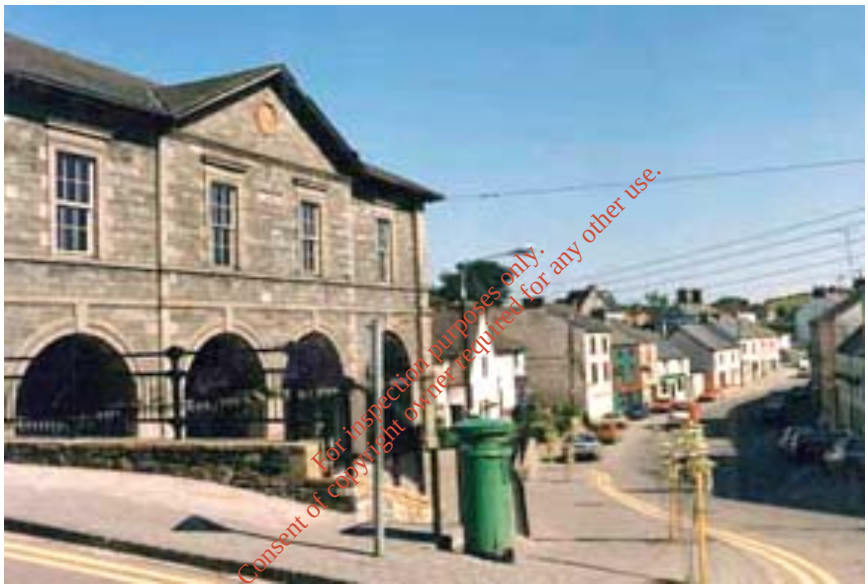
National Urban Waste Water Study

Catchment Report

for

BALLYBAY



Revision Control Table

The User is Responsible for Checking the Revision Status of this Document

Rev.	Description of Changes	Prepared by	Checked by	Approved by	Date
A	Initial Issue	FO'M	JK	FMcG	August 2003
B	Post Review Revisions	GM/JK	JK	FMcG	Jan 2004

TABLE OF CONTENTS

TABLES

FIGURES

ACRONYMS

CSO	Central Statistics Office
cSO	Combined sewer overflow
CiS	Complete Information System
DEHLG	Department of the Environment, Heritage and Local Government
LA	Local authority
LG	Local government
OD	Ordnance datum
SI	Statutory Instrument
EC	European Community
EU	European Union
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
BOD	Biochemical oxygen demand
COD	Chemical oxygen demand
WWTP	Waste Water treatment plant
NH_3	Ammonia
SS	Suspended solids
P	Phosphorus
ND	No data
pe	Population equivalent
M	Million
N/A	Not applicable
d/s	Downstream
u/s	Upstream

SCIENTIFIC TERMS

m^3/s	Cubic metres per second
l/s	Litres per second
mg/l	Milligrams per litre
km	Kilometres
Ml/d	Megalitres per day
kg/d	Kilograms per day
m	Metres
dia.	Diameter
mm	Millimetres
tds	Tonnes dry solids
Tds/d	Tonnes dry solids per day
ha	Hectares
% ds	Percent dry solids
MLSS	Mixed Liquor Suspended Solids

DEFINITIONS

Summary definitions for the Confidence, Condition and Performance Grades are given below. For comprehensive definitions of the terms used in the National Urban Waste Water Study, refer to Volume 2, Methodology.

Confidence Grades

The Confidence Grades are directly related to the sources of available information. The definitions summarise the "Source Codes" descriptions used in conjunction with the data collection questionnaires and reflect the confidence, which it is considered an external party can attach to the data without further checking.

1 **High degree of confidence**; based on comprehensive current records

2 **Relatively high degree of confidence**; records are generally current and comprehensive with only limited shortcomings.

3 **Reasonable confidence**; records, although not wholly complete or up to date, were confirmed by local staff as correct and/or have passed selective checks.

4 **Low level of confidence**; basic records are poor and local knowledge is sketchy and uncorroborated.

5 **Very low level of confidence**; no formal records or detailed knowledge of the assets or data and no corroborative checks possible.

5A **Very low level of confidence**; data derived from use of the standard methodology

Asset Condition Grades*
Sewers and Rising Mains

≤ 3 **Normal wear and tear**; no failures or structural defects, and mains designed to current standards (Grade 1) through to significant defects evident in the fabric of sewers or deterioration beginning to be reflected in the levels of service and/or operating costs (Grade 3). Replacement/renovation of mains required within 10 years, review of condition of sewers in the medium term.

4 **Serious structural deterioration** in sewers (5-10% deformation, displacement, cracking); rising mains nearing the end of their useful life with frequent bursts and reduction in level of service. Asset renovation/replacement required in medium term.

5 **Assets collapsed or substantially derelict**, frequent rising main bursts & no residual life expectancy. The asset will require replacement within short term.

5A **Very low level of confidence**; data derived from use of the standard methodology

Above Ground Civil, Mechanical & Electrical Works

≤ 3 **Normal wear and tear**; sound modern structure and plant, which is operable and maintained (Grade 1) through to structure and plant which is functionally sound or adequate but is significantly affected by deterioration with some reduced efficiency and minor failures (Grade 3) – review of condition required in the medium term.

4 **Structural deterioration having a significant effect on performance** due to leakage or other problems; plant functions but requires significant maintenance to remain operational. Major overhaul/replacement required in medium term.

5 **Serious structural problems, effective life of plant exceeded;** structural problems having a detrimental effect on the performance, unreliable and incurring excessive maintenance costs compared to replacement. The asset will require major overhaul/replacement in short term.

DEFINITIONS continued

Performance Grades*

Sewers & Rising Mains

≤ 3 **Excellent to moderate**; no operational or service problems (Grade 1) through to significant loss of capacity in sewers and rising mains, resulting in intermittent surcharge or occasional blockage (Grade 3).

4 **Borderline**; frequent problems causing rising main blockage under normal operating conditions - sewers require occasional cleaning to prevent blockage and surface flooding.

5 **Fail**; Sewer requires regular de-silting or other maintenance to prevent flooding of property or premature operation of storm overflows. Rising mains suffer severe blockage problems and pumping performance cannot be ensured.

Above Ground Assets (General)

≤ 3 **Excellent to normally serviceable**; meets all design, statutory and/or relevant authority standards at all times (Grade 1) through to, meets statutory and performance criteria under normal operating conditions but has minor shortcomings under extreme conditions (Grade 3).

4 **Unsatisfactory**; performance or operational shortcomings have a significant effect on asset functional/effectiveness.

5 **Unacceptable**; substantially incapable of meeting externally or internally imposed standards except under normal or reduced operating conditions.

Waste Water Treatment Plant (individual elements or stages)

≤ 3 **Excellent to moderate**; performance in excess of design requirement through to, cause for concern as poor performance of the element or stage may be contributing to marginal performance of the plant as a whole.

4 **Borderline**; severe reduction in the design performance or capacity of the element which has become the main cause of borderline performance of the plant as a whole.

5 **Fail**; continuous poor performance of the element or stage is the main cause of the overall plant performance, which is borderline or failing.

- With acknowledgements to The Office of Water Services, AMP 2 Strategic Business Plan Manual, UK.

1.0 THE CATCHMENT

Catchment Name	Ballybay
Catchment Code	2400 0010
County	Monaghan
Local Authority	Monaghan County Council
OS Grid Reference for WWTP	H 716 201
OS Grid Reference for Discharge	ND

1.1 URBAN AREA

Ballybay is a small market town in the centre of County Monaghan and is situated on the shores of Lough Major (see Figure 1). The town is located 21 km south of Monaghan Town and 120 km north west of Dublin. The current residential population of the town was estimated as 1,185 (see Table 1.2).

The town of Ballybay grew as a linen industry town in the mid 18th century and the site of the original settlement is to be found in the Lower Main Street area. The decline of the industry after 1840, although serious, did not cause a mortal blow to the town as it had established itself as an important market centre at that stage.

The town is built along a winding main street with a number of attractive buildings giving it an appealing character. Lough Major, to the east of the town, is renowned for its excellent angling facilities.

Today Ballybay serves as a retail and service centre to the agricultural community in the surrounding hinterland. Employment locally is provided in a food processing plant and a manufacturing industry adjoining the town and in the retail and service sector within the town. Commercial facilities are located predominantly around the centre of town.

Institutional facilities in Ballybay include three primary schools and one secondary school, with an estimated 148 students and staff residing outside the catchment.

The drainage catchment in Ballybay includes the main urban area on the banks of Lough Major and extends outwards to service ribbon development along roads leading into the town (with the exception of the R162 to the south). The total area of the drainage catchment is approximately 95 ha. Details of current development and future planning targets were not available at time of writing.

The urban area lies in a relatively flat area surrounded by drumlins, rivers and interglacial lakes. Information on the geology of the urban area was not provided.

1.2 PLANNING TARGETS & ANTICIPATED GROWTH

The 2002 Monaghan County Development Plan, which includes the Ballybay Development Plan was expected to be adopted in June 2003. As zoning maps for Ballybay were not available at time of writing it was not possible to identify present land zoning or future zoning targets. Accordingly Table 1.1 is not used and the current and future development boundaries are not shown on Figure 1. This shows only the boundary of the drainage catchment.

A sectoral breakdown of current land use was not available at the time of this study (2002).

1.3 POPULATION PROJECTIONS

Table 1.2 gives population trends and projections for a 20 year planning period. The 2002 population estimates are based on the 1996 census data, the Central Statistics Office (CSO) population growth projections and local authority information, as described in the Methodology in Volume 2. The detailed 2002 census figures were not available at the time this work was carried out.

The standardised population estimates use the CSO figures for District Electoral Divisions (DED's). It is noted that there are occasional differences between the DED boundaries and those of study catchments, which may also lead to differences between local authority figures and those given below for 1991 and 1996.

The Standard Methodology estimated the existing resident population of the town to be approximately 1,185 and calculated the 2022 population to be 1,229.

Local authority staff estimated the current population at 870 based on a house count in the area and an occupancy rate of 3 people per house, and predicted the 2022 population to be 1,000.

Due to the discrepancy between the estimates, the preliminary results from the 2002 National Census were used to verify the current population estimate. This indicated that populations in Ballybay and Environs have fallen slightly from the 1996 level. However a drop of 27% (using the LA estimate) from the 1996 population is considered unrealistic and therefore the standard estimate of 1,185 is considered more reliable for the 2002 population.

Although Ballybay has suffered a decline in population in the past it is reasonable to assume there will shortly be an increase in population in the area resulting from the imminent construction of approx. 120 residential units. It is therefore proposed to use the standard estimate of 1,229 for the 2022 population as this projects an increase in population in line with development trends in the area.

Table 1.2
Catchment Population Trends and Projections

Description	Census Figures		Estimated		Comment
	1991	1996	2002	2022	
Resident Domestic Population	1,116	1,152	1,185	1,229	Standard Estimates

2.0 ENVIRONMENTAL FACTORS

2.1 RECEIVING WATERS

2.1.1 Classification & Quality

Treated effluent from Ballybay Waste Water Treatment Plant (WWTP) discharges to the River Dromore via a single outfall. The river flows into a lake and marshy area approximately 0.5 km downstream of the WWTP outfall.

Table 2.1 gives the receiving water classification by type, use and amenity value. The applicable European Union (EU or EC) Directives and National regulations (Statutory Instruments or S.I.) are also identified along with the current and future quality ratings at the key sampling stations. There is no EPA sampling station between the WWTP outfall and the lake/marsh. 95 percentile flow data was not available for the Dromore, with the only flow data available being the Dry Weather Flow further downstream near Cootehill.

Table 2.1
Receiving Waters Classification

Characteristic	Classification	Comment
Receiving Water Name and type	Dromore River	Treated waste water from the WWTP discharges via an open ended outfall
Resource Use	Water Abstraction	12 km d/s of outfall
Amenity Value	Coarse fishing, Bathing	Coarse fishing 0.8 km d/s
Applicable Regulations	Water Quality Standards – Phosphorus	S.I. No. 258 of 1998
		Freshwater Fish Directive (68/659/EEC)
95 Percentile	ND	
EPA Sampling Stations	0150: Bridge in Ballybay Downstream: ND	Approx 0.5 km u/s of outfall No relevant d/s monitoring station
Biological Quality Ratings	0150 = Q3-4	Based on EPA sampling data (1998-2000)
Target Water Quality Values (Q)	0150 = Q4	
Other applicable issues.		Urban Waste Water Treatment Regulations, S.I. 254 of 2001

Sampling station measurements for the key water quality parameters are given in Table 2.2 along with permissible concentrations, where applicable, in accordance with the classifications given in Table 2.1.

There is water quality data available for the Dromore River downstream of the lake, but it is not considered relevant to the impact of Ballybay WWTP discharge since there is another branch of the Dromore and a stream flowing into the lake and there may be deposition occurring in the lake/marsh. It is understood that staff at Ballybay WWTP have commenced a monitoring programme for water quality upstream and downstream of the WWTP, but data was not available at the collection/analysis stage

of the study. However, it was indicated that there are marked increases in nitrate and phosphorus downstream of the WWTP outfall.

Table 2.2
Bio-Chemical Water Sampling Data & Target Values

Bio-chemical Constituent (concentrations in mg/l)		Measured Values (mg/l) (1998-2000)		Permissible* Concentrations (mg/l)
		0150	ND	
BOD concentration	Median value	2.8	ND	< 5**
Ortho-phosphate concentration	Median value	0.10	ND	0.03
	Maximum value	0.32	ND	N/A
Ammonia concentration	Non-ionised	0.001	ND	0.025
	Total value	0.11	ND	1

* Most stringent concentration under the applicable regulations.

** No single discharge to freshwater river should cause the receiving water BOD to rise more than 1mg/l.

2.1.2 Assimilative Capacity

The estimated assimilative capacity of the receiving waters to accept treated effluent from Ballybay WWTP while complying with the relevant legislation could not be calculated due to the absence of adequate flow data. Therefore Table 2.3 is not used.

However, based on the high concentrations in the river upstream of the WWTP outfall (Table 2.2) it can be seen that any increase in loading would be undesirable. The assimilative capacity of the river can therefore be considered to be extremely limited in terms of BOD and nutrients.

Lough Major, which is upstream of the WWTP outfall, but bounded by the drainage catchment on three sides has been classified by Monaghan County Council as eutrophic, and as oligotrophic by the EPA (based on 1998-2000 monitoring). Further monitoring is recommended by the EPA to confirm its classification. Its water quality may be affected by cSO's and emergency overflows from pump stations.

2.2 FLOWS AND LOADS

2.2.1 Dry Weather Flow and Load

Measured waste water flows and loads from the Ballybay sewerage system are given in Table 2.4 below.

Table 2.4
Measured Flows and Loads to & From the WWTP

Location	DWF* (m;/d)	BOD (kg/d)	P (kg/d)	NH_4 (kg/d)	SS (kg/d)	Peak Flow (m^3/d)	Confidence Grade
Discharge from sewerage network	1,049	220	7	16	259	ND	3
Discharge to Receiving Waters	1,063	13	1	2	10	ND	3

*This is the average daily flow measured and is likely to correspond to a multiple of DWF.

The influent and effluent quality at Ballybay WWTP is monitored continuously by 24 hour flow proportional sampling. Table 2.5 gives the estimated breakdown of the current and future flows and loads on a sectoral basis. A Water Services Pricing Policy (Polluter Pays Principle) Report for the Ballybay catchment has not been prepared.

The two major "wet" industries in the catchment are Silver Crest (food processing) and M.I. Metals (shower units manufacturer). It is understood that waste water from Silver Crest receives preliminary treatment prior to discharging to the sewer network. These industries are licensed to discharge (a total flow of 210 m^3/day with a BOD load of 95 kg/day) to the sewerage system. All other industries in the town are considered to be "dry" and discharge only domestic sewage to the sewerage network.

Ballybay is not a traditional tourism centre and no contribution for tourism flows and loads is included in Table 2.5.

The waste water flow and load from the commercial sector is not known but an estimate of the commercial contribution based on 16% of the domestic contribution (in accordance with Volume 2 of the Standard Methodology) is used.

Institutional facilities in the town include three primary schools and a secondary school with approximately 147 students/staff residing outside the catchment.

Approximately 14 m^3/day (14 kg BOD/day) of leachate from Scotch Corner landfill is currently imported to Ballybay for treatment. In addition, sludge from the Ballybay water treatment works is currently imported to the WWTP for treatment. The Sludge Management Plan does not anticipate sludge will be imported to Ballybay WWTP in the future (refer to Section 5.0). There will therefore be no additional load contribution to the waste water treatment stream from imported wastes in the future.

It is the standard estimate of DWF (405 m^3/day) and the measured daily loads (240 kg BOD/day) as presented in Table 2.5 that are accepted for further use in this study. The low growth rate in the resident population (to 2022) will be balanced by the fact that sludge and leachate will not be imported for treatment in the future, resulting in no increase in WWTP loading in 2022.

Table 2.5
Estimated Flow and Load by Sector

Contributing Elements		LA Data for 2002	Standard Estimates		Comment
			2002	2022	
Domestic Resident		870	1,185	1,229	As per table 1.2
Resident Visitors		0	0	0	Not a tourism centre
Day Visitors		0	0	0	
Domestic Flow	m^3/d	587	163	189	2002 estimate @ 137.7 l/hd/d 2022 estimate @ 154.0 l/hd/d
Leisure/Tourist Flow(1)	m^3/d	0	0	0	
Unmeasured Commercial Flow	m^3/d	94	26	30	16% of domestic
Measured Commercial Flow	m^3/d	0	0	0	None measured
Industrial Flow	m^3/d	150	150	150	Licensed flow from industries
Institutional Flow	m^3/d	80	7	8	147 students/staff reside outside the catchment
Infiltration	m^3/d	138	59	61	Estimate based on 50 l/hd/day
Imported Wastes	m^3/d	17	17	0	Not part of DWF
Dry Weather Flow	m^3/d	1,049	405	433	
BOD Domestic load	Kg/d	165	71	74	Assuming loading of 60g/hd/d
BOD Leisure/Tourist(1)	Kg/d	0	0	0	
BOD Institutional(2)	Kg/d	14	4	4	147 students/staff reside outside the catchment
BOD Commercial(3)	Kg/d	26	11	12	16% of domestic
BOD Industrial	Kg/d	15	95	95	Licensed load from industries
Total	Kg/d	220	181	185	
Population Equivalent		3,667	3,017	3,083	
BOD Imported Waste	Kg/d	20.4	20	0	Currently 14 m^3/day of leachate and WTP sludge is imported to site. No imported waste or sludge in future
Total BOD Load	Kg/d	240	201	185	

(1) Resident and Day Visitors combined
(2) Refers to contributions additional to those from the resident Domestic population
(3) Combined Measured and Unmeasured Commercial figures

2.2.2 Storm Flow

Insufficient information (sectoral breakdown of current land use) was available at time of writing to estimate proportional storm runoff from each development sector where there is a combined or partially separate sewerage system. Therefore Table 2.6 is not used.

However, it was reported that approximately 25% (24 ha) of the sewered catchment is served by partially separate sewerage systems (refer to Figure 2), with the remainder served by a combined sewerage system.

3.0 SEWERAGE SYSTEM

The layout of the system is shown on Figure 2. The Ballybay catchment is drained by a combination of gravity sewers and pumping systems. The catchment currently has 5 pump stations, which serve low-lying areas near Lough Major and outlying areas to the north and south of the town centre. Waste water from the catchment currently drains via two main trunk sewers (which serve the northern and southern areas of the catchment respectively) which combine and discharge to the WWTP at Meetinghouse Lane. Treated effluent from the WWTP is discharged to the nearby Dromore River.

There are five known Combined Sewer Overflow (cSO) discharges from the sewerage network. Two of the cSOs discharge to Lough Major, 2 discharge to the Dromore River while the remaining cSO drains to a soakaway in a marsh near Lough Major.

The catchment is reported to be served by a predominantly combined sewerage system that was last upgraded in the early 1980's. It is reported that a partially separate sewer system drains areas either side of the R183 north of Lough Major. No information was available on the number of houses served by the storm sewer network, or on the routes and destinations of storm sewer drainage systems in the Ballybay catchment.

It is understood that all houses within the drainage catchment are connected to the municipal sewerage system.

3.1 INVENTORY

3.1.1 Sewerage System Records

"Post construction" plans and longitudinal sections (produced in 1988) of all "new" sewers within the catchment were available at the Monaghan County Council offices in Ballybay. A numerical inventory of sewerage assets was not available.

3.1.2 Sewers

Estimates of sewer lengths and diameters were obtained from drawings of the network. Where information was not available local authority staff have provided estimates.

These estimates were then compared with estimates derived from use of the Sewerage Density and Structural Condition Assessment Methodology. This indicated that both the gravity sewer and the rising main lengths were underestimated. The standard estimates are deemed to be a more accurate reflection of the Ballybay catchment as they include local sewers that were not included in the local authority estimates.

A breakdown of the sewerage system inventory by length and pipe size is provided in Table 3.1 and a summary of sewer conditions is given in Table 3.2.

Table 3.1
Sewer Length Summary

Sewer Type*	Length in each Dia. Band (m)			Totals (m)	Confidence Grade
	≤225 mm	>225 <600 mm	≥600		
Combined**	5,687	1,334	0	7,021	5A
Storm***	500	0	0	500	5
Foul****	Incl.	Incl.	Incl.	Incl.	-
Total Gravity	6,187	1,334	0	7,521	5A
Rising Mains	1,062	0	0	1,062	5

* Gravity sewers unless otherwise indicated.
** Estimated using Sewerage Density and Structural Condition Assessment Methodology
*** Storm drains are included under storm sewers unless otherwise indicated. Lengths estimated by local authority staff
*** Included in combined sewer totals

Pipe work material in the Ballybay catchment is either clay (65%) or uPVC (35%), (confidence grade 4). The most recent extensions to the network used uPVC (housing estates) while in the older main street area, clay pipes are more predominant.

Rising main pipe work is reportedly either plastic or asbestos cement (50:50 split) (confidence grade 4).

Details on the condition of the sewers throughout the drainage network were not available at time of writing. Therefore a condition grading in accordance with the Sewerage Density and Structural Condition Assessment Methodology was applied. Accordingly the data is given a confidence grading of 5A. The findings of the Methodology are considered an acceptable reflection of the condition of the sewer network as these results correspond well with local authority estimates for pipe work condition.

All rising main pipe work in the catchment was given a condition grade 1-3 by local authority staff (confidence grade 3). This is considered reasonable based on the age of the rising mains and material of construction.

Table 3.2
Sewer Condition

Sewer Type*	% by length in each Condition Grade/Band**		Confidence Grade
	1 – 3	4 - 5	
Combined	98%	2%	5A
Storm	98%	2%	5A
Foul	98%	2%	5A
Total Gravity	98%	2%	5A
Rising Mains	100%	0%	5

* Gravity sewers unless otherwise indicated
** Standard estimate valve (all gravity sewers)

The number of manholes in the catchment was estimated at 150 based on guidelines from the Sewerage Density and Structural Condition Assessment Methodology (confidence grade 5).

3.1.3 Combined Sewer Overflows

Details of Combined Sewer Overflows (cSOs) are given in Table 3.3. The cSOs were not inspected and the data Confidence Grade is taken as 4 based on uncorroborated local knowledge.

Table 3.3
Combined Sewer Overflow Summary

Ref. & Overflow Location	Screening or Solids Separation	Condition Grades (1 - 5)		Perform'ce Grade 1, 3 or 5	Overflow Outfalls to	Conf'ce Grade
		Civil* Works	M & E Plant**			
1. Blaney Rd.	Wilkes Screen	≤3	N/A	3	Lough Major	4
2. C'brannan Park	None	≤3	N/A	3	Lough Major	4
3. O'Brien's Shop (rear)	None	≤3	N/A	3	Dromore River***	4
4. Technical School	None	≤3	N/A	3	Soakway (Marsh)	4
5. Clones Rd.	None	≤3	N/A	3	Dromore River	4

* Includes Building Works
** M & E = Mechanical & Electrical Plan
*** Dromore River discharges to Rectory Lake (adjacent to WWTP).
Note: Conf'ce Grade = Confidence Grade, Perform'ce Grade = Performance Grade,

No information was available on the operation of the cSOs in terms of continuation flows or spill frequency of the overflows. It is recommended that the cSO operation be examined in more detail to determine whether the overflows in place comply with the Urban Waste Water Treatment Directive (UWWTD 91/271/EEC) and DEHLG policy. This will dictate whether the current mechanisms are adequate or need to be upgraded/replaced.

3.1.4 Pump Stations

Summary details for the pump stations are given in Table 3.4 below. Figure 2 identifies the location of each pump station (except for that of PS5 whose exact location was not provided). The actual pump capacities were not known and the order of magnitude was provided instead. The pump stations were not inspected and the data Confidence Grade is taken as 4 based on regular inspections by local authority staff.

Table 3.4
Pump Stations Summary

Ref. & Location	Capacity (l/s*)	Condition Grade (1-5)		Emergency Overflow Outfalls to	Confidence Grade
		Civil Works	M & E Plant		
1. Corrybrannan (Carrick Rd.)	10-20	≤3	≤3	ND	4
2. Knocknamaddy	5-10	≤3	≤3	Adjacent Lake	4
3. Corfad	5-10	≤3	≤3	ND	4
4. Loch Mor Avenue	5-10	≤3	4	ND	4
5. Corkeeran	ND	ND	ND	ND	ND

* Capacity of the duty or duty and assist pumps only, i.e. standby capacity is excluded.

While each pump station has an emergency overflow it was not known to where these discharges were directed, or the frequency of their discharge. However, it was reported that PS4 is subject to overflow on a regular basis. Local authority staff have identified the reduction in the quantity of storm water entering the foul/combined sewer network as essential to reduce current hydraulic loads at the WWTP and to provide additional capacity for foul sewage in the network.

It has been reported that the pumps at Loch Mor Avenue break down several times per year.

3.1.5 Other Ancillaries

No other ancillaries were identified and Table 3.5 is not used.

3.2 HISTORIC PERFORMANCE

The historic performance of the sewerage network is illustrated on Figure 3 and is described below.

3.2.1 Hydraulic

Sewer flooding in the Ballybay catchment was reported in the past decade. There are no available meteorological records regarding any storm events coinciding with these incidents of flooding. The following is the available information in relation to the flooding incidents:

- Corrybrannan Park – flooding is reported to occur at monthly intervals in this area. It is reported that the pipe work has suffered structural deformation resulting in sewer blockages, and regular flooding from the nearest upstream manhole.
- Loch Mor Avenue – flooding due to blockages in the storm sewer has occurred on a monthly basis at this location. It is not known what causes the blockages in this sewer.
- Clones Road – The sewer along this road is subject to flooding.

The number and nature of recorded flooding incidents suggests that there are localised structural/operational problems with the present sewerage and drainage systems.

3.2.2 Structural

Structural collapses have been reported in the sewer at the rear of the Credit Union Building on Main Street. Structural failures in the sewerage system have also been noted at Corrybrannan Park.

3.2.3 Environmental

Watercourse pollution has not been reported, despite the presence of 5 cSO's on the sewerage network, and the switching off of the pumping systems during periods of heavy rainfall. The high BOD concentration in the river at Ballybay Bridge and downstream of Lough Major (2.8 mg/l and 2.1 mg/l) may be due to discharges from cSOs or emergency overflows from pump stations.

3.2.4 Infiltration/Exfiltration

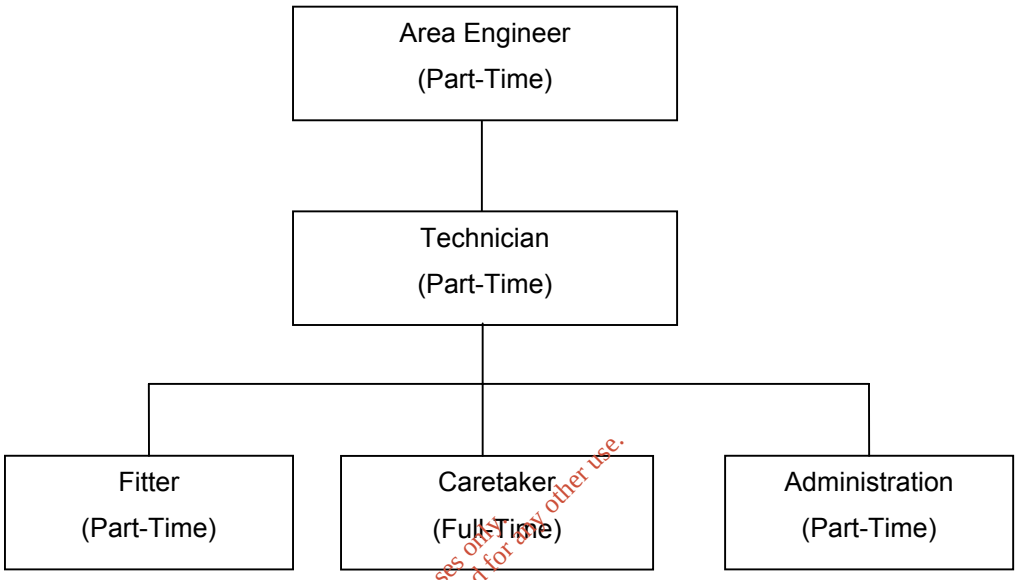
Infiltration is believed to be a problem in the Ballybay catchment, though no flow surveys of the sewerage system have been carried out to verify this. An allowance equivalent to 50 l/hd.d has been included for infiltration.

3.3 OPERATIONAL CONTROL & STAFFING STRUCTURE

3.3.1 Management Structure

The management structure for operation and maintenance of both the sewerage network and the WWTP is represented in the organogram below.

Organogram of Staffing Structure for Ballybay Sewerage System



3.3.2 Operation and Maintenance Policy

The operation and maintenance policy for the sewerage network as described by the Local Authority is as follows:

- Pump stations are visited daily by the caretaker to check operation and carry out any necessary maintenance. There are no telemetry/SCADA/dial-out systems at any of the pump stations
- Problems with pipe blockages etc. are dealt with as they arise. Blockages from OFG occur regularly (on average once every 3 months) in the network. Pipe jetting is required to clear obstructions caused by this problem.

3.3.3 Relative Manpower

The Local Authority has indicated that the amount of staff time expended to the sewerage network is as set out in Table 3.6 overleaf:

Table 3.6
Staff Time Expended on Maintaining the Sewerage Network

Grade of Staff	Weekly Hours	Annual Days*
Area Engineer	0.5	2.75
Technician	2.0	11.00
Caretaker	7.0	38.50
Fitter	0.5	2.75
Clerk	0.5	2.75
Total Man	10.5 hours	57.75 days
	Total Man Years	0.26

* Based on 8 hours per day and 44 working weeks per year or 220 days per year.

The relative manpower requirements for operation and maintenance purposes are presented below in Table 3.7. The two parameters or Performance Indicators analysed are:

i) relative length of sewer maintained per man-year of staff time.

ii) relative number of households served per man-year staff time.

Table 3.7
Relative Man Power Requirements for Sewerage Network Maintenance

Performance Indicator	Output Measure(see notes)
Length of sewer maintained per man-year	33 km
Number of households maintained per man-year	1,588 nr.

Note 1: Based on a total length of 8.6 km of sewers (inc. rising mains), which is the estimated total length of publicly maintained sewers in the catchment.

Note 2: The number of households maintained per man-year is based on a total of 413 nr. households in the catchment, connected to the public sewer network.

3.4 NETWORK INTEGRITY AUDIT

3.4.1 Hydraulic Capacity

A mathematical model has not yet been developed for this catchment and detailed hydraulic assessment is not practical at this stage.

Localised flooding incidents, which occur on a monthly basis at two locations, have been attributed to structural/operational problems rather than capacity limitations in the network.

The capacity of the trunk sewers leading to the WWTP has been calculated, from appropriate data relating to pipe work diameters and gradients. The limiting capacity was calculated at 332/s (136 l/s and 196 l/s for the northern and southern trunk sewers respectively). This corresponds to 71 DWF based on current flow (which is approximately half the ultimate flow used in the sewerage system design).

The high multiple of DWF that can be conveyed in the trunk sewers would suggest that these sewers act as tank sewers during times of heavy rainfall to reduce the quantity of storm water entering the WWTP.

3.4.2 Structural Integrity

CCTV surveys of sewers and manholes have not yet been undertaken and no useful comment on structural integrity can be made at this stage. As per section 3.1.2, the only known sewer structural failure in the sewerage system is at Corrybrannan Park. However, on the basis of the structural condition assessment in Section 3.1.2 it is expected that up to 150 m (2%) of sewers in the catchment are in a state of serious structural deterioration.

3.4.3 Structural Rehabilitation Options

Local authority staff have indicated that the replacement of two sections of pipework (each of 50 m length) will be necessary to remedy the sewer structural failure at Corrybrannan Park.

3.4.4 Pollution Control

Information was available on the extent of the combined and storm systems from local authority staff, and is shown on Figure 2. The present system is deemed adequate for current flows within the drainage catchment, but further storm separation will be required to reduce storm water flows being treated at the WWTP.

Monitoring of the cSOs and emergency overflows is necessary to determine the impact of discharges from these locations on the local watercourses.

3.4.5 Hydraulic Solutions

It is not possible to comment on hydraulic solutions at this stage.

3.5 SURVEYS AND INVESTIGATIONS

To date, no major surveys have been undertaken in the Ballybay catchment and therefore standard sections 3.5.1 to 3.5.4 (including Table 3.8) are not used.

3.5.5 Permanent Monitoring

There are no permanent monitors (water quality or rain gauges) installed on the sewerage network. The flow through the WWTP is continuously monitored.

3.5.6 Future Surveys

In the absence of reliable sewer records a full assessment of the network is deemed necessary. Survey work should include surveys necessary to update existing limited sewer records and to develop a hydraulic model of the catchment. (The level of surveying required will depend on the relevance of existing sewer records and the complexity of the hydraulic model required).

Future survey and mapping requirements are given in Table 3.9 under the headings "Full Survey" and "Initial Survey".

Initial survey requirements are those necessary to confirm the validity of existing records, identify the core area of the network, build and verify a computer model and to develop a Drainage Area Plan. This may include a connectivity survey (to prove the sewer route), CCTV sewer survey and a limited impermeability survey to confirm the extent of surface water connections to the combined network.

Full Survey assumes that manholes and sewer records are to be fully updated. In addition, more detailed impermeability survey may be required to assess the route of surface water discharges.

The actual extent of survey must be reassessed at the stage of scoping a detailed study. River and lake surveys for the purpose of developing pollution models have not been considered at this stage as the work is outside the scope of this study.

Permanent monitors (at treatment works and on cSOs) are discussed separately in connection with long-term monitoring requirements.

Table 3.9
Future Surveys Requirements

Type of Survey	Units	Quantities*	
		Initial Survey	Full Survey
Manhole Survey & Mapping	Manholes	23	150
Sewer Survey	Km of Sewer	1.9	
Flow & Rainfall Survey	Flow Monitors	4	
	Rain gauges	2	
Impermeability	Ha	0	0

* Full survey quantities include the initial survey requirements

3.5.7 Network Modelling & Hydraulic Assessment

Once the core of the network has been accurately mapped and sewer records collated it will be possible to construct a simple hydraulic model (combined system only) to assess storm flows and potential flooding in the system.

In the case of Ballybay a Drainage Area Plan hydraulic model is deemed sufficient. This model should contain all core area sewers.

The model should be used to confirm the extent of any hydraulic under capacity and identify appropriate solutions where necessary should the network prove to be more complex than indicated in Figures 2 and 3, flow monitoring and verification of the computer model may be necessary.

3.5.8 Drainage Area Plan

The information derived from the surveys and assessments described in sections 3.5.6 and 3.5.7 should provide a reasonably comprehensive picture of the current condition of the network with regard to actual or potential hydraulic, structural, pollution and maintenance problems. Integrated solutions should then be developed for the target year, taking due account of both the direct cost (design and contract costs) and the indirect cost or economic impact on the urban area (e.g. disruption of business activity and other infrastructure/services). The general approach is briefly described in the Methodology. The optimum solution will form the Drainage Area Plan for the catchment.

3.6 NETWORK UPGRADING

3.6.1 Adequacy and Utilisation of Existing System

Available information is inadequate to make a useful assessment of under or overcapacity in the network. The requisite information to carry out a quantitative hydraulic assessment of the sewerage network was not available at the time the study was undertaken. The network has therefore been assessed qualitatively.

Current operational problems in two areas of the catchment are causing regular flooding in Ballybay. Remedial works will be necessary to prevent future flooding at these locations. In the absence of reported capacity limitations in the network, the sewerage system is deemed to have adequate capacity to convey current waste water flows from the catchment.

Detailed analysis required to assess the impact of increased development areas and future flows (see Table 2.5) is beyond the scope of this Study.

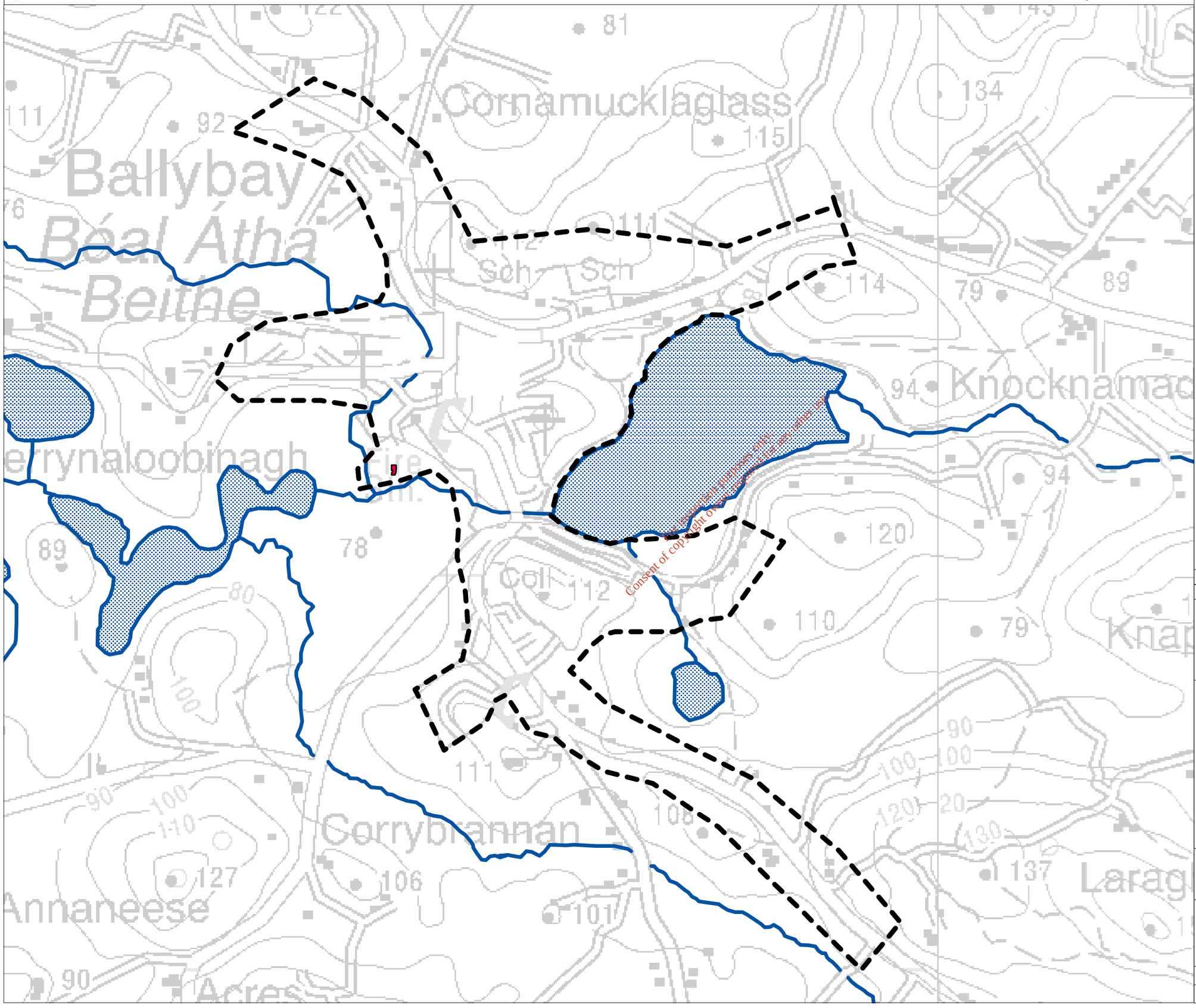
3.6.2 Current and Planned Works

It is proposed to extend the present sewerage network along the R183 to service existing developments at Knocknamaddy. However no funding or approval to commence preliminary design work has been received to date. The associated flows and loads have not been included in the future system flow and loading.

3.6.3 Potential Additional Works

- Structural failure at Corrybrannan Park – Relay 2 nr. 50 m sections of pipe work to remedy current problems with blockages
- Storm water separation – Local authority staff have identified the reduction of storm water entering the foul/combined sewer network as essential to reduce the quantity of storm water flows being treated at the WWTP, to reduce overflow spills from the pump stations and to provide additional capacity for foul sewage in the network.

Do Not Scale - If in Doubt Ask



Legend

- Catchment Boundary
- Current Development Boundary
- Future Development Boundary
- River
- Waste Water Treatment Plant

Note:
1. As zoning maps for the Ballybay Development Plan were not available at the time of this study, the current and future development boundaries are not shown

Rev.	Date.	Description.	Drn.By	Chkd.	Appd.
B	DEC '03	Post Review Revisions	SWAL	DCAS	JKEL

Client

Department of the Environment, Heritage and Local Government

Consulting Engineers

Pettit Project Design & Management

White Young Green Ireland

BARRY & PARTNERS consulting engineers

3 b

Project

The National Urban Waste Water Study

Drg.Title

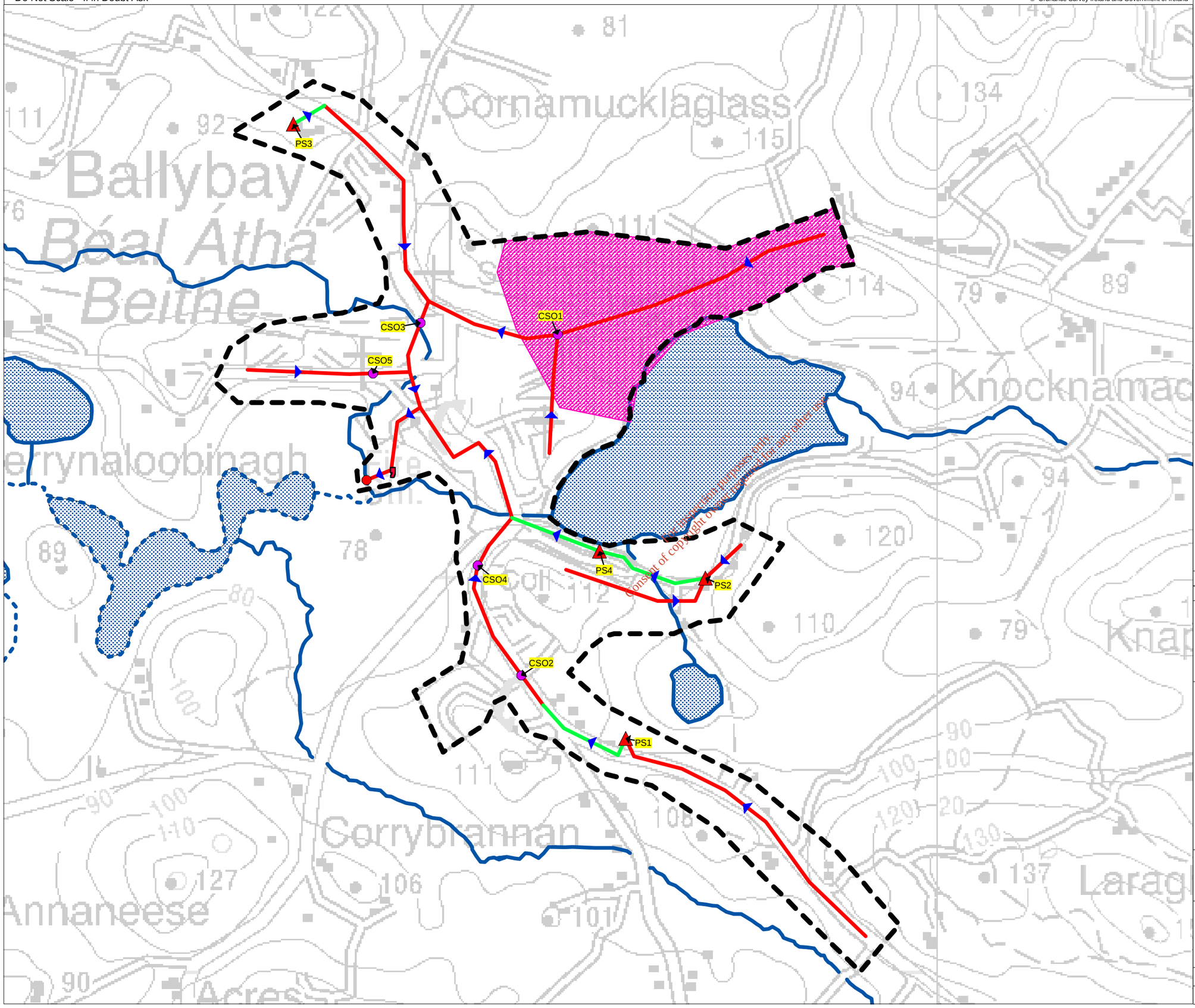
Ballybay Catchment Area

Figure 1
Catchment Geographic Plan

Drawn	Checked	Approved
SWAL	FOMA	JKEL

Date	Scale	Drg.Nr.	Rev:
05.08.03	N.T.S.	A7090-129-1-EGP	B

Do Not Scale - If in Doubt Ask



Legend

- Catchment Boundary
- Gravity Sewer
- Rising Main
- Main Storm Drains
- Combined Sewer Overflow (CSO)
- Major Storm Outfall
- Sewer Outfall
- Pumping Station
- Waste Water Treatment Plant
- Combined System
- Partially Combined System
- Separate System
- River
- Receiving Water

Note:
1. Catchment area is combined unless otherwise stated.
2. Refer to table 3.4 for details of pump stations.

Rev.	Date.	Description.	Drn.By	Chkd.	Appd.
B	DEC '03	Post Review Revisions	SWAL	DCAS	JKEL

Client

AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS AITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

Department of the Environment, Heritage and Local Government

Consulting Engineers

Pettit Project Design & Management

White Young Green Ireland

BARRY & PARTNERS consulting engineers

3 b

Project

The National Urban Waste Water Study

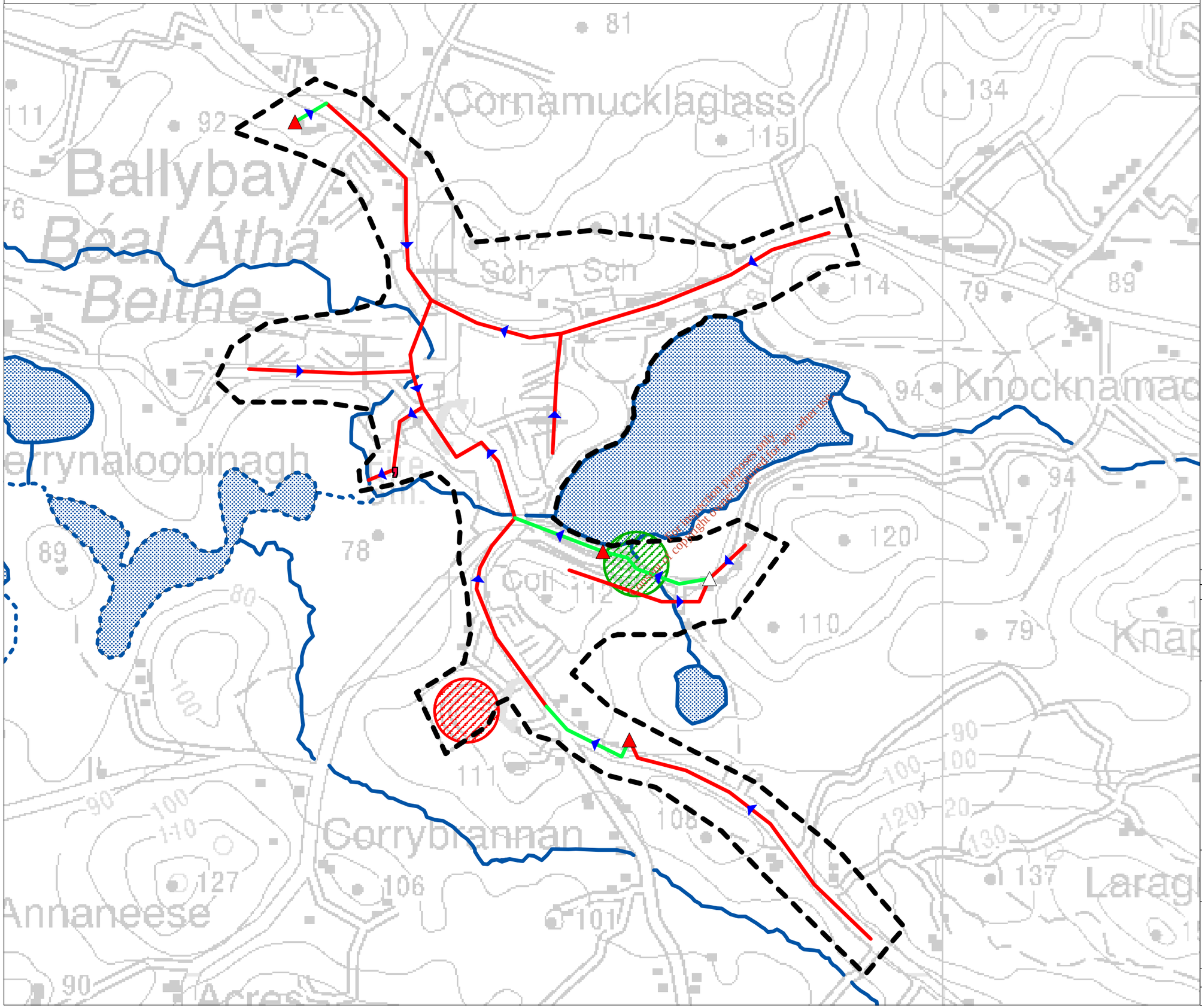
Drg.Title

Ballybay Catchment Area

Figure 2
Existing Sewerage System

Drawn	Checked	Approved		
SWAL	FOMA	JKEL		
Date 05.08.03	Scale N.T.S.	Drg.Nr. A7090-129-2-EGP	Rev: B	

Do Not Scale - If in Doubt Ask



Legend

- Catchment Boundary
- Gravity Sewer
- Rising Main
- Main Storm Drains
- Pumping Station
- Waste Water Treatment Plant
- Foul Sewerage Flooding
- Storm Water Flooding
- Sewer Collapses
- River
- Receiving Waters

Rev.	Date.	Description.	Drn.By	Chkd.	Appd.
B	DEC '03	Post Review Revisions	SWAL	DCAS	JKEL

Client

AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

Department of the Environment, Heritage and Local Government

Consulting Engineers

Pettit Project Design & Management

White Young Green Ireland

BARRY & PARTNERS consulting engineers

3 b

Project

The National Urban Waste Water Study

Drg.Title

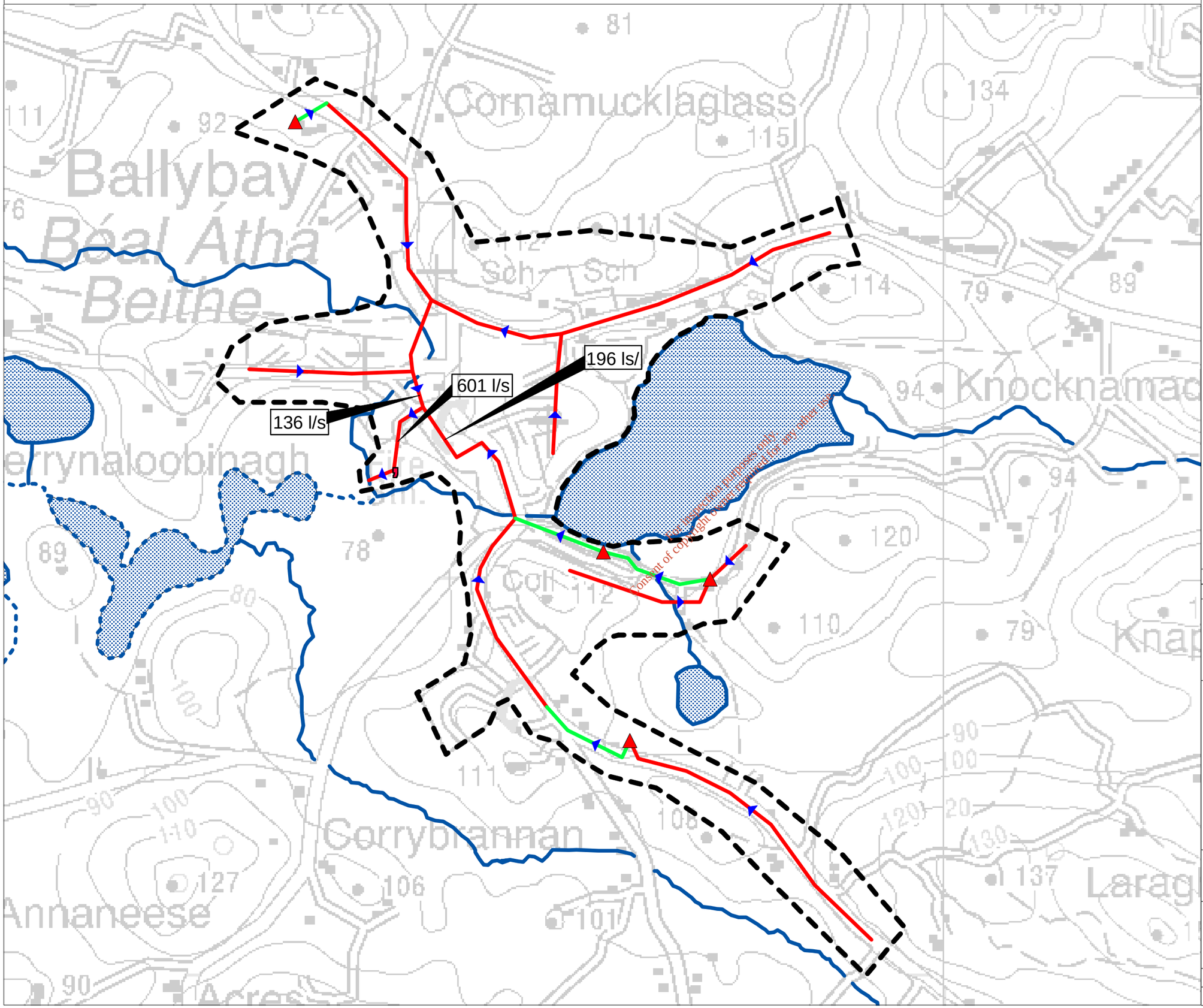
Ballybay Catchment Area

Figure 3
Sewerage System Performance

Drawn	Checked	Approved
SWAL	FOMA	JKEL

Date	Scale	Drg.Nr.	Rev:
05.08.03	N.T.S.	A7090-129-3-EGP	B

Do Not Scale - If in Doubt Ask



Legend

- Catchment Boundary
- Gravity Sewer
- Rising Main
- Main Storm Drains
- Pumping Station
- Waste Water Treatment Plant
- XXX l/s Sewer Capacity
- Structural Grade 4/5
- River
- Receiving Water

Rev.	Date.	Description.	Drn.By	Chkd.	Appd.
B	DEC '03	Post Review Revisions	SWAL	DCAS	JKEL

Client

AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE AND LOCAL GOVERNMENT

Department of the Environment, Heritage and Local Government

Consulting Engineers

Pettit Project Design & Management

White Young Green Ireland

BARRY & PARTNERS consulting engineers

3 b

Project

The National Urban Waste Water Study

Drg.Title

Ballybay Catchment Area

Figure 3A
Hydraulic & Structural Assessment

Drawn	Checked	Approved
SWAL	FOMA	JKEL

Date	Scale	Drg.Nr.	Rev:
05.08.03	N.T.S.	A7090-129-3A-EGP	B

4.0 WASTE WATER TREATMENT

4.1 TREATMENT PROCESS

4.1.1 General Description

Ballybay WWTP was built and commissioned in 1983 to provide preliminary and secondary treatment for waste water prior to discharge to the River Dromore. The WWTP operates as an extended aeration plant, preceded by screening and grit removal. Sludge treatment at the WWTP comprises thickening and dewatering. The dewatered sludge is stored on site prior to disposal at Scotch Corner landfill.

Figure 4 illustrates the current treatment process, which was confirmed by a site visit during the course of the Study. Reasonable confidence (Grade 3) can be placed in the dimensions and capacities given in the figure and quoted below, these being subject of selective checks.

4.1.2 Preliminary Treatment

At the WWTP inlet, incoming waste water flows of up to 60 l/s (i.e. 12.8 x current DWF) are pumped by duty/standby pumps to the preliminary treatment system. Preliminary treatment comprises screening using a mechanically raked coarse screen (20 mm aperture), followed by grit removal in a vortex grit trap. Screenings are macerated and returned to the flow, while grit is stored in a skip prior to disposal at Scotch Corner landfill.

The inlet pumping station also has an overflow weir, which passes excess flows to the storm sump from where they are pumped (without screening) on to grass plots on site.

The total flow pumped forward for treatment is measured in venturi flume located at the plant inlet. An automatic sampler has been installed at the plant inlet. Grab samples of the influent are taken routinely.

4.1.3 Primary Treatment

Primary treatment is not provided at the site.

4.1.4 Secondary Treatment

Following preliminary treatment waste water gravitates to the secondary treatment system. Secondary treatment is provided by an activated sludge treatment system comprising of two rectangular aeration tanks designed for BOD removal and nitrification, followed by two rectangular secondary settlement tanks and a sludge circulation system.

The aeration tanks have a reported total capacity of approximately 2,460 m^3, which corresponds to a residence time of approximately 6 days at current DWF or 2.3 days at current average flows. Each tank is fitted with two vertical shaft surface aerators rated at 14.4 kW each. If the peak pumped inflow of 60 l/s is sustained for a full day, the hydraulic residence time is reduced to 11.5 hours, resulting in hydraulic overload with potential for solids wash-out from the system. For this reason the inlet pumps are occasionally switched off during periods of heavy rainfall, with all incoming flows then pumped by the storm pumps on to the grass plots.

At the time of this study, only one of the aeration tanks was in operation and was providing adequate treatment, with the second tank bypassed until the plant loading increases.

The extended aeration system currently operates at a F/M ratio of less than 0.07 kg BOD/kg MLSS.day with a sludge age in excess of 25 days. MLSS is maintained

between 2,000 to 4,000 mg/l, and the hydraulic residence time is approximately 3 days at current DWF.

Flow from the aeration tanks gravitates to two rectangular horizontal flow settlement tanks fitted with continuous chain driven scraper mechanisms. Settled sludge gravitates to the nearby pumping station, while scum is removed automatically from the tank surface. A common set of submersible pumps (duty/standby) is used to alternately pump the activated sludge to the aeration tanks or to a picket fence thickener.

Treated effluent which overflows from the secondary settlement tanks gravitates to an on site chamber from where it discharges to the River Dromore, via an open ended outfall.

The treated effluent is measured in a venturi flume at the plant outlet. Twenty-four hour composite samples and grab samples are also routinely taken at this location.

4.1.5 Tertiary Treatment

Tertiary treatment is not provided.

4.1.6 Sludge Treatment and Disposal

Sludge from Ballybay water treatment plant (WTP) is imported to the WWTP for treatment. It is mixed with the indigenous sludge and thickened from 1% to 2.5% ds in a gravity sludge thickening tank. Thickened sludge is then dewatered using a single belt press. Prior to dewatering, the sludge is pre-conditioned by polyelectrolyte to improve its dewatering ability. The dewatering press rated at 90 kg ds/hr, produces a dewatered cake at 9.5 % ds. The dewatered sludge is stored in a covered skip until it is transported to Scotch Corner landfill for disposal.

Supernatant liquor from the gravity sludge thickening tank and filtrate from the dewatering press gravitate to the sludge pump station from where the liquor combines with return activated sludge. Flows are subsequently pumped to the aeration tanks to receive full biological treatment with the main process stream.

4.1.7 Pumping Stations

Besides those pumping systems at the WWTP inlet, and those integral to the treatment process as outlined above there are no other pumping systems at the WWTP.

4.1.8 Power Generation

There is no standby power generator on site.

4.2 TREATMENT PLANT

The WWTP is located to the south west of the town, at Meetinghouse Lane. The current site layout is shown in Figure 5. An inventory of the elements of plant, their structural condition and serviceability is given in Table 4.1 and discussed briefly below. A photograph showing the aeration system is included at the end of this section. The WWTP currently occupies an area of approximately 0.4 hectares (Confidence Grade 3).

Reasonable confidence (Grade 3) can be placed in the dimensions, capacities and Condition/Serviceability assessments given in Table 4.1 these being subject of selective checks when the site was visited in the course of the Study.

4.2.1 Buildings

There are two buildings at the WWTP. These are the main pump house, which includes the administration and control room, and a separate building for the sludge dewatering press.

4.2.2 Miscellaneous Assets

There are no redundant assets on site.

4.2.3 Asset Condition

Ballybay WWTP was commissioned in 1983. With the exception of the preliminary treatment system, the structural and performance condition of the treatment plant including mechanical and electrical items was generally recorded as good, i.e., ≤Grade 3.

It should be noted that the mechanical and electrical items of the plant have been operating for approximately 20 years which is considered to be the typical useful life expectancy for these items. Significant refurbishment will be required in the short term.

4.2.4 Serviceability

The plant and equipment on site are performing the functions for which they were designed and installed for. However, the existing screening facility is inadequate with screenings observed in the downstream treatment processes. Inadequate screening also causes blockage of the screw conveyor from the sludge dewatering press. The grit trap is currently not operational.

4.2.5 Health & Safety

The Waste Water Treatment Plant is generally in satisfactory condition with regard to Health & Safety issues. A Safety Statement has been prepared for the plant and a number of issues and corrective actions have been identified for implementation.

4.2.6 Treatment Works Records

As stated earlier, the plant was commissioned in 1983 and some ”As Built” drawings were available. The sizes and dimensions provided for the process units were checked on site and were found to be correct.

Results of waste water analyses are available on site.

4.2.7 Flow Records

Records of flow through the secondary treatment system were not available at the time of the site visit.

View of the Aeration System at Ballybay WWTP

Table 4.1
Treatment Plant Asset Condition Summary

Treatment Stage	Element	Description (dimensions, capacities etc)	No of units	Structural Condition ≤3, 4,5		Service Condition ≤3 or 5	Comment (inc. date constructed or refurbished)
				E/M/I*	Civil/ Build		
Preliminary	Inlet Pumping Station	2 nr submersible duty pumps (rated at 30 l/s each) 2 nr storm pumps in separate well	2	≤ 4	≤ 3	≤ 3	Commissioned in 1983
	Screen	Mechanical coarse screen (20 mm aperture)	1	≤ 4	≤ 3	5	Commissioned in 1983
	Grit removal	Vortex Grit trap	1	≤ 4	≤ 3	5	Commissioned in 1983 Not operating at present
	Flow monitor	Venturi flume at the plant inlet and outlet	2	≤ 3	N/A	≤ 3	Commissioned in 1983
	Storm water treatment	Grass plots	1	N/A	≤ 3	≤ 3	Commissioned in 1983
Primary	N/A	N/A	N/A	N/A	N/A	N/A	No primary treatment
Secondary	Extended Aeration	Rectangular aeration tanks (Total capacity = 2,460 m^3)	2	≤ 4	≤ 3	≤ 3	Commissioned in 1983
	Settlement Tank	Rectangular settlement tanks (Total area = 215 m^2)	2	≤ 4	≤ 3	≤ 3	Commissioned in 1983
Tertiary	N/A	N/A	N/A	N/A	N/A	N/A	No tertiary treatment
Sludge treatment/ Disposal	Thickening	Picket fence thickener, achieves 2.5% dry solids (Capacity = 306m^3)	1	≤ 4	≤3	≤3	Commissioned in 1987
	Dewatering	Single belt press estimated @ 90 kg ds/hr, achieves 9.5 % ds	1	≤ 4	≤ 3	≤ 3	Commissioned in 1983
Outfall	Pipe	10 m long open ended outfall to River Dromore	1	N/A	≤ 3	≤ 3	Commissioned in 1983
Power Generation	N/A	N/A	N/A	N/A	N/A	N/A	No standby generator

* E/M/I –Electrical/Mechanical/Instrumentation
Confidence Grades: Dimensions – Grade ≤3, Structural Condition – Primarily Grade ≤3, Service Condition – Primarily Grade ≤3

4.3 OPERATIONAL CONTROL & STAFFING STRUCTURE

The waste water treatment plant is managed on a part-time basis by a technician and a caretaker. There is no SCADA system and no remote monitoring of the plant in place.

The Management and Staffing Structure used by Monaghan County Council for this scheme is as shown in Section 3.3.1. In terms of manhours, 4.5 hours per week of engineering, management and clerical time is spent on the WWTP. The technician and caretaker each spend 30 hrs/week at Ballybay WWTP, and a fitter/electrician spends approximately 1 hr/week. The total number of man-hours expended on the WWTP is therefore 65.5 hrs/week or 1.64 man years per year.

For comparative purposes, the performance indicator for operation and maintenance of treatment plant is taken as the load treated (in units of a population equivalent), per man year of operation and maintenance time. The current treatment plant services a population equivalent of approximately 4,006, thus the key output measure or load treated per man year is 2,443 pe.

4.4 PERFORMANCE AND CAPACITY

4.4.1 Historical Performance

Routine monitoring data has shown that the WWTP has consistently discharged treated effluent in compliance with the discharge standards specified in the Urban Waste Water Treatment Regulations, 2001 (i.e., < 25 mg/l BOD, < 35 mg/l suspended solids and 2 mg/l Total Phosphorus concentration). Treated effluent samples in 2001 had average concentrations of 12 mg/l BOD, less than 9 mg/l suspended solids and less than 1.0 mg/l Ortho-Phosphate.

Historically there has been a significant increase in the concentrations of nitrates in the final effluent being discharged, reaching as high as 61 mg/l reported in March 2001. This is attributed to the treatment of imported leachate from Scotch Corner landfill. Since February 2002 80% of the leachate from Scotch Corner landfill has been treated at Monaghan WWTP and this has lead to a reduction in nitrate concentrations being discharged in the treated effluent from Ballybay WWTP.

4.4.2 Current Capacity

The treatment capacity of the WWTP is determined by the limiting stage as illustrated in Table 4.2 below. The capacity of the individual process units are calculated using the standard loading rates typical for similar systems as set out in the relevant section of the Standard Methodology in Volume 2.

Table 4.2
Estimated Treatment Capacity Limitations

Treatment Stage	Element	Capacity (pe.)	Limiting Criteria	Comment
Preliminary	Screens & Grit Removal	ND	Peak flow	Capacity not known
	Grass Plots	N/A	N/A	No known limitations
Primary	N/A	N/A	N/A	No primary treatment
Secondary	Aeration Tanks	9,225	BOD	At standard conditions for extended aeration.
	Final Settlement Tanks	11,169*	Peak Flow	Peak flow = 60 l/s pe @ 154 l/hd/d & 3DWF
Tertiary	N/A	N/A	N/A	No tertiary treatment
Sludge	Picket Fence Thickener	47,830	Kg ds/day	Adequate for existing sludge loading
	Dewatering Press	13,392	Kg ds/day	Adequate for existing sludge loading

* This figure should be treated with caution since it is the peak flow of 60 l/s which is the limiting factor.

From the above table, it can be seen that Ballybay WWTP has adequate capacity to treat the current (4,006 pe) and future (4,006 pe) plant loading. It should however be noted, that in addition to the biological loading limitations on the aeration tanks, there are also hydraulic limitations on their effective operation. It is important that the hydraulic residence time in these tanks is not less than 20 hours, corresponding to a maximum daily flow of 2,952 m^3/day.

The adequacy of the sludge treatment processes in terms of compliance with the recommendations of the Sludge Management Plan and the treatment of sludge from other municipal WWTP's is addressed in Section 5.0.

4.4.3 Meeting the Standards

Ballybay WWTP currently provides an adequate level of waste water treatment for compliance with the Urban Waste Water Treatment Regulations (S.I. No. 254 of 2001), i.e. secondary treatment for discharges to freshwaters from between 2,000 and 10,000 pe by 31st December 2005. The Dromore River is not designated sensitive under the UWWTR and the provision of nutrient reduction is not a legislative requirement under these regulations.

Table 4.3 below sets out the current and future treated effluent loads discharged from Ballybay WWTP

Table 4.3
Impact of Future Discharges (2022)

Parameter	Assimilative Capacity	Current Load *	Future Load **	Comment
BOD (kg/day)	ND	13	11	25 mg/l for future discharges
Total P (kg/day)	ND	1	4	10 mg/l for future discharges
Total Ammonia (kg/day)	ND	2	11	25 mg/l for future discharges
Suspended Solids (kg/day)	ND	10	15	35 mg/l for future discharges

* Based on current (year 2001) treated effluent quality achieved

** Based on Urban Waste Water Treatment Regulations standard limits.

At present, Ballybay WWTP discharges treated effluent in compliance with the standards of the Urban Waste Water Treatment Regulations 2001.

By maintaining current performance at the WWTP, there should not be an increase in the BOD load being discharged. However, based on the high background concentrations of nutrients in the receiving waters (which do not currently comply with target phosphate concentrations), any increase in nutrient discharges is undesirable. Since the existing system is achieving phosphate concentrations of less than 1 mg/l in the treated effluent, this may be maintained at future plant loading. Continued monitoring, particularly in terms of nutrients, is recommended.

With the WWTP loading not expected to exceed its current level, it is likely to continue to achieve the required discharge standards without undertaking modifications to the treatment process.

To comply with the requirements of the Local Government (Water Pollution) Act 1977 (Water Quality Standards for Phosphorus) Regulations 1998, it is essential that the phosphate load being discharged into the Dromore River is not increased beyond current levels. The Phosphorus Measures Report prepared by Monaghan County Council (1999) has recommended further investigation into the provision of a phosphorus reduction system at Ballybay within the short term.

4.4.4 Utilisation

The standardised analysis given above, suggests that there is spare capacity at the WWTP corresponding to 5,219 pe. The ability of a WWTP to comply with the appropriate discharge standards, or receiving water assimilative limits, depends on a range of factors such as the diurnal pattern and/or the variability of contributions from individual industries or sectors. Detailed investigation of such issues was beyond the remit of this study and any decision to significantly increase the load to treatment should be preceded by a careful assessment of the relevant factors.

4.5 TREATMENT PLANT UPGRADING

4.5.1 Planned Works

Other than the investigations into the provision of nutrient reduction systems, there are no other planned works for Ballybay WWTP.

4.5.2 Potential Additional Works

On the basis of the foregoing sections of this report, the WWTP has adequate capacity to treat the predicted flow and load to the current discharge standards. Nutrient reduction facilities may be required, depending on the outcome of further investigations.

As the WWTP has been operating for approximately 20 years and most mechanical and electrical equipment has an average useful life of 20 years, an overhaul of the equipment (in particular the preliminary treatment systems) will be necessary in the short term. The current condition of the Control Building is very poor and requires a new roof to replace the existing flat roof, which is leaking. It is also recommended that an improved storm water management system be provided since the existing practice of pumping unscreened waste water on to grass plots, and the pumping of 60 l/s for secondary treatment is not considered sustainable. The performance of the plant can be optimised by the provision of a new SCADA system and variable speed control on the aeration system.

Implementation of the recommendations of the Health and Safety audit is expected to be undertaken at a cost of approximately € 27,000.

5.0 SLUDGE DISPOSAL

5.1 CURRENT SITUATION

At present, approximately 1.70 tds/week (or 88.3 tds/year) of indigenous sludge is co-thickened with 1.16 tds/week of imported sludge from the Ballybay water treatment plant (Lough Egish Water Supply Scheme). The thickened sludge is dewatered to produce 2.85 tds/week of cake with an estimated dry solids concentration of approximately 9.5%. The sludge is disposed of at Scotch Corner landfill.

5.2 THE SLUDGE MANAGEMENT PLAN

The Sludge Management Plan for County Monaghan (March 2002) outlines four sludge management scenarios for Co. Monaghan but as yet the scenario to be adopted has not been identified. However, in all four scenarios the Plan recommends that the sludge produced by the Ballybay WWTP be treated by a new sludge treatment centre (hub centre) in Monaghan town, which will serve either the whole county or the northern part of the County Monaghan. This plant will be located adjacent to the existing WWTP in Monaghan Town. The sludge product from the hub centre will be promoted for re-use in municipal and horticultural (but not agricultural) activities in County Monaghan.

The Plan predicts that Ballybay WWTP will produce approximately 83.4 tds/year of dewatered sludge by the year 2022. The similarity between current and future sludge quantities produced by Ballybay reflects that no increase in WWTP loading is expected by 2022. The importation of sludge from the water treatment plant and leachate from the landfill will have ceased, with these being diverted to other WWTP's by 2022. The corresponding volume of sludge exported to the Monaghan hub centre, from Ballybay WWTP is estimated to be approximately 878m^3/yr or 3 Nr. 6 tonne skips per week (based on 9.5% ds in the cake).

5.3 INDICATIVE NEW WORKS

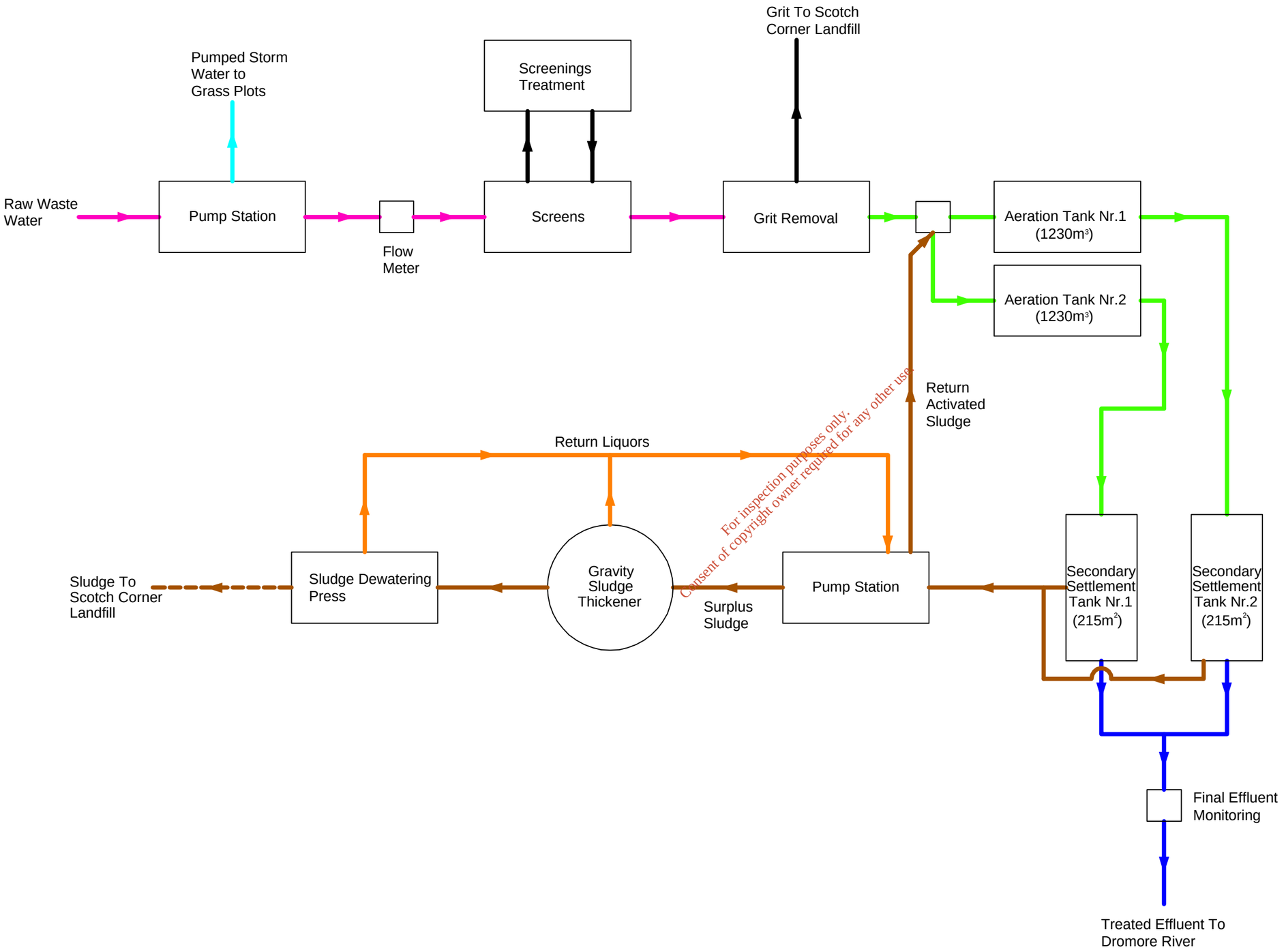
According to the Water Services Investment Programme (WSIP) 2002–2004, the Monaghan Sludge Management Scheme was approved to commence construction in 2003. The WSIP 2003–2005 also lists the Monaghan Sludge Management Scheme as approved to start in 2004.

The Sludge Management Plan does not identify additional works for municipal waste water treatment plants or specify the level of on site storage for indigenous sludge's.

The existing sludge thickener has adequate storage capacity (28 days) for sludge prior to dewatering and transport off site for treatment at the Monaghan sludge treatment centre. Since the sludge is produced by extended aeration, odour is not considered an issue.

The capacity of the existing treatment plant set out in Table 4.2 and the projected quantity of sludge to be treated, indicate that the sludge thickening and dewatering facilities are adequate for current and future sludge treatment requirements.

Do Not Scale - If in Doubt Ask



Legend

- Raw Waste Water
- Final Effluent
- Sludge
- Dewatered Sludge
- Flow to Secondary Tanks
- Screenings/Grit
- Storm Water
- Return Liquors
- Chemical Dosing

Rev.	Date	Description	Drn.By	Chkd.	Appd.
B	DEC'03	POST REVIEW REVISIONS	SWAL	DCAS	JKEL

Client

Department Of The Environment, Heritage And Local Government

Consulting Engineers

Pettit Project Design & Management

White Young Green Ireland

BARRY & PARTNERS consulting engineers

Babtie

Project

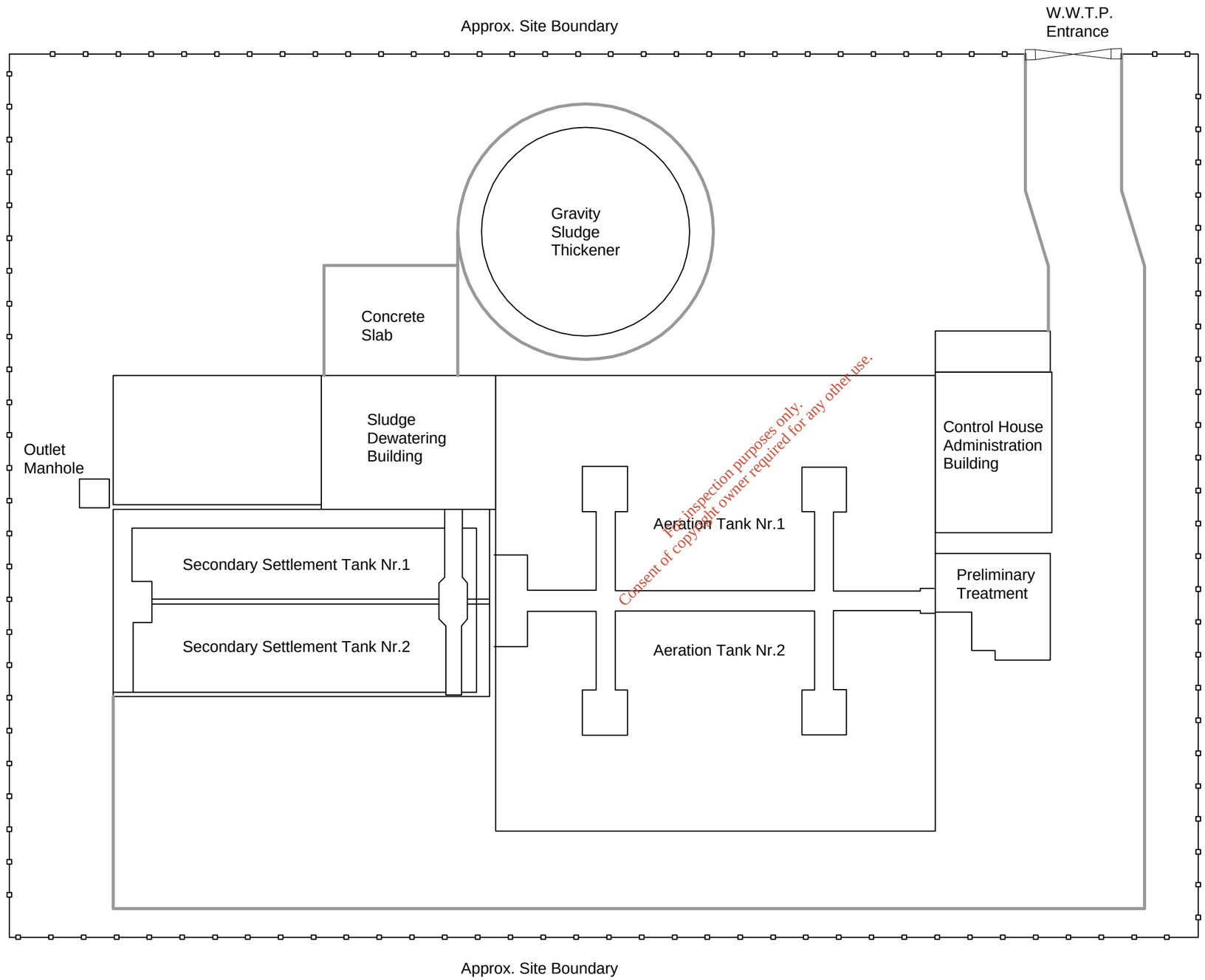
The National Urban Waste Water Study

Drg. Title

Ballybay Catchment Area
Figure 4
Waste Water Treatment Plant
Process Flow Diagram For Current Operation

Drawn	Checked	Approved	
MHEA	FOMA	JKEL	
Date	Scale	Drg. Nr.	Rev
05.08.03	N.T.S.	A7090-129-4-EGP	B

Do Not Scale - If in Doubt Ask



Legend

Redundant/Unused Plant

Rev.	Date	Description	Drn.By	Chkd.	Appd.
B	DEC'03	POST REVIEW REVISIONS	SWAL	DCAS	JKEL

Client

Department Of The Environment, Heritage And Local Government

Consulting Engineers

Pettit Project Design & Management

White Young Green Ireland

BARRY & PARTNERS consulting engineers

Babtie

Project

The National Urban Waste Water Study

Drg. Title

Ballybay Catchment Area

Figure 5
Waste Water Treatment Plant
Site Layout Plan

Drawn	Checked	Approved
MHEA	FOMA	JKEL

Date	Scale	Drg. Nr.	Rev
05.08.03	N.T.S.	A7090-129-5-EGP	B