National Wastewater Sludge Management Plan

SEA Statement

September 2016

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APPENDICES

1 INTRODUCTION

This Strategic Environmental Assessment (SEA) Statement has been prepared as part of the SEA of the National Wastewater Sludge Management Plan (NWSMP) in accordance with national and EU legislation. This document provides information on the decision-making process and documents how environmental considerations, the views of consultees/stakeholders and the recommendations of the Environmental Report and the assessment carried out under Article 6 of the Habitats Directive have been taken into account by, and influenced, the final adopted plan.

The NWSMP and associated environmental documents have been prepared by Irish Water, the single utility providing water and wastewater services nationally. This SEA Statement has been prepared in accordance with Article 8 (Decision Making) of EU Directive 2001/42/EC on Strategic Environmental Assessment; Article 16(2) of the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations (S.I. No. 435 of 2004) as amended; and Circular Letter PL 9/2013, Department of Environment, Community and Local Government.

The structure of the SEA Statement is as follows:

1. Introduction;
2. Summary of Key Facts;
3. Summary of the SEA Process;
4. Influence of the SEA Process on the NWSMP;
5. How Consultation Feedback has influenced the NWSMP;
6. Preferred scenario and reasons for choosing the final plan;
7. Measures to monitor significant environmental effects of the implementation of the adopted NWSMP; and
8. Addendum to Environmental Report

2 SUMMARY OF KEY FACTS

Title of Plan:	National Wastewater Sludge Management Plan
Purpose of Plan:	The National Wastewater Sludge Management Plan (NWSMP) sets out the short, medium and long-term strategy for the management of sludge produced at wastewater treatment plants under the control of Irish Water. The plan is focused on providing a national approach to ensure that, for the first time, treated wastewater sludge across the country is effectively managed, stored, transported and disposed of or re-used in a sustainable way, to the benefit of the public and the environment we all live in. The proposals of the NWSMP will be used to inform future capital and operational activities in relation to sludge management.
Competent Authority:	Irish Water
Period Covered:	The NWSMP sets out Irish Water's high level strategies for wastewater sludge management over a 25 year horizon. The NWSMP will have ongoing five yearly reviews.
Area of Plan:	The NWSMP is a national plan for the management of sludge arising from facilities under the control of Irish Water. The plan covers the Republic of Ireland.
Nature/Content of Plan:	The NWSMP takes into account current legislation and guidance documents in relation to the treatment and utilisation of wastewater sludge in addition to potential environmental impacts and sustainability of proposals. The NWSMP sets out a strategy for future capital works, operating procedures, quality control and risk management systems to ensure a sustainable strategy for wastewater sludge management.
Date NWSMP came into effect:	19th September 2016
Main Contact:	National Wastewater Sludge Management Plan Irish Water Colvill House, 24-26 Talbot Street, Dublin Email: nwsmp@water.ie

3 SUMMARY OF SEA PROCESS

The NWSMP has been subject to a process of SEA, as required under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations S.I. No. 435 of 2004, as amended by S.I. No. 200 of 2011. This has included the key steps described in the following sections.

3.1 SCREENING

Screening was carried out to establish if an SEA was required for the NWSMP. Screening of the NWSMP was undertaken by Irish Water in 2014. In the context of the S.I. 435 of 2004 (as amended), it was determined that the NWSMP would require SEA.

3.2 SCOPING AND STATUTORY CONSULTATION

Scoping was carried out to establish the level of detail appropriate for the Environmental Report. A Scoping Report was prepared and published in May 2015 and this was used as the basis for statutory and non-statutory consultations. Statutory consultation was undertaken with the five statutory consultees for SEA in Ireland as follows:

1. Environmental Protection Agency (EPA);
2. Department of Arts, Heritage and the Gaeltacht (DAHG) [1];
3. Department of Agriculture, Food and the Marine (DAFM);
4. Department of Communications, Energy and Natural Resources (DCENR); and
5. Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government)

A workshop was held at the offices of Irish Water in Dublin on 7th July 2015 and all statutory consultees were invited. Also, transboundary consultation was undertaken with the Northern Ireland Environment Agency (NIEA).

Non-statutory consultation was also undertaken. To facilitate this, the Scoping Report was formally put out for consultation for a period of 6 weeks (12th May to 24th June 2015). A notice was placed in the *Irish Independent* on 12th May 2015 announcing that scoping was underway and inviting submissions. The scoping report was also placed on a dedicated web page of the Irish Water website www.water.ie/wastewater-sludge-management. The submissions are also summarised in the *National Wastewater Sludge Management Plan Consultation 1 Report*.

All submissions received from statutory and non-statutory consultation were considered in preparation of the Environmental Report. All of the environmental topics listed in the SEA Directive were considered and all were scoped in for the purposes of the assessment.

[1] Note: A number of these Departments have since changed name in 2016.

3.3 ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL REPORT

The preparation of an Environmental Report on the likely significant effects on the environment of implementation of the NWSMP included consideration of:

- Baseline data relating to the current state of the environment report;
- Links between the draft NWSMP and other relevant strategies, policies, plans, programmes and environmental protection objectives;
- Key environmental problems affecting wastewater sludge management;
- The likely significant effects of the NWSMP on the environment (both positive and negative);
- Measures envisaged for the prevention, reduction and mitigation of any significant adverse effects;
- An outline of the reasons for selecting the alternatives chosen; and
- Monitoring measures to ensure that any unforeseen environmental effects will be identified, allowing appropriate remedial action to be taken.

3.4 STATUTORY CONSULTATION ON NWSMP

On 23rd March 2016 the draft *National Wastewater Sludge Management Plan* was published for public consultation alongside the SEA Environmental Report and the Natura Impact Statement (NIS). The deadline for receipt of submissions was the 18th May 2016. A total of 23 responses were received from a wide range of stakeholders and interested parties including government departments, waste and environmental services companies, professional bodies, industry bodies/chambers of commerce, community and voluntary /NGO groups, local government and other interested parties. **Table 3.1** identifies the organisations and individuals that made a submission.

Table 3.1 – Organisations/Individual Making Written Submissions

Ref.	Organisation/Individual
1	Confederation of European Waste-to-Energy Plants (CEWEP)
2	Clogrennane Lime Ltd.
3	Clonaslee Tidy Towns
4	Cré
5	Department of Agriculture, Food and the Marine (DAFM)
6	Enva Ireland Ltd.
7	Environmental Protection Agency (EPA)
8	Galway County Council
9	H&L Environmental Services Ltd.
10	IBEC
11	Irish Grain and Feed Association (IGFA)
12	Irish Farmers Association (IFA)
13	Indaver Ireland
14	Insinkator
15	Irish Cooperative Organisation Society (ICOS)
16	Kerry County Council

Ref.	Organisation/Individual
17	Northern Ireland NIEA
18	Response Engineering Limited (Response Group)
19	Sustainable Water Network (SWAN)
20	Technology Centre for Biorefining and Bioenergy (TCBB)
21	The Agricultural Trust
22	Tipperary County Council
23	Zero Waste Alliance Ireland

The submissions are summarised in the *National Wastewater Sludge Management Plan Consultation 2 Report*. Further details of the key issues raised are presented in Chapter 5 of this SEA Statement.

3.5 APPROPRIATE ASSESSMENT AND NATURA IMPACT STATEMENT

In addition to the SEA, there is a requirement under the EU Habitats Directive (92/43/EEC) (as transcribed into Irish law) to assess whether the NWSMP, individually or in combination with other plans or projects, is likely to have significant effect on a European Site, which includes Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), in view of the site's conservation objectives. The requirement for an assessment derives from Article 6 of the directive, and in particular Article 6(3) which requires that:

> "*Any plan or project not directly connected with or necessary to the conservation of a site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives*."

In recognition of this, an Appropriate Assessment Screening was carried out, in parallel with the SEA process. From this it was determined that AA was required and a Natura Impact Statement was prepared to inform an Appropriate Assessment. The assessment of the NWSMP has been carried out in the context of the scope and content presented in the NWSMP.

The NIS took a precautionary approach and assessed the impacts that would be anticipated from the NWSMP providing the necessary inclusion of mitigation measures and guiding principles at the strategic level of the plan. The policies and objectives of the NWSMP have been devised, as part of an iterative approach, to anticipate and avoid as appropriate measures that would likely have a significant adverse effect upon the integrity of the European Sites. Where such measures might be permitted, on foot of provisions of the NWSMP, they shall be required to conform to the mitigation measures contained in the NIS (as transposed into the draft NWSMP) and to the relevant regulatory provisions aimed at preventing pollution or other environmental effects likely to adversely affect the integrity of European Sites. In addition, all lower level plans and projects arising from the implementation of the NWSMP will themselves be subject to Appropriate Assessment legislation when details of location and design become known.

Through the assessment of the draft NWSMP, it was noted that there is a potential gap in detailed assessment, at lower tiers of planning, specifically in relation to land spreading activities. Land spreading on agricultural lands, where up to 98% of wastewater sludge is currently directed, is

governed by nutrient management planning and although this recognises the importance of protecting soil and water quality, it is uncertain final acceptance of Nutrient Management Plans addresses the protection of European Sites. This gap has been flagged within the NIS and measures have been put in place to address this short coming.

Based on the NIS, and with reference to the scope of the NWSMP, Irish Water has determined that the *National Wastewater Sludge Management Plan* is compliant with the requirements of Article 6 of the EU Habitats Directive as transposed into Irish law.

3.6 SEA STATEMENT

In accordance with article 16 of S.I. 435 of 2004 as amended, the Competent Authority is required to prepare a statement summarising:

a) *How environmental considerations have been integrated into the plan or programmes, or modification to a plan or programme;*

b) *How (i) the environmental report, prepared pursuant to article 12, (ii) submissions and observations made to the planning authority in response to a notice under article 13 and (iii) any consultations under article 14 have been taken into account during the preparation of the plan or programme;*

c) *The reasons for choosing the plan or programme, in light of other reasonable alternatives dealt with, and*

d) *The measures decided upon to monitor, in accordance with article 17, the significant environmental effects of implementation of the plan or programme.*

The main purpose of this SEA Statement is to provide information on the decision-making process for the NWSMP in order to illustrate how decisions were taken, making the process more transparent. In so doing, the SEA Statement records how the recommendations of both the Environmental Report and the Natura Impact Statement, as well as the views of the statutory consultees and other submissions received during consultation have influenced the preparation of the final plan. The SEA Statement also provides information on the arrangements put in place for monitoring and mitigation. The SEA Statement will be available to the public, along with the Natura Impact Statement and the adopted National Wastewater Sludge Management Plan.

3.7 ADOPTION OF THE NWSMP

The NWSMP was adopted by Irish Water on the 19th of September 2016.

4 INFLUENCE OF THE SEA PROCESS ON THE NWSMP

4.1 INTRODUCTION

The SEA and the AA processes have been undertaken in parallel to the preparation of the draft NWSMP. Thus, from the outset, considerations of the environmental consequences of the alternatives have been taken into account. The iterative process ensured that the SEA/AA and the preparation of the NWSMP were integrated in order to meet the environmental objectives and the objectives of the plan.

A considerable effort has been made through the Plan, SEA and AA processes to integrate environmental considerations into the development of the NWSMP. This commenced with the preparation of the strategic vision for the NWSMP which incorporates the principle criterion that the sludge management strategies must provide a secure, sustainable, cost-effective solution to management of wastewater sludge over the life of the NWSMP, taking into account current and anticipated legislative and operational constraints. In addition the strategic objectives of the NWSMP focus on implementation of 5 action areas:

- Policy;
- Administration;
- Review and Research;
- Infrastructure Planning; and
- Protection.

The findings of the SEA and AA have been directly integrated into the plan through recommended mitigation measures for specific actions which promote the sustainable management of wastewater sludge, protection of the environment and the Natura 2000 network ensuring that environmental considerations have been integrated into the NWSMP.

4.2 SUMMARY OF SEA ASSESSMENT

The approach used for the assessment in the SEA is termed an “objectives led assessment”. In this case, each of the draft plan policies and policy actions was tested against defined SEA Strategic Environmental Objectives, as outlined in **Table 4.1**, which covered all SEA environmental topics under the relevant SEA legislation, e.g. population, biodiversity, material assets, etc. A matrix format was used for the assessment, which permitted a systematic approach and comparison of alternatives.

Table 4.1 – Strategic Environmental Objectives

Obj. 1 Biodiversity Flora and Fauna: Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species resulting from Irish Water's wastewater sludge management activities.

Obj. 2 Population and Human Health: Protect and reduce risk to human health in undertaking wastewater sludge management practices.

Obj. 3 Food Production and Safety: To contribute to protection of food safety by ensuring the quality of the wastewater sludge product for land spreading on agricultural land.

Obj. 4 Water: Prevent deterioration of the status of water bodies with regard to quality and quantity due to Irish Water activities and contribute towards the improvement of water body status for rivers, lakes, transitional and coastal waters and groundwaters to at least good status, as appropriate to the Water Framework Directive.

Obj. 5 Air and Climatic Factors: Minimise contributions to climate change and emissions to air (including greenhouse gas emissions) as a result of Irish Water activities in relation to wastewater sludge management and ensure the resilience of related infrastructure to the effects of climate change.

Obj. 6 Material Assets: Provide new, and upgrade existing, wastewater sludge management infrastructure to protect human health and ecological status of water bodies.

Obj. 7 Soils and Geology: Avoid conflicts with, and contribute towards, the appropriate management of soil quality and quantity.

Obj. 8 Cultural Heritage: Avoid damage to cultural heritage resources resulting from Irish Water's wastewater sludge management activities.

Obj. 9 Landscape: Avoid damage to designated landscapes resulting from Irish Water's activities.

4.2.1 Overall Summary Assessment

At the broad level, implementation of the NWSMP is expected to bring environmental improvements, since it outlines actions to promote the sustainable management of wastewater sludge, protection of the environment and the Natura 2000 network. The NWSMP has outlined actions to address concerns from the food sector through better oversight of the wastewater sludge management process from WWTP to reuse / disposal. The NWSMP also includes specific actions to enable farmers and growers to utilise the beneficial properties in wastewater sludge as a valuable and cost effective source of nutrients and organic matter while providing greater comfort in the quality of the wastewater sludge product by improving transparency / compliance in the treatment process. Many of the actions within the NWSMP relate to development of systems to better manage and coordinate existing wastewater sludge activities within Ireland. This will offer protection of the environment, agriculture and human health and as such, the NWSMP will result in a broadly positive impact on the environment. Potential negative impacts have been identified, particularly in relation to provision of infrastructure and landspreading. The SEA identified such areas where mitigation of impacts can be achieved, including siting criteria in relation to the provision of infrastructure and Standard Operating Procedures (SOPs) and Annual Audits of facilities and operators in the treatment and recovery of wastewater sludge. The assessment of policies and related policy actions which are set out in the plan are summarised in **Table 4.2**.

Table 4.2 – Summary Assessment Table

	Overall Impact	Mitigation Measures
Policy	+	✓
Administration	+	✓
Research & Review	+	✓
Infrastructure Planning	+/-	✓
Protection	+	✓

4.3 INTEGRATION OF SEA PROCESS

The SEA and AA processes were ongoing throughout the development of the draft NWSMP, with the corresponding project teams working together to identify potential environmental issues/constraints at the earliest possible stage in the plan-making process. The SEA and AA teams were involved in the:

- Development of the alternatives;
- Evolution of NWSMP actions; and
- Recommendation of mitigation measures to address the potential impacts arising from the alternatives considered.

The SEA and AA processes have ensured that potential environmental impacts (both positive and negative) associated with the draft NWSMP have been given due consideration in the preparation of the plan. **Table 4.3** shows how environmental considerations and the input of the SEA and AA have been taken into account in the final NWSMP.

Table 4.3 – How Environmental Considerations Have Been Taken Into Account in the NWSMP

Environmental Consideration	How has this been accounted for in the Plan?
Identification of environmental constraints	The SEA team undertook an audit of baseline environmental conditions for the plan with reference to biodiversity, flora and fauna, population, human health, food production and safety, soils and geology, water, air quality and climatic factors, material assets, cultural heritage and landscape. This information was used to focus the SEA objectives, develop alternatives and assess positive and negative impacts associated with the implementation of the proposed NWSMP.
Assessment of alternatives	The environmental baseline and objectives were used to identify key sensitivities and inform development of the alternatives and ultimately the assessment of the preferred alternative. The SEA team and the plan team liaised on possible alternatives during preparation of the SEA scoping document and subsequently as the NWSMP evolved through meetings and workshops.
Recommendation of mitigation measures to address impacts on the wider environment	Mitigation measures were proposed to address negative environmental impacts identified during the assessment process. These included amendments to the wording of actions in the plan and inclusion of new actions to reflect protection of the environment and human health. A key aspect of this was the development of environmental protection criteria for inclusion in the plan to ensure that management of wastewater sludge

Environmental Consideration	How has this been accounted for in the Plan?
	nationally is carried out in a safe and secure manner.
Required Environmental Monitoring Programme	An Environmental monitoring programme to track progress towards achieving SEOs and reaching targets was presented in the SEA Environmental Report and has been integrated into the NWSMP. This programme will facilitate the ongoing monitoring of the implementation of the NWSMP.
Consultation	Statutory consultation was undertaken with the environmental consultees for SEA in Ireland in relation to scoping of the environmental report. Issues raised were used to inform the overall scope and context of the environmental assessment. Public consultation was undertaken at the scoping stage and this stakeholder feedback also helped to shape the environmental assessment. Subsequently, the SEA environmental report, the Natura Impact Statement (from the Appropriate Assessment Process) and the draft NWSMP were published. Submissions received have been reviewed by the SEA and plan teams and amendments have been made where appropriate. All changes to the NWSMP have been screened by the SEA and AA teams to determine if they would result in significant effects (see **Appendix A**).

4.3.1 Recommended Mitigation Measures

The assessment of the alternatives and the preferred strategy for the NWSMP resulted in the recommendation of mitigation measures (**Table 4.4** and **Table 4.5**). It is notable that the mitigation proposed by the SEA process was, in the main, integrated into the plan to improve its overall environmental benefits.

Table 4.4 – Mitigation Measures Relating to Assessment of Alternatives

Alternatives	Mitigation Measures Proposed in SEA Environment Report	Included in the NWSMP
No Plan versus NWSMP	Contracts should ensure that wastewater sludge is transported and spread on the nearest suitable spread lands to the source of the sludge to reduce impacts to air quality and climate.	This mitigation was included in the NWSMP in Section 6.3. The full wording as included in the NWSMP is: *Contracts should ensure that, where practicable, sludge is transported and spread on the nearest suitable spread lands to the source of the treated sludge*.
Transport Alternatives	The suitability of sites for the provision of thickening/dewatering shall take account of environmental considerations relating to odour, traffic, emissions to water and land use change prior to a final decision at site level.	Text has been included in the NWSMP in Section 9.4 in relation to requirements that need to be assessed when considering sludge storage, thickening and dewatering requirements.
Infrastructure Alternatives	The selection of new locations for 'Hub-centre and Satellite-site' systems will require detailed assessments on a site by site basis to establish suitability. This assessment must take into account the environmental, social and financial impacts of any proposal. A review of other constraints such as existing operational contracts must also be taken into account.	This mitigation was included in the NWSMP in Section 6.3. The full wording as included in the NWSMP is: *The selection of the location and number of Satellite Dewatering Sites requires a detailed assessment on a site by site basis to establish suitability. This assessment must take into account the environmental, social and financial impacts of any proposal. A review of other constraints such as an existing operational contract must also be taken into account.* Reference to this mitigation measure is also included in the NWSMP in Section 7.2.3 and Section 7.3.1.
Outlet Alternatives	Inconsistencies between the COGP and the Regulations should be addressed by Irish Water through their Standard Operating Procedures.	This mitigation was included in the NWSMP in Section 10.8. The full wording as included in the NWSMP is: *Irish Water intends to liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture to take into account current legislation and any recommendations for wastewater sludge quality parameters and any additional sampling of persistent organics or emerging pollutants. It is proposed that any updated COGP would be incorporated into Standard Operating Procedures for Irish Water and would include recommendations for*

Alternatives	Mitigation Measures Proposed in SEA Environment Report	Included in the NWSMP
		assessment of environmental sensitivity of lands to be used for landspreading. The Standard Operating Procedures will also include a template for Nutrient Management Plans and a requirement to consider environmental impacts, WFD objectives and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures.
	Further research into alternative reuse outlets should include consideration of wider environmental impacts including biodiversity, water, soils, human health and food safety as a minimum with a view to developing Specific Standard Operating Procedures for reuse.	Consideration of wider environmental impacts in the promotion of alternative outlets has been included in the NWSMP in Section 9.9. The full wording as included in the NWSMP is: *Further research into alternative reuse outlets will be undertaken to assess options. This will include a financial evaluation and consideration of wider environmental impacts including biodiversity, water, soils, human health and food safety. Irish Water will incorporate alternative outlets into its Standard Operating Procedures for sludge management, as appropriate once any such outlet is developed.*
	It is recommended that Irish Water formally liaise with the Regional Waste Authorities and suppliers in relation to thermal recovery capacity.	Text has been included in Section 3.6 in the NWSMP recommending that Irish Water liaise with the Regional Waste Authorities, Local Authorities and other stakeholders.

Table 4.5 – Mitigation Measures Relating to Assessment of Actions (see Chapter 9)

Alternatives	Mitigation Measures Proposed in SEA Environment Report	Included in the NWSMP
Policy Actions 1 -2	Under Policy Action_1 and 2, reference to wastewater sludge management activities should be clarified to mean all activities from production of wastewater sludge at a treatment plant through to reuse and disposal of same.	The term "Sludge Management" has been described in the NWSMP in Appendix 2, Glossary and Abbreviations.
	The audit of wastewater sludge activities is essential to ensure progress is being made in ensuring compliance with good practice and to ensure an overall quality product is being	Mitigation in the form of an independently audited quality assurance scheme and annual auditing of contractors activities has been included in the NWSMP in Section 10.1 and Section

Alternatives	Mitigation Measures Proposed in SEA Environment Report	Included in the NWSMP
	generated. Therefore it is recommended that the audit process becomes an integral part of the quality assurance system and it addresses all wastewater sludge management activities from the operational WWTP to the disposal / reuse activity. Contractors who break contractual obligations will be penalised.	10.9 respectively.
	The audits of land spreading should be undertaken during the timescale of application of the biosolids to the lands to fully assess if compliance is being achieved.	This mitigation has been included in the NWSMP in Section 10.9. The full wording as included in the NWSMP is: *The timing of the audit will be planned to allow auditing of landspreading activities during spreading periods.*
	A Standard Operating Procedure for reuse of wastewater sludge in agriculture and non-agricultural outlets will be developed and become a requirement of Irish Water contractors. This SOP should address inconsistencies in the legislation and COGP and specify clearly the best practice required for Irish Water contractors. The SOP will also promote a risk based approach to determine lands most at risk from land spreading activities. Irish Water will contractually require all Irish Water contractors to fully implement the most stringent requirements of the legislation and guidance.	Mitigation in relation to Standard Operating Procedures has been included in Section 3.5.2, Section 10.1 and Section 10.8 of the NWSMP.
	The SEA has outlined that the existing COGP shall be revised through Irish Waters standard operating procedures to specifically address inconsistencies in legislation and existing guidelines. The COGP is not an Irish Water document, but Irish Water has committed to '*liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture to* address inconsistencies in legislation and existing guidelines'.	This mitigation was included in the NWSMP in Section 3.5.2 and Section 10.8. The full wording as included in the NWSMP is: *Irish Water intends to liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture to take into account current legislation and any recommendations for wastewater sludge quality parameters and any additional sampling of persistent organics or emerging pollutants. It is proposed that any updated COGP would be incorporated into Standard Operating Procedures for Irish Water and would include recommendations for assessment of environmental sensitivity of lands to be used for landspreading. The Standard Operating Procedures will also include a template for Nutrient Management Plans and a*

Alternatives	Mitigation Measures Proposed in SEA Environment Report	Included in the NWSMP
		requirement to consider environmental impacts, WFD objectives and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures.
Admin Actions 1-3	It is recommended that the proposed national reporting database (including online reporting system and GIS systems) be cross referenced to sites and lands considered sensitive for the purposes of land spreading, as outlined in **Figure 9.1**, to ensure that conflicts do not occur.	Section 10.7 details mitigation in the form of development of online reporting systems including geographical data in relation to sludge disposal sites. The online reporting system will be used to check landspreading areas for environmental sensitivity.
Research and Review Actions 1 - 6	As upgrades to infrastructure would result in more effluent generation the sensitivity of the receiving waters must be considered in advance and proposals. In projects where the only potential impact is on the final effluent discharges, screening for Appropriate Assessment is undertaken by the EPA as part of the wastewater discharge licensing process. (*Research and Review Action_1*).	Text has been included in Section 9.5 outlining the commitment to undertake AA screening as required on proposed projects and any associated works, individually or in combination with other plans or projects. This is further strengthened by the inclusion of environmental protection criteria in Section 9.5 which must be considered for the location of new of upgraded sludge facilities.
	Assessment of the feasibility of sludge reed beds must have regard to appropriate siting and in the first instance should have regard to the siting criteria presented in Section 10.2.1 (*Research and Review Action_2*).	Text has been included in Section 6.4.4 The full wording as included in the NWSMP is: *A further study of the feasibility of sludge reed beds at potentially suitable sites is recommended. This will take into account the siting criteria detailed in Section 9.5*.
	Preliminary sensitivity mapping has been compiled to provide a high level interpretation of the geographic extent of the key sensitivities to land spreading. This sensitivity map (**Figure 9.1**) will be included in the SOP for reuse to be developed by Irish Water and will be used as a guide to decision making for any future land spreading proposed (Research and Review Action_3).	Section 8.7 of the NWSMP has included a commitment to review options for reuse of wastewater sludge in non-agricultural land on an on-going basis to identify potential outlets.
	In the absence of detailed site specific information for increased anaerobic digestion capacity or detail of project proposals, a risk based approach is recommended and any review should ensure that sites proposed comply with siting criteria outlined in Section 10.2.1 of this Environmental Report as a minimum (*Research and Review Action_4*).	The text in Section 9.8 of the NWSMP includes a commitment to review all sites with thermal drying to assess whether anaerobic digestion is feasible to either replace or supplement the existing thermal drying plant. Furthermore text has been included in Section 9.5 on siting criteria.

Alternatives	Mitigation Measures Proposed in SEA Environment Report	Included in the NWSMP
	Irish Water will record how the existing standards for monitoring of wastewater sludge and soil samples comply with EU and international practice. This will provide a benchmark which can be used to determine what changes need to be made going forward (*Research and Review Action_5*).	Section 3.5.2 and Section 10.8 includes a commitment to develop standard operating procedures for sludge management and which will be reviewed on an ongoing basis taking into account current legislation, guidance documents, EU standards and codes of practice and the latest available research.
Infrastructure Planning Actions 1-3	Prior to finalising sites for upgrade to satellite sites, a risk based assessment should be undertaken to determine the implications of increased effluent on receiving waters and to ensure that Irish Water is addressing the implications and wider obligations under the Water Framework Directive (2000/60/EC) and the Habitats Directive (92/43/EEC) (*Infrastructure Planning Action 1).*	Section 9.5 of the NWSMP outlines the appropriate environmental protection criteria. The site selection process for any new facilities or upgrades and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.
	New infrastructure and upgrades to existing infrastructure will consider the siting criteria outlined in Section 10.2.1 of this Environmental Report. (*Infrastructure Planning Actions 1-2).*	Section 9.5 of the NWSMP outlines the appropriate environmental protection criteria.
	The following text should be included in the draft NWSMP: *Irish Water will carry out screening for Appropriate Assessment on proposed projects and any associated works, to ensure that there are no likely significant effects on the integrity (defined by the structure and function(s) of any European Site (s) and that the requirements of Article 6(3) and 6(4) of the EU Habitats Directive are fully satisfied.* *Irish Water will also ensure that in carrying out its activities associated with management of wastewater sludge, that they are in compliance with their our obligations as a public water authority under the Birds and Natural Habitats Regulations 2011-2015.*	This text was included in Section 9.5 with some minor modifications to provide further clarity. The full wording as included in the NWSMP is: *Irish Water will carry out Appropriate Assessment Screening as required on proposed projects and any associated works, individually or in combination with other plans or projects, to ensure there are no likely significant effects on the integrity (defined by the structure and function) of any Natura 2000 site(s) and that the requirements of Articles 6(3) and 6(4) of the EU Habitats Directive are fully satisfied. In projects where the only potential impact is on the final effluent discharges, Appropriate Assessment Screening is undertaken by the EPA as part of the wastewater discharge licensing process. Irish Water will also ensure that in carrying out activities associated with management of wastewater sludge, we are in compliance with our obligations under the Birds and Natural Habitats Regulations 2011-2015.*
Protection Actions 1-4	As identified under Infrastructure Planning the following protection mitigation is also applicable to the Protection Actions.	This text was included in Section 9.5 with some minor modifications to provide further clarity.

Alternatives	Mitigation Measures Proposed in SEA Environment Report	Included in the NWSMP
	The following text should be included in the draft NWSMP: *Irish Water will carry out screening for Appropriate Assessment on proposed projects and any associated works, to ensure that there are no likely significant effects on the integrity (defined by the structure and function(s) of any European Site (s) and that the requirements of Article 6(3) and 6(4) of the EU Habitats Directive are fully satisfied.* *Irish Water will also ensure that in carrying out its activities associated with management of wastewater sludge, that they are in compliance with their our obligations as a public water authority under the Birds and Natural Habitats Regulations 2011-2015.*	
	Preliminary sensitivity mapping has been compiled to provide a high level interpretation of the geographic extent of the key sensitivities to land spreading. This sensitivity map (**Figure 9.1**) will be included in the SOP for reuse to be developed by Irish Water and will be used as a guide to decision making for any future land spreading proposed (*Infrastructure Protection Actions 1-4)*	Section 10.7 of the NWSMP includes a commitment to develop online reporting systems including geographical data in relation to sludge disposal sites and central recording of all sludge and soil analysis is considered an essential element of the quality assurance procedures for wastewater sludge management. The online reporting system will be used to check landspreading areas for environmental sensitivity. Section 10.9 of the NWSMP further clarifies that GIS systems will facilitate reviewing the suitability of lands considered sensitive for the purposes of land spreading.
	In order to minimise the risk of negative impacts associated with upgrades to existing infrastructure and provision of new infrastructure the siting criteria outlined in Section 10.2.1 should be applied to all such proposals (*Infrastructure Protection Actions 1-4)*.	Section 9.5 of the NWSMP includes appropriate environmental protection criteria for the location of new or upgraded sludge facilities.
	Standard Operating Procedures should be developed for the full wastewater sludge lifecycle (*cradle to grave approach*).	Section 10.1 of the NWSMP states “Separate Standard Operating Procedures and control procedures are being developed by Irish Water to ensure that the whole process from source control of pollutants, through sludge treatment and reuse is controlled and monitored. Standard Operating Procedures are covered in the

Alternatives	Mitigation Measures Proposed in SEA Environment Report	Included in the NWSMP
		NWSMP in Sections 3.5.2, 6.1, 9.9 and 10.8.
	The Standard Operating Procedures for landspreading will include a template for Nutrient Management Plans (NMPs) and a requirement to specifically consider environmental impacts and the potential to impact on the European Sites. These environmental issues will be included in both in the Nutrient Management Plan and the Standard Operating Procedures. These SOP's will be included as a contract requirement for contracts which include landspreading of sludge.	To address this, Section 10.8 of the NWSMP includes the following wording *"The Standard Operating Procedures (SOP's) will also include a template for Nutrient Management Plans and a requirement to consider environmental impacts, WFD objectives and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures. Contractors appointed to carry out sludge management on behalf of Irish Water will be required to comply with Irish Water's Standard Operating Procedures".*
	Irish Water will liaise with the DHPCLG (former DECLG) and provide them with the findings of all audits undertaken to facilitate a coordinated response if required.	Section 10.8 of the NWSMP includes a commitment that "*Irish Water intends to liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture to take into account current legislation and any recommendations for wastewater sludge quality parameters and any additional sampling of persistent organics or emerging pollutants. It is proposed that any updated COGP would be incorporated into Standard Operating Procedures for Irish Water and would include recommendations for assessment of environmental sensitivity of lands to be used for landspreading. The Standard Operating Procedures will also include a template for Nutrient Management Plans and a requirement to consider environmental impacts, WFD objectives and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures*".

5 HOW CONSULTATION FEEDBACK HAS INFLUENCED THE NWSMP

The key issues raised in the submissions received from stakeholders are summarised in this section by theme. Following a comprehensive review and consideration of all the submissions, Irish Water have responded with changes to the final NWSMP – wording changes and additions are marked in **bold**.

For Thematic issues that were raised in the submissions on the draft National Wastewater Management Plan, the reader is directed to the Consultation Report 2 on the Irish Water website.

A number of submissions raised issued outside of the scope of the NWSMP. It is noted for clarity that the NWSMP considers the management of wastewater sludge only. Broader water and wastewater issues were raised that while relevant to Irish Water's activities are not relevant to the NWSMP.

Significant changes made, after the publication of the draft plan have been screened, for potential significant environmental effects in accordance with both the SEA Directive and the Habitats Directive and are recorded in **Appendix A**.

5.1 KEY ISSUES RAISED IN THE SUBMISSIONS AND CHANGES MADE TO THE NWSMP

5.1.1 Treatment of Sludge

Issue Raised: Treatment of Sludge
Stakeholders welcomed proposals, as set out in the Draft NWSMP, to phase out the use of off-site sludge treatment by lime stabilisation and suggested that a defined timeline for this phase out should be identified, as a means of incentivising the development of alternatives. Others supported the increased use of lime in the alkaline stabilisation process, due to its beneficial use on agricultural land as a valuable organic fertiliser that is high in nutrients. Stakeholders supported the Draft NWSMP proposals with respect to Anaerobic Digestion (AD) in the treatment of wastewater sludge. InSinkErator stated that waste entering WwTPs from Food Waste Disposer (FWD) units play a positive and constructive role in facilitating energy recovery by (AD). Cré stated that all composting and anaerobic digestion plants in Ireland provide a superior level of control and treatment compared to lime stabilisation and are regulated by either the relevant Local Authority or by the Environment Protection Agency (EPA). It noted that the Draft NWSMP does not consider sludge treatment by composting plants and recommended that existing composting plants around the country, which are regulated to a high standard, be used to process wastewater sludge, in combination with anaerobic digestion, thus avoiding a capital requirement from Irish Water. With respect to the intention, referred to in the Draft NWSMP, to assess the potential for co-digestions of organic wastes with sludge material in order to improve the economic feasibility of AD facilities, H&L outlined that Irish Bioenergy Association (IrBEA) has developed a national standard for anaerobic digestion digestate to a draft stage. They noted that the standard does not allow for the inclusion of wastewater sludge as a feedstock and recommended that Irish Water consult with IrBEA as to the potential for development of a separate standard, or a revision of the existing draft, to address the co-digestion issue. Response Engineering Ltd. (REL) highlighted that, following a technical feasibility study of using Advanced Pyrolysis Treatment, it is now progressing plans to proceed with pyrolysis as its preferred solution for sludge management at its 35 WwTPs around Ireland. ZWAI recommended that reed bed or Integrated Constructed Wetland (ICW) treatment be further

explored, some stakeholders noted that discharge from the Clonaslee treatment plant should use this process. The EPA recommended that the Final NWSMP describe at what point reed beds fail to be efficient in terms of sludge management.

ZWAI advised that ferric sulphate should be added instead of aluminium sulphate for removal of phosphorus from wastewater as aluminium is more toxic than iron in dissolved form. ZWAI also recommended that Irish Water should develop a scheme that incentivises homes and industries to avoid or prevent the production of excessive quantities of wastewater which would reduce the amount of wastewater sludge generated.

Influence on the Final NWSMP

The final NWSMP considers the need for further investigation of sludge outlets including thermal treatment options. Further studies on options for co-digestion at sludge hub centres are also proposed in the final NWSMP.

The NWSMP considers the management of wastewater sludge only. Policies and procedures to manage wastewater production are outside the scope of this report. However, the Trade Effluent Policy, as detailed in Section 10.3 of the final NWSMP details how industrial discharges will be managed. Wastewater treatment methodologies such as reed beds, dosing for phosphorus removal and reduction of wastewater volumes will be considered separately by Irish Water in the development of strategies and plans for wastewater treatment and disposal.

Changes to the Final NWSMP

The NWSMP has been updated to include additional commitment in relation to feasibility studies for alternatives.

Updated wording for Section 2.1 is outlined below:

Over 95% of this was treated, in accordance with the treatment processes recommended in the *Code of Good Practice for Use of Biosolids in Agriculture*, in 2014 with further improvements to treatment levels introduced during 2015. **It is intended to undertake a detailed feasibility study of alternative options for sludge reuse or disposal to reduce the dependence on a single outlet for sludge.**

Updated wording for Section 9.9 is outlined below:

However, it is considered desirable to promote alternative outlets in order to provide flexibility **and to reduce the dependence on use of agricultural land for sludge reuse**. Further research into alternative reuse outlets will be undertaken to assess options. This will include a financial evaluation and consideration of wider environmental impacts including biodiversity, water, soils, human health and food safety. Irish Water will incorporate alternative outlets into its Standard Operating Procedures for sludge management, as appropriate once any such outlet is developed.

The main alternative outlet **currently in use** in Europe is incineration. **There are commercial incinerator facilities currently in place and under development in Ireland which may provide a suitable alternative for some of the wastewater sludge produced by Irish Water. A feasibility study is proposed to consider options for thermal treatment of sludge including incineration.**

Other outlets such as use as a fuel in industry have been researched in Ireland previously with no reliable outlet identified to date. However, this is still considered a viable option in the future as companies strive to meet renewable energy targets. **The main industrial outlet is use in the cement industry and further evaluation of this potential outlet is proposed. The use in cement kilns has the advantage of potential full reuse of the sludge with sludge used for energy recovery and raw materials with no ash for disposal.**

5.1.2 Sludge Hub Centre and Satellite Sites Upgrade

Issue Raised: Sludge Hub Centre and Satellite Site Upgrades

With regard to the "Sludge Hub Centre and Satellite Site" system and proposed upgrades, the EPA recommended that the provision of sludge management facilities should be prioritised and directed towards WwTPs that are breaching authorisation limits due to the lack of sludge management infrastructure. It proposed that desludging at WwTPs should be carried out at appropriate frequencies and volumes to prevent breaches of authorisation limits. It recommended that the flood risk vulnerability of

proposed additional infrastructure should be assessed and that the requirements of the Flood Risk Management Guidelines be taken into account. The EPA further recommended that Irish Water should include a commitment in the final NWSMP to establish environmental management plans for proposed additional wastewater related infrastructure (or upgrades to existing facilities), where potential exists to significantly impact negatively on environmental vulnerabilities/sensitivities. The EPA also stated that the NWSMP needs to ensure that the deficiency in wastewater sludge management facilities in the west of Ireland is addressed.

Galway County Council (GCC) questioned whether consideration was given, in the development of the Draft NWSMP, to the suggested East Galway Wastewater Treatment Plant (WwTP) including Sludge Hub Centre, together with satellite facilities in five towns, including Tuam. They noted the Draft NWSMP suggests that Tuam is considered to be a suitable location for a Sludge Hub Centre and sought clarification on the location of hub and satellite centres proposals. GCC highlighted that the need for the East Galway WwTP was included in the Galway Sewerage Scheme Phase 3 and is considered a critical project for the region and asked that it be given due consideration, particularly as the NWSMP represented a 25-year strategy.

Kerry County Council (KCC) highlighted that sludge dewatering facilities are available at Killarney, Tralee, Dingle, Listowel, Castleisland, Kenmare, Cahersiveen and Killorglin and that the plants at Killarney and Killorglin are currently adequate to accept settled activated sludge (e.g. from Rathmore and Glenbeigh WwTPs). It expressed concern that Killorglin and particularly Cahersiveen are not included in the list of sites proposed for 'sludge import facilities' and recommended that they be included in the list of sites with sludge acceptance facilities. It stated that this omission would result in an unsustainable transport outcome and inevitable undesirable environmental issues.

KCC also recommended that detailed economic and environmental assessments should be carried out for continuing the operation of the existing dewatering facilities at the proposed sludge acceptance sites.

KCC highlighted that Killarney WwTP meets the definition of a Hub and produces a Class A pasteurised sludge that is disposed of locally to agriculture. However, the Draft NWSMP states that there is no Sludge Satellite or Hub in Kerry and that all sludges are sent off site for treatment and disposal. KCC requested clarification on the future of the Autothermal Thermophilic Aerobic Digestion (ATAD) plant in Killarney WwTP.

While the Draft NWSMP recommends a Sludge Hub Centre with advanced anaerobic digestion for Tralee WwTP, KCC highlighted that Tralee WwTP has an anaerobic digester and gas turbine which have been taken out of operation for economic reasons due to a lack of sufficient feedstock. They suggested that the assessment of Tralee WwTP as the Kerry Hub should take account of a number of investigations completed on the potential for co-digestions of the wastewater sludge and mixed organic waste in the existing plant.

Tipperary County Council (TCC) made a detailed submission to Irish Water to inform the formal submission of the Emerging Investment Plan to the Commission of Energy Regulation (CER) and asked that cognisance be taken of that submission in the finalisation of the NWSMP. TCC was concerned that very low and unreasonable population growth rates have been used by Irish Water in the Draft NWSMP, which are at significant odds with population figures provided by the DHPCLG (former DECLG) and by the Mid-West and South East Regional Planning Guidelines. They cited concern that figures for the predicted wastewater sludge load per county would be impacted if these low population growth figures were used to inform the development of the plan, and that this could adversely affect the implementation of the NWSMP.

TCC also noted that details in the Final NWSMP with respect to North and South Tipperary County Councils should be combined to reflect the amalgamation of these counties.

Tipperary County Council requested that a full cost-benefit analysis (including transport costs) be applied to the recommendations of the Draft NWSMP with respect to the upgrade of wastewater sludge treatment and import facilities in County Tipperary.

Influence on the Final NWSMP

The final NWSMP has been updated to take account of the specific feedback from local authorities in relation to infrastructure and populations. The final NWSMP recommends that the actual population growth and predicted population growth is reviewed every 5 years.

The NWSMP recommends siting guidelines and standard operating procedures for infrastructure relating to sludge management including flood risk assessment. Overall environmental management plans for wastewater infrastructure will be considered separately by Irish Water in the development of strategies

and plans for wastewater treatment and disposal.

Changes to the Final NWSMP

The NWSMP has been updated to take account of the specific feedback from local authorities.

Updated wording for Section 7.4.12, Galway County Council is outlined below:

There is a requirement for a new Sludge Hub Centre in the Galway county area as the wastewater treatment plant at Mutton Island is not considered to be suitable as a Sludge Hub Centre. **There are proposal for a new wastewater treatment plant to serve the eastern environs of Galway City in the future. This wastewater treatment plant may also be used as a sludge hub. However, there is no definite date for commencement of this scheme at present. Detailed consideration of this site as a Sludge Hub Centre or a Satellite Site will be undertaken when the project progresses.**

Updated wording for Section 7.4.13, Kerry County Council is outlined below:

The sites at Dingle, Listowel, Castleisland and Kenmare should be provided with sludge acceptance facilities to allow sludge to be balanced and discharged to the inlet works.

Due to the geographical nature of County Kerry, there are potentially long transport distances for DWWT sludge in south-west Kerry and the Ring of Kerry. The wastewater treatment plants at Cahersiveen and Killorglin will continue to accept sludge, where there is no negative impact on the wastewater treatment plant, until such time as a scheduled approach to the collection of DWWTS sludge is implemented as recommended in Strive Report No 123. On-site treatment using sludge reed beds may be appropriate at a number of sites and its feasibility should be assessed.

Updated wording for Section 7.4.27, Tipperary County Council is outlined below:

There is currently one Sludge Hub Centre in County Tipperary at Clonmel. **The county sludge management plans and sludge hub centre at Clonmel were developed prior to the amalgamation of North and South Tipperary local authorities and sludge management was therefore progressed separately within the county prior to 2014.**

5.1.3 Landspreading of Wastewater Sludge

Issue Raised: Impact on Agri-Food Sector

Stakeholders expressed concern that landspreading remains the preferred option for the re-use of wastewater sludge under the Draft NWSMP and considered that this would be detrimental to Ireland's critically important food sector, noting the possible presence of heavy metals, pathogens, pharmaceuticals and complex organic compounds. Other stakeholders were concerned that there is a knowledge gap regarding the exact constituents of treated wastewater sludge and that Irish Water should consider this area as a priority topic for research.

Stakeholders stressed the importance of the agri-food sector to Ireland, referencing Foodwise 2025, the strategic plan for Ireland's agri-food sector and deemed that greater consideration must be given to the impact of quality assurance schemes such as:-

- Bord Bia Origin Green Initiative;
- Sustainable Dairy Assurance Scheme (SDAS);
- Beef & Lamb Quality Assurance Scheme;
- Irish Grain Assurance Scheme.

Stakeholders noted that one of the requirements of SDAS and other Bord Bia quality assurance schemes is that raw or treated sewage sludge is prohibited from being used on Bord Bia certified farms. Some noted that landspreading of wastewater sludge on agricultural land has been banned as a practice in the Netherlands and Switzerland.

The Department of Agriculture, Food and Marine (DAFM) expressed concern that the Draft NWSMP does not adequately deal with the issues around quality assurance schemes and land application of wastewater sludge. It recommended the NWSMP should stress that land subject to quality assurance schemes is not available for landspreading and that landspreading of wastewater sludge should be prioritised to non-food

crops.

Feedback from stakeholders suggested Irish Water should investigate alternative crops such as energy crops and forestry for the recovery of treated wastewater sludge that may not have negative consumer sentiment.

Other feedback included stakeholder views that there should be a coherent policy approach across all government departments and state agencies with regard to the use of landspreading in the management of wastewater and that Irish Water should commit to this approach in the Final NWSMP.

Ibec welcomed the commitment by Irish Water to restrict wastewater sludge spreading on land covered by food quality assurance schemes, but also noted its concern about the potential implications of using such sludge on other lands used to produce animal feed not covered by quality assurance schemes.

Some stakeholders pointed out that there was scope to go beyond the measures identified in the Draft NWSMP to provide the reassurances required to alter the perceptions that currently hinder the use of biosolids in land application. Their view was that an agricultural outlet must remain available to biosolids, given the benefits associated with land spreading and the economics of this form of sludge management.

Stakeholders also stated that Irish Water should play a central role in promoting the benefits of biosolids applications and confronting the perception issues that exist in relation to landspreading and the need to protect Ireland's 'green image' in terms of food production, which some noted was informed more by sentiment rather that scientific fact.

While the Irish Co-operative Organisation Society Ltd. ICOS acknowledged that the Draft NWSMP confirms that land used for dairy cattle is not considered to be a viable option due to concerns by the dairy industry, it challenged the NWSMP statement that the concerns of the dairy industry relate only to perception issues.

Influence on the Final NWSMP

Further to publication of the Draft NWSMP, it is considered necessary to undertake a detailed feasibility study on alternative outlet options to address the concerns of agricultural industry stakeholders and to assess alternative options proposed by stakeholders during the public consultation phase including energy recovery options, thermal treatment and use in cement industry.

Changes to the Final NWSMP

Additional text added in Section 8.2, Reuse in Agriculture is outlined below:

The proposed national reporting systems for sludge reuse locations, as detailed in Section 10.6, will facilitate the operators of these schemes. Irish Water propose to liaise with the Department of Agriculture, Food and Marine on an ongoing basis to ensure outlets for reuse of sludge are appropriate and not in conflict with the aims of the Bord Bia and the Irish Grain Assurance Schemes. It is expected that this will lead to a reduction in the land available for land-spreading and emphasises the importance of reduction of sludge quantities through anaerobic digestion and the need for alternative outlets to agricultural reuse.

Updated wording for Section 9.9 is outlined below:

However, it is considered desirable to promote alternative outlets in order to provide flexibility **and to reduce the dependence on use of agricultural land for sludge reuse**. Further research into alternative reuse outlets will be undertaken to assess options. This will include a financial evaluation and consideration of wider environmental impacts including biodiversity, water, soils, human health and food safety. Irish Water will incorporate alternative outlets into its Standard Operating Procedures for sludge management, as appropriate once any such outlet is developed.

The main alternative outlet **currently in use** in Europe is incineration. **There are commercial incinerator facilities currently in place and under development in Ireland which may provide a suitable alternative for some of the wastewater sludge produced by Irish Water. A feasibility study is proposed to consider options for thermal treatment of sludge including incineration.**

Other outlets such as use as a fuel in industry have been researched in Ireland previously with no reliable outlet identified to date. However, this is still considered a viable option in the future as companies strive to meet renewable energy targets. **The main industrial outlet is use in the cement industry and further evaluation of this potential outlet is proposed. The use in cement kilns has the advantage of potential full reuse of the sludge with sludge used for energy recovery and raw materials with no ash for disposal.**

Updated wording for Section 13, Conclusions and Recommendations is outlined below:

The current **end-use** outlet for wastewater sludge in Ireland is almost exclusively agriculture. The NWSMP identifies **reuse on land** as the preferred outlet in the **short to medium term. Research and EU policy supports this option in the light of economic and environmental benefits. Nevertheless, Irish Water accepts that** a policy based on a single reuse or disposal option is very susceptible to policy, regulatory and/or perception changes**.** Alternative options will be investigated on an ongoing basis in order to reduce our current dependence on agricultural **reuse, in view of the risk of constraints on this outlet and to provide co-operation with the agricultural sector in the implementation of their quality assurance schemes. Irish Water will carry out a feasibility study into identification of viable alternatives, including detailed consideration of thermal treatments, during the 5-year cycle before the next review of the Plan**.

Issue Raised: Persistent Organic Pollutants (POPs)

ZWAI asked that Irish Water should take Ireland's obligations under the Stockholm convention into account which are to avoid, minimise and, where feasible, eliminate emissions of persistent organic pollutants (POPs).

While the EPA acknowledged the inclusion of aspects relating to POPs within the Draft NWSMP, it suggested that the Final NWSMP addresses minimising the potential for bio-accumulation of substances in soils from the landspreading of treated wastewater sludge.

The EPA also suggested that the Final NWSMP incorporates a programme for monitoring POPs and other contaminants of emerging concern in the context of protecting the environment and securing food safety. It proposed that this includes the sampling and analysis of sludge and the receiving soils from WwTPs servicing population equivalents in excess of 100,000 as well as contingency plans for risk mitigation when elevated concentrations of contaminants are observed.

Influence on the Final NWSMP

Irish Water consider source control preferable to end-of-pipe treatment to minimise the risk of specific pollutants (e.g., metals, persistent organic pollutants, pharmaceutical products, etc.) in the biosolids. This is a key step in minimising the risk of contaminants in the sludge.

Irish Water intend to liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture to take into account current legislation and any recommendations for additional sampling of persistent organics or emerging pollutants.

Changes to the Final NWSMP

Additional text added in Section 9.12.3, is outlined below:

Irish Water has commenced a programme of more extensive licencing of trade discharges with tighter emission controls. **As detailed in Section 10.3 Irish Water consider source control preferable to end-of-pipe treatment to minimise the risk of specific pollutants (e.g., metals, persistent organic pollutants, pharmaceutical products, etc.) in the biosolids and is actively pursuing targeted source control as part of our strategy for protecting the water environment.**

Monitoring of persistent organic pollutants is undertaken based on the requirements of the Code of Good Practice for Use of Biosolids in Agriculture. There has been extensive international monitoring and research in this area in recent years. To date, there are no limits or recommendations for levels of organic pollutants **specifically relating to** wastewater sludge used in agriculture. It is proposed that research and recommendations in this area are reviewed regularly, with additional analysis undertaken if necessary, to mitigate against any risk to soils or health due to the presence of organic pollutants. **The proposed update of the Code of Good Practice for Use of Biosolids in Agriculture will review current monitoring and limits for organic pollutants and make recommendations for any further monitoring or limits required to mitigate against the potential risks. There are limits set in Regulation (EC) No. 850/2004 on persistent organic pollutants as listed in Annex IV of the regulations. An EU funded study on the levels of selected compounds in sludge has found that the levels of POP's are generally significantly below the limits set in relation to Regulation 850/2004.**

Additional text added in Section 10.8, is outlined below:

Irish Water **intends** to liaise with the **Department of Housing, Planning, Community and Local Government** (formerly the Department of the Environment, Community and Local Government) in relation to a review of the *Code of Good Practice for the Use of Biosolids in Agriculture* to take into account current legislation **and any recommendations for wastewater sludge quality parameters and any additional sampling of persistent organics or emerging pollutants**. It is proposed that any updated COGP would be incorporated into Standard Operating Procedures for Irish Water and would include recommendations for assessment of environmental sensitivity of lands to be used for landspreading. The Standard Operating Procedures will also include a template for Nutrient Management Plans and a requirement to consider environmental impacts, **WFD objectives** and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures.

Issue Raised: Quality of Wastewater Sludge

Stakeholders noted that the variability in quality and consistency of wastewater sludge from different WwTPs is a significant factor affecting confidence in the Irish Agricultural Sector for biosolid re-used on agricultural land. They were of the opinion that Irish Water should seek to implement robust quality control procedures to ensure consistency of material for landspreading.

The IFA stated that if wastewater sludge/biosolid is to be used on agricultural land it is critical that proper standards are laid down and adhered to including that the material:-

- Is pasteurised and guaranteed free from harmful pathogens;
- Is free from contamination from harmful substances, including heavy metals;
- Has a minimum dry matter content;
- Has a declaration of available nutrients;
- Has a physical and nutritional consistency;
- Is destined for use on suitable arable crops/non-food crops only and is excluded for use on milling wheat, milling oats and malting barley crops, as well as vegetables destined for human food consumption.

Influence on the Final NWSMP

Irish Water intend to liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture (COGP) to take into account current legislation and any recommendations for additional sampling of persistent organics or emerging pollutants. It is intended that the updated COGP will review and update, where necessary, the current recommendations in relation to wastewater sludge quality.

Changes to the Final NWSMP

Additional text added in Section 10.8, is outlined below:

Irish Water **intends** to liaise with the **Department of Housing, Planning, Community and Local Government** (formerly the Department of the Environment, Community and Local Government) in relation to a review of the *Code of Good Practice for the Use of Biosolids in Agriculture* to take into account current legislation **and any recommendations for wastewater sludge quality parameters and any additional sampling of persistent organics or emerging pollutants**. It is proposed that any updated COGP would be incorporated into Standard Operating Procedures for Irish Water and would include recommendations for assessment of environmental sensitivity of lands to be used for landspreading. The Standard Operating Procedures will also include a template for Nutrient Management Plans and a requirement to consider environmental impacts, **WFD objectives** and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures.

Issue Raised: Availability of Land
Stakeholders highlighted the issue of availability of suitable land for landspreading, noting that Ireland currently relies on agriculture as an outlet for 98% of its wastewater sludge disposal. They noted that there is likely to be less land available in the long term for landspreading due to an increased take up of quality assurance schemes, customer demands and other market pressures and that alternative options must be considered in spite of significant costs associated with some possible alternatives. Stakeholders suggested that it may be worth re-addressing farms in quality assurance schemes that are part tillage/part livestock to see if the tillage areas of these farms can be made available for landspreading, however, it would be important to ensure traceability of the land-use in such cases for the purpose of quality assurance. Some stakeholders provided feedback that, in their opinion, the Draft NWSMP has significantly underestimated the land actually available for the recovery of municipal sludge in Ireland. Ibec noted that while the area of animal fodder cereals land was provided in the Draft NWSMP, it is unclear how much of this is not covered by a quality assurance scheme. It highlighted that it would be a concern if any of this fodder, which would be subject to landspreading, is sold into the beef or dairy industry.
Influence on the Final NWSMP
The SEA noted the lack of resilience in terms of alternatives in the short-term, with little or no alternative to land spreading on agricultural land. Until such time as thermal recovery options and other reuse outlets are more fully developed, reuse on agricultural lands is the only viable alternative available to Irish Water. However, further to publication of the Draft NWSMP, a commitment has been included to undertake a detailed feasibility study on alternative outlet options including thermal treatment options.
Changes to the Final NWSMP
Additional text added in Section 8.1, is outlined below: Other options are available, **including thermal treatment**, use in energy crops, silviculture and land remediation. However, development of these outlets, **apart from thermal treatment**, has been limited both in Ireland and internationally. **Further details of these options are included in Sections 8.7 to 8.10. It is proposed to undertake a feasibility study for alternative options for sludge outlets within the first 5 year cycle of the plan. The current high reliance on agricultural use is considered to be a risk to Irish Water due to potential difficulties in sourcing land for sludge reuse as further detailed in Sections 8.2 to 8.4.** Additional text added in Section 8.2, Reuse in Agriculture is outlined below: **The proposed national reporting systems for sludge reuse locations, as detailed in Section 10.6, will facilitate the operators of these schemes. Irish Water proposes to liaise with the Department of Agriculture, Food and Marine on an ongoing basis to ensure outlets for reuse of sludge are appropriate and support the aims of the Bord Bia and the Irish Grain Assurance Schemes. It is expected that this will lead to a reduction in the land available for land-spreading and emphasises the importance of reduction of sludge quantities through anaerobic digestion and the need for alternative outlets to agricultural reuse.** Additional text added in Section 8.6, Overall availability of agricultural land is outlined below: **Further limitations on use of sludge in areas within or adjacent to Natura 2000 sites or areas prone to flooding. This will be reviewed on a case-by-case basis as part of the assessment of suitability of landbanks to ensure that there are no significant impacts.**

Issue Raised: Biosolids Application to Energy Crops
H&L stated that a minor legislative amendment is required to address the anomaly whereby biosolids application to agricultural land is not restricted, yet application to energy crops is. It suggested the development of a working group or similar to address the restriction of land application to energy crops. It also asked that consultation with the EPA be undertaken to explore whether flexibility regarding end of waste criteria could be considered for biosolids applied to land.
Influence on the Final NWSMP
Irish Water will liaise with the Department of Housing, Planning, Community and Local Government in

relation to the current legislation relating to use of wastewater sludge on energy crops and any potential changes to address the current restrictions. In addition, Irish Water will liaise with Bord na Mona, Coillte and private forestry operations to identify any potential outlets.

Changes to the Final NWSMP

Additional text added in the Executive Summary under Summary of actions proposed in the NWSMP is outlined below:

The preferred option for re-use of treated wastewater sludge (biosolids) is reuse on land. Non-food tillage crops will be the primary focus for agricultural reuse of biosolids;

A detailed feasibility study will be carried out to investigate alternative sludge outlet options to reduce the dependence on the use of agricultural land for wastewater sludge reuse.

Additional text added in Section 8.7 Re-use in Non Agricultural Land is outlined below:

There are options for reuse of wastewater sludge in non-agricultural land. This includes use in energy crops, forestry and land remediation. There are limited ongoing options for both forestry and land remediation. It is recommended that this is reviewed on an ongoing basis to identify potential outlets. This includes liaising with **Bord na Mona**, Coillte and private forestry operations to identify any potential outlets.

Additional text added in Section 8.7.1, Energy Crops is outlined below:

It is considered that recycling to energy crops is unlikely to become a significant sludge disposal route, unless existing legislative restrictions are amended. **Irish Water will liaise with the Department of Housing, Planning, Community and Local Government in relation to the current legislation and any potential changes to address the current restrictions.** The production of energy crops may have impacts on the catchment hydrology with potential **indirect** impacts on Natura 2000 sites **particularly where there is sensitivity to water levels within the Natura 2000 site**. These potential impacts must be considered where the use of wastewater sludge is proposed.

5.1.4 Options Assessment and Alternatives

Issue Raised: Options Assessment and Alternatives

As previously noted, stakeholders asked that alternatives to land spreading be considered for wastewater sludge. They encouraged new approaches to safely capture and re-use all of the potentially valuable resources arising from wastewater treatment. They recognised that there may be a significant cost to investing in alternatives, but advocated that a move must be made towards solutions like enhanced treatment of sludge and energy recovery.

The EPA proposed that energy recovery be incorporated into the high level strategic objectives of the NWSMP. It suggested that Irish Water should strive over the lifetime of the NWSMP to recover the nutrient and energy potential of wastewater sludge. It proposed that the promotion of the concept of energy recovery at treatment hubs, from processes such as anaerobic digestion. It further suggested that the aim for each hub would be to become energy self-sufficient as a long term sustainable target to improve the overall environmental performance of the facility and improve business resilience.

Some stakeholders proposed that biodigesters be used to treat slurry from pig farms and cattle sheds.

Ibec proposed that the NWSMP give greater consideration to incineration in its various forms, and research best practices in other EU Member States and elsewhere. Such consideration would include appropriately thorough cost-benefit analyses that takes into account all relevant economic factors, including, but not limited to, the cost of spreading versus the cost of incineration, the value of fertiliser (whether produced domestically or imported), as well as the current and future security of incineration supply.

The Irish Technology Centre for Biorefining and Bioenergy (TCBB RESOURCE) suggested that the current network of WwTPs offers the opportunity for one large national network of renewable energy centres, creating the potential to convert cost centres to revenue-generating centres, thus generating revenue for Irish Water. It recommended that a number of wastewater treatment sites could be adapted to introduce a cluster of renewable gas technologies that work in an integrated fashion to efficiently generate a

valuable renewable gas. It stated that introducing such technologies at WwTP sites would convert organic loads into biomass rather than sludge, generating an energy carrier that can be used on-site and reducing the energy cost of aeration. It further asserted that doing so would aid Ireland's compliance with EU environmental and renewable energy directives.

Ibec suggested that a clear distinction be made in the NWSMP between the various forms of thermal treatment currently available in Ireland, namely waste to energy and cement kilns. It noted that experience in Europe demonstrates the effectiveness of cement kilns for the treatment of biosolids/sludge, which are commonly used as both a source of energy and also a source of raw material in a thermal process that results in no ash for disposal. Ibec stated that the cement kilns in Ireland already have the appropriate planning or licence permissions, or are actively seeking permission to use biosolids/sludge from the treatment of wastewater.

Stakeholders noted that there are options for recovering phosphate from ash generated from mono-incinerators dedicated to the treatment of sludge. However, they also pointed out that certainty of demand is required for the development of large scale advanced thermal treatment facilities specifically for sludge.

Indaver Ireland noted that European Member States which have successfully developed thermal treatment infrastructure have put in place policy drivers (such as a ban on landfill and restrictions /ban on land spreading) and/or financial mechanisms (such as subsidies). It suggested that the NWSMP sets out clear actions for the provision of alternatives in line with Ireland's three waste management plans.

The EPA recommended that a specific commitment is included in the Final NWSMP, to incorporate the requirements of the Water Framework Directive as relevant to the siting, design and operation of wastewater related infrastructure and in conducting wastewater sludge management and related activities on those sites. It also recommended that a specific commitment be included to integrate the second round of River Basin Management Plans and associated Programmes of Measures upon their adoption within the lifetime of the Plan.

The EPA also noted that the potential environmental effects which may arise from using alternative treatment and disposal technologies should be considered prior to their implementation.

Influence on the Final NWSMP

The SEA noted the lack of resilience in terms of alternatives in the short-term, with little or no alternative to land spreading on agricultural land. Until such time as thermal recovery options and other reuse outlets are more fully developed, reuse on agricultural lands is the only viable alternative available to Irish Water. However, further to publication of the Draft NWSMP, a commitment has been included to undertake a detailed feasibility study on alternative outlet options including thermal treatment options. Irish Water have identified energy recovery as one of the main issues addressed in the NWSMP and propose to maximise use of energy recovery where possible.

The final NWSMP identifies energy recovery and phosphorus recovery options which will be considered on a case by case basis for specific projects.

Changes to the Final NWSMP

Additional text added in the Executive Summary under Summary of actions proposed in the NWSMP is outlined below:

- **The introduction of a quality assurance system for the whole wastewater treatment process from source control of pollutants, through to sludge treatment and reuse;**
- **An annual audit of sludge management activities will be undertaken on behalf of Irish Water pending a fully developed quality assurance scheme;**
- **Standard Operating Procedures (SOPs) for wastewater sludge management will be developed by Irish Water and requirements with respect to landspreading of treated wastewater sludge (biosolid) will be included in these SOPs;**
- **While thermal drying will continue to be provided where practically and economically viable, advanced anaerobic digestion is the preferred option for the majority of sites;**
- **Lime stabilisation at off-site centres will be phased out and any on-site lime treatment will be strictly controlled for effective treatment;**
- **The network of hub treatment sites and satellite dewatering plants will be further developed to**

optimise the balance between treatment and transport costs;

- **The location of 'hubs' will be considered on a regional rather than county basis and will maximise the use of energy recovery where possible;**
- **The preferred option for re-use of treated wastewater sludge (biosolids) is reuse on land. Non-food tillage crops will be the primary focus for agricultural reuse of biosolids;**
- **A detailed feasibility study will be carried out to investigate alternative sludge outlet options to reduce the dependence on the use of agricultural land for wastewater sludge reuse.**

Updated wording for Section 2.1 is outlined below:

Over 95% of this was treated, in accordance with the treatment processes recommended in the *Code of Good Practice for Use of Biosolids in Agriculture*, in 2014 with further improvements to treatment levels introduced during 2015. **It is intended to undertake a detailed feasibility study of alternative options for sludge reuse or disposal to reduce the dependence on a single outlet for sludge.**

Additional text added in Section 8.1, is outlined below:

Other options are available, including **thermal treatmen**t, use in energy crops, silviculture and land remediation. However, development of these outlets, **apart from thermal treatment,** has been limited both in Ireland and internationally. **Further details of these options are included in Sections 8.7 to 8.10. It is proposed to undertake a feasibility study for alternative options for sludge outlets within the first 5 year cycle of the plan. The current high reliance on agricultural use is considered to be a risk to Irish Water due to potential difficulties in sourcing land for sludge reuse as further detailed in Sections 8.2 to 8.4.**

Updated wording for Section 9.9 is outlined below:

However, it is considered desirable to promote alternative outlets in order to provide flexibility **and to reduce the dependence on use of agricultural land for sludge reuse**. Further research into alternative reuse outlets will be undertaken to assess options. This will include a financial evaluation and consideration of wider environmental impacts including biodiversity, water, soils, human health and food safety. Irish Water will incorporate alternative outlets into its Standard Operating Procedures for sludge management, as appropriate once any such outlet is developed.

The main alternative outlet **currently in use** in Europe is incineration. **There are commercial incinerator facilities currently in place and under development in Ireland which may provide a suitable alternative for some of the wastewater sludge produced by Irish Water. A feasibility study is proposed to consider options for thermal treatment of sludge including incineration.**

Other outlets such as use as a fuel in industry have been researched in Ireland previously with no reliable outlet identified to date. However, this is still considered a viable option in the future as companies strive to meet renewable energy targets. **The main industrial outlet is use in the cement industry and further evaluation of this potential outlet is proposed. The use in cement kilns has the advantage of potential full reuse of the sludge with sludge used for energy recovery and raw materials with no ash for disposal.**

5.1.5 Quality Assurance Monitoring and Reporting

Issue Raised: Quality Assurance Monitoring and Reporting
Stakeholders proposed that, in order to increase industry confidence in the landspreading of wastewater sludge/biosolids and to secure and stabilise the recovery route as an organic fertiliser on Irish agricultural farmland, it is extremely important to design and implement a quality assurance scheme for the entire wastewater treatment process, from source control of pollutants, through to sludge treatment and reuse. The EPA suggested that Irish Water undertakes sufficient tracking and monitoring of treated wastewater sludge applied to agricultural land to ensure that it is environmentally and agronomically safe and appropriate to do so and at levels which ensure that the nutrients can be effectively used for plant growth or assimilated into the soil. Some stakeholder feedback proposed the development of an industry 'Biosolid Quality Assurance

Standard' similar to the Biosolid Assurance Standard/Safe Sludge Matrix adapted in the UK in order to achieve operational consistency and demonstrate transparency in the recovery of municipal WwTP sludges to agriculture.

The IFA recommended the following measures be put in place for the treatment of sludge:-

- Training, licensing and auditing of plant operators, contractors and hauliers;
- Creation of a biosolid nutrient matrix management plan in consultation with industry and farmers;
- Insurance indemnifying farmers from any potential claims relating to the use of treated sludge;
- Gate fees for use on arable land.

Ibec encouraged Irish Water to work with stakeholders to update the Code of Good Practice (COGP) for the use of Biosolids in Agriculture, and potentially develop quality standards for different categories of wastewater sludge to ensure appropriate end use. It suggested that Irish Water commits to a rigorous enforcement process to ensure that sludge spread on land is in accordance with the Code of Good Practice, through audits and certification of suppliers.

Stakeholders stated that strong consideration be given to placing the Code of Good Practice on a legislative footing in order to strengthen the 'control regime' for sludge treatment. H&L suggested that the COGP be revised to phase out the use of alkaline stabilisation for sludge treatment over a specified timeframe.

H&L suggested that a timeline for the completion of the development of the wastewater treatment quality assurance scheme be put in place, and suggested that this would be within 12 – 18 months of the issue of the final NWSMP. It suggested that development of a similar model to that of the DAFM Compost Quality Assurance Scheme be considered by Irish Water when developing their wastewater sludge management quality assurance scheme.

SWAN emphasised that there must be a strong focus on nutrient management in any quality assurance system proposed as well as the risk to water bodies in the receiving catchment, and that particular attention must be paid to at risk and High Status Water Bodies and ensuring continued compliance with the Water Framework Directive objectives. It suggested that Irish Water works with the EPA Catchment Science and Management Unit and Teagasc in relation to nutrient management planning. SWAN also supported recommendations from the DAFM that the total nitrogen and total phosphorus content per ton must be declared by the supplier in accordance with the Waste Management (Use of Sewage Sludge in Agriculture) Regulations.

Influence on the Final NWSMP

Irish Water propose that an independently audited quality assurance system is put in place for sludge management activities. This will include monitoring and tracking of all wastewater sludge. The final NWSMP has been updated to identify the need for Irish Water to liaise with the EPA Catchment Science and Management Unit and Teagasc to ensure that WFD objectives are met in relation to nutrient management planning. In addition it is proposed that Standard Operating Procedures will include a template for Nutrient Management Plans and a requirement to consider environmental impacts, WFD objectives and the potential to impact on the European Sites.

Changes to the Final NWSMP

Additional text added in Section 9.12.3, is outlined below:

Monitoring of persistent organic pollutants is undertaken based on the requirements of the *Code of Good Practice for Use of Biosolids in Agriculture*. There has been extensive international monitoring and research in this area in recent years. To date, there are no limits or recommendations for levels of organic pollutants **specifically relating to** wastewater sludge used in agriculture. It is proposed that research and recommendations in this area are reviewed regularly, with additional analysis undertaken if necessary, to mitigate against any risk to soils or health due to the presence of organic pollutants. **The proposed update of the *Code of Good Practice for Use of Biosolids in Agriculture* will review current monitoring and limits for organic pollutants and make recommendations for any further monitoring or limits required to mitigate against the potential risks. There are limits set in Regulation (EC) No. 850/2004 on persistent organic pollutants as listed in Annex IV of the regulations. An EU funded study[2] on the levels of selected compounds in sludge has found that the levels of POP's are generally significantly below the limits set in relation to Regulation 850/2004.**

[2] Occurrence and Levels of Selected Compounds in European Sewage Sludge Samples JRC 2012

Additional text added in Section 10.4, is outlined below:

The audit of sludge storage facilities identified some **issues** with facilities lacking the relevant permissions, structural integrity certificates and/or safety signage in place. Where issues have been identified, the relevant contractor must detail how this situation will be rectified. **All wastewater sludge storage facilities must be registered in accordance with S.I. No. 32/2010 - Waste Management (Registration of Sewage Sludge Facility) Regulations 2010. Sludge storage at a wastewater treatment plant or a waste licenced facility is excluded from this requirement for registration. Irish Water is now proposing that such off-site storage is addressed in conjunction with the upgrading of plants and sludge treatment, with strategic storage sites to be developed to the required standard.**

It is proposed to develop an independently assessed quality assurance scheme in relation to sludge management. **Until** this scheme is in place, an annual audit of sludge management activities **will be** undertaken on behalf of Irish Water. **In addition future contracts relating to sludge management will include Key Performance Indicators which contractors will be assessed against on an ongoing basis.**

Additional text added in Section 10.7, is outlined below:

Monitoring and reporting of sludge data is undertaken at wastewater treatment plants, **sludge treatment and storage facilities** and at the final **reuse** location.

Additional text added in Section 10.8, is outlined below:

Irish Water **intends** to liaise with the **Department of Housing, Planning, Community and Local Government** (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture to take into account current legislation **and any recommendations for wastewater sludge quality parameters and any additional sampling of persistent organics or emerging pollutants.** It is proposed that any updated COGP would be incorporated into Standard Operating Procedures for Irish Water and would include recommendations for assessment of environmental sensitivity of lands to be used for landspreading. The Standard Operating Procedures will also include a template for Nutrient Management Plans and a requirement to consider environmental impacts, **WFD objectives** and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures.

Irish Water will liaise with the EPA Catchment Science and Management Unit and Teagasc to ensure that WFD objectives are met in developing the template for Nutrient Management Plans. The Programme(s) of Measures in the second round of River Basin Management Plans will be reviewed upon their adoption and integrated into Irish Water's Standard Operating Procedures where appropriate. Each 5-year update of the NWSMP will take into account the WFD Objectives and Programmes of Measures in place. Contractors appointed to carry out sludge management on behalf of Irish Water will be required to comply with Irish Water's Standard Operating Procedures.

Ongoing research in relation to the composition of treated wastewater sludge has identified the presence of persistent organic pollutants, pharmaceuticals and personal care products which needs to be considered. **Standards** for monitoring of wastewater sludge in the EU and international research will be reviewed **regularly as a basis for identifying** additional monitoring of sludge or soil samples required.

Additional text added in Section 10.9, is outlined below:

It is proposed that future sludge treatment and **reuse** contracts for Irish Water will be required to comply with a quality assurance **procedures** currently being developed by Irish Water.

5.1.6 Domestic Wastewater Treatment Systems

Issue Raised: Domestic Wastewater Treatment Systems
The EPA welcomed the adoption of its recommendation that Irish Water plan for the reception of Domestic Waste Water Treatment System (DWWTS) sludge. It stated that a clear national strategy for the management of DWWTS sludge is required and collaboration with other relevant parties (statutory agencies and permitted contractors) should be considered in this regard. SWAN highlighted that there is a 50% deficit in capacity to receive and treat DWWTS wastewater and expressed its concern that the Draft NWSMP does not outline how it would address this situation.

SWAN challenged Irish Water's assertion that there will not be significant increases in DWWTS sludge produced during the lifetime of the NWSMP. It asserted that if the EPA's National Inspection Plan for DWWTS is effective then it should result in a significant increase in homeowners desludging their systems and therefore an increase in DWWTS sludge that needs to be processed. SWAN also questioned where the remaining sludge, that is not collected by private contractors or spread on land by farmers, will go. It expressed concern that that this would pose an uncontrolled risk to the environment.

Kerry County Council (KCC) welcomed the national approach to the commitment to cater for sludge from DWWTS. However it expressed concerns in relation to the Draft NWSMP statement that sludge from DWWTS would be accepted only at 'those sites defined as satellite dewatering centres'. It noted that this would result in septic tank sludges being transported long distances in tractor-towed tanks. KCC recommended that the Final NWSMP should allow for the limited acceptance of DWWTS sludges at peripheral Irish Water plants that will in turn feed into satellite centres. It also recommended that a sufficient network of Sludge Acceptance Facilities be provided so that DWWTS sludges can be disposed of in all areas. It stated that, if necessary, the provisions and operation of these facilities should be subvented by Irish Water and/or the Department of Housing, Planning, Community and Local Government in the interests of protecting the environment and supporting rural communities.

ZWAI noted that adequate income needs to be generated from sludge acceptance facilities for DWWTS sludge to ensure ongoing treatment and disposal of DWWTS sludge and suggested that human excrement be managed in a more cost-effective and environmentally friendly way. It suggested that urine separation and toilet solids separation should be one of the first steps towards a more sustainable and safer way to recycle nutrients to agriculture. It encouraged Irish Water to work with the Department of Housing, Planning, Community and Local Government to develop awareness, training and standards for urine separation at source.

Influence on the Final NWSMP

The final NWSMP has been updated to undertake that Irish Water will review the capacity available for accepting DWWTS sludge at its facilities if there is a significant increase in the demand for acceptance DWWTS acceptance facilities. As Irish Water have no statutory involvement in the treatment and disposal of DWWTS sludge any national strategy for the management of DWWTS sludge would not be within the remit of Irish Water. Irish Water will liaise with statutory bodies when requested in relation to any national strategy for DWWTS sludge. The final NWSMP has been also updated to take into account the particular concerns of Kerry CC in relation to transport distances.

The NWSMP considers the management of wastewater sludge only. Wastewater minimisation methodologies are outside the scope of the plan and will be considered separately in the development of strategies and plans for wastewater treatment and disposal where appropriate.

Changes to the Final NWSMP

Additional text added in Section 2.4.3, is outlined below:

Population growth rates have been reviewed by ESRI on behalf of Irish Water. Predicted growth rates have been provided on a county by county basis. **It is proposed that population growth rates and consequent sludge production should be reviewed every 5-years as part of the 5-year review of the NWSMP. This will allow the most up to date Census and wastewater load data to be used in planning wastewater sludge management.** A pro-rata increase in non-domestic effluent is assumed. The quantity of sludge produced at wastewater treatment plants will increase in line with increased populations.

Additional text added in Section 2.4.4, is outlined below:

The estimated sludge loads for 2015 includes predicted sludge load for treatment of existing wastewater loads at all agglomerations **including nutrient removal where required**. The completion dates for treatment plants with no treatment will extend beyond 2015 in a number of cases. It is expected that all agglomerations will have treatment by 2021 **with 99% compliance with the Urban Wastewater Treatment Directive standards by 2027. As the level of compliance increases the actual sludge load will increase to the predicted sludge loads as detailed in Table 2.3.** There are additional sludge loads due to imports from private wastewater treatment plants. However, the quantities of such sludge imported, for further treatment is low relative to the indigenous wastewater treatment plant sludge.

Additional text added in Section 2.5, is outlined below:

Sludge acceptance facilities for DWWTS sludge will need to generate an adequate income stream from the

acceptance of DWWTS sludge to fund initial investment and the ongoing CAPEX and OPEX costs associated with treating and disposing of DWWTS sludge. **Irish Water will continue to accept DWWTS sludge at wastewater treatment plants where the acceptance of sludge is not having a negative impact on the operation of the plant and will review the capacity available for accepting DWWTS sludge if there is a significant increase in the demand for acceptance facilities.**

It is estimated that 20% to 30% of the estimated volume of DWWTS sludge **produced** is currently collected by private contractors and treated at Irish Water facilities. It is likely that the recommended average desludging frequency of **3** years**, recommended in the Strive Report,** would only be complied with if new legislation and/or enforcement **is** undertaken.

5.1.7 Implementation of the NWSMP

Issue Raised: Implementation of the NWSMP
The EPA recommended that the Final NWSMP should include a separate section on Governance and Implementation with provisions for robust and transparent mechanisms to oversee the implementation of the NWSMP actions and commitments. It asked that the Final NWSMP would include a commitment that ensures temporary effects associated with implementing the NWSMP are considered and mitigated for.
Influence on the Final NWSMP
The final NWSMP has been updated to identify the need to identify and mitigate potential impacts due to temporary effects associated with implementing measures or projects. The final NWSMP identifies that the mechanism for monitoring implementation of the plan will be via 5 yearly reviews of the National Wastewater Sludge Management Plan every. This review will assess the implementation of the proposed measures proposed and make recommendations for new or updated measures.
Changes to the Final NWSMP
The governance and implementation for the recommendations in the NWSMP are considered in Section 10 of the NWSMP in terms of Quality Assurance, Monitoring and Reporting. This section identifies the particular measures needed including the need for Standard Operating Procedures for sludge management. <u>Additional text added in Section 10.4, is outlined below:</u> The audit of sludge storage facilities identified some **issues** with facilities lacking the relevant permissions, structural integrity certificates and/or safety signage in place. Where issues have been identified, the relevant contractor must detail how this situation will be rectified. **All wastewater sludge storage facilities must be registered in accordance with S.I. No. 32/2010 - Waste Management (Registration of Sewage Sludge Facility) Regulations 2010. Sludge storage at a wastewater treatment plant or a waste licenced facility is excluded from this requirement for registration. Irish Water is now proposing that such off-site storage is addressed in conjunction with the upgrading of plants and sludge treatment, with strategic storage sites to be developed to the required standard.** It is proposed to develop an independently assessed quality assurance scheme in relation to sludge management. **Until** this scheme is in place, an annual audit of sludge management activities **will be** undertaken on behalf of Irish Water. **In addition future contracts relating to sludge management will include Key Performance Indicators which contractors will be assessed against on an ongoing basis.** <u>Additional text added in Section 10.7, is outlined below:</u> Monitoring and reporting of sludge data is undertaken at wastewater treatment plants, **sludge treatment and storage facilities** and at the final **reuse** location. <u>Additional text added in Section 10.8, is outlined below:</u> Irish Water **intends** to liaise with the **Department of Housing, Planning, Community and Local Government** (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture to take into account current legislation **and any recommendations for wastewater sludge quality parameters and any additional**

sampling of persistent organics or emerging pollutants. It is proposed that any updated COGP would be incorporated into Standard Operating Procedures for Irish Water and would include recommendations for assessment of environmental sensitivity of lands to be used for landspreading. The Standard Operating Procedures will also include a template for Nutrient Management Plans and a requirement to consider environmental impacts, **WFD objectives** and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures.

Irish Water will liaise with the EPA Catchment Science and Management Unit and Teagasc to ensure that WFD objectives are met in developing the template for Nutrient Management Plans. The Programme(s) of Measures in the second round of River Basin Management Plans will be reviewed upon their adoption and integrated into Irish Water's Standard Operating Procedures where appropriate. Each 5-year update of the NWSMP will take into account the WFD Objectives and Programmes of Measures in place. Contractors appointed to carry out sludge management on behalf of Irish Water will be required to comply with Irish Water's Standard Operating Procedures.

Ongoing research in relation to the composition of treated wastewater sludge has identified the presence of persistent organic pollutants, pharmaceuticals and personal care products which needs to be considered. **Standards** for monitoring of wastewater sludge in the EU and international research will be reviewed **regularly as a basis for identifying** additional monitoring of sludge or soil samples required.

Additional text added in Section 10.9, is outlined below:

It is proposed that future sludge treatment and **reuse** contracts for Irish Water will be required to comply with a quality assurance **procedures** currently being developed by Irish Water.

5.1.8 Additional Comments/Information for Consideration in the SEA and NIS

Issue Raised: Additional Comments/Information for Consideration in the SEA and NIS
DAERA highlighted that a proposed Marine Conservation Zone is currently the focus of a public consultation and noted that the boundary for Carlingford Lough SPA has recently been extended and that the North Channel pSAC and East Coats Marine pSPA have recently been proposed as Natura Sites. The EPA asked that the NWSMP clarifies whether any wastewater infrastructure within the remit of Irish Water is present in South Dublin County Council or whether it is managed through other adjacent Local Authority wastewater infrastructure. The EPA suggested that the SEA considers describing the potential impacts on landscape which may arise in implementing the NWSMP.
Influence on the Final NWSMP
The final NWSMP has been updated to clarify that there is no wastewater treatment plants under the control of Irish Water in South Dublin and therefore no wastewater sludge to be considered. The NWSMP identifies that potential impact on any Natura 2000 site will need to be considered for any project by undertaking an Appropriate Assessment (AA). Any AA will take into account any new or proposed Natura 2000 sites in undertaking evaluation of potential impacts. The SEA considered landscape impacts as part of the overall assessment. This was supported by sensitivity mapping and the development of siting criteria which have been integrated into the final plan in Section 9.5. Potential impacts include visual intrusion, alteration of landscape character, disruption of protected and / or scenic views; however, such impacts will be location and development specific.
Changes to the Final NWSMP
Additional text added in Section 7.4.1, is outlined below: Each local authority area **(excluding South Dublin which has no wastewater treatment plants in the county)** has been reviewed to assess the current situation and recommendations for the future. Additional text added in Section 8.6, is outlined below: The restrictions in agricultural use of wastewater sludge, due to groundwater vulnerability and **naturally occurring** cadmium and nickel levels, reduce the overall area of agricultural land, potentially available, from approximately 4.45 million hectares to 2.54 million hectares, i.e. 54% of agricultural land. These

areas are shown on Figure 8.4. This area would be further reduced to approximately 108,000 hectares if only land used for animal fodder cereals was used. **Further limitations are required on use of sludge in areas within or adjacent to Natura 2000 sites or areas prone to flooding. This will be reviewed on a case-by-case basis as part of the assessment of suitability of landbanks to ensure that there are no significant impacts.**

6 PREFERRED SCENARIO AND REASON FOR CHOOSING THE FINAL NWSMP

The consideration of alternatives is a requirement of the SEA Directive (2001/42/EC). It states under Article 5(1) that:

> *Where an environmental assessment is required under Article 3(1), an environmental report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated. The information to be given for this purpose is referred to in Annex I.*

Annex 1 (h) of the Directive clarifies that the information to be provided on alternatives under Article 5(1) is *inter alia an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information*. Article 9 of the Directive requires that a statement shall be prepared providing information on the reasons for choosing the plan as adopted, in the light of the other reasonable alternatives dealt with.

Annex 1 (f) details the environmental topics to be considered in the evaluation of the alternatives, which is the same as that addressed in the assessment of the plan itself: biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors.

In summary, the directive emphasises that the SEA process must consider alternatives that are "reasonable", and take into account "the objectives" of the plan, and "the geographical scope of the plan".

6.1 ALTERNATIVES CONSIDERED FOR THE NWSMP

At the strategic level, it is noted that the NWSMP is a Tier 2 Plan within the Irish Water Planning and Environmental Assessment Hierarchy for Waste Services. These Tier 2 Plans derive from the Water Services Strategic Plan, a Tier 1 Plan required under Section 33 of the Water Services No. 2 Act of 2013. This represents the highest tier of asset management plans for Irish Water. The Tier 2 Plans are not statutorily required but rather detail Irish Waters implementation strategies for the WSSP. Given that there is no statutory requirement for the NWSMP, consideration was given to the "do nothing" as an alternative under strategic considerations in the SEA.

6.1.1 Strategic Alternatives

6.1.1.1 No Plan versus National Wastewater Sludge Management Plan

The preferred alternative is the development of a NWSMP. This plan will provide a clear and transparent approach to the management of wastewater sludge at a national level. Importantly it will also standardise the requirements and expectations for contractors charged with collecting and

spreading treated wastewater sludge, including ensuring that the lands chosen are appropriate and that the contractor is adhering to best practice in use of the sludge.

Overall the development of a national plan is anticipated to be positive across all environmental receptors as the auditing and monitoring of facilities and activities will reduce the incidence of poor practice and increase consistency within the system. Possible avenues of poor practice have been identified including incorrect liming in the treatment wastewater sludge, Nutrient Management Plans that did not necessarily reflect the requirements of legislation and spreading in inappropriate conditions. The development of a national management plan with appropriate monitoring will improve practices across the sector which will lead to indirect positive impacts for the receiving environment.

One of the potential negative impacts associated with a national approach is the potential for greater separation distances between the source of the treated wastewater sludge and suitable spread lands i.e. the closest available spread lands to the treated source are not always utilised, which arises due to contractual arrangements. This could potentially lead to wastewater sludge being hauled over long distances with little or no benefit. Transport related emissions are also likely to increase with indirect impacts on air quality and climate. There is some indication of this significant transport of wastewater sludge from recent auditing by Irish Water.

The NWSMP will also look at capacity of existing infrastructure for treatment of wastewater sludge and identify gaps on a national top down level. Initial audits of infrastructure including wastewater sludge treatment plants, sludge hub centres and sludge satellites indicate fewer treatment facilities along the west and southwest areas. This is leading to increased transport from wastewater treatment facilities in these areas. The NWSMP will address this geographic imbalance leading to better servicing of the west and southwest areas and ultimately less transport related emissions, although it is acknowledged that availability of spread lands in the west are limited by geology and as such may not be available due to the environmental risks. The provision of infrastructure must take into account the potential need to haul material further in some cases and to enable diversion of sludge loads to alternative sites during periods of maintenance or peak loading.

Without the NWSMP, it could reasonably be expected that infrastructure needs would not be clear resulting in continued export of wastewater sludge for treatment from facilities along the west coast. Monitoring of contractors and facilities would likely be more local with no opportunity to identify cumulative impacts or realise cumulative benefits from existing practices.

Summary of significant impacts of these alternatives:

	BFF	PHH	FPS	SG	W	AQ	CF	MA	CH	L
No Plan	+/-	+/-	+/-	+/-	+/-	+/-	+/-	+/-	+/-	+/-
NWSMP	+	+	+	+	+	+/-	+/-	+	+	+

BFF (Biodiversity Flora and Fauna); PHH (Population/Human Health); FPS (Food Production and Safety); SG (Soils and Geology); W(Water); AQ (Air Quality); CF (Climatic Factors); MA (Material Assets); CH (Cultural Heritage); L (Landscape). Positive impact (+); Negative impact (–); Both positive and negative impacts (+/–); and Neutral (0).

6.1.2 Transport Alternatives

6.1.2.1 Wastewater Sludge Volumes – Transport of Liquid Wastewater Sludge versus Transport of Thickened / Dewatered Wastewater Sludge

The preferred alternative is to reduce the wastewater sludge volumes requiring transport. This is achieved by thickening, and in the case of larger wastewater treatment plants, by dewatering.

Un-thickened Wastewater Sludge: There are two outputs from the wastewater treatment process: treated effluent; and liquid sludge with a dry solid (d.s.) content of 0.7-3%. The treated effluent is typically released, to receiving waters while the liquid sludge is then either treated further on-site through a process of thickening (d.s. content of 2-6%) and dewatering (d.s. content of 14-30%) or it is shipped off-site for similar treatment at facilities operated by Irish Water or other third parties. For smaller treatment plants, (< 500 p.e), storage may be facilitated within the process if there is room. Alternatively storage may require the provision of separate dedicated storage tanks. The removal of wastewater sludge from these tanks is then a function of the level of treatment and the volume of available storage space.

Thickened Wastewater Sludge: Wastewater sludge thickening can take place at different points in the process depending on the level of treatment involved. Generally where secondary treatment occurs, wastewater sludge is normally removed from the process stream at <1% d.s. while with primary wastewater sludge it is removed at approximately 2-3% d.s. The main technologies used in Ireland for wastewater sludge thickening include: picket fence thickeners, consolidation tanks, drum thickeners and gravity belts. The preferred technology is a function of the size of the population being served and the distance to the nearest satellite. Dewatering as the name implies, seeks to remove water (which adds both significant volume and mass in terms of transportation) from the sludge remaining after wastewater treatment. The main processes currently in use in Ireland are: belt presses, centrifuges and sludge drying beds. There are 177 No. WWTPs reported as having sludge dewatering installed. In general, existing WWTPs with a current PE over 3,000 have dewatering in place, however there are a number of WWTPs with a PE of less than 2,000 which also have dewatering. On-site wastewater sludge reed beds are another version of dewatering and have been provided in Ireland in recent years and are operating successfully. Wastewater sludge reed beds are considered beneficial in smaller remote WWTPs where the cost of transport of wastewater sludge to a satellite dewatering site is unsustainable.

In overall terms the reduced volume of wastewater sludge achieved by thickening and dewatering prior to transport will bring positive environmental benefits by reducing the number of tanker movements required thereby reducing transport related emissions including GHG.

The total volume of wastewater sludge from treatment plants is estimated to be in the order of 900,000m^3/annum with the majority of this from local authority operated WWTP. Analysis undertaken in preparation of the NWSMP indicates that there is potential to reduce the volume of wastewater sludge for transport by 20 to 25% by optimising thickening at smaller WWTPs. Alongside this there are a large number of sites with existing wastewater sludge storage tanks where sludge thickening could be optimised by automating the decant process.

Reducing the volume of wastewater sludge for transport would represent a significant saving in terms of emissions to air, climate, energy usage in transport and reduced pressure on the road infrastructure. This in turn would have a long-term positive impact on air quality and climatic factors associated with wastewater sludge management. GHG emissions have a direct impact in terms of climate change with indirect impacts on population, human health, biodiversity and material assets

as a result of increased flooding. NOx, SOx and particulate matter have short, medium and long-term effects on human health in particular but also on biodiversity as a result of deposition and acidification.

An example is provided in **Table 6.1** to demonstrate that the extent of the impact of transporting wastewater sludge (thickened and unthickened) is largely dependent on the volume of material to be transported. The average GHG emissions per mass of material transported by road have been devised by Department for the Environment, Food and Rural Affairs, UK (Defra)[3] and were used to calculate the kg of CO_2 for each of four scenarios. It is clear that with increased thickening of liquid wastewater sludge there is a decrease in the number of vehicles required to remove the sludge offsite and a direct relative reduction in the kg of CO_2 having a positive contribution toward the reduction of GHG emissions. The energy required to treat the wastewater sludge has not been accounted for in these calculations.

Table 6.1 – Scenario on Transport of (thickened and unthickened) Sludge

Scenario	Description	No. Truck Movements*	Transport GHG Emissions (kg CO_2)
Transport of Liquid Wastewater Sludge 3000m^3 (1% d.s)	Transport of liquid wastewater sludge from a WWTP for further treatment within 100km.	150	13,264
Partial On-site Treatment to thickened Liquid – 1000m^3 (3% d.s.)	Transport of thickened liquid wastewater sludge from a WWTP for further treatment within 100km.	50	4,421
On-site Treatment to Wastewater Sludge Cake - 150m^3 (20% d.s.)	Transport of wastewater sludge cake from a WWTP for further treatment within 100km.	7.5	663
On-site Treatment to thermally dried 31.5m^3 (95% d.s.)	Disposal of treated wastewater sludge to an outlet within 100km	1.6	141

*It has been assumed that a tanker has 20m^3 capacity

As demonstrated by the sample scenario, the GHG transport emissions are inversely proportional to the level of on-site treatment. The relative differences would change depending on the location of the WWTP and off-site treatment facility.

Transport related emissions have the potential for negative impacts on the terrestrial and aquatic environment and on biodiversity, flora and fauna from deterioration in air and water quality and from disturbance of habitats. The contribution of transport to GHG emissions also has consequences for climate change and in particular flooding which in turn has negative impacts for population, human health, biodiversity and material assets.

It is important to note that the full or partial on-site options have, themselves, potential for negative effects which would be felt locally as new infrastructure would need to be built resulting in land use changes, emissions to air and water (albeit controlled), disturbance of biodiversity, flora and fauna and populations. Any additional infrastructure locally will have the potential for some emissions,

[3] DEFRA 2012 GHG Conversion Factors, 0.88433kg CO_2 per vehicle per km (Assumption 7.5-17 tonne vehicle weight, 39% weight laden)

locally compared to the scenario where liquid wastewater sludge is transported to off-site facilities (see previous example for comparison). However, these impacts should not be significant as they will be controlled by the licensing / planning systems. Any emissions would be within licensed emission levels and / or planning conditions that are based on standards intended to protect human health and the environment.

Full or partial onsite options may also require energy for treatment with indirect negative impacts on air and climate as a result and this needs to be weighed against savings in GHG emission from transport. Simple partial treatment using settlement or by mechanical dewatering typically offers the greatest balance as it does not require significant energy to dry materials but the number of truck movements would decrease significantly compared transport of liquid wastewater sludge. The balance becomes more challenging as energy costs (financial and environmental) for drying are considered against emissions savings from the reduced transport. However, any facility with the potential for energy recovery will have environmental benefits by offsetting the use of other fossil fuels, which may in some cases be regarded as renewable energy.

However, it is important to note that the provision of new or upgraded infrastructure, itself, may have potential for negative effects which would be felt locally resulting in land use changes, emissions to air and water (albeit controlled), disturbance of biodiversity, flora and fauna and populations. Reed beds for example may result in increased odour in the local area. The option of wastewater sludge reed beds as an alternative technology to transportation of liquid wastewater sludge may provide a sustainable solution, for smaller plants, particularly where there are long transport distances to a satellite dewatering centre.

Summary of significant impacts of these alternatives:

	BFF	PHH	FPS	SG	W	AQ	CF	MA	CH	L
Transport of Liquid Wastewater Sludge	+/-	+/-	0	+/-	+/-	+	+	+	+/-	+/-
Transport of Thickened / Dewatered Wastewater Sludge	+/-	+/-	0	+/-	+/-	+	+	+	+/-	+/-

BFF (Biodiversity Flora and Fauna); PHH (Population/Human Health); FPS (Food Production and Safety); SG (Soils and Geology); W(Water); AQ (Air Quality); CF (Climatic Factors); MA (Material Assets); CH (Cultural Heritage); L (Landscape). Positive impact (+); Negative impact (–); Both positive and negative impacts (+/–); and Neutral (0).

6.1.3 Infrastructure Alternatives

6.1.3.1 Maintain Status Quo versus Improve Regional Access to Treatment Infrastructure

The preferred alternative is to provide improved regional access to a network of satellites and hubs.

The DELG document, *Sludge Management Plans: A Guide to their Preparation and Implementation (DELG 1998)* recommended the adoption of a 'hub-centre and satellite-site' system for the treatment of wastewater sludge. The system, which is used internationally, provides for wastewater sludge from outlying rural works to be directed via intermediate WWTP (satellite dewatering sites) where sludge is dewatered prior to transfer to a centralised treatment facility (the sludge hub-centre). The dewatering of wastewater sludge at the satellite-sites reduces onward transport costs and traffic movements, thereby having the potential to contribute to overall reduction in GHG emissions. There are a total of 24 wastewater sludge hub and treatment centres in Ireland where

full treatment to produce biosolids is provided. The majority of these are being operated by DBO contractors.

The principle benefit of providing an improved network of satellite sites and hub centres with a more regional focus is the reduction in volume of wastewater sludge material achieved thereby reducing the number of truck movements required to transport unthickened wastewater sludge. This is particularly important for rural areas where provision of thickening and dewatering processes may be unviable given the P.E. being served or the location of the WWTP. Given the highly dispersed nature of the population in Ireland and the large volume of WWTPs of varying size, the provision of an intermediate step offers many advantages.

The negative effect relates to the requirement for an improved network of satellite and hubs which may mean new infrastructure or upgrades to existing infrastructure leading to localised traffic, odour, and noise nuisance if in proximity to population centres and / or clusters. There could also be negative impacts on landscape due to land use change but the level of impact will depend on the chosen location and the size of the facility that is being constructed.

There will be positive effects in relation to material assets as through improved access to a 'Hub-centre and Satellite-site' system there will be more options for de-watering of the wastewater sludge. This will have knock on positive impacts on air quality and climate change as it is hoped that there will be less vehicle movements required to transport the wastewater sludge.

Summary of significant impacts of these alternatives:

	BFF	PHH	FPS	SG	W	AQ	CF	MA	CH	L
Maintain status quo	+/-	+/-	0	+/-	+/-	+/-	+/-	+/-	+/-	+/-
Improve regional access to treatment infrastructure	+/-	+/-	0	+/-	+/-	+/-	+/-	+/-	+/-	+/-

BFF (Biodiversity Flora and Fauna); PHH (Population/Human Health); FPS (Food Production and Safety); SG (Soils and Geology); W(Water); AQ (Air Quality); CF (Climatic Factors); MA (Material Assets); CH (Cultural Heritage); L (Landscape). Positive impact (+); Negative impact (–); Both positive and negative impacts (+/–); and Neutral (0).

6.1.4 Reuse and Disposal Alternatives

6.1.4.1 Reuse on Land versus Thermal Recovery

Following review and assessment of the various reuse and thermal recovery options, no one specific alternative is considered to be superior to the others. All reuse options are considered feasible, subject to a review of site suitability on a case by case basis and specifically consideration of impacts to human health, water and soil quality and biodiversity, flora and fauna relevant to the quality of the wastewater sludge product being reused. Thermal recovery also offers a feasible alternative in the medium to long-term.

Of note is the lack of resilience in terms of alternatives in the short-term, with little or no alternative to land spreading on agricultural land. Until such time as thermal recovery options and other reuse outlets are more fully developed, reuse on agricultural lands is the only viable alternative available to Irish Water.

Reuse on Agricultural Land

There are recognized advantages to the use of treated wastewater sludge in agriculture. The principle one relates to the nutrient cycle in soils. Plants take up nutrients from the soil as they grow. When plants are harvested many of the nutrients associated with their growth are removed also. The plants, or products derived from them, are consumed directly and indirectly by humans and animals and many of the plant nutrients are assimilated in animal or human growth. However, not all nutrients are used in these processes and as a result some are released in waste and enter the wastewater stream and ultimately are found in wastewater sludge. If these nutrients can be returned to the soil, it completes the natural cycle, replenishing those lost when plants are harvested or removed by feeding livestock. Of particular interest from an agricultural perspective is the presence of quantities of both phosphorus and nitrogen in the wastewater sludge, two nutrients which are regularly applied to land as inorganic fertiliser to aid plant growth. An available organic source of these nutrients offers significant cost and soil fertility advantage to famers. Other important nutrients are also present e.g. potassium.

Inappropriate application of wastewater sludge for use in agriculture could give rise to run-off and potential negative impacts to surface and/ or groundwater leading to deterioration in water quality and consequently negative impacts to water dependant ecosystems. Impacts on water quality could also have a negative effect on drinking water supplies and ultimately human health. There could be impacts from leaching of heavy metals, nutrients and pathogens to soil and water following landspreading if the requirements of the COGP are not complied with.

It is noted that there is considerable and growing opposition from sectors of the food industry to the use of wastewater sludge on agricultural lands. The concerns relate to the use of wastewater sludge on agricultural lands and the lack of statutory basis for the COGP. Therefore, there is the potential for negative impacts on food safety and population in the absence of tightening controls on current practices.

Reuse on Energy Crops

Inappropriate application of wastewater sludge for use on energy crops could give rise to run-off and potential negative impacts to surface and/ or groundwater leading to deterioration in water quality and consequently negative impacts to water dependant ecosystems. Impacts to water quality could also have negative effect on drinking water supplies and ultimately human health having a negative impact on population and human health. There could also be impacts from leaching of heavy metals, nutrients and pathogens to soil and water following the application of wastewater sludge.

The application of wastewater sludge on soils to grow energy crops would be positive for material assets as the provision of wastewater sludge would facilitate the growth of energy crops and negate the need to acquire other forms of fertiliser. However due to the process, requiring compliance with the EPA ‘certificate of registration’ there is very limited interest.

There is the potential for secondary positive impacts on population from increased bioenergy usage and the provision of more renewable sources of energy. Whilst the use of wastewater sludge on energy crops would alleviate food safety concerns there is the potential for negative impacts in the absence of a nutrient management system being in place for wastewater sludge spread on energy crops.

Reuse on Forestry Lands

The impacts presented are similar to those outlined for reuse on energy crops. Inappropriate application of wastewater sludge could give rise to run-off and potential negative impacts to surface and/ or groundwater leading to deterioration in water quality and consequently negative impacts to water dependant ecosystems. Impacts to water quality could also have negative effect on drinking water supplies and ultimately human health having an indirect negative impact on population and human health. There could also be impacts to water quality from leaching of heavy metals, nutrients and pathogens to soil and water following the application of wastewater sludge.

Site suitability is key to establishing forestry as a feasible outlet. As with energy crops, forestry can have its own impacts on the receiving environment and in particular the hydrological regime as a result of the significant drainage works which are often required in commercial forestry. Acidification of the receiving waters and release of suspended solids are also a concern in relation to forestry operations and these impacts could give rise to in combination effects with application of wastewater sludge. The underlying geology, tree species and site characteristics determine much of the suitability of a site for forestry and this information is included in forestry applications to DAFM. Such applications do undergo screening for Appropriate Assessment however it is not clear if application of wastewater sludge as a fertilizer would require any further consent. The Forestry and Water Quality Guidelines published by the Forest Service, DAFM do contain specific measures regarding fertiliser application including measures to protect permanent or seasonal streams, rivers and lakes (aquatic zones) from fertiliser discharge.

There would be positive impacts on material assets as the provision of wastewater sludge would facilitate improved forest production and follicular health and negate the need to acquire other forms of fertiliser. There is the potential for positive impacts on air quality and climate also where there is reduced need for artificial fertiliser production, and increased biomass production contributing to reduced CO2 levels and medium to long term benefits for climate.

Reuse for Land Reclamation

The use of wastewater sludge for land reclamation is positive for biodiversity, population, soils and material assets as it provides a natural fertiliser that can be used to generate new growth on the lands. However as with reuse on energy crops or forestry there is the potential for direct negative impacts on biodiversity, water and soils and indirect negative effects on drinking water supplies and ultimately human health from run-off if applied inappropriately. There is also the possibility of impacts from leaching of heavy metals, nutrients and pathogens to soil and water following the application of wastewater sludge.

Thermal Recovery

It is acknowledged that thermal recovery can cover incineration (waste to energy), co-incineration (e.g. in cement kilns), pyrolysis, gasification and others technologies.

The use of wastewater sludge in thermal recovery facilities has both positive and negative impacts on the environment. The energy output from the combustion of the wastewater sludge has long term positive impacts on material assets, population and human health from the production of heat and electricity and the displacement of fossil fuels. In addition, the ash generated can be utilised by the cement industry displacing mined materials. However, there are negative impacts on material

assets as there are high costs involved in drying the wastewater sludge for use in cement kilns which would contribute to the increase of emissions to the atmosphere. There are negative impacts on biodiversity and soils as the nutrient content of the wastewater sludge is not captured and released back into the soil but instead is converted to energy.

It is noted that certain recovery processes can give rise to by-product such as fly ash and bottom ash (from Waste to Energy). In the case of fly ash, this is considered hazardous material and is exported for disposal in appropriate facilities. The export of fly-ash for disposal has the potential to impact negatively on AQ and CF as a result of transport related emissions. The disposal of this material also has potential for negative environmental impacts, particularly in relation to AQ, water, soils, BFF and PHH. It is acknowledged that risks related to these impacts would currently be borne by the country accepting this waste as Ireland does not have facilities to deal with this material. It is noted that such facilities would be subject to licensing and permitting regimes in the host country therefore significant impacts are not anticipated.

Bottom ash is not considered hazardous and can be landfilled in non-hazardous landfills in Ireland, a practice which is ongoing. In addition bottom ash may be reused in the production of construction blocks as is the practice in the Netherlands. This reuse of materials would give rise to positive environmental impacts.

Summary of significant impacts of these alternatives:

	BFF	PHH	FPS	SG	W	AQ	CF	MA	CH	L
Reuse on Agricultural Land	+/-	-/0	-/0	+/-	+/-	0	0	+	0	0
Reuse on Energy Crops	+/-	-/0	+	+/-	+/-	+	+	+	0	0
Reuse in Forestry	+/-	-/0	+	+/-	+/-	+	+	+	0	0
Land Reclamation	+/-	-/0	+	+/-	+/-	0	0	+	-/0	+
Thermal Recovery	+/-	+/-	+	+/-	+/-	+/-	+/-	+	0	0

BFF (Biodiversity Flora and Fauna); PHH (Population/Human Health); FPS (Food Production and Safety); SG (Soils and Geology); W(Water); AQ (Air Quality); CF (Climatic Factors); MA (Material Assets); CH (Cultural Heritage); L (Landscape). Positive impact (+); Negative impact (–); Both positive and negative impacts (+/–); and Neutral (0).

6.2 OVERALL PREFERRED SCENARIO

The NWSMP proposes to develop the network of sludge hub centre treatment sites and satellite dewatering sites, with hubs optimised on a regional rather than county basis. The preferred option is reuse with primary focus in agriculture on tillage lands used for animal feed crops. Alternative options, such as energy crops, forestry etc. will be developed where possible.

7 MEASURES TO MONITOR SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE IMPLEMENTATION OF THE ADOPTED NWSMP

7.1 INTRODUCTION

Article 10 of the SEA Directive requires that monitoring be carried out in order to identify, at an early stage, any unforeseen adverse effects due to implementation of a Plan or Programme, and to be able to take remedial action. Monitoring is carried out by reporting on a set of indicators, which enable positive and negative impacts on the environment to be measured. The environmental targets and indicators of relevance to this NWSMP were identified from the SEA process. These targets and indicators will be used to identify unforeseen adverse effects from implementation of the NWSMP.

7.2 RESPONSIBILITY FOR MONITORING

It is the responsibility of Irish Water to undertake the monitoring of the NWSMP.

7.3 SOURCES OF INFORMATION FOR MONITORING

Monitoring will focus on aspects of the environment that are likely to be significantly impacted by the NWSMP. The NWSMP is a Tier 2 Plan sitting below the Water Services Strategic Plan (WSSP) and therefore the monitoring programme for the NWSMP has been developed in line with the WSSP monitoring programme.

Where possible, indicators have been chosen based on the availability of the necessary information and to show changes that would be attributable to implementation of the NWSMP. **Table 7.1** presents the environmental monitoring and reporting programme to track progress towards achieving SEOs and reaching targets, and includes sources of relevant information.

Table 7.1 – Environmental Monitoring Programme

Environmental Component	Strategic Environmental Objectives (SEOs)	SEA Indicators	SEO Targets	Data Source for Indicators
Biodiversity and flora and fauna (BFF)	Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species resulting from Irish Water's wastewater sludge management activities.	The Status of EU Protected Habitats and Species (Article 17 Conservation Status Assessment Reports due every 6 years, current reports published in 2013) (Ire and NI).	Maintenance / achievement of favourable conservation status for all habitats and species protected under national and international legislation to be unaffected by implementation of the NWSMP[4].	NPWS/ NIEA (6 yearly reporting)
		Provision of appropriate and effective wastewater treatment.	Achievement of WSSP indicators in relation to "operating water services infrastructure in a manner that facilities the achievement of the water body objectives under the Birds and Habitats Directives" *(pg. 48 of the final WSSP).*	Irish Water (yearly reporting)
Population and Human Health (PHH)	Protect and reduce risk to human health in undertaking wastewater sludge management practices.	Indicators as listed in Chapter 4 and Chapter 5 of the WSSP* *Strategic Objective to Ensure a Safe and Reliable Water Supply (pg. 39-40 of the final WSSP); and* *Strategic Objective to Provide Effective Wastewater Management (pg. 42-43 of the final WSSP).*	In line with WSSP, contribute to the achievement of: ▪ All drinking water areas (including groundwater), as identified on the register of protected areas, to achieve good status, or maintain high status. ▪ All bathing waters, as identified on the register of	Irish Water and EPA

[4] Except as provided for in Section 6(4) of the Habitats Directive viz. There must be (a) no alternative solution available; (b) imperative reasons of overriding public interest for the plan to proceed; and (c) adequate compensatory measures in place.

Environmental Component	Strategic Environmental Objectives (SEOs)	SEA Indicators	SEO Targets	Data Source for Indicators
			protected areas, to achieve good status, or maintain high status. ▪ All economic shellfish waters, as identified on the register of protected areas, to achieve good status, or maintain high status. ▪ All water bodies designated for salmonids, as identified on the register of protected areas, to achieve good status, or maintain high status. ▪ Long term reduction in drinking water restriction notices.	
Food Production and Safety (FPS)	To contribute to protection of food safety by ensuring the quality of the wastewater sludge product for land spreading on agricultural land.	Audit of contractor compliance with the COGP and the legislation, as a minimum, prior to development of a quality assurance scheme.	To develop a quality assurance scheme for all Irish Water wastewater sludge to ensure that only treated and tested wastewater sludge of suitable quality is used for land spreading on agricultural lands.	Irish Water
Water(W)	Prevent deterioration of the status of water bodies with regard to quality and quantity due to Irish Water activities and contribute towards the improvement of water body status for rivers, lakes, transitional and coastal waters and groundwaters to at least good	Indicators as listed in Chapter 4 and Chapter 5 of the WSSP* *Strategic Objective to Ensure a Safe and Reliable Water Supply (pg. 39-40 of the final WSSP); and* *Strategic Objective to Provide Effective Wastewater*	In line with WSSP, contribute to the achievement of: ▪ No deterioration in status of waters currently with high or good status (WFD Objective). ▪ Restoration to good status of waters currently at moderate, poor or bad	Irish Water and EPA

Environmental Component	Strategic Environmental Objectives (SEOs)	SEA Indicators	SEO Targets	Data Source for Indicators
	status, as appropriate to the Water Framework Directive.	*Management (pg. 42-43 of the final WSSP).*	status (WFD Objective). ▪ Progressively reduce chemical pollution in waters (WFD). ▪ Limit pollution inputs to groundwaters and prevent deterioration (WFD Objective).	
Air and Climatic Factors (AQ)	Minimise contributions to climate change ad emissions to air (including greenhouse gas emissions) as a result of Irish Water activities in relation to wastewater sludge management and ensure the resilience of related infrastructure to the effects of climate change.	*EN1b on pg. 59 of the final WSSP* - Preparation and implementation of the Sustainable Energy Strategy. % increase in overall energy efficiency at Irish Water facilities.	Improve energy efficiency by 33% by 2020 (from the 2009 baseline). Each treatment hub to develop a strategy toward energy self-sufficiency, where practicable, as a long term sustainable target to improve the overall environmental performance of the facility and improve business resilience.	Irish Water
		Number of complaints received related to odour.	Compliance with odour criteria to prevent deterioration in amenity beyond the site boundary for new or upgraded wastewater infrastructure and minimise emissions to air from wastewater sludge spreading.	Irish Water
		EN1c on pg. 59 of the final WSSP - Preparation and implementation of the Climate Change Adaptation and Mitigation Strategy)	Ensure resilience of infrastructure to the effects of climate change.	Irish Water

Environmental Component	Strategic Environmental Objectives (SEOs)	SEA Indicators	SEO Targets	Data Source for Indicators
Material Assets (MA)	Provide new, and upgrade existing, wastewater sludge management infrastructure to protect human health and ecological status of water bodies.	Wastewater services investment expenditure per annum.	Increase investment in wastewater management infrastructure.	Irish Water
Soil and Geology (SG)	Avoid conflicts with, and contribute towards, the appropriate management of soil quality and quantity.	Audit of contractors compliance with the COGP and the legislation, as a minimum, prior to landspreading.	Accurate Nutrient Management Plan (NMP) for all lands proposed for spreading of Irish Water wastewater sludge.	Irish Water
Cultural Heritage (CH)	Avoid damage to cultural heritage resources resulting from Irish Water's wastewater sludge management activities.	*Implementation of Strategy EN1e on pg. 59* [Adherence to environmental and planning legislation]. Any change in the condition of monuments on the Record of Monuments and Places due to Irish Water activities.	No unauthorised physical damage or alteration of the context of cultural heritage features due to Irish Water activities.	Irish Water Archaeological Survey of Ireland Sites and Monuments Record
Landscape (L)	Avoid damage to designated landscapes resulting from Irish Water's activities.	*Compliance with WSSP Strategy EN1e on pg. 59* [Adherence to environmental and planning legislation]	Avoid damage to designated landscapes as a result of NWSMP implementation.	Irish Water

8 ADDENDUM TO ENVIRONMENTAL REPORT

8.1 INTRODUCTION

This is the addendum to the Environmental Report for the NWSMP. This chapter serves two purposes: a) to provide clarification and/or additional information following comments in the submissions received during the consultation period on the draft NWSMP and Environmental Report; and b) to identify where the Environmental Report has been updated in following consideration of comments received in submissions during the public consultation period.

It should be noted that this document supplements and should be read in conjunction with the original Environmental Report.

The clarifications and additional information contained herein (shown in italicised blue text) have been provided in order to increase the usefulness of the document for the public and decision makers. However, the amendments proposed are not of such an extent that changes to the content or outcome of the assessment contained within the Environmental Report will be required.

8.2 AMENDMENTS BY CHAPTER

8.2.1 Non-Technical Summary

Clarification is provided on page 8 in relation to the Northern Ireland Climate Change Adaption Programme. A key priority for climate change will be the implementation of the Northern Ireland Climate Change Adaption Programme *which was published in January 2014 and contains the Northern Ireland Government response to the risks from climate change to Northern Ireland identified in the Climate Change Risk Assessment for Northern Ireland*.

8.2.2 Chapter 5

Table 5.1 – Key Relevant Plans and Programmes, page 43 has been amended to include the *National Strategic Plan for Sustainable Aquaculture Development* under the National entries.

In addition, the following plans (under preparation) which will be finalised over the lifetime of the NWSMP have been included in Table 5.1; the *Plan for Forestry & Freshwater Pearl Mussel in Ireland* and the *National Planning Framework* under the National entries. The *Regional Spatial and Economic Strategies* by the three Regional Assemblies have also been included under the Regional entries.

Table 5.2 – Key Relevant Policy and Legislation, page 44 has been amended to include *The Foreshore Acts (as amended 1933 – 2011).*

8.2.3 Chapter 6

The following text is included in Section 6.2.1.1 under Table 6.4:

In Northern Ireland there are 57 SACs, 16 SPAs, 20 Ramsar and 385 Areas of Special Scientific Interest (ASSIs). *There are recently proposed Natura 2000 sites; North Channel pSAC and East Coast Marine pSPA.* The ASSIs are areas of land with national conservation value. Some designations, such as Carlingford Lough SPA and Carlingford Shore SAC extend into Northern Ireland and as such present potential for transboundary effects. *A proposed Marine Conservation Zone (pMCZ) is currently out for consultation in Northern Ireland. This pMCZ is designated for subtidal mud with sea-pen and white sea slug communities. (Other proposed MCZs in Northern Ireland include: Outer Belfast Lough pMCZ; Rathlin pMCZ; and Waterfood pMCZ).*

The following text is included in Section 6.2.6.2:

The EPA also stated that 47% of rivers (water bodies), 57% of lakes (water bodies), 55% of transitional waters (area) and 7% of coastal waters (area) require improvement to achieve satisfactory condition. This will require significant additional targeted action to achieve the objectives set out in the Water Framework Directive. The recently published "*Significant Water Management Issues in Ireland*" Report (DECLG, 2015) identifies the key pressures on our water environment and states that "*Much of the water pollution identified in Ireland is caused by excessive nutrients entering waters resulting in eutrophication*". Other pressures which have been identified include fine sediment, abstractions and flows, hazardous chemicals, climate change, invasive alien species and changes to the physical environment.

A key finding of the "Report on Bathing Water Quality for 2015" (EPA, 2016) was that 93.4% of Ireland's identified bathing waters met the minimum required standard of 'Sufficient' water quality. 73.7% of bathing waters were classified as "Excellent", 9.5% were classified as "Good" and 10.2% were classified as "Sufficient". 4.4% of bathing waters failed to meet the minimum required standard and were classified as being of "Poor" quality. Ireland possesses some of the best waters in northern Europe, however the impacts of pollution from urban run-off, wastewater discharged and from agricultural sources - especially after heavy rain, are a continuing threat especially in our more built up areas.

Emerging pressures in meeting the objectives under the Water Framework Directive include agriculture as a sector in the context of increasing agricultural output under Food Wise 2025. The DHPCLG (former DECLG) report has stated that "*Increased agricultural output will likely increase the pressures on waters which will have to be managed in a sustainable way within the context of the overall objective of protecting and improving water quality and meeting the requirements of the WFD*".

The following text is included in Section 6.2.7.2:

Climate change impacts in Ireland are expected to include more intense rainfall events as well as periods of increased drought along with a rise in sea level. The EPA Report "Local Authority Adaptation Strategy Development Guideline" (EPA, 2016) states that "Autumn and winter will become significantly wetter by the end of the century, with summers likely to become substantially drier over the same period". The Irish Water WSSP (Water Services Strategic Plan) acknowledges that adapting to climate change will require careful planning, preparation, investment and management.

As outlined in Section 5.5.4 Irish Water Plans, along with all public bodies, Irish Water must prepare a Climate Change Adaption and Mitigation Strategy. The purpose of this document is to support national objectives for climate change mitigation and to meet our obligations under the National Climate Change Adaptation Framework to ensure the resilience and sustainability of water services. Climate change impacts in Ireland are expected to include more intense rainfall events as well as

periods of increased drought along with a rise in sea level. These events will impact on water services through increased risk of sewer flooding, possible inundation of treatment plants and other assets; deterioration in water quality in rivers and lower dry weather river flows reducing the water available for abstraction or for diluting treated effluent.

The following clarifications to the footnotes have been provided for Table 6.5 in Section 6.2.3.3:

Table 6.5 – Estimated Wastewater Sludge Loads per county[1]

County	TDS/a (2015)	TDS/a (2020)	TDS/a (2030)	TDS/a (2040)
Cork[2]	5,087	5,331	5,856	6,433
Louth[3]	2,284	2,359	2,516	2,684
Sligo[3]	845	864	905	948
Tipperary[3]	2,808	2,875	3,013	3,163

Notes:

1) *Predicted sludge loads are estimated based on sludge loads with full wastewater compliance and standard sludge production values. Actual sludge loads generated will be lower than the predicted sludge load until full compliance with final effluent standards is achieved at all wastewater treatment plants. A detailed assessment of sludge loads will be undertaken on a case by case basis where new infrastructure is proposed.*

2) Predicted sludge loads in Cork include sludge from wastewater treatment plants in Youghal and the Cork Lower Harbour which are currently under construction and will significantly increase sludge production.

3) The sludge quantities in Louth, Sligo and Tipperary are based on predicted sludge quantities at individual wastewater treatment plants. The reduction in sludge following transport to off-site sludge hub centre with anaerobic digestion has not been taken into account

Clarification has been provided in relation to the exclusion of South Dublin County Council in Table 6.5. There are no wastewater treatment plants located in the South Dublin local authority area and therefore no wastewater sludge produced.

The following text is included in Section 6.2.10 in relation to the proposed mitigation measures, which take visual amenity / landscape character into account:

It is recognised that impacts to designated landscape and landscape character are more appropriately assessed at a project level e.g. proposals for new wastewater infrastructure. At the strategic level of the NWSMP, focus is on appropriate siting guidance that can alleviate conflict at later stages in the planning hierarchy and contribute to avoidance of risk as far as possible.

The following text is included in Section 6.3, Inter-relationship and Key Issues below Figure 6.11:

The key issues for each environmental topic has been considered and checked against the relevant area of the NWSMP. The proposed mitigation measures which have been incorporated into the NWSMP to minimise the environmental effects are detailed in Table 6.16. This table is shows the most relevant mitigation measures which are a feature of the NWSMP and provide for the protection of the issues raised, however it should be noted that this table is not exhaustive.

Table 8.16 – Key Issues and how the NWSMP provides for their protection

Environmental Criteria	Key Issues	How the NWSMP provides for the protection of Key Issues raised	Location in the NWSMP
Biodiversity, Flora and Fauna	▪ Pollution (e.g. nutrient and metal losses) to soil and water as a result of disposal of treated sludge on agricultural and non-agricultural outlets leading to impacts on ecosystems; ▪ Habitat deterioration from spreading of sludge and subsequent changes to chemical composition of overland flows leading to impacts on ecosystems; ▪ Species loss and / or disturbance as a result of changes to environmental receptors; ▪ Species loss and / or disturbance associated with new or expanded sludge infrastructure, transport of sludge, disposal of sludge.	The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.	Section 7.3.5
		Irish Water will carry out Appropriate Assessment Screening as required on proposed projects and any associated works, individually or in combination with other plans or projects, to ensure that there are no likely significant effects on the integrity (defined by the structure and function) of any Natura 2000 site(s) and that the requirements of Articles 6(3) and 6(4) of the EU Habitats Directive are fully satisfied.	Section 9.5
		Irish Water will also ensure that in carrying out activities associated with management of wastewater sludge, we are in compliance with our obligations under the Birds and Natural Habitats Regulations 2011-2015.	Section 9.5
Population and Human Health	▪ Population growth forecasts as quantity of sludge produced at WWTPs will increase in line with increased populations; ▪ Number of households with domestic wastewater treatment systems for the provision of acceptance of sludge from DWWTS's at Irish Water WWTPs; ▪ Population effects associated with increased provision of production, treatment and storage including noise, transport,	Population growth rates and consequent sludge production should be reviewed every 5-years as part of the 5-year review of the NWSMP. This will allow the most up to date Census and wastewater load data to be used in planning wastewater sludge management.	Section 2.4.3

Environmental Criteria	Key Issues	How the NWSMP provides for the protection of Key Issues raised	Location in the NWSMP
	health effects; ▪ Potential for odour to cause nuisance at all stages of sludge management; and ▪ Improving the function and operation of wastewater management facilities and infrastructure affecting land quality and water quality.	The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.	Section 7.3.4
Food Production and Safety	▪ Food safety concerns related to introduction and transfer of pathogens through the food chain; ▪ Increased levels of toxic metals and environmentally persistent chemicals; ▪ Negative perceptions in relation to the spreading of sludge; ▪ The prohibited use of raw or treated wastewater sludge under Quality Assurance Schemes; and ▪ The merits of sludge as a fertiliser and the potential to reduce imports of chemical fertilisers	Irish Water proposes to liaise with the Department of Agriculture, Food and Marine on an ongoing basis with the objective of ensuring that outlets for reuse of sludge are appropriate and support the aims of the Bord Bia and the Irish Grain Quality Assurance Schemes.	Section 8.2
		It is proposed to develop an independently assessed quality assurance scheme in relation to sludge management. Until this scheme is in place, an annual audit of sludge management activities will be undertaken on behalf of Irish Water. In addition future contracts relating to sludge management will include Key Performance Indicators which contractors will be assessed against on an ongoing basis.	Section 10.1 and 10.4
		Irish Water intend to liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the *Code of Good Practice for the Use of Biosolids in Agriculture* to take into account current legislation and any recommendations for wastewater sludge quality parameters and any additional sampling of persistent organics or emerging pollutants.	Section 10.8

Environmental Criteria	Key Issues	How the NWSMP provides for the protection of Key Issues raised	Location in the NWSMP
		In order to ensure that there is consistency and traceability in reporting of sludge reuse, it is proposed that GIS systems will be used to record the destination of all sludge. This will also facilitate reviewing the suitability of lands considered sensitive for the purposes of land spreading.	Section 10.9
Soils and Geology	▪ Suitability of landspreading based on existing heavy metal content in soils e.g. Cadmium and Nickel levels; ▪ Soils quality and the effects on soil from land-spreading of sludge; ▪ Influence on land use practices; and ▪ Future wastewater management facilities and infrastructure land requirements.	The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.	Section 7.3.5 & Section 9.5
		In order to ensure that there is consistency and traceability in reporting of sludge reuse, it is proposed that GIS systems will be used to record the destination of all sludge disposed of. This will also facilitate reviewing the suitability of lands considered sensitive for the purposes of land spreading.	Section 10.9
		It is proposed to undertake a feasibility study for alternative options for sludge outlets within the first 5 year cycle of the plan.	Section 8.1
Water	▪ Impacts on water bodies from upgrading infrastructure and developing new infrastructure; ▪ Impacts on surface waters from run-off from sludge; ▪ Deterioration of water quality; ▪ Impacts on achieving objectives under the Water Framework Directive; ▪ Impact on achieving the objectives under the Marine Strategy	The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.	Section 7.3.5 & Section 9.5

Environmental Criteria	Key Issues	How the NWSMP provides for the protection of Key Issues raised	Location in the NWSMP
	Framework Directive; ▪ Vulnerability to flood risk; ▪ Suitability of landspreading based on groundwater aquifer vulnerability; and ▪ Groundwater contamination where landspreading of sludge is carried out, particularly in areas which are unsuitable due to groundwater vulnerability and soil type.	Irish Water will liaise with the EPA Catchment Science and Management Unit and Teagasc to ensure that WFD objectives are met in developing the template for Nutrient Management Plans. The Programme(s) of Measures in the second round of River basin Management Plans will be reviewed upon their adoption and integrated into Irish Water's Standard Operating Procedures where appropriate. Each 5-year update of the NWSMP will take into account the WFD Objectives and Programmes of Measures in place.	Section 10.8
Air Quality & Climatic Factors	▪ Direct process emissions from the controlled degradation of organic wastes from aerobic, anaerobic digestion and other treatment processes; ▪ Indirect emissions from the collection and transport of wastewater sludge by road caused by the burning of fossil fuels in combustion engines, emissions from landspreading practices and odours generated by wastewater sludge management; ▪ Energy recovery and potential energy generation as an alternative to fossil fuels.	The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.	Section 7.3.5 & Section 9.5
Material Assets	▪ Existing wastewater sludge management infrastructure; ▪ Existing transport networks for collecting and transporting wastewater sludge; and ▪ Wastewater sludge as a resource	The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.	Section 7.3.5 & Section 9.5
		It is proposed to undertake a feasibility study for alternative options for sludge outlets within the first 5 year cycle of the plan.	Section 8.1
Cultural Heritage	▪ Impacts on archaeological features and setting; ▪ Potential impacts for unknown archaeological features during construction of new facilities and/or infrastructure upgrades; ▪ Potential impacts for underwater archaeological features during construction of new facilities and/or infrastructure	The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.	Section 7.3.5 & Section 9.5

Environmental Criteria	Key Issues	How the NWSMP provides for the protection of Key Issues raised	Location in the NWSMP
	upgrades		
Landscape	▪ Impacts on designed landscape; ▪ Impacts on landscape character as a result of siting new wastewater sludge management infrastructure ▪ Impacts on cultural heritage resources; and ▪ Impacts on natural heritage resources and tourism assets which are dependent on the adjoining landscape setting.	The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5.	Section 7.3.5 & Section 9.5

8.2.4 Chapter 7

Population and Human Health (PHH) in Table 7.1 is updated as follows:

Protect and reduce risk to human health in undertaking water services *and sludge management practices*.

APPENDIX A

SEA and AA Screening Amendments Report

RPS

UISCE ÉIREANN : IRISH WATER

National Wastewater Sludge Management Plan

SEA & AA Screening Amendments

September 2016

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1 SCREENING OF SIGNIFICANT EFFECTS RESULTING FROM PROPOSED AMENDMENTS FROM THE DRAFT PLAN

The draft National Wastewater Sludge Management Plan (NWSMP) and accompanying Environmental Reports and NIS were put on public display from 23/03/16 to 18/05/16. All submissions received were reviewed and amendments to the draft NWSMP have been proposed. This document has been prepared to screen the proposed changes to the draft NWSMP, for potential significant environmental effects in accordance with both the SEA Directive (2001/42/EC) and the Habitats Directive (92/43/EEC) as transposed into Irish law.

The text in black is the text as contained in the draft NWSMP and is not changing. The text highlighted in yellow is proposed as amending/new text to the Plan. ~~Strike through~~ text is proposed for deletion. Responses with regard to the environmental consequences of the changes are shown in *italics* in column 3 of the assessment tables.

As a general comment there has been a change in the terminology from satellite site or sludge dewatering to satellite dewatering site.

This proposed amendment is a text change to ensure consistency and correct terminology is utilised. It does not have any environmental consequences and as such screening of the proposed changes in accordance with both the SEA Directive (2001/42/EC) and the Habitats Directive (92/43/EEC) is not required for this update in terminology.

1.1 CHANGES TO EXECUTIVE SUMMARY

The Executive Summary provides a synopsis of the NWSMP, which summaries the key findings of each section of the plan. There have been some amendments to the Executive Summary, which reflect the amendments made under various sections of the NWSMP.

Additional text has been added in the Executive Summary, with a summary provided on Environmental Assessment and Consultation, and a Summary of the Actions Proposed in the NWSMP. Amendments to the text have been made to provide clarification and do not alter the original meaning of the text. Additional text is further discussed in this report under the relevant sections below.

1.2 CHANGES TO CHAPTER 1 (INTRODUCTION)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 1.3	The disposal of waterworks sludge to sewer has a potential impact on the quantity of wastewater sludge produced at a wastewater treatment plant and may also increase the concentration of phosphorus in the sludge ~~as the coagulants in the sludge transfer phosphorus from the liquid stream to the sludge stream~~.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 1.4	Other non-hazardous sludges, such as industrial or agricultural sludges are not considered in this plan with the exception of industrial or commercial sludge treated at wastewater treatment plants under the control of Irish Water.	*The proposed amendment represents a clarification. It is anticipated that this change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 1.5	We aim to treat all wastewater sludge, for use in agriculture, to meet the requirements of the ~~DECLG~~ Code of Good Practice for ~~re-use~~Use of Biosolids in Agriculture and reuse as fertiliser and soil conditioner. This requires a stable pasteurised product, complying with chemical standards for safe use in agriculture or equivalent use. Irish Water will work with stakeholders and industry to develop alternatives for the beneficial reuse of wastewater sludge and the possible recovery of energy and/or constituents in a sustainable and economically viable manner. The NWSMP supports the Hierarchy of Waste Management by optimal minimisation of volume and organic stabilisation followed by reuse with disposal to landfill only considered where alternative reuse or recovery options are not available.	*The proposed amendment represents a clarification in relation to the position of landfill as a disposal option for sludge. Disposal to landfill is only considered where* alternative reuse or recovery options are not available*. As it is anticipated that suitable, sustainable alternatives exist in sufficient quantities to avoid landfilling this change will not result in any changes to the assessment included in the Environmental Report. Overall it was determined that landfill is not a sustainable outlet for wastewater sludge.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

1.3 CHANGES TO CHAPTER 2 (SLUDGE COMPOSITION, LOADS AND OUTLETS)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 2.1	Over 98% of wastewater sludge produced at Irish Water wastewater treatment plants is currently ~~disposed to~~ reused in agriculture including sludge which is composted and subsequently ~~disposed of to~~ reused in agriculture. Over 95% of this was treated, in accordance with the treatment processes recommended in the *Code of Good Practice for Use of Biosolids in Agriculture*, in 2014 with further improvements to treatment levels introduced during 2015. It is intended to undertake a detailed feasibility study of alternative options for sludge reuse or disposal to reduce the dependence on a single outlet for sludge.	*The proposed amendment is welcomed as it represents a commitment to investigate alternative outlet options. It is intended that the inclusion of this additional commitment will reduce dependence on a single outlet for sludge which will address concerns raised across the agriculture sector during consultation.* *The feasibility study will consider environmental, social and financial criteria as outlined in Section 9.1 of the NWSMP and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP and the sensitivity mapping (Figure 9.1 of the*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
		SEA). *The feasibility study will have regard to Irish Water's obligations as the public water authority under the Birds and Natural Habitats Regulations 2011-2015. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.2	In accordance with the waste hierarchy minimisation is the next most preferred waste solution after prevention. Wastewater treatment processes can be designed to reduce the quantity of sludge produced. Traditional extended aeration treatment plants with long sludge ages can produce smaller quantities of sludge. However, the additional capital and operating cost is generally insufficient to warrant increasing process tank sizes. Similarly, other wastewater treatment processes such as integrated constructed wetlands (ICWs) significantly reduce the amount of sludge produced. ICWs are being considered by Irish Water where the technology is considered appropriate.	*The proposed amendment represents further clarification on wastewater treatment processes. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.3	There has been some misreporting of data over the last number of years where total tonnes of wet sludge have been reported in some cases.	*The proposed amendment represents further clarification on reported sludge loads. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.3 (Table 2.1)	Table 2.1, the 2015 Sludge Register data has been added to the table with the following quantities of sludge (tonnes dry solids) reported: Agriculture - 57,643 Landfill - 94 Other - 650 Total – 58,387	*The proposed amendment comprises of the addition of 2015 data that offer clarification on the quantities of sludge (tonnes dry solids) reported to the EPA. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 2.4.1	A substantial number of the existing wastewater treatment plants that currently ~~do not~~ have ~~tertiary~~ secondary treatment will require ~~tertiary~~ more stringent treatment for nutrient removal in the coming years. The projected change to sludge loads over the next 25 years will depend on a number of	*The proposed amendment represents a clarification in relation to the level of treatment at existing wastewater treatment plants but recognises that more stringent treatment is required. It is anticipated that this change will not result in any changes to the assessment included in the Environmental*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	factors.	*Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.4.2	It should be noted that where a wastewater treatment plant is underloaded or designed as an extended aeration system the quantity of sludge produced is lower due to a higher sludge age being achieved in the biological process. In addition where treatment performance is poor, this is likely to show lower sludge production due to losses in the effluent.	*The proposed amendment represents a clarification in relation to sludge production where treatment performance is poor. It is anticipated that this change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.4.3	Population growth rates have been reviewed by ESRI on behalf of Irish Water. Predicted growth rates have been provided on a county by county basis. It is proposed that population growth rates and consequent sludge production should be reviewed every 5-years as part of the 5-year review of the NWSMP. This will allow the most up to date Census and wastewater load data to be used in planning wastewater sludge management.	*The proposed amendment relates to the inclusion of a recommendation that actual and predicted population growth is reviewed every 5 years. This is a positive addition as it provides a commitment for 5 yearly reviews. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.4.4	The estimated sludge loads for 2015 includes predicted sludge load for treatment of existing wastewater loads at all agglomerations including nutrient removal where required. The completion dates for treatment plants with no treatment will extend beyond 2015 in a number of cases. It is expected that all agglomerations will have treatment by 2021 with 99% compliance with the Urban Wastewater Treatment Directive standards by 2027. As the level of compliance increases the actual sludge load will increase to the predicted sludge loads as detailed in Table 2.3. There are additional sludge loads ~~at~~ due to imports ~~of sludge~~ from private wastewater treatment plants. However, the quantities of such sludge imported, for further treatment is low relative to the indigenous wastewater treatment plant sludge.	*The proposed amendment represents further clarification on the expected timelines for compliance with the Urban Wastewater Treatment Directive standards and how this relates to predicted sludge loads presented.* *The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.4.4 (Table 2.3)	1. Predicted sludge loads are based on sludge loads with full wastewater compliance. Actual sludge loads generated will be lower than the predicted sludge load until full compliance with final effluent standards is achieved at all wastewater treatment plants. A	*The proposed amendment represents further clarification on the predicted versus actual sludge loads. It is noted that while the predicted sludge loads represent a worst case scenario in terms of sludge volume, they represent positive effects for water quality and biodiversity in particular as they have greater compliance with emissions standards.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	detailed assessment of sludge loads will be undertaken on a case by case basis where new infrastructure is proposed. ~~1.~~ 2. Predicted sludge loads in Cork include sludge from wastewater treatment plants in Youghal and the Cork Lower Harbour which are currently under construction and will significantly increase sludge production. ~~2.~~ 3. The sludge quantities in Louth, Sligo and Tipperary are based on predicted sludge quantities at individual wastewater treatment plants. The reduction in sludge following transport to off-site sludge hubs with anaerobic digestion has not been taken into account There are substantial variations in the predicted and reported sludge volumes. This is due to a number of reasons. The main reasons are considered to be as follows:- • The predicted sludge loads have been calculated based on reported influent wastewater loads. There is uncertainty on the accuracy of this data as it is normally based on 6 to 12 samples per year with variation in the accuracy of the sampling and flow monitoring equipment.	*The proposed amendment is welcomed as it represents a commitment to confirm capacity requirements where new infrastructure is proposed.* *The proposed amendment will not result in any changes to the assessment included in the Environmental Report. The inclusion of the footnotes to the table provides further clarification on the estimation of future sludge production.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.5	Sludge acceptance facilities for DWWTS sludge will need to generate an adequate income stream from the acceptance of DWWTS sludge to fund initial investment and the ongoing CAPEX and OPEX costs associated with treating and disposing of DWWTS sludge. Irish Water will continue to accept DWWTS sludge at wastewater treatment plants where the acceptance of sludge is not having a negative impact on the operation of the plant and review the capacity available for accepting DWWTS sludge if there is a significant increase in the demand for acceptance facilities. It is estimated that 20% to 30% of the estimated volume of DWWTS sludge produced is currently collected by private contractors and treated at Irish Water facilities. It is likely that the recommended average desludging frequency of ~~2~~ 3 years, recommended in the Strive Report, would only be complied with if new legislation	*The proposed amendment represents a clarification in relation to Irish Water's position on the acceptance of DWWTS sludge. Irish Water's WSSP adopted an EPA recommendation that Irish Water plan for reception of this type of sludge. While Irish Water will continue to accept this source of sludge where there is existing capacity within the limits of current licenses, if further capacity is required, new infrastructure may be necessary. As such, Irish Water will review the capacity available for accepting DWWTS sludge to ensure that the capacity of sludge acceptance facilities will allow for potential future imports of DWWTS. Any new infrastructure would be subject to planning and associated licencing and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP.* *It is anticipated that this change will not result in any changes to the assessment included in the Environmental Report.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	and/or enforcement ~~was~~ is undertaken. The implementation of scheduled desludging of septic tanks, as recommended in the Strive report referred to above, would provide transportation efficiencies and potential cost benefits to customers. The spatial distribution of existing DWWTS systems has been considered in assessing areas where future sludge acceptance facilities or upgrades of existing facilities are likely to be required. It is not expected that there will be significant increases in DWWTS sludge produced over the duration of the NWSMP~~. Growth~~ as population growth in rural areas is low.	*No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 2.5 (Table 2.4)	Table 2.4 Estimated Sludge Load per County from Domestic WWTS's; the South Tipperary row has been renamed Tipperary and the North Tipperary Row has been deleted with these figures now added and included as part of Tipperary.	*The proposed amendment provides clarification in relation to the amalgamation of North and South Tipperary local authorities into a single entity. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 2.6.1	In larger wastewater treatment plants, primary settlement is normally included together with anaerobic digestion. In smaller agglomerations, there may be primary treatment only or primary treatment within a ~~packaged~~ package type wastewater treatment plant. The addition of primary treatment at an existing wastewater treatment plant can provide a relatively straightforward and economic way of increasing the capacity ~~of a wastewater treatment~~ the plant. The overall quantity of sludge increases where primary treatment is used as it is a physical process to remove solids with no biological reduction of the sludge. The cost of treating and disposing of additional sludge in addition to the capacity of existing sludge treatment equipment should be considered in any proposal to add primary treatment. Primary sludge is typically more ~~odourous~~ odorous than biological sludge and ~~sludge~~ management of this type of ~~sluge~~ sludge must take into account the potential for an odour nuisance.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 2.6.2	Biological sludge is produced at approximately 80% of wastewater treatment plants accounting for over 94% of the	*This change will not result in any changes to the assessment included in the Environmental Report.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	population equivalent treated. Biological treatment is most commonly by way of the activated sludge process but other processes including biological filters, rotating biological contactors and trickling filters are also utilised. The quantity of sludge produced decreases as the sludge age increases. The sludge age required for nitrogen removal is approximately 10 days whereas the sludge age required for BOD removal only is 3-4 days. Therefore, where nitrogen removal is included, the estimated sludge production is reduced. However, it should be noted that in some cases, existing wastewater treatment plants have been designed for longer sludge ages where nitrogen removal was not required. Therefore estimated sludge production must be based on an understanding of the actual wastewater treatment processes at each site.	*No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 2.6.4	The quantity of sludge produced and the consequent cost of treatment and reuse or disposal needs to be assessed in terms of both the volume and the total dry solids. A significant proportion of the costs associated with sludge relate to sludge transport. This ranges from less than 10% at larger wastewater treatment plants up to 40% of the cost for smaller wastewater treatment plants in areas remote from the final treatment and disposal locations. There is a balance to be achieved between the cost of sludge transport and the cost of treatment to reduce the volume of sludge. This is assessed in more detail in Section 6. The main technology used to reduce the quantity of sludge is anaerobic digestion including advanced anaerobic digestion processes which may include hydrolysis or pasteurisation.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 2.6.5	In some cases desludging is undertaken only when a problem occurs. It is more cost effective in terms of transport costs and operation and maintenance of the wastewater treatment plants to undertake scheduled desludging. This also reduces the potential for pollution incidents and ~~allows~~ enables more efficient operation of the wastewater treatment plant.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 2.6.6	Sludge from DWWTS's (septic tanks and individual private WWTP's) is not currently the responsibility of Irish Water. However, it is expected that following the introduction of	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	legislation in regard to registration of septic tanks, that more frequent desludging of septic tanks will be required. As detailed in Section 2.5, the most ~~suitable~~ economical and practical way to provide suitable treatment and disposal of this sludge is within Irish Water controlled wastewater treatment plants.	*sites are anticipated as a result of this proposed amendment.*
Section 2.7	Wastewater sludge consists of the organic residue of the wastewater treatment processes. Wastewater sludge contains organic matter and nutrients that can provide soil benefits. The sludge also, however, contains contaminants including metals, pathogens, and organic and emerging pollutants, such pharmaceutical residues.	*The proposed amendment represents a clarification on the contaminants present in wastewater sludge. It is anticipated that this change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	The amount of phosphorus in wastewater sludge is normally the limiting parameter in agricultural use based on the nutrient level needed for crops. Nutrient management plans are developed in order to manage the application of phosphorus and nitrogen to plant needs.	*The proposed amendment offers clarification on nutrient management. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 2.8	Anaerobic digestion of wastewater sludge produces methane gas which by conversion to electricity can significantly reduce energy costs for operating wastewater treatment plants, with energy recovery further increased where thermal hydrolysis is provided in addition to conventional anaerobic digestion with the sludge quantity for reuse or disposal reduced by up to 50% during the digestion process.	*The proposed amendment offers factual information regarding the value of wastewater sludge, particularly in relation to sludge reduction from thermal hydrolysis with anaerobic digestion. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

1.4 CHANGES TO CHAPTER 3 (REVIEW OF STANDARDS AND PLANS)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 3.2.1	The main European legislation in relation to use of wastewater sludge is the Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when wastewater sludge is used in agriculture (*Sewage Sludge Directive)*. The Directive facilitates the use of sludge in agriculture subject to specified technical requirements, without the need for a specific waste authorisation. This directive	*The proposed amendment comprises minor text changes that offer clarification on current legislative requirements and do not alter the original meaning of the text. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	has been transposed into Irish legislation by S.I. No. 148 of 1998 — Waste Management (Use of Sewage Sludge in Agriculture) Regulations, 1998, as amended by the SI No. 267 of 2001. The main restrictions for ~~disposal~~ reuse of wastewater sludge in agriculture are set out in terms of limit values for heavy metals and nutrients summarised in Table 3.1.	*proposed amendment.*
Section 3.2.2	The management of the sludge is governed by waste legislation~~. This legislation is~~ based on European Directives ~~directives in relation to sludge~~. The Waste Framework Directive establishes the framework requirements for management of waste and ~~repealed previous EU Directives in relation to waste. T~~the main ~~waste legislation in Ireland impacting~~ provisions relating to wastewater sludge management in Ireland have been transposed through the following legislation ~~is as follows~~:- • Waste Management Act of 1996 • European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011) • S.I. 821 of 2007 Waste Management (Facility Permit and Registration) as amended by S.I. 86 of 2008, ~~and~~ S.I. 320 of 2014 and S.I. 546 of 2014 • S.I. 820 of 2007 Waste Management (Collection Permit) Regulations 2007, as amended by S.I. 87 of 208 and S.I. 197 of 2015 • S.I. ~~No.~~ 32 of 2010 - Waste Management (Registration of Sewage Sludge Facility) Regulations • ~~Waste Management Act of 1996~~ Wastewater sludge is classified as a waste under the EU "List of Waste ~~"EWC~~ "Codes in Irish ~~EU and Irish~~ Legislation[4]. ~~The Waste Management Act, 2006, states that a~~ A waste licence is not required for wastewater sludge for use in agriculture. '~~the recovery of – sludge from a facility operated by a local authority for the treatment of water or waste water. In the Waste Management Act 'Sewage sludges, untreated or unsuitable for use in agriculture' are classified as a Category II Waste, i.e. treated sludge or sludge suitable for use in agriculture is not classified. However, in S.I. No. 821/2007 - Waste Management (Facility Permit and~~	*The proposed amendment comprises minor text changes that offer clarification on current legislation and does not alter the original meaning of the text. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	~~Registration) Regulations 2007, sub-paragraph (i) of the Waste Management Act, quoted above is replaced by (i) sludge for use in agriculture. i.e. t~~The use of wastewater sludge on non-agricultural land ~~in Ireland~~, e.g. silviculture and biomass crops, is regulated by S.I. 821 of 2007 as amended. S.I. No. 32 of 2010, Waste Management (Registration of Sewage Sludge Facility) Regulations 2010, introduced a requirement for registration of wastewater sludge facilities. This excludes wastewater treatment plants and as such does not apply to Irish Water sludge facilities which are located ~~at~~ within wastewater treatment plants. Facilities which are licenced under a Waste Licence are also excluded from these regulations. The collection and transport of sludge is regulated by S.I. 821 of 2007, as amended.	
Section 3.2.3	The other main legislation relevant to sludge ~~disposal~~ reuse in agriculture is the Nitrates Directive (Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources).	*The proposed amendment comprises minor text changes that offer clarification on current legislation and does not alter the original meaning of the text. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 3.3	As detailed in Section 3.2, the main European legislation in relation to use of wastewater sludge is the *Sewage Sludge Directive*. The European Commission is currently considering whether the current Directive should be revised. ~~There have been ongoing reviews of the *Sewage Sludge Directive* over the last 20 years.~~ A detailed ~~review~~ study of current sludge disposal practices was undertaken by Milieu Ltd, WRc and RPA for the European Commission, DG Environment under Study Contract DG ENV.G.4/ETU/2008/0076. Reports were issued in 2010[5]. This ~~review~~ study was undertaken as part of the assessment being undertaken by the European Commission on whether the current Directive should be reviewed. The study considered the agricultural ~~re-use~~ reuse of wastewater sludge in accordance with Directive 86/278/EEC and the options for changes to this directive as follows:	*The proposed amendment provides additional information on an EU study. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	This ~~review~~ study evaluates the cost impact of the options identified but does not make	

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	any specific recommendations apart from excluding repeal of the Directive as an option, i.e. Option 5. This is examined further in the SEA and in Sections ~~0~~ 2.5 and 9 of this document, including assessment of alternatives. Irish Water will undertake ~~reviews~~ assessments of EU reports and proposed legislation on an ongoing basis to ensure that any new or upcoming requirements in relation to the management of wastewater sludge are complied with.	
Section 3.4	In the UK and Sweden, voluntary agreements set more stringent requirements than those in the Directive or in national regulations. As further detailed in Section 8, reuse in agriculture is the main outlet for treated sludge in the EU with sludge produced by wastewater treatment plant being used in accordance with national legislation in 23 EU countries.	*The proposed amendment offers factual information regarding the practice of reuse in agriculture in European Countries. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 3.5.2	The main guidance document referred to in current contracts for Irish Water in relation to sludge treatment is the Code of Good Practice for the Use of Biosolids in Agriculture (DoELG, 1999) (COGP). This document provides detailed information on good practice for both treatment and disposal. The requirement for treatment in the COGP is a more onerous requirement than current legislation requires. It is Irish Water policy to comply with the COGP. The sampling and analysis of sludge and soil is carried out in accordance with this document. Irish Water ~~intend~~ intends to liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the Code of Good Practice for the Use of Biosolids in Agriculture to take into account current legislation.	*The proposed amendment provides clarification in relation to the changes in the names and functions of government departments. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 3.6	Three Waste Management Planning Regions have been ~~setup~~ set up and draft plans prepared for each of the regions. The regions for the Waste Management Plans are the planning regions, as set out in S.I. No. 573/2014 - Local Government Act 1991 (Regional Assemblies) (Establishment) Order 2014 and are the same as the ~~regional split~~ regions used by Irish Water, i.e. East-Midlands, North-West (Connacht-Ulster) and	*The proposed amendment provides clarification in relation to the legislative context of the three waste management planning regions. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	Southern.	
Section 3.7.1	The dewatering of sludge at the Satellite Dewatering Sites reduces onward transport costs and traffic movements. The Hub Centres facilitate the effective treatment of sludge and its storage prior to final reuse. Off-site storage of treated sludge is used to cater for constraints on land spreading due to seasonal factors.	*The proposed amendment provides clarification in relation to the purpose of hub centres. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 3.7.2 (Table 3.3)	Table 3.3 Summary of the Recommended Hub Centres and Satellites in County Sludge Management Plans; Footnote 2 added to the South Tipperary and North Tipperary rows. Notes: 1. Single plans prepared for Limerick City and County and County Clare, Cork City and County, Galway City and County 2. North and South Tipperary became a single local authority in 2014	*The proposed amendment provides clarification in relation to the amalgamation of North and South Tipperary local authorities into a single entity. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

1.5 CHANGES TO CHAPTER 4 (CONSULATION PROCESS)

Additional text has been added to Chapter 4 regarding the consultation process. As this chapter presents text on the stakeholders/consultees, the public information strategy and public consultation feedback, it is not part of the environmental assessments carried out on the plan, as such it is not assessed as part of the SEA or AA processes.

1.6 CHANGES TO CHAPTER 5 (SLUDGE TREATMENT PROCESSES)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 5.1	These categories are not mutually exclusive, e.g. thermal drying substantially reduces sludge volume by evaporation of water and also produces a microbiologically safe and stable biosolid~~.~~ by heat treatment of the organic solids. Anaerobic digestion, when carried out in conjunction with pasteurisation or hydrolysis, reduces the quantity of sludge, in terms of TDS, and produces a biosolid product.	*The proposed amendment provides clarification in relation to the process by which thermal drying reduces sludge volume and produces a safe and stable biosolid. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 5.3	The preferred option for production of biosolids identified in the majority of sludge management plans prepared for Local Authorities was thermal drying. The main reason identified for this was the potential	*The proposed amendment provides clarification in relation to thermal drying. This change will not result in any changes to the assessment included in the Environmental Report.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	for use as an alternative fuel if agricultural reuse was not possible. Thermally dried sludge has a calorific value similar to peat and can potentially be used as a fuel in industry to replace fossil fuels. However, the economics of this option have led in some cases to thermal drying facilities not being utilised in favour of more costs effective treatment and land reuse.	*No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	In addition to the sludge treatment processes described above, there are emerging technologies, such as ultrasonic treatment which may provide an alternative means of achieving the required level of pathogen destruction. Use of any such techniques will require process proving in trials before adoption.	*The additional text acknowledges the need for process proving in trials on emerging technologies before any such techniques are adopted. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 5.3.1	Thermal hydrolysis with mesophilic anaerobic digestion followed by agricultural ~~re-use~~ reuse of the residual biosolids has been evaluated to be the most sustainable solution for wastewater sludge treatment and disposal.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 5.4.1	Wastewater sludge is not currently incinerated in Ireland. However, restrictions on agricultural landspreading due to quality assurance schemes implemented by the agricultural sector and lack of viable alternative uses may lead to incineration being the only viable option for some or all of the wastewater sludge ~~treatment.~~ produced in Ireland.	*The proposed text provides clarification in relation to the current position of incineration in Ireland and its potential as a future viable option. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	However, if restrictions on land application increase, it may be necessary to provide for this type of technology in Ireland. However, any use of such technologies is likely to involve a complex and protracted planning period before it could become available.	
Section 5.4.2	A recent review by United Utilities in the UK concluded that energy recovery is optimised by using advanced anaerobic digestion upstream of incineration rather than incineration of raw sludge. The possibility of co-incineration with other waste forms can also be considered.	*The proposed text provides clarification in relation to co-incineration as a thermal sludge treatment process. A feasibility study has been committed to within the plan to explore these other options. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 5.4.3	Pyrolysis is a similar process to gasification but the decomposition of organic material	*The proposed text provides clarification in relation to the resultant liquid product from*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	takes place in anaerobic conditions to produce a fuel which may be in gaseous or liquid (tar like) form and a solid biochar product. As there is potential for sludge gasification or pyrolysis to provide net energy recovery, there is a potential for a lower carbon footprint than other sludge management techniques. However, at present, there is insufficient information on commercial scale systems to assess the potential viability of sludge gasification or pyrolysis in Ireland~~.~~ in the short term.	*pyrolysis. The text also clarifies the current position on pyrolysis. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 5.5.	Thermal hydrolysis of sludge is a well known technology ~~for~~ a n~~umber of years~~ and a large number of plants have been developed in recent years.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 5.6	The type of treatment varies from year to year. There are thermal drying facilities available at thirteen wastewater treatment plants which have a combined sludge drying capacity of approximately 60,000 tds/annum.	*The proposed amendment provides clarification in relation to the sludge drying capacity at thirteen wastewater treatment plants. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

1.7 CHANGES TO CHAPTER 6 (SLUDGE TRANSPORT STRATEGY)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 6.3	There are a number of options to reduce the volume of sludge currently being transported. This ~~is to have~~ has benefits in terms of environmental, social and financial impacts. Reducing sludge transport has the benefit of reducing greenhouse gas emissions due to reduced ~~transport~~ fuel use. This must be balanced against the lifecycle cost, environmental and social impacts of additional sludge infrastructure at a ~~high~~ higher number of sites, with additional staff transportation required to operate and maintain equipment.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	Contracts should ensure that, where practicable, sludge is transported and spread on the nearest suitable spread lands to the source of the treated sludge. This phase	*The additional text acknowledges the need for additional storage facilities and the need for co-ordinated facilities to be developed. The requirement for the selection of sites for*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	needs to be supported by suitable strategic sludge storage to facilitate land-spreading of the biosolids by providing storage during periods when sludge cannot be used on land. This can be accommodated at hub sites or at dedicated storage centres.	*new or upgraded sludge facilities is still a feature of the plan and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	An assessment of the cost of provision of a satellite centre versus transport directly to a Sludge Hub Centre has also been undertaken to provide an initial assessment of where additional Satellite Dewatering Sites for dewatering are justified.	*The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	This cost may increase substantially in some cases, e.g. if additional buildings are required to accommodate dewatering plant upgrades or if an access road upgrade would be required to ~~provide~~ facilitate the satellite dewatering site.	
	The selection of the location and number of Satellite Dewatering Sites requires a detailed assessment on a site by site basis to establish suitability.	
Section 6.4.1	Inadequate sludge management, in terms of either plant design or operation, including frequency of ~~desluding~~ desludging and/or impact of supernatant return, can potentially lead to breaches of emission limit values, odours and high operating cost.	*The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 6.4.3	UKWIR[9] report that the use of picket fence thickeners (settlement in circular tanks aided by gentle stirring mechanism) is only considered cost effective for WWTP's greater than 2,000 PE.	*The proposed amendments include clarifications within the text and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	Other considerations such as available space on the site, environmental impacts and options for on-site treatment options, such as sludge reed beds or other low cost low maintenance techniques should be considered prior to any upgrade to provide sludge thickening.	
	Picket fence thickeners should be designed to achieve a ~~minimum~~ target dry solids of 4%. However, in practice, this can be difficult to achieve consistently with activated sludge.	
	The option of provision of a sludge reed bed or similar system should be considered in	

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	each case for remote sites.	
	For wastewater treatment plants with a population equivalent of less than 2,000p.e., sludge thickening or alternative sludge disposal should be considered where:- • Transport distance to satellite is > 20km for a p.e. < 1,000 – 2,000 • Transport distance to satellite is > 30km for a p.e. 500 – 1,000 • Transport distance to satellite is > 50km for p.e. ~~>~~ < 500	*The proposed amendment provides a clarification that sludge thickening or alternative sludge disposal should be considered where the transport distance to satellite is greater than 50km for a population equivalent of less than 500. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 6.4.5	Sludge dewatering is currently in place at all wastewater treatment plants greater than 5,000 p.e and at a number of smaller wastewater treatment plants. In general, sludge dewatering is not economically viable for plants less than 5,000 p.e. However, a cost comparison sludge transport costs should be undertaken for plants between 2,000 p.e. and 5,000 p.e. to compare the cost of dewatering to the cost of transport of liquid sludge.	*The proposed amendment suggests that a cost comparison of dewatering to cost of transport of liquid sludge should be carried out for plants between 2,000 p.e and 5,000 p.e. This suggestion would be welcomed to optimise the balance between treatment and transport costs. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	In general, sludge cake storage should have a minimum capacity of 7 days up to a maximum skip size of 20m^3. The replacement of existing sludge skips should be considered where inadequate storage is provided as this can be justified based on the transportation cost savings, particularly at larger sites. In addition, storage of sludge biosolids (cake or granules), may be required, either on site or off site, between production and application to land. Off-site storage is commonly provided by Contractors at present. Any such arrangements are reviewed by Irish Water, as part of it's auditing process, to ensure that such facilities are in compliance with all required environmental and planning controls and permits with an assessment of the viability of development of new storage facilities also being conducted by Irish Water.	*The proposed amendment provides clarity in relation to the current arrangements and controls in place in relation to off-site storage of sludge biosolids (cake or granules). The requirement for the selection of sites for new or upgraded sludge facilities including storage facilities is still a feature of the plan and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

1.8 CHANGES TO CHAPTER 7 (SLUDGE SATELLITE AND HUB INFRASTRUCTURE)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 7.1	This system of satellite and hubs is commonly used internationally and is considered to be appropriate for use by Irish Water. Irish Water intend to maximise energy recovery from anaerobic digestion by maximising use of Sludge Hub Centres with energy recovery and upgrading existing Sludge Hub Centres to provide energy recovery where economically feasible. However, local authority areas will no longer be considered individually allowing greater flexibility and efficiency~~. Location~~ from regional consideration. Locations for sludge satellite and hub centres were identified in the county sludge management plans undertaken in the late 1990's and early 2000's.	*The proposed amendment includes a commitment to maximise use of energy recovery where possible. This will have positive effects for climate and material assets in particular. The requirement for the selection of sites for new or upgraded sludge facilities is still a feature of the plan and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 7.2.2	The EPA published, in April 2014, a document on Management Options for the Collection, Treatment and Disposal of Sludge Derived from Domestic Wastewater Treatment Systems, Strive Report Series 123 which reviews best practice regarding management of predicted DWWTS sludge volumes associated with the implementation of S.I. No. 223/2012 - Water Services Acts 2007 and 2012 (Domestic Waste Water Treatment Systems) Regulations 2012.	*The proposed amendment provides additional information in relation to an EPA report. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	The report prepared on behalf of the EPA estimates that there is capacity for approximately 50% of the existing septic tank sludge to be accommodated within existing wastewater treatment plants.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 7.3.1	The capacity of the existing sludge hub at Limerick is insufficient, at present, to accept sludge from County Clare, as proposed. Existing sludge treatment centres at Waterford and Cork may provide a cost effective way to provide sludge hub capacity for ~~these areas.~~ the Waterford and Cork regions. Upgrade of existing Sludge Hub Centres to provide anaerobic digestion or advanced anaerobic digestion should be considered at all sites. In general all Sludge Hub Centres should also act as Satellite Dewatering Sites with upgrades required to allow this where the required facilities are not in place at present.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 7.3.1	Table 7.1, Existing Sludge Hub and Treatment	*The proposed amendment will not result in*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
(Table 7.1)	Centres, updated column on Current Sludge Treatment Capacity (PE)[2] for Dublin as follows: Dublin - 1,~~640,000~~900,000[4] Notes: 1. Sites for sludge treatment are at licenced wastewater treatment plants. Private sludge treatment facilities and sludge treatment locations where additional treatment is provided off-site are not included. 2. The current sludge treatment capacity has been estimated based on available information. Population equivalent has been estimated based on sludge production of 55g/PE/day. 3. The existing sludge treatment centres at Cork City, Galway City, Shanganagh and Waterford City have no sludge imports. All other sites act as sludge hubs. 4. The capacity of the sludge treatment stream in Ringsend was upgraded following completion of the WWTP to cater for the additional loads being received.	*any changes to the assessment included in the Environmental Report. The inclusion of the footnotes to the table provides further clarification on current sludge treatment capacities.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 7.3.3	The main treatment process for pathogen reduction in sludge installed ~~since~~ in Ireland from the late 1990's to date has been thermal drying. Thermal dryers were installed following recommendations in the county sludge management plans. The provision of sludge ~~driers~~ dryers was regarded as beneficial, based on providing a sustainable product with ~~re-use~~ additional reuse options, such use as a fuel, in addition to agricultural use. However, ~~thermal~~ at present all thermally dried sludge is reused in agriculture. Thermal dryers have high energy consumption and high operation and maintenance costs. Due to the significant cost and operational difficulties of operating the sludge ~~driers~~ dryers, they are not all currently in operational use.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 7.3.4	***Current Off-Site Sludge Treatment and Storage***	*The proposed amendment provides clarification on sludge storage requirements.*
Section 7.3.5	There is a requirement for storage of sludge being used for landspreading during the periods when application of fertilisers to land is prohibited in accordance with S.I. 31/2014 European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014, as amended by S.I. 134/2014 and S.I. 463/2014. In order to ensure storage requirements for sludge are met nationally,	*The proposed amendment provides clarification on sludge storage requirements. The additional text acknowledges the need for co-ordinated* facilities developed to serve a number of local plants and/or a wider regional need. *It is acknowledged in the new text that any proposed new facilities or upgrades of existing facilities will be subject to detailed site assessment to establish*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	additional sludge storage facilities are required to facilitate the predicted increase in wastewater sludge as new and upgraded treatment plants are completed. These can be located on the Sludge Hub Centre or Sludge Treatment Centre site or at a separate facility. In line with the approach taken to other facilities in this Plan, the development of Sludge Storage Facilities will no longer be considered solely on a per-plant or per-county basis. Where appropriate, Sludge Storage Facilities will be developed to serve a number of local plants and/or a wider regional need. In particular, the upgrade to the Ringsend sludge hub and the proposed new North Dublin WWTP will result in a significant increase from current sludge volumes with a consequent increase in storage requirements. Therefore, a dedicated sludge storage facility should be developed in conjunction with the expansion of Ringsend to meet its requirements and take account of other future needs in the region. The location and size of any new facilities will require detailed site assessment including appropriate assessment. The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5. All wastewater sludge storage facilities must be registered in accordance with S.I. No. 32/2010 - Waste Management (Registration of Sewage Sludge Facility) Regulations, 2010. Sludge storage at a wastewater treatment plant or a waste licenced facility is excluded from this requirement for registration.	*suitability which is a feature of the plan (Section 7.4.1). The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with the environmental siting criteria in Section 9.5 of the NWSMP.* *The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section ~~7.3.5~~ 7.3.6	However, the majority of sludge produced from wastewater treatment plants over 500p.e. (approximately 70%) is dealt with by DBO contractors (i.e. with outsourced operation and maintenance) representing the larger plants nationally. These plants account for less than 3% of the total population equivalent served by municipal wastewater treatment with the proportion of sludge being even lower as a significant number of these small treatment plants are primary or septic tank type treatment plants.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section ~~7.3.6~~ 7.3.7	DBO Contracts for wastewater treatment plants with full sludge treatment ~~always~~ include responsibility for sludge transport	

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	from the sludge treatment to the final ~~disposal~~ reuse location.	
Section ~~7.3.7~~ 7.3.8	These contracts include full responsibility for sludge treatment and reuse or disposal. Over 150 wastewater treatment plants are currently being operated by DBO contractors. These include ~~most~~ the majority of the larger plants in the country.	
Section 7.4.1	Each local authority area (excluding South Dublin which has no wastewater treatment plants in the county) has been reviewed to assess the current situation and recommendations for the future.	*The proposed amendment offers factual information regarding wastewater infrastructure in South Dublin. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	Particular sites which are considered geographically suitable as satellite dewatering sites or sludge hubs have been identified. These sites will be subject to detailed assessments on a site by site basis to establish suitability. This assessment must take into account the environmental, social and financial impacts of any proposal. The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5 to 9.7.	*The proposed amendment provides further clarification in relation to the site selection process for any proposed new facilities or upgrades of existing facilities. This site selection process extends to all local authorities. The environmental siting criteria in Section 9.5 of the NWSMP will be important in avoiding impacts. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 7.4.3	Sludge within County Cavan was lime stabilised at the Cavan WWTP, for a number of years, under a temporary contract. Due to the ~~current~~ recent WWTP upgrade works contract, this lime stabilisation now takes place off-site.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	The ~~new~~ Cavan WWTP is considered to be in a suitable location to act as a Satellite ~~Site~~ Dewatering Site and the upgrade of the WWTP included sludge acceptance facilities.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 7.4.6	There are no WWTP sites in Cork county being used as sludge hubs. At present, framework contracts for sludge treatment and disposal from sites in Cork are in operation. As detailed in Section 7.4.5, the Cork City wastewater treatment plant at Carrigrennan is considered to be in a suitable location to be used as a sludge hub. A detailed assessment of this option is	*The proposed amendment provides clarification in relation to a potential hub location at the existing Cork City wastewater treatment plan. The additional text reinforces that any proposed new facilities or upgrades of existing facilities will be subject to detailed site assessment which is a feature of the plan*

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	recommended in order to establish the suitability of the site and feasibility of developing a Sludge Hub Centre with advanced digestion. As stated above this is subject to planning and infrastructure requirements including an assessment of potential traffic impacts is proposed to assess feasibility of importing sludge to this site.	*(Section 7.4.1) to establish suitability. The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with the environmental siting criteria in Section 9.5 of the NWSMP. The environmental siting criteria will be important in avoiding impacts.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 7.4.8	The Ringsend WWTP currently acts as a sludge hub for the Greater Dublin ~~City~~ area. Sludge treatment is provided by thermal hydrolysis and anaerobic digestion followed by thermal drying. The Sludge Hub Centre in Ringsend will be retained and upgraded, as necessary, during the upgrade of the wastewater treatment plant. ~~The selected treatment process and any chemical dosing for phosphorus removal may impact the quantity of sludge produced. The predicted sludge quantity from the Ringsend wastewater treatment plant will be reviewed on completion of detailed design for the works.~~ ~~There is a~~ There is a requirement for Sludge Storage Facilities for any sludge destined for use in landspreading as detailed in Section 7.3.5. Due to space limitations on the site in Ringsend, any such storage facilities are required to be located at a separate site to the existing wastewater treatment plant site. The proposed plant upgrade will result in a significant increase in sludge quantities, which will require additional off-site storage capacity. As discussed in Section 7.3.4 a new storage facility is currently being considered as part of the Ringsend plant upgrade, with a view to identifying a suitable site and seeking the necessary approvals for its development. The site selection process and assessment of potential environmental impacts in particular is being and will be undertaken in accordance with Section 9.5. The development of such a sludge storage facility will require appropriate planning permission. As part of the planning application process, the requisite environmental assessments will be carried out to ensure the development is in compliance with all relevant environmental and planning legislation. There is the potential for use of the waste-to-energy plant currently under construction	*The proposed amendment provides clarification in relation to Sludge Hub and Satellite Centres under the remit of Dublin City Council. The additional text reinforces the need to ensure that there are sufficient sludge storage facilities and reiterates the requirement to follow the site selection process for any proposed new facilities or upgrades of existing facilities which is a feature of the plan (Section 9.5). The environmental siting criteria in Section 9.5 of the NWSMP will be important in avoiding impacts. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	adjacent to the Ringsend Wastewater Treatment Plant~~.~~ as an option for co-incineration with municipal solid waste in the future, subject to commercial terms and the applicable planning permission and other permits for both facilities. Other alternatives, such as use of dried sludge in industry may also be considered. In accordance with the waste hierarchy, it is preferable to recycle rather than incinerate wastewater sludge. However, due to current pressures on the agricultural outlet for wastewater sludge, it is considered important to consider alternative outlets. This is considered further in Section 8.	
Section 7.4.9	A sludge management plan prepared on behalf of Fingal County council recommended that the proposed new North Dublin WWTP (Greater Dublin Drainage Scheme www.greaterdublindrainage.ie) should include a Sludge Hub Centre for treatment of wastewater sludge produced in the Fingal area. This proposal has been reviewed by Irish Water and is considered to provide the most appropriate option for a sludge hub in Fingal. There is a requirement for sludge storage for any sludge destined for use in landspreading as detailed in Section 7.3 to store sludge during the winter period when landspreading is not permitted. An assessment of the appropriate location for storage facilities for the Fingal Sludge Hub Centre will be considered as part of the detailed design for this facility. Sludge storage may be located either at the sludge hub centre site itself or in a separate off-site Sludge Storage Facility. If an off-site storage facility is preferred a site selection process as detailed in Section 9.5 will be undertaken and all planning requirements complied with including an assessment of potential traffic impacts.	*The proposed amendment provides clarification in relation to Sludge Hub and Satellite Centres under the remit of Fingal County Council. The additional text reinforces the need to ensure that there are sufficient sludge storage facilities and reiterates the requirement to follow the site selection process for any proposed new facilities or upgrades of existing facilities which is a feature of the plan (Section 9.5). The environmental siting criteria in Section 9.5 of the NWSMP will be important in avoiding impacts.* *It is noted that the proposed new WWTP, to be located in Fingal, is currently in planning and an EIS and NIS are being prepared. The additional text clarifies that an assessment of the appropriate location for storage facilities for the Fingal Sludge Hub Centre will be considered as part of the planning for that facility.* *The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 7.4.10	The Bray-Shanganagh WWTP is ~~marginal in size relative~~ close to the typical minimum economic size for thermal hydrolysis, so provision of advanced anaerobic digestion may not be economically feasible at this stage but may be considered in the future.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 7.4.11	The wastewater treatment plant for Galway City is located at Mutton Island. The treatment plant currently has anaerobic	*This change will not result in any changes to the assessment included in the Environmental Report.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	digestion and pasteurisation of sludge. However, the pasteurisation unit is not currently in use and the sludge produced undergoes additional treatment off-site prior to ~~disposal~~ reuse.	*No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 7.4.12	There is a requirement for a new Sludge Hub Centre in the Galway county area as the wastewater treatment plant at Mutton Island is not considered to be suitable as a Sludge Hub Centre. There are proposals for a new wastewater treatment plant to serve the eastern environs of Galway City in the future. This wastewater treatment plant may also be used as a sludge hub. However, there is no definite date for commencement of this scheme at present. Detailed consideration of this site as a Sludge Hub Centre or a Satellite Dewatering Site will be undertaken when the project progresses. A Sludge Hub Centre is required for the Galway/Mayo region. Tuam is considered to be a suitable location for a Sludge Hub Centre. However, a detailed site assessment is required in order to confirm suitability.	*The proposed amendment provides clarification on the need to ensure that there are sufficient sludge storage facilities. Any proposed new facilities or upgrades of existing facilities will be subject to detailed site assessment which is a feature of the plan (Section 7.4.1) to establish suitability. The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with the environmental siting criteria in Section 9.5 of the NWSMP. The environmental siting criteria will be important in avoiding impacts.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 7.4.13	~~There are no sludge hubs in operation in County Kerry~~. The wastewater treatment plant in Killarney has an autothermal thermophilic aerobic digestion process which fully treats sludge from that plant and imported sludge from the local area.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	There is a substantial cost associated with the management of sludge across County Kerry and satellite dewatering ~~centres~~ sites with liquid sludge acceptance facilities are recommended at Killarney and Tralee.	
	Due to the geographical nature of County Kerry, there are potentially long transport distances for DWWT sludge in south-west Kerry and the Ring of Kerry. The wastewater treatment plants at Cahersiveen and Killorglin will continue to accept sludge, where there is no negative impact on the wastewater treatment plant, until such time as a scheduled approach to the collection of DWWTS sludge is implemented as recommended in Strive Report No 123. On-site treatment using sludge reed beds may be appropriate at a number of sites and its feasibility should be assessed.	*The proposed amendment provides clarification on the need to ensure that there are sufficient sludge storage facilities. Any proposed new facilities or upgrades of existing facilities will be subject to detailed site assessment which is a feature of the plan (Section 7.4.1) to establish suitability. The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with Section 9.5. The environmental siting criteria will be important in avoiding impacts.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 7.4.18	The Sludge Hub Centre in Limerick currently accepts imports of liquid sludge including	*The proposed amendment provides clarification in relation to Sludge Hub and*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	septic tank sludge. In order to reduce liquid sludge transport costs a satellite dewatering ~~centre~~ site with liquid sludge import facilities is recommended at Newcastle West. ~~In order to reduce the volume of traffic to the Limerick City wastewater treatment plant, consideration should be given to a future satellite dewatering centre at Castletroy.~~	*Satellite dewatering sites under the remit of Limerick County Council. Any proposed new facilities or upgrades of existing facilities will be subject to detailed site assessment which is a feature of the plan (Section 7.4.1) to establish suitability. The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with the environmental siting criteria in Section 9.5 of the NWSMP. The environmental siting criteria will be important in avoiding impacts.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 7.4.22	The Athboy, Castletown Tara, Duleek and Navan sites have facilities for accepting sludge which are not adequate at present. These existing facilities should be reviewed to assess ~~wthe~~ the scope of upgrades required. Additional ~~sludge~~ Satellite Dewatering Sites are proposed for the Kells and Trim WWTP's to accept liquid sludge.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 7.4.23	Sludge imports of liquid sludge are currently reported as accepted at a number of wastewater treatment plants in the county including Monaghan, Castleblayney, Carrickmacross and Glaslough. However, the facilities for accepting sludge at these sites are not currently adequate. Satellite dewatering ~~centres~~ sites with liquid sludge acceptance facilities are recommended at Monaghan and Carrickmacross.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 7.4.27	There is currently one Sludge Hub Centre in County Tipperary at Clonmel. The county sludge management plans and sludge hub centre at Clonmel were developed prior to the amalgamation of North and South Tipperary local authorities and sludge management was therefore progressed separately within the county prior to 2014. Clonmel acts as a sludge hub for South Tipperary with imported sludge facilities for liquid and cake sludge imports and treatment by thermal drying. The sludge hub/treatment centre in Clonmel was both constructed in the last 10 years and is considered to have sufficient capacity for the foreseeable future.	*The proposed amendment provides clarification in relation to the amalgamation of North and South Tipperary local authorities into a single entity and on the need to ensure that there is sufficient sludge storage facilities. Any proposed new facilities or upgrades of existing facilities will be subject to detailed site assessment which is a feature of the plan (Section 7.4.1) to establish suitability. The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with the environmental siting criteria in Section 9.5 of the NWSMP. The environmental siting criteria will be important in avoiding impacts.* *No significant negative impacts on European*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
		Sites are anticipated as a result of this proposed amendment.
Section 7.5 (Table 7.2)	Table 7.2, the column Proposed Upgrades for Dublin City Council has been amended as follows: ~~None~~ Sludge facilities to be upgraded as part of the WWTP upgrade. Separate sludge storage facility to be provided. Table 7.2, the column Proposed Upgrades for Fingal County Council has been amended as follows: Sludge hub planned as part of GDD WWTP. Sludge storage may be located either at the sludge hub centre site itself or in a separate off-site sludge storage facility. Notes: 1. The county sludge management plans and sludge hub centre at Clonmel were developed prior to the amalgamation of North and South Tipperary local authorities and are therefore considered separately in Table 7.2.	*The proposed amendment comprises minor text changes that offer clarification on the status of current and proposed upgrades for Dublin City Council, Fingal County Council and Tipperary. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

1.9 CHANGES TO CHAPTER 8 (SLUDGE OUTLET OPTIONS)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 8.1	Historically, ~~landfilling~~ disposal to landfill was the main outlet. However, this is not considered to be economically or environmentally sustainable and is not considered further. Other options are available, including thermal treatment, use in energy crops, silviculture and land remediation. However, development of these outlets, apart from thermal treatment, has been limited both in Ireland and internationally. Further details of these options are included in Sections 8.7 to 8.10. It is proposed to undertake a feasibility study for alternative options for sludge outlets within the first 5 year cycle of the plan. The current high reliance on agricultural use is considered to be a risk to Irish Water due to potential difficulties in sourcing land for sludge reuse as further detailed in Sections 8.2 to 8.4.	*The proposed amendment is welcomed as it represents a commitment to investigate alternative outlet options. It is intended that the inclusion of this additional commitment will reduce dependence on a single outlet for sludge which will address concerns raised across the agriculture sector during consultation.* *The feasibility study will consider environmental, social and financial criteria as outlined in Section 9.1 of the NWSMP and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP and the sensitivity mapping (Figure 9.1 of the SEA).* *The feasibility study will have regard to Irish Water's obligations as the public water authority under the Birds and Natural Habitats Regulations 2011-2015. This change will not result in any changes to the assessment included in the Environmental Report.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
		No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.
Section 8.2	As detailed in Section 2, over 98% of wastewater sludge is currently ~~disposed of to~~ reused in agriculture including sludge which is composted prior to agricultural reuse. The agricultural outlet for wastewater sludge is under ~~pressure~~ increasing scrutiny mainly due to perceptions of contamination risk. There has been a significant reduction in availability of agricultural outlets due to a tendency to exclude wastewater sludge from lands used for agricultural production under quality assurance schemes. This includes the schemes operated by An Bord Bia and the Irish Grain Assurance Scheme. The proposed national reporting systems for sludge reuse locations, as detailed in Section 10.6, will facilitate the operators of these schemes. Irish Water propose to liaise with the Department of Agriculture, Food and Marine on an ongoing basis to ensure outlets for reuse of sludge are appropriate and not in conflict with the aims of the Bord Bia and the Irish Grain Assurance Schemes. It is expected that this will lead to a reduction in the land available for land-spreading and increases the importance of reduction of sludge quantities through anaerobic digestion and the need for alternative outlets to agricultural reuse. The use of wastewater sludge as a fertiliser ~~in agriculture reduces the dependence on artificial (inorganic) fertilisers which are all imported and may contain high level of heavy metals or other contaminants~~ is considered a favourable environmental option. The use of properly treated wastewater sludge, in accordance with a nutrient management plan can avoid any adverse environmental impact on receiving waters as the quantity of phosphorus is monitored and controlled to match the quantity required by the crop being grown.	*The proposed amendment represents a commitment to engage with the Department of Agriculture, Food and the Marine to ensure that there is not dependence on a single outlet for sludge and involves a coordinated approach to ensure outlets for reuse of sludge are appropriate. It is considered that this further reinforces the need to investigate alternative options as committed to elsewhere as a feasibility study.* *This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	The cost of ruling out the agricultural outlet in Ireland for sludge was estimated in 2010 as €200 million over a 10 year period in a review of current sludge disposal commissioned by the EU[10]. Scottish water have estimated the cost of omitting the current agricultural outlet in Scotland would be £50 million from 2015 to 2021. The risk of	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	complete loss of the agricultural outlet can be mitigated by ensuring confidence in the sludge product by adopting appropriate control (e.g. HACCP) and monitoring measures. Treatment of all sludge to ensure pathogen removal and more stringent monitoring of sludge treatment and disposal practices is necessary to support the sustainable retention of the agricultural outlet~~.~~ and is a core objective of this Plan. Footnote inserted: [10] Environmental, economic and social impacts of the use of sewage sludge on land - Final Report; Milieu Ltd, WRc and RPA for the European Commission	
	Some of the additional cost for treatment and monitoring may be off-set by maximising energy recovery and reducing sludge volumes. More critically, the viable alternatives are not currently available and their mobilisation is likely to take up to 10 years given statutory planning processes, funding and other logistical challenges.	*The proposed amendment provides clarification on the current status of alternatives and the likely timeframe for mobilisation. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 8.3	Agricultural land-use in Ireland, from 2010-2013, from CSO data, is detailed in Table 8.1 below. The type of land typically ~~used~~ engaged for agricultural use of wastewater sludge is land used for fodder for animals with grassland also used.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 8.3 (Table 8.1)	Table 8.1 – Summary of Agricultural Land-Use in Ireland, Footnote added to row Area farmed (AAU)[1] Notes: 1. Area in '000 hectares	*The proposed amendment provides clarification on the units of area farmed. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 8.4	In considering lands suitable for reuse of properly treated wastewater sludge, a regional rather than county based approach is needed. Much of the central part of Ireland is limited by existing naturally occurring heavy metal content, mainly cadmium and nickel. In accordance with the Sewage Sludge Directive, as implemented by S.I. 148 of 1998 and amended by S.I. 267 of 2001, the levels of cadmium and nickel in soil must be less than 1mg/kg and 30 mg/kg respectively for use of sludge to be ~~allowable~~ permitted. Based on these restrictions, the areas where use of wastewater sludge is not	*The proposed amendment provides clarification on the limitations of landspreading based on existing heavy metal content in soils (cadmium and nickel). This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	permitted are shown in red on Figure 8.2~~.~~ for cadmium or red and orange in the case of nickel.	
Section 8.6	The restrictions in agricultural use of wastewater sludge, due to groundwater vulnerability and naturally occurring cadmium and nickel levels, reduce the overall area of agricultural land, potentially available, from approximately 4.45 million hectares to 2.54 million hectares, i.e. 54% of agricultural land. These areas are shown on Figure 8.4. This area would be further reduced to approximately 108,000 hectares if only land used for animal fodder cereals was used. Further limitations are required on use of sludge in areas within or adjacent to Natura 2000 sites or areas prone to flooding. It is required to review this on a case-by-case basis to ensure that there are no significant impacts.	*The proposed amendment includes specific reference to restrictions in use of sludge in areas within or adjacent to Natura 2000 sites or areas prone to flooding. This is considered a positive addition and should be read in conjunction with Figure 9.1 of the SEA report which provides sensitivity mapping in relation to land spreading.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	The quantity of wastewater sludge produced in 2014 was 53,543 tonnes dry solids. Based on a typical phosphorus content of 1.7%, the application rate would be approximately 3.5 tonnes per hectare. Therefore the land requirement for agricultural reuse would be 15,300 hectares. It is expected that the quantity of sludge may increase to 75,150 tds per annum by 2020 if full compliance with wastewater discharge licencing is achieved. This would increase the land requirement to 21,500 hectares. The most sustainable, cost effective and beneficial outlet for wastewater sludge in Ireland, subject to appropriate treatment, is reuse on land, with agricultural ~~land~~,landuse primarily on land used for animal fodder production.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 8.7	This includes liaising with Bord na Mona, Coillte and private forestry operations to identify any potential outlets.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 8.7.1	While there are many advantages in the use of wastewater sludge in the fertilisation of energy crops, there are also some obstacles. The production of energy crops is not considered to be agriculture and as such the ~~exclusions~~ exemption from licencing under the Waste Management Act which apply to agricultural use, ~~do~~ does not apply and separate permissions are required under waste legislation to allow the sludge to be	*The proposed amendment includes a commitment that Irish Water will liaise with the relevant department relating to legislation governing the use of wastewater sludge on energy crops. The amendment will not result in any changes to the assessment included in the Environmental Report. In addition the second amendment provides clarity on the potential impacts of the production of energy crops on Natura 2000*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	used. It is considered that recycling to energy crops is unlikely to become a significant sludge disposal route, unless existing legislative restrictions are amended. Irish Water will liaise with the Department of Housing, Planning, Community and Local Government in relation to the current legislation and any potential changes to address the current restrictions. The production of energy crops may have impacts on the catchment hydrology with potential indirect impacts on Natura 2000 sites particularly where there is sensitivity to water levels within the Natura 2000 site. These potential impacts must be considered where the use of wastewater sludge is proposed.	*sites. The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 8.8	The main alternative outlet for wastewater sludge is incineration. Other thermal processes, including gasification and pyrolysis, are currently being developed internationally and are expected to be available on a commercial scale in the next 5-10 years. There are significant capital and operating costs associated with all thermal processes and as such ~~it~~ they are only likely to become a preferred option if reuse in agriculture or non-agricultural landuse are not available.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	~~Incineration~~ In other jurisdictions, incineration of wastewater sludge ~~may be~~ is carried out in commercial incinerators for general waste or in stand-alone wastewater sludge incinerators. There is substantial capital investment required for construction of a wastewater sludge incinerator and this is not currently being considered by Irish Water. However, the proposed feasibility study for alternative options for sludge disposal will consider thermal processes in more detail.	*This change will not result in any changes to the assessment included in the Environmental Report. Feasibility studies will consider environmental, social and financial criteria as outlined in Section 9.1 of the NWSMP and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 8.9	At present, the only sludge which is landfilled is from Shannon Town in a dedicated facility due to the potential presence of high heavy metal levels in this sludge. The quantity of wastewater sludge going to landfill in 2005 was 10,292 tonnes. This had reduced to 361 tonnes by 2014. Landfill is not considered to be a sustainable outlet for wastewater sludge and will only be considered as a short-term emergency outlet where reuse options are not available.	*The proposed amendment represents a clarification in relation to the position of landfill as a disposal option for sludge. Disposal to landfill is only considered where alternative reuse or recovery options are not available. As it is anticipated that suitable, sustainable alternatives exist in sufficient quantities to avoid landfilling this change will not result in any changes to the assessment included in the Environmental Report. Overall it was determined that landfill is not a sustainable outlet for wastewater sludge.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
		No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.
Section 8.10	The main recovery options for wastewater sludge are energy recovery and phosphorus recovery (as struvite) ~~and use as a fertiliser where organic and nutrient content are of beneficial use.~~ its use as a fertiliser where organic and nutrient content are of beneficial use. Phosphorus recovery is normally only viable for larger anaerobic digestion facilities and will be reviewed on a case by case basis for new or upgraded anaerobic digestion facilities. In conjunction with the expansion and upgrading of the Ringsend (Dublin) plant, consideration of struvite recovery will be possible when the sludge characteristics are determined post commissioning. Similarly there are options for phosphorus recovery from ash where mono-incineration is used for sludge disposal. There has been research into recovery of other constituents including precious metals. However, these recovery options are not currently viable.	*The proposed amendment offers clarification regarding phosphorus recovery. The requirement for the selection of sites for new or upgraded sludge facilities is still a feature of the plan and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

1.10 CHANGES TO CHAPTER 9 (OPTIONS ASSESSMENT AND ALTERNATIVES)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 9.1	The options in relation to wastewater sludge management relate mainly to the approach to its treatment, transport and disposal. This was formerly assessed on a county by county basis.	*The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 9.3.2	Satellite Dewatering ~~Centres~~ Sites	*The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 9.5	The selection of sites for new infrastructure ~~has been considered in~~ must consider a number of factors including environmental, planning, economic, technical and site availability factors. Due to the ~~Strategic Environmental Assessment.~~ wide range of needs and circumstances associated with each project, the specific criteria and methodology for site selection will be	*The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	developed on a case by case basis. The specific requirements in relation to ~~satellite dewatering centres~~ Satellite Dewatering Sites and Sludge Hub Centres are considered in Section 9.6 and 9.7 respectively. In general the location of new or upgraded sludge facilities including Sludge Storage Facilities must consider the following~~:~~ environmental siting criteria:- • Avoid, as far as possible, siting sludge infrastructure (including expansion to WWTP, sludge hub or ~~sludge~~ satellite dewatering site) or related infrastructure in areas protected for landscape and visual amenity, geological heritage and/or cultural heritage value. Where this is unavoidable, an impact assessment should be carried out by a suitably qualified practitioner and appropriate mitigation and/or alternatives must be provided.	
	Irish Water will carry out Appropriate Assessment Screening as required on proposed projects and any associated works, individually or in combination with other plans or projects, to ensure there are no likely significant effects on the integrity (defined by the structure and function) of any Natura 2000 site(s) and that the requirements of Articles 6(3) and 6(4) of the EU Habitats Directive are fully satisfied. In projects where the only potential impact is on the final effluent discharges, Appropriate Assessment Screening is undertaken by the EPA as part of the wastewater discharge licensing process. Irish Water will also ensure that in carrying out activities associated with management of wastewater sludge we are in compliance with our obligations ~~as a the public water authority~~ under the Birds and Natural Habitats Regulations 2011-2015.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 9.6	Selection of Satellite Dewatering ~~Centres~~ Sites	*The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 9.8	A review of all sites with thermal drying is also recommended to assess whether anaerobic digestion is feasible to either replace or supplement the existing thermal drying plant. Options for co-digestion with organic waste ~~shall~~ should also be considered in order to improve the energy recovery and	*The proposed amendment provides a clarification that co-digestions should be considered at sludge hub centres and off-site facilities. The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	economic feasibility of anaerobic digestion facilities. This will ~~also~~ be considered at Sludge Hub Centres and off-site facilities.	*Sites are anticipated as a result of this proposed amendment.*
	Off site anaerobic digestion and composting facilities have also been assessed as part of the sludge management audit and the facilities inspected are considered to provide a high level of treatment and quality control. These may be retained on the basis of regular audit and confirmed compliance.	*The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 9.9	The main outlet for treated wastewater sludge is currently agriculture. As detailed in Section 8, this is considered to provide a sustainable solution provided the sludge is treated appropriately with the required quality control. Extensive research has been undertaken both in Ireland and internationally on the use of wastewater sludge in agriculture. These studies have shown that, subject to suitable quality controls, wastewater sludge is safe to use in agriculture and has considerable economic, environmental and security of outlet benefits. Use in agriculture can require strategic storage of sludge biosolids when the outlet is unavailable due to seasonal or other factors. These storage facilities require assessment for environmental impacts in the same way as other infrastructure. However, it is considered desirable to promote alternative outlets in order to provide flexibility and to reduce the dependence on use of agricultural land for sludge reuse. Further research into alternative reuse outlets will be undertaken to assess options. This will include a financial evaluation and consideration of wider environmental impacts including biodiversity, water, soils, human health and food safety. Irish Water will incorporate alternative outlets into its Standard Operating Procedures for sludge management, as appropriate once any such outlet is developed. The main alternative outlet currently in use in Europe is incineration. There are commercial incinerator facilities currently in place and under development in Ireland which may provide a suitable alternative for some of the wastewater sludge produced by Irish Water. A feasibility study is proposed to consider options for thermal treatment of sludge including incineration.	*The proposed amendments represent a commitment to investigate alternative options to reduce dependence on a single outlet for sludge.* *The position in relation to commercial incinerator facilities is provided. Feasibility studies will consider environmental, social and financial criteria as outlined in Section 9.1 of the NWSMP and will be supported by the environmental siting criteria included in Section 9.5 of the NWSMP.* *These changes will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	Other outlets such as use as a fuel in industry have been researched in Ireland previously with no reliable outlet identified to date. However, this is still considered ~~as~~ a viable option in the future as companies strive to meet renewable energy targets. The main industrial outlet is use in the cement industry and further evaluation of this potential outlet is proposed. The use in cement kilns has the advantage of potential full reuse of the sludge with energy recovery and no ash for disposal.	
Section 9.10	All of these impacts, including temporary effects during implementation of new measures or projects, will need to be considered in advance of any upgrade works at any individual site.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 9.11	The current outlet for wastewater sludge in Ireland is almost exclusively agriculture. The NWSMP has identified ~~agriculture~~ reuse on land as the preferred outlet ~~going forward.~~ currently and for the medium term. However, ~~a policy based~~ the current dependence on a single disposal ~~of~~ option, i.e. reuse on agricultural land, is ~~very~~ susceptible to policy, regulatory and/or perception changes.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 9.11 (Table Risk and Mitigation)	Mitigation has been updated as follows: Stakeholder consultation – NWSMP/SEA and one-to-one engagement Ongoing consultation with stakeholders to reduce ~~potential~~ likelihood of short-term loss of agricultural outlet	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 9.12	The potential risks associated with landspreading include, but are not limited to the following:- • Risk to availability of agricultural outlet; • Risk ~~of different~~ to agricultural produce; • Risk to Natura 2000 sites; • Persistent organic pollutants, pathogens and metals content in sludge; • Pharmaceuticals and personal care products content in sludge; • Industrial discharges to WWTP's impacting sludge quality; • Illegal discharges to WWTP's impacting sludge quality; • ~~Leachate~~ Landfill leachate acceptance at WWTP's impacting sludge quality.	*This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 9.12.3	Irish Water has commenced a programme of	*The proposed amendments include*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	more extensive licencing of trade discharges with tighter emission controls. As detailed in Section 10.3 Irish Water consider source control preferable to end-of-pipe treatment to minimise the risk of specific pollutants (e.g., metals, persistent organic pollutants, pharmaceutical products, etc.) in the biosolids and is actively pursuing targeted source control as part of our strategy for protecting the water environment.	*clarifications within the text and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	Monitoring of persistent organic pollutants is undertaken based on the requirements of the *Code of Good Practice for Use of Biosolids in Agriculture*. There has been extensive international monitoring and research in this area in recent years. To date, there are no limits or recommendations for levels of organic pollutants ~~for~~ specifically relating to wastewater sludge used in agriculture. It is proposed that research and recommendations in this area are reviewed regularly, with additional analysis undertaken if necessary, to mitigate against any risk to soils or health due to the presence of organic pollutants. The proposed update of the Code of Good Practice for Use of Biosolids in Agriculture will review current monitoring and limits for organic pollutants and make recommendations for any further monitoring or limits required to mitigate against the potential risks. There are limits set in Regulation (EC) No. 850/2004 on persistent organic pollutants as listed in Annex IV of the regulations. An EU funded study[13] on the levels of selected compounds in sludge has found that the levels of POP's are generally significantly below the limits set in relation to Regulation 850/2004. Footnote 13 inserted: [13] Occurrence and Levels of Selected Compounds in European Sewage Sludge Samples JRC 2012	*The proposed amendment provides clarification in relation to limits for persistent organic pollutants as outlined in legislation. There is an existing monitoring programme for particular persistent organics in wastewater sludge in accordance with Code of Good Practice for the Use of Biosolids in Agriculture (Section 10.8). In order to identify any additional parameters which require monitoring, further research is needed to identify appropriate monitoring. The additional text will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 9.12.5	Industrial discharges from a wastewater catchment are generally to the sewer network but may also be discharged via tanker. All industries require either a Trade Effluent Licence (Section 16) or an IPPC Licence to discharge to the sewer network. Irish Water is currently reviewing all Section 16 and IPPC Licences. As part of this review, limits will be set on all relevant parameters taking into account the potential impact on wastewater sludge. Ongoing monitoring and	*The proposed amendment provides clarification in relation to Industrial discharges and the ongoing work that is being undertaken to ensure that control measures and monitoring is in place for discharges to sewer. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	controls are required, at both the WWTP and the industrial discharge point, to mitigate against any risk to the wastewater sludge produced. Work is ongoing to ensure that appropriate control and monitoring regimes are in place for discharges to the sewer network.	
Section 9.12.6	Landfill leachate is frequently discharged to wastewater treatment plants for treatment. This is either directly to the WWTP via tanker or to the sewer network. It is a requirement of the Wastewater Discharge Licence for any WWTP accepting leachate, that the toxicity of the leachate is assessed and the quantity is controlled. In order to ensure that the WWTP and sludge are not impacted~~, Irish Water has limited the leachate quantity to a maximum of 5% of the hydraulic load to any plant. In addition to this,~~ the leachate must be analysed to assess nutrient and metal content. Ongoing monitoring and controls are required to mitigate against any risk to the wastewater sludge produced and work is ongoing to ensure that appropriate control and monitoring regimes are in place for all leachate discharges.	*The proposed amendment provides clarification in relation to wastewater treatment plants which accept landfill leachate. Clarification is provided in relation to the ongoing work that is being undertaken to ensure that control measures and monitoring is in place for all leachate discharges. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*

1.11 CHANGES TO CHAPTER 10 (QUALITY ASSURANCE, MONITORING AND REPORTING)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 10.1	There are a number of statutory requirements for monitoring and reporting of sludge management activities. However, in order to ensure that the risks and perception issues are addressed, it is recommended that an independently audited quality assurance system is put in place for sludge management activities. ~~It is proposed that an~~ An annual audit of sludge management activities ~~is~~ will be undertaken on behalf of Irish Water pending a fully developed quality control scheme. Separate Standard Operating Procedures (SOP's) and control procedures are being developed by Irish Water to ensure that the whole process from source control of pollutants, through sludge treatment and reuse is controlled and monitored. Full monitoring and reporting is required for each step of the process to	*The proposed amendment will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	ensure a quality assured biosolids product.	
Section 10.2	There has been a requirement for Local Authorities to keep a register of all sludge since 1996 (Waste Management Act) with additional specific requirements in S.I. No. 148/1998 - Waste Management (Use of Sewage Sludge in Agriculture) Regulations, 1998. ~~There regulations require that the following information is included in the sludge register:~~ ~~a) the quantities of sludge produced and the quantities supplied for use in agriculture in their functional area,~~ ~~b) the composition and properties of the sludge having regard to the parameters referred to in Part II of the Schedule (i.e. cadmium, copper, nickel, lead, zinc and mercury)~~ ~~c) the treatment which the sludge has undergone having regard to the types of treatment referred to in article 2~~ ~~d) the name and address of each recipient of the sludge and the location of each site where the sludge is to be used~~ Data collected in sludge registers, in addition to site data with regard to existing infrastructure and quantities of sludge removed has been used to inform the assessment of sludge infrastructure requirements. Ongoing data collection is proposed to confirm capacity requirements as solutions are developed.	*It is noted that this amendment excludes the information as required under legislation in relation to sludge register. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
Section 10.3	Irish Water ~~is applying~~ advocates the application of source control principles to commercial and industrial discharges to ~~the sewer network. A review~~ sewer. Building on work previously initiated by each local authority Irish Water are establishing a wastewater source control capability which is developing an ongoing process for the appraisal of existing discharges and discharge ~~licences and~~ licence conditions ~~is ongoing. Through.~~ .Using this source control approach, standardised conditions ~~are~~ will be applied to discharge to sewer licences based on the nature of the discharger's activity, the capacity of the receiving network and the capability of the wastewater treatment plant to remove pollutants.	*The proposed amendment offers clarification in relation to source control principles and the controls which are being developed. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	In the case of industries licenced to discharge	*The proposed amendment provides clarity in*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	by the EPA, ~~a memorandum of understanding (MoU) or similar should be established~~ arrangements are in place between Irish Water and the EPA ~~to agree protocols~~ for exchange of information ~~and assistance in addressing earlier intervention in removing~~ the setting of licence conditions and the removal substances which could compromise the WWTP~~. End~~ process or the further reuse of sludge. This engagement with the EPA also allows for a time-based review of existing licences or where new or revised limits are deemed necessary.	*relation to EPA licensed discharges and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	Irish Water recognises that end~~End~~ of-pipe treatment is often not the ~~appropriate location~~ optimal way to remove specific pollutants (e.g., metals, persistent organic pollutants, pharmaceutical products, etc~~),~~): in such cases, treatment at source is the most economic to all involved. Ensuring specific pollutants are managed at source also ~~ensures~~ minimises the impacts of industrial pollutants on the quality of wastewater sludge. • ~~Industrial discharges~~ • ~~Commercial discharges~~ • ~~Leachate~~ • ~~Water treatment plant sludge~~ • ~~Septic tank sludge~~	*The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 10.4	The audit of sludge storage facilities identified some ~~concerns~~ issues with facilities lacking the relevant permissions, structural integrity certificates and/or safety signage in place. Where issues have been identified, the relevant contractor must detail how this situation will be rectified. All wastewater sludge storage facilities must be registered in accordance with S.I. No. 32/2010 - Waste Management (Registration of Sewage Sludge Facility) Regulations 2010. Sludge storage at a wastewater treatment plant or a waste licenced facility is excluded from this requirement for registration. Irish Water is now proposing that such off-site storage is addressed in conjunction with the upgrading of plants and sludge treatment, with strategic storage sites to be developed to the required standard.	*The proposed amendment comprises minor text changes that offer further clarification on current legislative requirements and the scope to which these requirements encompass. The amendment also offers clarification in relation to off-site facilities. Any proposed new facilities or upgrades of existing facilities will be subject to detailed site assessment which is a feature of the plan (Section 7.4.1) to establish suitability. The site selection process and assessment of potential environmental impacts in particular will be undertaken in accordance with the environmental siting criteria in Section 9.5 of the NWSMP. The environmental siting criteria will be important in avoiding impacts.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	In general, nutrient management plans were not updated following any changes to quantities spread or crop types. Currently there are limited checks by Local Authorities	*The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	~~to check~~ that the plans are followed.	*No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	It is proposed to develop an independently assessed quality assurance scheme in relation to sludge management. ~~It is recommended that until~~ Until this scheme is in place, an annual audit of sludge management activities ~~is~~ will be undertaken on behalf of Irish Water. In addition future contracts relating to sludge management will include Key Performance Indicators which contractors will be assessed against on an ongoing basis.	*The proposed amendment represent an additional commitment in which future contracts relating to sludge management will include Key Performance Indicators which contractors will be assessed against on an ongoing basis. This will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 10.7	Monitoring and reporting of sludge data is undertaken at wastewater treatment plants, sludge treatment and storage facilities and at the final ~~disposal~~ reuse location. The final ~~disposal,~~ reuse including statutory monitoring of all sludge and soil, is current undertaken by contractors acting on behalf of Irish Water. These contractors provide sludge data directly to Local Authorities for inclusion in the Sludge Register. In addition, all contractors report directly to Irish Water. Data reported to Irish Water includes all sludge treatment, transport~~, disposal~~ and final ~~disposal~~ reuse locations including all statutory analysis data and additional data where required in particular contracts.	*The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 10.8	In accordance with S.I. 267 of 2001, all reuse of sludge in ~~disposal to~~ agriculture must be carried out in accordance with a Nutrient Management Plan. Particular limits on nutrient addition to land are set by S.I. No. 31/2014 - European Union (Good Agricultural Practice for Protection of Waters) Regulations, 2014.	*The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	Irish Water intends to liaise with the Department of Housing, Planning, Community and Local Government (formerly the Department of the Environment, Community and Local Government) in relation to a review of the *Code of Good Practice for the Use of Biosolids in Agriculture* to take into account current legislation and any recommendations for wastewater sludge quality parameters and any additional sampling of persistent organics or emerging pollutants. It is proposed that any updated COGP would be incorporated into Standard Operating Procedures for Irish Water and would include recommendations for	*The proposed amendment provides for clarity on the intention to take into account any recommendations in relation to sampling of persistent organics or emerging pollutants. The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	assessment of environmental sensitivity of lands to be used for landspreading. The Standard Operating Procedures will also include a template for Nutrient Management Plans and a requirement to consider environmental impacts, WFD objectives and the potential to impact on the European Sites in both in the Nutrient Management Plan and the Standard Operating Procedures.	
	Irish Water will liaise with the EPA Catchment Science and Management Unit and Teagasc to ensure that WFD objectives are met in developing the template for Nutrient Management Plans. The Programme(s) of Measures in the second round of River basin Management Plans will be reviewed upon their adoption and integrated into Irish Water's Standard Operating Procedures where appropriate. Each 5-year update of the NWSMP will take into account the WFD Objectives and Programmes of Measures in place. Contractors appointed to carry out sludge management on behalf of Irish Water will be required to comply with Irish Water's Standard Operating Procedures.	*The proposed amendment represents an additional commitment in relation to ongoing liaison with the EPA's Catchment Science and Management Unit and Teagasc to ensure that WFD objectives are met. This change will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European sites are anticipated as a result of this proposed amendment.*
	Ongoing research in relation to the composition of treated wastewater sludge has identified the presence of persistent organic pollutants, pharmaceuticals and personal care products which needs to be considered. ~~It is proposed that standards~~ Standards for monitoring of wastewater sludge in the EU and international research will be reviewed ~~on an ongoing~~ regularly as a basis ~~to determine if~~ for identifying additional monitoring of sludge or soil samples ~~is~~ required.	*The proposed amendment represents a clarification in relation to the review of EU and international standards and research to identify any additional parameters which require monitoring. The additional text will not result in any changes to assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 10.9	It is proposed that future sludge treatment and ~~disposal~~ reuse contracts for Irish Water will be required to comply with a quality assurance ~~scheme~~ procedures currently being developed by Irish Water. Compliance with the Code of Good Practice for Use of Biosolids in Agriculture is currently a requirement of Irish Water contractors. In order to ensure that all sludge treatment and ~~disposal~~ reuse complies with this, annual auditing of contractors activities is proposed. The timing of the audit ~~shall~~ will be planned to allow auditing of landspreading activities during spreading periods. In order to ensure that there is consistency and traceability in reporting of sludge reuse,	*The proposed amendments are minor wording revisions and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	it is proposed that GIS systems will be used to record the destination of all sludge ~~disposed of~~. This will also facilitate reviewing the suitability of lands considered sensitive for the purposes of land spreading. Teagasc ~~have~~ has recently developed an online nutrient management planning system which must be used by farmers participating in the Glas scheme.	

1.12 CHANGES TO CHAPTER 12 (FINANCIAL EVALUATION)

NWSMP Reference	Proposed Change	*SEA / AA Screening*
Section 12.1	The overall cost of sludge treatment is estimated ~~as follows~~ by reference to:- • Sludge transport; • Sludge treatment (thickening and dewatering); • Sludge treatment (stabilisation); • Sludge ~~disposal~~ reuse. The estimated cost for sludge transport ranges from €8.00 to €25.00 per tonne, depending on the required travel distance and type of sludge. Based on transportation utilising satellite dewatering ~~centres~~ sites and full compliance, the annual sludge transport cost is estimated as €10 to €15 million per annum. Sludge dewatering has a relatively high ~~operation~~ operational cost due to the labour, power, chemical and capital maintenance requirements. This is disproportionately high at smaller sites, due to high fixed costs, with the cost range estimated as <€2 to €25 per PE. The total national ~~cost~~ annual operating cost is estimated as €10 to €15 million.	*The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
	The cost for sludge treatment and ~~disposal costs~~ reuse varies depending mainly on sludge quantity and type of treatment. The ~~estimated~~ cost for sludge treatment and ~~disposal~~ reuse is ~~estimated as~~ approximately €400 per tonne dry solids produced in the wastewater treatment process, i.e. upstream of anaerobic digestion. The total estimated annual cost is €28 million per annum based on the 2014 sludge production. This is expected to increase to €35 to €38 million with full compliance with all wastewater discharge licences. There may be a further	*The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

NWSMP Reference	Proposed Change	*SEA / AA Screening*
	increase in cost if a higher level of treatment, such as thermal treatment, is required in order to effectively manage the wastewater sludge produced.	
Section 12.2.1	The cost saving for transport of sludge to a satellite dewatering site versus transport directly to the proposed hub has been estimated. The cost savings range from ~~<~~€ less than €10,000 to over €100,000. Where the proposed volume of imports of sludge ~~are~~ is less than 7,000 to 8,000 m^3/annum, it is considered more cost effective to discharge sludge to a balancing tank, which will enable controlled discharge to the inlet works.	*The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*
Section 12.2.2	If sludge is accepted to a purpose built balancing tank, this will reduce the risks to wastewater treatment plant compliance and reduce the potential impact on the WWTP equipment. There ~~is~~ are potential cost savings of up to €1.5 million per annum if the proposed infrastructure is provided compared to the cost of transfer directly to the proposed Sludge Hub Centre.	*The proposed amendment is a minor wording revision and will not result in any changes to the assessment included in the Environmental Report.* *No significant negative impacts on European Sites are anticipated as a result of this proposed amendment.*

1.13 CHANGES TO CHAPTER 13 (CONCLUSIONS & RECOMMENDATIONS)

Additional text has been added to Chapter 13 regarding the conclusions and recommendations. This additional text provides further details in relation to recommendations regarding anaerobic digestion which had been incorporated as a feature of the plan (included in Section 9.8) and alternative options investigation to reduce the dependence on use of agricultural land for sludge reuse (included in Section 8.2 and 9.2).

The inclusion of the additional text does not have any environmental consequences and as such screening of the proposed changes in accordance with both the SEA Directive (2001/42/EC) and the Habitats Directive (92/43/EEC) is not required in this instance.