

# VILLAGE OF CRESTLINE

## PLANNING REPORT for WASTEWATER TREATMENT PLANT IMPROVEMENTS PHASE I

April 2014



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## **INTRODUCTION**

The Village has been issued “Findings and Orders” regarding the wastewater collection & treatment systems effective April 4, 2011. In accordance with these orders the Village is obligated to pursue the following schedule to eliminate sewer overflows from its collection system and achieve compliance with the effluent limits of its NPDES permit;

- Within thirty days, locate and report the locations of all active or potentially active overflows
- Within sixty days post signs at all overflows and begin monitoring activity
- By December 31, 2010 create an accurate sewer base map of the system
- By no later than April 1, 2011 initiate flow monitoring at all active overflow locations
- By August 31, 2011 initiate a smoke and dye testing program
- By December 31, 2011 submit for review a General Plan to address sewer upgrades to eliminate existing sewer overflows.

In an effort to aggressively remain in compliance with the Village’s existing NPDES Permit, the approved General Plan as well as the Findings and Orders, the Village has proposed the construction of the Wastewater Treatment Plant Improvements Phase I.

The project is to be funded through the Water Pollution Control Loan Fund (WPCLF) administered through the Ohio Environmental Protection Agency (OEPA), Division of Environmental & Financial Assistance (DEFA). Additional funding for the project will be received from the Ohio Public Works Commission (OPWC). The funding is a combination of 0% interest loan, a low interest loan, and a partial grant.

# **1 Project Description**

## **1.1 SUMMARY OF PROJECT**

The Wastewater Treatment Plant Improvements Phase I provides upgrades to the Village's Sludge treatment processing. The work includes the conversion of the currently nonfunctioning anaerobic digester into an aerobic digester, demolition and replacement of the sludge processing building, and the ability to dewater sludge by means of a screw press.

The new aerobic digester will repurpose the existing digester tank. The existing floating cover and all internal piping will be removed. The tank will be equipped with a new and complete aeration system. Proposed blowers will deliver aeration to a network of coarse bubble diffusers that are designed to provide adequate treatment as well as mixing within the tank.

The existing sludge processing building is unsafe for occupancy. The existing roof and most of the equipment has exceeded their useful life. The new building is a pre-engineered steel building and will replace the bathroom, garage, and pumping room facilities that are currently housed within the existing building. This building will also house the new sludge dewatering equipment.

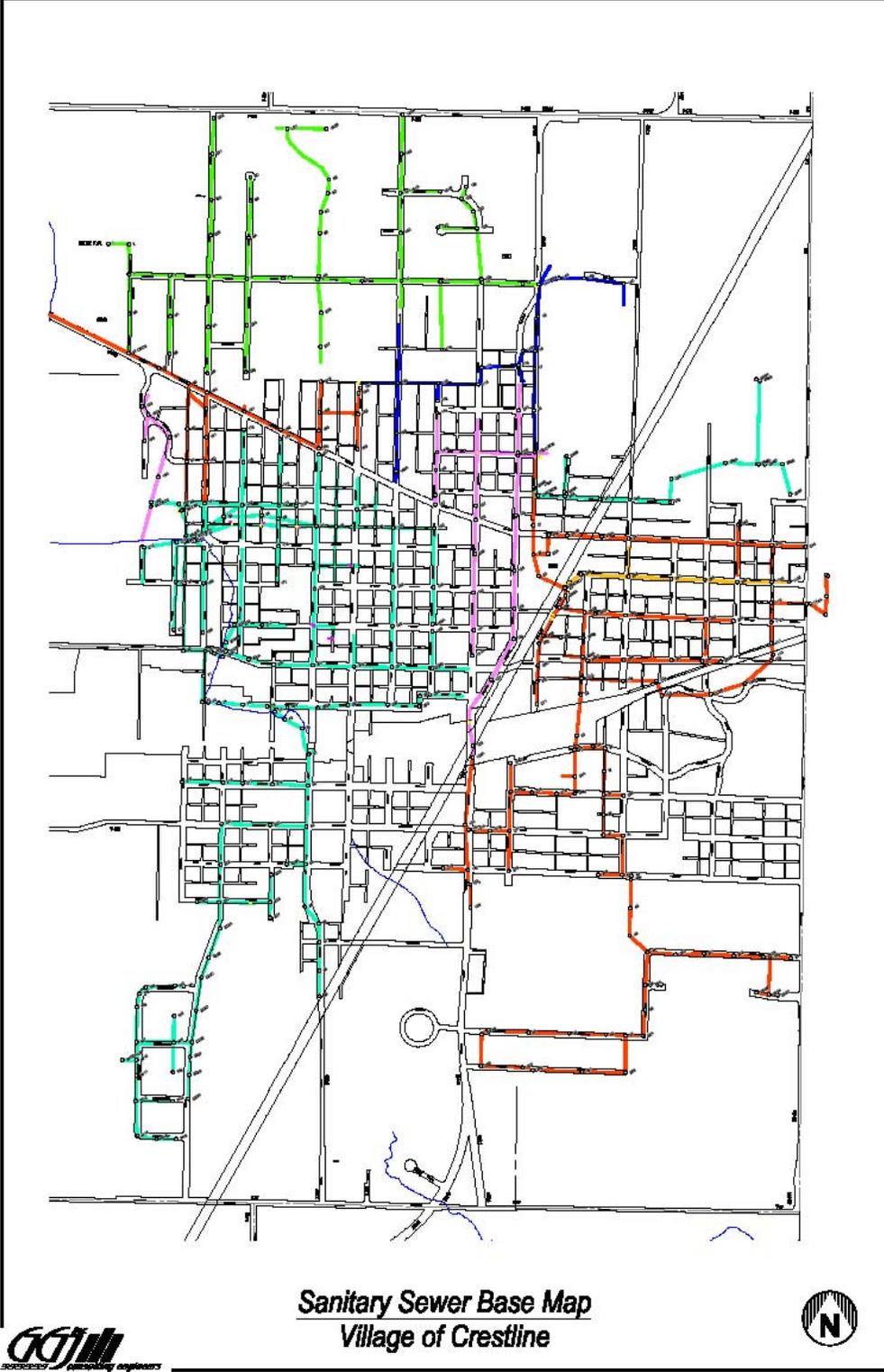
The Village will improve their sludge handling by means of dewatering the sludge. As the term implies dewatering the sludge is a process that is intended to remove the water from sludge, which will reduce the volume of the sludge by transforming a liquid sludge into sludge that behaves as a solid. This process minimizes both transportation and disposal costs. This process will be performed using a screw press.

## **1.2 PREVIOUS LAND USAGE**

The area that will be involved with the proposed project is contained to the existing Wastewater Treatment Plant located off of Westgate Drive at the Northwest portion of town. The bulk of the work is repairing or replacing existing facilities in place. The existing building will be replaced and enlarged from the current footprint. Limited site work is needed to reroute existing drives around the proposed building. The area is generally consists of a combination of grassed areas and gravel driveways. A few trees will be impacted with the proposed improvements.

## **1.3 PLANNING AND SERVICE AREA**

See the figure on the next page for the current service area and sewer base map that has been developed in 2010.



## 2 Existing Conditions/ Future Needs

### 2.1 WATER QUALITY ISSUES

The Sandusky River originates in north central Ohio and is located in the Lake Erie drainage basin. The watershed lies within the Sandusky Hydrologic Unit (04100011) and encompasses a drainage area of 1,850 mi.2. It is divided into 14 separate 11-digit hydrologic units. The entire Village is located in the headwaters of Sandusky River Drainage basin, the area further defined as being within the Sandusky-Bucyrus Assessment unit. The WWTP discharges into the Westerly Creek at River Mile 0.5 from its confluence with Paramour Creek. This segment of Westerly Creek has the following designated uses under the Ohio Water Quality Standards (OAC 3745-1-12): Warm water Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS), and Primary Contact Recreation (PCR). This segment of Westerly Creek is described by Ohio EPA River Code: 05-055, USEPA River Reach #04100011-013.

The following is an excerpt from the “Biological and Water Quality Study of the Sandusky River and Selected Tributaries”;

***Westerly Creek was in non-attainment upstream and downstream from the Crestline WWTP.... Water quality evaluated at this location was impaired by enrichment and elevated bacteria counts. The greatest concern involves phosphorus with a median concentration of 0.81 mg/l, considerably higher than the level recommended in wadeable streams of 0.10 mg/l. Annual loadings (kg/day) from the WWTP over the last 20 years were tracked using the Liquid Effluents Analysis Processing (LEAP) system. This is an Ohio EPA database that stores monthly self-monitoring data. Loadings declined considerably after the facility was upgraded***

***in 1994, but further consideration should be made regarding advanced treatment to remove phosphorus***

There are three items of most concern at the plant; phosphorous limits, sludge handling and hydraulic capacity. The improvements considered with this project addresses phosphorous and sludge handling. The ability to properly treat and handle sludge will increase the Village's ability to remove phosphorous chemically as they currently do.

## **2.2 EXISTING SYSTEM**

The Village of Crestline WWTP was upgraded and expanded in 1994 to treat an average daily flow of 0.95 MGD and has a hydraulic capacity of 2.2 MGD. Previously the WWTP was designated to treat an average daily flow of 0.6 MGD. The WWTP was constructed in 1948, and parts of the original WWTP are now used for storm water retention. Wet stream processes at the facility include aerated grit removal, mechanical bar screen, communitation, primary settling, counter-current aeration, final settling, post aeration, and u.v. disinfection. The Village of Crestline collection system is approximately 10% combined, and 90% separated. Sludge is digested aerobically and disposed of by land application under approved sludge management plan, number 03-216-PW.

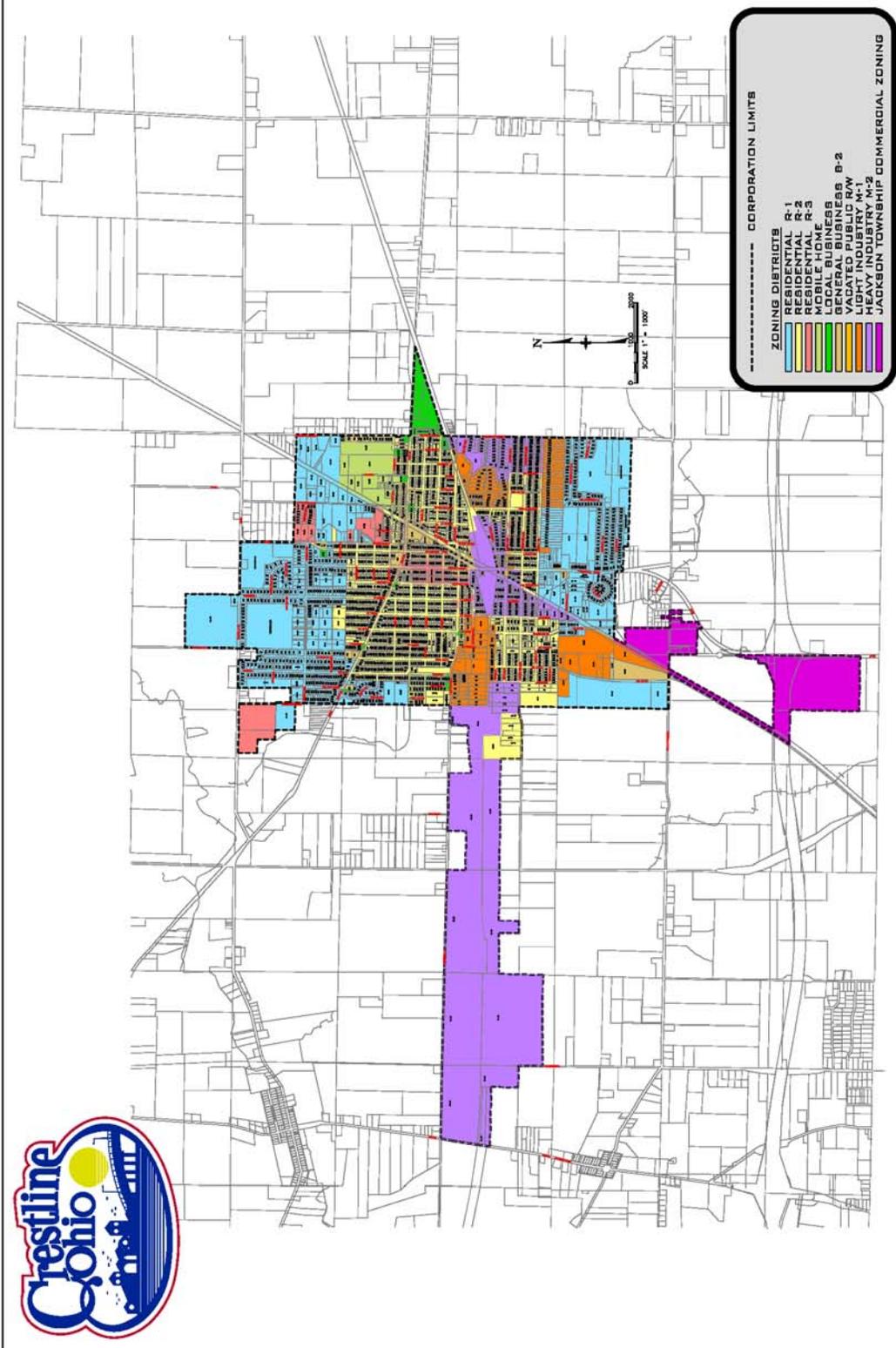
### 2.3 **PRESENT AND FUTURE POPULATIONS**

The Village has a population of 4,630 people as of the 2010 US Census. The Chart included shows that the Village has maintained a population between 4,000 and 6,000 over the past 90 years. It is estimated that population will remain consistent in the near future.

HISTORICAL POPULATIONS	
YEAR	POPULATION
1890	2,911
1900	3,282
1910	3,807
1920	4,313
1930	4,425
1940	4,337
1950	4,614
1960	5,521
1970	5,947
1980	5,406
1990	4,934
2000	5,088
2010	4,630

### 2.4 **PRESENT AND FUTURE LAND USE**

The Village is well developed throughout with a significant residential component. See the following zoning map. The Village has been relatively unchanged over the past 80 years with any shifting heading towards a larger residential component compared to commercial and/ or Industrial. Current planning does not indicate any major shift occurring in the near future.



## **2.5 PRESENT AND FUTURE DESIGN FLOWS**

The Village of Crestline WWTP is capable of treating an average daily flow of 0.95 MGD with a hydraulic capacity of 2.2 MGD. The future flows rates will remain consistent with the existing design flows. This particularly holds true for the sanitary component of the flows. Due to continual improvements such as the Sewer separation Improvements Phase I and II projects the wet weather component should actually decrease as I&I is targeted and removed from the system.

## **2.6 SENSITIVE ENVIRONMENTAL FEATURES**

There are no known environmental features that are of concern other than improvements to westerly creek to which the WWTP discharges to.

## **2.7 ARCHAEOLOGICAL/ HISTORICAL RESOURCES**

There are no known archeological or historical resources that will be impacted with these improvements.

### **3 ALTERNATIVES**

#### **3.1 NO-ACTION**

No-action is not a viable option with the current WWTP. The Village is required under the authority of the Ohio EPA to improve their current facilities that are inadequate and are functionally compromised. The existing digester is no longer capable of being used as in that capacity, the existing sludge processing building is unsafe for occupancy, and the Village is limited in their ability to dewater their sludge.

#### **3.2 OPTIMUM UTILIZATION OF EXISTING SYSTEMS**

The project took into consideration the existing facilities and the attempt has been made to provide optimum utilization of each. The existing Digester tank is being converted into an aerobic digester improving the Plants capacity and ease to handle sludge. Facilities and equipment that are salvageable have been reused where feasible.

#### **3.3 SELECTION CRITERIA**

Due to the man-hours available for the treatment plant consideration was given to improvements that minimized the operators time for both operation and maintenance. Conversion to an aerobic digester minimizes the efforts of the existing staff compared to that of maintaining anaerobic digestion.

There are a number of available dewatering options available that would meet the dewatering results that the Village required. However, some of the technologies require operational and maintenance hours that are not readily available. Therefore, consideration came down to two alternatives the screw press and the rotary press. Each alternative provided minimal O&M hours at a comparable price point. The screw press was ultimately selected due to a larger amount of installs locally.

## 4 PROJECT DESCRIPTION

The Wastewater Treatment Plant Improvements Phase I provides upgrades to the Village's Sludge treatment processing. The work includes the conversion of the currently nonfunctioning anaerobic digester into an aerobic digester, demolition and replacement of the sludge processing building, and the ability to dewater sludge by means of a screw press.

The new aerobic digester will repurpose the existing digester tank. The existing floating cover and all internal piping will be removed. The tank will be equipped with a new and complete aeration system. Proposed blowers will deliver aeration to a network of coarse bubble diffusers that are designed to provide adequate treatment as well as mixing within the tank.

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The Village will improve their sludge handling by means of dewatering the sludge. As the term implies dewatering the sludge is a process that is intended to remove the water from sludge, which will reduce the volume of the sludge by transforming a liquid sludge into sludge that behaves as a solid. This process minimizes both transportation and disposal costs. This process will be performed using a screw press.

A current set of drawings are included within Appendix A.

#### **4.1 PROJECT COSTS**

See Appendix B for project costs.

#### **4.2 PROJECT FINANCING**

##### **4.2.1 USER RATES**

User rates will not increase due to this project specifically. Sewer step rate increases were established in 2012. The step increases occur yearly starting in 2012 and continue through the year 2020. See Appendix C for current sewer rates. Village costs will be paid from revenues currently being generated from the existing rate structures.

##### **4.2.2 SUPPLEMENTARY FUNDING SOURCES**

Ohio EPA Water Pollution Control Loan Fund (WPCLF) will provide the up to \$1,208,250 at an interest rate of 1.0% for 20 years.

Additional funding includes Ohio Public Works Commission funding in the amount of \$250,000.00 in grants and up to \$250,000.00 in a 30 year 0% loan.

Loan Repayment will be made with money generated for the current user generated rates.

## **5 PUBLIC PARTICIPATION**

### **5.1 PROJECT POSTED ON VILLAGE WEBSITE**

Village will post this document on the Village's official website for residents to review, comment and question.

### **5.2 PROJECT POSTED AT VILLAGE HALL AND LIBRARY**

Village will post a hard copy of this document at Village Hall located near sewer billing offices as well as the Village library

### **5.3 NOTIFICATIONS AT COUNCIL MEETINGS**

The Village has discussed this project throughout meetings that have occurred in 2012-2013. When this document is posted as described in Sections 3.1 and 3.2 the Village will make a general statement about this project and notify all in attendance how to review and comment on the project.

### **5.4 NOTIFICATIONS IN LOCAL NEWSPAPER**

The Village shall make a general statement at council meeting about this project and notify all in attendance how to review and comment on the project. The newspaper covering council will be urged to include this information within their coverage of the meeting.

### **5.5 RECEIVE COMMENTS**

The Village will include ways for the public to comment on the project while it is being displayed for public commenting. All comments received will addressed and included in updated postings.

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**APPENDIX A**  
**PROJECT DRAWINGS**

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**SEE SEPARATE FILE FOR DRAWINGS**

**APPENDIX B**  
**PROJECT COSTS**

CITY OF CRESTLINE  
WASTEWATER TREATMENT PLANT IMPROVEMENTS - PHASE 1  
CRESTLINE, OHIO  
ENGINEER'S OPINION OF POSSIBLE CONSTRUCTION COST  
April, 2014

PROBABLE CONSTRUCTION COST					
Bid Item No.	Item Description	Est. Qty.	Unit	Total Unit Cost	Total Cost
<b>General</b>					
1	Bond & Insurance	1	LUMP	\$ 16,000.00	\$ 15,000.00
2	Mobilization	1	LUMP	\$ 10,000.00	\$ 9,500.00
3	Maintenance of Traffic	1	LUMP	\$ 500.00	\$ 500.00
4	Subsurface & Foundation Services	1	LUMP	\$ 20,000.00	\$ 20,000.00
5	Sludge Drying Bed Improvements	1	LUMP	\$ -	\$ -
6	Digester Improvements	1	LUMP	\$ 125,000.00	\$ 125,000.00
7	Building (4352SF)	1	LUMP	\$ 310,000.00	\$ 310,000.00
8	Sludge Pumps	1	LUMP	\$ 25,000.00	\$ 25,000.00
9	Sludge Press and polymer system	1	LUMP	\$ 250,000.00	\$ 250,000.00
10	Conveyor	1	LUMP	\$ 30,000.00	\$ 30,000.00
11	Electrical Improvements	1	LUMP	\$ 70,000.00	\$ 70,000.00
12	Mechanical Improvements	1	LUMP	\$ 50,000.00	\$ 50,000.00
13	Control Building Demo	1	LUMP	\$ 65,000.00	\$ 65,000.00
14	Site Work	1	LUMP	\$ 150,000.00	\$ 150,000.00
Construction Cost					\$ 1,120,000.00
Construction Contingencies (10%)					\$ 112,000.00
Total Probable Construction Cost					\$ 1,232,000.00
Preliminary Engineering					\$ 21,600.00
Final Design					\$ 71,000.00
Construction Administration					\$ 26,000.00
Resident Observation					\$ 54,000.00
Total Project Probable Cost					\$ 1,404,600.00

John Sabo, P.E. #69811  
GGJ Engineers Inc.  
35585 Curtis Boulevard, Unit C  
Eastlake, Ohio 44095  
I certify the above Improvements will have  
in excess of fifty (50) years of life expectancy.

**APPENDIX C**  
**CURRENT USER RATES**

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**ORDINANCE NO. 3023**

**AN ORDINANCE ESTABLISHING SANITARY SEWER RATES EFFECTIVE OCTOBER 1, 2012 AND INCREASING THEREAFTER EACH YEAR ON THE FIRST DAY OF JANUARY THROUGH 2020.**

WHEREAS, the Village Administrator has recommended a new method of assessment of sanitary sewer rents to defray expenses of improvements and/or managing the municipal sanitary sewage, and

WHEREAS, said rate schedules have heretofore been reviewed with Village Council,

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE VILLAGE OF CRESTLINE, OHIO:

**SECTION 1.** That the sanitary sewer rates set forth in Section 2 be and the same are hereby established on a one quarter year basis and will be effective as noted.

**SECTION 2.** Sanitary sewer rates shall be as follows:

	Current	10/1/12	1/1/13	1/1/14	1/1/15	1/1/16	1/1/17	1/1/18	1/1/19	1/1/20
<u>Inside City</u>										
<u>Regular Rates</u>										
First 600 ft <sup>3</sup> or any part	\$49.67	\$54.64	\$60.10	\$66.11	\$69.42	\$72.89	\$76.53	\$80.36	\$84.38	\$86.06
Next 2400 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$4.36	\$4.80	\$5.28	\$5.80	\$6.09	\$6.40	\$6.72	\$7.05	\$7.41	\$7.55
Next 4000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$4.16	\$4.58	\$5.03	\$5.54	\$5.81	\$6.10	\$6.41	\$6.73	\$7.07	\$7.21
Next 23000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$3.30	\$3.63	\$3.99	\$4.39	\$4.61	\$4.84	\$5.08	\$5.34	\$5.61	\$5.72
Next 30000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$2.95	\$3.25	\$3.57	\$3.93	\$4.12	\$4.33	\$4.55	\$4.77	\$5.01	\$5.11
Over 60,000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$2.61	\$2.87	\$3.16	\$3.47	\$3.65	\$3.83	\$4.02	\$4.22	\$4.43	\$4.52
<u>Multiple Units, Mobile Homes, and Mobile Home Parks - Units Not Individually Metered</u>										
Per unit rate (plus rates below)	\$25.74	\$28.31	\$31.15	\$34.26	\$35.97	\$37.77	\$39.66	\$41.64	\$43.73	\$44.60
First 600 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$8.28	\$9.11	\$10.02	\$11.02	\$11.57	\$12.15	\$12.76	\$13.40	\$14.07	\$14.35
Next 2400 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$4.36	\$4.80	\$5.28	\$5.80	\$6.09	\$6.40	\$6.72	\$7.05	\$7.41	\$7.55
Next 4000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$4.16	\$4.58	\$5.03	\$5.54	\$5.81	\$6.10	\$6.41	\$6.73	\$7.07	\$7.21
Next 23000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$3.30	\$3.63	\$3.99	\$4.39	\$4.61	\$4.84	\$5.08	\$5.34	\$5.61	\$5.72
Next 30000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$2.95	\$3.25	\$3.57	\$3.93	\$4.12	\$4.33	\$4.55	\$4.77	\$5.01	\$5.11
Over 60,000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$2.61	\$2.87	\$3.16	\$3.47	\$3.65	\$3.83	\$4.02	\$4.22	\$4.43	\$4.52
<u>Outside City</u>										
<u>Regular Rates</u>										
First 600 ft <sup>3</sup> or any part	\$124.17	\$136.59	\$150.25	\$165.27	\$173.53	\$182.21	\$191.32	\$200.89	\$210.93	\$215.15
Next 2400 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$10.89	\$11.98	\$13.18	\$14.49	\$15.22	\$15.98	\$16.78	\$17.62	\$18.50	\$18.87
Next 4000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$10.39	\$11.43	\$12.57	\$13.83	\$14.52	\$15.25	\$16.01	\$16.81	\$17.65	\$18.00
Next 23000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$8.25	\$9.08	\$9.98	\$10.98	\$11.53	\$12.11	\$12.71	\$13.35	\$14.01	\$14.29
<u>Multiple Units, Mobile Homes, and Mobile Home Parks - Units Not Individually Metered</u>										
Per unit rate (plus rates below)	\$90.08	\$99.09	\$109.00	\$114.45	\$120.17	\$126.18	\$132.49	\$139.11	\$146.07	\$148.99
First 600 ft <sup>3</sup> or any part	\$20.69	\$22.76	\$25.03	\$26.29	\$27.60	\$28.98	\$30.43	\$31.95	\$33.55	\$34.22
Next 2400 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$10.89	\$11.98	\$13.18	\$13.84	\$14.53	\$15.25	\$16.02	\$16.82	\$17.66	\$18.01
Next 4000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$10.39	\$11.43	\$12.57	\$13.20	\$13.86	\$14.55	\$15.28	\$16.05	\$16.85	\$17.18
Next 23000 ft <sup>3</sup> (per 100 ft <sup>3</sup> )	\$8.25	\$9.08	\$9.98	\$10.48	\$11.01	\$11.56	\$12.13	\$12.74	\$13.38	\$13.65

SECTION 3. That Section 921.14 Sewage Disposal Rates of the Codified Ordinances of this Village is hereby repealed on the effective date of the rates set forth in this Ordinance.

SECTION 4. That this Ordinance shall be in full force and effect from and after the earliest period allowed by law.

DATE: \_\_\_\_\_

Aye \_\_\_\_\_ Nay \_\_\_\_\_ Abstain \_\_\_\_\_

\_\_\_\_\_  
David Sharrock, Mayor

Attest:

\_\_\_\_\_  
Annette Johnston, Clerk of Council

Approved as to form:

\_\_\_\_\_  
Harry M. Welsh, Law Director