# APPENDIX B

# RESOURCE MANAGEMENT ADVISORY COMMITTEE MISSION STATEMENT, MEETING AGENDAS AND MEETING SUMMARIES

# Resource Management Advisory Committee (RMAC)

## Mission Statement

The mission of the Resource Management Advisory Committee is to evaluate potential options and provide recommendations to the Environmental Services Department and their consultant, on significant solid waste and source reduction policy issues affecting the City of San Diego.

## Principles of Participation

**Role of Committee Members**

To accomplish the Committee's mission, it is important for committee members to have an understanding of relevant issues, opportunities, and constraints. Consequently, the role of the Committee member is to:

- Become familiar with current and projected solid waste and source reduction demands.
- Become familiar with current Environmental Services Department's (ESD) solid waste disposal, collection, and source reduction programs.
- Review, evaluate, screen and rank options to be considered in the City of San Diego Long Term Resource Management Plan. This review shall include, at a minimum, evaluating potential financial impacts, revenue sources, and environmental impacts or benefits related to each option.
- Evaluate options on how best to finance and implement the preferred options.
- Provide recommendations to ESD throughout the process of developing a Long Term Resource Management Strategic Plan.

**Participation**

Members of the RMAC are being sought based upon several qualities:

- Willingness to work cooperatively with other committee members;
- Ability to provide the perspective of a diverse range of interested stakeholders;

- Ability to listen courteously to other points of view; and
- Willingness to participate in a concentrated review process requiring attendance at scheduled meetings.

**Discussion Process**

RMAC members agree to abide by the following discussion process:

- All perspectives are valued.
- One person speaks at a time.
- The preferred deliberation process is collaborative problem solving.
- In cases of non-consensus, alternative perspectives will be documented.
- RMAC members treat each other with respect.
- A neutral third-party will facilitate the meetings.

**Meeting Attendance**

In order for the process to work effectively, full participation of representatives will be essential. RMAC members are asked to commit to attend meetings consistently. If a RMAC member becomes unavailable to attend a meeting, he or she may send an alternative to monitor that meeting. The alternate should be briefed by the Committee member regarding the status of prior discussions and decisions. Active participation by the alternate is permissible if the alternate does not impede the progress of the Committee.

**Support**

A neutral third-party facilitator, Mr. Lewis Michaelson, with Katz and Associates, will conduct all RMAC meetings. The role of the facilitator is to ensure all perspectives are heard through a collaborative discussion process. Meeting discussions may be audio taped to aid in the preparation of meeting summaries.

**Meeting Agendas**

ESD and the facilitator will be responsible for preparing the agendas in collaboration with the RMAC members. At the conclusion of each meeting, RMAC members will recommend items for inclusion in the next agenda and any action items requiring additional research.

**Observers**

Observers are welcome at RMAC meetings and meetings will be publicly noticed. However, meetings are intended for the benefit of Committee members to promote balanced, constructive interaction. Observers will be asked to refrain from commenting during the proceedings. There will be an opportunity for public comment at each meeting.

**Media**

Media present, if any, will be identified for the benefit of RMAC members. Members will be asked not to make public statements about the Committee's deliberations to the media that would tend to hamper constructive discussions.

**Information Sharing**

In order to ensure that all representatives have the same information available to them, all documents will be distributed through the established point of contact for the RMAC. RMAC members are asked to provide any materials seven (7) business days prior to the meeting, whenever possible, for distribution to RMAC members at least five (5) days before the next meeting.

Bryan A. Stirrat & Associates
Civil And Environmental Engineers

# LONG-TERM RESOURCE MANAGEMENT OPTIONS (LRMO) STRATEGIC PLAN

## RESOURCE MANAGEMENT ADVISORY COMMITTEE (RMAC)

## FIRST MEETING
## Tuesday, October 9, 2007 3:00 – 5:00 p.m.

City of San Diego
Environmental Services Department (ESD)
Auditorium
9601 Ridgehaven Court
San Diego, CA 92123

# AGENDA

1. **Welcome / Why are we Here? -** Elmer L. Heap Jr., ESD

2. **Introductions** - Lewis Michaelson, Katz & Associates

3. **RMAC Committee Mission and Principles of Participation** – Lewis Michaelson, Katz & Associates

4. **LRMO Strategic Plan Process** – BAS & Associates

5. **Environmental Services Department Overview** - Chris Gonaver, ESD

6. **Regional Overview -** Robert Hilton, HF&H Consultants

7. **Next Steps** - BAS & Associates

   - Consultant Milestones

   - RMAC Participation

8. **Public Comment**

9. **Next Meetings**

ENVIRONMENTAL SERVICES DEPARTMENT

**City of San Diego Long-term Resource Management Options Strategic Plan**
**Resource Management Advisory Committee**
ESD Auditorium, 9601 Ridgehaven Court, San Diego, CA 92123
Tuesday, Oct. 9, 2007, 3:00 – 5:00 p.m.

## Meeting Summary

**RMAC Members Present:**
Fatih Buyukonmez, San Diego State University, Department of Civil and Environmental Studies
Kristen Byrne, San Diego County Disposal Association
Sylvia Castillo, Environmental Services Department
Chris Cate, San Diego County Taxpayers Association
Andrea Eaton, City of San Diego Council District 7
Richard Flammer, Integrated Waste Management Community Advisory Committee
Lynn France, Integrated Waste Management Technical Advisory Committee
Shirley Larson, League of Women Voters San Diego
Leslie L. McLaughlin, Navy Region Southwest
Rochelle Monroe, Environmental Services Department
Alan Pentico, San Diego County Apartment Association
Bill Prinz, Solid Waste Local Enforcement Agency

**Project Team Members:**
Christine Arbogast, Bryan A. Stirrat and Associates
Chris Gonaver, Environmental Services Department
Elmer Heap, Environmental Services Department
Bob Hilton, HF&H Consultants
Bryan Stirrat, Bryan A. Stirrat and Associates

**Support:**
Lewis Michaelson, Katz & Associates
Kelly Thomas, Katz & Associates

### Introduction
Mr. Lewis Michaelson introduced himself as the neutral facilitator for the Resource Management Advisory Committee (RMAC) process. RMAC is scheduled to meet approximately every other month for two years to provide input on the development of a Long-term Resource Management Options (LRMO) Strategic Plan for the City of San Diego.

### Welcome
Mr. Elmer Heap, Director of ESD, thanked the committee members for their time. Mr. Heap gave an overview of ESD's currently proposed waste management initiatives, such as a recycling ordinance, a construction and demolition waste ordinance, an increase in self-haul fees at Miramar landfill and a fee for refuse container replacement. These proposed changes will be presented to the San Diego City Council in the next few months. In addition, the city's proposal to increase the height of a portion of the Miramar landfill 20 feet is currently under an environmental review. Finally, ESD is considering a resource recovery center/transfer station at Miramar landfill. Mr. Heap explained that these projects, if all implemented, would only extend the life of the landfill another 10 years. The purpose of the study and the RMAC, then, is to develop options that could be implemented to sustain the city's waste management system over the next 25 years or more. He emphasized that the resulting plan will include several components,

and that the RMAC should take the approach of finding "silver buckshot" as opposed to a single, "silver bullet" solution.

**Committee Mission and Principles of Participation**
Mr. Michaelson reviewed the mission statement and principles of participation with the committee. Committee members concurred and adopted them.

**LRMO Strategic Plan Process**
Mr. Bryan Stirrat of BAS, who is contracted with ESD to conduct the LRMO Strategic Plan study, briefly explained BAS's relevant background and role in the process. BAS is currently conducting a capacity analysis of all the waste management facilities and options in the city and county of San Diego and surrounding regions, including landfills, recycling facilities, rail hauling, Miramar landfill expansion and alternative technologies. BAS team members and HF&H consultants will also analyze the projected level of demand for waste disposal and will conduct a financial review of the city's funding and economic analysis of selected options in Phase 2 of the study. The RMAC will assist in evaluating and prioritizing the options, and the highest ranked options will be analyzed in depth during Phase 2 of the study.

**Environmental Services Department Overview**
Mr. Chris Gonaver explained that the main mission of the ESD is to provide a sustainable solid waste management system for the city. In addition to refuse collection and disposal, ESD also manages curbside and green waste recycling programs, enforces city codes and conducts public outreach and education. The department also includes divisions for energy, sustainability and environmental protection.

Mr. Gonaver reviewed the fees collected at Miramar landfill, and committee members asked the following questions:

**Q:** What is the self haul fee?
**A:** Currently, self-haul is a flat fee of $12. ESD is proposing to increase the rate to $21 in 2008 and to $30 in 2009. ESD predicts that $2-3 million per year could be generated once the rates increase to $30. ESD is presenting this proposal to the city council on Oct. 24. Increasing the self-haul rate will make ESD's rates comparable to other solid waste fees and will encourage people who live distant from the Miramar landfill to use transfer stations instead.

**Q:** Is disposal of green waste free?
**A:** Individuals are not charged to dispose of green refuse, but landscapers may be charged $25 per ton to dispose of large amounts of green refuse.

**Q:** What is the difference between the fees for vehicles under and over two tons?
**A:** Vehicles under two tons are usually personal vehicles, and a flat rate is charged instead of weighing the vehicle. Vehicles over two tons are weighed and charged a fee per ton, plus a franchise fee/Refuse Collectors Business Tax.

**Q:** What fund pays to pick up residents' trash?
**A:** The general fund, which includes property taxes, sales tax and real estate tax, funds residential trash collection and disposal. It costs approximately $37 million per year to collect and dispose of trash in the city, which is about $14 per month for each residence. A breakdown of costs can be provided at the next meeting.

**Q:** Are other fees currently proposed to be increased?

**A:** The fee schedule includes other increases, though the self-haul fee increase is the most significant. A breakdown of fees collected at Miramar landfill can be provided at the next meeting.

**Q:** Are you anticipating the need to increase enforcement efforts after raising self haul fees? People may think the fee is too high and dump illegally.
**A:** ESD can address that issue, if necessary. People who dump illegally tend to do so regardless of the fee. It is hoped that by increasing the self-haul fee, most people will use other facilities, like transfer stations, over Miramar landfill.

**Q:** A waste characterization study has been circulating for a few years. Has this been updated? What is the current composition of Miramar landfill? What recyclables are coming into the landfill?
**A:** The last waste characterization study was specific to Miramar and conducted in 2000. Another study is not planned. Other reference information is available in a construction and demolition waste report. ESD staff will check with the recycling division to see if they are planning a study.

**Q:** It would be helpful to see who generates waste in each category.
**A:** ESD records the type and tonnage of vehicles that come to Miramar landfill, so those data are available.

**Regional Overview**
Mr. Bob Hilton of HF&H Consultants provided a summary of his background relevant to this study. HF&H is analyzing disposal capacity, demand and ESD's long-term financial management options. The preliminary results of these analyses show that the region (San Diego County) will reach its capacity between 2019 and 2021. Even if Miramar landfill were expanded and several other proposed projects were implemented, the waste disposal capacity in the county will still be reached within 15 years. Mr. Hilton emphasized that the city and county have a finite amount of disposal space and that the strategic plan needs to consider alternate options for disposing and managing waste.

**Next Steps**
The next RMAC meeting is scheduled for Wednesday, Dec. 5. At that meeting, Mr. Hilton will present the analysis of demand, capacity, and ESD's financial programs. The RMAC will begin establishing criteria to evaluate options and alternatives. At subsequent meetings, the RMAC will prioritize options and develop recommendations for which options should be further analyzed in Phase 2.

Before the next meeting, project staff will develop a Web site for posting committee information such as agendas and meeting summaries along with background information on waste management issues. Other outreach efforts will be discussed at the next meeting.

**Questions from the RMAC**
**Q:** Will you look at rail haul?
**A:** Rail haul is an option, and the BAS team is looking at other options. At the next meeting, RMAC members will be asked for input on a list of options BAS is evaluating and others that may be suggested. Because the BAS contract budget limits the number of options that can be analyzed, not all options (i.e. specific alternative technologies) will be reviewed. In Phase 2, the BAS team can focus on the financial, technical and environmental feasibility of the most promising subset of possible options.

**Q:** I heard about an Indian group that had room on its reservation for a landfill. Is that Gregory Canyon?
**A:** That is the Campo Indian group. They have prepared an EIS, which will not be distributed to the public until it is approved by the EPA due to their unique regulatory structure. Therefore, details such as the capacity of the landfill will not be known until the EIS is released.

**Q:** It would be helpful to receive information about options before discussing them so I can gather input from my group.
**A:** RMAC members would be given time to present information to their respective organizations before asking for input on options, or at least before concluding the committee's deliberation on the topic.

**Q:** Will we consider options similar to what is being done in Germany with waste to energy facilities? This technology has already been implemented in Montana. I strongly recommend looking to other country's activities and approaching waste management as solid resource management. It would be wise to consider this option if we are putting together a long-range plan.
**A:** San Diego has considered this option multiple times in the past, and it has been rejected each time. In addition, Proposition H restricts the ability to implement waste to energy technology because it prohibits the facilities from processing more than 500 tons per day and imposes setbacks to sensitive uses like hospitals and schools. While this option is not necessarily off the table, it is important to keep in mind that the options we recommend must be socially acceptable as well as economically and financially feasible.

Bryan A. Stirrat & Associates
Civil And Environmental Engineers

# CITY OF SAN DIEGO - LONG-TERM RESOURCE MANAGEMENT OPTIONS (LRMO) STRATEGIC PLAN

http://www.sandiego.gov/environmental-services/geninfo/lwmo.shtml

## RESOURCE MANAGEMENT ADVISORY COMMITTEE (RMAC)

## SECOND MEETING

City of San Diego - Environmental Services Dept, Auditorium
9601 Ridgehaven Court, San Diego CA 92123

Wednesday, January 16, 2008 - 3:00 P.M.

## AGENDA

I. **Welcome / Introductions** - All

II. **Environmental Services Department (ESD) Update** - ESD

III. **Project Status** – Bryan A. Stirrat & Associates (BAS)

IV. **Overview of System Demand / Capacity Projections** – HF&H

- City Projections
- Regional Projections

V. **Diversion and Financial Impacts**

- Construction & Demolition (C&D) Debris Diversion Ordinance - ESD
- City Recycling Ordinance - ESD

VI. **Discussion of Screening Criteria** – BAS / Katz & Associates

VII. **Next Meeting**

ENVIRONMENTAL SERVICES DEPARTMENT

**City of San Diego Long-Term Resource Management Options**
**Strategic Plan**
**Resource Management Advisory Committee**
ESD Auditorium, 9601 Ridgehaven Court, San Diego, CA 92123
Wednesday, Jan. 16, 2008, 3:00 – 5:00 p.m.

# Meeting Summary

## RMAC Members Present:

Fatih Buyukonmez, San Diego State University, Department of Civil and Environmental Studies
Kristen Byrne, San Diego County Disposal Association
Sylvia Castillo, PE, City of San Diego Environmental Services Department
Chris Cate, San Diego County Taxpayers Association
Andrea Eaton, City of San Diego Council District 7
Bob Epler, City of San Diego Environmental Services Department
Richard Flammer, Integrated Waste Management Community Advisory Committee
Lynn France, Integrated Waste Management Technical Advisory Committee
Shirley Larson, League of Women Voters San Diego
Rochelle Monroe, City of San Diego Environmental Services Department
Alan Pentico, San Diego County Apartment Association
Bill Prinz, Solid Waste Local Enforcement Agency

## Project Team Members:

Chris Gonaver, City of San Diego, Environmental Services Department
Brian Henry, City of San Diego, Environmental Services Department
Jennifer Ott, City of San Diego, Environmental Services Department
Stephen Grealy, City of San Diego, Environmental Services Department
Christine Arbogast, PE, Bryan A. Stirrat and Associates
Bob Hilton, HF&H Consultants
Sonia Nasser, PE, Bryan A. Stirrat and Associates
Lewis Michaelson, Katz & Associates
Kelly Thomas, Katz & Associates

## Interested Attendees:

Christina Buchanan, City of San Diego
Reg Renaud, STI Engineering
Kip Sturdivant

## Welcome/Introductions

Lewis Michaelson welcomed committee members and guests. Everyone introduced themselves. Richard Flammer mentioned that he brought several copies of the October 2007 edition of BioCycle Magazine, which had dedicated the entire issue to zero waste. Committee members were encouraged to read through the magazine before the next meeting.

Mr. Michaelson reminded the committee that the Long-Term Resource Management Options Strategic Plan is a two-phase study. The committee and project team are working on Phase 1 right now. The main focus of this meeting is to begin discussing what a good solution would look like by identifying criteria the committee will use to evaluate resource management options.

## City of San Diego - Environmental Services Department Update

Chris Gonaver explained recent organizational changes within the Environmental Services Department. Elmer Heap has been promoted to Deputy Chief Operations Officer for the Neighborhood and Community Services Department, which includes Environmental Services, Parks and Recreation, Libraries and Customer Service. During this transition period, Chris Gonaver is the Acting Director for ESD.

Since the last RMAC meeting, ESD presented a few initiatives to the San Diego City Council. The city council approved the following ordinances:

The Construction and Demolition Debris Ordinance was actually put in place two years ago but was not actually implemented because no facility existed at the time to accept this kind of debris. The City Council's recent approval of the ordinance will trigger the ordinance now that the SANCO Facility, a construction and demolition debris facility, is now operational just outside the City of San Diego in Lemon Grove. The ordinance will implement a deposit system on construction and demolition debris beginning July 1, 2008. Parties who recycle this debris will recoup the deposit amount. In addition, an ordinance has adjusted fees at Miramar Landfill, including self-haul rates and a construction and demolition surcharge. These adjusted fees will provide incentive to dispose of waste at Lemon Grove instead of Miramar. Overall, then, this ordinance creates an economic incentive to recycle this type of debris.

The City Council also approved a City Recycling Ordinance requiring residential, commercial and multifamily condo properties to continue or initiate recycling, either through the curbside system or through private haulers. The ordinance implementation will be phased in over two years. Residences already served by curbside recycling will continue using that system. On February 11, 2008, the largest commercial facilities and multifamily residential units (based on square footage) will be required to initiate recycling programs. Every subsequent year, another tier of commercial and residential

properties will be included in the program, until properties of all sizes are included. This ordinance also requires a permit for special events.

Along with these ordinances were some adjusted fees at the landfill. Self-haul rates that had not been adjusted for about 15 years were increased. A Construction and Demolition surcharge was also implemented for customers coming in from outside the City of San Diego. The surcharge will create a financial disincentive to bringing C&D debris into San Diego and will help identify people who did not pick up a permit or who did not need to pick up a permit for C&D activities.

Mr. Gonaver gave an update on the City's plans for a resource recovery center (RRC) on a piece of property north of Hwy. 52 and west of Convoy near the Miramar Landfill. ESD holds lease rights to part of that area for future facilities. Grading activities are currently occurring in the area, but it is not associated with the planned RRC. The Marines have taken back part of the leased property and are building four (4) 80,000 gallon tanks for fuel storage. The tank farm will allow Kinder Morgan, the company that delivers fuel to this area, to make fuel deliveries to Marine Corps Air Station on a more flexible schedule.

## Diversion and Financial Impacts

Brian Henry, long-range forecasting analyst for ESD, presented the expected financial impacts of increased waste diversion at Miramar Landfill on ESD funding. Mr. Henry explained that as more waste is diverted from Miramar Landfill through recycling and other diversion efforts, the Refuse Disposal Fund and Recycling Fund receive less revenue. Even without diversion efforts, both funds have been decreasing because operation costs exceed revenues.

ESD has implemented cost cutting measures and increased efficiencies to extend the lives of the funds. However, given the overall trend of the funds and the additional impacts from diversion efforts, both funds are expected to be in a deficit between 2010 and 2011. ESD is currently working with the San Diego City Council and Mayor's office to develop a package of mitigation measures to address the decreasing fund balance.

In the long term, though, the City may have to implement measures such as increased fees or reductions in services. ESD will present its findings and recommendations on maintaining the health of the funds to the City Council later this year. The RMAC should keep these impacts to the funds in mind as it considers different long-term resource management options.

RMAC members asked the following questions:

Q. Do these charts include offsets or mitigation measures?

A. No, these charts assume no offsets or mitigation measures would be implemented.

Q: How exactly are these two funds used?

A: The Refuse Disposal and Recycling funds are used mostly to collect the green and blue bins. The disposal fund also helps pay for maintenance of closed landfills, community cleanups and other activities.

Q: How will the construction and demolition surcharge be used?

A: The scenario presented here represents the worse case fiscally but the best case in terms of diversion rates. This represents about 40,000 tons of non-City C&D debris currently being disposed of at Miramar. The surcharge will be used to fund disposal activities. How exactly the surcharge will be used depends upon how people react to the surcharge. If all the debris is diverted and everyone recoups their deposits, the funds will receive no additional revenue. If half of all debris is diverted, the fund will receive the revenue from the surcharges that are not returned.

Q: If the goal is to conserve landfill space at Miramar, why continue to accept construction and demolition debris there at all?

A: ESD considered banning construction and demolition debris but was concerned about illegal dumping as a result. We concluded that providing financial disincentives might be a better approach. The new rates to dispose of this debris at Miramar are 275% above the normal tipping fee. This significant increase makes it cost more to dispose of debris at Miramar than to take it to the C&D facility in Lemon Grove, even after considering any additional transportation costs.

Q: Does green recycling service change on a seasonal basis?

A: Yes, service can fluctuate depending on weather conditions. For example, the City has a surge in greenery waste following heavy rains, so we need to send out additional trucks. During dry periods we can send out fewer trucks, but we can usually predict the times of year where we will need additional service. For every ton of trash collected by the City that ends up at Miramar, the general fund pays the tip fees. Green waste diverted from black trash cans does not require the general fund to pay that fee. ESD does not want to limit service to the point where people are putting green waste in their trash cans, because this impacts the general fund. We try to strike a balance between the resources needed for collection service and maintaining customer service.

## Project Status

Ms. Christine Arbogast provided a status update on the LRMO project. The project team has maintained the overall schedule, which anticipates Phase 1 to be completed in June 2008. Several major tasks have already been completed, including establishing the RMAC and holding two of the five meetings. The next RMAC meeting is scheduled for February to keep the project on track. The project team has substantially completed its demand/capacity study and is identifying pertinent regulatory requirements and policy issues. The consultant team member from HF&H is studying ESD's current financial program, which will be an important component in considering options in Phase 1 and going into more analysis in Phase 2. Today we will review the preliminary screening criteria, and next meeting we will begin discussing options.

## System Demand/Capacity Projections

Mr. Bob Hilton of HF&H presented the findings of the system demand and capacity analysis. The core of his message was: "The City, with a current population of 1.3 million people, along with businesses and tourists, generates a lot of landfill material. SANDAG predicts that the amount of material will grow 30% by 2030." This prediction is based on population projections, assuming waste generation and diversion rates remained constant. Miramar will reach its capacity by 2012 and will need to close. Once Miramar closes, the region will have four other landfills available, all of which are owned by Allied Waste Services. If you look at the regional demand of five million tons per year, that total capacity will be reached by 2020. The expansions of Sycamore and Miramar landfills and the development of Gregory Canyon Landfill would extend the capacity a few years but are not long-term solutions. This challenge is why the LRMOSP was initiated.

RMAC members asked the following questions:

Q: Is the life expectancy of Miramar based on current disposal levels?

A: The analysis took into account the predicted disposal levels at the time the Miramar expansion is expected to be complete. It is important to remember that the Miramar expansion and other expansion projects are not guaranteed, as all projects are at different phases of approval and permitting right now.

Q: Are these predictions based on current diversion rates or projected diversion rates?

A: The analysis used 2005 disposal levels. Diversion activity is not incorporated. Accounting for future increases in diversion rates could possibly extend capacity for a year, but it will not change the need to develop long-term solutions. As a reference

point, every 100,000 tons diverted from the landfill equal one extra month of landfill capacity.

Q: One option is to use the existing capacity more efficiently by recovering air space within the landfills.

A: The committee will begin considering options, including these types of options, at the next meeting.

**Discussion of Screening Criteria**

The goal of this Phase 1 of the LRMOSP is to consider a wide range of resource management options and narrow down this list to the most promising options. The short list of options will be analyzed in much more detail during Phase 2. In order to effectively evaluate a broad range of options in this phase, project staff and consultants developed a draft list of screening criteria. These criteria are not meant to be used to disqualify any option. Rather, the criteria are to be used to consider the relative merits of some options over others. The criteria are grouped into six generic categories. The committee reviewed each category and made recommended changes.

*Financial Viability*: Options provide financial support for the City's environmental programs; are economically viable for the City of San Diego and are reasonably competitive with future customer alternatives.

- The committee recommended removing the term "customer."
- This criterion is meant to say that options should be economically viable to the City government.

*Technical Viability*: Options are technically sound with a proven track record.

- The committee recommended adding the phrase "at needed volumes." Many technologies have track records but only at lower quantities.
- Options are needed that will work at an appropriate scale. The City cannot invest in experimental alternatives to handle small waste stream volumes. However, the City will not rule out setting up pilot studies in addition to implementing options with proven track records.

*Regional Viability*: Options and/or technologies are viable (legal, compliant with regulations and socially acceptable) in the San Diego region and address local needs.

- For example, Proposition H restricts facilities from burning 500 tons or more waste per day in order to limit increases in toxic air emissions and additional demands on treated water distribution. This regulation will have an impact on how we consider

facilities that would burn over 500 tons per day. Also, ESD only has a few pieces of available real estate, at Miramar and at the collection facility. Regionally viable can mean that the option utilizes currently available resources.

- The committee recommended adding language that reflects that options should consider existing assets, civic structure, geology and climate. Some of these criteria are covered under other screening categories.

*Environmental Viability*: Options have minimal impact to CEQA/NEPA environmental parameters and are environmentally beneficial such as providing green energy, renewable fuels and/or reduced greenhouse gas emissions.

- The committee recommended replacing "and/or" with "and" to say that options can provide any and all environmental benefits.

*Capacity Optimization*: Options reduce disposal demand and extend remaining landfill capacity at Miramar.

- The committee recommended rephrasing this criterion to say the following: "Options minimize disposal demand and optimize remaining landfill capacity at Miramar."
- As a reminder, this study will make both short-term and long-term recommendations.

*Sustainability*: Options reasonably provide for the highest and best use of material generated by the City's residents and businesses.

- The committee recommended removing "reasonably."

## Next Meeting

At the next meeting the project team will bring back the refined criteria based on today's discussion. The committee will then start discussing options and alternatives, based on a starter list developed by the project team and ideas from committee members. Rich Flammer brought copies of the October 2007 issue of BioCycle that includes information about zero waste options. All committee members are encouraged to bring information about other options. The project team will bring experts who can speak to different options.

The next meeting will be held Feb. 20 from 2 to 5 p.m. Please note this meeting will be three hours long instead of the normal two hours. Refreshments will be provided. Future possible meeting dates are April 30 and June 18.

Bryan A. Stirrat & Associates
Civil And Environmental Engineers

# CITY OF SAN DIEGO - LONG-TERM RESOURCE MANAGEMENT OPTIONS (LRMO) STRATEGIC PLAN

http://www.sandiego.gov/environmental-services/geninfo/lwmo.shtml

## RESOURCE MANAGEMENT ADVISORY COMMITTEE (RMAC)

## THIRD MEETING

City of San Diego - Environmental Services Dept., Auditorium
9601 Ridgehaven Court, San Diego CA 92123
Wednesday, February 20, 2008
2:00 to 5:00 P.M.

# AGENDA

I. Welcome/Introductions

II. Refined Screening Criteria – Katz & Associates

III. Zero Waste – Chip Clements/Environmental Services Dept.

IV. Resource Recovery Parks – Clements/BAS

15 minute BREAK 3:30- 3:45 PM

V. Conversion Technologies – Clements

VI. Waste To Energy- Clements

VII. Landfill Optimization Techniques – Bryan A. Stirrat and Associates

VIII. Alternative Disposal Options – BAS

IX. Next Meeting

ESD ENVIRONMENTAL SERVICES DEPARTMENT

**City of San Diego Long-Term Resource Management Options**
**Strategic Plan**
**Resource Management Advisory Committee**
Environmental Services Department Auditorium, 9601 Ridgehaven Court, San Diego, CA 92123
Wednesday, Feb. 20, 2008, 2:00 – 5:00 p.m.

## Meeting Summary

**RMAC Members Present:**
Kristen Byrne, San Diego County Disposal Association
Sylvia Castillo, PE, City of San Diego Environmental Services Department
Chris Cate, San Diego County Taxpayers Association
Andrea Eaton, City of San Diego Council District 7
Bob Epler, City of San Diego Environmental Services Department
Richard Flammer, Integrated Waste Management Community Advisory Committee
Shirley Larson, League of Women Voters San Diego
Ted Schleutker, Department of Navy Southwest Division (alternate for Leslie McLaughlin)
Rochelle Monroe, City of San Diego Environmental Services Department
Alan Pentico, San Diego County Apartment Association
Bill Prinz, Solid Waste Local Enforcement Agency

**Project Team Members:**
Chris Gonaver, City of San Diego Environmental Services Department
Bryan Stirrat, PE, Bryan A. Stirrat and Associates
Christine Arbogast, PE, Bryan A. Stirrat and Associates
Sonia Nasser, PE, Bryan A. Stirrat and Associates
Chip Clements, PE, Clements Environmental
Lewis Michaelson, Katz & Associates
Kelly Thomas, Katz & Associates

**Interested Attendees:**
Tom Blair, City of San Diego Environmental Services Department
Christina Buchanan, City of San Diego, LEA
Stephen Grealy, City of San Diego Environmental Services Department
Brian Henry, City of San Diego Environmental Services Department
Reg Renaud, STI Engineering
Kip Sturdevan, City of San Diego Environmental Services Department
Ann Wheeler, Allied Waste
Lisa Wood, City of San Diego Environmental Services Department

### Welcome/Introduction

Mr. Lewis Michaelson began the meeting at 2 p.m. He welcomed the group and reviewed the agenda for the meeting. The two primary objectives of the meeting were 1) to review the screening criteria the committee discussed at the last meeting and 2) to review a broad range of resource recovery and waste management options that will be considered in the Strategic Plan. Committee members were encouraged to ask questions throughout the presentations.

### Refined Screening Criteria

Mr. Michaelson reviewed the revisions to the screening criteria and advised the committee that the project team had revised the screening criteria based on the committee's recommendations

during the last meeting. A copy of the revised screening criteria was provided in each of the committee members' binders. The refined screening criteria will be used to narrow the list of resource management options to a manageable number of options that will be further analyzed in Phase 2 of the Strategic Plan development.

**Zero Waste Presentation**
Note: a copy of the Power Point presentation was included in each of the committee members' binders, and extra copies were available for the public.

Mr. Chip Clements of Clements Environmental and part of the consultant team provided an overview of zero waste management program features. Mr. Clements began by explaining a fundamental paradigm shift in viewing waste as a resource rather than as waste, which can lead to increased source reduction, recycling, composting and conversion technologies. In this new paradigm, landfills are considered the last step and last resort in resource management. A zero waste approach means a jurisdiction tries to dispose of as little waste as possible. Some jurisdictions, like the City of Los Angeles, have adopted specific goals of diverting 90 percent of waste from landfills.

Implementing a zero waste approach involves both "upstream" (pre-consumption) and "downstream" (post-consumption) strategies. Upstream strategies include more significant, society-level changes such as extending the lifespan of consumer products, reducing product packaging and increasing recycled content in products. Downstream strategies include increasing resource diversion rates, increasing processing capacity at Material Recovery Facilities and implementing conversion technologies to turn waste into fuel.

Mr. Stephen Grealey reviewed which of these strategies the City of San Diego is currently implementing. A handout with the complete list of these initiatives is attached to this meeting summary.

Mr. Clements then presented and explained several types of facilities that are part of the zero waste infrastructure:
- "Safe" centers for household hazardous waste, e-waste and universal waste
- Transfer stations to load waste from collection trucks onto larger vehicles, which transport waste to distant landfills
- Curbside Material Recovery Facilities (MRF), which use magnets, screens and hand sorting by employees to sort recyclables. San Diego has three MRFs.
- Commercial MRFs to recycle commercial waste, especially cardboard
- Construction and demolition processing centers to sort and recycle wood, concrete, green waste and drywall
- Green waste chipping, grinding and composting facilities

Ms. Christine Arbogast, BAS Consultants, reported that a study to determine the feasibility of building a MRF at Miramar Landfill had been conducted. The study found that Miramar would be able to accommodate a material recovery and transfer facility that could process 5,000 tons per day in a 200,000 square foot building. A separate area could also possibly accommodate a conversion technology.

One of the RMAC members asked the following during this presentation:

Q: You stated that there are air pollution considerations with composting. I don't understand why there are issues with windrows that just turn compost into mulch.

Mr. Clements responded that windrows emit volatile organic emissions, carbon dioxide and nitrous oxides as a natural part of the decomposition process. This illustrates the point that no strategy truly has zero emissions. There are ways to trap the emissions, but these increase operating costs.

**Resource Recovery Parks**
Two general types of resource recovery parks exist: large parks to encourage symbiotic relationships among industrial users to reuse and dispose of waste in one area and public service parks where residents drop off and pick up free materials. These are usually located near landfills or transfer stations.

One RMAC member mentioned that Habitat for Humanity manages a store in Mission Valley where contractors donate and buy used construction materials.

**Conversion Technologies**
After reuse and recycling, a residue made of about 70 percent organic material typically remains. Conversion technologies convert this organic material into steam, electricity, compost and/or gas using one of several technologies. Many of these technologies are currently being implemented in Western Europe and Japan, and some facilities are in operation or are being constructed in the United States. Of these technologies, biomass facilities are the most popular in the United States. California has 30 biomass facilities that convert green waste and low-grade papers into electricity.

Several projects involving conversion technologies are going on in California right now:
- City of Los Angeles completed a first phase feasibility study of potential conversion technologies and issued a request for proposals (RFP) to develop its first plant. Interviews are currently being conducted. The City of L.A.'s situation is different from San Diego's because it controls a lot of the waste stream itself, owns the land that will be used for the plant and can sell converted power to its own utilities (L.A. Water and Power).
- County of Los Angeles is focusing on combining conversion technologies with its existing MRF transfer station. Currently, four conversion technology vendors and four MRF operators are competing to construct this facility.
- City of Santa Barbara completed feasibility studies and is issuing an RFP for a conversion technology facility.

Several factors must be considered in siting waste management infrastructure, such as:
- Zoning issues
- Access to roads and freeways
- Distance from sensitive receptors like residences and schools
- Environmental justice concerns
- Service area
- Reducing truck traffic
- Aesthetics
- Environmental impacts
- Overall diversion rate
- Renewable energy potential
- Cost and overall economic benefit

**Waste to Energy**
Whereas conversion technologies use biologic, thermal and other technologies to turn waste into gas that can be burned, waste-to-energy facilities burn waste directly. This technology produces up to 30 percent of the weight of the original waste as ash, which can then be mixed to create concrete. Newer facilities use better pollution controls and can limit the amount of ash waste. Currently the United States has 100 waste-to-energy facilities.

Initially, there was concern in California that waste-to-energy technology would discourage recycling efforts, so diversion credit for waste-to-energy facilities was limited to 10 percent of the 50 percent diversion requirement. The legislature is trying to determine which strategies should count toward diversion rates and is considering changing current legislation in California.

One RMAC member noted the possible value in limiting diversion credit for waste-to-energy facilities, because it is important to prevent these facilities from using resources that could be better used or reused elsewhere in the waste processing stream. Mr. Clements mentioned that the project in Los Angeles includes requirements to remove any materials that could be better processed elsewhere.

One member also mentioned the importance of considering the full cost of certain management strategies by accounting for environmental impacts and the costs of operation and maintenance for the whole life cycle.

**Landfill Optimization Techniques**
Ms. Sonia Nasser presented this portion of the presentation. She mentioned that after reusing, recycling and converting resources, some residual material will need to be disposed. In the new paradigm, landfills are the last step used to dispose of this small residual, and several technologies exist to optimize the space in landfills and extend their lives. San Diego is unique because Miramar Landfill is the first municipal landfill to meet International Standards Organization standards. To meet this goal, the landfill was audited, and an environmental management system was developed to monitor whether operations were running as efficiently as possible.

Miramar Landfill already implements several of the following landfill optimization techniques:
- Compaction, including increasing accuracy of layer thickness, using less soil over landfill material and placing soil stockpiles to compact unused areas
- Alternative daily cover – Miramar uses a tarp fabric over the face of the landfill, which uses less space than a soil cover.
- Leachate recirculation – Leachate is liquid within the landfill that can be recirculated onto the same landfill cell from which it was taken, as opposed to hauling the leachate offsite.
- Steam injection injects steam into the landfill to increase the decomposition rate. A pilot project was conducted at Miramar in 2005-2006 by STI Engineering. The results of the study showed that Miramar landfill material was very dry, which means there is less leachate than needed for steam injection. The study also discovered difficulties in heating liquid to steam because solids in the leachate would clog the injector lines.
- Bioreactor techniques use anaerobic and aerobic digestion techniques to process landfill waste into forms that use less space. A pilot study showed bioreactor techniques could result in settlement rates of up to 25 percent.
- Landfill reclamation recovers material from old areas of landfills, such as soil, aggregate materials, recyclables and organic materials. There is currently a work plan being developed

for a pilot landfill reclamation project at North Miramar. One RMAC member mentioned that the landfill in the former Naval Training Center area near Terminal 2 of San Diego International Airport is being excavated for reclamation purposes.

**Alternative Landfill Disposal Options**
Ms. Arbogast presented this portion of the presentation and began by stating that at the very bottom of the paradigm shift pyramid is finding other landfill sites in and around San Diego County to use once the West Miramar Landfill closes, which it is currently projected to in 2012.

In-county and out-of-county alternatives:

- The most feasible alternative is Sycamore Landfill, owned by Allied Waste. The City has an agreement in place with Allied Waste to take residential waste collected by the City after West Miramar closes. However, city waste only accounts for about one-third of the current waste stream going into West Miramar.
- A landfill facility is proposed for Gregory Canyon in north San Diego County. A landfill on this site is proposed to provide 30 million tons of capacity. This project has been in the permitting stage for over 10 years and is currently trying to obtain a solid waste disposal permit. It is planned to serve north San Diego County but could also take City of San Diego waste if it opens.
- Out-of-county landfills would be considered once all in-county landfill capacity has been exhausted. Imperial County has a few small sites, but the closest is 120 miles away. Riverside County has a closest landfill that is 80 miles away from San Diego that will take imported waste.
- A landfill in Orange County (Prima Deshecha in San Juan Capistrano) currently takes 750 tons of San Diego waste per day; this agreement expires in 2015.

**Rail Haul**
Mr. Bryan Stirrat then discussed the rail haul options that might be available to San Diego. The residual waste remaining after other processing techniques would be loaded onto container trucks at a transfer facility and shipped to a distant landfill. The Mesquite Landfill in Imperial County, owned by the L.A. County Sanitation District, is already permitted for this purpose and would be the largest landfill in the world when it is fully operational. San Diego would need access to an intermodal facility to connect to a nearby rail facility to access this landfill. However, currently, rail capacity from San Diego is limited.

**Next Meeting**
The project team thought it would be beneficial to take a tour of the waste management facilities at and near Miramar Landfill to give the committee a better sense of how those facilities work. This tour is scheduled for March 26, 2008 from 12:30 until 4:30. Lunch and transportation will be provided. Tour attendees should wear close-toed shoes.

The next regular RMAC meeting is scheduled for April 30. Before that meeting, the consultant team will use the screening criteria to develop a preliminary list of options to carry to Phase 2, and the committee will provide feedback on this list at the April meeting.

The meeting was adjourned at 5 p.m.

**Environmental Services Department**
**Zero Waste Efforts Currently Undertaken**
**(independent of Long-Term Resource Management Options Agreement)**

- Council Ordinances / Policies / Administrative Regulations
  - Construction and Demolition recycling ordinance
  - City recycling ordinance for commercial, multi-family and single family sectors
  - Recycled Products Procurement (Council Policy 100-14) – Purchase of recycled content products
  - Sustainable Building (Council Policy 900-14) – LEED Silver Certification for new City facilities and fast track permitting for private LEED projects
  - Energy Efficient Products Policy (Council Policy 900-18) – Purchase of Energy Star equipment
  - Energy Conservation and Management (Council Policy 900-02) – Adherence to energy conservation guidelines
  - Environmentally Preferable Purchasing Policy (EP3) –Administrative Regulation

- On-going effort to expand organics diversion
  - Effort with commercial sector to maintain food waste composting and partner in zero waste events
  - Effort to double size of Miramar Greenery composting facility and upgrade permit
  - Foodwaste partnership with SeaWorld, Petco Park, SDSU, PLNU, Del Mar Fair
  - Backyard Composting Bin Events
  - Compost Bin Demonstration Gardens in partnership with Zoo, Wild Animal Park, and SeaWorld, and own site at Ridgehaven Green Building
  - Backyard Composting workshops and informational booths at community events
  - Vermicomposting in schools partnership with Solana Center (siting vermicomposting bins in schools)
  - Master Composter training
  - Christmas tree recycling
  - Bagged compost sales

- Outreach and Education:
  - Waste reduction guide
  - Unwanted mail reduction
  - Holiday Waste Reduction
  - Recycle Or Else
  - Other educational initiatives such as environmental workshops, tours, etc.
  - Commercial & multi-family technical assistance and annual award recognition for top waste reducers
  - Commercial & multi-family waste audits
  - Zero Waste Earth Day Event in Balboa Park
  - Support of Zero Waste at San Diego County Fair and Del Mar Fairgrounds
  - Ridgehaven Green Building/Xeriscape Demonstration Project

- Legislative Initiatives we actively supported at state level:
  - Curbside recycling funding
  - E-waste
  - Clopyralid
  - Other initiatives

1/16/2008 – S. GREALY

- Non-Profit/charity oversight – to encourage reuse, allow charities free disposal of residue, but must have at least 50% diversion
- Economic Incentive of $18-$19 per ton for source-separated recycling
- Resource Recovery at Miramar Landfill
  - Partnership with Goodwill adjacent to recycling center
  - Salvage operation (currently in operation)
  - CEQA review for C&D facility and other future resource recovery facilities currently underway

Bryan A. Stirrat & Associates
Civil And Environmental Engineers

**CITY OF SAN DIEGO - LONG-TERM RESOURCE MANAGEMENT OPTIONS (LRMO) STRATEGIC PLAN**
http://www.sandiego.gov/environmental-services/geninfo/lwmo.shtml

**RESOURCE MANAGEMENT ADVISORY COMMITTEE (RMAC)**
**SOLID WASTE FACILITIES TOUR**

Tour Meeting Point: City of San Diego - Environmental Services Dept., Auditorium
9601 Ridgehaven Court, San Diego CA 92123

Wednesday, March 26, 2008
Bus Departs at 12:45 PM and Returns at 4:30 P.M (Lunch on the bus)

REMINDER: Please wear closed toe shoes that are comfortable for light walking
Hat and sunscreen recommended.

## AGENDA

| | | |
|---|---|---|
| I. | Board tour bus | 12:30 PM |
| II. | Leave for tour* | 12:45 PM |
| III. | Allan Company, Material Recovery Facility tour | 1:15PM |
| IV. | Miramar Landfill Tour | 2:10 PM |
| | (Includes Household Hazardous Waste Center, Recycling Center, | |
| | Miramar Greenery, Nursery, Landfill operations, MBC Co-Gen Facility) | |
| V. | Return to Environmental Services Department | 4:15 PM |

**Contact Person: Sylvia Castillo (858) 518-7837 (cell)**

*The bus will leave promptly at 12:45 PM.
---Anyone arriving after this time will not be able to participate in the tour–

ESD ENVIRONMENTAL SERVICES DEPARTMENT

Bryan A. Stirrat & Associates
Civil And Environmental Engineers

# CITY OF SAN DIEGO - LONG-TERM RESOURCE MANAGEMENT OPTIONS (LRMO) STRATEGIC PLAN

http://www.sandiego.gov/environmental-services/geninfo/lwmo.shtml

## RESOURCE MANAGEMENT ADVISORY COMMITTEE (RMAC)

## FOURTH MEETING

City of San Diego - Environmental Services Dept., Auditorium
9601 Ridgehaven Court, San Diego CA 92123

Wednesday, April 30, 2008
2:30 to 5:00 P.M.

# AGENDA

I. Welcome/Introductions/Approval of Feb. 20, 2008 Meeting Summary

II. Recap of Solid Waste Facilities Tour – March 26, 2008

III. Review Screening Criteria Matrix for Resource Management Options

IV. Next Meeting (tentative June 18, 2008)

ENVIRONMENTAL SERVICES DEPARTMENT

**City of San Diego Long-Term Resource Management Options (LRMO)**
**Strategic Plan**
**Resource Management Advisory Committee**
Environmental Services Department Auditorium, 9601 Ridgehaven Court, San Diego, CA 92123
Wednesday, Apr. 30, 2008, 2:30 – 5:00 p.m.

# Meeting Summary

**RMAC Members Present:**
Kristen Byrne, San Diego County Disposal Association
Sylvia Castillo, PE, City of San Diego Environmental Services Department
Andrea Eaton, City of San Diego Council District 7
Bob Epler, City of San Diego Environmental Services Department
Richard Flammer, Integrated Waste Management Citizens Advisory Committee
Lynn France, Integrated Waste Management Technical Advisory Committee
Shirley Larson, League of Women Voters San Diego
Alan Pentico, San Diego County Apartment Association
Bill Prinz, Solid Waste Local Enforcement Agency

**Project Team Members:**
Bryan Stirrat, PE, Bryan A. Stirrat and Associates
Bob Hilton, HF&H Consultants
Christine Arbogast, PE, Bryan A. Stirrat and Associates
Sonia Nasser, PE, Bryan A. Stirrat and Associates
Chip Clements, PE, Clements Environmental
Lewis Michaelson, Katz & Associates
Kelly Thomas, Katz & Associates

**Interested Attendees:**
Christina Buchanan, Solid Waste Local Enforcement Agency
Robert Cattolica, UCSD Mechanical Aerospace Engineering Department
Bud Chase, Allied Waste
Richard Chase, GCC
Stephen Grealy, City of San Diego Environmental Services Department
Rex Motes, UCSD Rady School of Management
Robert Peguk, UCSD Rady School of Management
Bob Wallace, WIH Resource Group
Lisa Wood, City of San Diego Environmental Services Department

## Welcome/Introductions/Approval of Feb. 20, 2008 Meeting Summary

The committee approved the meeting summary from Feb. 20, 2008.

## Recap of Solid Waste Facilities Tour

The tour on March 26 covered the Allan Company Material Recovery Facility, the Miramar Nursery, Miramar Greenery and the Miramar Landfill. The committee members who attended the tour provided feedback on what they saw during the tour. One member said she was impressed by how proud the employees were of their work. Tour attendees were also impressed by the City's programs to keep birds away from the landfill.

**Environmental Services Department Updates**

Mr. Stephen Grealy gave an update on current department initiatives. First, the department will present a proposal to the City Council in July to modify the department's Park and Recreation recycling program, which has been in effect since 1992 to provide recycling drop off for people who are not served by the curbside recycling program. Currently, the department collects recyclables from bins in City parks and uses money from the recycled products to sponsor park and recreation programs. The department will propose hiring a private firm to pick up the recyclables from the large bins in the parking lots and installing many smaller recycling receptacles in public spaces. The department's proposed project will provide a better nexus between park and recreation activities and recycling, decrease the frequency with which the containers must be emptied and deter scavenging of recyclable material. The department plans to initiate pilot programs late this summer at Mission Trails Regional Park.

Another pilot program will begin this fall to test the effectiveness of public disposal bins that include a separate bin on top for recyclables, as is already done in Solana Beach.

Finally, the department is conducting a study of possible markets for certain kinds of organic and yard waste products as part of its plan to expand the Miramar Greenery.

**Review Screening Criteria Matrix for Resource Management Options**

Mr. Lewis Michaelson explained that the purpose of today's meeting is to review a list of 91 options that the consultant team evaluated based on the criteria the committee developed. Each option was ranked 1 (low), 3 (medium) or 5 (high); for each screening criterion. As a reminder, the final product of this process will be a long-term strategic plan with a planning horizon of 2030. The best strategies in the plan will maximize the remaining capacity at Miramar Landfill and manage waste produced in the City of San Diego once the landfill closes.

The options were split into six categories. The option categories were Zero Waste Programs, Zero Waste Infrastructure, Conversion Technologies, Waste to Energy, Landfill Optimization and Alternative Disposal Options. The lead team member for each set of options provided the committee a brief overview of how options were evaluated and ranked. Lewis then solicited committee input on whether the options were ranked logically and fairly. During Phase 2 of this process, the consultant team will further analyze a subset of options. The team and Environmental Services Department staff cautioned that, while some options may be ranked low relative to other options, political, economic or social circumstances may change, resulting in a possible increase in the feasibility of these lower-ranked options in the future. The report for Phase 1 will include the rationale behind all rankings, including explanations of why options were eliminated.

RMAC members asked questions and made comments on each category.

*Alternative Landfill Disposal Options – Christine Arbogast*

The options in this category included a review of 25 potential landfills where refuse could potentially be taken; 17 landfills in San Diego County and eight in adjacent counties (Orange, Riverside and Imperial). Several of the in-county landfills were eliminated because they are operated by the military and do not accept non-military waste; others were too remote or too

small (daily tonnage capacity or limited site capacity) to provide the needed disposal capacity for the City.

Some of the out-of-county sites were eliminated because they cannot accept out-of-county waste or have limited disposal daily or site capacities. The remaining options were ranked based on disposal fees, transportation fees, transfer station fees, immediate availability of landfill capacity, regional accessibility, traffic and air quality impacts, available daily tonnage, overall sustainability and ability to optimize Miramar Landfill capacity, either by actually increasing capacity at Miramar or by disposing waste at a different landfill.

Of the in-county options, the Miramar Landfill height increase rated best overall because it is located at the current landfill site and would provide four to five years of additional capacity. Sycamore Landfill (without the proposed capacity expansion) ranked similarly because it is located in San Diego and the City already has an agreement in place with Allied Waste to take the City's residential waste.

Out-of-county options ranked lower overall because of higher transportation costs and lower available tonnage. The rail haul option to the Mesquite Landfill ranked similarly to some out-of-county options because of the transportation distance and the lack of rail infrastructure connectivity to the City of San Diego. .

Q: What fuel price was used in this analysis?
A: Analysis on that level of detail will be conducted in Phase 2.

Q: Do landfills in Mexico provide any options?
A: Mexican landfills are not options because it is illegal to export waste over international borders.

*Landfill Optimization Techniques – Sonia Nasser*
The options in this category maximize the remaining space at the existing Miramar Landfill and include soil compaction, alternative daily cover, landfill reclamation, leachate recirculation, bioreactor techniques and steam injection.

The City is currently implementing compaction and alternative daily cover techniques. Among options the City is not currently implementing, landfill reclamation of North Miramar Landfill ranked relatively high.

Q: How does Miramar Landfill's compaction rates compare with private landfills?
A: Compaction rates are comparable because the City follows the same industry standards and uses the same equipment as private landfill operators.

Q: Is anything being done elsewhere that the City is not already doing?
A: Bioreactor techniques would make a big difference because the landfill waste would decompose as it sits in the landfill and produce gas that can be used to produce energy. However, because refuse requires a long time to decompose, it would be about 10 years before a noticeable site capacity gain could be seen from implementing a bioreactor. The City investigated the possibility of retrofitting the active section of West Miramar as a bioreactor site.

Bioreactors require a double liner at the bottom of the landfill and an interrupted path for moisture to seep through soil layers. West Miramar is not a feasible site because it only has a single liner and would require significant permitting and design challenges for an existing landfill site. The bioreactor option is a good example of an option that is not very feasible on its own but could be feasible if the inactive North Miramar is reclaimed.

Q: Last meeting you said the pilot study for steam injection showed this technique would not work because the waste is too dry and the City does not have enough leachate to apply to the landfill. Would you be able to do use reclaimed water instead of leachate?
A: Use of reclaimed water needs to be approved by the San Diego Regional Water Quality Control Board, and not enough reclaimed water is available to supply a steam injection project. Steam injection would also require significant new infrastructure. Currently Miramar's compaction is doing well. The goal of steam injection is to further compact the waste. It is reported that the compaction rates at West Miramar have improved over time. The City leases all of its landfill operation equipment and can upgrade to the most up-to-date equipment on a regular basis..

Comment: Alternative Daily Cover-Computer Aided Earth Moving System (Option #4) should be ranked higher for financial viability because the heavy equipment is leased, lowering the City's capital and maintenance expenditures. We can assume that the computer-aided units would be leased as well, which would be covered as an operating cost, not a capital investment. Why is regional viability low?
A: Regional viability is lower because of the incremental gain in compaction that the computer-aided system would provide. However, we will take another look at this option based on the assumption that the City leases all of its heavy equipment. We will also look at compaction results at landfills that use this technique to determine what would be possible at Miramar.

*Waste to Energy – Chip Clements*
Only one option is included in this category: a traditional waste to energy facility that could process 500 tons per day. While this option is technically viable, it ranked relatively low overall because the lack of social acceptance for this option would make it difficult to permit. This is another example of an option that could become more feasible if social attitudes change. One hypothetical option could be to site a plant at Miramar Landfill, located on federal land, to supply energy to Marine Corps Air Station Miramar.

Ms. Lisa Wood mentioned that as reduction of greenhouse gases gains attention from elected officials, such as California's governor, waste to energy plants may become more acceptable. She said the EPA has ranked waste to energy plants as preferable to landfills in terms of reducing greenhouse gas emissions.

Comment: If the full life cycles of products are taken into account, waste to energy plants would not rank as highly.

*Conversion Technologies – Chip Clements*
This category includes gasification and pyrolysis, anaerobic digestion, hydrolysis (creating ethanol from products in the waste stream), mechanical processing, chemical processing and

composting. Gasification/pyrolysis and anaerobic digestion scored the highest in this category because they are the most proven technologies. Gasification/pyrolysis provides the greatest diversion rates, produces energy and is moderately expensive. Anaerobic digestion ranked slightly lower on regional viability because the final material must be composted. This ranking could increase depending on future markets for compost waste. The remaining options ranked lower because the technologies are not proven.

Comment: Anaerobic digestion should be ranked higher on regional viability. It produces fewer emissions.

A: It probably should be rated similarly to gasification. The difference is that digestion produces material that needs to be disposed, and there is sometimes an issue with controlling odors, but both techniques have side effects. If a market opens for the residual material, digestion would become a preferred option. Both gasification and digestion will go forward to Phase 2.

*Zero Waste Infrastructure – Chip Clements*
This category includes household hazardous waste collection centers, material recovery facilities, green waste facilities, construction and demolition facilities, transfer facilities and resource recovery parks. Household hazardous waste centers and material recovery facilities rated highest. The City is already implementing or has piloted household hazardous waste and curbside material recovery facilities and is working to expand its green waste center. Green waste centers scored lower under regional viability because it is difficult to permit composting facilities. Siting a construction and demolition processing center or transfer facility is also difficult but can be appropriate at certain sites.

Comment: This chart ranks financial viability for most of the options at a 3 because the City would be less able to fund such facilities. However, a private developer could fund these facilities, which would be beneficial to the overall system. The City's finances could also change in the future and make these options more viable.

Comment: Construction/demolition and transfer facilities should be rated 3 under regional viability. There is good capacity for construction/demolition waste right now, and we can expect that to continue over the next five years.

Comment: There is stakeholder support for resource recovery parks. The audience for the report will want to see that analysis.

Question: What model are you using to rank resource recovery parks and transfer facilities? I would expect capacity optimization, environmental viability and regional viability to be high.
A: A lot of the materials that would go to those facilities are already being recycled. The main purpose of a resource recovery park is the ability to site recycling and recovery businesses near or with compatible manufacturers that would need their recycling and recovery services. One business' discards could be another business' raw product and reused in some fashion in another manufacturing process This would increase efficiency, but it would not necessarily increase the amount of material being recycled. It could provide an incremental increase. Also,

manufacturers typically decide to site their facilities in certain places for several reasons, and currently, siting a facility near other facilities that could recycle their waste materials is not a strong factor for choosing a certain location.

Comment: Green Waste Facilities (Option #4) could score higher under regional viability if Sycamore Landfill installs a compost facility, as is described in its Environmental Impact Report.

*Zero Waste Programs – Chip Clements*
This category includes a long list of programs that were more difficult to score because their feasibility is dependent on policies being adopted but not necessarily regulated. Overall, each program on its own would result in low capacity optimization; however, individually and together many of them have high value in the other categories of regional, financial, technical and environmental viability. The City already implements many of the programs on the list.

Q: Given the recent legal challenges to the plastic bag ban in San Francisco, should we rank this option lower for regional viability?
A: The plastic bag ban is ultimately driven by an effort to reduce bag litter. Bans like these, or at least incentives to limit one-time-use bags are probably here to stay. Right now a task force is working to compromise on recovering the plastic bags instead of banning them outright. The City of San Diego considered picking up plastic bags in the curbside recycling program, but the market for the bags is not strong right now. In addition, the City and other stakeholders are supporting State Bill 2058, which would require retail stores to charge for plastic bags after 2012. While regional viability may be low today, it could be higher over the longer term.

Comment: San Diego needs to get on board supporting extended producer responsibility and stewardship activities. It will take all the regional jurisdictions working together to fight the industry lobbyists and support producer responsibility legislation. Brochures from the California Product Stewardship Council have more information. Extended producer responsibility strategies also include passing local ordinances and resolutions that support responsible purchasing policies. This language should be included with this option.

Comment: The option to increase waste hauling fees to fund recycling programs would cause concern within the hauling industry. Because the City's People's Ordinance prohibits charging residents for waste collection, the burden of paying the higher fees would fall on residents in apartments and businesses that must pay for trash pickup.

Comment: The option to increase waste hauling fees to fund recycling indicates a change in the waste management paradigm. Initially and currently, the system has been financed to assume all waste will be disposed, so recycling programs are free. As we move toward recycling more waste, we will need to figure out how these processes will pay for themselves. Some jurisdictions are moving towards charging for recycling service. For example, the Bakersfield area charges $48 per month for recycling and has little participation. However, Kern County includes fees for recycling in the trash pickup fee and has a lot of participation.

Comment: Food scraps constitute a substantial portion of the waste stream. We throw away about 40% of the groceries we buy. When the infrastructure is in place it is easy to incorporate

processing food scraps and green waste. San Fernando implemented this, and it didn't cost any more or increase transportation costs. They collect weekly. Seattle collects food waste bi-weekly. In addition, outreach programs can help restaurants waste less food, and extra support for food banks can help.

Comment: I would suggest removing the option to renovate functional buildings. Building renovations are handled by the Development Services Department, not Environmental Services.

Comment: The City passed an ordinance for Multi-family Curbside Recycling (Option #6, page 3), so it should be highlighted in green.

Q: What does it mean to Use Reusable Shipping Containers (Option #12, page 1)?
A: As the City refines its procurement practices, it could stipulate that vendors have to report how much of their product is green, including shipping in reusable containers whenever possible.

Comment: Some of these programs are good ideas, such as the education programs, but seem to be on a different scale as other options in terms of capacity optimization. Perhaps the education programs can be rolled into one category. In the report, the really "big ticket" categories can be discussed broadly and include a few examples.

Comment: Support Landfill Surcharges (Option #11, page 3) should be removed. All options will need to be financed in some way, so this does not really count as an option for this plan.

Q: The Master Gardeners have a huge school garden program, and the same schools could use the compost in their gardens. How does the Composting at Schools Program (Option #2, page 5) work?
A: The City has a contract with Solana Center to train master composters and put worm bins in schools so the compost can be used at the gardens. The program is not easy to implement because the worm beds need a lot of maintenance.

**Public Comment**
Bob Cattolica, UCSD Aerospace Engineering Professor –
I agree with the committee's ranking of gasification/pyrolysis and digestion. Digestion is more suitable for processing food waste, whereas thermal and gasification techniques are better for urban green waste trimmings. Right now I'm working on building a facility to process five tons of biomass per day into mixed alcohols that can be used to produce energy. The system was built and tested based on a Japanese design for a 150 ton per day facility. Another facility at UC Davis digests food waste. We're working on new technologies at small scales. Last week a 6,000 ton per day biomass-to-liquid facility opened in Germany; it cost $400 million to construct and can make 100 million gallons of diesel. Our project at UCSD is now at the pilot level but could rapidly be expanded to process 150 tons per day, which translates to a three megawatt power plant or three million gallons of fuel.

Q: What is the residual waste from this process?
A: The processed wood waste produces five percent of its original volume in ash. Our test

facility is located next to a concrete manufacturing plant that is using our residual to make concrete.

Comment: SDG&E's proposed Sunrise Powerlink project is talking about using alternative energy systems. Maybe we should look at that project as a way to get biomass into the system.

**Next Meeting**
The next RMAC meeting is scheduled for June 18. At this meeting the committee will help City staff identify options to recommend for further analysis in Phase 2; this will wrap up Phase 1 of the process. Recommended options will be presented to the City Council for approval at either the July or September meeting. Council is in recess during the month of August.

Bryan A. Stirrat & Associates
Civil And Environmental Engineers

# CITY OF SAN DIEGO - LONG-TERM RESOURCE MANAGEMENT OPTIONS (LRMO) STRATEGIC PLAN

http://www.sandiego.gov/environmental-services/geninfo/lrmo.html

## RESOURCE MANAGEMENT ADVISORY COMMITTEE (RMAC)

## FIFTH MEETING

City of San Diego - Environmental Services Dept., Auditorium
9601 Ridgehaven Court, San Diego CA 92123
Wednesday, June 18, 2008
3:00 to 5:00 PM

# AGENDA

I. Welcome/Introductions/Approval of April 30, 2008 Meeting Summary

II. ESD Programs

   a. Environmentally Preferable Purchasing Program ($EP^3$)

   b. Changes to Park & Recreation Recycling Programs

III. Final Review of Phase I Options

IV. Phase I Report & Schedule

V. Phase II Initiation

VI. Phase II RMAC Committee Participation

VII. Adjourn

ESD ENVIRONMENTAL SERVICES DEPARTMENT

**City of San Diego Long-Term Resource Management Options (LRMO)**
**Strategic Plan**
**Resource Management Advisory Committee (RMAC)**
Environmental Services Department Auditorium, 9601 Ridgehaven Court, San Diego, CA 92123
Wednesday, June 18, 2008, 3:00 – 5:00 p.m.

## Meeting Summary

**RMAC Members Present:**
Christina Buchanan (alternate for Bill Prinz), Solid Waste Local Enforcement Agency
Sylvia Castillo, PE, City of San Diego Environmental Services Department
Bob Epler, City of San Diego Environmental Services Department
Richard Flammer, Integrated Waste Management Citizens Advisory Committee
Beryl Flom (alternate for Shirley Larson), League of Women Voters of San Diego
Lynn France, Integrated Waste Management Technical Advisory Committee
Brian Henry (alternate for Rochelle Monroe), City of San Diego Environmental Services Department
Mike McDade (alternate for Kristen Byrne), San Diego County Disposal Association
Alan Pentico, San Diego County Apartment Association

**Project Team Members:**
Chris Gonaver, City of San Diego Environmental Services Department
Stephen Grealy, City of San Diego Environmental Services Department
Bryan Stirrat, PE, Bryan A. Stirrat and Associates
Bob Hilton, HF&H Consultants
Christine Arbogast, PE, Bryan A. Stirrat and Associates
Sonia Nasser, PE, Bryan A. Stirrat and Associates
Chip Clements, PE, Clements Environmental
Lewis Michaelson, Katz & Associates
Kelly Thomas, Katz & Associates

**Interested Attendees:**
Lawrence Chapman, Tayman
Bud Chase, Allied Waste
Donna Chralowicz, City of San Diego Environmental Services Department
Matthew Cleary, City of San Diego Environmental Services Department
Stephen Heverly, City of San Diego Environmental Services Department
Gabriel Jebb, Adaptive ARC
Gregg King, Debris Box
Jim Lehman, Allied Waste
Sam Merrill, City of San Diego Environmental Services Department
Jason Rush, WARF Disposal
Steve South, EDCO
Bob Wallace, WIH Resource Group
David Wells, City of San Diego Environmental Services Department
Lisa Wood, City of San Diego Environmental Services Department

**Welcome/Introductions/Approval of April 30, 2008 Meeting Summary**
The committee celebrated the successful conclusion of Phase 1 of the RMAC's participation in the Long-Term Resource Management Options Strategic Plan. The committee's input has been extremely helpful and valuable and has shaped the approach for moving into Phase II. At today's meeting the committee reviewed the options that will be analyzed in more detail in Phase II and discussed the schedule of next steps.

**ESD Programs**
Mr. Stephen Grealy provided an update on two current ESD programs.

*Environmentally Preferable Purchasing Program ($EP^3$)*
The Environmentally Preferable Purchasing Program ($EP^3$) is a fairly new policy that the Mayor approved in April 2007 and is preparing to formally initiate city-wide. This program encourages all City departments to investigate the environmental impacts of City-purchased products and determine the best ways to incorporate environmentally preferred purchasing into their own programs.

For example, the Park and Recreation Department was using many different chemicals for cleaning facilities, and these chemicals were often being mixed incorrectly. The department limited the number of cleaning chemicals it purchased, which made staff training easier and was environmentally preferred. Also, the City is beginning to purchase smaller pickup trucks for City business unless a larger truck is necessary. Finally, the City already purchases many products made with recycled content, such as street and traffic signs, reprocessed paint, re-refined oil, park benches and park equipment, with no increase in product price.

It is estimated that the City saved at least $8 million in 2007 through the $EP^3$ efforts that were undertaken by select City departments.

*Changes to Park & Recreation Recycling Programs*
In 1992, the ESD initiated a Park and Recreation recycling program to provide recycling opportunities for those not served by the City's blue bin program. Under this program, dumpsters were placed at 45 parks and 10 to 12 other City facilities. This program is no longer cost-effective. Therefore, ESD staff will initiate two pilot programs for recycling at Mission Trails Regional Park and Mission Beach. The recycling containers at Mission Trails will look like regular garbage bins but will extend eight feet underground, which will allow for bi-weekly collection and limit scavenging. The containers at Mission Beach will look like normal trash cans but will have a separate container on top for recyclables. If these pilot programs are successful, ESD will expand the use of these containers to other locations.

**Final Review of Phase I Options**
The committee started earlier in Phase I with a long list of possible options for resource management and prioritized this list of options for deeper analysis in Phase II. Through a series of committee meetings and further analysis, the committee and project team refined the initial list of options, consolidating some and eliminating or adding others. Based on committee

feedback, some of the options were also re-ranked in terms of the screening criteria. This refined list was brought to the committee for one last review before deciding which ones would be carried forward for more in-depth evaluation in Phase II.

The committee concurred with the revised list and then discussed how the screening criteria and relative rankings would be used to produce a “short list” of the top-ranking options in each category. This discussion led to a recommendation to carry forward 39 options that will be analyzed in more detail in Phase II, with two important caveats. First, the screening criteria rankings will not influence the options’ evaluation in the second phase; that is, all Phase II options will be evaluated on an equal footing going forward. Second, the team will continue to monitor options that were not carried into Phase II because they were deemed infeasible for the foreseeable future. These options will be monitored for changes in external conditions or the technology/policy itself that may make them more feasible in the future. For example, if the proposed Gregory Canyon Landfill is permitted, it would become a more viable option.

The committee discussed the options of addressing zoning issues for resource management facilities (e.g., composting facilities) individually or taking a more proactive approach of encouraging comprehensive land use modifications before specific projects are proposed. Some committee members felt that changing zoning to allow for siting these kinds of facilities in the county presents a major barrier to expanding resource management options and encouraged the City to be proactive in opening up certain parcels to these land uses. Other members felt that siting/zoning issues should be addressed for each specific project rather than rezoning the whole county. The committee agreed not to include a separate option for comprehensive rezoning at this time because it would not necessarily prevent any particular facility from being studied in more depth in Phase II.

The committee also agreed to study the option of collecting food waste from residences as well as commercial uses in Phase II. The ESD is currently analyzing the feasibility of modifying the Miramar Greenery to collect green waste and food waste together. This option is highly dependent on the feasibility of collecting green waste weekly, which would allow residents to include food waste with green waste, as opposed to the current bi-weekly collection. If the study finds that it is feasible to collect green waste every week, then collecting food waste from residences could be a more feasible option.

**Phase I Report and Schedule**

The Phase 1 report will include an overview of the RMAC process, current solid waste regulations and policies, current and future resource management needs, current financial programs, screening criteria and options, and recommendations for different timelines. The team estimated that the Phase 1 report would be ready in August 2008, after which the report will be presented to the City’s Natural Resource and Culture Committee and then to the full City Council. RMAC members will receive an electronic version of the report and an invitation to attend the presentations.

**Phase II Initiation and RMAC Committee Participation**

The team assumes that all RMAC members will be able to continue their participation in Phase II. RMAC members are encouraged to notify the project team as soon as possible if they are unable to continue participation. The team anticipates that the RMAC will meet for five meetings starting in December 2008. Details on meeting dates and times will be e-mailed.

**Public Comment**

A guest asked if the public would be able to access copies of the Phase I report. Mr. Chris Gonaver of ESD answered that once the item is docketed for the Natural Resource and Culture Committee, the report will be available to the public and will be posted to the LRMO Strategic Plan Web site.

**CITY OF SAN DIEGO LONG-TERM RESOURCE MANAGEMENT OPTIONS STRATEGIC PLAN**

**COMPOSITE SCORING OF ALL OPTIONS**
**June 18, 2008**

| NO. | CODE | OPTION DESCRIPTION | Screening Score |
|---|---|---|---|
| | | **ZERO WASTE PROGRAMS AND POLICY OPTIONS** | |
| 1 | ZW-SR-2 | Implement rigid plastic recycling at curbside | 4.33 |
| 2 | ZW-SR-3 | Ban single use polystyrene food containers | 4.33 |
| 3 | ZW-SR-9 | Extended Producer/Manufacturer Responsibility | 4.33 |
| 4 | ZW-RU-3 | Recycle plastic bags using blue bins | 4.00 |
| 5 | ZW-RY-2 | Establish future "MRF First" - Require MSW to be processed through a MRF if available | 4.00 |
| 6 | ZW-OD-1 | Increase greenwaste pickup from bi-weekly to weekly | 4.00 |
| 7 | ZW-OD-2 | Create a cost incentive for business participation in a food disgards program as markets become available | 3.67 |
| 8 | ZW-OD-4 | Establish restaurant foodwaste collection and composting requirements as markets become available | 3.67 |
| 9 | ZW-SR-5 | Provide business tax credits/incentives for certified Green Businesses | 3.33 |
| 10 | ZW-SR-7 | City Procurement Policy - Return usable shipping containers | 3.33 |
| 11 | ZW-RY-7 | Establish on-call bulky item pick-up for single, multi-family and businesses | 3.33 |
| 12 | ZW-ED-1 | Develop/promote e-newsletters to schools | 3.33 |
| 13 | ZW-ED-2 | Educate Restaurants about source reduction | 3.33 |
| 14 | ZW-ED-5 | Establish Re-Create Art Contest and Exhibition for youth | 3.33 |
| 15 | ZW-RY-4 | Coordinate large retailer drop-off locations for specific wastes | 3.00 |
| 16 | ZW-RU-5 | Encourage rebate incentives for marginally economic materials (e.g., carpet recycling leasing)^ | 2.67 |
| 17 | ZW-RY-9 | Modify Zoning Code to allow Zero Waste infrastructure (MRFs, Transfer Stations, Convenience Centers)^ | 2.67 |
| 18 | ZW-SR-4 | Ban plastic bags in stores with over $1 million revenue/year^ | 2.33 |
| 19 | ZW-SR-8 | Require businesses to take back non-recyclable packaging^ | 2.33 |
| 20 | ZW-OD-9 | Allow inclusion of certain residential foodwaste in the green can (bi-weekly)^ | 2.00 |
| | | | |
| | | **INFRASTRUCTURE OPTIONS** | |
| 1 | ZWI-1 | Household Hazardous Waste Collection Center* | 4.67 |
| 2 | ZWI-2 | Material Recovery Facilities - Curbside* | 4.67 |
| 3 | LO1 | Compaction* | 4.67 |
| 4 | LO2 | Alternative Daily Cover - Tarpomatic* | 4.33 |
| 5 | DIN1 | Miramar Height Increase (0 miles) | 4.33 |
| 6 | DIN2 | Sycamore Landfill (8 miles) | 4.33 |
| 7 | ZWI-4 | Greenwaste Facilities* | 4.00 |
| 8 | ZWI-5 | Construction & Demolition Facilities | 4.00 |
| 9 | CT1 | Gasification & Pyrolysis | 4.00 |
| 10 | LO3 | Landfill Reclamation of North Miramar | 4.00 |
| 11 | DIN3 | Otay Landfill (20 miles) | 4.00 |
| 12 | ZWI-3 | Material Recovery Facilities - Commercial | 3.67 |
| 13 | ZWI-6 | Transfer Facilities** | 3.67 |
| 14 | ZWI-7 | Resource Recovery Parks (RRP)- Industrial | 3.67 |
| 15 | ZWI-8 | Resource Recovery Parks - Community (Convenience drop-off) | 3.67 |
| 16 | CT2 | Anaerobic Digestion | 3.67 |
| 17 | LO4 | Alternative Daily Cover-Computer Aided Earth Moving System | 3.67 |
| 18 | DOUT1 | El Sobrante Landfill (82 miles) | 3.67 |
| 19 | CT3 | Hydrolysis | 3.33 |
| 20 | CT4 | Mechanical Processing (Autoclave) | 3.33 |
| 21 | CT5 | Chemical Processing (Depolymerization) | 3.00 |
| 22 | WTE1 | 500-tpd Mass-Burn Municipal Waste Combustor | 3.00 |
| 23 | DOUT2 | Prima Deshecha Landfill (62 miles) | 3.00 |
| 24 | DOUT3 | Frank R Bowerman Landfill (78 miles) | 3.00 |
| 25 | CT6 | MSW Composting^ | 2.67 |
| 26 | DIN4 | Gregory Canyon Landfill (41 mil)^ | 2.67 |
| 27 | LO5 | Leachate Recirculation^ | 2.33 |
| 28 | LO6 | Bio-Cell - Bioreactor^ | 2.00 |
| 29 | DOUT4 | Olinda Alpha Landfill (90 miles)^ | 2.00 |
| 30 | DOUT6 | Rail Haul - Mesquite Regional Landfill (142 miles)^ | 1.67 |
| 31 | LO7 | Steam Injection* | 1.33 |
| 32 | DOUT5 | Allied Imperial Landfill (124 miles)^ | 1.00 |

^ Options will not be analyzed in Phase II but will be monitored for changes that could increase their viability in the future

*Program City is already implementing or has piloted