

The image features a dark blue header with a white and green wavy graphic element. The background is a photograph of a long, multi-span bridge over a body of water, with some greenery in the foreground. The text 'City of Melbourne' is written in a white, serif font in the upper right corner.

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Public Works and Utilities Energy Efficiency Projects

July 20, 2018

Membrane and VFD Project at Water Production

- Replaced Constant Speed Pump Soft Starts with new Variable Frequency Drives \$656,000.
 - VFDs can ramp speed up and down to meet a pressure set point.
 - Reduce the energy demand for the Reverse Osmosis Feed Pumps
- Membrane Replacement after 14 Years with new lower energy membranes. Hybrid combination of looser and tighter membranes, produce same quality water but use less energy. VFDs and new membranes provide a 4 year payback on investment in energy savings.
- The City's reverse osmosis (RO) treatment process includes two existing treatment trains, each designed to produce 2.5 million gallons per day (mgd) of permeate at an 80% recovery rate. Each train has two stages with 48 pressure vessels in first stage and 24 pressure vessels in second stage. Each pressure vessel contains 7 membrane elements. In total, there are 1,008 membrane elements.
- Newer membranes cost half of the cost to replace in-kind older style membranes. 400K vs 800K

Reverse Osmosis Membrane Skids



Membrane and VFD Project at WP

- Driving pressure for the new membranes has dropped from 230 psi to 127 psi, saving approximately **\$150,000** annually in power costs.
- Current cost to run both the Lake Washington Surface Water Treatment Plant and the Reverse Osmosis Water Treatment Plant - \$1,039,863.84 (2017) RO only - \$460,000
- Upcoming modifications to the Generator Exhaust Systems will allow the plants to enroll in the CDR Program with savings up to \$10,000 per month.

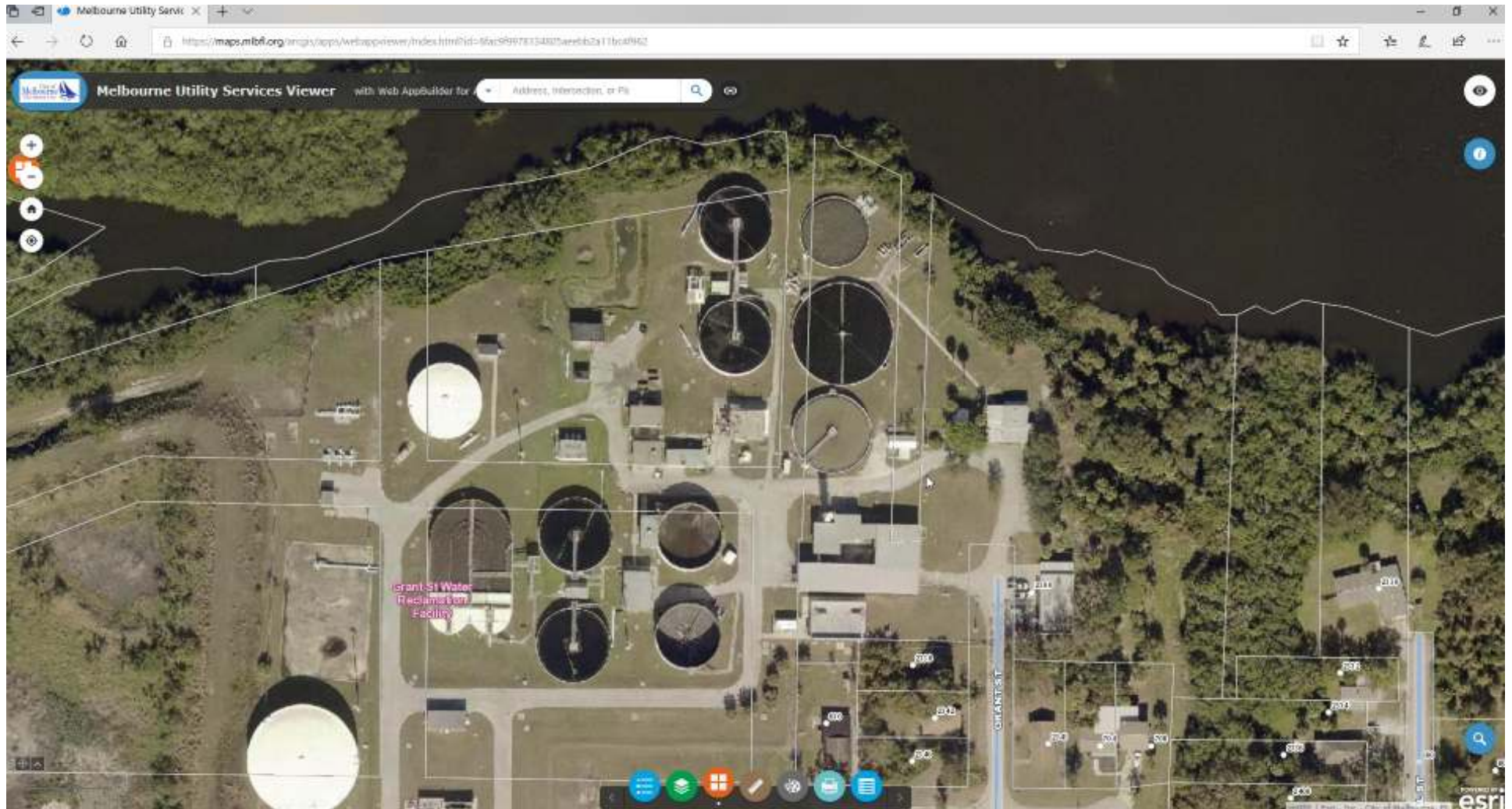




Grant Street Generator Replacement and CDR program Savings

- In 2010, two new 2000 kW generators were installed in a new building to replace multiple other smaller generators that were past their useful life.
- Energy consumption at Grant Street is approximately \$300,000 per year.
- New generators have emission standards that allowed the City to participate in FPL Commercial Demand Rate program. Joining CDR program saves approximately \$4,000 per month.
 - Savings: 2016 - \$36,000 (not a full year)
2017 - \$49,000
2018 - \$28,000 (so far this year)

Grant Street Water Reclamation Facility

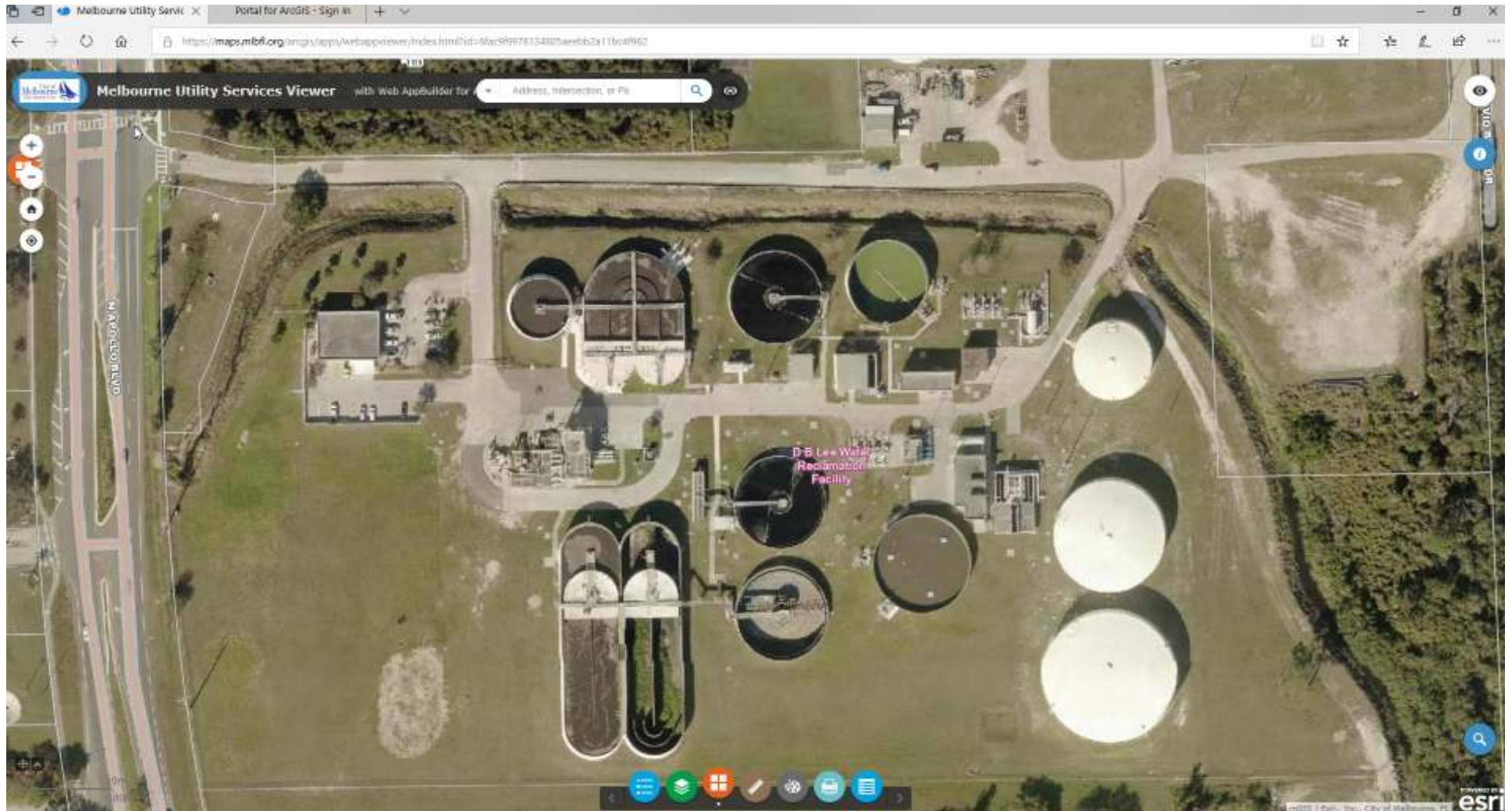


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DB Lee Energy Efficiency Projects

- New mixers in equalization basin reduce energy cost along with new high efficiency blowers - \$100,000 in energy savings.
 - Added anoxic zone and replaced aeration equipment to achieve better nutrient removal.
 - Total nitrogen removal – **26,000 lbs./year**
 - Generator modifications to allow inclusion to FPL CDR Program.
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- ❖ Energy consumption at DB Lee - \$456,000 Per Year
 - ❖ With CDR Program – will save \$3,000-\$4,000 per month which is approximately \$42,000 Per Year.

DB Lee Energy Efficiency Projects

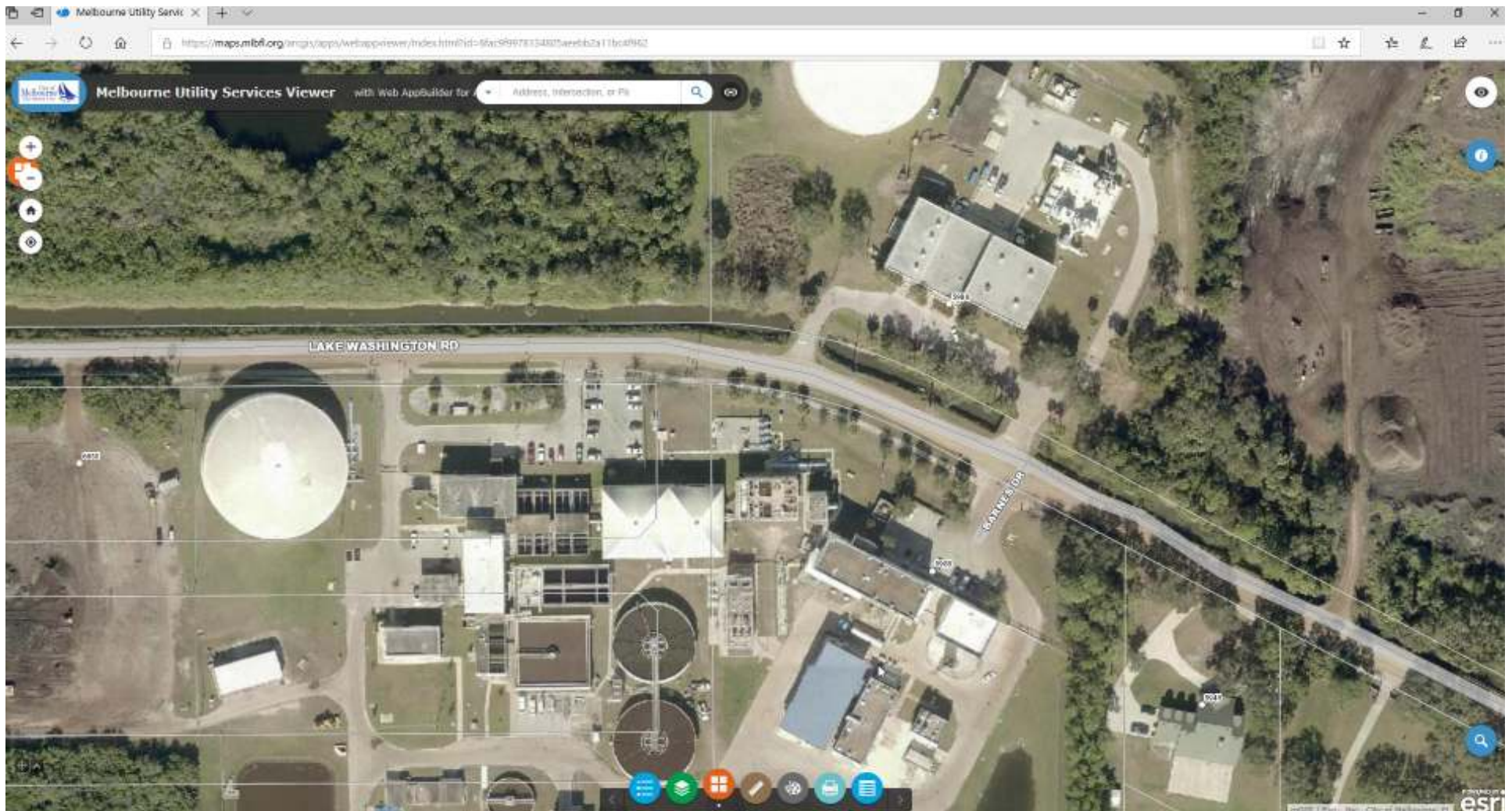


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Other Upcoming Potential Projects

- Placing solar panels on new roof enclosure at SWTP filter gallery.
- Adding VFDs to the existing production wells.
- Replace trickling filter at Grant Street with carousel unit for biological nutrient removal. Total Nitrogen removal from the effluent – **160,000 lbs./year**
- Adding anoxic tank at Grant Street to older style carousel unit for nutrient removal.
- On-going program to replace lights with LEDs.

Lake Washington Water Production Facilities



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