

ELKHORN CITY 201 FACILITIES PLAN

PIKE COUNTY, KENTUCKY

13-445 2910.027



Prepared for:
City of Elkhorn City
Pike County, Kentucky

January 2015

Prepared by:
Summit Engineering Inc.
3205 Summit Square Place
Lexington, Kentucky 40509

Contact:
Derek Motsch
859-264-9860

TABLE OF CONTENTS

SECTION 1 – REGIONAL FACILITIES PLAN SUMMARY

- 1.01 Purpose of the Plan
- 1.02 Recommended Alternate
- 1.03 Estimate of Probable Cost
- 1.04 Planning Agency Commitments
- 1.05 Suggested Implementation Schedule

SECTION 2 – STATEMENT OF PURPOSE AND NEED

- 2.01 Need for 201 Facilities Plan

SECTION 3 – PHYSICAL CHARACTERISTICS OF THE PLANNING AREA

- 3.01 Planning Area Boundaries
- 3.02 Topography
- 3.03 Geographic Features
- 3.04 Maps:
 - 3-1 Boundary Map
 - 3-2 Existing Wastewater System Map
 - 3-3 Topographic Map
 - 3-4 100-Year Floodplain Map
 - 3-5 Planning and Zoning Map

SECTION 4 – SOCIOECONOMIC CHARACTERISTICS OF THE PLANNING AREA

- 4.01 Planning Area Population
- 4.02 Service Area Population
- 4.03 Industrial & Commercial Usage
- 4.04 Economic & Social Impact

SECTION 5 – EXISTING ENVIRONMENT IN THE PLANNING AREA

- 5.01 Physical Features
 - 5.01.1 Surface and Groundwater Quality
 - 5.01.2 Water Sources & Supply
 - 5.01.3 Wetlands, Lakes, & Streams
 - 5.01.4 Air Pollution
 - 5.01.5 Floodplain
 - 5.01.6 Soils
 - 5.01.7 Geology & Topography
- 5.02 Biological
- 5.03 Cultural
- 5.04 Other Resource Features
 - 5.04.1 Climate
 - 5.04.2 Energy Production and Consumption

SECTION 6 – EXISTING WASTEWATER SYSTEM

- 6.01 On-Site Disposal
- 6.02 Treatment Plant(s)
- 6.03 Collection & Conveyance System
- 6.04 Biosolids Disposal
- 6.05 Operation, Maintenance, & Compliance

SECTION 7 – FORECASTED FLOWS AND WASTE LOADS IN THE PLANNING AREA

- 7.01 Residential Flows
- 7.02 Commercial & Industrial Flows
- 7.03 Waste Water Treatment Plant
- 7.05 DOW Waste Load Allocation

SECTION 8 – EVALUATION OF ALTERNATIVES

- 8.01 Possible Alternates
- 8.02 Cost Analysis
- 8.03 Effectiveness
- 8.04 Proposed Alternate

SECTION 9 – CROSS-CUTTER CORRESPONDENCE AND MITIGATION

- 9.01 Correspondence:
 - US Fish and Wildlife Service
 - Kentucky Department of Fish and Wildlife Resources
 - Kentucky Heritage Council
 - US Army Corps of Engineers
 - Natural Resources and Conservation Services

SECTION 10 – EVALUATION OF RECOMMENDED REGIONAL FACILITY PLAN

- 10.01 Environmental Impacts
- 10.02 Institutional Structure
- 10.03 Funding Plan
- 10.04 Implementation Schedule

SECTION 11 – DOCUMENTATION OF PUBLIC PARTICIPATION

- 11.01 Newspaper Advertisement
- 11.02 Measures Taken to Solicit Public Participation
- 11.03 Public Meeting Summary Report
- 11.04 Public Meeting Attendance Sheet
- 11.05 Public Concerns

SECTION 12 – REGIONAL FACILITIES PLAN COMPLETENESS CHECKLIST & FORMS

APPENDIX

- Appendix A Correspondence
- Appendix B Sewer Use Agreement
- Appendix C Waste Load Allocation
- Appendix D Construction Cost Opinions, Operation & Maintenance Cost Opinions and Corresponding Project Area Exhibits

SECTION 1

REGIONAL FACILITIES PLAN SUMMARY

1.01 PURPOSE OF THE PLAN

The purpose of this facilities planning report is to determine the most economical, effective, environmentally sound, and implementable wastewater collection and treatment system for the Elkhorn City Planning Area. This Facilities Plan is prepared to outline the wastewater collection, conveyance and treatment needs of the Elkhorn City Planning Area for the next 20 years.

The City of Elkhorn City has owned and operated a wastewater collection and treatment system since the early 1960's. In 1972 the current plant was constructed near the mouth of John Moore Branch. In 1995, Elkhorn City published its first Facilities Plan. The existing treatment works were rehabilitated in accordance with set plan beginning in 1997. Gravity sewers have been extended to most, but not all of the Elkhorn City corporate limits.

The City of Elkhorn City has authorized Summit Engineering, Inc. to develop a 201 Facilities Plan for the new Elkhorn City Planning Area. This report will examine and assess any existing collection and treatment facilities in the study area, provide projections as to likely growth in the study area, identify alternatives for continued public sewage collection and treatment, and address all remaining wastewater needs for the next 20 year period.

1.02 RECOMMENDED ALTERNATE

Two alternatives for wastewater collection and conveyance were considered for the Elkhorn City Planning Area. These alternatives were: pressure sewers and conventional gravity sewers. A life cycle cost analysis of each system revealed that pressure sewers are the most cost effective method of collecting wastewaters in the planning area (see Table 8A-5).

The 3-10 year goals for the collection and conveyance system include:

- A. Remaining Elkhorn City
- B. John Moore Branch
- C. Beaver Creek

Five wastewater treatment alternatives were evaluated. These were:

1. "Do Nothing."
2. New Site at Belcher Bottom
 - a. Phased construction of a new oxidation ditch plant at a new site.
 - b. Phased construction of a new sequencing batch reactor plant at a new site.
 - c. Phased construction of a lagoon plant at a new site.
3. Expand existing plant.

- a. Extended Aeration
- b. SBR

Alternate 3 is the selected plan.

The selected plan is the construction of a pressure sewer system with lift stations and construction of a sequencing batch reactor (SBR) plant. If the construction is not phased over the planning period the capital requirements would exceed the City of Elkhorn City’s financial capability. Phasing is based on two planning periods as suggested by Division of Water’s guidelines: 0 – 2 Years (2016-2017) for the expansion of the plant, and 3 – 10 Years (2018-2025) for the construction of the sewer system. The selected plan for the sewer system is presented in Table 1-1 herein.

1.03 ESTIMATE OF PROBABLE COST

The capital requirements for the selected treatment plant option are \$3,304,750 (see Table 1-1). The proposed method of funding for the treatment plant expansion is outlined in Table 1-2.

For sewer service the City of Elkhorn City proposes to charge rates equal to what is currently charged for metered water use by Elkhorn City. See Table 8C-4 for more information on proposed sewer rates.

**Table 1-1
Summary of Estimated Project Costs for Selected Plan (0-10 Years)**

PRESSURE SEWER SYSTEMS		
SERVICE AREA	PHASE	
	0-2 YEAR	3-10 YEAR
Remaining Elkhorn City		\$ 574,986.44
John Moore Branch		\$ 2,329,847.95
Beaver Creek		\$ 1,899,274.09
SUBTOTAL CONSTRUCTION	\$ -	\$ 4,804,108.48
SUBTOTAL PROJECT COST	\$ -	\$ 6,965,957.30
TREATMENT		
SEQUENCING BATCH REACTOR WWTP		
SUB-TOTAL PROJECT COST	\$ 3,304,750.00	\$ -
GRAND TOTAL - CAPITAL REQ'D	\$ 3,304,750.00	\$ 6,965,957.30

Table 1-2
Potential Sources of Funding for Phase 1 WWTP

AGENCY	GRANT / LOAN	AMOUNT	COMMENTS
KIA-SRF	LOAN	\$ 1,000,000.00	
ARC	GRANT	\$ 500,000.00	
CDBG	GRANT	\$ 1,000,000.00	
LOCAL	FUNDS	\$ 1,000,000.00	
GRAND TOTAL		\$3,500,000.00	

Check Funding \$ -
Balance = \$ (3,500,000.00)

1.04 PLANNING AGENCY COMMITMENTS

No planning agency commitments are required.

1.05 SUGGESTED IMPLEMENTATION SCHEDULE

**TABLE 1-3
ELKHORN CITY WASTEWATER FACILITIES PLAN
0-20 YEAR PLANNING PERIOD PROJECTS
PRELIMINARY PROJECTS IMPLEMENTATION SCHEDULE**

Area #	Proposed Service Area	Planning Period	PLANNING PERIOD																
			Planning	0-2 Year		2018 - 2019		2020		2021		2022		2023		2024		2025	
1	Sequencing Batch Reactor WWTP	0-2 Year																	
5	Remaining Elkhorn City	3-10 Year																	
6	John Moore Branch	3-10 Year																	
7	Beaver Creek	3-10 Year																	

Notes:

1. Each implementation bar includes all funding acquisition, design, permitting, bidding, and construction work items.

SECTION 2 STATEMENT OF PURPOSE AND NEED

2.01 NEED FOR 201 FACILITIES PLAN

1. Expansion of the existing treatment plant by more than 30% design capacity in order to achieve the following:
 - A. To provide all residents of the Planning Area access to municipal wastewater collection and treatment.
 - B. To foster the economic growth of the community by eliminating the impediment to new construction posed by the lack of an expandable public wastewater collection and treatment system.
 - C. To eliminate the existing package plants, septic tanks and straight pipe discharges.
 - D. To improve the water quality of the Elkhorn City area by eliminating straight pipe discharges of raw sewage.

SECTION 3 PHYSICAL CHARACTERISTICS OF THE PLANNING AREA

3.01 PLANNING AREA BOUNDARIES

The Planning Area is illustrated in Exhibit 3-2. The Planning Area covers 6.2 square miles of southeastern Pike County. It includes the sub-areas of Elkhorn City, John Moore Branch, and Beaver Creek. Project planning boundaries can be seen in Exhibit 3-3. Exhibit 3-2 illustrates the service area.

3.02 TOPOGRAPHY

The topography of the planning area is consistent with the eastern coalfields and typical of the Kanawha section of the Appalachian Plateau physiographic region. Steep, rugged, irregular mountains with narrow, winding valleys characterize the planning area. Some of the major streams are entrenched in floodplains of moderate width, but most of the smaller creeks have no valley floors.

The planning area is underlain by the relatively flat strata of sandstones, siltstones, shales, and coals of the Breathitt Formation (Pennsylvanian Age). Sandstone forms the cap rock on many of the ridges. Many of the coal layers, such as the Upper Elkhorn, Amburgy and Fire Clay have been extensively mined, and the Upper Elkhorn No. 2 has been mined out in much of the area.

Most of the City of Pikeville is located on the alluvium and colluvium. The valley floors of some of the larger creeks, also have alluvium valley floors. This alluvium tends to be mainly sandy silt, and it may be mixed with coal, cinder, glass, and metal.

The unsewered customers of the planning area have few options for wastewater disposal due to the shallow soils and lack of valley floors. Land for construction of residences is limited. Hillside lots are small and steep. On-site disposal systems tend to be ineffective, thus much domestic wastewater flows to the nearest stream or drainage ditch.

3.03 GEOGRAPHIC FEATURES

3.03.1 Land Use & Development - The local Planning and Zoning authority is the Pikeville/Pike County/Elkhorn City joint planning and zoning commission.

A land use map is presented as **Exhibit 3-5**. Most of the area is best described as unmanaged hardwood forest. The relatively narrow valley floors are urbanized and should be described as rural residential. With the exception of small residential garden plots, there is essentially no agriculture in Pike County.

3.03.2 Wetlands - A wetlands map of the Planning Area is provided as **Exhibit 3-1**. The collector sewers and treatment system presented herein will be planned to avoid wetland areas. Any sewer system must cross streams. The appropriate stream crossing permits will be obtained when the collector sewers are designed. The construction plans will incorporate sediment control measures to protect aquatic resources.

3.03.3 Floodplains – **Exhibit 3-4** depicts the 100 year floodplain extents.

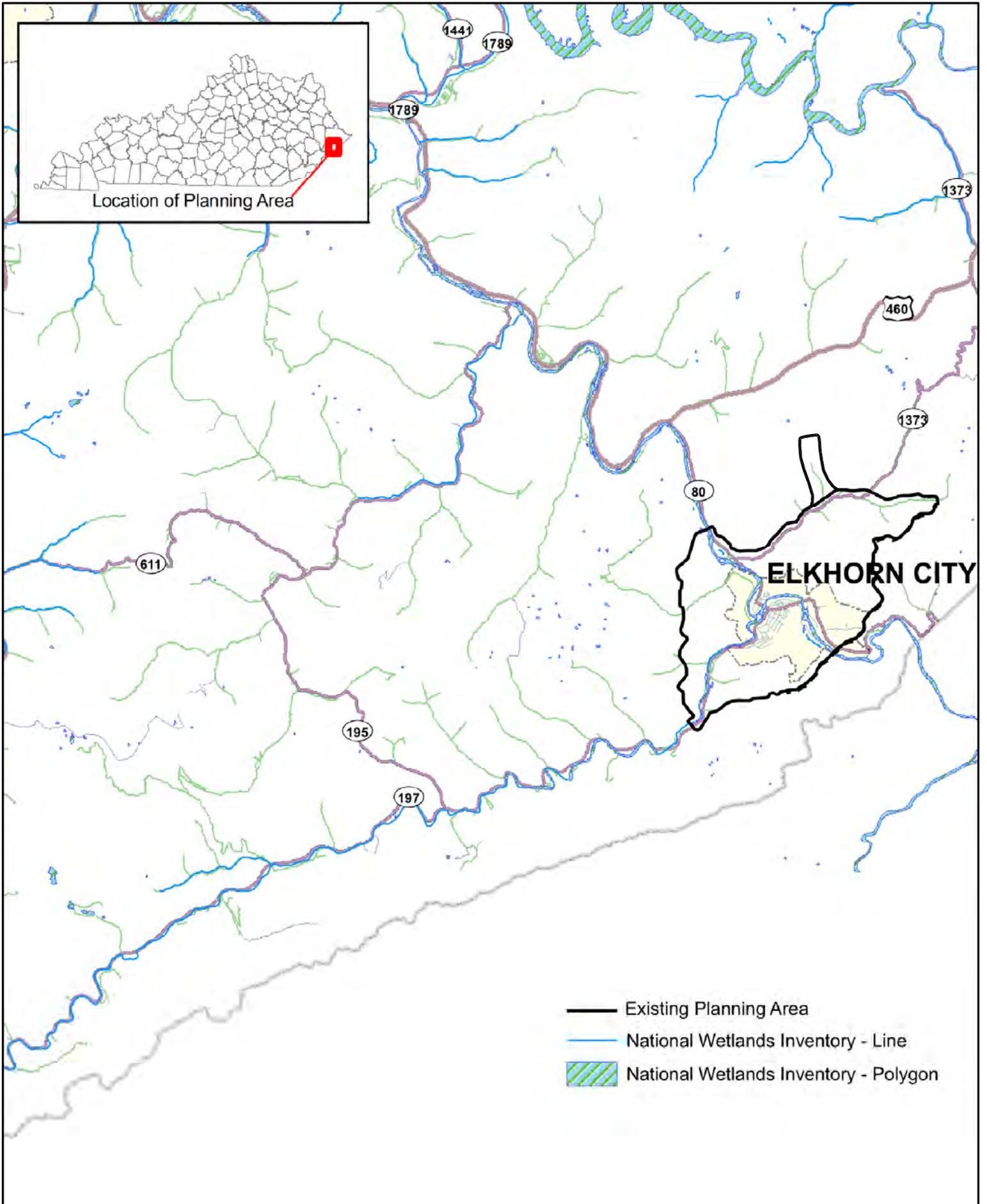
The proposed wastewater treatment plant expansion will not encroach on the regulatory floodway. All controls for pump stations will be located above the 100-year flood elevation.

3.04 NATURAL OR MANMADE FEATURES

The Mountain Water District operates a 3 MGD water treatment plant at Harless Creek, Kentucky. This plant has a raw water intake on Russell Fork approximately 8 miles downstream from the existing wastewater treatment plant at Elkhorn City. This water intake is illustrated on Exhibit 3-2. Kentucky Division of Water regulations prohibit wastewater treatment plant discharges within 5 miles of a water intake location. Any proposed treatment works will be sited in compliance with the 5 mile policy.

3.05 MAPS

3-1	Wetlands in the Planning area
3-2	Existing Wastewater System Map
3-3	Planning Area Topographic Map
3-4 A-D	100-Year Floodplain Map
3-5	Land Use in Planning Area



- Existing Planning Area
- National Wetlands Inventory - Line
- ▨ National Wetlands Inventory - Polygon

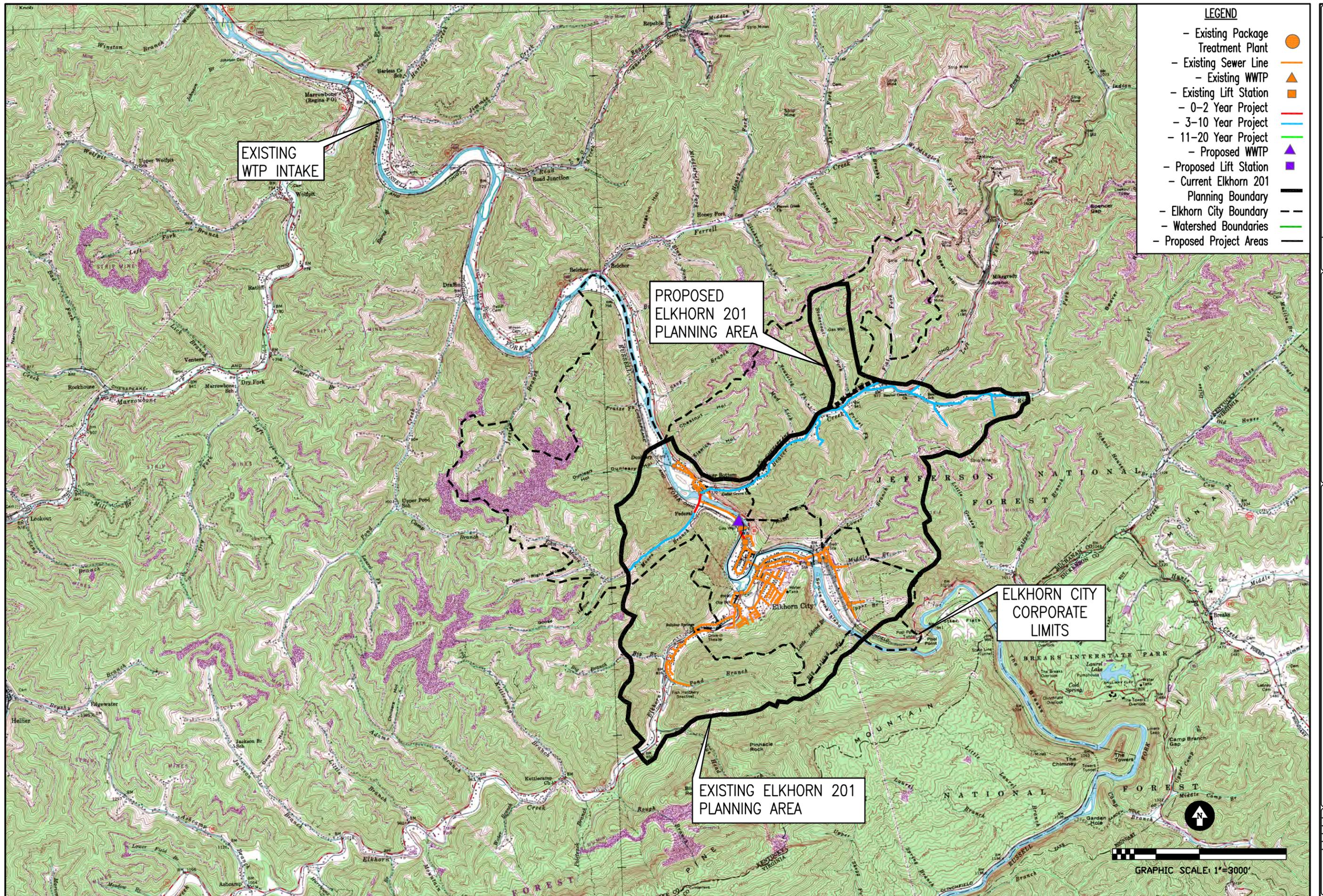


0 0.5 1 2
Approximate Scale in Miles



SUMMIT ENGINEERING, INC.
PIKEVILLE, KY HAZARD, KY LEXINGTON, KY
CHARLESTON, WV CHAPMANVILLE, WV
BIG ROCK, VA

EXHIBIT 3-1
Wetlands in the Planning Area



LEGEND

- Existing Package Treatment Plant ●
- Existing Sewer Line —
- Existing WWP ▲
- Existing Lift Station ■
- 0-2 Year Project —
- 3-10 Year Project —
- 11-20 Year Project —
- Proposed WWP ▲
- Proposed Lift Station ■
- Current Elkhorn 201 Planning Boundary - - -
- Elkhorn City Boundary —
- Watershed Boundaries —
- Proposed Project Areas —

EXISTING WTP INTAKE

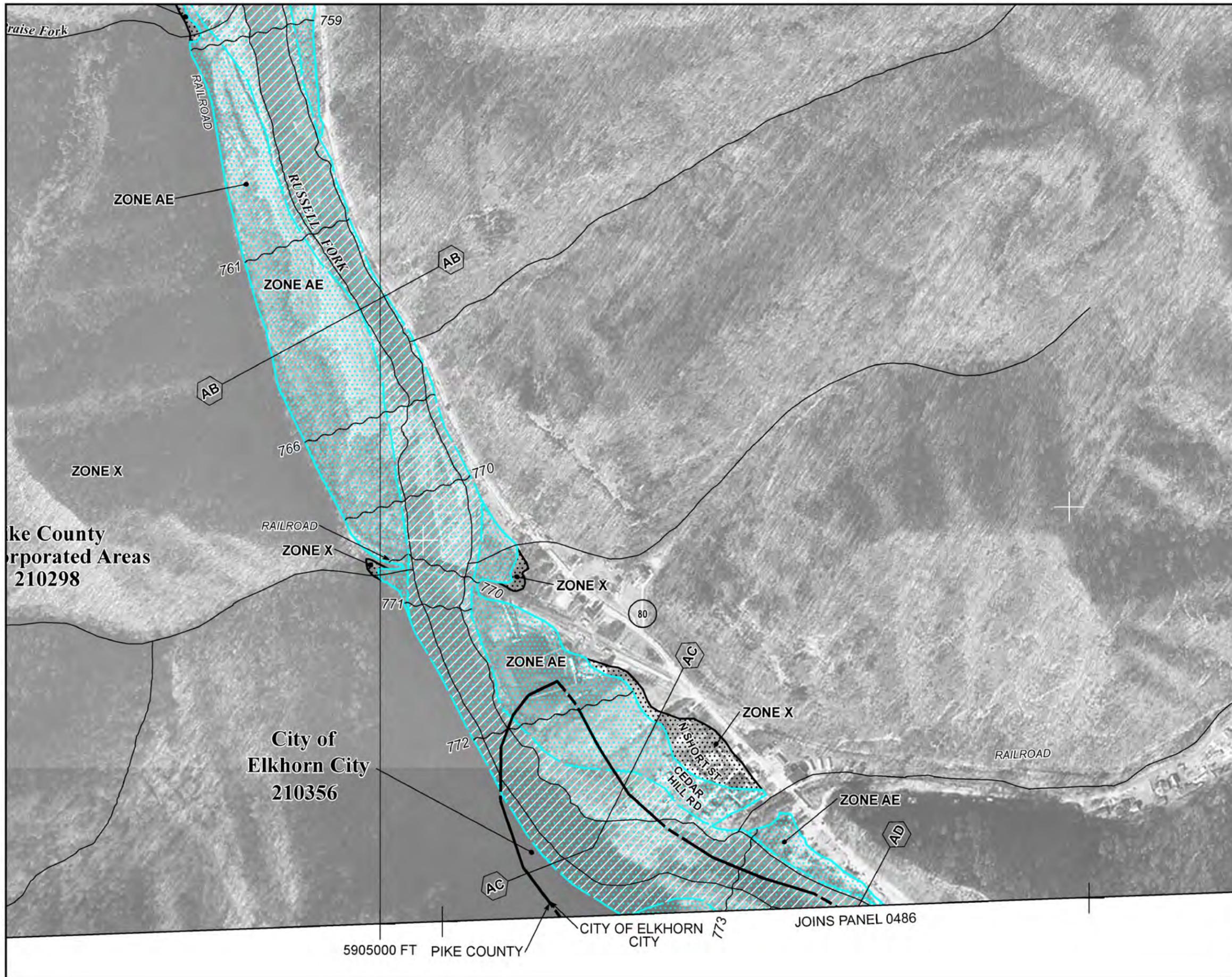
PROPOSED ELKHORN 201 PLANNING AREA

ELKHORN CITY CORPORATE LIMITS

EXISTING ELKHORN 201 PLANNING AREA

GRAPHIC SCALE 1"=3000'

<p>DATE</p> <p>DESCRIPTION OF REVISION</p>	<p>SUMMIT ENGINEERING, INC.</p> <p>LEASANTOWN, KY FRENCHVILLE, KY HAZARD, KY LONDON, WV BRUNDTY, VA</p>
<p>City of Elkhorn City Pike County, Kentucky</p>	
<p>Elkhorn City 201 Facilities Plan Existing Service Map</p>	
<p>DATE: 10/16/2014 SCALE: 1"=3000' DRAWN BY: MDJ CHECKED: RDM PROJECT NO: 07-536</p>	
<p>SHEET: EX 3-2 OF:</p>	



Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

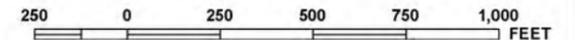


Exhibit 3-4A

NFIP PANEL 0478G

FIRM
FLOOD INSURANCE RATE MAP
PIKE COUNTY,
KENTUCKY
AND INCORPORATED AREAS

PANEL 478 OF 585
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ELKHORN CITY, CITY OF	210356	0478	G
PIKE COUNTY	210298	0478	G

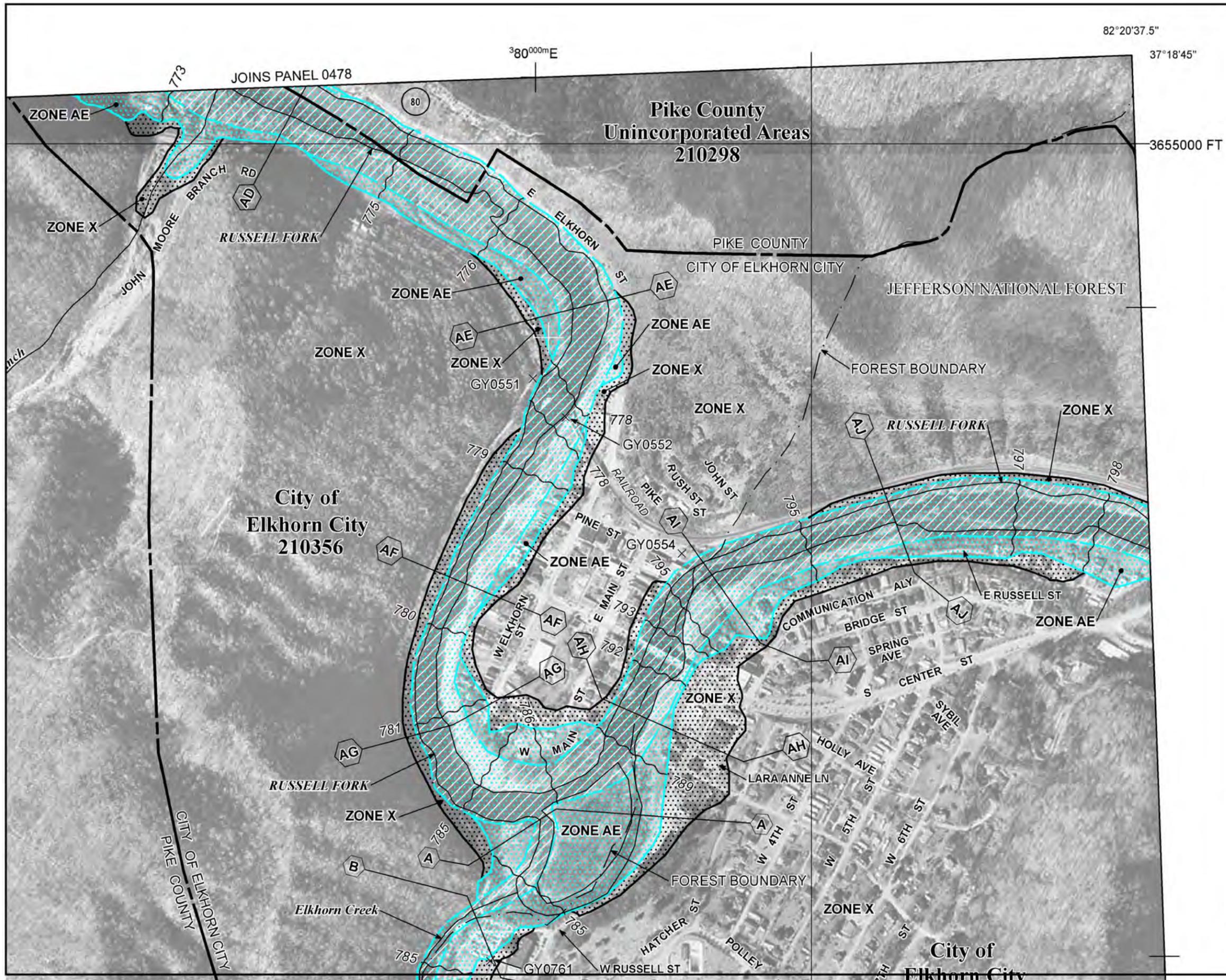
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
21195C0478G
MAP REVISED
MAY 2, 2008

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



82°20'37.5"
37°18'45"

380000mE

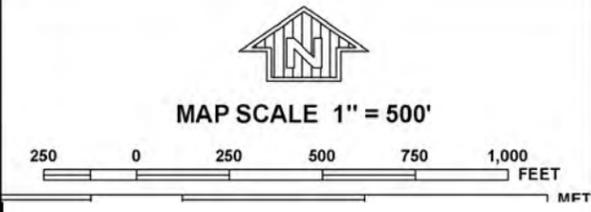


Exhibit 3-4B

NFIP PANEL 0486G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
PIKE COUNTY,
KENTUCKY
AND INCORPORATED AREAS

PANEL 486 OF 585
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ELKHORN CITY, CITY OF	210356	0486	G
PIKE COUNTY	210298	0486	G

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
21195C0486G

MAP REVISED
MAY 2, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 500'

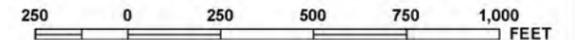


Exhibit 3-4C

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0487G

FIRM

FLOOD INSURANCE RATE MAP
PIKE COUNTY,
KENTUCKY
AND INCORPORATED AREAS

PANEL 487 OF 585

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ELKHORN CITY, CITY OF	210356	0487	G
PIKE COUNTY	210298	0487	G

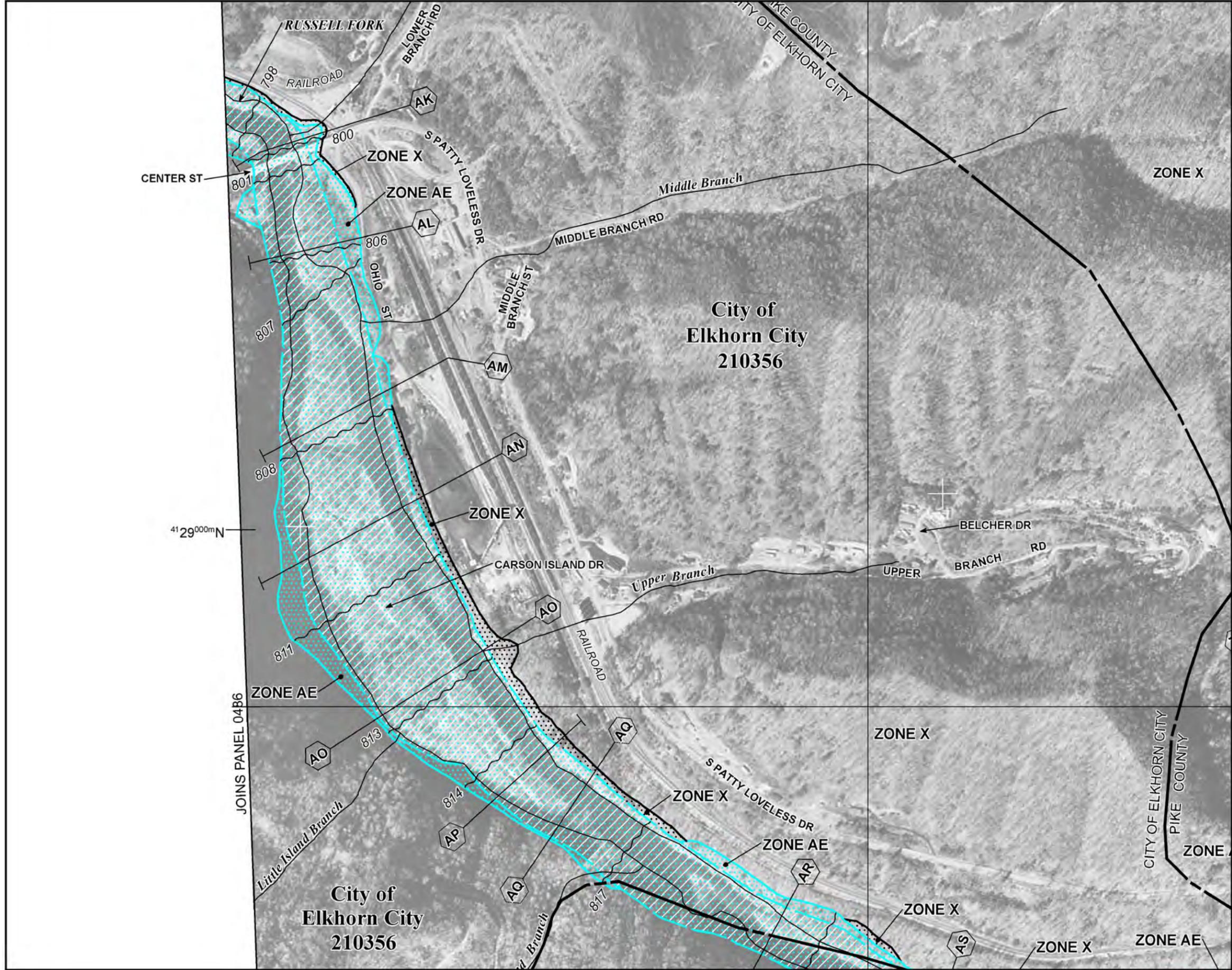
Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
21195C0487G

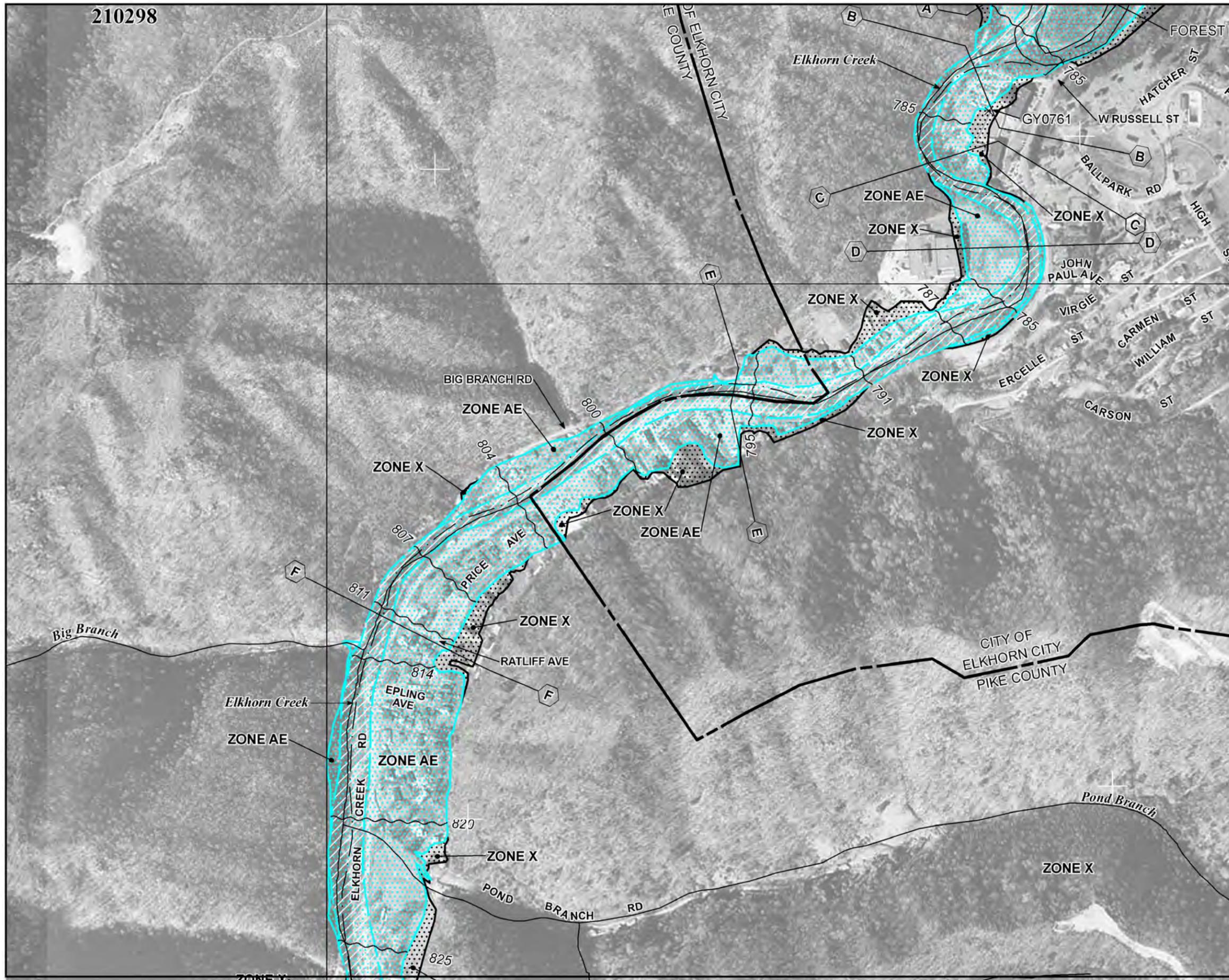
MAP REVISED
MAY 2, 2008

Federal Emergency Management Agency



This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

210298



Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

Exhibit 3-4D

NFIP PANEL 0486G

FIRM
FLOOD INSURANCE RATE MAP
PIKE COUNTY,
KENTUCKY
AND INCORPORATED AREAS

PANEL 486 OF 585
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

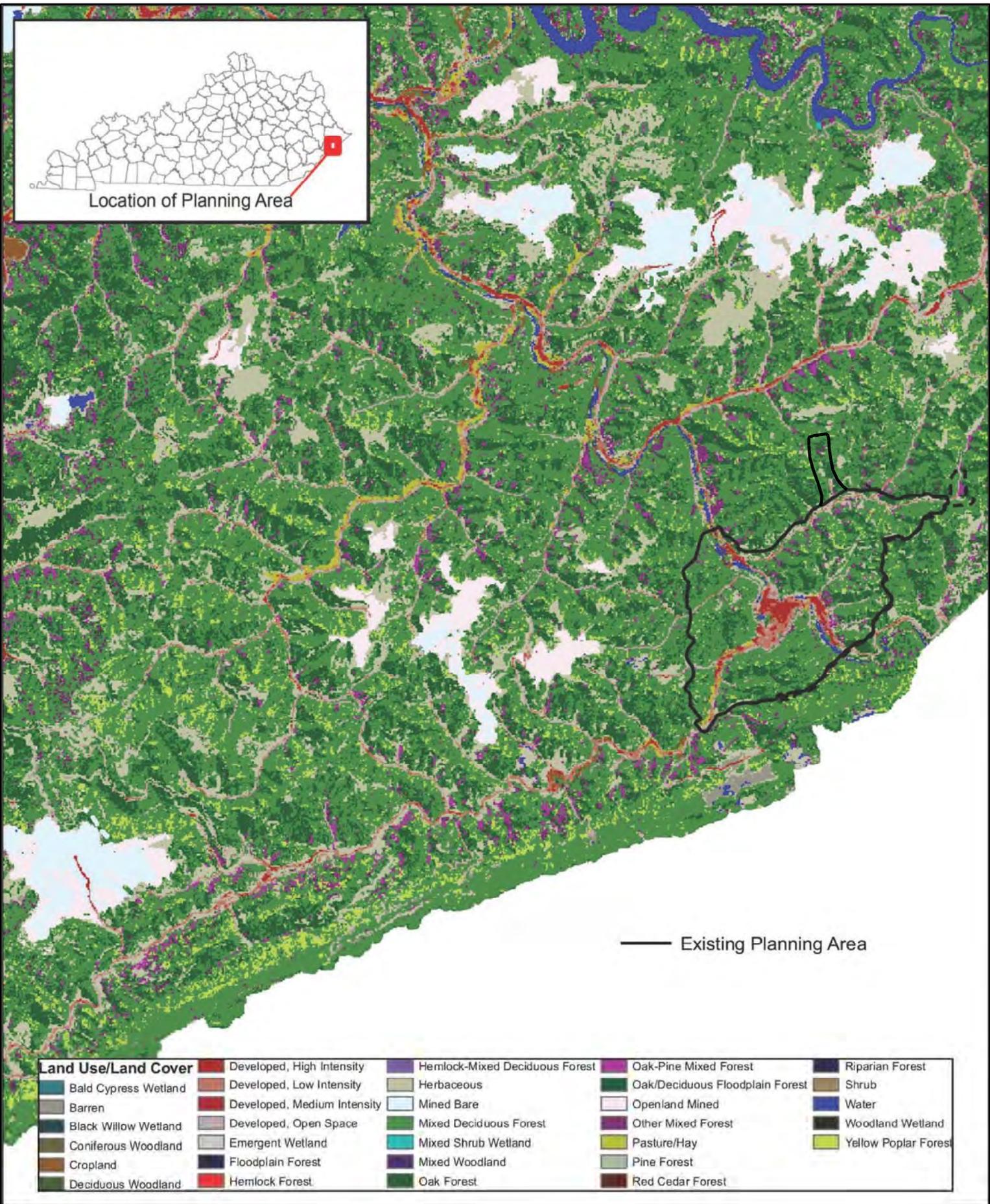
COMMUNITY	NUMBER	PANEL	SUFFIX
ELKHORN CITY, CITY OF	210356	0486	G
PIKE COUNTY	210298	0486	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
21195C0486G
MAP REVISED
MAY 2, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



Location of Planning Area

— Existing Planning Area

Land Use/Land Cover				
Bald Cypress Wetland	Developed, High Intensity	Hemlock-Mixed Deciduous Forest	Oak-Pine Mixed Forest	Riparian Forest
Barren	Developed, Low Intensity	Herbaceous	Oak/Deciduous Floodplain Forest	Shrub
Black Willow Wetland	Developed, Medium Intensity	Mined Bare	Openland Mined	Water
Coniferous Woodland	Developed, Open Space	Mixed Deciduous Forest	Other Mixed Forest	Woodland Wetland
Cropland	Emergent Wetland	Mixed Shrub Wetland	Pasture/Hay	Yellow Poplar Forest
Deciduous Woodland	Floodplain Forest	Mixed Woodland	Pine Forest	
	Hemlock Forest	Oak Forest	Red Cedar Forest	



0 0.5 1 2
 Approximate Scale in Miles



SUMMIT ENGINEERING, INC.
 PIKEVILLE, KY HAZARD, KY LEXINGTON, KY
 CHARLESTON, WV CHAPMANVILLE, WV
 BIG ROCK, VA

EXHIBIT 3-5
Land Use in the Planning Area

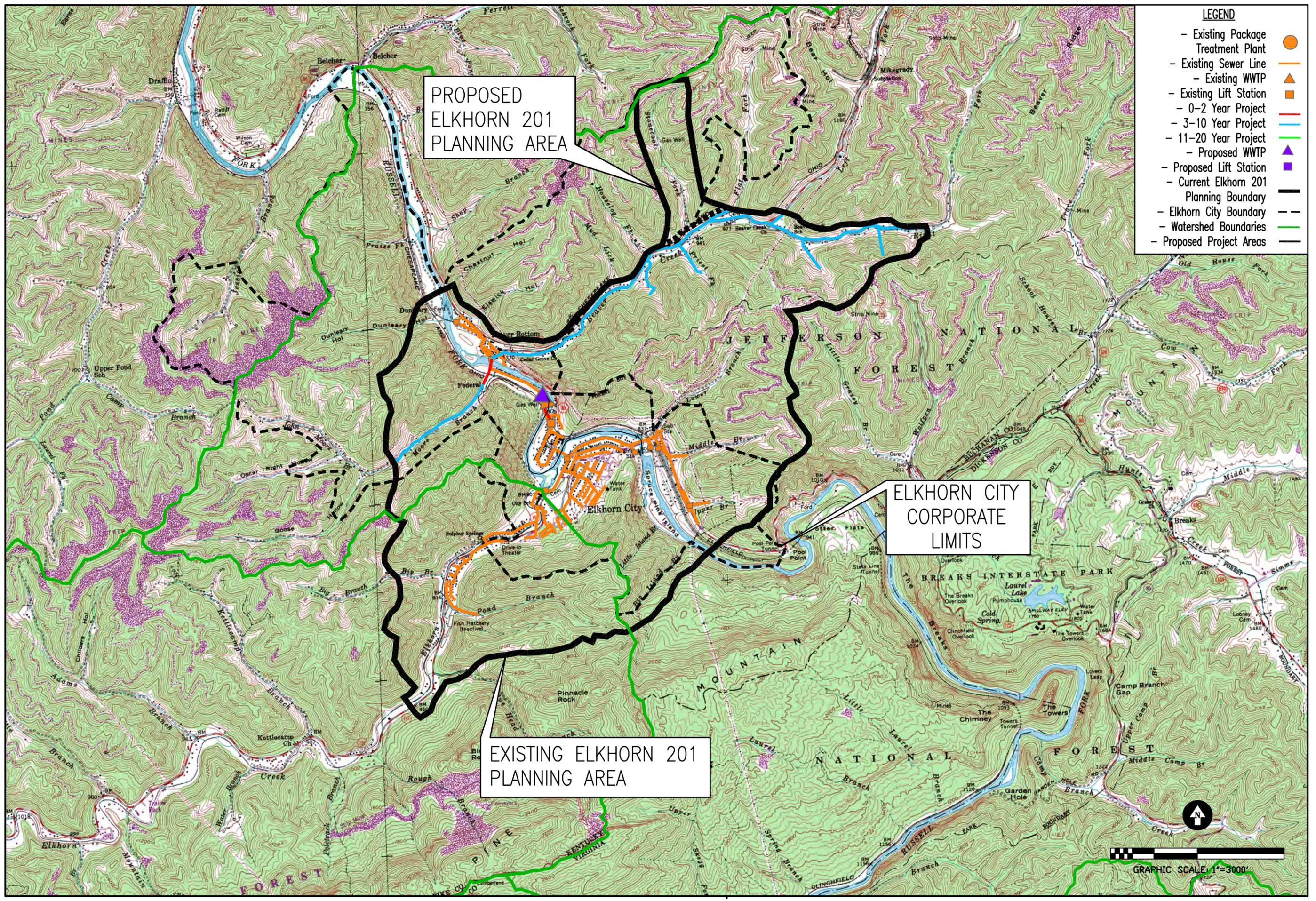
PROPOSED ELKHORN 201 PLANNING AREA

ELKHORN CITY CORPORATE LIMITS

EXISTING ELKHORN 201 PLANNING AREA

LEGEND

- Existing Package Treatment Plant ●
- Existing Sewer Line —
- Existing WWTP ▲
- Existing Lift Station ■
- 0-2 Year Project —
- 3-10 Year Project —
- 11-20 Year Project —
- Proposed WWTP ▲
- Proposed Lift Station ■
- Current Elkhorn 201 Planning Boundary —
- Elkhorn City Boundary - - -
- Watershed Boundaries —
- Proposed Project Areas —



<p>DATE</p> <p>DESCRIPTION OF REVISION</p>	<p>SUMMIT ENGINEERING, INC.</p> <p>LEWISTOWN, KY PREVAILLE, KY HAZARD, KY MORGANTOWN, WV LOGAN, WV BRUNDY, VA</p>
<p>City of Elkhorn City Pike County, Kentucky</p>	
<p>Elkhorn City 201 Facilities Plan Existing Service Map</p>	
<p>DATE: 10/16/2014 SCALE: 1"=3000' DRAWN BY: MDJ CHECKED: RDM PROJECT NO: 07-536</p>	
<p>SHEET: EX 3-6 OF:</p>	

SECTION 4 SOCIOECONOMIC CHARACTERISTICS OF THE PLANNING AREA

4.01 PLANNING & SERVICE AREA POPULATION

According to the Urban Study Center (Kentucky State Data Center), population studies show negative growth over the past 10 years. The total population of Pike County, Kentucky in the year 2000 was 68,736 persons and for the year 2010 the population was 65,024. However, due to reoccurring booms in the natural resource industry this facilities plan will assume no change in population over the next 20 years.

The Elkhorn City Planning Area (Exhibit 3-3) was sub-divided into sewer service areas based principally on watershed boundaries. In order to estimate the population of the planning area, Pike County E911 maps and listings were obtained. The E911 maps and listings provided the best current source of the location and number of potential customers for the year 2013. The data indicated that the planning area contains an equivalent population of approximately 2,813 persons. Customer data was obtained from the Water and Sewer Department of Elkhorn City regarding the existing sewer customers of the City. See Table 4-1 for 2013 customer data.

**Table 4-1
Planning Area Estimated Population**

Proposed Service Area	Population
Remaining Elkhorn City	2,105
John Moore Branch	114
Beaver Creek	594
Total	2,813

Studies by the Urban Study Center (Kentucky State Data Center) predict negative growth for Pike County and Elkhorn City.

4.02 INDUSTRIAL & COMMERCIAL USAGE

The Kentucky Transportation Cabinet is in the process of relocating US-460. The 460 project will create significant spoil fills in John Moore Branch. Local planning groups have targeted the John Moore Branch fill for an industrial park. Future waste flows for the John Moore Branch site were estimated to be 102,500 GPD.

A search of KPDES files for Elkhorn Creek revealed that the Elkhorn City Planning Area currently has no significant industrial wastewater customers. As noted there are plans for a future industrial park in John Moore Branch. The seven largest potential customers in 2033 are: (1) Proposed Industrial Park at John Moore's Branch Road

(2) Mountain View Health Care Center (3) Westcare Rest Home (4) Elkhorn City Elementary School (5) EC Housing Development.

**Table 4-2
Planning Area Estimated Non-Residential Users**

Potential Customers	Population Equivalent
Proposed John Moore Branch Industrial Development	1,025
Mountain View Health Care Center	105
Westcare Rest Home	30
Elkhorn City Elementary School	24
EC Housing Development	24
Total	1,208

4.03 ECONOMIC & SOCIAL IMPACT

Population studies predict negative growth over the next 10 years, but a new development is expected at John Moore Branch. The proposed development consists of a total +/-100 developable acres to be used for residential, industrial, and commercial purposes. These developments will likely increase the tax base, create jobs, create new businesses for use by the residents, create recreational opportunities, create additional housing, etc. with an overall improvement of the quality of life in the Planning Area.

SECTION 5 EXISTING ENVIRONMENT IN THE PLANNING AREA

5.01 PHYSICAL FEATURES

5.01.1 Surface and Groundwater Quality

Surface Water: The Russell Fork of the Levisa Fork of the Big Sandy River is the primary watercourse draining the planning area. Elkhorn City is located at the confluence of Elkhorn Creek with the Russell Fork. Beaver Creek joins the Russell Fork approximately one mile downstream of the Elkhorn Creek confluence. The flow of Russell Fork is controlled in part by the Flanagan Reservoir near Pound, Virginia. Surface water quality is generally good, although all local streams are subject to mining related discharges (sediments, acidic waters, etc.).

Surface Water Quality: All local streams are subject to mining related discharges (sediments, acidic waters, etc.), straight-line sewer pipe discharges from residences, and seepage from failed septic leach fields.

The recommended criteria for fecal coliform is 200 colonies per 100 ml for 2 or more samples over a 30 day period or a single count of 1000 colonies per 100 ml water at any time. In a recent study of the Big Sandy River Basin the watersheds of the Big Sandy River Basin were found to exceed the single count level by two to three times the limit. This high level of fecal coliform contamination in the watershed can partly be attributed to poorly installed or failed septic and sewer systems and "straight-piping" discharges (BSRB Study).

Groundwater: The major aquifers of the planning area are the sedimentary rocks of the Breathitt Formation and the unconsolidated alluvial and colluvial deposits bordering the major stream courses. The type and depth of the well and the character of the aquifer, control well yield. Most drilled wells in the sandstone yield more than 500 gallons per day, and wells in the shale or coal usually provide adequate supplies for domestic uses through fracture flow. Wells in the alluvium often yield more than 100 gallons per day. The groundwater is variable, and may have good quality water or may have high concentrations of iron and manganese (particularly in wells in the shale strata) which may stain laundry. All of the planning area lies within a moderate groundwater sensitivity region

5.01.2 Water Sources & Supply

The Mountain Water District operates a 3 MGD water treatment plant at Harless Creek, Kentucky. This plant has a raw water intake on Russell Fork approximately 8 miles downstream from the existing wastewater treatment plant at Elkhorn City. This water intake is illustrated on Exhibit 3-2. Kentucky Division of Water regulations prohibit wastewater treatment plant discharges within 5 miles of a water intake location. Any proposed treatment works will be sited in compliance with the 5 mile policy. There are no package treatment plants in the planning area.

5.01.3 Wetlands, Lakes, & Streams

A wetlands map of the Planning Area is provided as Exhibit 3-1. The collector sewers and treatment system presented herein will be planned to avoid wetland areas. Any sewer system must cross streams. The appropriate stream crossing permits will be obtained when the collector sewers are designed. The construction plans will incorporate sediment control measures to protect aquatic resources.

There are no streams designated as wild and scenic rivers within the planning area.

5.01.4 Floodplain

The FEMA “Flood Insurance Rate Maps” for the study area are reproduced as Exhibits 3-4A through 3-4D. Exhibits 3-4A through 3-4D show all available 100 year flood water elevations and floodway boundaries for Russell Fork and Elkhorn Creek in the Elkhorn City 201 Planning Area.

The proposed wastewater treatment plant expansion will not encroach on the regulatory floodway. All controls for pump stations will be located above the 100-year flood elevation

5.01.5 Soils

The most common soil association within the planning area and the county is Marrowbone-Feds creek-Kimper-Dekalb with Nelse-Shelbiana-Udorthents lying along the Russell Fork.

Marrowbone-Feds creek-Kimper-Dekalb

Soils are moderately deep and deep, steep to extremely steep, well drained soils with a loamy subsoil laying on ridge crests and mountain side slopes. Soils of this type are generally not suited to agriculture; they are best suited to woodlands. Most of the soils in this map unit are poorly suited to development because of steep slopes; however, most valleys are heavily populated and have a high concentration of residential and commercial development.

Marrowbone soils are moderately deep and well drained; on convex ridge crests and upper and middle side slopes. Slopes range between 30 and 80 percent. They typically have a fine sandy loam surface layer and a fine sandy loam, loam, or channery loam subsoil that has moderate or moderately rapid permeability.

Feds creek soils are deep and well drained; on slightly concave to convex middle and lower side slopes on dominantly warm aspects. Slopes range from 20 to 80 percent. These soils have a channery loam surface layer and a channery silt loam and channery loam subsoil that has moderately rapid permeability.

Kimper soils are deep and well drained; on concave to slightly convex middle and lower side slopes on dominantly cool aspects. Slopes range between 30 and 80

percent. They typically have a very channery loam surface layer and a channery loam or very channery loam subsoil that has moderate or moderately rapid permeability.

Dekalb soils are moderately deep and well drained; on convex ridge crests. Slopes range from 30 to 80 percent. These soils have a channery fine sandy loam surface layer and a channery and very channery fine sandy loam subsoil that has moderately rapid or rapid permeability.

5.01.6 Geology & Topography

The Planning Area is underlain by the relatively flat lying strata of sandstones, siltstones, shales, and coals of the Breathitt Formation (Pennsylvania Age).

The topography of the planning area is consistent with the eastern coalfields and typical of the Kanawha section of the Appalachian Plateau physiographic region. Steep, rugged, irregular mountains with narrow, winding valleys characterize the planning area. Some of the major streams are entrenched in floodplains of moderate width, but most of the smaller creeks have no valley floors. Ridgetops in the Elkhorn City area are over 2000 feet above sea level. The elevation of Elkhorn City is 800 feet above sea level.

The planning area is underlain by the relatively flat strata of sandstones, siltstones, shales, and coals of the Breathitt Formation (Pennsylvanian Age). Sandstone forms the cap rock on many of the ridges. Many of the coal layers, such as the Upper Elkhorn, Amburgy and Fire Clay have been extensively mined, and the Upper Elkhorn No. 2 has been mined out in much of the area.

Most of Elkhorn City is located on the alluvium and colluvium of the Russell Fork of the Big Sandy River valley. The valley floors of some of the larger creeks, such as Lower Chloe Creek and Ratliff Creek also have alluvium valley floors. This alluvium tends to be mainly sandy silt, and it may be mixed with coal, cinder, glass, and metal.

The unsewered customers of the planning area have few options for wastewater disposal due to the shallow soils and lack of valley floors. Land for construction of residences is limited. Hillside lots are small and steep. On-site disposal systems tend to be ineffective, thus much domestic wastewater flows to the nearest stream or drainage ditch.

5.02 BIOLOGICAL

The Planning Area offers a diverse assortment of habitats for plant and wildlife communities ranging from stream borders, pastures and fields of the flood plain and stream corridors, to the steep slopes and narrow ridge tops of the forested hills. No adverse impact to the plant and animal communities would be anticipated due to the implementation of wastewater collection and treatment system improvements. Plant and animal communities would likely benefit from predicted betterment of water quality.

5.03 CULTURAL

The State Historic Preservation Office has identified three (3) previously recorded archaeological resources within the planning area. These sites included two historic farms and one cemetery. See Section 9 for a map of archaeological project areas identified and correspondence related to the State Historic Preservation Office review.

5.04 OTHER RESOURCE FEATURES

5.04.1 Climate

The Planning Area climate is classified as humid temperate, well suited to agriculture and other human activities. The climatic elements of sunlight, heat, moisture, and wind are all in moderation without prolonged extremes. Rainfall is abundant and fairly regular throughout the year, usually as short showers. Heavy snowfalls are rare. The seasons differ markedly, yet warm to cool weather prevails with extremes of heat and cold occurring only for short duration.

A. Temperature

Based on historical data the average temperature in January is 23.2° F and the average temperature in July is 87.2° F.

B. Precipitation

The average annual rainfall for this area is approximately forty-four (44) inches. The month of May typically has the most precipitation (4.6 inches).

5.04.2 Energy Production & Consumption

The planning area is centered in a region of energy production. Coal mining is the key industry of the region and is a significant component of the local economy.

SECTION 6 EXISTING WASTEWATER SYSTEM

6.01 ON-SITE DISPOSAL

The majority of residents in the Elkhorn Planning Area outside of the Elkhorn City corporate limits rely on septic fields and straight pipes for the disposal of their sanitary wastewaters.

The remainder of the wastewater generated in the Planning Area is treated in one of the following ways: (1) septic tank and leach field or (2) straight pipe discharge. There is no ready means of assessing the relative number of septic tank and straight pipe discharges in use by the residents of the Planning Area. Historically, straight pipe discharges have been a common occurrence in eastern Kentucky because the rugged topography confines most development to the relatively narrow floodplains immediately adjacent to stream courses.

6.02 TREATMENT PLANT(S)

The Elkhorn City WWTP handles the majority of the collected wastewater flows of about 150,000 gallons per day. According to the Discharge Monitoring Reports from the last twelve (12) months the treatment plant is operating on average at 115 percent of its capacity and will not allow for any expansion of the sewer system until this plant can be upgraded, or a new one constructed. See Table 6-1 for a summary of the discharge monitoring reports for each of the last twelve (12) months for the existing Elkhorn City Wastewater Treatment Plant. Two (2) possible treatment plant expansion options will be evaluated in section 8B of this report.

Table 6-1
Summary of Discharge Monitoring Reports
Existing Elkhorn City Wastewater Treatment Plant

Date	Effluent Flow (MGD)	TSS (mg/l)		BOD (mg/l)		Nitrogen, Ammonia (mg/l)	
		Influent	Effluent	Influent	Effluent	Influent	Effluent
6/12/12	0.165	118.0	3.0	136.0	BMDL	10.6	1.6
7/18/12	0.093	107.0	4.0	196.0	BMDL	15.0	4.8
9/18/12	0.123	116.0	10.0	134.0	4.0	14.3	1.3
10/11/12	0.205	92.0	22.0	149.0	5.0	12.5	1.1
11/16/12	0.184	127.0	11.0	140.0	5.0	13.6	1.1
12/28/12	0.117	143.0	5.0	200.0	4.0	16.7	1.9
1/24/13	0.145	108.0	7.0	121.0	BMDL	12.8	2.2
2/25/13	0.234	86.0	9.0	162.0	6.0	6.2	1.3
3/22/13	0.205	59.0	10.0	155.0	4.0	4.9	1.0
4/25/13	0.173	84.0	6.0	101.0	BMDL	5.6	0.6
5/29/13	0.226	89.0	3.0	96.0	3.0		0.7
6/17/13	0.161	72.0	2.0	127.0	BMDL		1.9
7/22/13	0.211	56.0	2.0	127.0	3.0		0.6

*Note: BMDL = Below Minimum Detectable Level

Table 6-2
Lift Station Summary

I.D. #	Station Name	Station Location	Capacity (gpm)	TDH (ft)	HP	Force Main Dia.	Lid Elev.	Invert Elev.	Date Installed	Date Upgraded	Notes
1	Plant Inf. Lift Station	Floodplain by RR Bridge	450	60	15	6	762.24'	754.94'	1978	1992	3
2	Bank	Still House ave. near bank	325	60	9.4	6	780.80'	772.5'	1983	1994	5,7
3	Old School	Grade School	150	41	3	4	783'	768.5'	1964	1994	4
4	New School	New School	100	35	3.2	6				2003	unknown
5	Ohio Street	Ohio Street By route 80 bridge	80	40	30	4	788'	773.7'	1964	future	10
6	Clinchfield	Clinchfield Street	30	43	20	2	850.2'	839'	1983	future	10
7	City Hall	Riverside of City Hall bldg.	8	10	1	1.25	847.5'	843.5'	Future		11
8	Upper Branch	Upper Branch East Elkhorn	30	40	2	3	883'	877'	1983		7
9	Route 80 Lift Station	Between Route 80 and CSX Tracks North of Beaver Creek	48	36	3	3	763'	751'	2003		9
10	Beaver Bottom Lift Station	Russell Fork and Beaver Creek Convergence	186	63	7.5	6	763	746.9'	2003		9

- (1) Information obtained from old plans
- (2) Dry Pit Station
- (3) Submersible Station
- (4) Project APW-KY-182G, Phelps Perkins & Thredgill, 1964
- (5) Emergency Sewer Program. J.H. Milam Engineers, 1978
- (6) East Elkhorn Water and Sewer, Browser Morner, No Date
- (7) Water and Sewer Improvements, Kenvirons, 1983
- (8) Station Appears on old plan, Dated 1968
- (9) Beaver Bottom Sanitary Sewer Project, Plans Dated 2003
- (10) Lift Station Relocation Project for Route 80 Bridge Replacement Project, Plans Dated 2007 (pending)
- (11) New lift station construction for Route 80 Bridge Replacement Project, Plans Dated 2007

6.03 COLLECTION & CONVEYANCE SYSTEM

Only the residents of Elkhorn City have access to public sewers. Exhibit 3-2 illustrates the location of collector sewers in Elkhorn City. The majority of residents in the planning area without sewer service rely on septic fields and straight pipes for the disposal of their sanitary wastewaters.

6.04 BIOSOLIDS DISPOSAL

Currently the City of Elkhorn City operates the only public wastewater treatment facility within the Planning Area. Elkhorn City's plant is equipped with a sludge dewatering press for dewatering of digested solids. After sludge is dewatered a third party hauler is required to transport the solids to the landfill for final disposal.

Occasional biosolids removal is required at localized package plants and residential septic systems. These biosolids typically are removed by third party sewage pumping companies in the liquid sludge form and disposed of at local wastewater treatment facilities for further treatment and final disposal.

6.05 OPERATION, MAINTENANCE, & COMPLIANCE

According to DOW compliance records, Elkhorn City has received various minor violations over the recent years for their wastewater collection and treatment system. A summary of the violations is provided below:

- June 22, 2005: NOV issued for various operation and maintenance issues: solids washing out in final effluent, chlorination unit not working, flow meter not working, not water available at plant, and TSS in final effluent.
- April 13, 2006: NOV issued for failing to report an overflowing manhole.
- August 30, 2007: NOV issued for several issues of non-compliance. The operator was not making daily visits to the plant. The belt press was not in operation. The facility was using chlorine tablets to disinfect the final effluent (facility too large for tablet chlorination).
- February 19, 2009: NOV issued for unreported overflowing lift station near old Elkhorn City high school. The facility was using tablet chlorination, but was too large for this method of disinfection.
- September 8, 2009: NOV issued for bypassing solids, not collecting sludge, and out of compliance BOD, TSS, and E. Coli.
- August 12, 2010: NOV issued for excessive flow through the plant. The facility was bypassing solids, not properly disinfecting the effluent, not properly collecting sludge, and not properly taking samples. Samples of BOD, TSS, and E. Coli were out of compliance.

November 15, 2012: NOV issued for excessive concentrations of fecal coliform, suspended solids, and BOD. The City had also failed to submit a Discharge Monitoring Report for July 2012.

Table 6-3
Existing Package Treatment Plants

County	KPDES #	Facility Name	Major/Minor	Design Capacity (MGD)	Sic Code Description	Telephone	DMR Contact	Location Address	Location City	State	Location Latitude	Location Longitude	Outfall	Outfall Description	Outfall Latitude	Outfall Longitude
PIKE	KY0102725	KY NATIONAL BANK	MINOR	.0005	MORTG BANKERS & LOAN CORRESPON	6064374000	MICHAEL O LAVIN, VP OPER	CREEK BRANCH 10057 ELKHORN CREEK RD	BELCHER	KY	+3721310	-08222270	0011	SANITARY WASTEWATER	+3721310	-08222270
PIKE	KY0102407	WESTCARE KENTUCKY	MINOR	0.003	RESIDENTIAL CARE	7023852090	TRUMAN THOMPSON	PIKE CO BD OF ED	ASHCAMP	KY	+3715170	-08228440	0011	SANITARY WASTEWATER	+3715180	-08228470
PIKE	KY0106534	EAST RIDGE HIGH SCHOOL	MINOR	0.020	ELEMENTARY & SECONDARY SCHOOLS	6064339279	JR	PIKE CO BD OF ED	LICK CREEK	KY	+3721480	-08218270	0011	SANITARY WASTEWATER	+3721480	-08218270

**SECTION 7
FORECASTED FLOWS AND WASTE LOADS
IN THE PLANNING AREA**

7.01 RESIDENTIAL FLOWS

In order to estimate the population of the planning area, Pike County E911 maps and listings were obtained. The E911 maps and listings provided the best current source of the location and number of potential customers for the year 2013. The data indicated that the planning area contains an equivalent population of approximately 2,813 persons generating an estimated total flow of 281,300 gallons per day. Customer data was obtained from the Water and Sewer Department of Elkhorn City regarding the existing sewer customers of the City. See Table 7-1 for 2013 customer data.

**Table 7-1
Planning Area Estimated Population and Flows for 2013**

(A)	(B)	(C)	(D)
Proposed Service Area	Population Equivalent (Note 2)	Flow per Person (gpd) (Note 3)	Estimated Wastewater Flow (gpd) (Note 4)
Remaining Elkhorn City	2105	100	210,500
John Moore Branch	114	100	11,400
Beaver Creek	594	100	59,400
TOTAL =	2,813		281,300

1. Column B is determined by e911 data and the City of Elkhorn City sewer customer list
2. Ten States Standards
3. Column D calculated by multiplying column C with column B.

Year 2023

Table 7-2 derives the estimated waste flows for the Planning Area in 2023. The design year flow for the Planning Area is 385,000 GPD.

Studies by the Urban Study Center (Kentucky State Data Center) predict negative growth for Pike County and Elkhorn City.

The Kentucky Transportation Cabinet is in the process of relocating US-460. The 460 project will create significant spoil fills in John Moore Branch. Local planning groups have targeted the John Moore Branch fill for an industrial park. Future waste flows for the John Moore Branch site were estimated to be 102,500 GPD.

**Table 7-2
Planning Area Estimated Population and Flows for 2035**

(A)	(B)	(C)	(D)
Proposed Service Area	Population Equivalent (Note 1)	Flow per Person (gpd) (Note 2)	Estimated Wastewater Flow (gpd) (Note 3)
Remaining Elkhorn City	2105	100	210,500
John Moore Branch (Note 4)	1139	100	113,900
Beaver Creek	594	100	59,400
TOTAL =	3,838		383,800

1. Column B is determined by e911 data and the City of Elkhorn City sewer customer list
2. Ten States Standards
3. Column D calculated by multiplying column C with column B.
4. Proposed US-460 project Industrial Park at John Moore Branch to be completed by design year 2033
= 100 acres at 1000 gpd per acre

7.02 COMMERCIAL & INDUSTRIAL FLOWS

A search of KPDES files for Elkhorn Creek revealed that the Elkhorn City Planning Area currently has no significant industrial wastewater customers. As noted there are plans for a future industrial park in John Moore Branch. The seven largest potential customers in 2035 are: (1) Proposed Industrial Park at John Moore's Branch Road (2) Mountain View Health Care Center (3) Westcare Rest Home (4) Elkhorn City Elementary School (5) EC Housing Development.

The following Table 7-3 represents the anticipated flows created by the proposed and existing developments. The remaining non-residential customers in the planning area will be considered as residential in this study as the flow from these generators is relatively small.

**Table 7-3
Largest Flow Generators in the Planning Area 2015 - 2035**

Proposed Service Area	Quantity	Population Equivalent	Flow per Unit (gpd)	3-10 Year	11-20 Year	Total Flow (gpd)
Proposed John Moore Branch Industrial Development (Note 1)	100	1025	100	102,500	102,500	102,500
Mountain View Health Care Center (Note 3)	105	105	100	10,500	10,500	10,500
Westcare Rest Home (Note 2)	30	30	100	3,000	3,000	3,000
Elkhorn City Elementary School (Note 3)	24	24	100	2,400	2,400	2,400
EC Housing Development	24	24	100	2,400	2,400	2,400
TOTAL =	283	1,208		120,800	120,800	120,800

1. 100 acres at 1000 gpd per acre
2. Flow rates as per table 6-3
3. Flow rates obtained from the Elkhorn City Sewer Department

7.03 WASTE WATER TREATMENT PLANT

Population studies predict negative growth over the next 10 years, but a new development is expected at John Moore Branch. Additionally, the existing treatment plant is operating beyond its capacity. Based on the flow projections in Table 7-2 and design year of 2033 a recommended treatment plant capacity of 385,000 GPD is needed to handle the project

7.04 PROJECTED WASTE LOAD

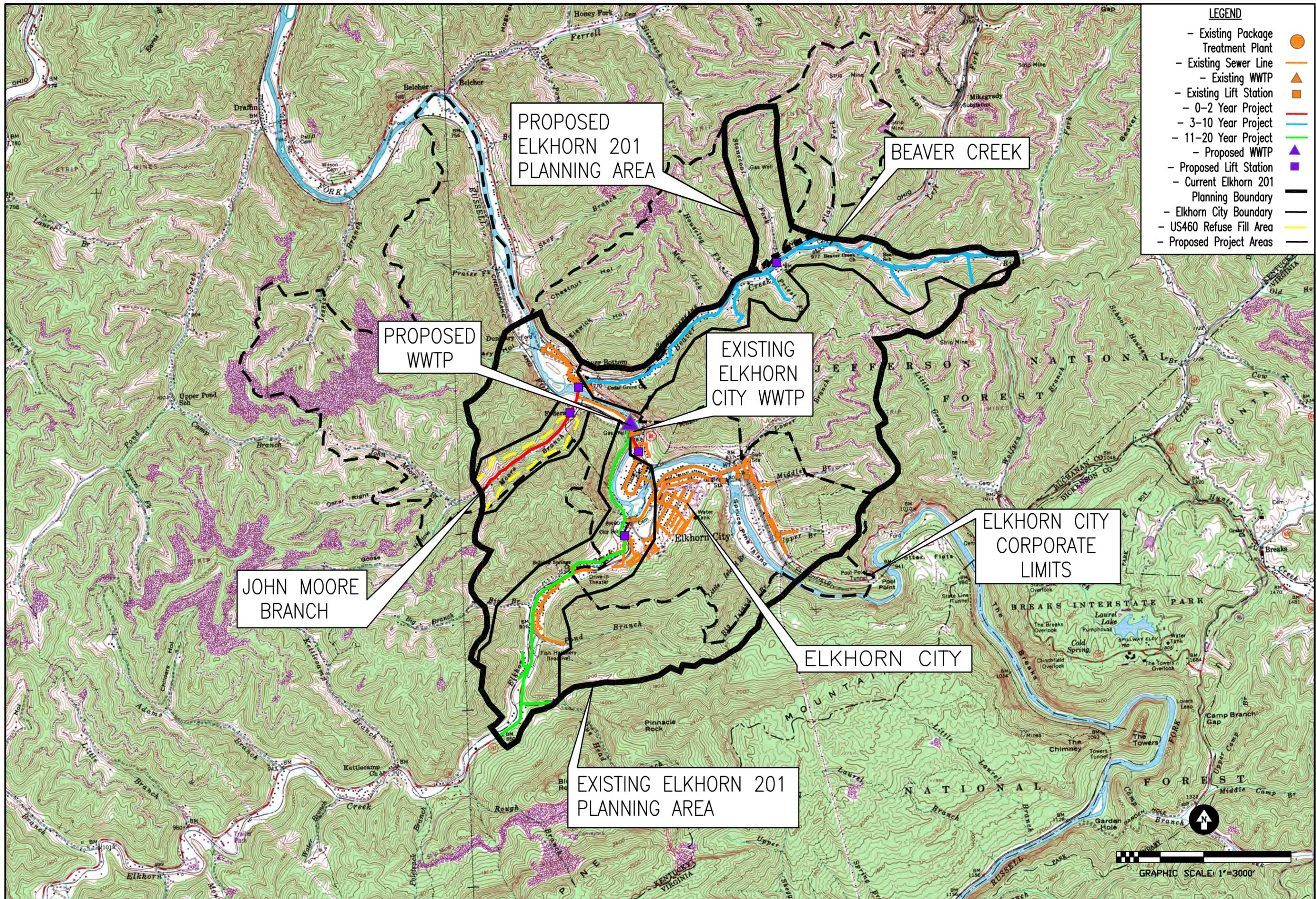
Table 7-4 presents the anticipated waste flows by service area and project year. Ten State Standards suggests the following loading factors for normal strength domestic waste: 0.17 LB (0.08 kg) BOD₅/P.E./day, 0.20 LB (0.09 kg) TSS/P.E./day, and 0.16 LB (0.07 kg) dried sludge production/P.E./day. Using 100 gpd per person the future waste loading for the project may be forecast as illustrated Table 7-4.

Table 7-4
Anticipated Flows by Service Area and Phase

Proposed Service Area	Population Equivalent	Flow per Person (gpd)	0-2 Year	3-10 Year	Total Flow (gpd)
Dunleary and Elkhorn City	2105	100	210,500		210,500
John Moore Branch	1139	100	113,900		113,900
Beaver Creek	594	100		59,400	59,400
TOTAL =	3,838		324,400	59,400	383,800

7.05 PROJECTED WASTE LOAD

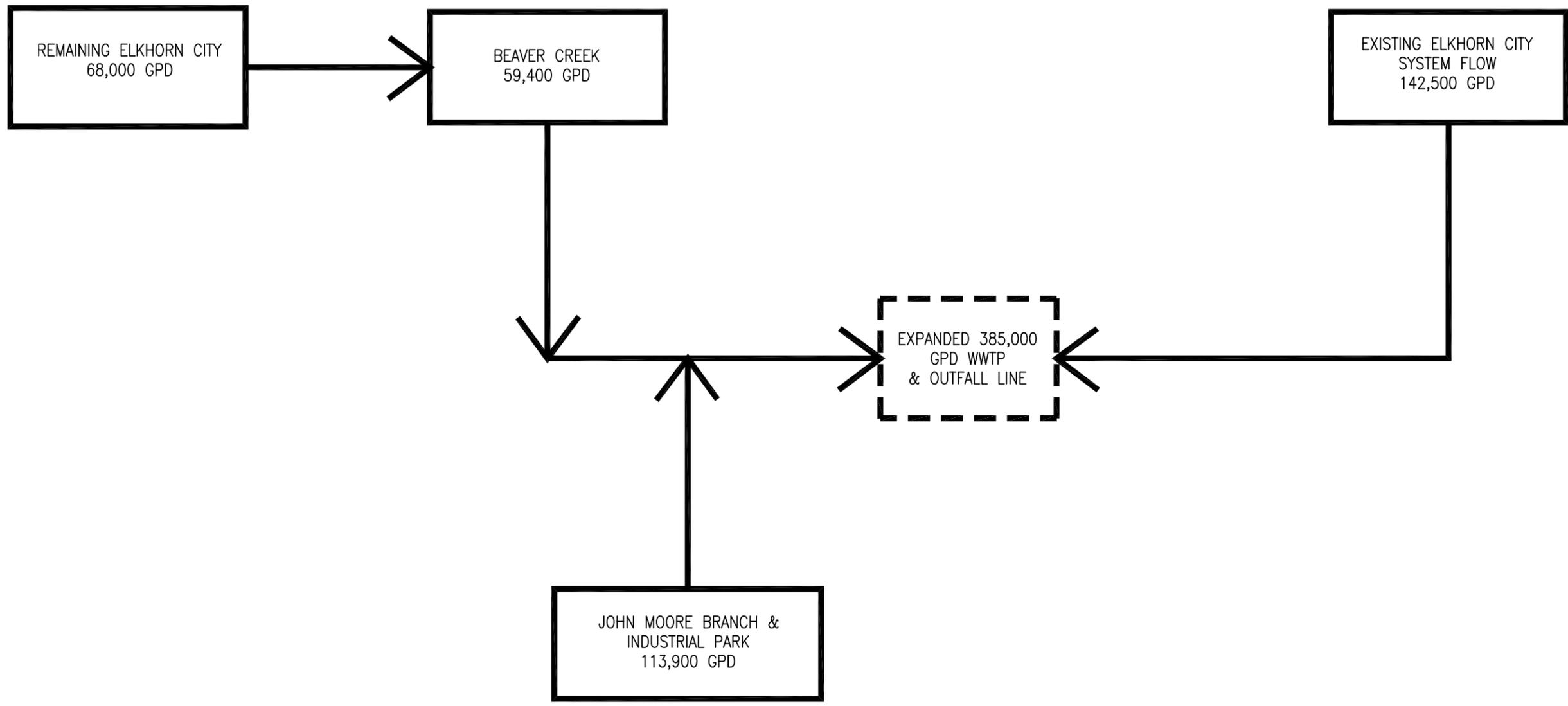
A copy of the Division of Water issued waste load allocation is attached to this section.



LEGEND

- Existing Package Treatment Plant ●
- Existing Sewer Line —
- Existing WWTP ▲
- Existing Lift Station ■
- 0-2 Year Project —
- 3-10 Year Project —
- 11-20 Year Project —
- Proposed WWTP ▲
- Proposed Lift Station ■
- Current Elkhorn 201 Planning Boundary - - -
- Elkhorn City Boundary —
- US460 Refuse Fill Area —
- Proposed Project Areas —

<p>DATE</p> <p>DESCRIPTION OF REVISION</p>	<p>SUMMIT ENGINEERING, INC.</p> <p>LEWISTOWN, KY PREVAILLE, KY HAZARD, KY LOGAN, WV BRUNDTY, VA</p>
<p>City of Elkhorn City Pike County, Kentucky</p> <p>Elkhorn City 201 Facilities Plan Proposed Project Areas Map</p>	
<p>DATE: 10/16/2014 SCALE: 1"=3000' DRAWN BY: MDJ CHECKED BY: RDM PROJECT NO: 07-536</p>	
<p>SHEET: EX 7-1 OF:</p>	



NOTE:
ALL FLOWS ARE AVERAGE DAILY FLOWS

City of Elkhorn City Pike County, Kentucky Elkhorn City 201 Facilities Plan Project Flows Schematic		SUMMIT ENGINEERING, INC. LEXINGTON, KY FRENCHBURG, KY CHARLESTON, WV LOGAN, WV BRISTOL, VA
DATE:	10/16/2014	DESCRIPTION OF REVISION
SCALE:	NTS	
DRAWN BY:	MDJ	
CHECKED BY:	RDM	
PROJECT NO:	07-536	
SHEET:	EX 7-2	
OF:		

SECTION 8A EVALUATION OF COLLECTION AND CONVEYANCE ALTERNATES

8A.01 POSSIBLE ALTERNATES

The wastewater collection, conveyance and treatment system for the study area is divided into three (3) service areas as described in Section 3 herein. (See Exhibit 3-3 for a map showing project area boundaries). These service areas are:

1. Remaining Elkhorn City
2. John Moore Branch
3. Beaver Creek

8A.02 POSSIBLE COLLECTION ALTERNATES

There are two alternates for the collection of wastewaters: (1) pressure sewers and (2) conventional gravity sewers. The following paragraphs highlight the advantages of each system.

8A.02.01 **Alternate 1** - Pressure Sewer System

In a pressure sewer system each household, business, or institution is served by an individual simplex grinder pump station. An illustration of a typical pressure sewer layout is presented in Exhibit 8-2. The individual customer on a pressure sewer system is responsible for the power service to the pump station and the utility is responsible for the maintenance and care of the pumping unit. A typical customer "Sewer User Agreement" is reproduced herein in Appendix B. The individual pump stations are headered together on small diameter force mains that collect and convey the flow to centralized treatment.

The primary design consideration for a force main sewer is the cleansing velocity. Ten States Standards requires a minimum cleansing velocity of two (2) feet per second. Extremely high velocities should also be avoided to minimize the forces acting on joints and fittings in the force main. The design flows for sizing the force mains are obtained from the daily sewer flow rates calculated previously.

Due to the terrain of the Planning Area and the location of the wastewater treatment facility, most of the project's pressure sewers will be conveying flow in a downhill direction. Downhill pumping through significant changes in elevation creates line pressures too great to be overcome by individual residential pumping units. Consequently, the pressurized sewage flows must be returned to atmospheric pressure at selected locations. This creates a demand for mainline pump stations to re-pressurize the flow on its way to the plant.

A preliminary layout of the sewer system is presented in Exhibit 8-1.

8A.02.2 **Alternate 2** - Conventional Gravity Sewer

A conventional gravity sewer consists of a series of manholes connected by pipes to transport wastewater by gravity to the treatment facility. The pipe must be laid 'gun barrel straight' manhole to manhole on a uniform down gradient to insure positive flow. Ten

States Standards mandates minimum slopes for each diameter of pipe to minimize solids deposition. Obviously, these sewers, by nature of their design, are constructed to follow the natural drainage of a watershed.

Unfortunately, site topography and development does not always allow sewers to follow stream courses. Further, since the lines must flow by gravity, they cannot be diverted around major obstacles, such as intersecting storm drains and culverts. Therefore, pump stations and force mains are still a necessary part of conventional gravity sewer construction. However, the pump stations are mainline stations owned, operated and maintained solely by the utility. Additionally, the “gun barrel” straight construction of a gravity sewer system typically requires procurement of right of way from private concerns, which may add substantially to the cost of the project.

The topographical layout of the Elkhorn City Planning Area contains many obstacles for gravity sewers such as streams that cannot be crossed without the aid of a lift station. These streams divide many of the service areas into two parts. In these areas the use of lift stations or residential grinder pumps will be utilized to serve the customers on the opposing side of the river.

A preliminary layout of the sewer system is presented in Exhibit 8-1

8A.03 SERVICE AREA COLLECTION AND CONVEYANCE SYSTEMS

Alternate pressure and gravity sewer systems were estimated for each of the three (3) service areas. Table 6-4 (located at the end of Section 6) summarizes the estimated construction costs for each alternate by service area and phase. Table 6-5 (located at the end of Section 6) shows the present worth analysis for each alternate by phase. The individual construction cost opinions for each service area’s alternates are reproduced herein as Table D-1 through D-8 of Appendix D and their corresponding area Exhibits D-2 through D-7 in Appendix D. Operation and maintenance cost opinions are located in Table D-9 through D-12 in Appendix D.

The following Table 8A-1 summarizes the proposed lift stations required for alternate 1 the pressure sewer system.

The following Table 8A-2 summarizes the proposed lift stations required for alternate 2 the gravity sewer system.

**Table 8A-1
Summary of Proposed Pressure Sewer Lift Stations**

Proposed Service Area	Lift Station Location Description	Capacity (GPM)
Remaining Elkhorn City	Upgrade Beaver Bottom Lift Station	175
Remaining Elkhorn City	New Lift Station at Mouth of John Moore Branch	275
Remaining Elkhorn City	Upgrade Existing Plant Influent Lift Station	450
Beaver Creek	Required for Pressure Breaking	200

Table 8A-2
Summary of Proposed Gravity Sewer Lift Stations

Proposed Service Area	Lift Station Location Description	Capacity (GPM)
Remaining Elkhorn City	Upgrade Beaver Bottom Lift Station	175
Remaining Elkhorn City	New Lift Station at Mouth of John Moore Branch	275
Remaining Elkhorn City	Upgrade Existing Plant Influent Lift Station	400

8A.04 SELECTION OF ALTERNATE

Alternates 1 and 2 are compared on a present worth basis in Table 8A-5 at the end of this section. The present worth analysis assumes:

1. The life of the system is twenty (20) years.
2. An interest rate of seven (7) percent.
3. An inflation rate of zero (0).
4. A salvage value of zero (0).

The pressure sewer alternate was found to be the most economical approach in existing developed areas. Gravity sewers are the preferred alternate for the pending new development in John Moore Branch. Gravity sewers are more cost effective in new developments where plot and land use density is high.

The cost opinions of Tables D-1 through D-4 of Appendix D contain the pressure sewer alternative and the Tables D-5 through D-8 contain cost opinions for the gravity sewer alternative. Operations and maintenance costs for both alternatives 1 and 2 were derived in Tables D-9 through D-12 of Appendix D.

Exhibit 7-1 presents a conceptual layout of the proposed sewer system.

8A.05 NON-MONETARY FACTORS

Non-monetary factors are those which are more subjective in nature and cannot easily have a dollar value assigned to them. The non-monetary factors evaluated for this study are:

1. Ease of construction- the pressure sewer system is simpler to construct because it can be constructed like a water line, with no need to be concerned with maintaining set grades. A pressure sewer has smaller line diameters, is buried at shallower depths than a gravity system, and is frequently installed by trenchless techniques. Consequently, pressure sewer construction is far less disruptive to existing developed areas.
2. Ease of operation- the gravity sewer system is simpler to operate because it has fewer pumps to maintain.

3. Adaptability - the pressure sewer system is more readily adaptable to rugged terrain as it is not constrained by a minimum slope, and can force wastewater up slopes as necessary.
4. Right of way – The right of way taking for pressure sewers is significantly less than for gravity sewers.
5. Reserve Capacity (Expansion) – It is easier to provide reserve capacity in gravity sewers.

Table 8A-3 summarizes the above criteria and gives each a score of + or -. A plus score indicates a favorable rating and a – indicates an unfavorable rating. The alternate with the most favorable rating is the preferred.

**TABLE 8A-3
NON-MONETARY FACTOR RATING**

FACTOR	PRESSURE SYSTEM	GRAVITY SYSTEM
Ease of	+	-
Ease of Operation	-	+
Adaptability	+	-
Right of Way	+	-
Reserve Capacity	-	+
SCORE	3	2

The pressure sewer alternate is the preferred collection system alternate both from a present worth analysis and from a non-monetary analysis. See Table 8A-4 for a summary of collection system costs by alternate and phase. See Table 8A-5 for a present worth analysis of the collection system by alternate and phase.

**TABLE 8A-4
ESTIMATED SEWER CONSTRUCTION COSTS BY ALTERNATE**

SERVICE AREA	ALT #1 PRESSURE	ALT #2 GRAVITY
Remaining Elkhorn City	\$ 574,986.44	\$ 574,986.44
John Moore Branch	\$ 2,329,847.95	\$ 1,780,079.88
Beaver Creek	\$ 1,899,274.09	\$ 2,934,197.26
SUB-TOTAL CONSTRUCTION	\$ 4,804,108.48	\$ 5,289,263.58
Construction Contingency @ 15%	\$ 720,616.27	\$ 793,389.54
Right of Way, Engineering Design, Inspection, Bond Council, and Legal @ 30% ¹	\$ 1,441,232.55	\$ 1,920,112.41
PROJECT COST	\$ 6,965,957.30	\$ 8,002,765.52

1. Gravity Sewers Assume an Additional \$1,000,000 for Right of Way Acquisition Costs

**TABLE 8A-5
PRESENT WORTH ANALYSIS**

SERVICE AREA	PROJECT YEAR	
	PHASE II - (3-10 Years)	
	ALT #1 PRESSURE	ALT #2 GRAVITY
1. CONSTRUCTION COST	\$ 4,804,108.48	\$ 5,289,263.58
2. Construction Contingency @ 15%	\$ 720,616.27	\$ 793,389.54
3. Right of Way, Engineering Design, Inspection, Bond Council, and Legal @ 30%	\$ 1,441,232.55	\$ 1,920,112.41
4. PROJECT COST	\$ 6,965,957.30	\$ 8,002,765.52
5. Present Worth Factor (Int = 7%, t = 10 Yrs)	0.5083	0.5083
6. PRESENT WORTH PROJECT COST	\$ 3,540,796.10	\$ 4,067,805.71
7. OPERATIONS & MAINTENANCE (See Note 1)	\$91,354	\$50,310
8. Equal Series Present Worth Factor (Int = 7%, t = 10 Yrs)	7.0236	7.0236
9. Present Worth Factor (Int = 7%, t = 10 Yrs)	0.5083	0.5083
10. PRESENT WORTH O&M	\$ 326,142.95	\$ 179,610.86
11. SALVAGE (See Note 3)	\$ -	\$ -
12. PRESENT WORTH SALVAGE	\$ -	\$ -
GRAND TOTAL PRESENT WORTH OF ALTERNATE (See Note 2)	\$ 3,866,939.05	\$ 4,247,416.57

Notes

1. For derivation of O&M costs, see Tables D-9 thru D-10.
2. Sum of row 7, row 11 and row 13
3. Salvage value is assumed to be zero
4. Gravity sewer will require additional R/W acquisition.

SECTION 8B EVALUATION OF WASTEWATER TREATMENT ALTERNATES

8B.01 POSSIBLE WASTEWATER TREATMENT ALTERNATES

Three treatment options were evaluated. These were:

1. “Do Nothing”
2. Build a new plant at a new site
3. Expand existing plant

The options are described in sections 8B.01.1, 8B.01.2, and 8B.01.3 respectively.

8B.01.1 **Option 1** – “Do Nothing”

The do nothing option preserves the status quo and provides no improvements to wastewater treatment systems. Wastewater generated by most of the residents will either be treated with private septic systems or ‘straight piped’ directly to local streams and watercourses. Larger commercial / business enterprises will continue to rely on private package treatment plants which tend to be poorly operated and maintained. This option will do nothing to improve local water quality or public health and will likely result in a gradual deterioration of surface water quality. This option is contrary to the public good and will not be considered.

8B.01.2 **Option 2** - Build a new plant at a new site

Construct a new wastewater treatment plant at a new site with additional land and access to facilitate ease of construction, maintenance, operation, and expansion throughout the planning period. This option will be of greater expense than other options due to the construction of all new facilities.

8B.01.3 **Option 3** - Expand existing plant

This option would endeavor to expand the existing plant facilities. Options for expansion are limited due to the amount of available room at the existing plant and because additional parallel units are mandated by the DOW redundancy. DOW redundancy requirements mandate that the plant be capable of turning off one set of primary units while doing repairs or expanding the plant and still be able to handle the peak flow from the system.

The existing site is located on the banks of the Russell Fork of the Levisa Fork of the Big Sandy River and is surrounded by constraints. Floodway, railroad right-of-way and land constraints constrict the usable area for expansion on the existing site. However it is possible to construct an expansion within the boundary limits while maintaining operation.

This option results in an adequately sized facility at a lower cost resulting from reuse of existing facilities. An optimum selection will be determined in section 8B.01.4.

8B.01.4 **Option Selection**

Option three (3) the expansion of the existing plant is the preferred approach. The “Do Nothing” approach is contrary to public policy and it is not cost effective at this time to construct a new treatment facility while the existing facility can be modified to meet the proposed flow

8B.02 WASTEWATER TREATMENT TECHNOLOGIES

Two wastewater treatment technologies were evaluated for the existing plant site. Technologies were limited based on available space at the existing site. These were:

1. Construction of an extended aeration treatment plant
2. Construction of a sequencing batch reactor

8B.02.1 **Technology 1** – Construction of an Extended Aeration Plant

This technology constructs extended aeration basins, clarifier and aerobic digester basins at the existing treatment plant site. Existing chlorination and de-chlorination would be adjusted to meet requirements relative to the proposed capacity. The new plant would be capable of meeting the current and proposed wastewater needs identified for the Planning Area.

All existing facilities would be reused with the likely exception of the existing treatment tank. The aeration, clarifier and digester basin would be built while the existing plant continues to remain in operation. Once the new basins are constructed the existing tank would be taken out of service and determined whether to be suitable for use as an equalization tank or if demolition is warranted. The waste sludge pumps would pump sludge from the reactor tanks to the aerobic digesters. Digester supernatant would be decanted back to the reactor tanks. Digested sludge pumps will also pump the digested sludge to the sludge press room where an existing belt press will be used for sludge dewatering.

A process diagram of a typical extended aeration plant is shown in Exhibit 8-3. A site plan depicting the proposed expansion is shown in Exhibit 8-4A.

8B.02.2 **Technology 2** - Construction of a Sequencing Batch Reactor Plant

This technology constructs sequencing batch reactor basins and an aerobic digester basin at the existing treatment plant site. Existing chlorination and de-chlorination would be adjusted to meet requirements relative to the proposed capacity. The new plant would be

capable of meeting the current and proposed wastewater needs identified for the Planning Area.

All existing facilities would be reused with the likely exception of the existing treatment tank. The sequencing batch reactor basins and digester basin would be built while the existing plant continues to remain in operation. Once the new basins are constructed the existing tank would be taken out of service and determined whether to be suitable for use as an equalization tank or if demolition is warranted. The waste sludge pumps would pump sludge from the reactor tanks to the aerobic digesters. Digester supernatant would be decanted back to the reactor tanks. Digested sludge pumps will also pump the digested sludge to the sludge press room where an existing belt press will be used for sludge dewatering.

A process diagram of a typical SBR plant is shown in Exhibit 8-3. A site plan depicting the proposed expansion is shown in Exhibit 8-4B.

8B.02.3 Reliability and Continued Operation

The extended aeration and sequencing batch reactor based plants are proven wastewater treatment technologies. All systems are capable of handling a wide range of flows and are resistant to system “upset”.

8B.03 SELECTION OF WASTEWATER TREATMENT TECHNOLOGY

The selection of the preferred technology will be chosen after a comparison of Technologies 1 and 2. The criteria of the final selection of the preferred technologies as follows:

1. Initial construction cost.
2. Present worth analysis, including operating and maintenance and salvage values.
3. Non-monetary factors.

The following paragraphs will address each of the selection criteria as they pertain to Technologies 1 and 2.

8B.03.1 Initial Construction Cost Comparison

The estimated initial capital costs of Technologies 1 and 2 are compared in Table 8B-1.

**TABLE 8B-1
COMPARISON OF CAPITAL (PROJECT) COSTS OF ALTERNATES 1 AND 2**

PHASE	Technology 1 – Extended Aeration Type Plant	Technology 2 – Sequencing Batch Reactor Type Plant
1 (0-2 Year)	\$ 2,510,000.00	\$ 2,485,000.00

8B.03.2 Present Worth Analysis

The present worth analysis is frequently referred to as a life cycle cost analysis. The objective of this analysis is to identify the treatment technology with the least cost to the owner over its operating life. Frequently, systems with low capital costs have high operations costs and are not a bargain to the owner.

The present worth computations are presented in Table 8B-3. The present worth computations rely on the following assumptions:

1. The alternates shall be compared over a twenty-year life.
2. The time value of money (interest rate) is 7%.
3. Inflation may be neglected.
4. Salvage values are zero for the existing plant components.
5. Sludge handling will be a regular expenditure for both Technologies 1 and 2.

8B.03.3 Non-monetary Factors

Non-monetary factors are those elements of the treatment process, which cannot be readily quantified, but rather are subjective in nature. The non-monetary factors considered in this study are:

Reliability – Both technologies are considered equally reliable.

Simplicity - It requires a microprocessor to operate the SBR plant. An extended aeration plant is less complicated to operate.

Familiarity - Eastern Kentucky operators will be more familiar with the extended aeration operations than the SBR.

Flexibility – An SBR can alter the treatment process in multiple ways.

Expandability - Technologies 2 has the greatest potential for expansion

Odor production - Technologies 1 and 2 are comparable.

Land Requirements – Technologies 1 and 2 can both be constructed within the grounds allocated for the plant site. The SBR requires less space.

Table 8B-2 compares the non-monetary factors for Technologies 1 and 2. A plus sign indicates a favorable rating for the technology option, while a minus sign indicates an unfavorable rating for that technology.

Table 8B-2
Comparison of Non-Monetary Factors for Alternates 1 and 2

Non-Monetary Factor	TECHNOLOGY	
	Technology 1 – Extended Aeration Plant	Technology 2 – Sequencing Batch Reactor
Reliability	+	+
Simplicity	+	-
Familiarity	+	-
Flexibility	-	+
Expandability	-	+
Odor Production	-	-
Land Requirement	-	+
TOTAL =	3	4

TABLE 8B-3
PRESENT WORTH ANALYSIS OF TREATMENT TECHNOLOGIES

ITEM	COST	FACTOR	PRESENT WORTH
TECHNOLOGY 1 - EXTENDED AERATION PLANT			
1. Capital Cost	\$ 2,510,000.00	1.00	\$2,510,000.00
2. (Plant O&M)x(Equal Series Present Worth Factor for 20 Yrs)	\$173,020	10.5940	\$1,832,973.88
3. Present Worth - Technology 1			\$4,342,973.88
TECHNOLOGY 2 - SEQUENCING BATCH REACTOR			
1. Capital Cost	\$ 2,485,000.00	1.00	\$2,485,000.00
2. (Plant O&M)x(Equal Series Present Worth Factor for 20 Yrs)	\$152,488	10.5940	\$1,615,457.87
3. Present Worth - Technology 2			\$4,100,457.87

SECTION 8C SELECTED ALTERNATES

8C.01 COLLECTION & TREATMENT PROPOSED ALTERNATE

Per the analyses presented in this Section, the recommended plan for the collection, conveyance, and treatment of wastewater in the planning area is a phased extension of a pressure sewer system and construction of a new sequencing batch reactor type wastewater treatment plant. The following paragraphs describe in more detail the proposed phasing and implementation of the recommended plan. See Appendix D for cost opinions and Exhibits for the selected plan. See Table 8A-1 & 8A-2 for a summary of the proposed lift stations for the selected plan.

8C.01.1 Phase 1 (0-2 Year)

This phase will consist of one (1) contract and will be entitled the Elkhorn City WWTP Expansion Project.

Contract 1 WWTP - will be the Phase 1 expansion/conversion of a sequencing batch reactor wastewater treatment plant. See Exhibit 8-3 for process schematic for this plant. The effluent line discharge location will remain the same. This plant will be sized for 0.385 MGD.

8C.01.2 Phase 2 (3-10 Year)

This phase will consist of three (3) contracts. These areas consist mainly of residential customers and small businesses.

Contract 1 Remaining Elkhorn City - consists of the connection of the existing Elkhorn City sewer system to the newly expanded plant. This connection to the expanded plant will consist of the construction of the interceptor force main to the existing plant influent pump station and the rehabilitation of the Beaver Bottom lift station and existing plant influent lift station. An equivalent population of 2,105 will be served by this project. Total flow generated by contract 2 is estimated to be 210,500 GPD.

Contract 2 John Moore Branch - This area is located along the US460 relocation corridor and will become an excess fill location for the highway department. Upon completion of the fill, the area of John Moore Branch will be used to develop an industrial park. At final build out the area will have an equivalent population of approximately 1,139 persons that will be best served by way of alternate 1, a gravity sewer system because the development will be new construction where gravity sewers can be constructed with greater ease. Though, for purposes of this report this project will be cost estimated as a pressure sewer system.

The total flow generated by contract 2 is estimated to be 113,900 GPD, when the industrial development is complete, to make a total of 324,400 GPD traveling to the treatment plant for Phase 1.

Contract 3 Sewer System Expansion - It is recommended that the sewer lines for this system be pressure sewers. Due to the drastic elevation changes throughout the planning area, various lift stations will need to be constructed to act as “pressure breaks” throughout the system.

See Exhibits D-1 to D-7 of Appendix D for maps of the WWTP site and proposed collection system.

8C.02 FINANCIAL REQUIREMENTS

8C.02.1 Project Cost

The capital requirements and phasing of the selected plan (0-2 Year) are summarized in Table 8C-1. The estimated project costs for the collection system (Table 6-4) and treatment works (Table D-35) are \$6,965,957 and \$3,304,241 respectively.

8C.02.2 Funding Plan – Phase I

It is impractical to identify funding for Phases II and III at this time. Elkhorn City’s efforts are currently directed at funding Phase I. Table 8C-2 presents the proposed plan for funding Phase I.

8C.02.3 Operation and Maintenance Costs

Table 8C-3 summarizes the estimated operation and maintenance costs for the selected conveyance and treatment alternatives.

8C.02.4 Sewer Revenues

Table 8C-4 summarizes the estimated sewer revenues to be generated by the selected plan based on water use rates in Elkhorn City. The city charges equal rates for sewer use as they do for water. The rates are as follows:

Inside City Limits: Minimum bill of \$17.00 with a surcharge of \$2.50 for the first 2,000 gallons and \$6.75 per every additional 1000 gallons used each month. An average bill (4,000 gallons per month) is approximately \$33.00 per customer.

Outside City Limits: Minimum bill of \$20.02 with a surcharge of \$2.50 for the first 2,000 gallons and \$7.01 per every additional 1000 gallons used each month. This rate was applied to the average daily waste flows from each customer and the revenues were calculated. An average bill (4,000 gallons per month) is approximately \$36.54 per customer.

8C.02.5 Operations Budget

Table 8C-5 derives an estimated operations budget for the Phase I project. This budget assumes an average sewer use of 100 gallons per person per day and no increase in Elkhorn City's existing sewer service fees as described in the sewer revenues section. This table summarizes the total revenues and costs for the system to develop the estimated operations budget.

**Table 8C-1
Summary of Estimated Project Costs for Selected Plan (0-10 Years)**

PRESSURE SEWER SYSTEMS		
SERVICE AREA	PHASE	
	0-2 YEAR	3-10 YEAR
Remaining Elkhorn City		\$ 574,986.44
John Moore Branch		\$ 2,329,847.95
Beaver Creek		\$ 1,899,274.09
SUBTOTAL CONSTRUCTION	\$ -	\$ 4,804,108.48
SUBTOTAL PROJECT COST	\$ -	\$ 6,965,957.30
TREATMENT ALTERNATE 1		
SEQUENCING BATCH REACTOR WWTP		
SUB-TOTAL PROJECT COST	\$ 3,304,750.00	\$ -
GRAND TOTAL - CAPITAL REQ'D	\$ 3,304,750.00	\$ 6,965,957.30

NOTES

1. Project costs include 15% contingency for construction and 30% for legal, right of way and engineering. For additional information refer to Tables 6-4 and 6-5.

**Table 8C-2
Potential Sources of Funding for Phase 1 WWTP**

AGENCY	GRANT / LOAN	AMOUNT	COMMENTS
KIA-SRF	LOAN	\$ 1,000,000.00	
ARC	GRANT	\$ 500,000.00	
CDBG	GRANT	\$ 1,000,000.00	
LOCAL	FUNDS	\$ 1,000,000.00	
GRAND TOTAL		\$3,500,000.00	

**Table 8C-3
Summary of O&M Costs for
Selected Plan**

SEQUENCING BATCH REACTOR PLANT	
Project Phase	O&M Cost per Phase
1	\$152,488
Total =	\$152,488

**Table 8C-4
Summary of Potential Sewer Use Revenues**

SERVICE AREA	Population Equivalent	Total Flow (gpd)	MONTHLY REVENUES
Remaining Elkhorn City	2105	210,500	\$ 46,836.25
John Moore Branch	1139	113,900	\$ 27,180.34
Beaver Creek	594	59,400	\$ 14,174.82
MONTHLY TOTALS =			\$ 88,191.41
YEARLY TOTALS =			\$ 1,058,296.88

NOTES

1. Assume \$19.50 for the first 2000 gallons and \$6.75 per 1000 gallons after that each month in the City Limits
2. Assume \$22.52 for the first 2000 gallons and \$7.01 per 1000 gallons after that each month outside the City Limits

**Table 8C-5
Estimated Operating Budget for Phase 1**

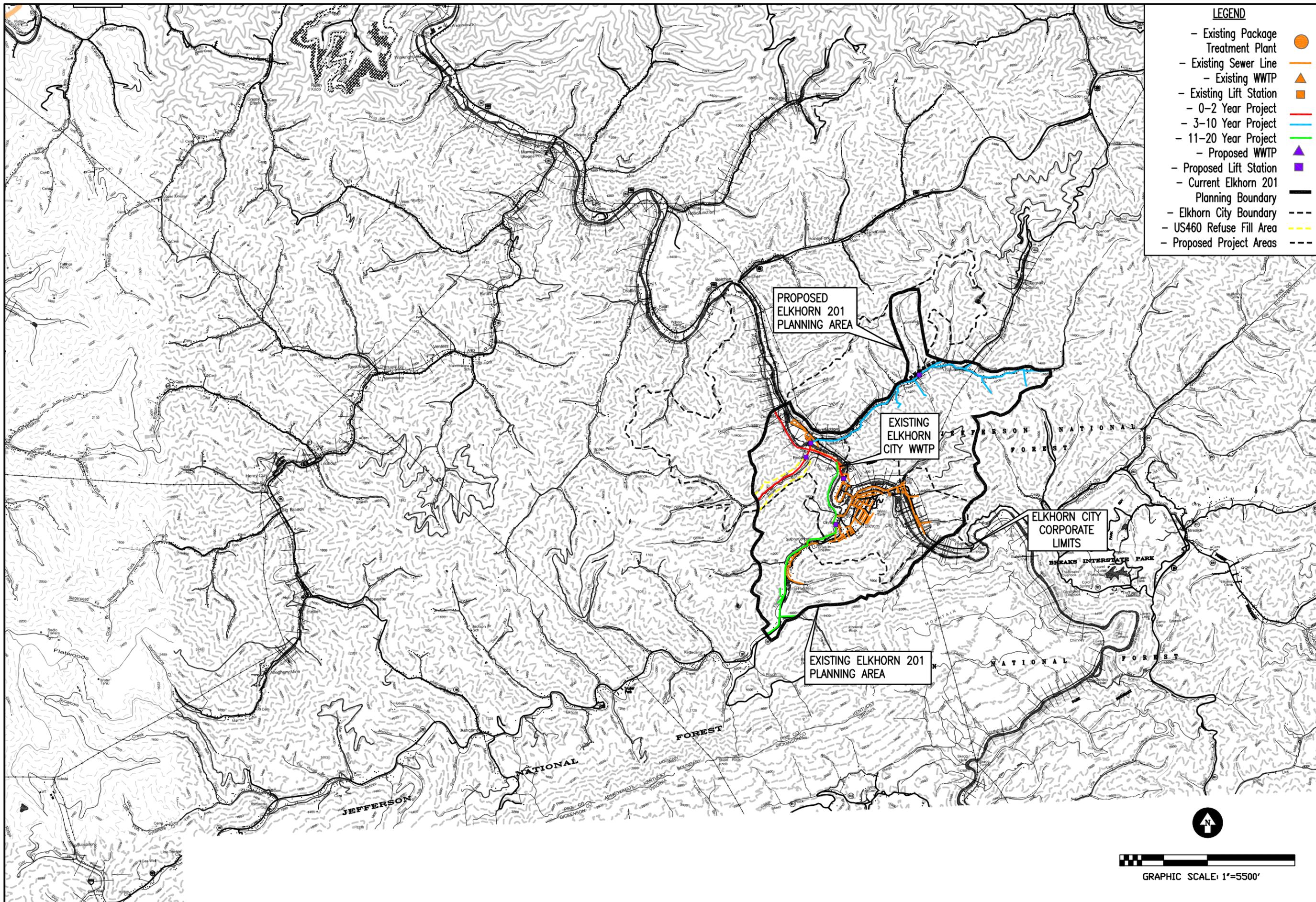
OPERATING EXPENSES				
Phase 1 Treatment O & M	- \$	152,488.00		
Net O&M =	- \$	152,488.00		
DEBT REPAYMENT				
LOAN DESCRIPTION	AMOUNT	RATE (%)	LOAN PERIOD (Yrs)	ANNUAL PAYMENT
KIA Loan	\$ 1,000,000.00	1.000%	20	\$55,415.31
TOTALS	\$1,000,000.00			\$55,415.31
Total Annual Debt Payment Services = - \$55,415.31				
Total Annual O&M Costs = - \$ 152,488.00				
Total Annual Costs = \$207,903.31				
Total Annual Phase 1 Flows (in 1000's) = 108,907 * Assumes only 25% initial buildout of John Moore Industrial Park				
Annual O&M/Debt Service Cost Per 1,000 Gallons = \$ 1.91				
Average Estimated Monthly Sewer Cost \$ 36.82				

8C.03 PLAN IMPLEMENTATION

Actions Required:

.. Submit this Facilities Plan update to the Kentucky Department of Natural Resources and Environmental Protection-Division of Water for review, comment, and approval.

.. Conduct a public hearing to discuss this plan Update and receive input on the plan from the public



LEGEND	
- Existing Package Treatment Plant	Orange circle
- Existing Sewer Line	Orange line
- Existing WWTP	Orange triangle
- Existing Lift Station	Orange square
- 0-2 Year Project	Red line
- 3-10 Year Project	Blue line
- 11-20 Year Project	Green line
- Proposed WWTP	Purple triangle
- Proposed Lift Station	Purple square
- Current Elkhorn 201 Planning Boundary	Black line
- Elkhorn City Boundary	Dashed black line
- US460 Refuse Fill Area	Yellow dashed line
- Proposed Project Areas	Red dashed line

SUMMIT ENGINEERING, INC.	
LEXINGTON, KY	LEXINGTON, KY
FRANKFURT, KY	FRANKFURT, KY
CHARLESTON, WV	CHARLESTON, WV
LOGAN, WV	LOGAN, WV
SPRINGDALE, VA	SPRINGDALE, VA
<p>City of Elkhorn City Pike County, Kentucky</p> <p>Elkhorn City 201 Facilities Plan Proposed Sewer System Map</p>	
DATE:	10/16/2014
SCALE:	1"=5500'
DRAWN BY:	MDJ
CHECKED BY:	RDM
PROJECT NO:	07-536
SHEET:	EX 8-1
OF:	

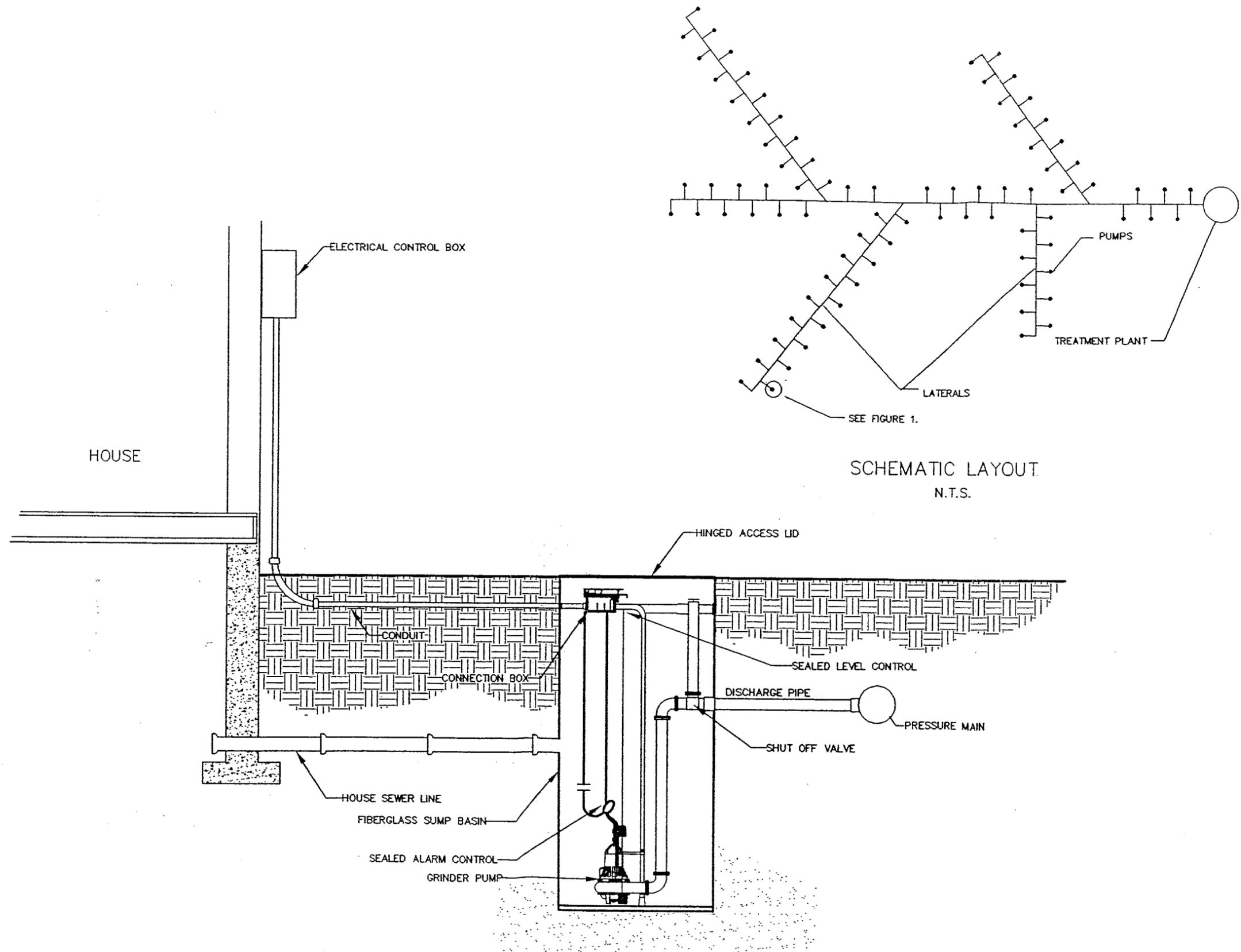
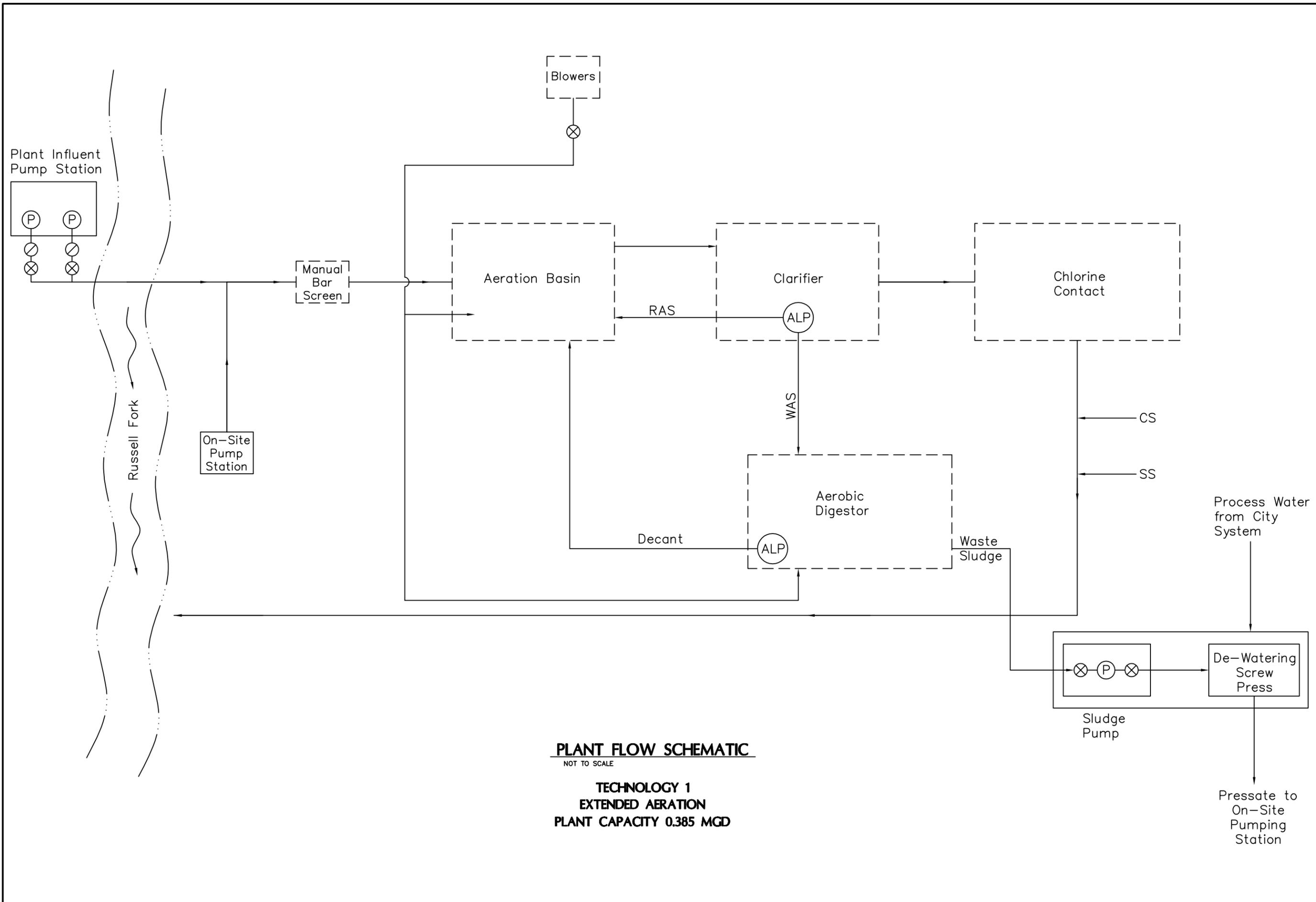


FIGURE 1
N.T.S.

Exhibit 8-2
EXAMPLE LAYOUT OF A
PRESSURIZED SEWER SYSTEM

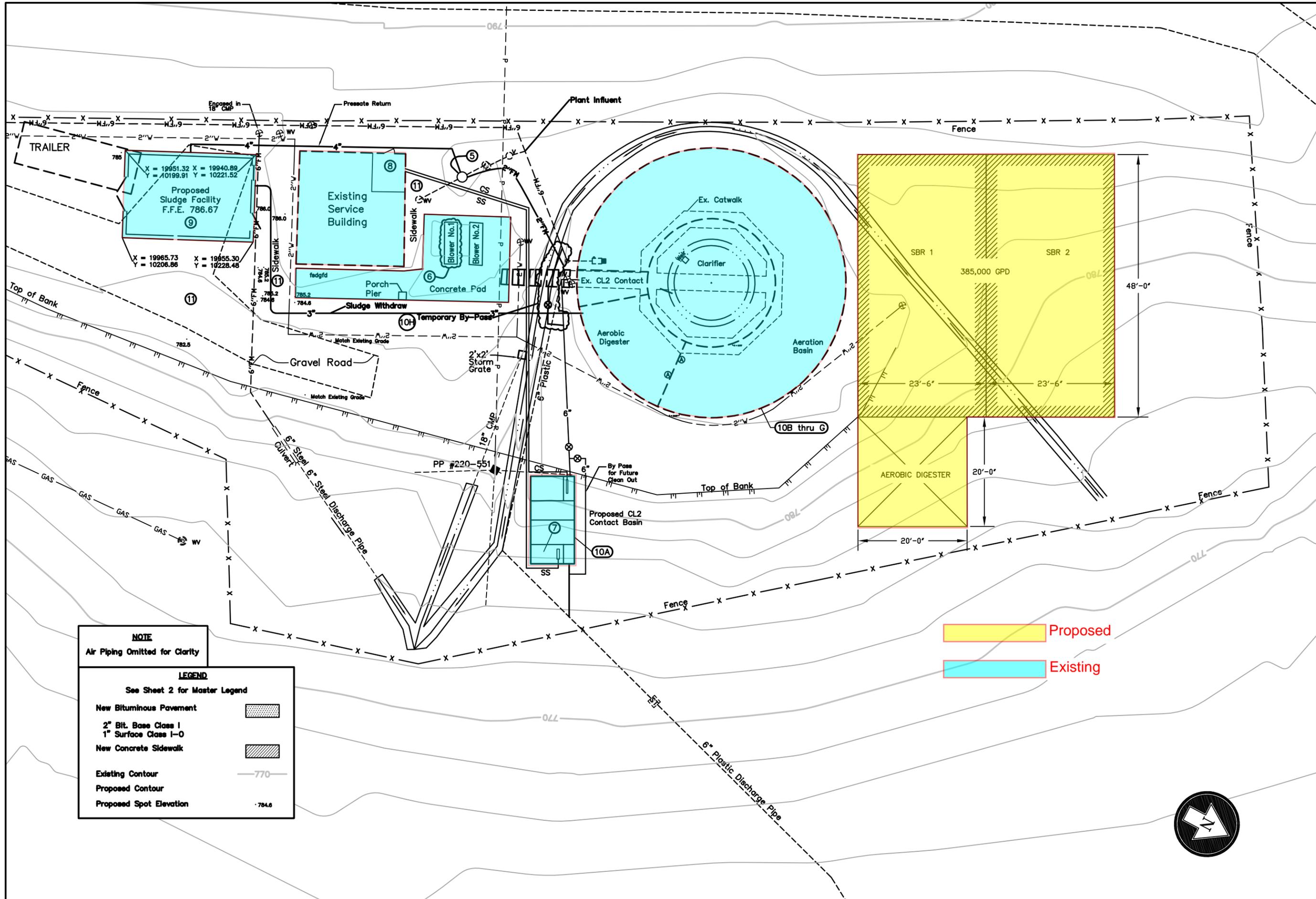


PLANT FLOW SCHEMATIC

NOT TO SCALE

**TECHNOLOGY 1
EXTENDED AERATION
PLANT CAPACITY 0.385 MGD**

DESCRIPTION OF REVISION	
DATE	
SUMMIT ENGINEERING, INC.	
LENINGTON, KY	
LEXINGTON, KY	
CHARLESTON, WV	
HAZARD, KY	
BRUNDTY, VA	
City of Elkhorn City Pike County, Kentucky	
Elkhorn City 201 Facilities Plan	
Process Schematic - Extended Aeration Type Treatment Plant	
DATE: 12/31/13	
SCALE: NTS	
DRAWN BY: M. Jolly	
CHECKED BY: D. Motsch	
PROJECT NO: 13-445	
SHEET:	
EX. 8.3	
OF:	



NOTE
Air Piping Omitted for Clarity

LEGEND
See Sheet 2 for Master Legend

New Bituminous Pavement	
2" Bit. Base Class I	
1" Surface Class I-0	
New Concrete Sidewalk	
Existing Contour	
Proposed Contour	
Proposed Spot Elevation	

Proposed
 Existing



DATE	12/27/13
SCALE	1/16" = 1'
DRAWN BY	MDJ
CHECKED BY	MDJ
PROJECT NO.	13-445
SHEET	Ex. 8-4B
OF	

DESCRIPTION OF REVISION

SUMMIT ENGINEERING, INC.
LEWISTON, KY
HAZARD, KY
CHARLESTON, WV
BRUNDTY, VA

City of Elkhorn City
Pike County, Kentucky

Elkhorn City 201 Facilities Plan
Plan View - Sequencing Batch Reactor Plant

SECTION 9
CROSS-CUTTER CORRESPONDENCE AND MITIGATION

9.01 CORRESPONDENCE

US Fish and Wildlife Service
Kentucky Department of Fish and Wildlife Resources
Kentucky Heritage Council
US Army Corps of Engineers
Natural Resources and Conservation Services



SUMMIT ENGINEERING, INC.

September 25, 2014

ATTN: Supervisor
US Fish and Wildlife Service
330 West Broadway, Suite 265
Frankfort, KY 40601

Re: Elkhorn 201 Facilities Plan
Pike County, Kentucky

Dear Sir or Madam:

The City of Elkhorn City has prepared a Wastewater Facilities Planning document for the Municipal Planning Section of the Facilities Construction Branch, Division of Water, proposing a force main project and wastewater treatment plant upgrade in Pike County. The project is being proposed in order to expand existing sewer service to new customers and increase the capacity of the existing wastewater treatment plant, which is currently operating over capacity. Enclosed are U.S. Geological Survey maps that depict the proposal's construction activities.

The proposal should not represent a "major construction activity" as defined in 50 CFR 402.02. We request a list of any Federally-listed or proposed threatened or endangered species and designated or proposed critical habitats that may be present in the project area. In addition, please advise us of any present concerns you may have related to possible effects of the project listed above on such species or critical habitat, as well as any other wildlife concerns.

We would appreciate a response within 30 days. If you need any further information or wish to discuss our project, please contact Matt Jolly at (859) 264-9860 ext. 106.

Sincerely,
SUMMIT ENGINEERING, INC.

Matt Jolly, E.I.T.

Enclosure

CC: David Sanders, City of Elkhorn City
Mike Taylor, City of Elkhorn City
File



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

October 21, 2014

Mr. Matt Jolly
Summit Engineering, INC.
3205 Summit Square Place
Lexington, Kentucky 40601

Re: FWS 2015-B-0005; Elkhorn 201 Facilities Plan; Pike County, Kentucky

Dear Mr. Jolly:

Thank you for the opportunity to provide comments on the above-referenced project. The U.S. Fish and Wildlife Service (Service) has reviewed this proposed project and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). This is not a concurrence letter. Please read carefully, as further consultation with the Service may be required.

In accordance with the 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 accordance to section 7 of the ESA, the Service must also consider the effects of actions interrelated and interdependent to the proposed project. "Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification and "interdependent actions" are those that have no independent utility apart from the action under consideration. Please inform us of any future actions and/or projects (*i.e.*; additional water/sewer lines, Pumps/tanks, electrical transmission lines, subdivisions, commercial development) that would reasonably occur as a result of the proposed project so that we may adequately analyze those effects.

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 the following federally listed species have the potential to occur within the project vicinity. The listed species are:

Group	Species	Common name	Legal* Status
Mammals	<i>Myotis sodalis</i>	Indiana bat	E
	<i>Myotis septentrionalis</i>	Northern long-eared bat	P

* Key to notations: E = Endangered, T = Threatened, P = Proposed, C = Candidate, CH = Critical Habitat

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

The proposed project is located within “known Indiana bat non-maternity” habitat. “Non-maternity habitat” refers to suitable summer habitat used by non-reproductive females and/or males. Forested areas in the vicinity of and on the project area provide summer roosting and foraging habitat for non-reproductive females and/or males and may also provide habitat for a maternity colony that has not been documented. The species utilizes a wide array of forested habitats, including riparian forests, bottomlands, and uplands for both summer foraging and roosting habitat. Indiana bats typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (i.e., dead trees or dead portions of live trees). Trees in excess of 16 inches diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat. Male Indiana bats have been observed roosting in trees as small as 5 inches DBH. A tree is considered a “potential Indiana bat roost tree” if it is greater than 5-inches DBH and exhibits one or more of the following characteristics: exfoliating bark, cracks, crevices, dead portions, and cavities.

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 within the proposed project area. We do not believe a survey is necessary for the proposed project. Also, seasonal tree clearing for the project could still result in indirect and/or cumulative effects to the species through changes to the landscape and the removal of potential foraging and roosting habitat. Currently, the available forested habitat within the summer range of the Indiana bat is being reduced by development, so even seasonal removal of habitat is likely to result in significant or non-discountable effects to the species. 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:

- The project proponent can modify the proposed project to eliminate or reduce impacts to trees and thus avoid impacts.
- The project proponent can request formal section 7 consultation through the lead federal action agency associated with the proposed project. To request formal consultation, the project proponent would need to submit a Biological Assessment that describes the action and evaluates the effects of the action on the listed species

in the project area. After formal consultation is initiated, the Service has 135 days to prepare a Biological Opinion that analyzes the effects of the action on the listed species and recommends strategies to minimize those effects.

- The project proponent can conduct an indirect and cumulative effects analysis by a qualified biologist. This analysis assesses the quantity and quality of the suitable habitat within the project area and area surrounding the project area to determine the effects of the removal.
- 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 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.

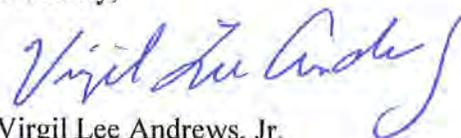
Northern long-eared bat

The proposed project is located within habitat designated as “known overlapping summer/winter habitat” for the northern long-eared bat. The species is currently proposed for federal listing under the ESA. During the summer, northern long-eared bats typically roost singly or in colonies in a wide-variety of forested habitats, where they seek shelter during daylight hours underneath bark or in cavities/crevices of both live trees and snags, including relatively small trees and snags that are less than 5 inches in diameter at breast height (DBH). Northern long-eared bats have also been documented roosting in man-made structures (i.e., buildings, barns, etc.) during the summer. According to current winter occurrence data, northern long-eared bats predominately winter in hibernacula that include caves, tunnels, and underground mine passages.

Although species proposed for listing are not afforded protection under the ESA, when a species is listed, the prohibitions against jeopardizing its continued existence and unauthorized take are effective immediately, **regardless of an action’s stage of completion**. Therefore, to avoid significant project delays, we recommend that you contact our office to identify and resolve potential conflicts regarding the northern long-eared bat in your project area.

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 Jessi Miller at (502) 695-0468 extension 104.

Sincerely,



Virgil Lee Andrews, Jr.
Field Supervisor



SUMMIT ENGINEERING, INC.

January 24, 2014

Kentucky Department
Fish and Wildlife Service
#1 Sportsman Lane
Frankfort, KY 40601

Re: Elkhorn 201 Facilities Plan
Pike County, Kentucky

Dear Sir or Madam:

The City of Elkhorn City has prepared a Wastewater Facilities Planning document for the Municipal Planning Section of the Facilities Construction Branch, Division of Water, proposing a force main project and wastewater treatment plant upgrade in Pike County. The project is being proposed in order to expand existing sewer service to new customers and increase the capacity of the existing wastewater treatment plant, which is currently operating over capacity. Enclosed are U.S. Geological Survey maps that depict the proposal's construction activities.

The proposal should not represent a "major construction activity" as defined in 50 CFR 402.02. We request a list of any Federally-listed or proposed threatened or endangered species and designated or proposed critical habitats that may be present in the project area. In addition, please advise us of any present concerns you may have related to possible effects of the project listed above on such species or critical habitat, as well as any other wildlife concerns.

We would appreciate a response within 30 days. If you need any further information or wish to discuss our project, please contact Matt Jolly at (859) 264-9860 ext. 107.

Sincerely,
SUMMIT ENGINEERING, INC.

Matt Jolly, E.I.T.

Enclosure

CC: David Sanders, City of Elkhorn City
Mike Taylor, City of Elkhorn City
File



**TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES**

Steven L. Beshear
Governor

#1 Sportsman's Lane
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov

Bob Stewart
Secretary

30 January 2014

Matt Jolly, E.I.T.
Summit Engineering, Inc.
3205 Summit Square Place
Lexington, KY 40509

RE: Elkhorn 201 Facilities Plan
Pike County, Kentucky

Dear Mr. Jolly:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for information pertaining to the subject project. The Kentucky Fish and Wildlife Information System indicates that the federally - endangered Indiana bat (*Myotis sodalis*) and Grey bat (*Myotis grisescens*) are known to occur within close proximity to the project. Additionally, non-maternity Indiana bat summer habitat is known to occur within the proposed Elkhorn 201 Planning Area. KDFWR requests you contact the U.S. Fish and Wildlife Service Kentucky Field Office (USFWS 502-695-0468) prior to project commencement. If tree clearing is required for the project, it is likely a tree cutting restriction may be applied (cut only from October 15th – March 31st). The Big Sandy Crayfish (*Cambarus veteranus*), American Black Bear (*Ursus americanus*), Virginia Bladetooth (*Patera panselenus*), Eastern Small-footed Myotis (*Myotis leibii*), and Common Raven (*Corvus corax*) are additional state-listed species known to occur within the project planning area. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

To minimize impacts to the aquatic environment the Kentucky Dept. of Fish & Wildlife Resources recommends that erosion control measures be developed and implemented prior to construction to reduce siltation into waterways located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed.

KDFWR recommends that you contact the appropriate US Army Corps of Engineers office and the Kentucky Division of Water prior to any work within the waterways or wetland habitats of

Kentucky. Additionally, KDFWR recommends the following for the portions of the project that impact streams:

- Channel changes located within the project area should incorporate natural stream channel design.
- If culverts are used, the culvert should be designed to allow the passage of aquatic organisms.
- Culverts should be designed so that degradation upstream and downstream of the culvert does not occur.
- Development/excavation during low flow period to minimize disturbances.
- Proper placement of erosion control structures below highly disturbed areas to minimize entry of silt into area streams.
- Replanting of disturbed areas after construction, including stream banks, with native vegetation for soil stabilization and enhancement of fish and wildlife populations. We recommend a 100 foot forested buffer along each stream bank.
- Return all disturbed instream habitat to a stable condition upon completion of construction in the area.
- Preservation of any tree canopy overhanging any streams within the project area.

I hope this information is helpful to you, and if you have questions or require additional information, please call me at (502) 564-7109 extension 4453.

Sincerely,



Dan Stoelb
Wildlife Biologist

Cc: Environmental Section File



SUMMIT ENGINEERING, INC.

January 27, 2014

Craig Potts, Director
Kentucky Heritage Council
300 Washington Street
Frankfort, KY 40601

Re: Elkhorn 201 Facilities Plan
Pike County, Kentucky

Dear Mr. Potts:

The City of Elkhorn City has prepared a Wastewater Facilities Planning document for the Municipal Planning Section of the Facilities Construction Branch, Division of Water, proposing a force main project and wastewater treatment plant upgrade in Pike County. The project is being proposed in order to expand existing sewer service to new customers and increase the capacity of the existing wastewater treatment plant, which is currently operating over capacity. Enclosed are U.S. Geological Survey maps that depict the proposal's construction activities.

The City of Elkhorn City requests the assistance of your office in identifying historic properties that are listed or eligible for listing on the National Register of Historic Places and that may be affected by the project. Please provide any recommendations you may have to mitigate or avoid these impacts to properties that may be affected.

We would appreciate a response within 30 days. If you need any further information or wish to discuss our project, please contact Matt Jolly at (859) 264-9860 ext. 107.

Sincerely,
SUMMIT ENGINEERING, INC.

Matt Jolly, E.I.T.

Enclosure

CC: David Sanders, City of Elkhorn City
Mike Taylor, City of Elkhorn City
File



STEVEN L. BESHEAR
GOVERNOR

**TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL**

BOB STEWART
SECRETARY

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

CRAIG A. POTTS
EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

February 7, 2014

Matt Jolly
Summit Engineering, Inc.
3205 Summit Square Place
Lexington, KY 40509

RE: Proposed Sewer Extension Project, Elkhorn City, Pike County, Kentucky

Mr. Jolly,

Thank you for your correspondence regarding the Elkhorn City wastewater undertaking. Currently, we do not have enough information to comment on this project in accordance with Section 106 of the National Historic Preservation Act of 1966 (16 U. S. C. Sec. 470f) and its implementing regulations at 36 CFR Part 800. You may not be aware, but as outlined in 36 CFR Part 800.4, it is the responsibility of the federal agency (or its designee) to identify historic properties listed on or eligible for listing on the National Register of Historic Places that may be impacted by the proposed undertaking and provide that information to our office for review and concurrence. It is important to note that effective July 8, 2013 our office instituted a new Section 106 submission process to assist applicants and agencies in providing us the appropriate level of information to facilitate our review and comments. Please refer to the following website <http://www.heritage.ky.gov/siteprotect/> where you will find three separate documents to assist you in submitting additional information to our office for review. Those documents include a memo outlining the standardized Section 106 submission process, a Section 106 Cover sheet that must be included with all submissions to our office, and instructions for the proper completion of the required cover sheet and associated information.

If you have questions, please contact Yvonne Sherrick of my staff at 502.564.7005, extension 113.

Sincerely,

Craig A. Potts
Executive Director and
State Historic Preservation Officer

CP:40852-2



SUMMIT ENGINEERING, INC.

March 17, 2014

Craig Potts, Director
Kentucky Heritage Council
300 Washington Street
Frankfort, KY 40601

Re: Elkhorn 201 Facilities Plan
Pike County, Kentucky

Dear Mr. Potts:

The City of Elkhorn City has prepared a Wastewater Facilities Planning document for the Municipal Planning Section of the Facilities Construction Branch, Division of Water, proposing a force main project and wastewater treatment plant upgrade in Pike County. The project is being proposed in order to expand existing sewer service to new customers and increase the capacity of the existing wastewater treatment plant, which is currently operating over capacity. Enclosed is a U.S. Geological Survey map that depicts the proposal's construction activities.

The City of Elkhorn City requests the assistance of your office in identifying historic properties that are listed or eligible for listing on the National Register of Historic Places and that may be affected by the project. Please provide any recommendations you may have to mitigate or avoid these impacts to properties that may be affected.

We would appreciate a response within 30 days. If you need any further information or wish to discuss our project, please contact Matt Jolly at (859) 264-9860 ext. 106.

Sincerely,
SUMMIT ENGINEERING, INC.

Matt Jolly, E.I.T.

Enclosure

CC: David Sanders, City of Elkhorn City
Mike Taylor, City of Elkhorn City
File

KENTUCKY HERITAGE COUNCIL COVER SHEET FOR SECTION 106 REVIEW AND COMPLIANCE

When federal (and some state) funds, permits or approvals are needed for a project, regulations such as 36 CFR Part 800 require agencies or their delegates to consult with the Kentucky Heritage Council/State Historic Preservation Office regarding the project's potential effects on historic properties. To facilitate our review, please provide the following information and applicable attachments. Our office will generate a response within 30 days of receipt. Incomplete submissions may result in review delays.

SECTION 1: APPLICANT INFORMATION	
Project Sponsor or Applicant:	
Contact Person (name & position):	
Telephone:	E-mail:
Project Title:	
SECTION 2: AGENCY INFORMATION	
Funding/Permitting Agency:	
Agency Contact Person (name & position):	
Telephone:	E-mail:
SECTION 3: PROJECT LOCATION	
E911 Street Address (or other description):	
City/Township:	County:
Latitude:	Longitude:
SECTION 4: PROJECT TYPE (please check all that apply)	
Proposed Activity: <input type="checkbox"/> Demolition <input type="checkbox"/> Rehabilitation <input type="checkbox"/> Structural Relocation <input type="checkbox"/> Trails <input type="checkbox"/> New Construction <input type="checkbox"/> Land and/or Building Acquisition <input type="checkbox"/> Sewer/Water Lines <input type="checkbox"/> Roads/Bridges <input type="checkbox"/> Non-Construction Planning/Refinancing <input type="checkbox"/> Other (describe):	
SECTION 5: IDENTIFICATION OF KNOWN HISTORIC PROPERTIES	
KHC Preliminary Site Check #:	OSA Preliminary Site Check #:
<i>If your project involves ground disturbance, has the site been previously disturbed?</i> <input type="checkbox"/> Yes (describe in detail below) <input type="checkbox"/> No	
Is there anything over 50 years of age in or visible from the project location? <input type="checkbox"/> Yes <input type="checkbox"/> No	
SECTION 6: ATTACHMENTS	
<i>Please attach the following documentation as applicable. All documentation should be labeled with the project name or site address.</i>	
<input type="checkbox"/> Clear, current photographs of the project site and anything over 50 years of age in or visible from it. <input type="checkbox"/> Site map/plan indicating the exact location and boundaries of the project area. <input type="checkbox"/> Detailed description of the project (may include plans, scope of work, and other available information.) <input type="checkbox"/> Documentation of prior ground disturbance (e.g. maps, photographs, underground utility plans, etc.) <input type="checkbox"/> Any known information about the history/use of the property and local significance.	
We are unable to accept electronic submissions at this time. Please submit all information to Craig Potts, Executive Director/SHPO, Kentucky Heritage Council, 300 Washington St., Frankfort, KY 40601.	

Kentucky Heritage Council

Site Identification Program

300 Washington Street, Frankfort, KY 40601

Confidential Information Not For Public Release

This information report includes only those historic resources within or near the project area that have been previously recorded with the Site Identification Program of the Kentucky Heritage Council and may not be exhaustive of all historic resources that are actually present. Note: this information report does not constitute Section 106 consultation or "clearance" from the KHC/SHPO.

KHC Historic Resources

NAME	LOCATION	NR STATUS
ROCK BLEACHERS	BALL PARK ROAD ELKHORN CITY KY	UNDETERMINED
ELKHORN CITY HIGH SCHOOL	RUSSELL ST ELKHORN CITY KY	UNDETERMINED
ELKHORN CITY CEMETERY	CEMETERY ROAD/HATCHER ST ELKHORN CITY KY	UNDETERMINED
LEWIS CLEVINGER HOUSE	MAIN ST ELKHORN CITY	UNDETERMINED
L D POLLEY STORE	CENTER ST ELKHORN CITY	DEMOLISHED
ELKHORN CITY CEMETERY	HATCHER ST AT BALLPARK ROAD ELKHORN CITY KENTUCKY	UNDETERMINED

KENTUCKY OFFICE OF STATE ARCHAEOLOGY
University of Kentucky, 1020A Export Street, Lexington, KY 40506
859-257-1944 • fax: 859-323-1968 • email: ky-osa@lsv.uky.edu

*Fill out one form for each project that requires a records review.
Incomplete forms will not be processed.*

Part 1: Project Information

Date (mm/dd/yyyy): 02/25/2014
Project Description: Sanitary sewer service and wastewater treatment plant upgrades
Firm/Institution: Summit Engineering, Inc.
Name: Matt Jolly
Telephone: 859-264-9860
Email Address: mjolly@summit-engr.com

Part 2: Location Information

Provide the latitude and longitude of the center point of your project, the name of the USGS Quad(s) where your project is located, and attach a map depicting your project area and size.

Latitude: 37°18'09" N
Longitude: 82°21'01" W
USGS Quad(s): Elkhorn City, KY-WV SE/4 Regina 15' Quadrangle

Part 3: Confidentiality Agreement

The undersigned acknowledges receipt of Office of State Archaeology (OSA) confidential site information for the Project identified in Part 1, and is aware of the confidential nature of the information being provided, and takes complete responsibility for this information to avoid unauthorized use or duplication. Confidential Information obtained from the OSA is to be used only for the project identified above, and any other use of the information is a violation of the Non-Disclosure of Confidential Information.

Confidential Information. The term "Confidential Information" shall mean any and all information, data, and maps, technical or non-technical, written or printed or photocopied or stored electronically or on magnetic media provided by or obtained from the Office of State Archaeology.

Non-Disclosure of Confidential Information. The individual designated below, with her/his principal place of business designated in Part 1, together with its affiliates (a) shall use reasonable care and discretion to prevent

disclosure, publication, or dissemination of the OSA Confidential Information that has been provided to such party; and (b) shall not use, reproduce, distribute, disclose, or otherwise disseminate the Confidential Information that has been provided to such, except (i) to evaluate and perform the Project and (ii) as required to be disclosed by a government agency or by operation of law.

I have read and agree to the Non-Disclosure of Confidential Information.

Name: **Matt Jolly**

Title: **Civil Engineer**

<p><u>OSA Use Only</u> Report prepared by: _____ Date: _____ Time used: _____ Appointment Made Date: _____ Time: _____</p>

Kentucky Office of State Archaeology

University of Kentucky, 1020A Export Street, Lexington, KY 40506

Phone:859-257-1944 fax:859-323-1968 email:ky-osa@lsv.uky.edu

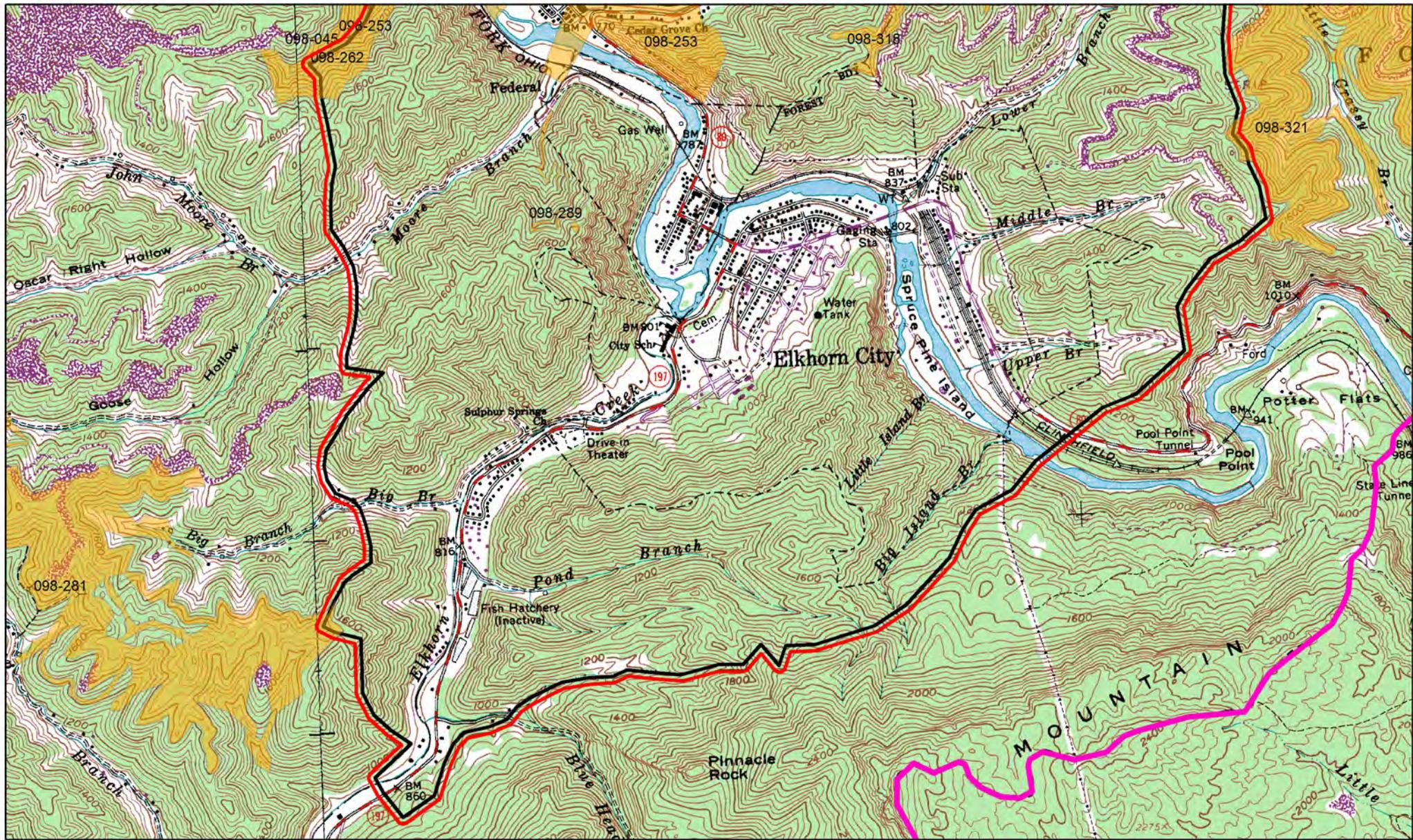
Preliminary Records Review Invoice

Invoice Date: March 4, 2014

<u>Review No.</u>	<u>Project Title</u>	<u>Contact</u>	<u>Date</u>	<u>Amount Billed</u>
P 8013	Sanitary Sewer Service and Wastewater Treatment Plant Upgrades	Matt Jolly	3/4/2014	\$40.00
		Paid via Check	2/27/2014	(\$40.00)
			Total Due	\$0.00

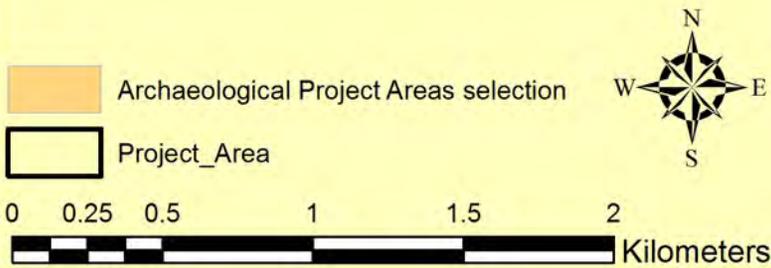
Payable to: University of Kentucky

Due and Payable upon Receipt

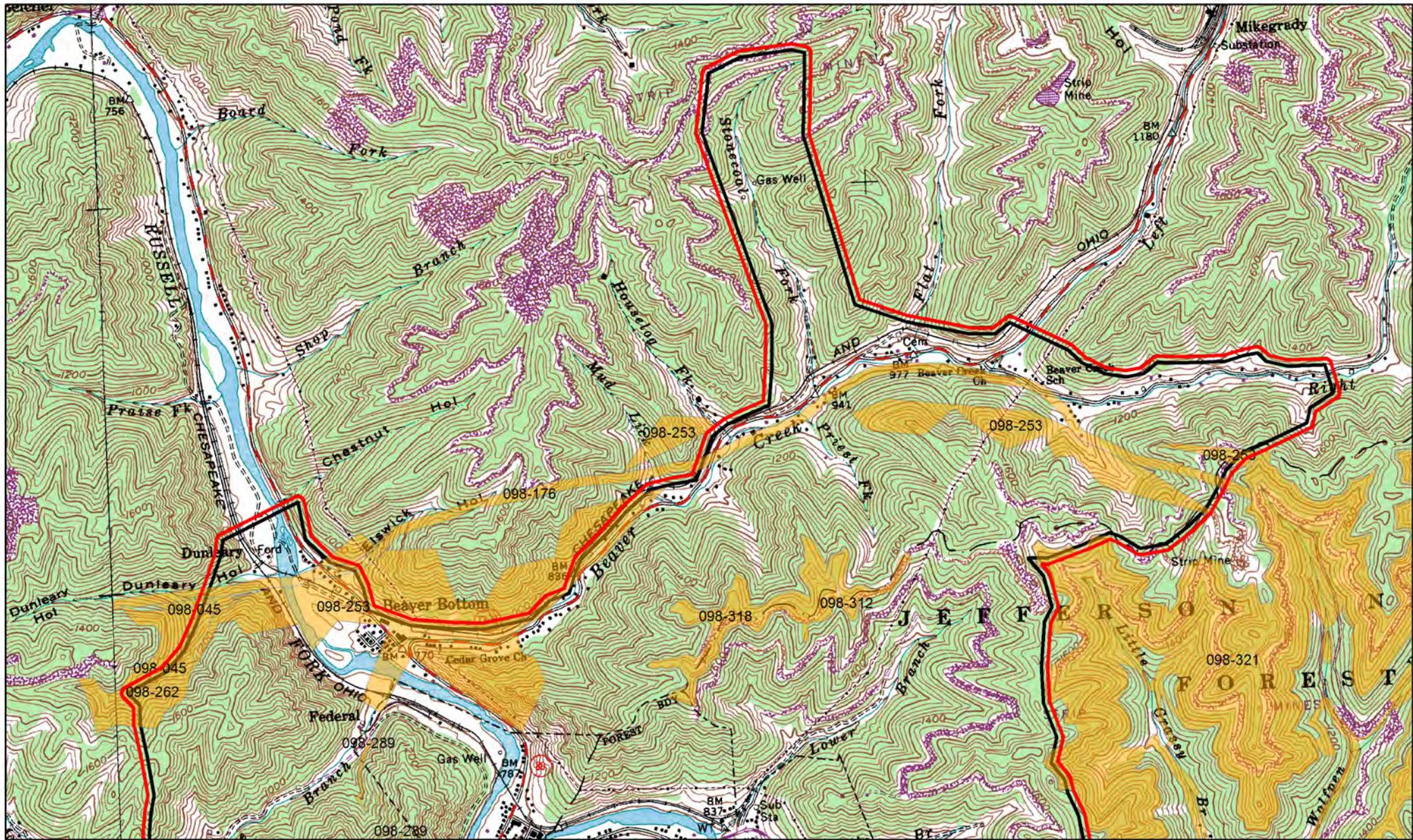


P08013: Sanitary Sewer Service and Wastewater Plant Upgrades, Pike County
 Kentucky Office of State Archaeology

University of Kentucky, 1020A Export Street, Lexington, KY 40506
 phone: 859-257-1944 fax: 859-323-1968 email: ky-osa@lsv.uky.edu



Confidential Information
Not for Public Release



P08013: Sanitary Sewer Service and Wastewater Plant Upgrades, Pike County
 Kentucky Office of State Archaeology

University of Kentucky, 1020A Export Street, Lexington, KY 40506
 phone: 859-257-1944 fax: 859-323-1968 email: ky-osa@lsv.uky.edu

 Archaeological Project Areas selection
 Project_Area



Confidential Information
Not for Public Release

Kentucky Office of State Archaeology

University of Kentucky, 1020a Export Street, Lexington, KY 40506
Phone: (859)257-1944 Fax: (859)323-1968 email: ky-osa@lsv.uky.edu

Confidential Information; Not for Public Release

P08013: Sanitary Sewer Service and Wastewater Treatment Plant Upgrades, Pike County

This report includes only previously recorded archaeological resources within your project area and its immediate vicinity and may not be exhaustive of all archaeological resources actually present. This information does not constitute Section 106 consultation or 'clearance' from the KHC/SHPO.

Date Request Filled: 03/04/14

Archaeological Sites

<u>Site Type</u>	<u>National Register Status</u>
historic farm / residence	not recorded
historic farm / residence	not recorded
cemetery	National Register status not assessed

Archaeological Surveys

- 098-045 578151 1989 Janzen, Donald E.
An Archaeological Survey of Surface Mining Permit Area 898-5448, Pike County, Kentucky
- 098-176 580748 1998 Stallings, Richard and Paul Thomas
A Phase I Archaeological Survey of Segments E, F, and H of the Proposed Realignment of US 460, Pike County, Kentucky
- 098-253 582903 2003 Kush, David R.
An Additional Archaeological Survey of the Proposed U S 460 Reconstruction, Sections 3 Through 9V, in Pike County, Kentucky and Buchanan County, Virginia
- 098-262 583144 2003 Hand, Robert B. and Dean Doerrfeld
An Archaeological Survey of Seven Proposed Excess Material Disposal Sites for the Reconstruction of US 460 Construction Sections 5, 6A, and 6B in Pike County, Kentucky
- 098-281 583975 2006 Arnold, George C.
An Archaeological Survey of a Proposed Coal Mine Operation for Cambrian Coal Corporation Near Elkhorn City, Pike County, Kentucky
- 098-289 584111 2004 Arnold, George C.
An Archaeological Survey of the Proposed West Pikeville Candidate "A", Elkhorn City Candidate "A", Zebulon Candidate "D", and Penny Cellular Communication Tower Site Locations in Pike County, Kentucky

098-312 585079 2007 Paternostro, Paul and Andrew Martin
A Cultural Resource Survey of the Proposed Wolfpen Branch Coal Mine Operation, Pike County, Kentucky

098-318 585272 2008 Paternostro, Paul
A Cultural Resource Survey of the Proposed Amendment to the Wolfpen Branch Coal Mine Operation, Pike County, Kentucky

098-321 585293 2008 Arnold, George
A Cultural Resource Survey of the Proposed Clintwood Elkhorn Coal Company Coal Mine Operation Along Wolfpen Branch in Pike County, Kentucky



STEVEN L. BESHEAR
GOVERNOR

**TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL**

BOB STEWART
SECRETARY

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

CRAIG A. POTTS
EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

April 8, 2014

Matt Jolly
Summit Engineering, Inc.
3205 Summit Square Place
Lexington, KY 40509

RE: Proposed Sewer Extension Project, Elkhorn City, Pike County, Kentucky

Mr. Jolly,

Thank you for submitting your project for our review. Our review indicated that the proposed project has the potential to impact sites eligible for listing or currently listed on the National Register of Historic Places. Therefore, we recommend that a cultural historic survey and an archaeological survey be completed by qualified professionals prior to project implementation. Separate reports documenting the results of the cultural historic and archaeological investigations must be submitted to the State Historic Preservation Officer for review, comment and approval. Where a given project area or portions thereof have been disturbed by prior construction, the applicant may file documentation of that disturbance with the State Historic Preservation Office, and may request an opinion concerning the need of an archaeological survey.

If you have questions, please contact Yvonne Sherrick of my staff at 502.564.7005, extension 113.

Sincerely,

Craig A. Potts
Executive Director and
State Historic Preservation Officer

CP:41245-2



SUMMIT ENGINEERING, INC.

January 27, 2014

U.S. Army Corps of Engineers, Huntington District
Regulatory Division
502 8th Street
Huntington, WV 25701

Re: Elkhorn 201 Facilities Plan
Pike County, Kentucky

Dear Sir or Madam:

The City of Elkhorn City has prepared a Wastewater Facilities Planning document for the Municipal Planning Section of the Facilities Construction Branch, Division of Water, proposing a force main project and wastewater treatment plant upgrade in Pike County. The project is being proposed in order to expand existing sewer service to new customers and increase the capacity of the existing wastewater treatment plant, which is currently operating over capacity. Enclosed are U.S. Geological Survey maps that depict the proposal's construction activities.

Please review and comment on the proposed project. We would appreciate a response within 30 days. If you need any further information or wish to discuss our project, please contact Matt Jolly at (859) 264-9860 ext. 107.

Sincerely,
SUMMIT ENGINEERING, INC.

Matt Jolly, E.I.T.

Enclosure

CC: David Sanders, City of Elkhorn City
Mike Taylor, City of Elkhorn City
File



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
EASTERN KENTUCKY REGULATORY OFFICE
845 Sassafras Creek Road
Sassafras, Kentucky 41759-8806

May 1, 2014

Operations Division
Regulatory Branch (South)
ID No. LRL-2014-333-jlb

Mr. Matt Jolly
Summit Engineering, Inc.
3205 Summit Square Place
Lexington, KY 40509

Dear Mr. Jolly:

This is in response to your letter requesting Corps of Engineers comments concerning the proposed sewer service expansion and capacity increase of the existing wastewater treatment plant in Elkhorn City. Please refer to File No. LRL-2014-333-jlb in any future correspondence with us concerning this project.

Your proposed project was reviewed pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act of 1899 requires that a DA permit be obtained for certain structures or work in or affecting navigable waters of the United States (U.S.), prior to conducting the work (33 U.S.C. 403). Section 404 of the Clean Water Act requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including wetlands, prior to conducting the work (33 U.S.C. 1344).

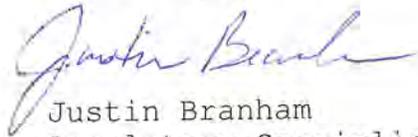
Your letter did not indicate if any stream or wetlands would be impacted by the placement of the new sewer service or the expansion of the wastewater treatment plant. Please note that streams and adjacent wetlands are considered waters of the United States pursuant to Section 404 of the Clean Water Act (CWA).

We encourage a construction plan and that will avoid wetland and/or stream impacts if possible. If wetland or stream impacts are unavoidable, a DA permit application should be submitted to this office before any work is done.

The Louisville District is available to participate in any onsite inspections of the proposed site and/or attend pre-application meetings to discuss aquatic resource impact avoidance and minimization. Based on the USGS quadrangle maps included with the letter, it appears that the force main lines will cross the Russell Fork River in addition to multiple crossings in the Beaver Creek and John Moore Branch watersheds. These crossings would result in a discharge of fill material into waters of the U.S. if the typical open trench method is utilized. However, if directional boring is the preferred method to cross under the stream bed at these locations, a DA authorization may not be required.

Thank you for including this office in your scoping process. If we can be of further assistance or if you have any questions regarding DA permit requirements, please contact Justin Branham at the above address, telephone 606-642-3208, or by email at Justin.L.Branham@usace.army.mil .

Sincerely,

A handwritten signature in blue ink that reads "Justin Branham". The signature is written in a cursive style with a large initial "J".

Justin Branham
Regulatory Specialist
Regulatory Branch



SUMMIT ENGINEERING, INC.

January 27, 2014

Karen Woodrich
State Conservationist
Natural Resources Conservation Service
771 Corporate Drive, Suite 210
Lexington, KY 40503

Re: Elkhorn 201 Facilities Plan
Pike County, Kentucky

Dear Ms. Woodrich:

The City of Elkhorn City has prepared a Wastewater Facilities Planning document for the Municipal Planning Section of the Facilities Construction Branch, Division of Water, proposing a force main project and wastewater treatment plant upgrade in Pike County. The project is being proposed in order to expand existing sewer service to new customers and increase the capacity of the existing wastewater treatment plant, which is currently operating over capacity. Enclosed are U.S. Geological Survey maps that depict the proposal's construction activities.

We are requesting information on the possible effect of the proposal on important farmland and any recommendations you have to minimize or avoid these effects. We also seek your assessment of the compatibility of the proposal with State and local government or any private programs and policies to protect important farmland.

We would appreciate a response within 30 days. If you need any further information or wish to discuss our project, please contact Matt Jolly at (859) 264-9860 ext. 107.

Sincerely,
SUMMIT ENGINEERING, INC.

Matt Jolly, E.I.T.

Enclosure

CC: David Sanders, City of Elkhorn City
Mike Taylor, City of Elkhorn City
File



To: Matt Jolly, E.I.T.
Summit Engineering, Inc.
3205 Summit Square Place
Lexington, KY 40509

Feb. 4, 2014

Re: Elkhorn 201 Facilities Plan
Pike County, KY

Mr. Jolly,

According to the information in your letter and as best that can be determined using the small scale map provided, it appears that most areas of the sewer line construction will take place either on existing highway right-a-ways, on previously disturbed areas, or within residential areas that are already considered as prior converted lands and not affecting farmlands or do not have prime farmland or statewide important farmlands identified. The remaining sewer lines are on areas that do not have prime farmland or statewide important farmlands identified. The proposed WWTP is on an area that does not have prime farmlands or statewide important farmlands identified. See attached NRCS map. This office does not have additional concerns at this time.

If needed, additional information on the soils of Pike County, KY is available on-line through USDA's Web Soil Survey.

If this office may be of additional assistance, please do not hesitate to contact my office in Maysville Ky. or contact the NRCS District Conservationist at 606-789-5263.

Steve Jacobs
Resource Soil Scientist, NRCS, Maysville, KY.

cc: Chris Slone, NRCS District Conservationist, Paintsville, KY

Elkhorn 201 Facilities Plan Pike County, KY

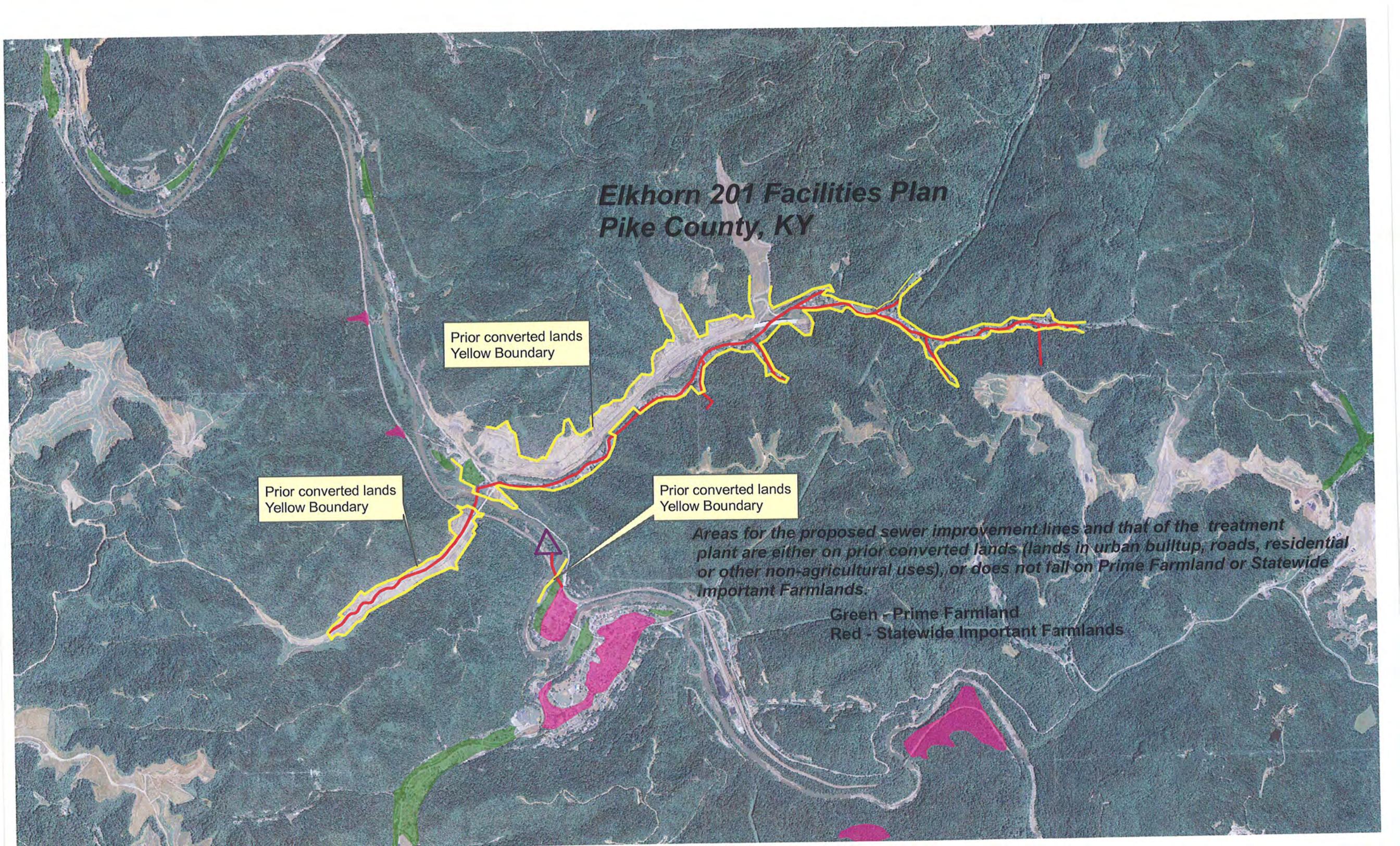
Prior converted lands
Yellow Boundary

Prior converted lands
Yellow Boundary

Prior converted lands
Yellow Boundary

Areas for the proposed sewer improvement lines and that of the treatment plant are either on prior converted lands (lands in urban builtup, roads, residential or other non-agricultural uses), or does not fall on Prime Farmland or Statewide Important Farmlands.

Green - Prime Farmland
Red - Statewide Important Farmlands



SECTION 10 EVALUATION OF RECOMMENDED REGIONAL FACILITY PLAN

10.01 ENVIRONMENTAL IMPACTS

10.01.1 Introduction

An important component of this facilities plan is the assessment of potential environmental impacts to the study area. Environmental impacts should be considered as both long and short term and beneficial and adverse in nature.

10.01.2 Beneficial Environmental Impacts

The primary beneficial environmental impact of implementing the recommended plan is the protection and possible improvement of water quality in the creeks and streams in the area. Protecting and improving water quality may improve the quantity and diversity of plant and aquatic life forms. Additionally, the overall attractiveness of the area for future development may be increased. Eliminating unsafe or non-functional sewage discharges will have positive effects on human health and safety.

10.01.3 Adverse Environmental Impacts

No adverse environmental impacts are anticipated from the proposed project. While the potential exist, mitigation measure will be followed in order to eliminate impacts.

10.01.4 Important Farmlands

The wastewater plant expansion and collection lines will not impact any available farmland in the planning area. (See Section 9, NRCS correspondence).

10.01.5 Historic/ Archaeological Sites

The proposed project has been determined to have potential to impact sites eligible for the National Register of Historic Places. A cultural historic and archaeological survey will be completed and submitted for review and approval to the state historic preservation office prior to project commencement. (See Section 9, State Historic Preservation correspondence).

10.01.6 Plant and Animal Communities

Multiple federally and state listed endangered species are known to exist within close proximity to the Elkhorn City Facility Planning boundary.

Tree cutting restrictions will be applied from March 31st to October 15th to mitigate impact to bat populations.

Erosion controls measure shall be implemented to reduce siltation in waterways. Waterway crossings shall be performed by direction bore whenever possible.

Coordination with U.S. Fish and Wildlife Service will be made prior to project commencement. (See Section 9, U.S. Fish and Wildlife correspondence).

10.01.7 Potential Health Hazards

Implementation of the plan is not anticipated to create any adverse health hazards to the public.

10.01.8 Correspondence

All correspondence with cross cutter agencies is included in Section 9 of this document. All agencies were given 30 days to respond. It is assumed that the cross cutter agencies that failed to respond have no comments regarding the proposed project.

10.02 INSTITUTIONAL STRUCTURE

The City of Elkhorn City will continue to own its own, operate, and maintain wastewater treatment and collection system.

10.03 FUNDING PLAN

10.03.1 Project Cost

The capital requirements and phasing of the selected plan (0-2 Year) are summarized in Table 10-1. The estimated project costs for the collection system (Table 6-4) and treatment works (Table D-35) are \$6,965,957 and \$3,304,241 respectively.

10.03.2 Funding Plan – Phase I

It is impractical to identify funding for Phase II at this time. Elkhorn City's efforts are currently directed at funding Phase I. Table 10-2 presents the proposed plan for funding Phase I.

10.03.3 Operation and Maintenance Costs

Table 10-3 summarizes the estimated operation and maintenance costs for the selected conveyance and treatment alternatives.

10.03.4 Sewer Revenues

Table 10-4 summarizes the estimated sewer revenues to be generated by the selected plan based on water use rates in Elkhorn City. The city charges equal rates for sewer use as they do for water. The rates are as follows:

Inside City Limits: Minimum bill of \$17.00 with a surcharge of \$2.50 for the first 2,000 gallons and \$6.75 per every additional 1000 gallons used each month. An average bill (4,000 gallons per month) is approximately \$33.00 per customer.

Outside City Limits: Minimum bill of \$20.02 with a surcharge of \$2.50 for the first 2,000 gallons and \$7.01 per every additional 1000 gallons used each month. This rate was applied to the average daily waste flows from each customer and the revenues were calculated. An average bill (4,000 gallons per month) is approximately \$36.54 per customer

10.03.5 Operations Budget

Table 10-5 derives an estimated operations budget for the Phase I project. This budget assumes an average sewer use of 100 gallons per person per day and no increase in Elkhorn City's existing sewer service fees as described in the sewer revenues section. This table summarizes the total revenues and costs for the system to develop the estimated operations budget.

**Table 10-1
Summary of Estimated Project Costs for Selected Plan (0-10 Years)**

PRESSURE SEWER SYSTEMS		
SERVICE AREA	PHASE	
	0-2 YEAR	3-10 YEAR
Remaining Elkhorn City		\$ 574,986.44
John Moore Branch		\$ 2,329,847.95
Beaver Creek		\$ 1,899,274.09
SUBTOTAL CONSTRUCTION	\$ -	\$ 4,804,108.48
SUBTOTAL PROJECT COST	\$ -	\$ 6,965,957.30
TREATMENT ALTERNATE 1		
SEQUENCING BATCH REACTOR WWTP		
SUB-TOTAL PROJECT COST	\$ 3,304,750.00	\$ -
GRAND TOTAL - CAPITAL REQ'D	\$ 3,304,750.00	\$ 6,965,957.30

NOTES

1. Project costs include 15% contingency for construction and 30% for legal, right of way and engineering. For additional information refer to Tables 6-4 and 6-5.

**Table 10-2
Potential Sources of Funding for Phase 1 WWTP**

AGENCY	GRANT / LOAN	AMOUNT	COMMENTS
KIA-SRF	LOAN	\$ 1,000,000.00	
ARC	GRANT	\$ 500,000.00	
CDBG	GRANT	\$ 1,000,000.00	
LOCAL	FUNDS	\$ 1,000,000.00	
GRAND TOTAL		\$3,500,000.00	

Check Funding \$ 3,304,750.00
Balance = \$ (195,250.00)

**Table 10-3
Summary of O&M Costs for Selected
Plan**

SEQUENCING BATCH REACTOR PLANT	
Project Phase	O&M Cost per Phase
1	\$152,488
Total =	\$152,488

**Table 10-4
Summary of Potential Sewer Use Revenues**

SERVICE AREA	Population Equivalent	Total Flow (gpd)	MONTHLY REVENUES
Remaining Elkhorn City	2105	210,500	\$ 46,836.25
John Moore Branch	1139	113,900	\$ 27,180.34
Beaver Creek	594	59,400	\$ 14,174.82
MONTHLY TOTALS =			\$ 88,191.41
YEARLY TOTALS =			\$ 1,058,296.88

NOTES

1. Assume \$19.50 for the first 2000 gallons and \$6.75 per 1000 gallons after that each month in the City Limits
2. Assume \$22.52 for the first 2000 gallons and \$7.01 per 1000 gallons after that each month outside the City Limits

**Table 10-5
Estimated Operating Budget for Phase 1**

OPERATING EXPENSES					
Phase 1 Treatment O & M	- \$	152,488.00			
Net O&M =	- \$	152,488.00			
DEBT REPAYMENT					
LOAN DESCRIPTION	AMOUNT		RATE (%)	LOAN PERIOD (Yrs)	ANNUAL PAYMENT
KIA Loan	\$ 1,000,000.00		1.000%	20	\$55,415.31
TOTALS	\$1,000,000.00				\$55,415.31
Total Annual Debt Payment Services = - \$55,415.31					
Total Annual O&M Costs = - \$ 152,488.00					
Total Annual Costs = \$207,903.31					
Total Annual Phase 1 Flows (in 1000's) = 70,380 * Assumes only 25% initial buildout of John Moore Industrial Park					
Annual O&M/Debt Service Cost Per 1,000 Gallons = \$ 2.95					
Average Estimated Monthly Sewer Cost \$ 22.16					

10.04 IMPLEMENTATION SCHEDULE

**Table 10-6
Service Areas and Phasing Period**

Proposed Service Area	Proposed Period For Construction
Sequencing Batch Reactor WWTP	0-2 Year
Remaining Elkhorn City	3-10 Year
John Moore Branch	3-10 Year
Beaver Creek	3-10 Year

See also Table 1-3.

SECTION 11
DOCUMENTATION OF PUBLIC PARTICIPATION

11.01 NEWSPAPER ADVERTISEMENT

11.02 MEASURES TAKEN TO SOLICIT PUBLIC PARTICIPATION

11.03 PUBLIC MEETING SUMMARY REPORT

11.04 PUBLIC MEETING ATTENDANCE SHEET

11.05 PUBLIC CONCERNS

SECTION 12 REGIONAL FACILITY PLAN COMPLETENESS CHECKLIST AND FORMS

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 Elkhorn City

Date: _____

		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:		1-1
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.	1-2 - 1-3
4.	Planning agency commitments necessary to implement the plan.	1-3
5.	Schedule of implementation for projects.	1-4
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:		3-1
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.	3-3
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)].	3-4
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.	3-5

4.	If available, a local planning and zoning land use map.	3-10
SECTION 4		
SOCIOECONOMIC CHARACTERISTICS OF THE PLANNING AREA- The following characteristics of the planning area shall be discussed:		4-1
1.	Historical, current, and projected population in the planning area including wastewater contributions from industrial and commercial sources.	4-1
2.	Current and projected population in the existing service area and unsewered parts of the planning area	4-1
3.	Economic or social benefit to the affected community	4-2
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:		5-1
1.	Physical features such as surface and groundwater quality, water sources and supply, wetlands, lakes, streams, air pollution, floodplains, soils, geology, and topography	5-1-5-4
2.	Biological: Identify plant and animal communities in the planning area with an emphasis upon endangered and threatened species likely to be impacted	5-4
3.	Cultural: Describe archaeological and historical resources that may be affected by the proposed project	5-4
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:		6-1
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.	6-1 - 6-2
3.	Existing collection and conveyance system and its condition	6-2
4.	Existing biosolids disposal method	6-3
5.	Existing operation, maintenance and compliance issues	6-3 - 6-4
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:		7-1
1.	Current and projected commercial, industrial and residential growth for the proposed planning period	7-2 - 7-3
2.	A copy of the waste load allocation (WLA) issued by the DOW for new or expanded treatment plant projects	Appendix C

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:		8A-1 - 8C-5
1.	No-action alternative	8B-1
2.	Optimization of existing facilities	8B-1
3.	Regionalization	8B-1
4.	Other alternatives	8A-1
5.	Detailed cost analysis along with 20 year present worth analysis for each alternative	8A-5; 8B-5; 8C-3 - 8C-5; Appendix D
6.	Recommended alternative	8C-1 - 8C-5
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:		9-1
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	9-1
2.	Historical Resources: The Kentucky Heritage Council State Historic Preservation Office	9-1
3.	Aquatic Resources: The US. Army Corps of Engineers (Louisville, Nashville, or Huntington Districts).	9-1
4.	Agricultural Resources: The local office of the Natural Resources Conservation Service (NRCS) or USDA Service Center	9-1
SECTION 10		
EVALUATION OF RECOMMENDED REGIONAL FACILITY PLAN- This section of the facility plan shall summarize the critical components of the recommended plan.		10-1
1.	Environmental impacts	10-1-10-2
2.	institutional structure	10-2
3.	Funding plan	10-2-10-5
4.	Current and projected residential user charge rate based on 4,000 gallon usage per month	10-3
5.	Implementation schedule	10-5
SECTION 11		
DOCUMENTATION OF PUBLIC PARTICIPATION- The section shall include a copy of the newspaper advertisement/proof of publication, attendance sheet, and public comments.		11-1

Design Flow and Concentration Form							
Design Flows and Organic Concentrations	Flows MGD	BOD5 mg/l	BOD5 lb/day	SS mg/l	SS lb/day	NH3-N mg/l	NH3-N lb/day
Average Daily	0.18	3.09	4.78	6.50	12.35	2.88	3.71
Peak Daily	0.58	15.00	65.60	42.00	155.20	20.20	16.40

APPENDIX A
CORRESPONDENCE

APPENDIX B
GRAVITY SEWER USAGE
AGREEMENT

**ELKHORN CITY
SEWER USER AGREEMENT
NO. _____**

This Agreement is entered into between _____ whose address is _____ hereinafter called, "USER," and Elkhorn City, P.O. Box 681, Elkhorn City, Kentucky 41522 hereinafter called "SUPPLIER."

WHEREAS, the USER desires to obtain sanitary sewer service from the SUPPLIER, the USER hereby enters into this sewer user's agreement as required by the Bylaws of the SUPPLIER.

NOW, THEREFORE, in consideration of the mutual covenants, promises and agreements herein contained, it is hereby understood and agreed by the parties hereto as follows:

1. **LOCATION.** The SUPPLIER shall construct and maintain, subject to the limitations set out in it's Bylaws and Regulations, sewer collector lines in connection with the property to be served by this agreement. The property to be served is a _____ (type structure) located at _____ (street address).
2. **SERVICE LINE.** The SUPPLIER shall install and the USER shall maintain, at his own expense, a service line which shall begin at the end of the service stub provided by the SUPPLIER and extend to the dwelling or place of use. The location of the sewer service stub on the property shall be determined upon a mutual agreement of the CONTRACTOR, USER, and SUPPLIER.
3. **SERVICE START DATE.** The USER shall connect his service line to the sewer collection system and shall commence to use the sewer system on the date the sewer is made available to him. **SEWER CHARGES TO THE USER WILL COMMENCE ON THE DATE SERVICE IS MADE AVAILABLE BY THE SUPPLIER, REGARDLESS OF WHETHER THE USER IS CONNECTED TO THE SYSTEM.**
4. **CONNECTION FEE.** The USER will not be charged for a connection fee if the USER agrees to sign this agreement during the time frame that has been set aside by the SUPPLIER. A charge of \$450.00 will be assed if the USER hooks up after this time frame has passed.
5. **RULES.** The USER agrees to comply with and be bound by the Articles, Bylaws, Rules and Regulations of the SUPPLIER, now in force or as hereafter duly and legally supplemented, amended or changed. The USER agrees to pay for sewer at such rates, time and place as shall be determined by the SUPPLIER, and agrees to the imposition of such penalties for noncompliance as are now set out in the SUPPLIER'S Bylaws, Rules and Regulations, or which have been or hereafter will be adopted and imposed by the SUPPLIER.
6. **FAILURE TO CONNECT.** In the event the USER shall breach this agreement by refusing or failing, without just cause, to connect his service line to SUPPLIER'S collection system as set forth above, the USER will not be charged any fees for liquidated damages. In however the USER wishes to be connected once the project is completed it is understood that the USER will be required to pay \$450.00 or the set going rate as specified by the SUPPLIER.

- 7. **PROHIBITED CONNECTIONS.** The USER agrees that no present or future private septic system will be connected to any sewer service lines served by the SUPPLIER'S lines and, will disconnect from his/her present septic system prior to connecting to and switching to the SUPPLIER's system and shall eliminate present or future cross-connections, in his/her system.
 - 8. **FAILURE TO PAY SERVICE FEES.** The failure of USER to pay sewer charges duly imposed shall result in the automatic imposition of the following penalties:
 - .. Nonpayment within ten days from the due date will be subject to a penalty of 10 percent of the delinquent account.
 - .. Nonpayment within thirty days from the due date will result in the water being shut off from the USER'S property.
 - .. In the event it becomes necessary for the SUPPLIER to shut off the water from the USER'S property, a fee of \$10.00 will be charged for a reconnection service.
 - 9. **PERPETUAL EASEMENT.** The USER grants to the SUPPLIER, it's successors and assigns, a perpetual easement in, over, under and upon land owned by the USER, with the right to erect, construct, install and lay, and thereafter use, inspect, repair, maintain, replace, and remove sewer pipelines and appurtenant facilities, together with the right to utilize adjoining lands belonging to the USER for the purpose of ingress to and egress from the said lands. It is understood that the lines will be constructed in general conformance to the plan set entitled "Sewer Project" on file in the City Clerk's office, City Hall, Elkhorn City, Kentucky.
 - 10. **REFUND.** If the SUPPLIER does not start construction of this project by Month, Day Year, the connection fee will be refunded to the USER upon request.
- 1.

IN WITNESS WHEREOF, we have executed this agreement this ____ day of _____, 20__.

WITNESS: SEWER USER

_____ _____

(Sewer User)

_____ _____

(Sewer User)

WITNESS SUPPLIER (ELKHORN CITY)

_____ By: _____

Title: _____

APPENDIX C
WASTELOAD ALLOCATION



Steven L. Beshear
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE
FRANKFORT, KENTUCKY 40601-1190
www.kentucky.gov

Leonard K. Peters
SECRETARY

R. Bruce Scott
COMMISSIONER

November 20, 2008

Kevin Howard, P.E.
Vice President
Summit Engineering, Incorporated
120 Prosperous Place
Suite 101
Lexington, Kentucky 40509

Re: Elkhorn City Facilities Plan Update
KPDES No.: KY0020958
Elkhorn City Wastewater Treatment Plant (WWTP)
Pike County, Kentucky

Dear Mr. Howard:

This is in response to your November 15, 2007 letter requesting a waste load allocation (WLA) for the subject facility. Per your correspondence, the City anticipates relocating the existing WWTP. Discharge from the new plant will be to mile point 9.6 of Russell Fork, segment 01031. The new plant will have an initial design capacity of 0.625 MGD and ultimate design capacity of 0.9 MGD. The WLA information provided will be utilized in preparation of a Regional Wastewater Facilities Plan Update.

Considering the abovementioned information, following are effluent limitations applicable to the design of the proposed wastewater treatment facility.

Design Capacity = 0.625 MGD or 0.9 MGD

	<u>May 1 - October 31</u>	<u>November 1 - April 30</u>
BOD ₅	30 mg/l	30 mg/l
Total Suspended Solids	30 mg/l	30 mg/l
Ammonia Nitrogen	20 mg/l	20 mg/l
Dissolved Oxygen	2 mg/l	2 mg/l
Total Residual Chlorine	0.019 mg/l	0.019 mg/l
Total Phosphorus	Monitor	Monitor
Total Nitrogen	Monitor	Monitor

Reliability Classification = Grade 2

In addition to the above limitations, the monthly geometric mean and weekly geometric mean values of E. coli shall be at or below 130 colonies per 100 ml or 240 colonies per 100 ml, respectively, the year around. If a form of chlorine is proposed for wastewater disinfection, then de-chlorination will be required by your Kentucky Pollutant Discharge Elimination System (KPDES) permit. Some suitable form of effluent post aeration may also be necessary in order to produce the required dissolved oxygen concentration. Additional effluent limitations and water quality standards are contained in the Division of Water Regulations.

These preliminary design effluent limitations are valid for one (1) year from the date of this letter, and are subject to change as a result of additional information which may be presented during the public notice phase of the KPDES permitting process. Please note that this letter does not convey authorization or

Mr. Kevin Howard
Elkhorn City Facilities Plan Update
Page Two

approval to proceed with the construction or operation of the proposed wastewater treatment facilities. Construction and KPDES permit applications must be submitted to request such authorization. Nor does this letter ensure the issuance of either permit. During the review processes of these permits the Division of Water will further evaluate the viability of the project.

Should you have any questions regarding this letter, please contact me at (502) 564-8158, extension 4914 or e-mail at Courtney.Seitz@ky.gov.

Sincerely,



Courtney Seitz, WLA Coordinator
KPDES Branch
Division of Water

CS
c: Compliance and Technical Assistance
Branch, Hazard Section
Division of Water Files

APPENDIX D

CONSTRUCTION COST OPINIONS, OPERATION & MAINTENANCE COST OPINIONS AND CORRESPONDING PROJECT AREA EXHIBITS

TABLE D-1
ALTERNATE 1 - PRESSURE SEWER SYSTEM
COST SUMMARY FOR PLANNING AREA

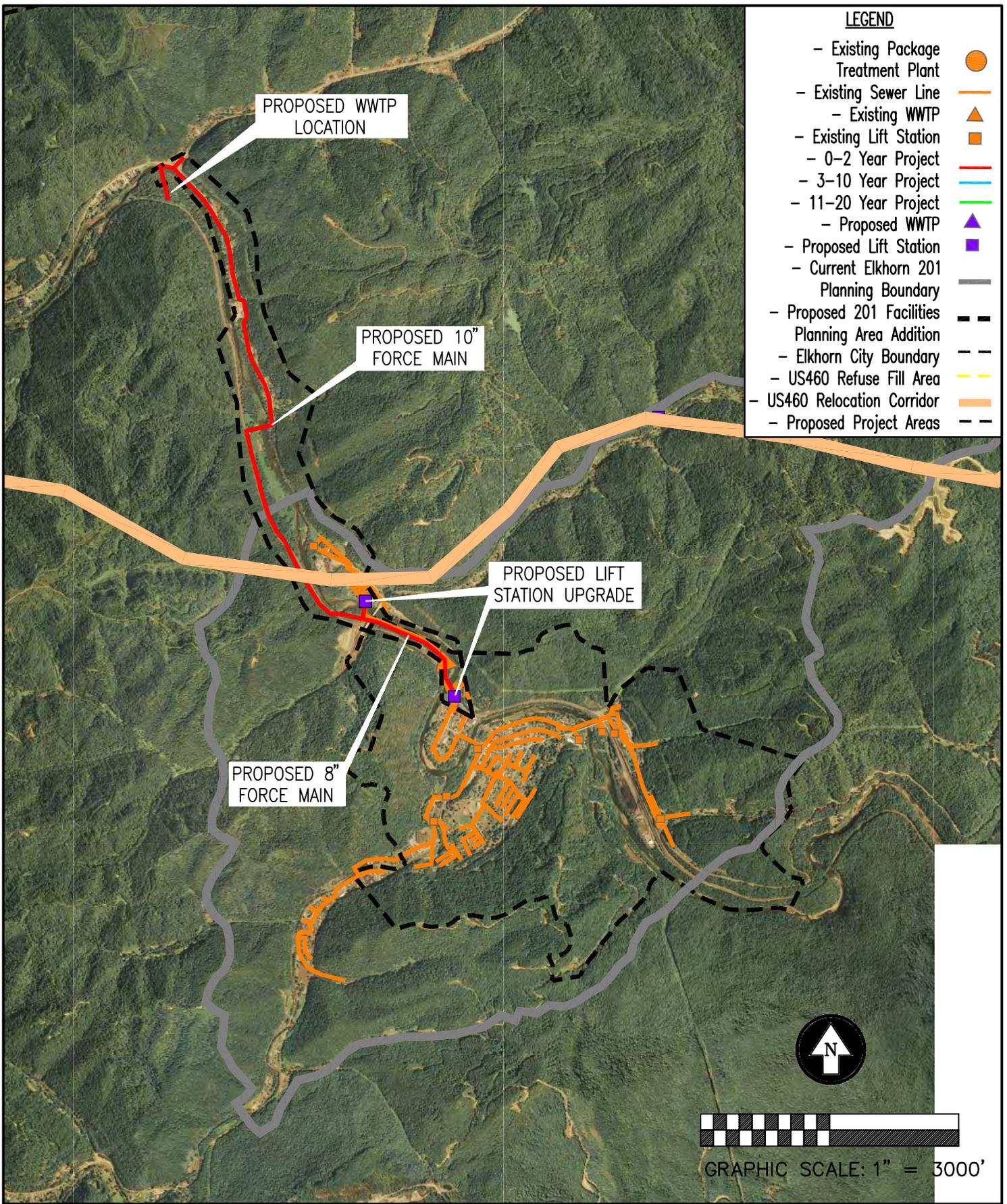
LOCATION DESCRIPTION	AMOUNT
Dunleary and Elkhorn City	\$ 1,542,401.97
John Moore Branch	\$ 2,329,847.95
Beaver Creek	\$ 1,899,274.09
Ferrell's Creek	\$ 970,777.12
Belcher	\$ 2,655,921.21
Honey Fork	\$ 986,935.00
Abner Fork	\$ 1,666,143.56
Draffin	\$ 1,007,239.09
Road Junction	\$ 1,180,185.15
Sycamore	\$ 2,614,834.77
Ashcamp	\$ 2,602,201.89
Elkhorn Creek	\$ 3,295,957.20
SUBTOTAL CONSTRUCTION COST	\$ 22,751,719.02
CONTINGENCY @ 15%	\$ 3,412,757.85
RIGHT OF WAY, LEGAL SERVICES, BOND COUNCIL @ 30%	\$ 6,825,515.70
ESTIMATED PROJECT COST	\$ 32,989,992.57

TABLE D-2
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
DUNLEARY AND ELKHORN CITY SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 45,000.00	1	\$ 45,000.00
	Landscape Allowance	Mile	\$ 1,500.00	4	\$ 6,522.73
	Seeding and Cleanup	Mile	\$ 500.00	4	\$ 2,174.24
	Removal of Existing Septic Tank	Each	\$ 750.00	3	\$ 2,250.00
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	1,200	\$ 48,000.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	3	\$ 6,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	1,150	\$ 12,650.00
	3" PE SDR 11	Lin Ft	\$ 13.00	400	\$ 5,200.00
	4" PE SDR 11	Lin Ft	\$ 14.00	750	\$ 10,500.00
	6" PE SDR 11	Lin Ft	\$ 16.00	2,075	\$ 33,200.00
	8" PE SDR 11	Lin Ft	\$ 18.00	2,110	\$ 37,980.00
	10" PE SDR 11	Lin Ft	\$ 28.00	15,275	\$ 427,700.00
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	200	\$ 35,000.00
	6" River Crossing	Lin Ft	\$ 200.00	200	\$ 40,000.00
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	400	\$ 100,000.00
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 100.00	35	\$ 3,500.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	0	\$ -
	Bore and Encasement 6"	Lin Ft	\$ 150.00	0	\$ -
	Bore and Encasement 8"	Lin Ft	\$ 175.00	35	\$ 6,125.00
	Bore and Encasement 10"	Lin Ft	\$ 200.00	210	\$ 42,000.00
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	60	\$ 300,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	3	\$ 3,600.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	175 gpm Submersible Pump Station	Each	\$ 80,000.00	1	\$ 80,000.00
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	1	\$ 125,000.00
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	2	\$ 100,000.00
	ADD for Odor Control	Each	\$ 35,000.00	2	\$ 70,000.00
	ESTIMATED CONSTRUCTION COST				\$ 1,542,401.97

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
GRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Dunleary and Elkhorn City - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 3000'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

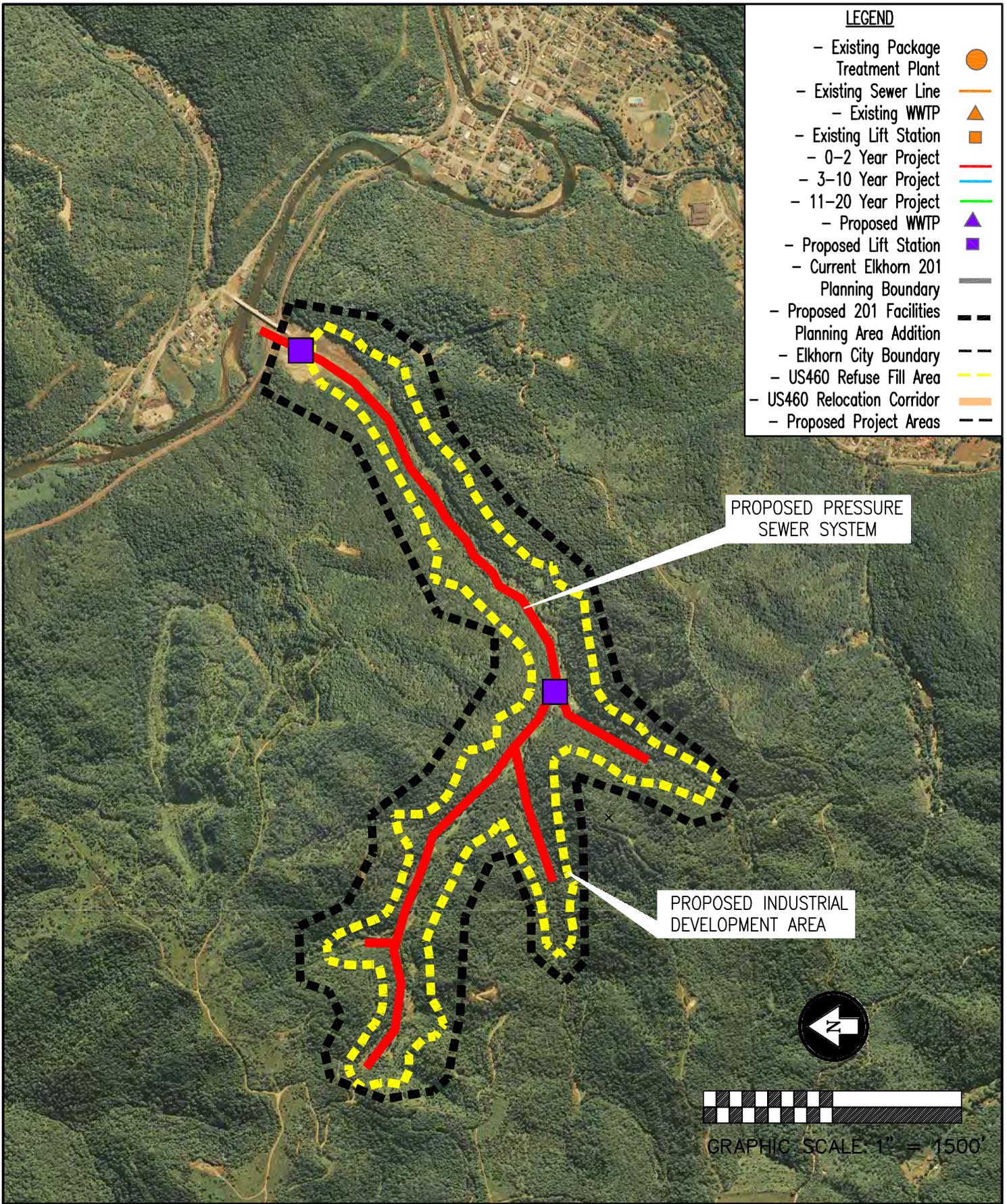
SHEET:
EX D-2
OF:

TABLE D-3
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
JOHN MOORE BRANCH SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 68,000.00	1	\$ 68,000.00
	Landscape Allowance	Mile	\$ 1,500.00	4	\$ 5,893.47
	Seeding and Cleanup	Mile	\$ 500.00	4	\$ 1,964.49
	Removal of Existing Septic Tank	Each	\$ 750.00	0	\$ -
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	2,000	\$ 80,000.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	1	\$ 2,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	2,000	\$ 22,000.00
	3" PE SDR 11	Lin Ft	\$ 13.00	8,565	\$ 111,345.00
	4" PE SDR 11	Lin Ft	\$ 14.00	2,180	\$ 30,520.00
	6" PE SDR 11	Lin Ft	\$ 16.00	6,000	\$ 96,000.00
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	140	\$ 17,500.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	35	\$ 4,375.00
	Bore and Encasement 6"	Lin Ft	\$ 150.00	35	\$ 5,250.00
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	200	\$ 45,000.00
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	0	\$ -
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	0	\$ -
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	100	\$ 1,500,000.00
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	1	\$ 70,000.00
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	0	\$ -
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	1	\$ 100,000.00
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	2	\$ 100,000.00
	ADD for Odor Control	Each	\$ 35,000.00	2	\$ 70,000.00
	ESTIMATED CONSTRUCTION COST				\$ 2,329,847.95

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



- LEGEND**
- Existing Package Treatment Plant 
 - Existing Sewer Line 
 - Existing WWTP 
 - Existing Lift Station 
 - 0-2 Year Project 
 - 3-10 Year Project 
 - 11-20 Year Project 
 - Proposed WWTP 
 - Proposed Lift Station 
 - Current Elkhorn 201 Planning Boundary 
 - Proposed 201 Facilities Planning Area Addition 
 - Elkhorn City Boundary 
 - US460 Refuse Fill Area 
 - US460 Relocation Corridor 
 - Proposed Project Areas 

PROPOSED PRESSURE SEWER SYSTEM

PROPOSED INDUSTRIAL DEVELOPMENT AREA



GRAPHIC SCALE: 1" = 1500'



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

DATE: 2/1/09
SCALE: 1" = 1500'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

Russell Fork 201 Facilities Plan
John Moore Branch – Pressure Sewer

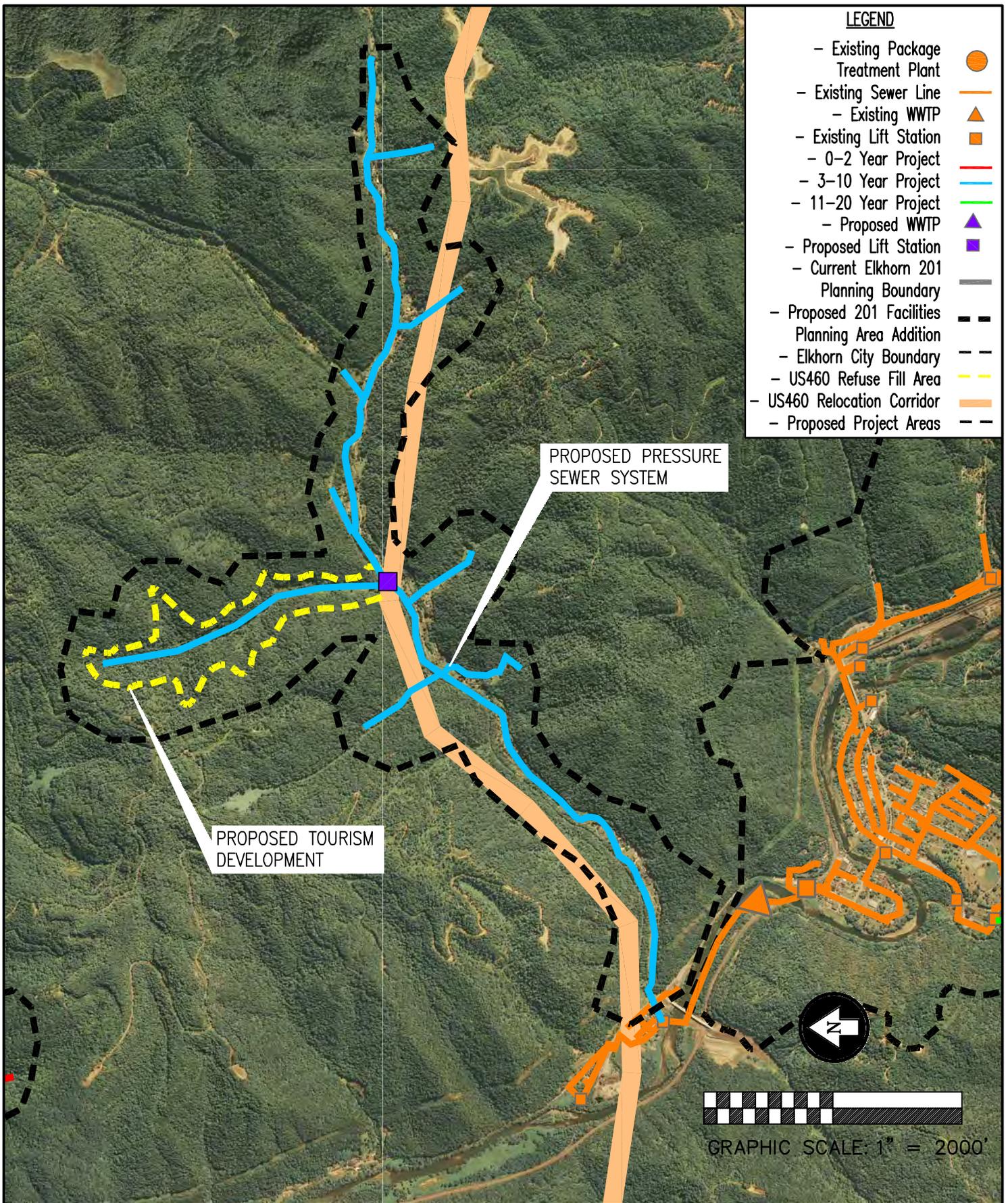
SHEET:
EX D-3
OF:

TABLE D-4
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
BEAVER CREEK SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 55,000.00	1	\$ 55,000.00
	Landscape Allowance	Mile	\$ 1,500.00	8	\$ 11,275.57
	Seeding and Cleanup	Mile	\$ 500.00	8	\$ 3,758.52
	Removal of Existing Septic Tank	Each	\$ 750.00	6	\$ 4,455.00
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	3,960	\$ 158,400.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	1	\$ 2,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	7,755	\$ 85,305.00
	3" PE SDR 11	Lin Ft	\$ 13.00	14,450	\$ 187,850.00
	4" PE SDR 11	Lin Ft	\$ 14.00	13,525	\$ 189,350.00
	6" PE SDR 11	Lin Ft	\$ 16.00	0	\$ -
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	175	\$ 21,875.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	105	\$ 13,125.00
	Bore and Encasement 6"	Lin Ft	\$ 150.00	0	\$ -
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	198	\$ 990,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	10	\$ 11,880.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 80,000.00	1	\$ 80,000.00
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	1	\$ 50,000.00
	ADD for Odor Control	Each	\$ 35,000.00	1	\$ 35,000.00
	ESTIMATED CONSTRUCTION COST				\$ 1,899,274.09

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



- LEGEND**
- Existing Package Treatment Plant 
 - Existing Sewer Line 
 - Existing WWTP 
 - Existing Lift Station 
 - 0-2 Year Project 
 - 3-10 Year Project 
 - 11-20 Year Project 
 - Proposed WWTP 
 - Proposed Lift Station 
 - Current Elkhorn 201 Planning Boundary 
 - Proposed 201 Facilities Planning Area Addition 
 - Elkhorn City Boundary 
 - US460 Refuse Fill Area 
 - US460 Relocation Corridor 
 - Proposed Project Areas 

PROPOSED PRESSURE SEWER SYSTEM

PROPOSED TOURISM DEVELOPMENT



GRAPHIC SCALE: 1" = 2000'



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

DATE: 2/1/09
SCALE: 1" = 2000'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

Russell Fork 201 Facilities Plan
Beaver Creek - Pressure Sewer

SHEET:
EX D-4
OF:

TABLE D-5
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
FERRELLS CREEK SERVICE AREA

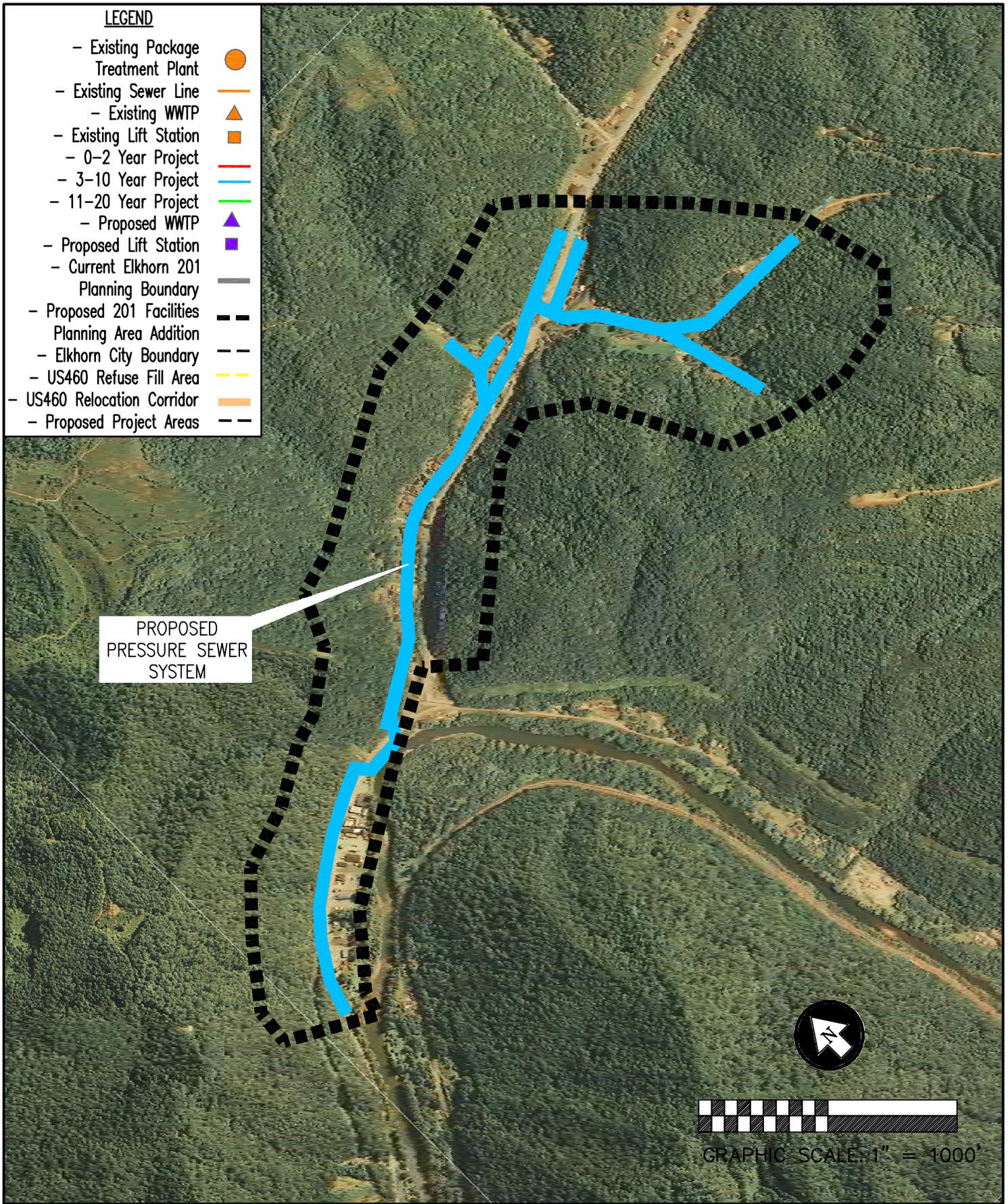
ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 28,000.00	1	\$ 28,000.00
	Landscape Allowance	Mile	\$ 1,500.00	3	\$ 4,471.59
	Seeding and Cleanup	Mile	\$ 500.00	3	\$ 1,490.53
	Removal of Existing Septic Tank	Each	\$ 750.00	4	\$ 2,745.00
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	2,440	\$ 97,600.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	0	\$ -
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	3,000	\$ 33,000.00
	3" PE SDR 11	Lin Ft	\$ 13.00	2,800	\$ 36,400.00
	4" PE SDR 11	Lin Ft	\$ 14.00	0	\$ -
	6" PE SDR 11	Lin Ft	\$ 16.00	7,500	\$ 120,000.00
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	70	\$ 8,750.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	0	\$ -
	Bore and Encasement 6"	Lin Ft	\$ 150.00	140	\$ 21,000.00
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	122	\$ 610,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	6	\$ 7,320.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	0	\$ -
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	0	\$ -
	ADD for Odor Control	Each	\$ 35,000.00	0	\$ -
	ESTIMATED CONSTRUCTION COST				\$ 970,777.12

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.

LEGEND

- Existing Package Treatment Plant 
- Existing Sewer Line 
- Existing WWTP 
- Existing Lift Station 
- 0-2 Year Project 
- 3-10 Year Project 
- 11-20 Year Project 
- Proposed WWTP 
- Proposed Lift Station 
- Current Elkhorn 201 Planning Boundary 
- Proposed 201 Facilities Planning Area Addition 
- Elkhorn City Boundary 
- US460 Refuse Fill Area 
- US460 Relocation Corridor 
- Proposed Project Areas 



PROPOSED
PRESSURE SEWER
SYSTEM



GRAPHIC SCALE: 1" = 1000'



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Ferrell's Creek - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 1000'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

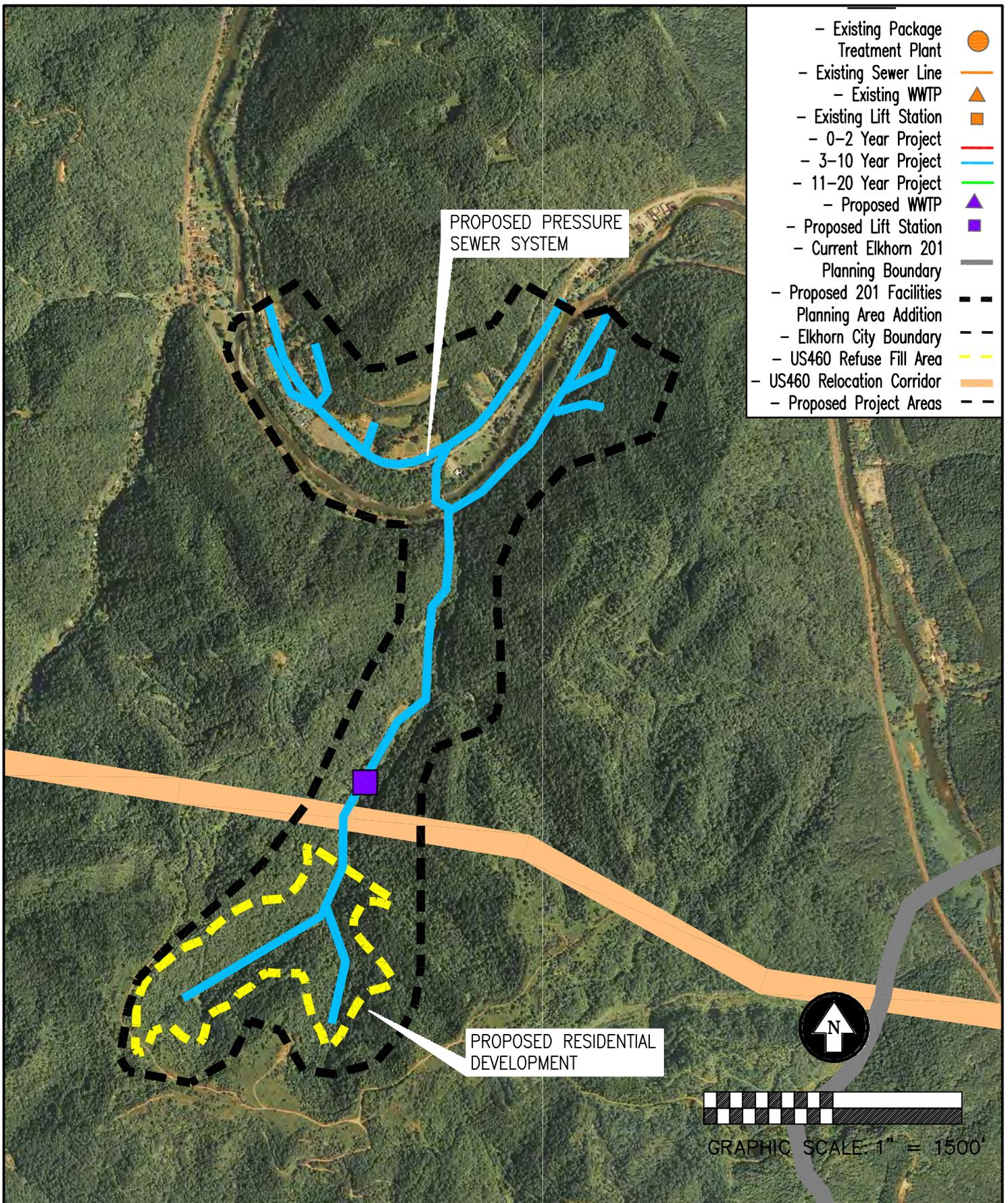
SHEET:
EX D-5
OF:

TABLE D-6
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
BELCHER SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 77,000.00	1	\$ 77,000.00
	Landscape Allowance	Mile	\$ 1,500.00	6	\$ 8,903.41
	Seeding and Cleanup	Mile	\$ 500.00	6	\$ 2,967.80
	Removal of Existing Septic Tank	Each	\$ 750.00	10	\$ 7,650.00
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	6,800	\$ 272,000.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	1	\$ 2,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	4,050	\$ 44,550.00
	3" PE SDR 11	Lin Ft	\$ 13.00	7,710	\$ 100,230.00
	4" PE SDR 11	Lin Ft	\$ 14.00	10,380	\$ 145,320.00
	6" PE SDR 11	Lin Ft	\$ 16.00	2,400	\$ 38,400.00
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	200	\$ 35,000.00
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	105	\$ 13,125.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	105	\$ 13,125.00
	Bore and Encasement 6"	Lin Ft	\$ 150.00	35	\$ 5,250.00
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	340	\$ 1,700,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	17	\$ 20,400.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	1	\$ 85,000.00
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	1	\$ 50,000.00
	ADD for Odor Control	Each	\$ 35,000.00	1	\$ 35,000.00
	ESTIMATED CONSTRUCTION COST				\$ 2,655,921.21

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



- Existing Package Treatment Plant ●
- Existing Sewer Line —
- Existing WWTP ▲
- Existing Lift Station ■
- 0-2 Year Project —
- 3-10 Year Project —
- 11-20 Year Project —
- Proposed WWTP ▲
- Proposed Lift Station ■
- Current Elkhorn 201 Planning Boundary - - -
- Proposed 201 Facilities Planning Area Addition - - -
- Elkhorn City Boundary - - -
- US460 Refuse Fill Area - - -
- US460 Relocation Corridor —
- Proposed Project Areas - - -

PROPOSED PRESSURE SEWER SYSTEM

PROPOSED RESIDENTIAL DEVELOPMENT



GRAPHIC SCALE: 1" = 1500'

SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Belcher - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 1500'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

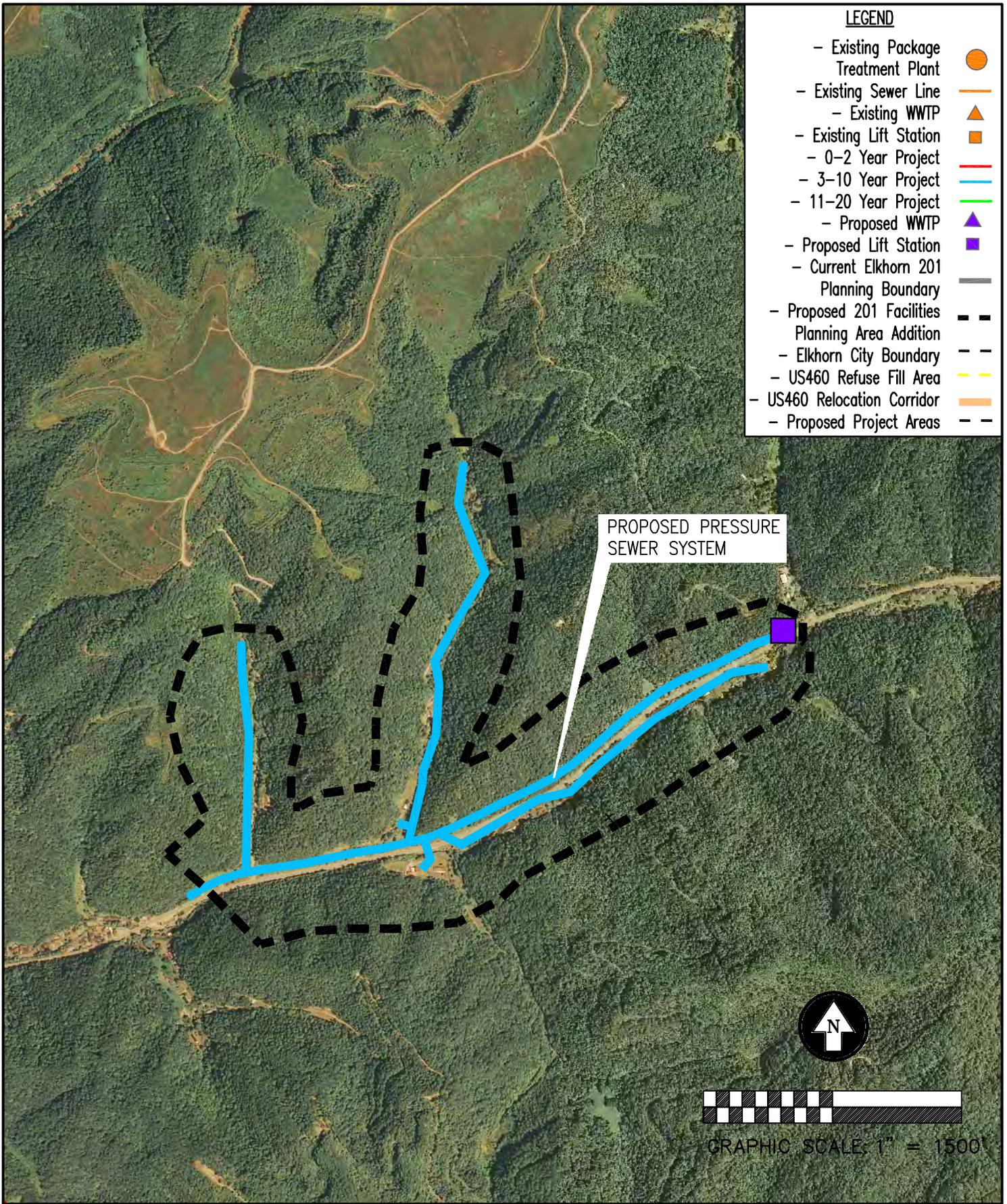
SHEET:
EX D-6
OF:

TABLE D-7
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
HONEY FORK SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 29,000.00	1	\$ 29,000.00
	Landscape Allowance	Mile	\$ 1,500.00	5	\$ 7,031.25
	Seeding and Cleanup	Mile	\$ 500.00	5	\$ 2,343.75
	Removal of Existing Septic Tank	Each	\$ 750.00	2	\$ 1,710.00
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	1,520	\$ 60,800.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	0	\$ -
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	7,600	\$ 83,600.00
	3" PE SDR 11	Lin Ft	\$ 13.00	7,180	\$ 93,340.00
	4" PE SDR 11	Lin Ft	\$ 14.00	8,450	\$ 118,300.00
	6" PE SDR 11	Lin Ft	\$ 16.00	0	\$ -
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	140	\$ 17,500.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	70	\$ 8,750.00
	Bore and Encasement 6"	Lin Ft	\$ 150.00	0	\$ -
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	76	\$ 380,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	4	\$ 4,560.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	0	\$ -
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	1	\$ 95,000.00
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	1	\$ 50,000.00
	ADD for Odor Control	Each	\$ 35,000.00	1	\$ 35,000.00
	ESTIMATED CONSTRUCTION COST				\$ 986,935.00

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



- LEGEND**
- Existing Package Treatment Plant 
 - Existing Sewer Line 
 - Existing WWTP 
 - Existing Lift Station 
 - 0-2 Year Project 
 - 3-10 Year Project 
 - 11-20 Year Project 
 - Proposed WWTP 
 - Proposed Lift Station 
 - Current Elkhorn 201 Planning Boundary 
 - Proposed 201 Facilities Planning Area Addition 
 - Elkhorn City Boundary 
 - US460 Refuse Fill Area 
 - US460 Relocation Corridor 
 - Proposed Project Areas 

PROPOSED PRESSURE SEWER SYSTEM



GRAPHIC SCALE: 1" = 1500'



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Honey Fork - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 1500'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

SHEET:
EX D-7
OF:

TABLE D-8
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
ABNER FORK SERVICE AREA

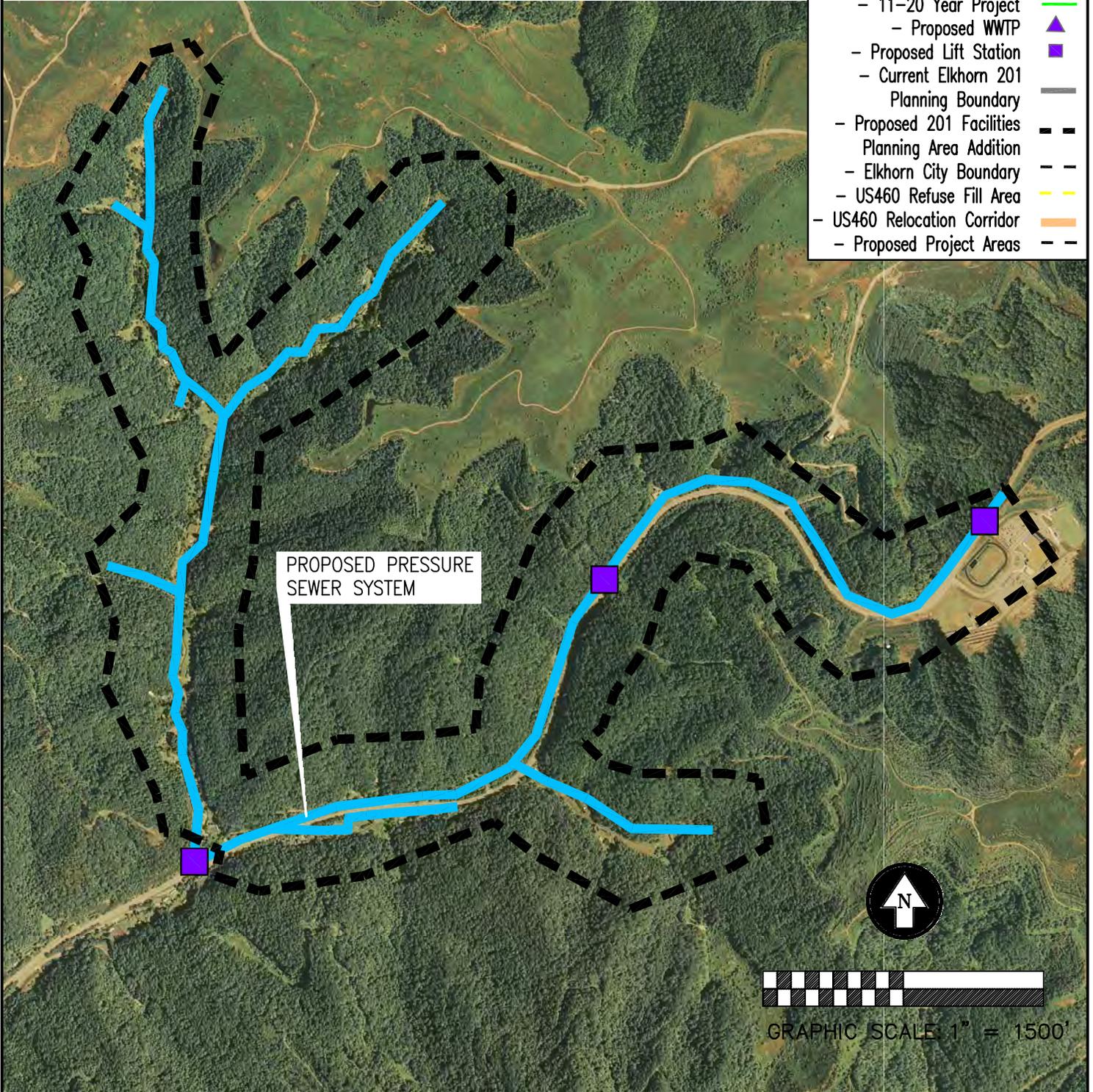
ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 48,500.00	1	\$ 48,500.00
	Landscape Allowance	Mile	\$ 1,500.00	7	\$ 10,767.05
	Seeding and Cleanup	Mile	\$ 500.00	7	\$ 3,589.02
	Removal of Existing Septic Tank	Each	\$ 750.00	4	\$ 3,037.50
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	2,700	\$ 108,000.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	1	\$ 2,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	6,600	\$ 72,600.00
	3" PE SDR 11	Lin Ft	\$ 13.00	12,100	\$ 157,300.00
	4" PE SDR 11	Lin Ft	\$ 14.00	16,500	\$ 231,000.00
	6" PE SDR 11	Lin Ft	\$ 16.00	0	\$ -
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	105	\$ 13,125.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	105	\$ 13,125.00
	Bore and Encasement 6"	Lin Ft	\$ 150.00	0	\$ -
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	135	\$ 675,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	7	\$ 8,100.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	1	\$ 65,000.00
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	1	\$ 85,000.00
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	2	\$ 100,000.00
	ADD for Odor Control	Each	\$ 35,000.00	2	\$ 70,000.00
	ESTIMATED CONSTRUCTION COST				\$ 1,666,143.56

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.

LEGEND

- Existing Package Treatment Plant 
- Existing Sewer Line 
- Existing WWTP 
- Existing Lift Station 
- 0-2 Year Project 
- 3-10 Year Project 
- 11-20 Year Project 
- Proposed WWTP 
- Proposed Lift Station 
- Current Elkhorn 201 Planning Boundary 
- Proposed 201 Facilities Planning Area Addition 
- Elkhorn City Boundary 
- US460 Refuse Fill Area 
- US460 Relocation Corridor 
- Proposed Project Areas 




SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Abner Fork - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 1500'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

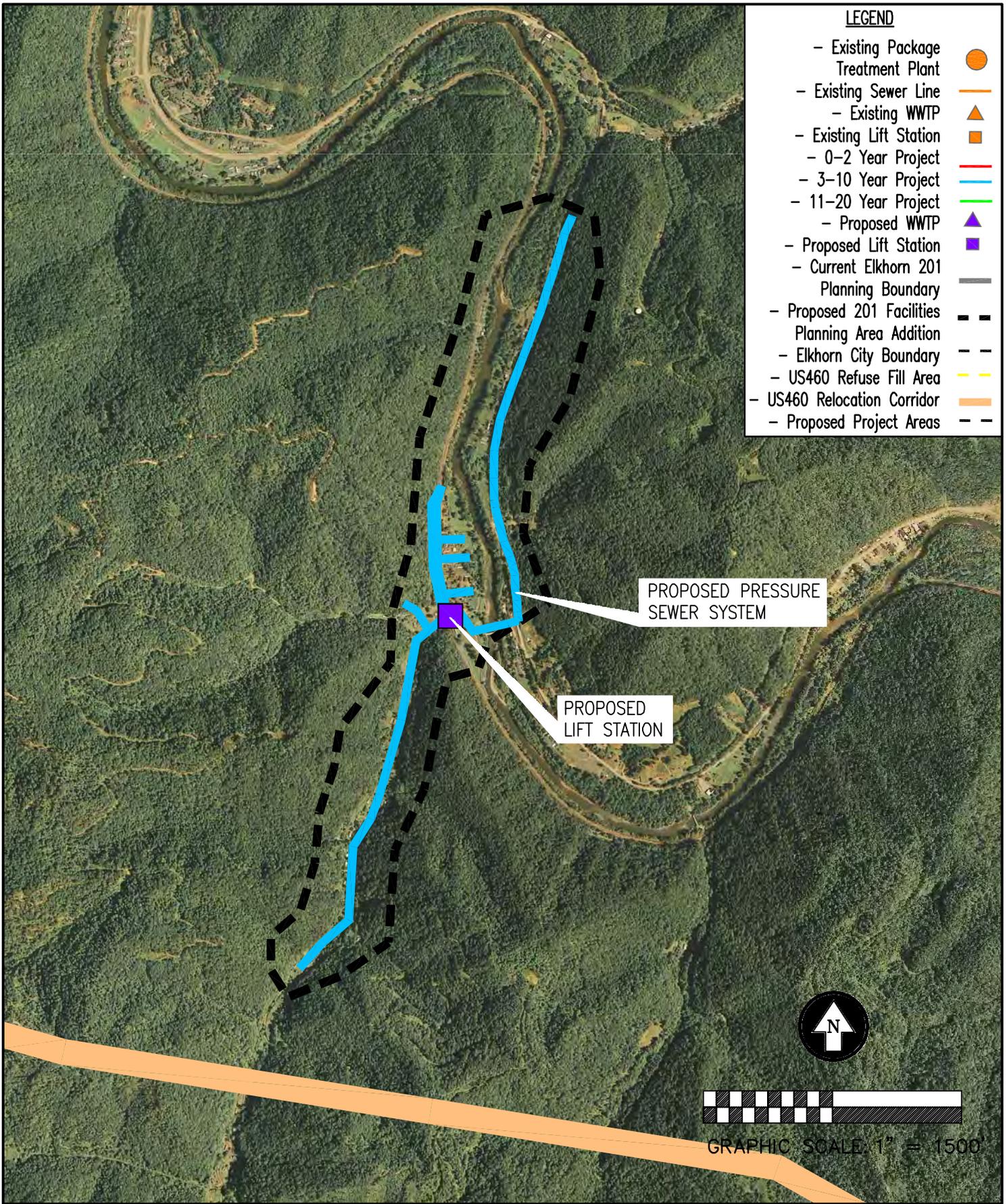
SHEET:
EX D-8
OF:

TABLE D-9
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
DRAFFIN SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 29,000.00	1	\$ 29,000.00
	Landscape Allowance	Mile	\$ 1,500.00	3	\$ 4,759.94
	Seeding and Cleanup	Mile	\$ 500.00	3	\$ 1,586.65
	Removal of Existing Septic Tank	Each	\$ 750.00	3	\$ 2,227.50
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	1,980	\$ 79,200.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	1	\$ 2,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	3,100	\$ 34,100.00
	3" PE SDR 11	Lin Ft	\$ 13.00	6,275	\$ 81,575.00
	4" PE SDR 11	Lin Ft	\$ 14.00	5,400	\$ 75,600.00
	6" PE SDR 11	Lin Ft	\$ 16.00	0	\$ -
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	200	\$ 30,000.00
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	175	\$ 21,875.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	35	\$ 4,375.00
	Bore and Encasement 6"	Lin Ft	\$ 150.00	0	\$ -
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	99	\$ 495,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	5	\$ 5,940.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	75 gpm Submersible Pump Station	Each	\$ 55,000.00	1	\$ 55,000.00
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	0	\$ -
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	1	\$ 50,000.00
	ADD for Odor Control	Each	\$ 35,000.00	1	\$ 35,000.00
	ESTIMATED CONSTRUCTION COST				\$ 1,007,239.09

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



- LEGEND**
- Existing Package Treatment Plant 
 - Existing Sewer Line 
 - Existing WWTP 
 - Existing Lift Station 
 - 0-2 Year Project 
 - 3-10 Year Project 
 - 11-20 Year Project 
 - Proposed WWTP 
 - Proposed Lift Station 
 - Current Elkhorn 201 Planning Boundary 
 - Proposed 201 Facilities Planning Area Addition 
 - Elkhorn City Boundary 
 - US460 Refuse Fill Area 
 - US460 Relocation Corridor 
 - Proposed Project Areas 

PROPOSED PRESSURE SEWER SYSTEM

PROPOSED LIFT STATION



GRAPHIC SCALE: 1" = 1500'



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Draffin - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 1500'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

SHEET:
EX D-9
OF:

TABLE D-10
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
ROAD JUNCTION SERVICE AREA

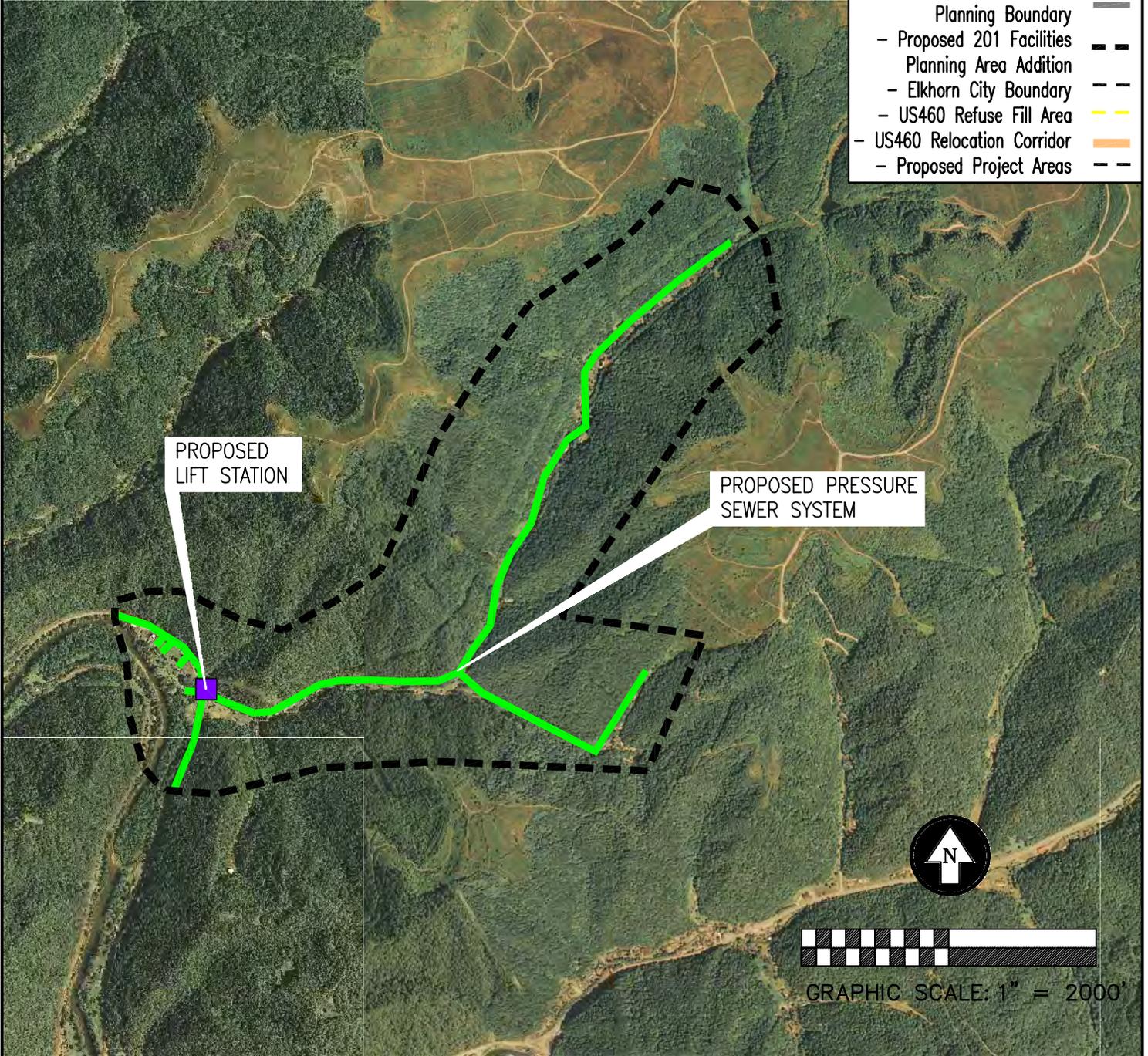
ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 34,000.00	1	\$ 34,000.00
	Landscape Allowance	Mile	\$ 1,500.00	4	\$ 6,433.24
	Seeding and Cleanup	Mile	\$ 500.00	4	\$ 2,144.41
	Removal of Existing Septic Tank	Each	\$ 750.00	4	\$ 2,677.50
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	2,380	\$ 95,200.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	1	\$ 2,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	4,830	\$ 53,130.00
	3" PE SDR 11	Lin Ft	\$ 13.00	9,880	\$ 128,440.00
	4" PE SDR 11	Lin Ft	\$ 14.00	5,555	\$ 77,770.00
	6" PE SDR 11	Lin Ft	\$ 16.00	0	\$ -
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	140	\$ 17,500.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	70	\$ 8,750.00
	Bore and Encasement 6"	Lin Ft	\$ 150.00	0	\$ -
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - and Pressure Sewer Lateral Assembly	Lin Each	\$ 5,000.00	119	\$ 595,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	6	\$ 7,140.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	1	\$ 65,000.00
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	0	\$ -
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	1	\$ 50,000.00
	ADD for Odor Control	Each	\$ 35,000.00	1	\$ 35,000.00
	ESTIMATED CONSTRUCTION COST				\$ 1,180,185.15

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.

LEGEND

- Existing Package Treatment Plant 
- Existing Sewer Line 
- Existing WWTP 
- Existing Lift Station 
- 0-2 Year Project 
- 3-10 Year Project 
- 11-20 Year Project 
- Proposed WWTP 
- Proposed Lift Station 
- Current Elkhorn 201 Planning Boundary 
- Proposed 201 Facilities Planning Area Addition 
- Elkhorn City Boundary 
- US460 Refuse Fill Area 
- US460 Relocation Corridor 
- Proposed Project Areas 




SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Road Junction – Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 2000'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

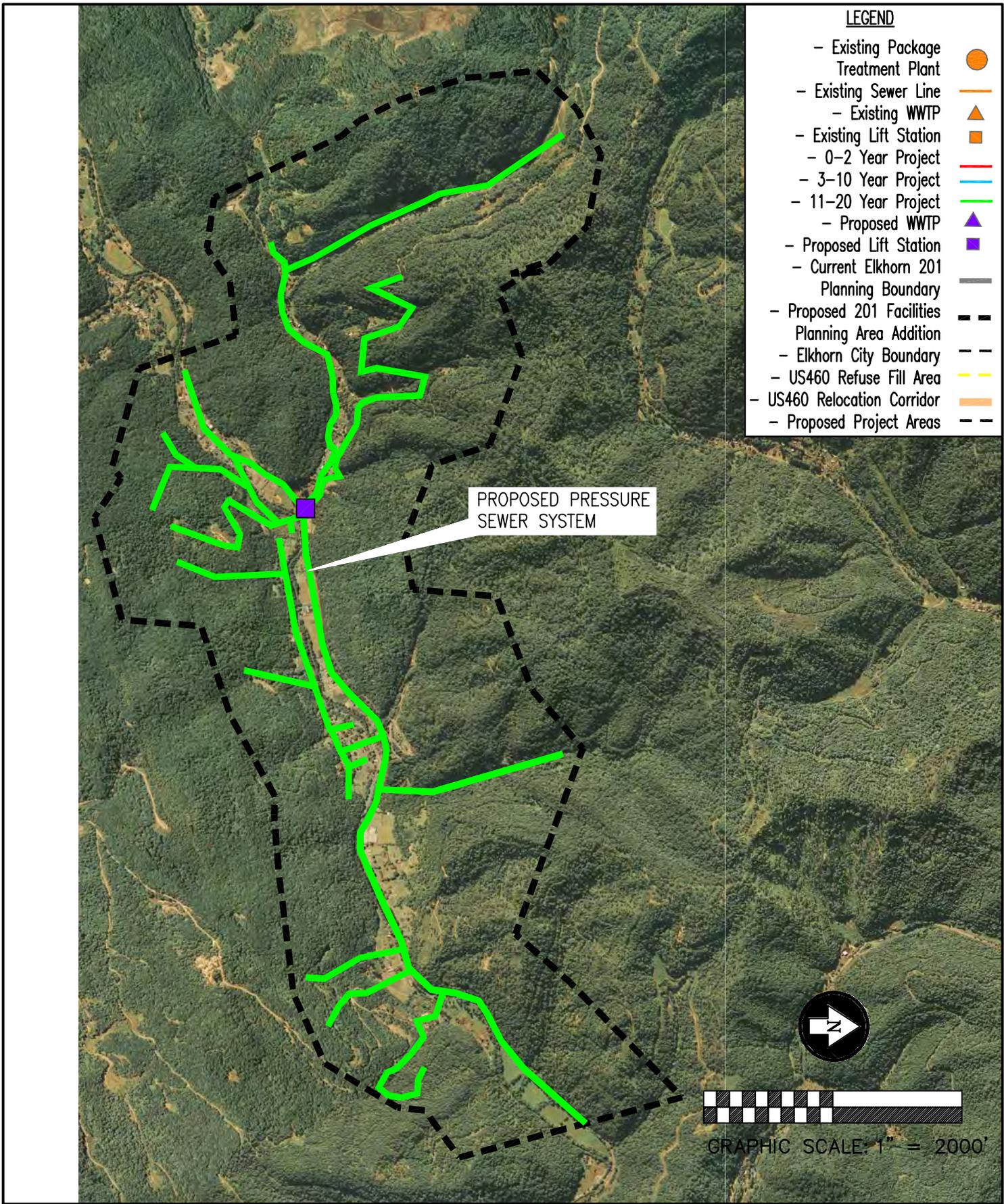
SHEET:
EX D-10
OF:

TABLE D-11
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
SYCAMORE SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 76,000.00	1	\$ 76,000.00
	Landscape Allowance	Mile	\$ 1,500.00	13	\$ 19,998.58
	Seeding and Cleanup	Mile	\$ 500.00	13	\$ 6,666.19
	Removal of Existing Septic Tank	Each	\$ 750.00	8	\$ 5,760.00
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	5,120	\$ 204,800.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	2	\$ 4,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	32,050	\$ 352,550.00
	3" PE SDR 11	Lin Ft	\$ 13.00	20,450	\$ 265,850.00
	4" PE SDR 11	Lin Ft	\$ 14.00	12,775	\$ 178,850.00
	6" PE SDR 11	Lin Ft	\$ 16.00	0	\$ -
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	210	\$ 26,250.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	70	\$ 8,750.00
	Bore and Encasement 6"	Lin Ft	\$ 150.00	0	\$ -
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	256	\$ 1,280,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	13	\$ 15,360.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	1	\$ 85,000.00
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	1	\$ 50,000.00
	ADD for Odor Control	Each	\$ 35,000.00	1	\$ 35,000.00
	ESTIMATED CONSTRUCTION COST				\$ 2,614,834.77

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Sycamore - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 2000'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

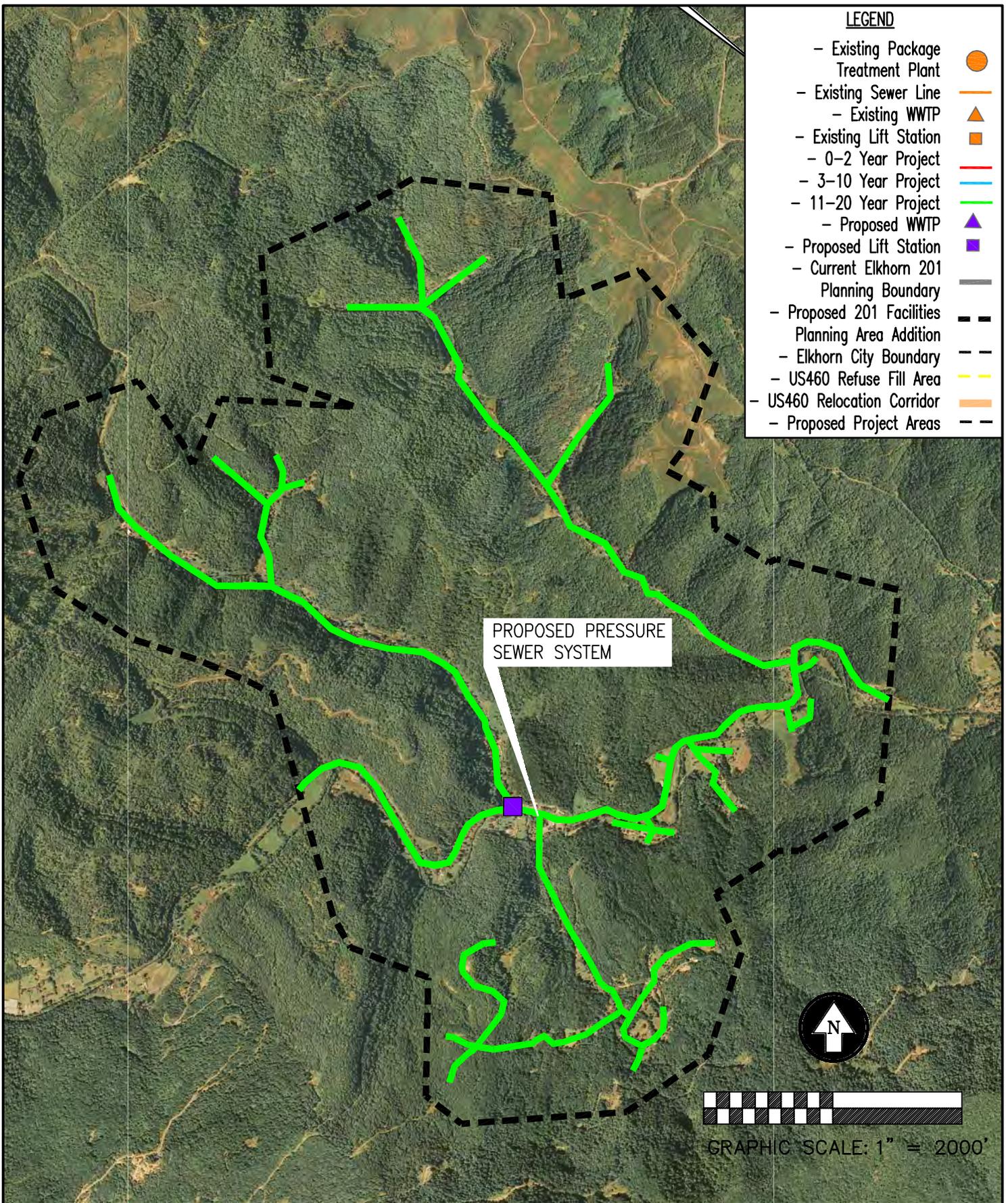
SHEET:
EX D-11
OF:

TABLE D-12
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
ASHCAMP SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 76,000.00	1	\$ 76,000.00
	Landscape Allowance	Mile	\$ 1,500.00	13	\$ 19,829.55
	Seeding and Cleanup	Mile	\$ 500.00	13	\$ 6,609.85
	Removal of Existing Septic Tank	Each	\$ 750.00	7	\$ 5,512.50
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	4,900	\$ 196,000.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	2	\$ 4,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	25,975	\$ 285,725.00
	3" PE SDR 11	Lin Ft	\$ 13.00	24,675	\$ 320,775.00
	4" PE SDR 11	Lin Ft	\$ 14.00	5,225	\$ 73,150.00
	6" PE SDR 11	Lin Ft	\$ 16.00	9,025	\$ 144,400.00
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	280	\$ 35,000.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	0	\$ -
	Bore and Encasement 6"	Lin Ft	\$ 150.00	70	\$ 10,500.00
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	245	\$ 1,225,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	12	\$ 14,700.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	0	\$ -
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	0	\$ -
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	1	\$ 100,000.00
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	600 gpm Submersible Pump Station	Each	\$ 200,000.00	0	\$ -
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	1	\$ 50,000.00
	ADD for Odor Control	Each	\$ 35,000.00	1	\$ 35,000.00
	ESTIMATED CONSTRUCTION COST				\$ 2,602,201.89

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



- LEGEND**
- Existing Package Treatment Plant 
 - Existing Sewer Line 
 - Existing WWTP 
 - Existing Lift Station 
 - 0-2 Year Project 
 - 3-10 Year Project 
 - 11-20 Year Project 
 - Proposed WWTP 
 - Proposed Lift Station 
 - Current Elkhorn 201 Planning Boundary 
 - Proposed 201 Facilities Planning Area Addition 
 - Elkhorn City Boundary 
 - US460 Refuse Fill Area 
 - US460 Relocation Corridor 
 - Proposed Project Areas 

PROPOSED PRESSURE SEWER SYSTEM



GRAPHIC SCALE: 1" = 2000'



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Ashcamp - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 2000'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536

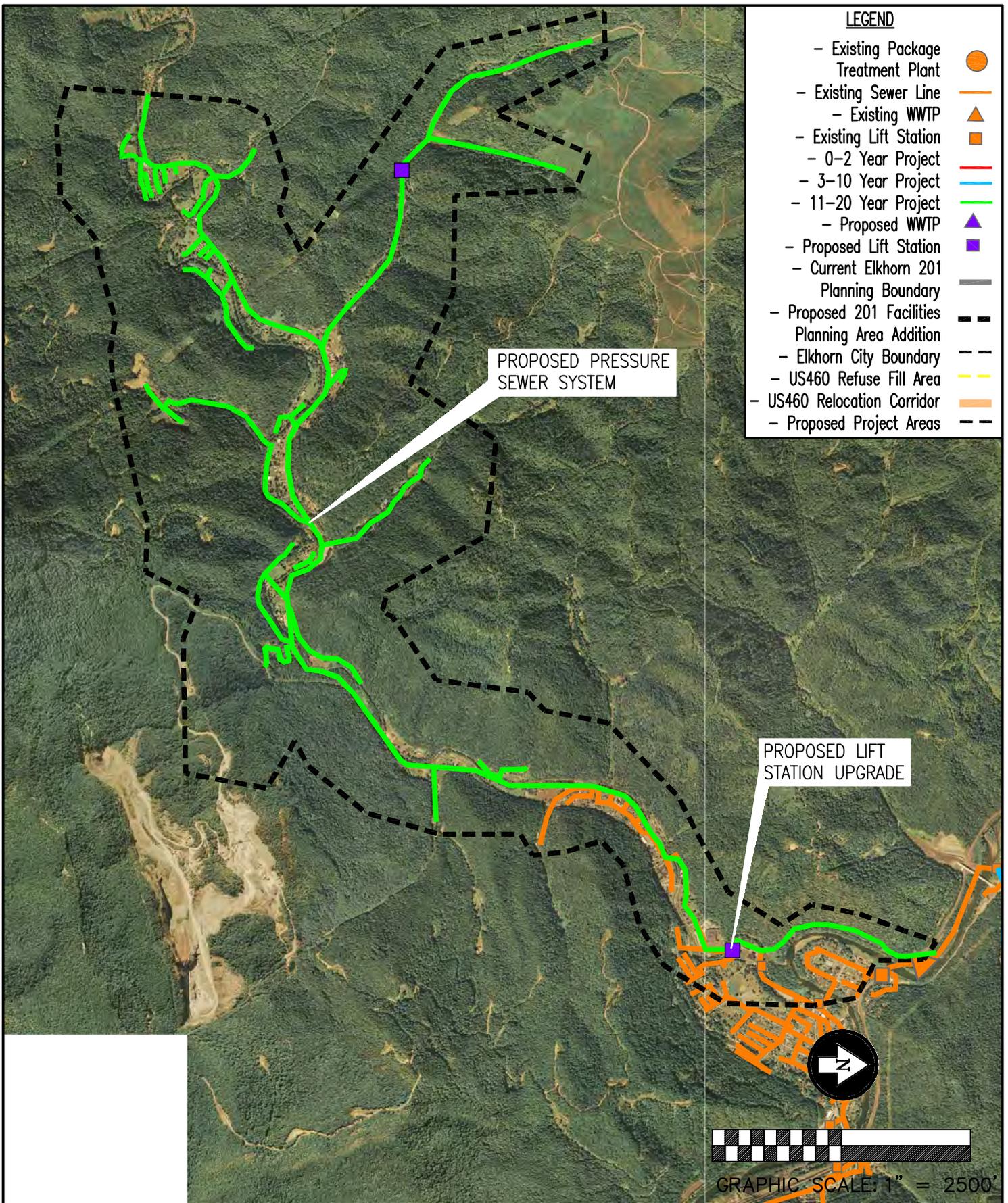
SHEET:
EX D-12
OF:

TABLE D-13
OPINION OF PROBABLE CONSTRUCTION COST FOR
PRESSURE SEWER COLLECTION AND CONVEYANCE SYSTEM
ELKHORN CREEK SERVICE AREA

ITEM NUMBER	ITEM DESCRIPTION	UNIT	UNIT COST	QTY	AMOUNT
1	GENERAL				
	Mobilization/Demobilization	LS	\$ 96,000.00	1	\$ 96,000.00
	Landscape Allowance	Mile	\$ 1,500.00	16	\$ 24,305.40
	Seeding and Cleanup	Mile	\$ 500.00	16	\$ 8,101.80
	Removal of Existing Septic Tank	Each	\$ 750.00	9	\$ 6,570.00
2	GRAVITY SEWER PIPE				
	4" diameter PVC SDR 35	Lin Ft	\$ 40.00	5,840	\$ 233,600.00
	8" diameter PVC SDR 35	Lin Ft	\$ 50.00	0	\$ -
3	FORCE MAINS				
	Air/Vacuum Relief Assembly	Each	\$ 2,000.00	1	\$ 2,000.00
	1.25" PE SDR 11	Lin Ft	\$ 9.00	0	\$ -
	2" PE SDR 11	Lin Ft	\$ 11.00	30,995	\$ 340,945.00
	3" PE SDR 11	Lin Ft	\$ 13.00	15,535	\$ 201,955.00
	4" PE SDR 11	Lin Ft	\$ 14.00	0	\$ -
	6" PE SDR 11	Lin Ft	\$ 16.00	33,185	\$ 530,960.00
	8" PE SDR 11	Lin Ft	\$ 18.00	0	\$ -
	10" PE SDR 11	Lin Ft	\$ 28.00	0	\$ -
4	RIVER CROSSING				
	3" River Crossing	Lin Ft	\$ 150.00	0	\$ -
	4" River Crossing	Lin Ft	\$ 175.00	0	\$ -
	6" River Crossing	Lin Ft	\$ 200.00	0	\$ -
	8" River Crossing	Lin Ft	\$ 225.00	0	\$ -
	10" River Crossing	Lin Ft	\$ 250.00	0	\$ -
5	ENCASEMENTS				
	Bore and Encasement 3"	Lin Ft	\$ 125.00	140	\$ 17,500.00
	Bore and Encasement 4"	Lin Ft	\$ 125.00	0	\$ -
	Bore and Encasement 6"	Lin Ft	\$ 150.00	210	\$ 31,500.00
	Bore and Encasement 8"	Lin Ft	\$ 175.00	0	\$ -
	Bore and Encasement 10"	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 4" Railroad	Lin Ft	\$ 200.00	0	\$ -
	Bore and Encasement 6" Railroad	Lin Ft	\$ 225.00	0	\$ -
	Bore and Encasement 8" Railroad	Lin Ft	\$ 250.00	0	\$ -
6	PAVEMENT REPLACEMENT				
	Bituminous Pavement Replacement	Lin Ft	\$ 30.00	0	\$ -
	Concrete Replacement (sidewalks & misc)	Cu Yd	\$ 150.00	0	\$ -
7	RESIDENTIAL PUMP STATION				
	Simplex Grinder Pump Station w/ Service - Line and Pressure Sewer Lateral Assembly	Each	\$ 5,000.00	292	\$ 1,460,000.00
	Residential Core Grinder Pump, Stored	Each	\$ 1,200.00	15	\$ 17,520.00
	Duplex Grinder Pump Station w/ Service Line	Each	\$ 15,000.00	0	\$ -
8	DUPLEX PUMP STATION				
	50 gpm Submersible Pump Station	Each	\$ 50,000.00	1	\$ 50,000.00
	100 gpm Submersible Pump Station	Each	\$ 65,000.00	0	\$ -
	125 gpm Submersible Pump Station	Each	\$ 70,000.00	0	\$ -
	200 gpm Submersible Pump Station	Each	\$ 85,000.00	0	\$ -
	250 gpm Submersible Pump Station	Each	\$ 95,000.00	0	\$ -
	275 gpm Submersible Pump Station	Each	\$ 100,000.00	0	\$ -
	400 gpm Submersible Pump Station	Each	\$ 125,000.00	0	\$ -
	575 gpm Submersible Pump Station	Each	\$ 190,000.00	1	\$ 190,000.00
	1000 gpm Submersible Pump Station	Each	\$ 350,000.00	0	\$ -
	Pump Station Backup Power	Each	\$ 50,000.00	1	\$ 50,000.00
	ADD for Odor Control	Each	\$ 35,000.00	1	\$ 35,000.00
	ESTIMATED CONSTRUCTION COST				\$ 3,295,957.20

Assumptions

1. Bore and encasement required under US and KY highways and railroads.
2. Individual grinder pump located at each customer with average 100 lf of service line.
3. Bituminous Pavement Replacement is over width of trench only.
4. Creek and river crossings assumed to be 100 lf for Elkhorn Creek and 200 lf for Russell Fork.



- LEGEND**
- Existing Package Treatment Plant 
 - Existing Sewer Line 
 - Existing WWTP 
 - Existing Lift Station 
 - 0-2 Year Project 
 - 3-10 Year Project 
 - 11-20 Year Project 
 - Proposed WWTP 
 - Proposed Lift Station 
 - Current Elkhorn 201 Planning Boundary 
 - Proposed 201 Facilities Planning Area Addition 
 - Elkhorn City Boundary 
 - US460 Refuse Fill Area 
 - US460 Relocation Corridor 
 - Proposed Project Areas 

PROPOSED PRESSURE SEWER SYSTEM

PROPOSED LIFT STATION UPGRADE



GRAPHIC SCALE: 1" = 2500'



SUMMIT ENGINEERING, INC.

LEXINGTON, KY
PIKEVILLE, KY
HAZARD, KY
CHARLESTON, WV
LOGAN, WV
BRUNDY, VA

Russell Fork Sewer Authority
Pike County, Kentucky

Russell Fork 201 Facilities Plan
Elkhorn Creek - Pressure Sewer

DATE: 2/1/09
SCALE: 1" = 2500'
DRAWN BY: BDF
CHECKED: KH
PROJECT NO: 07-536
SHEET:
EX D-13
OF: