





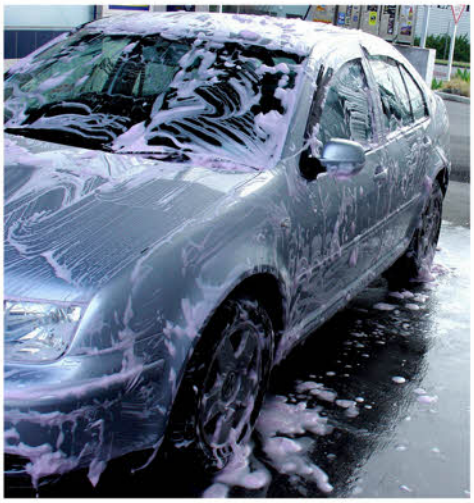









Wastewater Business Plan 2012 - 2019

GuernseyWater
A DIVISION OF THE PUBLIC SERVICES DEPARTMENT

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EXECUTIVE SUMMARY

Foul water pumping station, Vazon

• No matter what form of governance the Guernsey Wastewater function finds itself in for the future the works described in this Business Plan are essential if we are to extend and maintain our sewerage system to an acceptable standard that will serve our community, at a cost of £84 million between 2012 - 2019.

• It is clear from the study work undertaken to produce this plan that insufficient maintenance work has been undertaken in the past and with 13% of our sewer pipes described as being at risk of collapse, remedial works cannot be deferred.

• We recognise that in the present economic climate increasing water charges significantly in excess of inflation is both unpopular and therefore unrealistic. Instead it is proposed that the works put forward in this plan are funded by Water Industry standard long term asset management funding. In this way the costs are rightly spread across the generations which are going to benefit from the investments now being made.

• Guernsey Water has responsibility for the collection and safe conveyance of wastewater to the environment. It is also responsible for the collection and return of surface water to the environment.

• This Plan has been created to outline the strategic direction for Guernsey Water's wastewater function for the period 2012 – 2019 together with the programme of works and resources necessary to ensure satisfactory performance of our wastewater system.

• Much of the wastewater infrastructure is in a poor state of repair. A recent CCTV survey of the network showed that 77% of sewers are classified as being in satisfactory condition, 10% are in an acceptable condition and 13% need attention. In addition, there are 12.617km of sewer where the combination of condition and risk of loss of service are unacceptable.

• There are also a further 52km of sewer where the further investigation will be required within the next five years. This plan focuses upon the remedial works to bring these pipes up to standard condition in which service to our customers can be maintained in a sustainable manner. This will involve rehabilitating 35km of sewer over the period 2012 to 2019.

• With a deteriorating asset base, it is important that sufficient investment is made at an early stage in order to reduce immediate risk of collapse of sewers.

• The proportion of rainwater being passed forward through the foul water system is much higher than a typical UK water industry area. In times of exceptionally heavy rainfall, 'stormwater' overflows into the surface water drainage system. Some overflows discharge straight into the sea with inadequate treatment and monitoring.

• The Environmental Regulator will soon require us to monitor and report all discharges from our system into the environment. As such, we plan to install monitoring equipment at all of our Combined Sewer Overflows (CSO's) and Emergency Overflows (EO's) and will link these to our SCADA telemetry system.

• We will develop a minimum asset standard for our outfalls in line with the regulated UK companies. Currently none of our outfalls are adequately screened (I.e. non-biodegradable items removed).

• We believe that a significant number of private cesspits are leaking which is resulting in contamination of streams with the potential to pollute bathing waters. We are working hard to carry out water quality modelling of the stream system in order to understand its sensitivity to discharges.

• There are in the region of 5,000 properties that are not presently connected directly to the sewer network, and these rely on cesspits to store their sewage. The sewage is taken by road to locally convenient points on the sewerage system (known as emptying points) where it is discharged.

• Hydrogen sulphide given off by septic sewage attacks the concrete pipes in the sewerage network, accelerating deterioration and reducing the life expectancy of the asset. Our plan is to rationalise the emptying points to a number where we can carry out improvements in order to mitigate the impact on our sewerage system.

• It is important to reduce the Island's reliance on cesspit emptying, hence reducing the rate of deterioration (and cost) of the sewerage system and to protect the environment from pollution caused by the degradation of cesspits. Following the introduction of the wastewater charge we have experienced an increase in expectation from our customers that they should be provided with a direct connection to the sewer network.

• Our Network Extension Programme aims to connect 95% of the properties on the Island to mains sewerage as stated in the States Resolution of 2000. However, due to restrictions in public sector funding the original target of 2020 will have to be put back to 2079 if the current rate of investment remains the same. If funding is available as originally planned, then the target could be brought forward to 2045.

• GW has a number of SLA's (Service Level Agreements) in place with States Works to ensure the appropriate ongoing maintenance of the infrastructure.

• The States of Guernsey introduced a new wastewater charge in 2011 that will go some way to reducing the draw from general revenue. However, it will take many years before this charge has increased sufficiently to cover the whole of the wastewater business.

• The introduction of the charge has the benefit of a consistent income stream for wastewater and therefore reduces the reliance on the States' central revenue. However, the amount of income raised initially will be well below what is required for covering the operational costs of the wastewater network, let alone extending it. Guernsey Water will also need to consider the future of the charge, which might be in the form of annual increases until all expenditure is covered.

• Whilst the wastewater charges could rise to cover the required operating costs, capital funding remains a key issue as the present level of investment is insufficient to maintain the present system to a satisfactory standard. If this were to be allowed to continue then the increased degradation would lead to unsatisfactory system performance and environmental damage.

• It is the intention that the whole of the Wastewater function will be managed and monitored in a similar way to that of the UK. Once governance issues have been resolved then it will be appropriate to revise all of the water legislation.

• States' revenue is not a guaranteed source of income for wastewater, and there is always the risk that other Departments or projects will be considered a higher priority than wastewater for funding. The ultimate objective for wastewater would be to become self-sufficient. The future corporate governance of Guernsey Water will play a big part in how operations can be funded.

INTRODUCTION

Sewer relining, St Julian's Avenue

This Business Plan has been created to outline the strategic direction for Guernsey Water's wastewater function for the period 2012 – 2019 together with the programme of works and resources necessary to ensure satisfactory performance of our wastewater system.

The Plan highlights the current condition and performance of the wastewater infrastructure and the improvements that need to be carried out in order to provide an infrastructure which is reliable, environmentally sustainable, safe and efficient.

The Plan also outlines the financial requirements and what time frames will be set for their completion. The Plan will be monitored and updated on a regular basis by senior management and the Public Services Department Board (PSD), and an Annual Review will be published each year.

Since May 2010, Guernsey Wastewater and Guernsey Water have been working together in the same building and operating in 'parallel streams' in order to identify synergies between the two business units. Opportunities to take advantage of these synergies in order to drive efficiency have been identified within the plan. We also believe that by providing our supply chain with forward visibility of our capital delivery programme we can introduce further efficiencies.

This can only be achieved through long term Business Planning.

WASTEWATER OVERVIEW

Archived photo of old sewer

Guernsey Water has responsibility for the collection and safe conveyance of wastewater (toilet waste, bathwater, cleaning) to the environment. It is also responsible for the collection and return of surface water (rainwater) to the environment.

Beneath the Island's roads is a network of **foul water** sewers totalling approximately 150km in length that collect sewage from 75% of domestic households. These sewers, collectively referred to as the sewerage system, should be cleaned, maintained and inspected on a regular basis so as to ensure satisfactory performance throughout the life of the pipes.

The network was progressively extended through the towns of St Peter Port and St Sampsons during the late 1800's and early 1900's, and then into St Martin's and the Vale areas around the mid 1960's when a pumping station and long sea outfall were constructed at Belle Greve. About 99% of the foul network is pumped or gravitates to the Belle Greve pumping station while the remaining 1% is discharged through a short sea outfall at Fort George. This will hopefully cease in 2012 when a new sewer pipeline is installed to take the sewage to Belle Greve.

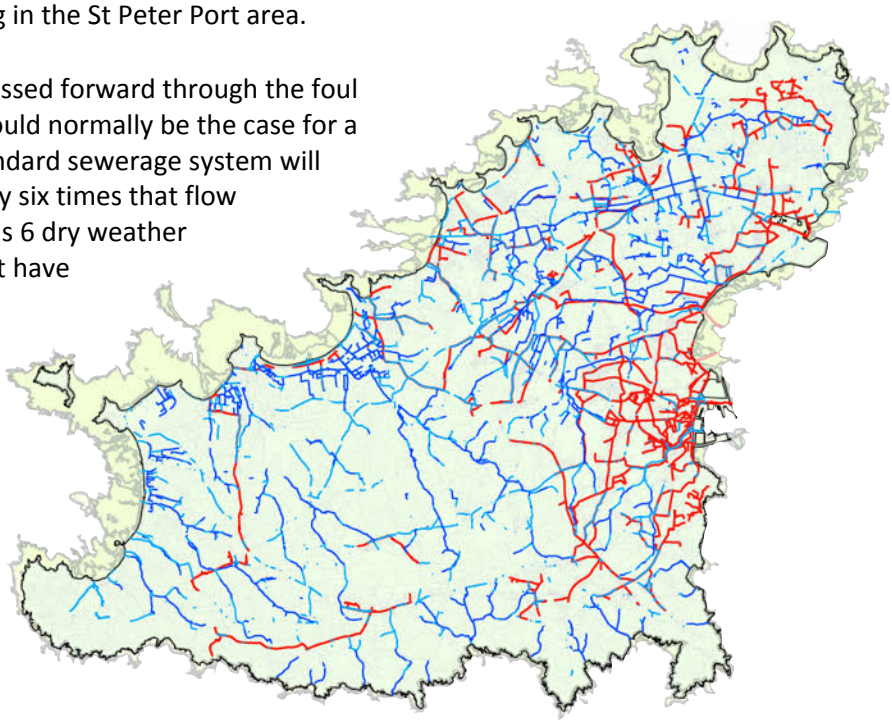
There are 57 pumping stations which transport wastewater to the centralised treatment facility at Belle Greve. Here, litter (in the form of non-biodegradable matter) is chopped up and grit is removed which would otherwise damage pipelines and pumps. The resulting wastewater is then discharged through a long sea outfall pipe which extends more than 1,600 metres out into the fast flowing waters of the Little Russel (at the present time further wastewater treatment options are being considered before discharge to sea).

Ultra-Violet (UV) rays of the sun and the natural wave action together with massive dilution provide the current biological breakdown. Water Quality monitoring work is ongoing to understand the effectiveness of this natural process and whether further treatment is required.

The **surface water** drainage system is a combination of douits, ditches, channels, culverts, pipes and 9 pumping stations that take rainwater and any other liquid run-off from the land. Many landowners throughout the Island share the responsibility for ensuring that these are kept clear from debris that would otherwise block or hinder the flow of water and thus cause flooding.

The surface water system has been developed through the years in order to drain land for development such as that around La Mare de Carteret School and playing fields. Urban surface waters were generally combined with the foul water network until the 1970's and the need to separate the flows in order to prevent flooding and to reduce combined flows to a future treatment system has resulted in surface water drainage being installed in some of the major streets in St Peter Port. This programme is continuing and has reduced the incidence of flooding in the St Peter Port area.

The proportion of rainwater being passed forward through the foul water system is much higher than would normally be the case for a typical UK water industry area. A standard sewerage system will convey flows of 'formula A' or roughly six times that flow experienced in dry weather (known as 6 dry weather flow or 6 DWF). Flows in St Peter Port have been recorded at up to 12 DWF.



In times of exceptionally heavy rainfall and when the main sewerage system cannot cope with the flows from combined systems then 'stormwater' (a mixture of rainwater and dilute sewage) overflows into the surface water drainage system. Such occurrences must be carefully monitored as the frequency of these 'spills' is an indication as to the state and adequacy of the foul water network. Some overflows discharge straight into the sea with inadequate treatment and monitoring.

As shown in red on the map (*above*), the foul sewerage network currently extends to serve only about 75% of the properties on the Island. The pipe diameters range from 150mm to 900mm, along with some larger Brick Ovoid pipes, although 225mm is the predominant size throughout the network.

Following the commissioning of the Belle Greve pumping station and long sea outfall, a trunk sewer (a larger-diameter length of pipe transferring sewage from one catchment area to another) was constructed westwards across the Island to enable west coast properties to be connected to the network. This required the construction of major pumping stations at Vazon and Cobo. More recently, the network has been extended to Creux Mahie on the south coast to intercept the flow that would otherwise be discharged to the sea. The Creux Mahie scheme in 2010 also allowed Guernsey Water to commission and remove a direct foul water short sea outfall discharge which although not near to any designated bathing beach produced an unsightly slick.

Creux Mahie before scheme

Creux Mahie after scheme

KEY VISION & POLICIES

Guernsey Water aims to:

"Deliver to its customers a reliable wastewater collection service which conveys, treats and returns flow to the environment sustainably and efficiently."

To support this vision, a number of Key Policies have been formulated and are shown below:

OPERATIONAL MAINTENANCE

We will carry out an appropriate level of maintenance on our assets to ensure their continued efficient operation and expected life. We will drive value from our maintenance contracts and monitor and improve our Service Level Agreements (SLA's).

CAPITAL MAINTENANCE

We will maintain stable service for our sewerage infrastructure by replacing and refurbishing assets in a planned manner, driven from an appropriate evidence base. We will be proactive in reducing aggressive discharges at source to extend the life of our assets. As a result of our plan, customers will see no deterioration in the serviceability of our assets or in the level of service they provide.

DEMAND MANAGEMENT

We will maximise the capacity of our foul system for customer connection and mitigate the impact of rainfall by separating surface water connections and reducing infiltration. We will extend the foul water network to facilitate the connection of properties onto main sewer to reduce the Island's reliance on cesspits and road tankers. We will actively engage with planners to influence Planning Policy to encourage new development to be served by main sewer.

ENVIRONMENTAL PROTECTION

We will act responsibly and sustainably in our role of environmental protection. We will proactively seek regulation of our discharges to the environment and will act within the terms of our permit to do so. We will ensure that the impact of our discharges on water quality is understood and any improvements required will be supported by a sound evidence base. We will work with the Environmental Regulator to protect and improve our bathing waters and will respond with the highest priority to any potential deterioration in water quality.

LEVELS OF SERVICE

We will investigate all issues related to odour emanating from our system and flooding due to blockage or hydraulic incapacity of our system. We will record and geo-code all complaints such that areas of inadequacy can be addressed strategically if they cannot be resolved cost-effectively at a local level. We will programme our planned works to reduce the customer impact of our activities and aim to mitigate the customer impact of reactive work where practical.

These Key Policies are supported by another Policy - **Management and General**, which incorporates the core business functions of staff, information technology, property, finance, performance monitoring, PR and health and safety.

MANAGEMENT & GENERAL

People are our most important asset. Staff at all levels are encouraged to participate in business improvement initiatives and are appreciated for their contribution. Guernsey Water places an emphasis on efficiency, financial transparency and good people management.

OPERATIONAL MAINTENANCE

WE WILL CARRY OUT AN APPROPRIATE LEVEL OF MAINTENANCE ON OUR ASSETS TO ENSURE THEIR CONTINUED EFFICIENT OPERATION AND EXPECTED LIFE. WE WILL DRIVE VALUE FROM OUR MAINTENANCE CONTRACTS AND MONITOR AND IMPROVE OUR SERVICE LEVEL AGREEMENTS.

Operational maintenance is the activity which prolongs the life of an asset at an optimal cost/benefit. Our asset life and replacement projections assume that assets are being managed under an operational maintenance strategy. This has not happened in the past and an element of catch-up is required.

The whole of the sewerage system is designed to carry 'liquid flows', and blockages can arise because something has been put down the toilet or drain that should have been disposed of via an alternative route. Nothing should be put down the sewer which is not biodegradable. Cooking oils and fats which solidify in the pipes can also cause huge problems as blocked pipes and pumps lead to sewage flooding. The costs of removing fats, oils and greases from the system and attending to blocked sewers and pumps caused by items such as baby wipes are significant.

Tree roots protruding into sewer

As well as reacting to clearing blockage events through jetting we will continue to have a proactive, planned preventative jetting programme to maintain the system capability of our sewers and pumping facilities.

The current operational maintenance function is carried out for Guernsey Water by States Works under three separate SLA's. Performance against these SLA's is reviewed monthly against a series of Serviceability indicators:

UNPLANNED MAINTENANCE

EQUIPMENT FAILURES (PUMP BREAKDOWN)

RISING MAIN BURSTS

POLLUTIONS (AND UNCONSENTED DISCHARGES)

CONSENTED DISCHARGES (CSO SPILLS)

SEWER BLOCKAGES/COLLAPSES (PUBLIC)

FLOODING

This is similar to the way in which serviceability is measured in the regulated UK water industry.

WASTEWATER COLLECTION SERVICE

Tanker from sewage fleet

Guernsey Water provides a comprehensive wastewater collection service for cesspit emptying. This is contracted to States Works and is managed through a SLA. States Works owns, maintains and operates a tanker fleet and carries out around 165,000 standard tanker loads per annum. The SLA requires that the following services are undertaken:

- Provision of tankers
- Tanker operation
- Tanker maintenance
- Provision of fuel and oil
- Sewage conditioning and odour control
- Hoses and couplings
- Maintenance of depot and facilities
- Customer services and information technology
- Management, technical support and reporting, including customer billing service

The value of the SLA is £2.478m per annum. This is only partially offset by the income received in this area of £900k.

PUMPING STATION & RISING MAIN MAINTENANCE

Pumping station operating kiosk

Guernsey Water is responsible for the management of a network of pumping stations with associated rising mains. The operation and maintenance of this infrastructure has been contracted to States Works and is managed through a SLA. The SLA requires that the following services are undertaken:

- Pumping station wet well cleaning
- Routine mechanical and electrical pumping station maintenance
- Air valve maintenance
- Routine maintenance of buildings and kiosks
- Routine maintenance of landscaping and fences
- Sewage conditioning and odour treatment
- Operations management and reporting
- Waste disposal

The value of the SLA is £1.251m per annum.

SEWERAGE & SURFACE WATER NETWORK MAINTENANCE

(including outfall maintenance)

Engineer in brick sewer

Guernsey Water is responsible for the management of the foul and surface water network. It is also responsible for the management of defined lengths of streams, including culverts, grills and outfalls. The operation and maintenance of the network has been contracted to States Works and is managed through a SLA. The SLA requires that the following services are undertaken:

- Sewer descaling (planned and reactive)
- Maintenance of outfalls
- Clearing stream grills
- Clearing culverts and road crossings
- Maintenance of auxiliary equipment
- Tanker emptying point maintenance
- Waste disposal
- Management and reporting

Guernsey Water is also required to ensure that equipment is available to deal with emergency works with the capability to service any pumping station or sewer on the Island. Part of this provision is supported through the SLA by States Works.

The value of the SLA is £739k per annum.

PRELIMINARY TREATMENT

The new Belle Greve preliminary treatment facility is due for completion around summer 2013. There will be a significant amount of associated operation and maintenance works, particularly to ensure the effectiveness of screening. Currently, the operational cost is estimated to be £80k per annum. Opportunities to combine these activities with ongoing maintenance works at Belle Greve will be investigated in order to reduce costs.

Excerpt from Belle Greve Inlet Works plan

OBJECTIVES

Objective	Timescale	Target
Improve reporting on Serviceability to mirror the regulated water industry in the UK in order to provide hard data for the performance of the Island's wastewater infrastructure	**2012**	**Create a set of KPI's which can be benchmarked with other jurisdictions**
Reduce the number of cesspit tanker loads by 1,000 each year	**Annual**	**Reduce reliance on cesspits and tankers and rationalise emptying points**
Review existing SLA's in order to achieve the highest level of service and value for money	**2012**	**-**
Develop Preliminary Treatment SLA	**2012**	**-**

FINANCIAL FORECAST

Operational Maintenance	2012	2013	2014	2015	2016
Wastewater collection service	2,478k	2,478k	2,478k	2,478k	2,478k
Pumping station maintenance	1,251k	1,251k	1,251k	1,251k	1,251k
Sewers	539k	539k	539k	539k	539k
Surface water outfalls & streams	200k	200k	200k	200k	200k
Management & general	198k	198k	198k	198k	198k
Preliminary treatment SLA			80k	80k	80k
Total	**4,665k**	**4,665k**	**4,745k**	**4,745k**	**4,745k**

CAPITAL MAINTENANCE

WE WILL MAINTAIN STABLE SERVICE FOR OUR SEWERAGE INFRASTRUCTURE BY REPLACING AND REFURBISHING ASSETS IN A PLANNED MANNER DRIVEN FROM AN APPROPRIATE EVIDENCE BASE. WE WILL BE PROACTIVE IN REDUCING AGGRESSIVE DISCHARGES AT SOURCE TO EXTEND THE LIFE OF OUR ASSETS. AS A RESULT OF OUR PLAN, CUSTOMERS WILL SEE NO DETERIORATION IN THE SERVICEABILITY OF OUR ASSETS OR IN THE LEVEL OF SERVICE THEY PROVIDE.

SEWERAGE

Much of the wastewater infrastructure is in a poor state of repair. A continuous scheme of rehabilitation has been ongoing for the last 13 years although the rigorous regime of pipe rehabilitation conducted throughout the UK water industry has not been adopted yet here in Guernsey.

The pictures below show a sewer collapse which was found following an investigation into surcharging of our system. A significant void had been created in the ground surrounding the sewer, which was some 5m deep. It took three days to dig down, repair and reinstate due to the depth at a cost of £16,500. Had we been able to proactively re-line this sewer prior to collapse we would have renovated the whole length of the sewer and could have prevented the collapse by patch lining for under £1,000.

Collapsed sewer

Replaced sewer

Surcharged sewer before rehabilitation

Free-flowing sewer after rehabilitation

As part of the preparation of this plan, we have conducted a CCTV inspection of the inside of all our main sewers and we now have a categorised assessment of their condition. The categorisation followed that set out in the UK Regulated Water Industry Standard - Sewerage Rehabilitation Manual:

1. Acceptable structural condition;
2. Minimal collapse likelihood in short term but potential for further deterioration;
3. Collapse unlikely in near future but further deterioration likely;
4. Collapse likely in foreseeable future;
5. Collapsed or collapse imminent.

Our survey results concluded:

Internal Condition Grade	Length (km)	Percentage (%)
1	89.797	60
2	26.257	17
3	14.611	10
4	15.934	11
5	2.420	2

The table below shows how this compares to a classification of sewer condition across the regulated UK water industry:

Condition of critical sewers in England and Wales (SRM 4th)

Internal Condition Grade	Percentage (%)
1	60
2	17
3	13
4	8
5	2

77% of our sewers are classified as being in satisfactory condition, 10% are in an acceptable condition and 13% need attention. In addition, we have 12.617km of sewer where the combination of Internal Condition Grade (ICG) and Service Grade (the risk of loss of service i.e. flooding) are unacceptable. We also have a further 52km of sewer where the combination of ICG and Service Grade will require further investigation within the next five years.

Broken pipe

Pipe with multiple fractures

The above pictures show an example of a Grade 4 sewer at Mont D'Aval, Castel; a broken pipe and multiple fractures.

This plan focuses upon the remedial works to bring these pipes up to standard condition in which service to our customers can be maintained in a sustainable manner. This will involve rehabilitating 35km of sewer over the period 2012 to 2019. Our sewerage rehabilitation programme will be prioritised based on asset age, condition, deterioration rate and consequence of failure in terms of criticality of location.

Service intrusion in sewer

Large hole in sewer

Far left is an example of a Grade 4 service intrusion in Damouettes Lane, St Peter Port. An intrusion like this causes a high risk of blockage in high flows due to solids debris catching on the poorly constructed lateral connection. The picture near left shows a sewer with a very large hole which is clearly in need of immediate attention.

In order to rehabilitate our entire sewer network over a 100 year period, we would need to repair 1.5km of sewer per year. However, this rate has not been maintained in the past and there is a significant degree of catching up to be done. It is generally preferable in terms of both cost and disruption to use relining techniques to renovate a sewer. This is particularly apparent in Guernsey, where sewers are typically deeper than those in the UK and almost all are in the highway. Repairing or replacing a severely deformed or collapsed sewer even in a planned manner can incur significantly higher costs than relining at an earlier stage of degradation.

Relining operation at Smith Street

Relined egg-shaped brick sewer

The pictures on the left show an example of a re-lining operation in Smith Street, St Peter Port, and a re-lined egg shaped brick sewer.

Emergencies by their very nature typically attract a higher unit cost than planned rehabilitation and cause major disruption and public safety issues.

In particular the costs of providing safe working conditions through the provision of trench support can be very high, particularly where ground conditions are poor. Full rehabilitation between man-holes cannot be undertaken as part of an emergency, this would be undertaken as part of a planned programme with a lower unit cost. For these reasons we have also targeted those sewers with a high frequency of condition Grade 3 defects along its length.

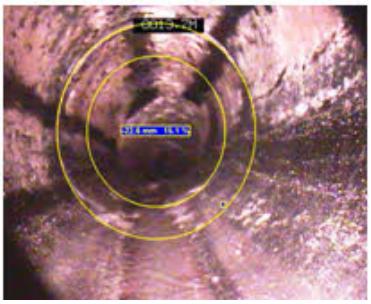
Partial collapse in unlined brick sewer

Partial collapse in unlined brick sewer

There are a number of public sewers which at present cannot be surveyed or assessed due to their position within private land. Therefore the condition of these pipes is unknown and more survey work must be undertaken.

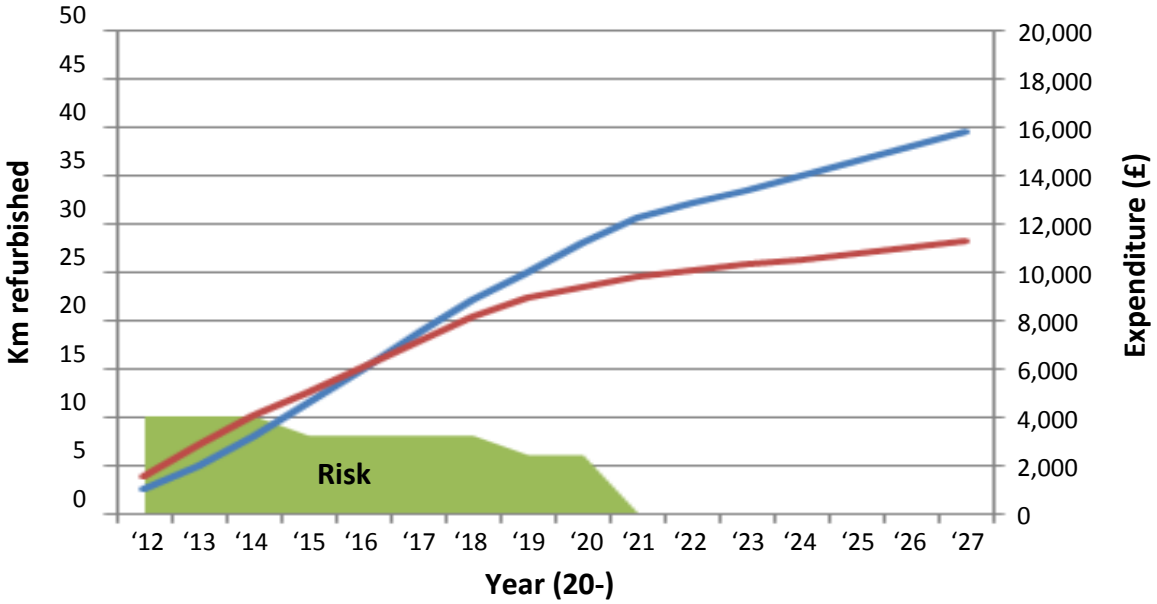
PITCH FIBRE

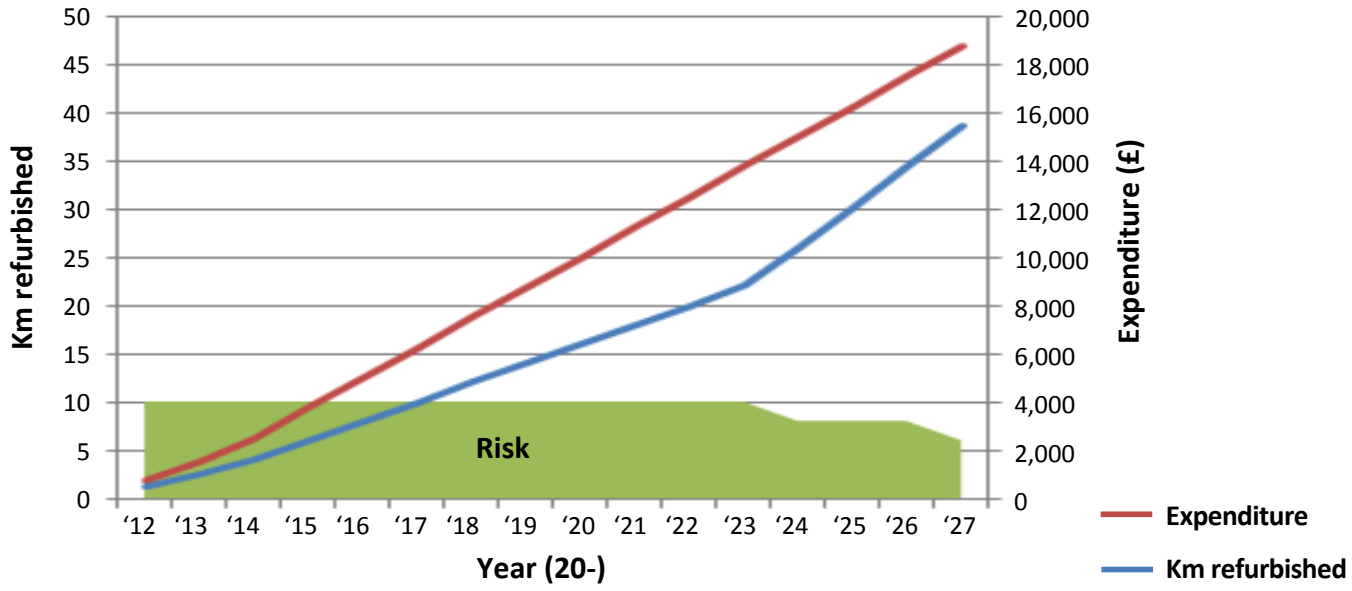
Pitch fibre sewers are particularly problematic as they suffer deformation after a relatively short life (c.40 years). If carried out early enough these sewers can be relined, giving a lesser whole life cost than repairing on failure. The picture on the right shows 20% deformation in one of our pitch fibre sewers. This sewer has since been patch lined before full collapse could occur. We will target all sewers constructed from pitch fibre for renovation. In some locations all of the sewer pipes are made of pitch fibre, for example in Fort George, St Peter Port.



Pitch fibre sewer with slight deformation

With a deteriorating asset base, it is important that sufficient investment is made at an early stage in order to reduce immediate risk of collapse of condition grade 5 sewers and prevent the further deterioration of condition grade 4 sewers. The graphs below show how delaying expenditure further carries with it a longer period of high risk and a higher unit cost of sewer rehabilitation (the first graph represents a 10-year plan of sewer rehabilitation, the second graph shows the effects of delaying expenditure to a 20-year plan).





MANHOLES

We plan to do a similar appraisal programme for our manholes, although this will be targeted on a risk basis for those manholes on strategic sewers and those likely to be in poor condition. We have already carried out rehabilitation on 15 of our manholes, some of which were at risk of imminent collapse. In total there are around 2,500 manholes in the wastewater network.

This manhole in Rue de la Brigade (*pictures below*) had to be rebuilt as an emergency over a bank holiday period and given additional structural support due to the poor condition of the concrete in the supporting slab below the road surface, as it was at imminent risk of collapse. This particular manhole was identified only after a blockage in the sewer was investigated. Until we have carried out a wider survey of our manholes we cannot tell with any degree of certainty how many more manholes are at risk of collapse.

Manhole before rebuilding

Manhole after rebuilding

Clearly this reactive approach to rehabilitation is unacceptable both in terms of public safety and financial cost. When carried out proactively, cost and disruption can be reduced by the design and off-site pre-fabrication of manhole units. These can be constructed using corrosion resistant materials and has been used successfully in Rue de Manoir.

PUMPING STATIONS

A separate condition survey of foul water and surface water pumping stations has also been carried out, and there are a number of rehabilitation projects which have resulted from this. The penstocks at St Sampsons Harbour Pumping Station do not hold back flow. This makes it unsafe to carry out maintenance within the wet well as flow cannot be isolated (*below right*). This is typical of the deteriorating asset condition within our installations. This sort of reactive rehabilitation adds complexity and cost to our capital maintenance programme.

Additionally, we have identified the need for a scheme to increase storage capacity at our Les Landes Pumping Station to alleviate foul flooding experienced by properties in the locality.

Ingress through penstock at SS Harbour pumping station

- Health and Safety

A recent Health and Safety assessment was carried out across our 66 Pumping Stations by our independent Health and Safety consultants against the following criteria:

A. Matters of imminent concern which if not attended to could lead to substantial and imminent risk of injury or ill-health. These items should be dealt with immediately as there is a clear breach of statutory duty; 4 items were raised in this category, they have been addressed.
B. Matters of concern as failure to act may result in significant risk to employees and/or persons who may be affected by your work activities. Action should be effected within a time scale of three to six months. Priority B items are also likely to be in breach of statutory duty; 118 items were raised in this category. Many of these items related to access covers and the risk of fall from height and working over water.
C. Matters requiring attention but which carry no significant risk. Such items should be addressed when budgetary considerations allow but should be no longer than twelve months from when the risk was initially identified; 37 items were raised in this category.

- Screening

A significant amount of time and effort is being spent on unblocking and removing rag (mostly sanitary products) from our pumps. The issue appears to be exacerbated by our “daisy chain” of pumping stations and early “balling” of rag from cesspits. We plan to investigate the installation of screening systems at some of our key pumping stations and emptying points. Clearly screenings management will be an issue, however, the removal of rags before they cause damage is more cost effective than reacting to blockages.

The pictures below show a pump at our St Sampson Harbour Pumping Station being lifted for routine maintenance. Over a tonne of rag was removed from the pump which was consequently operating well below its optimum level. The handling of this increased weight and break out force also poses a safety risk to our operational personnel.

Pump before removal of rags

Pump after removal of rags

EMPTYING POINTS

There are in the region of 5,000 properties that are not presently connected directly into the public sewer network and these have storage tanks, known as cesspits, which are designed to be watertight and which are emptied regularly by road tankers. The sewage is taken by road to locally convenient points on the sewerage system (known as emptying points) where it is discharged.

Unfortunately, hydrogen sulphide given off by septic sewage attacks the concrete pipes in the sewerage network, accelerating deterioration and reducing the life expectancy of the asset. There are 12 of these emptying points on the Island. Our plan is to rationalise these emptying points to a number where we can carry out improvements in order to mitigate the impact on our sewerage system. Such improvements include the installation of grit traps, dip tubes to reduce the pass forward of rag, bauer couplings to improve safety and reduce the time to discharge, and the provision of aeration to facilitate the management of septicity.

Manhole before refurbishment

Manhole after refurbishment

SURVEY WORK

Various products have been used over previous years to reduce septicity at the emptying points and downstream network. However, Hydrogen Sulphide was not monitored so the efficacy of the products is unknown. We plan to install Hydrogen Sulphide monitors across the network on a partial temporary/ permanent location basis to understand the effectiveness of emptying point improvements and to identify areas where our assets are at risk of an increased rate of degradation.

Our central Belle Greve preliminary treatment facility has been shown to receive flows in excess of ten times dry weather flow. An area of focus for us will be on surface water separation and infiltration reduction. In order to understand the effectiveness of our demand management schemes we will carry out scheduled flow monitoring at strategic points in our sewerage system on a regular basis consistent with UK best practice in addition to continuing to install flow monitoring at our pumping stations.

OBJECTIVES

Objective	Timescale	Target
Rehabilitate sewers using relining where suitable in order to improve reliability of wastewater network	**Ongoing**	**2012 - 2.5km 2013 - 2.5km 2014 - 3km 2015 - 3.5km**
Assess condition of manholes and consider refurbishment	**Ongoing**	**100 per year**
Refurbish assessed manholes where necessary	**Ongoing**	**15 per year**
Develop Preliminary Treatment SLA	**2012**	**-**

FINANCIAL FORECAST

Sewerage	2012	2013	2014	2015	2016
Sewer rehabilitation	1,518k	1,290k	1,210k	1,033k	1,033k
Stream culvert maintenance	10k	10k	10k	10k	10k
Rising Main replacement	75k	75k	75k	75k	75k
Manhole replacement	100k	125k	150k	176k	176k
Chamber cover replacement	38k	38k	38k	38k	38k
Emptying point improvements	25k	25k	25k	25k	25k
Adoption of private sewers	10k	10k	10k	10k	10k
Gate valve replacement	9k	9k	9k	9k	9k
Flap valve maintenance	16k	16k	16k	16k	16k
Operational Capital	75k	75k	75k	75k	75k
Total	**1,875k**	**1,672k**	**1,617k**	**1,466k**	**1,466k**

Survey Work	2012	2013	2014	2015	2016
Surface water surveys		150k	150k		
Flow monitoring	10k		10k		10k
CCTV survey	5k	5k	5k	5k	5k
DAP report		10k		10k	
H2S survey	5k	5k	5k	5k	5k
Total	**20k**	**170k**	**170k**	**20k**	**20k**

Pumping Stations	2012	2013	2014	2015	2016
H&S Improvements	150k	150k	150k	150k	150k
Pumping station refurbishment	550k	550k	550k	550k	550k
Electric panels	10k	10k	10k	10k	10k
Critical spares	10k	10k	10k	10k	10k
Level control	8k	8k	8k	8k	8k
Flow meter installation	15k	15k	15k	15k	15k
Adoption of private PS	15k	15k	15k	15k	15k
Operational capital	75k	75k	75k	75k	75k
Total	**833k**	**833k**	**833k**	**833k**	**833k**

DEMAND MANAGEMENT

WE WILL MAXIMISE THE CAPACITY OF OUR FOUL SYSTEM FOR CUSTOMER CONNECTION AND MITIGATE THE IMPACT OF RAINFALL BY SEPARATING SURFACE WATER CONNECTIONS AND REDUCING INFILTRATION. WE WILL EXTEND THE NETWORK TO FACILITATE THE CONNECTION OF PROPERTIES ONTO MAIN SEWER TO REDUCE THE ISLAND'S RELIANCE ON CESSPITS. WE WILL ACTIVELY ENGAGE WITH PLANNERS TO INFLUENCE PLANNING POLICY TO ENCOURAGE NEW DEVELOPMENT TO BE SERVED BY MAIN SEWER.

Historically the wastewater network was developed as an open channel surface water drainage system through the town's streets and then progressed to become a closed pipe system. In addition, this system was modified to accept foul water flows as this was thought to be the main contributing factor to the Cholera outbreak of 1832. This historical combination of flows adds complexity and cost to sewage treatment options that are being considered in addition to introducing hydraulic capacity issues into the sewerage system and consequently increasing the risk of foul flooding.

The separation of these flows has become a priority for the business. During periods of heavy rainfall flows can increase from the dry weather flow of 180 litres per second to more than 2,400 litres per second. Clearly, trying to design any process capable of treating such a wide variation in flow-rate will result in a solution which is costly and carries redundancy. By rehabilitating or replacing ageing sewers, the volume of infiltration will diminish. The continued separation of combined sewers will also improve the situation by reducing 'stormwater' peaks within the sewers which can often result in flooding.

HYDRAULIC MODELLING

In order to effectively manage the sewerage system it is essential to have a computerised hydraulic flow model. These are the industry recognised tools that allow appropriate management of the system and help us make operational decisions. By using an hydraulic model, we will be able to understand which areas of the sewer network are prone to high storm response and therefore where surface water separation will be most effectively targeted. We will also be able to see those areas where negative flow has been recorded through tidal ingress and therefore where to target outfall refurbishment. We also plan to use our hydraulic model as a basis for predicting the impact of rainfall overflow events on bathing water quality. Our existing model will be upgraded to enable us to better understand the performance of our system.

PROMOTION OF SUSTAINABLE DEVELOPMENT

We will actively engage with the Environment Department's Planning section to develop policy to encourage new development to connect to mains sewerage. We will also promote Planning Policy to ensure commercial developers and commercial buildings provide means to facilitate the connection of other properties onto main sewer.

New developments will be encouraged to connect to the main sewer

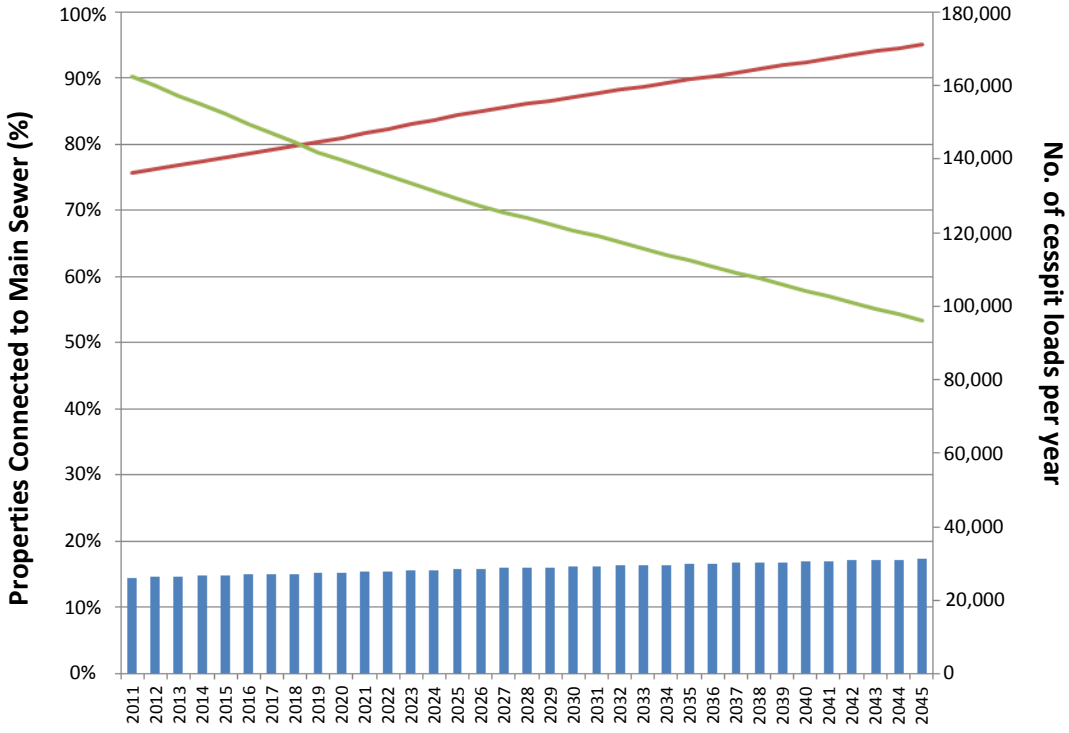
NETWORK EXTENSION PROGRAMME

Our Network Extension Programme aims to connect 95% of the properties on the Island to mains sewerage as stated in the States Resolution of 2000. However, due to restrictions in public sector funding the original target of 2020 will have to be put back to 2079 if the current rate of investment remains the same.

Pumping station at Perelle

It is important to reduce the Island's reliance on cesspit emptying, hence reducing the rate of deterioration (and cost) of the sewerage system and to protect the environment from pollution caused by the degradation of cesspits. Following the introduction of the wastewater charge we have experienced an increase in expectation from our customers that they should be provided with a connection to the sewerage network. Our Network Extension Programme has been prioritised to deliver the best results against these requirements. We plan to deliver the programme by the year 2045.

Network Extensions Phase 1	Cost	Properties	Cesspit loads removed
L'Eree Phase 1	1.2m	66	1,407
St Andrews Phase 1	1.2m	107	974
L'Eree Phase 2	1.0m	69	808
St Andrews Phase 2	1.7m	132	2,526
Kings Mills Phase 1	2.0m	138	2,480
Richmond Phase 2	0.9m	88	878
Rocque Poisson Phase 1	2.55m	179	2,263
Fort Grey Phase 1	1.3m	86	2,257
Fort Grey Phase 2	1.3m	105	4,103
St Saviours Phase 1	1.9m	100	1,867
St Saviours Phase 3	1.2m	146	2,030
L'Islet Phase 10	1.6m	142	1,567



This graph shows how cesspit loads will decrease as the number of properties connected to the main sewer increases.

OBJECTIVES

Objective	Timescale	Target
Extend the wastewater network in order to get as many properties onto the main sewer as possible	**Ongoing**	**144 properties per year**
Reduce no. of cesspit loads through new connections	**Ongoing**	**1,900 loads per year**

FINANCIAL FORECAST

Demand Management	2012	2013	2014	2015	2016
Network Extensions	2,000k	2,000k	2,000k	2,000k	2,000k
Infiltration reduction			125k	125k	125k
Surface water separation	150k	250k	300k	300k	300k
Lateral renovation	125k	125k	125k	125k	125k
Total	**2,275k**	**2,375k**	**2,550k**	**2,550k**	**2,675k**

ENVIRONMENTAL PROTECTION

WE WILL ACT RESPONSIBLY AND SUSTAINABLY IN OUR ROLE OF ENVIRONMENTAL PROTECTION. WE WILL PROACTIVELY SEEK REGULATION OF OUR DISCHARGES TO THE ENVIRONMENT AND WILL ACT WITHIN THE TERMS OF OUR PERMIT TO DO SO. WE WILL ENSURE THAT THE IMPACT OF OUR DISCHARGES ON WATER QUALITY IS UNDERSTOOD AND ANY IMPROVEMENTS REQUIRED WILL BE SUPPORTED BY A FIRM EVIDENCE BASE. WE WILL WORK WITH THE ENVIRONMENTAL REGULATOR TO PROTECT AND IMPROVE OUR BATHING WATERS AND WILL RESPOND WITH THE HIGHEST PRIORITY TO ANY POTENTIAL DETERIORATION IN WATER QUALITY

SEWER OVERFLOWS

We currently have no means by which to record the frequency and duration of storm water discharges from our foul system to bathing waters through Combined Sewer Overflows (CSO). This is unacceptable and the Environmental Regulator will soon require us to monitor and report all discharges from our system into the environment. As such, we plan to install monitoring equipment at all of our CSOs and Emergency Overflows (EOs) and will link these to our SCADA telemetry system. We will monitor this system and react to all events in accordance with our Environmental Permit. This will also enable us to build a better understanding of the performance of our sewerage system and any interaction with bathing water quality and provide evidence for the basis of future capital and operational improvement works. In the longer term we plan to provide information relating to bathing water quality on a predictive basis through use of our hydraulic model.

Weir in CSO discharging foul flow

During routine CCTV survey work Guernsey Water staff found a CSO which they believed to present a risk to bathing water quality. The picture on the left shows the CSO which was found to be constructed so as to allow wastewater to flow underneath a weir into the surface water system.

The level of the gap was such that this would occur before the pipe was running full. Our hydraulic model was used to show that by sealing the gap, the installation could be used as a conventional CSO to spill over the weir during high storm flows without causing an increased risk of foul flooding in the network. This work has been carried out and the installation has been linked to our SCADA system.

Prior to these remedial works raw sewage would have discharged directly onto the bathing beach. There are believed to be eight other CSO's within the sewerage system. These are currently being assessed as to whether they are of appropriate design.

OUTFALL REFURBISHMENT

We will develop a minimum asset standard for our outfalls in line with the regulated UK companies. This will include screening where appropriate and the installation of effective one-way flow control to reduce tidal ingress. Currently none of our outfalls are adequately screened (I.e. non-biodegradable items removed).

WATER QUALITY MODELLING

We believe that a significant number of private cesspits are leaking which is resulting in contamination of streams with the potential to pollute bathing waters. We are working hard to carry out water quality modelling of the stream system in order to understand its sensitivity to uncontrolled point source pollution, diffuse pollution and the impact from our own intermittent discharges. The findings of this modelling will drive future environmental protection schemes. Our Network Extension Programme will be targeted at those areas where water quality is sensitive to, or is being adversely affected by pollution from leaking cesspits. We will continue to take firm action against those who put water quality at risk through their actions.

OBJECTIVES

Objective	Timescale	Target
Ensure all CSO's are monitored for spills	**2014**	**-**
Improve the existing hydraulic model	**2012**	**-**

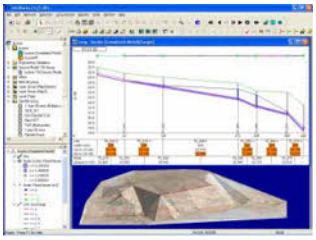
FINANCIAL FORECAST

Environmental Protection	2012	2013	2014	2015	2016
CSO's and EO's					
Installation of monitoring	20k	20k	20k		
Outfall refurbishment	125k	125k	125k	125k	125k
Water Quality modelling		75k	25k	10k	10k
Operational Capital	30k	30k	30k	30k	30k
Cobo - security of Bathing Water Quality	250k	250k			
Total	**425k**	**500k**	**200k**	**165k**	**90k**

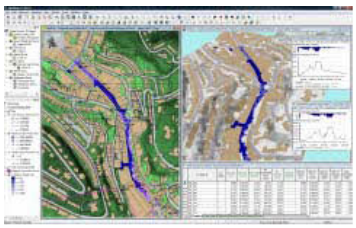
LEVELS OF SERVICE

WE WILL INVESTIGATE ALL ISSUES RELATED TO ODOUR EMANATING FROM OUR SYSTEM AND FLOODING DUE TO BLOCKAGE OR HYDRAULIC INCAPACITY OF OUR SYSTEM. WE WILL RECORD AND GEO-CODE ALL COMPLAINTS SUCH THAT AREAS OF INADEQUACY CAN BE ADDRESSED STRATEGICALLY IF THEY CANNOT BE RESOLVED COST-EFFECTIVELY AT A LOCAL LEVEL. WE WILL PROGRAMME OUR PLANNED WORKS TO REDUCE THE CUSTOMER IMPACT OF OUR ACTIVITIES AND AIM TO MITIGATE THE CUSTOMER IMPACT OF REACTIVE WORK WHERE PRACTICAL.

We will further utilise specialist computer software such as InfoNet to manage the geo-coding of data in combination with our InfoWorks hydraulic model. All of our CCTV data will be recorded onto InfoNet and this will drive our capital maintenance programme as well as our operational response to customer complaints. We will use this data to update the Digimap system on a regular basis in order to ensure other companies and utilities have access to our asset location data.



Infoworks screenshot



Infoworks screenshot

We will use our hydraulic model in combination with rainfall recording and analysis to determine the level of protection which our sewers give during storm events. The UK standard for protection from sewer flooding is for that intensity and duration of rainfall experienced in a one in twenty year statistical return period event. We have no record of whether parts of our sewerage system have fallen below this standard. We will assess the return period of any rainfall event which causes surcharge of our system.

OBJECTIVES

Objective	Timescale	Target
Manage all CCTV data through InfoNet	**2013**	**-**
Geocode all operational issues in order to find trends and patterns	**2012**	**-**

FINANCIAL FORECAST

Levels of Service	2012	2013	2014	2015	2016
Flooding	15k	15k	15k	15k	15k
Odour mitigation	10k	10k	10k	10k	10k
West Coast Storage				500k	1,500k
TOTAL	25k	25k	25k	525k	1,525k

MANAGEMENT & GENERAL

PEOPLE ARE OUR MOST IMPORTANT ASSET. STAFF AT ALL LEVELS ARE ENCOURAGED TO PARTICIPATE IN BUSINESS IMPROVEMENT INITIATIVES. GUERNSEY WATER PLACES AN EMPHASIS ON EFFICIENCY, STRONG FINANCIAL PERFORMANCE AND GOOD PEOPLE MANAGEMENT.

RESOURCING

We will focus on strengthening our core competences, while engaging with other organisations to bring in specialist expertise as and when required. We will build long term relationships with our term contractors and provide long term visibility of our work programmes in order to even out peaks and troughs in workload. Where appropriate, we will give our term contractors long term targets such that they can plan their workload more efficiently and look for synergies with other Island projects.

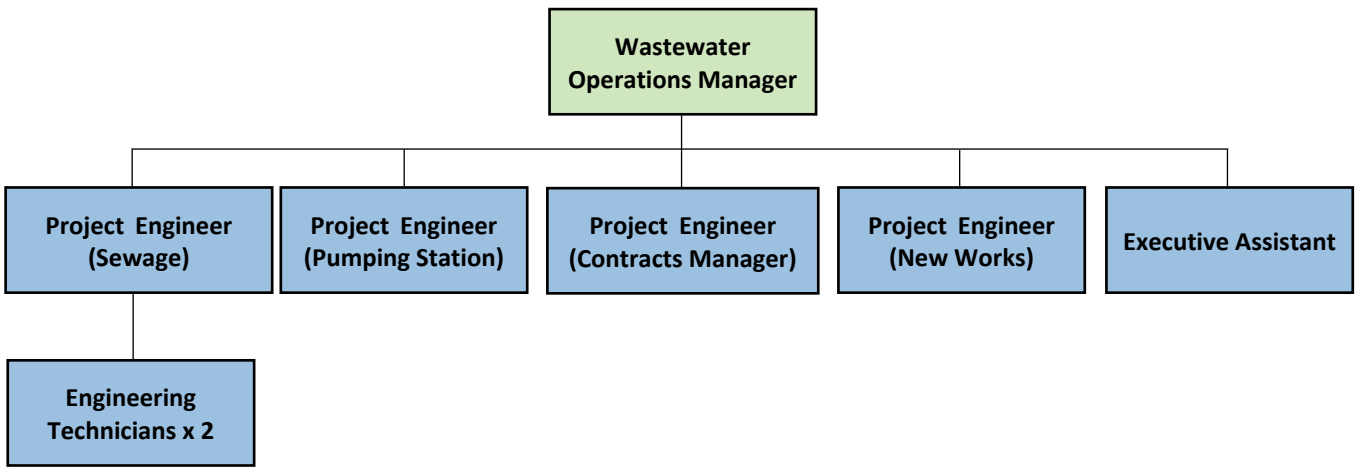
We have identified the following areas where we must retain in-house expertise:

- Wastewater Operations
- Work management (job raising, recording, tracking)
- Operational health and safety
- Reactive response
- Operational survey work (CCTV, GPS, H2S)
- Operational Capital Delivery
- Capital works commissioning
- Asset Management
- Capital Programme Development
- Capital Programme Management
- Contract Management (i.e. SLAs)
- Capital Delivery (design, supervision)
- Data Analysis (InfoNet, InfoWorks, SCADA)
- System Optimisation

Support from other parts of the GW team:

- Scientific (water quality compliance)
- Health & Safety management
- Asset data management
- Alarm management (control room)
- Finance
- Administrative support
- Stores
- Procurement

We currently have the following staff structure to support our activities:



TERM CONTRACTS

We will manage the delivery of other elements of our Business Plan through partnerships with term contracts:

Capital Maintenance

We plan to continue with our current term contract for capital works (contracted to GeoTrant). This is currently for construction only.

Sewer and Manhole Rehabilitation

We plan to investigate using our term contractors to provide design and construct services for our sewer rehabilitation programme and pumping station capital maintenance. We plan to use our CCTV survey equipment to audit contract delivery, as happens with our SLA Operational Management contract.

Operational Maintenance

We will continue to contract out our operational maintenance through long term SLA's. These will be tendered so as to ensure continued value for money as appropriate.

Hydraulic Modelling

We plan to use a specialist wastewater hydraulic modelling consultant to provide ongoing modelling support and model maintenance and improvement work. It would be inefficient for Guernsey Wastewater to develop staff in this area due to insufficient workload to justify the cost.

OBJECTIVES

Objective	Timescale	Target
Incorporate an extra three posts into the wastewater function	**2012**	**-**
Investigate using term contractors to provide design and constuct services for sewer rehabilitation programme	**Ongoing**	**-**

FINANCIAL FORECAST

Management & General	2012	2013	2014	2015	2016
Vehicles	6k		6k		
CCTV equipment	23k	13k	28k	51k	13k
SCADA upgrade	100k	50k	50k	50k	50k
Health and safety	10k	10k	10k	10k	10k
Migrate systems to Navision	50k				
General equipment	10k	10k	10k	10k	10k
Plant and equipment	15k	15k	15k	15k	15k
Building maintenance	50k	50k	50k	50k	50k
Total	**264k**	**148k**	**169k**	**186k**	**148k**

BELLE GREVE/SEWAGE TREATMENT

Aerial view of Belle Greve site

This was the final phase of a policy of centralisation of the network to Belle Greve in preparation for sewage treatment. Belle Greve headworks pumping station has recently undergone a complete upgrade with new pumps and pipework being installed.

Further work is currently being planned to replace the inlet works, which have become obsolete, with a new facility that removes grit and rotating fine screens to remove non-biodegradable debris from the flow. This work, together with the provision of "storm flow" retention, provides the essential first stage of any further sewage treatment.

The existing long sea outfall pipe is known to be in very poor condition and its replacement is currently being studied together with the option of improving the Red Lion short sea outfall. PSD has been instructed to bring a report to the States by early 2012 indicating how the Island's sewage should be treated and a study will then follow to find a suitable site.

At the Belle Greve site all flows will be screened so as to remove any material greater than 6mm in two dimensions and grit will also be removed. Once treated, wastewater will be pumped through a long-sea outfall pipe into an area of high natural dispersion in the Russell where ultraviolet sunlight and wave action will continue the treatment process.

Water quality in the Little Russell will be carefully monitored so as to satisfy the Environmental Regulator that the prescribed level of treatment is being achieved. If tests confirm that further wastewater treatment is necessary then this will require additional funding and this will be identified in a later Business Plan.

Flows at Belle Greve vary considerably more than most wastewater systems. Volumes of wastewater have been measured which are ten times greater than the normal dry weather flow (DWF). In the UK typically maximum flow-rates rarely exceed six times the DWF. As it would be inefficient to build treatment processes to cope with such high peak flows there will be stormwater tanks that enable short-term temporary storage capacity. Normally wastewater treatment plants are designed to cope with peak flow rates up to three times the DWF.

The Belle Greve site is close to domestic housing and is too small for further sewage treatment processes. If wastewater treatment beyond that of preliminary treatment is required then an additional site will need to be found, ideally co-located with, or certainly close to, the solid waste treatment facility on the Island.

FUNDING AND REGULATION

All funding for the sewerage system maintenance and extension has until now come from general States revenue being granted on an annual basis. The sewerage system of pipes and pumping stations have an asset replacement cost estimated to be in the region of £300million at today's prices. The management of important infrastructure requires careful and steady asset maintenance to ensure its serviceability to the community.

In 2000 a 20-year plan was produced which set out to increase the proportion of Islanders connected to the main sewer to 95%. The cost of the network extension plan was originally put at £3million per annum but funding has been dramatically reduced to just £1million per annum, meaning that the goal of achieving 95% connection by 2020 will not be achieved. The remaining 5% are more distant from the public sewers and could not, on their own, justify the connection costs.

The States of Guernsey introduced a new wastewater charge in 2011 that will go some way to reducing the draw from general revenue. However, it will take many years before this charge has increased sufficiently to cover the whole of the wastewater business. In order to bring about a more orderly development of the foul water and surface networks, this Business Plan has been developed to cover an 8-year programme of work.

The States of Guernsey agreed in principle to the introduction of a wastewater charge to cover a significant proportion of the operational costs of the sewerage network back in October 2007. Subsequent reports to the Assembly by the Public Services Department (PSD) outlined how the charge would be made up (the charge was approved in January 2009).

It was decided that the charge would average approximately £150 per household, comprising:

- a standing charge of £30 per annum
- additional charges relating to wastewater discharged (metered customers) or the TRP of the property (unmetered customers)

In addition, a fixed fee of £50 per household/business was levied in respect of sewage treatment investigation works for a four-year period. For properties which are not yet connected to the main sewer and utilise a cesspit, the collection charge would be reduced by half.

The introduction of the charge has the benefit of a consistent income stream for wastewater and therefore reduces the reliance on the States' central revenue (from taxes). It also allows Guernsey Water to make efficiencies through long term planning and early identification of synergies. However, the amount of income raised initially will be well below what is required for covering the operational costs of the wastewater network, let alone extending it.

Guernsey Water will also need to consider the future of the charge, which might be in the form of annual increases until all expenditure is covered.

Whilst the wastewater charges could rise to cover the required operating costs, capital funding remains a key issue as the present level of investment in routine asset renovation and replacement is insufficient to maintain the present system of pipes and pumps to a satisfactory standard. If this were to be allowed to continue then the increased degradation would lead to unsatisfactory system performance and environmental damage.

It is the intention that the whole of the Wastewater function will be managed and monitored in a similar way to that of the UK. While the Guernsey Water and Wastewater legislation does not mirror that of the UK it is our stated intention that we should use the UK Water Industry performance criteria as a yardstick. Once governance issues have been resolved then it will be appropriate to revise all of the water legislation.

States' revenue is not a guaranteed source of income for wastewater, and there is always the risk that other Departments or projects will be considered a higher priority than wastewater for funding. The ultimate objective for wastewater would be to become self-sufficient. The future corporate governance of Guernsey Water will play a big part in how operations can be funded.

APPENDIX A - EXPENDITURE

TOTAL EXPENDITURE

	2012	2013	2014	2015	2016	2017	2018	2019
Operational Maintenance	4,665k	4,665k	4,745k	4,745k	4,745k	4,745k	4,745k	4,745k
Capital Maintenance	2,727k	2,675k	2,620k	2,319k	2,319k	2,310k	2,360k	2,417k
Sewerage	1,895k	1,842k	1,787k	1,486k	1,486k	1,477k	1,527k	1,584k
Pumping Stations	833k	833k	833k	833k	833k	833k	833k	833k
Demand Management	2,275k	2,375k	2,550k	2,550k	2,675k	2,675k	2,675k	2,675k
Levels of Service	25k	25k	25k	525k	1,525k	1,025k	25k	25k
Environmental Protection	425k	500k	200k	165k	90k	90k	90k	90k
Management and General	264k	148k	169k	186k	148k	198k	154k	168k
TOTAL	**10,381k**	**10,388k**	**10,309k**	**10,490k**	**11,502k**	**11,043k**	**10,049k**	**10,120k**

OPERATIONAL MAINTENANCE

	2012	2013	2014	2015	2016	2017	2018	2019
Wastewater collection service	2,478k	2,478k	2,478k	2,478k	2,478k	2,478k	2,478k	2,478k
Pumping station maintenance	1,251k	1,251k	1,251k	1,251k	1,251k	1,251k	1,251k	1,251k
Sewers	539k	539k	539k	539k	539k	539k	539k	539k
Surface water outfalls/streams	200k	200k	200k	200k	200k	200k	200k	200k
Management and general	198k	198k	198k	198k	198k	198k	198k	198k
Preliminary treatment SLA			80k	80k	80k	80k	80k	80k
TOTAL	4,665k	4,665k	4,745k	4,745k	4,745k	4,745k	4,745k	4,745k

CAPITAL MAINTENANCE

Sewerage	2012	2013	2014	2015	2016	2017	2018	2019
Sewer rehabilitation	1,518k	1,290k	1,210km	1,033k	1,033k	1,033k	1,033k	760k
Stream culvert maintenance	10k	10k	10k	10k	10k	10k	10k	10k
Rising main replacement	75k	75k	75k	75k	75k	75k	75k	75k
Manhole replacement	100k	125k	150k	176k	176k	176k	176k	176k
Chamber cover replacement	38k	38k	38k	38k	38k	38k	38k	38k
Emptying point improvements	25k	25k	25k	25k	25k	25k	25k	25k
Adoption of private sewers	10k	10k	10k	10k	10k	10k	10k	10k
Gate valve replacement	9k	9k	9k	9k	9k			
Flap valve maintenance	16k	16k	16k	16k	16k	16k	16k	16k
Operational capital	75k	75k	75k	75k	75k	75k	75k	75k
TOTAL	1,875k	1,672k	1,617k	1,466k	1,466k	1,457k	1,457k	1,184k

All figures above are based on a Price Time Base of January 2012

CAPITAL MAINTENANCE (cont...)

Survey Work	2012	2013	2014	2015	2016	2017	2018	2019
Surface water surveys		150k	150k					
Flow monitoring	10k		10k		10k		10k	
CCTV survey	5k	5k	5k	5k	5k	5k	5k	200k
DAP report		10k		10k		10k	50k	150k
H2S survey	5k	5k	5k	5k	5k	5k	5k	50k
TOTAL	20k	170k	170k	20k	20k	20k	70k	400k

Pumping Stations	2012	2013	2014	2015	2016	2017	2018	2019
PS refurbishment	550k	550k	550k	550k	550k	550k	550k	550k
H&S improvements	150k	150k	150k	150k	150k	150k	150k	150k
Electrical panels	10k	10k	10k	10k	10k	10k	10k	10k
Critical spares	10k	10k	10k	10k	10k	10k	10k	10k
Level control	8k	8k	8k	8k	8k	8k	8k	8k
Flow meter installation	15k	15k	15k	15k	15k	15k	15k	15k
Adoption of private stations	15k	15k	15k	15k	15k	15k	15k	15k
Operational capital	75k	75k	75k	75k	75k	75k	75k	75k
TOTAL	833k	833k	833k	833k	833k	833k	833k	833k

DEMAND MANAGEMENT

	2012	2013	2014	2015	2016	2017	2018	2019
Network extensions	2,000k	2,000k	2,000k	2,000k	2,000k	2,000k	2,000k	2,000k
Infiltration reduction			125k	125k	125k	125k	125k	125k
Surface water separation	150k	250k	300k	300k	300k	300k	300k	300k
Lateral renovation	125k	125k	125k	125k	250k	250k	250k	250k
TOTAL	2,275k	2,375k	2,550k	2,550k	2,675k	2,675k	2,675k	2,675k

ENVIRONMENTAL PROTECTION

	2012	2013	2014	2015	2016	2017	2018	2019
CSO's and EO's								
Installation of monitoring	20k	20k	20k					
Outfall refurbishment	125k	125k	125k	125k	50k	50k	50k	50k
Water Quality modelling		75k	25k	10k	10k	10k	10k	10k
Operational Capital	30k	30k	30k	30k	30k	30k	30k	30k
Cobo - security of Bathing Water Quality	250k	250k						
Total	425k	500k	200k	165k	90k	90k	90k	90k

All figures above are based on a Price Time Base of January 2012

LEVELS OF SERVICE

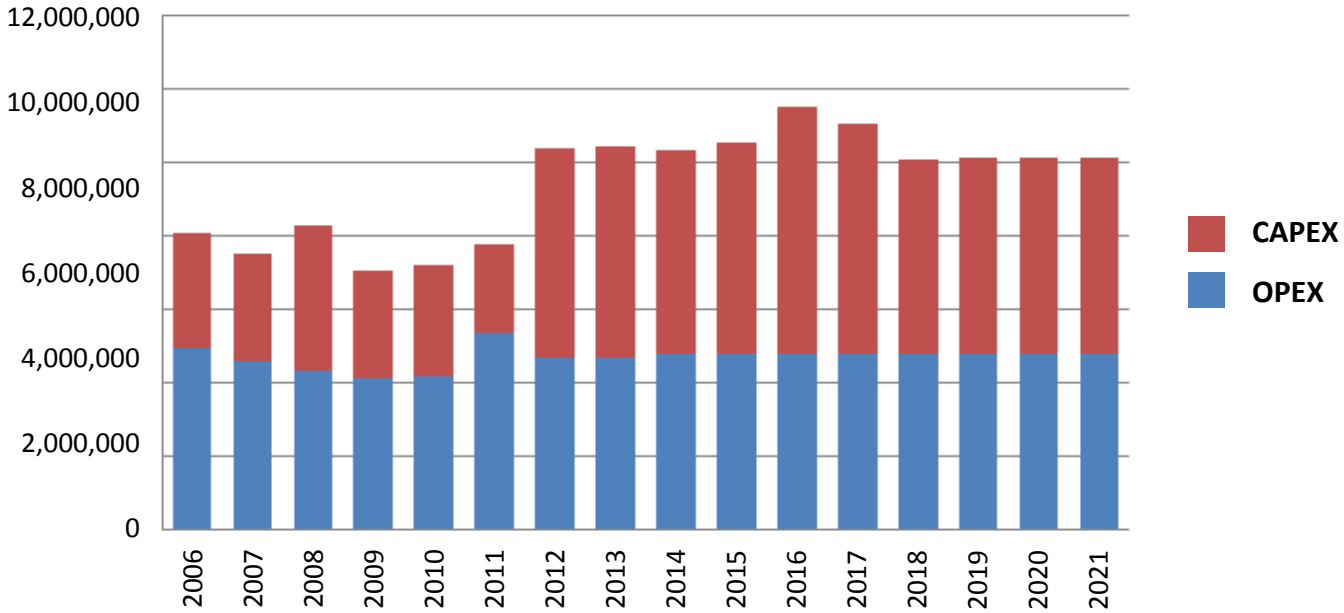
	2012	2013	2014	2015	2016	2017	2018	2019
Flooding	15k	15k	15k	15k	15k	15k	15k	15k
Odour mitigation	10k	10k	10k	10k	10k	10k	10k	10k
West Coast Storage				500k	1,500k	1,000k		
TOTAL	25k	25k	25k	525k	1,525k	1,025k	25k	25k

MANAGEMENT AND GENERAL

	2012	2013	2014	2015	2016	2017	2018	2019
Vehicles	6k		6k				6k	
CCTV equipment	23k	13k	28k	51k	13k	63k	13k	33k
SCADA upgrade	100k	50k	50k	50k	50k	50k	50k	50k
Health and safety	10k	10k	10k	10k	10k	10k	10k	10k
Migrate systems to Navision	50k							
General equipment	10k	10k	10k	10k	10k	10k	10k	10k
Plant and equipment	15k	15k	15k	15k	15k	15k	15k	15k
Building maintenance	50k	50k	50k	50k	50k	50k	50k	50k
TOTAL	264k	148k	169k	186k	148k	198k	154k	168k

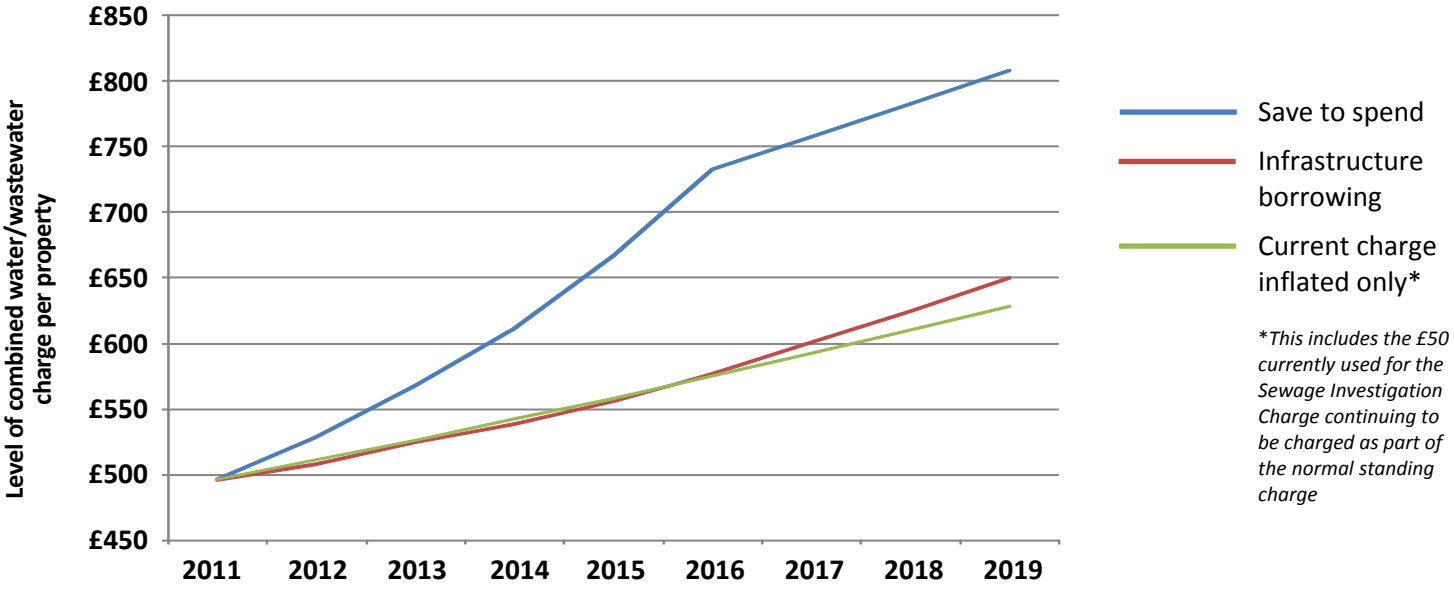
All figures above are based on a Price Time Base of January 2012

APPENDIX B - EXPENDITURE PROFILE



Above figures are based on a Price Time Base of January 2012

APPENDIX C - INCOME/CHARGES



The "Save to Spend" line indicates the level of average combined water and wastewater charges required to move the business to a self-financing position after five years during which period General Revenue provides £8m worth of subsidy.

The "Current Charge Inflated Only" line indicates the level the charges would reach by 2019 if simply inflated by an RPIX figure of 3%. The level of charge will still leave a £48m shortfall in funding required.

The "Infrastructure Borrowing" line indicates the level charges would reach if a sensible level of borrowing were permitted. The business would be self-financing from 2012 onwards. **This is the recommended course of action by the GW management team.**

APPENDIX D - GLOSSARY

CCTV (Closed Circuit Television) - camera system used for studying the inside of sewers in the wastewater network.

Cesspit – a watertight tank which collects wastewater from households which is then removed via a sewage tanker.

CSO (Combined Sewer Overflow) - a system whereby stormwater (foul water and rainwater) is automatically discharged to sea without treatment due to excessive flows, in order to prevent flooding.

Digimap – corporate data mapping system shared with other companies and utilities.

EO (Emergency Overflow) - a system whereby wastewater is discharged into the sea without treatment due to an emergency situation e.g. a power outage, major system failure etc.

Geocode – a means by which a location and event can be shown geographically on a map.

GPS (Global Positioning System) - A system that allows accurate mapping of assets through a satellite.

H2S (Hydrogen Sulphide) - A gas created by septic sewage within sewers which can cause damage to the lining of the sewer.

Infiltration – ground water which enters the sewerage system through cracks and joints in the pipes.

InfoNet – computer software application which stores information graphically and stores and analyses CCTV data from the inside of sewer pipes.

InfoWorks/Hydraulic model – computer software application for running a computerised hydraulic model to represent flows in the sewerage system and predict response to varying scenarios.

KPI (Key Performance Indicators) - a set of easily measurable targets which are used to assess the success of a company or service.

Rag – commonly used name to define sanitary products which can cause blockages in pumps and sewers.

SCADA (Supervisory Control and Data Acquisition) – computer system by which the performance of assets can be monitored and alarms generated to warn of plant failure.

Screen – a mechanically raked mesh which removes non-biodegradable matter such as ear buds and sanitary products from wastewater.

SLA (Service Level Agreement) - a contracted agreement which lays out in detail how a service will be delivered from one organisation to another.

Stormwater – a combination of wastewater and surface water, typically found in combined sewerage systems.

Supply Chain – suppliers of goods and services to Guernsey Water. This includes materials, labour, design consultancy and construction.

Surface Water – rain water which enters the sewerage system through direct connections.

Wastewater – water which contains foul effluent from toilets, sinks, baths and showers.