Cat 1 Sulfate Mass Flux to West Pit after Installation of Geomembrane Cover

\[ A_G := 541.6 \text{-acre} \]

Area of Cat 1 with geomembrane (Table 1-1, sheet 1)

\[ X_{50} := 0.00325121 \]

P50 percolation (P50 obtained from log-normal input to GoldSim)

\[ R_{50} := 3.05^3 \text{in yr}^{-1} \]

P50 rainfall (Table 1-1, sheet 5)

\[ Q_{perc} := X_{50} R_{50} A_G \]

P50 percolation flow rate

\[ \text{pH} := \frac{7.8 + 8.1}{2} \]

P50 Cat 1 pH for geomembrane cover (Table 1-1, sheet 1)

\[ \text{pH} = 7.95 \]

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\[ \text{Mg} := \frac{0.235127}{24.305} \]

P50 magnesium release rate in mmole/kg/week (Table 1-1, sheet 1)

\[ \text{Mg} = 9.674 \times 10^{-3} \]

\[ \text{Ca} := \frac{1.10426}{40.078} \]

P50 calcium release rate in mmole/kg/week (Table 1-1, sheet 1)

\[ \text{Ca} = 0.028 \]

\[ \text{K} := \frac{0.191692}{39.0983} \]

P50 potassium release rate in mmole/kg/week (Table 1-1, sheet 1)

\[ \text{K} = 4.903 \times 10^{-3} \]

\[ \text{Na} := \frac{0.227726}{22.989} \]

P50 sodium release rate in mmole/kg/week (Table 1-1, sheet 1)

\[ \text{Na} = 9.906 \times 10^{-3} \]

\[ \text{CAP}_{SO4} := \left[ \frac{1294}{\text{Ca}} \left( \frac{0.5 \cdot \text{Na} + 0.5 \cdot \text{K}}{\text{Mg}} \right) + 1760 \right] \text{mg SO4 conc into PRB based on above P50 release rates} \]

\[ \text{CAP}_{SO4} = 2562 \text{mg L}^{-1} \]

\[ \text{CSO4}_\text{in} := \text{CAP}_{SO4} \]

Sulfate concentration of inflow into PRB (set to CAP concentration)

\[ \text{CSO4}_\text{in} = 2562 \text{mg L}^{-1} \]

\[ \text{MSO4}_\text{in} := Q_{perc} \cdot \text{CSO4}_\text{in} \]

Mass flux of sulfate into PRB

\[ \text{MSO4}_\text{in} = 13.157 \text{tonne yr}^{-1} \]

\[ \text{FSO4} := 50\% \]

Total percent removal of sulfate in PRB

\[ \text{FSO4} = 50\% \]

\[ \text{MSO4}_\text{out} := (1 - \text{FSO4}) \cdot Q_{perc} \cdot \text{CSO4}_\text{in} \]

Mass flux of sulfate out of PRB to West Pit

\[ \text{MSO4}_\text{out} = 6.579 \text{tonne yr}^{-1} \]

\[ \text{CSO4}_\text{out} := \frac{\text{MSO4}_\text{out}}{Q_{perc}} \]

Sulfate concentration in water out of PRB to West Pit

\[ \text{CSO4}_\text{out} = 1281 \text{mg L}^{-1} \]

\[ \text{Can't Find} \]

\[ \text{FSO4} \]

\[ \text{Can't Find} \]

\[ \text{MSO4}_\text{out} \]

\[ \text{Can't Find} \]

\[ \text{CSO4}_\text{out} \]

\[ \text{Can't Find} \]

\[ \text{FSO4} \]

\[ \text{Can't Find} \]

\[ \text{MSO4}_\text{out} \]

\[ \text{Can't Find} \]

\[ \text{CSO4}_\text{out} \]

\[ \text{Can't Find} \]

\[ \text{FSO4} \]

\[ \text{Can't Find} \]

\[ \text{MSO4}_\text{out} \]

\[ \text{Can't Find} \]

\[ \text{CSO4}_\text{out} \]

\[ \text{Can't Find} \]