The City of Pataskala Utility Study Update

July 2010

W.E. STILSON
CONSULTING GROUP

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

The City of Pataskala, Licking County, Ohio, is a community whose history is rooted in agricultural tradition, and whose transformation to present day has occurred in unique ways. Since the merger of the City with Lima Township in the 1990s, community responsibility for provision of services has increased dramatically. Further, central Ohio has grown eastward, bringing the challenges and opportunities of development.

In 1999, the City of Pataskala conducted a comprehensive study of its water, sanitary sewer, storm water, and transportation infrastructure, for dual purpose: first, the study represented Pataskala's attempt to plan proactively for continuity of community services; second, the study provided information such that City administration could review the possibility of merged effort with the Southwest Licking Community Water and Sewer District. Outcomes of the study presented a roadmap for capital improvement projects in the past ten years, and concluded that both the City and SWLCWSD could remain in operation independent of one another at no obvious disadvantage. Neither entity perpetuated discussions of merged operations since that time.

In the ten years hence, regional development, combined with aging infrastructure and limits on revenue, has created a need for current information on utility infrastructure. In 2009, the City of Pataskala requested an update of the original utility study by W.E. Stilson Consulting Group, LLC.

In an effort to coordinate and communicate with fellow jurisdictions in the region, the City identified certain regional stakeholders to participate in this process: City of Columbus, City of Reynoldsburg, SWLCWSD, Licking County, and St. Albans and Jersey Townships. Infrastructure and planning information was solicited from these entities, and incorporated into this study.

In general terms, the City of Pataskala's utility infrastructure is in fair to good condition. Sanitary sewer infrastructure is in poorer condition than water infrastructure, and storm sewer infrastructure is in fair condition. Many separate diagnostics tests were conducted on the infrastructure throughout this study, and many previous maps, studies, and other documents were reviewed. Where appropriate, computer models of infrastructure were created as planning tools, and GIS mapping of all infrastructure was created for use in this effort. In short, this report has quantified the capability/capacity of the City's infrastructure investment in present day.

Population projections and regional growth patterns were studied following the diagnostic review, in an attempt to identify the City's future infrastructure planning needs for territory it could cost-effectively serve. With few exceptions, nearly all potential for growth of Pataskala's user base lies in the State Route 310 corridor. Provision of City utility service to this corridor, and potentially as far north as to include the State Route 161 corridor, is of critical importance to the City in the coming years. Infrastructure projects to enable, either by City or shared regional (SWLCWSD) provision have been identified.

In sum total, the recommendations of this report are presented in three types of projects: Restorative (projects needed to restore functionality and/or capacity of present investment); Maintenance (generally preventive measures); and Anticipatory (in anticipation of growth or development). All projects were then assigned a low, moderate, or high risk factor in order to sort them to a particular year for budget and planning purposes. Together, recommended projects for the 20-year planning period represent nearly $30 million.

Herein, great emphasis is placed on the need for regional cooperation. As the tables, figures, and exhibits of this study illustrate, cost-effective utility service provision, and the livelihood of its municipal governments will depend on the success of this initiative.

2 PURPOSE AND NEED

In 1999 the City of Pataskala commissioned a comprehensive utility study of its water, wastewater, and stormwater infrastructure to determine its condition and capacity. The initiative for the study was to provide the City with data which would assist in regional deliberations on utility service provision, addressing the viability of available options to concede, acquire, or merge ownership of utilities with the Southwest Licking Community Water and Sewer District (District), following the dissolution of Lima Township, circa 1996. Study outcomes indicated that, indeed, the City of Pataskala could continue to cost-effectively provide potable water for distribution, collect and treat sanitary waste, and address stormwater issues. Accordingly, City and District utility systems were not merged in 1999 and each remains in service, independently operated by their respective governments.

In the ten years since its original study, the City, District, and greater Licking County region have grown and changed dramatically. Infrastructure has aged, and the challenges of cost-effective utility service provision remain. **This study was requested by the City of Pataskala Council, and its purpose is clear: to create a document update and extend the conclusions of its predecessor, as a current assessment of the condition of the City's water, wastewater, and stormwater infrastructure, in order to best position the City for continuity and quality of utility service and financial solvency**. Furthermore, consideration must be continually given for technological advances, breadth and depth of regulatory governance, and increased environmental awareness.

Between 1999 and 2009, the population of the City of Pataskala has increased by approximately 50%, from 10,249 persons to 15,535 persons, creating a sharp increase in average demand for utility service from approximately 0.56 MGD in 1999, to nearly 0.80 MGD in present day. Operation, maintenance, and capital improvement plans of the past may soon be outpaced by need. Projections for future population and service demand have changed, along with shifts in location of development pockets and corridors. These changes require utility service providers to revisit and reassess system useful life, opportunities, and vulnerabilities, such that future needs may be reidentified, planned, and controlled with respect to time and available funding.

Technological advancements persist in present day, which simultaneously define and enable the reach of regulatory oversight of public utilities. The current regulatory environment is different than that of ten years ago, a time when some key (current) requirements had not yet been conceptually articulated. Environmental awareness, sensitivity, and increasing prominence and pervasiveness of sustainability issues are now a global movement. Understanding and incorporating these requirements is vital to the success of any and all future planning efforts.

As the purpose and need for this study are well established, one measure of its success would most certainly be in the system's long-term financial health. Positioning Pataskala for strong financial viability will require concerted effort. In the current economic environment, resources have become scarce or limited, and some operation and maintenance prescriptions have become cost-prohibitive and/or labor intensive. Exacerbated by infrastructure rates of decline, it is imperative that a sound plan is formed from the conclusions of a thorough investigation.

This study will provide the facts from which a solid plan can be built. By assembling an inventory of all City services, system completeness can be analyzed, and diagnosis performed. Diagnosis will yield life expectancy estimation, and provide the basis for creation and evaluation of alternatives for provision of service over time. With system needs identified, scenarios will then be quantified, prioritized, and presented to align with City goals.

3 PLANNING DATA

The initial efforts of this study included a review of the 1999 Pataskala Utility Study, and extensive data gathering and document review from multiple sources. The first relative influence of this information arises in the consideration of the project planning area. In consultation with City Council, regional governments, and metropolitan planning organizations, it became evident that the planning area for this study should extend beyond the municipal corporation boundaries of Pataskala, to include some surrounding areas that will have significant influence on Pataskala's future planning. Established and endorsed very early in the process, the planning area boundary was a necessary first step to beginning with the end in mind.

In addition to the project planning area map, other key planning tools were identified and utilized in preparation of this study, namely: population data and projections, and land use plans from Mid-Ohio Regional Planning Commission (MORPC), and land use plans and zoning designations from the City of Pataskala. This information, along with existing infrastructure maps provided by the City of Pataskala, SWLCWSD, and other regional stakeholders were used in the planning process.

3.1 Project Planning Area Map

The Planning Area Map, as shown on **Figure 1 in Appendix A,** is notably different than the areas studied in previous reports. In general terms, the planning area is bounded by the Franklin/Licking County line to the west, the State Route 161 corridor to the North, State Route 37 and various Township roads to the east, and State Route 40 to the south. The planning area was delineated in consultation with Pataskala City Council, Utility Committee, and regional stakeholders.

The reasons for a more expansive, regional focus for utility service provision stems from the changes in the community in the past ten years. Predominantly, the dissolution of Lima Township and resulting increase in population, along with the associated land use changes, the transportation corridor development of State Route 161, State Route 310 corridor changes, and the multi-jurisdictional cooperation for development of a Jobs- Ready Site for commercial/industrial business have shaped the study area boundary as presented.

It is notable that the planning area map for this study overlaps utility service territory of other regional entities. In some cases, service territory has been mutually reviewed and set forth in legal agreements, as is the case with Southwest Licking Community Water and Sewer District (SWLCWSD). Territories for both the City and SWLCWSD were delineated (including 'shared service territory') and set forth in a 2004 agreement between the parties; these territory maps is presented as **Figure 2A and 2B in Appendix A**. Service territory agreements between other entities and the City do not exist; however, certain territory boundaries for sanitary sewer service area have been identified and endorsed by the Ohio Environmental Protection Agency (OEPA) in its Statewide 208 Plan dated in 2006. These service territory summaries, or 'prescriptions', for SWLCWSD, City of Reynoldsburg, City of Columbus, and Licking County are presented as **Figures 3 and 4 in Appendix A** for information purposes, as portions of the study planning area are overlapped by the 208 Plan and earmarked as territory for other entities. In short, overlapping interest in utility service territory underscores the need for regional cooperation. The City's project planning area map signals its desire to cooperate with regional governments, as the needs of Pataskala and surrounding region can no longer be addressed by a singular, isolated entity. With the support of all surrounding communities, the pressures and problems of an ever-increasing population can be handled more effectively.

3.2 Historical Population Data and Projections

A review and study of historical population data and establishment of population trends is key to quantifying demand for utility service within the 20-year planning period of the study. Historical population values for the planning area are shown on **Figure 5** in **Appendix A,** taken from the U.S. Census Bureau (note that pre-merger--before 1996--

values are reported for what was then the Village of Pataskala, and post-merger values are for the current City of Pataskala).

Several population projection methodologies considered for application in preparing future population projection. Straight-line projections were prepared and studied, along with Licking County Regional Planning's Arithmetic Rates of Change methodology. However, in consultation with City, Licking County, and Mid-Ohio Regional Planning Commission (MORPC) it was determined that the MORPC Five Year Incremental Land Use Forecast Methodology: 2005 – 2030 and MORPC 2030 Land Use Variables Projection Methodology would be most appropriate and accurate for the purpose of this work. A copy of this methodology can be found in **Appendix A.**

Accordingly, from a year 2000 population of 19,149 persons for the planning area, estimates of population in 2010, 2015, 2020, and 2030 were prepared to represent population in the present day, and at 5-year, 10-year, and 20-year planning intervals. Population estimates are noted Table 1, below:

	2000	2010	2015	2020	2030
City of Pataskala	10,249	16,052	19,346	21,723	26,196
Planning Area	19,149	27,378	32,996	37,050	46,115

3.3 Comprehensive Plan and Zoning

In recognition of recent growth, and reflection of its goals for future growth, the City of Pataskala maintains a Comprehensive Land Use Plan, and has adopted a zoning code. Development initiatives are guided by these parameters. The City's current zoning code, adopted in 2001, delineates 17 distinct districts which are identified on the zoning map and accompanying definition sheet; **Figures 6 and 7**, **Appendix** A.

With growth, Pataskala and the surrounding region face the challenge of maintaining its identity as it develops. The long term vision within City (corporation limits) emphasizes priorities such as maintaining its rich agricultural district (which makes up the majority of the northeast quadrant of the municipality), and promoting revitalization of the downtown business district. According to City staff, recent commercial growth has primarily occurred in the area east of the intersection of SR 310 and SR 16 around the Kroger shopping center, while residential development during recent years has been relatively stagnant.

Within the project planning area, MORPC and Licking County Planning Commission staff also provided information to establish and identify areas of current development activity and pockets/corridors of development potential. Future development areas within the project planning boundary are therefore represented as **Figures 8, 9, and 10, in Appendix A**, for years 2015, 2020, and 2030. General presentation of these development pockets and corridors indicates strong potential in areas west of and immediately adjacent to Mink Street (primarily residential), along the State Route 161 corridor (commercial), along State Route 310 north of Pataskala (commercial at far north), areas south of Broad street abutting and including the JRS site (mixed), and along State Route 310 just north of US 40 (mixed). Other isolated residential development pockets are identified.

Key regional planning documents with influence on this study, provided by MORPC and Licking County, include the SR 310 Corridor Traffic Study (MORPC, 2009) and the SR 161 Corridor Development Plan (Licking County, 2009). These documents, poised to shape the development landscape in the region, note sustainable growth must be preceded by improvements along the SR 310 corridor between I-70 and SR 161.

3.4 Regional Stakeholders

As previously noted, the City recognizes multiple regional government ‘stakeholders’ in the area whose respective goals and plans are of interest and important to the City, including but not limited to: SWLCWSD, Etna Township, Harrison Township, Jersey

Township, St. Albans Township, City of Reynoldsburg, City of Columbus, and Licking County. These entities share borders with the City of Pataskala, and it is the City's intent to include these stakeholders' input with planning initiatives and seek mutually cooperative ventures. Public and individual meetings regarding this planning effort have been, and will be held to solicit feedback from stakeholders. Due to proximity, the most strategic cooperation must occur between the City and SWLCWSD. These entities currently share responsibility of utility service to the municipality and surrounding area.

3.5 Existing Infrastructure and Tributary Areas

In order to plan for utility service within the planning area, complete and accurate mapping of regional utility infrastructure is required. Recognizing this, Global Information System (GIS) mapping of the Pataskala water, sanitary sewer, and stormwater infrastructure was a substantial portion of this study effort. In late 2009, WESCG and City staff conducted a GIS survey of City utility infrastructure by field locating system attributes. Field data was later compared to all construction record drawings maintained by the City, to ensure accuracy in creation of utility atlas maps. **Figures 1, 2, and 3 in Appendix B** represents the City's sanitary sewer, water, and stormwater atlases as updated. Other regional infrastructure, such as that owned by SWLCWSD, is represented in **Figures 4 and 5 in Appendix B,** for reference.

One final item of note to utility planning studies is that of tributary areas. Often, utility service to certain territory (primarily for sanitary sewer infrastructure) is dictated by regional topographic features. Cost-effective utility service often lies with flow by gravity to providers whose infrastructure is at comparatively low elevations to that of their surroundings. To assist in this evaluation, planning area topographic study was completed. A tributary area map within the planning area was created, and is presented in **Appendix C as Figure 1**. This tributary area map is divided into six discreet tributary sub-areas.

4 EXISTING INFRASTRUCTURE ASSESSMENT

Existing water, sanitary sewer, and storm sewer infrastructure is the foundation for provision of utility service. Therefore, an accurate and thorough condition assessment of each system is required in order to establish its capability and capacity for continued use. Major attributes and key components of each utility system were reviewed during the course of this work, and certain deficiencies identified via physical inspection, testing, computer modeling, and review of recent studies by the City. Correction of existing system deficiencies will protect the City's financial investment and perpetuate its infrastructure as a viable commodity in future planning.

4.1 Sanitary Sewer System

4.1.1 Sanitary Sewer System - General

The City of Pataskala's sanitary sewer system is comprised of approximately 161,500 feet of waste collection piping which range in size from 4" to 30", 15,365 feet of force main, 737 sanitary manholes, 7 sanitary pump stations, and one wastewater treatment plant (WWTP), which are collectively in fair to poor condition.

4.1.2 Sanitary Sewer System - Sewer Trunk Lines and Current Flow

As previously referenced in **Appendix B, Figure 1**, the City's sanitary waste collection piping network originated circa 1967, constructed over time as dictated by development, into two basic halves, the 'Eastside' (flow by gravity into the City's Eastside pump station) and 'Westside' (flow by gravity into the City's Creek Road pump station). Comprised of pipes with varying age, material, and construction standards, the system is not unlike those of other municipalities, which is subject to the effect of system inflow and infiltration (I/I) from rainfall and groundwater. If left unattended, the influence of I/I will increase over time, unnecessarily reducing the sewer system's capacity for sanitary waste.

Metered water from 1,922 current City customer accounts---which translates loosely to waste production to the City's sanitary sewer system---averages 0.437 MGD per day in the past two years. Monthly operating reports of the WWTP, reviewed for the purpose of this study, indicate that over the most recent two-year timeframe the WWTP has received and treated an average of approximately 0.745 MGD flow. This review, along with capacity analysis work noted below, indicates that the City's sanitary sewer system is significantly impacted by I/I.

In 2003, the City undertook a substantial system cleaning and flow monitoring effort, to identify sources of inflow and infiltration that adversely effected system capacity. In general, the 2003 report identified seven major areas of focus for I/I mitigation. While the outcomes and recommendations of this study were clear, the City is still actively engaged in mitigative measures. As such, updated flow monitoring at the 2003 monitoring sites was not warranted with this study effort; it is, however, recommended at such time as the 2003 outcomes are complete.

For the purpose of this study, in an attempt to further assess the condition and capacity of the sewer system, WESCG prepared an exhibit which highlights major sanitary sewer trunk lines in the system, as collection points for sanitary waste within sub-tributary areas in the City (as dictated in most cases by topography, or reflected in project construction drawings). This exhibit is presented as **Figure 2 in Appendix C**. 'Eastside' sub-tributaries are designated by number, and 'Westside' sub-tributaries are designated by letter. All sanitary waste within the sub-areas will eventually flow through the trunk sewer lines shown, before passing to a downstream tributary, and eventually received at the City's wastewater treatment plant.

Design capacity calculations for major sewer trunk lines were prepared, using theoretical values for I/I influence. These design calculations are shown on **Figures 3 and 4 in Appendix C,** and are separated into spreadsheets for the 2 major halves of the system, designated as 'Eastside Trunk Sewer' capacities, and 'Westside

Trunk Sewer' capacities. Sewer lines tributary to the geographic east side of the City are generally newer lines, whereas west side sewer lines (which include old Village downtown) are older.

As noted in the capacity spreadsheets, based on total development densities permitted by zoning, certain sewer lines' flow exceeds acceptable standards created by regulatory and other recognized government authorities. This finding can be attributed to either I/I influence, restrictions due to pipe slope, or general planning and resultant development of the system as a whole (allowing more connections to a sewer line that it can handle, or connecting large lines upstream to smaller lines downstream). These system deficiencies are highlighted on the capacity spreadsheets by specific location, and cross-referenced to the **Figure 2** tributary map in Appendix C. In general summary, most sewer trunk line deficiencies were confined to the Westside system, and are prevalent in the old Village downtown areas south of Broad Street, adjacent to State Route 310. Sewer infrastructure in the 'Main St' tributary (where North End, 2nd Avenue, Pataskala Green, Cedar Front, and Lincoln Wood sewers enter that line) appears to be significantly over capacity. [It must be noted, however, that City operations staff's observations have not substantiated a major 'over-capacity' problem by visual inspection during recent rain events. This may be attributed to lower-than-OEPA-expected water use per household, or due to initial successes of City I/I reduction efforts. In either case, a regular, annual flow monitoring program is recommended prior to the endorsement of sewer infrastructure capital improvement projects targeted at capacity relief. This approach will quantify and monitor flow capacity prior to large capital expenditures].

Following capacity calculations, results were compared to flow monitoring locations from the City's 2003 report, and values were noted (where applicable) in the capacity spreadsheets. Certain capacity bottlenecks within the system have been identified as a result of this analysis, and project recommendations are noted in subsequent sections of this report, along with system cleaning and preventive maintenance initiatives indicated below.

4.1.3 Sanitary Sewer System - General Maintenance History

As with any aging system, Pataskala's sanitary sewer infrastructure has required maintenance over time. WESCG consulted with City system operators throughout the course of the work, and requested that they identify ongoing maintenance issues over time (with focus on the past five years), which could indicate or further emphasize system deficiencies. In addition, City staff identified certain ongoing preventive maintenance plans in concept or practice, such as sewer cleaning and televising, which have been conducted on a limited basis. As a general rule, the City should aim to maintain a video log of all sewer lines, updated roughly every five years. Trunk sewer lines should be cleaned on a regular basis, and I/I mitigation and follow-up flow monitoring should occur on a maintenance schedule.

4.1.4 Sanitary Sewer System - Manholes

A large component of the wastewater collection system, sanitary manholes are generally placed every 400' within central public sewer systems, or at changes in horizontal alignment, such that sewers can be accessed to free blockages. The City's wastewater collection system includes approximately 737 manholes, a majority of which are precast concrete and in good condition. As system manholes age, however, they become a potential source of I/I, and should therefore be monitored and maintained in good repair. Manhole interior (generally concrete or brick) surface should be in good condition, steps in good repair, and joints (if any) should be intact. Manhole lids shall not be vented, particularly for manholes located in low elevation areas. Further, the manhole flow channel should be free from restrictions and sediment.

Throughout the course of the study, in tandem with City staff, field inspection of individual sewer manholes was conducted in order to establish an initial inventory, update its numbering/identification system, and present recommendations to mitigate deficiencies. Manhole inspection inventory for the City was not complete at the time of this report, but remains a work-in-progress. Samples of inspection sheets are presented in **Figure 5 of Appendix C** and a compilation of the inspection forms received to date are presented in **Figure 6 of Appendix C**. From these and other reports, certain conclusions about manhole rehabilitation have been drawn and are noted in project recommendations in **Appendix H**.

4.1.5 Sanitary Sewer System - Pump Stations

The City of Pataskala owns and operates seven sanitary sewer lift stations, which are controlled and monitored via the City's new SCADA software, to aid in operations. They are of varying age, condition, and hydraulic capacity, and were physically inspected and tested for this study effort. Collectively, the pump stations are in good condition, but certain stations have repair needs that should be addressed in the short term, to reduce ongoing maintenance and sustain design capacity. A summary of field investigation is noted below, shall be addressed separately in the following. Individual inspection forms can be found in **Appendix C**. It is noted that inspection and pump testing of each station should occur annually, followed by preventive maintenance and repair activity, as these stations are critical to continuity of service.

1. Creek Road Station:

The Creek Road Lift Station is located on the east side of Creek Road near the WWTP, is fully enclosed by a fence, has a lockable gate for system security, and it is in good structural condition upon visual inspection. It is triplex (3) pump system, but only two of the pumps are operational, causing it to operate as a duplex system with reduced capacity. All pumps are submersible, with the third (non-operational pump) being much older than the other two. The two working pumps were tested and found to have pumping rates of 875 and 940 gallons per minute (GPM), wherein their design capacity were both 1,150 GPM; this indicates normal wear and tear. This station is in good condition, but pump #3 is recommended for replacement. Similarly, preventive maintenance on pumps 1 and 2 should occur on a regular basis, and repair/replacement should follow accordingly, as warranted.

2. Eastside Station:

The East Side Lift Station is situated off Shawnee Loop S, and is not enclosed by fence, which should be considered. The control panel and backup generator however, are in a small locked enclosure. The Eastside Station is in good structural condition upon visual inspection. This pump station has a duplex (2) pump system, but at the time of testing it was noted that pump #2 did not appear to be operating correctly. During testing, it was noted that pump 2 impeller was rotating backwards. The pump was rewired at the time of testing, and this appeared to resolve the issue, however, continued monitoring is recommended. Both pumps are submersible and testing resulted in ratings of 1090 and 1150 GPM, as compared to original design capacity of 1,150 GPM.

3. Blacks Road Station:

The Blacks Road Lift Station is located off of Blacks Road to the west of Foor Boulevard, near the Legacy Estates subdivision. The site is fully enclosed by a fence with a lockable gate for security, and the station is in good structural condition upon visual inspection. This is a newer lift station with a duplex (2) submersible pump system. Everything at the site is in relatively good condition. Drawdown testing yielded rates of 376 GPM and 451 GPM for the pumps, compared to original design capacity of 760 GPM. No improvements are recommended for this station, aside from regular monitoring and preventive maintenance.

4. Settlement Station:

The Settlement Lift Station is located off of John Reese Parkway at the southwestern edge of the Settlement subdivision, and is in good structural condition upon visual inspection. The site is secured by a wire fence and lockable gate. This station operates as a duplex (2) submersible pump system. Though the pump manufacture designates these pumps as non-clog, the station requires regular maintenance due to clogs. Pump #2 was clogged and out of service at the time of testing. Pump #1 was tested and found to have a pumping rate of 223 GPM, compared to its original design capacity of 225 GPM. Note that there also exists a wet well on site for future use that does not have internal or inlet piping, and is currently full of water to counteract groundwater buoyancy forces. It is recommended that pumps in this station are replaced with true non-clog pumps to address ongoing maintenance issues.

5. Administration Office Station:

The Administration Office station is located in front of the Administration office at 621 W. Broad St. This lift station is not surrounded by a fence, however, the wet well, valve vault and control panel are locked with pad locks; site fence should be considered. This is a duplex (2) submersible pump station. Pumping rates were found to be 88 and 110 GPM, compared to design capacity of 120 GPM. The station was found to be in good structural condition upon visual inspection, and no improvements are recommended beyond regular monitoring and preventive maintenance.

6. Sugar Mill Station:

The Sugar Mill Lift Station is located just to the south of Hosanna Lutheran Church on SR 310 at the northern edge of the future Sugar Mill subdivision. This station does not have a fenced enclosure, nor is the valve vault locked; this is a security risk which should be addressed immediately. The Sugar Mill station is a duplex (2) pump system, but does not currently receive flow. During site investigation it was noted that there was water in the wet well, so a drawdown test was attempted. However, it was discovered that the power to the lift station was off. The city plans to do further investigation, as these issues should be referred to the contractor who constructed the station. While in good condition due to lack of use, the City should prioritize regular maintenance checks of the station such that it is in good repair when put into service.

7. River Forest Station:

The River Forest Estates Lift Station is situated on the east side of Creek Road near the southern end of the River Forest Estates subdivision. The site is not enclosed by a fence, but the valve vault and control panel are locked with pad locks; site fencing should be considered. The wet well however, has a standard manhole casting and lid for access, and is not lockable, which in its present configuration is a security risk. This station operates as a duplex (2) pump system, and is the only station in Pataskala that has suction lift pumps. The River Forest Station is the oldest station in Pataskala. The drawdown test was performed on pump #1 with a result of 376 GPM, compared to a design capacity of 400 GPM. A test was unable to be run on pump #2 at the time of inspection; City staff should follow-up to test pump 2 and schedule maintenance as required.

4.1.6 Wastewater Treatment Plant

The WWTP, originally constructed in 1967 and expanded in 1989, has a design capacity of 1.1 MGD. For the purpose of this study, WESCG conducted a thorough site investigation of the WWTP which is presented in **Appendix C**. In general, the existing plant currently experiences hydraulic capacity issues within its Oxidation Ditch which creates sewer overflows from time to time, and the plant is woefully lacking appropriate sludge digestion facilities and sludge storage space. Beyond these challenges, the plant has little ability to control and adjust its processes, as there exists no controlling headworks or other sensors; plant flows are dictated primarily by two major system pump stations at Creek Road and Eastside. Sewage flow received by the plant varies with pump station operation, having great effect on the plant's ability to oxidize flow. Adequate sludge digestion is rarely achieved. Additional, more detailed information regarding WWTP diagnostics are included in the WWTP Solids Evaluation report, conducted by the City and WESCG in 2008.

It is notable; however, that construction plans are nearly complete for major improvements to the existing WWTP, for adequate hydraulic capacity to 1.1 MGD average flow and peak flows of 4.6 MGD. New influent screening, gravity sludge thickener tank, aerobic digesters, and various other site and process control improvements are planned to bring the facility to optimal operating capability. Construction for plant upgrades is planned to be completed by Summer, 2011.

From a regulatory standpoint, few challenges exist on the horizon for this facility. The Pataskala WWTP is authorized by the Ohio EPA to discharge to the South Fork of the Licking River under NPDES permit number 4PB00009*ID, issued April 1, 2009 and expiring March 31, 2014. This permit was issued with special conditions that must be met by the City within specified time limits. Ongoing compliance and monitoring reviews of final effluent limits for total dissolved residue and total recoverable strontium are being coordinated with OEPA. Further, the next renewal application must include a letter stating that the discharge of mercury complies with water quality standards, or submit an application for a variance. No other violations or sanitary sewer overflows have been documented in this permit.

It is notable, however, that OEPA efforts to complete Total Maximum Daily Limit (TMDL) studies for various receiving streams in Licking County is ongoing. As these studies are drafted by OEPA, the City should monitor their progress; as conclusions are reached on receiving stream pollutant loading, certain additional (currently unknown) requirements/limits may be placed on the WWTP for sampling, monitoring, and compliance.

4.2 Water Distribution System

4.2.1 Water Distribution System - General

The City of Pataskala potable water supply is a treated groundwater source. The City owns and maintains two water treatment plants, of 900 gpm and 650 gpm capacity, for a total production capacity of 2.232 million gallons per day. Each plant is located on a City wellfield site, one on SR310 that actively utilizes four wells, and one on Refugee Road which utilizes two wells. The City owns a third wellfield on Mill Street, which is not currently utilized. The City's distribution system piping network is comprised of approximately 291,100 feet of 4" to 12" pipe, of varying age, condition, and material. The distribution system provides water in two pressure zones, from four elevated storage tanks that pressurize the system, and one booster pump station on Broad Street. Collectively, Pataskala's potable water system is in good condition.

4.2.2 Water Distribution System – Source of Supply/Groundwater Wells

Stemming from concerns raised by the 1999 Utility Study, hydrogeological review of Pataskala wellfields' sustainable yield was a major focus of this study. A summary of findings is noted in brief below, but the complete text and exhibits of the hydrogeological review is included in **Appendix D**.

The City of Pataskala is situated on a major watershed divide between the Scioto River basin and the Muskingum River basin. This location provides challenges for the groundwater resources available within the City and the study area. The geology in the study area consists of two large buried valleys over 300 feet deep. The bedrock has generally been regarded as a poor aquifer. The soils above the bedrock in the study area also have many areas of relatively impermeable layers of clay, which hinder the ability of the aquifers to recharge from either the South Fork of the Licking River or from precipitation.

A review of the Ground Water Resources of Licking County map produced by the Ohio Department of Natural Resources (ODNR) in 1992 shows that groundwater resources available within the study area that are capable of providing a sustainable yield suitable for a city's demand are limited.

The southern portion of the City of Pataskala, and the study area, currently has six ground water production wells in service by the City of Pataskala. Four of these are situated just south of the City on SR 310 at Water Treatment Plant #1 along Muddy Fork Creek. The remaining two production wells are located at the corner of Refugee Road and Watkins Road at Water Treatment Plant #2 along the South Fork of the Licking River. Two future well sites have been studied and designed for this location. In addition, other jurisdictions (primarily SWLCWSD) operate groundwater wells in general proximity to the City's system, which have the ability to influence the City's system.

Several hydrogeological studies have been commissioned in recent years, by Ohio Department of Natural Resources and various other governmental entities, including Pataskala and SWLCWSD. The comprehensive evaluation conducted with this study has indicated the following:

1. Together, the City's three wellfields can be relied upon to safely yield between 2.8 – 3.2 MGD
2. Most of the City's wells are new, and test data indicates they are in good condition
3. The greatest interference with City wells' yield is that of the City's other wells (due to proximity); little interference is felt by SWLCWSD or other jurisdiction's wells
4. In order to achieve maximum performance from the City's existing wells, aggressive wellfield management is required, particularly at WTP #1, due to well locations relative to each other, and well pump/screen elevations. If not managed, the City's investment cannot be fully realized and may have negative impact on well yield
5. It is strongly recommended that the City identify a viable, additional wellfield site (including test hole, drilling, 24-hour and Step-drawdown tests, and chemical analysis) for purchase of land, such that it preserves an additional future supply before regional development precludes this possibility

Generally speaking, the City's water supply is in good position and condition to remain viable. Wellfield management and monitoring, periodic well cleaning and video inspection, and future well site identification/acquisition are recommended outcomes from this study. Further, it is recommended that the City initiate regular coordination and communication of wellfield management initiatives with SWLCWSD, to safeguard the prudent use and protection of the region's groundwater resource.

4.2.3 Water Treatment Plants

Both of Pataskala's water treatment plants utilize groundwater source of supply, then aerate and filter raw water for iron removal, and polish with ion exchange softening systems. The combined design production of the two plants is 2.075 MGD (with planned expansion capability to a total of 2.950 MGD), however, hydraulic limitations in the current storage and distribution system will make this difficult to achieve if they are left unattended. A review of Monthly Operating Reports for both facilities indicates that in the most recent year, the plants collectively produced an average 0.793 MGD.

Water Treatment Plant #1, located at 7024 Hazelton-Etna Road, was originally constructed in 1955, but has undergone expansion in 1965, improvements in 1985, and further expansion in 2002. WTP #1 is in fair condition. There are four active wells at this site, but only three are operational, as one is currently out of service. The plant itself employs three dual aerators, four Tonka softening units, two transfer pumps, and four high service pumps to achieve a maximum output rating of 1.2 million gallons per day (MGD). Waste byproduct from the water treatment process is discharged to the City's sanitary sewer system. Plant operations are monitored and controlled through a PLC-based SCADA software.

WESCG conducted a site investigation of Water Treatment Plant #1 for the purpose of this study, which is presented in **Appendix E.** The investigation report notes a number of maintenance/repair items that need to be addressed, few of which likely impact plant operations.

Water Treatment Plant #2 is located at 8000 Refugee Road, and was constructed in 2007. This plant draws from two wells on site, and one aerator, two Tonka softeners, two transfer pumps, and two high service pumps give this plant a maximum output rating of 0.875 MGD. Waste byproduct from the water treatment process is directly discharged to stream outfall at the rear of the plant; accordingly, WTP #2 has its own waste discharge permit by the Ohio EPA (for discharge to the South Fork of the Licking River under NPDES permit #4IZ00051*AD, issued July 1, 2005 and expiring June 30, 2010). This permit was issued with special conditions requiring biomonitoring for toxicity at four locations. These stations are continually monitored, and results are reported to the Ohio EPA quarterly.

WTP #2 was designed to accommodate space for future upgrades for increased production/permit capacity, with the addition of equipment. No formal investigation of this site was conducted for this report, as WTP #2 is in 'like new' condition. No recommendations for improvement are made at this time, aside from regular preventive maintenance of plant components.

Collectively, the City's groundwater supply and water treatment mechanisms produce a high quality water that consistently meets Primary Drinking Water Standards set by the OEPA. The 2008 Consumer Confidence Report (CCR) for the system is shown in **Appendix E**.

4.2.4 Water Distribution System – Elevated Storage and Booster Station

Pataskala pressurizes its water system through four elevated water storage tanks and one booster station, constructed circa 1972, 1986, 1987, and 2003, respectively. From the water treatment plants, water is pumped to the two towers in the low-pressure district (see **Figure 2, Appendix B** for the GIS map of the water system). The low-pressure district towers located on Headleys Mill Road and just off South

Shawnee Loop (referenced by system operators as the 'Southeast Tower') have capacities of 200,000 and 500,000 gallons respectively. From the low pressure district, water is then pumped through a booster station located just east of Oxford Drive on the north side of SR 16, to the two towers in the high pressure district. These towers are both located near the northern edge of the Beechwood Trails subdivision, and have capacities of 200,000 and 500,000 gallons.

The City's elevated storage towers and booster station are critical components of the water distribution system. Water levels in the towers dictate (via SCADA software) when the water plants produce water and how long pumps run. Presently, City staff is engaged in periodic maintenance of the towers, but have not regularly cleaned or inspected tank interiors in recent years. As such, it is recommended that the City increase its preventive maintenance efforts to:

1. Conduct physical inspection of water tower exterior and interior on each tank on a regular schedule
2. On the recommendations of the tower inspections, clean and reapply tank coating to interior wet and dry surfaces, and repaint tower exterior
3. Conduct regular preventive maintenance on the booster station, and frequently test backup power protocols

4.2.5 Water Distribution System – Supply lines and Current Demand

The City's current water supply system is comprised of approximately 291,100 feet of pipe, ranging in size from 4" to 12", and constructed of various materials. Age of the system varies. Generally speaking, the condition of water supply piping can be assessed in various ways: prevalence of water main breaks and leaks; unaccounted for water volume (water produced minus water metered/sold to customers), and water pressure and flow. At present, the water distribution piping network is in good condition, with the exception of certain isolated areas, noted below. Current demand on the system is approximately 820,000 GPD with 2,976 user accounts to residential and commercial units.

For the purpose of this study, WESCG created a computer model of the distribution system using WaterCAD software, in tandem with the newly created GIS map of the system. The computer software incorporates the ‘picture’ of the system (the GIS map included elevations and horizontal position of the pipes), and requires the user to input several variables including system demand; length, diameter, type of material, and age of pipes; elevations and connection points between the pipes; and WTP pump, storage tank, and other reservoir data for supply to the system. With this information, the computer model simulates system use over a 24-hour period, and reports information that can be used to analyze system health. In addition, the computer model is used to simulate fires in areas dictated by the user to assure sufficient flows for fire suppression, and allows the user to simulate potential improvements to the system and model the resultant effect. Modeling software is an excellent tool for infrastructure planning; WESCG recommends that the City continue to update its model for use over time as a cost-effective planning resource.

Following the completion of the water model, it was calibrated for accuracy against ISO testing results provided by the Western Licking Joint Fire District. Then, several scenarios were simulated: 2010 Maximum Day; 2010 Fire Flows (simulation #1: fire location at Pataskala Elementary School; simulation #2: fire at old Village downtown; simulation #3: fire at Kroger shopping plaza on Broad Street; simulation #4: fire in Beechwood Trails); and 2030 Maximum Day. These fire locations were selected by WESCG and approved by City staff, due to the level of vulnerability they pose (i.e., commercial shopping plaza fires require higher flow rates per ISO guidelines, downtown areas generally represent more dense development and are served by older lines, etc.). System simulation results indicate minimum and maximum pressure in all pipes. Pursuant to OEPA guidelines, public water systems shall maintain a pressure of 35 pounds per square inch (psi) during non-fire flows and 20 psi during fire events. The WaterCAD node map is presented in **Figure 1 of Appendix E** and simulation results for six model scenarios are shown in **Appendix E**, for reference.

In present day, with no fire event, model scenarios indicate that all areas of the City water system maintain acceptable pressures. Supply pressures vary throughout the system, generally between 45 psi – 85 psi, with lower pressures at non-looped line extremities. This is expected.

Upon review of the simulated fire events, one area of concern was noted, as follows:

Scenario #3 – Fire at Old Village Downtown

- Negative pressure is noted in at the end of Cedar Street during a fire simulated on North Street, affecting water supply, likely due to small water line sizes.

In general terms, the City's water system simulations indicate that it will meet demand in multiple scenarios. Infrastructure improvements to correct the above-noted deficiency is recommended, and described in detail in **Appendix H**.

4.2.6 Water Distribution System – General Maintenance History

As noted above, other characterizations of the condition of Pataskala's water distribution system are made by the prevalence and locations of line breaks and leaks, and estimated volume of unaccounted for water (produced versus sold/metered). WESCG requested that system operators summarize major maintenance/repair areas in the past five years, and the following represents areas of substantial effort:

- 7 Water main breaks along Jefferson Street between Mill Street and Walnut Street
- 6 Water main breaks along or near Middle Ground Road in Beechwood Trails
- 4 Water main breaks near intersection of Poplar Street and Dennison Street
- 3 Water main breaks along Oak Meadow Drive
- 3 Water main breaks near intersection of Mill Street and Washington Street
- 1 Water main break along Watkins Road

- 3 Fire Hydrant replacements near intersection of Grand Road and Beecher Road
- 50-60 saddle repairs in Beechwood Trails
- 5 Copper service leaks on Shawnee Loop South
- 7 Copper service leaks in Broadview Crossing
- 5 Copper service leaks in Pataskala Ridge
- 3 Water main breaks on SR310 near RR tracks

While reported water main breaks are fixed immediately, care must be taken on a case-by-case basis to ascertain the cause of the break, and monitor localized geographical areas' break history such that contributing factors are identified. As breaks occur in localized areas over time, water main replacement is often warranted, over multiple repair clamps. Appropriate repair mechanisms vary, but most often, water main sections with multiple repairs will require water line replacement. From the list above, service and saddle repairs are common, particularly within Beechwood Trails subdivision. Permanent fixes for several of these high-frequency repair areas is noted in **Appendix H**, contemplated such that maintenance resources will be better utilized over time.

Aside from these heavy maintenance areas, Pataskala is mindful of areas in which maintenance needs are not known to them, where leaks and breaks result in 'unaccounted for' water. In 2009, Pataskala WTP's produced an average of 0.793 MGD, yet metered water sold to customers during this period averaged 0.596 MGD; therefore, 25% of all production (and revenue from sales) is not accounted. Upon further study, some sources of unaccounted for water have been identified as unmetered water at the Fire Department, unmetered water at Foundation Park and Karr Park, unmetered water at City Police and Street Department and Cemetery, and unmetered water used at City Water and Wastewater Plants, where City Council and administration may elect to review current policies and capture additional future revenues. Beyond these sources, water meter age and water line breaks/leaks contribute heavily to produced yet unsold water figures. At present, the City is actively engaged in a project to replace its water meters; this project will likely have a positive effect on water system revenues. It is recommended that Pataskala continue to monitor water revenue trends, and consider metering work to isolate and identify potential leaks should trends to unaccounted for water increase.

One final measure of the health of any water system is that of looped/redundant feeds. In short, public water systems should strive to have multiple feed points for water supply in the event of line breaks. Pataskala's water system is in fair condition for redundant feeds; however, this should be an ongoing focus in future planning.

4.3 Storm Sewer System

4.3.1 Storm Sewer System - General

The City of Pataskala is situated along a major watershed divide between the Scioto River basin and the Muskingum River basin. The divide is approximately a half-mile wide and cuts across the city from near the Refugee Road / Columbia Road intersection on the south to the Morse Road / Beech Road / Clark State Road intersection on the northwest side of the City as seen in **Figure 1 of Appendix F**. The land area in this divide area is characterized by highly clayey soils, high water table and numerous large ponding areas after rain events. Due to these features, this divide area has little development potential and as such has a zoning designation of 'Agriculture'.

The smaller portion of the City to the west of this divide flows to the Blacklick Creek. The majority of the City flows into either the Muddy Fork or the South Fork of the Licking River. The Muddy Fork converges with the South Fork of the Licking River near the Mill Street / Township Road / Creek Road intersection. These drainage basins generally have well defined stream corridors, which are highly favorable for further development. The City of Pataskala adopted Ordinance 2003-3477 establishing authority to control the quality of stormwater discharged into its waterways. The requirements are established in the Codified Ordinances of the City of Pataskala, Part H - Subdivision Regulations, Code 1119 – Stormwater Management. This section governs stormwater runoff for new development within the City. This code follows the guidelines as set forth by the Ohio Environmental Protection Agency and the Ohio Department of Natural Resources' "Rainwater and Land Development" manual. The guidelines limit the amount of stormwater flow from new developments as well as establishing best management practices during construction and post-construction of new developments.

As such, as development has expanded in pockets throughout the City of Pataskala, the City maintains many independent stormwater collection systems. In general, they are contained within new developments, and can be described by individual subdivisions. Many of these systems have an initial outfall into on-site detention or retention basin. Outside of developments, the stormwater system consists of open ditches, roadway culverts and drive pipes that extend along major roadways. All of the systems eventually discharge to the South Fork of the Licking River directly or by way of the Muddy Fork, or other small tributaries.

Pataskala is authorized by the Ohio EPA to discharge stormwater as a Small Municipal Separate Storm Sewer System – Rapidly Developing Watershed. This permit (4GQ1007*AG) was issued on, and became effective January 30, 2009, and will expire on January 29, 2014. As part of the permit the City was required to develop and implement a Stormwater Management Plan (SWMP).

Pataskala's SWMP (revised April, 2009) outlines the City's goals to improve its stormwater system, and also provides a strategy to accomplish these goals in a five year plan. Of note, a plan to inventory, map, monitor, and police all stormwater structures will be created to eliminate illicit discharge. Construction runoff will be curbed by the inclusion of regulations in the stormwater management plan and the addition of a stream buffer zone ordinance. A systematic storm drain and ditch cleaning process and schedule will also be created to assist in the prevention of pollution.

As part of this utility study, the City has finished mapping the stormwater system within the main area of Pataskala (**see Figure 3 of Appendix B**). The City also conducted a study in 2008 titled "Outfall Mapping and Screening Inventory Protocol Manual" to detect and map outfalls within the City. This report also analyzed these outfalls to determine if any outfalls were discharging illicit substances. Of the 451 outfalls recorded, 33 were shown to have probable pollutants. This report also outlined a procedure for the City to continue monitoring these outfalls to access for illicit discharges in the future as to meet their goals in the City SWMP.

Generally speaking, formal storm water infrastructure in rural agricultural areas is uncommon, when compared to open ditch drainage, due in large part to flat topography. Accordingly, flooding concerns in primarily agricultural regions are expected, as neither the limited infrastructure nor the region's ditch system can efficiently handle large rain events. Pataskala's stormwater infrastructure and history of flooding complaints mirror these trends. When consulted for the purpose of this study, City staff expressed strong concern for existing infrastructure suitability, frequency of flooding complaints, and candidly, manpower sufficiency to begin addressing these concerns in a manner commensurate with SWMP goals. As Pataskala corporation limits include both large (poorly drained) agricultural acreage, and aging, under-capacity (for its large tributary) ditch system and infrastructure, the Pataskala storm sewer system is considered to be in fair condition.

4.3.2 Storm Sewer System – Existing Stormwater Sewers

The City of Pataskala's storm sewer system is comprised of approximately 10,150 feet of stormwater collection piping which does not include roadway and drive culverts, 1,180 storm structures and 15 detention/retention ponds. Recently constructed portions of the system seem to be satisfactorily sized to handle stormwater flows, however, certain developments within the City did occur prior to the onset of storm water design standards, which makes issues more evident during rain events.

City staff provided, for the purpose of this study, multiple previously-completed, target area storm water reports. Conclusions from most of the reports have not been implemented due to lack of funding. Some of these (and other) historically flood prone areas include: Summit Station; Columbia Center; Blanche Addition; Mink Street - south of the railroad tracks; Halloon Lane; Refugee Road; International Drive; Dixon Road; and Sims Road. Some of these flood prone areas are in the drainage basin divide area, and as such, have no quality outlet locations. As designed in the Stormwater Management code 1119, as new developments within the City continue, peak stormwater flows need to be maintained at or below the pre-developed rate to ensure downstream stormwater system are not negatively affected.

4.3.3 Storm Sewer System - General Maintenance History

WESCG discussed with City staff throughout the study, and requested that they provide maintenance records from the last five years. Maintenance records indicate that Pataskala Street Department staff cannot currently accommodate the number of complaints received, having neither the time or resources to keep catch basins and ditches cleaned and maintained, despite having actively pursued improving its stormwater system over the past five years. Installation of new sewers, replacement of failing sewers, and cleaning of sewers and ditches are all attempted regularly as part of the effort to keep the storm sewer system in good repair. Continued effort on part of the City to maintain the stormwater sewer system as well as keeping roadside ditches clean will ensure that the City's system operates as effectively as possible.

4.3.4 Storm Sewer System – Floodway Bottlenecks

The existence of potential floodway "bottlenecks" are also an area of concern for the City. A bottleneck is any structure that impedes the flow of a stream.

Generally, these bottlenecks are limited to bridges or roadway culverts. All of these structures are designed to allow unrestricted normal flow of a stream; however, it is impractical to design a bridge or culvert to allow unrestricted flow for a stream in a flood event. However, these structures should be designed to allow the flow of a 100-year storm event under the bottom of the bridge. The characteristics of these "bottlenecks" are shown in **Figure 2 in Appendix F**: These potential bottlenecks have been analyzed to determine the 100-year flood level at the bridge and the amount of water able to flow through these bridges by studying FEMA records and reports. The FEMA records indicate that during a 100-year storm event, the bridge/culverts crossing the South Fork of the Licking River at Township Road, McIntosh Road and Cable Road have water that is slightly impeded by the bottom of the bridge. The culvert at Cable Road is currently under construction while the study is being conducted, however, the newly constructed culvert should address these concerns. While neither the Township Road nor the McIntosh Road crossings are overtopped during a 500-year storm event, the effect of these bottlenecks causing flooding upstream should be considered and further studied.

Infrastructure improvements to mitigate flooding, along with critical tasks of the SWMP are noted in **Appendix H**, and recommended. However, additional, case-by-case study of each is recommended prior to construction, as regional development over time may impact the scope of each project. Further, City officials may want to consider additional financial mechanisms to support these much-needed improvements on an ongoing basis, such as creation of a storm water utility, or other fee-related vehicles.

5 FUTURE DEMAND WITHIN THE PLANNING AREA

Assembling a picture of what the future might bring is a difficult task. Many variables can and will affect how the City and the Planning Area are developed, and therefore what public works will be necessary. As previously referenced, **Figures 8, 9, and 10, in Appendix A** represent areas with strong development potential in 5, 10, and 20 years' time. Study of the nature of potential development in these areas, as outlined in City and County Land Use plans and zoning codes, enables future utility service demand to be quantified. **Figures 1, 2, and 3, in Appendix G** summarizes the *additional* forecasted residential and commercial/industrial development demand that is expected to occur in the next five, ten, and twenty years. These exhibits are based on the projections by the Mid Ohio Regional Planning Commission (MORPC), and are summarized in the table below:

	2015	2020	2030
New- Residential	673,000 gpd	1.306 MGD	1.882 MGD
New– Commercial/Industrial	292,000 gpd	617,000 gpd	1.273 MGD
TOTAL DEMAND	965,000 gpd	1.923 MGD	3.155 MGD

With current (2010) demand for utility service in the planning area estimated at 2.74 MGD, it is important to note that these figures are projected to rise nearly 35% in the next five years, and more than double within the planning period. It is also notable that Pataskala's water infrastructure capacity could accommodate this magnitude of development until approximately 2020, while its sanitary sewer infrastructure capacity could not begin to support much more than it does in present day.

Of projected development areas, none has greater potential for Pataskala than the SR 161 corridor. While located outside City corporation limits, development of this area will affect the City in significant ways. It has been estimated that this intersection will experience quick commercial development, with the possibility of as much as 30% of the buildable area at SR 310/SR161 interchange being covered in as little as five years.

Modest growth pressure will then be expected along the SR 310 corridor from the intersection at SR 161 to, and into the Pataskala City Limits. This growth will be facilitated by the commercial zoning that currently exists along SR 310 in Harrison Township. The SR 310 corridor south of the City, in Etna Township, is expected to continue to grow at about the same rate that it has experienced over the past 10 years.

Commercial development is also expected in the Jobs Ready Site (JRS) currently being constructed. Only 10% of JRS development is estimated to be seen within the next five years. However, this percentage could vary depending on the implementation of one of the seven possible scenarios presented by MORPC in the SR *310 Corridor Traffic Study Strategic Plan.*

In the western part of the City, zoning designates a narrow band of general business district along either side of SR 16 that is largely undeveloped at present. This strip of real estate will become more vital as the border areas between Reynoldsburg and Pataskala become more densely inhabited. Also west of the City, ongoing development of the Mink Street corridor is highly anticipated.

6 ANALYSIS: COST-EFFECTIVE UTILITY SERVICE TO MEET FUTURE DEMAND

City of Pataskala has sought and included the input of all governing bodies of surrounding jurisdictions in the planning efforts of this study, as stakeholders in the interest of its development over time. Meetings have been arranged to facilitate information exchange with respect to all aspects of this study. Much information has been received to support its conclusions on how best to provide cost-effective utility service to the planning area.

At the outset of this report, and upon review of numerous planning studies conducted to date, WESCG determined that, were regional cooperative efforts and initiatives to continue, previous studies and service agreements between stakeholders must be identified and their intent preserved. In short, prior determinations of service territory and/or presence of utility infrastructure would not be eschewed without overwhelming evidence. Conversely, prior planning document conclusions would play a strong role in the analysis phase of this study.

Reviewing **Figures 8, 9, and 10 in Appendix A** for pockets and corridors of development, in comparison to both the Statewide 208 Plan (**Figures 3 and 4 in Appendix A**) boundaries, and the Pataskala-SWLCWSD Agreement of 2004 (**Figures 2a and 2b in Appendix A**), it is clear that neither Pataskala's existing infrastructure (**Figures 1, 2, and 3 in Appendix B**) nor its previous legal service territory agreements support that much of the planning area development could be cost-effectively served by the City. Pataskala's water and sanitary sewer lines do not exist in close proximity to many of the development areas, and most of these areas exist outside territory earmarked by the City.

Review of infrastructure maps provided by stakeholders indicates that a majority of development potential in the planning area can be easily served by or is adjacent to existing infrastructure owned by SWLCWSD. These concepts are supported in their water system master plan, completed August of 2006, and their sanitary sewer facilities plan completed in August of 2004, provided to WESCG for review as part of this effort. Therefore, the need for Pataskala to conceptually plan and cost estimate utility service to development areas along Mink Street, State Route 310 South of Refugee Road, along Watkins Road north and south of the City, was deemed impractical and not feasible, and this effort was discarded.

Licking County provided its *Phase I Facilities Plan: Initial Feasibility Review* and its *Phase II Facilities Plan: Analysis and Recommendations of Feasible Alternatives*, both by R.D. Zande & Associates, to aide in the planning initiatives of this study. These two studies focus on the SR 161 corridor and recommend a service provider, identified by Licking County as SWLCWSD. It is notable that the City of Pataskala did not have a major role in the preparation and coordination of this work.

As a planning guide for wastewater matters only, the Statewide 208 plan (as prepared by the OEPA) is the embodiment of the State Water Quality Management Plan (WQM). The primary objectives of which are to identify anticipated waste treatment works, their responsible agencies, and implementation measures necessary to carry out the plan. It is the assessment of the OEPA that large scale regional planning of sewer and treatment capacity is appropriate and necessary at this time in central Ohio counties. There are two types of prescriptions given in the 208 plan, generic and specific, previously referenced in this report. The generic prescriptions are statements that address permitting, parameters, and responsibilities for all wastewater treatment efforts of applicable entities. Six of these have been prescribed for the City of Pataskala, and should be reviewed prior to installation of any wastewater treatment system, public or private. Specific prescriptions are spelled out by locality per county. Although these are tailored to the exact facility, and accurately describe its attributes, they are not specific recommendations. Instead, they effectively exemplify the need for cost effective wastewater facilities that will meet current and long range capacity needs for the area. Some caveats and some endorsements are addressed, but the following statement by the OEPA is an effective summary: “It is Ohio EPA’s finding in this update of the State 208 plan that a coherent regional plan is needed to address sewage collection and treatment needs throughout the county, especially along the anticipated growth corridors in western Licking County."

In consideration of the above items, there remain certain areas where the questions of proximity and territory have not yet dictated future planning, highlighted on **Figure 4 in Appendix G** as 'Utility Service Focus Areas' for Pataskala. These areas include:

- SR310 North, to SR161
- Broad Street corridor to Mink Street
- Blacks Road corridor to Watkins Road
- SR 310 South to Refugee Road

While multiple other jurisdictions' infrastructure information was reviewed in preparation of this report, none of the City of Reynoldsburg, Licking County, or City of Columbus utility infrastructure exists in close enough proximity that it might be utilized cost-effectively.

7 CONCLUSIONS AND RECOMMENDATIONS

Several recommendations are made by WESCG to conclude this study, and are divided into three key functional classifications: *Restorative* (to restore service and/or capacity, or create redundancy within the City's system); *Maintenance* (includes service contracts); and *Anticipatory* (to support future development). All project recommendations resulting from the study effort are presented as **Figures 1, 2, and 3 in Appendix H**. In general, the largest project classification is Restorative, as the City's infrastructure continues to age. Heavy emphasis should be placed on completion of Restorative class projects in the near term, to retain the City's infrastructure investment value.

In recognition of the Utility Service Focus Areas (previously referenced as **Figure 4 in Appendix G**) for the City of Pataskala, several recommendations have been made for the purpose of positioning the City to retain capability in certain key remaining development corridors. As well-planned utility service can be self-supporting, it is in the best interest of the City to give strong consideration to pursuing these opportunities. Following the diagnostic efforts of this study, the City's water system has great potential to support future development; sanitary sewer system infrastructure will require significant investment to be similarly positioned.

With multiple Sanitary Sewer, Water, and Storm Sewer recommendations, WESCG has provided planning-level estimates of cost for information purposes. It should be noted that these planning estimates should be revisited prior to annual budget preparation, such that inflationary and other impacts can be accommodated. In total, planning estimates for these projects is noted below:

	Sanitary Sewer	**Water**	**Storm Sewer**	**TOTAL**
Restorative	$6,564,200	$3,198,500	$588,000	$10,350,700
Maintenance **(part annual/ongoing)**	$475,000	$715,000	$370,000	$1,560,000
Anticipatory	$9,473,400	$6,092,500	$750,000	$16,315,900
TOTAL	$16,512,600	$10,006,000	$1,708,000	$28,226,600

With over $28 million in projects identified as outcomes of this study, the task of prioritizing them was achieved by utilization of a Risk Matrix. Illustrated as **Figure 4 in Appendix H**, the matrix plots the existing useful life of City infrastructure (horizontal axis) versus the likelihood of catastrophic result should infrastructure collapse (or in the case of Anticipatory projects, the likelihood of catastrophic result should it not be built). Projects in the upper half of the graph are considered high risk, those below that are low risk. Along the plotted line are those that represent moderate risk.

High, moderate, and low risk potential has been reviewed, and projects separated (color-coded) accordingly on **Figures 1, 2, and 3 in Appendix H**. WESCG then used project risk ratings to create a comprehensive Utility Capital Improvement Plan over time, presented as **Figure 5 in Appendix H**.

In summary, the City of Pataskala's sanitary sewer, water, and storm sewer infrastructure is an investment like no other; a self-sustaining tool to enhance development within the City. Many opportunities to position City infrastructure have passed, but several key ones remain. With heavy emphasis on maintenance, and a renewed cooperative spirit in the region, the planning area can be cost-effectively served.