National Water Study

County Mayo Report

March 2000

WS Atkins Ireland

Balgriffin House, Balgriffin, Dublin 17
Tel: (01) 846 0000 Fax: (01) 847 0310

WS ATKINS IRELAND
A Division of WS Atkins Consultants Ltd

DOCUMENT CONTROL SHEET

Client:	Department of Environment & Local Government
Project:	National Water Study
Title:	County Mayo Report
Date:	March 2000
WSA Doc Ref	RK2370/712/DG/117/Rev1

Distribution

Copy 1:

Copy 2:

Copy 3:

Copy 4:

Copy 5:

Copy 6:

1	**Implementation**	**R. Leslie**	**R. OCarroll**	**N. Oakey**	**R. Beynon**	**March 00**
0	**Client Comment**	**R. Leslie**	**R. OCarroll**	**N. Oakey**	**R. Beynon**	**August 99**
Revision	Purpose	Originated	Checked	Reviewed	Authorised	Date

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1. INTRODUCTION

The National Water Study includes three schemes within County Mayo serving more than 5,000 consumers, as listed in the Environmental Protection Agency (EPA) Report on Quality of Drinking Water in Ireland.

These and their respective populations served are:-

Scheme Populations

Scheme	Population Served 1997
Ballina Regional	15,885
Lough Mask Regional	21,755
Westport	6,454
Total Population Served	**44,094**

In addition there are over 22 other public supply schemes, serving over 15,690 consumers, 449 Group Water Schemes serving approximately 47,260 people and a variety of other small private supplies or wells, none of which are monitored for quality. Thus, out of an estimated 1997 county population of 112,585, some 53% of the population are served by Public Schemes, 42% by Group Schemes and 5% by Private Schemes.

2. COUNTY MAYO SCHEMES

Chapter 2 of the County Report contains general descriptions of each of the three schemes.

3. ASSET INFORMATION AND ASSET PERFORMANCE

Asset data availability for the Mayo schemes was good, as was the response to data collection. Data was of good quality and reliability.

As for other counties few records of asset condition or performance were available. Some anecdotal information on performance was noted but useful data was limited.

A summary of scheme assets and their condition in presented in Chapter 3 and a complete record of the asset information collected is in Appendix 3.1 of the Report.

4. STAFFING STRUCTURE AND OPERATIONAL CONTROL

Staffing Structure

Details of the staffing structure for the management and operation of the schemes as provided is detailed in Chapter 4. As for most counties operational staff numbers are too low to facilitate extensive proactive distribution system management. However, there is a degree of proactive leakage detection in operation, whereby the caretakers

monitor the meter readings for high flows and report suspected leaks to the waste inspectors.

Operational Control

With the exception of the Lough Mask Regional scheme, operational control management is embryonic. Limited data is available locally from flow or level gauges, but in general there is no central monitoring or control. There is scope for planned development of suitable and economically justifiable control, display and recording of system operation.

5. RELIABLE SOURCE YIELDS

For the sources supplying the three Mayo schemes the deployable output has been estimated and compared with the 2%, or 1 in 50 year, hydrological yield where available. The results are as shown in Table 5.1 below.

Source Yields

Scheme	Source	Hydrological Yield Ml/d	Deployable Output		Reliable Yield	
			Average Ml/d	Peak Ml/d	Average Ml/d	Peak Ml/d
Ballina Regional	Lough Conn	unknown	13.500	13.500	13.500	13.500
Lough Mask Regional	Lough Mask	60.000	24.000	27.000	24.000	27.000
Westport	Moher Lake	5.900	3.600	3.600	3.600	3.600

6. TREATMENT CAPACITY

The relevant water treatment works (WTW) supplying treated water to each of the three schemes and their potential for expansion to meet increased in demand are discussed in Chapter 6. In summary the situation is as follows:-

Ballina Regional: Raw water from Lough Conn is supplied via Lisglennon and Wherrew WTW. The current WTW capacity is 13.500 Ml/d. The maximum potential capacity of the source should be capable of meeting the demand forecast for study period.

Lough Mask Regional: Raw water from Lough Mask is supplied via Tourmakeady WTW. The current WTW capacity is 27.000 Ml/d. The maximum potential capacity of the source should be capable of meeting the demand forecast for the study period, provided high UFW levels are addressed.

Westport: Raw water from Moher Lake is supplied via Moher Lake WTW. The current WTW capacity is 3.600 Ml/d. The capacity of the WTW needs to be increased to be able to meet the forecast demand.

7. WATER QUALITY

Main Report Table 7.1 summarises water quality in the three schemes. This shows recorded exceedances of maximum reliable concentrations (MAC).

Summary of Water Quality

Scheme	Compliance with 1988 Drinking Water Regulations		Substances in High Concentrations in Raw Water
	Parameters Exceeding MAC	Monitoring Frequency	
Ballina Regional	Coliforms Iron	Non-Compliant	Iron Phosphorus Chlorophyll
Lough Mask Regional	Coliforms	Non-Compliant	Phosphorus Chlorophyll
Westport	None	Non-Compliant	Phosphorus Chlorophyll

Total coliform exceedances have been measured in the Ballina Regional and Lough Mask Regional schemes. The cause is attributed to minor pollution occurring within the distribution systems. Retesting was immediately carried out and samples were found to be clear in both cases. Bacteriological test failures on the schemes are rare.

In all cases the level of water quality monitoring was below the requirements set out under the 1988 Drinking Water Regulations. However, the frequency of monitoring for bacteriological parameters has been consistently higher than regulation requirements, reflecting the efforts by Mayo County Council in monitoring for coliform bacteria, which are the most relevant indicators of water quality. The Council are currently reviewing their policy on monitoring frequencies for other less important parameters.

8. DEMAND ESTIMATION AND FORECASTING

The basis for the derivations of the baseline and forecast domestic and non-domestic demands are set out in two appendices in Volume 2 of the main study report.

These are:-

"Annual Average Domestic Demand in Ireland 1997 to 2018"
"Baseline and Forecast Sectoral Demand Estimation"

Domestic demand was calculated from a micro-component analysis of water usage per household together with a county specific household occupancy rate. The county figures were then obtained using appropriate population data. In gross terms the 1997 population for Mayo is 112,585 at an occupancy rate per property of 3.14 and a per capita consumption of 131.9l/h/d. This gives a total countywide domestic demand of 14.800 Ml/d.

It should be noted that the calculation of the future demand in both the domestic and non-domestic sectors does not include extensions of the schemes which are at various stages of planning and, as such, are difficult to quantify. These include the extension of the Ballina Regional scheme to serve Crossmolina, the extension of the Lough Mask Regional scheme to Knock Ballyhaunis and expansion of the supply to Westport which is likely to be provided by Lough Mask.

The results are summarised in the following table:-

Scheme Demand Forecasts

Scheme	Sector	Demand (Ml/d)				
		1997	2003	2008	2013	2018
Ballina Regional	Domestic	2.104	2.151	2.220	2.287	2.342
	Non-Domestic	2.081	2.337	2.531	2.714	2.875
	Total	**4.185**	**4.488**	**4.751**	**5.001**	**5.217**
Lough Mask Regional	Domestic	2.873	2.954	3.047	3.140	2.168
	Non-Domestic	5.405	6.543	7.546	8.591	9.660
	Total	**8.278**	**9.497**	**10.593**	**11.731**	**11.828**
Westport	Domestic	0.859	0.878	0.906	0.934	0.957
	Non-Domestic	1.325	1.618	1.833	2.023	2.182
	Total	**2.184**	**2.496**	**2.739**	**2.957**	**3.139**

9. WATER AUDIT

Water Audits were undertaken for each of the three schemes and the results are scheduled in Table 9.1 reproduced below.

Scheme Unaccounted For Water (UFW)

Scheme	UFW as Volume (Ml/d)	UFW as % of Distribution Input	UFW per Conn (l/conn/hr)
Ballina Regional	3.815	47.7	24.2
Lough Mask Regional	15.222	64.8	78.1
Westport	1.116	33.8	18.6

The levels of UFW are high varying between 33.8% and 64.8% of total distribution input. Factors contributing to these figures include:-

- Inadequate metering of flows into a within the distribution system, and lack of continuous recording of these flows.
- Doubts as to whether all significant non-domestic water users are metered, especially in the agricultural and public sectors.
- Possibility that the numbers of domestic connections and unmetered non-domestic connections are underestimated, especially if joint services exist with more than one property being served by a single connection from the distribution main.

10. CURRENT SYSTEM PERFORMANCE

Too little data are available to enable adequate assessment of system performance to be made. Data on the following indicators was available, and these together with the known problems, are illustrated in the following schematics:-

- Hydrological yield
- Deployable output
- Current demand
- Current UFW
- Current storage capacity

11. PLANNED REHABILITATION AND RECOMMENDATIONS

Without more comprehensive data on asset condition and performance than is currently available for the Mayo schemes it is difficult to formulate a planned rehabilitation programme. The current rehabilitation and replacement practices within the schemes are reviewed in Chapter 11.

Recommendations are also made in Chapter 11 for each of the three schemes. Some of the recommendations are common to all schemes and include:-

- construction of a GIS-based system to map all asset and network data which would assist in the operational management of the schemes, provide the input data to network models and assist in setting up district meter areas (DMA's) as part of a water conservation strategy
- implementation of comprehensive leakage reduction programmes including establishing DMA's with permanent flow metering and recording
- systems established to assess the condition and performance of scheme assets on a regular basis
- feasibility of establishing a centralised operational and control system for each scheme or for groups of or all schemes to be considered
- undertake a risk analysis for each scheme identifying key elements, standby requirements and reinforcement interconnection possibilities

12. ASSET VALUATION AND INVESTMENT STRATEGY

The methodology for assessing the valuation of scheme assets and the associated investment strategy are included in Volume 2 of the National Report.

Figure i. Current System Performance:- Ballina Regional Scheme

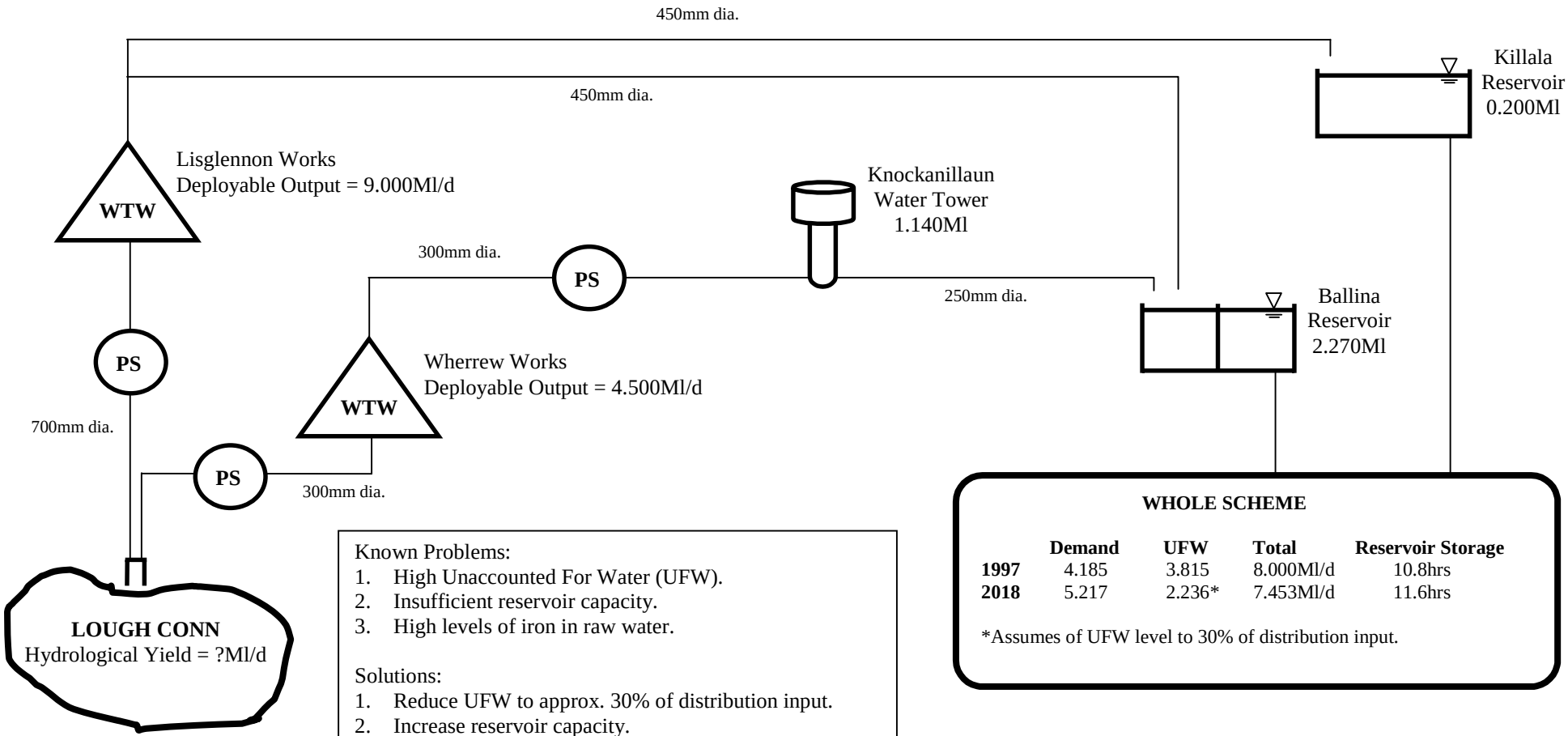


Figure ii. Current System Performance:- Lough Mask Regional Scheme

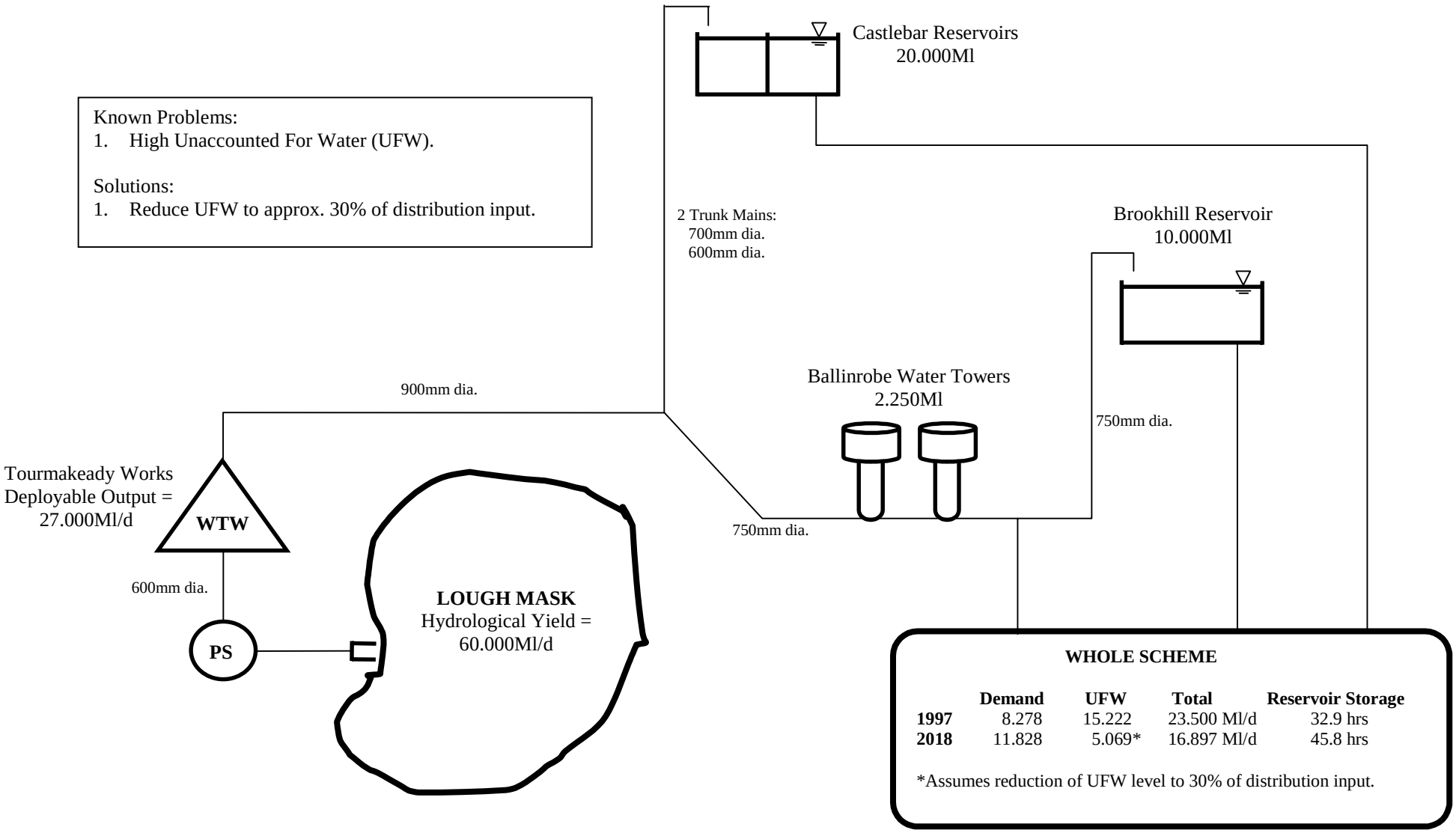
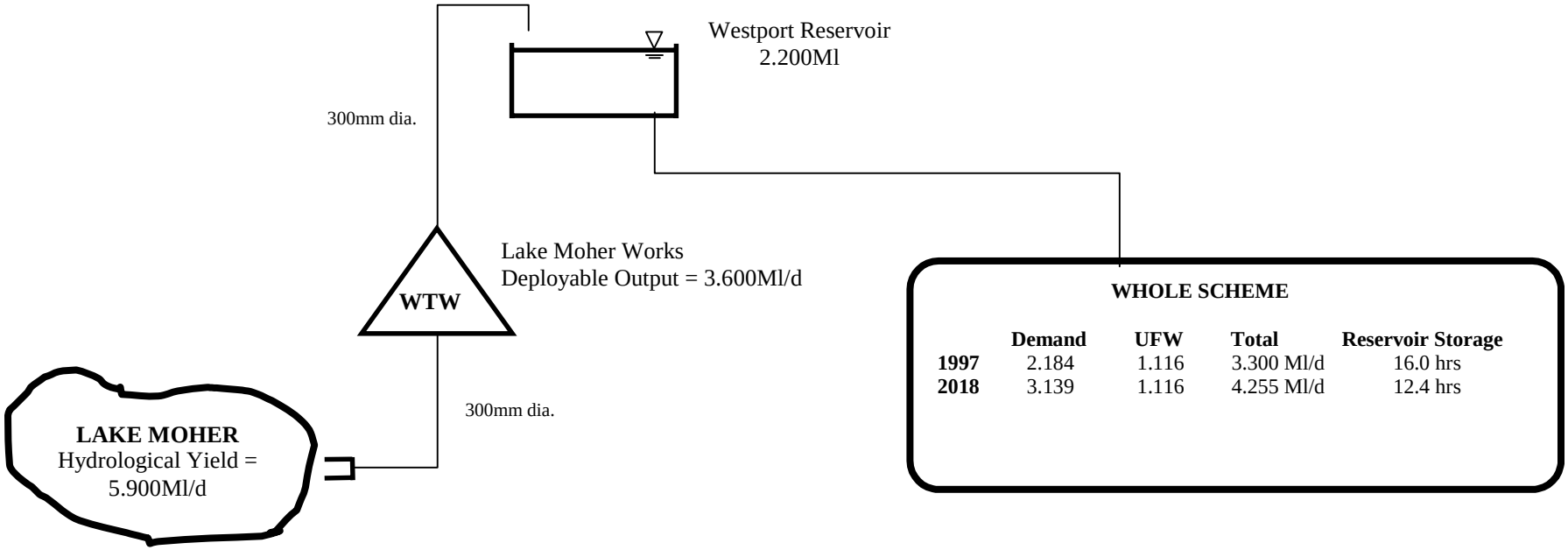


Figure iii. Current System Performance:- Westport Scheme



Known Problems:
1. Insufficient WTW capacity.
2. Insufficient reservoir capacity.

Solutions:
1. Increase WTW capacity.
2. Increase reservoir capacity.

1.0 INTRODUCTION

This is the report on the water supply schemes in County Mayo that qualify for inclusion in the National Water Study. They are municipal, ie. public supply, schemes that supply more than 5,000 consumers as listed in Table A6.3; EU Questionnaire Re Drinking Water Directive, of Appendix A6 of the Report on the Quality of Drinking Water in Ireland by the EPA for the year 1996.

A similar report has been produced for each county of the Republic of Ireland using a similar framework. These reports will form Appendices to the National Report which is in two volumes, Volume 1 summarises the national situation, aggregates the national information, contains conclusions on the study analyses and recommendations on the way forward building on the foundation of the national study. Volume 2 contains the common methodologies and strategic proposals applying to all schemes and which were produced to set the criteria for the studies. In addition Volume 2 contains common explanatory notes and definitions, eg. the term "Sanitary Authority" applies to the public authority responsible for the operation and maintenance of qualifying public water supply schemes. These can be urban district councils, corporations or county councils.

Each specific county report is a separate appendice volume and includes data on all qualifying schemes within the county whether operated by the county council, corporations or urban district councils.

2.0 COUNTY WATER SUPPLIES

2.1 GENERAL DESCRIPTION

County Mayo is situated as shown in Figure 2.1. It is bordered by counties Sligo, Roscommon and Galway and has a significant length of coastline on the western seaboard of Ireland.

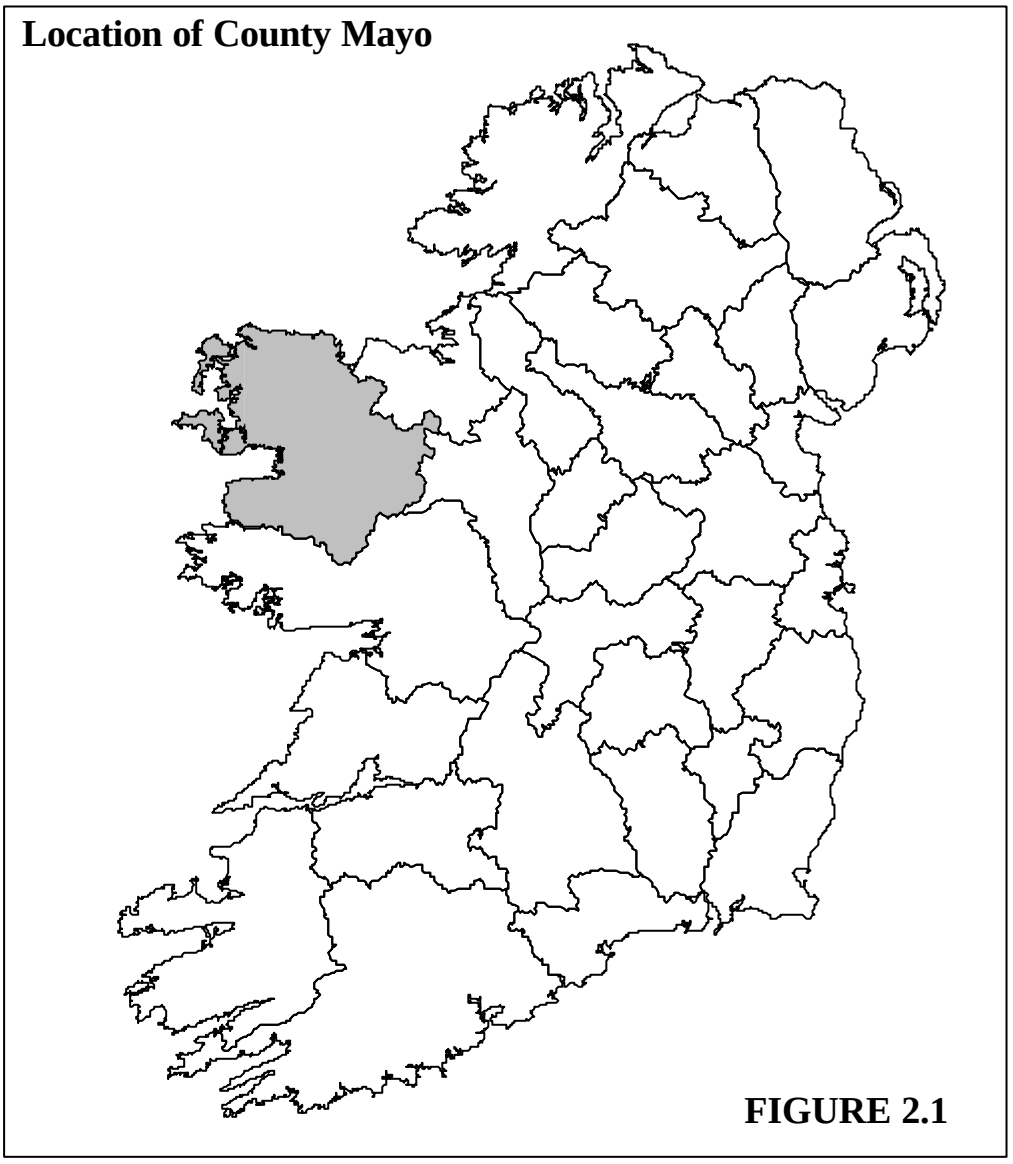


FIGURE 2.1

In County Mayo there are three qualifying schemes for the National Water Study, all of which are the responsibility of Mayo County Council. These are listed in Table 2.1.

Table 2.1 Qualifying Schemes in County Mayo

Scheme	Estimated Population Served 1997
Ballina Regional	15,885
Lough Mask Regional	21,755
Westport	6,454
Total Population Served	**44,094**

The areas supplied by these three schemes, at District Electoral Division (DED) level, are shown in Figure 2.2. Figures for populations served within each DED were based on County Council estimates of percentages of each DED population supplied.

In addition to the three qualifying schemes there were over 22 other Public Water Supply Schemes, serving over 15,690 consumers, and 449 Group Water Schemes, serving approximately 47,260 consumers, in 1997.

Thus, out of an estimated 1997 county population of 112,585, some 53% of the population are served by Public Schemes, 42% by Group Schemes and 5% by Private Schemes.

2.2 BALLINA REGIONAL

The source of water for the Ballina Regional scheme is Lough Conn located a few kilometres south west of the town. There is generous source capacity and the quality of the raw water is, in general, satisfactory, particularly during the summer.

The scheme is supplied from two water treatment works (WTW), the Wherrew works located at the intake on the north shore of the lake and the Lisglennon works located approximately ten kilometres north of Wherrew WTW.

The Wherrew WTW, commissioned in 1974 and in adequate condition, treats water pumped from Lough Conn by flocculation, upward flow clarification, rapid gravity sand filtration and chlorination. The treated water is pumped to the distribution system via a 300mm diameter trunk main. This main supplies water to the Knockanillaun water tower (TWL 67.1 m O.D.), and from there via a 250mm diameter main to Ballina reservoir (TWL 51.6 m O.D.) which act as storage for the area surrounding the town.

The Lisglennon WTW pumps water from Lough Conn before treating it by flocculation, plate or tube settling, rapid gravity sand filtration and chlorination. The treated water is transferred by gravity to Ballina and Killala reservoirs which act as storage for the areas surrounding the towns.

MAYO COUNTY DISTRICT ELECTORAL DIVISIONS (DEDs)

KEY:-

BALLINA REGIONAL

B1: Ardagh
B2: Ardnaree North
B3: Ardnaree South Rural
B4: Ardnaree South Urban
B5: Attymass West
B6: Ballina Rural
B7: Ballina Urban
B8: Ballysakeery
B9: Carrowmore
B10: Fortland
B11: Kilfian East
B12: Kilfian South
B13: Killala
B14: Mount Falcon
B15: Rathoma

LOUGH MASK REGIONAL

L1: Ballinchalla
L2: Ballindine
L3: Ballinrobe
L4: Ballyhean
L5: Breaghwy
L6: Burren
L7: Cappaghduff
L8: Castlebar Rural
L9: Castlebar Urban
L10: Claremorris
L11: Cloonkeen
L12: Islandeady
L13: Killavally
L14: Portroyal
L15: Tawnynagry
L16: Turlough
L17: Westport Rural

WESTPORT

W1: Aghagower North
W2: Croaghpatrick
W3: Kilmeena
W4: Knappagh
W5: Westport Rural
W6: Westport Urban

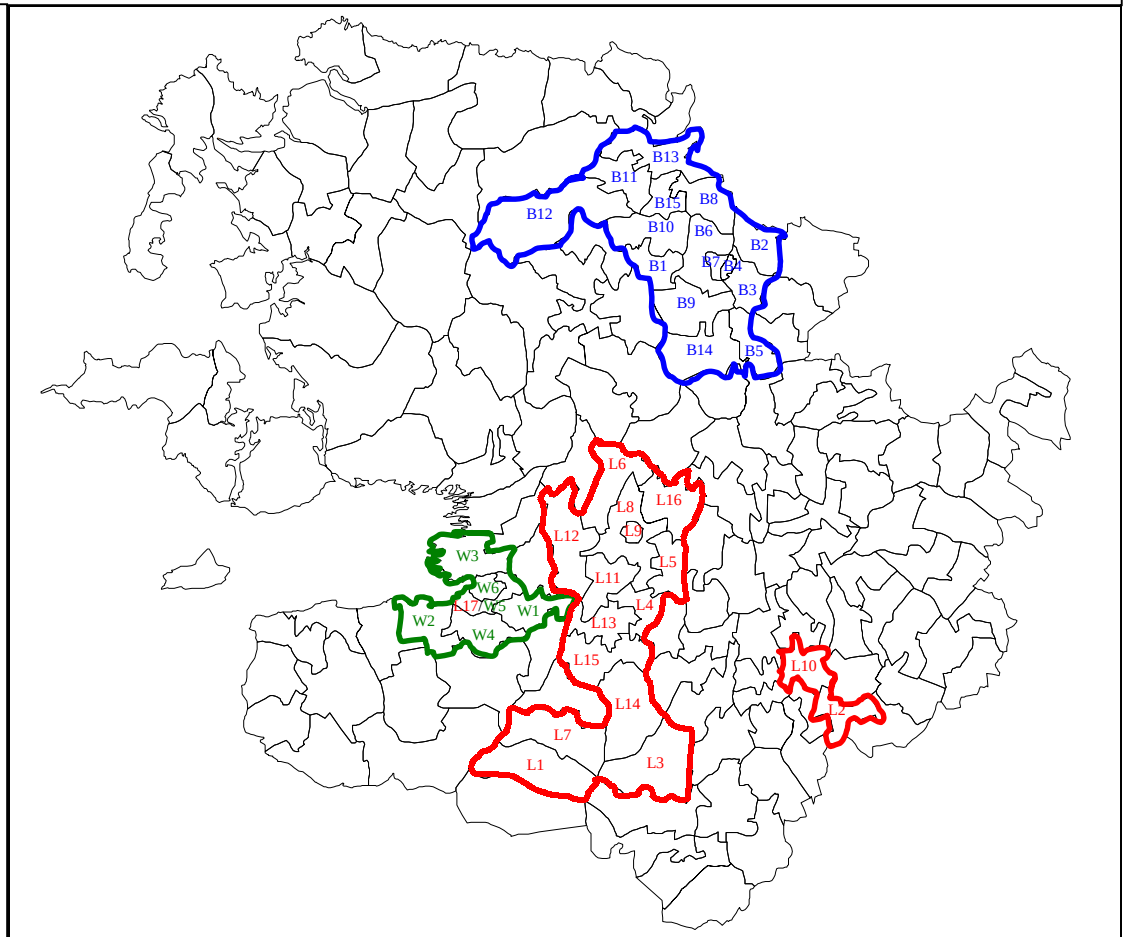


Figure 2.2 – DEDs Wholly or Partially Supplied by Mayo County Council Water Schemes included in The National Water Study

2.3 LOUGH MASK REGIONAL

Water is abstracted from Lough Mask at the western shore of the northern tip of the lough to serve the towns of Ballindine, Ballinrobe, Castlebar and Claremorris and surrounding areas. There is generous source capacity and the quality of the raw water is, in general, satisfactory.

The scheme is supplied from the Tourmakeady WTW approximately two kilometres west of the intake.

The Tourmakeady WTW, commissioned in 1979 and in reasonable condition, treats water by rapid gravity sand filtration and chlorination. The treated water is passed by gravity to the Castlebar reservoirs (TWL 83.3 m O.D.), Ballinrobe water towers (TWL 67.0 m O.D.) and Brookhill reservoir (TWL 10.0 m O.D.) via Ballinrobe.

2.4 WESTPORT

The source of water for the Westport scheme is Moher Lake located approximately seven kilometres south of Westport Town. The quality of the raw water is good.

The scheme is supplied from the Moher Lake WTW on the eastern shore of the lake.

The Moher Lake WTW, commissioned in 1977 and in adequate condition, treats water by flocculation, horizontal or radial flow clarification, filtration and chlorination. The treated water is passed by gravity to Westport reservoir via a 300mm diameter trunk main. The distribution system serves Westport town and the surrounding area.

3.0 ASSET INFORMATION & ASSET CONDITION

3.1 INTRODUCTION

This section describes how data and information on the asset stock and asset condition for each scheme was collected and provides a summary of the data for each scheme. Confidence grades for the data are also included. The full database for the asset stock of the three Mayo schemes is presented in Appendix 3.1.

3.2 MAYO DATA COLLECTION

Data collection was carried out by engineers from PJ Tobin & Co. Ltd. Visits to the County Council offices were carried out during March 1999. The data obtained from Mayo County Council was of a good standard and was, in general, reliable. However, there were difficulties in locating and obtaining the required information for some assets. In particular, there was no information available on the distribution main networks for the schemes.

3.2.1 Asset Identification

The National Water Study database includes an asset identification feature. Each asset entered has a unique identification sequence that allows the database to be sorted via a number of different identifiers.

Mayo County Council do not however use the DOELG codes to identify any part of their schemes. The financial department uses it's own system and bills for water geographically according to the residential address of the owner of the land or premises.

3.2.2 Physical Data

The physical data obtained from the County Council were mostly complete. There were some gaps in the data, in particular regarding authorised or licensed abstraction rates, but in general all of the more important information was supplied and was reliable.

3.2.3 Performance Data

There was a reasonable amount of information supplied regarding pipe bursts, resource failures, service interruptions, nominal and peak daily flows, etc. For the Lough Mask Regional scheme the operation of the system is monitored at a centralised control room using SCADA and telemetry systems. There are no centralised control rooms or telemetry systems in place for the Ballina Regional and Westport schemes but some monitoring facilities do exist for pumping stations and reservoirs.

Water quality monitoring is undertaken by the County Council at the treatment works in on site laboratories for the implementation of the EU Water Regulations 1988. Sampling for bacterial and chemical parameters is carried out approximately twice per month and reports containing details of any exceedances are submitted regularly to the EPA. Daily sampling for colour, odour and some chemical parameters is also

carried out at the treatment works as part of the day to day management of the schemes. The Western Health Board carries out water quality monitoring in the distribution system.

3.3 INPUTS TO ENVISAGE DATABASE

At the commencement of the National Water Study, it had been intended that the asset data collected would be entered into the DoELG's ENVISAGE database. However, as this database was not finalised in time to receive the data, the data is presented in the National Water Study Access database, which has been built in a suitable format to facilitate data export to the DoELG database.

3.4 CONFIDENCE GRADES

Confidence Grades have been assigned to the data obtained during the visit and are included in the asset database. These are included in the summary asset tables included below in Section 3.6 of this report.

3.5 SUMMARY OF ASSET INFORMATION AND ASSET CONDITION DATA

A summary of the assets and their condition is presented in Tables 3.1 to 3.3. A complete record of the asset information collected is presented in Appendix 3.1.

Table 3.1 - Asset Data Summary for the Ballina Regional Scheme

Surface Source Works

Name of Source	Nominal Output Capacity (Ml/d)	Maximum Output Capacity (Ml/d)	Maximum Authorised Abstraction (Ml/d)	Year Commissioned	Condition Assessment	Data Confidence
Lough Conn	6.600	36.000	Unknown	1976	Adequate	Reliable

Water Treatment Works

Name of Works	Type of Pretreatment	Type of Clarification	Type of Filters	Type of Disinfection	Nominal Output (Ml/d)	Maximum Output (Ml/d)	Peak Day Output (Ml/d)	ominal Day Peak Week Output (Ml/d)	Year Commissioned	Condition Assessment	Data Confidence
Lisglennon	Flocculation	Plate or Tube Settlers	Rapid Gravity Sand Filters	Chlorination	9.000	Unknown	9.500	9.500	1988	Fair	Reliable
Wherrew	Flocculation	Upward Flow Basin	Rapid Gravity Sand Filters	Chlorination	4.500	Unknown	4.500	Unknown	1974	Adequate	Reliable

Service Reservoirs and Water Towers

Name of Structure	Structure Type	Construction Material	Number of Compartments	Bypassable?	Capacity (Ml)	Year Commissioned	Condition Assessment	Data Confidence
Ballina Res.	Service Reservoir	Reinforced Concrete	2	no	2.270	1974	Adequate	Reliable
Killala Res.	Service Reservoir	Reinforced Concrete	1	yes	0.200	1948	Fair	Reliable
Knockanillaun Water Tower	Water Tower	Reinforced Concrete	1	no	1.140	Unknown	Unknown	Unknown

Pumping Stations

Name of Pump Station	Type of Pumps	Surge Supression?	Automatic Changeover?	Nominal Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Stage 3, High Lift at Lisglennon	Centrifugal	yes	no	36.000	36.000	1986	Fair	Reliable
Wherrew Local (to Knockanillaun)	Centrifugal	yes	no	4.500	4.500	1974	Adequate	Reliable
Wherrew Main Raw Water Pumps	Vertical Spindle Centrifugal	yes	no	43.000	43.000	1976	Adequate	Reliable

Raw Water Aqueducts

Name of Aqueduct	Type of Aqueduct	Material	Typical Diameter (mm)	Height (mm)	Width (mm)	Length (km)	Capacity (Ml/d)	Average Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Intake to Lisglennon Works	Pumped	Concrete	700			11.000	53.000	6.6000	Unknown	1976	Fair	Reliable
Intake to Wherrew Works	Pumped	Ductile Iron - Lined	300			0.100	Unknown	1.5000	4.5000	1974	Adequate	Unknown

Trunk Mains

Name of Trunk Main	Type Of Trunk Main	Material	Typical Diameter (mm)	Length (km)	Capacity (Ml/d)	Average Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Knockanillaun to Ballina	Pumped	Asbestos	250	4.000	4.5	Unknown	Unknown	1974	Good	Reliable
Lisglennon to Ballina	Gravity	Asbestos	450	9.300	4.5	4.500	4.500	1988	Good	Reliable
Lisglennon to Rathbaun	Gravity	Asbestos	450	9.300	4.5	1.000	1.000	1988	Good	Reliable
Wherrew to Knockanillaun	Pumped	Asbestos	300	5.000	Unknown	1.500	1.500	1974	Fair	Reliable

Distribution Mains

Not Available

Table 3.2 - Asset Data Summary for the Lough Mask Regional Scheme

Surface Source Works

Name of Source	Nominal Output Capacity (Ml/d)	Maximum Output Capacity (Ml/d)	Maximum Authorised Abstraction (Ml/d)	Year Commissioned	Condition Assessment	Data Confidence
Lough Mask	27.000	27.000	54.000	1979	Adequate	Reliable

Water Treatment Works

Name of Works	Type of Pretreatment	Type of Clarification	Type of Filters	Type of Disinfection	Nominal Output (Ml/d)	Maximum Output (Ml/d)	Peak Day Output (Ml/d)	Nominal Day Peak Week Output (Ml/d)	Year Commissioned	Condition Assessment	Data Confidence
Tourmakeady	None	None	Rapid Gravity Sand Filters	Chlorination	27.000	Unknown	27.000	26.000	1979	Fair	Reliable

Service Reservoirs and Water Towers

Name of Structure	Structure Type	Construction Material	Number of Compartments	Bypassable?	Capacity (Ml)	Year Commissioned	Condition Assessment	Data Confidence
Ballinrobe Water Towers	Water Tower	Reinforced Concrete	2	no	2.250	1993	Good	Highly Reliable
Brookhill Reservoir	Service Reservoir	Reinforced Concrete	1	yes	10.000	1997	Good	Highly Reliable
Castlebar Reservoirs	Service Reservoir	Reinforced Concrete	2	no	20.000	1979	Good	Highly Reliable

Pumping Stations

Name of Pump Station	Type of Pumps	Surge Suppression?	Automatic Changeover?	Nominal Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Intake Works	Centrifugal	yes	no	24.000	39.000	1979	Fair	Reliable

Raw Water Aqueducts

Name of Aqueduct	Type of Aqueduct	Material	Typical Diameter (mm)	Height (mm)	Width (mm)	Length (km)	Capacity (Ml/d)	Average Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Source to Treatment Works	Pumped	Ductile Iron - Lined	600			2.400	Unknown	24.000	Unknown	1979	Fair	Moderately Reliable

Trunk Mains

Name of Trunk Main	Type Of Trunk Main	Material	Typical Diameter (mm)	Length (km)	Capacity (Ml/d)	Average Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Ballinrobe to Brookhill Res.	Gravity	Asbestos	750	19.187	Unknown	3.000	3.000	1997	Good	Highly Reliable
Brookhill to Claremorris A	Gravity	Asbestos	600	3.714	Unknown	Unknown	Unknown	1997	Good	Highly Reliable
Brookhill to Claremorris B	Gravity	Asbestos	300	4.371	Unknown	3.000	3.000	1997	Good	Highly Reliable
Partry to Ballinrobe	Gravity	Asbestos	750	11.320	Unknown	7.000	7.000	1992	Good	Reliable
Partry to Castlebar	Gravity	Concrete	700	5.500	Unknown	17.000	17.000	1979	Good	Reliable
Partry to Castlebar	Gravity	Asbestos	600	15.371	Unknown	17.000	17.000	1979	Fair	Reliable
Tourmakeady to Partry	Gravity	Concrete	900	8.000	Unknown	24.000	24.000	1979	Good	Reliable

Distribution Mains

Not Available

Table 3.3 - Asset Data Summary for the Westport Scheme

Water Treatment Works

Name of Works	Type of Pretreatment	Type of Clarification	Type of Filters	Type of Disinfection	Nominal Output (Ml/d)	Maximum Output (Ml/d)	Peak Day Output (Ml/d)	ominal Day Peak Week Output (Ml/d)	Year Commissioned	Condition Assessment	Data Confidence
Lake Moher Works	Flocculation	Horizontal or Radial Flow	Other	Chlorination	3.600	Unknown	3.600	3.600	1977	Adequate	Reliable

Service Reservoirs and Water Towers

Name of Structure	Structure Type	Construction Material	Number of Compartments	Bypassable?	Capacity (Ml)	Year Commissioned	Condition Assessment	Data Confidence
Westport Reservoir	Reservoir	Reinforced Concrete	Unknown	no	2.200	Unknown	Unknown	Unknown

Pumping Stations

Name of Pump Station	Type of Pumps	Surge Suppression?	Automatic Changeover?	Nominal Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Supplementary Pumps at Works	Centrifugal	no	no	3.600	Unknown	1994	Adequate	Reliable

Raw Water Aqueducts

Name of Aqueduct	Type of Aqueduct	Material	Typical Diameter (mm)	Height (mm)	Width (mm)	Length (km)	Capacity (Ml/d)	Average Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Moher Lake to Treatment Works	Gravity	PVC	300			2.400	Unknown	3.4000	Unknown	1976	Good	Moderately

Trunk Mains

Name of Trunk Main	Type Of Trunk Main	Material	Typical Diameter (mm)	Length (km)	Capacity (Ml/d)	Average Flow (Ml/d)	Maximum Flow (Ml/d)	Year Installed	Condition Assessment	Data Confidence
Works to Westport Town	Gravity	PVC	300	8.000	3.600	3.200	3.200	1977	Adequate	Reliable

Distribution Mains

Not Available

4.0 STAFFING STRUCTURE & OPERATIONAL CONTROL

4.1 STAFFING STRUCTURE

The County Council staff responsible for the running and maintenance of the County water supply schemes are made up of the following:

- 1 executive engineer who works full time on the Ballina Regional and Lough Mask Regional schemes;
- 9 area executive engineers, who are responsible for roads and sewerage as well as water supply in their respective areas and divide time between all three;
- 1 technician who works full time on the Lough Mask Regional scheme;
- 2 full time waste inspectors, one of whom is responsible for all public water supply schemes with the other having responsibility for Group Water Schemes;
- 26 full time water supply caretakers.

4.2 OPERATIONAL CONTROL

The Lough Mask Regional scheme incorporates SCADA and telemetry systems linked to a centralised control room. Water levels at the reservoirs are monitored and controlled by means of actuated valves, the status and operation of which is also monitored. There are pump status monitors and flow meters at the pumping stations and the pumps are controlled via timers and balance tank levels. Flow meters have also been installed at the treatment plant and at all service reservoirs and water towers.

There are no centralised control rooms or SCADA systems in operation for the Ballina Regional and Westport schemes. The pump stations at both WTW for the Ballina Regional scheme are controlled by means of a timer at Wherrew and by water level monitoring at Lisglennon. For the Westport scheme water levels in the reservoir are monitored and controlled by means of a ball valve. There is a supplementary pump on the intake main which is operated manually when required. There are 9 flow meters installed on the system which are read automatically.

5.0 RELIABLE SOURCE YIELDS

5.1 METHODOLOGY

The recommended methodology for assessing reliable source yield is described in the WS Atkins Report "Notes on Yield Assessment Methodology" reference AK2370/712/DG/011 of January 1999. This is included in Volume 2 of the core report.

The study has considered two aspects of source yield when assessing the reliable yield.

- Hydrological yield is the hydrological capacity of a source, i.e. how much water is available from the natural environment during a drought that can be expected to occur once every fifty years.

- Deployable output considers the capacity of the plant used to abstract and process the raw water.

Depending on the circumstances of an individual source, hydrological yield may be greater, smaller, or equal to deployable output.

The reliable yield of a source is defined as the lesser of the deployable output and hydrological yield. It is the yield that can be supplied by a source through a drought that could be expected to occur once every fifty years.

The principle advantage of considering reliable yield from these two perspectives is that it allows the critical constraint on yield from each source to be determined, i.e. is it the natural capacity of the source or the plant used to exploit the source?

In précis the yield assessment report details the approach to be taken to re-assessing yields for the three types of sources i.e. reservoirs and lakes; rivers; and groundwater. It includes as Appendix A: Reliable Yield Summary Forms and Guidance Notes. This includes guidance notes for completing reliable yield analysis for each of the three source types. The completed reliable yield assessment summary forms for Mayo are included as Appendix 5.1 of this report.

Attention is drawn to the confidence grades ascribed to the data on these forms, and the variability of the data used.

As part of the Brief for The National Water Study, it was agreed that a representative sample of counties be selected for a full hydrological yield analysis of water supply sources. The counties chosen for this full analysis were Donegal, Galway, Kerry, Meath and Waterford. Thus, assessments of the 1 in 50 year hydrological yields of the County Mayo sources were not undertaken but any previous hydrological yield studies carried out by other organisations were reviewed. However, we would draw attention to our methodology of assessing the 1 in 50 year yield of water sources and recommend that it be applied to the sources in County Mayo.

5.2 COUNTY MAYO SOURCES: SUMMARY

An assessment has been made of the reliable yields of the County Mayo sources. These are listed in Table below 5.1. Details on how these yields were derived are provided in the reliable yield assessment summary forms of Appendix 5.1. A précis of the findings is given in sections 5.3 to 5.6.

Table 5.1 – Source Yields Ml/d

Scheme	Source	Hydrological Yield Ml/d	Deployable Output		Reliable Yield	
			Average Ml/d	Peak Ml/d	Average Ml/d	Peak Ml/d
Ballina Regional	Lough Conn	unknown	13.500	13.500	13.500	13.500
Lough Mask Regional	Lough Mask	60.000	24.000	27.000	24.000	27.000
Westport	Moher Lake	5.900	3.600	3.600	3.600	3.600

5.3 BALLINA REGIONAL

5.3.1 Lough Conn

The deployable output of the source was assessed using data from the National Water Study asset database. The dominant constraint on the deployable output of the source is the combined capacity of the Lisglennon and Wherrew water treatment works, given as 13.500 Ml/d. Thus, the current reliable yield for the source was taken as 13.500 Ml/d under both average and peak demand conditions.

A hydrological yield assessment was not undertaken for the source. However, the lake is extremely large, with an estimated live capacity of 1,376,000 Ml, and it is assumed that the 1 in 50 year hydrological yield of the lake will not be a constraint on the abstraction.

5.4 LOUGH MASK REGIONAL

5.4.1 Lough Mask

The deployable output of the source was assessed using data from the National Water Study asset database. The dominant constraint on the deployable output of the source under average demand conditions is the capacity of the pump on the raw water main, rated at 24.000 Ml/d. Under peak demand conditions the deployable output is constrained by the capacity of the WTW which is 27.000 Ml/d. Thus, the current reliable yield for the source was taken as 24.000 Ml/d under average demand conditions and 27.000 Ml/d under peak demand conditions.

A hydrological yield assessment was not undertaken for the source. A previous study carried out by University College Galway in 1975 estimated the hydrological yield of the lake at 60.000 Ml/d. The lake is extremely large, with a catchment area of 834km^2 and an estimated live capacity of 1,104,600 Ml, and it is assumed that the 1 in 50 year hydrological yield of the lake will not be a constraint on the abstraction.

5.5 WESTPORT

5.5.1 Moher Lake

The deployable output of the source was assessed using data from the National Water Study asset database. The dominant constraint on the deployable output of the source under average demand conditions is the capacity of the WTW, rated at 3.600 Ml/d. Thus, the current reliable yield for the source was taken as 3.600 Ml/d under both average and peak demand conditions.

A hydrological yield assessment was not undertaken for the source. A previous study carried out by An Foras Forbartha in 1979 estimated the hydrological yield of the lake at 5.920 Ml/d. The lake has a catchment area of 48 km^2 and an estimated live capacity of 371,000 Ml, and it is assumed that the 1 in 50 year hydrological yield of the lake will not be a constraint on the abstraction.

6.0 TREATMENT CAPACITY

6.1 INTRODUCTION

The relationship between source hydrological yield and source deployable output is defined in Volume 2 of the Core Documents and in particular in Appendix 3 the "Notes on Yield Assessment Methodology". Essentially the deployable output is defined by the capacity of the plant used to abstract and process the raw water as opposed to the source hydrological yield. The difference between hydrological yield and deployable output can be considerable, as can be seen in the previous section. This difference can be converted into additional deployable output from the same source if the treatment processes and associated M&E plant are uprated and the abstraction licence permits the increased abstraction. A proviso is the priority ascribed to any other water abstractions compared to those for public water supply that might affect the allowable abstraction for water supply purposes.

6.2 BALLINA REGIONAL

6.2.1 Treatment Capacity

The Ballina Regional scheme is supplied with treated water from the Lisglennon and Wherrew treatment works. The combined output from both treatment works is 13.500 Ml/d under average demand conditions, 67% of which comes from the Lisglennon works.

6.2.2 Treatment Process

Treatment at the Lisglennon works consists of flocculation, plate or tube settling, rapid gravity sand filtration and chlorination. Treatment at the Wherrew works consists of flocculation, upward flow clarification, rapid gravity sand filtration and chlorination.

6.2.3 Potential Treatment Capacity

The combined treatment works capacity is extremely small when compared with the generous source capacity of Lough Conn. Increasing the capacity of the intakes and treatment plants and construction of the necessary additional storage, trunk main and distribution reinforcement could easily accommodate any foreseeable increases in demand. However, the current average demand on the scheme is 8.000 Ml/d, which is significantly lower than the current treatment works capacity of 13.500 Ml/d, indicating that significant increases in demand could be met without any further increases in the current capacity.

6.3 LOUGH MASK REGIONAL

6.3.1 Treatment Capacity

The Lough Mask Regional scheme is supplied with treated water from the Tourmakeady treatment works. The output from the treatment works is 27.000 Ml/d under average and peak demand conditions.

6.3.2 Treatment Process

The treatment at the works consists of rapid gravity sand filtration and chlorination.

6.3.3 Potential Treatment Capacity

The treatment works capacity is approximately 45% of the 60.000 Ml/d hydrological yield of Lough Mask. The maximum authorised abstraction from the lake is 54.000 Ml/d. Thus, foreseeable increases in demand of up to twice the current requirements could be accommodated by increasing the capacity of the intakes and treatment plants and construction of the necessary additional storage, trunk main and distribution reinforcement. The current average demand on the scheme is 23.500 Ml/d, which is lower than the current treatment works capacity of 27.000 Ml/d, indicating that a small increase in demand could be met without any further increases in the current capacity.

6.4 WESTPORT

6.4.1 Treatment Capacity

The Westport scheme is supplied with treated water from the Moher Lake works. The output from the treatment works is 3.600 Ml/d under average demand conditions.

6.4.2 Treatment Process

The treatment at the works consists of flocculation, horizontal or radial flow clarification, filtration and chlorination.

6.4.3 Potential Treatment Capacity

The treatment works capacity is approximately 61% of the 5.920 Ml/d hydrological yield of Moher Lake. Thus, increasing the capacity of the intakes and treatment plants and construction of the necessary additional storage, trunk main and distribution reinforcement could accommodate a significant increase in demand.

7.0 WATER QUALITY

7.1 METHODOLOGY

The methodology used to assess the quality of water supplied by schemes included in the National Water Study is detailed in the WS Atkins report "Notes on Water Quality Assessment Methodology". This is included in Volume 2 of the core report.

The methodology assesses water quality at two locations: raw water at the point of abstraction and treated water at the point of consumption. Treated water is assessed using standards from the 1988 Drinking Water Regulations. An assessment is also made against the standards set in the 1998 Drinking Water Directive, however the conclusions of this assessment should only be considered as indicative, since the standards to be used in this country will not be confirmed until the Directive is enforced into Irish law.

7.2 COUNTY MAYO SCHEMES: SUMMARY

An assessment has been made of the quality of water abstracted and supplied by the three County Mayo scheme. The assessments at the points of abstraction and supply are presented in the Water Quality Assessment Summary in Appendix 7.1. Further details on scheme compliance, at the point of consumption, with the standards set in the 1988 Drinking Water Regulations are shown in the Drinking Water Quality Assessment Forms in Appendix 7.2. A précis of the findings is given in sections 7.3 to 7.6 and is summarised in Table 7.1.

Table 7.1: Summary of Water Quality

Scheme	Compliance with 1988 Drinking Water Regulations		Substances in High Concentrations in Raw Water
	Parameters Exceeding MAC	Monitoring Frequency	
Ballina Regional	Coliforms Iron	Non-Compliant	Iron Phosphorus Chlorophyll
Lough Mask Regional	Coliforms	Non-Compliant	Phosphorus Chlorophyll
Westport	None	Non-Compliant	Phosphorus Chlorophyll

7.3 BALLINA REGIONAL

An abstraction from Lough Conn supplies the scheme. The quality of the raw water is satisfactory, particularly during the summer. Lough Conn is classed as Mesotrophic under the modified OECD classification scheme, indicating that it is satisfactory for abstraction. The EPA Report on Water Quality in Ireland 1995-1997 draws particular attention to Lough Conn in the following discussion on the water quality of salmonid fishery lakes in the west of Ireland:

"Of particular concern were growths of benthic algae on and near shores adjacent to polluted inflowing rivers and, in the case of Lough Conn, excessive autumn/winter cyanobacterial accumulations along shorelines. It is believed that the associated

ecological changes in these lakes included, in the case of Lough Conn, the loss of the Arctic Charr, *Salvelinus alpinus*. These algal developments have been reduced in recent years as a result of measures put in place to control phosphorus losses to the inflowing rivers. Significant reductions in phosphorus loadings have been recorded in the cases of Loughs Conn and Mask"

Treated water supplied by the waterworks is of satisfactory quality. The coliform exceedances were due to minor contamination of the distribution mains. The typical course of action taken by Sanitary Authorities in addressing such problems is to clean out the distribution mains. This is done on a regular basis by Mayo County Council. The iron exceedances were due to naturally occurring high levels in the raw water. A secondary cause may be the poor condition of the very old cast iron distribution mains in the towns of Ballina and Killala.

Monitoring at the point of consumption is below the requirements of the 1988 Regulations. Thus, the above assessment of water quality may be unreliable. However, the frequency of sampling for bacteriological parameters, which are the most relevant indicators of water quality, exceeded the regulation requirements. This reflects the efforts by the Council to ensure a satisfactory drinking water quality. The Council are currently reviewing their policy regarding frequency of sampling for other less important parameters.

7.4 LOUGH MASK REGIONAL

An abstraction from Lough Mask supplies the scheme. Lough Mask is classed as Mesotrophic under the modified OECD classification scheme, indicating that it is satisfactory for abstraction. As mentioned in the above section, the EPA Report on Water Quality in Ireland 1995-1997 draws attention to high levels of benthic algae observed on and near shores adjacent to polluted inflowing rivers and significant reduction in phosphorus loadings to the lake.

Treated water supplied by the waterworks is of satisfactory quality. The coliform exceedances were due to minor contamination of the distribution mains. The typical course of action taken by Sanitary Authorities in addressing such problems is to clean out the distribution mains. This is done on a regular basis by Mayo County Council.

Monitoring at the point of consumption is below the requirements of the 1988 Regulations. Thus, the above assessment of water quality may be unreliable. However, as explained in the previous section, the sampling rate for bacteriological parameters exceeded the regulation requirements and sampling rates for the other parameters are currently under review.

7.5 WESTPORT

An abstraction from Moher Lake supplies the scheme. The quality of the raw water is good. Moher Lake is classed as Oligotrophic under the modified OECD classification scheme, indicating that it is suitable for abstraction.

Treated water supplied by the scheme is of good quality. There were no recorded exceedances in 1997.

Monitoring at the point of consumption is below the requirements of the 1988 Regulations. Thus, the above assessment of water quality may be unreliable. However, as explained in the previous section, the sampling rate for bacteriological parameters exceeded the regulation requirements and sampling rates for the other parameters are currently under review.

8.0 DEMAND ESTIMATION AND FORECASTING

8.1 INTRODUCTION

The methodology for assessing the 1997 Domestic Demand and Forecasting the Demand through to 2018 is set out in Volume 2 of the Core Report in the paper entitled "Annual Average Domestic Demand in Ireland 1997-2018" by WS Atkins of March 1999.

This sets out in considerable detail the derivation of the 1997 baseline domestic demand figure from the population data for each county and the new unique per capita consumption figure derived for each county. The per capita consumption figure was calculated using an analysis of the micro-components of water usage per household and household occupancy rates.

The detailed makeup of these elements is not repeated here reference should be made to Appendix 3 of Volume 2 where necessary.

The 1997 population figure for Mayo is 112,585 at an occupancy rate per property of 3.14 and a county average per capita consumption of 131.9l/h/d. This gives a total countywide domestic demand of 14.800 Ml/d.

It should be noted that the calculation of the future demand in both the domestic and non-domestic sectors does not include extensions of the schemes which are at various stages of planning and, as such, are difficult to quantify. These include the extension of the Ballina Regional scheme to serve Crossmolina, the extension of the Lough Mask Regional scheme to Knock Ballyhaunis and expansion of the supply to Westport which is likely to be provided by Lough Mask.

8.2 DOMESTIC DEMAND

8.2.1 Baseline 1997

Baseline domestic demand was calculated using the following data sets:

- Mayo County Council estimates of the number of people supplied in each District Electoral Division (DED) in each scheme area based on the 1991 Census.
- WSA projections of total DED populations in 1997.
- WSA estimates of county, county borough aggregate town and aggregate rural area occupancy rates for Mayo in 1997.
- WSA estimates of county, county borough aggregate town and aggregate rural area per capita consumptions (PCCs) for Mayo in 1997.

The County Council estimates of population served within each DED in 1991 were compared with the total DED populations given in the 1991 Census. The differences were used to factor the WSA projections of DED populations in 1997 to reflect the percentages of the DEDs supplied by the schemes. These adjusted populations were then multiplied by the appropriate PCC figures to give the domestic demand in each DED within each scheme area in 1997. Details of these calculations are given in Appendix 8.1 for the three schemes.

8.2.2 Forecast

Forecasts of domestic demand were calculated using the following data sets:

- WSA projections of the DED populations to 2018.
- WSA projections of county, county borough, aggregate town and aggregate rural area PCCs to 2018.

As for the baseline demand calculations, the WSA projections of DED populations were factored to reflect the percentages of the DED populations supplied in 1991. The adjusted DED populations were then multiplied by the appropriate projected PCC figures to give the forecasts of domestic demand in each DED within each scheme area to 2018. Details of these calculations are given in Appendix 8.2.

Table 8.1 gives the projected occupancy rates and PCC figures used in the domestic demand calculations and Table 8.2 gives the baseline and forecast total population supplied and domestic demand for each of the three schemes.

Table 8.1 - Baseline and Projected Occupancy Rates and Per Capita Consumption for the County, Aggregate Town and Aggregate Rural Areas of Mayo

Area	Occupancy Rate (persons per household)					Per Capita Consumption (litres per head per day)				
	1997	2003	2008	2013	2018	1997	2003	2008	2013	2018
County	3.14	3.00	2.90	2.81	2.73	131.9	136.6	140.6	144.5	148.5
Aggregate Town Area	2.95	2.82	2.72	2.64	2.56	134.0	138.9	143.0	147.1	151.2
Aggregate Rural Area	3.20	3.05	2.95	2.86	2.78	131.2	136.0	139.9	143.8	147.8

Table 8.2 - Baseline and Projected Population Supplied and Domestic Demand for Mayo Schemes

Scheme	Population Supplied					Domestic Demand (megalitres per day)				
	1997	2003	2008	2013	2018	1997	2003	2008	2013	2018
Ballina Regional	15,885	15,676	15,714	15,747	15,693	2.104	2.151	2.220	2.287	2.342
Lough Mask Regional	21,755	21,586	21,638	21,683	21,610	2.873	2.954	3.047	3.140	2.168
Westport	6,454	6,369	6,384	6,397	6,375	0.859	0.878	0.906	0.934	0.957

8.3 NON-DOMESTIC DEMAND

8.3.1 County Council Water Charges

To estimate baseline demand in the agricultural, commercial, industrial and public sectors, water charge account data was obtained from the rates department of the County Council and processed by County Council engineers for the purpose of this study.

Mayo County Council charges agricultural, commercial, industrial and public sector water users either on a metered consumption or fixed charge basis. The metered and fixed charge customer accounts are kept on separate systems within the rates departments. Metered data, including consumption figures, and fixed charge customer listings were used in the analyses.

For each scheme the fixed charge customer consumption in the different sectors was estimated as follows:

- The major metered user consumption (i.e. consumption by those customers using in excess of 0.100 Ml/d) was subtracted from the total metered consumption for each sector.
- The remaining metered consumption was divided by the total number of metered customers minus the number of major users to get the average consumption per normal metered customer.
- This average consumption figure was then applied to all unmetered or fixed charge customers.

In the case of the agricultural consumers, a figure of 706 litres/farm/day was used to estimate consumption. This figure is given in Appendix A of the WS Atkins paper entitled "Baseline and Forecast Sectoral Demand Estimation" which is contained in Volume 2 of the Core Report. The number of farms served by each scheme was estimated by multiplying the total number of farms within each DED by the percentage of the DED area served by the scheme.

8.3.2 Agricultural Demand: Baseline

Agricultural demand for the three schemes in Mayo is given in Table 8.3, where the consumption by unmetered customers has been estimated by the procedure described above. There are no metered agricultural customers on the three schemes under consideration.

Table 8.3 - Baseline Demand in the Agricultural Sector for Mayo Schemes

Scheme	Baseline Demand – Agricultural Sector			
	Metered Customers		Unmetered Customers	
	No. of Users	Consumption (Ml/d)	No. of Users	Consumption (Ml/d)
Ballina Regional	0	0.000	1,101	0.777
Lough Mask Regional	0	0.000	483	0.341
Westport	0	0.000	309	0.218

8.3.3 Agricultural Demand: Forecast

Agricultural demand is dominated by the high water consumption dairy and beef sectors. Demand in these sectors is controlled by EU Common Agricultural Policy (CAP), which is currently under review.

Demand in the dairy sector until 2006 will be stable, since the size of Ireland's milk quota is fixed until this date. Demand in the beef sector until 2006 is also unlikely to

increase, since the population of cattle in Ireland is at or exceeds the country's holding capacity.

There is no indication, as yet, of the outcome of the current CAP review. However, since the cattle population is at the country's holding capacity, it is very unlikely that the freer agricultural market that the CAP reforms are expected to create will lead to an increase in cattle numbers after 2006.

The projection is that there will be zero growth in agricultural demand across the planning period. Thus demand through to 2018 is assumed to be the same each year as it is in the baseline year of 1997.

8.3.4 Commercial Demand: Baseline

The baseline commercial demand as returned by the County Council is given in Table 8.4, where the consumption by unmetered customers has been estimated by the procedure described Section 8.3.1.

Table 8.4 - Baseline Demand in the Commercial Sector for Mayo Schemes

Scheme	Baseline Demand – Commercial Sector			
	Metered Customers		Unmetered Customers	
	No. of Users	Consumption (Ml/d)	No. of Users	Consumption (Ml/d)
Ballina Regional	134	0.221	231	0.381
Lough Mask Regional	41	0.269	617	1.031
Westport	108	0.693	25	0.160

8.3.5 Commercial Demand: Forecast

The forecast demand is based on the Economic and Social Research Institute Medium Term Review (ESRI MTR) 1997-2003 projections of numbers employed in the 'Other Market Services' sector. In this report the ESRI predict 4.9% growth in employment per annum from 1995 to 2000, 3.5% from 2000 to 2005 and 2.3% from 2005 to 2010. The results are detailed in Table 8.5.

Table 8.5 – Baseline and Forecast Total Demand (metered+unmetered) in the Commercial Sector for Mayo Schemes

Scheme	Demand (Ml/d)				
	1997	2003	2008	2013	2018
Ballina Regional	0.601	0.770	0.883	0.975	1.040
Lough Mask Regional	1.300	1.663	1.908	2.106	2.247
Westport	0.854	1.092	1.253	1.383	1.476

8.3.6 Industrial Demand: Baseline

The baseline industrial demand as returned by the County Council is given in Table 8.6, where the consumption by unmetered customers has been estimated by the procedure described Section 8.3.1.

Table 8.6 - Baseline Demand in the Industrial Sector for Mayo Schemes

Scheme	Baseline Demand – Industrial Sector			
	Metered Customers		Unmetered Customers	
	No of Users	Consumption (Ml/d)	No of Users	Consumption (Ml/d)
Ballina Regional	11	0.121	5	0.055
Lough Mask Regional	14	2.879	17	0.566
Westport	5	0.227	1	0.026

8.3.7 Industrial Demand: Forecast

The forecast demand is based on ESRI MTR projections of Manufacturing Output and Manufacturing Employment. The overall indicator is made up of 85% of the Manufacturing Output indicator and 15% of the Manufacturing Employment indicator since 15% of Industrial demand may be attributed to usage by employees (NI study, ref. 8.1).

For Manufacturing Output the ESRI predict an average of 5.7% growth per annum from 1997 to 2005 falling to 4.7% per annum from 2005 to 2010. For Manufacturing Employment ESRI predict 1.8% growth per annum from 1995 to 2000, 1.3% from 2000 to 2005 and 1% from 2005 to 2010. The results are detailed in Table 8.7.

Table 8.7 – Baseline and Forecast Total Demand (metered+unmetered) in the Industrial Sector for Mayo Schemes

Scheme	Demand (Ml/d)				
	1997	2003	2008	2013	2018
Ballina Regional	0.177	0.215	0.252	0.294	0.340
Lough Mask Regional	3.445	4.191	4.922	5.740	6.637
Westport	0.253	0.308	0.362	0.422	0.488

8.3.8 Public Sector Demand: Baseline

The baseline industrial demand as returned by the County Council is given in Table 8.8, where the consumption by unmetered customers has been estimated by the procedure described Section 8.3.1.

Table 8.8 - Baseline Demand in the Public Sector for Mayo Schemes

Scheme	Baseline Demand – Public Sector			
	Metered Customers		Unmetered Customers	
	No of Users	Consumption (Ml/d)	No of Users	Consumption (Ml/d)
Ballina Regional	3	0.066	21	0.460
Lough Mask Regional	11	0.304	6	0.014
Westport	-	-	-	-

8.3.9 Public Sector Demand: Forecast

The forecast demand is based on WSA projections of the overall population of County Mayo and ESRI MTR projections of 'Non-Market Services' employment. The overall indicator is made up of 40% of the population indicator and 60% of the employment indicator (NI study).

It is predicted that the population of County Mayo will have increased by 25% in 2018. For 'Non-Market Services' employment ESRI predict 2.5% growth per annum from 1995 to 2000 and 2.3% from 2000 to 2010. The results are detailed in Table 8.9.

Table 8.9 – Baseline and Forecast Total Demand (metered+unmetered) in the Public Sector for Mayo Schemes

	Demand (Ml/d)				
Scheme	**1997**	**2003**	**2008**	**2013**	**2018**
Ballina Regional	0.526	0.575	0.619	0.668	0.718
Lough Mask Regional	0.319	0.348	0.375	0.404	0.435
Westport	-	-	-	-	-

8.4 SCHEME DEMANDS AND FORECASTS

Tables 8.10 to 8.12 summarise the data on current and future demands for each of the three Mayo water supply schemes included in the National Water Study.

Table 8.10 – Baseline and Forecast Total Demand for the Ballina Regional Scheme

	Demand (Ml/d)				
Sector	**1997**	**2003**	**2008**	**2013**	**2018**
Domestic	2.104	2.151	2.220	2.287	2.342
Agricultural	0.777	0.777	0.777	0.777	0.777
Commercial	0.601	0.770	0.883	0.975	1.040
Industrial	0.177	0.215	0.252	0.294	0.340
Public Sector	0.526	0.575	0.619	0.668	0.718
TOTALS	**4.185**	**4.488**	**4.751**	**5.001**	**5.217**

Table 8.11 – Baseline and Forecast Total Demand for the Lough Mask Regional Scheme

Sector	Demand (Ml/d)				
	1997	**2003**	**2008**	**2013**	**2018**
Domestic	2.873	2.954	3.047	3.140	2.168
Agricultural	0.341	0.341	0.341	0.341	0.341
Commercial	1.300	1.663	1.908	2.106	2.247
Industrial	3.445	4.191	4.922	5.740	6.637
Public Sector	0.319	0.348	0.375	0.404	0.435
TOTALS	**8.278**	**9.497**	**10.593**	**11.731**	**11.828**

Table 8.12 – Baseline and Forecast Total Demand for the Westport Scheme

Sector	Demand (Ml/d)				
	1997	**2003**	**2008**	**2013**	**2018**
Domestic	0.859	0.878	0.906	0.934	0.957
Agricultural	0.218	0.218	0.218	0.218	0.218
Commercial	0.854	1.092	1.253	1.383	1.476
Industrial	0.253	0.308	0.362	0.422	0.488
Public Sector	-	-	-	-	-
TOTALS	**2.184**	**2.496**	**2.739**	**2.957**	**3.139**

9.0 WATER AUDIT

9.1 INTRODUCTION

The DoELG has issued guidance to the Sanitary Authorities on how to prepare water audits to support their applications for funding of water conservation projects. This guidance is set out in DoELG circular L7/96. Further advice is presented in the water distribution network management and leakage control guidance manual prepared for the DoELG as part of the Mayo and Waterford operational management studies.

The precise methodology adopted for water audits as part of the National Water Study is included as a core document in Volume 2 of the National Water Report.

9.2 AUDITS

At the time of the National Water Study data gathering visit, Mayo County Council had prepared a water audit for the Lough Mask Regional scheme. This has been recalculated for the National Water Study. Water Audits for the Ballina Regional and Westport schemes have also been completed for the National Water Study.

9.3 UNACCOUNTED FOR WATER (UFW)

The results of the Water Audits with regard to the UFW are presented in Table 9.1. Copies of the water audit calculations are included as Appendix 9.1 of this report.

Table 9.1 : Scheme UFW's

Scheme	UFW as Volume (Ml/d)	UFW as % of Distribution Input	UFW per Conn (l/conn/hr)
Ballina Regional	3.815	47.7	24.2
Lough Mask Regional	15.222	64.8	78.1
Westport	1.116	33.8	18.6

The high levels of UFW in the two schemes of Ballina Regional and Lough Mask Regional, in the 47-65% of distribution input range, are similar to those that have been calculated during the analyses of the operation and management of distribution systems of other schemes in Ireland for which reports have been undertaken. However, the figure for the Lough Mask Regional scheme is exceptionally high at 64.8%.

There are various factors that are believed to contribute to these high levels of UFW. They include:-

- Inadequate metering of flows into and within the distribution system, and lack of continuous recording of these flows.
- Doubts as to whether all significant non-domestic water users are metered, especially in the agricultural and public sectors.
- Possibility that the numbers of domestic connections are underestimated, especially if joint services exist with more than one property being served by a single connection from the distribution main.

10.0 CURRENT SYSTEM PERFORMANCE

This section summarises the current performance of the County Mayo schemes included in the National Water Study.

Ideally the following performance indicators would have been examined.

- Raw Water Availability (Hydrological yield)
- Raw Water Quality
- Treatment Works Capacity
- Deployable Output
- Supply Demand Balance
- Water Quality
- Burst Frequency
- Customer Complaints
- Hydraulic performance of the scheme distribution systems (high headlosses / velocities in mains)
- Interruptions to Supply
- Areas of the schemes currently suffering from low pressures
- Areas of the schemes at risk of low pressures
- Leakage
- High Pressures
- Reservoir Performance
- Pumping Capacity
- Energy Costs
- Standby provision

However, for the three Mayo schemes, there was little if any information or data available for the indicators with which to assess the performance of the schemes.

Therefore, Figures 10.1 to 10.4 show in schematic format the following indicators:

- Hydrological yield
- Deployable output
- Current demand
- Current UFW
- Current storage capacity

In addition known problems in the scheme are noted on the schematics. Summaries of current system performance are presented in Appendix 10.1.

Section 11 of this report makes recommendations for overcoming known problems within the schemes, and for implementing data collection and analysis systems to allow a meaningful assessment of the current system performance to be carried out.

Figure 10.1. Current System Performance:- Ballina Regional Scheme

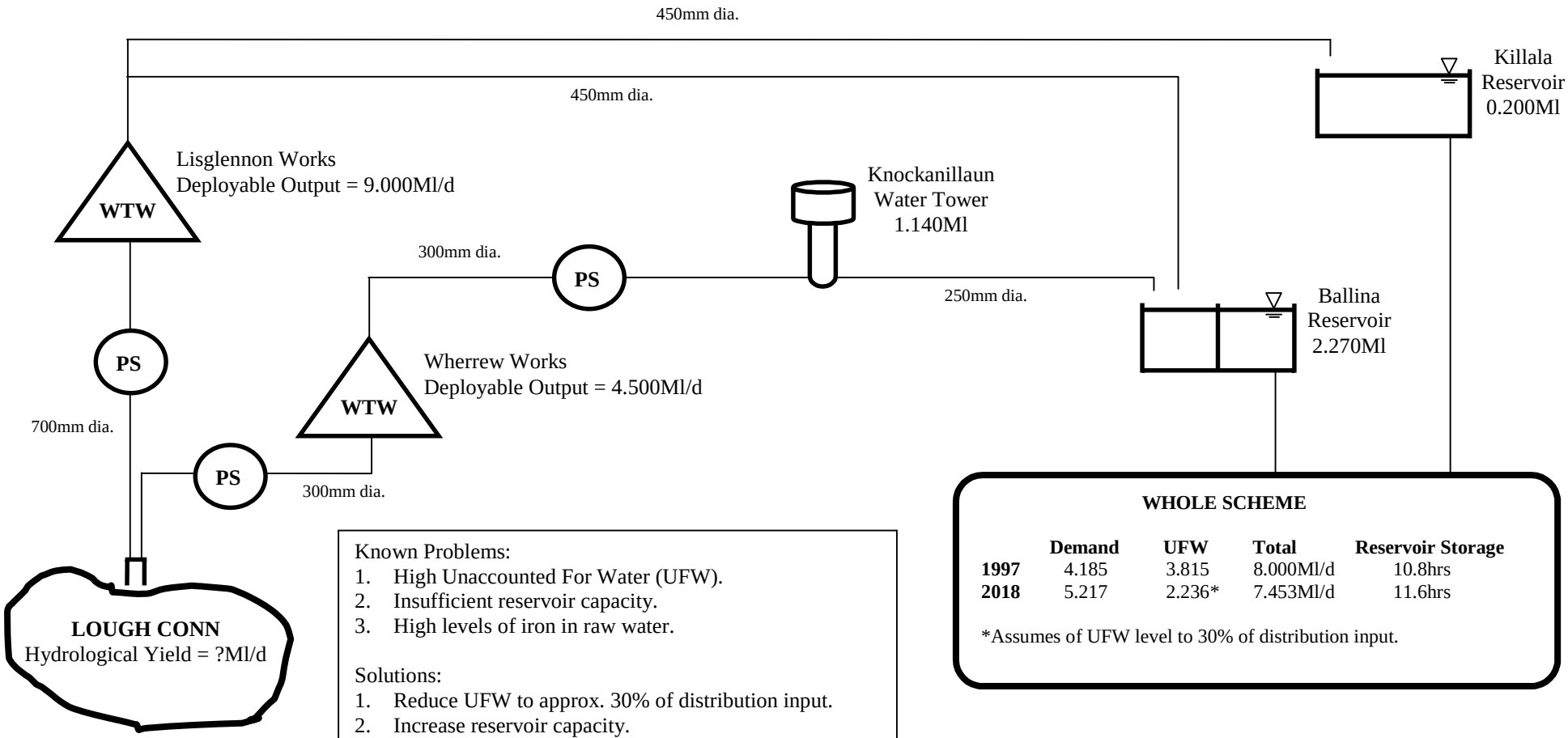


Figure 10.2. Current System Performance:- Lough Mask Regional Scheme

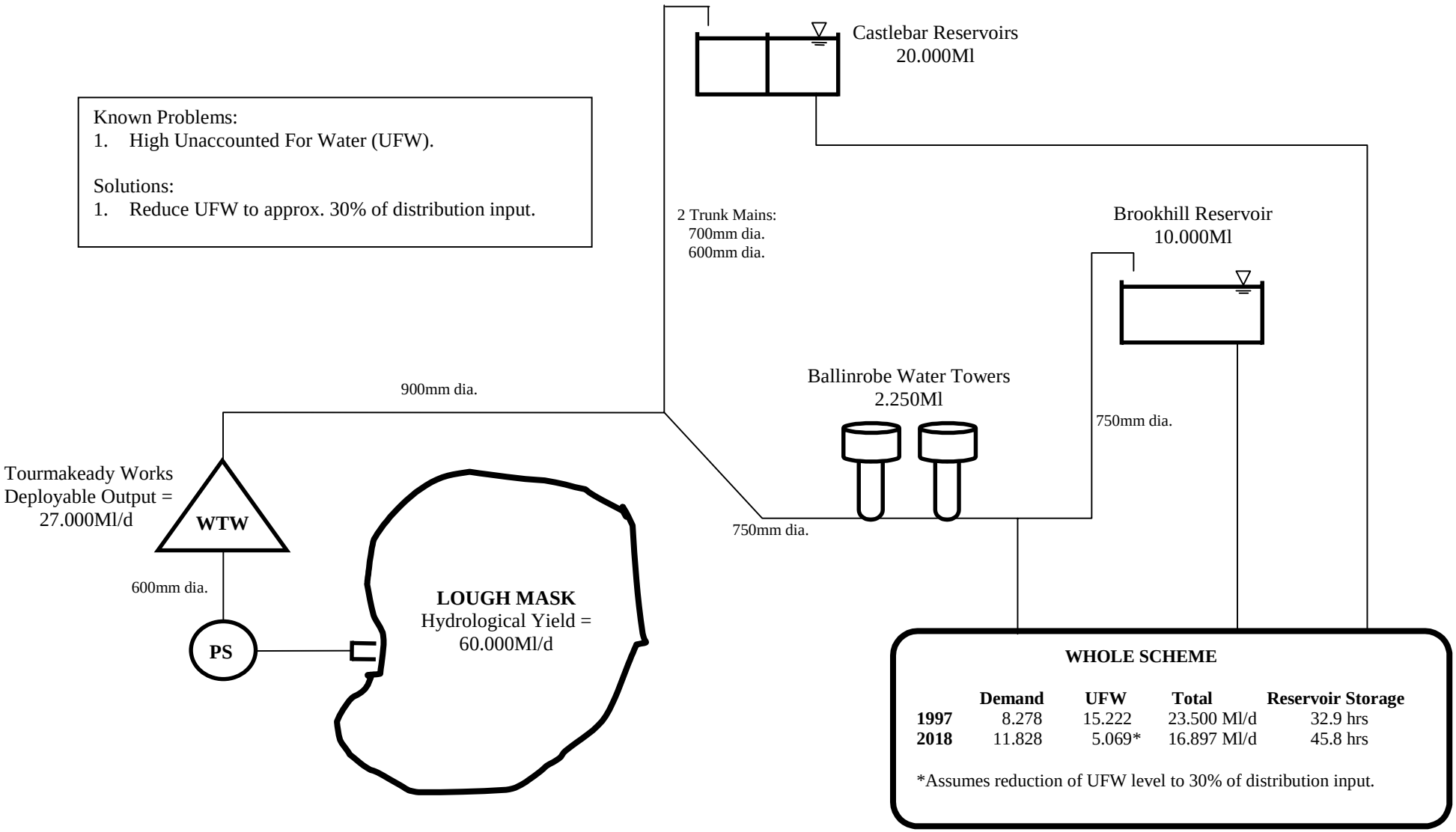
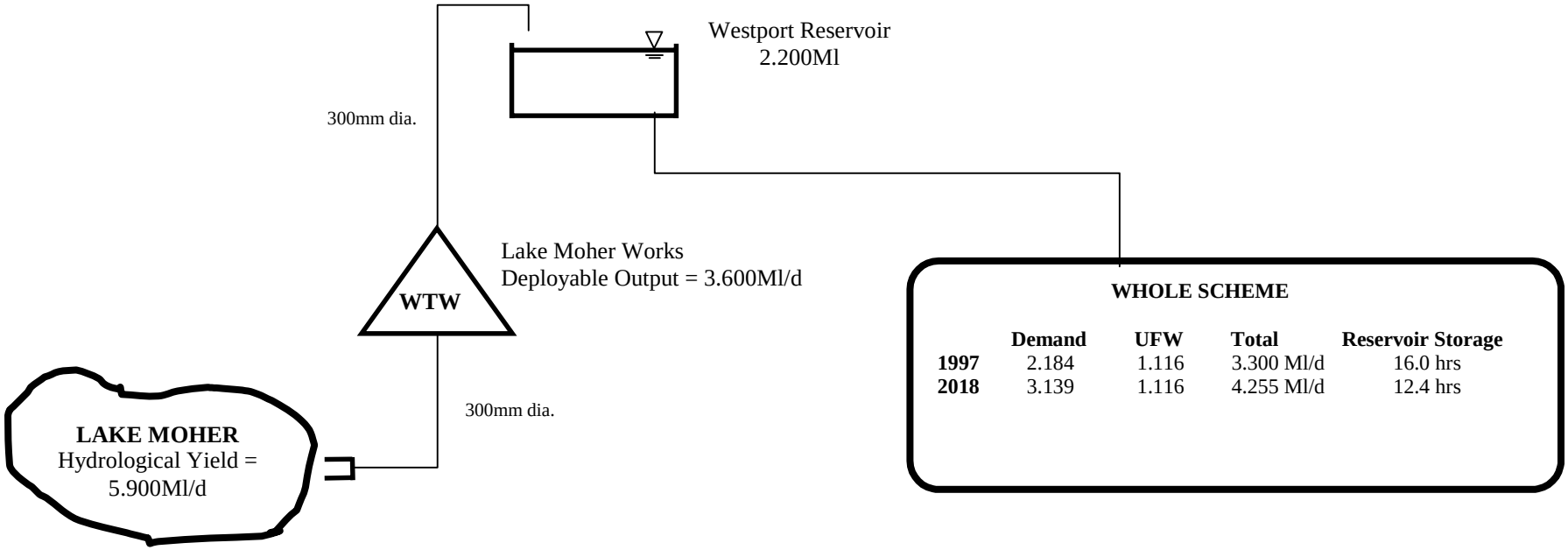


Figure 10.3. Current System Performance:- Westport Scheme



Known Problems:
1. Insufficient WTW capacity.
2. Insufficient reservoir capacity.

Solutions:
1. Increase WTW capacity.
2. Increase reservoir capacity.

11.0 PLANNED REHABILITATION & RECOMMENDATIONS

11.1 INTRODUCTION

The purposes of any scheme rehabilitation and replacement programme are to restore the scheme assets to a condition which is maintainable, and to meet the specified performance targets in terms of levels of service provided to customers, efficiently.

The elements of an asset rehabilitation programme can be summarised as:

- Understand the extent, location and details of the asset stock
- Determine asset condition
- Monitor current system performance
- Determine future system performance requirements
- Plan system maintenance
- Plan system expansion
- Develop investment strategy

This section of the report reviews the current asset rehabilitation and replacement practices within the Mayo schemes. Summaries of the scheme analyses and recommendations for the future are also included.

11.2 PLANNED REHABILITATION

There is currently little in the way of planned system rehabilitation or replacement being undertaken in the three Mayo County Council schemes under consideration. Maintenance of the schemes is generally carried out on a reactive basis by the County Council engineers, waste inspectors and caretakers occasionally assisted by contractors.

- Repairs to burst mains are carried out by County Council maintenance crews.

- Leakage Detection is implemented on a reasonably proactive basis, in response to abnormally high meter readings or leaks identified by the scheme caretakers who report such incidences to the waste inspectors.

- Any mains rehabilitation is undertaken by the Council maintenance crews. There is little or no mains rehabilitation on the public scheme network but extensive rehabilitation is carried out within Group Water Schemes which receive water from public schemes in anticipation of their take-over by the Council.

- New mains for housing developments are installed by developers under the supervision of the Council engineers. Once installed, the responsibility for the mains is taken over by the Council.

- New meter installations to existing properties and meter installations to new properties are generally carried out by County Council maintenance crews.

11.3 RECOMMENDATIONS

Section 10 of this report (Current System Performance) summarises how each scheme is performing, and what the particular problems within each scheme are. This section proposes remedial actions to be implemented to improve current performance, and to ensure that the schemes perform adequately in the future.

There are currently no systems in place in Mayo County Council to assist in the operational management of the water schemes. In correspondence with the Council, the engineers responsible for water supply have expressed interest in developing such systems. Thus, a common recommendation to all schemes is the construction of a GIS system to map all assets and networks (including customer connections) which could form the basis of network models of the distribution systems. The mapping would assist in the establishment of DMA's as part of an overall water conservation strategy.

11.3.1 Ballina Regional

Demand is predicted to rise from 4.185 Ml/d to 5.217 Ml/d by 2018. UFW is currently estimated at 3.815 Ml/d, or 47.7% of distribution input. Reducing UFW to 25-30% of distribution input will allow total demand for water to remain approximately constant over the planning horizon.

A comprehensive leakage reduction programme should therefore be implemented. This should include division of the scheme into DMA's with permanent flow metering and recording, an audit of the number of connections to the scheme, and a drive to meter all non domestic connections to identify actual water consumption more accurately.

Reservoir capacity on the Ballina Regional scheme is currently 3.610 Ml which equates to 10.8 hours at average demand. By 2018, this will have increased to 11.6 hours assuming UFW is reduced to 30% of distribution input. This is significantly lower than the basic guideline minimum storage capacity of 24 hours. Consideration needs to be given to increasing the reservoir capacity within the scheme.

The reliable yield within the scheme is limited by the combined capacity of the two treatment works which is rated at 13.500 Ml/d. Thus, there is sufficient capacity at the sourceworks to meet the projected increase in demand.

The condition of the scheme pumping stations and reservoirs appears to be adequate. There is little information available about the condition or performance of the distribution system as a whole. Depending on the spatial distribution of the demand increases and UFW reductions over the planning period, the capacities of the pumping stations and water distribution systems may need to be increased.

Therefore, systems should be put in place to allow the condition and performance of the scheme assets to be assessed on a regular basis. The methodology for implementing zonal asset management studies is included in Volume 2 of the National Report. These should be implemented, updated and reviewed on a regular basis. The

outputs from such studies would be a register of the scheme assets and their condition and a detailed, timebanded, costed programme of scheme enhancements.

There is no centralised operational and control system within the scheme. Provision of a centrally located control facility with links to key outstations particularly at reservoirs and pumping stations should be considered. Reservoir and pumping station status could be telemetered to the control facility. Key system flows and pressures could also be relayed back to the control room. The availability of this information in a single location would free up caretaker resources to improve the maintenance of the scheme assets, and response to emergency situations.

A risk analysis should be carried out to determine the probability and consequences of key parts of the system failing. This would allow an efficient policy for providing standby or backup capacity to be developed.

The potential for linking the Ballina Regional scheme with other schemes within the county should be the subject of further investigation. This should include investigating the possibility of conjunctive use of resources, potential synergies from operating a larger scheme, organisational efficiencies, and the increased flexibility in scheme operation for emergencies.

11.3.2 Lough Mask Regional

Demand is predicted to rise from 8.278 Ml/d to 11.828 Ml/d by 2018. UFW is currently estimated at 15.222 Ml/d, or 64.8% of distribution input. This value seems exceptionally high and may be due to under estimation of the current domestic and non-domestic demands on the scheme. Reducing UFW to approximately 25-30% of distribution input will allow significant increases in demand to be met over the forecast period.

A comprehensive leakage reduction programme should therefore be implemented. This should include division of the scheme into DMA's with permanent flow metering and recording, an audit of the number of connections to the scheme, and a drive to meter all non domestic connections to identify actual water consumption more accurately.

Reservoir capacity on the Lough Mask Regional scheme is currently 32.250 Ml which equates to 32.9 hours at average demand. By 2018, this will have increased to 45.8 hours assuming UFW is reduced to 30% of distribution input. This is sufficiently higher than the basic minimum guideline storage capacity of 24 hours.

The reliable yield within the scheme is 24.000 Ml, this being limited by the capacity of the sourceworks. Thus, there is adequate capacity within the scheme to meet the demand forecast provided UFW levels are halved.

The condition of the scheme pumping stations appears to be good, as does the condition of the reservoirs. There is little information available about the condition or performance of the distribution system as a whole. Depending on the spatial distribution of the demand increases and UFW reductions over the planning period,

the capacities of the pumping stations and water distribution systems may need to be increased.

Therefore, systems should be put in place to allow the condition and performance of the scheme assets to be assessed on a regular basis. The methodology for implementing zonal asset management studies is included in Volume 2 of the National Report. These should be implemented, updated and reviewed on a regular basis. The outputs from such studies would be a register of the scheme assets and their condition and a detailed, timebanded, costed programme of scheme enhancements.

A risk analysis should be carried out to determine the probability and consequences of key parts of the system failing. This would allow an efficient policy for providing standby or backup capacity to be developed.

The potential for linking the Lough Mask Regional scheme with other schemes within the county, particularly the Westport scheme, should be investigated. This should include investigating the conjunctive use of resources, potential synergies from operating a larger scheme, organisational efficiencies, and the increased flexibility in scheme operation for emergencies.

11.3.3 Westport

Demand is predicted to rise from 2.184 Ml/d to 3.139 Ml/d by 2018. UFW is currently estimated at 1.116 Ml/d, or 33.8% of distribution input. This level of UFW is relatively low and would be difficult to reduce significantly. However, measures should be introduced to slightly reduce or keep constant the UFW volume over the planning period.

A comprehensive leakage reduction programme should therefore be implemented. This should include division of the scheme into DMA’s with permanent flow metering and recording, an audit of the number of connections to the scheme, and a drive to meter all non domestic connections to identify actual water consumption more accurately.

Reservoir capacity on the Westport scheme is currently 2.200 Ml which equates to 16 hours at current average demand. By 2018 this will have reduced to 12.4 hours. This is significantly lower than the basic minimum guideline storage capacity of 24 hours. Consideration needs to be given to increasing the reservoir capacity of the scheme.

The reliable yield within the scheme is currently 3.600 Ml/d, this being limited by the capacity of the WTW. The capacity of the WTW will need to be increased to meet the forecast demand.

The condition of the scheme pumping station appears to be adequate, as does the condition of the reservoir. There is little information available about the condition or performance of the distribution system as a whole. Depending on the spatial distribution of the demand increases and UFW reductions over the planning period, the capacities of the pumping station and water distribution systems may need to be increased.

Therefore, systems should be put in place to allow the condition and performance of the scheme assets to be assessed on a regular basis. The methodology for implementing zonal asset management studies is included in Volume 2 of the National Report. These should be implemented, updated and reviewed on a regular basis. The outputs from such studies would be a register of the scheme assets and their condition and a detailed, timebanded, costed programme of scheme enhancements.

A risk analysis should be carried out to determine the probability and consequences of key parts of the system failing. This would allow an efficient policy for providing standby or backup capacity to be developed.

The potential for linking the Westport scheme with other schemes within the county, particularly the Lough Mask Regional scheme, should be the subject of further investigation. This should include investigating the possibility of conjunctive use of resources, potential synergies from operating a larger scheme, organisational efficiencies, and the increased flexibility in scheme operation for emergencies.

12.0 ASSET VALUATION & INVESTMENT STRATEGY

Asset Valuation and Investment Strategy was considered on a National rather than a County by County basis.

The proposed methodology for calculation of Asset Values is included in Volume 2 of the National Report, Section 10.

The methodology for ranking investment priorities, Investment Priority Ranking, is included in Volume 2 of the National Report, Section 11.

National Water Study

County Mayo Report Appendices

March 2000

WS Atkins Ireland

Balgriffin House, Balgriffin, Dublin 17
Tel: (01) 846 0000 Fax: (01) 847 0310

WS ATKINS IRELAND
A Division of WS Atkins Consultants Ltd

DOCUMENT CONTROL SHEET

Client:	Department of Environment & Local Government
Project:	National Water Study
Title:	County Mayo Report Appendices
Date:	March 2000
WSA Doc Ref	RK2370/712/DG/117/Rev1

Distribution

Copy 1:

Copy 2:

Copy 3:

Copy 4:

Copy 5:

Copy 6:

Revision	Purpose	Originated	Checked	Reviewed	Authorised	Date
1	**Implementation**	**R. Leslie**	**R. OCarroll**	**N. Oakey**	**R. Beynon**	**March 00**
0	**Client Comment**	**R. Leslie**	**R. OCarroll**	**N. Oakey**	**R. Beynon**	**August 99**

TABLE OF CONTENTS

APPENDIX 3.1

ASSET DATA

Republic of Ireland
National Water Study
2. Surface Sourceworks (SSW)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	SSW
ID Number	56
DOELG Scheme Code	
Name of Source	Lough Conn

Physical Data

Source Type	Lake	
Nominal Output Capacity	6.600	Ml/d
Maximum Output Capacity	36.000	Ml/d
Authorised Abstraction (Average)		Ml/d
Authorised Abstraction (Max)		Ml/d
Drought Yield (2%)		Ml/d
Delivery Mode		
Year Commissioned	1976	
Year of Last Refurbishment	1991	
Associated Pumpstation		
Condition Assessment	3	
Data Confidence	2	
Comments on Physical Data		

Performance Data for 1997

Number of Significant Occurrences of Algal Blooms

1 Events

Number of Occurrences of Resource Failure

0 Events

Number of Service Interruptions >3hrs but <12hrs in Duration

0 Events

Number of Service Interruptions >12hrs in Duration

0 Events

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
2. Surface Sourceworks (SSW)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	SSW
ID Number	57
DOELG Scheme Code	
Name of Source	Lough Mask

Physical Data

Source Type	Lake	
Nominal Output Capacity	27.000	Ml/d
Maximum Output Capacity	27.000	Ml/d
Authorised Abstraction (Average)	54.000	Ml/d
Authorised Abstraction (Max)		Ml/d
Drought Yield (2%)		Ml/d
Delivery Mode	Gravity	
Year Commissioned	1979	
Year of Last Refurbishment		
Associated Pumpstation	Lough Mask	
Condition Assessment	3	
Data Confidence	2	

Comments on Physical Data

Performance Data for 1997

Number of Significant Occurrences of Algal Blooms

0 Events

Number of Occurrences of Resource Failure

0 Events

Number of Service Interruptions >3hrs but <12hrs in Duration

0 Events

Number of Service Interruptions >12hrs in Duration

0 Events

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
4. Raw Water Aqueducts (RWA)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	RWA
ID Number	71
DOELG Scheme Code	
Name of Aqueduct	Intake to Lisglennon WTW

Physical Data

Type of Aqueduct	Pumped
Material	Concrete Pipes
Nominal Capacity	53.000 Ml/d
Length	11.000 km

Typical Dimensions:

Circular : Size (dia) 700mm

OR

Rectangular : Height mm

x

Width mm

Year Commissioned	1976
Year of Last Internal Inspection	
Year of Last Refurbishment	
Number of Flow Meters	0
Condition Assessment of Flowmeters	
Condition Assessment of Aqueduct	2
Data Confidence	2

Comments on Physical Data
Twin 675 mm raw water aqueducts.

Performance Data for 1997

Average Daily Flow	6.600Ml/d
Maximum Daily Flow	Ml/d
Number of Bursts	0 Events
Number of Bursts (1992-96)	0 Events
Number Properties Affected by1997 Bursts	Prop.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment
and Local Government

4. Raw Water Aqueducts (RWA)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	RWA
ID Number	72
DOELG Scheme Code	
Name of Aqueduct	Intake to Wherrew WTW

Physical Data

Type of Aqueduct	Gravity		
Material	Ductile Iron - Lined		
Nominal Capacity		Ml/d	
Length	0.100	km	
Typical Dimensions:			
Circular :	Size (dia)	300mm	
OR			
Rectangular :	Height	mm	
	x		
	Width	mm	
Year Commissioned			1974
Year of Last Internal Inspection			
Year of Last Refurbishment			
Number of Flow Meters			
Condition Assessment of Flowmeters			2
Condition Assessment of Aqueduct			3
Data Confidence			

Comments on Physical Data

Performance Data for 1997

Average Daily Flow	1.500	Ml/d
Maximum Daily Flow	4.500	Ml/d
Number of Bursts	0	Events
Number of Bursts (1992-96)	0	Events
Number Properties Affected by1997 Bursts		Prop.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
4. Raw Water Aqueducts (RWA)

Dept. of the Environment
and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	RWA
ID Number	73
DOELG Scheme Code	
Name of Aqueduct	Source to WTW

Physical Data

Type of Aqueduct	Pumped
Material	Ductile Iron - Lined
Nominal Capacity	Ml/d
Length	2.400 km

Typical Dimensions:

Circular : Size (dia) 600mm

OR

Rectangular : Height mm

x

Width mm

Year Commissioned	1979
Year of Last Internal Inspection	
Year of Last Refurbishment	
Number of Flow Meters	1
Condition Assessment of Flowmeters	2
Condition Assessment of Aqueduct	2
Data Confidence	3

Comments on Physical Data

Performance Data for 1997

Average Daily Flow	24.000Ml/d
Maximum Daily Flow	Ml/d
Number of Bursts	0 Events
Number of Bursts (1992-96)	0 Events
Number Properties Affected by1997 Bursts	Prop.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
4. Raw Water Aqueducts (RWA)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	WST
Asset Type	RWA
ID Number	74
DOELG Scheme Code	
Name of Aqueduct	Moher Lake to WTW

Physical Data

Type of Aqueduct	Gravity		
Material	Other		
Nominal Capacity		Ml/d	
Length	2.400	km	
Typical Dimensions:			
Circular :	Size (dia)	300mm	
OR			
Rectangular :	Height	mm	
	x		
	Width	mm	
Year Commissioned			1976
Year of Last Internal Inspection			
Year of Last Refurbishment			
Number of Flow Meters			1
Condition Assessment of Flowmeters			2
Condition Assessment of Aqueduct			1
Data Confidence			3

Comments on Physical Data
Material is PVC.

Performance Data for 1997

Average Daily Flow	3.400Ml/d	
Maximum Daily Flow	Ml/d	
Number of Bursts	0	Events
Number of Bursts (1992-96)	0	Events
Number Properties Affected by1997 Bursts	Prop.	

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
5. Pumping Stations (PST)

Dept. of the Environment and Local Government

Identification	Identification
County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	PST
ID Number	157
DOELG Scheme Code	
Name of Pumpstation	Stage 3, High Lift at Lisglennon

Physical Data

Type of Pumps	CEN	
Number of Pumps	4	
Nominal Flow	36.000	Ml/d
Maximum Flow	36.000	Ml/d
Combined Pump Power	180	kW
Installed Power to PST	200	kW
Year Installed	1986	
Year of Last Refurbishment		
Surge Supression (Y/N)		
Gross Floor Area of PS Buildings	114.00	sqm
Standby Generator Power		kW
Generator Commissioning Year		
Automatic Changeover		
Condition Assessment of MEICA Plant	2	
Condition Assessment of CBI	1	
Data Confidence	2	

Comments on Physical Data

Performance Data for 1997

Number of Interruptions >3hrs due to Plant Failure

1 Events

Number of Interruptions >12hrs due to Plant Failure

0 Events

Number of Interruptions >3hrs due to Electrical Supply Failure

1 Events

Number of Interruptions >12hrs due to Electrical Supply Failure

0 Events

Does this Pumpstation Form Part of a Surface Sourceworks Abstraction? If so name the SSW Abstraction.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
5. Pumping Stations (PST)

Dept. of the Environment and Local Government

Identification	Identification
County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	PST
ID Number	158
DOELG Scheme Code	
Name of Pumpstation	Wherrew Local (to Knockanillaun)

Physical Data

Type of Pumps	CEN	
Number of Pumps	2	
Nominal Flow	4.500	Ml/d
Maximum Flow	4.500	Ml/d
Combined Pump Power	22	kW
Installed Power to PST		kW
Year Installed	1974	
Year of Last Refurbishment		
Surge Supression (Y/N)		
Gross Floor Area of PS Buildings		sqm
Standby Generator Power	1280	kW
Generator Commissioning Year		
Automatic Changeover		
Condition Assessment of MEICA Plant		3
Condition Assessment of CBI		2
Data Confidence	2	

Comments on Physical Data

Performance Data for 1997

Number of Interruptions >3hrs due to Plant Failure

0 Events

Number of Interruptions >12hrs due to Plant Failure

0 Events

Number of Interruptions >3hrs due to Electrical Supply Failure

0 Events

Number of Interruptions >12hrs due to Electrical Supply Failure

0 Events

Does this Pumpstation Form Part of a Surface Sourceworks Abstraction? If so name the SSW Abstraction.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
5. Pumping Stations (PST)

Dept. of the Environment and Local Government

Identification	Identification
County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	PST
ID Number	159
DOELG Scheme Code	
Name of Pumpstation	Wherrew Main Raw Water Pumps

Physical Data

Type of Pumps	VER
Number of Pumps	2
Nominal Flow	43.000 Ml/d
Maximum Flow	43.000 Ml/d
Combined Pump Power	97 kW
Installed Power to PST	1280 kW
Year Installed	1976
Year of Last Refurbishment	
Surge Supression (Y/N)	
Gross Floor Area of PS Buildings	283.00sqm
Standby Generator Power	kW
Generator Commissioning Year	
Automatic Changeover	
Condition Assessment of MEICA Plant	3
Condition Assessment of CBI	2
Data Confidence	2
Comments on Physical Data	

Performance Data for 1997

Number of Interruptions >3hrs due to Plant Failure

0 Events

Number of Interruptions >12hrs due to Plant Failure

0 Events

Number of Interruptions >3hrs due to Electrical Supply Failure

0 Events

Number of Interruptions >12hrs due to Electrical Supply Failure

0 Events

Does this Pumpstation Form Part of a Surface Sourceworks Abstraction? If so name the SSW Abstraction.

Lough Conn

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
5. Pumping Stations (PST)

Dept. of the Environment and Local Government

Identification	Identification
County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	PST
ID Number	160
DOELG Scheme Code	
Name of Pumpstation	Intake Works

Physical Data

Type of Pumps	CEN
Number of Pumps	5
Nominal Flow	24.000 Ml/d
Maximum Flow	39.000 Ml/d
Combined Pump Power	925 kW
Installed Power to PST	kW
Year Installed	1979
Year of Last Refurbishment	
Surge Supression (Y/N)	
Gross Floor Area of PS Buildings	370.00sqm
Standby Generator Power	kW
Generator Commissioning Year	
Automatic Changeover	
Condition Assessment of MEICA Plant	3
Condition Assessment of CBI	1
Data Confidence	2

Comments on Physical Data
Installed power 20 kVa.

Performance Data for 1997

Number of Interruptions >3hrs due to Plant Failure

0 Events

Number of Interruptions >12hrs due to Plant Failure

0 Events

Number of Interruptions >3hrs due to Electrical Supply Failure

0 Events

Number of Interruptions >12hrs due to Electrical Supply Failure

0 Events

Does this Pumpstation Form Part of a Surface Sourceworks Abstraction? If so name the SSW Abstraction.

Lough Mask

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
5. Pumping Stations (PST)

Dept. of the Environment and Local Government

Identification	Identification
County	MAY
Sanitary Authority	MAY
Scheme Name	WST
Asset Type	PST
ID Number	161
DOELG Scheme Code	
Name of Pumpstation	Supplementary Pumps at Works

Physical Data

Type of Pumps	CEN	
Number of Pumps	1	
Nominal Flow	3.600	Ml/d
Maximum Flow		Ml/d
Combined Pump Power	10	kW
Installed Power to PST	20	kW
Year Installed	1994	
Year of Last Refurbishment		
Surge Supression (Y/N)		
Gross Floor Area of PS Buildings	16.00	sqm
Standby Generator Power		kW
Generator Commissioning Year		
Automatic Changeover		
Condition Assessment of MEICA Plant	2	
Condition Assessment of CBI	3	
Data Confidence	2	

Comments on Physical Data

Not used normally, only employed as supplementary pumping from time to time.

Performance Data for 1997

Number of Interruptions >3hrs due to Plant Failure

1 Events

Number of Interruptions >12hrs due to Plant Failure

Events

Number of Interruptions >3hrs due to Electrical Supply Failure

1 Events

Number of Interruptions >12hrs due to Electrical Supply Failure

Events

Does this Pumpstation Form Part of a Surface Sourceworks Abstraction? If so name the SSW Abstraction.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

6. Water Treatment Works (WTW)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	WTW
ID Number	60
DOELG Scheme Code	
Name of Works	Lisglennon

Physical Data

Nominal Capacity	9.000	Ml/d
Year Installed	1988	
Year of Last Refurbishment		

Pumping

No. of Stages of Internal Pumping		
Internal Pumping Power		kW
Condition Assessment of Internal Pumping		

Treatment

Type of Pre-Treatment	FLC	
Condition Assessment of Pre-Treatment	1	
Type of Clarification	PLT	
Condition Assessment of Clarifier	1	
Type of 1st Stage Filters		
Capacity of 1st Stage Filters		Ml/d
Condition Assessment of 1st Stage Filters		
Type of 2nd Stage Filters	RGF	
Capacity of 2nd Stage Filters	9.000	Ml/d
Condition Assessment of 2nd Stage Filters	1	
Type of Disinfection	CHL	
Condition Assessment of Disinfector	3	
Capacity of Clear Water Tank	4.500	Ml
Number of Compartments	1	
Bypassable?		
Condition Assessment of Clear Water Tank	1	
Buildings Gross Floor Area	763.00	sqm
Condition Assessment of Works	2	
Data Confidence	2	
Comments on Physical Data		

Performance Data for 1997

Nominal Daily Output	9.500	Ml/d
Peak Daily Output	9.500	Ml/d
Nominal Daily Output (Peak Week)	9.500	Ml/d
Bacterial Sampling Frequency	22	/yr
Bacterial Sampling Failure Frequency	0.0%	
Chemical Sampling Frequency	365	/yr
Chemical Sampling Failure Frequency	0.0%	
Colour Sampling Frequency	365	/yr
Colour Sampling Failure Frequency	0.0	%
Taste Sampling Frequency	0	/yr
		%
Taste Sampling Failure Frequency		%
Odour Sampling Frequency	0	/yr
Odour Sampling Failure Frequency		%
Plant and Electrical Failure >3hrs	0	Events
Plant and Electrical Failure >12hrs	0	Events
Water Supply Interruptions >3hrs	0	Events
Water Supply Interruptions >12hrs	0	Events
Derogations (Y/N) (On Yes, entry in comment box required).		
Comments on Performance Data		

First Previous Next Last

Republic of Ireland
National Water Study
6. Water Treatment Works (WTW)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	WTW
ID Number	61
DOELG Scheme Code	
Name of Works	Wherrew

Physical Data

Nominal Capacity	4.500	Ml/d
Year Installed	1974	
Year of Last Refurbishment		

Pumping

No. of Stages of Internal Pumping		
Internal Pumping Power		kW
Condition Assessment of Internal Pumping		

Treatment

Type of Pre-Treatment	FLC	
Condition Assessment of Pre-Treatment	2	
Type of Clarification	UFB	
Condition Assessment of Clarifier	2	
Type of 1st Stage Filters		
Capacity of 1st Stage Filters		Ml/d
Condition Assessment of 1st Stage Filters		
Type of 2nd Stage Filters	RGF	
Capacity of 2nd Stage Filters	4.500	Ml/d
Condition Assessment of 2nd Stage Filters	2	
Type of Disinfection	CHL	
Condition Assessment of Disinfector	3	
Capacity of Clear Water Tank		Ml
Number of Compartments		
Bypassable?		
Condition Assessment of Clear Water Tank		
Buildings Gross Floor Area	195.00	sqm
Condition Assessment of Works	3	
Data Confidence	2	
Comments on Physical Data		

Performance Data for 1997

Nominal Daily Output	4.500	Ml/d
Peak Daily Output	4.500	Ml/d
Nominal Daily Output (Peak Week)		Ml/d
Bacterial Sampling Frequency	24	/yr
Bacterial Sampling Failure Frequency		0.0%
Chemical Sampling Frequency	365	/yr
Chemical Sampling Failure Frequency		0.0%
Colour Sampling Frequency	365	/yr
Colour Sampling Failure Frequency	0.0	%
Taste Sampling Frequency	0	/yr
		%
Taste Sampling Failure Frequency		%
Odour Sampling Frequency	0	/yr
Odour Sampling Failure Frequency		%
Plant and Electrical Failure >3hrs		1Events
Plant and Electrical Failure >12hrs		0Events
Water Supply Interruptions >3hrs	0	Events
Water Supply Interruptions >12hrs	0	Events
Derogations (Y/N) (On Yes, entry in comment box required).		
Comments on Performance Data		

First Previous Next Last

Republic of Ireland
National Water Study
6. Water Treatment Works (WTW)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	WTW
ID Number	62
DOELG Scheme Code	
Name of Works	Tourmakeady

Physical Data

Nominal Capacity	27.000	Ml/d
Year Installed	1979	
Year of Last Refurbishment	1979	

Pumping

No. of Stages of Internal Pumping		
Internal Pumping Power		kW
Condition Assessment of Internal Pumping		

Treatment

Type of Pre-Treatment	NON	
Condition Assessment of Pre-Treatment		
Type of Clarification	NON	
Condition Assessment of Clarifier		
Type of 1st Stage Filters	RGF	
Capacity of 1st Stage Filters	27.000	Ml/d
Condition Assessment of 1st Stage Filters		
Type of 2nd Stage Filters	NON	
Capacity of 2nd Stage Filters		Ml/d
Condition Assessment of 2nd Stage Filters		
Type of Disinfection	CHL	
Condition Assessment of Disinfector	2	
Capacity of Clear Water Tank	20.000	Ml
Number of Compartments	2	
Bypassable?		
Condition Assessment of Clear Water Tank	1	
Buildings Gross Floor Area	780.00	sqm
Condition Assessment of Works	2	
Data Confidence	2	
Comments on Physical Data		

Performance Data for 1997

Nominal Daily Output	24.000	Ml/d
Peak Daily Output	27.000	Ml/d
Nominal Daily Output (Peak Week)	26.000	Ml/d
Bacterial Sampling Frequency	30	/yr
Bacterial Sampling Failure Frequency	0.0%	
Chemical Sampling Frequency	30	/yr
Chemical Sampling Failure Frequency	0.0%	
Colour Sampling Frequency	260	/yr
Colour Sampling Failure Frequency	0.0	%
Taste Sampling Frequency	0	/yr
		%
Taste Sampling Failure Frequency		%
Odour Sampling Frequency	0	/yr
Odour Sampling Failure Frequency		%
Plant and Electrical Failure >3hrs	0	Events
Plant and Electrical Failure >12hrs	0	Events
Water Supply Interruptions >3hrs	0	Events
Water Supply Interruptions >12hrs	0	Events
Derogations (Y/N) (On Yes, entry in comment box required).		
Comments on Performance Data	1	THMs are greater than 100.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

6. Water Treatment Works (WTW)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	WST
Asset Type	WTW
ID Number	63
DOELG Scheme Code	
Name of Works	Lake Moher Works

Physical Data

Nominal Capacity	3.600	Ml/d
Year Installed	1977	
Year of Last Refurbishment	1994	

Pumping

No. of Stages of Internal Pumping		
Internal Pumping Power		kW
Condition Assessment of Internal Pumping		

Treatment

Type of Pre-Treatment	FLC	
Condition Assessment of Pre-Treatment	3	
Type of Clarification	HRF	
Condition Assessment of Clarifier	2	
Type of 1st Stage Filters	OTH	
Capacity of 1st Stage Filters	3.600	Ml/d
Condition Assessment of 1st Stage Filters	2	
Type of 2nd Stage Filters		
Capacity of 2nd Stage Filters		Ml/d
Condition Assessment of 2nd Stage Filters		
Type of Disinfection	CHL	
Condition Assessment of Disinfector	3	
Capacity of Clear Water Tank	0.300	Ml
Number of Compartments	1	
Bypassable?		
Condition Assessment of Clear Water Tank	2	
Buildings Gross Floor Area	260.00	sqm
Condition Assessment of Works	3	
Data Confidence	2	
Comments on Physical Data		

Performance Data for 1997

Nominal Daily Output	3.180	Ml/d
Peak Daily Output	3.600	Ml/d
Nominal Daily Output (Peak Week)	3.600	Ml/d
Bacterial Sampling Frequency	24	/yr
Bacterial Sampling Failure Frequency	0.0%	
Chemical Sampling Frequency	365	/yr
Chemical Sampling Failure Frequency	0.0%	
Colour Sampling Frequency	260	/yr
Colour Sampling Failure Frequency	0.0	%
Taste Sampling Frequency	0	/yr
		%
Taste Sampling Failure Frequency		%
Odour Sampling Frequency	365	/yr
Odour Sampling Failure Frequency	0.0	%
Plant and Electrical Failure >3hrs	2	Events
Plant and Electrical Failure >12hrs		Events
Water Supply Interruptions >3hrs	2	Events
Water Supply Interruptions >12hrs		Events
Derogations (Y/N) (On Yes, entry in comment box required).		
Comments on Performance Data		

First Previous Next Last

Republic of Ireland
National Water Study
7. Trunk Mains (TRM)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	TRM
ID Number	375
DOELG Scheme Code	
Name of Trunk Main	Knockanillaun to Ballina

Physical Data

Type of Trunk Main	Pumped	
Trunk Main Length	4.000	km
Typical Diameter	250	mm
Material	Asbestos	
Nominal Capacity	4.500	Ml/d
Year Commissioned	1974	
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations	1	
Number of Flowmeters	0	
Condition Assessment of Flowmeters		
Condition Assessment of Main	1	
Data Confidence	2	

Comments on Physical Data

Performance Data for 1997

Average Daily Flow	Ml/d
Maximum Daily Flow	Ml/d
Number of Bursts (1992-96)	0Events
Number of Bursts in 1997	0 Events
Number of Properties Affected by 1997 Bursts	Prop.

Comments on Performance Data

Only used as an emergency supply.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

7. Trunk Mains (TRM)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	TRM
ID Number	376
DOELG Scheme Code	
Name of Trunk Main	Lisglennon to Ballina

Physical Data

Type of Trunk Main	Gravity	
Trunk Main Length	9.300	km
Typical Diameter	450	mm
Material	Asbestos	
Nominal Capacity	4.500	Ml/d
Year Commissioned	1988	
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations	0	
Number of Flowmeters	1	
Condition Assessment of Flowmeters	5	
Condition Assessment of Main	1	
Data Confidence	2	
Comments on Physical Data		

Performance Data for 1997

Average Daily Flow	4.500	Ml/d
Maximum Daily Flow	4.500	Ml/d
Number of Bursts (1992-96)	0	Events
Number of Bursts in 1997	0	Events
Number of Properties Affected by 1997 Bursts		Prop.
Comments on Performance Data		

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

7. Trunk Mains (TRM)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	TRM
ID Number	377
DOELG Scheme Code	
Name of Trunk Main	Lisglennon to Rathbaun

Physical Data

Type of Trunk Main	Gravity	
Trunk Main Length	9.300	km
Typical Diameter	450	mm
Material	Asbestos	
Nominal Capacity	4.500	Ml/d
Year Commissioned	1988	
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations	0	
Number of Flowmeters	1	
Condition Assessment of Flowmeters	5	
Condition Assessment of Main	1	
Data Confidence	2	
Comments on Physical Data		

Performance Data for 1997

Average Daily Flow	1.000	Ml/d
Maximum Daily Flow	1.000	Ml/d
Number of Bursts (1992-96)	0	Events
Number of Bursts in 1997	0	Events
Number of Properties Affected by 1997 Bursts		Prop.
Comments on Performance Data		

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

7. Trunk Mains (TRM)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	TRM
ID Number	378
DOELG Scheme Code	
Name of Trunk Main	Wherrew to Knockanillaun

Physical Data

Type of Trunk Main	Pumped	
Trunk Main Length	5.000	km
Typical Diameter	300	mm
Material	Asbestos	
Nominal Capacity		Ml/d
Year Commissioned	1974	
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations	1	
Number of Flowmeters	0	
Condition Assessment of Flowmeters		
Condition Assessment of Main	2	
Data Confidence	2	

Comments on Physical Data

Performance Data for 1997

Average Daily Flow	1.500	Ml/d
Maximum Daily Flow	1.500	Ml/d
Number of Bursts (1992-96)	0	Events
Number of Bursts in 1997	0	Events
Number of Properties Affected by 1997 Bursts		Prop.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
7. Trunk Mains (TRM)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	TRM
ID Number	379
DOELG Scheme Code	
Name of Trunk Main	Ballinrobe to Brookhill Reservoir

Physical Data

Type of Trunk Main	Gravity	
Trunk Main Length	19.187	km
Typical Diameter	750	mm
Material	Asbestos	
Nominal Capacity		Ml/d
Year Commissioned		1997
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations		0
Number of Flowmeters		1
Condition Assessment of Flowmeters		1
Condition Assessment of Main		1
Data Confidence		1

Comments on Physical Data

Some short sections of 800mm ductile iron pipe.

Performance Data for 1997

Average Daily Flow	3.000	Ml/d
Maximum Daily Flow	3.000	Ml/d
Number of Bursts (1992-96)	0	Events
Number of Bursts in 1997	0	Events
Number of Properties Affected by 1997 Bursts		Prop.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
7. Trunk Mains (TRM)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	TRM
ID Number	380
DOELG Scheme Code	
Name of Trunk Main	Brookhill to Claremorris A

Physical Data

Type of Trunk Main	Gravity	
Trunk Main Length	3.714	km
Typical Diameter	600	mm
Material	Asbestos	
Nominal Capacity		Ml/d
Year Commissioned		1997
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations		
Number of Flowmeters		1
Condition Assessment of Flowmeters		1
Condition Assessment of Main		1
Data Confidence		1
Comments on Physical Data		

Performance Data for 1997

Average Daily Flow	Ml/d
Maximum Daily Flow	Ml/d
Number of Bursts (1992-96)	0Events
Number of Bursts in 1997	0 Events
Number of Properties Affected by 1997 Bursts	Prop.

Comments on Performance Data

This line will serve Lough Mask, Stage III.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

7. Trunk Mains (TRM)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	TRM
ID Number	381
DOELG Scheme Code	
Name of Trunk Main	Brookhill to Claremorris B

Physical Data

Type of Trunk Main	Gravity	
Trunk Main Length	4.371	km
Typical Diameter	300	mm
Material	Asbestos	
Nominal Capacity		Ml/d
Year Commissioned		1997
Year of Last Internal Inspection		1997
Year of Last Refurbishment		
Number of Associated Pumping Stations		
Number of Flowmeters		1
Condition Assessment of Flowmeters		1
Condition Assessment of Main		1
Data Confidence		1
Comments on Physical Data		

Performance Data for 1997

Average Daily Flow	3.000	Ml/d
Maximum Daily Flow	3.000	Ml/d
Number of Bursts (1992-96)	0	Events
Number of Bursts in 1997	0	Events
Number of Properties Affected by 1997 Bursts		Prop.
Comments on Performance Data		

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

7. Trunk Mains (TRM)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	TRM
ID Number	382
DOELG Scheme Code	
Name of Trunk Main	Partry to Ballinrobe

Physical Data

Type of Trunk Main	Gravity	
Trunk Main Length	11.320	km
Typical Diameter	750	mm
Material	Asbestos	
Nominal Capacity		Ml/d
Year Commissioned	1992	
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations	0	
Number of Flowmeters	1	
Condition Assessment of Flowmeters	2	
Condition Assessment of Main	1	
Data Confidence	2	
Comments on Physical Data		

Performance Data for 1997

Average Daily Flow	7.000	Ml/d
Maximum Daily Flow	7.000	Ml/d
Number of Bursts (1992-96)	0	Events
Number of Bursts in 1997	0	Events
Number of Properties Affected by 1997 Bursts		Prop.
Comments on Performance Data		

First Previous Next Last

Republic of Ireland
National Water Study
7. Trunk Mains (TRM)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	TRM
ID Number	383
DOELG Scheme Code	
Name of Trunk Main	Partry to Castlebar 600mm

Physical Data

Type of Trunk Main	Gravity	
Trunk Main Length	15.371	km
Typical Diameter	600	mm
Material	Asbestos	
Nominal Capacity		Ml/d
Year Commissioned		1979
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations		
Number of Flowmeters		1
Condition Assessment of Flowmeters		3
Condition Assessment of Main		2
Data Confidence		2

Comments on Physical Data

Section 2, 600 mm pipe.

Performance Data for 1997

Average Daily Flow	17.000	Ml/d
Maximum Daily Flow	17.000	Ml/d
Number of Bursts (1992-96)	1	Events
Number of Bursts in 1997	1	Events
Number of Properties Affected by 1997 Bursts	400	Prop.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
7. Trunk Mains (TRM)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	TRM
ID Number	384
DOELG Scheme Code	
Name of Trunk Main	Partry to Castlebar, 700mm

Physical Data

Type of Trunk Main	Gravity
Trunk Main Length	5.500 km
Typical Diameter	700 mm
Material	Concrete Pipes
Nominal Capacity	Ml/d
Year Commissioned	1979
Year of Last Internal Inspection	
Year of Last Refurbishment	
Number of Associated Pumping Stations	0
Number of Flowmeters	1
Condition Assessment of Flowmeters	2
Condition Assessment of Main	1
Data Confidence	2

Comments on Physical Data

Section 1, prestressed concrete.

Performance Data for 1997

Average Daily Flow	17.000 Ml/d
Maximum Daily Flow	17.000 Ml/d
Number of Bursts (1992-96)	2Events
Number of Bursts in 1997	1 Events
Number of Properties Affected by 1997 Bursts	400Prop.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study
7. Trunk Mains (TRM)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	TRM
ID Number	385
DOELG Scheme Code	
Name of Trunk Main	Tourmakeady to Partry

Performance Data for 1997

Average Daily Flow	24.000 Ml/d
Maximum Daily Flow	24.000 Ml/d
Number of Bursts (1992-96)	0Events
Number of Bursts in 1997	0 Events
Number of Properties Affected by 1997 Bursts	Prop.

Comments on Performance Data

Physical Data

Type of Trunk Main	Gravity
Trunk Main Length	8.000 km
Typical Diameter	900 mm
Material	Concrete Pipes
Nominal Capacity	Ml/d
Year Commissioned	1979
Year of Last Internal Inspection	
Year of Last Refurbishment	
Number of Associated Pumping Stations	0
Number of Flowmeters	1
Condition Assessment of Flowmeters	3
Condition Assessment of Main	1
Data Confidence	2

Comments on Physical Data

Prestressed concrete pipes.

First Previous Next Last

Republic of Ireland
National Water Study
7. Trunk Mains (TRM)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	WST
Asset Type	TRM
ID Number	386
DOELG Scheme Code	
Name of Trunk Main	WTW to Westport Town

Physical Data

Type of Trunk Main	Gravity	
Trunk Main Length	8.000	km
Typical Diameter	300	mm
Material	PVC	
Nominal Capacity	3.600	Ml/d
Year Commissioned	1977	
Year of Last Internal Inspection		
Year of Last Refurbishment		
Number of Associated Pumping Stations	0	
Number of Flowmeters	1	
Condition Assessment of Flowmeters	1	
Condition Assessment of Main	3	
Data Confidence	2	

Comments on Physical Data

Performance Data for 1997

Average Daily Flow	3.200	Ml/d
Maximum Daily Flow	3.200	Ml/d
Number of Bursts (1992-96)	8	Events
Number of Bursts in 1997	2	Events
Number of Properties Affected by 1997 Bursts	50	Prop.

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment
and Local Government

8. Service Reservoirs and Water Towers - (SRT)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	SRT
ID Number	208
DOELG Scheme Code	
Structure Name	Ballina Reservoir

Physical Data

Structure Type	Service Reservoir	
Construction Type	CON	
Overall Tower Height*		m
Capacity of Tank	2.270	Ml
Depth of Water in Tank	6.00	m
TWL	51.59	mOD Poolbeg
Number of Compartments	2	
Bypassable?		
Year Commissioned	1974	
Year of Last Internal Inspection	1998	
Condition Assessment	3	
Data Confidence	2	

Comments on Physical Data

*Note:- 'Overall Tower Height' applies to Water Towers only.

Performance Data for 1997

Estimated Population Served	10000Persons
Estimated Leakage Rate	Ml/d
Bacterial Sampling Frequency	0/yr
Bacterial Sampling Failure Frequency	%
Number of Occasions of SRT Failure >3hrs but <12hrs in Duration	0Events
Number of Occasions of SRT Failure >12hrs in Duration	0Events

Comments on Performance Data

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment
and Local Government

8. Service Reservoirs and Water Towers - (SRT)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	SRT
ID Number	209
DOELG Scheme Code	
Structure Name	Killala Reservoir

Physical Data

Structure Type	Service Reservoir	
Construction Type	CON	
Overall Tower Height*		m
Capacity of Tank	0.200	Ml
Depth of Water in Tank	4.50	m
TWL		mOD Poolbeg
Number of Compartments	1	
Bypassable?		
Year Commissioned	1948	
Year of Last Internal Inspection	1987	
Condition Assessment	2	
Data Confidence	2	

Comments on Physical Data

Performance Data for 1997

Estimated Population Served	1000Persons
Estimated Leakage Rate	Ml/d
Bacterial Sampling Frequency	0/yr
Bacterial Sampling Failure Frequency	%
Number of Occasions of SRT Failure >3hrs but <12hrs in Duration	0Events
Number of Occasions of SRT Failure >12hrs in Duration	0Events

Comments on Performance Data

*Note:- 'Overall Tower Height' applies to Water Towers only.

First Previous Next Last

Republic of Ireland
National Water Study
8. Service Reservoirs and Water Towers - (SRT)

Dept. of the Environment and Local Government

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	BLA
Asset Type	SRT
ID Number	210
DOELG Scheme Code	
Structure Name	Knockanillaun Water Tower

Physical Data

Structure Type	Water Tower	
Construction Type	CON	
Overall Tower Height*		m
Capacity of Tank	1.140	Ml
Depth of Water in Tank		m
TWL	67.06	mOD Poolbeg
Number of Compartments	1	
Bypassable?		
Year Commissioned		
Year of Last Internal Inspection		
Condition Assessment		
Data Confidence		
Comments on Physical Data		

Performance Data for 1997

Estimated Population Served	3500Persons
Estimated Leakage Rate	Ml/d
Bacterial Sampling Frequency	0/yr
Bacterial Sampling Failure Frequency	%
Number of Occasions of SRT Failure >3hrs but <12hrs in Duration	Events
Number of Occasions of SRT Failure >12hrs in Duration	Events
Comments on Performance Data	

*Note:- 'Overall Tower Height' applies to Water Towers only.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment
and Local Government

8. Service Reservoirs and Water Towers - (SRT)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	SRT
ID Number	211
DOELG Scheme Code	
Structure Name	Ballinrobe Water Towers

Physical Data

Structure Type	Water Tower	
Construction Type	CON	
Overall Tower Height*	33.60	m
Capacity of Tank	2.250	Ml
Depth of Water in Tank		m
TWL	67.00	mOD Poolbeg
Number of Compartments	2	
Bypassable?		
Year Commissioned	1993	
Year of Last Internal Inspection		
Condition Assessment	1	
Data Confidence	1	

Comments on Physical Data

Two separate towers, combined capacity 2.250 Ml, one TWL = 33.6 m, other = 30.6 m

Performance Data for 1997

Estimated Population Served	1900Persons
Estimated Leakage Rate	Ml/d
Bacterial Sampling Frequency	0/yr
Bacterial Sampling Failure Frequency	%
Number of Occasions of SRT Failure >3hrs but <12hrs in Duration	0Events
Number of Occasions of SRT Failure >12hrs in Duration	0Events

Comments on Performance Data

*Note:- 'Overall Tower Height' applies to Water Towers only.

First Previous Next Last

Republic of Ireland
National Water Study
Dept. of the Environment and Local Government

8. Service Reservoirs and Water Towers - (SRT)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	SRT
ID Number	212
DOELG Scheme Code	
Structure Name	Brookhill Reservoir

Physical Data

Structure Type	Service Reservoir	
Construction Type	CON	
Overall Tower Height*		m
Capacity of Tank	10.000	Ml
Depth of Water in Tank		m
TWL	10.00	mOD Poolbeg
Number of Compartments	1	
Bypassable?		
Year Commissioned	1997	
Year of Last Internal Inspection		
Condition Assessment	1	
Data Confidence	1	

Comments on Physical Data

Serves Claremorris.

Performance Data for 1997

Estimated Population Served	3200Persons
Estimated Leakage Rate	Ml/d
Bacterial Sampling Frequency	0/yr
Bacterial Sampling Failure Frequency	%
Number of Occasions of SRT Failure >3hrs but <12hrs in Duration	0Events
Number of Occasions of SRT Failure >12hrs in Duration	0Events

Comments on Performance Data

*Note:- 'Overall Tower Height' applies to Water Towers only.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment
and Local Government

8. Service Reservoirs and Water Towers - (SRT)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	LMR
Asset Type	SRT
ID Number	213
DOELG Scheme Code	
Structure Name	Castlebar Reservoirs

Physical Data

Structure Type	Service Reservoir	
Construction Type	CON	
Overall Tower Height*		m
Capacity of Tank	20.000	Ml
Depth of Water in Tank	5.00	m
TWL	83.30	mOD Poolbeg
Number of Compartments	2	
Bypassable?		
Year Commissioned	1979	
Year of Last Internal Inspection	1995	
Condition Assessment	1	
Data Confidence	1	

Comments on Physical Data

Performance Data for 1997

Estimated Population Served	10600Persons
Estimated Leakage Rate	0.000Ml/d
Bacterial Sampling Frequency	0/yr
Bacterial Sampling Failure Frequency	%
Number of Occasions of SRT Failure >3hrs but <12hrs in Duration	0Events
Number of Occasions of SRT Failure >12hrs in Duration	0Events

Comments on Performance Data

*Note:- 'Overall Tower Height' applies to Water Towers only.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment
and Local Government

8. Service Reservoirs and Water Towers - (SRT)

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name	WST
Asset Type	SRT
ID Number	214
DOELG Scheme Code	
Structure Name	Westport Reservoir

Physical Data

Structure Type	Service Reservoir	
Construction Type	CON	
Overall Tower Height*		m
Capacity of Tank	2.200	Ml
Depth of Water in Tank	4.50	m
TWL		mOD Poolbeg
Number of Compartments		
Bypassable?		
Year Commissioned		
Year of Last Internal Inspection		
Condition Assessment		
Data Confidence		
Comments on Physical Data		

Performance Data for 1997

Estimated Population Served	Persons
Estimated Leakage Rate	Ml/d
Bacterial Sampling Frequency	0/yr
Bacterial Sampling Failure Frequency	%
Number of Occasions of SRT Failure >3hrs but <12hrs in Duration	0Events
Number of Occasions of SRT Failure >12hrs in Duration	0Events
Comments on Performance Data	

*Note:- 'Overall Tower Height' applies to Water Towers only.

First Previous Next Last

Republic of Ireland
National Water Study
10. Operational Control

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name Code	BLA
Asset Type	OPC
ID Number	25

DOELG Scheme Code

Operational Control Data

Is there a centralised control room for the scheme?
Is there a SCADA system for the scheme?
Is there a telemetry system for the scheme?
What other monitoring and control facilities are there?
Ball valve - Ballina Reservoir.

Reservoirs / Water Towers

Are there monitoring facilities in place for:

Water Level

High Water Level Alarm

Low Water Level Alarm
Intruder Alarm

How are water levels controlled?

Control Valves

Are there monitoring facilities in place for:
Current Status (i.e. Open, Closed or %)
Operation (i.e. yes/no)

How are valves controlled?

Pumping Stations

Are there monitoring facilities in place for:

Current Status (i.e. on/off)
Current Pump Speeds

Flowrates
Lift
Power Availability

Intruder Alarm

How are Pumps controlled?
Wherrew - timer, Lisglennon - water level.

Dept. of the Environment and Local Government

System

Are there monitoring facilities in place for:
System Pressures
If so, how many and where?

System Flows

If so, how many and where?

Water Treatment Works

Are the water treatment works manned at night?
What process monitoring and control exists?
Instrumentation.

Are there monitoring facilities in place for:

Power Availability

Intruder Alarm

Flow Meters

What (non-customer) flow meters are there in the system (describe locations)

Method of meter reading	Manual
Frequency of meter reading	Daily.

Water Quality

What facilities exist for monitoring water quality at the water treatment works?

Laboratory.
What facilities exist for monitoring water quality in the system?

None, Western Health Board monitor.

Are the water quality monitoring facilities automated?

Routine System Monitoring

What facilities exist for routine automated monitoring of system performance?

First Previous Next Last

Republic of Ireland
National Water Study
10. Operational Control

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name Code	LMR
Asset Type	OPC
ID Number	26

DOELG Scheme Code

Operational Control Data

Is there a centralised control room for the scheme?
Is there a SCADA system for the scheme?
Is there a telemetry system for the scheme?
What other monitoring and control facilities are there?

Reservoirs / Water Towers

Are there monitoring facilities in place for:

Water Level

High Water Level Alarm

Low Water Level Alarm

Intruder Alarm

How are water levels controlled?

Actuated valve.

Control Valves

Are there monitoring facilities in place for:

Current Status (i.e. Open, Closed or %)

Operation (i.e. yes/no)

How are valves controlled?

Pumping Stations

Are there monitoring facilities in place for:

Current Status (i.e. on/off)

Current Pump Speeds

Flowrates

Lift

Power Availability

Intruder Alarm

How are Pumps controlled?
timers and balance tank level.

First Previous Next Last

Dept. of the Environment and Local Government

System

Are there monitoring facilities in place for:
System Pressures
If so, how many and where?

System Flows

If so, how many and where?

Water Treatment Works

Are the water treatment works manned at night?
What process monitoring and control exists?

Are there monitoring facilities in place for:

Power Availability

Intruder Alarm

Flow Meters

What (non-customer) flow meters are there in the system (describe locations)

WTW and all service reservoirs.

Method of meter reading Automatic
Frequency of meter reading

Water Quality

What facilities exist for monitoring water quality at the water treatment works?

Laboratory.
What facilities exist for monitoring water quality in the system?

None, Western Health Board test for EC limits.

Are the water quality monitoring facilities automated?

Routine System Monitoring

What facilities exist for routine automated monitoring of system performance?

Republic of Ireland
National Water Study
10. Operational Control

Identification

County	MAY
Sanitary Authority	MAY
Scheme Name Code	WST
Asset Type	OPC
ID Number	27

DOELG Scheme Code

Operational Control Data

Is there a centralised control room for the scheme?
Is there a SCADA system for the scheme?
Is there a telemetry system for the scheme?
What other monitoring and control facilities are there?

Reservoirs / Water Towers

Are there monitoring facilities in place for:

Water Level

High Water Level Alarm

Low Water Level Alarm
Intruder Alarm

How are water levels controlled?

Ball valve.

Control Valves

Are there monitoring facilities in place for:
Current Status (i.e. Open, Closed or %)
Operation (i.e. yes/no)

How are valves controlled?

Pumping Stations

Are there monitoring facilities in place for:

Current Status (i.e. on/off)
Current Pump Speeds

Flowrates
Lift
Power Availability

Intruder Alarm

How are Pumps controlled?
Manually.

Dept. of the Environment
and Local Government

System

Are there monitoring facilities in place for:
System Pressures
If so, how many and where?

System Flows

If so, how many and where?
2.

Water Treatment Works

Are the water treatment works manned at night?
What process monitoring and control exists?
Instrumentation.

Are there monitoring facilities in place for:

Power Availability

Intruder Alarm

Flow Meters

What (non-customer) flow meters are there in the system (describe locations)

9 in Westport Town and reservoirs.

Method of meter reading Automatic
Frequency of meter reading

Water Quality

What facilities exist for monitoring water quality at the water treatment works?

Laboratory.
What facilities exist for monitoring water quality in the system?

None, Western Health Board monitor.

Are the water quality monitoring facilities automated?

Routine System Monitoring

What facilities exist for routine automated monitoring of system performance?

First Previous Next Last

APPENDIX 5.1

RELIABLE YIELD ASSESSMENT SUMMARY SHEETS

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Reliable Yield Assessment Summary - Lake or Reservoir Source

1. Source Details

Name of Source **Lough Conn**

National Grid Reference: Region G E 172 N 167 Lake Reservoir

2. Reliable Yield

Average Reliable Yield	**13.5 Ml/d**	**Peak Reliable Yield**	**13.5 Ml/d**
Constraint	WTW	Constraint	WTW
Data Confidence	2	Data Confidence	2
Additional Information		Additional Information	

3. Allocation of Reliable Yield

Scheme Name	Name Code	County Code	Sanitary Authority Code	Average Reliable Yield (Ml/d)	Peak Reliable Yield (Ml/d)
Ballina Regional	BLA	MAY	MAY	13.5	13.5

Additional Information:

4. Previous Studies

Have Previous Studies Been Completed? Yes No

Deployable Output (DO)		***Hydrological Yield***	
Average DO	**Ml/d**	**Hydrological Yield (HY)**	**Ml/d**
Method Used to Calculate Average DO		Method Used to Calculate HY	
Peak DO	**Ml/d**		
Method Used to Calculate Peak DO			
Title of Document		Title of Document	
WSA Reference		WSA Reference	
Data Confidence		Data Confidence	

Additional Information:

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Reliable Yield Assessment Summary - Lake or Reservoir Source

5. Hydrological Yield

Method Used

Semi-Infinite Reservoir Analysis
Behavioural Analysis
Other
Spreadsheet File Reference

Analgous Gauge			***Subject Site***		
Analgous Gauge Name			Area of Lake/Reservoir		sq. km
River			Live Capacity	1376000	Ml
Analgous Gauge Number					
Catchment Area		sq. km	Catchment Area		sq. km
Annual Average Rainfall		mm	Annual Average Rainfall	1376	mm
Runoff to Analgous Gauge		mm	Runoff to Subject Site		mm
Period of Flow Record:	Start		Compensation Flow:	Summer	Ml/d
	Finish			Winter	Ml/d

Hydrological Yield **Ml/d**
Data Confidence
Additional Information:

Hydrological Yield not undertaken for this source. However, 1 in 50 year hydrological yield of Lough Conn will far exceed any deployable output constraints of assets.

6. Deployable Output

Demand Condition		***Constraints*** (all units are Ml/day)				
Average Demand	Ml/d	Sourceworks:	Average	6.6	Peak	36
Average Day Peak Week Demand	Ml/d	Abstraction Authorisation:	Average		Peak	
		Water Treatment Works:	Average	13.5	Peak	
Drought Condition Year						
		Pump Capacity:	Average	79	Peak	79
		Raw Water Main			53	
		Other:	Average		Peak	
		Dominant Constraints:				
		WTW	Average	13.5		
		WTW			Peak	13.5

Deployable Output (DO)

Average DO **13.5 Ml/d**

Average Day Peak Week DO **13.5 Ml/d**

Data Confidence 2
Additional Information:

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Reliable Yield Assessment Summary - Lake or Reservoir Source

1. Source Details

Name of Source **Lough Mask**

National Grid Reference: Region M E 115 N 705 Lake Reservoir

2. Reliable Yield

Average Reliable Yield	**24 Ml/d**	**Peak Reliable Yield**	**27 Ml/d**
Constraint	Pump Capacity	Constraint	WTW
Data Confidence	2	Data Confidence	2
Additional Information		Additional Information	

3. Allocation of Reliable Yield

Scheme Name	Name Code	County Code	Sanitary Authority Code	Average Reliable Yield (Ml/d)	Peak Reliable Yield (Ml/d)
Lough Mask Regional	LMR	MAY	MAY	24	27

Additional Information:

4. Previous Studies

Have Previous Studies Been Completed? Yes No

Deployable Output (DO)		***Hydrological Yield***	
Average DO	**Ml/d**	**Hydrological Yield (HY)**	**60 Ml/d**
Method Used to Calculate Average DO		Method Used to Calculate HY	
Peak DO	**Ml/d**		
Method Used to Calculate Peak DO			
Title of Document		Title of Document	
WSA Reference		WSA Reference	
Data Confidence		Data Confidence	4

Additional Information:

Yield study undertaken by Professor Nash of UCG in 1975.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Reliable Yield Assessment Summary - Lake or Reservoir Source

5. Hydrological Yield

Method Used

Semi-Infinite Reservoir Analysis
Behavioural Analysis
Other
Spreadsheet File Reference

Analgous Gauge			***Subject Site***			
Analgous Gauge Name			Area of Lake/Reservoir			sq. km
River			Live Capacity		1104600	Ml
Analgous Gauge Number						
Catchment Area		sq. km	Catchment Area		834	sq. km
Annual Average Rainfall		mm	Annual Average Rainfall		1580	mm
Runoff to Analgous Gauge		mm	Runoff to Subject Site			mm
Period of Flow Record:	Start		Compensation Flow:	Summer		Ml/d
	Finish			Winter		Ml/d

Hydrological Yield **Ml/d**
Data Confidence
Additional Information:

Hydrological Yield not undertaken for this source. However, 1 in 50 year hydrological yield of Lough Mask will far exceed any deployable output constraints of assets.

6. Deployable Output

Demand Condition		***Constraints***	(all units are Ml/day)			
Average Demand	Ml/d	Sourceworks:	Average	27	Peak	27
Average Day Peak Week Demand	Ml/d	Abstraction Authorisation:	Average		Peak	54
		Water Treatment Works:	Average	27	Peak	
Drought Condition Year						
		Pump Capacity:	Average	24	Peak	39
		Raw Water Main				
		Other:	Average		Peak	
		Dominant Constraints:				
		Pump Capacity	Average	24		
		WTW			Peak	27

Deployable Output (DO)

Average DO **24 Ml/d**

Average Day Peak Week DO **27 Ml/d**

Data Confidence 2
Additional Information:

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Reliable Yield Assessment Summary - Lake or Reservoir Source

1. Source Details

Name of Source **Moher Lake**

National Grid Reference: Region L E 980 N 766 Lake Reservoir

2. Reliable Yield

Average Reliable Yield	**3.6 Ml/d**	**Peak Reliable Yield**	**3.6 Ml/d**
Constraint	WTW	Constraint	WTW
Data Confidence	2	Data Confidence	2
Additional Information		Additional Information	

3. Allocation of Reliable Yield

Scheme Name	Name Code	County Code	Sanitary Authority Code	Average Reliable Yield (Ml/d)	Peak Reliable Yield (Ml/d)
Westport	WST	MAY	MAY	3.6	3.6

Additional Information:

4. Previous Studies

Have Previous Studies Been Completed? Yes No

Deployable Output (DO)		***Hydrological Yield***	
Average DO	**Ml/d**	**Hydrological Yield (HY)**	**5.918 Ml/d**
Method Used to Calculate Average DO		Method Used to Calculate HY	Lapworth Chart
Peak DO	**Ml/d**		
Method Used to Calculate Peak DO			
Title of Document		Title of Document	
WSA Reference		WSA Reference	
Data Confidence		Data Confidence	2

Additional Information:

Undertaken by An Foras Forbartha, 1979.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Reliable Yield Assessment Summary - Lake or Reservoir Source

5. Hydrological Yield

Method Used

Semi-Infinite Reservoir Analysis
Behavioural Analysis
Other
Spreadsheet File Reference

Analgous Gauge			***Subject Site***		
Analgous Gauge Name			Area of Lake/Reservoir		sq. km
River			Live Capacity		371000 Ml
Analgous Gauge Number					
Catchment Area		sq. km	Catchment Area		48 sq. km
Annual Average Rainfall		mm	Annual Average Rainfall		1600 mm
Runoff to Analgous Gauge		mm	Runoff to Subject Site		mm
Period of Flow Record:	Start		Compensation Flow:	Summer	Ml/d
	Finish			Winter	Ml/d

Hydrological Yield **Ml/d**
Data Confidence
Additional Information:

Hydrological yield assessment not undertaken for this source.

6. Deployable Output

Demand Condition

Average Demand Ml/d
Average Day Peak Week Demand Ml/d
Drought Condition Year

Constraints (all units are Ml/day)

Sourceworks:	Average		Peak	
Abstraction Authorisation:	Average		Peak	
Water Treatment Works:	Average	3.6	Peak	3.6
Pump Capacity:	Average	3.6	Peak	
Raw Water Main				
Other:	Average		Peak	
Dominant Constraints:				
WTW	Average	3.6		
WTW			Peak	3.6

Deployable Output (DO)

Average DO **3.6 Ml/d**
Average Day Peak Week DO **3.6 Ml/d**
Data Confidence 2
Additional Information:

No sourceworks, water flows by gravity via an open channel to the treatment works.

First Previous Next Last

APPENDIX 7.1

WATER QUALITY ASSESSMENT SUMMARY SHEETS

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Water Quality Assessment Summary

1. Scheme Details

Scheme Name	Ballina Regional	Scheme Name Code	BLA
Scheme Population	15885	Sanitary Authority Code	MAY
Scheme Distribution Input	8 Ml/d	County Code	MAY

2. Drinking Water Quality

Monitoring Performance using 1988 Drinking Water Regulation Standards

Compliance with 1988 Drinking Water Directive Standards	Data Reliability
Non-Compliance with Regulations	4

Parameters Exceeding MACs set in 1988 Drinking Water Regulations (and W.H.O. Standards for Residual Chlorine)

Parameter	No. of Exceedances	No. of Samples	Cause of Exceedance	Proposed Remedial Action
Total Coliforms	1	33	PMC	COM
Iron	3	4	NOP	None

Additional Information

Parameters Exceeding Parametric Values set in Annex 1, Parts A and B of the 1998 Drinking Water Directive

Parameter	No. of Exceedances	No. of Samples	Cause of Exceedance	Proposed Remedial Action

Additional Information

NOTE 1: Above table derived from data intended for assessment against standards set in 1988 Drinking Water Regulations. The 1998 Drinking Water Directive stipulates wider parametric coverage and more extensive sampling than 1988 Regulations. It is therefore possible that all non-compliances under the 1998 Directive will not have been identified.

NOTE 2: 1998 Directive not currently enforced into Irish Law. Parametric values used in above table are therefore subject to change.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Water Quality Assessment Summary

3. Source Water Quality

Source 1 Lough Conn — Source Type: Lake — Data Confidence: 2

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations
	M			

Additional Information
Decrease in open water phytoplankton.

Source 2 — Source Type: — Data Confidence:

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations

Additional Information

Source 3 — Source Type: — Data Confidence:

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations

Additional Information

Source 4 — Source Type: — Data Confidence:

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations

Additional Information

Source 5 — Source Type: — Data Confidence:

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations

Additional Information

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Water Quality Assessment Summary

1. Scheme Details

Scheme Name	Lough Mask Regional	Scheme Name Code	LMR
Scheme Population	21755	Sanitary Authority Code	MAY
Scheme Distribution Input	23.5 Ml/d	County Code	MAY

2. Drinking Water Quality

Monitoring Performance using 1988 Drinking Water Regulation Standards

Compliance with 1988 Drinking Water Directive Standards	Data Reliability
Non-Compliance with Regulations	4

Parameters Exceeding MACs set in 1988 Drinking Water Regulations (and W.H.O. Standards for Residual Chlorine)

Parameter	No. of Exceedances	No. of Samples	Cause of Exceedance	Proposed Remedial Action
Coliforms	1	31	PMC	COM

Additional Information

Parameters Exceeding Parametric Values set in Annex 1, Parts A and B of the 1998 Drinking Water Directive

Parameter	No. of Exceedances	No. of Samples	Cause of Exceedance	Proposed Remedial Action
Faecal Coliforms	1	31	PMC	COM

Additional Information

NOTE 1: Above table derived from data intended for assessment against standards set in 1988 Drinking Water Regulations. The 1998 Drinking Water Directive stipulates wider parametric coverage and more extensive sampling than 1988 Regulations. It is therefore possible that all non-compliances under the 1998 Directive will not have been identified.
NOTE 2: 1998 Directive not currently enforced into Irish Law. Parametric values used in above table are therefore subject to change.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Water Quality Assessment Summary

3. Source Water Quality

Source 1 Lough Mask — Source Type: Lake — Data Confidence: 2

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations
	M			

Additional Information
Increased algal growth in open water.

Source 2 — Source Type: — Data Confidence:

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations

Additional Information

Source 3 — Source Type: — Data Confidence:

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations

Additional Information

Source 4 — Source Type: — Data Confidence:

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations

Additional Information

Source 5 — Source Type: — Data Confidence:

EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification	Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations

Additional Information

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Water Quality Assessment Summary

1. Scheme Details

Scheme Name	Westport	Scheme Name Code	WST
Scheme Population	6454	Sanitary Authority Code	MAY
Scheme Distribution Input	3.3 Ml/d	County Code	MAY

2. Drinking Water Quality

Monitoring Performance using 1988 Drinking Water Regulation Standards

Compliance with 1988 Drinking Water Directive Standards	Data Reliability
Non-Compliance with Regulations	4

Parameters Exceeding MACs set in 1988 Drinking Water Regulations (and W.H.O. Standards for Residual Chlorine)

Parameter	No. of Exceedances	No. of Samples	Cause of Exceedance	Proposed Remedial Action

Additional Information

Parameters Exceeding Parametric Values set in Annex 1, Parts A and B of the 1998 Drinking Water Directive

Parameter	No. of Exceedances	No. of Samples	Cause of Exceedance	Proposed Remedial Action

Additional Information

NOTE 1: Above table derived from data intended for assessment against standards set in 1988 Drinking Water Regulations. The 1998 Drinking Water Directive stipulates wider parametric coverage and more extensive sampling than 1988 Regulations. It is therefore possible that all non-compliances under the 1998 Directive will not have been identified.

NOTE 2: 1998 Directive not currently enforced into Irish Law. Parametric values used in above table are therefore subject to change.

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Water Quality Assessment Summary

3. Source Water Quality

Source 1	Moher Lake	Source Type	Lake	Data Confidence	2
EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification		Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations
	O				
Additional Information					
Source 2		Source Type		Data Confidence	
EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification		Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations
Additional Information					
Source 3		Source Type		Data Confidence	
EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification		Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations
Additional Information					
Source 4		Source Type		Data Confidence	
EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification		Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations
Additional Information					
Source 5		Source Type		Data Confidence	
EPA River Water Quality Class	EPA Lake Water Quality Class	Surface Water Abstraction Directive Classification		Freshwater Fish Directive Classification	Derogations under 1988 Drinking Water Regulations
Additional Information					

First Previous Next Last

APPENDIX 7.2

DRINKING WATER QUALITY ASSESSMENT SUMMARY SHEETS

Drinking Water Quality Assessment

Full Assessment

Scheme Details

Scheme	Ballina Regional	Sanitary Authority	Mayo CC	County	Mayo	Population Served	15,885

Summary of 1997 Exceedences

	No. of Exceedences	No. of Samples
Total Coliforms	**1**	**33**
Faecal Coliforms	0	33
Residual Chlorine	*0*	*0*
Colour	0	0
Turbidity	0	4
Odour	0	4
Taste	0	4
pH	0	4
Aluminum	0	0
Nitrates	0	4
Nitrites	0	4
Ammonium	0	4
Iron	**3**	**4**
Manganese	0	0
Copper	0	0
Zinc	0	0
Cadnium	0	0
Lead	0	0
Fluoride	0	0

Summary of 1997 Monitoring Performance

	C0	C1	C2	C3	Cx	Total
Required	-	12	3	1		**16**
Actual	33	0	4	0	15	**52**

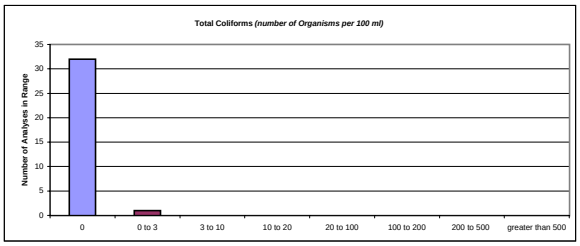
Key

CO	Number of coliform samples taken in addition to those taken as part of C1, C2 or C3
C1	Minimum Monitoring (Table 3.2 Flanagan 1990)
C2	Current Monitoring (Table 3.3 Flanagan 1990)
C3	Periodic Monitoring (Table 3.4 Flanagan 1990)
Cx	Additional coliform sampling because disinfection part of treatment process

Parameter Assessment 1997

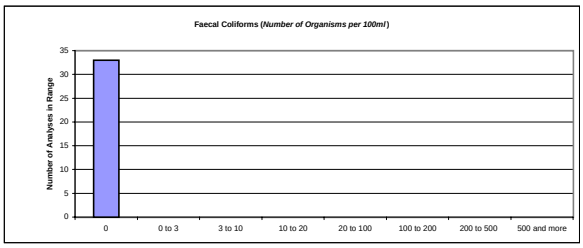
Total Coliform (Organisms per 100ml)

Range	Number of Samples in Range	Percentage of Samples in Range
0	32	97%
0 to 3	1	3%
3 to 10	0	0%
10 to 20	0	0%
20 to 100	0	0%
100 to 200	0	0%
200 to 500	0	0%
greater than 500	0	0%
Total	**33**	**100%**
MAC	*0*	*org. / 100ml*



Faecal Coliform (Organisms per 100ml)

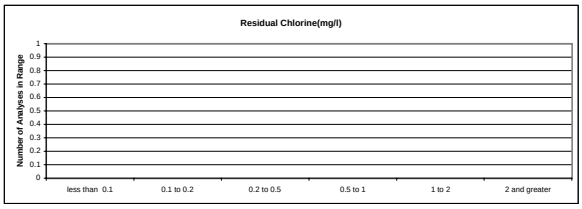
Range	Number of Samples in Range	Percentage of Samples in Range
0	33	100%
0 to 3	0	0%
3 to 10	0	0%
10 to 20	0	0%
20 to 100	0	0%
100 to 200	0	0%
200 to 500	0	0%
500 and more	0	0%
Total	33	100%
MAC	*0*	*org. / 100ml*



Residual Chlorine

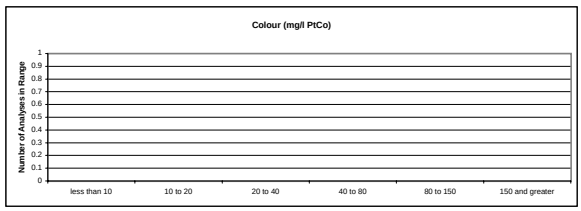
Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	0	#DIV/0!
0.1 to 0.2	0	#DIV/0!
0.2 to 0.5	0	#DIV/0!
0.5 to 1	0	#DIV/0!
1 to 2	0	#DIV/0!
2 and greater	0	#DIV/0!
Total	0	#DIV/0!
Recommended Conc	*0.2-0.5*	*mg/l*

NOTE: *No MAC for Residual Chlorine. Range used is taken from WHO 1984 guidelines.*



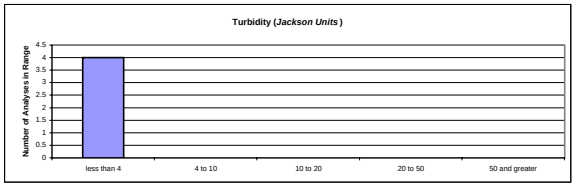
Colour

Range	Number of Samples in Range	Percentage of Samples in Range
less than 10	0	#DIV/0!
10 to 20	0	#DIV/0!
20 to 40	0	#DIV/0!
40 to 80	0	#DIV/0!
80 to 150	0	#DIV/0!
150 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*20*	*mg/l PtCo*



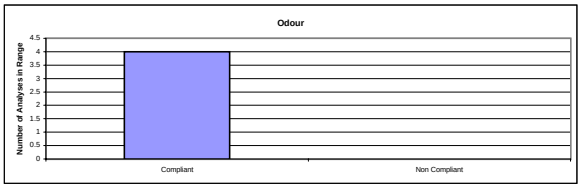
Turbidity (Jackson Units)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 4	4	100%
4 to 10	0	0%
10 to 20	0	0%
20 to 50	0	0%
50 and greater	0	0%
Total	4	100%
MAC	*4*	



Odour

Range	Number of Samples in Range	Percentage of Samples in Range
Compliant	4	100%
Non Compliant	0	0%
Total	4	100%
MAC	*present*	

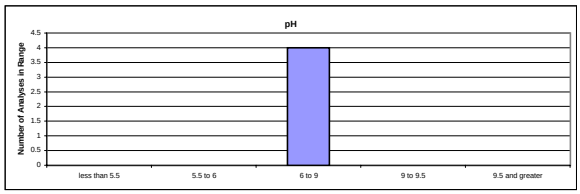


Taste

Range	Number of Samples in Range	Percentage of Samples in Range
Compliant	4	100%
Non Compliant	0	0%
Total	4	100%
Recommended Level	*present*	*mg/l*

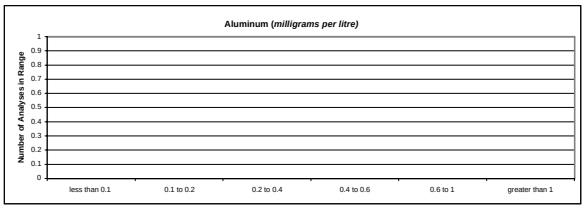
pH

Range	Number of Samples in Range	Percentage of Samples in Range
less than 5.5	0	0%
5.5 to 6	0	0%
6 to 9	4	100%
9 to 9.5	0	0%
9.5 and greater	0	0%
Total	4	100%
MAC	*6 to 9*	*pH units*



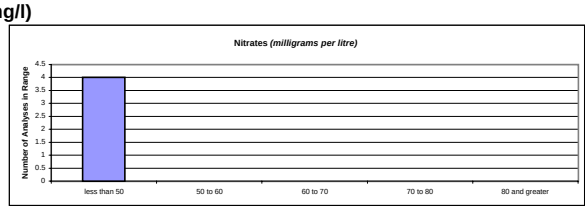
Aluminum (milligrams per litre)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	0	#DIV/0!
0.1 to 0.2	0	#DIV/0!
0.2 to 0.4	0	#DIV/0!
0.4 to 0.6	0	#DIV/0!
0.6 to 1	0	#DIV/0!
greater than 1	0	#DIV/0!
Total	0	#DIV/0!
MAC	*0.2*	*mg/l*



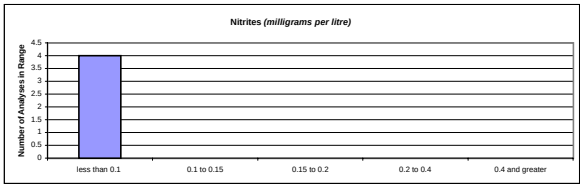
Nitrates (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 50	4	100%
50 to 60	0	0%
60 to 70	0	0%
70 to 80	0	0%
80 and greater	0	0%
Total	4	100%
MAC	*50*	*mg/l*



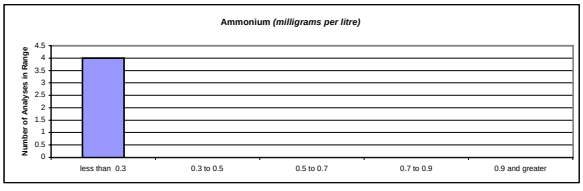
Nitrites (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	4	100%
0.1 to 0.15	0	0%
0.15 to 0.2	0	0%
0.2 to 0.4	0	0%
0.4 and greater	0	0%
Total	4	100%
MAC	0.1	mg/l



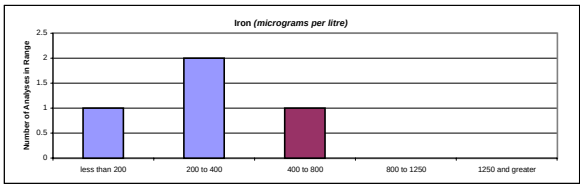
Ammonium (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.3	4	100%
0.3 to 0.5	0	0%
0.5 to 0.7	0	0%
0.7 to 0.9	0	0%
0.9 and greater	0	0%
Total	4	100%
MAC	*0.3*	*mg/l*



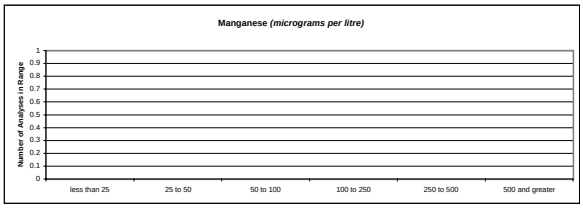
Iron (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 200	1	25%
200 to 400	2	50%
400 to 800	1	25%
800 to 1250	0	0%
1250 and greater	0	0%
Total	4	100%
MAC	*200*	*micrograms/l*



Manganese (micrograms/l)

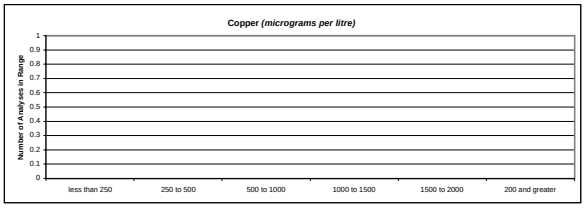
Range	Number of Samples in Range	Percentage of Samples in Range
less than 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 to 100	0	#DIV/0!
100 to 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*50*	*micrograms/l*



Copper (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1500	0	#DIV/0!
1500 to 2000	0	#DIV/0!
200 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	500	micrograms/l

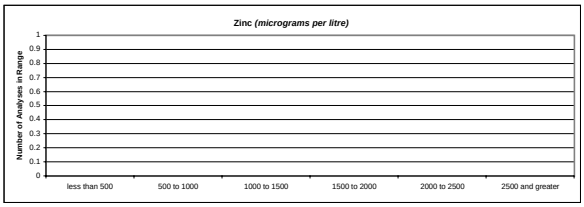
NOTE: *MAC quoted is for the outlet of PS and WTW works. Increases to 3000 micrograms/l after 12 hours standing.*



Zinc (micrograms/l)

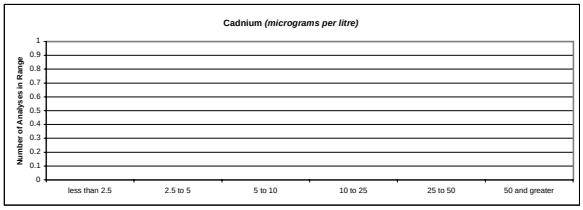
Range	Number of Samples in Range	Percentage of Samples in Range
less than 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1500	0	#DIV/0!
1500 to 2000	0	#DIV/0!
2000 to 2500	0	#DIV/0!
2500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*1000*	*micrograms/l*

NOTE: *MAC quoted is for the outlet of PS and WTW works. Increases to 5000 micrograms/l after 12 hours standing.*



Cadnium (micrograms/l)

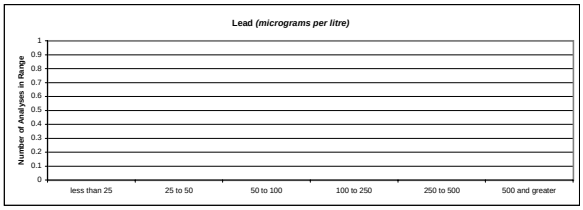
Range	Number of Samples in Range	Percentage of Samples in Range
less than 2.5	0	#DIV/0!
2.5 to 5	0	#DIV/0!
5 to 10	0	#DIV/0!
10 to 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*5*	*micrograms/l*



Lead (micrograms/l)

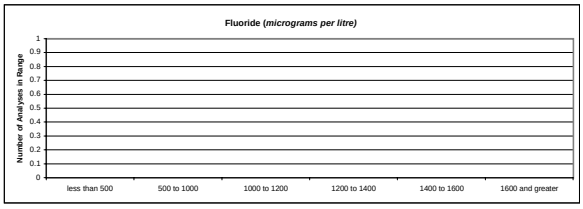
Range	Number of Samples in Range	Percentage of Samples in Range
less than 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 to 100	0	#DIV/0!
100 to 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*50*	*micrograms/l*

NOTE*: 50 micrgram per litre MAC is for running water.*



Fluoride (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1200	0	#DIV/0!
1200 to 1400	0	#DIV/0!
1400 to 1600	0	#DIV/0!
1600 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*1000*	*micrograms/l*



Drinking Water Quality Assessment

Full Assessment

Scheme Details

Scheme Lough Mask Regional **Sanitary Authority** Mayo CC **County** Mayo **Population Served** 21,755

Summary of 1997 Exceedences

	No. of Exceedences	No. of Samples
Total Coliforms	**1**	**31**
Faecal Coliforms	**1**	**31**
Residual Chlorine	*0*	*0*
Colour	0	0
Turbidity	0	11
Odour	0	11
Taste	0	11
pH	0	11
Aluminum	0	0
Nitrates	0	11
Nitrites	0	11
Ammonium	0	11
Iron	0	0
Manganese	0	0
Copper	0	0
Zinc	0	0
Cadnium	0	0
Lead	0	0
Fluoride	0	0

Summary of 1997 Monitoring Performance

	C0	C1	C2	C3	Cx	Total
Required	-	12	3	1		**16**
Actual	31	0	11	0	7	**49**

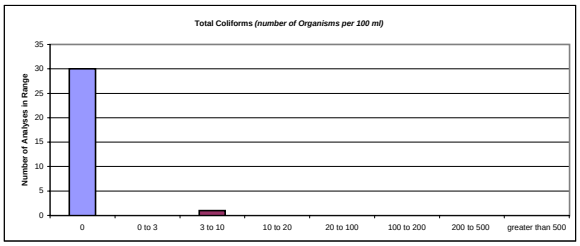
Key

CO	Number of coliform samples taken in addition to those taken as part of C1, C2 or C3
C1	Minimum Monitoring (Table 3.2 Flanagan 1990)
C2	Current Monitoring (Table 3.3 Flanagan 1990)
C3	Periodic Monitoring (Table 3.4 Flanagan 1990)
Cx	Additional coliform sampling because disinfection part of treatment process

Parameter Assessment 1997

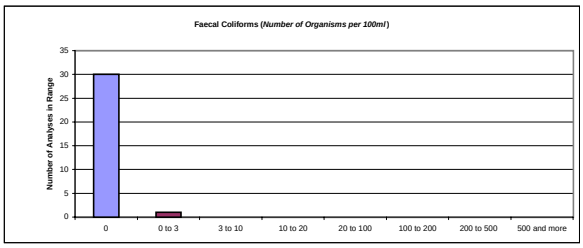
Total Coliform (Organisms per 100ml)

Range	Number of Samples in Range	Percentage of Samples in Range
0	30	97%
0 to 3	0	0%
3 to 10	1	3%
10 to 20	0	0%
20 to 100	0	0%
100 to 200	0	0%
200 to 500	0	0%
greater than 500	0	0%
Total	**31**	**100%**
MAC	*0*	*org. / 100ml*



Faecal Coliform (Organisms per 100ml)

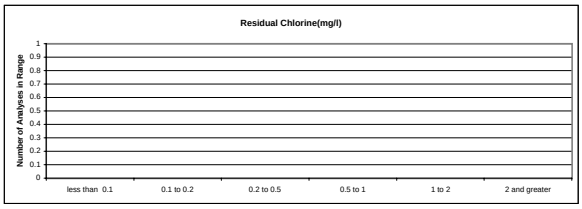
Range	Number of Samples in Range	Percentage of Samples in Range
0	30	97%
0 to 3	1	3%
3 to 10	0	0%
10 to 20	0	0%
20 to 100	0	0%
100 to 200	0	0%
200 to 500	0	0%
500 and more	0	0%
Total	31	100%
MAC	*0*	*org. / 100ml*



Residual Chlorine

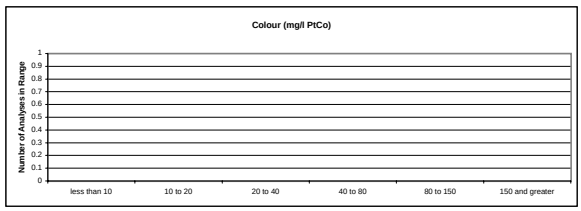
Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	0	#DIV/0!
0.1 to 0.2	0	#DIV/0!
0.2 to 0.5	0	#DIV/0!
0.5 to 1	0	#DIV/0!
1 to 2	0	#DIV/0!
2 and greater	0	#DIV/0!
Total	0	#DIV/0!
Recommended Conc	*0.2-0.5*	*mg/l*

NOTE: *No MAC for Residual Chlorine. Range used is taken from WHO 1984 guidelines.*



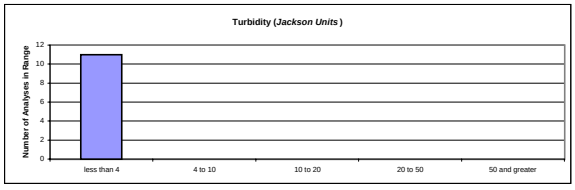
Colour

Range	Number of Samples in Range	Percentage of Samples in Range
less than 10	0	#DIV/0!
10 to 20	0	#DIV/0!
20 to 40	0	#DIV/0!
40 to 80	0	#DIV/0!
80 to 150	0	#DIV/0!
150 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*20*	*mg/l PtCo*



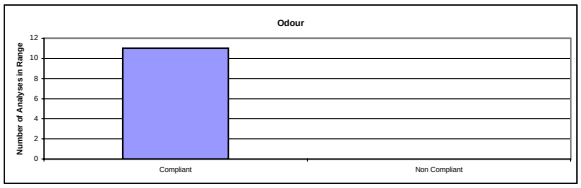
Turbidity (Jackson Units)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 4	11	100%
4 to 10	0	0%
10 to 20	0	0%
20 to 50	0	0%
50 and greater	0	0%
Total	11	100%
MAC	*4*	



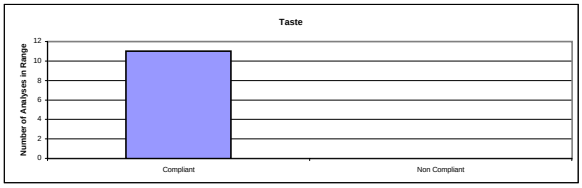
Odour

Range	Number of Samples in Range	Percentage of Samples in Range
Compliant	11	100%
Non Compliant	0	0%
Total	11	100%
MAC	*present*	



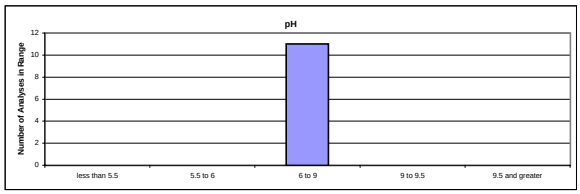
Taste

Range	Number of Samples in Range	Percentage of Samples in Range
Compliant	11	100%
Non Compliant	0	0%
Total	11	100%
Recommended Level	*present*	*mg/l*



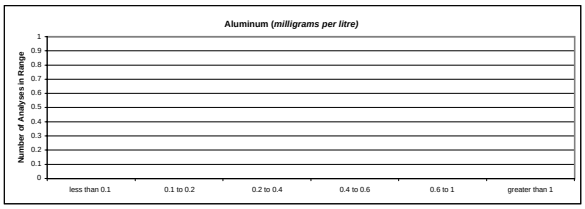
pH

Range	Number of Samples in Range	Percentage of Samples in Range
less than 5.5	0	0%
5.5 to 6	0	0%
6 to 9	11	100%
9 to 9.5	0	0%
9.5 and greater	0	0%
Total	11	100%
MAC	*6 to 9*	*pH units*



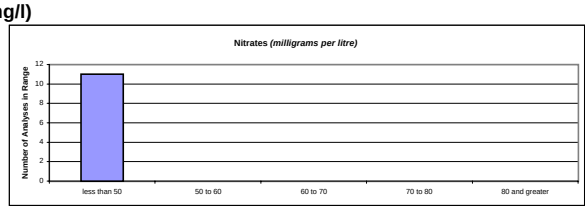
Aluminum (milligrams per litre)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	0	#DIV/0!
0.1 to 0.2	0	#DIV/0!
0.2 to 0.4	0	#DIV/0!
0.4 to 0.6	0	#DIV/0!
0.6 to 1	0	#DIV/0!
greater than 1	0	#DIV/0!
Total	0	#DIV/0!
MAC	*0.2*	*mg/l*



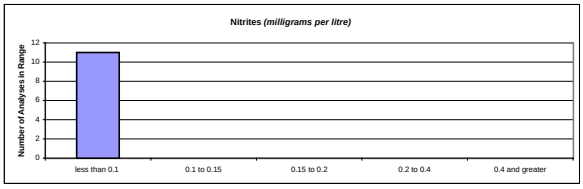
Nitrates (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 50	11	100%
50 to 60	0	0%
60 to 70	0	0%
70 to 80	0	0%
80 and greater	0	0%
Total	11	100%
MAC	*50*	*mg/l*



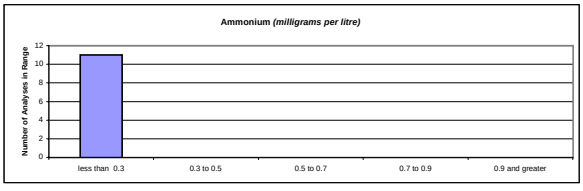
Nitrites (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	11	100%
0.1 to 0.15	0	0%
0.15 to 0.2	0	0%
0.2 to 0.4	0	0%
0.4 and greater	0	0%
Total	11	100%
MAC	0.1	mg/l



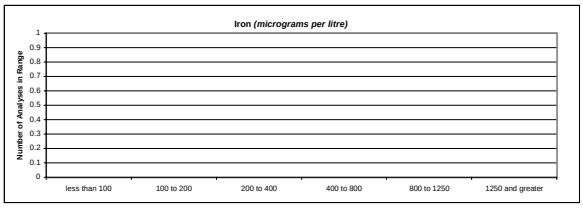
Ammonium (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.3	11	100%
0.3 to 0.5	0	0%
0.5 to 0.7	0	0%
0.7 to 0.9	0	0%
0.9 and greater	0	0%
Total	11	100%
MAC	*0.3*	*mg/l*



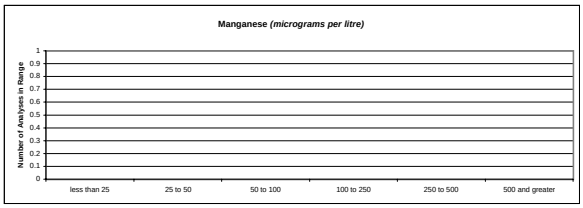
Iron (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 100	0	#DIV/0!
100 to 200	0	#DIV/0!
200 to 400	0	#DIV/0!
400 to 800	0	#DIV/0!
800 to 1250	0	#DIV/0!
1250 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*200*	*micrograms/l*



Manganese (micrograms/l)

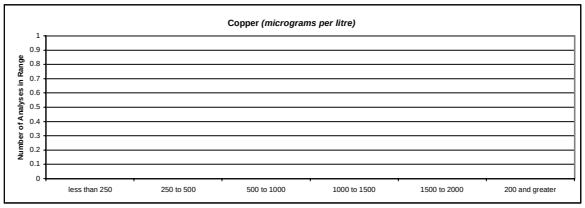
Range	Number of Samples in Range	Percentage of Samples in Range
less than 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 to 100	0	#DIV/0!
100 to 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*50*	*micrograms/l*



Copper (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1500	0	#DIV/0!
1500 to 2000	0	#DIV/0!
200 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	500	micrograms/l

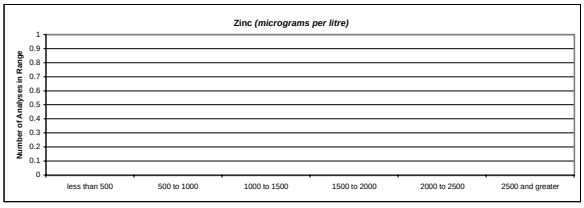
NOTE: *MAC quoted is for the outlet of PS and WTW works. Increases to 3000 micrograms/l after 12 hours standing.*



Zinc (micrograms/l)

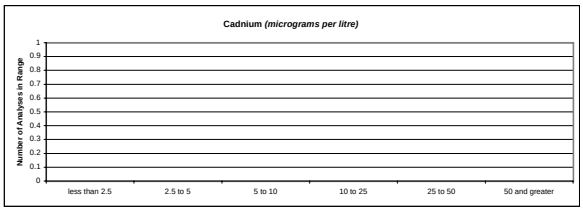
Range	Number of Samples in Range	Percentage of Samples in Range
less than 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1500	0	#DIV/0!
1500 to 2000	0	#DIV/0!
2000 to 2500	0	#DIV/0!
2500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*1000*	*micrograms/l*

NOTE: *MAC quoted is for the outlet of PS and WTW works. Increases to 5000 micrograms/l after 12 hours standing.*



Cadnium (micrograms/l)

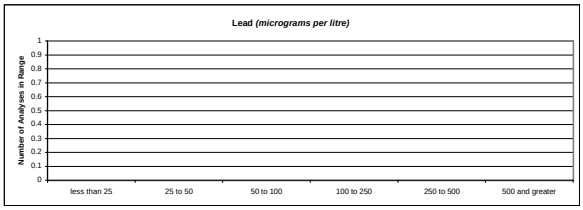
Range	Number of Samples in Range	Percentage of Samples in Range
less than 2.5	0	#DIV/0!
2.5 to 5	0	#DIV/0!
5 to 10	0	#DIV/0!
10 to 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*5*	*micrograms/l*



Lead (micrograms/l)

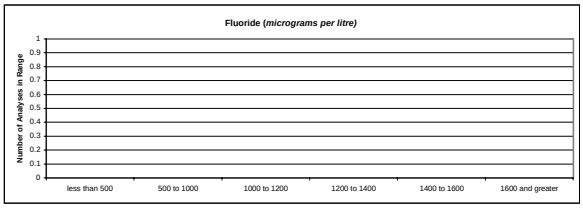
Range	Number of Samples in Range	Percentage of Samples in Range
less than 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 to 100	0	#DIV/0!
100 to 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*50*	*micrograms/l*

NOTE*: 50 micrgram per litre MAC is for running water.*



Fluoride (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1200	0	#DIV/0!
1200 to 1400	0	#DIV/0!
1400 to 1600	0	#DIV/0!
1600 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*1000*	*micrograms/l*



Drinking Water Quality Assessment

Full Assessment

Scheme Details

Scheme Westport **Sanitary Authority** Mayo CC **County** Mayo **Population Served** 6,454

Summary of 1997 Exceedences

	No. of Exceedences	No. of Samples
Total Coliforms	0	26
Faecal Coliforms	0	26
Residual Chlorine	*0*	*0*
Colour	0	0
Turbidity	0	2
Odour	0	2
Taste	0	2
pH	0	2
Aluminum	0	0
Nitrates	0	2
Nitrites	0	2
Ammonium	0	2
Iron	0	0
Manganese	0	0
Copper	0	0
Zinc	0	0
Cadnium	0	0
Lead	0	0
Fluoride	0	0

Summary of 1997 Monitoring Performance

	C0	C1	C2	C3	Cx	Total
Required	-	12	3	1		**16**
Actual	26	0	2	0	6	**34**

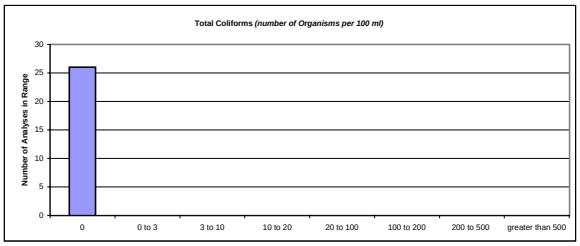
Key

CO	Number of coliform samples taken in addition to those taken as part of C1, C2 or C3
C1	Minimum Monitoring (Table 3.2 Flanagan 1990)
C2	Current Monitoring (Table 3.3 Flanagan 1990)
C3	Periodic Monitoring (Table 3.4 Flanagan 1990)
Cx	Additional coliform sampling because disinfection part of treatment process

Parameter Assessment 1997

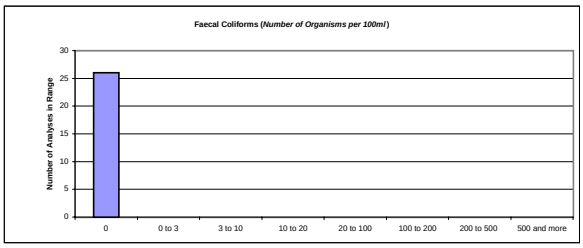
Total Coliform (Organisms per 100ml)

Range	Number of Samples in Range	Percentage of Samples in Range
0	26	100%
0 to 3	0	0%
3 to 10	0	0%
10 to 20	0	0%
20 to 100	0	0%
100 to 200	0	0%
200 to 500	0	0%
greater than 500	0	0%
Total	**26**	**100%**
MAC	*0*	*org. / 100ml*



Faecal Coliform (Organisms per 100ml)

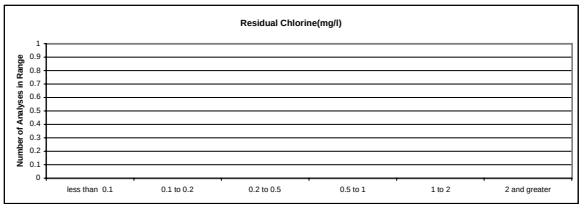
Range	Number of Samples in Range	Percentage of Samples in Range
0	26	100%
0 to 3	0	0%
3 to 10	0	0%
10 to 20	0	0%
20 to 100	0	0%
100 to 200	0	0%
200 to 500	0	0%
500 and more	0	0%
Total	26	100%
MAC	*0*	*org. / 100ml*



Residual Chlorine

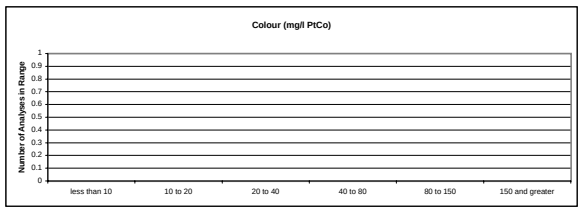
Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	0	#DIV/0!
0.1 to 0.2	0	#DIV/0!
0.2 to 0.5	0	#DIV/0!
0.5 to 1	0	#DIV/0!
1 to 2	0	#DIV/0!
2 and greater	0	#DIV/0!
Total	0	#DIV/0!
Recommended Conc	*0.2-0.5*	*mg/l*

NOTE: *No MAC for Residual Chlorine. Range used is taken from WHO 1984 guidelines.*



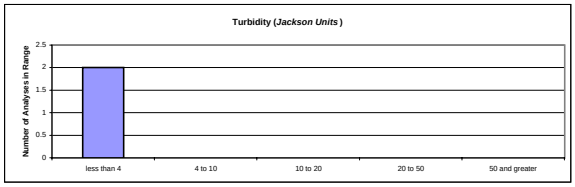
Colour

Range	Number of Samples in Range	Percentage of Samples in Range
less than 10	0	#DIV/0!
10 to 20	0	#DIV/0!
20 to 40	0	#DIV/0!
40 to 80	0	#DIV/0!
80 to 150	0	#DIV/0!
150 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*20*	*mg/l PtCo*



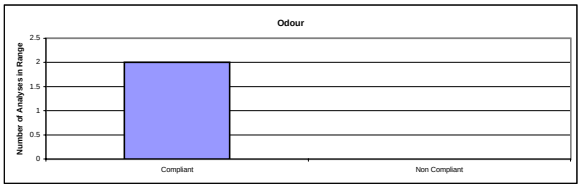
Turbidity (Jackson Units)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 4	2	100%
4 to 10	0	0%
10 to 20	0	0%
20 to 50	0	0%
50 and greater	0	0%
Total	2	100%
MAC	*4*	



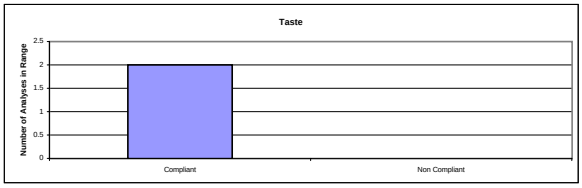
Odour

Range	Number of Samples in Range	Percentage of Samples in Range
Compliant	2	100%
Non Compliant	0	0%
Total	2	100%
MAC	*present*	



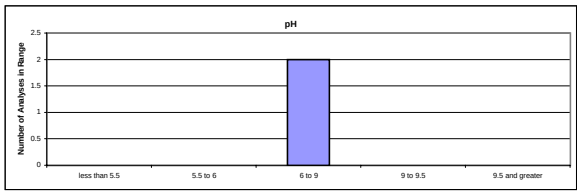
Taste

Range	Number of Samples in Range	Percentage of Samples in Range
Compliant	2	100%
Non Compliant	0	0%
Total	2	100%
Recommended Level	*present*	*mg/l*



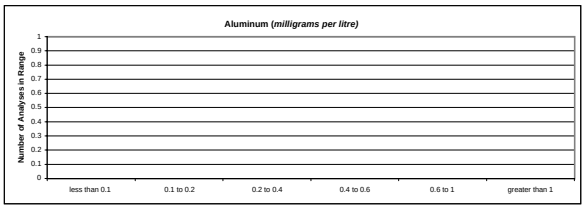
pH

Range	Number of Samples in Range	Percentage of Samples in Range
less than 5.5	0	0%
5.5 to 6	0	0%
6 to 9	2	100%
9 to 9.5	0	0%
9.5 and greater	0	0%
Total	2	100%
MAC	*6 to 9*	*pH units*



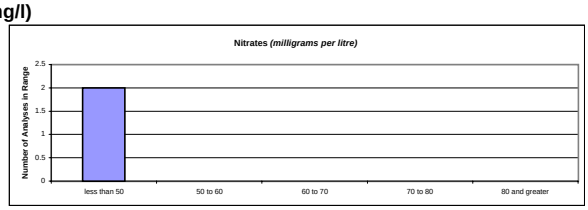
Aluminum (milligrams per litre)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	0	#DIV/0!
0.1 to 0.2	0	#DIV/0!
0.2 to 0.4	0	#DIV/0!
0.4 to 0.6	0	#DIV/0!
0.6 to 1	0	#DIV/0!
greater than 1	0	#DIV/0!
Total	0	#DIV/0!
MAC	*0.2*	*mg/l*



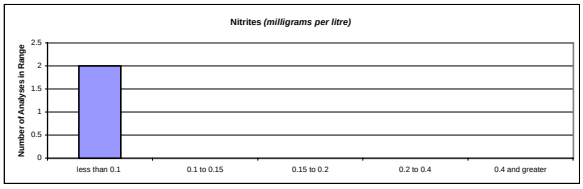
Nitrates (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 50	2	100%
50 to 60	0	0%
60 to 70	0	0%
70 to 80	0	0%
80 and greater	0	0%
Total	2	100%
MAC	*50*	*mg/l*



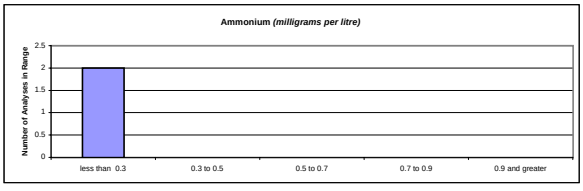
Nitrites (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.1	2	100%
0.1 to 0.15	0	0%
0.15 to 0.2	0	0%
0.2 to 0.4	0	0%
0.4 and greater	0	0%
Total	2	100%
MAC	0.1	mg/l



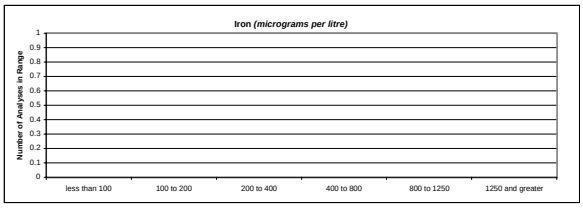
Ammonium (mg/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 0.3	2	100%
0.3 to 0.5	0	0%
0.5 to 0.7	0	0%
0.7 to 0.9	0	0%
0.9 and greater	0	0%
Total	2	100%
MAC	*0.3*	*mg/l*



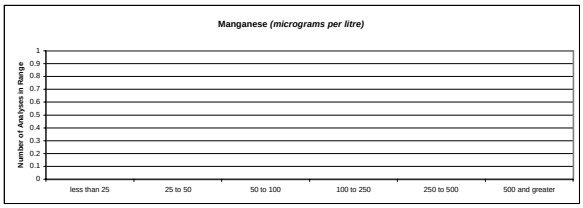
Iron (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 100	0	#DIV/0!
100 to 200	0	#DIV/0!
200 to 400	0	#DIV/0!
400 to 800	0	#DIV/0!
800 to 1250	0	#DIV/0!
1250 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*200*	*micrograms/l*



Manganese (micrograms/l)

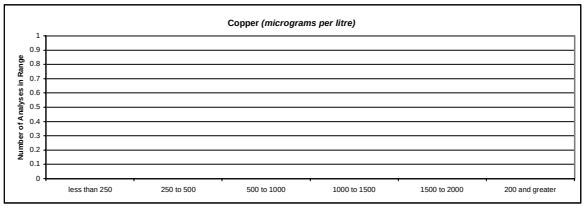
Range	Number of Samples in Range	Percentage of Samples in Range
less than 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 to 100	0	#DIV/0!
100 to 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*50*	*micrograms/l*



Copper (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1500	0	#DIV/0!
1500 to 2000	0	#DIV/0!
200 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	500	micrograms/l

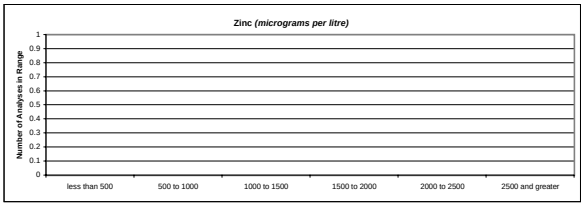
NOTE: *MAC quoted is for the outlet of PS and WTW works. Increases to 3000 micrograms/l after 12 hours standing.*



Zinc (micrograms/l)

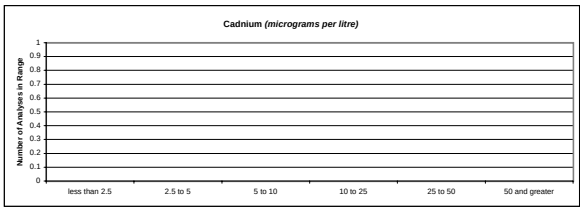
Range	Number of Samples in Range	Percentage of Samples in Range
less than 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1500	0	#DIV/0!
1500 to 2000	0	#DIV/0!
2000 to 2500	0	#DIV/0!
2500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*1000*	*micrograms/l*

NOTE: *MAC quoted is for the outlet of PS and WTW works. Increases to 5000 micrograms/l after 12 hours standing.*



Cadnium (micrograms/l)

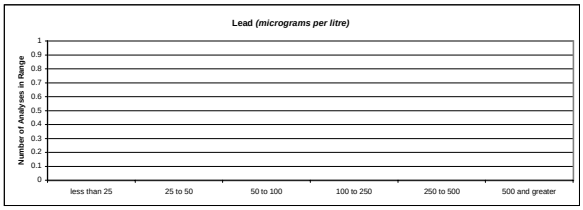
Range	Number of Samples in Range	Percentage of Samples in Range
less than 2.5	0	#DIV/0!
2.5 to 5	0	#DIV/0!
5 to 10	0	#DIV/0!
10 to 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*5*	*micrograms/l*



Lead (micrograms/l)

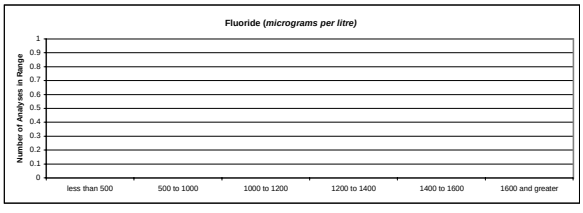
Range	Number of Samples in Range	Percentage of Samples in Range
less than 25	0	#DIV/0!
25 to 50	0	#DIV/0!
50 to 100	0	#DIV/0!
100 to 250	0	#DIV/0!
250 to 500	0	#DIV/0!
500 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*50*	*micrograms/l*

NOTE*: 50 micrgram per litre MAC is for running water.*



Fluoride (micrograms/l)

Range	Number of Samples in Range	Percentage of Samples in Range
less than 500	0	#DIV/0!
500 to 1000	0	#DIV/0!
1000 to 1200	0	#DIV/0!
1200 to 1400	0	#DIV/0!
1400 to 1600	0	#DIV/0!
1600 and greater	0	#DIV/0!
Total	0	#DIV/0!
MAC	*1000*	*micrograms/l*



APPENDIX 8.1

BASELINE DOMESTIC DEMAND CALCULATIONS

APPENDIX 8.1 - Baseline Domestic Demand for Mayo County Council Water Supply Schemes

District Electoral Division (DED)	DED Type[1]	Population Supplied - MCC[2]	Total DED Population 1991 - CSO[2]	% of DED Supplied	Total DED Population 1997 - WSA[2]	Population Supplied 1997	1997 PCC (l/h/d) - WSA	1997 Domestic Demand (Ml/d)
BALLINA REGIONAL								
Ardagh	Aggregate Rural Area	315	315	100	341	341	131.2	0.045
Ardnaree North	Aggregate Rural Area	781	781	100	843	843	131.2	0.111
Ardnaree South Rural	Aggregate Rural Area	1,384	1,384	100	1,380	1,380	131.2	0.181
Ardnaree South Urban	Aggregate Town Area	2,083	2,083	100	2,144	2,144	134.0	0.287
Attymass West	Aggregate Rural Area	60	250	24	249	60	131.2	0.008
Ballina Rural	Aggregate Rural Area	1,714	1,714	100	1,985	1,985	131.2	0.260
Ballina Urban	Aggregate Town Area	4,480	4,480	100	4,773	4,773	134.0	0.640
Ballysakeery	Aggregate Rural Area	495	495	100	519	519	131.2	0.068
Carrowmore	Aggregate Rural Area	746	746	100	742	742	131.2	0.097
Fortland	Aggregate Rural Area	499	499	100	465	465	131.2	0.061
Kilfian East	Aggregate Rural Area	160	320	50	284	142	131.2	0.019
Kilfian South	Aggregate Rural Area	55	279	20	289	57	131.2	0.007
Killala	Aggregate Rural Area	1,050	1,404	75	1,383	1,034	131.2	0.136
Mount Falcon	Aggregate Rural Area	1,155	1,155	100	1,156	1,156	131.2	0.152
Rathoma	Aggregate Rural Area	266	266	100	244	244	131.2	0.032
TOTALS		**15,243**				**15,885**		**2.104**
LOUGH MASK REGIONAL								
Ballindine	Aggregate Rural Area	156	746	21	753	157	131.2	0.021
Ballinrobe	Aggregate Rural Area	1,953	2,136	91	2,156	1,971	131.2	0.259
Castlebar Rural	Aggregate Rural Area	2,476	3,420	72	3,453	2,500	131.2	0.328
Castlebar Urban	Aggregate Town Area	6,585	6,585	100	6,648	6,648	134.0	0.891
Claremorris	Aggregate Rural Area	3,189	2,431	131	2,454	3,219	131.2	0.422
Westport Rural	Aggregate Rural Area	200	1,121	18	1,132	202	131.2	0.027
Group Water Schemes	NA	7,057	NA	NA	NA	7,057	131.2	0.926
TOTALS		**21,616**				**21,755**		**2.873**
WESTPORT								
Aghagower North	Aggregate Rural Area	293	586	50	624	312	131.2	0.041
Croaghpatrick	Aggregate Rural Area	43	431	10	419	42	131.2	0.005
Kilmeena	Aggregate Rural Area	183	915	20	976	195	131.2	0.026
Knappagh	Aggregate Rural Area	466	466	100	480	480	131.2	0.063
Westport Rural	Aggregate Rural Area	1,048	1,048	100	1,132	1,132	131.2	0.149
Westport Urban	Aggregate Town Area	3,688	3,688	100	4,293	4,293	134.0	0.575
TOTALS		**5,721**				**6,454**		**0.859**

[1]A DED may be one of 4 types: County, County Borough, Aggregate Town or Aggregate Rural Area

[2]Abbreviations for sources of data: MCC = Mayo County Council, CSO = Central Statistics Office, WSA = WS Atkins

APPENDIX 8.2

FORECAST DOMESTIC DEMAND CALCULATIONS

APPENDIX 8.2 - Forecast Domestic Demand for Mayo County Council Water Supply Schemes

District Electoral Division (DED)	2003				2008				2013				2018			
	Projected Pop.	Est. Pop. Supplied	PCC (litres/head/day)	Demand (Ml/d)	Projected Pop.	Est. Pop. Supplied	PCC (litres/head/day)	Demand (Ml/d)	Projected Pop.	Est. Pop. Supplied	PCC (litres/head/day)	Demand (Ml/d)	Projected Pop.	Est. Pop. Supplied	PCC (litres/head/day)	Demand (Ml/d)
BALLINA REGIONAL																
Ardagh	337	337	136.0	0.046	338	338	139.9	0.047	338	338	143.8	0.049	337	337	147.8	0.050
Ardnaree North	832	832	136.0	0.113	834	834	139.9	0.117	836	836	143.8	0.120	833	833	147.8	0.123
Ardnaree South Rural	1,362	1,362	136.0	0.185	1,365	1,365	139.9	0.191	1,368	1,368	143.8	0.197	1,363	1,363	147.8	0.201
Ardnaree South Urban	2,116	2,116	138.9	0.294	2,121	2,121	143.0	0.303	2,126	2,126	147.1	0.313	2,118	2,118	151.2	0.320
Attymass West	246	59	136.0	0.008	247	59	139.9	0.008	247	59	143.8	0.009	246	59	147.8	0.009
Ballina Rural	1,959	1,959	136.0	0.266	1,963	1,963	139.9	0.275	1,967	1,967	143.8	0.283	1,961	1,961	147.8	0.290
Ballina Urban	4,710	4,710	138.9	0.654	4,722	4,722	143.0	0.675	4,731	4,731	147.1	0.696	4,715	4,715	151.2	0.713
Ballysakeery	512	512	136.0	0.070	513	513	139.9	0.072	514	514	143.8	0.074	513	513	147.8	0.076
Carrowmore	732	732	136.0	0.100	734	734	139.9	0.103	736	736	143.8	0.106	733	733	147.8	0.108
Fortland	459	459	136.0	0.062	460	460	139.9	0.064	461	461	143.8	0.066	460	460	147.8	0.068
Kilfian East	280	140	136.0	0.019	281	140	139.9	0.020	281	141	143.8	0.020	280	140	147.8	0.021
Kilfian South	285	56	136.0	0.008	286	56	139.9	0.008	286	56	143.8	0.008	285	56	147.8	0.008
Killala	1,365	1,021	136.0	0.139	1,368	1,023	139.9	0.143	1,371	1,025	143.8	0.147	1,366	1,022	147.8	0.151
Mount Falcon	1,141	1,141	136.0	0.155	1,143	1,143	139.9	0.160	1,146	1,146	143.8	0.165	1,142	1,142	147.8	0.169
Rathoma	241	241	136.0	0.033	242	242	139.9	0.034	242	242	143.8	0.035	241	241	147.8	0.036
TOTALS		**15,676**		**2.151**		**15,714**		**2.220**		**15,747**		**2.287**		**15,693**		**2.342**
LOUGH MASK REGIONAL																
Ballindine	743	155	136.0	0.021	745	156	139.9	0.022	747	156	143.8	0.022	744	156	147.8	0.023
Ballinrobe	2,128	1,946	136.0	0.265	2,133	1,950	139.9	0.273	2,138	1,954	143.8	0.281	2,130	1,948	147.8	0.288
Castlebar Rural	3,407	2,467	136.0	0.335	3,415	2,473	139.9	0.346	3,422	2,478	143.8	0.356	3,411	2,469	147.8	0.365
Castlebar Urban	6,560	6,560	138.9	0.911	6,576	6,576	143.0	0.940	6,590	6,590	147.1	0.969	6,567	6,567	151.2	0.993
Claremorris	2,422	3,177	136.0	0.432	2,428	3,185	139.9	0.445	2,433	3,191	143.8	0.459	2,424	3,180	147.8	0.470
Westport Rural	1,117	199	136.0	0.027	1,119	200	139.9	0.028	1,122	200	143.8	0.029	1,118	199	147.8	0.029
Group Water Schemes*	7,082	7,082	136.0	0.963	7,099	7,099	139.9	0.993	7,114	7,114	143.8	1.023	7,090	7,090	147.8	
TOTALS		**21,586**		**2.954**		**21,638**		**3.047**		**21,683**		**3.140**		**21,610**		**2.168**
WESTPORT																
Aghagower North	616	308	136.0	0.042	617	309	139.9	0.043	618	309	143.8	0.044	616	308	147.8	0.046
Croaghpatrick	413	41	136.0	0.006	414	41	139.9	0.006	415	41	143.8	0.006	414	41	147.8	0.006
Kilmeena	963	193	136.0	0.026	966	193	139.9	0.027	968	194	143.8	0.028	964	193	147.8	0.028
Knappagh	473	473	136.0	0.064	474	474	139.9	0.066	475	475	143.8	0.068	474	474	147.8	0.070
Westport Rural	1,117	1,117	136.0	0.152	1,119	1,119	139.9	0.157	1,122	1,122	143.8	0.161	1,118	1,118	147.8	0.165
Westport Urban	4,237	4,237	138.9	0.589	4,247	4,247	143.0	0.607	4,256	4,256	147.1	0.626	4,241	4,241	151.2	0.641
TOTALS		**6,369**		**0.878**		**6,384**		**0.906**		**6,397**		**0.934**		**6,375**		**0.957**

*Group Water Scheme populations were projected using overall county population growth rates.

APPENDIX 9.1

WATER AUDIT CALCULATIONS

WATER AUDIT CALCULATIONS

Scheme: Ballina Regional

							Ml/d
DISTRIBUTION INPUT							**8.000**
DOMESTIC DEMAND						**2.104**	
NON-DOMESTIC DEMAND							
Agricultural	**Metered**	No. of Users	0				
		Demand		0.000			
	Unmetered	No. of Users	1101				
		Demand		0.777	**0.777**		
Commercial	**Metered**	No. of Users	134				
		Demand		0.221			
	Unmetered	No. of Users	231				
		Demand		0.381	**0.601**		
Industrial	**Metered**	No. of Users	11				
		Demand		0.121			
	Unmetered	No. of Users	5				
		Demand		0.055	**0.177**		
Public Sector	**Metered**	No. of Users	3				
		Demand		0.066			
	Unmetered	No. of Users	21				
		Demand		0.460	**0.526**		
TOTAL NON-DOMESTIC DEMAND						**2.081**	
TOTAL DEMAND							**4.185**
UNACCOUNTED FOR WATER (UFW)							**3.815**
UFW as a %							**47.7**
UFW per connection (litres/conn/hr)							**24.2**

WATER AUDIT CALCULATIONS

Scheme: Lough Mask Regional

						Ml/d
DISTRIBUTION INPUT						**23.500**
DOMESTIC DEMAND	Public Water Schemes			1.947		
	Group Water Schemes			0.926		
	Total				**2.873**	
NON-DOMESTIC DEMAND						
Agricultural	**Metered**	No. of Users	0			
		Demand		0.000		
	Unmetered	No. of Users	483			
		Demand		0.341	**0.341**	
Commercial	**Metered**	No. of Users	41			
		Demand		0.269		
	Unmetered	No. of Users	617			
		Demand		1.031	**1.300**	
Industrial	**Metered**	No. of Users	14			
		Demand		2.879		
	Unmetered	No. of Users	17			
		Demand		0.566	**3.445**	
Public Sector	**Metered**	No. of Users	11			
		Demand		0.304		
	Unmetered	No. of Users	6			
		Demand		0.014	**0.319**	
TOTAL NON-DOMESTIC DEMAND					**5.404**	
TOTAL DEMAND						**8.278**
UNACCOUNTED FOR WATER (UFW)						**15.222**
UFW as a %						**64.8**
UFW per connection (litres/conn/hr)						**78.1**

WATER AUDIT CALCULATIONS

Scheme: Westport

				Ml/d		
DISTRIBUTION INPUT						**3.300**
DOMESTIC DEMAND					**0.859**	
NON-DOMESTIC DEMAND						
Agricultural	**Metered**	No. of Users	0			
		Demand		0.000		
	Unmetered	No. of Users	309			
		Demand		0.218	**0.218**	
Commercial	**Metered**	No. of Users	108			
		Demand		0.693		
	Unmetered	No. of Users	25			
		Demand		0.160	**0.854**	
Industrial	**Metered**	No. of Users	5			
		Demand		0.227		
	Unmetered	No. of Users	1			
		Demand		0.026	**0.253**	
Public Sector	**Metered**	No. of Users	0			
		Demand		0.000		
	Unmetered	No. of Users	0			
		Demand		0.000	**0.000**	
TOTAL NON-DOMESTIC DEMAND					**1.325**	
TOTAL DEMAND						**2.184**
UNACCOUNTED FOR WATER (UFW)						**1.116**
UFW as a %						**33.8**
UFW per connection (litres/conn/hr)						**18.6**

APPENDIX 10.1

CURRENT SYSTEM PERFORMANCE SUMMARY SHEETS

Republic of Ireland
National Water Study
Current System Performance Summary

Dept. of the Environment and Local Government

Scheme	Ballina Regional			Code	BLA		
Sanitary Authority	Mayo County Council			Code	MAY		
AVAILABILITY OF WATER	**Hydrological Yield**						
	Source	**(Ml/day)**	**Confidence Grade**				
	Abstraction Licence						
	Source	**Average (Ml/day)**	**Confidence Grade**		**Peak (Ml/day)**		**Confidence Grade**
	Water Treatment Works Rated Capacity						
	Source	**Average (Ml/day)**	**Confidence Grade**		**Peak (Ml/day)**		**Confidence Grade**
	Lough Conn	13.5	Reliable				
	Deployable Output						
	Source	**Average (Ml/day)**	**Confidence Grade**		**Peak (Ml/day)**		**Confidence Grade**
	Lough Conn	6.6	Reliable			36	Reliable
	Reliable Yield						
		Average (Ml/day)	**Confidence Grade**		**Peak (Ml/day)**		**Confidence Grade**
	Scheme	6.6	Reliable			36	Reliable
RAW WATER QUALITY	**Source**	**EPA Biological Water Quality Class**	**No. of Interruptions > 3 hrs < 12hrs**		**No. of Interruptions > 12 hrs**		**Confidence Grade**
	Lough Conn	NA	1		0	Reliable	
							Confidence Grade
POTABLE WATER QUALITY	Does Water Quality Sampling comply with EU Directive 1988?				No		Reliable
	Number of Indicators not complying with EU Directive 1988					2	Reliable
	Compliance Rating				Bad		Reliable

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Current System Performance Summary

DEMAND ESTIMATION 1997	Population Supplied		15885	
	Number of Properties Supplied (Population/Occupancy Rate)		5059	
	1997 Total Average Demand (Ml/day)		4.185	
	Confidence Grade	Moderately Reliable		
DEMAND ESTIMATION 2018	2018 Total Average Demand (Ml/day)		5.217	
	Confidence Grade	Moderately Reliable		
WATER AUDIT	Unaccounted For Water (Ml/day)		3.815	
	Unaccounted For Water (% of Distribution Input)		47.7	
	Unaccounted For Water (litres/connection/hour)		24.2	
	Confidence Grade	Moderately Reliable		
	"Spare" Water (= Reliable Yield - 1997 Demand - UFW)		0	
	Confidence Grade	Moderately Reliable		
				Confidence Grade
CURRENT SYSTEM HYDRAULIC PERFORMANCE	Population at risk of low pressure (below target)			
	Reservoir Performance (hours)		10.8	Reliable
	Interruptions to supply		1	Reliable
	Hydraulic Performance Indicator			
	Energy Costs			
	Standby Provision			
		Condition Grade		**Confidence Grade**
CURRENT SYSTEM CONDITION	Underground Source Works	NA		
	Surface Source Works - Lakes and Reservoirs	Adequate		Reliable
	Surface Source Works - Rivers	NA		
	Dams	NA		
	Raw Water Aqueducts	Adequate		Reliable
	Pumping Stations	Adequate		Reliable
	Water Treatment Works	Adequate		Reliable
	Trunk Mains	Good		Reliable
	Service Reservoirs and Water Towers	Adequate		Reliable
	Distribution Mains	Unknown		
	Operational Control Systems	NA		
	Overall Condition Grade	Adequate		Reliable

First Previous Next Last

Republic of Ireland
National Water Study
Current System Performance Summary

Dept. of the Environment and Local Government

Scheme	Lough Mask Regional			Code	LMR	
Sanitary Authority	Mayo County Council			Code	MAY	
AVAILABILITY OF WATER	**Hydrological Yield**					
	Source	**(Ml/day)**	**Confidence Grade**			
	Lough Mask		60Moderately Reliable			
	Abstraction Licence					
	Source	**Average (Ml/day)**	**Confidence Grade**	**Peak (Ml/day)**	**Confidence Grade**	
	Lough Mask				54Reliable	
	Water Treatment Works Rated Capacity					
	Source	**Average (Ml/day)**	**Confidence Grade**	**Peak (Ml/day)**	**Confidence Grade**	
	Lough Mask		27Reliable		27Reliable	
	Deployable Output					
	Source	**Average (Ml/day)**	**Confidence Grade**	**Peak (Ml/day)**	**Confidence Grade**	
	Lough Mask		24Reliable		27Reliable	
	Reliable Yield					
		Average (Ml/day)	**Confidence Grade**	**Peak (Ml/day)**	**Confidence Grade**	
	Scheme		24Reliable		27Reliable	
RAW WATER QUALITY	**Source**	**EPA Biological Water Quality Class**	**No. of Interruptions > 3 hrs < 12hrs**	**No. of Interruptions > 12 hrs**	**Confidence Grade**	
	Lough Mask	NA		0	0Reliable	
					Confidence Grade	
POTABLE WATER QUALITY	Does Water Quality Sampling comply with EU Directive 1988?			No	Reliable	
	Number of Indicators not complying with EU Directive 1988				1Reliable	
	Compliance Rating			Bad	Reliable	

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Current System Performance Summary

DEMAND ESTIMATION 1997	Population Supplied		21755	
	Number of Properties Supplied (Population/Occupancy Rate)		6928	
	1997 Total Average Demand (Ml/day)		8.278	
	Confidence Grade	Moderately Reliable		
DEMAND ESTIMATION 2018	2018 Total Average Demand (Ml/day)		11.828	
	Confidence Grade	Moderately Reliable		
WATER AUDIT	Unaccounted For Water (Ml/day)		15.222	
	Unaccounted For Water (% of Distribution Input)		64.8	
	Unaccounted For Water (litres/connection/hour)		78.1	
	Confidence Grade	Moderately Reliable		
	"Spare" Water (= Reliable Yield - 1997 Demand - UFW)		0.5	
	Confidence Grade	Moderately Reliable		
				Confidence Grade
CURRENT SYSTEM HYDRAULIC PERFORMANCE	Population at risk of low pressure (below target)			
	Reservoir Performance (hours)		32.9	Reliable
	Interruptions to supply		0	Moderately Reliable
	Hydraulic Performance Indicator			
	Energy Costs			
	Standby Provision			
		Condition Grade		**Confidence Grade**
CURRENT SYSTEM CONDITION	Underground Source Works	NA		
	Surface Source Works - Lakes and Reservoirs	Adequate		Reliable
	Surface Source Works - Rivers	NA		
	Dams	NA		
	Raw Water Aqueducts	Fair		Moderately Reliable
	Pumping Stations	Fair		Reliable
	Water Treatment Works	Fair		Reliable
	Trunk Mains	Good		Reliable
	Service Reservoirs and Water Towers	Good		Highly Reliable
	Distribution Mains	Unknown		
	Operational Control Systems	Good		Reliable
	Overall Condition Grade	Fair		Reliable

First Previous Next Last

Republic of Ireland
National Water Study
Current System Performance Summary

Dept. of the Environment and Local Government

Scheme	Westport		Code	WST		
Sanitary Authority	Mayo County Council		Code	MAY		
AVAILABILITY OF WATER	**Hydrological Yield**					
	Source	**(Ml/day)**	**Confidence Grade**			
	Moher Lake	5.9	Moderately Reliable			
	Abstraction Licence					
	Source	**Average (Ml/day)**	**Confidence Grade**	**Peak (Ml/day)**	**Confidence Grade**	
	Water Treatment Works Rated Capacity					
	Source	**Average (Ml/day)**	**Confidence Grade**	**Peak (Ml/day)**	**Confidence Grade**	
	Moher Lake	3.6	Reliable	3.6	Reliable	
	Deployable Output					
	Source	**Average (Ml/day)**	**Confidence Grade**	**Peak (Ml/day)**	**Confidence Grade**	
	Moher Lake	3.6	Reliable	3.6	Reliable	
	Reliable Yield					
		Average (Ml/day)	**Confidence Grade**	**Peak (Ml/day)**	**Confidence Grade**	
	Scheme	3.6	Reliable	3.6	Reliable	
RAW WATER QUALITY	**Source**	**EPA Biological Water Quality Class**	**No. of Interruptions > 3 hrs < 12hrs**	**No. of Interruptions > 12 hrs**	**Confidence Grade**	
	Moher Lake	NA	3	0	Reliable	
					Confidence Grade	
POTABLE WATER QUALITY	Does Water Quality Sampling comply with EU Directive 1988?		No		Reliable	
	Number of Indicators not complying with EU Directive 1988				0	Reliable
	Compliance Rating		Bad		Reliable	

First Previous Next Last

Republic of Ireland
National Water Study

Dept. of the Environment and Local Government

Current System Performance Summary

DEMAND ESTIMATION 1997	Population Supplied		6454	
	Number of Properties Supplied (Population/Occupancy Rate)		2055	
	1997 Total Average Demand (Ml/day)		2.184	
	Confidence Grade	Moderately Reliable		
DEMAND ESTIMATION 2018	2018 Total Average Demand (Ml/day)		3.139	
	Confidence Grade	Moderately Reliable		
WATER AUDIT	Unaccounted For Water (Ml/day)		1.116	
	Unaccounted For Water (% of Distribution Input)		33.8	
	Unaccounted For Water (litres/connection/hour)		18.6	
	Confidence Grade	Moderately Reliable		
	"Spare" Water (= Reliable Yield - 1997 Demand - UFW)		0.3	
	Confidence Grade	Moderately Reliable		

			Confidence Grade
CURRENT SYSTEM HYDRAULIC PERFORMANCE	Population at risk of low pressure (below target)		
	Reservoir Performance (hours)	16	Reliable
	Interruptions to supply	3	Reliable
	Hydraulic Performance Indicator		
	Energy Costs		
	Standby Provision		

		Condition Grade	**Confidence Grade**
CURRENT SYSTEM CONDITION	Underground Source Works	NA	
	Surface Source Works - Lakes and Reservoirs	NA	
	Surface Source Works - Rivers	NA	
	Dams	NA	
	Raw Water Aqueducts	Good	Moderately Reliable
	Pumping Stations	Adequate	Reliable
	Water Treatment Works	Adequate	Reliable
	Trunk Mains	Adequate	Reliable
	Service Reservoirs and Water Towers	Unknown	
	Distribution Mains	Unknown	
	Operational Control Systems	NA	
	Overall Condition Grade	Adequate	Reliable

First Previous Next Last