National Urban Waste Water Study

Catchment Report

for

CASTLEBLAYNEY

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/SM	JK	FMcG	August 2003
B	Post Review Revisions	GM/JK	JK	FMcG	Jan 2004

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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.

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	Castleblayney
Catchment Code	2400 0030
County	Monaghan
Local Authority	Monaghan County Council
OS Grid Reference for WWTP	H 828 199
OS Grid Reference for Discharge	ND

1.1 URBAN AREA

Castleblayney is the third largest town in County Monaghan and is located approximately 23 km southeast of Monaghan Town. It is close to the border with County Armagh and Northern Ireland and is on the N2 National Primary Route between Dublin and Derry. The current residential population of the town was estimated at 2,889 (see Table 1.2).

The principal feature of Castleblayney is the attractive Lough Muckno, which is Monaghan's largest lake. The tourism potential of the area, which includes wooded parkland along the shores of the lake, has yet to be fully realised. More visitors to the "Killarney of the North" are expected in the future.

The town serves as an important service centre to the large surrounding hinterland through its industrial and commercial facilities. The majority of the industrial facilities are located along the Monaghan Road, with smaller industrial areas also located at Killycard on the Shercock Road.

Commercial facilities are located predominantly around the town centre.

Institutional facilities include six schools with approximately 656 students and staff residing outside the catchment.

The drainage catchment in Castleblayney includes the main urban area and existing housing estates to the south and north west of the town centre. The catchment also extends outwards to serve ribbon developments on all roads leading into the town. The area of the current drainage catchment is 249 ha. Information on current land use in the catchment was not available at time of writing.

The urban area lies in a relatively flat area surrounded by drumlins, rivers and interglacial lakes. The geology of the urban area was not provided although it is reported that parts of the catchment are bogland.

1.2 PLANNING TARGETS & ANTICIPATED GROWTH

Future development targets (2001-2006) were obtained from the 2001 Castleblayney Urban Development Plan, only in terms of the additional areas zoned for future development. Future zoning targets allow for the consolidation of existing sites as well as the establishment of additional residential and industrial areas. In all an additional 46 ha has been zoned for future development in Castleblayney. A sectoral breakdown of current land use within the catchment was not available at the time of this study.

Residential land use has developed around the town, with the majority of developments occurring to the south and east of the town centre. Recently, development has occurred at Rosevale, along the Shercock and Keady Roads and at York St. and Muckno St.

At present there is a high number of planning applications submitted (for approximately 400 housing units) in the Castleblayney catchment. This demand is attributed to the lower house costs in the town, and its proximity to other larger urban settlements in the region. As a large amount of land in the catchment already has approval for residential development, it was considered necessary to zone only a small number of additional plots (26 ha) in the catchment for future housing. These zones are at New St., Shercock Rd., Muckno St., York St. Monaghan Rd. Conabury, Bree Rd. Upper and Dundalk Rd.

Commercial activity is currently focused around the town centre (West St., Muckno St. and York St.) but has also extended along the Monaghan Road.

Industry is currently concentrated at Monaghan Road, but smaller industrial areas are also located at Killycard on the Shercock Road. Other areas (11 ha) have also been zoned for industrial use at Bree Road Upper and along the Keady and Monaghan Roads for future industrial needs.

Other zonings included in the plan are for open space/amenity at Keady Road (1 ha) and mixed use (residential, open space/amenity and institutional) just off the Shercock Road (7 ha).

As a breakdown of current land use (by area) was not available for Castleblayney (only future zoning outlined in Development Plan) Table 1.1 is not used. The current boundary shown on Figure 1 is the Castleblayney urban boundary (as identified for the 1996 Census). The future development boundary includes the urban area as well as future zonings outside the urban boundary as identified in the Castleblayney Development Plan.

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 2,889 and calculated the 2022 population to be 2,997.

The Castleblayney Urban Development Plan (2001-2006) estimated the population of Castleblayney and Environs to be 3,040 in the year 2001 and 3,291 in the year 2006. Local authority staff estimated the 2002 population at 3,200 and the 2022 population to be 4,000. The large increase in population to 2022 is based on current planning applications that have been approved, and the likelihood that Castleblayney will develop as a commuter town to nearby larger settlements such as Dundalk.

Due to the wide discrepancy between the 2002 estimates, the preliminary results from the 2002 National Census were used to verify the current population. Preliminary results have indicated that populations in Castleblayney and Environs have followed recent trends in the area with the population of the environs increasing (+353 between 1996 and 2002) at the expense of the urban area (-172). This resulted in a net increase in population for Castleblayney and Environs of 181 persons between 1996 and 2002, resulting in a catchment population for 2002 of 2,989.

It is proposed to use the standard estimates for the 2002 (2,889) population as the Development Plan and Census estimates differ from this figure by less than 10%. For the 2022 population, the local authority estimate of 4,000 is considered more realistic in light of current development trends.

Table 1.2
Catchment Population Trends and Projections

Description	Census Figures		Estimated		Comment
	1991	1996	2002	2022	
Resident Domestic Population	2,938	2,808	2,889	4,000	Standard Estimate for 2022 is 2,997

2.0 ENVIRONMENTAL FACTORS

2.1 RECEIVING WATERS

2.1.1 Classification & Quality

Treated effluent from Castleblayney Waste Water Treatment Plant (WWTP) discharges to Lough Muckno via a single 250m long open ended outfall. The waters of Lough Muckno are designated as sensitive under the Urban Waste Water Treatment Regulations, S.I. No. 254 of 2001.

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 designations.

Table 2.1
Receiving Waters Classification

Characteristic	Classification	Comment
Receiving Water Name and type	Lough Muckno	Treated waste water from the WWTP discharges via an open ended outfall.
Resource Use	Drinking water	Abstraction from River Fane (d/s of Lough Muckno) for Dundalk town and also at Inniskeem WTP approximately 8 km d/s of outfall
Amenity Value	Boating, Coarse fishing Bathing	Boating and coarse fishing in the lake. Traditional bathing area at Black Island approximately 0.5 km d/s of the WWTP outfall
Applicable Regulations	*Bathing Water Regulations	*Bathing Water Regulations (1989-1998)
	Water Quality Standards – Phosphorus	LG Act, S.I. No. 258 of 1998
95 Percentile Flow	N/A	
EPA Sampling Stations	Lough Muckno	
Biological Water Quality	Mesotrophic	Based on EPA sampling data (1998-2000)
Target Water Quality	Mesotrophic	
Other applicable issues.	Muckno Lough's sensitive area designation	Urban Waste Water Treatment Regulations, S.I. 254 of 2001

* Since Lough Muckno is not a designated bathing water, compliance with the water quality standards of these regulations is not a legislative requirement, but is considered necessary to maintain and enhance the amenity value of the lake.

Lough Muckno was classified as mesotrophic in the EPA Survey (1998-2000) and it has a similar target status under the Phosphorus Regulations. While water quality in Lough Muckno is monitored, concentrations of the key parameters normally set out in Table 2.2 were not provided, and the table is therefore not used here.

2.1.2 Assimilative Capacity

In the absence of a dispersion model and water quality data, the assimilative capacity of the Lough Muckno could not be calculated. Table 2.3 is not used in this case.

An assessment of the impact of Waste Water Treatment Plants and collection systems on water quality in County Monaghan was undertaken in 2001/2002. This reported elevated concentrations of phosphorus upstream and downstream of the Castleblayney WWTP outfall, with the ortho-phate concentration rising by 0.49 mg/l P in August 2000, and these elevated concentrations persisting in 2001. Elevated nitrate concentrations were also reported in 2000, with reduced levels reported for 2001.

2.2 FLOWS AND LOADS

2.2.1 Dry Weather Flow and Load

Historical flow data for the Castleblayney WWTP was considered unreliable due to the inaccuracy of the inlet flow meter. An ultrasonic unit has since been installed. Limited influent and effluent quality data was available at time of writing. Flows and loads currently conveyed by Castleblayney urban drainage scheme were therefore not available and Table 2.4 is not used.

Castleblayney has a small tourism population estimated to average 150 visitors per day.

The waste water flow and load from the commercial sector is not known. The existing and future contributions were estimated using the standard estimate of 16% of domestic contribution.

The industries in the town are predominantly “dry” and discharge only domestic sewage to the sewerage network.

Institutional facilities in the town include four primary schools, one secondary school and a technical college. It is estimated that 656 students/staff attending these institutions reside outside the catchment.

Sludge is not currently imported to the WWTP for treatment. The Sludge Management Plan does not anticipate that sludge will be imported to Castleblayney WWTP in the future. Refer to Section 5.0.

Table 2.5 gives the estimated breakdown of the current and future flows and loads on a sectoral basis. Due to the unreliability of historical flow records, it is the standard estimates, that are used in subsequent analyses. A Water Services Pricing Policy (Polluter Pays Principle) Report for the Castleblayney catchment has not been prepared.

Table 2.5
Estimated Flow and Load by Sector

Contributing Elements		LA Data for 2002	Standard Estimates		Comment
			2002	2022	
Domestic Resident		3,200	2,889	4,000	As per table 1.2
Resident Visitors		150	50	55	As per Methodology 1/3 of tourists are resident visitors
Day Visitors		Incl.	100	110	
Domestic Flow	m^3/d	800	398	616	2002 estimate @ 137.7 l/hd/d 2022 estimate @ 154.0 l/hd/d
Leisure/Tourist Flow(1)	m^3/d	10	9	10	Resident visitor @ 80% of domestic pcc flow Day visitor = 30 l/hd/day
Unmeasured Commercial Flow	m^3/d	128	64	99	16% for domestic
Measured Commercial Flow	m^3/d	0	0	0	None measured
Industrial Flow	m^3/d	94	94	94	
Institutional Flow	m^3/d	92	26	27	
Infiltration	m^3/d	176	144	200	Estimate based on 50 l/hd/d
Imported Wastes	m^3/d	0	0	0	Not part of DWF
Dry Weather Flow	m^3/d	1,300	735	1,046	
BOD Domestic load	Kg/d	192	173	240	Assuming loading of 60g/hd/d
BOD Leisure/Tourist(1)	Kg/d	5	5	6	Resident visitor @ 48g/hd/d Day visitor @ 30g/hd/d
BOD Institutional(2)	Kg/d	21	13	14	
BOD Commercial(3)	Kg/d	31	28	38	16% of domestic
BOD Industrial	Kg/d	4	4	4	140 employees @ 30 g/hd/d
Total	Kg/d	253	223	302	
Population Equivalent		4,217	3,717	5,033	
BOD Imported Waste	Kg/d	0	0	0	No existing or future imported wastes or sludge
Total BOD Load	Kg/d	253	223	302	

(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 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.

On the basis that 79% of the catchment is served by a combined system, it is estimated that 197 ha. contribute storm water to the combined sewerage system.

3.0 SEWERAGE SYSTEM

The layout of the sewerage network is shown on Figure 2. The Castleblayney catchment is drained by a combination of gravity sewers and pumping systems to the WWTP, which in turn discharges to Lough Muckno. The catchment has 5 pump stations, which serve low-lying areas to the south, north west and north east of the catchment.

There are six known Combined Sewer Overflow (cSO) discharges from the sewerage network, all of which discharge to Lough Muckno via drainage channels.

The catchment is reported to be served by a predominantly combined sewerage system that was last upgraded in the mid 1980's. It is reported that separate sewer systems drain sections of the Bree, Connabury, Monaghan Road and Keady Road areas. No information was available on the number of houses connected to the storm sewer network, or the routes and destinations of storm sewer drainage systems.

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

3.1 INVENTORY

3.1.1 Sewerage System Records

A layout plan (subsequently superseded) of the sewerage network was available at the Monaghan County Council Offices in Castleblayney. In addition to this, it is understood that post-construction longitudinal section drawings of less than 50% of the trunk sewers in the network are available. A numerical inventory of sewerage assets was not available. The lengths of foul, storm and combined sewers were not available.

3.1.2 Sewers

The Castleblayney Sewerage Scheme comprises mainly of a combined sewer system with recently developed areas served by separate sewer systems.

No information was available on storm, foul or combined sewer lengths within the catchment as there were insufficient records of the sewerage network available for this purpose.

In the absence of adequate records the total length of foul and combined sewers in Castleblayney was estimated using the findings of the Sewerage Density and Structural Condition Assessment Methodology (contained in Volume 2).

For this Methodology it was assumed that: -

1. The number of properties connected to Castleblayney sewerage network is 979.
2. 30% of the properties in the catchment are served by separate sewers.
3. The diameter of the largest foul or storm sewer is <600mm

This methodology does not provide guidelines for estimating storm sewer lengths. Therefore in the absence of any other information on storm sewer lengths it is assumed that the total storm sewer length is equal to the total foul sewer length.

The estimated breakdown of the sewerage system by length and 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	9,432	1,863	350	11,645	5A
Storm**	ND	ND	ND	4,993	5A
Foul	4,044	949	0	4,993	5A
Total Gravity	17,520	3,761	350	21,631	5A
Rising Mains	ND	ND	ND	2,295****	5

* Gravity sewers unless otherwise indicated.
** Storm drains are included under storm sewers unless otherwise indicated. Storm sewer length is taken as equal to foul sewer length in the absence of any other information. As the breakdown of storm sewers will be different to that for foul sewers a breakdown by diameter is not provided
*** All sewer lengths estimated in accordance with the Sewerage Density and Structural Condition Assessment Methodology
**** Rising main lengths estimated from pipe work routes supplied by local authority staff

The length of combined trunk sewers is estimated to be 7.9 km (estimated from sewer routes supplied by local authority staff). No information on the materials of sewer construction was available.

No detailed information on the condition of the sewers was 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.

No information was available on the condition, age or material of rising main pipe work within the catchment.

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	ND	ND	-

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

The number of manholes in the catchment was estimated at 430 based on guidelines from the Sewerage Density and Structural Condition Assessment Methodology.

3.1.3 Combined Sewer Overflows

Details of combined Sewer Overflows (cSOs) are given in Table 3.3 and their location is illustrated on Figure 2. The cSOs were not inspected and the data Confidence Grade is taken as 4 based on uncorroborated local knowledge. It was not known if any screening systems are in place.

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. Loch Egish Rd.	ND	≤3	N/A	3	Lough Muckno	4
2. West St.	ND	≤3	N/A	3	Lough Muckno	4
3. Adjacent to Monaghan Rd.	ND	≤3	N/A	3	Lough Muckno	4
4.Off West St.	ND	≤3	N/A	3	Lough Muckno	4
5. Off Market St.	ND	≤3	N/A	3	Lough Muckno	4
6. C'macross Rd.	ND	≤3	N/A	3	Lough Muckno	4

* Includes Building Works
** M & E = Mechanical & Electrical Plant
*** CSOs drain to Muckno Lough via drainage channels.
Note: Conf'ce Grade = Confidence 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. The pump stations were not inspected and the data Confidence Grade is taken as 4 due to a lack of available records.

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. Monaghan Rd.	5-10	≤3	≤3	None	4
2. Kinnagin	5-10	≤3	≤3	None	4
3. Connabury	10-20	≤3	≤3	None	4
4. Muckno St.	30-50	≤3	4	Lough Muckno	4
5. Dundalk Rd.	5-10	≤3	≤3	ND	4

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

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

Flooding of roads near the town centre occurred in the mid 1990s due to an extreme storm event with an indicative return period of 200 years. The affected areas were West Street and Monaghan Road. There are no available meteorological records regarding any storm events coinciding with this incident of flooding. It is not known what caused flooding at these locations (e.g. capacity limitation or blockages) and no further comment can be made at this stage.

Build up of fats, oils and grease upstream of one of the cSO's has been reported, and based on monthly inspections, this sewer is jet cleaned regularly as necessary. This reduces the potential for sewer blockages and pollution.

In the past the pumps at Muckno Street pump station (PS4) had inadequate pumping capacity for the incoming flow rates, resulting in regular overflow of untreated sewage via the emergency overflow into a feeder drain to Lough Muckno. The subsequent replacement of one of the pumps has led to a reduction in the number of overflow spills reported.

3.2.2 Structural

There are no known sewer structural failures in the sewerage system.

3.2.3 Environmental

Pollution due to overflow of sewage from the emergency overflow at PS1 (Muckno St.) has been reported. This occurred regularly when incoming flows exceeded the pumping capacity. Sewage is visible in a nearby feeder stream to Lough Muckno. This overflow was re-routed to the WWTP at the end of 2001.

Seepage of untreated sewage from the Bree Street pump station into an adjacent stream has been reported. The cause or the impact of this discharge has not been advised.

It has been reported that on occasions when water levels in Lough Muckno had increased, causing it to flood upstream along the storm drains, significant water pollution problems associated with cSO3 were observed, with untreated waste water discharging to surface waters.

Local authority staff have reported that unauthorised sewage discharges from some properties in the Drumillard Housing Estate, Main Street and Muckno Street are contributing to the elevation of nutrient levels in Muckno Lough and Gas Lough.

Other reported incidents of watercourse pollution caused by the sewerage system are those caused by cSO spills into a common drain to Lough Muckno (see Section 3.1.3). No information was available on the operation of the cSOs or on the impacts of the discharges on the receiving waters.

3.2.4 Infiltration/Exfiltration

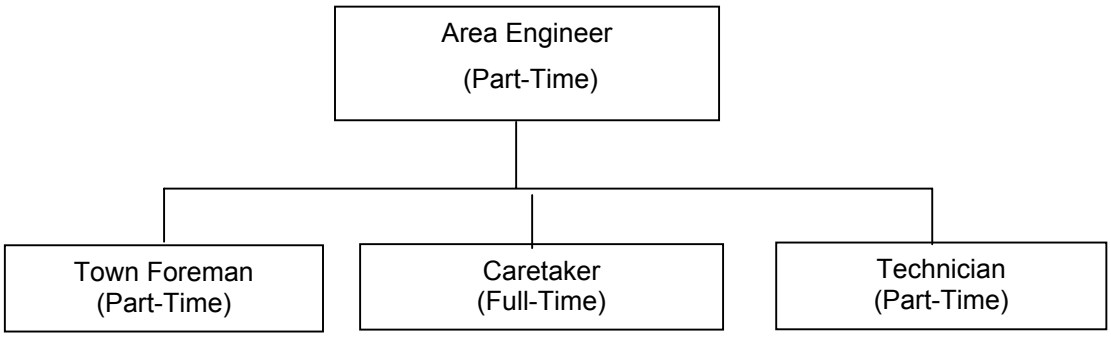
Infiltration is not believed to be a problem in the Castleblayney catchment.

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 Castleblayney 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 station 4 is visited daily by the caretaker to check operation and carry out any necessary maintenance. The other 4 stations are visited on a weekly basis. 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.

3.3.3 Relative Manpower

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

Table 3.6
Staff Time Expended on Maintaining the Sewerage Network

Grade of Staff	Weekly Hours	Annual Days*
Area Engineer	0.5	2.75
Town Foreman	2.0	11.00
Caretaker	8.0	44.00
Total Man	10.5 hours	58 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	91 km
Number of households maintained per man-year	3,765 nr.

Note 1: Based on a total length of 23.9 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 979 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 assessment is not practical at this stage.

As stated in Section 3.2.1, incidents of flooding were reported after an extreme storm event (200 year return period) in 1995. As flooding has not recurred since, it is considered that there is sufficient capacity in the network to cope with present waste water flows and loads from the drainage catchment.

The combined capacity of the trunk sewers leading to the WWTP has not been calculated, as the appropriate data relating to pipe work diameters and gradients was not available.

In the absence of trunk sewer capacities, and the location of sewers in known condition grade 4 or 5, figure 3A is not used.

3.4.2 Structural Integrity

No sewer structural failures have been reported.

3.4.3 Structural Rehabilitation Options

No current need for structural renovation has been identified.

3.4.4 Pollution Control

Further investigation of the cSOs and their operation is considered necessary.

Identification of existing illegal discharges, and the connection of unsewered properties to the sewerage network is necessary to reduce this source of pollution.

Further investigation into the source of the fats, oils and grease that are depositing in the network is necessary to reduce the impact of overflows from the relevant cSO downstream of the Glencarn Hotel.

Local authority staff have indicated that the Muckno Street pump station now requires upgrading and that the existing rising main needs to be replaced. These improvement measures are necessary to increase the quantity of waste water being pumped forward to the WWTP. In addition to this, it is recommended that any upgrading works at the pump station should include the provision of a new or improved screening system to eliminate the current pollution problem caused by the emergency overflow discharges.

3.4.5 Hydraulic Solutions

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

3.5 SURVEYS AND INVESTIGATIONS

No major surveys have been undertaken in the 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. Waste water flows at the WWTP are monitored continuously.

3.5.6 Future Surveys

Since no surveys have been undertaken in the Castleblayney catchment, the sewer records are poor. To update all sewer records and to develop a hydraulic model of the sewer network, comprehensive surveying and assessment of the urban drainage scheme is recommended. 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	65	430
Sewer survey	Km of Sewer	5.4	
Flow & Rainfall Survey	Flow Monitors	5	
	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 Castleblayney 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.

Sewer flooding has been reported in the Castleblayney sewerage network in the past. However, as this was due to flows from an extreme storm event (200 year return period), the combined sewerage system is deemed adequate for current flows within the catchment. The absence of reported flooding incidents on the foul network indicates that it also has adequate capacity for current flows.

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

There are no works on the Castleblayney sewerage network planned at present.

3.6.3 Potential Additional Works

- Pollution and flooding at Muckno St. pump station – Upgrade present pump station and rising mains and provide adequate screening mechanisms
- Storm water separation – The reduction of storm water entering the foul/combined sewer network should be investigated. This will reduce current storm water flows being treated at the WWTP and provide additional capacity for foul sewage in the network.
- Modifications at cSOs to reduce their frequency of operation, and the possible provision of storm water screening facilities.
- Extension of sewerage network to unsewered properties, and the interception of illegal discharges from properties within the catchment.

Do Not Scale - If in Doubt Ask

Legend

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

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Consulting Engineers

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The National Urban Waste Water Study

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Castleblayney Catchment Area

Figure 1
Catchment Geographic Plan

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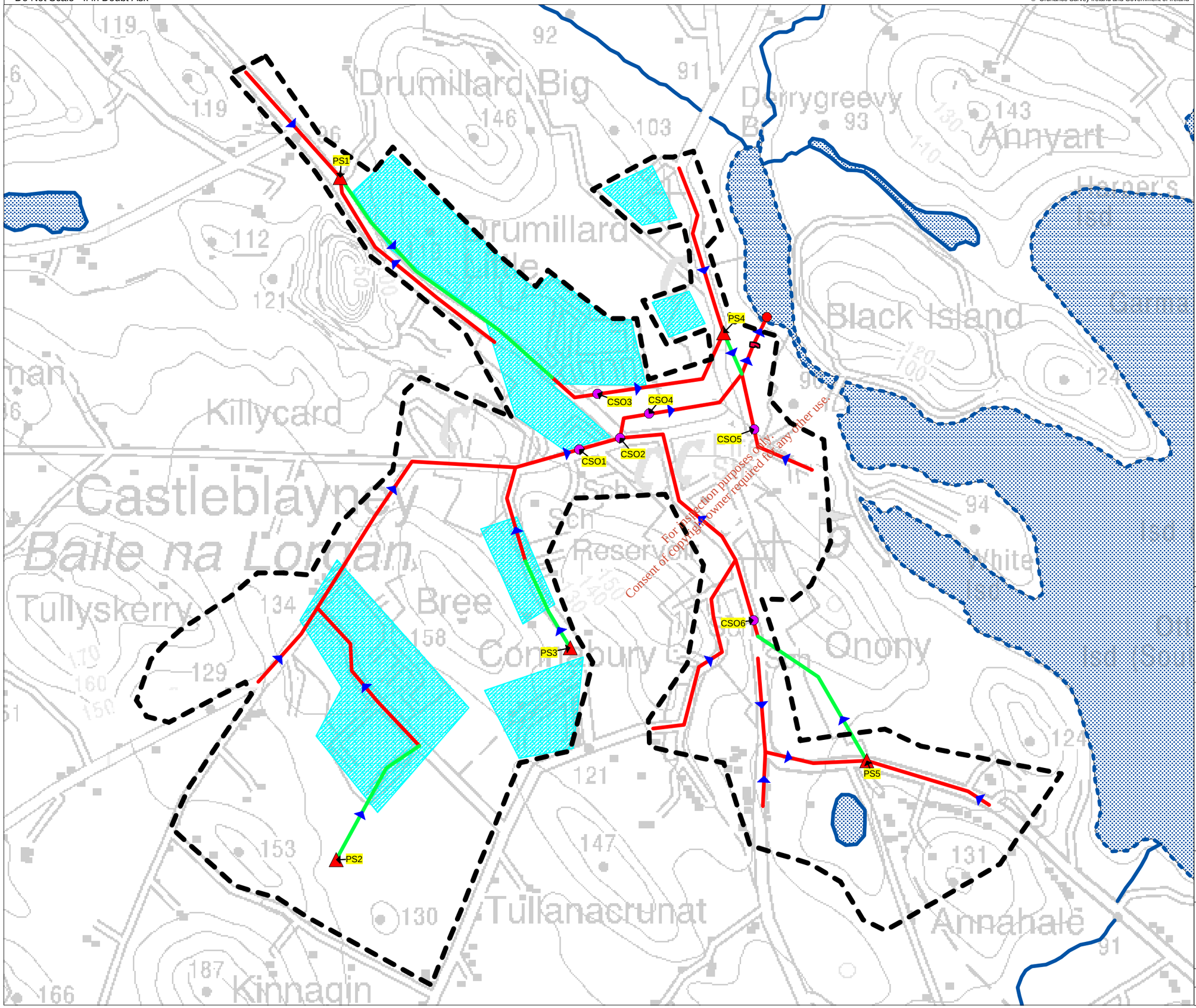

Legend

- 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

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Figure 2
Existing Sewerage System

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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

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Castleblayney Catchment Area

Figure 3
Sewerage System Performance

Drawn	Checked	Approved
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4.0 WASTE WATER TREATMENT

4.1 TREATMENT PROCESS

4.1.1 General Description

Castleblayney WWTP was built in 1983 to provide secondary treatment and operates as an extended aeration plant with phosphorus reduction, preceded by screening and grit removal. The WWTP discharges treated effluent to Lough Muckno, which is a designated Natural Heritage Area. Sludge dewatering facilities are also provided on site. The dewatered sludge is stored on site prior to disposal to 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

Incoming waste water gravitates to the preliminary treatment system. This comprises storm water separation and treatment, screening and grit removal. Initially all incoming waste water is screened by a mechanically raked coarse screen (30 mm aperture). Following screening flows greater than 70 l/s overflow a storm weir and discharge to Lough Muckno. Flows between 35 and 70 l/s discharge via a second overflow to a storm tank. Downstream of the storm overflow weirs, flows up to 35 l/s are subject to grit removal in a vortex grit trap. Screenings and grit are not washed and are stored on site prior to their disposal at Scotch Corner landfill.

The storm water settlement tank is a rectangular tank (converted septic tank), which is not fitted with a cleaning mechanism. When the storm tank has filled, settled storm water overflows to Lough Muckno. When the storm abates and incoming waste water flow is less than 35 l/s, storm water is pumped back to the secondary treatment system by two duty/standby submersible pumps (27 l/s each).

The total flow receiving secondary treatment at the WWTP is measured in venturi flumes at the plant inlet and outlet i.e downstream of the grit removal system and downstream of the final effluent sampling chamber, at the plant outlet.

An automatic sampler has been installed at the plant inlet. In addition grab samples of the influent are routinely taken.

4.1.3 Primary Treatment

Primary treatment is not provided at the site.

4.1.4 Secondary Treatment

Following preliminary treatment waste water flows up to 35 l/s gravitate to the secondary treatment system. Secondary treatment is provided by an activated sludge treatment process comprising a single stage extended aeration system. This consists of two rectangular aeration tanks designed for BOD removal and nitrification, followed by two secondary settlement tanks and a return sludge system.

The aeration tanks have a total capacity of approximately 3,600 m^3, which corresponds to a residence time of approximately 5 days at current DWF or 1.6 days at a flow of 3DWF. Each tank is fitted with two 18 kW vertical shaft surface aerators.

At the time of this study only one of the aeration tanks was operating and was providing an adequate level of treatment. The F/M ratio was less than 0.06 kg

BOD/kg MLSS.day, with a sludge age in excess of 31 days. The MLSS concentration is generally maintained between 2,500 and 3,000 mg/l.

Flow from the aeration tanks gravitates to two radial flow settlement tanks fitted with rotating half bridge scraper mechanisms. Settled sludge gravitates to the nearby pumping station, while scum is removed automatically from the tank surface. A submersible pump is used to pump the return activated sludge to the aeration tanks. A separate submersible pump transfers surplus sludge to the dewatering press.

Treated effluent which overflows from the secondary settlement tanks gravitates to an on site chamber where it combines with the settled storm water discharge. From there the treated effluent discharges to Lough Muckno, via an open ended outfall.

Ferric sulphate is dosed into the flow splitting chamber upstream of the aeration tanks, to bring about the chemical precipitation and removal of phosphates.

4.1.5 Tertiary Treatment

Tertiary treatment is not provided at the treatment plant.

4.1.6 Sludge Treatment and Disposal

Sludge is not imported to Castleblayney WWTP for treatment. Indigenous sludge is dewatered using a single belt press. Sludge is not thickened prior to dewatering, but the sludge is pre-conditioned by polyelectrolyte to improve its dewatering ability. The dewatering press rated at 100 kg ds/hr, produces a dewatered cake at 9 % dry solids. The dewatered sludge is stored in a covered skip until it is transported to Scotch Corner landfill.

Filtrate from the dewatering press gravitates to the preliminary treatment system where the liquor combines with incoming waste water and receives full biological treatment with the main process stream.

4.1.7 Pumping Stations

Flow of waste water through the treatment process stream is primarily by gravity. Aside from the sludge pumping systems which form an integral part of the treatment process (storm water and sludge pumping) there are no pump stations 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 north of the town, at Muckno Street. 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 general layout of the works is given at the end of this section. The WWTP currently occupies an area of approximately 0.62 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 is one building at the WWTP. This is the main administration building, which includes a separate room for the sludge dewatering press.

4.2.2 Miscellaneous Assets

The existing sludge drying beds are reported to be redundant.

4.2.3 Asset Condition

Castleblayney WWTP was commissioned in 1983. With the exception of the preliminary treatment system, the structural condition of the treatment plant including mechanical and electrical items was recorded as reasonable i.e $\leq$ Grade 3.

There is considerable evidence of rust at the ferric dosing tanks and their support frames.

It should be noted that the mechanical and electrical items of the plant have been operating for approximately 20 years, which is at the limit of the average useful lives of these items. Significant refurbishment will be required in the short term.

4.2.4 Serviceability

The inlet flow measurement system was reported to be inaccurate but this has recently been replaced. There is no fine screening provided on site and gross solids can be seen in the downstream treatment processes.

4.2.5 Health & Safety

The Waste Water Treatment Plant is generally in satisfactory condition with regard to Health & Safety issues. A Health and Safety statement has been prepared, and a number of remedial works and actions have been identified.

The recommendations range from the provision of gas monitors within the plant building to the provision of bunding at the polyelectrolyte and diesel tanks and the repair of paving slabs. The overall cost of the remedial works has been estimated at less than € 20,000.

4.2.6 Treatment Works Records

”As Built” drawings were not available. The sizes and dimensions provided for the process units were, checked on site and were found to be correct.

4.2.7 Flow Records

Flow records were not available on site at the time of the site visit.

View of Aeration Tank at Castleblayney 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	Screen	Mechanical coarse screen (30 mm aperture)	1	≤ 4	≤ 3	4/5	Commissioned in 1983
	Grit removal	Vortex Grit trap	1	≤ 4	≤ 3	4/5	Commissioned in 1983
	Flow monitor	Venturi flume at the plant inlet and outlet	2	≤ 3	N/A	≤ 3	Commissioned in 1983
	Storm water settlement	Rectangular tank (Capacity = 300 m^3)	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 = 3,600 m^3)	2	≤ 4	≤ 3	≤ 3	Commissioned in 1983
	Settlement Tank	Circular settlement tanks (Surface area = 433 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
Ancillary	Phosphorus removal	Chemical dosing for Phosphorus removal	1	≤ 4	≤ 4	≤ 3	Commissioned in 1983
Sludge treatment/ Disposal	Dewatering	Single belt press estimated @ 100 kg DS/hr, achieves 9 % DS	1	≤ 4	≤ 3	≤ 3	Commissioned in 1983
Outfall	Pipe	250 m long open ended outfall to Muckno Lough	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 – Grade 3, Service Condition – Grade 3

4.3 OPERATIONAL CONTROL & STAFFING STRUCTURE

The waste water treatment plant is managed full-time by a caretaker and part-time by a technician. 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 hrs/week of engineering, management and clerical time are spent on the WWTP. A technician spends 4.5 hrs/week (2 visits/week), a caretaker generally spends 39 hrs/week and the fitter/electrician approximately 1 hr/week. The total number of man-hours expended on the WWTP is therefore, 49 hrs/week or 1.23 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 3,717, thus the key output measure or load treated per man year is 3,035 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).

Treated effluent samples for 2001 had an average BOD concentration of less than 9 mg/l, suspended solids concentration of less than 13 mg/l and Ortho-Phosphate concentration of less than 1.5 mg/l. Total nitrogen concentrations were not available.

While operating conditions in the treatment process would favour nitrification, data was not available to verify its occurrence.

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 is calculated using the standardised estimates typical for similar systems as set out in the relevant section of the Standard Methodology, Volume 2.

Table 4.2
Estimated Treatment Capacity Limitations

Treatment Stage	Element	Capacity (pe)	Limiting Criteria	Comment
Preliminary	Screens & Grit Removal	ND	Peak flow (l/s)	Capacity not known
Primary	N/A	N/A	N/A	No primary treatment
Secondary	Aeration Tanks	13,500	Kg BOD/day	At standard operating conditions for extended aeration
	Final Settlement Tank	22,490*	Peak Flow (l/s)	Based on 154 l/hd/day and 3 DWF Max flow = 120 l/s
Tertiary	N/A	N/A	N/A	No tertiary treatment
Sludge	Dewatering Press	14,881	Kg ds/hr	Based on 37.5 hours per week @ 100 kg ds/hr

* This figure should be treated with caution since it is the maximum flow of 120 l/s, which is the limiting factor.

From the above table, it can be seen that Castleblayney WWTP has adequate capacity to handle the current (3,717 pe) plant loading as well as the projected future plant loading in 2022.

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

Castleblayney 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 pe >2,000 by 31st December 2005.

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

While the receiving waters (Lough Muckno) are classified as sensitive by these Regulations, the population equivalent of the Castleblayney catchment is currently below the 10,000 pe threshold above which nutrient reduction is required under these Regulations.

However, based on current elevated concentrations of nitrate in Lough Muckno (which have been attributed to the WWTP discharge) and the mesotrophic status of the lake it is considered necessary to provide nutrient reduction facilities at Castleblayney WWTP. An effective phosphate removal system is currently operational, but it is not known if nitrification is being achieved.

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 Lough Muckno is not increased beyond current levels. The Phosphorus Measures Report prepared by Monaghan County Council has not recommended any refurbishment or upgrade of the existing Phosphorus reduction system at Castleblayney.

Table 4.3 below gives the current and projected future treated effluent discharges for Castleblayney WWTP. In the absence of a dispersion model the assimilative capacity of Lough Muckno could not be quantified numerically.

Table 4.3
Impact of Future Discharges (2022)

Parameter	Assimilative Capacity	Current Load *	Future Load **	Comment
BOD (kg/day)	ND	7	26	25 mg/l for future discharges
Total P (kg/day)	ND	1.1	2.1	2 mg/l for future discharges
Total Ammonia (kg/day)	ND	ND	26	25 mg/l for future discharges
Suspended Solids (kg/day)	ND	10	37	35 mg/l for future discharges

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

** Based on Urban Waste Water Treatment Regulations standard limits (except for total ammonia).

When the loading to the plant increases beyond its current level, it is likely to continue to achieve the required discharge standards without undertaking modifications to the treatment processes. An improvement in the level of screening and the provision of fine screening is considered necessary based on the amenity value of Lough Muckno.

4.4.4 Utilisation

The standardised analysis given above, suggests that there is spare capacity at the WWTP corresponding to 9,783 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

According to the Water Services Investment Programme (WSIP) 2003-2005 the Castleblayney WWTP scheme was approved to enter planning. The scope of work covered by this scheme was not provided.

4.5.2 Potential Additional Works

On the basis of the foregoing sections of this report, if the loading to the WWTP is to increase to the predicted level of 5,033 pe within the next 20 years, the WWTP has adequate capacity to treat the predicted flow and load to the current discharge standards.

It is recommended that nitrogen concentrations in the influent and effluent are monitored to determine the performance of the existing system in terms of nitrification. An anoxic tank together with associated recirculation pumps will be necessary to achieve de-nitrification.

As the WWTP has been operating approximately 20 years and most mechanical and electrical equipment has an average useful life of 20 years, an overhaul of the equipment will be necessary in the short term. The provision of fine screening including treatment, grit treatment, cleaning mechanism for the storm water settlement tank and a gravity sludge thickening tank is also recommended. 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 & Safety Audit is necessary.

5.0 SLUDGE DISPOSAL

5.1 CURRENT SITUATION

At present, approximately 1.74 tonnes of dry solids per week (or 90.6 tds/year) of indigenous sludge is dewatered at the Castleblaney WWTP to a cake with an estimated dry solids concentration of approximately 9%. 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 sludge produced by the Castleblayney WWTP will be treated by a new sludge treatment centre (hub centre) in Monaghan Town. This hub centre will serve either the whole county or the northern part of County Monaghan. This plant will be located adjacent to the existing WWTP at Monaghan. The sludge product will be promoted for use in municipal and horticultural activities but not in agriculture.

The Plan predicts that Castleblayney WWTP will produce approximately 248.3 tds/year of dewatered sludge by the year 2022. This is considered an over estimation of the 2022 situation. Based on predicted WWTP loading in 2022 and current sludge production rates, it is estimated that 123 tds/yr will be produced at Castleblayney WWTP. The corresponding volume of sludge exported to the Monaghan hub centre, is estimated to be approximately 1,367 m^3/yr or 4 skips per week (based on 9% dry solids in the cake). Sludge will not be imported to Castleblayney WWTP for treatment.

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. However it will be necessary to provide adequate storage of indigenous sludge prior to transport off site for treatment at the Monaghan sludge treatment centre, in order to optimise transport costs.

Provision of a separate sludge thickening/storage tank would enable surplus sludge to be wasted as necessary in a controlled manner.

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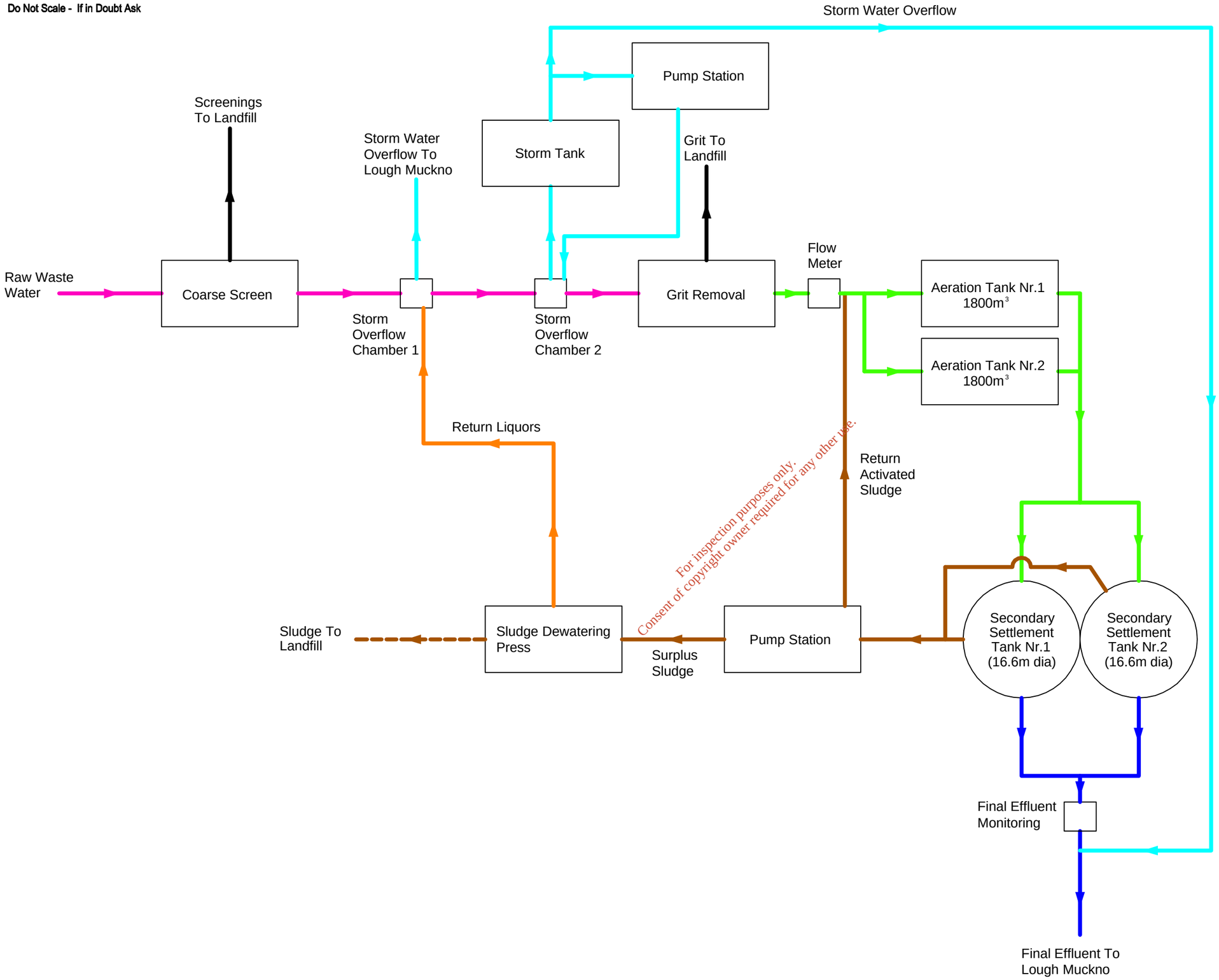

Legend

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

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

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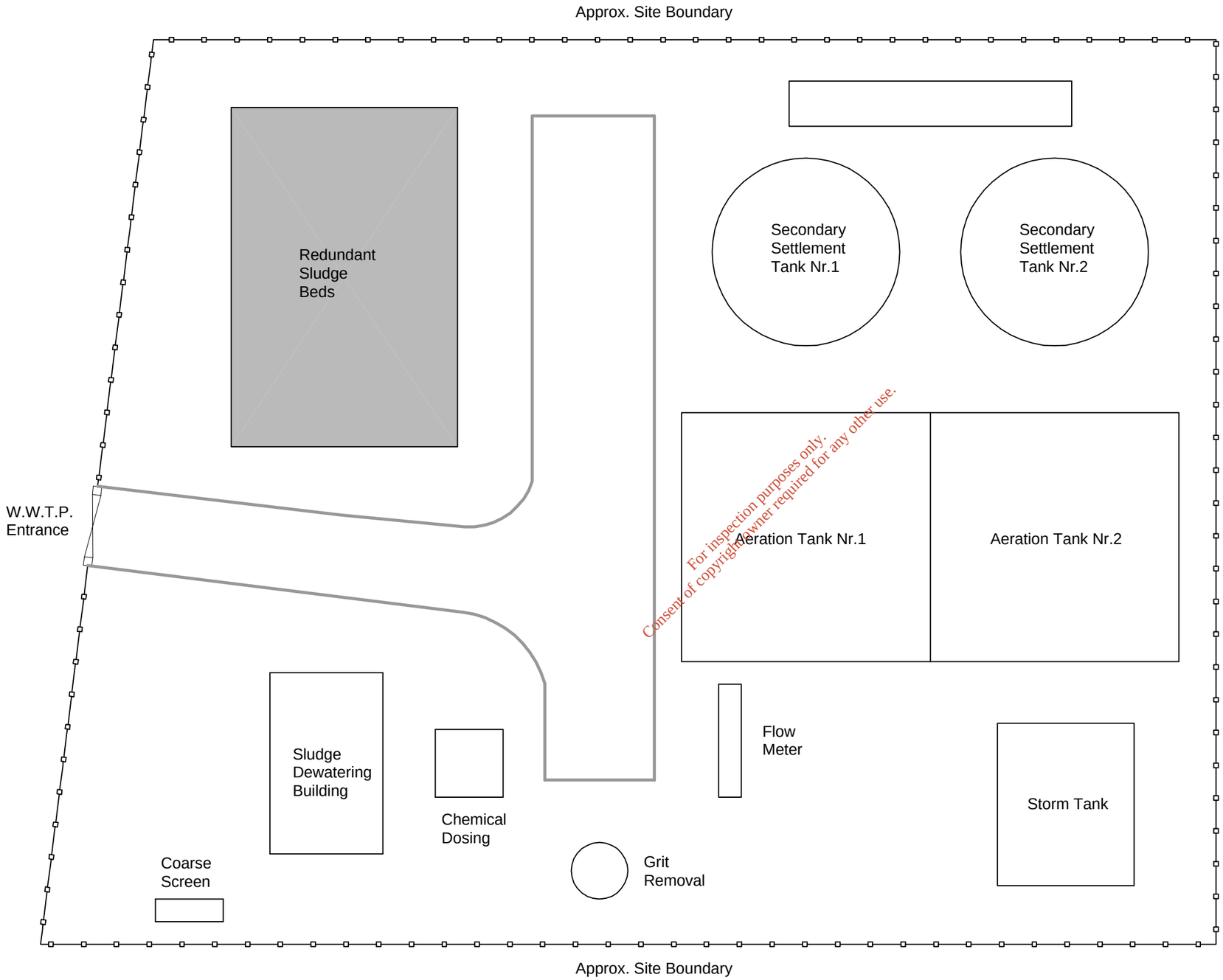

Legend

Redundant/Unused Plant

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Castleblaney Catchment Area
Figure 5
Waste Water Treatment Plant
Site Layout Plan

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