Code of Practice, Domestic Waste Water Treatment Systems (Population Equivalent ≤ 10)

Public Consultation Response Document

March, 2021

The EPA published the Code of Practice, Domestic Waste Water Treatment Systems (Population Equivalent ≤ 10) Draft for Consultation on 26 November 2018. The public were invited to submit comments on the draft consultation document by 26 March 2019.

The EPA received 37 submissions.

List of Submitters
Dryloos Ireland Ltd
Toilet Revolution
Clare County Council
Kilkenny Precast Concrete Ltd
Alvin Morrow Reed Bed and Waste Water Treatment Systems
New England Onsite Wastewater Training Center
Irish Water Treatment Association/Wastewater Solutions
Irish Water Treatment Association/Premier Tech Aqua Ltd
Ash Environmental Technologies
Kildare County Council
Irish Onsite Wastewater Association
Cavan County Council
Tobin Consulting Engineers
An Taisce
Zero Waste Alliance Ireland and Herr Ltd
National Standards Authority of Ireland
National Standards Authority of Ireland Small Wastewater Engineering Working Group
Kerry County Council
Offaly County Council
Department of Housing, Planning and Local Government
Polylok (Europe) Ltd
Elected Members of Leitrim County Council
Vesi Environmental Ltd
An Bord Pleanála
InSinkErator Ireland
FH Wetland Systems Ltd
Meath County Council

IT Sligo
Waterford City and County Council
Sustainable Water Network Ireland (SWAN)
Local Authorities Waters Programme (LAWPro)
Health Service Executive
Individual person, Building and Environmental Service Engineer
Individual person, Architect
Individual person, Councillor
Individual person, Planner
Individual person

The publication of the updated Code of Practice (CoP) was broadly welcomed. The introduction of the new technologies of low-pressure pipe distribution and drip dispersal for slowly percolating sites was positively received. The restructuring of the CoP was commended.

Each submission was reviewed. The submissions were grouped in line with the relevant section of the CoP. The response is presented under each of the subject headings in the following sections. Where edits have been made to the final CoP, in response to the submissions received, these have been outlined.

SECTION 1 – INTRODUCTION

Section 1.1 Background

Submissions
It was submitted that:

1. It is internationally accepted that wastewater is one word.

Consideration
The document follows Irish DWWTS legislation, which defines and uses the term 'waste water'.

Section 1.2 Role of the Code of Practice

Submissions
It was submitted that:

2. The publication of the CoP should be accompanied by a public engagement and enforcement campaign, where registered septic tanks should be obliged to submit maintenance records, including for desludging, with a confirmation letter from an authorised contractor.
3. There is no guidance in the CoP or legislation for 20 or 30 population equivalent (PE) systems, with a significant gap between 10 PE systems and the Small Communities Manual.
4. Figure 1.1 should explicitly show that a site may 'FAIL' and be deemed unsuitable for a DWWTS discharging to ground.
5. Though Figure 1.1 includes the word 'Installation', this is not detailed in the diagram.
6. In Figure 1.1 on the 'Key Criteria Met' panel, 'Slope ≥ 1 : 8' should read 'Slope ≤ 1 : 8'.

Consideration
Points 4, 5 and 6 should be accommodated.

Regarding point 2, the CoP provides technical guidance on DWWTSs for single houses or equivalent developments, and sets out a methodology for site assessment and selection, installation and

maintenance of appropriate DWWTSs, to current Building Regulations standards. The national framework for engagement and enforcement is a matter of policy and law and is implemented through the National Inspection Plan, which contains a programme of local authority inspections and engagement activities. The National Inspection Plan is revised on a cyclical basis, most recently in late 2017, with public consultation. In addition, the Local Authority Waters Programme has commenced its work, which also extends to addressing problematic septic tanks, and the Government has announced an extended septic tank remediation grants scheme to support the national River Basin Management Plan. Enforcement is also a matter for planning authorities under planning legislation.

In relation to point 3, the Small Communities Manual (Section 3.11) cross-references to standards for single houses for discharges to ground.

Recommendation

Amend Figure 1.1, illustrating that a site might 'fail', revise the wording 'Configure DWWTS' and change text to read 'Slope ≤ 1 : 8'. Where sites might 'fail', incorporate 'site improvements' for percolation values of <3.

Section 1.3 Variances for Existing Systems, Sensitive Areas and New Technologies

Submissions

It was submitted that:

7. Variances be permitted to be considered by local authorities with extensive areas of soils that would not permit new development under the CoP.
8. As well as products being proven in other jurisdictions, product proving in Ireland should be possible.
9. New or innovative technologies may not have EN12566 testing or comply with SR66. If they had, there would be no need to consider them as a one-off solution.
10. Existing systems should be held to the same standard.
11. More guidance should be provided for sensitive areas.
12. Responsibility should not be placed on local authority to satisfy itself that technologies have a proven track record based on good science. Reword to stipulate that the building regulations, environmental and health requirements and applicable standards should be met.
13. The lack of a certification regime for prefabricated tertiary treatment systems is a complicating factor for those systems. There is a need for a coordinated national approach for new technologies.
14. This section allows new technologies to be adopted based on good science in other jurisdictions, and SR66 and I.S. EN 12566, as applicable. Keep this in the final draft.
15. The last paragraph on page 64 should be added:

    'Where the standards are not yet available, products should be certified (certification may include a European Technical Approval, an agreement certificate or equivalent), be fit for the purpose for which they are intended, be fit for the conditions in which they are used and meet the performance requirements of this CoP.'
16. Variances should be permitted if the development involves the conversion of protected structures to domestic use.
17. Consideration could be given to including a section that deals specifically with proposed extensions to dwellings and upgrading existing DWWTSs.

Consideration

Point 14 is in agreement.

Points 8, 9, 12, 15 and 16 should be accommodated.

In relation to point 16, TGD H states in relation to 'existing buildings' that the *'adoption without modification of the guidance in this document may not, in all circumstances, be appropriate'* and that *'Buildings of architectural or historical interest are especially likely to give rise to such circumstances'*.

In relation to point 7, the CoP is for the purposes of the protection of the environment and human health and stipulates the same requirements regardless of geography or jurisdiction. Variances as specified in Section 1.3 are available in all areas equally.

In relation to point 10, existing systems are subject to the standards that pertained at the time they were developed and the 2012/2013 DWWTS legislation, which requires that all systems are operated and maintained in compliance with Regulations and so as to protect human health and the environment. Where existing systems are being upgraded, site constraints may not allow full compliance with the CoP, so variance is allowed as long as human health and the environment are protected.

In relation to point 11, this is an enabling clause in case local authorities have concerns in site-specific cases. The standards specified in the CoP generally provide for environmental protection and there are specific additional soil depth requirements in higher risk areas such as source protection areas.

In relation to point 13, this is beyond the scope of the CoP. The National Standards Authority of Ireland (NSAI) is examining revision of the national standard to address the matter referred to.

Regarding point 17, the way in which the CoP addresses existing DWWTSs is addressed above. House extensions are not a matter for the CoP *per se*.

Recommendation

Amend Section 1.3 to address points 8, 9, 12, 15 and 16 as follows:

Add sentence at the start of the section:

> *'Adoption without modification of the specifications in this document may not, in all circumstances, be appropriate.'*

and at the end of the first paragraph add:

> *'DWWTSs serving buildings of architectural or historical interest may be especially likely to give rise to such circumstances. Homeowners should consult with their local authority to determine if planning permission is required for proposed upgrades.'*

and a rewriting of the third paragraph to state:

> *'The use of new and innovative products and technologies must be considered in detail by local authorities on a case-by-case basis with due regard to the following:*
>
> - *compliance with building regulations;*
> - *compliance with technical standards as appropriate;*
> - *evidence of suitability internationally or in Ireland;*
> - *adequate protection of the environment and human health.'*

SECTION 2 – POLICY AND LEGAL BACKGROUND

Section 2.2 Planning System

Submissions

It was submitted that:

18. Use of the term 'dispose, or disposal' of wastewater (used throughout the document) has a poor connotation.
19. A suite of acceptable site improvement works should be provided to local authorities, as well as to site assessors, in situations where they are and are not acceptable.
20. When regarding other policies as well as the CoP on a site, highlight in the CoP the legally binding nature of the Water Framework Directive (WFD).
21. Clarity regarding the need for planning applications for upgrades on existing sites is required, where retrofitting systems that do not comply with the CoP on existing, unsuitable sites.
22. Include reference to the Sustainable Rural Housing Guidelines for Planning Authorities (2005), which sets out the need to protect water quality when considering applications for housing in rural areas.

Consideration

In relation to point 18, waste water is disposed of and not recovered using the ideology of the CoP. The term 'waste water disposal' is also that used in all Irish planning legislation.

Regarding point 19, the CoP gives guidance as to where site improvement works are not acceptable (Section 6.7), i.e. where the slope exceeds 1 : 8, where the average percolation value from the three conducted tests is greater than 120, and where separation distances cannot be satisfied. Such works may be acceptable on other sites, and are outlined as acceptable in the CoP where percolation values are < 3, and as potentially acceptable if the minimum depths of unsaturated soil and/or subsoil required are not met on a site.

In relation to point 20, Section 2.3 deals with the legal requirements of the WFD, which is also mentioned explicitly in Section 2.5 on 'DWWTS law', as well as in Section 5.4 'On-site assessment'.

Points 21 and 22 should be accommodated.

Recommendation

Delete the paragraph

> *'If retrofitting existing systems that do not comply with this CoP, where the site is unsuitable, the proposed upgrade must provide improved treatment and reduced environmental impact as in many cases site improvement works will not be sufficient to enable the site to be used for a system incorporating discharge to ground. If site improvement works are being proposed on any site, it is recommended to consult the local authority before such works commence. Local authorities may also apply stricter standards.'*

and include

> *'Homeowners should consult with their local authority to determine if planning permission is required for proposed upgrades.'*

at the end of the first paragraph in Section 1.3 on p. 10.

Include reference to the Sustainable Rural Housing Guidelines for Planning Authorities (2005) in Section 2.2.

Section 2.3 Water Framework Directive

Submissions
It was submitted that:

23. Some surface water bodies have a high-status objective, and this should be stated, and the necessity to protect these water bodies should also be clearly stated.
24. Clarification is required on date to achieve good status, as the environmental objective date is not just 2021 (also 2027).

Consideration
Points 23 and 24 should be accommodated.

Recommendation
Rewrite the text

> *'... ensure that all surface waters and groundwaters are required to achieve "Good" status by 2021 and whereby any deterioration in water status is prohibited.'*

as

> *'... ensure that all surface waters and groundwaters are required to achieve the required status by the specified dates'.*

Section 2.4 Discharge Licences

Submissions
It was submitted that:

25. Use of the quote mentioning soakage pits is misleading, as it suggests that soakage pits are permissible and/or appropriate.
26. Climate change policy also needs a place within this section as it is directly relevant to DWWTSs and sewage management.
27. Where a discharge licence to surface water is required, can registration be considered rather than a discharge licence?

Consideration
In relation to Point 25, this reproduces what the legislation says. A sentence will be added in Chapter 7 to make clear that soakage pits are not technically acceptable under the CoP.

In relation to Point 26, the CoP is not a policy document. Carbon footprint is listed as a factor that may be considered when selecting a DWWTS (Section 6.6).

In relation to point 27, the CoP cannot create legal requirements. That is a matter for the legislature.

Recommendation
Insert the sentence

> *'Soakaways (also termed soakage pits, soakholes or soakpits) are no longer considered an acceptable infiltration/treatment area for the disposal of domestic waste water on-site'*

in Chapter 7.

Section 2.6 Protected Species and Areas

Submissions
It was submitted that:

28. Refer to the need to consider whether *'a project could adversely affect the integrity of the European site(s), either individually or in combination with other plans and projects, in view of the site's conservation objectives'*.
29. Further explanation of the 'in-combination effects' should be provided, including the need to consider the in-combination effects of existing DWWTSs or other treatment systems, extant permissions not yet completed, extant permissions not yet started and current applications for permission under consideration.

Consideration
Point 28 should be accommodated.

In relation to point 29, the site characterisation and assessment process does take DWWTS density into account and may require a more detailed assessment if there are concerns.

Recommendation
Include the text:

'a project could adversely affect the integrity of the European site(s), either individually or in combination with other plans and projects, in view of the site's conservation objectives'

in this section.

Section 2.7 Sludge

Submissions
It was submitted that:

30. Clarification is required on the applicable Good Agricultural Practices (GAP) regulations date.

Consideration
Point 30 should be accommodated.

Recommendation
Replace the word *'Communities'* with *'Union'* and the date *'2010'* with *'2017'* in the text.

SECTION 3 – WASTE WATER CHARACTERISTICS AND LOADINGS

Section 3.2 Waste Water Characteristics

It was submitted that:

31. No mention is made of the human health risk associated with high concentrations of nitrate nitrogen in groundwater/drinking water.
32. DWWTSs are not designed for animal waste.
33. Ammonium nitrogen and suspended solids should be included in Table 3.1.
34. As waste water percolates through the soil and/or subsoil, it converts firstly to ammonia and then to nitrite, rather than nitrate as is stated.
35. The relevance of Table 3.1 is unclear.
36. The EPA has highlighted well head protection as an issue in Ireland.
37. Phosphorus is also a limited resource and recouping P from sewage is a valuable avenue for P cycling to agriculture.
38. As a climate change measure, source separation technologies can recoup the nitrogen value from urine for reuse in agriculture to both reduce the potential for water pollution and reduce the greenhouse gas load from fertiliser manufacture and use.
39. There is a third circumstance, where phosphate (PO_4) in groundwater enters and impacts on surface water.

40. What is considered excessive levels, in terms of phosphate, that might lead to digestive issues?
41. Limiting the amount of detergents and bleaches used in households should be encouraged.
42. Section 3.2.2 should also include reference to the threat posed by DWWTSs on European sites, as a result of algal blooms.
43. A simple statement in Section 3.2.4 as to what BOD is would be useful.

Consideration

Points 31, 32, 34, 36, 39 and 43 should be accommodated.

In relation to points 33 and 35, Table 3.1 is background information on pollution loads in effluent from DWWTSs, which is considered applicable background information to the CoP. It uses data available from Gill and Mockler (2016).

In relation to points 37 and 38, information has now been included in Section 3.4 of the CoP on grey water recycling, the reference to the STRIVE Report Series 108 on water-saving technologies has been maintained and the reference to innovative products under Section 1.3 has also been maintained. Also, Section 6.6 includes carbon footprint as a consideration when selecting a DWWTS following a site characterisation and assessment. In terms of recouping nutrients from DWWTS effluent, the CoP provides solutions for the safe treatment of DWWTS effluent from environmental and human health perspectives and provides for innovative approaches under Section 1.3.

In relation to point 40, as there is no agreed empirical demarcation of an 'excessive' level of phosphorus that would lead to digestive issues, this sentence will be deleted.

Regarding point 41, the limiting of the amount of detergents and bleaches that are used in households is already referred to in the CoP, Sections 3.2 and 3.4.

In relation to point 42, algal blooms are mentioned in the CoP, in respect of all rivers and lakes.

Recommendation

Shorten introductory sentences in Section 3.2 to:

> *'Domestic waste water treatment systems accept waste water discharged from kitchens, bathrooms, toilets and washing machines, dishwashers, showers, baths, sinks, etc*.'

Delete the reference to 'animal waste' in this section.

At the end of Section 3.2.1, include reference to EPA guidance on wellhead protection.

Include a third scenario as the second bullet point:

> *'where phosphate enters groundwater and is discharged directly to surface water via springs, such as in areas of karstified bedrock'*.

Change the sentence on nitrogen in waste water to

> *'Waste water from a DWWTS contains nitrate in both organic and ammoniacal forms. As it percolates through the soil and/or subsoil, the organic nitrogen is converted first to ammonia, which then can get converted in aerobic conditions to nitrate via nitrite in a process called nitrification'*.

Insert as a second paragraph in Section 3.2.3

> *'The link between nitrate concentration in drinking water and infantile methaemoglobinaemia (IM) is complex and there are several other causes of IM including genetic causes and exposure to other oxidising agents besides nitrates. However, infants are particularly susceptible to IM and drinking water standards which protect them will protect the rest of the population*.'

The start of the paragraph in Section 3.2.4 should read

'Biochemical oxygen demand is a measure of the organic concentration of the waste water'.

A submission was also made in relation to antimicrobial resistance and a paragraph will be added to this section highlighting that waste medicines should not be disposed of to DWWTS.

Section 3.4 Minimising Waste Water Flow

Submissions

It was submitted that:

44. No provision is made for grey water only systems in the CoP.
45. Building regulation G3 requires that *'Sanitary conveniences shall be of such design as to facilitate efficient use of water for flushing*.*'*
46. Some more information on the various types of waterless toilet, and how they perform, would be helpful to the public.
47. It may be useful to devise a typical daily hydraulic loading rate in litres per person for grey water.
48. Clarify whether or not 'waste water reuse' may be used as an alternative to discharge to waters where the site is unsuitable for discharge to ground.
49. Technical Guidance Documents (TGDs) cannot require any measure; they merely describe a means of achieving *prima facie* compliance with the building regulations.
50. Credits for the use of low-flow shower heads are included in the Building Energy Rating calculation software, DEAP 4.1.
51. The suggestion that the use of sink food waste disposers reduces the efficiency of treatment in septic tanks is contradicted by current science.
52. Allow for the inclusion of source separation systems, and composting/dry toilets, as part of the suite of technologies listed.
53. The importance of minimising waste water flows in areas where percolation is restricted is not sufficiently emphasised.
54. Amend the wording of this section, to make certain water saving strategies and/or devices mandatory under certain circumstances.

Consideration

Points 45, 49 and 50 should be accommodated.

In relation to points 44 and 47, TGD H of the Building Regulations provides for treatment and reuse of grey water, and this should be incorporated in the CoP.

Regarding points 46 and 52, it is not possible to provide specifications for composting/dry toilets in the CoP at this stage, and such systems would have to be considered case by case by local authorities, if considered valid as under Section 1.3. Composting toilets are referred to in relation to EPA Strive Report No. 108 and that reference will be changed to 'composting/dry toilets' for clarity.

In relation to point 48, waste water reuse is not of itself a solution where a site is unsuitable for discharge to ground.

In relation to point 51, the CoP should be directly aligned with TGD H of the Building Regulations.

In relation to point 53, only the Building Regulations can specify what might occur in terms of water-saving technologies in the house itself. The CoP has recommended minimisation as far as practicable, across the board, and not just on poorly draining sites.

Similarly, in relation to point 54, the regulation of water conservation in the house is a matter for the Building Regulations.

Recommendation

The following text will be added at the end of the first sentence in Section 3.4:

> *'It is a requirement of Building Regulations that sanitary conveniences are designed to facilitate efficient use of water for flushing'*.

Insert new wording into the CoP and refer to TGD H for grey water systems.

In the second last paragraph of Section 3.4, change the wording of terms *'waste water reuse'*, *'waste water recycling'* and *'waste water reuse/recycling systems'* to *'grey water'* throughout.

Regarding point 49, the word 'required' in 'dual flush toilets (required under TGD G under the building regulations)' will be changed to 'recommended'.

In relation to point 50, change the words 'low-flow shower heads' to 'low-flow shower heads (credited in the Building Energy Rating calculation software of energy demand, DEAP 4.1)'.

For point 51, reword the relevant sections in 3.2.4 and 3.4 to state:

> *'TGD H of the Building Regulations does not recommend the use of household garbage grinders/sink macerators for buildings where wastewater treatment systems are used, unless specifically designed to do so.'*

SECTION 4 – STANDARDS

Submissions

It was submitted that:

55. Delete *'rigid pipe pressure networks should be certified'*, as this is another name for PVC pressure pipe systems and LPP systems etc.
56. Suggest a range of treatment system levels be quantified and assigned (TS 1–5 similar to US EPA in table 3-27 of 2002 Design Manual) to the GWPR zones and the vertical separation depth of unsaturated soil.
57. There is a reference to EN12566 Part 7 being covered by SR66, and this is not the case.
58. In Table 4.1, phosphorus is excluded.
59. With the exception of I.S. CEN/TR 12566 Part 2 and Part 5, the list of applicable standards should list those cited in the Official Journal of the EU (OJEU), as these are the only harmonised standards (hENs) that allow the covered systems to be CE marked.
60. Editorial comment – Include the word 'notified' before testing body at start of paragraph.
61. Direct reference to a specific notified testing body and internet hyperlink not considered appropriate. [242; 322; 380; 412]
62. Amend standard reference 'EN 12566 Part 3' with 'I.S. EN 12566 Part 3'.
63. Total coliform values are not from I.S. EN 12566 Part 3.
64. The last paragraph of Section 4 outlines that more assessment is needed in certain areas, and should refer to Appendix F for further guidance.
65. After the final reference to I.S. EN 12566, a statement should be added that a person should also ensure that their DWWTS is operating within the constraints of any relevant planning permission relating to same.

Consideration

Points 57, 58, 59, 60, 61, 62, 63 and 65 should be accommodated.

In relation to point 55, as it is stated in Section 10.1.1 that *'The detailed bespoke design of the pumped distribution system should be carried out by an appropriately trained and qualified designer and conform to best practice'*, it is considered that the reference as suggested can be deleted.

Regarding point 56, the CoP is based on research in specific areas and contains sufficient information for site characterisation, system selection and design in the various site conditions nationally.

In relation to point 64, this issue is dealt with in Section 5.4.1 and is somewhat out of context in this section so it will be deleted. It is considered that the level of assessment needed will be case-specific and likely to require specialist input so the recommendations will be clarified in that respect.

Recommendation

Delete the reference to *'rigid pipe pressure networks'* requiring certification.

Remove reference to EN 12566, Part 7 being covered by SR 66.

As 'Total phosphorus of 5–20 mg/l' is included in IS EN12566 3 (2005), Section B3.2 (d), this figure will be included in Table 4.1.

Chapter 4 has been rewritten to bring the referencing to standards in line with the format in S.R 66 and TGD H of the Building Regulations.

Include the word *'notified*' before testing body at start of paragraph.

Revise paragraph 5 as follows: '*All products under EN 12566 Parts 1, 3, 4 & 6 should have a Certificate declaring compliance with SR66. This Certificate must be issued by an EN12566-approved notified test laboratory.'*

Replace standard reference 'EN 12566 Part 3' with 'I.S. EN 12566 Part 3'.

Move footnote into Table 4.1 so it is clear to the reader that the total coliform values are not from I.S. EN 12566 Part 3.

Delete the last paragraph of Section 4 regarding high densities of DWWTSs.

Include the text *'a person should also ensure that their DWWTS is operating within the constraints of any relevant planning permission relating to same'* in this section, after the final reference to I.S. EN 12566.

SECTION 5 – SITE CHARACTERISATION

Section 5.1 General

Submissions

It was submitted that:

66. *'Where sites are deemed unsuitable for discharge to ground, alternative options, if any, will need to be discussed with the local authority'*. There may be scenarios where there are no alternative options and the CoP should provide a non-exhaustive list of same, e.g. no available receiving waters, receiving waters incapable of assimilating any further discharges, site located in a Priority Area for Action at risk of not achieving the WFD target with a discharge likely to contribute to failure of achieving the WFD target.
67. Reference EPA Guidance on the Authorisation of Discharge to Groundwater (2011) or to the link with the Tier 1 assessment in that document.

Consideration

In relation to point 66, the CoP provides a means of assessing site suitability for on-site DWWTSs, each site is assessed (Chapter 5) and a decision made by reviewing the assembled data against the required criteria (Chapter 6). Chapter 6 sets out the scenarios in which a site fails: slopes > 1 : 8,

percolation values of >120, or minimum separation distances not met. Sites will also fail if the required soil depths are insufficient or if the percolation value is <3 but it may be possible to address this through site improvements. Discharges to waters require a Water Pollution Act licence from the local authority which is a separate licensing system if it were to happen. Guidance is provided in the Technical Guidance document that accompanies the forms for a Discharge Licence (published by the Water Services Training Group, 2011).

Regarding point 67, as the CoP refers to discharges where the population equivalent is ≤10, systems of this size are exempt from the requirement for a groundwater discharge licence/authorisation (see Section 2.4) and are controlled via the CoP, planning, building regulations and EU and Irish Standards.

Section 5.2 Risk and the Source–Pathway–Receptor Conceptual Model

Submissions

It was submitted that:

68. Figure 5.1 does not show an effluent filter.
69. While it is acknowledged that an explanation for the term *'in situ'* is contained in the Glossary with the document, it would help if an explanation of the term was also included within this section of the main document.

Consideration

In relation to point 68, Figure 5.1 is a general schematic of the Source–Pathway–Receptor model so it does not have design detail.

In relation to point 69, the explanation of the term *'in situ'* in the glossary, consistent with many other terms, is considered sufficient.

Section 5.3 Desk Study

Submissions

It was submitted that:

70. Depth to water table should be added here, under *'hydrological aspects'*.
71. Section 5.3 deals in a comprehensive manner with groundwater, but is inadequate for surface water, and reference to water-body status and risk should be included.
72. Section 5.3 is out of date as it does not incorporate important work completed as part of WFD characterisation and risk assessment.
73. There seems to be a compulsory 'fail' at desktop stage, which might rule out sites that might actually be suitable.

Consideration

In relation to point 70, the 'hydrological aspects' mentioned here relate to the desk study only, and the depth to water table can only be ascertained as part of the trial hole assessment element of the site characterisation, where it is discussed in detail.

Regarding point 71, the technical solutions in the CoP are focused on discharges to ground. Discharges to waters require a Water Pollution Act licence from the local authority which is a separate licensing system if it were to happen. Guidance is provided in the Technical Guidance document that accompanies the forms for a Discharge Licence (published by the Water Services Training Group, 2011).

In relation to Point 72, water bodies have been identified, characterised and classified as part of the WFD. Data is available on status, and the pressures in each water body have been highlighted. Detail on WFD waterbody status and pressures will be included in the CoP (in Section 2.3).

Regarding point 73, there is no compulsory 'fail' as part of the desk study. Even if unfavourable characteristics are suggested (slope, soil depth), on-site assessment can proceed to determine if they hold true on the ground.

Section 5.4.1 Visual assessment

Submissions

It was submitted that:

74. The section on densities of DWWTs would need to be developed further, for both local authorities and site assessors.
75. Reference should be made here to 'A Risk-Based Methodology to Assist in the Regulation of Domestic Waste Water Treatment Systems' (2012), Environmental Protection Agency, Johnstown Castle, Ireland.
76. BS 5930 does not outline decommissioning of wells.

Consideration

Point 76 should be accommodated.

In relation to point 74, it is considered that the level of assessment needed will be case-specific and likely to require specialist input, the recommendations will be clarified in that respect.

In relation to point 75, the National Inspection Plan methodology is a national non-intrusive assessment and not a site-specific suitability assessment for new DWWTSs.

Recommendation

Replace reference to BS5930 with SEPA guidance on decommissioning redundant boreholes and wells.

Amend the paragraph referring to increased risk associated with high-density housing to require specialised assessment.

Section 5.4.2 Trial hole assessment

Submissions

It was submitted that:

77. If the site is not suitable for a septic tank system due to area, there should be no requirement to dig to 3 m.
78. Explain that 'n' in Table 5.2 is sample size.
79. Peat soils are never suitable for disposal of wastewater as they will become saturated for significant periods of the year.
80. Suggest adding soil redoximorphic features as indicators of soil wetness to the list of soil characteristics.
81. Line 2, last word – Should it read *ground* and not *groundwater*?
82. Table 5.2 should include units for the percolation value.
83. Why is it considered that 'structureless' or 'massive' soil structures are those preferred for wastewater treatment?
84. Is there a way that inspection of the trial holes by local authorities can be accommodated, rather than backfilling after 48 hours as specified in the CoP?
85. It would provide more clarity to either state that the site is unacceptable where mottling is noted above 500 mm, or state the circumstances under which the site would be deemed acceptable with mottling above 500 mm.
86. The draft states that if the soil or subsoil is mottled at a level above 500 mm below ground level, the site will usually be unacceptable for discharge to groundwater. It is presumed that

the same restriction would apply in cases where bedrock and/or water table are at a level above 500 mm below ground level.

87. Soil characteristic analysis: who is this performed by?
88. Rather than trial pits being located outside of the proposed area, they should be dug within the proposed area of development.
89. The last sentence in this section does not make it clear that PFPs in clayey soil/subsoil will not generally provide adequate percolation.
90. The GSI mapped vulnerability classification should not be revised by one trial pit result but the GWPR requirements should be those relating to the site-specific trial pit value.

Consideration

Points 78, 81, 82, 86 and 90 should be accommodated.

In relation to point 77, the excavation of a trial hole to 3m depth where possible is required in all areas of Regionally Important Aquifers, to confirm if the groundwater vulnerability is correct at site scale, and if the associated Groundwater Protection Response is also correct. Should a site not be suitable for a conventional septic tank based on separation distances and/or space, this often can only be determined fully following the completion of desk study, visual assessment, trial hole tests and percolation tests, so digging to 3m as part of the trial hole test is still required for a full assessment of the site.

Regarding point 79, this is largely in agreement. The word '*generally*' should be included, however, as there may be layers beneath the peat soils that are suitable for the treatment of and disposal of wastewater.

In relation to point 80, this is covered by the requirements in relation to soil 'mottling'.

In relation to point 83, as the majority of Irish soils are derived from glacial till subsoils, structureless or massive subsoil materials are dominant in Ireland. These are preferable as they often allow a ready, but not too rapid, rate of infiltration.

Regarding point 84, there is a window of 48 hours in which the trial hole and percolation test holes can be inspected, which can be accommodated by Local Authorities requiring a system of prior notification of the completion of assessments to them if they do require their own inspection to be carried out.

In relation to point 85, the minimum depths of unsaturated soil above bedrock and the water table and the options in the event they are not available are covered in detail in Section 6.4.

In relation to point 87, at the start of Section 5 it is stated that a 'site suitability assessment carried out by an appropriately trained and qualified person in accordance with the requirements of this section' is required for all sites.

Regarding point 88, the CoP states that '*The trial hole should be located adjacent to but not within the proposed infiltration/treatment area, as the disturbed subsoil may later provide a preferential flowpath in the constructed infiltration/treatment area*'.

In relation to point 89, it can be clarified that the CLAY without the PFPs would have a much higher percolation value.

Recommendation

Include explanatory note in Table 5.2: '"n" = sample size'.

Delete the words '*when saturated*', and include '*generally'*, in the sentence *'Peat soils* ~~***when saturated***~~ *are generally unsuitable for wastewater treatment* ...'.

Change the word '*groundwater*' to '*ground*' at the end of page 27.

Include ‘minutes per 25 mm’ in Table 5.2, after ‘Percolation value’.

For clarity and consistency, the sentences

> ‘*The preferred structures from a waste water treatment perspective are granular (as fine sand), blocky and structureless or massive. Subsoils with extensive, large and continuous fissures and thick lenses of gravel and coarse sand may be unsuitable; this suitability will be assessed by the percolation tests*’

will be deleted.

In relation to points 85 and 86, include the text

> *‘as the upper level of mottling is taken to be that of the water table or of periodic saturation*’

after

> *‘If the soil or subsoil is mottled at a level above 500 mm below ground, the site will usually be unacceptable for discharge to ground*’.

Regarding point 89, insert the text

> ‘*yet the true percolation value of such a CLAY without the PFPs would probably be much higher*’

at the end of the sentence.

At the start of Section 5.4.2, revise text as follows

> ‘*this vulnerability classification must be considered at a site level to be “extreme” and this new local GWPR relating to “extreme” groundwater vulnerability adhered to for the site*’.

Section 5.4.3 Percolation tests

Submissions

It was submitted that:

91. Surface testing at 400 mm should also be used for sub-surface drip systems, and additional shallow testing done at the possible drip invert level of 200 mm depths.
92. The CoP needs to be elaborated to cover surface percolation tests and subsurface percolation tests where the percolation test holes will be dug at depths significantly less than 850 mm (i.e. where the depth of the unsaturated layer is significantly less than the ‘norm’ represented by Figure 7.3).
93. The CoP should revert to the denomination of the respective tests as ‘P’ tests (surface percolation tests) and ‘T’ tests (sub-surface percolation tests).
94. Can clarification be provided on whether there is a minimum depth at which a percolation test on the subsurface can be undertaken?
95. Are prospective landowners allowed to suggest using secondary treatment options instead of percolation areas?
96. Percolation values do not pick up on inconsistencies within soils.
97. The modified test should be omitted, on the grounds of the precautionary principle.

Consideration

In relation to point 91, 92 and 93, a percolation test hole itself must be 400mm. The depths at which test must be conducted depends on whether the system will be discharging at depth such as a conventional percolation area or near the surface such as raised systems and shallow systems such as drip dispersal. This will be made clear in the Code.

In relation to point 93, the surface and subsurface terminology is used because the test methodology is the same, it is only the depth of the test that differs.

Regarding point 95, the site assessor completes site characterisation, concludes whether the site is suitable for a DWWTS, identifies suitable options and makes a recommendation. It is a matter for the person making the planning application to make the proposal they consider appropriate and for the planning authority to decide on the application.

In relation to point 96, the percolation test has a long history and is used internationally. It has been used extensively for many years to determine site suitability and loading rates. It is completed in triplicate and in many cases may be done at depth and at the surface. The information from the trial pit is also available to identify any significant variability.

Regarding point 97, the precautionary principle upon which the modified test is to be omitted is not stated clearly. Thus the test will be maintained. Recording of the times will be required.

SECTION 6 – DETERMINING SITE SUITABILITY AND THE APPROPRIATE DWWTS

Section 6.1 Integration of Desk Study and On-Site Assessment

Submissions

It was submitted that:

98. No calculations or direction is provided for carrying out a cumulative assessment, nor for calculating the dilution capacity within a given aquifer/reach/catchment.
99. The CoP creates an impression that virtually all sites, irrespective of their characteristics or surrounding characteristics, can be engineered to accept a packaged treatment plant in some shape or form.

Consideration

In relation to point 98, cross-reference will be made to Section 5.4.1 where this is dealt with. It is considered that the level of assessment needed will be case-specific and likely to require specialist input, so the recommendations will be clarified in that respect.

Regarding point 99, the pass/fail criteria are set out in Chapter 6: slopes > 1 : 8, percolation values > 120, or minimum separation distances not met. Sites will also fail if the required soil depths are insufficient or if the percolation value is <3, but it may be possible to address this through site improvements.

Section 6.2 Slope

Submissions

It was submitted that:

100. Should this state ‘slopes less than 1 : 8’?
101. Allow site-specific deigns of pressurised infiltration systems by PI insured designers on slopes > 1 : 8.

Consideration

Point 100 should be accommodated.

In relation to point 101, the evidence is not available to make this change. The CoP cannot specify insurance requirements. There is provision in the CoP for variations for existing sites if there are problems with those.

Recommendation

Change ‘greater than’ to ‘≤’ for slopes criteria.

Section 6.3 Minimum Separation Distances

Submissions

It was submitted that:

102. Table 6.2 is too fussy, and there is too much information.
103. Clarification is required in relation to the wording for superscript 'a' in Table 6.2, as it is unclear whether the reference relates to a watercourse/stream.
104. For free water surface constructed wetlands, 25 m minimum distance is recommended.
105. In Table 6.2, insert an upper percolation value of 120 for well distance, and cross-check cross-referencing for stream and free water surface wetlands.

Consideration

Points 103 and 105 should be accommodated.

In relation to point 102, Table 6.2 combines two tables from the previous CoP (Table 6.1 and the Groundwater Protection Responses). It is better to have all this information in one place. There is potentially excessive data in the 'Notes' at the end, however.

In relation to point 104, a setback distance of 25 m will be specified for free water surface constructed wetlands to neighbouring dwellings to protect against nuisance. This is consistent with Department of the Environment, Heritage and Local Government – *Integrated Constructed Wetlands Guidance Document for Farmyard Soiled Water and Domestic Wastewater Applications.*

Recommendation

The notes at the end of Table 6.2 will be edited.

Superscript 'a' will be deleted where it appears beside 'watercourse/stream'.

Include the upper percolation value of 120 for 'SILT/CLAY' and 'CLAY' subsoils.

Table 6.4 will be shown as all on one page.

Section 6.4 Interpreting the Trial Hole Test Results for Required Minimum Depths

Submissions

It was submitted that:

106. In Table 6.3, is the '20/40 cfu/100 ml a realistic figure? ... the bathing water limit is 500 cfu/100 ml'.
107. Add a 'Tertiary typical requirements' table for a) microbial levels and b) nutrient levels of N and P for areas requiring tertiary treatment.
108. In Table 6.3, where the words 'Secondary/tertiary soil polishing filters' appear, are all polishing filters not tertiary?
109. Do the 'minimum depths' in Table 6.3 refer to the minimum depth of the filter or the minimum depth of unsaturated soil/subsoil required after the filter?
110. A minimum depth of 0.9 m is required for tertiary packaged media filter systems; if this refers to the depth of the filter media, then it would also be useful to include this under the heading of 10.2 Packaged Media Filter Systems Providing Tertiary Treatment on p. 63.
111. Revise the 20/40 cfu/100 ml values for *E. coli*/total coliforms to a % reduction of 99%.
112. The minimum depth of 300 mm between infiltration point for tertiary sand polishing filter appears to contradict the minimum requirement of 500 mm on-site.

Consideration

In relation to points 106 and 111, tertiary systems can be used where there are depths of 0.9 m of soil without the need for emissions performance criteria. This is similar to the approach taken elsewhere in the CoP. The performance criteria in respect of coliforms were and are only proposed in the context of using these systems in areas with very shallow soils/high water tables. The values

are derived using a back-calculation based on coliform reductions at depth in soils, the principal consideration being the protection of groundwater as a drinking water source for which the coliform standard is zero. The bathing water standard is not relevant. Based on the submissions received, it is proposed that the *E. coli* value will be set at 1,000 cfu/100 ml with discharge limited to 0.6 m of soil (where performance is demonstrated). The full requirement will be that infiltration areas following tertiary treatment systems (i.e. post a tertiary sand filter, constructed wetland, packaged media filter or specialised system) must be underlaid by 0.9 m of unsaturated soil/subsoil, unless the tertiary treatment system is proven to reduce *E. coli* to 1,000 cfu/100 ml prior to discharge to the infiltration area (90% of values complying, no value exceeding by more than 30%), in which case 0.6 m applies. Point 112 becomes irrelevant on foot of these changes.

In relation to point 107, the general approach in the code has been to specify design criteria for DWWTS that will achieve an acceptable level of treatment based on best practice and trials. The only instance where performance criteria have been specified is the standards for secondary packaged systems which were adopted in S.R. 66. Standards for tertiary systems will also be adopted if specified in S.R. 66. It should be noted that the coliform value above is not an obligatory performance standard as it only applies if the 0.6 m soil depth provision is to be availed of.

In relation to point 108, this can be confusing due to the various configurations and overlaps possible. These have now been grouped into:

- percolation trenches and intermittent soil filters (following septic tanks);
- polishing filters (following secondary systems);
- infiltration areas (following tertiary systems).

In relation to points 109 and 110, this is explained in note 'a' to the table:

These depths refer to the minimum depth of unsaturated soil and/or subsoil between the point of infiltration and the bedrock and the water table. The point of infiltration is the base of the distribution gravel in all systems, except for drip dispersal where the tubing itself is the point of infiltration.

Recommendation

Amend Table 6.3 to reflect the proposed changes above.

Section 6.5 Interpreting the Percolation Values of the Soil and the Subsoil

Submissions

It was submitted that:

113. In Table 6.4, please add sand and tertiary filters to this table, in order to facilitate construction on small sites.
114. Tidy up Table 6.4 so that it is on one page.
115. Table 6.4 states that 'The retention time in the soil and/or subsoil is too fast to provide satisfactory treatment', but this is not true of drip systems. A drip dispersal system with e.g. 300 mm dripline spacing would control the application of wastewater and maximise the treatment in the rapidly draining soils.
116. The option of using drip and LPP should be allowed and spelled out in all percolation value (PV) categories between 3 and 90.
117. Polishing filters are allowed only up to percolation value of 75 (change from 90 in the 2009 CoP).
118. In Table 6.4, where percolation values are less than 3, tertiary treatment should be sufficient without any additional soil.

119. In Table 6.4, where percolation values are >120, allow for options that may be suitable, even if ground conditions are unsuitable.
120. In Table 6.4, where sites 'fail' the percolation test, there should be options for site improvement works.
121. In relation to surface water discharge licences, references should be made to the provisions and pollution parameters set out in Schedule 5 of S.I. 272 of 2009, particularly in relation to assimilative capacity.

Consideration

Regarding point 113, all DWWTS are included, but the language will be modified so this should be clearer.

Point 114 should be accommodated.

Regarding points 115 and 116, provision will be made for drip dispersal and LPP at lower percolation values at the lower PV values. LPP requirements will mirror trench option 3. Calculations have been carried out for drip dispersal based on maintaining percolation rates consistent with the research conducted on drip dispersal at high percolation values.

Regarding point 117, the 2009 CoP only allowed secondary treatment systems with polishing filters up to a T value of 90 where they were installed at the surface and the P value was less than or equal to 75, i.e. the percolation value at the point of infiltration had to be less than or equal to 75. The wording, however, will be changed to make clear that this option remains the same.

In relation to point 118, allowing discharge following tertiary treatment into soils with percolation values less than 3 would be a concern, given that in such conditions microbial pathogens can rapidly travel to groundwater (after Research Report 2000-MS-15-M1). It should also be noted that there are no performance standards for tertiary treatment systems. Provision is made for site improvement works.

In relation to points 119 and 120, the CoP has solutions for all sites up to percolation values of 120. Above that limit, effluent cannot percolate away safely. Discharge to surface water may be an alternative, but requires a Water Pollution Act licence from the local authority.

Regarding point 121, discharges to waters require a Water Pollution Act licence from the local authority which is a separate licensing system if it were to happen. Guidance is provided in the Technical Guidance document that accompanies the forms for a Discharge Licence (published by the Water Services Training Group, 2011).

Recommendation

Amend Table 6.4 to reflect the proposed changes above.

Section 6.6 Selecting an Appropriate DWWTS

Submissions

It was submitted that:

122. Selecting an appropriate DWWTS should include factors affecting the choice of treatment system and its suitability for the dwelling and site.
123. Where there is a particular requirement, such as a holiday home requiring a system that can deal with periods of inactivity, this must be clearly stipulated in the CoP.
124. References to National Heritage Areas (NHAs) in should be amended to refer to Special Protection Areas (SPAs).

Consideration

Points 122 and 124 should be accommodated.

In relation to point 123, there is no legal separation between holiday homes and other residences; therefore, the CoP can only provide guidance.

Recommendation
Include topics such as potential for seasonal or intermittent use, potential requirement for pumping, requirement for enhanced nutrient reduction, potential for unusual flow patterns, or unusual hydraulic and/or wastewater strengths, and type of wastewater discharged to the system, e.g. relative percentages of black water and grey water, in the bullet points on selecting an appropriate DWWTS.

Change from 'NHA/SAC' to 'NHAs/SACs/Special Protection Area (SPAs)' throughout the document.

Section 6.7 Site Improvement Works

Submissions
It was submitted that:

125. Another example should be added where site improvement works will not work.
126. Section 6.7 never really states what such measures would be considered site improvement works, but the document states what measures are not considered.
127. Are site improvement works still required if a percolation value can be achieved during the summer months, i.e. where there is mottling above 0.5 m below ground level and a sub-surface percolation value has been provided?
128. Carrying out percolation tests on each 'lift' or soil as part of site improvement works is not practical, and the soil percolation values can be damaged or affected in this process.

Consideration
Regarding point 125, three examples are given already (see above). It must be noted that these are examples only and are not exhaustive.

In relation to Point 126, the first paragraph of Section 6.7 states that site improvement works may be possible where sites may have a high water table, or may have an insufficient subsoil depth owing to bedrock close to the surface, or may have a layer of unsuitable subsoil (at the surface, different to that at depth) for the purposes of treatment and percolation of the pre-treated waste water from a tank or plant. Tis is also addressed in Sections 6.4 and 6.5.

In relation to point 127, this is addressed in Section 5.4.2 of the Code under Depth to the bedrock and depth to the water table.

Regarding point 128, as only part of the overall infiltration/treatment area is being tested when carrying out such percolation tests, the procedure is considered to be appropriate.

SECTION 7 – SEPTIC TANK SYSTEMS

Section 7.1 Septic Tanks

Submissions
It was submitted that:

129. The statement at the top of p. 38 gives the impression that only septic tanks that are assembled on site must comply with the EN 12566.
130. Table 7.2 is incorrect and may be based on the old design flow of 180 litres per person.
131. On line 3, it would be more accurate to state '*the biomat controls infiltration at the base of the drainage trench and soil characteristics govern the rate at which water percolates through the subsoil*'.

132. Failure can also be due to poor design, or the designer's inability to recognise site and soil characteristics and account for them in the system design.
133. The CoP focuses only on the biomat to control and influence detention time in soil beneath the trench; this may be short-sighted as the biomat governs infiltration, and soil characteristics (which you are attempting to quantify with the percolation test) govern the rate of movement (what percolation test approximates) and the moisture content and detention time dependent reactions in the subsoil where the main treatment occurs.
134. Given that there is one standard hydraulic loading rate, the long-term acceptance rate (LTAR) is not actually used to design the percolation trenches, so why is LTAR mentioned at all?
135. There should be a table in this section relating LTARs to percolation values.
136. Revise Figure 7.1 to include an effluent filter in the figure as it is currently drawn.
137. The text of the last sentence in Section 7.1.1 should ensure the effluent filter is used to protect the percolation area and polishing filters from sludge solids carryover due to lack of maintenance desludging.
138. Remove the reference to nominal capacity and change this on Table 7.2 to minimum working capacity (m^3).
139. An increase in septic tank capacity should be considered.
140. Figure 7.2 does not illustrate an effluent filter clearly.

Consideration

Point 133 is largely in agreement, while the detail on processes occurring in the percolation trench is noted.

Points 129, 130, 131, 134, 137 and 138 should be accommodated.

In relation to point 132, it is considered that the existing text in the CoP, '*Failure of a septic tank and percolation area to function properly is generally due to poor construction or installation or to operation in an area of unsuitable ground conditions, or to the use of a soakaway instead of a properly designed percolation area*', covers the point adequately.

In relation to point 135 on comparing LTARs to percolation values, as LTARs are not determined during site characterisation and assessment, the requirement for such a table is not relevant to the procedure outlined in the CoP.

In relation to point 135 and 140, septic tank effluent filters are recommended in the text as per TGD-H under the Building Regulations, but will not be included in diagrams as they are not a standard requirement.

Regarding point 139, recent research has shown that water usage has decreased in households over the past 20 years; in the EPA Manual (2000) a daily loading per person of 180 litres per day was used, in the 2009 CoP and the current CoP that figure was and is 150 litres per person per day, while Irish Water research has shown that the average person uses between 100 and 130 litres per day. The ideology of conservation was advocated in the Strive Report No. 108 for the EPA and this has been repeated in the current revision of the CoP (Section 3.4 in particular). Thus, tank sizes as listed in the CoP, and reflecting EN 12566, are adequate.

Recommendation

In relation to point 129, change text to:

> '*All septic tanks must comply with the requirements of the relevant parts of I.S. EN 12566, Part 1 for prefabricated septic tanks and Part 4 for septic tanks assembled on site from*

prefabricated kits. All compliant septic tanks must be installed in accordance with the manufacturer's instructions.'

In relation to points 130 and 136, S.R. 66 requires that the septic tank nominal and usable capacities are declared. The declared *usable capacity* of the septic tank being installed on site must be no less than the calculated *design capacity*. The text has been amended and Table 7.2 which referred to nominal capacity has been removed to clarify.

The reference to LTAR at the start of this section, which relates it to the percolation rate of the subsoil, will be deleted.

In relation to point 137, include the wording '*to protect the "downstream" element of the DWWTS from carryover of sludge solids*'.

Section 7.2 Percolation Areas

Submissions

141. In Table 7.4, depth of percolation trench should read 'per Figures 7.1 and 7.3', not Figure 7.2.
142. The maximum number of trenches that may be attached to a distribution device has increased from five to six. Would it be possible to include a layout example of this?
143. Mention a stilling chamber when discussing raised percolation areas.
144. Regarding Figure 7.3, it is more important that the subsoil percolation test is carried out at a depth consistent with where the invert level of the percolation pipes will be laid, which in turn should reflect the depths of the respective subsoil layers. Site assessors in the past have tended to apply the 850 as a 'standard' or 'target' dimension.
145. In Section 7.2, a distribution device is mentioned but there is no reference to the glossary for clarity on this meaning; thus insert '*(see glossary for description)'* following this term.
146. At the base of page 41, in Section 7.2.3, reference to Table 7.4 is required.
147. In Table 7.4, in the percolation pipes row, text in the requirements column should be more evenly spaced out.
148. Revise Figure 7.4, as the current figure represents a shallow percolation area, not a raised percolation area.
149. In Figure 7.3, the base of the subsurface test hole is at present shown at 850 mm; should it be at 1200 mm?
150. There appears to be no guidance in relation to the minimum pipe length that would be considered acceptable for a percolation area.
151. In Section 7.2, an effluent filter is mentioned but there is no reference to the glossary for clarity on this meaning – insert '(see glossary for description)' following this term.
152. A new section on 'planted percolation areas' should be included; where sites are suitable and garden layout is appropriate, willow-planted percolation areas may be used in conjunction with a modified pipe layout used to prevent clogging of pipe perforations (see attached diagram for details).
153. Section 7.2.4 starts with '*Where site conditions are suitable, raised percolation areas may be installed*'. However, it does not define what 'suitable' is. This is too vague.

Consideration

Points 141, 142, 143, 146 and 147 and 153 should be accommodated.

In relation to point 144, the Code specifies this.

In relation to points 145 and 151, it is not considered appropriate to put the wording 'see glossary for description' after technical terms, as it would proliferate throughout. As in other similar documents, the presence in the glossary of such technical terms is adequate.

Regarding point 148, the diagram covers a shallow percolation area which has had the 'cap' of topsoil above it raised, but this is as high as the trenches can go, as the laying of imported soil and imported gravel side by side above ground, with pipes involved also, means that the system is prone to failure owing to settlement issues after construction. Thus, raised percolation areas where the gravel and soil are imported side by side are not recommended; in such cases, a raised intermittent polishing filter will work adequately across the site.

In relation to point 149, the base of the subsurface hole should actually be at 950 mm, rather than 850 mm as it is in the current diagram, and this will be rectified here as well as in diagram D1.

In relation to point 150, guidance on this is not required.

Considering point 152, the research on which the addition of new options to the CoP is based was focused on drip dispersal and LLP, and did not extend to planted percolation areas.

Recommendation

In relation to point 141, change the text from 'per Fig. 7.2' to 'per Fig. 7.1 and 7.3'.

In relation to point 143, change text in final paragraph to

> '*… distribution occurs either by gravity via a distribution device or by pumping to a distribution device via a stilling chamber*'.

Insert reference to Table 7.4 at the base of page 41, in Section 7.2.3.

In Table 7.4, space out the text better in the 'Requirements' row relating to percolation pipes.

Change the depth of the base of the subsurface hole to 950 mm in Figures 7.3 and D1.

Rewrite the opening paragraph of Section 7.2.4 to read 'A standard percolation area (Figure 7.3) requires a standard depth to bedrock and water table of 2.05 m. Where this is not available, a raised percolation area could be considered. In this case, the gravel trenches and pipework are installed at ground level and the raised or mounded element comprises the cap.'

SECTION 8 – SECONDARY TREATMENT SYSTEMS RECEIVING SEPTIC TANK EFFLUENT

Submissions

It was submitted that:

154. Confusion still exists when a sub-section of Section 8 is referred to, as people regularly miss the most important point that all items in Section 8 are specifically for 'systems receiving septic tank effluent'.
155. Is it wise to have soil filters for septic tanks detailed in the CoP?
156. Regarding intermittent filters, the emphasis on proper designs and installation by trained people is very helpful but the basic factors to be considered by the designer and local authority reviewer should be listed for clarity. There is a lot of confusion among designers, installers and local authorities over what is necessary for pumped systems to operate effectively. The end user also needs to know what questions to ask. Additional industry training for all involved would be helpful in this regard.
157. Replace standard reference EN 12566 Part 6 with I.S. EN 12566 Part 6.
158. In Figure 8.1, insert an 'Effluent filter chamber' between the septic tank and the pump sump and detail an 'in-line filter' on the pipe from the chamber.

159. At the end of the 1st paragraph on Page 45 there is a requirement to detail the protection required for the intermittent filter. Insert the following at the beginning of the last paragraph in the section 'There should be an effluent filter in or after the septic tank. If there is a pump sump after the septic tank then an in-line filter should be used (refer to the glossary for a description of an in-line filter).'
160. The sections relating to intermittent soil filters and sand filters would benefit from inclusion of sample plan layout drawings and photographs of existing systems.

Consideration

Points 157 and 159 should be accommodated.

In relation to point 154, the heading for Section 8 has been amended from the 2009 CoP and states that the section relates to 'Secondary treatment systems receiving septic tank effluent'.

In relation to point 155, soil filters are in the 2009 CoP and are provided for in EN Standards and TGD H.

Regarding point 156, Section 76 of the EPA Act provides for the EPA to issue the Code of Practice which sets out the technical requirements for systems. This is part of the overall framework that also includes TGD H of the Building Regulations, S.R. 66 and EN 12566 standards. The Code follows TGD H by requiring that those that are involved in design and installation are 'appropriately trained and qualified' persons. There is a specialised training course for site characterisation and assessment that will need to be adopted to provide for LPP and drip dispersal.

In relation to points 157, references to standards have been aligned with S.R. 66 and TGD H.

Regarding point 158, septic tank effluent filters are recommended in the text as per TGD-H under the Building Regulations, but will not be included in diagrams as they are not a standard requirement.

Regarding point 160, it is considered that such plan views of intermittent soil or sand polishing filters, and associated photographs of these, are not required.

Recommendation

Insert the following at the beginning of the last paragraph at the start of Section 8:

'*As with septic tanks discharging to percolation areas, there should be an effluent filter in or after the tank discharging to intermittent filter systems and constructed wetlands*'.

Replace standard reference EN 12566 Part 6 with I.S. EN 12566 Part 6.

Section 8.1 Intermittent Filters

Section 8.1.1 Intermittent soil filter systems

Submissions

It was submitted that:

161. The phrase 'such as relatively shallow water table' leaves a lot of interpretation. What is considered shallow?
162. Change Section 8.1.1 so that it is clear that the filter must be above the water table.
163. The paragraph at the start of Section 8.1 has contradictions; it is best to have many small doses per day and timed-dosed over a 24-hour clock to maintain oxic conditions in the filter. Four large doses will produce anoxic conditions.
164. In Section 8.1.1, it is stated that 'the filters use a bed of gravel to treat the septic tank effluent'. Should this not read 'the filters use a bed of gravel to distribute the septic tank effluent'?

165. It is stated in Section 8.1.2: 'although it should be noted that the ability of sand to remove phosphorus is finite'. How do you determine when a sand polishing filter has reached the end of its ability to remove phosphorus?
166. Allow for designer discretion as to what pipes to be used (e.g. MDPE pipe).
167. Table 8.1 'Pumping system', is mentioning a 10 mm passage restrictive in not allowing for pumps with a large enough protective suction screen, but less than 10 mm slot widths?
168. For Table 8.1, in-line filter: '*An in-line filter between the pump chamber and the infiltration pipe is recommended to prevent blockages in the orifices. It should be designed to have a mesh size < 10 mm*'. Consider saying: have a mesh size less than or equal to the smallest orifice holes, but not so fine as to cause frequent clogging.
169. A number of changes are required to the design criteria of pumped laterals and orifices spacings, in both Tables 8.1 and 8.2, that restrict the designer's objective of balancing the number of orifices in the pipe network with the volume of water to be pumped and the pump capacity.
170. For Tables 8.1 and 8.2, changes are required to the pumping aspects cited; also dosing frequency in Table 8.1 but not in Table 8.2 stipulates timed dosing. CoP needs to be consistent in both tables; include timed dosing in both tables as a recommendation, especially with high hydraulic loading rates to filters and in fine-textured soils.
171. Where an underdrain collection system is required where T > 120, clarify that collection of the final effluent for discharge to surface water must be from below the 0.9 m of underlying polishing soil, not from directly underneath the filter.
172. In Section 8.1.1, the sentence 'As well as this, a septic tank can be installed using these filter systems where the percolation values are slightly higher', is open to too much interpretation through using the word 'slightly'.

Consideration

Points 162, 164, 168, 171 and 172 should be accommodated.

In relation to point 161, the minimum depths required are outlined in Section 6.4 and all relevant information on required minimum depths is included in that section and table therein.

In relation to point 163, it is considered that more frequent small doses are better for treatment; thus the specification will be altered to state 'As many doses as possible, and ideally a minimum four timed doses per day'.

In relation to point 165, the process of sand removing phosphorus is complex, and it is difficult to be prescriptive in terms of determining when a sand polishing filter has reached the end of its ability to remove phosphorus, due to all the variables involved in making such a calculation. Installers should obtain information on this from the supplier and share this with the homeowner.

Regarding point 166, PVC pipes are considered the optimal pipe type as when drilling orifices, shavings and burrs can easily be removed, whereas this is not the case with MDPE.

In relation to point 167, mentioning the 10 mm passage is not considered restrictive in terms of pump specifications.

In relation to points 169 and 170, the specifications for infiltration laterals and lateral centre separation will remain unchanged as the specifications in the tables have been reviewed by industry experts and are considered to cover requirements, whereas details on dosing frequency, zoned regions, access/inspection points and vertically attached pipes will be altered slightly for clarity.

Recommendation

Insert details in Section 8.1.1 after each of the design configurations as to when these might be used. Towards the end of the section, state that '*In all cases the required depths beneath the filter gravel as outlined in Table 6.3 must apply*'.

Change text in Section 8.1.1 to read '*the filters use a bed of gravel to distribute the septic tank effluent*'.

In Table 8.1, at the 'in-line filter' row, include the text '*smaller than the orifice holes of the distribution pipework*' instead of '*<10 mm*'.

In Tables 8.1 and 8.2, where the underdrain collection systems are required, state that the washed gravel must be beneath the soil of the soil polishing filter.

Rewrite

> '*As well as this, a septic tank can be installed using these filter systems where the percolation values are slightly higher*'

as

> '*As well as this, a septic tank can be installed using these filter systems where the percolation values are greater than or equal to 50 and less than 75*'.

Section 8.1.2 Intermittent sand filter systems

Submissions

It was submitted that:

173. To facilitate draining a lateral that has down-facing orifices (6:00 position) to substitute two orifices per lateral with up-facing (12:00 position) orifices, which allows air to enter lateral after the dose, eliminate the vacuum effect, and drain lateral much more quickly.
174. It has been suggested that if using a PLC /programmable timer, you can certainly keep the 'on' dose short and spread doses out over the 24 hour period, to have surge storage space in the tank to store peak flows.
175. For footnote 'a' in Table 8.2, it is important to note that the US EPA 1999 Fact Sheet is a bit dated.
176. An in-line filter is critical to protect the intermittent filter from solids being pumped in and causing blockages and therefore failure of the intermittent filter; the mesh size must be smaller than the orifice holes of the distribution pipework to be useful.
177. The standard reference is incorrect and 'I.S. EN/TR 12566:2' should be deleted and replaced with 'I.S. CEN TR 12566-2:2005'
178. Regarding Figures 8.2 and 8.3, these need review and rescaling to provide clarity to the user, and make them easier to read. In particular, is the use of 100 mm diameter pipe detailed in Figure 8.2 appropriate? Also, the depth of cover of pea gravel is inconsistent, and figures do not include in-line filters.
179. In Table 8.2, the description of a 'pumped system' does not mention an in-line filter.
180. In Table 8.2, design criteria, spacing and lateral centres separation requirements indicate a maximum of 0.3 m and 0.6 m respectively. This would seem to be contradictory when it states that '*spacing to be determined by an appropriately trained and qualified person*' and separation is '*designer-specific*'.
181. Revise Figure 8.2 to show an in-line filter after the pump sump plus a stilling well before the distribution device.
182. Figure 8.3 does not show and in-line filter, and the scale of the pipe work is misleading particularly when compared to Figure 8.2.
183. Regarding sand filters, it needs a to be made clear that the sand for the filter is 500 mm plus 150 mm of gravel layer dividers, for the stratified filter. Consider increasing the

amount of sand to a total of 700 mm in the multi-layer design e.g. 300 mm—200mm–200 mm of sand interleaved with gravel. Consider increased grain size. If this were introduced it would be necessary to have a new diagram for layered and single-layered filters.

184. Regarding monograde sand filters, it needs to be made clear that the sand for the filter is 900 mm deep for a single-layer sand filter and that the coarser sand grain size is appropriate for the single-layer filter.
185. In Table 8.2, the grain size recommended is too fine to be suitable for long-life sand filters. A Cu of 2 or less would be more appropriate or specify larger grain sizes and a slightly deeper filter.
186. In Table 8.2, the venting requirements are not shown in any diagram for the upper layer and not shown for the lower layer for Figure 8.3; should also indicate that 100 m pipe is to be used.
187. In Figures 8.2 and 8.3, the infiltration pipe diameter is shown as 100 mm whereas this is usually 25 mm.
188. In Table 8.2, when mentioning an underdrain collection system, make reference to percolation value >40 for offset (see Figure 8.3).
189. Regarding the hydraulic loading for intermittent sand filters, 10 l/m^2/day is the maximum that should be recommended for septic tank effluent treatment sand filter designs.

Consideration

Points 175 and 177 should be accommodated.

Regarding points 176, 178, 179, 181 and 182 in relation to in-line filters, this is covered in the text which states that *As with septic tanks discharging to percolation areas, there should be an effluent filter in or after the tank discharging to intermittent filter systems, constructed wetlands and packaged media filters*.

In relation to points 178, 182, 186 and 187, the diagrams will be clarified where possible in line with the scale of the drawings. Full design criteria are set out in the text. The pipe diameter in 8.2 reflects that it is gravity flow from the distribution device and the title will be clarified in this respect.

Regarding points 173, 174, 180, 183, 184, 185, 188 and 189, the design details for the sand filters are based on the original research and existing Code and have been reviewed as part of the revision of the Code. They allow for expert design by an appropriately trained and qualified person while meeting the parameters therein.

Regarding point 188, the T > 90 is incorrect and will be changed.

Recommendation

Delete the reference to US EPA 1999 Fact Sheet in Table 8.2.

Align references to standards have been aligned with S.R. 66 and TGD H.

Amend reference to T>90.

Section 8.1.3 Constructed wetlands

Submissions

It was submitted that:

190. With horizontal and vertical subsurface flow reed beds, length to width ratios vary due to single house design equations, and there is no set ratio.
191. Free water surface wetland systems' length to width ratios can vary from a 2:1 ratio upwards, ideally around the 3:1 ratio.

192. For horizontal flow reed beds, a slope of 1%–2% has been suggested. When working with single house design equations, 0.5%–1% is the working base slope design range.
193. Free water surface designs are not ideally suited to treating septic tank effluents as they are open bodies of water and exposed to the open air, exposing septic tank effluent to health and safety issues.
194. In Table 8.3, the area required for a vertical reed bed comprising sand is normally 1–2 m^2/PE, not 5–6 m^2.
195. Consider adding a plan diagram to Figure 8.5 on horizontal subsurface flow reed beds.
196. For the hydraulic loading of vertical reed bed wetlands, the figures provided are not correct as per Sean O'Hógáin, based on research; should be 1–2 m^2/PE?
197. The height of fencing required for free water surface constructed wetlands is inappropriate, and is the height to prevent falling not to prevent access. Height should be in the order of 2.0 m.
198. Rather than using geomembranes or geosynthetic clay liners for constructed wetlands, where soils (or reworked soils) with sufficient clay fractions are present, compaction of the underlying clay may be sufficient for sealing the base of the wetland, providing it achieves a minimum value ($K = 1 \times 10^{-8}$ m/s).
199. For such a liner, which it is specified requires a permeability of 1.0×10^{-8} m/s, is this tested by the applicant or by a contractor?
200. For constructed wetlands as outlined in Table 8.3, for optimal performance, a multicellular design approach should be implemented.
201. What is the basis to set the constructed wetlands as far away from the dwelling as possible?
202. Regarding fencing of free water surface constructed wetlands, are semi-natural fencing options and exclusion approaches allowed, e.g. wood paling or suitable vegetation?
203. Include reference to DEHLG (Department of Environment, Heritage and Local Government), 2010. Integrated Constructed Wetlands: Guidance Document for Farmyard Soiled Water and Domestic Wastewater Applications.
204. For free water surface constructed wetlands, delete the text: '*but need to be significantly larger to provide the same degree of treatment as their subsurface counterparts*'.
205. For free water surface constructed wetlands, where it is stated that '*A reduction in BOD_5 and suspended solids is provided through sedimentation and filtration*', amend the text to state '*A reduction in BOD_5, suspended solids, nutrients and faecal microorganisms is provided through sedimentation, filtration and biological processes*'.
206. For free water surface constructed wetlands, where it states that '*Best practice would be that these types of wetlands would be as distant from the ...'*, a 25 metres minimum distance from all adjacent dwelling houses is recommended.

Consideration

Point 203 should be accommodated.

In relation to points 190, 191 and 192, it is considered that the length to width ratios are important from a hydraulic design perspective. For free water surface constructed wetlands, the ratio should be kept at 5 : 1 to prevent short-circuiting With the slope, the gradient will be reduced from 1–2% to 'approximately 1%'.

Regarding points 193, 197 and 202, free water surface wetlands are open areas of effluent and are required to be fenced off; access to these wetlands should be controlled and the wetland area

effectively closed except for maintenance. Having considered the submissions, the fencing height specification will be set at 2 m.

In relation to points 194 and 196, the area required for vertical beds will be set at 4 m^2/PE based on recent reviews of international practice.

Stefanakis, A., Akratos, C.S. and Tsirintzsis, V.A. (2014). *Vertical Flow Constructed Wetlands: Eco-engineering Systems for Wastewater and Sludge Treatment.* Elsevier Science, Amsterdam.
Dotro, G., Langergraber, G., Molle, P., Nivala, J., Puigaagut, J., Stein, O. and von Sperling, M. (2017). *Biological Wastewater Treatment Series: Volume 7 – Treatment Wetlands*. IWA Publishing, London.
Brix, H. and Arias, C.A. (2005) Danish guidelines for small-scale constructed wetland systems for onsite treatment of domestic sewage. *Water Science & Technology* 51(9): 1–9.

Regarding point 195, Figure 8.5 illustrates a horizontal subsurface flow reed bed.

Regarding point 198, using clay-based soils to line wetlands is prone to failure. The adoption of this approach could also have issues with installation procedures and the potential for non-robust systems to be installed.

In relation to point 199, geomembranes or geosynthetic clay liners are products that are certified to meet specific standards and are generally CE marked. Such information is part of the delivery of such materials to site, and if installation requires sealing through welding or a similar means, this is certified by the lining operator installing the system.

Regarding point 200, this has been stated in the CoP text directly under the table concerned.

In relation to point 201, the general nuisance from exposed effluent is the reasoning behind keeping wetlands as far away from dwelling houses as possible.

In relation to point 203, this is already referred to in the text and references.

Regarding point 204, the statement as written is true and therefore accurate in terms of the area required for such systems; this statement is not dealing in any way with the level of treatment provided in same.

Regarding point 206, this will be implemented.

Recommendation

Include the term '*minimum length to width ratio*' in Table 8.3.

Include the text '*(slope with a slight fall of approx. 1%)'* in Section 8.1.3.1 on horizontal flow reed beds.

For vertical flow reed bed systems, set the area required at 4 m^2/PE.

Amend

> '*A reduction in BOD_5 and suspended solids is provided through sedimentation and filtration*'

to

> '*A reduction in BOD_5, suspended solids, nutrients and faecal microorganisms is provided through sedimentation, filtration and biological processes*'.

Alter the last line in Section 8.1.3.4 to state

> '*Best practice would be that these types of wetlands would be as distant from dwelling**s** as possible (see also Table 6.2)*'.

Amend minimum separation distances in Chapter 6 to require FWS constructed wetland to be 25m from neighbouring dwelling.

Section 8.2 Packaged Media Filter Systems

Submissions

It was submitted that:

207. In Figure 8.7, there is no reference to an inline filter or effluent filter on the outlet of the septic tank prior to the pump sump.
208. Any reference to peat filters should be removed from the CoP, and they should not be presented as a viable solution.
209. Section 8.2.1 should refer to Section 10 for design requirements.
210. Figure 8.8 should be removed or altered to show a proper infiltration piping system below the tank.
211. In Sections 8.2.1 and 8.2.2, under peat and coconut husk media filters, there is no mention that the media will become exhausted with time and that there is cost in disposal of old and replacement with new.
212. In Sections 8.2.1 and 8.2.2, on peat media filters and coconut husk media filters respectively, insert the text '*Packaged peat or other filter systems should be tested in accordance with EN 12566-6 (Part 3 may be used if primary tank is included in the test) and meet the requirements of SR 66*'.
213. Willow bed evapotranspiration systems are generally not suitable for one-off houses due to construction costs and the fact that a discharge route is required; this should be clear in the CoP.
214. Under willow bed evapotranspiration systems, where a membrane is specified, this should mention a low permeability membrane and give a permeability figure.
215. Willow bed evapotranspiration systems are detailed as secondary treatment systems and should also be included as a tertiary system.
216. With willow bed evapotranspiration systems, clarity is needed on the degree of slope – is a slope of 90° correct, or should the side walls not be tapered?
217. Worked examples from Danish work on these systems show differences of 60 to 100 m^2/PE from the figures given in the CoP.
218. The term 'willow bed evapotranspiration systems' is misleading, as these are just treatment systems where some of the liquid is evaporated but much of the liquid (effluent and rainwater) overflows, and, as per the text, they must be designed to have an infiltration/treatment area.
219. The suggestion that the area required could be reduced to 125 m^2 per PE for willow bed systems is not justifiable. The research was a desktop study and much is based on supposition.
220. Lining willow bed evapotranspiration systems with indigenous clay subsoil should be permitted as an option.
221. The addition of willow filter systems, which are unlined filter systems set out as per a soil polishing filter or distribution area, with a modified pipe layout to prevent root ingress. Willow cultivars used should be cultivated biomass varieties bred for high uptake of N, P and liquid volume.
222. Greater clarity on the sizing of willow bed evapotranspiration systems should be provided.

Consideration

Points 209, 210, 211 and 219 should be accommodated.

Regarding point 207, septic tank effluent filters are recommended in the text as per TGD-H under the Building Regulations, but will not be included in diagrams as they are not a standard requirement.

Regarding point 208, there is no legislation prohibiting peat filters, and they are provided for under EN 12566, Part 6 and in use already.

In relation to point 212, it is considered that the insertion of this text is not required in Section 8.2.1, as this has been included at the start of Section 8.2.

Regarding point 213, the introduction willow bed evapotranspiration systems is based on EPA Research Report 161 *Assessment of disposal options for treated wastewater from single houses in low-permeability subsoils.* It is clearly stated that the system requires a discharge route per Section 10 or discharge to surface water under licence.

In relation to point 214, the requirement is for '*an impermeable membrane of a minimum thickness of 0.5 mm*'.

In relation to point 215, evapotranspiration rates were highest for willow bed system cultivars receiving primary effluent (Research Report 161). Hence, the results obtained show that the addition of raw effluent has a positive effect on evapotranspiration. Constructed wetlands are provided as a tertiary treatment option in the CoP.

In relation to point 216, the slope of 90^{o} is based on the systems researched and the volume calculations to be used in construction have been based on the assumption that this slope gradient is utilised.

Regarding point 217, it is considered that, given the differences in climate between Denmark and Ireland, research work and results from that country are not directly comparable here and should therefore not be used in design specification.

Regarding point 218, the willow bed system is still an evapotranspiration medium, and it has been clearly stated that this does not achieve zero discharge.

Regarding point 220, using clay-based soils to line willow bed systems is prone to failure. The adoption of this approach could also have issues with installation procedures and the potential for non-robust systems to be installed.

Regarding point 221, the research was completed on willow bed evapotranspiration systems across Ireland, which is the basis for their inclusion.

Regarding point 222, the sizings of willow bed evapotranspiration systems has been provided, in that 187.5 m^2 per person is stated.

Recommendation

Insert '(see Section 10.1 for design specifications)' at the end of Section 8.2.1.

Insert the following text in the 'Maintenance' Section (12) after 'media filters'.

> '*The peat fibres, coconut husk or other media will require replacing in time and there will be associated costs. Insufficient desludging of the septic tank will also shorten the useful life of the peat fibre, coconut husks or other media*'.

Delete Figure 8.8 and omit this from the CoP.

Remove provision for reduction based on water conservation.

SECTION 9 – SECONDARY PACKAGED WASTE WATER TREATMENT SYSTEMS RECEIVING RAW WASTE WATER

Submissions

It was submitted that:

223. Paragraph 3 of Section 9 needs to be reworded to be in line with EN 12566, thus replace with '*These systems should be tested in accordance with I.S. EN 12566 Part 3 Standard and meet the national requirements as detailed in SR66*'.
224. Where the text states '*These systems should meet SR 66 and I.S. EN 12566 Part 3 standards*', change 'should 'to 'must'.
225. In Figure 9.1, remove the word 'sand'.
226. Replace title of Figure 9.1 with title of Figure 9.6 in 2010 CoP: '*Illustration of a packaged system and polishing filter system*'.
227. Secondary treatment systems should not be presented as an easy solution for sites with low permeability, and the CoP should be reworded to reflect this.
228. Revise Figure 9.1 to show an 'Effluent filter chamber' between the septic tank and manhole change in directions and the inspection chamber OR delete text on manhole change in directions and inspection chamber and insert 'Effluent filter chamber'.
229. While most (but not all) secondary packaged waste water treatment systems have a primary settlement area, many do not have filtration, i.e. rotating biological contactors (RBCs), sequencing batch reactors (SBRs), etc.
230. Where is the evidence for the statement that DWWTSs 'reduce microbial pathogens by a significant amount'?

Consideration

Points 223, 224, 225, 226, 229 and 230 should be accommodated.

Regarding point 227, the CoP must set out clear requirements and cannot be ambiguous or subjective. It specifies situations where DWWTS discharging to ground are not possible (excessive slope, insufficient set-backs, low percolations > 120) and other situations where DWWTSs are possible if the criteria are met.

Regarding point 228, an effluent filter would only be required if the soil polishing filter were drip dispersal, so this is not necessary in this general diagram.

Recommendation

At the start of Section 9, where the CoP states

> '*These systems should be tested in accordance with I.S. EN 12566 Part 3 Standard and meet the national requirements as detailed in SR66*'

change 'should 'to 'must' here, as well as in regard to all mentions of meeting S.R. 66 and EN 12566 Standards throughout the document.

Remove the word 'Sand' from Figure 9.1 text should just read 'Soil polishing filter (gravity fed)'.

Replace title of Figure 9.1 with title of Figure 9.6 in 2010 CoP:

> '*Illustration of a packaged system and polishing filter system*'.

Reword text in the second paragraph to state

> '*Such systems are required to meet the treatment standards of 20 : 30 : 20 (mg/l) for BOD_5, suspended solids and ammonium nitrogen (NH_4-N). They also reduce concentrations of microbial pathogens and provide partial nitrification.*'

Section 9.4 Sequencing Batch Reactors

Submissions
It was submitted that:

231. Figure 9.4 is a schematic representative of an SBR system design. Replace this with a more representative schematic of the typical SBR system with no humus/tank chamber used in Ireland.

Consideration
In relation to point 231, the schematic will be removed.

SECTION 10 – TERTIARY TREATMENT SYSTEMS RECEIVING SECONDARY TREATED EFFLUENT

Section 10.1 Polishing Filters

Submissions
It was submitted that:

232. Why are LPP and drip systems excluded from Table 10.1, as tertiary LPP distribution and DD systems are suitable for sites with PV <75?
233. Why is there a difference in placement depth of LPP laterals compared to drip lines? [92]
234. In Section 10.1.2, should '*Table 10.3*' read '*Table 10.2*' and '*Table 8.3*' read '*Table 8.4*'?
235. Does the 300 mg/L refer to BOD? If so, specify. Note: Tables 10.3 and 10.4 are out of sequence relative to how the text appears – suggest renumber/reposition.
236. In Table 10.2 for the coarse sand layer – what does the 'a' footnote apply to?
237. In Section 10.1.1, change the wording from '*gravity from a sand or peat filter'* to *'gravity from a sand or packaged filter*', to cover all available media.
238. The total areas required for each type of infiltration area and degree of effluent pre-treatment must be consistent: a) in comparison to each other and b) to reflect the efficiency of each in terms of soil treatment primarily of pathogenic bacteria, nutrients where appropriate and hydraulic dispersal of the effluent.
239. There are a number of errors in the diagram of a typical drip system, and a number of changes have been suggested; the layout of the pipework should also be more typical.
240. Regarding drip distribution, 600 mm spacing between driplines is typical but allowance should be made for designers to reduce the spacing in order to maximise the use of better-quality soil with more discharge emitters and closer spacing.
241. For tertiary sand polishing filter, a maximum depth of soil cover and type of soil cover should be stipulated to allow sufficient air supply to reach the filter to prevent it becoming starved of air, becoming clogged and overflowing, and to allow access for maintenance of the filter surface, which is prone to clogging over time with any decrease in efficiency of the DWWTS.
242. In Section 10.1.1, the diameter of the pipes has reduced from 32 mm to 25 mm. Is this still with orifices 0.6 m apart at 0.6 m spacing between laterals?
243. Is there a maximum trench length and a specified diameter of the pipe for low-pressure pipe distribution (LPPD)?
244. Drip dispersal – are these 25 mm diameter pipes also?
245. In Section 10.1.2, where it is stated 'The minimum depth between the distribution gravel and the bedrock and water table', it would provide more clarity to write 'the minimum

depth between the distribution gravel at the base of the sand polishing filter and the bedrock and water table'.

246. The percolation-value bands to be broken up further to allow for different loading rates for, e.g., 3 < PV < 10, 11 < PV < 20, 21 < PV <30, 31 < PV < 40, 41 < PV < 50.
247. A specific tertiary sand polishing filter cross-section should be included in Section 10. [196]
248. The CoP should allow for Constructed Wetlands to be sized as a singular system which will achieve excellent water quality (and may have zero discharge).
249. Section 10.2 needs to be reviewed and rewritten to make reference to EN 12566 Part 7 only (reference to SR 66 and EN 12566 Part 3 must be deleted as these documents cannot be used to assess tertiary treatment systems) and a requirement of evidence that filtration through packaged media filters provides sufficient reduction in *E. coli*/total coliforms to an appropriate level.
250. Remove reference to SR 66 and EN12566 Part 3 in all clauses related to tertiary treatment. Reference should be made to EN12566 Part 7 only. Further guidance and clarification as to the quality of effluent from Part 7 systems is needed throughout Section 10 as a whole, in particular in relation to coliforms, with a need to demonstrate that the system in question can achieve a satisfactory reduction in *E. coli*/total coliforms to an appropriate level.
251. Insert a circle between the secondary treatment system and the pumping chamber to represent an 'effluent filter chamber' and a small rectangle between the pump chamber and the low-pressure pipework to represent an in-line filter, labelling both.
252. In relation to Table 10.1, allow water-saving device flow reductions in all percolation value ranges.
253. In Figure 10.1: Schematic of an LPP distribution system, a pad-type layout is indicated rather than narrow trenches; this should be changed to reflect narrow trenches.
254. The maximum pipe trench length for a gravity discharge soil polishing filter is 10 metres; however, no guidance is provided as to the minimum trench length applicable.
255. The difference between 'packaged media filter systems providing tertiary treatment' and 'specialised prefabricated tertiary treatment systems' needs to be clearly set out, as there is some confusion on this issue.
256. The current lack of a certification regime for prefabricated tertiary treatment systems (Part 7 of I.S. EN 12566) is a complicating factor with regard to tertiary systems that are currently coming onto market. There is, therefore, a need for an expanded coordinated national approach to deal with the issue of existing and new tertiary treatment systems and technologies, and a potential revision of S.R. 66.
257. In Table 10.1, Gill *et al.* (2015) is not proven as a method of reducing water usage. Omit reference to water-saving devices and Gill *et al*. (2015) while retaining the reference to the 150 litres per day as the design basis?
258. If a constructed wetland can achieve either zero discharge or suitable discharge quality, is a tertiary system necessary?
259. Include the option for disposal of treated wastewater via a stand of evergreen trees.
260. In last row of Table 10.3, give a reference number to link subsurface flow system (SFS) explanation back to the previous rows in the table.
261. In Section 10.1.2, paragraph 1 describes a stratified sand filter; paragraph 2 seems to describe a single layer sand filter.
262. Could a table be included that shows an overview of the potential land take associated with the various tertiary treatment systems?

Consideration

Points 234, 235, 237, 239, 241, 245, 249, 250, 253 and 260 should be accommodated.

In relation to point 232, provision will be made for drip dispersal and LPP at lower percolation values. LPP requirements will mirror trench option 3. Calculations have been carried out for drip dispersal based on maintaining percolation rates consistent with the research conducted on drip dispersal at high percolation values.

In relation to point 233, LPP and drip dispersal were researched and tested in specific settings, at specific depths. The CoP has adhered to these settings and depths in the resultant specifications.

In relation to point 236, the 'a' footnote is outdated, and taken directly from the 2009 CoP.

In relation to point 238, the loading rates have been examined. Options 1, 2 and 3 are consistent with the 2009 Code. LPP (option 4) is proposed to be kept consistent with the other trench option (option 3). Specific calculations have been made for drip dispersal. These are similar to the other bed options (options 1 and 2) except at higher percolation values where drip dispersal has been shown to perform. Tertiary infiltration areas are to be set at 50% of soil polishing filters, reflecting the greater level of treatment, and will be incorporated in table 10.1 for clarity.

In relation to point 240, variation to the CoP is provided for in Section 1.3 subject to agreement with the local authority.

In relation to point 242, the 25 mm pipes still have orifices 0.6 m apart at maximum 0.6 m spacing between laterals.

Regarding point 243, there is no maximum trench length and a specified diameter of the pipe for LPPD, as this is a pumped system.

Regarding point 244, the pipes have a 14 mm inside diameter, as specified in Section 11.

In relation to point 246, various changes to the percolation bands and introduction of an additional band were examined. However, the revised calculations resulted in increased area requirements in most categories and no reductions, without there being a demonstratable environmental requirement. Therefore no benefit arose in making this change.

In relation to point 247, there is already a cross-section of a sand-polishing filter in Figures 8.3 and 8.4; thus, it is considered that another (albeit specifically a tertiary filter) is not required.

Regarding point 248, the wetlands outlined in the CoP are those that are acceptable as secondary and tertiary treatment systems, subject to meeting the criteria specified in the CoP. As well as the wetlands themselves, all that is required for a complete system is a septic tank at the front end and a gravel distribution area at the back end. Zero discharge has not been shown to be achievable in the research so far, albeit on willow-based wetlands.

In relation to point 251, in-line filters after secondary systems are only considered necessary for drip dispersal systems and will be included in the relevant diagram.

Regarding points 252 and 257, this provision has been removed except in relation to willow systems, which would have large buffering capacity.

In relation to point 253, this follows convention elsewhere in the code and indicates trances within the overall area of the of the LPP distribution system.

In relation to point 254, guidance is not necessary for minimum pipe lengths.

Regarding point 255, the wording of the tertiary section will be revised to clarify the scope of the different systems.

In relation to point 256, this is beyond the scope of the CoP. The NSAI is examining revision of the national standard to address the matter referred to.

Regarding point 258, zero discharge is not considered an achievable option under the CoP. Constructed wetlands can be used for secondary treatment, preceded by a septic tank and followed by a suitable soil-polishing filter. Constructed wetlands can also be used for tertiary treatment preceded by a secondary system (which could be a septic tank and constructed wetland) and followed by a suitable infiltration gravel bed.

Considering point 259, the research on which the introduction of new technologies into the CoP is based examined willow, LLP and drip dispersal only, so only those are considered for introduction.

In relation to point 261, the paragraph on tertiary sand filters will be simplified and rewritten to emphasise the differences between the two types of sand filters.

In relation to point 262, as there are so many variables in sizing tertiary treatment systems, it is considered that the generation of a table showing potential land takes would be both confusing and potentially misleading. As with any DWWTS, the sizing of the site may have to be altered or modified following the completion of the site characterisation and assessment, regardless of the types of system being installed.

Recommendation

Chapter 10 to be restructured to clarify the different types of tertiary systems and their role. It will be divided into:

- soil polishing filters (which take secondary effluent); and
- tertiary treatment systems (which provide an additional treatment module after secondary treatment and then discharge to infiltration areas)

LPP and drip dispersal to be extended to lower percolation values.

The final sentence of the introductory sub-section to Section 10 will be rewritten as

'All tertiary systems should comply with I.S. EN 12566 Part 7, as applicable.'

In Section 10.1.1, delete 'from a sand or peat filter' in Option 1 and 'the entire filter may be covered with soil and then the ground level graded' in Option 2.

Replace '*Table 10.3*' with '*Table 10.2*' and '*Table 8.3*' with '*Table 8.4*' in Section 10.1.2.

Delete the 'a' footnote in Table 10.2.

In the drip system schematic (Figure 10.2) the power cable should extend to the pump chamber; the flush line returns to the primary settlement for desludging; the yellow supply line should be on one side and the return on the opposite with driplines between; and one air vent should be shown on each of the supply and return lines only. There should also be an in-line filter.

Change text in tertiary sand polishing filters to

'*The hydraulic loading should not exceed 60 l/m^2.d and the sand polishing filter can be soil covered with a maximum depth of 300 mm topsoil and sown with grass. Access for regular visual inspection of the media must be provided*'.

Include the text '*of 14 mm inside diameter pipes*,' in the section on drip distribution.

In last row of Table 10.3, give a footnote reference to link the SFS explanation back to the previous rows in the table.

Section 10.2 Packaged Media Filter Systems Providing Tertiary Treatment

Submissions

It was submitted that:

263. Such systems can be tested to Part 3 if the primary tank is included, but can also be tested to Part 6.

264. Parts 3 and 6 only deal with secondary treatment and cannot be used to justify systems' use as a tertiary plant.
265. Referring back to secondary infiltration depths is confusing and appears contrary to guidance given in 2013 for 'clean' effluent after tertiary treatment.

Consideration

Point 264 should be accommodated.

In relation to point 263, Part 7 applies to tertiary systems.

In relation to point 265, it is clearer to include all depth requirements in one place.

Recommendation

Omit any reference to tertiary treatment in relation to Parts 3 and 6.

Section 10.3 Constructed Wetlands Providing Tertiary Treatment

Submissions

It was submitted that:

266. With horizontal subsurface flow reed beds, length to width ratios vary and there is no set ratio.
267. Free water surface wetlands are suitable to receive secondary effluents; however, they only require 4 m^2/PE, not 10 m^2 as suggested. For example, 5 m^2/PE for horizontal secondary treatment requires 1 m^2/PE for tertiary, therefore FWS system at 20 m^2/PE for secondary requires 4 m^2/PE for tertiary (division by 5).

Consideration

In relation to points 266 and 267, it is considered that the sizings and ratios are necessary to provide sufficient treatment and prevent short-circuiting.

The area required for vertical systems will be changed from 1 m^2/PE (gravel) and 3 m^2/PE (sand) to 2 m^2/PE further to the review of vertical systems referred to above.

Section 10.4 Specialised Prefabricated Tertiary Treatment Systems

Submissions

It was submitted that:

268. A design for a specific application may require a combination of prefabricated and/or other tertiary treatment systems (treatment train) based on the site's sensitivity and risks. Any variation from planning permitted designs should be approved by an insured system designer.
269. The CoP should stipulate separate nutrient and pathogenic removal requirements for areas where tertiary treatment is necessary and systems should be tested and certified to achieve them.

Consideration

In relation to point 268, variations from those granted under planning permission cannot be accommodated in the CoP, and this is outside its scope. What is accepted in terms of the DWWTS in a Planning Permission Grant is binding, and any variances are a matter for, and would have to be dealt with through, the local authority.

Regarding point 269, the general approach in the code has been to specify design criteria for DWWTS which will achieve an acceptable level of treatment based on best practice and trials. The only instance where performance criteria have been specified is the standards for secondary

packaged systems which were adopted in S.R. 66. Standards for tertiary systems will also be adopted if specified in S.R. 66. It should be noted that although it is proposed to specify a coliform value (see above), this is not an obligatory performance standard as it only applies if the 0.6 m soil depth provision is to be availed of. More generally, separate nutrient and pathogenic removal is not the norm and therefore it would be difficult to address in the CoP as the requirements would depend on the specific circumstances. If necessary it can be dealt with on a site-specific basis by the applicant and the planning authority.

SECTION 11 – CONSTRUCTION AND INSTALLATION OF A DWWTS

Submissions
It was submitted that:

270. The site assessor who completed the respective site characterisation and assessment should have to oversee the installation of the DWWTS they have designed and received planning permission for.

Consideration
In relation to point 270, the CoP follows TGD H of the Buildings Regulations, which requires that the design, installation and commissioning of wastewater treatment systems should be carried out and/or supervised by a suitably qualified person or persons. There is no requirement, and it would be difficult practically, to specify or limit who can complete different elements.

Section 11.1 Drain from the House to the DWWTS

Submissions
It was submitted that:

271. An access junction to facilitate a future connection to a sewer network is referred to; this should be reflected in relevant diagrams in the CoP, along with a potential need to install a grease trap.

Consideration
In relation to point 271, this statement is slightly outdated, and the wording will try to reflect the potential need to do this rather than the requirement to.

Recommendation
Include the phrase *if feasible*' at the end of this phrase in Section 11.1.

Section 11.2 Septic Tanks

Submissions
It was submitted that:

272. Septic tanks section – Suggest that some discussion be added relative to proper compaction during installation; suitable bedding material around tanks; and provision for access risers to finish grade to facilitate operation and maintenance (pumping/desludging).
273. A system of training and certification for system installers is essential if quality control is to be achieved. Only trained and certified installers should install treatment systems.
274. Consistency in wording is required: use 'effluent filter', not 'effluent screen', to match the glossary.

Consideration
Points 272 and 274 should be accommodated.

In relation to point 273, TGD H of the Building Regulations sets out the standards in relation to material and workmanship to which the regulations must be carried out, and stipulates that the installation and commissioning of all wastewater treatment systems should be carried out and supervised by a suitably qualified person or persons. The CoP follows TGD H. Training provision and stipulation of certification systems is beyond the scope of the CoP, however.

Recommendation
Include data on compaction during installation; suitable bedding material around tanks; and provision for access risers to finish grade to facilitate operation and maintenance (pumping / desludging, as outlined in EN 12566, Part 1.

The term *'effluent screen'* will be replaced with *'effluent filter'* throughout the CoP document.

Section 11.3 Conduit from the Septic Tank to the Distribution Device

Submissions
It was submitted that:

275. In Section 11.3, include the words *'via a stilling chamber'* after *'and will contain the electric pump that is used to pump the effluent to the distribution device'*.
276. It is stated that 1 m^3 is the minimum for 24 hour storage; for a 4 PE system the required storage is 600 litres.

Consideration
Point 275 and 276 should be accommodated.

Recommendation
Include the words '*via a stilling chamber*' after '*and will contain the electric pump that is used to pump the effluent to the distribution device*'.

Delete the following from paragraph 4 *'(meaning that the chamber will have to be at least 1m^3 in volume)'* and state that chambers should be sized based on the population served.

Section 11.5 Infiltration/Treatment Areas

Submissions
It was submitted that:

277. There is a lack of design and construction details on constructed wetlands.
278. There is a requirement that after each placement of an imported soil fill layer, percolation tests shoud be carried out. Is it intended that the applicant/agent on behalf of the applicant is required to submit evidence of this to the planning authority?
279. Does not mention the in-line or effluent filters to protect the 'infiltration/treatment areas' The inclusion of these will prevent 'restricted clogging of the distribution pipes'.
280. Reference is included to the use of a stilling chamber where effluent is being pumped to an infiltration area. Guidance should be provided on the optimum location of the stilling chamber, relative to the distribution box/system.

Consideration
In relation to point 277, information on design of wetlands is provided Chapters 8 and 10 of the CoP.

Regarding point 278, it is a matter for the parties concerned to following planning authority requirements in terms of submitting information under a planning application.

In relation to point 279, as in-line filters are addressed in the text in relation to drip dispersal system for which they are required.

Regarding point 280, such a specification is not required, as ground conditions, slopes and spacings will vary from site to site, and such a specification cannot be prescriptive in terms of setting.

SECTION 12 – OPERATION AND MAINTENANCE OF A DWWTS

Submissions

It was submitted that:

281. Could a study be considered to verify the effectiveness of the CoP a few years after installation, as performance of the DWWTS and the management of the public health and environmental risks are ultimately the aim of the CoP?
282. Is a national awareness campaign planned on the topic of desludging?
283. In Table 12.1, who is the *'appropriately trained person'*? This should be specified and details listed.

Consideration

In relation to points 281 and 282, it is considered that both are worthy suggestions. The National Inspection Plan does provide a rolling sample of 1,000 systems a year and examines DWWTS installation, operation and desludging. The plan is reported on yearly or twice yearly by the EPA, so there is an ongoing accumulation of data. Engagement by local authorities and other stakeholders is an ongoing aspect of the National Inspection Plan also, and the new de-sludging guidance can be incorporated into this on an ongoing basis. It is the EPA's intention to develop the table into a simple online calculator.

In relation to point 283, this has been covered in TGD H of the Building Regulations, and stipulates that the maintenance of all DWWTSs should be carried out by a suitably qualified person or persons. The CoP cannot provide lists regarding qualifications, experience, *etc*.

Section 12.1 Desludging

Submissions

It was submitted that:

284. Table 12.2; left-most column heading should read *'Tank usable volume'* and not depth, as units are in m^3.
285. The second paragraph should also include cleaning of the in-line filter or effluent filter.
286. Allow for other shapes of tanks, e.g. round and oval.
287. Figure 12.1 should include an effluent filter on the outlet of the tank for consistency.

Consideration

Point 284, 285 and 286 should be accommodated.

In relation to point 287, septic tank effluent filters are recommended in the text as per TGD-H under the Building Regulations, but will not be included in diagrams as they are not a standard requirement.

Recommendation

Change *'Tank Useable Depth'* to *'Tank Useable Volume'* in first column of Table 12.2.

Insert the following at the end of the second paragraph

'*… and the effluent filter should be cleaned*'.

Rewrite second sentence as

'For example, the volume of a rectangular tank can be calculated …'.

Section 12.2 Record Keeping

Submissions
It was submitted that:

288. Who should be keeping the records – homeowner, pumping/desludging contractor?

Consideration
Point 288 should be accommodated.

Recommendation
Reflect in text of Section 12.2 what has already been included in Table 12.1, in terms of the responsibilities for record keeping by various parties.

Section 12.3 Septic Tanks

Submissions
It was submitted that:

289. Suggest also include 'associated access risers and lids/covers' in the inspections that will occur. [99]
290. There is no mention of the effluent filters in this section.

Consideration
Points 289 and 290 should be accommodated.

Recommendation
Include *'and associated risers and lids/covers'* at the end of the first paragraph of this section.

Insert the following sentences at the end of paragraph 3: '*Where an effluent filter has been installed at the outlet of the septic tank, the opportunity for solids or sludge to exit the septic tank has been mitigated. The effluent filter should be inspected and cleaned during routine maintenance.*'

Section 12.4 The Infiltration/Treatment Areas

Submissions
It was submitted that:

291. All pressure pumped systems for intermittent filters, LPP and drip systems should be flushed regularly.
292. In the 2nd last sentence of the last paragraph change *'filter cartridge'* to *'in-line filter'* and delete the last sentence as in-line filter designs can vary.

Consideration
Regarding point 291, Table 12.1 suggests that infiltration/treatment areas be inspected and maintained every 12 months, or as per manufacturer's instructions, and such instructions for LPP and DD systems would include specifications for flushing every six months, which has also been included in the text in Section 12.4. Thus, the text as is in the CoP will remain unchanged.

In relation to point 292, change to 'in-line *filter cartridge*'.

Section 12.5 Filter Systems

Submissions
It was submitted that:

293. The first paragraphs of Sections 12.5.1 and 12.5.3, and the last paragraph of Section 12.5.2, should also include cleaning of the in-line filter or effluent filter. [346; 348; 445; 446; 447]
294. Appropriate vegetation species should be used to limit access to influent area as much as possible.

295. For packaged media filter systems, the 'regular intervals' at which the media should be inspected should be specified.

Consideration

In relation to Point 293, effluent filters are recommended for septic tanks and maintenance of these is referred to in Section 12.3; in-line filters are required for drip dispersal and maintenance of these is referred to in Section 12.4

Point 294 will be accommodated. It should be noted that FWS constructed wetlands are required to be fenced.

Regarding point 295, this information has already been included in Table 12.1.

Recommendation

Include the text:

> *'Appropriate vegetation species should be used to limit access to the influent area as much as possible. These should be species which provide dense vegetation cover, limiting open water area as much as possible (e.g. Glyceria maxima).'*

Section 12.6 Packaged Waste Water Treatment Plants

Submissions

It was submitted that:

296. As it is unclear which industry standard is referred to, delete the sentence *'These systems need to be cleaned (the frequency of which is determined by way of a pressure differential detector) and, according to the current industry standard, need to be replaced once every 10 years on average'*.
297. In terms of the warning alarm system, revise this bullet point as follows – change *'Many'* to *'All'* and delete the following from the second sentence – *'When the facility to do so has been incorporated'*.

Consideration

Points 296 and 297 should be accommodated.

GLOSSARY

Submissions

It was submitted that:

298. Include the following terms – distribution device, effluent filter, in-line filter, stilling well.
299. Revise definition of 'percolation area' to include reference to an actual I.S. EN 12566 part.
300. Include definition of 'water body status'.

Consideration

Point 298 should be accommodated for 'in-line filter'; the other three entries exist already.

Points 299 and 300 should be accommodated.

Recommendation

Include *'in-line filter'* in the Glossary.

> *'Filter installed between the pump and the intermittent filter pipework in a secondary treatment system, to prevent blockages due to solids. It should have a mesh less than 3 mm and be accessible for maintenance'*.

Include '*Part 2*' in the brackets after 'EN 12566' in definition of 'percolation area'.

Include 'water body status' definition, thus

> '*The WFD classification scheme for water quality includes five status classes for rivers, lakes, estuaries and coastal waters: high, good, moderate, poor and bad. In regard to groundwater bodies, only two status' are classified; good and poor*'.

APPENDICES

Appendix A – Site Characterisation Form

Submissions

It was submitted that:

301. Requirement for cross-section should be changed to *'site-specific cross-section'* to eliminate generic cross sections which may be submitted.
302. Photos should include some site identifier mark, such as an adjoining house or hill, that then can be related to a specific site.
303. Change *'Pumped design must be designed by a suitably qualified or competent person'*, if possible.
304. The tab *'Not suitable for development'* has been removed and replaced by *'Suitable for development'*; revert to as was.
305. Suitable for, in 2a, add the word '*intermittent*' before soil and sand.
306. In Section 2b, 'packaged tertiary filter' should be added.
307. In Section 6.0 under Tertiary, replace *'Package treatment system'* with 'Package tertiary type treatment system'.
308. Also in Section 6.0, include *'Sand filter area'* in m^2 and add *'Gravel bed area'* in m^2 under *'Sand/Media filter'*.
309. If discharge to surface water is proposed, there should be another box with *'Discharge licence required'* to be ticked.
310. In step 5 of the modified method in the Site Characterisation Form, is it possible to include a column with clock times, to ensure that the test is completed non-stop, as opposed to breaking the test and spreading over two days?

Consideration

Points 301, 302, 304, 305, 306, 307 and 310 should be accommodated.

In relation to point 303, it is considered that is important throughout the site characterisation and assessment procedure, as well as in terms of installing DWWTSs, that a suitably qualified or competent person carry out the work.

Regarding point 308, these potential additions are already covered in Section 6.0, under 'polishing filter' in m^2, and the fact that 'offset filter size' is also mentioned as an option.

Regarding point 309, this aspect is already covered at the end of the form with the note and double asterisks.

Recommendation

Include the words *'site specific'* before each mention of *'cross-section'* in Section 5.2 and Section 6.6, as well as in Section 3.4 (5) of the Site Characterisation Form.

Include a landmark in each photograph of the site itself, while considering general privacy and data protection issues arising from GDPR.

Include a column with clock times to be inserted for the section showing the results of the *'modified method'*.

Include the two options '*Not suitable for development*' first, on the left-hand site of the form, and then '*Suitable for development*' on the right-hand side. The options, where suitable, will then follow this.

In Section 2a of the Site Characterisation Form, add the word 'intermittent' before soil and sand.

In Section 2b of the Site Characterisation Form, add packaged tertiary filter as an option.

The options in Section 2 therefore become

2a. Septic tank and intermittent soil or sand filter,
2b. Septic tank, and constructed wetland or filter media system, and soil polishing filter.
2c. Packaged plant and packaged tertiary filter, and polishing filter or constructed wetland and polishing filter.
2d. Packaged plant and low-pressure pipe distribution system or
2e. Packaged plant and drip dispersal system.

Replace *'Package treatment system'* with *'Package tertiary type treatment system'* under 'Tertiary' in Section 6.

Appendix D – Percolation Test Procedure

Submissions

It was submitted that:

311. Scenario 1: '*If the initial drop from 400 mm to 300 mm is greater than seven hours this means the percolation value will be greater than 120*'. Should that not be eight hours?
312. Scenario 1: 'if … the percolation value will be greater than 120. There is no requirement to complete the test and the trial hole location is not suitable for discharge to ground'. This is not correct as the sub-surface test is done at a minimum depth of 850 mm.
313. Step 2: 'The hole should be pre-soaked twice from 4 to 24 hours before the start of the test'; this should be changed to 'between 4 and 48 hours'.
314. Can a 'modified test' be included to take account for willows planted around the infiltration/treatment area?

Consideration

Point 311 and 312 should be accommodated.

Regarding point 313, 4-24 hrs is the requirement.

Considering point 314, there is no basis for this.

Recommendation

Change the time concerned to *'8 hours'* for Scenario 1.

Appendix E – Groundwater Protection Responses

Submissions

It was submitted that:

315. In Table E2, replace the word *'Receptor'* with *'Well or water supply source'*.
316. In Figure E2, *'Distribution box'* should be named *'Distribution device'*.
317. In Figure E2, an *'effluent filter chamber'* should be included.
318. Figure E1 from the 2009 CoP, showing the development of the biomat, should be re-inserted into the current CoP reissue.
319. The reference to *'particularly of nitrate'* is at odds with the findings of the EPA/GSI 2013 report on the National Inspection Plan.

Consideration

In relation to point 315, as the text in this section comes from the Groundwater Protection Responses of the GSI/EPA/DELG, and as 'Receptor' is the accepted word in the Source–Pathway–Receptor model which forms the bases of these responses, the text will remain unchanged.

In relation to point 316, to ensure consistency throughout the CoP document, the word 'box' will be replaced with 'device' in this figure.

Regarding point 317, see above regarding treatment of effluent filters in diagrams.

As regards point 318, as one of the goals of the reissue of the CoP is to ensure more brevity and conciseness in terms of text and diagrams, Figure E1 from the 2009 CoP has no technical effect and will remain omitted.

In relation to point 319, this is not specifically the case, as the National inspection Plan is a ranking methodology for areas in the country that might be susceptible to having various types of contamination issues, at a national to sub-catchment scale, based on geo-scientific maps and rankings, whereas the issue of nitrate as mentioned in this section is at the site scale. It must also be borne in mind that the research of Morrissey *et al*. (2015) concluded that nitrate and indicator bacteria were a potential issue with greater than six houses per hectare in areas of 'Extreme' and 'High' groundwater vulnerability.

Recommendation

In Figure E2, '*Distribution box*' should be named '*Distribution device*'.

Appendix F – Guidance on Dilution Calculations for Groundwater Discharge in Areas with a High Density of DWWTSs

Submissions

It was submitted that:

320. This section may not be particularly helpful to professionals preparing planning documentation for a proposed DWWTS, as they are unlikely to be fully aware of the levels of nitrate and phosphorus in the groundwater in the area. However, information is already available at a 1 km square level of detail in the EPA/GSI 2013 report that would indicate where/when dilution calculations may be necessary.
321. At the end of the document, the list of relevant maps and the websites that they are available on is not given.

Consideration

In relation to point 320, this is again not specifically the case, as the National inspection Plan is a ranking methodology for areas in the country that might be susceptible to having various types of contamination issues, at a national to sub-catchment scale, based on geo-scientific maps and rankings, whereas the issue of nitrate as mentioned in this section is at the site scale.

Regarding point 321, website addresses often change, and even slight changes may leave them obsolete. Each body or organisation relevant to the appropriate sections of the CoP is given in the document, as are applicable references.

END.