NORFOLK ISLAND
Regional Council

Norfolk Island Regional Council

Wastewater Management Strategy

Revision 4.2

Document Control

Client	**Norfolk Island Regional Council**
Document Name	**Wastewater Management Strategy**
Client Number	2003
File Location	https://norfolkisland.sharepoint.com/sites/WasteEnviro/Shared Documents/WasteWater/WMS for council/241201_NIRC_WMS_Final Draft_V4.1_TB_1_a.docx

Document Status

Revision No.	Date	Description	Author	Reviewer
0.12	*24/6/24*	*Review Draft*	JMN	AT/TP
1.0	*13/8/24*	*Final Draft*	JMN	AT
1.1	*4/9/24*	*Final Draft – minor amendment*	JMN	Stakeholders
2.0	*21/10/24*	*Final inc. Stakeholder Feedback*	JMN	TP, DD, PR and JD
3.0	*14/11/24*	*Final NIRC Review*	JMN	TP
4.0	*19/11/24*	*Final – Minor Amend.*	JMN	TP
4.1	*1/12/24*	*Final – Comm. Comments*	JMN	
4.2	*28/5/2025*	*Final – public exhibition comments adopted 3 June 2025 Council Resolution 2025/78*	JMN	TP, TB

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PART 1 – BACKGROUND REPORT

1.0 Executive Summary

1.1 *Purpose*

The Norfolk Island Regional Council (NIRC), as part of its strategic planning responsibilities, has initiated the development of a Wastewater Management Strategy (WMS). This strategy aims to consolidate information on the current operation of wastewater treatment on Norfolk Island and establish a framework for future improvements. To support this goal, the WMS – Background Report investigates key aspects of wastewater management implementation and operation, including:

- Wastewater System Types
- Performance and Operational Issues and Risks
- Asset Management Requirements
- Financial Considerations
- Legislative, Regulatory and compliance issues

From this assessment NIRC will seek to develop an agreed Wastewater Management Strategy - Action Plan that addresses the findings of the WMS – Background Report.

1.2 *Context*

Norfolk Island like all communities seeks to protect the health of its communities and environment by the implementation of appropriate treatment of wastewater. Currently this is performed by either:

- Onsite Wastewater Management Systems (OWMS) from a variety of technologies; or
- Conventional Sewerage Network and Treatment known as the Water Assurance Scheme (WAS)

The background report seeks to explore the current performance of both of these solutions to meet the current standards and expectations of the community.

1.3 *Findings*

The assessment has found significant issues that will need to be addressed by policy, regulation, capital investment and improved funding for ongoing operations and maintenance of the systems. Key findings include:

1. Underperforming infrastructure or system failures to treat waste to the desired standard for the:
    a. WAS (e.g. failed processes in the sewage treatment plant);
    b. OWMS – (e.g. leaking tanks and trench failures)
2. Environmental impacts from poorly performing OWMS effluent discharges which contributes to other contamination in the watercourses and groundwater, particularly in the sensitive Emily and Slaughter Bay catchments.
3. Many OWMS are within prescribed buffer distances to ground water bores and watercourses set out in the Development Control Plan No.2, compounding the issue of impact on the environment and human health.

4. Significant maintenance and renewal shortfalls issues in both the OMWS and WAS infrastructure.
5. Duplication and complexity in the legislation and regulation of both the OWMS and WAS.
6. Lost revenue due to existing connections to the WAS that were not registered to pay utility charges.
7. Asset management investigations revealing a significant shortfall in the necessary capital and operational funding to ensure the network meets contemporary standards.
8. Key shortcomings in necessary evidence to support appropriate asset management, governance and financial management.

These finding are supported by The CSIRO Norfolk Island Water Quality Assessment (2024) which provides the most authoritative and up-to date analysis of the water quality issues facing Norfolk Island.

1.4 *Solutions*

In the documentation of these issues **WMS Part 1 - Background Review** has sought to also capture some proposed courses of action that could be implemented to address the findings. These suggested solutions have been documented for consideration in the **WMS Part 2 - Action Plan.**

The Action Plan will aim to address the majority of these issues by developing additional policies and programs within the existing strategic planning framework. This approach will help ensure that wastewater management on the island is guided by a bespoke strategy tailored to its unique environmental, infrastructure, and community needs.

The delivery of the Actions can be supported by:

The Norfolk Island Planning Scheme
The Asset Management Plan and Policies
Annual Plan
Operational Plan
Delivery Plan
Long Term Financial Plan
Revenue Policy including Fees Charges
Regulatory Policies and Procedures

1.5 *Other Actions*

While the current legislative framework provides a foundation for managing wastewater on Norfolk Island, two key challenges complicate its effective implementation:

1. The regulation of wastewater and environmental protection is currently subject to a complex and sometimes inconsistent legislative framework.
2. Investment in infrastructure is essential to:
   a. Bring existing wastewater systems in line with contemporary requirements; and
   b. Broaden service coverage to support environmental goals and sustainable asset management.

To enable effective and lasting improvements, coordinated support is required in two priority areas. The framework for such support should be bespoke, tailored specifically to Norfolk Island's unique environmental conditions, community needs, and governance context. This

approach may ultimately be determined by the newly established Norfolk Island Assembly, as part of its broader responsibility for shaping the island's future governance and infrastructure priorities.

Legislative Reform

The new governing body will be responsible for driving reform. Changes will need to be comprehensive, ensuring that all previous amendments, are consolidated into a coherent, stand-alone legislative framework.

This is critical to the efficient and effective management of wastewater.

Funding Support

The identification of issues and development of potential solutions for wastewater management on Norfolk Island are capital intensive, requiring both significant upfront investment and sustained funding support to achieve compliance with modern standards.

To implement these improvements, new funding mechanisms and revisions to existing funding agreements will be essential.

This could include the development of a targeted subsidy scheme to assist households and property owners with the cost of upgrading On-site Wastewater Systems (OMWS), as well as support for community-owned infrastructure.

2.0 The Wastewater Management Strategy

2.1 *Strategy Purpose*

The Wastewater Management Strategy (**WMS**) seeks to identify the key objectives of Norfolk Island Regional Council (**NIRC**) with respect to managing the wastewater on the island. The WMS seek to assess the performance of the current systems against the objectives and set out a course of action to resolve identified issues.

The key outcome of the strategy is to develop and articulate a compelling agreed vision for Island's wastewater management and drive the necessary changes to achieve the vision. The WMS - Background Report seeks to inform all stakeholders of the current status of wastewater management on the island, with the WMS Action Plan determining how the agreed future vision can be achieved.

2.2 *Context*

Norfolk Island comprises a range of urban and rural land uses which includes a central core of urban uses in Burnt Pine and environs. This core is then encircled by semi-rural and rural and conservation lands. **Figure 1** provides an overview of the Land Use Types which can be found on Norfolk Island and where the demand for wastewater service varies from urban uses (higher density residential, retail commercial, and industrial) to rural residential forms.

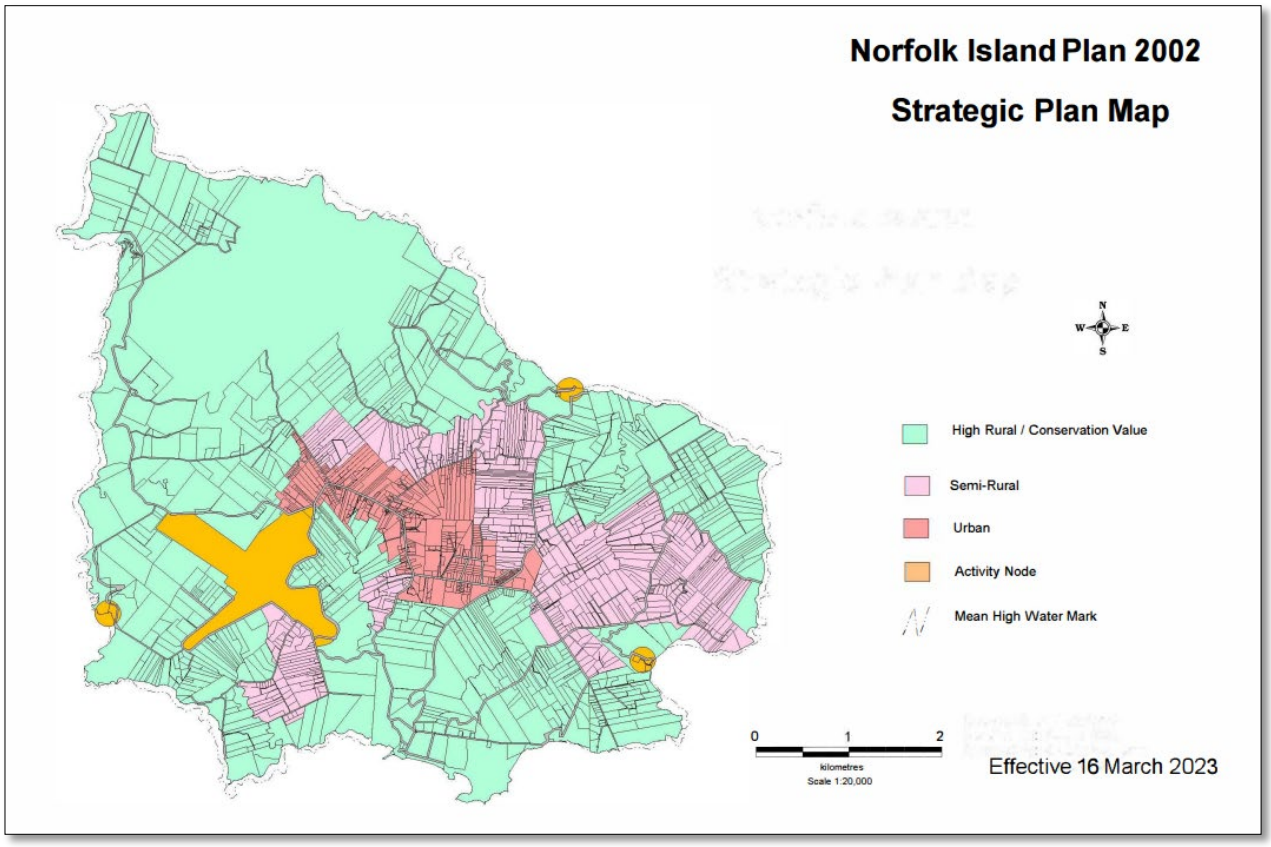

Figure 1 Norfolk Island Strategic Plan Map (2023)

2.3 *Strategy Objectives*

To achieve the purpose of the WMS, a number of key objectives have been determined to guide the assessment and actions to ensure the objectives are met. These objectives are focused on:

1. Maintaining Public Health
    a. the public health of residents is maintained through a sanitary sewerage system that collects and treats wastewater to recognised national standards, policies and codes.
2. Reducing Environmental Harm
    a. *Environmental harm from inadvertent effluent discharges is minimised through effective management*.
    b. consistent and *practical & tailored* advice on the operation and maintenance of each of the wastewater systems is provided to property owners. This gap will be addressed through the distribution of clear information sheets, regular supplier visits, and community training sessions designed to build capacity and understanding.
3. Supporting Economic Growth
    a. clarity is provided to property owners as to the options and obligations to connect to:
        i. the water assurance scheme (**WAS**) within the water assurance area; or
        ii. on-site wastewater management systems (**OWMS**)
    b. the island's main industry of tourism can be supported without adverse impact on the environment.
4. Improved Asset Management
    a. detailed information on the WAS is captured within Council's systems to provide an evidence-based approach to the management of the asset base.
    b. Council Staff at all levels are trained in understanding asset management principles and practical approaches to ensure optimal performance and elimination of risk.
5. Financial Sustainability
    a. appropriate fees and charges management (price/tariff setting, application validation of user base, reconciliation, inspections/compliance) are set.
    b. the asset management framework provides the evidence to provide funding support to deliver both capital works and operational activities ensuring continuity of service.
6. Maintaining Appropriate Governance
    a. a set of planning, design and construction standards for each system are developed.
    b. licensing and related compliance requirements are met and reported on regularly.

3.0 Overview Wastewater Management on Norfolk Island

The management of wastewater from urban (residential, mixed use, business and industrial), rural and rural residential development on the island is addressed either by:

- **A Conventional Sewerage Network** of pipes, pumps and a treatment plant to service the main urban area and township area of Burnt Pine and environs. This sewerage network is known as the Water Assurance Scheme (WAS); or alternatively
- **On-site Waste Management Systems** (**OWMS**) including:
  - holding tanks and pump outs,
  - traditional septic systems with transpiration trenches,
  - greywater/sullage with irrigation and soaker disposal, and
  - advanced wastewater treatment systems (AWTS) with chlorine disinfection and designated irrigation disposal areas.

These OWMS are mainly found outside the WAS and typically service dwellings in rural and rural residential settings.

An initial audit has been undertaken of the island to determine the occupied properties and the nature of wastewater management. The initial results are set out in **Figure 2** which depicts breakdown of the number of properties serviced by either the WAS or OWMS:

- WAS Service Area – Gazetted and Connected Properties
- WAS Service Area – Potential Connections (Currently serviced by OWMS but capable of connection to the existing WAS sewerage network)
- OWMS Service Area

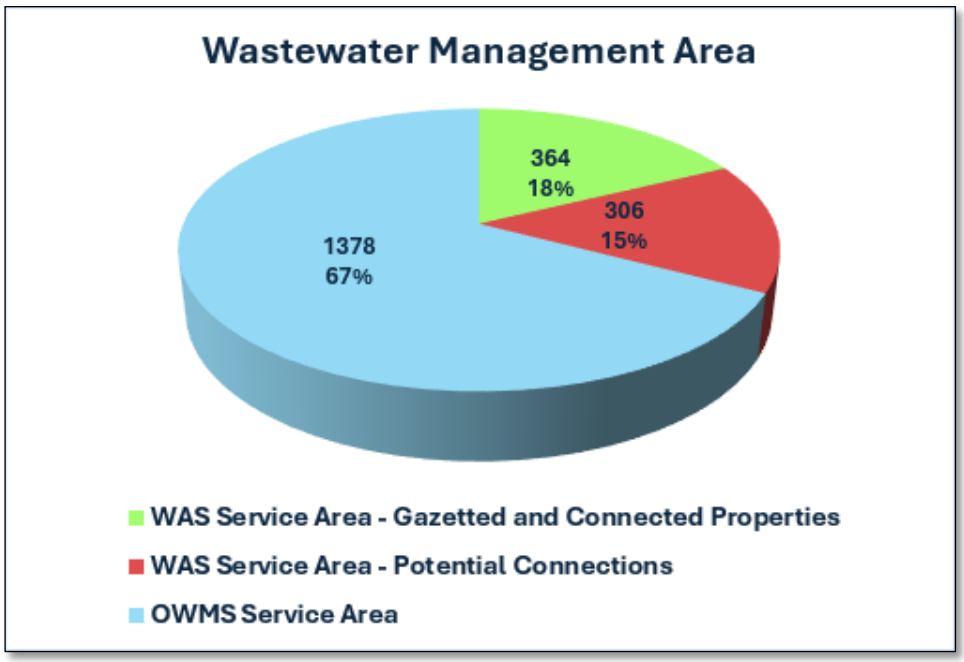

Figure 2 - Breakdown of Properties Serviced by WAS or OWMS

These areas are mapped in **Figure 3** – Wastewater Management Areas.

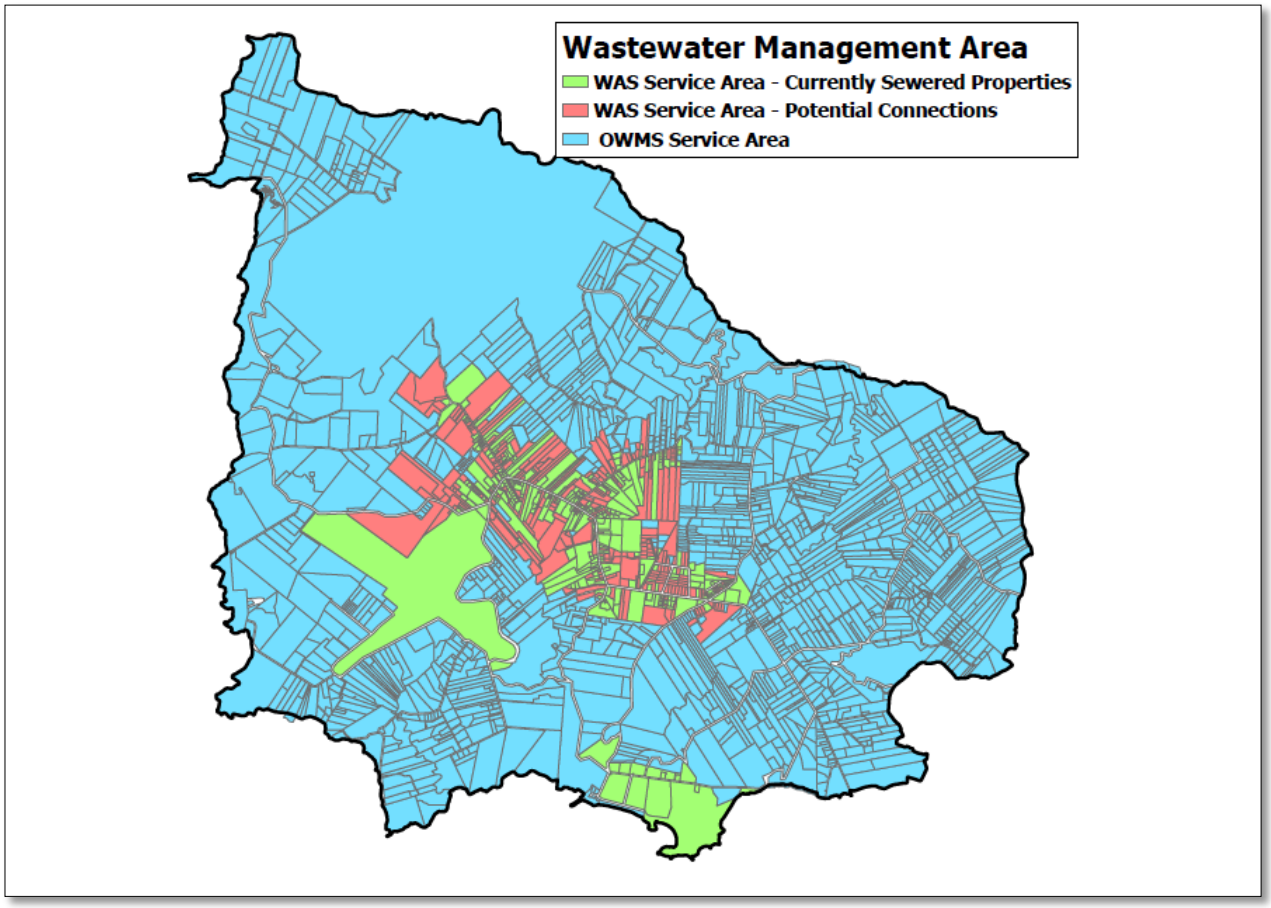

Figure 3 - Wastewater Management Areas

3.1 *Key Management Issues*

Constructed in 1992, the WAS replaced the former OWMS that were used in the main urban area core around Burnt Pine. The reticulated sewer was implemented to improve amenity, public health and environmental outcomes and has been largely successful.

The balance areas of the island have been serviced by OWMS, with many being in place for decades. Over the past 30 years, limited auditing and assessment have been undertaken of these systems to understand their performance and what, if any, investment, policy or resourcing changes should be implemented to ensure the systems continue to provide appropriate treatment of wastewater.

At the time of writing the strategy, a number of key issues have been identified.

3.1.1 Common Wastewater Issues

- There is significant lack of records as to the location, type, methods of service, performance and inspection for both the WAS and OWMS
- Overall maintenance of both systems was at or below a level that ensured that the operation of these systems were meeting the design performance necessary to treat wastewater to a standard that mitigated risks to public health and environmental harm.
- Information necessary to assist in design and determination of the optimal system to service land uses was not readily available including soil types, slope, bore locations, watercourse buffers, existing development, location of network infrastructure and the like.

- Fact sheets and other information to guide owners as to what to look out for and what is a proper maintenance regime, are not available.
- The process of determining new connections is typically through the Development Approvals process under the Planning Act. The Council then undertakes a case-by-case analysis to arrive at advice and defines conditions regarding connection to the WAS wastewater network or the appropriate technology for Onsite Wastewater Management Systems (OWMS).

Specific issues in relation to the WAS and OWMS are further discussed in the sections 5.0 and 6.0 below.

3.2 *Environmental Harm and Public Health*

Water quality impacts on Norfolk Island have been extensively studied, with particular focus on the Kingston Catchment, which includes the KAVHA World Heritage-listed site. Over the years, multiple assessments have identified elevated nutrient levels, primarily nitrogen and phosphorus originating from failing septic systems and cattle grazing as key contributors to declining water quality.

Most recently, the CSIRO's 2024 Norfolk Island Water Quality Assessment, commissioned by the Department of Infrastructure, has confirmed that both surface water and groundwater are significant pathways for nutrient discharge into the sensitive coral reef ecosystems of Emily Bay and Slaughter Bay. This research reinforces the need for robust wastewater management practices, particularly for developments within the catchment.

A consequence of the poor performance of both the WAS and OWMS, where it exists, is the resultant effect on the environment and potential for public health.

The absence of engineered solutions and failure of natural systems to maintain water quality can lead to concentrated discharges into the environment impacting water quality.

Many catchments on island drain directly into the deep ocean waters around the island which provides significant dilution at sea of any concentrated contaminants. This does not provide a mitigation solution on the island and all efforts should be made to improve the performance of these systems before runoff enters local watercourses, ground water aquifers and marine waters.

Figure 4 - Topographic Catchments and Watercourses illustrates the varying catchments, watercourses and receiving waters on island.

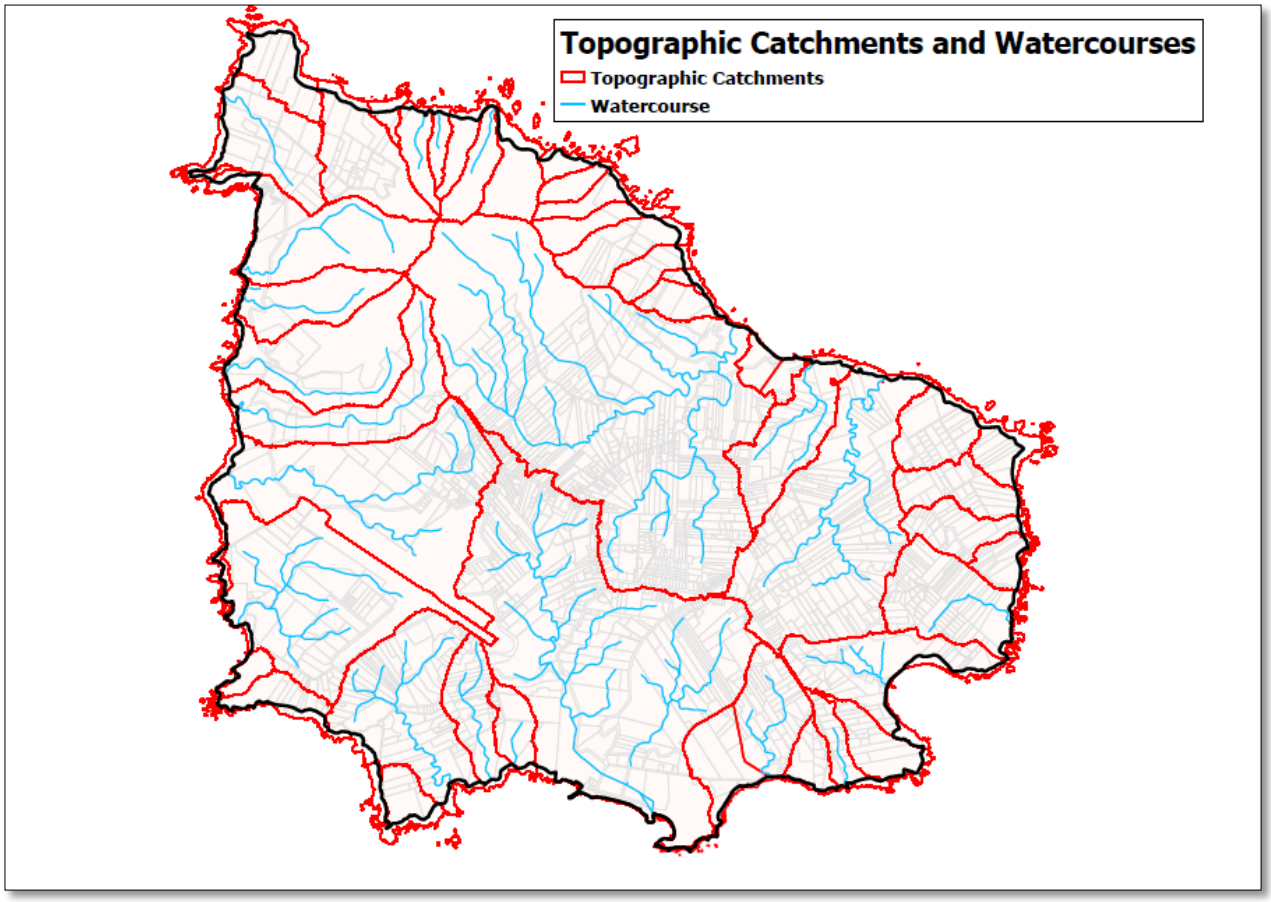

Figure 4 - Norfolk Island - Topographic Catchments and Watercourses

Depending on the land use, vegetation cover, geomorphology and contaminant levels, all water courses on the island are likely to experience impacts such as septicity of standing water at deeper levels, reducing oxygen levels, high algae and plant growth all impacting endemic plant and aquatic animal life.

There is also an impact on groundwater particularly where contamination can be expedited through bores located in proximity to effluent disposal areas.

A number of factors have an influence on risks and resultant impacts including:

- Density of OWMS in the catchment (facilities per ha)
- The siting, design and method of operation of the OWMS and its propensity to release effluent to ground or surface water.
- The maintenance and performance of the system
- The proximity of the OWMS to water bores and water courses
- The soil types, slope and level and type of vegetation downstream of the OWMS
- The nature of the watercourse
    - free draining or chain of ponds
    - extent of shade over standing water
    - bed and banks material and vegetation

- The hydrological nature of the catchment in a variety of rainfall intensities including time of concentration and extent of flushing to discharge point.

The following figures highlight some of the key considerations that currently apply to the location of dwellings and proximity to sensitive receivers, including bores and watercourses. The maps depict the nominated buffers (i.e. areas where OWMS are to be excluded). These are taken from DCP No.2 Water Resources and vary based on the type of OWMS used. The resulting maps illustrate the residential dwellings and related OWMS that pose a higher risk of contamination to the environment, particularly surface and groundwater.

- **Figure 5** – Bore & Waterway Setback Buffers (exclusion zone) for traditional Septic Systems
- **Figure 6** – Bore & Waterway Setback Buffers (exclusion zone) for Activated Wastewater Treatment System (AWTS) with no tertiary disinfection.
- **Figure 7** - Bore & Waterway Setback Buffers (exclusion zone) for an AWTS with tertiary disinfection.

Please note that the exclusion buffer maps are **indicative only**, as the specific characteristics and locations of each watercourse are not fully known. Any application for an Onsite Wastewater Management System (OWMS) will therefore be assessed on a case-by-case basis through a site-specific environmental evaluation.

It is also important to note that these maps do not include the locations of water bores & wells. What is missing from all versions are:

- Old hand-dug wells
- Bores drilled prior to the mid-1970s
- Abandoned or dry bores
- Unapproved bores
-
- Machine-dug water holes near creeks

These gaps in mapping highlight the need for updated groundwater data and thorough site-specific assessments when considering OWMS applications.

Figure 5 - Septic Tank Exclusion Zone Buffer

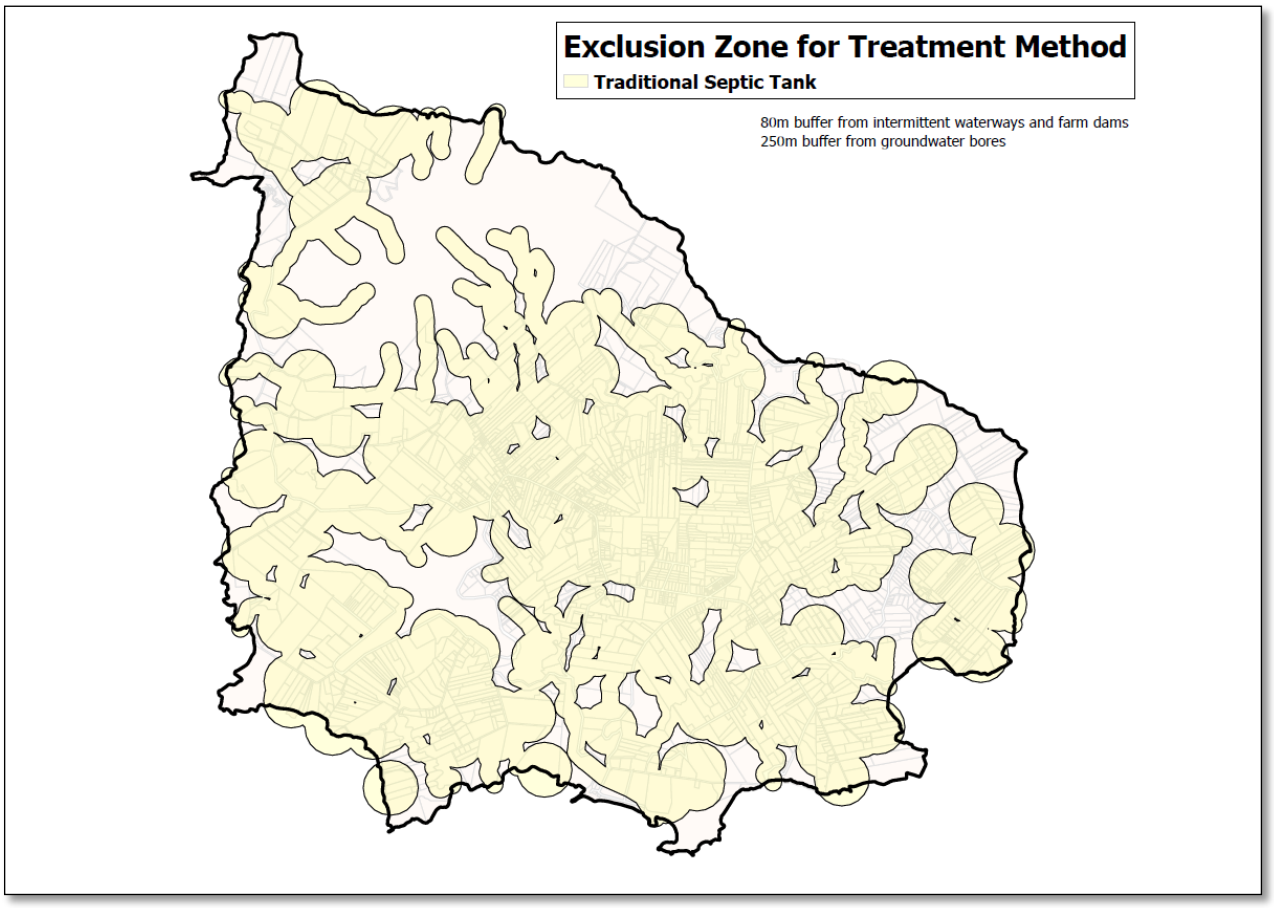

Figure 5 - Septic Tank Exclusion Zone Buffer

Figure 6 - AWTS No Tertiary Treatment (No Disinfection) - Exclusion Zone Buffer

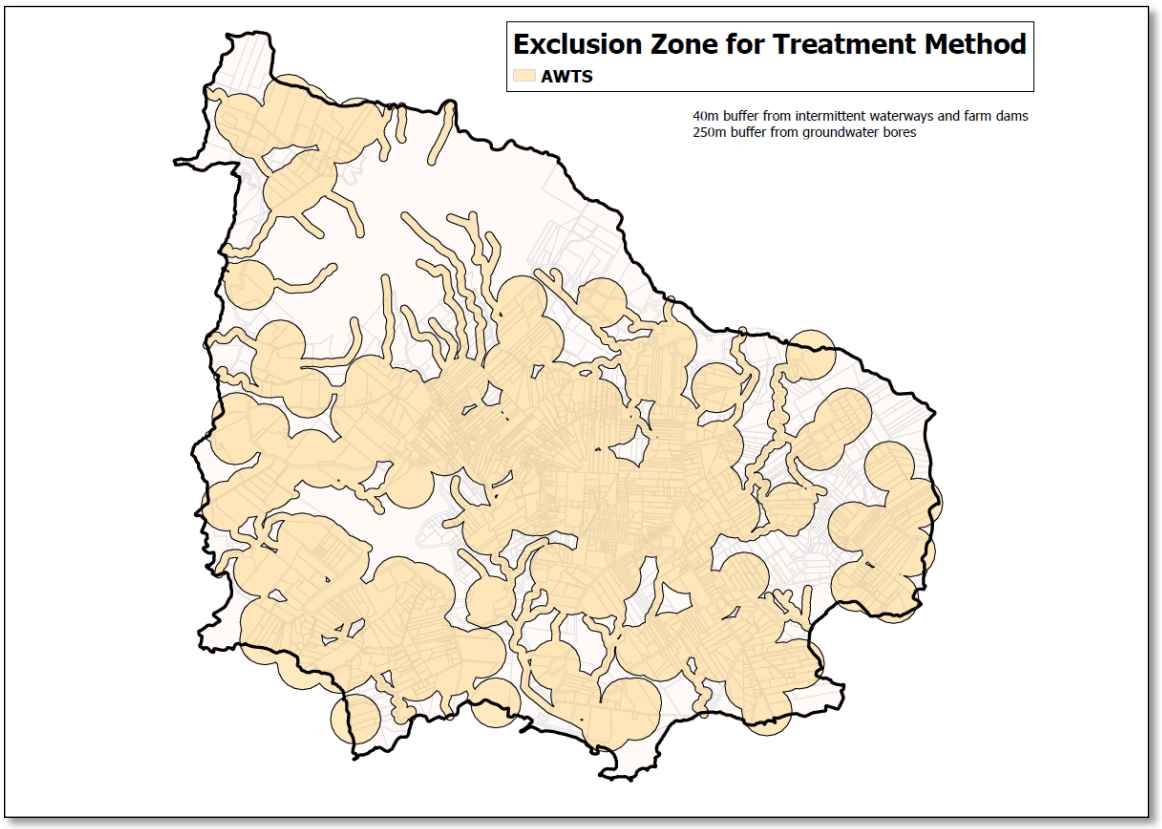

Figure 6 - AWTS No Tertiary Treatment (No Disinfection) - Exclusion Zone Buffer

Figure 7 - AWTS with Tertiary Treatment - Exclusion Zone Buffer

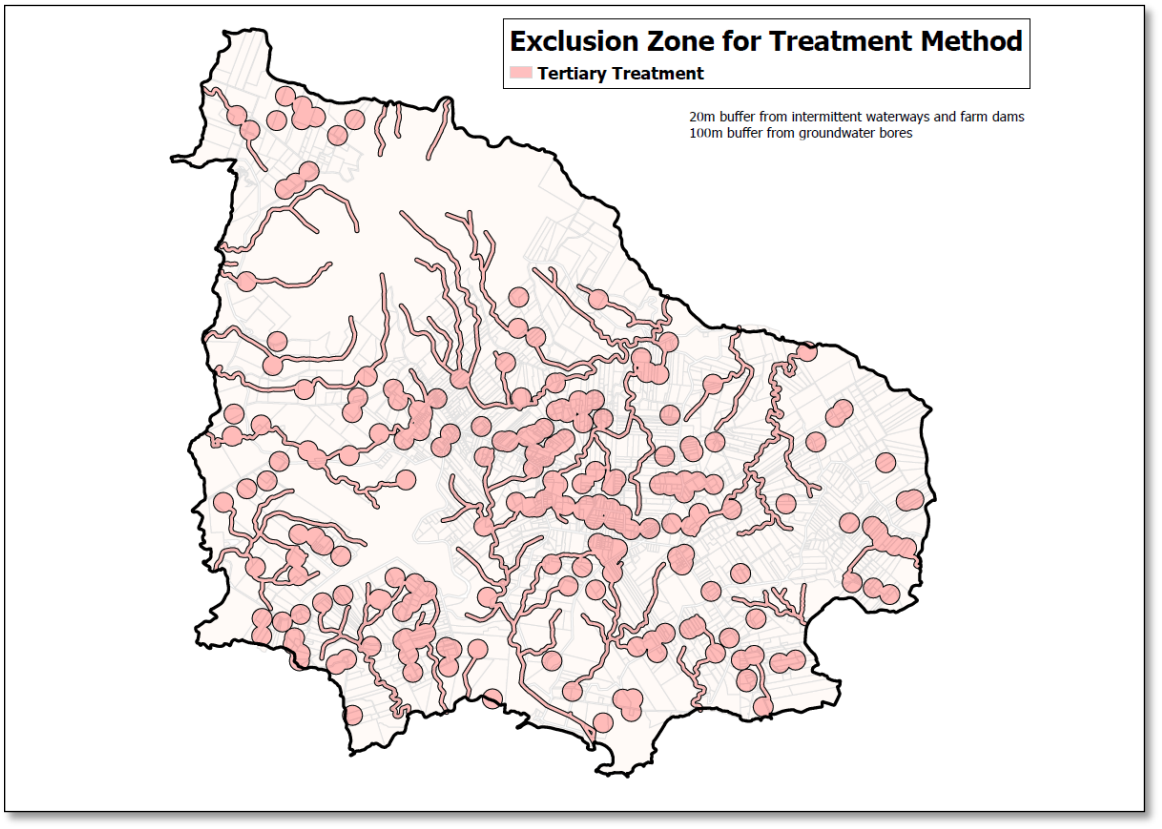

Figure 7 - AWTS with Tertiary Treatment - Exclusion Zone Buffer

The mapping shows the larger number of dwellings in the catchment that have wastewater disposal methods that fail these buffer requirements increasing the likelihood of impact on groundwater or surface water in watercourses. The degree of conflict shown by the mapping is significant, and a program to convert from septic systems to either AWTS with tertiary treatment or connection to the WAS would ensure less likelihood of harm.

This is a significant undertaking, and a process should be established to prioritise any exist, or the circumstances of the site and the condition of the existing system is likely to be causing impact.

Any conversion to higher order treatment will come at a financial cost and also require higher levels of maintenance to ensure reliability. It would be envisaged that as more AWTS systems are installed, the demand for ongoing maintenance would increase resulting in a greater market and competitive cost of maintenance.

3.2.1 Slaughter and Emily Bay Catchment

Unlike many other catchments on Norfolk Island the runoff from the Slaughter and Emily Bay catchments is trapped by barrier reef, preventing high levels of dilution in the ocean waters through mixing facilitated by wave action and ocean currents. The combination of the physical character of the Bay; and the upstream catchment of urban and grazing uses creates the islands most susceptible catchment for environmental impact.

Poor water quality in both Emily and adjacent Slaughter Bay has been identified at times following concentrated stormwater discharge into the environment. This is evidenced by poor reef health resulting from high nutrient runoff entering the receiving waters. Testing of the water quality during these events and examination of the reef has confirmed that catchment impacts are occurring including coral die back, algal blooms and need for closure of popular swimming areas.

The following is an extract from previous work undertaken by NIRC being "*Sewage Containment within the KAVHA Catchment - Options Paper November 2021".*

> *Parks Australia commissioned the Sydney Institute of Marine Science (SIMS) in 2020 and 2021 to conduct a coral health study within the Emily and Slaughter Bay lagoon. The study has confirmed the coral reef in the lagoon is in poor and declining health, with increased coral disease and algae growth.*
>
> *A summary of the findings of the report are detailed below:*
> - *Rainfall periods correlated to elevated nutrient levels within Emily Bay and Slaughter Bay, and increased bacterial counts*
> - *Elevated seawater temperatures recorded in February and March 2020 resulted in coral bleaching, with over 30% of each of the 3 dominant corals found to be bleached*
> - *A 19-fold increase in fleshy algal cover was identified during the study. A significant increase in fleshy macroalgae is consistent with declining reef health.*
> - *Algae are the major competitors with corals for space and are a natural part of any coral reef system, however on coral reefs in a healthy coral dominated state algal cover is dominated by turfing algae. Large fleshy algae are reported as unpalatable to herbivores and associated with lower herbivory rates leading them to outcompete resident corals, they also significantly benefit from increased nutrients.*

- *A coral disease outbreak, identified as Atrementous necrosis, was observed in December 2020 and April 2021 (54% of Montipora spp colonies affected). This disease was not evident in March 2020. Causes of these outbreaks in other regions have been linked to inshore reefs, poor water quality and sedimentation.*
- *Rapid tissue loss white syndrome disease outbreak was also evident within plating Montipora coral colonies during March and April 2021, tissue losses of 30 cm of live coral tissue within a month were observed in coral colonies estimate to be over 20 years of age (This potentially equates to a loss of 10-15 years of average growth). Large areas of growth anomalies were also observed on plating corals.*
- *Given the isolated nature of Norfolk Island, the source of juvenile corals and fish recruiting onto the reef is currently unknown. In a disturbed environment, sufficient recruitment is required to maintain healthy population stocks and aid in recovery. Coral spawning was reported by the local residents of Norfolk Island in January 2021 occurring several days following the full moon. No juvenile corals were observed on the reef structure during surveys using GFP switch torch in March and April 2021, as such no evidence for recruitment could be obtained at the time of survey.*

Given these outcomes, the Slaughter and Emily Bay Catchment has been identified as the priority catchment for a range of interventions to improve water quality outcomes.

4.0 Statutory Framework

The management of wastewater on Norfolk Island is covered under various statutory instruments including:

- Environment Act 1990 (NI)
- Environment Regulations 1990 (NI)
- Planning Act 2002 (NI)
- Water Assurance Charges Act (NI)
- Local Government Act 1993 (NSW) (NI)
- Norfolk Island Legislation Amendment Act 2015
- Norfolk Island Legislation Amendment Act 2016 (No 1).
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Given the ecological sensitivity of the area and its proximity to a World Heritage site, actions that may significantly impact water quality may also trigger requirements under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). I.e. Is there a known presence or likely habitat for threatened coral, fish, seabirds, or turtles?

Figure 8 provides an overview of the various approval processes and legislative powers that exist.

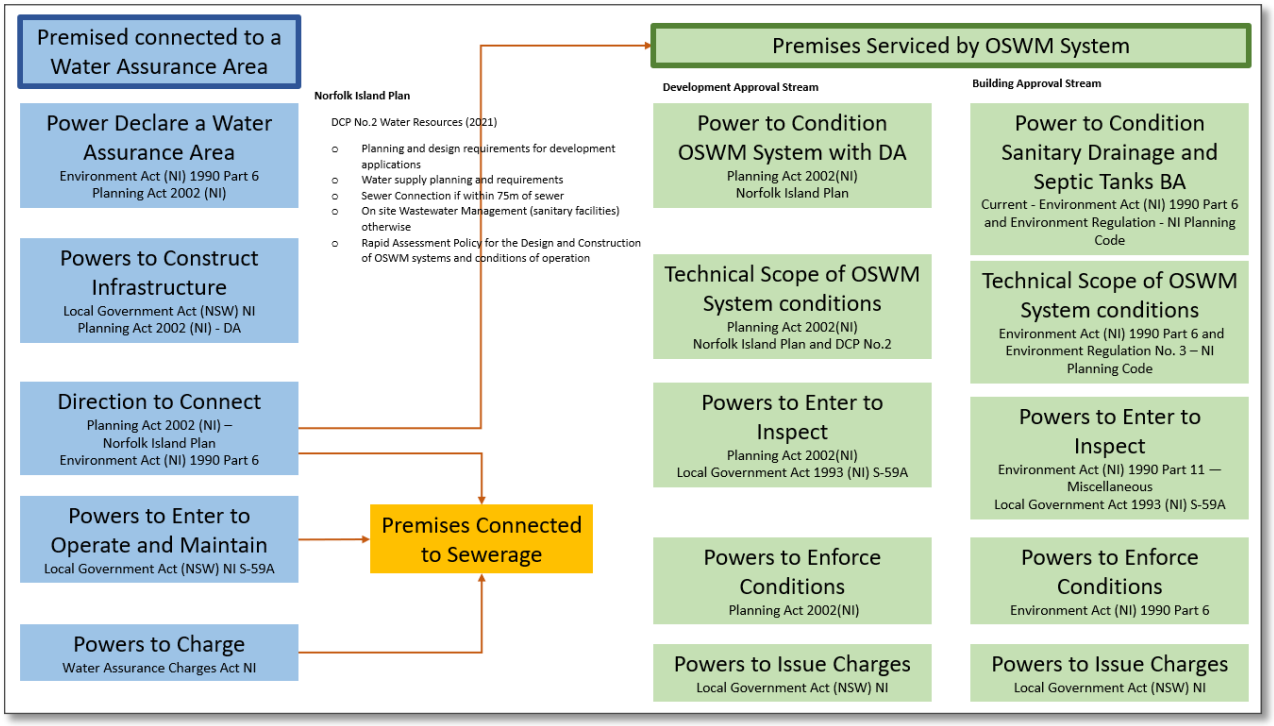

Figure 8 - Overview of Statutory Framework

4.1 *Wastewater Management via Direction of NIRC*

NIRC has responsibilities under Section 56 of the Environment Act 1990 (NI), which allows the General Manager to issue a notice requesting that a suitable wastewater or sanitary facility be provided for a property or parcel of land. This may include the provision of a main sewer connection, a septic system, or a temporary facility, depending on the circumstances.

In practical terms, this means:

- For properties within the Water Assurance Scheme (WAS): This would generally involve connecting to the existing sewerage network where a connection point is available at or near the property boundary. This may also apply in the future where connection points become available as part of a WAS network expansion.
- For properties in the On-site Wastewater Management System (OWMS) Area: This would typically involve the installation and proper connection of a septic system or Aerated Wastewater Treatment System (AWTS).

This approach supports both environmental protection and responsible infrastructure planning, while allowing flexibility based on each property's location and access to services.

4.2 *Wastewater Management under Condition of Development Approval*

The Development Control Plan No. 2 (DCP2) – Water Resources was formally approved as part of the Norfolk Island planning framework. The revised DCP2 was endorsed by the Administrator of Norfolk Island, acting as the delegate of the commonwealth minister, in March 2022. This approval was officially announced in the Norfolk Island Government Gazette on 16 March 2023, as part of the 'Norfolk Island Plan 2002 Housekeeping Amendment 2022'.

The updated DCP2 provides detailed planning guidelines to support sustainable water resource management on the island. It aims to improve water security for new developments and to help protect Norfolk Island's ground and surface water systems, as well as the marine environment.

Development Applications which include the requirement for a wastewater facility are made under Part 5 - Development Approval Process of the Planning Act 2002 (NI) and DCP No.2 Water Resources. Typically, the Council will provide a development approval and related conditions that requires:

i. Connection to the main sewer if the development is inside the WAS or
ii. to provide an OWMS elsewhere on the island.

The nature of the connection and sanitary facility will be determined with reference to the criteria under DCP No. 2, which considers site features, proximity to the sewer, and other characteristics such as bores and watercourses.

4.3 *Removal of Wastewater Facilities*

Section 60 of the Environment Act 1990 (NI), states that the General Manager of NIRC may, by written notice served on the owner or occupier of a place, require the owner or occupier to remove, demolish or make inoperable a septic facility. This capability is important where direction or condition of a development has been given to provide for a connection to the main sewer facility in the WAS and to abandon any OWMS.

4.4 *Inspection of WAS or OWMS*

In contrast, for on-site wastewater management systems (OWMS), the *Environment Act* and *Planning Act* include provisions that allow NIRC to respond to issues related to previously approved systems or where environmental or planning concerns arise. In these cases, access to a property is typically requested with the landowner’s consent. If this is not possible, further steps—such as obtaining an Entry Order or Search Warrant—may be taken to support necessary site assessments.

Currently, the existing Statutory Framework does not explicitly provide for routine inspections or maintenance enforcement for OWMS or to enter land for the purpose of carrying out inspections of the OWMS. Currently the process relies on each owner to understand the responsibilities of maintenance and engage qualified trades to attend to routine maintenance and repairs.

The obligations on landowners to maintain systems should also be self-regulating given the logical need to ensure the:

- operational performance mitigates any adverse health issues for the residents.
- use of the land is not detrimentally impacted by the effluent.

- value of the land is not diminished by odour or contamination or a clear need for capital investment in significant maintenance or entire renewal.
- prospect of actionable nuisance claims by downstream neighbour for overland flows or quantified pollutants levels.

5.0 Water Assurance Scheme

5.1 *Purpose*

The purpose of the WAS is to primarily ensure the collection and treatment of wastewater to protect public health, reduce environmental impact, support economic growth and provide high levels of community amenity.

The system aims to:

a. Ensure the management of wastewater, sustaining the physical, economic and social wellbeing of the people of Norfolk Island
b. Protect waterways, surface water and all groundwater reserves from contamination and the adverse impacts on public health;
c. Protect the unique ecosystems, both marine and those located on the island from contamination; and
d. Efficiently collect sewage from premises and convey that to the treatment plant to appropriately process the effluent to suitable discharge standards.

5.2 *Description of WAS Infrastructure and Loadings*

The Water Assurance Scheme (WAS) is a network of reticulated sewer constructed in 1992 including approximately 230 connections, one Sewerage Treatment Plant (STP), seven Sewerage Pump stations (SPS) and over 15km of gravity and rising main pipelines.

The properties serviced by the WAS are contained within the Water Assurance Area as defined by the Environment Act (NI). The system design dates from 1989, was made operational in 1992 and continues to serve as the primary form of wastewater management in the more heavily populated and urban area of Burnt Pine and environs. The network services approximately 50% of the population. The remainder of the residences, approximately 1000, have onsite waste management systems.

Importantly, the majority of large tourist facilities and resorts are located in the WAS area with the population in the WAS doubling during peak season. In addition, day trips to the Island by cruise ships can again significantly impact the population within the WAS providing a midday peak when cruise passengers are using the restaurants and ablution facilities.

Another notable issue in the asset management plan is the extent of inflows and infiltration to the network during rainfall events again this can add to the peak loading of the system.

Given the low base flow, the impact of tourists, the peak impact from day trippers and the rainfall ingress can present some significant capacity challenges for the network and particularly the STP. Renewal and maintenance tasks on the WAS should be mindful of these issues.

To provide better evidence and data improved monitoring and telemetry of the network and flow monitoring has been proposed along with smoke and dye testing to trace any points of interest of ingress.

5.2.1 Collection System

The sewerage network is commonly referred to as the Water Assurance Scheme. It collects sewage via piped connections to each premise which includes business, tourism and residential uses. However, the scheme only covers a small area of about 10% of the land area within the higher density residential and commercial areas.

The parts of the island which are connected to the WAS include

- To the east – the Norfolk Island Central School and Queen Elizabeth Ave area where numerous large tourist and tourism businesses are located,
- Centrally - the main commercial and tourist areas of Burnt Pine
- To the west - the hospital and Airport.
- To the north - The network extends north along New Cascade Rd and so includes most of the large tourist accommodation facilities.

The highest concentration of urban uses including tourist accommodation on the island are found within the WAS which ensures that the majority of high intensity uses are serviced by the highest order of treatment and not by OWMS. Importantly nearly all of the industrial and food premises on the island are also connected to the WAS limiting concentrated discharges to the environment.

Under construction are new areas of sewerage network to connect the Kingston and Arthurs Vale Heritage Area (KAVHA) to the existing water assurance network. This project has been delivered by the Commonwealth to reduce the impacts of effluent contributing to nutrient loads entering the local catchment of Emily Bay.

The project includes a small diameter pressure systems which includes multiple SPS, approximately 2.0 kilometres of sewer pressure mains, 200 metres of gravity mains, a transfer pump station and 1.7km of rising main to connect to the WAS. This also includes two 8,900 litre ‘end of line’ emergency sewage holding tanks located adjacent to Middle Gate and Country Road.

Investigations are also underway to provision for the various private properties that are within the proximity of the system with property connection points to the sewer. This would involve the landowner connecting via:

- Gravity main to one of the collection pump stations or
- a pressure system which would involve a small pump at the residence which injects into the rising mains laid in the road reserve of Taylors Road.

Figure 9 - The current and proposed WAS Sewerage Network is mapped.

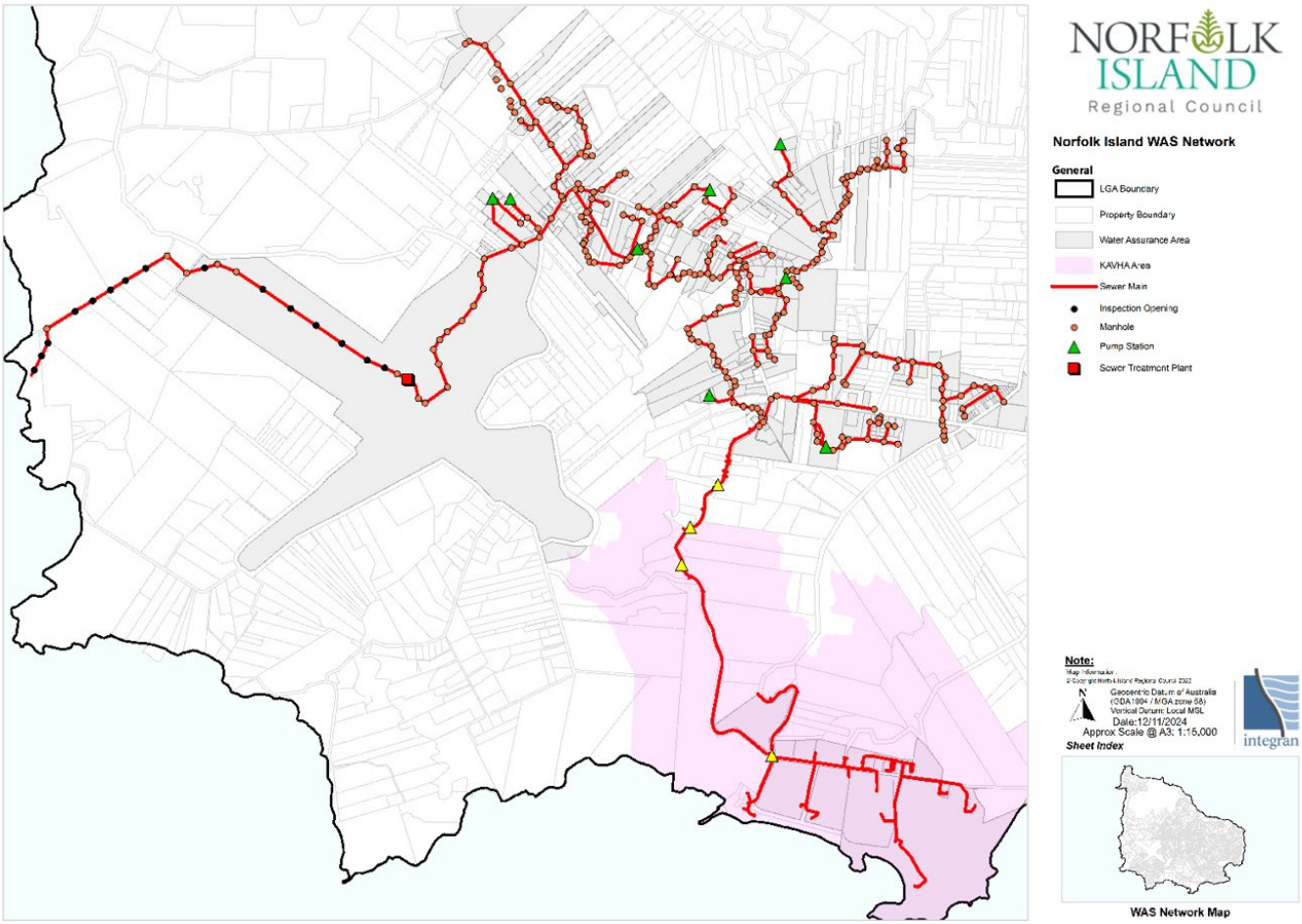

Figure 9 - WAS Infrastructure Network and Service Area – Existing and Committed Projects

In addition, effluent is collected from some premises via tanker trunk and taken to the sewage treatment plant to be processed. Effluent is stored within on-site septic tanks, package plant process tanks and standalone holding tanks, which are pumped out for maintenance in areas not connected to WAS. Tankered in waste can also include trade waste collected from commercial premises and grease traps which hold concentrated fats, oils and grease (FOG).

5.2.2 Treatment and Disposal

The sewage influent is designed to be treated in a secondary treatment process within the plant located adjacent to the airport. The first step is pre-treatment where the sewage is sieved through screens, followed by primary treatment where the suspended solids settle to the bottom of a settling tank. In the secondary treatment, the liquid is trickled over rotating biological contactors (RBC) which provide oxygen and significant surface area for contact with bacteria that treat the effluent. It then enters a humus tank to further strip nutrients and sludge before discharge. The treated effluent is then gravity feed to an outfall into the sea on the west coast near Headstone.

The wastewater treatment plant has faced operational challenges for several years, notably with the sludge pumps breaking down, which has compromised the treatment process and effluent quality. Additionally, the accumulation of screenings and biosolids within the main septic tanks has contributed to the failure of the plant to treat the influent to any appropriate level. This allows for solids to bypass through the plant and be carried in the effluent stream to the outfall.

All of these issues are currently under detailed technical investigation and options for rectification and renewal of various aspects of the plant are being developed it is expected that works will commence in the 2025 calendar year.

As part of the plant refurbishment there will be appropriate engagement with the Marine Parks and Environment Protection and Biodiversity Conservation (EPBC) teams in the Department of Climate Change, Energy, the Environment and Water to ensure that the performance requirements are known as part of the design and delivery process. Given the technical limitations of the plant on the island, a balanced and serviceable approach is necessary to improve the plant's effluent quality and to ensure the operation and maintenance is sustainable in the future. Continued collaboration is expected through all phases of the plant's development and commissioning.

The current process is explained by the schematic of the treatment plant set out in **Figure 10** and is further annotated with the current conditions.

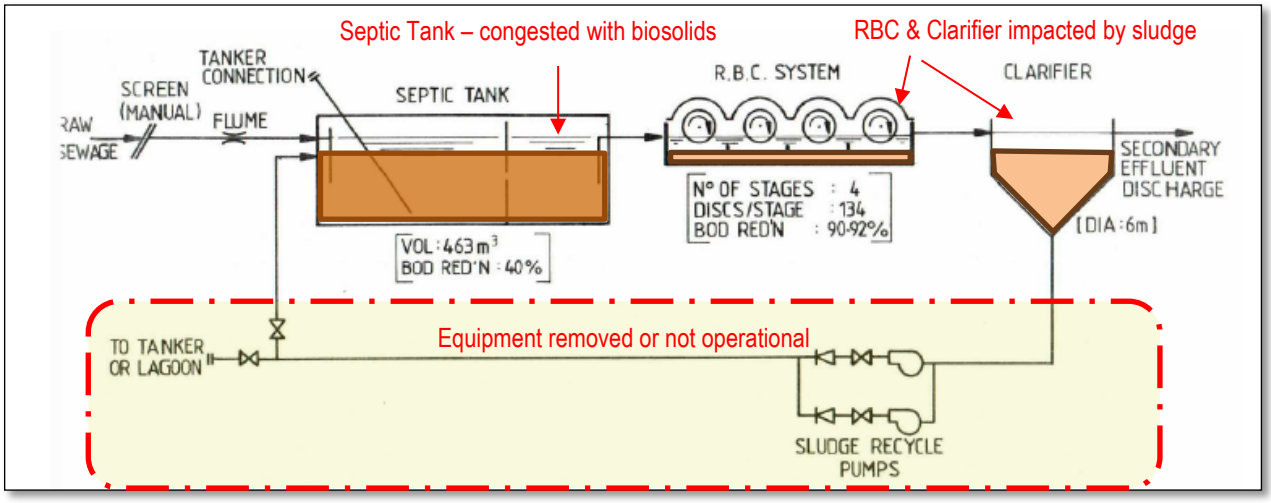

Figure 10 - Current STP Process (Source: Norfolk Island Wastewater - Options Study 2019 Public Works Advisory)

5.3 *Gazetted Water Assurance Area*

At the commencement of the WAS, properties that would be serviced by the network were formally 'gazetted' or declared under S62 of the Environment Act to be part of the proposed scheme and subject to user charges. During construction of the WAS, it was opportunistically expanded to include other properties that became connected via additional network infrastructure. Over the years other connections have been made periodically, not all of these being formally gazetted into the scheme.

The various status of properties in respect of connection and formal declaration in the WAS is outlined in **Figure 11** – WAS Gazetted Area**.**

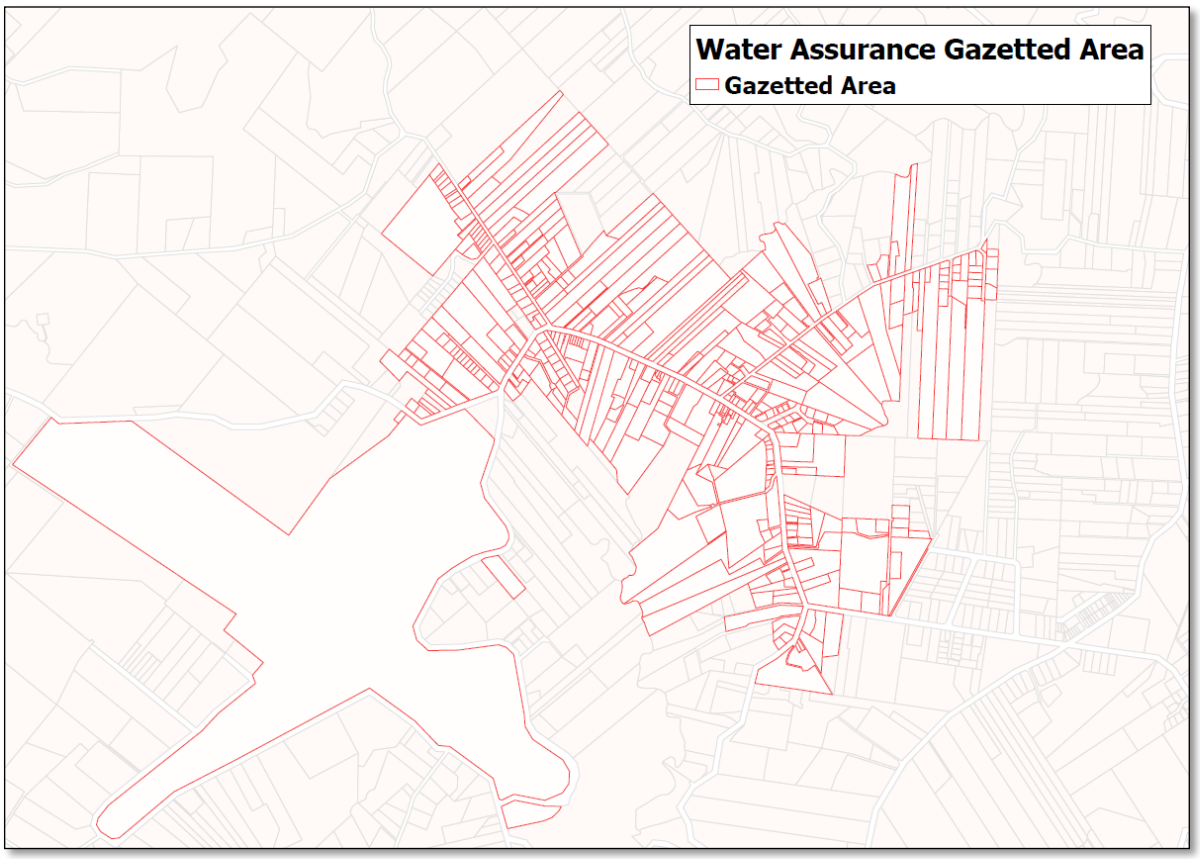

Figure 11 - Water Assurance Gazetted Area

Figure 12 - WAS Gazetted Area Expansion is suggested to regularise the properties that are currently connected or capable of connection making clear the service catchment for the network and the likely demands to be managed in the immediate future.

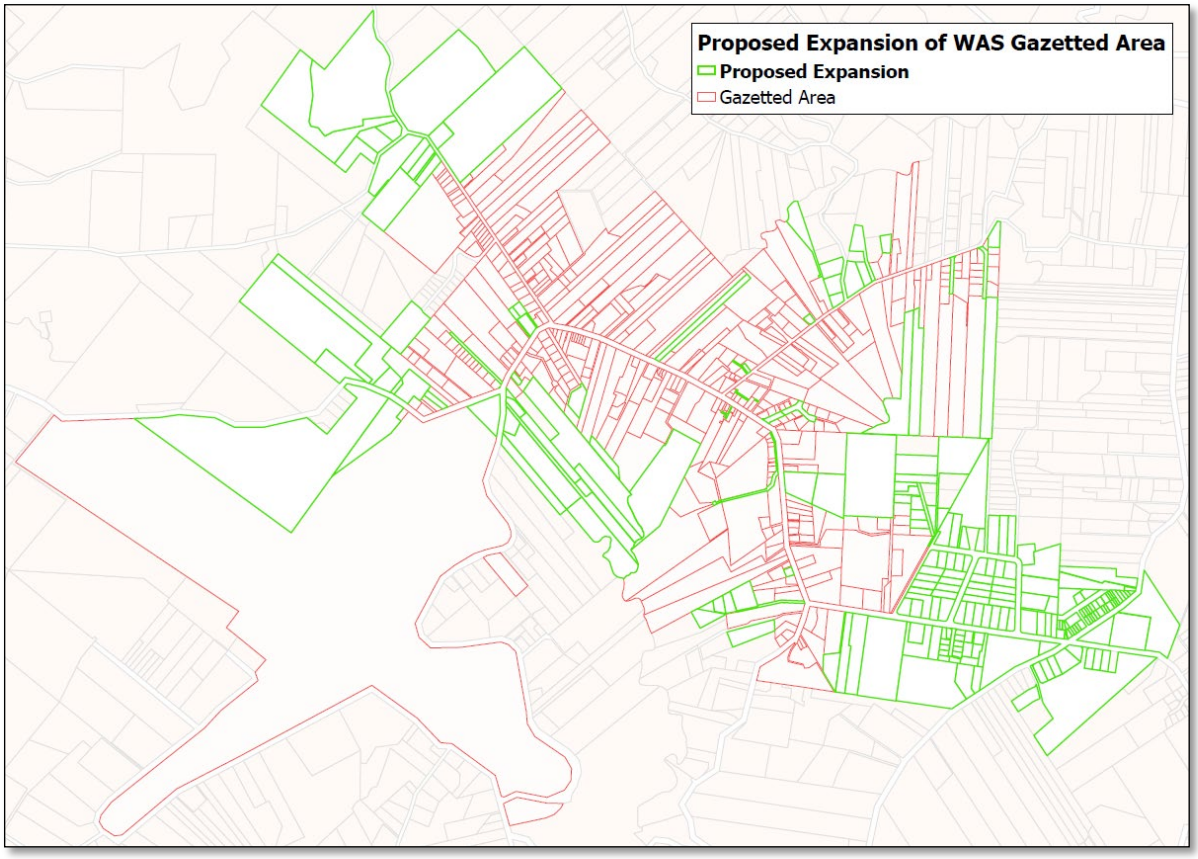

Figure 12 - Water Assurance Gazetted Area Proposed Expansion

5.3.1 Connecting to the Scheme

As set out in Section 4.0 Statutory Framework, the connections to the WAS can be achieved through a number of potential means, including:

1) Direction from NIRC
2) Following a Development Application Approval
3) Request from a property owner and plumbing approval.

It is important to the success of the WAS, to ensure that there is capacity in the existing network, prior to connection being made.

Currently, Development Control Plan No. 2 – Water Resources 2021 (DCP No. 2) requires that any specified use or development on land located within 75 metres of a sewer main, measured from the property boundary, must be connected to that sewer main (refer Item 24 of DCP No. 2).

This requirement is intended to reduce the risks that on-site wastewater management systems (OWMS) may pose to the island's water quality.

If a dwelling is located within the WAS and an existing house connection is available for the dwelling along the reticulated sewer network, then following application and approval a plumber can complete the connection to the dwelling.

If no house connection is available, the process set out above in Section 4.0 may provide new network access or capacity to facilitate the outcome. Connection to the WAS can only be enacted on dwellings located within the WAS serviceable area and where the network can be feasible and lawfully constructed.

For new connections Council will coordinate and arrange for the related civil works on the sewer mains to provide an extension to the to allow for a point of connection. Connections are made to the boundary of the applicant's property.

In some cases, the most cost-effective or practical route may require the sewer line to pass through other properties. If this happens, Council will work with the affected property owners and help arrange any easement agreements that may be needed.

At this stage, Council does not provide financial assistance to individual landowners for the cost of connecting to the Water Assurance Scheme (WAS).

That said, it is recognised that the long-term success and sustainability of the WAS relies on progressively increasing the number of dwellings and buildings connected to the system. Expanding connections over time will help improve the efficiency of the network and deliver stronger environmental and public health outcomes.

The funding of new connection works would be considered by Council on a case-by-case basis, considering key factors such as:

- Development proposals and approved applications
- Inclusion in defined capital works programs
- Critical connections required to address public health or environmental risks

5.4 *WAS Asset Management*

NIRC has recently completed a major phase of data collection, mapping, and analysis of the island's infrastructure, leading to the development of a range of reports, resources, and documentation aimed at strengthening asset management across all asset classes.

This includes the Asset Management Policy and Asset Management Plans (AMPs) for the Water Assurance Scheme.

It should be noted that the AMP should be considered an evolving document, with ongoing data collection and refinement needed to improve its accuracy and effectiveness.

The AMP outlines the layout, condition, and performance of the infrastructure network, providing an initial evidence base to guide future planning and investment. It captured all aspects of the infrastructure network, its operation and current condition these aspects have been reported consistent with the Institute of Public Works Engineers Australia IPWEA - NAMS plus framework, a recognised standard adopted for asset management planning across Australia and New Zealand.

The initial findings point to a significant volume of work required to bring the system up to standard, resolve operational issues, and support potential service expansion. The AMP plays a key role in prioritising actions to ensure the network meets both operational needs and regulatory obligations, including environmental protection.

5.4.1 Operations and Maintenance

Routine Maintenance of the network has been captured for the various asset components based on the current day to day tasks to ensure continued operation. This included a range of planned and reactive tasks that may occur based on climatic conditions (e.g heavy rain) or where significant loading is increased when cruise ships increase the island population by 80-100%.

The forms of maintenance gave rise to consideration of how best to minimise or optimise the running of the network. This includes both policy and capital works responses that could be employed to significantly reduce or eliminate some of the current maintenance tasks and their frequency.

These network issues are discussed below in Section 5.5

Access to and maintenance of the existing water assurance network is critical, requiring access across both public and private freehold land. The Local Government Act (NI) provides the statutory power to provide rights of access. In many jurisdictions, the utility providers have assets located on private land in a similar circumstance where a wayleave or right of way allows for a range of operations and maintenance.

Legal review of the legislative framework around the NIRC WAS operations and maintenance has found that Council has a range of rights to access the sewer lines to maintain and renew them as required.

The review concluded that powers for existing infrastructure exist under:

- Section 59A of the *Local Government Act 1993 (NSW) (NI)* (**LG Act**) provides the statutory power to NIRC to access existing sewer assets on properties that are not burdened by an easement that benefits NIRC if the works have been installed by NIRC;

- Subitem 364(2) of schedule 2 of the *Norfolk Island Legislation Amendment Act 2015* (**NILA Act**) and section 12 of the *Norfolk Island Legislation Amendment Act Transitional Rule 2016 (No 1)*, specify that the works are considered installed by NIRC if they were delivered before 1 July 2016.

- Section 59A of the LG Act empowers NIRC to enter premises without an easement to undertake the following operations to ensure that the sewerage network is operating in an efficient manner for the purposes for which the network was installed. Actions include:
    - Operate;
    - Repair;
    - Replace;
    - Maintain;
    - Remove;
    - Extend;
    - Expand;
    - Connect;
    - Disconnect;
    - Improve; and
    - Any other works necessary or appropriate in the opinion of NIRC.

5.5 *Identification of Key WAS - Management Issues*

From the analysis it was found that the management of the network in respect of planning and record keeping of connections and new works was not comprehensive with some identified gaps. Issues included:

- There is medium confidence that the register of WAS connections captures all the properties that are connected to the systems.
- There are also a number of residential properties on existing OWMS within the areas serviced by the WAS that should be connected, particularly those within 75m of an existing service, Council could direct such connection under Section 56 of the Environment Act
- The high-risk properties that were identified in the Inspection of OWMS - KAVHA Catchment undertaken by NIRC could be addressed through mandated connections as above.
- New network extensions and connections are being made to the network in an opportunistic manner at minimal capital cost. This practice whilst expedient may impact on achieving improved whole of life costs particularly when needing to maximise service to other land.

5.5.1 WAS - Network Condition

There are currently a number of identified known network where assets or components are failing or impacted by external factors, including:

- **Sewer Gravity Mains**-
    - In some locations, the gravity mains have very flat grades resulting in suspended solids and fats, oils and grease (FOG) settling out reducing pipe capacity and increasing risk of blockages.
    - Some mains are in steep and highly vegetated areas. Inspection and maintenance have been a significant issue but is being resolved through

increased vegetation management based on improved routine maintenance scope.
    - Given high wet weather flows there is likely stormwater ingress through illegal roof water connections, infiltration through manhole segments, inflow through inundated manhole lids. Given the extent of current CCTV, it appears that limited inflow are occurring at pipe joints given the current integrity of the pipeline, - inspection and response procedure required.
- **Manholes** –
    - Tree root intrusion in selected locations separating the precast sections and filling chamber and pipes with root mass. Related issues include the ability of water infiltration and washed sediment into the manhole and mains;
    - Washed sediments in steep and remote locations can lead to the covering manholes increasing loss of access, risk of infiltration and vegetation impacts
    - Depressed manhole surface levels allowing ponding or watercourses over the manholes increase wet weather inflows in the system.
- **Pump Stations**
    - Some switchboards and controllers are very old and past their useful lives.
    - Pump wells are impacted by heavy FOG loads which become trapped in the pump well and impact float controls. These accumulate due to inadequate FOG capture in grease traps on commercial food premises. High levels of intervention are required on a weekly basis to ensure FOG levels are under control and do not lead to pump failure and surcharging.
    - Need for pump alarms on a select number of pump wells to warn of pending overflows and 24/7 flow monitoring or other telemetry systems in place to provide data for management and decision making nor warn of risk events.
- **Sewage Treatment Plant –** the current plant has been reviewed and found to be significantly underperforming in the treatment of raw sewage or requiring high levels of manual intervention. These issues include:
    - Manual cleaning of the debris and waste on the bar screens at front of plant.
    - Significant sediment and solids build up in the primary waste tank that has become impacted and incapable of being removed due to the design and access.
    - Failure of the sludge return system within the plant.
    - Inability to properly clean and maintain the sludge levels in the RBC's and Humus Tank.
    - Some activities are not possible due to Work Health and Safety (WHS) – Safe Work Method Statement (SWMS) requirements for working with wastewater and confined spaces.

5.6 *Capital Works Planning and Delivery*

Capital Works include:

- **New assets** to provide additional service to new areas (e.g KAVHA extension)
- **Renewal/replacement** of failing or end of life assets (e.g STP)
- **Upgrades** of the asset with new components to improve the performance or level of service (e.g pump station telemetry)

The extent and type of capital expenditure is a function of the age of the network, its performance and any additional demands it may need to service. All of these decisions are analysed in the Asset Management Plan which informs the capital planning and budgetary processes including the Long-Term Financial Plan and Operational Plan of NIRC.

5.7 *New WAS Expansion Areas*

As part of the strategy, it has been identified that there are opportunities to connect more properties on to the reticulated sewerage network of the WAS. Such action would reduce reliance on aging septic systems and related OWMS's. **Figure 13** Norfolk Island Sewerage Network – Burnt Pine & – **Figure 14** Norfolk Island Sewerage Network – Kingston provides an overview of both the existing network and the potential network extensions that can be constructed to bring more properties into the WAS.

It is important to note the Future WAS network expansions (green linework) are "**concept only**" and will be subject to detailed investigation, design, consultation and funding. At this point in the process, the concept is based on a continuation of the current WAS network design approach being primarily a gravity system with collection pump station to transfer sewage to the treatment plant.

As the investigations progress this may be a mixture of small pressure systems and gravity to account for site conditions and other physical or administrative constraints.

These have been listed by the general priority based on active projects or simplicity of making a connection to the network as set out below.

Table 1 – WAS Expansion Areas

Priority	Scope of Work	Status	Delivery Agency
1	New KAVHA Sewer servicing the world heritage area Stages 1-3	Contract Awarded	Commonwealth Department of Infrastructure
2	Delivery of pressure rising main on Taylors Road and lower Middlegate Road as part of the new KAVHA Stage 2 Rising Main. These works also include a provision for private connections to allow for transfer from septic on-site disposal to connection to the WAS subject to investment in compatible onsite infrastructure being delivered by the adjacent landholders.	Commenced	Commonwealth Department of Infrastructure
3	Opportunistic connections to the existing WAS noted previously in Figure 3 "WAS Service Area - Potential Connections"	Ongoing	NIRC
4	Logical network extensions to the existing urbanised areas north and east of Queen Elizabeth Drive. Including: • Mildreds Catchment (Balance area north of QE Drive to Edward Young Road and Cascade Road) • Little Cutters Corn (New)	Concept	NIRC
5	Servicing of more challenging catchments including: Urban Areas • Pye's (Balance to South) • Hunn Knobs (New) • Portion 35 (Balance to Grassy Road) • RSL (Balance to west and south) Rural Areas • Middlegate Road (Balance area to North of KAVHA Stage 2) • Rooty Hill Road West (New) • Ferny Lane North (New) • Ferny Lane South (New) - Catchments are not in any particular order.	Concept	Commonwealth Department of Infrastructure and NIRC

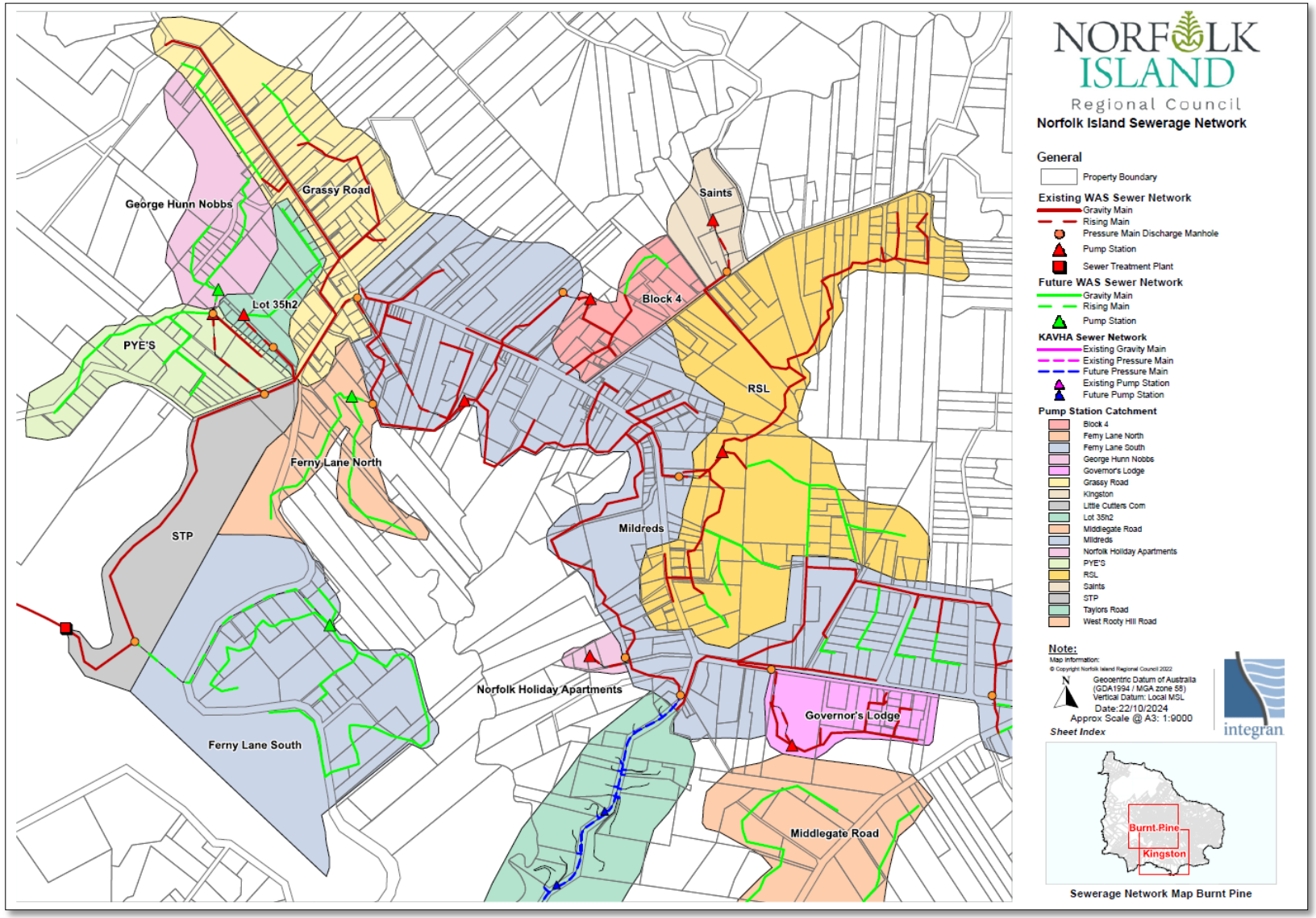

Figure 13 Norfolk Island Sewerage Network – Burnt Pine

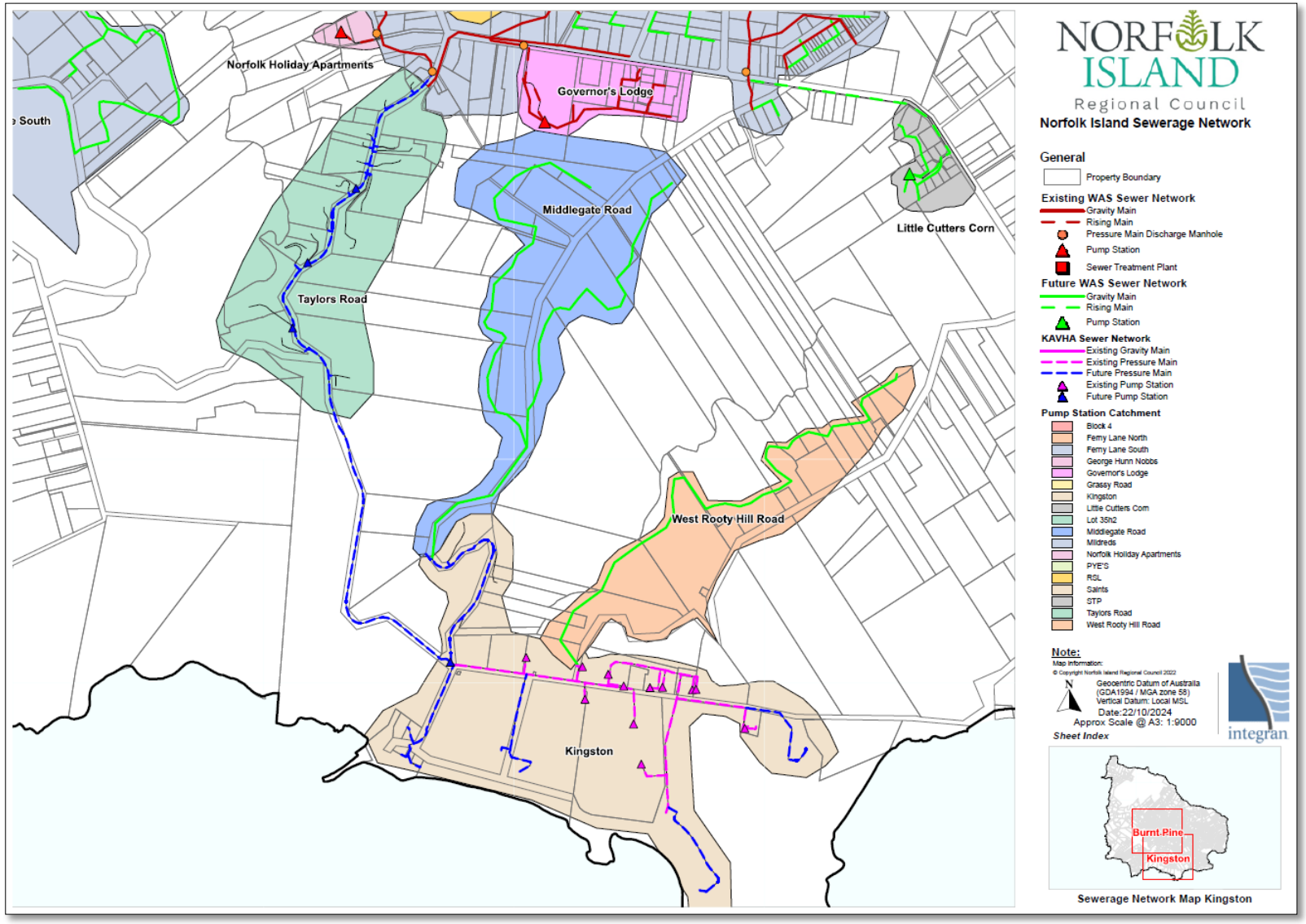

Figure 14 Norfolk Island Sewerage Network – Kingston

5.7.1 KAVHA Sewerage

As part of major servicing initiative of the Commonwealth government the buildings and facilities in KAVHA are being connected to the existing WAS infrastructure replacing the failing OWMS which are old septic systems.

The project includes the installation of a pressure pumps and a small diameter pressure main network allowing for collection of sewage using minimal excavation and trenching in the sensitive world heritage area.

The project is being delivered in 3 Stages being:

- **Stage 1** works involve the installation of pressure sewerage system to service the main buildings and tourist facilities within Kingston with a major collection tank and pumping station at Country and Middlegate Road.
- **Stage 2** works involve connection of Stage 1 to the WAS via Country and Taylors Road. This also allows for other opportunistic works that includes servicing of houses adjacent to the rising main through small on-site pressure sewer pumps. It also includes a connection of the 4 four properties at the bottom end of Middlegate Road adjacent to the main pump station.
- **Stage 3** works involve the servicing of buildings and tourist facilities located around the Kingston Pier, Lone Pine and Cemetery.

5.7.2 Urban Area WAS Expansion

These areas are in the higher density built up areas and typically involve the installation of new sewers in pragmatic and feasible alignments to serve the lowest point of each lot. This allows the sewer to command the whole site and provide for flexibility in servicing existing buildings and any future buildings.

Sewers will need to be run through private property consistent with the current WAS area and take into account built and natural features like sheds trees and the like. Varying construction techniques can be used to minimise disturbance and to limit any impacts to structures.

Examples of this type of installation are the areas

- north of Queen Elizabeth Drive; and
- Little Cutters Corn.

5.7.3 Rural Area WAS Expansion

These areas are generally the more challenging give the ability to align sewers that command all dwellings and buildings and allow for feasible construction in the steep valleys which are predominantly in the Emily and Slaughter Bay catchments.

The installation of gravity sewers provides for the best Whole of Life Cost (WOLC) outcome over the longer term given the primarily passive system to collect sewage. This will require significant investigation and walking of future alignments to determine the construction feasibility of the lines. Preliminary concept design had been prepared in Figure 13 & 14 based on the current contours, location of dwellings and to ensure appropriate grades. In some location the level of constrain from vegetation is unknown as areas vary from regrowth weed and invasive species, to plantations and to remnant forest.

Notwithstanding, the design approach is completely consistent with the current WAS scheme which has been installed in similar terrain and conditions. Recently clearing along the alignment of the existing WAS completed to provide for improved access for maintenance and inspection reveals the form of how this can be achieved.

Examples of this type of installation are the new catchments of:

- Middlegate,
- Rooty Hill,
- Ferny Land North & South.

5.8 *Adopted Sewerage Standards*

Typically, the Desired Standard of Service set out the:

- **Planning Standards** – how sewers service properties and what alignments do they take.
- **Design Standard** – engineering and hydraulic specifications how are the networks sized and what level of performance is expected to give the location and need for passive and active assets; and
- **Construction Standards** – how are the assets built - what materials finishes and construction methods are used.
- **Maintenance Standards** – how are the assets maintained and repaired.

This information is important to provide clarity and certainty in respect of the scope of infrastructure, how it will be operated and maintained and the like lifecycle costs of the asset bases. It will allow for a greater consistency in design, construction and asset information specifications across the island.

The Environment Regulations 1990, Schedule: Norfolk Island Planning Code - Chapter 4 Sanitation deals with the design and construction standards for sanitary fixtures and septic systems.

NIRC does not have any current policy position or documentation in respect of the Desired Standards of Service for the sewerage network. It is important for certainty in the performance of the network and future design requirements that a standard or variation of it is adopted to guide future decision making and outcomes.

On that basis Council should consider adopting a relevant standard from a similar jurisdiction to guide future planning, design and construction work.

5.9 *Funding*

The revenue required to meet the running costs of the wastewater network is sourced from several streams. Current funding pathways include:

1. Rates, Fees and Charges Revenue
   – including Water Assurance Scheme charges
2. Developer Contributions under Part 6 of the *Planning Act*
3. Commonwealth Grants and Subsidies
4. Commonwealth Service Delivery Agreements (SDA)

At present, no funding has been allocated to support individual landowners with the maintenance or upgrade of On-site Wastewater Management Systems (OWMS). Property owners remain responsible for ensuring their systems are functioning properly and meet regulatory and environmental standards.

5.9.1 NIRC Revenue

Exclusive of grants and subsides NIRC is predominantly funded by general rate revenue and operation of business activities such as the liquor bond, tanalith wood processing, wastewater, telecom and electricity etc. This revenue is used broadly to operate the Council administration and fund essential services provided by the Council.

Whilst there are separate revenue sources, under the revenue policy such varying streams are not hypothecated (i.e. isolated) to fund a particular cost centre (ie. the electricity tariffs are not tied to solely fund the operational costs of the electricity network).

It is clear that the capacity to generate revenue is limited on island and as a consequence limited new funding is available to supplement the WAS charges for initiatives beyond business as usual.

Own source revenue is not sufficient to deliver day to day operations and maintenance without the support provided from Commonwealth grants and subsidies which is subject to ap[plication and the priorities of the federal budget. Changes to both rates and tariffs need to be considered to try and strike a balance between the needs of Council and the ability to pay.

5.9.1.1 Water Assurance Fees and Charges

Current WAS charges are set out within the Council Fes and Charges Schedule. The utility charges are applied under the Water Assurance Charges Act (WACA) 1991 and can be applied on a quarterly or annual basis.

User Pays

The WACA sets up a key principle under section 2A – Approved Fees being:

> *"The approved fees are payable for services provided in accordance with this Act, including services provided in relation to the connection of premises."*

This is supported by the Act Section 2.- Interpretation, sub section (3) that states:

> *"For the purposes of this Act, premises are to be taken to have been connected at the time when a sanitary facility that is in or on the premises is first able to be effectively discharged into a sewer."*

These provisions establish the fundamental principles of service based charging acknowledging the contract between a supplier of service, in this case the Council, and the beneficiary of that service being the customer who has an obligation to pay for that service.

Given there has been over 30 years since the WAC legislation was delivered and the network constructed there has been significant changes to the urban land uses of premises and operation of the scheme. These changes have included additional premises being connected with a variety of residential and non-residential (i.e business) uses. There also have been new

network extensions and connections delivered. Not all these changes had been reflected in the records of Council nor had the legislation kept abreast of more recent developments.

Notwithstanding, Council has now developed improved records of the network infrastructure including the connected premises and the related land use of those premises. There has also been work done to ensure some connected properties discovered in that process are now being charged. This has ensured that the underlaying principle of 'user pays' has been established and recorded as part of ongoing management of the WAS.

Charge Setting

The pricing of Water Assurance Scheme (WAS) charges has been set with a focus on affordability and capacity to pay, rather than being based on a detailed calculation of full cost recovery for the scheme's capital and operational expenses.

At this point in time, limited detailed assessment of future capital works has been undertaken beyond the current investigations for the replacement of the treatment plant. Other allowances have been made in the AMP for capital maintenance or renewal of identified degraded assets at this time a comprehensive long-term funding strategy is still to be developed.

When fully investigated as part of the future asset management planning, NIRC will be better informed as to the extent of cost recovery achieved through the current level of revenue generated from the WAS charges.

In contrast, for properties using On-site Wastewater Management Systems (OWMS), the full responsibility for the cost of installation, maintenance, upgrades, and compliance rests with the property owner. At this time, no public funding or subsidies are available to support individual landowners with the upkeep or replacement of OWMS infrastructure.

5.9.2 Development Contributions under Planning Act

Given the extent of asset planning, costings and development information being generated out of the current infrastructure planning and asset management investigations NIRC is beginning to hold the inputs necessary to develop a Contributions Scheme under the Planning Act – Part 6. This charge could be applied to new connections to 'buy into' the scheme and pay for their proportional use of capacity in the WAS.

The contribution would be determined on a Service-based charging basis which is likely to be discounted to provide a reasonable cost to access the network of infrastructure. In simple terms it would apportion the current day capital cost of the existing and planned future network over the existing and planned future connections.

Given the high capital cost of delivery and the relatively small number of connections it is unlikely that the full cost could be reasonably applied to determine the contribution rate per connection. This combined with the lower levels of development would mean it would be only seldom used and offer limited reliable revenue.

It is unlikely that such a scheme would provide consistent or sufficient revenue. The costs of implementation would outweigh the practical benefits in the current context.

5.9.3 Commonwealth Funding

Traditionally, shortfalls in funding on Norfolk Island have been meet through capital grants or ongoing Service Delivery Agreements (SDA) from the Commonwealth. However, these forms of funding are not guaranteed nor are they predictable and reliable. Another aspect is that confirmation of funds may come at varying times of the asset planning and delivery cycle being somewhat unpredictable.

The form and nature of these levels of financial assistance will in the future be better informed by the AMP's that will document the:

- expenditures necessary on the current network to maintain and operate the infrastructure at the desired level: and
- capital investment required to meet the expansion and growth in demand.
- Recognition that financial support is needed to assist with upgrade and maintenance costs.

The objective being to move to a prioritised model of delivery around the identified risks and broader shared objectives of the Council and the Commonwealth. Modelling of the financial implications of these demands will be an important feature in providing the necessary evidence base to support the business case for investment. This will mark a change from reactive funding to more strategic and proactive planned funding and asset delivery.

With the need for major renewal and upgrades, significant investment is required consistent with the funding provided for the Sewage Treatment Plant. Data driven asset management planning is critical to set priorities and provide long term planning and efficiency in operations and delivery. Council has invested in this area over the past 2 years and continued endeavours are required to overcome known issues.

Whilst there are no guarantees the improved evidence will be able to support better Whole of Life decision making and related investment.

6.0 On Site Wastewater Management

6.1 *Current Status*

On-site Wastewater Management Systems (**OWMS**) are currently used by households, smaller tourist accommodation and some commercial premises that are not proximate or connected to the WAS to otherwise collection and treat their wastewater. Most of the properties have septics while more recently a number have Advanced Wastewater Treatment Systems (AWTS) with tertiary treatment (disinfection).

In 2022 NIRC undertook a survey of OWMS in the KAVHA (Slaughter and Emily Bay) Catchment. This study highlighted the high number of failing systems due to age, capacity or lack of appropriate maintenance.

The graph below in **Figure 15** is an extract of the analysis system failure risk which could be considered representative of the OWMS on island. Some particular sub-catchments and the broader area had “high risk” system failure rates of 50%.

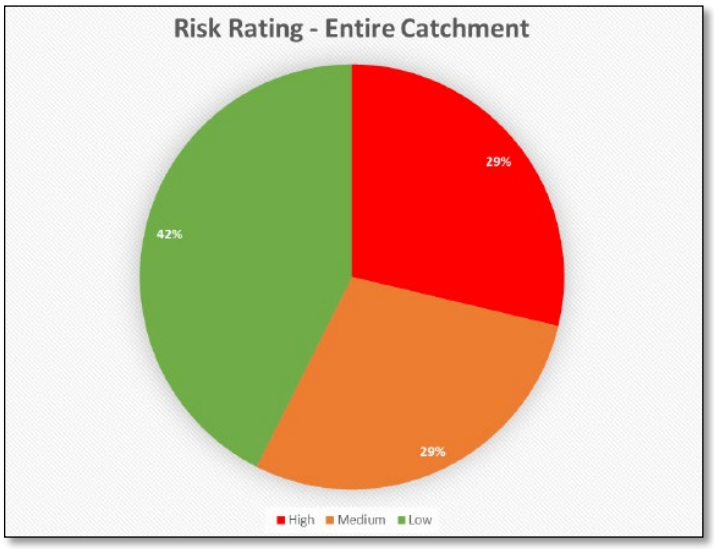

Figure 15 - KAVHA OWMS Failure Risk

OWMS are effective when properly designed to meet the site conditions and where appropriate maintenance and inspection routines are implemented in accordance with manufacturers' requirements. This assists the system in operating appropriately for its design life. Failure to maintain the OWMS appropriately can impact public health, the environment, the resident amenity and property value.

6.2 *Current OWMS Performance*

A significant number of the existing OWMS were installed on the island prior to the creation of Norfolk Island Regional Council, as such, there are limited records of the existing systems, including manufacturer details, installation dates, system type and plans, size, maintenance regime etc. NIRC are now working to retrospectively compile a register of the existing systems.

It is understood that there are significant numbers of OWMS which have passed their design life, are not adequately maintained and are not treating effluent efficiently and/or are failing. Of the approximate 1,000 Private Septic Tanks installed on the island, NIRC believes that based on the KAVHA inspection process as high as 30-35% of systems may be failing.

The inspections were visual and non-destructive. It was evident that:

- 30% were High Risk
  - systems were very clearly failing due to evidence of very poor condition including:
    - undersized tanks,
    - direct wastewater leakage from the tank and/or
    - inundated discharge trenches.

- 30% were Medium Risk,
  - Evidence of emerging issues that will lead to potential failure.

Analysis of dwellings served by septics against the setback criteria in DCP No.2 in **Figure 3** - Setback Buffer to Septic Systems demonstrates that nearly all fail to comply with the required setback distances from waterways or water supply bores.

A number of failing systems discharge effluent into the Slaughter and Emily Bay catchment. The poor condition of these systems, as well as their proximity to waterways, have led to both surface and groundwater contamination and poses a risk to public health, and sensitive and unique ecosystems such as the reef in Slaughter and Emily Bays.

These failing systems require suitable maintenance or replacement to ensure compliance with the Performance Criteria detailed in AS1546 and to ensure adverse impacts are prevented. Alternatively, if these properties are located within the WAS, it is preferred for these properties to connect to the sewer network and decommission the existing OWMS.

Currently, there is no financial assistance or subsidy available to landowners for the upgrade, replacement, or maintenance of OWMS. This represents a significant financial burden for affected property owners and presents a barrier to addressing known environmental and health risks in these catchment areas.

6.3 *Design Standards*

Such issues are set out in NIRC's **DCP No.2 Water Resources** which identifies design and siting criteria.

Any proposed new dwelling outside the WAS or replacement of OWMS requires approval from NIRC under the Environment Act 1990 Section 51. The applicant is to demonstrate their assessment and evaluation using NIRC's *Rapid Evaluation Procedure for On-Site Wastewater Management*, as specified in DCP No. 2 – Water Resources. This procedure includes four stages to guide applicants through assessing site requirements and helps determine relevant constraints and limitations to achieving ecologically sustainable OWMS. This is achieved through minimum assessment parameters and design criteria including the following:

i. Proximity to any waterways including groundwater bores;
ii. Soil type;
iii. Slope;
iv. General landform;
v. Site drainage;
vi. Area of the subject land;

vii. Aspect of the land;
viii. exposure;
ix. potential for flooding/inundation;
x. density of the use or development;
xi. proximity of adjoining use or development; and
xii. potential 'effluent disposal field size'.

6.3.1 Pre-approved Facilities

New On-site Wastewater Management Systems (OWMS) must be systems that are approved for use on Norfolk Island and capable of meeting environmental and public health requirements.

A list of suitable and commonly accepted systems is available to assist landowners and applicants in making informed choices. Property owners are encouraged to consult with system manufacturers and local plumbers to determine the most appropriate system for their site—taking into account factors such as performance, ease of maintenance, and availability of parts or consumables.

https://www.business.qld.gov.au/industries/building-property-development/building-construction/plumbing-drainage/on-site-sewerage

6.4 *OWMS Key Management Issues*

Registers
- There is no formal register of the island's OWMS or any details of the condition and other key facts and circumstances.
- No accurate mapping exists of the location of the systems and mapping to date is an approximation based on dwellings and some aerial photography.

Approvals
- New installations are made through applications and approvals with conditions which sets out the treatment type, the location of the facility and requirement for the system to be maintained.
- Inspection can be undertaken at the commencement of its operation but there is no formal ongoing inspection and testing regime in place to ensure appropriate management and maintenance of these systems.

System Performance
- From the limited inspections undertaken a larger proportion of the OWMS may be failing and action is required to have the systems operate in accordance with the design standards.

Operation and Maintenance
- Currently it is entirely up to the landowner as to the degree of maintenance and system performance.
- As noted above, beyond the approval and conditions for construction, there is no formalised procedure / policy for conducting OWMS inspections.
- Some powers exist to ensure these systems are managed appropriately and to direct the owner to address failures, but these have not been formalised or implemented to date.

PART 2 – WMS Action Plan

The Action Plan seeks to distil the key management issues that have been identified in Part 1 - Background Review and set about a structured set of actions to overcome or mitigate the risks identified with the current operation of the Water Assurance Scheme (WAS) or the Onsite Wastewater Management Systems (OWMS).

The Actions will be determined separately for the WAS and OWMS.

The types of actions follow the logical process of infrastructure delivery and includes:

1) Consultation
2) Investigation
3) Planning
4) Design
5) Construction
6) Operation and Maintenance
7) Governance
8) Funding

8.0 Water Assurance Scheme – Action Plan

Actions	Objective	Priority	Resources	Funding	Progress	Completion Date
Consultation / Information						
1. Facts Sheet – What is the Water Assurance Scheme	Overview of the WAS, where is it, how it operates and what is the benefits to the landholder, community and environment from having it in place	Medium	NIRC	New	Not Commenced	Planned for 25/26
2. Facts Sheet – Network Mapping and Ground Truthing	To advise community about the program to undertake ground truthing of the current network mapping and where possible identify the location of connections. Scope may include CCTV and Smoke Testing.	Medium	NIRC	New	Not Commenced	Proposed 26/27
3. Improved mapping	Modern mapping helps plan and maintain wastewater, stormwater, efficiently. • Identifies service gaps and risk areas (e.g., septic system locations near coastal zones). • Supports upgrades and long-term infrastructure planning.	Medium	NIRC	New	Not started	Proposed 2026/27
4. Facts Sheet – Future Network Planning	To advise community that extensions to the sewer network are being planning to reduce risks in the Slaughter and Emily Bay Catchments and to provide service to higher density urban areas where feasible.	Medium	NIRC	New	Not Commenced	Planned for 25/26
5. Facts Sheet - Proposed Major Works	To advise community about major projects including KAHVA Sewerage and Planning and Design of STP	Medium	NIRC	New	Not Commenced	Proposed 26/27
Investigation						
1. Sewer CCTV Inspections	To continue to inspect all sewer mains in the network to identify any asset maintenance issues and to determine general network conditions for AM. Footage should be retained, catalogued and linked to GIS for future reference	Medium	NIRC	Current	Substantially Commenced	Started ongoing
2. Manhole Inspections	Progressive program of inspecting each manhole and recording issues that need to be addressed including root intrusion, silting over, segment displacement	Medium	NIRC	Current	Commenced	Started ongoing
3. Pump Station Monitoring	Telemetry and related monitoring of Pump Starts, Run Time and Flow rates	High	Contractor/ NIRC	New	Commenced	Planned for 25/26
4. Property Connection Inspections Smoke Testing	In areas of suspect higher inflow undertake smoke testing to ensure appropriate connections are made to the sewer.	High	Contractor/ NIRC	Current	Not Commenced	Planned for 25/26
5. New Sewer Alignment - Feasibility	Ground truthing by walking the concept alignments in the Planning Phase to determine risks, alignment challenges and overall feasibility of delivery.	Medium	NIRC/ Consultant	New	Not Commenced	2026-2030
6. New Sewer Alignment - Survey	Following the Concept Planning and Feasibility assessment above for the future alignments undertake survey to properly located site details (buildings, structures major trees) and to establish site contours along the proposed routes.	Medium	Consultant	New	Not Commenced	2026-2030

Actions	Objective	Priority	Resources	Funding	Progress	Completion Date
7. Water Quality Monitoring	Continue regular water quality monitoring in sensitive catchments to provide evidence of the issues being present but also progress on improvement or decline in catchment health	High	NIRC	Current	Ongoing	Ongoing
8. As Constructed Survey	Establish greater certainty of network ahead of Network Hydraulic Modelling particularly in areas of known pipe issues on flat grades and critical points in the network such as pump station and discharge manholes	Medium	Consultant	New	Not Commenced	2026-2030
9. Grease Trap Regulation	Investigate the legislative and related powers to require the installation and maintenance of grease traps on commercial kitchens and other sources of FOG which is not managed before entering the sewerage network.	High	NIRC/ Consultant	New	Not Commenced	Proposed 2026/27
Planning						
1. Concept Planning of New Network Extensions	Planning the provision of new connections to existing dwellings and business premises. Planning to prioritise the High Density unsewered areas, Slaughter and Emily Bay Catchment, premises in close proximity to the existing network in the Urban Zoned Land.	High	Consultant	Previous	Completed	Completed
2. Network Demand Model	Given the additional demands from the KAVHA and the proposed new sewered areas it would be necessary to determine the performance implications for the network. A hydraulic model will determine if the pipe and pump capacity will be adequate as well as inform the ultimate sewage treatment plant (STP) sizing.	Medium	Consultant	New	Commenced 2024	2025/26
3. Options Assessment and Specification of Optimal STP Process	Given the failure of the current STP undertake the necessary investigation and planning for a fit for purpose STP that can cater for the sewage loads and type on Norfolk. Also ensure the logistical issue of the island are contemplated with the design to limit the need for imported and exported material.	High	Consultant	Current	Substantially Commenced	Sept 2025/26
Design						
1. Preliminary Design of New Sewer extensions	From the Concept Design in the Planning Phase prepare Preliminary Engineering Drawings • Prioritising design based on risk • Preliminary design based on early phase alignment confirmation • Preparation of long sections including grading and set out and alignment plans to allow for informed consultation	High	Consultant	Current	Not Commenced	2026-30
2. STP Design	Following a determination of the Optimal Sewer Process set about undertaking the appropriate design which provides a cost effective and fit for purpose solution.	High	Consultant	Current	Design Underway	2025-26
3. Network Upgrades – Capacity or Performance	As a result of the network hydraulic modelling consequential pipe and pump upgrades may be necessary to ensure continue low incident operation or to provide for increased capacity	Medium	Consultant	New	Not Commenced	2026-30
4. Grease Trap Planning	Prepare a potential capital work program to provide grease traps into all commercial food premises within the WAS. The program will include: • Review of legislation, regulation and policy relevant to these assets. • Investigation of the target premises and feasibility of connection • Planning and sketch planning • General consultation and discussion concerning impact of FOG • Discussion and liaison with affected parties • Design	High	Consultant	New	Not Commenced	2026-30

Actions	Objective	Priority	Resources	Funding	Progress	Completion Date
	• Procurement					
5. Grease Traps Installation	From land use and network data identify most appropriate properties to install grease taps to arrest FOG entering the sewerage system to reduce build up in pipe network and particularly the pump stations.	High	Contractor	New	Not Commenced	2026-30
6. Design of Telemetry System for Pump Stations	Implementation of telemetry would provide for increased efficiency in use of NIRC resources and also provide for greater data to improve operational efficiency and electricity usage. Impacts of wet weather would also be quantified to support targeted action in the network to limit infiltration.	High	Contractor	New	Quote Obtained	Proposed 202/26
Funding						
1. Detailed AMP including financial modelling	The initial Asset Management Plan has provided insights into the shortfalls in new and recurrent expenditure to maintain the network at the appropriate standard. Future iterations and refinements to the resultant cashflow analysis will provide clarity as to the funding shortfalls and the trade-offs for both Council and the Commonwealth to consider going forward. This work should inform the 10year Long Term Financial Plan. At present the LTFP is only part funded as it can only focus on operations and limited maintenance. With the exception of the STP funding, there is no new revenue to support other necessary endeavours in the strategy.	High	Consultant	Previous	Completed	Completed 2022-2023-2024
2. Capital Works Planning	10-year Capital Plan which forms part of the AMP and LTFP is necessary to focus on new capital investment and increased renewal funding in the short to medium term. This is necessary to meet new demands of an expanded network, to deliver necessary changes in standards of service and to also bring the current network back to full operational capacity and performance.	High	Consultant	Previous	Completed	Completed 2024-25
3. Funding Sources	The data and modelling undertaken in the AMP can be used to determine the extent to which: • NIRC - WAS Charges • NIRC – Consolidated Revenue • Commonwealth - SDA Funding • Commonwealth - Grants Can be used to meet the agreed future outcomes and standards of the Water Assurance scheme	High	NIRC/ Commonwealth	New	Not Commenced	Ongoing
Construction/Delivery						
1. Delivery of New Sewer Extensions	Network Extension Program - Construction of Sewers based on prioritised and Stage program of works	Medium	Consultant / Contractor	New	Not Commenced	2026-30 TBC
2. Delivery of Sewer Upgrades	Sewer Network Renewal Program - Replacement of sections of the current network based on risk of failure	Low	Consultant / Contractor	New	Not Commenced	2026-2030 TBC
3. Delivery of new STP	Replacement or restoration of STP to provide additional/recovered capacity and to treat influent to the appropriate standard for the receiving waters. Includes new receiving point for tanker waste form holding tanks, septics and FOG from grease traps	High	Consultant / Contractor	New	Not Commenced	25/26 funding dependent
4. Installation for Grease Traps	Grease Trap Program – subsidised delivery of grease traps on private premises to arrest FOG from entering the network Such grease traps would then need to be registered for trade waste and serviced and inspected on a regular frequency.	High	NRIC / Contractor	New	Not Commenced	2026-30 TBC
Operations and Maintenance						

Actions	Objective	Priority	Resources	Funding	Progress	Completion Date
1. Current Scope	Continue with current rounds of high frequency PS and STP cleaning an inspection. When time permits opportunistic inspections and investigations of the network CCTV. Continue maintenance of access tracks and manholes for water and root ingress.	High	NIRC	Current	Ongoing	Commenced & ongoing
2. Post Grease Trap Installation	• Monitoring of grease trap clearance and pump out in early phases. • Determination of volumes and frequency to assist in process planning; • Determination of appropriate way to integrate FOG into the treatment plant	High	NIRC	Current	Not Commenced	2026-30 TBC
3. Post STP Upgrade	Further reduce time on STP inlet cleaning and divert time to: • Documented STP operations • Preventative maintenance of network • Routine network investigations CCTV and smoke testing • Improved use of technology to guide operations and management decisions	High	NIRC	Current	Not Commenced	2026-30
Governance						
1. Legislation Reform	Given the duplicitous arrangements around sewerage networks under the various Acts in force on Norfolk Island these must be rationalised through reform processes which are targeted at efficient whilst protecting public health and the environment. It must allow for the appropriate controls and powers to ensure the operation and maintenance of the network is a key outcome.	High	Commonwealth Consultants	New	Not Commenced	2026-30
2. Design Code	Adoption of relevant Network Design and Plumbing and Drainage Code • Planning, Design and Construction Standards • Investigation of appropriate vehicle for implementation (e.g planning scheme or local laws) • Ensure Code is used for both NIRC and private projects	Medium	Consultants / NRIC	New	Not Commenced	2026-30
3. Connected Premises Register	Following data analysis and field investigations, it is important that those connected to the network or those that should be connected as a result of the Environment Act and DCP are brought into a fair, transparent and comprehensive register of connected premises. This will ensure that there is equity in the charging of services and the distribution of costs to those benefiting from the service.	High	Consultants / NRIC	Previous	Ongoing	2023-24-25
4. Continual AMP Review	The AMP is an important document that must be continually reviewed and improved as it captures the issues with the network being experienced by the operational field staff, models the expected maintenance and renewal requirements and seeks to plan and provide necessary inputs for budgeting. As additional investigation and planning work is done this needs to feed into the AMP along with the operational experience to inform the plan and its outputs.	High	Consultants/ NIRC	Current	Ongoing	2024-25 ongoing
5. Trade Waste Policy	With the prospect of increased tankering of grease trap waste, increased maintenance of septic and AWTS and some conversion of OWMS to holding tanks a revised policy and pricing structure for trade waste needs to be developed. This includes greater controls on how and when waste is disposed into the system to ensure that shock loading of particular strength effluent is managed through the STP process.	Medium	Consultants/ NIRC	New	Not Commenced	2026-30

9.0 On-site Wastewater Management System – Action Plan

Actions	Objective	Priority	Resources	Funding	Progress	Completion Date
Consultation Scope						
1. OWMS Issues and Facts	Production of a series of facts sheets for owners of OWMS can refer to become better informed of the issues and the obligations of using a OWMS.	High	Consultant	New	Commenced	Started 2024/25 completed 2025-26
2. OWMS Town Hall - Information Sessions	Discussion/talk points: • Use of OWMS • Prevalence on island • Identified issues with OWMS • Impacts from failing systems • Risks and legal consequences (e.g contamination of land and water) • Planned inspection program	High	NIRC / Suppliers	New	Not Commenced	2025-30
3. OWMS – Field Days 2026-30	Hold "on site' sessions at an operating OWMS to show residents how to inspect, maintain and manage these systems. This might include the following activities: a) Review of failing system – tank failure, trench failure etc b) Review of Optimal System – what it should look like c) Undertaking inspection and maintenance – what's the checklist d) Scheduled contractor maintenance – what to book in when	Medium	NIRC / Suppliers	New	Not Commenced	2026-30
4. Facts Sheet - Septic	Documenting information regarding the operation of system including maintenance and siting considerations	High	Consultant/ NIRC / Suppliers	Previous	Completed	Started 2024/25 Completed 2025/26
5. Facts Sheet - AWTS	Documenting information regarding the operation of system including maintenance and siting considerations	High	Consultant/ NIRC / Suppliers	Previous	Commenced	Started 2024/25 Completed 2025/26
6. Facts Sheet – Greywater treatment systems	Documenting information regarding the operation of system including maintenance and siting considerations	High	Consultant/ NIRC / Suppliers	Previous	Commenced	Started 2024/25 Completed 2025/26

7. Facts Sheet – Holding Tank	Documenting information regarding the operation of system including maintenance and siting considerations	High	Consultant/ NIRC / Suppliers	Previous	Not Completed	Proposed 2025/26
Investigation						
1. OWMS Site Inspections	Council may consider offering for limited time a 'free' service for a plumber/s engaged by NIRC to inspect and provide checklist review of OWMS with recommendations for repairs and maintenance. Comprehensive inspections are required to determine performance, and any operational risks includes GPS locations to allow for spatial analysis and record keeping. This includes the tank, disposal trenches and location of any water bores on site.	High	NIRC / Contractors	New	Not Commenced	2026-30
2. Septic and AWTS Supplier Review/ Panel of Providers	Go to market based on Qld Government list and seek out those willing to export to and service the island.	High	Consultant / NIRC	New	Not Commenced	2026-30
3. Plumbing Skill Audit	To determine the breadth and depth of skills and experience in maintaining the various systems prevalent or likely to be prevalent on the island.	High	NIRC / Consultant	New	Not Commenced	2025-30
4. Bore Water Quality Testing	Sampling at all bore on each property inspected to check for common bacteria and pathogens that would be associated with sewage waste	High	NIRC	New	Not Commenced	2026-30
Planning						
1. Buffer Review and Planning	Part 1 - Spatial analysis of setbacks of systems and disposal areas from bores, watercourses and other sensitive receivers. Part 2 – Review of analysis in Part 1 based on improved data captured as part of site investigations.	High	Consultant	New	Part 1 – Completed. Part 2 – Not Commenced.	2026-30
Design						
Not Applicable						
Construction/Delivery						
Not Applicable						
Operations and Maintenance						
Not Applicable						
Governance						
1. Development of OWMS Register	To be developed from the site-based investigation of systems.	Medium	NIRC	New	Not Commenced	2025/30
2. Legislative Review	Consistent with reform to streamline the WAS similar clarity and efficiency is necessary to regulate the planning, design, installation and ongoing maintenance of OWMS. This is also tied to a fit for purpose and logical inspection program to ensure the systems are operating as required to maximise treatment outcome and to minimise harm.	High	Commonwealth / Consultants/ Norfolk Island representatives	New	Not Commenced	Norfolk Island representative 2025-26
3. Design Guidelines (DCP2 - Review)	Based on additional investigations and data analysis in the Planning Phase, amend as necessary the design requirements under DCP 2 (or any new equivalent) to guide the use of OWMS.	Medium	Consultant / NIRC	New	Not Commenced	2026-30
4. Site Inspection and Compliance Rules	A range of options exist for the regulation and compliance of OWMS to improve performance and to limit harm. It is proposed that a range of facts sheets and information sessions and field days are held to lift the overall awareness and understanding of their operation. Based on this, a system of registration and regular inspections would be a desired outcome.	Medium	Consultant / NIRC	New	Not Commenced	2026-30

	A nominal fee could be applied to assist in the meeting of costs for inspection and compliance matters.					
Funding						
1. Registration Fees	Investigated a suitable fee structure and capacity to pay before determining if a registration fee should apply.	Low	NIRC	N/A	Not Commenced	2025/26

References

https://www.business.qld.gov.au/industries/building-property-development/building-construction/plumbing-drainage/on-site-sewerage

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Ends.