

Date and time: Tuesday February 14 2017 1:30 - 2:30 pm[conditions
in London]**Weather:** Pr 0mm; RH 70%; BP 100.5 kPa; clear; calm; T 05°C**Contents:** We ride a pipeline from Grand Bend to London.

Our next foray into what we call “urban ecology” found me chatting with Andrew Henry (P. Eng.), Division Manager at the Lake Huron & Elgin Water Supply headquarters. I scribbled furiously to keep up with the flow of information as he recited facts and figures relating to the flow of water. We had started at the intake near Grand Bend ON, then follow the water through various stages until it arrived at city taps. Along the way there were fascinating details relating to mechanical issues, finance, governance, public relations, engineering, and R & D.



The main water pipeline to London gets a maintenance visit from a work crew. A section of deteriorated pipe was replaced on February 15, causing flow to be shut off for some 18 hours. To find out why our taps didn't run dry, read the following.

Let us start then at Lake Huron, north of the resort town of Grand Bend, a popular vacation spot for Londoners and many American tourists. Port Blake, just north of “The Bend”, is home to the intake pipe and adjacent water treatment plant. The pipe extends out 2.5 km into the lake where water begins its journey into a gigantic grated intake structure that sits about 10 m below the lake surface. The grate keeps out fish, small stones and other debris. A similar intake pipe extends into Lake Erie

from the Village of Port Stanley, the beginning of a similar journey into the Elgin system, about which more later.

When the water comes ashore it first enters a treatment plant (See IMAGES.) where it goes through some seven main stages of processing: pre-chlorination, a disinfection treatment; sedimentation, where a settling tank allows larger particulate matter to settle out; a flocculation process that agitates the water with added chemicals to promote the accumulation of fine particles into clumps or floccules; flash mixing which enhances the flocculation process of silt and other fine particles; filtration through three layers of filters to remove the floccules, remaining silt, algae and other impurities; post chlorination to kill off remaining bacteria; and a clear well where the treated water is stored prior to distribution.

An outside view of the treatment building is shown in IMAGES below, along with an inside view of the giant pumps that set the treated water in motion along the distribution network. The pumping pressure is immense, over 200 psi (pounds per square inch) — powerful enough to keep a long freight train running down its track. All told, the treatment plant processes 340 million cubic metres (or 90 million US gallons) per day.

Treated water then enters the main line of four-foot diameter pipe. Although most of that water ends up in London, spur lines also carry it to the municipalities of Bluewater, South Huron, Lambton Shores, North Middlesex, Lucan-Biddulph, Middlesex Centre, and Strathroy-Caradoc. Maintenance of the pipeline has its headaches. For example, the main pipe burst in 2012 and enough water gushed out to cover 70 acres to a depth of 15 feet. All the topsoil from adjacent farm fields was washed away and this had to be replaced at the Water Board's own expense, a bill that mounted eventually to some \$1.5 million dollars.

Before we continue our interrupted journey to the city, I had better explain governance of the system. Two Water Boards, the Huron Board and the Elgin Board, oversee and maintain two separate distribution networks, the Lake Huron networks described in this *Bulletin* and the network that draws from the Port Stanley treatment plant. The two boards must pay for all expenses and operational costs. For example the Huron Board pays \$6 million per year for its electricity alone. These are mostly pumping costs. The combined boards have an operational budget of some \$30 million/year. Revenue comes from the sale of water to municipalities. Having a mandate to show a balanced budget every year, the boards are not allowed to show a surplus or fall short. Both systems operate out of the same administrative offices in the administrative centre at 235 North Centre Road

(across the road from the Masonville Mall). The Water Boards (there are several throughout southern Ontario) function like regional councils, with members appointed in proportion to the municipalities being served. Thus London chooses 50% of Elgin Board members, with St Thomas getting 30% and 20% going to remaining municipalities. On the Huron Board, London City Council gets to choose 60% of the sitting members.

After treated water has travelled the length of the pipeline to London, it enters a storage facility, the Arva Terminal Reservoir, just north of the city. In the event of a rupture like the one in 2012, city taps would continue to supply water to residents and businesses, thanks to the reservoir. In any event, from Arva onward the water becomes the property of the City and London bears all responsibility for the operation and maintenance of the city network proper. The Engineering and Environmental Services Division at City Hall does the work. It should be mentioned in this connection that London also gets about half the water emerging from the Elgin Area supply. Indeed, the distribution map for the Huron supply shows the boundary (in red) where it meets the Elgin supply. (See IMAGES.) As Mr Henry pointed out, the boundary between those who drink Erie water and those who drink Huron water may fluctuate as the two systems are interconnected. It usually runs approximately along Commissioners Road in south London.

Within the city, the main pipe goes through a branching process, effectively necked-down to 16-inch diameters, followed in some cases by further reductions to six inch diameters. Those are the sizes that run below most arterial roads and neighbourhood streets of the city, with tee-joints attached to service valves that pipe water to each house or building.

I asked Mr. Henry about power failures. Since all those pumps run on electricity, would not our taps immediately run dry? He smiled. “The pumping stations are each equipped with back-up generators and a supply of diesel fuel to last three or four days.” I asked what happens when the reserve fuel runs out. Again he smiled. “More is trucked in as needed.” Along with the Arva reservoir, the presence of reserve power eased some of my fears of the water supply failing us, whether through pipe ruptures or power failures.

His last take was philosophical, treating me to an impromptu lecture on the water cycle. The city, as in a human body, takes in relatively clean water and rids itself of waste through an excretory system, the Greenway Wastewater facility. Round and round it goes, from the kidneys of dinosaurs to the spoon in your soup, so to speak.

Readers Write:

Ron Martin, a longtime friend of Newport Forest, provides another data point on what appears to be this years (local?) scarcity of birds: “I was talking to Andre Lachance and he has no birds at his normally busy feeder. It's scary indeed. I don't see big flocks of grackles any more, although the campus is covered with Canada Geese. I think the insect eaters and migratory birds are in real trouble and you're right Joe public doesn't seem to care. Living in a great extinction is no fun. We can just continue to do what we can however little.”

Bird Expert Dave Martin has this to say to ease the worries of the other Martin: “As for bird decline: If by that you mean that you aren't seeing many birds on your outings then my smart-ass answer would be yes there is a decline. But if you mean is there a major decline in numbers across the board my answer would be there is no sudden recent decline — other than the long term decline since the 1960s which is barely visible to us on a day to day basis and is only detected by long term monitoring programs.”

Dave Martin chimes in on the ice disk phenomenon as well: “Regarding the pattern of the ice in the river that you mentioned it is actually quite common on all kinds of water bodies includes lakes as the water begins to freeze and is called "pancake ice". Just Google "pancake ice" and then images and you will find 100s of different photos of pancake ice in its many variations.”

Nature lover Maria Gitta also cites websites, but attempts a solution of the puzzle: water is a curvy organic shape-making liquid ... There should be more ice circles and discs ... just like different waters tumble stones and rocks into smooth curvy shapes -- some are round discs -- I have 2 or 3.”

Brother and longtime Friend of Newport Forest, Chris Dewdney provides the neatest solution — which happens to be correct: “Twirling and bumping. That's the key to the ice pad mystery.”

Elaine Bebensee, donor of the Bebensee tract across the river from Newport Forest, enjoys the Bulletin: : “Thank you for sending me the Newport Bulletins over the many months. I most enjoy reading them and observing the cam images. I forward many of your bulletins to my grandchildren .Best wishes for continued good health and happiness in 2017!”

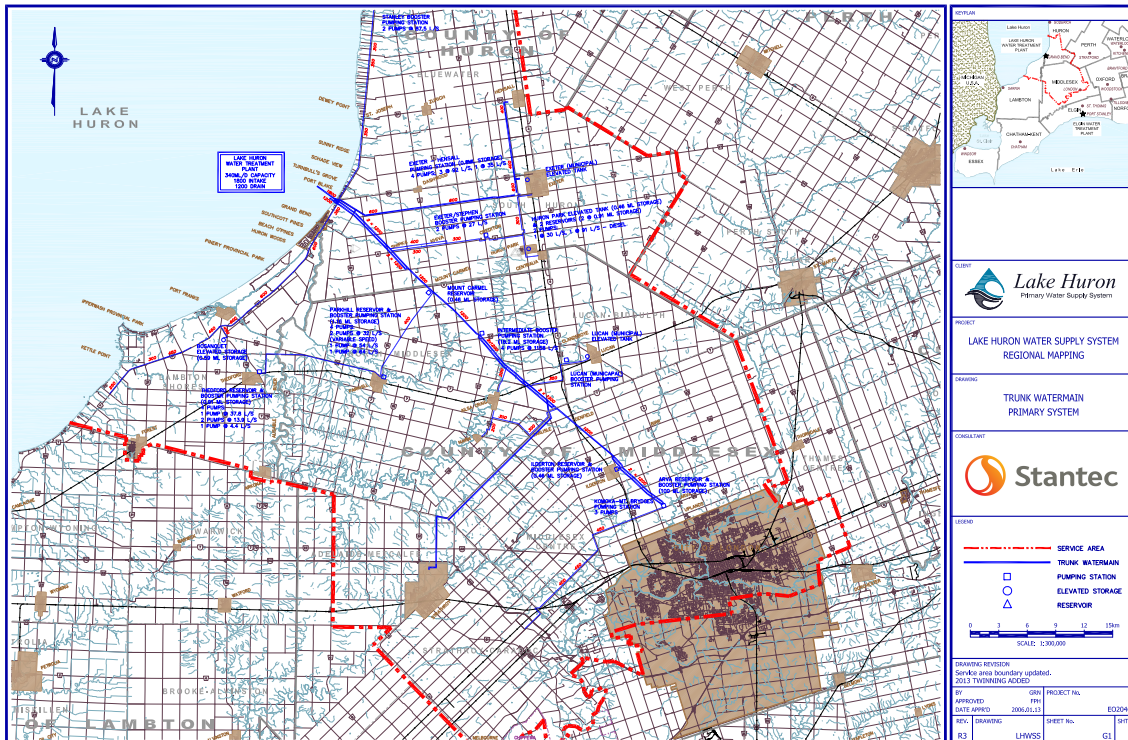
IMAGES:



The Elgin Water Supply intake and treatment facility north of Grand Bend processes the water, then sends it off to area municipalities with the aid of five gigantic pumps, three of which appear above.



Additional pumping is provided by a few pumping stations along the pipeline, including the one shown above.



Distribution map for the Huron Water Supply operation shows the main 47 km pipeline (blue) that runs from Grand Bend to the Arva Reservoir and pumping station that serves the city. Boundaries of the supply system (red) are shared with adjacent water operations, including the Elgin system to the south that takes water from Lake Erie. (With apologies for the tiny print.)