

Nominated Area Water Balance & Storage Calculations - Wick Trench Design (EPA compliant)

Site Address: **Beech Forest** Secondary Effluent - Wick Trench 5 or more bedrooms

INPUT DATA DO NOT MODIFY CELLS IN BLUE

Design Wastewater Flow	Q	1,080	L/day
Daily DLR		20.0	mm/day
Nominated Land Application Area	L	72.0	m sq
Crop Factor	C	0.5-0.7	unitless
Retained Rainfall	RR	0.85	unitless
Void Space Ratio	V	0.45	unitless
Rainfall Data	Beech Forest		
Evaporation Data	Beech Forest		

Estimated daily load from 5 bedroom residential property, with standard water fixtures and town water
 Enter DLR from table at right based on Appendix A Table 9 EPA Code of Practice (2013) for limiting soil horizon
 Used for iterative purposes to determine storage requirements based on nominated trench/bed bottom area
 Estimates evapotranspiration as a fraction of ET_0 ; varies with season and crop type (from EPA 168)
 Proportion of rainfall that remains onsite and infiltrates; function of slope/cover, allowing for any runoff
 Proportion of trench that is available for storage (assumes arch drain)
 BoM 70th percentile monthly
 SILO Data Drill Average monthly

Bed Water available (days) = **90**

Soil Category (AS1547:2012)	DLR
Gravels & Sands (1)	NS
Sandy Loams (2) Loams (3) High/Mod Clay Loams (4a)	NS
Weak Clay Loams (4b)	20
Massive Clay Loams (4)	10
Strong Light Clays (5a)	12
Moderate Light Clays (5b)	10
Weak Light Clays (5c)	8
Medium to Heavy Clays (6)	5

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Days in month	D	\	days	31	28	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	365
Rainfall	R	\	mm/month	88.1	90.8	114.0	178.8	207.7	242.0	232.7	243.6	213.1	187.2	134.1	113.6	88.1	90.8	114.0	178.8	207.7	242.0	2,045.7
Potential Evapotranspiration	ET_0	\	mm/month	128.0	105.0	87.0	54.0	34.0	22.0	26.0	38.0	55.0	81.0	97.0	118.0	128.0	105.0	87.0	54.0	34.0	22.0	846.0
Crop Factor	C			0.70	0.70	0.70	0.60	0.50	0.45	0.40	0.45	0.55	0.65	0.70	0.70	0.70	0.70	0.70	0.60	0.50	0.45	
OUTPUTS (LOSSES)																						
Evapotranspiration	ET	$ET_0 \times C$	mm/month	89.6	73.5	60.9	32.4	17.0	9.9	10.4	17.1	30.3	52.7	67.9	82.6	89.6	73.5	60.9	32.4	17.0	9.9	544.2
Percolation	B	(DLR) \times D	mm/month	620.0	560.0	620.0	600.0	620.0	600.0	620.0	620.0	600.0	620.0	600.0	620.0	620.0	560.0	620.0	600.0	620.0	600.0	7,300.0
Outputs		ET+B	mm/month	709.6	633.5	680.9	632.4	637.0	609.9	630.4	637.1	630.3	672.7	667.9	702.6	709.6	633.5	680.9	632.4	637.0	609.9	7,844.2
INPUTS (GAINS)																						
Retained Rainfall	Re	R \times RR	mm/month	74.9	77.2	96.9	152.0	176.5	205.7	197.8	207.1	181.1	159.1	114.0	96.6	74.9	77.2	96.9	152.0	176.5	205.7	1,738.8
Applied Effluent	W	(QxD)/L	mm/month	465.0	420.0	465.0	450.0	465.0	450.0	465.0	465.0	450.0	465.0	450.0	465.0	465.0	420.0	465.0	450.0	465.0	450.0	5,475.0
Inputs		Re+W	mm/month	539.9	497.2	561.9	602.0	641.5	655.7	662.8	672.1	631.1	624.1	564.0	561.6	539.9	497.2	561.9	602.0	641.5	655.7	7,213.8
STORAGE CALCULATION (Δ)																						
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	10.1	111.9	183.9	261.6	263.5	155.7	0.0	0.0	0.0	0.0	0.0	0.0	10.1	
Storage for the month	S	((Re+W)-(ET+B))/V	mm/month	-377.1	-302.9	-264.4	-67.6	10.1	101.8	72.0	77.7	2.0	-107.8	-230.9	-313.4	-377.1	-302.9	-264.4	-67.6	10.1	101.8	-1,400.8
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	10.1	111.9	183.9	261.6	263.5	155.7	0.0	0.0	0.0	0.0	0.0	0.0	10.1	111.9	
Maximum Storage Depth for Nominated Area	N		mm	263.5																		
Maximum Storage Vol. for Nominated Area	V	N \times L	L	18,974																		

BOTTOM AREA REQUIRED FOR ZERO STORAGE m² 52.7 54.4 57.3 67.4 72.7 80.2 77.4 77.9 72.1 65.2 58.5 55.2 52.7 54.4 57.3 67.4 72.7 80.2

MINIMUM BOTTOM AREA REQUIRED FOR ZERO STORAGE: **81** m² Value is based on the worst month of the year, so the balance overestimates the storage requirement for all other months. Assumes zero effluent depth (storage) in trench/bed. Model is run for 18-months to ensure trench/bed empties at least once per cycle.

- Wick trench dimensions (mm) Trench Width = **600** Depth = **450**
 Bed Width = **1,000** Depth = **150**
- Recommended wick trench length (m) = **85.0**
- Minimum trench spacing: 1m for Soil Categories 1-3; and 1.5m for Soil Categories 4-6
- No. of trenches @ (max) 20m length = **5**
- Total footprint with 1m spacing (m²) = **252**
- Total footprint with 1.5m spacing (m²) = **294**

