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JBLM restoration program benefits both enviroment, budget

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Restoration program
• Facilitated construction of a credit union and pizza parlor on a former gasoline station with removed leaking underground storage tanks, while protecting occupants from vapor intrusion.
• Groundwater monitoring using innovative Passive Diffusion Bags to reduce costs.
• Finished landfill clean-up with $1 million in cost savings through utilization of clean fill from other local sites.

Repurposing an active ground water remediation solution to support clean water requirements for heating and cooling systems is one of the many innovations of the Installation Restoration Program on Joint Base Lewis-McChord and contributed to JBLM winning the 2015 Secretary of the Army's Award for Environmental Restoration, Installation.

The program is responsible for investigating and cleaning up sites at JBLM and Yakima Training Center where hazardous substances were released. Active since the early 1980's, the program has investigated more than 120 sites, and only 17 sites remain that require continued remediation and monitoring.

Sites managed by JBLM IRP include former landfills, former small arms ranges, leaking underground storage tanks, disposal pits, industrial yards and historical petroleum or hazardous waste spill sites.

Three groundwater pump and treat systems are currently being used to mitigate a trichloroethylene plume that originates from a closed landfill (Landfill 2) impacting two aquifers: the upper Vashon aquifer and lower Sea Level aquifer. The Sea Level Aquifer Pump and Treat system pumps water from the sea level aquifer into a stripping tower. The Interstate 5 barrier, and Landfill 2 systems pump water from the upper Vashon aquifer in a similar fashion.

The original cleanup operation for the systems was to pump and treat groundwater and then infiltrate the water back into the upper Vashon aquifer.

In a joint effort between Installation Restoration Program staff and the Army Medical Command, the Sea Level Aquifer Pump and Treat system was built to serve two needs: treat groundwater containing trichloroethylene for the Logistics Center; and meet water supply needs for Madigan Army Medical Center's heating, ventilation and air conditioning system.

• A recent hospital expansion required additional water to meet Madigan's increased cooling load. Approximately 1,800 gallons per minute or 750 million gallons per year of clean water from the Sea Level Aquifer Pump and Treat system provides 90 percent of Madigan's cooling requirements.

• Eliminating the need for a separate water supply system for cooling by using discharge from the trichloroethylene treatment system saved approximately $1 million.

Water discharged from the Madigan's cooling system goes into decorative ponds, which flow to groundwater infiltration galleries. Groundwater discharge supports the water flow of nearby Murray Creek, providing habitat for various species.

• In 2010 Madigan received Practice Green-health's "Partners for Change" with distinction award for, among other things, using the Sea Level Aquifer Pump and Treat as the primary source of water for the HVAC system.

In 2014, the I-5 system was reconfigured to provide water for ground source heat pumps for two recently constructed buildings. Approximately 800 gallons per minute are diverted from the I-5 system discharge pipe and used as a geothermal source for heating the buildings.

The water provides 5.6 million British thermal units per hour (BTU/h) of heat during the winter for two tactical equipment maintenance facilities. Each building is approximately 60,000 square feet and the system uses an estimated 62 percent less energy annually compared to conventional HVACs, for an estimated annual savings in energy cost of approximately $50,000.

In addition, this effort made construction of separate groundwater supply wells and a water delivery system for the new facilities unnecessary.

In order to deliver a reliable source of water to the tactical equipment maintenance facilities buildings, worn out and inefficient flow control valves on the I-5 discharge pumps were replaced with variable frequency drives, which match the entire system discharge rate to the sum of the individual extraction well discharge rates and allow the system to run more consistently and efficiently.

Electricity savings averaged $8,000 a year.

In addition, the variable frequency drives enable the system to be a more reliable source of groundwater for the tactical equipment maintenance facilities heating systems.

Finally, the Landfill 2 system was reconfigured in 2014 to provide water for ground source heat pumps for an Army Reserve Center constructed nearby the same year. Approximately 400 gallons a minute of treated groundwater are pumped from the Landfill 2 system and used as a geothermal heat source for the building.

The system became fully operational at the end of 2015. Energy and cost savings similar to the I-5 system and tactical equipment maintenance facilities are expected.

JBLM IRP's repurposing of all three systems to provide clean water sources supporting facility heating and cooling systems made them models of water conservation and contributors to the net-zero goals of JBLM's sustainability program.

These accomplishments, amongst others, distinguished JBLM as the 2015 Secretary of the Army's Award winner for Environmental Restoration, Installation.

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