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1 INTRODUCTION

1.1 Introduction

Arklow Town Council (ATC) in conjunction with Wicklow County Council (WCC) are promoting the Arklow Sewerage Scheme. The scheme, which is required to meet current National and European environmental legislation, incorporates the construction of a new Waste Water Treatment Works (WwTW) together with a pumping station, transfer pipelines and long sea outfall.

The existing sewerage system within the town discharges raw sewage to the River Avoca. There is a mixture of separate, partially separate and combined sewers. The latter are generally the older sewers within the town, dating back to the 1930's and 1940's and carrying a mixture of foul sewage and surface water. The more modern sewers are separate and have different pipes to carry the foul and surface water flows.

The design philosophy for Arklow broadly follows that of the Supplementary Report 1993 where all foul/combined discharges are to be collected by proposed interceptor sewers constructed along both banks of the Avoca River with flows conveyed to the proposed North Quay Pumping Station and pumped onwards for treatment to the proposed WwTW located approx. 2.5km to the north east of the town. Flows from the south of the river are to be conveyed via a proposed siphon under the river bed to the North Quay.

The North Quay Pumping Station is designed to pass forward to treatment 3DW, with a further 3DW stored at the pumping station for period of two hours. For significant rainfall events, where the pumping station and storm tank capacity are exceeded, the pumping station is designed to discharge to the Avoca River, via a screened overflow.

This report reviews the proposed components of the Arklow Sewerage Scheme and discusses the contents of previously submitted reports. It gives recommendations regarding the works yet to be completed and examines the opportunities and risks associated with procurement options for the scheme contracts.

1.2 Background

Planning permission, Registration Reference 93/280, was granted by Wicklow County Council for the WwTW in September 1993 and confirmed by An Bord Pleanála in March 1994. In November 1993, the Department of the Environment issued a report entitled “Strategy Study on Options for the Treatment and Disposal of Sewage Sludge in Ireland.” In light of this, it was deemed necessary to review the design of the treatment works to ensure compliance with the Sludge Strategy. At the same time, the opportunity was taken to review the design population for the Works to take into account changes in the population patterns of Arklow and to incorporate changes to the outfall alignment.

An Environmental Impact Statement (EIS) was prepared for the WwTW in 1999 to cater for a population equivalent of 18,000. An EIS was required for each WwTW with a capacity greater than 10,000 PE, according to the European Community (Environmental Impact Assessment) Regulations, S.I. No. 349 of 1989. These regulations defined an environmental impact statement as “a statement of the effects, if any, which the proposed development, if carried out, would have on the environment.”
Further to the submission of the EIS, planning permission, and a judicial review, Registration Reference 23/99 was granted by An Bord Pleanála on the 21st January 2005 subject to a number of conditions (Refer to Appendix A).

1.3 Scope of Work

The scope of work for the Arklow Sewerage Scheme includes the following;

- Pipelines.  
  - The laying of new interceptor sewers on both banks of the Avoca River with an interconnecting underwater siphon.
- A Pumping Station at North Quay.
- A Sewage Treatment Works at Seabank Townland together with an access road from Sea Road and the construction of a submarine pipeline discharging to the Irish Sea east of the Treatment Works.
- A Rising Main from the North Quay Pumping Station to a high point on the Sea Road at Seabank and a gravity pipeline from there to the Treatment Works.
- Alterations to the existing Pumping Station at Porter's Bridge.
- Site Investigation Works for the above.

The 1993 Supplementary Report recommended the construction of river protection works. This will be discussed further in this report.

1.4 Litigation

The design and construction of the interceptor sewers, pumping station and WwTW has been delayed due to appeals regarding the EIS for the WwTW to the High Court. Litigation was ongoing in relation to the EIS approval for the WwTW for in excess of 10 years which has restricted the provision of the required wastewater treatment services in Arklow to meet current legislation, the Urban Wastewater Treatment (UWWT) and Water Framework Directive (WFD) Regulations. An Appeal on the High Court decision was heard in the Supreme Court on 2nd December 2009. The Supreme Court judgement was issued on the 21st July 2011. This judgement confirmed the decision of the High Court and effectively confirmed the planning approval for the WwTW.

Further legal objections since the 2011 judgement has been forward whereby the CPO of the WwTW Facility is under question as is the Notice to Enter these lands. For further information, refer to Section 10 of this report.

1.5 Engineering Consultancy References

This report refers to a number of different Engineering Consultants. Considering the life time of this scheme and for ease of reference, it should be noted that PH McCarthy & Partners were the original appointed Engineering Consultant who were then acquired by WYG Ireland Ltd. More recently, Byrne Looby Partners Ltd. acquired the Water and Wastewater Section of WYG Ireland Ltd.
2 HISTORY OF PLANNING

2.1 Environmental Impact Statement (EIS)

2.1.1 General

The EIS for the Arklow Sewerage Scheme WwTW was prepared in May 1999 with additional documents submitted in June 1999. The following is a non technical summary of its contents. Some of the referenced legislations may have been updated or superseded from the date of writing the EIS.

As described in the EIS, the main aim of the development is to replace the discharge of raw sewage to the River Avoca with treatment of the wastewater to such a level that it complies with national and EU standards.

The proposed location for the WwTW is on a 2.9-ha site in Seabank townland approximately 2.5km north-east of Arklow. The development comprises a WwTW and associated buildings on 2.41 ha and an access road on 0.49 ha from Sea Road to the site.

The treatment works will serve a population equivalent of 18,000, using the Conventional Activated Sludge process.

Waste water from the town will be screened at the inlet works. All screenings and grit will be washed prior to disposal to a landfill. The liquid will pass into the sedimentation tanks – sludge will be collected and partially dewatered prior to removal to Wicklow for further treatment. Provision will be made for the sludge to be treated on-site, using Lime Stabilisation, to allow for the eventuality that the proposed works at Arklow is operational before the sludge centre at Wicklow.

The wastewater flows into the aeration basins, into which oxygen is added to speed up the break down of organic components, and then into secondary clarifiers from which settled sludge will also be drawn off for thickening and transfer to Wicklow. The final effluent will discharge by gravity into the Irish Sea via a 1,200m long outfall pipe with a 90m long diffuser section at its end.

Construction of the outfall pipe, will be carried out either prior to or in conjunction with construction of the WwTW and access road. A tunnelling technique will be used to create the section of the outfall pipe between the works and the low-water-mark so that the surface of the dunes will not be disturbed. A protective concrete mat shall be placed over the pipeline in shallow waters.

For further details relating to the EIS for the WwTW, refer to Section 8 of this report.

2.2 An Bord Pleanala – Conditions of Planning

Further to the submission of the EIS, planning permission, Registration Reference 23/99 was granted by An Bord Pleanála on the 21st January 2005 subject to a number of conditions. A detailed list of the conditions of planning are included in the Second Schedule (refer to Appendix A).

The following are required to be completed prior to the commencement of the development;
2.2.1 Planning Permission Expiration

Planning permission was granted by ABP on the 21st January 2005. Wicklow County Council is the planning authority for the development with Arklow Town Council being the developer from a planning perspective.

WCC has sought legal advice from Mr. Pat Butler Senior Council regarding the expiration of permissions. WCC were subsequently advised that the validity period of the WwTW planning permission commenced from the date of the permission i.e. 21/01/2005. Validity period is 10 years + 90days from this date i.e. 21/04/2015. Furthermore, WCC sought confirmation of this validity period from ABP. This 10 year period was confirmed by ABP in September 2012.

For details regarding the programme risks associated with the above planning expiration period, refer to Section 11 of this report.

2.3 Part 8 Planning Permission – North Quay Pumping Station

A notice for the proposed North Quay Pumping Station (NQPS) was advertised in the Wicklow People on the 24th July 2003 and site notices were affixed in accordance with the Planning and Development Regulations 2001. In October 2003, Arklow Town Council approved a planning application, under Part 8 of the Planning and Development Act 2000 for the development of the North Quay Pumping Station (NQPS). The planning approval would permit the pumping station to be constructed within the stipulations set out in Arklow Town Council’s approval of the development.

The original design for the NQPS as contained in the planning approval included the following facilities:

- Inlet collection pipework from the Southside Interceptor,
- Boulder trap,
- Rotating bar interceptor screens,
- Storm water storage,
- Odour control facilities,
- Dry weather pumps (3 DWF),
- Storm water pumping (10 DWF),
- Flow to treatment rising main,
- Storm water rising main and outfall.

Figure 3.1 below includes an Architect’s impression drawing of the NQPS. This drawing was included in the approved planning application.
Figure 3.1 – Architects Impressions of North Quay Pumping Station
2.4 The Alps Development Planning Permission

Further to the submission of the EIS, planning permission, Registration Reference 08/58 was granted by An Bord Pleanála on the 11th August 2010 subject to a number of conditions.

The subject site is located in the heart of the main town at the western end of the Main Street. The site falls away from the Main Street towards the River Avoca.

The proposed south-side interceptor sewer will be located within this development.

The proposed site includes the construction of 5 No. blocks as follows:

<table>
<thead>
<tr>
<th>Block</th>
<th>No. of Storeys</th>
<th>Brief Description of Use</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>4</td>
<td>26No. Residential Units, 1 Anchor Retail Unit, 10No. Office units, 1 Medical Centre</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>2No. Retail units and Office Space</td>
</tr>
<tr>
<td>C</td>
<td>6</td>
<td>42No. residential Units, 7No. Class 2 Commercial Units, 7No. retail Units, Restaurant, Crèche</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>93 bedroom Hotel</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>32No. residential units, 8 Workshop Units</td>
</tr>
</tbody>
</table>

The works also includes the construction of a temporary Sewage Treatment Plant and the diversion and construction of new sewers.
3 SITE INVESTIGATIONS

3.1 Marine Site Investigations (1996)

In 1996 Glover Site Investigations Ltd. were appointed by then Arklow Urban District Council to undertake marine site investigations for the proposed long sea outfall from the site of the proposed (WwTW) at Seabank. The scope of the works included the following:

1. Echo sounding survey of the sea bed covering an area of approx. 1.5km²,
2. A seismic survey along the sea bed for approx. 1km,
3. Excavating 10 no. cable percussive boreholes in the sea bed,
4. Excavating 1 no. cable percussive boreholes in land,
5. Laboratory testing,
6. Preparation of all reports.

3.2 Marine Site Investigations – Additional Works (1997)

On completion of the above site investigation works, Glover Site Investigations Ltd. was instructed to commence additional works. The main purpose of the additional investigations was to determine the sub surface and sea/river bed strata in the vicinity of Arklow Harbour along sections of the proposed interconnector sewers and North Quay Pumping Station. The scope of the works included the following:

1. Excavating 2 no. cable percussive boreholes in the bed of the River Avoca,
2. Excavating 7 no. cable percussive boreholes on land along sections of the route of the interceptor sewers and North Quay Pumping Station,
3. Laboratory testing,
4. Preparation of all reports.

3.3 Arklow Main Drainage – Contract 2C Northside Advanced Works (2005)

Whitefords were enrolled by PH McCarthy & Partners to conduct ground investigations in the town of Arklow. This included investigating routes for the proposed interceptor sewers and the proposed pump station at North Quay. Fieldwork was completed between January and September 2005.

The works were separated into 3 separate areas as follows:

- Proposed Pump Station at North Quay (Mill Road);
- Along the length of the interceptor sewers;
- Railway crossing at the Vale Road.

The works included a pump test at the proposed North Quay Pump Station, boreholes, trial pits, dynamic probes, slit trenches and relative site and laboratory testing.

3.4 Additional Site Investigations – North Quay (2007)

Whitefords were enrolled by PH McCarthy & Partners to conduct additional ground investigations at Arklow North Quay. Fieldwork was completed between February and May 2007. A study was made of available geological hydro-geological information which was used to assess the potential for any
contaminant migration from the site. The works consisted of boreholes, trial pits, dynamic probes and relative site and laboratory testing.

3.5 Arklow Sewerage Scheme - Site Investigation Works (2008)

In 2008 Whiteford Geoservices Ltd. were appointed by Arklow Town Council to undertake site investigations in the town of Arklow. The areas involved were:

- Arklow Bridge,
- South Green and Harbour Road.

Considering the appeals to the High Court regarding the EIS, Wicklow County Council and Arklow Town Council decided to proceed with the design of South Green & Harbour Road Sewer Replacement. This contract is an advanced sewer replacement contract to rectify critical sewer deficiencies and local under capacities of the system to prevent flooding and public health issues.

The purpose of the site investigation works for the above contract was;

- Assessment of Arklow Bridge
- Determine sub soil conditions;
- Determine ground water and tidal levels;
- Determine permeability of underlying strata;
- Determine utility locations.

The scope of the works included the following;

1. Excavating 44 no. slit trenches,
2. Excavating 14 no. trial holes,
3. Excavating 13 no. cable percussive boreholes,
4. Excavating 7 no. rotary cored boreholes,
5. 117 no. Perth Petrometer tests along Arklow bridge,
6. Laboratory and in-situ testing.

The works were completed in May 2010.

3.6 Investigation Works Completed for Arklow Water Supply Scheme (2008)

In 2008 Geotech Specialists Ltd. were appointed by Arklow Town Council to undertake site investigations in the town of Arklow as part of the Arklow Water Supply Scheme. These works included investigation works along North Quay and the roads in the proximity of the proposed North Quay Pumping Station. The areas involved were;

- Ferrybank Rd/Dublin Rd,
- Bridgewater/Seaview Ave,
- Wexford Rd/Chestnut Grove,
- Coolgreany Rd/Cemetery Rd/Emoclew Rd,
- Lamberton Reservoir.

The scope of the works included the following;

1. Excavating 73 no. slit trenches,
2. Excavating 7 no. cable percussive boreholes,
3. Laboratory and in-situ testing,
4. Preparation of all reports.

A number of the slit trenches and boreholes are located in the vicinity of the route of the proposed northern interceptor sewer.

3.7 Site Investigations Works to be Completed (Contract 6 – DBO Site Investigation)

Considering the information provided from the above contracts, there is still considerable areas that require site investigation prior to finalising tender documents for the WwTW, Long Sea Outfall, North Quay Pumping Station and Interceptor Sewers. Drawing No. 857/03/SK001 - SK004 included in Appendix B shows the areas where site investigation has been completed to date and areas that are yet to be investigated.

Areas yet to be investigated are as follows;

- South Quay,
- North Quay and surrounds,
- Proposed Route of rising main from North Quay PS – WwTW,
- Route of proposed long sea outfall (ABP planning conditions require a full bedrock survey to be conducted along this proposed alignment).

Additional investigation works should also be completed at the following locations;

- Crossing of the Avoca River,
- Proposed Location of North Quay Pumping Station,
- North and south quay walls,
- Proposed WwTW site and access road at Seabank.

The above works were included in Contract 6 – DBO Site Investigation. This contract was awarded to Whiteford Geoservices Ltd. Works commenced on-site in August 2012 and is currently due for completion in December 2012.

3.8 Cost Estimate for Outstanding Site Investigations Works to be Completed

The following is an approximate scope of works included in Contract 6.

- Approx. 75 no. slit trenches,
- Approx. 85 no. trial pits,
- Approx. 60 no. cable percussive and 60 no. rotary drilled boreholes,
- A full bedrock survey and hydrodynamic surveys along the proposed alignment of the outfall pipe,
- Geophysical survey of proposed pipeline route,
- Dynamic load/deflection survey along the sea road,
- River and sea level monitoring,
- All necessary site based testing, lab testing and reporting

The above is the tender estimate of the extent of works required and this may change depending on information encountered on-site.
The tender cost of the above works is €363,227.94 excl. VAT.

3.9 Site Investigation Programme

A preliminary programme for the completion of the Arklow Sewerage Scheme is included in Appendix E. The key dates related to the site investigation works are as follows:

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<th>Completion Date</th>
<th>Duration</th>
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<td>Design and preparation of contract documents</td>
<td>Jan 2012</td>
<td>March 2012</td>
<td>1.5 months</td>
</tr>
<tr>
<td>Tender Period</td>
<td>Apr 2012</td>
<td>Apr 2012</td>
<td>1 month</td>
</tr>
<tr>
<td>Report on Tenders</td>
<td>Apr 2012</td>
<td>June 2012</td>
<td>1.5 months</td>
</tr>
<tr>
<td>Construction</td>
<td>August 2012</td>
<td>December 2012</td>
<td>4 months</td>
</tr>
<tr>
<td>Receive Final Reports</td>
<td>Feb 2013</td>
<td></td>
<td>3 months</td>
</tr>
</tbody>
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Table 3.1 – Site Investigation Programme Key Dates
4 POPULATIONS/LOADINGS

This chapter discusses the different sources of population projections that can be used to predict the future flows in the network and the required future capacity of the WwTW. The data sources examined are as follows;

- Census figures (2006 and 2011 (preliminary data)),
- Arklow Town Development Plan 2011 – 2017,
- Regional Population Projections 2011 – 2026 (CSO),
- Regional Planning Guidelines 2010 - 2022

4.1 Arklow Sewer Modelling Study (Populations)

WYG Ireland Ltd were appointed as Consulting Engineers in 2003 to carry out a detailed drainage study of the greater Arklow area, with the use of hydraulic modelling tools. This study included an assessment of the existing drainage systems and formed the basis for planning future drainage work in the area, to accommodate the substantial growth projected in the area.

The “Arklow Sewer Modelling Study” involved the construction and verification of hydraulic models, with supporting asset databases, of the existing drainage systems in the Arklow area. The Phase 3 Model results were used to develop future drainage options for the town.

The following planning documents were used for the purposes of calculating future populations for the Phase 3 model;

- Arklow Town Development Plan 2005-2011,
- Arklow Environ Local Area Plan 2006-2012,
- Wicklow County Development Plan,

4.1.1 Domestic Populations Census Figures

The Urban District of Arklow consists of 664 hectares. The 2006 Census report indicated a population of 11,721 within the urban district boundary. An additional estimated population of 1,062 lies to the south of the towns in the environs of Arklow – in total some 12,779 persons reside in Arklow based on the 2006 Census figures which were used as a basis for the hydraulic model. Allowing for some contribution from the DED of Kilbride the Arklow & environs population was of the order of 13,761 persons. It should be noted that not all properties within Arklow & Environs contribute to the town’s drainage system.

The 2006 census figures are included in Table 4.1 below.
Table 4.1 – 2006 Census figures

In April 2011, the preliminary figures for 2011 were published as shown in Table 4.1 below. These figures show an increase of approximately 1,304 (9.5% increase over 5 years).

<table>
<thead>
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<tr>
<td>001 Arklow No. 1 Urban, Co. Wicklow</td>
<td>9,824</td>
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<tr>
<td>002 Arklow No. 2 Urban, Co. Wicklow</td>
<td>2,955</td>
</tr>
<tr>
<td>021 Kilbride, Co. Wicklow</td>
<td>975</td>
</tr>
<tr>
<td>038 Arklow Rural, Co. Wicklow</td>
<td>1,311</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15,065</strong></td>
</tr>
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</table>

Figures in the above table for 2011 are preliminary figures only.

Table 4.2 – 2011 Census figures

Figure 4.1 below indicates the extent of the town in terms of the urban district boundary and the environs of the town.
Figure 4.1 Arklow Town & Environs

Arklow Urban District Boundary

Arklow Environs Boundary
4.1.2 Non-Domestic Flows - Water Meter Database

The Arklow Town Council Water Meter Database was provided for the purposes of developing the non-domestic flows from all metered premises. The Geodirectory identified all non-domestic premises in the study area; the Geodirectory was cross-referenced with the water meter database.

The water meter database provided the total metered water consumption over the period 1st January 2005 to 30th August 2005 for commercial, institutional and industrial premises in the town. In total 152 relevant premises were extracted from the database. The meter readings were interrogated and all readings deemed to be reliable were converted into a PE for the model construction.

Based on the work of PH McCarthy in the “Arklow Water Supply Scheme Review Report, 2005” the calculation of PE is based on the contribution to sewer of:

1 PE = 140 litres / head / day

4.1.3 Arklow and Environs Geo-directory

The Geo-directory for Arklow Town and its environs was provided by Arklow Town Council. The Geo-directory is a GIS based system with an address point count for every property including residential, institutional, commercial and industrial concerns developed by An Post and the OSI. The individual address point count identifies the address of the property and the name of particular business or institution as appropriate.

The Geo-directory provided the basis for the model construction for foul flows to the system. The calculation of foul flows for residential properties was made with the use of Census data and the Geo-directory. The Census data provided the average number of persons per residential property and this Population Equivalent (PE) per residential property was associated with the residential address point.

For non-domestic properties the Council’s water meter data was combined with the address point count data to calculate a PE for every non-domestic property in the town.

The total PE estimated for the Arklow Sewer Modelling Study – Phase 2 Model Preparation, Verification and System Performance Assessment Report – 2007 was 16,997.

4.1.4 Phase 3 Model Future Projections

The Phase 3 model projects the following future development statistics:

- Additional 13,376 residential PE,
- Additional 35,077 industrial/commercial PE.

Data on the existing and future proposed development was collated. The following planning documents were used for the purposes of the study:

- Arklow Town Development Plan 2005-2011;
- Arklow Environs Local Area Plan 2006-2012;
- Wicklow County Development Plan; and,
Where the population or number of residential units for future development was not available, the following densities were adopted, in line with IFPLUT Study:

- 50 units/hectare – within 600 meter radius from Main Street and Train Station; and,
- 35 units/hectare – elsewhere.

Where detailed information on future industrial development was not available, the loadings have been included in line with the IFPLUT Study as follows:

- Light industrial or commercial development - 10m³/ha/day; and,
- Industrial development - 25m³/ha/day

The day is based on an 8 hour shift and the area is the gross area of the development site.

4.2 Arklow Town and Environs Development Plan 2011 – 2017

4.2.1 Populations

The population objectives flow from allocations made at the different strategic levels within the national planning hierarchy. The Minister allocates population to each Regional Authority, and the members of the Mid East Regional Authority in turn decide how much of their allocation goes to each county. Finally, the members of Wicklow County Council, through the County Development Plan, decide on the share of this population to be given to each settlement and town in the County. Arklow town's population has been increasingly modestly since 1991, with annual increases in the range of 1.5% – 2%, increasing to around 4% per annum between 2002 and 2006.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>6,948</td>
<td>8,646</td>
<td>8,388</td>
<td>7,987</td>
<td>8,557</td>
<td>9,983</td>
<td>11,759</td>
</tr>
</tbody>
</table>

Table 4.3 - Population Arklow Town

Having regard to Arklow's designation as a Large Growth Town II in the Regional Planning Guidelines for the Greater Dublin Area and the Wicklow County Development Plan, Arklow and its environs is targeted in the Wicklow County Development Plan to grow to 19,000 persons up to 2016 and 23,000 persons up to 2022, at a faster rate than heretofore. In particular, the population target of 19,000 in 2016 will require a growth rate of c. 6% per annum between 2006 and 2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2016 Target</th>
<th>2022 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>11,759</td>
<td>19,000</td>
<td>23,000</td>
</tr>
</tbody>
</table>

Table 4.4 – Population Targets Arklow Town and Environs

The lifetime of this plan is between 2011 and 2017. In accordance with the Development Plan Guidelines issued by the Department of the Environment, Heritage and Local Government in 2007, in order to provide a robust strategy a development plan should make provision for the zoning of land for 3 years beyond the plan period i.e. up to 2020 in this case. Interpolating back from the 2022 figure the target population for 2017 is 19,670 persons and 21,670 persons for 2020.
4.2.2 Housing and Zoning

In order to accommodate the projected growth, it will be necessary for the plan to ensure that adequate provision is made for zoned housing / mixed use land. Chapter 3 of the plan sets out in detail the availability of land for housing, which is summarised as follows:-

- The plan area is planned to grow to a total population of 19,000 in 2016 and 23,000 in 2022;
- It is estimated that by 2017 average household size in Wicklow will have declined to 2.52 (in accordance with the Regional Planning Guidelines (RPG’s)). Assuming this same household size for Arklow and its environs, there would be a need for 7,800 dwelling units in the settlement by 2017;
- Further declines in household size to 2020 will necessitate a total housing stock in the settlement of 9,000 units to meet the 2020 population target (a household size of 2.4 is projected for 2020, in accordance with the RPGs);
- It is estimated that there are currently (June 2010) c. 5,250 residential units in the plan area;
- The development plan will require to make provision for c. 4,000 new housing units up to 2020;
- Three areas have been designated for significant mixed used development during the plan period these are referred to as Action Area Plans.
- Notwithstanding the zoning of land for residential purposes, the Development Management Process shall monitor and implement the population targets and shall phase and restrict where necessary the granting of residential planning permissions to ensure these targets are not exceeded;
- Housing development shall be managed and phased to ensure that infrastructure and in particular community infrastructure is provided to match the need of the new residents

4.3 Regional Population Projections 2011 – 2026 (CSO)

The Regional Population Projections 2011 – 2026 published by the Central Statistics Office (CSO) predict a growth rate of 1.8% for the south east of the country. This compares to an average of 1.5% nationally. These figures are lower that the Arklow Town Development Plan and the Census figures as they take into account recent patterns of internal migration.

4.4 Regional Planning Guidelines

The Regional Planning Guidelines 2010 – 2022 (RPG’s) seek to deliver policies integrating landuse, transport, economic growth and investment in utilities-water, broadband and energy so that the Greater Dublin Area (GDA) can move towards becoming a sustainable high quality location for business, residents and visitors. While moving forward into the period 2010 – 2022 the RPG’s examined the populations for each Council area within the GDA. Table 4.5 below shows the projected Regional Population Targets for 2016 and 2022.
Table 4.5 - Regional Population Targets for 2016 and 2022.

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2010</th>
<th>2016</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dublin</td>
<td>1,217,880</td>
<td>1,255,900</td>
<td>1,361,200</td>
<td>1,454,200</td>
</tr>
<tr>
<td>Mid-East</td>
<td>1,45,500</td>
<td>1,40,000</td>
<td>1,594,600</td>
<td>1,639,700</td>
</tr>
<tr>
<td>State</td>
<td>4,422,000</td>
<td>4,584,900</td>
<td>4,997,000</td>
<td>5,573,200</td>
</tr>
</tbody>
</table>

The following observations were made:

- Population targets increase by approx. 1.6% per year from 2010 – 2016
- Population targets increase by approx. 1.2% per year from 2016 – 2022

4.5 Population Projection Conclusions

The future capacities of the NQPS rising main, interceptor sewers and WwTW will be dependent on the domestic and non domestic population projections used to estimate the future contributions to the sewer network.

The following conclusions can be assumed when comparing the different sources of population projections;

**Domestic**

- The 2006 Census report indicated a population 13,761 for Arklow town and surrounds,
- The Arklow Town and Environ Development Plan 2011 – 2017 predicts an increase in population of approximately 4.3% per year,
- The CSO projections for 2011 - 2026 predict a growth rate of approximately 1.8% for the south east of the country,
- The Regional Planning Guidelines (RPG's) predicts a growth rates of approx. 1.6% for 2010 – 2016 and 1.2% for 2016 – 2022,
- The Phase 3 Arklow Sewer Model uses the information sourced from the Arklow Town Development Plan 2005 - 2011,
- The future domestic populations of Arklow town and environs vary between 1.2% and 4.3% increase per year depending on the source of the information. It is recommended that the future loadings on the network and the WwTW be calculated using a growth factor 1.2% - 1.8% per year as per CSO and RPG predictions.

**Non-Domestic**

- The Phase 3 model projects that the future development statistics includes an additional 35,077 industrial/commercial PE.
4.6 Flows and Loadings

To date, a flow and load survey has not been completed in the catchment. A flow and rainfall survey was completed by On-site Ltd. in 2005 which formed the basis of the hydraulic model verification process. Dry weather flow rates and baseflows in the system were determined from this survey.

A water sampling exercise was conducted in January 2005 as part of a discharge license application. Samples were collected to provide an indication of background effluent contamination within the river and the coastal areas. The samples were taken at three times during the day at 5 no. discharge sewer points. The samples were tested for the following:

- Total Coliforms,
- Faecal Coliforms,
- BOD,
- Suspended Solids,
- Ammoniacal Nitrogen,
- Discharge Rate.

For results of the above sampling analysis, refer to Section 6 of this report.

A flow and load survey of the main outfall locations throughout the catchment to determine the biological loadings on the Wastewater Treatment Plant was awarded to Enva Ireland Ltd. in August 2012. As the proposed monitoring sites are located in sewers influenced by the tide, the sampling periods are greatly reduced due to backing up of the sewers.

4.6.1 Scope of Works

As there are a high number of existing outfalls discharging to the river, it would be costly to target all these locations for sampling in a flow and load survey. The risks associated with getting accurate representative results are high. It is recommended to conduct a theoretical load calculation based on the existing trade discharge licences, non domestic water metering information and domestic populations including any seasonal variations. The results from the flow and load survey may provide a cross check on the estimated theoretical loadings.

Targeting the larger outfall locations where the vast majority of the flows pass through, would provide better value for money. Flow proportional composite samplers may provide better opportunities to record more accurate representative information.

The appointed Contractor is responsible for storing, labelling and transporting of samples to the laboratory and for the collection of sample analysis. The sampling and the approved accredited laboratory testing shall both be the responsibility of the Contractor. The following is a list of some of the contaminants that is tested for:

- BOD,
- COD,
- TSS,
- Coliforms,
- Ammonia,
- Nitrates,
- Kjeldahl Nitrogen,
- Alkalinity,
- Ph,
Rain gauges were also installed during the flow measurement period.

4.6.2 Cost Estimate for Flow and Load Survey

The initial site survey period was 5 weeks however this maybe extended should the required information not be recorded during this period. The tendered cost of the flow & Load survey is €48,808.00 excl. VAT.

4.6.3 Flow and Load Survey Programme

A preliminary programme for the completion of the Arklow Sewerage Scheme is included in Appendix E. The key dates related to the Flow and Load Survey is as follows:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Start Date</th>
<th>Completion Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Preparation of Contract Documents</td>
<td>Mar 2012</td>
<td>May 2012</td>
<td>2 months</td>
</tr>
<tr>
<td>Tender Period</td>
<td>May 2012</td>
<td>May 2012</td>
<td>1 month</td>
</tr>
<tr>
<td>Report on Tenders</td>
<td>May 2012</td>
<td>July 2012</td>
<td>1.5 months</td>
</tr>
<tr>
<td>Survey Period (Initially 5 weeks but allow for 6 months)</td>
<td>Aug 2012</td>
<td>Jan 2013</td>
<td>6 months</td>
</tr>
</tbody>
</table>

Table 4.6 – Flow and Load Survey Programme Key Dates
5 LAND ACQUISITIONS AND WAYLEAVES

5.1 Waste Water Treatment Works and Long Sea Outfall

A Compulsory Purchase Order (CPO) was served by Wicklow County Council/Acklow Urban District Council in June 1994 for two parcels of land that included the following;

- 6.03 acres at Seabank owned by Seabank Property Co. Ltd., Lessees Arklow Holidays Ltd. This land is the site of the proposed WwTW.
- 1.21 acres at Seabank owned by J.W Goode. This is the site of the proposed access road.

The CPO of the above lands was confirmed by the Minister of the Environment in November 1995. The Lessee of the land (Arklow Holidays Ltd) is to this date contesting the validity of this CPO process. This case is awaiting judgement in the High Court. For further information refer to Section 10 of this report.

A wayleave is outstanding for the proposed long sea outfall from the proposed WwTW to the high water mark (foreshore). It is recommended that WCC proceed with serving this wayleave without delay.

A Right of Way is also required for operational access to the beach area from the proposed WwTW. It is recommended that WCC proceed with serving this Right of Way without delay.

5.2 North Quay Pumping Station

The proposed North Quay Pumping Station is located on Arklow Town Council owned lands. These lands have always been in the control/ownership of ATC. No acquisition was required for these lands.

5.3 Interceptor Sewers

The following wayleaves were issued, confirmed but not yet registered;

Northside Interceptor Sewer
- Permanent and temporary wayleave for proposed 1,050mm interceptor sewer and 700mm dia. storm rising main through Quayfront Ltd. lands in North Quay.
- Permanent and temporary wayleave for proposed 525mm interceptor sewer through Allen & Smyth Construction Ltd. lands in North Quay.
- Right of Way through Allen & Smyth Construction Ltd. lands in north Quay to access 525mm dia. interceptor sewer.

Southside Interceptor Sewer

The following wayleave adjacent Arklow Bridge is currently at negotiations stage with the landowners and WCC. This is yet to be finalised;
• Permanent and temporary wayleave for proposed interceptor sewer through Bridge Hotel car park adjacent Arklow Bridge.

The remaining interceptors on the southside are located within public roads or footpaths hence no wayleave agreements are required.

5.4 Rising Main

The rising main is located within council owned lands and public roads hence no wayleave agreements are required.

5.5 South Green & Harbour Road

As all the sewers proposed in the South Green & Harbour Road Sewer Replacement contract are located in public roads, no private wayleaves are served for this contract.
6 FORESHORE AND DISCHARGE LICENSES

6.1 Wastewater Treatment Plant Marine Outfall – Foreshore Application

In October 1993, UDC submitted an application to Department of the Marine for a foreshore licence for the outfall pipe associated with the town's main drainage project.

In April 1997 PH McCarthy & Partners prepared a report "Comments on the Submission to the Minister for the Marine" responding to a number of submissions made in objection to the foreshore license.

A number of submissions were made to the Minister for the Marine in relation to the application for a foreshore licence. The majority of the statements made were related to the Main Drainage Scheme and were aired previously in relation to the planning aspects and also in relation to compulsory purchase procedures. A minority of the statements made in the submissions to the Minister for the Marine pertained to matters relating to the marine environment or affected waters. None of the assertions made in this area had any supporting information.

Considering the appeals to the planning application for the WwTW, it can be concluded that the issuance of the above application to the relevant department was premature. There has been little movement on this application for a number of years and hence may require a new foreshore application.

The primary consideration in the design of the treatment works and the marine outfall has been, from the outset, the provision of a scheme consistent with ensuring the achievement of bathing water quality and ensuring the environmental quality of water.

6.2 Foreshore Licences to be Submitted

The Foreshore Acts require that a lease or licence must be obtained from the Minister for the Environment, Community and Local Government for the carrying out of works or placing structures or material on, or for the occupation of or removal of material from, State-owned foreshore which represents the greater part of the foreshore. Developments on privately owned foreshore, also requires the prior permission of the Minister under the Foreshore Acts. (All the foreshore of Ireland is presumed state-owned unless valid alternative title is provided.)

Following on from the enactment of the Foreshore and Dumping at Sea (Amendment) Act 2009 responsibility for certain foreshore functions has transferred to the Minister for the Environment, Community and Local Government with effect from 15th January 2010. This includes:

- All foreshore energy-related developments (including oil, gas, wind, wave and tidal energy)
- Aggregate and mineral extraction developments on the foreshore,
- Foreshore projects in respect of port companies and harbour authorities governed by the Harbours Acts, 1946, 1996, and 2000, and foreshore projects in respect of any other harbour and harbour-related developments intended for commercial trade. All other foreshore projects, other than those relating to aquaculture and sea fisheries.
Arklow Sewerage Scheme
Scheme Review Report

6.2.1 South Green and Harbour Road Sewer Replacement Advanced Works

A foreshore application was submitted to the DECLG for the sewer replacement works at South Green and Harbour Road on the 24th November 2011. This application included 2 no. permanent surface water outfalls and 2 no. temporary combined sewer outfalls to the River Avoca. Upon construction of the interceptor sewers, the 2 no. temporary outfalls will be connected to the interceptor sewers hence the short operational duration of these outfalls.

Initial feedback from the DECLG is that this application will not be approved until a discharge licence is approved by the EPA (refer to Section 6.3). This may result in possible delays to the commencement of construction of this contract.

6.2.2 Interceptor Sewers, Siphon and North Quay Pumping Station

A foreshore licence will be required for the interceptor sewers, the proposed siphon under the Avoca River and the emergency storm outlet form North Quay Pumping Station. The preparation of this application is currently ongoing. As per South Green and Harbour Road, this application is dependent on a discharge licence to be approved by the EPA.

A foreshore lease is required for locating the south side interceptor sewer partly in the river Avoca. For further information on this refer to Section 8.5 of this report.

6.2.3 Marine Sea Outfall

It is recommended that an updated foreshore application be prepared and submitted for these works. The 1999 EIS provides a location for the proposed sea outfall hence it is unlikely that the location and details of this outfall pipe will change. As per South Green and Harbour Road, this application is dependent on a discharge licence to be approved by the EPA. A foreshore application for these works was submitted to the EPA on the 5th June 2012.

6.2.4 Site Investigation Works in Avoca River

Additional site investigation works will be required at the siphon crossing under the Avoca river. Section 228 of the Planning and Development Act – 2000 details the requirements for site investigation works in the foreshore. A summary of this section includes the following;

- Publish in a newspaper 4 weeks prior to construction,
- Inform the minister for the Marine and Natural Resources,

WCC notified the Foreshore Department of these works in accordance with Section 228. An advertisement was placed in the paper on the 18th July 2012.

6.3 Discharge Licence

In order to comply with the Waste Water Discharge (Authorisation) Regulations 2007 (S.I. No. 684 of 2007), all discharges to the aquatic environment from Waste Water Treatment Works managed and operated by Water Service Authorities require a Waste Water Discharge Licence or Certificate of Authorisation (for Disposal Schemes with PE of <500) from the EPA.
The waste water discharge licensing and certification process gives effect to a number of EU Directives by the imposition of restrictions or prohibitions on the discharge of dangerous substances thereby preventing or reducing the pollution of waters by waste water discharges.

This process provides for the EPA to place stringent conditions on the operation of waste water discharges to ensure that potential effects on the receiving water bodies are strictly limited and controlled. In overall terms the aim is to achieve good surface water and ground water status in addition to complying with standards and objectives established for associated protected areas by 2015 at the latest (or later where there is a derogation on a water body).

The key Components of the Licence Application are as follows:

1. Details of Applicant
2. Water Authority Area
3. Location (to National Grid) and description of waste water works including discharge point or points and wastewater treatment plants
4. P.E of agglomeration
5. Characterisation of waste water discharge
6. Characterisation of the receiving water body including protected areas
7. Identification of current and proposed monitoring of discharge and provision of details of the likely environmental consequences of the discharge(s)
8. Specific sampling data pertaining to the discharge for the previous 12 months
9. Description of existing or proposed measures to prevent unintentional wastewater discharges and to minimise the impact of such discharges on the environment
10. Particulars of downstream abstraction points
11. Assessment of the impact of the discharge(s) on the environment and identification of measures to mitigate pollution caused by discharge(s)
12. Details of compliance with monitoring requirements of relevant Directives and Regulations
13. Identification of work necessary to meet relevant discharge standards and a timeframe for such works
14. Non Technical Summary

For further guidance regarding discharge license requirements, refer to Section 8.1 of this report.

6.3.1 Arklow and Environs Agglomeration Application

Wicklow County Council applied to Environment Protection Agency (EPA) on the 13th December 2007 for a Waste Water Discharge License for the Arklow and Environs Agglomeration. All correspondence between the EPA and WCC is included in Appendix C of this report. In April 2008 the EPA responded by requesting additional information to accompany the application. WCC provided the requested information in June 2008. Additional information was again sought in September 2008 which was subsequently provided by WCC in October 2008. Following a meeting with the EPA in November 2011, the EPA confirmed their requirements in letter dated 19th January 2012. A Natura Impact Statement was prepared by Eleanor Mayes Ecologist in February 2012. This report concluded that the Arklow WWTW development will not result in any significant adverse impacts on the conservation objectives, integrity or function of the Wicklow Reef SAC or any other marine Natura 2000 site, nor will it have any such impact on the aquatic Annex II species that occur in the area. A copy of this report accompanied the licence application which was submitted to the EPA on the 1st March 2012. Discussions are ongoing with the EPA regarding this application.
6.3.2 Marine Outfall Modelling Study

A Marine Model Outfall Modelling Study Report accompanied the above application. The report examined the effects of combining a number of the sewerage outfalls to the Avoca River and discharging at a single outfall location.

A water sampling exercise was conducted in January 2005. Samples were collected to provide an indication of background effluent contamination with the river and the coastal areas. The samples were taken at three times during the day at 9 no. locations. Samples 1 & 2 were taken in the harbour mouth, samples 3 & 4 were taken at south beach and north beach respectively. The remaining 5 samples were taken in sewers discharging to the river. The results of the laboratory testing of these samples are included in the below tables;

Table 6.1 – Faecal Coliform Concentrations fc/100ml

<table>
<thead>
<tr>
<th>Location</th>
<th>0700hrs</th>
<th>1000hrs</th>
<th>1300hrs</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200</td>
<td>8400</td>
<td>100</td>
<td>Harbour Mouth</td>
</tr>
<tr>
<td>2</td>
<td>400</td>
<td>5800</td>
<td>3400</td>
<td>Harbour Mouth</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>5</td>
<td>2</td>
<td>South Beach</td>
</tr>
<tr>
<td>4</td>
<td>2400</td>
<td>100</td>
<td>100</td>
<td>North Beach</td>
</tr>
<tr>
<td>5</td>
<td>88000</td>
<td>1156000</td>
<td>1536000</td>
<td>Outfall 1</td>
</tr>
<tr>
<td>6</td>
<td>1216000</td>
<td>2256000</td>
<td>1098000</td>
<td>Outfall 2</td>
</tr>
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<td>744000</td>
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<td>8</td>
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<tr>
<td>9</td>
<td>3760</td>
<td>1480000</td>
<td>48000</td>
<td>Outfall 5</td>
</tr>
</tbody>
</table>

Table 6.2 – Total Coliform Concentrations fc/100ml

<table>
<thead>
<tr>
<th>Location</th>
<th>0700hrs</th>
<th>1000hrs</th>
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<th>Note</th>
</tr>
</thead>
<tbody>
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<td>1</td>
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<td>8200</td>
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</tr>
<tr>
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<tr>
<td>3</td>
<td>27</td>
<td>100</td>
<td>8</td>
<td>South Beach</td>
</tr>
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<td>4100</td>
<td>2848000</td>
<td>1160000</td>
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Table 6.3 – BOD mg/l

<table>
<thead>
<tr>
<th>Location</th>
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<th>1000hrs</th>
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</thead>
<tbody>
<tr>
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<td>2</td>
<td>&lt;2</td>
<td>Harbour Mouth</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>&lt;2</td>
<td>&lt;2</td>
<td>Harbour Mouth</td>
</tr>
<tr>
<td>3</td>
<td>&lt;2</td>
<td>3</td>
<td>&lt;2</td>
<td>South Beach</td>
</tr>
<tr>
<td>4</td>
<td>&lt;2</td>
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<td>&lt;2</td>
<td>North Beach</td>
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<td>7</td>
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<td>101</td>
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<td>Outfall 3</td>
</tr>
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<td>8</td>
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<td>51</td>
<td>50</td>
<td>Outfall 4</td>
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<tr>
<td>9</td>
<td>7</td>
<td>64</td>
<td>61</td>
<td>Outfall 5</td>
</tr>
</tbody>
</table>
It was concluded that combining the outfalls and discharging at a single location would lead to a slight increase in bacterial levels outside the harbour in the coastal waters. The increase will depend on river flows but are likely to be small, of the order of 10% greater than the existing situation. There will be no change in the concentrations associated with slowly decaying contaminants. The model also shows that the combined outfall will lead to local improvements within the harbour area and in particular reduce contamination levels in the dock.

6.3.3 Discharge Licence Recommendations

There may be a requirement to complete hydrodynamic water quality modelling of the receiving waters as per the Water Framework Directive however this and the discharge standards can be confirmed by the EPA. Considering the dependency of the South Green and Harbour Road Sewer Replacement on this licence, it is recommended that WCC liaise with the EPA without delay.

The EPA confirmed that it is likely that a limit for Dissolved Inorganic Nitrogen (DIN) would be included as part of the licensing agreement. Further details regarding the process requirements regarding the treatment for DIN are included in Section 8.1 of this report.
7 INTEGRATION WITH ARKLOW FLOOD RELIEF SCHEME

7.1 Arklow Flood Study Report (2002)

The “Arklow Flood Study Report” was submitted in June 2002. This report was not formally approved by the Office of Public Works (OPW) and the scheme did not advance to the planning stage. It was envisaged at the time of the flood study report preparation that works on the sewers and flood alleviation work would be carried out in tandem.

7.1.1 Introduction

Large flooding events have occurred at Arklow in August 1986, December 1989 and in November 2000. The flood of August 1986 is the largest ever recorded and resulted from extreme meteorological conditions commonly referred to as “Hurricane Charlie”.

Following the flooding event of August 1986, PH McCarthy & Partners were engaged by Wicklow County Council to prepare a preliminary flood study report. The resulting 1989 Preliminary Report recommended a number of short-term and long-term measures to assist in alleviating future flooding in Arklow. The recommended long-term measures were based upon the observed flooding of August 1986 and generally consisted of increasing the waterway area of the Arklow Bridge and providing a levee embankment and flood defence walls to prevent floodwater ingress into the Ferrybank, Condrons Lane and South Quay areas. Following the flooding event of November 2000, Arklow Town Council engaged PH McCarthy & Partners to review and update this report.

7.1.2 Conclusions

Conclusions from this study were as follows:

- The magnitude of the flow in the Avoca River at Arklow as a result of the August 1986 “Hurricane Charlie” storm was approximately equal to a flow with an average recurrence interval of 1 in 150yrs. In other words, the probability of this flow occurring in any one year is 0.67%.

- Flooding in the South Quay / Tinnahask areas is primarily due to the tidal conditions rather than the flow in the river.

- Flooding in the Condrons Lane and Ferrybank areas is primarily due to the flow in the river and the limited hydraulic capacity of the Arklow Bridge.

- The Marsh Floodplain is an essential factor in reducing the severity of flooding in Arklow and should be maintained in its current form.

- Global Warming is expected to increase tide levels by 0.2 to 0.6m over the next 100 years.

- There are major heritage/archaeological issues with large-scale modifications to the Arklow Bridge.

- The existing hydrometric records for the Avoca River Catchment are very limited and more hydrometric stations should be installed as part of the installation of a Flood Warning System.
7.1.3 Short-term Recommendations

It was recommended that Arklow Town Council undertake the following short-term/interim measures to assist in the alleviation of flooding in Arklow:

- Undertake tree trimming and removal of large debris from the riverbanks. This work would be to limit the possibility of logs and other large debris from crashing into the bridge causing potential structural damage. Also to prevent the bridge arches from becoming blocked, thus reducing the hydraulic capacity of the bridge.

- Establish a materials depot on high ground in the Ferrybank area with access to sandbagging facilities. In the event of a large flooding event and the Arklow Bridge is closed and Ferrybank becomes isolated, the access to sandbagging facilities will assist residents in protecting their properties.

- Ensure facilities are in place to provide sandbags (sand, bags and labour) to properties in flooding events.

- Installation of a Flood Warning System. This will assist in providing residents with sufficient warning time of an approaching flood so that measures can be undertaken to minimise flood damage.

- Ensure development control strategies are in place to prevent flood liable land from being developed.

- Educate (and possibly subsidise) the flood liable residents in flood proofing their property. Flood proofing generally comprises one or more of the following measures: removable barriers fitted to houses (e.g. flood guards), temporary barriers adjacent to properties, flood-resistant building materials and fittings.

- Ensure plans and funds are in place for potential temporary accommodation and post-flood trauma counselling.

- Installation of a permanent tide gauge in the Avoca River at Arklow. This will greatly assist in assigning return intervals to tidal events and for improving the confidence limits of any future engineering projects that require tidal input.

7.1.4 Long-term Recommendations

It was recommended that Arklow Town Council implement Option 3 as the long-term option to alleviate the flooding in Arklow. The basis of Option 3 is the provision of the following items as outlined below. The height of flood defence structures would be 0.5m above the floodwater level produced by the 1 in 50 year river flow in combination with a 1.39m OD Malin tide level.

- A 540m long levee embankment in the Marsh Floodplain area perpendicular to the direction of flow. This levee would have an average height of 1.2m (top level of 2.7m OD Malin) and its purpose would be to prevent floodwater ingress into the Ferrybank area.

- A 690m long flood defence wall along South Quay from immediately downstream of the Arklow Bridge to the Arklow Dock. The wall would increase the height of the existing river wall and would vary in height up to a maximum of 1.2m above the existing road.
level. Its main purpose would be to prevent tidal flooding in the South Quay / Tinnahask area.

- A 370m long low height flood defence wall along the North Quay. This would comprise of a 0.2m high (approx.) nib wall and its purpose would be to prevent nuisance tidal flooding on North Quay.

- A 256m long flood defence wall along the south-western bank of the river from the Arklow Bridge to River Lane. The bottom section of the wall would be permanent and the top section would be fully removable. The permanent section of the wall would be approximately 1.2m higher than the existing bank. The removable section would only be installed after notification of an approaching flood from the FWS and would increase the wall height by 0.6m.

- A 350m long low height flood defence wall along South Quay on the western and southern sides of the Arklow Dock. This would comprise of a 0.3m high wall to prevent floodwater from entering via the dock area.

- Arklow Bridge Modifications involving the lowering of the base of each arch opening by approximately 1m to improve its flow capacity and strengthening the foundations below selected piers. The piers would need to be underpinned or an open box channel built through the arch to protect the piers. As the invert of all arches will be lowered there will be a requirement to excavate the riverbed for approximately 100m upstream to match into the new level.

- Refinement of the Flood Warning System to allow for the incorporation of the flow and rainfall records which would have been collected since being installed as a short-term option.

### 7.1.5 Project Advancement

The project should be advanced through a formal planning process in accordance with the provisions of the Arterial Drainage Acts.

To assist in the detailed design phase and assist in refining the cost estimate, the following is recommend to be undertaken:

- Detailed geotechnical and structural investigations of the Arklow Bridge and the existing river walls, and

- Creation of a physical model of the Arklow Bridge by a hydraulics laboratory to verify the effect the Arklow Bridge has on the upstream floodwater level.

### 7.2 Avoca River (Arklow) Flood Relief Feasibility Study (2007)

P.H. McCarthy Consulting Engineers was appointed by the OPW and Arklow to carry out the "Avoca River (Arklow) Flood Relief Feasibility Study". Hydro Environmental Ltd. was engaged by P.H. McCarthy & Partners to perform the hydrological analysis and hydraulic modelling elements of this study. The OPW required this study to augment the work of the "Arklow Flood Study Report". This study was necessary in order to provide the level of detail as required by the OPW for a full Feasibility Report.
This involved establishing design return period fluvial flows and tidal levels in the Avoca River at Arklow. The design flows were obtained using gauged and un-gauged flood estimation techniques. The design tide conditions were obtained from the Irish Coastal Protection Strategy Study (ICPSS) Phase II Study (DCMNR, 2006) that was funded by the Department of the Communications, Marine and Natural Resources.

Hydraulic modelling was carried out using the HEC-RAS Hydraulic Model to predict the flood profile in the study reach under a range of tidal and fluvial flood conditions for existing and proposed flood relief scenarios. The HEC-RAS Hydraulic Model allowed the computation of the longitudinal Flood Profile in the reach, which provided the flood levels for preparing flood inundation maps for the various return period flood events.

7.2.1 General Description of the Study Reach

The study reach extended from the open sea at Arklow Harbour Entrance to 175 metres upstream of the N11 Arklow Bypass Bridge. This represented a total channel reach length of 3.3 kilometres.

The channel talweg invert levels over the entire reach were below mean sea level (i.e. < 0 metre OD Malin) and consequently the entire model study reach is tidal. The model reach was split into two distinct sections, a deeper canalised harbour section immediately downstream of Arklow Bridge (invert levels typically of -4.5m to -3m OD Malin) and an upper shallower section (invert levels typically -2m to -1m O.D.) located between Arklow Bridge and the N11 Arklow Bypass Bridge with a wide natural floodplain on the left river bank referred to as the Marsh Floodplain.

The bed gradient upstream of Arklow Bridge is practically flat with Arklow Bridge bed levels representing a raised ford crossing having typical invert levels of -0.3 to -0.4m O.D. The bed gradient downstream of Arklow Bridge is a moderate slope of 1 in 500.

7.2.2 Discussion

The Hurricane Charlie fluvial flood event (flow peak 695cume) of the 26th August 1986 used in the model calibration is of similar magnitude to the estimated 100 year design flood of 746 cumec and consequently some degree of confidence can be placed in the predicted design flood levels immediately upstream of Arklow Bridge.

The model calibration exercise was limited as a result of poor reliability of flood flow estimates in the catchment and a lack of flood level monitoring points distributed over the study reach. Anecdotal information for more recent storm events (November 2000, November 2002 and October 2004) was very conflicting and considered unreliable. Given the limitations of the model calibration exercise a model sensitivity analysis was carried out. The findings from this analysis are summarised as follows:

- Variations in modelling the bridge and loss coefficients inputs accounted for approximately 200mm in the upstream flood level.
- A 20% underestimation in the 100 year fluvial flow resulted in approximately 440mm increase in flood levels upstream of the bridge and 320mm increase downstream.
- A 25% error in the Manning’s ‘n’ coefficient accounted for an increase of 110mm at the bridge, an increase of 320mm upstream of the Bypass Bridge and 260mm increase immediately downstream of Arklow Bridge.
The predicted upstream flood levels were shown to be very sensitive to the width of effective overbank flow specified and that considerably higher upstream flood levels were predicted when the effective conveyance width was significantly reduced (i.e. restricted to the main channel). A generous floodplain width that included a large portion of the Marsh floodplain area was specified. The calibration exercise indicated that a smaller effective overbank width with reduced roughness would achieve the same calibration.

An increased density of vegetation, mature trees and woodland in the Marsh floodplain area, particularly the sections closest to the river channel will impede the development of overbank flow resulting in potentially higher upstream flood levels in the future.

The hydraulic analysis identified the existing Arklow Town Bridge as a major constriction to flood flow conveyance producing a large upstream afflux of 0.78m during the Hurricane Charlie event. It was not clear what contribution to the upstream afflux resulted from debris blockage to the upstream bridge face. Sensitivity analysis showed that a 20% reduction in flow area has a significant effect on upstream flood levels.

The modelling exercise identified two flooding regimes in the river; with the reach upstream of Arklow Bridge dominated by the fluvial flood event and flooding in the downstream reach by the tidal storm surge event. The downstream river channel is canalised, considerably deeper and of significantly better flow capacity than the upstream channel. Overbank flood flow upstream of the bridge is important, particularly through the Marsh Floodplain area.

Design flood levels throughout the study reach was estimated for a combined fluvial and tidal probability of 200 years. Given the lack of tidal and flood data for Arklow, a combined statistical analysis could not be carried out and the various combinations of tide and fluvial event that would produce the combined 200 year event was obtained from the coastal strategy study carried out for Dublin Coastal Region (Royal Haskoning, 2004) and also used in the GDSDS (DCC, 2005).

The design flood level simulations included two rates of sea level change of 300mm and 500mm rise over the next 100 years. The inclusion of sea level rise influences the design flood levels throughout the model reach, with a considerably reduced effect upstream of Arklow Bridge.

The Arklow Bridge, given its configuration of numerous, low and narrow arches has a high potential of collecting flood debris resulting in blockage and reduction in flow area. The hydraulic analysis considered bridge blockage in the sensitivity analysis and found that removing approximately 10% of the arches resulted in an increases in upstream design (100 year fluvial) flood levels of 0.23m and a 20% removal of arches resulted in a significant 0.59m rise in predicted upstream design flood level.

The design flood simulations assumed that 100% of the flood flow magnitude passes through Arklow Bridge with no bypassing of the bridge structure via overbank route.

### 7.3 Project Integration Report (2006)

In June 2006 PH McCarthy Consulting Engineers were requested to prepare a Project Integration Report combining Arklow Sewerage Scheme and Arklow Flood Relief Scheme.

The main aim of the report was:
Arklow Sewerage Scheme
Scheme Review Report

- Discuss the practicalities and benefits of integrating elements of both the Arklow Sewerage Scheme and the Arklow Flood Relief Scheme.

- Assess the likely implications of advancing selected elements of both the Arklow Sewerage Scheme and the Arklow Flood Relief Scheme in tandem.

PH McCarthy Consulting Engineers also acted as Consulting Engineers to both Arklow Town Council (ATC) and Wicklow County Council (WCC) for the Arklow Flood Relief Scheme.

In the Project Integration Report three options were identified and evaluated.


Option 3 – Implementation of the Interceptor Sewers with the Flood Alleviation Scheme in its entirety.

It was concluded that, while Option 1 has programme benefits, it does carry with it disadvantages in relation to overall costs, construction conflicts and social costs due to the reopening of excavations. The construction impacts could be extended causing an adverse public perception of the Council and their agents.

Option 2 ensures that the flood wall construction on the south side of the river and upstream of the bridge would be completed, per the "Arklow Flood Study Report", as part sewer contract thus reducing the future construction impacts. This assumed that the forthcoming "Avoca River (Arklow) Flood Relief Feasibility Study" would propose such a wall or similar. The construction of flood protection wall in parts carries with it the risk of increasing flooding in other areas of the town. Accordingly, works would have to be terminated at ground level and integrated into the sewer support system.

Option 3 ensures that the benefits of flood protection are provided at the earliest possible date. However, it has disadvantages in relation to programme. A full EIS would be required and a Foreshore Licence application would have to follow certification of the EIS.

No design work for the scheme for either Options 2 & 3 could be completed until the completion and formal approval of the "Avoca River (Arklow) Flood Relief Feasibility Study".

Given the present rate of development of Arklow, Option 1, whereby the interceptor sewers are advanced in isolation from any flood alleviation works provides the construction of the interceptor sewers in the shortest timeframe. This is a major issue for the residents of the town and the construction of the interceptors provides for reducing the aesthetic nuisance and public health risks associated with direct river discharges.

The decision on the procurement method for the NQPS is yet to be made and in the short-term there was uncertainty over the timeline for the construction of the Arklow Wastewater Treatment Works (WwTW) for the town. However it was advisable to proceed as soon as possible with the construction of the interceptor sewers so that they do not become a cause for delay in the overall provision of Arklow Sewerage Scheme.
This report concluded, that whilst the selection of Option 1 was not the most economically advantageous and did not necessitate the reopening of excavations and result in more onerous construction techniques, its advantage in terms of delivery of the entire Arklow Sewerage Scheme to the residents of the town made its selection the most promising of the options available.

7.4 External Stability Assessment of Quay Walls (2008)

Hyder Consulting Ltd (HCL) were commissioned by PH McCarthy Consulting Engineers to carry out a stability assessment on sections of the existing masonry quay walls along the Avoca River at Arklow and to carry out a preliminary analysis on the external stability of three alternative wall solutions that can be adopted to ensure the drainage works are carried out safely.

The purpose of the analyses was to assess the effects of the Arklow Sewerage Scheme Project and the Avoca River (Arklow) Flood Relief Feasibility Study on the existing quay walls and evaluate the possible requirement for replacement walls. The proposed drainage works would involve the laying of interceptor sewers behind or in front of the river walls on both sides of the river and the construction of a buried siphon across the Avoca River. The assessment report took into account the potential use of the quay wall or replacement walls as a flood defence barrier. The Avoca River (Arklow) Flood Relief Feasibility Study was sponsored by the Office of Public works and Arklow Town Council.

The following was concluded from this report;

- External stability analyses carried out on 14 wall sections revealed that the walls had factors of safety less than unity for either sliding, bearing capacity or overturning.

- If a wall has a factor of safety less than unity then in theory it should not be standing. The fact that some sections of the wall with factors of safety marginally less than unity are currently standing can be attributed to a combination of several physical factors (or wall geometry) and geotechnical assumptions. End restraint from adjacent sections with greater factor of safety could be a contributing factor.

- This fact is further confirmed in the sensitivity analysis on the effect of a 2° increase in the representative peak shear strength of the founding strata, also assuming full friction on the founding material (i.e. tan $d_{design} = 100\% \tan f_{peak}$) yielded a factor of safety greater than unity.

- The effect of an out of balanced water pressure is seen to have the greatest effect on the stability of the walls. It is therefore recommended that the groundwater response to tidal variations be assessed by carrying out hourly monitoring of borehole installations with corresponding tidal levels.

- Observations made on site show that between 60-70% of the walls inspected show signs of distress either in the form of cracking or ground settlement behind the wall and it is therefore reasonable to assume that under the existing conditions the walls have a factor of safety close to unity and further analyses with more detailed information is unlikely to lead to a different conclusion.

- The excavation of a trench behind the existing wall is shown to improve the stability of the wall due to the reduction in active thrust. However an increase in loading from construction traffic and machinery behind the wall is likely to result in instability of sections of the wall with unacceptable factors of safety (i.e. less than unity).
It is therefore recommended that the most appropriate course of action is to replace sections of wall which showed marginal or unacceptable factors of safety.

The king post option may not be viable on the site due to the granular nature of the underlying soils, which would require the need for temporary supports during construction. In addition, the use of king post wall is not recommended for retaining granular deposits below ground water level. The use of a king post wall would also require the use of ties to limit the required embedded length, this implies that the construction area is likely extend to the beneath the adjacent road and traffic management would be necessary.

A gravity wall option may be adopted, especially because it is an economic solution with low maintenance requirement. However, the temporary works requirements, the lengthy construction duration and health and safety precautions necessary during construction may make this an expensive option.

Based on the merits and limitations of the wall types considered for the remedial works, it can be concluded that the sheet piled wall is one of the most favourable options. It would match the other sheet piled sections of the wall; it also provides the quickest construction process and a relatively economic option. However, the long term maintenance requirement for corrosion and bedrock level require consideration.

Although tie backs may reduce the required pile lengths and section sizes, they would need to be located within the existing road to avoid interaction with the active zone. The presence of ties extending beneath the road would form an obstruction for services and the proposed sewer and would also create construction difficulties. We would therefore recommend that cantilever sheet piled walls with reinforced concrete capping be adopted as the remediation option.

A preliminary design of the sheet piled wall indicates that PU25 or AU25 steel sections would be required for a 3m height cantilevered wall with a 50 year design life based on a S270 steel grade. It should be noted that smaller section sizes could be utilised for a higher grade of steel.

7.5 Recommendations

The Project Integration Report (2006) recommends that the works progress with the implementation of the Interceptor Sewers without any Flood Alleviation Works. The Flood Alleviation Works as managed and funded by the OPW addresses the key issues with tidal and fluvial flooding. The Arklow Sewerage Scheme will address key issues with pluvial flooding. The construction of the interceptor sewers, North Quay PS and the WwTW will provide added protection against pluvial flooding due to the proposed increases in the capacity of the sewer network.

This report also recommends that the Arklow Sewerage Scheme progresses without the inclusion of the flood alleviation works which can be procured under a separate contract to be confirmed and approved by the OPW. This may be subject to the results of the site investigation scheme and the effects construction of the interceptor sewers may have on the existing quay walls.
8 PROPOSED INFRASTRUCTURE

8.1 Waste Water Treatment Works

The main aim of the project is to replace the discharge of raw sewage to the River Avoca with treatment of the wastewater to such a level that it complies with national and EU standards.

The proposed location for the Waste Water Treatment Works is on a 2.9-ha site in Seabank townland approximately 2.5km north-east of Arklow. The development comprises a Waste Water Treatment Works and associated buildings on 2.41 ha and an access road on 0.49 ha from Sea Road to the site.

The EIS approved treatment works will serve a population equivalent of approximately 18,000 PE. The treatment scheme developed for planning permission purposes is, comparatively with current practice, prescriptive (compared to current practise) and is based on a conventional activated sludge process, with nitrification and partial denitrification. The treatment processes also include screenings and grit removal, primary settlement and sludge thickening and dewatering. Provision was to be made for the sludge to be treated on-site, using lime stabilisation. Odour treatment is also included for foul air collection from the inlet works, sludge processing tanks and buildings and the primary settlement tanks.

The final effluent will discharge by gravity into the Irish Sea via a 900m long outfall pipe with a 90m long diffuser section at its end.

With the current population in Arklow Town and environs reaching approx. 17,500 PE (Phase 3 Arklow Sewer Model) as described elsewhere in this report, there is a risk that when construction of the scheme is completed, the treatment capacity will be immediately exceeded, potentially leading to operational problems and non-compliance of the effluent discharge licence and other requirements.

A preliminary assessment of the flexibility of the treatment scheme has been carried out in order to identify, within the planning restrictions imposed by the approved EIS, the limitations to the treatment of a higher population equivalent.

8.1.1 EIS Process Description

Wastewater flows up to 3 DWF, will be pumped from the North Quay Pumping Station to the Treatment Works while the remaining 3 DWF will be hydraulically diverted into an underground storm water holding tank adjacent the pumping station. This tank is to be sized to temporarily hold the volume equivalent of 2 hours retention for 3 DWF, after which any flows above that capacity will overflow and be discharged to the River Avoca.

Stored sewage will be pumped to the Treatment Works when the incoming flow falls below 3 DWF.

In the approved EIS, the proposed Treatment Works will be located at Seabank Townland, and the proposed layout to treat the expected pollution load of 18,000 PE at a 3 DWF of approx. 156l/s as shown on Drawing No. 466/EIS/003 (refer to Appendix D). A description of the processes included in the EIS design follows:

Preliminary Treatment: The influent to the works will enter the inlet works and will pass through 6mm step screens or equivalent to remove floatable matter and large solids. The proposed step screen will have an in-built washing facility that will allow potentially odorous organic and
other sediment to be rinsed back into the sewage stream. The washed screenings will be compressed and disposed to a covered skip for removal to landfill. A hydrodynamic grit trap will be installed which will remove grit particles down to 0.2mm size. All grit removed will pass to a grit classifier for washing prior to disposal off site.

**Primary Treatment:** Following preliminary treatment, all flows will pass to a flume for measurement and splitting. These flows will pass to 2 No. upward flow primary sedimentation tanks, each with a diameter of 17m. Tanks will be provided with rotating bridge scrapers. Bottom scrapers will remove sludge while floating arms will facilitate scum and grease removal. The tanks will be designed with a side-wall depth of 2.1m, which will minimise the impact of any wind effect on solids carry over. Primary sludge will be automatically drawn off and pumped to the centrifuge or belt press via the picket fence thickener, prior to removal to the sludge treatment works at Wicklow.

**Secondary treatment:** After primary treatment flows will pass to 2 No. aeration basins. Each basin will be 58m in length with a 3.6m channel width and a 6.2m liquid depth. Diffused air will be used to aerate the effluent. The aeration system will be designed to match closely the process oxygen requirements. Provision will be made within the basin for anoxic zones to provide for nitrification and partial denitrification within the system. The liquid will then flow into 2 No. secondary clarifiers, each with a diameter of 18.2m. The tanks will be provided with rotating bridge scrapers. Bottom scrapers will remove sludge while floating arms will facilitate scum and grease removal. The tanks will each have a side-wall depth of 2.1m, which will minimise the impact of any wind effect on solids carry over. Secondary sludge will be drawn off automatically and pumped to the picket fence thickener and on to the belt press, from which it will be removed to the appointed sludge treatment works.

**Sludge Treatment:** Thickened primary and secondary sludge will be batch treated in a centrifuge (or similar equivalent process) to provide a cake with a minimum Dry Solids content of 25% w/w. Dewatered cake will be deposited in specially converted skips for storage prior to removal to the sludge treatment works at Wicklow.

The treatment scheme will comprise of:

- **Inlet Works**
  - Screens
  - Grit Removal in a hydrodynamic grit removal system
  - Flow measurement
- **Primary Sedimentation**
  - 2 No. Tanks 17.0m diameter
  - Side Wall Depth 2.1m
  - Upflow Velocity 1.24m/s
- **Reactor**
  - 2 No. Tanks 13.5 hrs HRT @ DWF
  - Depth 6.2m
  - MLSS 3250 mg/l
- **Secondary Settlement**
  - 2 No. Tanks 18.2m diameter
  - Side Wall Depth 2.1m
- **Sludge Thickening:**
  - Primary
    - 1 No. Tank, 3.6m diameter, 4.5m deep
  - Secondary
    - 1 No. Tank, 3.6m diameter, 4.5m deep
- **Sludge Dewatering**
  - Belt Press or Equivalent
- **Odour Removal**
  - Using Peat/Heather Filters
Arklow Sewerage Scheme  
Scheme Review Report

- Building 1
  - Compressor Room
  - Power generation, Control and Switching
- Building 2
  - Control Room
  - Sludge Dewatering
  - Administration
  - Maintenance

The solids produced from the treatment process will be collected and transferred to Wicklow Sludge Hub at Wicklow Town, in accordance with the Wicklow County Council Sludge Management Plan. In the EIS, provision is made in the layout of the works to provide lime stabilisation of sludge. Lime stabilisation involves the addition of either hydrated or slaked lime to liquid sludge or of quicklime to pressed sludge cake. The application of lime to pressed sludge reduces the moisture content significantly, leaving a relatively inert and odour-free product. The resultant material is particularly suited for use for landfill capping.

Foul air from the screenings building, the sludge building, sludge thickeners and, as per conditions of planning, the primary settling tanks, will be treated prior to emission. Venting will occur at a rate of 6 air-changes/hour. The rate of emission will rise to 10 air-changes/hour in the event of a gas detection.

Gas monitoring for Hydrogen Sulphide, Ammonia, Methane, Oxygen levels and other gases associated with sewage will be continuous.

The treatment plant will be automatically controlled and will respond to varying levels of inflow quantities and concentrations. The Treatment Works will be manned on an 8 hour day, 6 day week basis. Call-outs will be made automatically in emergency situations.

The Works will be fenced in with a security fence to prevent unauthorised access and to protect the public from the hazards of open tanks and plant operation.

The WWTW will be connected to the Town’s water supply via a 100mm-diameter water main that will be laid from Porter’s Bridge to the Works.

8.1.2 Sea Outfall

The proposed Sea Outfall pipe will have a diffuser section approximately 90m in length at its extremity. The constituent material of the outfall pipe could be welded steel, welded polyethylene or some other equivalent material that can be formed into a continuous length. The diffuser section will terminate in deep water approximately 990m from the low water mark. Details of the proposed outfall in plan and longitudinal section are shown on Drawing No. 466/EIS/004 (refer to Appendix D). The pipe will run in a south-easterly direction from the treatment works, skirting the north-eastern end of the concrete sea wall at Porter’s Rocks. The total length running beneath the dunes is approximately 90m with this design.

Effluent flow from the Treatment Works will be measured and samples for analysis will be taken automatically.

A surge tank will be constructed within the treatment works, at the head of the outfall pipe. A valving arrangement at the surge tank will allow a regular flushing of the submarine pipe and will prevent fouling of the diffuser section.
Table 8.1 below summarises the approved EIS mitigation measures and An Board Pleánala planning requirements and performance criteria imposed to the treatment works. The environmental aspects listed are the most critical in the assessment of the flexibility of treatment capacities.

<table>
<thead>
<tr>
<th>Environmental Aspect</th>
<th>Performance criteria</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effluent standards</td>
<td>• BOD .................. 25 mg/l</td>
<td>An Board Pleánala Second Schedule Item 17</td>
</tr>
<tr>
<td></td>
<td>• SS .................... 35 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• COD ................... 125 mg/l</td>
<td></td>
</tr>
<tr>
<td>Outfall dispersion levels</td>
<td>The sea outfall design is based on estimates made for the bacteriological concentrations at the beaches along a 22km stretch of coastline north and south of Arklow. The premise was that the mandatory limit of 1000 faecal coliforms/100ml, would not be exceeded in any but the most extreme conditions and that for 97% of the time under the most adverse wind conditions, the number of coliforms/100ml would not exceed 390 for the Seabank Outfall.</td>
<td>EIS Section 13.2.4</td>
</tr>
<tr>
<td>Odour dispersion levels</td>
<td>An odour limit of 3 OU/m^3 on an 98 percentile basis for all odour sources shall be achieved at the boundary of the site. An independent specialist who is acceptable to Wicklow County Council shall monitor odours at specific locations and at a frequency to be determined by Wicklow County Council. Both primary settlement tanks shall be covered. Details of the type of covering to be used shall be agreed in writing with the planning authority prior to the commencement of development.</td>
<td>An Board Pleánala Second Schedule Item 6</td>
</tr>
<tr>
<td>Noise levels</td>
<td>The noise level during the operational phase of the development shall not exceed 55 dB(A) rated sound level at any point along the boundary of the site. Prior to commencement of development, the applicant shall agree with the planning authority monitoring procedures for the purpose of determining compliance with this limit.</td>
<td>An Board Pleánala Second Schedule Item 5</td>
</tr>
<tr>
<td>Visual impact</td>
<td>There is a protected view from the road extending from the houses to the north to Seabank House to the south. The net effect is that the treatment works does not impinge on the normal eye-level view that would be had by a passer-by at any point along the road and that no structure penetrates the existing cliff line, which is to the fore of and at a lower level than the horizon line.</td>
<td>EIS Section 7.1.3</td>
</tr>
<tr>
<td>Sludge treatment and disposal</td>
<td>Sludge will be dewatered on-site to reduce the water content by up to 25%. The solids produced from will be collected and transferred to Wicklow Town (sludge hub)</td>
<td>EIS Section 3.6</td>
</tr>
</tbody>
</table>
Environmental Aspect | Performance criteria | Reference
--- | --- | ---
 | Provision is made in the layout of the works to provide lime stabilisation of sludge | EIS Section 3.6 |
 | Solid waste from the treatment works shall be transported in covered skips. | An Board Pleanála Second Schedule Item 10 |

Table 8.1 – Summary of approved EIS mitigation measures and performance Criteria


Additionally, the Water Framework Directive (WFD) Regulations S.I. 722 of 2003 and its Amendment S.I. 413 of 2005 and S.I. 272 of 2009 transpose into Irish Law the requirements of the Water Framework Directive (2000/60/EC). The fundamental objective of the Water Framework Directive aims at maintaining “high status” of water quality where it exists, preventing any deterioration in the existing status of waters and achieving at least “good status” in relation to all waters (groundwaters, surface, transitional and coastal) by 2015 (currently, no later than 2021 or 2027, depending on the derogation terms granted by the EU to Ireland).

Ireland together with other member states has to ensure that a co-ordinated approach at catchment level is adopted for the achievement of the objectives of the WFD and for the implementation of programmes of measures for this purpose. To apply the requirements of the WFD, Ireland has been divided into discreet river basin districts, the Eastern River Basin District (ERBD) being the entity responsible for the Southwestern Irish Sea – Brittas Bay coastal water body1, where the future treatment works outfall will be located.

For a coastal water body to be classified as “good status”, it must achieve the Environmental Quality Objectives (EQOs) in Table 8.2 below as set in the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009).

---

1 Coastal water is defined as a surface water approximately one nautical mile from the point on the land where territorial waters are measured, extending where appropriate up to the outer limit of transitional waters.
In the report entitled “Strategic Environmental Assessment for the Water Framework Directive River Basin Management Plans and Programmes of Measures” which accompanies the ERBD Management Plan, the water quality of the Southwestern Irish Sea – Brittas Bay coastal water body has been classified as “Less than Good” by the EPA.

Although it is reasonable to assume that the water quality in the coastal waters will improve when the current CSOs into the Avoca River are intercepted and treated at the new treatment works, in relation to the future discharge from Arklow Wastewater Treatment Plant, the implications of the WFD are that the licensing authority may still impose stricter or additional discharge standards from the ones stated in the EIS.

Another recent legislation critical to the proposed treatment works relates to the bacteriological standards for bathing waters. Currently the bacteriological standards are those required for the Bathing Water Quality Regulations S.I. No. 79 of 2008 which transpose into Irish law Directive 2006/7/EC of the European Parliament and of the Council of 15th February 2006 concerning the management of bathing water quality. Schedule 4 of the Regulations, sets out the parameters to be achieved at the EPA monitoring coordinates (refer to Table 8.3 below).

In the absence of a detailed and updated hydrodynamic water quality model of the receiving waters in light of the WFD water quality criteria and the EPA monitoring coordinates, it is difficult to ascertain what discharge standards will be required by the EPA. However the most critical in terms of treatment capacity would be Nitrogen, either in terms of Total Nitrogen, Ammonia, Nitrate or a combination of these.

Therefore, in the assessment of the flexibility of the proposed treatment scheme, two scenarios were evaluated with different discharge standards in order to identify the maximum treatable population equivalent:

**Scenario 1:**
- BOD 25 mg/l,
- SS 35 mg/l,
- COD 125 mg/l and Total Nitrogen 15 mg/l;

**Scenario 2:**
- BOD 25 mg/l,
- SS 35 mg/l and COD 125 mg/l;

### Table 8.2 - WFD Water Body Classification Criterion for Good Status

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorophyll a (median)</td>
<td>10 µg/l @ 35 psu</td>
</tr>
<tr>
<td>Dissolved Oxygen (DO) (95thile)</td>
<td>&gt;80% saturation &lt; 120% saturation @ 35 psu</td>
</tr>
<tr>
<td>Dissolved Inorganic Nitrogen (DIN) (median)</td>
<td>0.25 mg N/l @ 34.5 psu</td>
</tr>
</tbody>
</table>

### Table 8.3 – Schedule 4 of Bathing Water Quality Regulations 2008

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Excellent Quality</th>
<th>Good Quality</th>
<th>Sufficient Quality</th>
<th>Reference Methods of Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intestinal Enterococci (cfu/100ml)</td>
<td>100(*)</td>
<td>200(*)</td>
<td>185(**)</td>
<td>ISO 7899-2 or ISO 7899-2</td>
</tr>
<tr>
<td>Escherichia Coli (cfu/100ml)</td>
<td>250(*)</td>
<td>500(*)</td>
<td>500(**)</td>
<td>ISO 9308-1 or ISO 9308-1</td>
</tr>
</tbody>
</table>

* Based upon a 95-per centile evaluation
** Based upon a 90-per centile evaluation
For this assessment microbiological discharge parameters were not included as the repercussions in terms of additional treatment stages are manageable, should the EPA impose a discharge standard in order to reduce the treated effluent microbiological load.

The results of the assessment undertaken by WYG are discussed in the following sections.

8.1.4 Treatment Scheme Flexibility Assessment

8.1.4.1 General assumptions

a) Estimated flows and loads
The wastewater treatment plant inlet flows have been estimated considering the following criteria:

- Average daily flow = Domestic DWF + Infiltration + Trade flows
- Peak daily flow = 3x Domestic DWF + Infiltration + Trade flows

The domestic DWF has been estimated considering a 150l/PE/day.

From the hydraulic model of the network, it was considered that infiltration will be a continuous flow of 17l/s (over 24 hours).

According to the hydraulic model of the network, the maximum trade flow that it is likely to be generated when all available zoned areas have been developed will be 60l/s over 8 hour-shifts. For the purpose of the assessment, it was considered that 50% of the zoned area will be developed which equates to a maximum of 30l/s over 8 hours.

The average daily loads have been estimated considering the following per capita loads (in terms of population equivalent)

- BOD........................................ 60  g/PE.day
- COD........................................ 120  g/PE.day
- TSS........................................ 70  g/PE.day
- Total Nitrogen......................... 10  g/PE.day

b) Mass balance and internal recycled flows and loads
In order to estimate the additional flow and loads to treatment originating in the treatment work’s sludge operations, the following increase percentages were considered in both scenarios:

- Daily flow.............................. 5  %
- BOD........................................ 10  %
- COD........................................ 10  %
- TSS........................................ 6.5  %
- Total Nitrogen......................... 5  %

c) Primary treatment efficiency
The removal efficiency for the different parameters in the primary treatment (standard primary settlement) was:

- BOD ........................................ 30 %
- COD ........................................ 30 %
- TSS ......................................... 50 %
- TN ........................................... 5 %

d) Secondary treatment

In both scenarios the assessment was based on maximizing the served population equivalent but maintaining for all estimated influent conditions the operational parameters within the acceptable operational ranges stated in the technical literature.

In the case of the secondary clarifiers, it was considered that the minimum depth would be 3.5m to increase the volume available for the sludge blanket, thus avoiding the wash-out of biomass from the activated sludge system, during periods of higher inflow to the treatment works (storm events).

e) Sludge import

In the “Sludge Management Plan for County Wicklow” Report, Arklow Wastewater Treatment Plant was classified as a satellite sludge centre, with infrastructure to receive sludge from Ballycoogue and Thomastown treatment plants.

However, for the purpose of the this assessment, it was considered that this would only occur in Stage 2 of the treatment works development as this impacts on the treatment works available capacity and consequently the maximum serviceable population equivalent.

f) Sludge thickening

It was considered that in both scenarios the picket fence thickeners will have a minimum internal diameter of 4.0 m, in order to increase the operational performance.

g) Sludge stabilisation

It was considered that secondary sludge would not have to be biologically stabilised in the activated sludge system as this would imply a sludge age above 20 days, which is incompatible with the proposed dimensions for the aeration tanks and the requirement to treat an additional population equivalent to the 18,000 PE.

For odour control purposes only, it was considered that both primary and secondary sludge will undergo lime stabilization after dewatering as the sludge will contain a high proportion of organic matter which, if not properly stabilized, will rapidly decompose (putrification) producing foul odours.

8.1.4.2 Scenario 1 Particular Assumptions

In the first scenario, in order to achieve the TN discharge standard of 15 mg/l and accommodate a higher population equivalent, it was considered that the plant will operate in extended aeration.
Further to describe above, the additional following assumptions were considered:

a) **Primary settlement preceded by a coagulation/flocculation stage**

In order to increase the removal efficiency of the primary treatment stage and consequently making additional treatment capacity available at the biological treatment stage, it was considered that upstream of the primary settlement there will be a coagulation/flocculation stage, with chemical addition.

This coagulation/flocculation stage can either occur by putting the pre-treatment effluent through a series of mechanical mixed tanks where a coagulant and polymer will be dosed or by adopting a specific type of scraper bridge in the primary settling tanks which includes an integrated flocculation chamber (please refer to Figure 8.1 below)

Below is the minimum estimated increase of removal efficiency at primary treatment:

<table>
<thead>
<tr>
<th></th>
<th>Without coagulation/flocculation</th>
<th>With coagulation/flocculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>30 %</td>
<td>50 %</td>
</tr>
<tr>
<td>COD</td>
<td>30 %</td>
<td>50 %</td>
</tr>
<tr>
<td>TSS</td>
<td>50 %</td>
<td>70 %</td>
</tr>
<tr>
<td>TN</td>
<td>5 %</td>
<td>20 %</td>
</tr>
</tbody>
</table>

![Figure 8.1 – Clariflocculator scraper bridge (by Sereco)](image)

Note – As per the plant’s estimated hydraulic profile, the above scraper bridge will be located at ground level which is compliant with the EIS requirements

b) **Sludge age**

In order to achieve the discharge standard for total nitrogen of 15 mg/l, full nitrification and denitrification will be required. For the purpose of this assessment it was considered that the minimum sludge age in the aeration tanks will be 12 days.
8.1.4.3 **Scenario 2 Particular Assumptions**

In this second scenario, it was considered that the plant will operate in conventional aeration with a maximum sludge age of up to 8 days. No additional assumptions were considered in relation to the general assumptions stated above.

8.1.4.4 **Assessment results**

The treatment process assessment shows that, within the restraints set in the EIS and An Bord Pleanála, and considering the assumptions referred in the previous sections, in particular regarding the discharge standards, the maximum treatable load is:

- Scenario 1 – 24,000 PE
- Scenario 2 – 28,000 PE

Hydraulically, in both scenarios the tanks would be able to handle up to estimated peak flows (3DWF + infiltration+ trade flows) for the corresponding population equivalent, providing that the pumping station and respective rising main upstream are designed to cater for those flows.

Table 8.4 overleaf summarises the findings of the assessment for both scenarios.
### Arklow Sewerage Scheme
#### Scheme Review Report

<table>
<thead>
<tr>
<th>Treatment Stage</th>
<th>EIS</th>
<th>Scenario 1 24,000 PE</th>
<th>Scenario 2 28,000 PE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-treatment</strong></td>
<td>Screens at 6 mm, Grit Removal in a hydrodynamic grit removal system, Flow measurement</td>
<td>Screens at 6 mm, Grit Removal in a hydrodynamic grit removal system or in aerated grit chambers (2 No L 8.0 x W 3.0 x D 3.0 m) with a HRT &gt; 5 minutes @ peak flows, Flow measurement</td>
<td>Screens at 6 mm, Grit Removal in a hydrodynamic grit removal system or in aerated grit chambers (2 No L 8.0 x W 3.0 x D 3.0 m) with a HRT &gt; 5 minutes @ peak flows, Flow measurement</td>
</tr>
<tr>
<td><strong>Coagulation/ Flocculation</strong></td>
<td>Not Included</td>
<td>Coagulation chamber (1 No L 1.7 x W 1.7 x D 1.7 m); Mixing power requirements 3.6 kW, Flocculation chambers (3 No L 4.5 x W 4.5 x D 5 m); Total mixing power requirements 2.0 kW; Or in alternative to flocculation chambers, clariflocculation scraper bridges</td>
<td>Not Included</td>
</tr>
<tr>
<td><strong>Primary Treatment</strong></td>
<td>2 No. Tanks 17.0m diameter, Side Wall Depth 2.1m, Upflow Velocity 1.24m/s</td>
<td>2 No. Tanks 17.0m diameter, Side Wall Depth 2.1m, Hydraulic loading @ peak flow 1.27 m3/m2.h (ideally &lt; 3.3 m3/m2.h as per Metcalf &amp; Eddy, 4th Edition, p.497), HRT @ peak flow 1.71 h (ideally 1.5 - 2.5 h as per Metcalf &amp; Eddy 4th Edition, p.398), Removal Efficiency BOD 50%, TSS 70%, TN 20%</td>
<td>2 No. Tanks 17.0m diameter, Side Wall Depth 2.1m, Hydraulic loading @ peak flow 1.44 m3/m2.h (ideally 1.25 - 2.0 m3/m2.h as per Metcalf &amp; Eddy, 4th Edition, p.398), HRT @ peak flow 1.5 h (ideally 1.5 - 2.5 h as per Metcalf &amp; Eddy 4th Edition, p.398), Removal Efficiency BOD 30%, TSS 50%, TN 10%</td>
</tr>
<tr>
<td>Treatment Stage</td>
<td>EIS</td>
<td>Scenario 1 24,000 PE</td>
<td>Scenario 2 28,000 PE</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----</td>
<td>----------------------</td>
<td>----------------------</td>
</tr>
</tbody>
</table>
| Secondary       | Reactor – Oxidation ditch  
        • 2 No. Tanks 13.5 hrs HRT @ DWF  
        • L 30 x W 7 m  
        • Depth 6.2m  
        • MLSS 3250 mg/l | Reactor – MLE2 type reactors  
        • 2No Anoxic tank each with 520 m3  
        • 2 No Aeration Tank each with 780 m3  
        • Average daily load to remove 792 kg/day  
        • MLSS 4,000 mg/l (ideally 3,000 – 5,000 mg/l as per Metcalf & Eddy 4th Edition p. 797)  
        • F/M 0.132 kg BOD/kg MLVSS.d (ideally 0.03 - 0.135 kg BOD/kg MLVSS.d as per Metcalf & Eddy 4th Edition p. 797)  
        • Sludge Age 13.3 days (aerobic fraction) | Reactor – Plug Flow type reactors  
        • No anoxic tank  
        • 2 No Aeration Tank each with 1300 m3  
        • Average daily load to remove 1340 kg/day  
        • MLSS 2,500 mg/l (ideally 1,000 - 3,000 mg/l as per Metcalf & Eddy 4th Edition p. 747)  
        • F/M 0.29 kg BOD/kg MLVSS.d (ideally 0.2 – 0.4 kg BOD/kg MLVSS.d as per Metcalf & Eddy 4th Edition p. 747)  
        • Sludge Age 6.2 days |
| Clarifiers      | 2 No. Tanks 20 m diameter (2 m wider than EIS)  
        • Side Wall Depth 3.5 m  
        • Hydraulic loading @ peak flow 0.91 m3/m2.h (ideally 1.0 - 1.34 m3/m2.h as per Metcalf & Eddy, 4th Edition, p. 687)  
        • Solids loading @ peak flow 5.3 kg TSS/m2.h (ideally < 6.8 kg TSS/m2.h as per Metcalf & Eddy, 4th Edition, p. 687)  
        • HRT @ peak flow 3.83 h (ideally > 2.5 h) | Clarifiers  
        • 2 No. Tanks 18.m diameter  
        • Side Wall Depth 3.5 m  
        • Hydraulic loading @ peak flow 1.28 m3/m2.h (ideally 1.7 – 2.7 m3/m2.h as per Metcalf & Eddy, 4th Edition, p.687)  
        • Solids loading @ peak flow 3.84 kg TSS/m2.h (ideally < 8 kg TSS/m2.h as per Metcalf & Eddy, 4th Edition, p.687)  
        • HRT @ peak flow 2.73 h (ideally > 2.5 h) |
| Sludge Thickening| Primary sludge  
        • 1 No. Tank  
        • 3.6m diameter | Primary sludge  
        • 1 No. Tank  
        • 4.0 m diameter; 4.5m deep  
        • Solids loading 100 kg TSS/m2.d (ideally 100 - 150 kg) | Primary sludge  
        • 1 No. Tank  
        • 4.0 m diameter; 4.5m deep  
        • Solids loading 83 kg TSS/m2.d (ideally 100 - 150 kg) |

2 MLE – Modified Ludzack-Ettinger process which has an anoxic aerobic tank sequence, with an internal recycle from the end of aeration back to the beginning of the anoxic tank in order for the provide de removal of soluble nitrogen via the reduction of nitrate to nitrogen gas; for inspection purposes only. Consent of copyright owner required for any other use.
## Arklow Sewerage Scheme
### Scheme Review Report

<table>
<thead>
<tr>
<th>Treatment Stage</th>
<th>EIS</th>
<th>Scenario 1 24,000 PE</th>
<th>Scenario 2 28,000 PE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.5m deep</td>
<td>TSS/m².day as per Metcalf &amp; Eddy, 4th Edition, p.1492</td>
<td>TSS/m².day as per Metcalf &amp; Eddy, 4th Edition, p.1492</td>
</tr>
<tr>
<td>Secondary sludge</td>
<td>1 No. Tank</td>
<td>Hydraulic loading 1.7 m³/m².day (ideally 15.5 - 31 m³/m².d as per Metcalf &amp; Eddy, 4th Edition, p.1491/92)</td>
<td><strong>Hydraulic loading 2.1</strong> m³/m².day (ideally 15.5 - 31 m³/m².d as per Metcalf &amp; Eddy, 4th Edition, p.1491/92)</td>
</tr>
<tr>
<td></td>
<td>3.6m diameter</td>
<td>HRT 2.7 days (ideally &gt; 2 days)</td>
<td>HRT 2.2 days (ideally &gt; 2 days)</td>
</tr>
<tr>
<td></td>
<td>4.5m deep</td>
<td>Secondary sludge</td>
<td>Secondary sludge</td>
</tr>
<tr>
<td></td>
<td>1 No. Tank</td>
<td>4.0 m diameter; 4.5m deep</td>
<td><strong>2 No. Tanks (1 extra tank than in the EIS)</strong></td>
</tr>
<tr>
<td></td>
<td>3.6m diameter</td>
<td>Solids loading 35 kg TSS/m².h (ideally 25 - 40 TSS/m².d as per Metcalf &amp; Eddy, 4th Edition, p.1492)</td>
<td>4.0 m diameter; 4.5m deep</td>
</tr>
<tr>
<td></td>
<td>4.5m deep</td>
<td>Hydraulic loading 4.4 m³/m².d (ideally 4 - 8 m³/m².d as per Metcalf &amp; Eddy, 4th Edition, p.1491/92)</td>
<td>Solids loading 40 kg TSS/m².h (ideally 20 - 40 TSS/m².d as per Metcalf &amp; Eddy, 4th Edition, p.1492)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HRT 1.0 day (ideally &gt; 2.0 days)</td>
<td>Hydraulic loading 5.0 m³/m².d (ideally 4 - 8 m³/m².d as per Metcalf &amp; Eddy, 4th Edition, p.1491/92)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HRT 0.9 day (ideally &gt; 2.0 days)</td>
</tr>
</tbody>
</table>

Table 8.4 – Comparison between EIS requirements and assessment scenarios

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8.1.5 Conclusions

The results of the treatment scheme flexibility assessment detailed in the sections above show that with little or no change to the proposed EIS design, additional treatment capacity can be made available in the future Arklow Wastewater Treatment Works to cater for a population equivalent above the initial 18,000 PE.

However, the estimated maximum serviceable population equivalent of 24,000 PE or 28,000 PE if respectively a discharge standard of 15mg/l of TN is or is not applicable, is greatly dependent on the discharge standards to be imposed by the future discharge license, which may require additional modelling to determine the impacts on the receiving water body.

Another aspect that will require further assessment when the future discharge standards imposed by the EPA are made known to Wicklow County Council is the sludge treatment operations and their integration with the storage requirements on site and the footprint available for future upgrades.

In order to comply with the EIS odour levels, further modelling may be required to assess the appropriate odour confinement and treatment in light of the operational changes required to cater for the additional population equivalent.

8.2 North Quay Pumping Station

8.2.1 General

The influent to the pumping station, collected by the Southside Interceptor, would be screened by duty/duty rotating bar interceptors, which would prevent large solids entering the pumping station. The flow would then gravitate to the dry weather wet well for forward pumping to the treatment plant. The dry weather pumps would be fitted with variable speed drives, permitting the pump to discharge at varying rates of flow relative to the rising and falling levels in the wet well. The pumps would be designed to operate on a duty/standby mode and be capable of pumping up to 3 DWF to the treatment plant.

In the event of storm conditions, due to the combined nature of the catchment sewers, the influent to the pumping station could exceed the 3 DWF capacities of the dry weather pumps. Such excess flows would overflow from the foul pump wet well and into the storm storage tanks. The storm tanks would provide sufficient off storage capacity, equivalent to 2 hours at 3 DWF, approximately 2,900m³. The collected storm flow would, when the storm abated, return to the foul pump wet well to be pumped to treatment.

Flows in excess of the available storm water storage would be discharged to the Avoca River via duty/standby storm water pumps. The line of the storm rising main would follow the route of the proposed interceptor sewer.

Based on the population and development projections included in the Phase 3 Modelling Report, a pumping capacity of 365l/s is required for the 3 DWF.

8.2.2 Storm Tank

In order to reduce the incidence of spillages from the NQPS and the manholes upstream on the collection system, it is proposed to provide a stormwater storage tank. The site chosen for this storm tank is to the immediate east of the proposed pumping station.

The tank included in the calibrated Phase 3 Model provides sufficient capacity equivalent to 2 hours at 3 DWF.
Excess flows from the storm tank will then be pumped to the Avoca River via storm water pumps with a capacity of 10 DWF (1,200l/s).

The following sensitivity analysis was carried out. The calibrated hydraulic model of the collection system was used to determine required storage volume should Arklow Town Council be required to limit the no. of spills to the river to zero during a 1 in 1 year rainfall event i.e. this assumes that the Avoca River will be re-classified to “sensitive”. This results in an increase of the tank capacity from 2,900m³ to 5,100m³.

**8.2.3 Rising Main**

The proposed rising main will be approx. 2.7km long from the proposed NQPS to a high point in Sea Road. The flows will then gravitate to the WwTW. The static head required for the pumps is approx. 27m.

The EIS includes for a rising main of 450mm dia. This section of the report explores the different options available regarding sizes of the rising main. The rising main will be sized to cater for the ultimate 36,000 PE WWTW capacity.

**8.2.3.1 Option A – Single Rising Main**

This option discusses the required size of the rising main to cater for the ultimate pumping capacity of 3 DWF at 36,000 PE (approx. 205l/s) and performance in the short term to convey the existing flows in the network.

- 3 DWF (18,000) = Approx. 111l/s
- 3 DWF (36,000) = Approx. 205l/s

A rising main diameter of 450mm is required to convey the maximum 205l/s.

- 450mm dia. rising main velocity @ 111l/s = 0.89m/s
- 450mm dia. rising main velocity @ 205l/s = 1.64m/s

The velocities calculated for the 450mm dia. rising main for the existing conditions is marginally above the minimum recommended scouring velocity i.e. 0.75m/s however the velocities are low.

It should be noted that the above velocities are calculated with pumps set at 3 DWF. In reality, during the initial stages, it maybe more productive to have the pumps set at a lower DWF factor to reduce the peaked pumped flow at the WWTW, hence the actual velocities maybe less than the above.

**8.2.3.2 Option B – Twin Rising Mains**

This option discusses the required size of a twin rising main to cater for the ultimate pumping capacity of 3 DWF (approx. 205l/s) and performance in the short term to convey the existing flows in the network.

- 3 DWF (18,000 PE) = Approx. 111/s
- 3 DWF (36,000 PE) = Approx. 205l/s (2 pumps running at approx. 102.5l/s)

The construction of twin rising mains allows a smaller more suitable sized rising main to operate during the existing short term conditions. When the maximum capacity of the first rising main is outstripped by the network flows, the second rising main can be utilised. The following velocities are calculated using twin 300mm dia. rising mains;
300mm dia. rising main velocity @ 111l/s = 1.81m/s
2 x 300mm dia. rising main velocity @ 205l/s = 1.67m/s

The above velocities are more suitable than those calculated with Option A above. The single 300mm diameter rising main is suitable to convey the 18,000 PE flows at 3 DWF. It is also suitable to convey flows during the initial stages with the pumps may not be set at 3 DWF. When the 36,000 PE WWTW is commissioned. The second 300mm diameter rising main can be utilised.

Option B also provides the additional security that should 1 no. rising main be out of operation for maintenance or repairs, the second rising main could be utilised.

### 8.3 Interceptor Sewers

#### 8.3.1 Phase 3 Modelling Report

The Phase 3 Modelling Report included the proposed southside and northside interceptor sewers. The extent of the sewers proposed in this report is as follows;

The model was revisited to examine the required upsizing of the sewers to cater for a 50 year horizon. A 50 year critical return period storm together with projected populations and developments (based on the Phase 3 model projections as described in Section 4 of this report) was simulated. The model predicted that the following upsizing of the proposed interceptor sewers is required to cater for a 50 year design horizon.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Location</th>
<th>Proposed diameter [mm]</th>
<th>Phase 3 Report Length [m]</th>
<th>50 Year Length [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>North Side Interceptor</td>
<td>300</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>2</td>
<td>North Side Interceptor</td>
<td>525</td>
<td>47</td>
<td>47</td>
</tr>
<tr>
<td>3</td>
<td>North Side Interceptor</td>
<td>600</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>4</td>
<td>North Side Interceptor</td>
<td>750</td>
<td>201</td>
<td>201</td>
</tr>
<tr>
<td>5</td>
<td>North Side Interceptor</td>
<td>1,350</td>
<td>230</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>North Side Interceptor</td>
<td>1,500</td>
<td>230</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>618</strong></td>
<td><strong>618</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 8.5 Northside Interceptor Sewers

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Location</th>
<th>Proposed diameter [mm]</th>
<th>Phase 3 Report Length [m]</th>
<th>50 Year Length [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>South Side Interceptor</td>
<td>300</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>2</td>
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</tr>
</tbody>
</table>

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Table 8.6 Southside Interceptor Sewers

In the Phase 3 Model, the northside interceptor sewer consists of a 1,350mm dia. sewer entering the pumping station. It is recommended to upsize this pipe to a 1,500mm dia. to cater for the 50 year design horizon. This up sizing provides an additional 23% capacity to the incoming sewer with an anticipated minimal increase in the construction cost.

In the Phase 3 Model, it is recommended that the southside interceptor sewers be upsized in places i.e. 211m of 525mm dia. will be upsized to a 750mm dia. sewer. The Phase 3 Model included for approx. 521m of 1,050mm and 121m of 1,350mm dia. sewers. It is recommended to upsize these pipes to 1,200mm and 1,500mm dia. respectively to cater for the 50 year design horizon.

Figure 8.2 below shows the areas along the quays where the proposed interceptor sewers may be upsized.
Figure 8.2 – Proposed Interceptor Sewer Upgrades (50 Year Design Horizon)
8.3.2 The Alps Development

As per Phase 3 Model, the proposed interceptor sewers do not extend within the Alps development but instead commence construction parallel to the river to the east of the development.


P.H. McCarthy and Partners Supplementary Report 1993 included a provision for the linkage of the existing 1,200mm dia. combined sewer and 300mm dia. foul sewers at “The Alps” by means of Hydrodynamic Separator (HDS) and storm discharge to the Avoca River. An application for planning permission included the lands in which this facility is proposed to be located.

In order to finalise the requirements for the layout of the development, a detailed design of the facility was recommended. Similarly, construction of the facility – given its complexity and the large size of its principal component – should ideally precede the development works.

8.3.2.1 Planning Status

As per Section 2.4 of this report, ABP granted planning permission in August 2010 for this development subject to a number of conditions. The proposed route of the interceptor sewer passes through the development.

8.3.2.2 Design Requirements

In order to complete the detailed design of the facility a number of steps was recommended;

- Measurement of existing flows in the 1,200mm dia. and 300mm dia. pipes and the response to rainfall events - This was completed during the Arklow Sewer Modelling project.
- Examination of the contributing catchment to facilitate calibration of the catchment run-off - This was completed during the Arklow Sewer Modelling project.
- Detailed examination of the behaviour of the system and optimisation of the improvement proposals - This was completed during the Arklow Sewer Modelling project.
- Detailed consideration of the options for stormwater separation in the light of the future flow environment with a view to determining the most appropriate mechanisms – HDS and other processes – including costs and environmental and operational benefits.
- Detailed design of the proposed facility.
- Preparation of contract documents for the procurement of the facility works.

The following contract was envisaged.

8.3.2.3 Storm Separation Contract

Construction of the storm separation works including the installation of all proprietary devices, all sewers and pipes required to link to existing pipes and such temporary works as may be required to link to the existing foul sewerage pending the completion of the Southside Interceptor Sewer as proposed in the 1993 Supplementary Report.
The sections below provide outline details of the proposed arrangement, including outline requirements for the Civil Works. It should be noted that this is subject to detailed design.

CSO Description

The Hydro-Jet Screen is a self-cleansing, self-activating, non-powered screening system for the removal of material greater than 6mm in two directions from storm overflows. Physical characteristics of the device include:

- a through-flow channel for DWF bypass;
- a flow control to limit this bypass flow to a permissible level (Hydro-Brake flow control);
- an overflow weir;
- a series of inclined perforated mesh screens;
- a screenings collection channel;
- a Hydro-Brake flow control to limit the screenings return to an average of 7l/s; and,
- a siphon to control the screened discharge to the watercourse and provide the water backwash to the screenings panels.

The proposed CSO may require monitoring equipment to maintain a record of the flows and number of spillages.

The incoming flow in excess of the designed continuation flow (overflow setting) discharges over the side-weir with a perforated mesh screen that traps the gross solids. A siphon is located directly downstream of the screen, through which the screened effluent discharges. The screen's self-cleansing mechanism operates by backwash, in the period before the siphon primes, where the rising water level increases the air pressure below the screen and lifts the debris off the screen. Screenings are returned to the continuation flow.

Component Sizing and Maintenance

The design flow is a 5 year return period peak flow. This information was obtained from the Infoworks hydraulic model verified as part of the Arklow Sewer Modelling Study.

The proposed unit is a special elongated Hydro-Jet Screen effectively comprising of two adjoining chambers, each with capacity for screening of 1,050 l/s. Each would have a single sided weir and its own siphon. The pass forward flow would be controlled by the hydro-brake flow control as well as screenings return flow. The pass on flow will be 10 DWF (120 l/s) which is greater than Formula A (116 l/s).

Excavation of approximately 320m$^3$ is required.

The chamber depth is 4m depending on the location (minimum depth is 2.5m)

Quantity of concrete required for the chamber is approximately 100m$^3$.

Existing outfall chamber and rectangular culvert are envisaged to be used as the overflow outfall into the river Avoca.

Required plan area of the site is approximately 200m$^2$. 
The maintenance regime is normally an infrequent event and may consist of a visual inspection once every six months. It may be required to wash the screens after a severe storm.

A number of 12 access covers to the chamber are required in order to:

- Access to facilitate maintenance to the screenings panels;
- Access to the hydrobrake control; and,
- Access above the overflow chamber that houses the control siphon.

8.3.2.4 Programme and Conclusions

Depending on the phasing of the construction of the whole Alps development i.e. when construction commences, it will affect whether the new sewers and sewer diversions as described above, should be included as part of the scope of works for the southern interceptor sewers.

Following further model simulations, it was concluded that the inclusion of the Alps sewer development would not significantly reduce the extent of flooding upstream unless the proposed works were extended upstream in the catchment along Dublin Road. This would involve a significant additional length of sewers which greatly alters the extent of the proposed works. Furthermore, considering the current state of the construction market, it would be prudent to assume that the Arklow Sewerage Scheme will progress prior to the privately funded Alps development; For this reason and the extent of additional works required, it is concluded that the Arklow Sewerage Scheme should progress prior to the privately funded Alps development; hence, the above scope of works should not be included in the Arklow Sewerage Scheme.

8.3.3 Proposed Interceptor Sewer Route Options

A number of sewer route options were assessed to determine the most suitable route option. A Risk Allocation Matrix was prepared and discussed in a number of workshops with Arklow Town Council, Wicklow County Council and WYG. A copy of this matrix is included in Appendix F.

The route options examined were as follows and are shown on Figure 8.3;

8.3.3.1 Route Option No. 1

Follow the original route of the Phase 3 Report along South and North Quay with pipelines located in roads. This includes a pinch point for approx. 200m from the bridge in an easterly direction along South Quay.

8.3.3.2 Route Option No. 2

This route follows a similar route to Option 1 above except that the proposed south side interceptor will be located within the river for approx. 200m from the bridge in an easterly direction along South Quay. This route avoids the pinch point located in the road at South Quay.

8.3.3.3 Route Option No. 3

This route involves a second river crossing in a pNHA designated area located upstream of Arklow bridge. By crossing the river upstream of the bridge, it eliminates the requirement for a south side interceptor along South Quay from the bridge – South Green.

8.3.3.4 Conclusions
It was concluded that Option 2 presented the most favourable route.

Option 1 presented major risks associated with construction of the sewer at the pinch point located in South Quay. This area was examined by a construction expert who advised that there were major risks of damage to buildings immediately adjacent the proposed trench, should the sewer be constructed at this location. Furthermore, the spatial restrictions would present major challenges when excavating a trench of suitable width and depth to safely accommodate a sewer of this size.

Option 3 presented a number of environmental issues associated with constructing a new sewer across the river in a pNHA designated area and directly adjacent Arklow bridge which is a protected structure. These issues presented a number of risks to the project programme, which has the potential to significantly delay the completion of the overall construction programme. For further details on Programme, refer to Section 11 of this report.

As Option 2 is the preferred option, which requires the construction of sewers within the Avoca River, a number of studies/reports were required to investigate the likely impacts of these works on the Environment. These are discussed further in Chapter 8.5.
Option 1: Locating sewer in the South Quay Roadway.

Option 2: Construction of the South interceptor in the river approximately 200m adjacent to the South Quay wall, with the remainder of the route on existing roads and paved surfaces.

Option 3: River crossing upstream of Bridge.

Figure 8.3 – Interceptor Route Selection Options
8.4 Avoca Siphon

The exact sizing of the siphon will be confirmed during detailed design and will ensure that backflows will not have a negative impact on the collection system upstream.

8.5 Reclamation of South Quay (Interceptors Located within Avoca River)

As interceptor sewer route Option 2 will include the construction of sewers in the Avoca River, the following assessments were undertaken to determine the possible impacts of the proposed development.

8.5.1 Natura Impact Assessment for the Construction of Interceptor Sewers

A Screening for Appropriate Assessment was prepared by Eleanor Mayes Ecologist in July 2012 to assess the impacts of constructing the sewers in the foreshore area. This report concluded that there is no potential for the construction of the interceptor sewers and siphon in the estuarine section of the Avoca River to impacts on habitats in SAC's located within 20km of the proposed works. It was not considered necessary to proceed to Stage 2 of the Appropriate Assessment Process.

8.5.2 EIA Pre-Screening

In May 2012, Wicklow County Council requested WYG Environmental & Planning Ireland Ltd to undertake a Screening exercise towards determining the requirement for an Environmental Impact Assessment for a proposal to construct a combined sewer within the Avoca River channel for approximately 200m along South Quay downstream of Arklow Bridge, Arklow Co Wicklow.

In conclusion, the screening assessment confirmed that the proposal to construct a combined sewer within the Avoca River channel for approximately 200m along South Quay downstream of Arklow Bridge, Arklow Co Wicklow will not have any significant environmental effects and therefore will not require an EIA.

8.5.3 Hydraulic Impact Assessment of Option 2

Hydro Environmental were requested by WYG Ireland on behalf of Wicklow County Council to examine the hydraulic impact of interceptor route Option 2 on flows and flood levels within the Avoca River. To accommodate the interceptor pipe it is proposed to move a section of South Quay wall approximately 2-3m into the river channel over a distance of approximately 155m starting at the old slipway downstream of Arklow Bridge.

This report concluded that the above works will only have a slight impact on the flow velocities which has a very minor impact on flood levels with levels less than 2cm rise immediately upstream of the route and no discernable rise upstream of the Arklow Bridge.

8.5.4 Part 8 Planning

Schedule 2 Part 1 of the Planning and Development Regulations 2001-2011 set out a number of projects which are considered exempted development however there is no formal exclusion list for projects which do not require an EIA. Class 11 of SI 454 of 2011 cites an exemption for an amendment in relation to drainage works on wetlands as follows;

“Development consisting of the carrying out of drainage of wetlands”. 
However, this is predicated on the conditions that; The area to be affected shall not exceed 0.1 ha. Where development has been carried out within a farm holding under this class, the total area of any such development taken together with the area of any previous such development within the farm holding shall not exceed the limits set out in 1. above.

It should be noted that Class 11 is a "Rural Exemption". It appears that he previous Class 11 is for the purpose of agriculture. Notwithstanding this, and any argument that drainage of non agricultural wetland is permitted, the works that are necessary to secure the drainage in this instance and all subsequent works, infilling etc, would not be covered by the exemption.

In this respect the works requires development consent under Part 8 procedures. It is recommended that WCC progress this Part 8 application without delay.
9  PROCUREMENT

9.1 General

Circular L10/01 issued by the DEHLG on 17th September 2001 relates to “Procurement using Public Private Partnership Arrangements”. The arrangements set out in the circular supersede those set out in the earlier Circular L3/99, which was the basis for previous DB/DBO Applicability Reports. The Circular sets out a two-stage approach for examining projects and determining if the project should be advanced under PPP:

- Stage 1 – Determination of suitability for PPP Procurement
- Stage 2 – Preparation of PPP Assessment Report

The Circular states “As a general principle, a PPP approach is likely to be used for the larger infrastructure projects…” which makes the Wastewater Treatment Works contract suitable for PPP.

The WwTW contract is likely to proceed based on a Design, Build and Operate (DBO) contract based on experiences on similar scale projects in Wicklow, however, prior to this, Wicklow County Council will be required to prepare a PPP Assessment Report and complete all the associated stakeholder consultations. It has not been decided how the interceptor sewers and North Quay PS contract will be procured.

The following section includes a qualitative description of the advantages associated with combining the WwTW, Long Sea Outfall, North Quay PS and Interceptor Sewers into one contract (DBO).

9.2 Combining Both Contracts

Should both contracts be combined, it is expected the works would be procured as a single DBO contract. The successful contractor would most likely be a Joint Venture between a Process / M&E contractor and a civil engineer contractor.

<table>
<thead>
<tr>
<th>Advantages of Combining both Contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 A single contractor would be better placed to manage the commissioning date for the scheme, particularly in relation to having the interceptor sewers and pumping station operational before the WwTW is ready for commissioning. In addition it removes the need for co-ordination / integration between areas where 2 separate contracts would overlap e.g. at the North Quay Pumping Station. This should result in better programming certainty and eliminate construction risks and potential claims;</td>
</tr>
<tr>
<td>2 Better value for money due to economies of scale;</td>
</tr>
<tr>
<td>3 Provide opportunities for innovation regarding the design and construction of the interceptor sewers;</td>
</tr>
<tr>
<td>4 Reduce the time and cost of procurement (one contract versus two contracts);</td>
</tr>
<tr>
<td>5 One contractor would be better placed to manage interaction with the public and local businesses;</td>
</tr>
</tbody>
</table>
9.3 Conclusions and Recommendations

The initial qualitative assessment above indicates that there are a number of advantages with combining the WwTW, Long Sea Outfall, North Quay Pumping Station and interceptor sewers, into one DBO contract.

It is recommended that the proposed works should proceed in one DBO procured contract.
10 CURRENT PLANNING STATUS

10.1 General

As stated earlier in this report, Planning permission was granted by ABP on the 21st January 2005. Below is a summary update of legal proceedings post ABP approvals.

Arklow Holidays Ltd appealed the above decision to the Supreme Court and then the High Court. The Supreme Court judgement was issued on 21st July 2011. The judgement dismissed the appeal by Arklow Holidays Ltd. and confirmed the decision of the High Court in relation to the planning approval for the wastewater treatment works.

Following a refusal of Arklow Holidays Ltd to grant ATC and WCC access to these lands, ATC issued Injunctive Proceedings against Arklow Holidays Ltd. in May 2012. A number of various affidavits were filed and exchanged between the parties. In addition to the injunctive proceedings, Arklow Holidays Ltd were granted leave on 21st May 2012 to apply for a Judicial Review of the Compulsory Purchase Order (CPO). ATC filed a Statement of Opposition to this and further issued a Motion asking the court to set aside these proceedings.

When ATC tried to proceed with the Injunction in July 2012, the High Court decided that the application could not be heard while the Judicial Review proceedings remained in being as the issue of the CPO had to be determined as it was fundamental to going ahead or not.

The judge issued directions on 4th July 2012 as to what steps had to be followed by both parties and the time frame they had to finish in. To date, ATC have adhered to all these time frames culminating in Arklow Holidays Ltd. filing a Defence to the Injunction proceedings. They have now issued a request for Discovery.

Both cases are in for mention in the High Court on 9th October 2012 to determine how both cases will progress. All matters are due to proceed on 4th December 2012.
11 PROGRAMME

11.1 Planning Permission Expiration

As stated in Section 2.2.1 of this report, WCC have received legal advise that planning permissions for the WwTW’s will expire in April 2015 i.e. 10 years + 90 days after date of approval by ABP. Arklow Town Council have sought advise from WCC Planning Department regarding options available to extend the validity period of the current Planning Permissions should the full Scheme not be commissioned by this date. In Section 42 of the Planning and Development Act, 2000, this section sets out the power of the Planning Authority to extend the appropriate period of a permission and the requirements that have to be complied with to allow an extension of the appropriate period to be granted by the Planning Authority. There are two sets of requirements set out as follows;

1. The first relates to permissions where substantial works have been carried out pursuant to the permission;
2. The second alternative relates to permissions where there were considerations of a commercial, economic or technical nature beyond the control of the applicant, where substantially militated against either the commencement of the development or the carrying out of substantial works pursuant to the permission.

It is considered that Option 1 above is the most appropriate route for WCC and ATC to follow should the legal issues associated with the CPO and Judicial Review at the WwTW be resolved in the short term. If this legal dispute has a further major impact on the programme and delivery of the project, Option 2 above can be explored further.

Should Option 1 above not be achievable, this may result in the need for preparing a new EIS for the entire Scheme. This would require the procurement of a new Consultant to prepare the EIS. It also requires ABP to revisit the Planning process. Should planning permissions be granted by ABP, it does not eliminate the risks associated with further public objections which could potentially result in years of judicial reviews through the legal processes. This will ultimately delay the delivery of the Arklow Sewerage Scheme. Such a scenario is best avoided if possible.

A preliminary programme for the delivery of Substantial Works for the Arklow Sewerage Scheme WwTW is included in Appendix E of this report. This programme includes the Section 42 Application for Planning Permission Extension to be submitted in late 2014. The programme indicates that Substantial Works of the WwTW will be achieved by the Planning Expiry Date of April 2015.

For display reasons, Contract 1 – South Green & Harbour Road Sewer Replacement has also been shown on this programme however, this contract does not have the same priority status from the DECLG as the WwTW.

11.2 Programme Assumptions

The preliminary programme, dated January 2012 is based on the following assumptions;

- Appoint Site Supervision Staff by August 2012;
- Commence Site Investigations works in July 2012 with delivery of Final Reports by February 2013;
- Complete a Flow & Load Survey (approx. 6 months) by January 2013;
Arklow Sewerage Scheme
Scheme Review Report

- Foreshore Application for Interceptor Sewers, Siphon and WwTW Marine Outfall granted by November 2011;
- Discharge Licence approval by the EPA by November 2011;
- Preparation of Contract Documents and Pre-Qualification Documents to run in parallel;
- Appoint a DBO Contractor by April 2014;
- Achieve Substantial Works at the WwTW by April 2015;
- Commissioning of the Scheme by March 2016.

Since preparation of this programme, further delays have been encountered, mainly associated with legal procedures, which have been discussed in this report.

11.3 Programme Risks

The preliminary programme includes the following major risks:

- Includes a 2 month period for the preparation of an Appropriate Assessment, however, based on initial screenings, it is unlikely that such an Assessment will be required.
- The report includes for approx. 3 months to account for possible tender challenges to the DBO Tender Recommendation.

11.4 Programme Critical Path

The critical path activity for the delivery of the WwTW’s within the approved planning period is as follows;

1. Site Investigation Works and delivery of Final Factual Report,
2. DBO Tender Period and Tender Report including all DECLG and Client approvals,
3. Completion of Substantial works at the proposed WwTW by April 2015.
CONCLUSIONS & RECOMMENDATIONS

The following is a list of conclusions and recommendations from this report;

12.1 Conclusions

- The Arklow Sewerage Scheme includes the construction of interceptor sewers, North Quay Pumping Station, rising main, gravity sewer, Wastewater Treatment Works and long sea outfall.

- Registration Reference 23/99 was granted by An Bord Pleanála on the 21st January 2005 for the planning permission of an 18,000 PE Wastewater Treatment Works at Seabank. The validity period of the WwTW planning permission commenced from the date of the permission. Validity period is 10 years + 90 days from 21/01/2005.

- In October 2003, Arklow Town Council approved a planning application, under Part 8 of the Planning and Development Act 2000 for the development of the North Quay Pumping Station (NQPS). The planning approval would permit the pumping station to be constructed within the stipulations set out in Arklow Town Council’s approval of the development.

- Litigation was ongoing in relation to the EIS approval for the Wastewater Treatment Works for in excess of 10 years which has restricted the provision of the required wastewater treatment services in Arklow. An Appeal on the High Court decision was heard in the Supreme Court on 2nd December 2009. The Supreme Court judgement was issued on the 21st July 2011. This judgement confirmed the decision of the High Court and effectively confirmed the planning approval for the Wastewater Treatment Works.

- The domestic population projections for the town of Arklow as included in the Phase 3 Arklow Sewer Model are assumed to increase by approx. 2.2% per annum. If the Phase 3 Model were to use the predictions of the Central Statistics Office and Regional Planning Guidelines, a lesser future domestic population would be predicted hence decreasing the predicted flows and loadings in the network.

- The Arklow Flood Study Report was submitted in June 2002. It was envisaged at the time of the flood study report preparation that works on the sewers and flood alleviation work would be carried out in tandem. The hydraulic analysis completed as part of the Avoca River (Arklow) Flood Relief Feasibility Study (2007) identified the existing Arklow Town Bridge as a major constriction to flood flow conveyance.

- The Project Integration Report (2006) examined the practicalities and benefits of integrating elements of both the Arklow Sewerage Scheme and the Arklow Flood Relief Scheme. The report concluded that whilst the construction of the interceptor sewers without any flood protections works was not the most economically advantageous and did not necessitate the reopening of excavations and result in more onerous construction techniques, its advantage in terms of delivery of the entire Arklow Sewerage Scheme to the residents of the town made its selection the most promising of the options available.

- The External Stability Assessment of Quay Walls (2008) observed that between 60-70% of the quay walls inspected along the river Avoca show signs of distress either in the form of cracking or ground settlement behind the wall and it is therefore reasonable to assume that under the existing conditions the walls have a factor of
safety close to unity and further analyses with more detailed information is unlikely to lead to a different conclusion.

- The EIS approved treatment works will serve a population equivalent of approximately 18,000 PE. The treatment scheme developed for planning permission purposes is, comparatively with current practice, prescriptive (compared to current practise). The results of the treatment scheme flexibility assessment detailed in this report, shows that with little or no change to the proposed EIS design, additional treatment capacity can be made available in the future Arklow Wastewater Treatment Works to cater for a population equivalent above the initial 18,000 PE. However, the estimated maximum serviceable population equivalent of 24,000 PE or 28,000 PE if respectively a discharge standard of 15mg/l of TN is or is not applicable, is greatly dependent on the discharge standards to be imposed by the future discharge license. Initial correspondence with the EPA indicates that a TN limit will form part of the Discharge Licence.

- An initial qualitative assessment of the proposed procurement of the interceptor sewers and the WwTW contract indicates that there would be significantly more potential benefits and less risk associated with the option of combining the WwTW and Interceptor Sewers into one DBO contract compared to the option of having two separate contracts.

### 12.2 Recommendations

- It is recommended that additional site investigation works be undertaken along the proposed works areas, to ascertain the ground conditions and extent of services. This also includes a bedrock survey and Hydrographic Survey along the proposed sea outfall. This is a critical programme activity.

- It is recommended that a full flow and load survey be conducted at the main outfall locations throughout the catchment to determine the biological loadings for the Wastewater Treatment Works.

- It is recommended that WCC/ATC proceed with serving a wayleave for the long sea outfall from the proposed WwTW to the high water mark.

- It is recommended that WCC/ATC apply to the Department of Environmental, Community and Local Government for a foreshore licence for the long sea outfall, siphon and the interceptor sewers. A separate application was submitted on the 24th November 2011 for the South Green and Harbour Road sewers. A foreshore lease will be required for locating the southside interceptor sewer for a short distance in the Avoca river.

- It is recommended that WCC/ATC liaise with the Environment Protection Agency regarding the existing application submitted in 2007 for a discharge Licence for the Arklow Sewerage Scheme. Depending on the EPA requirements, this may require additional modelling to determine the impacts on the receiving water body.

- It is recommended that the Arklow Sewerage Scheme progresses without the inclusion of the flood alleviation works which can be procured under a separate contract to be confirmed and approved by the OPW. However, this will be subject to the findings of the proposed site investigation scheme. The flood protection works up to existing ground level should be incorporated in the areas at which the southside interceptor sewer is located within the Avoca River i.e. South Quay.
It is recommended that when the future discharge standards imposed by the EPA are made known to Wicklow County Council, the sludge treatment operations and their integration with the storage requirements on site and the footprint available for future upgrades will require further assessment. In order to comply with the EIS odour levels, further modelling may be required to assess the appropriate odour confinement and treatment in light of the operational changes required to cater for the additional population equivalent.

It is recommended to increase the proposed size of the interceptor sewers to cater for a design horizon of 50 years. It is also recommended to construct a twin 300mm dia. rising main from the proposed North Quay Pumping Station to the gravity sewer draining to the proposed WwTW.

It is recommended to commence a Part 8 Planning application for the construction of the southern interceptor sewer in the Avoca River channel for approximately 155m downstream of Arklow Bridge.
An Bord Pleanála

LOCAL GOVERNMENT (PLANNING AND DEVELOPMENT) ACTS, 1963 TO 1999

Wicklow County

Planning Register Reference Number: 23/99

APPEAL by Seabank and District Residents’ Association care of James Fitzmaurice of Seabank, Sea Road, Arklow, County Wicklow and by others against the decision made on the 13th day of July, 1999 by Wicklow County Council to grant subject to conditions a permission to Arklow Urban District Council care of P. H. McCarthy and Partners of Rosemount Hall, Dundrum Road, Dublin for development comprising construction of a wastewater treatment works for a population equivalent of 18,000 and associated sewers, roads and outfall pipe on an area of 2.9 hectares, at Seabank, Arklow, County Wicklow. The works will consist of the provision of 800 metres of 450 millimetres rising main, 765 metres of 600 millimetres diameter gravity sewer; three buildings of 272 square metres, 160 square metres and 34 square metres, two primary sedimentation tanks each of 227 square metres, two aeration basins each of 203 square metres, two secondary settlement tanks each of 260 square metres, two sludge thickening tanks each 10 square metres, a hydrodynamic grit separator, a measuring flume, a discharge tank, interconnecting pipework, 765 metres of roads and a feature entrance gate, watermains, landscaping and 178 metres of 500 millimetres diameter outfall pipe laid by “no-dig” techniques between the treatment works and the sea and 990 metres of 500 millimetres diameter outfall pipe laid in the seabed in accordance with plans and particulars lodged with the said Council:

DECISION: Pursuant to the Local Government (Planning and Development) Acts, 1963 to 1999, it is hereby decided, for the reason set out in the First Schedule hereto, to grant permission for the said development in accordance with the said plans and particulars, subject to the conditions specified in the Second Schedule hereto, the reasons for the imposition of the said conditions being as set out in the said Second Schedule and the said permission is hereby granted subject to the said conditions.
FIRST SCHEDULE

Having regard to -

(a) the policies and objectives contained in the current Wicklow County Development Plan where it is an objective of the plan to ‘provide and facilitate improved wastewater treatment works for Arklow Urban Area and Arklow Environs Area’ in the Sallymount Johnstown Coastal Cell,

(b) the policies and objectives set out in the Regional Planning Guidelines for the Greater Dublin Area 2004-2016 and the specific requirement to implement the Arklow Main Drainage Scheme which is deemed to be essential to the overall strategy,

(c) the requirements to meet in full the requirements of the EU Urban Waste Water Treatment Directive in relation to the provision of secondary sewage treatment in urban areas by the end of 2005, and

(d) the planning history of the site,

it is considered that the proposed development which constitutes the provision of a basic public infrastructure utility is necessary in the interest of public health. Notwithstanding the fact that the proposed development is located in an area designated in the current development plan as an area of outstanding natural beauty, it is considered that the proposed excavation and landscaping will offset any potential adverse impact on visual amenities. Furthermore, it is considered that the proposed “no-dig” solution will protect the structural integrity of the environmentally sensitive sand dunes at Seabank beach. It is considered that the proposed development, subject to compliance with the conditions set out in the Second Schedule, would not seriously injure the amenities of the area or of property in the vicinity, would not be prejudicial to public health and would be acceptable in terms of traffic safety and convenience. The proposed development would, therefore, be in accordance with the proper planning and development of the area.

SECOND SCHEDULE

1. The development shall be carried out in accordance with the plans and particulars lodged with the application as amended by the drawings and documents received by the planning authority on the 14th day of May, 1999 and the 8th day of July 1999, except as may otherwise be required in order to comply with the following conditions.

   **Reason:** In the interest of clarity.

2. Lighting shall be provided in accordance with a scheme, details of which shall be submitted to the planning authority for agreement prior to the commencement of development.

   **Reason:** In the interest of amenity and public safety.
3. Water supply and drainage arrangements, including the disposal of surface water, shall comply with the requirements of the planning authority for such works and services.

Reason: In the interest of public health and to ensure a proper standard of development.

4. The internal road serving the proposed development, including any parking areas, footpaths and kerbs shall be in accordance with the detailed requirements of the planning authority for such works.

Reason: In the interest of amenities and public safety.

5. The noise level during the operational phase of the development shall not exceed 55 dB(A) rated sound level at any point along the boundary of the site. Prior to commencement of development, the applicant shall agree with the planning authority monitoring procedures for the purpose of determining compliance with this limit.

Reason: In the interest of residential amenity.

6. An odour limit of 3 OU/M$^3$ on an 98 percentile basis for all odour sources shall be achieved at the boundary of the site. An independent specialist who is acceptable to Wicklow County Council shall monitor odours at specific locations and at a frequency to be determined by Wicklow County Council.

Reason: In the interest of residential and recreational amenity.

7. Both primary settlement tanks shall be covered. Details of the type of covering to be used shall be agreed in writing with the planning authority prior to the commencement of development.

Reason: To reduce odour emissions from the plant.

8. A dynamic load/deflection survey shall be carried out along the sea road the detailed requirements of which will be agreed with the planning authority prior to the commencement of development. Subject to the survey results, a road strengthening programme shall be carried out prior to the commencement of development. Details of any road strengthening measures shall be agreed in writing prior to the commencement of development.

Reason: In the interest of road maintenance and traffic safety.
9. A full bedrock survey along the proposed alignment of the outfall pipe shall be submitted to the planning authority prior to the commencement of development. The survey shall indicate the nature, extent and depth of the bedrock overburden along the alignment. The proposed tunnel section of the outfall pipe shall be driven completely into the bedrock under the Seabank sand dunes to the immediate east of the appeal site and the tunnel shall remain within the bedrock to a point 10 metres beyond the high water mark, (i.e. the seaward side of the high water mark). Details of the revised longitudinal section of the outfall shall be submitted to the planning authority for agreement prior to the commencement of development on site.

**Reason:** To ensure that the proposed outfall pipe does not damage the integrity of the sand dunes.

10. Solid waste from the treatment works shall be transported in covered skips.

**Reason:** In the interest of residential amenity.

11. Details of any proposed chimney stack/flue for the odour treatment building together with plans and elevations to the building shall be submitted to the planning authority for written agreement prior to the commencement of development. In any event, the stack/flue shall not extend more than three metres above the ridge level of this building.

**Reason:** In the interest of clarity and visual amenity.

12. Prior to commencement of construction of the buildings on site, details of the materials, colours and textures of all the external finishes to the proposed buildings shall be submitted to the planning authority for agreement.

**Reason:** In the interest of orderly development and the visual amenities of the area.

13. The developer shall facilitate the planning authority in the archaeological appraisal of the site and in preserving and recording or otherwise protecting archaeological materials or features which may exist within the site. In this regard, the developer shall:-

(a) notify the planning authority in writing at least four weeks prior to the commencement of any site operation (including hydrological and geotechnical investigations) relating to the proposed development, and

(b) employ a suitably-qualified archaeologist prior to the commencement of development. The archaeologist shall assess the site and monitor all site development works.

The assessment shall address the following issues:-

(i) the nature and location of archaeological material on the site, and

(ii) the impact of the proposed development on such archaeological material.
Prior to the commencement of development, a report containing the results of the assessment shall be submitted to the planning authority. Arising from this assessment, the developer shall agree with the planning authority details regarding any further archaeological requirements (including, if necessary, archaeological excavation) prior to commencement of construction works.

**Reason:** In order to conserve any potential archaeological heritage of the site and to secure the preservation of any remains which may exist on the site.

14. Prior to commencement of development, a landscaping scheme shall be submitted to the planning authority for agreement. This scheme shall include details of all existing trees and hedgerows on the site, specifying those proposed for retention, together with measures for their protection during the period in which the development is carried out. The site shall be landscaped in accordance with the agreed scheme, which shall also include a timescale for implementation.

**Reason:** In the interest of visual amenity.

15. Construction work shall only be carried out on site between the hours of 0800 hours and 2000 hours Monday to Friday and between 0800 and 1300 hours on Saturdays. No work shall be carried out on site on Sundays or public holidays.

**Reason:** To protect the amenities of the area.

16. Adequate stand-by generation equipment shall be maintained to the satisfaction of the planning authority. Details shall be agreed in writing with the planning authority prior to the commencement of development.

**Reason:** To ensure the orderly operation of the plant.

17. The residual effluent produced by the plant shall be of a standard not exceeding a level of Biochemical Oxygen Demand of 25 mg/l, Chemical Oxygen Demand of 125 mg/l and Total Suspended Solids of 35 mg/l. Details of the proposed monitoring of the concentration of these pollution parameters shall be agreed in writing with the planning authority prior to the commencement of development.

**Reason:** To comply with the requirements of the Urban Waste Water Directive.

18. Results of all monitoring shall be made available for public inspection at the offices of the planning authority and the offices of the applicant.

**Reason:** In the interest of orderly development and the comprehensive monitoring of the proposed development.
19. The developer shall pay a sum of money to the planning authority as a contribution towards expenditure that was and/or that is proposed to be incurred by the planning authority in respect of works facilitating the proposed development. The amount of the contribution and the arrangements for payment shall be agreed between the developer and the planning authority or, in default of agreement, shall be determined by An Bord Pleanála.

In the case of expenditure that is proposed to be incurred, the requirement to pay this contribution is subject to the provisions of section 26(2)(h) of the Local Government (Planning and Development) Act, 1963 generally, and in particular, the specified period for the purposes of paragraph (h) shall be the period of seven years from the date of this order.

Reason: It is considered reasonable that the developer should contribute towards the expenditure that was and/or that is proposed to be incurred by the planning authority in respect of works facilitating the proposed development.

Member of An Bord Pleanála duly authorised to authenticate the seal of the Board.

Dated this day of 2005.
APPENDIX C

DISCHARGE LICENCE CORRESPONDENCE

For inspection purposes only. Consent of copyright owner required for any other use.
Environmental Protection Agency
P.O. Box 3000
Johnstown Castle Estate
CO. WEXFORD.

RE: Waste Water Discharge Licence – Arklow Sewerage Network,
Arklow, Co. Wicklow

A Chara

With reference to the above, the following are enclosed

1. 1 Original application and drawings
2. 2 no. copies of application and drawings
3. Cheque in the sum of €30,000
4. 2 CD's in PDF format – In this regard I wish to confirm that the contents of the electronic file is a true copy of the original application form and drawings.

Mise, le meas

MICHAEL GEANEY
SENIOR ENGINEER
WATER & ENVIRONMENTAL SERVICES

All correspondence should be addressed to the Senior Executive Officer, Environmental Services
Scoltaí gach comhfhreagráis chaughrimhithheidhmeannach na Seirbhísí Comhshaoil
re: Arklow town and environs:- Notice in accordance with Regulation 18(3)(b) of the Waste Water Discharge (Authorisation) Regulations 2007

Dear Mr Geaney

I am to refer to the above referenced application for a waste water discharge licence relating to the above referenced agglomeration. Having examined the documentation submitted, I am to advise that the Agency is of the view that the documentation does not comply with Regulation 16 of the Waste Water Discharge (Authorisation) Regulations 2007.

You are therefore requested, in accordance with Regulation 18(3)(b) of the regulations, to take the steps to supply the information detailed below:

ARTICLE 16 COMPLIANCE REQUIREMENTS

1. Provide the name of the agglomeration to which this Waste Water Discharge Licence application relates.

2. Where planning permission has been granted for development(s), but said development has not been commenced or completed to date, within the boundary of the agglomeration and this development is being, or is to be, served by the waste water works provide the following:

   - information on the calculated population equivalent (p.e.) to be contributed to the waste water works as a result of those planning permissions granted,
   - the percentage of the projected p.e. to be contributed by the non-domestic activities.
3. For all discharges from the waste water works provide details of the proposed measures to be undertaken to ensure compliance with all aspects of the Urban Waste Water Treatment Regulations, 2001 (S.I. No. 254 of 2001), as amended, and the Dangerous Substances Directive 2006/11/EC with particular emphasis on the means by which discharges of List II substances are to be eliminated/reduced. This shall include details on the extent and type of work to be undertaken and a description of the treatment processes at the proposed Waste Water Treatment Works.

4. For discharges from SW14 reported under Tables D.1(i)(b) – (c), provide mass emission data (in kg/day) for all parameters.

5. Provide the 95%ile and dry weather flow for the Avoca River at monitoring point aSW1u.

6. For discharges from SW1, SW3, SW4, SW10, SW11, SW12, SW13, SW15, SW18 and SW21 reported under Tables D.1(ii)(a), provide data for the volumes emitted.

7. Complete Tables D.1(ii)(b) – (c) for discharges from SW4, SW6, SW7, SW8, SW13, SW15 and SW23.

8. Complete all sections of Tables E.1(i) & E.1(ii).

9. Provide details of all unscheduled discharges, if any, from any pumping stations located within the agglomeration. Classify these discharges in terms of being either a secondary discharge or a storm water overflow, using the DoEHLG Guidance note on ‘Procedures and Criteria in relation to Storm Water Overflows’ in your considerations. Should a discharge be classified as a secondary discharge from the works provide comprehensive details on the proposed Programme of Improvements to ensure that all waste water entering this pumping station is forwarded to the proposed Waste Water Treatment Plant (WWTP). Furthermore, provide monitoring data on the discharge as per Tables D.1(ii)(a),(b) & (c) and F.1(ii)(a) & (b). Please include appropriately scaled drawings/maps in accordance with sections B.4 and B.5 of the application form.

10. In Section B.9(i): Population Equivalent of Agglomeration, the method of compilation is stated as network modelling. Please confirm that this figure is the maximum average weekly loading for the agglomeration and takes account of local festivals, peak holiday seasons, etc.

11. In the non-technical summary, reference is made to the proposed new waste water treatment works in Seabank, with a design capacity of 18,000 p.e. Please
provide details of the expected date of commencement of treatment at this works, the location of any proposed/potential new discharge points as a result of this works, and an updated drawing to include the proposed location of the plant and any proposed amendments to the agglomeration boundary, as shown in Attachment B.1 of the application.

12. In Attachment B, please re-submit a hardcopy of a document by PH McCarthy Consulting Engineers entitled ‘Response to Wicklow County Council on EPA Report Request under Section 63(1) of the EPA Acts 1992 to 2003’ in colour as the maps contained within are in black and white. Also in this document, reference is made to a modelling study conducted on Arklow Harbour in July 2005 of the discharges from the agglomeration. Please submit a copy of this model to the Agency, including any modifications or amendments deemed necessary due to changes in circumstances since the initial survey was completed. Please also submit all monitoring information gathered as part of that study.

13. Provide details of any correspondence engaged in with the National Parks and Wildlife Service in relation to a determination as to the likelihood of discharges from the waste water works having a significant effect on a European site. If the discharges are deemed likely to have a significant effect an appropriate assessment of the implications for the designated site in view of the sites conservation objectives must be carried out. Any assessment, should it be deemed necessary, shall be submitted as part of the reasoned response to this notice.

The non-technical summary submitted with your application is insufficient for its intended purpose and does not adequately address all criteria specified in Section A of the application. Please submit a more comprehensive non-technical summary to include the information outlined in Section A of the application form. You should also have regard to the Agency’s ‘Waste Water Discharge Licensing Application Guidance Note’ when compiling your response. Please also note that your reply to this notice should include a revised non-technical summary reflecting the information you supply in compliance with the notice, insofar as that information impinges on the non-technical summary.

In the case where any drawings already submitted are subject to revision consequent on this request, a revised drawing should be prepared in each case. It is not sufficient to annotate the original drawing with a textual correction. Where such revised drawings are submitted, provide a list of drawing titles, drawing numbers and revision status, which correlates the revised drawings with the superseded versions.

Please supply the information in the form of a one original plus one copy within eight weeks of the date of this notice. In addition please submit one copy of the requested information in electronic searchable PDF format on a CD-ROM to the Agency. Please note that all maps/drawings should not exceed A3 in size.
Please note that the application's register number is D006-01. Please direct all correspondence in relation to this matter to Administration, Environmental Licensing Programme, Office of Climate, Licensing & Resource Use, Environmental Protection Agency, Headquarters, PO Box 3000, Johnstown Castle Estate, County Wexford quoting the register number.

Yours sincerely,

Donal Grant,
Inspector, Office of Climate, Licensing & Resource Use
6th June, 2008

Administration,
Environmental Licensing Programme,
Office of Climate,
Licensing & Resource Use,
Environmental Protection Agency,
Headquarters,
P.O. Box 3000,
Johnstown Castle Estate,
Co. Wexford.

Article I. RE: Waste Water Discharge Licence – Arklow Town and Environs, D00006-01

A Chara

I refer to your letter of the 15th April 2008 with regard to article 16 compliance requirements.

1. The name of the agglomeration to which this Waste Water Discharge Licence application relates is "The Arklow and Environs Agglomeration".

2. With regard to the Environmental Protection Agency's queries under this point, Wicklow County Council wishes to inform the agency that the PE of under developments construction and currently granted planning permissions is 4615. We estimate that 30% of these developments will be non-domestic.

3. All aspects of the Urban Waste Water Treatment Regulations, 2001(S.I. No. 254 of 2001), as amended, and the Dangerous Substances Directive 2006/11/EC will be addressed as part of any scheme Wicklow County Council constructs. No detailed design is currently available for this scheme.

All correspondence should be addressed to the Senior Executive Officer, Water & Environmental Services, Wicklow County Council, County Buildings, Wicklow.
4. Please find attached revised Tables D.1(i)(b)-(c) for discharges from SW14. It should be noted, however, that the mass emission data figures provided are derived from the Maximum Daily Average in mg/l and the normal DWF volume emitted.

5. No detailed information is available on the 95% and the DWF for the Avoca River at monitoring point at SW1u. The EPA has a number of flow gauges installed at Woodenbridge, upstream of Arklow at the confluence of the Avoca, Aughrim and Goldmine Rivers. Based on figures provided in May 2007 by the hydrometric section of the EPA the 95% and DWF are as follows:

- Avoca River DWF 0.65 m³/sec
- Avoca River 95%tile 1.75 m³/sec
- Aughrim River DWF 0.31 m³/sec
- Aughrim River 95%tile 0.84 m³/sec
- Goldmine River DWF 0.004 m³/sec
- Goldmine River 95%tile 0.01 m³/sec

Attached in the appendix is a map with the location of these flow gauges points identified.

6. With regard to SW1, this is a combined storm overflow and as such will not have a normal dry weather flow. We have no further information about this discharge.

With regard to SW3, this is a combined storm overflow and as such will not have a normal dry weather flow. We have no further information about this discharge.

With regard to SW4, this is a combined storm overflow and as such will not have a normal dry weather flow. We have no further information about this discharge.

With regard to SW10, this is a combined storm overflow and as such will not have a normal dry weather flow. We have no further information about this discharge.

With regard to SW11, this is a combined storm overflow and as such will not have a normal dry weather flow. We have no further information about this discharge.

With Regard to SW12, this is a combined storm overflow and as such will not have a normal dry weather flow. We have no further information about this discharge.
With Regard to SW13, this is a combined storm overflow and as such will not have a normal dry weather flow. We have no further information about this discharge.

With Regard to SW15, this is a combined storm overflow and as such will not have a normal dry weather flow. We have no further information about this discharge.

With Regard to SW18, we do not have daily flow information on this manhole currently. Information available about this pipe currently is that it has a 450mm. A PE of 145 drains into this pipe. We estimate that the DWF of this pipe is 100*180/1000=27m3/day. We have included this estimate in a table D.1(ii)(a) attached in the appendix of this letter.

With Regard to SW21, we do not have daily flow information on this manhole currently. Information available about this pipe currently is that it has a 450mm diameter. A PE of 100 drains into this pipe. We would estimate that the DWF of this pipe is 100*180/1000=19m3/day. We have included this estimate in a table D.1(ii)(a) attached in the appendix.

7. With regard to information for tables D.1(ii)(b)-(c) for discharges SW4, SW6, SW7, SW8, SW13, SW15 and SW23 suitable sampling locations are not available.

8. Please find attached the completed sections E1 (i) and E1 (ii) in the attached appendix.

9. There are four pumping stations within the agglomeration which work as part of the network. These pumping stations overflow in emergency situations. As such we do not consider them as Secondary Discharges. Attached in the appendix is section B6 and maps of the pumping station outfall locations (WWDL/Arklow/B6 SW24,SW25,SW26,and SW27). A revised Attachment A1 (WWDL/Arklow/A1 Rev.1) showing the pumping station and outfall locations is also attached.

10. The estimation for the Population Equivalent of Agglomeration assumes that all holiday accommodation and facilities are fully committed and contributing to the drainage network.

11. The proposed treatment plant is currently the subject of an appeal to the Supreme Court with no date for a hearing. Once the legal issues have been addressed, the Council will be in a position to advance to detailed design, procurement and construction of the plant. We would estimate that these three stages would normally take five years. Attached is an outline of the treatment plant site and details of the outfall pipe.
12. Find enclosed digital and hard copies of PH McCarthy’s “Response to Wicklow County Council on EPA Report requested under Section 63(1) of the EPA Acts 1992 to 2003” and the modelling study carried out on Arklow Harbour in July 2005. There has been no significant changes in circumstances since the modelling study took place.

13. There is no correspondence with the National Parks and Wildlife on file.

The current network has a number of outfalls which discharge into the proposed natural heritage area “Arklow Town Marsh”. This proposed natural heritage area includes the River Avoca. These outfalls will be removed as part of the Arklow Main Drainage Scheme.

The area immediately to the east of the proposed new waste water treatment plant is proposed as a natural heritage area (NHA) (site code 1746). The area is known as Arklow Sand Dunes which includes the sand dunes and scrub-covered slopes behind them, together with a small area of wet woodland to the south of the site. The proposed NHA will be unaffected by the sewerage treatment works. The outfall pipe is routed through the proposed NHA but will be housed in a bored tunnel, which will have no affect on the ground surface between the site of the proposed treatment works and the low water mark.

With regard to the non-technical summary, please find attached an amended version in the appendix.

Every effort has been made to provide all the information requested however should you find that further information is required please do not hesitate to contact me.

Mise, le meas

MICHAEL GEANEY
SENIOR ENGINEER
WATER & ENVIRONMENTAL SERVICES
Document Register

Revised Sections in Application

Non-technical Summary
Section B5

Revised Tables in Application

Table D1(i)(a) SW14
Table D1(i)(b) SW14
Table D1(i)(c) SW14
Table D1(i)(a) SW18
Table D1(i)(a) SW21
Table E1(i)
Table E1(ii)

Revised Drawings

Original Drawing No.               Revised Drawing Number
WWDL/Arklow/A1                    WWDL/Arklow/A1 Rev. 1
WWDL/Arklow/B1                    WWDL/Arklow/B1 Rev. 1

Additional Drawings

WWDL/Arklow/A1b
WWDL/Arklow/B5 SW24
WWDL/Arklow/B5 SW25
WWDL/Arklow/B5 SW26
WWDL/Arklow/B5 SW27
Flows in Avoca River and Tributaries
European and National Habitat Conservation Designations
466/P/037
466/EIS/004

Revised Reports

Response to Wicklow County Council on EPA Report Requested under Section 63(1) of the EPA Acts 1992 to 2003 (in colour)

Additional Reports

Arkwlow Sewerage Scheme Marine Outfall Modelling Study
SECTION A: NON-TECHNICAL SUMMARY

Introduction

In the 1930's and 1940's a piped sewerage system was constructed on a combined basis in the older part of Arklow Town. All discharges were directly to the River Avoca. With the continued expansion of the Town the system became increasingly overloaded. A number of intermediate works were subsequently constructed, at Coolgreaney Road (1980), Northside (1982) and Southside (1986) with a view to alleviating principal difficulties.

The existing sewerage system within the town discharges raw sewage to the river Avoca from multiple discharge points on the north and south banks of the River Avoca. These discharge points are a mixture of sewer outfalls, combined sewer outfalls and combined sewer overflows along the North and South banks of the river Avoca.

Network description

For the purposes of describing the study area in further detail, it has been sub-divided into five catchments, with one to the north of the river and four to the south, named as follows (see attachment WWOL/Arklow/A1b)

Northside
Southside – Western
Southside – Southern
Southside – Eastern
Southside – Central

Northside Catchment

The Northside drainage system consists of three main discharges to the Avoca River, which drain the Ferrybank, Dublin Road and Sea Road areas. These three sewers range in diameter from 300mm to 525mm. The Potter's Bridge Pumping Station (SW 26) pumps foul flows which drain from the newer housing estates.

None of the outfalls from this catchment are screened or attenuated before they discharge to the river.

Southside – Western Catchment

The majority of this catchment drains into the three sewers which cross both under and over the Dublin-Wexford railway line between the Vale Road and Upper Main Street. There three sewers are all combined and drain into the Central Catchment.

Woodlands, Woodbrook, Mill Meadows, Oakhill, and Ballyraime drain into Ballyduff pumping station (SW 25). The 100mm rising main from the pumping station (SW 25) flows to the head of the Coolgreaney Road gravity sewer. There is a storm overflow into the nearby stream.

Southside – Central Catchment
The Central catchment includes the oldest areas of Arklow Town. The catchment is predominantly combined with a separate storm system draining the South Green / Old Chapel Ground / Hudson Square / Tinahask area.

An interceptor sewer runs along the River Walk commencing at the Alps to the South Quay at South Green. There are a number of areas where the flow from the interceptor sewer discharges into the river. The majority of discharges are in this catchment.

**Southside – Southern Catchment**

The Southern Catchment predominantly drains into the Eastern Catchment. All foul/combined flows ultimately drain to the outfall at Rockview Terrace. There are two pumping stations which pump from Croghan and Servier which are interlinked.

**Southside – Eastern Catchment**

There are two main combined discharges from this catchment at Harbour Road.

**Future Proposals**

Since 1993 Arklow Town Council has been attempting to build a new waste water treatment plant and upgrade the sewerage network to divert the existing discharge points to the new plant.

The proposed location for the new waste water treatment plant is on a 2.9-ha site in Seabank townland approximately 2.5 km north-east of Arklow and will serve a PE of 18,000. Stage 2 of the planning of this project will begin after we have a decision on the current planning process, to increase the treatment capacity of the network to a PE of 36,000. The construction of the Arklow main drainage scheme will remove the outfalls from the river Avoca.

The future operator will be under an obligation to monitor emissions into the environment from the new treatment plant.

Attached in the Section A attachments section are maps showing the general outfall locations (WWDL/Arklow/A1 Rev.1), a map showing the location of Arklow (WWDL/Arklow/A1a) and a map showing the network catchments (WWDL/Arklow/A1b)
B.5 Location of Storm Water Overflow Point(s)

Give the location of all storm water overflow point(s) associated with the waste water works.

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Attachment included | Yes | No |
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                    | X   |    |

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