

October 23, 2015

London Correctional Institution (LoCI) Water Plant

The London Correctional Institution (LoCI) is located at 1580 State Route 56, London Ohio in Madison County. LoCI provides water to LoCI, the Madison Correctional Institute (MaCI), the Ohio Peace Officer Training Academy (OPOTA), and the Ohio Bureau of Criminal Identification and Investigation (BCI). LoCI houses approximately 2,300 inmates and has approximately 400 staff members. MaCI has approximately 2,600 inmates and staffs over 450 employees. The yearly water demands of OPOTA and BCI is 8.4 MG, or 24,000 gallons per day (2005 data).

Site Visit

A site visit was performed on July 23, 2014. The 37 year old water plant has a current average daily production of 0.7 MGD. The maximum daily production observed at the plant is 1.1 MGD. Per the plant's 2001 detail plan approval by Ohio EPA, the plant is rated at 1.5 MGD.

Raw water to the plant is supplied by five wells and four high output influent/effluent service pumps. Pumps #1 and #3 are the main pumps which are rated at 300 gpm. Pump #2 is an emergency pump that has been replaced three or four times.

The plant consists of two aerators, three contact basins, six sand anthracite filters and a chlorination train to a clearwell. Sodium hypochlorite, ferric chloride, and lime slurry are added to the process.

Operations and maintenance requirements include manual filter backwash and screen cleaning. Two of the three lime dosing pumps are both operating consistently; however, there is no back-up should one go down. SCADA was installed in 2000; however, it was never operational.

Three pumps move water to three elevated storage tanks whose combined storage volume is 1,175,000. The distribution lines consist of 8-inch and 12-inch lines. In 2009, approximately 4,500 feet of water lines around the perimeter of the stockade and farm area were replaced with PVC water lines.

Madison County Water District

The Madison County Water District would serve the unincorporated communities of Summerford and Lafayette and extend to serve the commercial intersection at US 42 and I-70. Included on the map are handwritten approximate number of existing customers on the map. The existing customers needing water service include 250 residential users and 50 commercial users. Furthermore, certain areas are anticipated to develop significantly as water and sanitary sewer service is expanded. These areas include the US 42 corridor between US 40 and SR 29 as well as the US 40 corridor between Summerford and Lafayette. The Madison County Chamber of Commerce office has projected potential new employee counts based on



available land in the areas up to 21,000 employees in the next 30 years. Calculations presented to ODRC estimate 140,000 GPD in 2015 and grow to 515,000 GPD in 2035 (based on 80% build out in 20 years).

Based on the water demand information provided above, in the short term, the existing LoCI water plant will be capable of providing water to the Water District taking the average daily usage from 0.7 MGD to 0.84 MGD. By 2035, the average daily usage will be over 1.2 MGD to 1.39 MGD, respectively. By applying a peaking factor of 1.5, the calculated peak demand of the fully expanded system will be 1.8 MGD, which exceeds the plant's rated peak usage of 1.5 MGD. Ohio Revised Code (ORC) 5120.52 authorizes ODRC to contract with the Water District only to the extent that it has excess capacity. The ODRC does not have available funds to expand the plant. ORC 5120.52 prohibits a state facility from taking money from other government entities in the form of user rates to fund a future expansion. As long as the LoCI, MCI, OPOTA, and BCI facilities do not require more than 0.7 MGD, LoCI can supply up to 0.3 MGD to the Madison Water District.

In addition, the minimum storage capacity for systems not providing fire flow is equal to the average daily consumption. This requirement will increase with fire flow requirements and decrease if the water treatment facility has significant capacity with standby power to supplement peak demands of the system. The system currently has 1,175,000 of storage. If the water district wants to use the bulk supply for fire protection, it is suggested that the water district construct storage on their side of the master meter.

Requests by Operations Staff

- Bearings for all three clarifiers need replaced, with only two operating barely. Clarifier #3 is down and needs a complete overhaul. Clarifiers #1 and #2 need upper shaft bearings and Pillow Block Bearings on propeller shafts replaced.
- Replace or seal four butterfly valves at filter. Plant personnel estimate the valves leak around 25,000 gpd.
- Verderflex pump in the lime silo needs the bearing assembly output shaft replaced. Also need one new lime pump.
- The clarifier splitter box is rusted out. Need two water metering valves in splitter box replaced along with reinforcement of metal structure splitter box.
- Telemetry system needed
- Manual chlorine pumps
- Filters are 20 years old, need replaced in next 5 to 10 years
- Filter media needs replaced
- CO2 tank has fallen apart and needs updated
- A bigger generator is needed to run 3 high service pumps, the clarifier, and other pumps.
- A new finished water flow transmitter is needed to read peak flow. Looking at Model 3100 Smart including measuring range 0 to 700 GPM. Also needs Digital Finish Water flow indicator and totalizer.



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- Replacement of propeller meter required for Well #10.
- Beginning in 2015, one well per year will be taken down to have well screens and casings cleaned. Wells have not been cleaned in over 10 years.
- The altitude valve at the 175,000-gallon water tower was recently rebuilt. The altitude valve at the other tower needs rebuilt.

LoCI Wastewater Pretreatment Facility

LoCI operates a pretreatment facility that discharges directly into the City of London's sanitary sewer system. The plant is currently not running. The fine screen is running, but the grinder is not working and needs replaced. The building that houses the pretreatment facility has also collapsed. They are currently paying City of London \$307 per month in sewer surcharges.

O&M Expenses

The operations costs associated with payroll and chemicals were obtained directly from LoCI staff. Pension and health insurance costs were estimated from a percentage of payroll costs. The utility charges incurred by the plant were not included because the costs of the utility is paid for by the Correctional Facility directly and is not being tracked.

Line #	Category	O&M Cost
1	Payroll including Pension and Health insurance	\$168,912
3	Chemicals	\$122,446
4	Operator License	\$150
5	Permits	\$112
6	Annual Well Maintenance	\$24,000
	TOTAL OPERATIONS COSTS	\$315,620

The following table provides a cost summary of the maintenance costs the operations staff is requesting to keep the plant operating.

Line #	Item Description	COST
1	3 - 26' Contact Tank Bearings	\$93,750
2	4 - 10" Butterfly Valve	\$25,000
3	Lime Transfer Pump (35 GPM, 100 PSI, 7 HP)	\$6,250
4	Lime Transfer Pump (148 GPM, 70 PSI, 1 HP)	\$3,125
5	2 - 12" Water Metering Valves	\$12,500
8	2 - NACIO Metering Pump (11.3 GPH, 100 PSI, ¼ HP)	\$6,250
9	Gravity Sand Filter Media (475 SF)	\$60,000
12	Model 3100 Flow Meter, Indicator, Totalizer	\$25,000
13	Well #10 Propeller Meter	\$12,500
	TOTAL MAINTENANCE COST	\$244,375

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The costs listed in the above table is assumed to represent a "typical year" of costs incurred due to maintenance. In addition, an operation and maintenance program is recommended for the three facility water towers. To extend the useful life of the towers, it is recommended that each one be drained and cleaned every five years. The estimated cost to clean each tower is approximately \$15,000 per tower, or \$9,000 per year.

The total operations and maintenance costs incurred per year are summarized as follows:

Total Operations Cost	\$315,620
Total Maintenance Cost	\$244,375
Water Tower Maintenance Cost	\$9,000
TOTAL OPERATIONS & MAINTENANCE COST	\$568,995

Capital Improvements

ODRC recommended that ms consultants use the facility's capital expenditures to calculate the facility user rates. The following capital improvements were completed between the years of 2005 and 2014:

YEAR	PROJECT NAME	WATER COST
2005	Water Tower Repair	\$341,400
2010	Water Tower Repair	\$13,000
2014	Main Waterline Replacement	\$4,250,600
	TOTALS 2003-2014	\$4,605,000

In addition to the lists above, the staff is requesting the following capital improvements:

Line #	Item Description	COST
1	Splitter Box	\$62,500
2	Telemetry System	\$200,000
3	19,500 Gal Recarbonation Tank	\$118,000
4	Larger Generator	\$196,000
5	Altitude Valve at Water Tower	\$125,000
	TOTAL CAPITAL COST FOR EXISTING PLANT	\$701,500

Typically capital improvements are financed. Assuming a typical 10 year bond at a state bonding rate of 3.7%, the annual debt service for these improvements will be as follows:

	Past Capital Improvements			Future Capital Improvements			Total Cost per year
	Capital Cost/10 yrs	Annual Debt Service	Total Cost per year	Capital Cost/10 yrs	Annual Debt Service	Total Cost per year	
Water	\$460,500	\$201,743	\$662,243	\$70,150	\$30,732	\$100,882	\$763,125

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The actual volume of water treated during 2013 was 700,000 gallons per day. The Total Annual Volume (TAV) is the daily volume times 365 days per year for a TAV of 255,500/1,000 gallons. The user rate (UR) is the Total Annual Operations and Maintenance Cost (TAOMC) + the Total Annual Payments towards financing the Capital Improvements (TAPCI) divided by the TAV.

The user rate (UR) for LoCI using O&M and past capital improvements is:

$$UR = \frac{TAOMC + TAPCI(past)}{TAV} = \frac{\$568,995 + \$662,243}{255,500}$$

= \$4.82/1,000 gallons

The user rate (UR) for LoCI using O&M and past and future capital improvements is:

$$UR = \frac{TAOMC + TAPCI(past) + TAPCI(future)}{TAV} = \frac{\$568,995 + \$662,243 + \$100,882}{255,500}$$

= \$5.21/1,000 gallons

Regional Utility Rate Comparison

The Ohio EPA's Office of Fiscal Administration published an Annual Water and Sewer Rate Survey which compares utility rates amongst Ohio cities, villages, and special districts. The annual cost per 7,756 gallons per month was changed to cost per 1,000 gallons to provide an apples to apples comparison with ORDC's proposed rate. The utility providers that were closest to LoCI compared as follows (2013 rates unless otherwise indicated):

Utility Provider	Water Rate per 1,000 gallons
Columbus	\$4.42
London	\$4.99
Urbana	\$4.80
Springfield	\$2.66
Mount Sterling	\$4.90

Comparing rates, the water rate at LoCI compares closely.

SUMMARY

LoCI is rated at 1.5 MGD and currently treats around 0.7 MGD. The plant is 37 years old and is currently requiring maintenance. The Madison County Water District is currently asking to buy bulk water from the facility. Their initial request is 140,000 GPD with a projected volume of 515,000 GPD in 2035. To adequately provide for this volume, the plant will need to expand by 0.5 MGD to 2.0 MGD.

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Current operation and maintenance costs were evaluated, as were the plant's current capital improvement needs. **Based on these calculations, it is recommended that the user rate be increased to \$5.21/1,000 gallons.**

SITE VISIT – JULY 23, 2014 PHOTOS



Sand filters



Pipe galley adjacent to sand filters



Plant breaker boxes



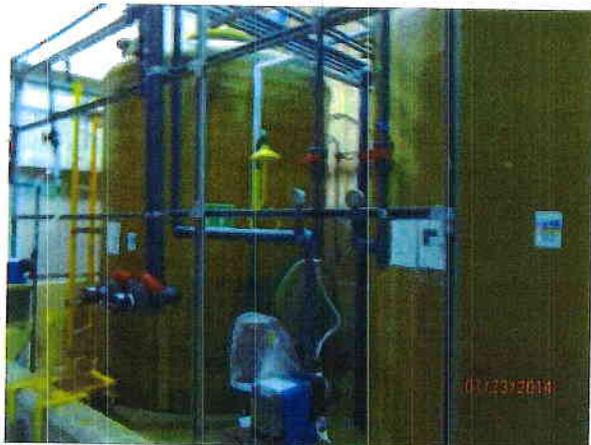
Service Pumps



WW Pretreatment Facility's inoperable Grinder



Sodium hypochlorite pumps



Sodium hypochlorite tanks



Verderflex lime dosing pumps