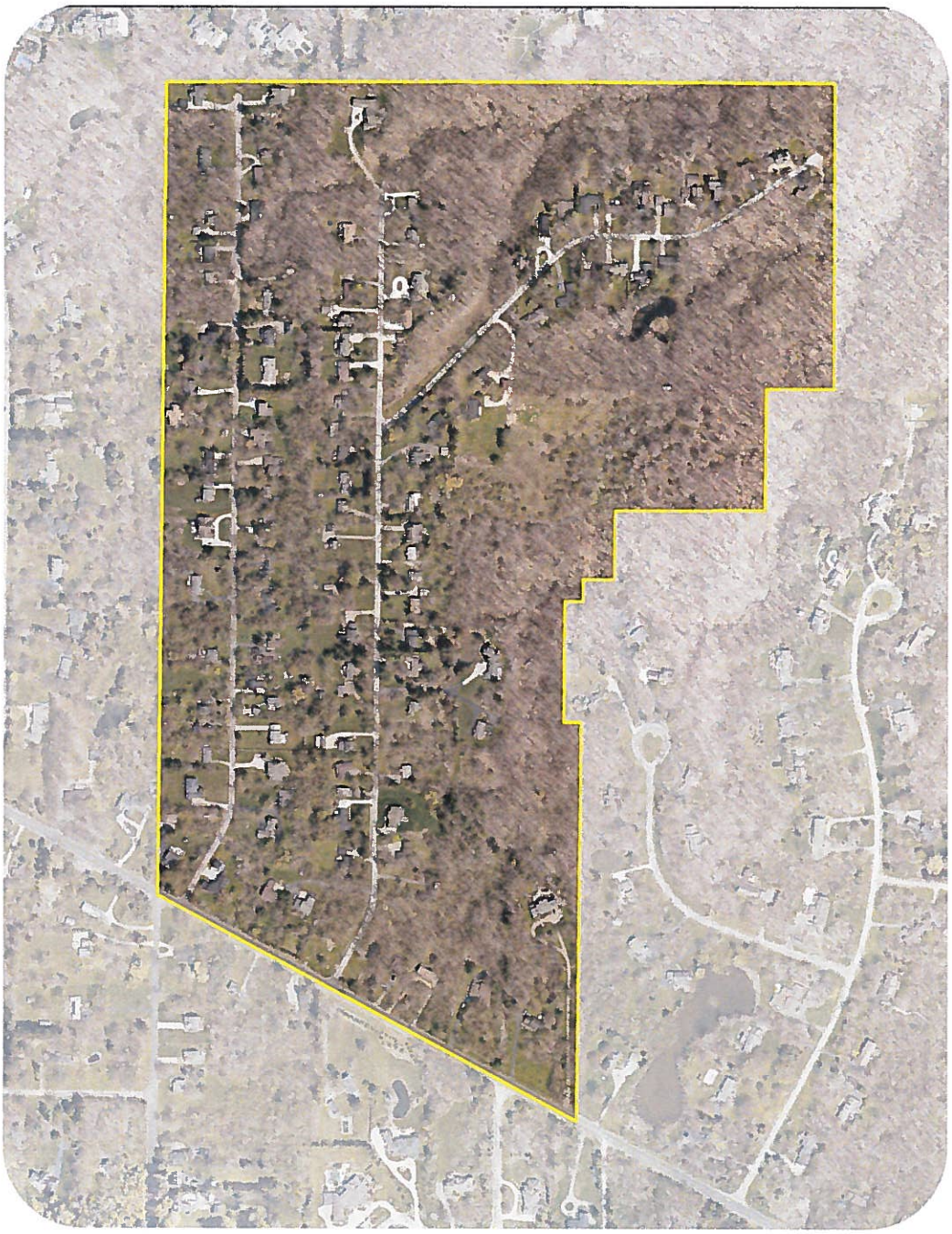
SEWAGE TREATMENT FACILITY PLAN FOR THE WILTSHIRE RD., ELLENDALE RD. AND BERKELEY AVE. AREA OF THE VILLAGE OF MORELAND HILLS, OHIO

PROJ. NO. 16247 ***FEBRUARY, 2017***



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INTRODUCTION

This study was performed as a result of the nuisance complaint to the Cuyahoga County Board of Health regarding odors in the area of in surface waters in the Wiltshire Rd., Ellendale Rd. and Berkeley Ave. in Moreland Hills, Ohio. This area will be referred to as the WEB area in this document. A map of the area is shown in *Fig. 1*.

The Cuyahoga County Board of Health (CCBH) responded to complaint calls of an odor near the intersection of Ellendale Rd. and Berkeley Ave. and found high levels of E. Coli, an indicator of failing septic systems in the stream in the area.

This study compares the various aspects of replacing the septic systems, now known as household sewage treatments system (HSTS) in order reduce pollution of the surface waters, compared to installing a centralized sanitary sewer system. The CCBH study is provided in *Appendix A*.

LOCAL REGULATION REGARDING STORMWATER POLLUTION

Any discharge to the municipal separate stormwater system (MS4) defined as roadside ditches, culverts and storm sewers that contain any substance other than stormwater is considered an illicit discharge. There are some exceptions to this, however the discharge of pollutants from HSTS, of which E.Coli is an indicator, are not included in these exceptions. The Village of Moreland Hills has adopted an Illicit Discharge and Illegal Connection Control Ordinance, Chapter 975 of the Codified Ordinances to address pollutants in storm water as part of our compliance with the Ohio EPA requirements.

Property owners who are found to be in violation of this ordinance, typically by having malfunctioning septic systems, can be charged with a penalty of a first degree misdemeanor if the source of the illicit discharge is not mitigated and can be required to replace the system if the CCBH determines that the system is not treating household sewage adequately.

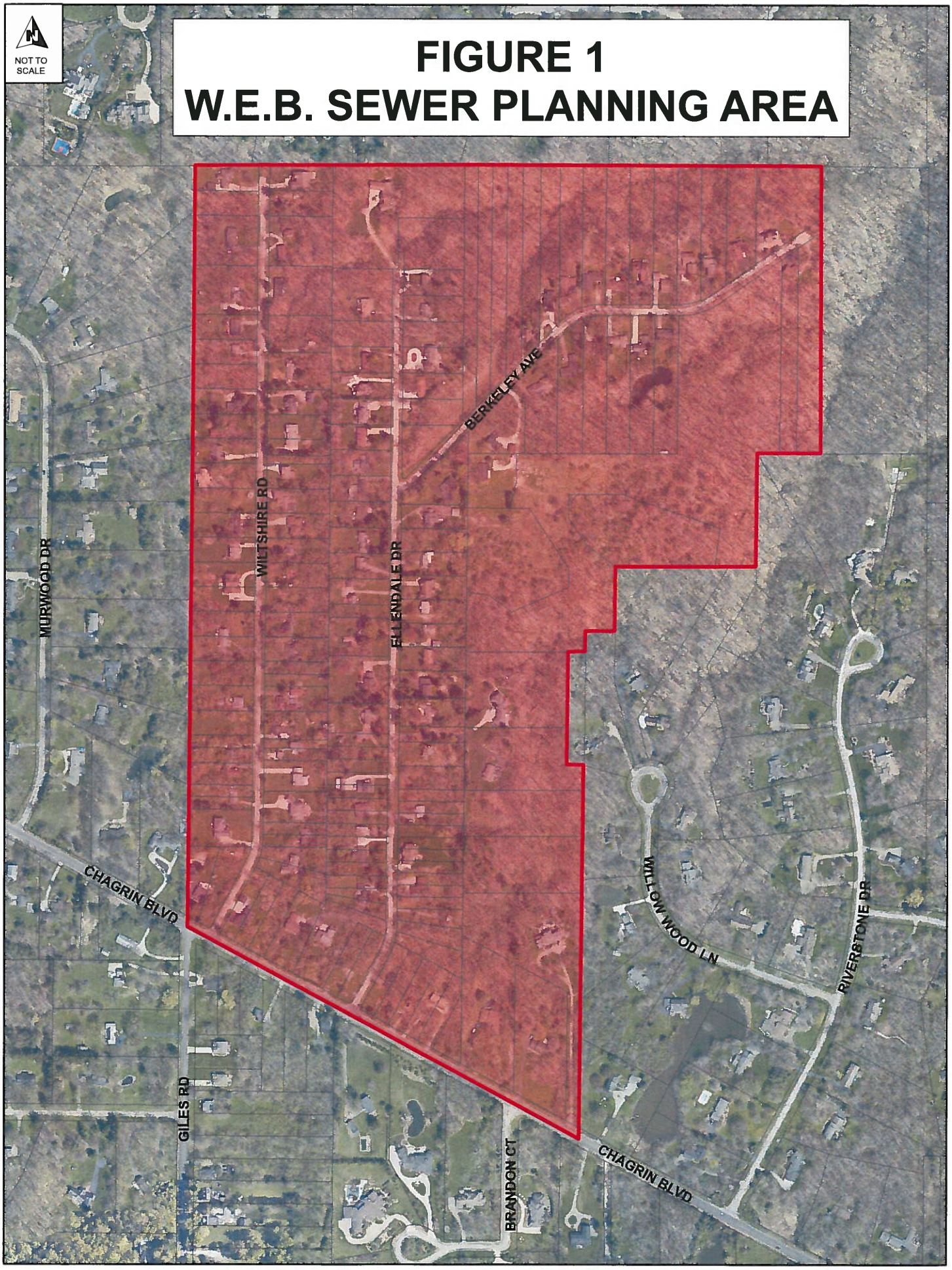
The Village works with the CCBH to determine the sources of illicit discharges and acts to remove such sources when necessary.

SURFACE WATER TESTING RESULTS

The CCBH conducted sampling of water from storm sewers and culvert outlets in the area from July through September of 2015.

It should be noted that flows in the sampling area also includes flow from Wiltshire Rd. since the surface water flows from that area to the Ellendale/Berkeley area.

The sample results are included in *Fig. 2*. The trigger point for a public health nuisance for E. Coli is 1,030 MPN/100 ml or higher. The sampling revealed levels from hundreds to thousands of times higher than this nuisance level, verifying that this is clearly a significant area of concern, as mostly raw, untreated sewage is flowing through the MS4.


NOT TO SCALE
FIGURE 1
W.E.B. SEWER PLANNING AREA
BERKELEY AVE
WILTSHIRE RD
ELLENDALE DR
MURWOOD DR
CHAGRIN BLVD
GILES RD
BRANDON CT
CHAGRIN BLVD
WILLOW WOOD LN
RIVERSTONE DR

Sample Results for Ellendale

FIGURE 2

	Date	Time	E. Coli MPN/100mL
Sample 1	7/30/2015	9:30a	97,855
	8/17/105	8:19a	3,482
	9/17/2015	8:11a	HT 517,200
	9/28/2015	9:14a	101,295
Sample 2	7/30/2015	9:45a	112,865
	8/17/105	8:14a	HT 2,463
	9/17/2015	8:23a	HT 615,200
	9/28/2015	9:22a	74,050
Sample 4	7/30/2015	9:50a	36,415
	8/17/105	8:41a	11,218
	9/17/2015	8:30a	HT 2,827,200
	9/28/2015	8:52a	108,090
Sample 5	7/30/2015	10:00a	133,785
	8/17/105	8:30a	7,709
	9/17/2015	8:35a	HT 254,570
	9/28/2015	8:55a	143,350
Sample 6	7/30/2015	10:15a	582
	8/17/105	N/A	N/A
	9/17/2015	N/A	N/A
	9/28/2015	N/A	N/A
Sample 7	9/28/2015	9:05a	2,665
Sample 8	9/28/2015	9:47a	15,018
Sample 9	9/28/2015	10:20a	14,425
End of Ellendale A	9/28/2015	10:20a	1,574
End of Ellendale B	9/28/2015	10:01a	1,003

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Terrence M. Allan, R.S., M.P.H. Health Commissioner

METHODS TO MITIGATE NUISANCE

There are two methods mitigate this nuisance issue. One is to require the replacement of failing HSTS in the area, and the second is to provide central sanitary sewers and eliminate the HSTS.

These two options have been investigated to determine costs if initial installation, and on-going costs for maintenance and various fees.

HSTS Systems and Costs

The CCBH provided a desktop analysis that determines the current conditions and costs for various types of HSTS systems that would be needed for the area. The system types are based on the lot size and soil conditions. *Figure 3* shows the probability of the current systems passing or failing an operational test. *Appendix B* provides information about the current HSTS systems based on available records.

The costs for replacing the HSTS per location depend on whether they would be non-discharging or discharging systems. Non-discharging systems do not have a discharge pipe and the treatment of the sewage occurs on the property. These are known as mound or drip systems and they range in cost from **$10,000** to **$35,000**, not including any landscape or drive/walk restoration. The simple evapotranspiration or leach field systems would not work in this area. Discharging systems have a discharge pipe that sends the effluent to a storm sewer, ditch or stream that is off the lot. These systems range in cost from **$10,000** to **$15,000**. *Table 1* shows the costs for the various systems along with annual costs and a summary by property. *Table 2* provides the annual costs to operate the HSTS systems.

Table 1

HSTS COSTS				
System Type- Low end of cost scale	**Installation**	**Restoration (Approximate)**	**NPDES Permit from OEPA**	**Totals**
Discharging	$10,000	$2,000	$200	**$12,200**
Non-Discharging	$10,000	$4,000	$0	**$14,000**
System Type- High end of cost scale				
Discharging	$15,000	$2,000	$200	**$17,200**
Non-Discharging	$35,000	$4,000	$0	**$39,000**

Therefore, initial costs range from $12,200 to $17,200 for a discharging system, and $14,000 to $39,000 for a non-discharging system

Table 2

CONTINUING ANNUAL HSTS COSTS						
System Type	**NPDES Permit from OEPA**	**Effluent Sampling and Operation Permit**	**Service Contract**	**Pumping Tank**	**Power**	**Totals (per year)**
Discharging	$20	$170	$200	$67	$250	**$707**
Non-Discharging	$0	$70	$200	$67	$125	**$462**

The Ohio EPA does not allow discharging systems on new lots created after January 1, 2007 or if it is not feasible to design an alternative system that could eliminate the need for an off lot discharge. The criteria for discharging system permits form the Ohio EPA is included in the fact sheet, provided in *Appendix C*.

Sewer System and Costs

The sewering of the area would consist of installing 8" diameter sanitary sewers on each street, and a 6" connection pipe would run to each property to the Right of Way line, which is approximately 10-15 feet from the roadway.

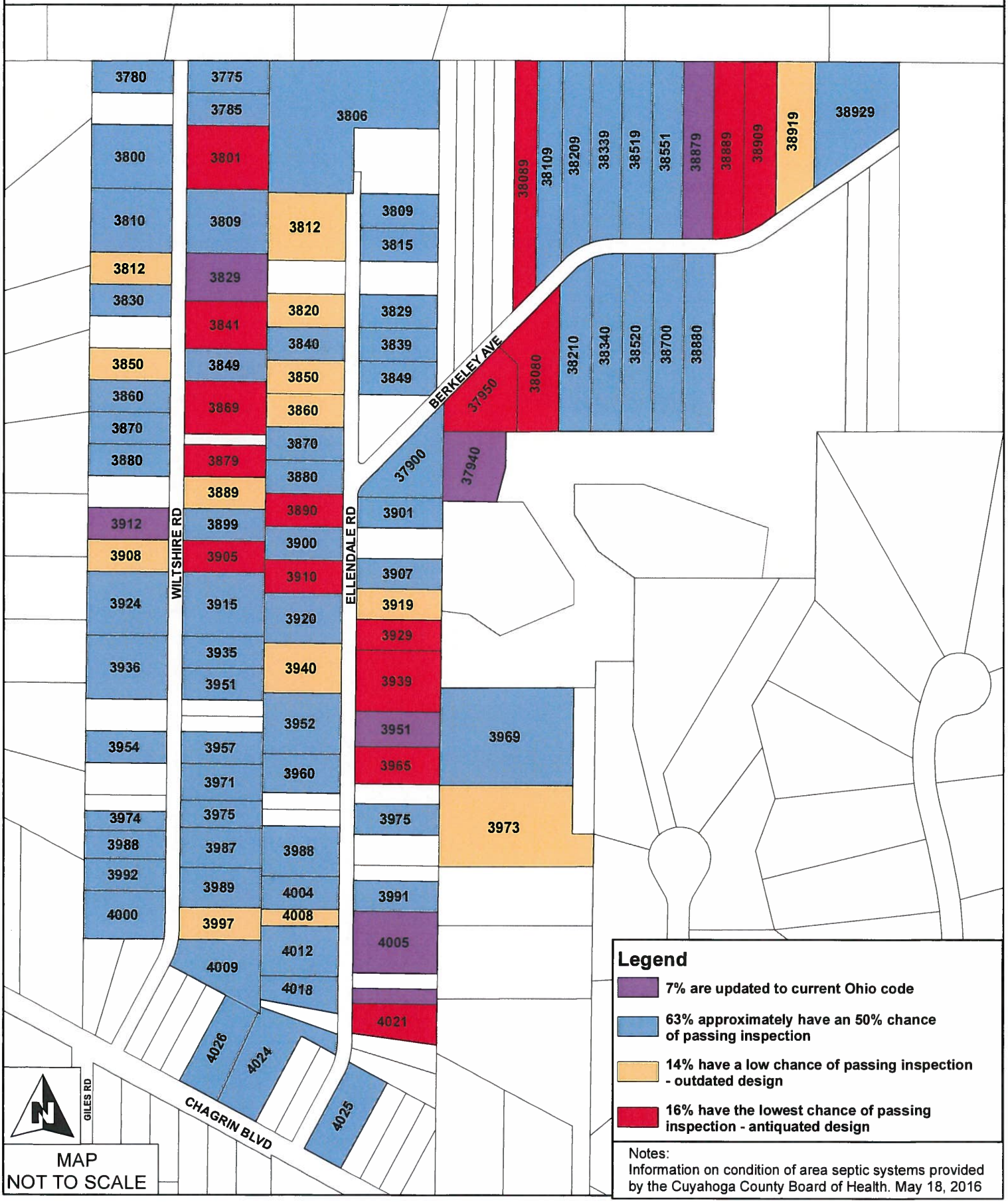
Due to the topography of the area, two pump stations are required to lift the sewer flows to the Chagrin Blvd. sewer, which would be extended from its current end point across from Brandon Ct. to Ellendale Rd. From this point, the flow would continue to the east, to the existing Quail Hollow pump station on Riverstone Dr. The flows would then be pumped to the Woodland Glenn Pump station, an ultimately to the Northeast Ohio Regional Sewer District's (NEORSD) treatment facilities. See *Figure 4* for the layout of the system.

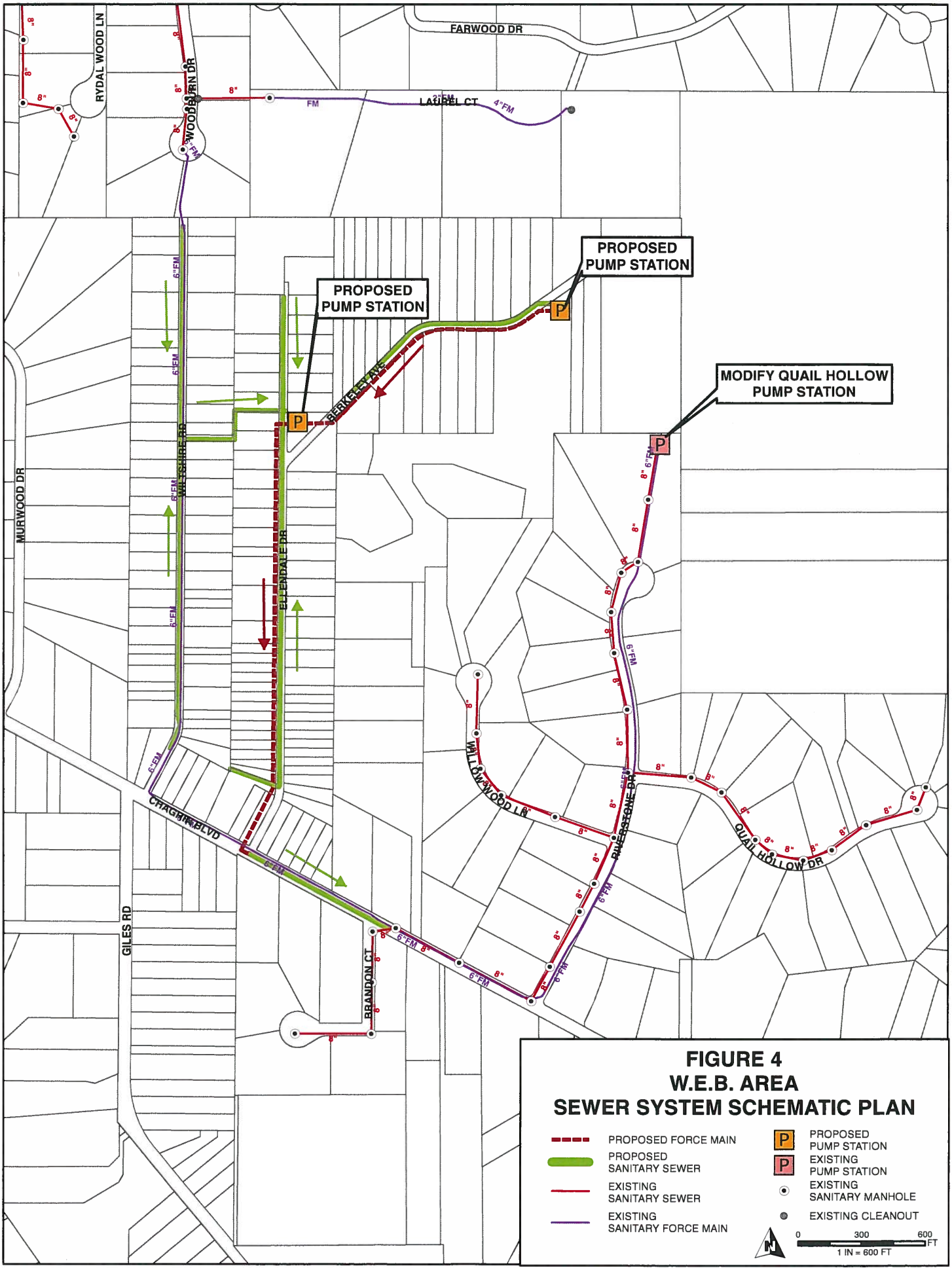
The connection pipe that is run to each property would be used to outlet the sewage from each property, by the property owner running a new pipe from their house foundation to the new connection pipe. The HSTS is pumped out, crushed in place and backfilled by the property owner.

The cost for installing the sewers, pump stations, force mains and connections to the Right of way lines is estimated to be $23,384 per property (after the Village cost share is deducted), considering 131 possible property connections. This cost can be reduced by a grant that has been approved

FIGURE 3

SEPTIC SYSTEM CONDITIONS ON BERKELEY AVE, ELLENDALE, AND WILTSHIRE ROADS




PROPOSED PUMP STATION
PROPOSED PUMP STATION
MODIFY QUAIL HOLLOW PUMP STATION
FARWOOD DR
RYDAL WOOD LN
WOODBARN DR
LAUREL CT
BERKELEY AVE
WILTSHIRE RD
ELLENDALE DR
MURWOOD DR
CRAGMONT BLVD
GILES RD
BRANDON CT
WILLOWWOOD LN
RIVERSTONE DR
QUAIL HOLLOW DR
FIGURE 4
W.E.B. AREA
SEWER SYSTEM SCHEMATIC PLAN
PROPOSED FORCE MAIN
PROPOSED SANITARY SEWER
EXISTING SANITARY SEWER
EXISTING SANITARY FORCE MAIN
PROPOSED PUMP STATION
EXISTING PUMP STATION
EXISTING SANITARY MANHOLE
EXISTING CLEANOUT
0
300
600
FT
1 IN = 600 FT

by the NEORSD's Member Community Infrastructure Program in the program year 2017 for $739,220, resulting in a net cost per property of **$17,741**.This cost can be assessed on property taxes over a 20 year period. The annual payment for the assessment is estimated to be **$1,219**.

An estimate of probable cost is provided in *Exhibit A.*

The cost that a property owner would typically be responsible for on private property to connect to the sewer is approximately $4,000. Annual costs for the connection to the sewers are estimated to be $1,609 for each user. These costs consist of NEORSD treatment costs, based on flows, and Village Special Sewer Assessment of $600.

In addition, the $5,500 connection fee stated in Chapter 931 of the Codified Ordinances that is required for lots connecting to the sanitary sewer would need to be waived.

COST SUMMARY

A summary of the estimated costs of the various HSTS systems and sewer system are as follows:

Table 3

Method of Treatment	Initial Cost	Annual Cost
HSTS- discharging : low	$12,200	$707
HSTS- non-discharging: low	$14,000	$462
HSTS- discharging :high	$17,200	$707
Sewer-with Grant	$17,741	$1,609 ($1,207 Homestead or Disabled)
HSTS : non-discharging high	$39,000	$462

CONSIDERATION OF OTHER FACTORS

As with any choice of options, each option has different issues and benefits that need to be considered in any decision.

HSTS Systems

1. Existing systems will be tested by the CCBH and may fail testing, requiring the property owner to install and pay for a new system without he ability to pay over a 20 year assessment period at a lower rate than a consumer loan.

2. New systems require more maintenance than in the past, especially discharging systems which the Ohio EPA requires annual testing of the effluent. If the effluent does not meet

the permitted standards, the system will need to be improved to provide an effluent that meets the discharge limits of the permit.

3. A portion of the yard that the HSTS occupies needs to be dedicated for that use. Additions, paving, pools, etc. cannot be placed in that area.

4. HSTS systems typically need to be replaced every 20-30 years, even those that are installed recently. If annual effluent testing does not meet the OHIO EPA permit criteria, portions, if not all of the system would need to be replaced or upgraded.

5. The sale of a property with a HSTS requires testing prior to transfer of ownership. Failure of the system can result in high escrow fund requirements (often 2X the estimated replacement cost) and/or delays in the sale of the property.

6. If the water quality does not improve in the area, even with the replacement of some of the current systems, the Ohio EPA can still mandate that sewers be installed.

7. EPA requirements for the quality of the discharge may become more restrictive for pollutant levels in the future, requiring additional upgrades to the HSTS systems.

Sewers

1. There is no regulatory testing such as from the CCBH or Ohio EPA required after the system is in place. There also is no Point of Sale test required.

2. The sewer connection pipe has working lifespan of 50+ years. There is no need to replace the pipe under normal conditions.

3. There is typically less disturbance of the yard when a property is converted from a HSTS to a sewer.

4. There are annual operation, maintenance and inspection costs involved as with an HSTS, and the sewer operation and treatment fees costs are higher than a HSTS.

5. Properties that have access to or are connected to a sanitary sewer typically sell for higher values.

6. The sewer system within the Right of Way can be installed by the Village and the cost to property owners can be passed on through assessments appearing on their property taxes. The cost is spread over 20 years, and the assessment remains with the property when sold, therefore the remaining balance of the sewer assessment cost is transferred to new owners. Since the assessment is part of property taxes, it can typically be counted as a deduction for federal taxes. For replacement HSTS systems, the cost is paid for entirely by the current owners.

7. The funding opportunity from the NEORSD is time sensitive. This program is an annual competitive funding program. If the project is not done now, there is no guarantee that this funding, which will reduce the cost by approximately $5,600 per property, will be available in the future.

EXHIBIT A- ESTIMATE OF PROBABLE COST

WEB Area Sewer Improvements
Prepared By Chagrin Valley Engineering, Ltd.

Item	Description	Unit	Quantity	Unit Price	Total Price
1	Connection to Existing Sanitary Manhole	EA	1	$ 3,000	$ 3,000
2	Sanitary Manhole	EA	31	$ 5,000	$ 155,000
3	8" Sanitary Sewer	LF	7,550	$ 150	$ 1,132,500
4	4" Sanitary Force Main	LF	1,540	$ 28	$ 43,120
5	6" Sanitary Force Main	LF	1,900	$ 30	$ 57,000
6	Force Main Air Release Valve Vault	EA	2	$ 6,000	$ 12,000
7	Sanitary Sewer Lateral Within R/W	EA	136	$ 2,200	$ 299,200
8	Existing Pump Stations Modification	LS	1	$ 80,000	$ 80,000
9	Sanitary Pump Station #1	LS	1	$ 90,000	$ 90,000
10	Sanitary Pump Station #2	LS	1	$ 184,000	$ 184,000
11	Asphalt Pavement Resurfacing	SY	15,014	$ 15	$ 225,210
12	Utility Allowance	LS	1	$ 10,000	$ 10,000
				Sub Total	$ 2,291,030

Construction Contingency (15%)	$	343,655
Subtotal	$	2,634,685
Engineering, Surveying,Const. Management & Easements	$	577,937
Total Project	**$**	**3,212,621**
Less Village Share	$	149,372
Net Project Cost	**$**	**3,063,249**
Less NEORSD Grant	$	739,220
Net cost for Assessment	$	2,324,029
Number of Properties	$	131
Cost per Property	$	17,741