

Attachment 3: Work Plan/Project Map(s)

Attachment 3

Work Plan/Project Map(s)

Description of the Project:

Padre Dam Municipal Water District (Padre Dam) is a Special District that provides water, wastewater, recycled water, and recreation services in east San Diego County. As part of its strategic plan, Padre Dam identified the goal of increasing water, wastewater and energy independence. In the near future Padre Dam will install Advanced Water Treatment (AWT) at its water reclamation facility (WRF) as part of an Indirect Potable Reuse Project. The AWT Process, while beneficial to increasing local water supplies, is also energy intensive. To offset the increased energy demand from the AWT Process and to move towards energy independence, Padre Dam is proposing an innovative program to incorporate biomass energy generation into its water and wastewater management, to partner with a neighboring landfill to maximize potential biomass energy generation, and to provide brine from the AWT process to the landfill for dust suppression and landfill cover compaction.

Padre Dam's Water System

Padre Dam provides water, wastewater, recycled water and recreation services to residents in East San Diego County including Santee, El Cajon, Lakeside, Flinn Springs, Harbison Canyon, Blossom Valley, Alpine, Dehesa, and Crest. Of these Cities, El Cajon has designated disadvantaged communities (DAC) within the 60 to 90 percent range (see Attachment 7, Figure 7-1).

Padre Dam serves 100,000 residents with over 24,000 active service connections to the potable water system. The water distribution system covers a sprawling 72-square mile service area with widespread population pockets and includes 389 miles of water mains and twenty-nine treated potable water reservoirs with high water elevations ranging from 629 to 2,646 feet. The total treated potable water storage capacity is 107 million gallons (MG). Sixteen pump stations and sixteen pressure reducing stations are used to deliver the water and maintain water pressure within the distribution system. In addition, there are three chloramination stations to maintain water quality throughout the system.

The wastewater collection system includes 165 miles of pipeline and four lift stations. Approximately 60 percent of the wastewater collected is discharged into the San Diego Metropolitan Wastewater System (Point Loma Treatment Facility) and the other 40 percent is treated at Padre Dam's **Ray Stoyer Water Recycling Facility (WRF)**. The WRF is a Title 22 tertiary treatment facility with a design capacity of 2 million gallons per day. The WRF provides recycled water to the recycled water distribution system for irrigation customers and to the Santee Lakes Recreation Preserve.

Sycamore Landfill Facility

San Diego Landfill Systems (SDLS), a Republic Services Company, owns and operates several municipal landfills in the San Diego area including the Sycamore Landfill located in the easterly portion of the City of San Diego. Within the existing 603-acre landfill site, approximately 150 acres have been disturbed to date by prior and on-going landfill operations. The Sycamore landfill may be expanding in the future and SDLS is interested in the possibility of generating electrical power through cogeneration of gases generated by digestion of solid waste trucked to the landfill. The landfill currently receives a variety of organic wastes including restaurant fat, oil and grease (FOG),

organic wastes from grocery stores and segregated green wastes. SDLS is also interested in the application of brine waste for dust control instead of water, as currently used. This approach would free recycled water for other uses (including the generation of potable water) and provide a suitable re-use option for a portion of the brine water.

Project Overview

Padre Dam, in cooperation with San Diego Landfill Systems (SDLS) is proposing to reduce GHG emissions and conserve water and energy through the development of a co-digestion facility that will generate a renewable source of biomass energy. The facility will treat the biosolids from Padre Dam's WRF and organic wastes that would have been disposed of at the landfill. It will be located at the Sycamore Landfill facility; approximately 2.5 miles from the WRF (see Location Map, **Figure 3-1**).

The proposed project will include the following components (see **Figure 3-2** for a schematic diagram of the project proposal):

- A co-digestion facility that includes a **1.3 million gallon anaerobic digester** located at the SDLS' Sycamore Landfill facility.
- The municipal biosolids from the WRF will be transported to the landfill facility, mixed with appropriate type and quantities of organic waste for enhanced energy production, and processed in the anaerobic digester. Biogas will be generated in the process.
- The biogas generated (approximately **340 SCFM of bio-digester gas**) will be converted into electricity and used to reduce the amount of power withdrawn from the grid to operate the WRF and the AWT Demonstration Plant. The biogas can also be converted to biofuel for vehicles.
- It is estimated that the co-digestion facility could ultimately generate up to **1.4 megawatts of electricity**.
- Biosolids from the WRF and organic waste is normally disposed in the landfill, and decomposition of these wastes in the landfill results in GHG emissions through leakage to the environment. These wastes will be diverted to the anaerobic digestion process and converted into renewable energy, thus reducing GHG emissions, producing renewable energy, and ultimately preserving landfill capacity.
- Brine from the AWT Demonstration Project reverse osmosis process will be used to replace water currently being used for dust control and cover compaction operations at the landfill site at an estimated rate of **15,000 GPD (16.8 acre-feet per year)**. This reduction in water will offset a portion of the total water supply demand for the region. It should be noted that the brine from the AWT Demonstration is considered as a waste stream and would have been disposed in the sewer for eventual, final ocean disposal at the Point Loma Water Treatment Plant. This innovative use of a waste product significantly reduces water consumption at the landfill.

Project Proponents/Partners

The project includes collaboration with Republic Services' SDLS Sycamore Landfill, a cooperating partner in the development and implementation of this project. This project also includes participation by Anaergia, a project implementation partner for this effort.

Letters of support from Republic Services (on behalf of SDLS) and Anaergia, Inc. are provided in **Attachments 3.1** and **3.2** respectively.

Work Plan Tasks

Task 1: Direct Project Administration and Reporting:

This task includes the management of the grant agreement requirements, and preparation and submission of supporting documents and coordination with the Department of Water Resources Project Manager (DWR Project Manager).

1.1 Project Administration

The Padre Dam Project Manager will be responsible for coordinating and maintaining communications with the DWR Project Manager. The Padre Dam Project Manager will be responsible for the overall progress of meeting the grant requirements that will be specified in the subsequent grant agreement. Activities under this task include coordination of the grant agreement, providing timely invoices, meeting grant milestone dates, and grant reporting.

1.2 Reporting

The reporting requirements are specified in the DWR grant agreement. The following reports are anticipated to be provided to the DWR project manager.

- **Progress Reports:** Padre Dam will provide the DWR with quarterly progress reports and invoices. The progress reports shall be sent via e-mail to the DWR Project Manager and shall be uploaded into GRanTS. The progress reports shall provide a brief description of the work performed during the reporting period.
- **Project Report:** Padre Dam shall prepare and submit a Project Completion Report. The Project Completion Report shall include, a description of actual work done, any changes or amendments to the project, and a final schedule showing actual progress versus planned progress, copies of any final documents or reports generated or utilized during the implementation of the project.
- **Grant Completion Report:** Padre Dam will provide the DWR Project Manager the Grant Completion Report that will include reimbursement status, a brief description of the project completed, and how the project will reduce greenhouse gas emissions, water use and energy use as a result of the project implementation.

Task 1 Deliverables: Deliverables under this task includes properly documented invoices, quarterly progress reports, Project Completion Reports (Draft and Final), and Grant Completion Report (Draft and Final).

Task 2: Easement/Cooperative Agreement

Padre Dam will collaborate with the SDLS to develop a cooperative agreement for the co-digester facility that will be constructed on the Sycamore Landfill site. The agreement will identify the roles and responsibilities for each agency as it applies to the ownership, operation, and maintenance of the co-digester facility, the use and delivery of the brine water, delivery of biosolids, and the use and application of the biogas.

Task 2 Deliverable: Deliverables under this task will consist of a copy of the fully executed Cooperative Agreement between Padre Dam and the SDLS.

Task 3: Conceptual Planning

Padre Dam will conduct the initial Conceptual Planning task that will consist of the preliminary planning activities for identifying the optimal location of the facility including the digester, waste receiving equipment, and location of structural foundations, organics extrusion press, and the pipe network. The conceptual planning will include a preliminary analysis of the feedstock sources and

optimal ratios of biosolids, organics, and fats, oils, and grease. In addition, preliminary estimates will be conducted of the facility dimensions and energy production. **Figure 3-1** provides a Location Map and **Figure 3-2** provides a schematic diagram of the process.

Task 3 Deliverables: Deliverables under this task include the Conceptual Planning Report for the co-digester facility.

Task 4: Preliminary and Final Design

This task will include the detailed design of the co-digester facility. The work will include civil design (site design and underground utility), mechanical design (process, pumping, and piping), structural design, geotechnical investigations, and electrical design (electrical service connections and control systems).

Padre Dam's design consultants will prepare engineering analyses and calculations, engineered design plans, technical specifications, and construction cost estimates. Design documents will include 50-percent, 100-percent, and Final Design documents. The final design documents will be certified by a California Registered Professional Engineer.

Task 4 Deliverables: Deliverables under this task include the Final Design Documents (Plans and Specifications), certified by a California Registered Professional Engineer, will be provided to the DWR Project Manager.

Task 5: Environmental Documentation

Padre Dam will conduct an Environmental Assessment to identify the required project-specific documents to comply with the California Environmental Quality Act (CEQA) as well as the environmental permits for the development of the project based on the Conceptual Planning Document. The Environmental Assessment will include the CEQA Environmental Checklist and a summary of the findings of the evaluation and any suggested mitigation measures and further studies needed.

Task 5 Deliverables: Deliverables under this task include the approved and adopted CEQA documentation.

Task 6: Permitting

Padre Dam will acquire the permits to develop and construct the co-digestion facility within the City of San Diego. It is anticipated that Padre Dam will acquire permits from the City of San Diego Building Department and the California Air Resources Board.

Task 6 Deliverables: Deliverables include the applicable approved Project Permits.

Task 7: Proposal Monitoring Plan

Padre Dam will develop a Proposal Monitoring Plan for the DWR Project Manager. The Proposal Monitoring Plan will include will describe how the savings in Green House Gas emissions, water, and energy will be quantified by Padre Dam. The Proposal Monitoring Plan will include the following items:

- Baseline (pre-project) water use and energy use
- Proposed savings
- Brief discussion of how water and energy savings will be monitored.
- Methodology of monitoring
- Frequency of monitoring
- Location of monitoring points

- Performance targets

Task 7 Deliverables: Deliverables include the draft and final Proposal Monitoring Plan.

Task 8: Project Construction/Implementation:

This task consists of the activities related to the contract administration, construction, commissioning and field acceptance of the Co-Digestion Facility. Padre Dam will administer the construction of the project at the landfill site including quality control through materials and equipment inspections.

8.1 Construction Contracting

Padre Dam will obtain the services of a contractor based on the contracting procedures established by Padre Dam. This will include advertising the bid documents and requesting for construction bids for the project. A construction contract will be awarded and a Notice of Award will be issued. The Notice to Proceed will be issued to the contractor, provided that the DWR Project Manager has received a copy of the Final Plans and Specifications, Environmental Documentation, and the Project Monitoring Plan from Padre Dam.

8.2 Construction Implementation

Once the Notice to Proceed has been issued, the contractor will be provided a 90-day move-in period to purchase and acquire the equipment and setup staging areas within the construction site. Padre Dam will provide a construction inspector to ensure that the project plans and specifications are followed, that all equipment meets specifications and performance standards, and materials meet quality standards. Construction of the facility is anticipated to occur over a period of 9 months.

8.3 Commissioning and Field Acceptance

At the end of the construction period, Padre Dam will conduct a commission and acceptance process with the contractor. During commissioning, the contractor will conduct performance testing of the equipment to demonstrate proper function. Field Acceptance will occur after the commissioning process has been completed, the punch list items have been resolved, the operators have been trained, and operations manual has been delivered.

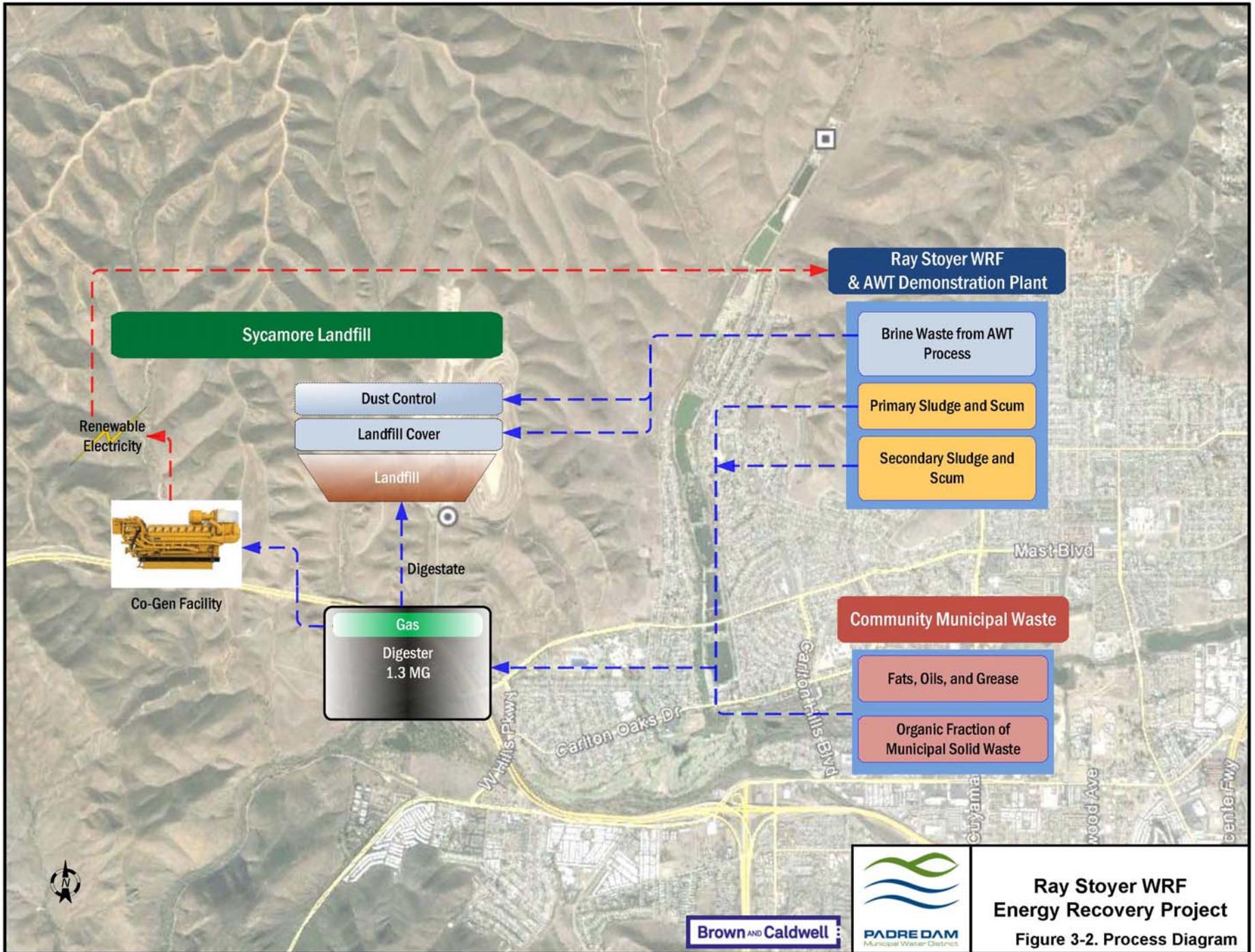
Examples of Deliverables: advertisement for bids, bid results, construction contracting and award, construction/implementation photographs, and project completion verification.

Task 8 Deliverables:

- A copy of the Construction Contracting Documents (advertisement for bids, bid results, construction contract award)
- Construction Implementation Documents (Photolog and Inspection Reports)
- Commissioning and Field Acceptance Documents (Project Completion Verification Form)



**Ray Stoyer WRF
Energy Recovery Project**
Figure 3-1. Location Map



**Ray Stoyer WRF
Energy Recovery Project
Figure 3-2. Process Diagram**

Attachment 3-1

Republic Services Support Letter



Department of Water Resources
PO Box 942836
Sacramento, CA 94236-0001

Reference: Support for Padre Dam Water-Energy Grant Program Application

To whom it may concern,

Through this letter, I wish to voice Republic Services' support for Padre Dam's application for the Water-Energy grant program, which would help establish a bioenergy facility in the San Diego region. If constructed, the Facility will not only help reduce California's GHG emissions, it will also generate renewable energy. Republic Services and Padre Dam currently partner in the use of reclaimed water. Sycamore Landfill uses recycled water from Padre Dam to supply all its dust control, irrigation and process water for aggregate mining.

Creation of Renewable Energy - Biosolids from Padre Dam and the portions of the organic fraction of municipal solid waste streams will be used to create renewable energy. Technologies will be employed to codigest these waste streams in a manner that is a cornerstone of most modern wastewater treatment plants. This process will create renewable energy in the form of biogas, which can be used to create clean energy products such as electricity and heat or pipeline-quality biomethane.

Greenhouse Gas Emissions - The facility will provide an additional resource to manage organics, such as food waste, while generating a renewal energy stream (biomethane). The biomethane can be used to produce energy either at the waste water facility or for the community.

Regional Participation Opportunities - The bioenergy Facility envisioned would rely on regional organic material to operate, including the biosolids that will be supplied by Padre Dam. Additional long-term organic feedstock commitments will be pursued, and the Facility will be designed to accept "opportunity feedstock" in the form of liquid waste such as Fats, Oils, and Grease, or other organic waste periodically available in the region.

Padre Dam has an opportunity with this grant to create a Regional renewable energy facility that will be seen as a key component in the Region's Climate Action Plan. We support Padre Dam's efforts to secure funding and plan to work closely with the team to provide resources such as expertise with organics management and biomethane processing to see this project succeed.

Sincerely,

A handwritten signature in blue ink, appearing to read "Neil R. Mohr", written over a horizontal line.

Neil R. Mohr
General Manager
San Diego Landfill Systems
Republic Services

Attachment 3-2

Anaergia Services Support Letter

12/5/2014

Department of Water Resources
PO Box 942836
Sacramento, CA 94236-0001

Reference: Support for Padre Dam Water-Energy Grant Program Application

To whom it may concern,

Through this letter, I wish to voice Anaergia's support for Padre Dam's application for the Water-Energy grant program, which would help establish a bioenergy facility in the San Diego region. If constructed, the Facility will not only help reduce California's GHG emissions, it will also generate renewable energy out of resources that are currently being landfilled.

Creation of Renewable Energy - Municipal sludge from Padre Dam and the organic fraction of municipal solid waste streams will be used to efficiently create renewable energy. Mature technologies will be employed to co-digest these waste streams in a manner that is a cornerstone of most modern wastewater treatment plants. This process will create renewable energy in the form of biogas, which can be used to create clean energy products such as electricity and heat or pipeline-quality biomethane.

Reduction in Greenhouse Gas Emissions – Even the most well managed landfills cannot capture 100% of the methane generated when organics naturally decompose, resulting in the uncontrollable emission of a potent greenhouse gas. Diversion of these organic waste streams away from landfills will significantly reduce the amount of fugitive greenhouse gasses emitted in the Region.

Regional Participation Opportunities – The bioenergy Facility envisioned would rely on regional organic material to operate, including the biosolids that will be supplied by Padre Dam. Additional long-term organic feedstock commitments will be pursued, and the Facility will be designed to accept "opportunity feedstock" in the form of liquid waste such as Fats, Oils, and Grease, or other organic waste periodically available in the region.

California's legacy of environmental stewardship has laid the foundation for companies like ours to innovate and compete, and we support Padre Dam in their endeavor to create a regional renewable energy facility which can be used as a model by the rest of California. Anaergia supports Padre Dam's efforts to secure funding, and looks forward to helping this innovative Facility become a reality.

Sincere Regards,



Dave Schneider
Vice President – Anaergia Services