

# Updated Master Plan Salt Lake Valley Landfill

Presentation  
to  
Salt Lake City Council  
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# Updated Master Plan Salt Lake Valley Landfill

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## Landfill Design Changes

- Increased slope height by 20 feet (+ 9.4 million cy)
- Expanded landfill footprint to public unloading area (+ 3.4 million cy)
- Revised final grading to provide flexibility for end-use
- Revised fill sequence plan
- Included 20% overfill for settlement (+ 8.4 million cy)
- Relocated leachate evaporation pond



# Projected Waste Disposal Quantities

Year	Waste Generation <sup>1</sup> (tons)	Projected Disposal (tons)	Adjusted Disposal (tons)
2002	1,703,165	596,529 <sup>2</sup>	387,744 <sup>2</sup>
2005	1,806,119	638,463 <sup>1</sup>	415,001 <sup>2</sup>
2010	1,997,228	706,020 <sup>1</sup>	458,913 <sup>3</sup>
2015	2,212,745	782,205 <sup>1</sup>	508,433 <sup>3</sup>
2020	2,402,676	849,346 <sup>1</sup>	552,075 <sup>3</sup>
2025	2,558,416	904,400 <sup>1</sup>	587,860 <sup>3</sup>
2030	2,705,324	956,332 <sup>1</sup>	621,616 <sup>3</sup>
<sup>1</sup> From Technical Memorandum Solid Waste Projections (GBB 2005). Assumes approximately 2% growth from 2005 to 2015 and approximately 1.3% growth from 2015 to 2030. <sup>2</sup> Disposal tonnage as reported by Salt Lake County <sup>3</sup> Projected disposal tonnage reduced by 35%			



# Site Capacity, Earthwork, and Service Life

	Estimated Quantity <sup>1</sup>
Remaining Air Space (cubic yards) <sup>2</sup>	53,001,600
Earthwork (cubic yards)	
Daily and Intermediate Cover <sup>3</sup>	8,875,400
Final Cover	1,671,500
Liner/Earthfill	325,200
LCRS/Operation Layer	267,500
Total Earthwork	11,139,600
Excavation (cubic yards)	1,263,400
Fill Capacity <sup>2</sup>	
Cubic Yards	50,589,800
Tons <sup>4</sup>	29,342,100
<b>Landfill Service Life <sup>5</sup></b>	<b>49</b>
<sup>1</sup> All quantities have been rounded. <sup>2</sup> As of April 23, 2004, based on a comparison of the final grading plan and April 23, 2004 topographic base map, Includes 20 percent overfill to account for settlement. <sup>3</sup> Based on a refuse-to-cover ratio of 4.7-to-1. <sup>4</sup> Based on capacity utilization factor of 0.58 tons per cubic yard. <sup>5</sup> Based on 312 operating days per year and adjusted disposal tonnage.	



# Module Capacity and Service Life

Module	Fill Capacity (cy) <sup>1</sup>	Service Life (yrs) <sup>2</sup>
6 <sup>3</sup>	5,130,500	6.3
7 <sup>4</sup>	8,832,500	10.1
8 <sup>5</sup>	7,522,000	7.5
11	4,926,200	4.6
10	9,953,900	8.7
9	14,224,400	11.3
	<u>50,589,500</u>	<u>49</u>
<sup>1</sup> Includes 20 percent overfill. <sup>2</sup> Based on estimated disposal tonnage and 0.58 tons/cy capacity utilization. <sup>3</sup> Includes remaining capacity in adjacent portions of Modules 1, 2, and 3. <sup>4</sup> Includes remaining capacity in adjacent portions of Modules 3 and 4. <sup>5</sup> Includes remaining capacity in adjacent portions of Modules 4 and 5.		



# Development Schedule

Module	Year <sup>1</sup>	Estimated Cost
Leachate Evaporation Pond	2000	\$7,244,000
Module 8	201	\$,344,000
Module 10	202	\$,468,000
Module 11	203	\$,260,000
Public Unloading Area	203	\$,660,000
Module 9	204	\$,805,000
<p><sup>1</sup> Schedule based on estimated module capacity and disposal time.</p> <p><sup>2</sup> Module development will occur the year before the module is put into service.</p>		



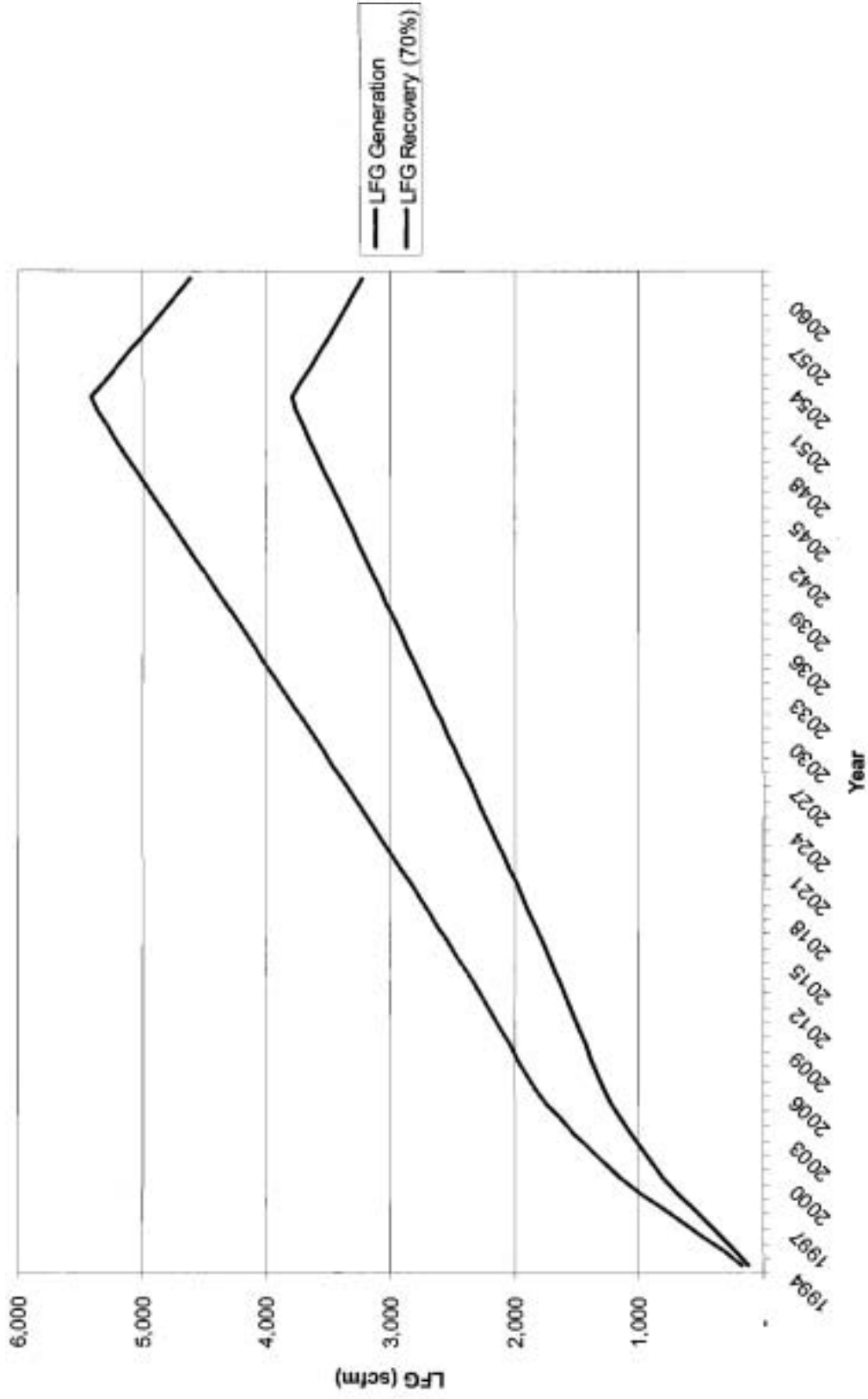
# Landfill Gas System Design Basis

- Horizontal collectors
  - Spacing: 250' horizontal, 40' vertical
  - 30-40' of cover before operation
  - Maximum 1,000'
  - 6" and 8" diameter HDPE pipe
- Wells
  - Spacing: 350'
  - Boring diameter: 30-36"
  - 4" and 6" diameter casing w/slip joints
- Condensate system
  - Pneumatic pumps and controls
  - Condensate returned to landfill
  - Maximum 1,700 gallons per day generation





Salt Lake Valley Landfill - LFG Generation and Recovery Rates



# Landfill Gas Control System Cost Estimate

Component	Development	Closure
Horizontal Collectors	\$1,000,500	
Wells	\$10,800	\$621,300
Lateral/Header Piping	\$869,500	\$653,300
Condensate Piping/Sump/Controls	\$102,600	
Valves & Fittings	\$205,800	\$23,700
Blower/Flare		\$275,000
Mob/Demob	\$109,500	\$78,700
Engineering/CQA/Surveying	<u>\$183,900</u>	<u>\$132,200</u>
Subtotal	\$2,482,600	\$1,784,200
Total		<u><u>\$4,266,800</u></u>



# Closure Cost Estimate

Item	Unit	Unit Cost	Quantity	Total
Final Cover				
Foundation Layer (1.0 foot) <sup>2</sup>	cy	\$4.00	668,600	\$2,674,000
Geomembrane	sf	\$0.45	18,244,000	\$8,210,000
Geonet	sf	\$0.40	18,244,000	\$7,298,000
Vegetative Layer (1.5 feet) <sup>3</sup>	cy	\$2.00	1,002,900	\$2,006,000
Revegetation	ac	\$2,400	415	\$996,000
Landfill Gas Control System	ls	\$1,784,100	1	\$1,784,000
Drainage System	ls	\$491,000	1	\$491,000
Survey Control Monuments	ls	\$12,000	1	\$12,000
		<b>Subtotal</b>		<b>\$23,471,000</b>
Engineering and CQA (15%)				<b>\$3,521,000</b>
Contingency (15%) <sup>4</sup>				<b>\$3,521,000</b>
		<b>Total</b>		<b>\$30,513,000</b>
<p>cy = cubic yards  sf = square foot  ac = acre  ls = lump sum</p> <p><sup>1</sup> Costs are in 2005 dollars.  <sup>2</sup> Total thickness of foundation layer is 2 feet. 1 foot is assumed to be placed as intermediate cover during landfill operations.  <sup>3</sup> Vegetative layer is assumed to come from amended on-site soils.  <sup>4</sup> Contingency for design changes, unforeseen conditions, cost over-runs, etc.</p>				



# Postclosure Maintenance Cost Estimate

Item	Unit	Unit Cost	Quantity	Total
Revegetation <sup>2</sup>	ac	\$2,400	14	\$34,000
Environmental Monitoring				
Groundwater	ls	\$85,000	1	\$85,000
Landfill Gas	ls	\$17,000	1	\$17,000
Leachate	ls	\$25,000	1	\$25,000
Leachate Management <sup>3</sup>				
Leachate Pump Replacement <sup>4</sup>	ls	\$10,000	1	\$10,000
Leachate Pump Maintenance	ls	\$15,000	1	\$15,000
Disposal Fee <sup>5</sup>	ls	\$24,000	1	\$24,000
Landfill Gas Control System <sup>6</sup>	ls	\$250,000	1	\$250,000
Inspection	ls	\$5,000	1	\$5,000
Maintenance	ls	\$25,000	1	\$25,000
	Subtotal			\$470,000
Engineering and CQA Program (15%)				\$71,000
Contingency (15%) <sup>7</sup>				\$71,000
	Annual Total			\$611,000
	30-Year Total			\$18,330,000

ac = acre  
ls = lump sum

Costs are in 2005 dollars.

<sup>2</sup> Revegetation is based on 10 percent of the site needing revegetation every 3 years.

<sup>3</sup> Leachate quantity based on approximately 25 percent of the current leachate generation prorated to the entire landfill.

<sup>4</sup> Assumes replacement of 5 leachate extraction pumps every 5 years.

<sup>5</sup> Assumes leachate discharge of sanitary sewer system during wet months.

<sup>6</sup> DTE Biomass Energy contributes \$90,000/year for 20 years for landfill gas control system maintenance.

<sup>7</sup> Contingency for unforeseen conditions, cost over-runs, etc.



# Closure Schedule

Module	Year <sup>1</sup>	Estimated Cost <sup>2</sup>
112 of Module 1	2009	\$962,000
Module 2	2010	\$1,741,000
112 of Module 3	2011	\$1,097,000
112 of Module 3	2018	\$1,098,000
213 of Module 4	2020	\$1,803,000
113 of Module 4 Module 5	2027	\$3,188,000
114 of Module 6	2032	\$611,000
114 of Module 6 114 of Module 7	2033	\$1,298,000
114 of Module 7 112 of Module 8	2035	\$1,870,000
112 of Module 8 213 of Module 11	2040	\$3,261,000
114 of Module 7 213 of Module 10 113 of Module 11	2041	\$4,029,000
112 of Module 1 112 of Module 6 114 of Module 7 Module 9 113 of Module 10	2053	\$9,554,000
<sup>1</sup> Closure year can be modified based on fill sequence. <sup>2</sup> Costs are in 2005 dollars.		



# Financial Plan

- Landfill supported almost exclusively by tipping fees
- There is a need to provide adequate funding for operations, capital improvements, closure, and postclosure maintenance
- Several reserve funds have been established
  - Insurance
  - Facility replacement
  - Equipment replacement
  - Module construction
  - Capital improvements
  - Environmental liability
- Need to provide financial assurance for closure and postclosure maintenance
  - Also need to provide funding for closure and postclosure maintenance
- Need to adjust tipping fee to provide funding for future expenditures
  - Need to monitor closely so as not to make competing landfills more economical
  - Tipping fee also supports other activities (e.g., public unloading facility, recycling, composting), other than the landfill



# Questions?

