NSW Onsite Wastewater Management Guidelines, 2025

Training for Regulators and Designers

Site and soil evaluation

Site and soil evaluation – Section 4

- "Site and soil evaluation should follow a systematic approach to the collection, recording and interpretation of information on a suitable scale and depth for the purposes of the investigation."
- "SSE is required for all unsewered developments where effluent is to be wholly or partially managed onsite."
- SSE varies from insufficient to overkill. Be clear and concise!

Purpose of SSE

- Identify site and soil characteristics significant to the OWMS selection, location and size
- Assess capability to sustainably manage all wastewater within allotment boundaries
- Quantify risk and gather relevant information to inform the design process and formulate a sustainable design
- Enable the regulator to make an informed decision on the viability of an unsewered development proposal

Who should complete a SSE?

- Suitably qualified and experienced professionals, with appropriate training, technical expertise and experience in SSE and onsite wastewater design
- Meet the requirements of council
- Councils may require written verification of qualifications, experience, professional affiliations and professional indemnity insurance
- Application assessors should have suitable qualifications and experience too

Steps in SSE

- Site details
- Desktop study (Section 4.2)
- Field evaluation to fill data gaps (Appendix 1)
- Constraint (risk) analysis (Section 4.3)
- Risk mitigation (Section 7.2)

Desktop study – Section 4.2

- Collate previously mapped information to develop a preliminary overview of the site (constraints map)
- Identify data gaps for further investigation
- Identify unsuitable site or soil conditions for OWM
- Target locations for soil boreholes or test pits
- Desktop studies are a suitable first step for all levels of investigation for development (rezoning, subdivision, or individual lot design)

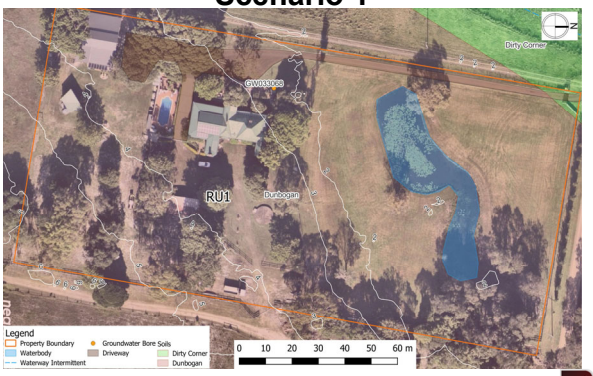
A critical issue

- One of the critical issues when collating data from different sources to include in a GIS project is that the coordinate reference systems are correct for each layer in the project
- Data must be georeferenced correctly so that all imported layers are aligned in the project

Desktop data to collect

- Cadastre and planning mapping (lot boundaries, roads, land zoning and planning specifications)
- Topographic mapping (contours, landscape position, landform and surface hydrology)
- Imagery (aerial photos – current and historic)
- Geological and soil mapping (soil landscapes, soil test data)
- Groundwater resources (domestic and public supply bores and wells)

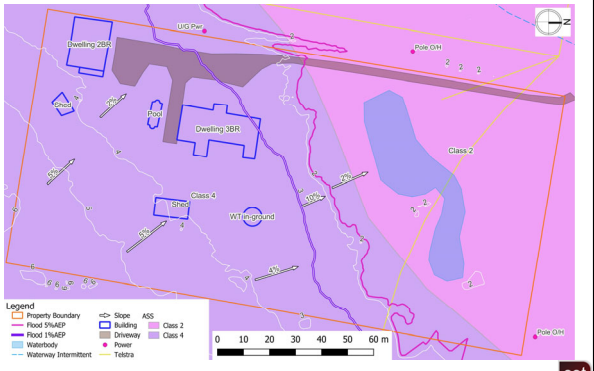
Scenario 1



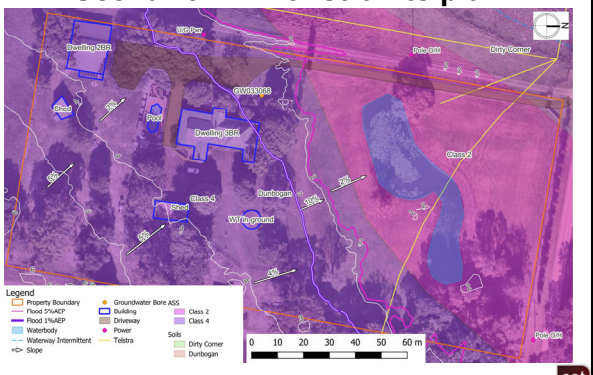
Desktop data to collect

- Land use mapping (adjacent and regional context e.g. agriculture)
- Environmental overlays (flooding, bushfire, ecology and drinking water catchments)
- Location of services (water, electricity, gas etc.)
- Plans or strategies relating to OWM (development strategies, lot size requirements, backlog sewer)
- Site development (existing, approved or proposed)

Scenario 1



Scenario 1 – Constraints plan



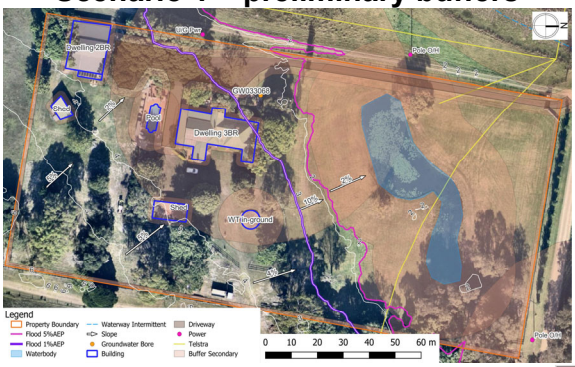
Additional desktop data

- Climate data (rainfall and evaporation) – 30+ years
- Local knowledge OWMS limitations (poor soils, shallow rock, groundwater, seasonal inundation)
- Owner discussion
  - Resourcing / capacity and understanding
  - Existing OWMS on the site
  - Existing unmapped services or usage patterns (electricity, water, tracks)

Desktop preliminary buffers

- Section 4.3.2
- Buffer off mapped constraints to provide a preliminary available EAA to field investigate
- This preliminary desktop assessment and buffering may indicate that some OWMS options aren't viable on some sites
- These will focus fieldwork investigations and soil testing locations

Scenario 1 – preliminary buffers



Site features

- Once the fieldwork has been completed, the full SSE can be completed
- Table 4-1 considers site features and their risk rating for OWMS (treatment, EAA or both)
- This table can be used in the SSE and by application assessors to determine if all limiting features on the site have been considered and appropriately mitigated, where necessary

Table 4-1 Site features – risk ratings for OWMS

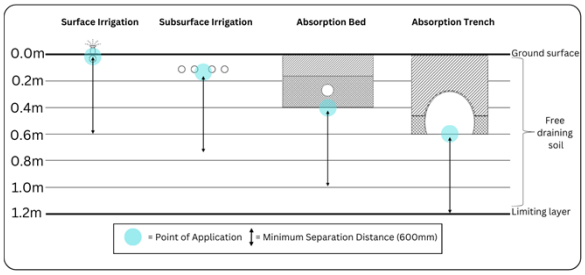
- A4 copy of table follows PowerPoint slides

Site Feature	Relevant System(s)	Risk Rating			Restrictive Feature
		Minor Limitation	Moderate Limitation	Major Limitation	
Geology/ regolith	All EAA systems	N/A	N/A	Major geological discontinuities, fractured or highly porous bedrock or regolith	Groundwater pollution hazard
Shallow bedrock	In ground treatment systems and all EAA systems	N/A	N/A	Bedrock at shallower depth than tanks or effluent application systems	Difficult excavation Low saturated hydraulic conductivity Shallow limiting layer (see Table 4-5)
Rocks and rock outcrops (% of land surface containing rocks (floaters) >0.2m diameter)	All EAA systems	<10%	10-20%	>20%	Limits EAA system performance Provides preferential flow paths Difficult excavation
Fill	All OWMS	No fill	Fill present	N/A	Subsidence Variable permeability
Landform	All OWMS	Hill crests, divergent slopes and plains	Convergent slopes and foot slopes	Drainage plains and incised channels	Groundwater pollution hazard Resurfacing hazard

Site features – scenario

- Go through the site features scenario example using the desktop assessment slides
- Consider what impact the site features could have on the OWM design and possible mitigation measures that could be used

Soil features - terminology



- Standardised terminology across the Guidelines

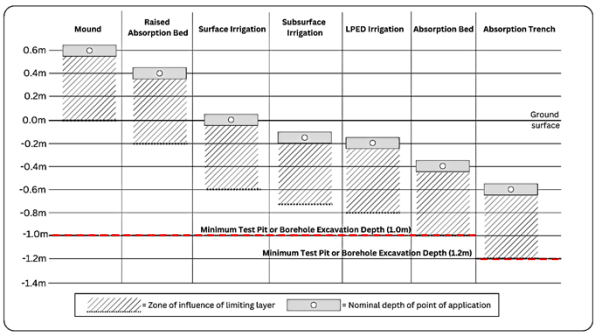
Soil features - terminology

- Point of application – effluent, e.g. emitters, base of bed or trench
- Separation distance – minimum 0.6m
- Free-draining soil – soil, beneath the point of application and above any limiting layer, through which effluent can pass freely under gravity

Soil features - terminology

- Limiting layer - within 0.6m beneath the point of application. Design loading rate is based on the saturated hydraulic conductivity of the limiting layer
  - Layer of soil with the lowest saturated hydraulic conductivity
  - Any other limiting layer (hard pan, bedrock, water table, or seasonal high water table (soil mottling)

Soil features - terminology



Soil investigations

- Soil investigations should adequately characterise the soil in the proposed EAA
- Minimum – 1 test pit and 2 boreholes in available EAA
- Significant soil variation = additional pits / holes
- Minimum depth = 0.6m below proposed point of application, or 1.0m, whichever is deeper (i.e. 1.2m for trenches)
- Record – location, depths, layer details; take photos

Table 4-5 Soil features – risk ratings for OWMS

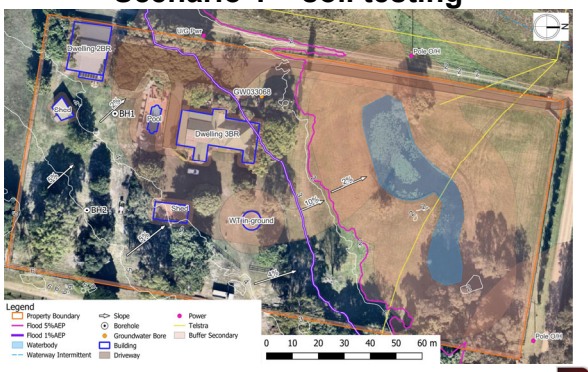
- A4 copy of table follows PowerPoint slides
- See Table 6-4 for soil category information

Soil Feature	Relevant System	Risk Rating			Restrictive Feature
		Minor Limitation	Moderate Limitation	Major Limitation[1]	
Depth to bedrock or hardpan (m)	Subsurface irrigation	>1.0	0.75 - 1.0	<0.75	Possible waterlogging Increased risk of runoff May limit plant growth (trees)
	Surface irrigation	>1.0	0.6 - 1.0	<0.6	Possible waterlogging Increased risk of runoff May limit plant growth (trees)
	Absorption system	>1.5	1.2 - 1.5	<1.2	May restrict seepage Resurfacing hazard Groundwater pollution hazard
Depth to high episodic/ seasonal water table (as evidenced by mottling) (m)	Subsurface irrigation	>1.0	0.75 - 1.0	<0.75	Resurfacing hazard Groundwater pollution hazard
	Surface irrigation	>1.0	0.6 - 1.0	<0.6	Resurfacing hazard Groundwater pollution hazard
	Absorption system	>1.5	1.2 - 1.5[2]	<1.2	May restrict seepage Groundwater pollution hazard

Soil features – scenario

- Go through the soil features scenario example using the scenario soil data
- Consider what impact the soil features could have on the OWM design and possible mitigation measures that could be used

Scenario 1 – soil testing



SSE for tiny houses

- Exemption from full SSE requirements for tiny house assessment (p85):
  - 1 bedroom, 3 occupants, stand alone OWMS, waterless composting toilet, no flushing toilet, dishwasher or bath
- 1 borehole in EAA, limiting layer texture test and modified Emerson Aggregate Test
- Recommended absorption bed lengths based on soil category only
- Very conservative design