
***Assessing the Potential for Resource Management
in Clark County, Nevada***

A Report Prepared for:

US EPA Region IX

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Prepared by:



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Note on Data Quality and Interpretation

The authors of the report have used the best publicly available data to estimate baseline disposal and recycling rates and financial impacts from increased recycling. These data are, however, incomplete. To improve the quality and accuracy of the analysis, a critical review of the draft report and supplementary data were formally requested of Clark County's Solid Waste Franchisee, Republic Services of Southern Nevada, Inc. in March 2002. However, as of this writing, no response had been received.

Detailed comments on data assumptions and calculations are included in Appendix A. Any errors in data interpretation are the sole responsibility of the authors.

I. Project Background

Tellus Institute received funding from US EPA Region IX to investigate how Resource Management (RM) contracting might assist Clark County Nevada in achieving higher recycling rates. RM is a strategic alternative to disposal contracting that seeks continual improvement in resource efficiency through enhanced source reduction, recycling, and recovery. When a contractor's incentives are tied to the value of services that foster prevention, reuse, and recycling—with disposal as the last resort—contractors' activities align with those of the customers' in a new type of joint effort. However, this is currently the exception rather than the rule in municipal waste contracting. Further discussion on the RM model is included as Appendix B.

Objectives of this Report and Project Approach

The objectives of this study were to assess whether Clark County's existing solid waste Ordinance and/or Franchise Agreement could be modified to promote increased recycling through the adoption of RM practices and incentives, and if so, how. This report represents the final draft of the assessment and encompasses tasks described the scope of work developed by Tellus staff with assistance from US EPA , Nevada Department of Environmental Protection, Clark County Administrative Services, and the Clark County Health District. Overall, the intent of this study is to look at an innovative market based approach to achieving higher diversion of materials from the municipal solid waste stream.

The information and analysis presented in this report is based primarily on:

- *Clark County Code Chapter 9.04 – Solid Waste Management (Ordinance)*
- *Franchise Agreement for Collection and Disposal of Solid Waste for Unincorporated Areas of Clark County (Franchise Agreement)*
- *Clark County Solid Waste Master Plan Update, Interim Report #1 (Draft)*
- *Consolidated Statements of Income for Silver State Disposal Service, Inc. and Subsidiary FY's 1995-1997 and Republic Silver State Disposal, Inc. and Subsidiary 1998-2000*
- *2000 Southern Nevada Consensus Population Estimates*
- Published commodities pricing data
- 1999 waste stream composition data produced by the California Integrated Waste Management Board
- Personal communications with County staff

The Ordinance, Franchise Agreement, and draft solid waste master plan were the main sources for determining baseline cost and service levels. The documents were reviewed together since the Franchise Agreement relies heavily on the scope of services and fee structure defined in the Ordinance.

To assess the feasibility of introducing an RM approach into Clark County's solid waste franchise arrangements, Tellus quantified current costs of waste and recycling

services for Clark County and identified or estimated disposal and diversion levels associated with existing programs. The potential for RM to increase current diversion through additional recycling or composting was examined through scenario assessments. These assessments identified incremental improvements from the year 2000 baseline. The associated net financial impacts of the scenarios were compared to estimated current costs to determine potential contract savings that would be available to provide financial incentives for increased recycling and reduced disposal. Tellus has applied its knowledge of performance contracting techniques to assess current contract methods and to provide advice on how to improve contracting techniques in order to increase the likelihood of achieving the diversion and cost savings outlined in the scenarios.

Included are recommendations on where RM contracting elements might be inserted into the Ordinance or amended to the Franchise. Where applicable, we have also highlighted those sections of the Ordinance and Franchise Agreement that might act as barriers to RM type contracting. The project followed an ambitious schedule with work beginning in September and ending by late December.

This report is organized into six sections:

1. Project background (this section)
2. Summary of baseline solid waste and recycling service levels
3. Summary of the existing contract compensation mechanism
4. Analysis (based on best available data) of the cost/benefits from increased residential recycling
5. An interpretation of implicit and explicit incentives built into the current arrangements
6. Recommendations and barriers to incorporating RM elements into the existing contract structure

II. Baseline Solid Waste and Recycling Service Levels

Clark County is the most populous County in Nevada, encompassing the Las Vegas metropolitan area and approximately 70% of the state's population. The area has seen rapid population growth in recent years (an avg. growth rate of 6.5% annually between 1995 and 2000) that is projected to continue. The County is comprised of incorporated and unincorporated urban and rural areas. The primary incorporated cities are Las Vegas, North Las Vegas, Henderson and Mesquite that harbor approximately 57% of the County's population. The remaining 43% of the population resides in unincorporated areas. Incorporated cities in Clark County contract independently from the County government.

In the unincorporated areas, the Clark County Board of Commissioners contracts for solid waste, recyclables, and household hazardous waste collection services through an exclusive Franchise Agreement. The franchise for solid waste collection covers both residential and commercial customers. The Franchise Agreement grants exclusive rights to the Franchisee to recyclables collection only from residential customers, while businesses are permitted to contract independently.

Table 1. Population and Housing Occupancy in Clark County, NV

	Population	Occupied Housing Units		
		Single family	Multi-unit (3)	Total
Unincorporated County (1)	588,748	100,880	131,232	232,112
Total Clark County (1)	1,428,690	290,212	246,157	536,369
Total Nevada (2)	1,998,257			751,165
Clark County Contribution to Total Nevada	71%			
(1) Source: Southern Nevada Consensus Population Estimates 2000 as reported by Clark County Comprehensive Planning Dept.				
(2) 2000 Census of Population and Housing, Nevada, Issued May 2001, U.S. Department of Commerce, U.S. Census Bureau. In general US Census 2000 figures for NV are approximately 4% lower on average than the 2000 Southern Nevada Consensus Population Estimates.				
(3) Multi-unit is sum of "Plex, Mobile, Apt. Town House, and Condo" as reported by Clark County Comprehensive Planning Dept.				

The current Franchisee for the County and most of the municipalities in the County is Republic Services of Southern Nevada and Subsidiary (Republic). The County’s contract with Republic extends through 2035.

Service Levels

Service levels for solid waste and recyclables within Urban Solid Waste Service Areas in unincorporated Clark County are detailed in Table 2. Self-transport, operation of recycling drop-off centers, transport of construction and demolition, yard waste, and collection and transport of recyclables from commercial establishments are explicitly excluded from the franchise by the Ordinance or Franchise Agreement. Household hazardous waste collection is also provided under the Franchise agreement, but has been intentionally excluded from our analysis because no data on collection quantities or cost was available.

Residents of Clark County’s Urban Solid Waste Service Areas, where the great majority of the population resides, receive curbside collection of solid waste twice a week. The county Ordinance limits solid waste collection containers to sizes between three and 30 gallons, but in practice, County staff report that most people use containers that are 33 gallons or larger. The Franchisee also collects just about anything that is put out for pick-up, including large white goods and furniture. Residents of the rural areas of the County receive curbside collection or can use one of seven convenience centers (self-serve roll-offs). The Franchisee operates three urban transfer stations and deposits waste in the Apex landfill, which it also owns.

Residents in the Urban Solid Waste Service Areas receive curbside recycling collection twice a month. The recycling program accepts newspaper, cardboard, magazines, glass bottles, aluminum cans, tin cans (steel/tin bimetal), plastic bottles (PET and HDPE) and used motor oil (in containers no larger than 1 gal.). Recyclables must be partially source separated into one of three 12-gallon bins: one each for paper, glass, and other. Corrugated cardboard is placed beside the containers. Recyclables are further separated by the Franchisee at its Materials Recovery Facility.

Table 2: Service level: Clark County solid waste and recyclables (Urban Solid Waste Service Areas)

	Solid Waste	Recyclables
Definition:	Any material (excluding liquid and hazardous materials) that <i>has</i> (emphasis added) been abandoned or discarded by their owners". Excludes "recyclables that are not commingled with refuse" but includes recyclable materials separated after commingling [O].	Materials "in or out of the solid waste stream that have <i>not</i> (emphasis added) been discarded or abandoned by their owners." [O]
Recipients:	Residences, multiple dwellings, places of business, public buildings, hotels and mobile home parks [O, F]	Residential customers (residences, multiple dwellings, mobile home parks) by curbside collection program [O, F]
Collection frequency:	2x weekly (residential) [O, F]	2x monthly (on solid waste collection days)
Container capacity:	3-30 gallon receptacles provided by customer [O] In practice "wheeled plastic containers sold by Home Depot" (probably standard 33 gallon or larger). Little or nothing refused for pick-up. [CS]	3 bins ~12 gals each ¹ [CS] Provided by Franchisee. [Size and number not specified in Franchise Agreement or Ordinance]
Collection strategy:	Scheduled routes with 3 urban and 7 rural transfer stations.	Partial source separation by resident; further post-collection separation by Franchisee at a Materials Recovery Facility. Three bins: paper, glass, other ("other" currently includes: plastic bottles, aluminum & steel cans) [CS]
Materials accepted:	Virtually anything put out for collection including large white-goods, furniture and recyclables commingled with refuse [CS]	<ul style="list-style-type: none"> o Newspaper, Cardboard, and Magazines o Glass bottles o Aluminum cans, Tin cans (steel/tin bimetal) o Plastic bottles (PET and HDPE²) o Used motor oil (in containers no larger than 1 gal) [O, plastic types - CS]
Drop-off services:	1) Provide for drop-off for solid waste at transfer station and landfill by residents [F] 2) Maintain at least three urban transfer (convenience) stations in Las Vegas Metro region (Shelbourne, Henderson, North Las Vegas) [F] 3) Establish and maintain seven rural transfer stations or "convenience centers" (roll-off dumpster protected by cyclone fence). [F]	
Reporting:	The contractor must report annually audited data on performance, customers, staff and equipment. [F]	Annual totals to County for state report, broken out by material.
Billing:	Quarterly. Managed by Franchisee. [F]	Included in solid waste fee; portion used for recycling is unknown.
Customer service:	(Not specified in Ordinance or Franchise Agreement)	(Not specified in Ordinance or Franchise Agreement)
Promotional Activities:	(Not specified in Ordinance or Franchise Agreement)	(Not specified in Ordinance or Franchise Agreement, but required by Nevada Statute) ³
[F] – Franchise Agreement; [O] – Ordinance; [CS] – County Staff, personal communication		

¹ Based on capacity of Huskylite ® three-bin system produced by Rehrig Pacific Company that matches descriptions of County staff

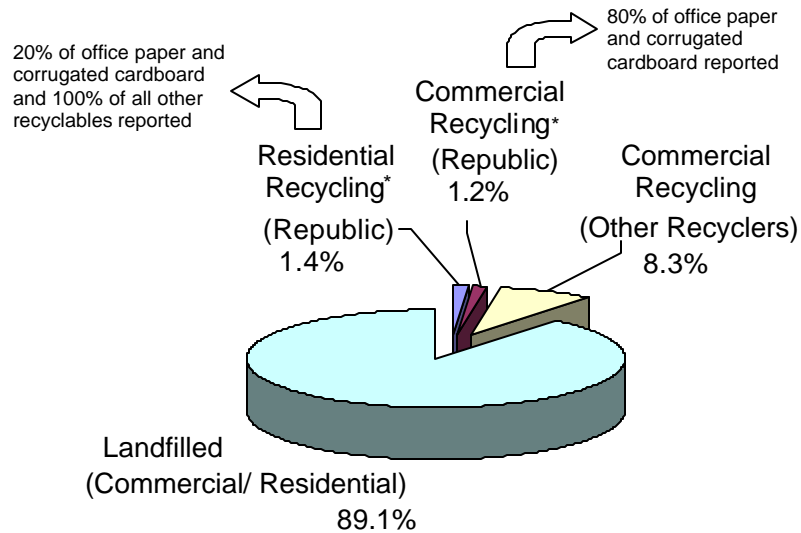
² Nationally, PET and HDPE together account for ~75% of the plastic bottle market (25% and 50% respectively)

³ Nevada Revised Statute 444A.050, 1(b) requires that the municipality, i.e. the County or Health District, "notify all persons occupying residential, commercial, and institutional premises within the area covered by the program of the local recycling opportunities and the need to reduce the amount of waste generated."

Baseline Disposal and Recycling Quantities for Year 2000

Total tonnage of solid waste generated and collected in the County has been rising and is projected to continue to increase quite rapidly. In 2000, 2,787,516 tons of residential/commercial waste was generated in Clark County. Of this 2,483,805 tons were landfilled. The landfilled portion of waste is projected to grow by 35% to 3,370,620 tons by 2010⁴, based on projected growth rates for the County’s permanent population, tourist population, and casino/hotel/resort industry.

Figure 1: Source of Recyclables Diverted in Clark County (2000)



* Clark County Solid Waste Master Plan Update, Interim Report 1 (Draft), Section 7.4

According to the draft Solid Waste Master Plan Update, Countywide recycling rates have been fluctuating between 8% and 17% since 1995 with an average rate of 12.5%. In 2000, approximately 11% of the municipal solid waste stream (303,711 tons) was diverted through recycling in Clark County⁵, for comparison the national recycling rate was 27.8% in 2000⁶. This is slightly less than half of the state’s voluntary target of 25% of the total solid waste generated within each municipality⁷. This is significantly below the U.S. Environmental Protection Agency’s goal to divert at least 35% of municipal solid waste from landfilling and combustion, through recycling and composting by the year

⁴ Clark County, Nevada, Solid Waste Master Plan Update, Interim Report #1 (Draft) prepared by Zia Engineering & Environmental Consultants, Inc. and Pentacore Resources, LLC for the Clark County Health District, April 24, 2001. (draft SWM Plan 2000).

⁵ Ibid.

⁶ U.S. EPA, Municipal Solid Waste in the United States: Facts and Figures 1999 (2000)⁷ Nevada Revised Statutes Chapter 444A.020

2005⁸. Figure 1 shows recyclables recovered both under the Franchise Agreement and by independent recyclers. The Franchisee collected roughly 1/4 of all collected recyclable materials through both franchise (residential) and non-franchise (commercial) activities. The remaining 3/4 were collected from the commercial sector by over 70 companies.

Calculating separate residential or commercial recycling rates is difficult because the relative contributions of the commercial and residential sectors to the solid waste stream as a whole in Clark County are currently unknown. Using the average relative contributions reported for California (60% commercial, 40% residential)⁹ and source attributions estimated in the draft Solid Waste Master Plan Update (80% newspaper and cardboard from the commercial sector and everything else from the residential sector)¹⁰, the recycling rate for the County's commercial sector is 14-16%, and for the residential sector is 4%.

County staff and the draft Solid Waste Master Plan Update report that, in general, only single-family residences have access to the recycling program at this time. Most multi-unit buildings cannot easily accommodate recycling bins and do not receive them.

There is no audited data on curbside recycling participation rates in the County. The draft Solid Waste Master Plan Update estimates the current participation rate among participating (i.e. single-family) residents to be 43% using the inferred tonnage of collected residential recyclables (37,747 tons) and an assumed average contribution of 600 lb. per participating household. If these calculations are used to estimate a combined single family and multi-unit residence participation, the rate shrinks to 24%. The Franchisee recently reported¹¹ that the participation rate for 2000 was 27.5%, as measured by driver "clicker counts" of recycling bins set out for pick-up.

Reporting requirements

The Franchise Agreement requires that the contractor provide the County with numerous data including:

- current year budget and actual expenses in prior year;
- number of collection vehicles, collection man-hours paid, personnel, and customers;
- tons of solid waste deposited in the landfill;
- tons of glass, paper, aluminum, steel/tin cans, cardboard and plastic sold;
- residential and multifamily recycling indicators;
- landfill facilities;
- and the schedule of significant equipment used.

⁸ U.S. EPA Strategic Plan, Government Performance and Results Act Goal 4.6 (1999)

⁹ 1999 California Statewide Waste Disposal Characterization Study, California Integrated Waste Management Board (CIWMB 1999)

¹⁰ County staff believe the Franchisee's commercial recycling may make up a much smaller proportion of its total recyclables collection than estimated under these assumptions.

¹¹ Republic Services of Southern Nevada, Letter responding to Audit Follow-up Data Request by Clark County Department of Business License. Signed by Alan Gaddy. Addressed to Michael Harwell. Dated 1/18/02.

The contractor must also “provide data and reports necessary to fulfill requirements of the County and/or Solid Waste Management Authority for assessing and reporting results of recycling and hazardous waste collection program in conformance with applicable federal and state laws and regulations.” County staff report that this provision of the contract is primarily for the Solid Waste Authority’s request for annual recycling data, but is not necessarily limited to this.

III. Contract Compensation

This section provides an overview of how compensation amongst the relevant stakeholders occurs.

Under the current contract, residents and businesses pay fees directly to the Franchisee. The Franchisee in turn pays the County a Franchisee fee for exclusive rights to provide services within the specified areas. Fees for customers are delineated explicitly in the current text of the county Ordinance last revised in 1998. For residential customers (Table 3), set fees cover solid waste collection, curbside collection of recyclables, and access to household hazardous waste collection events. Those for commercial establishments only cover solid waste collection. For residents, a combined fee is paid to the Franchisee for collection of recyclables and solid waste that is independent of the quantities of solid waste and/or recycling generated.

Table 3: Annual cost for solid waste and recyclables collection in Clark County Urban Solid Waste Service Areas

Effective date	CPI - U	Single Family	Multi-unit			
			2 units, 1 stop (total)	2 units, 1 stop (per unit)	6 units, 1 stop (total)	6 units, 1 stop (per unit)
1998	-	\$116	\$148	\$74	\$391	\$65
Jul-99	1.60%	\$118	\$150	\$75	\$397	\$66
Jul-00	2.21%	\$121	\$153	\$77	\$406	\$68
Jul-01	3.36%	\$125	\$158	\$79	\$419	\$70

Solid waste and recycling collection in unincorporated Clark County are derived from a schedule set forth in the Ordinance¹² and adjusted annually for inflation according to a methodology also set forth in the Ordinance. The method provides for an increase equal to the Consumer Price Index, All Urban Consumers, and U.S. City Average (CPI-U)¹³ when the CPI-U is between 0% and 6.5% with provisions for adjustments mechanisms when the CPI-U is above or below this range. The base rates and method were established through a revision of the County Ordinance in 1998 as an alternative to the rate adjustment process specified in the Franchise Agreement which had proved contentious and drawn-out. The new process was mutually agreed upon by the Board of Commissioners and the Franchisee. However, the Franchise Agreement was not simultaneously amended.

¹² Sections 9.04.150 through 9.04.200 of the Clark County Code and tables therein

¹³ published by the U.S. Bureau of Labor Statistics

The original rate adjustment method set out in the Franchise Agreement is quite different from the method described in the Ordinance. The original rate adjustment in the Franchise Agreement empowered the Board of Commissioners to lower or raise rates according to a complex methodology based on the Franchisee's performance against the established baseline, the Franchisee's rate of return, and administrative cost control. The performance baseline was to be established by performance over the first three years of the contract (1996-1999) based on solid waste and recycling collection and disposal data provided by the Franchisee. However, no precise method was ever specified describing how changes in performance would be reflected in rate changes.

The Franchise Agreement originally tied rate increases to a "desired" rate of return (ROR) (net profit—after federal tax and franchise fee) equal to 7% of gross receipts from activities related to all municipal solid waste disposal contracts (referred to as "contract revenues"). The ROR applied to contract revenue from both the unincorporated County and from contracts with the incorporated municipalities. If revenues fell short of this target, rates for the following year were to be increased to a level sufficient to provide the desired ROR for that year and make-up for the previous year's shortfall. The Franchise Agreement also allowed for a rate reduction if profit exceeded the desired 7% ROR.

Under the rate adjustment method set forth in the 1998 revision of the Ordinance¹⁴ the Board of Commissioners may adjust rates based only on the CPI-U or costs to the Franchisee both unforeseen and out of its control. While the Franchise Agreement does contain a clause stating that it is subject to the provisions in Title 9 of the Clark County Code and amendments thereto, the absence of a contract amendment makes the documents appear contradictory.

The Franchise Agreement requires the Franchisee to pay the County 5% of gross annual receipts from solid waste collection, recyclable, and drop-off in the unincorporated county. In 2000, total franchise fees paid to the County were \$3.7 million.

The Franchise Agreement also requires that the validity of the contractor's financial statements, rate calculation and reporting of performance indicators be audited by a licensed third party CPA. The CPA is chosen by the contractor to ensure that county residents are charged at the agreed upon rate, to confirm the accuracy of performance indicators, and to enable the guaranteed rate of return feature of the Franchise Agreement. The County is also permitted access to the Franchisees financial records once a year to verify reported financials. The County takes advantage of these provisions to conduct an audit every three or four years. These audits generally focus on verifying that the correct license fees have been paid to the County, if the correct rates are charged to customers and if the CPA has accurately tracked revenue and expenses from the Franchisee's general ledger.

¹⁴ Section 9.04.200

IV. Opportunities for Cost Savings and Enhanced Recycling Services

To evaluate the potential for RM in the County’s current solid waste and recyclables contracts we have constructed a simple model of costs and benefits from increased recycling in Clark County (see Table 4). The model relies on diverse, and in some cases, incomplete data sets. Where the necessary data was unavailable we have made substitutions or one or more assumptions. Data sources and assumptions are discussed briefly below the table and in detail in Appendix A. Available information was generally Countywide and insufficient to precisely determine the proportion of waste and recycling in unincorporated areas. Thus the numbers below therefore represent quantities and costs for all of the Franchisee’s operations in Clark County. More accurate estimates could be generated from a more detailed breakdown of the Franchisee’s costs and revenue and solid waste and recycling collection sources and totals.

Table 4: Clark County, NV Cost/Benefit of Increased Diversion of Recyclables from Residential Waste Stream

	Recycling rate		Land disposal (avoided costs)	Recycling revenue	Cost of increased Recycling	Net gain or loss
Cost/Benefit (per ton)			\$4.24	\$61	(\$27)	\$38
BASELINE						
	4%	Tons of waste/ recyclables	993,522	37,747		
		Total revenue/ cost	\$4,212,534	\$2,287,103		
Scenario 1						
	8%	Tons of waste/ recyclables	948,767	82,502	82,502	
		Total revenue/ cost	\$4,022,774	4,998,820	(\$2,237,441)	
<i>Difference from baseline</i>			\$189,760	\$2,711,717	(\$2,237,441)	\$664,036
Scenario 2						
	12%	Tons of waste/ recyclables	907,517	123,752	123,752	
		Total revenue/ cost	\$3,847,871	7,498,230	(\$3,356,162)	
<i>Difference from baseline</i>			\$364,663	\$5,211,127	(\$3,356,162)	\$2,219,629
Scenario 3						
	25%	Tons of waste/ recyclables	773,452	257,817	257,817	
		Total revenue/ cost	\$3,279,435	15,621,312	(\$6,992,003)	
<i>Difference from baseline</i>			\$933,099	\$13,334,209	(\$6,992,003)	\$7,275,305
Scenario 4						
	35%	Tons of waste/ recyclables	670,325	360,944	360,944	
		Total revenue/ cost	\$2,842,177	21,869,837	(\$9,788,805)	
<i>Difference from baseline</i>			\$1,370,357	\$19,582,734	(\$9,788,805)	\$11,164,286

Table 4 shows changes in gross and net revenue relative to the FY2000 baseline at 8%, 12%, 25%, and 35% recycling rates. Increases in recycling could come existing customers who recycle as well as increased participation for those customers who don't recycle. As the table shows, potential savings are significant and range from roughly \$664,036 under Scenario 1 up to over \$11 million under Scenario 4.

Let us explain briefly how the model works. The model has three components all indexed to increased tonnage of recycling/tonnage diverted from disposal:

- 1) Cost savings from avoided disposal fees
- 2) Revenue from sale of recyclables
- 3) Incremental cost of recycling

The model scenarios evaluate additional costs and benefits if the recycling rate in 2000 had been at that level. Solid waste generation is of course expected to grow in Clark County in proportion to population. Thus, recycling at a given recycling rate (and increased benefit) would also be expected to grow.

Avoided cost of land disposal

The avoided cost of land disposal (\$4.24/ton) was estimated by dividing the average dump operations expenses (FY1995-FY2000) reported by the Franchisee (\$10,523,810) by the total tonnage of MSW landfilled by the Franchisee in FY2000 (2,450,620 tons). This is a surrogate for the usual measure of avoided tipping fee, which cannot be readily applied here, since the Franchisee also operates the landfill. The calculated disposal cost/ton likely represent a lower bound on savings for several reasons. First, the value is based on dump operations expenses only and does not account for any debt service, or closure related costs that are typically part of a tip fee. Second, the disposal cost/ton is *much* lower than the tip fee of \$13.80 for the Apex landfill reported by *Waste News*. Finally it does not account for any labor savings associated with significant reductions of waste sent to the landfill or the value of extended life of the landfill.

Recycling Revenue

The average revenue/ton for recyclables of \$61 is a weighted average of revenue from the sale of residential recyclables. To calculate this average, the tonnage of recyclables by material type¹⁵ was multiplied by the cumulative averages of the average commodities prices on the Los Angeles spot market reported bi-weekly by *Waste News*. LA prices were used because equivalent data from local recycling market data was not available. Local recyclers have confirmed these prices are reasonable surrogates that they themselves use in setting bid prices. Actual market price data for 2000 on newspaper, corrugated cardboard, magazines, and aluminum cans provided by Nova Waste Paper, Inc., a Clark County recycler, were substantially higher than the LA prices (60% higher for corrugated cardboard, for example).

¹⁵ Commercial/residential breakdown for cardboard and office paper presumed to be 80/20. All other recyclables assumed to be from single family residential customers (pg. 52 Interim Report No. 1, Solid Waste Management Plan Update, Clark County, Nevada)

The total dollar values of estimated tonnage for each commodity type were summed and divided by total tons of residential recyclables to obtain the weighted \$56/ton value. When the Franchisee combined multiple commodities categories in reported collection data, such as aluminum and steel cans, the relative proportion of each commodity was estimated based on California Integrated Waste Management Board waste stream composition data adjusted to eliminate the contributions of yard waste.

Based on audited financial statements and recycling reports submitted by the Franchisee for 1995-97 and 2000, the Franchisee earned an average annual revenue of \$148/ton, much more than our estimated \$61. However, some portion of the reported revenue likely comes from other sources such as commercial recycling fees.

Incremental cost of recycling

Increased recycling will of course also generate increased costs from greater labor/time on collection routes and increased processing of recyclables. In the absence of detailed data we estimated the Franchisee’s *incremental* costs to recycle by comparing how total recycling costs have changed in the past as recycling has increased.

In 2000, the Franchisee reported recycling 71,418 tons of material at a total cost of \$11,257,218¹⁶. This would translate into a cost of \$158/ton and we presume this covers all fixed (trucks, processing infrastructure, etc.) and variable costs (labor for collection and processing, etc.). The increased costs to the Franchisee for providing service for increased recycling per the scenarios identified above will certainly be less than this number since they have already invested (and the county is already paying) in the fixed cost portion. In fact, it is likely that the current infrastructure for recycling could (or should) handle up to 222,500 tons of recyclables according to collection capacity specified in the scope of services and resulting recycling capacity (Table 8). Thus we have assumed for Scenario 1 and 2, the contractor will incur, predominately, increased variable costs. As it approaches Scenario 3, the Franchisee may need to invest in additional fixed costs.

Table 5: Incremental cost of recycling in Clark County

Year	Recycling costs	Tons of recyclables	Incremental cost
2000	\$11,257,218	71,481	
1995	\$10,821,080	55,338	
Difference	\$436,138	16,143	
	$\frac{\$436,138}{16,143}$	=	\$27.02

¹⁶ Based on (draft SWM Plan 2001)

To get an estimate of increased *incremental* variable costs, we took reported data for 1995 and compared it to the reported 2000 data (Table 5). In 1995, the franchise recycled 55,338 tons of material at a cost of \$10,821,080. This is equivalent to roughly \$195/ton. The incremental increase in tonnage between 1995-2000 is 16,143 (71,418-55,338) and the incremental cost is \$436,138. Thus the incremental cost per ton to recycle for the increased recycled tonnage is roughly \$27/ton.

Tons of diverted materials

To calculate the quantity of diverted material for each scenario the total tons of residential waste collected in 2000 (tons landfilled + tons recycled) was multiplied by the recycling rate and divided by 100. The quantity of solid waste landfilled in each scenario was calculated by subtracting the quantity diverted to recycling less tons recycled in 2000 from tons landfilled.

Bottom line for Clark County

So what does this mean for Clark County? If savings such as these do exist¹⁷, they represent a more efficient way of doing business and, if used properly, could represent a win-win-win situation (recycling is increased, the Franchisee can earn more income, and rates need not be increased).

Table 6: Net benefit of increased recycling in Clark County¹

	Residential recycling rate	Land disposal (avoided cost)	Recycling revenue	Incremental cost of increased recycling	Net gain
Per Ton		\$4	\$61	\$27	\$38
Scenario 1	8%	\$189,760	\$2,711,717	\$2,237,441	\$664,036
Scenario 2	12%	\$364,663	\$5,211,127	\$3,356,162	\$2,219,629
Scenario 3	25%	\$933,099	\$13,334,209	\$6,992,003	\$7,275,305
Scenario 4	35%	\$1,370,357	\$19,582,734	\$9,788,805	\$11,164,286

1 – Summary of data from Table 4

The linchpin of RM is to structure incentives such that a portion or all of these savings flow back to the Franchisee if they meet some predetermined recycling targets. In this way, they can make more money under each of these scenarios than they currently do under the baseline. Of course the economics rely heavily on favorable recycling revenue and net benefit will fluctuate with the commodities markets and any RM incentive must account for this market risk. Any new incentive would also need to be structured with the recognition of existing incentives and disincentives built into the current contractual relationship. The following section outlines our assessment the incentives and disincentives created by the existing Franchise Agreement and Ordinance.

¹⁷ Our estimate is based on aggregated data from reported financial statements and should be confirmed by the Franchisee.

V. Current Incentives

Incentives

The County’s current arrangement with the Franchisee contains a number of incentives that explicitly or implicitly reward disposal over recycling. Table 7 is our assessment of current service arrangements that generate incentives, who is incentivized, and the nature of the incentive. While stakeholders will probably not blindly act to achieve the respective incentives, the table highlights engrained barriers to changing the status quo and may offer insights into changes that may help increase diversion.

Table 7: Implicit Incentives created by the Clark County Ordinance, Franchise Agreement, or other factors

Key provision	Incentive for	Incentive
<ul style="list-style-type: none"> ▪ Recycling and solid waste collection covered by single fee ▪ Fee independent of customer utilization of service 	Franchisee	<ul style="list-style-type: none"> ▪ Provide service to fewest units at lowest cost ▪ Do not actively encourage participation in recycling
<ul style="list-style-type: none"> ▪ Twice weekly solid waste collection [F,O] ▪ Twice monthly recyclables collection [F,O] ▪ Avg. solid waste container capacity – 33 gal. (de facto capacity) ▪ Avg. recyclables containers capacity – 36 gal. 	Franchisee	<ul style="list-style-type: none"> ▪ Keep recyclables collection fleet capacity at =1/4 to 1/5 of solid waste fleet capacity
	Resident	<ul style="list-style-type: none"> ▪ Segregate no more than 36 gal of recyclables every two weeks –12 paper, 12 glass, 12 other (excluding cardboard and motor oil.)
<ul style="list-style-type: none"> ▪ 39+ year contract term [F, S] 	County	<ul style="list-style-type: none"> ▪ Avoid actions that might lead to significant contract disputes (due to prohibitive compensation costs for premature termination)
	Franchisee	<ul style="list-style-type: none"> ▪ Be less responsive to County requests ▪ Meet minimum service requirements to avoid contract termination
<ul style="list-style-type: none"> ▪ Franchise fee of 5% of gross receipts [F] 	County	<ul style="list-style-type: none"> ▪ Higher fees received when rate increases

[F] – Franchise Agreement; [O] – Ordinance; [S] – Sunrise Landfill Agreement

Single Fee for Solid Waste and Recycling Collection

The Franchisee receives compensation for collecting recyclables from every residence whether or not the residence receives service. For the case of multi-unit dwellings, residents largely do not participate because these services are not yet offered. This bundled fee creates a perverse incentive for the Franchisee to provide service to as few units as possible and otherwise minimize expenditures on the recycling program.

The Franchisee is in the best position to promote recycling, since it is the “front-line” and has regular access to residents. However, under the current fee structure there is no incentive for the Franchisee to promote increased recycling. On a subtler note, residents paying a bundled fee may not even recognize that they are paying for services they may not receive or utilize.

The Franchisee has only limited contractual and statutory requirements to promote the recycling program that might help counter the force of the incentives to discourage

advertisement. Neither the Franchise Agreement nor the Ordinance requires the Franchisee to advertise its recycling services. Relatively limited biennial advertising is required of the municipality by the State (Nevada Revised Statute 444A.050) and, in theory, should carry over into the Franchise, but not been explicitly incorporated into the Franchise agreement. The Franchisee does advertise periodically, usually annually, generally through billing inserts.

Collection capacity

The frequency of collection and container capacities specified in the Franchise Agreement and Ordinance define a theoretical infrastructure capacity that the Franchisee has contracted to meet (Table 8). Assuming that all residents in Clark County use the standard 33 gal. solid waste-can and three 12 gal. recycling bins supplied by the Franchisee, the maximum solid waste collection capacity required is 815,766 cubic yards per collection cycle and the maximum recycling collection capacity is 222,482 cubic yards per collection cycle. Theoretical solid waste collection capacity is therefore four times that for recycling. If multi-unit residences, which in practice do not receive recycling services, are not counted in the recycling calculations, theoretical collection capacity for solid waste is 8 times that for recyclables.

The recycling collection rates and container sizes also create a disincentive for residents to divert more than 12 gal. of paper, glass, and other recyclables or 1 gallon of motor oil in each 14 day period. Every other week collection can be expected to further reduce participation since it requires residents to actively remember which week is a recycling week, instead of simply putting out the recycling with their trash on a specific day each week.

Table 8: Collection Capacity: Solid Waste vs. Recyclables in Clark County Urban Solid Waste Districts (Monthly)

Material	Number of Containers	Container Size (Gal.)	Frequency of Collection	Total (gallons)	Total (cubic yards)	Capacity Ratio
Solid Waste	1	33	8	141,601,416	815,766	
Recyclables, single family and multi-unit residences	3	12	2	38,618,568	222,482	4
Recyclables, de facto (single family only)	3	12	2	17,723,304	102,104	8

Calculations based on 536,369 occupied households, 290,212 single family households, 246,157 multi-unit households, (SNCPE 2000); 1 gallon [US, dry] = 0.005761 cubic yard

Given the specified collection frequencies and capacity of waste to recycling, the County is receiving precisely what it has specified –significantly more disposal service than recycling service. Genuine collection capacity would be expected to be reflected in the proportion of labor dedicated to collection. The Franchisee’s reports that 23% of operations labor personnel and 18% of personnel overall are involved in recycling operations, very close to the predictions derived from the theoretical capacity

requirements estimated in Table 8¹⁸. However, as Figure 1 (pg. 5) shows, only a small fraction of total waste collected is being recycled.

Contract term

The 39-year contract term (34 years remaining) is exceptionally long and, regardless of its origins, creates several interesting incentives and disincentives for the Franchisee and the County. For the County, the long contract term might encourage the County to avoid actions that might precipitate premature termination of the contract, since this would create prohibitive compensation costs. For the Franchisee knowing the extent of the County's financial risk from significant contract disputes creates a corresponding incentive to be less responsive to County requests. However, the Franchisee has a countervailing incentive to maintaining service quality above a level that might allow the County to terminate their contract with cause. Contract termination with cause would deny the Franchisee significant revenue that would have been earned in the unfulfilled contract term.

Franchise Fee

The Franchise fee, the fee paid to the County by the Franchisee, is based on gross receipts. Since gross receipts rise both with increasing population and increasing rates, higher gross receipts for the Franchisee translates into higher franchise fees for the County. Thus the County has an incentive to increase rates charged to residents. However, politically, the elected Board of Commissioners as a strong incentive to avoid rate increases since public discontent at increased rates might cost them their positions in the next election.

¹⁸ Republic Services of Southern Nevada, Letter responding to Audit Follow-up Data Request by Clark County Department of Business License, signed by Alan Gaddy, addressed to Michael Harwell. Dated 1/18/02.

VI. Recommendations for Advancing RM and Barriers in Existing Contract

1. Provide a financial incentive for raising residential recycling diversion rates over a specified level.

The core elements of the RM approach are a cap on overall disposal and recycling rates or fees, and a remuneration system that allows the contractor to retain some or all of the cost savings and/or additional revenue from increased diversion and sale of recyclables. The idea is to create financial incentives for the Franchisee to increase recycling so that it will proactively seek cost-effective recycling and diversion.

Under the current operation of the Franchise Agreement and Ordinance the Franchisee has little incentive to adopt such a system, since it currently retains all gains from any increased revenue and cost savings. Our analysis shows that if the Franchisee increased recycling they would also increase their own profit. However, there may be many reasons why this might not occur. If the County wants to ultimately meet or exceed the State's 25% diversion goal, it might have to actively promote the changes. To do so the Board of Commissioners would need to have the ability to provide financial incentives and/or disincentives to influence the Franchisee's recycling performance. Although the Franchise Agreement provided the County with such tools, subsequent changes in the Ordinance may have temporarily eliminated them. To implement an RM approach these powers would need to be restored.

The original Franchise Agreement gave the County tools to encourage fiscal restraint by the Franchisee and regulate its performance. The principal tool provided in the Agreement for achieving these ends was the empowerment of the Board of Commissioners to *raise* or *lower* rates based on a specified set of criteria.

Several factors were to be used in the rate adjustment process, the most important being a goal of sustaining a "desired" 7% rate of return. The document is silent on the rationale behind this goal, but it would appear on the one hand to guarantee the Franchisee a specific profit and on the other to restrict the Franchisee from unreasonably benefiting from its position as sole contractor for residential solid waste collection.

The 1998 change in the county Ordinance, which shifted from the rate adjustment mechanism specified in the Franchise Agreement to an automatic mechanism indexed to CPI-U, may also have stripped the Board of Commissioners of its power to raise or lower rates if the ROR exceeds 7%. The Franchise Agreement itself was not amended and the Board of Commissioners could (and should if it wishes to implement RM) amend the Ordinance to allow for application of these original elements. The automatic CPI-U adjustment could be retained, and Board initiated rate adjustment applied at the discretion of the Board.

The power and willingness to adjust rates to meet the 7% target rate of return could be used as the basis for an effective incentive to increase diversion. The Franchisee's 2001 balance sheet appears to indicate that the Franchisee is at present making a rate of return

higher than 7% and possibly in excess of 10%¹⁹. If the Franchisee is exceeding the 7% ROR target and the Board of Commissioners restored their power to adjust the rates to meet this target, the County would then be in a position to establish an RM based relationship with the Franchisee. As will be discussed below an RM-type arrangement would have the County allow the Franchisee to an ROR greater than 7% in return for meeting or exceeding recycling targets.

2. Emphasize that maximizing cost-effective diversion is a County priority.

This preference should be stated explicitly in regular communication with the Franchisee as well as any future changes to the Ordinance and Franchise Agreement so that the contractor clearly understands the County's priorities. As the incentives and collection capacity shows, the existing contract sends direct and indirect signals that waste disposal is the primary service in the contract. While largely symbolic, such a message balances the perceived bias towards disposal identified in Section III.

3. Increase extent, parameters and transparency of reporting.

Under RM, transparency is a key component. Current reporting to the County is not frequent or detailed enough to enable meaningful analysis, spot trends or identify opportunities. With the current data, the County cannot develop a clear picture of the relative contribution of residential and commercial sectors to the solid waste stream and diverted recyclables, participation rates and patterns, or any activities associated with the household hazardous waste collection program. Neither we nor the County can determine the costs, participation rates and service levels from the data in currently reported form²⁰. Improvements are needed in two key areas:

- 3.1. *Require more detailed performance reporting.* The simple notion of “what gets measured gets managed” certainly applies to any waste and recycling program. The Franchise Agreement requires reporting of very little performance data. What is required is highly aggregated and cannot be used to identify areas for improvement. Aggregation is both at a geographic scale (all contracts within the county held by the Franchisee) by generating source (combined single family, multi family and commercial), and by category (all diverted metals, all recycling costs).
- 3.2. *Require more detail and specificity in financial reporting.* To effectively oversee its solid waste and recycling program, the County needs to know the costs and revenues that are associated with service to the unincorporated county, distinct from the county as a whole. The County should also know more precisely the contribution of all significant elements to the overall cost or revenue. For example, the revenues from the sale of each type of recycling commodity should be reported. The current consolidated income reports of the Franchisee provide some detail in

¹⁹The Franchisee's consolidated income statements show the overall rate of return has been growing steadily since 1996 reaching nearly 12% in 2000, nearly double the 1995 rate. This rate of return is not exactly that described in the Franchise agreement since the Franchisee only reports costs and revenues in each category for all operations and does not separate costs and revenues for Clark County and those from contracts with the incorporated municipalities. Source: Silver State Disposal Service, Inc. and Subsidiary (1995-1997) Republic Silver State Disposal, Inc. , and Subsidiary (1998-2000) Consolidated Statements of Income. FY 2000: Net income of \$19,699,373 reported on Gross receipts, \$165,810,802.

²⁰ General data limitations are discussed in greater detail in the *Clark County Solid Waste Master Plan Update, Interim Reports 1 and 2 (draft)*.

the source of disposal expenses, a breakdown by personnel, vehicle, transfer station and indirect expenses, but only a single line item for recycling. The current financial reporting also does not allow one to determine what percentage of fees charged to residents goes toward recycling services and what is spent on disposal services. A better understanding of individual cost centers would allow the County and Franchisee to see how the balance sheet is impacted by changes in recycling rates, illustrating for example, how potential net benefits (Section IV) might accrue through increased recycling.

The performance requirements that appear in the Franchise Agreement are tied to the rate adjustment mechanism and, like the 7% rate of return, it is unclear whether they are enforceable at this time²¹. Furthermore, the performance requirements are not particularly stringent or useful from an RM perspective. Performance is measured against a baseline derived from the Franchisee's own performance during the first three years of operation. After this time the Franchisee need only sustain these baseline levels. The agreement does not spell out how the county will use raw data presented in making any evaluations or what is defined as a decrease or improvement in performance. There are also no explicit penalties for declines in performance. County staff report that the County has not received the performance data since the contractor changed auditors several years ago, although they assert it is still required.

In order to implement a performance-based incentive, the County will need the Franchisee to report commercial and residential contributions for solid waste and all categories of recyclables. While the nature of the current collection routes may prevent exact reporting, other communities have generated estimates using several one-week samples based on temporary collection routes dedicated to each sector.

It has been suggested that requiring reporting of this information by the Franchisee may be justified under Section 20 of the Franchise Agreement that requires reporting of information necessary to assess and report solid waste, recycling and household hazardous waste collection activities to fulfill state requirements. In any case, if a performance based incentive is mutually agreed upon, the Franchisee will have a built-in incentive to track and report this data because it will be the basis of their performance bonus.

Summary Recommendation

We recommend investigating an RM performance-based incentive that contains the following elements:

1. Current rates and cost for waste and recycling services that are capped and used as the baseline. Thus, an RM based program would not increase current rates
2. The County sets performance based targets tied to overall recycling rates similar to the scenarios presented in Section IV.
3. The Franchisee receives all or a portion of the net benefits (see Table 6) from achieving the performance targets. The bonus could take several forms. For

²¹ County staff are unclear whether these provisions apply after the CPI-U revision of the ordinance was enacted in 1998.

example, the rate of return could be guaranteed at 7% as a floor, but allowed to be higher if the Franchisee meets the performance targets. The actual bonus in the form of a higher rate of return would need to be pegged to the cost savings from meeting the performance targets.

Such a mechanism would also require the Franchisee to improve reporting per the recommendation above because the bonus is tied to the performance and financial data. A key assumption of course is that cost-effective opportunities do exist when compared to the current baseline of services and costs. While this analysis is preliminary, there does appear to be potential if political and organizational barriers can be overcome. A good starting point for discussions might be how best to formalize the proposed performance-based incentive such that the County can receive much higher levels of service and increase recycling while the Franchisee can make more money through a higher rate of return.

VII. Appendix A: Inferences, Assumptions and Calculations

This Appendix is designed to explain the inferences, assumptions, and calculations used to produce data presented in the body of the report. As explained in detail below the analysis is based on a collection of sometimes incomplete data sets. When important data, such as waste stream characterization and residential vs. commercial contributions to the solid waste and recycling streams, were not reported by the contractor or otherwise readily available, we generated estimates based on other data sets or adopted those put forward in the *Clark County Solid Waste Master Plan Interim Report 1 (draft)* (draft SWM Plan). All data are for the year 2000 unless otherwise indicated.

Note on data and analysis

The analysis in this report has been made using the available data. We initially intended to focus primarily on the residential component of the solid waste stream in the unincorporated areas of Clark County, NV. However, we determined that the available data was too aggregated and incomplete to conduct such a focused analysis. Data was limited in the following ways:

- Collection activities within both incorporated and unincorporated areas of Clark County were aggregated in all reported recycling and solid waste collection data
- Data was not available on the relative contributions of residential and commercial sectors to the recycling and solid waste collected by Republic Services of Southern Nevada and Subsidiary (Republic), the Franchisee
- Data on actual costs and revenue of recycling and solid waste disposal operations was limited to single line items on consolidated annual income statements provided to the County by Republic
- Many collected recyclables were reported in aggregated categories (e.g. glass) instead of standard commodities market categories (e.g. green glass)
- (Demographic data was very complete and easily accessible)

Our analysis is therefore based primarily on data reflecting collection and materials from both residential and commercial customers in all incorporated and unincorporated areas served by the Franchisee, specifically: Las Vegas, North Las Vegas, Henderson, and Clark County and occasionally on data reflecting activities in the County and all constituent municipalities.

Where disaggregated data was essential to our analysis we have generated estimates from the aggregated data using waste stream composition data from the California Integrated Waste Management Board. When estimates involved selection among several options we have generally picked a conservative option to keep the analysis as realistic as possible.

Because available financial data provided only limited insight into recycling costs and revenue, the Franchisee should verify the cost estimate data. More accurate estimates could be generated if a detailed breakdown of recycling revenue and costs (e.g. portion of

revenue from sale of commodities, relative contribution of collection, separation, and storage to recycling costs) were provided.

Transparent calculation information is provided in Appendix A to allow for future calculation updates.

Source of figures reported in “Section II: Baseline Solid Waste and Recycling Service Levels”

Figure 1: Source of Recyclables Diverted in Clark County

The percentages presented in the figure are based on the following quantities reported in the draft SWM Plan:

Table A.1

Year 2000 data	Column 1	Column 2	Column 3
	Tons	Fraction of Total Recycling and Solid Waste Generated	
Republic recyclables	71,418		2.6%
Residential (Republic)	37,747	1.4%	
Commercial (Republic)	33,671	1.2%	
Commercial (Other)	232,293	8.3%	
All Clark County Recyclables	303,711		10.9%
Landfilled (Commercial/ Residential)	2,483,805	89.1%	
Total residential/commercial Solid Waste and Recyclables	2,787,516	100.0%	

- Values in bold in Column 3 are those listed in Figure 1.
- Data presented in Column 2, except for the residential and commercial waste breakdown, are as reported to the County by the Franchisee, other solid waste contractors and independent recyclers.
- The quantity of recyclables collected from residential customers by the Franchisee (column 1) is as *estimated* in the draft SWM Plan, since the Franchisee is not required to report this level of detail. The draft SWM Plan estimated contributions from each sector by assuming that 80% of all office paper and cardboard collected by Franchisee came from commercial customers and the remaining recyclables from residential customers.
- The values in Column 4, rounded to the nearest integer value, are referred to elsewhere in the *Baseline Disposal and Recycling Quantities in for the Year 2000* section.

Countywide recycling rates

Table A.2: Countywide recycling and land disposal

Year	Tons Recycled	Tons MSW Landfilled	Total Tons Generated	Recycle Rate
1995	273,094	1,854,150	2,127,244	13%
1996	382,589	1,878,533	2,261,122	17%
1997	362,565	2,047,322	2,409,887	15%
1998	297,064	2,220,500	2,517,564	12%
1999	211,601	2,320,403	2,532,004	8%
2000	303,711	2,483,805	2,787,516	11%
Total	1,830,624	12,804,713	14,635,337	
Average. Recycling Rate 1995 -2000				12.5%

- The average recycling rate since 1995 cited in the text was calculated as follows: (the total tons of recyclables collected) / (total tons of SW and recyclables generated), for the period 1995-2000.
- Totals are derived from data reported in *Table 7-1: Tons of MSW Recycled, Landfilled, and Percent Recycled from 1995-2000 Clark County, Nevada* of the draft SWM Plan. All data not including totals or averages in Table A.2 are derived from Table 7.1 in the draft SWM Plan.

Relative proportion of recyclables collected by franchisee vs. other companies

- The franchisee reported sales of 71,418 tons of recyclables in 2000 or 24% (~1/4) of all recyclables reported collected and sold.

Number of companies involved in recycling in Clark County

- The approximate number of businesses involved in recycling (~70) was derived from the number of entities whose recycling reports to the county were incorporated into countywide calculations. The source document was a spreadsheet from the Clark County Public Health Department showing reported tonnage in all categories of recyclables. The identities of individual firms are concealed.

Estimates for recycling rates within commercial and residential sectors

Table A.3: Sector recycling rates

	Column 1	Column 2
	Tons	Sector Recycling Rate
Total Residential/Commercial recyclables and solid waste	2,787,516	
Commercial (60%)	1,672,510	
Residential (40%)	1,115,007	
Total Commercial recyclables		16%
Franchisee	33,671	2%
Other	232,293	14%
Residential recyclables (Franchisee)	37,747	4% (3.7%)

To estimate rates within the commercial and residential sector we first estimated the contribution of each sector to the solid waste stream as a whole. Since this data is not currently reported to the County and waste stream characterization data for each sector in Clark County was not yet available, we assumed that the relative contributions of each sector to the solid waste stream as a whole was similar to that determined for the state of California (~60% commercial and 40% residential, including self-haul contributions to both) and reported in the *1999 California Statewide Waste Disposal Characterization Study*, published by the California Integrated Waste Management Board (CIWMB 1999).

California was chosen because the characterization is relatively recent and we believed that as a western state with significant portions of the population living in arid urban communities it would better approximate the conditions in Clark County than would national averages. National averages are 55-65% residential with the remainder commercial²². The higher average proportion of residential wastes in the national averages is likely due to yard trimmings which make up ~12%²³ of the MSW. Thus we used the California data.

Under this assumption commercial sector generation in 2000 in Clark County was 1,672,516 tons and residential sector generation was 1,115,007 tons (Table A.3). Tonnage of either commercial recyclables or residential recyclables was then divided by tonnage for that sector to generate sector recycling rate estimates.

- The lower end of the 14-16% range for the commercial sector recycling rate is a true lower bound and counts only recyclables collected by independent recyclers all of whom serve the commercial sector (232,293 tons). The upper end of the range also includes the estimated tonnage of commercial recyclables collected by the Franchisee (33,671 tons) (estimated in the Draft SWM plan and described in Table A.1).

²² *Characterization of Municipal Solid Waste in the United States, 1998 Update* (Appendix D, Table D-1), Franklin Associates prepared for the US EPA Municipal and Industrial Solid Waste Division, Office of Solid Waste, 1999.

²³ *Municipal Solid Waste in the United States: 1999 Facts and Figures* (Table 12), US EPA Solid Waste and Emergency Response, 2001.

- The residential recycling rate of 4% (more precisely, 3.7%) is simply the estimated quantity of residential recyclables (37,747 tons) (See Table A.1) divided by the estimated total quantity of residential solid waste and recyclables generated (1,115,001 tons). If the Franchisee’s commercial recyclables collection were actually lower than estimated in the draft SWMP, as suggested by County Staff, the residential recycling rate would be higher than this estimate. The maximum rate would still be only 6.4%.

Curbside collection participation rates

Table A.4

Residential recyclables (tons, estimate)	37,747
Average annual household contribution to the curbside collection program (tons)	0.3
Inferred number of participating households (single family)	125,823
Occupied single family households in Clark County	290,212
Occupied multi-unit households in Clark County	246,157
Total number of households in Clark County	
Participation rate of single family households	
Participation rate of multi-unit households	0%
Overall participation rate	23%

- The estimate of a 43% participation rate is taken from the draft SWM Plan. Their methodology assumes 50-lb/household/month contributions to the curbside recycling program (600 lb/household/year or 0.3 tons/household/year). The inferred number of households is estimated by taking the total quantity of residential recyclables diverted (33,747) and divided it this number (0.3). Since multi-unit households do not receive curbside collection service in practice, the authors of the draft SWM Plan calculate the participation rate by dividing the inferred number of participating households by the number of single-family households in the County. If residential recycling totals were actually higher than estimated as suggested by County staff than the participation rate would be more than double this estimate. This would give an unrealistically high participation rate and suggests that the lb/household/year value is probably too low.
- The Franchisee recently reported²⁴ that the participation rate for 2000 was 27.5%, as measured by diver “clicker counts” of recycling bins set out for pick-up. To obtain the participation rate the number of clicker counts for an area is divided by the number of homes in the area. It is not clear from the Franchisee’s description of their methodology how frequently such counts are done (annually, periodically, or daily) or whether the number is average of all data collected for all neighborhoods. If multi-unit dwellings, the reported rate would appear to validate the rates estimated above and their underlying assumptions.

²⁴ Republic Services of Southern Nevada, Letter responding to Audit Follow-up Data Request by Clark County Department of Business License, signed by Alan Gaddy, addressed to Michael Harwell. Dated 1/18/02.

Table A. 5: Comparison of occupied housing demographics in all of Clark County and the unincorporated county

Occupied housing	Entire county	Unincorporated county	Unincorporated county's share
Single-family	290,212	100,880	35%
Multi-family	246,157	131,232	53%
Total Clark County	536,369	232,112	43%

Source of housing data: Southern Nevada Consensus Population Estimate 2000 as reported by Clark County Comprehensive Planning Dept. (www.cl.clark.nv.us/comprehensive_planning)

- Dividing the inferred participation rate by the total number of households in Clark County gives a participation rate of only 23%.
- For the unincorporated county, the single-family participation rate and the overall participation rates are likely to be significantly lower than those for the entire county. The unincorporated county contains 43% of all housing units but has just 35% of all occupied single family housing units and 53% of occupied multi-unit residences.

Figures reported in “Section III: Contract Compensation”

Franchise fee paid to the County for service in the unincorporated county in 2000

The figure of \$3.7 million is 5% of the unincorporated county’s share of Franchisee’s revenue (\$73,787,074) as reported by Franchisee to the Clark County Business License Office.

Figures reported in “Section IV: Opportunities for Cost Savings and Enhanced Recycling Services”

Table 4: Clark County NV Cost/Benefit of Increased Diversion of Recyclables from Residential Waste Stream

Baseline Data

- **“Recycling rate” (residential):** 3.7% is simply the residential recycling rate in the year 2000 (see Table A.3).
- **“Land disposal” (residential):** 993,522 tons is the estimated residential fraction (40%) of all solid waste landfilled by the Franchisee in 2000 (2,483,805 tons).
- **“Recyclables” (residential):** 37,747 tons (see Table A.3)
- **“Cost/revenue per unit” for “Land Disposal”:** The avoided cost of land disposal (\$4.24/ton) was estimated by dividing the average dump operations expenses (FY1995-FY2000) reported by the Franchisee (\$10,523,810) by the total tonnage of MSW landfilled by the Franchisee in FY2000 (2,450,620 tons). This is

a surrogate for the usual measure of avoided tipping fee, which cannot be readily applied here, since the Franchisee also operates the landfill. These data likely represent a lower bound on savings since the disposal cost/ton is very low and did not account for any labor savings associated with decreased collection of waste sent to the landfill or extended life of landfill.

Actual tipping fees reported to Waste News are \$13.80/cubic yard of compacted waste. It is clear from the Franchisees 2000 balance sheet that they are not charging themselves the full tipping fee, since this would result in disposal costs of approximately \$13.5 million for residential waste alone, whereas their total reported revenue from dump operations for 2000 is \$5.7 million. It may be that the reported disposal revenue does not come from disposal of waste collected by the franchisee, but from tipping fees charged to others.

This estimate of avoided cost of disposal do not consider the more substantial benefits of reduced rolling stock, labor and related costs that would follow from significant reductions in the total volume of waste landfilled as diversion rates reach the levels of Scenario 3 and beyond.

- The average revenue/ton for recyclables of \$61 is a weighted average of revenue from the sale of residential recyclables. To calculate this average the tonnage of recyclables by material type²⁵ was valued according to current prices for secondary commodities. Since local recycling market data was not available we used the simple mean average reported average spot prices reported bi-weekly from 1/12/96 -1/25/02, which local recyclers confirm are reasonable surrogates, which they use themselves in setting bid prices. The total dollar values of tonnage for each commodity type were summed and divided by total tons of residential recyclables to get the \$61/ton value. When tonnage data provided by the Franchisee combined multiple commodities categories the relative proportion of each commodity in the combined tonnage was estimated using CIWMB waste stream composition data adjusted to eliminate the contributions of yard waste.
- Table A 6. shows quantities of recyclables sold in 2000 as reported by the Franchisee (column titled “Quantity”) and inferred sources for each category of recyclable based on methodology of the draft Solid Waste Master Plan (80/20 commercial/residential for corrugated cardboard and office paper) and the CIWMB waste stream composition data. Relative proportions of each subtype of material derived from the CIWMB data are reported in the last column. Actual proportions may differ

²⁵ Commercial/residential breakdown for cardboard and office paper presumed to be 80/20. All other recyclables assumed to be from single family residential customers (pg. 52 Interim Report No. 1, Solid Waste Management Plan Update, Clark County, Nevada)

- Table A.7. shows the cumulative average LA market commodities prices, the revenue Clark County residential recyclables sold in 2000 would have brought at these prices and the average revenue per ton for these recyclables using the historic average price from 1996-2002 and average prices in 2000. It is worth noting that the \$61/ton value derived using the eight year historic average is the more conservative of the two prices and that were to use the 2000 prices in our model recycling revenue would be 60% greater.

Table A.7 Estimated Revenue From Residential Recycling in Clark County, NV

		Historic Average			2000 Average		
		Price	Tons	Revenue	Prices (LA)	Tons	Revenue
Paper							
Cardboard		\$42	7,292	\$308,868	\$75	7,292	\$548,723
Newspaper*		\$62	18,973	\$1,183,077	\$113	18,973	\$2,145,135
Office paper		\$35	1,126	\$39,203	\$78	1,126	\$87,486
Magazines		\$9	1,488	\$92,785	\$17	1,488	\$168,237
Phone books	n/a		818	-	n/a	818	-
Mixed paper		1.50	120	\$1,079	6.88	120	\$2,010
Paper Subtotal			29,817	\$1,625,014		29,817	\$2,951,591
Metals							
Steel cans		\$26	1,735	\$44,475	\$27	1,735	\$46,908
Aluminum		\$584	475	\$277,502	\$552	475	\$262,200
							24%
				37,747			

Table A.8 reports just historic average (1996-2002) and 2000 average LA commodities spot market prices for easier comparison.

Table A.8 Los Angeles Commodities Spot Market Prices (\$/ton)

	Average Price 1996-2002	Average Price 2000
Corrugated	42.36	75.25
News No. 6	42.15	98.38
News No. 8*	82.56	127.75
Sorted office paper	34.82	77.71
Magazines	8.99	16.75
Mixed- residential paper	1.50	6.88
Steel Cans	25.64	27.04
Aluminum	583.80	551.67
PET*	196.46	318.33
Natural HDPE*	286.20	404.17
Colored HDPE*	139.24	210.00
Mixed HDPE*	143.36	210.00
Flint glass	34.71	41.92
Green glass	19.23	25.00
Amber glass	32.85	33.58
Sorted white ledger	95.60	54.38
Computer Printout	92.73	213.79

* baled, picked-up

Prices are simple mean of the average spot prices reported bi-weekly by Waste News from 1/12/96 -1/25/02

- **“Recycling Costs”:** \$27. As described in the discussion of Table 4: To get an estimate of increased *incremental variable* recycling costs, we took reported data for 1995 and compared it to the reported 2000 data. In 1995, the franchise recycled 55,388 tons of material at a cost of \$10,821,080. This is equivalent to roughly \$195/ton. The incremental increase in tonnage between 1995-2000 is 16,080 (71,418-55,338) and the incremental cost is \$608,970. Thus the incremental cost per ton to recycle for the increased recycled tonnage is roughly \$38/ton. Note we are assuming that the franchisee has invested in the appropriate

fixed cost to serve residences as specified in the Ordinance (twice a month) and thus the incremental increase in the variable costs for increased recycling is the appropriate measure to use.

VIII. Appendix B: Franchisee Revenue and Cost Data 1995-2000

Franchisee Revenue and Cost Data (1995-2000)¹

	FY 1995	FY1996	FY1997		FY1998	FY1999
Operating revenues				Operating revenues		
Disposal service revenues	\$87,877,576	\$93,830,896	\$94,019,838	Disposal services	\$116,082,389	\$125,298,787
Transfer station revenues	3,228,963	3,229,199	3,308,235	Transfer station operations	\$3,789,408	\$3,942,642
Dumping fees	3,127,952	3,878,140	4,517,059	Dump operations	\$3,755,024	4,993,960
Container rentals	5,552,794	5,844,201	5,712,897	Container Rentals	\$6,917,836	7,396,490
				Medical waste service		1,802,097
Recycle revenues	12,223,017	9,110,171	7,933,890	Recycling	6,606,785	\$7,730,119
				Soil, sludge, and septic		2,770,001
Real estate rentals	127,309	83,767	67,114			
Total operating revenues	\$112,137,611	\$115,976,374	\$115,559,033	Total operating revenues	\$137,151,442	\$153,934,096
Costs and expenses:				Cost and expense		
Disposal service expense:				Disposal services		
Personnel expense	22,850,691	25,995,119	28,057,827	Personnel	38,465,232	38,079,542
Vehicle expense	23,515,334	24,476,948	21,320,604	Vehicles	20,276,043	19,548,801
Indirect expense	9,648,092	6,329,529	6,012,945	Franchise fees		
Transfer station expense	5,945,172	9,808,761	7,661,213	Transfer station operations	16,987,388	18,199,450
Dump operating expense	13,991,422	11,017,441	10,293,786	Dump operations	10,246,512	8,228,033
Container rental expense	1,997,771	\$2,739,988	2,911,056	Container rental	\$2,297,398	2,703,591
Recycling expense:						
Operating expense	10,561,320	10,833,143	9,260,747	Recycling	8,366,061	4,991,091
Administrative expense	259,760	323,687	450,040			
				Medical waste service		717,506
Cost of container and cart sales				Soil, Sludge, and septic		\$812,475
Administrative and general expense	11,183,359	12,035,557	14,768,820	Other general and administrative	\$20,754,163	\$34,444,239
Total costs and expenses	\$99,952,921	\$103,560,173	\$100,737,038	Total cost and expenses	\$117,392,797	\$127,724,728
Operating Income	\$12,184,690	\$12,416,201	\$14,821,995	Net income from operations	\$19,758,645	\$26,209,368
Other Income (expense)				Other income (expense)		
Interest and dividend income	803,585	761,479	1,270,754	Interest Income	88,797	\$334,250
Gain on sale of equipment				Gain on sale of equipment	14,437	524,133
Loss on sale of marketable securities						
Interest expense	(1,013,043)	(892,800)	(667,635)	Interest expense		(3,179,656)
Amortization of covenants not to compete						
Amortization, other						
Contributions to employees' profit sharing plan	(600,000)	(600,000)				
Miscellaneous Income (expense), net	(71,098)	(181,648)	(432,775)	Miscellaneous, net	(141,467)	\$15,022
Total other income (expense)	(\$880,556)	(\$912,969)	\$170,344	Total other income (expense)	(38,233)	(2,306,251)
Income before federal taxes and cumulative effect of change in accounting principle						
Income before taxes	11,304,134	\$11,503,232	14,992,339	Income before income taxes	\$19,720,412	23,903,117
Federal income tax provision	3,800,772	4,038,981	5,139,404	Provision for income taxes	6,786,135	8,217,548
Net Income	\$7,503,362	\$7,464,251	\$9,798,935	Net income	\$12,934,277	\$15,685,569

¹ Data compiled from:

Silver State Disposal Services, Inc. and Subsidiary Consolidated Statements of Income Years Ended September 30, 1995 and 1996
 Silver State Disposal Services, Inc. and Subsidiary Consolidated Statements of Income Period From October 1, 1996 and August 27, 19
 Republic Silver State Disposal, Inc. and Subsidiary Consolidated Statement of Income for the Year Ended December 31, 1998
 Republic Silver State Disposal, Inc. and Subsidiary Consolidated Statement of Income for the Year Ended December 31, 1999
 Republic Silver State Disposal, Inc. and Subsidiary d/b/a Republic Services of Southern Nevada and Subsidiary
 Consolidated Statement of Income for the Year Ended December 31, 2000
 Note: Data for Consolidated Income Period from August 28, 1997 to December 31, 1997 not included

IX. Appendix C: What is RM Contracting

Resource Management (RM) is a strategic alternative to disposal contracting that seeks continual improvement in resource efficiency through enhanced source reduction, recycling, and recovery. When incentives are tied to the value of services that foster prevention, reuse, and recycling—with disposal as the last resort—contractors’ activities align with the customers’ in a new type of joint effort. However, this is currently the exception rather than the rule in integrated solid waste management contracting.

Conceptual Underpinnings and Historical Origins of RM

RM is based on the idea that contractors will pursue resource efficiency when offered proper financial incentives. RM contracts align waste generator and contractor incentives by constraining disposal compensation and providing opportunities for both the contractor and the generator to profit from cost-effective resource efficiency innovations. For example, RM contracts may cap disposal costs (based on current costs) and then include a gain-sharing arrangement for successful waste minimization projects initiated by the contractor. Thus, if contractors identify cost-effective recycling markets for disposed materials, or techniques for preventing waste altogether, they receive a portion of the savings resulting from the innovation. This arrangement enhances recovery of readily recyclable materials such as corrugated cardboard and wood pallets while promoting market development opportunities for difficult-to-recover materials such as paint sludge and solvents. As a result, it fosters a business-driven, corporate commitment to make waste reduction and pollution prevention a priority. While RM may improve reputation, employee morale, safety (in hazardous waste reduction), and other “intangibles” that nevertheless contribute to competitive advantage, decision-makers understand issues better in financial terms. The most appealing facet of RM to decision-makers, therefore, may be its cost saving or cost-neutral premise, which seeks higher resource efficiency and additional services for each dollar currently spent.

RM’s conceptual underpinnings are in the broader area of performance-based contracting. One of the better-known users of such contracts are the energy service companies (ESCOs) which first gained prominence in the 1970s. ESCOs generally identify and supply necessary capital for energy efficiency improvements and extract their return on investment from resulting cost savings derived from reduced energy consumption.

General Motors Corporation (GM) adopted the term “resource management” as a logical outgrowth of its success with a similar performance-based contracting system in the area of chemical purchasing, use, and management.²⁶ GM embraced RM in response to an internal corporate waste reduction goal and the recognition that existing hauling and disposal contracts produced limited and uncoordinated resource efficiency across its more than 70 North American facilities. GM’s objective in executing RM contracts was to “provide a systems approach to resource efficiency that motivates cost reduction and

²⁶ GM has been practicing chemical management for more than 15 years. For more information on chemical management services, see <www.chemicalstrategies.org>.

conservation of plant resources.”²⁷ One year after implementing RM contracts at several of its North American plants, GM realized a 20 percent reduction in overall waste generation (30,000 tons), a 65 percent increase in recycling (from 50,000 tons to over 82,000 tons), and a 15 to 30 percent decrease in waste management costs.²⁸

RM as a concept is certainly not new – many progressive organizations maintain that they have had RM-like contracts in place for years. By changing the ways in which organizations demand and pay for integrated waste management services, RM has the potential to transform the waste disposal industry into an sector that profits from mutually beneficial resource efficiency gains, rather than ever increasing quantities of waste. RM, however, is an emergent discipline that will require further standardization to forestall confusion in terminology and to better define what, operationally speaking, constitutes RM contracting. Many organizations, including those profiled in this project, have implemented elements of RM, and have without a doubt profited from doing so. However, falling short of a minimum set of implementation requirements embodied in the “RM practices” elaborated in this report precludes realization of the full series of associated benefits.

Resource Management versus Traditional Waste and Recycling Arrangements

A logical starting point to understand RM is to compare and contrast elements of traditional waste contracts and recycling arrangements with RM contracts. Typical disposal contracts send exactly the wrong economic signal to waste management contractors: more waste equals more profit. For this reason, they impede serious progress in resource efficiency by providing a profit incentive for disposal. The term “Resource Management” (RM) contracting is used to describe contracts that contain the types of incentives that align waste contractors incentives with those of their customers. The basic features of RM contracts are fundamentally different from those of traditional hauling and disposal contracts in three key areas: compensation and incentives, the type of contractor-customer relationship engendered, and the nature and variety of services offered (Table 1).

Traditional waste management contracts specify services that begin at the dumpster and end at the ultimate point of disposal, normally a landfill or incinerator. Services provided are limited to container rental and maintenance, hauling, and ultimate disposal or processing. In contrast with this exclusively external focus, an RM contractor addresses both external waste management activities and internal activities that affect waste generation.

²⁷ Underwood, Warren, 2000. General Motors Corporation Worldwide Facilities Group. Adopted from a presentation at the 2000 National Recycling Congress, Charlotte, NC, entitled: “Resource Management.”

²⁸ The variance in cost reduction can be attributed to the fact that some facilities were further along in their source reduction and recycling programs, and therefore had less opportunity to make quick gains.

Table 1: Distinguishing Features of Traditional Contracts vs. RM Contracts

Features	Traditional Waste Contracts and Recycling Arrangements	RM Contracts
Scope of Service	<ul style="list-style-type: none"> ▪ Container rental and maintenance, hauling, and disposal or processing. Contractor responsibilities begin at the dumpster and end at landfill or processing site. 	Services addressed in traditional hauling and disposal contracts as a last resort, plus services that inform and influence waste generation (i.e., product/process design, material purchase, internal storage, education on material use and handling, data management, reporting).
Contractor Compensation and Incentive Structure	<ul style="list-style-type: none"> ▪ Unit price based on waste weight and/or number of pick-ups ▪ Recycling often non-contractual “add-on” or “free” service provided by same contractor or other provider <p><u>Contractor Incentive:</u> Maximize waste service and volume; no integration with recycling/diversion/source reduction services</p>	<p>Cap total waste and recycling service cost (to control total contract costs) (Note: some organizations expect cost neutrality, others cost savings, and others still may be willing to pay a slight premium to increase diversion)</p> <p>Cap waste hauling/disposal costs and limit to “cost-recovery” basis (eliminates profitability)</p> <p>Performance bonuses based on (and financed from) demonstrated resource efficiency savings from documented baseline</p> <p><u>Contractor incentive:</u> Seek savings through recycling/diversion and other resource efficiency innovations</p>
Customer-Contractor Relationship	Minimal interface and collaboration between waste generator (incl. all stakeholders influencing waste) and contractor	Strategic alliance: waste generator and contractor work together to derive value from resource efficiency

The compensation and incentive structure devised under RM is central to its success in fostering diversion and other resource efficiency. In traditional waste contracts, waste generators typically pay a unit price based on the weight of trash collected, number of pick-ups, and any container rental fees. Moreover, recycling is often a peripheral and non-contractual activity that is at odds with the waste contractors main business drivers.

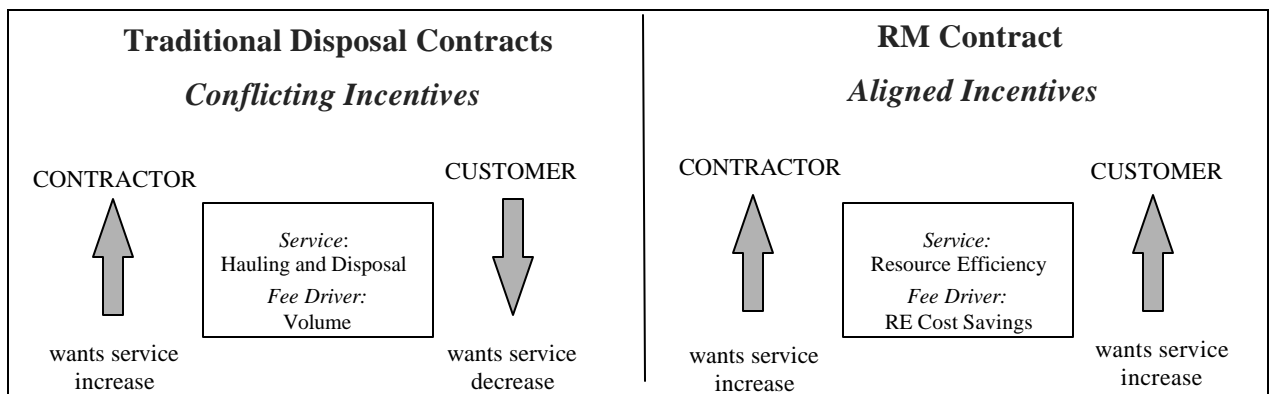
The contractor’s compensation structure under RM is fundamentally different than under traditional arrangements. Under RM, profitability is determined by the value of resource efficiency savings achieved through recycling and other activities, rather than quantities of waste disposed. RM undercuts waste service as the driver to emphasize and reward recycling/diversion and eventually source reduction on the basis of disposal or other documented cost savings. This is accomplished by using contracts to change the terms of business, redirecting funds from supporting trash service to incentivize recycling and other more resource efficient management methods (i.e., reuse, reduction through process/procedure redesign) where and when it is cost effective to do so.

This is carried out in practice by capping total organization-wide waste and recycling costs, and that portion allocated to waste disposal, and then setting performance bonuses based profit-sharing arrangement base on the value of resource efficiency savings identified and successfully implement by the contractor with its customer’s consent. For the initial recycling and diversion improvements achieved by the RM contractor, this value includes any revenues achieved by avoided disposal costs (i.e., hauling and landfill tip fees or incineration fees) and marketing recovered materials. As a result, the contractor receives the right price signals and their incentives align with those of the customer (Figure 1). This corrects the critical flaw in typical contracting environments in

which recycling or diversion services are often provided under an add-on or separate contract that is not linked with the waste services to provide a seamless and integrated view of cost savings and resource efficiency opportunities.

Finally, as a result of the altered scope of services and compensation basis, there is a marked alteration in the relationship between customer and contractor. With conventional waste and recycling services, there is little communication between the customer and contractor after contract inception, other than for problem resolution, regular service requests, or sporadic problem resolution. Collaboration on quality of service or optimization is atypical. Under RM, the combination of bestowing the RM a potentially broader scope of services and providing direct financial incentives helps transform the traditional adversarial relationship into a new kind of strategic partnership. In this new relationship, the RM contractor has both the financial motive and the capacity to interact key internal players that are capable of influencing waste generation, such as custodial staff, purchasers, environmental and design engineers, and purchasers.

Figure 1: Contractor and Customer Incentives in Traditional Disposal and RM Contracts



This transformation fosters new types of joint efforts in which core competencies of the contractor are harnessed to devise innovative, mutually beneficial solutions to waste management challenges. In industrial settings, contractors can provide on-site staff with the technical expertise to assist in the management, diversion, and reduction of specific waste streams within a plant, or assist in outreach/training activities about recycling. Providers can also help their clients structure their supply/service arrangements to reduce waste generation or enhance the recoverability of the waste created.

Although internal activities vary from organization to organization, a similarly comprehensive RM scope applies in non-industrial settings as well. In public institutions and/or small businesses, for example, RM contractors might work closely with internal janitorial and administrative staff to optimize resource efficiency. In municipal residential settings, a RM contractor might assume a more active role in public education and outreach to foster increased participation in recycling. Regardless of the organization type or source of resource efficiency, the generator and RM contractor share the savings.

The real strategic value of RM lies in the ability of to leverage the core competency of contractors while allowing the waste generator to concentrate resources on activities where it can provide unique value to its own customers. In pursuing the performance bonuses made available to them, RM contractors provide services above and beyond those offered in traditional waste contracts. For example, enhanced data tracking and reporting is a key added service that helps drive improvements in any program. These types of services are often more innovative, analytical, and management-oriented than “dump and return” waste or diversion services. This permits full utilization of contractors’ investments, innovations, and specialized capabilities that may be more expensive to duplicate internally. To be viable, however, any RM arrangement must be equitable and sustain the contractor’s profitability while being cost-effective for the customer.