
OPTIONS ANALYSIS

CHAPTER V - OPTIONS ANALYSIS

A. INTEGRATED SOLID WASTE MANAGEMENT ALTERNATIVES

As a result of the Goals and Objectives set by the DSWA's Board of Directors, priority has been given to analyzing various strategies for long term Solid Waste Management. From the population and tonnage projections derived in a previous section, it has been determined that a combination of facilities would be required to meet the amount of material generated.

Ten options were analyzed:

Base Case: Maintain Current Recycling Initiatives (DRP Closed)

1. Landfilling only
2. Contract Waste to Energy @ 350,000 Tons Per Year
3. Contract Waste to Energy @ 512,000 Tons Per Year
4. Contract Waste to Energy @ 650,000 Tons Per Year
5. In State Resource Recovery/Waste to Energy @ 512,000 Tons Per Year

Modified Case: 25% Recycling of Residential Solid Waste Initiatives (DRP closed)

6. Landfilling
7. Contract Waste to Energy @ 350,000 Tons Per Year
8. Contract Waste to Energy @ 512,000 Tons Per Year
9. Contract Waste to Energy @ 650,000 Tons Per Year
10. In State Resource Recovery/Waste to Energy @ 512,000 Tons Per Year

(NOTE: These options factor in the potential for providing waste to meet contractual responsibility to the Energy Generating Facility, which is not currently operating.)

Three of the five options analyzed in the "Base Case" were selected for consideration as a result of the availability of current excess capacity for Waste-to-Energy facilities in the region. Contract Waste-to-Energy could be a viable short term or long term solution to managing Delaware's solid waste stream. The other two options, Landfilling and Statewide Waste-to-Energy provide the primary long term strategies for managing Delaware's solid waste within Delaware borders.

The "Modified Case" was selected to analyze the "Base Case" options with an intermediate target of recycling twenty five percent (25%) of Delaware's Residential Waste Stream. The assumption made in this analysis is that the recycling would be carried out through a combination of private and municipal collection/separation of the materials prior to any collection of the normal waste stream. DSWA would not see or handle the materials. The recycled/separated materials would not utilize or be delivered to DSWA Facilities. Instead, separated collected materials would be directly delivered by the private and municipal collectors to markets. Such a system would reduce disposal costs of the municipalities and private collectors through avoided user fees.

Options Analysis Financial Comparisons

Table No. V-1 provides a detailed comparison of overall results. This table includes assumptions used in determining financial factors for long term projects (15 to 20 years). Table No. V-2 provides a detailed comparison of user fees projected through 2015, in five (5) year increments. Table V-3 provides a summary comparison of the ten (10) options on a total program cost and Net Present Value basis for an analysis time period of fifteen (15) years (1995 - 2009). Appendix G provides the actual detailed modeling results for each option analyzed.

Each option in Appendix G provides the following information:

1. Detailed Cost Analysis: 1992 - 2015
2. Summary of Costs: 1995 - 2009
3. Graph of Projected User Fees: 1995 - 2009
4. Debt Service Schedule: 1995 - 2009

DSWA PLAN OPTIONS MATRIX

	BASE CASE: CURRENT RECYCLING INITIATIVES										MODIFIED CASE: 25% RECYCLING OF RSW										
	OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 5	OPTION 6	OPTION 7	OPTION 8	OPTION 9	OPTION 10	OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 5	OPTION 6	OPTION 7	OPTION 8	OPTION 9	OPTION 10	
	LANDFILLING ONLY	CONT. WTE 350,000 TPY	CONT. WTE 512,000 TPY	CONT. WTE 650,000 TPY	IN STATE WTE 512,000 TPY	LANDFILLING ONLY	CONT. WTE 350,000 TPY	CONT. WTE 512,000 TPY	CONT. WTE 650,000 TPY	IN STATE WTE 512,000 TPY	LANDFILLING ONLY	CONT. WTE 350,000 TPY	CONT. WTE 512,000 TPY	CONT. WTE 650,000 TPY	IN STATE WTE 512,000 TPY	LANDFILLING ONLY	CONT. WTE 350,000 TPY	CONT. WTE 512,000 TPY	CONT. WTE 650,000 TPY	IN STATE WTE 512,000 TPY	
SOLID WASTE MATERIALS FOR MANAGEMENT 1995-2009 (TONS IN 000'S)																					
SOLID WASTE TO MANAGE	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441	13,441
SOLID WASTE TO COMBUST (1)	0	5,250	7,680	9,750	7,680	0	5,250	7,680	9,750	7,680	0	5,250	7,680	9,750	7,680	0	5,250	7,680	9,750	7,680	7,680
TOTAL ASH DSWA TO MANAGE	0	0	0	0	1,920	0	0	0	0	1,920	0	0	0	0	1,920	0	0	0	0	0	1,920
TOTAL RSW RECYCLABLES	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
LANDFILL SPACE REQUIRED	13,216	7,966	5,536	3,466	7,456	11,962	7,966	5,536	3,466	7,456	11,962	7,966	5,536	3,466	7,456	11,962	7,966	5,536	3,466	7,456	6,202
PERCENT LANDFILLED	98.33%	59.27%	41.19%	25.79%	55.47%	89.00%	59.27%	41.19%	25.79%	55.47%	89.00%	59.27%	41.19%	25.79%	55.47%	89.00%	59.27%	41.19%	25.79%	55.47%	46.14%
DSWA LANDFILL CAPACITY AS OF 1995	13,000	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500
LANDFILL CAPACITY AFTER 2009	0	4,729	6,997	8,901	5,205	633	4,729	6,997	8,901	5,205	633	4,729	6,997	8,901	5,205	633	4,729	6,997	8,901	5,205	6,684
CURRENT LANDFILL CAPACITY ENDS:	2008	2015	2020	2025	2016	2009	2015	2020	2025	2016	2009	2015	2020	2024	2024	2009	2015	2020	2024	2024	2020
TIP FEE COMPARISONS (\$/TON)																					
1996	\$49.60	\$63.02	\$72.22	\$80.66	\$66.06	\$48.75	\$63.02	\$72.22	\$80.66	\$66.06	\$48.75	\$63.02	\$72.22	\$80.66	\$66.06	\$48.75	\$63.02	\$72.22	\$80.66	\$66.06	\$76.32
2005	\$54.43	\$74.42	\$82.76	\$90.72	\$72.50	\$54.59	\$74.42	\$82.76	\$90.72	\$72.50	\$54.59	\$74.42	\$82.76	\$90.72	\$72.50	\$54.59	\$74.42	\$82.76	\$90.72	\$72.50	\$78.07
2015	\$78.21	\$108.70	\$117.10	\$126.60	\$98.70	\$79.14	\$108.70	\$117.10	\$126.60	\$98.70	\$79.14	\$108.70	\$117.10	\$126.60	\$98.70	\$79.14	\$108.70	\$117.10	\$126.60	\$98.70	\$101.50
AVOIDED USER FEES	\$0	\$0	\$0	\$0	\$0	\$65.0 MM	\$0	\$0	\$0	\$0	\$65.0 MM	\$0	\$0	\$0	\$0	\$65.0 MM	\$0	\$0	\$0	\$0	\$120.3 MM
ANALYSIS ASSUMPTIONS																					
ANNUAL PLANT CAPACITY: DSWA	0	0	0	0	470,000	0	0	0	0	470,000	0	0	0	0	470,000	0	0	0	0	470,000	470,000
TOTAL DSWA PLANT CAPITAL COST	\$0	\$0	\$0	\$0	\$195.0 MM	\$0	\$0	\$0	\$0	\$195.0 MM	\$0	\$0	\$0	\$0	\$195.0 MM	\$0	\$0	\$0	\$0	\$195.0 MM	\$195.0 MM
YEAR 1 PLANT OPERATIONS COST	\$0	\$0	\$0	\$0	\$14.0 MM	\$0	\$0	\$0	\$0	\$14.0 MM	\$0	\$0	\$0	\$0	\$14.0 MM	\$0	\$0	\$0	\$0	\$14.0 MM	\$14.0 MM
TRANSFER STATIONS	0	1	2	3	1	0	1	2	3	1	0	1	2	3	1	0	1	2	3	1	1
DSWA LANDFILL ASH	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES
ANNUAL COST ESCALATOR	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
DEBT SERVICE COST OF MONEY	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%	6.50%
ELECTRICITY GENERATED (KWH/TON)	0	0	0	0	500	0	0	0	0	500	0	0	0	0	500	0	0	0	0	500	500
ELECTRICITY REVENUES (\$/KWH)	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0500	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0500	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0500	\$0.0000	\$0.0000	\$0.0000	\$0.0000	\$0.0500	\$0.0500

TABLE V-2

DSWA PLAN OPTIONS ANALYSIS: 20 YEAR PROJECTIONS					
PROJECTED USER FEE COMPARISONS					
<i>CURRENT RECYCLING</i>	1996	2000	2005	2010	2015
1 LANDFILLING ONLY	\$49.60	\$55.85	\$54.43	\$67.07	\$78.21
2 CONTRACT WTE: 350,000 TPY	\$63.02	\$78.62	\$74.42	\$94.10	\$108.70
3 CONTRACT WTE: 512,000 TPY	\$72.22	\$83.95	\$82.76	\$100.00	\$117.10
4 CONTRACT WTE: 650,000 TPY	\$80.66	\$88.63	\$90.72	\$108.30	\$126.60
5 STATEWIDE WTE: 512,000 TPY	\$66.06	\$75.49	\$72.50	\$82.00	\$98.70
<i>25% RSW RECYCLING</i>	1996	2000	2005	2010	2015
6 LANDFILLING	\$48.75	\$61.43	\$54.59	\$65.71	\$79.14
7 CONTRACT WTE: 350,000 TPY	\$66.28	\$83.64	\$77.58	\$91.80	\$109.10
8 CONTRACT WTE: 512,000 TPY	\$79.64	\$86.76	\$90.00	\$105.60	\$125.30
9 CONTRACT WTE: 650,000 TPY	\$98.17	\$97.72	\$99.63	\$116.30	\$139.80
10 STATEWIDE WTE: 512,000 TPY	\$76.32	\$85.35	\$78.07	\$89.20	\$101.50
COST TO HOMEOWNER PER MONTH					
<i>CURRENT RECYCLING</i>	1996	2000	2005	2010	2015
1 LANDFILLING ONLY	\$6.61	\$7.45	\$7.26	\$8.94	\$10.43
2 CONTRACT WTE: 350,000 TPY	\$8.40	\$10.48	\$9.92	\$12.55	\$14.49
3 CONTRACT WTE: 512,000 TPY	\$9.63	\$11.19	\$11.03	\$13.33	\$15.61
4 CONTRACT WTE: 650,000 TPY	\$10.75	\$11.82	\$12.10	\$14.44	\$16.88
5 STATEWIDE WTE: 512,000 TPY	\$8.81	\$10.07	\$9.67	\$10.93	\$13.16
<i>25% RSW RECYCLING</i>	1996	2000	2005	2010	2015
6 LANDFILLING	\$6.50	\$8.19	\$7.28	\$8.76	\$10.55
7 CONTRACT WTE: 350,000 TPY	\$8.84	\$11.15	\$10.34	\$12.24	\$14.55
8 CONTRACT WTE: 512,000 TPY	\$10.62	\$11.57	\$12.00	\$14.08	\$16.71
9 CONTRACT WTE: 650,000 TPY	\$13.09	\$13.03	\$13.28	\$15.51	\$18.64
10 STATEWIDE WTE: 512,000 TPY	\$10.18	\$11.38	\$10.41	\$11.89	\$13.53

TABLE V-3

NET PRESENT VALUE ANALYSIS: ALL OPTIONS			
ANALYSIS TIME PERIOD: 1995 THROUGH 2009			
OPTIONS	TOTAL COSTS	NET PRESENT VALUE	
BASE CASE: CURRENT RECYCLING INITIATIVES			
1 LANDFILLING ONLY	\$749,220,032		\$533,228,707
2 CONTRACT WTE: 350,000 TPY	\$1,014,651,804		\$716,376,740
3 CONTRACT WTE: 512,000 TPY	\$1,114,182,002		\$782,508,892
4 CONTRACT WTE: 650,000 TPY	\$1,217,924,045		\$853,613,683
5 STATEWIDE WTE: 512,000 TPY	\$1,005,566,023		\$713,210,015
MODIFIED CASE: 25% RECYCLING OF RSW			
6 LANDFILLING	\$689,785,982		\$494,047,186
7 CONTRACT WTE: 350,000 TPY	\$947,554,544		\$668,663,844
8 CONTRACT WTE: 512,000 TPY	\$1,066,494,912		\$749,560,118
9 CONTRACT WTE: 650,000 TPY	\$1,167,733,299		\$820,146,360
10 STATEWIDE WTE: 512,000 TPY	\$954,664,276		\$681,039,970

5. Long range Capital Improvement Schedules: 1992 - 2015
6. Graph of Projected Landfill Life

Graph No. V-1 provides a user fee comparison of the five (5) Base Case options analyzed. Graph No. V-2 provides a user fee comparison of the five (5) modified case options analyzed. Both graphs also include a projected current (1993) user fee escalated at four percent (4%) per year.

Landfill Life Comparisons

Table No. V-4 provides a detailed comparison of remaining landfill life for all ten alternatives analyzed. Graph No. V-3 provides an illustration over time of the five Base Case options and their expected life, based on current state-wide capacity. Graph No. V-4 provides an illustration over time of the five modified case options and their expected life, based on current state-wide capacity.

B. DECISION FACTORS

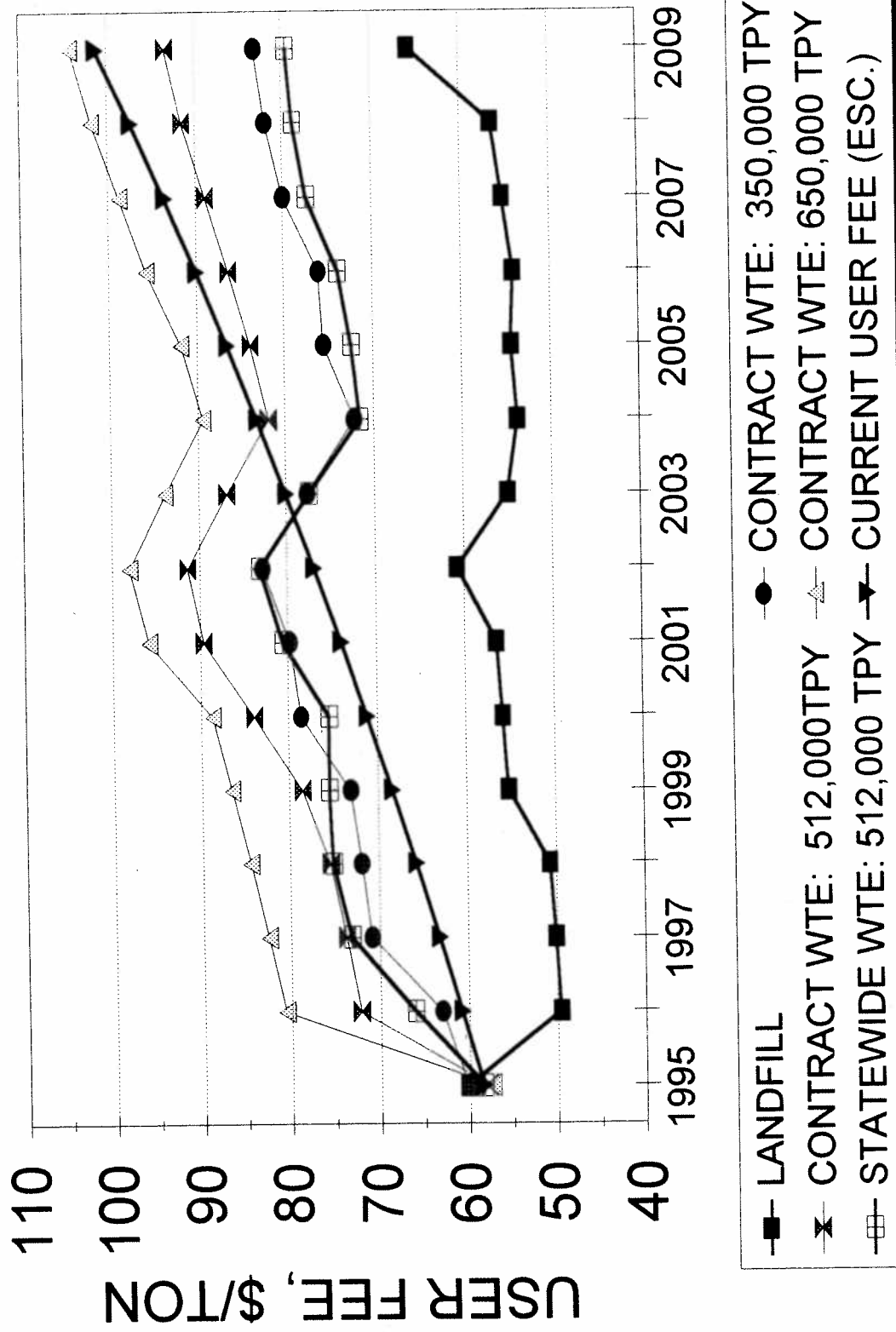
Several factors must be considered by the DSWA Board of Directors in the decision making process. Primarily, the Board must weigh each factor based on advantages, disadvantages and importance.

Factors which each Board member should consider include, but are not limited to:

- The Public Health
- The Environment
- The Economy
- Employment
- User Fees
- Total System Cost over a given time period
- Conservation, protection and expansion of landfill capacity
- Minimization of debt
- System Efficiency and Effectiveness
- Implementability
- Consistency with the Statewide Solid Waste Management Plan
- Legal and Regulatory Considerations

Each of the Plan's ten (10) options presented in the analysis has advantages and disadvantages. The feasibility of any option or combination of options must be determined through the evaluation of the factors listed on the previous page.

GRAPH V-1 OPTIONS ANALYSIS: BASE CASE PROJECTED USER FEES COMPARISON



GRAPH OPTIONS ANALYSIS: MODIFIED CASE

V-2

PROJECTED USER FEES COMPARISON

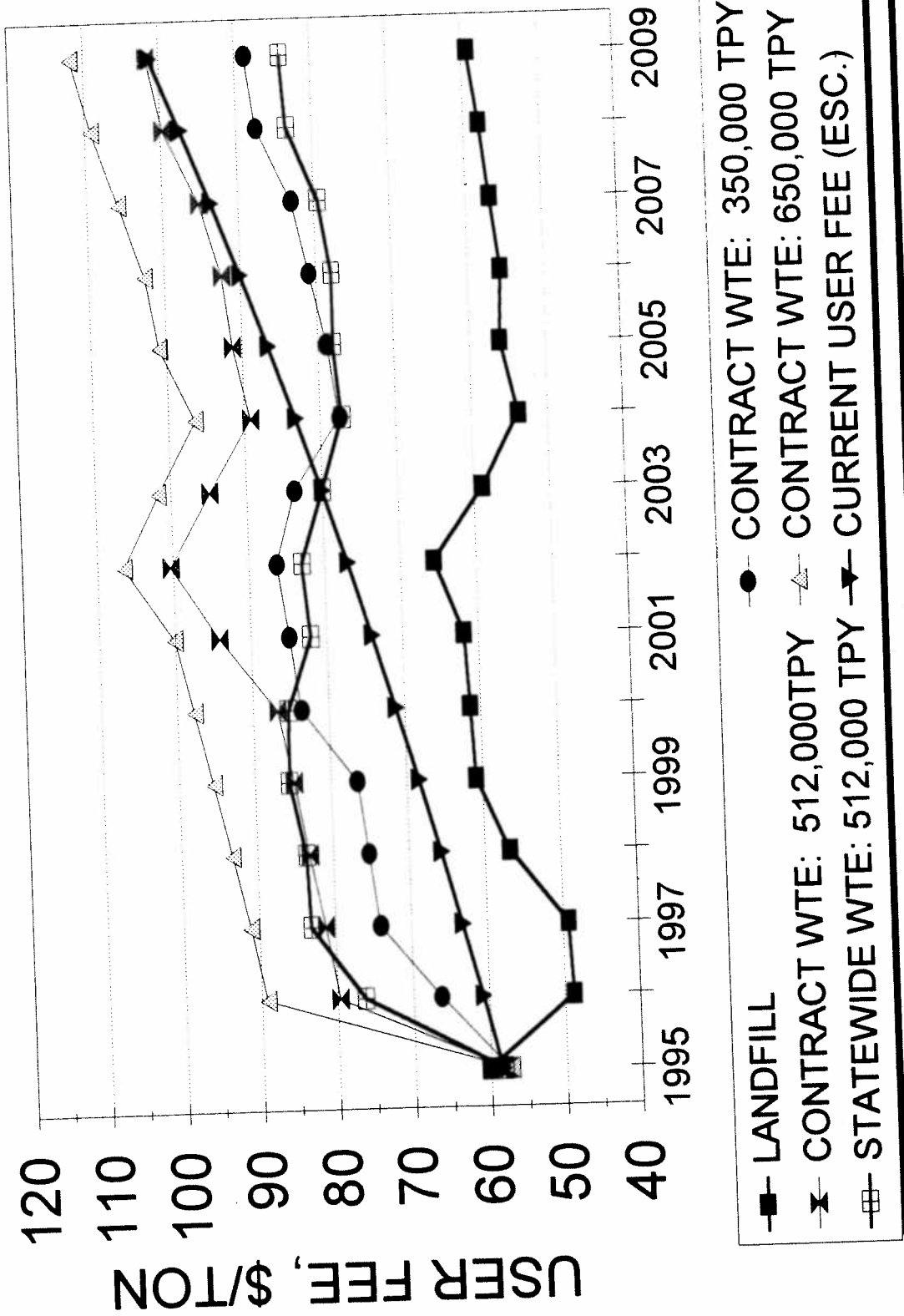


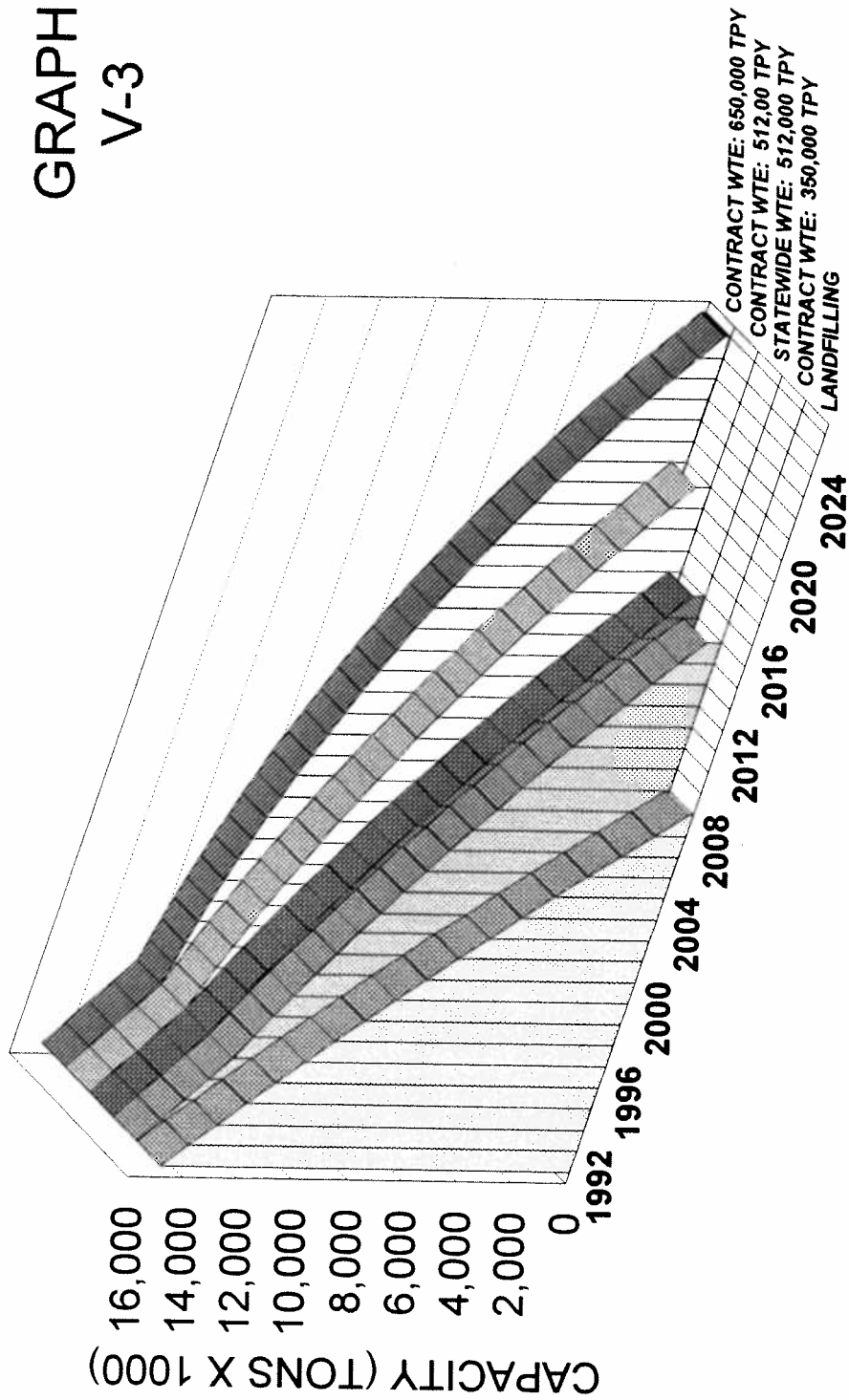
TABLE V-4

DSWA LANDFILL LIFE ANALYSIS CURRENT CAPACITY BASIS (TONS IN 000'S)											
BASE CASE: CURRENT RECYCLING INITIATIVES											
OPTIONS	1995	2000	2005	2010	2015	2020	2025	2030	2035		
1 LANDFILLING	12,595	8,460	3,990	(846)	(6,084)	(11,754)	(17,893)	(24,538)	(31,733)		
2 CONTRACT WTE: 350,000 TPY	13,095	10,535	7,815	4,729	1,241	(2,677)	(7,066)	(11,984)	(17,494)		
3 CONTRACT WTE: 512,000 TPY	13,095	11,183	9,273	6,997	4,319	1,206	(2,402)	(6,586)	(11,435)		
4 CONTRACT WTE: 650,000 TPY	13,095	11,727	10,497	8,901	6,903	4,469	1,522	(2,047)	(6,368)		
5 STATEWIDE WTE: 512,000 TPY	13,095	10,671	8,121	5,205	1,887	(1,793)	(5,758)	(10,029)	(14,631)		
MODIFIED CASE: 25% RECYCLING OF RSW											
6 LANDFILLING	12,595	8,858	4,912	633	(4,013)	(9,050)	(14,504)	(20,407)	(26,799)		
7 CONTRACT WTE: 350,000 TPY	13,095	10,933	8,737	6,208	3,312	36	(3,634)	(7,746)	(12,354)		
8 CONTRACT WTE: 512,000 TPY	13,095	11,581	10,195	8,476	6,390	3,928	1,074	(2,235)	(6,070)		
9 CONTRACT WTE: 650,000 TPY	13,095	12,125	11,419	10,380	8,974	7,202	5,058	2,461	(684)		
10 STATEWIDE WTE: 512,000 TPY	13,095	11,069	9,043	6,684	3,958	909	(2,375)	(5,913)	(9,725)		

LANDFILL LIFE: BASE CASE

ALL OPTIONS: CURRENT CAPACITY BASIS

GRAPH
V-3



LANDFILL LIFE: MODIFIED CASE

ALL OPTIONS: CURRENT CAPACITY BASIS

GRAPH
V-4

