



Village of Lake Isabella

Potable Water Supply Feasibility Study Lake Isabella North



Drafted by:
ROWE Professional Services Company
August 2009
Project# 09M0015

Table of Contents

I.	Introduction.....	-1-
II.	Research.....	-1-
III.	Discussion.....	-2-
VI.	Conclusion.....	-3-

Appendices:

Appendix	
	Conceptual Construction Estimate
	Graphical Exhibit

I. Introduction

The Village of Lake Isabella contains a municipal water system located near the western portion of the community near the Lake Isabella Property Owner's Association offices adjacent to Queens Way. This system was the start of construction of a much larger system to serve many areas of the community back in the late 1960's. Currently, the Isabella County Board of Public Works owns and maintains the system. Numerous discussions have occurred regarding future ownership of the water system

In February of this year, the Village decided to have a feasibility study completed to examine the possibility of extending the system into the plat of Lake Isabella North. Currently, the plat has a minimum well depth restriction of 100'. This restriction was placed on new wells in an attempt to ensure they were installed into the deeper, confined aquifer in the area. The scope of the study was to include the following:

- Determine maximum number of lots to be served in the plats
- Determine the routing and sizes of the water main
- Create construction cost estimates for the water main
- Compare the costs of the new water main versus the potential costs for deeper residential well construction within the plat
- Create graphical exhibits of the proposed system, including pipe routing and sizes
- Summarize the findings in a short narrative
- Meet with Village staff to discuss the findings
- Revise the findings based on the discussions with Village staff
- Finalize report

The following portion of the study will review each of the pertinent items, and provide information regarding the feasibility of extending water into the plat of Lake Isabella North.

II. Research

Since the Village was also having an On-Site Septage Collection and Treatment Feasibility Study completed, the number of lots to be served was determined through subsequent conversations with Village staff. It was decided to base the number of residents to be served upon the lots lying in the areas where the preliminary soil studies identified poor draining soils, or relatively high water tables. From this, it was decided approximately 28 undeveloped lots may encounter unsuitable conditions for the permitting of a septic field.

When researching the existing water system, the following data was obtained from Isabella County:

- The current system utilizes two wells. Well #1 is producing approximately 259 gpm, and Well #2 is producing approximately 194 gpm
- Well #1 was designed for 500 gpm, Well #2 was designed for 300 gpm
- The current system has an underground storage tank with an approximate storage capacity of 6,000 gallons
- The system, although originally designed for approximately 585 customers, currently has approximately 225 connections

Taking this data into account, Well #1 is working at approximately 51% of its design capacity, and Well #2 is working at approximately 64% of its design capacity.

The routing of the water main was determined based on the need for service, and ensuring the mains were looped to ensure water quality. Assumptions were made to estimate the sizes of the mains. Valves were added to the conceptual design for complete control of the main for servicing and repair. Discussions occurred with Village staff regarding the necessity of installing fire hydrants along the new main alignments. An argument could be made that since there are “dry hydrants” located around the lake for fire suppression water supply there is not a need for installing hydrants at regular intervals along the mains. For the purpose of this study, fire hydrants were shown for maintenance and flushing purposes only, final permitting of the system by the Michigan Department of Environmental Quality (MDEQ) Water Bureau will likely determine the necessity of the fire hydrants. An exhibit showing the proposed system piping, valves and routing is included at the end of this document in the Appendix.

When creating conceptual construction cost estimates for the new extension of the water system, many elements needed to be considered. Permitting and design requirements have changed over the past 40 years. When a new system is designed, and the system involves two wells, firm capacities of the system is determined with the largest well taken out of service. When determining existing supply of water to the system, approximately supply flow was calculated utilizing data from Well #2 only.

The existing storage tank is a below ground design. This is desirable to inhibit freezing in the winter months, but undesirable because of typical deterioration of the tank. Current permitting usually requires the construction of above ground tanks. Smaller tanks are usually enclosed in a heated building, unless it is a very large tank and the fear of freezing is not an issue.

III. Discussion

For the purpose of this study, the possibility of extending the system further than the plat of Lake Isabella North was not considered. Since Well #2 is only producing approximately 194 gpm the addition of 28 lots to the system, along with the two, possibly more fire hydrants, the current well and tank system does not appear to have the capacity to expand. According to current design and permitting standards, the existing system does not have the capacity to meet potential fire suppression needs and

potable water supply demand. The system would likely need to have a new 12" (200 gpm) well installed and 20,000 gallon storage tank added. This would increase the pumping firm capacity and storage capacity to approximately 400 gpm and 26,000 gallons respectively. This would likely provide enough supply and storage to meet the current and proposed potable water supply and fire protection demands of the system.

As part of the study, a conceptual construction cost estimate was created for the above modifications and expansion of the water system. This estimate is included at the end of the document in the Appendix. The other aspect of the study was to compare the cost per undeveloped lots (28) for the potable water system expansion to the cost to install a well to a depth of 110' vs. 55' respectively. The reason why it is necessary to compare the additional cost of a 55' well to a 110' well is because the static water levels generally found in Lake Isabella North are located at a depth of 50' or less. The MDEQ has placed a requirement for the construction of new wells in the area to be installed at a minimum depth of 100' or below the confining clay layer. The comparison which was requested to be completed as part of this study was to analyze the cost per lot owner for a new system and the cost per lot owner of a deeper well. Below is the comparison:

New System/Improvements Cost = \$474,000 ÷ 28 undeveloped lots = \$16,930/lot owner

Deeper well cost = \$1,000/lot owner

Three well drilling companies were contacted and the average difference in cost between a 55' well and a 110' well = \$1,000.

Considering the above, it appears the more economical choice for the protection of new potable water supplies for new lot development is for the resident to install the deeper well on their lot.

IV. Conclusion

The Village decided to have a feasibility study completed in an attempt to examine the possibilities for potable water sources in the plat of Lake Isabella North. From this study, the Village desired to have enough information to make sound decisions whether or not it was feasible to extend the existing water system, which is maintained by Isabella County, into the northern plat. From the information which was analyzed and stated in this report, it appears from a cost prospective, it would be more feasible to not extend the system into the plat. The current additional cost per resident for a deeper well installation is much less than the other option. It is also important to note that the current system, when comparing current permitting and flow requirements, does not appear to meet standards for fire protection. In order to modify the system for the extension of the infrastructure, a large portion of the cost is upgrading the system for additional users, and fire protection requirements.

VILLAGE OF LAKE ISABELLA

Conceptual Estimate for:

Lake Isabella North Water System**08/06/09****ROWE Professional Services Company**

127 S. Main St.

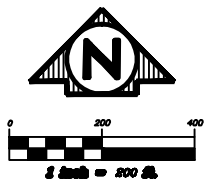
Mt. Pleasant, MI 48858

989-772-2138

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Connect to Existing Water Main	1	EA	\$ 500.00	\$ 500.00
Gate Valve and Box, 6 inch	5	EA	\$ 750.00	\$ 3,750.00
Gate Valve and Box, 8 inch	4	EA	\$ 1,000.00	\$ 4,000.00
Watermain, PVC, 6 inch, Bored	2990	FT	\$ 20.00	\$ 59,800.00
Watermain, PVC, 8 inch, Bored	2770	FT	\$ 25.00	\$ 69,250.00
Fire Hydrant Assembly	2	Ea	\$ 2,000.00	\$ 4,000.00
New 12" Well	1	LS	\$100,000.00	\$ 100,000.00
New 20,000 Gallon Storage Tank (Enclosed)	1	LS	\$ 100,000.00	\$ 100,000.00
Restoration and Cleanup	1	LS	\$ 10,000.00	\$ 10,000.00
			Total	\$ 351,300.00
			Contingency	\$ 70,260.00
			Engineering	\$ 52,500.00
			Grand Total	\$ 474,060.00



Comments:

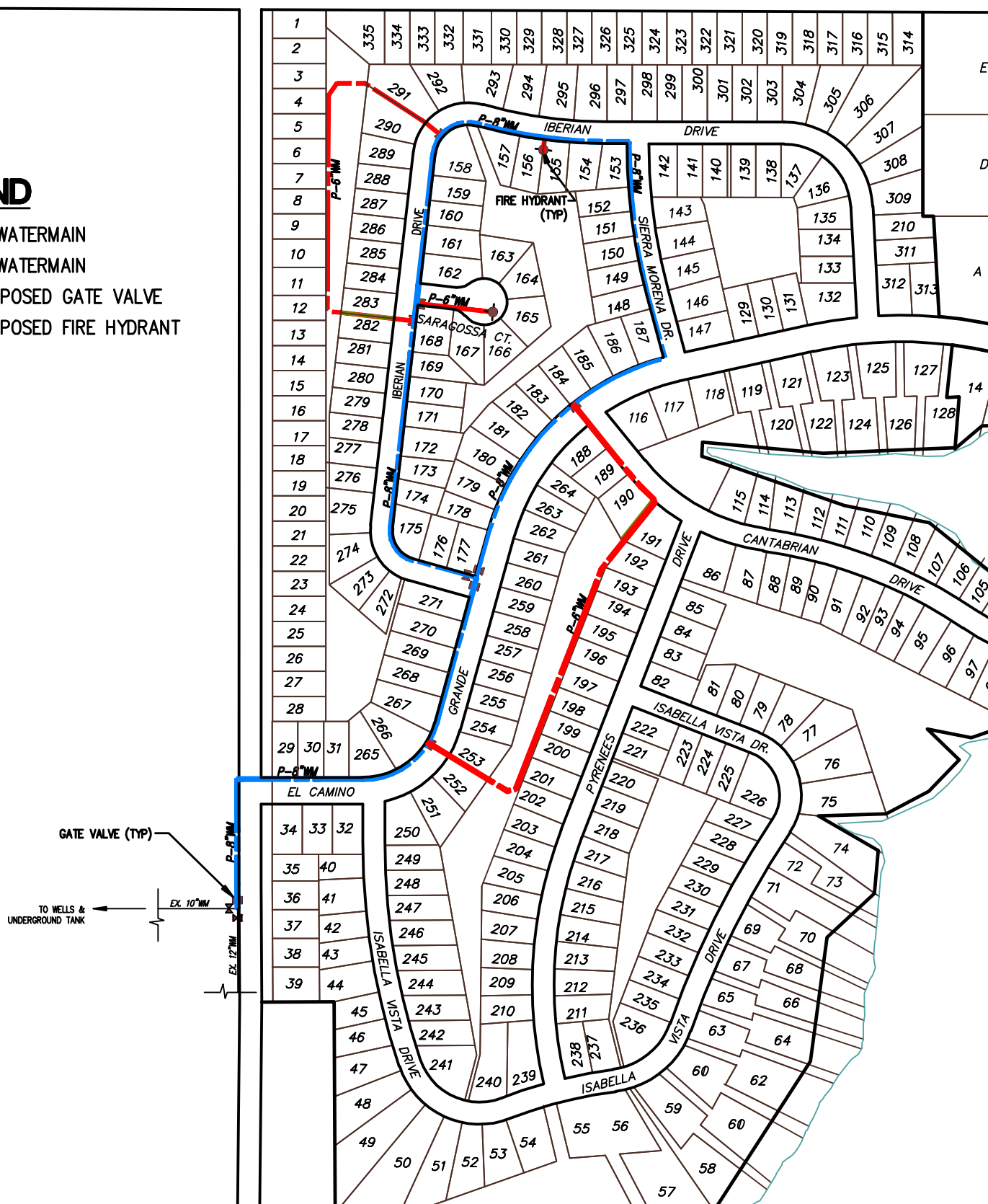
- 1) Estimate created utilizing existing base maps, no topographic survey has been completed.
- 2) Well and storage tank sizing based on pump data provided by the Isabella County Drain Commission.
- 3) Unit prices taken from projects bid in 2009.
- 4) Assuming 28 users on the new system, approximate cost per user equals \$16,931.
- 5) Approximate cost for a deeper well would cost resident \$1,000.



VILLAGE OF LAKE ISABELLA POTABLE WATER SUPPLY FEASIBILITY STUDY - LAKE ISABELLA NORTH (PLAT)

LEGEND

- 6" WATERMAIN
- 8" WATERMAIN
-  PROPOSED GATE VALVE
-  PROPOSED FIRE HYDRANT



**ROWE PROFESSIONAL
SERVICES COMPANY**

127 S. Main Street
Mt. Pleasant, MI 48858

Or: (989) 772-2138
Fr: (989) 773-7757
www.rowepsc.com