URS

Attachment 4

April 23, 2012

Village of Ashville, Ohio
200 East Station Street
P.O. Box 19
Ashville, Ohio 43103

Attention: Mr. Franklin Christman, Village Administrator

RE: Final Wastewater Engineering Report

Dear Mr. Christman:

Attached are one paper copy and a digital copy of the Final Wastewater Engineering Report for the Village of Ashville. This report provides background investigations, population and wastewater flow projections, wastewater treatment alternatives, a recommended plan, a schedule and financing options for a Village of Ashville wastewater project. The recommended project will include a new wastewater treatment plant on a new site as well as further investigations of your collection system infiltration and inflow problems.

We will submit one copy of the final report to the Ohio EPA after we receive your authorization. If you have any questions or comments, please contact us.

Sincerely,

URS Corporation

Jeffrey R. Kerr, P.E.
Senior Project Manager

cc: Kerry Hogan, P.E., URS

URS Corporation
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Columbus, OH 43215-2566
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Village of Ashville, Ohio
Final Wastewater Engineering Report

April 23, 2012

Project No. 14577731

URS
Architects Engineers Planners

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Section One Introduction

1.0 Introduction

1.1 Project Purpose and Scope

Improvements to the existing Village of Ashville Wastewater Treatment Plant (WWTP) are needed to meet the current and future needs of the Village and comply with Ohio EPA requirements. The Village is continuing to increase in population and would like an expandable WWTP that will provide service to the Village (and possibly some regional area surrounding the Village) through the year 2030.

The existing Ashville WWTP facility is aging and requires improvements to structures and equipment to treat existing and proposed flows. The WWTP is hydraulically overloaded and is known to experience backups of flows into the sewer system. According to the WWTP operators, peak flows to the facility have exceeded 3.0 MGD in the past. These peak flows, experienced after rain events, have exceeded the hydraulic capacity of the WWTP and resulted in NPDES permit limit violations and sewer system overflows at the WWTP site. The headworks of the facility, including the bar screen equipment, is in need of replacement due to plugging and hydraulic issues. Improvements to the oxidation ditch, clarifiers and disinfection system are necessary to improve hydraulic capacity, reliability and efficiency.

The WWTP lacks sufficient sludge holding, treatment, and disposal facilities. The existing sludge process, which includes aerobic digesters and geotextile bags, has been a source numerous odor complaints. These odor complaints appear to be due to the operation of the headworks, the removal of dewatered sludge, the removal and hauling liquid of sludge, and the operation of the sludge drying bags. The WWTP is in need of a more effective sludge dewatering and disposal system that will improve the quantity and speed of solids removal.

This report will address alternatives that involve expanding the WWTP on the existing site and on a new site. Two regional alternatives that include the Village of South Bloomfield are also analyzed and discussed.

1.2 Scope

In the development of this report, representatives of URS:

1. Visited the WWTP site to observe the treatment units, take photographs and discuss the operation of the WWTP with Village staff;
2. Reviewed plant operating data, NPDES permit requirements, previous engineering reports and letters from the Ohio EPA. Discussed these data with Village staff, Village Council and the Ohio EPA
3. Prepared a condition assessment memorandum for the WWTP;
4. Obtained Geographic Information System (GIS) mapping information from Pickaway County, MORPC and other sources;
5. Reviewed sanitary sewer system and pump stations maps, drawings, reports and operating data to understand the condition and operation of the sewer system;
6. Visited the sewer system and pump stations to observe the facilities, take photographs and discuss their operation with Village staff;

7. Reviewed the sanitary sewer service area and developed projections of service area size, population and wastewater flows;
8. Reviewed nearby sanitary sewer utilities operated by other communities and considered opportunities for regional cooperation;
9. Reviewed existing wastewater flow data to understand the infiltration/inflow problems and hydraulic overloading of the WWTP in the Village;
10. Developed four alternatives for the WWTP improvements on the existing and a new WWTP site;
11. Developed a regional wastewater treatment alternative;
12. Prepared an economic evaluation of WWTP alternatives;
13. Recommended a WWTP alternative and provided a preliminary cost estimate; and
14. Summarized financing alternatives for the recommended WWTP alternative.

Section Two

Summary of Background Investigations

2.0 Summary of Background Investigations

2.1 Facilities Planning Area and Sewer Service Area

The Ohio Environmental Protection Agency (OEPA) is currently preparing an update to the Regional Wastewater Plan (208 Plan) for the Upper Scioto Basin. This plan is expected to be completed by end of December and is expected to be submitted to the Governor by January 2012. The Mid-Ohio Regional Planning Commission (MORPC) has been granted funds to provide data for Central Ohio that could be incorporated into the 208 Plan.

MORPC has worked with the Village of Ashville to determine a Facilities Planning Area boundary to be incorporated into the 208 Plan. The proposed Ashville Wastewater Facilities Planning Area boundary and Sewer Service Area is shown on **Figure 2-1**. This boundary generally extends between Duvall Road on the north, Lockbourne Eastern Road and the Walnut Creek on the east, the Little Walnut Creek on the South. The Facilities Planning Area consists of approximately 6,406 acres. A Wastewater Facilities Planning Area is used by the Ohio EPA for wastewater planning purposes and can be used to lock in an area for future service by the Designated Management Agency for wastewater service in the subject area.

Sewer Service Area boundaries for the Village of Ashville are shown as blue on **Figure 2-1**. This sewer service area boundary was also taken from MORPC mapping and closely matches the corporate limits of the Village. The Village corporate limits include approximately 1,415 acres. However, the actual area currently served by sewers in the Village is 662 acres. Therefore, only 47% of the Village is currently served by sanitary sewers. Sewer extensions into the remaining 53% of the undeveloped area in the Village are expected to occur in the future as development occurs.

The Facilities Planning Area boundaries for the Village of Ashville and Village of South Bloomfield closely match the Cooperative Economic Development Area (CEDA) boundary established by Ashville, South Bloomfield, and Harrison Township as part of the North Gate Alliance CEDA. This CEDA is discussed in greater detail in **Section 2.6.1** and a copy of the Agreement is provided in **Appendix D**.

The Facilities Planning Area northern boundary for Ashville and South Bloomfield overlaps on the Columbus Lockbourne Intermodal Subtrunk service area as shown on **Figure 2-1**. This overlap, generally between Duval Road on the north and Miller Road on the south, is discussed in greater detail in **Section 2.6.4**.

2.2 Sanitary Sewer System

The Village of Ashville sanitary sewer system consists of gravity sewers ranging in size from 8-inch to 18-inch in diameter as shown on **Figure 2-2**. These sanitary sewers are generally vitrified clay or plastic pipe. An enlarged map of the sewer system is presented in **Appendix A**.

The sewer system generally drains to the south to the site of the Ashville WWTP located south of Main Street on South Scioto Street. A 12-inch sanitary sewer and an 18-inch sanitary sewer enter the WWTP site from the east and west, respectively.

Year 1999 Cleaning and Television Inspection. Cleaning and television inspection of the Ashville sewer system were performed in August 1999. VHS tapes and logs appear to be available for most of the sewer system. However, these tapes and logs have not been summarized in an engineering report with recommendations on corrective actions. In 1999, a report entitled "Summary of Steps Taken…to Implement a Village Wide Inflow and Infiltration Control Program" was prepared by Tom Bouts, Utilities Superintendent. The report summarized actual sanitary sewer system rehabilitation work completed during 1996 through 1999. Work included the installation of 19 chimney seals, 18 manhole dishes, and the elimination of 50 clean water connections or sources. A listing of 60 locations were investigation/maintenance was performed or still needed were listed.

Year 2002/2003 Infiltration Inflow Control/Elimination Plan. The results of manhole inspections and recommended corrective actions were summarized in a report entitled "I/I Control/Elimination, 2002 Annual Progress Report and 2002/2003 I/I (Infiltration and Inflow) Control Elimination Plan" by Urban Engineering. Two hundred eighty seven manhole inspections were completed in the year 2002. Inspection data sheets are available for these manholes. Corrective actions were recommended on 209 manholes. An additional 16 manholes were found to be buried under asphalt and needed to be uncovered and raised to grade. Some manhole rehabilitation work, consisting of the addition of chimney seals and inflow dishes was completed as a result of this report. However, records of where this work took place are not available.

The report noted that two sections of 8-inch sewer replacement on Long Street were completed in 2001 to eliminate some I/I sources. Also, a weir on an overflow structure between the sanitary and storm sewer systems on Church Street was raised in 2002. It appears that other weir structures existed in 2002 as connections between the storm and sanitary sewer systems in Ashville.

A mailed survey on basement flooding and the use of sump pumps was also performed as part of the 2002 study. One hundred eighty three homes out of 270 homes responding reported that they had basements and 84 had basements with sump pumps. The survey respondents reported 65 homes with periodic basement flooding and 29 of these basements were reported to be flooded with wastewater.

Limited flow monitoring in the sewer system was conducted by Urban Engineering in 1999 and 2002. This work consisted of "grabs of flow depth" at locations around the Village. The results of this flow monitoring are not available.

2004 I/I Control/Elimination Status Report and Illicit Connection Removal. In 2004, Urban Engineering prepared a report entitled "I/I Control/Elimination Status Report and Illicit Connection Removal". The report summarized historic and recent smoke and dye testing completed as of 2004. The report also discussed three or four known or suspected overflow points in the sewer system that was being monitored. According to the report, the results of this monitoring were reported to the Ohio EPA. However, copies of these reports could not be located. The report discussed the elimination of eleven "illicit" and three clean

water connections to the sanitary sewer and provided a listing of recommended wastewater capital improvement projects throughout the Village. Grade conflicts between the sanitary and storm sewer systems that dated back to the 1930's were noted and were thought to be the root of the problem in Ashville.

Year 2011. A budget of $40,000 per year was authorized by the Village in 2011 to provide rehabilitation throughout the sanitary sewer system. Drier and Maller, Inc. has provide annual cleaning and television inspection of selected areas of the sewer system as directed by Village staff. Inspections completed in the year 2011 revealed heavy debris and possible direct stormwater connections in certain areas of the sanitary sewer system. The direct stormwater connections appear to be tie-ins of curb inlets and catch basins in the old section of the Village. The Village is proceeding to investigate removal of these possible direct connections.

Overflows of the sewer system have been noted at the WWTP site and are currently reported to the Ohio EPA as Sewer System Overflows (SSOs). Two manholes at the WWTP site overflow when plant flows are high during rain events. In May, 2011, sanitary sewer overflows were reported at the WWTP on each of the following days: May 3, 4, 17, 18, and 23. WWTP average daily flows on those days were: 2.21 MGD, 1.365 MGD, 1.152 MGD, 1.269 MGD, and 1.985 MGD, respectively. Therefore, it appears that a sewer system overflow at the WWTP can occur when flows exceed 1.1 MGD.

Overflow volumes at the WWTP site vary with the rain event. On May 23, an approximate overflow volume of 20,000 gallons was estimated by the operators during an average daily plant flow of 1.985 MGD. When sewer system flows exceed 1.6 MGD, the hydraulic capacity of the WWTP is exceeded and bypassing of the clarifiers is needed to minimize flooding of the site and damage to WWTP equipment

2.3 Wastewater Pump Stations

There are three wastewater pump stations located within the Village corporate limits as shown on **Figure 2-2**. These pump stations include the Ashton Crossing, Ashton Village and Columbus Industries Pump Stations. Each pump station consists of a manhole wet well and valve vault. The wet well is equipped with two submersible pumps. Pump station capacities are summarized below:

- Ashton Village Pump Station: 2 pumps at 320 GPM@50 feet TDH, Depth: 27 feet, Manhole I.D.-6 feet, Force main size-6 inch.
- Ashton Crossing Pump Station: 2 pumps at 450 GPM@75 feet TDH, Depth: 38 feet.
- Columbus Industries Pump Station: Approximate capacity: 2 pumps at 240 GPM.

The Columbus Industries Pump Station is owned and operated by the Village for Columbus Industries. The pump station is currently under-utilized due to downsizing of the company. The company previously had 300 employees at this location and now has approximately 4 employees.

2.4 Wastewater Treatment Plant

2.4.1 Alternative Evaluation

The original Ashville WWTP was built in 1934 and consisted of a bar screen, an Imhoff tank and sludge drying beds which provided primary treatment of wastewater. In 1962, secondary treatment was added and the WWTP was expanded to include two aeration tanks, two rectangular final tanks, a metering manhole and a control building. The WWTP had three aeration blowers, two sludge pumps, one collector drive and one comminutor. The control building upstairs contained a small laboratory and a motor control center. The control building downstairs contained return sludge pumps, blowers, a hot water heater, gas furnace and water seal equipment.

In 1993, a major expansion of the WWTP to 0.6 MGD average daily flow was undertaken. During that year, the following treatment units were added: bar screen/flow splitter, 31-foot diameter primary clarifier, 132-foot long oxidation ditch, two 26-foot diameter final clarifiers, a return activated sludge (RAS) pump station (also known as a mud well), a 16-foot by 40-foot chlorine contact tank and post aeration with fine bubble diffusers and a flow splitter/flow metering tank with Parshall flume. The RAS pump station was equipped with two submersible pumps with an adjacent valve vault. The bar screen/flow splitter tank included a dewatering rack and a manual self-cleaning bar screen. One existing aeration tank was converted to a 160,000 gallon sludge holding tank and the other was allowed to remain as spare aeration capacity when plant flows exceeded 0.6 MGD. The existing clarifier was proposed to be used as part of a sludge dewatering process. Three 20 by 61-foot sludge drying beds were added and an existing 40,000 gallon sludge holding tank remained in service. A chlorine building with chlorine and sulfur dioxide cylinders was also added.

In 1995, additional WWTP improvements were undertaken. These improvements included a 9-foot by 18-foot generator pad, magnetic flow meters installed in a standard manhole, storm drain lines, water lines, miscellaneous yard piping, valves and pressure relief valves, and miscellaneous electrical improvements.

In 2004, improvements were made to covert the 160,000 gallon sludge holding and 160,000 gallon spare aeration capacity tanks into flow equalization tanks 1 and 2. The existing old clarifiers were also converted into flow equalization tanks 3 and 4. A new duplex pump system was added to one of the 160,000 gallon flow equalization tanks.

2.4.2 National Pollutant Discharge Elimination System (NPDES) Permit

Under the provisions of NPDES Permit 4PC00005*KD granted by the Ohio EPA, the Village of Ashville is authorized to discharge to Walnut Creek. The NPDES Permit specifies limitations on the quality of wastewater effluent that may be discharged, sampling and reporting requirements, and any special conditions or

constraints that may exist. The NPDES permit for the WWTP was effective on June 5, 2007 and expires on June 30, 2012. The permit expires every five years and must be renewed six months prior to the expiration date. A summary of the effluent limits mandated by the NPDES permit is provided in **Table 2-1**. The NPDES permit requires the effluent discharged to be below the maximum limits specified in **Table 2-1**. A copy of the NPDES permit is provided in **Appendix E**.

According to the Ohio EPA (February 8, 2012 meeting), a renewal of Ashville's NPDES Permit in the year 2012 is not expected to include a compliance schedule for WWTP improvements. This schedule is expected to be required as part of Findings and Orders or negotiated between the Village and the Ohio EPA outside of the Findings and Orders process.

The Ohio EPA has indicated that it is unlikely that either a total dissolved solids (TDS) or a total phosphorous limit will be required in the next (Year 2012) permit cycle as these pollutants were not identified as issues for Ashville in the Walnut Creek TMDL report. However, monitoring for one or both of these pollutants may be required.

Both TDS and nutrient related water quality criteria for Ohio will likely be finalized during Ashville's next permit cycle (Years 2012 to 2017). As such, it is hard to predict what the future holds for these parameters in regards to permit limits for Ashville. However, the recommended plan of this report includes phosphorous removal should it be needed.

Table 2-1 NPDES Permit Limitations

Effluent Characteristic	Weekly Concentration	Monthly Concentration	Weekly Loading (kg/day)	Monthly Loading (kg/day)	Daily Loading (kg/day)	Max	Min
TSS (mg/l)	34	22.5	77.2	51.1			
Nitrogen Ammonia NH3 Winter (mg/l)	15	10	34.1	22.7			
Nitrogen Ammonia NH3 Summer (mg/l)	11.7	7.8	26.6	17.7			
Fecal Coliform (No./100 ml)	2000	1000					
CBOD5 (mg/l)	**28.5**	**19**	**64.7**	**43.1**			
Dissolved Oxygen (mg/l)							5.0
PH-S.U.						9.0	6.5
Oil and Grease (mg/l)						10.0	
Zinc, Total ug/l					1.43	630	
Copper, Total ug/l					0.19	82	
Chlorine, Total Residual (mg/l)						.038	

Table 2-1 shows a maximum concentration limit for zinc, copper, oil and grease, pH, and residual chlorine and a minimum concentration limit for dissolved oxygen and pH. All effluent loadings shown in the permit are based on an average design flow of 0.600 MGD.

The permit requires Sewer System Overflow (SSO) monitoring and reporting for the sewer system.

2.4.3 Basis of Design

Data on the original and modified basis of design for the Ashville WWTP could not be located. However, the following data were reconstructed from the 1993, 1995 and 2004 drawings of the WWTP and are our best estimate of the basis of design:

Average Daily Design Flow: 0.6 MGD

Peak Daily Design Flow: 1.6 MGD

Treatment Units:

Bar Screen: Manual, 2' 2" wide, 3/8" openings

Mechanical Bar Screen: 2' 2" wide, 3/8" openings, Standard Duty, Pivoted Bar screen, Equipment Manufacturer-Envirex, Inc.

Primary Clarifier: (currently used for flow equalization) 31' Inside Diameter, 12' Side Water Depth, 11' x 11' Weir Trough, Total Volume- 67,750 gallons, Equipment Manufacturer- Lakeside Equipment Corp, Spiraflo Clarifier

Flow Equalization Tanks: Two tanks with a total volume of 160,000 gallons each (former sludge holding and aeration tanks), Two former rectangular clarifiers with a total volume of 42,000 gallons each. Total flow equalization volume: 404,000 gallons.

Oxidation Ditch: 132' x 32' x 10' Side Water Depth, Total Volume-300,000 gallons, Equipment Manufacturer-Lakeside Equipment Corp.

Final Clarifiers: Two clarifiers, 26' Inside Diameter, 12' Side Water Depth, 12' Diameter Weir Trough, Volume-47,656 gallons each, Surface Area: 530 square feet each, Surface Loading Rate-566 gpd/sf at average daily flow of 0.6 MGD, Equipment Manufacturer: Lakeside Equipment Corp. Spiraflo Clarifiers

Chlorine Contract Tank: 14' x 37'8" x 6' Side Water Depth (inside dimensions), Total Tank Volume-23,667 gallons (including post aeration/dechlorination),Fine bubble diffusers, Aeration/dechlorination area is 9' x 14' x 6' side water depth) Total aeration/dechlorination volume-5,655 gallons, Detention time-Total tank 56.8 minutes at 0.6 MGD and 22.7 minutes at 1.5 MGD

Chlorine Building: 18' x 13'4"x 8' (finished floor to ceiling) masonry

Flow Splitter/Flow Metering Tank: Precast concrete tank-17' long x 4'4" wide, Parshall Flume with 9" wide throat

Sludge Drying Beds: Three sand drying beds, 62'6" wide x 61'3" long.

Sludge Holding Tank: 40,000 gallons

Geotextile Bags: Three bags installed over the three sludge drying beds (used for sludge dewatering)

Standby Generator: Generac, 600 kw diesel

2.4.4 Monitoring Data

The Village generally collects samples of wastewater twice per week and the monthly average is computed from the samples taken for the entire month. These records of weekly and monthly average sampling results were used to assess WWTP performance.

Table 2-2 provides the WWTP monitoring data on a monthly basis during January 2009 through August 2011. Bold numbers in this table indicate that NPDES permit concentrations have been exceeded during the period. As shown in this table, the Village has exceeded NPDES permit limitations in 2009-2011 for total suspended solids, CBOD, Chlorine residual, ammonia, and fecal coliform (maximum number).

The maximum weekly NPDES Permit limit number of 34 mg/l for total suspended solids was exceeded during individual days and during some months as shown on **Table 2-2**. The maximum monthly NPDES Permit limit number of 22.5 mg/l for total suspended solids was exceeded during 10 months of the period.

The maximum weekly NPDES Permit limit number of 28.5 mg/l for CBOD5 was exceeded during individual days as shown on the table. The maximum monthly NPDES Permit limit number of 19 mg/l for CBOD5 was exceeded during one month of the period.

The maximum weekly and monthly fecal coliform limits of 2000 and 1000, respectively, were exceeded during 12 months of the period shown in **Table 2-2**. These fecal coliform problems appear to be due (in part) to the carryover of solids to the chlorine contact tank which cannot provide adequate disinfection when overloaded with solids.

The maximum weekly NPDES Permit limit number of 11.7 mg/l for ammonia nitrogen was exceeded during one month as shown on the table.

An Ohio EPA NPDES Compliance Inspection Report dated June 21, 2011 (see **Appendix C**) provides a listing of NPDES Permit limit violations during the period from March 2011 through May 2011. Twenty violations were reported during this period for CBOD5, Total Suspended Solids, and Fecal Coliform. The suspended solids, CBOD violations listed above are mainly due to peak flows to the WWTP that exceed the rated capacity of the treatment equipment.

Table 2-2 Village of Ashville WWTP Effluent Monitoring Data (January 2009 – August 2011)

Month/ Year	MIN Flow (MGD)	MAX Flow (MGD)	AVG Flow (MGD)	MAX Cl2-Res (mg/l)	AVG Cl2-Res (mg/l)	MIN TSS (mg/l)	MAX TSS (mg/l)	AVG TSS (mg/l)	MIN NH3N (mg/l)	MAX NH3N (mg/l)	AVG NH3N (mg/l)	MAX FeColi (#/100 ml)	AVG FeColi (#/100 ml)	MIN CBOD5 (mg/1)	MAX CBOD5 (mg/1)	AVG CBOD5 (mg/l)
Jan 2009	0.167	1.069	0.480	---	---	5.00	**50**	16.13	0.02	1.11	0.26	---	---	1.2	7.1	2.96
Feb 2009	0.511	0.626	0.577	---	---	7.00	**47**	**28.75**	0.03	4.50	0.62	---	---	1.2	21.0	8.56
Mar 2009	0.300	0.821	0.448	---	---	12.00	**49**	**28.56**	0.04	1.60	0.24	---	---	2.2	7.1	3.94
Apr 2009	0.329	0.885	0.556	---	---	8.00	**181**	**38.00**	0.09	9.68	2.11	---	---	1.2	**36.5**	7.87
May 2009	0.259	0.880	0.455	0.03	0.023	12.00	**46**	19.88	0.07	4.12	0.69	666	301.00	0.0	6.8	3.21
Jun 2009	0.043	0.777	0.435	0.03	0.023	6.00	**102**	**31.11**	0.15	6.60	1.45	**8367**	**1953.78**	1.9	12.1	5.00
Jul 2009	0.142	0.859	0.491	0.03	0.024	0.00	**47**	15.78	0.10	2.80	0.53	**6967**	**1732.22**	0.0	11.0	3.41
Aug 2009	0.038	1.411	0.510	0.03	0.022	9.00	**78**	**31.38**	0.08	3.00	0.82	**60000**	**18296.25**	1.2	18.2	4.45
Sep 2009	0.255	0.853	0.449	0.03	0.026	9.00	27	15.67	0.11	0.28	0.19	**7000**	**4247.33**	1.4	8.9	3.52
Oct 2009	0.364	1.028	0.585	0.03	0.027	0.00	25	7.67	0.15	0.23	0.18	**7000**	**3251.56**	1.5	6.4	3.09
Nov 2009	0.280	0.865	0.468	---	---	6.00	**44**	12.63	0.00	8.20	1.81	---	---	0.0	**30.2**	4.35
Dec 2009	0.384	0.870	0.609	---	---	0.00	31	11.60	0.00	1.55	0.23	---	---	0.0	5.8	2.66
Jan 2010	0.389	0.956	0.610	---	---	5.00	**50**	17.38	0.08	6.80	1.11	---	---	1.2	**45.1**	7.48
Feb 2010	0.383	0.876	0.574	---	---	0.00	**64**	20.13	0.04	6.30	0.87	---	---	0.0	6.0	2.90
Mar 2010	0.401	1.036	0.591	---	---	0.00	17	8.33	0.04	1.97	0.40	---	---	1.2	2.5	1.43
Apr 2010	0.322	0.726	0.446	---	---	5.00	**82**	**23.50**	0.05	0.30	0.13	---	---	1.2	4.4	2.19
May 2010	0.365	1.235	0.568	0.03	0.028	0.00	**40**	10.25	0.03	4.70	0.75	867	256.13	2.5	20.0	5.83
Jun 2010	0.370	1.309	0.546	0.03	0.026	0.00	8	2.33	0.00	0.16	0.09	**7000**	814.44	0.0	6.9	2.90
Jul 2010	0.109	0.536	0.373	0.03	0.027	0.00	**120**	20.11	0.05	1.14	0.29	**2300**	456.56	0.0	6.2	2.96
Aug 2010	0.141	0.742	0.407	0.03	0.015	1.00	20	8.67	0.03	0.48	0.12	**7000**	**1913.67**	1.2	5.8	2.56
Sep 2010	0.195	0.453	0.370	0.03	0.026	8.00	29	18.00	0.07	0.18	0.11	**4070**	572.56	2.2	8.1	5.18
Oct 2010	0.298	0.449	0.359	0.03	0.022	4.00	**37**	**23.88**	0.08	0.33	0.18	**7000**	**1459.63**	0.0	14.0	4.90
Nov 2010	0.277	0.850	0.385	---	---	2.00	28	10.11	0.00	0.42	0.09	---	---	1.5	4.2	2.79
Dec 2010	0.122	0.587	0.387	---	---	4.00	**50**	15.22	0.03	0.10	0.06	---	---	1.4	6.7	2.53
Jan 2011	0.241	0.626	0.348	---	---	4.00	**44**	18.50	0.03	0.15	0.09	---	---	1.7	6.4	3.34
Feb 2011	0.346	1.355	0.569	---	---	5.00	**126**	**48.50**	0.00	11.50	3.38	---	---	2.1	**40.9**	18.24
Mar 2011	0.346	1.140	0.693	---	---	7.00	**59**	**28.40**	0.03	9.20	3.52	---	---	0.0	**28.9**	8.91
Apr 2011	0.428	2.356	0.945	---	---	15.00	**265**	**56.88**	0.03	3.81	1.17	---	---	1.2	**158.0**	**26.71**
May 2011	0.483	2.211	0.916	**0.04**	0.018	2.13	**43**	16.64	0.04	4.80	1.88	**7000**	**2089.25**	1.2	**32.2**	12.28
Jul 2011	0.160	0.784	0.373	0.03	0.022	9.00	**35**	15.50	0.16	7.86	3.65	**7000**	**2706.13**	1.2	**34.7**	8.36
Aug 2011	0.073	0.637	0.337	0.03	0.024	5.00	**65**	14.67	2.02	**14.90**	5.09	1470	411.63	1.2	**31.5**	6.52

2.4.5 Condition Assessment

A Condition Assessment Memorandum was prepared for the Ashville WWTP by URS and is included in **Appendix B**. This memorandum was based on a site visit that was held on September 7, 2011 and discussions with Village staff. The memorandum discussed issues associated with each unit process at the WWTP, but did not provide a rating of its useful life. A summary of these process issues is presented below:

- Manholes overflow at the WWTP site due to shallow sewers and high peak flows.
- Pumps and equipment are clogged with rags that pass through the screens.
- The influent screening system is currently out of service for repairs.
- There is hydraulic overloading of the oxidation ditch and clarifiers.
- Hydraulic overloading results in flooding of the bearing/motor work pit of the oxidation ditch.
- Solids and grease pass through the clarifiers due to hydraulic overloading,
- The telescoping valves are often plugged with debris and do not provide adequate control of return sludge.
- The chlorine contact tank has scum draw off issues and accumulations of sludge due to wash out of the clarifiers. This accumulation of sludge in the chlorine contact tank results in fecal coliform violations.
- The exhaust fans and heaters in the Chemical Feed Building are not working,
- Sludge handling and disposal issues result in odor problems and complaints from residents living near the WWTP.

The memorandum also included a discussion of electrical issues which included the following:

- Brown outs and complete losses of power have been a problem at the WWTP due to power company issues.
- Equipment at the WWTP has to be manually restarted after brown outs and power losses. This causes a problem when no operator is on duty.
- Debris and rust have accumulated in the main service disconnect and have created a safety issue.
- The WWTP has extra electrical services that could be eliminated to reduce costs.
- The motor control center (MCC) is 25 years old and has exceeded its useful life. This MCC has inadequate clearance in front of the unit as required by building codes.
- There is no SCADA monitoring of electrical service status, generator status and plant operations status. Therefore, the operators are not notified when electric service is out, the generator is on or off, or when equipment at the plant is out of service.

2.5 Existing Engineering Reports

A "Wastewater Treatment Plant, Proposed Expansion, Preliminary Engineering Report" was prepared for the Village in October, 2008 by Kinder Environmental Services, Inc. The report provided a preliminary plan for a WWTP expansion to 1.2 MGD average daily flow. The report recommended a 2 million gallon flow equalization "pipe maze", elimination of primary settling, three additional oxidation ditches, two new final clarifiers, a UV disinfection system, a modified flow metering system and a sludge handling system (which may consist of more sludge dewatering bags and a belt filter press). The estimated cost of this system was $6.6 million for the wastewater treatment plant and $3.75 million for the flow equalization system.

2.6 Nearby Sanitary Sewer Utilities

2.6.1 South Bloomfield

The Village of South Bloomfield has a sanitary sewer system that is owned and operated by the Village. A large part of this sewer system was constructed in the year 1992-1995 and is in very good condition. Village staff report that infiltration and inflow in the Village are very low and peak flows to the WWTP are similar to the average daily flow. The Village sewer system has four pump stations including: the Mud Run, Dominion, WWTP and roadside rest pump stations. The sewer system extends on the north to the roadside rest located on U.S. Route 23. This area is pumped south via two 6-inch force mains to the South Bloomfield sewer system. A South Bloomfield gravity sewer tie-in location to Ashville is behind the Dairy Queen located at U.S. Route 23/ State Route 752 intersection. South Bloomfield staff has indicated that an 8-inch sewer at this location is available to accept flows from Ashville if the need arises. Another possible gravity sewer connection site is an 8-inch sewer in Millport along State Route 316. This sewer in Millport is very close to the Village of Ashville and is tributary to the Mud Run pump station which is owned and operated by South Bloomfield.

The Village of South Bloomfield constructed a new Wastewater Treatment Plant that was placed in service in the year 2006. This WWTP is located along State Route 316 west of U.S. Route 23 near the Scioto River. The WWTP discharges to the Scioto River under NPDES Permit 4PC00101*BD. This Permit allows for an average design capacity of 0.5 MGD. According to the operators, the WWTP was designed for an average daily flow of 0.50 MGD and a peak daily flow of 1.0 MGD. The WWTP currently receives average daily flows of 0.18 MGD and has available capacity of 0.32 MGD average daily flow. The WWTP uses the Schreiber Counter Current Aeration process for biological treatment. The WWTP also includes a raw sewage pump station, a headworks, two aerobic digesters, one sludge storage tank, a belt filter press and a UV disinfection tank. Raw sewage is pumped through the WWTP using a submersible pump station with three 400 gpm pumps. With two pumps operating, this pump station has a capacity of approximately 1.0 MGD. The headworks and UV disinfection tanks were designed for flows of 1.0 MGD.

The Village of South Bloomfield, Village of Ashville, Pickaway County and Harrison Township have established a North Gate Alliance Cooperative Economic Development Area (CEDA). Goals of this agreement include:

- Promoting economic development and uniform planning standards,
- Cooperating in creating and preserving jobs and employment opportunities,
- Cooperate in facilitating responsible development within the territory of the Township while preserving the geographic integrity of the Township, and
- Making water and sewer service more widely available.

The County, Villages and Township also agreed to meet and negotiate with respect to the possible formation of a regional water and sewer district pursuant to Chapter 6119 of the Ohio Revised Code to provide sewer service within the CEDA territory. A copy of this CEDA contract and CEDA territory map is included in **Appendix D**.

2.6.2 Pickaway County

Pickaway County has sanitary sewers and packaged wastewater treatment plants located south of Ashville along Walnut Creek. In the past, Pickaway County has expressed an interest in eliminating packaged wastewater treatment plants. A treatment plant currently serving about 60 homes in the Walnut Heights subdivision is owned and operated by Pickaway County and is about two to three miles south of the Village of Ashville on Cromley Road. There are two other packaged wastewater treatment plants in this same area. Negotiations with the County would be required if the Village wants to add these customers and construct a project to convey their wastewater to the Ashville Wastewater Treatment Plant (WWTP).

2.6.3 Earnhart Hill Water and Sewer District (EHWSD)

This EHWSD is a political subdivision of the state of Ohio organized under Chapter 6119 of the Ohio Revised Code. The district provides drinking water to more than 3,300 customer connections within its service area, which primarily includes Pickaway County, Ohio. Water service is provided to Pickaway County areas north, south and east of Ashville.

The EHWSD provides wastewater service to areas south of Circleville but does not provide wastewater service near the Village of Ashville. Therefore, a cooperative agreement between Ashville and the District on wastewater service is not possible at this time.

2.6.4 City of Columbus

In 2006, the Northern Pickaway County Joint Economic Development District (JEDD) was established via a joint agreement between the City of Columbus, Village of Ashville, and Harrison Township of Pickaway County (the JEDD parties). The JEDD parties and the Village of South Bloomfield entered into an Annexation Moratorium Agreement in August 2007 which placed a moratorium on annexation

within the Northern Industrial Area. The JEDD district includes the proposed Intermodal Facility and adjacent areas.

The JEDD agreement and annexation moratoriums allow the JEDD to receive water and sewer service from the City of Columbus without first annexing to the City. **Figure 2-3** shows the approximate boundary of the Joint Economic Development District.

The creation of the Northern Pickaway County JEDD and the annexation moratoriums are the legal mechanisms that allowed Columbus to construct a future Lockbourne Intermodal Subtrunk (LIS) sewer. Engineering studies for the LIS began in the year 2006 and final engineering plans and specs for this 12-foot diameter sewer tunnel were presented to the City of Columbus in 2009. Construction of this project was placed on hold due to easement acquisition and budget issues.

The LIS project is currently being downsized and re-designed as 10,300 lineal feet of 78-inch microtunnel and approximately 7,000 lineal feet of 60-inch gravity sewer. The 60-inch gravity sewer will begin at the intersection of Shepherd Road and Ashville Pike, proceed east along Ashville Pike, and end at the Intermodal Facility across from Rickenbacker Airport property.

The Lockbourne Intermodal Subtrunk will be designed to provide sewer service to the JEDD and a 10,104 acre tributary area shown on **Figure 2-3**. This 10,104 acre area will include the Big Walnut Service Area-1059 acres, the Lockbourne Service Area-1271 acres, the Intermodal Service Area-2,509 acres, the Duvall Service Area-3,257 acres, and the Rickenbacker Southeast Service Area-2008 acres. Sewer service to these service areas will be provided by public and private sewer extensions that may take many years to construct. Existing and possible future interceptor sewers in this area are shown on **Figure 2-4**. Such sewer construction will only take place when sufficient development occurs in the area to support it.

The Duval Service Area shown on **Figure 2-3** overlaps the Village of Ashville Facilities Planning Area that is currently being developed by the Mid-Ohio Regional Planning Commission in their report to the Ohio EPA and is shown on **Figure 2-1**. Future negotiations between Ashville and Columbus may be required in the future to resolve this sewer service area overlap. Duvall Road is currently under design as part of the Pickaway East West Connector project (see **Appendix F**). This project would widen and re-align Duvall Road and Ashville Pike. This project is also expected to promote further development in the area.

The LIS project is currently scheduled to be under construction in the year 2013 or 2014. Sewer service to the Intermodal Area is currently provided by gravity sewers, pump stations and force mains that are owned and operated by Franklin County and the Columbus Airport Authority.

The initial size of the existing JEDD is 1000 acres which includes land owned by the Columbus Regional Airport Authority and the Norfolk Southern Corporation. The JEDD can grow to 2000 acres under State of Ohio law. When the JEDD reaches 2000 acres, an additional JEDD can be established.

Other aspects of the JEDD agreement include a 2 percent income tax to be levied on persons working within the JEDD. Fifty percent of the income tax revenue will be used to pay for roadway and utility improvements in the district. Columbus will receive 35 percent of the revenue, and the remaining 15 percent will be divided evenly by Ashville, South Bloomfield, and Harrison Township. In addition, Harrison Township and the villages will retain all local property tax revenue to pay for local services.

The Earnhart Hill Water District will provide water service in the JEDD. An extension of Alum Creek Drive by Franklin County provides road access to the area. The right of way of Alum Creek Drive has been used for some utility extensions to the area.

Section Three Population and Wastewater Flow Projections

3.0 Population and Wastewater Flow Projections

3.1 Population Projections

Census data from the years 1990, 2000, and 2010 were used to assess trends in population growth in the Village. Table 3-1 shows that there has been significant actual growth: 40.8% during 1990 to 2000 and 29.1% during 2000 to 2010. Table 3-1 predicts that strong growth will continue to occur in the Village with a 30% growth rate predicted to occur during each 10 year period during 2010 through 2030.

Table 3-1 Summary of Population Changes and Projections in Village of Ashville

Year	1980 Pop. Actual	1990 Pop. Actual	2000 Pop. Actual	2010 Pop. Actual	2020 Pop. (Projection)	2030 Pop. (Projection)
Population	2,046	2,254	3,174	4,097	5,326	6,924
Growth		208	920	923	1229	1598
Growth Percentage		10.2%	40.8%	29.1%	30%	30%

3.2 Wastewater Flow Projections

Average Daily Wastewater Flow consists of Base Sanitary Flow (BSF) and Groundwater Infiltration (GWI). BSF is the residential, commercial, institutional, and industrial flow discharged into a sanitary sewer system for collection and subsequent treatment. BSF normally varies with water use patterns within a service area throughout a 24-hour period. Higher flows occur during the day and lower flows occur at night. BSF often represents a significant portion of the flow treated at wastewater treatment facility. If a collection system is tight and dry, BSF would be the only flow treated at a wastewater treatment facility.

GWI is the infiltration of groundwater that enters the collection system through leaking pipes, pipe joints, and manhole walls. GWI varies throughout the year, often trending higher in late winter and spring as groundwater levels and soil moisture levels rise. GWI subsides in late summer or after an extended dry period. Although the amount of GWI is dependent on overall weather trends, GWI does not respond directly to rainfall events.

Peak Hourly Flow includes those flows that occur during and following storm events. Rainfall dependent infiltration and inflow (RDII) is the rainfall-derived flow response in a sanitary sewer collection system. In many sewer systems, RDII is the major component of peak hourly flow and is typically responsible for capacity-related sanitary sewer overflows (SSOs) and water-in-basement (WIB) occurrences.

During the year 2010, Village billing records show that 94,291,000 gallons of water were pumped from the Ashville Water Treatment Plant to 1,350 water accounts. The average monthly water use per customer was 5,820 gallons per month (191 gallons per day (GPD). The Village has a total of 1,350 water and sewer customers. Assuming 2.74 persons per household, (Pickaway County population data) yields a per capita wastewater production of approximately 70 gallons per person per day. Recommended Standards for Wastewater Facilities (2004) recommends the use of 100 gallons per capita per day (gpcd) to calculate average daily flow plus wastewater flow from industrial plants and major institutional and commercial facilities unless water use data or other justification is available to better estimate the flow. The 100 gpcd figure is intended to include normal infiltration into sewer systems built using modern methods. However, in the Village of Ashville, an average daily flow of 115 gpcd appears to be more appropriate due to high infiltration and inflow and a partially combined sewer system.

Estimates of average daily flow in the year 2010 are presented in Table 3-2. These estimates, based on 115 gpcd, produce a flow of .471 MGD in the year 2010. Actual flow data at the WWTP, presented in Table 2-2, show mean average daily flow of 0.51 MGD during the period from January 2009 through August 2011.

On April 19 and May 3, 2011, flows of 2.356 MGD and 2.211 MGD were recorded at the WWTP flow meter, respectively, and flow as high as 3.0 MGD have been noted by Village staff after significant rain events during past years. On March 18, 2008, a flow of 4.074 MGD passed through the WWTP and was recorded on the plant flow meter that had been calibrated on February 21, 2008. This flow meter has a capacity to record flows up to 6 MGD. These high flows were due in part to a Walnut Creek flooding event which may have submerged manholes in the sewer system in some areas. This flooding event was an unusual, exceptional occurrence and not representative of normal peak daily flows through the WWTP.

Assuming a population of 6,924 in the year 2030, average daily flows are projected to increase to 796,260 gpd and peak flows are expected to be approximately 3,185,040 gpd. This assumes a peaking factor of 4.0 in the year 2030. Based on the above information, average daily flows of 800,000 gpd and peak flows of 3.2 MGD were used to size the proposed Ashville WWTP. The peak flow capacity of the WWTP will be revisited during detailed design. If peak flows to the WWTP can be controlled through sewer rehabilitation, then some adjustment of the peak flow capacity of the WWTP can probably be made.

Table 3-2 Projections of Wastewater Flow for Ashville Wastewater Treatment Plant

Wastewater Flow Estimates (Year 2010)				
	Population	**gpcd**	**Peaking Factor**	**Flow (gpd)**
Average Daily Flow Calculated (2010)	4,097	115	1.0	471,155
Mean Average Daily Flow Observed (2009-2011)				510,000
Max Daily Flow Observed (2010)				2,356,000
Wastewater Flow Projections (Year 2030)				
Average Daily Flow (2030)	6,924	115	1.0	796,260
Max Daily Flow (2030)			4.0	3,185,040

Section Four

Wastewater Treatment Alternatives

4.0 Wastewater Treatment Alternatives

Four wastewater treatment alternatives were evaluated for use at the existing Ashville WWTP site and a new site to be located south of the Village. The alternatives included adding new treatment processes and removing or converting existing treatment processes. The alternatives include: Alternative 1: the Integrated Fixed-film Activated Sludge Process (IFAS); Alternative 2: the Sequencing Batch Reactor Process (SBR); Alternative 3: the Oxidation Ditch Process (OD), and Alternative 4-the Vertical Loop Reactor Process (VLR).

Using the existing WWTP site has the benefit of possible reuse of existing structures, treatment units, access roadways and utilities. Existing treatment units that could be reused or converted include the primary clarifier, oxidation ditch, final clarifiers and flow equalization tanks. The primary clarifier could be converted into a gravity thickener, the oxidation ditch could be converted into an aerobic digester, and the final clarifiers could be converted into sludge storage and decanting. The existing flow equalization tanks (previously used as digesters) could remain as flow equalization tanks or be converted to digesters in the future if needed.

Reuse of existing structures or treatment units may require rehabilitation of concrete and the removal of existing equipment. Reuse of treatment units would also require a more complex staging of construction so that treatment of wastewater and sludge could continue while the new treatment facilities are under construction.

The existing WWTP site has several disadvantages including close proximity to residences and the location of most of the WWTP in the floodplain. All new structures in the floodplain would have to be elevated so that they remain accessible and operational during flood events. The close proximity to homes is a significant disadvantage in regard to odor production from the WWTP and related complaints from nearby residences. If new, odor producing treatment processes are constructed at the existing WWTP site, then odor scrubbing systems should be considered to reduce the potential impact on nearby residences.

Alternatives 1 through 4 are described and their construction, project and present worth costs are estimated in the following sections.

4.1 Alternative 1 – IFAS

Alternative 1 includes an Integrated Fixed-film Activate Sludge (IFAS) process. There are two manufacturers of this technology, WesTech and H2O Innovation. The WesTech process is known as the STM-Aerotor process and the H20 Innovation process is known as the Bio-Wheel.

The IFAS process combines activated sludge and fixed film in a compact biological treatment system that requires a low power input. The unique media provides both the fixed film surface area and the vehicle for coarse bubble aeration. The design allows for efficient aeration without the need for diffusers, air piping, control valves, blowers, or mixers.

IFAS process systems have been employed for wastewater treatment because they have many distinct advantages. First, the IFAS process can accomplish more treatment than conventional activated sludge in an existing footprint. Second, complete nitrification occurs

at much lower sludge ages than conventional activated sludge plants. Finally, the improvement in sludge settling makes an IFAS plant much easier to operate.

Most IFAS systems use a free-floating or structurally supported media in a diffused aeration basin, but the STM-Aerotor system being evaluated does not. This system has all the advantages of the IFAS process without the need for energy intensive diffused aeration or mixing equipment

With every rotation, the rotating discs of an IFAS system capture atmospheric air, draw it down into mixed liquor, and slowly release it as course bubble aeration. During the rotation, additional cascade aeration elevates the dissolved oxygen in the upper layer of the basin. The combination of the slow rotation of the discs, intense air release, and the addition of a peripheral mixing paddle ensure a thoroughly mixed system.

In addition, the discs include a large surface area for fixed film growth. The interior and exterior of the special polypropylene discs provide the perfect environment for a variety of attached growth organisms. These organisms will react quickly to an increased food source, or shock load, to eliminate discharge violations during peak or diurnal fluctuations. The amount of aeration can be controlled using a variable speed drive connected to the rotor, causing it to rotate faster or slower based on the actual oxygen demand.

Figure 4-1 shows a preliminary layout of the existing WWTP on the existing site with the proposed Alternative 1-IFAS process. This alternative includes a new influent pump station, a new headworks building with mechanical fine screens and grit removal system, anoxic tank with mixer, new IFAS tanks and equipment, two new clarifiers, a new return activated sludge pump station, a new UV disinfection system in a converted chlorine contact tank, a sludge cake storage/sludge press building, a new administration building and a new standby generator. The anoxic tank with mixer is provided for phosphorous removal which is expected to be required in the next 10 years. The existing oxidation ditch, primary settling and final clarifier tanks at the existing WWTP would be converted into an aerobic digester, sludge thickener, and sludge storage tanks, respectively.

Advantages of Alternative 1 include:

- Simple flow-through operation without automatic valves,
- No blowers or diffusers,
- Provides biological nutrient removal for municipal wastewater treatment, and
- Low maintenance - lubricate bearings, tighten chain, replace chain every 5 years and replace bearings every 10 years.

Disadvantages of Alternative 1 include:

- A newer process with no process installations in the State of Ohio, and
- Clarifiers are required.

4.2 Alternative 2 – SBR

Alternative 2 is the Sequencing Batch Reactor (SBR) process. There are multiple manufacturers of this technology including: Aqua-Aerobics, Siemens (Jet-Tech), and Sanitaire (ABJ).

The SBR system incorporates a true batch reactor process technology with advanced decanting and flexible process control. Treatment can be optimized with PLC automated process monitoring and control system to enhance nutrient removal and reduce operation, maintenance, and energy costs. The time-managed concept of the SBR system allows all phases within a cycle to be adjustable in order to meet fluctuating organic and hydraulic loads. The system automatically advances cycles at flows beyond peak design. There are minor differences between the different manufacturers but most have five basic phases of operation are described as follows:

Mix Fill:

- Influent enters reactor, and
- Complete mix of contents is achieved without use of aeration.

The mix fill phase controls filamentous organisms and is essential for phosphorus removal.

React Fill:

- Influent flow continues under mixed and aerated conditions, and
- Aeration may be intermittent to promote aerobic or anoxic conditions.

During the react fill phase, nitrification and de-nitrification are easily managed and the aeration source may be turned down during low flow conditions to conserve energy.

React:

- Influent flow is terminated,
- Mixing and aeration continue in the absence of raw waste, and
- Dissolved oxygen probes can be used to deliver oxygen on "as needed" basis without loss of mixing.

The react phase provides a treatment barrier that separates the fill phases from the settle and decant non-fill phases.

Settle:

- Influent flow does not enter reactor, and
- Mixing and aeration cease.

During the settle phase, ideal solids/liquid separation is achieved due to perfectly quiescent conditions and an adjustable time value allows settling time to match prevailing process needs.

Decant/Sludge Waste:

- Influent flow does not enter the reactor,
- Mixing and aeration remain off,
- Decantable volume is removed by subsurface withdrawal,
- Reactor is immediately ready to receive next batch of raw influent, and
- A small amount of sludge is wasted near the end of each cycle.

Figure 4-2 shows a preliminary layout of the existing WWTP with a proposed Alternative 2-SBR system. This alternative includes a new influent pump station, a new headworks building with mechanical fine screens and grit removal system, new SBR tanks and equipment, a new UV disinfection system in a converted chlorine contact tank, a sludge cake storage/sludge press building, a new administration building and a new standby generator. The SBR process by itself will provide phosphorous removal which is expected to be required in the next 10 years. The existing oxidation ditch, primary settling and final clarifier tanks at the existing WWTP would be converted into an aerobic digester, sludge thickener, and sludge storage tanks, respectively.

Advantages of Alternative 2 include:

- Automated storm flow processing,
- Small footprint and smallest number of new treatment units in the floodplain,
- Process provides biological nutrient removal for municipal wastewater treatment without additional treatment units,
- Simple to upgrade or expand, and
- Eliminates final clarifiers and return sludge pumping.

Disadvantages of Alternative 2 include:

- High degree of automation and valve controls which could potentially fail,
- More complex to operate compared to the other alternatives,
- Requires blowers and diffusers for aeration,
- Deeper tank construction and related dewatering requirements,
- Lack of operator familiarity with process, and
- Increased power costs associated with blowers and diffusers.

Figure 4-2 Wastewater Treatment Plant Alternative 2 – SBR

4.3 Alternative 3 – Oxidation Ditch

The oxidation ditch (OD) is a group of tanks or "channels" in series in the shape of a racetrack. There are multiple manufacturers of this technology including: Siemens (Envirex-Orbal), Lakeside, and Envirodyne. The OD system uses a mechanical aeration system comprised of discs or brushes spinning at the surface of the tank. An automated biological nutrient removal (BNR) process control system is available using dissolved oxygen and oxidation reduction potential (ORP) sensors. Treatment can be optimized with PLC automated process monitoring and a control system to enhance nutrient removal and reduce operation, maintenance, and energy costs. The OD can also be designed with a storm-flow mode that bypasses high flows around the first tank into the second tank to minimize loss of solids. The mechanical aeration system is not affected by surfactants in the water that reduce oxygen transfer. Therefore, more efficient aeration is provided.

In an OD system, the flow continuously recirculates around the "racetrack" while the influent sewage enters at one end. This evenly distributes the influent throughout the whole tank.

Figure 4-3 shows a preliminary layout of the existing plant with the proposed Oxidation Ditch system. This alternative includes a new influent pump station, a new headworks building with mechanical fine screens and grit removal system, new oxidation ditch tank and equipment, two new clarifiers, a new return activated sludge pump station, a new UV disinfection system in a converted chlorine contact tank, a sludge cake storage/sludge press building, a new administration building and a new standby generator. The OD process will provide for phosphorous removal which is expected to be required in the next 10 years. The existing oxidation ditch, primary settling and final clarifier tanks at the existing WWTP would be converted into an aerobic digester, sludge thickener, and sludge storage tanks, respectively.

Advantages of Alternative 3 include:

- Simple, flow-through operation with no automatic valves,
- No blowers,
- Provides biological nutrient removal for municipal wastewater treatment,
- Low maintenance (lubricate bearings),
- Easy expansion by adding a fourth channel on the outside of the existing ditch,
- Operator familiarity with process,
- Shallowest foot print so least amount of dewatering issues during construction, and
- Significant hydraulic capacity for peak wet weather flows.

Disadvantages of Alternative 3 include:

- Requires separate clarifiers and a return sludge pump station, and
- Requires the largest footprint in the floodplain of the four alternatives evaluated.

4.4 Alternative 4 – Vertical Loop Reactor

The vertical loop reactor (VLR) system is similar to an oxidation ditch system that has been flipped on its side. There is an upper and lower compartment separated by a horizontal baffle running the length of the tank. The process uses both surface mounted discs and blowers to provide mixing and to deliver oxygen. Coarse bubble diffusers are usually provided in the first quadrant of the lower compartment to supply any additional oxygen required by the process. Typically, two or more basins make up the VLR system with the first tank operating as an aerated anoxic reactor. Most VLR systems are designed for liquid depths greater than 20 feet. The horizontal baffle is located about mid-depth so that both upper and lower compartments are about 10 feet deep. The surface aeration discs establish an "over and under" mixing pattern with the flow direction on the surface opposite the flow direction on the bottom.

Figure 4-4 shows a preliminary layout of the existing plant with the proposed VLR system. This alternative includes a new influent pump station, a new headworks building with mechanical fine screens and grit removal system, new VLR tanks and equipment, two new clarifiers, a new return activated sludge pump station, a new UV disinfection system in a converted chlorine contact tank, a sludge cake storage/sludge press building, a new administration building and a new standby generator. The VLR process will provide for phosphorous removal which is expected to be required in the next 10 years. The existing oxidation ditch, primary settling and final clarifier tanks at the existing WWTP would be converted into an aerobic digester, sludge thickener, and sludge storage tanks, respectively.

Advantages of Alternative 4 include:

- Simple, flow-through operation with no automatic valves,
- Provides biological nutrient removal for municipal wastewater treatment,
- Low maintenance (lubricate bearings),
- Common wall construction which results in lower construction costs,
- Small footprint and less land area required,
- Lengthy aeration retention time with low power costs,
- A dual aerator design provides operating flexibility, and
- Handles excessive storm water treatment with peak flows five times the design flows.

Disadvantages of Alternative 4 include:

- Requires separate clarifiers and a return sludge pump station,
- Requires blowers and coarse bubble diffusers,
- There is only one manufacturer/supplier,
- The construction cost is higher than the Oxidation Ditch option,
- The process is slightly more complicated to operate due to having two sources of aeration, and
- Higher dewatering cost during construction due to groundwater level.

4.5 Alternatives 5 Through 8 – New WWTP Site

Alternatives 5 through 8 were considered for a new WWTP site south of the Village. Alternatives 5 through 8 are the same processes analyzed for Alternatives 1 through 4 but have been adapted to a new WWTP site.

Property owner names and parcel sizes south and west of the Village along Cromley Road are shown on **Figure 4-5**. No specific property has been identified as a WWTP site at this time. However, properties located west of Cromley Road and east or west of the Little Walnut Creek would generally be acceptable. Other properties in the area with access to Little Walnut Creek may also be acceptable.

If a new WWTP is constructed on a new site south or southwest of the Village, a site outside the floodplain and away from residences should be selected if available. Advantages of a new site would include ample room for future expansion(s), reduced flood protection requirements and costs, and reduced potential reduced impacts on residences due to odor issues.

A new WWTP site has the disadvantage of requiring pumping of wastewater from the existing WWTP site. It is anticipated that an influent pump station and approximately 5,000 to 9,000 lineal feet of 12-inch force main would be required to convey wastewater flows to a new WWTP site. This force main may require a river crossing of Little Walnut Creek which would probably be constructed using the directional boring method. The influent pump station would be somewhat more expensive to construct and operate at the existing WWTP site due to the distance pumped to the new site.

Another disadvantage of a new WWTP site is the need to purchase land for such a site and the need to construct an access road, electric service and other utilities to serve vacant land. It is anticipated that approximately 10 to 20 acres of land would be required for such a site. The new WWTP site is also expected to require new aerobic digesters as part of the treatment process instead of possibly converting the old oxidation ditch at the existing WWTP site into an aerobic digester.

Figure 4-6 shows a preliminary layout of a new plant site for Alternative 7 with the same Oxidation Ditch system as shown for Alternative 3. This alternative includes a new influent pump station (at the existing WWTP), a new headworks building with mechanical fine screens and grit removal system), new oxidation ditch tank and equipment, two new clarifiers, new aerobic digesters, a new return activated sludge pump station, a new UV disinfection system, a sludge cake storage/sludge press building, a new administration building and a new standby generator. The oxidation ditch process will provide for phosphorous removal which is expected to be required in the next 10 years. The existing oxidation ditch, primary settling and final clarifier tanks at the existing WWTP would be filled and abandoned.

Advantages of Alternative 7 include:

- New site with potentially fewer floodplain issues,
- New site with potentially fewer nearby homes and odor issues,
- Simple, flow-through operation without automatic valves,
- No blowers,
- Provides biological nutrient removal for municipal wastewater treatment,
- Low maintenance (lubricate bearings), and
- Easy expansion by adding a fourth channel on the outside of the existing ditch.

Disadvantages of Alternative 7 include:

- Requires separate clarifiers and a return sludge pump station,
- Requires new aerobic digesters instead of converting existing tanks to aerobic digesters,
- Requires the largest footprint of the four alternatives evaluated, and
- Site development costs.

4.6 Construction Costs and Present Worth Analysis of the WWTP Alternatives

The WWTP alternatives for the existing and new WWTP site were compared using a present worth analysis to determine the cost-effectiveness of each option. The present worth of an alternative represents the sum, which, if invested now at a standard interest rate will provide the exact funds to cover all expenditures during the planning period. A present worth analysis is one method to compare all costs that are incurred over the life of any capital investment. In addition to the initial or capital costs to construct these systems, the Village will incur annual operation and maintenance expenses for such items as operator salaries and electricity. These costs, occurring over time, are converted to an equivalent present worth cost using interest rates referred to as discount interest rates. Replacement costs include the routine replacement of larger equipment items such as pumps, which may occur every ten years. The alternative that has the lowest overall present worth over the 20 year planning period is determined to be the most cost-effective alternative. However, this alternative may or may not be selected based on other factors such as: ease and simplicity of operation, space requirements, environmental impacts, long-term performance of the process and frequency of use in the State of Ohio.

The discount interest rate used in the present worth analysis for this project is 2.80 %. This interest rate fluctuates and is currently lower than average.

Typically, the planning period for wastewater improvements is 20 years so the annual operation, maintenance and replacement (OM&R) costs are based on a 20-year period. Replacement costs of major equipment are assumed to be every 10 years. All capital and operation, maintenance and replacement (OM&R) costs are derived from previous planning documents, recent contractor bids on similar projects, and discussions with local contractors and suppliers. All construction and project costs have been adjusted for the year 2012. The total project costs include engineering, construction, equipment and installation, interest during construction and contingency.

Table 4-1 shows a comparison of Alternatives 1 through 4 including the construction cost, project cost and present worth cost. This comparison shows that Alternative 2-SBR has the lowest construction cost. This is due, in part, to the need for fewer treatment units (i.e. clarifiers) associated with Alternative 2. The annual power costs and other operation and maintenance costs required to operate Alternative 2 are similar to Alternative 1 and 3. Alternative 4 is estimated to have the highest construction cost, operation and maintenance cost and present worth cost. Alternatives 1, 2 and 3 are similar in total present worth cost.

Table 4-2 shows the comparison of Alternatives 5 through 8 including the construction cost, project cost and present worth cost. This comparison shows that Alternative 6-SBR has the lowest construction cost. This is due, in part, to the need for fewer treatment units (i.e. clarifiers) associated with Alternative 6. However, the annual power costs required to operate Alternative 6 are higher than Alternative 5, 7 and 8. Alternatives 6 and 7 are similar in total present worth.

A comparison of **Tables 4-1** and **4-2** shows that the new WWTP site alternatives construction costs are higher than the existing WWTP site alternatives. This is due to the

cost of the land, easements, additional influent pump station costs, force main, additional site work, electric service and other items required for the new WWTP site.

Table 4-1 Cost Estimates and Present Worth Analysis for Ashville WWTP Alternatives – Existing Site

		Alternative 1 IFAS			Alternative 2 SBR			Alternative 3 Ditch			Alternative 4 VLR		
Description	**Unit**	**Qty**	**Unit $**	**Cost**	**Qty**	**Unit $**	**Cost**	**Qty**	**Unit $**	**Cost**	**Qty**	**Unit $**	**Cost**
New Influent Pump Station	LS	1	$250,000	$ 250,000	1	$250,000	$ 250,000	1	$250,000	$ 250,000	1	$250,000	$ 250,000
New Headworks (Mechanical Fine Screen)	LS	1	$175,000	$ 175,000	1	$175,000	$ 175,000	1	$175,000	$ 175,000	1	$175,000	$ 175,000
New Headworks (Grit Removal System)	LS	1	$225,000	$ 225,000	1	$225,000	$ 225,000	1	$225,000	$ 225,000	1	$225,000	$ 225,000
New Headworks Building	SF	1,750	$ 175	$ 306,250	1,750	$ 175	$ 306,250	1,750	$ 175	$ 306,250	1,750	$ 175	$ 306,250
Rehabilitate Concrete on Existing EQ Tanks	SF	8,970	$ 15	$ 134,550	8,970	$ 15	$ 134,550	8,970	$ 15	$ 134,550	8,970	$ 15	$ 134,550
New Headworks Building	SF	1,750	$ 175	$ 306,250	1,750	$ 175	$ 306,250	1,750	$ 175	$ 306,250	1,750	$ 175	$ 306,250
Anoxic Mixer	LS	1	$ 25,000	$ 25,000									
Anoxic Tank Concrete	LS	115	$ 600	$ 69,000									
New IFAS Equipment	LS	1	$615,000	$ 615,000									
New IFAS Concrete Tanks	CY	650	$ 600	$ 390,000									
New SBR Equipment	EA				1	$773,500	$ 773,500						
New SBR Concrete Tanks	CY				1,350	$ 600	$ 810,000						
New Oxidation Ditch or VLR Equipment	LS							1	$360,295	$ 360,295	1	$484,484	$ 484,484
New Oxidation Ditch or VLR Concrete Tanks	CY							1,215	$ 600	$ 729,000	1,190	$ 600	$ 714,000
New Final Clarifier Equipment	EA	2	$125,000	$ 250,000				2	$125,000	$ 250,000	2	$125,000	$ 250,000
New Final Clarifier Concrete Tanks	CY	530	$ 600	$ 318,000				530	$ 600	$ 318,000	530	$ 600	$ 318,000
New RAS Pump Station	EA	1	$175,000	$ 175,000				1	$175,000	$ 175,000	1	$175,000	$ 175,000
New UV Disinfection in existing tank	LS	1	$150,000	$ 150,000	1	$200,000	$ 200,000	1	$150,000	$ 150,000	1	$150,000	$ 150,000
Modifications to CL2 Tank for UV	SF	1	$ 25,000	$ 25,000	1	$ 35,000	$ 35,000	1	$ 25,000	$ 25,000	1	$ 35,000	$ 35,000
Sludge Cake Storage Building	SF	4,489	$ 50	$ 224,450	4,489	$ 50	$ 224,450	4,489	$ 50	$ 224,450	4,489	$ 50	$ 224,450
Sludge Dewatering System	LS	1	$200,000	$ 200,000	1	$200,000	$ 200,000	1	$200,000	$ 200,000	1	$200,000	$ 200,000
Modifications to ex digesters/clarifiers/RAS PS	LS	1	$ 50,000	$ 50,000	1	$ 50,000	$ 50,000	1	$ 50,000	$ 50,000	1	$ 50,000	$ 50,000
Administration Building	SF	1,575	$ 150	$ 236,250	1,575	$ 150	$ 236,250	1,575	$ 150	$ 236,250	1,575	$ 150	$ 236,250
Demolition of old Final Clarifiers and	LS	1	$ 20,000	$ 20,000	1	$ 20,000	$ 20,000	1	$ 20,000	$ 20,000	1	$ 20,000	$ 20,000
Chemical Feed Equipment	LS	1	$ 35,000	$ 35,000	1	$ 35,000	$ 35,000	1	$ 35,000	$ 35,000	1	$ 35,000	$ 35,000
Phasing of Construction around existing plant	LS	1	$ 50,000	$ 50,000	1	$ 50,000	$ 50,000	1	$ 50,000	$ 50,000	1	$ 50,000	$ 50,000
Widen Scioto Street for larger trucks	CY	356	$ 225	$ 80,000	356	$ 225	$ 80,000	356	$ 225	$ 80,000	356	$ 225	$ 80,000
Standby Generator	kW	400	$ 500	$ 200,000	400	$ 500	$ 200,000	400	$ 500	$ 200,000	400	$ 500	$ 200,000
Site Work (piping, paving, grading, fencing,	LS	1	$598,000	$ 598,000	1	$648,000	$ 648,000	1	$598,000	$ 598,000	1	$698,000	$ 698,000
Sub-Total (rounded)				**$ 5,110,000**			**$ 4,960,000**			**$ 5,100,000**			**$ 5,320,000**
Electrical	12.0%		$284,550	$ 613,000			$ 595,000			$ 612,000			$ 638,000
Mechanical	6.0%			$ 307,000			$ 298,000			$ 306,000			$ 319,000
Design Contingency	10.0%			$ 511,000			$ 496,000			$ 510,000			$ 532,000
Construction Contingency	10.0%			$ 511,000			$ 496,000			$ 510,000			$ 532,000
General Conditions, Bonds, Ins., O&P, etc.	8.0%			$ 523,000			$ 508,000			$ 522,000			$ 545,000
Interest During Construction	5.0%			$ 379,000			$ 368,000			$ 378,000			$ 394,000
TOTAL CONSTRUCTION COST (rounded)				**$ 7,950,000**			**$ 7,720,000**			**$ 7,940,000**			**$ 8,280,000**
Design Engineering	8.0%			$ 636,000			$ 618,000			$ 635,000			$ 662,000
Geotechnical Investigation (Soil Borings)				$ 10,000			$ 10,000			$ 10,000			$ 10,000
Construction Engineering	8.0%			$ 636,000			$ 618,000			$ 635,000			$ 662,000
Building Permits				$ 10,000			$ 8,000			$ 10,000			$ 10,000
OEPA Permit to Install (PTI)				$ 20,000			$ 20,000			$ 20,000			$ 20,000
TOTAL PROJECT COST (rounded)				**$ 9,260,000**			**$ 8,990,000**			**$ 9,250,000**			**$ 9,640,000**

Present Worth Analysis

			Qty or	Annual O&M Cost Present Worth											
Annual O&M Costs	**Unit $**	**Unit**	**Hrs**	**kW**	**Cost/yr**	**PW**	**kW**	**Cost/yr**	**PW**	**kW**	**Cost/yr**	**PW**	**kW**	**Cost/yr**	**PW**
IFAS Power	$0.10	KW-h	8760	33.6	$29,407	$399,655									
SBR Power	$0.10	KW-h	8760				50.0	$43,800	$595,256						
Ditch or VLR Power	$0.10	KW-h	8760							24.6	$21,565	$293,080	27.1	$23,722	$322,388
Influent PS Power	$0.10	KW-h	1095	9.0	$980	$13,322	9.0	$980	$13,322	9.0	$980	$13,322	9.0	$980	$13,322
Headworks Power	$0.10	KW-h	1095	11.2	$1,225	$16,652	11.2	$1,225	$16,652	11.2	$1,225	$16,652	11.2	$1,225	$16,652
RAS Pump Station Power	$0.10	KW-h	8760	5.6	$4,901	$66,609				5.6	$4,901	$66,609	5.6	$4,901	$66,609
Clarifier Power	$0.10	KW-h	8760	7.5	$6,535	$88,812				7.5	$6,535	$88,812	7.5	$6,535	$88,812
UV Disinfection Power	$0.10	KW-h	4380	14.9	$6,535	$88,812	30.0	$13,140	$178,577	14.9	$6,535	$88,812	14.9	$6,535	$88,812
Digester Aerator Power	$0.10	KW-h	6570	37.3	$24,506	$333,046	37.3	$24,506	$333,046	37.3	$24,506	$333,046	37.3	$24,506	$333,046
Sludge Pump Power	$0.10	KW-h	624	7.5	$466	$6,326	7.5	$466	$6,326	7.5	$466	$6,326	7.5	$466	$6,326
Dewatering Pump Power	$0.10	KW-h	624	7.5	$466	$6,326	7.5	$466	$6,326	7.5	$466	$6,326	7.5	$466	$6,326
Labor & Misc.		LS			$180,600	$2,454,413		$180,600	$2,454,413		$180,600	$2,454,413		$180,600	$2,454,413
Emergency Fund	$10,000	LS	1		$10,000	$135,903		$10,000	$135,903		$10,000	$135,903		$10,000	$135,903
Total Annual O&M Costs					$265,621	$3,609,878		$275,183	$3,739,822		$257,779	$3,503,303		$259,936	$3,532,611
Sub-Total						**$12,870,000**			**$12,730,000**			**$12,750,000**			**$13,170,000**

			Replacement Cost Present Worth											
Maintenace/Replacement Costs @ 10 Years			**Qty**	**Cost**	**PW**	**Qty**	**Cost**	**PW**	**Qty**	**Cost**	**PW**	**Qty**	**Cost**	**PW**
IFAS chain	$1,000	EA	6	$6,000	$4,053									
IFAS bearings	$2,000	EA	3	$6,000	$4,053									
SBR Mixer	$2,500	EA				2	$5,000	$3,378						
SBR or VLR Blowers	$3,500	EA				2	$7,000	$4,729				2	$7,000	$4,729
SBR or VLR Diffusers	$75	EA				100	$7,500	$5,067				50	$3,750	$2,533
SBR Transfer Pumps	$1,500	EA				2	$3,000	$2,027						
Ditch Aerators	$2,500	EA							4	$10,000	$6,756	2	$5,000	$3,378
Influent Pumps	$5,000	EA	2	$10,000	$6,756	2	$10,000	$6,756	2	$10,000	$6,756	2	$10,000	$6,756
Headworks Equipment	$10,000	LS	2	$20,000	$13,511	2	$20,000	$13,511	2	$20,000	$13,511	2	$20,000	$13,511
RAS Pumps	$7,500	EA	2	$15,000	$10,133				2	$15,000	$10,133	2	$15,000	$10,133
Clarifiers	$3,500	EA	2	$7,000	$4,729				2	$7,000	$4,729	2	$7,000	$4,729
UV Bulbs	$300	per Bulb	90	$27,000	$18,240	180	$54,000	$36,480	90	$27,000	$18,240	90	$27,000	$18,240
Digester Ditch Aerators	$2,500	EA	2	$5,000	$3,378	2	$5,000	$3,378	2	$5,000	$3,378	2	$5,000	$3,378
Sludge Pumps	$10,000	EA	2	$20,000	$13,511	2	$20,000	$13,511	2	$20,000	$13,511	2	$20,000	$13,511
Dewatering Pump	$10,000	EA	1	$10,000	$6,756	1	$10,000	$6,756	1	$10,000	$6,756	1	$10,000	$6,756
Generator	$7,500	EA	1	$7,500	$5,067	1	$7,500	$5,067	1	$7,500	$5,067	1	$7,500	$5,067
Total Replacement Costs				$133,500	$90,188		$149,000	$100,659		$131,500	$88,837		$137,250	$92,721
Total Present Worth					**$12,960,000**			**$12,830,000**			**$12,840,000**			**$13,260,000**

Table 4-2 Cost Estimates and Present Worth Analysis for Ashville WWTP Alternatives – New Site

		Alternative 5 IFAS			Alternative 6 SBR			Alternative 7 Ditch			Alternative 8 VLR		
Description	**Unit**	**Qty**	**Unit $**	**Cost**	**Qty**	**Unit $**	**Cost**	**Qty**	**Unit $**	**Cost**	**Qty**	**Unit $**	**Cost**
New Influent Pump Station	LS	1	$300,000	$ 300,000	1	$300,000	$ 300,000	1	$300,000	$ 300,000	1	$300,000	$ 300,000
New 12" FM to New Site on SR 316	LF	4,500	$ 80	$ 360,000	4,500	$ 80	$ 360,000	4,500	$ 80	$ 360,000	4,500	$ 80	$ 360,000
New Headworks (Mechanical Fine Screen)	LS	1	$175,000	$ 175,000	1	$175,000	$ 175,000	1	$175,000	$ 175,000	1	$175,000	$ 175,000
New Headworks (Grit Removal System)	LS	1	$225,000	$ 225,000	1	$225,000	$ 225,000	1	$225,000	$ 225,000	1	$225,000	$ 225,000
New Headworks Building	SF	1,750	$ 160	$ 280,000	1,750	$ 160	$ 280,000	1,750	$ 160	$ 280,000	1,750	$ 160	$ 280,000
Anoxic Mixer	LS	1	$ 25,000	$ 25,000									
Anoxic Tank Concrete	LS	115	$ 600	$ 69,000									
New IFAS Equipment	LS	1	$615,000	$ 615,000									
New IFAS Concrete Tanks	CY	650	$ 600	$ 390,000									
New SBR Equipment	EA				1	$773,500	$ 773,500						
New SBR Concrete Tanks	CY				1,350	$ 600	$ 810,000						
New Oxidation Ditch Equipment	LS							1	$360,295	$ 360,295	1	$572,815	$ 572,815
New Oxidation Ditch Concrete Tanks	CY							1,215	$ 600	$ 729,000	1,190	$ 600	$ 714,000
New Final Clarifier Equipment	EA	2	$125,000	$ 250,000				2	$125,000	$ 250,000	2	$125,000	$ 250,000
New Final Clarifier Concrete Tanks	CY	530	$ 600	$ 318,000				530	$ 600	$ 318,000	530	$ 600	$ 318,000
New RAS Pump Station	EA	1	$175,000	$ 175,000				1	$175,000	$ 175,000	1	$175,000	$ 175,000
New UV Disinfection	LS	1	$175,000	$ 175,000	1	$260,000	$ 260,000	1	$175,000	$ 175,000	1	$175,000	$ 175,000
Sludge Cake Storage Building	SF	4,489	$ 75	$ 336,675	4,489	$ 75	$ 336,675	4,489	$ 75	$ 336,675	4,489	$ 75	$ 336,675
Sludge Dewatering System	LS	1	$200,000	$ 200,000	1	$200,000	$ 200,000	1	$200,000	$ 200,000	1	$200,000	$ 200,000
New Aerobic Digestion Equipment	EA	2	$ 75,000	$ 150,000	2	$ 75,000	$ 150,000	2	$ 75,000	$ 150,000	2	$ 75,000	$ 150,000
New Aerobic Digestion Tanks	CY	529	$ 600	$ 317,400	529	$ 600	$ 317,400	529	$ 600	$ 317,400	529	$ 600	$ 317,400
Administration Building	SF	1,575	$ 120	$ 189,000	1,575	$ 120	$ 189,000	1,575	$ 120	$ 189,000	1,575	$ 120	$ 189,000
Chemical Feed Equipment	LS	1	$ 35,000	$ 35,000	1	$ 35,000	$ 35,000	1	$ 35,000	$ 35,000	1	$ 35,000	$ 35,000
Standby Generator	kW	400	$ 500	$ 200,000	400	$ 500	$ 200,000	400	$ 500	$ 200,000	400	$ 500	$ 200,000
Site Work (pipe, paving, grading, fencing, etc.)	LS	1	$835,000	$ 835,000	1	$885,000	$ 885,000	1	$835,000	$ 835,000	1	$935,000	$ 935,000
Sub-Total (rounded)				**$ 5,620,000**			**$ 5,500,000**			**$ 5,610,000**			**$ 5,910,000**
Electrical	13.0%			$ 731,000			$ 715,000			$ 729,000			$ 768,000
Mechanical	6.0%			$ 337,000			$ 330,000			$ 337,000			$ 355,000
Design Contingency	10.0%			$ 562,000			$ 550,000			$ 561,000			$ 591,000
Construction Contingency	10.0%			$ 562,000			$ 550,000			$ 561,000			$ 591,000
General Conditions, Bonds, Ins., O&P, etc.	8.0%			$ 580,000			$ 568,000			$ 579,000			$ 610,000
Interest During Construction	5.0%			$ 420,000			$ 411,000			$ 419,000			$ 441,000
TOTAL CONSTRUCTION COST (rounded)				**$ 8,810,000**			**$ 8,620,000**			**$ 8,800,000**			**$ 9,270,000**
Design Engineering	8.0%			$ 705,000			$ 690,000			$ 704,000			$ 742,000
Geotechnical Investigation (Soil Borings)				$ 20,000			$ 20,000			$ 20,000			$ 20,000
Construction Engineering	8.0%			$ 705,000			$ 690,000			$ 704,000			$ 742,000
Property Acquisition				$ 200,000			$ 200,000			$ 200,000			$ 200,000
Easements				$ 50,000			$ 50,000			$ 50,000			$ 50,000
RR Crossing Permit				$ 10,000			$ 10,000			$ 10,000			$ 10,000
Building Permits				$ 10,000			$ 10,000			$ 10,000			$ 10,000
OEPA Permit to Install (PTI)				$ 20,000			$ 20,000			$ 20,000			$ 20,000
TOTAL PROJECT COST (rounded)				**$10,530,000**			**$10,310,000**			**$10,520,000**			**$11,060,000**

Present Worth Analysis

			Qty or	Annual O&M Cost Present Worth											
Annual O&M Costs	**Unit $**	**Unit**	**Hrs**	**kW**	**Cost/yr**	**PW**	**kW**	**Cost/yr**	**PW**	**kW**	**Cost/yr**	**PW**	**kW**	**Cost/yr**	**PW**
IFAS Power	$0.10	KW-h	8760	33.6	$29,407	$399,655									
SBR Power	$0.10	KW-h	8760				50.0	$43,800	$595,256						
Ditch Power	$0.10	KW-h	8760							24.6	$21,565	$293,080	27.1	$23,722	$322,388
Influent PS Power	$0.10	KW-h	1095	26.1	$2,859	$38,855	26.1	$2,859	$38,855	26.1	$2,859	$38,855	26.1	$2,859	$38,855
Headworks Power	$0.10	KW-h	1095	9.0	$980	$13,322	9.0	$980	$13,322	9.0	$980	$13,322	9.0	$980	$13,322
RAS Pump Station Power	$0.10	KW-h	8760	5.6	$4,901	$66,609				5.6	$4,901	$66,609	5.6	$4,901	$66,609
Clarifier Power	$0.10	KW-h	8760	7.5	$6,535	$88,812				7.5	$6,535	$88,812	7.5	$6,535	$88,812
UV Disinfection Power	$0.10	KW-h	4380	14.9	$6,535	$88,812	30.0	$13,140	$178,577	14.9	$6,535	$88,812	14.9	$6,535	$88,812
Digester Blowers Power	$0.10	KW-h	6570	37.3	$24,506	$333,046	37.3	$24,506	$333,046	37.3	$24,506	$333,046	37.3	$24,506	$333,046
Sludge Pump Power	$0.10	KW-h	624	7.5	$466	$6,326	7.5	$466	$6,326	7.5	$466	$6,326	7.5	$466	$6,326
Dewatering Pump Power	$0.10	KW-h	624	7.5	$466	$6,326	7.5	$466	$6,326	7.5	$466	$6,326	7.5	$466	$6,326
Labor & Misc.		LS			$180,600	$2,454,413		$180,600	$2,454,413		$180,600	$2,454,413		$180,600	$2,454,413
Emergency Fund	$10,000	LS	1		$10,000	$135,903		$10,000	$135,903		$10,000	$6,756		$10,000	$6,756
Total Annual O&M Costs					$267,255	$3,632,081		$276,816	$3,762,025		$259,413	$3,396,358		$261,569	$3,425,666
Sub-Total						**$14,160,000**			**$14,070,000**			**$13,920,000**			**$14,490,000**
				Replacement Cost Present Worth											
Maintenance/Replacement Costs @ 10 Years				**Qty**	**Cost**	**PW**	**Qty**	**Cost**	**PW**	**Qty**	**Cost**	**PW**	**Qty**	**Cost**	**PW**
IFAS chain	$1,000	EA		6	$6,000	$4,053									
IFAS bearings	$2,000	EA		3	$6,000	$4,053									
SBR Mixer	$2,500	EA					2	$5,000	$3,378						
SBR or VLR Blowers	$3,500	EA					2	$7,000	$4,729				2	$7,000	$4,729
SBR or VLR Diffusers	$75	EA					100	$7,500	$5,067				50	$3,750	$2,533
SBR Transfer Pumps	$1,500	EA					2	$3,000	$2,027						
Ditch Aerators	$2,500	EA								4	$10,000	$6,756	2	$5,000	$3,378
Influent Pumps	$6,000	EA		2	$12,000	$8,107	2	$12,000	$8,107	2	$12,000	$8,107	2	$12,000	$8,107
Headworks Equipment	$8,000	LS		2	$16,000	$10,809	2	$16,000	$10,809	2	$16,000	$10,809	2	$16,000	$10,809
RAS Pumps	$7,500	EA		2	$15,000	$10,133				2	$15,000	$10,133	2	$15,000	$10,133
Clarifiers	$3,500	EA		2	$7,000	$4,729				2	$7,000	$4,729	2	$7,000	$4,729
UV Bulbs	$300	per Bulb		90	$27,000	$18,240	180	$54,000	$36,480	90	$27,000	$18,240	90	$27,000	$18,240
Digester Blowers	$4,000	EA		2	$8,000	$5,405	2	$8,000	$5,405	2	$8,000	$5,405	2	$8,000	$5,405
Sludge Pumps	$10,000	EA		2	$20,000	$13,511	2	$20,000	$13,511	2	$20,000	$13,511	2	$20,000	$13,511
Dewatering Pump	$10,000	EA		1	$10,000	$6,756	1	$10,000	$6,756	1	$10,000	$6,756	1	$10,000	$6,756
Generator	$7,500	EA		1	$7,500	$5,067	1	$7,500	$5,067	1	$7,500	$5,067	1	$7,500	$5,067
Total Replacement Costs					$134,500	$90,863		$150,000	$101,335		$132,500	$89,512		$138,250	$93,397
Total Present Worth						**$14,250,000**			**$14,170,000**			**$14,010,000**			**$14,580,000**

4.7 Regional Alternatives

A meeting was held between Village of Ashville and Village of South Bloomfield staff to determine if there are regional wastewater alternatives that would benefit both communities. A record of this meeting is presented in Appendix B.

South Bloomfield's existing WWTP was constructed in 2006. Their sewer system was installed in 1995 and they do not have infiltration and inflow (I&I) problems. The WWTP has a design average daily capacity of 0.5 million gallons per day (MGD) and a peak hour flow of 1.0 MGD plus an 180,000 gallon equalization (EQ) tank.

Currently, South Bloomfield would be willing to accept between 100,000 and 300,000 gallons of wastewater per day (gpd) from Ashville. South Bloomfield average daily wastewater flows are currently only 180,000 gpd and accepting 300,000 gallons per day of flow from Ashville would increase average daily flow to 480,000 gpd. This would utilize available wastewater treatment capacity at the South Bloomfield WWTP. Flows above 500,000 gpd at South Bloomfield would require an expansion of the WWTP and may require some improvements to the sewer system.

South Bloomfield has an 8-inch gravity sewer which ends at Millport in close proximity to Ashville. This sewer has an approximate capacity of 600,000 gpd. The maximum flows at Millport are currently estimated to be approximately 25,000 gpd. South Bloomfield's has a Mud Run Pump Station that serves Millport. This pump station is undersized and would require an upgrade by South Bloomfield before additional flow could be accepted.

South Bloomfield's current sewer rates are $6.50/1000 gallons inside the Village and $9.75/1000 gallons outside the Village. The outside the Village rate for Ashville would be negotiable. For the purposes of the present worth analysis, a rate of $6.50/1000 gallons was used.

A Regional Wastewater Treatment Alternative was considered that includes Ashville and South Bloomfield. The Regional Alternative would delay the construction of certain wastewater treatment equipment at Ashville by diverting approximately 150,000 gpd of average daily flow to South Bloomfield. This would be accomplished by building a new pump station at the Ashville WWTP plus approximately 4,500 lineal feet of 4-inch force main. A new influent pump station, mechanical fine screens, grit removal system, headworks building, an additional final clarifier for peak flows, RAS pump station, UV disinfection tank, sludge cake storage building, sludge dewatering system, modifications to the existing digesters/clarifiers, administration building, chemical feed equipment, standby generator would still be required at the Ashville WWTP. The Regional Alternative would delay the construction of a new biological treatment process at the Ashville WWTP (such as an oxidation ditch) until sometime in the future. A summary of the total project cost and total present worth cost of the Regional Alternative is presented in Table 4-3. This alternative would have a total project cost of $5.04 million and a total present worth cost of $13.43 million. The Regional Alternative is not recommended due to its high present worth cost (due to operation and maintenance costs and treatment costs at South Bloomfield) when compared to Alternatives 1 through 4.

Advantages of the Regional Alternative include:

- Delays the need to expand the wet stream treatment system at the Ashville WWTP (oxidation ditch and one clarifier). The length of this delay would depend upon population growth and I/I removal in Ashville.
- Provides wastewater treatment revenues to the Village of South Bloomfield, and
- The overall immediate construction cost of the project would be reduced, but this cost would be transferred to some future date when further improvements to both WWTPs would be needed.

Disadvantages of the Regional Alternative include:

- Does not provide for the expansion of the Ashville WWTP to 0.8 MGD to meet the needs of the 20 year planning period,
- Requires the construction of a pump station and 4,500 lineal feet of force main to pump flows to South Bloomfield,
- Requires modification of the Mud Run pump station and force main owned by South Bloomfield,
- Diverting flow to South Bloomfield would utilize existing average daily flow capacity at their WWTP. This capacity would not be available for future growth of the Village of South Bloomfield. Future growth in South Bloomfield could result in the need to expand the WWTP or discontinue service to the Village of Ashville.
- Requires negotiation of a wastewater treatment rate with the Village of South Bloomfield, and
- Higher total present worth than Ashville WWTP Alternatives 1 through 4 due to high operation and maintenance costs and anticipated treatment costs at South Bloomfield.

A sludge hauling alternative was considered that would involve the Village of Ashville and the Village of South Bloomfield. South Bloomfield currently has available capacity in their aerobic digesters and belt filter press to handle increased quantities of sludge. However, South Bloomfield currently land applies their sludge using Wheeler Biosolids Management. Wheeler's current price is approximately $.05-.06 to per gallon for hauling and land applying South Bloomfield sludge.

The cost of the Village of Ashville to haul partially digested sludge to the Village of South Bloomfield on an interim or emergency basis was briefly evaluated. If this sludge is hauled to South Bloomfield, then Ashville would have to pay both treatment and land application costs to South Bloomfield. Ashville already has a holding tank and aerobic digester that can continue to be used for sludge holding and treatment. **This cost of hauling Ashville sludge to South Bloomfield, treatment and final land application of sludge at South Bloomfield is preliminarily estimated at $.10-$.015 per gallon which is not cost effective when compared to direct hauling and land application by Wheeler Biosolids Management.** Direct hauling of liquid digested sludge from Ashville by Wheeler would cost $.05-06 per gallon or approximately $200 per spreader load of dry solids (9.8 tons). Hauling of Ashville sludge to a landfill is also significantly more expensive than land application and such landfill disposal has recently been restricted by the landfill.

Table 4-3 Cost Estimates and Present Worth Analysis for Ashville WWTP Regional Alternative

Description	Unit	Qty	Unit $	Cost
New Influent Pump Station	LS	1	$ 250,000	$ 250,000
New Headworks (Mechanical Fine Screen)	LS	1	$ 175,000	$ 175,000
New Headworks (Grit Removal System)	LS	1	$ 225,000	$ 225,000
New Headworks Building	SF	1,750	$ 175	$ 306,250
New 0.3 MGD Pump Station to S. Bloomfield	LS	1	$ 175,000	$ 175,000
4" Forcemain to S. Bloomfield	LF	4,500	$ 26.50	$ 119,250
New Final Clarifier Equipment	EA	1	$ 100,000	$ 100,000
New Final Clarifier Concrete Tanks	CY	195	$ 600	$ 117,000
RAS Pump Station modifications	LS	1	$ 75,000	$ 75,000
New UV Disinfection in existing tank	LS	1	$ 150,000	$ 150,000
Modifications to CL2 Tank for UV	SF	1	$ 25,000	$ 25,000
Sludge Cake Storage Building	SF	4,489	$ 50	$ 224,450
Sludge Dewatering System	LS	1	$ 200,000	$ 200,000
Modifications to existing digesters/clarifiers	LS	1	$ 20,000	$ 20,000
Administration Building	SF	1,575	$ 125	$ 196,875
Chemical Feed Equipment (Ferric Chloride)	LS	1	$ 35,000	$ 35,000
Standby Generator	kW	400	$ 500	$ 200,000
Railings, Gratings, and Stairs	LS	1	$ 15,000	$ 15,000
Site Work (Piping paving, grading, fencing, etc.)	LS	1	$ 165,000	$ 165,000
Sub-Total (rounded)				**$ 2,770,000**
Electrical	12.0%			$ 332,000
Mechanical	6.0%			$ 166,000
Design Contingency	10.0%			$ 277,000
Construction Contingency	10.0%			$ 277,000
General Conditions, Bonds, Ins., O&P, etc.	8.0%			$ 284,000
Interest During Construction	5.0%			$ 205,000
TOTAL CONSTRUCTION COST (rounded)				**$ 4,310,000**
Design Engineering	8.0%			$ 345,000
Geotechnical Investigation (Soil Borings)				$ 10,000
Construction Engineering	8.0%			$ 345,000
Building Permits				$ 10,000
OEPA Permit to Install (PTI)				$ 20,000
TOTAL PROJECT COST (rounded)				**$ 5,040,000**

Present Worth Analysis

			Qty or	Annual O&M Cost Present Worth		
Annual O&M Costs	Unit $	Unit	Hrs	kW	Cost/yr	**PW**
Ditch Power	$0.10	KW-h	8760	23.9	$20,912	$284,199
Influent PS Power	$0.10	KW-h	1095	9.0	$980	$13,322
Headworks Power	$0.10	KW-h	1095	11.2	$1,225	$16,652
RAS Pump Station Power	$0.10	KW-h	8760	5.6	$4,901	$66,609
Clarifier Power	$0.10	KW-h	8760	5.0	$4,380	$59,526
UV Disinfection Power	$0.10	KW-h	4380	14.9	$6,535	$88,812
Digester Aerator Power	$0.10	KW-h	6570	37.3	$24,506	$333,046
Sludge Pump Power	$0.10	KW-h	624	7.5	$466	$6,326
Labor & Misc.		LS			$180,600	$2,454,413
Emergency Fund	$10,000	LS	1		$10,000	$135,903
S. Bloom. payment - WW	$6.50	1000 gal	150		$355,875	$4,836,457
Total Annual O&M Costs					$610,846	$8,295,266
Sub-Total						**$13,340,000**

			Replacement Cost Present Worth		
Maintenace/Replacement Costs @ 10 Years			Qty	Cost	**PW**
Ditch Aerators	$2,500	EA	2	$5,000	$3,378
Influent Pumps	$5,000	EA	2	$10,000	$6,756
Headworks Equipment	$10,000	LS	2	$20,000	$13,511
RAS Pumps	$7,500	EA	2	$15,000	$10,133
Clarifiers	$3,500	EA	2	$7,000	$4,729
UV Bulbs	$300	per Bulb	90	$27,000	$18,240
Digester Ditch Aerators	$2,500	EA	2	$5,000	$3,378
Sludge Pumps	$10,000	EA	2	$20,000	$13,511
Dewatering Pump	$10,000	EA	1	$10,000	$6,756
Generator	$7,500	EA	1	$7,500	$5,067
Total Replacement Costs				$126,500	$85,459
Total Present Worth					**$13,430,000**

Section Five Recommended Plan

5.0 Recommended Plan

5.1 Wastewater Treatment Plant

On February 17, 2012, the Ohio EPA requested a copy of the URS assessment for the Ashville WWTP after it is reviewed and approved by the Village. **It is recommended that the Village submit this "Wastewater Engineering Report" to the Ohio EPA for review and comment in April/May 2012.**

The Ohio EPA has expressed an interest in the contents of this report so that they can create a Findings and Orders schedule for WWTP and sewer system improvements in the Village. Section 4.5 of the report provides a discussion of the present worth analysis of the WWTP alternatives on the existing site versus a new site.

Alternatives 5 through 8 were evaluated for a new WWTP site. This comparison shows that Alternative 6-SBR has the lowest construction cost but a total present worth cost that is similar to the other alternatives. Alternative 6 is not recommended due to the operational complexity of the process and higher operation and maintenance costs. The process includes a high degree of automation and valve control that may be subject to failure in the future. **Alternative 7-Oxidation Ditch is recommended for a new WWTP site.** The Village currently operates an oxidation ditch and prefers the simple, flow through operation, low maintenance, and other benefits of an oxidation ditch treatment process. The recommended schedule for this project is shown in Section 5.3.

5.2 Sanitary Sewer System

Based on the information presented in Section 2.2, infiltration and inflow into the Ashville sewer system is excessive and cross connections between the storm and sanitary sewer systems and sewer system overflows appear to exist. Peak flows to the WWTP are currently at unacceptably high levels. Past efforts to locate and resolve these problems have not been successful enough to result in reduced flows to the WWTP.

At a meeting held with OEPA on February 8, 2012, it was noted that sewer system improvements that result in I/I reductions must be included in the schedule and plan of action submitted by the Village. **Therefore, it is recommended that the Village move forward with a flow metering/sewer rehabilitation study of the sewer system in 2012-2013 and the development of a corrective action plan.** This evaluation of the sewer system will make use of past sewer system studies completed by the Village and new field studies that will be completed. Work will include the collection of flow and rainfall data to determine where bottlenecks and surcharges are located. This flow metering/hydraulic analysis work will be used to define rehabilitation project(s) that can be designed and bid.

5.3 Recommended Schedule

The following implementation schedule is recommended for the WWTP and sewer system improvements:

Submit Wastewater Engineering Report to Ohio EPA: April/May-2012

Detailed Design of WWTP-August, 2012-August, 2013

Flow Monitoring and Corrective Action Plan for Sewer System-August, 2012-August, 2013

Ohio EPA Review -August, 2013-December, 2013

Funding Applications -August, 2012-May, 2014

Bidding/Construction -May, 2014-September, 2015

5.4 Regional Cooperation

Based on the information presented in Sections 2.6 and 4.7, opportunities exist for regional cooperation on wastewater conveyance and treatment with South Bloomfield, Pickaway County and the City of Columbus. These opportunities should continue to be explored in the future and include the following:

- One regional wastewater treatment alternatives involving cooperation between Ashville and South Bloomfield was analyzed in Section 4.7. This alternative was found to be non-cost effective and is not recommended. Hauling sludge to South Bloomfield to treatment and disposal was also considered and found to be non-cost effective at this time.
- The Village of Ashville and/or Village of South Bloomfield will both be able to provide sewer service to CEDA areas in the future. The Ashville WWTP expansion recommended in the current report will have an average daily flow capacity of 0.8 MGD and will serve growth in the Village for the next 20 years. Some of this capacity may be available to serve South Bloomfield areas of the CEDA that are in close proximity to the Village of Ashville. This may require pumping of wastewater to a connection point in the Village of Ashville. Similarly, pumping of wastewater from CEDA areas in Ashville to South Bloomfield may also be feasible since available capacity exists at the South Bloomfield WWTP.
- Pickaway County owns and operates packaged wastewater treatment plants south of Ashville serving Walnut Hills and other subdivision areas. If growth continues in this area south of the Village, it is recommended that the Village negotiate with Pickaway County and investigate pumping of this wastewater to the Ashville WWTP. If a new WWTP site south of the Village is selected, then it may be cost effective to abandon these packaged WWTPs and pump this wastewater to a new plant site in the near future.
- The City of Columbus is moving forward with the design of the Lockbourne Intermodal Subtrunk sewer. This design is expected to be completed in 2012 and construction is expected to proceed in 2013. The sewer will provide service to a 10,104 acre service area in Franklin and Pickaway Counties. The south boundary of this service area is south of

Duvall Road which is also a part of the Ashville Facilities Planning Area. Service to this Duvall Road area may require sewer extensions from the Lockbourne Intermodal Subtrunk or from the Village of Ashville which would be driven by development of this area. This development may be further catalyzed by the construction of the Pickaway East-West Connector Project by ODOT. This roadway project, which involves the re-design of Duvall Road and Ashville Pike, is expected to be designed in the year 2012 (see **Appendix F**). **In the near future, Ashville and the City of Columbus may need to negotiate sewer service for the Duvall Road area. Ashville should contact Columbus to discuss this sewer service prior to the construction of the Pickaway County East-West Connector.** Duvall Road is approximately 11,500 feet north of the current Ashville sewer service area as shown on Figure 2.

Section Six

Financing Options

6.0 Financing Options

There are several possible financing options available for this project. A combination of grants, low (or no) interest loans, use of existing local funds, and possible financial assistance from developers could be obtained to assist with financing. Many funding agencies determine grant amounts and interest rates based on the household income for the area. The median household income in Ashville was approximately $50,357 in the year 2010 as reported by the U.S. Census Bureau. This median household income is significantly higher than that reported for the State of Ohio ($45,151 in 2010) and may make it difficult to obtain grant funding. Descriptions of individual programs that may be applicable to this project are provided in the following sections.

6.1 Ohio Public Works Commission

The Ohio Public Works Commission (OPWC) has established a program that provides financing to public entities for infrastructure capital improvement projects. Local subdivisions (water and sewer districts, cities, villages, communities, townships, counties, etc.) in Ohio are eligible for funding through this program. The financial assistance can be in the form of a grant or a loan. Interest rates on the loans can vary and are determined by the OPWC District Integrating Committee. The interest rate may be 0 to 3 percent.

Obtaining grant funding from OPWC may be difficult due to the median household income of Ashville. However, 0% interest loans should be available for part of the cost of the project.

6.2 USDA/Rural Development

The United States Department of Agriculture / Rural Development (USDA/RD) provides financing to small communities and developing areas for water and wastewater projects. Financing terms are dependent on the Median Household Income of the area. Unless an acceptable income survey has been performed, the USDA/RD will use the income figure from the 2010 U.S. Census. Loans for water and wastewater improvements can be made for up to 40 years with an annual interest rate dependent on the Median Household Income (MHI) for the area.

USDA/RD awards a combination of grant and loan funding to reduce debt service cost for residential-sized customers to where the monthly user charge per household is considered reasonable. Prior to award of a loan, the USDA must first review and approve a preliminary engineering report and an engineering agreement. The applicant is also responsible for performing an assessment of the environmental impact as it relates to the project.

Loan funding should be available from USDA/RD for a Village of Ashville project. However, grant funding may be difficult to obtain due to median household income and other rating factors.

6.3 Ohio Water Development Authority

The Ohio Water Development Authority (OWDA) offers a loan program to finance the planning, design, and construction of water and wastewater projects. The repayment period for construction loans can extend up to 25 years. Interest rates are approximately equal to current market rates. There is also an OWDA five-year loan for the planning and design of water and wastewater facilities. This planning loan can be rolled over into an OWDA construction loan or paid in full when construction begins on the project. The current (March, 2012) OWDA market interest rate is 3.67%, although the Community Assistance loan rate is 2% if the project is deemed eligible for this rate. OWDA funding for an Ashville project should be readily available.

OWDA also provides funds for Water Pollution Control Loan Fund (WPCLF) projects approved by the Ohio EPA. Current loan rates for WPCLF projects are 2.45% standard and 1.95% small systems. WPCLF loan funding for an Ashville project should be readily available.

6.4 Ohio Department of Development: CDBG Water & Sewer Competitive Program

The Ohio Department of Development, Office of Local Government Services, offers Community Development Block Grant (CDBG) water and sanitary sewer program funds on a competitive basis. The primary goal of the CDBG program is to provide funds for low-to-moderate-income communities for safe and reliable drinking water and proper disposal of wastewater. In order to qualify for these funds, a low-to-moderate household income percentage of 51% or greater must be documented. That is, over half of the households in the proposed service area of the project need to be considered as low-to-moderate income.

It appears that the Village of Ashville is unlikely to qualify for grants under this program due to the median household income of the Village. However, further investigations of this source of funding should be made to see if selected areas of the Village qualify for funding.

6.5 TIF, JEDD, and CEDA Alternatives

Other financing options could include Tax Increment Financing (TIF), a Joint Economic Development District (JEDD), or a Cooperative Economic Development Authority (CEDA). A TIF is available to local governments in Ohio to finance public infrastructure improvements. A TIF works by locking in the taxable worth of real property at the value it holds at the time the authorizing legislation was approved. Payments derived from the increased assessed value of any improvement to that property beyond the initial worth are put in a separate fund to finance the construction of the utility improvements defined in the TIF legislation.

A JEDD or CEDA involves a contract between one or more corporations and one or more local subdivisions (water and sewer districts, cities, villages, communities, townships, counties, etc.) to facilitate economic development. This cooperation takes the form of tax revenue sharing among municipalities and is often considered to be mutually beneficial. This

process can take several months prior to being becoming law and submitted to the Ohio Department of Development.

The Village of Ashville, Village of South Bloomfield, Pickaway County and Harrison Township have already established a North Gate Alliance CEDA. Goals of this agreement include:

- Promoting economic development and uniform planning standards,
- Cooperating in creating and preserving jobs and employment opportunities,
- Cooperate in facilitating responsible development within the territory of the Township while preserving the geographic integrity of the Township, and
- Making water and sewer service more widely available.

The County, Villages and Township agreed to meet and negotiate in good faith with respect to the formation of a regional water and sewer district pursuant to Chapter 6119 of the Ohio Revised Code to provide sewer service within the CEDA territory. The boundaries of this CEDA territory appear to match the boundaries shown for the Village of Ashville and Village of South Bloomfield facilities planning areas shown on **Figure 2-1**. A copy of this CEDA contract and CEDA territory map is included in **Appendix D**.

The Village of Ashville is also a part of the JEDD established for the Lockbourne Intermodal Facility. This JEDD is discussed in detail in **Section 2.6.4**.

6.6 Financing Strategy

Once the recommended projects in this report have been finalized and approved by the Village and priorities are established, specific funding strategies can be identified for the project. Timing and project schedules will also be considered as the funding strategies are developed. A combination of funding programs is often used on a particular project.

It appears likely that Ashville would qualify for a 0% loan for part of the project cost from the OPWC and a loan interest loan from the OWDA or WPCLF for the remainder of the cost. These loans are usually paid for with user fees and tap fees collected by the Village. However, grant funding will be investigated to determine if the Village qualifies for State, Federal or local grant funding.

Appendix A Sanitary Sewer System Map

Appendix B

Project Meeting Reports

URS
277 W. Nationwide Blvd.
Columbus, OH 43215
Telephone: (614) 464-4500
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Architectural & Engineering Services

PROJECT MEETING REPORT

LOCATION: URS Office
BY: Jeff Kerr
ATTENDEES: Village: J. Welsh, T. Bouts
RE: **Field Meeting Minutes**

MEETING DATE: September 27, 2011
ISSUE DATE: September 28, 2011
PROJECT: Ashville Wastewater Engineering Report
JOB NO.: URS: 14577731

COPIES: Attendees (via email), J. Kerr, K. Hogan, F. Christman, Central Files

THE FOLLOWING REPRESENTS MY UNDERSTANDING OF THAT WHICH SHOULD BE RECORDED. IF CHANGES SHOULD BE MADE, PLEASE FORWARD PROMPTLY SO THAT AN ACCURATE RECORD CAN BE MAINTAINED FOR THE BENEFIT OF ALL.

Specific items discussed were as follows:

1. Some previous Infiltration and Inflow studies in the Village have been done by Dennis Urban, Urban Engineering.
2. Manhole inspections and some smoke and dye testing in the Village were completed in 2002. A summary of inspection results appears to be available for most manholes. Some manhole rehabilitation work (chimney seals and dishes) appears to have been performed in 2002. Tom will look into what work was actually done in 2002.
3. Survey forms are available for a resident survey which asked questions about water in basements. Follow ups on water in basement issues may or may not have been performed.
4. Cleaning and TV inspection of the Village sewer system was performed in August, 1999. VHS tapes and paper logs are available. No engineering report summarizing the tapes and logs or recommending further action is available.
5. Parts of the sanitary sewer system may have direct stormwater connections. A budget of $40,000 per year is being spent by the Village to find these problems with CCTV inspection and provide corrective actions. Drier and Maller, Inc. is currently working in town by providing CCTV services and hauling liquid sludge from the wastewater treatment plant.
6. Pickaway County expressed an interest in the past in eliminating some package plants. A package plant currently serving about 60 homes in the Walnut Heights subdivision is owned and operated by Pickaway County and is about two to three miles south of the Village on Cromley Road. There are two other package plants in this same area. Negotiations with the County would be required if the Village wants to add these customers and construct a project to convey their wastewater to the Ashville Wastewater Treatment Plant (WWTP).
7. Alsco Metal Products Corp. is located near SR 752. The company is a sheet metal fabricator. They have an NPDES permit that allows them to direct discharge to surface waters. In the past they had a zinc problem in their wastewater. Alsco could possibly be served by the Village at some time in the future with a sewer extension if an agreement can be negotiated.
8. A meeting with OEPA is needed to discuss a potential TDS and phosphorous NPDES Permit limits that could be required after Ashville's NPDES Permit expires in June, 2012. URS will arrange this meeting.
9. The Village's current OEPA contact is Erin Sherer in the Compliance and Enforcement Group. She wrote the Village a Notice of Violation letter on June 21, 2011. The letter summarized 20 NPDES Permit violations in March/April, 2011.

10. Sludge from the WWTP is currently hauled by Sam's Excavating to the Pinegrove Landfill. Geobags at Ashville usually provide 12 to 16% solids concentrations. The Village prefers not to have any more geobags. The bags create odors when they are emptied. The headworks of the WWTP also creates odors that can drift into the neighborhood when the garage door is open. A tank was being pumped by Drier and Maller during the plant visit. This work was creating odor problems that resulted in resident complaints.
11. Some sewer rehabilitation work has been completed by the Village and/or contractors in the past. Projects included Station Street (2007), Center Alley, and South Street. These small projects were completed using Village funds.
12. Copies of recent Monthly Operating Reports (MORS) were received from the Village for April, May, July, and August 2011. Some flow charts were also made available. Additional MORs for 2010 and the remainder of 2011 are needed.
13. Peak flows resulting from a half inch rain have been known to create SSOs at the WWTP. A rain of this size results in flows of about 600,000 gpd. Two manholes at the WWTP are known to overflow and are currently being reported as SSOs by the Village. A 24" and 18" sewer come together at the WWTP and create a hydraulic problem that results in overflows. When WWTP flow exceeds 1.6 MGD, plant personnel need to protect the plant equipment. Bypassing of the final clarifiers is necessary to protect the oxidation ditch rotor bearings from submergence.
14. URS will consider an alternative that involves moving the WWTP to a new site. A possible site for a new Asvhille WWTP is Cromley Farm located near the intersection of SR 316 and Cromley Road (i.e. CR 28). This farm is located next to Walnut creek. URS will look into this and possibly other downstream properties further. This evaluation will include a review of elevations and floodway/ floodplain boundaries. The existing WWTP could possibly be converted into a pump station to pump to a new WWTP site.
15. The current Ashville WWTP is located on a 28 acre site. Much of this site is located in the floodway or floodplain. URS will obtain FEMA maps showing the WWTP site and forward a copy to the Village.
16. URS will contact Pomeroy and Associates to obtain a sewer system map in AutoCAD and pump station plans.
17. The Village is looking into establishing an emergency water connection with the Earnhart Hill Regional Water and Sewer District. This Water & Sewer District is a political subdivision of the state of Ohio organized under Chapter 6119 of the Ohio Revised Code. The district serves drinking water to more than 3300 customer connections within its service area, which primarily includes Pickaway County, Ohio. Water service is provided to Pickaway County areas north, south and east of Ashville. The District provides wastewater service to areas south of Circleville.
18. The Village has not entered into cooperative water/sewer agreements with South Bloomfield. However, cooperation appears to be pending on a CEDA agreement. Rick Wilson is the Mayor and the Village is represented by Clark and Associates out of Circleville, Ohio.
19. The Village has three major pump stations: Columbus Industries, Ashton Crossing and Ashton Village. Ashton Crossing pump station has a capacity of 450 gpm at 75'TDH. The station is 38' deep and has Flygt submersible pumps. The station has an adjacent manhole that was installed for future expansion. The Ashton Village pump station has a capacity of 320 gpm at 50' TDH. The pump station is 32' deep and also has submersible pumps.
20. Action Items:
    a. URS will request a CAD map of the sewer system and pump station plans from Pomeroy and Associates.

b. The Village will assemble additional MOR report copies for 2010 and 2011 for URS.
c. Tom Bouts will look into past infiltration and inflow studies and the work completed as a result of these studies.
d. URS will arrange a meeting with OEPA to discuss the upcoming Village NPDES Permit.
e. URS will obtain floodplain mapping from FEMA and integrate into an overall GIS map of the Village vicinity.
f. URS will schedule a progress meeting with the Village for the 4th week of October.

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PROJECT MEETING REPORT

LOCATION:	URS Office	**MEETING DATE:**	September 7, 2011 10:00 am
BY:	Jeremy Cook	**ISSUE DATE:**	September 22, 2011
ATTENDEES:	Village: J. Welsh, T. Bouts, Adam URS: J. Cook, B. Walker	**PROJECT:**	Ashville Wastewater Engineering Report
RE:	**Condition Assessment Meeting Minutes**	**JOB NO.:**	URS: 14577731
COPIES:	Attendees (via email), J. Kerr, K. Hogan, F. Christman, Central Files		

THE FOLLOWING REPRESENTS MY UNDERSTANDING OF THAT WHICH SHOULD BE RECORDED. IF CHANGES SHOULD BE MADE, PLEASE FORWARD PROMPTLY SO THAT AN ACCURATE RECORD CAN BE MAINTAINED FOR THE BENEFIT OF ALL.

Specific items discussed were as follows **(Action items in blue)**:

1. The Village provided three sets of original drawings from the 1987, 1995, and 2004 Ashville Wastewater Treatment Plant (WWTP) upgrades. The Village also provided a complete set of WWTP 11x17 drawings that were printed from scanned images; however, they indicated that there are some duplicate and missing drawings. The Village indicated that the elevations on the drawings may not correct.
   A. The Village will send URS a copy of the CD with the scanned drawings. If needed, URS will re-scan missing drawings before returning them.

2. Village staff indicated that a regional WWTP option may not be a serious consideration at this time and that URS should concentrate on the repairs, upgrades and expansion of the existing WWTP.

3. Columbus Industries has downsized from 300 to 4 employees. The wastewater pump station that previously served this company is now bypassed.

4. The Village has grown by about 1000 people every 10 years for the past several decades. The Lockbourne Intermodal project could bring significant additional growth to the Village and surrounding area.

5. The Village has significant problems with the reliability of the electrical power at the WWTP (discussed further in Item 8).

6. Process Assessment
   A. Influent Screen
      1) The City has one mechanical bar screen with 3/8" openings. The original 12" diameter sewer enters from the east and a new 24" sewer enters from the west.
      2) The system was supplied by Envirex.
      3) These sewers are fairly shallow and during heavy rains the manholes overflow at the WWTP site. Rags and grease clog the screen which can also cause overflows.
      4) The 3/8" openings in the screen are not small enough to keep all the rags from passing through and clogging pumps and equipment in the plant.
      5) The influent screen is currently out of service and is being repaired by J.R. Mason.
      6) A pole building was recently constructed over the influent screen channel to keep the screen from freezing.

7) **URS will evaluate the plant hydraulics and investigate installing an influent pump station to prevent the manhole overflows at the WWTP.**
8) **URS will consider a screen with smaller openings to prevent clogging of pumps and equipment.**

B. Flow Equalization
1) The flow equalization system was designed to use the existing tanks from the 1969 WWTP. The Village is currently using the two old final clarifiers, the two aerobic digesters (160,000 gallons each) and the primary clarifier for flow equalization.
2) Use of the aerobic digesters for flow equalization has left the Village without enough tankage for sludge digestion.
3) **URS will evaluate the need for any flow equalization if the plant capacity is increased. URS will also evaluate converting the old aerobic digesters (now used for flow equalization) back to aerobic digesters.**

C. Primary Clarifier
1) There is one primary clarifier that is 31 feet in diameter and 12 feet deep with a volume of 67,750 gallons.
2) The original purpose of this primary clarifier was to remove 20-30% of the BOD load, 90% of the settleable solids, and 40-60% of the suspended solids, grit and grease.
3) The Village no longer uses the primary clarifier because it reduced too much of the pollutant load to the oxidation ditch which did not function properly and produced an anaerobic (septic) sludge that caused odors. The primary clarifier was put into service in 2003 and taken out of service early in 2009 based upon an analysis done by the Ohio EPA.
4) **URS will evaluate converting the primary clarifier to a vortex grit and grease removal system.**

D. Oxidation Ditch
1) The exterior oxidation ditch concrete appears to be in good condition.
2) The system was supplied by Lakeside.
3) The bearing/motor work pits are flooded with wastewater when the water level rises too high.
4) **The WWTP expansion is likely to add a second oxidation ditch which will likely prevent bearing/motor work pit flooding. However, in the meantime, the effluent weir could be lowered to reduce this flooding. URS will check the effects on the aeration system before the Village adjusts the weir.**
5) The oxidation ditch has a volume of 300,000 gallons.
6) The north rotor bearings were replaced two years ago and the south rotor bearings were rebuilt 5 years ago.

E. Final Clarifiers
1) Each final clarifier is 26 feet in diameter by 12 feet deep and holds 47,650 gallons. Each clarifier has a peak capacity of 0.503 MGD.
2) The clarifier equipment was supplied by Lakeside.
3) Both clarifier drives were rebuilt in the year 2011.
4) The clarifiers were apparently sized smaller than usual due to the presence of a primary clarifier (which is no longer used). Solids and grease currently pass through the clarifiers during peak flows.
5) The telescoping valves for the return activated sludge (RAS) do not provide sufficient control because since they plug if kept too high.
6) **URS will investigate using variable frequency drives (VFDs) on the RAS pumps to provide better control.**
7) **The final clarifiers are severely undersized for the existing peak flows.**

F. Effluent Structure
   1) The effluent structure consists of a baffled chlorine contact tank, a dechlorination/post aeration chamber and a parshall flume with a flow meter.
   2) The concrete is in good condition.
   3) A scum draw-off pipe was added in the chlorine contact tank which is too low and constantly recycles water during peak flows. The sump pump which recycles the scum water is too small and the sump pit overflows.
   4) **URS will investigate converting the chlorine system into an ultraviolet disinfection system.**

G. Chemical Feed Building
   1) The chemical feed building has two rooms. One room is for Sodium Hypochlorite (used for chlorination) and the other is for Sodium Thiosulfate (used for dechlorination).
   2) The building is in good condition; however, the exhaust fans and heaters in both rooms do not work.
   3) The transformer in the Sodium Thiosulfate room was noted to be very hot, but appears to be operating within specifications.

H. Sludge Digestion/Holding
   1) The two aerobic digesters (160,000 gallons each) were converted into flow equalization tanks.
   2) The sludge holding tank has a capacity of 40,000 gallons.
   3) Lime is added to stabilize the sludge and then it is either pumped into GEO tubes to be dewatered or it is hauled away for land application.

I. Sludge Drying Beds
   1) The sludge drying beds are being used to hold the GEO tubes.
   2) A new enclosure was built recently for a polymer feed system.

7. The WWTP capacity has been projected (in previous reports) to increase from 0.6 MGD average to 1.2 MGD average. However, this final size remains to be determined by URS using population, flow and loading projections. The WWTP was originally laid out to include a future second oxidation ditch and two future final clarifiers.
   1) **URS will verify the hydraulics and equipment sizing needed to expand the WWTP.**
   2) **The Kinder report recommended a peaking factor of only 3. This peaking factor will be evaluated further due to infiltration/inflow issues and known high peak flows. The Kinder report recommended three new oxidation ditches and two new clarifiers. URS will evaluate the number and size of new oxidation ditches and clarifiers that will be required.**
   3) **Several sludge treatment and handling alternatives will be evaluated. These alternatives include: covering the existing drying beds/GEO tubes, aerobic digestion and a rotary press. One additional drying bed for GEO tubes may be needed. As mentioned earlier, the flow equalization tanks may be converted back to aerobic digesters or new aerobic digester tanks could be constructed. The continued use of sludge bags will be discussed with staff. At our previous meeting, Village staff indicated that sludge bags should not be used as part of a long term sludge treatment/disposal plan.**

8. Electrical Assessment
   A. The plant personnel described their issues with South Central Power in detail. The most recent issue is the near certainty of power loss or brown out when any storm moves through the area. The brown out will not cause a complete loss of power, but will shut down any motors running at the time. The generator is connected to the WWTP system via a manual transfer switch. When there is a complete loss of power, plant personnel must manually start generator and transfer the power. These issues cause major operational problems. The

WWTP is not manned after normal business hours. WWTP personnel cannot get an afterhours alarm that indicates loss of power. Most equipment will not automatically restart after the restoration of power. Therefore, Village personnel spend a great deal of time dealing with the results of power losses the day after they occur.

B. WWTP electrical service is supplied by pole mounted South Central transformers. The service conductors are routed overhead to a pole mounted main disconnect and manual transfer switch. The main service is 480/277, 3 phase, 4 wire. The main circuit breaker disconnect is 400 ampere. The generator is a 480/277 volt, 200 Kw generator (full output of 240 amperes, approximately).

C. The WWTP has a second smaller residential size service feeding an equipment storage building. This second service can be eliminated and the equipment storage building re-powered from the WWTP's internal distribution system. This change would reduce costs by eliminating the second service and its base costs (costs not associated with energy used by building).

D. During site investigation the exterior main service disconnect circuit breaker was inspected. There was a large amount of unidentified debris covering the exposed line side connection lugs at the circuit breaker. This debris looked like saw dust or even nesting material. There was an unusual amount of rust on the inside of the disconnect enclosure that suggested water was getting inside the enclosure. This was called to the attention of plant personnel as a safety hazard. If the debris absorbed any amount of moisture it would likely cause a catastrophic short circuit and destroy the connection lugs at the circuit breaker. WWTP personnel indicated they would deal with it by using compressed air to blow the debris off the connection lugs. The secondary conductors appear to have two splices on each phase conductor. This is not recommended practice for cable installation.

E. The WWTP Motor Control Center (MCC) is more than 25 years old and has exceeded its useful life. Motor starter indicating lights do not appear to work. The space where the MCC is located has been converted into office space. There is not enough NEC (National Electric Code) working clearance in front of the MCC, which is a code violation.

F. Oxidation ditch starters and electrical disconnects are mounted on the handrail next to the oxidation ditch. The starters and disconnects appear to be in good condition and have no reported problems. The enclosures are stainless steel.

G. Site lighting is limited and lights are provided by South Central Power. Replacing the site lights and powering them from the WWTP power distribution system will remove the flat monthly fee for each light and replace with the actual cost of energy usage for each light.

H. The existing WWTP SCADA system is an extension of the existing Water Plant Rugid SCADA system. The WWTP is currently monitored for a limited number of I/O points that report back to the system at the Water Plant. There is limited interface with the system for the operators at the WWTP. A chronic SCADA issue is the lack of monitoring at the WWTP for electric service status, generator status, and plant operations status.

URS
277 W. Nationwide Blvd.
Columbus, OH 43215
Telephone: (614) 464-4500
Facsimile: (614) 464-0588
Architectural & Engineering Services

PROJECT MEETING REPORT

LOCATION: Municipal Building
5023 South Union Street
South Bloomfield, OH 43103

BY: Jeremy Cook

ATTENDEES: S. Bloomfield: Mayor R. Wilson, Joe Allen (WWTP Superintendent)
Ashville: F. Christman, G. Cook, J. Welsh, URS: G. Otey

RE: **S. Bloomfield Regional Coordination Meeting Minutes**

COPIES: Attendees (via email), K. Hogan, Central Files

MEETING DATE: January 9, 2012

ISSUE DATE: January 11, 2012

PROJECT: Ashville Wastewater Engineering Report

JOB NO.: URS: 14577731

THE FOLLOWING REPRESENTS MY UNDERSTANDING OF THAT WHICH SHOULD BE RECORDED. IF CHANGES SHOULD BE MADE, PLEASE FORWARD PROMPTLY SO THAT AN ACCURATE RECORD CAN BE MAINTAINED FOR THE BENEFIT OF ALL.

Specific items discussed were as follows:

1. Mayor Rick Wilson indicated South Bloomfield was interested in working with Ashville on Regional alternatives. Franklin and Glenn agreed it would be a positive step forward.

2. Greg Otey discussed the status of Ashville's Preliminary Engineering Report that URS is developing and that Ashville wished to review possible regional options as part of this report. URS distributed GIS maps showing the service areas of all the entities in the region for discussion purposes. URS handed out a summary of flow data for both the Ashville and South Bloomfield WWTPs.

3. South Bloomfield's existing WWTP was constructed in 2006. Their sewer system was installed in 1995 and they do not have inflow and infiltration (I&I) problems. The WWTP has a design average daily capacity of 0.5 million gallons per day (MGD) and a peak hour flow of 1.0 MGD and a 180,000 gallon equalization (EQ) tank.
    a. Currently, South Bloomfield would be willing to accept between 100,000 to 300,000 gallons per day (gpd) because their average daily flows are only 180,000 gpd. Flows above this would require an expansion of their WWTP and sewer system.

4. Joe Allen described a couple of ideas to pump flow from Ashton Crossing subdivision to South Bloomfield. They only want to take normal daily flows and not I&I.
    a. The additional forcemain required makes this option unfeasible for the small amount of flow that could be diverted from the existing Ashville WWTP. Also, 100,000 to 300,000 gpd is not enough to offset major improvements to Ashville's WWTP.

5. URS proposed that it may be feasible to pump flow from one of the gravity sewers along SR 316 on the west side of Ashville to Millport (in South Bloomfield's service area) if an EQ tank were constructed. The flow in this option would consist of normal sewage and I&I.
    a. South Bloomfield has an 8-inch gravity sewer which ends at Millport. At 0.4% slope, this sewer has a maximum capacity of 600,000 gpd. The maximum flows from

Millport are estimated at 25,000 gpd; therefore, this sewer can handle the additional flow from Ashville; however, South Bloomfield's Mud Run Pump Station would need to be upgraded at their own cost.

b. The required size of the equalization tank is not known at this time, but it would likely need to be close to 1,000,000 gallons. The exact costs are also not known but would be around $1,500,000. In addition, approximately 1 acre of land would have to be purchased along SR 316 unless the EQ tank and pump station were located at the WWTP, which would require additional forcemain.
c. South Bloomfield's normal sewer rate is $6.5/1000 gallons. For users outside the Village, the rate is $9.75/1000 gallons. Rick stated that the rate for Ashville would be negotiable since it would be a large contributor and a constant flow.

6. Jeremy mentioned the possibility of Ashville sending its sludge to South Bloomfield for treatment instead of having duplicate sludge treatment in Ashville.
    a. Ashville's sludge treatment system needs many improvements which could be avoided or delayed until South Bloomfield reaches their design capacity (presumably, this could be 10 to 20 years).
    b. Ashville would need to purchase a vac truck to haul the sludge to South Bloomfield.
    c. Alternatively, a pump station could be installed at the WWTP to pump the sludge to the Millport sewer.

7. Another option may be to pump Ashville's brine waste from the water treatment plant.

8. Greg mentioned the option of creating a 6119 district to combine Ashville's and South Bloomfield's service areas.
    a. Rick stated that their objection is that Ashville has expensive I&I problems to fix and South Bloomfield does not.
    b. URS said that each area could have a different rate.
    c. South Bloomfield's other concern is that the board created for the 6119 are not accountable to the voters.

9. Other opportunities for regional planning.
    a. Currently, there is no emergency connection between Ashville's and South Bloomfield's water systems. Many neighboring water utilities have such connections in case of water line breaks or for use during construction tie-ins and elevated tank cleaning. This would only require a few hundred feet of pipe and a meter vault.

"Sewage sludge" means a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works as defined in section 6111.01 of the Revised Code. "Sewage sludge" includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes. "Sewage sludge" does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator, grit and screenings generated during preliminary treatment of domestic sewage in a treatment works, animal manure, residue generated during treatment of animal manure, or domestic septage.

"Sewage sludge weight" means the weight of sewage sludge, in dry U.S. tons, including admixtures such as liming materials or bulking agents. Monitoring frequencies for sewage sludge parameters are based on the reported sludge weight generated in a calendar year (use the most recent calendar year data when the NPDES permit is up for renewal).

"Sewage sludge fee weight" means the weight of sewage sludge, in dry U.S. tons, excluding admixtures such as liming materials or bulking agents. Annual sewage sludge fees, as per section 3745.11(Y) of the Ohio Revised Code, are based on the reported sludge fee weight for the most recent calendar year.

2. GENERAL EFFLUENT LIMITATIONS

The effluent shall, at all times, be free of substances:

A. In amounts that will settle to form putrescent, or otherwise objectionable, sludge deposits; or that will adversely affect aquatic life or water fowl;

B. Of an oily, greasy, or surface-active nature, and of other floating debris, in amounts that will form noticeable accumulations of scum, foam or sheen;

C. In amounts that will alter the natural color or odor of the receiving water to such degree as to create a nuisance;

D. In amounts that either singly or in combination with other substances are toxic to human, animal, or aquatic life;

E. In amounts that are conducive to the growth of aquatic weeds or algae to the extent that such growths become inimical to more desirable forms of aquatic life, or create conditions that are unsightly, or constitute a nuisance in any other fashion;

F. In amounts that will impair designated instream or downstream water uses.

3. FACILITY OPERATION AND QUALITY CONTROL

All wastewater treatment works shall be operated in a manner consistent with the following:

A. At all times, the permittee shall maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee necessary to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with conditions of the permit.

B. The permittee shall effectively monitor the operation and efficiency of treatment and control facilities and the quantity and quality of the treated discharge.

C. Maintenance of wastewater treatment works that results in degradation of effluent quality shall be scheduled during non-critical water quality periods and shall be carried out in a manner approved by Ohio EPA as specified in the Paragraph in the PART III entitled, "UNAUTHORIZED DISCHARGES".

4. REPORTING

A. Monitoring data required by this permit shall be submitted on Ohio EPA 4500 Discharge Monitoring Report (DMR) forms using the electronic DMR (e-DMR) internet application. e-DMR allows permitted facilities to enter, sign, and submit DMRs on the internet. It is accessed from the Ohio EPA eBusiness Center. The eBusiness Center is found on the following web page:

http://www.epa.state.oh.us/dsw/swims/eDMR/eDMR.html

Alternatively, if you are unable to use e-DMR due to a demonstrated hardship, monitoring data may be submitted on paper DMR forms provided by Ohio EPA. Monitoring data shall be typed on the forms. Please contact Ohio EPA, Division of Surface Water at (614) 644-2050 if you wish to receive paper DMR forms.

B. DMRs shall be signed by a facility's Responsible Official or a Delegated Responsible Official (i.e. a person delegated by the Responsible Official). The Responsible Official of a facility is defined as:

1. For corporations - a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

2. For partnerships - a general partner;

3. For a sole proprietorship - the proprietor; or,

4. For a municipality, state or other public facility - a principal executive officer, a ranking elected official or other duly authorized employee.

For e-DMR, the person signing and submitting the DMR will need to obtain an eBusiness Center account and Personal Identification Number (PIN). Additionally, Delegated Responsible Officials must be delegated by the Responsible Official, either on-line using the eBusiness Center's delegation function, or on a paper delegation form provided by Ohio EPA. For more information on the PIN and delegation processes, please view the following web page:

http://www.epa.state.oh.us/dsw/swims/eDMR/eDMRpin.html

C. DMRs submitted using e-DMR shall be submitted to Ohio EPA by the 20th day of the month following the month-of-interest. DMRs submitted on paper must include the original signed DMR form and shall be mailed to Ohio EPA at the following address so that they are received no later than the 15th day of the month following the month-of-interest:

Ohio Environmental Protection Agency
Lazarus Government Center
Division of Surface Water - PCU
P.O. Box 1049
Columbus, Ohio 43216-1049

D. Regardless of the submission method, a copy of the submitted Ohio EPA 4500 DMR must be signed by a Responsible Official or a Delegated Responsible Official and maintained onsite for records retention purposes (see Section 7. RECORDS RETENTION). For e-DMR users, a copy of the DMR can be printed from e-DMR.

E. If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified in Section 5. SAMPLING AND ANALYTICAL METHODS, the results of such monitoring shall be included in the calculation and reporting of the values required in the reports specified above.

F. Analyses of pollutants not required by this permit, except as noted in the preceding paragraph, shall not be reported to the Ohio EPA, but records shall be retained as specified in Section 7. RECORDS RETENTION.

5. SAMPLING AND ANALYTICAL METHOD

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored flow. Test procedures for the analysis of pollutants shall conform to regulation 40 CFR 136, "Test Procedures For The Analysis of Pollutants" unless other test procedures have been specified in this permit. The permittee shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to insure accuracy of measurements.

6. RECORDING OF RESULTS

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

A. The exact place and date of sampling; (time of sampling not required on EPA 4500)

B. The person(s) who performed the sampling or measurements;

C. The date the analyses were performed on those samples;

D. The person(s) who performed the analyses;

E. The analytical techniques or methods used; and

F. The results of all analyses and measurements.

7. RECORDS RETENTION

The permittee shall retain all of the following records for the wastewater treatment works for a minimum of three years except those records that pertain to sewage sludge disposal, use, storage, or treatment, which shall be kept for a minimum of five years, including:

A. All sampling and analytical records (including internal sampling data not reported);

B. All original recordings for any continuous monitoring instrumentation;

C. All instrumentation, calibration and maintenance records;

D. All plant operation and maintenance records;

E. All reports required by this permit; and

F. Records of all data used to complete the application for this permit for a period of at least three years, or five years for sewage sludge, from the date of the sample, measurement, report, or application.

These periods will be extended during the course of any unresolved litigation, or when requested by the Regional Administrator or the Ohio EPA. The three year period, or five year period for sewage sludge, for retention of records shall start from the date of sample, measurement, report, or application.

8. AVAILABILITY OF REPORTS

Except for data determined by the Ohio EPA to be entitled to confidential status, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the appropriate district offices of the Ohio EPA. Both the Clean Water Act and Section 6111.05 Ohio Revised Code state that effluent data and receiving water quality data shall not be considered confidential.

9. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking, and reissuing, or terminating the permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

10. RIGHT OF ENTRY

The permittee shall allow the Director or an authorized representative upon presentation of credentials and other documents as may be required by law to:

A. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.

B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit.

C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.

D. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

11. UNAUTHORIZED DISCHARGES

A. Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

3. The permittee submitted notices as required under section 11.B.

B. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

C. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph 11.A. of this section.

D. The permittee shall submit notice of an unanticipated bypass as required in section 12.A.

12. NONCOMPLIANCE NOTIFICATION

A. Exceedance of a Daily Maximum Discharge Limit

1. The permittee shall report noncompliance that is the result of any violation of a daily maximum discharge limit for any of the pollutants listed by the Director in the permit by e-mail or telephone within twenty-four (24) hours of discovery.

The permittee may report to the appropriate Ohio EPA district office e-mail account as follows (this method is preferred):

Southeast District Office: sedo24hournpdes@epa.state.oh.us
Southwest District Office: swdo24hournpdes@epa.state.oh.us
Northwest District Office: nwdo24hournpdes@epa.state.oh.us
Northeast District Office: nedo24hournpdes@epa.state.oh.us
Central District Office: cdo24hournpdes@epa.state.oh.us
Central Office: co24hournpdes@epa.state.oh.us

The permittee shall attach a noncompliance report to the e-mail. A noncompliance report form is available on the following web site:

http://www.epa.state.oh.us/dsw/permits/permits.html

Or, the permittee may report to the appropriate Ohio EPA district office by telephone toll-free between 8:00 AM and 5:00 PM as follows:

Southeast District Office: (800) 686-7330
Southwest District Office: (800) 686-8930
Northwest District Office: (800) 686-6930
Northeast District Office: (800) 686-6330
Central District Office: (800) 686-2330
Central Office: (614) 644-2001

The permittee shall include the following information in the telephone noncompliance report:

a. The name of the permittee, and a contact name and telephone number;

b. The limit(s) that has been exceeded;

c. The extent of the exceedance(s);

d. The cause of the exceedance(s);

e. The period of the exceedance(s) including exact dates and times;

f. If uncorrected, the anticipated time the exceedance(s) is expected to continue; and,

g. Steps taken to reduce, eliminate or prevent occurrence of the exceedance(s).

B. Other Permit Violations

1. The permittee shall report noncompliance that is the result of any unanticipated bypass resulting in an exceedance of any effluent limit in the permit or any upset resulting in an exceedance of any effluent limit in the permit by e-mail or telephone within twenty-four (24) hours of discovery.

The permittee may report to the appropriate Ohio EPA district office e-mail account as follows (this method is preferred):

Southeast District Office:	sedo24hournpdes@epa.state.oh.us
Southwest District Office:	swdo24hournpdes@epa.state.oh.us
Northwest District Office:	nwdo24hournpdes@epa.state.oh.us
Northeast District Office:	nedo24hournpdes@epa.state.oh.us
Central District Office:	cdo24hournpdes@epa.state.oh.us
Central Office:	co24hournpdes@epa.state.oh.us

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Northeast District Office:	(800) 686-6330
Central District Office:	(800) 686-2330
Central Office:	(614) 644-2001

The permittee shall include the following information in the telephone noncompliance report:

a. The name of the permittee, and a contact name and telephone number;

b. The time(s) at which the discharge occurred, and was discovered;

c. The approximate amount and the characteristics of the discharge;

d. The stream(s) affected by the discharge;

e. The circumstances which created the discharge;

f. The name and telephone number of the person(s) who have knowledge of these circumstances;

g. What remedial steps are being taken; and,

h. The name and telephone number of the person(s) responsible for such remedial steps.

2. The permittee shall report noncompliance that is the result of any spill or discharge which may endanger human health or the environment within thirty (30) minutes of discovery by calling the 24-Hour Emergency Hotline toll-free at (800) 282-9378. The permittee shall also report the spill or discharge by e-mail or telephone within twenty-four (24) hours of discovery in accordance with B.1 above.

C. When the telephone option is used for the noncompliance reports required by A and B, the permittee shall submit to the appropriate Ohio EPA district office a confirmation letter and a completed noncompliance report within five (5) days of the discovery of the noncompliance. This follow up report is not necessary for the e-mail option which already includes a completed noncompliance report.

D. If the permitee is unable to meet any date for achieving an event, as specified in a schedule of compliance in their permit, the permittee shall submit a written report to the appropriate Ohio EPA district office within fourteen (14) days of becoming aware of such a situation. The report shall include the following:

1. The compliance event which has been or will be violated;

2. The cause of the violation;

3. The remedial action being taken;

4. The probable date by which compliance will occur; and,

5. The probability of complying with subsequent and final events as scheduled.

E. The permittee shall report all other instances of permit noncompliance not reported under paragraphs A or B of this section on their monthly DMR submission. The DMR shall contain comments that include the information listed in paragraphs A or B as appropriate.

F. If the permittee becomes aware that it failed to submit an application, or submitted incorrect information in an application or in any report to the director, it shall promptly submit such facts or information.

13. RESERVED

14. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

15. AUTHORIZED DISCHARGES

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than, or at a level in excess of, that authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such violations may result in the imposition of civil and/or criminal penalties as provided for in Section 309 of the Act and Ohio Revised Code Sections 6111.09 and 6111.99.

16. DISCHARGE CHANGES

The following changes must be reported to the appropriate Ohio EPA district office as soon as practicable:

A. For all treatment works, any significant change in character of the discharge which the permittee knows or has reason to believe has occurred or will occur which would constitute cause for modification or revocation and reissuance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. Notification of permit changes or anticipated noncompliance does not stay any permit condition.

B. For publicly owned treatment works:

1. Any proposed plant modification, addition, and/or expansion that will change the capacity or efficiency of the plant;

2. The addition of any new significant industrial discharge; and

3. Changes in the quantity or quality of the wastes from existing tributary industrial discharges which will result in significant new or increased discharges of pollutants.

C. For non-publicly owned treatment works, any proposed facility expansions, production increases, or process modifications, which will result in new, different, or increased discharges of pollutants.

Following this notice, modifications to the permit may be made to reflect any necessary changes in permit conditions, including any necessary effluent limitations for any pollutants not identified and limited herein. A determination will also be made as to whether a National Environmental Policy Act (NEPA) review will be required. Sections 6111.44 and 6111.45, Ohio Revised Code, require that plans for treatment works or improvements to such works be approved by the Director of the Ohio EPA prior to initiation of construction.

D. In addition to the reporting requirements under 40 CFR 122.41(l) and per 40 CFR 122.42(a), all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe:

1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis of any toxic pollutant which is not limited in the permit. If that discharge will exceed the highest of the "notification levels" specified in 40 CFR Sections 122.42(a)(1)(i) through 122.42(a)(1)(iv).

2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the "notification levels" specified in 122.42(a)(2)(i) through 122.42(a)(2)(iv).

17. TOXIC POLLUTANTS

The permittee shall comply with effluent standards or prohibitions established under Section 307 (a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement. Following establishment of such standards or prohibitions, the Director shall modify this permit and so notify the permittee.

18. PERMIT MODIFICATION OR REVOCATION

A. After notice and opportunity for a hearing, this permit may be modified or revoked, by the Ohio EPA, in whole or in part during its term for cause including, but not limited to, the following:

1. Violation of any terms or conditions of this permit;

2. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

3. Change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

B. Pursuant to rule 3745-33-04, Ohio Administrative Code, the permittee may at any time apply to the Ohio EPA for modification of any part of this permit. The filing of a request by the permittee for a permit modification or revocation does not stay any permit condition. The application for modification should be received by the appropriate Ohio EPA district office at least ninety days before the date on which it is desired that the modification become effective. The application shall be made only on forms approved by the Ohio EPA.

19. TRANSFER OF OWNERSHIP OR CONTROL

This permit may be transferred or assigned and a new owner or successor can be authorized to discharge from this facility, provided the following requirements are met:

A. The permittee shall notify the succeeding owner or successor of the existence of this permit by a letter, a copy of which shall be forwarded to the appropriate Ohio EPA district office. The copy of that letter will serve as the permittee's notice to the Director of the proposed transfer. The copy of that letter shall be received by the appropriate Ohio EPA district office sixty (60) days prior to the proposed date of transfer;

B. A written agreement containing a specific date for transfer of permit responsibility and coverage between the current and new permittee (including acknowledgement that the existing permittee is liable for violations up to that date, and that the new permittee is liable for violations from that date on) shall be submitted to the appropriate Ohio EPA district office within sixty days after receipt by the district office of the copy of the letter from the permittee to the succeeding owner;

At anytime during the sixty (60) day period between notification of the proposed transfer and the effective date of the transfer, the Director may prevent the transfer if he concludes that such transfer will jeopardize compliance with the terms and conditions of the permit. If the Director does not prevent transfer, he will modify the permit to reflect the new owner.

20. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

21. SOLIDS DISPOSAL

Collected grit and screenings, and other solids other than sewage sludge, shall be disposed of in such a manner as to prevent entry of those wastes into waters of the state, and in accordance with all applicable laws and rules.

22. CONSTRUCTION AFFECTING NAVIGABLE WATERS

This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

23. CIVIL AND CRIMINAL LIABILITY

Except as exempted in the permit conditions on UNAUTHORIZED DISCHARGES or UPSETS, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

24. STATE LAWS AND REGULATIONS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Clean Water Act.

25. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

26. UPSET

The provisions of 40 CFR Section 122.41(n), relating to "Upset," are specifically incorporated herein by reference in their entirety. For definition of "upset," see Part III, Paragraph 1, DEFINITIONS.

27. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

28. SIGNATORY REQUIREMENTS

All applications submitted to the Director shall be signed and certified in accordance with the requirements of 40 CFR 122.22.

All reports submitted to the Director shall be signed and certified in accordance with the requirements of 40 CFR Section 122.22.

29. OTHER INFORMATION

A. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

B. ORC 6111.99 provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $25,000 per violation.

C. ORC 6111.99 states that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $25,000 per violation.

D. ORC 6111.99 provides that any person who violates Sections 6111.04, 6111.042, 6111.05, or division (A) of Section 6111.07 of the Revised Code shall be fined not more than $25,000 or imprisoned not more than one year, or both.

30. NEED TO HALT OR REDUCE ACTIVITY

40 CFR 122.41(c) states that it shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with conditions of this permit.

31. APPLICABLE FEDERAL RULES

All references to 40 CFR in this permit mean the version of 40 CFR which is effective as of the effective date of this permit.

32. AVAILABILITY OF PUBLIC SEWERS

Not withstanding the issuance or non-issuance of an NPDES permit to a semi-public disposal system, whenever the sewage system of a publicly owned treatment works becomes available and accessible, the permittee operating any semi-public disposal system shall abandon the semi-public disposal system and connect it into the publicly owned treatment works.

Appendix F Pickaway County East-West Connector

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