

Conceptual Site Model Considerations - Terrestrial/Groundwater	
Site Name	
Site Description	Location:
	Size:
	Site Status: <input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Unknown
Site Conditions	
Current Conditions (Request maps of site and adjacent areas)	<p>Describe present site conditions using information obtained during property inspection or site-specific documents to identify:</p> <ul style="list-style-type: none"> <input type="checkbox"/> On-site land use (e.g. residential, industrial, recreational, commercial, school) <input type="checkbox"/> Land use on adjacent property <input type="checkbox"/> Site topography and surface water runoff patterns <input type="checkbox"/> Surface features (pavement, buildings, landscaping, etc.) <input type="checkbox"/> Subsurface infrastructure (pipelines, french drains, utility conduits, ponds, wetlands, drainage features, etc.) <input type="checkbox"/> Number/type of people (residents [adults/children], industrial workers, construction workers) <input type="checkbox"/> Distance from base boundary, beneficial use wells, or other sensitive resources <input type="checkbox"/> Distance to nearest off-base community (residential and non-residential) <input type="checkbox"/> Site investigation phase, cleanup, or post-cleanup phase <input type="checkbox"/> Biological habitats present on and near the site <input type="checkbox"/> Site ownership/control and easements
Future Conditions	Describe potential future conditions (obtain from Base Master Plans or redevelopment plans for property transfers), consider including information as was identified under "current conditions" above.
Geology and Hydrogeology	<ul style="list-style-type: none"> <input type="checkbox"/> Description of regional and site geology <input type="checkbox"/> Physical properties of subsurface materials (e.g., porosity, bulk density, moisture content) <input type="checkbox"/> Stratigraphy, including thickness, lateral extent, continuity of units, and presence of depositional features, such as channel deposits, that may provide preferential pathways for or barriers to contaminant transport or implementation of remedial options <input type="checkbox"/> Geologic structures that may form preferential pathways for contaminant migration, zones of accumulation, or may potentially impact in-situ or ex-situ remedial options <input type="checkbox"/> Aquifer characteristics including: <ul style="list-style-type: none"> • On-site and immediate downgradient groundwater use (potable vs. non-potable) • Depth to groundwater and seasonal variation • Hydraulic gradients (horizontal and vertical) (natural vs. induced) and flow velocities

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	<ul style="list-style-type: none"> • Groundwater recharge and discharge information • Groundwater/surface water interactions • Tidal influence • Halocline or thermocline potentially influencing transport or mixing
Geochemistry and Biotic Conditions	<p>Identify conditions that may impact fate and transport of chemicals in vadose zone and/or saturated zone:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Redox conditions (including these parameters: pH, DO, ORP, Fe, Mn, sulfate, methane, alkalinity) <input type="checkbox"/> Groundwater pH and buffering capacity <input type="checkbox"/> Nutrients to support in situ bioremediation <input type="checkbox"/> Potential electron acceptors and/or donors for biodegradation <input type="checkbox"/> Organic carbon content <input type="checkbox"/> Average soil/groundwater temperature <input type="checkbox"/> Fresh, brackish, or saline groundwater conditions
Meteorology	<ul style="list-style-type: none"> <input type="checkbox"/> Climate <input type="checkbox"/> Prevailing wind direction and speed <input type="checkbox"/> Seasonal precipitation and evaporation <input type="checkbox"/> Irrigation
Nature and Extent of Contamination	
Identify Potential Hazardous Substance Releases	<ul style="list-style-type: none"> <input type="checkbox"/> Fuel tanks (AST/UST/bladders) (fuel type, tank specs, integrity), dispensers, and associated lines <input type="checkbox"/> Degreasing operations (dip tanks, wash stands, gun cleaning areas) <input type="checkbox"/> Painting and plating operations (tanks, sand blast areas, paint booths, plating baths) <input type="checkbox"/> Hydraulic lifts and load rack areas <input type="checkbox"/> Drum or packaged storage areas <input type="checkbox"/> Maintenance areas (garages, public works office, landscape) <input type="checkbox"/> Landfills, burn pits, incinerators, dumps, waste disposal pits/trenches <input type="checkbox"/> Recycling centers & DRMO yards <input type="checkbox"/> Waste handling areas (oil water separators, sewer lines, sewage treatment plants, TSD facilities, leach lines, transfer stations) <input type="checkbox"/> Waste discharge areas (storm drains, drainage ditches, sumps, process effluent, random dumping of process waste)

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	<input type="checkbox"/> Pesticide areas (storage, mixing, loading, equipment cleaning, spills) <input type="checkbox"/> Surface impoundment (treatment lagoon, evaporation pond, wastewater treatment pond) <input type="checkbox"/> Munitions-related activities (R&D labs, ranges, demilitarization, OB/OD training) <input type="checkbox"/> Fire-fighter training areas <input type="checkbox"/> Dredge spoil areas, imported fill <input type="checkbox"/> Contaminated waste oil used for dust suppression <input type="checkbox"/> Areas of known or suspected surface spills <input type="checkbox"/> Research and development areas (laboratories, test stands, test ranges) <input type="checkbox"/> Other:
Impacted Media	<input type="checkbox"/> Surface soil <input type="checkbox"/> Subsurface soil <input type="checkbox"/> Groundwater <input type="checkbox"/> Sediment ⁽¹⁾ <input type="checkbox"/> Surface Water ⁽¹⁾ <input type="checkbox"/> Indoor Air/Outdoor Air ⁽²⁾ <input type="checkbox"/> Soil gas ⁽²⁾
Description of Contamination (Request figures)	<p>For each area of contamination, record the following information:</p> <input type="checkbox"/> Describe history of contamination <input type="checkbox"/> Describe previous remedial/removal actions <input type="checkbox"/> Depth to top of contamination <input type="checkbox"/> Depth to bottom of contamination <input type="checkbox"/> Location of contamination relative to site strata <input type="checkbox"/> Horizontal extent of contamination <input type="checkbox"/> Potential for contaminant mobility (leaching, soil gas transport, groundwater plume) <p>For impacted groundwater only:</p> <input type="checkbox"/> Plume orientation, direction, and speed <input type="checkbox"/> Plume expanding, stable, or shrinking <input type="checkbox"/> Distance to sensitive receptors (e.g., residential or non-residential developments, domestic wells, surface water bodies) or installation boundary
COPC Identification and Properties	<input type="checkbox"/> Identify COPCs <input type="checkbox"/> volatile organics <input type="checkbox"/> semivolatile organics <input type="checkbox"/> metals

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	<input type="checkbox"/> NAPL <input type="checkbox"/> Identify key chemical and physical properties of each COPC <input type="checkbox"/> Identify COPC concentrations in each medium
Assess Quality of Data	<p>Are there sufficient data of adequate quality and quantity to support a quantitative risk assessment?</p> <input type="checkbox"/> Age of the data <input type="checkbox"/> Number of sample events/number of samples <input type="checkbox"/> Media sampled <input type="checkbox"/> Sample collection methods <input type="checkbox"/> Analyses conducted for all suspected chemicals and degradation products <input type="checkbox"/> Reporting limits sufficiently low for comparison to screening criteria <input type="checkbox"/> Sampling locations relative to source area and current understanding of CSM <input type="checkbox"/> Nature and extent of contamination delineated
Contaminant Phases	<input type="checkbox"/> Dissolved <input type="checkbox"/> DNAPL <input type="checkbox"/> LNAPL <input type="checkbox"/> Sorbed <input type="checkbox"/> Vapor
Contaminant Release Mechanisms	<p>Source # : <input type="checkbox"/> infiltration/percolation <input type="checkbox"/> volatilization <input type="checkbox"/> fugitive dusts <input type="checkbox"/> erosion/runoff <input type="checkbox"/> uptake by plants</p> <p>Source # : <input type="checkbox"/> infiltration/percolation <input type="checkbox"/> volatilization <input type="checkbox"/> fugitive dusts <input type="checkbox"/> erosion/runoff <input type="checkbox"/> uptake by plants</p> <p>Source # : <input type="checkbox"/> infiltration/percolation <input type="checkbox"/> volatilization <input type="checkbox"/> fugitive dusts <input type="checkbox"/> erosion/runoff <input type="checkbox"/> uptake by plants</p>
Factors Affecting Migration	<p>Define the key subsurface characteristics and migration pathways:</p> <input type="checkbox"/> Heterogeneity and orientation of strata <input type="checkbox"/> Natural or man-made barriers to migration <input type="checkbox"/> Groundwater gradients <input type="checkbox"/> Retardation factors <input type="checkbox"/> Advective vs. diffusive contaminant transport <input type="checkbox"/> NAPL viscosity and capillary action <input type="checkbox"/> Biotic or abiotic attenuation factors <input type="checkbox"/> Identify locations and depths of underground utilities or other potential preferential pathways

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Establish Background Concentrations	<input type="checkbox"/> Surface soil <input type="checkbox"/> Subsurface soil for each geologic strata <input type="checkbox"/> Groundwater <input type="checkbox"/> Indoor Air ⁽²⁾ <input type="checkbox"/> Outdoor Air ⁽²⁾

Risk Assessment Exposure Pathways and Receptors

Current and Future Land Use	<p>Current:</p> <input type="checkbox"/> residential/school <input type="checkbox"/> industrial <input type="checkbox"/> commercial <input type="checkbox"/> agricultural <input type="checkbox"/> recreational <input type="checkbox"/> other <p>Future:</p> <input type="checkbox"/> residential/school <input type="checkbox"/> industrial <input type="checkbox"/> commercial <input type="checkbox"/> agricultural <input type="checkbox"/> recreational <input type="checkbox"/> other <p>Surrounding:</p> <input type="checkbox"/> residential/school <input type="checkbox"/> industrial <input type="checkbox"/> commercial <input type="checkbox"/> agricultural <input type="checkbox"/> recreational <input type="checkbox"/> other
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Media Affected or Potentially Affected by Soil Contamination	Source #: <input type="checkbox"/> air <input type="checkbox"/> groundwater <input type="checkbox"/> surface water <input type="checkbox"/> sediments Source #: <input type="checkbox"/> air <input type="checkbox"/> groundwater <input type="checkbox"/> surface water <input type="checkbox"/> sediments Source #: <input type="checkbox"/> air <input type="checkbox"/> groundwater <input type="checkbox"/> surface water <input type="checkbox"/> sediments
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Identify Potential Receptors	<p><u>Human</u></p> Current: <input type="checkbox"/> residents <input type="checkbox"/> visitors <input type="checkbox"/> workers <input type="checkbox"/> other: Future: <input type="checkbox"/> residents <input type="checkbox"/> visitors <input type="checkbox"/> workers <input type="checkbox"/> other: <p><u>Ecological</u></p> Current : <input type="checkbox"/> plants <input type="checkbox"/> mammals <input type="checkbox"/> invertebrates <input type="checkbox"/> avian <input type="checkbox"/> other: Future: <input type="checkbox"/> plants <input type="checkbox"/> mammals <input type="checkbox"/> invertebrates <input type="checkbox"/> avian <input type="checkbox"/> other:
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Identify Potential Routes of Exposure for each Receptor	<p><u>Human</u></p> Current: <input type="checkbox"/> ingestion <input type="checkbox"/> dermal contact <input type="checkbox"/> inhalation (outdoor) <input type="checkbox"/> inhalation (indoor) <input type="checkbox"/> food intake Rationale for exclusion of exposure pathway(s): Future: <input type="checkbox"/> ingestion <input type="checkbox"/> dermal contact <input type="checkbox"/> inhalation (outdoor)
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	<p><input type="checkbox"/> inhalation (indoor) <input type="checkbox"/> food intake</p> <p><u>For each Potential Ecological Receptor</u></p> <p>Current :</p> <p><input type="checkbox"/> ingestion <input type="checkbox"/> dermal contact <input type="checkbox"/> inhalation (outdoor) <input type="checkbox"/> food chain</p> <p><input type="checkbox"/> plant uptake</p> <p>Future:</p> <p><input type="checkbox"/> ingestion <input type="checkbox"/> dermal contact <input type="checkbox"/> inhalation (outdoor) <input type="checkbox"/> food chain</p> <p><input type="checkbox"/> plant uptake</p>
<p>Identify Appropriate Chemical-Specific Screening Level for Exposure</p>	<p>Human:</p> <p><input type="checkbox"/> generic (e.g., USEPA's Regional Screening Levels[RSL] for Chemical Contaminants at Superfund Sites [http://www.epa.gov/region09/superfund/prg/index.html]; USEPA MCL; Risk Assessment Information System website [http://rais.ornl.gov/tools/eco_search.php]; State-specific risk-based screening values).</p> <p><input type="checkbox"/> site-specific (back-calculation of risk-based screening levels)</p> <p>Ecological:</p> <p><input type="checkbox"/> generic (e.g., USEPA Ecological Benchmark Values [http://www.epa.gov/ecotox/ecossil/]; U.S. Navy Ecological Risk Assessment Guidance website [http://web.ead.anl.gov/ecorisk/methtool/]; Risk Assessment Information System website [http://rais.ornl.gov/tools/eco_search.php]; and state-specific screening values.</p> <p><input type="checkbox"/> site-specific (back-calculation of risk-based screening levels)</p>
<p>Is an Exposure Route Potentially Complete?</p>	<p><u>For each potential exposure route identified above, determine whether the exposure route is potentially complete.</u></p> <p><u>Human</u></p> <p>Current: <input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>Rationale for identifying incomplete exposure pathway(s):</p> <p>Future: <input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>Rationale for identifying incomplete exposure pathway(s):</p> <p><u>Ecological</u></p>

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	Current: <input type="checkbox"/> yes <input type="checkbox"/> no Rationale for identifying incomplete exposure pathway(s): Future: <input type="checkbox"/> yes <input type="checkbox"/> no Rationale for identifying incomplete exposure pathway(s):

(1) Sediment and surface water may become impacted due to soil and/or groundwater contamination (i.e., surface runoff, groundwater to surface water discharge). Please refer to the CSM consideration list developed especially for impact to sediment/surface water.

(2) Please refer to the CSM consideration list developed especially for vapor intrusion.