Lawrence Aviation Industries Site
Old Mill Pond Area
Port Jefferson, New York

Site Green Sheet

INTRODUCTION

It is the policy of the U.S. Environmental Protection Agency (EPA) to apply earth friendly technologies to remedial and removal projects within Region 2. Conscious efforts were made to utilize green techniques and resources while maintaining monetary and time efficient standards for the subject project. Some limitations, such as costs, environmental conditions, and other issues, prevented specific technologies from being utilized. Although formal cost analysis formulations were not fully used to predict differences in technology costs between conventional and green practices, loose cost-benefit structures assisted in determining the resources used.

This paper identifies the environmental and ecological friendly techniques and technologies utilized as part of the joint Remedial/Removal Action at the Lawrence Aviation Industries Site – Old Mill Pond location. Although it is not a full report on all green resources and applications utilized, it is a bulk discussion on the more available products and techniques that are considered sustainable.

Discussed in this document are a number of specific brands and/or products. This is not a designation of endorsement by the EPA or its contractors, partners, or the federal government. Where applicable, solicitations for materials and services were conducted as per citations outlined in the Federal Acquisition Regulations.

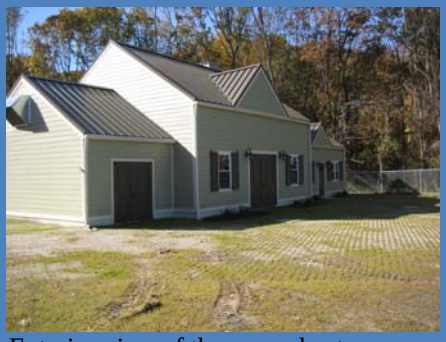
SITE HISTORY

Lawrence Aviation Industries (LAI) is located in the Village of Port Jefferson, Town of Brookhaven, Suffolk County, New York. Previously a turkey farm, LAI was a manufacturer of titanium sheeting for the aeronautics industry. Throughout the years, LAI practices for disposal of containers and chemicals were found to have caused negative environmental impacts. Drums containing trichloroethylene (TCE), tetrachloroethylene (PCE), and other wastes were allowed to leak onto the ground, making way to the underlying groundwater. EPA continues to conduct work at the LAI Superfund Site, and more information can be found at http://epaosc.org/lawrenceaviation

In September 2006, the Record of Decision (ROD) selected groundwater extraction and treatment to address groundwater contamination with the installation of groundwater treatment systems. Two have been proposed, with one system located at the facility and one within the plume area near Old Mill Pond.

Beginning in the Fall of 2007 and continuing through the summer of 2008, EPA and it's contractors conducted a groundwater investigation around the LAI Site. Based on June 2008 sampling results, it was determined that a groundwater TCE plume was traveling from the LAI Site to the north towards Port Jefferson Harbor.

In the fall of 2009, EPA authorized the allocation of funding to build a groundwater pump and treat system near Old Mill Pond. The system was designed to assist in drawing contaminated water from the up-gradient LAI Site, as well as prevent contaminated water from leaching into the Old Mill Pond, Old Mill Creek, and Port Jefferson Harbor.



Exterior view of the groundwater pump and treatment facility at the LAI-Old Mill Pond Site.

In 2010, EPA initiated and completed a number of projects throughout Port Jefferson in support of groundwater remediation. Portions of the Old Mill Pond and Old Mill Creek were cleaned and dredged. House-hold trash, dead vegetation, and other debris was removed from the surface water and creek embankment. Discharge piping was placed along Caroline Avenue and Barnum Avenue to carry discharge water to the Creek. In October 2010, EPA broke ground on construction of the groundwater pump and treatment system at the intersection of Caroline Avenue and Brook Road. The system became operation in August 2011. More information on this project can be found at www.epaosc.org/LAI_OldMillCreek

GREEN STRATEGY

Utilization of eco-friendly products and deployment of environmentally friendly techniques was discussed and primarily developed during the site development phase of activities. Project managers reviewed a variety of documents for ideas and established criteria that would benefit the project, environment, and human health. Documents associated with the United States Green Building Council (USGBC) supplied the platform for decision making concepts to follow, such as the Leadership in Energy and Environmental Design (LEED) program. Although this project has not been registered to receive a LEED accreditation, the guidelines set forth in the *LEED 2009 for New Construction and Major Renovations* were followed. This was the most current document published by the USGBC for LEED certification at the time of project design and construction.

Inspiration for utilizing specific techniques was also acquired through EPA Region 2 assets and EPA Superfund documentation. Site managers reviewed the *EPA Region 2 Clean and Green Policy, EPA Office of Solid Waste and Emergency Response Superfund*

Green Remediation Strategy, and various additional Agency publications. Reach-out and idea suggestions for specific tasks were provided by EPA Region 2 personnel working in sustainability design, as well as those working in the EPA Office of Superfund Remediation and Technology Innovation.

MATERIALS

LUMBER

Most lumber products used at the Site were purchased from a commercial yard located less than 5 miles from the Old Mill Pond location. The company is a "Certified Green Dealer™" and stocks products that are environmentally friendly, renewable, and energy conscious.

Lumber utilized for permanent structures on the facility has the potential for meeting LEED certification credits for New Construction, Materials and Resources, Credit 7 for Certified Wood (1 point). All lumber used for this project was grown and processed in the United States.

Framing

Framing is a construction technique that is based around structural members to provide a frame in which interior and exterior walls are attached. Materials utilized for framing generally include studs, solid wood in 2X4 or 2X6 dimensions. In creating the frame of the pump and treatment facility, studs were purchased from a local vendor located less than 4 miles from the Site. The wood selected is made of new wood that is rapidly-renewable.

Sheathing

Sheathing is plywood that is attached as an outer layer of a structure after the fame has been built. It is primarily attached to the wall studs and roof joists of a timber frame. Sheathing is used to protect the interior from adverse climate, provide privacy, and supply security. It is the space between sheathing and frame that insulation is typically placed for additional interior climate control. For the Lawrence Aviation Industries – Old Mill Pond Site, sheathing utilized was obtained from Boise Cascade, a company that promotes and practices sustainable responsibility. Although the company does not own timberlands, the pine plywood utilized for this project has undergone third party certification for sustainability. All wood procurement practices are audited and certified under the Sustainable Forestry Initiative® (SFI®) and the Program for Endorsement of Forest Certification (PEFC)[1].

[1] Information obtained from website http://www.bc.com/sustainability.html

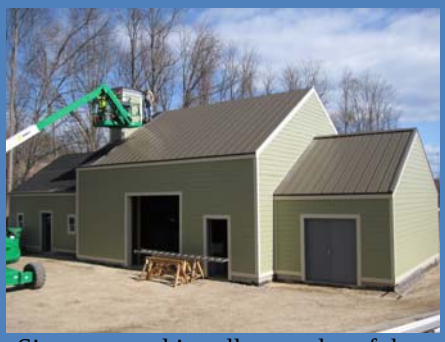
WINDOWS

When choosing products to be utilized for the construction of the groundwater treatment system, energy efficiency was at the fore-front of thought. Choosing the right windows proved to be no exception. Windows chosen needed to be of character to the exterior structure to provide an aesthetic look, but also needed to provide natural light, ventilation, and energy efficiency while being cost efficient. A total of eight windows were purchased and installed for the LAI-Old Mill Pond project. All windows are double hung, argon filled with an Energy Performance U-Factor of 0.30. All windows are Energy Star® qualified and rated by the National Fenestration Rating Council®.

Windows were purchased from a facility located in Farmingdale, NY, approximately 30 miles from the project site.

ROOFING

During the design phase of this project, EPA decided to utilize a roof that would provide a better energy efficiency rating than a standard black asphalt-shingle roof. A cool roof is made of material and/or color that has a solar reflectance index rating of 29 or greater. This not only provides for lower energy costs (due to cooling the interior), but also reduces the occurrence of a heat island effect. EPA decided to go with a metal roof due to look, colors available, durability, and its wide variety of uses in the community. A request for bid to provide this type of roof was developed and sent to various companies for proposal. The awarded firm supplies metal roofs manufactured by ATAS International. EPA supplied the Village of Port Jefferson with a list of colors available with an SRI value of 29 and greater. Working with the Architectural Review Committee and Port Jefferson Beautification Committee, a metal roof painted medium bronze was selected. The roof has a SRI value of 29, meeting the definition of a cool roof.



Site personnel install a metal roof that meets the criteria for a cool roof, reducing the heat island effect.

ATAS International Roofs have the potential for meeting LEED certification credits for New Construction, Sustainable Sites, Credit 7.2 for Heat Island Effect – Roof (1 point). ATAS International Roofs are made in the United States.

SIDING

A variety of siding options are available on the market, however, the theme of the municipality limited choices. HardiePlank® Lap Siding was chosen for its common look

throughout Port Jefferson and the Northeastern United States, but also for the environmental friendly qualities. HardiePlank® is made of sustainable products that are low in toxicity, including wood pulp, cement, sand, and water[2]. The finished material is durable in cold and wet climates and is resistant to damage from insects, hail, wind, and fire. The material is low maintenance requiring little upkeep. The HardiePlank® was generated from a facility located in Blanders, PA, approximately 175 miles from the project site. All coloring is conducted at the manufacturing plant, allowing no additional application of paint, stain, or other finishing materials. The color selected was chosen by the people of Port Jefferson during a public meeting with input from the Architectural Review Committee, Beautification Committee, and Port Jefferson Mayor's Office.

HardiePlank® Lap Siding has the potential for meeting LEED certification credits for New Construction, Materials and Resources, Credit 5.1 and 5.2 for Regional Materials (2 credits). HardiePlank® is made in the United States.

INSULATION

A decision agreed upon by site management was for the use of a spray-foam insulation. After thorough research, spray foam insulations were found to be better insulators against exterior climate changes, thus reducing interior energy consumption. They tend to stop air and moisture more efficiently than traditional insulation materials, save energy costs, keep dust and pollen out, and reduce requirements necessary on HVAC systems[3]. EPA's contractor generated a Request for Proposals for spray foam insulation. SoyTherm® was chosen based on price, product stability, and environmental benefits. SoyTherm® is a soy-based material that is free of formaldehyde, petroleum, asbestos, fiberglass, and volatile organic compounds (VOCs). The material is an air barrier that limits the amount of pollen and dust penetrating into the work space and reduces energy consumption due to climate control. SoyTherm® provides for noise reduction, an important issue to the surrounding residential property owners. It comes in various "models" of thickness, allowing for site tailored requirements for noise and climate control to be met. The material is a 100% renewable resource and is made in the United States[4].

Workers apply soy-based spray foam insulation that acts as a climate barrier and noise reducer.

[2] Information obtained from James Hardie, "Developing and Building Sustainably with James Hardie," document #99084SL, February 2009.

[3] Information obtained from www.sprayfoam.com

[4] Information gathered from www.soytherm.com/greenbuilding

SoyTherm® assists in potentially meeting LEED certification credits for New Construction, Materials and Resources, Credit 6 : Rapidly Renewable Materials (1 Point).

INTERIOR TRIM

Trim board is used to hide the gaps in sheet rock where it meets doors, windows, and the ceiling. It is used for aesthetics and assists in sealing any vapor exchange between interior and exterior spaces. The trim selected for use at the groundwater pump and treatment plant was one of recycled content. All trim purchased at 8-feet in length was generated from at least 85% recovered and recycled fiber content. All trim purchased at lengths of 12-feet was generated from at least 72% recovered and recycled fiber content.

This material has been certified by the Scientific Certification Systems, a third-party independent verification unit for environmental sustainability. The interior trim utilized has the potential for meeting LEEDS certification credits for New Construction, Materials and Resources, Credit 4 : Recycled Content (2 Points).

PERVIOUS PAVEMENT

Through the planning phase of the pump and treatment facility, EPA coordinated efforts and received input from various local committees and organizations. The Port Jefferson Beautification Committee is responsible for the recommendation and approval of landscaping throughout Port Jefferson. The Committee assisted EPA in the design of the surrounding outdoor environment. One request was the utilization of a pervious pavement system instead of the conventional asphalt pavement for parking and access areas. A "living driveway" was suggested to allow for grass to grow through the pavement, while allowing penetration of rain water through the pavement system.

The community requested pervious pavers in lieu of a traditional asphalt driveway, creating a "living" component.

Following review of various pervious pavement systems, EPA selected Nicolock Turfstone with agreement from local committees. This material is manufactured from local sources located approximately 25 miles away from the Site and is made in the United States. Pervious pavement has the potential for meeting LEED certification credits for New Construction, Sustainable Sites, Credit 6.1 and 6.2 for Stormwater Design-Quality Control (2 credits).

ASPHALT

Great attempts were made to not utilize traditional petroleum based asphalt mixes for the driveway, however a proper apron was necessary to join the driveway to the main street.

Following research, a cold-mix asphalt product that is environmentally friendly was purchased and utilized for the task. Green Patch® uses a biodegradable; renewable organic solution to replace petroleum derivatives normally found in conventional cold mix asphalt[5]. The material contains no VOCs, uses biodegradable solvents, and is approximately 40% recycled content. Green Patch ® contains no petroleum derivatives including benzene, diesel, or naphthalene.

Green Patch® is endorsed by the National Green Energy Council and is a member of the U.S. Green Building Council. The asphalt utilized has the potential for meeting LEED certification credits for New Construction, Materials and Resources, Credit 4 : Recycled Content (2 Points).

GEOTHERMAL

Groundwater held within the earth is at a constant temperature. Because of this, technology exists to utilize the water for heating and cooling interior climates. In Port Jefferson, NY the groundwater temperature is approximately 56^0F. Wells were already established for the extraction and treatment of groundwater. Prior to going through the treatment process to remove VOC contamination and following sediment filtration, water is carried to a geothermal heat exchange. This unit utilizes the constant temperature to provide a more efficient way of heating and cooling the support areas of the facility (i.e. offices, restrooms, meeting room, etc.).

A geothermal heat exchange unit allows for a more energy efficient way to heat and cool the interior of the structure.

Geothermal heat exchanges have the potential for accumulating 20 LEED credits, encompassing all New Construction, Energy and Atmosphere, Credits 1-6 (17 Points) and several in New Construction, Indoor Environment Quality, Credits 6.2 – 7.2 (3 Points).

WATER HEATER

Tank-less hot water heaters eliminate the storage of hot water, and are more energy conscious than conventional hot water tanks. Water flows through the heat exchangers only when hot water is required, as in a kitchen sink or bathroom. This saves money by lowering energy demands because there is no hot water reservoir to maintain a specified temperature, thus limiting standing heat loss.

The tank-less water heater selected for this project is Energy Star® qualified, requires less maintenance than conventional hot water tanks, and tends to last longer. Tank-less

[5] As stated on the product packaging and website www.greenpatch.com

water heaters have the potential for meeting LEED certification credits for New Construction, Energy and Atmosphere, Credit 1 : Optimize Energy Performance (1-19 Points).

TREATMENT EQUIPMENT

Designs for the treatment of contaminated water were developed in the early phases of the project. Utilization of an air stripper, aqueous carbon vessels, a vapor phase carbon vessel, and piping were outlined prior to determination of a location. The components of the system, along with the type of treatment to be conducted, were presented in the final Record of Decision. Around the time construction of the treatment was to commence, another groundwater pump and treatment facility located in Suffolk County was in the process of becoming decommissioned. The facility utilized a majority of the same equipment necessary for the LAI – Old Mill Pond Site. A decision was made to reuse as much equipment as possible from the Circuitron Corporation Site located in Farmingdale, New York. Two aqueous phase carbon vessels, a vapor phase carbon vessel, bag filters, a blower device, a significant amount of piping, valves, connectors, pumps, electrical wiring, interior lights, and supplemental equipment was reconditioned/refabricated to meet the needs of the LAI Site. An air stripper was brought in from the Stanton Cleaners Site located in Nassau County, where it was no longer being utilized. In general, not much equipment needed to be purchased for the establishment of the treatment process. This not only saved money on the purchasing side of the equation, but also prevented this material from being disposed of in landfills.

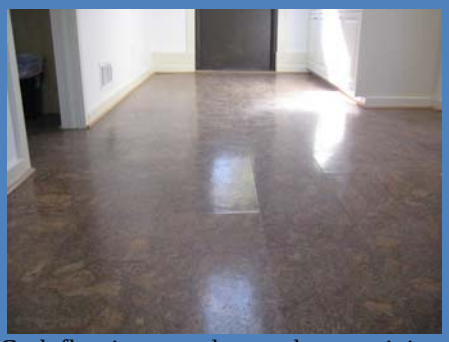
VARIABLE SPEED DRIVES

Pumps are used to extract contaminated water from the wells and control the flow of water through the treatment system. The speed of the pumps does not remain constant, and the pumps must be adjusted at various times. To control the speed of the pumps, variable speed drives were installed. Conventional technologies utilize single speed drives that would turn pumps on and off. By using variable speed drives, the pumps can adjust according to conditions at the time without the need to stop and start abruptly. This process uses less energy than single speed drives, and has the added benefit of producing less stress on the treatment equipment. As such, costs associated with maintenance and replacement time of the equipment is significantly reduced.

FLOORING

Various flooring techniques were utilized for the construction of the treatment facility. In the process equipment room, logical reasoning determined that materials should be limited due to the potential for water spills, condensation build-up, and humidity levels when equipment is operating. Site managers determined to keep the concrete foundation of the floor, grind the surface to create a smoother texture, and apply an epoxy sealant. This assists in creating a low-maintenance floor that will not require harsh chemicals for cleaning and caring.

Flooring was installed in the support areas of the treatment facility, including the hallway, control room, break area, and offices. The material utilized for the underlayment is Eco Silent Sound HD™, made of 100% post consumer recycled granulated rubber tires and high-density polyurethane foam using rapidly renewable resources[6]. The material contains a moisture barrier and antimicrobial protection while providing cushioning and floor noise reduction.



Cork flooring was choosen because it is a rapidly renewable resource and could be installed without VOC containing glues.

Flooring underlayment used for this project has the potential for meeting LEED certification credits for New Construction, Materials and Resources, Credit 4.2 for Recycled Content (2 Points); Credit 5.2 for Regional Materials (2 Points); Credit 6 for Rapidly Renewable Materials (1 Point); Indoor Environmental Quality, Credit 4.3 for Low-Emitting Materials – Flooring Systems (1 Point). Eco Silent Sound HD™ underlayment is made in the United States.

Following the underlayment, cork flooring was installed. This material is harvested from the bark of trees, with a number of years spanning until the next harvest. The tree is not cut down, allowing the forest to remain undamaged. Cork flooring is a rapidly renewable resource that was hand installed without the use of VOC containing glues or adhesives.

Cork flooring utilized for this project has the potential for meeting LEEDS certification credits for New Construction, Materials and Resources, Credit 4.2 for Recycled Content (2 Points); Credit 5.1 for Regional Materials (1 Point); Credit 6 for Rapidly Renewable Materials (1 Point); Indoor Environmental Quality, Credit 4.3 for Low-Emitting Materials-Flooring Systems (1 Point).

CEILING

As with most office space, a drop ceiling system was installed in the support areas of the facility. This includes the control room, office space, break area, and restroom. However, unlike traditional ceiling drop tiles, EPA selected a material that is made of renewable resources. The Armstrong® Tierra™ ceiling tile is comprised of 45% rapidly renewable resources and 23% recycled content[7]. Although made of unique materials, the product maintains characteristics of other commercially available ceiling tiles. The acoustical performance, insulation value, and fire performance are in-line with less eco-friendly products. A high light-reflective finish provides daylight effectiveness without utilizing additional energy sources. It meets standards associated with the California

[6] Information obtained from Product Specification Sheet of Eco Silent Sound HD™, Lumber Liquidators
[7] Information obtained from www.armstrong.com/tierra

Department of Health and Collaborative for High Performance Schools (CHPS) in low-emitting VOC materials.

Armstrong® Tierra™ ceiling tiles have the potential for meeting LEED certification credits in New Construction, Materials and Resources, Credit 4 : Recycled Content (2 Points), Credit 6 : Rapidly Renewable Materials (1 Point), and Indoor Environmental Quality, Credit 8.1 : Daylight and Views – Daylight (1 Point). The LAI – Old Mill Pond location is the first structure on Long Island to utilize this product.

VEGETATION

From pre-construction to beyond the completion of construction activities, landscaping and vegetation management was conducted by EPA personnel. EPA requested that the Village of Port Jefferson Beautification Committee become involved in all re-vegetation and landscaping that was to be performed by EPA. During cleaning of the Old Mill Creek near the Barnum Avenue Bridge, many invasive species of plants were extracted from the area. This included poison ivy, locusts, phragmites, reeds, and brambles. Following the removal of these non-local plants and activities necessary for cleaning the Old Mill Creek, jute mat was placed in lieu of traditional filter fabric. Jute mat is vegetable fibers that have been spun into a mesh sheet and provides an anchoring to control soil erosion. It allows planted vegetation to take root and stabilize creek embankments while not harming the environment.

Native species and jute mat were utilized in restoratoration activities following the removal of invasive plants.

The use of native vegetation was applied to these areas following placement of jute mat. Species were determined by the Beautification Committee and approved by the New York State Department of Environmental Conservation (NYSDEC) regulation 375-6.8. Materials selected included fruit producing, flower generating, evergreen-native species that have a wildlife significance.

During the construction of the pump and treatment building, several trees and vegetation had to be removed due to the footprint of the structure. All trees that were removed were chipped and mulched. This material was utilized in the landscaping along the southern property boundary. Again, EPA requested the assistance of the community-based Beautification Committee. The Committee provided EPA with a landscape design plan indicating species of interest. Re-vegetation and landscaping activities included the use of vegetation having wildlife significance and of native origin.

Water supplied to irrigate vegetation located at the pump and treatment facility is that of the treatment system. The system was designed to provide treated water that may be

utilized for irrigating landscape, so that potable water supplied by the water utility would not have to be used. This concept eliminates the use of potable water for landscaping, and with the planting of native vegetations, the need for irrigation becomes limited. The landscaping has the potential for meeting LEED certification credits in New Construction, Water Efficiency, Credit 1 : Water Efficient Landscaping (4 Points).

RESOURCE RE-USE

The re-use of on-site materials was conducted whenever feasible and practical. For example, materials that were purchased but not used at the Site were returned to the point of origin for obtaining refunds. Vegetation that was removed in order to construct a building or clean the Old Mill Creek was chipped and used as mulch. Left over materials from construction activities, including framing and sheathing, were used to create a variety of products necessary per the design selected by the local community.

Carriage doors were requested to be placed on the façade of the structure facing the street and Caroline Avenue Ball Field. This would add to the character of the building and blend with the architectural theme of the Village. Instead of purchasing carriage doors that were not going to be functional, materials left over from the building of the frame were used for constructing the doors. The same hold true for cabinets constructed for the break-room area and supports for some of the process equipment.

Approximately 240 tons of soil had to be removed from the Site in order to install the pervious pavement. Following analytical testing of the material, the soil was removed by the Port Jefferson Highway Department to be utilized in various projects throughout the municipality. This provided a cost savings to EPA by not having to dispose of the material in a landfill, but also provided reuse of material that still had value.

RENEWABLE ENERGY

The process of drawing water from groundwater aquifers, treating the water to remove contamination, and releasing it back into the environment is a high energy demand. To compensate for high usage, EPA uses renewable energy as a means of electrical supply. Purchased through Community Energy® and the local utility authority, the entire facility is powered by 60% wind and 40% small hydrologic projects. Community Energy® adds an equal amount of renewable power to the grid that is used as a result of operations at the treatment facility[8].

ECONOMIC IMPACTS

Great strides were done to provide economic growth in Port Jefferson, NY and the surrounding communities. Local area businesses potentially profited from the operations conducted by EPA and contractors. During the cleaning operations at the Old Mill Creek with Barnum Avenue partially closed, more vehicular and pedestrian traffic was forced

[8] Set up with Long Island Power Authority and Community Energy to purchase renewable energy was in the process of being established at the time of writing.

onto East Broadway, East Main Street, Main Street, Rt. 25A and other roads. These roads constitute the Port Jefferson downtown district where a vast majority of local businesses are located. Shortly after the completion of EPA activities along Barnum Avenue, signs in the area were changed to promote more traffic flow away from Barnum and onto the downtown roads.

As typical with projects, EPA contractors and employees were housed in local accommodations and frequented local restaurants and grocers. EPA and contractor personnel visited local restaurants and shops for procuring a variety of needs. Food services, gifts, clothing, and other personal needs were purchased from various Port Jefferson businesses. During the peak of activities, over a dozen personnel were working on the facility project and visiting local businesses.

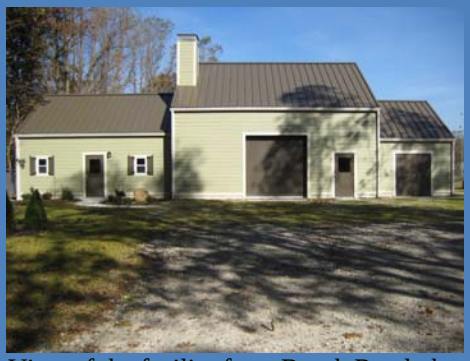
Site logistical needs were also obtained from sources located in the general area. Tools, hardware, electronic equipment, equipment rentals, disposal facilities, and others were sourced out through local vendors, stores, and businesses. Exterior doors needed to be fabricated to specifications in the design plans. A business located approximately 5 miles from the Site was chosen to construct the metal doors. All landscaping needs, including vegetation, crushed stone, mulch, and pervious pavers were purchased from local small businesses. The pervious pavers were manufactured from a facility located approximately 25 miles from the Site.

Office space utilized by EPA and contractors was rented for nearly one year in the heart of Port Jefferson. Conventional projects generally bring trailers for office space. Not only was the utilized method good for local economic strengthening, but also cost beneficial for EPA.

Several subcontracts were necessary to provide specialized services to meet project demands. One such need was that of an architectural firm. John Grillo Architects was selected based on price, knowledge, and location. Located in Port Jefferson, John Grillo personnel were familiar with local building requirements and regulations. Working with the architect, EPA was able to have a facility designed that met the needs of treating contaminated groundwater, was sustainable in design, appealed to the Architectural Review Board, blended with neighboring residential properties, and met all necessary codes. Other subcontracts were awarded to local firms for electrical services and gutter installation.

Additional economic advantages stemming from EPA activities include the removal of invasive vegetation located at the Barnum Avenue Bridge and Caroline Avenue Ball Field. Household trash and debris was removed from the waters of the Old Mill Pond and Creek. A beautification project was completed adjacent to the Barnum Avenue Bridge. Removal of invasive plant species provides an economic advantage by encouraging native plant growth, limiting the need for irrigation, and not having future removal needs of invasive species.

The intent of constructing a groundwater pump and treatment plant is to remove contamination that may, in the future, penetrate indoor air quality. The removal of contaminates from the groundwater will prevent future needs of installing and maintaining indoor air remediation systems. This provides an economic savings to local residents that may have been forced to increase energy demands for operating the systems. Also, the elimination of contaminates from the groundwater may provide a better quality of life for local residents and visitors, knowing that individuals and families can rest easily because threats have been limited.



View of the facility from Brook Road, the main entrance to the facility.

Green technologies do not come without additional costs in comparison to conventional technologies. Several items proved to have significant cost differences, such as the insulation. The cost for purchase and installation of the spray-foam insulation was nearly five times the amount of fiberglass insulation that can be obtained through local home improvement markets. However, the spray foam not only acted in the capacity of weather control for the interior of the facility, but aided in the noise reduction of the treatment equipment. Noise control was necessary as the area is a residential neighborhood, and fiberglass insulation would not supply this need. Had conventional methods been employed, additional measures would have been necessary to purchase, install, and/or fabricate to meet this requirement.

Operations of a groundwater treatment facility require a significant amount of electricity, and the purchase of renewable energy imposes an additional cost of approximately 1.3 cents per kWh. However, this money goes to pay for the harvesting and transporting of renewable energy to the facility. It is energy that is obtained from areas in New York State, providing local jobs as a result. Moneys also ensure that future projects for renewable energy continue to commence and thrive in New York State. The purchase of renewable energy in lieu of renewable energy credits was the least expensive option.

CONCLUSION

This paper is not a comprehensive report detailing all green technologies or LEED credits that may be available at the LAI Site. Several issues, such as alternative transportation, energy performance, light pollution, solar technology, and indoor environment quality aspects were left out of discussions. The intent was to focus on the approaches that are readily available and demonstrate that individuals need not to focus on advanced technologies or new concepts, but those that can be implemented without much deviation from conventional means.

A LEED certification was not pursued for the project because of potential conflicts of interest and additional costs associated with obtaining an official designation. This project followed LEED guidelines for New Construction as a pilot for determining the level of ease and efficiency of using green technologies for sustainable construction. Use of the EPA guidelines and recommendations were followed because of instituted policies and directives.

After completing the design and construction of the Lawrence Aviation Industries Site - Old Mill Pond groundwater pump and treatment facility, it was learned that use of the green techniques outlined in and out of this document did not constitute any great discomfort for project personnel. Overall, costs were slightly higher for purchasing certain items or systems; however the projected long term cost savings should outweigh the need for replacement, maintenance, and energy consumption required by conventional items or systems.

REFRENCES

US EPA, OSRTI, *Superfund Green Remediation Strategy*, September 2010, www.epa.gov/superfund/greenremediation

US EPA, OSWER, *Principles for Greener Cleanups*, August 2009

US EPA, OSWER, *Green Remediation Best Management Practices: Integrating Renewable Energy into Site Cleanup*, April 2011

US EPA, Region 2, *Region 2 Clean and Green Policy*, March 17, 2009

US Green Building Council, *LEED 2009 for New Construction and Major Renovations*, November 2008, updated February 2011.

Clu-In, http://www.clu-in.org/techfocus/default.focus/sec/Remediation_Optimization/cat/Overview/

ADDITIONAL INFORMATION

Additional information regarding the technologies and resources utilized at the Lawrence Aviation Industries – Old Mill Pond Site can be obtained by contacting the EPA On-Scene Coordinator.

Keith Glenn
US EPA Region 2
2890 Woodbridge Avenue
Edison, NJ 08837
glenn.keith@epa.gov
732-321-4454