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**ANNUAL REPORT to the
SOLANO COUNTY BOARD OF SUPERVISORS**

LAND APPLICATION OF BIOSOLIDS in SOLANO COUNTY



**Prepared by the BACWA Biosolids Committee
December 2015**

Introduction

With the 2015 application season recently completed, the Bay Area Clean Water Agencies (BACWA) Biosolids Committee is pleased to present its annual summary report on land application of biosolids in Solano County. BACWA wishes to express its sincere appreciation to the staff of the Environmental Health Services Division of the Department of Resource Management for the continuing support of the biosolids land spreading program, which permits many of our member agencies to continue to apply biosolids to agricultural land in the County. We believe this partnership provides a valuable resource to the Solano County agricultural industry and provides many Bay Area agencies with an opportunity to cost-effectively beneficially use biosolids and make a positive impact on the environment.

This report provides information on trends in the use of biosolids resources in California and the Bay Area, an update on regional biosolids programs, and specific information on projects and other efforts by individual agencies currently applying biosolids in the County. This report highlights each agency's compliance with the requirement in Chapter 25, Article IV, Sec. 25-400 that "Class B biosolids may only be land applied provided that the generator of the Class B biosolids is individually or as part of a consortium having a portion of their biosolids produced as Class A Exceptional Quality biosolids, converting biosolids to energy, or otherwise diverting Class B biosolids away from land spreading or landfilling (as waste or as Alternative Daily Cover)." This report is intended as supplemental information to the report submitted by the County Department of Resource Management staff and by Synagro, contract haulers and applicators of biosolids. In 2015, there were no permit violations, no regulatory issues, and no complaints related to the program.

This report has been prepared for the Solano County Board of Supervisors in response to the Board's request for an annual update on agency activities and progress towards compliance with the goals set forth in County Code (Chapter 25). The affected agencies have coordinated the required reporting through BACWA to produce a single report for the Board.

We would like to acknowledge the assistance of your staff in working with BACWA member agencies throughout the year, particularly Terry Schmidtbauer, Jagjinder Sahota, Jeff Bell, Misty Kaltreider, and Matthew Geisert.

Municipal Agencies Applying Biosolids in Solano County

The application of biosolids provides soil amendments and nutrients to enhance the productivity of the farmland using natural, recycled materials. Each agency that applies biosolids is required to meet strict standards and provides a report annually to the United States Environmental Protection Agency (USEPA) to demonstrate compliance. The following Bay Area agencies currently transport biosolids to agricultural land in Solano County under contract with Synagro:

Central Marin Sanitation Agency (CSMA)
City of Burlingame
City of Calistoga
City of San Mateo
North San Mateo County Sanitation District
(Daly City)

San Francisco Public Utilities Commission
Southeast WPCP (SF-SEP)
Oceanside WPCP(SF-OSP)
Silicon Valley Clean Water (SWCW - serving
Belmont, Redwood City and San Carlos)
Town of Windsor
Union Sanitary District (serving Fremont,
Newark and Union City)

A total of 6,416 dry tons were land applied on agricultural sites in Solano County in 2015. The portion from each agency is shown in Figure 1.

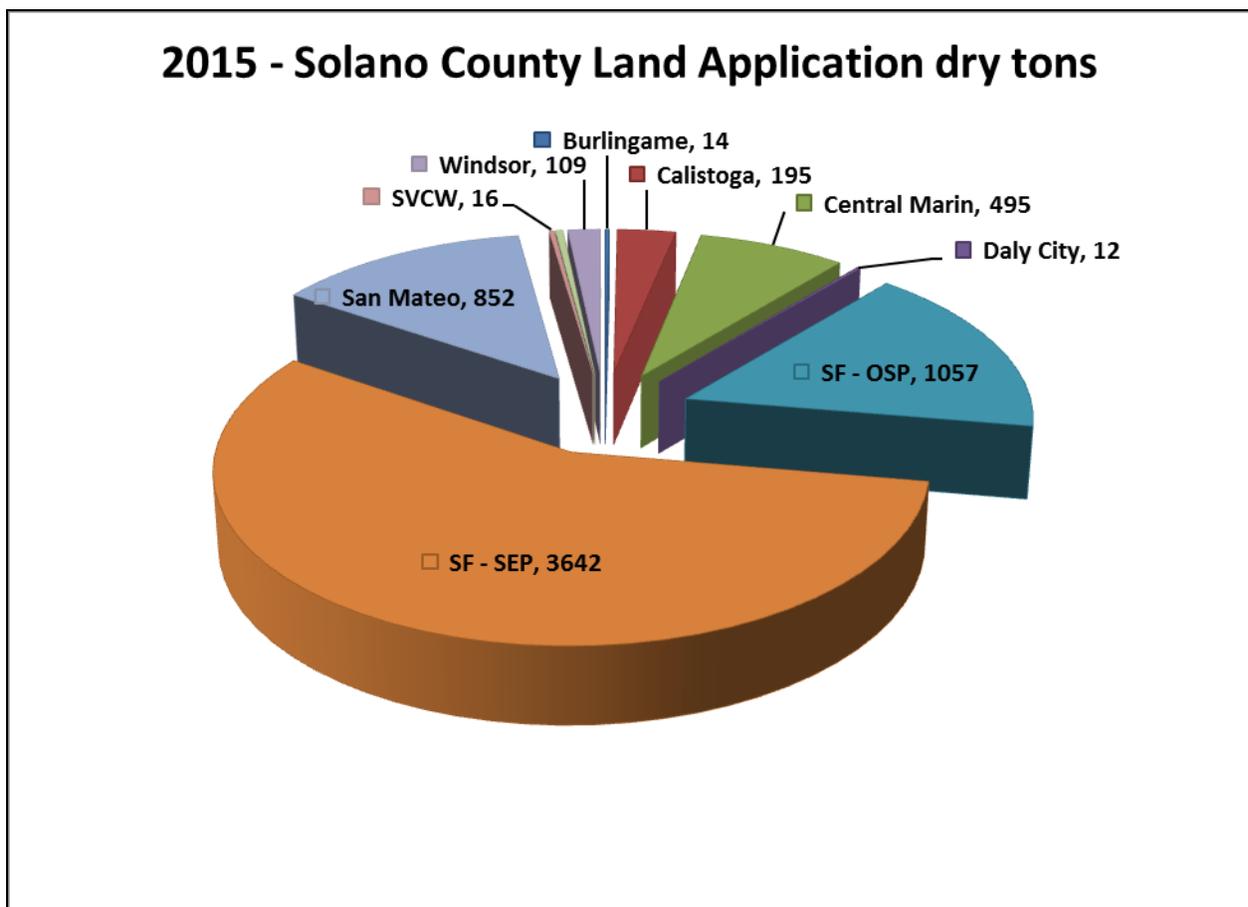


Figure 1. Amount of Biosolids Applied in Solano County by Each Agency in Dry Tons (2015). (Data provided by Synagro).

Data provided by Synagro indicates that the total quantity of biosolids applied to agricultural land in Solano County in 2015 remained similar to the 2014 application season, with a slight decrease of 2%.

Trends in Biosolids Usage in California

In general, municipal agencies in California are continuing to explore options for reuse, recycling and disposal of biosolids and are evaluating available technologies for extracting energy and nutrients. Traditional uses still dominate the biosolids landscape, however, primarily due to cost and reliability factors. Other efforts include development of processes for production of Class A biosolids.

Overall Use Summary. Figure 2 summarizes the use of biosolids in California for calendar years 2009 through 2014. Data for 2015 are not yet available and will be included in the 2016 report. The number one use statewide continues to be land application in various forms, including compost, Class B and Class A applications. From 2014 to 2015, land application of compost increased from 26 to 30 percent, and land application of Class B Biosolids increased from 20 to 25 percent. Biosolids have proven to be a safe, reliable and nutrient-rich soil amendment that offers a more cost-effective alternative to chemical fertilizers, which are increasingly expensive and very energy intensive to produce. Other significant methods for beneficial use and disposal include alternate daily cover (and other approved uses as a soil substitute) at landfills and landfill disposal.

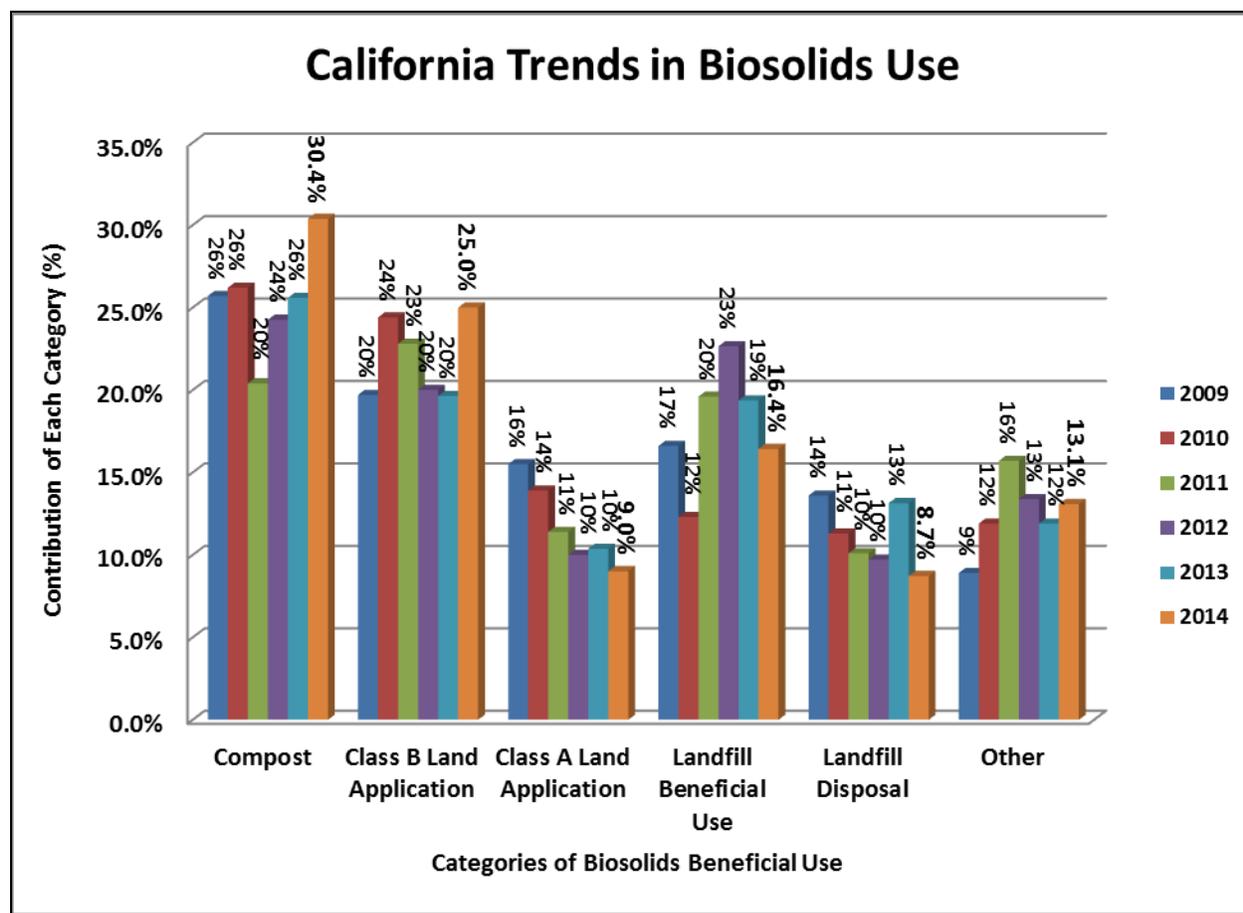


Figure 2. California Trends in Biosolids Use for the Years 2009 to 2014. (Data provided by EPA Region 9).

Bay Area Trends. In focusing on the Bay Area, Figure 3 illustrates uses of biosolids in the nine Bay Area counties. The primary uses continue to be landfill beneficial use, land application and incineration, which together account for 85% of biosolids end uses in the Bay Area. Compost, landfill disposal, and surface disposal levels remained similar to 2013 percentages.

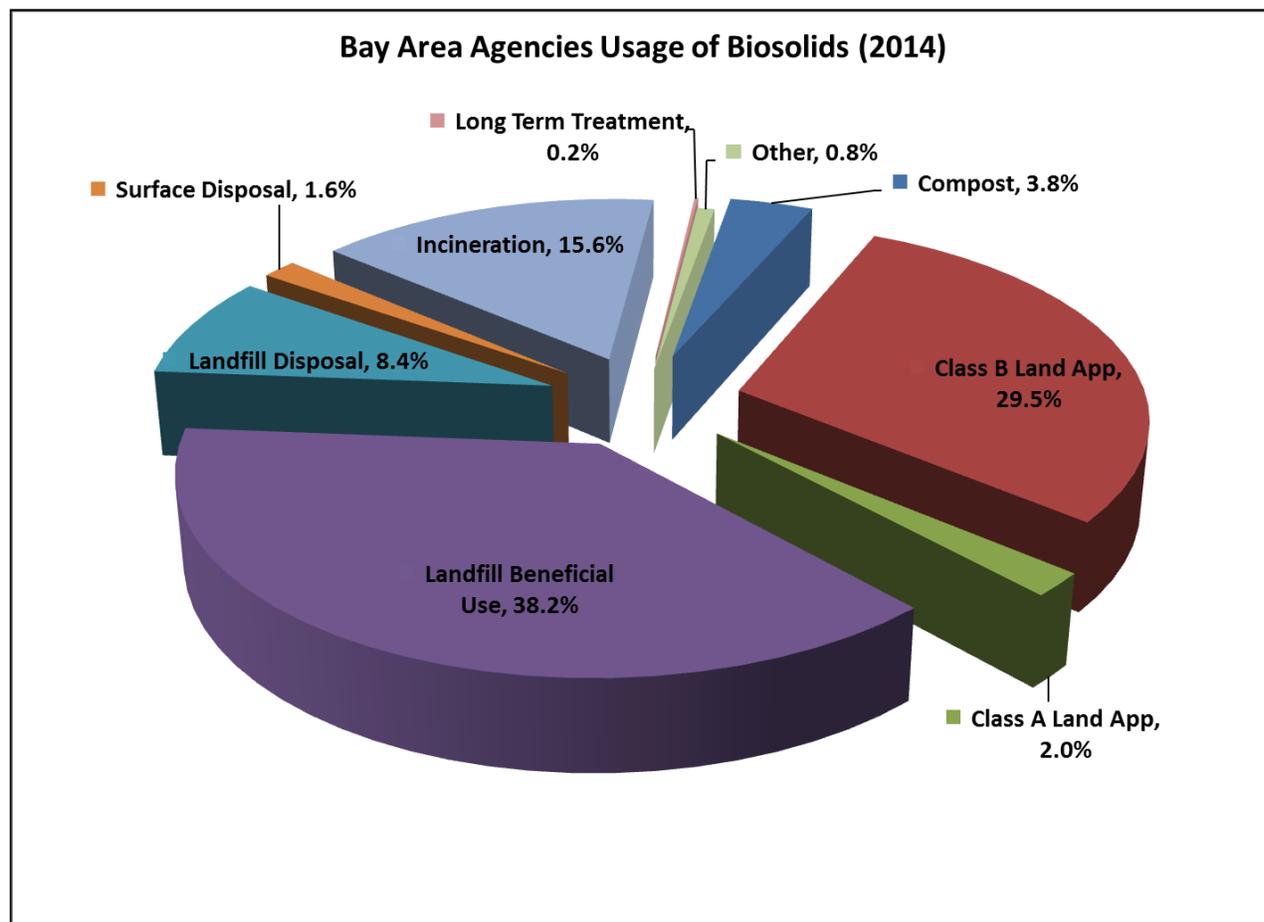


Figure 3. Bay Area Agencies Usage of Biosolids (2014). (Data Provided by EPA Region 9). (Other typically includes storage)

Biosolids were applied to agricultural land in six different Northern California counties in 2014 with Solano County ranking 4th at 7.8%, which is very similar to the previous year level of 7.9%. Figure 4 illustrates the distribution of land applied biosolids among the various counties.

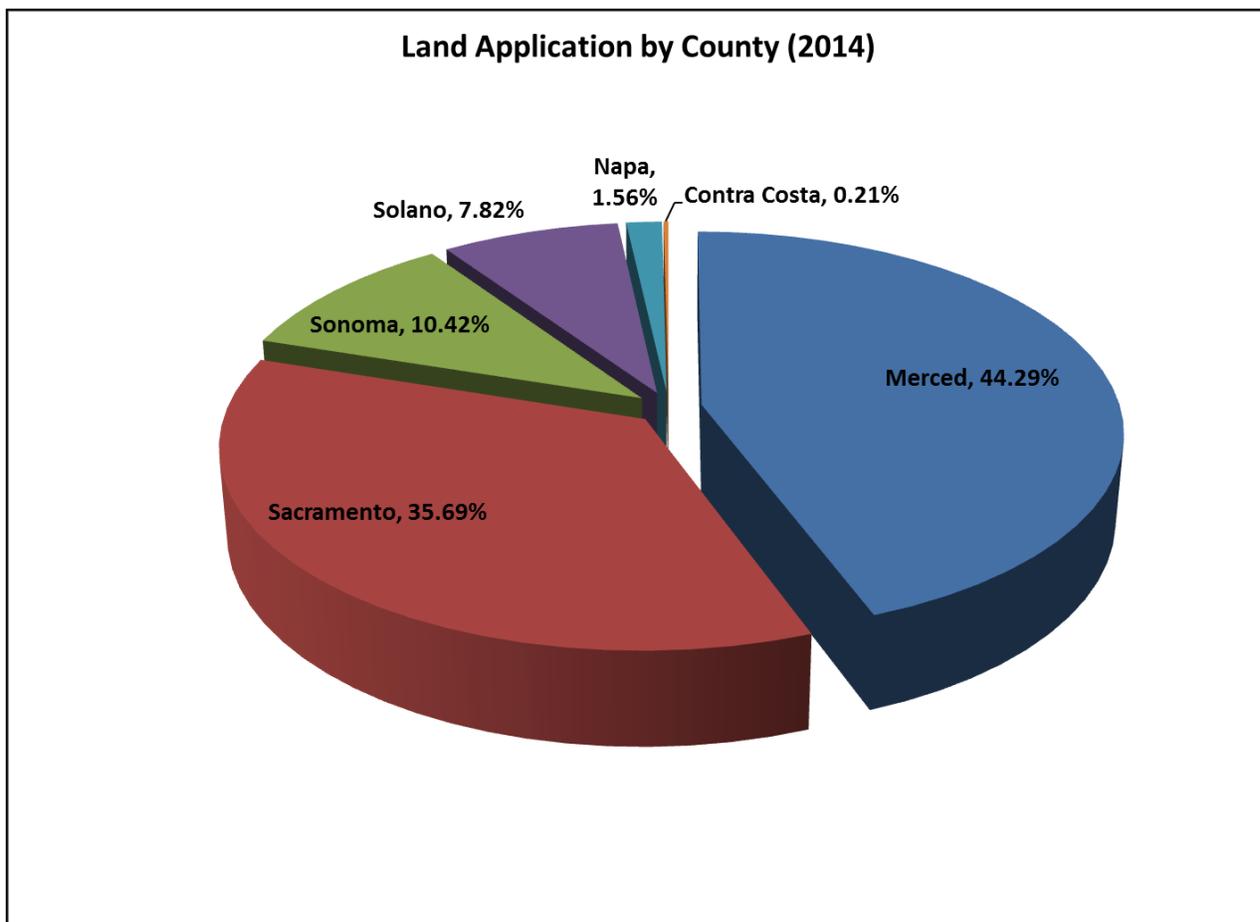


Figure 4. Distribution of Land Application of Biosolids among the Counties. (Data Provided By EPA Region 9).

Bay Area Regional Efforts

BACWA Biosolids Committee. The BACWA Biosolids Committee's (Committee) mission is to support the development and maintenance of cost-effective, sustainable biosolids management options for the more than 150,000 dry metric tons of biosolids produced in the Bay Area annually. The Committee continues to provide proactive support and information sharing to member agencies on regional biosolids issues, projects, and proposed regulations and legislation. The Committee holds quarterly meetings with an emphasis on biosolids technology information sharing among the participating agencies by providing facility tours and establishing a forum for vendors to present their products and technologies. In 2015, the Committee met at Silicon Valley Clean Water with a tour of an onsite BioForce Tech dryer, at the City of Santa Rosa with a tour of their compost facility, and at East Bay MUD with a tour of their dewatering facility.

Bay Area Biosolids to Energy Program. The Bay Area Biosolids to Energy Coalition (BAB2E, Coalition) was formed in 2006 and includes nineteen San Francisco Bay Area agencies representing a total population of over four million people. BAB2E seeks to develop options to

implement within the Bay Area that utilize biosolids as a renewable energy resource. Producing energy from biosolids is an emerging field with multiple ongoing advancements in technology, research and development currently taking place. BAB2E pursues a multi-pronged approach that includes:

- Advocacy for regulations and funding to foster technology solutions and project implementation as feasible as possible
- Solicitations of vendors to identify ready to implement commercial-scale projects, and implement those projects in the Bay Area
- Technology research and development through facilitating partnerships and hosting demonstration projects

Current coalition members are:

City of Burlingame	Fairfield-Suisun Sewer District
City of Livermore	Ironhouse Sanitary District
City of Millbrae	North San Mateo County Sanitation District
City of Palo Alto	San Francisco Public Utilities Commission
City of Richmond	Sausalito-Marín City Sanitary District
City of San Jose	Silicon Valley Clean Water
City of Santa Rosa	Union Sanitary District
Central Marin Sanitation Agency	Vallejo Sanitation District
Delta Diablo Sanitation District	West County Wastewater District
Dublin San Ramon Services District	

Advocacy. Previously BAB2E obtained a \$1 million grant through the California Energy Commission for a demonstration project. This year, BAB2E secured language in the House and Senate Energy & Water Appropriations bills directing biosolids feedstock to be included under Department of Energy renewable energy program funding. The Coalition has supported grant proposals to the California Energy Commission, and it continues to look for more grant opportunities. The Coalition's Synagro/SCFI project has also been advocated for the state's cap and trade funding opportunities.

Solicitation for Project Proposals. The Coalition issued a request for proposals in 2013 and is now in discussions with the team of Synagro/SCFI regarding a proposed biosolids to energy facility. SCFI's AquaCritox® technology uses Super Critical Water Oxidation (SCWO), an oxidation process that converts organic materials into carbon dioxide and water. Ideally, through future solicitations, biosolids to energy options will be developed for implementation throughout the Bay Area, providing valuable locally-distributed energy generation and reduction in hauling. The Coalition negotiated and signed a Term Sheet with Synagro/SCFI that describes the project and framework for the project to be constructed in the Bay Area. This project will process 22,500 wet tons of biosolids per year, be energy positive and provide useful residuals.

Technology Development Challenges. Commercial-scale demonstration of biosolids to energy requires substantial capital investment that is difficult to obtain without a revenue stream; yet agencies cannot commit a revenue stream without commercial-scale demonstration. It is expected that initial projects will require state and federal assistance to help offset the higher costs. However, once initial projects are established, costs are expected to decrease. BAB2E goals are closely tied to state and federal policy goals of renewable energy development and greenhouse gas reduction; and the state and federal government have an interest and role in addressing this challenge by assisting with the funding gap.

Technology Research & Demonstration Projects. Significant work is underway to develop technologies that can cleanly and efficiently convert biosolids to usable forms of energy including electricity and transportation fuel. Specifically, Coalition agencies are sponsoring three different technology demonstration projects. These demonstration projects are at different stages of design, funding, and testing. One demonstration project (BioForceTech) is now looking to build a commercial scale version at a Coalition member agency. BAB2E is also participating in a program called Leaders Innovation Forum for Technology (LIFT) sponsored by the Water Environment Research Foundation (WERF) to foster technology development to meet industry challenges.

Individual Agency Programs

Individual BACWA agencies are responsible for their own biosolids management programs and each develops its own plan in addition to participating in regional programs. Below are program highlights for many of the participating agencies. Note that while Fairfield Suisun Sewer District does not apply biosolids to agricultural land in the County, they are an active participant in both the BACWA Biosolids Committee and the BAB2E Coalition.

All agencies that land applied Class B biosolids in Solano County either participated in the BAB2E Coalition and/or diverted a portion of their biosolids to Class A conversion facility (i.e., compost).

Central Marin Sanitation Agency. The Central Marin Sanitation Agency (CMSA) began contracting with Synagro in 2015 for land application of its biosolids during the dry weather season in Solano and Sonoma County. CMSA sent approximately 17.5 wet tons of their biosolids to Synagro's Central Valley Compost facility and they continue to be a member of the BAB2E Coalition.

City of Burlingame. The City of Burlingame Wastewater Treatment Facility continues to contract with Synagro to land apply biosolids to farmland in both Sacramento and Solano Counties. During calendar year 2015, a portion of biosolids was diverted to Merced County for composting at Synagro's Central Valley Compost facility. The City continues to participate in the BAB2E Coalition.

City of Calistoga. The City of Calistoga produces prepared according to 40 CFR regulations. At this facility, solids are processed by the treatment methods of thickening and application to drying beds. The material is land applied to various fields in Solano County by Synagro, and a portion of this material is diverted to produce Class A Biosolids at Synagro's Central Valley Compost Site.

City of San Mateo. All of the City's biosolids are beneficially used as either ADC, soil amendment, or compost feedstock. Synagro is presently shipping a portion of the biosolids to its Central Valley Compost Facility. The City received a grant from the California Energy Commission in November 2014 to clean and utilize the biogas from the digestion process to produce compressed natural gas (CNG) for the City's vehicle fleet. The City anticipates producing 500 gas gallon equivalents per day.

North San Mateo County Sanitation District. North San Mateo County Sanitation District (Daly City) continues to contract with Synagro to land apply biosolids to farmland in both Sacramento and Solano Counties. Additionally, biosolids were diverted to Merced County for producing a Class A compost material. Daly City continues to actively participate in the BAB2E Coalition.

San Francisco Public Utilities Commission (Southeast and Oceanside). The Wastewater Enterprise (WWE) is one of three enterprises of the SFPUC. WWE marked its sixteenth consecutive season of land application of Class B biosolids in Solano County. Inspectors from the WWE perform bi-weekly land application inspections in Solano County to ensure that the contractors are following local regulations. In addition to Solano County, the WWE also land applies Class B biosolids in Sonoma and Sacramento Counties. WWE also contracts with Synagro to divert 5,000 to 10,000 wet tons per year to Synagro's Central Valley Compost Facility in Merced County. In 2015, the WWE diverted approximately 5% of the total biosolids to this Class A option. During the wet-weather season, biosolids from both plants were beneficially used at Hay Road, Potrero Hills and Altamont landfills.

Construction reached substantial completion in August 2015 for the upgrade of the digestion process at the Oceanside Water Pollution Control Plant (OSP) to a two-stage thermophilic/mesophilic process known as Temperature-Phased Anaerobic Digestion (TPAD), which will generate Class A Biosolids as defined by the 40CFR503 regulations. Start-up will commence in early 2016 and is expected to take at least six to eight months prior to the biosolids from OSP meeting Class A requirements. The WWE is proceeding with its multi-billion dollar Sewer System Improvement Program <http://sfwater.org/index.aspx?page=616>, which includes a keystone project – complete reconstruction of the Southeast Water Pollution Control Plant's (SEP) Biosolids processing facility. WWE Staff and its consultant team (Brown & Caldwell, CH2MHill and Black & Veatch) have decided on Thermal Hydrolysis Pretreatment prior to mesophilic digestion to achieve Class A biosolids from the SEP. Completion of the new facility is expected in 2022.

The WWE continues to actively participate in the BAB2E Coalition.

Silicon Valley Clean Water. Through the end of October 2015, Silicon Valley Clean Water (SVCW) land applied approximately 56% of its Class B biosolids in Merced, Solano, and Sacramento Counties via contract with Synagro. SVCW also diverted approximately 26% of SVCW biosolids to a compost facility in Merced County. In 2015, SVCW diverted approximately 18% to landfill for beneficial use in Solano County.

SVCW is in the process of completing the Biosolids Drying Bed Improvement Project, in which the drying beds were graded and lined with concrete bottoms and lime stabilized soil on the sloped sides. New concrete decant structures along with a decant pump station are in current construction. Completion date will be in early spring 2016. SVCW is in the performance testing phase of the installation of new Fournier Fan Press units for biosolids dewatering, which will replace an outdated centrifuge unit. The performance testing is scheduled for completion in January 2016.

SVCW is participating in the efforts of the BAB2E Coalition to identify and implement other methods of biosolids beneficial use. SVCW is also investigating alternative drying methods and potential uses for biosolids independently, in the event regional efforts do not meet our long-term needs.

Town of Windsor. The Town of Windsor Water Reclamation Facility contracts with Synagro to land apply biosolids to farmland in Solano County. The Town of Windsor is currently diverting a portion of its biosolids to Merced County for composting. The Town of Windsor continues to investigate feasible and cost effective Class A biosolids treatment and process options.

Union Sanitary District. Union Sanitary District (USD) beneficially used 100% of its biosolids in 2015 and met all USEPA regulations for the 22nd consecutive year. USD continues to contract with Synagro for its biosolids management, with nearly 75% of USD's biosolids land-applied to farmland in Sacramento, Merced and Solano Counties. Approximately 25% of biosolids production was delivered to Merced County for producing Class A compost.

USD began operating a new co-generation facility which produces an average of approximately 72% of the plant's power to date. USD is one of 19 Bay Area wastewater utilities actively participating in the BAB2E Coalition.

In conclusion, Bay Area Clean Water Agencies appreciate the opportunity to present this report for your consideration and will work with staff to address any questions you may have. We look forward to the continued partnership with Solano County and ensuring future success of biosolids end use.