

Executive Summary

The Town of Lapel (Town) retained Commonwealth Engineers, Inc. (CEI) to prepare this Preliminary Engineering Report (PER) to evaluate the present condition and future needs of its drinking water utility (Utility) in support of soliciting funding through the Office of Community and Rural Affairs (OCRA) and the Indiana Finance Authority State Revolving Fund (SRF) Loan Program. This PER discusses alternatives for improving the utility and provides final recommendations and course of action to help the Town ensure the quality and reliability of the Utility. The fundamental purpose of the Utility is to provide safe drinking water, which is adequate in terms of quantity, delivery pressure, and is aesthetically pleasing and affordable to the customers of the Utility. Water works facilities must be capable of meeting projected future demands over the course of a reasonable planning period.

The Utility generally consists of two (2) raw water production wells (280 gpm and 500 gpm), a 500 gpm package water treatment plant (WTP), one (1) 200,000-gallon elevated water storage tank, and one (1) 200,000-gallon ground level water storage tank. Water mains within the distribution system range in size from 2" to 8" in diameter with some mains constructed using asbestos cement pipe.

The groundwater wells (Ford St. and SR 13) were installed in 2000 and recently inspected by Peerless-Midwest on March 2, 2020. The inspection report noted that the Ford St. well pump is operating at 73% of the rated capacity and is over drawing the well, causing poor water quality and a shorter life expectancy. The pump should be replaced, and a variable frequency drive installed to control the rate of production. The Ford St. well house is in a state of disrepair and needs structural, piping, and electrical upgrades. The SR 13 well had its pump replaced in 2013 and is operating as expected, however the meter needs to be fixed and the well is due for a pump/motor overhaul. Due to old the iron buildup and raw water quality, both wells should be chemically cleaned. The Town also has two (2) old wells that are no longer in service that should be properly abandoned. Total existing firm pumping capacity for the Town's wells is 280 gpm (Ford St design capacity is 280 gpm, SR 13 design capacity is 500 gpm). The Town utilizes the Ford St well as much as possible because it produces better raw water quality; however, due to operational problems with the Ford St well, the Town has recently been relying on the SR 13 well. According to projections, the Town's peak day demand is anticipated to surpass the existing well field firm pumping capacity within the next 3-years; however, the Town's 200,000-gallon ground storage tank/clearwell provides additional storage for the 500 gpm high service pumps to deliver water to the distribution system and provides a buffer for the well pumps need to supply peak day demand. A feasibility study should be performed to determine possible locations for future well installations. It is recommended that the Town install a new 500 gpm well in a future project.

The existing WTP was constructed in 2012 and consists of a 500 GPM iron removal package treatment unit (PTU). Chlorine and fluoride chemical feeds are injected into the finished water prior to entering the distribution system. The treatment plant and process components require improvements—the existing filter media should be upgraded to a combination of sand and anthracite with oxide coating. The capacity of the chlorine gas system needs to be increased to accommodate for the high concentrations of ammonia in the raw water and per filter manufacturer recommendations, sodium permanganate and polymer should be added to the chemical feed

system to aid the removal of iron and manganese. The existing WTP building is not large enough to accommodate additional chemical feed facilities, therefore, it is recommended that a new prefabricated fiberglass building be installed to house the sodium permanganate feed system. Without improvements, the town will continue to experience poor water quality. According to projections, the Town's peak day demand is anticipated to surpass the existing WTP filtration and firm pumping capacity within the next 7-years. A plan for expansion should be re-evaluated in a future project phase based on needs.

The 200,000-gallon elevated storage tank was erected in 1970 and last inspected and serviced in October of 2018. The 200,000-gallon ground level storage tank was constructed in 2012 and also inspected in 2018. It is recommended that the Town continue regular maintenance inspections and address recommended rehabilitation. Current needs for the elevated tank include installing weather stripping and a lock on the access hatch, #24 corrosion resistant mesh on the overflow pipe, and epoxy repairs. The ground level tank is in better condition and should be monitored for corrosion and spalling. The volume of the elevated and ground level storage tanks is sufficient to satisfy the 2019 average daily demand of the Town's existing customer base. It may be in the Town's best interest to build a second elevated storage tank as population/demand increases in a future project. The existing tanks are undersized with respect to fire flow protection.

The existing system has 400,000-gallons of storage, 200,000-gallons in an elevated storage tank and 200,000-gallons in a ground storage tank/clearwell; however, the available volume in the ground storage tank/clearwell is limited by the capacity of the high service pumps. It is recommended that the Town install additional pump capacity specifically for drawing additional water from the ground storage tank for emergency/fire events. Adding two (2) 750 gpm pumps will provide the Town with sufficient fire flow from their existing storage facilities. This would provide supplemental fire flow volumes totaling 180,000-gallons over a 2-hour fire period which is recommended by the American Water Works Association (AWWA).

The distribution system covers approximately 500-acres and ranges in size from 2-inches in diameter to 8-inches in diameter. Pipe materials vary dependent on water main replacement or repairs completed. Pipe material utilized include cast iron, PVC, ductile iron, and asbestos cement pipe. The Town has recently had issues with water main breaks in the asbestos cement pipe north of Conrad Drive and Main Street. Many of the Town's mains are undersized (below 6" diameter) for fire protection and should be upsized according to priority. It is anticipated that multiple areas of existing asbestos cement pipe will be replaced within the proposed project plans. Several areas in the Town also have dead-ends which can decrease the water quality within the mains. Considering additional looping within the distribution system presents an option for improved mixing and redundancy. The Town also has aging hydrants and valves that are not functioning properly. Replacing these hydrants and valves will provide the Town with operational flexibility needed to reduce water loss during a water main break and address fire events in a timely manner.

It is recommended that the Town implement a lead service line replacement program to assure the system is lead-free. Due to the age of the distribution system, the Town should remain on their customer meter replacement plan.

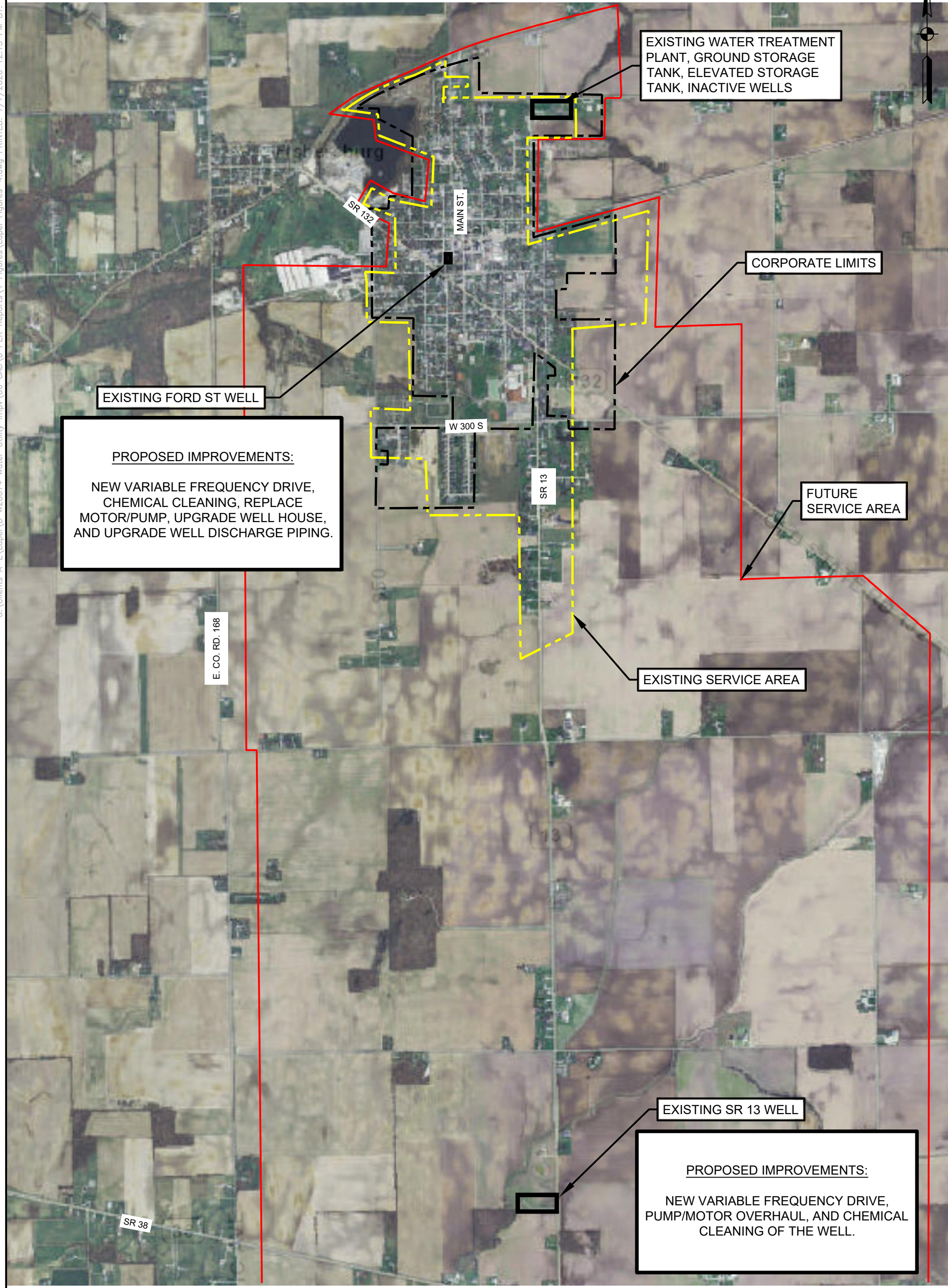
CEI reviewed recent Indiana Department of Environmental Management (IDEM) and Peerless Midwest inspection reports, sanitary survey records, and monthly reports of operation to further assess conditions of the raw water supply, treatment, and distribution facilities. System mapping was obtained, and detailed discussions were held with the Town's Utility Staff to evaluate areas of need within the Utility.

The recommended project is presented in **Figure ES-1 through Figure ES-3**.

ES.1 Water Utility Improvements

As noted above, this PER evaluated the present condition and future needs of the Utility and provides recommendations along with a course of action to ensure future quality and reliability for the Town. Alternatives were developed to address these needs, and a proposed implementation plan has been identified. The implementation plan utilizes a phased approach which affords the Town a unique opportunity to strategically address needs within the Utility in a cost-effective manner providing flexibility and the ability to secure additional funding in the future. The Town and the Engineer will be able to evaluate the order of implementation for subsequent phases upon the completion of each phase. Through discussion with and input from the Town's Utility Staff and the Lapel Town Council, the current Recommended Project submitted for funding consideration is included under **Phase I** and is summarized as follows:

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EXISTING WATER TREATMENT PLANT, GROUND STORAGE TANK, ELEVATED STORAGE TANK, INACTIVE WELLS

CORPORATE LIMITS

EXISTING FORD ST WELL

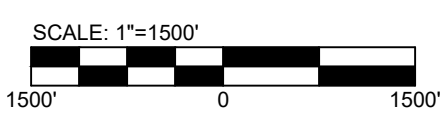
PROPOSED IMPROVEMENTS:
NEW VARIABLE FREQUENCY DRIVE, CHEMICAL CLEANING, REPLACE MOTOR/PUMP, UPGRADE WELL HOUSE, AND UPGRADE WELL DISCHARGE PIPING.

FUTURE SERVICE AREA

EXISTING SERVICE AREA

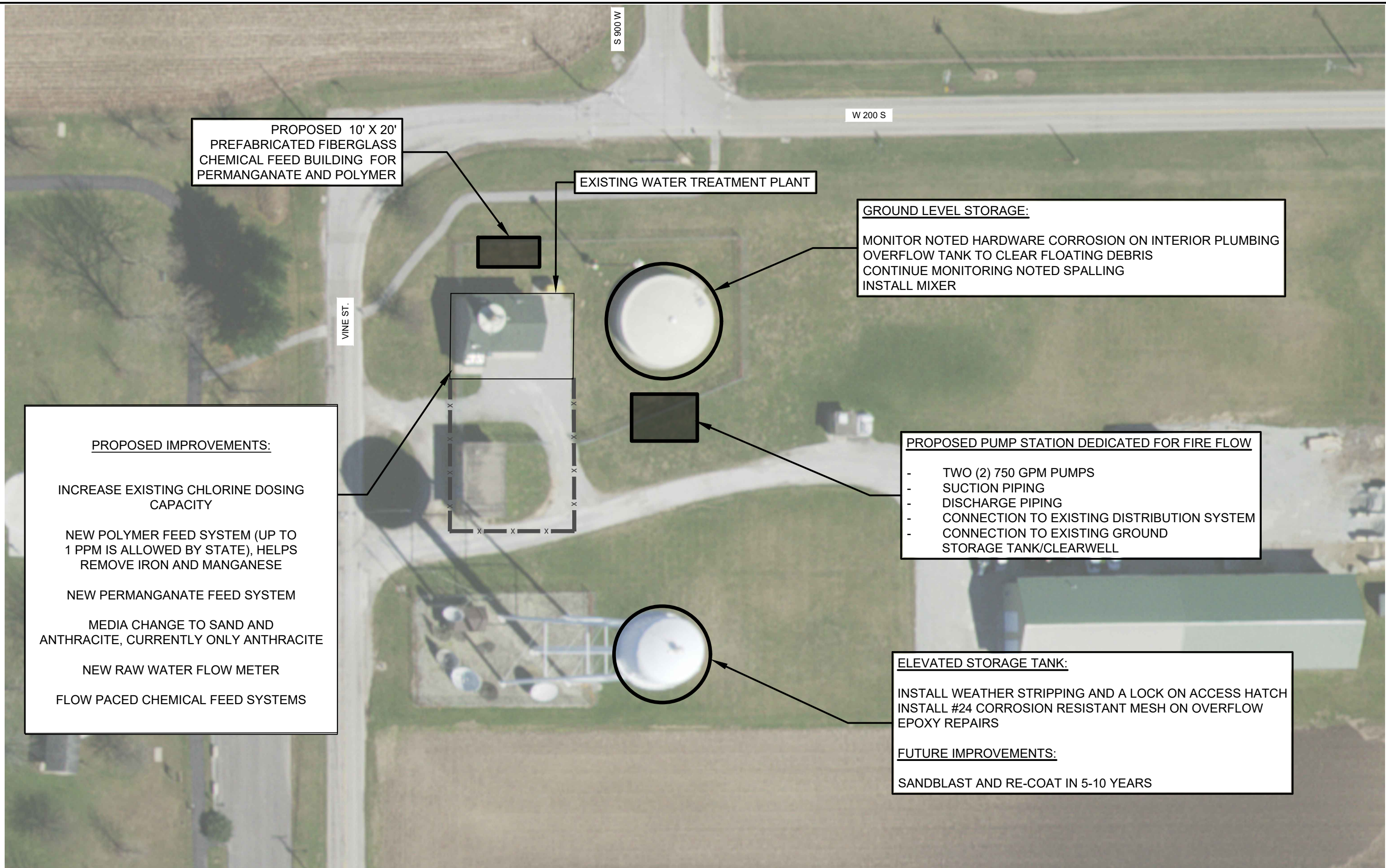
EXISTING SR 13 WELL

PROPOSED IMPROVEMENTS:
NEW VARIABLE FREQUENCY DRIVE, PUMP/MOTOR OVERHAUL, AND CHEMICAL CLEANING OF THE WELL.



TOWN OF LAPEL
MADISON COUNTY, INDIANA
PRELIMINARY ENGINEERING REPORT
PROPOSED GROUNDWATER SUPPLY
WELL IMPROVEMENTS
FIGURE ES-1

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PROPOSED 10' X 20' PREFABRICATED FIBERGLASS CHEMICAL FEED BUILDING FOR PERMANGANATE AND POLYMER

EXISTING WATER TREATMENT PLANT

GROUND LEVEL STORAGE:
MONITOR NOTED HARDWARE CORROSION ON INTERIOR PLUMBING
OVERFLOW TANK TO CLEAR FLOATING DEBRIS
CONTINUE MONITORING NOTED SPALLING
INSTALL MIXER

PROPOSED IMPROVEMENTS:

INCREASE EXISTING CHLORINE DOSING CAPACITY

NEW POLYMER FEED SYSTEM (UP TO 1 PPM IS ALLOWED BY STATE), HELPS REMOVE IRON AND MANGANESE

NEW PERMANGANATE FEED SYSTEM

MEDIA CHANGE TO SAND AND ANTHRACITE, CURRENTLY ONLY ANTHRACITE

NEW RAW WATER FLOW METER

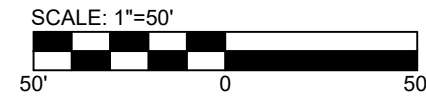
FLOW PACED CHEMICAL FEED SYSTEMS

PROPOSED PUMP STATION DEDICATED FOR FIRE FLOW

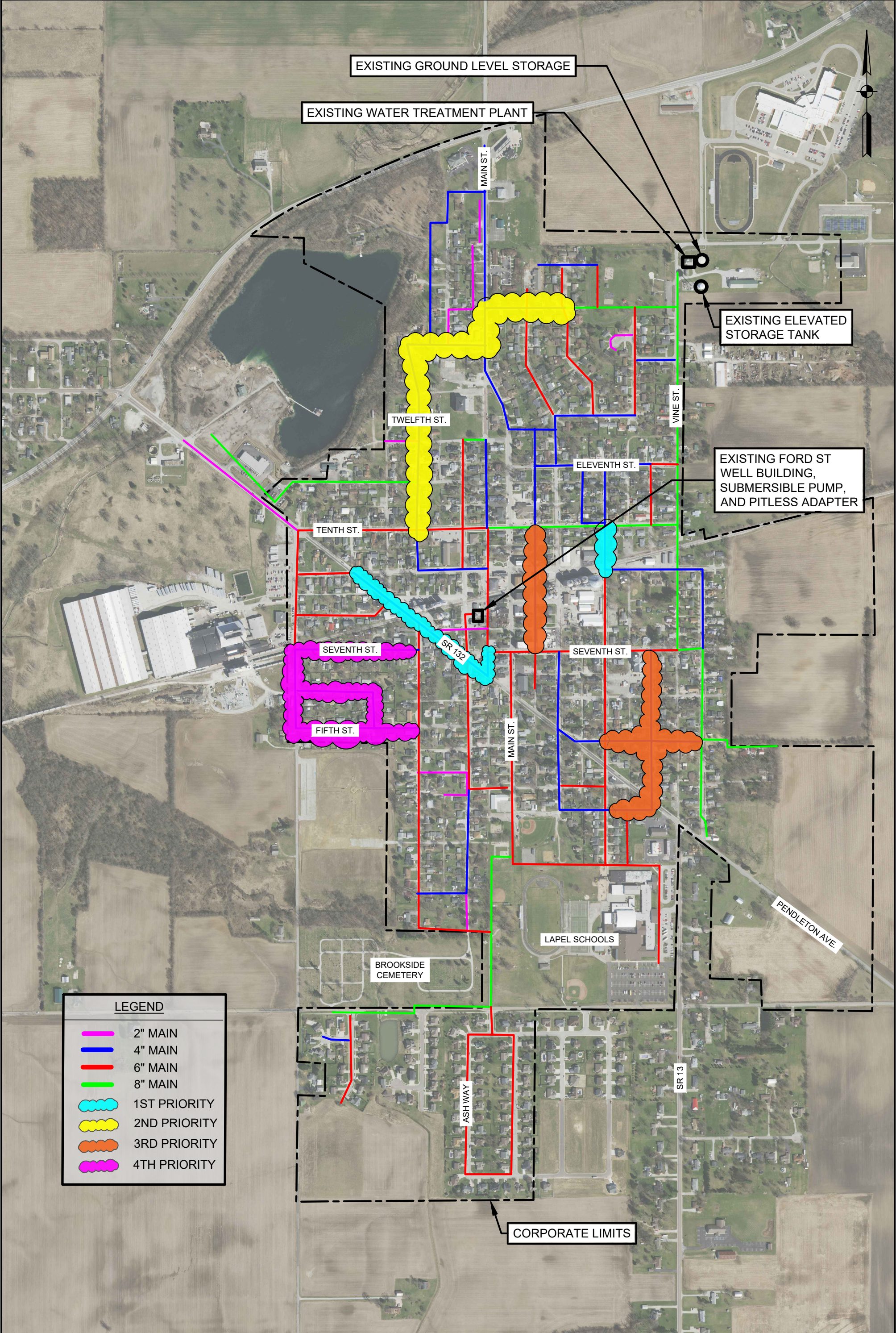
- TWO (2) 750 GPM PUMPS
- SUCTION PIPING
- DISCHARGE PIPING
- CONNECTION TO EXISTING DISTRIBUTION SYSTEM
- CONNECTION TO EXISTING GROUND STORAGE TANK/CLEARWELL

ELEVATED STORAGE TANK:
INSTALL WEATHER STRIPPING AND A LOCK ON ACCESS HATCH
INSTALL #24 CORROSION RESISTANT MESH ON OVERFLOW
EPOXY REPAIRS

FUTURE IMPROVEMENTS:
SANDBLAST AND RE-COAT IN 5-10 YEARS



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LEGEND	
	2" MAIN
	4" MAIN
	6" MAIN
	8" MAIN
	1ST PRIORITY
	2ND PRIORITY
	3RD PRIORITY
	4TH PRIORITY



TOWN OF LAPPEL
MADISON COUNTY, INDIANA
PRELIMINARY ENGINEERING REPORT
PROPOSED DISTRIBUTION SYSTEM
IMPROVEMENTS
FIGURE ES-3

➤ **Phase 1**

- Well Improvements
 - SR 13 Well
 - Installation of variable frequency drive
 - Chemical cleaning
 - Pump/motor overhaul
 - Ford St. Well
 - Building upgrades
 - Installation of variable frequency drive
 - Chemical cleaning
 - Pump replacement
 - Test Wells (Hydrogeological Studies)
 - Abandon Old Wells
- Water Treatment Plant Improvements
 - Upsize chlorine gas system to add a chlorinator and pre-filtration injection point
 - Add polymer (increase size of floc) and sodium permanganate (increase settleability) chemical feed systems
 - New prefabricated fiberglass building to house the new chemical feed systems
 - Upgrade filter media to a combination of sand and anthracite
 - SCADA/Controls Upgrade
- Water Storage Tank Repairs
 - Elevated Tank
 - Weather stripping around access hatch
 - Corrosion-resistant mesh on the overflow pipe
 - Epoxy repairs
 - Ground Storage Tank/Clearwell
 - Install mixer
- Fire Flow Pump Station
 - Installation of two (2) 750 gpm pumps to increase firm pumping capacity to 1,750 gpm (1,500 gpm for fires and emergencies and 250 gpm for current peak day demand), including standby power.
- Water Main Priority Area 1
 - Upsize to 8-inch diameter pipe. Identifies where 4" diameter and smaller pipes restrict flow between two (2) 6" diameter or larger pipes in the center of the Town and increases fire flow to the same areas. As well as likely replacement of isolated areas of asbestos cement pipe.

- Water Main Priority Area 2
 - Upsize to 8-inch diameter pipe. Identifies where 4” diameter and smaller pipes restrict flow between two 8” diameter pipes on the perimeter of the Town and increases fire flow to the same areas. As well as likely replacement of isolated areas of asbestos cement pipe.
- Water Main Priority Area 3
 - Upsize to 8-inch diameter pipe. Identifies where 4” diameter and smaller pipes restrict flow between two 6” or grater pipes in the center of the Town and increases fire flow to that area. As well as likely replacement of isolated areas of asbestos cement pipe.
- Water Main Priority Area 4
 - Upsize to 6-inch diameter pipe. Identifies a restricted perimeter area where increasing the water main size will increase fire flow within the area of improvement. As well as likely replacement of isolated areas of asbestos cement pipe
- **Phase 2 – Not Included in Current Phase 1 Funding Application**
 - Water Main Priority Area 5
 - Upsize to 6-inch diameter pipe. Addresses minor bottlenecks in the system where 4” mains restrict flow between 6” diameter or greater mains. Additionally, upsizes mains for increased fire protection.
 - Water Main Priority Area 6
 - Upsize to 6-inch diameter pipe. Addresses for increased fire flow within the proposed area of improvement.
 - Construction of New Well
 - Base decision on the results of a hydrogeologic study completed in Phase 1. A new well accounts for an increase in demand and brings an element of redundancy to increase its current firm pumping capacity.
- **Phase 3 - Not Included in Current Phase 1 Funding Application**
 - New WTP
 - The WTP will need to be doubled in capacity in order to meet the future demands anticipated within the 20-year planning period. Additional evaluation and analysis will need to be completed in order to confirm required increase in capacity and design.
 - Construction of New Elevated Storage Tank
 - A new tank increases storage capacity to meet future demands of a growth in population or industry as well as providing more available fire flow. Additional evaluation and analysis will need to be completed in order to confirm required increase in capacity and design.

- Looping Connections
 - Brookside Road Loop
 - 2,300 LF of 8” along Brookside Road connecting the 4-inch water main at the intersection of Myrtle Drive and CR 300 S to the 4-inch water main located at the intersection of Brookside Road and Fifth St. It would be beneficial to extend this loop about 1,100 ft south along Brookside to loop a development in the future.
 - Pendleton Ave Loop
 - 450 LF of 8” along Pendleton Ave connecting the 4-inch water main at the intersection of Walnut St and Pendleton Ave to the 8-inch water main at the intersection of Central Ave and Pendleton Ave.
 - Ninth St Loop
 - 500 LF of 6” along Ninth St connecting the 4-inch water main at the intersection of Erie St and Ninth St and the 6-inch water main at the intersection of Pendleton Ave and Ninth St.
 - Twelfth St Loop
 - 300 LF of 8” along Twelfth St connecting the 8-inch water main at the intersection of Ford St and Twelfth Street to the 4-inch water main at the intersection of Erie St and Twelfth St. Additionally, 200 LF along Twelfth St connecting the 8-inch water main at the intersection of School St and Twelfth St with the 4-inch water main at the intersection of Main St and Twelfth St.
 - CR 300 S Loop
 - 1,400 LF of 8” along CR 300 S connecting the 6-inch water main at the intersection of SR 13 and CR 300 S to the 8-inch water main at the intersection of CR 300 S and Northview Drive.

ES.2 Financial Requirements

The proposed Water Utility Improvements Phase 1 Project presented below is anticipated to slightly increase operation and maintenance (O&M) costs with regards to the additional pumping and chemical feed facilities; however, the O&M associated with the distribution system is anticipated to decrease because its improving the life expectancy and reducing the need for water main repairs. **Table ES-1** provides the cost estimates for phase 1 of the proposed project:

**Table ES-1
Phase 1 Estimate of Probable Cost – Water Utility Improvements**

Description	Cost
1. Well Improvements	\$288,500.00
2. WTP Improvements	\$501,800.00
3. Water Storage Tank Repair	\$59,200.00
4. Fire Flow Pump Station	\$442,500.00
5. Undersized WM Priority 1	\$471,500.00
6. Undersized WM Priority 2	\$700,400.00
7. Undersized WM Priority 3	\$806,200.00
8. Undersized WM Priority 4	\$672,100.00
Construction Costs⁽¹⁾	\$3,942,200.00
Study & Report	\$20,000.00
Preliminary Design	\$129,000.00
Final Design	\$86,000.00
Bidding & Negotiation	\$15,000.00
Construction Engineering	\$60,000.00
Post-Construction	\$5,000.00
Background Study & 3 Test Wells	\$45,000.00
Survey	\$15,000.00
Soil Borings	\$15,000.00
Erosion Control Plan	\$10,000.00
Records Drawings	\$5,000.00
Permits	\$500.00
Start-up Assistance	\$5,000.00
Regulatory Assistance	\$5,000.00
American Iron and Steel	\$5,000.00
Archeological Reconnaissance	\$7,500.00
Resident Project Representative (12 mo.)	\$210,000.00
Legal/Financial	\$10,000.00
Rate Consultant	\$30,000.00
Bond Counsel	\$30,000.00
Local Attorney	\$5,000.00
Grants Administration	\$56,000.00
Environmental Review	\$5,000.00
Labor Standards	\$5,000.00
Refinance Existing Water Utility Debt	\$2,096,919.00
Total Non-Construction Costs	\$2,875,919.00
Total Project Costs	\$6,818,119.00

⁽¹⁾Inclusive of a 10% Planning Level Contingency

**Table ES-2
Phase 2 Estimate of Probable Cost
Not Included in Proposed Project Costs**

Phase 2	
Description	Cost
Undersized WM Priority 5	\$1,049,850.00
Undersized WM Priority 6	\$1,554,600.00
Construction of New Well ⁽¹⁾	\$491,300.00
Construction Costs⁽²⁾	\$3,095,750.00
Total Non-Construction Costs (25%)	\$774,100.00
Total Project Costs	\$3,869,850.00

⁽¹⁾ Does not include costs associated with the raw water transmission main to the WTP because the proposed location is currently unknown.

⁽²⁾ Inclusive of a 10% Planning Level Contingency

**Table ES-3
Phase 3 Estimate of Probable Cost
Not Included in Proposed Project Costs**

Phase 3	
Description	Cost
New WTP	\$2,564,650.00
Construction of Elevated Storage Tank	\$1,297,100.00
Looping Connections	\$1,439,600.00
Construction Costs⁽¹⁾	\$5,301,350.00
Total Non-Construction Costs (25%)	\$684,400.00
Total Project Costs	\$5,985,750.00

⁽¹⁾ Inclusive of a 10% Planning Level Contingency

ES.3 Project Schedule

The following **Table ES-4 and Table ES-5** presents a preliminary timeline and estimated milestone dates for the recommended **Phase 1 and Service Line Replacement** Project.

**Table ES-4
Phase 1 - Project Schedule and Milestone Dates**

OCRA Round 1/SRF Tentative Schedule		Comments
SHPO Letter w/ SRF Coordination	July 2020	Letter to be sent out by ASAP ¹
NRCS Coordination	July 2020	NRCS ²
PER Updates	July 2020	
GPR Business Case	July 2020	GPR ³
PER/Application Submitted to SRF	July 2020	
SRF Environmental Coordination	August 2020	
FNSI Published	August 2020	FNSI ⁴
Public Hearing No. 1 for OCRA/SRF	August 2020	
OCRA Grant Round 1 Proposal Due	September 2020	* Need to confirm with Mike K
Public Hearing No. 2 for OCRA	September 2020	* Need to confirm with Mike K
Preliminary Design	November 2020	
IDEM Submittal	November 2020	
Misc. Permitting	December 2020	
OCRA Round 1 Applications Awarded	December 2020	* Need to confirm with Mike K
Final Design	January 2021	
Permits Approved	March 2021	
Bid advertisement	April 2021	
Receive Bids	May 2021	
loan closing	May 2021	
contract award initiation of construction	May 2021	
substantial completion of construction	April 2022	
initiation of operation	May 2022	

- SRF needs to submit a letter of determination to the State Historic Preservation Office concerning the identification of historic properties for the purpose of compliance with Section 106 of the National Historic Preservation Act. SHPO needs to confirm determination that historic sites will not be disturbed.*
- National Resources Conservation Service determines potential conversion of prime farmlands associated with construction of our proposed project.*
- Green Project Reserve sets a precedent for SRF by targeting funding towards projects that reduce water loss and aim to improve efficiency. SRF provides an incentive for GPR qualified projects.*
- Finding of No Significant Impact noting that SRF has evaluated all pertinent environmental information regarding the proposed project and determined that an Environmental Impact Statement is not necessary.*

**Table ES-5
Service Line Replacement
Project Schedule and Milestone Dates**

SRF Tentative Schedule	
PER/Application Submitted to SRF	Mar-21
Public Hearing for Application	Apr-21
Town Receives SRF Approval of PER	Apr-21
Plans and Spec Submittal to IDEM	Oct-21
Town Receives Construction Bids	Jan-22
Town Closes on Loan	Feb-22
Town Issues Notice to Proceed to Contractor	Feb-22
Town Substantially Completes Construction	Feb-23
Town Completes Final Inspection	Feb-23