Variables used in the Alternative Product Limit Calculator (Complete descriptions of variables appear in Appendix 2.4 of "Evaluation of Extractable Petroleum Hydrocarbons in Soil Technical Guidance", December 2018, Version 1.0)

Variable	Definition/ Purpose	Units	Default Value	Measurement or Calculation	Notes
C	Mass concentration of product in dry soil	mg/kg	No	Calculation	Alternative EPH Product Limit in the calculator
M_o	Mass of product	mg	No	Calculation	
M_s	Mass of dry soil	kg	No	Calculation	
θ	Porosity: Volume not occupied by soil grains	Unitless	0.41	N/A	0.41 value Set by the NJDEP
ρ_s	Grain density	g/cm3	2.54	Calculation	2.54 value Set by the NJDEP
θ_o	Product-filled porosity	Unitless	No	Calculation	
ρ_o	Petroleum hydrocarbon density	g/cm3	No	N/A	Literature values
ρ_b	Soil bulk density	g/cm3	1.50	N/A	1.5 value Set by the NJDEP
q	Darcy flux value	ft/yr	0.01	N/A	Defined as immobile for this guidance (1ft/100yrs) from IGW SESOIL FAQ (NJDEP 2013).
K	Hydraulic conductivity value	ft/yr	0.01	Calculation	From hydraulic conductivity and gradient
i	Hydraulic gradient of product	unitless	1.00	N/A	1 set by NJDEP, represents vertical flow (most conservative approach)
g	Gravitational acceleration constant	m/s2	9.81	N/A	Constant, literature value
μ	Dynamic viscosity of product	poise kg/(m·s)	No	N/A	Specific for each product
k	Intrinsic permeability: Property of the soil only	m2	No	Calculation	Calculated from porosity and D_{10} using Kozeny-Carmen equation
k_r	Relative permeability of soil to a specific product	Unitless	No	Calculation	
S_e	Effective petroleum hydrocarbon saturation ratio	Unitless	No	Calculation	
n	van Genuchten Uniformity Coefficient (grain shape parameter)	Unitless	4.00	N/A	Set by committee at 4 as a reasonable choice for a well-sorted soil.
S	NAPL saturation ratio	Unitless	No	Calculation	
S_r	Residual petroleum hydrocarbon ratio	Unitless	0.02	N/A	Literature value
θ_r	Residual petroleum hydrocarbon content	Unitless	0.08	Calculation	θ_r = Sr. Ø
D_{10}	effective diameter: sieve diameter that passes 10%	mm	No	Measurement	Laboratory-determined by grain size distribution