

## Task 6. Risk Factors

General Categories of Factors:

1. Site geotechnical
2. Impact on receptors
3. Landfill design, construction, maintenance, and compliance

Factor	Potential Impact Magnitude/Probability	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s)
Proximity to Urban Areas	<ul style="list-style-type: none"> <li>• <del>In</del>-large</li> <li>• <del>Out</del>-small</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering design</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Inside urban area</u></li> <li>• <u>Outside urban area</u></li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> <li>• LFG migration</li> <li>• Landslides</li> <li>• Air quality</li> <li>• Humans</li> </ul>
Amount of Waste in Place <u>and Daily Tonnage</u>	<ul style="list-style-type: none"> <li>• Large tonnage-large</li> <li>• Small tonnage-small</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering design</li> <li>• Relocate waste</li> <li>• <u>Future tonnage reduction</u></li> </ul>	<ul style="list-style-type: none"> <li>• Tons in place, <u>currently</u></li> <li>• <u>Daily tonnage input</u></li> <li>• <u>Final permitted capacity</u></li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> <li>• LFG migration</li> <li>• Landslides</li> <li>• Air quality</li> </ul>
Type of Waste in Place	<ul style="list-style-type: none"> <li>• <u>Inert-low</u></li> <li>• C&amp;D-low</li> <li>• Monofill-medium</li> <li>• MSW-high</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering design</li> <li>• Relocate waste</li> </ul>	<ul style="list-style-type: none"> <li>• Permitted types of waste</li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> <li>• LFG migration</li> </ul>
Hydrogeology	<ul style="list-style-type: none"> <li>• Permeable and high groundwater-high</li> <li>• Low permeability and low groundwater-low</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering design</li> </ul>	<ul style="list-style-type: none"> <li>• Depth to first groundwater</li> <li>• <u>Background levels</u></li> <li>• <u>Accessibility</u></li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> <li>• <u>Receptors</u></li> </ul>
Seismic Characteristics	<ul style="list-style-type: none"> <li>• Frequent, high ground acceleration-high</li> <li>• Infrequent, low ground acceleration-low</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering design</li> <li>• <u>Relocate waste</u></li> <li>• <u>Close landfill</u></li> </ul>	<ul style="list-style-type: none"> <li>• Ground acceleration, safety factor</li> <li>• <u>Historical activity</u></li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> <li>• LFG migration</li> <li>• Landslides</li> </ul>

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Factor	Potential Impact Magnitude/Probability	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s)
Rainfall	<ul style="list-style-type: none"> <li>High rainfall-large</li> <li>Low rainfall-low</li> </ul>	<ul style="list-style-type: none"> <li>Engineering design</li> <li><u>Storm water runoff control</u></li> <li><u>Containment</u></li> </ul>	<ul style="list-style-type: none"> <li>Average rainfall</li> <li>Rainfall intensity</li> <li><u>Adsorption capacity landfill</u></li> </ul>	<ul style="list-style-type: none"> <li>Groundwater</li> <li>Surface water</li> <li>LFG migration</li> <li>Landslides</li> </ul>
Potential for Flooding	<ul style="list-style-type: none"> <li>Frequent potential-high</li> <li>Infrequent-low</li> </ul>	<ul style="list-style-type: none"> <li>Engineering design</li> <li><u>Property berms or canals to redirect flood waters</u></li> <li><u>Containment</u></li> <li>Relocate waste</li> </ul>	<ul style="list-style-type: none"> <li>Flooding frequency (yrs)                             <ul style="list-style-type: none"> <li>High: &lt;100</li> <li>Low: &gt;100</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Groundwater</li> <li>Surface water</li> </ul>
Proximity to Sensitive Habitat	<ul style="list-style-type: none"> <li>Close-large</li> <li>Far-low</li> </ul>	<ul style="list-style-type: none"> <li>Engineering design</li> <li><u>Habitat development</u></li> <li><u>Relocate habitat</u></li> </ul>	<ul style="list-style-type: none"> <li>Distance from LF</li> </ul>	<ul style="list-style-type: none"> <li>Biota</li> </ul>
Compliance Status, <u>operational</u>	<ul style="list-style-type: none"> <li>Noncompliant-high</li> <li>Compliant-low</li> </ul>	<ul style="list-style-type: none"> <li>Engineering design</li> </ul>	<ul style="list-style-type: none"> <li>Frequency/Severity                             <ul style="list-style-type: none"> <li>High-<u>medium</u> = current CA, cleanup or abatement orders</li> <li><u>High-Low</u> = past history of CA or ongoing/repeat violations</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Groundwater</li> <li>Surface water</li> <li>LFG migration</li> <li>Landslides</li> </ul>
Engineering Controls	<ul style="list-style-type: none"> <li>Poor design-large</li> <li>Conservative design-low</li> </ul>	<ul style="list-style-type: none"> <li>Conservative <u>or approved</u> engineering design criteria and construction</li> <li>3<sup>rd</sup> party QAQC</li> <li><u>Size of landfill cell</u></li> </ul>	<ul style="list-style-type: none"> <li>Type/design of <u>final, intermediate, and daily</u> cover and bottom liner</li> <li>Type/design of LFG control</li> <li>Factor of safety</li> </ul>	<ul style="list-style-type: none"> <li>Groundwater</li> <li>Surface water</li> <li>LFG migration</li> <li>Landslides</li> </ul>

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Factor	Potential Impact Magnitude/Probability	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s)
Waste Fill Methods	<ul style="list-style-type: none"> <li>• Canyon-higher</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering design</li> </ul>	<ul style="list-style-type: none"> <li>• Type of fill method                             <ul style="list-style-type: none"> <li>○ Canyon</li> <li>○ Area</li> <li>○ Trench</li> <li>○ Side-Hill</li> <li>○ Pit/Quarry Fill</li> <li>○ Combination</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> </ul>
Presence of LF Bioreactor Technology	<ul style="list-style-type: none"> <li>• Unstabilized (low stability)-high</li> <li>• Stabilized (high stability)-low</li> </ul>	<ul style="list-style-type: none"> <li>• NA</li> </ul>	<ul style="list-style-type: none"> <li>• Bioreactor System In-place?                             <ul style="list-style-type: none"> <li>○ Yes</li> <li>○ No</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> <li>• LFG migration</li> </ul>
Slope Stability	<ul style="list-style-type: none"> <li>• Poor design-high</li> <li>• Conservative design-low</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease slope</li> <li>• Improve drainage</li> <li>• Improve landscaping</li> <li>• <u>Construction materials</u></li> </ul>	<ul style="list-style-type: none"> <li>• Known slope failures</li> <li>• No known slope failures</li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> <li>• LFG migration</li> <li>• Landslides</li> </ul>
Fire (intrusion from off site)	<ul style="list-style-type: none"> <li>• High fire hazard areas-high</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Addition of buffer area</u></li> <li>• <u>Increased fire suppression capacity</u></li> </ul>	<ul style="list-style-type: none"> <li>• Proximity to high fire hazard areas</li> </ul>	<ul style="list-style-type: none"> <li>• Groundwater</li> <li>• Surface water</li> </ul>

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