Infiltration Worksheet

Infiltration System

This sheet allows user to enter effluent concentration and details of infiltration system

Substance		**Naphthalene**		From introduction sheet
Compliance value or environmental standard	C_T	**1.00E-03**	**mg/l**	From introduction sheet

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Concentration of substance in discharge (entering infiltration system)	C_e	9.00E-03	mg/l	Concentration in interceptor chamber	
Type of treatment plant		**Other**			
Water use and percolation rate (for use only with septic tanls and package treatment plants)					
Number of persons	p				*Not valid for this treatment plant option*
Water use		1.80E+02	litres/person/day		*Not valid for this treatment plant option*
Percolation rate	Vp		s/mm		*Not valid for this treatment plant option*
Specify discharge (Q1) or calculate based on use (Q2)		**Specified discharge Q1**			
Discharge rate	Q1	1.40E+01	m^3/d	Maximum passing through the interceptor	
Calculated discharge	Q2	0.00E+00	m^3/d		*Value specifed by user and not calculated*
Area of drainage fied and hydraulic loading					
Specify area of drainage field or calculate based on percolation rate		**Specify**			
Enter area of drainage field	A	4.00E+00	m^2	2x2m Soakaway	
Calculated area of drainage field	A	0.00E+00	m^2		*Value specifed by user and not calculated*
Calculated infiltration rate	Inf	3.50E+00	m/d		

Site being assessed:	MLB Autospares Ltd
Completed by:	David Walker
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Infiltration Worksheet

Attenuation unsaturated zone

This sheet calculates attenuation factor for the unsaturated zone; concentration at base of unsaturated zone and discharge consent limit

Contaminant		**Naphthalene**		From introduction sheet
Compliance value or environmental standard	C_T	**1.00E-03**	mg/l	From introduction sheet
Concentration of substance in substance in discharge (entering infiltration system)	C_e	**9.00E-03**	mg/l	From infiltration sheet

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Drainage Layer					
Infiltraton rate	**Inf**	**3.50E+00**	**m/d**	From infiltration sheet	
Thickness of drainage layer	S_1	2.00E+00	m		
Water filled porosity	θ_1	1.00E-01	fraction	Lower range for sandy soils	
Bulk density	ρ_1	2.50E+00	g/cm^3	Bulk Density of crushed concrete - typical backfill of soakaway	
Calculated dispersivity	D_1	2.00E-01	m	calculated	
Option to select degradation	**Degradation occurs - sorbed and dissolved phases**				
Half life for degradation of substance	$t_{1/2}$	5.00E+00	days	Average 1 to 10 days in water	
Calculated decay rate	λ_1	1.39E-01	days^{-1}	calculated (very low value set if no degradation)	*Calculated from half life (above)*
Enter method of defining partition co-efficient (using pull down list)	**User specified value for partition coefficient**				
Entry if specify partition coefficient (option)					
Soil water partition coefficient	Kd_1	5.00E+01	l/kg	High Kd due to likely high FOC	
Entry for organic chemicals (option)					
Fraction of organic carbon (in soil)	foc_1	1.00E-02	fraction		*Not valid - User specified value used*
Organic carbon partition coefficient	Koc_1	1.00E+01	l/kg		*Not valid - User specified value used*
Soil water partition coefficient used in assessment	**Kd_1**	**5.00E+01**	**l/kg**	*Specified value*	
Retardation factor	Rfu_1	1.25E+03			
Unretarded travel time (no dispersion)	tu_1	5.71E-02	d		
Unretarded travel time (with dispersion)	tu_1	5.14E-02	d		
Retarded travel time (with dispersion)	tr_1	6.43E+01	d		
Attenuation factor	AFu_1	4.64E+02			
Unsaturated Zone					
Thickness of unsaturated zone below drainage field	S_2	1.00E+01	m	10m to groundwater	
Water filled porosity	θ_2	1.50E-01	fraction	Average for sandstone	
Bulk density of unsaturated zone	ρ_2	2.40E+00	g/cm^3	Well cemented sandstone	
Calculated dispersivity	D_2	1.00E+00	m	calculated	
Option to select degradation	**Degradation occurs - sorbed and dissolved phases**				
Half life for degradation of substance	$t_{1/2}$	5.00E+00	days	Average 1 to 10 days in water	
Calculated decay rate	λ_2	1.39E-01	days^{-1}	calculated (very low value set if no degradation)	*Default value of 1/10^99 used*
Fraction of rapid flow through unsaturated zone	B	1.00E-01	fraction	*10% rapid flow through potential fractures*	
Enter method of defining partition co-efficient (using pull down list)	**User specified value for partition coefficient**				
Entry if specify partition coefficient (option)					
Soil water partition coefficient	Kd_2	5.00E+01	l/kg	High Kd due to likely high FOC	
Entry for organic chemicals (option)					
Fraction of organic carbon (in soil)	foc_2	6.00E-01	fraction		*Not valid - User specified value used*
Organic carbon partition coefficient	Koc_2	1.00E+01	l/kg		*Not valid - User specified value used*
Soil water partition coefficient used in assessment	**Kd_2**	**5.00E+01**	**l/kg**	*Specified value*	
Retardation factor	Rfu_2	8.01E+02			
Unretarded travel time (no dispersion)	tu_2	4.29E-01	d		
Unretarded travel time (with dispersion)	tu_2	3.86E-01	d		
Retarded travel time (with dispersion)	tr_2	3.09E+02	d		
Attenuation factor	AFu_2	3.53E+07			
Total unretarded travel time	$tu_1 + tu_2$	4.86E-01	d		
Total retarded travel time	$tr_1 + tr_2$	4.15E+02	d		

Attenuation factor and discharge consent limit

Drainage layer attenuation factor	**AFu_1**	**4.64E+02**		
Unsaturated zone attenuation factor	**AFu_2**	**3.53E+07**		
Concentration at base of drainage layer	**C_{dl}**	**1.94E-05**	**mg/l**	**below compliance value**
Concentration at base of unsaturated zone	**C_{wt}**	**1.94E-06**	**mg/l**	
		and		

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