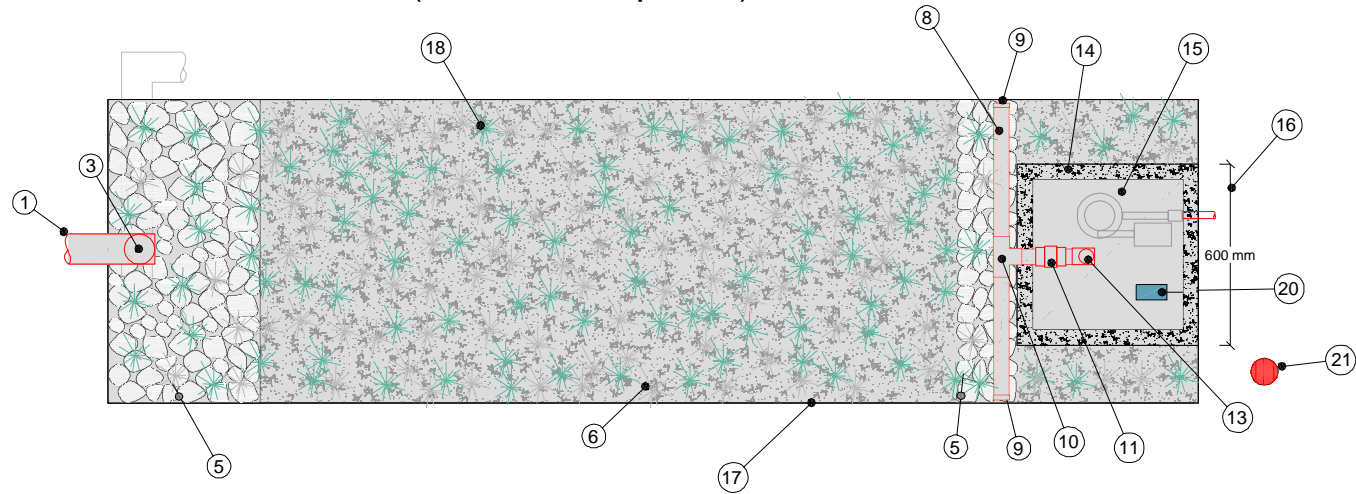
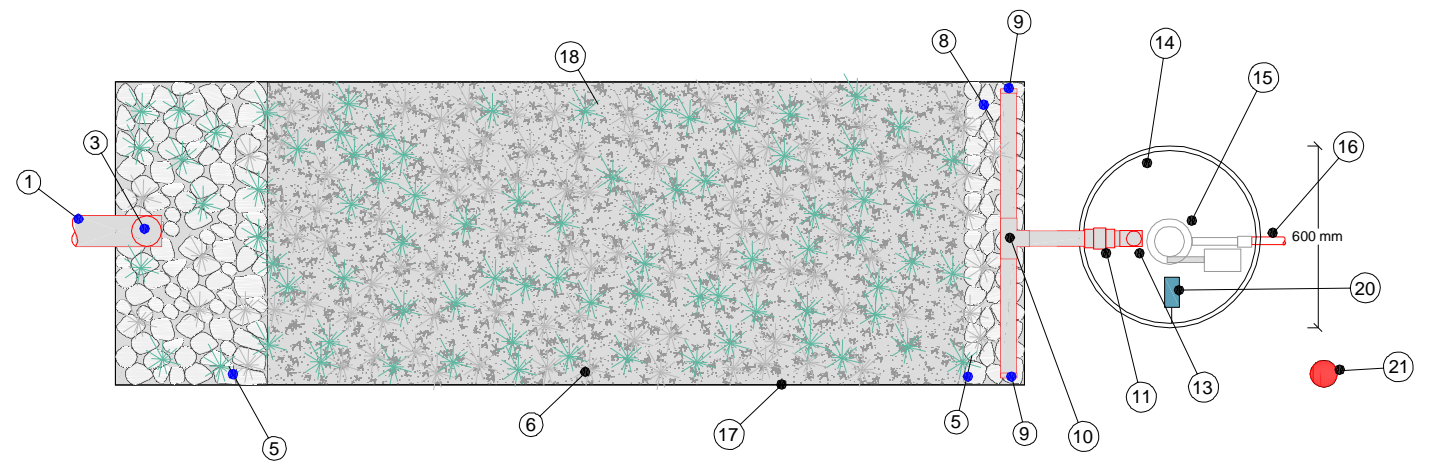


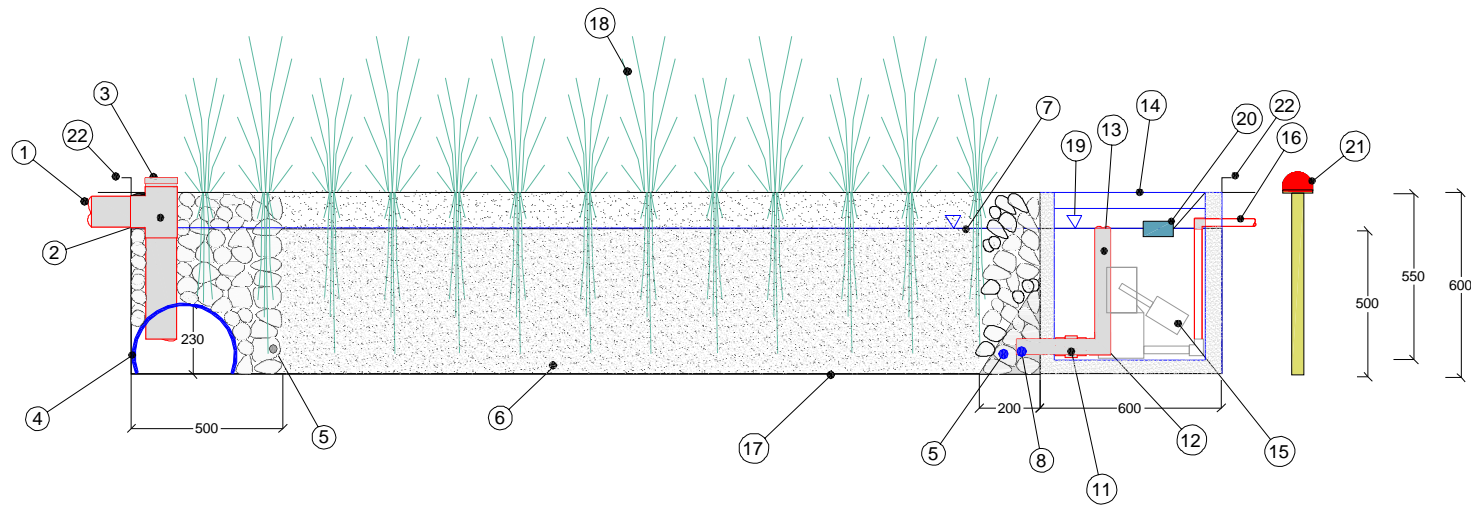
Sub-surface Wetland (Internal Pump Well) - PLAN VIEW



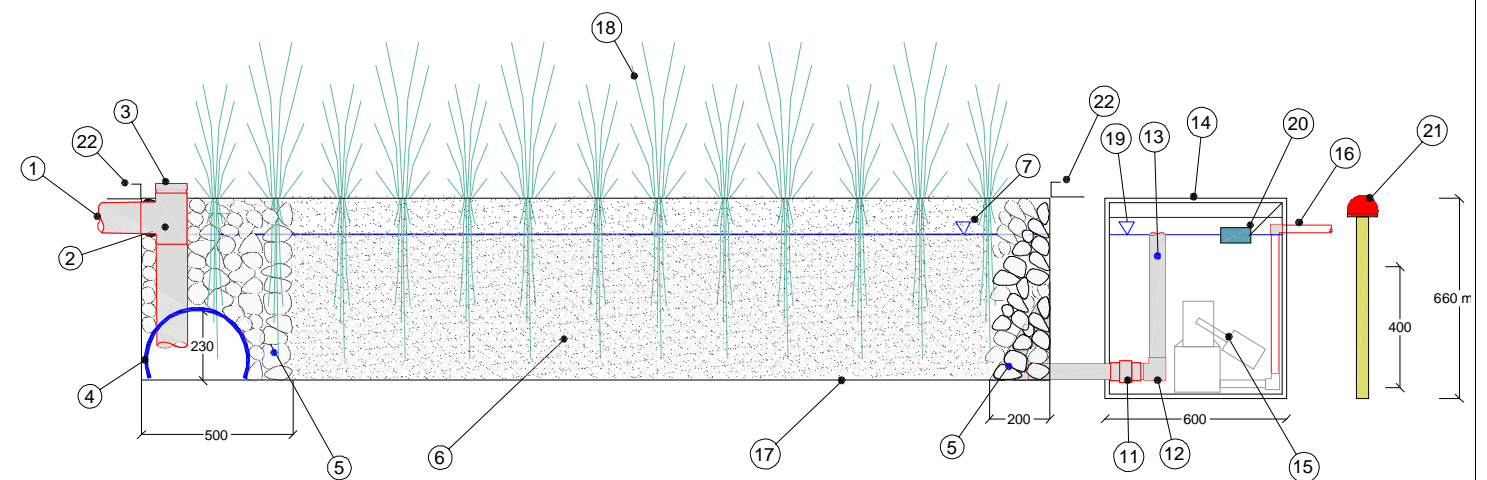
Sub-surface Wetland (External Pump Well) - PLAN VIEW



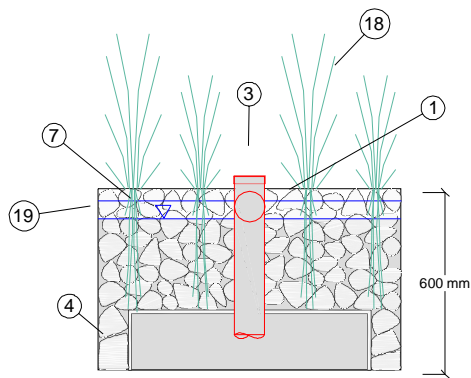
Sub-surface Wetland (Internal Pump Well) - LONG SECTION



Sub-surface Wetland (External Pump Well) - LONG SECTION



Inlet - CROSS SECTION



Minimum Components and Design Requirements

1. Inlet line from primary treatment unit (e.g. septic tank) - 100mm PVC pipe.
2. 100 mm PVC joining T.
3. 100 mm capped inspection port for maintenance and management purposes.
4. Self-supporting perforated arch (usually made from PVC), distributes effluent evenly.
5. Medium rocks/ very coarse aggregate (50-100 mm).
6. Gravel media (10 mm diameter). Maximum fine grade material < 5%.
7. Operating water level (approximately 100 mm below top of gravel). Controlled by rubber riser in the pump well. Minimum water level 500 mm.
8. 50 mm perforated PVC pipe. Perforations should be a minimum 10 mm diameter, spaced at 300 mm intervals along each of the 4 pipe axes'.
9. End cap.
10. 50 or 100 mm PVC joining T.
11. 50 or 100 mm PVC barrel union if required.
12. 50 or 100 mm PVC 90 degree bend. Junction should be left unglued to enable periodic draining of reed-bed.

13. 50 or 100 mm rubber riser. The water level in the wetland can be adjusted by loosening the barrel union and tilting the riser horizontally. The barrel must be retightened after altering the riser position. The wetland can be drained by removing the PVC pipe and rubber riser at the barrel union.
14. Final pump well chamber with lid. Detachable lids of inspection ports are acceptable. Lids can be made from a range materials including, plastic and concrete.
15. Treated effluent pump (Dosing siphon can be used if sufficient static head).
16. Effluent transfer line (25 or 40 mm) where pump is employed.
17. Impermeable container, preferably made from UV-stabilised polyethylene. Other approved lining materials include: (1) stainless steel, (2) polyethylene water troughs, (3) waterproofed brick and concrete. Flexible plastic liners must not be used as liners.
18. Wetland species (eg. typha, phragmites), initially planted at minimum of 3 plants/m2 when fluid reaches level accessible to roots.
19. High water level.
20. Float switch activating high-level alarm.
21. High-level alarm system, located adjacent to the pump well. Alarm must be clearly audible and/or visible from house or office.

22. Lip around top of reed-bed to reduce or prevent run-on and provide additional effluent storage. Lip to be 100 mm above surrounding soil level for slopes <10% and 150 mm for slopes >10%.

Notes

- a. Design is suitable for slopes up to 20 %, provided that adequate reinforcement is provided to prevent lower sides from bowing out. On slopes of greater than 20%, circular or more heavily reinforced designs should be considered.
- b. A minimum buffer of 2 m to residential buildings is required, and 10 m is recommended.
- c. The outlet and inlet devices should be accessible to allow for maintenance and operation inspections.
- d. Impermeable vessels and pipe work are to be installed by a licensed plumber in accordance with the manufacturers recommendations. A council inspection should be performed when the liner has been installed.
- e. All pipe work and fitting should comply with relevant standards.
- f. All materials should be durable and of non-corrosive components with an expected operating life of at least 15 years.
- g. Edges must cover exposed plastic to reduce UV deterioration.
- h. Stormwater diversion structures may be required to prevent stormwater from entering reed bed.

Final Draft

CLIENT/ PROJECT North Coast Councils	TITLE Example Design Sub-surface Reed-Bed Treatment System	DESIGNED: DM	DATUM: na	SHEET 1	REV.	DESCRIPTION	DATE	ISSUED
	PROJECT MANAGER:	DRAWN: DM	HORIZONTAL RATIO: na	OF 10 SHEETS	1.0	Sub-surface wetland / Reed bed design guide.	04/11/2003	DM
All measurements in mm unless otherwise specified.	PROJECT REFERENCE / DRAWING NUMBER: 2003G812JD2.2	REVIEWED: DL	VERTICAL RATIO: na	PAPER SIZE: A3	2.0	Amended sub-surface wetland / reed bed design guide.	14/01/2004	DM
					3.0	Final sub-surface wetland / reed bed design guide.	11/03/2004	DM
					4.0	Example Design Reed-Bed	18/04/2005	PDD