SECTION 4: SOCIOECONOMIC CHARACTERISTICS OF THE PLANNING AREA

The base population information for the City of Hardinsburg was obtained from the U.S. Census and the Kentucky State Data Center's population estimates. Estimates for the portion of the Planning Area outside the city limits was obtained by taking house count information available through the 911 program and multiplying by the average household size in the 2000 Census (2010 Census data this detailed was not yet available). In the 1976 Facilities Plan, the population projections were different than the real changes in population that has occurred in the years between 1976 and 2010. The projected population for year 1995 was 3,310 when in fact the 2000 Census for the City was 2,345 persons. The population estimates by the Kentucky State Data Center show a very small change from year 2004 to year 2009 – only an increase of 0.18% over this five year time frame. The 2010 Census shows a population that is nearly identical to the 2000 population – 2,343 persons.

A review of the City's billing records, going back to year 2004, reveals that the number of sewer customers stayed very constant during the past six years. Records back to year 2004 were used because the City changed billing programs in 2004 and only billing records for years 2004 through 2010 were readily available.

Table 4.1 shows the population figures for the City and sewer customers for the same time frame.

TABLE 4.1 - POPULATION ESTIMATES AND CUSTOMER DATA				
YEAR	POPULATION ESTIMATE	PERCENT CHANGE	SEWER SYSTEM CUSTOMERS	PERCENT CHANGE
2000 - Census	2345			
2004	2394	2.09%	1054	
2005	2418	1.00%	1061	0.66%
2006	2410	-0.33%	1062	0.09%
2007	2420	0.41%	1054	-0.75%
2008	2423	0.12%	1068	1.33%
2009	2415	-0.33%	1062	-0.56%
2010 - Census	2343	-2.98%	1052	-0.94%
Average		*0.18%*	*1059*	*-0.17%*

After reviewing the population estimates and the sewer system customer records, it is likely that the City's growth will continue with small percentage changes as has been evident over the past decade. The largest growth in sewer customers will likely come only from extending sewer service to areas that currently do not have service.

There are four subdivisions/neighborhoods within the City Limits that currently do not have public sewer service. These areas rely on on-site septic systems. These four areas are:

- Blancett Lake Subdivision – 50 homes
- Breckwood Subdivision – 24 homes
- Gilbert Heights Neighborhood – 32 homes
- Forest Hills Subdivision – 39 homes

The area outside the city limits but within the Facilities Plan Planning Area is estimated to include approximately 68 homes and an estimated population of 170 persons.

By extending service to these areas, the City could increase its customer base by at least 213 customers or twenty percent. As the population grows, commercial growth will result and the area paralleling US 60 is the most likely area for that growth to occur. The homes in the unserved subdivisions over time may experience problems with their septic systems due to age and soil conditions.

Population projections are not developed by the Kentucky State Data Center for Cities. Therefore, population projections for the Planning Area were developed utilizing the average population change over the decade shown in Table 4.1. The population of the Planning area is projected to grow 0.2 percent over the next twenty years. Table 4.2 illustrates the historical population for the Planning Area as well as the twenty year projections.

TABLE 4.2 – HISTORICAL AND FUTURE POPULATION		
YEAR	CITY OF HARDINSBURG	PLANNING AREA
1970	1,410	1,913
1980	2,211	2,301
1990	1,906	2,223
2000	2,345	2,533
2009	2,415	2,585
2015	2,419	2,590
2020	2,426	2,595
2025	2,430	2,600
2030	2,434	2,605

A review of the unemployment rates for Breckinridge County for the time frame of years 2004 through year 2010 shows that the rate stayed fairly constant until the recession of 2008. The unemployment rate started this time frame at a low rate of 5.8 percent in 2004 and spiked at 12.0 percent in year 2009. Fortunately, the County appears to have recovered somewhat in 2010 as the unemployment rate dropped to 10.4 percent.

However, in comparison with the State of Kentucky and United States rates for the same time period, Breckinridge County's unemployment rate is higher than both the state and national averages for all years reviewed. The following table shows the unemployment rate for the years 2004-2010.

TABLE 4.3 - UNEMPLOYMENT RATES			
YEAR	Breckinridge County	State of Kentucky	United States
2004	5.8%	5.5%	5.5%
2005	6.5%	6.1%	5.0%
2006	6.9%	5.9%	4.7%
2007	6.3%	5.5%	4.6%
2008	7.6%	6.6%	5.8%
2009	12.0%	10.8%	9.4%
2010	10.4%	9.9%	9.5%

Source: US Bureau of Labor Statistics

Breckinridge County is a small county population wise, ranking 57th out of 120 Kentucky Counties. The small population is a likely contributing factor to the limited employment opportunities in the City and in the County. According to the 2000 US Census, the number of residents of Breckinridge County that lived and worked in the County was 49.4 percent while 50.6 percent lived in the County but worked in another county or state. According to the Kentucky Economic Development Cabinet most employment in the County is in the trade, transportation, and utilities category. The category with the second offering the most employment opportunities is manufacturing, followed by construction. The Economic Development Cabinet's projections for employment sectors that will have the most growth in Breckinridge County in the next decade will be social and health services. These are not typically the highest paying jobs.

Because of the employment situation, higher than state and national unemployment, limited growth sectors, and half of the population commuting to work outside of the county, it is unlikely that employment opportunities will change dramatically over the trends of the past five years. This will limit the revenue generation of the City's wastewater system to its existing base and possible expansion to a small number of areas in the City that currently do not have service. When the City undertakes expansion or improvements to its wastewater system it must remain cognizance of its limited customer base and the financial status of that base.

The median household income (MHI) for the City of Hardinsburg per the 2000 Census was $26,447. This was an increase from the 1989 MHI of $18,776. However, this is below the State MHI of $ 33,672 and national MHI of $41,994. The City of Hardinsburg must maintain its wastewater system in accordance with state and Federal regulations but it must also

keep in mind that its customer base has fewer resources to pay its users charges than other communities might have.

The City's wastewater system is maintained strictly with revenue generated from its wastewater customers. The City does not use any property taxes to support the wastewater system. Wastewater projects undertaken by the City will need to be paid for with either income from new customers or increases in the rates charged for service. A copy of the City's rate ordinance is included in the Appendices to this Plan.

SECTION 5: EXISTING ENVIRONMENT IN THE PLANNING AREA

Physical Environment

Surface Water

The planning area is located nearly entirely within the Hardins Creek watershed within the Salt River Basin Management Unit. Only the segment of Hardins Creek below the wastewater treatment plant is reported to partially support its designated use as a warm water aquatic habitat. The *Integrated Report to Congress of Water Resources in Kentucky, 2012* reports this is due to "nutrient/eutrophication biological indicators and organic enrichment (sewage) biological indicators" from municipal point source discharges.

Groundwater

The City of Hardinsburg provides public drinking water to approximately 13,368 persons in Breckinridge County. The City's water source is wells located near the Ohio River in the northern portion of the County. The Kentucky Geological Survey in 2005, estimated about 8,800 residents of Breckinridge County rely on private domestic water supplies: 4,400 use wells and 4,400 use other sources; primarily cisterns. The City has completed several water line extension projects since 2005 and currently has a project starting construction will install approximately 74 miles of water line in the County. Another project is in design that will add an additional 59 miles of water line in the County.

In the northwestern edge of Breckinridge County, nearly all drilled wells in the Ohio River alluvium are adequate for domestic use; many wells yield several hundred gallons per minute. Compound horizontal wells set in the alluvium may yield 5,000 gallons per minute, enough for a community or industrial supply. In the northern third of the county (the central highlands and southeastern edge of Breckinridge County), most drilled wells are adequate for a domestic supply. Wells yielding as high as 100 gallons per minute have been reported from wells penetrating fault zones. Depths of adequate wells range from 100 to 300 feet. In the remaining areas of the county, only a few wells yield enough water for a domestic supply, except that in the lowland areas bordering streams, some wells may be adequate.[1]

The quality of groundwater in the Mississippian Plateau region varies considerably from place to place and is determined by the water's geologic source and the length of time it has been in contact with the rocks. Generally, deeper wells produce more mineralized water; however, deeper wells are less likely to become polluted by man's activities. In Breckinridge County, groundwater obtained from most drilled wells in limestone aquifers is considered hard. Common salt and hydrogen sulfide are the two naturally occurring constituents most often encountered in objectionable amounts in groundwater in the

county. Water obtained from wells and springs in many limestone aquifers is subject to pollution and, at a minimum, should be treated to eliminate bacterial contamination.[1]

Water Sources & Supply

The City of Hardinsburg provides public drinking water to approximately 13,368 persons in Breckinridge County. The City's water source is wells located near the Ohio River in the northern portion of the County. The well fields and water treatment plant are located outside and north of the wastewater Planning Area.

Wetlands

A review of the US Fish and Wildlife Wetlands Inventory shows that there are a number of freshwater ponds within the city limits. There is also one lake and one freshwater emergent wetland that are located upstream from a man-made lake. The wetlands do not impact the existing wastewater collection system nor are the wetlands affected by the wastewater system. The lake located off of Route 261 in the southern portion of the city would benefit from the installation of community sewage collection in the Breckwood subdivision as the houses in this area are close together and rely on septic tanks for wastewater treatment and disposal. Comments made by the US Fish and Wildlife Service include the recommendation that project plans be developed to avoid impacting wetland areas and/or streams, and that they reserve the right to review any required federal or state permits at the time of public notice issuance. They also said that the US Army Corps of Engineers should be contacted so they may assist in determining if wetlands or other jurisdictional waters are present or if a permit is required. See Exhibit 5.1 at the end of this section for the USFWS Wetlands Inventory Map. See Exhibit 9.1 at the end of Section 9 for the correspondence from USFWS.

Lakes

There is one lake within the Planning Area. It is man-made and is located off of Route 261 in the southern portion of the City. This lake was constructed as part of a FFA camp in the 1940's.

Streams

Located within the Planning Area are Hardin's Creek, two unnamed tributaries to Hardin's Creek, and Tule's Creek. Hardin's Creek is listed as only partially supporting aquatic life and Tule's Creek as fully supporting aquatic life in the *Integrated Report to Congress on Water Quality in Kentucky* (2006 and 2008 editions respectively).

Air Pollution

The closest air monitoring station is in Owensboro, KY – approximately 45 miles to the west. Per the Kentucky Division for Air Quality 2013 Annual Report, this monitoring station exceeded the National Ambient Air Quality Standards for ozone but not other pollutants.

Floodplains

A review of the FEMA Floodplains map for the City of Hardinsburg reveals very little area of the city classified as being in a flood hazard zone. The flood hazard zones are primarily along Hardin's Creek and its two unnamed tributaries. The flood zone A extends only a small distance from the actual creek banks. Exhibit 3.4 in Section 3 shows the FEMA Flood Hazard Map.

Soils

Most of the City and consequently the Planning Area has Sadler-Zanesville soil type. The Sadler soils are very deep and moderately well drained. The nearly level and gently sloping soils are broad upland flats. They have a compact and brittle fragipan at the depth of about 26 inches. They are loamy throughout. They formed in a thin mantle of loess and in the underlying material weathered from sandstone, siltstone, or shale. The Zanesville soils are deep and are well drained and moderately well drained. These gently sloping and sloping soils are on convex upland ridgetops and on the upper side slopes. They are generally on the narrower ridgetops. They have a compact and brittle fragipan at a depth of about 23 inches. They formed a thin mantle of loess and in the underlying material weathered from sandstone, siltstone, or shale. Both the Sadler and Zanesville soils are classified as having severe limitations for septic tank absorption fields due to slow percolation of water.[2]

Geology

In Breckinridge County, water is obtained from consolidated sedimentary rocks of Mississippian through Pennsylvanian age and from unconsolidated sediments of Quaternary age. Geologists call the oldest rocks found at the surface in Breckinridge County the St. Louis Limestone. The most common rock types in Breckinridge County are Mississippian limestones, which were deposited 350 million years ago in the bottom of a warm, shallow sea. At the end of the Mississippian Period, 320 million years ago, the seas receded and sediments of the Pennsylvanian were deposited. The warm climate of the Pennsylvanian allowed extensive forests and great coastal swamps to grow at the edges of water bodies. Marine waters advanced and receded many times, which produced many layers of sandstone, shale, and coal. Vegetation of all sorts fell into the water and was buried under blankets of sediments, which over long geologic time were compressed into coal. The nonvegetative sediments such as sand, clay, and silt were compressed into

sandstone and shale. Over the last million years, Quaternary sediments have been deposited along the larger streams and rivers.[1]

Topography

The majority of the Planning Area is located on a small plateau that is surrounded by a large drainage area with moderate to steep valleys that have been formed by erosion from runoff since the retreat of the last ice age. The topography of the area varies from gently rolling uplands to fairly steep slopes along some stream beds.

Biological Environment

A review of the Kentucky Department of Fish and Wildlife's database of Species Information reveals a number of species in Breckinridge County that are listed as either threatened or endangered. These species are:

- Southeastern Myotis (bat - endangered)
- Indiana Bat (endangered)
- Elusive Clubtail (insect – endangered)
- Bald Eagle (threatened)
- Lark sparrow (threatened)
- Northern Harrier (threatened)
- Salamander Mussel (threatened)
- Gray Myotis (bat – threatened)
- Eastern Small Footed Myotis (bat – threatened)

There are also 14 species that are listed as species of "special concern".

The US Fish & Wildlife Service identified two species that are federally listed as endangered that occur within the vicinity of the City. These are the Indian bat and gray bat. The USFWS recommends that the City follow one of the following options when projects are undertaken:

1. The project proponents can be modified to eliminate impacts to Indiana bat habitat and thus avoid impacts:
2. The project proponent can request formal section 7 consultation through the lead Federal Action Agency associated with the proposed project; or
3. The project proponent may choose to enter into a Conservation Memorandum of Agreement (MOA) with the Service to account for the incidental take of Indiana bats.
4. The project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site and avoid

impacts to those sites pending an analysis of their suitability as gray bat habitat by the USFWS.

It is not expected that any of the projects proposed in this Facilities Plan will adversely affect any of these species. Projects will be designed to have the least amount of impact on the environment as possible, avoiding streams and trees where possible. Because the new sewer line projects proposed will serve areas already developed, little impact is anticipated. If required at the time of the projects being undertaken, the City will complete a habitat survey to determine if any of these species are present.

Cultural Resources

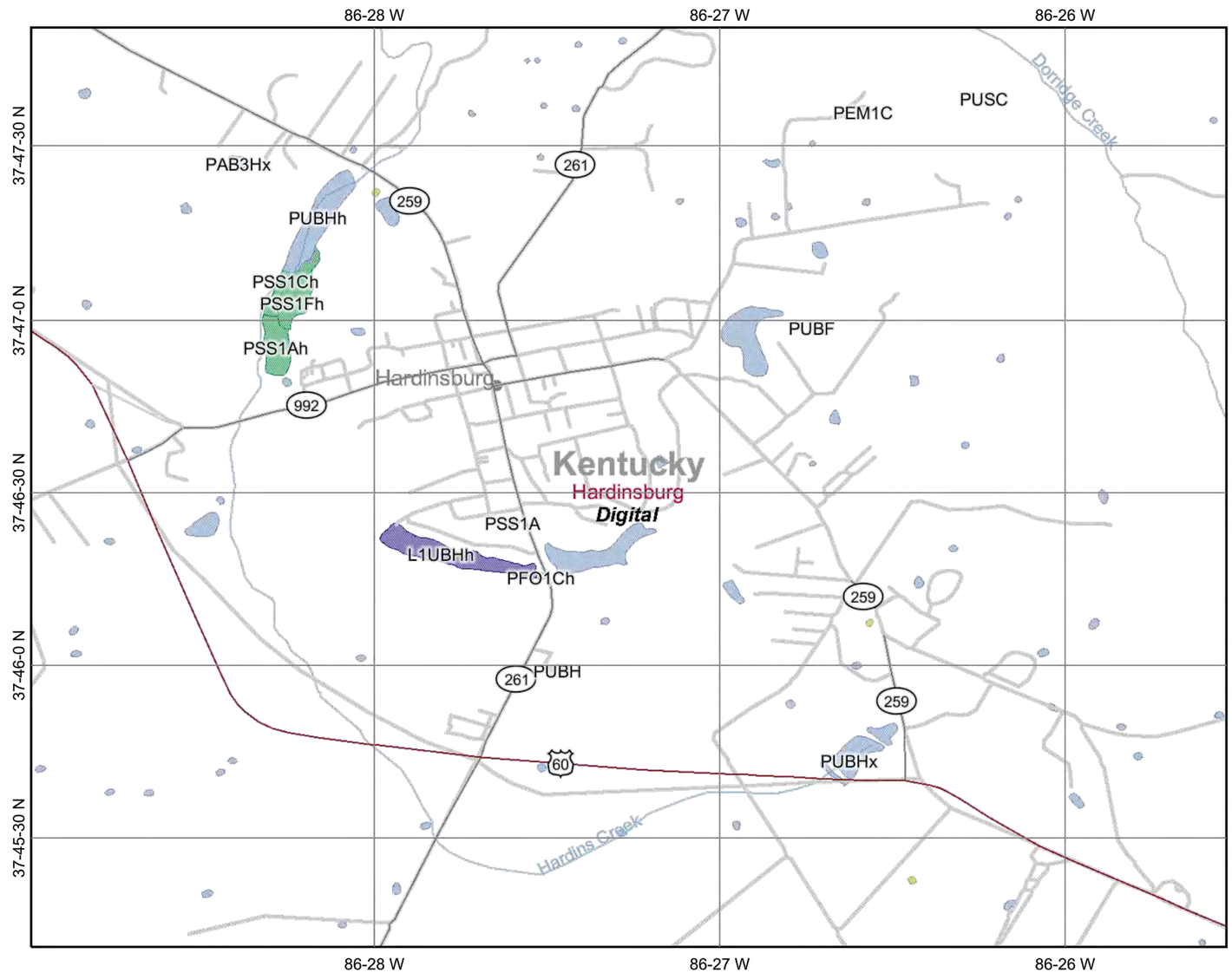
According to the State Historic Preservation Officer there is a high potential for locations in and around the City to contain archaeological sites. Before the City will be able to undertake any project that is not on land that can be documented as previously disturbed or on road right of way it will need to be surveyed by a professional archaeologist. The SHPO is also requiring that the City inventory all properties over 50 years of age for determination if any are eligible for listing in the National Register of Historic Places.

The SHPO letter and responses from the US Fish & Wildlife Service and the Kentucky Department of Fish & Wildlife Resources are located in Section 9.

[1] *Ground Water Resources of Breckinridge County* by Kentucky to Geological Survey, 2005.

2 *Soil Survey of Breckinridge and Meade Counties, Kentucky*, USDA, Natural Resource Conservation Service, 1992

City of Hardinsburg USFWS Wetlands Inventory Map



Map center: 37° 46' 31" N, 86° 27' 16" W

Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- Cities
- USGS Quad Index 24K
- Lower 48 Wetland Polygons
  - Estuarine and Marine Deepwater
  - Estuarine and Marine Wetland
  - Freshwater Emergent Wetland
  - Freshwater Forested/Shrub Wetland
  - Freshwater Pond
  - Lake
  - Other
  - Riverine
- Lower 48 Available Wetland Data
  - Non-Digital
  - Digital
  - No Data
  - Scan
- NHD Streams
- Counties 100K
- States 100K
- South America
- North America

N

Scale: 1:34,502

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

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PREPARED FOR:

HARDINSBURG PUBLIC WORKS MUNICIPAL UTILITIES

EXHIBIT 5.1
WETLANDS MAP

SECTION 6: EXISTING WASTEWATER SYSTEM

On-Site Disposal

Most of the structures located within the city limits are connected to the City's wastewater system. There are no package treatment plants within the city limits and the Planning Area. There are four subdivisions in the city limits and one area outside the city limits within the planning area that currently rely on septic tanks. According to the Breckinridge County Health Department's Sanitarian there are occasional complaints about septic tanks in these areas. The Sanitarian stated that the two most common problems apply mainly to the area outside the city limits along US 60 in the Harned area. These problems are low areas in Harned that when there are several rainy days in a row, the ground is saturated and will not perk causing the septic tanks to overflow. The second problem is that when a structure needs to install a new septic system the homes are so close together that there is often not enough space to install the required amount of lateral field.

No other wastewater treatment systems, such as private package treatment plants, are located within the planning area. Areas outside of the Hardinsburg system are served primarily by private septic systems. No data is available on the condition of septic systems in the area, but failing systems have the potential to adversely affect both groundwater and surface water quality.

Treatment Plant

The Hardinsburg Wastewater Treatment Plant is designed for an average daily flow rate of 0.732 MGD and is secondary treatment plant using an oxidation ditch process. This plant has facilities for removing, treating, and disposing of settleable and floating solids, for reducing suspended solids and dissolved organic material. Waste activated sludge is stored in the aerated sludge holding tank, and hauled by truck to a designated area for land disposal. The plant effluent is disinfected by chlorine to reduce the possible spread of waterborne diseases, then de-chlorinated with sulfur dioxide and discharged into the Town Branch Creek. A copy of the current KYPDES permit, copy of the Draft KPDES permit and the City's sewer use ordinances are located in the Appendices to this Plan.

The existing WWTP is a secondary biological wastewater treatment system that discharges into Hardins Creek. The plant has a design flow of 0.732 million gallons per day (mgd) average capacity. It has been a little over 20 years since this facility was constructed. The plant is currently operating as designed and the areas served by the wastewater system, along with the expected growth within the boundaries covered by the collection system will not ultimately cause the existing facility to exceed its hydraulic design capacity. With continued maintenance and periodic upgrades of components of the treatment plant it should serve the City for the timeframe of this Plan. The components that most likely will need to be upgraded and/or replaced during the 20 year planning period are:

- Provide Phosphorus Removal
- Replace or re-build aerators in Oxidation Ditch
- New Bar Screens/Grit Removal System
- Re-build or replace Influent pumps
- Clean oxidation ditch; replace rotors
- Replace sludge tractor and spreader with line and pump irrigation system

All wastewater generated within the Planning Area is treated at the Hardinsburg Wastewater Treatment Plant ("WWTP"). The current WWTP average daily flow rate is approximately 0.482 MGD or approximately 65% of capacity.

The City of Hardinsburg has contracted the operations of its water and wastewater systems since 1991. Since 1995, Veolia Water has been the contractor operator for the City. During this time frame, Veolia has maintained, replaced, or installed various components at the wastewater treatment plant and collection system including:

- Replaced pumps and controls at Mattingly lift station – 2010
- Replaced pumps at Berco lift station – 2007
- Raised 27 manholes that had been paved over – 2009
- Installed new sewer lines in two neighborhoods to eliminate backups and overflows – 2001 and 2004
- Installed plugs and transfer switches at all lift stations for emergency power – 2010
- Replaced pumps, guide rails, and controls at OPS lift station - 2007
- Mixers replaced or rebuilt – 2005, 2007, 2010
- Electrical improvements to aerators in the oxidation ditch – 2006
- Installed phase monitoring and lightening arrestors - 2007
- Replaced flow monitors – influent flow – 2005; waste magmeter – 2009; and return magmeter – 2007/2008
- Installed auto dialers for power failure and level alarm at influent station – 2004
- Replaced grinder pump in wet well – 2002
- Rebuilt two influent pumps – 2004 and 2011

WASTEWATER FLOW PATTERN

Exhibit 6-1 showing the general wastewater flow pattern and the main process units is presented at the end of this section.

The raw wastewater enters the raw sewage pump station via an 18-inch diameter gravity sewer. This sewer collects the flow from one 12-inch diameter and one 15-inch diameter

trunk sewers. Three (3) submersible raw wastewater pumps deliver the wastewater to the treatment plant via a 12-inch diameter force main.

Preliminary treatment begins with the influent passing through a manual bar screen which removes large solids (rags, sticks, etc.) from the wastewater. Debris that is not captured by the bar screen is comminuted and returned to the wastewater flow.

Wastewater flow is directed to the oxidation ditch for biological treatment. Return activated sludge is added to the oxidation ditch to resupply the activated sludge process with biologically active microorganisms.

Two (2) vertical mixers, agitate the mixed liquor to satisfy the oxygen requirements of the biological life and to maintain the growth in suspension.

Following a designed detention time in the oxidation ditch, the mixed liquor flows to the adjustable weir where the flow is directed to the final clarifier. The biological growth is settled from the wastewater in the clarifier and the majority returned to the oxidation ditch.

After clarification, the wastewater is subjected to chlorine for a specified time for disinfection, and sulfur dioxide is added to remove residual chlorine from the plant discharge.

Solids that are wasted from the clarifier are stored in the holding tank prior to land application.

Influent Pump Station

Bar Screen	
Number of Units	1
Type	Manual
Width	4 Ft.
Bar Spacing	1-1/4 inches
Comminutor	
Number of Units	1
Capacity	720 gpm
Motor Size	2 Hp
Square Overflow Orifice for Peak Flow Conditions	18” x 18”
Voltage Service	460 V
Service	Continuous Duty
Emergency Generator	
Number of Units	1
KW	150

KVA	156
RPM	1800
Fuel	No. 2 Diesel
Underground Fuel Storage	970 Gal.
Serves	Influent Pump Station
Day Tank Volume	25 Gal.
Raw Wastewater Pumps	
Number of Units	3
Type	Submersible Centrifugal
Capacity (Each)	1285 GPM @ 94' TDH 1950 GPM @ 73' TDH
Motor Size	53.6 Hp
Rotation Speed	1770 RPM

Flow Metering

Raw Wastewater (12")	
Number of Units	1
Type	Magmeter (Badger)
Flow Range	0-3000 GPM
Flow Totalizer	1000 Gal. Units
Return Sludge (6")	
Number of Units	1
Type	Magmeter
Flow Range	0-1500 GPM
Flow Totalizer	1000 Gal. Units
Waste Sludge (6")	
Number of Units	1
Type	Magmeter
Flow Range	0-1000 GPM
Flow Totalizer	1000 Gal. Units

Oxidation Ditch

Number of Units	1
Volume (Cubic Feet)	88,900
Volume (Gallons)	665,000
Depth	9 feet
Width	17 ft. – 2 inches
Design Average Flow	0.732 MGD
Detention Time at Design Flow	21.8 hours
BODLoading	14.8 lbs. per 1,000 CF/day
Aerators	
Number of Units	2

Type	Vertical
Motor Size	25 Hp
Oxygen Transfer	93.5 lbs. per O_2/hr.
Rotation	Counterclockwise
Efficiency	92%
SRT	20-30 days
F/M	0.05 to 0.10
Dissolved Oxygen	1 – 3 mg/l
Recommended Immersion (gauge)	7 inches (max.)
(As Recommended by Manufacturer)	to 1 inch (min.)
MLSS Range	2000 – 3000 mg/l
Sludge Volume Index Range	50 - 100
Sludge Density Index Range	1.0 – 2.0
Settled Sludge Volume (30 minute)	200 – 250 ml/l

Clarifier

Number of Units	1
Type	Circular
Diameter	55 ft.
Side Water Depth	11 ft.
Area	2376 sq. ft.
Gallons per foot side water depth	18,927 gal.
Volume	208,200 gal.
Avg. Design Flow	0.732 MGD
Peak Design Flow	3.08 MGD
Overflow Rate at Avg. Flow	308 GPD/Sq.ft.
Overflow Rate at Peak Flow	1296 GPD/Sq.ft.
Detention Time at Avg. Flow	6.8 Hr.
Detention Time at Peak Flow	1.6 Hr.
Collector Motor Size	3/4 HP
Sludge Blanket Level	1-3 Ft.

Disinfection System

Chlorinators

Number of Units	2
Unit Capacity	50 lbs. /day
Dosage Capacity at Avg. Flow (1 unit)	8.2 mg/L
Dosage Capacity at Peak Flow (1 unit)	1.9 mg/L
Dosage Capacity at Peak Flow (2 units)	3.9 mg/L

Sulfonators

Numbers of Units	2
Unit Capacity	50 Lbs. /Day
Dosage Capacity at Avg. Flow (1 unit)	8.2 mg/L
Dosage Capacity at Peak Flow (1 unit)	1.9 mg/L

Dosage Capacity at Peak Flow (2 units)	3.9 mg/L
Dilution Water Pumps	
Number of Units	3
Capacity (each)	8.8 gpm
PSIG	50
Motor Size	3/4 Hp
RPM	1750

Chlorine Contact Tank

Number of Units	2
Volume (each)	23,000gal.
Volume (total)	46,000 gal.
Detention Time at Avg. Flow (1 unit)	45 minutes
Detention Time at Avg. Flow (2 units)	90 minutes
Detention Time at Peak Flow (2 units)	22 minutes

Plant Pump Station (Duplex)

Number of Pumps	2
Type	Submersible Centrifugal
Capacity (each)	240 gpm
TDH	50 ft.
Motor Size	7.5 Hp
Motor Speed	1750 RPM

Return/Waste Sludge Pumps

Location	Operations Building
Number of Units	2
Type	Vertical Centrifugal
Capacity (each)	600 gpm
TDH	23 ft.
Motor Size	5 Hp
Speed	875 RPM

Sludge Transfer Pump

Location	Operations Building
Number of Units	1
Type	Rotary Lobe Positive Displacement
Capacity	110 gpm
TDH	48 ft.
Motor Size	7.5 Hp

Sludge Holding Tank (SHT)

Number of Units	1
Diameter	90 ft.
Sidewater Depth	9 ft.
Volume	472,000 gal.
Design Sludge Production	1,055 lbs. /day
	12,650 GPD at 1%
	5,060 GPD at 2.5%
Detention Time at 1%	37 days
at 2.5%	93 days

A 150 kilowatt generator located at the influent pump station will provide power to the comminutor, raw wastewater pumps and motor control center during a power failure.

SEWER SYSTEM

The City of Hardinsburg's existing sewer collection system is a combination of materials and sizes, which date back to the 1930's. The original system was constructed using clay tile that was manufactured in Breckinridge County. The system has been modified and extended numerous times over the years, primarily extending the collection system to provide sewer service to unserved and newly developed areas of the City. Clay tile piping was used for the collection lines until the late 1960's when polyvinyl chloride (PVC) piping was developed and used for sanitary sewer collection system piping. Exhibit 3-1 at the end of Section 3 shows the existing collection system.

The City's original wastewater treatment plant (WWTP) was located at the site of the existing sanitary influent pumping station and remained in operation until 1989. In the late 1980's, the City began the process of constructing a new wastewater treatment plant with an operating capacity of 0.732 MGD. This facility was completed and went into operation in 1989 and remains in operation.

SANITARY SEWER EVALUATION SURVEY (SSES)

The City of Hardinsburg observed in a heavy wet-weather event that its influent meter at the wastewater treatment plant would rise from an average reading of 400,000 gallons per day (GPD) to over 2.4 million gallons per day (MGD). The City conducted a sanitary sewer evaluation survey to assist in determining areas with infiltration and inflow (I&I). Also, The City of Hardinsburg wanted a single reference map of their entire sanitary sewer collection system. The SSES consisted of system mapping, flow monitoring, and smoke testing.

The City of Hardinsburg was aware of areas of I&I prior to the start of the SSES process. Such issues included storm sewers connected to the sanitary sewer system in front of City

Hall and at the hospital. These issues are referred to as combined sewer overflows (CSO's). The City also knew there would be residential and commercial gutter systems connected to the sanitary sewer system.

FIELD INVESTIGATION SUMMARY

The City of Hardinsburg's Sanitary Sewer Collection System was investigated by conducting a sanitary sewer evaluation survey. The study area included ALL of the existing sanitary sewer system; however only ninety percent of the collection system was investigated. The finished sanitary sewer collection system map reflects findings that include revisions to previously indicated/believed manhole locations and distances between the manholes.

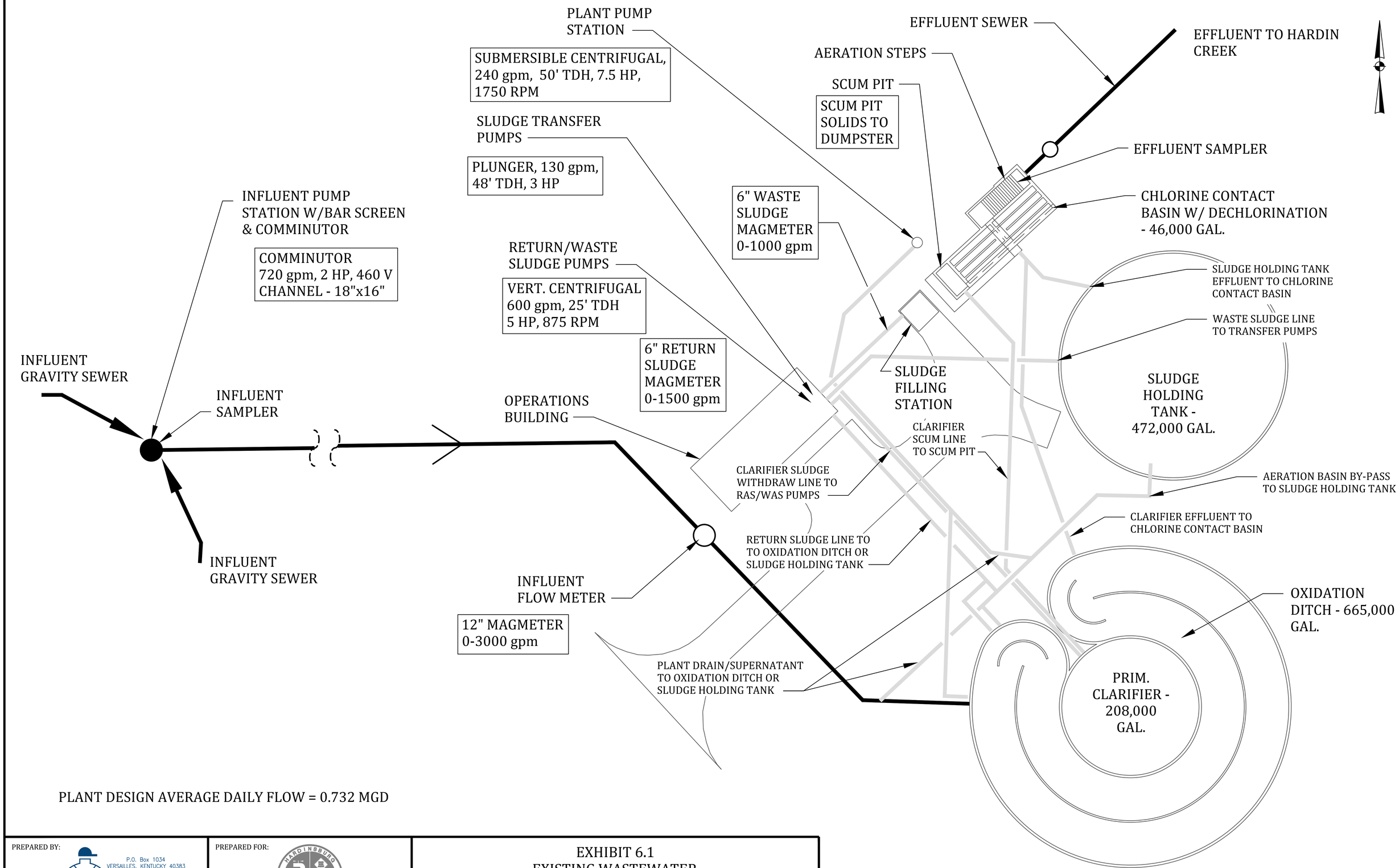
Approximately 27 manholes were paved over in the streets, buried, or otherwise inaccessible to inspection. After conducting visual manhole inspections, approximately eleven percent of the manholes have evidence of I&I.

Flow monitoring the sanitary sewer system was the next step in the SSES process. Five flow monitoring units were strategically placed to retrieve the best possible data from the study. Flow monitoring was scheduled to be a four-week process. Due to drought-like conditions, the flow monitoring process was extended another four weeks. The collected data was processed and used in determining which basins/sections of the sanitary sewer system had I&I issues.

After flow monitoring the sewer system, the data indicated not all of the sewer system needed to be smoke tested. Smoke testing log forms were completed, and problems were identified on the form and sewer system map. Photographs were taken of the problem areas and referenced with its description on the smoke testing log/form. This step of the SSES process is a great tool for the City of Hardinsburg to use in determining if the source of each problem is public or private, to delineate responsibility.

The summary of actual fieldwork is as follows:

Sanitary Sewer Smoke Tested:	105,200 LF
Manholes Inspected:	339
Manholes Raised:	27



PLANT DESIGN AVERAGE DAILY FLOW = 0.732 MGD

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SCALE: Not to Scale

EXHIBIT 6.1
EXISTING WASTEWATER TREATMENT PLANT LAYOUT & PROCESS FLOW DIAGRAM

SECTION 7: FORECASTS OF FLOW AND WASTE LOADS

Background

Existing land use in the Planning Area is predominantly rural agricultural. The inner urban area of Hardinsburg is primarily residential with scattered commercial development necessary to provide local trading services for the residents of Hardinsburg and some adjacent communities. Public and semi-public land uses consist of schools, city and government buildings, FFA campground, local airport, public reservoirs, some small local parks, and the cemetery. Some areas have been zoned industrial although there are no industries located in Hardinsburg at the present time.

The generalized land use plan developed for Hardinsburg does not reflect any significant changes in the land use patterns in the next twenty years. The community will continue to be primarily a rural residential area with an increase in some commercial and possibly industrial growth and public facilities necessary to serve the adjacent areas. The largest increase in land use will be in residential property as new areas open up with the completion of sewer services that are now restricted with the present facilities. A generalized land use plan projected for the City is shown in Exhibit 3.5

Current Flows

Based upon population data and land use trends, projections of wastewater flow were developed for the existing sewered and unsewered areas. A summary of Population and Wastewater Flow Projections are presented in Tables 7.2 along with peak flow projections. Residential wastewater flow projections were calculated based on 200 gallons per capita based on flow records from the wastewater treatment plant for the past five years. The Kentucky Division of Water requires 400 gallons per capita but based upon flow records of the city and experience in other communities this number is excessive. The average potable water customer uses approximately 60 to 80 gallons per day per person. The average household has 2.5 persons per connection, this would lead to a conservative usage of 200 gallons per capita.

The future Land Use map presented in Figure 3.5 was used to help verify the data that projects population out to 2030 from the 2000 census. The populations and households for the planning areas were interpolated at 5 year intervals through 2030. Peak-flows were determined by using a peaking factor of 3.0 based on the past five years of flow data and 200 gallons per capita.

According to typical design standards for wastewater collection systems, the sizing of wastewater facilities receiving flows from wastewater collection systems may be based on an average daily flow of 100 gallons per capita plus wastewater flow from industrial plants and major institutional and commercial facilities unless water use data or other

justification upon which to better estimate flow is provided. The 100 gal/cap/d figure shall be used which, in conjunction with a peaking factor, is intended to cover normal infiltration for systems built with modern construction techniques. The peaking factor referred to is explained below.

Ten States Standard Peaking Factor based on Population Served

To determine the peak-flow the total flow (residential + commercial/industrial) was multiplied by the Ten States Standards peaking factor.

$Flow_{peak}$ = ($Flow_{average}$) x (Peaking Factor)

Where Peaking Factor = $\frac{18+\sqrt{P}}{4+\sqrt{P}}$

And P = equivalent population in thousands

Average Daily Flow (ADF) Rate based on Ten States Standards with a population of 2,343 (2010 Population) gives a flow rate as follows:

ADF = 2,343 population x 100 gallons per capita = 234,300 gallons per day (0.234 MGD)

Peaking Factor (PF)= $\frac{18+\sqrt{2.343}}{4+\sqrt{2.343}}$ = 3.53

Peak Daily Flow (PDF) = ADF x PF = 234,000 x 3.53 = 827,079 gallons per day (0.827 MGD)

TABLE 7.1 – COMPARISON OF CALCULATED FLOWS AND ACTUAL FLOWS			
	ACTUAL FLOW RATES (per WWTP Records -YR 2011)	CALCULATED FLOWS (PER 10 States)	PERCENT DIFFERENCE
ADF	0.567	0.234	142%
PDF	1.771	0.827	114%

Compared to the design criteria from Ten States Standards of 100 gallons per capita and the peaking factor based on population served, the results showed that the actual flows seen by the wastewater treatment plant of an average of 200 gallons per capita and a peaking factor of 3.0 are in excessive of normal wastewater flows, indicating there is a

significant amount of external flows entering the collection system (i.e., infiltration and inflow)

The projected wastewater for the time period beyond 2012 was calculated by multiplying the total population for a given area (both residential and commercial or industrial) by the 200 gallons per day per capita per population equivalent. There are no significant industrial wastewater customers in the planning areas and a negligible amount of light commercial customers that do not excessively increase flows. These flow projections will be used for alternatives development in the following chapter and will be the basis for the sizing of associated wastewater treatment and conveyance facilities. Future growth in the planning areas is based on the building parcels and was tempered to reflect the rate of new construction permits being issued by the City. Based on current rate of development in the planning areas, the largest potential for new flow would result from adding customer from existing septic tank areas, rather than from new growth.

TABLE 7.2 – HISTORICAL AND FUTURE POPULATION & FLOWS

YEAR	BRECKINRIDGE COUNTY (Population)	CITY OF HARDINSBURG			PLANNING AREA		
		(Population)	Average Wastewater Flows (mgd)	Peak Wastewater Flows (mgd)	(Population)	Average Wastewater Flows (mgd)	Peak Wastewater Flows (mgd)
1970	14,789	1,410	~	~	1,913	0.383	~
1980	16,861	2,211	~	~	2,301	0.460	~
1990	16,312	1,906	~	~	2,223	0.445	~
2000	18,648	2,345	~	~	2,533	0.507	~
2005	~	2,418	0.375	1.099	~	~	~
2009	19,057	2,415	0.547	1.583	2,585	0.517	1.551
2015	19,952	2,419	0.484	1.451	2,590	0.518	1.554
2020	20,247	2,426	0.485	1.456	2,595	0.519	1.557
2025	20,506	2,430	0.486	1.458	2,600	0.520	1.560
2030	20,715	2,434	0.487	1.460	2,605	0.521	1.563

Actual flow from WWTP Records

The flow for years 2005 and 2009 for the City are from actual wastewater treatment plant records. The high flow rate in 2009 calculates to be more than the 200 gallons per day per capita used in determining future flow rates and as previously mentioned, indicating there is a significant amount of external flows entering the collection system (i.e., infiltration and inflow).

Proposed Design Capacity of the WWTP Alternatives

The proposed capacity for the sewer areas within the planning areas are presented in Tables 7-2. The recommended wastewater treatment capacity for the planning areas is presented in Table 7-3.

TABLE 7.3 – RECOMMENDED WASTEWATER FLOWS		
	AVERAGE WASTEWATER FLOW (MGD)	PEAK WASTEWATER FLOW (MGD)
2010	0.567	1.771
2030	0.521	1.563

The reduction in the average and peak flow rate can be attributed to the fact that the City has been and is aggressively working on the wastewater collection system in trying to remove the large amounts of inflow and infiltration (I&I) in the collection system and to rehabilitate the aging infrastructure. The City has recently completed Phase I of an ongoing wastewater collection system rehabilitation project. These projects included conducting an SSES, sewer main replacement, manhole rehabilitation, and cleaning and TV inspection of the sewer system. Phase II will include more of the same type work in other areas of the City and is describe in other chapters of this plan. It has been the City's current priority to remove excessive inflow and infiltration from the sewer collection system in order to reduce the flows to the wastewater treatment plant and prevent surcharges and overflows at the influent pump station, as well as, isolated areas in the collection system and to prevent solids from being washed-out from the treatment plant and discharged during high flow periods.

Based on the current design capacity of 0.732 MGD and the projected population growth in the planning area, it is not anticipated that the wastewater flows will increase more than 5% to 10% in the next twenty years. Therefore, with the City's proposed work on reducing inflow and infiltration in the collection system, the City of Hardinsburg does not expect the need to explore increased capacity to existing plant within the next 20 years. However, components of the WWTP will need to be replaced or upgraded during the 20 year planning period.

Treatment Plant Influent Design Criteria

Table 7.4 presents the preliminary design criteria for the treatment facilities and waste loadings.

TABLE 7.4 – EFFLUENT DESIGN CRITERIA				
Parameter	*Units*	Effluent Limits		
		Average Monthly *(mg/l)*		Weekly Max/ Min. Limit
		MAY 1 - OCT 31	NOV 1 - APR 30	
Design Flow	*(mgd)*	0.732	0.732	
BOD_5	*(mg/l)*	25	25	37.5
TSS	*(mg/l)*	30	30	45
Total Nitrogen	*(mg/l)*	Report Only		
Ammonia	*(mg/l)*	4	10	6 / 15
Dissolved Oxygen	*(mg/l)*	7	7	7
Total Phosphorus	*(mg/l)*	1	2	
E. Coli	*(per 100 col)*	130	130	240
Total Residual Chlorine	*(mg/l)*	0.011	0.011	240

The average daily flows and organic loadings for the past six years are presented in Exhibits 7.1 and 7.2 at the end of this section. Based on the average loadings for the past six years the anticipated loadings for the planning period are presented in Table 7.5 below. These loadings will be used in the evaluation of treatment alternatives.

TABLE 7.5 – ORGANIC LOADINGS - INFLUENT		
Parameter	Average Concentration	
	(mg/l)	(lbs/day)
$CBOD_5$	500	3,052
TSS	750	4,579
Ammonia - NH_3-N	20	122
Total Phosphorus	12	73

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EXHIBIT 7.1
ACTUAL FLOWS and
ORGANIC CONCENTRATION
INFLUENT

City of Hardinsburg WWTP - Actual Flows and Organic Concentrations

Description	Actual Flows and Organic Concentrations - Influent							
	Flows		BOD5		TSS		NH3-N	
	(mgd)	*(mgd)*	*(mg/l)*	*(lbs.day)*	*(mg/l)*	*(lbs.day)*	*(mg/l)*	*(lbs.day)*
Average Daily Flows	Average	Maximum						
July-12	0.206	0.395	195	335.0	115	197.6	31	52.9
June-12	0.243	0.771	123	248.8	52	105.4	42	85.2
May-12	0.357	1.398	352	1,049.2	2033	6,053.0	23	69.7
April-12	0.350	1.107	480	1,399.7	1118	3,262.0	18	51.7
March-12	0.524	1.623	199	868.6	701	3,064.6	10	44.1
February-12	0.428	1.007	386	1,376.9	770	2,748.5	15	52.5
January-12	0.597	1.960	182	907.2	528	2,628.9	5	25.7
December-11	0.800	2.408	81	539.1	741	4,944.0	7	49.2
November-11	0.800	2.870	188	1,251.0	1586	10,583.5	12	77.1
October-11	0.250	0.667	2517	5,246.9	1410	2,939.9	24	51.0
September-11	0.295	1.198	315	773.8	1025	2,521.8	17	40.9
August-11	0.258	0.749	317	681.7	1399	3,010.3	23	49.3
July-11	0.504	1.992	354	1,486.9	756	3,175.6	25	105.9
June-11	0.596	1.590	326	1,619.4	758	3,769.7	15	75.4
May-11	0.791	2.334	427	2,818.5	641	4,227.0	8	50.5
April-11	1.001	2.459	281	2,343.8	355	2,959.5	9	73.8
March-11	0.716	2.037	449	2,678.8	824	4,920.5	12	69.4
February-11	0.431	2.033	453	1,627.4	709	2,546.7	14	48.7
January-11	0.359	0.909	513	1,536.0	809	2,421.4	11	33.7
December-10	0.287	0.774	678	1,622.8	691	1,654.0	18	43.8
November-10	0.285	1.198	317	753.5	442	1,050.0	25	59.7
October-10	0.182	0.329	223	337.7	193	292.2	26	40.1
September-10	0.194	0.439	285	460.5	201	325.5	27	44.3
August-10	0.209	0.308	388	676.7	827	1,441.5	23	39.5
July-10	0.283	0.661	365	860.3	534	1,259.8	16	38.7
June-10	0.272	0.389	405	918.7	837	1,898.7	18	40.8
May-10	0.625	2.498	259	1,350.0	670	3,492.4	8	41.7
April-10	0.514	1.283	353	1,513.2	566	2,426.3	16	68.6
March-10	0.465	1.194	277	1,074.2	739	2,865.9	10	38.8
February-10	0.604	2.669	318	1,601.9	685	3,450.6	8	40.3
January-10	0.641	2.356	491	2,624.9	716	3,827.7	11	58.8
December-09	0.500	1.520	733	3,056.6	545	2,272.7	13	54.2
November-09	0.416	1.561	550	1,908.2	368	1,276.8	17	59.0
October-09	0.749	2.155	661	4,129.0	896	5,597.0	11	68.7
September-09	0.430	1.175	794	2,847.4	1212	4,346.5	14	50.2
August-09	0.393	1.285	550	1,802.7	772	2,530.3	18	59.0
July-09								
June-09	0.531	1.073	591	2,617.3	709	3,139.8	13	57.6
May-09	0.686	2.543	386	2,208.4	539	3,083.7	12	68.7
April-09	0.694	1.934	496	2,870.8	641	3,710.1	10	57.9
March-09	0.601	1.569	335	1,679.1	499	2,501.2	15	75.2
February-09	0.589	1.515	341	1,675.1	531	2,608.4	9	44.2
January-09	0.426	1.080	437	1,552.6	780	2,771.2	11	39.1
December-08	0.596	1.700	346	1,719.8	1848	9,185.7	14	69.6
November-08	0.293	1.071	383	935.9	930	2,272.6	23	56.2
October-08	0.239	0.878	526	1,048.5	806	1,606.6	37	73.8
September-08	0.195	0.354	647	1,052.2	1068	1,736.9	29	47.2
August-08	0.229	0.758	881	1,682.6	1798	3,433.9	25	47.7
July-08	0.264	0.627	1066	2,347.1	1064	2,342.7	24	52.8
June-08	0.265	0.938	848	1,874.2	901	1,991.3	25	55.3
May-08	0.613	2.726	590	3,016.3	965	4,933.5	22	112.5
April-08	0.626	2.068	609	3,179.5	739	3,858.2	13	67.9
March-08	0.900	2.116	330	2,477.0	442	3,317.7	7	52.5
February-08	0.912	2.080	239	1,817.9	389	2,958.8	4	30.4
January-08	0.487	1.579	453	1,839.9	567	2,302.9	15	60.9
December-07	0.938	2.201	398	3,113.5	312	2,440.8	10	78.2
November-07	0.335	1.003	663	1,852.4	670	1,871.9	19	53.1
October-07	0.424	2.396	716	2,531.9	1239	4,381.3	20	70.7
September-07	0.231	0.821	552	1,063.5	695	1,338.9	29	55.9
August-07	0.227	0.604	515	975.0	1089	2,061.7	24	45.4
July-07	0.309	1.008	523	1,347.8	674	1,736.9	19	49.0
June-07	0.230	0.574	796	1,526.9	1599	3,067.2	24	46.0
May-07	0.354	0.971	420	1,240.0	751	2,217.2	21	62.0
April-07	0.462	1.374	859	3,309.8	1110	4,276.9	23	88.6
March-07	0.392	1.123	297	971.0	589	1,925.6	15	49.0
February-07	0.492	1.843	388	1,592.1	446	1,830.1	16	65.7
January-07	0.745	2.255	302	1,876.4	396	2,460.5	9	55.9
December-06	0.589	2.807	453	2,225.3	461	2,264.6	21	103.2
November-06	0.593	2.351	625	3,091.0	677	3,348.2	18	89.0
October-06	0.569	2.696	149	707.1	337	1,599.2	11	52.2
September-06	0.563	2.263	228	1,070.6	311	1,460.3	16	75.1
August-06	0.286	0.706	344	820.5	430	1,025.7	20	47.7
July-06	0.216	0.612	361	650.3	274	493.6	19	34.2
June-06	0.413	0.991	304	1,047.1	296	1,019.5	20	68.9
Average Daily Value	0.467	1.459	468	1684.0	751	2803.6	17	57.7

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EXHIBIT 7.2
ACTUAL FLOWS and ORGANIC CONCENTRATION EFFLUENT

Description	Actual Flows and Organic Concentrations - Effluent								
	BOD5		TSS		NH3-N		P		COLIFORM, FECAL
	(mg/l)	*(lbs.day)*	*(mg/l)*	*(lbs.day)*	*(mg/l)*	*(lbs.day)*	*(mg/l)*	*(lbs.day)*	*(per 1000 col)*
Average Daily Flows									
July-12	2	3.4	3	5.2	0	0.4	0.25	0.4	10
June-12	2	4.1	3	5.1	0	0.5	1.30	2.6	10
May-12	3	8.3	7	21.4	0	1.1	1.67	5.0	10
April-12	1	1.5	4	12.4	0	0.2	1.39	4.1	10
March-12	2	8.7	4	15.3	0	1.1	0.43	1.9	10
February-12	1	4.5	4	15.2	0	0.5	0.69	2.4	10
January-12	4	18.9	5	23.9	0	2.4	0.50	2.5	108
December-11	2	14.7	3	22.7	0	1.7	0.15	1.0	10
November-11	3	20.0	5	31.7	0	1.7	1.71	11.4	128
October-11	6	11.5	3	6.8	0	0.5	2.22	4.6	10
September-11	5	12.3	5	12.9	0	0.6	2.38	5.9	13
August-11	3	7.3	5	10.3	0	1.0	2.69	5.8	10
July-11	4	17.9	5	21.0	1	2.2	1.36	5.7	15
June-11	3	13.9	8	37.8	0	1.4	0.82	4.1	12
May-11	5	29.7	6	37.9	2	11.0	0.35	2.3	13
April-11	2	18.8	10	79.3	0	4.0	0.16	1.3	10
March-11	4	26.3	5	31.1	1	4.5	0.33	2.0	10
February-11	4	12.6	4	15.3	0	1.5	1.42	5.1	10
January-11	3	8.2	4	12.7	1	1.6	0.49	1.5	10
December-10	6	14.8	6	13.9	1	2.3	0.71	1.7	58
November-10	3	6.5	3	6.5	0	1.0	1.91	4.5	23
October-10	3	4.6	4	5.7	0	0.5	2.31	3.5	10
September-10	3	5.2	6	9.1	1	1.9	3.15	5.1	10
August-10	3	5.2	6	9.6	1	1.1	3.57	6.2	10
July-10	2	4.7	4	10.0	0	1.0	1.95	4.6	10
June-10	3	6.8	3	6.8	1	2.3	2.45	5.6	10
May-10	2	10.4	7	36.5	0	0.0	0.84	4.4	12
April-10	3	12.9	8	34.3	0	0.0	1.29	5.5	10
March-10	5	19.4	11	42.7	0	0.0	1.17	4.5	10
February-10	4	20.1	7	35.3	0	0.0	0.57	2.9	10
January-10	3	16.0	8	42.8	1	5.3	1.18	6.3	12
December-09	7	29.2	6	25.0	1	4.2	1.51	6.3	10
November-09	6	20.8	4	13.9	1	3.5	1.27	4.4	10
October-09	4	25.0	5	31.2	1	6.2	0.72	4.5	10
September-09	10	35.9	7	25.1	1	3.6	1.55	5.6	10
August-09	3	9.8	5	16.4	1	3.3	2.20	7.2	10
July-09									
June-09	4	17.7	4	17.7	1	4.4	0.75	3.3	10
May-09	5	28.6	5	28.6	1	5.7	0.80	4.6	10
April-09	3	17.4	5	28.9	1	5.8	0.15	0.9	10
March-09	3	15.0	6	30.1	1	5.0	0.65	3.3	13
February-09	4	19.6	7	34.4	1	4.9	0.32	1.6	13
January-09	5	17.8	10	35.5	1	3.6	0.62	2.2	10
December-08	5	24.9	6	29.8	1	5.0	1.02	5.1	10
November-08	3	7.3	8	19.5	1	2.4	4.99	12.2	10
October-08	4	8.0	4	8.0	1	2.0	3.52	7.0	14
September-08	5	8.1	5	8.1	1	1.6	4.49	7.3	10
August-08	3	5.7	5	9.5	1	1.9	3.47	6.6	10
July-08	3	6.6	4	8.8	1	2.2	3.84	8.5	10
June-08	4	8.8	4	8.8	1	2.2	2.47	5.5	10
May-08	3	15.3	4	20.4	2	10.2	0.40	2.0	10
April-08	8	41.8	5	26.1	1	5.2	0.58	3.0	10
March-08	10	75.1	9	67.6	1	7.5	0.93	7.0	10
February-08	14	106.5	11	83.7	2	15.2	0.74	5.6	10
January-08	9	36.6	11	44.7	2	8.1	1.34	5.4	10
December-07	6	46.9	8	62.6	2	15.6	0.66	5.2	10
November-07	4	11.2	4	11.2	1	2.8	2.78	7.8	10
October-07	2	7.1	6	21.2	1	3.5	3.68	13.0	10
September-07	4	7.7	4	7.7	1	1.9	2.83	5.5	17
August-07	2	3.8	3	5.7	1	1.9	1.07	2.0	10
July-07	2	5.2	3	7.7	1	2.6	0.17	0.4	10
June-07	2	3.8	6	11.5	1	1.9	2.77	5.3	10
May-07	2	5.9	4	11.8	1	3.0	0.48	1.4	10
April-07	3	11.6	5	19.3	1	3.9	0.26	1.0	10
March-07	2	6.5	4	13.1	1	3.3	0.08	0.3	10
February-07	7	28.7	9	36.9	2	8.2	0.44	1.8	10
January-07	10	62.1	15	93.2	4	24.9	1.39	8.6	10
December-06	7	34.4	6	29.5	2	9.8	0.44	2.2	10
November-06	4	19.8	6	29.7	3	14.8	0.62	3.1	10
October-06	4	19.0	9	42.7	1	4.7	0.61	2.9	13
September-06	5	23.5	7	32.9	1	4.7	1.37	6.4	26
August-06	3	7.2	6	14.3	1	2.4	2.36	5.6	22
July-06	5	9.0	6	10.8	1	1.8	3.51	6.3	25
June-06	2	6.9	6	20.7	1	3.4	1.33	4.6	26
Average Daily Value	4	17.4	6	24.3	1	3.9	1.46	4.5	15

SECTION 8: EVALUATION OF ALTERNATIVES

Previous sections of this document have discussed the existing and proposed wastewater treatment plant and collection system for the City of Hardinsburg regional planning area. The intent of this chapter is to outline the wastewater system needs and to evaluate alternative wastewater systems in order to determine the most optimum system, which will enable the City of Hardinsburg to meet these needs.

In the process of evaluation for each alternative system, the focus was on five objectives:

1. Meet or exceed Stream Quality Standards set forth by State and Federal Water Quality Regulations.

2. Upgrade the plant to continue meeting existing and projected needs.

3. Rehabilitate the existing collection system to remove I/I.

4. Expand existing wastewater collection systems to meet 20 year projections.

5. Continue with on-going efforts to reduce excessive inflow and infiltration that is currently in the system.

Wastewater Treatment Plant

The existing City of Hardinsburg Wastewater Treatment Plant is a secondary biological wastewater treatment system that discharges into Hardins Creek. The plant has a design flow of 0.732 million gallons per day (mgd) average capacity. It has been a little over 20 years since this facility was constructed. The plant is currently operating as designed and the areas served by the wastewater system, along with the expected growth within the boundaries covered by the collection system will not ultimately cause the existing facility to exceed its hydraulic design capacity. With continued maintenance and periodic upgrades of components of the treatment plant it should serve the City for the timeframe of this Plan. The components that most likely will need to be upgraded and/or replaced during the 20 year planning period are:

- Provide Phosphorus Removal
- Replace or re-build aerators in Oxidation Ditch
- Clean oxidation ditch; replace rotors

All wastewater generated within the Planning Area is treated at the Hardinsburg Wastewater Treatment Plant ("WWTP"). The current WWTP average daily flow rate is approximately 0.482 MGD or approximately 65% of capacity.

Based on the projected population growth in the planning area and the current flows, it is not anticipated that the wastewater flows will increase more than 5% to 10% in the next twenty years. Therefore, with the City's proposed work on reducing inflow and infiltration in the collection system, the City of Hardinsburg does not expect the need to explore an expansion to existing plant within the next 20 years.

Depending on new Federal and/or state regulations and permit limits the City may need to undertake upgrades to the WWTP. These upgrades will be determined at the time that new regulations and/or permit limits are proposed. The final KPDES permit has been issued and includes a phosphorus limit on the effluent discharge of monthly average of 1 mg/L.

Treatment Process Alternatives

The current treatment plant is operating properly and efficiently removing the phosphorus from the waste stream and has been monitoring the effluent phosphorus for the past seven years. The yearly average for the effluent phosphorus varies from a low of less than 0.8 mg/l to a high of greater than 4.0 mg/l between 2007 and 2014. The treatment plant was not originally design for phosphorus removal but is currently achieving approximately 85% or better removal rates. In order for the City to meet the final KPDES permit limits, additional monitoring and evaluations will be need to determine the best available technologies and processes to reach the higher removal rates for phosphorus.

The City is considering several alternatives for achieving the higher phosphorus removal rates including chemical addition or chemical precipitation of the phosphorus or biological nutrient removal process. A result of chemical addition for the removal is the increased production of biomass or sludge and changes in the wastewater pH. The existing treatment plant is currently limited on the volume of sludge that can be processed at this time and any increase in the amount or volume of sludge will require the construction of additional or modifications to the basins or sludge handling equipment. Also, any major change in the pH will have to be corrected prior to discharge in order to meet the permit limits. These two changes would required the additional construction of chemical feed systems and a determination of the proper chemical injection point or points.

The alternatives presented in this section are alternatives for providing enhanced treatment to meet the recently issued KPDES permit limits. Four alternatives are being considered for phosphorus removal: Alternative #1 - Chemical Precipitation, Alternative #2 - Enhanced Biological Removal with New Anaerobic Zone and Chemical Polishing, Alternative #3 - Enhanced Biological Removal with Modified Anaerobic Zone and Chemical Polishing, and Alternative #4 - No Action.

Alternative #1 Chemical Precipitation

This alternative would require the installation of a chemical feed system and equipment installed near the existing clarifier and constructing a tertiary clarifier for chemical precipitation. The feed location for the chemical injection would be in the existing clarifier and would be the preferred method for chemical precipitation, if alkalinity is not an issue. If alkalinity becomes an issue, then the newly constructed tertiary clarifier would allow for the chemical precipitation of the phosphorus and additional pH adjustment. The tertiary clarifier would be smaller in size than what would be required of the biological sludge. This option would also require a second effluent pipe to be installed to the chlorine contact basin before being discharged.

Chemical precipitation of phosphorus has been acknowledged to also increase sludge production. From discussions with Veolia staff capacity of the existing sludge holding tank (SHT) may not have the additional volume based upon current wasting and sludge handling protocols. Adding a sludge thickener in the process stream will be required in order to lessen the impact to the existing SHT and help alleviate the volume issue.

TABLE 8.1 – ALTERNATIVE #1 - CHEMICAL PRECIPITATION				
DESCRIPTION	QUANTITIES	UNIT	UNIT COST	ESTIMATED COST
Chemical Feed System & Building	1	LS	$225,000	$ 225,000
Tertiary Clarifier	1	LS	$500,000	$ 500,000
New Aerators & Motors w/ VFDs	1	LS	$150,000	$ 150,000
Gravity Sludge Thickener Tank	1	LS	$550,000	$ 550,000
Rotary Sludge Press & Building	1	LS	$375,000	$ 375,000
SUBTOTAL – CONSTRUCTION COST				**$ 1,800,000**
Construction Contingencies (10%)				$ 180,000
Legal, Administration, Engineering & Specialty Services (25%)				$ 450,000
TOTAL – PROJECT COST				**$ 2,430,000**
ANNUAL – OPERATION, MAINTENANCE & REPLACEMENT COST [1]				$ 233,100
TOTAL – O, M, & R PRESENT WORTH COSTS [2]				$ 2,469,000
SALVAGE VALUE [3]				$ (600,000)
PRESENT WORTH COSTS [4]				**$ 4,299,000**

Notes:

[1] Annual operation, maintenance & replacement costs includes semi-annual solids removal, replacement costs and operation & maintenance costs for Force Main.

[2] Total O, M & R costs are calculated for 20 years at 7% interest rate.

[3] No marketable salvage value is available for the units after its service life.

[4] Present worth costs are based upon 20 years at 7% interest rate

Alternative #2 Enhanced Biological Removal with New Anaerobic Zone

This alternative would require creating an anaerobic zone by constructing a new concrete structure that will be the anaerobic zone prior to the raw sewage being introduced into the oxidation ditch. This alternative would require modification of the existing yard piping to be rerouted, and for the return activated sludge (RAS) to be mixed with the influent sewage. The existing single speed motors at each end of the oxidation ditch would be converted to variable speed motor and aerators. Adding DO, ORP and ammonia probes will help in automating the system thereby saving on both energy and chemicals.

This option would require construction of a secondary clarifier to be used for chemical polishing and would be the same size as the existing to accommodate the additional biological sludge and the injection of chemical for final polishing prior to the chlorine contact basin and before being discharged.

Biological precipitation of phosphorus has also been acknowledged to increase sludge production. From discussions with Veolia staff capacity of the existing sludge holding tank (SHT) may not have the additional volume based upon current wasting and sludge handling protocols. Making modifications to the existing SHT in the process stream will be required in order to lessen the impact to the existing SHT and help alleviate the volume issue.

TABLE 8.2 – ALTERNATIVE #2 - ENHANCED BIOLOGICAL REMOVAL WITH NEW ANAEROBIC ZONE				
DESCRIPTION	**QUANTITIES**	**UNIT**	**UNIT COST**	**ESTIMATED COST**
Chemical Feed System & Building	1	LS	$50,000	$ 50,000
Tertiary Clarifier	1	LS	$500,000	$ 500,000
New Aerators & Motors w/ VFDs	1	LS	$150,000	$ 150,000
New Anaerobic Zone	1	LS	$175,000	$ 175,000
Modification of Sludge Holding Tank	1	LS	$125,000	$ 125,000
SUBTOTAL – CONSTRUCTION COST				**$ 1,000,000**
Construction Contingencies (10%)				$ 100,000
Legal, Administration, Engineering & Specialty Services (25%)				$ 250,000
TOTAL – PROJECT COST				**$ 1,350,000**
ANNUAL – OPERATION, MAINTENANCE & REPLACEMENT COST [1]				$ 162,900
TOTAL – O, M, & R PRESENT WORTH COSTS [2]				$ 1,726,000
SALVAGE VALUE [3]				$ (333,000)
PRESENT WORTH COSTS [4]				**$ 2,743,000**

Notes:

[1] Annual operation, maintenance & replacement costs includes semi-annual solids removal, replacement costs and operation & maintenance costs for Force Main.

[2] Total O, M & R costs are calculated for 20 years at 7% interest rate.

[3] No marketable salvage value is available for the units after its service life.

[4] Present worth costs are based upon 20 years at 7% interest rate

Alternative #3 Enhanced Biological Removal with Modified Anaerobic Zone

This alternative would require creating an anaerobic zone in the existing oxidation ditch and modifying the existing influent piping to create the anaerobic zone prior to the raw sewage being introduced into the oxidation ditch. Using the existing oxidation ditch would

require for some yard piping to be rerouted, so that return activated sludge (RAS) would be mixed with influent sewage. It would then be returned to a common pipe to the back side of the oxidation ditch. Utilizing the existing ditch would require converting the existing single speed motor at each end to a variable speed motor/aerator. This will enable for the speed/aeration to be adjusted to minimize oxygen input to maintain anoxic/anaerobic conditions in the proposed zone. Adding DO, ORP and ammonia probes will help in automating the system thereby saving on both energy and chemicals.

This option also requires construction of a secondary clarifier to be used for chemical polishing and would be the same size as the existing to accommodate the additional biological sludge the same as Alternative #2.

As with Alternative #2, a second SHT in the process stream will be required in order to lessen the impact to the existing SHT and help alleviate the volume issue.

TABLE 8.3 – ALTERNATIVE #3 - ENHANCED BIOLOGICAL REMOVAL WITH MODIFIED ANAEROBIC ZONE				
DESCRIPTION	**QUANTITIES**	**UNIT**	**UNIT COST**	**ESTIMATED COST**
Chemical Feed System & Building	1	LS	$75,000	$ 75,000
Tertiary Clarifier	1	LS	$500,000	$ 500,000
New Aerators & Motors w/ VFDs	1	LS	$150,000	$ 150,000
Modification to Existing Aeration Zone	1	LS	$150,000	$ 150,000
Sludge Holding Tank	1	LS	$425,000	$ 425,000
SUBTOTAL – CONSTRUCTION COST				**$ 1,300,000**
Construction Contingencies (10%)				$ 130,000
Legal, Administration, Engineering & Specialty Services (25%)				$ 325,000
TOTAL – PROJECT COST				**$ 1,755,000**
ANNUAL – OPERATION, MAINTENANCE & REPLACEMENT COST [1]				$ 189,500
TOTAL – O, M, & R PRESENT WORTH COSTS [2]				$ 2,008,000
SALVAGE VALUE [3]				$ (433,000)
PRESENT WORTH COSTS [4]				**$ 3,330,000**

Notes:

[1] Annual operation, maintenance & replacement costs includes semi-annual solids removal, replacement costs and operation & maintenance costs for Force Main.

[2] Total O, M & R costs are calculated for 20 years at 7% interest rate.

[3] No marketable salvage value is available for the units after its service life.

[4] Present worth costs are based upon 20 years at 7% interest rate

Alternative #4 - "No Action":

If the "no action" alternative is taken, the wastewater treatment plant would not provide any additional treatment process during the planning period and result in exceedance of the KPDES discharge limits for phosphorus. These permit exceedances would likely lead to the Kentucky Divison of Water's Division of Enforcement to file legal action against the City, which would require corrective actions to be taken and expenditure of funds for the design and construction of the necessary improvements.

TABLE 8.4 – ALTERNATIVE #4 - NO ACTION				
DESCRIPTION	QUANTITIES	UNIT	UNIT COST	ESTIMATED COST
NO ACTION	1	LS	$ -	$ -
SUBTOTAL – CONSTRUCTION COST				**$ -**
Construction Contingencies (10%)				$ -
Legal, Administration, Engineering & Specialty Services (25%)				$ -
TOTAL – PROJECT COST				**$ -**
ANNUAL – OPERATION, MAINTENANCE & REPLACEMENT COST [1]				N/A
TOTAL – O, M, & R PRESENT WORTH COSTS [2]				N/A
SALVAGE VALUE [3]				N/A
PRESENT WORTH COSTS [4]				**N/A**

Notes:

[1] Annual operation, maintenance & replacement costs includes semi-annual solids removal, replacement costs and operation & maintenance costs for Force Main.

[2] Total O, M & R costs are calculated for 20 years at 7% interest rate.

[3] No marketable salvage value is available for the units after its service life.

[4] Present worth costs are based upon 20 years at 7% interest rate

COST ANALYSIS OF WWTP ALTERNATIVES

Based upon the monetary comparison, Table 8.5 below, Alternative #2 is the selected alternative based upon project construction costs and present worth costs. Also, Alternative #2 has the lowest annual O, M & R costs and present worth costs.

TABLE 8.5 – MONETARY COST COMPARASION OF ALTERNATIVES			
ALTERNATIVE	PROJECT COSTS	ANNUAL O, M & R COSTS	PRESENT WORTH COSTS
#1 - CHEMICAL PRECIPITATION	$ 2,430,000	$ 233,100	$ 4,299,000
#2 - ENHANCED BIOLOGICAL REMOVAL WITH NEW ANAEROBIC	$ 1,350,000	$ 162,900	$ 2,743,000
#3 - ENHANCED BIOLOGICAL REMOVAL WITH MODIFIED	$ 1,755,000	$ 189,500	$ 3,330,000
#4 - NO ACTION	N/A	N/A	N/A

Wastewater Collection System

The alternatives presented in this section are alternatives for providing sewer service to the areas identified in this plan as not currently having sewer service provided by the City of Hardinsburg.

The rehabilitation of the existing wastewater collection system is critical for the continued successful operation of the Hardinsburg WWTP and collection system. The city plans to implement the findings of the SSES to address deficiencies in the collection system. These repairs include all aspects of the collection system: manholes (repair/replace), sewer mains, lateral connections, and/or cleanouts.

The first phase the rehabilitation will take place in the 0-2 year PA. This will make the most critical repairs and also expand the study of the wastewater collection system by utilizing cleaning and Closed Circuit Televising (CCTV) of the existing collection system.

The second phase of the rehabilitation will be placed within the 3-10 year PA. This will make other repairs known and unknown at the time of this report. The same procedures utilized in the first phase will be utilized in the second phase.

Alternative #1 - "No Action":

If the "no action" alternative is taken, the problems with failing septic tanks will only increase. When septic systems fail, the homeowners are faced with the expense of repairing or replacing their septic tank. The cost of replacing the septic system is one that many of the residents cannot afford and/or have planned for financially. If a "no action" approach is taken, the general public's health and welfare maybe subject to compromise.

Alternative #2: Septic System Maintenance Program

Failed septic systems are costly to repair, pose a danger to public health, and are a significant source of water pollution. Seepage from inadequate or failing septic systems can contaminate both ground and surface waters affecting the drinking water and surface waters.

A septic tank maintenance program recommends that all homes have their tank pumped every 3-4 years (3 years is recommended for rental homes). The annual cost for a 4-year inspection and tank pump by a licensed contractor can run from about $100 to $200 per year, depending on the size and condition. Going beyond the 4-year interval adds risk and saves very little cost. All homeowners are responsible to maintain the septic system.

Since this program relies on the cooperation of the individual resident to maintain their septic system, the City does not desire to be in the septic tank maintenance business and competing with the local businesses that currently offer these services. Therefore, this alternative is deemed not viable.

Alternative #3 – Individual Onsite Treatment Units and Surface Discharge

The use of individual wastewater treatment units that can be constructed to treat between 400 – 4,000 gallons/day is an alternative to septic tanks and sewer system extensions. The proposed units are Fusion Treatment Systems (Zoeller / Clarus Environmental), that utilize aerobic and anaerobic processes. The aerobic process occurs within an aeration chamber with a suspended media, the anaerobic process occurs in a fixed, submerged media. Manufacturer literature provides that the media are permanent and do not require replacement, but the units do require semi-annual pumping of solids. Effluent from the units will be pumped into force main sewers and discharge to surface water at a centralized point. Fusion units are capable of meeting the secondary effluent limits, but will require step-aeration before being discharged to a receiving stream. In order for the units to discharge to a receiving stream, a KPDES permit (and associated cost) would be required.

TABLE 8.6 – ALTERNATIVE #3 - INDIVIDUAL ONSITE WWTP				
DESCRIPTION	QUANTITIES	UNIT	UNIT COST	ESTIMATED COST
2" PVC FORCE MAIN	18,500	LF	$12	$ 222,000
1 1/2" PVC FORCE MAIN	20,500	LF	$11	$ 225,500
1" PVC FORCE MAIN	7,400	LF	$10	$ 74,000
INDIVIDUAL FUSION WWTP	213	EA	$13,000	$ 2,769,000
4" PVC LATERAL	10,650	LF	$40	$ 426,000
CHLORINATION & DECHLORINATION UNITS	6	EA	$40,000	$ 240,000
SUBTOTAL – CONSTRUCTION COST				**$ 3,956,500**
Construction Contingencies (10%)				$ 395,650
Legal, Administration, Engineering & Specialty Services (25%)				$ 989,125
TOTAL – PROJECT COST				**$ 5,341,275**
ANNUAL – OPERATION, MAINTENANCE & REPLACEMENT COST [1]				$ 33,090
TOTAL – O, M, & R PRESENT WORTH COSTS [2]				$ 351,000
SALVAGE VALUE [3]				$ (254,000)
PRESENT WORTH COSTS [4]				**$ 5,438,275**

Notes:

[1] Annual operation, maintenance & replacement costs includes semi-annual solids removal, replacement costs and operation & maintenance costs for Force Main.

[2] Total O, M & R costs are calculated for 20 years at 7% interest rate.

[3] No marketable salvage value is available for the units after its service life.

[4] Present worth costs are based upon 20 years at 7% interest rate

Alternative #4: Conventional Gravity Sewers

Gravity sewers are the traditional method used for the collection of wastewater from residential, commercial, industrial, and institutional sources. The sewer lines must be laid on grade and the topography of the area must be considered during the design process. Gravity sewers are generally more expensive to construct than other alternative, but cheaper to maintain and operate.

TABLE 8.7 – ALTERNATIVE #4 - CONVENTIONAL GRAVITY SEWERS				
DESCRIPTION	**QUANTITIES**	**UNIT**	**UNIT COST**	**ESTIMATED COST**
8" GRAVITY SEWER MAIN	46,350	LF	$75	$ 3,476,250
4' DIAMETER MANHOLE	163	EA	$3,500	$ 570,500
6" PVC LATERALS	4,700	LF	$40	$ 188,000
RECONNECTION OF EXISTING SEWER CUSTOMERS	10	EA	$1,500	$ 15,000
LIFT STATION	3	EA	$75,000	$ 225,000
4" PVC FORCE MAIN	9,250	LF	$12	$ 111,000
SUBTOTAL – CONSTRUCTION COST				**$ 4,585,750**
Construction Contingencies (10%)				$ 458,575
Legal, Administration, Engineering & Specialty Services (25%)				$ 1,146,438
TOTAL – PROJECT COST				**$ 6,190,763**
ANNUAL – OPERATION, MAINTENANCE & REPLACEMENT COST [1]				$ 50,837
TOTAL – O, M, & R PRESENT WORTH COSTS [2]				$ 539,000
SALVAGE VALUE [3]				$ (1,524,000)
PRESENT WORTH COSTS [4]				**$ 5,205,763**

Notes:

[1] Annual operation, maintenance & replacement costs includes semi-annual solids removal, replacement costs and operation & maintenance costs for Force Main.

[2] Total O, M & R costs are calculated for 20 years at 7% interest rate.

[3] No marketable salvage value is available for the units after its service life.

[4] Present worth costs are based upon 20 years at 7% interest rate

Alternative #5: Individual Grinders & Force Main

Individual grinders and force mains are an alternative to gravity sewers, where the initial capital costs can be excessive. The force mains can be smaller in size due to the grinder pump grinding all solids into small particles. Grinders and force mains are generally less expensive to construct than gravity sewers, but more expensive to maintain and operate.

TABLE 8.8 – ALTERNATIVE #5 - INDIVIDUAL GRINDERS & FORCE MAIN				
DESCRIPTION	**QUANTITIES**	**UNIT**	**UNIT COST**	**ESTIMATED COST**
4" PVC FORCE MAIN	8,000	LF	$14	$ 112,000
3" PVC FORCE MAIN	15,000	LF	$13	$ 195,000
2" PVC FORCE MAIN	15,000	LF	$12	$ 180,000
1 1/2" PVC FORCE MAIN	10,000	LF	$11	$ 110,000
INDIVIDUAL GRINDER UNITS	213	EA	$4,500	$ 958,500
TIE INTO EXISTING MANHOLE	5	EA	$2,500	$ 12,500
4" PVC LATERAL	10,650	LF	$40	$ 426,000
SUBTOTAL – CONSTRUCTION COST				**$ 1,994,000**
Construction Contingencies (10%)				$ 199,400
Legal, Administration, Engineering & Specialty Services (25%)				$ 498,500
TOTAL – PROJECT COST				**$ 2,691,900**
ANNUAL – OPERATION, MAINTENANCE & REPLACEMENT COST [1]				$ 50,210
TOTAL – O, M, & R PRESENT WORTH COSTS [2]				$ 532,000
SALVAGE VALUE [3]				$ (665,000)
PRESENT WORTH COSTS [4]				**$ 2,558,900**

Notes:

[1] Annual operation, maintenance & replacement costs includes semi-annual solids removal, replacement costs and operation & maintenance costs for Force Main.

[2] Total O, M & R costs are calculated for 20 years at 7% interest rate.

[3] No marketable salvage value is available for the units after its service life.

[4] Present worth costs are based upon 20 years at 7% interest rate

COST ANALYSIS OF ALTERNATIVES

Based upon the monetary comparison, Table 8.9 below, Alternative #5 is the selected alternative based upon project construction costs and present worth costs. Although Alternative #5 does not have the lowest annual O, M & R costs, the savings of project costs more than offset the additional annual operation, maintenance and replacement costs.

TABLE 8.9 – MONETARY COST COMPARASION OF ALTERNATIVES

ALTERNATIVE	PROJECT COSTS	ANNUAL O, M & R COSTS	PRESENT WORTH COSTS
#3 - INDIVIDUAL ONSITE TREATMENT UNITS	$ 5,341,275	$ 33,090	$ 5,438,275
#4 - CONVENTIONAL GRAVITY SEWER	$ 6,190,763	$ 50,837	$ 5,205,763
#5 - INDIVIDUAL GRINDERS & FORCE MAIN	$ 2,691,900	$ 50,210	$ 2,558,900

The cost of construction is beyond the means of the City to undertake without seeking financing from outside sources. The two main sources of funding that the City has used in the past are the USDA Rural Development Water and Wastewater grant and loan program and the Clean Water and Drinking Water State Revolving Funds through the State of Kentucky, Division of Water and the Kentucky Infrastructure Authority. It is anticipated that the City will need to utilize these programs again in the future to construct any of the alternatives identified. Table 8.9 shows the impact of borrowing the project costs identified in Table 8.10 on the user rates of the City. The evaluation of the impact on rates took into consideration the following:

- Rural Development Funding would consist of seventy percent loan at 2.5 percent for 40 years; grant funding would make up the balance at thirty percent.
- SRF funding would consist of 100 percent loan at 1 percent for 20 years.
- No increase in operating costs were factored in; just additional debt service

TABLE 8.10 – RATE IMPACT OF ALTERNATIVES			
ALTERNATIVE	PROJECT COSTS	PROJECTED RATES WITH RURAL DEVELOPMENT FUNDING	PROJECTED RATES WITH STATE REVOLVING FUNDS
#3 – ONSITE TREATMENT UNITS	$5,140,500	$9.50 Minimum Bill $5.35 per 1000 gal.	$10.50 Minimum Bill $7.50 per 1000 gal.
#4 – GRAVITY SEWERS	$5,962,750	$10.00 Minimum Bill $5.60 per 1000 gal.	$11.00 Minimum Bill $8.15 per 1000 gal.
#5 – GRINDERS	$2,592,200	$9.00 Minimum Bill $4.40 per 1000 gal.	$9.75 Minimum Bill $5.45 per 1000 gal.

NONMONETARY ANALYSIS OF ALTERNATIVES

Nonmonetary analysis was utilized to quantify and evaluate each alternative. Alternatives #1 & #2 are not being considered due to previously discussed opinions. The following criteria were used for the nonmonetary analysis of the alternatives:

- *Environmental Impacts* – Impact of each alternative on the environment.
- *Operation Evaluation* – A judgment of reliability, maintenance and operation issues of each treatment process.
- *Constructability* – the ease to obtain necessary permits and regulatory approval, construction difficulty and design constraints.
- *Public Acceptance* – A measure of public acceptance of the project.
- *Energy Use* – Energy efficiency of the treatment process.

The characteristics above were the basis for establishing a quantitative score for each of the alternatives. A numerical ranking of 1 to 3 was given to each alternative in the order of least favorable (1) to the most favorable (3). The alternative with the highest point score is considered the most favorable alternative.

Each criterion is assigned a weight factor to rank the relative importance of the criterion to the City of Hardinsburg. A total weight factor of 100 points was distributed to the criteria. The score of each alternative is calculated by multiplying the criteria ranking by the weight factor and adding the total score for each alternative. Table 8.11 displays the scoring matrix.

TABLE 8.11 - NONMONETARY COMPARASION OF ALTERNATIVES							
EVALUATION CRITERIA	WEIGHT FACTOR	ALTERNATIVE #3		ALTERNATIVE #4		ALTERNATIVE #5	
		RANKING	WEIGHTED POINTS	RANKING	WEIGHTED POINTS	RANKING	WEIGHTED POINTS
ENVIRONMENTAL IMPACT	20	1	20	2	40	3	60
OPERATION EVALUATION	20	1	20	3	60	2	40
CONSTRUCTIBILITY	20	1	20	2	40	3	60
PUBLIC ACCEPTANCE	20	1	20	2	40	3	60
ENERGY USE	20	2	40	1	20	3	60
TOTAL WEIGHTED SCORE			120		200		280

Alternative #5 – Individual Grinder & Force Mains is the most favorable alternative based upon the nonmonetary analysis. The basis for the Non-Economic Factors scoring is discussed in the following sections.

Environmental Impacts

Alternative #5 – Grinder will have the least impact during construction. Alternative #4 – Gravity Sewers would require extensive excavation and rock removal due to the lines being laid at a specific grade to flow by gravity. Alternative #3 would have the most impact on private lands during installation and throughout the service life of the treatment facilities.

Operation Evaluation

Alternative #4 – Gravity is seen as the most favorable from an operations and maintenance standpoint due to annual time requirements. Alternative #3 & #5 both will require more time and effort from an operations and maintenance standpoint.

Constructability

Alternative #5 – Grinders would require the least amount of excavation and skilled pipe workers. Alternative #4 – Gravity would have more extensive excavation and require skilled labors. Alternative #3 – Onsite Treatment Units would require the most disturbances to private property and be the least favorable as far as liability during construction.

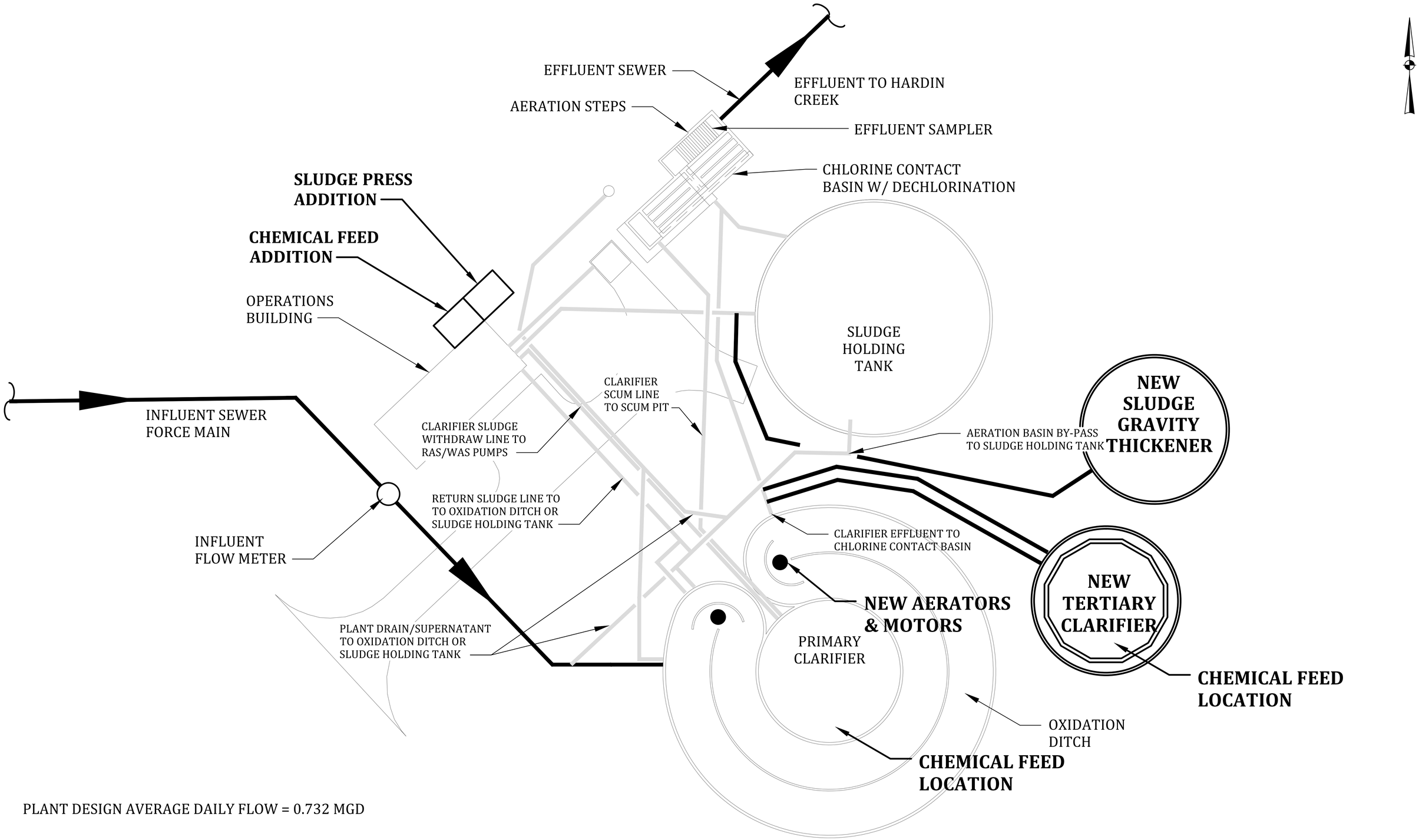
Public Acceptance

Alternative #3 – Onsite Treatment Units is seen as the least favorable due to the long term commitment from private property owners. Alternatives #4 & #5 were viewed as being acceptable to the public.

Energy Use
Alternative #4 – Gravity is believed to have the highest energy cost due to the lift stations that would be required to transport a majority of the wastewater to the existing collection system. Alternative #5 – Grinders is believed to have the lowest energy cost associated with transporting the wastewater into the existing collection system.

RECOMMENDED ALTERNATIVES

Based upon the monetary and nonmonetary analysis Alternative #5 – Individual Grinder and Force Main is the recommended alternative for collection system expansion. For phosphorus removal the recommended alternative is Alternative #2 – Enhanced Biological Removal with New Anaerobic Zone.



PLANT DESIGN AVERAGE DAILY FLOW = 0.732 MGD

PREPARED BY:

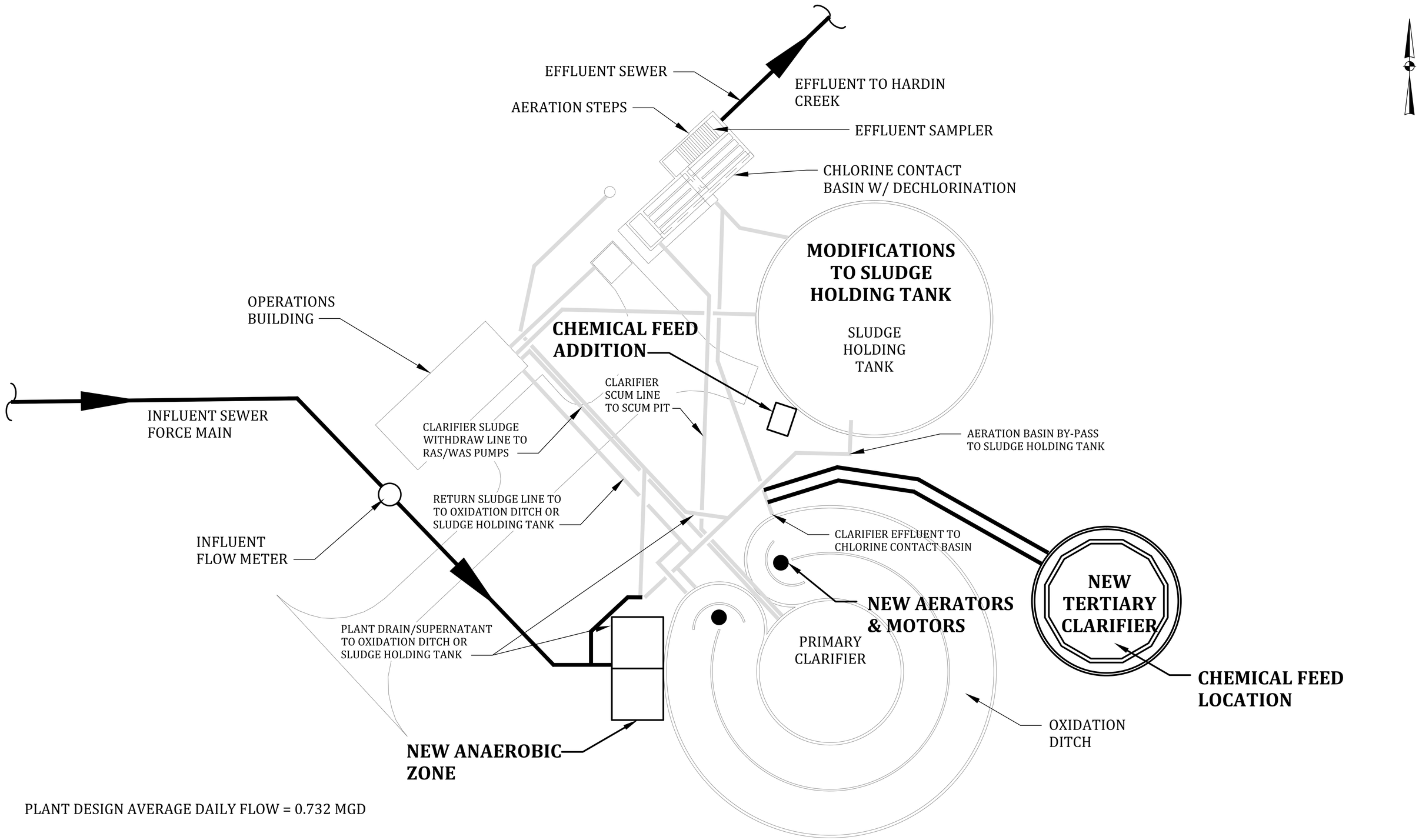
P.O. Box 1034
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

PREPARED FOR:

HARDINSBURG PUBLIC WORKS MUNICIPAL UTILITIES

SCALE: Not to Scale

EXHIBIT 8.1
WASTEWATER TREATMENT PLANT PHOSPHORUS REMOVAL
ALTERNATIVE #1 PROCESS FLOW DIAGRAM



PLANT DESIGN AVERAGE DAILY FLOW = 0.732 MGD

PREPARED BY:

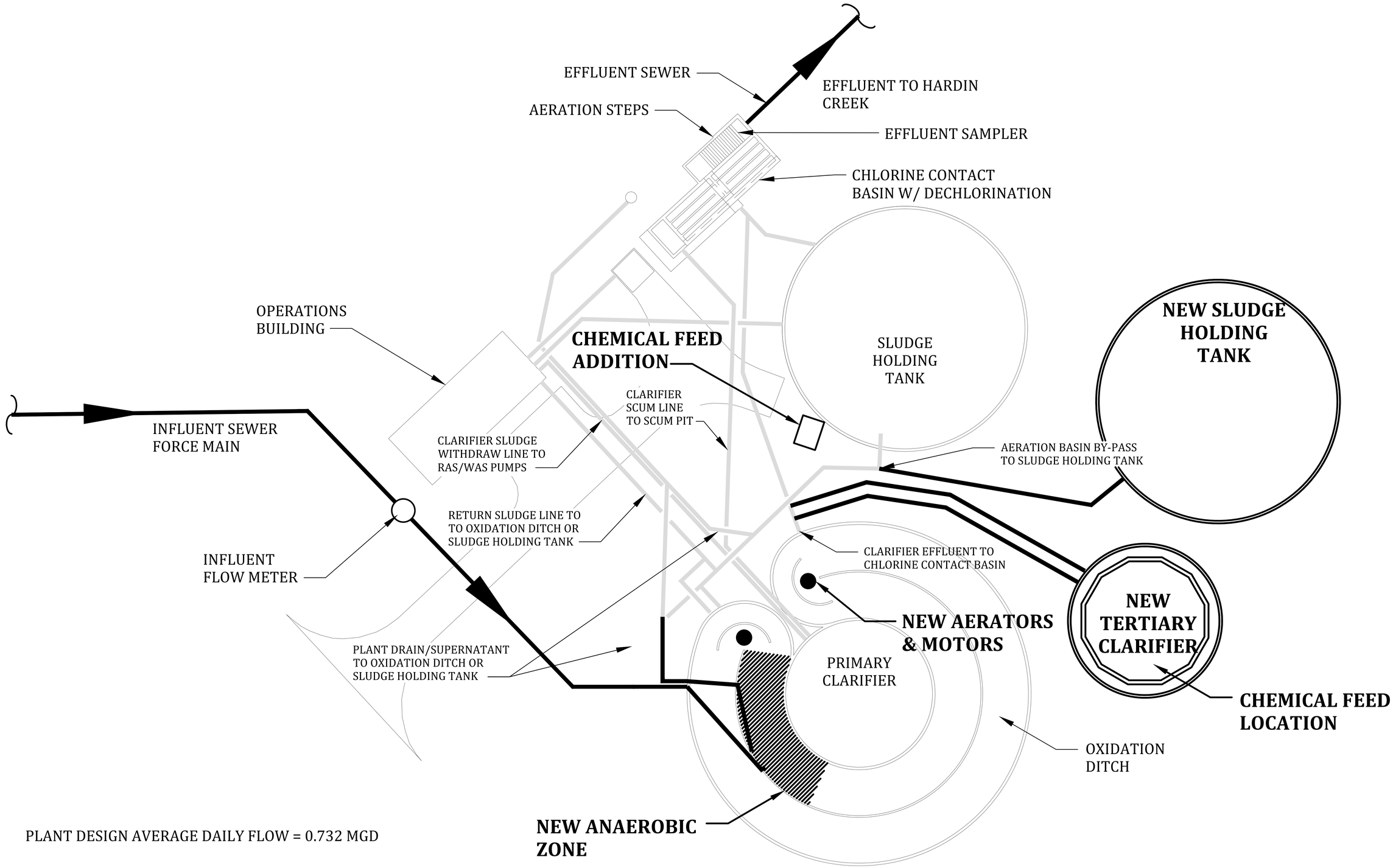
P.O. Box 1034
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

PREPARED FOR:

HARDINSBURG PUBLIC WORKS MUNICIPAL UTILITIES

SCALE: Not to Scale

EXHIBIT 8.2
WASTEWATER TREATMENT PLANT PHOSPHORUS REMOVAL
ALTERNATIVE #2 PROCESS FLOW DIAGRAM



PLANT DESIGN AVERAGE DAILY FLOW = 0.732 MGD

PREPARED BY:

P.O. Box 1034
VERSAILLES, KENTUCKY 40383
KENTUCKY ENGINEERING GROUP, PLLC

PREPARED FOR:

HARDINSBURG MUNICIPAL UTILITIES PUBLIC WORKS

SCALE: Not to Scale

EXHIBIT 8.3
WASTEWATER TREATMENT PLANT PHOSPHORUS REMOVAL
ALTERNATIVE #3 PROCESS FLOW DIAGRAM

SECTION 9: CROSS CUTTER CORRESPONDENCE & MITGATION

After the drafting of the Facilities Plan Update, scoping letters were sent to:

- US Fish & Wildlife Service – Exhibit 9.1
- Kentucky Department of Fish and Wildlife Resources – Exhibit 9.2
- Kentucky Heritage Council – Exhibit 9.3
- NRCS – Exhibit 9.4
- US Army Corps of Engineers – Exhibit 9.5

Responses were received from US Fish & Wildlife, Kentucky Heritage Council and US Army Corps of Engineers, Exhibits 9.6 thru 9.8 respectfully.

KENTUCKY ENGINEERING GROUP, PLLC

November 2, 2010

Mr. Virgil Lee Andrews, Jr., Field Office Supervisor
U.S. Department of the Interior
Fish and Wildlife Service
J.C. Watts Federal Building
330 West Broadway, Suite 265
Frankfort, KY 40601

RE: City of Hardinsburg
Regional Facilities Plan Update

Dear Mr. Andrews:

The City of Hardinsburg is in the process of completing an update to its wastewater Regional Facilities Plan. Within this Plan Update are proposed projects that may be undertaken by the City over the next twenty years. Two of the projects are anticipated to be completed during the zero to two year time frame; the remaining projects will be completed either during the three to ten year period or ten to twenty year period.

Enclosed is a map that shows the location of the proposed projects. The two projects to be completed during the zero to two year time frame are rehabilitation of various sections of the existing collection system and the replacement of a sewage collection line along O'Connell Park Road.

Please advise us of any present concerns your office may have related to possible effects of the abovementioned projects on threatened or endangered species or critical wildlife habitat.

We would appreciate a response within 30 days, if possible. If you need any further information or wish to discuss the project, please contact me at 859-333-9742.

Sincerely,

KENTUCKY ENGINEERING GROUP, PLLC

Holly L. Nicholas

Enclosure- Map

P.O. Box 1034
Versailles, Kentucky 40383
Phone: (859) 251.4127
Fax: (859) 251.4137
Email: info @ kyengr.com
www.kyengr.com

KENTUCKY ENGINEERING GROUP, PLLC

November 2, 2010

Dr. Jonathan W. Gassett
Commissioner
Kentucky Department of Fish and Wildlife Resources
#1 Sportsman's Lane
Frankfort KY 40601

RE: City of Hardinsburg
Regional Facilities Plan Update

Dear Commissioner Gassett:

The City of Hardinsburg is in the process of completing an update to its wastewater Regional Facilities Plan. Within this Plan Update are proposed projects that may be undertaken by the City over the next twenty years. Two of the projects are anticipated to be completed during the zero to two year time frame; the remaining projects will be completed either during the three to ten year period or ten to twenty year period.

Enclosed is a map that shows the location of the proposed projects. The two projects to be completed during the zero to two year time frame are rehabilitation of various sections of the existing collection system and the replacement of a sewage collection line along O'Connell Park Road.

Please advise us of any present concerns your office may have related to possible effects of the abovementioned projects on threatened or endangered species or critical wildlife habitat.

We would appreciate a response within 30 days, if possible. If you need any further information or wish to discuss the project, please contact me at 859-333-9742.

Sincerely,

KENTUCKY ENGINEERING GROUP, PLLC

Holly L. Nicholas

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KENTUCKY ENGINEERING GROUP, PLLC

November 2, 2010

Mr. Mark Dennen
State Historic Preservation Officer
Kentucky Heritage Council
300 Washington Street
Frankfort KY 40601

RE: City of Hardinsburg
Regional Facilities Plan Update

Dear Mr. Dennen:

The City of Hardinsburg is in the process of completing an update to its wastewater Regional Facilities Plan. Within this Plan Update are proposed projects that may be undertaken by the City over the next twenty years. Two of the projects are anticipated to be completed during the zero to two year time frame; the remaining projects will be completed either during the three to ten year period or ten to twenty year period.

Enclosed is a map that shows the location of the proposed projects. The two projects to be completed during the zero to two year time frame are rehabilitation of various sections of the existing collection system and the replacement of a sewage collection line along O'Connell Park Road.

Please advise us of any present concerns your office may have related to possible effects of the above mentioned projects on historic or archaeological properties within the City of Hardinsburg and its Regional Planning Area.

We would appreciate a response within 30 days, if possible. If you need any further information or wish to discuss the project, please contact me at 859-333-9742.

Sincerely,

KENTUCKY ENGINEERING GROUP, PLLC

Holly L. Nicholas

Enclosure- Map

P.O. Box 1034
Versailles, Kentucky 40383
Phone: (859) 251.4127
Fax: (859) 251.4137
Email: info @ kyengr.com
www.kyengr.com

February 5, 2016

Mr. Benjamin Stith
Resource Conservationist
NRCS
1101 South Highway 261
Hardinsburg KY 40143

RE: City of Hardinsburg
Regional Facilities Plan Update

Dear Mr. Stith:

The City of Hardinsburg is in the process of completing an update to its wastewater Regional Facilities Plan. Within this Plan Update are proposed projects that may be undertaken by the City over the next twenty years. Two of the projects are anticipated to be completed during the zero to two year time frame; the remaining projects will be completed either during the three to ten year period or ten to twenty year period.

Enclosed are maps that show the location of the proposed projects. The two projects to be completed during the zero to two year time frame are rehabilitation of various sections of the existing collection system and phosphorus removal at the wastewater treatment plant.

Please advise us of any present concerns your office may have related to possible effects of the abovementioned projects on farmland in the area.

We would appreciate a response within 30 days, if possible. If you need any further information or wish to discuss the project, please contact me at 859-333-9742.

Sincerely,

KENTUCKY ENGINEERING GROUP, PLLC

Holly L. Nicholas

Enclosure- Map

P.O. Box 1034
Versailles, Kentucky 40383
Phone: (859) 251.4127
Fax: (859) 251.4137
Email: info @ kyengr.com
www.kyengr.com

February 12, 2016

U.S. Army Engineer District, Louisville Corps of Engineers
Regulatory Branch
PO Box 59
Louisville, KY 40201-0059

RE: City of Hardinsburg
Regional Facilities Plan Update

To Whom It May Concern:

The City of Hardinsburg is in the process of completing an update to its wastewater Regional Facilities Plan. Within this Plan Update are proposed projects that may be undertaken by the City over the next twenty years. Two of the projects are anticipated to be completed during the zero to two year time frame; the remaining projects will be completed either during the three to ten year period or ten to twenty year period.

Enclosed are maps that show the location of the proposed projects. The two projects to be completed during the zero to two year time frame are rehabilitation of various sections of the existing collection system and phosphorus removal at the wastewater treatment plant.

Please advise us of any present concerns your office may have related to possible effects of the abovementioned projects on threatened or endangered species or critical wildlife habitat or jurisdictional waters.

We would appreciate a response within 30 days, if possible. If you need any further information or wish to discuss the project, please contact me at 859-333-9742.

Sincerely,

KENTUCKY ENGINEERING GROUP, PLLC

Holly L. Nicholas

Enclosure- Maps

P.O. Box 1034
Versailles, Kentucky 40383
Phone: (859) 251.4127
Fax: (859) 251.4137
Email: info @ kyengr.com
www.kyengr.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

November 30, 2010

RECEIVED
DEC - 2 2010
By

Ms. Holly L. Nicholas
Project Administrator
Kentucky Engineering Group, PLLC
P O Box 1034
Versailles, Kentucky 40383

Re: FWS 2011-B-0125; Kentucky Engineering Group, City of Hardinsburg, Regional Facilities Plan Update, located in Breckinridge County, Kentucky

Dear Ms. Nicholas:

Thank you for your correspondence of November 2, 2010, regarding the above-referenced project. The U.S. Fish and Wildlife Service (Service) has reviewed the proposed project and offers the following comments in accordance with the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

In accordance with provisions of the Fish and Wildlife Coordination Act, the Service has reviewed the project with regards to the effects the proposed actions may have on wetlands and/or other jurisdictional waters. We recommend that project plans be developed to avoid impacting wetland areas and/or streams, and reserve the right to review any required federal or state permits at the time of public notice issuance. The U.S. Army Corps of Engineers should be contacted to assist you in determining if wetlands or other jurisdictional waters are present or if a permit is required.

In order to assist you in determining if the proposed project has the potential to impact protected species, we have searched our records for occurrences of listed species within the vicinity of the proposed project. Based upon the information provided to us and according to our databases, we believe that two federally listed species have the potential to occur within the project vicinity. The listed species are:

Common Name	**Scientific Name**	**Federal Status**
Indiana bat	*Myotis sodalis*	Endangered
gray bat	*Myotis grisescens*	Endangered

We must advise you that collection records available to the Service may not be all-inclusive. Our database is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitats and, thus, does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality.

Indiana bat

Based on your correspondence, summer habitat (suitable forested areas) for the federally endangered Indiana bat occurs within the project area. Furthermore, the majority of project portions would occur within the swarming range of a several, sensitive Priority 1 and Priority 2 documented hibernacula. Prior to hibernation, Indiana bats utilize the forest habitat around the hibernacula, where they feed and roost until temperatures drop to a point that forces them into hibernation. This "fall swarming" period lasts, depending on weather conditions in a particular year, from about August 16 to about November 15. This is a critical time for Indiana bats, since they are acquiring additional fat reserves and mating prior to hibernation. Another critical time for Indiana bats utilizing this swarming range is during spring emergence (~April 1 - ~May 14) from the hibernacula. During this time, bats utilize the swarming range to forage prior to migrating to their respective summering areas. It should also be noted that some bats may continue to utilize this swarming area year round; however, these are typically adult males. Typically for a project of this nature, the Service would recommend seasonal tree clearing or the completion of a mist net survey before construction activities take place. Mist net surveys provide presence/absence information; however, we already know that the Indiana bats are present and that the project area falls within the swarming range of known hibernacula. We do not believe a survey is necessary for the proposed project. Also, seasonal tree clearing could result in indirect and/or cumulative effects to the bats utilizing this hibernacula and associated swarming ranges through changes to the landscape and the removal of potential foraging and roosting habitat while the bats are hibernating. Currently, the available forested habitat within the swarming range of these hibernacula is already relatively low and determined sensitive, so even seasonal removal of habitat is likely to result in significant or non-discountable effects to the Indiana bat. Due to these concerns, we cannot concur with a determination of not likely to adversely affect for the Indiana bat at this time.

In order to address these concerns and be in compliance with the ESA, we recommend one of the following options:

1) The project proponent can further modify the proposed project to eliminate impacts to Indiana bat habitat and thus avoid impacts;

2) The project proponent can request formal section 7 consultation through the lead Federal Action Agency associated with the proposed project; or

3) The project proponent may choose to enter into a Conservation Memorandum of Agreement (MOA) with the Service to account for the incidental take of Indiana bats. By entering into a Conservation MOA with the Service, Cooperators gain flexibility in project timing with regard to the removal of suitable Indiana bat habitat. In exchange for this flexibility, the Cooperator provides recovery-focused conservation benefits to the Indiana bat through the implementation

of minimization and mitigation measures that are described in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky. For additional information about this option, please notify our office.

gray bat

Gray bats roost, breed, rear young, and hibernate in caves year round. They migrate between summer and winter caves and will use transient or stopover caves along the way. Gray bats eat a variety of flying aquatic and terrestrial insects present along streams, rivers, and lakes. Forested riparian areas are especially valuable to the gray bat as foraging habitat. For hibernation, the roost site must have an average temperature of 42 to 52 degrees F. Most of the caves used by gray bats for hibernation have deep vertical passages with large rooms that function as cold air traps. Summer caves must be warm, between 57 and 77 degrees F, or have small rooms or domes that can trap the body heat of roosting bats. Summer caves are normally located close to rivers or lakes where the bats feed. Gray bats have been known to fly as far as 12 miles from their colony to feed. Additional, habitat and life history information on these species is available on the Service's national website at www.fws.gov.

Because we have concerns relating to the gray bat on this project and due to the lack of occurrence information available on this species relative to the proposed project area, we have the following recommendation relative to gray bats.

1) Based on the presence of numerous caves, rock shelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rock shelters, and/or abandoned underground mines may occur within the project area, and, if they occur, they could provide winter/summer habitat for gray bats. Therefore, we would recommend that the project proponent survey the project area for caves, rock shelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as gray bat habitat by this office.

A survey for gray bat habitat would not be necessary if sufficient site-specific information was available that showed that: (1) there is no potentially suitable habitat within the project area or its vicinity or (2) the species would not be present within the project area or its vicinity due to site-specific factors.

Thank you again for your request. Your concern for the protection of endangered and threatened species is greatly appreciated. If you have any questions regarding the information that we have provided, please contact James Gruhala at (502) 695-0468 extension 116.

Sincerely,

Virgil Lee Andrews, Jr.
Field Supervisor

STEVEN L. BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL

MARCHETA SPARROW
SECRETARY

THE STATE HISTORIC PRESERVATION OFFICE
300 WASHINGTON STREET
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-7005
FAX (502) 564-5820
www.heritage.ky.gov

MARK DENNEN
EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

November 29, 2010

RECEIVED
DEC - 2 2010
By

Ms. Holly Nicholas
Kentucky Engineering Group, LLC
P.O. Box 1034
Versailles, KY 40383

Re: City of Hardinsburg Regional Facilities Plan Update

Dear Ms. Nicholas:

Thank you for your correspondence on the project listed above. As the environmental conditions in these locations have a high potential for containing archaeological sites, I recommend that undisturbed portions of the project area within the waste water treatment plant and water and sewer lines outside of existing state right-of-way be surveyed by a professional archaeologist. Sewer and water lines and other infrastructure being constructed in or immediately adjacent to the right-of-way or existing lines do not need to be surveyed. A report documenting the results of this investigation must be submitted to the State Historic Preservation Officer for review, comment, and approval. It should be noted that agricultural usage is not considered disturbance and those areas of the project where farming is or has occurred and are outside of the state right-of-way should also be surveyed. Please contact my office if further guidance on a disturbed area is required.

In addition, in order to make a preliminary determination if above ground historic properties eligible for listing in the National Register of Historic Places will be affected by this project, the applicant must submit photographs of all structures 50 years or older that are within and adjacent to the project area. Each photograph should be labeled by street address with a brief description of potential impacts or proposed treatment, and should be accompanied by a project map showing their location. Upon completion of our review, the State Historic Preservation Officer will advise the applicant if further consultation is required.

Should you have any questions, feel free to contact Philip Mink of my staff at 564-7005, ext. 140.

Sincerely,

Mark Dennen, FOR
Executive Director and
State Historic Preservation Officer

MD:pbm

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE KY 40201-0059
FAX: (502) 315-6677
http://www.lrl.usace.army.mil/

March 17, 2016

Operations Division
Regulatory Branch (South)
ID No. LRL-2016-00230-mdh

Ms. Holly Nicholas
Kentucky Engineering Group, PLLC
P.O. Box 1034
Versailles, Kentucky 40383

Dear Ms. Nicholas:

This is in response to your letter dated February 12, 2016, which requested review by our office of a proposal to update an existing wastewater treatment facility in Hardinsburg, Breckinridge County, Kentucky. Specifically, you requested that we respond with any environmental concerns we may have regarding the aforementioned proposal.

The U.S. Army Corps of Engineers (USACE) exercises regulatory authority under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) and Section 404 of the Clean Water Act (33 U.S.C. § 1344) for certain activities in "waters of the United States (U.S.)" These waters include all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce.

"Waters of the U.S." include hydrologically connected lakes, rivers, and stream channels (perennial, intermittent, ephemeral) exhibiting an Ordinary High Water Mark (OHWM), wetlands, sloughs, wet meadows and wetlands adjacent to "waters of the U.S." The OHWM elevation is the line on the bank established by the changing water surface and is indicated by physical characteristics such as a clear natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; and other indications as determined upon inspection of the area.

If the project would necessitate the discharge of dredged or fill material into any "waters of the U.S.," then you should submit a Department of the Army (DA) permit application for review by this office.

Our lack of comments on specific potential environmental impacts should not be construed as concurrence that no significant environmental damage would result from the project. Our comments on this project are limited to only those effects, which may fall within our area of jurisdiction and thus does not obviate the need to obtain other permits from State or local agencies.

Further information on the Regulatory Program, including the DA permit application, can be obtained from our website located at: http://www.lrl.usace.army.mil/Missions/Regulatory.aspx. If your project would necessitate the discharge of dredged or fill material into "waters of the U.S.", please allow sufficient time in your preconstruction schedule for the processing of a DA permit application.

If you have any questions concerning this matter, please contact this office at the above address, ATTN: CELRL-OPF-S or call me at (502)315-6676. All correspondence pertaining to this matter should refer to our ID No. LRL-2016-00230-mdh.

Sincerely,

Michael Hasty
Senior Project Manager, South Section
Louisville District

SECTION 10: EVALUATION OF RECOMMENDED REGIONAL FACILITY PLAN

Recommended Plan

The recommended alternative is Alternative 5 – Individual Grinder & Force Main. This alternative includes extending sewers, WWTP improvements & Phosphorus Removal and rehabilitation of the existing collection system. By rehabilitating the existing collection system, I/I will be reduced and would increase the efficiency of the collection system. The recommended plan will be constructed in phases, as funding and public support are secured.

Phase I – 0-2 Year

The first phase of the recommended plan would be to design/construct a phosphorus removal treatment at the WWTP to meet the draft KPDES permit. The continuation of rehabilitation work on the existing collection system would also be a part of the 0-2 year plan. Rehabilitation of the existing collection system would include point repairs to sewer lines, manhole repair, lift station improvements, cure-in-place pipe, slip lining and/or pipe bursting. Table 10-1 & 10-2 itemizes the costs associated with components discussed above.

Phase II – 3-10 Year

The second phase of the recommended plan would be to continue the rehabilitation of the existing collection system. The city would also begin to extend sewer service to areas within the planning area that are currently unserved/underserved via grinders and force mains. Table 10-3 & 10-4 itemizes the costs associated with components discussed above.

I. Environmental Impacts

All phases of the recommended plan will require environmental reviews and be reviewed by the appropriate agencies. The proposed rehabilitation and expansion of the collection system will be constructed to minimize any adverse environmental impacts, with guidance from the regulatory authorities. The proposed projects have the potential to improve water quality in area streams by removing potential sources of pollution

Removing septic systems within the boundaries of the planning area would help eliminate a potential source of untreated wastewater from entering groundwater and/or surface waters. The continued efforts of the rehabilitation of the collection system would help minimize the peak flows, allowing for a more reliable treatment process and reduction or elimination of surcharging events.

II. Institutional Structure

The City of Hardinsburg has the legal authority to implement the recommendations made within the RFP within their planning area.

III. Funding Plan

In order to implement the recommendations made in the RFP, funding will need to be secured from a variety of local, state and federal funding agencies. The City of Hardinsburg has a good working relationship with multiple funding agencies from previous projects that have lead to the construction of the existing infrastructure. Hardinsburg will seek funding from at least the following agencies Community Development Block Grant, USDA Rural Development and KIA SRF.

Due to the scope of the recommended projects, both loan and grant moneys will be utilized to implement the recommended project. The current rate schedules are listed below:

Current Rate Schedule

Usage Bracket	Minimum Rate	Usage Rate
Residential & Commercial 5/8"	$ 8.70	
Residential & Commercial 1"	$ 46.45	
Residential & Commercial 1 1/2"	$ 92.34	
Residential & Commercial 2"	$ 149.70	
Commercial 3"	$ 298.96	
Usage Rate per 1,000 gallons		$ 3.80
Bill for 4,000 gallon of usage Residential & Commercial 5/8"		$23.90

Proposed Rate Schedule

The proposed rate structure is based upon proposed projects in 0-2 & 3- 10 year planning period, including rehabilitation work within the existing system,

improvements to the existing WWTP. Below is the proposed rate structure that includes all work proposed during the first 10 years of the Regional Facility Plan.

The proposed rate schedule is based upon possible funding sources, with no committed sources of funding. For the exercise of projecting a proposed rate schedule, it will be assumed that all funding will be a loan. The total funding package will ultimately determine the rates required for debt service, short lived assets and operation and maintenance.

Proposed Rate Schedule

Usage Bracket	Minimum Rate	Usage Rate
Residential & Commercial 5/8"	$ 11.83	
Residential & Commercial 1"	$ 63.17	
Residential & Commercial 1 1/2"	$ 125.58	
Residential & Commercial 2"	$ 203.59	
Commercial 3"	$ 406.59	
Usage Rate per 1,000 gallons		$ 5.17
Bill for 4,000 gallon of usage Residential & Commercial 5/8"		$32.51

IV. Implementation Schedule

The implementation schedule for the recommended plan will be constructed in a phased approach that will allow the City of Hardinsburg to improve the existing facilities (WWTP & collection system) and expand the collection system to serve citizens currently unserved.

0-2 Year – Phase I
- Construction of Phosphorus Removal system
- Rehabilitation of the Collection System

3-10 Year – Phase II
- Expansion of the Collection System
- Rehabilitation of the Collection System

TABLE 10.1 – 0-2 Year Phosphorus Removal Process				
DESCRIPTION	QUANTITIES	UNIT	UNIT COST	ESTIMATED COST
WWTP – Phosphorus Removal Process	1	EA	$500,000	$500,000
SUBTOTAL – CONSTRUCTION COST				**$500,000**
Construction Contingencies (10%)				$50,000
Legal, Administration, Engineering & Specialty Services (20%)				$110,000
TOTAL – PROJECT COST				**$660,000**

TABLE 10.2 – 0-2 Year Collection System Rehabilitation				
DESCRIPTION	QUANTITIES	UNIT	UNIT COST	ESTIMATED COST
Manhole – Chemical Grout	40	EA	$350	$14,000
Manhole – Cemintious Lining	60	EA	$1,000	$60,000
Manhole – Epoxy Lining	40	EA	$1,500	$60,000
Manhole – Replacement	12	EA	$6,000	$72,000
Manhole – Clean, Seal & Grout	60	EA	$500	$30,000
Manhole – Adjust Rim Elevation	65	EA	$300	$35,000
Manhole – New	10	EA	$3,500	$35,000
Sewer – Relocate Existing New Sewer Main	2,500	LF	$75	$187,500
Sewer – Cleaning	10,000	LF	$3	$30,000
Sewer – CCTV	10,000	LF	$4	$40,000
SUBTOTAL – CONSTRUCTION COST				**$548,000**
Construction Contingencies (10%)				$55,000
Legal, Administration, Engineering & Specialty Services (20%)				$120,000
TOTAL – PROJECT COST				**$723,000**

TABLE 10.3 – 3-10 Year Collection System Rehabilitation				
DESCRIPTION	QUANTITIES	UNIT	UNIT COST	ESTIMATED COST
Manhole – New	30	EA	$3,500	$105,000
Sewer – Relocate Existing New Sewer Main	7,500	LF	$75	$562,500
Sewer – Combined Sewer Separation	3	EA	75,000	$225,000
Sewer – Cleaning	65,000	LF	$3	$195,000
Sewer – CCTV	40,000	LF	$4	$160,000
SUBTOTAL – CONSTRUCTION COST				**$1,247,500**
Construction Contingencies (10%)				$122,500
Legal, Administration, Engineering & Specialty Services (20%)				$274,000
TOTAL – PROJECT COST				**$1,644,000**

TABLE 10.4 – 3-10 Year Collection System Expansion				
DESCRIPTION	QUANTITIES	UNIT	UNIT COST	ESTIMATED COST
4” PVC FORCE MAIN	8,000	LF	$14	$112,000
3” PVC FORCE MAIN	15,000	LF	$13	$195,000
2” PVC FORCE MAIN	15,000	LF	$12	$180,000
1 ½” PVC FORCE MAIN	10,000	LF	$11	$110,000
INDIVIDUAL GRINDER UNITS	213	EA	$4,500	$958,500
TIE INTO EXISTING MANHOLE	5	EA	$2,500	$12,500
4” PVC LATERAL	10,650	LF	$40	$426,000
SUBTOTAL – CONSTRUCTION COST				**$1,994,000**
Construction Contingencies (10%)				$199,400
Legal, Administration, Engineering & Specialty Services (20%)				$398,800
TOTAL – PROJECT COST				**$2,592,200**

TABLE 10.5 – Summary of Recommended Plan			
Planning Areas	Description	Type	ESTIMATED COST
0-2	WWTP – Phosphorus Removal Process	Improvements	$660,000
	Collection System Rehabilitation	Rehabilitation	$723,000
0-2 Year Total			**$1,383,000**
3-10	Collection System Rehabilitation	Rehabilitation	$1,644,000
	Collection System Expansion	Expansion	$2,592,200
3-10 Year Total			**$4,236,200**
Total Cost of Regional Facilities Plan			**$5,619,200**

SECTION 11: PUBLIC PARTICIPATION

The City held a public hearing on the draft Facilities Plan Update on November 11, 2010. The minutes of this meeting are Exhibit 11.1. The advertisement and publisher's affidavit are Exhibits 11.2 and 11.3.

Since submission of the draft Facilities Plan Update the KY Division of Water determined that the document should be a full Facilities Plan. A second public hearing has been set for June 1, 2016 at City Hall at 6:00 pm Central Time. The advertisement and publisher's affidavit are Exhibits 11.4 and 11.5.

City of Hardinsburg
Public Hearing Minutes
Regional Wastewater Facilities Plan
November 11, 2010

The required public hearing for review and public comment on the draft Regional Wastewater Facilities Plan Update was held Thursday, November 11, 2010 at 6:00 PM CT at the Hardinsburg City Hall, Hardinsburg, Kentucky.

The hearing was advertised in the local newspaper – The Herald News and on the Kentucky Division of Water's web page. A copy of the newspaper tearhseet and publisher's affidavit are attached.

Unfortunately, the only persons attending the hearing were the Wayne Macy, Mayor of Hardinsburg, Holly Fouler, Assistant City Clerk, James Henning, Veolia Water, and Holly Nicholas with Kentucky Engineering Group.

The opportunity was taken to review the proposed projects with the Mayor and Mr. Henning. An error on the map showing the proposed location of sewer line extensions during the Plan Update time frame was discovered. One of the unsewered subdivisions was indicated in the wrong location. A corrected map will be submitted with these minutes.

Mr. Henning also pointed out that there was one other area in the city that does not have community sewers. This area is known as Forest Hills. This area will be added to the draft Plan Update.

Mr. Henning went on to say that they get more request for sewer service from businesses locating along the US 60 Bypass than from the neighborhoods that rely on septic tanks.

Discussion was held regarding the results of the CCTV'ing and cleaning of the sanitary sewer lines. The most recent area cleaned and TV'd was by far the worst area found by the contractor completing the work. This area will most certainly be replaced during the upcoming CWSRF rehabilitation project.

The hearing, though not formally convened, was adjourned at 6:25 PM CT.

_____

Holly L. Nicholas
Kentucky Engineering Group, PLLC

The Breckinridge Herald-News
• 120 Old Hwy 60 • P.O. Box 6
Hardinsburg, KY 40143
• Telehone: (270) 756-2109 • Fax: (270) 756-1003

November 5, 2010

AFFIDAVIT OF PUBLICATION

I, Nadean Croan, hereby certify that I am the manager of The Breckinridge Herald-News, a newspaper published in the State of Kentucky, County of Breckinridge, and having a bona fide circulation in Breckinridge County, Kentucky.

I certify that the attached advertisement "Notice of Public Hearing" for The City of Hardinsburg for the Regional Facilities Plan Update is a true copy of the said notice and was published in The Breckinridge Herald-News on Wednesday, November 3, 2010.

The Breckinridge Herald-News

By Nadean Croan

Subscribed and sworn to before me this November 5, 2010

My Commission expires: 12/22/2012.

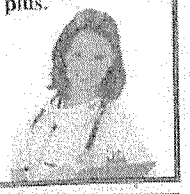
Suzanne M. Hinton
Notary Public
Breckinridge County, Kentucky

TO LAW TO

- Medical Assistant
- Receptionist

k in busy physician's office. Electronic ecords experience is a plus.

to:
Resources
lace Avenue
eld, KY 42754
'0-259-9524
ortunity Employer



oom, 1.5 baths, new ceramic tile en, dining, laundry, both baths nt porch. New carpet in living, ms, new appliances, new paint ouse including trim and ceiling, ht fixtures, walk in closet in master m with plenty of shelving, large laundry room, central heating r, front porch, deck on rear of large lot, nice neighborhood, in sburg. This house is only 11 years ith maintenance free exterior. is movie in ready. Priced to sell at 0. Call 270-756-1508

TANNING, RED

District Facility Plan may present oral or written comments at the local State Board public hearing.

The local Board of Education, after due process, will forward the approved District Facility Plan to the Kentucky Department of Education for Ultimate approval by the State Board of Education.

. The local State Board public hearing is being scheduled in accordance with KRS 157.620, and regulated by 702 KAR 1:001.

NOTICE OF PUBLIC HEARING

(Pursuant to 401KAR5:006 Section 4 & 5; KRS-424, and 40 CFR 25, 5 & 6)

The City of Hardinsburg, Kentucky, PO Box 149, 220 South Main Street, Hardinsburg KY 40143 has drafted a 20 year Regional Facilities Plan Update (RFP) containing wastewater requirements for collection and treatment and its cost, within the planning area, as described therein, to be served. Interested citizens may obtain further information including copies of the draft RFP by contracting Mary Jo Hess, City Clerk at the above given address or calling 270-756-2213 between the hours of 8 AM and 4:30 PM, Monday through Friday.

A public hearing will be held on November 11, 2010 at 6:00 PM at the City Hall (address above). The purpose of the hearing is to discuss the draft plan and its contents, specifically the alternatives, project cost, financing sources, user charges and hook up/tap fees. This project may affect sewer rates in the future. The public is encouraged to attend this meeting and shall have a right to comment on the plan for a period of 30 days from the date of publication of this notice by writing to the above address or before the termination of the hearing whichever is later. A longer comment period may be requested in writing. All persons who believe any condition of the draft plan is inappropriate, inaccurate, incomplete, or otherwise not in the best interest of the public and the environment must raise all reasonable issues and submit all reasonable arguments, facts, and comments with supporting documents to the above given contact person.

etc. I shall proceed to offer for sale at the front door of the Breckinridge County Courthouse, to the highest and best bidder, at Public Auction, on November 8, 2010, at 10:00 a.m., local prevailing time, the following real estate having a street address of 7825 Highway 629, Falls of Rough, Kentucky 40119, and more particularly described as follows:

Being a 0.3902 acre tract located on the southeasterly side of Ky. Hwy. 629 approximately 900' westerly from the bridge over the Black Lick Creek near the town of Vanzant in Breckinridge County, Kentucky and further described as follows:

Beginning at a 5/8" rebar in the southeasterly R/W of Ky. Hwy. 629, being approximately 900' westerly from the bridge crossing Black Lick Creek, also being N 61 deg. 34 min. 48 sec. E., 70.08' from the inside corner of a concrete headwall; thence with new lines in S. Moorman S 40 deg. 00 min. 00 sec. E., 170.00' to a 5/8" rebar; thence S 50 deg. 00 min. 00 sec. W., 100.00'; thence N 40 deg. 00 min. 00 sec. W., 170.00' to a 5/8" rebar in said R/W; thence with said R/W N 50 deg. 00 min. 00 sec. E., 100.00' to the beginning and containing 0.3902 acres (more or less) per physical survey of Timothy W. smith, L.S. 2373.

The above described property is subject to any easements or restrictions either implied or of record.

Being the same property conveyed to Robert C. Gibson, single, from Timothy P. Moxley and Donna L. Moxley, f/k/a Donna L. Goff, his wife, by deed dated July 7, 2008 and recorded in Deed Book 333 at page 734 in the Breckinridge County Clerk's Office.

The above-described real estate will be sold free and clear of all claims but subject to the following:

a. The purchaser shall pay all state, county, school and/or city ad valorem taxes for the year 2010 and thereafter, and
b. Existing restrictions and easements now of record affecting the property.

The real estate will be sold on terms of ten (10%) percent of the purchase price in cash; with the balance due and payable in forty-five (45) days, with the purchaser to be required to execute bond with good surety thereon, to be approved by the Master Commissioner, to secure the unpaid portion of the purchase price; said bond to bear interest at the rate of twelve (12%) percent per annum from the date of sale until paid, and said bond shall have the same force and effect as a judgment and to remain a prior and superior lien on said property until fully paid.

The purchaser shall have the privilege of paying the purchase price in cash, or paying said bond before maturity by paying the principal amount thereof, together with all interest accrued thereon to date of such payment. The purchaser shall be required to assume and pay all taxes against said property by the County of Breckinridge, Commonwealth of Kentucky, and any school district which shall become due and payable at any time during the year 2010 and thereafter, and said sale shall be made subject to all easements, covenants and restrictions of record, and shall be sold with improvements thereon, "as is". Bidders shall be prepared to comply promptly with these terms.

Based on the Property Valuation Administrator's records the 2010 assessed value of the property is $86,000.00. Based on the 2009 tax rate the 2010 tax bill will be for the approximate amount of $729.28 which shall be the responsibility of the purchaser of the property.

The risk of loss for the subject property shall pass to the purchaser on the date of sale. The right to possession of the premises shall pass to the purchaser upon payment of the purchase price and delivery of the deed.

Dated this the 30th day of September, 2010.

HERBERT M. O'REILLY
MASTER COMMISSIONER
BRECKINRIDGE CIRCUIT COURT

L INFORMATION:
cellation deadline is Monday at noon, unless otherwise announced • Please read your ad the first day of publication and report any errors promptly. We only accept responsibility for incorrect week • The publisher assumes no financial responsibility for errors nor for omission of copy • The Herald-News accepts no responsibility for the quality of work of classified ers and recommends that you check references prior to entering into any agreement, or contract. Discrepancies in Quality of work or customer satisfaction should be reported to ar Business Bureau • The Herald-News reserves the right to reject any advertising. In the event the advertisement is not published, or an error occurs in the advertisement through of the advertiser or its agents, the liability of The Herald-News shall be limited to a refund of the sum to the extent paid.

30U-04 1 1
Breckinridge County
Hess property Division 1.
Bruce Meizler and Michaelle
Meizler to Walter Meizler and
Subdivision Revised.
Lester Miller to Lawrence
M. Crossan, Susan M. Crossan,
of owner to maintain required
insurance/security 1st offense,
dismissed on proof; 3. improper

CITY OF HARDINSBURG
MUNICIPAL ORDINANCE NO. 2012-04

AN ORDINANCE AMENDING PRESENT ORDINANCES SETTING SEWER RATE CHARGES FOR THE CITY OF HARDINSBURG, KENTUCKY.

WHEREAS, the City Council of the City of Hardinsburg, Kentucky, recognizes the need to change the existing sewer rate charges for the City of Hardinsburg in order to generate sufficient revenues to meet all its expenses related to sewer, and

WHEREAS, the City Council has maintained a policy that all services provided to its customers should generate sufficient revenues to pay for said services and to cover all costs and expenses.

NOW, THEREFORE, the City Council of the City of Hardinsburg, Kentucky, does hereby ordain;

SECTION I: AMENDMENT OF § 52.105 SCHEDULE OF RATES AND CHARGES FOR SEWER (A)(2) and (B) and (C) IN THE CITY OF HARDINSBURG CODE OF ORDINANCES; ORDINANCES 610.91, 610.92, 620-22, 620.25, 620-26, 97-3.1 97-9.4, 98-7.3, 2000-11.1, 2002-2, 2003-06, 2004-03, 2005-05, 2010-03, 2011-05

SEWER RATE CHARGES:

SEWER RATES	RATE		
	Current Flat Rate Facility Charge	Increase	Suggested Rate Increase
RESIDENTIAL 5/8"	~~8.40~~	.30	8.70
COMMERCIAL 5/8"	~~8.40~~	.30	8.70
RESIDENTIAL 1"	~~46.15~~	.30	46.45
COMMERCIAL 1"	~~46.15~~	.30	46.45
RESIDENTIAL 1.5"	~~92.04~~	.30	92.34
COMMERCIAL 1.5"	~~92.04~~	.30	92.34
RESIDENTIAL 2"	~~149.40~~	.30	149.70
COMMERCIAL 2"	~~149.40~~	.30	149.70
COMMERCIAL 3"	~~298.66~~	.30	298.96
Per 1,000 gallons	~~3.50~~	.30	3.80

SECTION I: ALL FORMER PROVISIONS AND CONFLICT REPEALS EFFECTIVE DATE OF ORDINANCE;

All City Ordinances, Orders, Resolutions, Motions and parts thereof; insofar as the same may be in conflict herewith, are repealed and this ordinance shall take effect, from and after its passage, approval and publication as provided by law and will be effective on the **July 1, 2012** monthly billing.

Introduced, publicly read and approved on the first reading this 11th day of June, 2012.

Publicly read, passed and finally approved on second reading this 13th day of June, 2012.

Date of Publication on this 20th day of June 2012.

_____
WAYNE MACY, MAYOR
CITY OF HARDINSBURG, KENTUCKY

ATTEST:

_____
MARY JO HESS, CITY CLERK
CITY OF HARDINSBURG, KENTUCKY

NOTICE OF PUBLIC HEARING
(Pursuant to 401KAR5:006 Section 4 & 5; KRS-424, and 40 CFR 25, 5 & 6)

The City of Hardinsburg, Kentucky, PO Box 149, 220 South Main Street, Hardinsburg KY 40143 has drafted a 20-year Regional Facilities Plan (RFP) containing wastewater requirements for collection and treatment and its cost, within the planning area, as described therein, to be served. Interested citizens may obtain further information including copies of the draft RFP by contracting Mary Jo Hess, City Clerk at the above given address or calling 270-756-2213 between the hours of 9 AM and 4 PM, Monday through Friday.

A public hearing will be held on **Wednesday, June 1, 2016 at 6:00 PM** at the City Hall (address above). The purpose of the hearing is to discuss the draft plan and its contents, specifically the alternatives, project cost, financing sources, user charges and hook up/tap fees. This project may affect sewer rates in the future. The public is encouraged to attend this meeting and shall have a right to comment on the plan for a period of 30 days from the date of publication of this notice by writing to the above address or before the termination of the hearing whichever is later. A longer comment period may be requested in writing. All persons who believe any condition of the draft plan is inappropriate, inaccurate, incomplete, or otherwise not in the best interest of the public and the environment must raise all reasonable issues and submit all reasonable arguments, facts, and comments with supporting documents to the above given contact person.

Section 12: Regional Facility Plan Completeness Checklist and Forms

Requirements: Two (2) hard copies, one certified by a professional engineer licensed in Kentucky and one (1) non-certified digital copy of the regional facility plan and the planning area shapefile on a Compact Disc (CD) shall be submitted to the Cabinet. This completeness checklist should be completed and submitted with each regional facility plan.

Regional Planning Agency Name: City of Hardinsburg

Date: March 2013

		PAGE #
SECTION 1		
REGIONAL FACILITY PLAN SUMMARY- This section shall provide a brief summary of the information provided in the facility plan, including the following:		
1.	Purpose of the plan and major problems evaluated in the plan.	1-1
2.	Recommended alternative chosen to remediate or correct the problems and/or serve the area of need identified in the plan. Also, include any institutional arrangements necessary to implement the recommended alternative(s).	1-2
3.	Estimated cost of implementing the proposed plan (including user fees) and the proposed funding method to be used.	1-3
4.	Planning agency commitments necessary to implement the plan.	1-2
5.	Schedule of implementation for projects.	1-2
SECTION 2		
STATEMENT OF PURPOSE AND NEED- This section shall contain a brief description of the purpose and need for a submitting the facility plan.		2-1
SECTION 3		
PHYSICAL CHARACTERISTICS OF THE PLANNING AREA- This section shall delineate the planning area boundaries and describe key topographic, geographic and pertinent natural or man-made features of the area. Digital or electronic submission of the planning area boundary shapefile in a standard GIS format shall also be included. This section shall also include the following maps:		
1.	One (1) up-to-date map, suitable for photocopying, indicate the planning area boundary, service area boundary, watershed boundaries, county lines, populated places, cities and/or towns and project areas or proposed planning period phases.	Exhibit 3.1
2.	One (1) up-to-date map, suitable for photocopying, include locations of wastewater treatment facilities (including package treatment plants), discharge location(s), collection lines (gravity, force main, interceptors), pump stations, public drinking water intake points and groundwater supply areas [Source Water Area Protection Plans (SWAPP) and/or Wellhead Protection Areas (WHPA)].	Exhibit 3.2
3.	One (1) seven and one-half (7 ½) minute USGS topographic map including the location of wetlands, delineation of the 100-year floodplain, surface water(s), and topography.	Exhibit 3.3 Exhibit 3.4

4.	If available, a local planning and zoning land use map.	Exhibit 3.5
SECTION 4		
SOCIOECONOMIC CHARACTERISTICS OF THE PLANNING AREA- The following characteristics of the planning area shall be discussed:		
1.	Historical, current, and projected population in the planning area including wastewater contributions from industrial and commercial sources.	4-1 & 4-2
2.	Current and projected population in the existing service area and unsewered parts of the planning area	4-2
3.	Economic or social benefit to the affected community	4-3
SECTION 5		
EXISTING ENVIRONMENT IN THE PLANNING AREA- Describe existing physical, biological, cultural, and other resource features within the planning area with an emphasis on those that may be impacted by the proposed plan or projects, including the following:		
1.	Physical features such as surface and groundwater quality, water sources and supply, wetlands, lakes, streams, air pollution, floodplains, soils, geology, and topography	5-1
2.	Biological: Identify plant and animal communities in the planning area with an emphasis upon endangered and threatened species likely to be impacted	5-3
3.	Cultural: Describe archaeological and historical resources that may be affected by the proposed project	5-3
4.	Other Resource Features such as national and state parks, recreational areas, USDA Designated Important Farmland, and any other applicable environmentally sensitive areas	5-4
SECTION 6		
EXISTING WASTEWATER SYSTEM- This section shall be prepared by a Professional Engineer licensed in Kentucky. A description of the existing facilities within the planning area shall include the following:		
1.	On-site systems in the planning area	6-1
2.	Physical condition of the existing wastewater treatment plant(s) including the type, age, design capacity, process units, peak and average wastewater flows, current discharge permit limits, schematic layout of treatment plant. Include a narrative description of the capacity of the treatment plant to meet reliability and redundancy requirements as outlined in regulation 401 KAR 5:005, Section 13.	6-2
3.	Existing collection and conveyance system and its condition	6-6
4.	Existing biosolids disposal method	6-5
5.	Existing operation, maintenance and compliance issues	6-6
SECTION 7		
FORECASTS OF FLOWS AND WASTE LOADS IN THE PLANNING AREA- This section shall be prepared by a professional engineer licensed in Kentucky and shall include:		
1.	Current and projected commercial, industrial and residential growth for the proposed planning period	7-1
2.	A copy of the waste load allocation (WLA) issued by the DOW for new or expanded treatment plant projects	Awaiting from DOW

SECTION 8		
EVALUATION OF ALTERNATIVES- This section shall be prepared by a professional engineer licensed in Kentucky and include an assessment of alternatives to determine the appropriate facilities that will meet the wastewater needs of the planning area and provide benefits that are cost-effective and environmentally sound. The section shall include:		
1.	No-action alternative	8-2
2.	Optimization of existing facilities	8-1
3.	Regionalization	N/A
4.	Other alternatives	8-2
5.	Detailed cost analysis along with 20 year present worth analysis for each alternative	8-4
6.	Recommended alternative	8-9
SECTION 9		
CROSS-CUTTER CORRESPONDENCE AND MITIGATION- Each facility plan shall include cross-cutter correspondences to and from each agency related to the following four environmental and cultural concerns:		
1.	Threatened and Endangered Species: The U.S. Fish and Wildlife Service- Kentucky Ecological Services Field Station and the Kentucky Department of Fish and Wildlife Resources	Section 9
2.	Historical Resources: The Kentucky Heritage Council State Historic Preservation Office	Section 9
3.	Aquatic Resources: The US. Army Corps of Engineers (Louisville, Nashville, or Huntington Districts).	Section 9
4.	Agricultural Resources: The local office of the Natural Resources Conservation Service (NRCS) or USDA Service Center	Section 9
SECTION 10		
EVAULATION OF RECOMMENDED REGIONAL FACILITY PLAN- This section of the facility plan shall summarize the critical components of the recommended plan.		
1.	Environmental impacts	10-1
2.	Institutional structure	10-1
3.	Funding plan	10-1
4.	Current and projected residential user charge rate based on 4,000 gallon usage per month	10-1
5.	Implementation schedule	10-1
SECTION 11		
DOCUMENTATION OF PUBLIC PARTICIPATION- The section shall include a copy of the newspaper advertisement/proof of publication, attendance sheet, and public comments.		

Unit Process Design Criteria Form

Unit Process	Number of Units[1]	Flow per Unit (MGD)	Design Criteria[2]
Influent Pumping	3	1.85 - 1 unit 2.80 - 2 Units	0.732 MGD
Screening	1 Manual	0.732	1-1/4"
Grit Removal	N/A	N/A	N/A
Primary Clarification			
Biological Process	1	0.665	0.732 MGD
Chemical Phosphorus Removal	N/A	N/A	N/A
Final Clarification	2	0.732	308 GPD / SF Overflow Rate at ADF
Disinfection	2 - Chlorniators 2 - Sufonators	0.732	8.2 mg/L Dosage Capacity at ADF
RAS/WAS Pumping	2	0.864	118 % of ADF
Sludge Treatment	1	0.472	37 days storage at 1%
Sludge Dewatering			Land Application

1*The number of units shall be in accordance with the reliability/redundancy checklist
2*The design criteria shall be in accordance with 401 KAR 5:005 including Ten States Standards

Note: This is a suggested format only. The process listed here will not fit every project and will therefore need to be revised accordingly.

Design Flow and Concentration Form

Design Flows and Organic Concentrations	Flows MGD	BOD_5 mg/l	BOD_5 lb/day	SS mg/l	SS lb/day	NH_3-N mg/l	NH_3-N lb/day	TKN mg/l	TKN lb/day	P mg/l	P lb/day
Average Daily											
Domestic Portion	0.521	500	3,052	750	4,579	20	122			12	73
Industrial Portion	-	-	-	-	-	-	-	-	-	-	-
Total	0.521	500	3,052	750	4,579	20	122			12	73
Population Equivalent											
Peak Hourly											
Domestic Portion	1.563	141	1837	212	2764	6	77			3	39
Industrial Portion	-	-	-	-	-	-	-		-	-	-
Total	1.563	141	1837	212	2764	6	77			3	39
Peak Daily	2.80										
Peak Instantaneous	2.80										