



B A C W A
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A G E N C I E S

Bay Area Clean Water Agencies
2016 Biosolids Trends Survey Report



Photo: Anaerobic Digesters at San Francisco's Oceanside Wastewater Plant

BACWA 2016 Biosolids Trends Survey

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1. Introduction

Biosolids management programs at Publically Owned Treatment Works (POTWs) are under increasing pressure in the San Francisco Bay Region. Northern California POTWs are much more likely to use landfill Alternative Daily Cover (ADC) as a reuse strategy than their counterparts in Southern California¹. However, new legislation and regulation aimed at diverting organic material from landfills is making it increasingly likely that landfill burial and ADC will be phased out in the future. The California Association of Sanitation Agencies (CASA) prepared *An Evaluation of the Sustainability of Biosolids Use as Landfill Burial or Beneficial Cover Material*², which is an excellent summary of the regulatory challenges facing biosolids reuse and management alternatives for California agencies.

Bay Area Clean Water Agencies (BACWA) is a joint powers agency whose members own and operate POTWs and sanitary sewer systems that collectively provide sanitary services to over 7.1 million people in the nine-county San Francisco Bay Area (Bay Area). BACWA supports a Biosolids Committee, where members can meet to discuss common issues and tour local biosolids facilities. Staff from agencies outside the San Francisco Bay Region may participate in BACWA's Biosolids Committee.

In 2016, BACWA distributed a survey³ to its member agencies to better understand the state of the biosolids treatment, disposal, and reuse in the Bay Area. The intent of this survey was to summarize information obtained from BACWA members in order to identify current industry trends for the following issues:

- *Biosolids production*
- *Hauling and tipping costs*
- *Hauling distances*
- *Dewatering technologies*
- *Agency challenges*
- *Agencies future biosolids management plans*
- *Marketing and media practices*
- *Biosolids program staffing*

The Survey includes responses from the following agencies, representing more than 95 percent of the total flow of BACWA member agencies, plus the City of Santa Rosa (which is not a BACWA member):

¹ See SCAP Biosolids Trends Survey <https://bacwa.org/wp-content/uploads/2017/06/2016-SCAP-Biosolids-Trends-Update-3.pdf>

² <https://bacwa.org/wp-content/uploads/2017/01/1-11-17-Sustainability-for-biosolids-use-at-landfills.pdf>

³ Survey questions may be viewed by following this link: <https://www.surveymonkey.com/r/LXKF3RL>

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- Central Contra Costa Sanitary District
- Central Marin Sanitation Agency
- City of American Canyon
- City of Benicia
- City of Hayward
- City of Livermore
- City of Millbrae
- City of Palo Alto
- City of Petaluma
- City of San Jose
- City of San Leandro
- City of San Mateo
- City of Santa Rosa
- City of South San Francisco - San Bruno Water Quality Control Plant
- City of Sunnyvale
- Delta Diablo
- Dublin San Ramon Services District
- East Bay Municipal Utility District
- Fairfield-Suisun Sewer District
- Las Gallinas Valley Sanitary District
- Mt. View Sanitary District
- Napa Sanitation District
- Novato Sanitary District
- Oro Loma SD
- San Francisco Public Utilities Commission
- Sewer Authority Mid-Coastside
- Sewerage Agency of Southern Marin
- Silicon Valley Clean Water
- Union Sanitary District
- Vallejo Sanitation and Flood Control District
- West County Wastewater District

The survey data presented in this report will provide a baseline against which to compare data in future surveys. The body of the report summarizes the data provided by agencies, but the data on reuse and disposal destinations is presented in full in **Appendix A**.

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It is BACWA's intention to conduct this survey on a biennial basis. Agency responses will be used as part of a regional conversation about the future of biosolids management in Northern California, to identify regional needs, and to support efforts to identify and develop additional sustainable biosolids reuse alternatives. The survey was modeled after the Southern California Association of Publicly Owned Treatment Works (SCAP) Biosolids Trends Survey⁴ and allows data comparisons between northern and southern California agencies.

BACWA wishes to thank all of our agencies that took the time and effort to assist with the production of this survey and report.

Inset 1: Biosolids incorporation as Alternative Daily Cover at a landfill



2. Annual Biosolids Production

Survey respondents reported their biosolids production for the 2014 and 2015 calendar years. **Table 1** lists the type of biosolids produced by each agency, based on the classifications defined by EPA Rule 503⁵. Solids designated as EQ are “Exceptional Quality” solids, and “Other Quality” solids do not need to meet the 503 Rules, due to their disposal destination. **Figure 1a and 1b** compare the total tonnage of wet and dry tons, respectively, which were largely unchanged between the two calendar years. The preponderance of wet tons of biosolids produced in the

⁴ SCAP Biosolids Trends Survey <https://bacwa.org/wp-content/uploads/2017/06/2016-SCAP-Biosolids-Trends-Update-3.pdf>

⁵ See the “Plain English Guide to the EPA Part 503 Biosolids Rule” at https://www.epa.gov/sites/production/files/2015-05/documents/a_plain_english_guide_to_the_epa_part_503_biosolids_rule.pdf

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San Francisco Bay Region are Class B, although the difference between Class A and B is smaller when considering dry tons given that agencies producing Class A biosolids produce a higher percentage solids.

Table 1. Classes of biosolids produced by respondents

	Biosolids Class
Central Contra Costa Sanitary District	Other
Central Marin Sanitation Agency	B
City of American Canyon	B
City of Benicia	Other
City of Hayward	A
City of Livermore	B
City of Millbrae	B
City of Palo Alto	Other
City of Petaluma	B
City of San Jose	A
City of San Leandro	A
City of San Mateo	B
City of Santa Rosa	A-EQ and B
City of South San Francisco - San Bruno Water Quality Control Plant	B
City of Sunnyvale	A and B
Delta Diablo	B
Dublin San Ramon Services District	A
East Bay Municipal Utilities District	B
Fairfield-Suisun Sewer District	B
Las Gallinas Valley Sanitary District	B
Mt. View Sanitary District	B
Napa Sanitation District	B
Novato Sanitary District	B
Oro Loma SD	B
San Francisco Public Utilities Commission	B
Sewer Authority Mid Coastside	B
Sewerage Agency of Southern Marin	B
Silicon Valley Clean Water	B
Union Sanitary District	A and B
Vallejo Sanitation and Flood Control District	B
West County Wastewater District	B

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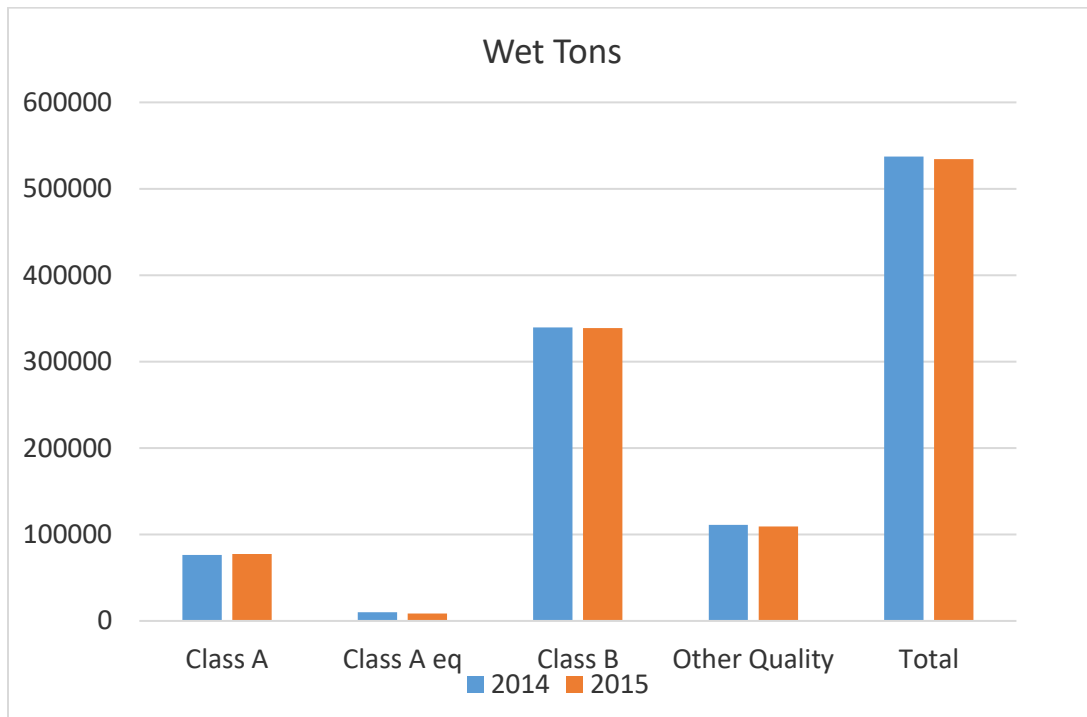


Figure 1a. Aggregate wet tons of biosolids of different classes produced by survey respondents.

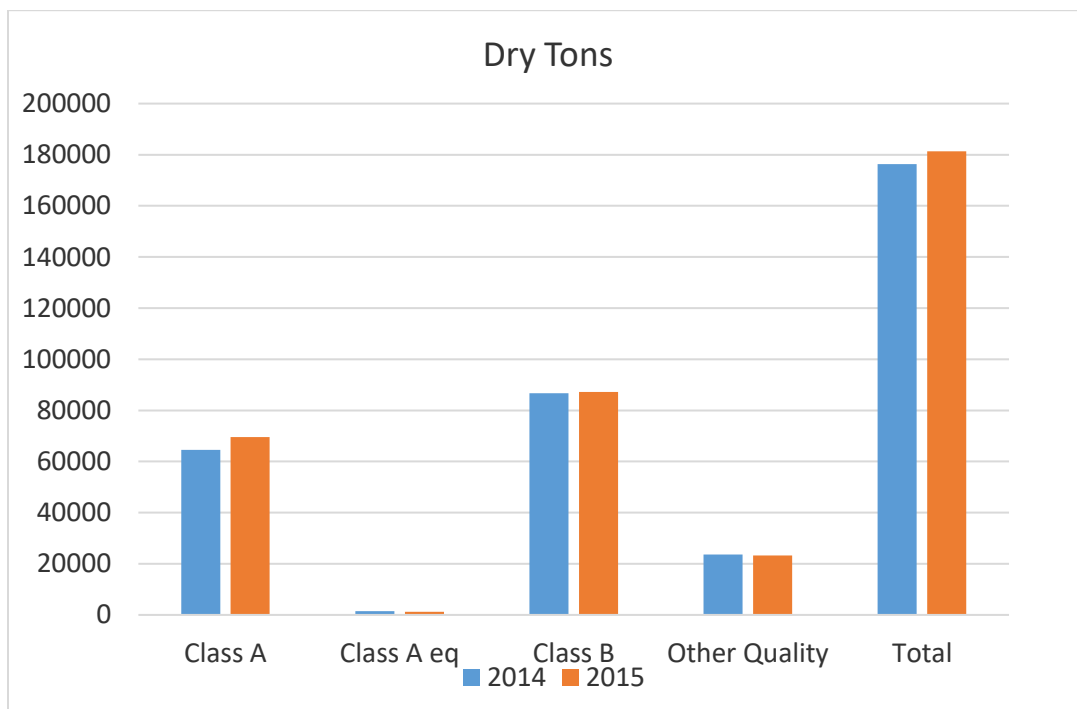


Figure 1b. Aggregate dry tons of biosolids of different classes produced by survey respondents.

3. Management Options, Management Costs and Dewatering Statistics

3.1 Biosolids Reuse and Disposals Options

The amount of biosolids sent to each type of reuse and disposal destination by each responding agency is reported in **Table 2**. The accompanying **Figures 2a** and **2b** illustrate the relative importance of each reuse and disposal method for wet and dry tons, respectively. Reuse via landfill alternative daily cover (ADC) receives the most tonnage of biosolids in the region, followed by land application. Onsite disposal and incineration come next, followed by compost, then finally, landfill disposal.

Inset 2: East Bay Municipal Utilities District Digesters



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Table 2. Wet tons of biosolids delivered by usage, 2015.

	Landfill	Landfill ADC	Land Application	Compost	Incineration	Onsite disposal	Total
Central Contra Costa Sanitary District					72,297		72,297
Central Marin Sanitation Agency		3,608	2,292				5,900
City of American Canyon		197					197
City of Benicia		2,330					2,330
City of Hayward	2,396						2,396
City of Livermore		5,751	2,060				7,811
City of Millbrae		236	1,139	121			1,496
City of Palo Alto					34,680		34,680
City of Petaluma		9,169					9,169
City of San Jose		53,405					53,405
City of San Leandro			7,590				7,590
City of San Mateo		3,083	3,828				6,911
City of Santa Rosa		2,349	16,398	8,514			27,261
City of South San Francisco - San Bruno Water Quality Control Plant		13,981					13,981
City of Sunnyvale		702	11,700	321		2,641	15,364
Delta Diablo		1,119	10,800	114			12,033
Dublin San Ramon Services District						37,500	37,500
East Bay Municipal Utilities District		43,001	33,024				76,025
Fairfield-Suisun Sewer District		11,219					11,219
Las Gallinas Valley Sanitary District						4,170	4,170
Mt. View Sanitary District		750					750
Napa Sanitation District						6,846	6,846
Novato Sanitary District						18,000	18,000
Oro Loma SD		9,841					9,841
San Francisco Public Utilities Commission		37,013	32,909	3,371			73,293

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Sewer Authority Mid Coastside	1,485						1,485
Sewerage Agency of Southern Marin		700	252				952
Silicon Valley Clean Water		5,045	13,313	2,981			21,339
Union Sanitary District		2,450	13,313	3,470			19,233
Vallejo Sanitation and Flood Control District			12,292				12,292
West County Wastewater District		9,304					9,304
Sum	3,881	215,253	160,910	18,892	106,977	69,157	575,070

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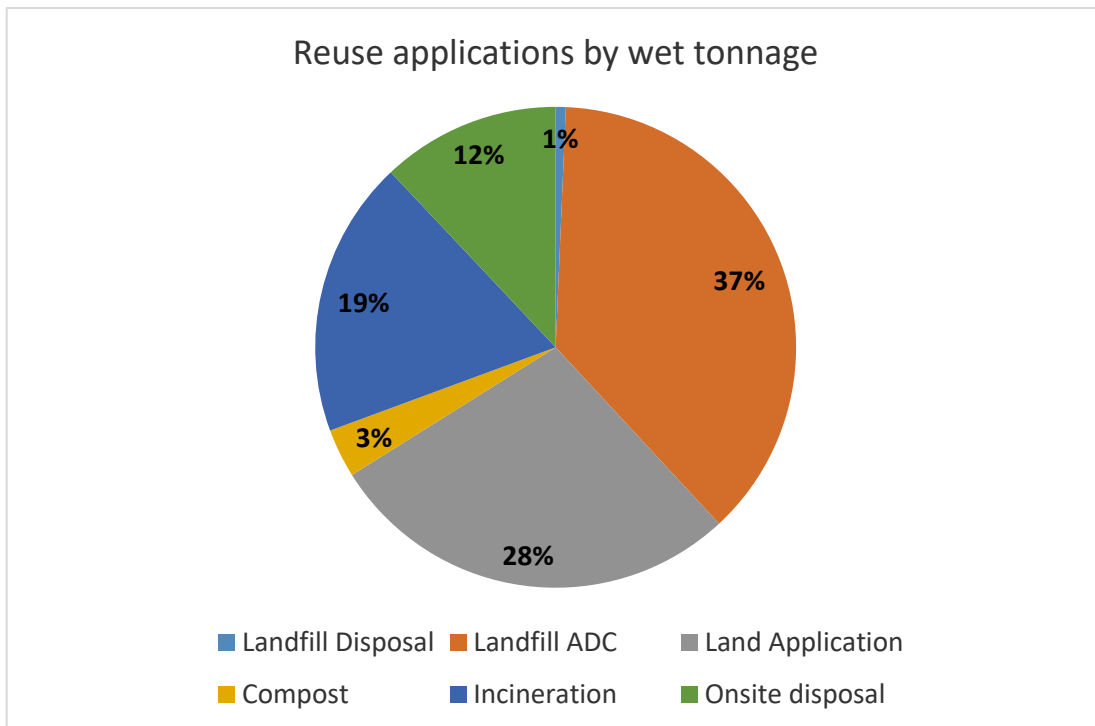


Figure 2a. Relative wet tonnage of biosolids per reuse and disposal method in 2015

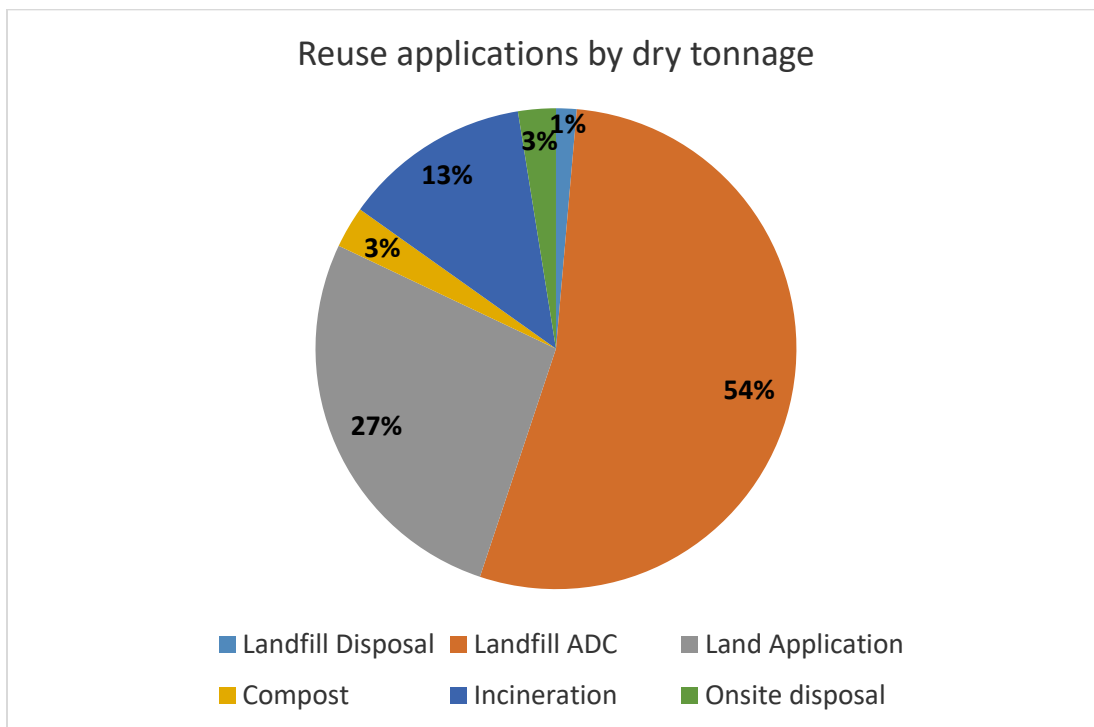


Figure 2a. Relative dry tonnage of biosolids per reuse and disposal method in 2015

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Another way to measure the relative importance of reuse and disposal methods is by counting the number of agencies that employ each, as illustrated in **Figure 3**. As can be seen in **Table 2**, many agencies use more than one reuse or disposal alternative. Out of the thirty-one responding agencies, nineteen use landfill ADC as one of their reuse alternatives. Land application is the next most popular, followed by compost and onsite disposal. Landfill disposal is used by just three agencies. Incineration is used by two agencies, although one of these agencies, the City of Palo Alto, will be transitioning away from incineration by 2019.

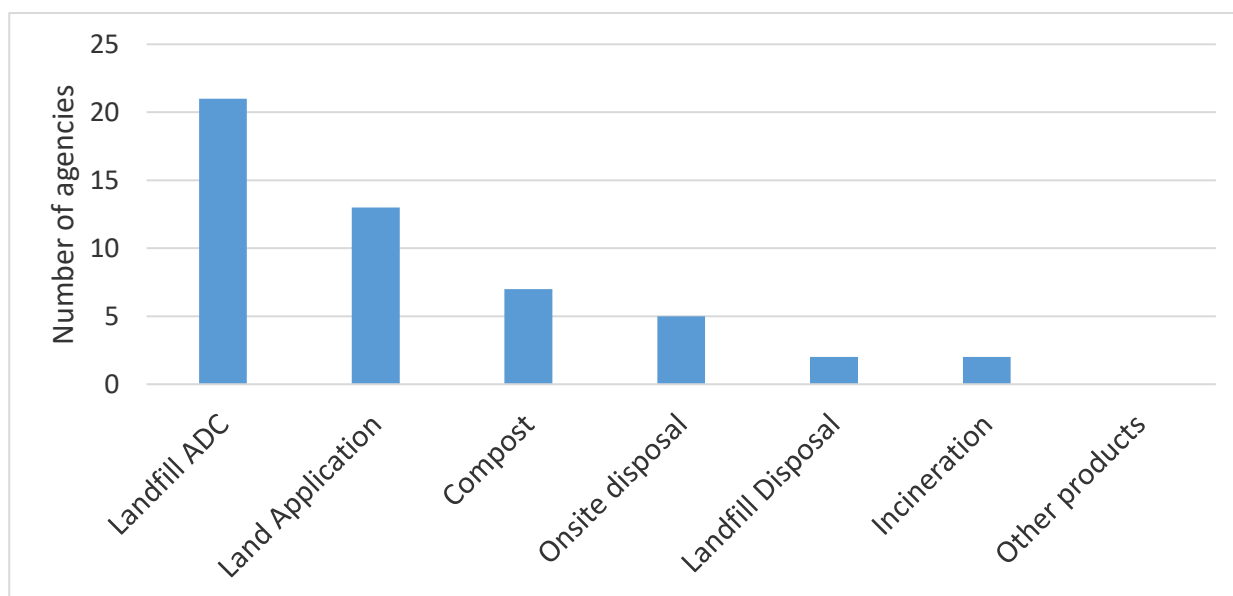


Figure 3. Number of agencies out of thirty-one respondents applying biosolids reuse alternatives in 2015.

While compost is the third-most common reuse application (as illustrated in **Figure 3**), it is fairly minor in terms of tonnage (only 3%, see **Figure 2**). The relatively minor use of compost by Bay Area agencies is notable, since SCAP's 2016 Biosolids survey found that composting represented approximately half of the tonnage of biosolids reuse for Southern California agencies. While there are currently no agencies reporting use of "Other Products," in 2016 several agencies will begin sending their solids to the new Lystek Facility. The Lystek Facility is hosted by the Fairfield-Suisun Sewer District and will produce liquid fertilizer for agriculture (see Inset 3 on pg. 13).

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Inset 3. Lystek and Fairfield-Suisun Sewer District partnered to develop a facility to receive biosolids and convert them to liquid fertilizer. The new facility came online in 2016.

LYSTEK LAND APPLICATION OF LIQUID BIOFERTILIZER, SOLANO COUNTY



LYSTEK-FAIRFIELD ORGANIC MATERIAL RECOVERY CENTER, SOLANO COUNTY



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3.2 Management Costs

Agencies that send biosolids to multiple destinations report a range of costs per ton. Minimum and maximum reported hauling and tipping costs for each agency are reported in **Table 3**.

Where costs were provided by the respondent as a range, the mean of the range was used for that destination. Total costs per agency are calculated by multiplying tons of solids by cost per ton for each destination and summing the destinations. Average costs for each agency are calculated by dividing total cost by tons of biosolids. In future surveys, cost trends will be tracked to see how they are changing over time.

Table 3: Hauling and tipping costs for agencies

	Minimum cost/ton	Maximum cost/ton	Average Cost/ton	Total cost
Central Contra Costa Sanitary District^a	\$0.00	\$0.00	\$0.00	\$0
Central Marin Sanitation Agency	\$20.25	\$45.58	\$56.14	\$249,423
City of American Canyon^b	\$0.00	\$0.00	\$0.00	\$0
City of Benicia	\$79.28	\$79.28	\$79.28	\$184,722
City of Hayward^c	not provided	not provided	not provided	not provided
City of Livermore	\$40.00	\$40.00	\$40.00	\$312,440
City of Millbrae	\$54.95	\$54.95	\$65.24	\$82,205
City of Palo Alto^a	\$0.00	\$0.00	\$0.00	\$0
City of Petaluma	\$43.35	\$43.35	\$43.35	\$397,476
City of San Jose	\$30.00	\$30.00	\$30.00	\$1,602,150
City of San Leandro	\$36.95	\$36.95	\$36.95	\$280,451
City of San Mateo	\$34.75	\$34.75	\$34.75	\$240,157
City of Santa Rosa	\$1.84	\$7.52	\$3.90	\$126,691
City of South San Francisco - San Bruno Water Quality Control Plant	\$55.00	\$55.00	\$55.00	\$768,955
City of Sunnyvale^d	\$32.18	\$135.00	\$117.33	\$1,802,592
Delta Diablo	\$32.18	\$50.42	\$32.35	\$389,301
Dublin San Ramon Services District	\$3.50	\$3.50	\$3.50	\$131,250
East Bay Municipal Utilities District	\$30.40	\$36.22	\$33.69	\$2,561,426
Fairfield-Suisun Sewer District	\$22.00	\$22.00	\$22.00	\$246,818
Las Gallinas Valley Sanitary District	\$11.00	\$11.00	\$11.00	\$45,870
Mt. View Sanitary District	\$15.00	\$15.00	\$15.00	\$11,250
Napa Sanitation District^e	\$0.00	\$0.00	\$0.00	\$0
Novato Sanitary District	\$7.72	\$7.72	\$7.72	\$139,039

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Oro Loma SD	\$33.50	\$33.50	\$33.50	\$329,674
San Francisco Public Utilities Commission	\$42.32	\$94.42	\$60.70	\$4,449,015
Sewer Authority Mid Coastside	\$42.08	\$42.08	\$42.08	\$62,489
Sewerage Agency of Southern Marin	\$51.03	\$72.96	\$65.10	\$63,932
Silicon Valley Clean Water	\$36.98	\$150.00	\$40.44	\$862,925
Union Sanitary District	\$30.41	\$49.27	\$33.81	\$650,320
Vallejo Sanitation and Flood Control District	\$12.00	\$12.00	\$12.00	\$147,504
West County Agency^b	\$0.00	\$0.00	\$0.00	\$0
Total				\$16,138,073

^a Onsite incineration. No cost reported.

^b Solids hauled as part of agency's franchise agreement

^c Costs not reported in survey, no response upon follow-up

^d Contract with Synagro includes dewatering, therefore costs are not comparable to other agencies.

^e Onsite disposal, no reported cost to agency

The range of hauling and tipping costs associated with each reuse and disposal alternative are plotted in **Figure 4**. For agencies with available land, onsite disposal is by far the cheapest option. Land application and landfill ADC are both relatively inexpensive when compared to compost, which begins at \$50 per wet ton. City of Sunnyvale costs for land application, landfill ADC, and compost included dewatering and were therefore omitted from Figure 4.

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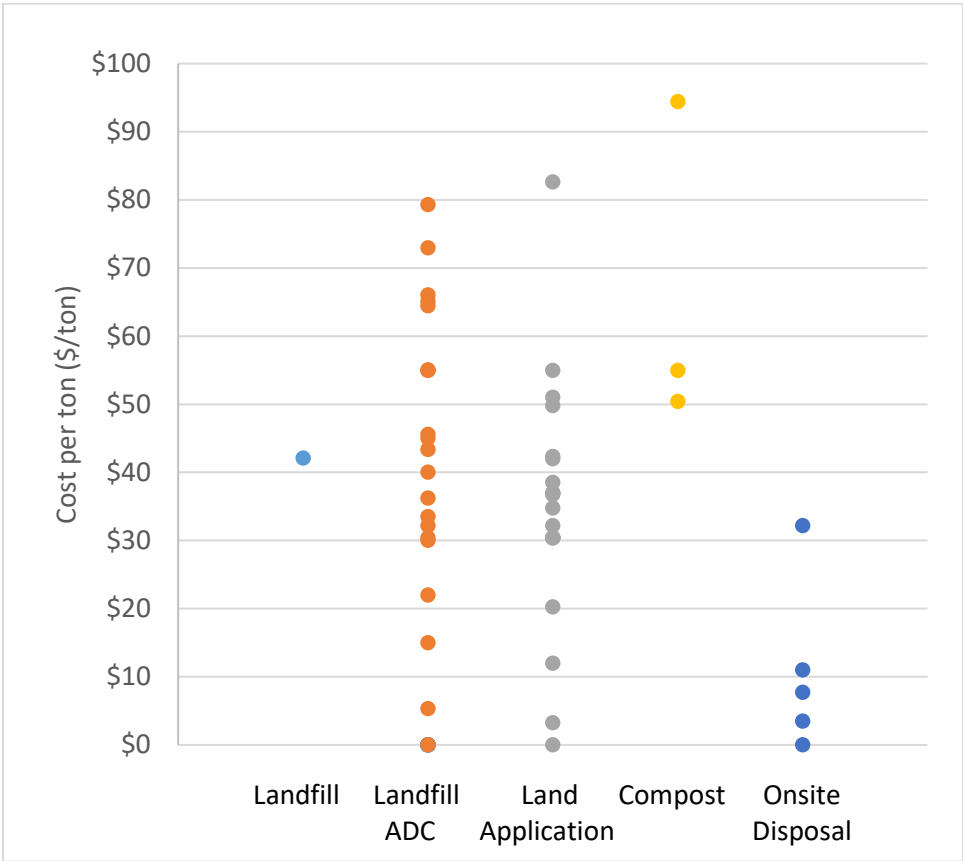


Figure 4. Tipping and Hauling Costs for each reuse/disposal alternative.

Inset 4: Biosolids Land Application in Merced County



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3.3 Hauling Distance

The range of round-trip hauling distances for each agency, as well as total ton-miles, are listed in **Table 4**. The ton-miles provides a metric for the total hauling burden for each agency. In future surveys, hauling distance trends will be tracked to see how they are changing over time.

Table 4. Round-trip Distance Hauled

	Minimum distance hauled (miles)	Maximum distance hauled (miles)	Total ton-miles
Central Contra Costa Sanitary District	0	0	0
Central Marin Sanitation Agency	35	296	327,318
City of American Canyon	64	64	12,608
City of Benicia Plant	60	60	139,800
City of Hayward	70	70	167,688
City of Livermore	14	172	434,834
City of Millbrae	131	200	275,464
City of Palo Alto	0	0	0
City of Petaluma	104	104	953,576
City of San Jose	2	2	106,810
City of San Leandro	250	250	1,897,500
City of San Mateo	140	150	1,005,820
City of Santa Rosa	1	47	625,844
City of South San Francisco - San Bruno Water Quality Control Plant	80	124	1,172,512
City of Sunnyvale	2	250	2,303,582
Delta Diablo	80	240	1,628,880
Dublin San Ramon Services District	0	0	0
East Bay Municipal Utilities District	90	260	12,456,330
Fairfield-Suisun Sewer District	20	20	224,380
Las Gallinas Valley Sanitary District	0	0	626
Mt. View Sanitary District	76	76	57,000
Napa Sanitation District	0	0	0
Novato Sanitary District	0	0	0
Oro Loma SD	62	62	610,142
San Francisco Public Utilities Commission	69	284	10,011,832
Sewer Authority Mid Coastside	5	5	7,722
Sewerage Agency of Southern Marin	43	58	46,126
Silicon Valley Clean Water	144	250	2,594,370
Union Sanitary District	70	252	3,101,667
Vallejo Sanitation and Flood Control District	26	26	319,592
West County Wastewater District	57	57	530,328

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3.4 Dewatering Statistics

The on-site methods employed by agencies to dewater biosolids prior to final use included drying beds, centrifuges, presses, and dryers. Dewatering equipment employed by each agency, as well as the resulting percentage of solids, is listed in **Table 5**.

Table 5. Percentage Solids, Dewatering technology type and manufacturer for each agency

Agency	Percent Solids	Dewatering Technology	Equipment Manufacturer
Central Contra Costa Sanitary Agency	20 to 30%	Centrifuge	Sharples
Central Marin Sanitation Agency	20 to 30%	Centrifuge	Centrisys CS 18-4
City of American Canyon	10 to 20%	screw press	OR-TEC Rocker
City of Benicia	10 to 20%	Belt Filter Press	Ashbrook-Simon-Hartley belt press
City of Hayward	90 to 99.99%	Drying Bed	drying bed
City of Livermore	10 to 20%	Belt Filter Press	Ashbrooks
City of Millbrae	10 to 20%	Belt Filter Press	Andritz (pilgrim) Press. Netzsch cake progressive cavity pump
City of Palo Alto	20 to 30%	Belt Filter Press	Ashbrook Simon-Hartley, Model WP (i.e., Bellmer Winklepress)
City of Petaluma	10 to 20%	Screw Press	FKC Co. Ltd
City of San Jose	90 to 99.99%	Drying Bed	We currently use drying beds
City of San Leandro	90 to 99.99%	Belt Filter Press, Drying Bed	BDP 2-meter Belt Filter Press
City of San Mateo	20 to 30%	Centrifuge	Westfalia Bowl&Scroll
City of Santa Rosa*	10 to 20%	Belt Filter Press	Ashbrook Corp
City of South San Francisco - San Bruno Water Quality Control Plant	10 to 20%	Belt Filter Press	(2) Komline Sanderson two meter belt filter presses, ten roll
City of Sunnyvale	20 to 30%	Centrifuge, Drying Bed	Andritz (centrifuge) and FRC (belt press)
Delta Diablo	20 to 30%	Centrifuge	Flottweg
Dublin San Ramon Services District	0 to 5%	No dewatering	N/A
East Bay Municipal Utility District	20 to 30%	Centrifuge	3 Humbolt; 2 Flottweg
Fairfield-Suisun Sewer District	20 to 30%	Drying Bed, screw press	FKC Screw Press
Las Gallinas Valley Sanitary District	5 to 10%	Biosolids are thickened in sludge lagoons	None
Mt. View Sanitary District	30 to 40%	Centrifuge	Alfa Laval
Napa Sanitation District	10 to 20%	Belt Filter Press	Ashbrook
Novato Sanitary District	5 to 10%	sludge lagoons	NA

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Oro Loma SD	40 to 90%	Belt Filter Press	Two - 2.0M BDP Presses
San Francisco Public Utilities Commission	20 to 30%	Centrifuge and Screw Press	Southeast Plant - Sharples and Gulfcoast Centrifuges; Oceanside Plant - Fukoku Kogyo
Sewer Authority Mid Coastside	10 to 20%	Belt Filter Press	Ashbrook
Sewerage Agency of Southern Marin	20 to 30%	Belt Filter Press	BDP Industries 3DP (for the belt press)
Silicon Valley Clean Water	40 to 90%	Centrifuge	Primary Fournier Filter Press, standby Contec Centrifuge
Union Sanitary District	20 to 30%	Centrifuge	Andritz
Vallejo Sanitation and Flood Control District	20 to 30%	Belt Filter Press	Ashbrook
West County Wastewater District	40 to 90%	Drying bed	

4. Challenges and Future Planning

4.1 Challenges

Agencies were asked to rank the challenges facing their biosolids program. The following challenges were ranked from the aggregate responses from most to least important.

1. Rising costs
2. Regulatory restrictions on using biosolids for alternative daily cover
3. Securing long term disposal options
4. Hauling distance
5. Public perception/relations
6. Space for drying operations
7. Local restrictions on land application
8. Wet weather impeding drying operations
9. Other

Reasons listed as “other” included lack of space for drying beds, and sea level rise related to height restrictions for levees.

Another challenge mentioned is the impact of increasing air quality regulations that limit biosolids treatment options by potentially creating compliance issues and future uncertainty. For example, high temperature drying uses less space but requires combustion of natural gas, which increases both conventional pollutants and greenhouse gas emissions. These impacts

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might require pollutant offsets or cause an agency to exceed regulatory thresholds for additional programs⁶.

4.2 Future Biosolids Management Plans

The survey asked respondents about their plans for biosolids management in 2016, in five years, and beyond 2025 when ADC may be phased out as a reuse alternative. Only two agencies were planning to make changes in 2016:

- Fairfield-Suisun Sewerage District: *“In 2015, the District embarked on a public-private partnership with Lystek to develop a regional Organic Materials Recovery Center (OMRC) at the District WWTP. The OMRC will transform 100% of the District's biosolids into federally-registered liquid fertilizers.”* (see inset on pg. 12 on Lystek facility).
- SFPUC: *“We plan to: initiate an in-city biosolids gardening demonstration; produce Class A biosolids at our Oceanside Plant via TPAD; develop products for Class A cake; begin construction on our Southeast Plant for Class A conversion; engage in 3 research projects; participate on a hydrolysis pilot project.”*

Agencies' responses on their plans for management in five years and beyond 2025 are listed in **Table 6**. Of the thirty-one responding agencies, only twelve have concrete plans for beyond 2025.

Inset 5: City of San Jose, preparation to transfer biosolids to Newby Landfill



⁶ These programs may include, among others, Title V, the State Cap and Trade program, or the Bay Area Air Quality Management District's proposed Rule 11-18.

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Table 6. Plans for biosolids in 5 years and beyond 2025

Name of agency	Plans for biosolids in 5 years	Plans for biosolids beyond 2025, if any
Central Contra Costa Sanitary District	Same plan/strategy	Same plan/strategy
Central Marin Sanitation Agency	Participating in various programs to explore biosolids diversification options, such as the Bay Area Biosolids to Energy Coalition. CMSA recently initiated a facilities master plan that include a task to determine future biosolids options.	
City of American Canyon	continue ADC and/or land application	
City of Benicia -	Same plan/strategy	
City of Hayward	unknown	
City of Livermore	same plan	
City of Millbrae	Currently we are doing a study for class A Biosolids and Pelletizing	
City of Palo Alto	Decommission incinerators and switch to dewater and haul facility that would haul unstabilized biosolids for final treatment at another facility	Currently in development
City of Petaluma	Same plan as 2016, while continuing to evaluate future reuse options.	Comply with all biosolids regulations using a diversified biosolids reuse portfolio
City of San Jose	We plan to have a new mechanical dewatering facility and transition out of our drying beds. The City is also looking into diversification options for final use. At this time we are planning to look into diverse contractual	We plan to have a diversified portfolio that includes multiple contracts for reuse. We are also transition our current mesophilic digestion process to a Temperature Phased Anaerobic Digestion (TPAD) process to provide flexibility to add batch tanks in the future if there is the need to provide Class A biosolids.

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	options to haul our Class B biosolids for potential further treatment and reuse.	
City of San Leandro	Evaluating technologies to increase gas production and reduce biosolids production	
City of San Mateo	Similar treatment	Likely shifting to thermophilic AD/ increase digester # for Class A product.
City of Santa Rosa	Same strategy at this point	Same strategy at this point
City of South San Francisco - San Bruno Water Quality Control Plant	Continue ADC	
City of Sunnyvale	Same plan as 2015.	Construction of a new Thickening/Dewatering Facility by 2025, concurrent with new Secondary Treatment Facilities. Assessing equipment options, such as rotary drum thickeners, screw presses, bioscrubber and other emerging technologies
Delta Diablo	Investigating biosolids to energy options and interested in reducing the volume of biosolids produced	
Dublin San Ramon Services District	We may dewater a small portion of the biosolids in 5 years	We are exploring a number of options, we are currently working on an updated treatment plant and biosolids master plan
East Bay Municipal Utility District	unknown, likely not landfill ADC	We are developing a biosolids master plan.
Fairfield-Suisun Sewer District	The District intends to send 100% of its biosolids to the Lystek OMRC	The District intends to send 100% of its biosolids to the Lystek OMRC
Las Gallinas Valley Sanitary District	Most likely same as current	

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Mt. View Sanitary District	We are looking at other possibilities: Lystek, Bioforce	We are working on it
Napa Sanitation District	Continue existing plan/strategy	Continue existing plan/strategy
Novato Sanitary District	Continue to use the DLD	Continue to use the DLD
Oro Loma Sanitary District	We negotiated a fixed price (with CPI escalator) until 2027.	We negotiated a fixed price (with CPI escalator) until 2027.
San Francisco Public Utilities Commission	In five years, we plan to be actively engaged in soil blending projects, and we expect the conversion of our Southeast plant to Class A to be near completion.	We plan: a complete phase-out from landfill; to develop multiple outlets including soil blending and land application; to mature the local biosolids to soil demonstrations; to actively collaborate with academia on monitoring trace organic compounds; to strengthen soil blending operations using San Francisco's Class A biosolids as feedstock; to strengthen regional partnerships promoting biosolids safety and benefits.
Sewer Authority Mid Coastside	No change	
Sewerage Agency of Southern Marin	Same plan/strategy	The Waste Management site is planning to incorporate composting Class A onsite before 2025 once funding is secured.
Silicon Valley Clean Water	Not defined	
Union Sanitary District	Possibly increase percentage sent to composting facility and possibly pilot small amount of solids other option like Lystek.	
Vallejo Sanitation and Flood Control District	Continue to land apply at Tubbs	Land apply at Tubbs as long as possible
West County Wastewater District	Same plan/strategy as 2016.	

5. Public Outreach

5.1 Marketing

The survey asked whether agencies directly market their biosolids products. Only Santa Rosa replied in the affirmative, that they market their compost. In Southern California, seven of 33 agencies surveyed report that they directly market their biosolids products.

5.2 Outreach and Education

Agencies were asked whether they conduct any outreach or education pertaining to their biosolids programs, and via what venue. Only six agencies replied that they conduct outreach pertaining to biosolids, and they use a combination of YouTube videos, their website, and print media. In Southern California, sixteen of the 33 respondents reported they use social media to promote their biosolids program, as illustrated in **Figure 5**.

Seventeen agencies in this survey replied that they conduct outreach but not for biosolids in particular. Seven agencies replied that they do not conduct outreach at all.

6. Biosolids Staff

The final survey question asked respondents whether their agencies have dedicated biosolids staff, and if so, how many full time equivalent positions (FTUs). Twenty-nine agencies responded that they do not have dedicated staff, with the following exceptions:

- City of Santa Rosa – 9 FTUs
- City of Sunnyvale – 2 contractors

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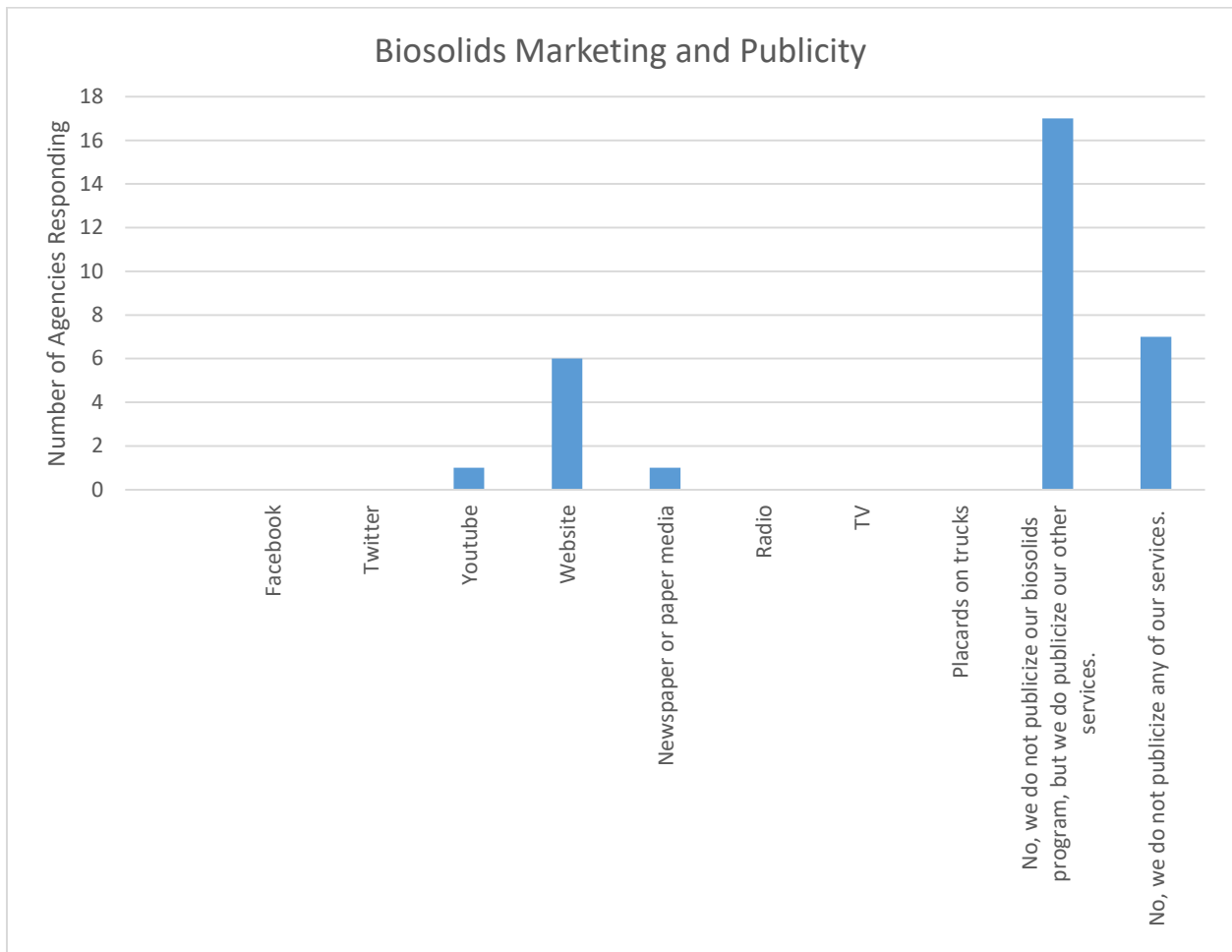


Figure 5. Number of agencies doing biosolids marketing and publicity via traditional and social media.

7. Future Surveys

BACWA intends to repeat this survey in 2018, and every two years thereafter. This will give the Region the ability to track changes in biosolids trends over time. Additionally, the Biosolids Committee may choose to expand the scope of this survey to a greater geographical area. BACWA member agencies are all permitted by the San Francisco Regional Water Quality Control Board, but the Regional Water Board's jurisdiction does not have a bearing on biosolids regulation or management.

If the next two years brings clarity on the future regulatory scenarios for biosolids reuse and disposal in California, future survey questions may be refined to better understand how agencies are responding to this shifting landscape.

Inset 6. City of San Jose dredges sludge from lagoons. Roughly 1 MGD of digester effluent is pumped to Residual Sludge Management area sludge lagoons where the material consolidates for 3 to 4 years. Consolidated material is then pumped to drying beds for one drying season.



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APPENDIX A – AGENCY DATA: 2015 Reuse and Disposal Alternatives

Central Contra Costa Sanitary District	
	Destination 1
type	incineration
location	onsite
wet tons	72,297
cost (\$/ton)	\$0
distance (miles)	0

Central Marin Sanitation Agency					
	Destination 1	Destination 2	Destination 3	Destination 4	Destination 5
type	ADC	Land Application	Land Application	Land Application	Other Products
location	Redwood Landfill, Novato	Synagro's Sonoma County land application site	Synagro's Solano County land application site	Synagro's Merced County land application site	Lystek Organic Material Recovery Center @ FSSD
wet tons	3,608	582	1,692	18	0
cost (\$/ton)	\$45.58	\$38.53	\$36.75	\$20.25	n/a
distance (miles)	34.6	36.4	104	296	86.4

City of American Canyon	
	Destination 1
type	ADC
location	Hay Road Landfill, Solano County
wet tons	197
cost (\$/ton)	\$0.00
distance (miles)	64

City of Benicia	
	Destination 1
type	ADC
location	Hay Road Landfill, Vacaville, California
wet tons	2,330
cost (\$/ton)	\$79.28
distance (miles)	60

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City of Hayward	
	Destination 1
type	Landfill
location	Altamont Landfill & Resource Recovery Facility
wet tons	2395.54
cost (\$/ton)	not reported
distance (miles)	70

City of Livermore		
	Destination 1	Destination 2
type	ADC	Land App
location	Vasco Rd Landfill	Robinson Ranch, Winton, CA
wet tons	5,751	2,060
cost (\$/ton)	\$40.00	\$40.00
distance (miles)	14	172

City of Millbrae				
	Destination 1	Destination 2	Destination 3	Destination 4
type	Land App	Land App	Compost	ADC
location	Merced County	Sacramento County	Merced County	ADC
wet tons	223	916	121	236
cost (\$/ton)	\$54.95	\$54.95	\$54.95	\$54.95
distance (miles)	131	100	131	200

City of Palo Alto	
	Destination 1
type	incineration
location	onsite
wet tons	34,680
cost (\$/ton)	\$0
distance (miles)	0

City of Petaluma	
	Destination 1
type	ADC
location	Hay Road Landfill
wet tons	9,294
cost (\$/ton)	\$43.35
distance (miles)	104

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City of San Jose	
	Destination 1
type	ADC
location	Newby Island Landfill
wet tons	53,405
cost (\$/ton)	\$30.00
distance (miles)	2

City of San Leandro	
	Destination 1
type	Land App
location	Robinson Ranch, Merced
wet tons	7,590
cost (\$/ton)	\$36.95
distance (miles)	250

City of San Mateo		
	Destination 1	Destination 2
type	Land App	ADC
location	Solano Co,	Potrero Hills Landfill- Contra Costa
wet tons	3,828	3,083
cost (\$/ton)	\$34.75	\$34.75
distance (miles)	150	140

City of Santa Rosa									
	Dest. 1	Dest. 2	Dest. 3	Dest. 4	Dest. 5	Dest. 6	Dest. 7	Dest. 8	Dest. 9
type	landfill	Land app	Land App	Land App	Land App	Land App	Land App	Compo st	Storage
location	landfill	South County land app	South County land app via storage	stone farm	stone farm via storage	brown farm	brown farm via storage	City of Santa Rosa Compo st Facility	Alpha Storage for use in 2016
wet tons	2349	9382	2591	22	399	180	568	8514	3971
cost (\$/ton)	\$5.33	\$5.33 - \$7.96	\$6.21 - \$8.83	\$4.30	\$3.24	\$3.24	\$3.24	\$1.84	\$3.24
distance (miles)	24	36.5 - 57	36.5 - 57	6.9	4.9	4.5	4.5	0.5	6

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City of South San Francisco - San Bruno Water Quality Control Plant		
	Destination 1	Destination 2
type	ADC	ADC
location	Newby Island Landfill	Potrero Hills Landfill, Suisun City
wet tons	12,753	1,228
cost (\$/ton)	\$55.00	\$55.00
distance (miles)	80	124

City of Sunnyvale						
	Destination 1	Destination 2	Destination 3	Destination 4	Destination 5	Destination 6
type	Land App	Land App	ADC	ADC	Compost	Onsite Disposal
location	Sacramento County	Merced County	Vasco Road Landfill	Potrero Hills Landfill	Central Valley Composting Facility	Sunnyvale Biosolids Monofill
wet tons	6,685	5,015	93	609	321	2,641
cost (\$/ton)	\$135.00	\$135.00	\$135.00	\$135.00	\$135.00	\$14.63
distance (miles)	130	250	80	160	220	2

Delta Diablo			
	Destination 1	Destination 2	Destination 3
type	Land App	ADC	Compost
location	Various Sacramento and Solano County sites	Potrero Hills Landfill	Synagro's El Nido Compost Facility
wet tons	10,800	1,119	114
cost (\$/ton)	\$32.18	\$32.18	\$50.42
distance (miles)	140	80	240

Dublin San Ramon Sanitary District	
	Destination 1
type	Onsite Disposal
location	DSRSD
wet tons	37,500
cost (\$/ton)	\$3.50
distance (miles)	0

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East Bay Municipal Utilities District		
	Destination 1	Destination 2
type	ADC	Land App
location	landfill ADC	land application
wet tons	43,001	33,024
cost (\$/ton)	\$30.40	\$36.22
distance (miles)	90	260

Fairfield-Suisun Sewer District	
	Destination 1
type	ADC
location	Potrero Hills Landfill
wet tons	11,219
cost (\$/ton)	\$22.00
distance (miles)	20

Las Gallinas Valley Sanitary District	
	Destination 1
type	Onsite Disposal
location	LGVSD
wet tons	4,170
cost (\$/ton)	\$11.00
distance (miles)	0.15

Mt. View Sanitary District	
	Destination 1
type	ADC
location	B&J Hay Road Landfill
wet tons	750
cost (\$/ton)	\$15.00
distance (miles)	76

Napa Sanitation District	
	Destination 1
type	Onsite Disposal
location	NSD
wet tons	6,846
cost (\$/ton)	\$0.00
distance (miles)	0

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Novato Sanitary District	
	Destination 1
type	Onsite Disposal
location	Novato Designated Land Disposal
wet tons	18,000
cost (\$/ton)	\$7.72
distance (miles)	0

Oro Loma SD	
	Destination 1
type	ADC
location	Altamont Landfill
wet tons	9,841
cost (\$/ton)	\$33.50
distance (miles)	62

San Francisco Public Utilities Commission							
	Destination 1	Destination 2	Destination 3	Destination 4	Destination 5	Destination 6	Destination 7
type	Land App	Land App	Land App	Compost	ADC	ADC	ADC
location	Sonoma County	Solano County	Sacramento County	Merced	Hay Road Landfill	Potrero Hills Landfill	Altamont Landfill
wet tons	2,349	21,549	4,324	3,371	20,376	14,512	2,125
cost (\$/ton)	\$42.32	\$49.81	\$82.64	\$94.42	\$65.12	\$64.43	\$66.06
distance (miles)	69	126	246	284	124	136	136

Sewer Authority Mid Coastside	
	Destination 1
type	Landfill
location	Ox Mountain Landfill
wet tons	1,485
cost (\$/ton)	\$42.08
distance (miles)	5.2

Sewerage Agency of Southern Marin		
	Destination 1	Destination 2
type	ADC	Land App
location	Waste Management Inc. (Redwood Landfill),	Synagro, Land Application
wet tons	700	252
cost (\$/ton)	\$72.96	\$51.03
distance (miles)	43	58

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Silicon Valley Clean Water					
	Destination 1	Destination 2	Destination 3	Destination 4	Destination 5
type	Compost	Land App	Land App	Land App	ADC
location	Central Valley Compost	Solano County	Merced County	Silva Ranch Sacramento County	Potrero Hills Landfill
wet tons	2,981	67	120	4,330	5,044
cost (\$/ton)	\$150.00	\$36.98	\$36.98	\$41.98	\$45.01
distance (miles)	250	150	250	250	144

Union Sanitary District					
	Destination 1	Destination 2	Destination3	Destination 4	Destination 5
type	Compost	Land App	Land App	Land App	ADC
location	Central Valley Composting Facility	Merced County	9896 WT	Solano County	Vasco Road Landfill
wet tons	3,470	3,319	9,896	98	2,450
cost (\$/ton)	\$49.27	\$30.41	\$30.41	\$30.41	\$30.41
distance (miles)	252	220	161	147	70

Vallejo Sanitation and Flood Control District	
	Destination 1
type	Land App
location	Tubbs Island, Sonoma County
wet tons	12,292
cost (\$/ton)	\$12.00
distance (miles)	26

West County Wastewater District	
	Destination 1
type	ADC
location	Keller Canyon, Pittsburg
wet tons	9,304
cost (\$/ton)	\$0.00
distance (miles)	57