Considerations for Exfiltration

- Considerable organic matter & nutrients contributed
- Native microbes outcompete/consume pathogens
- Biomat develops in soil, thus slowing infiltration, sorbing viruses and filtering bacteria/protozoa
- Soil moisture/grain size, redox and pH conditions influence sorption, filtration & degradation kinetics
- Survival times increase with soil sterility, moisture, organic matter, alkalinity, and low temperatures

Pathogen Survival Times (days)

Pathogen	Soils	Water	Surface
Viruses	<20-100	<50-120	<20
Bacteria (general)	<10-70	<10-30	<10-20
Fecal Coliform	<20-50	<30-60	<15-30
Protozoa cysts	<10-20	<15-30	<10
Helminth eggs	>180	>180	<30-60
Pollutants/Nutrients	*<10-Years*	*<10-Years*	---

Based on data from WHO (1989), Strauss (2013) & Feachem et al. (1983)

Relevant Observations

- Soils can act as filters/sorbents for pathogens, but macropores and channels can reduce effect
- Transport of pathogens via particulates/flocs is rare in soils but predominant in surface runoff
- Monitoring refractory & non-retarded components of sewage (EDTA, caffeine, pharmaceuticals, etc.)
- Microbial source tracking (MST) rarely conducted to genetically or biochemically identify origin of pathogens in coastal seawater