

Task 6, Step 2. Factors That Potentially Affect Landfill's Impact on Public Health and Safety and the Environment

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Financial Assurance and Corrective Action Contracted Study

Potential Factors of Interest:

1. Siting/climate
2. Landfill design, construction, and maintenance
3. Operational practice
4. Potential for migration/distance to sensitive receptors
5. Compliance record for releases/system upsets

Siting/Climate Factors

Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
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Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
Seismic Characteristics	Designed for: <ul style="list-style-type: none"> • Max Credible Earthquake; 1.5 or above factor of safety (low impact) • Most Probable Earthquake; below 1.5 factor of safety, but at least 1.3 (medium impact) • No design (high impact) 	<ul style="list-style-type: none"> • Engineering design 	<ul style="list-style-type: none"> • Ground acceleration, safety factors • Seismic zone maps 	<ul style="list-style-type: none"> • Slope failure • Leachate seeps • Surface water/ground-water impact • LFG migration • Cap failure – vector control and uncontrolled emissions • Explosive concentration of gas • LF fire • Methane capture – greenhouse gases
Rainfall Intensity	Designed for: <ul style="list-style-type: none"> • 1000 year/24 hour storm (low impact) • 100 year/24 hours storm (medium impact) • Not designed for 100 year/24 hour storm (high impact) 	<ul style="list-style-type: none"> • Engineering design 	<ul style="list-style-type: none"> • Average annual rainfall • Rainfall intensity 	<ul style="list-style-type: none"> • Slope failure • Leachate seeps • Surface water Impact • Erosion or a drainage system failure • LFG migration

Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
Floodplain	<ul style="list-style-type: none"> • Location (base of landfill) within 100 year floodplain (high) • Location (base of landfill) within 500 feet of 100 year floodplain (medium) • Location (base of landfill) not within 500 feet of 100 year floodplain (low) 	<ul style="list-style-type: none"> • Engineering design • Flood control measures 	<ul style="list-style-type: none"> • Floodplain maps 	<ul style="list-style-type: none"> • Groundwater • Surface water • Waste release
Fire (intrusion from off site)	<ul style="list-style-type: none"> • Adjacent land area with high fire hazard potential (high) • Adjacent land area with moderate fire hazard potential (medium) • Adjacent land area with low fire hazard (low) 	<ul style="list-style-type: none"> • Addition of buffer area • Increased fire protection at facility 	<ul style="list-style-type: none"> • Fire hazard severity zone maps 	<ul style="list-style-type: none"> • Runoff • Groundwater • Surface water • Explosive concentration of gas • LF fire • Methane capture – greenhouse gases

Potential Factors - Landfill design, Construction, and Maintenance

Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
Engineering Controls	<ul style="list-style-type: none"> • Combination of Subtitle D equivalent and non-Subtitle D equivalent design, or no Subtitle D design (high) • Subtitle D or equivalent design (medium) • Above Subtitle D design (low) 	<ul style="list-style-type: none"> • 3rd party construction QA/QC 	<ul style="list-style-type: none"> • Type/design of cover and bottom liner • Type/design of LFG control system • Factor of safety 	<ul style="list-style-type: none"> • Groundwater • Surface water • LFG migration • Slope stability • Explosive concentration of gas • LF fire • Methane capture – greenhouse gases
Permitted Capacity ¹	<ul style="list-style-type: none"> • Greater than 30,000,000 cubic yards (high) • Less than 500,000 cubic yards (low) • Between 500,000 and 30,000,000 cubic yard (medium) 	<ul style="list-style-type: none"> • Engineering design 	<ul style="list-style-type: none"> • Permitted capacity 	<ul style="list-style-type: none"> • Groundwater • Surface water • LFG migration • Slope stability • Air quality • Explosive concentration of gas • LF fire • Methane capture – greenhouse gases

¹ Permitted capacity intervals used for scoring criteria are preliminary and may be modified after further analysis.

Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
Type of Waste in Place	<ul style="list-style-type: none"> • Pre-Subtitle D, co-disposal waste (high) • MSW (medium) • Monofill, C&D (low) 	<ul style="list-style-type: none"> • Engineering design • Waste screening procedures 	<ul style="list-style-type: none"> • Permitted types of waste • Operational protocol and records 	<ul style="list-style-type: none"> • Groundwater • Surface water • LFG migration • Explosive concentration of gas • LF fire • Methane capture – greenhouse gases
Slope Stability	<ul style="list-style-type: none"> • Side slopes 2:1 or steeper, or history of slope failure (high) • Side slopes between 2:1 and 4:1 (medium) • Side slope less steep than 4:1 (low) 	<ul style="list-style-type: none"> • Decrease slope • Improve drainage • Improve landscaping 	<ul style="list-style-type: none"> • History of slope failures • Existing and planned side slope angles 	<ul style="list-style-type: none"> • Groundwater • Surface water • LFG migration • Slope failure • Liner/cover failure

Operational Practice

Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
Liquids Management/ Landfill Bioreactor Technology	<ul style="list-style-type: none"> Permitted leachate recirculation (medium) Bioreactor permitted (low) Neither of the above (high) 	<ul style="list-style-type: none"> Engineering design 	<ul style="list-style-type: none"> Efficiency of leachate collection system Efficiency of LFG collection Leachate quality trends 	<ul style="list-style-type: none"> Groundwater Surface water LFG migration Explosive concentration of gas LF fire Methane capture – greenhouse gases

Potential for Migration/Distance to Sensitive Receptors

Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
Hydrogeology	<ul style="list-style-type: none"> Depth to groundwater (measured from base of landfill) < 50 feet (high) 50 to 100 feet (medium) >100 feet (low) 	<ul style="list-style-type: none"> Engineering design 	<ul style="list-style-type: none"> Depth to groundwater of uppermost aquifer 	<ul style="list-style-type: none"> Groundwater Surface water Gas migration

Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
Proximity to Urban Areas	<ul style="list-style-type: none"> • In urban (high) • Not in urban (low) 		<ul style="list-style-type: none"> • Property maps • Development plans 	<ul style="list-style-type: none"> • Groundwater • Surface water • LFG migration • Landslides • Air quality • Odors • Explosive concentration of gas • LF fire • Methane capture – greenhouse gases
Proximity to Sensitive Habitat	<ul style="list-style-type: none"> • Sensitive species at location (high) • No sensitive species at location (low) 	<ul style="list-style-type: none"> • Engineering design • Operations management • Formally managed habitat 	<ul style="list-style-type: none"> • California natural diversity database 	<ul style="list-style-type: none"> • Biota • Explosive concentration of gas • LF fire • Methane capture – greenhouse gases

Compliance Record for Release/System Upsets

Factor	Scoring Criteria	Controls/Mitigations	Quantitative Parameter(s)	Primary Resource Potentially Impacted/ Problem(s) (not relevant to model)
Compliance Status	<ul style="list-style-type: none"> • Current CA, cleanup or abatement orders (high) • Past history of CA or ongoing/ repeat violations (medium) • Compliant (low) 	<ul style="list-style-type: none"> • Engineering design • Operations management 	<ul style="list-style-type: none"> • Correspondence from regulatory agency • Monitoring data 	<ul style="list-style-type: none"> • Groundwater • Surface water • LFG migration • Slope failure • Explosive concentration of gas • LF fire • Methane capture – greenhouse gases