

Conceptual Site Model Considerations - Munitions	
Site Name	
Site Description	Location:
	Size:
	Site Status: <input type="checkbox"/> Active <input type="checkbox"/> Inactive <input type="checkbox"/> Unknown
<b>Site Conditions</b>	
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"> <li><input type="checkbox"/> Past munitions-related activity (e.g., munitions storage and handling, weapons training, munitions disposal) and the potential releases that may be associated with these activities (e.g., buried munitions, UXO, kick-outs from open burning/open detonation [OB/OD] areas)</li> <li><input type="checkbox"/> Expected locations and the depth and extent of contamination based on munitions and explosives of concern (MEC) activities</li> <li><input type="checkbox"/> Likely key contaminants associated with MEC<sup>(1)</sup></li> <li><input type="checkbox"/> Current land use</li> <li><input type="checkbox"/> Groundwater use (e.g., potable, irrigation, etc.)</li> <li><input type="checkbox"/> Land and groundwater use on adjacent property</li> <li><input type="checkbox"/> Surface features (pavement, buildings, landscaping, ponds, wetlands, drainage features, vegetation, topography, craters, etc.)</li> <li><input type="checkbox"/> Subsurface infrastructure (pipelines, french drains, utility conduits, etc.)</li> <li><input type="checkbox"/> Distance from base boundary</li> <li><input type="checkbox"/> Distance to nearest off-base community (residential and non-residential)</li> <li><input type="checkbox"/> Site investigation phase, cleanup, or post-cleanup phase</li> <li><input type="checkbox"/> Biological habitats present on and near the site</li> <li><input type="checkbox"/> Endangered species and habitats (wildlife refuge)</li> </ul>
Future Conditions	Describe potential future land use (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"> <li><input type="checkbox"/> Description of regional and site geology</li> <li><input type="checkbox"/> Physical properties of subsurface materials (e.g., porosity, bulk density, moisture content)</li> <li><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</li> <li><input type="checkbox"/> Geologic structures that may form preferential pathways for contaminant migration or zones of accumulation (settling basins)</li> <li><input type="checkbox"/> Description of terrain and soil type(s) (relevant for evaluating depth of penetration of</li> </ul>

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	<p>munitions and for determining the type of geophysical sensor(s) which may work best and the method of data gathering (e.g., man portable, towed, airborne, etc.) and sensor positioning (e.g., GPS, laser, total station, etc.)</p> <p><input type="checkbox"/> MEC transport via sluffing or mass movement on hillsides and due to runoff</p> <p><input type="checkbox"/> Aquifer characteristics including:</p> <ul style="list-style-type: none"> <li>• Depth to groundwater and seasonal variation</li> <li>• Hydraulic gradients (horizontal and vertical)</li> <li>• Groundwater recharge and discharge information</li> <li>• Groundwater/surface water interactions</li> <li>• Salinity</li> </ul>
Geochemistry and Biotic Conditions	<p>Identify conditions that may impact fate and transport of chemicals in vadose zone and/or saturated zone or the detection of MECs:</p> <p><input type="checkbox"/> Redox conditions</p> <p><input type="checkbox"/> Potential electron acceptors for biodegradation</p> <p><input type="checkbox"/> Organic carbon content</p> <p><input type="checkbox"/> Iron Content</p> <p><input type="checkbox"/> Average soil/groundwater temperature</p>
Meteorology	<p>(This is an issue on MEC sites and needs evaluation)</p> <p><input type="checkbox"/> Climate</p> <p><input type="checkbox"/> Prevailing wind direction and speed</p> <p><input type="checkbox"/> Precipitation patterns</p> <p><input type="checkbox"/> Frost heave (this is a big issue on MEC sites and requires significant evaluation)</p> <p><input type="checkbox"/> Areas of potential erosion</p>
<b>Nature and Extent of Contamination</b>	

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Source Mechanisms and Potential MEC		<b>MEC Use Type of Area</b>	<b>Possible Activity</b>	<b>Potential MEC</b>
	<input type="checkbox"/>	Small Arms	Pistol, rifle, machine gun and skeet ranges	Small arms ammo .50 Cal and under
	<input type="checkbox"/>	Grenade	Hand grenade range Rifle grenade range	Hand or rifle grenades
	<input type="checkbox"/>	Artillery	Anti-aircraft, tank, artillery, naval gunfire, recoilless rifle	Projectiles and submunitions, propellants
	<input type="checkbox"/>	Bombing	Aircraft bombing	Bombs and submunitions
	<input type="checkbox"/>	Air to air	Air to air firing	Small arms, projectiles and guided missiles
	<input type="checkbox"/>	Air to ground	Strafing, rockets and other air to ground activity	Small arms, projectiles, rockets, flares and guided missiles
	<input type="checkbox"/>	Ground to air	Anti-aircraft firing	Small arms, projectiles, rockets and guided missiles
	<input type="checkbox"/>	Ground to ground	Rocket and missile firing	Rockets and guided missiles
	<input type="checkbox"/>	Multiple/combined use	Multiple training activities	Small arms, projectiles, rockets, grenades, bombs
	<input type="checkbox"/>	Training/Maneuver Areas	Tactical training	Small arms, projectiles, signals, booby traps, trip flares, other pyrotechnic devices
	<input type="checkbox"/>	OB/OD Areas	Disposal of munitions	Various ammunition items
	<input type="checkbox"/>	Ammunition Plants	Production of explosives and munitions; load assembly and packaging of munitions	High explosives, explosive soils, process residuals
	<input type="checkbox"/>	Storage Areas/Transfer Points	Storage and handling of munitions	Various munitions and explosives in approved storage configuration
	<input type="checkbox"/>	Firing Points	Preparation and firing of approved weapons	Unfired or abandoned munitions and explosives
	<input type="checkbox"/>	Burial Pits	Mass burial of large quantities of MEC	Unfired or abandoned munitions and explosives
<input type="checkbox"/>	Bivouac Areas	Burial of small quantities of MEC	Unfired or abandoned munitions and explosives	
MEC Release Mechanisms	<input type="checkbox"/> Horizontal and vertical extent of MEC <input type="checkbox"/> Mishandling or loss <input type="checkbox"/> Abandonment <input type="checkbox"/> Burial <input type="checkbox"/> Firing or dropping - complete detonation <input type="checkbox"/> Firing or dropping - incomplete detonation <input type="checkbox"/> Firing or dropping - dud firing			

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|  | <input type="checkbox"/> Intentional placement<br><input type="checkbox"/> Kick-outs<br><input type="checkbox"/> Low-order detonations<br><input type="checkbox"/> Incomplete burning<br><input type="checkbox"/> Leaching |
|--|--|

- |                       |   |
|-----------------------|---|
| <b>Impacted Media</b> | <input type="checkbox"/> Surface soil <input type="checkbox"/> Subsurface soil <input type="checkbox"/> Groundwater <input type="checkbox"/> Sediment<br><input type="checkbox"/> Surface Water |
|-----------------------|---|

- |  |   |
|--|---|
| <b>Factors Affecting Potential for Exposure to MEC<sup>(2)</sup></b> | <input type="checkbox"/> Flooding and erosion<br><input type="checkbox"/> Frost heaving<br><input type="checkbox"/> Agricultural activities<br><input type="checkbox"/> Construction<br><input type="checkbox"/> Surface soil or vegetation removal<br><input type="checkbox"/> Depth of MEC <ul style="list-style-type: none"> <li><input type="checkbox"/> at surface</li> <li><input type="checkbox"/> at subsurface</li> </ul> <input type="checkbox"/> Type of Activities <ul style="list-style-type: none"> <li><input type="checkbox"/> intrusive</li> <li><input type="checkbox"/> nonintrusive</li> </ul> <input type="checkbox"/> Accessibility |
|--|---|

**Hazard/Risk Assessment Exposure Pathways and Receptors**

- |                                    |   |
|------------------------------------|---|
| <b>Current and Future Land Use</b> | <p>Current:</p> <input type="checkbox"/> residential <input type="checkbox"/> industrial <input type="checkbox"/> commercial <input type="checkbox"/> agricultural<br><input type="checkbox"/> recreational <input type="checkbox"/> other <p>Future:</p> <input type="checkbox"/> residential <input type="checkbox"/> industrial <input type="checkbox"/> commercial <input type="checkbox"/> agricultural<br><input type="checkbox"/> recreational <input type="checkbox"/> other <p>Surrounding:</p> <input type="checkbox"/> residential <input type="checkbox"/> industrial <input type="checkbox"/> commercial <input type="checkbox"/> agricultural<br><input type="checkbox"/> recreational <input type="checkbox"/> other |
|------------------------------------|---|

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Identify Potential Environmental Receptors	<p><u>Human</u>            Current:  <input type="checkbox"/> residents   <input type="checkbox"/> visitors   <input type="checkbox"/> workers   <input type="checkbox"/> recreational users  <input type="checkbox"/> other:            Future:  <input type="checkbox"/> residents   <input type="checkbox"/> visitors   <input type="checkbox"/> workers   <input type="checkbox"/> recreational users  <input type="checkbox"/> other:</p> <p><u>Ecological</u>            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:</p>
Identify Potentially Complete Routes of Exposure for Environmental Receptors	<p><u>Human</u>            Current:  <input type="checkbox"/> ingestion   <input type="checkbox"/> dermal contact   <input type="checkbox"/> inhalation (outdoor)   <input type="checkbox"/> inhalation (indoor)  <input type="checkbox"/> consumption of biota/produce            Rationale for exclusion of exposure pathway(s):            Future:  <input type="checkbox"/> ingestion   <input type="checkbox"/> dermal contact   <input type="checkbox"/> inhalation (outdoor)   <input type="checkbox"/> inhalation (indoor)  <input type="checkbox"/> consumption of biota/produce            Rationale for exclusion of exposure pathway(s):</p> <p><u>Ecological</u>            Current :  <input type="checkbox"/> ingestion   <input type="checkbox"/> dermal contact   <input type="checkbox"/> inhalation (outdoor)            Rationale for exclusion of exposure pathway(s):            Future:  <input type="checkbox"/> ingestion   <input type="checkbox"/> dermal contact   <input type="checkbox"/> inhalation (outdoor)            Rationale for exclusion of exposure pathway(s):</p>

(1) MCs of potential concern include explosive and nonexplosive materials, and the emissions, degradation, or breakdown products of such munitions, potentially including, but not limited to:  
 2-Amino-4,6-dinitrotoluene (2 A 4,6 DNT)

4-Amino-2,6-dinitrotoluene (4 A 2,6 DNT)  
1,3-Dinitrobenzene (1,3 DNB)  
2,4-Dinitrotoluene (2,4-DNT)  
2,6-Dinitrotoluene (2,6-DNT)  
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)  
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)  
Nitrobenzene (NB)  
Nitroglycerin (NG)  
2-Nitrotoluene (2-NT)  
3-Nitrotoluene (3-NT)  
4-Nitrotoluene (4-NT)  
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)  
Perchlorate  
1,3,5-Trinitrobenzene (1,3,5 TNB)  
2,4,6-Trinitrotoluene (TNT)

- (2) Please refer to other CSM consideration checklists for evaluation of MCs in soil, groundwater, surface water, sediment, and air as necessary.