UPPER VALLEY DISPOSAL

Analysis of Alternative Disposal Fees

First DRAFT Report

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PURPOSE AND OVERVIEW OF THE STUDY

Executive Summary

History – In 2005, Upper Valley Disposal (UVD) prepared an analysis addressing two questions: what was a reasonable fair-market value of the land used for the Clover Flat Landfill (CFL) operations, and what would be the cost impacts on UVD customers if UVD had to deliver waste to disposal facilities other than the CFL site? This second question included the impact on both direct-haul (collection vehicles delivering waste directly to an alternate disposal facility) and transfer-haul operations (which would require constructing a new transfer station at CFL). The purpose of the 2005 analysis was to assist with contract related discussions between UVD and the Upper Valley Waste Management Agency (UVWMA).

For similar reasons, UVD now wants to update this analysis, but only consider the second question: what would be the cost impacts on UVD customers if UVD had to deliver waste to disposal facilities other than the CFL site? NBS has updated that analysis, with revisions to key assumptions and costs, along with reviewing the methodology to ensure it is still a reasonable means of estimating of these impacts.

Results – Briefly, the results indicate that constructing a transfer station at the CFL site and transfer-hauling waste to another disposal facility is not cost effective. The direct-haul alternative would also be costlier, although it may be cheaper for some specific areas; unfortunately, UVD must either use a direct-haul system for its operations, a transfer station, or continue current operations. This means UVD must serve all areas; selectively picking the few areas where direct-haul is cheaper is not an option. Regarding UVD customers who self-haul their waste to CFL, their travel distances to other disposal facilities are significantly longer, although tipping fees are lower at competing landfills and transfer stations.

In this analysis, NBS used a range of potential costs (such as fuel costs, travel time, and equipment costs) to estimate the cost impacts. In short, the results show the following:

- **Transfer-Haul** – The costs for the best case scenario (which is lower-cost range for transfer-haul from CFL to Potrero Hills) was 47 percent higher than the base-case (CFL's current system), while the worst case scenario (higher cost range for transfer-haul from CFL to Kiefer Road) was over 220 percent higher than the base-case.
- **Direct-Haul** – The costs for the best case scenario (which is lower cost range for direct-haul from St. Helena to Potrero Hills) was 23 percent lower than the base-case (CFL's current system), while the worst case scenario (direct-haul from CFL to Potrero Hills) was over 90 percent higher than the base-case.
- **Self-Haul** – From the larger customer bases in UVD's service area (such as Calistoga, Yountville, and St. Helena), travel times to the nearest disposal facility (Devlin Road Transfer Station) are more than four times longer than the travel time to CFL. Although tipping fees at alternative disposal facilities are lower, the value of the additional time and cost for longer travel distance do not outweigh the tipping fee savings.

Background and Key Issues

Background – This analysis evaluates the transfer, haul, and disposal costs related to the use of other available disposal facilities other than Clover Flat Landfill. The analysis includes a number of assumptions about tipping fees, equipment costs, fuel prices, and so on, which are documented in the tables presented herein.

Key Issues Addressed – The financial reviewed includes:

- **Transfer Station Alternative** – The cost impacts of CFL building a transfer station to transfer haul franchise-handled wastes to alternate disposal facilities.

- **Direct-Haul Alternative** – The cost impacts of UVD direct hauling franchise-handled wastes to alternate disposal facilities.
- **Self-Haul Alternative** – Cost impacts of UVD customers disposing of their self-haul waste at landfills or transfer stations other than CFL.

The sections below outline the analysis NBS prepared to evaluate the cost impacts resulting from (1) UVD constructing a transfer station and hauling waste to other disposal facilities, (2) UVD direct hauling to those same facilities, and (3) UVD customers self-hauling to alternative disposal facilities.

COST COMPARISON METHODOLOGY

Key Financial Assumptions

Following are the key assumptions used in the analysis of alternative disposal facilities, either via a UVD transfer station or by direct-haul of collection vehicles from on-route locations to other disposal facilities.

- **Funding of Capital Equipment and Facilities –** After reviewing the required capital, NBS decided the capital equipment and facilities should be financed over a practical period of time and at a realistic interest rate, in order to smooth out the costs per ton over time. However, all other future capital costs for equipment and facilities are excluded.
- **Operating Reserves and Landfill Closure Costs –** These costs are not included, as they are assumed to be a part of the disposal costs charged by each facility.
- **Inflation and Growth Projections –** The inflation and growth projections are held at present costs and are not inflated for any future projections.
- **Mileage and Time Estimates –** Destination data was gathered from Google Maps to calculate the shortest routes from the center of the city or landfill address to alternative disposal facilities. Time estimates assume typical traffic conditions. However, in order to reflect the slower travel speeds of collection and transfer-haul vehicles compared to non-waste hauling vehicles, additional time was added to provide a range of realistic travel times.

Disposal Alternatives – What might be described as a "worst-case scenario", CFL would redirect waste away from CFL to another disposal facility. NBS has evaluated the cost impacts of such an action compared to alternative facilities. In preparing this analysis, NBS made some general assumptions:

- UVD, as well as the general public, would have the option to either direct-haul their waste to another facility, or UVD would build a transfer station and then transfer-haul collected tonnages to an alternative disposal facility (landfill or transfer station).
- The public self-haul vehicles and UVD collection and transfer-haul rigs have access to all available disposal facilities, including both transfer stations and landfills.
- Lower to mid-ranges of industry costs, although conservative from a cost-estimating perspective, are appropriate and therefore were used to develop "lower end" and "higher end" cost scenarios.

Additional assumptions are listed in Appendix Tables A-1 and A-2, followed by more detailed calculations shown in Appendix Tables A-3 through A-12.

Evaluating Cost Differences – Estimating cost differences for the transfer-haul and direct-haul alternatives involves a more technical analysis that relies on a number of operating costs and assumptions (Appendix Tables A-1 and A-2). Self-haul costs are more straightforward and primarily involve a decision by self-haulers regarding how far they are willing to haul their waste in order to pay a smaller tipping fee. Most self-haulers handle relatively small waste volumes (for example, pickups and small trailers) and, therefore, are less likely to travel farther distances for lower tip fees.

The next section discusses the resulting cost impacts of alternate disposal operations.

RESULTS OF THE ANALYSIS

Key Results

Figure 1 indicates that (1) a transfer-haul system would result in rates that are roughly 17 to 77 percent higher, and (2) a direct-haul system would result in rates that range from approximately 8 percent lower to 33 percent higher. However, the CFL tipping fee used in calculating these rate impacts is $73.42/ton, which includes the fee paid to UVWMA; if this fee were not included, the effective CFL tipping would result in larger (more unfavorable) rate changes than those shown. We believe it is reasonable to assume that the actual rates would be somewhere between the lower and higher end costs shown in Figure 1.

We also note that the "Effective Rate Change" noted in Figure 1 represents an overly conservative approach to estimating rate impacts, and assumes that customer rates are composed of only about one-third of "disposal costs". Even with these limitations, there are significant undesirable rate impacts resulting from the transfer-haul and direct-haul alternatives.

FIGURE 1

Additional Disposal Costs Due to Re-Directing UVD-Collected Waste to Another Transfer Station or Landfill vs. Disposal at Clover Flat Landfill (CFL)

Transfer Haul Analysis Lower End of Cost Range		CFL Disposal Cost[1]	Transfer Station Alt. Cost	Percent Change	Effective Rate Change[2]
From	*To*	*($/ton)*	*($/ton)*	*%*	*%*
Clover Flat TS	Devlin Road TS	$73.42	$135.92	85%	30%
Clover Flat TS	Potrero Hills LF	$73.42	$108.08	47%	17%
Clover Flat TS	Keller Canyon LF	$73.42	$134.09	83%	29%
Clover Flat TS	Kiefer Road LF	$73.42	$158.58	116%	41%
Higher End of Cost Range					
Clover Flat TS	Devlin Road TS	$73.42	$172.59	135%	47%
Clover Flat TS	Potrero Hills LF	$73.42	$163.75	123%	43%
Clover Flat TS	Keller Canyon LF	$73.42	$218.69	198%	69%
Clover Flat TS	Kiefer Road LF	$73.42	$237.19	223%	78%
Direct Haul Analysis **Lower End of Cost Range**		**CFL Disposal Cost[1]**	**Direct-Haul Alternative Cost**	**Percent Change**	**Effective Rate Change[2]**
From	*To*	*($/ton)*	*($/ton)*	*%*	*%*
Clover Flat LF	Potrero Hills LF	$73.42	$90.41	23%	8%
Calistoga	Potrero Hills LF	$73.42	$70.27	-4%	-2%
St. Helena	Potrero Hills LF	$73.42	$56.80	-23%	-8%
Yountville	Potrero Hills	$73.42	$42.33	-42%	-15%
Clover Flat LF	Devlin Rd. TS	$73.42	$110.86	51%	18%
Calistoga	Devlin Rd. TS	$73.42	$106.12	45%	16%
St. Helena	Devlin Rd. TS	$73.42	$66.30	-10%	-3%
Yountville	Potrero Hills	$73.42	$66.30	-10%	-3%
Higher End of Cost Range					
Clover Flat LF	Potrero Hills LF	$73.42	$142.15	94%	33%
Calistoga	Potrero Hills LF	$73.42	$109.43	49%	17%
St. Helena	Potrero Hills LF	$73.42	$86.95	18%	6%
Yountville	Potrero Hills	$73.42	$62.21	-15%	-5%
Clover Flat LF	Devlin Rd. TS	$73.42	$138.84	89%	31%
Calistoga	Devlin Rd. TS	$73.42	$130.88	78%	27%
St. Helena	Devlin Rd. TS	$73.42	$105.94	44%	16%
Yountville	Potrero Hills	$73.42	$64.54	-12%	-4%

1. Current tipping fee at Clover Flat Landfill, includes the Upper Valley Waste Management Agency fee.
2. Based on UVWMA rate analysis, 35% of UVDS costs are for disposal: this is the effective customer rate impact. Per 2005 study.

Transfer Station Alternative – The results of the Transfer Station Analysis shown in Figure 1 are graphically represented in Figures 2 and 3 and illustrate the magnitude of higher costs in all transfer-haul alternatives compared the current system of disposal at CFL.

FIGURE 2

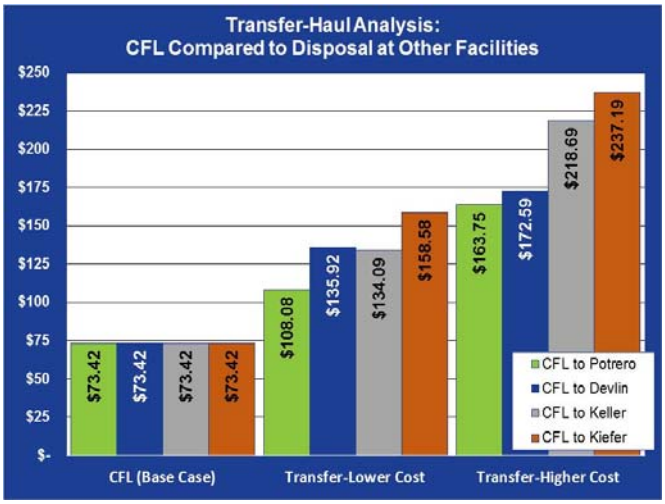
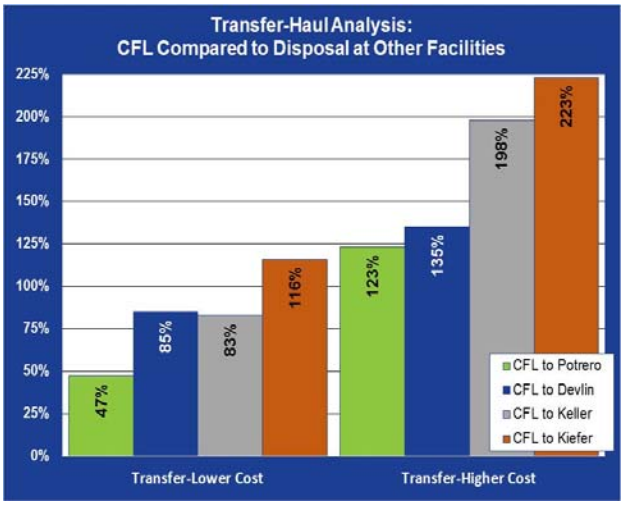


FIGURE 3



Direct-Haul Alternative – Figures 4 and 5 illustrate the results of the Direct-Haul Alternative shown in Figure 1 and indicate that, in the "lower cost" scenario, half of the direct-haul cases are lower than the base case, and that in the "higher cost" scenario only two of the eight cases are lower than the base case. Since UVD would need to use either a transfer station or a direct-haul operating system[1] (assuming the base case is not continued), these figures indicate that direct-haul does not appear to be financially attractive.

FIGURE 4

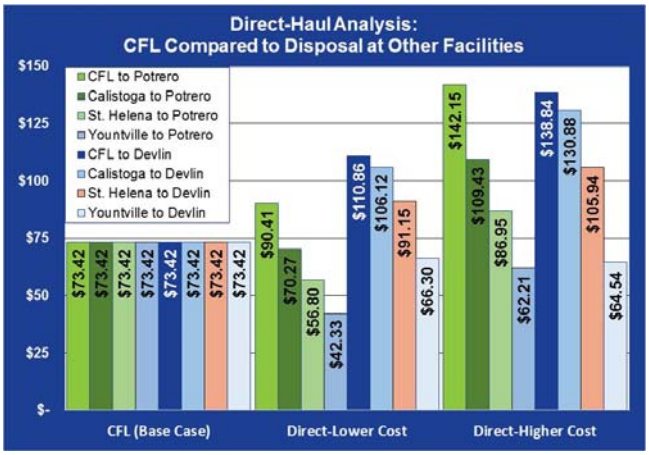
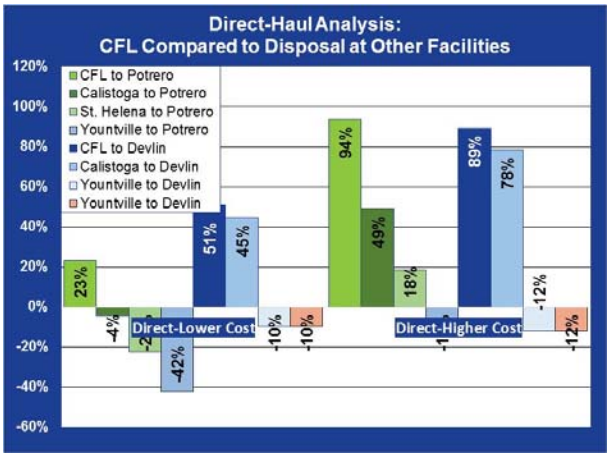


FIGURE 5



Self Haul Alternative – The costs of self-haul by UVD customers is primarily based on a combination of the travel distances to the nearest disposal facility (landfill or transfer station) and the tipping fee. Since the CFL site is relative close to the main population areas in UVD's service area, alternative disposal facilities are considerably farther.

Figures 6 and 7 summarize the self-haul travel distances for Calistoga, St. Helena, and Yountville in the base case (disposal at CFL) compared to other disposal alternatives. Figure 6 shows that the only one self-

[1] That is, UVS cannot use a partial direct-haul and partial transfer station operating system.

haul case (from Yountville to the Devlin Road Transfer Station) would involve less travel time than the base case (hauling to CFL). Figure 7 indicates that tipping fees are lower for all alternative disposal facilities although, as previously noted, CFL's tipping fees includes the UVWMA's fee.

FIGURE 6

Self-Haul Distances: Base-Case vs. Alternative Disposal Facilities

Self-Haul Options		Total One-Way Miles[1]	Additional Distance[2]		
From	To		*Miles*	*vs. Base Case*	*Average*
Base Case (Delivery to CFL)					
Calistoga	Clover Flat TS	3.8			
St. Helena	Clover Flat TS	7.2			
Yountville	Clover Flat TS	18.2			
Self-Haul to Alternative Disposal Facilities					
Calistoga	Potrero Hills LF	51.0	**47**	**13.4 X**	**7.1 X**
St. Helena	Potrero Hills LF	43.0	**36**	**6.0 X**	
Yountville	Potrero Hills LF	33.4	**15**	**1.8 X**	
Calistoga	Devlin Road TS	34.0	**30**	**8.9 X**	**4.5 X**
St. Helena	Devlin Road TS	25.6	**18**	**3.6 X**	
Yountville	Devlin Road TS	16.3	**-2**	**0.9 X**	
Calistoga	Keller Canyon LF	65.8	**62**	**17.3 X**	**9.3 X**
St. Helena	Keller Canyon LF	57.3	**50**	**8.0 X**	
Yountville	Keller Canyon LF	48.0	**30**	**2.6 X**	
Calistoga	Kiefer Road LF	104.0	**100**	**27.4 X**	**15.1 X**
St. Helena	Kiefer Road LF	95.8	**89**	**13.3 X**	
Yountville	Kiefer Road LF	86.4	**68**	**4.7 X**	

1. Source of mileage: Google Maps.

2. Refers to the additional time compared to the Base Case.

FIGURE 7

Tipping Fees: Base-Case vs. Alternative Disposal Facilities

Disposal Facility	Tipping Fee/ Disposal Costs ($/ton)[1]	Tipping Fee Difference vs. CFL	% Change vs. Base Case (CFL)[2]	
			%	*Average*[3]
Clover Flats LF (Base Case)	*$73.42*	--	--	
Devlin Road TS	$69.00	-$4.42	-6%	
Potrero Hills LF	$53.00	-$20.42	-28%	***-19%***
Keller Canyon LF	$54.72	-$18.71	-25%	
Kiefer Road LF	$60.00	-$13.42	-18%	

1. Average of the "Low" and "High" range of tipping costs.

2. Refers to the additional time compared to the Base Case.

3. Average of % difference between tipping fees for CFL vs. alternative disposal facilities.

These travel-time and disposal costs ignore other, broader considerations in an alternate self-haul scenario, such as the inconvenience to members of the public and the local traffic impacts resulting from hauling small loads longer distances over routes that would otherwise not be used for this purpose if CFL disposal continued.

SUMMARY

Findings and conclusions

The analysis presented above indicates the following findings and conclusions:

- **Transfer-Haul Alternative** – Transfer-haul costs are higher than the base case of continued disposal at Clover Flat Landfill. This is only a logical conclusion, since the additional costs of the transfer station (both capital and operating costs) and the additional hauling costs for disposal at another disposal facility all increase the costs of current UVD services. The real question is, by how much does the cost increase? The answer is that, in the best case (that is, wherein the lower range of costs were assumed), costs are about 47 percent higher. If a higher range of costs were assumed, which may better reflect industry averages, costs are much higher – roughly one to two times higher than the base case.
- **Direct-Haul Alternative** – NBS looked at direct-haul costs on a case-by-case basis for geographic areas with UVD's service, including CFL, Calistoga, St. Helena, and Yountville. Although costs vary depending on the area, in the "lower-cost" assumptions it's at best a break-even option. In the higher cost scenario, it's clearly not a financial benefit to direct haul. However, a direct-haul operation does not selectively pick areas that are less expensive, but instead service all areas on the same direct-haul basis. Considering both lower- and higher-costs scenarios, direct-haul is not cost effective compared to the based case (that is, continued disposal at CFL).
- **Self-Haul Customers** – Self-haul customers, who typically weigh both the travel-time and tipping fee costs in their decision about where to dispose of their waste, would be faced with significantly higher travel distances if CFL were not a disposal option. Only Devlin Road Transfer Station offers a reasonable option, and then only for Yountville area self-haulers. While landfill tipping fees are lower for alternative disposal facilities, NBS believes that those savings would be unlikely to sway most self-haulers in light of the longer hauling distances.
- **Potential Rate Impacts** – If a significantly constrained perspective was taken in which UVD's rates for waste collection-disposal service only reflected about 35 percent of the "higher disposal costs", transfer-haul costs would result in rates that increase from 17 percent to 78 percent. The combined rate impacts of direct-haul costs are not as easy to estimate due to the need to consider the weighted average of costs for all service locations throughout UVD's service area. However, it clearly would not be beneficial from a rate-increase perspective to have self-haulers using other disposal facilities.

Principal Assumptions and Considerations

In preparing this report, NBS relied on a number of principal assumptions and considerations with regard to financial costs, operating conditions, and other assumptions that may occur if alternatives are implemented. This information and assumptions, including CFL capital and operating costs, budgets and disposal fees was provided by CFL staff or was provided by other sources we believe to be reliable, although NBS has not independently verified all such data.

While we believe NBS' use of such information and assumptions is reasonable for the purpose of this report and its recommendations, some assumptions will invariably not materialize as stated herein or may vary significantly due to unanticipated events and circumstances. Therefore, the actual results can be expected to vary from those projected to the extent that actual future conditions differ from those assumed by us or provided to us by others.

The appendices provide supporting documentation and detailed calculations which were used in the above analysis.

APPENDIX – COST ANALYSIS TABLES AND FIGURES

Table A-1 summarizes the key cost-related assumptions for the transfer-haul and direct-haul alternatives. These costs include lower- and higher-end cost estimates that are intended to cover a reasonable range of likely costs. These costs were developed jointly with CFL staff and considered costs experienced by one other municipal agency that provided similar cost estimates.

Table A-1

TRANSFER HAUL AND DIRECT HAUL ANALYSIS
List of Key Assumptions

	Lower-End Cost		Higher-End Cost	
Transfer Costs				
Transfer Station O&M cost/ton (1)	$14.46		$17.36	
Transfer Station Capital (2)	$1,500,000		$3,000,000	
Average Daily Tonnage (3)	111		111	
Average Annual Tonnage (3)	34,570		34,570	
Average Transfer load (tons/trailer)	20		16	
Average Direct-Haul Load (tons/vehicle)	9		7	
Annual Days of Operation/yr.	312		312	
Transfer Station Equipment (4)	**Lower-End**	**Higher-End**	**Lower-End**	**Higher-End**
2 - CAT UT 12B - Loader ($300,000/ea.)	$ 540,000	$ 660,000	$ 540,000	$ 660,000
2 - CAT D6R - Dozer ($400,000/ea.)	$ 720,000	$ 880,000	$ 720,000	$ 880,000
Trailer (Walking Floor) ($100,000/ea.)	$ 90,000	$ 110,000	$ 90,000	$ 110,000
GMC CARGO/Flatbed Truck ($70,000/ea.)	$ 63,000	$ 77,000	$ 63,000	$ 77,000
Bobcat ($50,000/ea.)	$ 45,000	$ 55,000	$ 45,000	$ 55,000
Sub-Total Equipment	**$ 1,458,000**	**$ 1,782,000**	**$ 1,458,000**	**$ 1,782,000**
Adjustment factor for Lower- and Higher-End TS Equipment costs:	*-10%*	*10%*	*-10%*	*10%*
Transfer Station Equipment	**< 30 Miles**	**> 30 Miles**	**< 30 Miles**	**> 30 Miles**
3 to 4 - Long-Haul Tractor/Trailer ($160,000/ea.) (5)	$ 480,000	$ 640,000	$ 480,000	$ 640,000
Total Equipment - 3 trailers (< 30 Miles)	**$ 1,938,000**	**$ 2,422,000**	**$ 1,938,000**	**$ 2,422,000**

1. Labor and Operation costs only. Amounts per call with Bryce Howard on 2/10/16.
2. Includes top-load facility with tamper. Amounts per call with Bryce Howard on 2/10/16.
3. Used most recent full year of solid waste disposal - 2014. Source file: CFL Five Yr. Totals.xlsx
4. CFL provided equipment costs were reduced by 10% and increased by 10% for the "Lower" and "Higher" costs, based in CFL emails on 11/16/2015 and phone call on 2/10/16.
5. Requires either 3 or 4 tractor/trailer rigs, depending on the haul distance, and including a spare.

Table A-2 is a continuation of the key assumptions for costs used in this analysis, and covers transportation and disposal costs. Both Tables A-1 and A-2 are the basis for calculations in subsequent tables shown below.

Table A-2

TRANSFER HAUL AND DIRECT HAUL ANALYSIS List of Key Assumptions (Cont.)	Lower-End Cost		Higher-End Cost	
Transportation Costs (6)				
Load Time (hours)	0.4		0.6	
Unload Time (hours)	0.4		0.6	
Vehicle Operation Cost (7)				
Driver Costs (Labor & Benefits)	$60		$70	
Maintenance Costs	$20		$30	
Shop & Overhead Costs	$20		$25	
Total Vehicle Operation Cost ($/hr.)	**$100**		**$125**	
Fuel Costs				
Miles Per Gallon	6		4	
Price Per Gallon (8)	$2.15		$2.45	
Total Fuel Cost ($/Mile)	**$0.36**		**$0.61**	
Disposal Costs ($/ton)				
Devlin Road TS (9)	$69.00		$69.00	
Clover Flats LF	$73.42		$73.42	
Potrero Hills LF (10)	$23.00		$30.00	
Keller Canyon LF (11)	$40.00		$69.43	
Kiefer Road LF (12)	$30.00		$30.00	
Third-Party Asset Costs (6)	**Min.**	**Max.**	**Min.**	**Max.**
Expected Life - Capital (yrs.)	20	30	20	30
Expected Life - Equipment (yrs.)	5	7	5	7
Interest Rate - Capital	4%	5%	4%	5%
Interest Rate - Equipment	4%	5%	4%	5%

6. Received new numbers per phone call with Bryce Howard on 2/10/16.
7. Numbers were estimated. Waiting on full numbers from clients accountant.
8. The average California price per gallon of diesel is $2.302 from 1995-2016 per the U.S Energy Information Administration.
   Source: https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_sca_w.htm
9. Most recent rates from source file: *Devlin TS 07.2015 Rates.pdf*
10. Per Bryce Howard's email on 2/9/16 and via phone on 2/10/16
11. High Rate - Source: http://www.wmr.saccounty.net/Pages/KieferLandfill-MaterialsandRates.aspx; Last visited 2/9/16.
    Low Rate - per Bryce Howard on phone call on 2/10/2016.
12. Rate determined from discussion with client on 02/10/2016 and is lower than the public rate on Kiefer's website.
    The current price could not be confirmed via phone or internet due to the Keller Canyon Landfill serving commercial contracts only.

Tables A-3 and A-4 summarize the transfer station unit costs for various transfer-haul alternative, and outline what the disposal facility ultimately used for delivering waste from the UVD transfer station, the transfer station and equipment capital costs, and the unit costs based on an assumed annual tonnage of 34,750 tons.

Table A-3

Calculation of Lower End Unit Costs for Transfer Station Capital Costs for the Transfer Station Haul Analysis ($/ton).														Scenario 1 - Lower End Costs
Transfer Station Haul Scenario		Distance Traveled (1)	Transfer Station				Transfer Station Equipment				Unit Cost Calculation			
			Transfer Station Costs	Expected Life in Years	Interest Rate (%)	Annual Payment	Transfer Station Equipment	Expected Life in Years	Interest Rate (%)	Annual Payment	Total Annual Payments	Annual Tonnage (tons/yr.)	TS Unit Costs ($/ton)	
From	*To*													
Minimum Expected Life & Minimum Interest Rate:														
Clover Flat TS	Devlin Road TS	35	$1,500,000	20	4%	$110,400	$1,938,000	5	4%	$435,300	$545,700	34,570	$15.79	
Clover Flat TS	Potrero Hills LF	52	$1,500,000	20	4%	$110,400	$1,938,000	5	4%	$435,300	$545,700	34,570	$15.79	
Clover Flat TS	Keller Canyon LF	66	$1,500,000	20	4%	$110,400	$1,938,000	5	4%	$435,300	$545,700	34,570	$15.79	
Clover Flat TS	Kiefer Road LF	104	$1,500,000	20	4%	$110,400	$1,938,000	5	4%	$435,300	$545,700	34,570	$15.79	
Minimum Expected Life & Maximum Interest Rate:														
Clover Flat TS	Devlin Road TS	35	$1,500,000	20	5%	$120,400	$1,938,000	5	5%	$447,600	$568,000	34,570	$16.43	
Clover Flat TS	Potrero Hills LF	52	$1,500,000	20	5%	$120,400	$1,938,000	5	5%	$447,600	$568,000	34,570	$16.43	
Clover Flat TS	Keller Canyon LF	66	$1,500,000	20	5%	$120,400	$1,938,000	5	5%	$447,600	$568,000	34,570	$16.43	
Clover Flat TS	Kiefer Road LF	104	$1,500,000	20	5%	$120,400	$1,938,000	5	5%	$447,600	$568,000	34,570	$16.43	
Maximum Expected Life & Minimum Interest Rate:														
Clover Flat TS	Devlin Road TS	35	$1,500,000	30	4%	$86,700	$1,938,000	7	4%	$322,900	$409,600	34,570	$11.85	
Clover Flat TS	Potrero Hills LF	52	$1,500,000	30	4%	$86,700	$1,938,000	7	4%	$322,900	$409,600	34,570	$11.85	
Clover Flat TS	Keller Canyon LF	66	$1,500,000	30	4%	$86,700	$1,938,000	7	4%	$322,900	$409,600	34,570	$11.85	
Clover Flat TS	Kiefer Road LF	104	$1,500,000	30	4%	$86,700	$1,938,000	7	4%	$322,900	$409,600	34,570	$11.85	
Maximum Expected Life & Maximum Interest Rate:														
Clover Flat TS	Devlin Road TS	35	$1,500,000	30	5%	$97,600	$1,938,000	7	5%	$334,900	$432,500	34,570	$12.51	
Clover Flat TS	Potrero Hills LF	52	$1,500,000	30	5%	$97,600	$1,938,000	7	5%	$334,900	$432,500	34,570	$12.51	
Clover Flat TS	Keller Canyon LF	66	$1,500,000	30	5%	$97,600	$1,938,000	7	5%	$334,900	$432,500	34,570	$12.51	
Clover Flat TS	Kiefer Road LF	104	$1,500,000	30	5%	$97,600	$1,938,000	7	5%	$334,900	$432,500	34,570	$12.51	

Source of Costs and financing assumptions: Assumptions tab - Table 1.

1. Distance traveled was determined by googlemaps.com; the shortest route was chosen.

Table A-3 (cont.)

Calculation of Higher End Unit Costs for Transfer Station Capital Costs for the Transfer Station Haul Analysis ($/ton).														*Scenario 2 - Higher End Costs*
Transfer Station Haul Scenario		**Distance Traveled**	**Transfer Station**				**Transfer Station Equipment**				**Unit Cost Calculation**			
From	*To*	**(1)**	**Transfer Station Costs**	**Expected Life in Years**	**Interest Rate (%)**	**Annual Payment**	**Transfer Station Equipment**	**Expected Life in Years**	**Interest Rate (%)**	**Annual Payment**	**Total Annual Payments**	**Annual Tonnage (tons/yr.)**	**TS Unit Costs *($/ton)***	
Minimum Expected Life & Minimum Interest Rate:														
Clover Flat TS	Devlin Road TS	35	$3,000,000	20	4%	$220,700	$2,422,000	5	4%	$544,000	$764,700	34,570	$22.12	
Clover Flat TS	Potrero Hills LF	52	$3,000,000	20	4%	$220,700	$2,422,000	5	4%	$544,000	$764,700	34,570	$22.12	
Clover Flat TS	Keller Canyon LF	66	$3,000,000	20	4%	$220,700	$2,422,000	5	4%	$544,000	$764,700	34,570	$22.12	
Clover Flat TS	Kiefer Road LF	104	$3,000,000	20	4%	$220,700	$2,422,000	5	4%	$544,000	$764,700	34,570	$22.12	
Minimum Expected Life & Maximum Interest Rate:														
Clover Flat TS	Devlin Road TS	35	$3,000,000	20	5%	$240,700	$2,422,000	5	5%	$559,400	$800,100	34,570	$23.14	
Clover Flat TS	Potrero Hills LF	52	$3,000,000	20	5%	$240,700	$2,422,000	5	5%	$559,400	$800,100	34,570	$23.14	
Clover Flat TS	Keller Canyon LF	66	$3,000,000	20	5%	$240,700	$2,422,000	5	5%	$559,400	$800,100	34,570	$23.14	
Clover Flat TS	Kiefer Road LF	104	$3,000,000	20	5%	$240,700	$2,422,000	5	5%	$559,400	$800,100	34,570	$23.14	
Maximum Expected Life & Minimum Interest Rate:														
Clover Flat TS	Devlin Road TS	35	$3,000,000	30	4%	$173,500	$2,422,000	7	4%	$403,500	$577,000	34,570	$16.69	
Clover Flat TS	Potrero Hills LF	52	$3,000,000	30	4%	$173,500	$2,422,000	7	4%	$403,500	$577,000	34,570	$16.69	
Clover Flat TS	Keller Canyon LF	66	$3,000,000	30	4%	$173,500	$2,422,000	7	4%	$403,500	$577,000	34,570	$16.69	
Clover Flat TS	Kiefer Road LF	104	$3,000,000	30	4%	$173,500	$2,422,000	7	4%	$403,500	$577,000	34,570	$16.69	
Maximum Expected Life & Maximum Interest Rate:														
Clover Flat TS	Devlin Road TS	35	$3,000,000	30	5%	$195,200	$2,422,000	7	5%	$418,600	$613,800	34,570	$17.76	
Clover Flat TS	Potrero Hills LF	52	$3,000,000	30	5%	$195,200	$2,422,000	7	5%	$418,600	$613,800	34,570	$17.76	
Clover Flat TS	Keller Canyon LF	66	$3,000,000	30	5%	$195,200	$2,422,000	7	5%	$418,600	$613,800	34,570	$17.76	
Clover Flat TS	Kiefer Road LF	104	$3,000,000	30	5%	$195,200	$2,422,000	7	5%	$418,600	$613,800	34,570	$17.76	

Source of Costs and financing assumptions: Assumptions tab - Table 1.

1. Distance traveled was determined by googlemaps.com; the shortest route was chosen.

Figures A-1 and A-2 illustrate the unit costs calculated in Tables A-3 and A-4.

Figure A-1

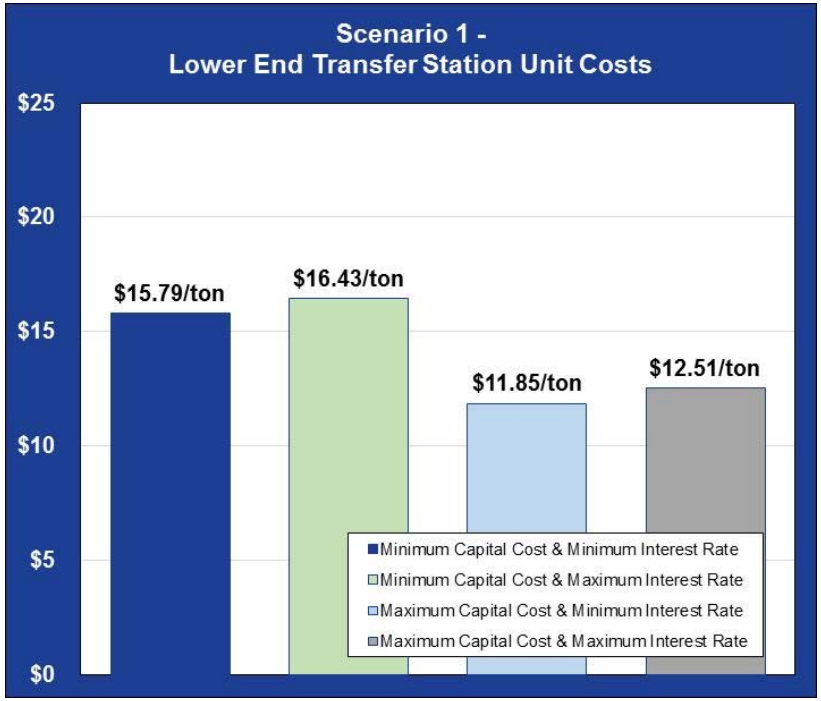
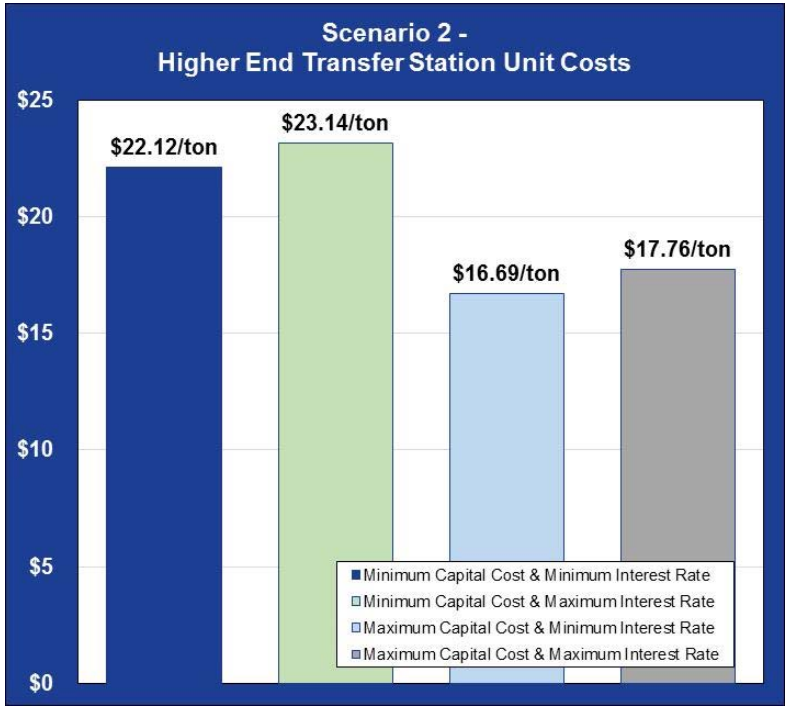


Figure A-2



As shown above in Table A-4, there are travel distances and times for various alternatives; the 10 percent and 40 percent additional times were used in determining the lower- and higher-end unit costs in subsequent tables.

Table A-4

Disposal Destinations and Travel Mileage and Times											
Destinations			Total Minutes	Miles to CFL Removed	Minutes to CFL Removed	Excess Miles	Excess Minutes	Additional Time			
From	To	Total Miles						10%	20%	30%	40%
Clover Flat TS	Devlin Road TS	35	41	0	0	35	41	45	49	53	57
Clover Flat TS	Potrero Hills LF	52	74	0	0	52	74	81	89	96	104
Clover Flat TS	Keller Canyon LF	66	70	0	0	66	70	77	84	91	98
Clover Flat TS	Kiefer Road LF	104	108	0	0	104	108	119	130	140	151
Clover Flat LF	Potrero Hills LF	52	74	0	0	52	74	81	89	96	104
Calistoga	Potrero Hills LF	51	39	-4	-6	47	33	36	40	43	46
St. Helena	Potrero Hills LF	43	30	-7	-10	36	20	22	24	26	28
Yountville	Potrero Hills LF	33	44	-18	-24	16	20	22	24	26	28
Clover Flat LF	Devlin Road TS	35	41	0	0	35	41	45	49	53	57
Calistoga	Devlin Road TS	34	44	-4	-6	30	38	42	46	49	53
St. Helena	Devlin Road TS	26	32	-7	-10	18	22	24	26	29	31
Yountville	Devlin Road TS	16	20	-18	-24	-2	-4	-4	-5	-5	-6

Note: Removed mileage and time to deliver to Clover Flats from the time to deliver to new destination, thus leaving excess miles and time incurred to deliver to new hauling destination.

Tables A-5 through A-8 present the transfer-haul cost calculations that were used in Table 1 above.

Table A-5

TRANSFER STATION HAUL ANALYSIS ($/ton) Scenario 1A - Lower End of Cost Range with 10% increase in travel time for transfer vehicles over civilian vehicles										
Haul Locations		Transfer Station Haul Cost Calculations							CFL Disposal Cost	Difference Between TS Haul & CFL Cost
		One-Way Haul Distance & Time (1)		TS Operation Costs (2)	TS Capital Costs (3)	Haul / Vehicle Costs	Disposal Costs	Total TS Haul Costs		
From	*To*	*Miles*	*Minutes*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*
Clover Flat TS	Devlin Road TS	35	45	$14.46	$15.79	$36.67	$69.00	$135.92	$73.42	$62.50
Clover Flat TS	Potrero Hills LF	52	81	$14.46	$15.79	$54.83	$23.00	$108.08	$73.42	$34.66
Clover Flat TS	Keller Canyon LF	66	77	$14.46	$15.79	$63.85	$40.00	$134.09	$73.42	$60.67
Clover Flat TS	Kiefer Road LF	104	119	$14.46	$15.79	$98.33	$30.00	$158.58	$73.42	$85.16

Assumptions: UVDS collection trucks deliver to a transfer station at CFL. Transport is then via transfer vehicles.
Transport costs include round trip, load, and unload times. Without traffic travel time is increased by 10% due to slower speed of transfer vehicles.

Table A-6

TRANSFER STATION HAUL ANALYSIS ($/ton) Scenario 1B - Lower End of Cost Range with 40% increase in travel time for transfer vehicles over civilian vehicles										
Haul Locations		Transfer Station Haul Cost Calculations							CFL Disposal Cost	Difference Between TS Haul & CFL Cost
		One-Way Haul Distance & Time (1)		TS Operation Costs (2)	TS Capital Costs (3)	Haul / Vehicle Costs	Disposal Costs	Total TS Haul Costs		
From	*To*	*Miles*	*Minutes*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*
Clover Flat TS	Devlin Road TS	35	57	$14.46	$15.79	$38.72	$69.00	$137.97	$73.42	$64.55
Clover Flat TS	Potrero Hills LF	52	104	$14.46	$15.79	$58.53	$23.00	$111.78	$73.42	$38.36
Clover Flat TS	Keller Canyon LF	66	98	$14.46	$15.79	$67.35	$40.00	$137.59	$73.42	$64.17
Clover Flat TS	Kiefer Road LF	104	151	$14.46	$15.79	$103.73	$30.00	$163.98	$73.42	$90.56

Assumptions: UVDS collection trucks deliver to a transfer station at CFL. Transport is then via transfer vehicles.
Transport costs include round trip, load, and unload times. Without traffic travel time is increased by 40% due to slower speed of transfer vehicles.
1. From Google maps.
2 . O&M costs only and source data provided by client in source file: ?
3. Assumes a privately built transfer station, Third Party Lease: 20-year loan, equipment amortized over 5 years, interest rate of 4%, and average tons per day of 111 tpd. All hauls are long hauls and include an additional tractor/trailer rig.

Table A-7

TRANSFER STATION HAUL ANALYSIS ($/ton)
Scenario 2A - Higher End of Cost Range with 10% increase in travel time for transfer vehicles over civilian vehicles.

Haul Locations		Transfer Station Haul Cost Calculations							CFL Disposal Cost	Difference Between TS Haul & CFL Cost
		One-Way Haul Distance & Time (1)		TS Operation Costs (2)	TS Capital Costs (3)	Haul / Vehicle Costs	Disposal Costs	Total TS Haul Costs		
From	*To*	*Miles*	*Minutes*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*
Clover Flat TS	Devlin Road TS	35	45	$17.36	$22.12	$64.12	$69.00	$172.59	$73.42	$99.17
Clover Flat TS	Potrero Hills LF	52	81	$17.36	$22.12	$94.27	$30.00	$163.75	$73.42	$90.33
Clover Flat TS	Keller Canyon LF	66	77	$17.36	$22.12	$109.79	$69.43	$218.69	$73.42	$145.27
Clover Flat TS	Kiefer Road LF	104	119	$17.36	$22.12	$167.71	$30.00	$237.19	$73.42	$163.77

Assumptions: UVDS collection trucks deliver to a transfer station at CFL. Transport is then via transfer vehicles.
Transport costs include round trip, load, and unload times. Travel time is increased by 10% due to slower speed of transfer vehicles.

Table A-8

TRANSFER STATION HAUL ANALYSIS ($/ton)
Scenario 2B - Higher End of Cost Range with 40% increase in travel time for transfer vehicles over civilian vehicles.

Haul Locations		Transfer Station Haul Cost Calculations							CFL Disposal Cost	Difference Between TS Haul & CFL Cost
		One-Way Haul Distance & Time (1)		TS Operation Costs (2)	TS Capital Costs (3)	Haul / Vehicle Costs	Disposal Costs	Total TS Haul Costs		
From	*To*	*Miles*	*Minutes*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*
Clover Flat TS	Devlin Road TS	35	57	$17.36	$22.12	$67.32	$69.00	$175.80	$73.42	$102.38
Clover Flat TS	Potrero Hills LF	52	104	$17.36	$22.12	$100.05	$30.00	$169.53	$73.42	$96.11
Clover Flat TS	Keller Canyon LF	66	98	$17.36	$22.12	$115.26	$69.43	$224.16	$73.42	$150.74
Clover Flat TS	Kiefer Road LF	104	151	$17.36	$22.12	$176.15	$30.00	$245.63	$73.42	$172.21

Assumptions: UVDS collection trucks deliver to a transfer station at CFL. Transport is then via transfer vehicles.
Transport costs include round trip, load, and unload times. Travel time is increased by 40% due to slower speed of transfer vehicles.
1. From Google maps.
2 . O&M costs only and source data provided by client in phone call on
3. Assumes a privately built transfer station, Third Party Lease: 20-year loan, equipment amortized over 5 years, interest rate of 4%, and average tons per day of 111 tpd. All are long hauls and include an additional tractor/trailer rig.

Tables A-9 through A-12 present the direct-haul cost calculations that were used in Table 1 above.

Table A-9

DIRECT HAUL ANALYSIS ($/ton)
Scenario 3A - Lower End of Cost Range with 10% increase in travel time for transfer vehicles over civilian vehicles.

Haul Locations		Direct Haul Cost Calculations						CFL Disposal Cost	Difference Between Direct Haul & CFL Cost
		One-Way Haul Distance & Time (1)		Transport Costs (2)	Off-Route Time (3)	Disposal Costs	Total Direct Haul Costs		
From	*To*	*Miles*	*Minutes*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*
Clover Flat LF	Potrero Hills	52	81	$37.27	$30.15	$23.00	**$90.41**	$73.42	$16.99
Calistoga	Potrero Hills	47	36	$33.83	$13.44	$23.00	**$70.27**	$73.42	($3.15)
St. Helena	Potrero Hills	36	22	$25.66	$8.15	$23.00	**$56.80**	$73.42	($16.62)
Yountville	Potrero Hills	16	22	$11.18	$8.15	$23.00	**$42.33**	$73.42	($31.09)
Clover Flat LF	Devlin Road TS	35	45	$25.16	$16.70	$69.00	**$110.86**	$73.42	$37.44
Calistoga	Devlin Road TS	30	42	$21.64	$15.48	$69.00	**$106.12**	$73.42	$32.70
St. Helena	Devlin Road TS	18	24	$13.19	$8.96	$69.00	**$91.15**	$73.42	$17.73
Yountville	Devlin Road TS	(2)	(4)	($1.08)	($1.63)	$69.00	**$66.30**	$73.42	($7.12)

Assumptions: Transport via route collection vehicle averaging 9 tons/load. Transport costs do not include load and unload at either transfer station or landfill.
and unload times since collection vehicles load as part of their normal routine,
Traffic travel time was increased by 10% due to slower speed of transfer vehicles.

Table A-10

DIRECT HAUL ANALYSIS ($/ton)
Scenario 3B - Lower End of Cost Range with 40% increase in travel time for transfer vehicles over civilian vehicles.

Haul Locations		Direct Haul Cost Calculations						CFL Disposal Cost	Difference Between Direct Haul & CFL Cost
		One-Way Haul Distance & Time (1)		Transport Costs (2)	Off-Route Time (3)	Disposal Costs	Total Direct Haul Costs		
From	*To*	*Miles*	*Minutes*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*
Clover Flat LF	Potrero Hills	52	104	$37.27	$38.37	$23.00	**$98.64**	$73.42	$25.22
Calistoga	Potrero Hills	47	46	$33.83	$17.11	$23.00	**$73.94**	$73.42	$0.52
St. Helena	Potrero Hills	36	28	$25.66	$10.37	$23.00	**$59.03**	$73.42	($14.39)
Yountville	Potrero Hills	16	28	$11.18	$10.37	$23.00	**$44.55**	$73.42	($28.87)
Clover Flat LF	Devlin Road TS	35	57	$25.16	$21.26	$69.00	**$115.41**	$73.42	$41.99
Calistoga	Devlin Road TS	30	53	$21.64	$19.70	$69.00	**$110.35**	$73.42	$36.93
St. Helena	Devlin Road TS	18	31	$13.19	$11.41	$69.00	**$93.59**	$73.42	$20.17
Yountville	Devlin Road TS	(2)	(6)	($1.08)	($2.07)	$69.00	**$65.85**	$73.42	($7.57)

Assumptions: Transport via route collection vehicle averaging 9 tons/load. Transport costs do not include load and unload times since collection vehicles load as part of their normal routine, and unload at either transfer station or landfill.
Traffic travel time was increased by 40% due to slower speed of transfer vehicles.
1. Distance (miles) and travel time (minutes) are from Google maps.
2. Includes total round trip fuel costs per extra mile traveled.
3. Includes total round trip haul time, and vehicle operating costs ($100/hr., which includes driver labor time).

Table A-11

DIRECT HAUL ANALYSIS ($/ton)
Scenario 4A - Higher End of Cost Range with 10% increase in travel time for transfer vehicles over civilian vehicles.

Haul Locations		Direct Haul Cost Calculations						CFL Disposal Cost	Difference Between Direct Haul & CFL Cost
		One-Way Haul Distance & Time (1)		Transport Costs (2)	Off-Route Time (3)	Disposal Costs	Total Direct Haul Costs		
From	*To*	*Miles*	*Minutes*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*
Clover Flat LF	Potrero Hills	52	81	$63.70	$48.45	$30.00	**$142.15**	$73.42	$68.73
Calistoga	Potrero Hills	47	36	$57.82	$21.61	$30.00	**$109.43**	$73.42	$36.01
St. Helena	Potrero Hills	36	22	$43.86	$13.10	$30.00	**$86.95**	$73.42	$13.53
Yountville	Potrero Hills	16	22	$19.11	$13.10	$30.00	**$62.21**	$73.42	($11.21)
Clover Flat LF	Devlin Road TS	35	45	$43.00	$26.85	$69.00	**$138.84**	$73.42	$65.42
Calistoga	Devlin Road TS	30	42	$37.00	$24.88	$69.00	**$130.88**	$73.42	$57.46
St. Helena	Devlin Road TS	18	24	$22.54	$14.40	$69.00	**$105.94**	$73.42	$32.52
Yountville	Devlin Road TS	(2)	(4)	($1.84)	($2.62)	$69.00	**$64.54**	$73.42	($8.88)

Assumptions: Transport via route collection vehicle averaging 7 tons/load. Transport costs do not include load and unload times since collection vehicles load as part of their normal routine, and unload at either transfer station or landfill.
Traffic travel time was increased by 10% due to slower speed of transfer vehicles.

Table A-12

DIRECT HAUL ANALYSIS ($/ton)
Scenario 4B - Higher End of Cost Range with 40% increase in travel time for transfer vehicles over civilian vehicles.

Haul Locations		Direct Haul Cost Calculations						CFL Disposal Cost	Difference Between Direct Haul & CFL Cost
		One-Way Haul Distance & Time (1)		Transport Costs (2)	Off-Route Time (3)	Disposal Costs	Total Direct Haul Costs		
From	*To*	*Miles*	*Minutes*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*	*($/ton)*
Clover Flat LF	Potrero Hills	52	104	$63.70	$61.67	$30.00	**$155.37**	$73.42	$81.95
Calistoga	Potrero Hills	47	46	$57.82	$27.50	$30.00	**$115.32**	$73.42	$41.90
St. Helena	Potrero Hills	36	28	$43.86	$16.67	$30.00	**$90.52**	$73.42	$17.10
Yountville	Potrero Hills	16	28	$19.11	$16.67	$30.00	**$65.78**	$73.42	($7.64)
Clover Flat LF	Devlin Road TS	35	57	$43.00	$34.17	$69.00	**$146.16**	$73.42	$72.74
Calistoga	Devlin Road TS	30	53	$37.00	$31.67	$69.00	**$137.66**	$73.42	$64.24
St. Helena	Devlin Road TS	18	31	$22.54	$18.33	$69.00	**$109.87**	$73.42	$36.45
Yountville	Devlin Road TS	(2)	(6)	($1.84)	($3.33)	$69.00	**$63.83**	$73.42	($9.59)

Assumptions: Transport via route collection vehicle averaging 7 tons/load. Transport costs do not include load and unload times since collection vehicles load as part of their normal routine, and unload at either transfer station or landfill.
Traffic travel time was increased by 40% due to slower speed of transfer vehicles.
1. Distance (miles) and travel time (minutes) are from Google maps, without traffic travel minutes were increased by 40% for slower travel time of collection vehicles.
2. Includes total return haul time, vehicle operating costs ($125/hr., which includes driver labor time).
3. Includes total to way haul time, vehicle operating costs ($125/hr., which includes driver labor time).