

Draft Final Report
**Preliminary Feasibility Study of
Regional MRF Alternatives**

November 3, 2006

Prepared for
City of Santa Barbara
City of Goleta
City of Lompoc
City of Santa Maria
County of Santa Barbara

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Table of Contents

<u>Section</u>	<u>Page</u>
Acknowledgements.....	ii
Definitions and Abbreviations	iii
Executive Summary.....	1
1. Advantages and Disadvantages of Local MRF	5
1.1 Introduction.....	5
1.2 Background.....	5
1.3 Issues and Analysis.....	5
1.4 Conclusions	9
1.5 References.....	9
2. Waste Stream Analysis	9
2.1 Commingled Recyclables	9
2.2 Local Processing Facilities.....	10
3. Technical Analysis of Existing Processing System vs. New Local or Regional MRF.....	14
3.1 Existing Processing Infrastructure	15
3.2 Potential New Facilities	17
4. Identification of Additional Types of Recovered Materials and Market Analysis	20
4.1 Existing Conditions	20
4.2 Additional Recovery of Materials	21
4.3 Commodity Prices and Trends	22
4.4 References.....	23
5. Statewide Clean MRF Residuals Survey.....	23
6. Financial Analysis.....	24
6.1 Alternatives Analyzed.....	24
6.2 Sensitivity Analysis	28
7. Clean MRF Design Standards.....	29
8. Dirty/Dusty MRF Analysis	31
8.1 Residue Generation.....	32
8.2 Quantities and Composition	32
8.3 Financial Analysis.....	32
Appendix A: Waste Characterization Results	36
Appendix B: Historical Price of Materials Types (West Coast)	39
Appendix C: Clean MRF Survey Form	40
Appendix D: Summary of Clean MRF Survey Results.....	41
Appendix E. Population Escalation during Project Period	42
Appendix F: Tonnage Escalation during Project Period.....	43
Appendix G: Sensitivity Analyses of MRF Alternatives	44

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Participating jurisdictions:

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- Kimberly Nilsson, City of Goleta
- Claudia Stine and Steve Clark, City of Lompoc
- Bradford Whitty and Jeffrey Clarin, City of Santa Maria

Private businesses:

- Allied Waste/BFI
- Gold Coast Recycling and Transfer Station
- MarBorg Industries
- Waste Management/Health Sanitation Services

Definitions and Abbreviations

CIWMB	California Integrated Waste Management Board
Clean MRF	A materials recovery facility designed to process relatively uncontaminated mixtures of recyclable materials that have been source separated
Commingled recyclables	A mixture of several different types of recyclable materials (e.g., paper and beverage containers) set out for collection by the generator in a single cart or other type of container; also referred to as single stream recyclables
Dirty MRF	A materials recovery facility designed to process mixed solid waste
MRF	Materials recovery facility
Process residuals (or process residue)	Waste remaining after a mixture of materials (e.g., commingled recyclables or mixed solid waste) has been processed to recover marketable materials
TPD	Tons per day
TPD ₂₆₀	Tons per day based on an operating schedule of 260 days per year
WM/HSS	Waste Management/Health Sanitation Services

Executive Summary

Preliminary Feasibility Study of Regional MRF Alternatives

CalRecovery has been retained by the Cities of Santa Barbara, Goleta, Lompoc, and Santa Maria, and by the County of Santa Barbara to perform a preliminary feasibility study of regional materials processing facility (MRF) alternatives in Santa Barbara County. The study consisted of a number of tasks to evaluate the technical and financial aspects of processing residential and commercial commingled recyclables collected within the jurisdictions. The purpose of the study is provide the jurisdictions with information that they can use to evaluate whether or not one or more of the jurisdictions should further pursue planning and implementing of a regional MRF to process commingled recyclables.

The following sections describe the key work and results of the study.

Public versus Private Ownership and Operation

There are a number of advantages and disadvantages of private ownership or ownership and operation of solid waste facilities. For example, privatization of solid waste management services may result in lower costs to the public sector. Additionally, privatization can lessen the exposure of the public sector to many of the risks associated with provision of solid waste management services. The decision of whether or not governmental organizations should operate or take over operation of solid waste management services usually is governed by fundamental local considerations, including the capacity of the government to efficiently and effectively manage such services, the availability of trained personnel to perform the services, and the availability of adequate financial resources.

Waste Stream Analysis

The quantities of residential and commercial commingled recyclables were estimated with the assistance of the jurisdictions and local waste haulers. Currently, approximately 35,000 tons per year of commingled recyclables are collected from within the Cities of Santa Barbara and Goleta, and the unincorporated areas in the South Coast region of the County of Santa Barbara. Approximately 20,000 tons per year of materials are collected from Lompoc, Santa Maria, and the North County unincorporated areas. Thus, approximately 55,000 tons per year of residential and commercial commingled recyclables are collected form among the jurisdictions.

Waste characterization analyses were conducted in connection with local commingled recyclables processed by some of the regional processors, namely the Gold Coast materials recovery facility (MRF) in Ventura, the Waste Management/Health Sanitation Services MRF in Santa Maria, and the MarBorg Industries commercial MRF located near the Santa Barbara

Airport. Objectives of the characterizations included estimations of percent residue production and identification of opportunities for additional recovery of recyclables materials, thus increasing the rate of diversion of materials from landfill disposal.

Technical Analysis of Existing Processing System and New Regional MRF

The major processors of commingled materials generated in the County have been described in the previous section. To establish alternative MRF options, CalRecovery worked with representatives of the jurisdictions to identify four general site locations in the county. Subsequently, the key elements of each alternative were established, including locations of the landfill sites to receive process residues from the MRFs, locations of markets for materials, and transfer station infrastructure, if desirable, to efficiently transport commingled recyclables to the MRFs, depending on the specific alternative. In all, seven alternative MRF scenarios were formulated and evaluated. The seven alternatives are shown in the table below.

Summary of Alternatives Analyzed

Scenario	MRF Location	Residue Disposal Location
South Coast – Local 1	Downtown Santa Barbara	Tajiguas
South Coast – Local 2	South Coast Transfer Station	Tajiguas
South Coast – Local 3	Tijiguas Landfill	Tajiguas
South Coast – Regional 1	Downtown Santa Barbara	Tajiguas
South Coast – Regional 2	South Coast Transfer Station	Tajiguas
South Coast – Regional 3	Tajiguas Landfill	Tajiguas
North County – Regional	Cat Canyon Landfill	Cat Canyon

Identification of Additional Types of Recovered Materials and Market Analysis

Based on the quantities and composition of disposed waste from the Cities of Santa Barbara and Goleta and the County of Santa Barbara, there appear to be additional opportunities to divert on the order of 9,000 tons per year of various grades of paper and film plastic. Prices for most grades of recyclables have been increasing at a high rate over the past few years. Likely, the current rates of price, and associated revenue, appreciation will not continue over the long term, based on historical trends of price, and of supply and demand for recyclable materials.

Statewide Survey of MRFs Processing Commingled Recyclables

A survey of MRFs in California found an average process residual rate for commingled recyclables of approximately 12% on a weight basis, with a range of 9% to 15%.

Financial Analysis

CalRecovery performed a financial analysis of the seven MRF alternatives formulated for the study. A set of baseline conditions were defined and used to estimate the net cost of each alternative MRF scenario from the standpoint of each jurisdiction. In addition to estimating the net cost of the alternatives, CalRecovery also estimated the net cost of each jurisdiction’s current, comparable situation. The results of the base case analysis are presented below. The report also describes the sensitivity of the financial results to changes in some of the key project assumptions.

Comparison Net Costs of MRF Alternatives – Year 1 (\$/ton)

Scenario: Base Case

SANTA BARBARA

Alternative	Transport to MRF	Processing, Disposal of Residual,		Net Cost
		Marketing		
Current situation	4.18	5.00		9.18
Regional - Santa Barbara	2.85	(2.68)		0.17
Regional - South Coast TS	4.18	(1.32)		2.86
Regional - Tajiguas Landfill	21.85	3.23		25.08
Regional - Cat Canyon	28.43	13.76		42.19
Local - Santa Barbara	2.85	12.32		15.17
Local - South Coast TS	4.18	13.68		17.86
Local - Tajiguas Landfill	21.85	18.23		40.08

LOMPOC

Alternative	Transport to MRF	Processing, Disposal of Residual,		Net Cost
		Marketing		
Current situation	20.57	7.93		28.50
Regional - Santa Barbara	28.13	(2.68)		25.45
Regional - South Coast TS	25.33	(1.32)		24.00
Regional - Tajiguas Landfill	18.33	3.23		21.55
Regional - Cat Canyon	20.90	13.76		34.66

GOLETA

Alternative	Transport to MRF	Processing, Disposal of Residual,		Net Cost
		Marketing		
Current situation	2.85	N/A		
Regional - Santa Barbara	8.55	(2.68)		5.87
Regional - South Coast TS	2.85	(1.32)		1.53
Regional - Tajiguas Landfill	16.15	3.23		19.38
Regional - Cat Canyon	27.10	13.76		40.86
Local - Santa Barbara	8.55	12.32		20.87
Local - South Coast TS	2.85	13.68		16.53
Local - Tajiguas Landfill	16.15	18.23		34.38

SANTA MARIA

Alternative	Transport to MRF	Processing, Disposal of Residual,		Net Cost
		Marketing		
Current situation	2.81	8.39		11.20
Regional - Santa Barbara	34.70	(2.68)		32.02
Regional - South Coast TS	32.95	(1.32)		31.63
Regional - Tajiguas Landfill	25.95	3.23		29.18
Regional - Cat Canyon	16.15	13.76		29.91

UNINCORPORATED SOUTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual,		Net Cost
		Marketing		
Current situation	14.56	(25.54)		(10.99)
Regional - Santa Barbara	7.13	(2.68)		4.45
Regional - South Coast TS	1.43	(1.32)		0.10
Regional - Tajiguas Landfill	18.05	3.23		21.28
Regional - Cat Canyon	25.68	13.76		39.44
Local - Santa Barbara	7.13	12.32		19.45
Local - South Coast TS	1.43	13.68		15.10
Local - Tajiguas Landfill	18.05	18.23		36.28

UNINCORPORATED NORTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual,		Net Cost
		Marketing		
Current situation	20.47	(41.13)		(20.66)
Regional - Santa Barbara	35.25	(2.68)		32.57
Regional - South Coast TS	32.45	(1.32)		31.13
Regional - Tajiguas Landfill	25.45	3.23		28.68
Regional - Cat Canyon	8.55	13.76		22.31

Clean MRF Design Standards

Based on the technical analysis, a regional MRF to process residential and commercial commingled recyclables from the Cities of Santa Barbara and Goleta, and the South Coast unincorporated area, would require an average current processing capacity of 35,000 tons per year.

A regional MRF to process commingled materials from the above-mentioned jurisdictions as well as from the Cities of Lompoc and Santa Maria, and those of the North County unincorporated areas, would have to be designed to have a current average capacity of 55,000 tons per year. Other key design standards are described in the report.

Mixed Waste MRF Analysis

CalRecovery analyzed the technical and economics of a mixed waste (dirty) MRF that would process a current average of approximately 218,000 tons per year, or 840 tons per day. The facility would be designed to primarily recover paper, metals, glass, plastics, and wood. The estimated recovery rate is approximately 78%, based on evaluation of the disposed waste characteristics in Santa Barbara County, as well as analysis of information from two mixed waste processing facilities. The estimated net cost of mixed waste processing is \$59 per ton processed.

Report

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1. Advantages and Disadvantages of Local MRF

1.1 Introduction

The following is a discussion of the key issues and aspects of public versus private ownership and/or operation of materials processing and recovery facilities, including advantages and disadvantages of public ownership and/or operation. The discussion primarily focuses on those issues and aspects that are relevant to conditions in the state of California, although many of the comments also would apply throughout the United States.

1.2 Background

The following conditions are generally assumed in the development of the discussion:

- the alternative materials recovery facility would be located somewhere in Santa Barbara County;
- the required processing capacity would be medium to large, thus implying a relatively complex processing system and substantial capital outlay;
- waste collection service in the jurisdictions is provided by public or private entities;
- cost of land in many areas of the county is high; and
- a number of jurisdictions desire to increase the rate of diversion of materials from disposal.

1.3 Issues and Analysis

The participation of the private sector in solid waste management represents a potential opportunity to mobilize private investment and introduce higher levels of efficiency in the management of solid wastes. In some locations, however, it is important to note that commercial lenders and private companies may not want to risk their funds on long-term or

large-scale investments that rely on government payments. Furthermore, maximum efficiency and cost effectiveness from the private sector is promoted only in those situations in which competition, performance monitoring, and accountability exist.

The public sector has been motivated toward privatization of various types of solid waste services in California for primarily three reasons: 1) to pursue cost savings, 2) to implement new technologies, and 3) to reduce risks to the public sector related to the provision of the desired services.

1.3.1 Cost Savings

The results of evaluations indicate that the use of competitive processes in the delivery of solid waste services can lead to cost savings and improvements in the quality of service. Studies have shown that the presence of competition is critical to the achievement of cost savings and not necessarily privatization (Savas, 1977; Stevens, 1984). According to Stevens (1984), the following factors contribute to cost savings due to privatization.

Private contractors have the tendency to:

- require more work from employees;
- offer equivalent salaries to those of the public sector, but offer fewer benefits;
- use part-time labor when it is appropriate;
- match skill levels with job requirements;
- allow authority to first-line managers to hire and fire employees;
- require managers to be responsible for the availability of equipment and labor;
- use incentive pay systems; and
- use as much automation as possible.

1.3.2 Access to Technology

Waste management services have undergone substantial changes during the past 10 to 15 years. Impetus has been given to material recovery and recycling. In addition, California (as well as the Federal Government) enacted stringent environmental protection measures that impacted final treatment and disposal methods. In many instances, particularly at the level of small local governments, the “new regulations” stretched the capabilities and experience of their engineering staff. Consequently, privatization of facilities and operations offered a viable option to meet regulations by accessing technologies and know-how offered by the private sector.

1.3.3 Risk Reduction

Financial and legal risks that have been brought about by the regulatory climate have prompted local governments to partner with the private sector -- the idea being that the private sector assumes most if not all of the risks.

Recommendations for private sector participation should not be made in isolation and separate from a supportive structure. For example, developing proper service fees and the revenue specifically earmarked for solid waste services is one way to attract private investors. Establishing a reasonable combination of public and private sector service is one way of encouraging competition. Many opportunities and options exist for the private sector to participate in the management the solid waste, provided that it is understood that the main objective is not to just simply privatize, but rather to increase efficiency and at the same time introduce investment to the solid waste management system.

The question that needs to be answered is whether or not government should privatize the entire solid waste management service or a portion of the service. In each situation, the government needs to determine whether or not the economic risks associated with political manipulation, changes in environmental regulations, inflation, unclear taxation systems, and other factors are substantial when compared with the economic benefits of private sector efficiency, which is motivated primarily by market forces.

Some of the issues that should be evaluated in deciding whether or not the private sector should be involved in solid waste management services are provided below.

1.3.4 Efficiency

Define the political realities that keep government from providing efficient service. Some of these realities may include: government wage scales, cost accountability, labor tenure, labor practices, personnel benefits, inflexible work arrangements, hiring and firing procedures, and procurement procedures. Evaluate if these constraints can be removed and if the private sector is constrained in the same manner.

1.3.5 Competition

With regard to competition, it is important to determine if the private sector is adequately developed to ensure competition between a number of private firms or between the government and a few private firms. Identify if financial incentives would be needed to enable the private sector to participate in the delivery of public services and if the government is committed to conducting a competitive, fair, and transparent procurement process.

1.3.6 Capability

Determine the differences, if any, between the government and the private sector in terms of technical and financial resources needed to build or buy, operate, and maintain solid waste facilities or equipment. In addition, it is important to define if the government has in-house capability to monitor performance and to enforce contractual agreements with the private sector.

1.3.7 Duplication of Effort

Define if the costs for monitoring that must be undertaken by the government will offset the savings that might be accrued from the participation by the private sector.

1.3.8 Costs

To evaluate the potential benefits of privatization, the public sector must determine the costs of comparable services offered by the private sector. Based on its own cost accounting information and proposals by the private sector, the public sector must evaluate if the private sector would be able to offer solid waste service at a cost lower than that provided by the government.

1.3.9 Risk

Key factors are shown below that govern the risks associated with providing solid waste management services, whether supplied by the public or private owners/operators:

- quantity and characteristics of the waste, and quality assurance;
- markets for recovered materials;
- volatility of the markets for recyclable materials;
- siting and permitting of facilities;
- changes in environmental laws and regulations; and
- disposal capacity for process residues.

Also, two fundamental questions should be considered and resolved in the evaluation of risk, namely: 1) a determination if the environmental regulatory framework in place protects the private sector against unforeseen environmental risks so that price increases to the public sector associated with private service provision are minimized, and 2) a determination if the local government has adequate revenue generating capacity to meet its contractual agreements with the private sector.

1.3.10 Siting

The risks of siting solid waste management facilities includes availability of suitable land and the potential for successfully obtaining construction and operating permits. Private or public entities may or may not have sufficient or suitable land for solid waste management facilities. Availability of land that can be permitted or the availability of an existing permitted site/facility offers a substantial advantage to the private sector if the public sector does not have the land or a permitted site/facility.

1.3.11 Control, Technical and Financial

Regardless of either public or private facility operation, it is advantageous for the public sector to have the capacity and tools for immediate collection and monitoring of operating and performance data from the system. While in the case of private operation, the service agreement can provide for public sector control of the scalehouse and its data collection and management system, even more control and immediate evaluation of data are available if the public sector is the operator of the facility. The reason is that the operator of the facility is always in a better position of knowing more than any other entity about the current operation and costs of processing. Immediacy of knowledge of the technical and financial status is a

hedge against many risks associated with processing. Immediate knowledge of and control of revenues also has many financial advantages, e.g., advanced awareness of downturns in commodity market prices and changes in other purchasing terms.

1.4 Conclusions

Both public and private provision of solid waste services is practiced in California. However, the private sector provides the greater share of the services. The determination of public or private service provision usually is a local decision based on local circumstances and opportunities, some of which may be offered by enterprising businesses in the solid waste management industry. Also, some communities desire to have substantial control of their solid waste management systems, and believe that such control is best exercised when the government owns, or owns and operates, the facility. Regardless of whether or not the government chooses to own, or to own and operate a solid waste processing facility, it must be willing to invest the time and effort required to closely monitor and oversee the operations. Thus, the government accrues the cost of the oversight and monitoring under either operating alternative.

1.5 References

- Eggerth, L.L. (1998). "Requests for Proposals for Privatization," presented at Asia-North-American Waste Management Conference, sponsored by The American Society of Mechanical Engineers (ASME), Los Angeles, California, December 1998, *Proceedings from ANACON '98*, pp. 365-371. in *Proceedings from ANACON '98*, Asian-North American Solid Waste Management Conference, Los Angeles, California.
- Savas, E.S. (Ed.) (1977). *The Organization and Efficiency of Solid Waste Collection*, Lexington Books, Lexington, Massachusetts.
- Stevens, B. (1984). *Comparative Study of Municipal Service Delivery*, Ecodata, Inc., New York.

2. Waste Stream Analysis

2.1 Commingled Recyclables

2.1.1 Quantities

A breakdown of the estimated quantities of residential and commercial commingled recyclables collected in 2006 is presented in Table 1 for the South Coast (total = 35,000 tons) and North County (total = 20,000 tons) regions. The equivalent average daily tonnages TPD are also shown in the table. The commingled materials shown for the South Coast in Table 1 are processed by Gold Coast, and those shown for the North County are processed by WM/HSS.

Table 1. Estimated Quantities of Residential and Commercial Commingled Recyclables Collected in 2006

Jurisdiction	Quantity (Tons) (Rounded)	TPD₂₆₀	Notes
Santa Barbara	16,400	63	a)
Goleta	5,000	19	b)
South Coast Uninc.	13,000	50	c)
South Coast Total	34,400	132	
Santa Maria	9,000	35	d)
Lompoc	2,000	8	e)
North County Uninc.	9,000	35	f)
North County Total	20,000	78	

Sums may not total exactly due to rounding.

Notes:

- a) Data from S MacIntosh, also includes Allied's and Marborg's data for mixed commercial recyclables collected in large bins.
- b) Data from K. Nilsson for residential materials; also includes MarBorg's and Allied's commercial commingled bin data.
- c) Per L. Wells, use largest County uninc. value (2004) for planning purposes; also includes Allied's and MarBorg's commercial commingled bin data.
- d) Data from B. Whitty.
- e) Data from C. Stein and S. Clark.
- f) Data per C. Johnston; used largest value (FY 2005/06) for planning purposes.

2.2 Local Processing Facilities

As part of the project, CalRecovery performed waste characterization analyses of certain commingled recyclables and byproduct streams for three of the processing facilities in the Santa Barbara and Ventura County region, namely the Gold Coast MRF located in Ventura, the MarBorg MRF located on City of Santa Barbara property (David Love Place) near the Santa Barbara Airport, and the Waste Management/Health Sanitation Services (WM/HSS) MRF located in Santa Maria. The purposes of the analyses included estimating concentrations of material types in the commingled recyclables and in the residue streams, and measuring rates of residue generation. The characterization work was performed during August 2006. The test programs and methods were negotiated with the facility operators and the County of Santa Barbara in the case of the Gold Coast and WM/HSS MRFs, and with MarBorg Industries in the case of the David Love Place MRF.

2.2.1 Waste Management/Health Sanitation Services MRF

The test program developed for the WM/HSS facility consisted of a one-day test that included measurement of the quantities of materials processed from the Santa Ynez, Orcutt, and Vandenburg Village areas in the North County area and of quantities of recovered materials and of process residuals. Additionally, the composition of the three residue streams produced at the facility during the test period were determined. The day of CalRecovery testing was selected to coincide with the semi-annual waste characterization at the facility scheduled by the County, in

order to minimize the effect of CalRecovery data collection on the facility operator. During the test day, CalRecovery personnel monitored the processing of recyclables and weighing of process outputs by WM/HSS, as well as collected representative samples of each of the process residue discharges for subsequent analysis of composition.

Based on the results of the testing, the rate of generation of process residuals during the test was approximately 16%. At the conclusion of the test, there was a difference of approximately 6% between the sum of the weights of all the output streams from the process (i.e., recovered product and residue streams) and the sum of the net weight of the loads processed. CalRecovery computed the residue generation based on both the net weight of the loads, as well as the net weights of all of the output streams, and subsequently averaged the two residue generation rates. The average value of residue generation, 16%, is considered representative for the processing performed on the test day.

The various products recovered during the test period and their percentages are shown in Table 2. CalRecovery also analyzed the composition each of the three residue streams produced at the facility. The results are shown in Figure 1 (more data are presented in Appendix A).

Table 2. Products Recovered during Waste Characterization Testing at the WM/HSS MRF

Commodity/Material Type	Composition (wt basis)
3-Color Mixed Glass	22.5%
Aluminum Cans	0.8%
Tin Cans	1.7%
PET Bottles	2.1%
Newspaper	44.7%
Corrugated Cardboard & Mixed Paper	16.9%
Mixed Paper	9.7%
HDPE Colored	1.0%
HDPE Natural	0.6%
Total Recovered Products	100.0%

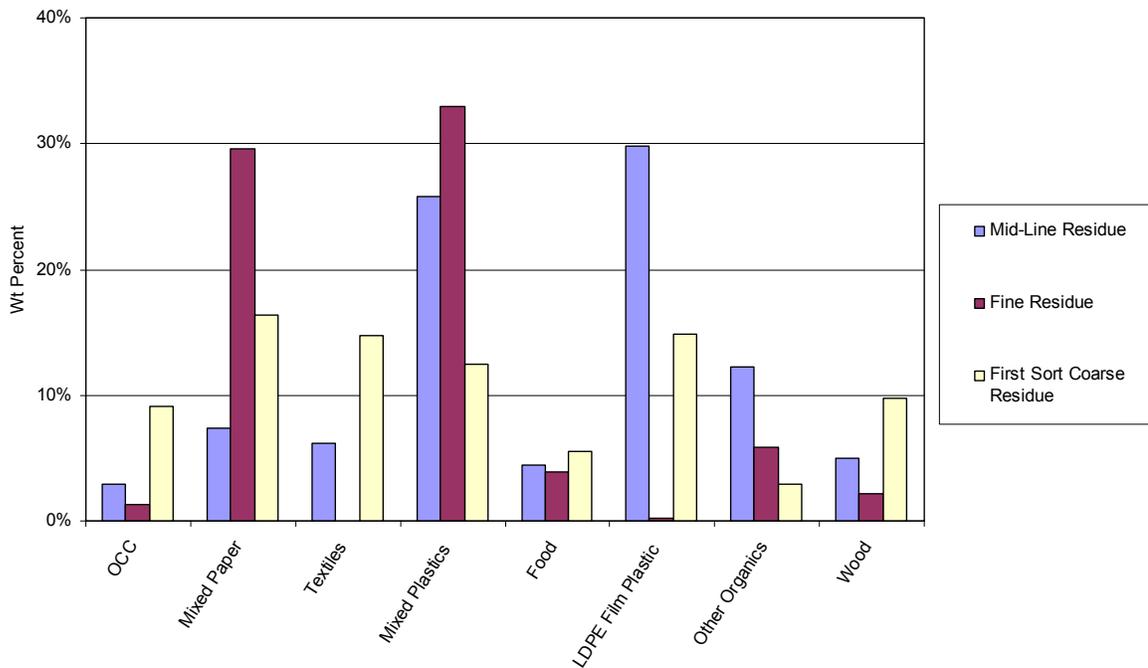


Figure 1. Composition of the Primary Material Types in Residue Discharge Streams WM/HSS MRF, August 5, 2006

2.2.2 Gold Coast MRF

The waste characterization analysis performed for the Gold Coast MRF consisted of collecting representative samples of commingled recyclables input to the process and of process residuals, and of analysis of the composition of these two fractions. By prior arrangement with the County and Gold Coast, the collection of the samples was performed at the South Coast Recycling and Transfer Station. The County arranged for storage at the transfer station of a representative mix of commingled recyclables from South Coast sources, and for transport and storage of residuals produced as a consequence of processing. CalRecovery collected representative samples of commingled recyclables and/or process residual on August 21, 2006.

The results of the composition analysis of the commingled recyclables and of the process residuals are shown in Figure 2 (more data are presented in Appendix A).

The characterization program described above excluded measurement of the rate of residue production. However, the rate of residue production of the Gold Coast MRF while processing South Coast commingled recyclables was estimated based on facility waste characterization data for February 2006 provided by the County. These data indicate that the residual production rate was approximately 18%.

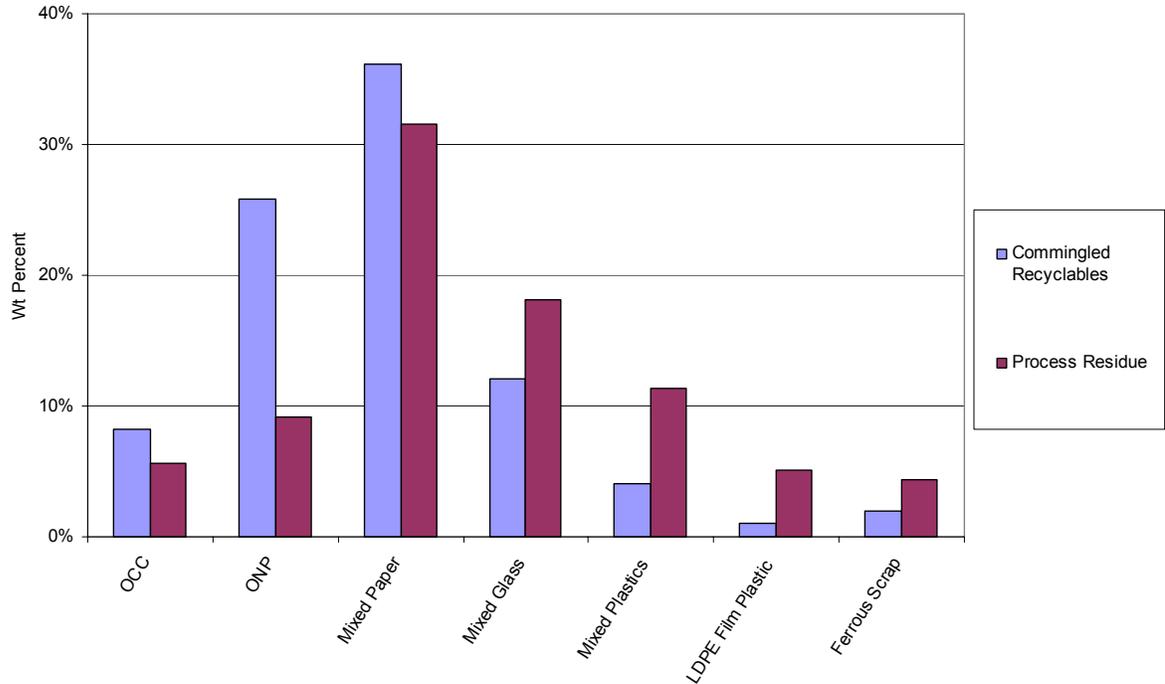


Figure 2. Concentration of the Primary Material Types in the Commingled Recyclables and the Resulting Process Residue Stream – Gold Coast MRF, August 25, 2006

2.2.3 MarBorg David Love Place MRF

CalRecovery conducted a waste characterization analysis of the David Love Place MRF on August 22, 2006. This materials recovery facility receives commercial commingled recyclables and processes them to recover recyclable commodities. The characterization program for this MRF consisted of following components: 1) analyzing the composition of the commercial commingled recyclables collected within Santa Barbara, Goleta, and South Coast unincorporated area and of the process residuals produced during the processing of this source of materials; and 2) evaluating the rate of residue generation from the processing of the commercial commingled recyclables. The test plan was jointly developed between representatives of CalRecovery and of MarBorg Industries. On the day of the test, CalRecovery staff monitored the processing of the commingled recyclables and weighing of process outputs by MarBorg personnel, as well as collected representative samples of delivered commingled recyclables and of process residue discharged from the system for later analysis of composition.

The composition of the commercial commingled recyclables and of the associated process residuals is illustrated in Figure 3 (more data are presented in Appendix A).

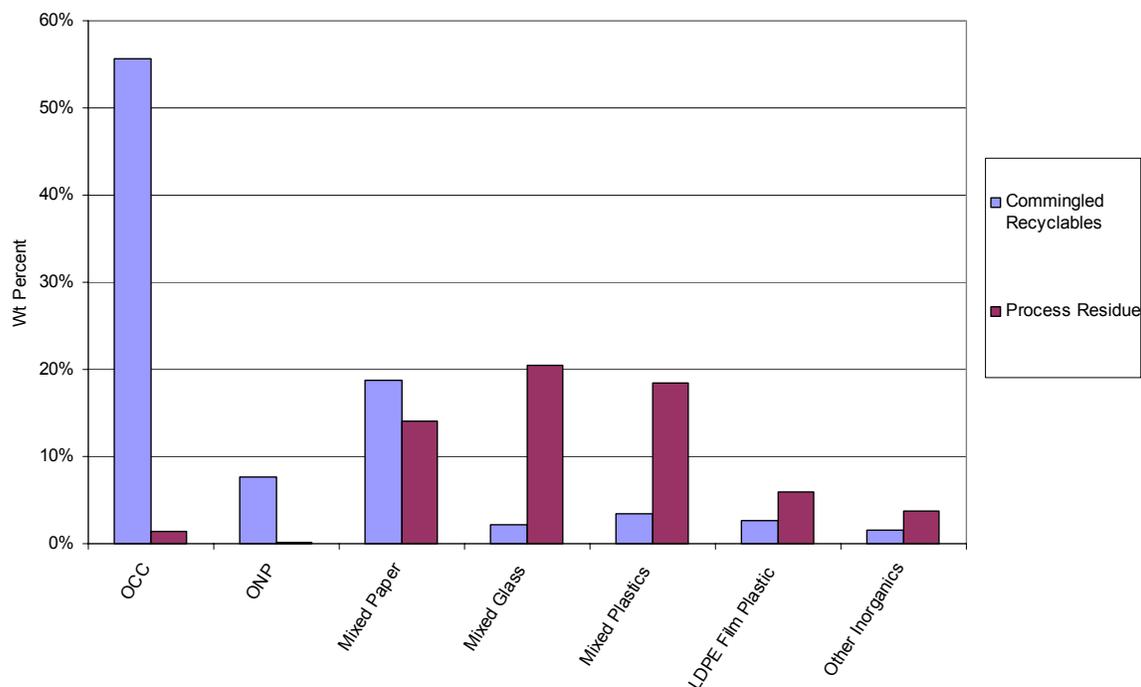


Figure 3. Composition of Commercial Commingled Recyclables and Process Residues – MarBorg David Love Place MRF, August 22, 2006

3. Technical Analysis of Existing Processing System versus New Local or Regional MRF

Regardless of the type of MRF, yield and quality of commingled recyclables is governed initially and substantially by the actions of generators. Some of the key variables relevant to setout and collection of commingled recyclables are the following:

- number and types of recyclables targeted by the recyclables collection programs;
- level and frequency of public education programs;
- level and type of commitment of public to the recycling program;
- collection rates and their relation to container volumes available for setout of mixed solid waste and for recyclables;
- types and levels of enforcement of rules for segregation of recyclables from other types of solid waste material types; and
- operating characteristics of collection vehicles (e.g., compaction pressure).

Once the materials are collected and delivered to the processing facility, the recovery and quality of the recovered recyclables depends significantly on the process design and operating conditions.

3.1 Existing Processing Infrastructure

3.1.1 General

Key permitted waste processing and disposal facilities in the study region are listed in Table 3, along with some of their design and operating characteristics.

3.1.2 Primary Commingled Recyclables Processing Facilities

The largest materials recovery facilities that are processing commingled recyclables generated in Santa Barbara County are those operated by Gold Coast and WM/HSS.

Under an agreement with the County of Santa Barbara, the Gold Coast facility processes commingled recyclables collected in the Cities of Santa Barbara and Goleta, and in the South Coast unincorporated areas of Santa Barbara County. The quantities of South Coast commingled recyclables processed at the Gold Coast MRF have been described previously in the report. The processing design of the facility uses a combination of manual and mechanical methods of separating and recovering marketable recyclable materials.

Under separate agreements with the County of Santa Barbara, City of Lompoc, and City of Santa Maria, the WM/HSS facility in Santa Maria processes commingled recyclables collected, respectively, in the North County unincorporated areas of Santa Barbara County, City of Lompoc, and City of Santa Maria. WM/HSS recently (July 2006) made substantial modifications to its processing system in order improve the facility's processing rate. The quantities of North County residential and commercial commingled recyclables processed at the WM/HSS MRF have been described previously in the report. The design of the facility incorporates manual and mechanical methods for separating and recovering recyclable materials for marketing.

The types of commingled materials generally processed at the Gold Coast and WM/HSS facilities are listed below:

- paper (e.g., cardboard, paper board, magazines, newspaper, junk mail, other paper and telephone books);
- steel cans;
- aluminum cans and foil;
- glass bottles; and
- plastic containers (PET, HDPE).

Table 3. Some Key Permitted Solid Waste Facilities in the Study Area

Facility	Location	Maximum Permitted Throughput	Acres	WDR Landfill Class	Notes
Gold Coast	Ventura	440 TPD	2		Large Volume Transfer/Processing Facility
Waste Management/Health Sanitation	Santa Maria	99 TPD	9		Medium Volume Transfer/Processing Facility
South Coast Recycling & Transfer Station	Santa Barbara	550 TPD	8		Large Volume Transfer/Processing Facility
Tajiguas Sanitary Landfill	Goleta	1500 TPD	Total 357, disposal 118	III	
Santa Maria Landfill	Santa Maria	740 TPD	Total 291, disposal 247	III	
Vandenburg AFB Landfill		400 TPD	Total 172, disposal 46	III	
Lompoc Landfill	Lompoc	400 TPD	Total 115, disposal 80	III	
MarBorg C&D Recycling and Transfer Facility	Santa Barbara	750 TPD	3		Large Volume Transfer/Processing Facility
Ventucopa Transfer Station	Ventucopa	80.00 yd ³ /day			Medium Volume Transfer/Processing Facility
Santa Ynez Valley Recycling & Transfer Station	Los Olivos	212 TPD	13		Large Volume Transfer/Processing Facility
New Cuyama Transfer Station	New Cuyama	99.00 yd ³ /day	1		Medium Volume Transfer/Processing Facility

Source: Facility permit information maintained on the California Integrated Waste Management Board's website Solid Waste Information System (SWIS).

3.2 Potential New Facilities

In terms of locating and analyzing new clean MRF systems, two general alternatives were defined for the study, namely a local facility to process commingled recyclables generated in the South Coast region of Santa Barbara County and a regional facility to process all of the quantities of commingled recyclables generated within the Cities of Santa Barbara, Goleta, Lompoc, and Santa Maria, and within the unincorporated areas of Santa Barbara County.

A basic conceptual design and overall mass balance of the local MRF and the regional MRF are given in Figures 4 and 5, respectively.

A number of different, general locations were considered and discussed at the August 2006 meeting with representatives of the MRF Subgroup as potential sites for these two sizes of facilities (termed “local” and “regional”). Four representative locations were approved by the Subgroup for use in the feasibility analysis: 1) downtown Santa Barbara, 2) the South Coast Recycling and Transfer Station, 3) the Tajiguas Landfill, and 4) the site selected for the new City of Santa Maria landfill (Cat Canyon). After these alternative MRF site locations were selected, CalRecovery developed local and regional MRF alternatives and their key ancillary system elements, e.g., waste transfer stations (if needed) and locations for disposal of process residuals. The key elements of each of the MRF alternatives are described in Table 4. In all, seven alternatives were defined for financial analysis, three “local” (all in the South Coast region processing commingled recyclables collected in the Cities of Santa Barbara and Goleta, and in the South Coast unincorporated areas), and four “regional” alternatives. The alternatives are summarized in Table 4.

For both processing alternatives, local or regional, the recovery of high-quality, marketable recyclables from commercial and residential commingled recyclables will require properly designed processing systems. These systems would be composed of the following major fixed and rolling equipment based on the current state of the art:

Fixed equipment:

- infeed, transfer, and discharge conveyors
- screens
- sorting stations with integrated conveyors and discharge chutes systems
- magnetic separators
- pneumatic system
- baler
- bins and carts for storage of materials and waste

Rolling equipment:

- front-end loaders
- roll-off chassis and debris box containers
- forklifts
- pickup truck

Materials Recovery Facility (Local)

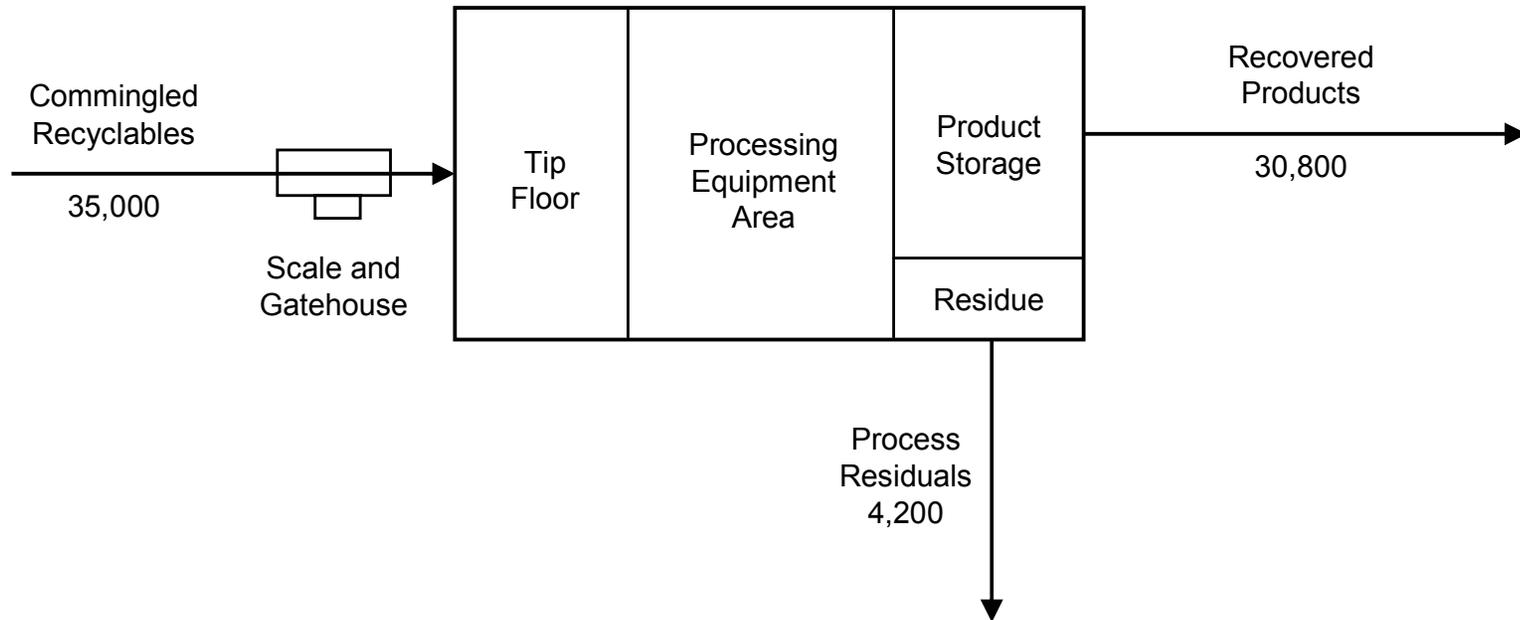


Figure 4. Schematic Diagram and Materials Balance (tons/year) for Local MRF Alternative

Materials Recovery Facility (Regional)

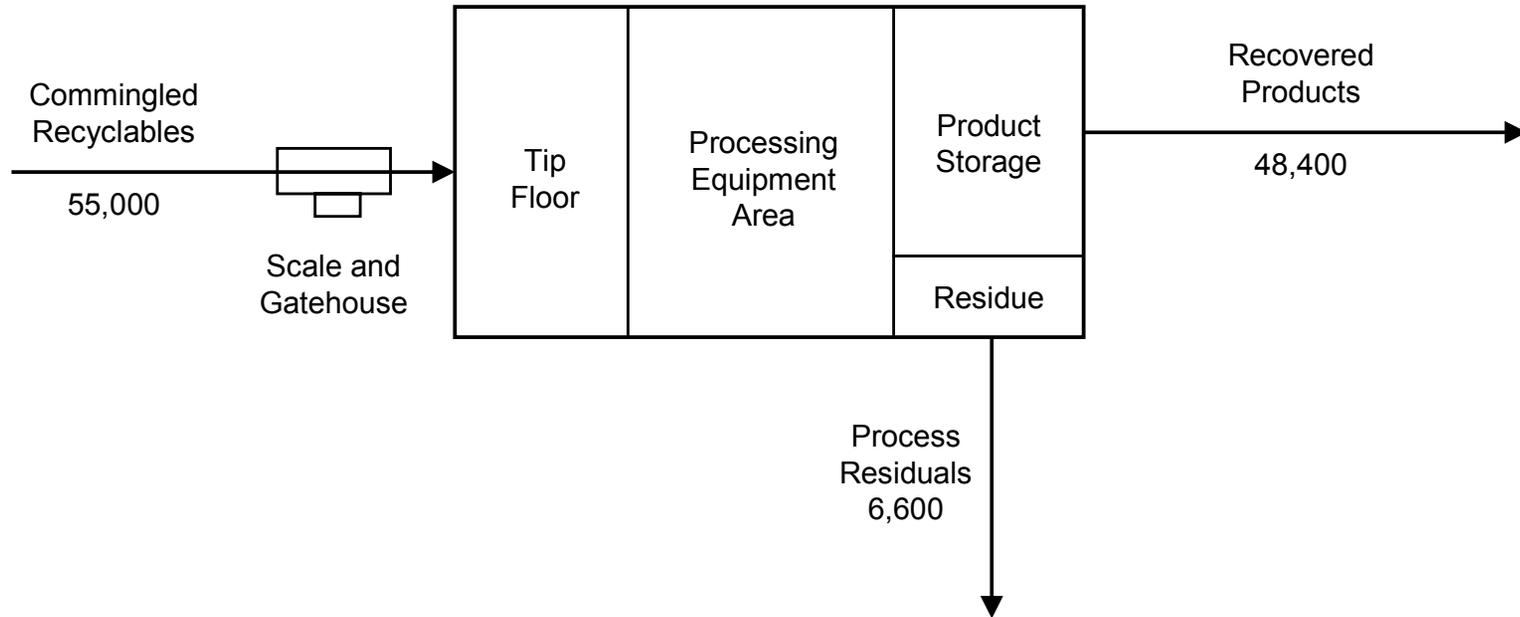


Figure 5. Schematic Diagram and Materials Balance (tons/year) for Regional MRF Alternative

Table 4. Summary of Alternatives Analyzed

Scenario	Location of Transfer Station ^{a)}	MRF Location	Residue Disposal Location
South Coast – Local 1	none	Downtown Santa Barbara	Tajiguas
South Coast – Local 2	none	South Coast Transfer Station	Tajiguas
South Coast – Local 3	none	Tijiguas Landfill	Tajiguas
South Coast – Regional 1	Lompoc	Downtown Santa Barbara	Tajiguas
South Coast – Regional 2	Lompoc	South Coast Transfer Station	Tajiguas
South Coast – Regional 3	Lompoc	Tajiguas Landfill	Tajiguas
North County – Regional	South Coast	Cat Canyon Landfill	Cat Canyon

a) If required, because of long distance from MRF.

The cost of the facility would also include the following major capital expenses:

- land,
- permitting,
- site preparation,
- site utilities,
- administration building,
- processing building,
- engineering, and
- contingency.

4. Identification of Additional Types of Recovered Materials and Market Analysis

4.1 Existing Conditions

The primary material types collected in the commingled residential and commercial recyclables streams among the jurisdictions in the Santa Barbara County are listed below:

- paper (e.g., cardboard, paper board, magazines, newspaper, junk mail, other paper and telephone books);
- steel cans;
- aluminum cans and foil;
- glass bottles; and
- plastic containers (PET, HDPE).

In turn, these material types are processed and recovered (e.g., at the Gold Coast and WM/HSS MRFs) in the following general product categories:

- corrugated cardboard;
- newspaper;
- mixed paper;
- color-sorted glass (clear, green, brown);
- mixed-color glass;
- high density polyethylene (HDPE) (natural, colored);
- polyethylene terephthalate (PET or PETE); and
- steel cans.

4.2 Additional Recovery of Materials

There are primarily two methods that can be applied in order to increase recovery of source-separated recyclable materials from residential and commercial generators – namely, by increasing the rate of recovery from generators and by adding material types to the list of acceptable materials for the collection programs. Increasing the rate of recovery from generators is typically achieved in a number of ways, including, for example, the use of comprehensive and aggressive public education campaigns targeting residential and commercial waste generators and the use of waste audits in the business sector. Given the level of maturity of the recycling programs among the jurisdictions in the County, there may be some additional, but marginal, recovery that can be achieved for the existing list of material types through increases in public education, etc. For example, using data from the 2003 County of Santa Barbara Waste Characterization Study (SCS Engineers and Cascadia Consulting Group, 2003), approximately 13% of disposed waste by single-family residences was composed of various grades of uncontaminated paper. Additional public education or other promotional programs might divert some of this disposed paper to the commingled recyclables collection programs. If 20% to 25% of the non-contaminated paper disposed in mixed waste by residential and commercial generators could be captured in the commingled residential and commercial recyclables collection programs, then approximately an additional 6,000 to 7,000 tons per year of paper and film plastic would be collected in the South Coast region and would require processing. The additionally recovered paper would most likely be sold under the currently marketed commodity grades locally or on the export market.

As mentioned above, additional recovery can also be achieved through an expansion of the list of acceptable material types targeted by the commingled recyclables collection programs. The current list of recyclables collected in the jurisdiction in the County and in most other communities in California is primarily set by the marketplace, i.e., markets are relatively available to material types, and/or pricing support exists in the case of CRV beverage container types. The addition of other types of materials to the list of materials targeted for source-separated collection programs carries more market risk than that associated with the more commonly recovered material types.

Based on the data in the 2003 County of Santa Barbara Waste Characterization Study, film plastic (#4 resin) composed coincidentally 4.6% of the residential and of multi-family and business disposed waste. If 20% to 25% of the film plastic typically disposed in mixed waste by residential and commercial generators could be captured in the commingled recyclables collection programs, then an estimated additional 1,500 to 2,000 tons per year of film would be collected in the South Coast region and would require processing. In terms of diversion impact, film plastic represents an opportunity in the County. However, markets for the film would have to be secured or developed if not available in the Santa Barbara region. At least one facility (WM/HSS) that is processing recyclables from County jurisdictions has recovered film plastic on a limited scale. Other communities in California are experimenting with recycling of plastic film. Additionally, some jurisdictions are commercially practicing recycling of plastic film from commingled collection programs, either directly at their own materials recovery facilities or through use of a third party. Thus, at least in particular locations in California, recycling of film plastics is being practiced at the commercial scale. Recent prices for plastic film have been approximately \$90/ton on the export market. Market prices for some plastic types (especially, polyethylene resins) are at or near historical highs. Historically, secondary material prices fluctuate substantially and cyclically between their highest and lowest prices over a period of several years as users adjust their inventories and raw material needs.

In addition to adding film plastic to the list of acceptable materials for commingled collection, there are other material types that have been included by other jurisdictions in California. These include plastic resins #3 and #5 through #7 and textiles. Oftentimes, these material types are placed in recycling containers by generators even if they are not accepted in the recyclables collection program and recycling of them became a fact only if markets, usually local or export, became available, usually only through substantial marketing research performed by recycling plant operators.

4.3 Commodity Prices and Trends

CalRecovery analyzed market prices for material types recovered by the Gold Coast and WM/HSS facilities based on some data for years 2004 and 2006 that the County of Santa Barbara made available to the study. The average net price (i.e., market price F.O.B. the user, less transportation charges) per ton for recovered recyclables in 2004, based on 10 months of data 2004, was approximately \$103. A comparable average net price for one month's data in 2006 was approximately \$130/ton. Based on these prices, the average net price over the 2-year period was approximately \$117/ton.

Also, based on these data, the average price escalation over the 2-year period is approximately 12% per annum. This high rate of price escalation is likely due to the cumulative effect over the last two years of: 1) increases in California Refund Value (CRV) payments paid by the California Department of Conservation (DOC) to processors for recycled CRV beverage containers; and 2) substantial increases in the prices of certain material types, in particular aluminum, PET, and HDPE. However, the continuation of the high rate of average price escalation experienced over

the past two years is not supported by market data reported for the past 10 to 15 years and, therefore, such a high rate of price appreciation is not likely to continue. When long-term historical trends of market prices are examined, the pricing trend is cyclical for each type of material, with prices being up for some material types during any given point in time while down for others (the reader is referred to historical pricing data given in Appendix B). Given the long-term historical record, mix of recovered recyclables, and DOC payment program, average price appreciation is likely to grow at a modest rate, i.e., between 3% and 5%.

4.4 References

SCS Engineers and Cascadia Consulting Group, Inc. (2003). *Waste Characterization Study-County of Santa Barbara, Final Report.*

5. Statewide Clean MRF Residuals Survey

CalRecovery performed a survey of clean MRFs in California in order to assess generation rates for process residuals from facilities processing commingled residential and commercial recyclables. The survey was performed primarily by email and by telephone. CalRecovery prepared a survey form to collect the required data. An example of the data collection form is given in Appendix C. The data collection form was designed specifically for ease of completion by those completing the form and to enable CalRecovery to acquire data needed to estimate typical residue generation percentages based on processing of residential and commercial commingled recyclables. The survey requested quantities (tons/year) for various types of recyclables processed in the facilities and for residues generated. The survey process was performed during the period July-September 2006. The following is a summary of the key statistics for the surveying process:

- number of clean MRFs surveyed: 34;
- number of follow-up contacts to facilities for clarifications or to acquire data: 17;
- number of MRFs for which sufficient data were supplied for analysis: 7; and
- survey response rate: 21%.

The results of the survey indicate that range of residue generation rates from clean MRFs processing residential and commercial recyclables is 9.0% to 15.0% on a wet weight basis. The average residue from commingled materials among the surveyed clean MRFs is 12%. Eliminating the highest and lowest rates of residue generation does not have a significant effect on the average rate of residue generation. A summary of the results of the survey is given in Appendix D. The spread of 9% to 15% residue generation among the facilities reflects the fact that a number of site-specific variables affect residue production; among them are:

- allowable types of recyclables that can be delivered to the facility for processing;
- any incentives for the collectors and processors to accept only “clean” recyclables, i.e., mixtures of recyclables containing low percentages of contamination;
- extent and success of public education programs to promote high rates of setout for recyclables for collection and low rates of contamination;

- differences in design concepts, equipment, and/or operation among facilities;
- age of the facility and the relation of its processing system to the current state of the art; and
- availability of markets for recovered material types, in particular those for mixed glass.

Commingled collection programs that target many types of recyclables and include sporadically or marginally marketable material types can be expected to have higher levels of contamination than programs having a less comprehensive list of acceptable material types, all other factors being equal, and unless significant measures are incorporated into the collection and processing programs to minimize and/or remove contamination.

The degree to which markets and incentives exist to processors for color-sorted glass and for mixed (color) glass, and the manner (intentional or unintentional) in which glass is collected and processed can substantially affect the extent of recovery of glass practiced by plant operators and consequently the residue generation rates. CalRecovery's experience is that recovery and marketing of mixed glass can decrease residue generation rates by 2% to 5% absolute percentage points compared to minimal recovery of glass, all other conditions being equal.

For the base case (baseline) analysis for the Clean MRF alternatives, CalRecovery selected the average residue generation from the survey results (12%) in the financial analysis that follows later in the report. The average value (12%) of residue generation is less than that generally observed for the Gold Coast MRF when processing South Coast jurisdiction's commingled recyclables (i.e., approximately 18%) and that observed for the WM/HSS facility when processing North County unincorporated commingled recyclables (i.e., 16%). The rates of residue generation of the Gold Coast and of the WM/HSS facility observed during the analysis fall just beyond the low end of the range of residual generation rates for clean MRFs obtained through the survey process.

6. Financial Analysis

6.1 Alternatives Analyzed

A financial analysis of the seven alternatives described previously has been performed. The key system elements of each alternative scenario are the following:

- transport of commingled recyclables from the jurisdictions directly to the MRF, or via a transfer station depending on the alternative;
- processing of the materials at the MRF;
- transport and disposal of processing residuals;
- transport of recovered products to market (Los Angeles/Long beach area);
- marketing of recovered products.

6.1.1 Base Case Analysis

The analysis was first performed for a base case scenario. Subsequently, a sensitivity analysis was performed by varying some key project assumptions. The key base case parameters and assumptions are described in Table 5. The 20-year costs assume escalation of tonnages based on population growth (see Appendix E) and increase in quantity of materials collected due to enhanced programs (see Appendix F), as well as of escalation of costs (3.5%/yr) and revenues (4%/yr).

Table 5. Key Assumptions for Base Case Analysis of MRF Alternatives

Parameter	Units	Value
Transport of feedstock to transfer station or directly to MRF	\$/ (ton*one-way mile)	0.95
Transport of feedstock from transfer station to MRF, residue to landfill, or recovered materials to market	\$/ (ton*one-way mile)	0.30 to 0.35
Transfer station operations	\$/ton	5
MRF capital cost	\$	18 million
Cost of land	\$/sq ft	50
MRF operating cost	\$/ton	65 Regional, 80 Local (South Coast jurisdictions)
Process residue generation	%	10
Average Recovered Material Commodity Price	\$/ton	117
Landfill tip fee (for process residue)	\$/ton	52.50 Tajiguas 69.90 Cat Canyon

MRF locations	City of Santa Barbara, South Coast Transfer Station, Tajiguas Landfill, Cat Canyon
Landfill location	Tajiguas or Cat Canyon
Transfer station location, if needed	Santa Maria Landfill, Lompoc Landfill, South Coast Transfer Station
Market location for recyclables	Los Angeles/Long Beach Area

The results of the base case analysis are shown for Year 1 for each of the jurisdictions in Table 6. The financial results show the unit costs (\$/ton) associated with the current situation as well as those for each of the seven MRF alternatives, broken down into the following:

- cost of transport of commingled recyclables to the MRF;
- cost of processing, disposal of residual, and marketing; and
- net cost.

The cost competitiveness of the various MRF alternatives depends on the cost of the jurisdiction’s current situation and on the location of the local or regional MRF.

Table 6. Comparison of MRF Alternatives – Year 1 (\$/ton)

Scenario: Base Case

SANTA BARBARA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	4.18	5.00	9.18
Regional - Santa Barbara	2.85	(2.68)	0.17
Regional - South Coast TS	4.18	(1.32)	2.86
Regional - Tajiguas Landfill	21.85	3.23	25.08
Regional - Cat Canyon	28.43	13.76	42.19
Local - Santa Barbara	2.85	12.32	15.17
Local - South Coast TS	4.18	13.68	17.86
Local - Tajiguas Landfill	21.85	18.23	40.08

LOMPOC

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.57	7.93	28.50
Regional - Santa Barbara	28.13	(2.68)	25.45
Regional - South Coast TS	25.33	(1.32)	24.00
Regional - Tajiguas Landfill	18.33	3.23	21.55
Regional - Cat Canyon	20.90	13.76	34.66

GOLETA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.85	N/A	
Regional - Santa Barbara	8.55	(2.68)	5.87
Regional - South Coast TS	2.85	(1.32)	1.53
Regional - Tajiguas Landfill	16.15	3.23	19.38
Regional - Cat Canyon	27.10	13.76	40.86
Local - Santa Barbara	8.55	12.32	20.87
Local - South Coast TS	2.85	13.68	16.53
Local - Tajiguas Landfill	16.15	18.23	34.38

SANTA MARIA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.81	8.39	11.20
Regional - Santa Barbara	34.70	(2.68)	32.02
Regional - South Coast TS	32.95	(1.32)	31.63
Regional - Tajiguas Landfill	25.95	3.23	29.18
Regional - Cat Canyon	16.15	13.76	29.91

UNINCORPORATED SOUTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	14.56	(25.54)	(10.99)
Regional - Santa Barbara	7.13	(2.68)	4.45
Regional - South Coast TS	1.43	(1.32)	0.10
Regional - Tajiguas Landfill	18.05	3.23	21.28
Regional - Cat Canyon	25.68	13.76	39.44
Local - Santa Barbara	7.13	12.32	19.45
Local - South Coast TS	1.43	13.68	15.10
Local - Tajiguas Landfill	18.05	18.23	36.28

UNINCORPORATED NORTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.47	(41.13)	(20.66)
Regional - Santa Barbara	35.25	(2.68)	32.57
Regional - South Coast TS	32.45	(1.32)	31.13
Regional - Tajiguas Landfill	25.45	3.23	28.68
Regional - Cat Canyon	8.55	13.76	22.31

A summary of the total Year 1 costs and the cumulative 20-year costs of the MRF alternatives is presented in Table 7.

Table 7. Summary of Costs of MRF Alternatives – Year 1 and 20-Year (\$)

Alternative	Annual Cost (Year 1)	Project Cost (20 years)
SANTA BARBARA		
Regional - Santa Barbara	2,827	(2,989,040)
Regional - South Coast TS	46,838	(1,537,290)
Regional - Tajiguas Landfill	411,253	10,483,376
Regional - Cat Canyon	691,955	19,742,623
Local - Santa Barbara	248,827	5,125,563
Local - South Coast TS	292,838	6,577,322
Local - Tajiguas Landfill	657,253	18,597,950
GOLETA		
Regional - Santa Barbara	29,362	30,336
Regional - South Coast TS	7,630	(712,241)
Regional - Tajiguas Landfill	96,882	2,337,392
Regional - Cat Canyon	204,312	6,008,056
Local - Santa Barbara	104,362	2,592,929
Local - South Coast TS	82,630	1,850,406
Local - Tajiguas Landfill	171,882	4,899,946
UNINCORPORATED SOUTH COUNTY		
Regional - Santa Barbara	57,816	(602,202)
Regional - South Coast TS	1,313	(2,580,950)
Regional - Tajiguas Landfill	276,593	7,059,364
Regional - Cat Canyon	512,686	15,327,324
Local - Santa Barbara	252,816	6,226,696
Local - South Coast TS	196,313	4,247,939
Local - Tajiguas Landfill	471,593	13,888,285
LOMPOC		
Regional - Santa Barbara	229,027	5,944,410
Regional - South Coast TS	216,009	5,508,833
Regional - Tajiguas Landfill	193,963	4,771,140
Regional - Cat Canyon	311,962	8,719,614
SANTA MARIA		
Regional - Santa Barbara	64,045	1,948,397
Regional - South Coast TS	63,252	1,918,900
Regional - Tajiguas Landfill	58,353	1,736,825
Regional - Cat Canyon	59,825	1,791,533
UNINCORPORATED NORTH COUNTY		
Regional - Santa Barbara	293,152	10,009,870
Regional - South Coast TS	280,134	9,468,405
Regional - Tajiguas Landfill	258,088	8,551,526
Regional - Cat Canyon	200,812	6,169,594

6.2 Sensitivity Analysis

In order to evaluate the impact of key assumptions on the cost of the MRF alternatives, a sensitivity analysis was conducted. The following variables were considered:

- Land Cost – reduction in land cost equal to \$10/ton of throughput to the MRF, since the high cost of land impacts the annual MRF costs
- Residue Percentage – assumption that residue is equal to 10% of throughput to the MRF, which would represent a well-designed and operated MRF and a comprehensive public education program
- Market Revenues – assumption of -\$5/ton and +\$5/ton, due to the volatility of market revenues

The results of the sensitivity analysis are presented in Table 8. Supporting information for the results shown in Table 8 is given in Appendix G.

Table 8. Sensitivity Analysis of Costs of MRF Alternatives – Year 1 (\$/ton)

Variables for Sensitivity Analysis

MRF Processing Cost - Regional (\$/ton)	80	70		
MRF Processing Cost - Local (\$/ton)	65	55		
Residue (%)	12%		10%	
Market Revenue (\$/ton)	117			112 122

Alternative	Base Case	Land Cost -\$10	Residue -2%	Market -\$5	Market +\$5
SANTA BARBARA					
Regional - Santa Barbara	0.17	(9.83)	(2.75)	4.57	(4.23)
Regional - South Coast TS	2.86	(7.14)	0.01	7.26	(1.54)
Regional - Tajiguas Landfill	25.08	15.08	22.47	29.48	20.68
Regional - Cat Canyon	42.19	32.19	39.43	46.59	37.79
Local - Santa Barbara	15.17	5.17	12.25	19.57	10.77
Local - South Coast TS	17.86	7.86	15.01	22.26	13.46
Local - Tajiguas Landfill	40.08	30.08	37.47	44.48	35.68
GOLETA					
Regional - Santa Barbara	5.87	(4.13)	2.95	10.27	1.47
Regional - South Coast TS	1.53	(8.47)	(1.32)	5.93	(2.87)
Regional - Tajiguas Landfill	19.38	9.38	16.77	23.78	14.98
Regional - Cat Canyon	40.86	30.86	38.10	45.26	36.46
Local - Santa Barbara	20.87	10.87	17.95	25.27	16.47
Local - South Coast TS	16.53	6.53	13.68	20.93	12.13
Local - Tajiguas Landfill	34.38	24.38	31.77	38.78	29.98
UNINCORPORATED SOUTH COUNTY					
Regional - Santa Barbara	4.45	(5.55)	1.53	8.85	0.05
Regional - South Coast TS	0.10	(9.90)	(2.75)	4.50	(4.30)
Regional - Tajiguas Landfill	21.28	11.28	18.67	25.68	16.88
Regional - Cat Canyon	39.44	29.44	36.68	43.84	35.04
Local - Santa Barbara	19.45	9.45	16.53	23.85	15.05
Local - South Coast TS	15.10	5.10	12.26	19.50	10.70
Local - Tajiguas Landfill	36.28	26.28	33.67	40.68	31.88

Alternative	Base Case	Land Cost -\$10	Residue -2%	Market -\$5	Market +\$5
LOMPOC					
Regional - Santa Barbara	25.45	15.45	22.53	29.85	21.05
Regional - South Coast TS	24.00	14.00	21.16	28.40	19.60
Regional - Tajiguas Landfill	21.55	11.55	18.95	25.95	17.15
Regional - Cat Canyon	34.66	24.66	31.90	39.06	30.26
SANTA MARIA					
Regional - Santa Barbara	32.02	22.02	29.10	36.42	27.62
Regional - South Coast TS	31.63	21.63	28.78	36.03	27.23
Regional - Tajiguas Landfill	29.18	19.18	26.57	33.58	24.78
Regional - Cat Canyon	29.91	19.91	27.15	34.31	25.51
UNINCORPORATED NORTH COUNTY					
Regional - Santa Barbara	32.57	22.57	29.65	36.97	28.17
Regional - South Coast TS	31.13	21.13	28.28	35.53	26.73
Regional - Tajiguas Landfill	28.68	18.68	26.07	33.08	24.28
Regional - Cat Canyon	22.31	12.31	19.55	26.71	17.91

7. Clean MRF Design Standards

CalRecovery has developed fundamental technical standards during the course of the study for: 1) a local MRF that would be located in the South Coast region, and 2) a regional MRF that would be located in either the North County or the South Coast region. The fundamental standards are based on the conceptual designs of the clean MRFs described earlier in the report. These fundamental technical standards can serve as the basis and support for preliminary and final engineering evaluations and facility designs.

The major areas and facilities of the proposed clean MRF are listed below:

- vehicle weigh scale and gatehouse;
- administration building;
- processing building, including tipping floor for receipt of vehicle loads, processing equipment, and storage and load-out of recovered recyclable materials and of process residuals; and
- uncovered, paved areas for vehicle ingress and egress, parking of vehicles, and storage of materials

The key technical design standards, e.g., design throughput, area requirements, etc., of the clean MRF are described in Table 9.

Table 9. Fundamental Clean MRF Design Standards

Parameter	Local	Regional
Type of Material	Source-separated residential and commercial commingled recyclables	Source-separated residential and commercial commingled recyclables
Throughput (tons per year, Year 1)	35,000	55,000
Primary Materials Recovered	Paper and metal, glass, and plastic	Paper and metal, glass, and plastic
Key Facilities	Weigh scale/gatehouse, administration building, processing building, covered and uncovered storage areas, vehicle parking	Weigh scale/gatehouse, administration building, processing building, covered and uncovered storage areas, vehicle parking
Basic Method of Separation/Recovery of Marketable Materials	Manual and mechanical	Manual and mechanical
<ul style="list-style-type: none"> • Fixed Equipment 	<ul style="list-style-type: none"> • Infeed, transfer, and discharge conveyors • Screens • Sorting stations with integrated conveyors and discharge chutes systems • Magnetic separators • Pneumatic system • Baler 	<ul style="list-style-type: none"> • Infeed, transfer, and discharge conveyors • Screens • Sorting stations with integrated conveyors and discharge chutes systems • Magnetic separators • Pneumatic system • Balers • Compactors
Rolling Equipment	<ul style="list-style-type: none"> • Front-end loaders • Roll-off chassis and debris box containers • Forklifts • Pickup trucks 	<ul style="list-style-type: none"> • Front-end Loaders • Roll-off chassis and debris box containers • Forklifts • Pickup trucks
Number of staff	15 to 20	20 to 25
Operating hours	Nominally 1-shift operation	Nominally 2-shift operation
Overall Facility Area (acres)	3	3
Area of Processing Building (sq ft)	40,000	40,000

8. Dirty/Dusty MRF Analysis

CalRecovery performed an analysis of processing mixed municipal solid waste for materials recovery. The key elements of the analysis are the following:

- estimation of mixed waste characteristics and of rates of generation of process residuals,
- conceptual design of a mixed waste processing system for recovery of recyclable materials, and
- estimation of cost of the processing system.

For the analysis, CalRecovery selected a mixed waste processing system (i.e., a “dirty” MRF) that would process quantities of mixed solid waste generated in the South Coast region of Santa Barbara County. The system analyzed is composed of a processing facility designed to accept waste delivered in commercial vehicles and in vehicles operated by the public. The key components of the facility are the following:

- vehicle weigh scale and gatehouse;
- administration building;
- processing building, including tipping floor for receipt of vehicle loads, processing equipment, and storage and load-out of recovered recyclable materials and of process residuals; and
- uncovered, paved areas for vehicle ingress and egress, parking of vehicles, and storage of materials.

In terms of this study, key parameters required for the analysis of a dirty MRF alternative are types and rates of recovery of recoverable materials, and rate of generation of residues from processing. As one means of estimating the material types and rates experienced in the industry in California, CalRecovery collected data from two mixed waste MRFs; one MRF serves a location where the communities do not have a source separation program for recyclables (i.e., containers and paper), but there is a source separation program for yard waste, and the other MRF serves a location where the communities have very aggressive source separation programs for recyclables and for yard waste. These particular dirty MRFs were selected for analysis because they were representative and also willing to share the details of their data if their data were not released. The data for the two facilities allowed CalRecovery to estimate the probable lower and higher boundaries of material recovery rates, and conversely the higher and lower rates, respectively, of residual generation. The estimated upper limit of recovery is 29%, which includes recovery of mixed glass. The estimated lower limit of recovery is 16%, excluding recovery of food waste (and subsequent processing into a soil amendment using composting). The average recovery of these two limits is 22.5%, or 23% rounded to the nearest whole number.

Separately, CalRecovery analyzed some of the data in the 2003 waste characterization study for the purpose of estimating quantities of recyclable materials remaining in the disposed waste stream and of potentially recoverable percentages. The primary material types that are

estimated contribute more significantly to the recoverable product stream of a South Coast dirty MRF are those listed below:

- corrugated cardboard,
- newspaper,
- mixed paper,
- glass,
- HDPE,
- PET,
- steel cans,
- aluminum cans, and
- wood.

Assuming a recovery rate of 90% for each of the materials types, we estimate that the overall recovery rate for the facility would be about 21%. To account for the uncertainties in this type of abbreviated analysis of recovery percentage, we selected an approximate recovery rate of 22% to use in the dirty MRF financial analysis; this percentage is the average of the 23% described in the preceding paragraph and the 21% estimated cumulative recovery for the material types listed immediately above.

8.1 Residue Generation

Based on the average net recovery of the recyclable material types described in the last subsection, the estimated average rate of residue production for the dirty MRF alternative is 78%.

8.2 Quantities and Composition

The estimated quantities of mixed solid waste disposed in 2005 in the South Coast region is 218,000 tons as shown in Table 10. On a 260-day/yr basis, this quantity is equivalent to 840 TPD. Allowing for the estimated population growth in the South Coast region through the year 2025, disposed waste is estimated to increase to 940 TPD. As indicated in the previous subsection, the estimated rate of residue production is 78% of the input quantities.

The assumed average composition of the mixed waste that would be delivered to the dirty MRF is that presented in the 2003 County of Santa Barbara Waste Characterization Study. A conceptual design of the mixed waste MRF is shown in Figure 6.

8.3 Financial Analysis

For the financial analysis, CalRecovery assumed that the dirty MRF would be located at the Tajiguas Landfill and, therefore, process residue would be transported for disposal onsite. Also for the financial analysis, CalRecovery assumed a recovery rate of 90% for recyclables at the processing facility.

The estimated cost of the mixed waste MRF to process 218,000 tons per year is \$67 million; a breakdown of the cost is shown in Table 11. The estimated unit capital cost is approximately \$31 per ton processed.

The estimated unit cost of operation and maintenance is \$64 per ton. Thus, the estimated total unit cost for this facility is \$95 per ton. Based on the estimated rate of recovery of recyclables, the average net unit revenue for recyclables would be approximately \$36 per ton; thus, the estimated net unit cost for mixed waste processing is approximately \$59 per ton.

Table 10. Estimated Quantities of Mixed Solid Waste Disposed by Jurisdiction in South Santa Barbara County (2005)

Jurisdiction	Quantity (Tons) (Rounded)	TPD ₂₆₀	Notes
Santa Barbara	108,000	410	a)
Goleta	19,000	70	b)
South Coast Uninc.	91,000	350	c)
South Coast Total	218,000	840	

Sums may not total exactly due to rounding.

Notes:

- a) CIWMB Disposal Reporting System (DRS).
- b) Not available separately from DRS; data from K. Nilsson.
- c) Not available separately from DRS; 2005 quantity from C. Johnston.

Materials Recovery Facility (Mixed Waste (Dirty))

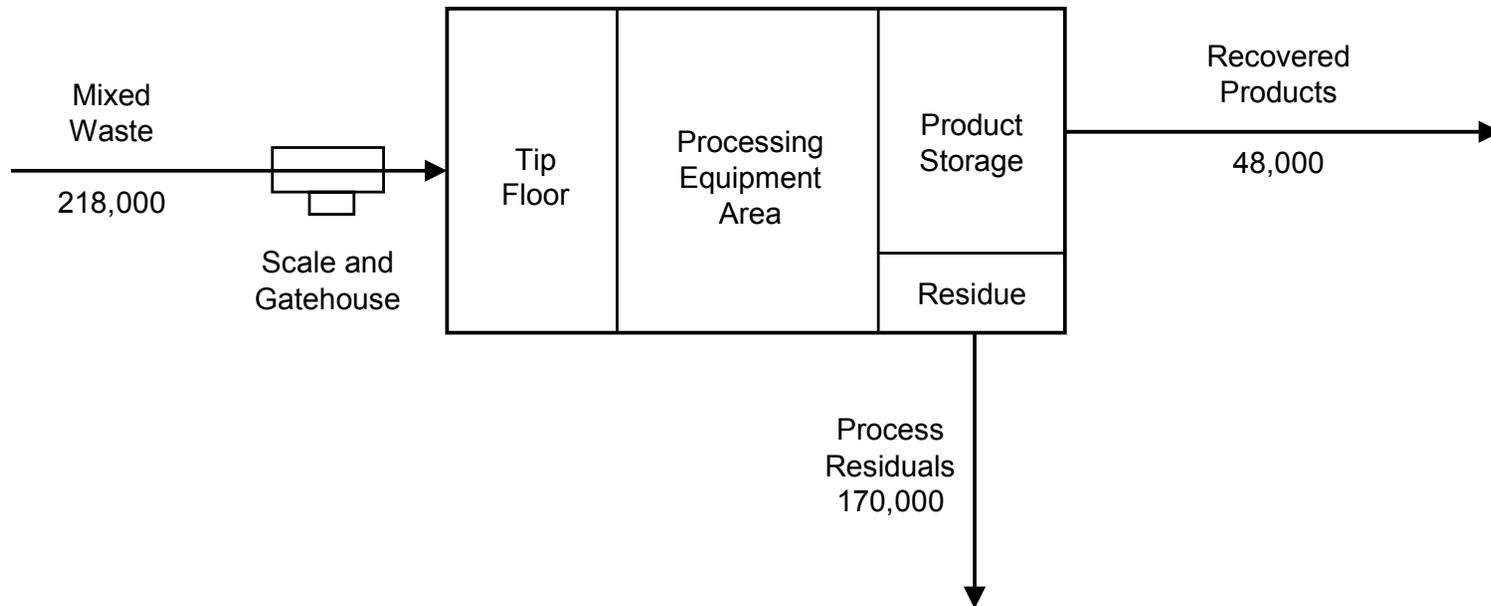


Figure 6. Schematic Diagram and Materials Balance (tons/year) for Mixed Waste (Dirty) MRF Alternative

Table 11. Estimated Capital and O&M and Product Revenues for Mixed Waste Processing Facility

Capital Cost	\$	Unit Cost (\$/ton)
Land, Permitting, Site Preparation	19,400,000	
Structures	11,600,000	
Equipment	24,000,000	
Engineering	4,400,000	
Contingency and Startup Expenses	7,900,000	
Total Capital	67,300,000	31.30
Operations and Maintenance (O&M)	Annual \$	
Personnel	2,500,000	
Maintenance	1,100,000	
Utilities and Fuel	500,000	
Residue Transport/Disposal	9,900,000	
Total O&M	14,000,000	63.85
Amortized Capital and O&M		95.15
Revenues from Sale of Recovered Materials		36.45
Net Cost		58.70

Appendix A: Waste Characterization Results
Gold Coast MRF (August 2006)
Composition of Residential and Commercial
Commingled Recyclables and of Process Residue

Material Type	Commingled Recyclables (wt basis)	Process Residue (wt basis)
OCC	8.3%	5.6%
ONP	25.8%	9.1%
Mixed Paper	36.2%	31.6%
Magazines	0.0%	0.0%
Clear Glass	3.1%	0.6%
Brown Glass	0.8%	0.5%
Green Glass	1.6%	0.5%
Mixed Glass	12.1%	18.1%
Aluminum	1.7%	0.6%
Tin	0.5%	2.0%
PETE	1.4%	0.8%
HDPE Natural	0.7%	1.1%
HDPE Color	0.7%	0.0%
Textiles	0.0%	0.6%
Mixed Plastics	4.1%	11.3%
Food	0.0%	1.7%
Animal Food	0.0%	0.0%
LDPE Film Plastics	1.0%	5.1%
Ferrous Scrap	2.0%	4.4%
Aluminum Scrap	0.0%	0.1%
Other Organics	0.0%	1.5%
Wood	0.0%	4.5%
Other Inorganics	0.1%	0.1%
Total	100.0%	100.0%

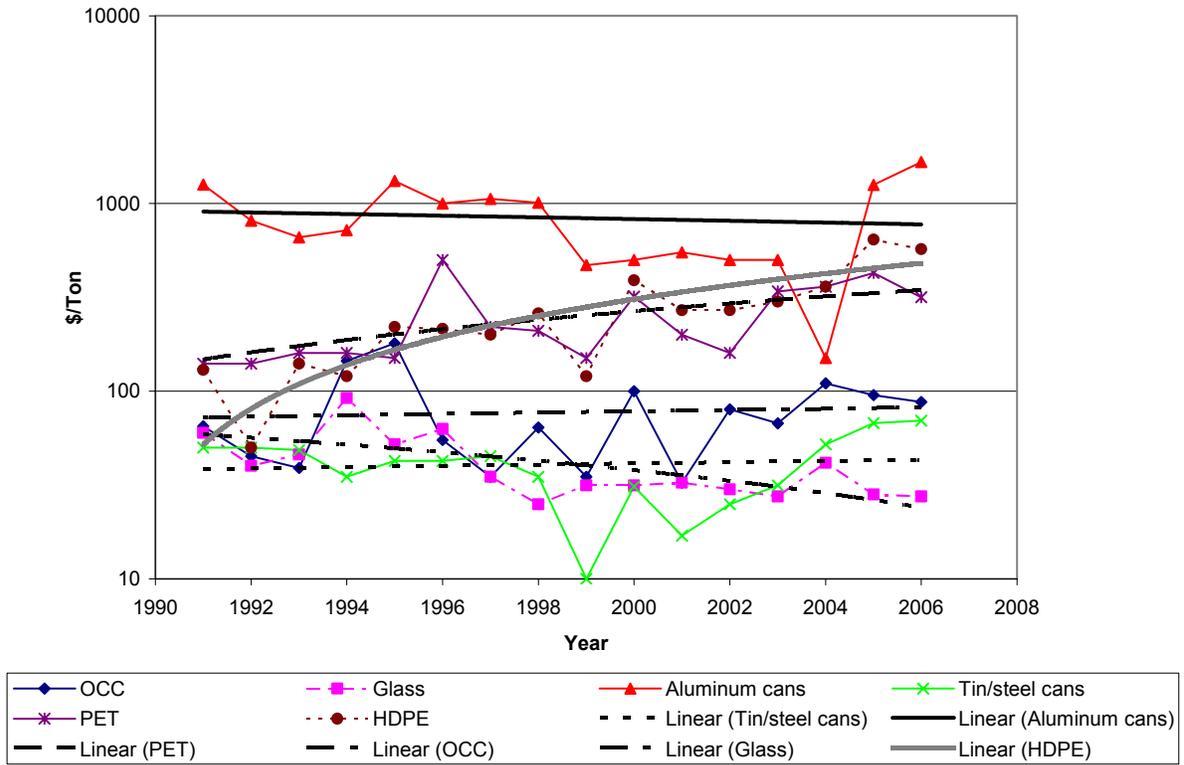
Appendix A: Waste Characterization Results (cont.)
MarBorg David Love Place MRF (August 2006)
Composition of Commercial Commingled Recyclables and of Process Residue

Material Type	Commingled Recyclables (wt basis)	Process Residue (wt basis)
OCC	55.6%	1.4%
ONP	7.7%	0.2%
Mixed Paper	18.8%	14.1%
Magazines	0.0%	2.2%
Clear Glass	0.2%	2.0%
Brown Glass	0.0%	0.3%
Green Glass	0.0%	2.0%
Mixed Glass	2.2%	20.4%
Aluminum	0.5%	1.1%
Tin	1.2%	0.6%
PETE	0.5%	0.0%
HDPE Natural	0.0%	0.0%
HDPE Color	0.4%	0.0%
Textiles	0.0%	2.6%
Mixed Plastics	3.4%	18.4%
Food	0.1%	9.8%
Animal Food	0.0%	0.0%
LDPE Film Plastics	2.7%	6.0%
Ferrous Scrap	0.4%	1.2%
Aluminum Scrap	0.7%	0.0%
Other Organics	1.0%	11.9%
Wood	3.0%	2.2%
Other Inorganics	1.5%	3.7%
Total	100.0%	100.0%

Appendix A: Waste Characterization Results (cont.)
WM/HSS MRF (August 2006)
Composition of Residue Streams from Processing of
Residential and Commercial Commingled Recyclables

Material Type	Mid-Line Residue (wt basis)	Fine Residue (wt basis)	First Sort Coarse Residue (wt basis)
OCC	2.9%	1.3%	9.1%
ONP	2.2%	0.4%	3.9%
Mixed Paper	7.4%	29.6%	16.4%
Magazines	0.0%	0.0%	0.0%
Clear Glass	0.1%	3.5%	0.0%
Brown Glass	0.0%	0.9%	0.1%
Green Glass	0.1%	1.9%	0.3%
Mixed Glass	0.8%	0.5%	0.1%
Aluminum	0.7%	0.4%	0.2%
Tin	0.0%	4.0%	0.7%
PETE	1.2%	3.5%	0.6%
HDPE Natural	0.1%	0.5%	0.7%
HDPE Color	0.3%	0.3%	1.0%
Textiles	6.2%	0.0%	14.8%
Mixed Plastics	25.9%	32.9%	12.5%
Food	4.4%	3.9%	5.5%
Animal Food	0.0%	0.0%	2.9%
LDPE Film Plastics	29.8%	0.2%	14.8%
Ferrous Scrap	0.6%	3.5%	0.2%
Aluminum Scrap	0.0%	0.0%	0.5%
Other Organics	12.3%	5.9%	3.0%
Wood	5.0%	2.1%	9.8%
Other Inorganics	0.0%	4.5%	2.9%
Total	100.0%	100.0%	100.0%

Appendix B: Historical Price of Materials Types (West Coast)



Appendix C: Clean MRF Survey Form

SURVEY OF CALIFORNIA MATERIALS RECOVERY FACILITIES

Name and Address of Facility	
Contact Information Name	
Telephone number	
E-mail address	
Name of Owner	
Name of Operator	

Inbound Recyclable Materials (excluding buy-back)

If tonnage information for residential and commercial is not available separately, report under "Combined"

Type of Material	Residential (tons/yr)	(Commercial (tons/yr)	Combined (tons/yr)
Commingled (single stream)			
Dual stream paper mix			
Dual stream container mix			
Single-material loads (e.g., cardboard)			
Mixed waste			
Other: _____			

Residue

Quantity of residue from MRF processing (tons/yr)	
If residue is tracked by type of material, please provide a breakdown (tons/yr)	
Commingled (single stream)	
Dual stream paper mix	
Dual stream container mix	
Single-material loads	
Mixed waste	
Other: _____	

Comments

Please return the completed survey form to: LEggerth@calrecovery.com.
If you have questions, please call Linda Eggerth or George Savage (925/356-3700).

**Appendix D:
Summary of Clean MRF Survey Results**

	Clean MRF Location							Average	Max	Min
	1	2	3	4	5	6	7			
Inbound Recyclable Materials (annual tons) (b)										
Total Inbound	13,900	178,100	60,000	3,200	50,500	32,400	21,500	51,400	178,100	3,200
Total Commingled/Dual Stream	13,900	118,300	50,000	3,200	50,500	32,400	21,500	41,400	118,300	3,200
Residue										
Quantity of residue from MRF processing (annual tons) (b)	1,400	17,800	4,500	400	6,400	3,800	2,800	5,300	17,800	400
Residue generation, based on commingled (a)	10.2%	15.0%	9.0%	13.6%	12.6%	11.9%	13.3%	12.2%	15.0%	9.0%

Notes:
 a) Assumes that an insignificant percentage of contamination is generated from processing of single material loads.
 b) Except for Location #7, which are totals for a recent 6-month period.
 Facility data are presented anonymously as a condition of the facilities participating in the survey. The facilities are located throughout California.

Appendix E. Population Escalation during Project Period

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population by Year	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Santa Barbara	91,200	91,500	91,800	92,100	92,400	92,700	93,140	93,580	94,020	94,460	94,900	95,360	95,820	96,280	96,740	97,200	97,640	98,080	98,520	98,960	99,400
Goleta	29,900	30,380	30,860	31,340	31,820	32,300	32,440	32,580	32,720	32,860	33,000	33,080	33,160	33,240	33,320	33,400	33,500	33,600	33,700	33,800	33,900
Unincorporated South	73,700	74,320	74,940	75,560	76,180	76,800	77,780	78,760	79,740	80,720	81,700	82,560	83,420	84,280	85,140	86,000	86,240	86,480	86,720	86,960	87,200
Lompoc	43,500	43,780	44,060	44,340	44,620	44,900	45,140	45,380	45,620	45,860	46,100	46,320	46,540	46,760	46,980	47,200	47,460	47,720	47,980	48,240	48,500
Santa Maria	87,900	89,680	91,460	93,240	95,020	96,800	98,620	100,440	102,260	104,080	105,900	106,880	107,860	108,840	109,820	110,800	111,180	111,560	111,940	112,320	112,700
Guadalupe	5,900	5,920	5,940	5,960	5,980	6,000	6,040	6,080	6,120	6,160	6,200	6,240	6,280	6,320	6,360	6,400	6,420	6,440	6,460	6,480	6,500
Solvang	5,900	5,980	6,060	6,140	6,220	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300	6,300
Buellton	5,400	5,480	5,560	5,640	5,720	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,820	5,840	5,860	5,880	5,900
Unincorporated North	65,000	69,120	73,240	77,360	81,480	85,600	86,980	88,360	89,740	91,120	92,500	93,200	93,900	94,600	95,300	96,000	96,160	96,320	96,480	96,640	96,800
Total	408,400	416,160	423,920	431,680	439,440	447,200	452,240	457,280	462,320	467,360	472,400	475,740	479,080	482,420	485,760	489,100	490,720	492,340	493,960	495,580	497,200
		7,760	7,760	7,760	7,760	7,760	5,040	5,040	5,040	5,040	5,040	3,340	3,340	3,340	3,340	3,340	1,620	1,620	1,620	1,620	1,620
Population Escalation		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Santa Barbara		0.33%	0.33%	0.33%	0.33%	0.32%	0.47%	0.47%	0.47%	0.47%	0.47%	0.48%	0.48%	0.48%	0.48%	0.48%	0.45%	0.45%	0.45%	0.45%	0.44%
Goleta		1.61%	1.58%	1.56%	1.53%	1.51%	0.43%	0.43%	0.43%	0.43%	0.43%	0.24%	0.24%	0.24%	0.24%	0.24%	0.30%	0.30%	0.30%	0.30%	0.30%
Unincorporated South		0.84%	0.83%	0.83%	0.82%	0.81%	1.28%	1.26%	1.24%	1.23%	1.21%	1.05%	1.04%	1.03%	1.02%	1.01%	0.28%	0.28%	0.28%	0.28%	0.28%
Lompoc		0.64%	0.64%	0.64%	0.63%	0.63%	0.53%	0.53%	0.53%	0.53%	0.52%	0.48%	0.47%	0.47%	0.47%	0.47%	0.55%	0.55%	0.54%	0.54%	0.54%
Santa Maria		2.03%	1.98%	1.95%	1.91%	1.87%	1.88%	1.85%	1.81%	1.78%	1.75%	0.93%	0.92%	0.91%	0.90%	0.89%	0.34%	0.34%	0.34%	0.34%	0.34%
Guadalupe		0.34%	0.34%	0.34%	0.34%	0.33%	0.67%	0.66%	0.66%	0.65%	0.65%	0.65%	0.64%	0.64%	0.63%	0.63%	0.31%	0.31%	0.31%	0.31%	0.31%
Solvang		1.36%	1.34%	1.32%	1.30%	1.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Buellton		1.48%	1.46%	1.44%	1.42%	1.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.34%	0.34%	0.34%	0.34%	0.34%
Unincorporated North		6.34%	5.96%	5.63%	5.33%	5.06%	1.61%	1.59%	1.56%	1.54%	1.51%	0.76%	0.75%	0.75%	0.74%	0.73%	0.17%	0.17%	0.17%	0.17%	0.17%

Appendix F: Tonnage Escalation during Project Period

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Tonnage (tons/yr)															
Santa Barbara	16,400	16,618	16,839	17,063	17,290	17,546	17,805	18,067	18,333	18,603	18,880	19,161	19,445	19,734	20,026
Goleta	5,000	5,130	5,262	5,396	5,532	5,611	5,692	5,774	5,856	5,940	6,014	6,089	6,165	6,241	6,319
Unincorporated South	13,000	13,240	13,483	13,729	13,979	14,299	14,624	14,954	15,289	15,630	15,952	16,280	16,612	16,949	17,292
Lompoc	9,000	9,148	9,298	9,451	9,605	9,753	9,903	10,055	10,209	10,365	10,518	10,674	10,832	10,992	11,153
Santa Maria	2,000	2,060	2,121	2,183	2,246	2,312	2,378	2,445	2,513	2,583	2,633	2,684	2,735	2,787	2,840
Unincorporated North	9,000	9,632	10,275	10,931	11,598	11,903	12,213	12,528	12,848	13,173	13,405	13,641	13,880	14,122	14,368
Total	54,400	55,828	57,278	58,753	60,251	61,424	62,614	63,823	65,049	66,293	67,403	68,528	69,669	70,825	71,998
Tonnage Increase (%/yr)															
Santa Barbara		1.33%	1.33%	1.33%	1.33%	1.48%	1.48%	1.47%	1.47%	1.47%	1.49%	1.49%	1.48%	1.48%	1.48%
Goleta		2.60%	2.57%	2.55%	2.52%	1.44%	1.44%	1.43%	1.43%	1.43%	1.24%	1.24%	1.24%	1.24%	1.24%
Unincorporated South		1.84%	1.84%	1.83%	1.82%	2.29%	2.27%	2.26%	2.24%	2.23%	2.06%	2.05%	2.04%	2.03%	2.02%
Lompoc		1.65%	1.64%	1.64%	1.63%	1.54%	1.54%	1.53%	1.53%	1.53%	1.48%	1.48%	1.48%	1.48%	1.47%
Santa Maria		3.00%	2.97%	2.93%	2.89%	2.90%	2.86%	2.83%	2.80%	2.77%	1.93%	1.93%	1.92%	1.91%	1.90%
Unincorporated North		7.02%	6.68%	6.38%	6.11%	2.63%	2.60%	2.58%	2.55%	2.53%	1.76%	1.76%	1.75%	1.75%	1.74%

Appendix G: Sensitivity Analyses of MRF Alternatives

Scenario: Land Cost -\$10/ton

SANTA BARBARA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	4.18	5.00	9.18
Regional - Santa Barbara	2.85	(12.68)	(9.83)
Regional - South Coast TS	4.18	(11.32)	(7.14)
Regional - Tajiguas Landfill	21.85	(6.77)	15.08
Regional - Cat Canyon	28.43	3.76	32.19
Local - Santa Barbara	2.85	2.32	5.17
Local - South Coast TS	4.18	3.68	7.86
Local - Tajiguas Landfill	21.85	8.23	30.08

LOMPOC

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.57	7.93	28.50
Regional - Santa Barbara	28.13	(12.68)	15.45
Regional - South Coast TS	25.33	(11.32)	14.00
Regional - Tajiguas Landfill	18.33	(6.77)	11.55
Regional - Cat Canyon	20.90	3.76	24.66

GOLETA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.85	N/A	
Regional - Santa Barbara	8.55	(12.68)	(4.13)
Regional - South Coast TS	2.85	(11.32)	(8.47)
Regional - Tajiguas Landfill	16.15	(6.77)	9.38
Regional - Cat Canyon	27.10	3.76	30.86
Local - Santa Barbara	8.55	2.32	10.87
Local - South Coast TS	2.85	3.68	6.53
Local - Tajiguas Landfill	16.15	8.23	24.38

SANTA MARIA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.81	8.39	11.20
Regional - Santa Barbara	34.70	(12.68)	22.02
Regional - South Coast TS	32.95	(11.32)	21.63
Regional - Tajiguas Landfill	25.95	(6.77)	19.18
Regional - Cat Canyon	16.15	3.76	19.91

UNINCORPORATED SOUTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	14.56	(25.54)	(10.99)
Regional - Santa Barbara	7.13	(12.68)	(5.55)
Regional - South Coast TS	1.43	(11.32)	(9.90)
Regional - Tajiguas Landfill	18.05	(6.77)	11.28
Regional - Cat Canyon	25.68	3.76	29.44
Local - Santa Barbara	7.13	2.32	9.45
Local - South Coast TS	1.43	3.68	5.10
Local - Tajiguas Landfill	18.05	8.23	26.28

UNINCORPORATED NORTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.47	(41.13)	(20.66)
Regional - Santa Barbara	35.25	(12.68)	22.57
Regional - South Coast TS	32.45	(11.32)	21.13
Regional - Tajiguas Landfill	25.45	(6.77)	18.68
Regional - Cat Canyon	8.55	3.76	12.31

Scenario: Residue 10%

SANTA BARBARA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	4.18	5.00	9.18
Regional - Santa Barbara	2.85	(5.60)	(2.75)
Regional - South Coast TS	4.18	(4.17)	0.01
Regional - Tajiguas Landfill	21.85	0.62	22.47
Regional - Cat Canyon	28.43	11.00	39.43
Local - Santa Barbara	2.85	9.40	12.25
Local - South Coast TS	4.18	10.83	15.01
Local - Tajiguas Landfill	21.85	15.62	37.47

LOMPOC

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.57	7.93	28.50
Regional - Santa Barbara	28.13	(5.60)	22.53
Regional - South Coast TS	25.33	(4.17)	21.16
Regional - Tajiguas Landfill	18.33	0.62	18.95
Regional - Cat Canyon	20.90	11.00	31.90

GOLETA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.85	N/A	
Regional - Santa Barbara	8.55	(5.60)	2.95
Regional - South Coast TS	2.85	(4.17)	(1.32)
Regional - Tajiguas Landfill	16.15	0.62	16.77
Regional - Cat Canyon	27.10	11.00	38.10
Local - Santa Barbara	8.55	9.40	17.95
Local - South Coast TS	2.85	10.83	13.68
Local - Tajiguas Landfill	16.15	15.62	31.77

SANTA MARIA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.81	8.39	11.20
Regional - Santa Barbara	34.70	(5.60)	29.10
Regional - South Coast TS	32.95	(4.17)	28.78
Regional - Tajiguas Landfill	25.95	0.62	26.57
Regional - Cat Canyon	16.15	11.00	27.15

UNINCORPORATED SOUTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	14.56	(25.54)	(10.99)
Regional - Santa Barbara	7.13	(5.60)	1.53
Regional - South Coast TS	1.43	(4.17)	(2.75)
Regional - Tajiguas Landfill	18.05	0.62	18.67
Regional - Cat Canyon	25.68	11.00	36.68
Local - Santa Barbara	7.13	9.40	16.53
Local - South Coast TS	1.43	10.83	12.26
Local - Tajiguas Landfill	18.05	15.62	33.67

UNINCORPORATED NORTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.47	(41.13)	(20.66)
Regional - Santa Barbara	35.25	(5.60)	29.65
Regional - South Coast TS	32.45	(4.17)	28.28
Regional - Tajiguas Landfill	25.45	0.62	26.07
Regional - Cat Canyon	8.55	11.00	19.55

Scenario: Market Revenues \$112/ton

SANTA BARBARA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	4.18	5.00	9.18
Regional - Santa Barbara	2.85	1.72	4.57
Regional - South Coast TS	4.18	3.08	7.26
Regional - Tajiguas Landfill	21.85	7.63	29.48
Regional - Cat Canyon	28.43	18.16	46.59
Local - Santa Barbara	2.85	16.72	19.57
Local - South Coast TS	4.18	18.08	22.26
Local - Tajiguas Landfill	21.85	22.63	44.48

LOMPOC

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.57	7.93	28.50
Regional - Santa Barbara	28.13	1.72	29.85
Regional - South Coast TS	25.33	3.08	28.40
Regional - Tajiguas Landfill	18.33	7.63	25.95
Regional - Cat Canyon	20.90	18.16	39.06

GOLETA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.85	N/A	
Regional - Santa Barbara	8.55	1.72	10.27
Regional - South Coast TS	2.85	3.08	5.93
Regional - Tajiguas Landfill	16.15	7.63	23.78
Regional - Cat Canyon	27.10	18.16	45.26
Local - Santa Barbara	8.55	16.72	25.27
Local - South Coast TS	2.85	18.08	20.93
Local - Tajiguas Landfill	16.15	22.63	38.78

SANTA MARIA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.81	8.39	11.20
Regional - Santa Barbara	34.70	1.72	36.42
Regional - South Coast TS	32.95	3.08	36.03
Regional - Tajiguas Landfill	25.95	7.63	33.58
Regional - Cat Canyon	16.15	18.16	34.31

UNINCORPORATED SOUTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	14.56	(25.54)	(10.99)
Regional - Santa Barbara	7.13	1.72	8.85
Regional - South Coast TS	1.43	3.08	4.50
Regional - Tajiguas Landfill	18.05	7.63	25.68
Regional - Cat Canyon	25.68	18.16	43.84
Local - Santa Barbara	7.13	16.72	23.85
Local - South Coast TS	1.43	18.08	19.50
Local - Tajiguas Landfill	18.05	22.63	40.68

UNINCORPORATED NORTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.47	(41.13)	(20.66)
Regional - Santa Barbara	35.25	1.72	36.97
Regional - South Coast TS	32.45	3.08	35.53
Regional - Tajiguas Landfill	25.45	7.63	33.08
Regional - Cat Canyon	8.55	18.16	26.71

Scenario: Market Revenues \$122/ton

SANTA BARBARA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	4.18	5.00	9.18
Regional - Santa Barbara	2.85	(7.08)	(4.23)
Regional - South Coast TS	4.18	(5.72)	(1.54)
Regional - Tajiguas Landfill	21.85	(1.17)	20.68
Regional - Cat Canyon	28.43	9.36	37.79
Local - Santa Barbara	2.85	7.92	10.77
Local - South Coast TS	4.18	9.28	13.46
Local - Tajiguas Landfill	21.85	13.83	35.68

LOMPOC

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.57	7.93	28.50
Regional - Santa Barbara	28.13	(7.08)	21.05
Regional - South Coast TS	25.33	(5.72)	19.60
Regional - Tajiguas Landfill	18.33	(1.17)	17.15
Regional - Cat Canyon	20.90	9.36	30.26

GOLETA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.85	N/A	
Regional - Santa Barbara	8.55	(7.08)	1.47
Regional - South Coast TS	2.85	(5.72)	(2.87)
Regional - Tajiguas Landfill	16.15	(1.17)	14.98
Regional - Cat Canyon	27.10	9.36	36.46
Local - Santa Barbara	8.55	7.92	16.47
Local - South Coast TS	2.85	9.28	12.13
Local - Tajiguas Landfill	16.15	13.83	29.98

SANTA MARIA

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	2.81	8.39	11.20
Regional - Santa Barbara	34.70	(7.08)	27.62
Regional - South Coast TS	32.95	(5.72)	27.23
Regional - Tajiguas Landfill	25.95	(1.17)	24.78
Regional - Cat Canyon	16.15	9.36	25.51

UNINCORPORATED SOUTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	14.56	(25.54)	(10.99)
Regional - Santa Barbara	7.13	(7.08)	0.05
Regional - South Coast TS	1.43	(5.72)	(4.30)
Regional - Tajiguas Landfill	18.05	(1.17)	16.88
Regional - Cat Canyon	25.68	9.36	35.04
Local - Santa Barbara	7.13	7.92	15.05
Local - South Coast TS	1.43	9.28	10.70
Local - Tajiguas Landfill	18.05	13.83	31.88

UNINCORPORATED NORTH COUNTY

Alternative	Transport to MRF	Processing, Disposal of Residual, Marketing	Net Cost
Current situation	20.47	(41.13)	(20.66)
Regional - Santa Barbara	35.25	(7.08)	28.17
Regional - South Coast TS	32.45	(5.72)	26.73
Regional - Tajiguas Landfill	25.45	(1.17)	24.28
Regional - Cat Canyon	8.55	9.36	17.91