VALUATION REPORT

City of Wood Heights, Missouri
Water Delivery and Wastewater Collection Systems

Prepared for:

Ms. Nikki Pacific
Manager Business Development – Proposal & Integration
Missouri American Water Company
727 Craig Road
St. Louis, Missouri 63141

Prepared by:

Joseph E. Batis, MAI, AI-GRS, R/W-AC
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Joliet, Illinois 60432

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2023 South Big Bend Boulevard
St. Louis, Missouri 63117

Elizabeth Goodman Schneider, ASA
Goodman Appraisal Consultants, LLC
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Cudahy, WI 53110

DINAN REAL ESTATE ADVISORS, INC.	UTILITY VALUATION EXPERTS, INC.	GOODMAN APPRAISAL CONSULTANTS, LLC
2023 South Big Bend Boulevard	313 N. Chicago Street, Suite 101	6260 S. Lake Drive, #718
St. Louis, Missouri 63117	Joliet, Illinois 60432	Cudahy, Wisconsin 53110

March 7, 2022

Ms. Nikki Pacific
Manager Business Development – Proposal & Integration
Missouri American Water Company
727 Craig Road
St. Louis, Missouri 63141

Re: ***Valuation Report***
City of Wood Heights
Ray County, Missouri
Water Delivery and Wastewater Collection Systems Appraisal

Dear Ms. Pacific:

In accordance with your request, we have made a physical inspection on November 29, 2021, of the facilities and real estate that comprise the City of Wood Heights water and wastewater systems' assets.[1]

The water delivery and wastewater collection systems (referred to herein as "the subject properties") are owned by the City of Wood Heights and are located in Ray County, Missouri. The customer count includes 268 water customers and 194 wastewater customers.

The purpose of the appraisal report was to arrive at opinions of market value of the subject water and wastewater systems as private systems (the intended use) as of the date of our inspection of the subject property systems.

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[1] *Throughout the attached appraisal report, any reference to the appraisers' "inspection", "subject property inspection", "inspection of the subject property", "inspection of the subject water and wastewater systems", etc., refers to the appraisers' customary task of viewing the subject property for purposes of observing the condition, layout, design, and utility of the real property (land and building), as is typical in the appraisal profession and in the framework of completing the appraisal process. The reference to the term "inspection" in the context of the appraisers' work should not be interpreted to suggest the appraisers have any expertise and/or qualifications in the assessment of the condition and functionality of any mechanical and non-mechanical components of the subject property water and wastewater systems. The appraisers refer the client and intended users of the attached appraisal report to the engineer's report for an assessment of the water and wastewater systems' infrastructure components. The three professional real estate appraisers co-signing the attached appraisal report are not qualified to independently detect and assess the condition and functionality of the water and wastewater systems' infrastructure components. However, the three professional real estate appraisers co-signing the attached appraisal report assume that the water and wastewater systems' components (including the plant, pumps, and all related facilities) are in proper working order and have been maintained adequately to meet all pertinent codes and regulatory requirements.*

This Appraisal Report is prepared in conformance with Standards Rule 2-2(a) of the 2020-2021 Edition of the *Uniform Standards of Professional Appraisal Practice* (USPAP). In addition to being prepared in compliance with USPAP, this appraisal has been prepared in accordance with the *Code of Ethics* and *Standards of Professional Practice* of the Appraisal Institute.

In completing our analysis of the subject property water and wastewater systems, we relied on a report prepared by Flinn Engineering, dated January 27, 2022 ("the Flinn report"). The Flinn report is attached to this appraisal report. Based upon our analysis of the subject property systems and taking into consideration the independent report prepared by Flinn Engineering, our opinions of the market values of the City of Wood Heights systems are as follows:

Market Value of Water Delivery System	Market Value of Wastewater Collection System
$800,000	$400,000

This appraisal report is prepared subject to the Extraordinary Assumptions found on Pages 12-14. The assumptions address several significant issues that impact the analysis and conclusions presented in the attached report, including:

Each of the three appraisers co-signing this appraisal report (Mr. Dinan, Mr. Batis, and Ms. Goodman Schneider) participated in the assignment by collecting and analyzing relevant data, and forming the opinions and final conclusions.

In addition, Mr. Jordan Leiner and Ms. Elizabeth S. West of Dinan Real Estate assisted in the collection of data for this assignment. While each of the appraisers performed different tasks and were responsible for different parts of this valuation assignment, the appraisers consulted throughout the assignment with each other, the client, and representatives from the City of Wood Heights.

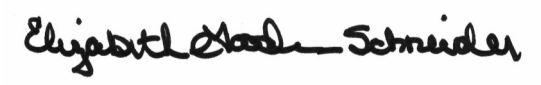
We certify that we personally have no undisclosed interest, either present or contemplated, in the real estate described herein as the subject properties; furthermore, neither the procurement of this appraisal assignment nor the negotiated compensation was contingent upon predetermined conclusions of value, value estimates which advocate the client's position, or the occurrence of any subsequent event.

On behalf of Utility Valuation Experts, Inc., Goodman Appraisal Consultants, LLC, and Dinan Real Estate Advisors, Inc., we appreciate the opportunity to prepare this appraisal report for the Missouri American Water Company. Please feel free to contact the undersigned should you have any questions regarding the assignment.

Sincerely,

Joseph E. Batis, MAI, AI-GRS, R/W-AC
Utility Valuation Experts, Inc.
General Certification Lic. #553.000493 (IL; Expires 09/23)
General Certification Lic. #2016044083 (MO; Expires 06/22)
General Certification Lic. #CG03684 (IA; Expires 06/22)
General Certification Lic. #5660 (TN; Expires 06/23)
General Certification Lic. #4001017857 (VA; Expires 06/23)
General Certification Lic. #TX 131049 G (TX; Expires 11/22)
General Certification Lic. #A8416 (NC; Expires 06/22)
General Certification Lic. #CGA-1027103 (AZ ; Expires 07/23)

Edward W. Dinan, CRE, MAI
Dinan Real Estate Advisors, Inc.
State Certified General Real Estate Appraiser RA001300 (MO; Expires 06/22)



Elizabeth Goodman Schneider, ASA
Goodman Appraisal Consultants, LLC
Colorado Certified General Appraiser No. CG.200001080 exp 12/31/2023
Florida State Certified General Real Estate Appraiser No. RZ4093 exp 11/30/2022
Illinois Certified General Real Estate Appraiser No. 553-001973 exp 9/30/2023
Indiana Certified General Real Estate Appraiser No. CG41700036 exp 6/30/2022
Iowa Certified General Appraiser No. CG02980 exp 6/30/2022
Kentucky Certified General Real Property Appraiser No. 5262 exp 6/30/2022
Louisiana Certified General Appraiser No. APR.04505-CGA exp 12/31/2023
Minnesota Certified General Real Property Appraiser No. 40232088 exp 8/31/2022
Missouri State Certified General Real Estate Appraiser No. 2016042105 exp 6/30/2022
Ohio Certified General Real Estate Appraiser No. ACGO.2017003680 exp 8/10/2022
Pennsylvania Certified General Appraiser No. GA004327 exp 6/30/2023
Rhode Island Certified General Appraiser No. CGA.0020068 exp 8/17/2023
Wisconsin Certified General Appraiser No. 1586-010 exp 12/14/2023

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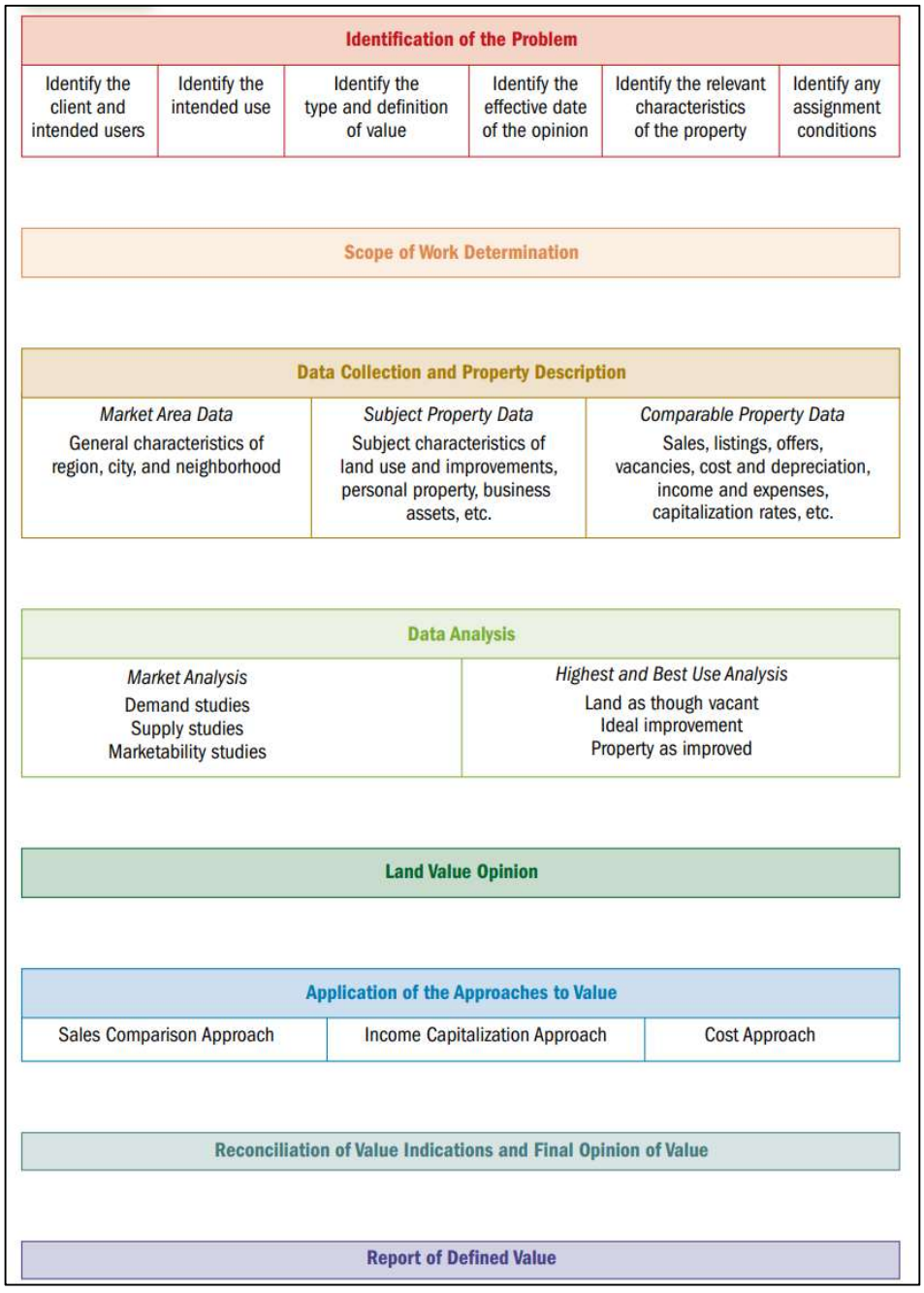
Summary of Salient Facts

Property Type:	Water and wastewater systems
Location:	City of Wood Heights Ray County, Missouri
Facilities:	The subject property includes the facilities that comprise the delivery of public water and the collection and treatment of wastewater. The water delivery system serves 268 customers and the wastewater collection and treatment system serves 194 customers. Please refer to the attached report prepared by Flinn Engineering for a list of the infrastructure, system assets, and facilities.
Date of Inspection:	November 29, 2021
Date of Value:	November 29, 2021
Date of Report:	March 7, 2022
Type of Value:	Market Value
Property Rights:	Fee Simple Estate
Value Conclusions:	
Market Value of Water Delivery System:	$800,000 Eight Hundred Thousand Dollars
Market Value of Wastewater Collection System:	$400,000 Four Hundred Thousand Dollars

The Appraisal Process

The client requested opinions of market value for the City of Wood Heights water delivery system and the wastewater collection and treatment system. In arriving at opinions of value for the two subject property systems, we followed an orderly set of steps that has led us to the final conclusions of market value. This procedure is known as the "Appraisal Process" and is summarized in the exhibit below.



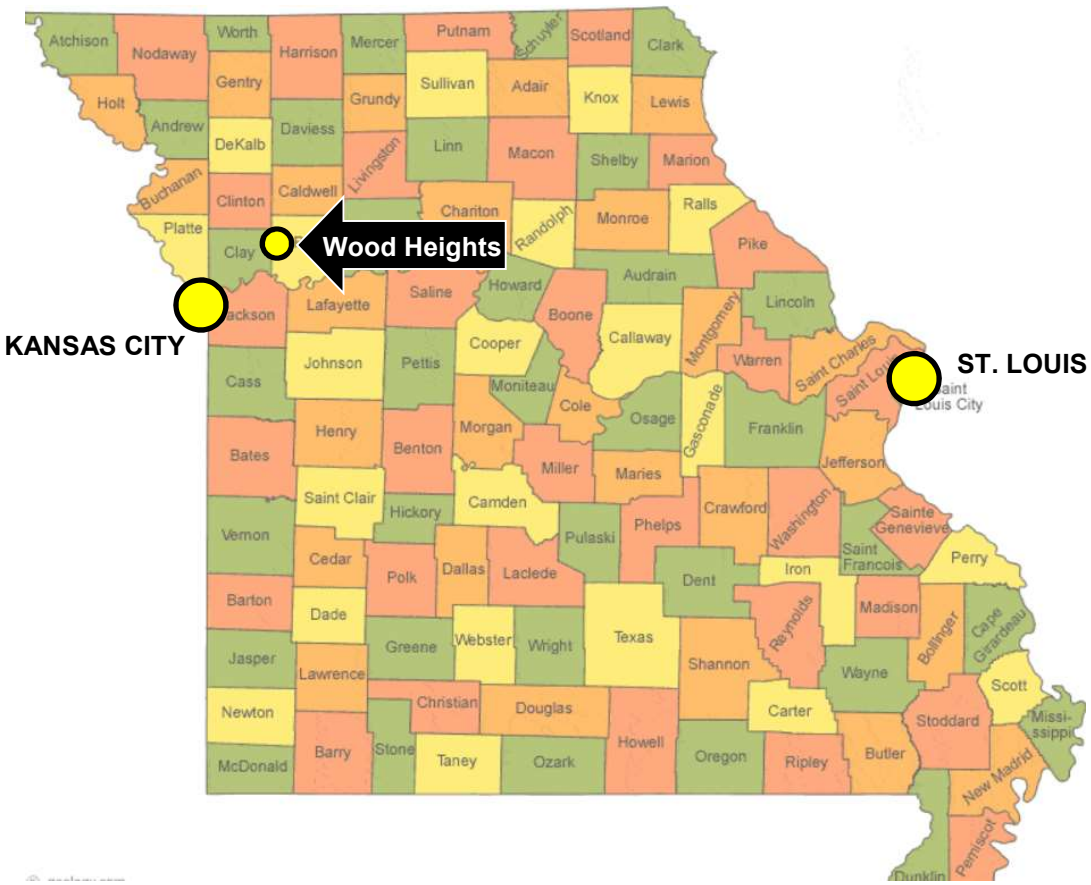
Source: The Appraisal of Real Estate, 15th Ed.,
Published by the *Appraisal Institute*, 2020; P. 31.

Identification of the Subject Properties

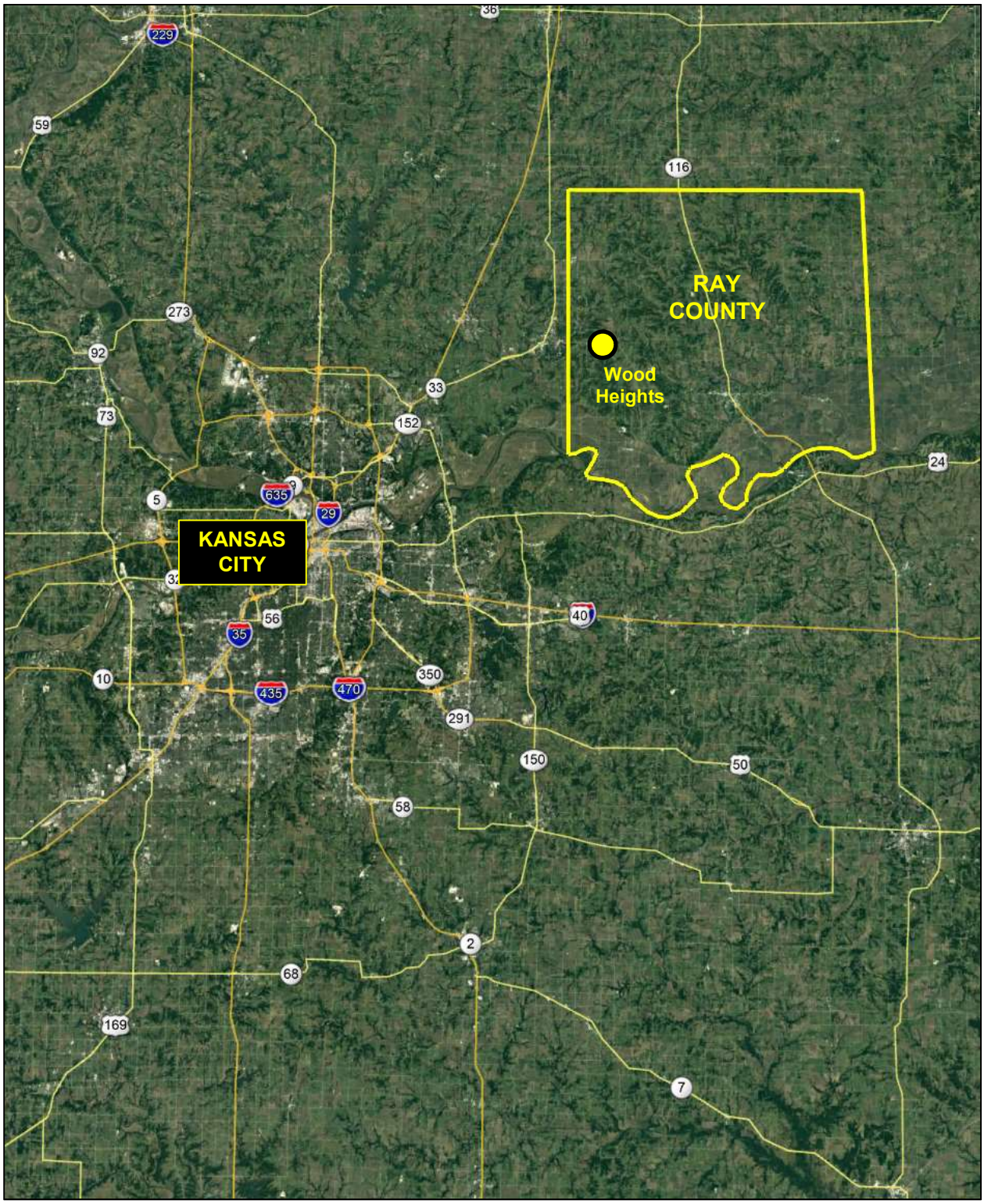
The subject properties are a combination of water and wastewater infrastructure and related components that are owned and operated by the City of Wood Heights. The systems provide services to residents of Wood Heights, located in Ray County, Missouri.

There are 268 customers for the water delivery system and 194 customers for the sewer collection system. The subject property assets include infrastructure and facilities associated with the two systems and includes three parcels of land to be conveyed in fee plus permanent easements (see Extraordinary Assumptions, Pages 12-14 of this report).

The City of Wood Heights is located in the western part of Ray County approximately 30 miles north of Kansas City.

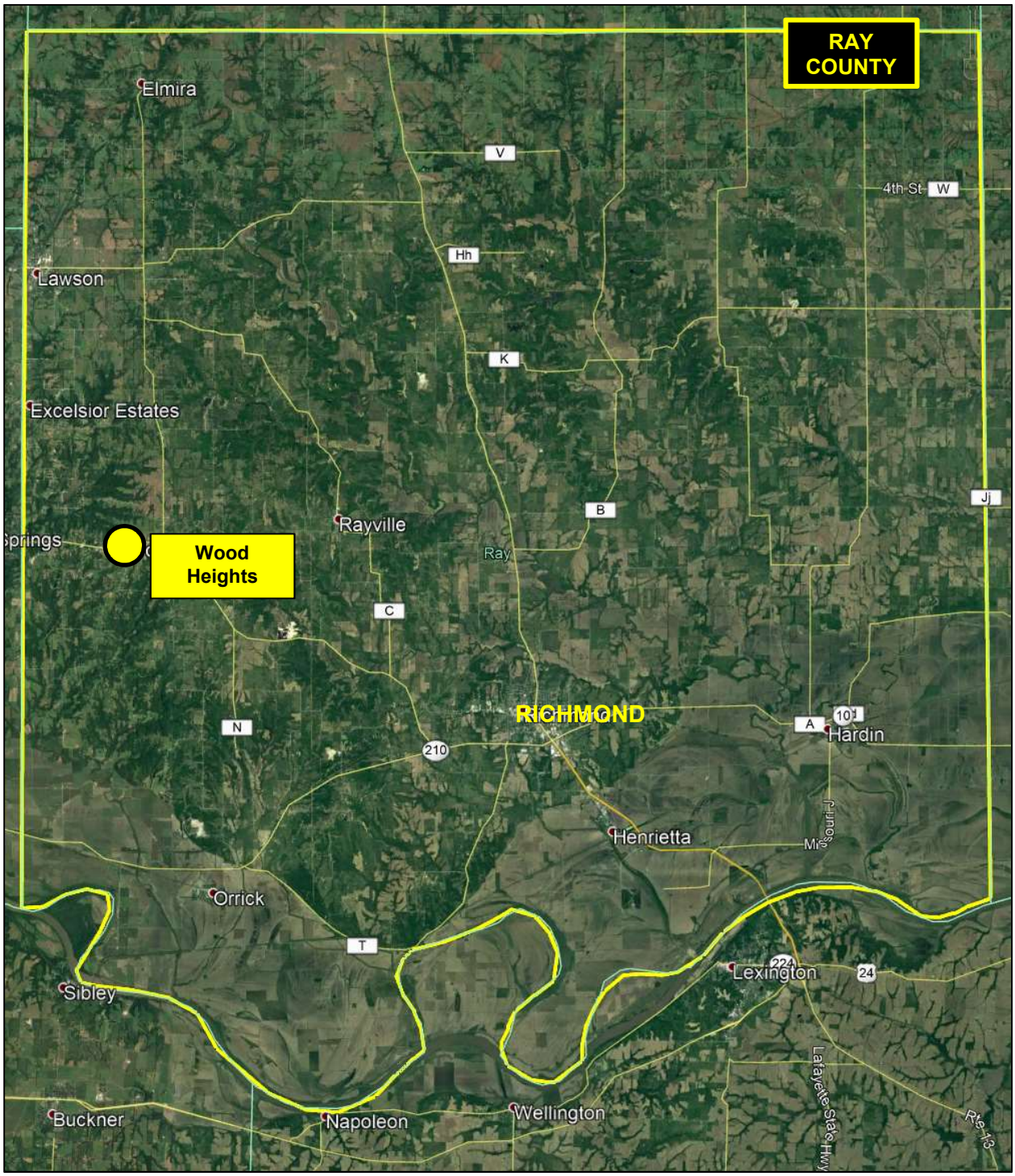


Identification of the Subject Properties
(Continued)



Identification of the Subject Properties
(Continued)

The City of Wood Heights is located approximately 12 miles northwest of the City of Richmond, the county seat of Ray County.



Purpose of the Assignment and Definition of Market Value

The purpose of this appraisal assignment is to arrive at opinions of market value for the two subject property systems.

Market value is defined as:

The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress.[2]

Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

1. Buyer and seller are typically motivated;

2. Both parties are well informed or well advised, and acting in what they consider their best interest;

3. A reasonable time is allowed for exposure in the open market;

4. Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and

5. The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

Relevant Assignment Dates

Date of physical inspection of the property:	November 29, 2021
Effective date of value:	November 29, 2021
Date of report:	March 7, 2022

[2] *The Appraisal of Real Estate,* 15th Edition, (Chicago, Illinois: Appraisal Institute, 2020), p. 48.

Property Rights Appraised

The property rights appraised for the subject properties include the Fee Simple Estate of the properties which is defined as:

> *Absolute ownership unencumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat.*[3]

A fee simple estate implies absolute ownership unencumbered by any other interest or estate.

Legal Descriptions

No legal descriptions have been provided for this assignment. The real property included in this valuation assignment includes three parcels of land owned in fee, permanent easements for two parcels, and presumed permanent easements rights conveyed to Missouri American Water for all mains for the water and wastewater systems and related assets that are located throughout the City of Wood Heights. Please refer to the Extraordinary Assumptions section of this report for an explanation regarding the appraisal assignment assumptions relative to the presumed permanent easements. With respect to the two parcels owned in fee, the parcels have been identified based upon information provided by the representative of the City of Wood Heights at the inspection and county GIS data

[3] *The Appraisal of Real Estate,* 15th Edition, (Chicago, Illinois: Appraisal Institute, 2020), p. 60.

Exposure Time and Marketing Time

The estimated marketing time of a property implicitly assumes the property would be marketed in a manner typical in the market for that particular type of property, including utilization of the normal channels of exposure; also, implicit is the assumption that the asking price would be reasonably close to the market value of the property; and, the sale terms would conform to the market value definition included herein.

Based upon the conditions which prevailed in the local market effective November 29, 2021, we have concluded a reasonable market time for the subject property systems, each as a whole, is 12 to 24 months and the exposure time for the subject properties is also estimated to be from 12 to 24 months.

Intended Use and Intended User of the Appraisal

The intended use of this appraisal report is to assist the client (Missouri American Water Company) and the City of Wood Heights with the acquisition of the City of Wood Heights water and wastewater systems by the client. The intended users of this appraisal report include the client (for acquisition purposes), the City of Wood Heights (for asset disposition), and any regulatory agency with jurisdiction over the transfer of the water delivery and wastewater collection systems' assets from the City of Wood Heights to Missouri American Water Company.

History of the Subject Property

Pursuant to Standards Rule 1-5 of USPAP, we are required to consider and analyze any current Agreement of Sale, option, or listing of the property being appraised. We are also required to consider and analyze any sales of the subject property that have occurred within the last three years.

To the best of our knowledge, and based upon discussions with the client and a representative of the City of Wood Heights, the subject property has not been the subject of any sales, listings, offerings or contracts during the last three years.

Scope of Work

The subject property systems are reportedly owned and operated by the City of Wood Heights. In addition to receiving and reviewing numerous pertinent documents from the client pertaining to the subject property water and wastewater systems, we inspected the subject property, met with a representative from the City of Wood Heights, and collected market data for this assignment.

Proper and accepted appraisal methodology in the subject matter is (1) governed by Missouri legislation[4], and (2) guided by the binding requirements of the Uniform Standards of Professional Appraisal Practice (USPAP).[5]

Explicit in the SCOPE OF WORK RULE section of the current (2020-2021) edition of USPAP is the requirement of the real estate appraiser to include research and analysis necessary to develop credible assignment results. The standard for acceptability of Scope of Work is, in part, what an appraiser's peers' actions would be in performing the same or similar assignment.[6]

In accordance with USPAP, consideration was given to the market standards in the appraisal profession established in other market areas by qualified appraisers performing similar assignments. In our opinion, the applicable professional standards of valuation of utility systems generally in Missouri -- and specifically in the case of the valuation of the City of Wood Heights systems -- are similar to those established and utilized in other market areas, including Illinois.

Illinois has similar legislation in place regulating the procedures for acquisitions of public utility systems by investor-owned companies. Although not identical, the procedures and framework for valuation are considered to be very similar.[7]

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[4] The Missouri legislation mandates the inclusion and participation of three independent professional real estate appraisers, all of which shall be licensed in the State of Missouri. Missouri Revised Statutes, Chapter 393, Section 393.320 (August 28, 2016).

[5] USPAP is developed, interpreted, and amended by The Appraisal Standards Board (ASB) of The Appraisal Foundation. State and federal regulatory authorities enforce the content of the current or applicable edition of USPAP. All state licensed/certified professional real estate appraisers must perform services in compliance with USPAP.

[6] USPAP, 2020-2021 Edition, Page 14.

[7] On August 9, 2013, P.A. 98-0213, codified as 220 ILCS 5/9-210.5, went into effect in Illinois. That Section of the Public Utilities Act ("Act") provides an alternate procedure that a large public utility may choose in establishing the ratemaking rate base of a water or sewer utility that the large public utility is acquiring. Among other things, Section 9-210.5 requires that if the utility company elects the procedures of that Section of the Act, three appraisals shall be performed, the appraisers must be selected by the Illinois Commerce Commission, and each appraiser must be State certified general real estate appraiser under the Illinois Real Estate Licensing Act of 2002.

Scope of Work
(Continued)

The Illinois legislation has been in place since 2013. In Illinois, there have been several conveyances of utility systems from the public sector to investor-owned companies that were subject to the recently-enacted legislation governing such transactions.

The standards for valuation in Illinois have been established by the market and are consistently followed by the professional appraisers who engage in valuation assignments of public utility systems pursuant to the applicable governing legislation. The industry-accepted framework for the valuation of utility system assets includes the application of the Cost Approach and the application of the Sales Comparison Approach, and the omission of the Income Capitalization Approach.

The Income Capitalization Approach is not relied on in the typical appraisals of the utility systems due to the generally limited information available from the market necessary for the credible and reliable application of the Income Capitalization Approach. For instance, a proper application of the Income Capitalization Approach would require substantial detail from competing/alternate utility systems in the market, including, but not limited to, income levels from all sources (historic and future expectations), operating expense details, and market-derived capitalization rates used to convert projected net operating income into present value.

One of the factors impacting the challenges of obtaining necessary income and expense data from other systems pertains to the fact that most of the municipal-owned utility systems include public water and sanitary sewer, and often the management and budget operations for the two systems are not separated. Therefore, we have not applied the Income Capitalization Approach in the valuation of the subject property system. The omission of the Income Capitalization Approach does not result in a misleading analysis or conclusion of value. The omission of the Income Capitalization Approach is in compliance with USPAP, and is consistent with the actions of peers for similar assignments.

We applied the cost approach in arriving at an opinion of value for the system. The cost approach included an analysis and valuation of the parcels in fee, the permanent easements necessary for the water delivery and wastewater systems, the contributory value of the buildings and improvements situated on the fee parcels, and the infrastructure and components that comprise the City of Wood Heights water and wastewater systems.

Scope of Work
(Continued)

We then reviewed limited market data pertaining to sales of other utility systems in order to apply the Sales Comparison Approach. In our selection of market data, we included transactional data pertaining to utility systems located in Illinois. The market data available for utility systems acquired in Missouri is very limited, with Missouri American Water Company being the primary entity acquiring systems. Therefore, it is reasonable and acceptable to expand the search for comparable market data to areas outside the borders of Missouri. We selected the Illinois market due to the following factors: proximity, availability of relatively current market data, similarity of legislative rules governing the valuation process, and the existence of a competitive market environment with multiple buyers influencing the balance of supply and demand.

Also required by Missouri statute pertaining to the valuation is the inclusion of a professional engineer's report addressing the depreciated cost estimates for the components and infrastructure relating to the water delivery and wastewater system. For purposes of this appraisal report, we are relying, in part, on a report prepared by Flinn Engineering, dated January 27, 2022, in which Flinn Engineering arrives at an opinion of the depreciation cost new of the infrastructure components of the City of Wood Heights water and wastewater systems. We reviewed the Flinn Engineering report, consulted with its author, and reviewed the data Flinn relied on in forming their opinions. Furthermore, we reviewed other engineering data and reports pertaining to the subject system as well as several other water and wastewater systems. Based upon our reviews and independent research, we find the report prepared by Flinn Engineering to be thorough, prepared in compliance with industry standards, and credible. Therefore, we have relied on the opinions rendered in the Flinn Engineering report. Our reliance on the Flinn report in consistent with the Appraisal Institute's Guide Note 4 which addresses the conditions for an appropriate reliance by appraisers of reports prepared by others.[8]

The Flinn Engineering report does not give any value consideration to the permanent easement rights being acquired by Missouri American Water Company as part of its acquisition of the City of Wood Heights water and wastewater systems, nor does the Flinn report include any contributory value for the parcels owned in fee that are included with the systems. Therefore, we arrived at an independent opinion of the market value of the easements and fee parcels being acquired as part of the purchase of the subject property water and wastewater systems by Missouri American Water Company.

Finally, we prepared this appraisal report in compliance with the applicable standards as set forth in the 2020-2021 Edition of USPAP.

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[8] The Appraisal Institute has adopted Guide Notes to the Institute's Standards of Professional Practice ("SPP"). The Guide Notes are not part of the SSP but provide guidance on how the standards requirements may apply to specific situations.

Extraordinary Assumptions

The 2020-2021 Edition of the *Uniform Standards of Professional Appraisal Practice* (USPAP) defines an extraordinary assumption as follows:

> *An assignment-specific assumption as of the effective date regarding uncertain information used in an analysis which, if found to be false, could alter the appraiser's opinions and conclusions.*

This appraisal report is prepared subject to the following Extraordinary Assumptions.

INFORMATION PROVIDED BY THE CLIENT AND THE CITY OF WOOD HEIGHTS

We have been provided information for this assignment by the client (Missouri American Water Company) and from the City of Wood Heights. The information is assumed to be correct, accurate, and complete. This includes, but is not limited to, all information pertaining to the subject property systems (financial, physical, legal) as well as all information pertaining to other systems acquired by American Water.

We reserve the right to revise all opinions and conclusions presented herein upon receiving or becoming aware of any information that is inconsistent with and/or contradicts the information provided by the client and the City of Wood Heights. The client and intended users are advised that if this assumption is found to be false, it could impact the analysis and opinions.

WATER AND SEWER MAINS PRESUMED TO BE LOCATED IN PUBLIC RIGHTS OF WAY

The valuation of the subject property water delivery and wastewater collection systems includes the water and sewer mains that are located throughout the community and that connect the facilities. According to City of Wood Heights officials, the water mains and sewer mains are located in public rights of way.

We reserve the right to revise all opinions and conclusions presented herein upon receiving or becoming aware of any information that is inconsistent with and/or contradicts the assumption outlined above. The client and intended users are advised that if this assumption is found to be false, it could impact the analysis and opinions.

Extraordinary Assumptions
(Continued)

IDENTIFICATION OF THE PARCELS OWNED IN FEE

Part of this analysis includes the valuation of three parcels of land owned in fee. Surveys of the parcels had not been performed at the time of this report; therefore, the parcels are described herein based upon information from public sources, namely the county GIS data. The information obtained from the public sources is assumed to be correct.

We reserve the right to revise all opinions and conclusions presented herein upon receiving or becoming aware of any information that is inconsistent with and/or contradicts the land sizes/characteristics as reported herein for the parcels owned by the City of Wood Heights. The client and intended users are advised that if this assumption is found to be false, it could impact the analysis and opinions.

THE FLINN ENGINEERING REPORT

The Flinn Engineering report, dated January 27, 2022, referenced in the Scope of Work section of this report is assumed to be accurate, complete, and prepared in compliance with applicable industry standards.

We reserve the right to revise all opinions and conclusions presented herein upon receiving or becoming aware of any information that is inconsistent with and/or contradicts the information, analysis, opinions, and conclusions presented in the Flinn report. We also reserve the right to revise all opinions and conclusions presented herein upon receiving more detailed and complete information regarding the age and condition of the existing water and sewer mains. The client and intended users are advised that if this assumption is found to be false, it could impact the analysis and opinions.

THE TERM “INSPECTION”

Throughout this appraisal report, any reference to the appraisers' "inspection", "subject property inspection", "inspection of the subject property", "inspection of the subject water and wastewater systems", etc., refers to the appraisers' customary task of viewing the subject property for purposes of observing the condition, layout, design, and utility of the real property (land and building), as is typical in the appraisal professional and in the framework of completing the appraisal process.

The reference to the term "inspection" in the context of the appraisers' work should not be interpreted to suggest the appraisers have any expertise and/or qualifications in the assessment of the condition and functionality of any mechanical and non-mechanical components of the subject water delivery and wastewater systems.

Extraordinary Assumptions
(Continued)

The appraisers refer the client and intended/authorized users of this appraisal report to the Flinn Engineering report for an assessment of the water and wastewater systems' infrastructure components. The three professional real estate appraisers co-signing this appraisal report are not qualified to independently detect and assess the condition and functionality of the water and wastewater systems' infrastructure components. However, the three professional real estate appraisers co-signing this appraisal report assume that the water delivery and wastewater systems' components (including the plant, pumps, and all related facilities) are in proper working order and have been maintained adequately to meet all pertinent codes and regulatory requirements. The client and intended users are advised that if this assumption is found to be false, it could impact the analysis and opinions.

CUSTOMER COUNTS

According to the City of Wood Heights, the subject property water delivery system serves 268 customers and the wastewater collection system serves 194 customers. This appraisal is based upon the assumption that the customer counts provided by City of Wood Heights are accurate. The client and intended users are advised that if this assumption is found to be false, it could impact the analysis and opinions.

Hypothetical Conditions

The 2020-2021 Edition of the *Uniform Standards of Professional Appraisal Practice* (USPAP) defines a hypothetical condition as follows:

> *A condition, directly related to a specific assignment, which is contrary to what is known by the appraiser to exist on the effective date of the assignment results, but is used for the purpose of analysis.*

This appraisal assignment did not include any hypothetical conditions.

Regional Analysis

KANSAS CITY AREA OVERVIEW

The subject is located in Wood Heights, Missouri, and is in the northeast part of the Kansas City, MO-KS metropolitan area. The bi-state, 14-county Kansas City Metropolitan Area is the most centrally located of any principal U.S. city. Kansas City is situated within 250 miles of both the geographic and population centers of the United States. The 14 counties within the greater metropolitan area are Cass, Clay, Jackson, Lafayette, Platte, Bates, Caldwell, Clinton, and Ray in Missouri, and Johnson, Leavenworth, Miami, Linn and Wyandotte in Kansas. The area covers more than 4,000 square miles and includes more than 100 municipalities.

The Kansas City Metropolitan Statistical Area is a mostly stable market. The following statistics are available through the U.S. Census Bureau. Projections are based upon the 2010 census, and are applied to an urban growth simulation model.

TRANSPORTATION

The following interstate highways serve the metropolitan area.

Interstate 29 is a primary north/south running thoroughfare that travels northward from Kansas City. It travels through Omaha, Nebraska; Sioux Falls, South Dakota; up the eastern side of North and South Dakota; and has its terminus at the US/Canadian border in Pembina, North Dakota. In the Kansas City metropolitan area, the interstate has two to four lanes in each direction.

Interstate 35 is a primarily north/south running thoroughfare in the Kansas City metro area. It runs through central Kansas City and extends northward into Iowa and Minnesota. It provides access to Wichita to the southwest and extends southerly to Oklahoma City, Dallas and has its terminus at the US/Mexico border in Laredo, Texas. In the Kansas City metropolitan area, the interstate has three to four lanes in each direction.

Interstate 70 is a primarily east/west running thoroughfare in the Kansas City metro area. It runs through central Kansas City and extends eastward through St. Louis, Missouri where it takes a north eastwardly direction toward Indianapolis, Indiana. It travels through Columbus, Ohio, and terminates in Baltimore, Maryland. It extends westward through Salina, Kansas; Denver, Colorado and terminates at its intersection of Interstate 15 in Utah. In the Kansas City metro area, the interstate has three to four lanes in each direction.

Regional Analysis
(Continued)

Interstate 49 is a north/south running thoroughfare in the Kansas City metro area. Its furthermost point is when it intersects with Interstate 435 and Interstate 470 in Kansas City and extends south through the western portion of Missouri. It stops at the Missouri/Arkansas border as the Interstate becomes Interstate 540.

Interstate 435 is the circumferential highway around Kansas City that provides access to Interstate 35, Interstate 70, Interstate 29 and Interstate 470. It has three to four lanes in each direction.

Interstate 635 is a partial loop around the northern and western side of Kansas City. It provides access to Interstate 29, Interstate 70 and Interstate 35.

Interstate 470 is a partial loop around the southeast portion of Kansas City. It provides access to Interstate 70, US Highway 71 and Interstate 435. It has three to four lanes in each direction.

For any major metropolitan area, transportation is a primary factor that influences the growth trends of jobs, shopping, and residential development. Kansas City has a well-designed highway system that creates very little traffic congestion as indicated by the difference of only 20 percent increase in time between the average commute times compared to non-peak traffic periods. In comparison, Chicago averages a 70% increase. Kansas City's relatively low load factor is attributable to an abundance of highway miles on a per capita basis. Kansas City has four major interstate highways that intersect in the metropolitan area: Interstate 29, Interstate 70, Interstate 35, and Interstate 49. In addition, Interstate 435 is a circumferential highway that serves the Kansas City area.

AIRPORTS

Kansas City International Airport links nearly 10 million passengers between mid-America and other US cities. International arrivals are also handled. It is considered the hub for the States of Kansas, Missouri, Iowa and Nebraska. The airport is located about 20 minutes from the Kansas City CBD and about 40 miles from St. Joseph. It is recognized as one of the most convenient airports in the world for its few flight delays, easy terminal access and limited congestion. There are three terminals. Passengers can fly nonstop to 42 cities throughout the United States, Canada and Mexico on the following airlines: Air Canada, AirTran, Great Lakes, United, US Airways, Delta, Southwest, American Airlines, and Frontier.

Regional Analysis
(Continued)

Two regional airports service the southwest quadrant of the metropolitan area and include the Johnson County Executive Airport and the New Century AirCenter. Johnson County Executive Airport is located at the intersection of 151st Street and Pflumm Road in South Johnson County. This airport provides complete services for private business jets and general aviation. With over 50,000 annual operations and approximately 210 based aircraft, the airport is the fourth busiest in the state of Kansas.

New Century AirCenter is located 12 miles southwest of Overland Park in Gardner, Kansas. This airport also offers general aviation services and accommodates cargo or passenger jets of any size. New Century AirCenter serves as an alternative for general aviation traffic so that the regional commercial service airport, Kansas City International Airport, does not become capacity constrained.

It should be noted that the Governor of Kansas has entertained opening a major metropolitan airport on the Kansas side due to the age of the existing airport and its location. This is preliminary in nature and is considered to be cost prohibitive to the state.

GOVERNMENT

Each incorporated city within the Kansas City MSA has its own zoning ordinances and building codes. The various counties that comprise the metropolitan area have established zoning codes, and the codes apply to their unincorporated areas. Additionally, each county has a comprehensive zoning plan and building code that provides specific guidelines for development of all types of properties, and the codes have had a positive effect on the development of the county.

EMPLOYMENT CHARACTERISTICS

Outlined in the following table, are details of the labor force and unemployment rate that have occurred in the Kansas City area between 2010 (annual totals) and 2017.

Regional Analysis
(Continued)

Employment by Place of Work by Industry - Kansas City MSA (NAICS)

Code	Description	2015	2016	2017	2018
	Employment by place of work				
10	Total employment	1342743	1368339	1389620	1408379
	By type				
20	Wage and salary employment	1085313	1106037	1119401	1130623
40	Proprietors employment	257430	262302	270219	277756
50	Farm proprietors employment	11154	11044	10960	10952
60	Nonfarm proprietors employment 2/	246276	251258	259259	266804
	By industry				
70	Farm employment	12456	12387	11986	12030
80	Nonfarm employment	1330287	1355952	1377634	1396349
90	Private nonfarm employment	1168470	1193413	1216860	1234770
100	Forestry, fishing, and related activities	1698	1751	1876	1992
200	Mining	4760	5319	4131	4105
300	Utilities	4758	4786	4049	(D)
400	Construction	66136	69817	71478	72388
500	Manufacturing	77836	80950	80425	81370
600	Wholesale trade	58012	55825	57256	56704
700	Retail trade	132592	134949	136609	(D)
800	Transportation and warehousing	55180	57240	65694	71529
900	Information	(D)	(D)	21654	21221
1000	Finance and insurance	89956	92866	91786	90196
1100	Real estate and rental and leasing	58007	60195	62589	64536
1200	Professional, scientific, and technical services	(D)	121542	126749	130299
1300	Management of companies and enterprises	(D)	29441	29659	30529
1400	Administrative and waste management services	88740	89102	88496	88526
1500	Educational services	(D)	(D)	(D)	(D)
1600	Health care and social assistance	144271	146814	149593	152739
1700	Arts, entertainment, and recreation	(D)	(D)	(D)	(D)
1800	Accommodation and food services	(D)	(D)	(D)	(D)
1900	Other services, except public administration	71002	71094	(D)	(D)
2000	Government and government enterprises	161817	162539	160774	161579
2001	Federal, civilian	27177	27709	27754	27887
2002	Military	11408	11110	11107	11012
2010	State and local	123232	123720	121913	122680
2011	State government	18818	19674	17311	17212
2012	Local government	104414	104046	104602	105468

Legend / Footnotes:
1/ The estimates of employment for 2001-2006 are based on the 2002 North American Industry Classification System (NAICS). The estimates for 2007-2010 are based on the 2007 NAICS. The estimates for 2011-2016 are based on the 2012 NAICS. The estimates for 2017 forward are based on the 2017 NAICS.

2/ Excludes limited partners.

Metropolitan Areas are defined (geographically delineated) by the Office of Management and Budget bulletin no. 18-03 issued April 10, 2018.

E The estimate shown here constitutes the major portion of the true estimate.

(D) Not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

Last updated: November 14, 2019-- new statistics for 2018; revised statistics for 2001-2017.

Regional Analysis
(Continued)

Growth in employment was steady throughout the 1990s, averaging between two percent and three percent a year. Job growth slowed in the early 2000s due to problems in the telecommunications industry. The area is experiencing modest growth, with continued pressure in the telecommunication industry. Unemployment over the past year has nearly doubled. The State of Kansas, State of Missouri and the Kansas City MSA are outperforming the nation as a whole in terms of unemployment. The State of Missouri's unemployment rate is in-line with the national trends. The following categories employ the greatest percentage of people in the Kansas City MSA: Trade, Transportation & Utilities, Government, and Professional Business Services.

The Kansas City metro area is an ideal headquarters location and has a growing number of corporate headquarters. The area's pro-business environment includes a robust workforce, low business and living costs, top-flight education and training opportunities and solid infrastructure systems.

The metropolitan Kansas City area is the production and service center for the Midwest. With a General Motors and a Ford assembly plant, Kansas City is the nation's third largest producer of automobiles. The area is home to Hallmark Cards, H&R Block, and American Century. It is also one of 12 regional centers for the federal government, serving as a focus for many Missouri and Kansas state agencies, public and private health and educational services, and midwestern financial, insurance, and real estate interests. The following is a list of the area top ten employers.

Employers	Sector	Employees
Federal Government	Government	18,744
Cerner Corporation	Health-care information systems-Realizaton Cam	13,964
Childern's Mercy Hospitals & Clinics	Health services	8,123
Internal Revenue Service	Government	4,600
City of Kansas City, MO	Government	4,521
University of Missouri Kansas City	Higher education	3,850
Honeywell FM&T	Electronic & mech, weapons components mfg.	3,600
Hallmark Cards, Inc.	Greeting card mfg. (Hdq.)	3,222
Saint Luke's Hospital of Kansas City	Health services	3,195
Burns & McDonnell	Architects/Engineering (Hdq.)	2,793

Regional Analysis
(Continued)

Net migration into Kansas City is forecasted to decrease as a result of economic sluggishness that will constrain the area's growth. This decline in net migration is primarily the result of the area's declining manufacturing employment, which has caused workers to leave the area to find new employment. Some upside in construction employment is taking place because of two large intermodal rail facilities in Gardner, Kansas and Grandview, Missouri. The creation of 7,000 new industrial jobs at the Gardner facility and surrounding areas with about 5,000 jobs expected from the Grandview operation. This will have a large positive impact on the southern part of the Kansas City economy. The housing market has rebounded with residential construction levels at or near 2007-2008, and has had a positive impact on other segments of the real estate market.

HIGHER EDUCATION

Institutions of higher learning are an important part of any major metropolitan area as they serve as both an attraction to bring new residents, but also serve as a way to provide a highly educated workforce. The Kansas City area is home to many institutions of higher learning both of the four-year and two-year variety. In addition to these local colleges and universities, there are three major universities within two hours of Kansas City, including the University of Missouri in Columbia, Kansas State University in Manhattan, and the University of Kansas in nearby Lawrence.

KANSAS CITY TOURISM

The Kansas City metropolitan area is becoming a regional destination for travelers. Kansas City currently has in excess of $9.0 billion in major improvements completed in the CBD. The major catalyst for development in Kansas City has been the redevelopment of the downtown area, which has seen more than $4.5 billion spent. The hub of Kansas City's downtown is the Power & Light District, which is anchored by the Sprint Center, an 18,500 seat arena that hosts sporting events and concerts. Additionally, there is the National World War I Museum at The Liberty Memorial. In addition to the downtown revitalization, Kansas City, Kansas is home to one of the largest waterparks in the United States. Phase one of the Schlitterbahn Vacation Village outdoor waterpark opened in July 2009. Future development includes: a resort hotel, shopping, dining, and entertainment. In addition, Wyandotte County is already home to three of the largest tourist destinations in the entire state of Kansas: Kansas Speedway, Sporting Park, and The Legends at Village West, which is a major outlet mall. Hollywood Casino opened in February 2012. The $411 million casino has more than 100,000 square feet of gambling space, 2,000 slot machines, five restaurants/eateries, 12 poker tables and 40 other gaming tables. A hotel and convention center are planned for the next phase as the project, but no time-table has been set. When combined with the Schlitterbahn development, Wyandotte County will have over $1.5 billion dollars spent on tourist destinations.

Regional Analysis
(Continued)

CONCLUSIONS

The following summarizes our general observations relating to the subject's region.

Location - The Kansas City MSA is located in the western portion of the state of Missouri and the eastern portion of the state of Kansas. The area is nearly centered in the United States in all directions and as such, is somewhat insulated from the volatility experienced in other areas.

Economy - Kansas City's economy has begun to stabilize and outperforms national trends on most accounts. Both truck and rail traffic through the area and nation have been increasing, which drives the need for jobs. Diversification in the past several years has benefitted the local economy and is expected to do so in the future with increasing intermodal transportation.

Population - Population growth in the MSA is forecasted to continue on a trend of conservative, but stable growth with the overall MSA growing at a rate of 0.9% per year.

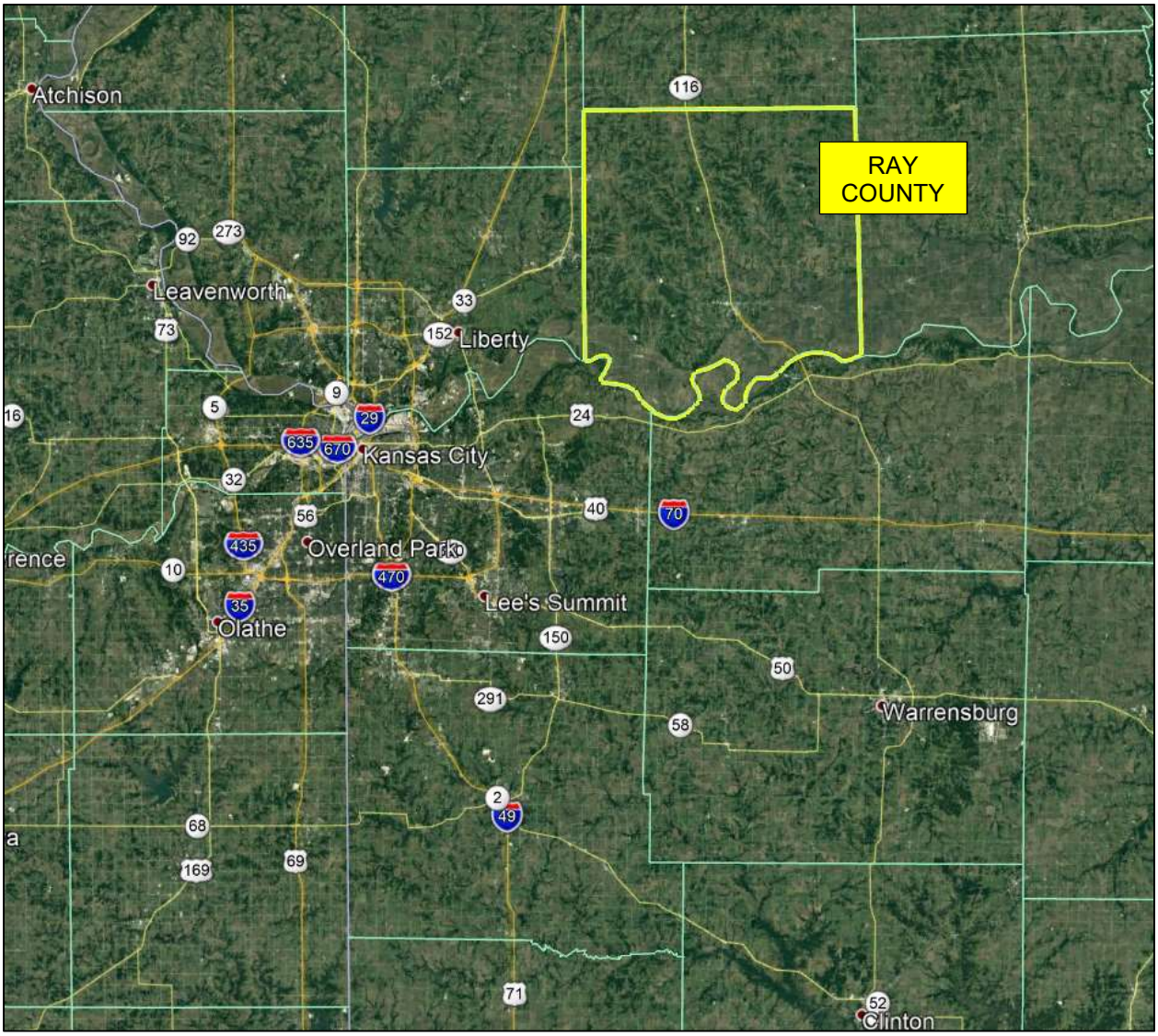
Strengths - Strengths of the area include low cost of living, relatively low unemployment rates, especially on the Kansas side, and a well-developed transportation infrastructure and distribution network. The two intermodal rail yards will make Kansas City a national distribution hub due to its location at the intersection of I-35 and I-70, two central interstates. There are also a significant number of federal government jobs, including the Internal Revenue Service, Federal Reserve Bank of Kansas City and the Federal District Courthouse in downtown Kansas City.

Weaknesses - Weaknesses within the MSA include the economy's relatively slow growth, limited rent potential in many markets across many property types, the lack of diversity in terms of culture to offer new residents and suburban sprawl that is beginning to take its toll on some inner-ring suburbs.

Ray County Overview

Ray County was organized in 1820 and on January 1, 1821, when Missouri became a state, it was one of the original 14 counties and at that time included the entire northwest corner of the state. It was named after the Honorable John Ray, a state legislator. Richmond became the permanent county seat on September 24, 1827. The population was estimated to be 22,883 in 2018 and its size is calculated to be 574 square miles, comprised of 569 square miles of land and 5.1 square miles of water. Ray County is a Classification Three county and is governed by a three member commission. Ray County includes the communities of Richmond, Knoxville, Henrietta ,and Orrick.

On the following page is demographic data for Ray County followed by a comparison of the demographic data for communities in Ray County.



Ray County Overview
(Continued)

Ray County, Missouri *July 2021*			
Population Data			
Total County Population			**23,916**
Population in households	*23,605*	*98.7%*	
Population in group quarters	*311*	*1.3%*	
Housing Data			
Total Housing Units			**10,380**
Owner-occupied	*7,317*	*70.5%*	
Renter-occupied	*1,949*	*17.8%*	
Vacant units	*1,214*	*11.7%*	
County Income Data			
Median Household Income			**$62,913**
Average Household Income			**$74,429**
Population Growth Trend			
Growth Rate per Year	**2010 to 2021**	**2021 to 2026**	
Population	*0.16%*	*0.17%*	
Population and Income Rankings			
State Rankings (out of 115 counties)			
Total Population	*#49*		
Population Density	*#46*		
Median Household Income	*#9*		
Housing Affordability Index	*#76*		
Per Capita Income	*#26*		
Diversity Index	*#58*		

Ray County Overview
(Continued)

Comparison of Census Bureau Data *July 2021*			
Population Data			
County Population			**23,916**
Camden	*183*		
Crystal Lakes	*358*		
Elmira	*51*		
Excelsior Estates	*155*		
Excelsior Springs	*11,541*		
Fleming	*123*		
Hardin	*579*		
Henrietta	*359*		
Homestead	*185*		
Lawson	*2,526*		
Orrick	*803*		
Rayville	*227*		
Richmond	*5,964*		
Wood Heights	*723*		
Income Data			
County Average Household Income			**$74,429**
Camden	66408		
Crystal Lakes	89141		
Elmira	70373		
Excelsior Estates	82258		
Excelsior Springs	62751		
Fleming	68901		
Hardin	69253		
Henrietta	55396		
Homestead	89183		
Lawson	82930		
Orrick	66905		
Rayville	81310		
Richmond	64992		
Wood Heights	81627		
Population and Income Rankings			
State Rankings (out of 1,032 cities/towns)	***Population***	***Population Density***	***Per Capita Income***
Camden	*#756*	*#902*	*#498*
Crystal Lakes	*#592*	*#841*	*#182*
Elmira	*#980*	*#563*	*#437*
Excelsior Estates	*#807*	*#607*	*#236*
Excelsior Springs	*#77*	*#322*	*#593*
Fleming	*#851*	*#909*	*#499*
Hardin	*#477*	*#433*	*#506*
Henrietta	*#589*	*#638*	*#916*
Homestead	*#752*	*#270*	*#181*
Lawson	*#227*	*#377*	*#326*
Orrick	*#411*	*#639*	*#501*
Rayville	*#698*	*#573*	*#255*
Richmond	*#126*	*#391*	*#429*
Wood Heights	*#431*	*#849*	*#286*

Wood Heights Overview

Incorporated in 1978, the city of Wood Heights is a fourth class city in the State of Missouri. Wood Heights is located approximately nine miles west of the City of Richmond, the Ray County Seat, and is less than one mile east of Excelsior Springs, Missouri. Wood Heights is approximately twenty miles north of Interstate 70 and is generally bordered by Gold Mine Creek to the north, Willow Lane to the south, Highway M to the east, and New Garden Road to the west. Nearby communities include Excelsior Springs, Richmond, Crystal Lakes, Orrick, Rayville, Henrietta, Fleming, Camden, and Lawson.

Wood Heights was named after Robert “Woodson” Hite, a first cousin to Frank and Jesse James and a member of the “James Gang”. According to the United States Census Bureau, the City of Wood Heights has a total area of 2.3 square miles. In 2020 there were 757 people and 252 households residing in the City of Wood Heights. The population density was 329 inhabitants per square mile. There were 284 housing units of which were 92.5 percent owner occupied. The average household size was 2.67. The median age in the city was 44.3 years. 22.3 percent of residents were under the age of 20; 23.4 percent were between the ages of 20 and 39; 14 percent were from 40 to 49; 25.1 percent were in the range of 50 to 64; and 15.3 percent were 65 years of age or older. The exhibit on the following page summarizes the demographic data for Wood Heights based upon the 2021 census bureau.

In summary, the subject neighborhood is an established area with adequate access to Interstate 70. The overall outlook for the neighborhood is one of relative stability with little to modest growth taking place in the foreseeable future.

Wood Heights Overview
(Continued)

Wood Heights, Missouri *July 2021*			
Population Data			
Total Population			**723**
Population in households	*723*	*100.0%*	
Population in group quarters	*0*	*0.0%*	
Housing Data			
Total Housing Units			**281**
Owner-occupied	*243*	*86.5%*	
Renter-occupied	*18*	*6.4%*	
Vacant units	*20*	*7.1%*	
Income Data			
Median Household Income			**$70,767**
Average Household Income			**$81,627**
Population Growth Trend			
Growth Rate per Year	**2010 to 2021**	**2021 to 2026**	
Population	*0.07%*	*0.14%*	
Population and Income Rankings			
State Rankings (out of 1,032 cities/towns)			
Total Population	*#431*		
Population Density	*#849*		
Median Household Income	*#143*		
Housing Affordability Index	*#786*		
Per Capita Income	*#286*		
Diversity Index	*#550*		

Description of the Subject Properties

The subject property systems include the assets and facilities that comprise the delivery of purchased water and the collection and treatment of wastewater. There are five locations that are part of the subject property systems. The following is a summary of the five parcels. Exhibits pertaining to the five locations are on the following pages. Unless otherwise noted, all of the following properties are owned by the City of Wood Heights. Please refer to the attached report prepared by Flinn Engineering for more details pertaining of the infrastructure, system assets, and facilities.

North & East Ridge Drive - Wastewater Treatment Plant
(*To be conveyed in fee*)

This site is located at the terminus of a private roadway, approximately one quarter of a mile west of its intersection with Wyman Drive. This parcel is identified by the Parcel Identification Number 12-03-05-00-000-030.000 and by the common street address of North & East Ridge Drive, Wood Heights, Missouri. According to measurements taken from public maps, the entirety of the site consists of approximately 61,800 square feet, or 1.42 acres. There is an aeriation basin, of approximately 140 lineal feet in length, located on this site. This site is improved with three buildings. The first is a one story, with no basement, steel frame utility building, with metal panel exterior walls, containing approximately 364 square feet of gross building area, which is estimated to have been built in 2013, and is considered to be in good condition. The second is a one story, with no basement, wood frame utility building with metal panel exterior walls, containing approximately 1,353 square feet that was reportedly built in 2021. This building houses two clarifiers and is considered to be in new condition. The third building is a one story, with no basement, concrete block building which contains approximately 961 square feet. The interior of this building is comprised of an office with a three fixture lavatory and a vehicle storage garage. This building is considered to be in average condition. The improvements are secured by a three strand barbed wire fence, approximately 860 lineal feet in length with a steel gate at the entryway.

106 Carson Lane - Lift Station
(*Privately owned; valuation assumes permanent easement*)

This site is located on the east side of a private roadway, approximately 500 lineal feet south of its intersection with Carson Lane and at the intersection of the proposed extension of Bombay Street. The Ray County Assessor identifies this site by Parcel Number 12-02-09-00-001-005.003. According to public records, this parcel is in the name of Randolph C. and Debora K. Jones. The entirety of the site consists of approximately 2.687 acres. However, the lift station site is estimated to consist of approximately 30 feet by 60 feet, or 1,800 square feet, of land area. The improvements are secured by a chain fence with a height of six feet approximately 80 lineal feet in length. The site is improved with a lift station and a backup generator.

Description of the Subject Properties
(Continued)

5600 Block of Highway 10 – Meter
(*To be conveyed in fee*)

This site is located on the south side of Highway 10, approximately one quarter of a mile west of its intersection with Highway M, in Wood Heights, Missouri. The Ray County Assessor identifies this site by Parcel Number 12-02-03-00-000-047.002. According to measurements taken from public maps, the entirety of the site consists of approximately 1,700 square feet, or 0.04 acres. The site is improved with a master water meter.

100 Block of Lift Lane - Lift Station
(*Privately owned; valuation assumes permanent easement*)

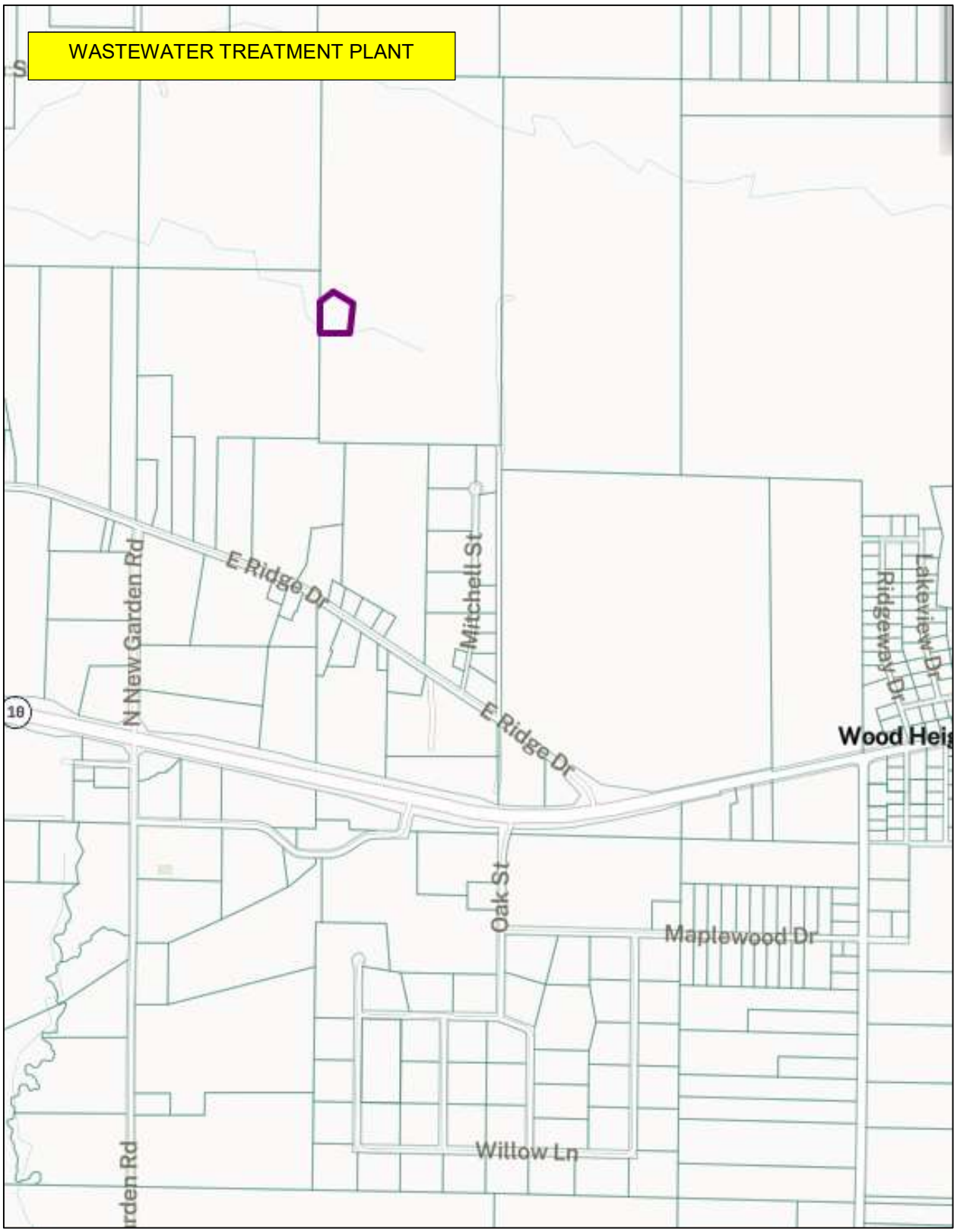
This site is located on the south side of Lift Lane, approximately one fifth of a mile west of its intersection with Highway O, in Wood Heights, Missouri. The Ray County Assessor identifies this site by Parcel Number 12-02-09-00-002-057.001. According to public records, this parcel is in the name of Jeffrey and Tawna Phillippeit. The entirety of the site consists of approximately 4.85 acres. However, the lift station site is estimated to consist of approximately 20 feet by 20 feet, or 400 square feet, of land area. The improvements are secured by a three strand wire chain fence with a height of six feet approximately 60 lineal feet in length. The site is improved with a lift station.

2000 Block of Maplewood Drive – Water Tower
(*To be conveyed in fee*)

This site is located on the north side of Maplewood Drive, just east of its intersection with Evergreen Street, in Wood Heights, Missouri. The Ray County Assessor identifies this site by Parcel Number 12-02-09-00-002-016.001. According to public records, the site consists of approximately 43,560 square feet, or one acre. The site is improved with a 100,000 gallon multi-leg elevated tank. Two frame sheds are also located on the site. The improvements are secured by a three strand wire chain fence with a height of six feet approximately 835 lineal feet in length.

Description of the Subject Properties
(Continued)

Description of the Subject Properties
(Continued)

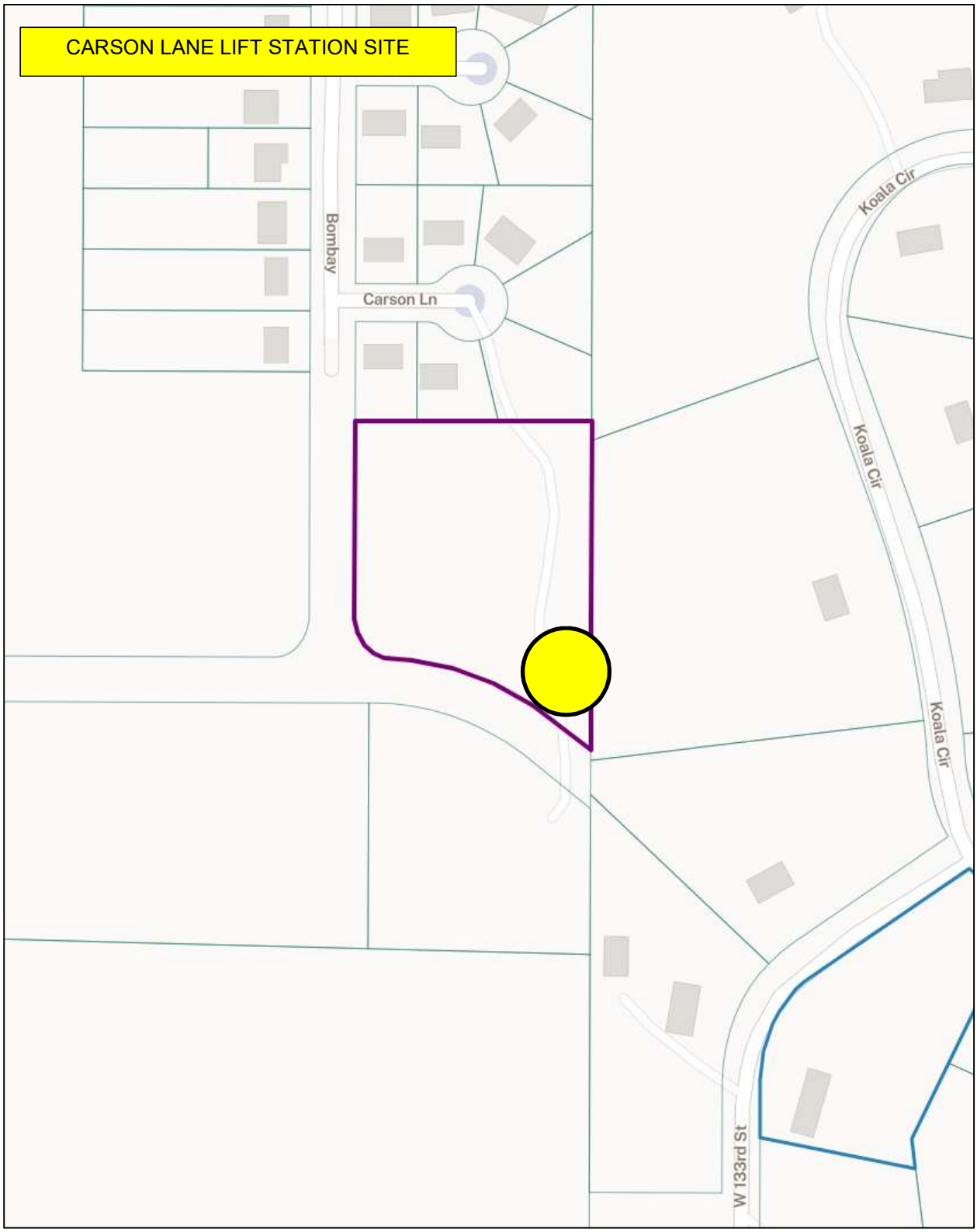


Description of the Subject Properties
(Continued)

Description of the Subject Properties
(Continued)

WASTEWATER TREATMENT PLANT

Description of the Subject Properties
(Continued)



Description of the Subject Properties
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Description of the Subject Properties
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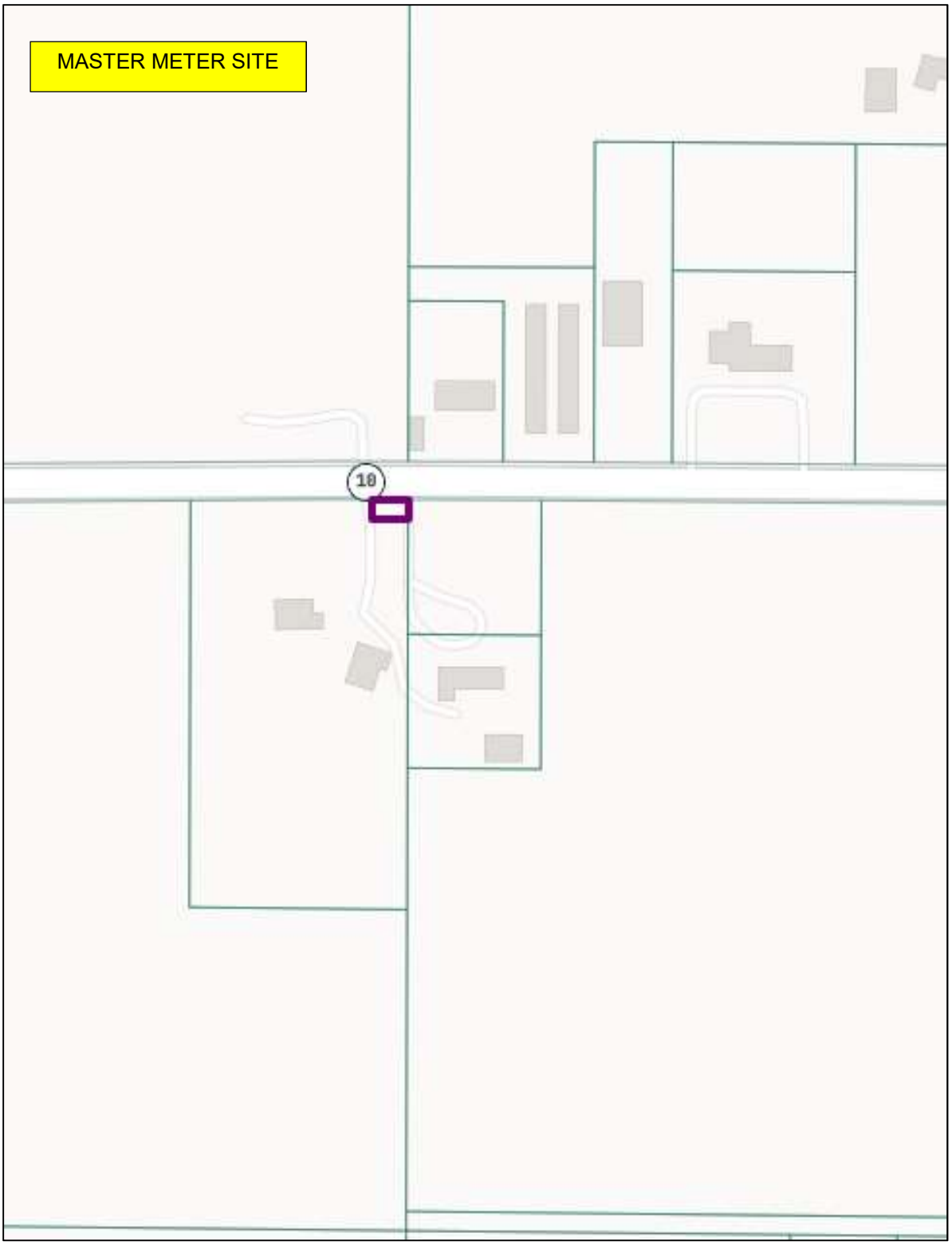
CARSON LANE LIFT STATION SITE

Description of the Subject Properties
(Continued)

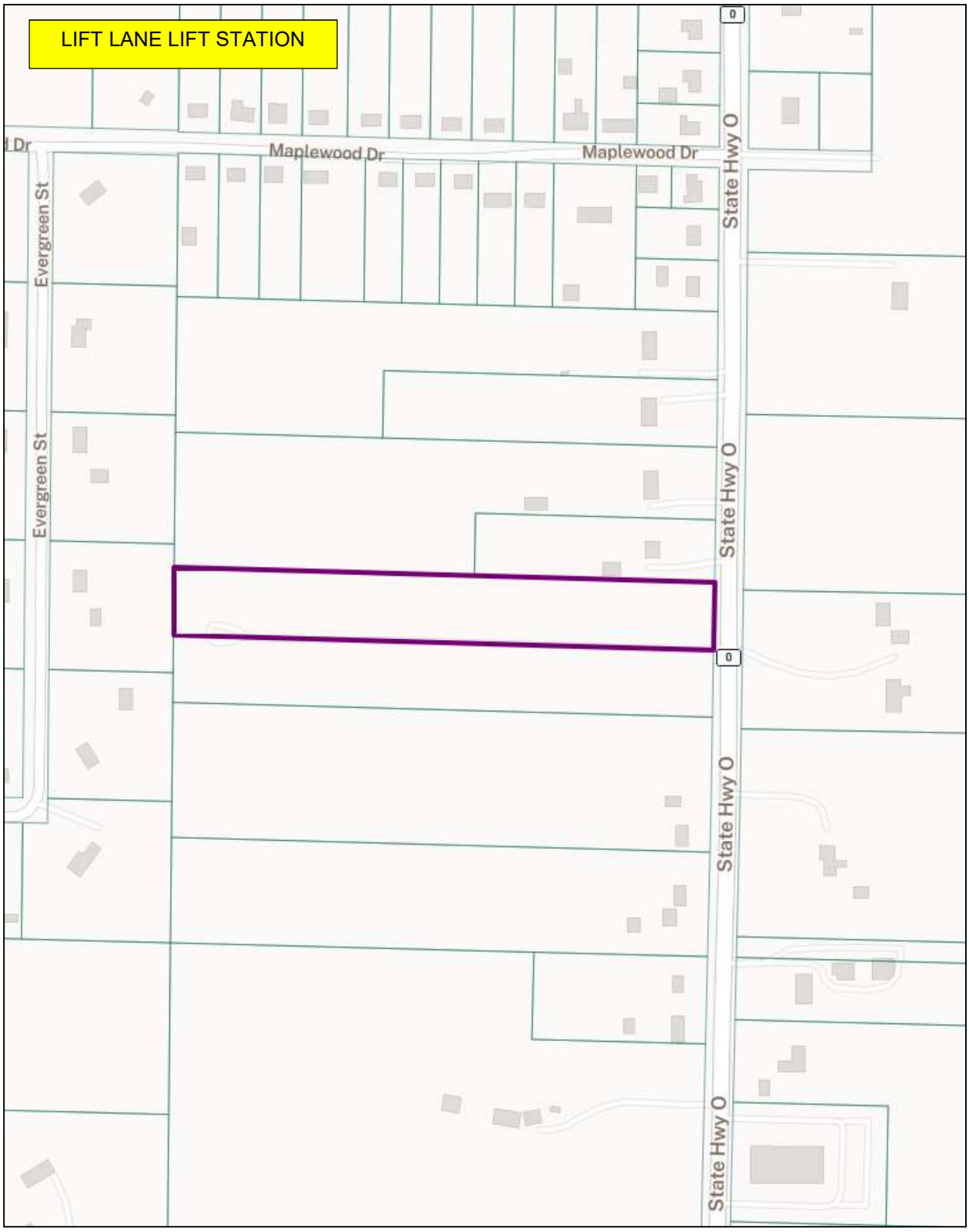


Description of the Subject Properties
(Continued)

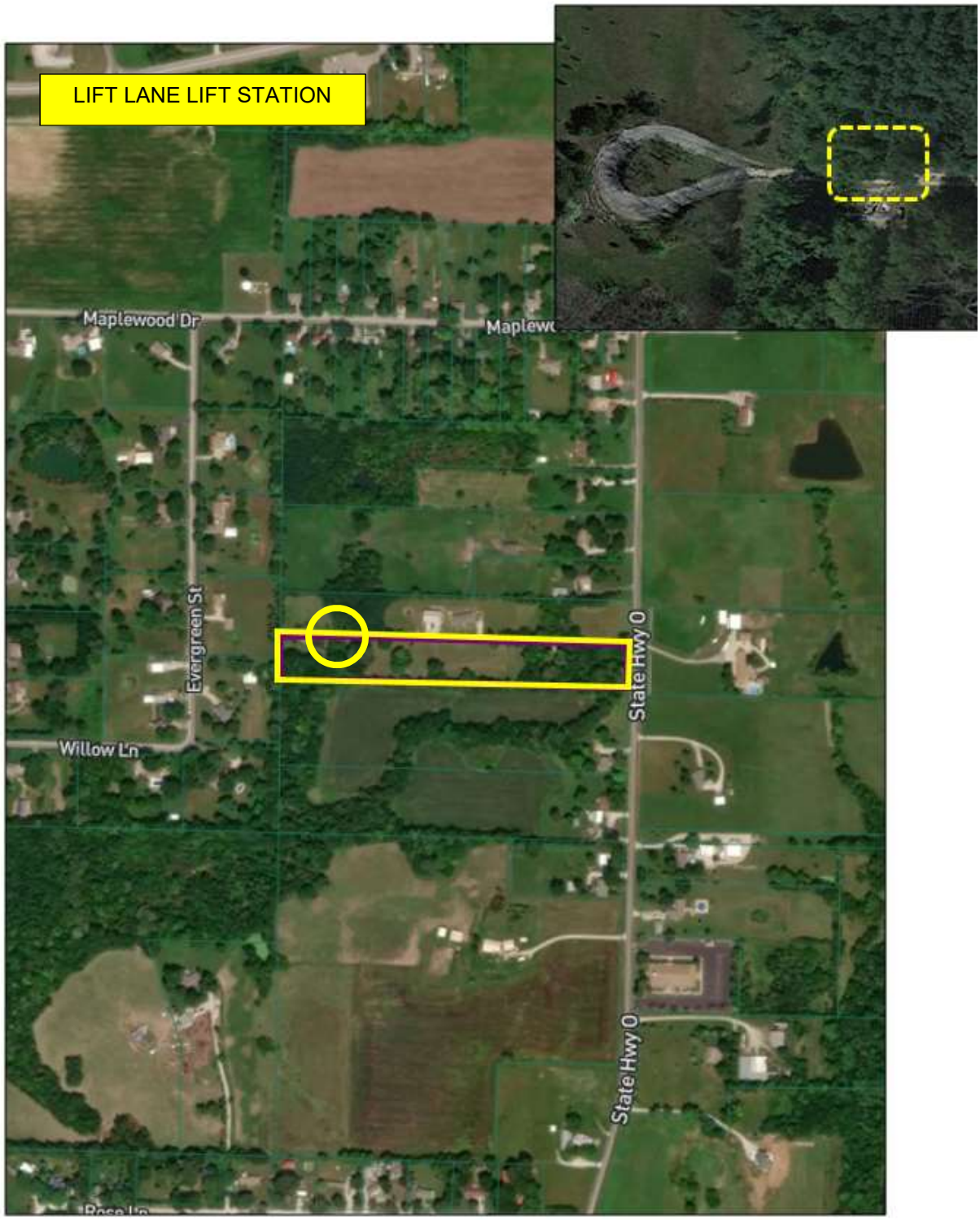
Description of the Subject Properties
(Continued)

MASTER METER SITE

Description of the Subject Properties
(Continued)



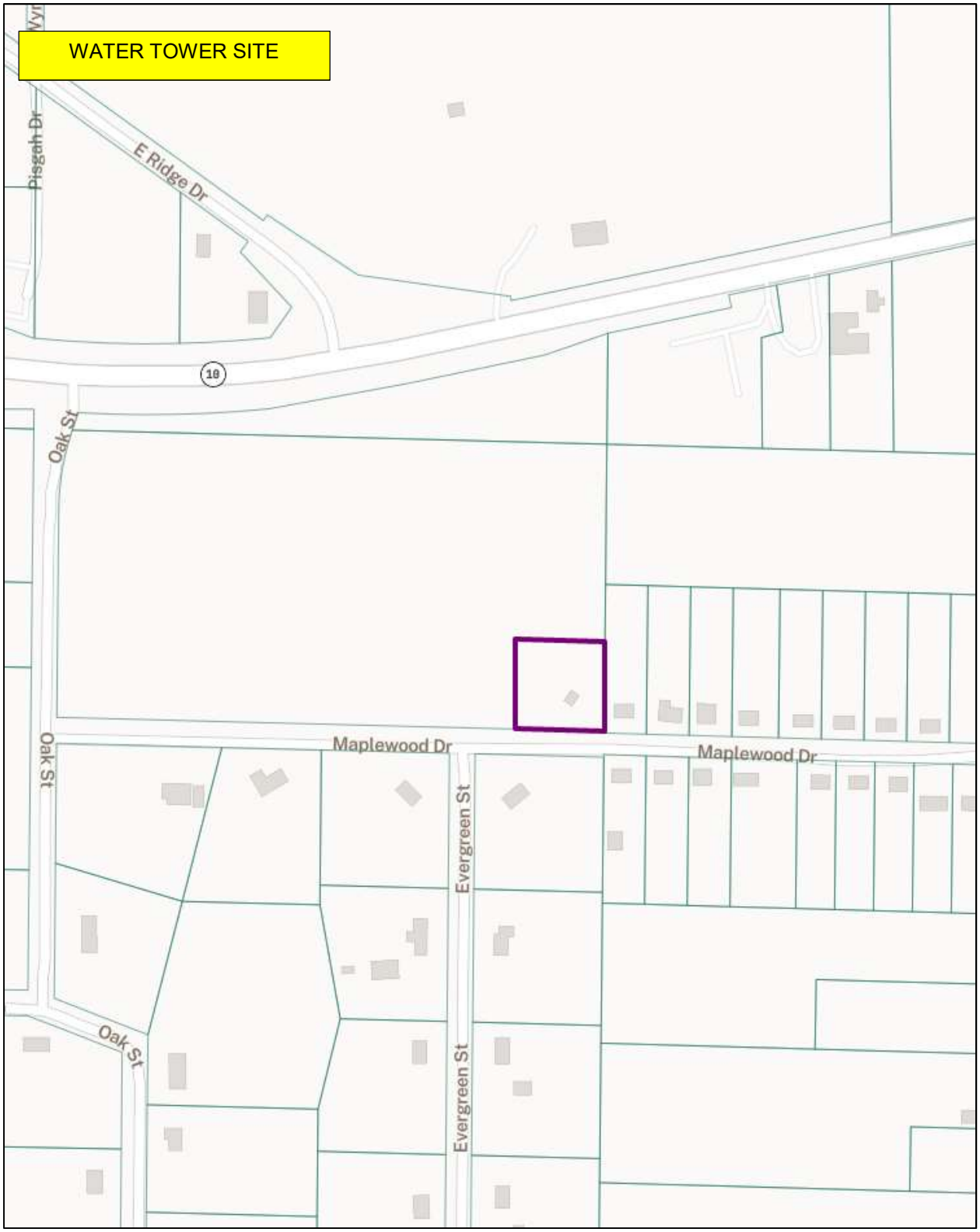
Description of the Subject Properties
(Continued)



Description of the Subject Properties
(Continued)

LIFT LANE LIFT STATION

Description of the Subject Properties
(Continued)



Description of the Subject Properties
(Continued)

Description of the Subject Properties
(Continued)

WATER TOWER SITE

Highest and Best Use Analysis

The beginning point in the valuation of any real estate is the determination of the property's highest and best use. Highest and Best Use is defined in the 15th Edition of *The Appraisal of Real Estate* as follows:

> *The reasonably probable and legal use of vacant land or an improved property that is physically possible, appropriately supported, and financially feasible and that results in the highest value.*

The 15th Edition states that there are four implicit steps as part of the analysis that are applied in the following order: (1) Legally Permissible, (2) Physically Possible, (3) Financially Feasible, and (4) Maximally Productive.

The subject property includes land owned in fee, permanent easements, and infrastructure/facilities associated with the City of Wood Heights water delivery and wastewater systems. After considering the components of the subject property systems as a whole, and taking into account the analysis and report prepared by Flinn Engineering, it is our opinion the highest and best use of the subject property as of November 29, 2021, is its present use as a water delivery and wastewater system. Furthermore, it is our opinion the market value of the land, as vacant, is also for its present use as part of a utility infrastructure system.

Application of the Approaches to Value

Normally included within the steps of the valuation process are the three classic approaches to a value estimate: the Cost Approach, the Sales Comparison Approach and the Income Capitalization Approach. Each of these approaches tends to independently serve as a guide to the valuation of the property with varying degrees of validity.

The Cost Approach gives recognition to the fact that buyers have available to them the alternative of constructing a new building when contemplating the purchase of an existing building. Thus, the cost to reproduce the property is utilized as a measure of value.

However, most properties experience varying degrees of accrued depreciation which result from physical depreciation, functional obsolescence and external obsolescence. Any of these three types of depreciation (or a combination thereof) from which the property suffers must be deducted from the estimated cost new of the improvements. The difficulty, then, in applying the Cost Approach is the ability of the appraiser to accurately extract or estimate the amount of depreciation the property being appraised suffers.

The Sales Comparison Approach is based upon the theory that the value of a property is determined by the actions of buyers and sellers in the market for comparable types of property. Recognizing no two properties are identical and that properties sell at different times under different market conditions, the application of the Sales Comparison Approach requires the appraiser to consider any differences between a respective sale and the subject property which may affect value. After the relevant differences are adjusted for, an indicated range of value results.

The theory of the Sales Comparison Approach also realizes that buyers and sellers often have motivations that are unknown to the appraiser and difficult to quantify in the adjustment process. Therefore, while this approach has certain strengths and foundation, it must be carefully applied in order to lead the appraiser to a realistic opinion of value.

And lastly, the Income Capitalization Approach is typically given very much consideration in the appraisal process for income-producing properties. The Income Capitalization Approach gives recognition to the subject property's capabilities of producing an income and that investors in the real estate market will pay a specific amount of cash, or its equivalency, to receive that income, as well as the rights of ownership of the property at the end of the income period.

The Income Capitalization Approach is applied based upon market-extracted information, most notably the income and expenses that prevail in the market for the type of property being appraised. After an appropriate estimate of income is arrived at, the income is converted to an estimate of value via a capitalization rate. The capitalization rate is also either extracted from the market or may be derived based upon a built-up method.

Application of the Approaches to Value
(Continued)

After the appraiser independently applies each approach to value, the three resultant value estimates are reconciled into an overall estimate of value. In the reconciliation process, the appraiser analyzes each approach with respect to its applicability to the property being appraised. Also considered in the reconciliation process is the strength and weakness of each approach with regards to supporting market data.

Regarding the valuation of the subject property, we have applied the Cost Approach and the Sales Comparison Approach. The Income Capitalization Approach was not applied due to the unavailability of the significant amount of market data pertaining to income and expenses that would be necessary to arrive at a credible conclusion.

Following this section is a more detailed explanation of the Cost Approach and the Sales Comparison Approach.

Cost Approach

The Cost Approach to Value is a technique in the appraisal process which recognizes that a prudent purchaser/investor of real estate may consider constructing a new building as an alternative to buying an existing property.

Although it holds true that a prudent purchaser would not pay more for a building than the cost of buying the land and constructing a new building which would offer similar utility, the estimated cost new of the property must be adjusted for items of depreciation which the property being appraised has suffered. Only then will the Cost Approach yield an indication of value which can be correlated with the other two approaches to arrive at the Market Value of the property.

The beginning point of the typical Cost Approach is to arrive at an estimate of the land value as vacant. The land value is arrived at by applying the Direct Comparison Approach utilizing vacant land sales from the market.

The next step is to estimate the cost new of the building. There are two primary types of cost: the Reproduction Cost and the Replacement Cost.

Reproduction Cost is defined as:

The cost of construction, at current prices, of an exact duplicate, or replica, using the same materials, construction standards, design, layout, and quality of workmanship, and embodying all of the deficiencies, superadequacies, and obsolescence of the subject building. [9]

Replacement Cost is defined as:

The cost of construction, at current prices, of a building having utility equivalent to the building being appraised but built with modern materials and according to current standards, design, and layout. [10]

If a property suffers any functional obsolescence, it is necessary to utilize the Reproduction Cost estimate. The measure of loss of value from the functional inadequacy (or superadequacy) would then be deducted as an item of depreciation.

After the cost of the property is estimated, all items of depreciation are measured and deducted from the cost to arrive at an estimate of the depreciated cost new of the improvements. The land value as vacant is then added to arrive at a total estimate of the property via the Cost Approach.

Cost Approach
(Continued)

Thus, to accurately estimate the value of the property, the appraiser must:

1). Estimate the value of the land as vacant;
2). Estimate the cost new of the building;
3). Estimate the amount of all items of depreciation, if any;
4). Deduct the depreciation estimate from the cost new estimate; and
5). Add the estimated land value to the depreciated value of the improvements.

The starting point in the application of the Cost Approach is to arrive at an estimate of the subject property land as vacant. The land value is estimated based upon the Direct Sales Comparison theory which basically states that no one will pay more for a parcel of land than the cost of acquiring an equally suitable parcel. Therefore, the value of the site is arrived at by measuring the actions of buyers and sellers in the market for comparable parcels of land.

Land Value Contribution

The subject property land values (fee parcels and easements for mains and access rights) are concluded to be $75,000 total ($50,000 for the wastewater system and $25,000 for the water system). Below is a summary of land transactions that were relied on in developing the land value opinions.

Comparable Residential Land Sales
(All located in Excelsior Springs, Ray County)

No.	Address	Sale Date	Sale Price	Size/SF	Size/Ac	Price per S.F.	Price per Acre
1	31639 Horn Circle	10/15/2021	$16,000	62,291	1.43	$0.26	$11,189
2	Mockingbird Lane	8/24/2021	$67,500	198,664	4.56	$0.34	$14,803
3	North Raymore Road	11/3/2021	$53,000	370,696	8.51	$0.14	$6,228
4	Lot 21 Walnut Lane	12/1/2021	$42,500	139,828	3.21	$0.30	$13,240

Comparable Commercial Land Sales
(All located in Excelsior Springs, Clay County)

No.	Address	Sale Date	Sale Price	Size/SF	Size/Ac	Price per S.F.	Price per Acre
1	200 Block of South McCleary Road	12/22/2021	$242,000	143,748	3.30	$1.68	$73,333
2	100 Block of South McCleary Road	12/10/2021	$188,200	55,321	1.27	$3.40	$148,189
3	1600 Block of West Meadowlark Lane	11/29/2021	$69,000	54,450	1.25	$1.27	$55,200

Cost Approach
(Continued)

Contributory Value of System Assets – Flinn report

The Flinn report includes a detailed inventory of the water and wastewater system assets that are part of this analysis, and concludes an opinion of the estimated depreciated value for the water system of $848,705 and an opinion of the estimated depreciated value for the wastewater system of $411,145. Please refer to the attached Flinn report for additional cost and depreciation details.

Contributory Value of System Assets – Site Improvements

The contributory value of the various improvements on the properties that are not included in the Flinn report are summarized below.

Summary of Contributory Values of Improvements

Location	Building	Size	Value per Unit	Cost New	REL	Contributory Value
(Waste Water) North & East Ridge						
	Metal Utility Building	364 S.F.	$35.57	$12,947	80%	$10,358
	Metal Clarifier Building	1,353	$35.57	$48,126	100%	$48,126
	Office/Garage	961	$40.56	$38,978	50%	$19,489
	Barded Wire Fence	860 Lineal Ft.	$4.79	$4,119	70%	$2,884
	Gate			$8,050	95%	$7,648
(Lift Station) 106 Carson Lane						
	Chain Fence	80 Lineal Ft.	$25.83	$2,066	70%	$1,446
(Lift Station) 100 Block Lift Lane						
	Chain Fence	60 Lineal Ft.	$25.83	$1,550	70%	$1,085
(Water Tower) 2000 Block Maplewood Drive						
	Chain Fence	835 Lineal Ft.	$25.83	$21,568	70%	$15,098

Summary

The final step in the Cost Approach is to add the depreciated value of the assets for the water and wastewater systems.

With respect to the subject property system facilities, we have utilized the depreciated asset values from the Flinn report. The Flinn values are summarized on Page 5 of the Flinn Report.

Based upon our analysis of the land, combined with the Flinn analysis, the total value by the Replacement Cost New Less Depreciation is summarized below.

Cost Approach
(Continued)

Summary

The final step in the Cost Approach is to add the depreciated value of the assets for the water and wastewater systems.

With respect to the subject property system facilities, we have utilized the depreciated asset values from the Flinn report. The Flinn values are summarized on Page 7 of the Flinn report.

Based upon our analysis of the land, combined with the Flinn analysis, the total value by the Replacement Cost New Less Depreciation is summarized below.

Property Component	Value Conclusion
Water System Assets	
Contributory Value - fee parcels and easements:	$25,000
Contributory Value - site improvements:	$15,098
Flinn Engineering opinion (depreciated value of water system assets):	$848,705
Total Value Opinion:	$888,803
Rounded to:	**$890,000**
Wastewater System Assets	
Contributory Value - fee parcels and easements:	$50,000
Contributory Value - site improvements:	$91,036
Flinn Engineering opinion (depreciated value of wastewater system assets):	$411,145
Total Value Opinion:	$552,181
Rounded to:	**$550,000**

Sales Comparison Approach

The Sales Comparison Approach is an approach to value which measures the actions and activity of buyers and sellers in the market and relates those actions to the property being appraised. Also referred to as the Market Approach, the underlying premise of this approach to value is that no prudent purchaser will pay more for a property than the cost of acquiring an equally suitable parcel. The fundamental concept of the Sales Comparison Approach is the Principle of Substitution, which is defined as:

> *A valuation principle that states that a prudent purchaser would pay no more for real property than the cost of acquiring an equally desirable substitute on the open market. The Principle of Substitution presumes that the purchaser will consider the alternatives available and will act rationally or prudently on the basis of the information about those alternatives, and that reasonable time is available for the decision. Substitution may assume the form of the purchase of an existing property, with the same utility, or of acquiring an investment which will produce an income stream of the same size with the same risk as that involved in the property in question.*

Research of the area, state and national real estate market was completed in order to find sales of water distribution systems that included comparable features to the subject property. There have been several sale properties selected from all available sale transactions for analysis in this approach. The sales data was provided through information from the Missouri Public Service Commission, Illinois Commerce Commission, Aqua America Inc., American Water Company, and Hartman Consultants LLC.

The sales were considered to be the most comparable to the subject property in terms of arms-length sales transactions, location of the system, capital improvements supporting the water system and number of water customer accounts in the entire system. All information of the sale transactions and properties was confirmed by the previously mentioned party or parties to the transaction.

As explained in the Scope of Work section of this report, we included transactional data pertaining to utility systems located in Illinois. We did consider transactions by Missouri American Water of systems in Missouri. However, the market data available for utility systems acquired in Missouri is very limited, with Missouri American Water Company being the primary entity acquiring systems. Therefore, it is reasonable and acceptable to expand the search for comparable market data to areas outside the borders of Missouri. The following is a summary of the market data relied on for this assignment.

Sales Comparison Approach
(Continued)

Sales 1a & 1b
1a - Royal Oaks Mobile Water & Wastewater System (Water & Sewer)
1b - Four Seasons Water & Wastewater System (Water & Sewer)
City of Peoria, Peoria County, Illinois

Pending
Asset Purchase Agreement signed November 30, 2021
Price: Royal Oaks Water $56,000 ($221 per customer)
Royal Oaks Wastewater $35,000 ($138 per customer)
Four Seasons Water $26,000 ($123 per customer)
Four Seasons Wastewater $15,000 ($71 per customer)

Seller: YES Companies EXP Fred, LLC
Buyer: Illinois American

Water and wastewater system serving Royal Oaks Mobile Home Community, 2109 N. Abbey Cir., Peoria, Illinois, having approximately 253 customer connections, main, valves, and hydrants; and water and wastewater system serving Four Seasons Mobile Home Community, 204 N. Apple Blossom, Peoria, Illinois, having approximately 212 customer connections, main, valves, and hydrants.

The water systems are distribution facilities and customers only. They received wholesale potable water service and have no source, treatment, or storage facilities.

The wastewater systems have only wastewater collection systems consisting of gravity sewers, manholes, connecting into the wastewater transmission, treatment, and disposal by other providers. They own no transmission, treatment, or disposal facilities.

Sales Comparison Approach
(Continued)

Sale 2
Country Meadows Water Utility (Water)
Village of Swansea, St. Clair County, Illinois

Pending
Asset Purchase Agreement signed June 30, 2021
Price: $400,000
Water system with 230 customers ($1,739 per customer)

Seller: Jim McDonald Sales, Inc.
Buyer: Illinois American

The water system includes approximately 17,784 linear feet of water mains, 67 valves, one master meter vault, one tapping saddle and valve, and approximately 230 water meters. There are no land or easements applicable to this water system. This is a water system for a mobile home park.

Sales Comparison Approach
(Continued)

Sale 3

Village of Hardin Water & Wastewater Utility (Water & Sewer)
Village of Hardin, Calhoun County, Illinois

Pending
Asset Purchase Agreement signed June 10, 2021
Price: $2,300,000 Water
$1,000,000 Sewer
Water system with 435 customers ($5,287 per customer)
Wastewater system with 405 customers ($2,469 per customer)
.
Seller: Village of Hardin, Illinois
Buyer: Illinois American
ICC Docket #21-0511

The water system includes five parcels of land owned in fee, one water treatment plant, two active wells, one water storage tank, one pressure reducing station, one booster pump station, meters, hydrants, and approximately 49,800 linear feet of water mains. The land parcels owned in fee include 1 Lions Lane (a water treatment plant), Dripping Springs Hollow Road (a water storage tank), the east side of County Hwy 1 (two wells), S County Road (booster pump station), and W Main St and Stone Hill Road (pressure reducing station).

The wastewater system includes six parcels of land owned in fee, five wastewater lift stations, a wastewater treatment plant, and approximately 57,400 linear feet of mains. The land parcels owned in fee include 21415 Illinois River Road (wastewater treatment plant), 2 Braun St (lift station #1), South of North Side Grocery on Rt 100 (lift station #2), North of North Side Grocery on Rt 100 (lift station #3), South of Calhoun Auto on Rt 100 (lift station #4), East of Water Treatment Plant on Rt 100 (lift station #5).

Sales Comparison Approach
(Continued)

Sale 4

City of Mount Pulaski Water & Wastewater Utility (Water & Sewer)
City of Mount Pulaski, Logan County, Illinois

Pending (Asset Purchase Agreement signed April 1, 2021)
Price: $3,800,000 Water
$1,450,000 Sewer
Water system with 834 customers ($4,556 per customer)
Wastewater system with 800 customers ($1,813 per customer)
.
Seller: City of Mount Pulaski, Illinois
Buyer: Illinois American
ICC Docket #21-0309

The water system includes three parcels of land owned in fee, one water treatment plant, three active wells, one water tower, meters, hydrants, and approximately 68,000 linear feet of water mains.

The wastewater system includes four wastewater lift stations, a wastewater treatment plant, and approximately 71,600 linear feet of mains.

Sales Comparison Approach
(Continued)

Sale 5

City of Livingston Water & Wastewater Utility (Water & Sewer)
City of Livingston, Logan County, Illinois

Pending
Asset Purchase Agreement signed June 19, 2020
Price: $550,000 Water
$1 Sewer
Water system with 375 customers ($1,467 per customer)
Wastewater system with 340 customers ($NA per customer)
.
Seller: City of Livingston, Illinois
Buyer: Illinois American
ICC Docket #20-0680

The water system includes one parcels of land owned in fee, one water treatment plant, one water tower, two booster pumps, meters, hydrants, and approximately 45,000 linear feet of water mains.

The wastewater system includes four wastewater lift stations, one wastewater treatment plant, and approximately 34,000 linear feet of mains.

Sales Comparison Approach
(Continued)

Sale 6
City of Hallsville Wastewater Utility (Sewer)
City of Hallsville, Missouri

Pending
Price: $2,000,000 Sewer
Wastewater system with 664 customers ($3,012 per customer)
.
Seller: City of Hallsville, Missouri
Buyer: Missouri American
MO Docket #SA-2021-0017

The Hallsville wastewater system is unique in that it utilizes a land application process to dispose of its wastewater. Large irrigation systems distribute untreated wastewater onto farmland. This process has resulted in some compliance issues with the Missouri Department of Natural Resources. When irrigation is not possible, wastewater is held and accumulates in three holding cells or lagoons. The collection system has just over 13 miles of pipe and 256 manholes.

There is a capital commitment of $3,300,000 over five years, including terms that provide for future service, maintenance, capital improvements and other terms and conditions.

Sales Comparison Approach
(Continued)

Sale 7
City of Bourbonnais Wastewater Utility (Sewer)
City of Bourbonnais, Logan County, Illinois

Pending
Price: $32,100,000 Sewer
Wastewater system with 6,491 customers ($4,945 per customer)
.
Seller: City of Bourbonnais, Illinois
Buyer: Aqua Illinois
ICC Docket #20-0866

The wastewater system includes 14 wastewater lift stations, and approximately 530,000 linear feet of mains. The system provides sewage collection, and pumps the sewage to the Kankakee Regional Metropolitan Authority (KRMA) Wastewater Treatment Plant. The Village of Bourbonnais recently constructed $14.5 million of improvements to the wastewater system which was an interceptor extension to accommodate planned growth at the new Interstate 57 interchange at 6000N. The subject property includes easements, facilities and buildings, and the wastewater system personal property assets.

Sales Comparison Approach
(Continued)

Sale 8

City of Bolivar Water & Wastewater Utility (Water & Sewer)
City of Bolivar, Missouri

Pending
Price: $20,000,000 Water & Sewer
Water and wastewater system with 9,000 customers ($2,222 per customer)
.
Seller: City of Bolivar, Missouri
Buyer: Liberty Utilities
MO Docket # WA-2020-0397

Water and wastewater system with two wastewater treatment plants, eight wells, 14 lift stations.

Sales Comparison Approach
(Continued)

Sale 9

City of Taos Wastewater Utility (Sewer)
City of Taos, Missouri

Closed July 2021
Price: $4,100,000 Sewer
Wastewater system with 421 customers ($9,739 per customer)
.
Seller: City of Taos, Missouri
Buyer: Missouri American
MO Docket #SA-2021-0120

The Taos system consists of approximately 1/3 pressure sewer lines and 2/3 gravity sewer lines with five lift stations, as well as 22 duplex and 5 simplex pumping stations.

Sales Comparison Approach
(Continued)

Sale 10

City of Trimble Wastewater Utility (Sewer)
City of Trimble, Missouri

Closed April 2021
Price: $1,000,000 Sewer
Wastewater system with 200 customers ($5,000 per customer)
.
Seller: City of Trimble, Missouri
Buyer: Missouri American
MO Docket #SA-2021-0074

The Trimble sewer system consists of approximately 24,200 linear feet of sewer line, five pumping stations and a three-cell treatment lagoon.

Sales Comparison Approach
(Continued)

Sale 11

City of Jerseyville Water & Wastewater Utility (Water & Sewer)
City of Jerseyville, Jersey County, Illinois

Closed October 2020
Price: $26,250,000 Water
$17,000,000 Sewer
Water system with 4,259 customers ($6,163 per customer)
Wastewater system with 3,959 customers ($4,294 per customer)
.
Seller: City of Jerseyville, Illinois
Buyer: Illinois American
ICC Docket #19-1139

The water system includes three parcels of land owned in fee, one water treatment plant, three active wells, one water tower, one water storage tank, meters, hydrants, and approximately 649,000 linear feet of water mains.

The wastewater system includes 10 wastewater lift stations, two wastewater treatment plants, and approximately 438,000 linear feet of mains.

Sales Comparison Approach
(Continued)

Sale 12

Four Lakes Condominium Association Water Utility (Water)
City of Lisle, Jersey County, Illinois

Closed October 2020
Price: $900,000 Water
Water system with 1,266 customers ($711 per customer)
.
Seller: Four Lakes Village Condominium Homeowners' Association
Buyer: Illinois American

The water system includes meters, hydrants, and approximately 16,000 linear feet of water mains.

Sales Comparison Approach
(Continued)

Sale 13

City of Granite City Wastewater Utility (Sewer)
City of Granite City, Madison County, Illinois

Closed September 2020
Price: $18,000,000 Sewer
Wastewater system with 12,783 customers ($1,408 per customer)
.
Seller: City of Granite City, Illinois
Buyer: Illinois American
ICC Docket #19-1134

The wastewater system assets for sale include 27 wastewater lift stations, gravity sewers, force mains, and manholes. The subject property includes easements, facilities and buildings, and the wastewater collection system personal property assets.

Sales Comparison Approach
(Continued)

Sale 14

City of Rosiclare Water and Wastewater Utility (Water & Sewer)
City of Rosiclare, Hardin County, Illinois

Closed May 2020
Asset Purchase Agreement signed June 4, 2019
Price: $480,000 Water
$120,000 Sewer
Water system with 525 customers ($914 per customer)
Wastewater system with 400 customers ($300 per customer)

Seller: City of Rosiclare, IL
Buyer: Illinois American
ICC Docket #19-0733

This sale included the transfer of a water treatment and sewer system. The water system includes two parcels of land owned in fee, one water treatment plant built in 1934, two active wells built in 1995, one 150,000 gallon water tower, one settling basin and one overflow basin. The water system purchase does not include the distribution system. The water treatment plant design maximum capacity is 350,000 gpd. The wastewater system includes four parcels of land owned in fee, one wastewater lift station built in 2017, one wastewater treatment plant built in 1951 with major improvements in 1987, and approximately 46,000 linear feet of mains.

Sales Comparison Approach
(Continued)

Sale 15

Village of Sidney Water Utility (Water)
Village of Sidney, Champaign County, Illinois

Closed May 2020
Asset Purchase Agreement signed April 25, 2019
Price: $2,300,000
Water system with 567 customers ($4,056 per customer)

Seller: Village of Sidney, IL
Buyer: Illinois American
ICC Docket #19-0653

This sale included the transfer of a water system. The water system includes a 150,000 gallon elevated storage tank built in 1953, 92 hydrants, approximately 220 valves, 546 meters, approximately 100,000 linear feet of water mains, a booster pump station, and rechlorination buildings. The system is a sequential system purchasing bulk water from Illinois American Water Company.

Sales Comparison Approach
(Continued)

Sale 16

Village of Andalusia Water and Wastewater Utility (Water & Sewer)
Village of Andalusia, Rock Island County, Illinois

Closed May 2020
Asset Purchase Agreement signed May 7, 2019
Price: $1,800,000 Water
$1,500,000 Sewer
Water system with 490 customers ($3,673 per customer)
Wastewater system with 460 customers ($3,261 per customer)

Seller: Village of Andalusia, IL
Buyer: Illinois American
ICC Docket #19-0732

This sale included the transfer of a water treatment and distribution system, and sewer system. The water system includes a 310,000 gallon storage tank built in 1980, a chlorination and fluoridation water treatment plant operating in the 60 to 80 psi range, 106 hydrants, a booster pump station, and approximately 55,000 linear feet of water mains. The sewer system includes three lift stations, approximately 6,000 linear feet of force mains, 34,800 linear feet of gravity collection mains, 140 manholes, and a three cell wastewater treatment plant. The sanitary system does not include stormwater and is not a CSO type facility.

Sales Comparison Approach
(Continued)

Sale 17

Village of Leonore Water Utility (Water)
Village of Leonore, Rock Island County, Illinois

Closed May 2020
Asset Purchase Agreement signed July 10, 2019
Price: $100,000
Water system with 68 customers ($1,471 per customer)

Seller: Village of Leonore, IL
Buyer: Illinois American
ICC Docket #19-0854

This sale included the transfer of a water treatment system. The water system was built in 1958 and includes one operating well, approximately 11,000 linear feet of water mains, 16 flushing hydrants (not fire hydrants), 68 meters, a 7,500 gallon hydrotank built in 1978, a 10,000 gallon hydrotank built in 1983, and a water treatment plant built in 1976.

Sales Comparison Approach
(Continued)

Sale #18

Village of Godfrey Wastewater Utility (Sewer)
Village of Godfrey, Madison County, Illinois

Closed November 2019
Asset Purchase Agreement signed November 9, 2018
Price: $13,550,000
Wastewater System with 6,250 Customers ($2,168 per customer)

Seller: Village of Godfrey, IL
Buyer: Illinois American
ICC Docket #18-1830

This sale included the transfer of a sewer system. The sale includes a wastewater treatment plant with a current average flow of 0.80 MGD, a 2.2 MGD average capacity and 5.5 MGD maximum flow capacity providing secondary treatment, discharging into the Mississippi River; 16 lift stations; 32,000 linear feet of force mains; 498,000 linear feet of gravity sewer mains; 2,107 manholes; two sanitary sewer detention facilities; 13 parcels of land owned in fee; and permanent easements pertaining to wastewater mains located on private property, and properties that are utilized for lift stations. Approximately 65% of the gravity sewer linear feet, located west of Godfrey Road, flow to the wastewater treatment plant; the other 35%, located east of Godfrey Road, flow to the Alton Treatment Plant.

Sales Comparison Approach
(Continued)

Sale #19

Village of Glasford Water & Wastewater Utility (Water & Sewer)
Village of Glasford, Peoria County, Illinois

Closed September 2019
Asset Purchase Agreement signed August 28, 2018
Water System Price: $800,000
Water System with 492 Customers ($1,626 per customer)
Wastewater System Price: $1,100,000
Wastewater System with 482 Customers ($2,282 per customer)

Seller: Village of Glasford, IL
Buyer: Illinois American
ICC Docket #18-1498

This sale included the transfer of a water and wastewater system.

The water system is in average condition and includes a water treatment plant with a capacity of 200 gpm or 288,000 gpd with attained capacity of 150 gpm or 216,000 gpd; two active wells and one well not in service; a 125,000 gallon elevated storage tank; a 50,000 gallon ground storage tank; meters; hydrants; approximately 48,000 linear feet of water mains; four parcels of land owned in fee; and permanent easements pertaining to water mains located on private property. Well #1 is 876 feet deep; Well #2 is not in service (radium) and is 1,750 feet deep; Well #3 is 1,000 feet deep with 1,300 linear feet of 4" raw water main.

The wastewater system is in average condition and includes a 0.26 MGD DAF wastewater treatment plant with a MDF of 0.65 MGD with basic secondary treatment with filtration and sludge treatment; one lagoon; one wastewater lift station; and approximately 47,000 linear feet of mains.

Sales Comparison Approach
(Continued)

Sale #20

Village of Manteno Wastewater Utility (Sewer)
Village of Manteno, Kankakee County, Illinois

Sold July 2018
Asset Purchase Agreement signed September 18, 2017
Price: $25,000,000
Wastewater System with 4,300 Customers ($5,814 per customer)

Seller: Village of Manteno, IL
Buyer: Aqua Illinois
ICC Docket #17-0813

This sale included the transfer of a sewer system. The sale includes a wastewater treatment plant, seven lift stations, force and gravity sewer mains, four parcels of land owned in fee and permanent easements pertaining to wastewater mains located on private property, and properties that are utilized for lift stations.

The sewer system was built in 1945 with additional constructed between 1945 and 2006. The sewer system includes a sewer treatment facility, seven lift stations, and the sewer collection system.

Testimony of Paul J. Hanley states expected expenditures after sale of $4,300,000 over five years.

Sales Comparison Approach
(Continued)

Sale #21

Grant Park Wastewater Utility (Sewer)
Village of Grant Park, Kankakee County, Illinois

Closed November 2019
Asset Purchase Agreement signed May 17, 2018
Price: $2,300,000
Wastewater System with 535 Customers ($4,299 per customer)

Seller: Village of Grant Park, IL
Buyer: Aqua Illinois
ICC Docket #18-1093

This sale included the transfer of a sewer system. The sale includes a wastewater treatment plant, one lift station, portions of two parcels of land owned in fee and permanent easement interests, and a wastewater collection system. The permanent easements pertain to properties that are utilized for the lift station, wastewater mains located on private property, an access road, and septic tanks located on private property.

Sales Comparison Approach
(Continued)

Sale #22

Skyline Water and Wastewater Utility System (Water and Sewer)
Kane County, Illinois

Closed November 2019
Asset Purchase Agreement signed March 27, 2018
Price: $3,550,000
Combined water and wastewater system - 752 customers ($4,721 per customer)

Seller: Fox River Water Reclamation District
Buyer: Aqua Illinois
ICC Docket #18-0785

This sale included the transfer of a water system and a sewer system. The water system includes five parcels of land owned in fee, a water treatment plant, two wells, a 600,000 gallon elevated storage tank, and a water delivery system. The wastewater system includes one lift station and a sewage collection system.

Sales Comparison Approach
(Continued)

Sale #23

Alton Wastewater System (Sewer)
City of Alton, Madison County, Illinois

Closed June 2019
Asset Purchase Agreement signed April 13, 2018
Price: $53,800,000
Wastewater system with 11,456 customers ($4,696 per customer)

Seller: City of Alton, IL
Buyer: Illinois American
ICC Docket #18-0879

This sale included the transfer of a sewer system. The sale includes 14 lift stations and related easements, a sewage collection system, two excess flow wastewater detention facilities, two flow meters, one parcel of land, and one wastewater treatment plant with a rated flow capacity of 10.5 MGD and a design maximum flow capacity of 26.25 MGD..

Sales Comparison Approach
(Continued)

Sale #24

Lawson Water and Wastewater Utilities (Water and Sewer)
City of Lawson, Clay and Ray Counties, Missouri

Sold August 2018 (Letter of Intent signed April 21, 2017)
Price: $4,000,000
Price breakout per appraisal of this system:
$2,619,000 for Water System with 970 Customers ($2,700 per customer)
$1,356,000 for Sewer System with 904 Customers ($1,500 per customer)
$3,975,000 for both Water and Sewer System, rounded within client documentation to $4,000,000

Seller: City of Lawson, MO
Buyer: Missouri American

This sale included the transfer of a water system and sewer system. The sale includes three parcels of land owned in fee and a permanent easement interest in nine additional tracts. The permanent easements pertain to properties that are utilized for lift stations, a water tower, and a pump station.

The water system was built in 1956 and includes two elevated water storage tanks, a pump system, and the water distribution system. The 300,000 gallon tank was constructed in the 1990-1991. The 50,000 gallon tank was constructed in the 1940s or 1950s. The sewer system includes a sewer treatment facility including a four-cell lagoon system, eight lift stations, and the sewer collection system.

An appraisal report dated July 7, 2017 of the Lawson system indicated the following expected expenditures after sale:

> According to information from Lawson's current permit (MO-0091031) and the Missouri Department of Natural Resources affordability study, the regulations regarding the sewer system operations will be changing in 2020. The water will be required to be disinfected prior to discharge. In addition, a different chemical will need to be added to offset the disinfectant that was added before it can be released into a stream. This will require either a new system to be built or significant changes will need to be made to the existing facility. The chemical added is to control the ammonia levels and nutrient levels. Also, an in-cell aeration system will be needed to help remove the sludge the 1st and 2nd cells. Cost at this time are not known.

Sales Comparison Approach
(Continued)

Sale #25

Sundale Utilities (Water and Sewer)
Washington, Tazewell County, Illinois

Sold May 2018
Asset Purchase Agreement Signed January 9, 2017
Price: $2,000,000
$1,500,000 for Water System with 550 Customers ($2,727 per customer)
$500,000 for Sewer System with 1,410 Customers ($355 per customer)

Seller: Sundale Utilities, Inc.
Buyer: Illinois American Water
ICC Docket #17-0113

This sale included the transfer of a water system and three sewer systems. The water system is Washington Estates (552 customers), and the sewer systems are Washington Estates (552 customers), Sundale Hills (713 customers), and Highland Hills (141 customers). The sale included 10 parcels of land owned in fee by Sundale Utilities which included office building, sewage treatment parcels, lagoons, lift stations, and water treatment facility. In addition, permanent easements encumbering private property included approximately 5.17 acres for the water delivery system and 9.47 acres for the wastewater collection system. The water system's primary assets include two wells, a water treatment plant, a 75,000-gallon elevated water tower, and a 150 kw generator.

The wells were drilled in 1970 and 1985 and are 350' deep. A new well was drilled in 1995 and replaced the 1970 well. The wells are rated at 460 gallons-per-minute. The elevated tank was placed in service in 1960. The sewer systems reportedly were in fair to poor condition and required substantial capital investment.

According to testimony by an official from Illinois American Water at an Illinois Commerce Commission hearing, the buyer intends on investing $900,000 in the water system and $1,700,000 in the sewer systems, all within the first five years.

Sales Comparison Approach
(Continued)

Sale #26

City of Farmington Water System (Water)
Farmington, Fulton County, Illinois

Sold April 2018 (Asset Purchase Agreement Signed April, 2017)
Price: $3,750,000
Water System with 1,063 Customers ($3,528 per customer)

Seller: City of Farmington
Buyer: Illinois American Water
ICC Docket #17-0246

This sale includes a water delivery system that includes two wells. One was drilled in 1918 and is 1,710' deep. It has a capacity of 350 gallons-per-minute, and was improved with a new submersible pump in 1997. The second well was drilled in 1955 and is 1,743' deep. It has a capacity of 385 gallons-per-minute, and had a new pump installed in 2006. The water treatment plant includes the treatment process, two clearwells, and two high-service pumps. The two clearwells (underground storage tanks) each have a capacity of 125,000 gallons. The system also includes two elevated water storage tanks constructed in 1992 and 1997, respectively. Each has a capacity of 156,000 gallons.

Per testimony of Jeffrey Kaiser, Director of Engineering for Illinois American Water Company, there are expected expenditures after sale totaling $5,540,000 for the following:

> *Capital improvements anticipated for the water system in the first five years of ILAW ownership are projected to total approximately Five Million Five Hundred Forty Thousand Dollars ($5,540,000.00). These improvements include security and safety improvements, SCADA systems integration, customer meter replacements, water main replacement and dead end elimination, and miscellaneous water treatment plant related capital expenditures such as reverse osmosis membrane replacement and conversion from gas to liquid chlorine.*

Sales Comparison Approach
(Continued)

Sale #27

Village of Fisher Water and Sewer System (Water & Sewer)
Fisher, Champaign County, Illinois

Sold March 2018 (Asset Purchase Agreement Signed July, 2017)
Water System Price: $3,700,000 with 890 Customers ($4,157 per customer)
Sewer System Price: $3,100,000 with 890 Customers ($3,483 per customer)

Seller: Village of Fisher
Buyer: Illinois American Water
ICC Docket #17-0339

This sale includes a water delivery system that includes a water treatment facility, two elevated water storage tanks and two groundwater supply wells. The water treatment plant includes the treatment process, one 30,000 gallon capacity clearwell, and three pumps rated 167 GPM. The clearwell (underground storage tank) has a capacity of 30,000 gallons. Tank #1 has a capacity of 50,000 gallons and was constructed in 1936. Tank #2 has a capacity of 100,000 gallons and was constructed in 1973. The wells are both 236' deep and rated 125 GPM, drilled in 1936 and 1959. Average daily production is 135,000 per day.

This sale includes a wastewater system that includes a wastewater treatment facility with an average daily flow between 170,000 and 180,000 gallons per day.

Expenditures during the first five years after sale are estimated at $610,000 for the water utility and $2,300,000 for the sewer utility.

Sales Comparison Approach
(Continued)

Sale #28

Village of Peotone Water and Sewer System (Water & Sewer)
Village of Peotone, Will County, Illinois

Sold October 1, 2018 (Asset Purchase Agreement Signed July 2017)
Price: $12,300,000 with 3,000 Customers ($4,100 per customer)

Seller: Village of Peotone
Buyer: Aqua Illinois
ICC Docket #17-0314

This sale includes a water delivery system that includes a water treatment facility, two elevated water storage tanks and two groundwater supply wells. The water treatment plant includes the treatment process, one 30,000 gallon capacity clearwell, and three pumps rated 167 GPM. The clearwell (underground storage tank) has a capacity of 30,000 gallons. Tank #1 has a capacity of 50,000 gallons and was constructed in 1936. Tank #2 has a capacity of 100,000 gallons and was constructed in 1973. The wells are both 236' deep and rated 125 GPM, drilled in 1936 and 1959. Average daily production is 135,000 per day.

This sale includes a wastewater system that includes a wastewater treatment facility with an average daily flow between 170,000 and 180,000 gallons per day.

Expenditures during the first five years after sale are estimated at $610,000 for the water utility and $2,300,000 for the sewer utility.

Sales Comparison Approach
(Continued)

Sale #29

Forest Homes Maple Park (Water)
Cottage Hills, Madison County, Illinois

Sold July 2017 (Asset Purchase Agreement Signed November 03, 2016)
Price: $900,000
Water System with 525 Customers ($1,714 per customer)

Seller: Forest Homes Maple Park District
Buyer: Illinois American Water
ICC Docket #16-0581

The Forest Homes Maple Park system includes one elevated storage tank, one storage tank control system, approximately 9 miles of pipeline, telemetry equipment, and various hydrants, valves, service connections, and other appurtenances. The system became operational in 1959. The water distribution system used wells until 1983 when the district started purchasing water from Illinois American Water. Per information from the water district, there are 525 customer connections, of which approximately 495 were installed in 1994 and 30 were installed in 2004. The elevated water tank has a capacity of 75,000 gallons and is approximately 57 years old. Located on the site with the water tower is the storage tank control structure, an office building, and storage buildings. The water distribution system includes 47,272 lineal feet of pipeline. The mains range from 13 to 58 years old. Most the mains are 6” with the balance being 4”. Included in the sale were two small lots owned in fee, permanent easements across two parcels, and mains located in public roads and rights of way. According to an assessment completed by an engineer familiar with the system, there was approximately $250,000 worth of deficiencies and deferred maintenance items that required immediate attention.

Sales Comparison Approach
(Continued)

Sale #30

Lake Region Water and Sewer Company (Water and Sewer)
Camden County and Miller County, Missouri

Sold June, 2017 (Asset Purchase Agreement Signed December, 2016)
Price: $6,084,000
Total Customers: 1,608 ($3,784 per customer)
683 Water Customers, 925 Sewer Customers (1,608 total customers) per Joint Application for Transfer of Assets

Seller: Lake Region Water and Sewer Company
Buyer: Camden County Public Water District
MO Docket #WM-2017-0186

Operating in the Lake of the Ozarks area, Lake Region Water & Sewer Company ("Lake Region") was originally granted a Certificate of Convenience and Necessity (CCN) to provide water and sewer service in the 1970s. After various name changes, sales, and the granting of an additional CCN, Lake Region now serves approximately 683 water customers in the Shawnee Bend area and 925 sewer customers in the Shawnee Bend and Horseshoe Bend area.

On December 28, 2016, Lake Region filed a Joint Application with the Camden County Public Water Supply District Number 4 seeking authority to sale, transfer, and assign Lake Region's water and sewer assets to the District. Staff contends that under the terms of the Purchase Agreement, the District is paying an acquisition premium of approximately $3.7 million.

The Missouri Public Service Commission Staff recommended in February, 2017, that the Commission does not approve the transfer of the assets. According to Staff, were the purchaser of Lake Region's assets a Commission-regulated entity, they would not be allowed to recover the acquisition premium cost in a customer rate increase. However, since the Commission does not regulate the District, Staff fears that the District may choose to recover the acquisition premium costs through a customer rate increase.

The Commission does not share Staff's concern. The Commission does not regulate the District, nor does it have jurisdiction over the District's board of directors or the future rates set by that board. On April 27, 2017, the Commission approved the transfer.

Sales Comparison Approach
(Continued)

Sale #31

Village of Wardsville Utility System (Water and Sewer)
Wardsville, Cole County, Missouri

Sold May, 2017 (Asset Purchase Agreement Signed December 8, 2016)
Price: $2,750,000 ($2,750,003 for both Water and Sewer System, rounded within client documentation to $2,750,000)
$795,428 for Water System with 480 Customers ($1,657 per customer)
$1,954,575 for Sewer System with 407 Customers ($4,802 per customer)

Seller: Village of Wardsville
Buyer: Missouri American Water
MO Docket #WA-2017-0181

According to a press release on April 11, 2017, from the Board of Trustees of the Village of Wardsville, Wardsville has three sewage treatment plants (Deer Haven, Churchview, and Northwest), none of which reportedly are able to meet the Missouri Department of Natural Resources and the EPA requirements regarding limitations of the amount of ammonia that can be discharged from sewage treatment plants. After a study by an engineering firm, it was determined that the three options to meet the EPA limits ranged from $4 million to $12 million. According to Missouri American Water, the expected capital investment after the sale includes $305,000 for the water system and $395,000 for the sewer system, all of which is projected to be invested over a five-year period.

Wardsville's water system (MO3010831) produces an average of 90,000 gpd. Water system assets include two (2) wells, 150,000-gallon elevated tank, 250,000-gallon ground storage tank, 300 gpm booster pump, 63 hydrants, 146 valves and over 15 miles of distribution main ranging in size from 2" to 8" in diameter.

The wastewater system includes the following treatment facilities:

Churchview WWTP (NPDES MO-0109118) is a packaged extended aeration system with a design flow of 30,000 gpd and actual flow of 15,000 gpd. It services 102 connections.
Deerhaven WWTP (NPDES MO-119326) is a packaged extended aeration system with a design flow of 21,368 gpd and actual flow of 17,000 gpd. It serves 81 connections.
Northwest WWTF (NPDES MO-0129658) is an aerated lagoon system with design flow of 151,000 gpd and actual flow of 44,000 gpd. It serves 212 connections.

The collection system includes five (5) pump stations, 38 brick manholes , 238 concrete manholes, approximately 9 miles of gravity sewers and 1.7 miles of force main.

Sales Comparison Approach
(Continued)

Sale #32

Village of Sadorus of Water System (Water)
Village of Sadorus, Champaign County, Illinois

Sold March, 2017 (Asset Purchase Agreement Signed April, 2016)
Price: $240,000 - Water System with 384 Customers ($625 per customer)

Seller: Village of Sadorus, IL
Buyer: Illinois American Water Company
ICC Docket #16-0341

This sale includes a water delivery system that includes a 40,000 gallon elevated storage tank, two wells and one water treatment plant.

Sales Comparison Approach
(Continued)

Sale #33

Woodland Manor Water System (Water)
Kimberling City, Stone County, Missouri

Sold June 2016
Price: $200,000 - Water System with 164 Customers ($1,220 per customer)

Seller: Woodland Manor Water System
Buyer: Missouri American Water
MO Docket #WM-2016-0169

Sales Comparison Approach
(Continued)

Sale #34

Village of Ransom Water System (Water)
Village of Ransom, LaSalle County, Illinois

Sold April, 2016
Price: $175,000 - Water System with 170 Customers ($1,029 per customer)

Seller: Village of Ransom, IL
Buyer: Illinois American Water Company
ICC Docket #15-0544

The water delivery system includes a water treatment plant constructed in 1995 including aerator and, 16,700 gallon ground storage tank, a 75,000 gallon elevated water tank constructed in 1990, a 915' primary supply well installed in 1971 and rehabilitated in 2014 with a production rate of 88 gpm, and a 280' secondary supply well installed in 1946 with a production rate of 20 gpm.

Expenditures after sale are estimated at $2,000,000 in the first five years after sale.

Sales Comparison Approach
(Continued)

Sale #35

Ozark Shores Water Company (Water)
Camden County, Missouri

Sold July, 2015 (Asset Purchase Agreement Signed March 5, 2015)
Price: $5,252,781
Total of 1,869 Customers ($2,810 per customer)

Seller: Ozark Shores Water Company
Buyer: Public Water Supply District of Camden County
MO Docket #WM-2015-0231

The Staff recommended the Commission deny the application.[1] During the approval process before the Missouri Public Service Commission, the Staff had concerns regarding the sale that pertained to the purchase price exceeding the value of Oak Shore's net rate base by more than $2.6 million, the possibility of rate increases due to the acquisition premium, and the history of an overly-close relationship between Ozark Shores and the buyer.[2] On July 3, 2015, the Commission rejected the Staff's recommendations and granted the application.[3]

Included in the sale were 12 parcels of land that were reported to have a total market value of $448,580.

[1] Document: Staff Recommendation to Deny Transfer of Assets and Request for Local Public Hearing; Date: May 5, 2015
[2] Document: Suggestions in Support of Staff's Motion for Evidentiary Hearing; Date: May 25, 2015
[3] Document: Order Granting Application; Date: July 3, 2015

Sales Comparison Approach
(Continued)

Sale #36

City of Water System (Sewer)
City of Arnold, St Louis County, Missouri

Sold May, 2015
Price: $27,200,000 - Sewer System with 7,500 Customers ($3,627 per customer)

Seller: City of Arnold, MO
Buyer: Missouri American Water
MO Docket #SA-2015-0150

Sales Comparison Approach
(Continued)

Sale #37

North Maine Water & Sewer System (Water and Sewer)
Village of Glenview, Unincorporated Cook County, Illinois

Sold April, 2015
Price:
$18,590,000 Water System with 4,724 Customers ($3,935 per customer)
$3,410,000 Sewer System with 2,494 Customers ($1,367 per customer)

Seller: Village of Glenview, IL
Buyer: Aqua Illinois
ICC Docket #14-0396

This sale is a water and sewer system located in Unincorporated Cook County, IL with portions of the area within the municipal boundaries of Des Plaines, Park Ridge, Morton Grove, Niles, and Glenview covering a population of approximately 44,000 and a mixed residential/commercial customer base, primarily residential. The water system includes a 750,000 gallon storage tank and other water delivery system assets. The system does not include a water treatment plant. The sewer system includes sanitary sewer system assets but does not include a wastewater treatment plant.

Expected expenditures after purchase are estimated at $9,300,000: $6,300,000 for water main reinforcement and $3,000,000 to purchase a reservoir for fire protection.

Sales Comparison Approach
(Continued)

Water System Summary

Below is a summary of the water sales transactions that were considered in this analysis. These sales are included on the previous pages. These sales transactions were reported to be cash to the seller at closing unless otherwise noted in the specific sale transaction description. There is not adequate income information available for the sale properties to extract income multipliers and overall rates. The best method of comparison for the subject property in this appraisal is the sale price per customer.

SUMMARY OF SALES OF WATER DELIVERY SYSTEMS
(INCLUDES ALLOCATIONS FROM SALES OF WATER/SEWER SYSTEMS)

Sale #	Grantor	Grantee	Location		Sale Date	Sale Price	# of Cust	Sale Price / Customer
1a	Royal Oaks - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 56,000	253	$ 221
1b	Four Seasons - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 26,000	212	$ 123
2	Country Meadows/Jim McDonald Sales	Illinois American	Village of Swansea	IL	Pending	$ 400,000	230	$ 1,739
3	City of Hardin	Illinois American	City of Hardin	IL	Pending	$ 2,300,000	435	$ 5,287
4	City of Mount Pulaski	Illinois American	City of Mount Pulaski	IL	Pending	$ 3,800,000	834	$ 4,556
5	City of Livingston	Illinois American	City of Livingston	IL	Pending	$ 550,000	375	$ 1,467
11	City of Jerseyville	Illinois American	City of Jerseyville	IL	Oct-2020	$ 26,250,000	4,259	$ 6,163
12	Four Lakes Condominium Association	Illinois American	City of Lisle	IL	Oct-2020	$ 900,000	1,266	$ 711
14	City of Rosiclare	Illinois American	City of Rosiclare	IL	May-2020	$ 480,000	525	$ 914
15	Village of Sidney	Illinois American	Village of Sidney	IL	May-2020	$ 2,300,000	567	$ 4,056
16	Village of Andalusia	Illinois American	Village of Andalusia	IL	May-2020	$ 1,800,000	490	$ 3,673
17	Village of Leonore	Illinois American	Village of Leonore	IL	May-2020	$ 100,000	68	$ 1,471
19	Village of Glasford	Illinois American	Village of Glasford	IL	Sep-2019	$ 800,000	492	$ 1,626
24	City of Lawson	Missouri American	City of Lawson	MO	Aug-2018	$ 2,619,000	970	$ 2,700
25	Village of Sundale, Illinois	Illinois American	Village of Sundale	IL	May-2018	$ 1,500,000	550	$ 2,727
26	City of Farmington	Illinois American	Fulton County	IL	Apr-2018	$ 3,750,000	1,063	$ 3,528
27	Fisher Water & Wastewater System	Illinois American	City of Fisher	IL	Mar-2018	$ 3,700,000	890	$ 4,157
29	Forest Homes Maple Park	Illinois American	Cottage Hills	IL	Jul-2017	$ 900,000	525	$ 1,714
31	Village of Wardsville	Missouri American	Cole County	MO	May-2017	$ 795,428	480	$ 1,657
32	Village of Sadorus	Illinois American	Village of Sadorus	IL	Mar-2017	$ 240,000	384	$ 625
33	Woodland Manor	Missouri American	Kimberling City/Branson	MO	Jun-2016	$ 200,000	164	$ 1,220
34	Village of Ransom	Illinois American	Village of Ransom	IL	Apr-2016	$ 175,000	170	$ 1,029
35	Ozark Shores Water Company	Camden County Public Water Supply District Number Four	Camden County	MO	Jul-2015	$ 5,252,781	1,869	$ 2,810
37	Village of Glenview	Aqua Illinois	Village of Glenview	IL	Apr-2015	$ 18,590,000	4,724	$ 3,935
						High	4,724	$ 6,163
						Low	68	$ 123
						Median	509	$ 1,727
						Mean	908	$ 2,421

Of the 24 examples of market data, 18 are closed sales and 6 are pending sales. The analysis of the sale properties for comparison with the subject property is ultimately based on the number of customers within the water system, the age of the system, and the overall general condition of the system. The Missouri and Illinois sale properties indicate a range of sale prices from $123 to $6,163 per customer.

Sales Comparison Approach
(Continued)

The most comparable properties would be those that include a similar number of customer accounts for the water system, although other differences such as age/condition, location and market area must be reconciled. The sales utilized were of water systems that were pending, relatively recent, or took place within the last six years. The dates of sale and market conditions at the time of sale do not appear to significantly impact the unit sale prices of the sale properties selected for analysis in this approach.

The Wood Heights water system has 268 customers. Sales of systems with customer counts greater than 1,000 were excluded from the analysis.

SUMMARY OF SALES OF WATER DELIVERY SYSTEMS
EXCLUDING SALES WITH CUSTOMER COUNTS GREATER THAN 1,000
(INCLUDES ALLOCATIONS FROM SALES OF WATER/SEWER SYSTEMS)

Sale #	Grantor	Grantee	Location		Sale Date	Sale Price	# of Cust	Sale Price / Customer
1a	Royal Oaks - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 56,000	253	$ 221
1b	Four Seasons - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 26,000	212	$ 123
2	Country Meadows/Jim McDonald Sales	Illinois American	Village of Swansea	IL	Pending	$ 400,000	230	$ 1,739
3	City of Hardin	Illinois American	City of Hardin	IL	Pending	$ 2,300,000	435	$ 5,287
4	City of Mount Pulaski	Illinois American	City of Mount Pulaski	IL	Pending	$ 3,800,000	834	$ 4,556
5	City of Livingston	Illinois American	City of Livingston	IL	Pending	$ 550,000	375	$ 1,467
14	City of Rosiclare	Illinois American	City of Rosiclare	IL	May-2020	$ 480,000	525	$ 914
15	Village of Sidney	Illinois American	Village of Sidney	IL	May-2020	$ 2,300,000	567	$ 4,056
16	Village of Andalusia	Illinois American	Village of Andalusia	IL	May-2020	$ 1,800,000	490	$ 3,673
17	Village of Leonore	Illinois American	Village of Leonore	IL	May-2020	$ 100,000	68	$ 1,471
19	Village of Glasford	Illinois American	Village of Glasford	IL	Sep-2019	$ 800,000	492	$ 1,626
24	City of Lawson	Missouri American	City of Lawson	MO	Aug-2018	$ 2,619,000	970	$ 2,700
25	Village of Sundale, Illinois	Illinois American	Village of Sundale	IL	May-2018	$ 1,500,000	550	$ 2,727
27	Fisher Water & Wastewater System	Illinois American	City of Fisher	IL	Mar-2018	$ 3,700,000	890	$ 4,157
29	Forest Homes Maple Park	Illinois American	Cottage Hills	IL	Jul-2017	$ 900,000	525	$ 1,714
31	Village of Wardsville	Missouri American	Cole County	MO	May-2017	$ 795,428	480	$ 1,657
32	Village of Sadorus	Illinois American	Village of Sadorus	IL	Mar-2017	$ 240,000	384	$ 625
33	Woodland Manor	Missouri American	Kimberling City/Branson	MO	Jun-2016	$ 200,000	164	$ 1,220
34	Village of Ransom	Illinois American	Village of Ransom	IL	Apr-2016	$ 175,000	170	$ 1,029
						High	970	$ 5,287
						Low	68	$ 123
						Median	480	$ 1,657
						Mean	453	$ 2,156

Sales 2, 24 and 29 - the Country Meadows, City of Lawson, and Forest Homes Maple Park properties - are most similar to the subject property. Primary weight is placed on these transactions with lesser weight on other recent Missouri and Illinois sales. While the mean is lower than the concluded value for the subject water system, weight is not placed on the mean, as such. In the final analysis, each sale was viewed and compared individually on a qualitative basis based on appraiser judgment and experience with each of these systems.

The Village of Sundale allocation, at $2,727 per water customer and $355 per sewer customer, reflects the substantially higher water contribution versus the sewer contribution as the Sundale sewer system was in fair to poor condition. Therefore, the Village of Sundale sale is given the least weight in our analysis of the subject property water system.

Sales Comparison Approach
(Continued)

Using unit prices that result from allocations are generally less reliable than sales of individual systems. And, in cases such as Sundale – where one component of the system has an allocation substantially higher than the other component – it is important to use the allocations with caution as internal bookkeeping purposes may have been a factor in the diverse allocations.

We have concluded a unit value of $2,700 per water customer for the subject property water system. Based on the 268 reported water customers, the indicated value of the Wood Heights Water System is rounded to $725,000 (SEVEN HUNDRED TWENTY-FIVE THOUSAND DOLLARS).

Wastewater System Summary

We were able to determine a unit value (price per sewer customer) for 23 sewer or water and sewer system sales transactions. The table below summarizes the transactions for which a price per sewer customer was calculated. In 13 cases, the unit values are developed based upon an allocation of a sale price that included a water and sewer system. The other 10 sales were of sewer systems.

SUMMARY OF SALES OF SEWER SYSTEMS
(INCLUDES ALLOCATIONS FROM SALES OF WATER/SEWER SYSTEMS)

Sale #	Grantor	Grantee	Location		Sale Date	Sale Price	# of Cust	Sale Price / Customer
1a	Royal Oaks - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 35,000	253	$ 138
1b	Four Seasons - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 15,000	212	$ 71
3	City of Hardin	Illinois American	City of Hardin	IL	Pending	$ 1,000,000	405	$ 2,469
4	City of Mount Pulaski	Illinois American	City of Mount Pulaski	IL	Pending	$ 1,450,000	800	$ 1,813
6	City of Hallsville	Missouri American	City of Hallsville	MO	Pending	$ 2,000,000	664	$ 3,012
7	City of Bourbonnais	Aqua Illinois	City of Bourbonnais	IL	Pending	$32,100,000	6,491	$ 4,945
9	City of Taos	Missouri American	City of Taos	MO	Jul-2021	$ 4,100,000	421	$ 9,739
10	City of Trimble	Missouri American	City of Trimble	MO	Apr-2021	$ 1,000,000	200	$ 5,000
11	City of Jerseyville	Illinois American	City of Jerseyville	IL	Oct-2020	$17,000,000	3,959	$ 4,294
13	City of Granite City	Illinois American	City of Granite City	IL	Sep-2020	$18,000,000	12,783	$ 1,408
14	City of Rosiclare	Illinois American	City of Rosiclare	IL	May-2020	$ 120,000	400	$ 300
16	Village of Andalusia	Illinois American	Village of Andalusia	IL	May-2020	$ 1,500,000	460	$ 3,261
18	Village of Godfrey	Illinois American	Village of Godfrey	IL	Nov-2019	$13,550,000	6,250	$ 2,168
19	Village of Glasford	Illinois American	Village of Glasford	IL	Sep-2019	$ 1,100,000	482	$ 2,282
20	Village of Manteno	Aqua Illinois	Village of Manteno	IL	Jul-2018	$25,000,000	4,300	$ 5,814
21	Village of Grant Park	Aqua Illinois	Village of Grant Park	IL	Nov-2019	$ 2,300,000	535	$ 4,299
23	City of Alton	Illinois American	City of Alton	IL	Jun-2019	$53,800,000	11,456	$ 4,696
24	City of Lawson	Missouri American	City of Lawson	MO	Aug-2018	$ 1,356,000	904	$ 1,500
25	Village of Sundale	Illinois American	Village of Sundale	IL	May-2018	$ 500,000	1,410	$ 355
27	Fisher Water & Wastewater System	Illinois American	City of Fisher	IL	Mar-2018	$ 3,100,000	890	$ 3,483
31	Village of Wardsville	Missouri American	Cole County	MO	May-2017	$ 1,954,575	407	$ 4,802
36	City of Arnold	Missouri American	St Louis County	MO	May-2015	$27,200,000	7,500	$ 3,627
37	Village of Glenview	Aqua Illinois	Village of Glenview	IL	Apr-2015	$ 3,410,000	2,494	$ 1,367
						High	12,783	$ 9,739
						Low	200	$ 71
						Median	800	$ 3,012
						Mean	2,769	$ 3,080

Sales Comparison Approach
(Continued)

Of the 23 examples of market data, 17 are closed sales and 6 are pending sales that are under contract. The analysis of the sale properties for comparison with the subject property is ultimately based on the number of customers within the sewer system, the age of the system, and the overall general condition of the system. The Missouri and Illinois sale properties indicate a range of sale prices from $313 to $9,739 per customer.

The most comparable properties would be those that include a similar number of customer accounts for the sewer system, although other differences such as age/condition, location and market area must be reconciled. The sales utilized were of sewer systems that were pending or took place within the last five years. The dates of sale and market conditions at the time of sale do not appear to significantly impact the unit sale prices of the sale properties selected for analysis in this approach.

Sewer systems with more than 1,000 customers, in comparison to the subject property sewer system's 194 customers, are less comparable to the subject property based on number of customers. When the sales with more than 1,000 customers are omitted from the analysis, market data indicates an average sale price of $3,112 per customer with a range of sale prices from $313 to $9,739 per sewer customer.

We have given most consideration to Sales 3, 4, 14, 16, 19, 21, 24 and 27 based on overall comparability including number of customers, location, type of system, system components and system condition. Lesser consideration is given the remaining sales. While the mean is lower than the concluded value for the subject sewer system, weight is not placed on the mean, as such. In the final analysis, each sale was viewed and compared individually on a qualitative basis based on appraiser judgment and experience with each of these systems.

SUMMARY OF SALES OF SEWER SYSTEMS
EXCLUDING SALES WITH CUSTOMER COUNTS GREATER THAN 1,000
(INCLUDES ALLOCATIONS FROM SALES OF WATER/SEWER SYSTEMS)

Sale #	Grantor	Grantee	Location		Sale Date	Sale Price	# of Cust	Sale Price / Customer
1a	Royal Oaks - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 35,000	253	$ 138
1b	Four Seasons - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 15,000	212	$ 71
3	City of Hardin	Illinois American	City of Hardin	IL	Pending	$ 1,000,000	405	$ 2,469
4	City of Mount Pulaski	Illinois American	City of Mount Pulaski	IL	Pending	$ 1,450,000	800	$ 1,813
6	City of Hallsville	Missouri American	City of Hallsville	MO	Pending	$ 2,000,000	664	$ 3,012
9	City of Taos	Missouri American	City of Taos	MO	Jul-2021	$ 4,100,000	421	$ 9,739
10	City of Trimble	Missouri American	City of Trimble	MO	Apr-2021	$ 1,000,000	200	$ 5,000
14	City of Rosiclare	Illinois American	City of Rosiclare	IL	May-2020	$ 120,000	400	$ 300
16	Village of Andalusia	Illinois American	Village of Andalusia	IL	May-2020	$ 1,500,000	460	$ 3,261
19	Village of Glasford	Illinois American	Village of Glasford	IL	Sep-2019	$ 1,100,000	482	$ 2,282
21	Village of Grant Park	Aqua Illinois	Village of Grant Park	IL	Nov-2019	$ 2,300,000	535	$ 4,299
24	City of Lawson	Missouri American	City of Lawson	MO	Aug-2018	$ 1,356,000	904	$ 1,500
27	Fisher Water & Wastewater System	Illinois American	City of Fisher	IL	Mar-2018	$ 3,100,000	890	$ 3,483
31	Village of Wardsville	Missouri American	Cole County	MO	May-2017	$ 1,954,575	407	$ 4,802
						High	904	$ 9,739
						Low	200	$ 71
						Median	441	$ 2,741
						Mean	502	$ 3,012

Sales Comparison Approach
(Continued)

We have concluded a unit value of $2,000 per sewer customer for the subject property sewer system. Based on the 194 reported sewer customers, the indicated value of the Wood Heights Sewer System is rounded to $390,000 (THREE HUNDRED NINETY THOUSAND DOLLARS).

Water Delivery and Wastewater Collection Systems Combined

The combined value opinion of the water delivery and wastewater systems is $1,115,000. Based upon the subject property system having a total of 462 customers (268 water customers, 194 sewer customers), the overall value per customer is approximately $2,400.

Our market data included 17 examples of transactions that included both water and sewer systems.

SUMMARY OF SALES OF COMBINED WATER & SEWER SYSTEMS

Sale #	Grantor	Grantee	Location		Sale Date	Sale Price	# of Cust	Sale Price / Customer
1a	Royal Oaks - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 91,000	506	$ 180
1b	Four Seasons - YES Companies EXP Fred LLC	Illinois American	City of Peoria	IL	Pending	$ 41,000	424	$ 97
3	City of Hardin	Illinois American	City of Hardin	IL	Pending	$ 3,300,000	840	$ 3,929
4	City of Mount Pulaski	Illinois American	City of Mount Pulaski	IL	Pending	$ 5,250,000	1,634	$ 3,213
8	City of Bolivar	Liberty Utilities	City of Bolivar	MO	Pending	$20,000,000	9,000	$ 2,222
11	City of Jerseyville	Illinois American	City of Jerseyville	IL	Oct-2020	$43,250,000	8,218	$ 5,263
14	City of Rosiclare	Illinois American	City of Rosiclare	IL	May-2020	$ 600,000	925	$ 649
16	Village of Andalusia	Illinois American	Village of Andalusia	IL	May-2020	$ 3,300,000	950	$ 3,474
19	Village of Glasford	Illinois American	Village of Glasford	IL	Sep-2019	$ 1,900,000	974	$ 1,951
22	Fox River Water Reclamation District	Aqua Illinois	Kane County	IL	Nov-2019	$ 3,550,000	752	$ 4,721
24	City of Lawson	Missouri American	City of Lawson	MO	Aug-2018	$ 4,000,000	1,874	$ 2,134
25	Village of Sundale	Illinois American	Village of Sundale	IL	May-2018	$ 2,000,000	1,960	$ 1,020
27	Fisher Water & Wastewater System	Illinois American	City of Fisher	IL	Mar-2018	$ 6,800,000	1,780	$ 3,820
28	Peotone Water & Sewer System	Aqua Illinois	Village of Peotone	IL	Oct-2018	$12,300,000	3,000	$ 4,100
30	Lake Region Water & Sewer Co	Camden County Public Water Supply District Number Four	Camden & Miller Counties	MO	Jun-2017	$ 6,084,000	1,608	$ 3,784
31	Village of Wardsville	Missouri American	Cole County	MO	May-2017	$ 2,750,000	887	$ 3,100
37	Village of Glenview	Aqua Illinois	Village of Glenview	IL	Apr-2015	$22,000,000	7,218	$ 3,048
						High	9,000	$ 5,263
						Low	424	$ 97
						Median	1,608	$ 3,100
						Mean	2,503	$ 2,747

The above market data indicates a water and sewer system sale price of $97 to $5,263 per customer. A review of the market data pertaining to utility systems that included water and sewer shows the subject property's unit value of $2,400 per customer is within the range indicated by the market data.

Based upon this analysis, it is our opinion the market value of the subject property systems (water and sewer) as a whole is supported at $1,115,000 (ONE MILLION ONE HUNDRED FIFTEEN THOUSAND DOLLARS) based upon the Sales Comparison Approach.

Income Capitalization Approach

The income capitalization approach has its strengths and weaknesses, similar to the inherent weaknesses and strengths that exist in the application of the cost approach and the market approach. The valuation expert's reconciliation of the value(s) indicated by the income approach takes into consideration various factors.

The income capitalization approach is a technique in which the value of assets are arrived at by capitalizing future (anticipated) benefits into a present value. The capitalization process includes one of two methods: (1) direct capitalization or (2) yield capitalization. The distinction between the two capitalization methods pertains to the perspective of the future benefits (cash flows).

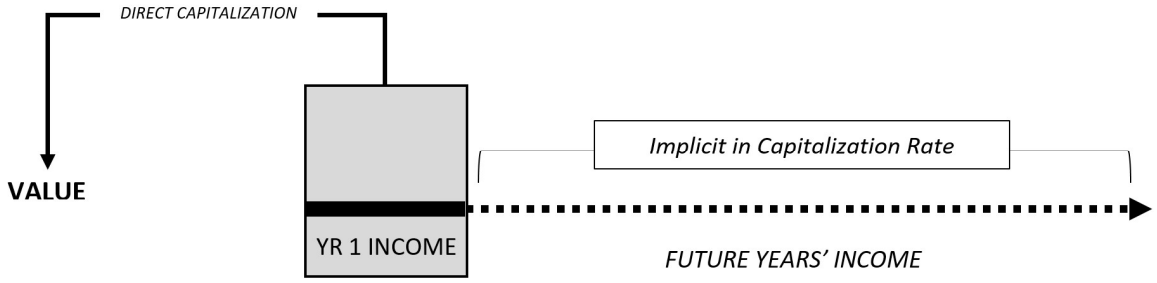
Direct Capitalization

Direct capitalization involves the conversion of a single-year's income (referred to as "first-year income") by applying an overall capitalization rate and using the following formula.

VALUE = INCOME ÷ RATE

*Where **INCOME** = First Year Income and **RATE** = Capitalization Rate*

The capitalization rate may be developed through a market extraction process or by utilizing built-up techniques in which the rates of return (dividend rates) of the respective property components are weighted (for example, debt and equity investment returns, land and building investment returns, etc.). In direct capitalization, change in value (over the investment/holding term) and change in income (over the investment/holding term) are implicit in the capitalization rate.



Income Capitalization Approach
(Continued)

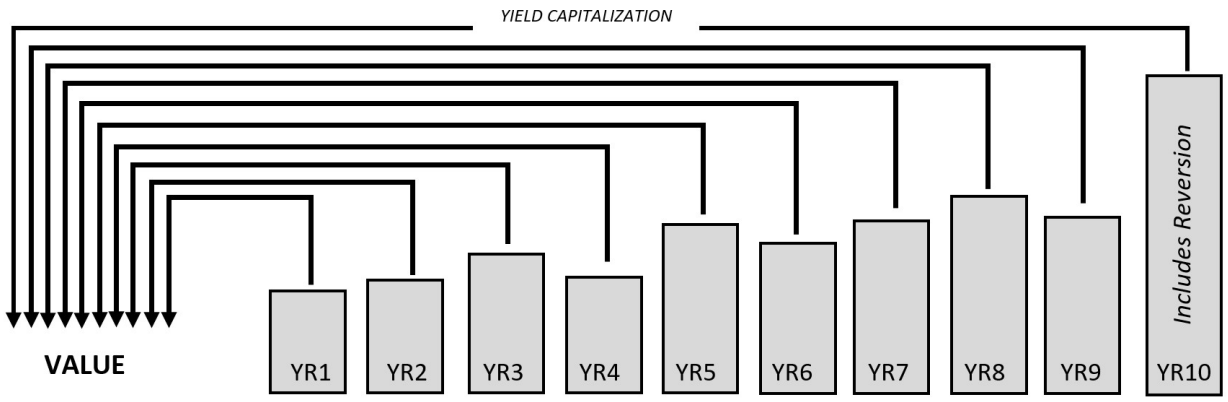
Yield Capitalization

Yield capitalization involves a more detailed analysis of the projected income of the asset. Anticipated changes in (1) income patterns and (2) overall value are explicitly stated. In yield capitalization, the conversion of each anticipated future cash flow (plus the reversion at the end of the income/investment period) is by means of discounting using a discount rate (also referred to as a yield rate). The resultant net present value is the sum of the present value calculations for each individual periodic cash flow plus the present value of the reversion.

Below is the formula for the discounting process followed by an illustration depicting the discounting of each individual periodic cash flow.

$$PV = \frac{P_1}{1+r} + \frac{P_2}{(1+r)^2} + \ldots + \frac{P_n}{(1+r)^n}$$

Where P = Income, r = discount rate, and n = term (years)



Income Capitalization Approach
(Continued)

Factors significant to the income capitalization methodology

A proper analysis in the valuation of a utility system will take into account the fact that there are many issues relating to the income capitalization process, whether that process includes direct capitalization or yield capitalization.

The issues that are inherent in the projection of cash flows for the income capitalization process pertaining to the valuation of public utility systems include:

(1) the fact that revenue (potential income) generated through customer rates is determined based upon the tariff or service area of which the subject system becomes part and impacted by rate cases;

(2) the changes in revenue resulting from changes in the level of income and expenses for the tariff resulting from, amongst other issues, the management and operational efficiencies of the IOU;

(3) changes in the rate base of the tariff resulting from acquisitions, mergers, and consolidations, and consequently the revenues that are generated by tariffs tend to experience irregular patterns of change over time;

(4) the changes in the rate base of the tariff resulting from qualified capital investment projects impacting systems within the tariff;

(5) the concept of *investment value* (value to a *particular* purchaser based on buyer-specific investment returns and criteria) v*. market value* (value of the system to a *typical* purchaser and not influenced by that particular buyer's specific returns generated by its respective tariffs).

The last factor (6) that impacts yield capitalization (DCF) exclusively goes to the issue of assumptions that are incorporated into the discounting model and how sensitive net present values can be to seemingly subtle variances in the valuation expert's inputs (DCF assumptions).

Additionally, yield capitalization models that use a pre-tax cash flow are not impacted by changes in tax rates and tax codes. However, after-tax DCF models can be affected by changing tax rates, similar to the situation that might occur in the near future based upon the current administration's proposed revisions to the federal tax code.

The following provides additional explanations regarding the issues inherent in the income capitalization approach.

Income Capitalization Approach
(Continued)

(1) Revenue influenced by systems in the tariff and rate cases

Tariffs often include assets from multiple systems, combined for investment, management, operational, and regulatory agency-influenced purposes. In many cases, the applicable customer rates are the same for all customers in the tariff, regardless of the system or service area of which they were part prior to acquisition and placement in the tariff; and, the applicable customer rates for the tariff are impacted by financial and regulatory components for the systems in the tariff collectively. Thus, often there is no tariff revenue (income and expense) data that can be credibly attributed to one particular system that is part of a multiple-system tariff. Additionally, the customer rates (income) and operating expenses for one IOU may vary amongst that IOU's different tariffs, and likewise there may be no correlation between the projected income and expenses of a service area as part of one IOU's holdings as opposed to the projected income and expenses for that same service area that would pertain to a different IOU's tariff in the same general geographical location or market area.

Tariffs are highly regulated and changes in allowed revenues, and ultimately changes in rates, can be granted provided the applicant meets extensive application and regulatory requirements. Rate cases provide mechanisms for the applicants to have allowed revenues and customer rates adjusted by the regulating authority. It is the role of the regulating authority (commission, for example) to review the applicant's request and, assuming the applicant and its operations meet the requirements established by the agency, adjust the revenues and rates, if deemed appropriate by the agency, in an effort to provide the applicant the opportunity to receive a fair and reasonable rate of return on its investment. As part of the rate case process, IOUs are required to validate operating expenses and operational efficiencies, which contribute to the respective commission's decision and determination regarding a rate change. Rate cases can impact all of a tariff's customers -- even though the customers may have come from various independent service areas. Examples of approved rate cases impacting multiple service areas include the 2016 rate case in Illinois involving Illinois American Water[9] and the 2017 rate case in Illinois involving Aqua Illinois.[10]

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[9] In January 2016, Illinois American Water requested a change in its water and wastewater rates of $340 million, due to substantial capital investments including a $76 million investment in its Chicago Metro service area. The Illinois Commerce Commission (ICC) issued an Order in 2016 that allowed Illinois American Water to adjust its rates effective January 1, 2017. The Order provided a decrease in monthly water rates applicable to its customers in Arlington Heights, Bolingbrook, Des Plaines, Elk Grove, Homer Glen, Homer Township, Lemont, Lockport, Mount Prospect, Norwood Park Township, Orland Hills, Orland Park, Prospect Heights, Romeoville, Wheeling, and Woodridge; but, increases (ranging from $6.51 per month to $17.70 per month) for wastewater services. For Illinois American Water customers in Carol Stream, Elmhurst, Glen Ellyn, Lisle, Lisle Township, Lombard, Villa Park, Winfield, and Wheaton, the monthly water rates decreased by $5.57 while wastewater service rates had increases by up to $17.70 per month on top of the pre-existing rates; and, for its water customers in Glenview and Rolling Meadows, the wastewater rates increased by $6.57 per month.

[10] In May 2017, Aqua Illinois, Inc., filed revised tariff sheets with the Illinois Commerce Commission which included

Income Capitalization Approach
(Continued)

(2) Operational efficiencies impact income and expenses of the tariff

IOUs generate revenues for services provided by the IOU that are directly impacted by management and operational efficiencies. For example, it is reasonable to expect certain line item expenses to be generally lower for a tariff consisting of multiple utility systems as compared to the sum of the line item expenses for each system if operated and managed independently. The ability of the IOU to spread certain costs among all customers in a tariff and to benefit from economies of scale generally results in a lower expense unit cost (cost per customer) for the individual systems; and, the extent of the benefit tends to be greater for the smaller systems due to the economies of scale.

(3) Changes to the rate base and customer rates are impacted by mergers, acquisitions, and consolidations; revenue streams typically do not remain constant or demonstrate level/patterned increases

The rate base of a tariff is also subject to change if the IOU acquires additional systems that are incorporated into the tariff or by consolidation of two or more tariffs. In the latter, it is reasonable to expect some of the customers may experience increases in rates while others may experience decreases in rates. Also significant is the fact that rate changes often occur within the first few years of the service area's acquisition, demonstrated by the March 2021 consolidation of service areas in Missouri into the Elm Hills tariff.[11]
I have researched this issue in public filings and dockets in several states where IOUs have acquired public utility systems.

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the request for increases in water and wastewater service rates affecting numerous service areas throughout Illinois and a consolidation of multiple service areas into one extensive service area. (Case 17-0259). In its Final Order, filed March 7, 2018, the Commission authorized Aqua to file new tariff sheets for its Consolidated Sewer Division and Consolidated Water Division and further amended the original cost of plant for the water division of more than $382 million and amended the original cost of the plant for the sewer division of more than $76 million.

[11] Four Missouri service areas -- Missouri Utilities, Rainbow Acres, State Park Village, and Twin Oaks -- were acquired between May 2018 and December 2018. In each case, the rate change and consolidation occurred within 3 years of the acquisitions. Substantial rate increases were also realized for the service areas that comprise the Elm Hills tariff. The four service areas had monthly rates from $3.18 (applies to Twin Oaks/Preserve and is estimated as the customers were not previously individually billed for sewer service) to $45 per month (State Park Village), and all customer rates were set at $99.88 per month as a result of the consolidation.

Income Capitalization Approach
(Continued)

Some of the additional relevant recent examples include a Missouri rate case from 2020[12], a pending case in Missouri for establishing a new service area[13], and a Missouri consolidation including recent (2021) acquisitions by the consolidated district[14].

(4) Changes to the rate base impacted by capital improvements

Qualifying capital investments can impact the rate base of a tariff that consequently could impact all of the customers within the tariff. For instance, a substantial capital investment program to replace, repair, or add infrastructure to a particular system's assets can, subject to regulatory approval, have a direct influence on all of the customers in the tariff, including those customers from different systems that are not the subject of the capital investment project. Consequently, customer rates for one service area in a tariff are subject to change over time based upon qualifying capital projects necessary for the maintenance and/or improvements to other service areas in the tariff.

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[12] On April 7, 2021, the State of Missouri Public Service Commission issued an ORDER APPROVING STIPULATION AND AGREEMENT for the matter of Missouri American Water's 2020 application to implement a general rate increase for water and sewer services in its Missouri service areas. (Case No. WR-2020-0344.) The stipulation, filed on March 5, 2021, provides for an increase in Missouri American Water's revenue requirement of $30 million over revenues authorized in its last general rate case. The $30 million increase results in Missouri American Water's annual revenue requirement being increased to $348 million. The Commission's Order became effective May 7, 2021.

[13] An example of a possible change in customer rates is evident in the docket filing by Missouri American Water of its PROPOSAL OFFER TO CITY OF HALLSVILLE dated July 18, 2019. (File No. SA-2021-0017.) On July 20, 2020, Missouri American Water filed its application for a certificate of convenience and necessity (CCN) to essentially operate a wastewater system in and near Hallsville, Missouri. In its offer to Hallsville, Missouri American Water proposed placing the City of Hallsville system in its existing tariff that would result in a 3% reduction in the Hallsville customer rates.

[14] 12 utility service areas located in Missouri that were consolidated in a July 2020 rate case into a tariff known as Confluence Rivers. All 12 service areas that comprise the Confluence Rivers tariff were purchased between April 2019 and June 2019. In each case, consolidation and rate change occurred less than 16 months after the system's acquisition date. The 12 service areas (systems) include the Auburn Lake Service Area, the Calvey Brook Service Area, the City of Eugene Service Area, the Evergreen Lake Subdivision Service Area, the Whispering Pines Subdivision Service Area (formerly Gladlo), the Lake Virginia Service Area, the Majestic Lakes Service Area, the Mill Creek Service Area, the Roy-L Service Area, the Bon-Gor Lake Estates Subdivision Service Area (formerly Smithview H2O), the Villa Ridge Service Area, and Chalet City West Subdivision/Alpine Village Community Service Area (formerly The Willows Utility Company). The rate changes for the service areas that comprise the Confluence Rivers Service Area ranged from increases of approximately 127% (Roy-L) to 807% (The Willows Utility System). Examples of customer rate increases for systems in Confluence Rivers include the Evergreen Lake Subdivision Service Area (water system) in which rates were increased from $7.71 per month to $42.20 per month and The Willows Utility Company (water system) in which rates were $5.23 per month and increased to $42.20 per month as a result of the consolidation and rate case. On May 3, 2021, the Missouri Public Service Commission approved the acquisition of five additional systems by the Company (Branson Cedars Resort Utility Company, DeGuire Subdivision, Freeman Hills Subdivision, Prairie Heights Water Company, and Terre du Lac.

Income Capitalization Approach
(Continued)

Capital Improvement Projects (CIPs) often can add substantially to the total investment of an IOU in an acquired service area or utility system. In the case of the proposal by Missouri American Water to acquire the City of Hallsville wastewater system, the proposal offer included a $2 million cash purchase price payable at closing with an additional $3.3 million committed to a five-year CIP. In this case, the CIP represented 62% of the total anticipated investment.

Another important consideration relating to CIPs and their impact on potential revenue streams over an investment period is that very often the actual investments by the IOU can be considerably higher or lower than the anticipated or projected investments prior to acquisition. For instance, a CIP might require less than anticipated based solely on more efficient management and operations due to IOU ownership after acquisition; or, the CIP might include substantially more investment than projected based upon an acquired system operating at levels that exceed capacity -- which might require substantial upgrades and improvements not contemplated at the time the Asset Purchase Agreement was executed.

(5) Investment Value v. Market Value

Implicit in the definition of market value is the concept that the value conclusion pertains to “typical” purchasers under “typical” circumstances based upon “typical” market forces and influences. Investment value, by contrast, is an opinion of value developed based upon particular investment criteria, returns, or requirements that are unique and/or specific to an investor and not necessarily representative of the market in general. If the objective of the valuation assignment is to develop a market value opinion, discounted cash flow analysis and other yield capitalization models must, by definition, incorporate and be based upon *market* inputs: market income levels, market expense ratios, market returns for the investors, etc.

Utilizing a system’s projected income for a specific purchaser, based upon that purchaser’s anticipated income resulting from that purchaser’s tariff, and using that investor’s projected increases and/or decreases in income and expenses, respectively, during the investment period, and based upon that investor’s allowed rate of return for the investment period, may or may not be consistent with market levels for the same inputs (income, expenses, periodic rates of change, rate of return, etc.). If the investor’s particular income and expense projections are not consistent with or based upon market levels, the resultant value opinion would be *investment* value.

Income Capitalization Approach
(Continued)

(6) Sensitivity inherent in DCF analysis

Discounted cash flow analysis (DCF) is a method of yield capitalization in which anticipated/projected future cash flows, identified for a particular investment period, are discounted to a present value, often referred to as a net present value. The process requires a number of investment assumptions, all of which impact the level of periodic cash flows and the net present value of the investment as a whole.

Seemingly insignificant changes in one input can have a significant impact on the final calculation/opinion; and, changes in multiple assumptions can compound the effect of the change on the conclusions.

Conclusion of DCF analysis

DCF analysis is sensitive to subtle changes in the assumptions. Valuation experts need to exercise caution in selecting inputs (assumptions) as what seemingly are small/insignificant changes in the inputs can have a significant impact on the final conclusion. Credible assignment results for a market value opinion using DCF requires careful analysis of comparable market data to assist in determining appropriate assumptions.

Summary of Income Approach

The Income Capitalization Approach is not considered applicable in the subject property valuation assignment. It is not possible to project accurate and credible cash flows for the subject property system due to the number of variables that are unknown. Projecting future cash flows attributable to the subject property would not be realistic or credible, and could result in assignment results that are misleading.

Final Reconciliation

The purpose of this appraisal report was to arrive at an estimate of market value for the City of Wood Heights water delivery and wastewater systems based upon conditions evident in the market as of November 29, 2021. We inspected the subject property, reviewed numerous reports and documents provided by the client and the City of Wood Heights, conducted research with regard to land values and easement valuation, and reviewed a report prepared by Flinn Engineering.

Our analysis of the City of Wood Heights water delivery and wastewater collection systems included the application of the Cost Approach and the Sales Comparison Approach. As explained in the report, the Income Capitalization Approach is not customarily relied on for the valuation of water delivery and wastewater collection systems acquired by investor-owned entities.

The Sales Comparison Approach included an analysis of transactions from Missouri and transactions from Illinois. As explained in this report, the Illinois market is more representative of a competitive market with balance the supply and demand forces. The market approach resulted in opinions of $725,000 for the subject property water delivery system and $390,000 for the subject property wastewater collection system.

The Cost Approach included the analysis and valuation of the system by its components: land (fee owned parcels and permanent easements), and facilities/infrastructure associated with the water delivery and wastewater collection systems. The Cost Approach resulted in a conclusion of value for the water delivery system of $890,000 and a conclusion of value for the wastewater collection system of $550,000.

Based upon a review of the market data available for both applications, we have concluded that primary emphasis should be placed on the value opinions indicated by the Sales Comparison Approach. The Cost Approach was relied on but concluded to not be as reliable as the Sales Comparison Approach.

Therefore, our final value opinions for the subject property systems are as follows:

Market Value of Water Delivery System	Market Value of Wastewater Collection System
$800,000	$400,000

These valuation opinions are developed subject to the extraordinary assumptions and hypothetical conditions explained in this appraisal report.

Statement of Certification – Joseph E. Batis

I certify that, to the best of my knowledge and belief:

- -- the statements of fact contained in this report are true and correct.
- -- the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions and are my personal, impartial, and unbiased professional analyses, opinions, and conclusions.
- -- I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved.
- -- I have not completed a real estate appraisal of the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.
- -- I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
- -- my engagement in this assignment was not contingent upon developing or reporting predetermined results.
- -- my compensation for completing this assignment is not contingent upon the developing or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
- -- my analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the *Uniform Standards of Professional Appraisal Practice* and in conformity with the requirements of the *Code of Professional Ethics* and the *Standards of Professional Appraisal Practice* of the Appraisal Institute.
- -- I have made a personal inspection of the property that is the subject of this report.
- -- no one other than Jordan Leiner, Elizabeth West, Elizabeth Goodman Schneider and Edward Dinan provided significant real property professional assistance to the person signing this certification.

As of the date of this report, Joseph E. Batis has completed the requirements of the continuing education program of the Appraisal Institute.

Furthermore, I certify that the use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.

March 7, 2022

Joseph E. Batis, MAI, AI-GRS, R/W-AC
Edward J. Batis & Associates, Inc.
General Certification Lic. #553.000493 (IL; Expires 09/23)
General Certification Lic. #2016044083 (MO; Expires 06/22)
General Certification Lic. #CG03684 (IA; Expires 06/22)
General Certification Lic. #5660 (TN; Expires 06/23)
General Certification Lic. #4001017857 (VA; Expires 06/23)
General Certification Lic. #TX 131049 G (TX; Expires 11/22)
General Certification Lic. #A8416 (NC; Expires 06/22)
General Certification Lic. #CGA-1027103 (AZ ; Expires 07/23)

Statement of Certification – Elizabeth Goodman-Schneider

I certify that, to the best of my knowledge and belief:

The statements of fact contained in this report are true and correct.

The analyses, opinions, and conclusions in this review report are limited only by the reported assumptions and limiting conditions and are my personal, impartial, and unbiased professional analyses, opinions, and conclusions.

I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved.

I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.

My engagement in this assignment was not contingent upon developing or reporting predetermined results.

My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favor the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.

My analyses, opinions, and conclusions were developed and this appraisal report was prepared in conformity with the *Uniform Standards of Professional Appraisal Practice*.

Elizabeth Goodman Schneider made a personal inspection of the property that is the subject of this appraisal report.

No one other than Jordan Leiner, Elizabeth West, Joseph Batis and Edward Dinan provided significant real property appraisal assistance to the person signing this certification.

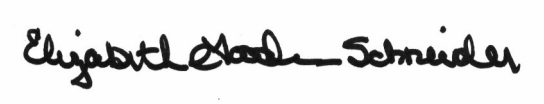
My engagement for this assignment, and my conclusions as well as other opinions expressed herein are not based on a required minimum value, a specific value, or approval of a loan.

Elizabeth Goodman Schneider has performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of this appraisal report within the past three-year period immediately preceding acceptance of this assignment.

As of the date of this report, Elizabeth Goodman Schneider has completed the Standards and Ethics Education Requirement of the Appraisal Institute for Associate Members.

As of the date of this report, Elizabeth Goodman Schneider has completed the continuing education programs of the State of Missouri and the State of Wisconsin.

All individuals who participated in the preparation of this report and who are Senior Members of the American Society of Appraisers are recertified as required by the mandatory recertification as set out in the constitution by-laws and administrative rules of the American Society of Appraisers.



Elizabeth Goodman Schneider, ASA

Colorado Certified General Appraiser No. CG.200001080 exp 12/31/2021
Florida State Certified General Real Estate Appraiser No. RZ4093 exp 11/30/2022
Illinois Certified General Real Estate Appraiser No. 553-001973 exp 9/30/2023
Indiana Certified General Real Estate Appraiser No. CG41700036 exp 6/30/2022
Iowa Certified General Appraiser No. CG02980 exp 6/30/2022
Kentucky Certified General Real Property Appraiser No. 5262 exp 6/30/2022
Louisiana Certified General Appraiser No. APR.04505-CGA exp 12/31/2021
Minnesota Certified General Real Property Appraiser No. 40232088 exp 8/31/2022
Missouri State Certified General Real Estate Appraiser No. 2016042105 exp 6/30/2022
Ohio Certified General Real Estate Appraiser No. ACGO.2017003680 exp 8/10/2022
Pennsylvania Certified General Appraiser No. GA004327 exp 6/30/2023
Rhode Island Certified General Appraiser No. CGA.0020068 exp 8/17/2023
Wisconsin Certified General Appraiser No. 1586-010 exp 12/14/2021

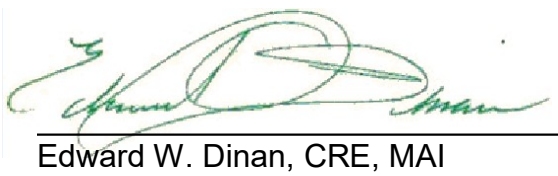
Statement of Certification – Edward Dinan

I certify that, to the best of my knowledge and belief:

- -- the statements of fact contained in this report are true and correct.
- -- the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions and are my personal, impartial, and unbiased professional analyses, opinions, and conclusions.
- -- I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved.
- -- I have not completed a real estate appraisal of the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.
- -- I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
- -- my engagement in this assignment was not contingent upon developing or reporting predetermined results.
- -- my compensation for completing this assignment is not contingent upon the developing or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
- -- my analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the *Uniform Standards of Professional Appraisal Practice* and in conformity with the requirements of the *Code of Professional Ethics* and the *Standards of Professional Appraisal Practice* of the Appraisal Institute.
- -- I have made a personal inspection of the property that is the subject of this report.
- -- no one other than Jordan Leiner, Elizabeth West, Elizabeth Goodman Schneider and Joseph Batis provided significant real property professional assistance to the person signing this certification.

As of the date of this report, Edward Dinan has completed the requirements of the continuing education program of the Appraisal Institute.

Furthermore, I certify that the use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.



March 7, 2022

Edward W. Dinan, CRE, MAI
Dinan Real Estate Advisors, Inc.

ADDENDA

Statement of Assumptions and Limiting Conditions

Qualifications of the Appraisers

Flinn Engineering Report

STATEMENT OF ASSUMPTION AND LIMITING CONDITIONS

The value herein estimated and/or other opinions presented are predicated on the following:

1. No responsibility is assumed for matters of a legal nature concerning the appraised property -- especially those affecting title. It is considered that the title is marketable for purposes of this report. The legal description as used herein is assumed to be correct.

2. The improvement is considered to be within the lot lines (unless otherwise stated); and, except as herein noted, is presumed to be in accordance with local zoning and building ordinances. Any plots, diagrams, and drawings found herein are to facilitate and aid the reader in picturing the subject property and are not meant to be used as references in matters of survey.

3. The appraiser assumes that there are no hidden or unapparent conditions of the property, subsoil or structure which would render it more or less valuable than otherwise comparable properties. The appraiser assumes no responsibility for such conditions or for engineering which might be required to discover such things.

4. Any description herein of the physical condition of improvements including, but not limited to, the heating, plumbing, and electrical systems, is based on visual inspection only, with no demonstration performed, and they are thus assumed to be in normal working condition. No liability is assumed for same, nor for the soundness of structural members for which no engineering tests were made.

5. The appraiser shall not be required to give testimony or appear in court by reason of this appraisal with reference to the property herein described unless prior arrangements have been made.

6. The distribution of total valuation in this report between land and improvements applies only under the existing program of utilization under the conditions stated. This appraisal and the allocations of land and building values should not be used as a reference for any other purpose and are invalid if used so.

7. That this report is to be used in its entirety and only for the purpose for which it was rendered.

8. Information, estimates, and opinions furnished to us and considered in this report were obtained from sources considered reliable and believed to be true and correct; however, no responsibility for guaranteed accuracy can be assumed by the appraiser.

9. The property is appraised as though under responsible ownership and competent management.

10. The report rendered herein is based upon the premise that the property is free and clear of all encumbrances, all mortgage indebtedness, special assessments, and liens--unless specifically set forth in the description of property rights appraised.

11. No part of this report is to be reproduced or published without the consent of its author.

12. The appraisal covers only the property described herein. Neither the figures therein, nor any analysis thereof, nor any unit values thereof derived, are to be construed as applicable to any other property, however similar it may be.

13. Neither all, nor any part, of the contents of this report, or copy thereof, shall be used for any purpose by any but the client without the previous written consent of the appraiser and/or the client; nor shall it be conveyed by any including the client to the public through advertising, public relations, news, sales, or other media, without the written consent and approval of the author--particularly as to value conclusions, the identity of the appraiser or a firm with which he is connected, or any reference to any professional society or institute or any initialed designations conferred upon the appraiser, as stated in his qualifications attached hereto.

14. Any cash flow calculations included in this report are developed from but one of a few alternatives of a possible series and are presented in that context only. Specific tax counsel should be sought from a C.P.A., or attorney, for confirmation that this data is the best alternative. This is advised since a change in value allocation, method or rate of depreciation or financing will have consequences in the taxable income.

15. This appraisal has been made in accordance with the Code of Ethics of the Appraisal Institute.

16. This report has not taken into consideration the possibility of the existence of asbestos, PCB transformers, or other toxic, hazardous or contaminated substances, and/or underground storage tanks (hazardous materials), or the cost of encapsulation or removal thereof. Should client have concern over the existence of such substances on the property, the appraiser considers it imperative for the client to retain the services of a qualified, independent engineer or contractor to determine the existence and extent of any hazardous materials, as well as the cost associated with any required or desirable treatment or removal thereof. The valuation stated herein would therefore be void, and would require further analysis to arrive at a market estimate of value.

EDWARD J. BATIS & ASSOCIATES

UTILITY VALUATION EXPERTS

Professional Profile

Joseph E. Batis, MAI, AI-GRS, R/W-AC

EMPLOYMENT

Owner and President of EDWARD J. BATIS & ASSOCIATES, INC.

Owner and President of UTILITY VALUATION EXPERTIS, INC.

Real Estate Appraiser and Consultant since 1983

PROFESSIONAL AFFILIATIONS, MEMBERSHIPS, AND CERTIFICATIONS

Member of the Appraisal Institute
MAI designation, AI-GRS designation (Member #63637)

Member of the International Right of Way Associations
R/W-AC certification (Member #7482)

Member of the American Water Works Association
(Member #03666505)

Member of the Illinois Chapter of the National Association of Water Companies (NAWC)

Approved Instructor
Appraisal Institute - multiple continuing education and qualifying education courses

DEVELOPMENT OF STATE-ACCREDITED CONTINUING EDUCATION SEMINARS

- *The Valuation of Water of Wastewater Systems (2020)*
- *Pipeline and Corridor Easements – Aren't They All the Same? (2020)*
- *Understanding Easements – What is Being Acquired? (2003)*
- *Pipelines and Easements – Can They Co-Exist? (2003)*

STATE – GENERAL CERTIFICATION APPRAISAL LICENSES

Illinois - Missouri - Tennessee - Virginia - Iowa - Texas - North Carolina

PRIVATE AND PUBLIC UTILITY ASSET VALUATION (2013-PRESENT)

Valuation and consulting services of public water treatment and distribution assets, public wastewater collection and treatment assets, shared assets (treatment plants), natural gas delivery systems, and other public infrastructure and assets for acquisition, disposition, allocation, or resolution of value disputes for more than 75 assignments during the last 7 years.

EDWARD J. BATIS ASSOCIATES

UTILITY VALUATION EXPERTS

SPECIALIZED VALUATION SERVICES AND EXPERIENCE

- Right of Way / Energy Transmission Lines / Fiber Optic Corridors / Railroad Corridors
- Power Transmission Line Corridors / Solar Energy Fields / Underground Gas Storage Fields
- Public and Investor-Owned Utility Systems (water distribution and wastewater collection)
- Valuation of Permanent and Temporary Easements
- Market Impact Studies for Corridors (Power Transmission Lines, Underground Pipelines)
    - Remainder Properties / Proposed Projects / Expansion of Infrastructure Systems

LITIGATION, ARBITRATION, AND CONSULTING SERVICES

- Expert Testimony (Federal and Circuit Courts, Commerce Commission Hearings)
- Value Dispute Resolution Services - Review and Rebuttal Services
- Litigation Consultation and Support Services

IMPACT STUDIES – SOLAR FIELD PROJECTS (2018)

Market impact studies pertaining to the proposed development of solar energy fields in several counties in the Chicago metropolitan area. Each market study included a site analysis and "before and after" analysis to determine the impact from the proposed solar projects to properties in the immediate and general market areas of the proposed facilities.

IMPACT STUDIES – PROPERTY VALUES AFFECTED BY INTERMODAL FACILITIES (2020)

Market impact studies pertaining to 15 warehouse, industrial, and intermodal facilities developed from 1988-2020 and their impact on more than 6,000 residences. Analysis included a review of traffic reports, proposed infrastructure developments, and independent study of proximity impacts. Scope of work included multiple appearances in front of multiple village and city committees to provide testimony.

MARKET STUDY AND APPRAISAL REVIEW - CONTAMINATION (2018)

Appraisal review services and market data research pertaining to the impact to the market values of numerous properties resulting from the contamination of underground water sources. Scope of work included technical reviews of multiple appraisals, independent market research, and consultation with clients to assist with settlement strategy.

MARKET IMPACT STUDY – CONTAMINATION FROM UNDERGROUND LEAK AT NUCLEAR POWER GENERATING STATION (2007)

Coordinated the market research, analysis, and valuation services pertaining to the impact of more than 500 properties affected by an underground leak of tritium from the Braidwood Nuclear Power Plant. Market Study included a before and after statistical analysis including market development patterns and value trends in 20 communities during a five-year time frame.

Analysis and Allocation of the Contributory Values of Multiple Permanent Easements Co-Located in a Transmission Corridor (2019-2020)

An analysis and valuation of the easement values for multiple contiguous and overlapping permanent easements within a right-of-way corridor, including gas pipeline easements, power transmission lines, public utility (water line) easements, and recreational easements. Scope of work included preliminary valuation, consultation, and technical reviews of multiple appraisal reports to assist client is settlement strategy.

Management and Supervision of Valuation Services for Simultaneous Acquisition of Easements for Multiple Oil Pipelines (2012-2020)

Valuation and consulting services including the coordination and management of preliminary land value studies, market impact studies to support "good-faith" offers, appraisal services for acquisition and condemnation hearings, appearance and testimony at Illinois Commerce Commission hearings, expert testimony at trial, appraisal review services, preparation of rebuttal reports and appearance for rebuttal testimony, and preparation for settlement conferences. Project involved acquisition of permanent and temporary easements for the simultaneous construction of three interstate oil transmission lines. Market research included an analysis of statistical data pertaining to 18 residential subdivisions impacted by underground pipelines. Responsible for management of the projects' valuation services pertaining to more than 2,000 properties in 22 counties including the managing, training, and supervising of 35 appraisers, consultants, and researchers that participated in the acquisition projects.

Interstate Natural Gas Pipeline Project (2000-2003)

Valuation and consulting services including the coordination and management of appraisal services for acquisition and condemnation hearings in federal court, appraisal review services, rebuttal report/testimony, and settlement conferences. Project involved acquisition of permanent and temporary easements for the construction of a natural gas transmission line. Responsible for management of the project's valuation services including more than 600 properties in 4 counties.

Valuation Review Services and Expert Testimony for 1,000+ Mile Railroad Corridor

In 2019, provided valuation and consulting services including the review of appraisals and consulting reports pertaining to the valuation of a 1,000+ mile fiber optic corridor within a railroad corridor extending through Virginia, North Carolina, South Carolina, Tennessee and Illinois.

EDWARD J. BATIS ASSOCIATES

UTILITY VALUATION EXPERTS

RECENT AND PENDING PRESENTATIONS, DISCUSSION PANEL APPEARANCES, AND OFFERINGS OF SELF-DEVELOPED SEMINARS

Appraisal Institute - Chicago Chapter
Midwest Easements - Aren't They All the Same?
Chicago, IL; 2020

Illinois Municipal League Association - 2018 Annual Conference
What's the Value of Your Public Utility System?
Chicago, IL; 2019

Appraisal Institute - Chicago Chapter
The Valuation of Water and Wastewater Systems
Chicago, IL; 2021

Will County Estate Planning Council
Valuation and Regulatory Issues - Updates
Lockport, IL; 2018

Appraisal Institute - 2019 National Conference
Valuation of Easements - Litigation Issues
Denver, CO; 2019

International Right of Way Association - Chapter 12
Valuation of Easements for Pipelines
Aurora, IL; 2020

Southwest Suburban Water Coalition
Valuation of Easements within Easements in Right-of-Way Corridors
Orland Park, IL; 2019

Illinois Property Assessment Institute - 2021 Annual Conference
Highest and Best Use Analysis
Bloomington, IL; 2021

Illinois Property Assessment Institute - 2021 Annual Conference
The Valuation of Privately-Owned Water and Wastewater Utility Systems
Bloomington, IL; 2021

Appraisal Institute - Chicago Chapter
Illinois Appellate Court Cases - Impacts to Valuation Experts
Chicago, IL; Pending 2021

ELIZABETH GOODMAN SCHNEIDER, ASA

goodmanappraisal@gmail.com • 414-559-5898 • www.linkedin.com/in/elizabethgoodmanschneider

CERTIFIED GENERAL APPRAISER

Certified General Appraiser with 32 years experience in utility appraisal, commercial appraisal and appraisal review.

- Significant experience using the cost, market/sales and income approaches to value.
- Outstanding analytical skills.
- Superior oral and written communication.
- Public utility appraisal experience totaling 32 years.
- Knowledge of appraisals of commercial property types obtained through reviewing real property appraisals.

Public utility appraisal experience of the following property types:

- Water Systems
- Wastewater/Sewer Systems
- Hydroelectric Plants
- Natural Gas Pipelines
- Ip Gas Pipelines
- Oil Pipelines
- Products Pipelines
- Gas Transmission Assets
- Gas Distribution Assets
- Electric Transmission Assets
- Electric Distribution Assets
- Coal-Fired Power Plants
- Gas-Fired Power Plants
- Nuclear Power Plants
- Telecommunication Assets

Appraisal review experience of the following property types:

- Water Systems
- Wastewater/Sewer Systems
- Multi-Family
- Public Utilities
- Retail
- Office
- Commercial Condominium
- Industrial Condominium
- Office Condominiums
- Residential Condominium Units
- Retail Condominiums
- Shopping Centers
- Small Marinas
- Mobile Home Parks
- Subdivisions
- Industrial / Warehouse
- Mixed-Use
- Vacant Land
- Restaurant
- Tavern
- Funeral Home
- Day Care Center
- Special Purpose Property

PROFESSIONAL EXPERIENCE

PRESIDENT AND OWNER, Goodman Appraisal Consultants LLC, Cudahy, WI. 2010 to present

Goodman Appraisal Consultants provides valuation of public utilities including water and wastewater/sewer systems as well as commercial real estate appraisal review services.

- Appraisals of water and wastewater/sewer systems for purchase.
- Appraisals of public utilities and desktop technical appraisal reviews.
- Use of the Cost, Sales Comparison, and Income Approaches to Value.
- Consistently increasing experience with different real property types through reviews of real property appraisals completed by many different appraisers and appraisal firms.

SENIOR ASSOCIATE, AUS Consultants, Greenfield, WI. 1989 to 2011

AUS Consultants provides ad valorem valuation of public utilities. As Senior Associate at AUS Consultants, I performed and assisted with appraisals of public utility property for property tax purposes in a number of states.

- Pursued appropriate licensing and became the only Certified General Appraiser employed by the company.
- Increasing responsibility and autonomy.
- Experience with attorneys as clients.

ELIZABETH GOODMAN SCHNEIDER, ASA

goodmanappraisal@gmail.com • 414-559-5898 • www.linkedin.com/in/elizabethgoodmanschneider

LICENSES

- Certified General Appraiser, State of Colorado, #CG.200001080, exp 12/31/2021
- State-Certified General Real Estate Appraiser, State of Florida, #RZ4093, exp 11/30/2022
- Certified General Real Estate Appraiser, State of Illinois, #553.001973, exp 9/30/2023
- Certified General Appraiser, State of Indiana, #CG41700036, exp 6/30/2022
- Certified General Appraiser, State of Iowa, #CG02980, exp 6/30/2022
- Certified General Real Property Appraiser, State of Kentucky, #5262, exp 6/30/2022
- Certified General Appraiser, State of Louisiana, #APR.04505-CGA, exp 12/31/2021
- Certified General Appraiser, State of Minnesota, #40232088, exp 8/31/2022
- State Certified General Real Estate Appraiser, State of Missouri, #2016042105, exp 6/30/2022
- Certified General Real Estate Appraiser, State of Ohio, #ACGO.2017003680, exp 8/10/2022
- Certified General Appraiser, State of Pennsylvania, #GA004327, exp 6/30/2023
- Certified General Appraiser, State of Rhode Island, #CGA.0020068, exp 8/17/2023
- Certified General Appraiser, State of Wisconsin, #1586-010, exp 12/14/2021

CREDENTIALS & PROFESSIONAL AFFILIATIONS

- ASA - Machinery and Technical Specialties - Public Utilities, American Society of Appraisers
- SBA Going Concern Registry
- Accredited Senior Appraiser - American Society of Appraisers, #41144
- National Association of Water Companies - Illinois Chapter Associate Member
- American Water Works Association - Member #03443739
- Board of Directors - Appraisal Institute, Wisconsin Chapter, 2017
- General Associate Liaison - Appraisal Institute, Wisconsin Chapter, 2010 to 2014
- Nominating Committee Member - Appraisal Institute, Region III, 2011 to 2013

EDUCATION

Master of Arts in Economics, University of Wisconsin – Milwaukee. Completed in 2003.
Specializing in monetary policy and labor relations.

Bachelor of Arts in Economics, University of Wisconsin – Milwaukee. Completed in 1998.
Honors in the Major. Appointed to the Dean's Advisory Council.

CONTACT INFORMATION

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414-559-5898
goodmanappraisal@gmail.com

ELIZABETH GOODMAN SCHNEIDER, ASA

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WISCONSIN CERTIFIED GENERAL APPRAISER LICENSE

NO. 1586 - 10

EXPIRES: 12/14/2021

The State of Wisconsin
Department of Safety and Professional Services

Hereby certifies that

ELIZABETH KATHLEEN COMTE GOODMAN SCHNEIDER

was granted a certificate to practice as a

CERTIFIED GENERAL APPRAISER ELIGIBLE TO APPRAISE FEDERALLY RELATED TRANSACTIONS IS AQB COMPLIANT

in the State of Wisconsin in accordance with Wisconsin Law on the 21st day of November in the year 2003.

This authority granted herein must be renewed each biennium by the granting authority.

In witness thereof, the State of Wisconsin Department of Safety and Professional Services has caused this certificate to be issued under its official seal.

This certificate was printed on the 22nd day of December in the year 2019

MISSOURI CERTIFIED GENERAL APPRAISER LICENSE

State of Missouri

Missouri Department of Commerce and Insurance
Division of Professional Registration
Real Estate Appraisers Commission

State Certified General Real Estate Appraiser

VALID THROUGH JUNE 30, 2022
ORIGINAL CERTIFICATE/LICENSE NO. 2016042105

ELIZABETH GOODMAN SCHNEIDER
6260 S LAKE DR #718
CUDAHY WI 53110
USA

EXECUTIVE DIRECTOR

DIVISION DIRECTOR

DINAN REAL ESTATE ADVISORS, INC.

EDWARD W. DINAN, MAI, CRE®
PRESIDENT

ACADEMIC

Rockhurst College, Kansas City, Missouri, A.B., 1972
American Institute of Real Estate Appraisers
- Course 1A, Memphis State University - May 1975
- Course 1B, Tulane University - July 1975
- Course II, University of Georgia - February 1976
- Course VI, Chicago Education Center - March 1977

Appraisal Institute
- Standards of Professional Practice, Parts A and B
- Seminars include: Cash Equivalency, Subdivision Analysis, Rates Ratios and Reasonableness, Feasibility, Valuation of Leasehold Interests, Americans with Disability Act Review, Condemnation Process and Appraisal, Condemnation Appraising: Advanced Topics and Applications, Standards of Professional Practice, Parts A and B, Corridors And Rights-Of-Way II Symposium Valuation and Policy

Harvard Law School, Program of Instruction for Lawyers
- Advanced Negotiation: Deal Design and Implementation

University of Houston
- Dispute Resolution Institute

EXPERIENCE

Professional experience includes market and financial feasibility studies, highest and best use analyses, transient housing and convention market surveys, analysis of redevelopment potential of existing communities, lease analysis and consultation, as well as the appraisal and evaluation of many types of properties including:

Airports
Apartments (high rise, garden, townhouse)
Banks
Casinos
Cemeteries
Condemnation Appraisals
Condominiums/Co-op/Timeshare
Duck Clubs
Farms
Golf Courses/Country Clubs
Hotels and Motels
Industrial Plants and Warehouses
Mobile Home Parks
Office Buildings
Planned Communities
Quarries/Mines
Railroad Properties
Resorts
Restaurants
Sales and Service Buildings
Schools (private, parochial, secondary, higher education)
Shopping Centers (regional, community, neighborhood)
Single Family Residential
Special Use Properties
Subdivisions
Surgical Centers
Theaters
Urban Renewal (acquisition, reuse)
Vacant Land (commercial, industrial, residential, rural, agricultural)
Vessels

2023 South Big Bend Boulevard · Saint Louis, Missouri 63117 · 314-647-9900 · Fax 314-647-9922
email: edinan@dinanreal.com

In addition, Mr. Dinan has been approved as a fee appraiser for the U.S. Department of Justice, Missouri Department of Natural Resources, Missouri Department of Highways and Transportation, Illinois Department of Transportation, Probate Court of St. Louis City, as well as FNMA, FDIC, RTC, HUD, SBA, OTS, along with numerous other governmental agencies and is qualified in court as an expert witness. Mr. Dinan has also served as a hearing officer for the St. Louis County Board of Equalization.

Prior to forming Dinan Real Estate Advisors, Inc., Mr. Dinan was employed by the Turley Martin Company as Vice President of their Consulting and Appraising Division. Mr. Dinan has also participated as a guest lecturer on real estate appraising at Washington University, as well as several seminars sponsored jointly by the University of Missouri - St. Louis and the Home Builders Association of Greater St. Louis, Counselors of Real Estate®, and Law Seminars International. In addition, Mr. Dinan is approved as an instructor for the Missouri Real Estate Commission's Continuing Education Program, and has been a lectured speaker for the Bar Association of Metropolitan St. Louis. Mr. Dinan has also delivered seminars on appraisal reviews to loan officers at several financial institutions in the St. Louis area.

GEOGRAPHICAL AREAS OF EXPERIENCE

Territory covered is primarily Metropolitan St. Louis, but also includes professional experience in the following 27 states: Arizona, Arkansas, California, Colorado, Connecticut, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, Nebraska, New York, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Virginia, Wisconsin and Wyoming.

PROFESSIONAL AFFILIATION

Mr. Dinan has held virtually every position as an officer and has served on the Board of Directors for the local chapter of the Appraisal Institute. In 1990, Mr. Dinan served as President of the former American Institute of Real Estate Appraisers and coordinated its unification with the local Society Chapter. Mr. Dinan also served as a Regional Representative for Region II of the Appraisal Institute. Mr. Dinan currently serves on the Board of Directors and is a National Liaison Membership Chair for the Counselors of Real Estate® as well as serving on the Advisory Board of Great Southern Bank. In addition, Mr. Dinan has the following affiliations:

Counselor of Real Estate® - 1996
- 2010 National Chairman - Dispute Resolution
- 2011 National Liaison Vice Chair
- 2011 National Co-Chair - Litigation Support
- 2012-2017 Board of Directors
- 2013 Recipient of the Chairs Award presented by The Counselors of Real Estate
- 2013 -2014 National Liaison Membership Chair

Appraisal Institute MAI Designation, Certificate Number 6103 -1980
St. Louis Association of Realtors
Royal Institution of Chartered Surveyors - 2006

In addition, Mr. Dinan has been approved as a fee appraiser for the U.S. Department of Justice, Missouri Department of Natural Resources, Missouri Department of Highways and Transportation, Illinois Department of Transportation, Probate Court of St. Louis City, as well as FNMA, FDIC, RTC, HUD, SBA, OTS, along with numerous other governmental agencies and is qualified in court as an expert witness. Mr. Dinan has also served as a hearing officer for the St. Louis County Board of Equalization.

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- 2012-2017 Board of Directors
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- 2013 -2014 National Liaison Membership Chair

Appraisal Institute MAI Designation, Certificate Number 6103 -1980
St. Louis Association of Realtors
Royal Institution of Chartered Surveyors - 2006

Flinn Engineering, LLC
11216 Neumann Lane
Highland, Illinois 62249
618-550-8427
ksimpson@flinnengineering.com

January 27, 2022

Mr. Joseph E. Batis, MAI, R/W-AC
Edward J. Batis & Associates
313 N. Chicago Street
Joliet, IL 60432

Re: Engineering Report
Water and Wastewater System
Wood Heights, Missouri

Dear Mr. Batis:

Flinn Engineering, LLC is pleased to present the following information regarding the water and wastewater systems owned by the City of Wood Heights, Missouri (City) as part of the appraisal process you are completing for Missouri American Water. The purpose of this Engineering Report is to provide an inventory of assets, estimate the 2021 installation cost, and estimate the depreciated value of the assets based on 2021 installation costs and the age of the assets. This report also includes a high-level review of the overall condition of the systems.

Information provided and/or found through internet research includes:

- US Department of Labor – Bureau of Labor Statistics Average Annual Inflation Rate - **Appendix A**
- MDNR Census of Missouri Public Water Systems 2020 - excerpt in **Appendix B**
- Tank Inspection Report prepared by Pittsburg Tank & Tower Group dated March 19, 2019 (Tank Inspection Report) - **Appendix C**
- MDNR Inspection of water system dated September 1, 2020 (MDNR Water Inspection Report) - **Appendix D**
- Water Distribution System Schematic - **Appendix E**
- Construction plans for sewer system improvements prepared by Larkin & Associates dated 1981 (1981 Construction Plans) – not attached
- "Larkin Study 2011" pages 3 through 7 - **Appendix F**
- MDNR Operating Permit for WWTP – excerpt in **Appendix G**
- USEPA Technology Fact Sheet on Oxidation Ditches dated September 2000 (USEPA Fact Sheet) - excerpt in **Appendix H**
- MDNR Inspection of wastewater treatment plant dated July 9, 2018 (MDNR Wastewater Inspection Report) - **Appendix I**

The high-level condition assessment includes five (5) designations for the overall systems – Excellent, Very Good, Good, Fair, and Poor. Each individual piece of equipment is not assessed separately and underground assets are not observed. The overall condition assessment is based on visual observation of the physical condition of the above-ground assets, known or estimated age of the assets, judgment based on my experience observing water and wastewater assets,

and reports by others if applicable. The high-level overall condition assessment considers that individual assets and/or facilities within the system may range from Excellent to Poor. Therefore, even though a system, for example, might appear to be in good overall condition, it is reasonable to expect some of the assets and/or facilities that comprise the system could be in excellent condition while others could be in poor condition. The overall condition for the system is not intended to suggest that every individual component of the system is in the same condition. A site visit was conducted on November 29, 2021. The site visit included an interview with City staff followed by a site visit to each facility location. No additional testing was conducted beyond the visual observation of physical condition of above-ground assets. The following reports (also listed above) that include an indication of the condition of the assets were also used in the high-level condition assessment:

- Tank Inspection Report (**Appendix C**)
- MDNR Water Inspection Report (**Appendix D**)
- MDNR Wastewater Inspection Report (**Appendix I**)

The original installation costs and installation dates were not documented by the City. The 2021 estimated cost of installation was calculated using a combination of an engineering opinion of cost to install the assets based on knowledge of other systems, as well as correspondence from the City, vendors, and contractors. When original costs are provided or estimated, they are inflated to 2021 using the average annual inflation rate downloaded from the US Department of Labor – Bureau of Labor Statistics (**Appendix A**). The 2021 estimated installation cost was depreciated based on the estimated age of each asset.

Water System

Based on the MDNR Census of Missouri Public Water Systems 2020 (excerpt in **Appendix B**), the Wood Heights original water system was placed in service in 1957. The City purchases water from Ray County Public Water District #2. The water system includes a meter vault (not owned by the City), an elevated storage tank, a below ground booster pump station, and the water distribution system. There was virtually no formal documentation or plans for the water system assets. Based on correspondence from the City, they received a USDA grant in 2011 for water system improvements.

Water Storage Tank

The water system includes a 100,000-gallon elevated tank. The tank is a welded steel, multileg tank. Based on the Tank Inspection Report (**Appendix C**), the tank was installed in 1995. The City has an annual contract with Pittsburg Tank & Tower Group to inspect/clean the tank regularly. The original installation cost was not documented by the City. Based on conversations with tank manufacturers, the estimated cost for supplying and constructing a storage tank in 2021 would be in the range of $2.00 to $2.50 per gallon depending on the height of the tank. We estimated the cost of the tank to be $2.50 per gallon because of the height. We estimated the cost of the foundation to be 10% of the tank cost, the site piping to be 5% of the tank cost, and the site work (grading, fencing, etc.) to be $5,000. The engineering is estimated at 10% of the subtotal for the tank, foundation, etc. **Table 1** summarizes the estimated cost to install the tank in 2021.

Table 1 – Tank Estimated Installation Cost in 2021

Description of Work	Elevated Tank (100,000 gallons)
Tank ($2.50 per gallon)	$ 250,000.00
Foundation (10% of Tank)	$ 25,000.00
Site Piping (5% of Tank)	$ 12,500.00
Site Work (Lump sum $5,000)	$ 5,000.00
Subtotal	$ 292,500.00
Engineering (10% of Subtotal)	$ 29,250.00
Total	**$ 321,750.00**

The MDNR Water Inspection Report (**Appendix D**) includes photos of various components of the tank and indicates that they are in good condition. Based on the visual observation during the site visit, the age of the tank, the Tank Inspection Report (**Appendix C**), the MDNR Water Inspection Report (**Appendix D**), and the annual maintenance contract with Pittsburg Tank & Tower Group, the tank appears to be in good condition.

Booster Pump Station

A below ground booster pump station is located on the east side of the City near the master meter vault. The pump station is a pre-fabricated station by Engineered Fluid, Inc. (EFI). EFI was contacted and they indicated that the pump station was purchased in 2010 for approximately $40,000. The booster pump station is assumed to be part of the USDA grant the City received in 2011. Assuming the installation cost was equal to the material cost ($40,000) and telemetry and programming was approximately $7,500, the total 2011 installed cost of the booster pump station is estimated to be $87,500. The average annual inflation factor for 2011 (**Appendix A**) was used to inflate the estimated 2011 installation cost to 2021 dollars. The estimated 2021 installed cost is $106,000. The booster station hatch was opened during the site visit and the condition of the station was observed from above ground. The station was not entered due to confined space requirements. The MDNR Water Inspection Report (**Appendix D**) includes photos of the booster station and indicates that it is good condition. Based on the MDNR Water Inspection Report (**Appendix D**), the age, and the visual observation during the site visit, the booster station appears to be in good condition.

Water Distribution System

A photo of a schematic of the water distribution system was provided by the City (**Appendix E**). The schematic appears to be from a bound report (possibly 2006 or 2008) with handwritten updates in 2015. The schematic shows the size of water main, handwritten street names, handwritten landmarks, and handwritten fire hydrant locations. The water distribution layout was recreated and measured in *Google Earth™ mapping service* to obtain an estimate of the length of main by size for this report. **Table 2** summarizes the water main inventory.

Table 2 – Water Main Inventory

Pipe Diameter	Length (feet)
2-inch Water Main	5,200
4-inch Water Main	28,100
8-inch Water Main	15,700
Total	49,000

During the site visit, the City indicated that approximately 16,000 feet of new PVC water main was installed about 10 years ago. The length of 8-inch main measured on *Google Earth™ mapping service* is approximately 16,000 feet. It was assumed that the 8-inch main is PVC and was installed in 2011 as part of the USDA grant received by the City. It was assumed that the 2-inch and 4-inch main was part of the original system in 1957. The material for the 2-inch and 4-inch main is unknown. **Table 3** summarizes the estimated 2021 cost of the water distribution system. The estimated cost assumes the average depth of the water main is approximately 3 feet. The estimate includes design, excavation, materials, installation, backfill, and restoration. The number of fire hydrants is based on the Water Distribution System Schematic (**Appendix E**). The number of services and meters is based on the information provided by the City. The hydrants and the services/meters are assumed to be part of the original system.

Table 3 – Distribution System Estimated Installation Cost in 2021

Asset Description	Quantity	Unit	Estimated Unit Cost 2021	2021 Estimated Installation Cost
2-inch Water Main	5,200	feet	$ 30.00	$ 156,000
4-inch Water Main	28,100	feet	$ 50.00	$ 1,405,000
8-inch Water Main	15,700	feet	$ 55.00	$ 863,500
Fire Hydrants	42	each	$ 4,000.00	$ 168,000
Services and Meters	268	each	$ 1,750.00	$ 469,000
			Total	**$ 3,061,500**

The water distribution system was not observed for condition. The MDNR Water Inspection Report (**Appendix D**) indicates a very high non-revenue water (NRW) of 110% in April 2020 and possibly 100% in August 2020. NRW can be caused by a variety of issues and is not always an indication of the condition of the water distribution system. Common causes of NRW include water main leaks, inaccurate meters, unmetered connections, theft, and inaccurate estimates of water used for flushing hydrants and fire protection. At the time of the MDNR Inspection, the City suspected the cause was theft. While preparing this report, I followed up with the City on this issue and the City indicated that a bad meter was the cause and it has been resolved. The City indicated that they experience very little NRW after fixing the meter. Based on the age of the water distribution assets and the currently reported low level of NRW, the water distribution system appears to be in good condition.

Wastewater System

The original wastewater system is assumed to date back to the original water system in 1957. The wastewater system includes a wastewater treatment plant (WWTP), two (2) lift stations, and the sewer collection system. The City provided construction plans dated 1981 prepared by Larkin & Associates. The plans included the wastewater treatment plant, a lift station, and several feet

of sewer. The plans were returned to the City and are not on file in our office. The City also provided an excerpt from what they refer to as the "Larkin Study 2011" (**Appendix F**).

Wastewater Treatment Plant

According to the MDNR Operating Permit (excerpt in **Appendix G**), the WWTP includes an influent lift station, bar screen, grit chamber, oxidation ditch, two (2) final clarifiers, UV disinfection, sludge holding tank, and sludge drying beds. The WWTP has a design capacity of 150,000 gpd. The original installation cost was not documented by the City. The WWTP was installed as part of the 1981 improvement project. We used the USEPA Technology Fact Sheet on Oxidation Ditches published in September 2000 (excerpt in **Appendix H**) to estimate the 2021 cost of the WWTP. The EPA evaluated 10 plants and the construction cost ranged from $1.96 per gpd to $12.00 per gpd. Several factors can impact the construction cost including the treatment capacity. Larger treatment plants can typically be constructed at a lower unit cost than smaller treatment plants. Addition information in the USEPA Fact Sheet (excerpt in **Appendix H**) shows that plants ranging from 1.0 MGD to 6.8 MGD were constructed for $2.50 to $4.00 per gpd and a 4.0-MGD plant was constructed for $3.00 per gpd. Since the Wood Heights WWTP is rated at 0.15 MGD, the unit price would be higher than the $2.50 to $4.00 per gpd range for plants rated 1.0 to 6.8 MGD. We assumed a unit price of $7.00 per gpd for the Wood Heights WWTP, which is about the median between $1.95 and $12.00 per gpd cited in the USEPA Fact Sheet (excerpt in **Appendix H**) for all 10 plants evaluated. The average annual inflation factor for 2000 (**Appendix A**) was used to inflate the estimated 2000 unit cost to 2021 dollars. The estimated 2021 unit cost is estimated to be approximately $10.50 per gpd.

The WWTP includes UV disinfection. The "Larkin Study 2011" (**Appendix F**) indicates that the facility needed to add UV disinfection by 2014 to be in compliance with the Operating Permit. We assumed the UV system was installed in 2014 and based on recent projects, we assumed the 2021 cost would be $250,000.

The MDNR Wastewater Inspection Report (**Appendix I**) indicates that the rotors for the oxidation ditch were rebuilt "recently" at the time of the inspection. The MDNR Wastewater Inspection Report (**Appendix I**) indicates that several components of the WWTP were in good condition. Based on the visual observations during the site visit and the MDNR Wastewater Inspection Report (**Appendix I**), the WWTP appears to be in good condition.

Sewer Lift Stations

The wastewater system includes two (2) sewer lift stations. The Highway O Lift Station was installed as part of the 1981 project. The "Larkin Study 2011" (**Appendix F**) indicates that the lift station includes two (2) submersible pumps that are each 15 hp. The Marvin Hills Lift Station installation date was assumed to be 2000 based on historic images available on *Google Earth™ mapping service*. The homes that are likely served by the lift station, based on topography, do not show up on *Google Earth™ mapping service* in the 1996 imagery and start to show up in 2002. No additional imagery is available on *Google Earth™ mapping service* between those dates. The number of home served by the Marvin Hills Lift Station is assumed to be 22 based on topography and *Google Earth™ mapping service* imagery. It was assumed that the Marvin Hills Lift Station includes two (2) submersible pumps that are each 5 hp to serve 22 homes. During the site visit, the City indicated that the pumps were replaced within the last year.

The City did not document the cost of the lift stations or the pump replacement at the Marvin Hills Lift Station. Based on discussions with contractors and recent project, the 2021 cost of the Highway O Lift Station is estimated at $100,000 and the Marvin Hills Lift Station is estimated at $30,000. The pump replacement at the Marvin Hills Lift Station is estimated at $10,000.

Most of the structure and equipment at the lift stations is below ground and could not be observed. Based on the age and the apparent condition of the above-ground assets, the lift stations are assumed to also be in good condition.

Sewer Collection System

The "Larkin Study 2011" (**Appendix F**) included an inventory of the sewer collection system including vitrified clay pipe (VCP) and polyvinyl chloride (PVC). The 1981 Construction Plans were reviewed for the sewer collection inventory. The amount of new PVC pipe in the 1981 plans compared closely with the PVC in the "Larkin Study 2011" (**Appendix F**). **Table 4** summarizes the sewer inventory.

Table 4 – Sewer Collection System Inventory

Pipe Diameter and Material	Length (feet)
8-inch Gravity (VCP)	900
8-inch Gravity (PVC)	6,900
10-inch Gravity (VCP)	845
12-inch Gravity (PVC)	4,955
6-inch Forcemain (PVC)	3,200
Total	16,800

The VCP is assumed to be part of the original system dating back to 1957 and the PVC is assumed to be part of the 1981 project. The number of manholes is based on the 1981 Construction Plans and the number of service laterals was provided by the City. Since a majority of the sewer collection system was installed in 1981, it is assumed that all the service laterals were installed in 1981.

The 2021 estimated cost to install the sewer is based on an average depth of 6 feet for the gravity sewer and 3 feet for the forcemain. The cost to install manholes in 2021 is estimated to be $4,000 each. Service laterals are assumed to be 4-inch and are estimated at $400 each. The estimate includes design, excavation, materials, installation, backfill, and restoration. **Table 5** summarizes the inventory of the sewer collection system and the estimated installation cost in 2021.

Table 5 - Sewer Collection System Estimated Installation Cost in 2021

Asset Description	Quantity	Unit	Estimated Unit Cost 2021	2021 Estimated Installation Cost
8-inch Gravity Sewer Original System	900	feet	$ 60.00	$ 54,000
8-inch Gravity Sewer 1981	6,900	feet	$ 60.00	$ 414,000
10-inch Gravity Sewer Original System	845	feet	$ 65.00	$ 54,925
12-inch Gravity Sewer 1981	4,955	feet	$ 70.00	$ 346,850
6-inch Forcemain 1981	3,200	feet	$ 50.00	$ 160,000
Manholes 1981	40	each	$ 4,000.00	$ 160,000
Service Laterals 1981	194	each	$ 400.00	$ 77,600
			Total	$ 1,267,375

The sewer collection system was not observed for condition. The "Larkin Study 2011" (**Appendix F**) indicates that the majority of Infiltration/Inflow is experienced in the areas served by the VCP and is not necessarily an indication of the condition of the overall collection system. Based on the age and material of the majority of the collection system, it is assumed to be in good condition.

Estimated Depreciated Value

Table 6 shows a summary of the estimated cost for installation in 2021 and the depreciated value based on the age of the assets. The depreciation calculation is included in **Appendix J**. The depreciation periods are based on depreciation periods used by the Missouri Public Service Commission (PSC) during recent rate cases. The depreciation schedules from six (6) recent rate cases are included in **Appendix K**. Three (3) are from water systems and three (3) are from wastewater systems. The depreciation periods used are summarized in **Table 7**.

Table 6 - Summary of Estimated Depreciated Value

	Estimated 2021 Installation Cost	Depreciated from 2021 Estimate
Wood Heights Water System	$ 3,489,250.00	$ 848,704.76
Wood Heights Wastewater System	$ 3,232,375.00	$ 411,144.55
Total	$ 6,721,625.00	$ 1,259,849.31

Table 7 – Depreciation Periods

Asset	Depreciation Period (years)
Tanks	42
Pump Station	15
Water Main	50
Fire Hydrants	50
Services and Meters	35
WWTP Equipment	22
Lift Station	10
Sanitary Sewer, Manholes, Laterals	50

Overall the water and wastewater systems appear to be in good condition. Although many of the assets are fully or nearly depreciated, they are still in operation and could continue to stay in operation well beyond the depreciation period.

Thank you for the opportunity to assist you on this project. Please let me know if you have any questions.

Sincerely,

Kelly A. Simpson

Kelly A. Simpson, PE, LEED® AP
Owner

Enclosures:
Appendix A – US Department of Labor – Bureau of Labor Statistics Average Annual Inflation Rate
Appendix B – MDNR Census of Missouri Public Water Systems 2020
Appendix C – Tank Inspection Report prepared by Pittsburg Tank & Tower Group dated March 19, 2019
Appendix D – MDNR Inspection of water system dated September 1, 2020
Appendix E – Water Distribution System Schematic
Appendix F – "Larkin Study 2011" pages 3 through 7
Appendix G – MDNR Operating Permit for WWTP
Appendix H – USEPA Technology Fact Sheet on Oxidation Ditches dated September 2000
Appendix I – MDNR Inspection of wastewater treatment plant dated July 9, 2018
Appendix J – Depreciation Calculation
Appendix K – Missouri PSC Depreciation Schedules

Appendix A
Average Annual Inflation Rates

CPI-All Urban Consumers (Current Series)
12-Month Percent Change
US Department of Labor - Bureau of Labor Statistics
Series Id: CUUR0000SA0L1E
Not Seasonally Adjusted
Series Title: All items less food and energy in U.S. city
Area: U.S. city average
Item: All items less food and energy
Base Period: 1982-84=100
Years: 1958 to 2020

https://data.bls.gov/pdq/SurveyOutputServlet
Search for CUUR0000SA0L1E
More Formatting Options
12-month percent change

Added Columns to Calculate Inflation Factor

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	HALF1	HALF2	Annual Factor	Factor to 2021
1958	3.2	3.2	2.8	2.4	2.4	2.1	2.4	2.1	1.7	1.7	1.7	1.7	2.4			1.024	9.246
1959	1.7	1.7	1.7	1.7	2.0	2.0	2.0	2.0	2.4	2.7	2.0	2.0	2.0			1.020	9.029
1960	2.0	2.3	2.0	2.0	1.7	1.7	1.3	1.3	1.0	1.0	1.0	1.0	1.3			1.013	8.852
1961	1.0	0.7	0.7	1.0	1.0	1.0	1.3	1.3	1.6	1.3	1.3	1.3	1.3			1.013	8.739
1962	1.3	1.3	1.6	1.3	1.6	1.6	1.3	1.3	1.3	1.3	1.3	1.3	1.3			1.013	8.627
1963	1.0	1.0	1.0	1.3	1.0	1.3	1.3	1.6	1.3	1.3	1.6	1.6	1.3			1.013	8.516
1964	1.9	1.9	1.9	1.6	1.6	1.6	1.6	0.9	1.3	1.3	1.2	1.2	1.6			1.016	8.407
1965	1.6	1.6	1.2	1.6	1.6	1.2	1.2	1.6	1.5	1.5	1.2	1.5	1.2			1.012	8.274
1966	0.9	1.2	1.5	1.8	2.1	2.4	2.8	3.1	3.0	3.3	3.6	3.3	2.4			1.024	8.176
1967	3.6	3.6	3.6	3.3	3.3	3.3	3.3	3.3	3.6	3.5	3.5	3.8	3.6			1.036	7.985
1968	4.1	4.1	4.4	4.4	4.3	4.6	4.9	4.9	4.9	4.8	5.1	5.1	4.6			1.046	7.707
1969	5.1	5.3	5.6	6.1	6.1	5.8	5.8	5.8	6.0	6.0	5.9	6.2	5.8			1.058	7.368
1970	6.2	6.1	6.1	5.8	6.0	6.5	6.2	6.2	6.2	6.4	6.6	6.6	6.3			1.063	6.964
1971	6.3	5.8	5.2	5.0	5.2	4.9	4.9	4.6	4.4	3.8	3.3	3.1	4.7			1.047	6.551
1972	3.1	3.3	3.3	3.3	3.1	2.8	2.8	3.3	2.8	3.0	3.0	3.0	3.0			1.030	6.257
1973	2.8	2.8	3.0	3.2	3.2	3.2	3.2	3.2	3.8	4.3	4.5	4.7	3.6			1.036	6.075
1974	4.9	5.4	5.8	6.2	6.8	7.9	8.8	9.6	10.2	10.6	11.2	11.1	8.3			1.083	5.864
1975	11.5	11.7	11.4	11.3	10.5	9.6	9.1	8.2	7.7	7.0	6.8	6.7	9.1			1.091	5.415
1976	6.7	6.5	6.6	6.4	6.5	6.5	6.7	6.8	6.8	6.7	6.5	6.1	6.5			1.065	4.963
1977	6.3	6.3	6.2	6.3	6.3	6.6	6.3	6.2	6.2	6.0	5.9	6.5	6.3			1.063	4.660
1978	6.4	6.2	6.3	6.5	6.8	7.0	7.4	7.5	7.9	8.4	8.7	8.5	7.4			1.074	4.384
1979	8.6	9.2	9.3	9.3	9.4	9.3	9.6	10.0	9.9	10.1	10.6	11.3	9.8			1.098	4.082
1980	12.0	12.0	12.5	13.0	13.3	13.6	12.4	11.8	12.0	12.3	12.1	12.2	12.4			1.124	3.718
1981	11.4	10.9	10.0	9.5	9.5	9.4	11.1	11.6	11.8	10.9	10.2	9.5	10.4			1.104	3.307
1982	9.3	9.1	8.8	8.9	8.7	8.6	7.6	7.1	5.9	5.9	5.3	4.5	7.4			1.074	2.996
1983	4.7	4.7	4.7	4.3	3.6	2.9	3.0	3.0	3.5	3.7	4.3	4.8	4.0			1.040	2.789
1984	4.8	4.8	5.0	5.0	5.2	5.1	5.0	5.1	5.1	4.9	4.6	4.7	5.0			1.050	2.682
1985	4.5	4.7	4.8	4.5	4.5	4.4	4.2	4.1	4.0	4.1	4.4	4.3	4.3	4.7	4.3	1.043	2.554
1986	4.4	4.2	4.1	4.2	4.0	4.0	4.1	4.0	4.1	4.0	3.8	3.8	4.0	4.1	4.0	1.040	2.449
1987	3.8	3.8	4.0	4.2	4.2	4.1	4.0	4.2	4.3	4.3	4.4	4.2	4.1	4.0	4.2	1.041	2.355
1988	4.3	4.3	4.4	4.3	4.3	4.5	4.5	4.4	4.4	4.5	4.4	4.7	4.4	4.4	4.5	1.044	2.262
1989	4.6	4.8	4.7	4.6	4.6	4.5	4.6	4.4	4.3	4.3	4.4	4.4	4.5	4.6	4.3	1.045	2.167
1990	4.4	4.6	4.9	4.8	4.8	4.9	5.0	5.5	5.5	5.3	5.3	5.2	5.0	4.8	5.3	1.050	2.074
1991	5.6	5.6	5.2	5.1	5.1	5.0	4.8	4.6	4.5	4.4	4.5	4.4	4.9	5.3	4.6	1.049	1.975
1992	3.9	3.8	3.9	3.9	3.8	3.8	3.7	3.5	3.3	3.5	3.4	3.3	3.7	3.8	3.4	1.037	1.883

Appendix A
Average Annual Inflation Rates

CPI-All Urban Consumers (Current Series)
12-Month Percent Change
US Department of Labor - Bureau of Labor Statistics
Series Id: CUUR0000SA0L1E
Not Seasonally Adjusted
Series Title: All items less food and energy in U.S. city
Area: U.S. city average
Item: All items less food and energy
Base Period: 1982-84=100
Years: 1958 to 2020

https://data.bls.gov/pdq/SurveyOutputServlet
Search for CUUR0000SA0L1E
More Formatting Options
12-month percent change

Added Columns to Calculate Inflation Factor

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	HALF1	HALF2	Annual Factor	Factor to 2021
1993	3.5	3.6	3.4	3.5	3.4	3.3	3.2	3.3	3.2	3.0	3.1	3.2	3.3	3.4	3.2	1.033	1.815
1994	2.9	2.8	2.9	2.8	2.8	2.9	2.9	2.9	3.0	2.9	2.8	2.6	2.8	2.8	2.9	1.028	1.757
1995	2.9	3.0	3.0	3.1	3.1	3.0	3.0	2.9	2.9	3.0	3.0	3.0	3.0	3.0	3.0	1.030	1.710
1996	3.0	2.9	2.8	2.7	2.7	2.7	2.7	2.6	2.7	2.6	2.6	2.6	2.7	2.7	2.7	1.027	1.660
1997	2.5	2.5	2.5	2.7	2.5	2.4	2.4	2.3	2.2	2.3	2.2	2.2	2.4	2.6	2.2	1.024	1.616
1998	2.2	2.3	2.1	2.1	2.2	2.2	2.2	2.5	2.5	2.3	2.3	2.4	2.3	2.2	2.4	1.023	1.578
1999	2.4	2.1	2.1	2.2	2.0	2.1	2.1	1.9	2.0	2.1	2.1	1.9	2.1	2.1	2.0	1.021	1.543
2000	2.0	2.2	2.4	2.3	2.4	2.5	2.5	2.6	2.6	2.5	2.6	2.6	2.4	2.3	2.5	1.024	1.511
2001	2.6	2.7	2.7	2.6	2.5	2.7	2.7	2.7	2.6	2.6	2.8	2.7	2.6	2.6	2.7	1.026	1.476
2002	2.6	2.6	2.4	2.5	2.5	2.3	2.2	2.4	2.2	2.2	2.0	1.9	2.4	2.5	2.2	1.024	1.438
2003	1.9	1.7	1.7	1.5	1.6	1.5	1.5	1.3	1.2	1.3	1.1	1.1	1.4	1.7	1.3	1.014	1.404
2004	1.1	1.2	1.6	1.8	1.7	1.9	1.8	1.7	2.0	2.0	2.2	2.2	1.8	1.6	2.0	1.018	1.385
2005	2.3	2.4	2.3	2.2	2.2	2.0	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.1	1.022	1.361
2006	2.1	2.1	2.1	2.3	2.4	2.6	2.7	2.8	2.9	2.7	2.6	2.6	2.5	2.2	2.7	1.025	1.331
2007	2.7	2.7	2.5	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.4	2.3	2.4	2.3	1.023	1.299
2008	2.5	2.3	2.4	2.3	2.3	2.4	2.5	2.5	2.5	2.2	2.0	1.8	2.3	2.3	2.3	1.023	1.270
2009	1.7	1.8	1.8	1.9	1.8	1.7	1.5	1.4	1.5	1.7	1.7	1.8	1.7	1.8	1.6	1.017	1.241
2010	1.6	1.3	1.1	0.9	0.9	0.9	0.9	0.9	0.8	0.6	0.8	0.8	1.0	1.1	0.8	1.010	1.220
2011	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.0	2.1	2.2	2.2	1.7	1.3	2.0	1.017	1.208
2012	2.3	2.2	2.3	2.3	2.3	2.2	2.1	1.9	2.0	2.0	1.9	1.9	2.1	2.2	2.0	1.021	1.188
2013	1.9	2.0	1.9	1.7	1.7	1.6	1.7	1.8	1.7	1.7	1.7	1.7	1.8	1.8	1.7	1.018	1.164
2014	1.6	1.6	1.7	1.8	2.0	1.9	1.9	1.7	1.7	1.8	1.7	1.6	1.7	1.8	1.7	1.017	1.143
2015	1.6	1.7	1.8	1.8	1.7	1.8	1.8	1.8	1.9	1.9	2.0	2.1	1.8	1.7	1.9	1.018	1.124
2016	2.2	2.3	2.2	2.1	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	1.022	1.104
2017	2.3	2.2	2.0	1.9	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.8	1.8	2.0	1.7	1.018	1.080
2018	1.8	1.8	2.1	2.1	2.2	2.3	2.4	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2	1.021	1.061
2019	2.2	2.1	2.0	2.1	2.0	2.1	2.2	2.4	2.4	2.3	2.3	2.3	2.2	2.1	2.3	1.022	1.039
2020	2.3	2.4	2.1	1.4	1.2	1.2	1.6	1.7	1.7	1.6	1.6	1.6	1.7	1.8	1.6	1.017	1.052
2021	1.4	1.3	1.6	3	3.8	4.5	4.3	4	4	4.6	4.9		3.4			1.034	1.000

CENSUS OF MISSOURI PUBLIC WATER SYSTEMS 2020

Missouri Department of Natural Resources
Division of Environmental Quality
Water Protection Program
Public Drinking Water Branch

City Water Systems

Community Water System Name		Year Began	Operator Level	Owner Code	Population Served	Service Connections	Pct Sur Water	Pct Grd Water	Pct GW Under Infl	Pct Pur Sur Water	Pct Pur Grd Water	Pct Pur GW Und Infl	Supply Capacity MGD	Avg Daily Consumption MGD	Finished Water Storage
WILLIAMSVILLE PWS															
System ID Number	County Location														
MO4010861	WAYNE	1962	2	L	342	220	0	100	0	0	0	0	0.3600	0.0420	0.0850
WILLOW SPRINGS PWS															
System ID Number	County Location														
MO4010862	HOWELL	1925	2	L	2,100	1,073	0	100	0	0	0	0	2.3470	0.4820	0.8900
WINDSOR PWS															
System ID Number	County Location														
MO1010865	HENRY	1911	1	L	3,044	1,252	0	100	0	0	0	0		0.2940	0.4000
WINFIELD PWS															
System ID Number	County Location														
MO6010866	LINCOLN	1979	2	L	1,700	483	0	0	0	0	100	0	0.4320	0.0670	0.0500
WINONA PWS															
System ID Number	County Location														
MO4010867	SHANNON	1948	2	L	1,325	552	0	100	0	0	0	0	0.4170	0.1500	0.2630
WOOD HEIGHTS PWS															
System ID Number	County Location														
MO1010871	RAY	1957	1	L	660	246	0	0	0	0	100	0		0.0380	0.1000
WYACONDA PWS															
System ID Number	County Location														
MO2010875	CLARK	1962	1	L	227	112	0	0	0	0	100	0	0.1510	0.0110	0.0500
WYATT PWS															
System ID Number	County Location														
MO4010876	MISSISSIPPI	1966	C2	L	428	202	0	100	0	0	0	0	0.0700	0.0200	0.0830

PITTSBURG TANK & TOWER GROUP
MAINTENANCE DIVISION Since 1919

1 Watertank Place
PO Box 1849
Henderson, KY 42419
P: (270) 826-9000
F: (270) 767-6912
www.pttg.com

City of Wood Heights
2098 Eastridge Drive
Wood Heights, MO 64024
RE: Maplewood Drive
100,000 Gallon EWT
March 19, 2019
Ms. Sondra Kasserman
City Clerk
(816) 630-7900
Job No. 511007

If you would like to speak with Patrick Heltsley concerning this report, call (270) 826-9000, Ext. 4601

For additional copies of this report call (270) 826-9000, Ext. 4601

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ELEVATED TANK INSPECTION REPORT

JOB NO: 511007 INSPECTOR: Brian Alsup (CE)

TANK OWNER: City of Wood Heights

OWNER'S REPRESENTATIVE: Ms. Sondra Kasserman

TITLE: City Clerk

MAILING ADDRESS: 2098 Eastridge Drive Wood Heights, MO 64024

PHYSICAL ADDRESS: 2098 Eastridge Drive Wood Heights, MO 64024

E-MAIL: sondra.kasserman@woodheights-mo.gov

CITY, STATE: Wood Heights, MO ZIP: 64024 COUNTY: Ray County

TELEPHONE: (816) 630-7900 FAX: (816) 637-0388

LOCATION OF TANK: Maplewood Drive Wood Heights, MO 64024

City of Wood Heights
2098 Eastridge Drive
Wood Heights, MO 64024
March 19, 2019
Ms. Sondra Kasserman
City Clerk
(816) 630-7900

ORIGINAL CONTRACT NO: Not Provided YEAR BUILT: 1995

ORIGINAL MANUFACTURER: Not Provided CAPACITY: 100,000 Gallon

DATE OF LAST INSPECTION: May 1, 2018 TYPE: Potable

HIGH WATER LEVEL: 124'-0" LOW WATER LEVEL: 100'-0"

DIAMETER: 30'-0" HEAD RANGE: 24'-0"

TYPE CONSTRUCTION: WELDED: X RIVETED: BOLTED:

ACCOUNT EXECUTIVE: Patrick Heltsley

PTTG Since 1919
MAINTENANCE DIVISION

City of Wood Heights
RE: Maplewood Drive
100,000 Gallon EWT

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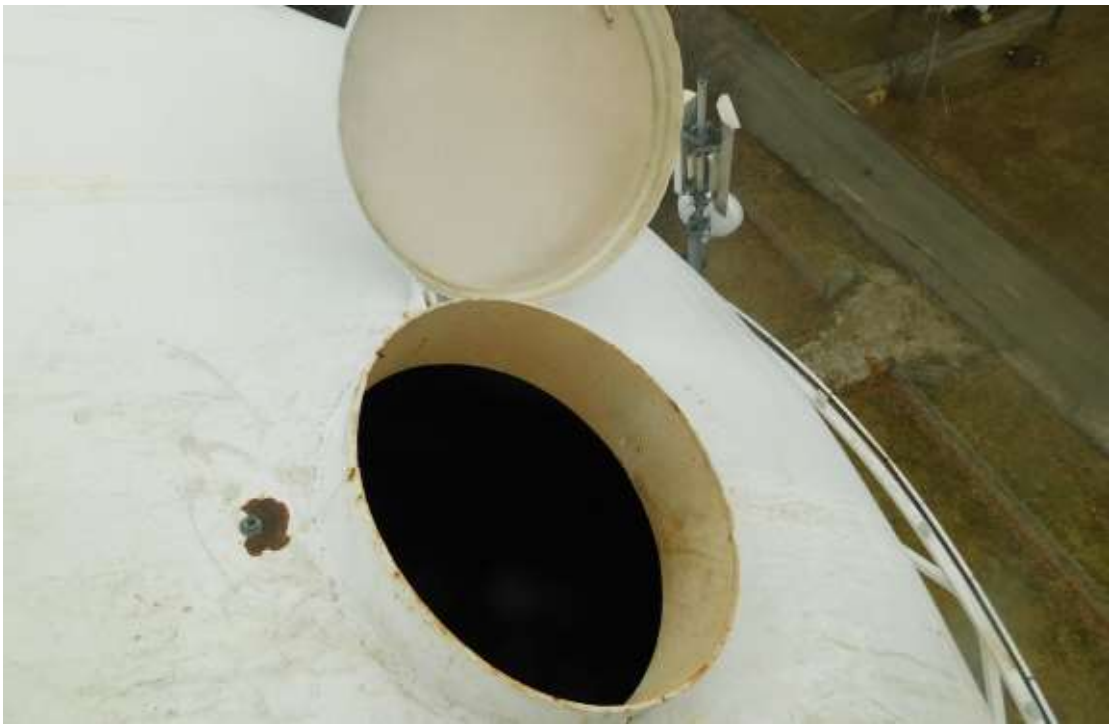
City of Wood Heights
RE: Maplewood Drive
100,000 Gallon EWT



PTTG Since 1919
MAINTENANCE DIVISION

City of Wood Heights
RE: Maplewood Drive
100,000 Gallon EWT

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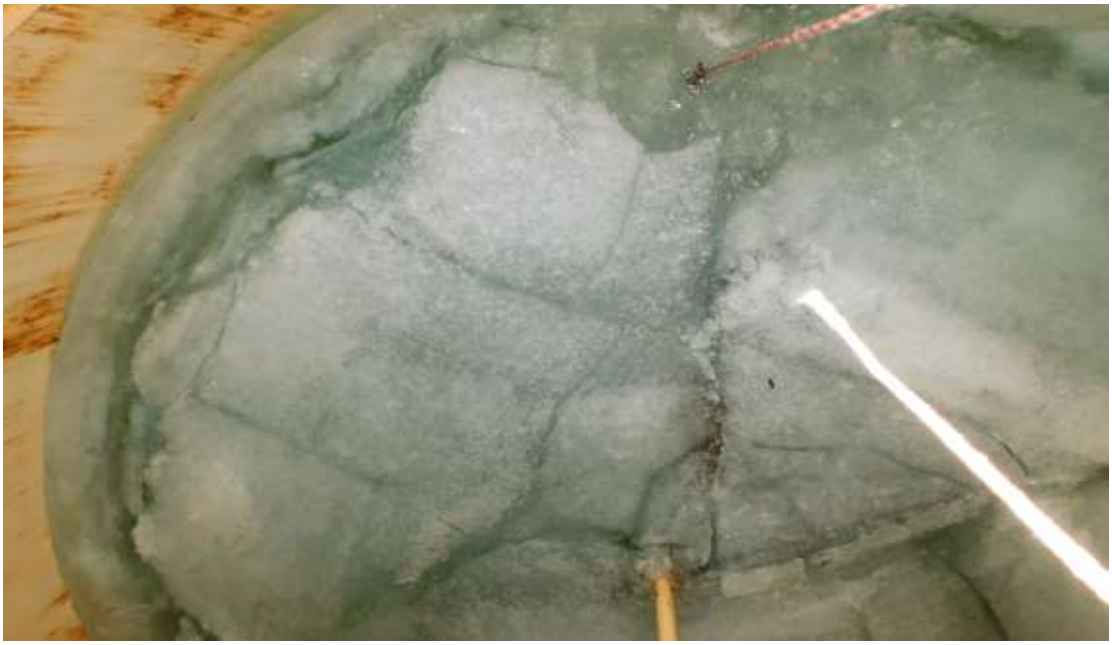

Due to ice in the tank at time of inspection, a full inspection of the tank interior could not be performed.

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1 Watertank Place
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March 19, 2019

Ms. Sondra Kasserman, City Clerk
City of Wood Heights
2098 Eastridge Drive
Wood Heights, MO 64024
(816) 630-7900

Dear Ms. Sondra Kasserman,

In accordance with Pittsburg Tank & Tower Co. Inc. Extended Warranty Program, Pittsburg Tank & Tower performed an annual inspection of the 100,000 gallon water storage tank on March 19, 2019. The tank was found to be in a structurally sound and acceptable working condition. This report also contains copies of photographs taken of the interior and exterior of the tank.

Although our extended warranty program does not include OSHA code update modifications, we want to bring these items to your attention. If you decide to perform these modifications, please contact us for pricing.

A project manager will be assigned to oversee the project maintenance and will contact you to set a maintenance date. Pittsburg Tank & Tower wants to serve all of your tank needs, therefore, should you ever be in need of anything concerning your tank, please do not hesitate contacting Patrick Heltsley at (270) 826-9000 Ext. 4601.

Sincerely,

Pittsburg Tank & Tower Co. Inc.
Patrick Heltsley
V.P. Specialty Projects

PITTSBURG TANK & TOWER GROUP
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	No Action Required	Action Required	Notes
Foundations	X		Foundations appear to be in good condition
Anchor Bolts	X		Anchor Bolts appear to be in good condition
Riser	X		Riser appears to be in good condition
Riser Manway	X		Riser Manway appears to be in good condition
Shell Manway	X		Shell Manway appears to be in good condition
Roof Hatch	X		Roof Hatch appears to be in good condition
Overflow	X		Overflow appears to be in good condition
Tower Ladder	X		Tower Ladder appears to be in good condition
Shell-to-Roof Ladder	X		Shell-to-Roof Ladder appears to be in good condition
Riser Ladder	X		Riser Ladder appears to be in good condition
Windage Rods	X		Windage Rods appear to be in good condition
Strut End Connections	X		Strut End Connections appear to be in good condition
Riser & Bowl Connection	X		Riser & Bowl Connection appears to be in good condition
Balcony Handrails	X		Balcony Handrails appear to be in good condition
Roof Handrails		X	Roof Handrails should extend around all working surfaces, but are not present
Balcony Floor	X		Balcony Floor appears to be in good condition
Roof Vent	X		Roof Vent appears to be in good condition
Exterior Coating	X		Exterior Coating appears to be in good condition
Interior Coating	X		Interior Coating appears to be in good condition

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Page #	CODE UPDATES	CODE
3	Tank should be electrically grounded for lightning protection	OSH Act of 1970 Section 5
14	Roof Handrails should extend around all working surfaces and be 42" high	OSHA 1910.29 (b)(1)

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

September 1, 2020

The Honorable Frank Davitt, Mayor
Wood Heights PWS
2098 East Ridge Drive
Wood Heights, MO 64024

Email: woodheights.mo@yahoo.com

UNSATISFACTORY FINDINGS
RESPONSE REQUIRED

Dear Mayor Davitt:

Staff from the Department of Natural Resources (Department) conducted an inspection on August 13, 2020, of Wood Heights, MO1010871, located at 2098 East Ridge Drive, Wood Heights in Ray County.

Compliance with Missouri Safe Drinking Water Laws and Regulations was evaluated. The enclosed report is being issued with Unsatisfactory Findings for the violations identified.

Please refer to the enclosed report for details on findings and required actions. **A written response documenting actions taken to correct the violations is required by the date specified in the report.**

Fact sheets are available on the Department's website to assist entities with understanding and following environmental requirements.

The Department records will document continued noncompliance of the environmental laws and regulations until the required actions are completed. Please understand that failure to respond or address ongoing violations may result in a follow-up inspection.

If you have any questions, or would like to schedule a time to meet with Department staff to discuss compliance requirements, please contact Drew Hodgdon at 816-251-0797 in the Kansas City Regional Office, 500 Northeast Colbern Road, Lee's Summit, Missouri 64086-4710, or by email at drew.hodgdon@dnr.mo.gov.

Sincerely,

KANSAS CITY REGIONAL OFFICE

Crystal Wellman
Environmental Supervisor

CW/dhvj

Enclosures

c: Mr. Gary Harter, Chief Operator, (same email address as above)
Monitoring Section, Public Drinking Water Branch

Missouri Department of Natural Resources
Kansas City Regional Office, Public Drinking Water Branch
Report of Inspection
Wood Heights PWS
2098 East Ridge Drive, Wood Heights, Ray County
MO1010871

Introduction

On August 13, I, Drew Hodgdon, of the Missouri Department of Natural Resources (Department), Kansas City Regional Office (KCRO), conducted a Compliance and Operations Inspection at the community public water system of Wood Heights Public Water System located at 2098 East Ridge Drive, Wood Heights, in Ray County, Missouri.

Participants included:

Missouri Department of Natural Resources:
Mr. Drew Hodgdon, Environmental Specialist, (KCRO)
816-251-0797
drew.hodgdon@dnr.mo.gov

Wood Heights Public Water System:
Mr. Gary Harter, Chief Operator
816-604-0928
woodheights.mo@yahoo.com

This inspection was conducted to determine whether the system is operated and maintained in compliance with the Missouri Safe Drinking Water Act and its implementing regulations, in accordance with 640.120.5, RSMo. This inspection reviewed all eight (8) critical components of a public water system, as defined by the United States Environmental Protection Agency (EPA). Required actions to correct deficiencies found during this inspection, as well as any recommendations, are described in this report.

Facility Description and History

Wood Heights is a Community Public Water System located in the Lower Missouri - Crooked Watershed. The water system serves approximately 628 customers through 245 active service connections. Wood Heights is a DS I distribution system and employs an operator with a DS III certification.

This is a secondary system served by Ray County PWSD #2, MO1024511. This system is 100% groundwater purchase, and purchases approximately both an average of 45,000 gallons per day and a maximum daily purchase of 63,000 gallons. The system maintains an emergency water connection with Excelsior Springs, MO1010261.

This facilities distribution system includes one 100,000 gallon elevated water storage tank constructed in 1995 and a master meter connection with Ray County PWSD #2, as previously noted and maintained by them. It also includes a pump station with two pumps capable of 50 gallons per minute (gpm) output at an average of approximately 50 pounds per square inch (psi).

Prior to the inspection, I reviewed the files for Wood Heights PWS, including previous inspection reports, correspondence, and the permit conditions of Missouri State Operating Permit (MSOP) MO1010871, for familiarization with the requirements specific to this facility.

The previous compliance and operational inspection was conducted on September 21, 2017, by Ms. Diana Reinert in which, she noted two unsatisfactory findings. Unsatisfactory Findings included that the Emergency Operations Plan (EOP) was incomplete and the system did not have a backup operator. The EOP was updated; however, Wood Heights still needs to obtain a certified backup operator (see Unsatisfactory Findings). Ms. Reinert also stated there were corrosion issues with the 100,000 gallon elevated storage tank, which have since been corrected. The consecutive connection vault was not inspected for this report, as it is the responsibility of Ray County PWSD #2 MO1024511 to maintain.

Discussion of Inspection and Observations

At the time of inspection, Department staff reviewed Wood Heights Public Water System for regulatory compliance with the following eight (8) critical components of public drinking water systems: System Management and Operation, Operator Certification, Monitoring and Reporting, System Source, System Treatment, Pumping Facilities, Finished Water Storage, and Distribution System.

I conducted the inspection during normal business hours and gave prior notification to ensure timely access to the site. Upon arrival at the facility, I met with Mr. Harter, and outlined the purpose and scope of the inspection. Mr. Harter granted permission to access the site and accompanied me throughout the tour of the facility.

I arrived at approximately 8:00 a.m. to be greeted by Mr. Harter and Ms. Kasserman with Mr. Wiley arriving shortly thereafter. I sat down with Mr. Harter to review records and discuss the facility with both he and Mr. Wiley primarily, with some records pulled upon request, when they were not on the table, by Ms. Kasserman. The Permit to Dispense was available for review, there were no current construction permits or approvals pending and no owner supervised program in place.

The backflow prevention program was available for review along with the certification records, the primacy fees were current and there were no public notification requirements. We discussed the active meters and the current population. I noted the distribution map should be updated, (**Recommendation 3**) and a main break/leak repair program should be set established (**Recommendation 2**). We discussed the water usage and Ms. Kasserman provided the data for the system whereupon I noted very high water losses such as 110% for April 2020. Mr. Harter stated he is working with Mr. Gary Webber of the Missouri Rural Water Association (MRWA) to reduce their water losses, suspecting theft at this time (**Recommendation 4**).

I asked about the backup operator, since that had been an issue in the past. Mr. Wiley, acts as the sampler; however, he is not currently certified (**Unsatisfactory Finding 3**). The Disinfection By-Products (DBPs) sampling plan was not available for review (**Unsatisfactory Finding 2**) and the results were at the wastewater office along with the bacteriological sampling data, so I deferred their review until later in this site visit.

I noted the lead ban was current; however, the lead and copper sampling plan was incomplete (**Unsatisfactory Finding 5**) and the sample results, for the past twelve years, were not available for review (**Unsatisfactory Finding 1**). The past compliance and inspection reports from the Department and notifications were reviewed, the Consumer Confidence Reports (CCRs) were reviewed and complete as well as the most recent water storage tank inspection by Pittsburgh Tank and Tower Group on March 19, 2019. I noted no issues with the water storage tank and we discussed the maintenance. Mr. Harter stated the tank was recently painted.

After completing the records review, I collected a special sample at city hall as noted below. I then traveled to the field office, wastewater treatment facility, along with both Mr. Harter and Mr. Wiley where the past results were inspected, and although the monthly monitoring routine bacteriological data was available for review from the past five years, the bacteriological site sampling plan map was not current as inspected at City Hall (**Unsatisfactory Finding 3**). The DBPs data was there for review and was complete.

When the records review was completed, I accompanied Mr. Harter to the 100,000-gallon water storage tank. I did not note any unsatisfactory findings or recommendations regarding the storage tank. After the water storage tank inspection, I proceed to follow Mr. Harter to the pump station and noted only some minor corrosion on the piping and flooring in the vault (**Recommendation 1**).

I debriefed Mr. Harter before I left. I emphasized that they had the few unsatisfactory findings to follow up on such as the backup operator certification and that Mr. Wiley should have the hours for that as Mr. Harter stated he is always there helping with any drinking water work. The bacteriological site sampling plan map and the lead and copper sampling plan need to be followed up on - the other issues shall be remedied quickly with my assistance. There were only a few recommendations as part of their maintenance program to be corrected. I then left to drop off the bacteriological sample for analysis.

On August 20, 2020, I communicated with Ms. Kasserman via email and telephone to discuss several items for follow-up. I called to determine if Wood Heights still had sufficient operational funds due to their high water loss. They still have reserve funds, but it was stated by the clerk that the water loss ‘may still be around 100% for the month of August once this period is over. See Recommendation 4 below.

Sampling and Monitoring

During the inspection, Department staff field verified the disinfectant residual, collected a special bacteriological sample, and conducted other chemical analyses as necessary to verify that Wood Heights PWS is meeting key operational and regulatory water quality requirements– see Table 1 for results.

I collected a bacteriological sample from the bathroom tap at city hall and noted that as a special since, they had already collected the routine monthly monitoring sample.

Table 1: Analyses Conducted

Parameter	Result	Statutory Limitation/Range
Free Chlorine	1.49 mg/L	Less than or =4.0 mg/L in distribution 0.5 mg/L at entry point for free chlorine disinfection
Total Chlorine	1.36 mg/L	0.2-4.0 mg/L
Bacteriological Sample - Special Testing Laboratory: State Laboratory		**Result**
Sampling Site #/Physical Address: NA/2098 Eastridge Drive City Hall		Coliform: Not Analyzed E. coli: Not Analyzed

Analysis Summary: No analyses yielded results that were outside of statutory or acceptable range. The special sample; however, was not analyzed as the date was incorrect and the laboratory did not analyze the sample.

Compliance Determination and Required Actions

The facility was found to be out of compliance with the Missouri Safe Drinking Water Act and its implementing regulations, based upon observations made during the inspection.

Unsatisfactory Findings:

System Management and Operation

1. The water system failed to maintain water system records as required by Missouri Safe Drinking Water Regulation 10 CSR 60-9.010.

At the time of the inspection lead and copper records could not be found or provided by the water system. This is a significant deficiency under the Ground Water Rule, 10 CSR 60-4.025 and requires Corrective Action.

Maintenance of adequate records is essential to the effective operation of all water supply systems. Public Drinking Water regulations require public water systems to keep operational records, sample analysis reports and records relating to inspections or other compliance issues. At the time, the following records were not available:

- Lead & Copper sample reports & all correspondence - 12 years,

REQUIRED ACTION**:** Beginning immediately, the water system must develop policies and procedures to maintain public water system records for the minimum time periods. All records must be retained by the water system on the premises or at a convenient location near the premises. The water system had the 2011 and 2014 results for this unsatisfactory finding delivered via email on the date of inspection. An information sheet on record retention is included with this report for your reference.

2. The water system did not have a copy of their approved Disinfection By-Products sampling plan for use by the water system staff in accordance with 10 CSR 60-4.094(3).

At the time of inspection, there was no plan available for review. New staff need to know the locations of the sampling sites for required future sampling. The DBP Monitoring Plan was delivered via email to this facility on the date of inspection. No further action is required.

Operator Certification

3. The water system does not have a plan or provisions for a standby chief operator, with the proper certification; to take over operation of the water system in the even the current chief operator is not available, on leave, ill or resigns. This is a required by Missouri Safe Drinking Water Regulation 10 CSR 60-14.010(4)(A)(6).

Missouri Safe Drinking Water Regulations requires all community and nontransient noncommunity public water systems to have an operator with the appropriate level of certification, to be in charge of each treatment facility and each distribution system. Any personnel making changes to the treatment processes or the distribution must be under the direct supervision of the chief operator. Regulations also specify that public water systems must have a contingency plan for standby replacement chief operator to be available at all times. This can be a second employee certified to the appropriate level, a mutual assistance agreement with a neighboring system, or an arrangement with a contract operator. This was previously mentioned in both compliance and operational inspections conducted by Ms. Diana Reinert on September 21, 2017 and Mr. Michael Elkana on October 7, 2014.

REQUIRED ACTION: By **October 6, 2020**, the water system must develop this contingency plan and notify KCRO of the standby chief operator (or operators). This plan shall include a timeline of the current backup operator's certification classes and testing. The contingency plan should be reviewed no less than annually and be part of the system's emergency operations plan.

Monitoring and Reporting

4. The water system must develop a bacteriological site-sampling plan in accordance with 10 CSR 60-4.022(3)(A).

Missouri Safe Drinking Water Regulation 10 CSR 60-4.022(3)(A) requires all public water systems to develop a site sampling plan for the collection of samples for the monthly bacteriological samples. The site plan must consist of a list of routine sample sites where a sample may be collected, along with a map showing the location of the sample sites. The repeat upstream and repeat downstream sites must also be listed for each routine sampling site. Repeat sampling sites should be located within five service connections from the routine sampling site. The routine sampling sites must be spread out across the distribution system so the samples can be representative of the water in all areas of the water system.

REQUIRED ACTION: By **October 6, 2020**, the water system is to develop a written bacteriological site-sampling plan and submit this to KCRO for review and approval. Please refer to the instructions delivered via email, on the date of inspection, for details on how to develop a written bacteriological site-sampling plan.

5. The water system does not have a Lead and Copper Site Sampling Plan meeting the requirements of Missouri Safe Drinking Water Regulation 10 CSR 60-15.070.

All community water systems must develop a sample site plan for the collection of samples for Lead and Copper analysis. The sites must be prioritized with the most vulnerable to lead contamination (Tier 1) sites first, followed by sites in decreasing severity. All sample locations should be identified with a street address or lot number, not a person name. Also, identify the level of Tier identified for each location. These same sites are to be used, each time the water system is required to conduct lead and copper sampling unless a change of sampling site(s) form is completed, submitted to the department and approved.
I emailed the public water system on the date of inspection with a list of addresses previously used for lead and copper sampling by which to develop their lead and copper site-sampling plan.

REQUIRED ACTION: By **October 6, 2020**, the water system must submit a lead and copper site-sampling plan to KCRO for review and approval. The water system should use this list to create a current list, with a map that may be included, to make the required sampling plan. The water system must keep this sampling plan in their files, and make sure it is available to all operators and staff.

System Source
No unsatisfactory findings were noted; however, the consecutive connection is not maintained by this facility, but by the water distribution supplier Ray County PWSD #2.

System Treatment
This system does not conduct water treatment.

Pumping Facilities
No unsatisfactory findings were noted. See Recommendations.

Distribution System
No unsatisfactory findings were noted. See Recommendations.

Recommendations:

Pumping Facilities

1. The pipes and flooring at the pumping station are in need of maintenance and repair (Photograph 6).

Piping was rusting and the flooring is corroded with surface repair work required. Failing to control corrosion of the metallic surfaces of the piping and related components can result in premature failure of the system, unnecessary water outages, and the added expense of replacing equipment prematurely. Rust and corrosion should be removed from the piping and valves, and a rust preventive paint applied.

Distribution System

2. The water system does not have a written main disinfection and leak repair program to ensure proper disinfection of all newly constructed or repaired water distribution mains as recommended by the Department.

At the time of inspection, the water system did not have a written main break/leak disinfection program. Missouri Safe Drinking Water Regulation 10 CSR 60-4.080(5) requires all new or repaired water mains to be disinfected by methods acceptable by the department. At this time, the department recognizes the standards of the latest edition of the American Water Works Association (AWWA).

The water system should develop a main disinfection program/leak repair program to be used by staff and contractors. The procedures should include adequate flushing, disinfection and microbiological testing of all water mains. In addition to main disinfection, the water system should maintain records of each repair including, location, date of repair, probable cause, materials used, method of repair, and estimated water loss. The program should also include guidelines and procedures for issuing a Boil Advisory, notification to the department, and reporting low-pressure events.

3. The water system needs to develop and maintain an updated map of all distribution piping, valves, and flush hydrants.

At the time of the inspection, the water system was able to provide a map of the distribution system; however, it should be further updated to include the most current valves and flush hydrants in the system. A detailed map of the distribution piping showing the location, size, and type of existing piping, valves, flush hydrants, and service connections is needed to maintain the water distribution system piping. It is important that distribution piping is located on a map in case of water leaks, and to locate piping in order to prevent accidental damage and contamination of the water system.

4. During the previous twelve months, water loss was reported to be approximately 54.3%. Water loss should not exceed 10%.

If water loss exceeds ten percent, it is considered cost effective to locate and eliminate the water loss. All connections should be metered in the system, including all municipal facilities and unbilled connections. Flushing hydrants, main breaks, and fire suppression activities require an estimation of water loss for reconciliation at the end of the accounting period. Water loss represents lost revenue for the water system, and may indicate main leaks, which cause a loss of pressure and pose a potential risk for backflow. In addition, if the water loss is due to leaks: where water leaks out contaminants can enter. Therefore, active leaks can be a serious contamination threat to the customers.

The water system should develop and implement a policy by which to monitor and investigate water loss. The Department has provided the Missouri Rural Water Association with several leak detection devices to assist water systems in locating leaks. You can contact Missouri Rural Water at 573-657-5533, or contact the KCRO Public Drinking Water Unit at 816-251-0700 and our staff can forward your request for assistance.

Additional Comments/Conclusions

The EPA reported that the State of Missouri is among the top 25% of states affected by federal flooding declarations. This was noted during a March 31, 2015 webinar on EPA's new ***Flood Resilience: A Basic Guide for Water and Wastewater Utilities***, which was hosted by the Association of State Drinking Water Administrators and the EPA. The Flood Resilience Guide is geared towards helping small to medium sized water and wastewater utilities prepare for, and recover from, a flood event. This interactive guide is available online at http://water.epa.gov/infrastructure/watersecurity/emerplan/upload/epa817b14006.pdf. For more information, visit http://water.epa.gov/infrastructure/watersecurity/emerplan/. Additional emergency preparedness and response information for public water systems for flooding, drought, severe weather and other natural disasters are also available through the Missouri State Emergency Management Agency's website: http://sema.dps.mo.gov/.

Public water systems can now receive email notification when their samples have been received and when the sample results are available direct from the State Public Health Laboratory. In addition, after signing up as a user on the web portal users can also view and retrieve the test results on the web site. To sign up contact Shondra Johnson or Sandy Jones at the State Public Health Laboratory at 573-751-3334, or OpenElisWebportal@health.mo.gov. Official regulatory reports will still come from MoDNR, and final sample result should be available in Drinking Water Watch in 3 to 4 days.

Water systems can order sample bottles at the Department's web site at www.dnr.mo.gov/env/wpp/labs/water-analysis.htm, or at the State Public Health Lab website: www.health.mo.gov/lab/pdf/requisition-for-public-drinking-water-test-kits.pdf and follow the information on the form, or call State Public Health Lab Central Services unit at 573-751-4830.

PLEASE NOTE: All public water systems are required to submit a construction application with engineered plans and specifications to the Department for review and approval prior to any new construction, modification, alteration, or extension of your water system source, treatment, storage, or distribution piping. This requirement includes modifications made to your treatment process that would significantly change or alter plant capacity or treatment processes. Adding, removing, or changing chemical additives and/or their injection locations may significantly alter your treatment process. Water systems must notify the Department at least 60-days in advance of making any changes to the treatment process. Please make sure your water system has written approval prior to beginning any construction or modifications.

Please contact Drew Hodgdon of the Kansas City Regional Office on 816-251-0797 at 500 Northeast Colbern Road, Lee's Summit, Missouri 64086-4710, or via email at drew.hodgdon@dnr.mo.gov, if you have any questions concerning the content of this report. If you prefer to discuss the content of this report in person, we can arrange to meet with you at your convenience. For assistance with compliance issues or general technical assistance, you may also contact Mr. Leonard Johnson or Mr. David Greene, KCRO Water Specialists, at 816-251-0700. Water Specialists' duties are primarily intended to provide technical assistance and operator training to systems such as yours. We encourage you to utilize their services.

Signatures

SUBMITTED BY:

Drew Hodgdon
Environmental Specialist
Kansas City Regional Office

REVIEWED BY:

Crystal Wellman
Environmental Supervisor
Kansas City Regional Office

CW/dhvj

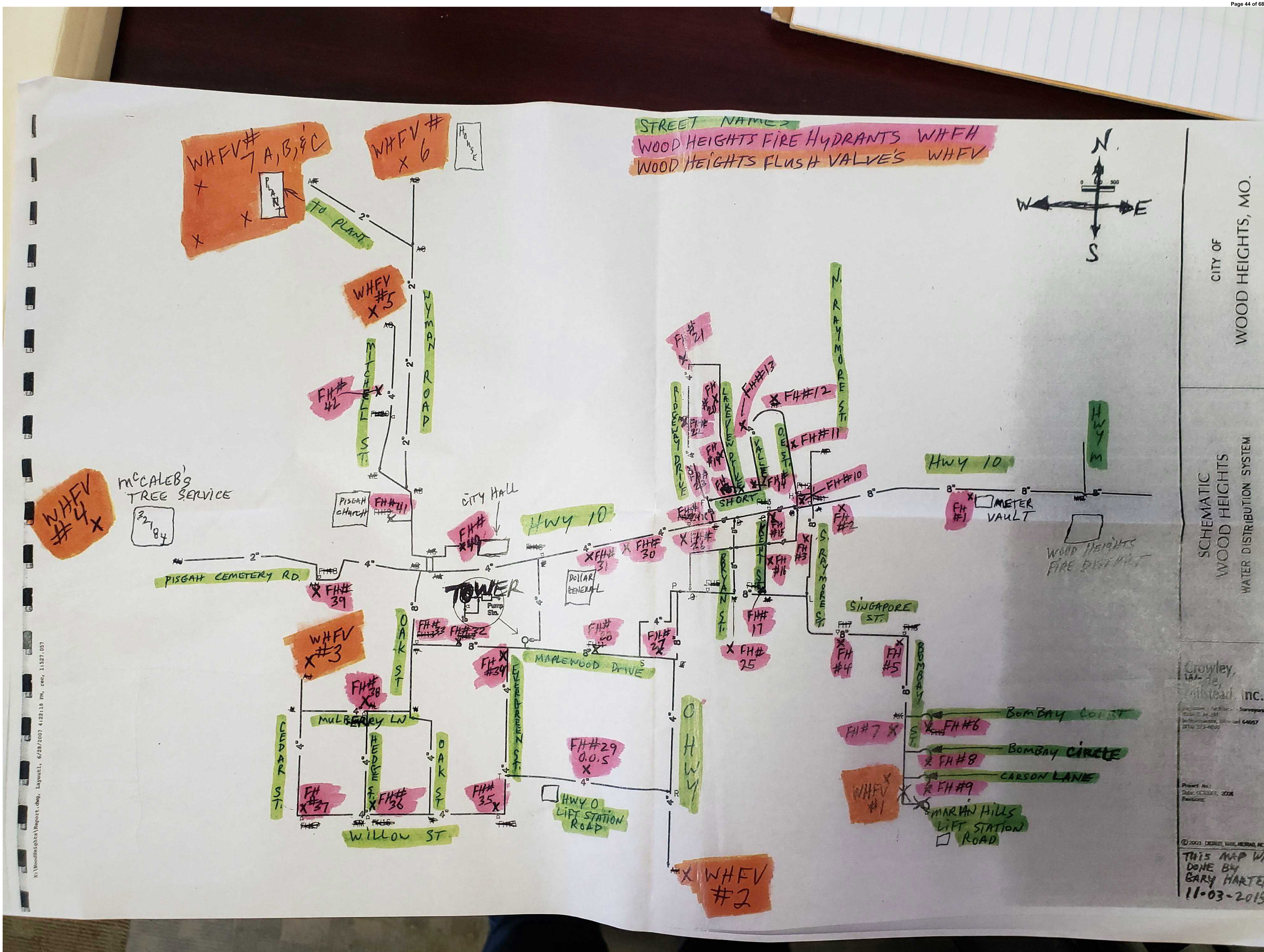
Attachments
Attachment # 1 – Photographs 1 through 6
Record Retention

Attachment #1 – Photographs
Wood Heights PWS
Page 1 of 2

	Photograph: 1 Taken By: Drew Hodgdon Facility: Wood Heights PWS Permit: MO1010871 Location: N 39.33582, W -94.16924 Description: Note the elevated water storage tank bowl exhibited no growth and the risers are all in good condition. Date Taken: August 13, 2020 Program: PDW Unit
	Photograph: 2 Taken By: Drew Hodgdon Facility: Wood Heights PWS Permit: MO1010871 Location: N 39.33582, W -94.16924 Description: The ladder guard was in good shape and locked, the grounds were also kept in good condition. Date Taken: August 13, 2020 Program: PDW Unit
	Photograph: 3 Taken By: Drew Hodgdon Facility: Wood Heights PWS Permit: MO1010871 Location: N 39.33582, W -94.16924 Description: I noted the flapper-valve was well secured and in good condition on the overflow piping. Date Taken: August 13, 2020 Program: PDW Unit

Attachment #1 – Photographs
Wood Heights PWS
Page 2 of 2

	Photograph: 4 Taken By: Drew Hodgdon Facility: Wood Heights PWS Permit: MO1010871 Location: N 39.33582, W -94.16924 Description: The overflow screen was setup with an 18 mesh and a larger screen both in good condition. Date Taken: August 13, 2020 Program: PDW Unit
	Photograph: 5 Taken By: Drew Hodgdon Facility: Wood Heights PWS Permit: MO1010871 Location: N 39.33587, W -94.16911 Description: I noted the pump station vault was secure and in good condition. Date Taken: August 13, 2020 Program: PDW Unit
	Photograph: 6 Taken By: Drew Hodgdon Facility: Wood Heights PWS Permit: MO1010871 Location: N 39.33587, W -94.16911 Description: Description: Noted the pump station was in good condition with only minor corrosion on the piping and flooring. Date Taken: August 13, 2020 Program: PDW Unit


STREET NAMES
WOOD HEIGHTS FIRE HYDRANTS WHFH
WOOD HEIGHTS FLUSH VALVE'S WHFV
N
S
W
E
CITY OF
WOOD HEIGHTS, MO.
SCHEMATIC
WOOD HEIGHTS
WATER DISTRIBUTION SYSTEM
Crowley, Wade, Milstead, Inc.
THIS MAP WAS DONE BY GARY HARTER 11-03-2015
WHFV # 7 A, B, & C
PLANT
TO PLANT
WHFV # 6
HOUSE
WHFV #5
WYMAN ROAD
MITCHELL ST.
FH #42
WHFV #4
McCALEB'S TREE SERVICE
PISGAH CHURCH
FH #41
CITY HALL
HWY 10
FH #40
PISGAH CEMETERY RD.
FH #39
TOWER
Pump Sta.
DOLLAR GENERAL
WHFV #3
OAK ST
FH #33
FH #32
FH #34
EVERGREEN ST.
MAPLEWOOD DRIVE
FH #38
MULBERRY LN
CEDAR ST.
HEDGE ST.
OAK ST
FH #37
FH #36
FH #35
WILLOW ST
FH #29 O.O.S
HWY O LIFT STATION ROAD
O HWY
WHFV #2
FH #31
FH #30
FH #26
FH #20
FH #27
FH #25
FH #17
BRYAN ST.
KENT ST.
FH #16
FH #15
FH #3
S. RAYMORE ST.
SINGAPORE ST.
FH #4
FH #5
BOMBAY ST.
BOMBAY COURT
FH #6
FH #7
BOMBAY CIRCLE
FH #8
CARSON LANE
FH #9
WHFV #1
MARIAN HILLS LIFT STATION ROAD
FH #21
RIDGEWAY DRIVE
LAKEVIEW DRIVE
VALLEY
FH #13
FH #12
FH #11
FH #10
N. RAYMORE ST.
SHORT
FH #2
FH #1
METER VAULT
WOOD HEIGHTS FIRE DISTRICT
HWY 10
HWY M

I. Purpose

The purpose of this report is to determine the most cost effective means by which to provide sewer service to both existing residents and new potential commercial customers within the existing Wood Heights city limits. This report will investigate available options to provide service to existing homes in two separate areas. The southern service area under consideration is bounded on the north and south by Maplewood Drive and Willow Lane, and on the east and west by Cedar and Evergreen Streets. The City also desires to extend service to residents of a northern service area along Wyman Drive, north of Missouri Route 10. The future commercial service area of approximately 28.3 acres, bounded by Maplewood Drive and Mo. Route 10, would flow by gravity into the northern gravity sewer extension.

In addition, the current NPDES permit requires the City to meet disinfection limits by April 1, 2014. This report will include costs and improvements needed in order to provide ultraviolet (UV) inactivation of the wastewater treatment plant effluent.

II. System Background

Although the 2000 census indicates a total population of 742 people in 248 households, only a portion of the City is served by the existing sewage collection system. At the time this report was written, there were a total of 270 water meters in the City. The existing sewage collection system, the majority of which was installed in 1981, consists of 6,900 L.F. of 8" PVC gravity sewer pipe, 900 L.F. of 8" VCP sewer pipe, 845 L.F. of 10" VCP gravity sewer pipe, 4,955 L.F. of 12" PVC gravity sewer pipe, a single lift station and

3,200 L.F. of 6" PVC force main sewer. The existing system serves 180 homes. Sewage from the remaining homes within the City limits is treated either by individual septic tanks or sewage lagoons. Figure 1 shows the existing collection system and service area.

68 Homes

The collection system conveys flow to the City of Wood Heights wastewater treatment plant. Wastewater treatment is provided with an oxidation ditch. Constructed in 1981, the 150,000 gallon per day (gpd) facility currently treats an average of 35,000 gpd.
The facility experiences peak flows between 150,000 gpd and 200,000 gpd, which equates to a peaking factor of 5.7. It is assumed in this report that the majority of the inflow creating the peak flows is experienced in the area served by vitrified clay pipe (VCP) constructed prior to 1980. The facility operates under Permit No. MO-0036218, effective on January 24, 2011.

III. Design Flow

Design average daily flows for developed areas were derived by assuming a density of three people per home, an average use of 100 gallons per person per day, and a peaking factor of four. These assumptions provide a peak hourly design flow of 0.83 gallon per minute (gpm) per home or lot in the developed areas. Design flows for undeveloped commercial areas were derived by assuming a peak hourly flow of 5,000 gallons per day per acre. Using these assumptions results in a peak hourly design flow of 3.5 gallon per minute (gpm) per acre for the undeveloped commercial area. With an area of 28.3 acres, estimated peak hourly flow for the commercial area is 99 gpm.
The southern service area is comprised of 44 existing residential lots with a peak hourly design flow of 36.5 gpm. The northern service area would serve 13 existing residential

lots and one municipal lot, for a peak hourly design flow of 11 gpm. The combined peak hourly design flow of the three areas under consideration is 146.5 gpm.

IV. Existing System Capacity

Figure 1 shows the main gravity sewers in the collection system and the tributary area for each segment. The existing pump station is equipped with two 15 h.p. submersible pumps rated to pump 250 gpm at 113 feet total dynamic head (TDH).

There are thirty-seven houses currently served by the pump station, which operated an average of 45 minutes each day between 2002 and 2006. The existing 6" force main discharges into an 8" gravity sewer (Interceptor B) with a minimum slope of 0.4%, which will convey 270 gpm when flowing two thirds full. Sewage is conveyed from Interceptor D to the treatment facility through the 12" Interceptor A, which has a minimum slope of 0.4% and capacity of 800 gpm when flowing two thirds full.

By including the load from the southern service area with the existing load, the total future peak load on the pump station is estimated to be 67 gpm, or 27% of the pump station capacity. By considering both the existing and the future loads, it becomes apparent that the pump station and collection system could easily accommodate the planned expansion. However, only a portion of the southern service area could be served by gravity by the pump station. Sending flow from the southern service area to the pump station would require approximately one half of that areas flow to be pumped twice in order to reach the WWTP.

V. Collection System Improvements

Flow from the northern service area can be delivered to the WWTP by the addition of an 8" gravity sewer installed along Wyman Drive. The slope of the proposed sewer would vary from approximately 0.3% at the southern end to 4.4% at the northern end, with a capacity when flowing two thirds full of 227 gpm. See Table 3 for a cost estimate and Figure 4 for a layout of this option. The cost estimate assumes that a portion of the gravity sewer will be installed through rock.

Extending the proposed Wyman Drive gravity sewer south across Mo Rte 10 would not only provide for service to the undeveloped commercial area, but provides an additional option for service of the southern service area as noted below. A cost opinion of the extension is provided in Table 4 with a proposed layout in Figure 4.

Three options were considered for providing service to the southern service area.

Alternate 1S consists of individual pump stations at each residence, with a low-pressure sewer system conveying flow to the existing lift station through one and a half and two inch force mains, and can be seen on Figure 2. The individual pump stations would receive electrical power from the residence being served. Assuming a cost per kilowatt hour of ten cents, it is estimated that the electrical cost of operating the pump station for each homeowner would be less than $1.00 per month.

Alternate 2S consists of the installation of a gravity collection system where the terrain allows, with two new pump stations (each equipped with 1 h.p. pumps rated at 20 gpm and 50 feet TDH) conveying flow to the existing lift station. Approximately half of the houses would be served by gravity, and half of the houses would be served by individual pump stations and a low-pressure sewer system. See Figure 3.

Alternate 2S consists of the installation of a gravity collection system with four new pump stations (each equipped with 2 h.p. submersible pumps rated at 12 gpm and 150 feet TDH). The six houses on the east edge of the service area would be served by the existing pump station. The remaining homes would be served by the new pump stations. Flow would be conveyed to the north side service area through new 1 ½" to 3" force mains. Each pump station would require single phase electrical service. The annual electric cost is estimated at $1,020. Annual O&M costs for the pump stations is estimated at $16,000. Alternate 3S considers using individual pump stations as in Alternate 1S. However, rather than pumping to the existing pump station, flow would be routed to the new Wyman Drive gravity sewer serving the northern and commercial service areas. See Table 5 for an estimated cost opinion and Figure 4 for a proposed layout.

VI. Ultraviolet Light (UV) Disinfection System

The current wastewater treatment plant discharge permit, which became effective on January 24, 2011, requires the facility to meet average monthly E. Coli level of 206/100mL by January 1, 2014. The facility will be required to meet the new limits during the recreation season from April 1 through October 31. Disinfection is commonly achieved by either chlorination/dechlorination or the application of UV light. While disinfection with UV will have a higher installation cost, operators will handle fewer chemicals, operators will not have to monitor discharge chlorine levels, and a more dependable system will be in place.

Hydraulics and plant layout will allow a UV system to be installed between the clarifiers and the effluent flow measuring manhole. The proposed system will consist of 6

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0036218
Owner:	City of Wood Heights
Address:	2098 East Ridge Drive, Wood Heights, MO 64024
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Wood Heights WWTP
Facility Address:	400 Wyman Drive, Wood Heights, MO 64024
Legal Description:	See Page 2
UTM Coordinates:	See Page 2
Receiving Stream:	See Page 2
First Classified Stream and ID:	See Page 2
USGS Basin & Sub-watershed No.:	See Page 2

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

See Page 2

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 621.250 RSMo, Section 640.013 RSMo and Section 644.051.6 of the Law.

August 1, 2020
Effective Date

Edward B. Galbraith, Director, Division of Environmental Quality

June 30, 2024
Expiration Date

Chris Wieberg, Director, Water Protection Program

FACILITY DESCRIPTION (continued):

Outfall #001 – POTW
The use or operation of this facility shall be by or under the supervision of a Certified "C" Operator.
Influent lift station / bar screen / grit chamber / oxidation ditch / two final clarifiers / UV disinfection / sludge holding tank / sludge/biosolids drying beds / biosolids are land applied

Design population equivalent is 1,500.
Design flow is 150,000 gallons per day.
Actual flow is 28,200 gallons per day.
Design sludge production is 31.5 dry tons/year.

Legal Description:	Sec. 5, T52N, R29W, Ray County
UTM Coordinates:	X=398529, Y=4356008
Receiving Stream:	Tributary to Gold Mine Creek (C)
First Classified Stream and ID:	100K Extent-Remaining Streams (C) (3960)
USGS Basin & Sub-watershed No.:	(10300101-0406)

Permitted Feature INF – Influent Monitoring Location – Headworks

Legal Description:	Sec. 5, T52N, R29W, Ray County
UTM Coordinates:	X=398529, Y=4356046

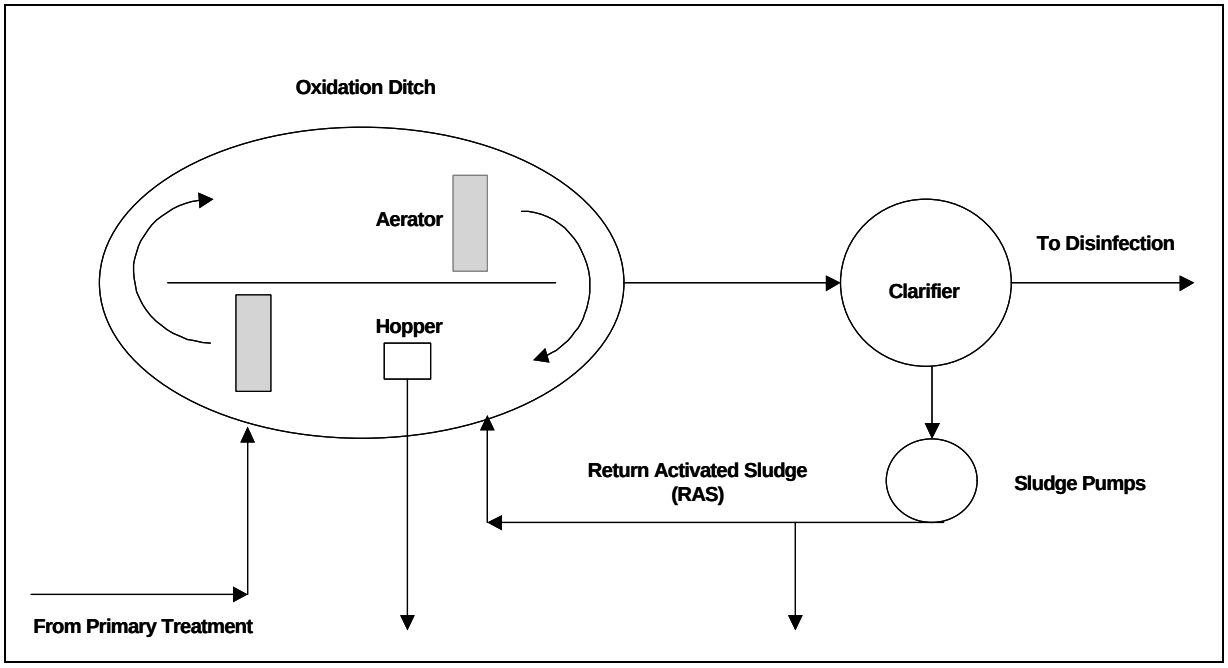
United States Environmental Protection Agency | Office of Water Washington, D.C. | EPA 832-F-00-013 September 2000

Wastewater Technology Fact Sheet
Oxidation Ditches

DESCRIPTION

An oxidation ditch is a modified activated sludge biological treatment process that utilizes long solids retention times (SRTs) to remove biodegradable organics. Oxidation ditches are typically complete mix systems, but they can be modified to approach plug flow conditions. (Note: as conditions approach plug flow, diffused air must be used to provide enough mixing. The system will also no longer operate as an oxidation ditch). Typical oxidation ditch treatment systems consist of a single or multi-channel configuration within a ring, oval, or horseshoe-shaped basin. As a result, oxidation ditches are called "racetrack type" reactors. Horizontally or vertically mounted aerators provide circulation, oxygen transfer, and aeration in the ditch.

Preliminary treatment, such as bar screens and grit removal, normally precedes the oxidation ditch. Primary settling prior to an oxidation ditch is sometimes practiced, but is not typical in this design. Tertiary filters may be required after clarification, depending on the effluent requirements. Disinfection is required and reaeration may be necessary prior to final discharge. Flow to the oxidation ditch is aerated and mixed with return sludge from a secondary clarifier. A typical process flow diagram for an activated sludge plant using an oxidation ditch is shown in Figure 1.



Source: Parsons Engineering Science, Inc., 2000.

FIGURE 1 TYPICAL OXIDATION DITCH ACTIVATED SLUDGE SYSTEM

range from 1.1 to 1.5 kg of O_2 per kg of BOD removed (1.1 to 1.5 lbs of O_2 per lb. of BOD removed) and 4.57 kg of O_2 per kilogram of TKN oxidized (4.57 lbs of O_2 per lb. of TKN oxidized) (EPA, 1991; Baker Process, 1999). Oxygen transfer efficiency ranges from2.5 to 3.5 lb./Hp-hour (Baker Process, 1999).

COSTS

The basin volume and footprint required for oxidation ditch plants have traditionally been very large compared with other secondary treatment processes. Larger footprints result in higher capital costs, especially in urbanized locations where available land is very expensive. Vertical reactors, in which process flow travels downward through the reactor, are generally more expensive than traditional horizontal reactors. However, because they require less land than more conventional horizontal reactors, they can significantly reduce overall capital costs where land costs are high.

The cost of an oxidation ditch plant varies depending on treatment capacity size, design effluent limitations, land cost, local co[redacted] t[redacted]/liter per day ($1.96 to $12.00/gpd) treated. These costs have been updated with the ENR construction cost index (ENR = 5916).

Recent information obtained from manufacturers on [redacted] facilities ranging 3,785 to 25,740 m^3/day (1.0 MGD to 6.8 MGD) indicates that [redacted] to $1.10/liter per day ($2.50 to $4.00 per gpd). For example, the Blue Heron Water Reclamation Facility in Titusville, Florida-- a 15,142 m^3/day (4.0 M[redacted] ruger, 1996). The facility features a multi-stage biological nutrient removal process and a sophisticated Supervisory Control and Data Acquisition System (SCADA) control system.

Oxidation ditches offer significantly lower operation and maintenance costs than other secondary treatment processes. Compared to other treatment technologies, energy requirements are low, operator attention is minimal, and chemical addition is not usually required. For example the Tar River Wastewater Reclamation Facility in Louisburg, North Carolina has documented energy savings of 40 percent compared with conventional activated sludge plants (Ellington, 1999). The oxidation ditch has also eliminated chemical costs and plant staff are available for other facility needs (Ellington, 1999).

REFERENCES

Other Related Fact Sheets

Other EPA Fact Sheets can be found at the following web address:
http://www.epa.gov/owmitnet/mtbfact.htm

1. Baker Process, 1999. Personal communication with Betty-Ann Custis, Senior Process Engineer, Memorandum to Parsons Engineering Science, Inc.

2. City of Casa Grande, Arizona, 1999. Facsimile from Jerry Anglin to Parsons Engineering Science, Inc.

3. Ettlilch, William F., March 1978. *A Comparison of Oxidation Ditch Plants to Competing Processes for Secondary and Advanced Treatment of Municipal Wastes.*

4. Ellington, Jimmy, 1999. Plant Superintendent, Tar River Water Reclamation Facility. Personal conversation with Parsons Engineering Science, Inc.

5. Kruger, Inc. 1996. *A2O &ATAD Processes provide Effective Wastewater, Biosoilds Treatment for Titusville, Fla.* Fluentlines, 1 (2).

6. Metcalf and Eddy, Inc., 1991. *Wastewater Engineering: Treatment, Disposal, Reuse.* 3rd edition. New York: McGraw Hill.

7. Sherwood Logan and Associates, Inc., 1999. Personal communication with Robert Fairweather. Faxsimile transmitted to Parsons Engineering Science, Inc.

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

July 9, 2018

The Honorable Robert Pettigrew, Mayor
City of Wood Heights
2098 Eastridge Drive
Wood Heights, MO 64024

FINDING OF COMPLIANCE

Dear Mayor Pettigrew:

An inspection was conducted by Missouri Department of Natural Resources staff on May 22, 2018 pursuant to the Missouri Clean Water Law, as described in the enclosed report.

The site was found to be in compliance with the Missouri Clean Water Law and Missouri State Operating Permit MO0036218 based upon the observations made at the time of the inspection. The Inspection Report outlines the findings of the inspection and may list important recommendations that should be considered to ensure continued compliance. Your cooperation implementing those recommendations will be appreciated.

If you have any questions regarding the report or would like to schedule a time to meet in person, please contact Mr. Patrick Peltz at the Kansas City Regional Office at 816-251-0713, patrick.peltz@dnr.mo.gov, or 500 Northeast Colbern Road, Lee's Summit, Missouri 64086-4710. Thank you.

Sincerely,

KANSAS CITY REGIONAL OFFICE

Jesse Cochran
Water Pollution Unit Chief

JC/ppvj

c: Mr. Kenny Wiley, Operator

Missouri Department of Natural Resources
Kansas City Regional Office, Water Pollution Control Branch
Report of Inspection
Wood Heights Wastewater Treatment Plant
400 Wyman Drive, Woods Heights, Ray County
MO0036218

Introduction

On May 22, 2018, I (Patrick Peltz) of the Missouri Department of Natural Resources' (Department's) Kansas City Regional Office (KCRO) conducted a routine water pollution compliance inspection of the Wood Heights Wastewater Treatment Plant (WWTP) located at 400 Wyman Drive, Woods Heights, Ray County, Missouri. Participants included:

Missouri Department of Natural Resources:
Mr. Patrick Peltz, Environmental Specialist, KCRO
816-251-0713
patrick.peltz@dnr.mo.gov

Wood Heights WWTP:
Mr. Kenny Wiley, Plant Operator
816-848-4903
kennywiley1@msn.com
Mr. Brad Blankenship
816-848-4677
gunnman8716@gmail.com

This inspection was conducted to determine the facility's compliance with Missouri State Operating Permit (MSOP) MO0036218, the Missouri Clean Water Commission Regulations, and the Missouri Clean Water Law (MCWL), pursuant to Section 644.026.1, RSMo. This report presents the findings and observations made during the compliance inspection.

Facility Description and History

Wood Heights WWTP's MSOP, MO0036218, was last issued on June 28, 2016, and expires on June 30, 2019. This permit sets forth effluent limitations, monitoring requirements, and permit conditions, both standard and specific, that the permittee is to follow.

The facility consists of an oxidation ditch with two final clarifiers, peak flow holding basin, sludge drying bed, and ultraviolet (UV) disinfection. The facility has a design flow of 150,000 gallons per day. The design sludge production is 31.5 dry tons per year. The MSOP requires a C level operator for this facility; they currently retain a C level operator and a D level operator. The receiving stream for this facility is Gold Mine Creek in the Lower Missouri – Crooked watershed.

On July 1, 2013 I conducted an inspection of the site and the facility was found to be out of compliance. Notice of Violation KC2013071817024660 was issued to the facility for multiple failures in facility operation and maintenance.

Report of Inspection
Wood Heights Wastewater Treatment Plant
Page 2 of 5

On December 23, 2015 Ms. Rachel Rush of the Missouri Department of Natural Resources, Kansas City Regional Office conducted a routine water pollution compliance inspection of Wood Heights wastewater treatment plant. Wood Heights was found not to be in compliance.

On December 3, 2016, a Technical Assistance Visit (TAV) was performed by Mr. Leonard Johnson. Wood Heights WWTP had experienced a washout of sludge from the facility. The biological community on their mixed liquor had died out. Mr. Johnson gave guidelines on how to restart the facility.

Prior to the inspection, I reviewed the files for Wood Heights WWTP, including previous inspection reports, correspondence, and the permit conditions of MSOP MO0036218, for familiarization with the requirements specific to this facility.

A review of the discharge monitoring reports from May 2013 to May 2018 shows exceedances during that period on time.

Date	Parameter	Monthly Limit	Reported Value
07-31-2014	Total Suspended Solids	30 mg/L	90 mg/L
08-31-2014	Total Suspended Solids	30 mg/L	45 mg/L
09-30-2014	Total Suspended Solids	30 mg/L	35 mg/L
11-30-2015	Total Suspended Solids	30 mg/L	60 mg/L
04-30-2016	Total Suspended Solids	30 mg/L	190mg/L
03-31-2017	Total Suspended Solids	30 mg/L	80 mg/L
08/31/2013	pH	> 6.5	6.2
09/30/2013	pH	> 6.5	6.29
12-31-2013	pH	< 9.0	9.65
09-30-2016	pH	< 9.0	9.97
10-31-2016	pH	< 9.0	9.91
11-30-2016	pH	< 9.0	10.10
12-31-2016	pH	< 9.0	10.77
01-31-2017	pH	< 9.0	10.23
02-28-2017	pH	< 9.0	9.76
07-31-2013	Oil and Grease	10 mg/L	19 mg/L
04-30-2014	E. coli	206 mpn/100 mL	2419 mpn/100 mL
05-31-2014	E. coli	206 mpn/100 mL	2419 mpn/100 mL
06-30-2014	E. coli	206 mpn/100 mL	2419 mpn/100 mL
08-31-2014	E. coli	206 mpn/100 mL	1072 mpn/100 mL
09-30-2014	E. coli	206 mpn/100 mL	1160 mpn/100 mL
10-31-2014	E. coli	206 mpn/100 mL	1145 mpn/100 mL
06-30-2015	E. coli	206 mpn/100 mL	416 mpn/100 mL
08-31-2015	E. coli	206 mpn/100 mL	781.9 mpn/100 mL
09-30-2015	E. coli	206 mpn/100 mL	428 mpn/100 mL
10-31-2015	E. coli	206 mpn/100 mL	1390.5 mpn/100 mL
09-30-2016	E. coli	206 mpn/100 mL	484.6 mpn/100 mL
10-31-2016	E. coli	206 mpn/100 mL	690.35 mpn/100 mL

Discussion of Inspection and Observations

The inspection was conducted during normal business hours. Prior notification of the inspection was provided to ensure timely access to the site. Upon arrival at the facility, I met with Mr. Kenny Wiley and Mr. Brad Blankenship. I outlined the purpose and scope of the inspection. Both gentlemen granted permission to access the site and accompanied me throughout the tour of the facility.

We toured the facility. The modified grit screen was clean of all solids. A permanent building had been built over the grit screen area to prevent intrusion of debris from the surrounding area. The grit chamber was cleaned daily. The oxidation ditch was free of floating solids and had a consistent color. The water was brown with a mild odor to no odor. Both rotors were running and had recently been rebuilt *(Photograph 001)*. They were in good shape and were working consistently. The effluent weir following the oxidation ditch was free of buildup and was regularly cleaned to remove any sludge and allow water to move freely. The clarifiers were housed inside of an enclosed building. One clarifier was working at the time if the inspection. It was clean and had regular maintenance *(Photograph 002)*. The other clarifier was down for repairs and maintenance. The plan was to put it back into operation. The ultraviolet light disinfection was downstream from the clarifiers. It was in good working order. The canal was clean and had no odor. The water was flowing clear. Outfall 001 was clearly marked in the field. It had steps leading to it for easy access. It was free from vegetation or encumbrances. It had a backflow preventer on it *(Photograph 003)*. The water was clear in the receiving stream. Woods Heights had two sludge drying beds. The drying beds were clean with no vegetation protruding out of the beds. One bed was used to dry the sludge and the other was used to store the sludge. They were not land applying the sludge at the time of the inspection. There were no land application records. There was a new fence with warning signs surrounding the facility. The gate was kept locked and had an all-weather road leading to it. The lot was well kept and good housekeeping was well maintained.

Sampling and Monitoring

The appropriate sampling materials were taken on the inspection, including a copy of the Missouri Department of Natural Resources' Standard Operating Procedures. Instruments for field monitoring were taken on the inspection that are capable of testing pH, temperature, conductivity, and dissolved oxygen.

	Parameters	**Outfall 001**
Monitoring	Time	11:32
	pH	7.21
	Dissolved Oxygen	7.21 mg/L
	Conductivity	678 µS/cm
	Temperature	19^0C
Sampling	Time	11:32
	Ammonia as N	0.38 mg/L
	Biochemical Oxygen Demand	2.12 mg/L
	Total Suspended Solids	5.00 mg/L
	Oil and Grease	<2 mg/L
	E. coli	<1 mpn/100ml

Compliance Determination and Required Actions

The facility was found to be in compliance with the MCWL, its implementing regulations, and MSOP MO0036218, based upon observations made during the inspection.

Recommendations

1. Please note that pursuant to 10 CSR 20-6.010(1)(A), all persons who build, erect, alter, replace, operate, use, or maintain existing point sources, or intend these actions for a proposed point source, water contaminant sources, or wastewater treatment facilities shall apply to the department for the construction and operating permits required by the MCWL and its implementing regulations. Applications for construction and operating permits can be downloaded from the department's website at **http://dnr.mo.gov/forms/#WaterPollution**. Maintenance activities do not require construction permitting and approval, but you must obtain a construction permit from the department prior to making any modifications that change the treatment process and/or capacity of the facility.

Additional Comments/Conclusion

As a result of the inspection, Wood Heights WWTP was in compliance with the MCWL, its implementing regulations, and MSOP MO0036218. Any questions regarding this report should be directed to Mr. Patrick Peltz of the KCRO at 816-251-0713, patrick.peltz@dnr.mo.gov, or 500 Northeast Colbern Road, Lee's Summit, Missouri 64086-4710.

Signatures

SUBMITTED BY:

Patrick Peltz
Environmental Specialist
Kansas City Regional Office

REVIEWED BY:

Jesse Cochran
Water Pollution Unit Chief
Kansas City Regional Office

JC/ppvj

Attachments
Attachment # 1 – Photographs (#001 through #003)
Attachment # 2 – Aerial Map

Attachment #1 – Photographs
Wood Heights WWTP
Page 1 of 1

	Photograph: #001 Taken By: Patrick Peltz Facility: Wood Heights WWTP Permit: MO0036218 Location: Wood Heights, MO Description: The oxidation ditch was free of floating solids and had a consistent color. The water was brown with a mild odor to no odor. Both rotors were running and had recently been rebuilt. Date Taken: May 22, 2018 Program: WPC Unit
	Photograph: #002 Taken By: Patrick Peltz Facility: Wood Heights WWTP Permit: MO0036218 Location: Wood Heights, MO Description: The clarifiers were housed inside of an enclosed building. One clarifier was working at the time of the inspection. It was clean and had regular maintenance. Date Taken: May 22, 2018 Program: WPC Unit
	Photograph: #003 Taken By: Patrick Peltz Facility: Wood Heights WWTP Permit: MO0036218 Location: Wood Heights, MO Description: Outfall 001 was clearly marked in the field. It had steps leading to it for easy access. It was free from vegetation or encumbrances. It had a backflow preventer on it. Date Taken: May 22, 2018 Program: WPC Unit

Attachment #2 – Aerial Map
Wood Heights WWTP
Page 1 of 1

Wood Heights, MO
Asset Report
Depreciated Value of 2021 Cost

Appendix J
Jnuary 27, 2022

Asset Description	Year Installed	Estimated Installation Cost 2021	Age (2021)	Depreciation Period [1]	Depreciation [2]	Depreciated Value [3]
Elevated Tank	1995	$ 321,750.00	26	42	$ 199,178.57	$ 122,571.43
Booster Pump Station	2011	$ 106,000.00	10	15	$ 70,666.67	$ 35,333.33
2-inch Water Main	1957	$ 156,000.00	64	50	$ 199,680.00	$ -
4-inch Water Main	1957	$ 1,405,000.00	64	50	$ 1,798,400.00	$ -
8-inch Water Main	2011	$ 863,500.00	10	50	$ 172,700.00	$ 690,800.00
Fire Hydrants	1957	$ 168,000.00	64	50	$ 215,040.00	$ -
Services and Meters	1957	$ 469,000.00	64	35	$ 857,600.00	$ -
Total Water Assets		$ 3,489,250.00				$ 848,704.76
WWTP - 150,000 gpd Oxidation Ditch	1981	$ 1,575,000.00	40	22	$ 2,863,636.36	$ -
WWTP UV Disinfection	2014	$ 250,000.00	7	22	$ 79,545.45	$ 170,454.55
Marvin Hill Lift Station - 2 5-hp Pumps	2000	$ 30,000.00	21	10	$ 63,000.00	$ -
Highway O Lift Station - 2 15-hp Pumps	1981	$ 100,000.00	40	10	$ 400,000.00	$ -
Marvin Hill Pump Replacement	2020	$ 10,000.00	1	10	$ 1,000.00	$ 9,000.00
8-inch Gravity Sewer Original System	1957	$ 54,000.00	64	50	$ 69,120.00	$ -
8-inch Gravity Sewer 1981	1981	$ 414,000.00	40	50	$ 331,200.00	$ 82,800.00
10-inch Gravity Sewer Original System	1957	$ 54,925.00	64	50	$ 70,304.00	$ -
12-inch Gravity Sewer 1981	1981	$ 346,850.00	40	50	$ 277,480.00	$ 69,370.00
6-inch Forcemain 1981	1981	$ 160,000.00	40	50	$ 128,000.00	$ 32,000.00
Manholes 1981	1981	$ 160,000.00	40	50	$ 128,000.00	$ 32,000.00
Service Laterals 1981	1981	$ 77,600.00	40	50	$ 62,080.00	$ 15,520.00
Total Wastewater Assets		$ 3,232,375.00				$ 411,144.55

Note 1 - Based on Missouri PSC Rate Case Dockets WR-2015-0138 Village Greens Water Company; WR-2016-0169 Woodland Manor Water Company; WR-2015-0104 Spokane Highlands Water Company; SR-2014-0105 Terre Du Lac Utility Company; SR-2014-0068 P.C.B., Inc.; and SR-2013-0435 Rogue Creek Sewer.

Note 2 - Depreciation = Age/Depreciation Period X Estimated Installation Cost

Note 3 - Depreciated Value = Estimated Installation Cost - Depreciation

APPENDIX K in Asset Report Prepared by Flinn Engineering, LLC dated 1/27/2022

VILLAGE GREENS WATER COMPANY

SCHEDULE of DEPRECIATION RATES

(WATER Class D)

WR-2015-0138 Attachment D

NARUC USOA ACCOUNT NUMBER	ACCOUNT DESCRIPTION	DEPRECIATION RATE	AVERAGE SERVICE LIFE (YEARS)	NET SALVAGE
	Source of Supply			
311	Structures & Improvements	2.5%	44	-10%
314	Wells & Springs	2.0%	55	-8%
	Pumping Plant			
321	Structures & Improvements	2.5%	44	-10%
325.1	Submersible Pumping Equipment	10.0%	12	-20%
	Water Treatment Plant			
331	Structures & Improvements	2.5%	44	-10%
332	Water Treatment Equipment	2.9%	35	0%
	Transmission and Distribution			
342	Distribution Reservoirs & Standpipes	2.5%	42	-5%
343	Transmission & Distribution Mains	2.0%	50	0%
345	Customer Services	2.5%	40	0%
346.1	Customer Meters, Plastic (Throw Aways)	10.0%	10	0%
347	Customer Meter Pits & Installation	2.5%	40	0%
348	Hydrants	2.0%	50	0%
	General Plant CLASS D			
371	Structures & Improvements	2.5%	40	0%
372	Office Furniture & Equipment	5.0%	20	0%
372.1	Office Electronic & Computer Equip.	14.3%	7	0%
373	Transportation Equipment	13.0%	7	9%
379	Other General Equipment (tools, shop equip., backhoes, trenchers, etc.)	10.0%	8.7	13%

https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=WR-2015-0138&attach_id=2015030930

*Revised 1/23/2015

APPENDIX K in Asset Report Prepared by Flinn Engineering, LLC dated 1/27/2022

For Staff Proposed Adoption by Missouri-American Water Company
WM-2016-0169

Woodland Manor Water Company
SCHEDULE of DEPRECIATION RATES dated 4/1/2013
(WATER Class D)
WR-2013-0326

USOA ACCOUNT NUMBER	ACCOUNT DESCRIPTION	DEPRECIATION RATE	AVERAGE SERVICE LIFE (YEARS)	NET SALVAGE
	Source of Supply			
311	Structures & Improvements	2.5%	44	-10%
314	Wells & Springs	2.0%	55	-8%
	Pumping Plant			
321	Structures & Improvements	2.5%	44	-10%
325	Electric Pumping Equip. (Plus Generator)	6.7%	15	0%
328	Other Pumping Equipment	5.0%	20	0%
	WaterTreatment Plant			
332	Water Treatment Equipment	2.9%	35	$0
	Transmission and Distribution			
342	Distribution Reservoirs & Standpipes	2.5%	42	-5%
343	Transmission & Distribution Mains	2.0%	50	0%
345	Customer Services	2.9%	35	0%
346.1	Customer Meters (Installed after 2012)*	10.0%	10	0%
346.2	Bronze Meters and Installs prior 2013	3.3%	30	0%
347	Meter Installations (Meter Pits after 2012)	2.5%	40	0%
348	Hydrants	2.5%	40	0%
349	Other Transmission & Distribution Plant	3.3%	30	0%
	General Plant			
372	Office Equipment & Furniture	5.0%	20	0%
372.1	Office Electronic Equipment	14.3%	7	0%
373	Transportation Equipment	13.0%	7	9%
379	Other General Equipment	6.7%	13	13%

Customer Meters (Installed after 2012)* Plus 18 plastic meters installed in 2007

The above recommended depreciation rates are based on Staff's review of the Company's operation and records.

https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=WM-2016-0169&attach_id=2016015052

APPENDIX K in Asset Report Prepared by Flinn Engineering, LLC dated 1/27/2022

SPOKANE HIGHLANDS WATER COMPANY
DEPRECIATION RATES
(WATER)
CASE NO. WR-2015-0104

ACCOUNT NUMBER	ACCOUNT	DEPRECIATION RATE %	AVERAGE SERVICE LIFE (YEARS)	SALVAGE %
311	Structures & Improvements	2.5%	44	-10%
314	Wells & Springs	2.0%	55	-8%
325	Electric Pumping Equipment			
325.1	Submersible (Well Pump) Equipment	10.0%	12	-20%
325.2	High Service or Booster Pumps	2.0%	7	0%
342	Distribution Reservoirs & Standpipes	2.5%	42	-5%
343	Transmission & Distribution Mains	2.0%	50	0%
345	Services	2.9%	35	0%
346	Meters	2.0%	10	0%
347	Meter Installations	1.0%	50	0%
348	Hydrants	2.5%	40	0%
372	Office Furniture & Equipment	5.0%	20	0%
379	Other General Equipment	6.7%	13	13%

https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=WR-2015-0104&attach_id=2015020974

APPENDIX K in Asset Report Prepared by Flinn Engineering, LLC dated 1/27/2022

Terre Du Lac Utility Company

DEPRECIATION RATES

(SEWER)

SR-2014-0105

ACCOUNT NUMBER	ACCOUNT DESCRIPTION	DEPRECIATION RATE	AVERAGE SERVICE LIFE (YEARS)	NET SALVAGE
300	Stipulated Plant	2.5%	40	0%
311	Structures and Improvements	2.5%	44	-10%
352.1	Collection Sewers (Force)	2.0%	50	0%
352.2	Collection Sewers (Gravity)	2.0%	50	0%
353	Services	2.0%	50	0%
354	Flow Measurement Devices	3.3%	30	0%
362	Receiving Wells	5.0%	26	-5%
363	Electric Pumping Equipment	10.0%	10	0%
371	Treatment Plant Shed	2.5%	44	-10%
372	Treatment & Disposal Equipment	5.0%	22	-10%
390	Structures & Improvements Office/Shop	2.5%	44	-10%
391	Office Furniture & Equipment	5.0%	20	0%
391.1	Electronic Office Equipment	0.0%	Excessively Accrued	
392	Transportation Equipment	13.0%	7	9%
393	Stores Equipment	4.0%	25	0%
394	Tools, Shop, and Garage Equipment	5.0%	18	10%
395	Laboratory Equipment	8.3%	12	0%
396	Power Operated Equipment	6.7%	13	13%
397	Communication Equipment	3.3%	Over Accrued	

Reviewed, 1/7/2014. The above are standard small company depreciation rates modified as a result of Staff's investigation of the Company's operation, records, and physical plant, and are dependent on the Company's implementation of the end of test year adjustments to the Company's plant in service and accumulated reserves as shown in the Staff accounting schedules.

https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=SR-2014-0105&attach_id=2014014505

APPENDIX K in Asset Report Prepared by Flinn Engineering, LLC dated 1/27/2022

P.C.B., Inc.

SCHEDULE of DEPRECIATION RATES
(SEWER Class C & D)
SR-2014-0068 Attachment D

ACCOUNT NUMBER	ACCOUNT DESCRIPTION	DEPRECIATION RATE	AVERAGE SERVICE LIFE (YEARS)
	COLLECTION PLANT		
311	Structures & Improvements	3.3%	33
352.2	Collection Sewers (Gravity)	2.0%	50
355	Flow Measurement Devices	3.3%	30
	PUMPING PLANT		
362	Receiving Wells	4.0%	26
363	Electric Pumping Equipment	10.0%	10
	TREATMENT & DISPOSAL PLANT		
372	Oxidation Lagoons	4.0%	40
373	Treatment & Disposal Facilities	5.0%	22
375	Outfall Sewer Lines	2.0%	50
	GENERAL PLANT		
391	Office Furniture & Equipment	5.0%	20

Reviewed, 1/07/2014. The above are standard small company depreciation rates modified as a result of Staff's investigation of the Company's operation, records, and physical plant, and are dependent on the Company's implementation of the end of test year adjustments to the Company's plant in service and accumulated reserves as shown in the Staff accounting schedules.

https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=SR-2014-0068&attach_id=2014016258

APPENDIX K in Asset Report Prepared by Flinn Engineering, LLC dated 1/27/2022

Rogue Creek Sewer
Interim Rate Case
SR-2013-0435
Test Year Ending 12-31-2012
Depreciation Expense - Sewer

Line Number	A Account Number	B Plant Account Description	C Adjusted Jurisdictional	D Depreciation Rate	E Depreciation Expense
1		INTANGIBLE PLANT			
2	301.000	Organization	$135	0.00%	$0
3	302.000	Franchises	$1,127	0.00%	$0
4	303.000	Miscellaneous Intangible Plant	$0	0.00%	$0
5		TOTAL INTANGIBLE PLANT	$1,262		$0
6		SOURCE OF SUPPLY PLANT			
7	310.000	Land & Land Rights	$0	0.00%	$0
8	311.000	Structures & Improvements	$2,532	3.00%	$76
9		TOTAL SOURCE OF SUPPLY PLANT	$2,532		$76
10		COLLECTION PLANT			
11	352.100	Collection Sewers - Force	$12,827	2.00%	$257
12	352.200	Collection Sewers - Gravity	$105,094	2.00%	$2,102
13	353.000	Other Collection Plant Facilities	$0	0.00%	$0
14	354.000	Services to Customers	$18,120	2.00%	$362
15	355.000	Flow Measuring Devices	$0	0.00%	$0
16		TOTAL COLLECTION PLANT	$136,041		$2,721
17		PUMPING PLANT			
18	362.000	Receiving Wells and Pump Pits	$1,804	5.00%	$90
19	363.000	Pumping Equipment (Elec.,Diesel, other)	$24,068	10.00%	$2,407
20		TOTAL PUMPING PLANT	$25,872		$2,497
21		TREATMENT & DISPOSAL PLANT			
22	372.000	Oxidation Lagoon	$0	0.00%	$0
23	373.000	Treatment and Disposal Equipment	$31,190	4.50%	$1,404
24	374.000	Plant Sewers	$0	0.00%	$0
25	375.000	Outfall Sewer Lines	$0	0.00%	$0
26	376.000	Other Treatment & Disposal Plant Equip.	$0	0.00%	$0
27		TOTAL TREATEMENT & DISPOSAL PLANT	$31,190		$1,404
28		GENERAL PLANT			
29	391.000	Office Furniture & Equipment	$467	5.00%	$23
30	391.100	Office Computer Equipment	$371	20.00%	$74
31	392.000	Transportation Equipment	$228	13.00%	$30
32	394.000	Tools Shop & Garage Equipment.	$15	5.00%	$1
33		TOTAL GENERAL PLANT	$1,081		$128
34		Total Depreciation	$197,978		$6,826

https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=SR-2013-0435&attach_id=2013018070