Executive Summary

In response to the Town of Clarks Hill receipt of a (3) Utility Planning Grant from the Indiana Office of Community and Rural Affairs (OCRA), Commonwealth Engineers, Inc. (Commonwealth) has prepared this Master Plan Report (MP) to evaluate the present conditions and future Utility needs for the Town. Within this MP we have identified cost-effective alternatives for addressing wastewater, drinking water, and stormwater utility needs along with recommended course of action for the to ensure safe, reliable, and affordable service to existing and future customers.

ES.1 Purpose of the Plan

A. Wastewater

Wastewater treatment for the Town of Clarks Hill is provided by a Class I, 0.115 MGD rotating biological contactor-type treatment facility originally constructed in 1975. The headworks structure was installed as part of an improvements project in 2004. Flows are transferred from the collection system to the influent lift station. The flows are then pumped and enter the WWTP through a grinder and mechanical screen at the headworks. From the headworks, flows are transferred through two (2) rotating biological contactors (RBC's), secondary clarifiers, a polishing lagoon with a floating aerator, effluent flow meter, chlorination/dechlorination facilities, and post-aeration. Solids are directed from a digester to a sludge lagoon. Final solids are hauled off-site for disposal. After treatment the flow is discharged into Anderson Ditch and ultimately to Lauramie Creek.

An analysis of the Monthly Reports of Operation (MROs) for the Clarks Hill WWTP show that influent loadings exceed design ratings and the WWTP is exceeding effluent limits for NH_3-N, Phosphorus, and Residual Chlorine. A summary of the historical effluent flows and influent loadings to the Clarks Hill WWTP are presented in the following **Table ES-1**. Effluent flows were evaluated because influent flows were not available. The design loading for Phosphorus was also not available.

Table ES-1
Clarks Hill Effluent Monthly Flows and Influent Loadings (lb/day)
Jan. 2018 to Jul. 2023

Statistic/ Parameter	Average Flow (gpd)	Peak Flow (gpd)	$CBOD_5$ (lb/day)	TSS (lb/day)	P (lb/day)	NH_3-N (lb/day)
Design Value	115,000	150,000	191.8	191.8	N/A	28.8
Period Data						
Average Month	70,879	105,106	56.84	72.54	2.75	13.21
Maximum Month	171,500	284,000	236.57	309.10	9.60	30.32
Minimum Month	29,800	39,000	14.98	16.69	0.85	4.86
Compared to Design						
Average	62%	70%	30%	38%	-	46%
Maximum	149%	189%	123%	161%	-	105%
Minimum	26%	26%	8%	9%	-	17%

** Extreme outlier values were excluded from data*

The most recent IDEM Inspection Report rated the collection system as unsatisfactory. The Town has indicated possible storm sewer connections to the gravity sewer system particularly in the south-east section of the Town and also at the Intersection of Madison Street and White Street where SSO events have been observed. Storm sewer connections are not allowed in the collection system as the system is listed as a 100% separate sanitary system. In the IDEM Inspection Report, the Town has been noted as removing a couple of these cross connections, but further investigations are recommended. The majority of the collection system was built around 1978-1979 and is made of Vitrified Clay Pipe (VCP).

B. Water

The Clarks Hill WTP has exceeded EPA secondary contaminant standards for manganese on 41 days over the past three (3) years. Additionally, raw water samples were collected and identified elevated manganese and arsenic levels. Increased concentrations of manganese in effluent water is primarily due to the age of existing filter media and inadequate backwashing. Typically filter media has a useful life of 10-15 years, and the current media has not been replaced since the WTP's initial installation in 1994. Additionally, the existing filter has not been properly air scoured during backwash procedures over the past two (2) years. If the existing media and blower remain, the WTP will not be able to effectively treat the raw water and potentially contaminate the existing distribution system.

The elevated storage tank and production wells are in good condition but are currently unsecured without any fencing or site security. Clarks Hill also has agreements with the local internet utility to utilize the Tower. Much of the above

ground wiring is run through conduit and is exposed to continuous sunlight. The east production well was recently repaired in 2021, due to a truck striking the wellhead. Without any changes to current site security, the production wells and storage tank are at increased risk of damage from natural sources and other non-natural sources.

The existing chlorine room contains an exhaust system that vents to the roof of the building. The vent is controlled by a light switch in the adjacent filter room building. There are currently no controls or automatic switches that engage the exhaust fan when the door is opened. The existing interior door appurtenances lack a handle and includes a lockable hatch. This is a health and safety hazard for Operators and could lead to the only exit being locked preventing escape from a dangerous atmosphere.

C. Stormwater

Flooding within the Town represents a continued safety, health, and financial burden on the Community. Inadequately sized, lack of, or failing storm drainage facilities have caused areas to flood, property damage, erosion, ponding water for significant amounts of time, and created roadside hazards. Flooding areas also can present a risk to human and environmental health by providing a breeding ground for many insects, including mosquitoes that can transmit diseases. The Intersection of Hudson Street and Union Street is a particular area of concern, and significant flooding has frequently occurred there. There are also other areas throughout the Town, such as the Intersection of Pearl Street and Division Street which has experienced less severe flooding. Residents have also complained of their yards and basements flooding during periods of heavy rain. The presence of sanitary and storm sewer cross connections also allows the potential for SSO events which can cause untreated wastewater to be released into waterways.

A stormwater improvements project is needed to address the aforementioned conditions, particularly the cross connections and the ponding between the intersection of Hudson Street and Union Street.

ES.2 Scope of Plan

A. Wastewater

The Recommended Alternative is to construct a new WWTP on the site of the existing facility. Components of the new facility are summarized as follows:

1. New Influent Lift Station
2. New Generator for Back-Up Emergency Power
3. New Mechanical Screen and Manual Bypass Bar Rack
4. New Package Treatment Plant
5. New Equalization Tank (Included in Package Treatment Plant)
6. Two (2) New Secondary Clarifiers (Included in Package Treatment Plant)

7. New UV Disinfection (Included in Package Treatment Plant)
8. New Cascade Aeration (Included in Package Treatment Plant)
9. New Aerobic Digester (Included in Package Treatment Plant)
10. New Maintenance Building
11. New Laboratory and Control Building
12. New Laboratory Equipment
13. Sludge Dewatering Bag System
14. Demolition of Existing WWTP

B. Water

1. Filter Inspection
2. Filter Media Replacement
3. New High Service Pumps
4. Mission Cellular Control System
5. Storage Tank Fencing
6. Well Fencing
7. Transite Water Main Replacement
8. Hydrant and Valve Replacement (50%)
9. Plastic Meter Lids

C. Stormwater

1. 353 LF of New Triple Twelve (12)-inch HDPE Pipe that Starts South of Division Street and Connects to the New Parallel Twenty-Four (24)-inch HDPE Pipe
2. 571 LF of New Parallel Twenty-Four (24)-inch HPDE Pipe that starts North of Division Street and connects to the East End of Hudson Dr.
3. 370 LF of New Twenty-Four (24)-inch HDPE Pipe from the Intersection of Union Street and Hudson Dr to the East End of Hudson Dr.
4. 40 LF of New Forty-Eight (48)-inch HDPE Pipe that connects the East End of Hudson Dr. with the New Open Channel
5. 2,872 LF of New Open Channel that Connects New Forty-Eight (48)-inch HDPE to a Drainage Tile North of Town
6. Investigate and Remove Sanitary Sewer Cross Connections

ES.3 Plan Summary

A. Wastewater

A new WWTP would be constructed adjacent to the existing Clarks Hill WWTP. The new WWTP would include a new Influent Lift Station, Standby Generator, Bag Dewatering System, and Package Treatment Plant inclusive of Aeration Tanks, Equalization Tank, two (2) Secondary Clarifiers, UV System, Low-Profile Cascade Aerator, and Aerobic Digester. The new WWTP would also include a new maintenance building, laboratory and control building, and laboratory equipment. The WWTP would be rated for a peak hourly flow of 0.74 MGD, a peak daily flow of 0.37 MGD, and an average daily flow of 0.185 MGD. For this alternative the existing Clarks Hill WWTP would be demolished at the end of construction in accordance with Indiana Code and Indiana Department of Environmental Management. The proposed alternative is presented in **Figure ES-1**. The Engineer's Estimate for proposed construction and non-construction costs for this alternative are summarized in **Table ES-2**.

Table ES-2
Wastewater Utility - Estimate of Total Project Cost

Item	Base Bid
Construction Costs	
Alternative #3 – New WWTP: Package Treatment Plant	$7,331,700
Alternative #2 – WWTP Dewatering: Bag Dewatering	$336,000
Mandatory Alternates	$671,400
Subtotal	**$8,339,100**
BABA (10%)	$833,910
Total Construction Cost	**$9,173,010**
Non-Construction Costs	
Preliminary Engineering Report	$40,000
Design	$694,000
Bidding / Negotiating	$37,000
Construction Inspection	$280,000
Construction Engineering	$105,000
Post-Construction	$10,000
Erosion Control Plan	$5,000
Geotechnical Report	$30,000
Field Investigation & Survey	$40,000
Legal / Financial Services	$10,000
Start-up Assistance	$20,000
Regulatory Assistance	$25,000
Administrative Assistance	$10,000
Labor Standards	$40,000
Fiscal Sustainability Plan	$10,000
Grants Administration	$40,000

Environmental Review - Arch.	$10,000
Legal Services	$20,000
American Iron and Steel Compliance	$5,000
Financial Consultant	$40,000
Bond Bank Fee	$20,000
Bond Council	$40,000
Interest During Construction (2%)	$214,000
Total Non-Construction Cost	**$1,531,000**
Total Project Cost	**$10,704,000**

B. Water

Instrumentation and controls shall be upgraded in this alternative inclusive of SCADA improvements. SCADA improvements shall include but not be limited to – filter head loss, chemical scale reads, filter tank float levels operation, on/off pumps, etc. Other electrical improvements shall include installation of discharge and suction pressure transducers on the high service pumps and new filter high pressure detector. Suction piping will be replaced on the discharge and suction sides of the high service pumps to facilitate installation of the new pressure transducers. The existing filter high pressure detector is inoperable and needs to be updated. Lastly the existing generator and automatic transfer switch have exceeded their useful lives and should be replaced.

Existing filter media will be removed and replaced in kind with new filter media with manganese greensand and anthracite layers. The existing blower is also inoperable and should be replaced with a new blower in kind with another redundant blower for alternating operation. Additional funds are allocated for inspection of the filter, upsizing of manways to be compliant with OSHA regulations, and an allowance for other repairs required on the interior of the tank. Additionally, the existing gate valve on the backwash discharge line is beginning to seize and replacement is recommended.

The existing high service pumps have surpassed their useful lives and should be replaced. The pumps have experienced periods of cavitation due to the condition of the media and are not operating efficiently. Additionally, the suction and discharge piping will be replaced to better facilitate installation of the suction and discharge pressure transducers. Chlorine room improvements include two (2) new cylinder scales integrated with the SCADA system, new exhaust fan, new electric heater, new door with panic bars, and repainting of the walls and floor with corrosion resistant coatings.

Distribution system improvements include replacement of 50% of existing hydrants and valves within the distribution system to accommodate Ten State Standards main with new six (6)-inch water main. Hydrants would be replaced with newer Mueller models and new isolation valves for future maintenance. Due to the existing isolation ability of the system and operational status of isolation valves in

the existing system, line stops and hot tap connections are required for installation of approximately 50% of all the proposed hydrants and isolation valves. Lastly, customer meter improvements include new meter lids for all existing meter pits with an allowance for replacing damaged existing meter pits discovered during construction. The Proposed location of the improvement is provided in **Figure ES-2** through **ES-5.** The Engineer's Estimate for proposed construction and non-construction costs for this alternative are summarized in **Table ES-3**.

Table ES-3
Water Utility - Estimate of Total Project Cost

Item	Base Bid
Construction Costs	
Water Supply Improvements	$13,100
Water Treatment Improvements	$729,000
Storage Improvements	$21,000
Priority No. 1 Improvements	$2,416,000
Hydrant and Isolation Valve Improvements	$317,000
Customer Meter Improvements	$119,000
Subtotal	**$3,615,100**
Bid Environment (10%)	$362,000
Total Construction Cost	**$3,977,100**
Non-Construction Costs	
Preliminary Engineering Report	$40,000
Design	$301,000
Bidding / Negotiating	$16,000
Construction Inspection	$240,000
Construction Engineering	$90,000
Post-Construction	$10,000
Erosion Control Plan	$5,000
Geotechnical Report	$30,000
Field Investigation & Survey	$40,000
Legal / Financial Services	$10,000
Start-up Assistance	$20,000
Regulatory Assistance	$25,000
Administrative Contingency	$10,000
Labor Standards	$40,000
Fiscal Sustainability Plan	$10,000
Grants Administration	$40,000
Environmental Review - Arch.	$10,000
Legal Services	$20,000
American Iron and Steel Compliance	$5,000
Financial Consultant	$40,000
Bond Bank Fee	$20,000
Bond Council	$40,000

Interest During Construction (2%)	$101,000
Total Non-Construction Cost	**$1,163,000**
Total Project Cost	**$5,140,100**

C. Stormwater

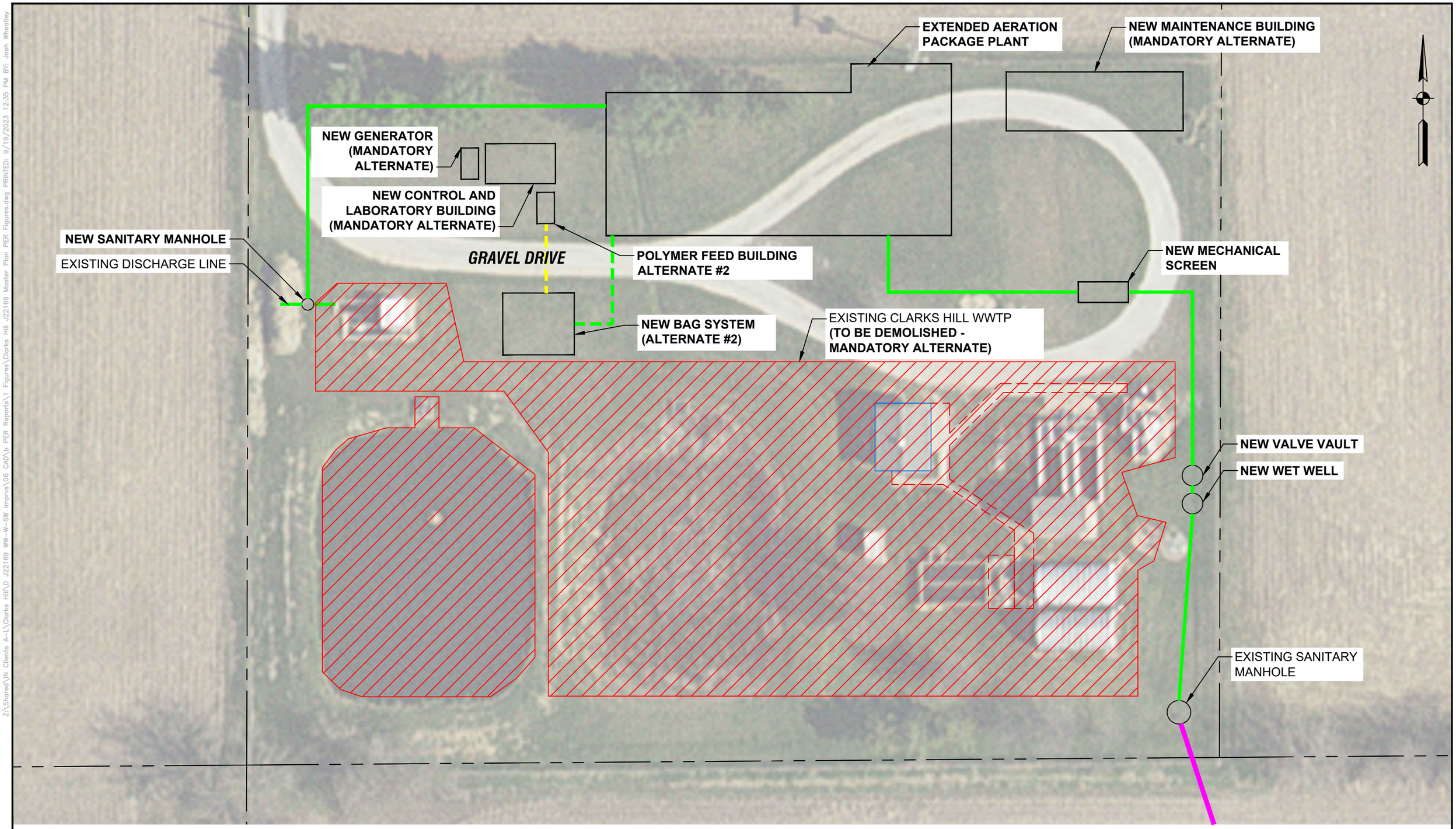
The County Surveyor indicated prior projects were identified to address capacity limitations of the surrounding drainage tiles, but the proposed projects were not implemented. The previously proposed 2005 J.B. Anderson Regulated Drain Improvements Project dealt with the ponding at the Intersection of Union Street and Hudson Dr. This project proposed increasing the drainage tile capacity upstream and downstream of this Intersection to prevent the most significant ponding within the Town. The improvements proposed in this Alternative follow this project and include replacing existing eighteen (18)-inch and twenty-four (24)-inch diameter pipe with 353 LF of triple twelve (12)-inch diameter pipe and 571 LF of parallel twenty-four (24)-inch diameter pipe, replacing an existing 370 LF section of eighteen (18)-inch pipe on Hudson Dive with twenty-four (24)-inch diameter pipe, replacing 40 LF of twenty (20)-inch pipe with forty-eight (48)-inch diameter pipe, and replacing 2,872 LF of an unknown diameter drainage tile with an open channel. Future projects should include repairs and increased capacity for other areas within the Town as this Alternative only addresses the Town's most severe issue. A future project coordinated with the County to address the drainage tile capacity issues downstream of the Town will likely be needed as they are currently undersized and in poor condition.

As a part of the Alternative, sanitary sewer cross connections will also be investigated and removed. The location of the proposed alternative is included in **Figure ES-6**. The Engineer's Estimate for proposed construction and non-construction costs for this alternative are summarized in **Table ES-4**. There is currently insufficient information regarding the existing interconnections to provide a cost estimate for Alternative #3 as of the time of writing the Master Plan.

Table ES-4
Stormwater - Estimate of Total Project Cost

Item	Base Bid
Construction Costs	
Alternative #2 – J.B. Anderson Regulated Drain Improvements	$972,700
Alternative #3 – Identify and Remove Sanitary Sewer Cross Connections	-
Subtotal	**$972,700**
Bid Environment (10%)	$97,300
Total Construction Cost	**$1,070,000**
Non-Construction Costs	
Preliminary Engineering Report (PER)	$30,000
Design	$81,000
Bidding / Negotiating	$30,000

Construction Inspection	$120,000
Construction Engineering	$45,000
Post-Construction	$10,000
Erosion Control Plan	$5,000
Geotechnical Report	$5,000
Field Investigation & Survey	$20,000
Legal / Financial Services	$10,000
Regulatory Assistance	$35,000
Administrative Assistance	$10,000
Labor Standards	$5,000
Grants Administration	$15,000
Environmental Review (ER)	$10,000
Legal Services	$20,000
American Iron and Steel Compliance	$5,000
Financial Consultant	$40,000
Bond Bank Fee	$20,000
Bond Council	$20,000
Total Non-Construction Cost	**$536,000**
Total Project Cost	**$1,606,000**



RECOMMENDED WW ALTERNATIVES

SCALE: 1"=30'

30' 0 30'

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PRELIMINARY ENGINEERING REPORT

RECOMMENDED WW ALTERNATIVES
FIGURE ES-1

SCADA UPGRADES

I. CELLULAR MONITORING SYSTEM

II. FILTER, CHEMICAL, HIGH SERVICE PUMP TELEMETRY

III. ALARM NOTIFICATION SYSTEM

FILTER UPGRADES

I. FILTER MEDIA REPLACEMENT

II. BACKWASH VALVE REPLACEMENT

III. REPLACE HIGH PRESSURE SENSOR

V. HATCH REPLACEMENT

CHLORINE SYSTEM IMPROVEMENTS

I. RECOAT WALL AND FLOOR

II. NEW EXHAUST FAN AND HEATER

III. REPLACE CHLORINE SCALES

IV. REPLACE DOOR

HIGH SERVICE PUMPS IMPROVEMENTS

I. HSP'S REPLACEMENT

II. SUCTION AND DISCHARGE PRESSURE TRANSDUCERS

MISCELLANEOUS IMPROVEMENTS

I. REPLACE GENERATOR AND ATS

II. LAGOON CLEANING

EXISTING BACKWASH LAGOON

EXISTING PRODUCTION WELLS

NEW 10'x10'x8' SECURITY FENCING

EXISTING WATER TREATMENT PLANT

WHITE ST.

MADISON ST.

HARRISON ST.

WHITE ST.

JEFFERSON ST.

PEARL ST.

ALTERNATIVE NO. 1 - SECURITY FENCING AND WTP REHABILITATION

SCALE: 1"=100'

100' 0 100'

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ALTERNATIVE NO. 1 - SECURITY FENCING AND WTP REHABILITATION

FIGURE ES-2

MADISON ST.

PEARL ST.

975 E.

EXISTING 8" WATER MAIN

NEW 50'X50' SECURITY FENCING

EXISTING 75,000 GALLON STORAGE TANK

EXISTING 4" WATER MAIN (TYP)

PEARL ST.

MADISON ST.

975 E.

ALTERNATIVE NO. 1 - SECURITY FENCING

SCALE: 1"=30'

30' 0 30'

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ALTERNATIVE NO. 1 - SECURITY FENCING
FIGURE ES-3

EXISTING WATER TREATMENT PLANT

EXISTING PRODUCTION WELLS

EXISTING 75,000 GALLON STORAGE TANK

E. 1175 S.

HIGH ST.

PARK ST.

FORD ST.

COUNTY RD. 925 E.

ORANGE ST.

SCANLON ST.

WHITE ST.

S. 925 E.

CLARK ST.

DIVISION ST.

SILVER ST.

UNION ST.

JEFFERSON ST.

HARRISON ST.

MADISON ST.

PEARL ST.

MAIN ST.

FULTON ST.

HUDSON DR.

975 E.

E. 1200 S.

LEGEND:

- EX. 8" WATER MAIN
- EX. 6" WATER MAIN
- EX. 4" WATER MAIN
- EX. 2" WATER MAIN
- EX. WATER VALVE
- EX. FIRE HYDRANT
- NEW 6" WATER MAIN
- NEW WATER VALVE
- NEW FIRE HYDRANT

PRIORITY NO. 1 - TRANSITE PIPE REPLACEMENT

SCALE: 1"=300'

300' 150' 0 300'

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PRIORITY NO. 1 - TRANSITE PIPE REPLACEMENT
FIGURE ES-4

EXISTING WATER TREATMENT PLANT

EXISTING PRODUCTION WELLS

EXISTING 75,000 GALLON STORAGE TANK

E. 1175 S.

HIGH ST.

PARK ST.

FORD ST.

SILVER ST.

CLARK ST.

DIVISION ST.

UNION ST.

JEFFERSON ST.

WHITE ST.

MADISON ST.

HARRISON ST.

PEARL ST.

MAIN ST.

975 E.

COUNTY RD. 925 E.

ORANGE ST.

SCANLON ST.

FULTON ST.

HUDSON DR.

S. 925 E.

E. 1200 S.

LEGEND:

- EX. 8" WATER MAIN
- EX. 6" WATER MAIN
- EX. 4" WATER MAIN
- EX. 2" WATER MAIN
- EX. WATER VALVE
- EX. FIRE HYDRANT
- NEW WATER VALVE
- NEW FIRE HYDRANT

ALTERNATE NO. 1 - HYDRANT AND VALVE REPLACEMENT

SCALE: 1"=300'

300' 150' 0 300'

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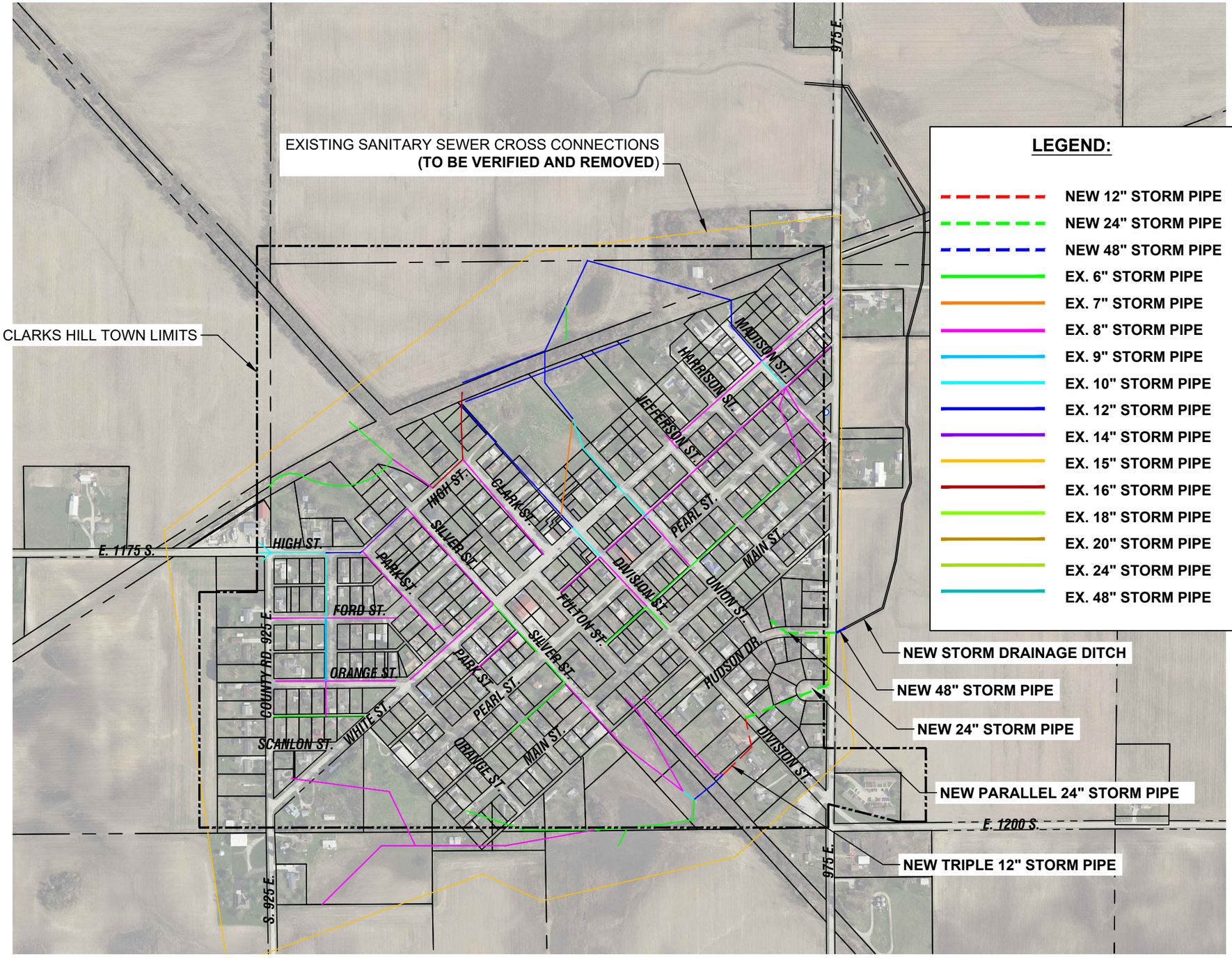
ALTERNATE NO. 1 - HYDRANT AND VALVE REPLACEMENT
FIGURE ES-5



LEGEND:

- NEW 12" STORM PIPE
- NEW 24" STORM PIPE
- NEW 48" STORM PIPE
- EX. 6" STORM PIPE
- EX. 7" STORM PIPE
- EX. 8" STORM PIPE
- EX. 9" STORM PIPE
- EX. 10" STORM PIPE
- EX. 12" STORM PIPE
- EX. 14" STORM PIPE
- EX. 15" STORM PIPE
- EX. 16" STORM PIPE
- EX. 18" STORM PIPE
- EX. 20" STORM PIPE
- EX. 24" STORM PIPE
- EX. 48" STORM PIPE

RECOMMENDED STORMWATER ALTERNATIVES

SCALE: 1"=500'

500' 0 500'

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RECOMMENDED STORMWATER ALTERNATIVES
FIGURE ES-6

ES.4 Key Goals

A. Wastewater

The key goals are to maintain a reliable wastewater treatment facility that will operate within required NPDES effluent parameters. This can be measured by monitoring the MRO reports for the facility and ensuring that no violations have occurred. The MRO reports can also be used as a measure for the remaining capacity, which can be used to determine the available future growth that can supported by the Utility.

B. Water

The key goal of the proposed project extends the useful life of the existing water treatment plant, while addressing aging water lines and inadequate valves or hydrants in the distribution system. Water loss audits can be utilized for continuous monitoring of the utility and its overall operation. MRO reports can also be used to measure remaining capacity available and can be used to assess available capacity for proposed future connections.

C. Stormwater

The key goals are to remove cross-connections with the sanitary collection system; ensure that all the storm sewer sections within the Town have sufficient capacity; prevent ponding on roads within the Town; and start the process for improving the downstream capacity issues within the J.B. Anderson Drainage Basin.