

Siting and Design

Attaining LEED Certification For Solid Waste Facilities

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ON JUNE 14, 2012, THE SOUTH BAYSIDE WASTE MANAGEMENT AUTHORITY

(the Authority) received an anxiously awaited e-mail from the U.S. Green Building Council. Hilary Gans, Operations Manager, was exuberant as he read the news that the new Shoreway Environmental Center (Shoreway) was awarded LEED® Gold Certification. For the past three years the Authority had been working on changing the collection system for their 11 member cities from a dual stream to a single stream/commingled system. At the heart of this change was the transformation of their current facilities to a new state-of-the-art single stream MRF and expansion of their recycling facilities. Their goal was to create a facility that would be an environmental icon for educating customers and visitors about the benefits to reduce, reuse and recycle and create a more sustainable lifestyle, which was achieved. Receiving a USGBC LEED Gold certification was the “icing on the cake”.

Meeting the LEED certification requirements for a solid waste facility is not totally unique. At the time, there were a few facilities certified

under the previous original version of LEED criteria. The challenge was to gain certification under the latest version of LEED with its elevated criteria for reducing energy. In 2007 the USGBC modified the registration standards to require that projects demonstrate a 14 percent reduction in total energy use before it could be considered for certification. Typically, this would be achievable for a new transfer station project that includes offices and employee areas, i.e. conditioned space. However, because of the process energy required to operate a materials recovery facility (MRF) it is difficult to attain LEED certification under these conditions. Whether it be a “dirty” MRF or one to process single stream or other materials, adding new equipment makes it almost impossible without having some form of renewable energy source as part of the project. How the Authority and its consultant team were able to get the Shoreway project certified may help others in their efforts to attain LEED certification for a new solid waste facility project.



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Making the Commitment

When the Authority decided to build the new Shoreway facility, they made the commitment to pursue LEED certification. To get started, the consultant team used the LEED Credit Scorecard to evaluate the design concept. Projects can receive credits in several categories representing every aspect of the project, including water efficiency, energy and atmosphere, sustainable sites, materials and resources, indoor environmental quality, and, innovation and design process. Using the credit scorecard, the design team evaluated each item giving a “yes” if the credit could be met, “maybe” meaning it was possible to achieve the credit or “no” if the credit was considered not attainable. After the preliminary review, the design team estimated that 33 credits were either a “yes” or “maybe”, suggesting the project could achieve a Silver rating. However, as mentioned previously, the new version of LEED required that the minimum energy requirement must be met in order to qualify. The new 70,000 sq. ft. MRF building would include generous use of translucent wall panels and skylights to maximize natural lighting as well as use of energy efficient artificial lighting. But considering that new equipment processing as much as 400 tons per day of commingled materials was to be installed, it was not possible to meet a 14 percent reduction in energy without providing a renewable energy source.

The Authority made the decision to submit the LEED application and begin the process fully realizing that to meet the minimum standards they would need to spend additional capital to install photovoltaic panels. The preliminary energy model indicated that to meet the energy standard, photovoltaics would need to be installed on 60,000 sq. ft. of roof of the new MRF, supplying 90,000 kWh of renewable solar power per year. The final number of panels needed

could not be determined until the MRF was operational. The Authority was aware of the added investment needed, but reserved the decision to add the photovoltaic's until the project was being commissioned.

Completing the LEED assessment before starting the design was a very important, if not critical, first step. There are plenty of examples of projects where the design process was nearly complete or, in some cases, into construction, when a decision to pursue a LEED certification was made. Making this decision after the design is well along will inevitably result in spending extra capital to become certified or it could quite simply be too late. The design team was lead by JR Miller and Associates (JRMA), an Architecture and Engineering firm specializing in the design of solid waste facilities, located in Brea, CA. JRMA knew from the start what the standards were for attaining certification and proceeded with LEED in mind as the design process went forward.

Design and Preparation

As the team commenced design and prepared construction documents, each discipline was charged with incorporating sustainable features to address the relevant credits, which can filter through to every phase of the project. For example, paving and structures need to be demolished to allow for the new buildings. Construction documents required the contractor to demolish and recycle 95 percent of the materials with only 5 percent going to landfills. There are several credits that are relatively easy to attain as well. For instance, to minimize the carbon footprint, the pre-engineered metal building was specified to require that it contain 25 percent recycled steel and it needed to be sourced less than 500 miles from the site. Because of research by the design team, these items did not add costs to the project.

Since solid waste projects are composed of large unconditioned work zones (no heating/cooling systems) with smaller administrative support, areas addressing LEED credits during construction are important. For instance, the indoor air quality of the conditioned space was improved with selection of finish materials with low emitting properties and by protecting of mechanical systems from fugitive dust during construction. Permanent entryway systems were installed to capture dirt and particulates at regularly used exterior entrances. In the administrative/employee areas, monitors were installed to alert the building's occupants of unsafe levels of carbon dioxide.

For a solid waste project where the amount of conditioned space is less than a typical office building, it is important to create strategies to achieve innovative credits. One innovative credit was awarded for reducing the carbon footprint. This credit was derived from a key objective of the new site plan that was to improve site circulation, reduce transaction times and eliminate customer traffic from backing into the public right-of-way. JRMA's new site design accomplished this goal by relocating the main entrance road to the perimeter of the site more than doubling the queue space for customers. A new gatehouse complex with two in-bound scales resulted in reducing transaction times by 60 percent. The improvements significantly reduced the idle time of vehicles waiting to enter the existing MRF and transfer station. Using the EPA Equivalency model, the design team calculated that the new site improvements resulted in a reduction of 202.5 metric tons of CO₂, which translates to removing 37 vehicles off the highway each year.

Testing

As the project neared completion and the new single stream MRF equipment began “shake down” testing, the mechanical engineer updated the facility energy model. It showed that, overall, the project could demonstrate almost an 11 percent reduction in energy over the base case. The new Bulk Handling

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Systems processing equipment used variable speed and high-efficiency motors to economize on energy usage. Therefore, the Authority learned the project could meet the minimum energy performance standard by installing about 10,000 sq. ft. of solar panels. At this point the Authority pursued proposals from companies to install and operate the photovoltaic system and, ultimately, signed a Solar Power Purchase Agreement to install 2,700 solar panels over the entire new MRF and the expanded transfer station—over 140,000 sq. ft. The system can produce as much as 1,399 kWh of renewable energy on a sunny day. The amount of renewable energy installed meant the project had achieved a 46 percent reduction and thus received 13 credits related to the Energy category. By maximizing the use of renewable energy in conjunction with the innovative credits the Authority exceeded their expectations by gaining the Gold standard.

Achieving Certification

The Shoreway Environmental Center achieving LEED Gold certification makes it one of the few, if not the only, MRF certified under the current USGBC® version of LEED. The Shoreway experience offers several points that can be applied to any project. First, it is important to complete the LEED assessment prior to the start of the design process. This ensures that each discipline has their marching orders from the get go. Second, assign a LEED Coordinator, preferably someone that fully understands the intent and purpose of the credit system. The Coordinator should be involved in the design process to make sure the proper information and data is submitted to the USGBC

reviewer. On the Shoreway project, the Authority received approval of every credit submitted, which is unusual. Therefore, having someone who constantly monitors the process and makes sure the data supporting the credit is valuable. Third, be aggressive in pursuing innovative credits. Many solid waste projects are designed to improve operational efficiencies, reduce energy and recycle more materials. These elements can be worked into innovative credits and, as demonstrated in the Shoreway case study, they may not add any cost to the project. In the end, they could make the difference between being certified or whether the project receives a Gold versus a Silver Certification.

Just as a new version of LEED raised the bar for the Shoreway project from earlier facilities, so will new credit standards affect the next solid waste facility. New credits and/or expanded existing credits will now take into account lifecycle Assessment, acoustics, bird-friendly facades and other design factors. The good news is that MRFs, with an experienced and well-informed designer, can meet these challenges. | **WA**

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Joann Haye, LEED BD +C, Sustainable Design Leader for JR Miller and Associates, was responsible for coordinating the team and managing the process to complete the LEED certification. Joann can be reached at (859) 245-0049.

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