Planning Period 2012 - 2032

Regional Wastewater Facilities Plan

City of Harrodsburg, KY

GRW Project No. 4100

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engineering | architecture | geospatial

GRW | 801 Corporate Drive | Lexington, KY 40503 | 859.223.3999

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Chapter 1

Chapter 1: REGIONAL WASTEWATER FACILITIES PLAN SUMMARY

Purpose and Goals of this Plan

The purpose of this Regional Wastewater Facilities Plan is to develop a cost effective and environmentally sound strategy for improving the wastewater collection and treatment systems in the City of Harrodsburg's Planning Area, to accommodate existing needs and projected growth during the Planning Period of 2012 to 2032. Wastewater system planning for that growth begins with this Plan.

The goals of this Plan include:

- Review and evaluation of the City's wastewater collection system and wastewater treatment plant to assess their current physical condition, capacity and improvement needs;
- Review of current and projected future compliance with existing, proposed and anticipated U.S. EPA Clean Water Act regulations, KPDES permit discharge limitations and other associated requirements;
- Evaluate impacts of wastewater loads on the City's wastewater collection and treatment facilities from areas outside of the current wastewater Planning Area;
- Study alternatives to expand and improve the capacity and effectiveness of the wastewater treatment facility to meet future requirements;
- Develop a Capital Improvements Plan to meet the future needs of the wastewater collection and treatment system so that such improvements can be funded and implemented in accordance with a schedule that matches the future requirements of the system;
- Ensure that public participation is included in the development of the recommended plan for wastewater collection and treatment system improvements;
- Address any anticipated adverse environmental impacts of the proposed improvements, as identified by state and federal agencies that have reviewed this Plan.

Planning Area Description

The Planning Area for this Regional Facilities Plan includes the City of Harrodsburg and its immediate surrounding area. This Planning Area is reduced from the Planning Area that was the basis of the original 1977 Facilities Plan and the 2000 Facilities Plan Update, due to the formation of the Mercer County Sanitation District (MCSD) in 2005 and the resulting approval of the MCSD's Regional Wastewater Facilities Plan by KDOW in 2007. The MCSD plan does not include the construction of a wastewater treatment facility. Instead, MCSD intends to convey wastewater either to Harrodsburg or to Danville for treatment. Accordingly, the Harrodsburg wastewater treatment plant will continue to serve as the regional treatment facility for the area.

Background

Two previous wastewater Facilities Plans have been prepared for the City of Harrodsburg. The original plan was completed in 1977 and an update was provided in 2000. Both plans were prepared for a regional wastewater Planning Area that encompassed the City of Harrodsburg and most of southeastern Mercer County, extending to Burgin and the residential areas along the west side of Lake Herrington. In 2005, a new regional planning agency was formed - the Mercer County Sanitation District (MCSD) - to provide wastewater service for all of Mercer County, except for the City of Harrodsburg and its immediate surrounding area. The 2007 MCSD Regional Wastewater Facilities Plan (RWFP) reduced the Harrodsburg Planning Area, which in turn altered the findings and recommendations of the Harrodsburg 2000 Facilities Plan Update and is cause to prepare this new Regional Wastewater Facilities Plan to specifically address the future wastewater service needs of Harrodsburg and its wastewater system customers.

The existing wastewater treatment plant provides capacity to treat an average daily flow of 2.68 MGD (million gallons per day) and a flow equalized peak daily flow of 5.28 MGD. A review of historical plant operating records and commercial/industrial discharge records for the period of 2009-2012 indicates that the plant received an average daily flow of 1.32 MGD from residential customers and 0.28 MGD from commercial/industrial customers until December 2012, when one of the City's largest industrial water users – Wausau Paper – completed an expansion of its process operations. This resulted in an increase of commercial/industrial flow by approximately 0.6 to 0.7 MGD, and increased the average daily plant flow rate from 1.60 ± MGD to 2.20 ± MGD.

The treatment plant is expected to receive increased flows during the Planning Period due to increased residential and commercial/industrial customer growth within the Planning Area, as well as due to the conveyance of wastewater from MCSD customers to Harrodsburg for

treatment. By 2032, the plant is expected to receive and average daily flow of 3.1 MGD (2.1 MGD from residential customers, 1.0 MGD from commercial/industrial customers) and a flow equalized peak flow of 6.8 MGD. In 2013-2014, Wausau Paper will be completing a feasibility study to evaluate if any further expansions of their process operations will be made during the Planning Period. If such expansions are planned, additional capacity will need to be provided at the City's treatment plant to treat the resulting additional wastewater flow.

The City of Harrodsburg is currently in the process of completing a series of projects in the wastewater collection system to eliminate wet weather–induced overflows and other associated problems. Plans have been made to increase the capacity of a recently constructed pump station on the west side of town (Western Regional PS) and to install a new pump station on the east side of town (Corning Glass PS). These two projects will allow the City to continue with its strategy of diverting flows away from the older "downtown" portion of the collection system which lacks capacity to handle such flow during wet weather periods. The City is also in the process of performing a series of sewer cleaning and rehabilitation projects in the "downtown" area and in several out-lying neighborhoods. One such project includes cleaning the main sewer interceptor that conveys wastewater from the "downtown" area to the treatment plant. These projects are expected to further reduce the number of overflows that have taken place in the collection system during peak wet weather periods.

The City also has a series of treatment plant improvement projects underway. Several of these projects will improve plant operation and performance by replacing equipment items that have exceeded their operating lives. One such project is the replacement of the two plant influent screw pumps with two new pumps, sized to ensure that pumping capacity for peak flow conditions is provided in the event that one of the pumps is out of operation. Another project is the provision of a belt filter press that will more reliably dewater waste sludge prior to landfill disposal, as compared to the previous practice of using sand drying beds to remove excess water from the sludge prior to landfill disposal.

All of these on-going collection system and treatment plant projects are described in this Plan as part of the first phase of improvements planned by the City for its wastewater system. This phase is underway at this writing and is scheduled to be completed by the end of Phase 1 (Year 0 to 2) of the Planning Period.

This Plan includes additional projects that are scheduled for completion during Phase 2 (Year 3 to 10) and Phase 3 (Year 11 to 20). The Phase 2 and Phase 3 projects are described in the following section of this chapter.

Recommended Plan

This Regional Wastewater Facilities Plan includes a series of projects built in two phases in the wastewater collection system, which will provide increased conveyance capacity for current and future wastewater flows from customers within the Planning Area, as well as from MCSD customers that are anticipated to be served by the City's wastewater system during the Planning Period. Many of these projects are included in this Plan as a continuation of the City's on-going strategy to eliminate historic wet weather-induced overflows and bypasses within the collection system.

The Recommended Plan also calls for the construction of projects built in three phases at the wastewater treatment plant, which will provide increased treatment capacity while also meeting more stringent discharge limitations that are expected to become effective during the Planning Period. After considering four alternatives for upgrading and expanding the plant (including a No Action Alternative and an Alternative for Optimizing of the Existing Facilities), two viable alternatives for a regionalized treatment plant using secondary treatment technologies to replace the existing Rotating Biological Contactors (RBCs) were evaluated from a monetary (present worth) and non-monetary standpoint. These two alternatives included modifications to or replacement of several existing plant components, either due to age, lack of compatibility with the new secondary treatment technology, or the need for improved safety and treatment effectiveness.

The continued use of the existing RBC system was not considered as a viable approach for the future requirements of the City's treatment plant due to concerns related to their long history of structural and mechanical component parts failures and due to their inability to reliably treat wastewater to the levels needed to comply with anticipated future stringent discharge permit limitations, especially for nutrients such as Nitrogen and Phosphorus. These concerns have caused the RBC process to fall out of favor nationwide as a viable secondary treatment process.

The Recommended Plan calls for replacing the RBC system with oxidation ditches that can be later modified to provide for improved removal levels of biological nutrients (primarily Phosphorus and Nitrogen) than are currently provided in order to achieve a plant effluent that is within the anticipated limitations of a more stringent discharge permit that is expected to be issued at some point during the latter portion of the Planning Period.

The following is a list of improvements that are included in the Recommended Plan for the wastewater collection system. These projects will be completed in Phase 1 (Year 0 to 2) or Phase 2 (Year 3 to 10) of the Planning Period.

- Phase 1 Wastewater Collection System Projects:

    - Continue with the on-going planned projects for cleaning and rehabilitation of sewers to eliminate wet weather induced overflows. These projects are the last significant sewer rehabilitation projects planned by the City to eliminate overflows and bypasses in the older "downtown" portion of the existing collection system. The first of these projects was bid for construction in November 2012 at a cost of $260,185 and is scheduled for completion in 2013. This includes replacement and repair of collector lines and manholes in Greenville Street, College Street and Cherokee Heights, and cleaning of the main interceptor sewer that conveys wastewater to the treatment plant.

    - The second sewer rehabilitation project includes cleaning, video inspection and rehabilitation of collector lines in the Blue Ridge, Cardwell, Green Acres and Brentwood neighborhoods. This project has an estimated project cost of $576,000 (2011 dollars, per the KIA Clean Water Project Profile). Bidding for construction of this project is scheduled for mid- to late-2013 if funds are available. In 2013 dollars, the estimated project cost is $647,000.

    - Increase the capacity of the Western Regional Pump Station by adding two more submersible pumps each with a capacity of 1,680 GPM at 63 feet TDH, thus providing a total of four pumps of equal capacity. This will ensure sufficient capacity for flows that are conveyed from the Corning Pump Station (discussed below) and future customers along U.S. 127 bypass on the eastern side of town. If a U.S 127 bypass is provided on the west side of town, this pump station upgrade will also provide capacity to handle these flows. This project has an estimated project cost of $428,640 (in 2011 dollars, per KIA Clean Water Project Profile) and is scheduled for construction in late-2013 if funds are available. In 2013 dollars, the estimated project cost is $482,000.

- Phase 2 Wastewater Collection System Projects:

    - Construct a new pump station (known as the new Corning Glass Pump Station) on the east side of town, and a force main from the new pump station along the southeastern perimeter of the City, to a manhole on the southwest interceptor. This project will remove flows currently discharged to the "downtown" part of the collection system that are contributed by Corning Glass and the other residential, commercial and industrial customers in the east part of town, further protecting the "downtown" portion of the collection system from overloading during wet weather periods. Flows will be conveyed to the southwest interceptor, and from that point via the Western Regional Pump Station and its force main to the treatment plant. This project was estimated to cost $810,000 (in 2011 dollars, per the KIA Clean Water Project Profile). In 2013 dollars, the estimated project cost of this project is $910,500.

    - Provide sewer service to two currently unsewered areas, Riverview Estates and Fountaine Trace. This will eliminate on-site systems from approximately 140 homes in the City's Planning Area. A KIA Clean Water Project Profile has not been developed for this project at this writing. For planning purposes, this project has an estimated project cost of $400,000 in 2013 dollars.

    - Plan for the connection of a force main (constructed by MCSD) from a pump station located in the Salvisa or McAfee area to a point that connects to the 27-inch treatment plant influent sewer. This force main was described in the MCSD RWFP as part of a larger $10,141,000 project (2006 dollars, per the MCSD RWFP) to be funded by MCSD. The 2013 project cost estimate for this project is unknown. Funding for this project will be the responsibility of MCSD.

    - Plan for the connection of a gravity sewer (constructed by MCSD) from the Stringtown area that connects to the Harrodsburg collection system at a manhole in the northeast part of the City. This project was described in the MCSD RWFP as part of a larger $2,210,000 project (2006 dollars, per the MCSD RWFP) to be funded by MCSD. The 2013

project cost estimate for this project is unknown. Funding for this project will be the responsibility of MCSD.

- Phase 3 Wastewater Collection System Projects:

  - No projects are planned for this phase. The City will continue to monitor the operation of the collection system, especially during wet weather periods, to determine if further projects are needed to eliminate overflows and other similar problems. If such problems are found to occur, the City will provide funding for required improvements to eliminate such problems.

The following is a list of improvements that are included in the Recommended Plan for the wastewater treatment plant These projects will be completed in either Phase 1 (Year 0-to 2), Phase 2 (Year 3 to 10) or Phase 3 (Year 11 to 20) of the Planning Period..

- Phase 1 Wastewater Treatment Plant Projects:

  The following projects are needed to either replace aged equipment that is currently operating inefficiently or to improve the performance of the treatment plant. These projects will allow the plant to operate more effectively until additional improvements are made in Phase 2. The plant's current treatment capacity (2.68 MGD design average daily flow rate, 5.28 MGD design peak flow rate) will be maintained by these Phase 1 improvements. These projects have an estimated project cost (2013 dollars) of $3,723,000.

  - Replace the influent screw pumps with new screw pumping equipment equal in capacity to the existing pumps (5.28 MGD), in the existing structure. However, based on their variable output design, they are each capable of pumping as much as 10 MGD according to the equipment manufacturer.
  - Replace the mechanically cleaned screen with a new screen of the same capacity (5.28 MGD) in the existing screen channel. A press/washer will be provided to dewater the screenings prior to landfill disposal. Also provide a new plant influent sampler and flow meter.

- Replace the existing digester heat exchanger and associated piping for the sludge digestion facilities with a new boiler in a new building.
- Build a new 2,400 SF Sludge Processing Building to house a belt filter press for dewatering of anaerobically digested sludge, with associated feed pumps, polymer conditioning system, backwash system and cake conveyor. Dewatered sludge will continue to be disposed as dry cake in a landfill. The existing sludge storage lagoon and most of the existing sludge drying beds will be kept as reserve sludge holding and dewatering facilities.
- Install a plant-wide Supervisory Control and Data Acquisition (SCADA) system to monitor plant performance and control key process operations.
- Complete site work and pavement improvements, as needed, to support the above projects.

- Phase 2 Wastewater Treatment Plant Projects:

  The following projects are needed to increase the plant's treatment capacity to match the design average daily flow rate of 3.5 MGD and a flow equalized peak flow rate of 6.8 MGD, while also achieving the reduction of pollutants that are anticipated to be required in the plant's future discharge permit that will be in effect during Phase 2. The estimated project cost (in 2013 dollars) for these projects is $21,342,453.

  - Divert the discharge from the Plant Influent Screw Pump Station to a new 3,300 SF Preliminary Treatment Building to house two mechanically cleaned bar screens and a manually cleaned bar rack, two vortex-type grit chambers and two grit classifier/dewatering units. These processes will be designed for a flow equalized peak flow rate of 6.8 MGD. The mechanically cleaned screen provided in the 0-2 year phase would be relocated to this building in this phase.
  - Relocate the influent sampling location to a point on the downstream side of the screens in the Preliminary Treatment Building. Relocate the influent sampler to this building.
  - Replace the influent flow meter with a new flow meter vault on the downstream side of the Preliminary Treatment Building to measure

plant influent flow. Use this reading to serve as the plant influent flow record and to control flow-dependent plant processes.

- Construct a submersible pump station to convey in-plant drainage and recycle flows to a point on the downstream side of the influent flow meter.
- Abandon the existing Primary Settling Tanks, RBC Basins and Final Clarifiers. These process units will be replaced with a new secondary treatment process designed for a flow equalized peak flow rate of 6.8 MGD, employing two Oxidation Ditches. These Oxidation Ditches will be configured for the future (Phase 3) addition of upstream Anaerobic and Anoxic stages to provide biological nutrient removal (to meet future Total Nitrogen and Total Phosphorus effluent limitations that are anticipated to be included in the plant's discharge permit in Phase 2 or Phase 3). Two new Final Clarifiers, a new Return Activated Sludge/Waste Activated Sludge Pump Station and a new Scum Pump Station are included with this process. Primary settling will not be required since the effluent from preliminary treatment will be directly conveyed to the new Oxidation Ditches.
- Replace the existing chlorination/de-chlorination plant effluent disinfection facilities with ultraviolet disinfection facilities capable of disinfecting a flow equalized peak flow rate of 6.8 MGD. Convert the existing Chlorination Building to house a plant effluent sampler, the UV system electrical and control equipment and a new Non-Potable Water pumping system.
- Replace the existing plant effluent Parshall flume with a new Parshall flume, and connect its discharge to the existing cascade aeration ladder and plant outfall.
- Abandon the existing gravity sludge thickener. Provide two new Aerated Sludge Holding Tanks to store the waste activated sludge prior to dewatering and off-site landfill disposal. Add an extension to the existing Digestion Control Building to house the aeration and mixing equipment for the new tanks. Discontinue use of the anaerobic sludge digestion system.
- Upgrade the plant electrical and control systems, including provision of a generator for use as a secondary source of power for emergency conditions and expand the plant SCADA system to automate and

monitor plant operations. Replace major electrical panels and distribution system components as needed.

- Provide yard plant piping systems, site drainage/grading, roads, yard lighting and other site work as needed.

- Phase 3 Wastewater Treatment Plant Projects:

The following projects will allow the plant to continue treating an average design flow rate of 3.5 MGD and a flow equalized peak flow rate of 6.8 MGD during Phase 3, while also providing treatment capability to meet more stringent discharge permit effluent limitations and to provide additional waste sludge storage and dewatering capacity. These projects have an estimated project cost (2013 dollars) of $4,253,516.

- Construct the Anoxic and Anaerobic Stages on the upstream side of each Oxidation Ditch. These stages will allow the plant to provide biological nutrient removal in order to meet the plant's anticipated discharge permit limitations for total phosphorus (TP) and total nitrogen (TN) that are expected to be in effect by Phase 3.
- Convert the existing anaerobic digesters to aerated sludge holding tanks. This includes renovating the existing digester control building to house similar pumping, aeration, HVAC and electrical equipment as provided in Phase 2 for the first two aerated sludge holding tanks.
- Install a second belt filter press and associated equipment in the Sludge Processing Building built in Phase 1. With two presses available for operation, the existing sludge lagoon and sludge drying beds may be removed from operation. Continue to landfill the dewatered sludge cake.

The following Phase 3 projects would be required at the treatment plant <u>only</u> if Wausau Paper completes another process expansion during the Planning Period, similar to the expansion that Wausau completed in 2012. These projects are identified as Phase 3 projects to list them separately from the projects listed above, however the construction of these projects could be required in Phase 2 if Wausau Paper expands its process operations earlier than anticipated. Since the project cost for these projects is a function of the process wastewater flow received from

Wausau Paper, the cost will be estimated if and when the need for these projects is confirmed.

- Provide additional equalization basin capacity to receive and store Wausau Paper's additional process wastewater before it is discharged to the plant for treatment. This will require either the expansion of the existing lagoon that is currently used to equalize Wausau Paper's wastewater or the conversion of the unused portion of Tertiary Lagoon 1 to store the additional flow.
- Construct additional preliminary and secondary treatment facilities, increase the capacity of the effluent disinfection system, and provide additional sludge holding and dewatering capacity for the added flow that is contributed by Wausau Paper.
- Install additional yard piping, electrical and control system equipment and other plant components as needed.

Summary of Estimated Project Costs (in 2013 Dollars) for the Recommended Plan

The estimated Project Costs for the Recommended Plan:

• Phase 1 Wastewater Collection System Projects	$1,547,500
• Phase 1 Wastewater Treatment Plant Projects	$3,723,000
Sub-Total	**$5,270,500**
• Phase 2 Wastewater Collection System Projects	$ 1,310,500
• Phase 2 Wastewater Treatment Plant Projects	$21,342,500
Sub-Total	**$22,653,000**
• Phase 3 Wastewater Collection System Projects	$ 0
• Phase 3 Wastewater Treatment Plant Projects	$4,253,500
Sub-Total	**$4,253,500**
Total Estimated Project Costs, Phases 1, 2 and 3	**$32,176,000**

These Project Costs include estimated construction, engineering, administrative and legal costs, expressed in 2013 dollars.

Environmental Impacts

Correspondence was exchanged with various state and federal agencies that relate to potential adverse impacts of the Recommended Plan. The responses from these agencies indicate that the Recommended Plan does not have a negative impact on surface and groundwater, threatened or endangered species, air quality, floodplains and wetlands, historical or archaeological sites, important prime farmland, or any other applicable environmentally sensitive areas. The implementation of the projects in the Recommended Plan will have a positive impact on water quality in Town Creek and the Salt River.

Institutional Structure

There are no changes required to the existing institutional structure of the City of Harrodsburg as a result of the Recommended Plan. The City and MCSD have an agreement that defines the respective areas of Mercer County for which each is to provide wastewater service. Other than a revised user charge system for paying debt service and the annual operating and maintenance costs for the Recommended Plan, no new ordinances or regulations are needed to implement the Recommended Plan.

Funding Plan

A preliminary funding plan has been prepared for the Recommended Plan. This includes an assessment of potential funding sources and preliminary estimates of potential user rates. This funding plan is based on the estimated project costs and annual operating and maintenance costs of the projects in this Plan. These costs are then evaluated against a combination of funding options (i.e., grants and loans) to provide estimated annual debt service and annual O & M costs that must be paid by the wastewater system customers as monthly sewer service rates. It should be noted that the calculations presented in the funding plan are preliminary and will require revision once the actual construction costs are known (from contractor's bids for the projects in this Plan) and the amounts and availability of grants and loans have been confirmed. Therefore, this information is presented to provide a preliminary order of magnitude for sewer service rates, and the City will need to conduct a separate User Charge Study to determine the actual rates needed to pay for the Recommended Plan.

The City's expenses for the wastewater system in Fiscal Year 2012 (FY12) were $1,363,534. This included historic debt service for loans and bonds to pay for previous projects, the O&M costs for the treatment and collection facilities, and other recurring costs such as administrative, general

and customer accounts expenses, insurance and other related costs. In FY12 the City received $1,434,103 in revenue from customers of the wastewater system. Most of the revenue ($1,304,725) was received as sewer service charges and the balance was from sewer taps, sewer surcharges, penalties and other charges.

The Phase 1 projects will increase the City's annual expenses for the wastewater system to an estimated $1,596,364. This includes the historic debt service for previous projects and the new debt service to re-pay loans for the construction of the Phase 1 projects, as well as the increased O&M and recurring annual costs for the wastewater system. Under a new monthly sewer service rate schedule that the City adopted in October 2011, the City is expected to receive an estimated $2,487,000 in annual revenue by the time the Phase 1 projects are completed.

The City is expected to receive an estimated annual revenue of $2,563,000 by the time the Phase 2 projects are completed in 2017 under the October 2011 rate schedule. Two funding scenarios were evaluated for the Phase 2 projects: Scenario 1 in which all funding is by loans only and Scenario 2 in which a combination of grants and loans is used to pay for the projects. Under Scenario 1, the City's annual expenses for the wastewater system is expected to increase to $3,122,309, which indicates that an 21.8% rate increase is needed in 2017 to make up the deficit. Under Scenario 2, the City's annual expenses for the wastewater system will increase to an estimated $2,854,516, indicating that a 11.4% rate increase in 2017 will be needed.

Phase 3 projects have an estimated cost of $4,253,516. It is projected that Phase 3 projects would be implemented during the 2024 to 2032 planning period time frame. It is anticipated that new debt service associated with the Phase 3 projects would have a minor effect of the proposed rates previously suggested for Phase 2. Due to the somewhat uncertain scope and schedule of Phase 3 projects, a detailed analysis of those future projects and their associated revenue, expenses and projected funding is not included in this study.

To more accurately calculate the actual sewer service rates needed to pay for Phases 2 and 3 of the Recommended Plan, the City will conduct a User Charge Study. This study will be based on actual construction bids and more accurately developed project cost estimates for the projects in this Plan, and will take into account the grants and loans (and applicable interest rates) that are available at the time these Phases are initiated.

Schedule for Implementation

The schedule for implementation of the Recommended Plan is a function of a number of factors, such as the timing of approval of this Regional Facilities Plan by the KDOW, the dates when funds are secured for the projects within this plan, and the respective dates for completion of design and construction for the projects.

At the time that this Regional Facilities Plan was prepared, these dates were not known. However, for the purpose of this Plan, the preliminary schedule in the following table has been developed. It should be noted that the design and construction of some of the Phase 1 projects are already in progress, therefore this schedule focuses on tasks that remain to be completed upon approval of this Plan. This schedule is subject to revision over time as the estimated dates of the aforementioned factors are updated.

Preliminary Implementation Schedule for
Harrodsburg Regional Wastewater Facilities Plan

Estimated Date	Event
September 2013	Public Hearing for Plan, Approval of Plan by City of Harrodsburg
October 2013	Submit Plan to KDOW for Review and Comment
October 2013	Begin Construction of Phase 1 Wastewater Treatment Plant Project
January 2014	Approval of Plan by KDOW
July 2014	Initiate Design of Phase 2 Projects
October 2014	Complete Construction of all Phase 1 Projects
July 2015	Complete Design of Phase 2 Projects
September 2015	Advertisement for Bids for Phase 2 Projects
October 2015	Receipt of Bids, Securing of Funds for Phase 2 Projects
December 2015	Award of Construction for Phase 2 Projects
August 2016	Complete Construction of Phase 2 Collection System Projects
September 2017	Complete Construction of Phase 2 Wastewater Plant Projects
2023	Design & Bidding for Phase 3 Projects
2024	Construction of Phase 3 Projects

Chapter 2

Chapter 2: STATEMENT OF PURPOSE AND NEED

Introduction

At regular intervals, it is necessary to update a wastewater facilities plan to account for changes that have occurred within the plan's Planning Area. It is the purpose of this Regional Facilities Plan to develop a recommended course of action for wastewater service for Harrodsburg and its wastewater system customers for the period of 2012 to 2032. This Plan replaces the previously prepared 1977 Wastewater Facilities Plan and 2000 Plan Update.

Purpose and Need

This Plan is needed for the following reasons:

- It has been more than ten years since the previous plan was prepared and significant changes have taken place with respect to the entities that are responsible for wastewater service in southeastern Mercer County.
- The Harrodsburg Wastewater Planning Area boundary was altered when the MCSD Regional Wastewater Facilities Plan (RWFP) was approved in 2007. MCSD has taken responsibility for wastewater service to customers in all of Mercer County, except for Harrodsburg.
- The MCSD RWFP called for MCSD to convey wastewater from its customers in Mercer County to the Harrodsburg wastewater facilities so that these flows can be treated at the Harrodsburg regional wastewater treatment plant. The Harrodsburg wastewater collection system was not designed to handle such additional flows without associated impacts – especially during wet weather periods. Coordination with MCSD is needed to ensure that MCSD's wastewater can be routed either directly to the Harrodsburg treatment plant or to portions of the Harrodsburg collection system that can effectively convey the combined City/MCSD flow without resulting in overflows or other problems in the City's collection system.
- In late 2012, MCSD began discussions with the City of Danville to evaluate the feasibility of routing wastewater from Burgin and other small communities along Herrington Lake to Danville, rather than to Harrodsburg as initially planned in the MCSD RWFP and approved by KDOW in 2007. If this change is approved by all concerned parties, including KDOW, the result would reduce the future wastewater flow to be handled by the Harrodsburg wastewater collection and treatment facilities. In early 2013, these

discussions between MCSD and the City of Danville continued to move forward and it is expected that this change will be approved by all concerned parties during 2013. On that basis, this Wastewater Facilities Plan needs to take this change into account.

- Wastewater contributed by residential, industrial and commercial customers within the Planning Area, and from MCSD customers, is projected to increase during the next 20 years. Flows to the Harrodsburg treatment plant are expected to surpass the plant's current capacity within the next five years. An evaluation of options to increase the plant's capacity is needed to ensure that the plant can effectively serve the region for at least the next 20 years.
- The existing Harrodsburg wastewater treatment plant, built in 1981 as a regional wastewater treatment facility, includes several treatment components that have reached the end of their useful life and/or can no longer be efficiently operated or effectively maintained so that the treated wastewater will consistently comply with the plant's KPDES discharge permit in the future. One such problem is the use of Rotating Biological Contactors (RBCs) for secondary treatment, a technology that is no longer supported by equipment manufacturers and has fallen out of favor for expansions of treatment facilities throughout the country. If the existing plant continues to operate without significant alteration, water quality and public health may be impaired. Alternative treatment measures need to be evaluated in this Plan to ensure that the plant meets its current and future permitted pollutant discharge limitations.
- One of Harrodsburg's major industrial water users and wastewater dischargers, Wausau Paper, completed a significant expansion of its production facilities in 2012, requiring the construction of its own dedicated process wastewater pre-treatment facility, pumping station and force main to convey wastewater to the City's treatment plant, where a flow equalization/cooling lagoon was provided. The average daily discharge from Wausau of 600,000 to 700,000 gallons per day began in December 2012, which has increased the treatment plant's daily average throughput to approximately 2.2 ± MGD. Wausau will be completing a feasibility study in 2013-14 that will evaluate further expansion options. A plan is needed to ensure that the City's treatment facility can accommodate these potential additional hydraulic loads.

This Plan includes assessments of on-going problems, projections of future wastewater collection and treatment needs, evaluations of alternatives to resolve these issues, and estimates of costs for construction projects. A recommended alternative is provided to serve as the planned approach for the next 20 years of wastewater service for Harrodsburg and its wastewater system customers. The input from several state and federal agencies has been taken into account related to the Plan's impact on social, historical, archaeological and

environmental resources. Public participation in the development of this Plan was included to ensure that those being served by the recommended alternative understand the financial consequences and environmental impacts of the improvements. A funding plan and implementation schedule is included in this Plan to provide estimates for increases in customer sewer use charges for each phase of construction of the recommended plan.

Chapter 3

Chapter 3: PHYSICAL CHARACTERISTICS OF THE PLANNING AREA

This chapter delineates the Planning Area boundaries and describes key topographic, geographic, and natural and man-made features of the area.

Planning Area and Service Area Boundaries

The original Wastewater Facilities Plan for the Harrodsburg Planning Area was completed in 1977 by Howard K. Bell, (Consulting Engineers, of Lexington, KY). The Planning Area in that Plan included 46.3 square miles of urban and rural area in southeastern Mercer County, encompassing Harrodsburg and Burgin and surrounding land. The Planning Area was designated by the Kentucky Department for Natural Resources and Environmental Protection (now the Kentucky Division of Water or KDOW) and the US Environmental Protection Agency. The recommended plan from that Plan was the construction of a 3.0 MGD wastewater treatment plant in Harrodsburg with a 0.95 MG flow equalization basin to serve a projected year 2000 population of 13,741. An old plant was to be abandoned upon completion of the new plant. In addition, projects were planned for the construction of sewers in unsewered areas, the rehabilitation of existing sewers to reduce infiltration and inflow, and the construction of a new trunk sewer from the City's old plant (to be abandoned) to the new treatment facility. A sewer system and separate 0.15 MGD treatment facility were planned at that time for the City of Burgin, located in the eastern part of the Planning Area.

The construction of the planned projects moved forward in phases, based on the availability of funds. The new Harrodsburg wastewater treatment plant was completed in 1981 and began serving the area as a regional treatment plant, with a permitted daily average flow capacity of 2.68 MGD and with 4.32 MG of storage capacity in flow equalization basins. The old plant was abandoned soon thereafter, and improvements were made to the wastewater collection system. The Burgin collection system and plant was not built due to lack of sufficient funds.

A Wastewater Facilities Plan Update was prepared in 2000 for the City of Harrodsburg by GRW Engineers, Inc., of Lexington, KY. A 62.0 square mile Planning Area was jointly decided upon by the City's planning committee, representatives of the City's consulting engineering firm (GRW Engineers, Inc.) and staff from the Planning Section of the Kentucky Division of Water. This Planning Area encompassed the City of Harrodsburg and the area surrounding the City to the north, west, south and east, including the City of Burgin and the area to the east of Burgin to Herrington Lake.

The intent of the 2000 Plan Update was to replace the 1977 Facilities Plan (by then, more than 20 years old) with a revised plan to address the future wastewater collection and treatment needs of the Planning Area as well as to address problems with overflows and bypasses of wastewater in the collection system and operating problems at the treatment plant, as presented in an Agreed Order issued on September 23, 1998 by the State of Kentucky. The 2000 Plan Update presented recommendations for resolving the items in the Agreed Order. The requirements of the Agreed Order were met by the City and approved by the KDOW on November 27, 2002.

In 2005, the Mercer County Sanitation District (MCSD) was formed to serve residents of Mercer County outside of Harrodsburg. In November 2006, a Regional Wastewater Facilities Plan (RWFP) was prepared for MCSD by Strand Associates, Inc., recommending collection and treatment facilities for the MCSD customers for the Planning Period of 2006-2026. That plan identified the MCSD Planning Area as all of Mercer County except for an area surrounding Harrodsburg. The Harrodsburg Planning Area boundaries were reduced from those in the 2000 Harrodsburg Facilities Plan Update. The KDOW approved the MCSD RWFP in November 2007.

The MCSD RWFP Planning Area was sub-divided into six service areas: Brightleaf, Burgin, McAfee, Stringtown, Salvisa, and Herrington Lake. The RWFP recommended that each service area be provided with a wastewater collection system. Conventional gravity sewers were recommended for Brightleaf, Stringtown, and McAfee. Individual grinder pump stations at each residence and a low pressure force main system were recommended for Burgin, Salvisa and Herrington Lake. Each service area's sewer system was to be constructed in phases, with projects beginning in 2006 and continuing for the following 20 years. All existing package treatment plants were to be phased out of service, with the wastewater from these facilities collected as part of the total flow in that service area. No new treatment facilities were recommended for these service areas, instead all wastewater from these six service areas was to be pumped directly to the Harrodsburg treatment plant, with the exception of a trunk sewer from the Stringtown area that was to convey wastewater by gravity first into the Harrodsburg wastewater collection system and then via Harrodsburg's collection system to the plant.

In the first two years of the MCSD RWFP (2006-2008), the Brightleaf area, the Burgin area and a portion of the McAfee area were to be served by new collection systems and new pump stations discharging to the Harrodsburg plant. Between 5-10 years (2011 to 2016), other sewers and pump stations were to be built to convey wastewater from the remaining part of the McAfee area and from the Salvisa area to the Harrodsburg plant, and wastewater from the Stringtown area was to be connected into the Harrodsburg collection system. The third phase

of the RWFP, to be completed by 2026, included pump stations from the Herrington Lake area to convey wastewater to Burgin, where it would be combined with Burgin's wastewater and re-pumped to Harrodsburg. By the end of the MCSD planning period (2026) the RWFP indicated that approximately 9,650 people would be served by the Harrodsburg wastewater facilities, contributing an average daily flow of 0.93 MGD.

Within the City's Corporate Limits, Harrodsburg currently provides wastewater service to approximately 4,000 residential, commercial and industrial customers. The City also currently accepts wastewater from MCSD, which discharges wastewater to the City's collection system from a pump station operated by MCSD on the south side of the City. This pump station conveys wastewater from the Brightleaf service area, where a collection system and four package treatment plants had been previously operated by MCSD. These plants were taken out of operation once the pump station was put into service, consistent with Phase 1 of the MCSD RWFP. It is not known if any measures were taken to reduce wet weather flows in the collection system.

In late 2012 and early 2013, meetings were held between MCSD and the City of Danville with the intent of conveying a portion of the MCSD wastewater to Danville. Under this approach, MCSD will amend its RWFP to indicate that sewer service will be provided for its residential customers in Burgin and the communities along Herrington Lake, with conveyance of this wastewater to Danville instead of to Harrodsburg. Based on the population projections presented in the MCSD RWFP, this approach would reduce the MCSD residential customers served by Harrodsburg in 2026 to 5,094, with an associated average daily 2026 wastewater flow of 0.51 MGD.

Exhibit 3-1 indicates the current Harrodsburg Planning Area that was approved by the Harrodsburg City Council and the KDOW in conjunction with the approval of the MCSD RWFP. On that basis, this Harrodsburg Wastewater Regional Facilities Plan will be based on the Harrodsburg Planning Area that was agreed to when the MCSD RWFP was approved. The above-discussed reduction of MCSD residential customers to be served by Harrodsburg will also be used as the basis for this Plan.

Exhibit 3-2 indicates the existing Harrodsburg wastewater collection system, the locations of the City's treatment plant, the wastewater pump stations in the City, and the location of the pumping station that is currently operated by MCSD. A larger version of this exhibit is provided in Appendix 1.

Water Treatment Plant and Distribution System

The City of Harrodsburg owns and operates a water treatment plant and a water distribution system that serves customers within Harrodsburg and supplies water to the Mercer County Water District, the Lake Village Water Association, and the Burgin Water Department. Each of the latter three entities purchases water from Harrodsburg and distributes it to their own customers. The Harrodsburg Water Treatment Plant, which provides a treatment capacity of 6.0 MGD, receives its raw water supply from the Kentucky River and is located in northern Mercer County. The treated water is pumped to Harrodsburg where it is circulated via a distribution system consisting of water mains and water storage tanks. The locations of the major water system facilities are shown on Exhibit 3-3. There are no municipal groundwater supply or wellhead protection areas in the Harrodsburg Wastewater Planning Area.

Topographical and Geographical Features

Harrodsburg is located in south central Mercer County at the intersection of U.S. 127 and U.S. 68. Harrodsburg is the county seat and is the oldest permanent English settlement west of the Allegheny Mountains. It is a fourth class city and operates as a Mayor/City Commission form of local government. One of the commissioners serves as the water/sewer commissioner whose actions are subject to ratification by the full City Commission.

Exhibit 3-4 is a “seven and one-half minute” USGS topographic map of the area. The topography of the Planning Area is gently to moderately rolling upland with broad, flat valleys. Elevations range from 483 feet in the north end of Mercer County at the downstream end of the Kentucky River to almost 950 feet on hilltops to the southwest side of the county. The county is drained generally to the north by the Chaplin River, Salt River, Dix River and Kentucky River. There is some underground drainage where limestone predominates.

Karst topography is common in Mercer County due to underlying areas of limestone bedrock. This presents concerns for development due to sinkhole formation and flooding, overburden collapse and groundwater contamination.

The Planning Area is located in the Eden Shale Belt subdivision of the Bluegrass Physiological Region. This region is composed of banks of dissected hills, and shale belt is characterized by sharp, irregular ridges and narrow valleys.

The Planning Area is underlain by rocks of Middle Ordovician age which are some of the oldest exposed rocks in Kentucky. The three formations that predominate are the Cynthiana Formation, the Lexington Group, and the High Bridge Group. The Cynthiana Formation is exposed in the western half of Mercer County.

Additional discussion of topography, geology as well as soils, wetlands and floodplains is provided in Chapter 5 of this Plan.

Land Use

An understanding of current and projected land use is important in wastewater system planning in order to analyze the anticipated wastewater flows that are expected to be received by the collection system and treatment plant. The most significant land use category for wastewater system planning is residential land use because, in most communities, residential wastewater discharge to the collection system is the majority of flow in the community. Flow from industries, commercial establishments, schools and other customers that use significant amounts of water generally comprise the remaining flow handled by a wastewater system. Knowing where residential areas, industries and other significant water users are located – and will be built in the future based on land use designations – is vital to properly planning for the capacity of the wastewater collection and treatment facilities.

The majority of land use within the Harrodsburg Planning Area is residential and agricultural. Outside the Corporate Limits of Harrodsburg are pockets of housing density, primarily along major roadways such as U.S.127, U.S. 68, and State Highway 152. Land use designations are governed by zoning regulations provided by the Greater Harrodsburg/Mercer County Planning and Zoning Commission. Exhibit 3-5 is the latest land use map developed by the Commission.

A Comprehensive Plan for Harrodsburg and Mercer County was developed in 2003 by the Commission and adopted in 2004 by the City of Harrodsburg and the Mercer County Fiscal Court. Land use categories listed in the Comprehensive Plan included Residential (low density, medium density and high density), Commercial (Retail, Office Commercial, Service Commercial and Wholesale Commercial), Neighborhood Shopping Centers, Industrial, Public/Institutional/Recreational, and Agricultural/Open Space.

The most intensive land use development has occurred in and around the population centers where the greatest demand for non-agricultural uses typically occur and on properties suitable for development where infrastructure (roads and utilities) are available. This has led to the

conversion of formerly used agricultural land for the development of residential subdivisions and strip commercial development along roadways within or near the Harrodsburg Corporate Limits where water and sewer are also available.

Floodplains

Floodplains are of significance to wastewater systems since it is common for sewers to convey wastewater to larger collection sewers and interceptor sewers located along the banks of streams. These sewers often convey the wastewater to treatment facilities that are also located along stream banks. During periods of flooding of low-lying areas, such sewers and treatment facilities are subject to flooding, which impairs their performance if flood protection is not provided. In planning wastewater system improvements, it is necessary to identify floodplains in order to avoid the costly need to provide flood protection for the system and plant.

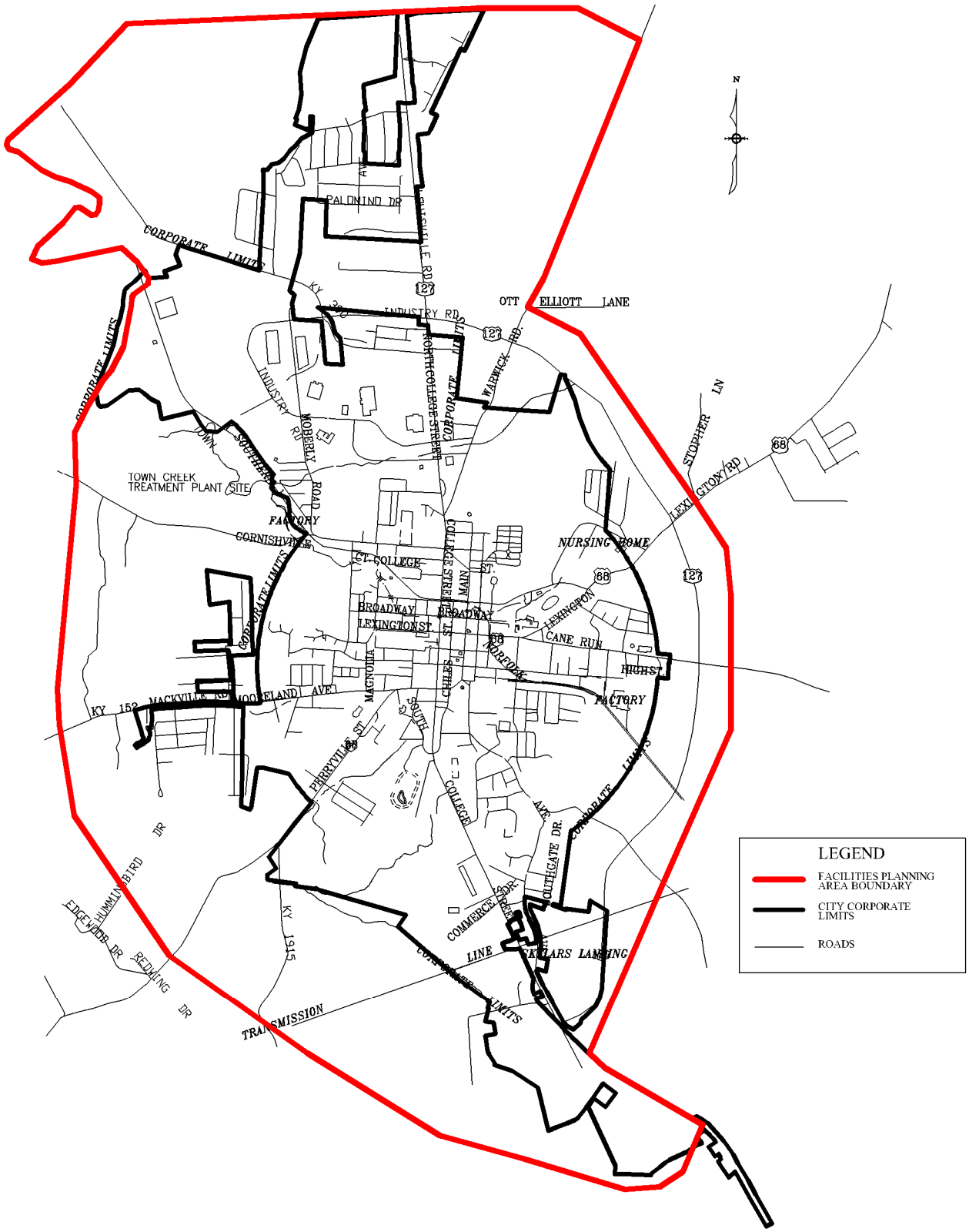
Flood hazard areas in the Planning Area are shown on Exhibit 3-6. This exhibit indicates that the area along Town Creek in the north end of the City of Harrodsburg has been identified by the Federal Emergency Management Agency (FEMA) as being within the 100-year floodplain. The FEMA flood mapping indicates that the Harrodsburg treatment plant is located within the 100-year floodplain. However, recent (2012) evaluations by the KDOW Floodplain Management Section have indicated that the area of the plant above elevation 827 (almost the entire plant site) is in fact located above the 100-year flood elevation.

Future Service Areas and Major Industries

The only future areas to be served by the Harrodsburg wastewater system (other than the service areas of MCSD that will discharge wastewater to Harrodsburg) will be the areas that lie between the Harrodsburg Corporate Limits and the Harrodsburg Planning Area boundary. Exhibit 3-5 indicates several low density and high density residential areas on the north, west and east sides of Harrodsburg, both within the Corporate Limits and just outside of the Corporate Limits, are expected to develop. The Harrodsburg-Mercer County Comprehensive Plan estimated that the City's population would grow from 8,014 in 2000 to 9,787 by 2030, an increase of 1,773 people or 12.2 percent.

In 2012 Wausau Paper, one of the City's major industrial employers and wastewater dischargers, completed a major plant expansion that resulted in the continuous (24 hours/day, 7 days/week) discharge of 600,000 to 700,000 gallons of process wastewater, beginning in December, 2012. This discharge is pumped by a dedicated pump station at the Wausau factory

directly to a flow equalization/cooling lagoon at the Harrodsburg treatment plant site, from which it is then discharged at a controlled rate to the plant for treatment in conjunction with other wastewater received at the plant via its main influent sewer. Preliminary discussions with Wausau Paper have indicated that a feasibility study will be completed by Wausau in 2013 to evaluate the possibility of future process expansions at their plant, which could produce a significant additional process wastewater discharge to the City's treatment plant. If this study indicates that another expansion of Wausau's operations is anticipated within the Planning Period, this Facilities Plan may need to be amended to address the additional storage and treatment capacity required at the City's treatment plant.



LEGEND

- FACILITIES PLANNING AREA BOUNDARY
- CITY CORPORATE LIMITS
- ROADS

0 2000' 4000' 8000'

1" = 4000'

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EXHIBIT 3-1
HARRODSBURG
WASTEWATER FACILITIES
PLANNING AREA

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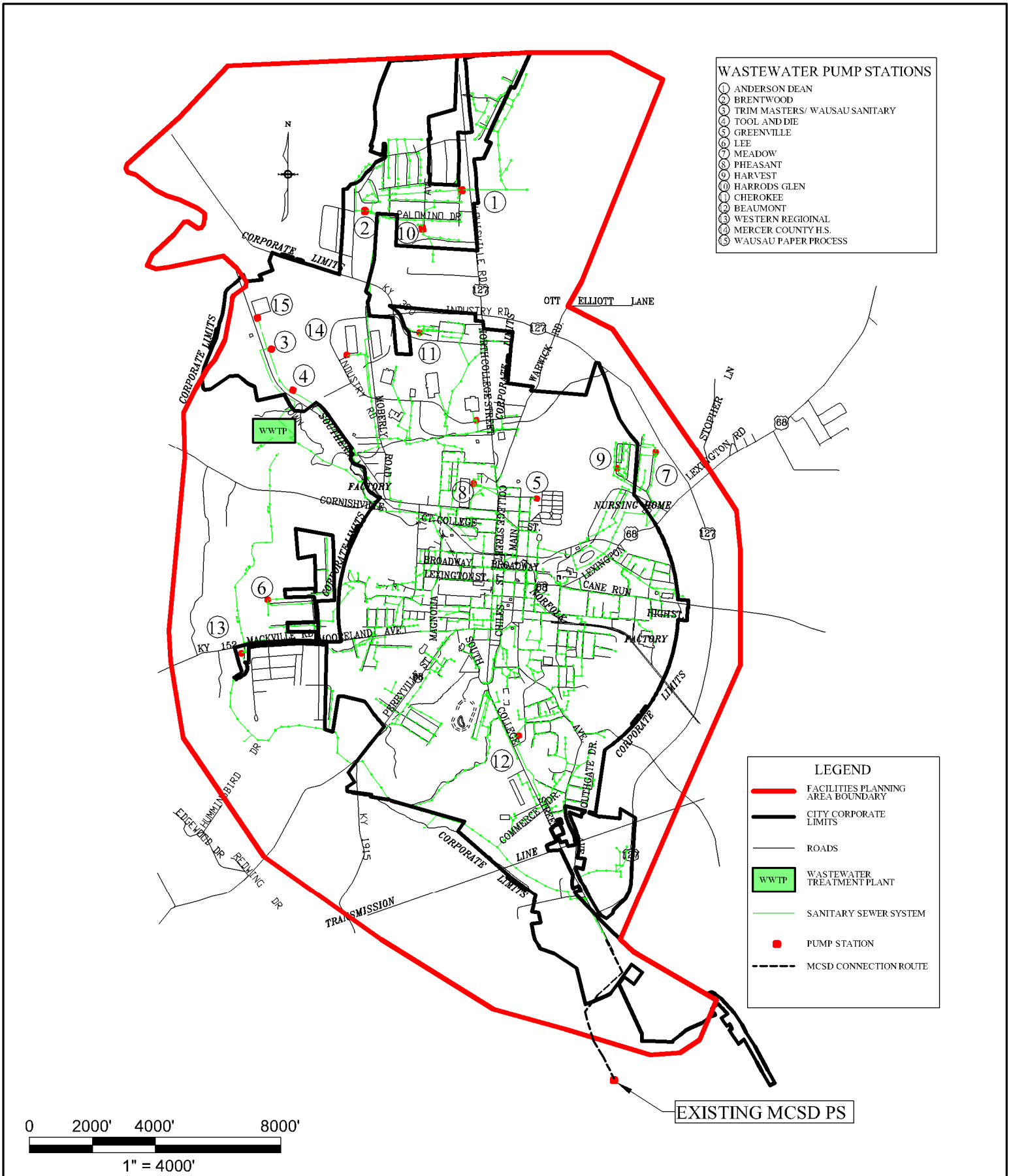

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EXHIBIT 3-2
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WASTEWATER COLLECTION
AND TREATMENT FACILITIES

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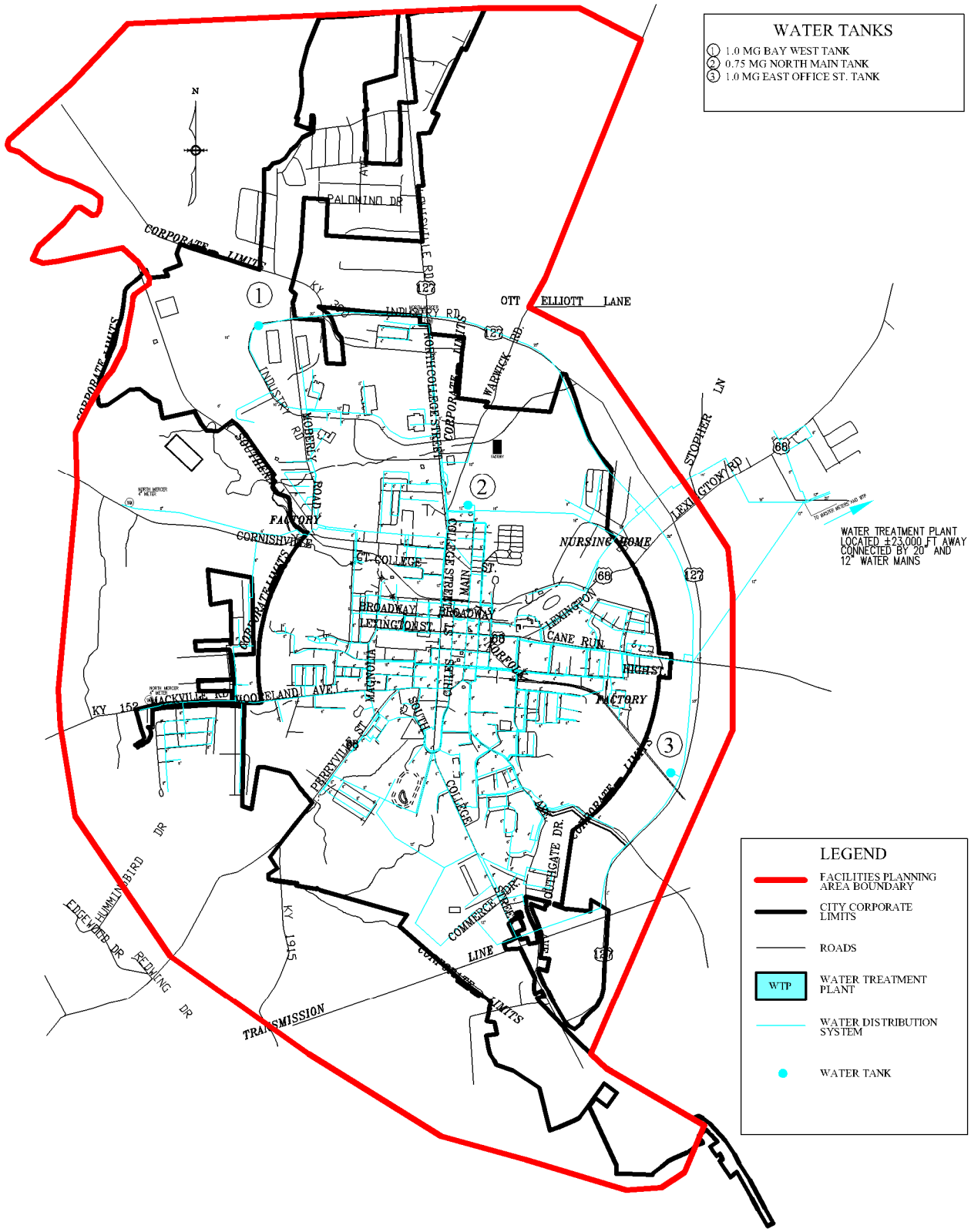

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EXHIBIT 3-3
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WATER DISTRIBUTION
SYSTEM

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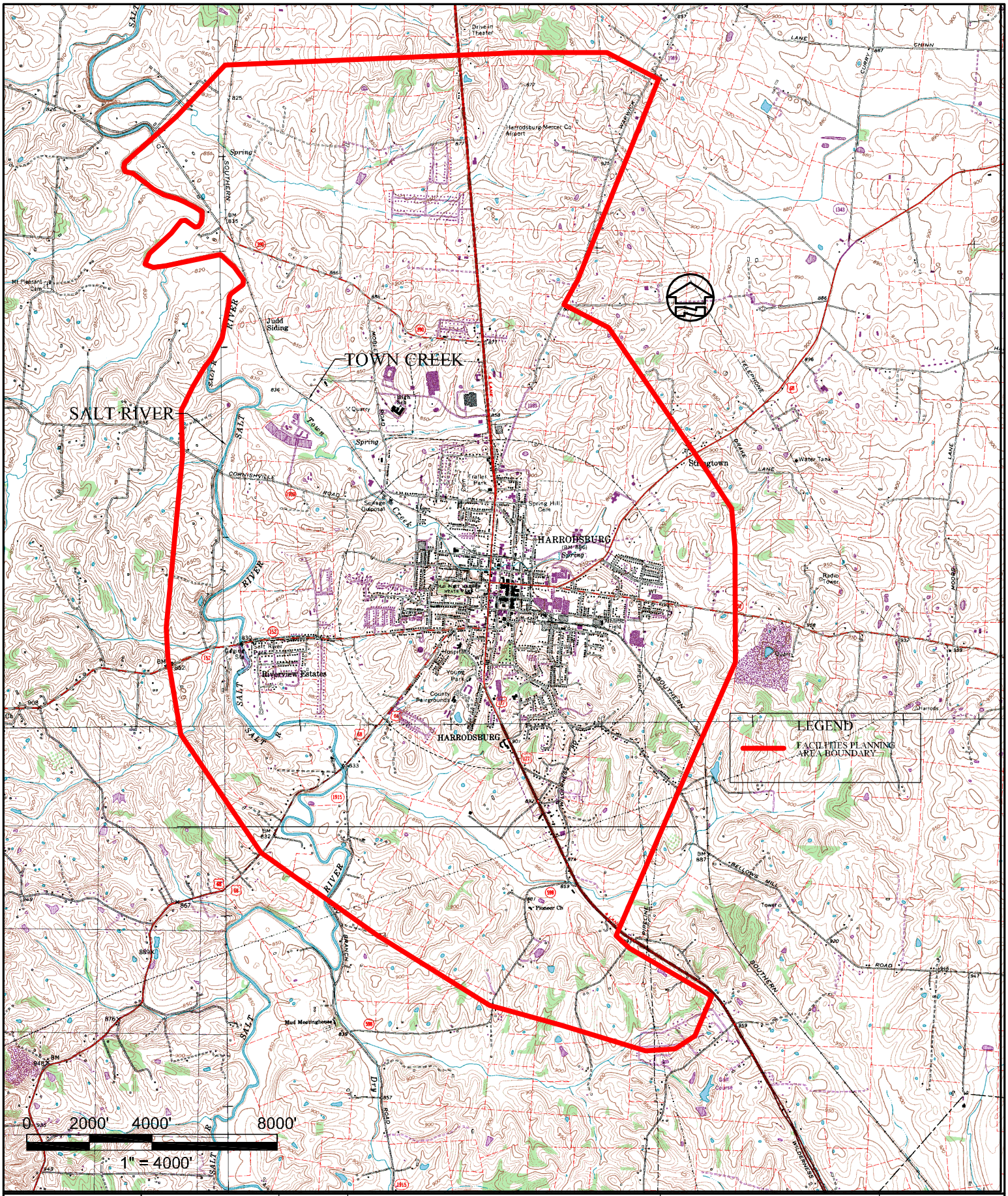

GRW PROJECT NO. 4100	CLIENT PROJECT NO.	DESIGNED:	EXHIBIT 3-4 HARRODSBURG WASTEWATER PLANNING AREA TOPOGRAPHIC FEATURES	ENGINEERS - ARCHITECTS - PLANNERS www.grwinc.com	DATE: FEBRUARY, 2013
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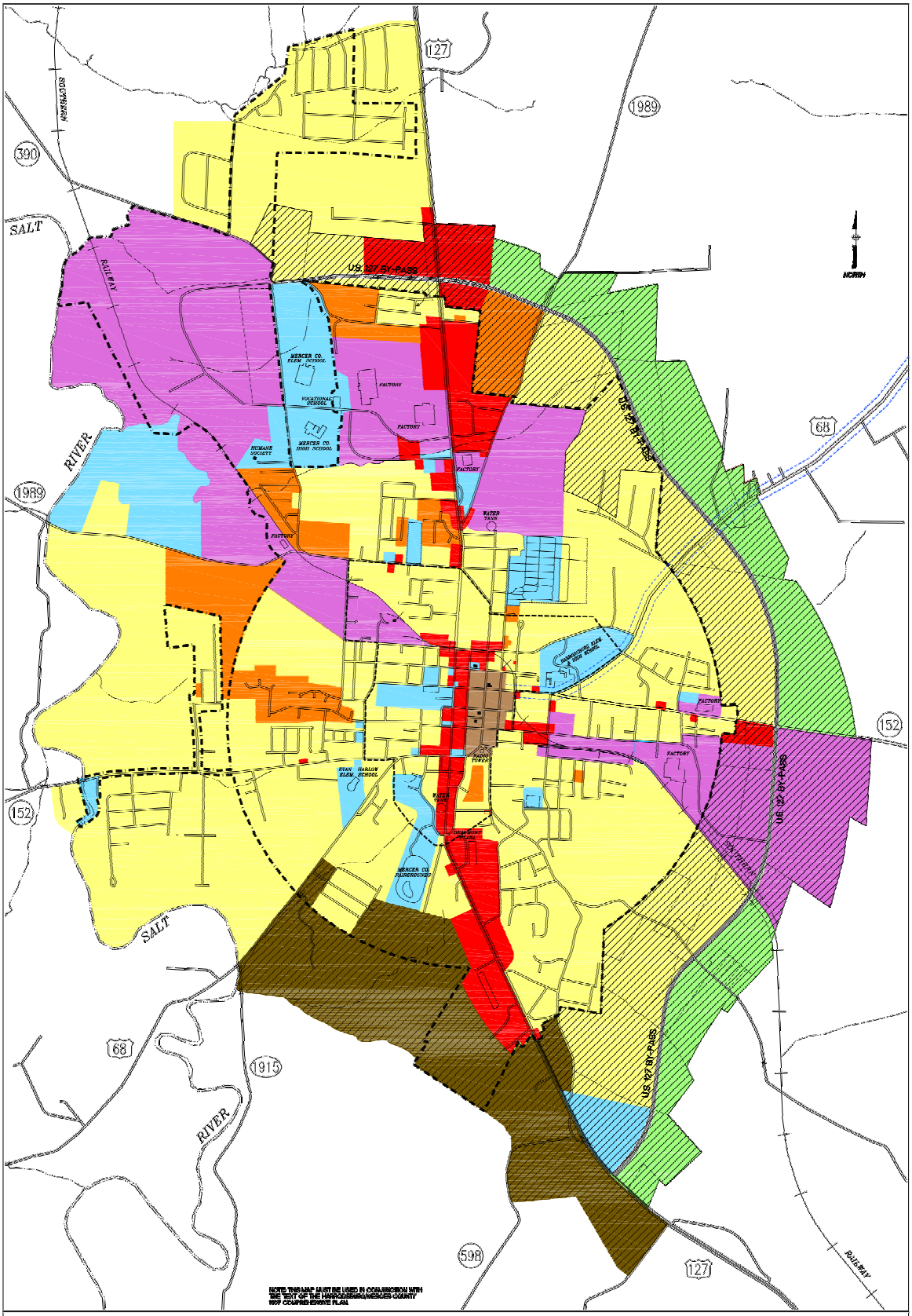

GRW PROJECT NO. 4100	CLIENT PROJECT NO.	DESIGNED:	EXHIBIT 3-5 HARRODSBURG WASTEWATER PLANNING AREA LAND USE	GRW ENGINEERS - ARCHITECTS - PLANNERS www.grwinc.com	DATE: FEBRUARY, 2013
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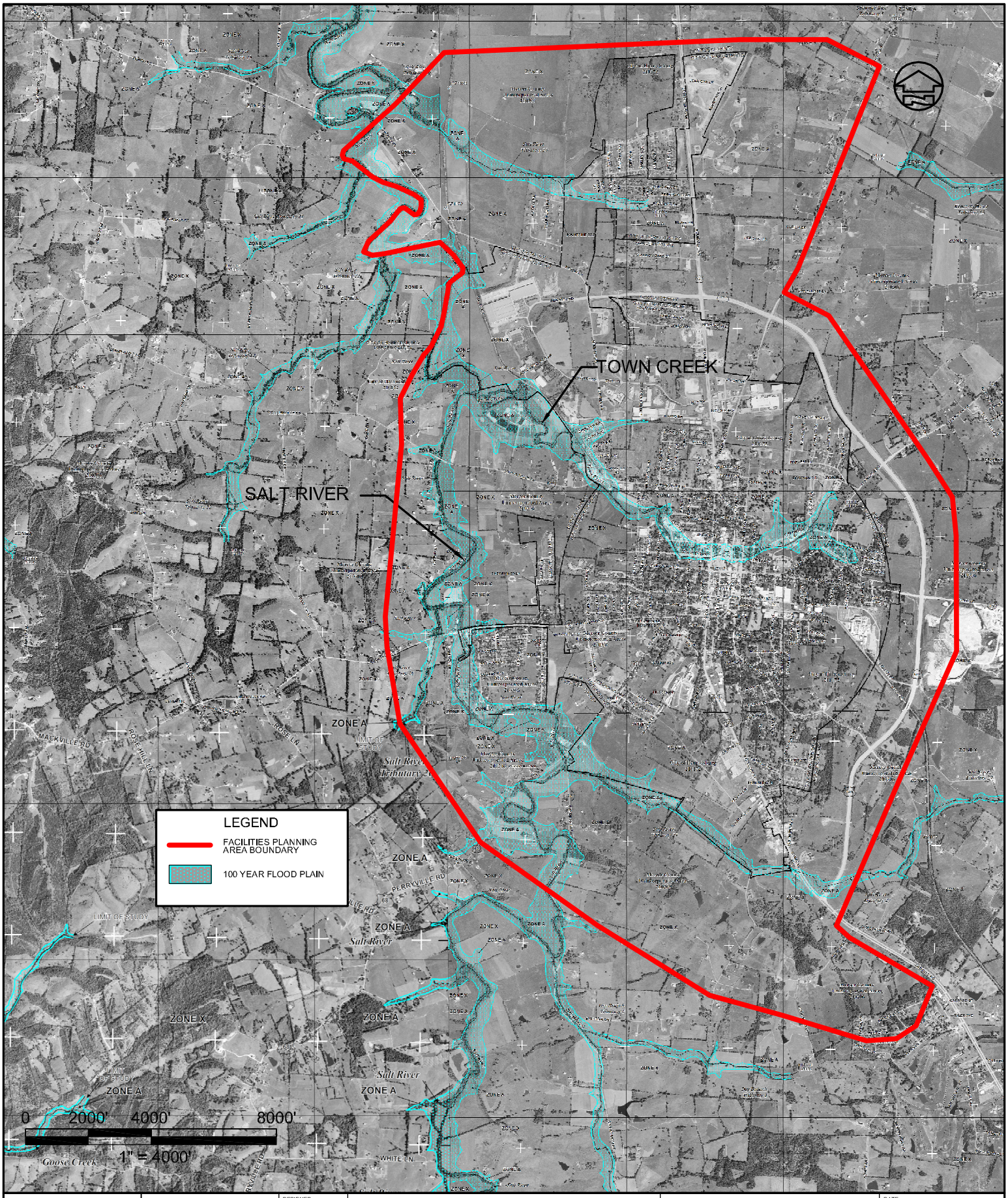

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EXHIBIT 3-6
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WASTEWATER PLANNING AREA
FLOOD HAZARD AREAS

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Chapter 4

Chapter 4: SOCIOECONOMIC CHARACTERISTICS OF THE PLANNING AREA

Introduction

This chapter reviews the current population trends in the Harrodsburg Wastewater Planning Area and summarizes future population projections for the Planning Period of 2012 to 2032. The current socioeconomic conditions, labor force, income and poverty conditions are also presented.

Population Trends

Population trends have been developed based on census data for Mercer County and Harrodsburg, as well as forecasts from the Kentucky State Data Center (KSDC). Table 4-1 includes historic population data and projected population forecasts for Mercer County, Harrodsburg and the Planning Area.

The Mercer County population forecasts for 2020 through 2040 were taken from 2012 data published by the KSDC, using historic census data through 2010. The KSDC does not provide population forecasts for cities. However, since 1960, the City's population has consistently averaged 38% to 42% of the county's population. In 2010, the City's population of 8,340 was 39.1% of the county's population. On that basis, the population projections for the City of Harrodsburg are based the 40% of the KSDC projections for the county. In Table 4-1, these projections are shown in the column for the population served within the current Corporate Limits of the City of Harrodsburg.

It is significant to note that the Harrodsburg wastewater system will serve two other population groups in addition to the residents within the Corporate Limits of Harrodsburg. The first additional population group is associated with future residential developments between the current Harrodsburg Corporate Limits and the boundary of the Harrodsburg Wastewater Planning Area. Based on the Future Land Use map for the City, the areas that are most likely for residential development are the area to the north of the City and west of U.S. 127, the area to the southwest of the City between KY 152 and U.S Highway 68, the area to the west of the City to the north of KY 152 and the areas to the northeast and southeast inside of the U.S 127 By-Pass. These areas are currently developing as residential areas and it is anticipated that this trend will continue. This additional population is shown in Table 4-1 in the column for the population served outside of the Corporate Limits.

The second additional population group includes customers of the Mercer County Sanitation District, which is currently planning to convey a portion of its wastewater from residential areas served by MCSD to the Harrodsburg wastewater system. Wastewater from other MCSD residential customers, primarily those in Burgin and the communities along Herrington Lake in southeastern Mercer County, will be collected in sewers constructed by MCSD and conveyed to Danville for treatment. Population projections provided in the MCSD RWFP are rounded down slightly to match the census years for which future projections have been made by the Kentucky State Data Center (2020, 2030, 2040), and are included in Table 4-1 in the column for MCSD customers.

Table 4-1
Residential Populations Trends, 1970 to 2040, Served by Harrodsburg Wastewater Facilities

Year	*Mercer County Population*	*Population Served in Existing Harrodsburg Corporate Limits*	*Population Served outside of Corporate Limits but within the Harrodsburg Planning Area*	*Population of MCSD Customers Served outside of the Harrodsburg Planning Area*	*Total Population Served by Harrodsburg Wastewater Facilities*
1970	15,960	6,741	-	--	6,741
1980	19,011	7,265	-	-	7,265
1990	19,148	7,335	-	-	7,335
2000	20,817	8,014	-	-	8,014
2010	21,331	8,340	150	1,660	10,150
2020	21,810	8,724	500	4,350	13,574
2030	21,741	8,696	900	6,000	15,596
2040	21,047	8,419	1,200	6,500	16,119

Sources: Harrodsburg Wastewater Facility Plan Update (2000), Harrodsburg/Mercer County Comprehensive Plan (2003), Mercer County Sanitation District Regional Wastewater Facility Plan (2006), Kentucky Cabinet for Economic Development (2012) and Kentucky State Data Center (2012)

Another population group includes employees of industrial and commercial establishments who work in the Planning Area during the daytime and return to their homes outside of the planning area at night. This group in not included in Table 4-1 because the sanitary wastewater generated from by this group is included in the wastewater discharged from the establishment where they are employed and is included as commercial/industrial wastewater.

For the purposes of this Plan, the population projections provided in Table 4-1 have been estimated in Table 4-2 at 5-year increments from 2012 to 2032 to coincide with the 20-year Planning Period of this Facilities Plan.

Table 4-2
Residential Population to be Served by the Harrodsburg Wastewater Facilities, 2012 to 2032

Year	*Population Served in Existing Harrodsburg Corporate Limits*	*Population Served outside of Corporate Limits but within Harrodsburg Planning Area*	*Population of MCSD Customers Served*	*Total Population Served*
2012	8,350	200	1,750	10,300
2017	8,750	350	3,750	12,850
2022	8,725	550	4,400	13,675
2027	8,700	725	5,100	14,525
2032	8,650	950	6,150	15,750

Socioeconomic Conditions

Labor Force/Employment

Employment data for the City of Harrodsburg is not available from state and federal agencies. However the U. S. Department of Labor provides employment statistics for Mercer County, which should be reflective of the employment in Harrodsburg.

In July 2012, the county's civilian labor force was estimated as 9,930 persons. Of this total, 9,036 were employed and 894 were unemployed, for an unemployment rate of 9.0 percent. Since Harrodsburg is the largest city in the county, with the majority of the county's non-agricultural employers, these statistics for the City of Harrodsburg are virtually the same as for Mercer County.

Table 4-3 reflects the number of employees in Mercer County in 2010 for seven employment classifications provided by the U.S Department of Labor, Bureau of Labor Statistics, as well as the percentage of total employment for each sector. Agricultural employment in Mercer County represents a small percentage of the total labor force.

Table 4-3
Employment in Mercer County, 2010

Industry	*Employment by Economic Sector*	*Percent of Total Employment*	*Average Weekly Wages*
Construction	387	6.4	$838
Manufacturing	1,732	28.7	$955
Trade, Transportation, Utilities	914	15.2	$688
Information	33	0.5	$803
Financial Activities	138	2.3	$994
Services	955	15.8	$660
Public Administration	211	3.5	$804

Source: US Department of Labor, Bureau of Labor Statistics (2010)

Income and Poverty Status

According to data published in 2012 by the Harrodsburg-Mercer County Industrial Development Authority, Mercer County employees had a per capita income of $23,051. 3,244 people were living below the poverty rate, or 15.3 percent of the 2010 population of 21,331. Harrodsburg had a poverty rate of 17.1 percent in 2010, which equates to 1,426 persons. This rate is less than the rate of 18.9 percent for the State of Kentucky.

Major Employers in Planning Area

Table 4-4 lists the major employers in the Planning Area.

Table 4-4
Major Employers in the Planning Area, 2012

Firm	*Products/Services*	*Number of Employees*	*Year Established*
Ayrshire Electronics	Electronic manufacturing services including printed circuit board assemblies, final unit assembly and test	83	2000
Corning Incorporated	AMLCD glass substrate – cover glass used in portable/handheld electronic devices	420	1952
Harrodsburg Herald	Newspaper printing and publishing, commercial printing, binding, direct mail service	17	1884
Heritage Tobacco Group, LLC	Pipe tobacco	20	2009
Hitachi Automotive Systems America, Inc.	Automobile electric and electronic components, lithium-ion battery pack production, warehouse and distribution center	764	1986

Mercer Stone Company	Crushed stone and agricultural limestone	15	1966
Self Refind	Headquarters for drug treatment clinics	50	2008
Toyota Boshoku America	Automotive plastics components and interior sub-assemblies	99	1988
Wausau Paper	Paper towels, toilet paper, facial tissue and sanitary paper products	500	1990
Mercer County Board of Education	K-12 Education in 8 school buildings	500 staff, 3,000 Students	

Source: Kentucky Cabinet for Economic Development (2012), Mercer County Board of Education (2012)

Economic and Social Benefit to the Community

The availability of a well operated and maintained wastewater system, with available capacity that allows for the community's projected growth during the next 20 years, provides the backbone for economic growth and development. When combined with the community's Comprehensive Plan, as well as the implementation of other infrastructure and social projects, this Regional Wastewater Facilities Plan establishes a roadmap to attract new businesses to the Planning Area, which in turn equates to improved socioeconomic conditions and to an environment that supports expanded residential growth.

Chapter 5

Chapter 5: EXISTING ENVIRONMENT IN THE PLANNING AREA

Introduction

This chapter provides information on the existing physical, biological, cultural and other resource features within the planning area, and also reviews data on land features, floodplains, general climate and precipitation conditions, wetlands, air quality, and archaeological resources.

Physical Land Features

Topography and Physiography

The Planning Area is located in the central part of Kentucky near the geographic center of the state. The area lies within the Inner Bluegrass physiographic region. The topography of this region is gently rolling. Ridge tops in the area are undulating with steep hillsides. Vertical limestone bluffs are common along the rivers. In some areas the surface is pockmarked by sinkholes and depressions common to karst topography. The area is drained by the Salt River and its tributaries.

Geology and Soils

The Planning Area is underlain by limestone and shale of the Ordovician age, specifically of the Tanglewood Limestone Member of the Lexington Limestone Formation. Typically, the Tanglewood Member does not contain chert. The Lexington Limestone Formation usually underlies typical Inner Bluegrass karst topography.

There are two major soil associations which occur in the area: the Lowell-Mercer-Faywood Series and the Maury-McAfee Series. The Lowell-Mercer-Faywood Series consists of soils that are deep, well drained and moderately well drained, clayey soils on rolling uplands. Usage is limited to farming activity because of permeability depth to rock in Faywood, and high seasonable water levels in Mercer soils. The Maury-MaAfee association soils consist of soils that are deep to moderately deep, well drained, clayey soils on rolling uplands. This association has broad gently sloping ridges dissected by drains and sinkholes, and the soils are primarily used for row crops.

Lowell soils have moderately slow permeability, and occur on ridge tops and side slopes. They have a brown silt loam surface, with a yellowish-brown, plastic, clayey subsoil, Mercer soils are moderately well drained with slow permeability, and are mostly on nearly level and gently sloping ridge tops. They have brown silt loam surfaces and yellow-brown, silty clay loam upper subsoil. Faywood soils are moderately deep and have moderately slow permeability. They occur mostly on side slopes, and have a dark grayish-brown, silty clay loam surface, with a yellowish-brown, plastic clayey subsoil. Maury soils have a moderate permeability and occur on ridge tops and side slopes. They have a dark brown silt loam surface, and the upper subsoil is reddish brown silty clay loam that becomes clayey at two to three feet. McAfee soils, which have moderately slow permeability, occur mostly on side slopes. They have a dark brown silt loam surface and reddish brown clayey subsoil, and the underlying limestone rock is exposed in some places.

Floodplains and Wetlands

Floodplains are of significance to wastewater systems since it is common for sewers to convey wastewater to larger collection sewers and interceptor sewers located along the natural drainage paths including the banks of streams. These sewers often convey the wastewater to treatment facilities that are also located along stream banks. During periods of flooding of low-lying areas, such sewers and treatment facilities are subject to flooding, which impairs their performance if flood protection is not provided. In planning wastewater system improvements, it is necessary to identify floodplains in order to avoid the costly need to provide flood protection for the system and plant. For parts of the system that are already in the floodplain, measures need to be incorporated in the facility plan to protect them from flood-impaired operation.

Flood hazard areas in the Planning Area are shown on Exhibit 3-5. This exhibit indicates that the area along Town Creek in the north end of the City of Harrodsburg has been identified by the Federal Emergency Management Agency (FEMA) as being within the 100-year floodplain. The FEMA flood mapping indicates that the Harrodsburg treatment plant is located within the 100-year floodplain. However, recent (2012) evaluations by the KDOW Floodplain Management Section have indicated that the area of the plant above elevation 827 (almost the entire plant site) is in fact located above the 100-year flood elevation.

The National Wetlands Inventory Maps were reviewed for the presence of wetlands in the planning area. Many small lakes, ponds and other impoundments area were denoted on the map for the Planning Area, which are primarily associated with agricultural and recreational uses of the surrounding land. Freshwater wetland ponds were shown to be on the wastewater treatment plant side, however these are actually known to be wastewater (not freshwater) basins used for flow equalization and tertiary treatment.

In general, when proper construction and remediation techniques are used, the construction of sewers, pump stations and force mains creates very little permanent damage to wetlands. For projects recommended in this plan, wetlands will be identified during the initial design phase and the construction will involve avoidance of wetlands unless otherwise cost-prohibitive. Therefore, wetlands should not be a deterrent to the implementation of this plan.

Water Sources and Supply

The City of Harrodsburg owns and operates a water treatment plant and a water distribution system that serves customers within Harrodsburg as well as the Mercer County Water District, the Lake Village Water Association, and the Burgin Water Department. Each of the latter three entities purchase water from Harrodsburg and distribute it to their own customers. The Harrodsburg Water Treatment Plant, which was recently expanded to provide a capacity of 6.0 MGD, is located on and receives its raw water supply from the Kentucky River. The plant provides treated water via a looped distribution system consisting of water mains and water storage tanks.

Surface and Groundwater Hydrology

The Planning Area can be readily divided into three development classifications: stream valley bottom lands, steeply sloped hillsides, and rolling plains. For the most part, there are no topographical restraints in the area, and two drainage systems exist: the Salt River drainage basin and sinkhole drainage basins.

The Salt River runs in a south to north direction just to the west of the City of Harrodsburg, and is joined by many small tributaries along its route. Sinkholes are a characteristic of the karst topography of the region. The area to the east of the city is drained via several independent sinkholes which have many subsurface solution

channels or underground streams. In times of high precipitation, backup of storm drainage occurs, causing water to stand in low areas of urban and certain rural sections. The areas that can be expected to flood are those immediately bordering the Salt River. The flooding is not major in terms of property damage due to the topographical makeup of the area, soil permeability, and the dominance of subsurface drainage systems.

The amount of ground water supply in the Planning Area varies substantially with the type of rock formation, or aquifer, from which the ground water is obtained. The most favorable locations for obtaining large quantities of ground water generally exist where there are thick beds of limestone with little or no shale. Limestone of the Odrovician system and alluvium in the stream terraces serve as the aquifers. Most of the drilled wells produce enough water for a domestic supply at depths of less than 100 feet. Water is high is calcium carbonate, and may contain salt or hydrogen sulfide, especially at depths greater than 100 feet. Ground water in underground solution channels is plentiful in the planning area. However, many of the streams are thought to be contaminated by organic wastes from sources such as septic tanks and factory discharges into sinkholes.

If any wastewater system projects indicate the need for construction in or near “waters of the United States”, a Department of the Army permit may be required for compliance under Section 404 of the 1972 Clean Water Act or Section 10 of the 1899 Rivers and Harbors Act. The need for such permits will be assesses on a project-specific basis during their preliminary design phase.

Climate and Precipitation

Since the arrival of the first people in the region more than 11,000 years ago, climatic conditions have changed substantially. Pleistocene glacial advances had ended at this time and were in retreat, causing the onset of generally warmer and drier conditions in the area. Climate fluctuations have caused differential change in the species of flora and fauna in the area; some species have become extinct or have left the area, and others species have filled specific ecological niches. Changing climatic conditions brought about by the retreat of the glaciers caused the replacement of the pine-spruce-fir flora with the oak and hardwoods species previously found in lower elevations and more southerly latitudes. A cooling trend with increased precipitation began about 3000 B.C., after a warming and drying trend associated with the Hypsithermal period of the Mid-Holocene. This trend continues in the area to this day.

The Planning Area's present climate is classified as humid continental, exhibiting a significant temperature range between seasons and a moderate amount of rainfall. Warm summers and cool winters are the norm, and when extremes in temperature occur they are usually not prolonged. The growing season is fairly long, averaging about 181 days. The total annual precipitation averages about 50 inches. The climate is favorable to growing a wide variety of crops.

Air Quality

The Planning Area is located within the Bluegrass Region of the state's Division for Air Quality ambient air quality monitoring network. This program monitors for pollutants such as ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, lead and particulates. The monitored levels of these pollutants are compared to National Ambient Air Quality Standards for each pollutant in order to determine if there is an air quality threat to human health and the environment. There are no monitoring stations for these pollutants in the planning area; the nearest is in Fayette County. Based on available data, all pollutants in the Bluegrass Region (which includes Mercer County and Fayette County), are within NAAQS standards.

Biological Resources

Because Harrodsburg was the first settled area in Kentucky, plant and animal life and their habitats in the area were altered long ago. Early literature discusses the Bluegrass area, stating that it was once heavily forested, with trees such as burr oak, blue ash, sugar maple, honey locust, and black walnut. The understory was composed mostly of huge areas of cane, pea vine, and various herbs. The original flora along the streams was probably similar to the present conditions, with sycamore, box elder, river maple and black willow among the dominant species. Original herbaceous flora was likely similar to the rolling uplands with an increase of moisture-loving species such as the waterleafs, Jacob's ladder, purple phacelia, and others.

The vertebrate fauna in the Planning Area has also been greatly altered by settlement. Although details are sketchy, it is known that the Bluegrass Region once supported large herds of bison and elk, and predators such as gray and red wolves, and mountain lions. Those mammals, in addition to black bears, beavers, and others, have long since been extirpated from the area. At present, the majority of vertebrate fauna in the area consists of small secretive animals which are able to avoid or tolerate man's presence.

At the time the 2000 Wastewater Facility Plan Update was prepared, information received from the U.S. Department of the Interior Fish and Wildlife Service related to endangered species indicated that two species were monitored in the planning area: the Indiana bat (*Myotis sodalis),* which was classified as endangered, and the gray bat *(Myotis grisescens.* A more recent on-line inquiry provided information for Mercer County from the Kentucky Ecological Services Field Office of the US Fish and Wildlife Service. This information is summarized in Table 5-1.

During the initial design phase for projects recommended in this Plan, a project site survey will be conducted to determine the presence of endangered or threatened species, and species that may be candidates for listing as endangered or threatened species. It will be the intention of the design and construction of such projects to avoid disturbance of such species and their respective habitats. If such species or their habitats are found to be located at a project site, measures will be taken to reroute the project unless it is economically unfeasible to do so.

Table 5-1
Endangered, Threatened and Candidate Species
Known and Potentially Located In the Planning Area

Group	Species	Common Name	Legal Status	Known Potential
Mammals	*Myotis sodalis*	Indiana bat	Endangered	Potentially in Area
	Myotis grisescens	gray bat	Endangered	Known to be in Area
	Dolichonyx oryzivorous	bobolink*	Endangered	Known to be in Area
	Ammodramus henslowii	Henslow's Sparrow*	Endangered	Known to be in Area
Mussels	*Pleurobema clava*	clubshell	Endangered	Known to be in Area
	Cyprogenia stegaria	tanshell	Endangered	Known to be in Area
	Epioblasma torulosa rangiana	Northern riffleshell	Endangered	Known to be in Area
	Obovaria retusa	ring pink	Endangered	Known to be in Area
Plants	*Lesquerella globosa*	globe bladderpod	Candidate	Known to be in Area
	Trifolium stoloniferum	running buffalo clover	Endangered	Potentially in Area

Sources: U.S. Fish and Wildlife Service, KY Ecological Services Field Office (7/30/2008)
**Kentucky Department of Fish and Wildlife (5/22/2013)*

Archaeology and Historic Sites

A large number of archaeological investigations have been conducted in Mercer County, and in particular in the area of Harrodsburg, since the city was the first settled community in what is now the State of Kentucky. These investigations date back to 1883 to a report completed by W.M. Linney, published by the Smithsonian Institution. More recent investigations were completed in 1976 for the Harrodsburg Water Improvement Project, where test excavations indicated that the cultural affiliation could not be determined, and in 1977 at the site of the then-planned Harrodsburg Wastewater Treatment Plant, where four camp sites were located. Test excavations performed at the wastewater treatment plant site determined that the camp sites were attributable to Archaic occupations. In 2000, a Phase I archaeological survey was performed along the route of a proposed wastewater collector, interceptor and pump station project in Harrodsburg. Of the seven sites found, four were determined to require no further archaeological work and three were recommended for further investigation or avoidance.

No known significant archaeological or cultural features in the Planning Area are anticipated to be impacted by the wastewater improvements envisioned under this plan. No additional land will be acquired for expansion of the wastewater treatment plant, the site of which has previously been studied and is large enough for the construction of the planned facilities. Before plans are developed for the construction of improvements to the wastewater collection system a Phase I archaeological survey will be conducted of the routes for new sewers and force mains and the sites of new pump stations.

There are a number of historic sites in Harrodsburg and Mercer County, and there will likely be other sites considered for registration with the National Register of Historic Places before all projects envisioned under this Plan are designed and built. None of these sites are currently impacted by the projects included in this Plan.

Other Resource Features

There are no national or state parks or recreational areas within the Planning Area. The Planning Area does not include USDA-designated Important Farmland or other environmentally sensitive areas.

Impact of State and Federal Projects

The most significant project impacting the Planning Area was the recently completed construction of the U.S. 127 by-pass around the eastern side of the City. This project was anticipated by the City, and provisions are being made to provide water and sewer service to potential commercial/industrial and residential customers that may develop in this area.

Other potential projects, all of which are dependent in part on state or federal funding, include improvements to traffic circulation on the downtown Harrodsburg Central Business District, by realignment of U.S. Highway 68. As such projects are planned and designed, the City intends to address their impacts on existing wastewater collection facilities and will relocate, revise and upgrade such facilities as needed.

Chapter 6

Chapter 6: EXISTING WASTEWATER SYSTEM FACILITIES

Introduction

This chapter includes a description of the existing wastewater collection and treatment facilities in the Planning Area. Also included is information on existing on-site disposal systems (septic tanks and tile fields), the methods of disposal of by-products from wastewater treatment and a description of problems with operation, maintenance and compliance of the wastewater system.

Collection System Description

General

The oldest parts of the City's wastewater collection system date back to the construction of the original treatment plant, an "Imhoff Tank" treatment facility built in the early 1930's and later expanded to a 0.5 MGD trickling filter plant in 1965. This plant was replaced at a new site in 1981 with the current 2.68 MGD plant which uses the rotating biological contactor process for secondary treatment. The collection system currently serves most of the City of Harrodsburg. A map of the existing collection system is provided in Appendix 1. This map indicates the locations of existing pump stations and the location of the treatment plant.

The City's wastewater collection system began with the construction of a series of 8-inch through 15-inch sewers to serve the "downtown" area of Harrodsburg, combined with a larger interceptor sewer to transport wastewater to the treatment facility located in the northwest part of the City. Over time, as the City grew outward from the "downtown" area, the predominately 8-inch sewer system expanded outward to serve the new customers. By the 1980s and 1990s the majority of wastewater treated in the City had to be initially conveyed into and through the "downtown" area before it could be transported via the main interceptor sewer to the plant. As this system aged, problems began to occur in the "downtown" area with wet weather induced overflows, pump station bypasses and flooded basements because the system lacked sufficient capacity to handle peak wet weather flows.

These problems led to the issuance of an Agreed Order in 1997, and the City began a strategy that included rehabilitation of many of its sewers, especially in the "downtown" area to eliminate wet weather induced problems. This strategy also called for reducing the volume of wastewater discharged from developments on the outer edges of the City into the "downtown" area to ensure that the "downtown" part of the collection system no longer exhibited these problems. This strategy included:

- Upgrading several pump stations to provide sufficient capacity so that bypasses and overflows at the pump stations no longer occur during wet weather periods.
- Constructing a new interceptor sewer, pump station and force main to convey flow from the southwestern area of the City directly to the treatment plant. This project allowed for the elimination of five small pump stations which previously discharged wastewater to the "downtown" part of the collection system.
- Rehabilitation of several sewer lines to eliminate or reduce infiltration and inflow problems.
- Planning for the construction of future projects to serve outlying parts of the City, with wastewater conveyed to portions of the collection system that have sufficient capacity to handle the flow.

The 2000 Wastewater Facilities Plan Update discussed the presence of several package wastewater treatment plants in the area surrounding the City, primarily serving residential developments that were not connected at that time to the City's wastewater collection system. None of these plants were located within the Harrodsburg Corporate Limits. These plants were permitted to operate under their own KPDES discharge permits and they were not operated by the City.

With the formation of the Mercer County Sanitation District, the responsibility for operating and maintaining these package plants and their respective collection systems became the responsibility of MCSD. MCSD plans to cease operation of these plants over time by building pump stations to convey the wastewater from the areas served by these plants, either to Harrodsburg or to Danville for treatment.

By 2012, approximately 1,660 people in MCSD were served by the Harrodsburg wastewater facilities. The majority of these customers reside in the Brightleaf area which formerly included package treatment plants that have recently been replaced by a pump station that conveys wastewater to the Harrodsburg system

Drainage Basins and Pump Stations

The City's collection system is divided into fifteen (15) drainage basins. In 2000, these basins included 12 pump stations, some of which were subject to receiving excessive levels of infiltration/inflow during high wet weather events which often exceeded their pumping capacity and resulted in overflows of wastewater. As part of the City's rehabilitation of the sewer system, five of those pump stations were eliminated by constructing a gravity interceptor sewer to convey wastewater from these stations to the Western Regional Pump Station. The City has increased the capacity of other pump stations to eliminate wet weather overflows.

Table 6-1 provides a summary of the type and capacity of the existing pump stations in the City.

Table 6-1
City of Harrodsburg
Wastewater Pump Stations
Location, Type and Capacity

Pump Station	*Type of Station*	*Capacity*	*Note*
Anderson Dean	Submersible	250 GPM	1
Brentwood	Submersible	175 GPM	
Trim Masters/ Wausau Sanitary	Submersible	150 GPM	2
Tool and Die	Submersible	50 GPM	
Greenville	Grinder/Submersible	15 GPM	
Lee	Grinder	90 GPM	
Meadow	Grinder	18 GPM	
Pheasant	Grinder	22 GPM	
Harvest	Grinder	50 GPM	
Harrods Glen	Submersible	280 GPM	3
Cherokee	Submersible	110 GPM	4
Beaumont	Submersible	240 GPM	5
Western Regional	Submersible	1,680 GPM	6
Mercer County H.S.	Submersible	160 GPM	7
Wausau Paper Process	Submersible	500 – 1500 GPM	8

Source: City of Harrodsburg (November, 2012)

Notes:

1. Capacity was increased to 250 GPM in 2007
2. Converted to Wausau Paper Sanitary PS and increased in capacity to 150 GPM in 2012. Pumps restroom and other non-process wastewater to City's collection system.
3. Constructed in 2006 for subdivision that was never developed
4. Capacity was increased to 110 GPM in 2009
5. Capacity was increased to 240 GPM in 2002
6. Built in 2003, replacing the Mooreland PS (100 GPM), Perryville PS (100 GPM), Fairview PS (200 GPM), Housing Project PS (50 GPM), and Mockingbird PS (100 GPM)
7. Owned and Maintained by Mercer County School District
8. Owned and Maintained by Wausau Paper. Pump station discharges directly to the City's treatment plant. Pump station is equipped with variable speed pumps. Began operation in December 2012.

Unsewered Areas

The 2000 Wastewater Facilities Plan Update indicated that an estimated 400 households within the Planning Area utilized on-site wastewater treatment systems, primarily conventional septic tanks and lateral fields, and as many as 75 homes had straight-pipe discharges. These estimates were for the Planning Area used in that plan, which included the City of Burgin and the residential areas along Herrington Lake. Many of these homes are now included in the area for which the Mercer County Sanitation District is responsible.

There are currently an estimated 140 homes within the current Harrodsburg Planning Area but outside of the City's Corporate Limits that are not connected to the City's sewer system. These homes are primarily in two areas: Riverview Estates (approximately 100 homes) on the west side of town, and Fountaine Trace (approximately 40 homes) on the north side of town.

In the Riverview Estates area, a recent project was completed by MCSD to provide gravity sewer service to approximately 40 homes along Scenic Drive (one street to the east of Riverview Estates). A second project was recently completed by the City to provide gravity sewer service to approximately 6 homes along Cresthill Drive (east of Scenic Drive), and another project was completed by the City to install a 10-inch gravity sewer to the north of Riverview Estates, along KY 152 from Harrods Place to the

Western Regional Pump Station. With the installation of the KY 152 sewer and the Western Regional Pump Station, capacity is now available to serve the unsewered homes in the Riverview Estates area with gravity sewers.

In the area on the north side of town, the City recently upgraded the Brentwood Pump Station and built a gravity sewer along the north end of Fountaine Trace. This system provides capacity to serve the currently unsewered homes on Fountaine Trace, Claire Du Lune and La Colline Streets with gravity sewers.

By 2012, an estimated 200 persons from these two areas were being served by sewers that are connected to the City's wastewater collection system.

Commercial and Industrial Wastewater Discharges

The City of Harrodsburg enforces its Industrial Waste Pre-Treatment Program by regularly inspecting and sampling discharges from several industrial and commercial customers within the City. A copy of the City's Ordinances for the Pre-Treatment Program is provided in Appendix 2.

Table 6-2 indicates these customers and lists the sources of wastes discharged by each customer. It should be noted that the 2000 Wastewater Facilities Plan Update included: Modine Climate Systems, which is no longer in operation; Bay West Paper, which is now Wausau Paper; and the Hallmack Site, which is a groundwater remediation site now owned by NuTone and operated by Kidd/Fenwall.

Table 6-2
Industrial Wastewater Dischargers to
Harrodsburg Wastewater System

Industry	***Source of Wastewater***	***Pollutants of Concern***
Corning Glass	Sanitary wastewater, including cafeteria wastes, and contact cooling water	Phosphorus, Ammonia-Nitrogen, BOD, TSS, Copper, Chlorine, Lead
Wausau Paper	Sanitary wastewater, Non-process wastewater	Ammonia-Nitrogen, BOD, TSS
Hitachi Automotive	Sanitary wastewater	BOD, TSS
NuTone	Scrubber wastewater	TCE
Toyota Boshoku	Sanitary wastewater	BOD, TSS
County Landfill	Leachate*	TSS

**Discharged to wetland treatment system or hauled to City's wastewater treatment plant.*
Source: Cynthia Leasor, Hall Environmental Consultants, LLC, Nicholasville, KY (October 31, 2012)

Of these waste streams, all except the leachate from the County Landfill are discharged to the wastewater collection system. In late 2012, Wausau Paper completed an expansion of its process operations which requires the use of large volumes of water to produce tissue and toilet paper from paper waste. Beginning in December 2012, all of Wausau Paper's process wastewater was thereafter directly pumped via a dedicated force main to an equalization and cooling lagoon at the City's treatment plant site. The impact of this additional commercial/industrial flow is discussed further in Chapter 7 of this Plan. Wausau's sanitary wastewater continues to be pumped to the City's collection system.

Wastewater Treatment Facilities

General Description of Treatment Processes

Harrodsburg has provided regionalized wastewater treatment since the early 1930's, when it built a treatment facility on a site at the intersection of Cornishville and Moberly Roads, approximately one mile upstream of the current plant. An 18-inch interceptor sewer conveyed wastewater to the plant from the City's wastewater collection system. In 1981, that plant was abandoned when the current plant was constructed. Influent flow was directed to the new plant via a new 27-inch interceptor sewer that extended from the 18-inch sewer to an influent structure for the new treatment facility.

The existing plant has an average design flow capacity of 2.68 MGD and a peak equalized design wet weather flow capacity of 5.32 MGD. Two equalization basins are provided to store high influent wastewater flows during peak wet weather periods. The plant provides preliminary, primary, secondary, and tertiary treatment of the wastewater, followed by disinfection, de-chlorination and post-aeration of the treated effluent, and sludge thickening, digestion, storage and dewatering using sand drying beds. A flow diagram of the existing plant is provided as Exhibit 6-1. A larger version of this flow diagram is provided in Appendix 3.

Wastewater entering the plant initially flows by gravity in a 27-inch sewer to an influent structure, which allows flows up to 2.68 MGD to pass through the structure to a screw pump influent chamber. At higher influent flow rates, such as during wet weather periods, flows in excess of 2.68 MGD travel over an overflow weir in the influent structure and enter the wet well of an equalization basin influent pump station. Four submersible pumps are provided in this pump station. Two are rated for 4,650 GPM each, one at 2,300 GPM and the fourth at 1,200 GPM. The two larger pumps were

replaced in 2003 with two pumps of equal capacity. This arrangement provides a firm capacity of 4,650 GPM (6.68 MGD), which is the maximum flow that can be discharged to the plant in the 27-inch plant influent sewer (12.0 MGD) less the maximum flow that the plant can process (5.32 MGD).

Two influent equalization basins, with a total volume of 4,325,000 gallons, are provided. An equalization basin recirculation pump station, equipped with two submersible pumps rated at 4,000 GPM each, is also provided. These pumps were replaced in 2003 with new pumps of equal capacity. This pump station allows for the contents of the equalization basins to be recirculated between Basins 1 and 2. These basins are also aerated from the plant air system (two 800 SCFM rotary blowers) to keep the stored wastewater from becoming anaerobic before it is transferred to the plant for treatment. The stored wastewater is returned by gravity to the screw pump influent chamber when the plant influent flow decreases to less than 5.32 MGD.

A third equalization basin, dedicated for storage and cooling of process wastewater pumped directly to it from Wausau Paper, is also provided. This basin occupies a portion of one of the plant's four original tertiary lagoons. The other portion of this lagoon is not used. The tertiary lagoons are further discussed later in this section.

An influent flow meter was installed in the 27-inch plant influent sewer in 1998, but was later found to not consistently provide accurate flow readings. Current plant flow measurements are recorded and reported from measurements taken from a Parshall flume at the discharge end of the plant. A project is being designed to provide plant inflow measurement by adding an ultrasonic level sensor/transmitter at the grit chamber effluent weir, with flows recorded based on the discharge over this weir.

Wastewater is pumped into the plant by two-stage open screw pumps, each rated for 5.32 MGD. These pumps lift the flow to a sufficient elevation to insure gravity flow through the remainder of the treatment plant, starting with the screen chamber. Evidence of corrosion and excess wear on components of this pump station has been noted over the past several years. Only one existing screw pump is currently operable and a project is currently underway to replace both of these pumps with two new pumps of equal capacity.

Preliminary wastewater treatment includes screening and grit removal. Coarse screening is provided by a mechanically-cleaned bar screen with ½-inch bar spacing. A

manually-cleaned bar rack is provided as a bypass/backup. Screenings removed from the wastewater are deposited in a container for off-site disposal. The mechanically-cleaned screen has shown evidence of corrosion and abrasion damage. A project is currently under design to replace the mechanically-cleaned screen.

The screened wastewater is routed through a channel to a 14-foot by 15-foot hopper-bottom grit chamber that was designed for the removal of 100 mesh and larger grit at the plant peak flow rate. Settled grit is pumped to a vortex classifier for solids-liquid separation. The dewatered grit is discharged to a container for off-site disposal, and the liquids from the classifier are returned to the plant flow stream. Problems with this system include the timers for the grit pumps, odors from the grit chamber, and noticeable accumulations of floating solids on the surface of the grit chamber. A project has been identified to replace this system with a new vortex-type grit chamber and a new grit classifier.

Influent wastewater samples are drawn from the channel between the screens and the grit chamber and pumped to a composite sampler located in the Administrative Building. Since plant recycle streams such as primary clarifier scum, digester supernatant and thickener overflow are allowed to return to the screw pump influent chamber, the location of the influent sample point allows the sample to be tainted by these recycle streams, resulting in reported levels of influent BOD and Suspended Solids to be higher than normal municipal wastewater.

Primary wastewater treatment is provided by two parallel double-wide rectangular chain and flight primary clarifiers that provide for the collection of primary sludge and scum. Sludge and scum are withdrawn from the primary clarifiers by air diaphragm pumps and conveyed to a sludge mixing chamber prior to a gravity thickener. Piping and valves are arranged to allow either pump to draw sludge and scum from either primary clarifier. If the thickener is out of service, primary sludge and scum may be pumped to the primary digester. Except for normal wear and tear and the need for occasional replacement of components of this process, these basins do not exhibit any significant operational or maintenance problems. The depth (7.5 feet) of these clarifiers is considered somewhat shallow compared to conventional design (10 feet), and could result in lower than normal removal of Suspended Solids and BOD.

Secondary treatment is provided by rotating biological contactors (RBC's) located in four parallel trains each containing six RBC units. This process provides biological wastewater

treatment by allowing a fixed film growth of microorganisms located on the surface area of the RBC units to come in contact with the wastewater while the RBC units are continually rotated. The RBC units are positioned so that they are partially submerged in the wastewater and partially exposed to ambient air. This allows the microorganisms on the surface of each RBC to absorb oxygen while the unit is exposed to the air and the microorganisms can then assimilate the organic matter in the wastewater while the unit is submerged.

Each RBC train includes three RBC units containing 100,000 square feet of standard density media and three units containing 150,000 square feet of high density media, for a total of 750,000 square feet of media per train and a total of 3,000,000 square feet for the complete system.

The actual capacity of the RBC system, however, is a function of the number of RBC units that are available for operation and the organic loading rate on the RBC units. Historic problems have been noted in the past with inoperable RBC components (shafts, gear boxes, broken drive belts, RBC structural damage, etc.) that have resulted in the need to take individual RBC units out of service until repairs can be completed.

This type of treatment technology, which became a popular and cost-effective secondary treatment process in the 1980's, is rarely used today and sources for replacement parts have become increasingly limited as time has passed. The plant staff has stockpiled several spare parts and other RBC components over the 30-plus years that this process has been used at this plant, mostly from other treatment plants around the region that have replaced their RBC system with a newer technology, but it is not logical to consider parts and components for the RBC system at this plant will be available much longer.

Two parallel double-wide rectangular secondary clarifiers provide for removal of sludge from the wastewater discharged from the RBCs. Each clarifier has a chain and flight collector and scum removal is provided. The scum and a portion of the sludge collected in these clarifiers are pumped by a centrifugal pump to the sludge thickener, where these solids are mixed with the sludge and scum from the primary clarifiers. Piping and valves are arranged to allow the pump to draw sludge and scum from either secondary clarifier. If the thickener is out of service, secondary sludge and scum may be directed to the screw pump influent chamber. The secondary clarifiers appear to be in good condition and operate satisfactorily. The depth of these clarifiers (8.5 feet) is shallower

than conventional secondary clarifiers (required minimum depth of 10 feet) following attached-growth biological treatment units (RBCs) and is likely to result in the removal of Suspended Solids that is poorer than deeper basins can achieve. These shallow basins may also impair the effective reduction of Ammonia-Nitrogen; secondary clarifiers with a minimum side water depth of 12 feet (preferably deeper) are generally provided when nitrification is required (as is the case for this facility).

Tertiary treatment is provided by three, 5-foot deep earthen lined facultative polishing lagoons that have a total volume of approximately 9.6 MG. The lagoons are operated in series. These lagoons are not aerated, but they serve to "polish" the secondary effluent by providing additional solids removal prior to disinfection. All of the lagoons are in need of rip-rap installation to protect their banks against erosion.

Four tertiary lagoons were initially provided at the plant. However a portion of Lagoon 1 has been converted to a flow equalization/cooling lagoon for process wastewater that is pumped to the plant from Wausau Paper. The discharge from this lagoon is directed to the screw pump influent chamber. The remaining portion of Lagoon 1 is not currently used. Lagoons 2, 3 and 4 currently provide tertiary treatment prior to effluent disinfection.

Disinfection of the lagoon effluent is provided by chlorination equipment located in a building adjacent to the chlorine contact chamber. Two 200 pound per day chlorinators are provided. The chlorine solution is introduced to the tertiary system effluent in the chlorine contact chamber that is designed to provide a 32-minute retention time at the peak plant flow rate of 5.32 MGD. This basin contains internal baffle walls that direct the flow in a serpentine pattern to an effluent weir.

De-chlorination is provided to reduce the concentration of chlorine in the plant's treated effluent to within its permitted discharge limitations for chlorine. Sulfur dioxide is used for de-chlorination, provided by a 100 pound per day sulfonator. The sulfur dioxide solution is introduced to the chlorinated wastewater via a diffuser as the flow is discharged from the contact basin.

Plant effluent flow is measured by a Parshall flume. An ultrasonic water level reading is taken in the channel upstream of the flume and converted to a flow measurement. This flow is recorded and reported as the plant effluent flow.

Post-aeration is provided by a 9.5 feet deep "cascade" aeration ladder. This process step allows for the introduction of oxygen into the plant effluent before it is discharged into Town Creek so that the permit discharge limitations for effluent dissolved oxygen levels are met.

Sludge from the primary clarifiers and sludge and scum from the secondary clarifiers is normally directed to a 25-foot diameter, 10-foot deep gravity thickener. This thickener is provided with a sludge collector mechanism which consists of rotating rake arms with mixing pickets and collector rake blades and squeegees. Thickened sludge is pumped by a diaphragm thickened sludge pump to the primary digester. The supernatant (overflow consisting of water and floating solids) from the thickener is returned to the screw pump influent chamber. Scum is collected in an influent well in the center of the thickener and is discharged to the thickened sludge pump for conveyance to the primary digester along with the thickened sludge.

The thickened sludge is pumped to the anaerobic digestion facilities. The primary digester (45-foot diameter x 30-foot side water depth) has a floating cover and the secondary digester (45-foot diameter x 28-foot side water depth) has a buoyant gasholder cover. The primary digester is equipped with a Perth gas recirculation mixing system. Sludge and supernatant from the primary digester flow by gravity or are pumped to the secondary digester. Digested sludge is pumped from the secondary digester to the sludge drying beds, to the sludge holding lagoon or to the sludge truck loading station for off-site disposal. Supernatant from the secondary digester is returned to the screw pump influent chamber. The gas produced during the digestion process is either used as a fuel by a heat exchanger to maintain the desired temperature in the digestion tanks or is wasted to the waste gas burner. The heat exchanger and boiler have reached the end of their useful life and a project is underway to replace this equipment.

Eight sludge drying beds are provided, four at 25-foot wide x 100-foot long and four at 50-foot wide x 100-foot long, providing 30,000 square feet of drying bed area. A digested sludge storage lagoon of 475,850 gallons capacity is also provided. Drainage from the drying beds is directed to the screw pump influent chamber. These drying beds are in poor condition due to loss of sand media and plugged underdrains and media. At times, these beds are unable to dewater plant sludge quickly enough, particularly during the winter and wet weather periods, resulting in excessive inventories of solids building up within the plant. A project is currently underway to provide a belt filter press to

dewater the digested sludge prior to disposal of the sludge cake in a landfill, which is also used for disposal of screenings and grit.

Dewatered sludge, dewatered screenings and dewatered grit are hauled to a landfill for disposal.

Unit Process Summary

Table 6-3 summarizes the design of the existing treatment plant. Sizes of treatment units were obtained from construction drawings and Operating/Maintenance Manuals. The capacity of treatment units is based on design criteria for wastewater treatment facilities taken from the 2004 Edition of "*Recommended Standards for Wastewater Facilities" (*also known as the "*Ten States Standards"*), which is the standard used by the Kentucky Division of Water in determining the capacity of wastewater facilities.

Table 6-3
Harrodsburg Wastewater Treatment Plant
Size and Capacity of Treatment Process Units

Treatment Unit	
Equalization Basins	
EQ Basin Influent Pumps	1 at 1200 GPM @44' TDH
	1 at 2300 GPM @47' TDH
	2 at 4650 GPM @ 54' TDH
EQ Basin Volume	4.325 MG
EQ/Cooling Lagoon (Wausau Paper)	1, approximately 2 MG
Aeration Blowers	2 at 800 SCFM
Recirculation Pumps	2 at 4000 GPM at 22.5' TDH
Influent Screw Pumps, Per Stage	2 at 3700 GPM @ 18.68' TDH per stage (or 5.32 MGD per pair of 2-stage pumps)
Influent Screens	
Mechanically Cleaned Screen	1 @ 5.32 MGD
Manually Cleaned Bar Rack	1 @ 5.32 MGD
Grit Chamber	1 @ 5.32 MGD

Primary Clarifiers	2, rectangular
Dimensions, each	40’ x 83’ x 7.5’ SWD
Surface Area and Volume	6,640 SF, 49,800 CF, 372,500 gallons
Surface Overflow Rate, at 2.68 MGD and 5.32 MGD	404 GPD/SF, 801 GPD/SF
Weir Overflow Rate, at 2.68 MGD and 5.32 MGD	3988 GPD/Ft, 7917 GPD/Ft
Sludge Pumps	2@152 GPM @ 40 strokes/min, 3.8 GPM/stroke, 40’ TDH
Rotating Biological Contactors	
Number of Trains and number of units per Train	6 Trains, 4 Units/Ea.
Surface Area of Media per Train	750,000 SF
Total Surface Area of all Trains	3,000,000 SF
Hydraulic Loading at 2.68 MGD	0.89 GPD/SF
Secondary Clarifiers	2, rectangular
Dimensions, each	40’ x 100’ x 8.5’ SWD
Surface Area and Volume	8,000 SF, 68,000 CF, 508,640 Gallons
Surface Overflow Rate, at 2.68 MGD and 5.32 MGD	350 GPD/SF, 665 GPD/SF
Tertiary Lagoons	
Number and Total Volume	3, approximately 9.6 MG
Chlorine Contact Chamber	
Volume	118,000 Gallons
Detention Time, at 5.32 MGD	32 minutes
Cascade Aeration Ladder	
Depth and Effluent Dissolved Oxygen Concentration	9.5’, 7.0 mg/l
Sludge Thickener	
Diameter and Side Water Depth	25’ x 10’ SWD
Volume	36,725 Gallons
Thickened Sludge Pump	152 GPM @ 40 strokes/min., 3.8 GPM/stroke, 40’ TDH
Anaerobic Sludge Digesters	
Primary Digester Volume	385,110 Gallons
Secondary Digester Volume	362,316 Gallons
Total Digester Volume	747,426 Gallons

Sludge Drying Beds	
Number and Size of Each	4 at 2500 SF and 4 at 5000 SF
Total Drying Bed Area	30,000 SF
Sludge Storage Lagoon	
Volume	475,850 Gallons

Effluent Limits

The City's current KPDES permit (KY0027421) was issued on December 8, 2008 and expires on December 7, 2013. Based on the plant's design flow of 2.68 MGD, the permit calls for the discharge limitations and monitoring requirements listed in Table 6-4. A copy of this permit is provided in Appendix 4.

Table 6-4
Harrodsburg Wastewater Treatment Plant KPDES Permit
Current Discharge Limitations and Monitoring Requirements
(Expires December 7, 2013)

Characteristic	Effluent Limitation		Monitoring Requirement
	Monthly Avg.	Daily Max.	
Effluent Flow (MGD)	Report	Report	Continuous by Recorder
Effluent CBOD5 (mg/l)	10	15	1/week by 24-Hr Composite
Effluent TSS (mg/l)	30	15	1/week by 24-Hr Composite
Ammonia Nitrogen (mg/l)			
May 1 – Oct 31	4	6	1/week by 24-Hr Composite
Nov 1 – April 30	10	15	1/week by 24-Hr Composite
Escherichia Coli (N/100 ml)	130	240	1/week by Grab Sample
Dissolved Oxygen (mg/l)	Not less than 7.0		1/week by Grab Sample

pH (standard units)	6.0 (min) to 9.0 (max)		1/week by Grab Sample
Total Residual Chloride (mg/l)	0.011	0.019	1/week by Grab Sample
Total Phosphorus (mg/l)	Report	Report	1/week by 24-Hr Composite
Total Nitrogen (mg/l)	Report	Report	1/week by 24-Hr Composite
Chronic Toxicity (TU)	N/A	1/Quarter	3 24-Hr Composite Samples

Treatment Plant Influent and Effluent Wastewater Characteristics

The monthly Discharge Monitoring Reports for the wastewater treatment plant for calendar years 2009 through 2012 were reviewed to determine the current performance of the plant. The data from these reports is summarized in Table 6-5.

Table 6-5
Harrodsburg Wastewater Treatment Plant
Influent and Effluent Wastewater Characteristics
January 2009 - December 2012

2009 Month	Avg Daily Flow (MGD)	Min Daily Flow (MGD)	Max Daily Flow (MGD)	Avg Influent CBOD (mg/l)	Avg Effluent CBOD (mg/l)	Avg Influent TSS (mg/l)	Avg Effluent TSS (mg/l)	Avg Influent NH3-N (mg/l)	Avg Effluent NH3-N (mg/l)	Avg Effluent Total P (mg/l)	Avg Effluent TRC (mg/l)	Effluent Fecal Coliform (N/100ml)
January	1.60	0.9	6.2	129	6	206	7	16.4	1.30	1.6	0.003	2
February	1.60	1.1	3.5	101	5	233	5	12.5	0.90	1.5	0.003	2
March	2.30	1.3	4.7	114	5	245	6	11.9	0.80	1.3	0.010	3
April	2.00	1.1	4.3	101	4	276	6	14.8	0.33	1.3	0.003	-
May	1.70	0.9	4.2	128	5	435	11	18.4	0.51	1.8	0.003	4
June	1.60	0.6	3.8	124	7	635	16	16.1	0.55	1.8	0.003	13
July	0.80	0.5	1.8	138	5	1085	8	17.9	1.48	2.5	0.004	42
August	1.00	0.6	2.0	121	4	457	4	22.8	1.89	2.2	0.004	1
September	1.20	0.7	3.2	142	4	574	4	20.4	1.81	2.4	0.003	3
October	1.70	1.1	4.3	116	4	489	5	19.9	1.60	2.1	0.003	1
November	1.20	0.9	4.1	133	3	584	2	15.1	1.04	1.6	0.003	1
December	1.60	0.9	3.7	99	4	290	2	10.5	2.65	1.7	0.004	1
Avg Daily	1.51			121	4.7	459	6.3	16.4	1.24	1.8		
Min Daily		0.5										
Max Daily			6.2									

2010 Month	Avg Daily Flow (MGD)	Min Daily Flow (MGD)	Max Daily Flow (MGD)	Avg Influent CBOD (mg/l)	Avg Effluent CBOD (mg/l)	Avg Influent TSS (mg/l)	Avg Effluent TSS (mg/l)	Avg Influent NH3-N (mg/l)	Avg Effluent NH3-N (mg/l)	Avg Effluent Total P (mg/l)	Avg Effluent TRC (mg/l)	Effluent Fecal Coliform (N/100ml)
January	1.51	1.0	2.6	91	5	182	6	10.3	0.67	1.7	0.004	1
February	1.40	1.1	2.6	115	4	252	4	13.6	0.78	1.4	0.003	1
March	1.20	1.0	2.3	143	5	646	4	15.0	0.73	2.3	0.003	1
April	1.14	0.9	2.6	137	4	454	4	20.5	1.79	2.2	0.003	1
May	2.10	1.0	7.1	94	5	551	3	12.2	0.67	0.9	0.004	1
June	0.90	0.6	2.6	126	6	642	5	16.9	0.72	2.0	0.003	3
July	0.80	0.5	2.0	146	3	1181	7	17.0	0.97	2.4	0.003	7
August	0.90	0.5	1.7	135	6	850	8	16.6	1.02	2.3	0.003	4
September	0.80	0.6	1.6	117	5	528	6	19.3	1.17	2.3	0.003	2
October	0.80	0.7	1.7	136	5	1013	4	20.6	0.99	2.4	0.003	1
November	1.00	0.7	2.0	167	6	946	2	21.8	1.17	2.4	0.004	1
December	1.40	1.0	3.4	181	8	300	3	14.9	1.15	1.8	0.005	1
Avg Daily	1.17			114	5.2	629	4.7	16.6	0.99	2.0		
Min Daily		0.5										
Max Daily			7.1									

2011 Month	Avg Daily Flow (MGD)	Min Daily Flow (MGD)	Max Daily Flow (MGD)	Avg Influent CBOD (mg/l)	Avg Effluent CBOD (mg/l)	Avg Influent TSS (mg/l)	Avg Effluent TSS (mg/l)	Avg Influent NH3-N (mg/l)	Avg Effluent NH3-N (mg/l)	Avg Effluent Total P (mg/l)	Avg Effluent TRC (mg/l)	Effluent Fecal Coliform (N/100ml)
January	1.40	1.1	2.6	171	7	231	7	16.3	1.24	2.3	0.003	1
February	1.70	0.9	5.2	116	8	225	5	9.8	0.78	1.5	0.004	1
March	2.10	0.9	5.0	103	6	173	6	8.9	0.54	1.3	0.003	1
April	2.77	0.9	5.8	82	5	131	6	7.3	0.7	1.3	0.003	1
May	1.60	0.7	5.3	96	5	196	6	7.8	0.57	1.1	0.004	1
June	0.86	0.5	1.7	233	6	422	8	15.3	0.76	2.3	0.005	1
July	1.80	0.8	10.0	233	11	940	7	14.9	0.71	2.6	0.003	5
August	0.70	0.5	1.3	174	6	661	9	15.7	0.61	2.3	0.003	3
September	1.20	0.5	3.0	105	7	124	7	8.0	0.83	1.9	0.003	2
October	1.00	0.0	2.4	175	5	254	4	5.6	1.6	1.6	0.003	1
November	1.90	0.5	5.5	113	5	158	7	15.8	2.04	1.7	0.004	2
December	1.80	0.5	4.1	191	6	135	4	10.0	1.99	1.4	0.004	1
Avg Daily	1.57			149	6.4	365	6.3	11.3	1.03	1.8		
Min Daily		0										
Max Daily			10.0									

2012 Month	Avg Daily Flow (MGD)	Min Daily Flow (MGD)	Max Daily Flow (MGD)	Avg Influent CBOD (mg/l)	Avg Effluent CBOD (mg/l)	Avg Influent TSS (mg/l)	Avg Effluent TSS (mg/l)	Avg Influent NH3-N (mg/l)	Avg Effluent NH3-N (mg/l)	Avg Effluent Total P (mg/l)	Avg Effluent TRC (mg/l)	Effluent Fecal Coliform (N/100 ml)
January	1.40	0.9	2.9	95	5	93	5	11.3	0.51	1.4	0.003	1
February	1.30	1.0	2.2	139	6	145	7	12.0	1.26	1.3	0.004	1
March	1.50	0.7	3.2	125	5	87	5	13.2	0.58	1.7	0.004	1
April	0.86	0.2	1.5	176	4	149	7	14.2	0.49	1.8	0.004	1
May	1.00	0.7	3.3	141	3	96	2	14.6	0.41	1.6	0.007	1
June	0.74	0.6	1.2	148	6	142	5	14.9	0.74	2.6	0.006	2
July	0.90	0.5	2.1	264	6	239	6	15.8	0.93	2.4	0.003	3
August	0.80	0.5	1.2	188	6	84	6	18.0	0.61	1.6	0.003	6
September	1.22	0.8	2.4	169	10	90	9	12.8	0.67	2.5	0.006	1
October	1.00	0.8	2.0	175	7	149	8	14.1	0.2	1.5	0.003	1
November	1.20	0.9	2.0	159	5	168	3	12.1	0.67	1,8	0.003	1
December	2.30*	1.4	4.3	136	5	144	6	8.2	0.81	1.2	0.006	1
Avg Daily	1.19			150	5.8	132	5.8	13.5	0.66	1.8		
Min Daily		0.2										
Max Daily			4.3									

*December 2012 included an average of656,000 GPD of process wastewater from Wausau Paper

Measurement of Wastewater Flows to Plant

As previously indicated, the plant is equipped with an influent flow measuring device that is located within the 27-inch plant influent sewer. This device was installed to measure the velocity of the flow in the pipe and the depth of flow in the pipe. The depth of flow is converted to an equivalent wetted surface on the inside diameter of the pipe, which in turn is converted to an equivalent cross-sectional area of flow in the pipe. This device has proven to be unreliable and is subject to erroneous readings due to the inherent inaccuracies associated with determining the depth and wetted diameter as flows change. During wet weather when the influent sewer surcharges, this device cannot measure the additional flow that is due to surcharged conditions in the influent sewer. In addition, it is almost impossible for plant staff to access this device for repair and/or cleaning because it is installed within a pipe that is more than 20 feet below ground.

As a result, the plant reports both the influent flow rate recorded from this device as well as the effluent flow rate measured by a Parshall flume. Because the Parshall flume is considered to report much more accurate readings, the effluent flow is used as the basis for reporting plant flows and loading conditions.

The plant continuously samples the influent and effluent to determine plant performance and to report operating data for compliance with its KPDES Permit. The effluent sampler draws samples from a point at the discharge end of the plant, and these samples are representative of the final plant effluent.

The influent sampler, on the other hand, draws samples from a channel that is downstream of the screens and upstream of the grit chamber. This location does not draw a representative influent sample at all times because this channel also includes recycled flows from process units within the plant. These recycle flows at times include the contents of tanks that are being drained, digester supernatant, thickener overflow, scum from the primary clarifiers, and other minor flows. As a consequence, there are times when the recorded influent wastewater characteristics are not representative of the actual influent.

Historic Average Daily and Maximum Daily Wastewater Flows to Plant

The plant's DMR's for 2009-2012 indicate that the plant has been receiving monthly average daily flow in the range of 1.0 to 2.43 MGD, with occasional monthly average daily flows as low as 0.70 MGD (in August 2011) and as high as 2.77 MGD (in April 2011). Extreme minimum daily flows and extreme maximum daily flows were recorded during this period. These readings may be inaccurate, however if they are correct, they are representative of a very dry period when little or no rain occurred in the area and very wet periods for extended periods, respectively.

The 2009-2012 DMR's indicate that the average daily flow to the plant averaged 1.36 MGD during this period. However, these records also reveal that the plant received much higher wet weather period average daily flows (1.60 MGD) for 8 ± months out of each year, indicating that the plant is subject to seasonal high hydraulic loading periods that are critical to the performance of the treatment facilities. During the remaining four months of these four years, the plant received dry weather flows that averaged 0.92 MGD.

The 2009 – 2012 DMR's also indicated that seven (7) days of peak wet weather flows were encountered during the four (4) year time period where the peak wet weather daily flow exceeded the nominally rated peak flow plant design capacity of 5.32 MGD. The peak monthly average flow in April of 2011 (a particularly wet month) was 2.77 MGD which exceeded the nominally rated plant capacity of 2.68 MHD for an entire month.

The significance of this flow data relates to the contribution of flows from the sources of flows handled by the City's wastewater facilities. During dry weather periods, the two primary sources of wastewater are residential customers and commercial/industrial customers. The relative amount of wastewater contributed by each of these two types of customers can be determined by first examining the flow contributed from commercial/industrial customers. This flow is summarized in Table 6-6, below.

Table 6-6
Industrial and Commercial Wastewater Discharge, in Gallons/Day
Harrodsburg Planning Area, 10/09 to 11/12

Account	*Water Consumption, in Cubic Feet **	*Water Consumption, in Gallons/Day*	*Wastewater Discharge In Gallons/Day*
Corning Glass	12,283,553	N/A	82,800
Anderson Dean Aquatic Center	7,910,630	53,150	53,150
Hitachi Automotive	3,304,303	N/A	22,380
Wausau Paper Sanitary	3,286,520	22,380	22,380
Mercer County Board of Education	3,214,090	21,800	21,800
Harrodsburg Housing #2	1,952,193	13,400	13,400
Harrodsburg Heath Care	1,477,020	9,800	9,800
Haggin Memorial Hospital	1,842,360	12,300	12,300
Harrodsburg Housing #1	1,536,005	10,350	10,350
Wallmart Super Store	1,070,720	7,300	7,300
Other Miscellaneous Billings	5,936,000	40,000	40,000
Total			**275,660**

Source: City of Harrodsburg, billing records for the period of 10/1/09 to 10/16/12. N/A indicates wastewater flows that are directly metered, not based on water meter readings.* ***Bold* *= included in industrial pretreatment program*

Table 6-6 indicates that the historic commercial/industrial wastewater flow to the City's wastewater collection facilities is on the order of 275,660 GPD, for the 3-year period ending in November of 2012. This flow includes sanitary wastewater as well as process wastewater from these customers, and each flow is either based on water meter or wastewater meter readings.

Accordingly, during extended dry weather periods when the average daily flow received at the City's treatment plant was an average of 0.92 MGD, the residential contribution of this flow can be calculated by subtracting the average commercial/industrial flow (0.28 MGD) from this total (0.92 MGD). This provides the average daily residential flow contribution during dry weather as 0.64 MGD.

The plant DMR's also provide an indication of the impact of infiltration and inflow (I/I) on the wastewater facilities during wet weather periods. Based on the 4-year average wet weather flow to the plant of 1.60 MGD, the I/I contribution can be estimated by subtracting the dry weather average daily flow (0.92 MGD) from the wet weather average daily flow (1.60 MGD) to determine the average I/I flow of 0.68 MGD. The wet weather residential contribution can also be estimated by subtracting the average commercial/industrial flow (0.28 MGD) from the average wet weather flow (1.60 MGD), which equates to a residential wet weather flow of 1.32 MGD.

Chapter 10 of the 2004 Edition of the *"Ten States Standards"* provides the rationale for using historic wastewater flow data in the planning and design of future wastewater collection and treatment facilities. Paragraph 11.241a of these standards defines the design average flow as the average of the daily volumes received for a continuous 12 month period except when facilities receive critical seasonal high hydraulic loading during periods of the year. Since the Harrodsburg treatment plant receives seasonal high hydraulic loadings for an average of 8 months out of each year, the historic average flow to the plant is 1.60 MGD. On that basis, when estimating future wastewater flows contributed to an <u>existing</u> collection system from all sources (i.e., residential customers and commercial/industrial customers), these standards allow for future flows to be estimated based on an equivalent residential flow of 132 gallons per person per day (1.32 MGD divided by an average of 10,000 persons served from 2009-2012) plus contributions from commercial and industrial customers.

The City has expended considerable effort and funds over the last 15 ± years to rehabilitate its wastewater collection system, including the elimination of overflows at pump stations, repairing manholes and sewer lines to reduce I/I and cleaning of numerous sewer lines, and has an on-going program to maintain and rehabilitate other portions of its collection system.

Paragraph 11.242a of the 2004 Edition of the *"Ten States Standards*" allows future flows contributed to a new wastewater collection system to be based on 100 GPD per person plus wastewater contributed from commercial and industrial customers. This rate is lower than the rate used for existing wastewater facilities due to the expectation of lower I/I rates in systems built with modern construction techniques. On that basis, the rate of 100 GPD per person will be used in this Plan Update for future residential customers in the Planning Area and for future residential customers from MCSD.

Maximum daily flows are provided in the plant's DMR's for 2009-2012. Table 6-7 summarizes the average daily and maximum daily flows for this period.

The data in Table 6-7 indicates that the ratio of maximum daily flow to average daily flow is approximately 2.5 times the average daily flow, regardless of wet weather or dry weather conditions. On that basis, projected future flow rates in the existing wastewater collection system should be based on a ratio of maximum daily flow to average daily flow of 2.5.

Table 6-7
Peak Wet Weather Flows, in MGD
Received at Harrodsburg Wastewater Treatment Plant
2009-2012

Month	*2009 Avg Daily Flow*	*2009 Max Daily Flow*	*Ratio: Max to Avg*	*2010 Avg Daily Flow*	*2010 Max Daily Flow*	*Ratio: Max to Avg*	*2011 Avg Daily Flow*	*2011 Max Daily Flow*	*Ratio: Max to Avg*	*2012 Avg Daily Flow*	*2012 Max Daily Flow*	*Ratio: Max to Avg.*
Jan	1.6	6.2	3.875	1.5	2.6	1.733	1.4	2.6	1.857	1.4	2.9	2.071
Feb	1.6	3.5	2.187	1.4	2.6	1.875	1.7	5.2	3.059	1.3	2.2	1.692
Mar	2.3	4.7	2.043	1.2	2.3	1.917	2.1	5.0	2.381	1.5	3.2	2.133
Apr	2.0	4.3	2.150	1.2	2.6	2.167	2.8	5.8	2.071	0.9	1.5	1.667
May	1.7	4.2	2.470	2.1	7.1	3.380	1.6	5.3	3.313	1.0	3.3	3.300
Jun	1.6	3.8	2.375	0.9	2.6	2.889	0.9	1.7	1.889	0.7	1.5	2.143
Jul	0.8	1.8	2.250	0.8	2.0	2.500	1.8	10.0	5.556	0.9	3.3	3.667
Aug	1.0	2.0	2.000	0.9	1.7	1.889	0.7	1.3	1.857	0.8	1.2	1.500
Sep	1.2	3.2	2.667	0.8	1.6	2.000	1.2	3.0	2.500	1.22	2.4	1.525
Oct	1.7	4.3	2.529	0.8	1.7	2.125	1.0	2.4	2.400	1.00	2.0	1.967
Nov	1.2	4.1	3.147	1.0	2.0	2.000	1.9	5.5	2.895	1.20	2.0	1.667
Dec	1.6	3.7	2.313	1.4	3.4	2.429	1.8	4.1	2.278	2.30	4.30	1.869
Avg.	**1.51**	**3.82**	**2.500**	**1.17**	**2.68**	**2.242**	**1.57**	**4.32**	**2.573**	**1.19**	**2.48**	**2.384**

Source: Harrodsburg WWTP Monthly Operating Reports, January 2009 to August 2012.

An additional flow condition is also needed for planning purposes – the peak hourly flow rate. This rate is needed to determine the maximum hydraulic capacity of sewers and treatment units. To estimate this condition, for relatively new (and recently rehabilitated collection systems), Figure 1 in the 2004 Edition of the *"Ten States Standards"* is used for guidance. This figure indicates that for a community with a population on the order of 10,000 people, a peak hourly flow of three (3) times the average daily flow rate should be used. For a community of 18,500 people, this ratio

should be 2.8 times the average daily flow. Accordingly, this plan will use a peak hourly flow to average daily flow ratio of 2.8 in the existing collection system for the purpose of planning future wastewater collection and treatment facilities.

The MCSD RWFP provided estimates of future average daily wastewater flows that were based on 100 gallons per person per day. Peak hourly wastewater flow projections were estimated based on a ratio of peak hourly flow to average daily flow of approximately 4.0. No estimates were prepared for projected maximum daily flows in the MCSD RWFP, however it is reasonable to use a maximum daily flow to average daily flow of 2.0 based on the installation of new collector sewers in the MCSD service areas.

To summarize, the review of historical wastewater flow data for the Harrodsburg wastewater system has led to the following conclusions:

- Residential wastewater flow to the existing collection system averaged 132 gallons per person per day from 2009-2012. Future wastewater flow to the existing collection system should be estimated at 132 gallons per person per day.
- Commercial/industrial wastewater flow to the existing collection system averaged 0.28 MGD from 2009-2012. Future commercial/industrial flow to the existing collection system should include the existing 0.28 MGD plus an allowance for increased flow from these establishments.
- Process wastewater flow from Wausau Paper, which is directly discharged to the treatment plant, should be included in future flow projections, plus any known future process wastewater flows from Wausau Paper or other significant water use customers.
- Maximum daily flow and peak hourly flow from the existing collection system to the plant averaged 2.5 times and 2.8 times the daily average flow. These ratios should be used when projecting future flows from the existing collection system to the plant.
- For MCSD wastewater flows, future average daily flows should be based on 100 gallons per person per day. Maximum daily flows and peak hourly flows should be based on 2.0 times and 4.0 times the average daily flow. Flows from MCSD should be conveyed either directly to the plant or to a segment of the Harrodsburg collection system that has sufficient capacity to handle the flow without overloading the existing system during peak wet weather flow periods.

Historic Wastewater Characteristics

The characteristics of the influent wastewater to the plant varied significantly over the 2009-2012 period, which is normal for a plant that receives a combination of residential, industrial and commercial wastewater. The influent CBOD, for example, ranged in concentration from a fairly weak 82 mg/l (in April 2011 which was a month when flows to the plant were extremely high, causing the CBOD to be somewhat diluted), to 264 mg/l (during July 2012, which was a relatively dry month without any significant rain, causing the CBOD level to be somewhat stronger than normal).

The annual average concentration of CBOD during the 4-year period ranged from 114 mg/l to 149 mg/l, which indicates that the plant influent CBOD concentration is generally lower than for similar municipalities where the influent CBOD is usually on the order of 150 mg/l to 200 mg/l.

Plant influent concentrations of Total Suspended Solids (TSS) appeared to exhibit significant variations during this 44-month period. During the dry winter months, TSS levels were generally in the range of 150 mg/l to 250 mg/l, which is within the normal range for municipal wastewater. In summer periods, however, TSS concentrations of over 500 mg/l were recorded for extended periods, and the influent TSS level exceeded 1000 mg/l on a few occasions (July 2009, July and October 2010).

Discussions with plant staff indicate that the periods of high influent TSS levels were associated with times when plant tanks were being drained for service or significant recycle streams from the sludge treatment facilities (digesters, thickener) were being returned to the plant influent and the influent samples were tainted by this recycle flow. Consequently, for the purpose of this plan, influent TSS concentrations in the range of 150 mg/ to 250 mg/l will be used for design of future facilities.

Ammonia-Nitrogen (NH3-N) levels in the plant influent were in the range of 5.6 mg/l to 22.8 mg/l, with an average of approximately 15 mg/l during this period. This range and average NH3-N concentration is normal for a municipal wastewater.

Influent Phosphorus concentrations were not required to be monitored under the plant's KPDES permit, however monitoring of plant influent levels indicated a range of 3 mf/l to 8 mg/l with an average of approximately 5 mg/l. Effluent phosphorus levels indicated an average of approximately 2 mg/l, which is to be expected for a plant

employing biological secondary treatment where the biomass of organisms in the plant utilize phosphorus during the process to metabolize organics in the waste stream. Typically, wastewater contains 6-8 mg/l of total phosphorus, with 2-3 mg/l of the total as orthophosphate, 2-3 mg/l as polyphosphate and 1-2 mg/l as organically bound phosphorus. The orthophosphate and polyphosphate are both soluble and may be partially used up during biological treatment whereas the organic phosphorus is bound to the organic solids and is usually removed with the settled solids in the treatment plant's clarifiers. On the basis of the monitoring data for the plant, an average influent phosphorus concentration of 5 mg/l will be used for the purpose of this Facility Plan.

Historic Treatment Plant Performance

Plant performance during this period was generally excellent, producing effluent CBOD and TSS levels in the single digit range, which are well below the KPDES permit monthly limitations of 10 mg/l for CBOD and 30 mg/l for TSS. Effluent NH3-N levels were consistently less than 3 mg/l and often lower than 1 mg/l, which are well within the KPDES seasonal permit limitations of 4 mg/l for May 1 to October 31 and 10 mg/l for November 1 to April 30. Effluent phosphorus, although not a permitted pollutant, averaged 2.0 mg/l or less.

One measure of a treatment plant's performance is its compliance with the terms of its KPDES discharge permit. The KDOW regularly reviews the plant's performance as indicated in monthly Discharge Monitoring Reports as well as by conducting routine inspections of the facility. When the permit conditions are not met, the KDOW issues a Notice of Violation (NOV) to the City. In turn, the City takes appropriate action to correct the problem. Recent NOVs are described in Table 6-8.

It should be noted that these NOV's, although they represent a violation of the plant's discharge permit requirements, were generally corrected by plant operating system adjustments or by submitting completed data soon after the NOV was recorded. Some of these NOV's were due to missing data, which was provided soon thereafter.

None of these NOVs were persistent or long-lasting, and, since they were resolved quickly, they were not the subject of fines or penalties imposed by the KDOW.

By comparison with other municipal treatment facilities over a similar 5-year period, the number of NOVs (15) issued to Harrodsburg indicate that the plant was generally

operated in accordance with its permit conditions with only occasional permit limitation exceedences.

Table 6-8
Harrodsburg Wastewater Treatment Plant
Notices of Violation of KPDES Permit
2006-2012

NOV Date	*ID Number*	*Description*
2/21/2006	2006001	Total ammonia nitrogen exceeded monthly average and daily maximum permit limits for October 2005
8/28/2006	2006002	Total ammonia nitrogen exceeded monthly average permit limits for May 2006 and maximum limits for June 2006
11/16/2006	2006003	Total ammonia nitrogen exceeded monthly average and daily maximum limits for July 2006, monthly average limit for August 2006 and monthly average and daily maximum limits for September 2006
11/26/2008	2008001	Total Residual Chlorine exceeded daily maximum limit for July 2008
11/26/2008	2008002	Dissolved Oxygen did not meet minimum limit for August 2008
3/16/2009	2009001	Degradation of stream during sewer crossing construction in February 2009
5/28/2009	2009003	Total residual chlorine exceeded monthly average and daily maximum for February 2009 and March 2009
5/28/2009	2009001	Did not submit required E. Coli data for February 2009 and March 2009
6/2/2009	2009001	Did not submit DMRs at required intervals for December 2008 to February 2009
6/2/2009	2009004	Did not submit required E. Coli results for February 2009 and March 2009
8/20/2009	2009005	Did not submit required Total Nitrogen data for April 2009 and May 2009
8/20/2009	2009005	Did not submit required E. Coli data for April 2009
11/20/2009	2009005	E. Coli exceeded monthly average and daily maximum permit limits for July 2009
10/17/2011	2011001	Whole Effluent Toxicity exceeded permit limit in August 2011
12/12/2011	2011002	Biochemical Oxygen Demand exceeded monthly average and maximum weekly permit limits for July 2011

Source: Open Records Request, Kentucky Division of Water (October, 2012)

Wastewater System Staff

The wastewater system staff includes a staff of twelve, six for the collection system and six for the treatment plant. The collection system staff includes a Superintendent (Mr. Troy Gowins), an Assistant Superintendent (Mr. Jason Sanford), three Public Service Workers III and one Public Service Worker II. The treatment plant staff includes a Superintendent (Mr. Roy Freeman), a Class III Senior Operator (Mr. Mike Mullins), two Class II Operators, a Public Service Worker II and a part-time employee. Funds are provided for the staff to receive routine training and refresher training for their respective positions.

Chapter 7

Chapter 7: FORECASTS OF WASTEWATER FLOWS AND WASTE LOADS

Introduction

This chapter provides projections of future wastewater flows to be handled by the Harrodsburg collection and treatment facilities. A forecast of future wastewater loads to the treatment facility is also provided.

Wastewater Flow Projections

In Chapter 6 an analysis of historic flow data for the period of 2009-2012 was completed. This analysis, which will be used in this chapter for projecting future wastewater flows, indicated the following:

- The plant's daily hydraulic loading has historically been subject to seasonally high flow rates on the order of 1.60 MGD for eight ± months out of the year. Paragraph 11.241a of the 2004 Edition of the *"Ten States Standards"* allows this rate to be used as the historic average daily flow.
- The plant received an average daily commercial/industrial flow rate of 0.28 MGD during 2009-2012. The plant also began receiving an average daily flow of 0.6 to 0.7 MGD of process wastewater that was pumped directly to an equalization/cooling lagoon from Wausau Paper.
- The historic residential flow during 2009-2012 was 1.32 MGD (1.60 MGD total flow minus 0.28 MGD commercial/industrial flow). For the average population of 10,000 residents that were served by the City's wastewater system in this period, the residential flow equated to 132 gallons per person per day.
- During the four ± dry months of each year during 2009-2012, the plant received an average daily flow of 0.92 MGD. When the average commercial/industrial flow of 0.28 MGD is deducted from this total, the average daily dry weather residential flow during this period was 0.64 MGD, or 64 gallons per person per day.
- The average rate of infiltration/inflow during wet weather periods from 2009-2012 was determined by subtracting the dry weather residential flow (0.64 MGD) and dry weather commercial/industrial flow (0.28 MGD) from the average daily wet weather flow (1.60 MGD). The average I/I rate was therefore 0.68 MGD during the wet weather months of 2009-2012.

Chapter 6 also included a discussion of the approach to be taken in projecting future wastewater flows to the City's wastewater system. This discussion concluded that:

- Residential flows from Harrodsburg customers currently served by the wastewater collection system should be based on the current per capita rate from 132 gallons per person per day.
- Residential flows from Harrodsburg customers that will reside outside the current Corporate Limits but within the Planning Area boundary should be based on the per capita rate of 100 gallons per capita per day. This rate is used due to the improved sewer construction techniques that will be used when these collection systems are built, resulting in lower I/I rates than in the existing collection system.
- Commercial/industrial flow projections should be based on historic metered flow rates from existing customers (an average of 0.28 MGD during 2009-2012) plus an allowance for additional future flows from these commercial/industrial customers.
- Flows of process wastewater from Wausau Paper to the treatment plant should be based on the historic metered flow rate (0.6 to 0.7 MGD average). Peak flows of Wausau Paper process wastewater should be based on the occasional increased discharges during "grade changes" of Wausau's production operations. In the event that the City of Harrodsburg agrees to provide wastewater treatment for future expansion(s) of Wausau's production operations, the City's treatment facility may in turn require additional expansion(s) beyond that determined in this Facility Plan Update.
- Projections of future maximum daily flows in the existing wastewater collection system should be based on historic data from 2009-2012, which indicated that maximum daily flows averaged 2.5 times the average daily flows during this period.
- Projections of future peak hourly flows in the existing wastewater collection system should be based on Figure 1 from the 2004 Edition of *"Ten States Standards"*, which recommended that the peak hourly flow rate should be based on 2.8 times the average daily flow for a system serving the projected population contributing to the Harrodsburg wastewater facilities.
- Projections of MCSD average daily flows should be based on the estimates presented in the MCSD RWFP, which in turn are equivalent to 100 gallons per person per day. Maximum daily wastewater flows from MCSD should be based on 2.0 times the average daily flows. Peak hourly flow rates from MCSD should be based on 4.0 times the average daily flows.

Base Wastewater Flows

This paragraph provides projections of average daily, maximum daily and peak hourly flows to the treatment plant for the Planning Period of this Plan.

Residential Wastewater Flow Projections:

The residential flow that will discharge to the Harrodsburg wastewater system in the future will come from three sources: Residents within the existing Harrodsburg Corporate limits, residents that live outside of the Harrodsburg Corporate Limits but within the Planning Area, and residents of MCSD. The projected population for these three residential groups for 2012 to 2032 was provided in Table 4-2. The per capita flow rate for each group was discussed in the previous paragraph.

On that basis, Table 7-1 provides the average daily residential wastewater flow projections for the Planning Period of this Plan.

Table 7-1
Average Daily
Residential Wastewater Flow Projections, in Gallons/Day
Harrodsburg Planning Area, 2017 to 2032

Year	*Flow from Residents Within the City's existing Corporate Limits (at 132 GPD)*	*Flow from Residents outside the City's existing Corporate Limits but within the Planning Area (at 100 GPD)*	*Flow from MCSD Residential Customers (at 100 GPD)*	*Total Average Daily Residential Flow to Harrodsburg Wastewater Facilities*
2017	1,373,000	35,000	375,000	1,783,000
2022	1,370,000	55,000	440,000	1,863,000
2027	1,367,000	72,500	510,000	1,949,500
2032	1,360,000	95,000	615,000	2,070,000

Commercial and Industrial Wastewater Flow Projections:

In addition to the historic average daily commercial/industrial flow of 0.28 MGD (per Table 6-6), flow projections for these establishments have been made in Table 7-2 for the planning period of this Facilities Plan.

An additional flow projection has been included in Table 7-2 for process wastewater from Wausau Paper, which represents a discharge from an expanded production facility that was built in 2012 and began producing process wastewater in December 2012. Unlike the sanitary wastewater from this plant (which discharges approximately 22,380 gallons per day to the City's wastewater collection system) the process wastewater produced by this expansion is pumped continuously (24 hours/day, 7 days/week) by a pump station via a dedicated force main directly to the Harrodsburg wastewater treatment plant. The pump station is owned and operated by Wausau Paper and is equipped with variable speed pumps that are capable of discharging 500 GPM to 1500 GPM to the treatment plant. In December 2012, this discharge averaged 656,000 gallons per day, which equates to a continuous pumping rate of 456 GPM. The higher pumping rate of 1500 GPM is designed to be used occasionally (estimated at 3-4 hours duration) during periodic "grade changes" in Wausau's process operation.

At the City's treatment plant, the process wastewater from Wausau is conveyed into a flow equalization/cooling lagoon which stores the wastewater before it is conveyed into the treatment plant. The lagoon is designed to store the periodic high flows of 3-4 hours duration during Wausau's "grade changes" so that the flow into the plant is discharged at a constant rate of no more than 720,000 gallons per day. The sanitary wastewater from Wausau continues to be discharged to the Harrodsburg wastewater collection system by a separate 150 GPM pump station.

Discussions with Wausau officials during the preparation of this Plan Update indicate that Wausau will be conducting a feasibility study in 2013 or 2014 to evaluate options for further expansions of production operations at their Harrodsburg facility. Options include the possibility of either one or two more future process expansions during the Planning Period, either of which would equate to a substantial additional discharge of process wastewater to the City's treatment plant. If either of these future expansions by Wausau were to occur, additional flow equalization/cooling lagoon capacity and additional wastewater treatment plant capacity would likely be required. In addition, additional water treatment plant capacity would need to be provided by the City to accommodate the water demand associated with either expansion.

While a firm date for either of these possible future expansions is unknown at this time, it is perceived that Wausau will make a decision regarding this matter within the 2013-2014 timeframe. On that basis, it may be necessary to amend this Plan to account for this matter, once the Wausau feasibility study has been completed and a decision has been made between the City and Wausau Paper concerning these possible future expansion(s).

Accordingly, Table 7-2 summarizes the projected average daily commercial/industrial wastewater discharges to the Harrodsburg wastewater facilities for the Planning Period.

Table 7-2
Average Daily
Commercial/Industrial Flow to Treatment Plant, in Gallons/Day
Harrodsburg Planning Area, 2017 to 2032

Year	*Commercial and Industrial Wastewater Flows From Existing Customers to the City's Wastewater Collection System*	*Wausau Process Wastewater Flow Discharged to the City's Wastewater Treatment Plant*	*Total Commercial/Industrial Wastewater Flow to the City's Wastewater Treatment Plant*
2017	300,000	650,000	950,000
2022	325,000	650,000	975,000
2027	350,000	650,000	1,000,000
2032	375,000	650,000	1,025,000

Sources: City of Harrodsburg Billing Records (10/09 to 10/12), Discussions with Wausau Paper

The reason that the Wausau process wastewater flow is shown separately in Table 7-2 from the other commercial/industrial flows is that the Wausau process flow does not pass through the wastewater collection system. This means that when future maximum daily and peak hourly flows to the treatment plant are projected, the Wausau process wastewater flow will not be included in the same manner as are flows from residential and other commercial/industrial customers that discharge directly to the collection system. This rationale is shown in the summary of projected wastewater flows in the following paragraph.

Average Daily Wastewater Flow Projections:

Table 7-3 summarizes the projected daily average wastewater flows to the Harrodsburg treatment plant for the Planning Period.

Table 7-3
Average Daily Flow Projections to Treatment Plant, in Gallons/Day
Harrodsburg Planning Area, 2017 to 2032

Year	*Average Daily Flow from Residential Customers within City's existing Corporate Limits*	*Average Daily Flow from Residential Customers outside existing Corporate Limits but within the Planning Area*	*Average Daily Residential Flow from MCSD Customers*	*Average Daily Flow from Commercial /Industrial Customers*	*Average Daily Wausau Paper Process Wastewater Flow*	*Total Average Daily Flow to City's Wastewater Treatment Plant*
2017	1,373,000	35,000	375,000	300,000	650,000	2,733,000
2022	1,370,000	55,000	440,000	325,000	650,000	2,840,000
2027	1,367,000	72,500	510,000	350,000	650,000	2,949,500
2032	1,360,000	95,000	615,000	375,000	650,000	3,095,000

Maximum Daily Wastewater Flow Projections:

Maximum daily flow projections for the planning period are presented in Table 7-4. The maximum daily flows from the residential population within the existing Harrodsburg Corporate Limits are based on 2.5 times the average daily flows from this population group. The maximum daily flows from the future population group that is anticipated to reside in developments between the City's Corporate Limits and the Planning Area boundary are based on 2.5 times the average daily flows from that population group.

The maximum daily flows from MCSD residential customers are based on 2.0 times the average daily flow from that population group. The maximum daily flows from commercial/industrial customers (except the Wausau Paper process flow) are based on 2.5 times the average daily flows from these customers, since this flow is conveyed to the treatment plant in the existing collection system along with the City's residential wastewater flow.

The maximum daily flows of process wastewater from Wausau Paper are based on the days during "grade changes", when the discharge from Wausau is approximately 500 GPM for 20 hours and 1,500 GPM for 4 hours, for a total maximum daily discharge of 960,000 GPD.

Table 7-4 summarizes the projected maximum daily wastewater flows for the Planning Period.

Table 7-4
Maximum Daily Flow Projections to Treatment Plant, in Gallons/Day
Harrodsburg Planning Area, 2017 to 2032

Year	*Maximum Daily Flow from Residential Customers within City's existing Corporate Limits*	*Maximum Daily Flow from Residential Customers outside existing Corporate Limits but within the Planning Area*	*Maximum Daily Residential Flow from MCSD Customers*	*Maximum Daily Flow from Commercial /Industrial Customers*	*Maximum Daily Wausau Paper Process Wastewater Flow*	*Total Maximum Daily Flow to City's Wastewater Treatment Plant*
2017	3,432,500	87,500	750,000	750,000	960,000	5,980,000
2022	3,425,000	137,500	880,000	812,500	960,000	6,215,000
2027	3,417,500	187,500	1,020,000	875,000	960,000	6,460,000
2032	3,400,000	237,500	1,230,000	937,000	960,000	6,764,500

Peak Hourly Wastewater Flow Projections:

Peak hourly flow projections for the planning period are presented in Table 7-5. The peak hourly flows from the residential population within the existing Harrodsburg Corporate Limits are based on 2.8 times the average daily flows from this population group. The peak hourly flows from the future population group that is anticipated to reside in developments between the City's Corporate Limits and the Planning Area boundary are based on 2.8 times the average daily flows from that population group.

The peak hourly flows from MCSD residential customers are based on 4.0 times the average daily flow from that population group. The peak hourly flows from commercial/industrial customers (except the Wausau Paper process flow) are based on 2.8 times the average daily flows from these customers, since this flow is conveyed to the treatment plant in the existing collection system along with the City's residential wastewater flow.

The peak hourly flows of process wastewater from Wausau Paper are based on the days during "grade changes", when the peak hourly discharge from Wausau is 1,500 GPM for 4 hours, which is equivalent to 2,158,300 GPD.

Table 7-5 summarizes the projected peak hourly wastewater flows for the Planning Period.

Table 7-5
Peak Hourly Flow Projections to Treatment Plant, in Gallons/Day
Harrodsburg Planning Area, 2017 to 2032

Year	*Peak Hourly Flow From Residential Customers within City's existing Corporate Limits*	*Peak Hourly Flow from Residential Customers outside existing Corporate Limits but within the Planning Area*	*Peak Hourly Flow from Residential MCSD Customers*	*Peak Hourly Flow from Commercial /Industrial Customers*	*Peak Hourly Wausau Paper Process Wastewater Flow*	*Total Peak Hourly Flow to City's Wastewater Treatment Plant*
2017	3,844,400	98,000	1,500,000	840,000	2,158,300	8,440,700
2022	3,836,000	154,000	1,760,000	910,000	2,158,300	8,818,300
2027	3,827,600	210,000	2,040,000	980,000	2,158,300	9,215,900
2032	3,808,000	266,000	2,460,000	1,050,000	2,158,300	9,742,300

Based on the flow projections in Tables, 7-3, 7-4 and 7-5, the following flows will be used as a basis for evaluating alternative treatment approaches in Chapter 8:

- Average Daily Flow = 3.50 MGD
- Maximum Daily Flow = 6.76 MGD
- Peak Hourly Flow = 9.74 MGD

Waste Load Projections

From the plant's Monthly Operating Reports for 2009-2012, and as discussed in Chapter 6, the projected daily average concentrations of CBOD, TSS, NH3-N and Phosphorus received at the treatment plant will be 175 mg/l, 200 mg/l, 15 mg/l and 5 mg/l, respectively. It is not expected that these concentrations will change significantly over the planning period due to the addition of flows from MCSD or from future commercial and industrial customers.

On that basis, the following waste load projections for the design year average daily conditions will be used in Chapter 8 for evaluating alternative treatment approaches:

- CBOD load at 175 mg/l for 3.50 MGD = 5,108 pounds/day
- TSS at 200 mg/l for 3.50 MGD = 5,838 pounds/day
- NH3-N at 15 mg/l for 3.50 MGD = 438 pounds/day
- Total Phosphorus at 5 mg/l for 3.50 MGD = 146 pounds/day

Chapter 8

Chapter 8: EVALUATION OF ALTERNATIVES

Introduction

This chapter includes an evaluation of alternatives for Harrodsburg's wastewater services for the 2012 to 2032 Planning Period. In each alternative, wastewater collection and treatment plant projects that are currently under design or construction are identified as projects that will be completed during the first phase (0 to 2 years) of the Planning Period. Other projects are identified for construction during either the second phase (3-10 years) or the third phase (11-20 years) of the Planning Period.

The construction of the majority of the City's currently planned and/or designed projects for the wastewater collection system and treatment plant will be completed within the first phase. The majority of the remaining projects, needed for additional collection and/or treatment plant capacity to serve the remainder of the Planning Period, will be designed and built in the second phase. The construction of some projects in the third phase is considered at the end of this chapter. In the event that Wausau Paper determines that it will further expand its current production facilities, requiring the discharge of additional process wastewater to the plant beyond that currently received, the construction of treatment plant facilities associated with Wausau Paper's additional flow may be needed in the second phase (or possibly in the third phase).

Four alternatives are evaluated in this chapter:

- Alternative 1 - No Action. Under this alternative, no improvements are made to the wastewater collection system or to the wastewater treatment plant. The existing wastewater facilities will remain in their current condition for the Planning Period.
- Alternative 2 - Optimization of Existing Facilities. Under this alternative, the currently designed and planned Phase 1 and Phase 2 projects for improvements to the wastewater collection system and Phase 1 projects for the treatment plant will be completed. In addition, improvements will be made to the treatment plant in Phase 2, to add additional treatment capacity using the same treatment processes currently employed. This includes the continued use of the existing Rotating Biological Contactors for secondary treatment. The use of the existing sludge processing system (gravity thickening, anaerobic digesters and sludge drying beds) will also continue under this alternative.

- Alternative 3 - Regionalized Treatment using new Oxidation Ditches for Secondary Treatment. Under this alternative, the currently designed and planned Phase 1 and Phase 2 projects for improvements to the wastewater collection system and Phase 1 projects for the treatment plant will be completed. In addition, expanding and upgrading improvements will be made to the treatment plant in Phase 2, to replace the existing secondary treatment process with Oxidation Ditches. The use of the existing Rotating Biological Contactors will be discontinued, as would the existing Primary Settling Tanks and Final Clarifiers. The sludge thickening and digestion system will be replaced with new aerated sludge holding tanks and belt filter presses. UV disinfection will replace the existing chlorination/de-chlorination system.
- Alternative 4 - Regionalized Treatment using new Vertical Loop Reactors for Secondary Treatment. This alternative will be identical in all respects Alternative 3, except that Vertical Loop Reactors will be provided in Phase 2 instead of the Oxidation Ditches. The currently designed and planned Phase 1 and Phase 2 projects for improvements to the wastewater collection system and Phase 1 projects for the treatment plant will be completed.

Discussion of Alternatives

Alternative 1 – No Action

Under this alternative, no further wastewater collection or treatment system improvements will be completed during the Planning Period. All currently designed and planned projects would be cancelled. If on-going and planned sewer system projects are not completed, the wastewater collection system will lack the needed capacity to convey flow to the plant, and wet weather conditions could result in overflows from manholes, bypasses from pump stations or wastewater backing up into residences. These conditions would also be cause for the State to issue an Agreed Order that would require corrective action by the City, necessitating the expenditure of funds for design and construction at a later point in the Planning Period.

If no action is taken, the plant's current rated capacity (2.68 MGD) will be surpassed within 5± years. Additionally, without adding more flow equalization capacity to store high flows during wet weather periods, the plant will be subject to periodic hydraulic overloads which may cause solids to "wash out" of the plant, decreasing the ability of the plant to provide effective treatment and resulting in discharges that exceed the permit limitations for extended periods until the plant's treatment processes are restored to their required performance level.

If no action is taken, several current treatment plant equipment deficiencies (due to equipment age and condition) would continue unabated without being upgraded. Examples include influent pumping, screening and grit removal facilities. The biological treatment system, which is based on the use of Rotating Biological Contactors (RBCs) – an out-of-date process which has fallen out of favor within the wastewater industry and for which spare parts continue to be in very limited supply – could place the plant's future ability to meet its discharge permit requirements at risk.

It is anticipated that at some point in the Planning Period that the State will issue a new discharge permit for the treatment plant that will include an effluent total phosphorus limitation and possibly an effluent total nitrogen limitation, or a more stringent seasonal Ammonia-Nitrogen limitation than that included in the current permit. The ability of the existing plant to meet any of these discharge limitations, without the addition of treatment facilities specifically provided to meet such requirements, will be problematic.

If needed equipment replacements are not completed or if the plant is not modified to include treatment processes that will meet anticipated regulatory requirements, the existing treatment facility will likely be in frequent violation of the Clean Water Act and the City will be required by the State to enter into an Agreed Order to make the required modifications. This would necessitate the need for the City to provide funds for design and construction of these modifications at a later point in the Planning Period.

For these reasons, the No Action Alternative is not a viable alternative and is rejected from further consideration in this Plan.

Alternative 2 - Optimization of Existing Facilities

Wastewater Collection System Improvements

Under this alternative, the on-going and planned Phase 1 and Phase 2 improvements to the wastewater collection system will continue to be planned and constructed.

Although the City has been rehabilitating its sewers during the past 15 years to reduce infiltration and inflow as well as to eliminate wet weather induced overflows, excess capacity is not available in the older "downtown" area through which the majority of flows must pass as wastewater is conveyed from customers on the periphery of the

system to the treatment plant, which is located on the northwest side of town. This is especially the case for wet weather flows generated by customers outside and to the east and north of the Harrodsburg Planning Area, which would overload the City's undersized "downtown" sewer system. To avoid overloading the existing collection system, MCSD will remain responsible for the construction of its own interceptor sewers, pump stations and force mains to convey future wastewater to Harrodsburg from its customers in Mercer County, except for those customers in the Burgin and Herrington Lake areas which are currently planned to be pumped to Danville. Since the Harrodsburg collection system does not have capacity to convey flows from MCSD customers through it, MCSD will be required to route its flows either directly to the treatment plant or to a part of the Harrodsburg collection system where sufficient capacity is provided for all customers.

This approach is a continuation of the strategy that was implemented following the adoption of the City's 2000 Facilities Plan Update. The primary goal of this approach is to reduce the impact of flows on the older "downtown" part of the collection system which is made up of a series of primarily 8-inch sewers that are adequate to serve the "downtown" area of the City but lack sufficient capacity to also convey additional flows contributed from areas around the perimeter of the City. Occasional wet weather overflows and other associated problems in this part of the system have continued to occur (and have been reported to KDOW). This strategy incorporates cleaning, repair and remediation of the affected sewers under a series of on-going and planned projects. Over time, in the event that such problems occur in other parts of the collection system, the City plans to continue addressing these issues.

It is cost-prohibitive to undertake an approach that would replace existing sewers in the "downtown" area with larger sewers in order to provide such capacity. Instead, the City will maintain its "downtown" system and will construct new peripheral sewers to reduce or eliminate additional flows on the "downtown" part of the system, while also providing capacity to handle flows from future growth areas within the Planning Area and from MCSD customers.

This strategy was previously employed successfully with the construction of the southwest interceptor sewer around the southwestern perimeter of the City, the Western Regional Pump Station on the west side of town and the force main to the treatment plant influent sewer. This project receives flows from the areas served by five former pump stations plus flows from other local customers that had previously

discharged into the "downtown" part of the City's system, and flows from the Brightleaf area (a MCSD customer). The former pump stations frequently overflowed or were bypassed during wet weather periods. They have been taken out of service and their flows no longer overload the City's "downtown" sewers during wet weather events.

This strategy was also used for handling the process wastewater from Wausau Paper, located on the northwest side of the City. Rather than discharge this industry's waste stream into the existing collection system, which could have resulted in overloaded sewers during wet weather periods (and possibly during dry weather periods), a dedicated pump station and force main were built to convey Wausau Paper's process wastewater directly to the treatment plant, where an existing lagoon was modified to receive and equalize the flow before it is discharged into the plant for treatment.

It is the City's intent to continue with this strategy going forward. This will apply to flows from existing and future customers within the Harrodsburg Planning Area that may otherwise create capacity problems in the existing collection system, as well as future flows that are to be conveyed to Harrodsburg from MCSD.

On that basis, the City will undertake the following wastewater collection system projects during the 0-2 year or the 3-10 year phases of the Planning Period, as indicated below and on Exhibit 8-1.

- Phase 1 (0 to 2 years) Wastewater Collection System Projects:
    - Continue with the on-going planned projects for cleaning and rehabilitation of sewers to eliminate wet weather induced overflows. These projects are the last significant sewer rehabilitation projects planned by the City to eliminate overflows and bypasses in the "downtown" portion of the existing collection system. The first of these projects was bid for construction in November 2012 at a cost of $260,185 and is in the process of being completed at this writing. This includes replacement and repair of collector lines and manholes in Greenville Street, College Street and Cherokee Heights, and cleaning of the main interceptor sewer that conveys wastewater to the treatment plant. Estimated project costs are $418,500 in 2013 dollars.

- The second sewer rehabilitation project includes cleaning, video inspection and rehabilitation of collector lines in the Blue Ridge, Cardwell, Green Acres and Brentwood neighborhoods. This project has an estimated project cost of $576,000 (2011 dollars, per the KIA Clean Water Project Profile). Bidding for construction of this project is scheduled for mid- to late-2013 if funds are available. In 2013 dollars, the estimated project cost is $647,000.

- Increase the capacity of the Western Regional Pump Station by adding two more submersible pumps each with a capacity of 1,680 GPM at 63 feet TDH, thus providing a total of four pumps of equal capacity. This will ensure sufficient capacity for flows that are conveyed from the Corning Pump Station (discussed below) and future customers along U.S. 127 bypass on the eastern side of town. If a U.S 127 bypass is provided on the west side of town, this pump station upgrade will also provide capacity to handle these flows. This project has an estimated project cost of $428,640 (in 2011 dollars, per KIA Clean Water Project Profile) and is scheduled for construction in late-2013 if funds are available. In 2013 dollars, the estimated project cost is $482,000.

- Phase 2 (3 to 10 years) Wastewater Collection System Projects:

  - Construct a new pump station (known as the new Corning Glass Pump Station) on the east side of town, and a force main from the new pump station along the southeastern perimeter of the City, to a manhole on the southwest interceptor. This project will remove flows discharged by residential, commercial and industrial customers in the east side of town that are currently discharged to the “downtown” part of the collection system, further protecting the “downtown” portion of the collection system from overloading during wet weather periods. Flows will be conveyed to the southwest interceptor, and from that point via the Western Regional Pump Station and its force main to the treatment plant. This project was estimated to cost $810,000 (in 2011 dollars, per the KIA Clean Water Project Profile). In 2013 dollars, the estimated project cost of this project is $910,500.

- Provide sewer service to two currently unsewered areas, Riverview Estates and Fountaine Trace. This will eliminate on-site systems from approximately 140 homes in the City's Planning Area. A KIA Clean Water Project Profile has not been developed for this project at this writing. For planning purposes, this project has an estimated project cost of $400,000 in 2013 dollars

- Plan for the connection of a force main (constructed by MCSD) from a pump station located in the Salvisa or McAfee area to a point that connects to the 27-inch treatment plant influent sewer. This force main was described in the MCSD RWFP as part of a larger $10,141,000 project (2006 dollars, per the MCSD RWFP) to be funded by MCSD. The 2013 project cost estimate for this project is unknown. Funding for this project will be the responsibility of MCSD.

- Plan for the connection of a gravity sewer (constructed by MCSD) from the Stringtown area that connects to the Harrodsburg collection system at a manhole in the northeast part of the City. This project was described in the MCSD RWFP as part of a larger $2,210,000 project (2006 dollars, per the MCSD RWFP) to be funded by MCSD. The 2013 project cost estimate for this project is unknown. Funding for this project will be the responsibility of MCSD.

- Phase 3 (11 to 20 years) Wastewater Collection System Projects:

  - Continue to monitor the operation of the collection system, especially during wet weather periods, to determine if further projects are needed to eliminate overflows and other similar problems. If such problems are found to occur, provide funding for the planning, design and construction of the required improvements to eliminate such problems.

Wastewater Treatment Plant Improvements

Under this alternative, improvements will be made to increase the capacity of the existing plant using the same treatment processes that are currently employed. The goal

of this alternative is to modify the plant so that existing treatment systems can achieve the anticipated level of treatment that will be required during the Planning Period.

Accordingly, this alternative is evaluated based on the projected wastewater loads developed in Chapter 7 as well as the anticipated future more stringent discharge limitations that will be included in the plant's discharge permit at some point during the Planning Period. The existing plant has provided excellent treatment over its lifetime, meeting the requirements of the plant's current discharge permit. However, some of the plant's components will need to be replaced to meet more stringent future nutrient discharge limitations that are likely to be issued during the 20-year Planning Period of this Facilities Plan.

The anticipated discharge limitations indicated in Table 8-1 have been used in evaluating each wastewater treatment alternative at the design average daily discharge rate of 3.5 MGD and an equalized peak flow rate of 6.8 MGD.

Table 8-1
Anticipated WWTP Discharge Limitations for the Planning Period, 2012-2032

Parameter	May 1-Oct 31	Nov 1 – Apr 31
Carbonaceous 5-Day Biochemical Oxygen Demand	10 mg/l	10 mg/l
Total Suspended Solids	30 mg/l	30 mg/l
Ammonia Nitrogen*	2 mg/l	10 mg/l
Dissolved Oxygen	7 mg/l	7 mg/l
Total Phosphorus*	1 mg/l	1 mg/l
Total Nitrogen*	10 mg/l	10 mg/l
Total Residual Chloride	0.011 mg/l	0.011 mg/l
pH (Standard Units)	6 to 9	6 to 9
Chronic Toxicity (TU_c)	1.0	1.0
Escherichia coli	130 colonies per 100 ml	

*Based on an April 30, 2013, letter received from KDOW (in Appendix 8), It is anticipated that the plant's next KPDES permit (to be issued for the period of December 8, 2013 to December 7, 2018) will include the requirement for effluent monitoring of total phosphorus and total nitrogen, and seasonal

ammonia-nitrogen limitations of 2 mg/l in summer and 10 mg/l in winter. It is anticipated that before the end of the Planning Period, the plant's KPDES permit will include a total phosphorus effluent limitation of 1 mg/l and a total nitrogen effluent limitation of 10 mg/l. If the total phosphorus limit is lower than 1.0 mg/l, or the total nitrogen limit is lower than 10 mg/l or if lower seasonal ammonia-nitrogen limitations are required, then additional treatment facilities beyond those evaluated in this chapter may be required, such as provisions for chemical addition and tertiary filtration.

Anticipated requirements for reliability and redundancy for the plant are based on a Grade C reliability classification assigned by KDOW to the plant and on the requirements contained in 401 KAR 5:005, Sections 7 and 13. Biological treatment processes must be able to meet permit limitations during planned maintenance with one basin out of service. Clarification must be able to meet the surface overflow rate requirements at peak hourly flow rates and maximum daily solids loading rates with all clarifiers in service.

This alternative includes the following on-going and planned Phase 1 projects at the wastewater treatment plant. The City intends to complete the construction of these projects in the 0-2 year phase of the Planning Period:

- Complete the following plant upgrade projects in late 2013, actual bid cost of $3,723,000 (in 2013 dollars).
    - Replace the influent screw pumps with new screw pumping equipment equal in capacity to the existing pumps (5.28 MGD), in the existing structure. However, based on their variable output design, they are each capable of pumping as much as 10 MGD according to the equipment manufacturer.
    - Replace the mechanically cleaned screen with a new screen of the same capacity (5.28 MGD) in the existing screen channel. A press/washer will be provided to dewater the screenings prior to landfill disposal. Also, provide a new plant influent flow meter and sampler.
    - Replace the existing digester heat exchanger and associated piping for the sludge digestion facilities with a new boiler housed in a new building.

- Build a new 2,400 SF Sludge Processing Building to house a belt filter press for dewatering of anaerobically digested sludge, with associated feed pumps, polymer conditioning system, backwash system and cake conveyor. Dewatered sludge will continue to be disposed as dry cake in landfill. The existing sludge storage lagoon and most of the existing sludge drying beds will be kept as reserve sludge holding and dewatering facilities.
- Install a plant-wide Supervisory Control and Data Acquisition (SCADA) system to monitor plant performance and control key process operations.
- Complete site work and pavement improvements, as needed, to support the above projects.

Under this alternative, the City will complete the following Phase 2 projects at the wastewater treatment plant during the 3-10 year phase of the Planning Period

- Construct a new 3,300 SF Preliminary Treatment Building to house two mechanically cleaned screens and a manually cleaned bar rack, two vortex-type grit chambers and two grit classifier/dewatering units. These processes will be designed for a flow equalized peak flow of 6.8 MGD. The mechanically cleaned screen provided in Phase 1 would be relocated to this building in this phase.
- Relocate the influent sampling location to a point on the downstream side of the screens in the Preliminary Treatment Building. Relocate the influent sampler to this building.
- Replace the influent flow meter with a new flow meter vault on the downstream side of the Preliminary Treatment Building to measure plant influent flow. Use this reading to serve as the plant influent flow record and to control flow-dependent plant processes.
- Construct a submersible pump station to convey in-plant drainage and recycle flows to a point on the downstream side of the influent flow meter.
- Increase the treatment capacity of the existing Primary Settling Tanks for a peak flow of 6.8 MGD by adding additional tankage and equipment.
- Increase the capacity of the existing Rotating Biological Contactors for a peak flow of 6.8 MGD by adding additional RBC basins and equipment. This will be contingent on the availability of the required RBC equipment.

- Increase the capacity of the existing Final Clarifiers for a peak flow of 6.8 MGD by adding additional tankage and equipment.
- Replace the chlorination/de-chlorination plant effluent disinfection facilities with ultraviolet disinfection facilities capable of disinfecting a peak flow of 6.8 MGD. Convert the existing Chlorination Building to house a plant effluent sampler, the UV system electrical and control equipment and a new Non-Potable Water pumping system.
- Replace the existing plant effluent Parshall flume with a new Parshall flume, and connect its discharge to the existing cascade aeration ladder.
- Add an additional gravity sludge thickener, and add another secondary anaerobic digester to increase the capacity of the sludge treatment facilities.
- Install a second belt filter press in the Sludge Processing Building, along with associated polymer, wash water and belt conveyor equipment.
- Upgrade the plant electrical and control systems, including provision of a generator for use as a secondary source of power for emergency conditions and expand the plant SCADA system to automate and monitor new plant operations. Replace major electrical panels and distribution system components as needed.
- Revise the yard plant piping systems, site drainage/grading, roads, yard lighting and other site work as needed.

Under this alternative, the following Phase 3 wastewater treatment plant projects would be required <u>only</u> if Wausau Paper completes another process expansion during the Planning Period, similar to the expansion that Wausau completed in 2012. These projects are identified as Phase 3 projects to list them separately from the projects listed above, however the construction of these projects could be required in Phase 2 if Wausau Paper expands its process operations earlier than anticipated.

- Provide additional equalization basin capacity to receive and store Wausau Paper's additional process wastewater before it is discharged to the plant for treatment. This will require either the expansion of the existing lagoon that is currently used to equalize Wausau Paper's wastewater or the construction of a new lagoon that would store the additional flow.
- Construct additional preliminary and secondary treatment facilities, increase the capacity of the effluent disinfection system, and provide additional sludge holding and dewatering capacity for the added flow contributed by Wausau Paper.

- Install additional yard piping, electrical and control system equipment and other plant components as needed.

This alternative involves optimizing the use of the existing treatment technologies by continuing to use the majority of the existing process components, with upgrades and other modifications as needed to increase the treatment capacity and to meet the anticipated discharge limitations. A key component of this alternative includes the continued use of the existing Rotating Biological Contactors (RBCs) and expanding the RBC facility to provide capacity for a peak flow of 6.8 MGD.

There are two major concerns in regard to continuing to use the RBC system in the future. The first concern is that the RBC system is not recognized as a viable alternative for providing biological nutrient removal (i.e., treatment that would produce an effluent in compliance with the anticipated discharge limitations). The RBC system, which is based on incorporating an attached growth media within a suspended growth reactor, is generally referred to as a fixed film system. The only fixed film technologies recognized by the US EPA that have been shown to achieve biological nutrient removal to the levels anticipated to be needed for this plant are the Integrated Fixed Film Activated Sludge (IFFAS) system, the Moving Bed Biofilm Reactor (MBBR) system and the Biological Aerated Biofilter (BAF) system. These systems are somewhat similar to RBCs in that they both provide for the growth of bacteria on submerged solid media, which allows for oxidation of carbonaceous matter and nitrification. However, unlike RBCs, these systems are also capable of denitrification and phosphorus removal with the inclusion of an in-basin anoxic zone and an exterior anaerobic reactor. RBCs, on the other hand, are not considered by the US EPA as a viable system for biological nutrient removal (see *"Nutrient Control Design Manual",* EPA/600/R-10/100, August 2010). Even with the addition of anaerobic and anoxic reactors upstream of the RBCs to provide processes that are capable of achieving phosphorus removal and denitrification, and with the replacement of the existing rectangular clarifiers with more effective circular clarifiers to improve solids removal, a biological treatment system that includes RBCs will likely not be capable of meeting the anticipated effluent limitations presented in Table 8-1.

The second concern with RBCs is that this process has fallen out of favor nationwide as a viable process for secondary or advanced wastewater treatment and is no longer supported by companies that formerly manufactured the equipment and components of RBC systems. This technology has a long history of failures of structural and mechanical component parts, which has led most municipalities to replacing this system

with another more reliable and less maintenance-intensive treatment system. Harrodsburg's RBC units have had a history of problems associated with gear boxes, shafts, bearing failures and other issues that have been similar to those reported for other RBC units elsewhere in the country. The RBCs at the Harrodsburg plant have exceeded their expected service life (33 ± years old).

At the Harrodsburg plant, the existing rectangular final clarifiers have a shallow side water depth (8.25') and use chain and flight sludge collectors. Minimum current KDOW design criteria for rectangular secondary clarifiers for fixed film biological treatment processes (such as RBC's) is 10' minimum (and greater depths are recommended). The existing arrangement results in the production of dilute secondary sludge which is more difficult to thicken and dewater and allows for the release of solids over the clarifier effluent weirs, particularly during wet weather flow events. Without the downstream tertiary lagoons to capture the released solids, this plant would discharge solids to the receiving stream in excess of its permit limitations.

For these reasons, Alternative 2 is not considered as a viable alternative and is rejected from further consideration in this Plan. On that basis, preliminary design calculations, construction and project cost estimates for this alternative have not been developed.

Alternative 3 - Regionalized Treatment with New Oxidation Ditches for Secondary Treatment

Wastewater Collection System Improvements

Under this alternative, expanding and upgrading the same on-going and planned Phase 1 and Phase 2 improvements to the wastewater collection system that were discussed for Alternative 2 will continue to be planned and built when funded.

Wastewater Treatment Plant Improvements

Under this alternative, expanding and upgrading improvements will be made to increase the capacity of the existing plant using a series of new treatment processes to replace those that are currently employed. The goal of this alternative is to modify the plant so that existing treatment systems can achieve the anticipated level of treatment that will be required during the Planning Period. Accordingly, this alternative is evaluated on the basis of meeting the same anticipated discharge limitations as Alternative 2.

This alternative includes the following on-going and planned Phase 1 projects at the wastewater treatment plant. The City intends to complete the construction of these projects in the 0-2 year phase of the Planning Period. These projects are the same as those listed for Alternative 2.

- Complete the following plant upgrade projects in 2014, at an estimated total project cost of $3,723,000 (in 2013 dollars).
    - Replace the influent screw pumps with new screw pumping equipment equal in capacity to the existing pumps (5.28 MGD), in the existing structure. However, based on their variable output design, they are each capable of pumping as much as 10 MGD according to the equipment manufacturer.
    - Replace the mechanically cleaned screen with a new screen of the same capacity (5.28 MGD) in the existing screen channel. A press/washer will be provided to dewater the screenings prior to landfill disposal. Also, provide a new plant influent flow meter and sampler.
    - Replace the existing digester heat exchanger and associated piping for the sludge digestion facilities with a new boiler housed in a new building.
    - Build a new 2,400 SF Sludge Processing Building to house a belt filter press for dewatering of anaerobically digested sludge, with associated feed pumps, polymer conditioning system, backwash system and cake conveyor. Dewatered sludge will continue to be disposed as dry cake in landfill. The existing sludge storage lagoon and most of the existing sludge drying beds will be kept as reserve sludge holding and dewatering facilities.
    - Install a plant-wide Supervisory Control and Data Acquisition (SCADA) system to monitor plant performance and control key process operations.
    - Complete site work and pavement improvements, as needed, to support the above projects.

Under this alternative, the City will complete the following Phase 2 projects at the wastewater treatment plant during the 3-10 year phase of the Planning Period. This series of projects will be completed as one construction project at an estimated project cost (in 2013 dollars) of $25,130,633.

- Construct a new 3,300 SF Preliminary Treatment Building to house two mechanically cleaned screens and a manually cleaned bar rack, two vortex-type grit chambers and two grit classifier/dewatering units. These processes will be designed for a flow equalized peak flow of 6.8 MGD. The mechanically cleaned screen provided in Phase 1 would be relocated to this building in this phase.
- Relocate the influent sampling location to a point on the downstream side of the screens in the Preliminary Treatment Building. Relocate the influent sampler to this building.
- Replace the influent flow meter with a new flow meter vault on the downstream side of the Preliminary Treatment Building to measure plant influent flow. Use this reading to serve as the plant influent flow record and to control flow-dependent plant processes.
- Construct a submersible pump station to convey in-plant drainage and recycle flows to a point on the downstream side of the influent flow meter.
- Abandon the Primary Settling Tanks, RBC Basins and Final Clarifiers. These process units will be replaced with a new secondary treatment process designed for a peak flow of 6.8 MGD, employing Oxidation Ditches which are modified to provide biological nutrient removal. New circular Final Clarifiers and a new Return Activated Sludge/Waste Activated Sludge Pump Station are included with this process. Primary settling will not be required since the effluent from preliminary treatment will be directly conveyed to the new Oxidation Ditches.
- Replace the chlorination/de-chlorination plant effluent disinfection facilities with ultraviolet disinfection facilities capable of disinfecting a peak flow of 6.8 MGD. Convert the existing Chlorination Building to house a plant effluent sampler, the UV system electrical and control equipment and a new Non-Potable Water pumping system.
- Replace the existing plant effluent Parshall flume with a new Parshall flume, and connect its discharge to the existing cascade aeration ladder.
- Abandon the existing gravity sludge thickener. Provide two new Aerated Sludge Holding Tanks and convert the existing Primary and Secondary Anaerobic Digesters to Aerated Sludge Holding Tanks. Add an extension to the existing Digestion Control Building to house the aeration and mixing equipment for the new tanks and renovate the existing building to house similar equipment for the converted digestion tanks.

- Install a second belt filter press in the Sludge Processing Building, along with associated polymer, wash water and belt conveyor equipment.
- Upgrade the plant electrical and control systems, including provision of a generator for use as a secondary source of power for emergency conditions and expand the plant SCADA system to automate and monitor new plant operations. Replace major electrical panels and distribution system components as needed.
- Revise the yard plant piping systems, site drainage/grading, roads, yard lighting and other site work as needed.

Under this alternative, the same Phase 3 wastewater treatment plant projects will be completed as for Alternative 2, only if Wausau Paper completes another process expansion during the Planning Period, similar to the expansion that Wausau completed in 2012.

This alternative is based on the use of Oxidation Ditches that are modified to provide biological nutrient removal, which will be required in order to achieve the anticipated discharge limitations presented in Table 8-1. In this case, a combination of anaerobic, anoxic, and aerobic stages are provided for removal of phosphorus, nitrogen and carbonaceous matter from the wastewater stream using an Oxidation Ditch as the aerobic stage.

The anaerobic stage is a mixed basin that is maintained at zero dissolved oxygen concentration, where screened and de-gritted wastewater is combined with phosphorus-rich return activated sludge from the aerobic stage of the process. This allows the phosphorus-containing bacteria in the return sludge to change from aerobic to anaerobic and to release the phosphorus contained in their cells. The next step is an anoxic basin that is maintained at near zero dissolved oxygen concentration where nitrate-rich mixed liquor from the aerobic stage is mixed with the discharge of the anaerobic stage. Some cellular uptake of phosphorus occurs in this stage but its primary purpose is to prevent additional nitrates in the waste stream from entering the aerobic stage. The nitrates are produced during nitrification in the aerobic stage, where oxygen and alkalinity are used to convert Ammonia-Nitrogen to nitrites and then to nitrates.

The nitrates returned to the anoxic stage will then denitrify, and will return approximately half of the alkalinity and oxygen used in the denitrification process back to the mixed liquor, thus reducing the amount of oxygen needed in the aerobic stage.

The discharge from the anoxic stage enters a large aerated and mixed aerobic stage (i.e., the Oxidation Ditch) where the majority of cellular uptake of phosphorus occurs by the bacteria in this basin while organics are oxidized (carbonaceous BOD reduction) and nitrification (Ammonia-Nitrogen reduction) takes place. Net phosphorus removal is achieved when solids are wasted from the secondary treatment process. Nitrogen reduction is achieved during the anoxic denitrification stage as the nitrates are reduced and nitrogen gas is released to the atmosphere.

Oxidation ditches are the most common type of secondary treatment used in municipal treatment plants in Kentucky and are very operator-friendly to use. These ditches consist of long oval basins with mechanical turbine aerators that are designed to continuously mix and aerate the wastewater over a period of several hours as the flow moves in a circular manner around a central dividing wall before discharging over an effluent weir located on an outer wall of the basin.

For this alternative, two parallel trains each consisting of an aerobic stage, an anoxic stage and an oxidation ditch for the aerobic stage, are used. No upstream primary settling will be provided. Each train will be capable of treating an average flow of 1.75 MGD and a peak flow of 3.4 MGD.

Each oxidation ditch will contain a volume of approximately 1.37 million gallons and will provide a hydraulic retention time of approximately 18.75 hours at average flow plus in-plant recycle flows. The anaerobic and anoxic stages will require an additional 1 hour and 2.5 hour hydraulic retention time, respectively, at average flow conditions. Each 3-stage ditch will have a site footprint that is approximately 85 feet wide by 205 feet long, and a side water depth (SWD) of 15 feet. This depth, which is needed to provide the volume needed for the required organic loading rate (15 pounds of BOD/day/1000 cubic feet), will minimize the rock excavation required to build these basins.

Following the oxidation ditches will be two 90-foot diameter, 14-feet (SWD) deep final clarifiers, each capable of treating a peak flow of 3.4 MGD. New RAS/WAS and scum pump stations will also be provided. Effluent from the final clarifiers will pass through the existing tertiary lagoons before discharging to the new UV disinfection facilities.

Space will be reserved on the site for a third oxidation ditch and a third final clarifier if additional capacity is needed to treat wastewater should another Wausau Paper process expansion occur during the Planning Period.

Alternative 4 - Regionalized Treatment with New Vertical Loop Reactors for Secondary Treatment

Wastewater Collection System Improvements

Under this alternative, the same on-going and planned Phase 1 and Phase 2 improvements to the wastewater collection system that were discussed for Alternatives 2 and 3 will continue to be planned and built when funded.

Wastewater Treatment Plant Improvements

Under this alternative, improvements will be made to increase the capacity of the existing plant using a series of new treatment processes to replace those that are currently employed. The goal of this alternative is to modify the plant so that existing treatment systems can achieve the anticipated level of treatment that will be required during the Planning Period. Accordingly, this alternative is evaluated on the basis of meeting the anticipated discharge limitations presented in Table 8-1.

This alternative includes the same Phase 1 wastewater treatment plant projects as those listed for Alternatives 2 and 3, with an estimated project cost of $3,723,000.

Under this alternative, the City will complete the following Phase 2 projects at the wastewater treatment plant during the 3-10 year phase of the Planning Period. This series of projects will be completed as one construction project at an estimated project cost (in 2013 dollars) of $28,894,194. The significant cost difference between the cost of this alternative and Alternative 3 is that this alternative uses Vertical Loop Reactors instead of Oxidation Ditches in the secondary treatment part of the plant.

- Construct a new 3,300 SF Preliminary Treatment Building to house two mechanically cleaned screens and a manually cleaned bar rack, two vortex-type grit chambers and two grit classifier/dewatering units. These processes will be designed for a flow equalized peak flow of 6.8 MGD. The mechanically cleaned screen provided in Phase 1 would be relocated to this building in this phase.
- Relocate the influent sampling location to a point on the downstream side of the screens in the Preliminary Treatment Building. Relocate the influent sampler to this building.

- Replace the influent flow meter with a new flow meter vault on the downstream side of the Preliminary Treatment Building to measure plant influent flow. Use this reading to serve as the plant influent flow record and to control flow-dependent plant processes.
- Construct a submersible pump station to convey in-plant drainage and recycle flows to a point on the downstream side of the influent flow meter.
- Abandon the Primary Settling Tanks, RBC Basins and Final Clarifiers. These process units will be replaced with a new secondary treatment process designed for a peak flow of 6.8 MGD, employing Vertical Loop Reactors which are modified to provide biological nutrient removal. New circular Final Clarifiers and a new Return Activated Sludge/Waste Activated Sludge Pump Station are included with this process. Primary settling will not be required since the effluent from preliminary treatment will be directly conveyed to the new Vertical Loop Reactors.
- Replace the chlorination/de-chlorination plant effluent disinfection facilities with ultraviolet disinfection facilities capable of disinfecting a peak flow of 6.8 MGD. Convert the existing Chlorination Building to house a plant effluent sampler, the UV system electrical and control equipment and a new Non-Potable Water pumping system.
- Replace the existing plant effluent Parshall flume with a new Parshall flume, and connect its discharge to the existing cascade aeration ladder.
- Abandon the existing gravity sludge thickener. Provide two new Aerated Sludge Holding Tanks and convert the existing Primary and Secondary Anaerobic Digesters to Aerated Sludge Holding Tanks. Add an extension to the existing Digestion Control Building to house the aeration and mixing equipment for the new tanks and renovate the existing building to house similar equipment for the converted digestion tanks.
- Install a second belt filter press in the Sludge Processing Building, along with associated polymer, wash water and belt conveyor equipment.
- Upgrade the plant electrical and control systems, including provision of a generator for use as a secondary source of power for emergency conditions and expand the plant SCADA system to automate and monitor new plant operations. Replace major electrical panels and distribution system components as needed.
- Revise the yard plant piping systems, site drainage/grading, roads, yard lighting and other site work as needed.

Under this alternative, the same Phase 3 wastewater treatment plant projects will be completed as for Alternatives 2 and 3, only if Wausau Paper completes another process expansion during the Planning Period, similar to the expansion that Wausau completed in 2012.

This alternative is based on the use of Vertical Loop Reactors (VLRs) that are modified to provide biological nutrient removal, which will be required in order to achieve the anticipated discharge limitations previously discussed under Alternative 2. In this case, a combination of anaerobic, anoxic, and aerobic stages are provided for removal of phosphorus, nitrogen and carbonaceous matter from the wastewater stream using a Vertical Loop Reactor as the aerobic stage.

VLRs are configured like an Oxidation Ditch turned on its side, with a long horizontal baffle running the length of the reactor, dividing the basin into a lower section and an upper section. The flow usually enters at one end of the basin and moves through the VLR between lower and upper sections before discharging over an effluent weir located in the end wall of the basin.

VLRs use coarse bubble diffusers in the lower section and the horizontal baffle helps to trap the oxygen from the diffusers in the bottom of the basin. This keeps the oxygen in contact with the wastewater for a longer period of time and improves oxygen transfer efficiency. Blowers are used to supply air under pressure to the diffusers in the lower section. Disc aerators are provided to mix and aerate the wastewater in the upper section of the VLR. Peak oxygen demands are met by turning on additional blowers and increasing the air flow rate through the coarse bubble diffusers.

Additional VLR volume is needed for biological nutrient removal as with the Oxidation Ditch alternative. The VLR basin volume is increased to provide the required anaerobic and anoxic reaction times. These stages are provided at the upstream end of the aerobic stage of the VLR. Mixers are provided to move the flow through the anaerobic and anoxic stages, and the air diffusers and disc aerators in the VLR are turned off and speed controlled to accomplish biological nutrient removal of phosphorus and nitrogen. The diffusers and aerators are then turned on again to provide the oxygen needed for aerobic treatment.

For this alternative, two parallel trains each consisting of an anaerobic stage, an anoxic stage and a VLR ditch for the aerobic stage, are used. No upstream primary settling will

be provided. Each VLR train will be capable of treating an average flow of 1.75 MGD and a peak flow of 3.4 MGD, plus in-plant recycle flows. Each VLR will contain a volume of approximately 1.37 million gallons and will provide a hydraulic retention time of approximately 18.75 hours at average flow. The anaerobic and anoxic stages will require an additional 1 hour and 2.5 hour hydraulic retention time, respectively, at average flow conditions.

Each 3-stage VLR will have a site footprint that is approximately 65 feet wide by 170 feet long, and a side water depth (SWD) of 25 feet. This depth, which is needed to provide the required lower and upper sections of the VLR and the volume needed for the required organic loading rate (15 pounds of BOD/day/1000 cubic feet), will require an estimated 12 feet of soil excavation and 10 feet of rock excavation for each basin.

Following the VLRs will be two 90-foot diameter, 14-feet (SWD) deep final clarifiers, each capable of treating a peak flow of 3.4 MGD. New RAS/WAS and scum pump stations will also be provided. Effluent from the final clarifiers will pass through the existing tertiary lagoons before discharging to the new UV disinfection facilities.

Space will be reserved on the site for a third VLR and a third final clarifier if additional capacity is needed to treat wastewater should another Wausau Paper process expansion occur during the Planning Period.

Analysis of Wastewater Treatment Alternatives

The following discussion presents an analysis of wastewater treatment Alternatives 3 and 4, based on monetary and non-monetary comparisons. Alternatives 1 and 2 are not analyzed since they were previously determined to be non-viable alternatives. The first comparison takes into account a monetary analysis based on present worth costs (which include initial capital costs, annual operation and maintenance costs, salvage value of plant components, and equipment replacement costs) over the 20-year Planning Period. The second comparison includes a series of five non-monetary factors (including environmental impact, engineering evaluation, implementation capability, regionalization, and public support). Each factor is independently weighted and rated.

Monetary (Present Worth) Analysis

Appendix 6 includes estimated construction and project costs, annual O&M costs, cost for replacement of equipment during the 20-year Planning Period, and the salvage value of facilities at the end of the Planning Period. A summary of this analysis is presented in Table 8-2.

Table 8-2
Monetary (Present Worth) Analysis of
WWTP Alternatives 3 and 4

Alternative 3: Regional Treatment with Oxidation Ditches for Secondary Treatment

Estimated Capital Cost, Phase 1 (Year 1)	$3,723,000
Estimated O&M Cost, Phase 1	$470,000
Estimated Equipment Replacement Cost, Phase 1 (Year 15)	$1,505,000
Estimated Salvage Value, Phase 1 (Year 20)	$724,650
Estimated Capital Cost, Phase 2 (Year 5)	$25,130,633
Estimated O&M Cost, Phase 2	$577,246
Estimated Salvage Value, Phase 2 (Year 20)	$4,233,565
Present Worth of Capital and O&M Costs, Phases 1 and 2	$29,587,038
Present Worth of Salvage Value, Phases 1 and 2	$1,546,963
20-Year Present Worth Cost of Alternative 3	**$28,040,075**

Alternative 4: Regional Treatment with Vertical Loop Reactors for Secondary Treatment:

Estimated Capital Cost, Phase 1 (Year 1)	$3,727,000
Estimated O&M Cost, Phase 1	$470,000
Estimated Equipment Replacement Cost, Phase 1 (Year 15)	$1,505,000
Estimated Salvage Value, Phase 1 (Year 20)	$724,650
Estimated Capital Cost, Phase 2 (Year 5)	$28,894,194
Estimated O&M Cost, Phase 2	$660,003
Estimated Salvage Value, Phase 2 (Year 20)	$4,372,900
Present Worth of Capital and O&M Costs, Phases 1 and 2	$33,060,804
Present Worth of Salvage Value, Phases 1 and 2	$1,590,454
20-Year Present Worth Cost of Alternative 4	**$31,470,350**

As Table 8-2 indicates, the present worth cost of Alternative 3 is less than the present worth cost of Alternative 4, therefore Alternative 3 is determined to be more cost-effective than Alternative 4.

Non-Monetary Analysis

The following is a brief discussion of each non-monetary factor.

Environmental Impact

Each alternative was selected on the basis of its ability to achieve the Planning Area's wastewater treatment and water quality goals and objectives, including the ability to comply with the anticipated KPDES Permit discharge limitations. The two periods when the environment could be damaged are during construction or during a major treatment process upset. Both alternatives require approximately the same amount of construction and both alternatives would be constructed on the existing treatment plant site. For both alternatives, construction would include provisions to safeguard the environment, such as the use of silt fences and proper material storage. Construction dust, noise, and traffic are similar for each alternative and are not anticipated to be problems since the plant site is a reasonable distance from residential and commercial properties.

The existing treatment facilities would remain fully operational during construction of each alternative, and no treatment operations would be bypassed or turned off while the new facilities are being built, tested and commissioned.

With regard to plant upsets, both alternatives include processes that are familiar to treatment plant operators and neither is expected to pose an operational problem. Oxidation ditches are among the most reliable and easy to operate types of secondary treatment processes. Vertical Loop Reactors include more equipment than Oxidation Ditches, and therefore present more opportunity for equipment failure, however redundant equipment would be provided to ensure minimal risk of process upsets for extended periods.

On that basis, there is not expected to be a significant difference between Alternative 3 and Alternative 4 regarding environmental impact.

Engineering Evaluation

Both alternatives are proven processes for secondary wastewater treatment and both can be expected to meet the anticipated discharge limitations. Both alternatives include equipment that has been commonly used in treatment facilities for many years and the likelihood of either process not being supported by manufacturers in the future is remote. Accordingly, both alternatives have the capability of long-term reliability over the design life of this project.

The use of Oxidation Ditches is more common than the use of Vertical Loop Reactors for biological nutrient removal. This is primarily due to the fact that there are many more treatment plants in Kentucky and across the country that employ the Oxidation Ditch process than the Vertical Loop Reactor process and therefore the addition of anaerobic and anoxic stages to this process for biological nutrient removal is a more common practice than for Vertical Loop Reactors. On that basis, the wastewater treatment industry's experience with Oxidation Ditches is more extensive that with Vertical Loop Reactors, and there are more equipment manufacturers that offer Oxidation Ditch equipment for treatment plants. This equates to a slightly higher rating for Oxidation Ditches due to their more extensive use.

Each alternative has distinctive energy requirements which are evaluated primarily based on cost and environmental impact. The power cost of each alternative has been included in the annual O&M costs that were taken into account in the cost-effective analysis in Table 8-2. In that analysis, it was found that VLRs require slightly more power than Oxidation Ditches to achieve the same required performance and to meet the same anticipated discharge limitations.

Otherwise, both alternatives would incorporate similar "green" attributes to achieve the sustainable design and construction goals of this project. These goals would incorporate many of the LEED (Leadership in Energy and Environmental Design) principals embraced by the United States Green Building Council (USGBC). Examples include the use of heat recovery systems for buildings that require high ventilation rates (such as the Preliminary Treatment Building), the use of high efficiency motors for equipment, the use of variable frequency drives (VFDs) to optimize power use, the employment of sustainable storm water management techniques such as previous pavements and rain gardens, the

planting of native vegetation that requires minimal irrigation and maintenance, and the use of roofs and pavements with high solar reflectivity to reduce heat island effect.

Implementation Capability

From the perspective of constructability, both alternatives are equal in that they are each similar to build. The Oxidation Ditches would require less vertical excavation than the VLRs since the Oxidation Ditches are shallower; however, because the VLRs are deeper, they do not require as large a horizontal footprint on the site as the Oxidation Ditches. For each alternative, however, there is sufficient site space to construct not only the number of Oxidation Ditches or VLRs required (2 each for the next 20 years) but site space is also available for the future construction of a third unit if required. The fact that the VLRs are deeper, requiring rock excavation, is taken into account in the cost-effective analysis presented in Table 8-2.

From an operational standpoint, both alternatives provide for a process that replaces the existing Rotating Biological Contactor system and therefore both alternatives call for the plant staff to become familiar with a treatment process that they have not previously operated. In this situation, both alternatives present a similar challenge to plant staff. However before the construction of either alternative would be completed, training of plant operators would be provided by the equipment manufacturers and by attendance at classes specifically oriented toward the selected alternative.

Regionalization

The existing plant provides for regionalized wastewater treatment, for customers within the Planning Areas as well as for other customers in Mercer County. The plant will continue to serve as a regional treatment facility during the Planning Period. Over time, as Mercer County Sanitation District expands its services into Mercer County, more package treatment plants will be eliminated from operation and their flows will be directed to the Harrodsburg treatment plant. Both alternatives have taken this factor into account and both are considered equivalent for this criteria.

Public Support

A Public Hearing was conducted to inform the public of the alternatives considered and the recommended plan for improving wastewater collection and treatment service for the City of Harrodsburg. Representatives of the Kentucky Division of Water were invited to the hearing. Projected construction and operating costs were presented at the hearing, and the projected sewer rates were discussed. Input from those in attendance was sought. The hearing minutes and attendance roster are provided in Appendix 6.

Table 8-3 provides the ratings of each factor for Alternatives 3 and 4.

Table 8-3
Non-Monetary Effectiveness Analysis of
WWTP Alternatives 3 and 4

Factor	Alternative 3			Alternative 4		
	Weight	Rating	Score	Weight	Rating	Score
Environmental Impact	1.00	9	9.00	1.00	9	9.00
Engineering Evaluation	1.00	9	9.00	1.00	7	7.00
Implementation Capability	0.90	10	9.00	0.90	10	9.00
Regionalization	0.70	10	7.00	0.70	10	7.00
Public Support	0.80	8	6.40	0.80	8	6.40
Total Score			41.40			38.40
Total Present Worth			$28,040,075			$31,470,350
NEU			**$677,296**			**$819,539**

Definitions for Table 8-3:

The **Weight** of each factor is a measure of the relative concerns of that factor compared to other factors, on a scale of 0 to 10, with the highest weight given to those that are considered the most critical.

The **Rating** is a measure of the relative implementation concern of that alternative compared to other alternatives on a scale of 0 to 10, with the highest rating given to the alternative that best satisfies that factor.

The **NEU** (Non-monetary Effectiveness Unit) is a measure of the relative implementation concern due to construction and operation of each alternative.

The NEU is the Total Present Worth divided by the Total Score. The alternative with the lowest NEU is the most capable of implementation.

Ranking of Alternatives

Of the four alternatives presented at the beginning of this chapter, two (Alternative 1 – No Action, and Alternative 2- Optimization of Existing Facilities) were not considered as viable alternatives and were eliminated from monetary and non-monetary evaluation. The other two alternatives (Alternative 3 – Regionalized Treatment with new Oxidation Ditches for Secondary Treatment, and Alternative 4 – Regionalized Treatment with new Vertical Loop Reactors for Secondary Treatment) were considered as viable alternatives and were evaluated from the standpoint of monetary and non-monetary factors. These factors are presented in Table 8-2 and Table 8-3, respectively. On that basis, the following ranking of each alternative has been determined:

- Alternative 1 – Not viable, not ranked
- Alternative 2 – Not viable, not ranked
- Alternative 3 – Ranked first in monetary factors and ranked first in non-monetary factors
- Alternative 4 – Ranked second in monetary factors and ranked second in non-monetary factors.

Based on the ranking of these alternatives, Alternative 3 is the Recommended Alternative.

Recommended Alternative – Three-Phase Approach

As the previous discussion in this chapter indicates, Alternative 3 is the Recommended Alternative for the treatment plant, and it is to be built in two phases. Phase 1 has an estimated construction cost of $3,723,000 and Phase 2 has an estimated construction cost of $25,130,633. To reduce the monetary impact (i.e., the monthly sewer rates) of the Phase 2 project on the community, consideration to providing the recommended alternative in three phases is given in this paragraph. Under this approach, the following projects at the treatment plant will be deferred until Phase 3 (Year 12, 2024) of the Planning Period instead of in Phase 2:

- Construction of the Anaerobic and Anoxic Stages of the Oxidation Ditches. These stages were initially planned for Phase 2 however they may not be required until

later in the Planning Period provided that the plant's KPDES permit does not require the anticipated reduction of total phosphorus (TP) and total nitrogen (TN) for which these stages are needed during Phase 2. The ditches built in Phase 2 will provide the capacity to treat the projected waste loads to within the discharge limitations that are expected to be in effect throughout Phase 2. The construction of the Anaerobic and Anoxic Stages in Phase 3 will likely coincide with the issuance of more stringent discharge permit limitations for TP and TN that are expected to become part of the permit by that time.

- Conversion of the existing Anaerobic Digesters to Aerated Sludge Holding Tanks. In Phase 2, two new aerated sludge holding tanks will be built, providing storage for approximately 812,000 gallons of waste activated sludge. Use of the existing digester tanks will be discontinued and they will be maintained in place until Phase 3. The two new tanks built in Phase 2 will provide an estimated 10-15 days of storage before the sludge is dewatered by a belt filter press and hauled as a cake to a landfill for disposal. The conversion of the existing digesters to aerated sludge holding tanks in Phase 3 will provide approximately 30 days of storage capacity for the waste sludge produced by that time.
- Installation of the second Belt Filter Press and associated equipment in the Sludge Processing Building built in Phase 1. The initially installed belt filter press has capacity to dewater the current waste sludge stream by operating up to 8 hours per day, 3 days per week, and it may be operated for additional hours each week to dewater the waste sludge produced in the future. The existing sludge drying beds can be used as a back-up to dewater the sludge if the press is not in operation. The installation of the second press in Phase 3 will allow for alternating use of the two presses and the elimination of the drying beds.

Under this approach – called Alternative 3A, because it includes all of the treatment processes of Alternative 3 but defers some projects until Phase 3 – an estimated $4,253,516 in capital costs is deferred from Phase 2 to Phase 3, lowering the Phase 2 estimated capital costs to $21,342,453. The annual O&M costs for Phase 2 are reduced from $577,246 to $556,205 by postponing the above-listed projects until Phase 3. The present worth analysis indicates that Alternative 3A has an estimated total present worth of $26,850,310, which is $1,189,765 less than the estimated total present worth for Alternative 3. Table 8-3 summarizes the present worth analysis of Alternative 3A.

Table 8-4
Monetary (Present Worth) Analysis of
WWTP Alternative 3A

Estimated Capital Cost, Phase 1 (Year 1)	$3,723,000
Estimated O&M Cost, Phase 1	$470,000
Estimated Equipment Replacement Cost, Phase 1 (Year 15)	$1,505,000
Estimated Salvage Value, Phase 1 (Year 20)	$724,650
Estimated Capital Cost, Phase 2 (Year 5)	$21,342,453
Estimated O&M Cost, Phase 2	$556,205
Estimated Salvage Value, Phase 2 (Year 20)	$3,949,690
Estimated Capital Cost, Phase 3 (Year 12)	$4,253,516
Estimated O&M Cost, Phase 3	$577,246
Estimated Salvage Value, Phase 3 (Year 20)	$1,504,930
Present Worth of Capital and O&M Costs, Phases 1, 2,3	$28,778,242
Present Worth of Salvage Value, Phases 1, 2,3	$1,927,932
20-Year Present Worth Cost of Alternative 3A	**$26,850,310**

A similar approach could have been evaluated for Alternative 4, but since Alternative 4 was previously found to have a higher estimated present worth cost, construction cost, annual O&M cost and NEU than Alternative 3, the results of such an evaluation would have indicated that Alternative 3A would still be the higher ranked alternative.

On that basis, the three-phased expansion of the Harrodsburg wastewater treatment plant as described for Alternative 3A is the Recommended Alternative.

Project Costs for each Phase of the Recommended Alternative

Exhibit 8-1 indicates the locations of the wastewater collection projects within the Planning Area that are included in the Recommended Alternative. These projects are identified as either Phase 1 or Phase 2 projects. A copy of this map is also provided in Appendix 10. Exhibit 8-2 is a site map of the wastewater treatment plant, indicating the locations of treatment facilities in the Recommended Alternative. These projects are identified as Phase 1, Phase 2 and Phase 3 projects. A copy of this site map is also provided in Appendix 10.

Phase 1 (0 to 2 year, 2012-2014) Collection System and Treatment Plant Projects

The first phase includes an estimated $1,547,500 in project costs in the wastewater collection system and an estimated $3,723,000 in project costs at the treatment plant, or a total capital cost of $5,270,500. It is anticipated that all Phase 1 projects will be completed by the end of Year 2 of the Planning Period (i.e., by the end of 2014).

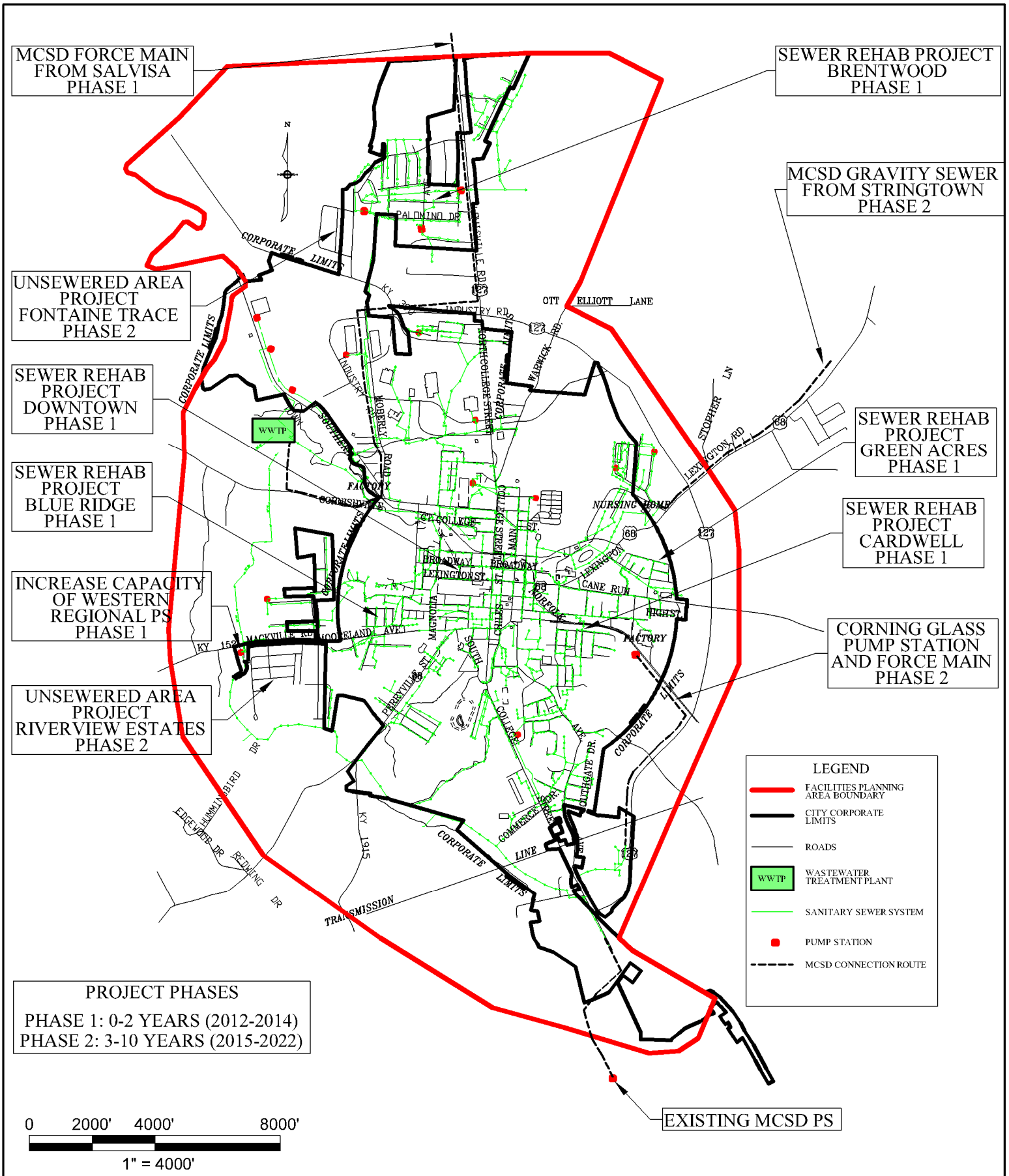
Phase 2 (3 to 10 year, 2015-2022) Collection System and Treatment Plant Projects

The second phase includes an estimated $1,310,500 in project costs in the wastewater collection system and an estimated $21,342,453 in project costs at the treatment plant, or a total capital cost of $22,652,953. It is anticipated that all Phase 2 projects will be completed by the end of Year 5 of the Planning Period (i.e., by the end of 2017).

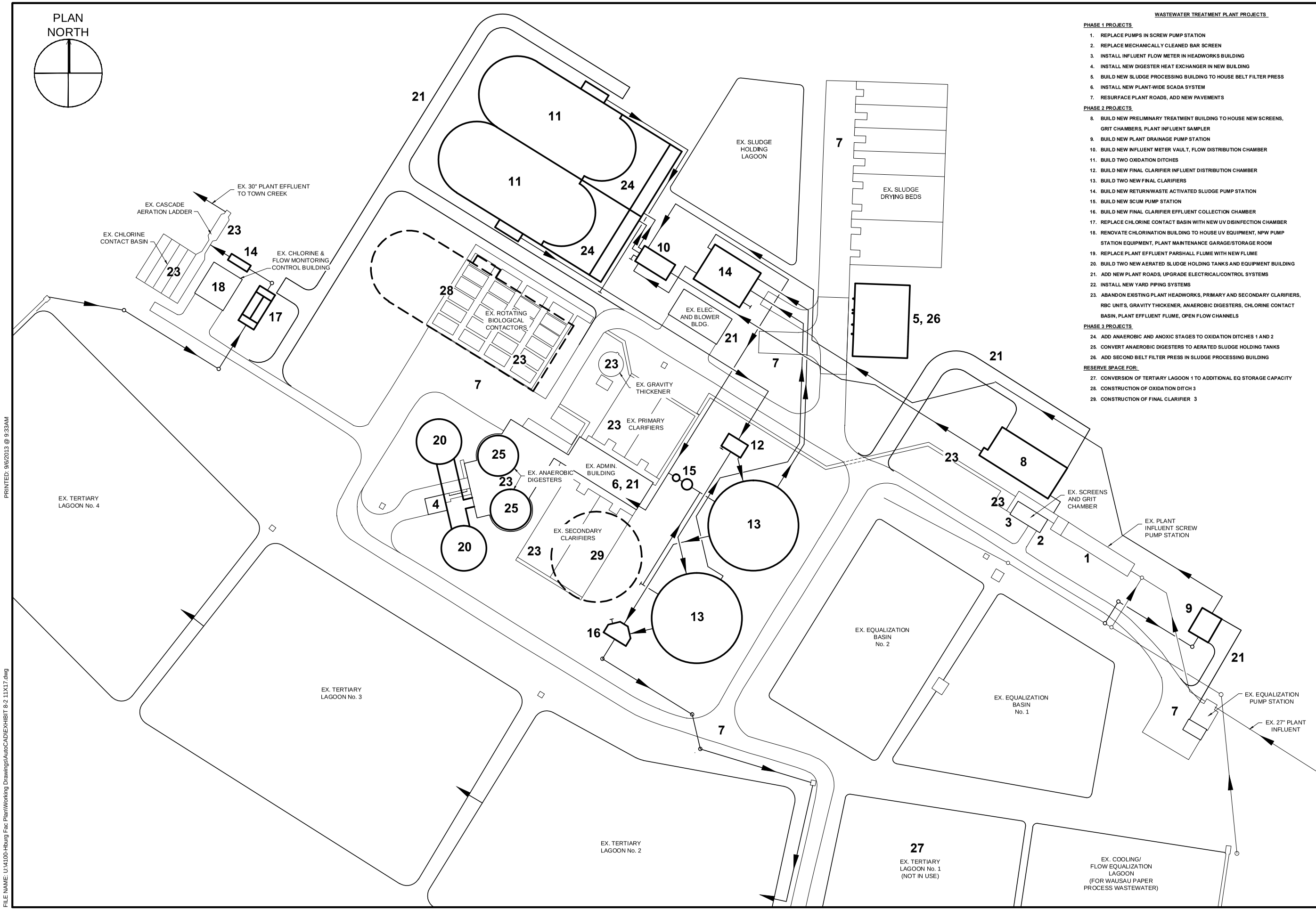
Phase 3 (11 to 20 year, 2023-2032) Collection System and Treatment Plant Projects

The third phase includes an estimated $4,253,516 in project costs at the wastewater treatment plant and no project costs in the wastewater collection system. It is anticipated that these projects will be completed by the end of Year 12 of the Planning Period (i.e., by the end of 2024).

In Chapter 7, the discussion of projected future wastewater flows to the treatment plant included the indication that Wausau Paper will complete a study in the 2013-2014 timeframe that will evaluate the potential of another process expansion of their Harrodsburg plant. This Facilities Plan has not taken such potential flows from Wausau Paper into account since they cannot be predicted at this writing. If that study indicates that Wausau Paper will produce a new wastewater discharge during the Planning Period that is substantially more than received from their current operation, it may be necessary to prepare an amendment to this Plan to include additional capital costs for further modifications at the treatment plant in either Phase 2 or Phase 3 to provide treatment of this additional wastewater flow.



GRW PROJECT NO. 4100	CLIENT PROJECT NO.	DESIGNED:	EXHIBIT 8-1 RECOMMENDED ALTERNATIVE WASTEWATER COLLECTION SYSTEM PROJECTS	ENGINEERS - ARCHITECTS - PLANNERS www.grwinc.com	DATE: FEBRUARY, 2013
REVISIONS		DRAWN:			SCALE:
NO. DESCRIPTION	DATE BY	REVIEWED:			SHEET NO.
		APPROVED:			
SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED				ALL RIGHTS RESERVED: THIS DOCUMENT IS THE PROPERTY OF GRW ENGINEERS, INC. AND SHALL NOT BE REPRODUCED IN WHOLE OR IN PART OR USED FOR CONSTRUCTION OF OTHER THAN THIS SPECIFIC PROJECT WITHOUT WRITTEN PERMISSION	



WASTEWATER TREATMENT PLANT PROJECTS

PHASE 1 PROJECTS

1. REPLACE PUMPS IN SCREW PUMP STATION
2. REPLACE MECHANICALLY CLEANED BAR SCREEN
3. INSTALL INFLUENT FLOW METER IN HEADWORKS BUILDING
4. INSTALL NEW DIGESTER HEAT EXCHANGER IN NEW BUILDING
5. BUILD NEW SLUDGE PROCESSING BUILDING TO HOUSE BELT FILTER PRESS
6. INSTALL NEW PLANT-WIDE SCADA SYSTEM
7. RESURFACE PLANT ROADS, ADD NEW PAVEMENTS

PHASE 2 PROJECTS

8. BUILD NEW PRELIMINARY TREATMENT BUILDING TO HOUSE NEW SCREENS, GRIT CHAMBERS, PLANT INFLUENT SAMPLER
9. BUILD NEW PLANT DRAINAGE PUMP STATION
10. BUILD NEW INFLUENT METER VAULT, FLOW DISTRIBUTION CHAMBER
11. BUILD TWO OXIDATION DITCHES
12. BUILD NEW FINAL CLARIFIER INFLUENT DISTRIBUTION CHAMBER
13. BUILD TWO NEW FINAL CLARIFIERS
14. BUILD NEW RETURN/WASTE ACTIVATED SLUDGE PUMP STATION
15. BUILD NEW SCUM PUMP STATION
16. BUILD NEW FINAL CLARIFIER EFFLUENT COLLECTION CHAMBER
17. REPLACE CHLORINE CONTACT BASIN WITH NEW UV DISINFECTION CHAMBER
18. RENOVATE CHLORINATION BUILDING TO HOUSE UV EQUIPMENT, NPW PUMP STATION EQUIPMENT, PLANT MAINTENANCE GARAGE/STORAGE ROOM
19. REPLACE PLANT EFFLUENT PARSHALL FLUME WITH NEW FLUME
20. BUILD TWO NEW AERATED SLUDGE HOLDING TANKS AND EQUIPMENT BUILDING
21. ADD NEW PLANT ROADS, UPGRADE ELECTRICAL/CONTROL SYSTEMS
22. INSTALL NEW YARD PIPING SYSTEMS
23. ABANDON EXISTING PLANT HEADWORKS, PRIMARY AND SECONDARY CLARIFIERS, RBC UNITS, GRAVITY THICKENER, ANAEROBIC DIGESTERS, CHLORINE CONTACT BASIN, PLANT EFFLUENT FLUME, OPEN FLOW CHANNELS

PHASE 3 PROJECTS

24. ADD ANAEROBIC AND ANOXIC STAGES TO OXIDATION DITCHES 1 AND 2
25. CONVERT ANAEROBIC DIGESTERS TO AERATED SLUDGE HOLDING TANKS
26. ADD SECOND BELT FILTER PRESS IN SLUDGE PROCESSING BUILDING

RESERVE SPACE FOR:

27. CONVERSION OF TERTIARY LAGOON 1 TO ADDITIONAL EQ STORAGE CAPACITY
28. CONSTRUCTION OF OXIDATION DITCH 3
29. CONSTRUCTION OF FINAL CLARIFIER 3

GRW PROJECT NO. 4100

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RECOMMENDED PLAN PHASES 1, 2, AND 3

WASTEWATER TREATMENT PLANT
CITY OF HARRODSBURG, KY

DESIGNED:
DRAWN:
REVIEWED:
APPROVED:

REVISIONS

NO.	DESCRIPTION	DATE	BY

SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED

DATE:

SCALE: 1" = 100'

SHEET NO.

EXHIBIT 8-2

PRINTED: 9/6/2013 @ 9:33AM

FILE NAME: U:\4100-Hburg Fac Plan\Working Drawings\AutoCAD\EXHIBIT 8-2 11X17.dwg

Chapter 9

Chapter 9: CROSS-CUTTER CORRESPONDENCE AND MITIGATION

Introduction

During the preparation of this Facilities Plan, an exchange of correspondence was completed with several agencies responsible for environmental concerns related to the construction and operation of wastewater collection and treatment facilities. Termed "Cross-Cutter" correspondence, the associated agencies were:

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.

Historical Resources: The Kentucky Heritage Council (State Historic Preservation Office)

Aquatic Resources: The U.S. Army Corps of Engineers (Louisville District)

Agricultural Resources: The Natural Resources Conservation Service

Copies of the "Cross-Cutter" correspondence are provided in Appendix 7. The letter to each agency contained a detailed description of the proposed projects, supported by location maps and other information. A summary of the results of this exchange of correspondence is provided in this chapter. When an agency's response indicates the potential adverse impact on a resource as a result of the proposed project, and an alternate method of installation or implementation cannot be used, a mitigation approach is presented to compensate for the adverse impact.

Threatened and Endangered Species

The US Fish and Wildlife Service reviewed the areas that are anticipated to be affected by future projects that are discussed in this Facilities Planning document. Their response indicated the possible presence of four federally listed species. These are the Indiana bat (Myotis sodalist) and the gray bat (Myotis grisescens), both of which are endangered, and running buffalo clover (Trifolium stoloniferum) and globe bladderpod (Tesquerella globosa), of which the clover is endangered and the bladderpod is a candidate.

The agency advised a more detailed review of the various project areas when the projects were imminent in order to determine the need for further surveys, protection methods and/or possible mitigation requirements.

The Kentucky Department of Fish and Wildlife Resources stated that there are two state-listed species that are known to be present in the planning area, but will not be impacted by the proposed projects. These are the Bobolink (Dolichonyx oryzivorus) and Henslow's Sparrow (Ammodramus henslowii).

Both agencies advised the use of strict erosion control measures during and after construction in order to protect aquatic habitats.

Historical Resources

The State Historic Preservation Office of the Kentucky Heritage Council stated that the proposed projects have the potential to impact historic properties eligible for or listed on the National Register of Historic Places. They directed that as each project was prepared for implementation, it be submitted individually for review by the Heritage Council.

Aquatic Resources

The Department of the Army, US Army Corps of Engineers stated that "waters of the United States" are located within the planning area. They recommended submittal of detailed information for each project prior to construction in order to determine if a Department of the Army Permit will be required.

Agricultural Resources

The United States Department of Agriculture Natural Resources Conservation Service review of the proposed projects concluded that they will not affect prime, unique or statewide important farmlands. However, they stated that the determination does not apply to any lands beyond the boundary of existing right-of-way, areas not already previously disturbed, or lands outside of urban areas.

Chapter 10

Chapter 10: EVALUATION OF RECOMMENDED REGIONAL FACILITIES PLAN

Introduction

This chapter summarizes the critical components of the Recommended Plan, including environmental impacts, institutional structure requirements, the funding plan and the implementation schedule.

Environmental Impacts

Chapter 9 refers to Cross-Cutter Correspondence with various state and federal agencies that relate to potential adverse impacts of the Recommended Plan. The responses from these agencies (included in Appendix 8) indicate that the Recommended Plan does not have a negative impact on surface and groundwater, threatened or endangered species, air quality, floodplains and wetlands, historical or archaeological sites, important prime farmland, or any other applicable environmentally sensitive areas. The implementation of the projects in the Recommended Plan will have a positive impact on water quality in Town Creek and the Salt River.

Institutional Structure

There are no changes required to the existing institutional structure of the City of Harrodsburg as a result of the Recommended Plan. The City and MCSD have an agreement that defines the respective areas of Mercer County for which each is to provide wastewater service. Other than a revised user charge system for paying debt service and annual O and M costs for the recommended plan, no new ordinances or regulations are needed to implement the recommended plan.

Funding Plan

The purpose of this section is to provide a preliminary funding plan for the Recommended Plan. This includes an assessment of potential funding sources and a preliminary estimate of potential user rates. This funding plan is based on the estimated project cost and annual operating and maintenance cost of the plan, as presented in Chapter 8. These costs are then evaluated against a combination of funding options (i.e., grants and loans) to provide estimated annual debt service and annual O and M costs that must be paid by the wastewater system customers as monthly sewer service rates. It should be noted that the calculations presented in

this section are preliminary and will require revision once the actual construction costs are known (from contractor's bids for the projects in this Plan) and the sources, amounts and availability of grants and loans have been confirmed. Therefore, this information is presented to provide a preliminary order of magnitude for sewer service rates, and the City will need to conduct a separate User Charge Study to determine the actual rates needed to pay for the Recommended Plan.

The following paragraphs describe the City's current wastewater system revenue and funding, as well as the revenue and funding for the Phase 1, Phase 2 and Phase 3 improvements.

Current Wastewater System Revenue and Funding

Revenue: In October 2011 the City passed an ordinance (Ordinance 2011-20) that increased the sewer service rates for its customers. Table 10-1 summarizes the current sewer service rates.

Table 10-1
Harrodsburg Monthly Sewer Service Rates
(Effective October, 2011)

Monthly Water Use (in CF)	Monthly Charge	Monthly Water Use (in Gal)	Monthly Charge
First 250	$10.56 minimum	First 1,870	$10.56 minimum
Next 750	$4.32 per 100 CF	Next 5,610	$5.77 per 1000 Gal
Next 3,000	$4.08 per 100 CF	Next 22,440	$5.45 per 1000 Gal
Next 6,000	$4.08 per 100 CF	Next 44,880	$5.45 per 1000 Gal
Next 25,000	$4.08 per 100 CF	Next 187,000	$5.45 per 1000 Gal
Next 25,000	$3.84 per 100 CF	Next 187,000	$5.13 per 1000 Gal
Over 60,000	$3.60 per 100 CF	Over 448,800	$4.81 per 1000 Gal

Based on this rate schedule, a residential customer using 4,000 gallons (535 CF) of water per month will pay a monthly rate of $22.87 ($10.56 for first 1,870 gallons plus $5.77 x 2.13 for remaining 2,130 gallons). If a residential customer uses 5,000 gallons of water per month, the monthly payment will be $28.62.

Under this rate schedule, for the fiscal year that ended on June 30, 2012 (FY12), the City's revenue for the wastewater system was as follows:

Sewer Use Charges	$1,304,725
Other Revenue:	
Sewer Taps and Sewer Surcharges	$ 15,424
Pre-Treatment Charges	$ 24,538
Penalties, other Charges	$ 50,656
Non-Operating Income (Interest on deposits, etc.)	$ 38,760
Total Annual Revenue, FY12	$1,434,103

The revenue for FY12 included residential and commercial/industrial customers within the City as well as MCSD flows, but it did not include Wausau Paper's increased process wastewater flow (related to 2012 plant expansion). The treatment plant did not begin receiving Wausau Paper's process wastewater until late 2012.

Expenses: The City owes debt service for re-payment of bonds for construction of the wastewater treatment plant and sewer projects, as well as for loan re-payments for construction of improvements at the treatment plant and the collection system. In FY12, the City's debt service for the wastewater system was $377,758 per year. When the required 10% debt service reserve coverage ($37,776) is added, the current total annual debt expense was $415,534. This includes the debt service for the loan used to pay for the 2003 construction of the Western Regional Pump Station, interceptor sewers and force main. Other improvements made to the wastewater system since 2003 (increasing the capacity of pump stations, rehabilitating/replacing sewers, eliminating overflows, etc.) have been paid for from operating revenue.

The City's annual cost for the operation and maintenance of the wastewater collection and treatment systems, for FY12 was on the order of $800,000. Of this amount, approximately $352,000 was for wastewater collection and approximately $448,000 was for wastewater treatment. These amounts include salaries and benefits, repairs and maintenance, utilities, office supplies, uniforms and automotive costs, small equipment purchases, contract services, chemicals, and other minor expenses. These amounts do not include large project capital costs or professional services, although the City includes such costs in the overall annual wastewater system budget in the years that they occur. In addition to O&M costs, there are several recurring costs (customer accounts expenses, general and administrative costs, insurance, etc.) that the City incurs for the

wastewater system, which added $148,000 in FY12 to the budget for the wastewater system. In summary, for FY12 the City's wastewater system expenses were:

Current Debt Service for Prior Projects	$ 377,758
Current Loan/Bond Coverage at 10%	$ 37,776
Annual O&M Costs	$ 800,000
Other Recurring Annual Costs	
Customer Accounts	$ 46,000
Administration and General Expense	$ 48,000
Insurance	$ 39,500
Other	$ 14,500
Total Annual Expenses, FY 12	$ 1,363,534

As noted above, the City of Harrodsburg's FY12 wastewater system revenues barely exceeded annual O & M costs for FY12 (5%±).

Revenue and Funding for Phase 1 Projects

Phase 1 Revenue: The October 2011 rate schedule will be used by the City as a basis for paying for the Phase 1 projects. By the time that Phase 1 is completed (late 2014), it is anticipated, that significant additional flow and associated revenue will be realized in FY13 and FY14 from industrial growth as well as growth within the Harrodsburg and MCSD planning areas. The anticipated FY14 revenues is $2,487,000± based 6± months of actual operating data from FY13.

Phase 1 Expenses: The total project cost for wastewater collection and treatment projects in Phase 1 is $5,270,500, of which $3,723,000 is for projects at the treatment plant and the remainder ($1,547,500) is for three collection system projects.

For the treatment plant projects, the City anticipates funding them with a USEPA General Appropriations Grant for $1,261,000, a USDA Rural Development grant for $288,000 and a USDA Rural Development loan for $2,174,000. The RD loan will be paid over 40 years at an annual interest rate of 2.75%, which equates to an annual payment of $90,286. When the required 10% loan coverage is added, this loan will require an annual payment of $99,315.

For the collection system projects, the City anticipates funding them with a Kentucky Infrastructure Agency State Revolving Fund (KIA/SRF) loan for $1,547,500 at 1.95% interest over 20 years. The City qualifies for a KIA/SRF loan rate of 1.75% since the Medium Household Income (MHI) in the community is in the range of $33,261 to $41,576 (80% to 100% of the MHI for the Commonwealth of Kentucky). A 0.2% KIA/SRF loan service rate is required on the unpaid loan balance, paid annually, which increases the loan rate to 1.95%. At this rate the City's payment on this loan will be $94,184 annually. When the required 10% loan coverage is added, this loan will require an annual payment of $103,602.

The Phase 1 projects are expected to increase the annual O&M cost for the wastewater system to $830,000. Other recurring annual costs ($148,000 in FY12) are expected to increase to $160,000 per year. When the Phase 1 projects are completed in 2014, the City's wastewater system expenses will be as follows:

Current Debt Service	$ 377,758
Current Loan/Bond Coverage at 10%	$ 37,776
Phase 1 Debt Service, RD Loan	$ 90,216
RD Loan Coverage at 10%	$ 9,022
Phase 1 Debt Service, KIA/SRF Loan	$ 94,184
KIA/SRF Loan Coverage at 10%	$ 9,418
Total Debt Service, at Completion of Phase 1 Projects	$ 618,374
Annual O&M Cost, at Completion of Phase 1 Projects	$ 830,000
Other Recurring Annual Costs	$ 160,000
Total Projected Annual Expenses, FY14	$1,608,374

As noted previously, projected FY14 revenues will be more than adequate to cover projected FY14 wastewater system O & M costs.

Revenue and Funding for Phase 2 Projects

Phase 2 Revenue: Phase 2 improvements are scheduled for completion in FY 2017. For the purposes of projecting FY17 wastewater system revenues, annual revenues have been projected to increase by 1% annually between FY14 and FY17. Projected FY17 annual wastewater system revenues are on the order of $2,563,000.

Phase 2 Expenses: The total estimated project cost for wastewater collection and treatment projects in Phase 2 is $22,652,953, of which $21,342,453 is for the treatment plant and the remainder ($1,310,500) is for collection system projects. The City anticipates funding these projects in a similar manner as for the Phase 1 projects, using a combination of Community Development Block Grant (CDBG) and RD grants and RD and KIA/SRF loans for the treatment plant and collection system projects, assuming such grants and loans are available at the time they are needed to fund the projects.

It is anticipated that the annual O&M cost for the wastewater system will increase to an estimated $936,000 after the Phase 2 projects are completed. Of this total, an estimated $556,000 is for the treatment plant and $380,000 is for the collection system. Other recurring costs are expected to increase to $200,000 per year.

The following discussion presents two potential funding scenarios for the Phase 2 projects. For Funding Scenario 1, it is assumed that no grants are available and all projects are funded by a $7,000,000, 40-year RD loan at 2.75% for some of the plant projects and a $15,652,953 KIA/SRF 20-year loan at 1.95% for the collection system and the balance of the plant projects. This is the "worst-case scenario" from the standpoint of the City and its customers in that the entire cost of Phase 2 will need to be repaid via loans, resulting in a larger increase in debt service and a larger increase in sewer rates.

For Funding Scenario 2, it is assumed that $4 million in grants are secured (a grant of $1 million from the CDBG and a grant of $3 million from USDA Rural Development (RD) for the treatment plant projects), with the balance of the cost repaid by loans (a $7 million RD loan for 40 years at 2.75% for the plant and a $11, 652,953 KIA/SRF loan for 20 years at 1.95% for the plant and collection system). Because a portion of the projects will be paid by grants, the increases in debt service and sewer rates under this scenario will not be as large as for the first scenario.

Phase 2 Funding Scenario 1: When the Phase 2 projects are completed under this scenario, the City's wastewater system expenses will be as follows:

Debt Service, after Phase 1 is complete	$ 618,374
Phase 2 Debt Service, RD Loan (40 years/2.75%)	$ 290,721
RD Loan Coverage at 10%	$ 29,072
Phase 2 Debt Service, KIA/SRF Loan (20 years/1.95%)	$ 952,670
KIA/SRF Loan Coverage at 10%	$ 95,267

Total Debt Service, at Completion of Phase 2 Projects	$1,986,104
Annual O&M Cost, at Completion of Phase 2 Projects	$ 936,205
Other Recurring Annual Costs	$ 200,000
Total Annual Expenses, 2017 (Scenario 1)	$3,122,309

Under this funding scenario, the City's annual expenses for the wastewater system ($3,122,309) will exceed the City's projected annual revenue ($2,563,000) by $559,309 per year. This indicates that a rate increase of approximately 21.8% will be needed by 2017 to cover the deficit in wastewater system revenue. For a residential customer using 4,000 gallons of water per month, the monthly sewer service rate will increase from $22.87/Mo to $27.85/Mo.

Phase 2 Funding Scenario 2: When the Phase 2 projects are completed under this scenario, the City's wastewater system expenses will be as follows:

Debt Service, after Phase 1 is complete	$ 618,374
Phase 2 Debt Service, RD Loan (40 years/2.75%)	$ 290,721
RD Loan Coverage at 10%	$ 29,072
Phase 2 Debt Service, KIA/SRF Loan (20 years/1.95%)	$ 709,222
KIA/SRF Loan Coverage at 10%	$ 70,922
Total Debt Service, at Completion of Phase 2 Projects	$1,718,311
Annual O&M Cost, at Completion of Phase 2 Projects	$ 936,205
Miscellaneous Costs	$ 200,000
Total Annual Expenses, 2017 (Scenario 2)	$2,854,516

Under this funding scenario, the City's annual expenses for the wastewater system ($2,854,516) will exceed the City's annual revenue ($2,563,000) by $291,516 per year. This indicates that a rate increase of approximately 11.4% will be needed by 2017 to cover the deficit in revenue. For a residential customer using 4,000 gallons of water per month, the monthly sewer service rate will increase to from $22.87/Mo to $25.48/Mo.

It is again noted that the funding scenarios and projected rate increases discussed in this section are conceptual and will need to be revised once the recommended projects are designed and the funding agencies have been involved in determining the availability of

loans and grants. The two funding scenarios presented above both indicate the need for a revised sewer service schedule that should be in place no later than FY 2017.

Revenue and Funding for Phase 3 Projects

Phase 3 projects have an estimated cost of $4,253,516. It is projected that Phase 3 projects would be implemented during the 2024 to 2032 planning period time frame. It is anticipated that new debt service associated with the Phase 3 projects would have a minor effect of the proposed rates previously suggested for Phase 2. Due to the somewhat uncertain scope and schedule of Phase 3 projects, a detailed analysis of those future projects and their associated revenue, expenses and projected funding is not included in this study.

Implementation Schedule

The schedule for implementation of the Recommended Plan is a function of a number of factors, such as the timing of approval of this Regional Facilities Plan by the KDOW, the dates when funds are secured for the projects within this plan, and the respective dates for completion of design and construction for the projects.

At the time that this Regional Facilities Plan was prepared, these dates were not known. However, for the purpose of this Plan, the preliminary schedule in Table 10-2 has been developed. It should be noted that the design and construction of most of the proposed Phase 1 projects (not including a collection system rehabilitation project) are currently in progress, therefore this schedule focuses on tasks that remain to be completed upon approval of this Plan. This schedule is subject to revision over time as the estimated dates of the aforementioned factors are updated and confirmed.

Table 10-2
Preliminary Implementation Schedule for
Harrodsburg Regional Wastewater Facilities Plan

Estimated Date	Event
September 2013	Public Hearing for Plan, Approval of Plan by City of Harrodsburg
October 2013	Submit Plan to KDOW for Review and Comment
October 2013	Begin Construction of Phase 1 Wastewater Treatment Plant Project
January 2014	Approval of Plan by KDOW
July 2014	Initiate Design of Phase 2 Projects
October 2014	Complete Construction of all Phase 1 Projects
July 2015	Complete Design of Phase 2 Projects
September 2015	Advertisement for Bids for Phase 2 Projects
October 2015	Receipt of Bids, Securing of Funds for Phase 2 Projects
December 2015	Award of Construction for Phase 2 Projects
August 2016	Complete Construction of Phase 2 Collection System Projects
September 2017	Complete Construction of Phase 2 Wastewater Plant Projects
2023	Design & Bidding for Phase 3 Projects
2024	Construction of Phase 3 Projects

Chapter 11

Chapter 11: DOCUMENTATION OF PUBLIC PARTICIPATION

On _____, 2013, a public meeting was held to present the findings and recommendations of this Regional Wastewater Facilities Plan to stakeholders and customers served by the Harrodsburg wastewater system. A copy of the meeting minutes and the attendance roster are provided in Appendix 7. During the meeting, comments were received from attendees and the responses to these comments were noted in the minutes. This chapter summarizes the more significant issues raised during the meeting. A more detailed review of the meeting may be obtained by reading the minutes in Appendix 7.

Public Meeting and Comments

Summary of Presentation

Summary of Comments and Responses

Chapter 12

Chapter 12: REGIONAL FACILITIES PLAN COMPLETENESS CHECKLIST AND FORMS

This chapter includes the Facilities Plan Completeness Checklist, indicating the page numbers related to items that are addressed in the Plan. This chapter also includes a summary of the unit process design criteria for the treatment plant and a summary of the design flows and concentrations for the plant.

This Plan is submitted in two hard copies, one copy of the Plan certified by a professional engineer licensed in Kentucky and one non-certified copy of the Plan and the Planning Area shapefile on a Compact Disc (CD).

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 HARRODSBURG

Date: JUNE 2013

		PAGE #
	SECTION 1	
REGIONAL FACILITY PLAN SUMMARY- This section shall provide a brief summary of the information provided in the facility plan, including the following:		
1.	Purpose of the plan and major problems evaluated in the plan.	1-1
2.	Recommended alternative chosen to remediate or correct the problems and/or serve the area of need identified in the plan. Also, include any institutional arrangements necessary to implement the recommended alternative(s).	1-4
3.	Estimated cost of implementing the proposed plan (including user fees) and the proposed funding method to be used.	1-11, 12
4.	Planning agency commitments necessary to implement the plan.	1-13
5.	Schedule of implementation for projects.	1-14
	SECTION 2	
STATEMENT OF PURPOSE AND NEED- This section shall contain a brief description of the purpose and need for a submitting the facility plan.		2-1
	SECTION 3	
PHYSICAL CHARACTERISTICS OF THE PLANNING AREA- This section shall delineate the planning area boundaries and describe key topographic, geographic and pertinent natural or man-made features of the area. Digital or electronic submission of the planning area boundary shapefile in a standard GIS format shall also be included. This section shall also include the following maps:		
1.	One (1) up-to-date map, suitable for photocopying, indicate the planning area boundary, service area boundary, watershed boundaries, county lines, populated places, cities and/or towns and project areas or proposed planning period phases.	AFTER 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)].	AFTER 3-3, 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.	AFTER 3-4

4.	If available, a local planning and zoning land use map.	AFTER 3-5
	SECTION 4	
SOCIOECONOMIC CHARACTERISTICS OF THE PLANNING AREA- The following characteristics of the planning area shall be discussed:		
1.	Historical, current, and projected population in the planning area including wastewater contributions from industrial and commercial sources.	4-1
2.	Current and projected population in the existing service area and unsewered parts of the planning area	4-3
3.	Economic or social benefit to the affected community	4-5
	SECTION 5	
EXISTING ENVIRONMENT IN THE PLANNING AREA- Describe existing physical, biological, cultural, and other resource features within the planning area with an emphasis on those that may be impacted by the proposed plan or projects, including the following:		
1.	Physical features such as surface and groundwater quality, water sources and supply, wetlands, lakes, streams, air pollution, floodplains, soils, geology, and topography	5-1
2.	Biological: Identify plant and animal communities in the planning area with an emphasis upon endangered and threatened species likely to be impacted	5-5
3.	Cultural: Describe archaeological and historical resources that may be affected by the proposed project	5-6
4.	Other Resource Features such as national and state parks, recreational areas, USDA Designated Important Farmland, and any other applicable environmentally sensitive areas	5-7
	SECTION 6	
EXISTING WASTEWATER SYSTEM- This section shall be prepared by a Professional Engineer licensed in Kentucky. A description of the existing facilities within the planning area shall include the following:		
1.	On-site systems in the planning area	6-4
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.	6-6
3.	Existing collection and conveyance system and its condition	6-1
4.	Existing biosolids disposal method	6-12
5.	Existing operation, maintenance and compliance issues	6-25
	SECTION 7	
FORECASTS OF FLOWS AND WASTE LOADS IN THE PLANNING AREA- This section shall be prepared by a professional engineer licensed in Kentucky and shall include:		
1.	Current and projected commercial, industrial and residential growth for the proposed planning period	7-1
2.	A copy of the waste load allocation (WLA) issued by the DOW for new or expanded treatment plant projects	APP 8

SECTION 8		
EVALUATION OF ALTERNATIVES- This section shall be prepared by a professional engineer licensed in Kentucky and include an assessment of alternatives to determine the appropriate facilities that will meet the wastewater needs of the planning area and provide benefits that are cost-effective and environmentally sound. The section shall include:		
1.	No-action alternative	8-2
2.	Optimization of existing facilities	8-3
3.	Regionalization	8-13
4.	Other alternatives	8-18
5.	Detailed cost analysis along with 20 year present worth analysis for each alternative	8-22
6.	Recommended alternative	8-28
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 App 8
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 App 8
2.	Historical Resources: The Kentucky Heritage Council State Historic Preservation Office	9-1, App 8
3.	Aquatic Resources: The US. Army Corps of Engineers (Louisville, Nashville, or Huntington Districts).	9-2, App 8
4.	Agricultural Resources: The local office of the Natural Resources Conservation Service (NRCS) or USDA Service Center	9-2, App8
SECTION 10		
EVAULATION OF RECOMMENDED REGIONAL FACILITY PLAN- This section of the facility plan shall summarize the critical components of the recommended plan.		
1.	Environmental impacts	10-1
2.	Institutional structure	10-1
3.	Funding plan	10-1
4.	Current and projected residential user charge rate based on 4,000 gallon usage per month	10-4-9
5.	Implementation schedule	10-10
SECTION 11		
DOCUMENTATION OF PUBLIC PARTICIPATION- The section shall include a copy of the newspaper advertisement/proof of publication, attendance sheet, and public comments.		App 7

Harrodsburg Wastewater Treatment Plant

Unit Process Design Criteria

1. Plant Influent Flow Equalization

Flow Equalization Pump Station: 4 Pumps, one at 1200 GPM/44'TDH, one at 2300 GPM/47'TDH, two at 4650 GPM/54'TDH. Firm Pumping Capacity = 4600 GPM (6.68 MGD) with all but one of the large pumps out of service.

Plant Influent Flow Equalization Basins: 2 Basins, total volume = 4.33 MG. Wausau Paper Equalization/Cooling Basin: 1 Basin, Volume = 2 MG

EQ Basins Aeration: 2 Blowers, each rated at 800 SCFM

EQ Basins Recirculation Pumps: 2 Pumps, each 2200 GPM/22.5'TDH

EQ Basins all discharge to Plant Influent Pump Station

2. Influent Pumping

Pump Station: 2, 2-stage screw pumps, each rated for 10 MGD. New pumps installed in Phase 1.

3. Wastewater Screening

Mechanically Cleaned Screens: 2 Screens, each rated for 10 MGD, with Screenings Press rated for 80% solids reduction and 8:1 solids compaction

Manually Cleaned Bar Rack: 1 Bar Rack, rated for 10 MGD

4. Grit Removal

Vortex-type Grit Chambers: 2 Chambers, each rated for 10 MGD, with 250 GPM grit pump and 250 GPM Grit Classifier.

5. Plant Influent Sampling

Composite, Refrigerated Sampler, located downstream of Screens.

6. Influent Flow Measurement

Magnetic Flow Meter: Rated for flows of 0.5 MGD to 15 MGD, located in Meter Vault/Flow Distribution Chamber on downstream side of Grit Chambers, upstream of Oxidation Ditches.

7. Biological Treatment

Oxidations Ditches: 2 Ditches, each designed for CBOD Load of 15 pounds/day/1000 CF, without upstream primary settling. Each ditch is approximately 80' x 170' x 15' SWD, and is equipped with aerators in the circular sections at each end. MLSS = 3000 mg/l. MLVSS = 2250 mg/l. HRT = 18.75 Hours at 3.5 MGD plus 10% in-plant recycle flow. The ditches are designed for the later addition of upstream BNR stages.

Biological Nutrient Removal Stages: Anaerobic Stage with HRT of 1 Hour, Anoxic Stage with HRT of 2.5 Hours (added in Phase 3), located upstream of each Oxidation Ditch. Mixers used in each stage to circulate flow.

8. Final Clarifiers

Circular Final Clarifiers: 2 center-feed, peripheral-discharge clarifiers, each 90' diameter x 14' SWD. Total Surface Area = 12,717 SF. Designed for SOR of 770 GPD/SF at peak flow (9.8 MGD), and SLR of 33.4 pounds/day/SF at maximum day flow (6.8 MGD) with 150% RAS and MLSS of 3000 mg/l. Each clarifier equipped with influent flow baffles and scum removal.

9. RAS/WAS Pump Station

Pump Station: 4 Pumps, two rated for 1150 GPM, two rated for 2300 GPM. Sized to provide 150% RAS to biological treatment with one large and one small pump in operation, while also providing WAS pumping using RAS pumps. WAS is directed to Aerated Solids Holding Tanks.

10. Scum Pump Station

Submersible Pump Station: 2 Pumps (1 active/1 standby), each rated for 100 GPM. Scum is intermittently pumped to Aerated Solids Holding Tanks.

11. Tertiary Treatment

Tertiary Lagoons: 3 lagoons (existing), with total volume of approximately 9.6 MG, located downstream of final clarifiers and upstream of effluent disinfection.

12. Effluent Disinfection

Ultraviolet Light Disinfection: 2 UV Channels, each rated for 6.8 MGD, capable of killing fecal coliform bacteria to levels required by discharge permit under all flow conditions.

13. Effluent Flow Measurement

Parshall Flume: With 1'-6" wide throat, rated for flows of 0.11 to 15.87 MGD, located on downstream side of UV disinfection channels.

14. Non-Potable Water Pump Station

Vertical Pumps: 2 pumps, one rated for 500 GPM, one rated for 100 GPM, located in former Chlorination Building. Pumps are sized to provide NPW for in-plant water uses.

15. Effluent Re-Aeration

Cascade Aeration Ladder: 1 Ladder (existing), located on downstream side of effluent flume**,** capable of providing dissolved oxygen concentration of 7 mg/l in plant effluent.

16. Plant Drainage Pumping

Pump Station: 2 Pumps, each rated for 250 GPM. Pumps discharge tank drainage, in-plant recycle flows (BFP filtrate, Screenings Press recycle water, Grit Classifier recycle water, etc.) to Flow Distribution Chamber upstream of Oxidation Ditches.

17. Sludge Processing

Aerated Solids Holding Tanks: 4 Tanks, two new tanks at 48' diameter x 30' SWD (built in Phase 2) and two tanks at 45' diameter x 30' SWD (converted from former anaerobic digesters in Phase 3). Total Volume = 200,720 CF (1,501,400 gallons). Provides 30 days storage for WAS at average flow of 50,000 GPD. Each tank is equipped with a "Jet" aeration system which uses external recirculation pumps and blowers to mix air with solids to maintain aerobic storage conditions.

Belt Filter Presses: 2 BFPs, one installed in Phase 1, and the second installed in Phase 3. Each press has 1.0 meter belt and is capable of dewatering a minimum of 150 GPM or 1500 pounds/hour of solids. Existing sludge storage lagoon and drying beds will no longer be needed after the second BFP is installed.

Sludge Disposal: Sludge Cake at 15% to 18% solids to Landfill (existing).

18. Stand-by Power

Generator: New 1500 KW, 480 Volt generator with automatic transfer switch.

Harrodsburg Regional Wastewater Facilities Plan

Design Flows and Concentration Form

Design Flows and Concentrations	Flow, MGD	BOD, mg/l	BOD, lb/d	SS, mg/l	SS, lb/d	NH3-N, mg/l	NH3-N, lb/d	TKN, mg/l	TKN, lb/d	P, mg/l	P, lb/d
Average Daily											
Domestic Portion	2.10	175	3065	200	3503	15	262	20	350	5	87
Industrial Portion	1.10	175	1605	200	1835	15	138	20	184	5	46
Total	3.20	175	4670	200	5338	15	400	20	534	5	133
Population Equivalent											
Peak Hourly											
Domestic Portion	6.60	130	7156	150	8257	10	550	15	826	3	165
Industrial Portion	3.21	130	3480	200	5354	15	402	20	535	5	134
Total	9.81	130	10636	166	13611	11.6	952	16.6	1361	3.6	299
Equalized Flow to WWTP	6.80	130	7373	150	8507	10	567	15	850	3	170
Peak Daily											
Total	6.80	130	7373	150	8507	10	567	15	850	3	170
Equalized Flow to WWTP	6.80	130	7373	150	8507	10	567	15	850	3	170
Peak Instantaneous	6.80	130	7373	150	8507	10	567	15	850	3	170

Note: All flows at Peak Daily Rate and higher are Flow Equalized to a maximum of 6.80 MGD

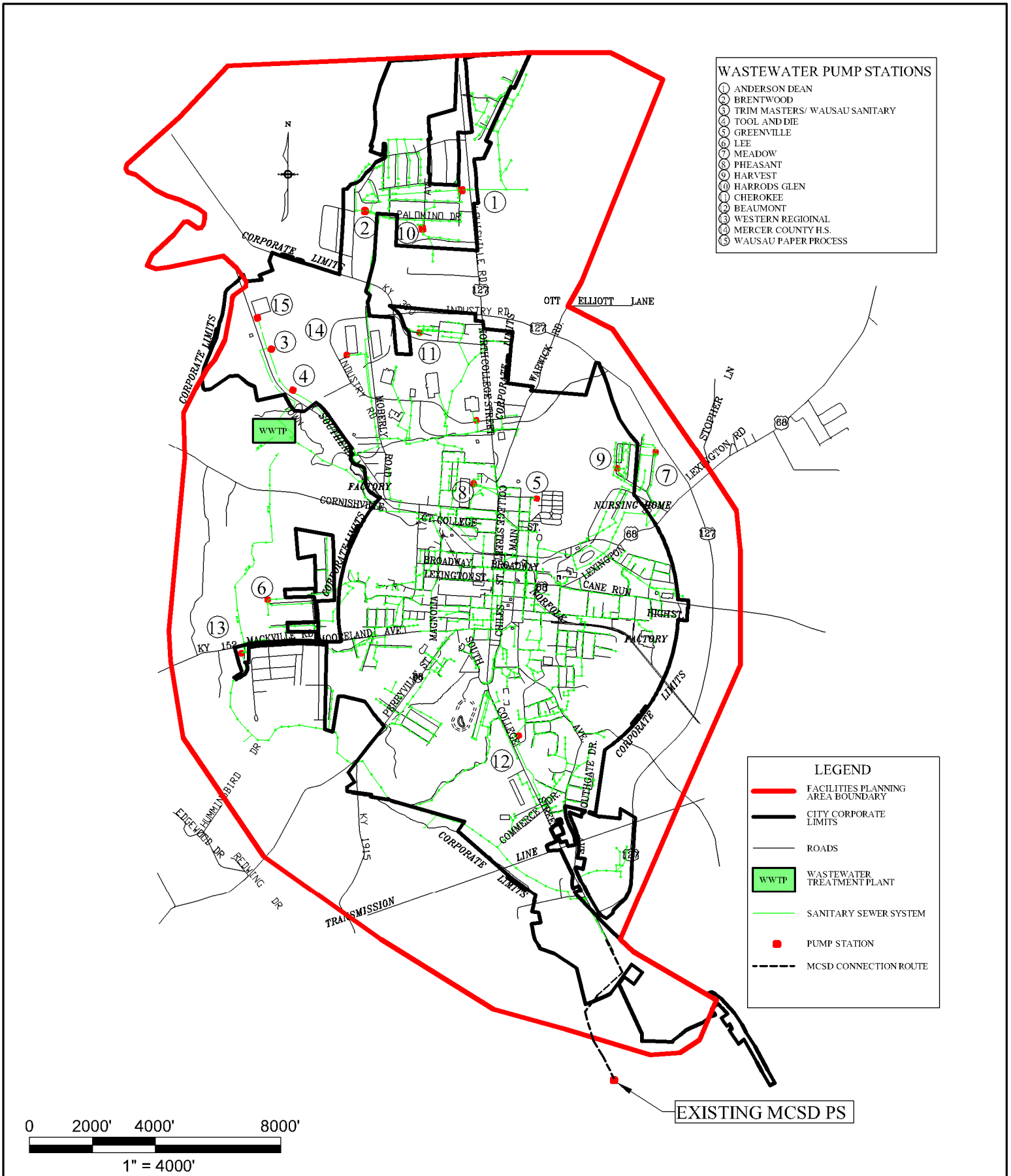
Appendix 1

APPENDIX 1

MAP OF HARRODSBURG

WASTEWATER COLLECTION

SYSTEM



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NO. / DESCRIPTION / DATE / BY		REVIEWED:
		APPROVED:
SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED		

EXHIBIT 3-2
HARRODSBURG
WASTEWATER COLLECTION
AND TREATMENT FACILITIES

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Appendix 2

APPENDIX 2

CITY OF HARRODSBURG

INDUSTRIAL WASTEWATER

PRETREATMENT PROGRAM

(Ordinances 1993-10 and 2012-03)

Recd
5-4-93

ORDINANCE NO. 1993-10

AN ORDINANCE CONCERNING USE OF THE MUNICIPAL SANITARY SEWAGE COLLECTION AND TREATMENT SYSTEM, SETTING FORTH POLICY, DEFINITIONS, RULES AND REGULATIONS REGARDING THE USE OF SAID SYSTEM, CONTROLLING PRIVATE WASTEWATER DISPOSAL, GOVERNING THE BUILDING OF SEWERS AND CONNECTIONS, POLLUTANT DISCHARGE LIMITS, PRETREATMENT PROGRAM ADMINISTRATION.

WHEREAS, the City of Harrodsburg has constructed facilities and improved trunk lines to same; and

WHEREAS, the City of Harrodsburg has determined the need for the adoption of a Sewer Use Ordinance to properly control the effluent to be discharged by the public into the City's sewer system, and the use of the system;

NOW THEREFORE, BE IT ORDAINED BY THE CITY OF HARRODSBURG, KENTUCKY:

I. ARTICLE II - SEWER USE, Section 17-26 through 17-155, is hereby amended in its entirety to read as set forth in pages i through 48 (Articles I through X) attached hereto dated April, 1993 and is titled SEWER USE ORDINANCE.

II. This Ordinance shall be effective on the date of it's passage and publication.

III. Any previous Ordinance, Order or Resolution in conflict with this Ordinance is hereby repealed.

IV. If any section, sentence, clause or portion of this Ordinance is for any reason declared illegal, unconstitutional, or otherwise invalid, such declaration shall not affect the remaining portions hereof.

MAYOR CHARLES W. CARR

Introduced by the Commission and given first reading on April 13, 1993.

Given second reading and adoption by the Commission on April 27, 1993.

Published in the Harrodsburg Herald on May 13, 1993, in summary.

ATTESTED:

Marquita E. Carey, City Clerk

city\sewer.ord

SEWER USE ORDINANCE

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ARTICLE I - GENERAL PROVISIONS

A. Purpose and Policy

This ordinance sets forth uniform requirements for direct and indirect contributors into the wastewater collection and treatment system for the City of Harrodsburg and enables the City to comply with all applicable State and Federal laws required by the Clean Water Act of 1977 and the general Pretreatment Regulations (40 CFR, Part 403).

The objectives of this ordinance are:

1. to prevent the introduction of pollutants into the municipal wastewater system which will interfere with the operation of the system or contaminate the resulting sludge;

2. to prevent the introduction of pollutants into the municipal wastewater system which will pass through the system inadequately treated into receiving waters so as to cause violations of the City's KPDES permit or the atmosphere or otherwise be incompatible with the system;

3. to improve the opportunity to recycle and reclaim wastewaters and sludges from the system; and

4. to provide for equitable distribution of the cost of the municipal wastewater system.

5. Provide for the safety of the treatment plant employees.

This ordinance provides for the regulation of direct and indirect contribution to the municipal wastewater system through the issuance of permits to certain non-domestic users and through enforcement of general requirements for the other users, authorizes monitoring and enforcement activities, requires user reporting and provides for the setting of fees for the equitable distribution of costs resulting from the program established herein.

This ordinance shall apply to the City of Harrodsburg and to persons outside the City who are, by contract or agreement with the City, users of the City Publicly Owned Treatment Works (POTW). Except as otherwise provided herein, the Superintendent shall administer, implement, and enforce the provisions of this ordinance.

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B. Definitions

Unless the context specifically indicates otherwise, the following terms and phrases, as used in this ordinance, shall have the meanings hereinafter designated:

1. Act or "the Act." The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. 1251, et. seq.

2. Approval Authority. The Secretary of the Kentucky Natural Resources and Environmental Protection Cabinet or an authorized representative thereof.

3. Agency. Any governmental or quasi governmental entity.

4. Authorized Representative. An authorized representative of a user may be: (1) A principal executive officer of at least the level of vice president, if the industrial user is a corporation; (2) a general partner or proprietor if the user is a partnership or proprietorship, respectively; (3) a duly authorized representative of the individual designated above if such representative is responsible for the overall operation of the facilities from which the indirect discharge originates.

   An authorized representative of the City may be any person designated by the City to act on its behalf.

5. Baseline Monitoring Report (BMR). A report submitted by categorical industrial users within 180 days after the effective date of a categorical standard which indicates the compliance status of the user with the applicable categorical standard (40 CFR 403.12(b)).

6. Biochemical Oxygen Demand (BOD). The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure, five (5) days at 20° Celsius expressed in terms of weight and concentration in milligrams per liter (mg/l).

7. Building Drain. That part of the lowest horizontal piping of a drainage system which receives the discharge from soil, water, and other drainage pipes inside the walls of the building and conveys it to the building sewer, beginning five (5) feet outside the inner face of the building wall.

8. Building Sewer. The extension from the building drain to the public sewer or other place of disposal, also called "house connection."

9. Building Sewer Permit. As set forth in "Building Sewers and Connections" (Article IV).

10. Categorical Industrial User. An industrial user subject to categorical pretreatment standards which have been promulgated by EPA.

11. Categorical Pretreatment Standards. National Categorical Pretreatment Standards or Pretreatment Standard. Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with Section 307 (b) and (c) of the Act (33 U.S.C. 1347) which applies to a specific category of industrial users.

12. City. The City of Harrodsburg; its City Commission; the City Engineer; or the Superintendent or their designee.

13. City Engineer. The city engineer of the City, or his authorized deputy, agent or representative. In the absence of a city engineer, the term superintendent shall be used.

14. Clean Water Act (CWA). (Also known as the Federal Water Pollution Control Act) enacted by Public Law 92-500, October 18, 1972. 33 USC 1251 et seq: as amended by PL 95-217. December 28, 1977; PL 97-117 December 29, 1981; PL 97-440, January 8, 1983, and PL 100-04, February 4, 1987.

15. Combined Sewer. Any conduit designed to carry both sanitary sewage and storm water or surface water.

16. Combined Wastestream Formula (CWF). Procedure for calculating alternative discharge limits at industrial facilities where a regulated wastestream is combined with other non-regulated wastestreams prior to treatment (40 CFR 403.7).

17. Compatible Pollutant. Biochemical oxygen demand, suspended solids and fecal coliform bacteria; plus any additional pollutants identified in the POTW's NPDES/KPDES permit, where the POTW is designed to treat such pollutants and, in fact, does treat such pollutants so as to ensure compliance with the POTW's NPDES/KPDES permit.

18. Concentration-based Limit. A Limit based on the relative strength of a pollutant in a wastestream, usually expressed in mg/l.

19. Control Authority. The term "control authority" shall refer to the City when there exists an approved Pretreatment Program under the provisions of 40 CFR 403.11.

20. Cooling Water. The water discharge from any use such as air conditioning, cooling or refrigeration, or to which the only pollutant added is heat.

21. Daily Maximum. The maximum allowable value for any single observation in a given day.

22. Dilute Wastestream. Boiler blowdown, sanitary wastewater, noncontact cooling water and certain process wastestreams that have been excluded from regulation in categorical pretreatment standards because they contain none or only trace amounts of the regulated pollutant.

23. Direct Discharge. The discharge of treated or untreated wastewater directly to the waters of the Commonwealth of Kentucky.

24. Discharger. Any person that discharges or causes a discharge to a public sewer.

25. Domestic Wastewater. The water-carried wastes produced from non-commercial or non-industrial activities and which result from normal human living processes.

26. Easement. An acquired legal right for the specific use of land owned by others.

27. Effluent. The liquid overflow of any facility designed to treat, convey or retain wastewater.

28. Environmental Protection Agency or EPA. The U.S. Environmental Protection Agency, or where appropriate the term may also be used as a designation for the Administrator or other duly authorized official of said agency.

29. Equipment. All movable, non-fixed items necessary to the wastewater treatment process.

30. Flow Proportional Composite Sample. Combination of individual samples proportional to the flow of the wastestream at the time of sampling.

31. Flow Weighted Averaging Formula (FWA). A procedure used to calculate alternative limits for a categorical pretreatment standard where regulated and nonregulated wastestreams combine after treatment, but prior to the monitoring point as defined in 40 CFR 403.

32. Garbage. The animal and vegetable waste resulting from the handling, preparation, cooking, and serving of foods.

33. Grab Sample. A sample which is taken from a wastestream on a one-time basis with no regard to the flow of the wastestream and without consideration of time.

34. Holding Tank Waste. Any waste from holding tanks such as vessels, chemical toilets, campers, trailers, septic tanks, and vacuum-pump tank trucks.

35. Incompatible Pollutant. All pollutants other than compatible pollutants as defined in paragraph 16 of this article.

36. Indirect Discharge. The discharge or the introduction of non-domestic pollutants from any source regulated under section 307(b) or (c) of the Act, (33 U.S.C. 1317), into the POTW (including holding tank waste discharged into the system).

37. Industrial User (IU). A source of Indirect Discharge which does not constitute a "discharge of pollutants" under regulations issued pursuant to Section 402 of the Clean Water Act.

38. Industrial User Permit (IUP). A permit issued to industrial users which authorizes discharges to the public sewer as set forth in the Administration Section of this Ordinance.

39. Industrial Wastes. The wastewater from industrial or commercial processes as distinct from domestic or sanitary wastes.

40. Interceptor. A device designed and installed so as to separate and retain deleterious, hazardous or undesirable matter from normal wastes which permits normal sewage or liquid wastes to discharge into the sewer or drainage system by gravity. Interceptor as defined herein is commonly referred to as a grease, oil, or sand trap.

41. Interference. A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

1) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

2) Therefore is a cause of a violation of any requirement of the POTW's NPDES/KPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act

(SWDA)(including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act (40 CFR 403.3).

42. May. This is permissive (see "shall," paragraph 73).

43. Monthly Average. The maximum allowable value for the average of all observations obtained during one month.

44. Multi-Unit Sewer Customer. A location served where there are two or more residential units or apartments, two or more businesses in the same building or complex or where there is any combination of business and residence in the same building or complex.

45. National Categorical Pretreatment Standard or Pretreatment Standard. Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with Section 307(b) and (c) of the Clean Water Act which applies to a specific category of industrial users. This term includes prohibitive discharge limits established pursuant to 40 CFR 403.5.

46. National (or Kentucky) Pollutant Discharge Elimination System or NPDES/KPDES Permit. A permit issued pursuant to Section 402 of the Act (33 U.S.C. 1332), or a permit issued by the Commonwealth of Kentucky under this authority and referred to as KPDES.

47. Natural Outlet. Any outlet, including storm sewers, into a watercourse, pond, ditch, lake, or other body of surface or groundwater.

48. New Source. Any source, the construction of which is commenced after the publication of proposed regulations prescribing a Section 307(c)(33 U.S.C. 1317) categorical pretreatment standard which will be applicable to such source, if such standard is thereafter promulgated within 120 days of proposal in the Federal Register. Where the standard is promulgated later than 120 days after proposal, a new source means any source, the construction of which is commenced after the date of promulgations of the standard.

49. Ninety (90) day compliance report. A report submitted by a categorical industrial user, within 90 days following the date for final compliance with applicable categorical standards that documents and certifies the compliance status of the user (40 CFR 403.12(d)).

50. Ordinance. This ordinance, unless otherwise specified.

51. Pass Through. A discharge of pollutant which cannot be treated adequately by the POTW, and therefore exits into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES/KPDES permit (including an increase in the magnitude or duration of a violation)(40 CFR 403.3).

52. Periodic Compliance Report. A report on compliance status submitted by significant industrial users to the Control Authority at least semiannually (40 CFR 403.12(e)).

53. Person. Any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estates, governmental entity or any other legal entity, or their legal representatives, agent or assigns. The masculine gender shall include the feminine, the singular shall include the plural where indicated by the context.

54. pH. The logarithm of the reciprocal of the hydrogen ion concentration. The concentration is the weight of hydrogen ions, in grams, per liter of solution.

55. Pollution. The man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

56. Pollutant. Any dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical, wrecked or discharged equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

57. POTW Treatment Plant. That portion of the POTW designed to provide treatment to wastewater.

58. Pretreatment or Treatment. The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater to a less harmful state prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. The reduction or alteration can be obtained by physical, chemical or biological processes, or process changes by other means, except as prohibited by 40 CFR Section 403.6(d).

59. Pretreatment Requirements. Any substantive or procedure requirement related to pretreatment, other than a

National Categorical Pretreatment Standard imposed on a significant user.

60. Process Wastewater. Any water which, during manufacturing or processing, comes into direct contact with or results from the production of or use of any raw material, intermediate product, finished product, by-product, or waste product.

61. Production-based Standard. A discharge limitation expressed in terms of allowable pollutant mass discharge rate per unit of production and is applied directly to an industrial user's manufacturing process.

62. Prohibitive Discharge Standard. Any regulation developed under the authority of 307(b) of the Act and 40 CFR, Section 403.(5).

63. Properly Shredded Garbage. The wastes from the preparation, cooking, and dispensing of food that has been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than 1/2 inch in any directions.

64. Publicly Owned Treatment Works (POTW). A treatment works as defined by Section 212 of the Act, (33 U.S.C. 1292) which is owned in this instance by the City. This definition includes any sewers that convey wastewater to the POTW treatment plant, but does not include pipes, sewers, or other conveyances not connected to a facility providing treatment. For the purpose of this ordinance, "POTW" shall also include any sewers that convey wastewaters to the POTW from persons outside the City who are, by contract or agreement with the City, users of the City's POTW.

65. Public Sewer. A common sewer controlled by a governmental agency or public utility. In general, the public sewer shall include the main sewer in the street and the service branch to the curb or property line, or a main sewer on private property and the service branch to the extent of ownership by public authority.

66. Regulated Wastestream. An industrial process wastestream regulated by a National Categorical Pretreatment Standard.

67. Sanitary Sewer. A sewer that carries liquid and water-carried wastes from residences, commercial buildings industrial plants, and institutions.

68. Sewage. The spent water of a community. Domestic or sanitary waste shall mean the liquid or water-carried

wastes from residences, commercial buildings, and institutions as distinct from industrial sewage. The terms "sewage" and "wastewater" are used interchangeably.

69. Sewerage. Any and all facilities used for collecting, conveying, pumping, treating and disposing of wastewater.

70. Sewer User Charges. A system of charges levied on users of a POTW for the cost of operation and maintenance, including replacement, of such works.

71. Sewer System or Works. All facilities for collecting, transporting, pumping, treating and disposing of sewage and sludge, namely the sewerage system and POTW.

72. Sewer. A pipe or conduit that carries wastewater or drainage water.

73. Shall. Is mandatory (see "may", paragraph 42).

74. Significant Industrial User (SIU). Defined by EPA guidance as: (A) all industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and (B) any noncategorical industrial user that (i) discharges 25,000 gallons per day or more of process wastewater ("process wastewater" excludes sanitary noncontact cooling, and boiler blowdown wastewaters) or (ii) contributes a process wastestream which makes up five percent or more of the average dry weather hydraulic or organic (BOD, TSS, etc.) capacity of the treatment plant or (iii) has a reasonable potential, in the opinion of the Control or Approval Authority, to adversely affect the POTW treatment plant (inhibition, pass through of pollutants, sludge contamination or endangerment of POTW workers).

75. Slug Discharge. Any discharge of a non-routine episodic nature including, but not limited to, an accidental spill or non-customary batch discharge or any discharge of water or wastewater in which the concentration of any given constituent or quantity of flow exceeds, for any period of duration longer that fifteen (15) minutes, more that five (5) times the average twenty-four (24) hour concentration or flow rate during normal operation which adversely affects the POTW.

76. Slug Load. Any pollutant (including Biochemical Oxygen Demand) released in a discharge at a flow rate or concentration which will cause interference with the operation of the treatment works or which exceeds limits set forth in the Industry's Discharge Permit and which include accidental spills.

77. Spill Prevention and Control Plan. A plan prepared by an industrial user to minimize the likelihood of a spill and to expedite control and cleanup activities should a spill occur.

78. Split Sample. Portion of a collected sample given to the industry or to another agency to verify or compare laboratory results.

79. Standard Industrial Classification (SIC). A classification scheme based on the type of industry or process at a facility.

80. Standard Methods. The examination and analytical procedures set forth in the recent editions of "Standard Methods for the Examination of Water and Wastewater," published jointly by the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation and as set forth in the Congressional Record 40 CFR 136.

81. State. Commonwealth of Kentucky.

82. Storm Drain (Sometimes Termed "Storm Sewer"). A drain or sewer for conveying water, groundwater, surface water, or unpolluted water from any source.

83. Storm Water. Any flow occurring during or following any form of natural precipitation and resulting therefrom.

84. Superintendent. The Superintendent of the wastewater facilities, his authorized deputy, agent, or representative.

85. Surcharge. A charge for services in addition to the basic sewer user and debt service charges, for those users whose contributions contain Biochemical Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Oil & Grease or Ammonia-nitrogen (NH_3-N) in concentrations which exceed limits specified herein for such pollutants. Where authorized by the control authority, payment of a surcharge will authorize the discharge of the referenced pollutants so long as the discharge does not cause pass through or interference.

86. Suspended Solids (TSS). Total suspended matter that either floats on the surface of, or is in suspension in, water, wastewater, or other liquids and that is removable by laboratory filtering as prescribed in "Standard Methods for the Examination of Water and Wastewater".

87. Time Proportional Composite Sample. Combination of individual samples with fixed volumes taken at specific time intervals.

88. Toxic Organic Management Plan. Written plan submitted by industrial users as an alternative to TTO monitoring, which specifies the toxic organic compounds used, the method of disposal used and procedures for assuring that toxic organics do not routinely spill or leak into wastewater discharged to the POTW.

89. Toxic Pollutant. Any pollutant or combination of pollutants listed as toxic in regulations promulgated by the Administrator of EPA under the provisions of the Clean Water Act 307(a) or any amendments thereto.

90. Unpolluted Water. Water of quality equal to or better than the treatment works effluent criteria in effect, or water that would not cause violation of receiving water quality standards and would not be benefited by discharge to the sanitary sewers and wastewater treatment facilities.

91. Unregulated Wastestream. A wastestream that is not regulated by National Categorical Pretreatment Standards.

92. User. Any person who contributes, causes or permits the contribution of wastewater into the POTW.

93. Wastewater. The spent water of a community. Sanitary or domestic wastes shall mean the liquid and water carried wastes from residences, commercial buildings and institutions as distinct from industrial waste.

94. Wastewater Facilities. The structures, equipment, and processes required to collect, carry away, treat domestic and industrial wastes, and dispose of the effluent.

95. Wastewater Treatment Works. An arrangement of devices and structures for treating wastewater, industrial wastes, and sludge. Sometimes used as synonymous with "waste treatment plant" or "wastewater treatment plant" or "water pollution control plant" or "sewage treatment plant.

96. Watercourse. A natural or artificial channel for the passage or water either continuously or intermittently.

97. Waters of the State. All streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the State or any portion thereof.

C. Abbreviations

The following abbreviations shall have the designated meaning:

ADMI - American Dye Manufacturers Institute
ASTM - American Society for Testing and Materials
BMP - Best Management Practices
BOD - Biochemical Oxygen Demand
BPJ - Best Professional Judgment
CFR - Code of Federal Regulations
CIU - Categorical Industrial User
CWA - Clean Water Act (33 USC 1251 et seq.)
CWF - Combined Wastestream Formula
EPA - Environmental Protection Agency
FWA - Flow Weighted Average
FR - Federal Register
GC - Gas Chromatography
GC/MS-Gas Chromatography/Mass Spectroscopy
gpd - gallons per day
IU - Industrial User
l - Liter
mg - Milligrams
mg/l - Milligrams per liter
NPDES- National Pollutant Discharge Elimination System
KPDES- Kentucky Pollutant Discharge Elimination System
POTW - Publicly Owned Treatment Works
QA - Quality Assurance
QC - Quality Control
RCRA - Resource Conservation and Recovery Act
SIC - Standard Industrial Classification
SIU - Significant Industrial User
SWDA - Solid Waste Disposal Act, 42 U.S.C. 6901, et. seq.
TSS - Total Suspended Solids
TTO - Total Toxic Organics
USC - United States Code

ARTICLE II - USE OF PUBLIC SEWERS

A. Mandatory Sewer Connections

1. The owner(s) of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes, situated within the City and abutting on any street, alley, or right-of-way in which there is now located or may in the future be located a public sanitary sewer of the City, is hereby required at the owner's expense to install suitable toilet facilities therein, and to connect such facilities directly with the proper sewer in accordance with the provisions of this ordinance, within ninety (90) days after date of official notice to do so, provided that said public sewer is within one hundred (100) feet (30.5 meters) of the property line.

2. It shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool, or other facility intended or used for the disposal of wastewater where public sanitary sewer service is available, as defined in paragraph 1, except as provided for in "Private Wastewater Disposal" (Article III).

3. At such time as a public sewer becomes available to a property served by a private wastewater disposal system, a direct connection shall be made to the public system within sixty (60) days in compliance with this ordinance, and any septic tanks, cesspools and similar private wastewater disposal facilities shall be cleaned of sludge and filled with suitable material or salvaged and removed.

B. Unlawful Discharge to Storm Sewers or Natural Outlets.

1. It shall be unlawful for any person to place, deposit, or permit to be deposited any pollutant in any unsanitary manner on public or private property within the City of Harrodsburg, or in any area under the jurisdiction of said City of Harrodsburg except in compliance with the provisions of this ordinance.

2. It shall be unlawful to discharge to any natural outlet within the City of Harrodsburg or in any area under the jurisdiction of said City, any wastewater or other polluted waters, except where suitable treatment or management has been provided in accordance with subsequent provisions of this ordinance. No provision of this ordinance shall be construed to relieve the owner of a discharge to any natural outlet of the responsibility for complying with applicable State and Federal Regulations governing such discharge.

C. Compliance with Local, State, and Federal Laws.

1. The discharge of any wastewater into the public sewer system by any person is unlawful except in compliance with the provisions of this ordinance, and any more stringent State or Federal Standards promulgated pursuant to the Federal Water Pollution Control Act Amendments of 1972, the Clean Water Act of 1977, and subsequent amendments, and 40 CFR 403.

D. Discharge of Unpolluted Waters into Sewer.

1. No person(s) shall discharge or cause to be discharged, through any leak, defect, or connection any unpolluted waters such as storm water, groundwater, roof runoff or subsurface drainage to any sanitary sewer, building sewer, building drain or building plumbing. The Superintendent or his representative shall have the right, at any time, to inspect the inside or outside of buildings or smoke test for connections, leaks, or defects to building sewers and require disconnection or repair of any such pipes carrying such water to the building sewer. No sanitary drain sump or sump pump discharge by manual switch-over of discharge connection shall have a dual use for removal of such water.

2. The owners of any building sewers having such connections, leaks, or defects shall bear all costs incidental to removal of such sources.

E. Prohibited Discharges

No user shall contribute or cause to be contributed, directly or indirectly, any pollutant or wastewater which will interfere with performance of the POTW. These general prohibitions apply to all such users of a POTW whether or not the user is subject to National Categorical Pretreatment Standards or any other National, State, or local Pretreatment Standards or Requirements. A user shall not contribute the following substances to the POTW;

1. Any liquids, solids or gases which by reason of their nature or quantity are, or may be, sufficient either alone or by interaction with other substances to cause fire or explosion or be injurious in any other way to the POTW or to the operation of the POTW. At no time shall the wastewater exhibit a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21.

2. Any waters or wastes having a pH lower than 5.5 or higher than 10.0 or having any other corrosive property capable

of causing damage or hazard to structures, equipment, and personnel of the POTW.

3. Any slug load of pollutants, including oxygen demanding pollutants (BOD, etc.), released at a flow rate and/or concentration that will cause interference with the normal operation of the POTW.

4. Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the wastewater facilities.

5. Any wastewater having a temperature which will inhibit biological activity in the POTW treatment plant resulting in interference, but in no case wastewater with a temperature at the introduction into the POTW that will result in a treatment plant influent temperature which exceeds 40°C (104°F).

6. Any pollutant(s) which result in the presence of toxic gases, vapors or fumes within the POTW in a quantity that may cause acute worker health and safety problems.

7. Any substance which may cause the POTW's effluent or any other product of the POTW such as residues, sludges, or scum, to be unsuitable for reclamation and reuse or to interfere with the reclamation process where the POTW is pursuing a reuse and reclamation program. In no case shall a substance discharged to the POTW cause the POTW to be in non-compliance with sludge use or disposal criteria, guidelines or regulations developed under Section 405 of the Act; any criteria, guidelines, or regulations affecting sludge use or disposal developed pursuant to the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, or State criteria applicable to the sludge management method being used.

8. Any substance which will cause the POTW to violate its NPDES/KPDES Permit and/or sludge disposal system permit.

9. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through at the POTW.

10. Any trucked or hauled pollutants except at discharge points designated by the POTW.

ARTICLE III - PRIVATE WASTEWATER DISPOSAL

A. Public Sewer Not Available

1. Where a public sanitary sewer is not available under the provisions of "Use of Public Sewer" (Article II), the building sewer shall be connected, until the public sewer is available, to a private wastewater disposal system complying with the provisions of the Mercer County Health Department and all applicable local and state regulations.

2. The owner shall operate and maintain the private sewage disposal facilities in a sanitary manner at all times, at no expense to the City.

3. No statement contained in this Article shall be construed to interfere with any additional requirements that may be imposed by applicable local or state regulations.

4. Holders of NPDES/KPDES Permits Excepted. Industries with current NPDES/KPDES permits may discharge at permitted discharge points provided they are in compliance of the issuing authority.

B. Requirements for Installation

1. The type, capacity, location and layout of a private sewage disposal system shall comply with all local or State regulations.

2. A permit for private sewage disposal system shall not become effective until the installation is completed to the satisfaction of the local and State authorities.

ARTICLE IV - BUILDING SEWERS AND CONNECTIONS

A. Permits

1. There shall be two (2) classes of building sewer permits required; (a) for residential and (b) for service to commercial and industrial establishments. In either case, the owner(s) or his agent shall make application on a special form furnished by the City. Applicants for service to commercial and industrial establishments shall be required to furnish information about all waste producing activities, wastewater characteristics and constituents. The permit application shall be supplemented by any plans, specifications, or other information considered pertinent in the judgment of the Superintendent. Details regarding commercial and industrial permits include, but are not limited to those required by this ordinance. Permit and inspection fees shall be paid to the City at the time the application is filed.

2. Users shall promptly notify the City in advance of any introduction of wastewater constituents or any substantial change in the volume or character of the wastewater constituents being introduced into the POTW. The Superintendent may deny or condition the new introduction or change in discharge based on the information submitted in the notification or additional information as may be requested.

3. No person(s) shall uncover, plug or make any connection with or opening into, use, alter, or disturb any public sewer or appurtenance thereof without first obtaining permission from the Superintendent.

B. Prohibited Connections

1. No person shall make connection of roof downspouts, basement wall seepage or floor seepage, exterior foundation drains, areaway drains, or other surface runoff or groundwater to a building sewer or building drain which in turn is connected directly or indirectly to a public sanitary sewer. Any such connections which already exist on the effective date of this ordinance shall be completely and permanently disconnected within sixty (60) days of the effective date of this ordinance. The owner(s) of any building sewers having such connections, leaks or defects shall bear all costs incidental to removal of such sources. Pipes, sumps, and pumps for such sources of ground and surface water shall be separate from wastewater facilities. Removal of such sources of water without presence of separate facilities shall be evidence of drainage to public sanitary sewer.

2. Floor, basement, or crawl space drains which are lower than ground surfaces surrounding the building shall not be connected to the building sanitary sewer. No sanitary inlet which is lower than six (6) inches above the top of the lowest of the two adjacent public sanitary sewer manholes shall be connected by direct drainage to the building sanitary sewer.

C. Design and Installations

1. A separate and independent building sewer shall be provided for every building; except where one building stands at the rear of another on an interior lot and no private sewer is available or can be constructed to the rear building through an adjoining alley, courtyard, or driveway. The sewer from the front building may be extended to the rear building and the whole considered as one building sewer, but the City does not and will not assume any obligation or responsibility for damage caused by or resulting from any such single connection aforementioned.

2. Old building sewers may be used in connection with new buildings only when they are found, on examination and test by the Superintendent, to meet all requirements of this ordinance. Permit and inspection fees for new buildings using existing building sewers shall be the same as for new building sewers. If additional sewer customers are added to the old building sewers, additional sewer tap fees shall be charged accordingly even though no new sewer tap is actually made into the City system.

3. Extension of customer service lines from any point on the customer's side of the tap for delivery of waste from any location other than that of the customer in whose name the tap is registered shall not be permitted.

4. The building sewer shall be cast iron soil pipe, ASTM A-74, latest revision, PVC (polyvinyl-chloride) sewer pipe, ASTM D-3034, latest revision, unglazed clay sewer pipe, ASTM C-261, latest revision, vitrified clay sewer pipe, ASTM C-700, latest revision, or ductile iron pipe, AWWA specification C-151 cement lined, and shall meet requirements of State plumbing code. Joints shall be as set out hereinafter. Any part of the building sewer that is located within five feet of a water service pipe shall be constructed with cast iron soil pipe or ductile iron pipe, unless the building sewer is at least one foot deeper in the ground than the water service line. In the latter case, vitrified clay pipe may be used. Cast iron soil pipe or ductile iron pipe may be required by the City where the building sewer is exposed to damage or

stoppage by tree roots. Cast iron soil pipe or ductile iron pipe shall be used in filled or unstable ground, in areas where the cover over the building sewer is less than three feet, or in areas where the sewer is subject to vehicular or other external loads.

5. The size, slope, alignment, materials of construction of a building sewer, and the methods to be used in excavating, placing of the pipe, jointing, testing, and backfilling the trench, shall all conform to the requirements of the local and state building and plumbing codes and other applicable rules and regulations of the City.

6. All costs and expenses incidental to the installation and connection of the building sewer shall be borne by the owner(s). The owner(s) shall indemnify the City for any loss or damage that may directly or indirectly be occasioned by the installation of the building sewer. Fees for connection shall be as established by the City.

7. The owner shall ensure that all excavations for building sewer installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways, and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the City.

8. In all buildings in which any sanitary facility drain is too low to permit gravity flow to the public sewer, sanitary sewage carried by such drain shall be lifted by an approved means and discharged to the same building sewer. Drain pipe and sump for collection of such sanitary drainage shall be above basement floor or in separately watertight or drained sump or channel.

9. The building sewer shall be connected into the public sewer at the easement or property line. Where no property located service branch is available, an authorized agent of the City shall cut a neat hole into the main line of the public sewer and a suitable wye or tee saddle installed to receive the building sewer. The invert of the building sewer at such point of connection with a saddle shall be in the upper quadrant to the main line of the public sewer. A neat workmanlike connection, not extending past the inner surface of the public sewer, shall be made and the saddle made secure and watertight by encasement in epoxy cement specially prepared for this purpose. A wye and H bend fitting shall be installed at the property line between the public sewer and the building sewer. This fitting shall serve the purpose of a cleanout and for applying the smoke test during inspection of the line. After testing, a cast iron or ductile iron riser will be inserted in this fitting and

brought flush with the ground surface. A stopper or plug, outfitted with a type joint applicable to the pipe used, shall seal this riser against the intrusion of ground or surface water.

10. All building sanitary sewer lines will be installed so as to meet or exceed the most current revision of the State Plumbing Code.

11. All persons working on City sewers with a cleaning rod must use an approved type rod in cleaning sewer connections to City sewers.

D. Inspection

1. The applicant for the building sewer permit shall notify the Superintendent when the building sewer is ready for connection to the public sewer. The connection shall be made under the supervision of the Superintendent or his representative. The connections shall be made gastight and watertight and verified by proper testing.

2. All building sewers shall be smoke tested through the wye branch at the public sewer connection, with public sewer tightly plugged off, after connections at both ends are made and after all pipe is properly bedded and backfilled at least to top of pipe and if backfill is completed, within two weeks after completion of backfill. At time of test, any openings into the building drain inside the building shall be water trapped or plugged. Any leakage of smoke from building sewer or building drain and plumbing shall be located at test and repaired to stand repetition of smoke test without leakage. When smoke testing is completed, the temporary flow line plug shall be removed and a permanent water tight plug shall be placed in branch of test wye-branch and carefully backfilled by hand and tamped to at least six inches above the top of the branch.

ARTICLE V - POLLUTANT DISCHARGE LIMITS

A. General Conditions

The following described substances, materials, waters or wastes shall be limited in discharges to municipal systems to concentration or quantities which: will not harm either the sewers, wastewater treatment process or equipment, will maintain and protect water quality in the receiving stream, and will not otherwise endanger lives, limb, public property, or constitute a nuisance. The Superintendent may set additional limitations or limitations more stringent than those established in the provisions below if in his opinion more severe limitations are necessary to meet the above objectives. In forming his opinion as to the acceptability of a discharge, the Superintendent shall give consideration to such factors as the quantity of subject waste in relation to flows and velocities in the sewers, materials of construction of the sewers, the wastewater treatment process employed, capacity of the wastewater treatment plant, and other pertinent factors.

B. Restricted Discharges

1. Wastewater containing more than 25 milligrams per liter of petroleum oil, nonbiodegradable cutting oils, or products of mineral oil origin.

2. Wastewater containing floatable oils, fat, or grease, whether emulsified or not, in excess of one hundred milligrams per liter (100 mg/l) or containing substances which may solidify or become viscous at temperatures 32-150° (0-65°C).

3. Any garbage that has not been properly shredded. Garbage grinders may be connected to sanitary sewers from homes, motels, institutions, restaurants, hospitals, catering establishments, or similar places where garbage originates from the preparation of food in kitchens for the purpose of consumption on the premises or when served by caterers.

4. Any wastewater containing toxic pollutants in sufficient quantity, either singly or by interaction with other pollutants which: injure or interfere with any wastewater treatment process, constitute a hazard to humans or animals, causes the City to violate the terms of its KPDES permit, prevents the use of acceptable sludge disposal methods, or exceed a limitation set forth in a Categorical Pretreatment Standard.

5. Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by the

City in compliance with applicable State or Federal Regulations.

6. Any water or wastes which by interaction with other water or wastes in the public sewer system, release obnoxious gases, form suspended solids which interfere with the collection system, or create a condition deleterious to structures and treatment processes.

7. Any wastewater with objectionable color which cannot be removed to an acceptable level within the operation of the wastewater treatment process unless otherwise specifically noted in the Industrial User Permit (IUP).

8. Waters or wastes containing substances which are not amenable to treatment or reduction by the wastewater treatment processes employed to the extent required by the City's NPDES/KPDES permit.

9. Any waste(s) or wastewater(s) classified as a hazardous waste by the Resource Conservation and Recovery Act (RCRA) without a 60 day prior notification of such discharge to the Superintendent. This notification must include the name of the hazardous waste, the EPA hazardous waste number, type of discharge, volume/mass of discharge and time of occurrence(s). The Superintendent may prohibit or condition the discharge(s) at any time.

10. Any water or wastes which have characteristics based on a 24 hour composite sample, grab or a shorter period composite sample, if more representative, that exceed the following normal maximum domestic wastewater parameter concentrations:

Parameter	Maximum Allowable Concentration Without Surcharges
BOD	250 mg/l
TSS	300 mg/l
NH_3-N	30 mg/l
Oil & Grease (total)	100 mg/l

Any person discharging wastewater exceeding the maximum allowable concentration as noted above, will be subject to a surcharge fee for each pound loading over and above the set limit. Any other amenable constituents requiring the addition of specific chemicals for proper treatment will also be subject to surcharge as noted on the Industrial User Permit. Exceedance of the effluent limits specified above shall not be deemed to constitute a violation of a permit condition or this ordinance if the appropriated surcharge fee is paid and the discharge does not cause interference or pass through of the POTW.

11. The following limitations are established for characteristics of any wastewaters to be discharged into the municipal sewer system subject to any compliance schedule as established in the Industrial User Permit. All significant industrial users must comply with these limitations where they are more stringent than applicable state and/or Federal regulations.

Parameter	Maximum Daily Concentration (mg/l)
Arsenic	0.27
Barium	5
Boron	100
Cadmium	0.07
Chloride	600
Chromium, Hex.	0.5
Chromium, Total	3
Copper	0.5
Cyanide, Amenable	0.05
Cyanide, Total	0.25
Fluoride	15
Iron	20
Lead	0.22
Mercury	0.0007
Nickel	2.56
Phenols	3
PCB	0
Selenium	0.1
Silver	0.43
Sulfate	250
Sulfide	5
Zinc	1.51

12. The City has received authority through the U.S. EPA and State Statutes to enforce the requirements of 40 CFR Subchapter N and 40 CFR Part 403. All users shall comply with the requirements of those regulations.

C. Dilution of Wastewater Discharge

No user shall ever increase the use of process water or, in any way, attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in the Federal Categorical Pretreatment Standards, or in any pollutant specific limitation developed by the City or State.

D. Grease, Oil, and Sand Interceptors

Grease, oil, and sand interceptors shall be provided when, in the opinion of the Superintendent, they are necessary for the proper handling of liquid wastes containing floatable grease

in excessive amounts, or any flammable wastes, sand, or other harmful ingredients; except that such interceptor shall not be required for private living quarters or dwelling units. All interceptors shall be of type and capacity approved by the Superintendent and shall be located as to be readily and easily accessible for cleaning and inspection. In the maintaining of these interceptors the owner(s) shall be responsible for the proper removal and disposal by appropriate means of the captured material and shall maintain records of the dates, and means of disposal. The City may require reporting of such information for their review. Any removal and hauling of the collected materials not performed by owner(s) personnel must be performed by currently licensed waste disposal firms. Interceptors shall also comply with applicable regulations of the County Health Department.

E. Special Industrial Pretreatment Requirements

1. Pursuant to the requirements imposed on publicly owned wastewater treatment works by the Federal Water Pollution Control Act Amendments of 1972 and later amendments, all Pretreatment Standards promulgated by the U.S. Environmental Protection Agency for new and existing industrial dischargers to public sewer systems are hereby made a part of this ordinance. Any industrial waste discharge which violates these EPA Pretreatment Standards shall be in violation of this ordinance.

2. Where pretreatment or flow equalizing facilities are provided or required for any waters or wastes, the industry shall be solely responsible for the continued maintenance in satisfactory and effective operation of such facilities and at their expense. The City may agree to assume these responsibilities if proper and appropriate arrangements for reimbursement of costs are made.

3. Any person who transports septic tank, seepage pit or cesspool contents, liquid industrial waste or other batch liquid waste and wishes to discharge such waste to the public sewer system shall first have a valid Trucker's Discharge Permit. All applicants for a Trucker's Discharge Permit shall complete the application form, pay the appropriate fee, and receive a copy of the City's regulations governing discharge to sewers of liquid wastes from trucks. All persons receiving such permits shall agree, in writing, to abide by all applicable provisions of this ordinance, and any other special provisions that may be established by the City as necessary for the proper operation and maintenance of the sewerage system.

   In addition any person holding a valid permit and wishing to discharge to the wastewater treatment plant must

submit to the Chief Operator a sample of each load prior to discharge. A fee and payment schedule shall be established in the permit to cover cost of the required analysis.

It shall be illegal to discharge any batch liquid waste into any manhole or other part of the public sewer system, or any building sewer or other facility that discharges to the public sewer system, except at designated points of discharge specified by the City for such purpose.

Any liquid waste hauler illegally discharging to the public sewer system or discharging wastewater not authorized in the permit shall be subject to immediate revocation of discharge privileges and further subject to the penalties and enforcement actions prescribed in Article X including fines and imprisonment.

Waste haulers who have been granted permission to discharge to the public sewer system shall pay fees for such discharge in accordance with a fee schedule established by the Superintendent and approved by the City.

Nothing in this ordinance shall relieve waste haulers of the responsibility for compliance with County Health Department, State, or Federal Regulations.

F. Protection from Accidental and Slug Discharges

1. Each significant user shall provide protection from accidental and/or slug discharges of prohibited materials or other substances regulated by this ordinance which adversely affects the POTW. Facilities to prevent accidental and/or slug discharges of prohibited materials shall be provided and maintained at the owner or user's own cost and expense. Once every two (2) years, the Superintendent will determine whether each industrial user needs to develop or update a plan to control slug discharges. If the Superintendent determines that a slug control plan or revision is necessary, the plan shall contain the following:

    a. Description of discharge practices
    b. Description of stored chemicals
    c. Procedures for notifying POTW
    d. Prevention procedures for spills

In the case of all possible or actual accidental and/or slug discharges, it is the responsibility of the user to immediately telephone and notify the POTW of the incident. The notification shall include location of

discharge, type of waste, concentration and volume, and corrective actions.

2. Written Notice. Within five (5) days following an accidental discharge, the user shall submit to the Superintendent a detailed written report describing the cause of the discharge and the measures to be taken by the user to prevent similar future occurrences. Such notification shall not relieve the user of any expense, loss, damage, or other liability which may be incurred as a result of damage to the POTW, fish kills, or any other damage to person or property; nor shall such notification relieve the user of any fines, civil penalties, or other liability which may be imposed by this article, the Enforcement Response Plan or other applicable law.

3. Notice to Employees. A notice shall be permanently posted on the user's bulletin board or other prominent place advising employees whom to call in the event of a dangerous discharge. Employers shall insure that all employees who may cause or suffer such a dangerous discharge to occur are advised of the emergency notification procedure.

G. State Requirements

State requirements and limitations on discharges shall apply in any case where they are more stringent than Federal requirements and limitations or those in this ordinance.

H. City's Right of Revision

The City reserves the right at the recommendation of the Superintendent to establish by majority vote of its Council, more stringent limitations, or requirements on discharges to the POTW if deemed necessary to comply with the objectives presented in this ordinance.

I. Federal Categorical Pretreatment Standards

Upon the promulgation of the Federal Categorical Pretreatment Standards for a particular industrial subcategory, the Federal Standard, if more stringent than limitations imposed under this ordinance for sources in that subcategory, shall immediately supersede the limitations imposed under this ordinance.

ARTICLE VI - PRETREATMENT PROGRAM ADMINISTRATION

A. Wastewater Discharges

It shall be unlawful to discharge to the POTW any wastewater except as authorized by the City in accordance with the provisions of this ordinance.

Any agency , nondomestic user, and/or industry outside the jurisdiction of the City that desires to contribute wastewater to the POTW must execute (through an authorized representative) an interjurisdictional agreement, whereby the agency and/or industry agrees to be regulated by all provisions of this ordinance and State and Federal regulations. An Industrial User Permit may then be issued by the Superintendent in accordance with Section B of this article.

B. Industrial User Permits

1. General

All significant industrial users proposing to connect to or to contribute to the POTW shall obtain an Industrial User Permit before connecting to or contributing to the POTW.

2. Permit Application

Users required to obtain an Industrial User Permit shall complete and file with the City, an application in the form prescribed by the City, and accompanied by a permit fee. New users shall apply at least ninety (90) days prior to connecting to or contributing to the POTW. Existing permit holder shall apply no later than sixty (60) days prior to expiration of permit. In support of the application, the user shall submit, in units and terms appropriate for evaluation, the following information:

a. Name, address, and location if different from the address;

b. SIC number(s) according to the Standard Industrial Classification Manual, United States Bureau of the Budget, 1972, as amended;

c. Wastewater constituents and characteristics as determined by an analytical laboratory acceptable to the City; sampling and analysis shall be performed in accordance with procedures established by the EPA pursuant to Section 304 (g) of the Act and contained in 40 CFR, Part 136, as amended;

d. Time and duration of contribution;

e. Average daily and 30 minute peak wastewater flow rates, including daily, monthly and seasonal variation if any;

f. Site plans, floor plans, mechanical and plumbing plans and details to show all sewers, sewer connections, and appurtenances by the size, location and elevation;

g. Description of activities, facilities, and plant processes on the premises including all materials which are or could be discharged;

h. Where known, the nature and concentration of any pollutants in the discharge which are limited by the City, State or Federal Pretreatment Standards, and a statement regarding whether or not the pretreatment standards are being met on a consistent basis and if not, whether additional pretreatment is required for the user to meet applicable Pretreatment Standards;

i. If additional pretreatment will be required to meet the Pretreatment Standards, the shortest schedule by which the user will provide such additional pretreatment. The completion date in this schedule shall not be later than the compliance date established for the applicable Pretreatment Standard;

The following conditions shall apply to this schedule:

1. The schedule must be acceptable to the City.

2. The schedule shall contain increments of progress in the form of dates for the commencement and completion of major events leading to the construction and operation of additional pretreatment required for the user to meet the applicable Pretreatment Standards.

3. Not later than 14 days following each date in the schedule and the final date for compliance, the user shall submit a progress report to the Superintendent including, as a minimum, whether or not it complied with the increment of progress to be met on such date and, if not, the date on which it expects to comply with this increment of progress and the reason for delay, and the steps being taken by the user to

return the construction to the schedule established.

j. Each product produced by type, amount, process or processes, and the rate of production;

k. Type and amount of raw materials processed (average and maximum per day);

l. Number of employees, and hours of operation of plant and proposed or actual hours of operation of pretreatment system;

m. Any other information as may be deemed by the City to be necessary to evaluate the permit application.

n. A copy of the industry's written environmental control program, comparable document, or policy.

3. Issuance

The City shall evaluate the data furnished by the user and may require additional information. After evaluation and acceptance of the data furnished, the Superintendent or his designee may issue an Industrial User Permit subject to terms and conditions provided herein.

C. Permit Modifications

Within 9 months of the promulgation of a National Categorical Pretreatment Standards, the Industrial User Permit of users subject to such standards shall be revised to required compliance with such standards within the time frame prescribed by such standards. Where a user, subject to National Categorical Pretreatment Standards, has not previously submitted an application for an Industrial User Permit as required, the user shall apply for an Industrial User Permit within 90 days after the promulgation of the applicable National Categorical Pretreatment Standard. In addition, the user with an existing Industrial User Permit shall submit, to the Superintendent within 90 days after the promulgation of an applicable Federal Categorical Pretreatment Standard, the information required by this ordinance.

D. Permit Conditions

Industrial User Permits shall be expressly subject to all provisions of this ordinance and all other applicable regulations, user charges and fees established by the City. Permits may contain the following:

1. The unit surcharges or schedule of other charges and fees for the wastewater to be discharged to a community sewer;

2. Limits on the average and/or maximum wastewater constituents and characteristics;

3. Limits on average and/or maximum rate and time of discharge or requirements for flow regulations and equalization;

4. Requirements for installation and maintenance of inspection and sampling facilities;

5. Specifications for monitoring programs which may include sampling location; frequency of sampling; number, type and standards for tests; and reporting schedule;

6. Compliance schedules;

7. Requirements for submission of technical reports or discharge reports.

8. Requirements for maintaining and retaining, for a minimum of three years, all plant records relating to pretreatment and/or wastewater discharge as specified by the City, and affording City access thereto as required by 40 CFR 403:12(o)(2);

9. Requirements for notification of the City or any new introduction of wastewater constituents or any substantial change in the volume or character of the wastewater constituents being introduced into the wastewater treatment system.

10. Requirements for notification of slug discharges.

11. The permit may require the user to reimburse the City for all expenses related to monitoring, sampling and testing performed at the direction of the Superintendent and deemed necessary by the City to verify that the user is in compliance with said permit.

12. Other conditions as deemed appropriate by the City to ensure compliance with this ordinance.

E. Alternative Discharge Limits

Where an effluent from a categorical industrial process(es) is mixed prior to treatment with wastewater other than that generated by the regulated process, fixed alternative discharge limits may be derived for the discharge permit by the Superintendent. These alternative limits shall be applied to the mixed effluent and shall be calculated using the Combined Wastestream Formula and/or Flow-Weighted Average Formula as defined in Article I.

Where the effluent limits in a Categorical Pretreatment Standard are expressed only in terms of mass of pollutants per unit of production (production-based standard), the Superintendent may convert the limits to equivalent limitations expressed either as mass of pollutant discharged per day or of effluent concentration for purposes of calculating effluent permit limitations applicable to the permittee. The permittee shall be subject to all permit limits calculated in this manner under 40 CFR 403.6(c) and must fully comply with these alternative limits.

All categorical users subject to production-based standards must report production rates annually so that alternative permit limits can be calculated if necessary. The categorical user must notify the Superintendent thirty (30) days in advance of any major change in production levels that will affect the limits for the discharge permit.

F. Permit Duration

Permits shall be issued for a specified time period, not to exceed five (5) years. A permit may be issued for a period less than a year or may be stated to expire on a specific date. The user shall apply for permit reissuance a minimum of 60 days prior to the expiration of the user's existing permit. The terms and conditions of the permit may be subject to modification by the City during the term of the permit as limitations or requirements as identified in Article V are modified or other just cause exists. The user shall be informed of any proposed changes in their permit at least 30 days prior to the effective date of change. Any changes or new conditions in the permit shall include a reasonable time schedule for compliance.

G. Permit Transfer

Industrial User Permits are issued to a specific user for a specific operation. An Industrial User Permit shall not be reassigned or transferred or sold to a new owner, new user, different premises, or a new or changed operation without a thirty (30) day prior notification to the Superintendent and provision of a copy of the existing permit to the new owner. The Superintendent may deny the transfer of the permit if it is deemed necessary.

H. Compliance Data Reporting

Within 90 days following the date for final compliance with applicable categorical Pretreatment Standards or, in the case of a new user, following commencement of the introduction of wastewater into the POTW, any user subject to Federal Categorical Pretreatment Standards and Requirements shall submit, to the Superintendent, a report indicating the nature and concentration of all pollutants in the discharge from the

regulated process which are limited by Categorical Pretreatment Standards and Requirements and the average and maximum daily flow for these process units in the user's facility which are limited by such Categorical Pretreatment Standards or Requirements. The report shall state whether the applicable Categorical Pretreatment Standards or Requirements are being met on a consistent basis and, if not, what additional pretreatment and time schedule is necessary to bring the user into compliance with the applicable Categorical Pretreatment Standards or Requirements. This statement shall be signed by an authorized representative of the user.

I. Periodic Compliance Reports

1. All significant industrial users shall submit, to the Superintendent, every six months (on dates specified in the Industrial User Permit) unless required more frequently by the Permit, a report indicating, at a minimum, the nature and concentration, of pollutants in the effluent which are limited by such Pretreatment Standards or the discharge permit. In addition, this report shall include a record of all daily flows which during the reporting period exceeded the average daily flow. At the discretion of the Superintendent and in consideration of such factors as local high or low flow rates, holidays, budget cycles, etc., the Superintendent may agree to alter the months during which the above reports are to be submitted.

2. All analyses shall be performed by a laboratory acceptable to the City. Analytical procedures shall be in accordance with procedures established by the U.S. EPA Administrator pursuant to Section 304 (g) of the Act and contained in 40 CFR, Part 136 and amendments thereto and 40 CFR 261 or with any other test procedures approved by the U.S. EPA Administrator. Sampling shall be performed in accordance with the techniques approved by the U.S. EPA Administrator.

3. Where 40 CFR Part 136 does not include a sampling or analytical technique for the pollutant(s) in question, sampling and analysis shall be performed in accordance with the procedures set forth in the EPA publication. "Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants," April 1977, and amendments thereto, or with any other sampling and analytical procedures approved by the U.S. EPA Administrator.

4. A Baseline Monitoring Report (BMR) must be submitted to the Superintendent by all categorical industrial users at least ninety (90) days prior to initiation of discharge

to the sanitary sewer. The BMR must contain, at a minimum, the following:

a. Production Data: a process description, SIC code number, raw materials used, chemicals used, final product, pretreatment industrial category (if applicable), and a schematic which indicates points of discharge to the sewer system.

b. Identifying information to include name, address of facility, owner(s), contact person and any other permits held by the facility.

c. Wastewater characteristics: total plant flow, types of discharges, average and maximum flows from each process.

d. Nature/Concentration of pollutants: analytical results for all pollutants regulated by this ordinance and/or any applicable federal pretreatment standard and sample type and location. All analyses must conform with 40 CFR Part 136 and amendments thereto.

e. Information concerning any pretreatment equipment used to treat the facility's discharge.

5. New sources shall give estimates of the information requested in sections (c) and (d) above, but at no time shall a new source commence discharge(s) to the public sewer of substances that do not meet provisions of this ordinance. All new sources must be in compliance with all provisions of this ordinance, State and federal pretreatment regulations prior to commencement of discharge to the public sewer.

J. Permit Violations

1. All significant industrial users must notify the Superintendent within 24 hours of first becoming aware of a permit violation. This notification shall include the date of violation, the parameter violated and the amount in exceedance.

2. The user shall immediately repeat the sampling and analysis of the parameter(s) in question and submit the results to the Superintendent within thirty (30) days after becoming aware of the violation. Exception to this regulation is only if the City performs the sampling within the same time period for the same parameter(s) in question.

3. Compliance with the terms of an industrial user permit shall be deemed in compliance with the terms of this ordinance.

K. Monitoring

1. The City shall require significant users to provide and operate, at the user's own expense, monitoring facilities to allow inspection, sampling, and flow measurement of the building sewer and/or internal drainage system. The monitoring facility should normally be situated on the user's premises, but the City may, when such a location would be impractical or cause undue hardship on the user, allow the facility to be constructed in a public right-of-way. The Superintendent shall review and approve the location, plans, and specifications for such monitoring facilities and may require them to be constructed to provide for the separate monitoring and sampling of industrial waste and sanitary sewage flows.

   There shall be ample room in or near such sampling manhole or facility to allow accurate sampling and preparation of samples for analysis. The facility shall be designed and maintained in a manner such that the safety of City and industrial personnel shall be foremost. The facility, sampling, and measuring equipment shall be maintained at all times in a proper operating condition at the expense of the user.

   Whether constructed on public or private property, the sampling and monitoring facilities shall be provided in accordance with the City's requirements and all applicable local construction standards and specifications. Construction shall be completed within 90 days following approval of the location, plans and specifications.

2. All sampling analyses done in accordance with approved federal EPA procedures by the industrial user during a reporting period shall be submitted to the Superintendent regardless of whether or not that analysis was required by the industrial user's discharge permit.

3. The industrial user must receive the approval of the Superintendent before changing the sampling point and/or monitoring facilities to be used in all required sampling.

L. Inspection and Sampling

The City shall inspect the facilities of any user to ascertain whether the purpose of this ordinance is being met and all requirements are being complied with. Persons or occupants of premises where wastewater is created or discharged shall allow

the City or their representative ready access at all reasonable times to all parts of the premises for the purposes of inspection, sampling, copying records, records examination or in the performance of any of their duties.

The City, Approval Authority, and EPA shall have the right to set up on the user's property such devices as are necessary to conduct sampling, inspection, compliance monitoring and/or metering operations. Where a user has security measures in force which would require proper identification and clearance before entry into their premises, the user shall make necessary arrangements with their security guards so that upon presentation of suitable identification, personnel from the City, Approval Authority and EPA will be permitted to enter, without delay, for the purposes of performing their specific responsibilities.

M. Pretreatment

All significant industrial users shall provide necessary wastewater treatment as required to comply with this ordinance and achieve compliance with any applicable Federal Categorical Pretreatment Standards within the time limitations as specified by the Federal Pretreatment Regulations. The City may require the development of a compliance schedule for installation of pretreatment technology and/or equipment by any industrial user that cannot meet discharge limits required by this ordinance. Any facilities required to pretreat wastewater to a level required by this ordinance shall be provided, operated, and maintained at the user's expense. Detailed plans showing the pretreatment facilities and operating procedures shall be submitted to the City for review, and shall be acceptable to the City before construction of the facility. The review of such plans and operating procedures will in no way relieve the user from the responsibility of modifying the facility as necessary to produce an effluent that complies with the provisions of this ordinance. Any subsequent changes in the pretreatment facilities or method of operation shall be reported to and be acceptable to the City prior to the user's initiation of the changes.

N. Annual Publication

The City shall annually publish in a newspaper of local circulation a list of significant users which were in significant non-compliance with any Pretreatment Requirements or Standards. The notification shall also summarize any enforcement actions taken against the user(s) during the same 12 months.

All records relating to the City's Pretreatment Program shall be made available to officials of the EPA or Approval Authority upon request. All records shall be maintained for a

minimum of three (3) years in accordance with 40 CFR 403.12 (O) (2).

O. Significant Non-Compliance

A user is defined as being in significant non-compliance when it commits one or more of the following conditions:

1. Causes imminent endangerment to human health or the environment or results in the exercise of emergency authority;

2. Involves failure to report noncompliance accurately;

3. Results in a chronic violation defined here as sixty-six percent (66%) or more of all measurements taken during a six (6) month period that exceed (by any magnitude) the daily maximum limit or the average limit for the same pollutant parameter.

4. Results in a Technical Review Criteria (TRC) Violation defined here as thirty-three percent (33%) or more of all measurements for each pollutant parameter taken during a six (6) month period that equal or exceed the product of the daily maximum limit or the average limit multiplied by the applicable TRC (TRC = 1.4 for BOD, TSS, fats, and O&G and 1.2 for all other pollutants except pH).

5. Any violation of a pretreatment effluent limit that the Control Authority determines has caused, alone or in combination with other discharges, interference or pass through or has endangered the health of the POTW personnel or the public.

6. Any discharge causing imminent endangerment to human health/welfare or to the environment or resulting in the POTW's use of its emergency authority to halt or prevent such a discharge.

7. Violations of Compliance Schedule Milestones, failure to comply with schedule milestones for starting or completing construction or attaining final compliance by ninety (90) days or more after the schedule date.

8. Failure to provide required reports within thirty (30) days of the due date.

9. Any violation or group of violations which the control authority determines will adversely affect the operation or implementation of the local pretreatment program.

P. Confidential Information

Information and data on a user obtained from reports, questionnaires, permit applications, permits and monitoring programs and from inspections shall be available to the public or other governmental agency without restriction unless the user specifically requests in writing and is able to demonstrate to the satisfaction of the City that the release of such information would divulge information, processes, or methods of production entitled to protection as trade secrets of the user.

When requested by the person furnishing a report, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public but shall be made available to all governmental agencies for uses related to this ordinance, the NPDES/KPDES Permit, Sludge Disposal System Permit and/or the Pretreatment Programs upon request. Such portions of a report shall be available for use by the State or any State agency in judicial review or enforcement proceedings involving the person furnishing the report. Wastewater constituents and characteristics shall not be recognized as confidential information and shall be available to the public without restriction.

Q. Signatory Requirements

All applications, reports or information submitted to the City shall be signed and certified.

1. All permit applications shall be signed:

   a) For a corporation: by a principal executive officer of at least the level of vice-president;

   b) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;

2. All other correspondence, reports and self-monitoring reports shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a) The authorization is made in writing by a person described above;

   b) The authorization specifies either an individual or a position having facility or activity, such as the position of plant manager, superintendent or position of equivalent responsibility.

3. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that I am familiar with the information contained in this report and its attachments and that to the best of my knowledge and belief such information is true, complete and accurate."

ARTICLE VII - FEES

A. Purpose

This article provides for the recovery of costs from users of the POTW for the implementation of the program established herein. The applicable charges or fees shall be set forth in the City's Schedule of Charges and Fees.

B. Charges and Fees

The City may adopt charges and fees which may include:

1. fees for reimbursement of costs of setting up and operating the City's Pretreatment Program;

2. fees for monitoring, inspections, and surveillance procedures;

3. fees for reviewing accidental discharge procedures and construction;

4. fees for permit applications;

5. fees for filing appeals;

6. fees for consistent removal by the POTW of excessive strength conventional pollutants;

7. other fees as the City may deem necessary to carry out the requirements contained herein.

These fees relate solely to the matters covered by this ordinance and are separate from all other fees chargeable by the City.

ARTICLE VIII - POWERS AND AUTHORITY OF INSPECTORS

A. Right to Enter Premises

The Superintendent and other duly authorized employees and representatives of the City and authorized representatives of applicable Federal and State regulatory agencies bearing proper credentials and identification shall be permitted to enter all properties for the purpose of inspection, observation, measurement, sampling, and testing pertinent to discharges to the public sewer system in accordance with the provisions of this ordinance.

B. Right to Obtain Information Regarding Discharge

Duly authorized employees of the City and representatives of the State and EPA are authorized to obtain information including but not limited to copying of records concerning character, strength and quantity of industrial wastes which have a direct bearing on the kind and source of discharge to the wastewater collection system.

C. Access to Easements

Duly authorized employees and representatives of the City bearing proper credentials and identification shall be permitted to enter all private properties through which the City holds a duly negotiated easement for the purpose of, but not limited to, construction, inspection, observation, measurement, sampling, repair, and maintenance of any portions of the wastewater facilities lying within said easement. All entry and subsequent work, if any on said easement shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property involved.

D. Safety

While performing the necessary work on private properties referred to in Section C above, all duly authorized employees of the City shall observe all safety rules applicable to the premises established by the company. The company shall be held blameless for injury or death to City employees. The City shall secure the company against loss or damage to its property by City employees and against liability claims and demands for personal injury or property damage asserted against the company and growing out of the gauging and sampling operation, except as such may be caused by negligence or failure of the company to maintain safe conditions as required by this ordinance.

ARTICLE IX - ENFORCEMENT

A. General

The City, through the Superintendent or his designee, to insure compliance with this ordinance, and as permitted through 40 CFR Subchapter N, and 401 KAR 5:055, may take the following enforcement steps against users in non-compliance with the ordinance. The remedies available to the POTW include injunctive relief, civil and criminal penalties, immediate discontinuance of discharges and/or water service and the publishing of the list of significant violators annually. The enforcement authority shall be vested in the Superintendent or their designee.

The Superintendent may suspend the wastewater treatment service and/or an Industrial User Permit when such suspension is necessary, in the opinion of the City, in order to stop an actual or threatened discharge which presents or may present an imminent or substantial endangerment to the health or welfare of persons, to the environment, causes interference to the POTW or causes the City to violate any condition of its NPDES/KPDES Permit.

Any user notified of a suspension of the wastewater treatment service and/or the Industrial User Permit shall immediately stop or eliminate the contribution. In the event of a failure of the person to comply voluntarily with the suspension order, the City shall take such steps as deemed necessary including immediate severance of the sewer connection, to prevent or minimize damage to the POTW system or endangerment to any individuals. The City shall reinstate the Industrial User Permit and/or the wastewater treatment service upon proof of the elimination of the non-complying discharge. A detailed written statement submitted by the user describing the causes of the harmful contribution and the measures taken to prevent any future occurrence shall be submitted to the City within 15 days of the date of occurrence.

B. Notice of Violation

Any user found to be violating any provisions of this ordinance, wastewater permit, or any order issued hereunder, shall be served by the City with written notice stating the nature of the violation(s). Within 10 days of the receipt date of this notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted to the Superintendent. Submission of this plan in no way relieves the user of potential liability for any violation occurring before or after receipt of the Notice of Violation.

If the violations persist or the explanation and/or plan are not adequate, the City's response shall be more formal and commitments (or schedules as appropriate) for compliance will be established in an enforceable document. The enforcement response selected will be related to the seriousness of the violation. Enforcement responses will be escalated if compliance is not achieved expeditiously after the initial action. A significant non-compliance as defined in Article VI, Sub paragraph O,will require a formal enforcement action.

The full scale of enforcement actions will be as detailed in the Enforcement Response Plan.

C. Administrative Orders

Any user who after receiving a Notice of Violation shall continue to discharge in violation of this ordinance or other pretreatment standards or requirements or is determined to be a chronic or persistent violator or who is determined to be a significant violator, shall be ordered to appear before the City. At said appearance, a compliance schedule will be given to the non-conforming user and an administrative fine assessed. The fine shall be determined on a case-by-case basis which shall consider the type and severity of violations, duration of violation, number of violations, severity of impact on the POTW, impact on human health, users economic benefit from violation, history of violations, good faith of the user, and shall be a non-arbitrary but appropriate amount.

The administrative order may take any of the following three forms.

1. Consent Orders

The Superintendent or their designee is hereby empowered to enter into Consent Orders, assurances of voluntary compliance, or other similar documents establishing an agreement with the industrial user responsible for the noncompliance. Such orders will include specific action to be taken by the industrial user to correct the noncompliance within a time period also specified by the order. Consent Orders shall have the same force and effect as orders issued pursuant to Article IX, Section C.3. below.

2. Compliance Orders

When the Superintendent or their designee finds that an industrial user has violated or continues to violate the ordinance or a permit or order issued thereunder, he may issue an order to the industrial user responsible for the discharge directing that, following a specified time period, sewer service shall be discontinued unless

adequate treatment facilities, devices, or other related appurtenances have been installed and are properly operated. Orders may also contain such other requirements as might be reasonably necessary and appropriate to address the noncompliance, including the installation of pretreatment technology, additional self-monitoring, and management practices.

3. Cease and Desist Orders

When the Superintendent finds that an industrial user has violated or continues to violate this ordinance or any permit or order issued hereunder, the Superintendent may issue an order to cease and desist all such violations and direct those persons in noncompliance to: a) comply forthwith, or b) take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation, including halting operations and terminating the discharge.

D. Show Cause Hearing

1. The Superintendent or their designee may issue to any user who causes or contributes to violations of this ordinance, wastewater permit or order issued hereunder, an order to appear and show cause why the proposed enforcement action should not be taken. A notice shall be served on the user specifying the time and place of a hearing to be held by the Superintendent regarding the violation, the reasons why the action is to be taken, the proposed enforcement action, and directing the user to show cause, before the Superintendent, why the proposed enforcement action should not be taken. The notice of the hearing shall be served personally or by registered or certified mail (return receipt requested) at least 10 days before the hearing. Service may be made on any agent or officer of the industrial user. Whether or not a duly notified industrial user or its representative appears, immediate enforcement action may be pursued.

2. The City may, itself, conduct the hearing and take the evidence, or designate a representative to;

   (a) Issue, in the name of the City, notices of hearings requesting the attendance and testimony of witnesses and the production of evidence relevant to any matter involved in such hearing;

   (b) Take the evidence;

   (c) Transmit a report of the evidence and hearing, including transcripts and other evidence, together with recommendations to the City for action thereon.

3. At any hearing held pursuant to this ordinance, testimony taken must be under oath and recorded stenographically. The transcript, so recorded, will be made available to any member of the public or any party to the hearing upon payment of the usual charges thereof.

4. After the City has reviewed the evidence, it may issue an order to the user responsible for the discharge directing that, following a specified time period, the sewer service will be discontinued unless adequate treatment facilities, devices, or other related appurtenances are properly operated. Further orders and directives as are necessary and appropriate may be issued.

E. Additional Enforcement Remedies

1. Performance Bonds

The Superintendent may decline to reissue a permit to any industrial user which has failed to comply with the provisions of this ordinance or any order or previous permit issued hereunder unless such user first files with it a satisfactory bond, payable to the POTW, in a sum not to exceed a value determined by the Superintendent to be necessary to achieve consistent compliance.

2. Liability Insurance

The Superintendent may decline to reissue a permit to any industrial user which has failed to comply with the provisions of this ordinance or any order or previous permit issued hereunder, unless the industrial user first submits proof that it has obtained financial assurances sufficient to restore or repair POTW damage caused by its discharge.

ARTICLE X - PENALTIES

A. Written Notice

Any user found to be violating any provision of this Ordinance or a wastewater permit or order issued hereunder, shall be served by the Superintendent or their designee with written notice stating the nature of the violation. The offender shall permanently remedy all violations upon receipt of this notice.

As contained in Article IX, the notice may be of several forms. Also as contained in Article IX, penalties of various forms may be levied against users for violations of this ordinance. The penalties, if levied, shall range from publication of violators in the local newspaper to administrative fines of up to $1,000.00 per day per violation.

B. Revocation of Permit

Any user violating any of the provisions of this ordinance or a wastewater permit order issued hereunder, may be subject to termination of its authority to discharge sewage into the municipal sewer system. Such termination may be immediate if necessary for the protection of the POTW. Said user may also have water service terminated.

Any user who violates the following conditions of this ordinance, or applicable State and Federal Regulations, is subject to having his permit revoked in accordance with the procedures of this ordinance:

1. Failure of a user to factually report the wastewater constituents and characteristics of his discharge;

2. Failure of the user to report significant changes in operations, or wastewater constituents and characteristics;

3. Refusal of reasonable access to the user's premises for the purpose of inspection or monitoring; or,

4. Violation of conditions of the permit.

C. Destruction of POTW

No person(s) shall maliciously, willfully, or negligently break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance or equipment which is part of the POTW. Any person(s) violating this provision shall be subject to immediate arrest under charge of disorderly conduct. It

shall be noted that the Clean Water Act does not require proof of specific intent to obtain conviction.

D. Legal Action

If any person discharges sewage, industrial wastes or other wastes into the City's wastewater disposal system contrary to the provisions of this ordinance, Federal or State Pretreatment Requirements or any order of the City, the City may commence an action for appropriate legal and/or equitable relief in the appropriate Court of this jurisdiction.

E. Injunctive Relief

Whenever an industrial user has violated or continues to violate the provisions of this ordinance or permit or order issued hereunder, the Superintendent, through counsel may petition the Court for the issuance of a preliminary or permanent injunction or both (as may be appropriate) which restrains or compels the activities on the part of the industrial user.

F. Civil Penalties

1. Any industrial user who has significantly violated or continues to violate this ordinance or any order or permit issued hereunder, may be liable to the Superintendent for a civil penalty of not more than $5,000.00 per day plus actual damages incurred by the POTW per violation per day for as long as the violation continues. Each day in which such violation shall continue shall be deemed a separate offense. In addition to the above described penalty and damages, the Superintendent may recover reasonable attorney's fees, court costs, court reporter's fees, and other expenses associated with the enforcement activities, including sampling and monitoring expenses.

2. The Superintendent may petition the Court to impose, assess and recover such sums. In determining amount of liability, the Court shall take into account all relevant circumstances, including, but not limited to, the extent of harm caused by the violation, the magnitude and duration, any economic benefit gained through the industrial user's violation, corrective actions by the industrial user, the compliance history of the user, and any other factor as justice requires.

G. Criminal Prosecution

1. Violations - General

a. Any industrial user who willfully or negligently violates any provision of this ordinance or any

orders or permits issued hereunder shall, upon conviction, be guilty of a misdemeanor, punishable by a fine not to exceed $5,000.00 per violation per day or imprisonment for not more than one (1) year or both.

b. Any industrial user who knowingly and/or negligently makes any false statements, representation or certification of any application, record, report, plan or other document filed or required to be maintained pursuant to this ordinance, or Industrial User Permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required under this ordinance shall, upon conviction, be punished by a fine of not more than $5,000.00 or by imprisonment for not more than 12 months, or by both.

c. In the event of a second conviction, the user shall be punishable by a fine not to exceed $10,000.00 per violation per day or imprisonment for not more than three (3) years or both.

AMENDMENT TO CITY OF HARRODSBURG
SEWER USE ORDINANCE NO. 2012-03

THE CITY COUNCIL OF THE CITY OF HARRODSBURG, KENTUCKY DOES ORDAIN AS FOLLOWS:

WHEREAS, it is necessary to amend and reenact certain sections of the City of Harrodsburg Sewer Use Ordinance No. 1993-10, said ordinance is hereby amended to read as follows:

ARTICLE I - GENERAL PROVISIONS

B. Definitions

74. Significant Industrial User (SIU). Defined by EPA ~~guidance~~ regulations as: (A) all industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and (B) any noncategorical user that (i) discharges 25,000 gallons per day or more of process wastewater ("process wastewater" excludes sanitary, noncontact cooling, and boiler blowdown wastewaters) or (ii) contributes a process wastestream which makes up five percent or more of the average dry weather hydraulic or organic (BOD, TSS, etc.) capacity of the treatment plant or (iii) has a reasonable potential, in the opinion of the Control or Approval Authority, to adversely affect the POTW treatment plant (inhibition, pass through of pollutants, sludge contamination or endangerment of POTW workers) or violate any requirements of this ordinance. The City may determine that an Industrial User subject to categorical Pretreatment Standards is a Non-Significant Categorical Industrial User rather than a Significant Industrial User on a finding that the Industrial User never discharges more than 100 gallons per day (gpd) of total categorical wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater, unless specifically included in the Pretreatment Standard) and the following conditions are met: (1) The Industrial User, prior to the City's finding, has consistently complied with all applicable categorical Pretreatment Standards and Requirements; (2) The Industrial User annually submits the certification statement required in 40 CFR 403.12(q) together with any additional information necessary to support the certification statement; and (3) the Industrial User never discharges any untreated concentrated process wastewater.

    Upon a finding that a User meeting the criteria in this section has no reasonable potential for adversely affecting the POTW's operation or for violating any Pretreatment Standard or Requirement, the City may at any time, on its own initiative or in response to a petition received from an Industrial User, and in accordance with procedures in 40 CFR 403.8(f)(6), determine that such User should not be considered a Significant Industrial User.

98. Best Management Practices or BMPs. Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to implement the prohibitions listed in 40 CFR 403.5. BMPs include, but are not limited to, treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage.

ARTICLE II - USE OF PUBLIC SEWERS

E. Prohibited Discharges:

No user shall contribute or cause to be contributed, directly or indirectly, any pollutant or wastewater which will interfere with performance of the POTW or cause Pass Through to the receiving stream. These general prohibitions apply to all such users of the POTW whether or not the user is subject to National Categorical Pretreatment Standards or any other National, State, or local Pretreatment Standards or Requirements. A user shall not contribute the following substances to the POTW:

ARTICLE V - POLLUTANT DISCHARGE LIMITS

B. Restricted Discharges

12. The City has received authority through the U.S. EPA and State Statutes to enforce the requirements of 40 CFR Chapter I, Subchapter N, Parts 405-471, and 40 CFR 403, and 40 CFR Part 35. All users shall comply with the requirements of those regulations.

13. The Superintendent and/or his designee is authorized to establish Local Limits pursuant to 40 CFR 403.5(c). In addition, the Superintendent may develop Best Management Practices (BMPs), by ordinance or in individual wastewater discharge permits, to implement Local Limits and the requirements of this ordinance. Such BMPs shall be considered Local Limits and Pretreatment Standards.

14. Significant Industrial Users are required to notify the Superintendent immediately of any changes at its facility affecting the potential for a Slug Discharge.

ARTICLE VI - PRETREATMENT PROGRAM ADMINISTRATION

B. Industrial User Permits

1. General

All significant industrial users proposing to connect to or to contribute to the POTW shall obtain an Industrial User Permit before connecting to or contributing to the POTW. The Superintendent may require Users to obtain an Industrial User Permit as necessary to carry out the purposes of this ordinance. Any violation of the terms and conditions of an Industrial User Permit shall be deemed a violation of this ordinance and subjects the permittee to the sanctions set out in Articles IX and X of this ordinance.

3. Issuance

The City shall evaluate the data furnished by the user and may require additional information. After evaluation and acceptance of the data furnished, the Superintendent or his designee may issue an Industrial User Permit subject to terms and conditions provided herein.

The Superintendent shall provide notice to each significant industrial user of the issuance of the user's Industrial User Permit. Any person, including the User, may petition the Superintendent to reconsider the terms of a permit within fifteen (15) days of notice of its issuance.

(1) Failure to submit a timely petition for review shall be deemed to be a waiver of the administrative appeal.

(2) In its petition, the appealing party must indicate the permit provisions objected to, the reasons for this objection and the alternative condition, if any, it seeks to place in the permit.

(3) The effectiveness of the permit shall not be stayed during the appeal.

(4) The Superintendent may forward the appeal to the Mayor. If the Mayor fails to act within thirty (30) days of receipt of the appeal, a request for reconsideration shall be deemed to be denied. Decisions not to reconsider a permit, not to issue a permit, or not to modify a permit shall be considered final administrative actions for purposes of judicial review.

(5) Aggrieved parties seeking judicial review of the final administrative action and/or the permit must do so by filing a complaint with the Mercer County Circuit Court in accordance with the appropriate procedures of that court and any statute of limitations.

C. Permit Modifications

~~Within 9 months of the promulgation of a National Categorical Pretreatment Standards, the Industrial User Permit of users subject to such standards shall be revised to required compliance with such standards within the time frame~~

~~prescribed by such standards. Where a user, subject to National Categorical Pretreatment Standards, has not previously submitted an application for an Industrial User Permit as required, the user shall apply for a Industrial User Permit within ninety (90) days after the promulgation of the applicable National Categorical Pretreatment Standard. In addition, the user with an existing Industrial User Permit shall submit, to the Superintendent within 90 days after the promulgation of an applicable Federal Categorical Pretreatment Standard, the information required by this ordinance.~~

The Superintendent may modify an Industrial User Permit for good cause, including, but not limited to, the following reasons:

(1) To incorporate any new or revised Federal, State or local Pretreatment Standards or Requirements;
(2) To address significant alterations or additions to the User's operation, processes or wastewater volume or character since the time of the individual wastewater discharge permit issuance;
(3) A change in the POTW that requires either a temporary or permanent reduction or elimination of the authorized discharge;
(4) Information indicating that the permitted discharge poses a threat to the Harrodsburg POTW, personnel, biosolids disposal and/or the receiving stream;
(5) Violation of any terms or conditions of the Industrial User Permit;
(6) Misrepresentations of failure to fully disclose all relevant facts in the wastewater discharge permit application or in any required reporting;
(7) Revision of or a grant of variance from categorical Pretreatment Standards pursuant to 40 CFR 403.13; or,
(8) To correct typographical or other errors in the discharge permit.

D. Permit Conditions

Industrial User Permits shall be expressly subject to all provisions of this ordinance and all other applicable regulations, user charges and fees established by the City. Permits may contain the following:

1. The unit surcharges or schedule of other charges and fees for the wastewater to be discharged to a community sewer;

2. Effluent Limits, including Best Management Practices, on the average and/or maximum wastewater constituents and characteristics;

3. Limits on average and/or maximum rate and time of discharge or requirements for flow regulations and equalization;

4. Requirements for installation and maintenance of inspection and sampling facilities;

5. Specifications for monitoring programs which may include sampling location; frequency of sampling; number, type and standards for tests; and reporting schedule;

6. Compliance schedules;

7. Requirements for submission of technical reports or discharge reports;

8. Requirements for maintaining and retaining, for a minimum of three years, all plant records relating to pretreatment and/or wastewater discharge as specified by the City, and affording City access thereto as required by 40 CFR 403:12(o)(2);

9. Requirements for notification of the City ~~or~~ <u>of</u> any new introduction of wastewater constituents or any substantial change in the volume or character of the wastewater constituents being introduced into the wastewater treatment system;

10. Requirements for notification of slug discharges;

11. The permit may require the user to reimburse the City for all expenses related to monitoring, sampling and testing performed at the direction of the Superintendent and deemed necessary by the City to verify that the user is in compliance with said permit;

12. Other conditions as deemed appropriate by the City to ensure compliance with this ordinance.

<u>13.</u> <u>A statement that indicates the Industrial User Permit issuance date, expiration date and effective date;</u>

<u>14.</u> <u>A statement that the Industrial User Permit is nontransferable;</u>

<u>15.</u> <u>Requirements to control Slug Discharge, if determined by the Superintendent, to be necessary.</u>

<u>16.</u> <u>A statement of applicable civil and criminal penalties for violation of Pretreatment Standards and Requirements, and any applicable compliance schedule. Such schedule may not extend the time for compliance beyond that required by applicable Federal, State or local law.</u>

H. Compliance Data Reporting:

Within ninety (90) days following the date for final compliance with applicable categorical Pretreatment Standards or, in the case of a new user, following commencement of the introduction of wastewater into the POTW, any user subject to Federal Categorical Pretreatment Standards and Requirements shall submit, to the Superintendent, a report indicating the nature and concentration of all pollutants in the discharge from the regulated process which are limited by Categorical Pretreatment Standards and Requirements and the average and maximum daily flow for these process units in the user's facility which are limited by such Categorical Pretreatment Standards or Requirements. The report shall state whether the applicable Categorical Pretreatment Standards or Requirements are being met on a consistent basis and, if not, what additional pretreatment and time schedule is necessary to bring the user into compliance with the applicable Categorical Pretreatment Standards or Requirements. This statement shall be signed by an authorized representative of the user.

Where compliance schedules are required, the following conditions shall apply:

A. The schedule shall contain progress increments in the form of dates for the commencement and completion of major events leading to the construction and operation of additional pretreatment required for the User to meet the applicable Pretreatment Standards (such events include, but are not limited to, hiring an engineer, completing preliminary and final plans, executing contracts for major components, commencing and completing construction, and beginning and conducting routine operation);
B. No increment referred to above shall exceed nine (9) months;
C. The User shall submit a progress report to the Superintendent no later than fourteen (14) days following each date in the schedule and the final date of compliance including, at a minimum, whether or not it complied with the increment of progress, the reason for any delay, and, if appropriate, the steps being taken by the User to return to the established schedule.

I. Periodic Compliance Reports

1. All significant industrial users shall submit, to the Superintendent, every six (6) months (on dates specified in the Wastewater Contribution Permit) unless required more frequently by the Permit, a report indicating, at a minimum, the nature and concentration of pollutants in the effluent which are limited by such Pretreatment Standards or discharge permit. The report shall also include the chain-of-custody (COC) forms, field data and any other information required by the Superintendent. In addition, this report shall include a record of ~~all daily flows which~~ the average daily flow during the

reporting period ~~exceeded the average daily flow~~. At the discretion of the Superintendent and in consideration of such factors as local high or low flow rates, holidays, budget cycles, etc., the Superintendent may agree to alter the months during which the above reports are to be submitted. All periodic Compliance reports must be signed and certified in accordance with 40 CFR 403.12 and Article VI, Section Q of this ordinance.

In cases where the Pretreatment Standard requires compliance with a Best Management Practice (BMP) or pollution prevention alternative, the User must submit documentation required by the Superintendent or the Pretreatment Standard necessary to determine the compliance status of the User.

The City may reduce the requirement for periodic compliance reports to a requirement to report no less frequently than once a year, unless required more frequently in the Pretreatment Standard or by the EPA and/or State, where the Industrial User's total categorical wastewater flow does not exceed any of the following:

(1) 0.01 percent of the WWTP's design dry-weather hydraulic or organic capacity, or five thousand (5,000) gallons per day, whichever is smaller, as measured by a continuous effluent flow monitoring device unless the Industrial User discharges in batches; or,

(2) 0.01 percent of the maximum allowable headworks loading for any pollutant regulated by the applicable categorical Pretreatment Standard for which approved Local Limits were developed in accordance with this ordinance.

2. All wastewater samples must be representative of the User's discharge. Wastewater monitoring and flow measurement facilities shall be properly operated, kept clean and maintained in good working order at all times. The failure of a User to keep its monitoring facility in good working order shall not be grounds for the User to claim that sample results are unrepresentative of its discharge. All analyses shall be performed by a laboratory acceptable to the City. Analytical procedures shall be in accordance with procedures established by the U.S. EPA Administrator pursuant to Section 304 (g) of the Act and contained in 40 CFR, Part 136 and amendments thereto and 40 CFR 261 or with any other test procedures approved by the U.S. EPA Administrator. Sampling shall be performed in accordance with the techniques approved by the U.S. EPA Administrator. Except as indicated in Section (a) and (b) below, the User must collect wastewater samples using 24-hour flow-proportional composite sampling techniques, unless time-proportional composite sampling or grab sampling is authorized by the Superintendent. Where time-proportional composite sampling or grab sampling is authorized by the Superintendent, the samples must be representative of the discharge. Using protocols (including appropriate

preservation) specified in 40 CFR Part 136 and appropriate EPA guidance, multiple grab samples collected during a 24-hour period may be composited prior to the analysis as follows: for cyanide, total phenols and sulfides the samples may be composited in the laboratory or in the field; for volatile organics and oil and grease, the samples may be composited in the laboratory. Composite samples for other parameters unaffected by the composting procedures as documented in approved EPA methodologies may be authorized by the Superintendent, as appropriate. In addition, grab samples may be required to show compliance with instantaneous limits. (a) Samples for oil and grease, temperature, pH, cyanide, total phenols, sulfides and volatile organic compounds must be obtained using grab collection techniques. (b) For sampling required in support of baseline monitoring and 90-day compliance reports required in 40 CFR 403.12(b) and (d), a minimum of four (4) grab samples must be used for pH, cyanide, total phenols, oil and grease, sulfide and volatile organic compounds for facilities for which historical sampling data do not exist; for facilities for which historical sampling data are available, the Superintendent may authorize a lower minimum. For the reports required by 40 CFR 403.12(e) and (h), the Industrial User is required to collect the number of grab samples necessary to assess and assure compliance with applicable Pretreatment Standards and Requirements.

3. Where 40 CFR 136 does not include a sampling or analytical technique for the pollutant(s) in question, sampling and analysis shall be performed in accordance with the procedures set forth in the EPA publication "Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants," April 1977, and amendments thereto, or with any other sampling and analytical procedures approved by the U.S. EPA Administrator.

4. A Baseline Monitoring Report (BMR) must be submitted to the Superintendent by all categorical industrial users at least ninety (90) days prior to initiation of discharge to the sanitary sewer. The BMR must contain, at a minimum, the following:
    a. Production Data: a process description, SIC code number, raw materials used, chemicals used, final product, pretreatment industrial category (if applicable), and a schematic which indicates points of discharge to the sewer system.
    b. Identifying information to include name, address of facility, owner(s), contact person and any other permits held by the facility.
    c. Wastewater characteristics: total plant flow, types of discharges, average and maximum flows from each process.
    d. Nature/Concentration of pollutants: analytical results for all pollutants regulated by this Ordinance and/or any applicable federal

pretreatment standard and sample type and location. All analyses must conform with 40 CFR Part 136 and amendments thereto.

e. Information concerning any pretreatment equipment used to treat the facility's discharge.

f. Compliance certification. A statement, reviewed by the User's authorized representative as defined in Article I(B)(4) and certified by a qualified professional, indicating whether Pretreatment Standards are being met on a consistent basis, and, if not, whether additional operation and maintenance (O&M) and/or additional pretreatment is required to meet the Pretreatment Standards and Requirements.

g. Compliance Schedule. If additional pretreatment and/or O&M will be required to meet the Pretreatment Standards, the shortest schedule shall not be later than the compliance date established for the applicable Pretreatment Standard. A compliance schedule pursuant to this Section must meet the requirements set out in Section I of this Article.

5. New sources shall give estimates of the information requested in sections (3) and (4) above, but at no time shall a new source commence discharge(s) to the public sewer of substances that do not meet all provisions of this chapter. All new sources must be in compliance with all provisions of this chapter, state and federal pretreatment regulations prior to commencement of discharge to the public sewer.

6. Compliance Schedule Progress Reports. The following conditions shall apply to all compliance schedules required by this ordinance:

   a. The schedule shall contain progress increments in the form of dates for the commencement and completion of major events leading to the construction and operation of additional pretreatment required for the User to meet the applicable Pretreatment Standards.

   b. No increment referred to above shall exceed nine (9) months;

   c. The User shall submit a progress report to the Superintendent no later than fourteen (14) days following each date in the schedule and the final date of compliance including, as a minimum, whether or not it complied with the increment of progress, the reason for any delay, and, if appropriate, the steps being taken by the User to return to the established schedule; and in no event shall more than nine (9) months elapse between such progress reports to the Superintendent.

7. Users subject to the reporting requirements of this chapter shall retain, and make available for inspection and copying, all records of information obtained pursuant to any monitoring activities required by this chapter, any

additional records of information obtained pursuant to monitoring activities undertaken by the User independent of such requirements and documentation associated with Best Management Practices as may be required. Records shall include the date, exact place, method and time of sampling and the name of the person(s) taking the samples; the dates analyses were performed; who performed the analyses; the analytical techniques or methods used and the results of such analyses. These records shall remain available for a period of at least three (3) years. This period shall automatically be extended for the duration of any litigation concerning the User or the city or where the User has been specifically notified of a longer retention by the Superintendent.

N. Annual Publication

The City shall annually publish in a newspaper of ~~local~~ general circulation that provides meaningful public notice within the jurisdictions served by the POTW, a list of significant users which were in significant non-compliance with any Pretreatment Requirements or Standards. The notification shall also summarize any enforcement actions taken against the user(s) during the same 12 months.

All records relating to the City's Pretreatment Program shall be made available to officials of the EPA or Approval Authority upon request. All records shall be maintained for a minimum of three (3) years in accordance with 40 CFR 403.12(O)(2).

O. Significant Non-Compliance

A user is defined as being in significant non-compliance when it commits one or more of the following conditions:

1. Causes imminent endangerment to human health or the environment or results in the exercise of emergency authority under 40 CFR 403 to halt or prevent such a discharge;

2. Involves failure to report noncompliance accurately;

3. Results in a chronic violation defined here as sixty-six percent (66%) or more of all measurements taken during a six (6) month period that exceed (by any magnitude) the daily maximum limit or the average limit for the same pollutant parameter;

4. Results in a Technical Review Criteria (TRC) Violation defined here as thirty-three percent (33%) or more of all measurements for each pollutant parameter taken during a six (6) month period that equal or exceed the product of the daily maximum limit or the average limit multiplied by the applicable TRC (TRC = 1.4 for BOD, TSS, fats, and O&G and 1.2 for all other pollutants except pH).

5. Any violation of a pretreatment effluent limit that the Control Authority determines has caused, alone or in combination with other discharges, interference or pass through or has endangered the health of the POTW personnel or the public;

6. Any discharge causing imminent endangerment to human health/welfare or to the environment or resulting in the POTW's use of its emergency authority to halt or prevent such a discharge;

7. Violations of Compliance Schedule Milestones, failure to comply with schedule milestones for starting or completing construction or attaining final compliance by ninety (90) days or more after the schedule date;

8. Failure to provide required reports within thirty (30) days of the due date.

9. Any violation or group of violations, which may include a violation of Best Management Practices, which the ~~control authority~~ Superintendent determines will adversely affect the operation or implementation of the local pretreatment program.

Q. Signatory Requirements

All applications, reports or information submitted to the City shall be signed and certified in accordance with the following requirements. Written designation of the signatory official must be received by the City prior to acceptance of any application or other required document.

1. All permit applications shall be signed:
   (a) For a corporation: by a principal executive officer of at least the level of vice-president;

   (b) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;

2. All other correspondence, reports and self-monitoring reports shall be signed by a person described above or by a duly authorized

representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having facility or activity, such as the position of plant manager, superintendent or position of equivalent responsibility.

3. Certification. Any person signing a document under this section shall make the following written certification:

"I certify under penalty of law that ~~I am familiar with the information contained in this report and its attachments and that to the best of my knowledge and belief such information is true, complete and accurate."~~ this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

A facility determined to be a Non-Significant Categorical Industrial User by the Superintendent pursuant to Article I of this ordinance must annually submit the following certification statement signed in accordance with the signatory requirements in this section. This certification must accompany any alternative report required by the Superintendent:

"Based on my inquiry of the person or persons directly responsible for managing compliance with the Categorical Pretreatment Standards under 40 CFR **[Part]**, I certify that, to the best of my knowledge and belief that during the period from _**[month/day]**_, **[year]** to **[month/day]**, **[year]**:

(a) The facility described as **[Facility Name]** met the definition of a Non-Significant Categorical Industrial User as described in Article I(B) Definitions of this ordinance.

(b) The facility complied with all applicable Pretreatment Standards and Requirements during this reporting period; and (c) the facility never discharged more than 100 gallons of total

categorical wastewater on any given day during this reporting period.

ARTICLE IX – ENFORCEMENT

F. Remedies Nonexclusive

The remedies provided for in this ordinance are not exclusive. The Superintendent may take any, all, or combination of these actions against a noncompliant User. Enforcement of pretreatment violations will generally be in accordance with the City's Enforcement Response Plan. However, the Superintendent may take other action against any User when the circumstances warrant. Further the Superintendent is empowered to take more than one enforcement action against any noncompliant User.

EXCEPT, as herein provided and amended, said Sewer Use Ordinance No. 1993-10 shall remain in full force and effect as originally enacted.

THIS AMENDMENT, to said Ordinance, shall be in full force and effect from and after its passage, approval, and publication as required by law.

The first reading of this Ordinance was held on the 13th day of Feb, ~~2011~~ 2012.

Kim Stennett
City Clerk

The second reading of this ordinance was held on the 27th day of Feb, ~~2011~~ 2012 and upon a roll call vote was adopted by the City Council of the City of Harrodsburg, Kentucky.

Kim Stennett
City Clerk

I, Eddie Long, Mayor of the City of Harrodsburg, Kentucky, hereby accept and approve the amended ordinance and direct same to be published this 8th day of March, ~~2011~~ 2012.

Eddie Long
Mayor

Attest:

Kim Stuart
City Clerk

SUMMARY OF ORDINANCE AMENDMENT

As required by the Kentucky Division of Water, the City of Harrodsburg implements a Pretreatment Program to control discharges of industrial wastewater to the sanitary sewer system. This implementation includes the requirement that the City adopt and enforce effluent discharge limitations as part of the Sewer Use Ordinance No. 1993-10.

Recent revisions to 40 CFR 403, the federal pretreatment program regulations, require that Ordinance No. 1993-10 be revised in order to continue in compliance with federal and state regulations.

U.S. EPA's adoption and approval of these modifications requires the City of Harrodsburg to adopt certain language revisions, which is being done through this ordinance amendment.

Appendix 3

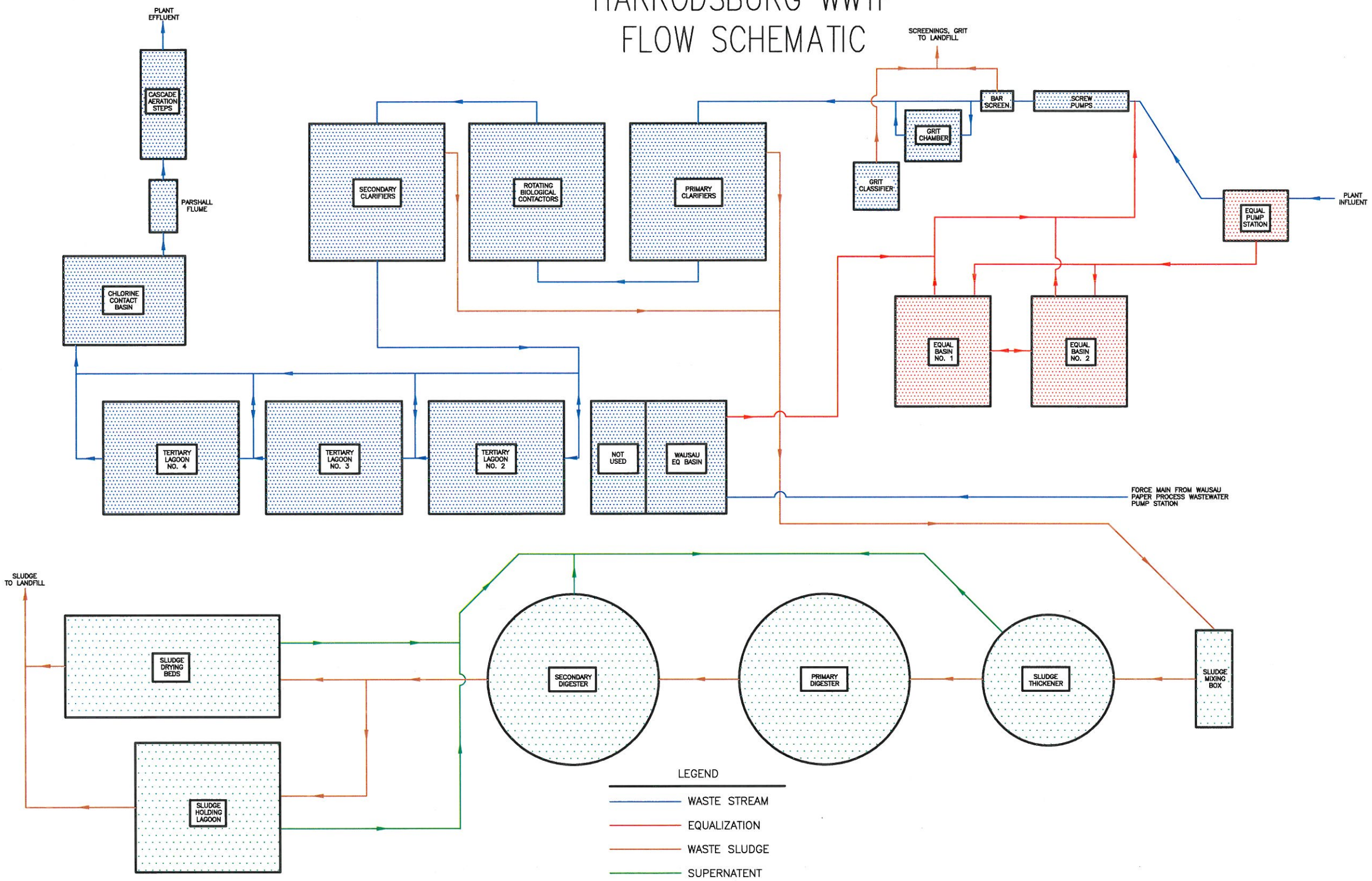
APPENDIX 3

FLOW SCHEMATIC DIAGRAM OF

EXISTING HARRODSBURG

WASTEWATER TREATMENT PLANT

HARRODSBURG WWTP
FLOW SCHEMATIC



GRW PROJECT NO. 4100

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PLANT FLOW SCHEMATIC
WASTEWATER TREATMENT PLANT
CITY OF HARRODSBURG, KY

DESIGNED:
DRAWN:
REVIEWED:
APPROVED:

REVISIONS

NO.	DESCRIPTION	DATE	BY

SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED

DATE:

SCALE:
NOT TO SCALE

SHEET NO.

PRINTED: 5/10/2013 @ 11:25AM

FILE NAME: U:\4100-Hburg Fac Plan\Working Drawings\AutoCAD\11X17\flowschematic.dwg

Appendix 4

APPENDIX 4

CURRENT KPDES PERMIT

FOR

WASTEWATER TREATMENT PLANT

KPDES

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT

PERMIT NO.: KY0027421
AI NO.: 3145

AUTHORIZATION TO DISCHARGE UNDER THE KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

Pursuant to Authority in KRS 224,

City of Harrodsburg
208 South Main Street
Harrodsburg, Kentucky 40330

is authorized to discharge from a facility located at

Harrodsburg Wastewater Treatment Plant
965 Cornishville Road
Harrodsburg, Mercer County, Kentucky

to receiving waters named

Town Creek at mile point 0.2 to Salt River at mile point 128.7

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, III, and IV hereof. The permit consists of this cover sheet, and Part I 2 pages, Part II 6 pages, Part III 5 pages, Part IV 3 pages, and Part V 3 pages.

This permit shall become effective on February 1, 2009.

This permit and the authorization to discharge shall expire at midnight, January 31, 2014.

December 8, 2008
Date Signed

Sandra L. Gruzesky, Director
Division of Water

A1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 001 - Sanitary Wastewater (Design Flow = 2.68 MGD)

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS (lbs/day)		Other Units (Specify)		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Effluent Flow (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Influent Flow (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Effluent $CBOD_5$ (mg/l)	224	335	10	15	1/Week	24 Hr Composite
Influent $CBOD_5$ (mg/l)	N/A	N/A	Report	Report	1/Week	24 Hr Composite
Percent Removal $CBOD_5$ (%)	N/A	N/A	85 or greater		1/Month	Calculated
Effluent TSS (mg/l)	671	1005	30	45	1/Week	24 Hr Composite
Influent TSS (mg/l)	N/A	N/A	Report	Report	1/Week	24 Hr Composite
Percent Removal TSS (%)	N/A	N/A	85 or greater		1/Month	Calculated
Ammonia Nitrogen (as mg/l N)						
May 1 - October 31	89	134	4.0	6.0	1/Week	24 Hr Composite
November 1 - April 30	224	335	10.0	15.0	1/Week	24 Hr Composite
Escherichia Coli (N/100 ml)	N/A	N/A	130	240	1/Week	Grab
Dissolved Oxygen (mg/l) (minimum)	N/A	N/A	Not less than 7.0		1/Week	Grab
pH (standard units)	N/A	N/A	6.0 (min)	9.0 (max)	1/Week	Grab
Total Residual Chlorine (mg/l)	N/A	N/A	0.011	0.019	1/Week	Grab
Total Phosphorus (mg/l)	N/A	N/A	Report	Report	1/Week	24 Hr Composite
Total Nitrogen (mg/l)	N/A	N/A	Report	Report	1/Week	24 Hr Composite
Chronic Toxicity (TU_c)	N/A	N/A	N/A	1.00	1/Quarter	3 24 Hr Composite

The abbreviation $CBOD_5$ means Carbonaceous Biochemical Oxygen Demand (5-day).
The abbreviation TSS means Total Suspended Solids.
The abbreviation N/A means Not Applicable.
The effluent limitations for $CBOD_5$ and TSS are Monthly (30 day) and Weekly (7 day) Averages.
The effluent limitations for *Escherichia Coli* are thirty (30) day and seven (7) day Geometric Means.
Total Nitrogen is to be reported as the summation of the analytical results for Total Nitrates, Total Nitrites, and Total Kjeldahl Nitrogen.
There shall be no discharge of floating solids or visible foam or sheen in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point prior to discharge to or mixing with the receiving waters or wastestreams from other outfalls.

B. SCHEDULE OF COMPLIANCE

The permittee shall achieve compliance with all requirements on the effective date of this permit.

STANDARD CONDITIONS FOR KPDES PERMIT

This permit has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal, and local agencies.

It is the responsibility of the permittee to demonstrate compliance with permit parameter limitations by utilization of sufficiently sensitive analytical methods.

The following KPDES permit conditions apply to all discharges authorized by this permit pursuant to 401 KAR 5:065, Section 1.

(1) Duty to comply.

(a) General requirement.
The permittee shall comply with all conditions of this permit. Any permit noncompliance shall constitute a violation of KRS Chapter 224, among which shall be the following remedies: enforcement action, permit revocation, revocation and reissuance, or modification; or denial of a permit renewal application.

(b) Specific duties.
1. The permittee shall comply with effluent standards or prohibitions established under 40 CFR Part 129 as of July 1, 2001, as adopted without change, within the time provided in the federal regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.
2. Any person who violates a permit condition as set forth in the KPDES administrative regulations shall be subject to penalties under KRS 224.99-010(1) and (4).

(2) Duty to reapply.
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee shall apply for and obtain a new permit as required in 401 KAR 5:060, Section 1.

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

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

(5) Proper operation and maintenance.
The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control and related appurtenances which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also shall include adequate laboratory controls, and appropriate quality assurance procedures. This provision shall require the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only if the operation is necessary to achieve compliance with the conditions of the permit.

(6) Permit actions.
The permit may be modified, revoked and reissued, or revoked for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or revocation, or a notification of planned changes or anticipated noncompliance, shall not stay any permit condition.

(7) Property rights.
This permit shall not convey any property rights of any kind, or any exclusive privilege.

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

(9) Inspection and entry.
The permittee shall allow the cabinet, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

(a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records pertinent to the KPDES program are or may be kept;
(b) Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of this permit;
(c) Inspect at reasonable times any facilities, equipment, including monitoring and control equipment, practices, or operations regulated or required under this permit; and
(d) Sample or monitor at reasonable times, for the purposes of assuring KPDES program compliance or as otherwise authorized by KRS Chapter 224, any substances or parameters at any location.

(10) Monitoring and records.

(a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
(b) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report, or application. This period may be extended by request of the cabinet at any time.
(c) Records of monitoring information shall include:
1. The date, exact place, and time of sampling or measurements;
2. The individuals who performed the sampling or measurements;
3. The dates analyses were performed;
4. The individuals who performed the analyses;
5. The analytical techniques or methods used; and
6. The results of the analyses.

(d) Monitoring shall be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in the permit.
(e) Any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under the permit shall, upon conviction, be subject to penalties under KRS 224.99-010(4).

(11) Signatory requirement.
All applications, reports, or information submitted to the cabinet shall be signed and certified as indicated in 401 KAR 5:060, Section 9. Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be subject to penalties under KRS 224.99-010(4).

(12) Reporting requirements.

(a) Planned changes.
The permittee shall give notice to the cabinet as soon as possible of any planned physical alteration or additions to the permitted facility. Notice shall be required only if:
1. The alteration or addition to a permitted facility may meet one (1) of the criteria for determining whether a facility is a new source in 401 KAR 5:080, Section 5; or
2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification only applies to pollutants which are subject either to effluent limitations in the permit, or to notification requirements under 401 KAR 5:080, Section 5.

(b) Anticipated noncompliance.
The permittee shall give advance notice to the cabinet of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

(c) Transfers.
The permit shall not be transferable to any person except after notice to the cabinet. The cabinet may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate other requirements as may be necessary under KRS Chapter 224.

(d) Monitoring reports.
Monitoring results shall be reported at the intervals specified in the permit. Monitoring results shall be reported as follows:
1. Monitoring results shall be reported on a Discharge Monitoring Report (DMR).
2. If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.
3. Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the cabinet in the permit.

(e) Compliance schedules.
Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than fourteen (14) days following each schedule date.

(c) Prohibition of a bypass.
1. Bypassing shall be prohibited, and the cabinet may take enforcement action against a permittee for bypass, unless:
a. The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition shall not be satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
c. The permittee submitted notices as required under paragraph (b) of this subsection.
2. The cabinet may approve an anticipated bypass, after considering its adverse effects, if the cabinet determines that it will meet the three (3) conditions listed in subparagraph 1a, b, and c of this paragraph.

(14) Occurrence of an upset.

(a) Effect of an upset.
An upset constitutes an affirmative defense to an action brought for noncompliance with technology-based permit effluent limitations if the requirements of paragraph (b) of this subsection are met.

(b) Conditions necessary for a demonstration of an upset.
A permittee who wishes to establish the affirmative defense of upset shall demonstrate through properly signed, contemporaneous operating logs, or other relevant evidence that:
1. An upset occurred and that the permittee can identify the causes of the upset;
2. The permitted facility was at the time being properly operated;
3. The permittee submitted notice of the upset as required in subsection (12)(f) of this section; and
4. The permittee complied with any remedial measures required under subsection (4) of this section.

(c) Burden of proof.
In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset shall have the burden of proof.

(f) Twenty-four (24) hour reporting.
The permittee shall follow the provisions of 401 KAR 5:015 and shall orally report any noncompliance which may endanger health or the environment, within twenty-four (24) hours from the time the permittee becomes aware of the circumstances. This report shall be in addition to and not in lieu of any other reporting requirement applicable to the noncompliance. A written submission shall also be provided within five (5) days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The cabinet may waive the written report on a case-by-case basis if the oral report has been received within twenty-four (24) hours. The following shall be included as events which shall be reported within twenty-four (24) hours:
1. Any unanticipated bypass which exceeds any effluent limitation in the permit, as indicated in subsection (13) of this section.
2. Any upset which exceeds any effluent limitation in the permit.
3. Violation of a maximum daily discharge limitation for any of the pollutants listed by the cabinet in the permit to be reported within twenty-four (24) hours, as indicated in Section 2(7) of this administrative regulation.

(g) Other noncompliance.
The permittee shall report all instances of noncompliance not reported under paragraphs (d), (e), and (f) of this subsection, when monitoring reports are submitted. The reports shall contain the information listed in paragraph (f) of this subsection.

(h) Other information.
Where the permittee becomes aware that it failed to submit any relevant fact in a permit application, or submitted incorrect information in a permit application or in any report to the cabinet, it shall promptly submit these facts or information.

(13) Occurrence of a bypass.

(a) Bypass not exceeding limitations.
The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. This type of bypass shall not be subject to the provisions of paragraphs (b) and (c) of this subsection.

(b) Notice.

1. Anticipated bypass.
If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten (10) days before the date of the bypass. Compliance with this requirement constitutes compliance with 401 KAR 5:015, Section 1.
2. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in subsection (12)(f) of this section, twenty-four (24) hour notice. Compliance with this requirement constitutes compliance with 401 KAR 5:015, Section 4.

PART III

OTHER REQUIREMENTS

A. Reporting of Monitoring Results

Monitoring results obtained during each monitoring period must be reported on a preprinted Discharge Monitoring Report (DMR) Form that will be mailed to you. The completed DMR for each monitoring period must be sent to the Division of Water at the address listed below (with a copy to the appropriate Regional Office) postmarked no later than the 28th day of the month following the monitoring period for which monitoring results were obtained.

Division of Water	Energy and Environment Cabinet
Frankfort Regional Office	Dept. for Environmental Protection
643 Teton Trail, Suite B	Division of Water/Surface Water Permits Branch
Frankfort, Kentucky 40601	200 Fair Oaks Lane
ATTN: Supervisor	Frankfort, Kentucky 40601

B. Reopener Clause

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under 401 KAR 5:050 through 5:086, if the effluent standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

2. Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of KRS Chapter 224 when applicable.

C. Sludge Disposal

The disposal or final use of sewage sludge generated during the treatment of domestic sewage in a treatment works shall be disposed of in accordance with federal requirements specified in 40 CFR Part 503 and state requirements specified in Division of Waste Management regulations 401 KAR Chapter 45.

D. Certified Operators

This wastewater system shall be operated under the supervision of a Class III Kentucky Certified Operator who shall be reasonably available at all times. All other operators employed by the system shall hold a Kentucky Certificate or shall be in the process of obtaining a Kentucky Certificate. The certificates of each operator shall be prominently displayed on the wall of the system office.

E. Monthly Operating Reports

In addition to the monitoring of effluent as specified by the permit the permittee shall conduct process control monitoring on a daily basis and record the data on a Monthly Operating Report (MOR) which shall be submitted with the Discharge Monitoring Reports. Process control monitoring is that monitoring performed by the operators of the wastewater treatment plant to determine if the wastewater system is operating at its optimum efficiency. This monitoring includes but is not limited to influent and effluent quality and quantity monitoring, chemical usage, sludge monitoring including volume produced, wasted, and disposed, and monitoring of internal units such as aeration basins and oxidation ditches.

(15) Additional conditions applicable to specified categories of KPDES permits. The following conditions, in addition to others set forth in this administrative regulation, shall apply to all KPDES permits within the categories specified below:

(a) Existing manufacturing, commercial, mining, and silvicultural dischargers. In addition to the reporting requirements under subsections (12), (13), and (14) of this section, any existing manufacturing, commercial, mining, and silvicultural discharger shall notify the cabinet as soon as it knows or has reason to know:
1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
a. 100 micrograms per liter (100 µg/l);
b. 200 micrograms per liter (200 µg/l) for acrolein and acrylonitrile; 500 micrograms per liter (500 µg/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one (1) milligram per liter (1 mg/l) for antimony;
c. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 401 KAR 5:060, Section 2(7);
d. The level established by the cabinet in accordance with Section 2(6) of this administrative regulation.
2. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
a. 500 micrograms per liter (500 µg/l);
b. One (1) milligram per liter (1 mg/l) for antimony;
c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 401 KAR 5:060, Section 2(7); or
d. The level established by the cabinet in accordance with Section 2(6) of this administrative regulation.

(b) POTWs.
1. POTWs shall provide adequate notice to the cabinet of the following:
a. Any new introduction of pollutants into that POTW from an indirect discharger which would be subject to the KPDES administrative regulations if it were directly discharging those pollutants; or
b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
2. For purposes of this paragraph, adequate notice shall include information on the quality and quantity of effluent introduced into the POTWs and any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

I. Approved Pretreatment Program

In accordance with the requirements of 401 KAR 5:057, Section 8 the Division of Water approved the Pretreatment Program developed by the permittee on September 30, 1984. Therefore pursuant to the requirements of 401 KAR 5:057, Section 6(3) the conditions of the approved pretreatment program are hereby incorporated into the permit as enforceable conditions of the permit.

Program Requirements

1. The permittee shall be responsible for the performance of all pretreatment requirements contained in 401 KAR 5:057, Section 6, and pursuant to 40 CFR Part 403, and shall be subject to enforcement actions, penalties, fines, and other remedies by the state, as provided in the Clean Water Act (hereafter the "Act"). The permittee shall implement and enforce its approved POTW pretreatment program. The permittee's approved POTW pretreatment program is hereby made an enforceable condition of this permit. The state may initiate enforcement action against a POTW and against an industrial user for noncompliance with applicable standards and requirements as provided in KRS 224.16-050(1), 224.70-110, and 224.73-120, and pursuant to the Act.

2. The permittee shall enforce the requirements promulgated under Sections 307(b), 307(c), 307(d), and 402(b) of the Act. The permittee shall cause industrial users subject to federal categorical standards to achieve compliance no later than the date specified in those requirements or, in the case of a new industrial user, upon commencement of the discharge.

Program Requirements

3. The permittee shall perform the pretreatment functions as required in 401 KAR 5:057, Section 6 and 40 CFR Part 403 including, but not limited to:

   a. Implement the necessary legal authorities as provided in 401 KAR 5:057, Section 6(4)(a). This includes, among other things, the authority to:

      (1) Deny or condition new or increased contributions of pollutants or changes in the nature of pollutants (401 KAR 5:057, Section 6(4)(a)(1));
      (2) Require compliance with applicable pretreatment standards (401 KAR 5:057, Section 6(4)(a)(2));
      (3) Control through permit to ensure compliance (401 KAR 5:057, Section 6(4)(a)(3));
      (4) Require the development of compliance schedules and submission of reports (401 KAR 5:057, Section 6(4)(a)(4));
      (5) Carry out inspection, surveillance, and monitoring procedures (401 KAR 5:057, Section 6(4)(a)(5));
      (6) Obtain remedies for noncompliance by industrial users (401 KAR 5:057, Section 6(4)(a)(6)).

   b. Implement the programmatic functions as provided in 401 KAR 5:057, Section 6(4)(b). This includes:

      (1) An industrial waste survey (401 KAR 5:057, Section 6(4)(b)(1 and 2));
      (2) Notification of appropriate federal, state and/or local standards or limitations (401 KAR 5:057, Section 6(4)(b)(3));
      (3) Receipt and analysis of self-monitoring reports and other notices, (401 KAR 5:057, Section 6(4)(b)(4));
      (4) POTW compliance sampling and analysis (401 KAR 5:057, Section 6(4)(b)(5));
      (5) Noncompliance investigations and enforcement (401 KAR 5:057, Section 6(4)(b)(6));
      (6) Public participation (401 KAR 5:057, Section 6(4)(b)(7)).

F. Outfall Signage

The permittee shall post a permanent marker at all discharge locations and/or monitoring points. The marker shall be at least 2 feet by 2 feet in size and a minimum of 3 feet above ground level with the Permittee Name and KPDES permit and outfall numbers in 2 inch letters. For internal monitoring points the marker shall be of sufficient size to include the outfall number in 2 inch letters and shall be posted as near as possible to the actual sampling location.

G. Necessity to Develop and Implement a Pretreatment Program

POTWs which meet one or more of the following criteria are required to develop, submit for approval, and implement specific Pretreatment Program Requirements.

A POTW or combination of POTWs operated by the same authority, with a total design flow greater than five (5) million gallons per day (MGD) and receiving from industrial users which pass through interfere with the operation of the POTW, or are otherwise subject to pretreatment standards.

A POTW with a design flow of five (5) MGD or less shall develop a pretreatment program if the cabinet determines that the nature or volume of the industrial wastewater, treatment process upsets, violation of the POTW effluent limitations, contamination of municipal sludge or other circumstances warrant to prevent interference with the POTW or pass through.

The permittee shall conduct annual sewer user surveys to determine if conditions warrant the development and implementation of a pretreatment program. An annual report listing the industrial users, the manufacturing processes, the nature and volume of flow and any problems caused by the users shall be submitted no later than December 31 of each year, unless otherwise specified by the Division of Water.

H. Prohibited Discharges

The following are prohibit from being discharged to the POTW.

Pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW);

Pollutants which will cause corrosive structural damage to the POTW, but in no case, discharges with a pH lower than 5.0;

Solid or viscous pollutants in amounts which will cause obstruction to the flow in sewers, or other interference with operation of the POTW;

Any pollutant, including oxygen demanding pollutants (BOD_5, etc.), released in a discharge at such a volume or strength as to cause interference in the POTW;

Heat in amounts, which will inhibit biological activity in the POTW, but in no case, heat in such quantities that the influent to the sewage treatment works exceeds 104° F (40° C);

Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through;

Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems; and,

Any trucked or hauled waste except, at discharge points designated by the POTW.

I. Approved Pretreatment Program - continued

(6) Not achieving compliance and not on a compliance schedule;
(7) The permittee does not know the industrial user's compliance status (with explanation).

e. A summary of the inspection and sampling activities conducted by the permittee during the past six (6) months to gather information and data regarding industrial users. The summary shall include:

(1) The names of industrial users subject to surveillance by the permittee and an indication of whether they were inspected, sampled, or both and the frequency of these activities at each user; and
(2) The conclusions or results from the inspection or sampling of each industrial user.

Semi-Annual Reporting - continued

f. A summary of the compliance and enforcement activities during the past six (6) months, the summary shall include the names of the industrial users affected by the following actions:

(1) Warning letter or notices of violation;
(2) Administrative orders;
(3) Civil actions;
(4) Criminal actions;
(5) Assessment of monetary penalties. For each industrial user identify the amount of the penalties;
(6) Restriction of flow to the POTW; or
(7) Disconnection from discharge to the POTW.

g. A description of any significant changes in operating the pretreatment program which differ from the information in the permittee's approved pretreatment program including, but not limited to changes concerning: the program's administrative structure; local industrial discharge limitations; monitoring program or monitoring frequencies; legal authority or enforcement policy; funding mechanisms; resource requirements; or staffing levels.

h. A summary of the semi-annual pretreatment budget, including the cost of pretreatment program functions and equipment purchases.

i. A summary of public participation activities to involve and inform the public. This shall include a copy of the annual publication of significant violations, if such publication was needed to comply with 40 CFR 403.8(f)(2)(vii).

H. Approved Pretreatment Program - continued

j. A description of any changes in sludge disposal methods and a discussion of any concerns not described elsewhere in the report.

k. Any other information deemed as pertinent by the state in effectively administrating an approved pretreatment program.

2. A signed copy of this report shall be submitted by the due dates to the state at the address shown below:

Energy and Environment Cabinet
Division of Water, Surface Water Permits Branch
200 Fair Oaks Lane
Frankfort, Kentucky 40601

I. Approved Pretreatment Program - continued

c. Provide the required funding, equipment, and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3) and 403.9(b)(4).

4. The permittee shall adopt and enforce local limits that will protect the treatment works against interference, pass-through, and sludge contamination. Local limits shall be revised as necessary by the permittee as provided in 40 CFR 122.21 and CFR 403.5.

Semi-Annual Reporting

1. The permittee shall submit semi-annually a pretreatment report to the state. The report due on March 1st shall describe the permittee's pretreatment program activities over the previous year and shall cover the period January through December. The report due on September 1st shall describe the permittee's pretreatment program activities over the previous six (6) months and shall cover the period January through June. In the event that the permittee is not in compliance with any conditions or requirements of this permit, then the permittee shall also include the reasons for noncompliance and state how and when the permittee shall comply with such conditions and requirements. Each report shall contain, but not be limited to, the following information:

Semi-Annual Reporting - continued

a. Analytical results of the POTW's influent, effluent, and sludge (including sludge from lagoons) annually, by the 28th of January, for those pollutants identified under Section 307(a) of the Act which are known or suspected to be discharged by industrial users, and for any non-priority pollutants which the permittee believes may be causing or contributing to interference, pass-through, or adversely impacting sludge quality. The report shall include all pollutants identified in Part D of Form A (Revised November 2003). The frequency of analysis shall not exceed twelve months.

b. A discussion of upset, interference, or pass-through incidents, if any, at the POTW treatment plant which the permittee knows or suspects were caused by industrial users of the POTW system. The discussion shall include the reasons why the incidents occurred, the corrective actions taken and, if known, the name and address of the industrial user(s) responsible.

c. The cumulative number of industrial users that the permittee has notified regarding baseline monitoring reports and the cumulative number of industrial user responses.

d. An updated list of the permittee's industrial users including their names and addresses, or a list of deletions and additions keyed to a previously submitted list. The permittee shall provide a brief explanation for each deletion. The list shall identify the industrial users subject to federal categorical standards and which set(s) of standards are applicable. The permittee shall characterize the compliance status of each industrial user by employing the following descriptions:

(1) In compliance with baseline monitoring report requirements (where applicable);
(2) Consistently achieving compliance;
(3) Inconsistently achieving compliance;
(4) Significantly violated applicable pretreatment requirements as defined by 40 CFR 403.8(f)(2)(vii);
(5) On a compliance schedule to achieve compliance (include the date final compliance is required);

(2) Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances which could result in a release of "BMP pollutants," the plan should include a prediction of the direction, rate of flow, and total quantity of the pollutants which could be released from the facility as result of each condition or circumstance.

c. Establish specific Best Management Practices to meet the objectives identified under paragraph b of this section, addressing each component or system capable of causing a release of "BMP pollutants."

d. Include any special conditions established in part b of this section.

e. Be reviewed by plant engineering staff and the plant manager.

5. Specific Requirements

The plan shall be consistent with the general guidance contained in the publication entitled "NPDES Best Management Practices Guidance Document," and shall include the following baseline BMPs as a minimum.

a. BMP Committee
b. Reporting of BMP Incidents
c. Risk Identification and Assessment
d. Employee Training
e. Inspections and Records
f. Preventive Maintenance
g. Good Housekeeping
h. Materials Compatibility
i. Security
j. Materials Inventory

6. SPCC Plans

The BMP plan may reflect requirements for Spill Prevention Control and Countermeasure (SPCC) plans under Section 311 of the Act and 40 CFR Part 151, and may incorporate any part of such plans into the BMP plan by reference.

7. Hazardous Waste Management

The permittee shall assure the proper management of solid and hazardous waste in accordance with the regulations promulgated under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1978 (RCRA) (40 U.S.C. 6901 et seq.) Management practices required under RCRA regulations shall be referenced in the BMP plan.

8. Documentation

The permittee shall maintain a description of the BMP plan at the facility and shall make the plan available upon request to NREPC personnel. Initial copies and modifications thereof shall be sent to the following addresses when required by Section 3:

Division of Water
Frankfort Regional Office
643 Teton Trail, Suite B
Frankfort, Kentucky 40601
ATTN: Supervisor

Environmental & Public Protection Cabinet
Dept. for Environmental Protection
Division of Water/KPDES Branch
200 Fair Oaks Lane
Frankfort, Kentucky 40601

PART IV

BEST MANAGEMENT PRACTICES

SECTION A. GENERAL CONDITIONS

1. Applicability

These conditions apply to all permittees who use, manufacture, store, handle, or discharge any pollutant listed as: (1) toxic under Section 307(a)(1) of the Clean Water Act; (2) oil, as defined in Section 311(a)(1) of the Act; (3) any pollutant listed as hazardous under Section 311 of the Act; or (4) is defined as a pollutant pursuant to KRS 224.01-010(35) and who have ancillary manufacturing operations which could result in (1) the release of a hazardous substance, pollutant, or contaminant, or (2) an environmental emergency, as defined in KRS 224.01-400, as amended, or any regulation promulgated pursuant thereto (hereinafter, the "BMP pollutants"). These operations include material storage areas; plant site runoff; in-plant transfer, process and material handling areas; loading and unloading operations, and sludge and waste disposal areas.

2. BMP Plan

The permittee shall develop and implement a Best Management Practices (BMP) plan consistent with 401 KAR 5:065, Section 2(10) pursuant to KRS 224.70-110, which prevents or minimizes the potential for the release of "BMP pollutants" from ancillary activities through plant site runoff; spillage or leaks, sludge or waste disposal; or drainage from raw material storage. A Best Management Practices (BMP) plan will be prepared by the permittee unless the permittee can demonstrate through the submission of a BMP outline that the elements and intent of the BMP have been fulfilled through the use of existing plans such as the Spill Prevention Control and Countermeasure (SPCC) plans, contingency plans, and other applicable documents.

3. Implementation

If this is the first time for the BMP requirement, then the plan shall be developed and submitted to the Division of Water within 90 days of the effective date of the permit. Implementation shall be within 180 days of that submission. For permit renewals the plan in effect at the time of permit reissuance shall remain in effect. Modifications to the plan as a result of ineffectiveness or plan changes to the facility shall be submitted to the Division of Water and implemented as soon as possible.

4. General Requirements

The BMP plan shall:

a. Be documented in narrative form, and shall include any necessary plot plans, drawings, or maps.

b. Establish specific objectives for the control of toxic and hazardous pollutants.

(1) Each facility component or system shall be examined for its potential for causing a release of "BMP pollutants" due to equipment failure, improper operation, natural phenomena such as rain or snowfall, etc.

PART V - BIOMONITORING - CHRONIC CONCERNS

In accordance with PART I of this permit, the permittee shall initiate, within 30 days of the effective date of this permit, or continue the series of tests described below to evaluate wastewater toxicity of the discharge from Outfall 001.

TEST REQUIREMENTS

The permittee shall perform one short-term static-renewal fathead minnow (Pimephales promelas) growth test and one short-term static-renewal water flea (Ceriodaphnia dubia) life-cycle test. Tests shall be performed on a series of 24 hour composite samples collected as described in 1.B. below. In addition to use of a control, effluent concentrations for the tests must include the permitted limit, (i.e., 100% effluent) and at least four additional effluent concentrations. For a permit limit of 100% effluent, test concentrations shall be 20%, 40%, 60%, 80% and 100%. If the permit limit is less than 100% effluent and greater than or equal to 75% effluent, the test concentrations shall include the permitted limit, two concentrations below the limit that are based on a 0.5 dilution factor, and two concentrations above the limit (to include 100% and mid-point between the permit limit and 100%). If the permit limit is less than 75% effluent, test concentrations shall include the permit limit concentration, two concentrations below the limit based on a 0.5 dilution factor, and two concentrations above the limit based on a 0.5 dilution factor if possible, otherwise to include 100% and mid-point between the permit limit and 100% . Selection of different effluent concentrations must be approved by the Division prior to testing. Testing of the effluent shall be initiated within 36 hours of completing each 24 hour composite sample. Controls shall be tested concurrently with effluent testing using synthetic water. The analysis will be deemed reasonable and good only if the minimum control requirements are met, (i.e. For the Ceriodaphnia test: at least 80% survival of all control organisms and an average of 15 or more young per surviving female in the control solutions; and 60% of surviving control females must produce three broods. For the fathead minnow test: at least 80% survival in controls and the average dry weight per surviving organism in control chambers equals or exceeds 0.25 mg. Any test that does not meet the control acceptability criteria shall be repeated as soon as practicable within the monitoring period (i.e. monthly or quarterly). Noncompliance with the toxicity limit will be demonstrated if the IC_{25} (inhibition concentration) for reproduction or growth is less than 100% effluent

Tests shall be conducted on both species at the frequency specified in PART I of this permit.

A minimum of three 24 hour composite samples shall be collected at a frequency of one 24 hour composite every other day. For example, the first sample would be used for test initiation on day 1 and for test solution renewal on day 2. The second sample would be used for test solution renewal on days 3 and 4. The third sample would be used for test solution renewal on days 5, 6, and 7. Each 24 hour composite shall be collected using a refrigerated automatic sampler. Each 24 hour composite sample shall consist of not less than 48 discrete aliquots of effluent. Aliquots shall be of equal volume and time-proportional unless effluent flow is expected to vary by more than 10% from one hour to another or by 50% over the 24 hour collection period (as predicted from historical trends, significant rainfall events, etc.). With anticipated effluent flow variation of greater than 10% per hour or 50% overall, the frequency, and volume of each aliquot shall be flow-proportional. The lapsed time from collection of the last aliquot of the composite and its first use for test initiation or for test solution renewal shall not exceed 36 hours.

9. BMP Plan Modification

The permittee shall amend the BMP plan whenever there is a change in the facility or change in the operation of the facility which materially increases the potential for the ancillary activities to result in the release of "BMP pollutants."

10. Modification for Ineffectiveness

If the BMP plan proves to be ineffective in achieving the general objective of preventing the release of "BMP pollutants," then the specific objectives and requirements under paragraphs b and c of Section 4, the permit, and/or the BMP plan shall be subject to modification to incorporate revised BMP requirements. If at any time following the issuance of this permit the BMP plan is found to be inadequate pursuant to a state or federal site inspection or plan review, the plan shall be modified to incorporate such changes necessary to resolve the concerns.

SECTION B. SPECIFIC CONDITIONS

Periodically Discharged Wastewaters Not Specifically Covered By Effluent Conditions

The permittee shall include in this BMP plan procedures and controls necessary for the handling of periodically discharged wastewaters such as intake screen backwash, meter calibration, fire protection, hydrostatic testing water, water associated with demolition projects, etc.

PART V - BIOMONITORING - CHRONIC CONCERNS

TOXICITY REDUCTION EVALUATION (TRE)

Having determined that a TRE is required, the permittee shall initiate &/or continue at least monthly testing with both species until such time as a specific TRE plan is approved by the Division. A TRE plan shall be developed by the permittee and submitted to the Division within thirty days of determining a TRE is required. The plan shall be developed in accordance with the most recent EPA and Division guidance. Questions regarding this process may be submitted to the Division's Water Quality Branch.

The TRE plan shall include Toxic Identification Evaluation (TIE) procedures, treatability studies, and evaluations of: chemical usage including changes in types, handling and suppliers; operational and process procedures; housekeeping and maintenance activities; and raw materials. The TRE plan will establish an implementation schedule to begin immediately upon approval by the Division, to have duration of at least six months, and not to exceed 24 months. The implementation schedule shall include quarterly progress reports being submitted to the Division's Water Quality Branch, due the last day of the month following each calendar quarter.

Upon completion of the TRE, the permittee shall submit a final report detailing the findings of the TRE and actions taken or to be taken to prevent the reoccurrence of toxicity. This final report shall include: the toxicant(s), if any are identified; treatment options; operational changes; and the proposed resolutions including an implementation schedule not to exceed 180 days.

Should the permittee determine the toxicant(s) and/or a workable treatment prior to the planned conclusion of the TRE, the permittee will notify the Division's Water Quality Branch within five days of making that determination and take appropriate actions to implement the solution within 180 days of that notification.

TEST METHODS

All test organisms, procedures and quality assurance criteria used shall be in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (Fourth Edition), EPA-821-R-02-013, the most recent edition of this publication, or as approved in advance by the Division of Water.

Toxicity testing for compliance to KPDES discharge limits shall be performed by a laboratory approved by the Division of Water to conduct the required toxicity tests. Within each toxicity report to the Division of Water, the permittee must demonstrate successful performance of reference toxicant testing by the laboratory that conducts their effluent toxicity tests. Within 30 days prior to initiating an effluent toxicity test, a reference toxicant test must be completed for the method used; alternatively, the reference toxicant test may be run concurrent with the effluent toxicity test. In addition, for each test method, at least 5 acceptable reference toxicant tests must be completed by the laboratory prior to performing the effluent toxicity test. A control chart including the most recent reference toxicant test endpoints for the effluent test method (minimum of 5, up to 20 if available) shall be part of the report.

PART V - BIOMONITORING - CHRONIC CONCERNS

TEST REQUIREMENTS

Composite samples shall be refrigerated and maintained at not greater than 6°C during collection, storage, transport and until used in the test by the laboratory.

If after at least six consecutive toxicity tests, it can be determined that Ceriodaphina dubia or the Fathead minnow is more sensitive and all tests have passed, a request for testing with only the most sensitive species can be submitted to the Division. Upon approval, that most sensitive species may be considered as representative and all subsequent compliance tests can be conducted using only that species unless directed at any time by the Division to change or revert to both.

REPORTING REQUIREMENTS

Results of all toxicity tests conducted with any species shall be reported according to the most recent format provided by the Division of Water. Notification of failed test shall be made to the Division's Water Quality Branch within five days of test completion. Test reports shall be submitted to the Division's Water Quality Branch within thirty days of completion.

Chronic Toxicity

If noncompliance with the toxicity limit occurs in an initial test, (i.e., the IC_{25} for reproduction of water fleas or growth of minnows is less than 100% effluent), the permittee must repeat the test using a new set of three 24 hour composite samples. Sampling must be initiated within 15 days of completing the failed test. The second round of testing shall include both species unless approved for only the most sensitive species by the Division. Results of the second round of testing will be used to evaluate the possible need for a Toxicity Reduction Evaluation (TRE).

If the second round of testing also demonstrates noncompliance with the toxicity limit, the permittee will be required to perform accelerated testing as specified in the following paragraphs.

Complete four additional rounds of testing to evaluate the frequency and degree of toxicity within 60 days of completing the second round of failed testing. Results of the initial and second rounds of testing specified above, plus the four additional rounds of testing will be used in deciding if a TRE shall be required.

If results from any two of the six rounds of testing show a significant noncompliance with the chronic limit (i.e., $\geq$1.2 times the TU_c), or results from any four of the six tests show chronic toxicity (as defined in 1.A), a TRE will be required.

The permittee shall provide written notification to the Division of Water within five (5) days of completing accelerated testing stating that: (1) toxicity persisted and that a TRE will be initiated; or (2) that toxicity did not persist and the normal testing will resume.

Should toxicity prove not to be persistent during the accelerated testing period, but reoccur within 12 months of the initial failure at a level $\geq$ 1.2 times the TU_c, then a TRE shall be required.

Appendix 5

APPENDIX 5

PRESENT WORTH ANALYSIS

FOR

ALTERNATIVES

(Including Project Cost Estimates for each Phase of Wastewater Collection System and WWTP Projects)

Harrodsburg Facilities Plan
Wastewater Collection System
Present Worth Cost

Basis of Present Worth Cost: A Discount Rate of 6.0% is used. Phase 1 is completed in Year 2, Phase 2 is completed in Year 6. Equipment installed in Phase 1 is replaced in Year 15.

Present Worth of Capital Costs and O&M Costs:

Year	Capital Costs	O and M Costs	Total	PW Rate	Present Worth Cost
0		$352,000	$352,000	1.000	$352,000
1	$1,547,500	$352,000	$1,899,500	0.943	$1,791,229
2		$360,000	$360,000	0.890	$320,400
3		$360,000	$360,000	0.840	$302,400
4		$360,000	$360,000	0.792	$285,120
5	$1,310,000	$380,000	$1,690,000	0.747	$1,262,430
6		$380,000	$380,000	0.705	$267,900
7		$380,000	$380,000	0.665	$252,700
8		$380,000	$380,000	0.627	$238,260
9		$380,000	$380,000	0.592	$224,960
10		$380,000	$380,000	0.558	$212,040
11		$380,000	$380,000	0.527	$200,260
12		$380,000	$380,000	0.497	$188,860
13		$380,000	$380,000	0.469	$178,220
14		$380,000	$380,000	0.442	$167,960
15	$300,000	$380,000	$680,000	0.417	$283,560
16	$80,000	$380,000	$460,000	0.394	$181,240
17		$380,000	$380,000	0.371	$140,980
18		$380,000	$380,000	0.350	$133,000
19		$380,000	$380,000	0.331	$125,780
20		$380,000	$380,000	0.312	$118,560

PW of Capital Costs and O&M Costs $7,227,859

Present Worth of 20-Year Salvage Value:

Phase	Salvage Value	PW Rate	Present Worth Cost
1	$423,000	0.312	$131,976
2	$446,400	0.312	$139,277

PW of Salvage Value $271,253

WW Collection System, Total Present Worth **$6,956,606**

Harrodsburg Facilities Plan
WW Collection System Projects, Phase 1

Construction Cost Estimate

The following projects are either under construction or are in the process of being planned and designed for construction during the 0 to 2 year phase of the Planning Period.

Cost Item	Project Cost
Cleaning and Rehabilitation of sewers to eliminate wet weather overflows	$418,500
Sewer Rehabilitation in Blue Ridge, Cardwell, Green Acres and Brentwood	$647,000
Increase Capacity of Western Reegional Pump Station	$482,000
Total Estimated Project Cost, WW Collection Projects, Phase 1	**$1,547,500**

Harrodsburg Facilities Plan
WW Collection System Projects, Phase 1

Annual O&M Cost Estimate

Basis of Annual Costs calculation:

Phase 1 Annual O&M Costs will start in Year 2 and continue until Year 5, when Phase 2 construction will be completed.

Cost Item			Totals
Labor Cost			
Salaries and Benefits	$268,000		
		Sub-Total	$268,000
General Cost			
Equipment Maintenance and Repair	$25,000		
Supplies	$10,000		
Small Equipment	$5,000		
Admininstration/Office Supplies	$3,000		
Vehicle Operation (Fuel, Oil, etc)	$13,000		
Utilities (Electricity, etc)	$13,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$5,000		
		Sub-Total	$92,000
		Total Annual Operation/Maintenance Cost	**$360,000**

Harrodsburg Facilities Plan
WW Collection System Projects, Phase 1

20-Year Salvage Value

Basis of 20-Year SV calculation:

Sewers, Force Mains, Structures and Buildings have 50-year useful life. SV at Year 20 is 60% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 33% of replacement cost
Electrical, HVAC and Control systems have 15-year useful life.SV at Year 20 is 33% of replacement cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.
Items with 15-year useful life will be replaced in Year 15

Sewers/Structures/Buildings Cost Item	Initial Cost	20-Year SV	Total SV
Sewer Lines in on-going Rehab Project	$240,000	$144,000	
Sewers in second Rehab Project	$300,000	$180,000	
			$324,000

Equipment Cost Item	Year to Replace	Cost to Replace	20-Year SV	
Western Regional PS Pumps	15	$250,000	$82,500	
Western Regional PS Elec/Controls	15	$50,000	$16,500	
Year 15 Equipment Replacement Cost		**$300,000**		
				$99,000

*Replaced with other equipment in Phase 2

Total, 20-Year Salvage Value	**$423,000**

Construction Cost Estimate

Cost Item	Project Cost
New Corning Glass PS, Force Main and Gravity Sewer	$910,500
Sewers for 140 homes in two Unsewered Areas	$400,000
Total Estimated Project Cost, WW Collection System, Phase 2	**$1,310,500**

Annual O and M Costs

Basis of Annual Costs calculation:

Phase 2 Annual O&M Costs will start in Year 5 and continue until Year 20.

Cost Item			Totals
Labor Cost			
Salaries and Benefits	$280,000		
		Sub-Total	$280,000
General Cost			
Equipment Maintenance and Repair	$30,000		
Supplies	$10,000		
Small Equipment	$5,000		
Admininstration/Office Supplies	$3,000		
Vehicle Operation (Fuel, Oil, etc)	$13,000		
Utilities (Electricity, etc)	$15,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$6,000		
		Sub-Total	$100,000
		Total Annual Operation/Maintenance Cost	**$380,000**

20-Year Salvage Value

Basis of 20-Year SV calculation:

Sewers, Force Mains, Structures and Buildings have 50-year useful life. SV at Year 20 is 60% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 33% of replacement cost
Electrical, HVAC and Control systems have 15-year useful life.SV at Year 20 is 33% of replacement cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.
Items with 15-year useful life will be replaced in Year 15

Sewers/Structures/Buildings Cost Item	Initial Cost	20-Year SV	Total SV
Corning Glass PS Structure	$50,000	$30,000	
Corning Glass PS Force Main, Sewer	$450,000	$270,000	
Sewers in Unsewered Area Project	$200,000	$120,000	
			$420,000

Equipment Cost Item	Year to Replace	Cost to Replace	20-Year SV	
Corning Glass PS Pumps	15	$60,000	$19,800	
Corning Glass PS Elec/Controls	15	$20,000	$6,600	
Year 15 Equipment Replacement Cost		**$80,000**		
				$26,400
		Total, 20-Year Salvage Value		**$446,400**

Harrodsburg Facilities Plan
WWTP Alternative 3
Present Worth Cost

Basis of Present Worth Cost: A Discount Rate of 6.0% is used. Phase 1 is completed in Year 2, Phase 2 is completed in Year 6. Equipment installed in Phase 1 is replaced in Year 15.

Present Worth of Capital Costs and O&M Costs:

Year	Capital Costs	O and M Costs	Total	PW Rate	Present Worth Cost
0		$448,000	$448,000	1.000	$448,000
1	$3,723,000	$448,000	$4,171,000	0.943	$3,933,253
2		$470,000	$470,000	0.890	$418,300
3		$470,000	$470,000	0.840	$394,800
4		$470,000	$470,000	0.792	$372,240
5	$25,130,633	$577,246	$25,707,879	0.747	$19,203,786
6		$577,246	$577,246	0.705	$406,958
7		$577,246	$577,246	0.665	$383,869
8		$577,246	$577,246	0.627	$361,933
9		$577,246	$577,246	0.592	$341,730
10		$577,246	$577,246	0.558	$322,103
11		$577,246	$577,246	0.527	$304,209
12		$577,246	$577,246	0.497	$286,891
13		$577,246	$577,246	0.469	$270,728
14		$577,246	$577,246	0.442	$255,143
15	$1,505,000	$577,246	$2,082,246	0.417	$868,297
16		$577,246	$577,246	0.394	$227,435
17		$577,246	$577,246	0.371	$214,158
18		$577,246	$577,246	0.350	$202,036
19		$577,246	$577,246	0.331	$191,068
20		$577,246	$577,246	0.312	$180,101

PW of Capital Costs and O&M Costs $29,587,038

Present Worth of 20-Year Salvage Value:

Phase	Salvage Value	PW Rate	Present Worth Cost
1	$724,650	0.312	$226,091
2	$4,233,565	0.312	$1,320,872

PW of Salvage Value $1,546,963

WWTP Alternative 3, Total Present Worth **$28,040,075**

Harrodsburg Facilities Plan
WWTP Alternative 3, Phase 1

Construction Cost Estimate

The following WWTP projects are either under construction or are in the process of being planned and designed for construction during the 0 to 2 year phase of the Planning Period.

Project	Total Cost
Replace existing Screw Pumps with new pumps of same capacity	$400,000
Replace existing mechanically-cleaned screen with new screen of same capacity, plus screenings press/washer	$260,000
Install new plant influent flow meter and sampler	$50,000
Replace existing digester heat exchanger with new unit, plus associated piping and controls	$300,000
Sludge Processing Building, including Belt Filter Press, polymer system wash water system, conveyor, and other associated equipment	$1,200,000
Install new plant-wide SCADA system	$100,000
New Pavements and Site Work for above improvements	$100,000
Sub-Total	$2,410,000
Contingencies	$390,000
Sub-Total	$2,800,000
Contractor's Bonds, Insurance, OH and Profit	$327,000
Total Estimated Construction Cost	**$3,127,000**
Engineering Design, Bidding and Construction Administration	$226,000
Resident Inspection	$180,000
Legal, Administration, Other Engineering, Interest	$190,000
Total Estimated Project Cost, WWTP Alternative 3, Phase 1	**$3,723,000**

Harrodsburg Facilities Plan
WWTP Alternative 3, Phase 1

Annual O&M Cost Estimate

Basis of Annual Costs calculation:

Phase 1 Annual O&M Costs will start in Year 2 and continue until Year 5, when Phase 2 construction will be completed.

Cost Item			**Totals**
Labor Cost			
Salaries and Benefits	$250,000		
		Sub-Total	$250,000
General Cost			
Equipment Maintenance and Repair	$100,000		
Chlorination/Dechlorination Chemicals	$15,000		
Sludge Heating Fuel	$5,000		
Sludge Dewatering Polymer	$1,000		
Vehicle Operation (Fuel, Oil, etc)	$5,000		
Vehicle Maintenance and Repair	$2,000		
Building Maintenance and Repair	$30,000		
Utilities (Gas, Heating,Telephone, etc)	$7,000		
Laboratory Operations	$12,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$5,000		
		Sub-Total	$200,000
Electrical Power Usage	kw-hr/yr		
EQ Basin Pumping (10% of the year)	99,900		
EQ Basin Mixing/Aeration (10% of the year)	46,620		
Influent Pumping	788,400		
Wastewater Screening/Dewatering	730		
Grit Removal/Pumping/Dewatering	2,194		
RBC Operation	198,900		
Primary and Final Clarifiers	2,510		
Primary and Final Sludge Pumps	18,915		
Sludge Thickening and Digestion	30,390		
Belt Filter Press Feed Pump	11,700		
Belt Filter Press Operation	32,850		
Belt Filter Press Wash Water Pump	2,740		
Building Lighting, Ventilation	233,910		
Site Lighting (50% of the day)	43,800		
Miscellaneous Power	16,441		
Total, kw-hr/yr	1,530,000		
Cost, per kw-hr	$0.07		
		Sub-Total	$107,100
Power Demand Charge			$20,000
	Total Annual Operation/Maintenance Cost		**$470,000**

Harrodsburg Facilities Plan
WWTP Alternative 3, Phase 1

20-Year Salvage Value

Basis of 20-Year SV calculation:

Structures and Buildings have 50-year useful life. SV at Year 20 is 60% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 33% of replacement cost
Electrical, HVAC and Control systems have 15-year useful life.SV at Year 20 is 33% of replacement cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.
Items with 15-year useful life will be replaced in Year 15

Structures/Buildings Cost Item	Initial Cost	20-Year SV	Total SV
Sludge Processing Building	$280,000	$168,000	
Site Work and Pavements	$100,000	$60,000	
			$228,000

Equipment Cost Item	Year to Replace	Cost to Replace	20-Year SV	
Influent Screw Pumps	15	$400,000	$132,000	
Bar Screen	15	$260,000	$85,800	
Flow Meter*	N/A	0	$0	
Digester Heat Exchanger*	N/A	0	$0	
Belt Filter Press System	15	$745,000	$245,850	
SCADA System	15	$100,000	$33,000	
Year 15 Equipment Replacement Cost		**$1,505,000**		
				$496,650

*Replaced with other equipment in Phase 2

Total, 20-Year Salvage Value **$724,650**

Construction Cost Estimate

Cost Item	Total Cost
Preliminary Treatment Building	$2,627,150
Influent Meter Vault/ Flow Distribution Chamber	$246,450
Oxidation Ditches	$3,956,925
Final Clarifier Influent Distribution Chamber	$96,142
Final Clarifiers	$1,434,775
RAS/WAS Pump Station	$859,765
UV Disinfection System	$636,136
Plant Effluent Parshall Flume	$45,690
Plant Drainage Pump Station	$410,980
Aerated Sludge Holding Tanks and New Pump/Blower Building	$2,254,800
Modifications to Existing Sludge Digestion Facilities	$974,500
Modifications to Phase 1 Sludge Processing Building	$488,500
Modifications to Existing Screw Pump/Screening Facility	$100,000
Modifications to Existing Chlorination Building	$125,000
Abandonment/Demolition of Existing Facilities	$215,000
Yard Piping	$1,221,205
Grading, Pavement, Site Work	$430,000
Upgrades to Electrical and Control Systems	$1,385,750
Miscellaneous	150000
Sub-Total	$17,658,768
Contingencies at 15%	$2,648,815
Sub-Total	$20,307,583
Contractor's Bonds, Insurance, OH and Profit at 10%	$2,030,758
Total Estimated Construction Cost	**$22,338,341**
Engineering Design, Bidding and Construction Administration	$1,429,654
Resident Inspection	$915,872
Legal, Administration, Other Engineering	$446,767
Total Estimated Project Cost, WWTP Alternative 3, Phase 2	**$25,130,633**

Preliminary Treatment Building

Approx 3300 SF building housing screening and grit removal equipment, on concrete foundation with CMU walls and standing seam metal roof. Ventilation at 12 air changes/hour, with electric unit heaters and heat recovery system. Covers over channels and foul air exhaust system for odor control. Control room, electrical room, mechanical room are separate from process area. Garage area (lower level) to house grit and screenings dumpsters, with exterior rollup doors for disposal vehicle access.

Cost Item	Unit Cost	Units	Quantity	Total
Foundations				
Earth Excavation	$20	CY	800	$16,000
Concrete Footings & Foundation Walls	$300	CY	400	$120,000
12" Crushed Stone	$25	CY	120	$3,000
Backfill	$3	CY	200	$600

Total, Foundations					**$139,600**
Substructure					
12" Slab-on-Grade	$450	CY	125	$56,250	
24" Concrete Channel Walls	$800	CY	100	$80,000	
8" Floor Slab	$550	CY	125	$68,750	
Total, Substructure					**$205,000**
Exterior Closure					
Exterior 16" Insulated CMU Walls	$60	SF	2,500	$150,000	
Windows	$100	SF	100	$10,000	
Double Doors	$1,500	EA	2	$3,000	
Single Doors	$800	SF	2	$1,600	
Overhead Doors	$40	SF	300	$12,000	
Total, Exterior Closure					**$176,600**
Roofing					
6" Rigid Insulation	$8	SF	3,300	$26,400	
Low Slope Standing Seam Metal Roof	$50	SF	3,300	$165,000	
Total, Roofing					**$191,400**
Interior Construction					
Interior 8" CMU or Concrete Walls	$10	SF	600	$6,000	
Double Doors, Metal	$1,500	EA	0	$0	
Single Doors, Metal	$500	EA	1	$500	
Handrail, Aluminum	$40	LF	50	$2,000	
General Finishes	$10	SF	3,300	$33,000	
Total, Interior Construction					**$41,500**
Process Equipment, Miscellaneous Items					
Mechanical Bar Screen and Press	$320,000	LS	1	$320,000	
Grit Removal Units	$150,000	LS	2	$300,000	
Grit Classifier/Concentrator	$70,000	LS	1	$70,000	
Sluice Gates, 2' x 6', w/elec operators	$10,000	EA	8	$80,000	
Weir Gates, 2' x 6', w/ handwheel operators	$6,000	EA	2	$12,000	
Internal Process Piping, Valves	$15,000	LS	1	$15,000	
Channel Covers	$40	SF	1,500	$60,000	
Relocate Influent Sampler to this Building	$10,000	EA	1	$10,000	
Equipment Installation at 15%				$128,550	
Total, Process Equipment, Misc Items					**$995,550**
Mechanical					
Plumbing Systems	$5.00	SF	0	$0	
HVAC System, w/ Heat Recovery	$150	SF	3,300	$495,000	
Odor Control Ductwork, Fans, Controls	$100	SF	2,000	$200,000	

Gas/Hazardous Alarm System	$25	SF	2,500	$62,500	
Total, Mechanical					**$757,500**
Electrical					
All Electrical	$120,000	LS	1	$120,000	
Total, Electrical					**$120,000**
Total, Preliminary Treatment Building					**$2,627,150**

Influent Meter Vault/Flow Distribution Chamber

Approx 40' x 20' x 17' deep concrete in-ground structure, containing vault for plant influent magnetic flow meter, valves and piping, with access hatch from top slab level and sump in floor. Chambers for dividing flow to each Oxidation Ditch (2 plus 1 in future) using weir gates to control flow rate. Vault is ventilated, not heated. Covers provided over open chambers

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	600	$12,000	
12" Crushed Stone	$25	CY	30	$750	
Backfill	$3	CY	100	$300	
Total, Foundations					**$13,050**
Substructure					
12" Slab-on-Grade	$450	CY	30	$13,500	
18" Concrete Walls	$500	CY	100	$50,000	
8" Elevated Slab	$600	CY	25	$15,000	
Total, Substructure					**$63,500**
Process Equipment, Miscellaneous Items					
Magnetic Flow Meter, 24"	$25,000	LS	1	$25,000	
Plug Valves, w/ HW Operators, 24"	$15,000	EA	3	$45,000	
Piping, Reducers, Elbows and Tees, 24"	$30,000	LS	1	$30,000	
Weir Gates, 4' x 3', w/HW Operators	$6,000	EA	3	$18,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Covers over Distribution Channels	$40	SF	50	$2,000	
Equipment Installation at 15%				$18,900	
Total, Process Equipment, Misc Items					**$144,900**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	

Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	
Total, Mechanical					**$10,000**
Electrical					
All Electrical	$15,000	LS	1	$15,000	
Total, Electrical					**$15,000**
Total, Influent Meter Vault/Flow Distribution Chamber					**$246,450**

Oxidation Ditches

Two oval ditches, each with a 80'' x 15'-4'' x 15' deep anaerobic stage, a 80' x 46' x 15' deep anoxic stage and a 80' x 170' x 15' deep aerobic stage, with mixers in the anaerobic and anoxic stages and aerators in the aerobic stage. The anaerobic and anoxic stages are concrete covered, the aerobic stage is open to the atmosphere. A central vertical dividing wall and circular end walls in each basin are used to circulate the flow.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	17,400	$348,000	
Rock Excavation	$80	CY	0	$0	
12" Crushed Stone	$25	CY	725	$18,125	
Backfill	$3	CY	450	$1,350	
Total, Foundations					**$367,475**
Substructure					
12" Slab-on-Grade	$450	CY	1,450	$652,500	
12" Elevated Concrete Slab	$800	CY	433	$346,400	
24" Dividing Wall	$600	CY	307	$184,200	
18" Concrete Walls	$500	CY	800	$400,000	
12" Concrete Walls	$300	CY	287	$86,100	
Weir Boxes and Steps	$150	CY	200	$30,000	
12" Vertical Concrete Baffle Wall	$300	CY	150	$45,000	
Total, Substructure					**$1,744,200**
Process Equipment, Miscellaneous Items					
Aerators, Mixers	$700,000	EA	2	$1,400,000	
Control System	$100,000	LS	1	$100,000	
Handrails	$50	LF	700	$35,000	
Equipment Installation at 15%				$230,250	
Total, Process Equipment, Misc Items					**$1,765,250**
Electrical					
All Electrical	$80,000	LS	1	$80,000	
Total, Electrical					**$80,000**

Total, Oxidation Ditches **$3,956,925**

Final Clarifier Influent Distribution Chamber

Approx 23' x 16' x 16' deep concrete in-ground open structure, containing chamber for discharge of 42" mixed liquor line from VLRs, and three chambers for distribution of mixed liquor to Final Clarifiers (2 plus 1 in future). Weir gates used to control flow to each Final Clarifier. Each chamber is covered with grating. No mechanical or electrical equipment.

Cost Item	Unit Cost	Units	Quantity	Total
Foundations				
Earth Excavation	$20	CY	400	$8,000
Rock Excavation	$80	CY	20	$1,600
12" Crushed Stone	$25	CY	20	$500
Backfill	$3	CY	80	$240
Total, Foundations				**$10,340**
Substructure				
12" Slab-on-Grade	$450	CY	15	$6,750
18" Concrete Walls	$500	CY	80	$40,000
12" Concrete Walls	$300	CY	30	$9,000
Concrete Steps	$150	CY	4	$600
Total, Substructure				**$56,350**
Process Equipment, Miscellaneous Items				
Weir Gates, 4' x 2", w/HW Operators	$4,000	EA	3	$12,000
Handrail	$50	LF	100	$5,000
Grating over Open Chambers	$35	SF	246	$8,610
Equipment Installatiuon at 15%				$3,842
Total, Process Equipment, Misc Items				**$29,452**

Total, Final Clarifier Influent Distribution Chamber **$96,142**

Final Clarifiers

Two 90 foot I.D. x 14' SWD Center Feed, Peripheral Discharge, Concrete clarifiers, with scum removal and telescopic valves to control RAS withdrawal. Effluent troughs on exterior of peripheral walls, with fiberglass covers. Sandford baffles to control flow distribution in basin.

Cost Item	Unit Cost	Units	Quantity	Total
Foundations				
Earth Excavation	$20	CY	9,600	$192,000
Rock Excavation	$80	CY	30	$2,400
12" Crushed Stone	$25	CY	500	$12,500
Backfill	$3	CY	500	$1,500
Total, Foundations				**$208,400**

Substructure					
12" Slab-on-Grade	$450	CY	480	$216,000	
18" Concrete Walls	$500	CY	300	$150,000	
12" Concrete Walls	$300	CY	200	$60,000	
Concrete Steps	$150	CY	10	$1,500	
Total, Substructure					**$427,500**
Process Equipment, Misc Items					
Final Clarifier Equipment	$225,000	EA	2	$450,000	
Flow Distribution Baffles	$25,000	EA	2	$50,000	
Effluent Trough Covers	$30,000	EA	2	$60,000	
Scum Collection System	$20,000	EA	2	$40,000	
Handrails	$50	LF	200	$10,000	
Mixed Liquor Piping under slab, 42"	$150	LF	100	$15,000	
RAS Piping under slab, 20"	$75	LF	100	$7,500	
Telescopic Valve for RAS conrtol	$5,000	EA	2	$10,000	
Equipment Installation at 15%				$96,375	
Total, Process Equipment, Misc Items					**$738,875**
Electrical					
All Electrical	$60,000	LS	1	$60,000	
Total, Electrical					**$60,000**
Total, Final Clarifiers					**$1,434,775**

RAS/WAS Pump Station

Concrete, in-ground structure, approximately 60' x 45' x 20' deep. Includes 2 small and 2 large RAS submersible pumps in wet well, with piping vault containing piping, RAS and WAS meters, valves, etc. Vault is covered with concrete roof, with access hatch into vault. Vault includes sump pump. Wet well includes level controls for pump operation. WAS is diverted from RAS pump discharge header (no separate RAS pumps provided).

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	1,500	$30,000	
Rock Excavation	$80	CY	500	$40,000	
12" Crushed Stone	$25	CY	100	$2,500	
Backfill	$3	CY	80	$240	
Total, Foundations					**$72,740**
Substructure					
12" Slab-on-Grade	$450	CY	100	$45,000	

18" Concrete Walls	$500	CY	200	$100,000	
8" Elevated Slab	$600	CY	50	$30,000	
Total, Substructure					**$145,000**
Process Equipment, Miscellaneous Items					
Large RAS Pumps w/ VFDs	$80,000	EA	2	$160,000	
Small RAS Pumps w/ VFDs	$60,000	EA	2	$120,000	
Pump Controls	$20,000	LS	1	$20,000	
Magnetic Flow Meter, 20"	$20,000	EA	1	$20,000	
Magnetic Flow Meter, 8"	$10,000	EA	1	$10,000	
Plug Valves, w/ HW Operators, 20"	$12,000	EA	7	$84,000	
Plug Valves, w/ HW Operators, 8"	$5,000	EA	3	$15,000	
Piping, Reducers, Elbows and Tees, 20"	$40,000	LS	1	$40,000	
Piping, Reducers, Elbows and Tees, 8"	$10,000	LS	1	$10,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Grating over Wet Well	$35	SF	1,100	$38,500	
Equipment Installation at 15%				$78,525	
Total, Process Equipment, Misc Items					**$602,025**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	
Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	
Total, Mechanical					**$10,000**
Electrical					
All Electrical	$30,000	LS	1	$30,000	
Total, Electrical					**$30,000**
Total, RAS/WAS Pump Station					**$859,765**

<u>UV Disinfection System</u>

Two parallel concrete, in-ground channels,each approximately 18' long x 8' wide x 6' deep, each with a 2-module UV disinfection ssystem that can be rotated out of the channel for maintenance. Upstream influent chamber & downstream effluent chamber, each approximately 4' long x 8' wide x 6' deep, include sluice gates to isolate each UV channel. UV system controls and electrical panels are housed in the (former) Chlorination Building garage and storage rooms.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	100	$2,000	
12" Crushed Stone	$25	CY	20	$500	
Backfill	$3	CY	12	$36	
Total, Foundations					**$2,536**

Substructure					
12" Slab-on-Grade	$450	CY	15	$6,750	
12" Concrete Walls	$300	CY	30	$9,000	
8" Elevated Slab	$600	CY	15	$9,000	
Total, Substructure					**$15,750**
Process Equipment, Miscellaneous Items					
UV Disinfection System	$200,000	EA	2	$400,000	
Sluice Gates, 3'W x 5' H, w/ Elec Operators	$10,000	EA	4	$40,000	
Level Control Weirs	$2,500	EA	2	$5,000	
Level Monitoring/Controls	$2,000	EA	2	$4,000	
Covers over Open Channels	$40	SF	250	$10,000	
Equipment Installation at 15%				$68,850	
Total, Process Equipment, Misc Items					**$527,850**
Electrical					
All Electrical	$90,000	LS	1	$90,000	
Total, Electrical					**$90,000**
Total, UV Disinfection System					**$636,136**

Plant Effluent Parshall Flume

Concrete, in-ground channel, with tapered section for 1'-6" Parshall Flume. Radar-type level detection equipment used to measure water level in flume and convert reading to flow rate. Reading used in SCADA to control UV dosage rate.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	30	$600	
12" Crushed Stone	$25	CY	8	$200	
Backfill	$3	CY	5	$15	
Total, Foundations					**$815**
Substructure					
12" Slab-on-Grade	$450	CY	10	$4,500	
12" Concrete Walls	$300	CY	15	$4,500	
Tapered Concrete Walls and Floor	$1,500	LS	1	$1,500	
Total, Substructure					**$9,000**
Process Equipment, Miscellaneous Items					
1'-6" Parshall Flume Insert	$12,500	EA	1	$12,500	
Level Monitoring/Controls	$2,000	EA	1	$2,000	
Covers over Open Channels	$40	SF	200	$8,000	
Equipment Installation at 15%				$3,375	
Total, Process Equipment, Misc Items					**$25,875**

Electrical					
All Electrical	$10,000	LS	1	$10,000	
Total, Electrical					**$10,000**
Total, Plant Effluent Parshall Flume					**$45,690**

Plant Drainage Pump Station

Concrete, in-ground structure, approximately 30' x 25' x 20' deep. Includes 2 small (250 GPM) submersible pumps in wet well, with piping vault containing piping, plant drainage flow meter, valves, etc. Vault is covered with concrete roof, with access hatch into vault. Vault includes sump pump. Wet well includes level controls for pump operation. Discharge is conveyed to secondary influent distribution chamber, downstream of plant influent meter vault.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	1,000	$20,000	
Rock Excavation	$80	CY	200	$16,000	
12" Crushed Stone	$25	CY	80	$2,000	
Backfill	$3	CY	60	$180	
Total, Foundations					**$38,180**
Substructure					
12" Slab-on-Grade	$450	CY	70	$31,500	
18" Concrete Walls	$500	CY	200	$100,000	
8" Elevated Slab	$600	CY	50	$30,000	
Total, Substructure					**$161,500**
Process Equipment, Miscellaneous Items					
Plant Drainage Pumps	$30,000	EA	2	$60,000	
Pump Controls	$20,000	LS	1	$20,000	
Magnetic Flow Meter, 8"	$10,000	EA	1	$10,000	
Plug Valves, w/ HW Operators, 10"	$7,000	EA	2	$14,000	
Plug Valves, w/ HW Operators, 8"	$5,000	EA	3	$15,000	
Piping, Reducers, Elbows and Tees, 10"	$20,000	LS	1	$20,000	
Piping, Reducers, Elbows and Tees, 8"	$10,000	LS	1	$10,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Grating over Wet Well	$35	SF	200	$7,000	
Equipment Installation at 15%				$24,300	
Total, Process Equipment, Misc Items					**$186,300**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	
Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	

Total, Mechanical					**$10,000**
Electrical					
All Electrical	$15,000	LS	1	$15,000	
Total, Electrical					**$15,000**
Total, Plant Drainage Pump Station					**$410,980**

Aerated Sludge Holding Tanks and New Pump/Blower Building

Two 48' Diameter x 30' SWD open top concrete tanks with jet mixing system plus 2-story (1500 SF each) addition to the existing digester building to house sludge recirculation pumps (4) on lower level and blowers (4) on upper level. 16" CMU walls for upper level, concrete walls for lower level. Two sludge transfer pumps to convey stored sludge to BFPs. Recently built boiler building converted to electrical room for sludge holding process.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	3,200	$64,000	
Concrete Footings and Foundation Walls	$300	CY	200	$60,000	
12" Crushed Stone	$25	CY	500	$12,500	
Backfill	$3	CY	400	$1,200	
Total, Foundations					**$137,700**
Substructure					
18" Slab-on-Grade	$600	CY	220	$132,000	
24" Concrete Basin Walls	$800	CY	760	$608,000	
12" Floor Slab-on-grade	$450	CY	60	$27,000	
8" Elevated Floor Slabs (2)	$600	CY	120	$72,000	
Total, Substructure					**$839,000**
External Closure					
Exterior 18" CMU Insulated Walls	$60	SF	3,000	$180,000	
Windows	$100	SF	300	$30,000	
Double Doors	$1,500	EA	2	$3,000	
Single Doors	$800	EA	2	$1,600	
Total, Exterior Closure					**$214,600**
Roofing					
6" Rigid Insulation	$8	SF	1,500	$12,000	
Low Slope Standing Seam Metal Roof	$50	SF	1,500	$75,000	
Total, Roofing					**$87,000**

Interior Construction					
Interior 8" CMU Walls	$10	SF	600	$6,000	
General Finishes	$10	SF	3,000	$30,000	
Total, Interior Construction					**$36,000**
Process Equipment, Miscellaneous Items					
Jet Aeration System and Controls	$30,000	EA	2	$60,000	
Recirculation Pumps w/ VFDs	$20,000	EA	4	$80,000	
Aeration Blowers w/ Silencers, Controls	$50,000	EA	4	$200,000	
BFP Feed Pumps w/ VFDs	$40,000	EA	1	$40,000	
Flow Meters, Valves and Piping	$70,000	LS	1	$70,000	
Tank Level Control System	$20,000	LS	1	$20,000	
Equipment Installation at 15%				$70,500	
Total, Process Equipment, Misc Items					**$540,500**
Mechanical					
HVAC System	$75	SF	3,000	$225,000	
Gas/Hazardous Alarm System	$25	SF	3,000	$75,000	
Total, Mechanical					**$300,000**
Electrical					
All Electrical	$100,000	LS	1	$100,000	
Total, Electrical					**$100,000**
Total, Aerated Sludge Holding Tanks and New Pump/Blower Building					**$2,254,800**

Modifications to Existing Sludge Digestion Facilities

After the new aerated sludge holding tanks are put into service, the existing primary and secondary digesters and gravity thickener will be taken out of service. The digesters will be converted to aerated slufge holding tanks 3 and 4 using the same jet aeration system as for Tanks 1 and 2. All existing equipment in the digester control building will be removed, as will the digester covers. The digester tanks will be drained, refurbished and retrofitted with the new jet aeration system. New sludge recirculation pumps (4) will be installed in the lower level of the building and new aeration blowers (4) will be installed in the upper level. The BFP feed pumps installed in the new pump/blower building will transfer stored sludge to the Sludge Processing Building via existing piping. The thickener will be abandoned, with provisions to drain it of rain water as needed.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Equipment Removal, Tank Draining and Refurbishing					
Removal/disposal of sludge pumps and piping	$50,000	LS	1	$50,000	
Removal/disposal of sludge heating system	$30,000	LS	1	$30,000	
Removal/disposal of digester covers	$15,000	EA	2	$30,000	
Tank Draining, Cleaning, Refurbishing	$10,000	EA	2	$20,000	
Total, Equipment Removal, etc					**$130,000**

Process Equipment, Miscellaneous Items

Jet Aeration System and Controls	$30,000	EA	2	$60,000	
Recirculation Pumps w/ VFDs	$20,000	EA	4	$80,000	
Aeration Blowers w/ Silencers, Controls	$50,000	EA	4	$200,000	
Flow Meters, Valves and Piping	$70,000	LS	1	$70,000	
Tank Level Control System	$20,000	LS	1	$20,000	
Equipment Installation at 15%				$64,500	
Total, Process Equipment, Misc Items					**$494,500**

Mechanical

HVAC System	$75	SF	2,500	$187,500	
Gas/Hazardous Alarm System	$25	SF	2,500	$62,500	
Total, Mechanical					**$250,000**

Electrical

All Electrical	$100,000	LS	1	$100,000	
Total, Electrical					**$100,000**

Total, Modifications to Existing Sludge Digestion Facilities **$974,500**

Modifications to Phase 1 Sludge Processing Building

This building houses a belt filter press and appurtenances (polymer system, wash water system, conveyor, etc). The building was sized for the installation of a second BFP at a later date. The modifications in this Phase include the installation of the second BFP and appurtenances

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Process Equipment, Miscellaneous Items					
1-meter Belt Filter Press	$350,000	LS	1	$350,000	
Wash water pumps	$10,000	LS	1	$10,000	
Piping, Valves	$15,000	LS	1	$15,000	
Polymer system	$5,000	LS	1	$5,000	
Conveyor Addition	$10,000	LS	1	$10,000	
Equipment Installation at 15%				$58,500	
Total, Process Equipment, Misc Items					**$448,500**
New Electrical					
All Electrical	$40,000	LS	1	$40,000	
Total, Electrical					**$40,000**

Total, Modifications to Phase 1 Sludge Processing Building **$488,500**

Modifications to Existing Screw Pump/Screening Facility

This includes installing a new 30" pipe to convey plant influent from the screen channel to the Preliminary Treatment Building, followed by abandoning the screening and grit removal facilities. The mechanical screen installed in Phase 1 will be relocated to the Preliminary Treatment Building. The abandoned channels and tanks will be filled and covered.

Cost Item	Unit Cost	Units	Quantity	Total
Equipment Removal, Channel and Basin Closure				
Relocation of Mechanical Screen	$15,000	LS	1	$15,000
Removal/Disposal of Equipment, Piping	$25,000	LS	1	$25,000
Draining, Filling of Channels, Basins	$25,000	LS	1	$25,000
Misc Demolition	$10,000	LS	1	$10,000
Total, Equipment Removal, etc				**$75,000**
Wet Installation of 30" Pipe Sleeve in Existing Channel Wall				**$25,000**
Total, Modifications to Existing Screw Pump/Screening Facility				**$100,000**

Modifications to Existing Chlorination Building

This building will no longer need to house chlorination equipment once the new UV system is operational. The UV control and electrical equipment will be installed in the storage room and garage of the building, respectively. The chlorination equipment in the existing control room will removed and a new non-potable water pumping system will be located in this room, drawing plant effluent from a new manhole on the discharge side of the new plant effluent Parshall flume channel. The chlorination equipment in the cylinder room will be removed and this room will become a garage/storage room for this end of the plant site. The plant effluent composite sampler will be located in this building.

Cost Item	Unit Cost	Units	Quantity	Total
Equipment Removal, New Equipment Installation				
Removal/Disposal of Equipment, Piping	$20,000	LS	1	$20,000
Installation of UV Elec and Control Equipmen	$30,000	LS	1	$30,000
Non-Potable Water Pumping System	$50,000	LS	1	$50,000
Sampler, Compresor and Sample Pump	$10,000	LS	1	$10,000
Misc Building Renovation (Painting, etc)	$5,000	LS	1	$5,000
Modifications to Mechanical, Electrical	$10,000	LS	1	$10,000
Total, Modifications to Existing Chlorination Building				**$125,000**

Abandonment/Demolition of Existing Facilities

This includes the primary and final settling tanks, RBC basins, chlorine contact tank, gravity thickener, several open channels, yard piping that is no longer required, etc. Drains will be retained to remove accumulated rain water from these structures.

Cost Item	Unit Cost	Units	Quantity	Total
Abandonment/Demolition of Existing Facilities				
Removal/disposal of Clarifier Equipment	$25,000	EA	2	$50,000
Removal/disposal of RBC Equipment	$70,000	LS	1	$70,000
Removal/disposal of Thickener Equipment	$10,000	LS	1	$10,000

Removal/disposal of Sludge Pumps, Piping	$30,000	LS	1	$30,000
Filling/covering of abandoned channels	$25,000	LS	1	$25,000
Filling/Removal of abandoned yard piping	$10,000	LS	1	$10,000
Misc Demolition	$20,000	LS	1	$20,000

Total, Abandonment/Demolition of Existing Facilities **$215,000**

Yard Piping

Pipe sizes, lengths and depts of burial are estimated based on preliminary arrangement of new treatment structures and planning level plant hydraulic profile. Unit costs include, pipe, excavation, bedding, and backfill to existing grade.

Cost Item	Unit Cost	Units	Quantity	Total
Yard Piping				
30" Prelim Treat Bldg Influent	$19,200	LS	1	$19,200
30" Prelim Treat Bldg Effluent	$139,220	LS	1	$139,220
24" Secondary Influent	$72,680	LS	1	$72,680
36" Mixed Liquor	$271,100	LS	1	$271,100
42" Mixed Liquor	$128,400	LS	1	$128,400
36" Final Clarifier Influent	$110,100	LS	1	$110,100
30" Final Clarifier Effluent	$78,400	LS	1	$78,400
30" UV Chamber Influent	$153,500	LS	1	$153,500
30" UV Chamber Effluent	$39,400	LS	1	$39,400
20" Final Clarifier RAS	$34,950	LS	1	$34,950
20" RAS FM	$19,100	LS	1	$19,100
8" WAS FM	$38,400	LS	1	$38,400
12" Plant Drainage	$17,475	LS	1	$17,475
8" Plant Drainage FM	$49,280	LS	1	$49,280
Misc Piping	$50,000	LS	1	$50,000

Total, Yard Piping **$1,221,205**

Grading, Pavement, Site Work

This includes regrading of the site as needed for appropriate drainage in the vicinity of new buildings and basins, new roads and pavements (including walkways and driveways), storm water management (retention or detention basins), and other miscellaneous site work. Estimates are very preliminary and require confirmation during final design

Cost Item	Unit Cost	Units	Quantity	Total
Grading, Pavement and Site Work				
Regrading (earthwork only)	$100,000	LS	1	$100,000
New Roads (asphalt)	$50,000	LS	1	$50,000
Resurfacing of Existing Roads (asphalt)	$75,000	LS	1	$75,000
Walkways, Driveways (concrete)	$50,000	LS	1	$50,000
Stormwater Management	$100,000	LS	1	$100,000
Landscaping, Signage	$30,000	LS	1	$30,000
Misc Site Work	$25,000	LS	1	$25,000

Total, Grading, Pavement, Site Work **$430,000**

Upgrades of Electrical and Control Systems

This includes a new stand-by emergency generator (assumed at 1500 KW, 480 volt), with automatic transfer switch, replacement of the existing Main Power Center with a new MPC, a new MCC for secondary treatment, upgrades of control and power distribution systems, a new SCADA system, and other miscellaneous modifications and additions. MCCs for the Preliminary Treatment, UV Disinfection and Sludge Aeration/Storage facilities are included in the cost estimates for those facilities.

Cost Item	Unit Cost	Units	Quantity	Total
Upgrades of Electrical and Control Systems-				
Emergency Generator	$500,000	LS	1	$500,000
Automatic Transfer Switch	$50,000	LS	1	$50,000
New MPC	$100,000	LS	1	$100,000
MCC for Secondary Treatment	$75,000	LS	1	$75,000
Upgrades of Control Circuits	$150,000	LS	1	$150,000
Upgrades of Power Distribution System	$75,000	LS	1	$75,000
Additional SCADA Upgrades	$120,000	LS	1	$120,000
MCC for EQ Pump Station	$60,000	LS	1	$60,000
Upgrade of Plant Lighting/Communication	$50,000	LS	1	$50,000
Other Misc Electrical/Control Work	$25,000	LS	1	$25,000
Equipment Installation at 15%				$180,750
Total, Upgrades of Electrical and Control Systems				**$1,385,750**

Annual O and M Costs

Basis of Annual Costs calculation:

Phase 2 Annual O&M Costs will start in Year 5 and continue until Year 20.

Cost Item			**Totals**
Labor Cost			
Salaries and Benefits	$230,000		
		Sub-Total	$230,000
General Cost			
Equipment Maintenance and Repair	$50,000		
UV System Lamp Cleaning and Replacements	$20,000		
Sludge Dewatering Polymer	$1,000		
Vehicle Operation (Fuel, Oil, etc)	$5,000		
Vehicle Maintenance and Repair	$2,000		
Building Maintenance and Repair	$30,000		
Utilities (Gas, Heating,Telephone, etc)	$7,000		
Laboratory Operations	$12,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$3,000		
		Sub-Total	$148,000
Electrical Power Usage	kw-hr/yr		
EQ Basin Pumping (10% of the year)	99,900		
EQ Basin Mixing/Aeration (10% of the year)	46,620		
Influent Pumping	788,400		
Wastewater Screening/Dewatering	19,710		
Grit Removal/Pumping/Dewatering	26,280		
Preliminary Treatment Bldg Ventilation	117,000		
Anaerobic Stage Mixers	14,040		
Anoxic Stage Mixers	157,600		
Aerobic Stage Aeration/Mixing	187,200		
Clarifiers	5,850		
RAS Pump Station	175,500		
Sludge Holding Tank Recirculation Pumps	117,000		
Sludge Holding Tank Aeration Blowers	93,600		
Belt Filter Press Feed Pumps	11,700		
Belt Filter Press Operation	32,850		
Belt Filter Press Wash Water Pumps	2,740		
Non-Potable Water Pumping	3,900		
UV Disinfection	156,000		
Plant Drainage Pump Station	27,375		
Building Lighting, Ventilation	300,000		
Site Lighting (50% of the day)	15,600		
Miscellaneous Power	18,935		
Total, kw-hr/yr	2,417,800		
Cost, per kw-hr	$0.07		
		Sub-Total	$169,246
Power Demand Charge			$30,000
	Total Annual Operation/Maintenance Cost		**$577,246**

20-Year Salvage Value

Basis of 20-Year SV calculation:

Phase 2 construction completed in Year 5. Phase 2 has operated for 15 years by Year 20
Structures, Buildings have 50-year useful life. SV at Year 20 is 60% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 0% of initial cost.
Electrical, HVAC and Control systems have 15-year useful life. SV at Year 20 is 0% of initial cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.
Items with 15-year useful life will be replaced at end of Year 20

Cost Item	Initial Cost	20-Year SV	Total SV
Preliminary Treatment Building	$754,100	$452,460	
Influent Meter Vault/Flow Dist Chamber	$76,550	$45,930	
Oxidation Ditches	$2,111,675	$1,267,005	
Final Clarifier Distribution Chamber	$66,690	$40,014	
Final Clarifiers	$635,900	$381,540	
RAS/WAS Pump Ststion	$217,740	$130,644	
UV Disinfection System	$18,286	$10,972	
Plant Effluent Parshall Flume	$9,815	$5,889	
Plant Drainage Pump Station	$199,680	$119,808	
Aerated Sludge Holding Tanks and New Pump/Blower Building	$1,314,300	$788,580	
Yard Piping	$1,221,205	$732,723	
Grading, Pavement and Site Work	$430,000	$258,000	
		Total 20-Year Salvage Value	**$4,233,565**

Harrodsburg Facilities Plan
WWTP Alternative 3A
Present Worth Cost

Basis of Present Worth Cost: A Discount Rate of 6.0% is used. Phase 1 is completed in Year 2, Phase 2 is completed in Year 6. Equipment installed in Phase 1 is replaced in Year 15. Phase 3 is completed in Year 12.

Present Worth of Capital Costs and O&M Costs:

Year	Capital Costs	O and M Costs	Total	PW Rate	Present Worth Cost
0		$448,000	$448,000	1.000	$448,000
1	$3,723,000	$448,000	$4,171,000	0.943	$3,933,253
2		$470,000	$470,000	0.890	$418,300
3		$470,000	$470,000	0.840	$394,800
4		$470,000	$470,000	0.792	$372,240
5	$21,342,453	$556,205	$21,898,658	0.747	$16,358,297
6		$556,205	$556,205	0.705	$392,125
7		$556,205	$556,205	0.665	$369,876
8		$556,205	$556,205	0.627	$348,741
9		$556,205	$556,205	0.592	$329,273
10		$556,205	$556,205	0.558	$310,362
11		$556,205	$556,205	0.527	$293,120
12	$4,253,516	$577,246	$4,830,762	0.497	$2,400,889
13		$577,246	$577,246	0.469	$270,728
14		$577,246	$577,246	0.442	$255,143
15	$1,505,000	$577,246	$2,082,246	0.417	$868,297
16		$577,246	$577,246	0.394	$227,435
17		$577,246	$577,246	0.371	$214,158
18		$577,246	$577,246	0.350	$202,036
19		$577,246	$577,246	0.331	$191,068
20		$577,246	$577,246	0.312	$180,101

PW of Capital Costs and O&M Costs $28,778,242

Present Worth of 20-Year Salvage Value:

Phase	Salvage Value	PW Rate	Present Worth Cost
1	$724,650	0.312	$226,091
2	$3,949,690	0.312	$1,232,303
3	$1,504,930	0.312	$469,538

PW of Salvage Value $1,927,932

WWTP Alternative 3, Total Present Worth **$26,850,310**

Harrodsburg Facilities Plan
WWTP Alternative 3A, Phase 1

Construction Cost Estimate

The following WWTP projects are either under construction or are in the process of being planned and designed for construction during the 0 to 2 year phase of the Planning Period.

Project	Total Cost
Replace existing Screw Pumps with new pumps of same capacity	$400,000
Replace existing mechanically-cleaned screen with new screen of same capacity, plus screenings press/washer	$260,000
Install new plant influent flow meter and sampler	$50,000
Replace existing digester heat exchanger with new unit, plus associated piping and controls	$300,000
Sludge Processing Building, including Belt Filter Press, polymer system wash water system, conveyor, and other associated equipment	$1,200,000
Install new plant-wide SCADA system	$100,000
New Pavements and Site Work for above improvements	$100,000
Sub-Total	$2,410,000
Contingencies	$390,000
Sub-Total	$2,800,000
Contractor's Bonds, Insurance, OH and Profit	$327,000
Total Estimated Construction Cost	**$3,127,000**
Engineering Design, Bidding and Construction Administration	$226,000
Resident Inspection	$180,000
Legal, Administration, Other Engineering, Interest	$190,000
Total Estimated Project Cost, WWTP Alternative 3A, Phase 1	**$3,723,000**

Harrodsburg Facilities Plan
WWTP Alternative 3A, Phase 1

Annual O&M Cost Estimate

Basis of Annual Costs calculation:

Phase 1 Annual O&M Costs will start in Year 2 and continue until Year 5, when Phase 2 construction will be completed.

Cost Item			**Totals**
Labor Cost			
Salaries and Benefits	$250,000		
		Sub-Total	$250,000
General Cost			
Equipment Maintenance and Repair	$100,000		
Chlorination/Dechlorination Chemicals	$15,000		
Sludge Heating Fuel	$5,000		
Sludge Dewatering Polymer	$1,000		
Vehicle Operation (Fuel, Oil, etc)	$5,000		
Vehicle Maintenance and Repair	$2,000		
Building Maintenance and Repair	$30,000		
Utilities (Gas, Heating,Telephone, etc)	$7,000		
Laboratory Operations	$12,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$5,000		
		Sub-Total	$200,000
Electrical Power Usage	kw-hr/yr		
EQ Basin Pumping (10% of the year)	99,900		
EQ Basin Mixing/Aeration (10% of the year)	46,620		
Influent Pumping	788,400		
Wastewater Screening/Dewatering	730		
Grit Removal/Pumping/Dewatering	2,194		
RBC Operation	198,900		
Primary and Final Clarifiers	2,510		
Primary and Final Sludge Pumps	18,915		
Sludge Thickening and Digestion	30,390		
Belt Filter Press Feed Pump	11,700		
Belt Filter Press Operation	32,850		
Belt Filter Press Wash Water Pump	2,740		
Building Lighting, Ventilation	233,910		
Site Lighting (50% of the day)	43,800		
Miscellaneous Power	16,441		
Total, kw-hr/yr	1,530,000		
Cost, per kw-hr	$0.07		
		Sub-Total	$107,100
Power Demand Charge			$20,000
	Total Annual Operation/Maintenance Cost		**$470,000**

Harrodsburg Facilities Plan
WWTP Alternative 3A, Phase 1

20-Year Salvage Value

Basis of 20-Year SV calculation:

Structures and Buildings have 50-year useful life. SV at Year 20 is 60% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 33% of replacement cost
Electrical, HVAC and Control systems have 15-year useful life.SV at Year 20 is 33% of replacement cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.
Items with 15-year useful life will be replaced in Year 15

Structures/Buildings Cost Item	Initial Cost	20-Year SV	Total SV
Sludge Processing Building	$280,000	$168,000	
Site Work and Pavements	$100,000	$60,000	
			$228,000

Equipment Cost Item	Year to Replace	Cost to Replace	20-Year SV	
Influent Screw Pumps	15	$400,000	$132,000	
Bar Screen	15	$260,000	$85,800	
Flow Meter*	N/A	0	$0	
Digester Heat Exchanger*	N/A	0	$0	
Belt Filter Press System	15	$745,000	$245,850	
SCADA System	15	$100,000	$33,000	
Year 15 Equipment Replacement Cost		**$1,505,000**		
				$496,650

*Replaced with other equipment in Phase 2

Total, 20-Year Salvage Value	**$724,650**

Construction Cost Estimate

Cost Item	Total Cost
Preliminary Treatment Building	$2,627,150
Influent Meter Vault/ Flow Distribution Chamber	$246,450
Oxidation Ditches	$2,712,050
Final Clarifier Influent Distribution Chamber	$96,142
Final Clarifiers	$1,434,775
RAS/WAS Pump Station	$859,765
UV Disinfection System	$636,136
Plant Effluent Parshall Flume	$45,690
Plant Drainage Pump Station	$410,980
Aerated Sludge Holding Tanks and New Pump/Blower Building	$2,300,800
Modifications to Existing Screw Pump/Screening Facility	$100,000
Modifications to Existing Chlorination Building	$125,000
Abandonment/Demolition of Existing Facilities	$215,000
Yard Piping	$1,221,205
Grading, Pavement, Site Work	$430,000
Upgrades to Electrical and Control Systems	$1,385,750
Miscellaneous	$150,000
Sub-Total	$14,996,893
Contingencies at 15%	$2,249,534
Sub-Total	$17,246,426
Contractor's Bonds, Insurance, OH and Profit at 10%	$1,724,643
Total Estimated Construction Cost	**$18,971,069**
Engineering Design, Bidding and Construction Administration	$1,214,148
Resident Inspection	$777,814
Legal, Administration, Other Engineering	$379,421
Total Estimated Project Cost, WWTP Alternative 3A, Phase 2	**$21,342,453**

Preliminary Treatment Building

Approx 3300 SF building housing screening and grit removal equipment, on concrete foundation with CMU walls and standing seam metal roof. Ventilation at 12 air changes/hour, with electric unit heaters and heat recovery system. Covers over channels and foul air exhaust system for odor control. Control room, electrical room, mechanical room are separate from process area. Garage area (lower level) to house grit and screenings dumpsters, with exterior rollup doors for disposal vehicle access.

Cost Item	Unit Cost	Units	Quantity	Total
Foundations				
Earth Excavation	$20	CY	800	$16,000
Concrete Footings & Foundation Walls	$300	CY	400	$120,000
12" Crushed Stone	$25	CY	120	$3,000
Backfill	$3	CY	200	$600
Total, Foundations				**$139,600**
Substructure				

12" Slab-on-Grade	$450	CY	125	$56,250	
24" Concrete Channel Walls	$800	CY	100	$80,000	
8" Floor Slab	$550	CY	125	$68,750	
Total, Substructure					**$205,000**
Exterior Closure					
Exterior 16" Insulated CMU Walls	$60	SF	2,500	$150,000	
Windows	$100	SF	100	$10,000	
Double Doors	$1,500	EA	2	$3,000	
Single Doors	$800	SF	2	$1,600	
Overhead Doors	$40	SF	300	$12,000	
Total, Exterior Closure					**$176,600**
Roofing					
6" Rigid Insulation	$8	SF	3,300	$26,400	
Low Slope Standing Seam Metal Roof	$50	SF	3,300	$165,000	
Total, Roofing					**$191,400**
Interior Construction					
Interior 8" CMU or Concrete Walls	$10	SF	600	$6,000	
Double Doors, Metal	$1,500	EA	0	$0	
Single Doors, Metal	$500	EA	1	$500	
Handrail, Aluminum	$40	LF	50	$2,000	
General Finishes	$10	SF	3,300	$33,000	
Total, Interior Construction					**$41,500**
Process Equipment, Miscellaneous Items					
Mechanical Bar Screen and Press	$320,000	LS	1	$320,000	
Grit Removal Units	$150,000	LS	2	$300,000	
Grit Classifier/Concentrator	$70,000	LS	1	$70,000	
Sluice Gates, 2' x 6', w/elec operators	$10,000	EA	8	$80,000	
Weir Gates, 2' x 6', w/ handwheel operators	$6,000	EA	2	$12,000	
Internal Process Piping, Valves	$15,000	LS	1	$15,000	
Channel Covers	$40	SF	1,500	$60,000	
Relocate Influent Sampler to this Building	$10,000	EA	1	$10,000	
Equipment Installation at 15%				$128,550	
Total, Process Equipment, Misc Items					**$995,550**
Mechanical					
Plumbing Systems	$5.00	SF	0	$0	
HVAC System, w/ Heat Recovery	$150	SF	3,300	$495,000	
Odor Control Ductwork, Fans, Controls	$100	SF	2,000	$200,000	
Gas/Hazardous Alarm System	$25	SF	2,500	$62,500	
Total, Mechanical					**$757,500**
Electrical					

All Electrical	$120,000	LS	1	$120,000	
Total, Electrical					**$120,000**
Total, Preliminary Treatment Building					**$2,627,150**

Influent Meter Vault/Flow Distribution Chamber

Approx 40' x 20' x 17' deep concrete in-ground structure, containing vault for plant influent magnetic flow meter, valves and piping, with access hatch from top slab level and sump in floor. Chambers for dividing flow to each Oxidation Ditch (2 plus 1 in future) using weir gates to control flow rate. Vault is ventilated, not heated. Covers provided over open chambers

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	600	$12,000	
12" Crushed Stone	$25	CY	30	$750	
Backfill	$3	CY	100	$300	
Total, Foundations					**$13,050**
Substructure					
12" Slab-on-Grade	$450	CY	30	$13,500	
18" Concrete Walls	$500	CY	100	$50,000	
8" Elevated Slab	$600	CY	25	$15,000	
Total, Substructure					**$63,500**
Process Equipment, Miscellaneous Items					
Magnetic Flow Meter, 24"	$25,000	LS	1	$25,000	
Plug Valves, w/ HW Operators, 24"	$15,000	EA	3	$45,000	
Piping, Reducers, Elbows and Tees, 24"	$30,000	LS	1	$30,000	
Weir Gates, 4' x 3', w/HW Operators	$6,000	EA	3	$18,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Covers over Distribution Channels	$40	SF	50	$2,000	
Equipment Installation at 15%				$18,900	
Total, Process Equipment, Misc Items					**$144,900**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	
Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	
Total, Mechanical					**$10,000**
Electrical					

All Electrical	$15,000	LS	1	$15,000	
Total, Electrical					**$15,000**
Total, Influent Meter Vault/Flow Distribution Chamber					**$246,450**

Oxidation Ditches

Two oval ditches, each 80' x 170'x 15' deep. Space provided for a future 80'' x 15'-4'' x 15' deep anoxic stage and a 80' x 46' x 15' deep anaerobic stage ahead of each ditch. Aerators are provided at the circular ends of each ditch.. A central vertical dividing wall and circular end walls in each basin are used to circulate the flow

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	12,100	$242,000	
Rock Excavation	$80	CY	0	$0	
12" Crushed Stone	$25	CY	600	$15,000	
Backfill	$3	CY	400	$1,200	
Total, Foundations					**$258,200**
Substructure					
12" Slab-on-Grade	$450	CY	1,007	$453,150	
12" Elevated Concrete Slab	$800	CY	433	$346,400	
24" Dividing Wall	$600	CY	213	$127,800	
18" Concrete Walls	$500	CY	660	$330,000	
12" Concrete Walls	$300	CY	160	$48,000	
Weir Boxes and Steps	$150	CY	200	$30,000	
12" Vertical Concrete Baffle Wall	$300	CY	150	$45,000	
Total, Substructure					**$1,380,350**
Process Equipment, Miscellaneous Items					
Aerators, Mixers	$400,000	EA	2	$800,000	
Control System	$70,000	LS	1	$70,000	
Handrails	$50	LF	400	$20,000	
Equipment Installation at 15%				$133,500	
Total, Process Equipment, Misc Items					**$1,023,500**
Electrical					
All Electrical	$50,000	LS	1	$50,000	
Total, Electrical					**$50,000**
Total, Oxidation Ditches					**$2,712,050**

Final Clarifier Influent Distribution Chamber

Approx 23' x 16' x 16' deep concrete in-ground open structure, containing chamber for discharge of 42" mixed liquor line from VLRs, and three chambers for distribution of mixed liquor to Final Clarifiers (2 plus 1 in future). Weir gates used to control flow to each Final Clarifier. Each chamber is covered with grating. No mechanical or electrical equipment.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	400	$8,000	
Rock Excavation	$80	CY	20	$1,600	
12" Crushed Stone	$25	CY	20	$500	
Backfill	$3	CY	80	$240	
Total, Foundations					**$10,340**
Substructure					
12" Slab-on-Grade	$450	CY	15	$6,750	
18" Concrete Walls	$500	CY	80	$40,000	
12" Concrete Walls	$300	CY	30	$9,000	
Concrete Steps	$150	CY	4	$600	
Total, Substructure					**$56,350**
Process Equipment, Miscellaneous Items					
Weir Gates, 4' x 2'', w/HW Operators	$4,000	EA	3	$12,000	
Handrail	$50	LF	100	$5,000	
Grating over Open Chambers	$35	SF	246	$8,610	
Equipment Installatiuon at 15%				$3,842	
Total, Process Equipment, Misc Items					**$29,452**
Total, Final Clarifier Influent Distribution Chamber					**$96,142**

Final Clarifiers

Two 90 foot I.D. x 14' SWD Center Feed, Peripheral Discharge, Concrete clarifiers, with scum removal and telescopic valves to control RAS withdrawal. Effluent troughs on exterior of peripheral walls, with fiberglass covers. Sandford baffles to control flow distribution in basin.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	9,600	$192,000	
Rock Excavation	$80	CY	30	$2,400	
12" Crushed Stone	$25	CY	500	$12,500	
Backfill	$3	CY	500	$1,500	
Total, Foundations					**$208,400**

Substructure

12" Slab-on-Grade	$450	CY	480	$216,000	
18" Concrete Walls	$500	CY	300	$150,000	
12" Concrete Walls	$300	CY	200	$60,000	
Concrete Steps	$150	CY	10	$1,500	
Total, Substructure					**$427,500**

Process Equipment, Misc Items

Final Clarifier Equipment	$225,000	EA	2	$450,000	
Flow Distribution Baffles	$25,000	EA	2	$50,000	
Effluent Trough Covers	$30,000	EA	2	$60,000	
Scum Collection System	$20,000	EA	2	$40,000	
Handrails	$50	LF	200	$10,000	
Mixed Liquor Piping under slab, 42"	$150	LF	100	$15,000	
RAS Piping under slab, 20"	$75	LF	100	$7,500	
Telescopic Valve for RAS conrtol	$5,000	EA	2	$10,000	
Equipment Installation at 15%				$96,375	
Total, Process Equipment, Misc Items					**$738,875**

Electrical

All Electrical	$60,000	LS	1	$60,000	
Total, Electrical					**$60,000**
Total, Final Clarifiers					**$1,434,775**

RAS/WAS Pump Station

Concrete, in-ground structure, approximately 60' x 45' x 20' deep. Includes 2 small and 2 large RAS submersible pumps in wet well, with piping vault containing piping, RAS and WAS meters, valves, etc. Vault is covered with concrete roof, with access hatch into vault. Vault includes sump pump. Wet well includes level controls for pump operation. WAS is diverted from RAS pump discharge header (no separate RAS pumps provided).

Cost Item	Unit Cost	Units	Quantity	Total
Foundations				
Earth Excavation	$20	CY	1,500	$30,000
Rock Excavation	$80	CY	500	$40,000
12" Crushed Stone	$25	CY	100	$2,500
Backfill	$3	CY	80	$240
Total, Foundations				**$72,740**
Substructure				
12" Slab-on-Grade	$450	CY	100	$45,000
18" Concrete Walls	$500	CY	200	$100,000
8" Elevated Slab	$600	CY	50	$30,000
Total, Substructure				**$145,000**

Process Equipment, Miscellaneous Items

Large RAS Pumps w/ VFDs	$80,000	EA	2	$160,000	
Small RAS Pumps w/ VFDs	$60,000	EA	2	$120,000	
Pump Controls	$20,000	LS	1	$20,000	
Magnetic Flow Meter, 20"	$20,000	EA	1	$20,000	
Magnetic Flow Meter, 8"	$10,000	EA	1	$10,000	
Plug Valves, w/ HW Operators, 20"	$12,000	EA	7	$84,000	
Plug Valves, w/ HW Operators, 8"	$5,000	EA	3	$15,000	
Piping, Reducers, Elbows and Tees, 20"	$40,000	LS	1	$40,000	
Piping, Reducers, Elbows and Tees, 8"	$10,000	LS	1	$10,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Grating over Wet Well	$35	SF	1,100	$38,500	
Equipment Installation at 15%				$78,525	
Total, Process Equipment, Misc Items					**$602,025**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	
Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	
Total, Mechanical					**$10,000**
Electrical					
All Electrical	$30,000	LS	1	$30,000	
Total, Electrical					**$30,000**
Total, RAS/WAS Pump Station					**$859,765**

<u>UV Disinfection System</u>

Two parallel concrete, in-ground channels,each approximately 18' long x 8' wide x 6' deep, each with a 2-module UV disinfection ssystem that can be rotated out of the channel for maintenance. Upstream influent chamber & downstream effluent chamber, each approximately 4' long x 8' wide x 6' deep, include sluice gates to isolate each UV channel. UV system controls and electrical panels are housed in the (former) Chlorination Building garage and storage rooms.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	100	$2,000	
12" Crushed Stone	$25	CY	20	$500	
Backfill	$3	CY	12	$36	
Total, Foundations					**$2,536**
Substructure					
12" Slab-on-Grade	$450	CY	15	$6,750	
12" Concrete Walls	$300	CY	30	$9,000	

8" Elevated Slab	$600	CY	15	$9,000	
Total, Substructure					**$15,750**
Process Equipment, Miscellaneous Items					
UV Disinfection System	$200,000	EA	2	$400,000	
Sluice Gates, 3'W x 5' H, w/ Elec Operators	$10,000	EA	4	$40,000	
Level Control Weirs	$2,500	EA	2	$5,000	
Level Monitoring/Controls	$2,000	EA	2	$4,000	
Covers over Open Channels	$40	SF	250	$10,000	
Equipment Installation at 15%				$68,850	
Total, Process Equipment, Misc Items					**$527,850**
Electrical					
All Electrical	$90,000	LS	1	$90,000	
Total, Electrical					**$90,000**
Total, UV Disinfection System					**$636,136**

Plant Effluent Parshall Flume

Concrete, in-ground channel, with tapered section for 1'-6" Parshall Flume. Radar-type level detection equipment used to measure water level in flume and convert reading to flow rate. Reading used in SCADA to control UV dosage rate.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	30	$600	
12" Crushed Stone	$25	CY	8	$200	
Backfill	$3	CY	5	$15	
Total, Foundations					**$815**
Substructure					
12" Slab-on-Grade	$450	CY	10	$4,500	
12" Concrete Walls	$300	CY	15	$4,500	
Tapered Concrete Walls and Floor	$1,500	LS	1	$1,500	
Total, Substructure					**$9,000**
Process Equipment, Miscellaneous Items					
1'-6" Parshall Flume Insert	$12,500	EA	1	$12,500	
Level Monitoring/Controls	$2,000	EA	1	$2,000	
Covers over Open Channels	$40	SF	200	$8,000	
Equipment Installation at 15%				$3,375	
Total, Process Equipment, Misc Items					**$25,875**
Electrical					

All Electrical	$10,000	LS	1	$10,000	
Total, Electrical					**$10,000**
Total, Plant Effluent Parshall Flume					**$45,690**

Plant Drainage Pump Station

Concrete, in-ground structure, approximately 30' x 25' x 20' deep. Includes 2 small (250 GPM) submersible pumps in wet well, with piping vault containing piping, plant drainage flow meter, valves, etc. Vault is covered with concrete roof, with access hatch into vault. Vault includes sump pump. Wet well includes level controls for pump operation. Discharge is conveyed to secondary influent distribution chamber, downstream of plant influent meter vault.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	1,000	$20,000	
Rock Excavation	$80	CY	200	$16,000	
12" Crushed Stone	$25	CY	80	$2,000	
Backfill	$3	CY	60	$180	
Total, Foundations					**$38,180**
Substructure					
12" Slab-on-Grade	$450	CY	70	$31,500	
18" Concrete Walls	$500	CY	200	$100,000	
8" Elevated Slab	$600	CY	50	$30,000	
Total, Substructure					**$161,500**
Process Equipment, Miscellaneous Items					
Plant Drainage Pumps	$30,000	EA	2	$60,000	
Pump Controls	$20,000	LS	1	$20,000	
Magnetic Flow Meter, 8"	$10,000	EA	1	$10,000	
Plug Valves, w/ HW Operators, 10"	$7,000	EA	2	$14,000	
Plug Valves, w/ HW Operators, 8"	$5,000	EA	3	$15,000	
Piping, Reducers, Elbows and Tees, 10"	$20,000	LS	1	$20,000	
Piping, Reducers, Elbows and Tees, 8"	$10,000	LS	1	$10,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Grating over Wet Well	$35	SF	200	$7,000	
Equipment Installation at 15%				$24,300	
Total, Process Equipment, Misc Items					**$186,300**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	
Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	
Total, Mechanical					**$10,000**
Electrical					

All Electrical	$15,000	LS	1	$15,000	
Total, Electrical					**$15,000**
Total, Plant Drainage Pump Station					**$410,980**

Aerated Sludge Holding Tanks and New Pump/Blower Building

Two 48' Diameter x 30' SWD open top concrete tanks with jet mixing system plus 2-story (1500 SF each) addition to the existing digester building to house sludge recirculation pumps (4) on lower level and blowers (4) on upper level. 16" CMU walls for upper level, concrete walls for lower level. Two sludge transfer pumps to convey stored sludge to BFPs. Recently built boiler building converted to electrical room for sludge holding process.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	3,200	$64,000	
Concrete Footings and Foundation Walls	$300	CY	200	$60,000	
12" Crushed Stone	$25	CY	500	$12,500	
Backfill	$3	CY	400	$1,200	
Total, Foundations					**$137,700**
Substructure					
18" Slab-on-Grade	$600	CY	220	$132,000	
24" Concrete Basin Walls	$800	CY	760	$608,000	
12" Floor Slab-on-grade	$450	CY	60	$27,000	
8" Elevated Floor Slabs (2)	$600	CY	120	$72,000	
Total, Substructure					**$839,000**
External Closure					
Exterior 18" CMU Insulated Walls	$60	SF	3,000	$180,000	
Windows	$100	SF	300	$30,000	
Double Doors	$1,500	EA	2	$3,000	
Single Doors	$800	EA	2	$1,600	
Total, Exterior Closure					**$214,600**
Roofing					
6" Rigid Insulation	$8	SF	1,500	$12,000	
Low Slope Standing Seam Metal Roof	$50	SF	1,500	$75,000	
Total, Roofing					**$87,000**
Interior Construction					
Interior 8" CMU Walls	$10	SF	600	$6,000	
General Finishes	$10	SF	3,000	$30,000	

Total, Interior Construction					**$36,000**
Process Equipment, Miscellaneous Items					
Jet Aeration System and Controls	$30,000	EA	2	$60,000	
Recirculation Pumps w/ VFDs	$20,000	EA	4	$80,000	
Aeration Blowers w/ Silencers, Controls	$50,000	EA	4	$200,000	
BFP Feed Pumps w/ VFDs	$40,000	EA	2	$80,000	
Flow Meters, Valves and Piping	$70,000	LS	1	$70,000	
Tank Level Control System	$20,000	LS	1	$20,000	
Equipment Installation at 15%				$76,500	
Total, Process Equipment, Misc Items					**$586,500**
Mechanical					
HVAC System	$75	SF	3,000	$225,000	
Gas/Hazardous Alarm System	$25	SF	3,000	$75,000	
Total, Mechanical					**$300,000**
Electrical					
All Electrical	$100,000	LS	1	$100,000	
Total, Electrical					**$100,000**
Total, Aerated Sludge Holding Tanks and New Pump/Blower Building					**$2,300,800**

Modifications to Existing Screw Pump/Screening Facility

This includes installing a new 30" pipe to convey plant influent from the screen channel to the Preliminary Treatment Building, followed by abandoning the screening and grit removal facilities. The mechanical screen installed in Phase 1 will be relocated to the Preliminary Treatment Building. The abandoned channels and tanks will be filled and covered.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Equipment Removal, Channel and Basin Closure					
Relocation of Mechanical Screen	$15,000	LS	1	$15,000	
Removal/Disposal of Equipment, Piping	$25,000	LS	1	$25,000	
Draining, Filling of Channels, Basins	$25,000	LS	1	$25,000	
Misc Demolition	$10,000	LS	1	$10,000	
Total, Equipment Removal, etc					**$75,000**
Wet Installation of 30" Pipe Sleeve in Existing Channel Wall					**$25,000**
Total, Modifications to Existing Screw Pump/Screening Facility					**$100,000**

Modifications to Existing Chlorination Building

This building will no longer need to house chlorination equipment once the new UV system is operational. The UV control and electrical equipment will be installed in the storage room and garage of the building, respectively. The chlorination equipment in the existing control room will removed and a new non-potable water pumping system will be located in this room, drawing plant effluent from a new manhole on the discharge side of the new plant effluent

Parshall flume channel. The chlorination equipment in the cylinder room will be removed and this room will become a garage/storage room for this end of the plant site. The plant effluent composite sampler will be located in this building.

Cost Item	Unit Cost	Units	Quantity	Total
Equipment Removal, New Equipment Installation				
Removal/Disposal of Equipment, Piping	$20,000	LS	1	$20,000
Installation of UV Elec and Control Equipmen	$30,000	LS	1	$30,000
Non-Potable Water Pumping System	$50,000	LS	1	$50,000
Sampler, Compresor and Sample Pump	$10,000	LS	1	$10,000
Misc Building Renovation (Painting, etc)	$5,000	LS	1	$5,000
Modifications to Mechanical, Electrical	$10,000	LS	1	$10,000
Total, Modifications to Existing Chlorination Building				**$125,000**

Abandonment/Demolition of Existing Facilities

This includes the primary and final settling tanks, RBC basins, chlorine contact tank, gravity thickener, several open channels, yard piping that is no longer required, etc. Drains will be retained to remove accumulated rain water from these structures.

Cost Item	Unit Cost	Units	Quantity	Total
Abandonment/Demolition of Existing Facilities				
Removal/disposal of Clarifier Equipment	$25,000	EA	2	$50,000
Removal/disposal of RBC Equipment	$70,000	LS	1	$70,000
Removal/disposal of Thickener Equipment	$10,000	LS	1	$10,000
Removal/disposal of Sludge Pumps, Piping	$30,000	LS	1	$30,000
Filling/covering of abandoned channels	$25,000	LS	1	$25,000
Filling/Removal of abandoned yard piping	$10,000	LS	1	$10,000
Misc Demolition	$20,000	LS	1	$20,000
Total, Abandonment/Demolition of Existing Facilities				**$215,000**

Yard Piping

Pipe sizes, lengths and depts of burial are estimated based on preliminary arrangement of new treatment structures and planning level plant hydraulic profile. Unit costs include, pipe, excavation, bedding, and backfill to existing grade.

Cost Item	Unit Cost	Units	Quantity	Total
Yard Piping				
30" Prelim Treat Bldg Influent	$19,200	LS	1	$19,200
30" Prelim Treat Bldg Effluent	$139,220	LS	1	$139,220
24" Secondary Influent	$72,680	LS	1	$72,680
36" Mixed Liquor	$271,100	LS	1	$271,100
42" Mixed Liquor	$128,400	LS	1	$128,400
36" Final Clarifier Influent	$110,100	LS	1	$110,100
30" Final Clarifier Effluent	$78,400	LS	1	$78,400
30" UV Chamber Influent	$153,500	LS	1	$153,500
30" UV Chamber Effluent	$39,400	LS	1	$39,400
20" Final Clarifier RAS	$34,950	LS	1	$34,950
20" RAS FM	$19,100	LS	1	$19,100

8" WAS FM	$38,400	LS	1	$38,400
12" Plant Drainage	$17,475	LS	1	$17,475
8" Plant Drainage FM	$49,280	LS	1	$49,280
Misc Piping	$50,000	LS	1	$50,000

Total, Yard Piping **$1,221,205**

Grading, Pavement, Site Work

This includes regrading of the site as needed for appropriate drainage in the vicinity of new buildings and basins, new roads and pavements (including walkways and driveways), storm water management (retention or detention basins), and other miscellaneous site work. Estimates are very preliminary and require confirmation during final design

Cost Item	Unit Cost	Units	Quantity	Total
Grading, Pavement and Site Work				
Regrading (earthwork only)	$100,000	LS	1	$100,000
New Roads (asphalt)	$50,000	LS	1	$50,000
Resurfacing of Existing Roads (asphalt)	$75,000	LS	1	$75,000
Walkways, Driveways (concrete)	$50,000	LS	1	$50,000
Stormwater Management	$100,000	LS	1	$100,000
Landscaping, Signage	$30,000	LS	1	$30,000
Misc Site Work	$25,000	LS	1	$25,000

Total, Grading, Pavement, Site Work **$430,000**

Upgrades of Electrical and Control Systems

This includes a new stand-by emergency generator (assumed at 1500 KW, 480 volt), with automatic transfer switch, replacement of the existing Main Power Center with a new MPC, a new MCC for secondary treatment, upgrades of control and power distribution systems, a new SCADA system, and other miscellaneous modifications and additions. MCCs for the Preliminary Treatment, UV Disinfection and Sludge Aeration/Storage facilities are included in the cost estimates for those facilities.

Cost Item	Unit Cost	Units	Quantity	Total
Upgrades of Electrical and Control Systems-				
Emergency Generator	$500,000	LS	1	$500,000
Automatic Transfer Switch	$50,000	LS	1	$50,000
New MPC	$100,000	LS	1	$100,000
MCC for Secondary Treatment	$75,000	LS	1	$75,000
Upgrades of Control Circuits	$150,000	LS	1	$150,000
Upgrades of Power Distribution System	$75,000	LS	1	$75,000
Additional SCADA Upgrades	$120,000	LS	1	$120,000
MCC Replacement at EQ Pump Station	$60,000	LS	1	$60,000
Upgrade of Plant Lighting/Communication	$50,000	LS	1	$50,000
Other Misc Electrical/Control Work	$25,000	LS	1	$25,000
Equipment Installation at 15%				$180,750

Total, Upgrades of Electrical and Control Systems **$1,385,750**

Annual O and M Costs

Basis of Annual Costs calculation:
Phase 2 Annual O&M Costs will start in Year 5 and continue until Year 20.

Cost Item			Totals
Labor Cost			
Salaries and Benefits	$230,000		
		Sub-Total	$230,000
General Cost			
Equipment Maintenance and Repair	$50,000		
UV System Lamp Cleaning and Replacements	$20,000		
Sludge Dewatering Polymer	$1,000		
Vehicle Operation (Fuel, Oil, etc)	$5,000		
Vehicle Maintenance and Repair	$2,000		
Building Maintenance and Repair	$30,000		
Utilities (Gas, Heating,Telephone, etc)	$7,000		
Laboratory Operations	$12,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$3,000		
		Sub-Total	$148,000
Electrical Power Usage	kw-hr/yr		
EQ Basin Pumping (10% of the year)	99,900		
EQ Basin Mixing/Aeration (10% of the year)	46,620		
Influent Pumping	788,400		
Wastewater Screening/Dewatering	19,710		
Grit Removal/Pumping/Dewatering	26,280		
Preliminary Treatment Bldg Ventilation	117,000		
Anaerobic Stage Mixers	0		
Anoxic Stage Mixers	0		
Aerobic Stage Aeration/Mixing	187,200		
Clarifiers	5,850		
RAS Pump Station	175,500		
Sludge Holding Tank Recirculation Pumps	58,500		
Sludge Holding Tank Aeration Blowers	46,800		
Belt Filter Press Feed Pumps	5,850		
Belt Filter Press Operation	16,425		
Belt Filter Press Wash Water Pumps	1,370		
Non-Potable Water Pumping	3,900		
UV Disinfection	156,000		
Plant Drainage Pump Station	27,375		
Building Lighting, Ventilation	300,000		
Site Lighting (50% of the day)	15,600		
Miscellaneous Power	18,935		
Total, kw-hr/yr	2,117,215		
Cost, per kw-hr	$0.07		
		Sub-Total	$148,205
Power Demand Charge			$30,000
		Total Annual Operation/Maintenance Cost	**$556,205**

20-Year Salvage Value

Basis of 20-Year SV calculation:

Phase 2 construction completed in Year 5. Phase 2 has operated for 15 years by Year 20
Structures, Buildings have 50-year useful life. SV at Year 20 is 60% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 0% of initial cost.
Electrical, HVAC and Control systems have 15-year useful life. SV at Year 20 is 0% of initial cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.
Items with 15-year useful life will be replaced at end of Year 20

Cost Item	Initial Cost	20-Year SV	Total SV
Preliminary Treatment Building	$754,100	$452,460	
Influent Meter Vault/Flow Dist Chamber	$76,550	$45,930	
Oxidation Ditches	$1,638,550	$983,130	
Final Clarifier Distribution Chamber	$66,690	$40,014	
Final Clarifiers	$635,900	$381,540	
RAS/WAS Pump Ststion	$217,740	$130,644	
UV Disinfection System	$18,286	$10,972	
Plant Effluent Parshall Flume	$9,815	$5,889	
Plant Drainage Pump Station	$199,680	$119,808	
Aerated Sludge Holding Tanks and New Pump/Blower Building	$1,314,300	$788,580	
Yard Piping	$1,221,205	$732,723	
Grading, Pavement and Site Work	$430,000	$258,000	
		Total 20-Year Salvage Value	**$3,949,690**

Harrodsburg Facilities Plan
WWTP Alternative 3A, Phase 3

Construction Cost Estimate

Cost Item	Total Cost
Oxidation Ditches (add Anoxic and Anaerobic Stages)	$1,385,675
Modifications to Existing Sludge Digestion Facilities	$974,500
Modifications to Phase 1 Sludge Processing Building	$488,500
Miscellaneous	$50,000
Sub-Total	$2,898,675
Contingencies at 15%	$434,801
Sub-Total	$3,333,476
Contractor's Bonds, Insurance, OH and Profit at 10%	$333,348
Total Estimated Construction Cost	**$3,666,824**
Engineering Design, Bidding and Construction Administration at 7	$256,678
Resident Inspection at 3%	$110,005
Legal, Administration, Other Engineering at 6%	$220,009
Total Estimated Project Cost, WWTP Alternative 3A, Phase 3	**$4,253,516**

Oxidation Ditches (add Anoxic and Anaerobic Stages)

Addition of 80' x 15'-4" x 15' deep anaerobic stage and 80' x 46' x 15' deep anoxic stage upstream of each ditch. Mixers provided in each stage to circulate flow through stages. Both stages are covered with concrete.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	5,300	$106,000	
Rock Excavation	$80	CY	0	$0	
12" Crushed Stone	$25	CY	125	$3,125	
Backfill	$3	CY	50	$150	
Total, Foundations					**$109,275**
Substructure					
12" Slab-on-Grade	$450	CY	443	$199,350	
12" Elevated Concrete Slab	$800	CY	176	$140,800	
24" Dividing Wall	$600	CY	94	$56,400	
18" Concrete Walls	$500	CY	140	$70,000	
12" Concrete Walls	$300	CY	127	$38,100	
Total, Substructure					**$504,650**

Harrodsburg Facilities Plan
WWTP Alternative 3A, Phase 3

Process Equipment, Miscellaneous Items

Aerators, Mixers	$300,000	EA	2	$600,000	
Control System	$30,000	LS	1	$30,000	
Handrails	$50	LF	300	$15,000	
Equipment Installation at 15%				$96,750	
Total, Process Equipment, Misc Items					**$741,750**

Electrical

All Electrical	$30,000	LS	1	$30,000	
Total, Electrical					**$30,000**
Total, Oxidation Ditches					**$1,385,675**

<u>Modifications to Existing Sludge Digestion Facilities</u>

After the new aerated sludge holding tanks are put into service, the existing primary and secondary digesters and gravity thickener will be taken out of service. The digesters will be converted to aerated sludge holding tanks 3 and using the same jet aeration system as for Tanks 1 and 2. All existing equipment in the digester control building will be removed, as will the digester covers. The digester tanks will be drained, refurbished and retrofitted with the new jet aeration system. New sludge recirculation pumps (4) will be installed in the lower level of the building and new aeration blowers (4) will be installed in the upper level. The BFP feed pumps installed in the new pump/blower building will transfer stored sludge to the Sludge Processing Building via existing piping. The thickener will be abandoned with provisions to drain it of rain water as needed.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Equipment Removal, Tank Draining and Refurbishing					
Removal/disposal of sludge pumps	$50,000	LS	1	$50,000	
Removal/disposal of sludge heating	$30,000	LS	1	$30,000	
Removal/disposal of digester covers	$15,000	EA	2	$30,000	
Tank Draining, Cleaning, Refurbishi	$10,000	EA	2	$20,000	
Total, Equipment Removal, etc					**$130,000**
Process Equipment, Miscellaneous Items					
Jet Aeration System and Controls	$30,000	EA	2	$60,000	
Recirculation Pumps w/ VFDs	$20,000	EA	4	$80,000	
Aeration Blowers w/ Silencers, Cont	$50,000	EA	4	$200,000	
Flow Meters, Valves and Piping	$70,000	LS	1	$70,000	
Tank Level Control System	$20,000	LS	1	$20,000	
Equipment Installation at 15%				$64,500	
Total, Process Equipment, Misc Items					**$494,500**

Harrodsburg Facilities Plan
WWTP Alternative 3A, Phase 3

Mechanical					
HVAC System	$75	SF	2,500	$187,500	
Gas/Hazardous Alarm System	$25	SF	2,500	$62,500	
Total, Mechanical					**$250,000**
Electrical					
All Electrical	$100,000	LS	1	$100,000	
Total, Electrical					**$100,000**
Total, Modifications to Existing Sludge Digestion Facilities					**$974,500**

Modifications to Phase 1 Sludge Processing Building

This building houses a belt filter press and appurtenances (polymer system, wash water system, conveyor, etc). The building was sized for the installation of a second BFP at a later date. The modifications in this Phase include the installation of the second BFP and appurtenances

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Process Equipment, Miscellaneous Items					
1-meter Belt Filter Press	$350,000	LS	1	$350,000	
Wash water pumps	$10,000	LS	1	$10,000	
Piping, Valves	$15,000	LS	1	$15,000	
Polymer system	$5,000	LS	1	$5,000	
Conveyor Addition	$10,000	LS	1	$10,000	
Equipment Installation at 15%				$58,500	
Total, Process Equipment, Misc Items					**$448,500**
New Electrical					
All Electrical	$40,000	LS	1	$40,000	
Total, Electrical					**$40,000**
Total, Modifications to Phase 1 Sludge Processing Building					**$488,500**

Harrodsburg Facilities Plan
WWTP Alternative 3A, Phase 3

Basis of Annual Costs calculation:

Phase 3 Annual O&M Costs will start in Year 12 and continue until Year 20.

Cost Item			Totals
Labor Cost			
Salaries and Benefits	$230,000		
		Sub-Total	$230,000
General Cost			
Equipment Maintenance and Repair	$50,000		
UV System Lamp Cleaning and Replac	$20,000		
Sludge Dewatering Polymer	$1,000		
Vehicle Operation (Fuel, Oil, etc)	$5,000		
Vehicle Maintenance and Repair	$2,000		
Building Maintenance and Repair	$30,000		
Utilities (Gas, Heating,Telephone, etc)	$7,000		
Laboratory Operations	$12,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$3,000		
		Sub-Total	$148,000
Electrical Power Usage	kw-hr/yr		
EQ Basin Pumping (10% of the year)	99,900		
EQ Basin Mixing/Aeration (10% of the y	46,620		
Influent Pumping	788,400		
Wastewater Screening/Dewatering	19,710		
Grit Removal/Pumping/Dewatering	26,280		
Preliminary Treatment Bldg Ventilation	117,000		
Anaerobic Stage Mixers	14,040		
Anoxic Stage Mixers	157,600		
Aerobic Stage Aeration/Mixing	187,200		
Clarifiers	5,850		
RAS Pump Station	175,500		
Sludge Holding Tank Recirculation Pum	117,000		
Sludge Holding Tank Aeration Blowers	93,600		
Belt Filter Press Feed Pumps	11,700		
Belt Filter Press Operation	32,850		
Belt Filter Press Wash Water Pumps	2,740		
Non-Potable Water Pumping	3,900		
UV Disinfection	156,000		
Plant Drainage Pump Station	27,375		
Building Lighting, Ventilation	300,000		
Site Lighting (50% of the day)	15,600		
Miscellaneous Power	18,935		
Total, kw-hr/yr	2,417,800		
Cost, per kw-hr	$0.07		
		Sub-Total	$169,246

Harrodsburg Facilities Plan
WWTP Alternative 3A, Phase 3

Power Demand Charge	$30,000
Total Annual Operation/Maintenance Cost	**$577,246**

20-Year Salvage Value

Basis of 20-Year SV calculation:

Phase 3 construction completed in Year 12. Phase 3 has operated for 8 years by Year 20
Structures, Buildings have 50-year useful life. SV at Year 20 is 84% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 47% of initial cost.
Electrical, HVAC and Control systems have 15-year useful life. SV at Year 20 is 47% of initial cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.

Cost Item	Initial Cost	20-Year SV	Total SV
Oxidation Ditch Structures	$613,925	$515,697	
Oxidation Ditch Process and Elec Equip	$771,750	$362,723	
Aerated Sludge Tanks Process, Mech and Elec Equip	$844,500	$396,915	
Sludge Proc Bldg Process and Elec Equip	$488,500	$229,595	
Total 20-Year Salvage Value			**$1,504,930**

Harrodsburg Facilities Plan
WWTP Alternative 4
Present Worth Costs

Basis of Present Worth Cost: A Discount Rate of 6.0% is used. Phase 1 is completed in Year 2, Phase 2 is completed in Year 6. Equipment installed in Phase 1 is replaced in Year 15.

Present Worth of Capital Costs and O&M Costs:

Year	Capital Costs	O and M Costs	Total	PW Rate	Present Worth Cost
0		$448,000	$448,000	1.000	$448,000
1	$3,723,000	$448,000	$4,171,000	0.943	$3,933,253
2		$470,000	$470,000	0.890	$418,300
3		$470,000	$470,000	0.840	$394,800
4		$470,000	$470,000	0.792	$372,240
5	$28,894,194	$660,003	$29,554,197	0.747	$22,076,985
6		$660,003	$660,003	0.705	$465,302
7		$660,003	$660,003	0.665	$438,902
8		$660,003	$660,003	0.627	$413,822
9		$660,003	$660,003	0.592	$390,722
10		$660,003	$660,003	0.558	$368,282
11		$660,003	$660,003	0.527	$347,821
12		$660,003	$660,003	0.497	$328,021
13		$660,003	$660,003	0.469	$309,541
14		$660,003	$660,003	0.442	$291,721
15	$1,505,000	$660,003	$2,165,003	0.417	$902,806
16		$660,003	$660,003	0.394	$260,041
17		$660,003	$660,003	0.371	$244,861
18		$660,003	$660,003	0.350	$231,001
19		$660,003	$660,003	0.331	$218,461
20		$660,003	$660,003	0.312	$205,921

PW of Capital Costs and O&M Costs $33,060,804

Present Worth of Year 20 Salvage Value:

Phase	Salvage Value	PW Rate	Present Worth Cost
1	$724,650	0.312	$226,091
2	$4,372,960	0.312	$1,364,363

PW of Salvage Value $1,590,454

WWTP Alternative 4, Total Present Worth **$31,470,350**

The following WWTP projects are either under construction or are in the process of being planned and designed for construction during the 0 to 2 year phase of the Planning Period.

Project	Total Cost
Replace existing Screw Pumps with new pumps of same capacity	$400,000
Replace existing mechanically-cleaned screen with new screen of same capacity, plus screenings press/washer	$260,000
Install new plant Influent flow meter and sampler	$50,000
Replace existing digester heat exchanger with new unit, plus associated piping and controls	$300,000
Sludge Processing Building, including Belt Filter Press, polymer system wash water system, conveyor, and other associated equipment	$1,200,000
Install new plant-wide SCADA system	$100,000
New Pavements and Site Work for above improvements	$100,000
Sub-Total	$2,410,000
Contingencies	$390,000
Sub-Total	$2,800,000
Contractor's Bonds, Insurance, OH and Profit	$327,000
Total Estimated Construction Cost	**$3,127,000**
Engineering Design, Bidding and Construction Administration	$226,000
Resident Inspection	$180,000
Legal, Administration, Other Engineering, Interest	$190,000
Total Estimated Project Cost, WWTP Alternative 4, Phase 1	**$3,723,000**

Annual O&M Cost Estimate

Basis of Annual Costs calculation:

Phase 1 Annual O&M Costs will start in Year 2 and continue until Year 5, when Phase 2 construction will be completed.

Cost Item			Totals
Labor Cost			
Salaries and Benefits	$250,000		
		Sub-Total	$250,000
General Cost			
Equipment Maintenance and Repair	$100,000		
Chlorination/Dechlorination Chemicals	$15,000		
Sludge Heating Fuel	$5,000		
Sludge Dewatering Polymer	$1,000		
Vehicle Operation (Fuel, Oil, etc)	$5,000		
Vehicle Maintenance and Repair	$2,000		
Building Maintenance and Repair	$30,000		
Utilities (Gas, Heating,Telephone, etc)	$7,000		
Laboratory Operations	$12,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$5,000		
		Sub-Total	$200,000
Electrical Power Usage	kw-hr/yr		
EQ Basin Pumping (10% of the year)	99,900		
EQ Basin Mixing/Aeration (10% of the year)	46,620		
Influent Pumping	788,400		
Wastewater Screening/Dewatering	730		
Grit Removal/Pumping/Dewatering	2,194		
RBC Operation	198,900		
Primary and Final Clarifiers	2,510		
Primary and Final Sludge Pumps	18,915		
Sludge Thickening and Digestion	30,390		
Belt Filter Press Feed Pump	11,700		
Belt Filter Press Operation	32,850		
Belt Filter Press Wash Water Pump	2,740		
Building Lighting, Ventilation	233,910		
Site Lighting (50% of the day)	43,800		
Miscellaneous Power	16,441		
Total, kw-hr/yr	1,530,000		
Cost, per kw-hr	$0.07		
		Sub-Total	$107,100
Power Demand Charge			$20,000
	Total Annual Operation/Maintenance Cost		**$470,000**

20-Year Salvage Value

Basis of 20-Year SV calculation:

Structures and Buildings have 50-year useful life. SV at Year 20 is 60% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 33% of replacement cost
Electrical, HVAC and Control systems have 15-year useful life.SV at Year 20 is 33% of replacement cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.
Items with 15-year useful life will be replaced in Year 15

Structures/Buildings Cost Item	Initial Cost	20-Year SV	Total SV
Sludge Processing Building	$280,000	$168,000	
Site Work and Pavements	$100,000	$60,000	
			$228,000

Equipment Cost Item	Year to Replace	Cost to Replace	20-Year SV	
Influent Screw Pumps	15	$400,000	$132,000	
Bar Screen	15	$260,000	$85,800	
Flow Meter*	N/A	0	$0	
Digester Heat Exchanger*	N/A	0	$0	
Belt Filter Press System	15	$745,000	$245,850	
SCADA System	15	$100,000	$33,000	
Year 15 Equipment Replacement Cost		**$1,505,000**		
				$496,650

*Replaced with other equipment in Phase 2

Total, 20-Year Salvage Value **$724,650**

Construction Cost Estimate

Cost Item	Total Cost
Preliminary Treatment Building	$2,627,150
Influent Meter Vault/ Flow Distribution Chamber	$246,450
Vertical Loop Reactors	$6,592,500
Final Clarifier Influent Distribution Chamber	$96,142
Final Clarifiers	$1,434,775
RAS/WAS Pump Station	$859,765
UV Disinfection System	$645,136
Plant Effluent Parshall Flume	$45,690
Plant Drainage Pump Station	$410,980
Aerated Sludge Holding Tanks and New Pump/Blower Building	$2,254,800
Modifications to Existing Sludge Digestion Facilities	$974,500
Modifications to Phase 1 Sludge Processing Building	$488,500
Modifications to Existing Screw Pump/Screening Facility	$100,000
Modifications to Existing Chlorination Building	$125,000
Abandonment/Demolition of Existing Facilities	$215,000
Yard Piping	$1,221,205
Grading, Pavement, Site Work	$430,000
Upgrades to Electrical and Control Systems	$1,385,750
Miscellaneous	$150,000
Sub-Total	$20,303,343
Contingencies at 15%	$3,045,501
Sub-Total	$23,348,844
Contractor's Bonds, Insurance, OH and Profit at 10%	$2,334,884
Total Estimated Construction Cost	**$25,683,728**
Engineering Design, Bidding and Construction Administration	$1,643,759
Resident Inspection	$1,053,033
Legal, Administration, Other Engineering	$513,675
Total Estimated Project Cost, WWTP Alternative 4, Phase 2	**$28,894,194**

Preliminary Treatment Building

Approx 3300 SF building housing screening and grit removal equipment, on concrete foundation with CMU walls and standing seam metal roof. Ventilation at 12 air changes/hour, with electric unit heaters and heat recovery system. Covers over channels and foul air exhaust system for odor control. Control room, electrical room, mechanical room are separate from process area. Garage area (lower level) to house grit and screenings dumpsters, with exterior rollup doors for disposal vehicle access.

Cost Item	Unit Cost	Units	Quantity	Total
Foundations				
Earth Excavation	$20	CY	800	$16,000
Concrete Footings & Foundation Walls	$300	CY	400	$120,000
12" Crushed Stone	$25	CY	120	$3,000
Backfill	$3	CY	200	$600
Total, Foundations				**$139,600**

Substructure					
12" Slab-on-Grade	$450	CY	125	$56,250	
24" Concrete Channel Walls	$800	CY	100	$80,000	
8" Floor Slab	$550	CY	125	$68,750	
Total, Substructure					**$205,000**
Exterior Closure					
Exterior 16" Insulated CMU Walls	$60	SF	2,500	$150,000	
Windows	$100	SF	100	$10,000	
Double Doors	$1,500	EA	2	$3,000	
Single Doors	$800	SF	2	$1,600	
Overhead Doors	$40	SF	300	$12,000	
Total, Exterior Closure					**$176,600**
Roofing					
6" Rigid Insulation	$8	SF	3,300	$26,400	
Low Slope Standing Seam Metal Roof	$50	SF	3,300	$165,000	
Total, Roofing					**$191,400**
Interior Construction					
Interior 8" CMU or Concrete Walls	$10	SF	600	$6,000	
Double Doors, Metal	$1,500	EA	0	$0	
Single Doors, Metal	$500	EA	1	$500	
Handrail, Aluminum	$40	LF	50	$2,000	
General Finishes	$10	SF	3,300	$33,000	
Total, Interior Construction					**$41,500**
Process Equipment, Miscellaneous Items					
Mechanical Bar Screen and Press	$320,000	LS	1	$320,000	
Grit Removal Units	$150,000	LS	2	$300,000	
Grit Classifier/Concentrator	$70,000	LS	1	$70,000	
Sluice Gates, 2' x 6', w/elec operators	$10,000	EA	8	$80,000	
Weir Gates, 2' x 6', w/ handwheel operators	$6,000	EA	2	$12,000	
Internal Process Piping, Valves	$15,000	LS	1	$15,000	
Channel Covers	$40	SF	1,500	$60,000	
Relocate Influent Sampler to this Building	$10,000	EA	1	$10,000	
Equipment Installation at 15%				$128,550	
Total, Process Equipment, Misc Items					**$995,550**
Mechanical					
Plumbing Systems	$5	SF	0	$0	
HVAC System, w/ Heat Recovery	$150	SF	3,300	$495,000	
Odor Control Ductwork, Fans, Controls	$100	SF	2,000	$200,000	
Gas/Hazardous Alarm System	$25	SF	2,500	$62,500	

Total, Mechanical					**$757,500**
Electrical					
All Electrical	$120,000	LS	1	$120,000	
Total, Electrical					**$120,000**
Total, Preliminary Treatment Building					**$2,627,150**

Influent Meter Vault/Flow Distribution Chamber

Approx 40' x 20' x 17' deep concrete in-ground structure, containing vault for plant influent magnetic flow meter, valves and piping, with access hatch from top slab level and sump in floor. Chambers for dividing flow to VLRs (2 plus 1 in future) using weir gates to control flow rate. Vault is ventilated, not heated. Covers provided over open chambers.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	600	$12,000	
12" Crushed Stone	$25	CY	30	$750	
Backfill	$3	CY	100	$300	
Total, Foundations					**$13,050**
Substructure					
12" Slab-on-Grade	$450	CY	30	$13,500	
18" Concrete Walls	$500	CY	100	$50,000	
8" Elevated Slab	$600	CY	25	$15,000	
Total, Substructure					**$63,500**
Process Equipment, Miscellaneous Items					
Magnetic Flow Meter, 24"	$25,000	LS	1	$25,000	
Plug Valves, w/ HW Operators, 24"	$15,000	EA	3	$45,000	
Piping, Reducers, Elbows and Tees, 24"	$30,000	LS	1	$30,000	
Weir Gates, 4' x 3', w/HW Operators	$6,000	EA	3	$18,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Covers over Distribution Channels	$40	SF	50	$2,000	
Equipment Installation at 15%				$18,900	
Total, Process Equipment, Misc Items					**$144,900**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	

Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	
Total, Mechanical					**$10,000**
Electrical					
All Electrical	$15,000	LS	1	$15,000	
Total, Electrical					**$15,000**
Total, Influent Meter Vault/Flow Distribution Chamber					**$246,450**

Vertical Loop Reactors

Two VLRs, each with a 62' x 10'-4" x 17' deep anaerobic stage, a 62' x 25' x 17' deep anoxic stage and a 62' x 122'-4" x 25' deep aerobic stage, with blowers and fine bubble diffisers for aeration of lower section and brush aerators for aeration of upper section. The anaerobic and anoxic stages are concrete covered, the aerobic stage is open to the atmosphere.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	9,445	$188,900	
Rock Excavation	$80	CY	6,020	$481,600	
12" Crushed Stone	$25	CY	740	$18,500	
Backfill	$3	CY	500	$1,500	
Total, Foundations					**$690,500**
Substructure					
12" Slab-on-Grade	$450	CY	1,030	$463,500	
12" Elevated Concrete Slab	$800	CY	230	$184,000	
24" Dividing Wall	$600	CY	360	$216,000	
18" Concrete Walls	$500	CY	823	$411,500	
12" Concrete Walls	$300	CY	215	$64,500	
Effluent Boxes and Steps	$150	CY	200	$30,000	
12" Horizontal Concrete Baffle Wall	$500	CY	550	$275,000	
Total, Substructure					**$1,644,500**
Process Equipment, Miscellaneous Items					
Aeration System (Mixers, Diffusers, Aerators)	$1,600,000	EA	2	$3,200,000	
Blowers	$50,000	EA	4	$200,000	
Control System	$150,000	LS	1	$150,000	
Handrail	$50	LF	2,000	$100,000	
Equipment Installation at 15%				$547,500	
Total, Process Equipment, Misc Items					**$4,197,500**
Electrical					
All Electrical	$60,000	LS	1	$60,000	
Total, Electrical					**$60,000**

Total, Vertical Loop Reactors **$6,592,500**

Final Clarifier Influent Distribution Chamber

Approx 23' x 16' x 16' deep concrete in-ground structure, containing chamber for discharge of 42" mixed liquor line from VLRs, and three chambers for distribution of mixed liquor to Final Clarifiers (2 plus 1 in future). Weir gates used to control flow to each Final Clarifier. Each chamber is covered with grating. No mechanical or electrical equipment.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	400	$8,000	
Rock Excavation	$80	CY	20	$1,600	
12" Crushed Stone	$25	CY	20	$500	
Backfill	$3	CY	80	$240	
Total, Foundations					**$10,340**
Substructure					
12" Slab-on-Grade	$450	CY	15	$6,750	
18" Concrete Walls	$500	CY	80	$40,000	
12" Concrete Walls	$300	CY	30	$9,000	
Concrete Steps	$150	CY	4	$600	
Total, Substructure					**$56,350**
Process Equipment, Miscellaneous Items					
Weir Gates, 4' x 2", w/HW Operators	$4,000	EA	3	$12,000	
Handrail	$50	LF	100	$5,000	
Grating over Open Chambers	$35	SF	246	$8,610	
Equipment Installatiuon at 15%				$3,842	
Total, Process Equipment, Misc Items					**$29,452**

Total, Final Clarifier Influent Distribution Chamber **$96,142**

Final Clarifiers

Two 90 foot I.D. x 14' SWD Center Feed, Peripheral Discharge, Concrete clarifiers, with scum removal and telescopic valves to control RAS withdrawal. Effluent troughs on exterior of peripheral walls, with fiberglass covers. Sandford baffles to control flow distribution in basin.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	9,600	$192,000	
Rock Excavation	$80	CY	30	$2,400	
12" Crushed Stone	$25	CY	500	$12,500	
Backfill	$3	CY	500	$1,500	
Total, Foundations					**$208,400**

Substructure

12" Slab-on-Grade	$450	CY	480	$216,000	
18" Concrete Walls	$500	CY	300	$150,000	
12" Concrete Walls	$300	CY	200	$60,000	
Concrete Steps	$150	CY	10	$1,500	
Total, Substructure					**$427,500**

Process Equipment, Misc Items

Final Clarifier Equipment	$225,000	EA	2	$450,000	
Flow Distribution Baffles	$25,000	EA	2	$50,000	
Effluent Trough Covers	$30,000	EA	2	$60,000	
Scum Collection System	$20,000	EA	2	$40,000	
Handrails	$50	LF	200	$10,000	
Mixed Liquor Piping under slab, 42"	$150	LF	100	$15,000	
RAS Piping under slab, 20"	$75	LF	100	$7,500	
Telescopic Valve for RAS conrtol	$5,000	EA	2	$10,000	
Equipment Installation at 15%				$96,375	
Total, Process Equipment, Misc Items					**$738,875**

Electrical

All Electrical	$60,000	LS	1	$60,000	
Total, Electrical					**$60,000**
Total, Final Clarifiers					**$1,434,775**

RAS/WAS Pump Station

Concrete, in-ground structure, approximately 60' x 45' x 20' deep. Includes 2 small and 2 large RAS submersible pumps in wet well, with piping vault containing piping, RAS and WAS meters, valves, etc. Vault is covered with concrete roof, with access hatch into vault. Vault includes sump pump. Wet well includes level controls for pump operation. WAS is diverted from RAS pump discharge header (no separate RAS pumps provided).

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	1,500	$30,000	
Rock Excavation	$80	CY	500	$40,000	
12" Crushed Stone	$25	CY	100	$2,500	
Backfill	$3	CY	80	$240	
Total, Foundations					**$72,740**
Substructure					
12" Slab-on-Grade	$450	CY	100	$45,000	
18" Concrete Walls	$500	CY	200	$100,000	
8" Elevated Slab	$600	CY	50	$30,000	
Total, Substructure					**$145,000**

Process Equipment, Miscellaneous Items

Large RAS Pumps w/ VFDs	$80,000	EA	2	$160,000	
Small RAS Pumps w/ VFDs	$60,000	EA	2	$120,000	
Pump Controls	$20,000	LS	1	$20,000	
Magnetic Flow Meter, 20"	$20,000	EA	1	$20,000	
Magnetic Flow Meter, 8"	$10,000	EA	1	$10,000	
Plug Valves, w/ HW Operators, 20"	$12,000	EA	7	$84,000	
Plug Valves, w/ HW Operators, 8"	$5,000	EA	3	$15,000	
Piping, Reducers, Elbows and Tees, 20"	$40,000	LS	1	$40,000	
Piping, Reducers, Elbows and Tees, 8"	$10,000	LS	1	$10,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Grating over Wet Well	$35	SF	1,100	$38,500	
Equipment Installation at 15%				$78,525	
Total, Process Equipment, Misc Items					**$602,025**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	
Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	
Total, Mechanical					**$10,000**
Electrical					
All Electrical	$30,000	LS	1	$30,000	
Total, Electrical					**$30,000**
Total, RAS/WAS Pump Station					**$859,765**

UV Disinfection System

Two parallel concrete, in-ground channels,each approximately 18' long x 8' wide x 6' deep, each containing a 2-module UV disinfection ssystem that can be rotated out of the channel for maintenance. Upstream influent chamber and a downstream effluent chamber, each approx 4' long x 8' wide x 6' deep, include sluice gates to isolate each UV channel. UV system controls and electrical panels are housed in the (former) Chlorination Building garage and storage rooms.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	100	$2,000	
12" Crushed Stone	$25	CY	20	$500	
Backfill	$3	CY	12	$36	
Total, Foundations					**$2,536**
Substructure					
12" Slab-on-Grade	$450	CY	15	$6,750	
12" Concrete Walls	$300	CY	30	$9,000	
8" Elevated Slab	$600	CY	15	$9,000	
Total, Substructure					**$24,750**

Process Equipment, Miscellaneous Items

UV Disinfection System	$200,000	EA	2	$400,000	
Sluice Gates, 3'W x 5' H, w/ Elec Operators	$10,000	EA	4	$40,000	
Level Control Weirs	$2,500	EA	2	$5,000	
Level Monitoring/Controls	$2,000	EA	2	$4,000	
Covers over Open Channels	$40	SF	250	$10,000	
Equipment Installation at 15%				$68,850	
Total, Process Equipment, Misc Items					**$527,850**

Electrical

All Electrical	$90,000	LS	1	$90,000	
Total, Electrical					**$90,000**

Total, UV Disinfection System **$645,136**

Plant Effluent Parshall Flume
Concrete, in-ground channel, with tapered section for 1'-6" Parshall Flume.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Foundations					
Earth Excavation	$20	CY	30	$600	
12" Crushed Stone	$25	CY	8	$200	
Backfill	$3	CY	5	$15	
Total, Foundations					**$815**
Substructure					
12" Slab-on-Grade	$450	CY	10	$4,500	
12" Concrete Walls	$300	CY	15	$4,500	
Tapered Concrete Walls and Floor	$1,500	LS	1	$1,500	
Total, Substructure					**$9,000**
Process Equipment, Miscellaneous Items					
1'-6" Parshall Flume Insert	$12,500	EA	1	$12,500	
Level Monitoring/Controls	$2,000	EA	1	$2,000	
Covers over Open Channels	$40	SF	200	$8,000	
Equipment Installation at 15%				$3,375	
Total, Process Equipment, Misc Items					**$25,875**
Electrical					
All Electrical	$10,000	LS	1	$10,000	
Total, Electrical					**$10,000**

Total, Plant Effluent Parshall Flume **$45,690**

Plant Drainage Pump Station

Concrete, in-ground structure, approximately 30' x 25' x 20' deep. Includes 2 small (250 GPM) submersible pumps in wet well, with piping vault containing piping, plant drainage flow meter, valves, etc. Vault is covered with concrete roof, with access hatch into vault. Vault includes sump pump. Wet well includes level controls for pump operation. Discharge is conveyed to secondary influent distribution chamber, downstream of plant influent meter vault.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	1,000	$20,000	
Rock Excavation	$80	CY	200	$16,000	
12" Crushed Stone	$25	CY	80	$2,000	
Backfill	$3	CY	60	$180	
Total, Foundations					**$38,180**
Substructure					
12" Slab-on-Grade	$450	CY	70	$31,500	
18" Concrete Walls	$500	CY	200	$100,000	
8" Elevated Slab	$600	CY	50	$30,000	
Total, Substructure					**$161,500**
Process Equipment, Miscellaneous Items					
Plant Drainage Pumps	$30,000	EA	2	$60,000	
Pump Controls	$20,000	LS	1	$20,000	
Magnetic Flow Meter, 8"	$10,000	EA	1	$10,000	
Plug Valves, w/ HW Operators, 10"	$7,000	EA	2	$14,000	
Plug Valves, w/ HW Operators, 8"	$5,000	EA	3	$15,000	
Piping, Reducers, Elbows and Tees, 10"	$20,000	LS	1	$20,000	
Piping, Reducers, Elbows and Tees, 8"	$10,000	LS	1	$10,000	
Access Hatch, with SS components, steps	$6,000	EA	1	$6,000	
Grating over Wet Well	$35	SF	200	$7,000	
Equipment Installation at 15%				$24,300	
Total, Process Equipment, Misc Items					**$186,300**
Mechanical					
Sump Pump, Controls and Piping	$3,000	LS	1	$3,000	
Exhaust System	$4,500	LS	1	$4,500	
Gas/Hazardous Alarm System	$2,500	LS	1	$2,500	
Total, Mechanical					**$10,000**
Electrical					
All Electrical	$15,000	LS	1	$15,000	
Total, Electrical					**$15,000**

Total, Plant Drainage Pump Station **$410,980**

Aerated Sludge Holding Tanks and New Pump/Blower Building

Two 48' Diameter x 30' SWD open top concrete tanks with jet mixing system plus 2-story (1500 SF each) addition to the existing digester building to house sludge recirculation pumps (4) on lower level and blowers (4) on upper level. 16" CMU walls for upper level, concrete walls for lower level. Two sludge transfer pumps to convey stored sludge to BFPs. Recently built boiler building converted to electrical room for sludge holding process.

Cost Item	Unit Cost	Units	Quantity		Total
Foundations					
Earth Excavation	$20	CY	3,200	$64,000	
Concrete Footings and Foundation Walls	$300	CY	200	$60,000	
12" Crushed Stone	$25	CY	500	$12,500	
Backfill	$3	CY	400	$1,200	
Total, Foundations					**$137,700**
Substructure					
18" Slab-on-Grade	$600	CY	220	$132,000	
24" Concrete Basin Walls	$800	CY	760	$608,000	
12" Floor Slab-on-grade	$450	CY	60	$27,000	
8" Elevated Floor Slabs (2)	$600	CY	120	$72,000	
Total, Substructure					**$839,000**
External Closure					
Exterior 18" CMU Insulated Walls	$60	SF	3,000	$180,000	
Windows	$100	SF	300	$30,000	
Double Doors	$1,500	EA	2	$3,000	
Single Doors	$800	EA	2	$1,600	
Total, Exterior Closure					**$214,600**
Roofing					
6" Rigid Insulation	$8	SF	1,500	$12,000	
Low Slope Standing Seam Metal Roof	$50	SF	1,500	$75,000	
Total, Roofing					**$87,000**
Interior Construction					
Interior 8" CMU Walls	$10	SF	600	$6,000	
General Finishes	$10	SF	3,000	$30,000	
Total, Interior Construction					**$36,000**
Process Equipment, Miscellaneous Items					
Jet Aeration System and Controls	$30,000	EA	2	$60,000	

Recirculation Pumps w/ VFDs	$20,000	EA	4	$80,000	
Aeration Blowers w/ Silencers, Controls	$50,000	EA	4	$200,000	
BFP Feed Pumps w/ VFDs	$40,000	EA	1	$40,000	
Flow Meters, Valves and Piping	$70,000	LS	1	$70,000	
Tank Level Control System	$20,000	LS	1	$20,000	
Equipment Installation at 15%				$70,500	
Total, Process Equipment, Misc Items					**$540,500**
Mechanical					
HVAC System	$75	SF	3,000	$225,000	
Gas/Hazardous Alarm System	$25	SF	3,000	$75,000	
Total, Mechanical					**$300,000**
Electrical					
All Electrical	$100,000	LS	1	$100,000	
Total, Electrical					**$100,000**
Total, Aerated Sludge Holding Tanks and New Pump/Blower Building					**$2,254,800**

Modifications to Existing Sludge Digestion Facilities

After the new aerated sludge holding tanks are put into service, the existing primary and secondary digesters and gravity thickener will be taken out of service. The digesters will be converted to aerated slufge holding tanks 3 and 4 using the same jet aeration system as for Tanks 1 and 2. All existing equipment in the digester control building will be removed, as will the digester covers. The digester tanks will be drained, refurbished and retrofitted with the new jet aeration system. New sludge recirculation pumps (4) will be installed in the lower level of the building and new aeration blowers (4) will be installed in the upper level. The BFP feed pumps installed in the new pump/blower building will transfer stored sludge to the Sludge Processing Building via existing piping. The thickener will be abandoned, with provisions to drain it of rain water as needed.

Cost Item	**Unit Cost**	**Units**	**Quantity**		**Total**
Equipment Removal, Tank Draining and Refurbishing					
Removal/disposal of sludge pumps and piping	$50,000	LS	1	$50,000	
Removal/disposal of sludge heating system	$30,000	LS	1	$30,000	
Removal/disposal of digester covers	$15,000	EA	2	$30,000	
Tank Draining, Cleaning, Refurbishing	$10,000	EA	2	$20,000	
Total, Equipment Removal, etc					**$130,000**
Process Equipment, Miscellaneous Items					
Jet Aeration System and Controls	$30,000	EA	2	$60,000	
Recirculation Pumps w/ VFDs	$20,000	EA	4	$80,000	
Aeration Blowers w/ Silencers, Controls	$50,000	EA	4	$200,000	
Flow Meters, Valves and Piping	$70,000	LS	1	$70,000	
Tank Level Control System	$20,000	LS	1	$20,000	
Equipment Installation at 15%				$64,500	

Total, Process Equipment, Misc Items					**$494,500**
Mechanical					
HVAC System	$75	SF	2,500	$187,500	
Gas/Hazardous Alarm System	$25	SF	2,500	$62,500	
Total, Mechanical					**$250,000**
Electrical					
All Electrical	$100,000	LS	1	$100,000	
Total, Electrical					**$100,000**
Total, Modifications to Existing Sludge Digestion Facilities					**$974,500**

Modifications to Phase 1 Sludge Processing Building

This building houses a belt filter press and appurtenances (polymer system, wash water system, conveyor, etc). The building was sized for the installation of a second BFP at a later date. The modifications in this Phase include the installation of the second BFP and appurtenances

Cost Item	Unit Cost	Units	Quantity		Total
Process Equipment, Miscellaneous Items					
1-meter Belt Filter Press	$350,000	LS	1	$350,000	
Wash water pumps	$10,000	LS	1	$10,000	
Piping, Valves	$15,000	LS	1	$15,000	
Polymer system	$5,000	LS	1	$5,000	
Conveyor Addition	$10,000	LS	1	$10,000	
Equipment Installation at 15%				$58,500	
Total, Process Equipment, Misc Items					**$448,500**
New Electrical					
All Electrical	$40,000	LS	1	$40,000	
Total, Electrical					**$40,000**
Total, Modifications to Phase 1 Sludge Processing Building					**$488,500**

Modifications to Existing Screw Pump/Screening Facility

This includes installing a new 30" pipe to convey plant influent from the screen channel to the Preliminary Treatment Building, followed by abandoning the screening and grit removal facilities. The mechanical screen installed in Phase 1 will be relocated to the Preliminary Treatment Building. The abandoned channels and tanks will be filled and covered.

Cost Item	Unit Cost	Units	Quantity		Total
Equipment Removal, Channel and Basin Closure					

Relocation of Mechanical Screen	$15,000	LS	1	$15,000	
Removal/Disposal of Equipment, Piping	$25,000	LS	1	$25,000	
Draining, Filling of Channels, Basins	$25,000	LS	1	$25,000	
Misc Demolition	$10,000	LS	1	$10,000	
Total, Equipment Removal, etc					**$75,000**
Wet Installation of 30" Pipe Sleeve in Existing Channel Wall					**$25,000**
Total, Modifications to Existing Screw Pump/Screening Facility					**$100,000**

Modifications to Existing Chlorination Building

This building will no longer need to house chlorination equipment once the new UV system is operational. The UV control and electrical equipment will be installed in the storage room and garage of the building, respectively. The chlorination equipment in the existing control room will removed and a new non-potable water pumping system will be located in this room, drawing plant effluent from a new manhole on the discharge side of the new plant effluent Parshall flume channel. The chlorination equipment in the cylinder room will be removed and this room will become a garage/storage room for this end of the plant site. The plant effluent composite sampler will be located in this building.

Cost Item	Unit Cost	Units	Quantity		Total
Equipment Removal, New Equipment Installation					
Removal/Disposal of Equipment, Piping	$20,000	LS	1	$20,000	
Installation of UV Elec and Control Equipmen	$30,000	LS	1	$30,000	
Non-Potable Water Pumping System	$50,000	LS	1	$50,000	
Sampler, Compresor and Sample Pump	$10,000	LS	1	$10,000	
Misc Building Renovation (Painting, etc)	$5,000	LS	1	$5,000	
Modifications to Mechanical, Electrical	$10,000	LS	1	$10,000	
Total, Modifications to Existing Chlorination Building					**$125,000**

Abandonment/Demolition of Existing Facilities

This includes the primary and final settling tanks, RBC basins, chlorine contact tank, gravity thickener, several open channels, yard piping that is no longer required, etc. Drains will be retained to remove accumulated rain water from these structures.

Cost Item	Unit Cost	Units	Quantity		Total
Abandonment/Demolition of Existing Facilities					
Removal/disposal of Clarifier Equipment	$25,000	EA	2	$50,000	
Removal/disposal of RBC Equipment	$70,000	LS	1	$70,000	
Removal/disposal of Thickener Equipment	$10,000	LS	1	$10,000	
Removal/Disposal of Sludge Pumps, Piping	$30,000	LS	1	$30,000	
Filling/covering of abandoned channels	$25,000	LS	1	$25,000	
Filling/Removal of abandoned yard piping	$10,000	LS	1	$10,000	
Misc Demolition	$20,000	LS	1	$20,000	
Total, Abandonment/Demolition of Existing Facilities					**$215,000**

Yard Piping

Pipe sizes, lengths and depts of burial are estimated based on preliminary arrangement of new treatment structures and planning level plant hydraulics. Unit costs include, pipe, excavation, bedding, and backfill to existing grade.

Cost Item	Unit Cost	Units	Quantity		Total
Yard Piping					
30" Prelim Treat Bldg Influent	$19,200	LS	1	$19,200	
30" Prelim Treat Bldg Effluent	$139,220	LS	1	$139,220	
24" Secondary Influent	$72,680	LS	1	$72,680	
36" Mixed Liquor	$271,100	LS	1	$271,100	
42" Mixed Liquor	$128,400	LS	1	$128,400	
36" Final Clarifier Influent	$110,100	LS	1	$110,100	
30" Final Clarifier Effluent	$78,400	LS	1	$78,400	
30" UV Chamber Influent	$153,500	LS	1	$153,500	
30" UV Chamber Effluent	$39,400	LS	1	$39,400	
20" Final Clarifier RAS	$34,950	LS	1	$34,950	
20" RAS FM	$19,100	LS	1	$19,100	
8" WAS FM	$38,400	LS	1	$38,400	
12" Plant Drainage	$17,475	LS	1	$17,475	
8" Plant Drainage FM	$49,280	LS	1	$49,280	
Misc Piping	$50,000	LS	1	$50,000	
Total, Yard Piping					**$1,221,205**

Grading, Pavement, Site Work

This includes regrading of the site as needed for appropriate drainage in the vicinity of new buildings and basins, new roads and pavements (including walkways and driveways), storm water management (retention or detention basins), and other miscellaneous site work. Estimates are very preliminary and require confirmation during final design

Cost Item	Unit Cost	Units	Quantity		Total
Grading, Pavement and Site Work					
Regrading (earthwork only)	$100,000	LS	1	$100,000	
New Roads (asphalt)	$50,000	LS	1	$50,000	
Resurfacing of Existing Roads (asphalt)	$75,000	LS	1	$75,000	
Walkways, Driveways (concrete)	$50,000	LS	1	$50,000	
Stormwater Management	$100,000	LS	1	$100,000	
Landscaping, Signage	$30,000	LS	1	$30,000	
Misc Site Work	$25,000	LS	1	$25,000	
Total, Yard Piping					**$430,000**

Upgrades of Electrical and Control Systems

This includes a new stand-by emergency generator (assumed at 1500 KW, 480 volt), with automatic transfer switch, replacement of the existing Main Power Center with a new MPC, a new MCC for secondary treatment, upgrades of control and power distribution systems, a new SCADA system, and other miscellaneous modifications and additions. New MCCs for the Preliminary Treatment, UV Disinfection and Sludge Aeration/Storage facilities are included in the cost estimates for those facilities.

Cost Item	Unit Cost	Units	Quantity		Total

Upgrades of Electrical and Control Systems-					
Emergency Generator	$500,000	LS	1	$500,000	
Automatic Transfer Switch	$50,000	LS	1	$50,000	
New MPC	$100,000	LS	1	$100,000	
MCC for Secondary Treatment	$75,000	LS	1	$75,000	
Upgrades of Control Circuits	$150,000	LS	1	$150,000	
Upgrades of Power Distribution System	$75,000	LS	1	$75,000	
Additional SCADA Upgrades	$120,000	LS	1	$120,000	
MCC for EQ Pump Station	$60,000	LS	1	$60,000	
Upgrade of Plant Lighting/Communication	$50,000	LS	1	$50,000	
Other Misc Electrical/Control Work	$25,000	LS	1	$25,000	
Equipment Installation at 15%				$180,750	
Total, Upgrades of Electrical and Control Systems					**$1,385,750**

Basis of Annual Costs calculation:

Phase 2 Annual O&M Costs will start in Year 5 and continue until Year 20.

Cost Item			**Totals**
Labor Cost			
Salaries and Benefits	$230,000		
		Sub-Total	$230,000
General Cost			
Equipment Maintenance and Repair	$50,000		
UV System Lamp Cleaning and Replacements	$20,000		
Sludge Dewatering Polymer	$1,000		
Vehicle Operation (Fuel, Oil, etc)	$5,000		
Vehicle Maintenance and Repair	$2,000		
Building Maintenance and Repair	$30,000		
Utilities (Gas, Heating,Telephone, etc)	$7,000		
Laboratory Operations	$12,000		
Training and Travel	$3,000		
Contract Services	$15,000		
Miscellaneous	$3,000		
		Sub-Total	$148,000
Electrical Power Usage	kw-hr/yr		
EQ Basin Pumping (10% of the year)	99,900		
EQ Basin Mixing/Aeration (10% of the year)	46,620		
Influent Pumping	788,400		
Wastewater Screening/Dewatering	19,710		
Grit Removal/Pumping/Dewatering	26,280		
Preliminary Treatment Bldg Ventilation	117,000		
Anaerobic Stage Mixers	14,040		
Anoxic Stage Mixers	157,600		
Aerobic Stage Aeration/Mixing	1,369,440		
Clarifiers	5,850		
RAS Pump Station	175,500		
Sludge Holding Tank Recirculation Pumps	117,000		
Sludge Holding Tank Aeration Blowers	93,600		
Belt Filter Press Feed Pumps	11,700		
Belt Filter Press Operation	32,850		
Belt Filter Press Wash Water Pumps	2,740		
Non-Potable Water Pumping	3,900		
UV Disinfection	156,000		
Plant Drainage Pump Station	27,375		
Building Lighting, Ventilation	300,000		
Site Lighting (50% of the day)	15,600		
Miscellaneous Power	18,935		
Total, kw-hr/yr	3,600,040		
Cost, per kw-hr	$0.07		
		Sub-Total	$252,003
Power Demand Charge			$30,000
		Total Annual Operation/Maintenance Cost	**$660,003**

20-Year Salvage Value

Basis of 20-Year SV calculation:

Phase 2 construction completed in Year 5. Phase 2 has operated for 15 years by Year 20
Structures, Buildings have 50-year useful life. SV at Year 20 is 60% of initial cost
Process Equipment has 15-year useful life. SV at Year 20 is 0% of initial cost.
Electrical, HVAC and Control systems have 15-year useful life. SV at Year 20 is 0% of initial cost
Contingencies, Engineering, Administration and other costs are not included in SV calculations.
Items with 15-year useful life will be replaced at end of Year 20

Cost Item	Initial Cost	20-Year SV	Total SV
Preliminary Treatment Building	$754,100	$452,460	
Influent Meter Vault/Flow Dist Chamber	$76,550	$45,930	
Vertical Loop Reactors	$2,335,000	$1,401,000	
Final Clarifier Distribution Chamber	$66,690	$40,014	
Final Clarifiers	$635,900	$381,540	
RAS/WAS Pump Ststion	$217,740	$130,644	
UV Disinfection System	$27,286	$16,372	
Plant Effluent Parshall Flume	$9,815	$5,889	
Plant Drainage Pump Station	$199,680	$119,808	
Aerated Sludge Holding Tanks and New Pump/Blower Building	$1,314,300	$788,580	
Yard Piping	$1,221,205	$732,723	
Grading, Pavement and Site Work	$430,000	$258,000	
		Total 20-Year Salvage Value	**$4,372,960**

Appendix 6

APPENDIX 6

SUMMARY OF PUBLIC HEARING

AND

ATTENDANCE ROSTER

Appendix 7

APPENDIX 7

KY DIVISION OF WATER AND CROSS-CUTTER CORRESPONDENCE

801 Corporate Drive
Lexington, KY 40503
Tel 859 / 223-3999
Fax 859 / 223-8917

GRW Engineers, Inc.

Engineering
Architecture
Planning
GIS
Aviation Consultants

Arlington, TX
Cincinnati, OH
Columbus, OH
Indianapolis, IN
Knoxville, TN
Louisville, KY
Nashville, TN

RECEIVED
FEB 07 2013
SWPB

February 5, 2013

Mr. Courtney Seitz
Waste Load Allocation Coordinator
Surface Water Permits Branch
Division of Water
Department for Environmental Protection
200 Fair Oaks Lane
Frankfort, KY 40601

Re: City of Harrodsburg, Mercer County
Wastewater Facilities Plan Update 2013
Effluent Limitations Request
GRW Proj. No. 4100

Dear Mr. Seitz:

GRW is in the process of preparing the subject Facilities Plan Update, which will replace the 2000 Plan Update. The planning period for the new plan is 2012 to 2032. Our analysis has included projections of flow that will occur from residential and commercial/industrial customers within the City's Planning Area as well as from Mercer County Sanitation District customers that will be served by Harrodsburg's wastewater facilities.

We have projected that the Harrodsburg wastewater treatment plant will require expansion to treat the following range of flows:

- Average Daily Flow = 3.2 MGD
- Maximum Daily Flow = 6.8 MGD
- Peak Hourly Flow = 9.8 MGD

Flow equalization will be utilized to store part of the maximum daily and peak hourly influent flows. The plant effluent will continue to be discharged to Town Branch, Segment 12017, Mile Point 0.2. Typical treatment plant influent waste loads projected for 2032 are as follows:

- CBOD load at 175 mg/l for 3.2 MGD = 4,670 pounds/day
- Total Suspended Solids load at 200 mg/l for 3.2 MGD = 5,338 pounds/day
- Ammonia-Nitrogen load at 15 mg/l for 3.2 MGD = 400 pounds/day
- Total Phosphorus load at 5 mg/l for 3.2 MGD = 133 pounds/day

We would appreciate the receipt of permitted effluent limitations for the projected conditions. The plant's current KPDES permit is based on a permitted flow of 2.68 MGD.

Please contact me or Ryan Carr at 859-223-3999 or by email (lgilkerson@grwinc.com rcarr@grwinc.com) if you have any questions on this matter.

Sincerely,

Laura Gilkerson

Laura Gilkerson
Project Manager

Posted on recycled paper

PJ — 4|00

RECEIVED
MAY 2 - 2013
BY:

STEVEN L. BESHEAR
GOVERNOR

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

LEONARD K. PETERS
SECRETARY

April 30, 2013

Laura Gilkerson, Project Manager
GRW Engineers, Incorporated
801 Corporate Drive
Lexington, Kentucky 40503

Re: Waste Load Allocation Request
Harrodsburg Wastewater Facilities Plan Update
KPDES No.: KY0027421
Mercer County, Kentucky

Dear Ms. Gilkerson:

This is in response to your February 5, 2013 letter (attached), requesting a waste load allocation (WLA) for expansion of the subject wastewater treatment plant (WWTP) from 2.68 MGD to 3.2 MGD. Discharge is to remain near mile point (mp) 0.2 of Town Creek, segment 12017. Per your correspondence, the requested WLA information will be utilized in drafting a Regional Wastewater Facilities Plan Update.

Considering the above-mentioned information, applicable effluent limitations are provided below.

Design Capacity = 3.2 MGD / Discharge near mp 0.2 of Town Creek

Parameter	May 1 - October 31	November 1 - April 30
$CBOD_5$	10 mg/l	10 mg/l
Total Suspended Solids	30 mg/l	30 mg/l
Ammonia Nitrogen	2 mg/l	10 mg/l
Dissolved Oxygen	7 mg/l	7 mg/l
Total Phosphorus	Monitor, mg/l	Monitor, mg/l
Total Nitrogen	Monitor, mg/l	Monitor, mg/l
Total Residual Chlorine	0.011 mg/l	0.011 mg/l

Reliability Classification = Grade C

In addition to the above requirements, the monthly average and weekly maximum values of E. coli shall be at or below 130 colonies per 100 milliliters or 240 colonies per 100 milliliters, respectively, the year around. If a form of chlorine is proposed to disinfect the wastewater, then de-chlorination will likely be needed to achieve the chlorine residual effluent limitation. Additional effluent limitations and water quality standards are contained in 401 KAR Chapter 5 and 401 KAR Chapter 10.

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. As such, this letter does not convey any authorization or approval to proceed with the construction or operation of the proposed WWTP. Construction and KPDES permit applications must be submitted to request such authorization or approval. Nor does this letter ensure 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

Courtney Seitz, WLA Coordinator
Wet Weather Section
Surface Water Permits Branch
Division of Water

CS
c: Anshu Singh, Water Infrastructure Branch
Compliance and Technical Assistance
Branch, Frankfort Section
Division of Water Files

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859.223.3999 • www.grwinc.com

May 15, 2013

Mr. Steve Jacobs
U.S. Department of Agriculture
Natural Resources Conservation Service
Murray Service Center
88 Robertson Road S
Murray, KY 42071-4658

RE: Cross- Cutter Correspondence
City of Harrodsburg, Kentucky
Regional Wastewater Facilities Plan
Planning Period 2012-2032
GRW Project 4100-01

Dear Mr. Jacobs:

On behalf of the City of Harrodsburg, we are preparing a Regional Wastewater Facilities Plan pursuant to the regulations of the Kentucky Division of Water, as required by 401 KAR 5:006. The purpose of this Plan is to develop recommendations for a series of projects that will be constructed to improve wastewater collection and treatment in the City's Planning Area for the Planning Period of 2012 to 2032. A map of the wastewater Planning Area is attached (Exhibit 3-1). Exhibit 3-2 illustrates the locations of the existing wastewater collection system and the wastewater treatment plant.

The Plan includes a series of projects that will be built over the next 20 years in phases. Some of these projects will be built within the wastewater collection system (see Exhibit 8-1) and some will be built at the treatment plant site (see Exhibit 8-2). The collection system projects include gravity sewers, pump stations and force mains, constructed in easements or along existing road rights-of-way, or on property that is owned by the City. The work will generally be built on areas that have been previously disturbed by previous construction of other projects. Once more precise routes and locations of these projects have been defined, and if they appear to have a potential environmental impact, we will address the needed mitigation measures with your office during their design.

The treatment plant projects include concrete treatment structures, buildings, buried pipes and similar features that are built on the existing plant site, and the demolition of some existing plant components that are no longer required for treatment. The locations for these proposed projects are on portions of the plant site that have been disturbed by previous construction during earlier plant expansions and modifications. The discharge of treated wastewater will remain at its existing location, which is on Town Creek at mile point 0.2 to Salt River at mile point 128.7. The average daily discharge rate is projected to increase from its current flow rate of approximately 2.1 MGD (million gallons per day) to 3.2 MGD by 2032.

We would appreciate your advice of any concerns your office may have related to possible adverse effects of these projects as soon as possible. We need to incorporate your response in the Regional

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Facilities Plan, and also address your concerns regarding any potential adverse impacts of these projects, before the Plan is submitted to KDOW for approval.

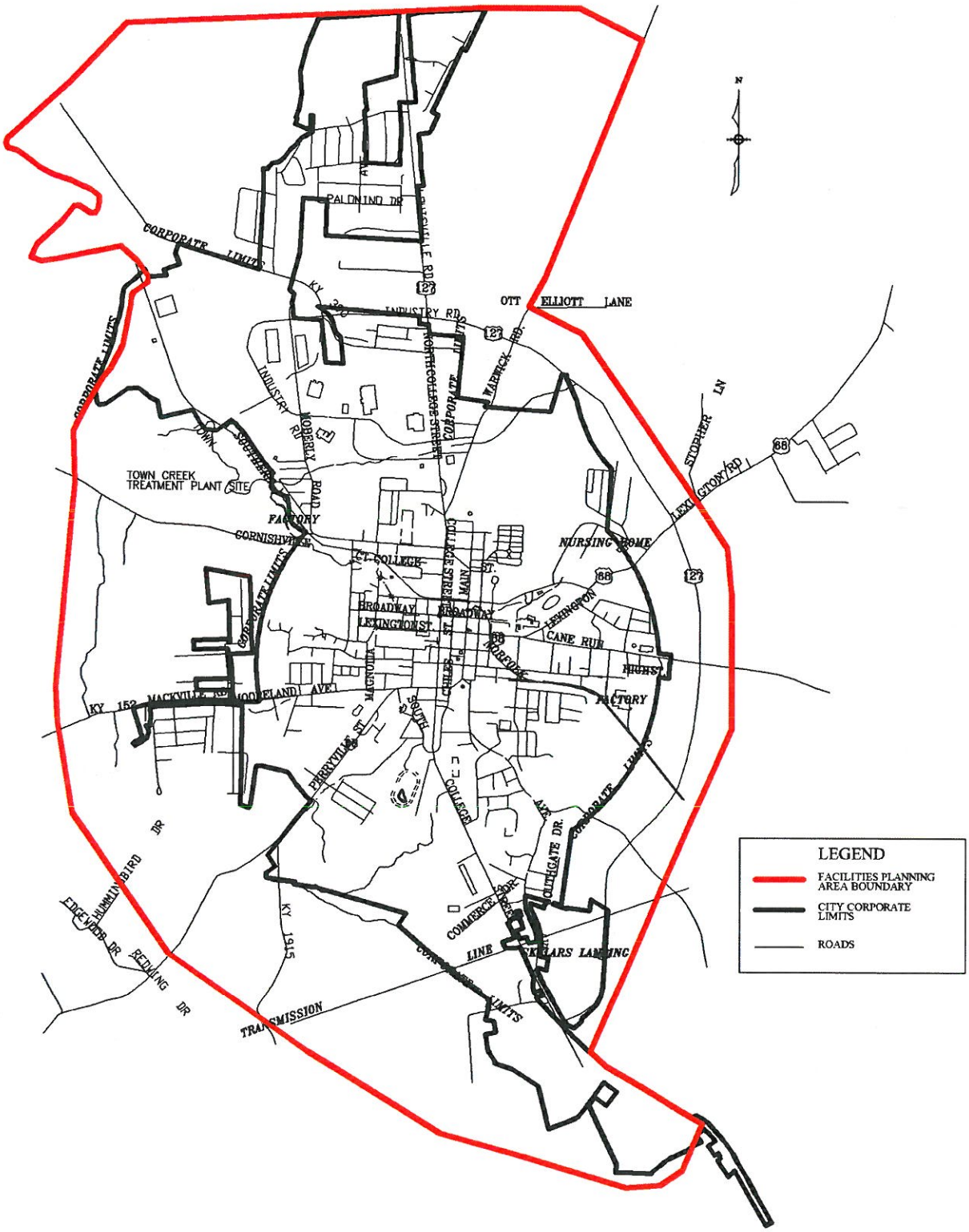
It is anticipated that these projects will be funded by a series of grants and loans, such as the USEPA Community Block Grant Program, the USDA Rural Development Agency Grant and Loan Program, and the Kentucky Infrastructure Agency State Revolving Fund Loan Program.

Please don't hesitate to contact me if you have any questions on this matter. I may be reached at (859) 223-3999 or at lgilkerson@grwinc.com.

Sincerely,

Laura Gilkerson

Laura Gilkerson
Project Manager



LEGEND

- FACILITIES PLANNING AREA BOUNDARY
- CITY CORPORATE LIMITS
- ROADS

0 2000' 4000' 8000'

1" = 4000'

GRW PROJECT NO. 4100	CLIENT PROJECT NO.	DESIGNED:
REVISIONS		DRAWN:
NO. / DESCRIPTION / DATE / BY		REVIEWED:
		APPROVED:
SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED		

EXHIBIT 3-1
HARRODSBURG
WASTEWATER FACILITIES
PLANNING AREA

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DATE: FEBRUARY, 2013
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SHEET NO.

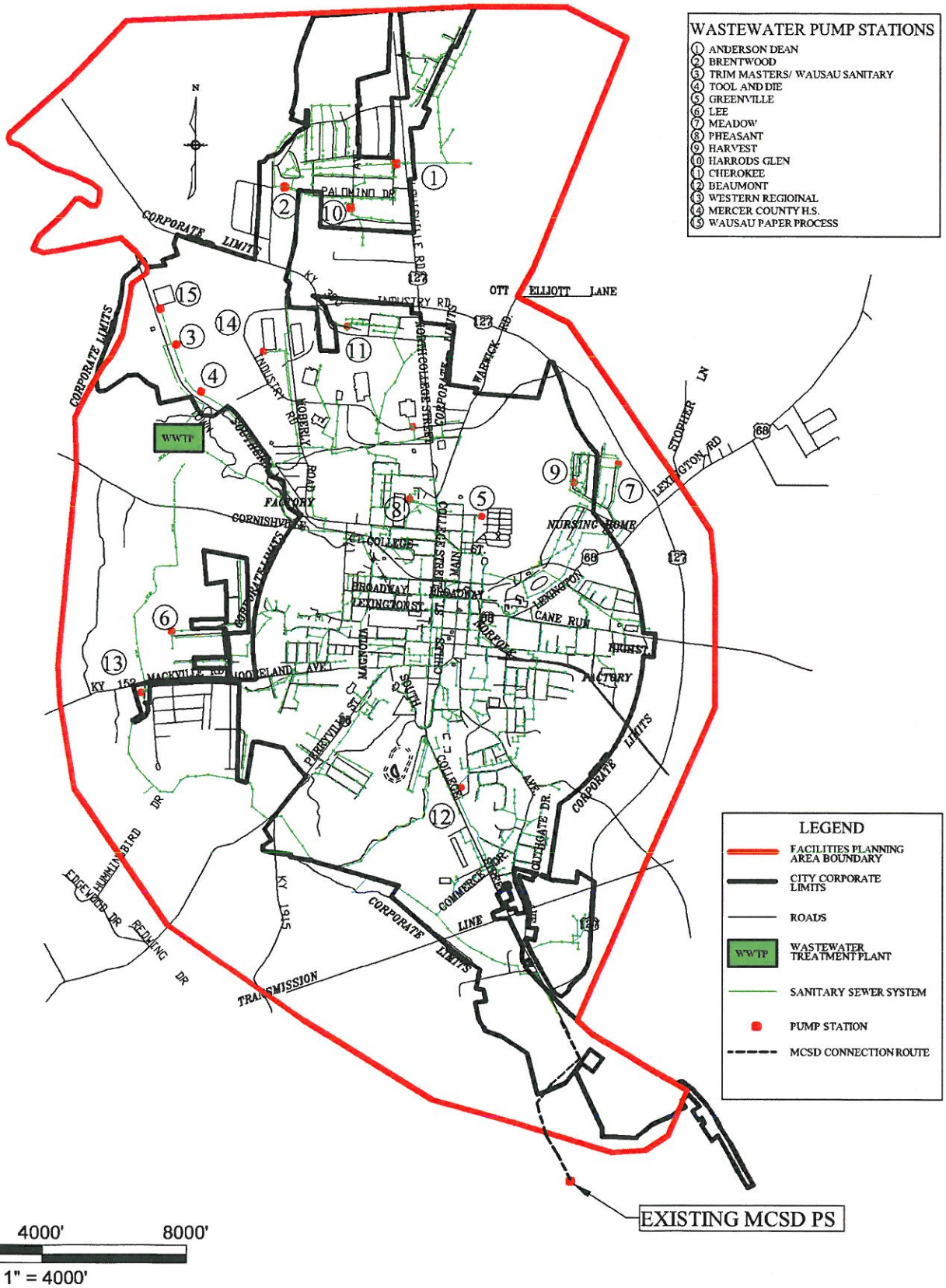

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EXHIBIT 3-2
HARRODSBURG
WASTEWATER COLLECTION
AND TREATMENT FACILITIES

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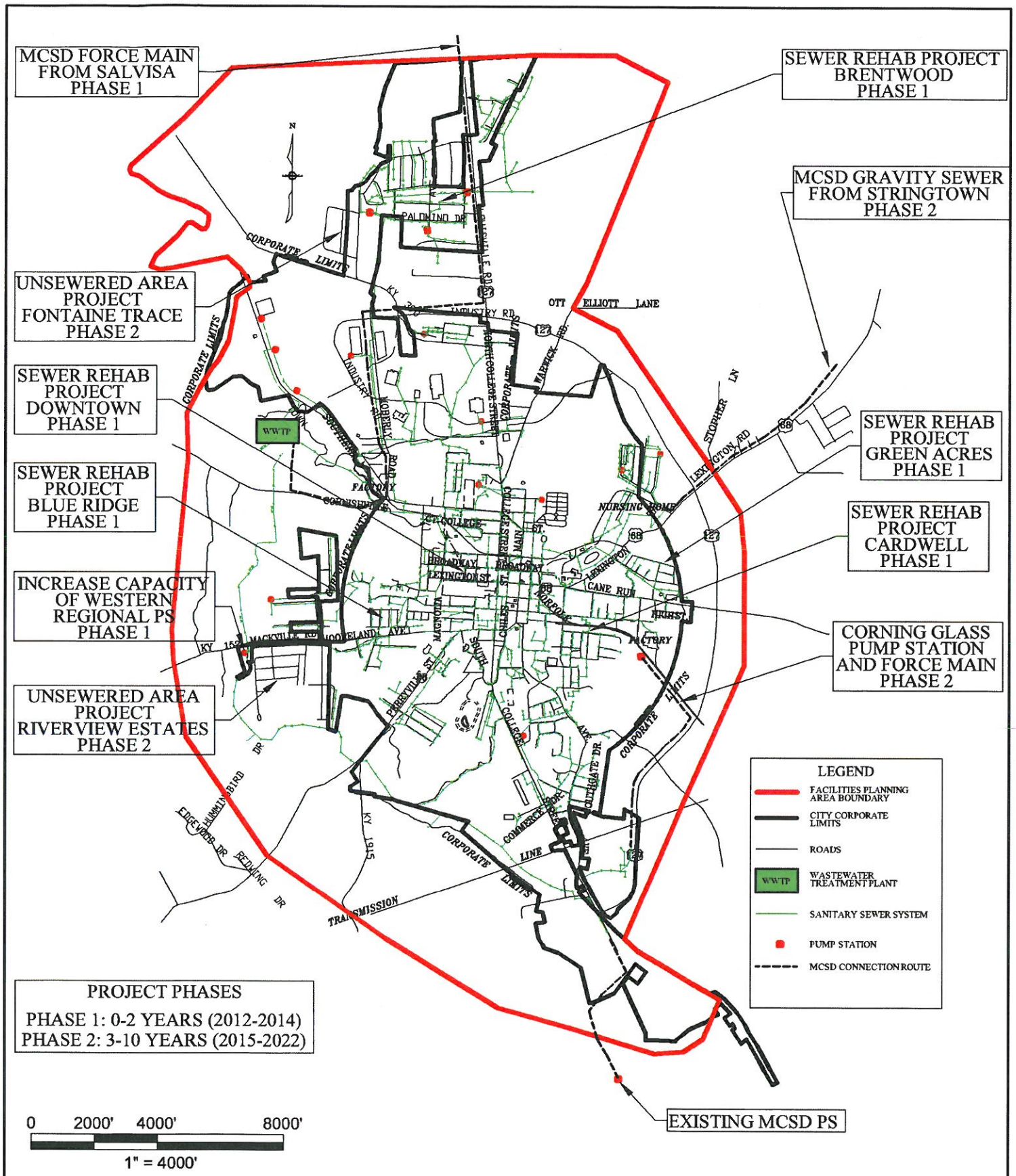
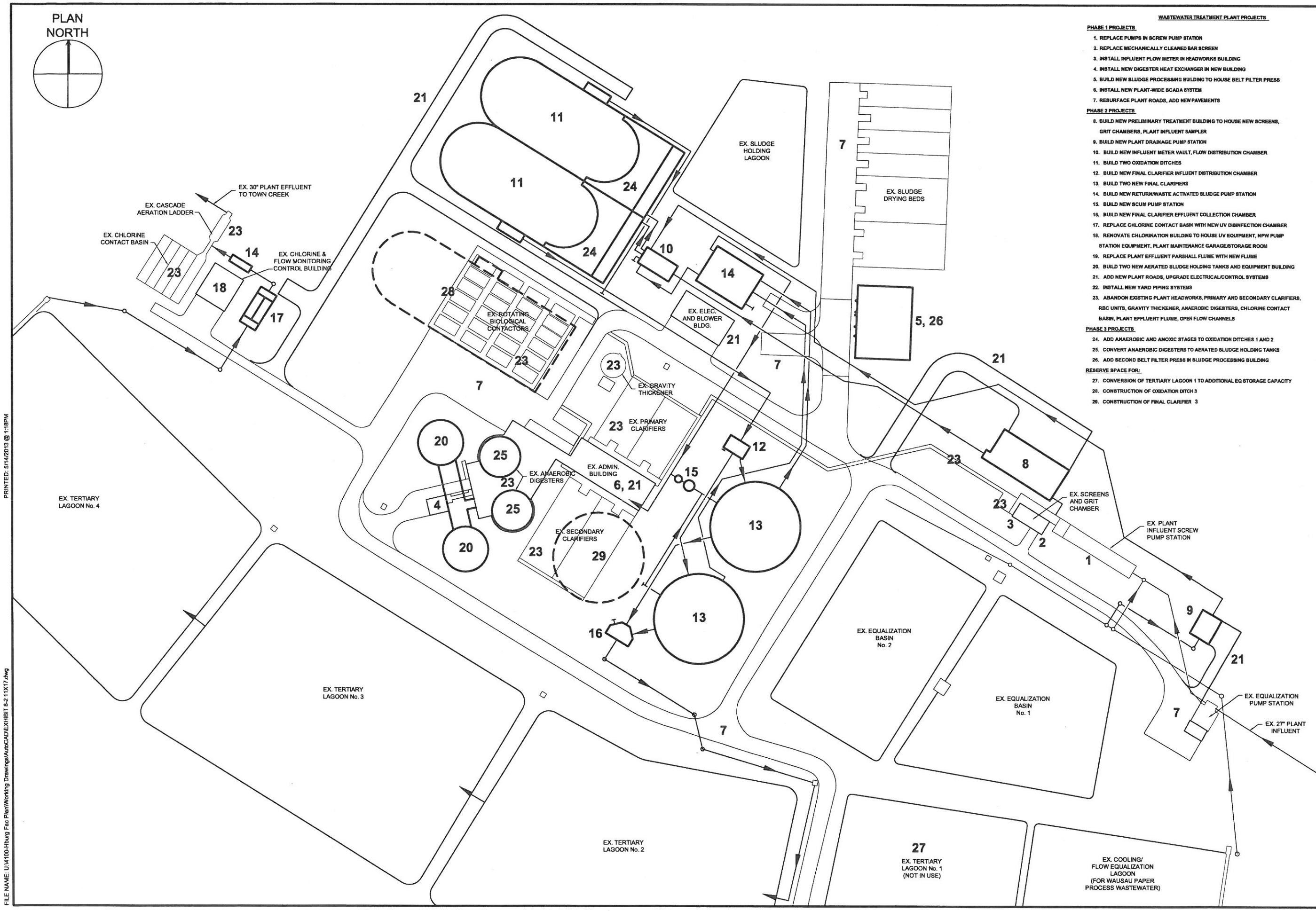


GRW PROJECT NO. 4100	CLIENT PROJECT NO.	DESIGNED:	EXHIBIT 8-1 RECOMMENDED ALTERNATIVE WASTEWATER COLLECTION SYSTEM PROJECTS	GRW ENGINEERS - ARCHITECTS - PLANNERS www.grwinc.com	DATE: FEBRUARY, 2013
REVISIONS		DRAWN:			SCALE:
NO. / DESCRIPTION / DATE / BY		REVIEWED:			SHEET NO.
		APPROVED:			
SCALE CHECK THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED				ALL RIGHTS RESERVED THIS DOCUMENT IS THE PROPERTY OF GRW ENGINEERS, INC. AND SHALL NOT BE REPRODUCED IN WHOLE OR IN PART OR USED FOR CONSTRUCTION OF OTHER THAN THIS SPECIFIC PROJECT WITHOUT WRITTEN PERMISSION	



WASTEWATER TREATMENT PLANT PROJECTS

PHASE 1 PROJECTS

1. REPLACE PUMPS IN SCREW PUMP STATION
2. REPLACE MECHANICALLY CLEANED BAR SCREEN
3. INSTALL INFLUENT FLOW METER IN HEADWORKS BUILDING
4. INSTALL NEW DIGESTER HEAT EXCHANGER IN NEW BUILDING
5. BUILD NEW SLUDGE PROCESSING BUILDING TO HOUSE BELT FILTER PRESS
6. INSTALL NEW PLANT-WIDE SCADA SYSTEM
7. RESURFACE PLANT ROADS, ADD NEW PAVEMENTS

PHASE 2 PROJECTS

8. BUILD NEW PRELIMINARY TREATMENT BUILDING TO HOUSE NEW SCREENS, GRIT CHAMBERS, PLANT INFLUENT SAMPLER
9. BUILD NEW PLANT DRAINAGE PUMP STATION
10. BUILD NEW INFLUENT METER VAULT, FLOW DISTRIBUTION CHAMBER
11. BUILD TWO OXIDATION DITCHES
12. BUILD NEW FINAL CLARIFIER INFLUENT DISTRIBUTION CHAMBER
13. BUILD TWO NEW FINAL CLARIFIERS
14. BUILD NEW RETURN/WASTE ACTIVATED SLUDGE PUMP STATION
15. BUILD NEW SCUM PUMP STATION
16. BUILD NEW FINAL CLARIFIER EFFLUENT COLLECTION CHAMBER
17. REPLACE CHLORINE CONTACT BASIN WITH NEW UV DISINFECTION CHAMBER
18. RENOVATE CHLORINATION BUILDING TO HOUSE UV EQUIPMENT, NPW PUMP STATION EQUIPMENT, PLANT MAINTENANCE GARAGE/STORAGE ROOM
19. REPLACE PLANT EFFLUENT PARSHALL FLUME WITH NEW FLUME
20. BUILD TWO NEW AERATED SLUDGE HOLDING TANKS AND EQUIPMENT BUILDING
21. ADD NEW PLANT ROADS, UPGRADE ELECTRICAL/CONTROL SYSTEMS
22. INSTALL NEW YARD PIPING SYSTEMS
23. ABANDON EXISTING PLANT HEADWORKS, PRIMARY AND SECONDARY CLARIFIERS, RBC UNITS, GRAVITY THICKENER, ANAEROBIC DIGESTERS, CHLORINE CONTACT BASIN, PLANT EFFLUENT FLUME, OPEN FLOW CHANNELS

PHASE 3 PROJECTS

24. ADD ANAEROBIC AND ANOXIC STAGES TO OXIDATION DITCHES 1 AND 2
25. CONVERT ANAEROBIC DIGESTERS TO AERATED SLUDGE HOLDING TANKS
26. ADD SECOND BELT FILTER PRESS IN SLUDGE PROCESSING BUILDING

RESERVE SPACE FOR:

27. CONVERSION OF TERTIARY LAGOON 1 TO ADDITIONAL EQ STORAGE CAPACITY
28. CONSTRUCTION OF OXIDATION DITCH 3
29. CONSTRUCTION OF FINAL CLARIFIER 3

GRW PROJECT NO. 4100

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RECOMMENDED PLAN PHASES 1, 2, AND 3

WASTEWATER TREATMENT PLANT
CITY OF HARRODSBURG, KY

DESIGNED:
DRAWN:
REVIEWED:
APPROVED:

REVISIONS

NO.	DESCRIPTION	DATE	BY

SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED

DATE:

SCALE: 1" = 100'

SHEET NO.

EXHIBIT 8-2

PRINTED: 5/14/2013 @ 1:18PM

FILE NAME: U:\4100-Hburg Fac Plan\Working Drawings\AutoCAD\EXHIBIT 8-2 11X17.dwg

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859.223.3999 • www.grwinc.com

May 15, 2013

Ms. Leanne Devine
U.S. Army Corps of Engineers
Louisville District
P.O. Box 59
Louisville, KY 40201-0059

RE: Cross- Cutter Correspondence
City of Harrodsburg, Kentucky
Regional Wastewater Facilities Plan
Planning Period 2012-2032
GRW Project 4100-01

Dear Ms. Devine:

On behalf of the City of Harrodsburg, we are preparing a Regional Wastewater Facilities Plan pursuant to the regulations of the Kentucky Division of Water, as required by 401 KAR 5:006. The purpose of this Plan is to develop recommendations for a series of projects that will be constructed to improve wastewater collection and treatment in the City's Planning Area for the Planning Period of 2012 to 2032. A map of the wastewater Planning Area is attached (Exhibit 3-1). Exhibit 3-2 illustrates the locations of the existing wastewater collection system and the wastewater treatment plant.

The Plan includes a series of projects that will be built over the next 20 years in phases. Some of these projects will be built within the wastewater collection system (see Exhibit 8-1) and some will be built at the treatment plant site (see Exhibit 8-2). The collection system projects include gravity sewers, pump stations and force mains, constructed in easements or along existing road rights-of-way, or on property that is owned by the City. The work will generally be built on areas that have been previously disturbed by previous construction of other projects. Once more precise routes and locations of these projects have been defined, and if they appear to have a potential environmental impact, we will address the needed mitigation measures with your office during their design.

The treatment plant projects include concrete treatment structures, buildings, buried pipes and similar features that are built on the existing plant site, and the demolition of some existing plant components that are no longer required for treatment. The locations for these proposed projects are on portions of the plant site that have been disturbed by previous construction during earlier plant expansions and modifications. The discharge of treated wastewater will remain at its existing location, which is on Town Creek at mile point 0.2 to Salt River at mile point 128.7. The average daily discharge rate is projected to increase from its current flow rate of approximately 2.1 MGD (million gallons per day) to 3.2 MGD by 2032.

We would appreciate your advice of any concerns your office may have related to possible adverse effects of these projects as soon as possible. We need to incorporate your response in the Regional

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801 Corporate Drive • Lexington, KY 40503
859.223.3999 • www.grwinc.com

Facilities Plan, and also address your concerns regarding any potential adverse impacts of these projects, before the Plan is submitted to KDOW for approval.

It is anticipated that these projects will be funded by a series of grants and loans, such as the USEPA Community Block Grant Program, the USDA Rural Development Agency Grant and Loan Program, and the Kentucky Infrastructure Agency State Revolving Fund Loan Program.

Please don't hesitate to contact me if you have any questions on this matter. I may be reached at (859) 223-3999 or at lgilkerson@grwinc.com.

Sincerely,

Laura Gilkerson

Laura Gilkerson
Project Manager

GRW | engineers | architects | planners
801 Corporate Drive • Lexington, KY 40503
859.223.3999 • www.grwinc.com

May 15, 2013

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

RE: Cross- Cutter Correspondence
City of Harrodsburg, Kentucky
Regional Wastewater Facilities Plan
Planning Period 2012-2032
GRW Project 4100-01

Dear Mr. Andrews:

On behalf of the City of Harrodsburg, we are preparing a Regional Wastewater Facilities Plan pursuant to the regulations of the Kentucky Division of Water, as required by 401 KAR 5:006. The purpose of this Plan is to develop recommendations for a series of projects that will be constructed to improve wastewater collection and treatment in the City's Planning Area for the Planning Period of 2012 to 2032. A map of the wastewater Planning Area is attached (Exhibit 3-1). Exhibit 3-2 illustrates the locations of the existing wastewater collection system and the wastewater treatment plant.

The Plan includes a series of projects that will be built over the next 20 years in phases. Some of these projects will be built within the wastewater collection system (see Exhibit 8-1) and some will be built at the treatment plant site (see Exhibit 8-2). The collection system projects include gravity sewers, pump stations and force mains, constructed in easements or along existing road rights-of-way, or on property that is owned by the City. The work will generally be built on areas that have been previously disturbed by previous construction of other projects. Once more precise routes and locations of these projects have been defined, and if they appear to have a potential environmental impact, we will address the needed mitigation measures with your office during their design.

The treatment plant projects include concrete treatment structures, buildings, buried pipes and similar features that are built on the existing plant site, and the demolition of some existing plant components that are no longer required for treatment. The locations for these proposed projects are on portions of the plant site that have been disturbed by previous construction during earlier plant expansions and modifications. The discharge of treated wastewater will remain at its existing location, which is on Town Creek at mile point 0.2 to Salt River at mile point 128.7. The average daily discharge rate is projected to increase from its current flow rate of approximately 2.1 MGD (million gallons per day) to 3.2 MGD by 2032.

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Sincerely,

Laura Gilkerson

Laura Gilkerson
Project Manager

GRW | engineers | architects | planners
801 Corporate Drive • Lexington, KY 40503
859.223.3999 • www.grwinc.com

May 15, 2013

Mr. Chris Garland
Kentucky Department of Fish and Wildlife
#1 Sportsman Lane
Frankfort, KY 40601

RE: Cross- Cutter Correspondence
City of Harrodsburg, Kentucky
Regional Wastewater Facilities Plan
Planning Period 2012-2032
GRW Project 4100-01

Dear Mr. Garland:

On behalf of the City of Harrodsburg, we are preparing a Regional Wastewater Facilities Plan pursuant to the regulations of the Kentucky Division of Water, as required by 401 KAR 5:006. The purpose of this Plan is to develop recommendations for a series of projects that will be constructed to improve wastewater collection and treatment in the City's Planning Area for the Planning Period of 2012 to 2032. A map of the wastewater Planning Area is attached (Exhibit 3-1). Exhibit 3-2 illustrates the locations of the existing wastewater collection system and the wastewater treatment plant.

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Sincerely,

Laura Gilkerson

Laura Gilkerson
Project Manager

GRW | engineers | architects | planners
801 Corporate Drive • Lexington, KY 40503
859.223.3999 • www.grwinc.com

May 15, 2013

Mr. Mark Dennen
Executive Director and State Historic Preservation Officer
300 Washington Street
Frankfort, KY 40601

RE: Cross- Cutter Correspondence
City of Harrodsburg, Kentucky
Regional Wastewater Facilities Plan
Planning Period 2012-2032
GRW Project 4100-01

Dear Mr. Dennen:

On behalf of the City of Harrodsburg, we are preparing a Regional Wastewater Facilities Plan pursuant to the regulations of the Kentucky Division of Water, as required by 401 KAR 5:006. The purpose of this Plan is to develop recommendations for a series of projects that will be constructed to improve wastewater collection and treatment in the City's Planning Area for the Planning Period of 2012 to 2032. A map of the wastewater Planning Area is attached (Exhibit 3-1). Exhibit 3-2 illustrates the locations of the existing wastewater collection system and the wastewater treatment plant.

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Sincerely,

Laura Gilkerson

Laura Gilkerson
Project Manager

United States Department of Agriculture

NRCS Natural Resources Conservation Service

1925 Old Main Street
Suite 2
Maysville, KY. 41056
Ph: 606-759-5570

To: Laura Gilkerson, Project Manager
GRW
801 Corporate Drive
Lexington, KY 40503

May 29, 2013

RECEIVED
JUN 3 - 2013
BY:

Re: City of Harrodsburg, Kentucky
Cross – Cutter Correspondence
Regional Wastewater Facilities Plan
Planning Period 2012 – 2032
GRW Project 4100 - 01

Ms. Gilkerson,

NRCS does not officially do environmental assessments for these types of projects, but rather provides information on the soils and/or impact to farmland according to the criteria set forth in 1985 National Food Security Act Manual.

According to the information in your letter all proposed areas of construction will take place on existing right-of-ways, on previously disturbed areas, or within the city limits that are already considered as "Prior Converted Lands" and not affecting prime, unique, or statewide important farmlands. As yet, no new areas of construction or additional new right-of-ways have been identified and for which no designation is being made at this time. "This determination does not apply to any lands beyond the boundary of the existing right-of-way, areas not already previously disturbed, or lands outside of urban areas." This office does not have any additional concerns at this time.

If needed, additional information on the soils of Mercer County 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 859-734-6889.

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

cc: Brandon Campbell, NRCS District Conservationist, Harrodsburg, KY

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May 15, 2013

Mr. Steve Jacobs
U.S. Department of Agriculture
Natural Resources Conservation Service
~~Murray Service Center~~
~~88 Robertson Road S~~
~~Murray, KY 42071-4658~~

RE: Cross- Cutter Correspondence
City of Harrodsburg, Kentucky
Regional Wastewater Facilities Plan
Planning Period 2012-2032
GRW Project 4100-01

Dear Mr. Jacobs:

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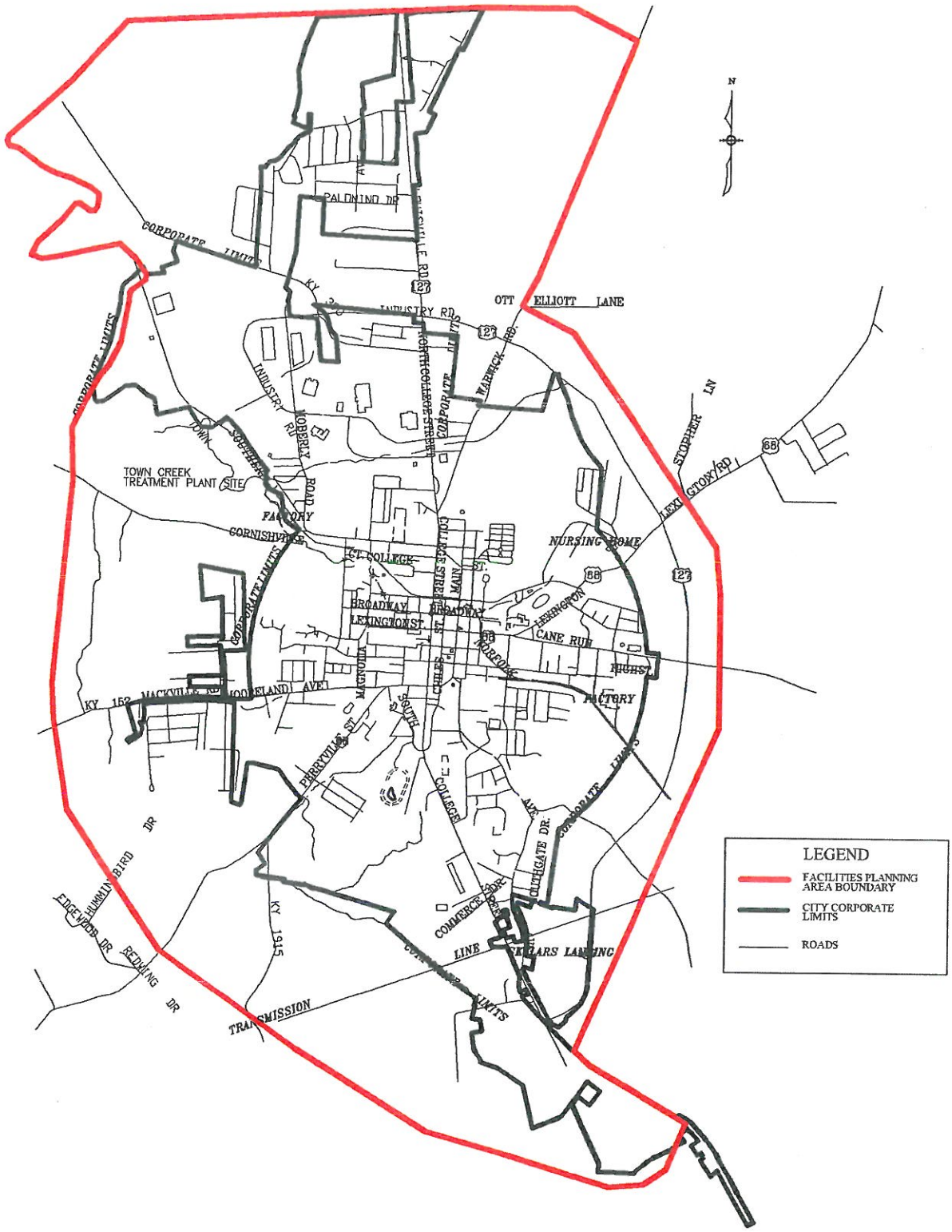
Sincerely,

Laura Gilkerson

Laura Gilkerson
Project Manager



GRW PROJECT NO. 4100	CLIENT PROJECT NO.	DESIGNED:
REVISIONS		DRAWN:
NO. / DESCRIPTION / DATE / BY		REVIEWED:
		APPROVED:
SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED		

EXHIBIT 3-1
HARRODSBURG
WASTEWATER FACILITIES
PLANNING AREA

GRW
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www.grwinc.com

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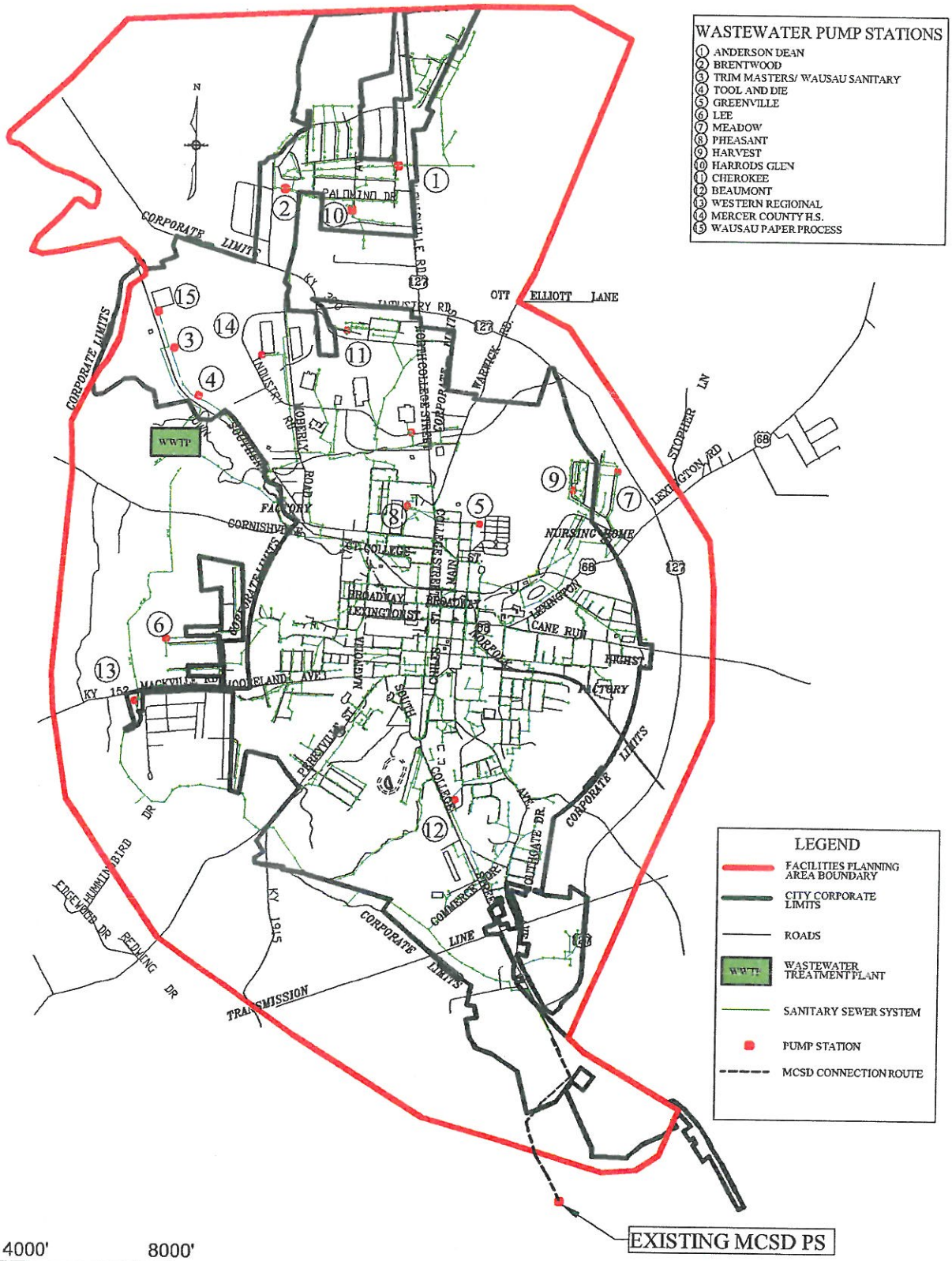
DATE: FEBRUARY, 2013
SCALE:
SHEET NO.



GRW PROJECT NO. 4100	CLIENT PROJECT NO.	DESIGNED:
REVISIONS		DRAWN:
NO. / DESCRIPTION / DATE / BY		REVIEWED:
		APPROVED:
SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED		

EXHIBIT 3-2
HARRODSBURG
WASTEWATER COLLECTION
AND TREATMENT FACILITIES

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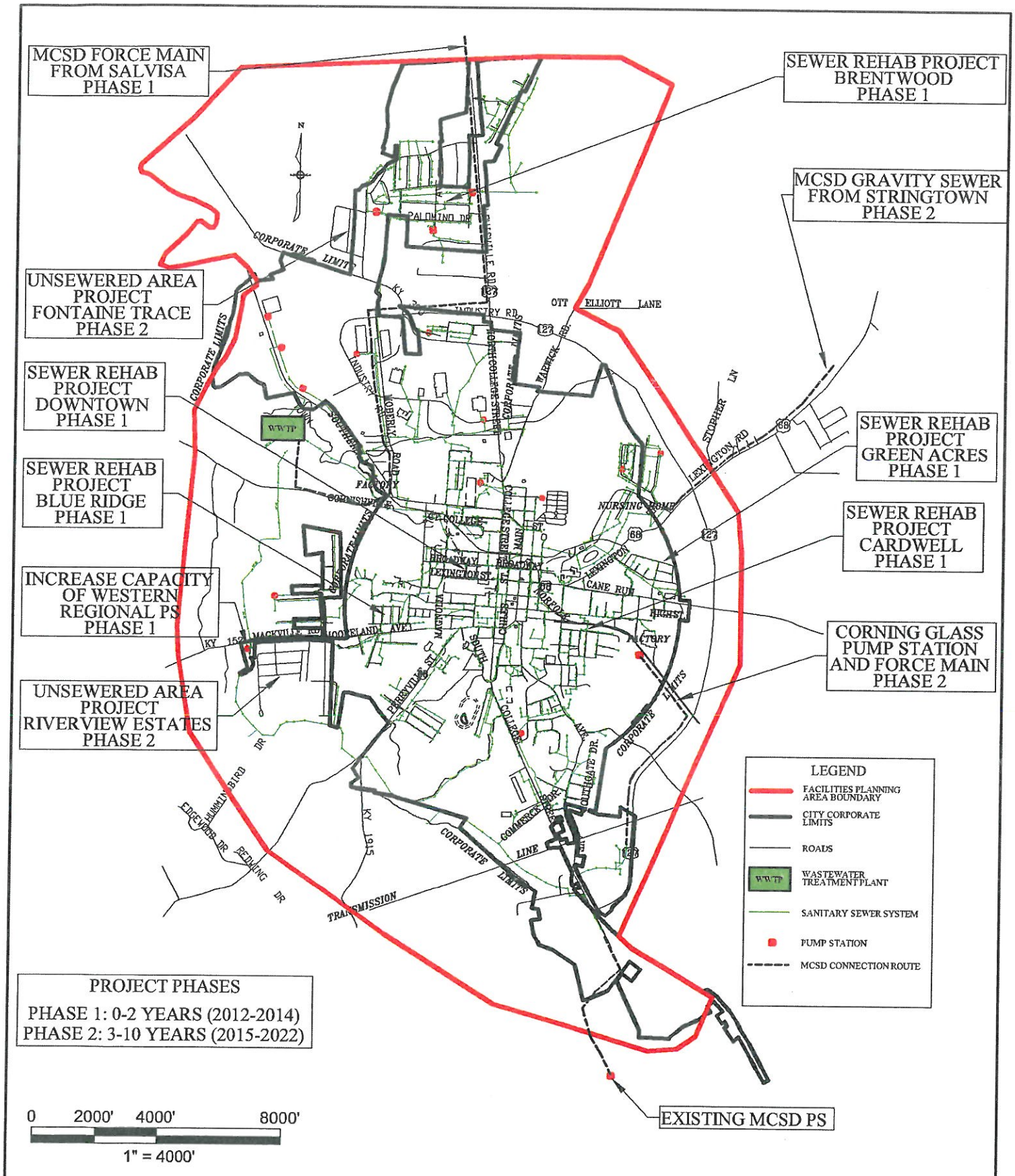

GRW PROJECT NO. 4100	CLIENT PROJECT NO.	DESIGNED:
REVISIONS		DRAWN:
NO. / DESCRIPTION / DATE / BY		REVIEWED:
		APPROVED:

SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1/2" WHEN PLOTTED

EXHIBIT 8-1
RECOMMENDED ALTERNATIVE WASTEWATER COLLECTION SYSTEM PROJECTS

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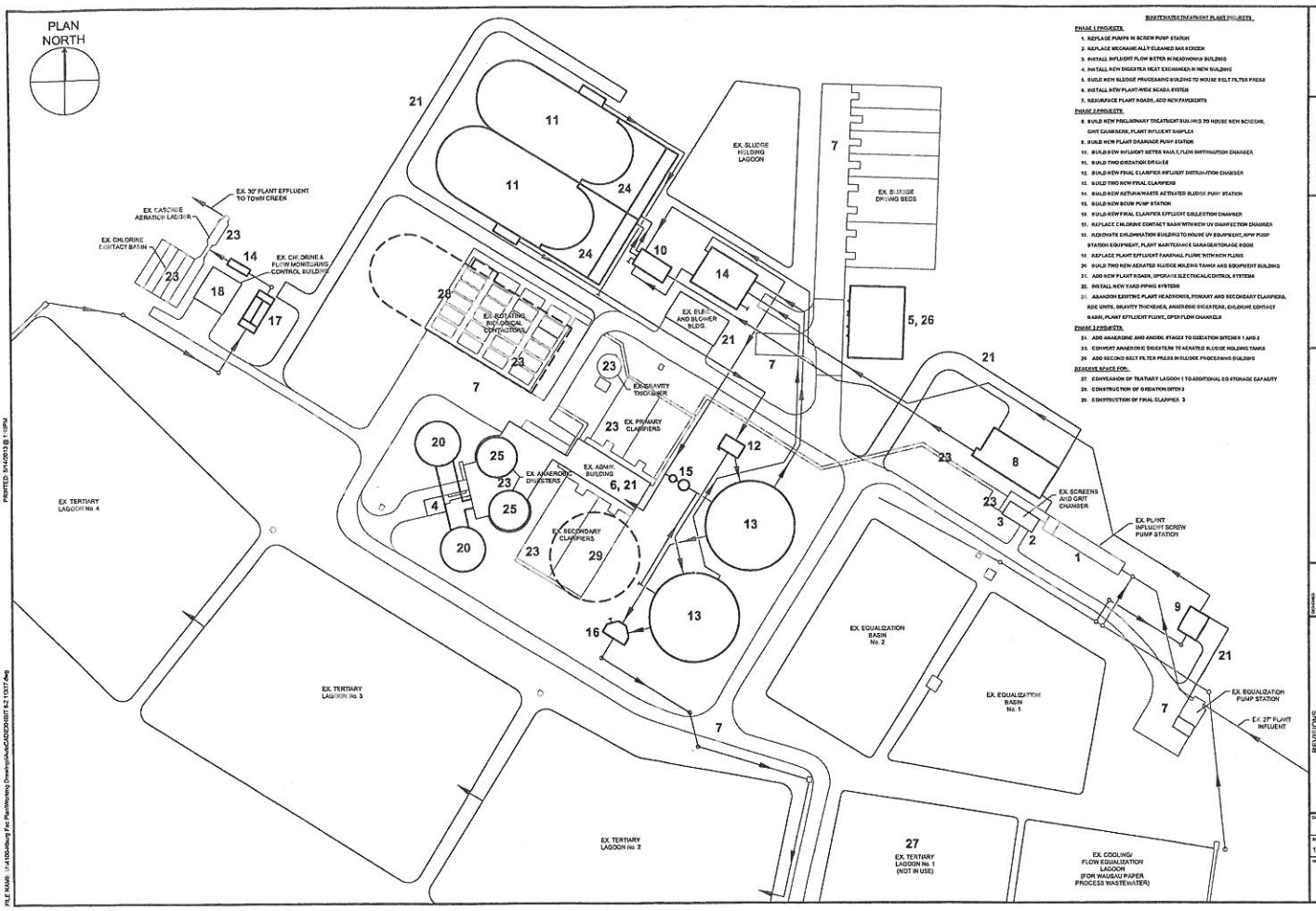
DATE: FEBRUARY, 2013
SCALE:
SHEET NO.



WASTEWATER TREATMENT PLANT PROJECTS

PHASE 1 PROJECTS:

1. REPLACE PHASE IN SCREW PUMP STATION
2. REPLACE MECHANICALLY CLEANED BAR SCREEN
3. INSTALL INFLUENT FLOW METER IN HEADWORKS BUILDING
4. INSTALL NEW DIGESTER HEAT EXCHANGER IN NEW BUILDING
5. BUILD NEW SLUDGE PROCESSING BUILDING TO HOUSE BELT FILTER PRESS
6. INSTALL NEW PLANT-WIDE SCADA SYSTEM
7. RESURFACE PLANT ROADS, ADD NEW PAVEMENTS

PHASE 2 PROJECTS:

8. BUILD NEW PRELIMINARY TREATMENT BUILDING TO HOUSE NEW SCREENS, GRIT CHAMBERS, PLANT INFLUENT SAMPLER
9. BUILD NEW PLANT DRAINAGE PUMP STATION
10. BUILD NEW INFLUENT METER VAULT, FLOW DISTRIBUTION CHAMBER
11. BUILD TWO OXIDATION DITCHES
12. BUILD NEW FINAL CLARIFIER INFLUENT DISTRIBUTION CHAMBER
13. BUILD TWO NEW FINAL CLARIFIERS
14. BUILD NEW RETURN/WASTE ACTIVATED SLUDGE PUMP STATION
15. BUILD NEW SCUM PUMP STATION
16. BUILD NEW FINAL CLARIFIER EFFLUENT COLLECTION CHAMBER
17. REPLACE CHLORINE CONTACT BASIN WITH NEW UV DISINFECTION CHAMBER
18. RENOVATE CHLORINATION BUILDING TO HOUSE UV EQUIPMENT, NEW PUMP STATION EQUIPMENT, PLANT MAINTENANCE GARAGE/STORAGE ROOM
19. REPLACE PLANT EFFLUENT FAREWALL FLUME WITH NEW FLUME
20. BUILD TWO NEW AERATED SLUDGE HOLDING TANKS AND EQUIPMENT BUILDING
21. ADD NEW PLANT ROADS, UPGRADE ELECTRICAL/CONTROL SYSTEMS
22. INSTALL NEW YARD PIPING SYSTEMS
23. ABANDON EXISTING PLANT HEADWORKS, PRIMARY AND SECONDARY CLARIFIERS, RBC UNITS, GRAVITY THICKENER, ANAEROBIC DIGESTERS, CHLORINE CONTACT BASIN, PLANT EFFLUENT FLUME, OPEN FLOW CHANNELS

PHASE 3 PROJECTS:

24. ADD ANAEROBIC AND ANOXIC STAGES TO OXIDATION DITCHES 1 AND 2
25. CONVERT ANAEROBIC DIGESTERS TO AERATED SLUDGE HOLDING TANKS
26. ADD SECOND BELT FILTER PRESS IN SLUDGE PROCESSING BUILDING

RESERVE SPACE FOR:

27. EXPANSION OF TRATIARY LAGOON 1 TO ADDITIONAL EQ STORAGE CAPACITY
28. CONSTRUCTION OF OXIDATION DITCH 3
29. CONSTRUCTION OF FINAL CLARIFIER 3

GRW PROJECT NO. 1120

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RECOMMENDED PLAN PHASES 1, 2, AND 3

WASTEWATER TREATMENT PLANT
CITY OF HARRODSBURG, KY

REVISIONS			
#	DESCRIPTION	DATE	BY

DESIGNED
DRAWN
REVIEWED
APPROVED

DATE:
SCALE: 1" = 100'
SHEET NO.

EXHIBIT 8-2

PRINTED: 04/24/2013 @ 1:19PM

FILE NAME: J:\4100-Bldg Fac Plan\Working Drawings\AutoCAD\EXHIBIT 8-2 13X17.dwg

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

May 24, 2013

RECEIVED
MAY 28 2013
BY:

Operations Division
Regulatory Branch (South)
ID No. LRL-2013-485

Ms. Laura Gilkerson
GRW Engineers, Incorporated
801 Corporate Drive
Lexington, Kentucky 40503

Dear Ms. Gilkerson:

This is in regard to your letter dated May 15, 2013, requesting comments for the City of Harrodsburg Regional Wastewater Facilities Plan in Mercer County, Kentucky. The proposed plan would develop recommendations for improving wastewater collection and treatment within the City's Planning Area for the period 2012 to 2032. The Plan proposes a series of projects that would be built over the next 20 years in phases. Some projects would be built at the treatment plant site, and others within the wastewater collection system, including gravity sewers, pump stations and force mains, most of which would be constructed in easements or along existing road rights-of-way, or on property owned by the City.

The U.S. Army Corps of Engineers (USACE) exercises regulatory authority under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act, 1972 (33 USC 1344) for certain activities in "waters of the United States (U.S.)." These waters include all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce. "Waters of the U.S.," include hydrologically connected lakes, rivers, and stream channels exhibiting an Ordinary High Water Mark (OHWM), wetlands, sloughs, wet meadows and wetlands adjacent to "waters of the U.S."

Based on the information provided by you in the above-referenced request, it appears as though a Department of the Army (DA) Permit MAY BE REQUIRED. The mapping you provided shows proposed work in or near what appears to be "waters of the U.S." These waters are Spring Creek and tributaries, Salt River and tributaries, and various open-water areas that may be hydrologically connected to the tributaries. When applying for a DA Permit, provide additional details regarding the project's design, scope, photos, construction methods, purpose and a

delineation of all "waters of the U.S.," including the coordinates and locations of each "water" within the proposed project area and all impacts to waters (linear feet and acreage).

You are reminded that all drawings must be submitted on 8½ x 11-inch paper and be of reproducible quality.

Further information on the Regulatory Program, including the DA Permit application, can be obtained from our website located at: http://www.lrl.usace.army.mil/Missions/Regulatory.aspx. Please allow sufficient time in your preconstruction schedule for the processing of a DA permit application.

If you have any questions concerning this matter, please contact this office at the above address, ATTN: CELRL-OP-FS or call me at (502)315-6693.

Sincerely,

Pam Loeffler

Pam Loeffler
Regulatory Specialist
Regulatory Branch

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

June 7, 2013

RECEIVED
JUN 11 2013
BY:

Ms. Laura Gilkerson
GRW
801 Corporate Drive
Lexington, KY 40503

Re: FWS 2013-B-0498; City of Harrodsburg; Regional Wastewater Facilities Plan, planning period 2012-2032; located in Mercer County, Kentucky

Dear Ms. Gilkerson:

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.

At this stage in the planning period for the proposed project, we cannot make determinations as to the effect that the proposed project will have on listed species. We can only offer general recommendations to be considered as the project design is being developed. As the planning process moves forward, more detailed information about the project phases should be submitted to our office to be reviewed with regard to potential effects to federally listed species. At that time, we would either make additional avoidance and minimization recommendations, concur that your project would not likely adversely affect federally listed species, or recommend additional ESA consultation.

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 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	*Myotis sodalis*	Indiana bat	E
	Myotis grisescens	gray bat	E
Plants	*Trifolium stoloniferum*	running buffalo clover	E
	Lesquerella globosa	globe bladderpod	C

* *Key to notations: E = Endangered, T = Threatened, 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 site is located within habitat designated as "potential habitat" for the Indiana bat and we believe that: (1) forested areas in the vicinity of and on the project area may potentially provide suitable summer roosting and foraging habitat for the Indiana bat; and (2) caves, rockshelters, and abandoned underground mines in the vicinity of and on the project area may potentially provide suitable wintering habitat for the Indiana bat. Our belief that potentially suitable habitat may be present is based on the information provided in your correspondence, the fact that much of the project site and/or surrounding areas contain forested habitats that are within the natural range of this species, and our knowledge of the life history characteristics of the species.

The Indiana bat 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.

Prior to hibernation, Indiana bats utilize the forest habitat around the hibernacula (*i.e.* cave) to feed and roost until temperatures drop to a point that forces them into hibernation. This "swarming" period is dependent upon weather conditions and lasts from about September 15 to about November 15. This is a critical time for Indiana bats, since they are acquiring additional fat reserves and mating prior to hibernation. Research has shown that bats exhibiting this "swarming" behavior will range up to five miles from chosen hibernacula during this time. For hibernation, the Indiana bat prefers limestone caves, sandstone rockshelters, and abandoned underground mines with stable temperatures of 39 to 46 degrees F and humidity above 74 percent but below saturation.

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

- The project proponent can modify the proposed project to eliminate or reduce impacts to potential Indiana bat roost trees. If this is not practicable, we would recommend that the project proponent only remove potential roost trees within the project area between October 15 and March 31 in order to avoid directly impacting summer roosting Indiana bats. Removing trees during the specified "unoccupied" period avoids direct effects to Indiana bats.

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

If your project schedule requires the clearing of potential Indiana bat roosting trees during the period of April 1 to October 14, you have two primary options for addressing impacts to Indiana bats:

- The project proponent can survey the project site to determine the presence or absence of Indiana bats within the project area in an effort to determine if potential effects are likely. A qualified biologist who holds the appropriate collection permits for the Indiana bat must undertake such surveys, and we would appreciate the opportunity to approve the biologist's survey plan prior to the survey being undertaken and to review all survey results, both positive and negative. If any Indiana bats are identified, we would request written notification of such occurrence(s) and further coordination and consultation.

- The project proponent can enter into a Conservation Memorandum of Agreement (MOA) with the Service to gain flexibility in project timing with regard to the removal of suitable Indiana bat habitat. In exchange for this flexibility, the Cooperator provides recovery-focused conservation benefits to the Indiana bat through the implementation of minimization and mitigation measures as set forth in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky. For additional information about this option, please notify our office.

Gray bat

Gray bats roost, breed, rear young, and hibernate in caves year round. They migrate between summer and winter caves and will use transient or stopover caves along the way. Gray bats eat a variety of flying aquatic and terrestrial insects present along streams, rivers, and lakes. Low-flow streams produce an abundance of insects and are especially valuable to the gray bat as

foraging habitat. For hibernation, the roost site must have an average temperature of 42 to 52 degrees F. Most of the caves used by gray bats for hibernation have deep vertical passages with large rooms that function as cold air traps. Summer caves must be warm, between 57 and 77 degrees F, or have small rooms or domes that can trap the body heat of roosting bats. Summer caves are normally located close to rivers or lakes where the bats feed. Gray bats have been known to fly as far as 12 miles from their colony to feed.

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

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

- Sediment Best Management Practices (BMPs) should be utilized and maintained to minimize siltation of the streams located within and in the vicinity of the project area, as these streams represent potential foraging habitat for the gray bat.

Running buffalo clover

Running buffalo clover may occur within the proposed project site. This species requires periodic, moderate disturbances to reduce competition and maintain open or semi-open habitat conditions. Disturbed areas such as old pastures, moderately grazed fields, road rights-of-way, and power line rights-of-way that are mechanically maintained are known to provide suitable habitat for these species. Additionally, running buffalo clover is known to occur in habitats ranging from stream banks and low mesic (moderately moist) forests to lawns and cemeteries. If the proposed project(s) require alteration of habitat that coincides with the habitat required for this species, an on-site inspection or survey of the area must be conducted to determine if the listed species is present or occurs seasonally. Surveys should be done by qualified personnel and be conducted during the appropriate time of day and/or year to ensure confidence in survey results. Please notify this office with the results of any surveys and an analysis of the "effects of the action," as defined by 50 CFR 402.02 on any listed species including consideration of direct, indirect, and cumulative effects.

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

Globe bladderpod

Globe bladderpod is a federal candidate species, which means the Service has sufficient information on its biological status and threats to propose globe bladderpod as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA. The Service encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA.

Globe bladderpod is one of the rarest plants in Kentucky. This plant species may occur within the proposed project area, and is known to occur in the vicinity of the project area. It inhabits dry rocky slopes in the Bluegrass Region. The Service recommends assessing the project area to determine if suitable globe bladderpod habitat, as described above, would be impacted as a result of the proposed project. Should the proposed project alter habitat required for this species, we recommend that those areas be surveyed for its presence; and, notifying this office with the results of any assessments and/or surveys for this species.

Addressing the needs of globe bladderpod before the regulatory requirements associated with a listed threatened or endangered species come into play, would allow entities greater management flexibility to stabilize or restore the species and its habitat for future projects. In addition, as such threats are reduced and populations are increased or stabilized, priority for listing can be shifted to those species in greatest need of the ESA's protective measures. Ideally, sufficient threats can be removed to eliminate the need for listing.

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

RECEIVED
MAY 24 2013
BY:

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

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

Marcheta Sparrow
Secretary

Dr. Jonathan W. Gassett
Commissioner

22 May 2013

GRW, Inc.
Attn: Laura Gilkerson
Project Manager
801 Corporate Drive
Lexington, KY 40503

RE: Cross – Cutter Correspondence
City of Harrodsburg, Kentucky
Regional Wastewater Facilities Plan
Planning Period 2012-2032
GRW Project 4100-01

Dear Ms. Gilkerson:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for information regarding the subject project. The Kentucky Fish and Wildlife Information System indicates that the federally - endangered Grey bat *(Myotis grisescens)* is known to occur near the project site. The state-listed Bobolink *(Dolichonyx oryzivorus)* and Henslow's Sparrow *(Ammodramus henslowii)* are known to occur within the planning area boundary. Due to nature of the project, the KDFWR does not anticipate impacts to listed species or any associated critical habitat. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

To minimize indirect impacts to aquatic resources, strict erosion control measures should be developed and implemented prior to any construction to minimize siltation into streams and storm water drainage systems 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.

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,

Daniel Stoll

Dan Stoelb
Wildlife Biologist

Cc: Environmental Section 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

RECEIVED
JUN 6 - 2013
BY:

June 3, 2013

Laura Gilkerson
GRW
801 Corporate Drive
Lexington, KY 40503

Re: City of Harrodsburg Regional Wastewater Facilities Plan Update

Ms. Gilkerson,

Thank you for your correspondence regarding the above referenced projects. Based on the information provided it is our understanding that the proposed projects have the potential to impact historic properties eligible for or listed on the National Register of Historic Places. As the Louisa Regional Facilities Plan will be implanted over a number of years, we request the following consultation regarding this undertaking.

1) As projects are chosen and prepared for implementation, please individually submit information regarding each individual project to the Kentucky Heritage Council for review.

As these projects are scheduled to take place over a number of years, it is important to note that our submission requirements will be changing in the near future. Prior to submitting a project to our office, please check our website http://heritage.ky.gov/siteprotect/ or contact our office for submission instructions.

Should you have any questions, feel free to contact me at 502- 564-7005 ext 123.

Sincerely,

Craig Potts, Executive Director
Kentucky Heritage Council and
State Historic Preservation Officer

LC:38924P

Appendix 8

APPENDIX 8

HARRODSBURG

WASTEWATER USER CHARGE

RATE STRUCTURE

(Ordinance 2011-20)

ORDINANCE NUMBER 2011-20

AN ORDINANCE OF THE CITY OF HARRODSBURG, KENTUCKY AMENDING CODE OF ORDINANCES TITLE V: PUBLIC WORKS, CHAPTER 52, SEWER USE, SECTION 52.145 (C) 3, SEWER SERVICE RATES

WHEREAS, the Board of Commissioners of the City of Harrodsburg desires to amend the sewer use. Section 52.145 (c) 3. which were last comprehensively updated by Ordinance 2001-10 and;

WHEREAS, the City of Harrodsburg is improving the Waste Water Treatment Plant, pump stations, and wastewater lines;

NOW THEREFORE BE IT ORDAINED BY THE BOARD OF COMMISSIONERS OF THE CITY OF HARRODSBURG THAT THE FOLLOWING RATES BE ADOPTED;

(3) Minimum sewer rate. The minimum sewer bill shall be ~~$8.80~~ <u>$10.56</u> per month, and each sewer customer shall be entitled to 250 cubic feet of sewer service consumption per month to customers of all size connections, except for any contractual arrangements with specific customers for additional surcharges.

Number of Cubic Feet of sewer per month	Minimum Monthly Charge
~~First 250~~	~~$8.80 per 100 cubic feet~~
~~Next 750~~	~~$3.63 per 100 cubic feet~~
~~Next 3,000~~	~~$3.40 per 100 cubic feet~~
~~Next 6,000~~	~~$3.40 per 100 cubic feet~~
~~Next 25,000~~	~~$3.40 per 100 cubic feet~~
~~Next 25,000~~	~~$3.20 per 100 cubic feet~~
~~All over 60,000~~	~~$3.00 per 100 cubic feet~~

Number of Cubic Feet of sewer per month	Minimum Monthly Charge
First 250	$10.56 minimum charge
Next 750	$4.32 per 100 cubic feet
Next 3,000	$4.08 per 100 cubic feet
Next 6,000	$4.08 per 100 cubic feet
Next 25,000	$4.08 per 100 cubic feet
Next 25,000	$3.84 per 100 cubic feet
All over 60,000	$3.60 per 100 cubic feet

This ordinance shall be effective upon its passage, approval, and publication as required by law.

Passed 1st Reading 9-26-11

Passed 2nd Reading 10-10-11

Published 10-13-11

Eddie Long

Eddie Long, Mayor
City of Harrodsburg

Kim Stinnett

Kim Stinnett, City Clerk/Treasurer/Budget Director

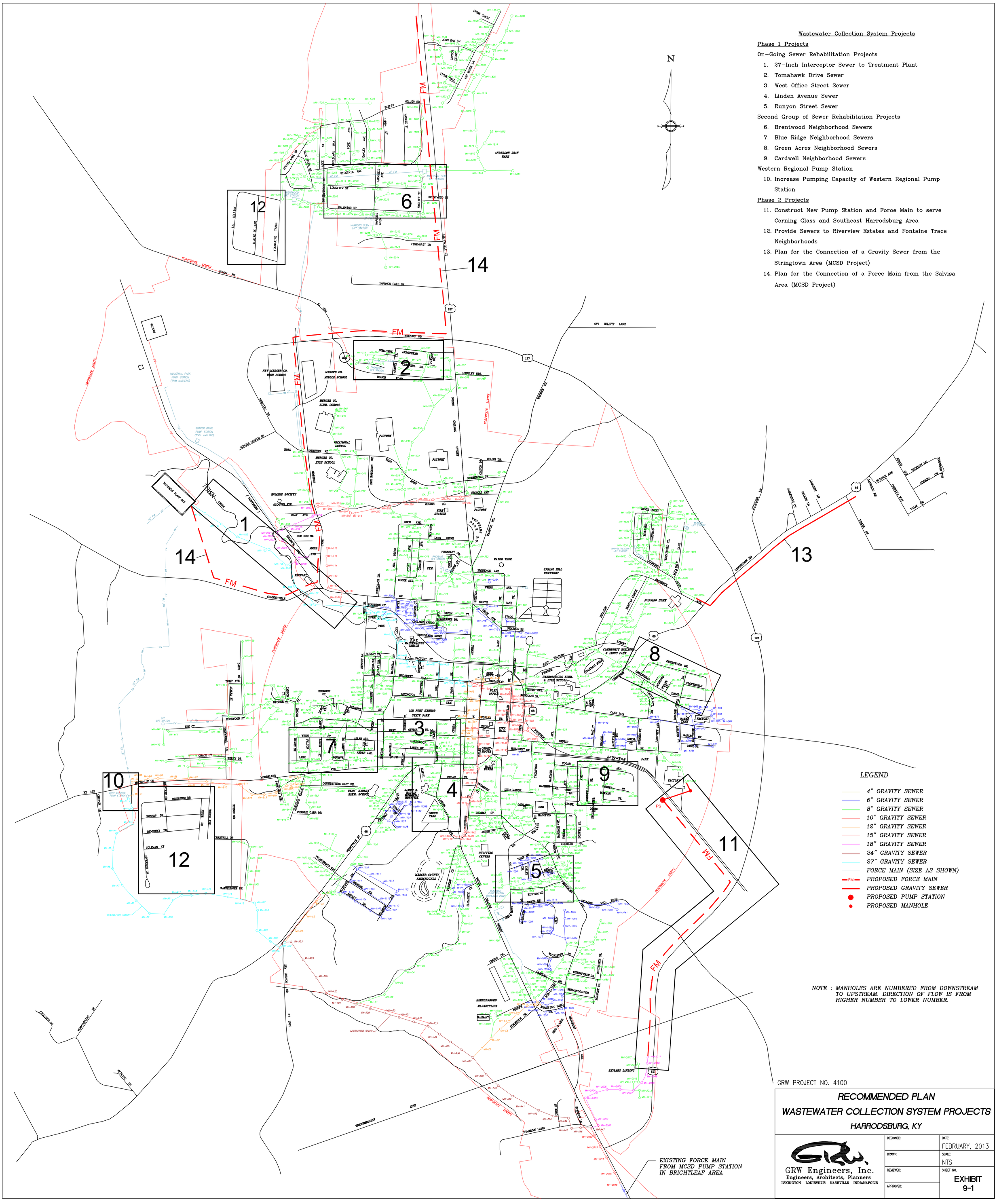
Appendix 9

APPENDIX 9

RECOMMENDED PLAN PROJECTS

FOR WASTEWATER COLLECTION SYSTEM

AND WASTEWATER TREATMENT PLANT



Wastewater Collection System Projects

Phase 1 Projects

On-Going Sewer Rehabilitation Projects

1. 27-Inch Interceptor Sewer to Treatment Plant
2. Tomahawk Drive Sewer
3. West Office Street Sewer
4. Linden Avenue Sewer
5. Runyon Street Sewer

Second Group of Sewer Rehabilitation Projects

6. Brentwood Neighborhood Sewers
7. Blue Ridge Neighborhood Sewers
8. Green Acres Neighborhood Sewers
9. Cardwell Neighborhood Sewers

Western Regional Pump Station

10. Increase Pumping Capacity of Western Regional Pump Station

Phase 2 Projects

11. Construct New Pump Station and Force Main to serve Corning Glass and Southeast Harrodsburg Area
12. Provide Sewers to Riverview Estates and Fontaine Trace Neighborhoods
13. Plan for the Connection of a Gravity Sewer from the Stringtown Area (MCSD Project)
14. Plan for the Connection of a Force Main from the Salvisa Area (MCSD Project)

GRW PROJECT NO. 4100

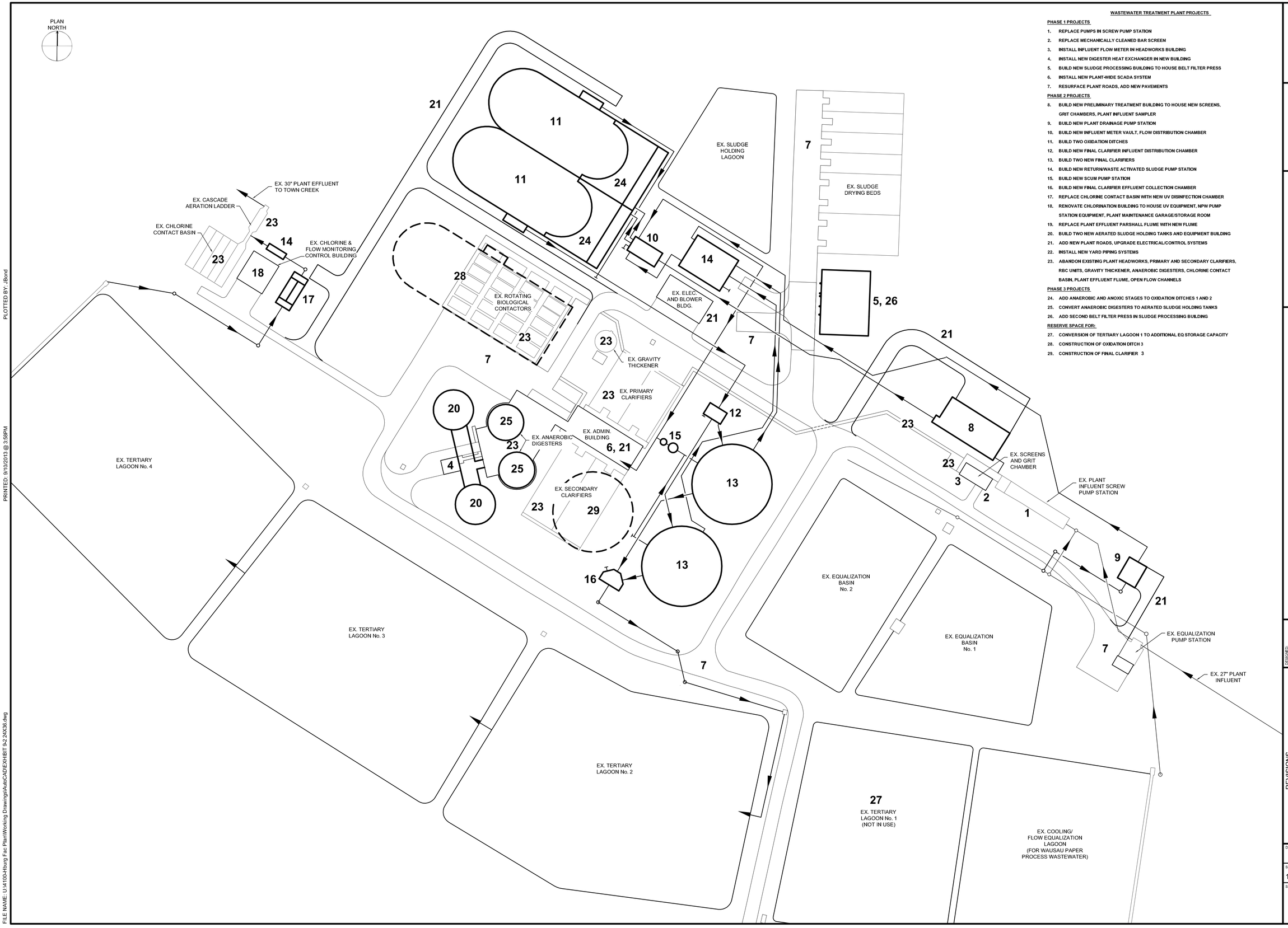
RECOMMENDED PLAN

WASTEWATER COLLECTION SYSTEM PROJECTS

HARRODSBURG, KY

GRW Engineers, Inc.
Engineers, Architects, Planners
LEXINGTON LOUISVILLE NASHVILLE INDIANAPOLIS

DESIGNED:	DATE: FEBRUARY, 2013
DRAWN:	SCALE: NTS
REVIEWED:	SHEET NO. EXHIBIT 9-1
APPROVED:	



WASTEWATER TREATMENT PLANT PROJECTS

PHASE 1 PROJECTS

1. REPLACE PUMPS IN SCREW PUMP STATION
2. REPLACE MECHANICALLY CLEANED BAR SCREEN
3. INSTALL INFLUENT FLOW METER IN HEADWORKS BUILDING
4. INSTALL NEW DIGESTER HEAT EXCHANGER IN NEW BUILDING
5. BUILD NEW SLUDGE PROCESSING BUILDING TO HOUSE BELT FILTER PRESS
6. INSTALL NEW PLANT-WIDE SCADA SYSTEM
7. RESURFACE PLANT ROADS, ADD NEW PAVEMENTS

PHASE 2 PROJECTS

8. BUILD NEW PRELIMINARY TREATMENT BUILDING TO HOUSE NEW SCREENS, GRIT CHAMBERS, PLANT INFLUENT SAMPLER
9. BUILD NEW PLANT DRAINAGE PUMP STATION
10. BUILD NEW INFLUENT METER VAULT, FLOW DISTRIBUTION CHAMBER
11. BUILD TWO OXIDATION DITCHES
12. BUILD NEW FINAL CLARIFIER INFLUENT DISTRIBUTION CHAMBER
13. BUILD TWO NEW FINAL CLARIFIERS
14. BUILD NEW RETURN/WASTE ACTIVATED SLUDGE PUMP STATION
15. BUILD NEW SCUM PUMP STATION
16. BUILD NEW FINAL CLARIFIER EFFLUENT COLLECTION CHAMBER
17. REPLACE CHLORINE CONTACT BASIN WITH NEW UV DISINFECTION CHAMBER
18. RENOVATE CHLORINATION BUILDING TO HOUSE UV EQUIPMENT, NPW PUMP STATION EQUIPMENT, PLANT MAINTENANCE GARAGE/STORAGE ROOM
19. REPLACE PLANT EFFLUENT PARSHALL FLUME WITH NEW FLUME
20. BUILD TWO NEW AERATED SLUDGE HOLDING TANKS AND EQUIPMENT BUILDING
21. ADD NEW PLANT ROADS, UPGRADE ELECTRICAL/CONTROL SYSTEMS
22. INSTALL NEW YARD PIPING SYSTEMS
23. ABANDON EXISTING PLANT HEADWORKS, PRIMARY AND SECONDARY CLARIFIERS, RBC UNITS, GRAVITY THICKENER, ANAEROBIC DIGESTERS, CHLORINE CONTACT BASIN, PLANT EFFLUENT FLUME, OPEN FLOW CHANNELS

PHASE 3 PROJECTS

24. ADD ANAEROBIC AND ANOXIC STAGES TO OXIDATION DITCHES 1 AND 2
25. CONVERT ANAEROBIC DIGESTERS TO AERATED SLUDGE HOLDING TANKS
26. ADD SECOND BELT FILTER PRESS IN SLUDGE PROCESSING BUILDING

RESERVE SPACE FOR:

27. CONVERSION OF TERTIARY LAGOON 1 TO ADDITIONAL EQ STORAGE CAPACITY
28. CONSTRUCTION OF OXIDATION DITCH 3
29. CONSTRUCTION OF FINAL CLARIFIER 3

GRW PROJECT NO. 4100

CLIENT PROJECT NO.

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ENGINEERS - ARCHITECTS - PLANNERS
www.grwinc.com

RECOMMENDED PLAN
PHASES 1, 2, AND 3
WASTEWATER TREATMENT PLANT IMPROVEMENTS
CITY OF HARRODSBURG, KENTUCKY

DESIGNED:
DRAWN:
REVIEWED:
APPROVED:

REVISIONS

NO.	DESCRIPTION	DATE	BY

SCALE CHECK: THIS MARK SHOULD MEASURE EXACTLY 1" WHEN PLOTTED

DATE:

SCALE: 1" = 50'

SHEET NO.

EXHIBIT 9-2

PLOTTED BY: JBond

PRINTED: 9/10/2013 @ 3:58PM

FILE NAME: U:\4100-Hburg Fac Plan\Working Drawings\AutoCAD\EXHIBIT 9-2 24X36.dwg