Wastewater Regional Facilities Plan

CITY OF HARDINSBURG

Hardinsburg, Kentucky

Kentucky Engineering Group, PLLC

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April 2016

KEG Project No. 10001

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SECTION 1: REGIONAL FACILITY PLAN SUMMARY

In 1976 the City of Hardinsburg completed a Regional Wastewater Facilities Plan as required by the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500). The City has not undertaken an update to this plan since the original document until now. The Kentucky Division of Water first required that the City complete an update prior to undertaking any wastewater projects from the year 2010 on. However, after submission of a draft update, the Kentucky Division of Water determined that the document should be a stand-alone document because the original facilities plan was over 20 years old.

The original facility plan brought about the last major treatment plant upgrade in 1989. In 1989, the City of Hardinsburg wastewater treatment plant was upgraded from a trickling filter treatment facility to an activated sludge/oxidation ditch treatment process with a design capacity of 0.732 million gallons per day.

The treatment plant has not been significantly modified or upgraded since 1989 and the service area has not expanded outside of the original planning area. At that time the facility planning area consisted of the incorporated area of the City of Hardinsburg and the immediate surrounding area. It is proposed to continue with the original planning area with this new Facilities Plan.

Wastewater generated from the City's wastewater customers within the Planning Area is treated at the Hardinsburg Wastewater Treatment Plant ("WWTP"). The current WWTP design capacity is 0.732 million gallons per day (MGD) and the current average daily flow rate is approximately 0.482 MGD. The WWTP is in good condition and has capacity for the existing customer base and for the future growth identified in the plan. Only maintenance or minor upgrade projects have been identified for the WWTP in this Plan; including upgrades necessary to meet new discharge permit requirements.

A major concern regarding the collection system is the amount of inflow and infiltration (I/I) entering the system. During heavy wet-weather events, the flow to the WWTP has reached to over 2.4 million gallons per day. The City undertook a sanitary sewer evaluation survey (SSES), cleaning, and closed circuit televising of ninety percent of its collection system in 2007 to identify areas where the inflow/infiltration is entering the system. The City received a 2010 Clean Water State Revolving Fund loan to complete rehabilitation of the worst portions of the collection system. The City recognizes that additional rehabilitation projects will need to be an on-going activity.

The City's customer base and population has not grown significantly since the completion of the 1976 Facilities Plan. The population projections in the 1976 Plan exceeded the changes in population that have actually occurred over the past thirty-eight years. A small number of residents in the City still rely on septic tanks.

Growth in the City's customer base can occur by extending sewer service to areas within the Planning Area (PA) that currently do not have service. There are four neighborhoods within the City Limits, Breckwood, Blancett Lake, Gilbert Heights, and Forest Hills that do not have sewer service and residents in these areas rely on septic tanks. Within the Planning Area are areas that are outside the city limits but could be served with sewer. These areas are along the US 60 Bypass and the unincorporated community of Harned east of the City.

The analysis of alternatives for the collection system resulted in the recommendation that the City continue with projects to rehab/replace the existing collection system and extend sewer service to unserved areas over the next twenty years. The City's customer base is small and the median household income of the City is less than the State's average. The City Council and Mayor recognize the need to continue its investment in its wastewater system but it also must stay aware of the limited incomes of many of its residents. For this reason, the City most likely will continue to use Federal and State low interest loans or grants to make the improvements and extensions to its wastewater system. All the alternatives presented in Section 8 result in an increase to the City's current wastewater rates. The impacts on user rates vary from an increase of eleven percent to an increase of eighty-two percent.

The projects identified in the Plan are:

0-2 YEAR

1. *Sewer Rehab*
2. *WWTP Upgrade & Improvement – Provide Phosphorus Removal & effluent flow monitoring*

3-10 YEAR

1. *Sewer Rehab*
2. *Sewer Extensions – US 60 Phase 1*
3. *Treatment Plant Upgrades & Improvements including: Replace aerators, Install new bar screen/grit removal system, Install new influent pumps, Clean oxidation ditch, replace rotors,*
4. *Replace sludge tractor and spreader with line/pump irrigation system*

11-20 YEAR

1. *Sewer Rehab*
2. *Sewer Extensions – US 60 Phase 2*
3. *Sewer Extensions – Breckwood*
4. *Sewer Extensions – Blancett Lake*
5. *Sewer Extensions – Gilbert Heights*
6. *Sewer Extensions – Forest Hills*
7. *Sewer Extensions – US 60 and Harned*

The two projects proposed for the zero to two year time frame will consist of:

- Sewer Rehab – The City had a 2010 Clean Water State Revolving Fund $500,000 loan that rehabbed approximately 9,800 linear feet of sewer line in the City. A second sewer rehab project is proposed to continue rehabbing deteriorated sections of the sewer collection system.

- WWTP Upgrade & Improvements – The City recently received their draft KPDES permit for the WWTP and this permit is now requiring phosphorus removal and effluent flow monitoring. The City will being the process of reviewing, evaluating the best available technologies and processes to meet the new permit limits. With the requirement and additional cost associated with the phosphorus removal in the new permit, the extra cost associated with meeting this requirement will be a very expensive construction project that the City is not capable of bearing at this time without passing a significant rate increase onto the existing sewer customers.

  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 five years. The yearly average for the effluent phosphorus varies from a low of 1.11 mg/l to a high of 2.33 mg/l between 2007 and 2011. The treatment plant was not originally designed for phosphorus removal but is currently achieving approximately 85% or better removal rates. In order for the City to meet the draft permit limits, additional monitoring and evaluations will be needed to determine the best available technologies and processes to reach the higher removal rates for phosphorus.

  One option the City is considering for achieving the higher phosphorus removal rates would be chemical addition or chemical precipitation of the phosphorus. A result of this form of removal is the increased production of biomass or sludge and changes in the wastewater pH. 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 require the additional construction of chemical feed systems and a determination of the proper chemical injection point or points.

  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 of sludge will require the construction of additional basins or sludge handling equipment.

SECTION 2: PURPOSE & NEED

The Kentucky Division of Water is requiring that the City complete a Regional Facility Plan because its original Plan completed in 1976 is over 20 years old and has never been updated.

As illustrated in following sections of this plan, the City's wastewater system has capacity to serve its current customer base and also to take the flow from areas within the planning area that do not currently have sewer service. The main issues facing the City's wastewater system are inflow/infiltration in the collection system and new permit and/or regulations that require new construction at the wastewater treatment plant.

This plan will provide a guide for the City to continue with improving and expanding its wastewater collection system and address issues that may arise with the wastewater treatment plant because of new permit requirements or new regulations. The City's elected officials, city utility staff, county health department staff and planning area residents have been apprised of the Facility Plan and have provided input into its development.

This plan will enable the City to comply with Kentucky Law, in particular 401 KAR 5:006

SECTION 3: PHYSICAL CHARACTERISTICS OF THE PLANNING AREA

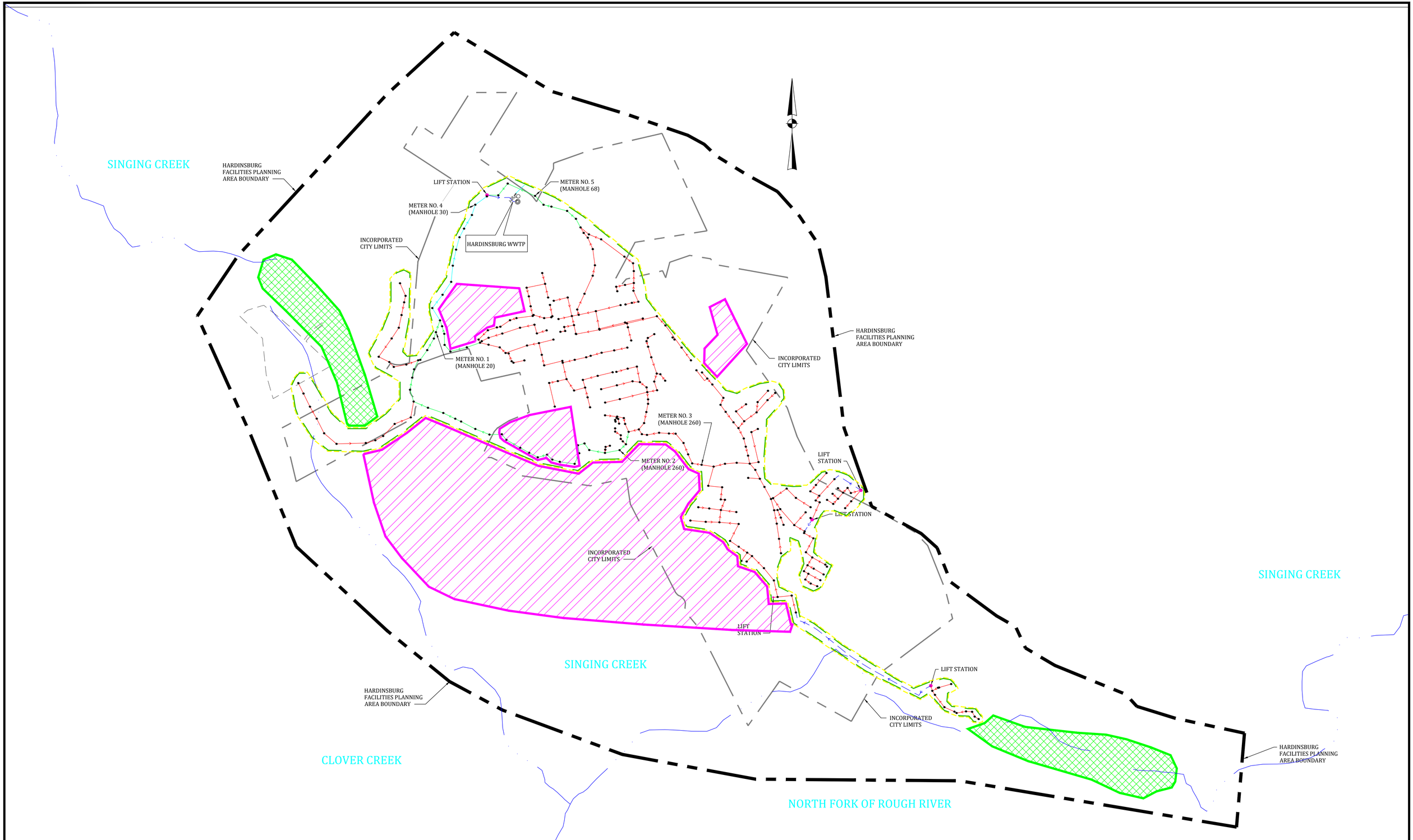
Planning Area (PA) Characteristics

The City of Hardinsburg is located in the center of Breckinridge County; approximately 60 miles southwest of Louisville. The City of Hardinsburg had a Regional Facilities Plan developed in 1976. The planning area delineated in 1976 plan and approved by the Division of Water will *not* be changed by this Facilities Plan.

The following exhibits are included in this section:

- Exhibit 3.1 – Shows the planning area boundary, service area boundary, watershed boundaries, and proposed project phases;
- Exhibit 3.2 – Shows the location of the existing wastewater treatment plant, collection lines, and pump stations; there are no package plants within the planning area.
- Exhibit 3.3 – A seven and one-half minute USGS topographic map
- Exhibit 3.4 – 100 Year Floodplain
- Exhibit 3.5 – Shows the existing land use and zoning in the City.

Large tracts of land within the city are designated for agriculture. This is the largest use of land within the City of Hardinsburg. There are many tracts designated for single family housing. This is the second most numerous land use in the City. Commercial use follows the main route into the downtown section and the downtown section itself. The other land uses within the city limits are industrial, mobile housing, multi-family housing, public, two-family housing, and vacant.



PREPARED BY:

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PREPARED FOR:

HARDINSBURG MUNICIPAL UTILITIES PUBLIC WORKS

SCALE: 1" = 1000'

LEGEND:

- LIFT STATION
- MANHOLE
- 8" GRAVITY SEWER
- 10" GRAVITY SEWER
- 15" GRAVITY SEWER
- FORCE MAIN
- CORPORATE BOUNDARY
- PLANNING AREA BOUNDARY
- SERVICE AREA
- WATERSHED
- 0-2 YEAR PLANNING AREA
- 3-10 YEAR PLANNING AREA
- 11-20 YEAR PLANNING AREA

EXHIBIT 3.1
EXISTING WASTEWATER COLLECTION SYSTEM

SINGING CREEK

HARDINSBURG FACILITIES PLANNING AREA BOUNDARY

LIFT STATION

METER NO. 5 (MANHOLE 68)

METER NO. 4 (MANHOLE 30)

HARDINSBURG WWTP (SEE THIS SHEET)

INCORPORATED CITY LIMITS

METER NO. 1 (MANHOLE 20)

METER NO. 3 (MANHOLE 260)

METER NO. 2 (MANHOLE 260)

LIFT STATION

LIFT STATION

INCORPORATED CITY LIMITS

LIFT STATION

HARDINSBURG FACILITIES PLANNING AREA BOUNDARY

INCORPORATED CITY LIMITS

SINGING CREEK

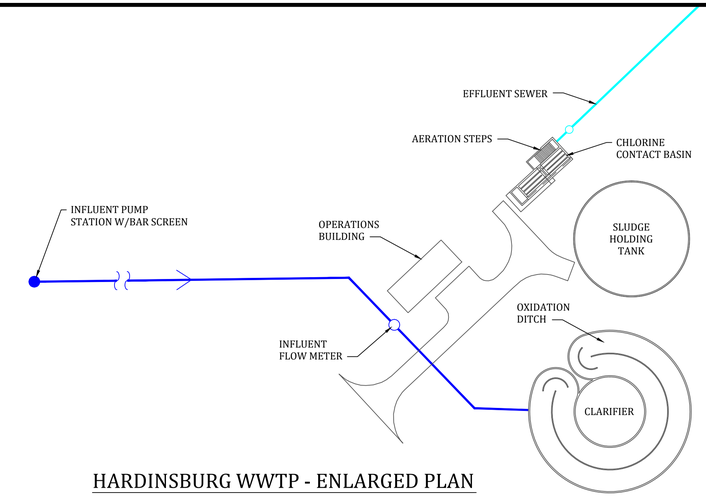
HARDINSBURG FACILITIES PLANNING AREA BOUNDARY

CLOVER CREEK

NORTH FORK OF ROUGH RIVER

SINGING CREEK

HARDINSBURG FACILITIES PLANNING AREA BOUNDARY



HARDINSBURG WWTP - ENLARGED PLAN

NOT TO SCALE

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HARDINSBURG PUBLIC WORKS MUNICIPAL UTILITIES

SCALE: 1" = 1000'

LEGEND:

- LIFT STATION
- MANHOLE
- 8" GRAVITY SEWER
- 10" GRAVITY SEWER
- 15" GRAVITY SEWER
- FORCE MAIN

EXHIBIT 3.2
EXISTING WASTEWATER SYSTEM


SINGING CREEK
HARDINSBURG FACILITIES PLANNING AREA BOUNDARY
Waterworks
Sewage Disposal
METER NO. 5 (MANHOLE 65)
METER NO. 4 (MANHOLE 30)
PIPELINE
INCORPORATED CITY LIMITS
HARDINSBURG WWTP
County Airport
Cem
WT
METER NO. 1 (MANHOLE 20)
Codyville
Hardinsburg
(BM 714)
METER NO. 3 (MANHOLE 260)
METER NO. 2 (MANHOLE 260)
LIFT STATION
Fairgrounds
Meadows
Creek
Dowdge
Run
Hardins
Bens Hole Br
Sheep Falls Br
Bens Hole Branch
CLOVER CREEK
SINGING CREEK
NORTH FORK OF ROUGH RIVER
Athletic Field
Harned
BM 726
BM 790

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PREPARED FOR:

HARDINSBURG PUBLIC WORKS MUNICIPAL UTILITIES

SCALE: 1" = 1000'

LEGEND:

- LIFT STATION
- MANHOLE
- 8" GRAVITY SEWER
- 10" GRAVITY SEWER
- 15" GRAVITY SEWER
- FORCE MAIN
- CORPORATE BOUNDARY
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- SERVICE AREA
- WATERSHED
- 0-2 YEAR PLANNING AREA
- 3-10 YEAR PLANNING AREA
- 11-20 YEAR PLANNING AREA

EXHIBIT 3.3
EXISTING WASTEWATER COLLECTION SYSTEM

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HARDINSBURG PUBLIC WORKS MUNICIPAL UTILITIES

SCALE: 1" = 1000'

LEGEND:

LIFT STATION	CORPORATE BOUNDARY
MANHOLE	PLANNING AREA BOUNDARY
8" GRAVITY SEWER	SERVICE AREA
10" GRAVITY SEWER	WATERSHED
15" GRAVITY SEWER	
FORCE MAIN	

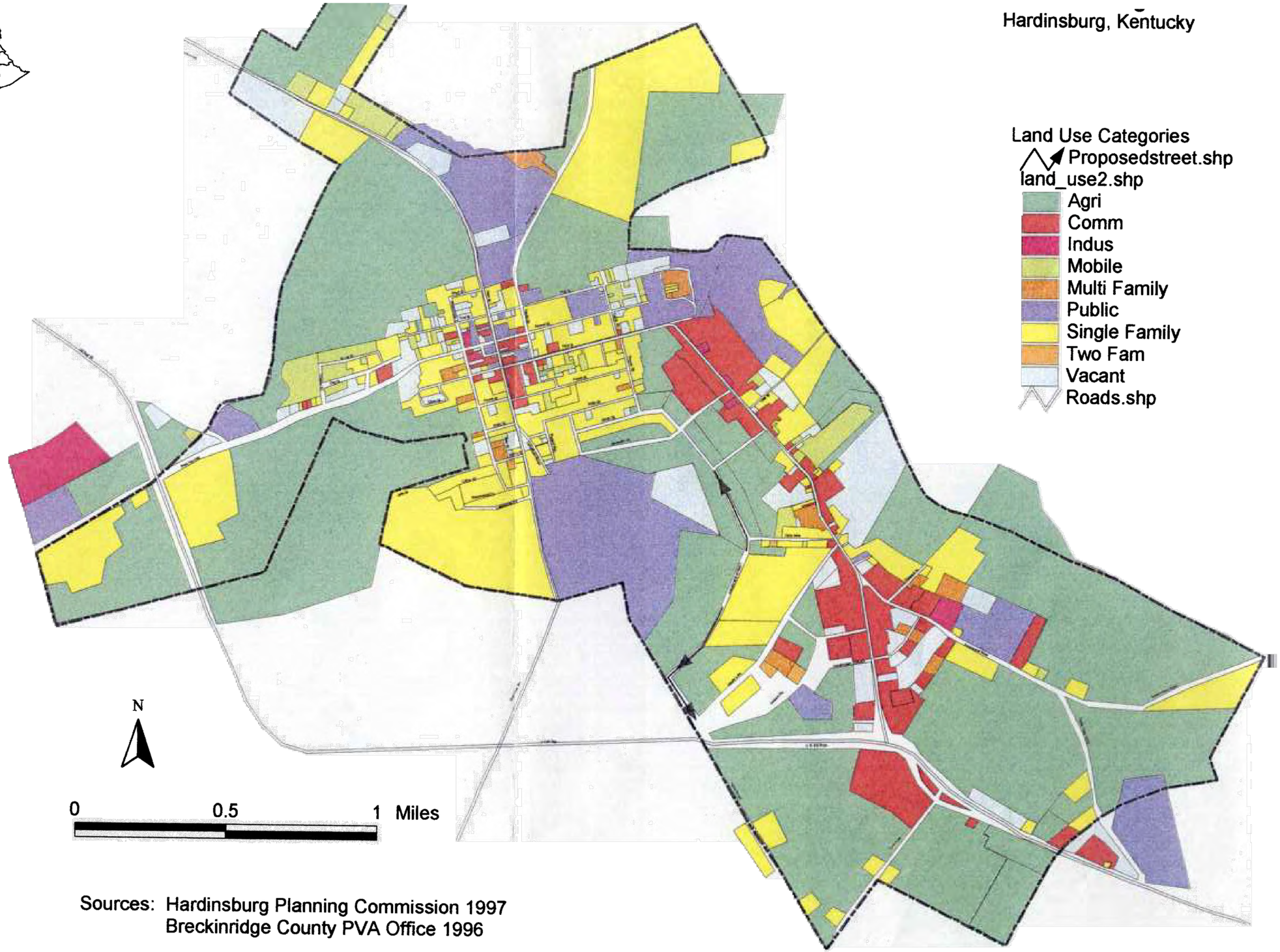
0-2 YEAR PLANNING AREA

3-10 YEAR PLANNING AREA

11-20 YEAR PLANNING AREA

EXHIBIT 3.4
FLOODPLAIN MAP

Hardinsburg, Kentucky



Sources: Hardinsburg Planning Commission 1997
Breckinridge County PVA Office 1996

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PREPARED FOR: HARDINSBURG PUBLIC WORKS MUNICIPAL UTILITIES

SCALE: AS NOTED

EXHIBIT 3.5
EXISTING CITY LIMITS
and LAND USE