STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

APPLICATION OF B & B WATER PROJECT, INC. FOR A NEW SCHEDULE OF RATES AND CHARGES FOR WATER SERVICE AND FINANCING APPROVAL	**)**	**CAUSE NO. 46219-U**

PUBLIC'S EXHIBIT NO. 2

TESTIMONY OF KRISTEN WILLOUGHBY

ON BEHALF OF

THE INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

August 18, 2025

TESTIMONY OF OUCC WITNESS KRISTEN WILLOUGHBY
CAUSE NO. 46219-U
B&B WATER PROJECT, INC.

I. INTRODUCTION

Q: Please state your name and business address.

A: My name is Kristen Willoughby, and my business address is 115 West Washington Street, Suite 1500 South, Indianapolis, Indiana 46204.

Q: By whom are you employed and in what capacity?

A: I am employed by the Indiana Office of Utility Consumer Counselor ("OUCC") as a Utility Analyst in the Water/Wastewater Division. I described my qualifications and experience in Appendix A.

Q: What is the purpose of your testimony?

A: I make recommendations on B&B Water Project, Inc.'s ("B&B," "Applicant," or "Utility") extensions and replacements ("E&R) revenue requirements. I describe B&B's other capital projects. Finally, I discuss B&B's level of water loss.

Q: What did you do to prepare your testimony?

A: I reviewed B&B's Application. I reviewed the Indiana Utility Regulatory Commission's ("Commission" or "IURC") Final Order in Cause No. 45810-U issued October 18, 2023 and November 6, 2024 True Up ordering B&B to submit this case, which established B&B's current rates and charges. I reviewed B&B's annual reports to the IURC for years 2016 through 2024. I wrote data request questions and reviewed B&B's responses. I reviewed monthly reports of operation B&B filed with the Indiana Department of Environmental Management

("IDEM").[1] I reviewed comments provided by customers of B&B, included as Public's Exhibit No. 4.

Q: To the extent you do not address a specific item, should that be construed to mean you or the OUCC agree with Applicant's proposal?

A: No. The scope of my testimony is limited to the specific items addressed herein.

Q: What attachments are included with your testimony?

A: My testimony includes the following attachments:

- OUCC Attachment KW-01: B&B's PER.
- OUCC Attachment KW-02: Utility Dashboard, showing operational statistics based upon B&B's IURC Annual Reports from 2016-2024.
- OUCC Attachment KW-03: Applicant's response to OUCC DR 7-3.
- OUCC Attachment KW-04: Applicant's response to OUCC DR 7-12.
- OUCC Attachment KW-05: Applicant's response to OUCC DR 5-4.
- OUCC Attachment KW-06: Applicant's response to OUCC DR 7-11.
- OUCC Attachment KW-07: Applicant's response to OUCC DR 4-1.

II. APPLICANT'S CHARACTERISTICS

Q: Please describe Applicant's characteristics.

A: Applicant is a not-for-profit utility providing water service to 1,887 customers in Monroe and Brown Counties.[2] Applicant currently purchases all water from the City of Bloomington Utilities. Applicant's storage and distribution system consists of three storage tanks, two booster stations, and an estimated 3,850,000 feet of distribution mains.[3]

[1] IDEM Virtual File Cabinet available at https://vfc.idem.in.gov/DocumentSearch.aspx
[2] 2024 Annual Report, page W-1, Year End Customer Numbers. Customers year-end includes private fire protection and irrigation customers.
[3] 2024 Annual Report page W-9. Distribution Mains.

Q: Does Applicant have adequate storage capacity?

A: Yes. B&B currently has a total storage capacity of 400,000[4] gallons. With total average sales in 2024 of 222,295[5] gallons per day, B&B meets the Ten States Standards recommendation that total water storage be able to meet the average day demand. [6]

III. WATER LOSS

Q: What is "water loss" as it pertains to a utility's operations?

A: As used in IURC annual reports, "water loss" means the difference between the total volume of water pumped and purchased by the water utility and the total volume of water sold to customers or used for backwash, flushing mains, street cleaning/sewer flushing, or other authorized consumption. Water loss may generally be attributed to leaks or inaccurate measurement of consumption.

Q: How does water loss affect a utility's costs and operations?

A: Whether finished water is metered, used for operations or lost through leaks, the cost to purchase the water is included in the utility's test year. The cost to purchase water that is lost through leaks is a cost paid by all customers through higher rates. Water loss caused by inaccurate or slow meters presents a different dynamic. Water "lost" through under recording is nonetheless consumed, and therefore, the actual cost to purchase that unrecorded water is not avoided by more accurate meters. However, removing inaccurate meters avoids subsidization among customers and

[4] B&B's PER p. 11, included as OUCC Attachment KW-01. 100,000+100,000+200,000 = 400,000 gallons.
[5] 2024 Annual Report page W-6. 81,360,000 / 366 = 222,295 gallons per day
[6] The Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers Recommended Standards for Water Works ("Ten States Standards"), Section 7.0.1 Sizing of Finished Water Storage.

allows the utility to both recognize that water is being lost through leaks and measure its success in mitigating that problem.

Q: What is B&B's current water loss?

A: According to its IURC annual reports, B&B's water loss has been at or above 41.6% since at least 2016.[7]

Q: Has B&B ascertained the cause of its water main breaks / leaks?

A: Yes. As stated in response to OUCC DR 7-3, B&B states "the cause of the main breaks is believed to be related to pipe installation conditions on underlying bedrock, aged pipe and PVC pipe material."[8]

Q: Has B&B sought outside help in addressing its high water loss?

A: In 2015, B&B began to work with M.E. Simpson in an attempt to reduce its water loss. However, "due to the type of materials used for most B&B mains the work was discontinued with no results and no associated cost for this work."[9] More recently, B&B sought technical assistance from the Alliance of Indiana Rural Water Association ("Alliance"). The Alliance provided B&B information on possible areas with leaks. B&B recently started investigating the leak information, but it does not yet know if the information provided will be beneficial.[10]

Q: What other steps has B&B taken to reduce its water loss?

A: B&B is replacing meters that have dead batteries with new meters, installing valves and master meters to help locate and isolate leaks, updating its system map, and developing a water main replacement plan. B&B has taken several other steps as

[7] See "Percent Water Loss" chart in OUCC Attachment KW-02.
[8] Applicant's Response to OUCC DR 7-3 is included as OUCC Attachment KW-03.
[9] Applicant's Response to OUCC DR 7-12 is included as OUCC Attachment KW-04.
[10] Applicant's Response to OUCC DR 7-12 is included as OUCC Attachment KW-04.

identified in its Response to OUCC DR 7-12.[11] Furthermore, B&B has developed a Water Loss Prevention Plan that incorporates some of the steps already taken and identifies other action items.[12]

Q: Is B&B doing everything it should do to reduce its water loss?

A: No. While B&B has begun taking steps to reduce water loss, it has not yet focused on replacing water mains. B&B needs to be more proactive and not just replace water mains after several leaks. B&B needs to develop an asset management program that includes a plan for regular water main replacement. I recommend B&B begin setting aside funds for water main replacements to more proactively address its water loss issues.

IV. EXTENSIONS AND REPLACEMENTS

Q: Why has B&B proposed an extensions and replacements revenue requirement?

A: According to Indiana Code § 8-1-2-125(c), which applies to not-for-profit utilities, a reasonable and just charge for water service is a charge that will produce sufficient revenue to pay all legal and other necessary expense incident to the operation of the not-for-profit utility's system including "provision for making extensions and replacements." IC § 8-1-2-125(c)(7).

Q: What has B&B proposed for its extensions and replacements revenue requirement?

A: B&B requests $59,139 per year for its extensions and replacements ("E&R") revenue requirement. (See Schedule 7 of its Application.) This revenue will allow B&B to set aside funds for a future meter replacement project, so the Utility will

[11] Applicant's Response to OUCC DR 5-4 is included as OUCC Attachment KW-05
[12] Applicant's Response to OUCC DR 7-11 is included as OUCC Attachment KW-06.

not need to borrow the money to pay for replacement of failing meters as it did in Cause No. 45810-U. B&B plans to use a ten-year replacement cycle for its meters.

Q: Did B&B provide additional cost support for its proposed E&R revenue requirement in its case-in-chief?

A: No additional support was included for the above item in its application. However, through the discovery process, the OUCC sought and received additional information about the costs associated with the current meter replacement project, for which B&B has borrowed $600,000 to complete. B&B has requested a revenue requirement that will fund meter replacements at approximately the same amount as it is spending on the current meter replacement project. I agree that requested revenue requirement is reasonable.

Q: Should B&B be funding other capital improvement through its E&R revenue requirement?

A: Yes. Meters are not the only assets that need regular replacement, and while borrowing is appropriate for larger capital projects, B&B should also have an asset management program that includes E&R funding for projects such as regular water main replacements. Replacing aging assets, specifically water mains, has been a financial issue common to water utilities for years. Given B&B's high water loss, replacing water mains regularly is especially important. I recommend B&B receive an additional $16,000 per year in its E&R revenue requirement to be used for replacing water mains and other aging infrastructure. B&B's E&R revenue requirement will be roughly the same as established in Cause No. 45810-U.

Q: Do you have any further recommendations regarding E&R?

A: Yes. In the past, B&B has used funds collected for its E&R revenue requirement for other operational expenses. Therefore, I recommend B&B's E&R revenue

requirement of $75,139 per year be placed in a restricted fund to ensure the money will be available when needed to complete a meter replacement project or other aging infrastructure replacement.

V. CAPITAL PROJECTS

Q: Did B&B provide information on the projects it proposes to use finance?

A: B&B provided a PER that outlined three phases of capital improvements. Phase I was the replacement of water meters that have dead batteries. Phase II includes adding hookups for a backup generator to the office building and State Road 45 Booster Station as well as replacing priority water main segments on Bethel Lane, North Mount Gilead Road, and Shilo Road. The preliminary cost estimate for Phase II was $2,000,000, which was the amount B&B received financing approval for in Cause No. 45810-U. Upon completion of the PER, a more accurate cost estimate of $6,901,000 was provided to B&B. However, Applicant has chosen not to raise rates to borrow more than the original $2,000,000 requested. Phase III is for future projects and is not being funded at this time.

Q: Do you have any concerns about the capital improvements to be financed?

A: I do not have concerns with the projects outlined in Table 18 of the PER or the Applicant spending the funds on replacing other priority leaking water mains. But, while B&B's PER outlines where funds should be spent first, the amount B&B has requested to finance does not match the cost of any project or combination of its projects.[13] When questioned which projects would be financed with the $2,000,000 B&B, stated the current plan was to fund some combination of projects from Table

[13] See Table B-18 of the PER, included as OUCC Attachment KW-01.

B-18 of the PER unless "another area is identified with significant water loss."[14] B&B is clearly unsure which projects will be funded with the requested financing.

VI. OUCC RECOMMENDATIONS

Q: Please summarize your recommendations in this Cause.

A: I recommend the Commission authorize an E&R revenue requirement of $75,139 per year. I recommend B&B's E&R revenue requirement of $75,139 per year be placed in a restricted fund to complete E&R projects and develop an asset management program.

Q: Does this conclude your testimony?

A: Yes.

[14] Applicant's response to OUCC DR 4-1, included as Attachment KW-07.

APPENDIX A

Q: Please describe your educational background and experience.

A: I graduated from Indiana University with a Bachelor of Science degree in Biology and a Master of Public Affairs ("MPA") concentrating in Environmental Management. My graduate coursework included studying how water pollution affects aquatic ecosystems, environmental rules and regulations, toxicology, risk analysis, epidemiology, finance and budgeting, economics, statistics, public management, and other courses on how pollution affects human health and the environment. After graduating with my MPA, I was hired as an Environmental Manager (EM2) by the Indiana Department of Environmental Management, Office of Air Quality, Permits Branch in 2006 where I analyzed projects for a variety of industries, calculated the air emissions associated with those projects, determined applicable state and federal rules, and drafted federally enforceable air permits. I was promoted to a Senior Environmental Manager (SEM1) about one year later. I held this position for more than ten years. As an SEM1, I worked on complex permit projects, trained and mentored staff, reviewed staff's work, and developed templates, guidance, and training materials. Since joining the OUCC in 2018, I have attended numerous utility related seminars and workshops including the National Association of Regulatory Utility Commissioners ("NARUC") Western Utility Rate School.

AFFIRMATION

I affirm the representations I made in the foregoing testimony are true to the best of my knowledge, information, and belief.

By: Kristen Willoughby, Utility Analyst

Cause No. 46219-U

Date: August 18, 2025

Preliminary Engineering Report

for

Water System Improvements

prepared for the

B&B Water Project, Inc.
Bloomington, Indiana

WESSLER ENGINEERING
More than a Project™

January 2024

Wessler Project No. 267823.01.001

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EXECUTIVE SUMMARY

The B&B Water Project, Inc. (Utility) owns and oversees the operations of a drinking water system which provides potable water to residential, commercial, and industrial users in Monroe and Brown County. The drinking water system is operated by Bynum Fanyo under contract with the Utility. The Utility purchases water from the City of Bloomington Utilities. There are two connection points where the Utility connects to the City of Bloomington Utilities, one on North Dunn Street and one on North Russell Road. There are two booster stations within the Utility's system that fill the three elevated storage tanks to maintain pressure within the system. The Utility currently operates three elevated storage tanks.

Current Situation

The Utility experiences frequent water main breaks. This is typically due to aging pipes and damage resulting from construction activities near hard-to-find water mains. Specific problem areas exist in the distribution system where mater main breaks and leaks are most common. Additionally, there are undersized watermains that are smaller than the minimum water main size as specified by the *Recommended Standards for Waterworks*. Also, A significant number of customer meters are radio read but must be read manually due to dead batteries within the meter.

According to the most recent Water Loss Audit (2021), 42.8% of the water supplied was non-revenue water. This equates to approximately 59 million gallons for the audit year.

The New Unionville Tank has recent history of being in and out of service due to leaks in the tank. Recently, the tank has been repaired again. The expected useful life of this tank will expire within the 20-year study period. With all three tanks in service, the current average day demand utilizes 98% of the storage capacity. The expected useful life of the Tunnel Road Tank will also expire within the study period.

The existing booster stations do not currently have dedicated on-site back up power. The water office also does not have any means, permanent or portable, for backup power. Additionally, the pumps in the State Road 45 Booster Station are approaching the end of their expected useful life.

Project Summary

The proposed project is broken into three (3) phases to spread fiscal impact over time and address the immediate needs first while also providing long-term, effective solutions. A summary of the work for each phase is provided below.

Phase I: Phase I will address the immediate need of replacing customer meters with dead batteries. The entirety of Phase I will be funded outside of the proposed project.

Phase II: Phase II will address distribution system improvements by replacing and upsizing high priority water mains within the system. These priority water main segments include Bethel Lane, North Mount Gilead Road, and Shilo Road. Priority water mains were identified based on frequency of breaks, the number of customers each water main served, and hydraulic need for

the system. Also addressed within this phase are back up power needs. A backup generator hookup will be added to the B&B Water Office Building and to the State Road 45 Booster Station. Phase II improvements are included within the proposed project.

Phase III: Phase III includes additional improvements to the distribution system and rehabilitation of the State Road 45 booster station. This will be completed later and is excluded from the Proposed Project at this time. As part of the planning process for Phase III, the storage capacity of the Utility and need for a new elevated storage tank should be reevaluated.

A summary of the costs for the proposed project is provided in **Table 1** below. A breakdown for costs for each phase is provided in **Appendix B, Table B-17**. Refer to **Figures A-2** and **A-3** for more information regarding the proposed project.

Table 1: Summary of Estimated Project Costs by Phase

Phase	*Outside Funding*	*SRF Proposed Project Funding*	*Total*
I	$600,000	-	$600,000
II	-	$6,901,000	$6,901,000
III	$1,664,000	-	$1,664,000
Total Program Budget	$2,264,000	$6,901,000	$9,165,000
SRF Funding		$6,901,000	

1.0 PROJECT LOCATION

The Utility is located in the northeastern part of Monroe County, Indiana, less than one mile northeast of the City of Bloomington. The Utility also expands into Brown County. The water system is owned by B&B Water Project, Inc., and operated by Bynum Fanyo under the supervision of B&B Water Project Utility Board. There are two connection points where the Utility connects to the City of Bloomington Utilities, one on North Dunn Street near the intersection of North Old Indiana 37. The other connection is on North Russell Road near the intersection of State Road 45. The Hinkle Road Booster Station is located near 4799 North Hinkle Road, Bloomington, Indiana 47408, and the State Road 45 Booser Station is located near located near 4571 East State Road 45, Bloomington, Indiana 47408.

1.1 Existing Service Area

The Utility's existing water service area extends south to the intersection of North Russell Road and State Road 45, and it extends north to the end of North Whispering Pines Drive. The Utility also extends west to North Dunn Street, and it extends east to approximately 6998 State Road 45. A map showing the Utility's existing service area is provided in **Appendix A, Figure A-1**. The Utility's distribution system currently serves 1,882 service connections.

The Utility is located within Monroe and Brown County. On the Modesto Quadrangle Map, the Utility is located within Township 10 North, Range 01 West in Section 36. On the Hindustan Quadrangle Map, the Utility is located within Township 10 North, Range 01 East in Sections: 28-35. On the Bloomington Quadrangle Map, the Utility is located within Township 09 North, Range 01 West Sections: 1, 2, 11-16, 21-25, 35, and 36. On the Unionville Quadrangle Map, the Utility is located within Township 09 North, Range 01 East in the following sections: 1-12, 15-22, 27, 29, 30.

1.2 Study Area

The Preliminary Engineering Report (PER) is based on a 20-year planning period from 2024 to 2044. The study area includes the existing water service area and anticipated growth areas. Residential growth (about ten additional service connections every year for the next 20 years) is anticipated near Shilo Road, which is included within the Utility.

1.3 Projected 20-year Service Area

The projected 20-year service area is the same as the study area. Minimal residential growth is expected within the 20-year study period. No industrial or commercial growth is anticipated during the study period.

1.4 Project Area

The Utility's system operates as a privately owned community water system with PWSID IN5253001.

The State Road 45 Booster Station is located on a parcel owned by the Utility and any improvements to this booster will be on the Utility-owned parcel. A parcel has not been identified for a new elevated storage tank. Further easement and Right-of-Way investigation will need to be completed for the water mains alternatives. A map showing the proposed project areas is provided in **Appendix A, Figure A-2**.

2.0 CURRENT CONDITIONS

2.1 Existing Water Use

2.1.1 Current Population

Currently, the Utility serves a population of approximately 5,075 people.

2.1.2 Water Consumption

The Utility's distribution system serves 1,882 active service connections. It should be noted that 100% of the customers for the Utility are metered. Water use per customer type is unavailable for the Utility. The Utility does not serve any industrial users. Institutional and commercial customers exist within the Utility; however, service connection classifications are not available within the Utility billing system. The largest water users all are individual residential customers.

The last three years (July 2020-July 2023) of the water system's monthly reports of operation (MROs) show a maximum day demand of **748,000 gpd** or about 519 gallons per minute (gpm) as shown in **Table 2.1.2.1**. To find the maximum day usage, the top five days of usage are considered, and the average is taken. The average day demand was found to be **392,000 gallons per day** (gpd) or about 272 gallons per minute (gpm). Water demand for the time period evaluated is summarized in **Table 2.1.2.2**. A more detailed MRO summary can be found in **Appendix D, Attachment D-1**.

Table 2.1.2.1: Maximum Day Demand (July 2020-July 2023)

Maximum Day	*Date*	*Water Use (gpd)*	*Water Use (gpm)*
1	8/24/2021	828,000	575
2	7/14/2020	797,000	553
3	7/27/2021	764,000	531
4	5/18/2022	681,000	473
5	9/16/2020	670,000	465
Average		748,000	519

Table 2.1.2.2: Existing Water Demand Summary July 2020 to July 2023

Average Day Demand	*Maximum Day Demand*
392,000 gpd	748,000 gpd
272 gpm	519 gpm

The peaking factor is calculated by taking the average maximum day demand and dividing by the average day demand. The peaking factor for the existing water system was calculated to be **1.91**. Using the number of active service connections of 1,882 and the average day demand of 392,000 gallons, the average day demand per service connection was calculated to be **208 gpd**. Then, using the calculated peaking factor of **1.91**, the maximum day demand per service connection was determined to be **397 gpd**.

The Utility's current water rate for a 5/8-inch or 3/4-inch meter is $34.53 per 3,000 gallons of usage. The most recent increase in water rates went into effect in November 2023. A copy of the current B&B Water Project, Inc. water rates, and rules and regulations can be found in **Appendix E, Attachment E-1.**

2.1.3 Water Quality

The Utility purchases water from the City of Bloomington, which treats surface water from the Monroe Reservoir for the production of potable water. The City of Bloomington utilizes chloramines in their distribution system.

To evaluate the water quality for the Utility, MROs were reviewed for the time period of July of 2020 to July of 2023.

The average distribution system free chlorine concentration is 0.39 mg/L and the average distribution system total chloramine concentration is 1.88 mg/L. According to the *Recommended Standards for Water Works,* the minimum total chloramine concentration in a water distribution system should be 1.0 mg/L. Out of the three years of MRO data available, 1% of the total chloramine concentrations were below the minimum according to the *Recommended Standards for Water Works*. This accounts for 10 days out of the total study period of 1,032 days. Of these 10 days, only 1 of those testing days had water main breaks to account for the low residual. Therefore, the remainder of the low residual testing days are due to factors other than water main breaks and leaks.

The Utility does not test for iron and manganese. Also, the Utility only flushes the system after a water main break and does not regularly flush hydrants.

2.1.4 Revenue and Non-Revenue Water

Water losses affect water demand. *Indiana Administrative Code 327 Article 8* requires utilities to complete a Water Loss Audit (WLA) annually, with an independent validation performed every other year.

The most recent WLA was completed for the Utility in 2021. This report found that approximately 138 million gallons of water were imported. Of the gallons imported, approximately, 79 million gallons were considered revenue water and that approximately 59 million gallons were considered non-revenue water. Therefore, approximately 42.8% of the water imported was considered non-revenue water. According to operator estimates found on monthly field reports for 2021, only 1.5 million gallons were accounted for due to leaks, breaks, and hydrant flushing after breaks. This large discrepancy could indicate that there are active leaks in the system and metering inaccuracies of customers.

Non-revenue water is water that is treated and pumped to the distribution system but does not provide revenue potential to the Utility. Non-revenue water is broken down into three categories: unbilled authorized consumption (i.e. hydrant flushing, fire protection), apparent losses (i.e. errors in records, master meter errors, and unauthorized consumption), and real losses (i.e. water main breaks and leaks). Water loss in excess of 25% is considered to be deficient by *Indiana Administrative Code 327 Article 8*. The Utility's cost to produce this annual non-revenue water is

$78.07 per service connection and corresponds to 87 gallons per service connection per day. Based on the data validity score of 59, priority areas identified for improvement from the WLA were: revise procedures for data collection, establish/improve mechanisms for customer meter accuracy testing, establish meter replacement schedules, active leakage control, and infrastructure monitoring, and create water loss reduction goals.

The complete WLA for the water system can be seen in **Appendix D, Attachment D-2.**

2.2 Existing Water Facilities

The Utility was first established as a wholesale customer to the neighboring City of Bloomington and has been ever since. The Utility's water facilities include: two connection points to the City of Bloomington Water System, two booster stations, three elevated storage tanks, and the distribution system piping. The layout of the Utility's system can be found on the system map provided in **Appendix A, Figure A-1**.

2.3 Source Water

The City of Bloomington owns and operates the public water system that supplies the Utility. The City of Bloomington utilizes chloramines in their distribution system. The capacity of this water system is not known. There are two connection points where the Utility connects to the City of Bloomington Utilities, one on North Dunn Street and one on North Russell Road. Additional evaluation of the source water is not included in this report.

2.4 Water Storage Facilities

The Utility currently operates three (3) elevated storage tanks in the distribution system to maintain system pressure. The three elevated storage tanks are the New Unionville Tank, the Tunnel Road Tank, and the State Road 45 Tank. Their locations can be seen in **Appendix A, Figure A-1**. The elevated water storage tank details are summarized in **Table 2.4.1** below.

Table 2.4.1: Storage Tank Summary

	New Unionville Tank	*Tunnel Road Tank*	*State Road 45 Tank*
Capacity (gallons)	100,000	100,000	200,000
High Water Level	165'	130'	130'
Total Capacity	**400,000 gallons**		

According to the *Recommended Standards for Water Works,* the minimum storage capacity (or equivalent capacity) for systems not providing fire flow shall be equal to the average day consumption. This requirement may be reduced when the source or treatment facilities have sufficient capacity with standby power to supplement peak demands of the system. The current average day demand of 392,000 gallons utilizes 98% of the storage capacity. If water use is expected to increase, additional storage capacity should be evaluated.

The Utility has a contract agreement with Suez to make repairs to all three of the elevated storage tanks as needed. The contract includes all maintenance and repairs to the tanks excluding the concrete foundations.

2.4.1 The New Unionville Tank

The New Unionville Tank is a 100,000-gallon tank constructed in 1967 by Universal Tank and Iron Co. The expected useful life of an elevated storage tank is 75 years, and this tank is currently 57 years old. The tank is located near 6220 East State Road 45, Bloomington, Indiana, 47408. The tank has a high water level of 165 feet.

New Unionville Tank

In 1995 the tank was repainted, but the scope of this work is unknown. According to Utility records, the tower was reported to be leaking in July of 2020.

In August 2020, Suez conducted a visual inspection of the tank. The tank was not drained for this inspection. According to this report, there were no nonconforming items to report regarding exterior coating of the tank. The interior of the tank was viewed from the top hatch, and a layer of sediment was present at the bottom of the bowl. Additionally, no deficiencies regarding the vent screen, overflow screen, ladder safety climb devices, access hatches, concrete foundation or legs were found during this inspection.

In May of 2023, the tower was reported to be leaking again. Then, in July of 2023 the tank was taken out of service. In August of 2023, Clouse Inspection Services performed an inspection for the leak that was discovered in May. During this inspection, it was noted that extensive repair

welds would need to be performed to correct the pits present in the steel. It should be noted that the inspection report provided by Clouse Inspection Services was not a complete inspection report; therefore, additional deficiencies could exist but were not included in the report.

In September of 2023, the tower was repaired and placed back into service, and in October of 2023, a submersible inspection was performed on the tank by USG Water Solutions. This inspection was performed to inspect the condition of the coatings and structural aspects of the tank. The tank will be scheduled for a visual inspection in 2024.

During this inspection by USG Water Solutions, only minor rust streaking and staining were noted on the interior coating. Sediment was found in the bottom of the tank. No deficiencies were noted on the exterior coating. No deficiencies were noted on the access hatches, vent screen, or overflow screen. The ladders are currently equipped with secured safety climb devices, and during the inspection a ladder gate was installed on the exterior ladder. No deficiencies were noted for the foundation, legs, ladders, column flanges, anchor bolts, rise pipe, riser rods or wind rods, balcony, interior ladders, roof, vents, overflow pipe, or weld seams.

It should be noted that no tests were performed to test for the constituents of the coatings or condition of the steel. Tanks of this age could potentially have heavy metals within the coatings. If heavy metals are present in the coatings, this can impact rehabilitation or disposal costs.

The full elevated water storage tank inspection report by USG Water Solutions can be found in **Appendix D, Attachment D-3**.

2.4.2 The Tunnel Road Tank

The Tunnel Road Tank is a 100,000-gallon tank constructed in 1967 by Universal Tank and Iron Co. This tank is located near 5680 North Tunnel Road, Bloomington, Indiana, 47408. The tank has a high-water level of 130 feet.

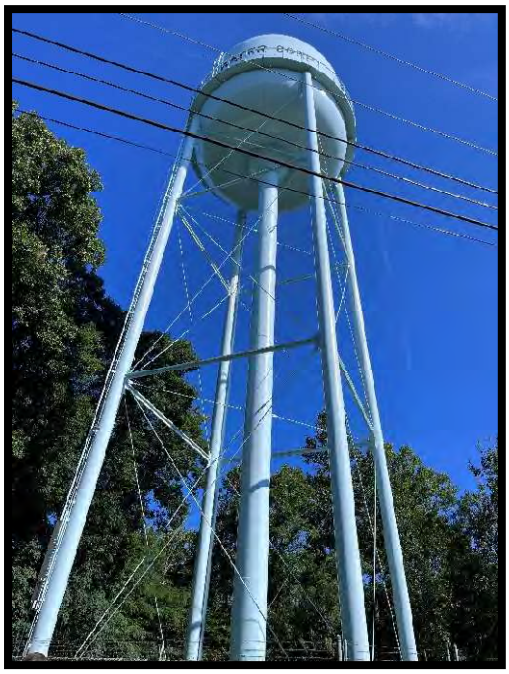
There is an altitude valve at the base of this tank that was historically used to control the tank filling.

Tunnel Road Tank

According to monthly field reports, this tank has had previous issues of overflowing due to communication issues with the booster stations. These communication issues include power outages and dropped radio signals. It should be noted that tanks of this age could potentially have heavy metals within the coatings. If heavy metals are present in the coatings, this can impact rehabilitation or disposal costs. This tank is regularly inspected every three years and according to the Utility there are currently no issues with this tank. There are no reports available regarding the repair history of this tank.

2.4.3 The State Road 45 Tank

The State Road 45 Elevated Storage Tank is a 200,000-gallon tank constructed in 1991 by Phoenix Fabricators and Erectors Inc. This tank is located near 8747 East State Road 45, Unionville, Indiana 47468. The tank has high water level of 130 feet.



State Road 45 Tank

According to monthly field reports, this tank was cleaned in August of 2020. Then, in March of 2022, the tank was drained, and the interior was cleaned. There are no records available regarding the extent of these cleanings.

2.5 Distribution System

The existing water distribution system is shown in **Appendix A, Figure A-1**. The Utility has a history of consistently maintaining the operating condition of their distribution system and plans to continue doing so.

2.5.1 Water mains

The water distribution system for the Utility was first established in the 1968. The system includes approximately 76 miles (402,700 feet) of water mains ranging from 2 inches to 12 inches in diameter. Approximately 35% of the distribution system is 2-inch, 31% is 3-inch, 11% is 8-inch, and 10% is 4-inches in diameter. The existing pipe materials include primarily polyvinyl chloride (PVC) and asbestos cement. The Utility has 101 valves and 81 hydrants within the distribution system.

The Utility's water distribution system is aged and experiences frequent water main breaks. It also has undersized water mains and outdated pipe materials. Water main breaks not only leave customers without water until a costly emergency repair can occur, but they also contribute to

unsafe water quality. During a water main break, if pressure drops below 20 pounds per square inch (psi), it can cause harmful pathogens and bacteria to enter the water main and contaminate the distribution system for a period of time making it unsafe for residents to drink the water. Other contaminants that cause physical water quality issues such as high turbidity, discoloration, and unpleasant taste and odor can also enter the distribution system during water main breaks leading to increased customer complaints. In addition to water quality issues, water main breaks can flood areas and create unsafe driving conditions or cause the need for road closures. Water main breaks and leaks also contribute to premature pavement failure. **Table 2.5.1.1** below summarizes the water main breaks for the whole distribution system from July 2020 to July 2023.

Table 2.5.1.1: Historic Water Main Breaks by Year

Year	*Number of Breaks*
July 2020 – December 2020	14
January 2021 – December 2021	36
January 2022 – December 2022	25
January 2023- July 2023	9
Total	**84**

Table 2.5.1.2 below summarizes the number of leaks per water main line from July 2020 through July 2023.

Table 2.5.1.2: Historic Water Main Breaks by Water Main Location

Water Main Location	*Number of Breaks*
North Mount Gilead	16
East State Road 45	14
Bethel Lane	6
East Old Meyers	5

The existing system has 2-inch water lines which violate the *Recommended Standards for Waterworks* minimum pipe diameter of 3 inches. Pipes that are smaller than 3-inches in diameter are undersized to convey required flows, resulting in poor water pressure and/or flow. The existing system also consists of several 3-inch water mains that would benefit from being upsized to provide better water pressure to customers. The following water mains would benefit most from being upsized shown in **Table 2.5.1.3**.

Table 2.5.1.3: Undersized Water Mains

Water Main Location	*Existing Size*
North Mount Gilead	2-inch and 3-inch
North Birdie Galyan Road	2-inch
Shilo Road	3-inch
Bethel Lane	3-inch and 5-inch
North Hinkle Road	3-inch

According to Utility records, the majority of water main breaks and leaks have been caused by cracks in the PVC, improper initial installation leading to rocks breaking the mains, or improperly marked locates leading to contractors hitting water mains.

2.5.1.1 Lead Service Lines

The EPA issued revised regulatory requirements for lead services lines on December 16, 2021, per the final Lead and Copper Rule Revisions (LCRR). Community Water Systems with more than 1,000 water service connections need to complete a lead service line inventory (LSLI) by October 16, 2024. Additionally, the Utility will need to develop a Lead Service Line (LSL) Program that identifies how they will manage and fund their LSL replacements on the utility-owner and customer-owner water service lines that contain lead material or galvanized steel that are downstream of lead material. The program will also need to include a plan with instructions for water quality sampling, meeting lead level triggers if exceeded, providing public education and notification, and potentially add corrosion control treatment if exceedances occur.

A utility records data SLI evaluation was completed in December 2023 utilizing the IFA SLI Type I funding. As part of the Type II and III funding opportunity, the SLI will be uploaded into the IDEM SLI State portal. This SLI will be certified prior to the October 16, 2024 LCRR deadline. Based upon the current data, the following information in **Table 2.5.1.1.1** was determined. The data is based on Utility records for service line installation date and home age.

Table 2.5.1.1.1: Lead Service Line Information

Service Line Material Category	*Quantity*
Known Lead	0
Known Lead Connector	0
Galvanized Requiring Replacement (GRR)	0
Known Non-Lead	611
Unknown	1,271
Total Service Lines in Distribution System	1,882

Grant funding opportunities were made available in June of 2023 and the Utility applied for Type I: Utility Records Review & Analysis. The B&B Water Project received $15,000 in funding to conduct the initial research. They anticipate applying for Type II funding in the future for Lead Service Line Replacement Planning. The Utility is currently eligible for $10,000 in Type II funding and are also eligible for $100,000 in Type III funding.

2.5.2 Booster Stations

Currently, the Utility operates two (2) booster stations near each of the interconnections with the City of Bloomington. The total additive rated capacity of the two booster stations is 1,360 gpm at normal operating conditions.

According to the *Recommended Standards for Water Works* regarding pumping facilities, two pumping units shall be provided. Each pumping unit is understood to refer to the pumps within the booster station as opposed to the booster station itself. Based on that understanding, each booster station shall have two pumps, and with the largest pump out of service still be able to satisfy peak demands. The firm capacity of the booster stations excludes the largest pump from each booster station.

Shown below in **Table 2.5.2.1** is a summary of the operating capacity and firm capacity of the booster stations. As shown, the current pumping capacity of the booster stations meets the requirements for the *Recommended Standards for Water Works.*

Table 2.5.2.1: Booster Station Pumping Capacity Summary

Item	*Hinkle Rd*	*State Rd 45*	*Existing Maximum Day Demand (gpm)*	*Meets Recommended Standard Requirements*
Pump 1	280 gpm	400	272	Yes
Pump 2	280 gpm	400		
Total	**1,360**			
Firm	**680**			

The booster stations are both controlled by the water level in the State Road 45 tank.

2.5.2.1 Hinkle Road Booster Station

The Hinkle Road Booster Station is located near 4799 North Hinkle Road and is shown in **Appendix A, Figure A-1.** This pumping station draws water from the City of Bloomington connection located on North Dunn Street through an 8-inch water main.

The station consists of two (2) high service pumps, telemetry equipment, electrical equipment, and process piping. The property is surrounded by a locked, chain-link fence. The *Recommended Standards for Water Works* states a standby power supply shall be provided through a dedicated portable or in-place auxiliary power of adequate supply and connectivity. Currently, the booster station is equipped to connect to a portable generator; however, it does not have a dedicated standby power generator.

Hinkle Road Booster Station

Each pump is a centrifugal end suction pump rated for 280 gpm at 175' total dynamic head (TDH). The pump model is PACO 98335788. The repair and testing history on these pumps is unknown. Typically, the expected useful life of a booster pump is 25-40 years, depending on maintenance and operation of the pump.

Both of the pumps each have a Baldor-Reliance Motor #EJMM2516T. These motors are 3-phase, 25 HP, and 3600 rpm.

2.5.2.2 State Road 45 Booster Station

The State Road 45 Booster Station is located near 4571 East State Road 45 and is shown in **Appendix A, Figure A-1**. This booster station was constructed in 1991. This pumping station draws water from the City of Bloomington connection located on North Russell Road through an 8-inch water main.

State Road 45 Booster Station

The station consists of two (2) high service pumps, electrical equipment, and process piping. The *Recommended Standards for Water Works* states a standby power supply shall be provided through a dedicated portable or in-place auxiliary power of adequate supply and connectivity. Currently, there are no provisions for backup power.

A new mini-split unit has been added in recent years to provide the booster station heating and cooling throughout the year.

Each pump is a horizontal split-case multistage Peerless pump. The pumps are rated for 400 gpm at 240′ TDH. Both of the pumps are 40 HP, 3-phase, 1800 rpm pumps. The last recorded pump test was before 1996. It is unknown if the pumps and motors have been replaced. Typically, the expected useful life of a booster pump is 25-40 years depending on maintenance and operation of the pump.

Booster Pumps and Process Piping

2.6 Controls Equipment

Both booster stations are currently controlled by the State Road 45 elevated storage tank level. Once the water level reaches a low level of 124 feet, both pumps at each booster station are called to turn on and pump water into the tank. When the water level in the State Road 45 Tank reaches a water level of 127.5 feet, both pumps at each booster station turn off. A combination of radio and cellular telemetry is utilized for the water towers to communicate with the booster stations. Initially, the radio system was operating unreliably, and the cellular system was installed to become the primary communication system. The radio system was left in place as a backup in the event cellular communication goes down.

2.7 Electrical Equipment

The Hinkle Road Booster Station operates on a 120/240V single-phase utility service. While the utility service is single-phase, the pump motors are configured to use three-phase power via phase conversion in the Variable Frequency Drives (VFDs). These VFDs also play a critical role in matching demand and optimizing power consumption. Although the booster station lacks a permanent backup generator, it does have a designated connection point for a portable generator, allowing for backup power supply through a double throw disconnect switch.

Similarly, the State Road 45 Booster Station relies on a 480V 3-phase utility service. Inside the booster station, there are VFDs, a 480V-120/240V transformer and a 120/240V distribution panel. This panel is responsible for accommodating all 120/240V loads, including lighting, receptacles, and control circuits. The SR 45 Booster Station does not possess a permanent backup generator or a hookup location for a portable generator.

Each of the water towers also utilize a 120/240V single-phase utility service, which supplies power to all the small loads at each tank.

3.0 FUTURE NEEDS

3.1 Planning Period

This study is based on a 20-year planning period from 2024 to 2044.

3.2 Population Projection

The population served as reported within the 2021 Water Loss Audit was reported to be 5,075. According to billing information, there are 1,882 active service connections. According to the Utility, ten (10) additional residential service connections are anticipated every year for the next 20 years. This leads to a total of two hundred (200) additional service connections by the end of the 20-year planning period.

3.3 20-Year Design Demands

According to the Utility, two hundred (200) additional residential service connections are anticipated within the next 20 years. **Table 3.3.1.** below summarizes the increase in water demand due to the expected additional service connections.

Table 3.3.1: Projected 2044 Demand

Increase in Service Connections	*Demand Per Service Connection (gpd/service connection)*	*Increase in Average Daily Demand (gpd)*	*Peaking Factor*	*Increase in Maximum Day Demand (gpd)*
200	208	41,600	1.91	79,500

Table 3.3.2 summarizes the existing and future average and maximum day demands. The additional connections anticipated will result in a 79,500 gpd increase in maximum day demand, approximately.

Table 3.3.2: Demand Summary

Year	2023		2044	
Average Day Demand	272 gpm	392,000 gpd	301 gpm	433,000 gpd
Maximum Day Demand	519 gpm	748,000 gpd	575 gpm	827,500 gpd

3.4 20-Year Capacity Needs

3.4.1 Supply Capacity Evaluation

The capacity of the City of Bloomington is unknown. The purchase contract between B&B Water Project and the City of Bloomington has not been reviewed.

3.4.2 Storage Capacity Evaluation

Two different methods were used to estimate the storage capacity needed: the Average Day Volume Method, and the Operational, Fire Flow, and Emergency Volume Method. The general rule for using the Average Day Volume Method does not always apply depending on the size of

the system. Small systems (less than 20,000-25,000 people served) require more than an average day to provide fire protection. Larger systems, (greater than 20,000-25,000 people served), require less than the average day in storage. This is due to the higher number of sources available, increased treatment capacity, and storage available within the system. For these reasons, both methods were evaluated.

3.4.2.1 Average Day Volume Method

According to the *Recommended Standards for Water Works,* the minimum storage capacity (or equivalent capacity) for systems not providing for fire flow demand shall be equal to the average day consumption. This requirement may be reduced when the source and treatment facilities have sufficient capacity with standby power to supplement peak demands of the system.

For this method, the average day demand is used to determine the storage capacity requirements for the system. **Table 3.4.2.1.1** shows the projected average day demand value provided in **Section 3**, compared to the existing storage capacity.

The age and condition of the water storage tanks should also be considered when evaluating the existing storage capacity. The Utility currently does not have sufficient storage capacity to produce the projected 20-year average day demand of 433,000 gpd (301 gpm) using the average day method.

Table 3.4.2.1.1: Average Day Water Storage Requirements

Year	*Average Day Demand*	*Existing Storage Volume*	*Meets Recommended Standard Requirement*
2024	392,000 gal	400,000 gal	No
2044	433,000 gal		

3.4.2.2 Operational, Fire Flow, and Emergency Volume Method

The *American Water Works Association* (AWWA) recommends the total storage in a system be equal to the operating storage plus the fire flow storage and the emergency storage.

Operational Storage

A water system should have 20% of the maximum day water demand in water storage capacity to reduce pumping cycles, to meet surge demands, and to meet short term emergencies. This typically equates to the portion of the storage that the community uses to control the pumps. By the end of the 20-year study period, the maximum day demand will be 827,500 gallons, and 20% of that demand equates to 165,500 gallons for operational storage.

Fire Flow Storage

The Utility's distribution system should be able to meet a design fire flow rate for the planning period in addition to the operating storage and emergency supply required. The following assumptions were utilized to represent system conditions and design fire flow.

- 2-hour duration fire flow
- 1,500 gpm fire flow

This equates to 180,000 gallons of storage for fire flow.

Emergency Supply

To determine the emergency supply of water required for a water utility, a judgement about the perceived vulnerability of the water supply must be made.

Typically, a utility has several sources and treatment facilities with standby power; therefore, the need for emergency storage is small. Care should be taken to ensure that some storage would be available to handle a catastrophic pipe break, should one occur, that could not readily be isolated and/or repaired. If a utility has a single supply source with no standby power and a relatively unreliable distribution system, a significant volume of emergency storage is recommended. The Utility currently has two connections to the City of Bloomington. Near each connection is a booster station. Neither booster station has onsite backup power, and only one booster station is equipped to connect to a portable generator. For these reasons, an emergency storage volume equal to 50% of the future average day demand is assumed, and this equates to 216,500 gallons.

Table 3.4.2.2.1 summarizes the water storage calculations from the Operational, Fire Flow and Emergency Supply Method. Using this method, it is recommended the Utility add an additional 162,000 gallons of storage capacity.

Table 3.4.2.2.1: Estimated Water Storage Recommendations

Operational Storage	*Fire Flow Storage*	*Emergency Storage*	*Total Storage Recommended*	*Existing Storage Volume*	*Additional Storage Recommended*
165,500	180,000	216,500	562,000	400,000	162,000

3.4.3 Distribution System Evaluation

3.4.3.1 Water Mains

The Utility has a history of consistently maintaining their own distribution mains, and minimal customer complaints are reported. Water mains with frequent breaks should be replaced, and existing mains smaller than 3-inches in diameter should be upsized to meet the requirements of the *Recommended Standards for Waterworks.* It is advised for the Utility to investigate creating redundancy with the main lines and eliminating dead-ends where practical. Finally, it is advised for the Utility to follow the recommendations of the 2021 Water Loss Audit report as summarized in **Section 2.1.4**.

A majority of the customer meters were replaced approximately fifteen years to be radio read meters. However, due to their age, the batteries in the meters are "dying" and must be manually read in the field.

3.4.3.2 Booster Stations

As described in **Section 2.5.2**, the firm capacity excludes the largest pump from each of the booster stations. Shown below in **Table 3.4.3.2.1** is a summary of the operating capacity and firm compacity of the booster stations. As shown, the current pumping capacity of the booster stations meets the requirements for the *Recommended Standards for Water Works.*

Table 3.4.3.2.1: Booster Station Pumping Capacity Summary

Item	*Hinkle Rd*	*State Rd 45*	*Future Maximum Day Demand (gpm)*	*Meets Recommended Standard Requirements*
Pump 1	280 gpm	400	575	Yes
Pump 2	280 gpm	400		
Total	**1,360**			
Firm	**680**			

3.4.4 Controls Evaluation

There was an upgrade of the telemetry equipment in August of 2021. Cellular communication was added in addition to radio communication. Since then, the controls equipment has been in good condition and performs as expected for the Utility.

3.4.5 Electrical Evaluation

The electrical equipment at both booster stations and at each water tower is in good condition, ensuring reliable performance. Both booster stations utilize VFDs to match water demand and maximize operational efficiency. These VFDs contribute to the overall efficiency and effectiveness of the facilities. Ensuring air conditioning systems are maintained will extend the life of VFDs.

However, it's important to note that neither of the booster stations has a dedicated backup power source. Consequently, in the event of a power outage, neither booster station can maintain its normal operational capabilities. To address this vulnerability and ensure uninterrupted service, it would be worth considering the implementation of backup generators with automatic transfer switches. These measures can help safeguard the reliability of water supply operations, even during unforeseen power disruptions.

3.5 20-year Operational & Condition Needs

In additional to capacity driven needs, operational and condition problems are present and must be addressed. A summary of the current condition and operational issues and future needs of the Utility's water system is provided below:

Booster Stations

The existing booster stations do not currently have a dedicated on-site back up power source. The booster pumps for the State Road 45 Booster Station are approaching their expected useful life of 25-40 years.

Distribution System

The Utility frequently experiences water main breaks due to aging pipes and difficult to locate PVC pipes. Specific problem areas exist in the distribution system where water main breaks and leaks are most common as mentioned in **Section 2.5.1**.

Additionally, the B&B Water Office Building frequently experiences power outages and does not have dedicated on-site backup power.

Furthermore, a majority of the customer meters were installed approximately fifteen years ago. The batteries in these meters are now dying, and the meters must be manually read by personnel in the field. Manually reading meters can lead to inaccurate readings and consume valuable time for Utility operators.

Elevated Storage Tanks

The New Unionville Tank is 57 years old and will reach the end of its useful life within the 20-year study period.

4.0 EVALUATION OF ALTERNATIVES

Alternatives were evaluated to determine the most cost-effective solution for the supply, and storage needs of the Utility.

4.1 Supply Alternatives

4.1.1 Supply Alternative 1 (R1): No Construction and Continued Regionalization

Given that the interconnects to the City of Bloomington are the Utility's only source of water and perform as expected, no necessary improvements have been identified, and no alternatives have been evaluated.

4.2 Storage Alternatives

4.2.1 Storage Alternative 1 (S1): No Construction

The Utility requires a minimum storage capacity of 392,000 gallons (average day demand as calculated in **Section 2.1.2**) for the current water consumption. This utilizes 98% of the storage capacity. Should a no construction alternative be pursued, the Utility would continue to rely on the Tunnel Road Tank and State Road 45 Tank with an aging New Unionville Tank. This alternative relies on the contract with Suez to continue to make repairs to all of the tanks as they age. This alternative addresses any additional repairs utilizing the Suez repair contract; however, it does not address the capacity issue the Utility will face in the future.

4.2.2 Storage Alternative 2 (S2): New Elevated Storage Tank – 175,000 Gallon

This alternative was identified to address the capacity needs at the end of the 20-year study period.

As discussed in **Section 3.4.2.2**, using the Operational, Fire Flow, and Emergency Volume Method, an additional 162,000 gallons of storage is recommended.

The work in this alternative includes constructing a new 175,000-gallon multi-legged elevated storage tank. The construction of a new elevated storage tank will provide more storage in addition to the other three existing tanks, which will remain in service. The tank construction will also include:

- New 10" water main to the tank
- Security fencing around the tank
- Crushed stone drive to tank
- Electrical & SCADA work

Further investigation regarding land acquisition is required. The estimated construction cost of this alternative is **$1,638,000.** A detailed cost estimate for this alternative is included in **Appendix B, Table B-1**.

4.3 Distribution System Alternatives

4.3.1 Booster Station Alternative 1 (BS1): No Construction

Should a no construction alternative be pursued, the Utility would continue to rely on both booster stations to pump into the distribution system. Though the Utility would have ample pumping capacity to meet the current and projected future demands, neither booster station has a dedicated onsite back-up power source. For these reasons, a no construction alternative was eliminated from consideration.

4.3.2 Booster Station Alternative 2 (BS2): Rehabilitate Pumps & Piping at State Road 45 Booster Station

The alternative includes replacing the aging pumps and motors, and re-coating the process piping and valves at the State Road 45 Booster Station.

The work in this alternative will take place on property currently owned by the Utility. The estimated construction cost of this alternative is **$149,000**. A detailed cost estimate for this alternative is included in **Appendix B, Table B-2**.

4.3.3 Booster Station Alternative 3 (BS3): Portable Power at State Road 45 Booster Station, Hinkle Road Booster Station, and Office Building

This alternative includes installing a portable generator hookup at both the State Road 45 Booster Station, Hinkle Road Booster Station, and the B&B Water Office Building. This alternative also includes a portable generator sized to power each of the facilities.

The work in this alternative will take place on property currently owned by the Utility. The estimated construction cost of this alternative is **$228,000**. A detailed cost estimate for this alternative is included in **Appendix B, Table B-3**.

4.3.4 Booster Station Alternative 4 (BS4): Permanent Power at Booster Stations & Office Building

This alternative includes installing an automatic transfer switch (ATS) and permanent onsite generators at each of the booster stations and at the office building.

For the Hinkle Road booster station, the existing portable generator hookup will be replaced with an ATS and permanent generator. For the State Road 45 booster station, the existing main disconnect switch will be demolished, and an ATS and permanent generator will be added. For the B&B Water Office, an ATS and permanent generator will be added.

The work in this alternative will take place on property currently owned by the Utility. The estimated construction cost of this alternative is **$341,000**. A detailed cost estimate for this alternative is included in **Appendix B, Table B-4**.

4.3.5 Water Mains Alternative 1 (WM1): No Construction

This alternative includes no rehabilitation or replacement of any of the water mains in the distribution system. This alternative does not address any of the consistent leaking and breaking water mains in the distribution system. Leaking or broken water mains can damage public and

private property, drain towers and lower water pressure causing potential contaminants to enter the distribution system. Contaminants can then be consumed by the public if the water main breaks are not addressed in a timely manner. In short, water main breaks pose a health hazard to the general public. For these reasons, this alternative was eliminated from further consideration.

4.3.6 Water Mains Alternative 2 (WM2): Water Main Replacement In-Kind

This alternative consists of replacing the priority water mains identified in **Section 2.5.1** using existing pipe sizes. These pipes will be replaced with PVC pipe and related appurtenances such as valves and hydrants will be replaced as well. Hydrants will be replaced with flushing-type hydrants only.

These water mains include:

- North Mount Gilead
- Bethel Lane
- North Birdie Galyan Rd
- Shilo Rd
- North Hinkle

A summary of the water main replacement cost by line is included in **Appendix B, Table B-5.** Detailed cost estimates for each water main replacement are included in **Appendix B, Table B-6** through **B-10.** It is assumed that all of the improvements will be installed entirely within existing Right-of-Way and easements will not be required, whether temporary or permanent. However, addition easement research is required.

The estimated construction cost for all of the lines is **$5,392,000.** A detailed description of each water main replacement can be found in the sections that follow. See **Appendix A, Figure A-2** for the locations of the proposed water main replacements.

Line A - Bethel Lane

The existing parallel 3-inch mains and 5-inch water main on Bethel Lane will be replaced starting at the intersection of Bethel Lane and North Hinkle and go to the west. The replacement will include approximately 550 linear feet of 6-inch water main and 3,000 linear feet of 3-inch water main. Due to extreme scarcity of 5-inch water main pipe, 6-inch pipe will be installed in lieu of the 5-inch pipe. Two new gate valves, two new flushing hydrant assemblies, and twenty-eight new service lines and meter pits will also be included. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$563,000**. A detailed cost estimate can be seen in **Appendix B, Table B-6.**

Line B - North Hinkle Road

The existing 8-inch and 3-inch water main on North Hinkle Road will be replaced from Bethel Lane to the end of the existing water main line. This replacement will include approximately 400 linear feet of 8-inch watermain and 3,700 linear feet of 3-inch water main. This replacement will

also include two new gate valves, two new flushing hydrant assemblies, and twenty-two new service lines and meter pits. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$755,000**. A detailed cost estimate can be seen in **Appendix B, Table B-7.**

Line C - North Mount Gilead Road

The existing 3-inch and 2-inch water main on North Mount Gilead Road will be replaced from State Road 45 on the north to the end of the line on North Gettys Creek. This replacement will include approximately 17,000 linear feet of 3-inch watermain. The 2-inch section of watermain will be upsized to 3-inches to meet the *Recommended Standards for Waterworks* minimum pipe diameter of 3-inches.

This replacement will also include three new gate valves, eight new flushing hydrant assemblies, and forty-eight new service lines and meter pits. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$2,281,000.** A detailed cost estimate can be seen in **Appendix B, Table B-8.**

Line D - North Birdie Galyan Road

The existing 2-inch water main on North Birdie Galyan Road will be replaced from North Mount Gilead Road to the end of the line. This replacement will include approximately 5,000 linear feet of 3-inch watermain. The 2-inch section of watermain will be upsized to 3-inches to meet the *Recommended Standards for Waterworks* minimum pipe diameter of 3-inches.

This replacement will also include two new gate valves, two new flushing hydrant assemblies, and thirty-two new service lines and meter pits. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$761,000**. A detailed cost estimate can be seen in **Appendix B, Table B-9.**

Line E - Shilo Road

The existing 3-inch water main on Shilo Road will be replaced from the Tunnel Road on the south to John Young Road on the north. This replacement will include approximately 7,200 linear feet of 3-inch watermain. This replacement will also include four new gate valves, two new flushing hydrant assemblies, and twenty new service lines and meter pits. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$1,031,000**. A detailed cost estimate can be seen in **Appendix B, Table B-10.**

While this alternative addresses replacing frequently breaking pipes, it does not address the issues of hydraulically undersized mains that are identified in this report.

4.3.7 Water Mains Alternative 3 (WM3): Replace Water Mains with Hydraulic Upsizing

This alternative consists of replacing the priority water mains identified in **Section 2.5.1** with PVC pipe and related appurtenances such as valves and hydrants as well as upsizing pipes that do not meet the requirements of *Recommended Standards for Waterworks*.

A summary of the water main replacement cost by line is included in **Appendix B, Table B-11.** Detailed cost estimates for each water main replacement are included in **Appendix B, Table B-12** through **B-16.** It is assumed that all of the improvements will be installed entirely within existing Right-of-Way and easements will not be required, whether temporary or permanent. However, addition easement research is required.

The estimated construction cost for all of the lines is **$7,263,000**. A detailed description of each water main replacement can be found in the sections that follow. See **Appendix A, Figure A-2** for the locations of the proposed water main replacements.

Line A - Bethel Lane

The existing parallel 3-inch mains and 5-inch water main on Bethel Lane will be replaced with one 6-inch water main. The replacement will start at the intersection of Bethel Lane and North Hinkle and go to the west. The replacement will include approximately 3,000 linear feet of 6-inch water main. Two new gate valves, two new hydrant assemblies, and twenty-eight new service lines and meter pits will also be included. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$726,000**. A detailed cost estimate can be seen in **Appendix B, Table B-12.**

Line B - North Hinkle Road

The existing 3-inch water main on North Hinkle Road will be replaced from Bethel Lane to the end of the line. This replacement will include approximately 400 linear feet of 8-inch watermain and 3,700 linear feet of 6-inch water main. This replacement will also include two new gate valves, two new hydrant assemblies, and twenty-two new service lines and meter pits. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$950,000**. A detailed cost estimate can be seen in **Appendix B, Table B-13.**

Line C - North Mount Gilead Road

The existing 3-inch and 2-inch water main on North Mount Gilead Road will be replaced from State Road 45 on the north to the end of the line on North Gettys Creek. This replacement will include approximately 17,000 linear feet of 6-inch watermain. This replacement will also include three new gate valves, eight new hydrant assemblies, and forty-eight new service lines and meter pits. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$3,159,000.** A detailed cost estimate can be seen in **Appendix B, Table B-14.**

Line D - North Birdie Galyan Road

The existing 2-inch water main on North Birdie Galyan Road will be replaced from North Mount Gilead Road to the end of the line. This replacement will include approximately 5,000 linear feet of 6-inch watermain. This replacement will also include two new gate valves, two new hydrant assemblies, and thirty-two new service lines and meter pits. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$1,019,000**. A detailed cost estimate can be seen in **Appendix B, Table B-15.**

Line E - Shilo Road

The existing 3-inch water main on Shilo Road will be replaced from the Tunnel Road on the south to John Young Road on the north. This replacement will include approximately 7,200 linear feet of 6-inch watermain. This replacement will also include four new gate valves, four new hydrant assemblies, and twenty new service lines and meter pits. The existing main will be abandoned in place and capped.

The estimated construction cost of this line is **$1,408,000**. A detailed cost estimate can be seen in **Appendix B, Table B-16.**

4.3.8 Water Mains Alternatives 2 and 3 Cost Comparison

A cost summary comparison for watermain alternatives **WM2 Water Main Replacement In-Kind** and **WM3 Replace Water Mains with Hydraulic Upsizing** is shown in **Table 4.3.8.1** below.

Table 4.3.8.1: Cost Summary for Watermain Alternatives WM2 and WM3

Line	Alternative	
	Alternative WM 2	Alternative WM 3
Line A - Bethel Lane	$563,000	$726,000
Line B - North Hinkle Road	$755,000	$950,000
Line C - North Mount Gilead Road	$2,281,000	$3,159,000
Line D - North Birdie Galyan Road	$761,000	$1,019,000
Line E - Shilo Road	$1,031,000	$1,408,000

4.3.9 Water Mains Alternative 4 (WM4): Replace Meters

This alternative includes replacing the existing dead meters with automatic meter reading (AMR) and advanced metering infrastructure (AMI). This installation will allow meters to be read remotely so that personnel does not need to read each meter individually. Additionally, this will decrease the water losses in the system and improve the data from the customer meter. This has the potential to improve the water loss audit score for the system.

All work included in this alternative will take place within existing right of way. The estimated construction cost of this alternative is **$600,000**.

5.0 RECOMMENDED IMPROVEMENTS

5.1 Description of Recommended Improvements

The recommended improvements were selected after evaluation of probability of construction costs, need for improvements, environmental impacts, and prioritization of benefits to the Utility. The selected alternatives best meet the needs of the Utility from a technical, financial, and operational standpoint. The selected alternatives will be implemented in a phased schedule in order to disperse funding over time.

5.1.1 Supply

Given that the interconnects to the City of Bloomington are the Utility's only source of water and perform as expected, no necessary improvements have been identified, and no alternatives have been evaluated. The Utility will continue to purchase water from the City of Bloomington.

5.1.2 Storage

Based on the contractual agreement to maintain the New Unionville Tank, and being able to meet current average day demands, **Storage Alternative 1 (S1): No Construction** has been selected.

The Tunnel Road Tank and State Road 45 have no reported tank deficiencies. For the New Unionville Tank, the Utility intends to continue to utilize the contract agreement with a tank repair company to maintain the condition of this tank as it ages. This addresses the potential issues that could arise because of the age of the tank.

For these reasons, **Storage Alternative S1** was selected and will be implemented in Phases I and II of the improvements project. A net present worth comparison for the storage alternatives can be found in **Appendix C, Attachment C-1.** The selected alternative S1 has the lowest net present worth.

Currently, the Utility has enough storage for the existing average day demand as calculated in **Section 2.1.2**. To prepare for future demand, additional storage should be considered. For these reasons, **Storage Alternative S3** will be revisited and reconsidered as part of Phase III of improvements.

5.1.3 Distribution System

Five (5) distribution system alternatives were selected. They are as follows:

- **Booster Station Alternative 2 (BS2): Rehabilitate Pumps & Piping at State Road 45 Booster Station**
- **Booster Station Alternative 3 (BS3): Portable Power at SR 45 Booster Station and Office Building**
- **Water Mains Alternative 2 (WM2): Water Main Replacement In-Kind**
    - Line B – North Hinkle Road
    - Line D – North Birdie Galyan Road

- **Water Mains Alternative 3 (WM3): Relace Water Mains with Hydraulic Upsizing**
  - Line A – Bethel Lane
  - Line C – North Mount Gilead Road
  - Line E – Shilo Road
- **Water Mains Alternative 4 (WM4): Replace Meters**

For booster station improvements, **Alternative BS2, and BS3** best address the conditional need of the Utility**. Alternative BS1** was not chosen because of the aging booster pumps within the State Road 45 Booster Station. **Alternative BS1** was also eliminated from consideration because of the lack of permanent back-up power at the Hinkle Road Booster Station and lack of any back-up power at the State Road 45 Booster Station.

Alternative BS3 was chosen because it most economically addresses the need for backup power at each booster station and water office. A net present value comparison for the booster station alternatives can be found in **Appendix C, Attachment C-2. Alternative BS1** has the lowest net present worth; however, it was not chosen for the reasons listed above.

A net present value comparison for the water main alternatives by line can be found in **Appendix C, Attachment C-3** through **Attachment C-7.** For all of the water lines, **Alternative 1 (WM1): No Construction** has the lowest net present worth. However, due to the reasons given in **Section 4.3.5**, this alternative was eliminated from consideration.

Only specific lines were chosen to be upsized to meet hydraulic needs under **Alternative WM3**. These include **Lines A, C,** and **E.** Priority was given to water main segments with more customers. Under **Alternative WM2**, **Line B** will be replaced in-kind with the existing size. For **Line D**, a 3-inch water main will replace the existing 2-inch main. These selections were verified by using the existing WaterCAD hydraulic model for the Utility. The results from the model verified that replacing the water main segments as described above will improve pressure. Lastly, **Alternative WM4** was also chosen to replace the dead meters within the system. This will address the need outlined in the water loss audit.

5.2 Proposed Phasing

The proposed project is broken down into multiple phases to distribute funds over time and address the immediate needs first while also providing a long-term effective plan. A description of the work occurring in each phase in included in the following section.

5.2.1 Phase I

Phase I includes **Alternative WM4**. This prioritizes the immediate need to replace dead customer meters. Phase I will be funded outside of the proposed project; therefore, it is excluded from the proposed project.

5.2.2 Phase II

Phase II includes **Alternative S1, Alternative WM3 including Lines A, C, and E,** and **Alternative BS3.** This addresses the need to upsize priority lines and replace priority line based on break history. Phase II improvements are included within the proposed project.

The estimated construction cost for this phase can be seen in **Table B-17.** The proposed improvements are shown in **Appendix A, Figure A-3**.

5.2.3 Phase III

Phase III will include **Alternative WM2** including **Lines B and D** and **Alternative BS2.** The proposed improvements are shown in **Appendix A, Figure A-3**.

As part of the planning process for Phase III, the storage capacity of the Utility and need for a new elevated storage tank (**Alternative S2**) should be reevaluated.

The improvements associated with these alternatives will be completed at a later time and are excluded from the proposed project at this time.

5.3 Estimated Project Costs of Recommended Improvements

The estimated total pre-design cost for proposed project is **$6,901,000**. A more detailed cost breakdown is available in **Appendix B, Table B-18**.

All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. A detailed cost estimate for individual alternatives is provided in **Appendix B.**

5.4 Project Permits

The following permits will be obtained prior to construction:

- IDEM Construction Stormwater General Permit (CSGP)
- IDEM Drinking Water Branch – Construction Permit
- USACE Section 404 Permit under the Clean Water Act (CWA) & IDEM Section 401 Water Quality Certification (401/404 Permits)

Additional state and local ordinances regarding stormwater detention and stormwater quality will be followed. Additional permits depending on the alternatives selected could be required.

5.5 Project Schedule

The anticipated schedule for the proposed project is provided in **Table 6.4.1**.

Table 6.4.1: Proposed Project Schedule

Activity	*Date*
SRF Public Hearing	February 2024
Submit PER to SRF	March 2024
Begin Design	April 2024
Submit Permit Applications	August 2024
Front End Document Certification Submittal	August 2024
Land Acquisition Complete	September 2024
Complete Design	September 2024
IDEM Construction Permit Approval	November 2024
Advertise for Bids	November 2024
Receive Bids	December 2024
Rate Increase Implementation	December 2024
SRF Loan Closing & Contract Award	January 2025
Start Construction (Notice to Proceed)	February 2025
Substantial Completion of Construction	December 2025
Final Completion	January 2026

6.0 EVALUATION OF ENVIRONMENTAL IMPACTS

The B&B Water Project, Inc. (Utility) is proposing modifications and improvements to its existing drinking water infrastructure to address frequent water main breaks, undersized mains, and back-up power capability. The installation of water main is expected to use approximately a 10-foot corridor. Water mains are to be installed within existing right-of-way. The existing mains will be abandoned in place and capped. The proposed project (Phase II) includes the following drinking water system improvements:

- Line A: Bethel Lane – installation of approximately 3,000 linear feet (LF) of 6-inch water main, and related appurtenances such as valves and hydrants, as well as twenty-eight new service lines and meter pits will be included.
- Line C: North Mount Gilead Road – installation of approximately 17,000 LF of 6-inch water main and related appurtenances such as valves and hydrants, as well as forty-eight new service lines and meter pits.
- Line E: Shilo Road – installation of approximately 7,200 LF of 6-inch water main and related appurtenances such as valves and hydrants, as well as twenty new service lines and meter pits.
- State Road 45 Booster Station – installation of a new portable emergency generator; replacement of pumps and motors; and recoat pipes within the booster station. No land disturbances are expected.
- Water Office Building – installation of a new portable emergency generator. No land disturbances are expected.

Additionally, Phase III, which is excluded from the proposed project but will be implemented at a late time is also included in the environmental evaluation. Phase III includes the following:

- Line B: North Hinkle Road – installation of approximately 400 LF of 8-inch water main and 3,700 LF of 3-inch water main and related appurtenances such as valves and hydrants, as well as twenty-two new service lines and meter pits.
- Line D: North Birdie Galyan Road – installation of approximately 5,000 LF of 3-inch water main and related appurtenances such as valves and hydrants, as well as thirty-two new service lines and meter pits.

The drinking water system improvements project area locations are listed in the tables below:

Phase II						
Project Element	**County**	**Civil Township**	**Quadrangle Map**	**Section(s)**	**Township**	**Range**
Line A	Monroe	Bloomington	Bloomington	22	9N	1W
Line C	Monroe	Benton	Unionville	9, 16, 20, 21, 29	9N	1E
Line E	Monroe	Benton	Hindustan	32	9N	1E
SR 45 Booster Station	Monroe	Bloomington	Bloomington	36	9N	1W
Water Office Building	Monroe	Benton	Unionville	18	9N	1E

Phase III						
Project Element	**County**	**Civil Township**	**Quadrangle Map**	**Section(s)**	**Township**	**Range**
Line B	Monroe	Bloomington	Bloomington	15, 22	9N	1W
Line D	Monroe	Benton	Unionville	21	9N	1E

A USGS Topographic Map of the project area is provided in **Appendix A, Figure A-4**.

6.1 Disturbed and Undisturbed Land

The primary land disturbance for the proposed project (Phase II) consists of the replacement of approximately 27,200 LF of water main (Lines A, C, and E). The construction corridor is expected to be approximately 10 feet in width. The replacement of water lines will occur on land previously disturbed by the original construction of the existing water lines and existing roadways. Proposed site improvements consist of approximately 6.24 acres of disturbances (water main installations) to previously disturbed areas.

The primary land disturbance for Phase III consists of the replacement of approximately 9,100 LF of water main (Lines B and D). The construction corridor is expected to be approximately 10 feet in width. The replacement of water lines will occur on land previously disturbed by the original construction of the existing water lines and existing roadways. Proposed site improvements consist of approximately 2.09 acres of disturbances (water main installations) to previously disturbed areas.

Proposed site improvements will not require the use of borrow soils during construction. Sediment removed during construction will be stockpiled and used as backfill. Excess soil that remains from excavation activities will be disposed of properly.

A Construction Stormwater General Permit (CSGP) will be obtained from the Indiana Department of Environmental Management (IDEM) for stormwater runoff associated with construction activities that disturb greater than one acre of land. Silt fencing, erosion control blankets, and other appropriate erosion and sediment control measures, if necessary, will be utilized to prevent erosion in the areas of construction activity. Disturbed land will be temporarily seeded if permanent seeding is delayed.

6.2 Archaeological, Historical and Architectural Resources

6.2.1 Archaeological Survey

The proposed project is in areas of previously disturbed land. Construction activities in these areas do not have the potential to affect archeological sites and do not require an archeological study. If at any time during the construction phase, artifacts, human remains or other items of archaeological significance are encountered, construction must stop and the Indiana Department of Natural Resources (IDNR), Division of Historic Preservation and Archeology (DHPA) must be contacted.

6.2.2 Historic Sites and Architectural Resources

To preserve the historical and cultural foundation of the nation, the alternatives have been evaluated for the presence of historic and/or architectural structures and landmarks. Historic properties were identified using the IDNR Indiana Historic Buildings, Bridges, and Cemeteries Map application (Indiana Historic Buildings, Bridges, and Cemeteries Map - Overview (arcgis.com)) that includes data from the State Historic Architectural and Archaeological Research Database (SHAARD). Refer **Appendix A, Figure A-5** for maps of the project area. Direct impacts to historical structures along these water main routes are not expected as part of this project since the project area is within existing road right-of-way. This includes no direct impacts from ground disturbances within 250 feet of the Old Fashioned Bethel Church Cemetery for water main Lines A and B, and also within 250 feet of Shiloh Cemetery for water main Line E. Historic properties from the map application are listed in **Table 5.2.2.1**.

Table 5.2.2.1: Historic Properties

105-055-20111 – Farmstead (1550 E. Bethel Ln.), Phase II
105-055-20038 – Martin Elementary School (1650 Bethel Ln.), Phase II
105-055-20114 – House (1812 E. Bethel Ln.), Phase II
105-055-20043 – House (2175 Bethel Ln.), Phase II
105-055-20051 – House (2275 Bethel Ln.), Phase II
105-055-20050 – House (2235 Bethel Ln.), Phase II
105-055-20062 – House (2425 Bethel Ln.), Phase II
105-055-20063 – House (2455 Bethel Ln.), Phase II
105-055-20094 – Old Fashioned Bethel Church (5012 Bethel Ln.), Phase II
105-055-20118/CR-53-75 – **Old Fashioned Bethel Church Cemetery (5012 Bethel Ln.), Phase II**
105-639-00068 – Duplex (7697 E. State Road 46) , Phase II
105-639-00102 – House (7616 E. State Road 46), Phase II
105-639-00051 – House (5370 N. Mount Gilead Rd.), Phase II
105-639-00072 – Barn (4291 N. Mount Gilead Rd.), Phase II
105-639-00047 – House (4498 N. Mount Gilead Rd.), Phase II
105-639-00050 – House (4300 N. Mount Gilead Rd.), Phase II
105-639-00046 – House (3255 N. Mount Gilead Rd.), Phase II
105-639-00045 – House (2650 N. Getty's Creek Rd.), Phase II
105-279-00201/CR-53-67 – Shiloh Cemetery (7398 Shilo Rd.), Phase II
105-279-00183 – House (7095 N. Shilo Rd.), Phase II
105-279-00182 – House (6957 N. Shilo Rd.), Phase II

Additionally, no National Historic Landmarks were identified in or near the project area as viewed on the National Parks Service website (List of NHLs by State - National Historic Landmarks (U.S. National Park Service) (nps.gov)).

The proposed project will not require the relocation, purchase, or demolition of any historic structures or properties. For this reason, it is assumed construction activities will have no negative impacts to historical or architectural structures and landmarks.

6.3 Hydrology

6.3.1 Wetlands

Wetlands are areas that are inundated or saturated by water for a period that allows vegetation to grow that is adapted for such soil conditions. Wetlands are identified by having hydric soils, wetland hydrology, and hydrophytic vegetation. Wetlands Maps from the Indiana Map GIS Atlas (IndianaMAP) are provided in **Appendix A**, **Figure A-6**.

Wetlands and wetland conditions were not identified within the project area; thus wetlands will not be affected by construction or operation of the proposed project. The IDEM and the U.S. Army Corps of Engineers (USACE) regulate construction activities within wetlands. A USACE

Section 404 Permit under the Clean Water Act (CWA) and an IDEM Section 401 Water Quality Certification (401/404 Permits) will not be required for wetland disturbances for the proposed project.

6.3.2 Surface Waters

Surface waters include rivers, streams, creeks, lakes, and reservoirs. Surface waters are important sources of wildlife habitat, drinking water, irrigation, power generation and recreation. The Indiana Map GIS Atlas (IndianaMAP) was used to identify ephemeral (intermittent) and perennial (permanent) streams, as well as lakes, reservoirs, and other surface waters. A Surface Water Map is included in **Appendix A, Figure A-7.**

Stephens Creek is located within the project area near Line C, along N. Mount Gilead Road. Construction activities, including an open cut method for the crossing, are expected to occur below the Ordinary High-Water Mark (OHWM). An open cut method must be used due to the abundance of rock formations in the area. Therefore, 401/404 permits are expected for waterway disturbances for the proposed project.

The following resources were also reviewed to determine potential disturbances to surface waters within the project area, as characterized below:

- Outstanding State Resource Waters listed in 327 IAC 2-1-11 (b), 327 IAC 2-1.3-3 (d), and 327 IAC 2-1.5-19 (b), – None in the project area.
- Natural, Scenic Recreational Rivers and Streams listed in 312 IAC 7-2 – None in the project area.
- Salmonid Streams listed in 327 IAC 2-1.5-5(a) (3) – None in the project area.
- Outstanding River list (Natural Resource Commission Non-Rule Policy Document) – None in the project area.

6.3.3 100-Year Floodplains and Floodways

A floodway is the river and the adjacent land reserved to carry and discharge flood waters. A 100-year floodplain consists of a floodway and a floodway fringe; it has a 1% chance of flooding in any given year. Disturbance that unduly restricts flood waters in these areas must be evaluated for an IDNR Construction in a Floodway Permit. The Indiana Map GIS Atlas (IndianaMAP) was used to identify the 100-year floodplain. A Floodplain Map is included in **Appendix A**, **Figure A-8.**

The proposed project is not located within the currently defined 100-year floodplain. The applicant, through local building codes, the authority of its council or planning commission, or other means, will ensure that the SRF-funded facilities will be protected from the 500-year flood to two feet above the base flood elevation for non-critical infrastructure, in accordance with Executive Order 14030.

Floodplains and floodways were not identified within the project area; thus, an IDNR Construction in a Floodway Permit is not required for land disturbing activities associated with the proposed project.

6.3.4 Soil Conditions and Groundwater

The Web Soil Survey program (Web Soil Survey - Home (usda.gov)), developed and maintained by the Natural Resources Conservation Service (NRCS), provided soil type and information on the depth to the water table for the project area. The project area is comprised primarily of Brownstown-Gilwood silt loams (BkF), with a depth to groundwater of 200 centimeters or greater. Dewatering activities may be required to temporarily lower the groundwater table in some areas during construction. Minor fluctuations in groundwater levels will be temporary in nature. Discharge from dewatering activities will be filtered or settled to remove sediment and will not be discharged to any waterway, wetland, or stormwater conveyance. Notes to this effect will be included in the project plan sheets and specifications. Soil borings will be obtained as necessary to evaluate soil suitability and determine actual groundwater depths. A Soil Survey Map is provided in **Appendix A**, **Figure A-9**.

A sole source aquifer is an underground water supply designated by the United States Environmental Protection Agency (USEPA) as the principal source of drinking water for an area. Due to the limited alternatives of drinking water in these areas, additional project approval by the USEPA is required. According to the USEPA Designated Sole Source Aquifer Map (Sole Source Aquifers (arcgis.com)), the project area is not located in the counties associated with a Sole Source Aquifer.

6.4 Plants and Animals

Endangered, threatened, and rare species are evaluated by the IDNR and the U.S. Fish and Wildlife Service (USFWS) to protect significant natural areas and the species that depend on those areas. The proposed project was entered into the USFWS's Information for Planning and Consultation (IPaC) system to obtain an official species list and complete the applicable determination keys. Based on the IPaC submission and the standing analysis for the determination key, the proposed project "May Affect" the northern long-eared bat. Tree removal will be avoided where possible. Tree cutting restrictions may be required to minimize the potential for impacts to the Indiana Bat and the Northern Long-Eared Bat. The verification letter with determination key results and official species list provided by the IPaC system are provided in **Appendix G**.

IDNR will be contacted immediately if it is determined a species from the Indiana or Federal List is found to be disturbed by construction activities. The proposed project will be implemented to minimize impacts to non-endangered species and their habitat.

6.5 Prime Farmland

The loss of farmland as a natural resource due to construction activities may threaten the ability to produce food in sufficient quantities for the United States. Farmland Conversion Impact Rating forms were submitted to the U.S. Department of Agriculture's (USDA), NRCS, on December 8,

2023. On December 21, 2023, NRCS confirmed that no conversion will occur at all sites. Refer to correspondence in **Appendix H**. The proposed project will occur in areas previously disturbed by the construction of drinking water structures, driving lanes, utility lines, and site grading. There are no farmed properties within the project area.

6.6 Influence of Local Geology

Karst is a landscape formed from the dissolution of soluble rocks, such as limestone, and is characterized by sinkholes, caves, and underground drainage systems. Karst features and underground aquifers are susceptible to pollution and contamination from surface waters. The Indiana Map GIS Atlas (IndianaMAP) indicated several karst features are located within Monroe County, including features near the west end of Line A, along Bethel Lane. However, no karst features are located within the project area. Appropriate measures will be utilized to prevent impact to karst features identified adjacent to the project area. A Karst Map is provided in **Appendix A**, **Figure A-10**.

6.7 Air Quality

Air pollution is generated from factories, vehicles, equipment and naturally occurring sources such as windblown dust. Construction for the proposed project may generate dust and noise during construction. The project area is located primarily in residential and non-residential areas. The hours of construction activity will be limited to daylight hours on weekdays to minimize noise effects. Construction specifications will require proper control measures be utilized to control wind erosion from all construction areas. Proper cleanup practices will be required to reduce the generation of dust and other construction debris. When impacts cannot be avoided, appropriate measures will be utilized. The proposed project will have no long-term effects on air quality. Open burning of trees and brush is not allowed for this project according to 326 IAC 4.

6.8 Open Space and Recreational Opportunities

Open and recreational spaces are undeveloped areas for public use that enhance the environmental quality of neighborhoods and communities. The project area is not currently used for recreational activities according to local and county websites available and a review of aerial photographs. Construction and operation of the proposed project will neither create nor destroy open space and recreational opportunities.

6.9 Lake Michigan Coastal Program

The Lake Michigan Coastal Program is based on a watershed approach that includes areas that drain into Indiana's portion of Lake Michigan. The program protects areas and properties, improves recreational areas, and revitalizes waterfronts. The Coastal Program Area map provided on IDEM's website (Lake Michigan Coastal Program Area (in.gov)) was reviewed. The construction and operation of the proposed project will not affect the Lake Michigan Coastal Zone.

6.10 National Natural Landmarks

The National Parks Service protects areas recognized as containing outstanding biological and geological resources or examples of natural history. The National Natural Landmarks website

(National Natural Landmarks Directory - National Natural Landmarks (U.S. National Park Service) (nps.gov)) identified no National Natural Landmarks within the project area. The construction and operation of the proposed project will not affect local landmarks.

6.11 Secondary Impacts

The Utility, through local zoning laws, the authority of its council or planning commission, or other means, will ensure that future development and utility projects connecting to SRF-funded facilities will not adversely affect wetlands, wooded areas, steep slopes, archeological/historical/structural resources, or other sensitive environmental resources. The Utility will require new development and utility projects to be constructed within the guidelines of the USFWS, IDNR, IDEM, and other environmental review authorities.

6.12 Mitigation Measures

Erosion control measures will be implemented during all construction activity. Areas disturbed by construction will be restored and revegetated with seeding and other measures, such as erosion control blankets, as necessary. A CSGP for stormwater runoff associated with construction activities is expected to be required for the proposed project since it will disturb more than once acre of land. 401/404 permits are expected for waterway disturbances for the proposed project. Tree removal will also be avoided where possible. Tree cutting restrictions may be required to minimize the potential for impacts to the Indiana Bat and the Northern Long-Eared Bat.

7.0 LEGAL, FINANCIAL, & MANAGERIAL CAPABILITIES

The water system is owned by B&B Water Project and operated by Bynum Fanyo under the supervision of B&B Utility Board. The Utility Board consists of nine (9) members. Board meetings are held the third Tuesday of every month at 6:00 pm.

The Utility's water distribution system is metered, and usage rates vary for customers based on meter size. The Utility's water rate schedule and rules and regulations are included in **Appendix E, Attachment E-1**.

B&B Water Project is regulated by the Indiana Utility Regulatory Commission.

B&B Water Project has not participated in a utility regional planning meeting within the last calendar year. Pursuant to IC 5-1.2-11-.5-6, B&B Water Project plans to meet this requirement prior to loan closing.

B&B Water Project currently has an in-progress Asset Management Program (AMP) that will meet the requirements defined by the State Revolving Fund's AMP Guidelines, pursuant to IC 5-1.2-10-16. When the AMP is completed, the AMP Certification form will be included in **Appendix E.**

8.0 PUBLIC PARTICIPATION

A public hearing will be held by the Utility Board to review and accept this Preliminary Engineering Report (PER) and the project described herein. A copy of the PER will be delivered to the B&B Water Utility Office and be made available for the public to view prior to the public hearing and for five days after the public hearing. At the time of the public hearing, the following items will be documented and collected:

- Copy of the Publisher's Affidavit from the newspaper for the public hearing notice;
- Public Hearing attendance record;
- Public Hearing meeting minutes;
- Copy of written comments submitted by the public and responses to those comments;
- Copy of the mailing labels for the public hearing attendees and other parties that might be interest in receiving copies of the Environmental Impact Statement

These items will be compiled and submitted in **Appendix F** in a revision once they are available.

APPENDIX A

FIGURES

Table of Contents

TUNNEL ROAD ELEVATED STORAGE TANK 100,000 GALLONS

STATE ROAD 45 ELEVATED STORAGE TANK 200,000 GALLONS

HINKLE ROAD BOOSTER STATION

NEW UNIONVILLE ELEVATED STORAGE TANK 100,000 GALLONS

CITY OF BLOOMINGTON CONNECTION NORTH DUNN STREET

CITY OF BLOOMINGTON CONNECTION NORTH RUSSEL ROAD

STATE ROAD 45 BOOSTER STATION

MONROE

BROWN

MONROE COUNTY
BROWN COUNTY

WESSLER ENGINEERING
More than a Project™

Legend

Water Main Diameter

- 2
- 3
- 4
- 5
- 6
- 8
- 10
- 12

Parcels

County Boundary

Incorporated Areas

0 2,000 4,000 8,000 FT

FIGURE A-1

EXISTING SERVICE AREAS AND ASSETS

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report for Water System Improvements
January 2024
ProjectNo-267823-01-001

U:\ GIS Projects\BBWater\BBWater MHI\BBWater MHI aprx Layout: Figure A-1 (10/3/2023, 1:51 PM) User: AaronA

LINE E: SHILOH ROAD

TUNNEL ROAD ELEVATED STORAGE TANK 100,000 GALLONS

STATE ROAD 45 ELEVATED STORAGE TANK 200,000 GALLONS

LINE A: BETHEL LANE

NEW UNIONVILLE ELEVATED STORAGE TANK 100,000 GALLONS

LINE C: NORTH MOUNT GILEAD ROAD

HINKLE ROAD BOOSTER STATION

LINE D: NORTH BIRDIE GALYAN ROAD

LINE B: NORTH HINKLE ROAD

CITY OF BLOOMINGTON CONNECTION NORTH DUNN STREET

CITY OF BLOOMINGTON CONNECTION NORTH RUSSEL ROAD

STATE ROAD 45 BOOSTER STATION

MONROE

BROWN

WESSLER ENGINEERING
More than a Project™

Legend

Water Main Diameter

- 2
- 3
- 4
- 5
- 6
- 8
- 10
- 12

Parcels

County Boundary

Incorporated Areas

0 2,000 4,000 8,000 FT

FIGURE A-2
PROPOSED WATER MAIN IMPROVEMENTS

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report for Water System Improvements
January 2024
ProjectNo-267823-01-001

U:\ GIS Projects\BBWater\BBWater_MHI\BBWater_MHI aprx Layout: Figure A-2 (10/3/2023, 1:52 PM) User: AaronA

PHASE II ALT.
WM3 - LINE E:
SHILO ROAD

TUNNEL ROAD
ELEVATED
STORAGE TANK
100,000
GALLONS

STATE ROAD 45
ELEVATED
STORAGE TANK
200,000 GALLONS

PHASE II ALT.
WM 3- LINE A:
BETHEL LANE

NEW UNIONVILLE
ELEVATED STORAGE
TANK
100,000 GALLONS

PHASE II ALT. WM 3-
LINE C: NORTH MOUNT
GILEAD ROAD

HINKLE ROAD
BOOSTER
STATION

PHASE III ALT. WM 2 -
LINE D: NORTH BIRDIE
GALYAN ROAD

PHASE III ALT. WM 2 -
LINE B: NORTH
HINKLE ROAD

CITY OF
BLOOMINGTON
CONNECTION
NORTH DUNN STREET

CITY OF BLOOMINGTON
CONNECTION
NORTH RUSSEL
ROAD

STATE ROAD 45
BOOSTER STATION

MONROE

BROWN

MONROE COUNTY
BROWN COUNTY

WESSLER ENGINEERING
More than a Project™

Legend

Water Main Diameter

- 2
- 3
- 4
- 5
- 6
- 8
- 10
- 12

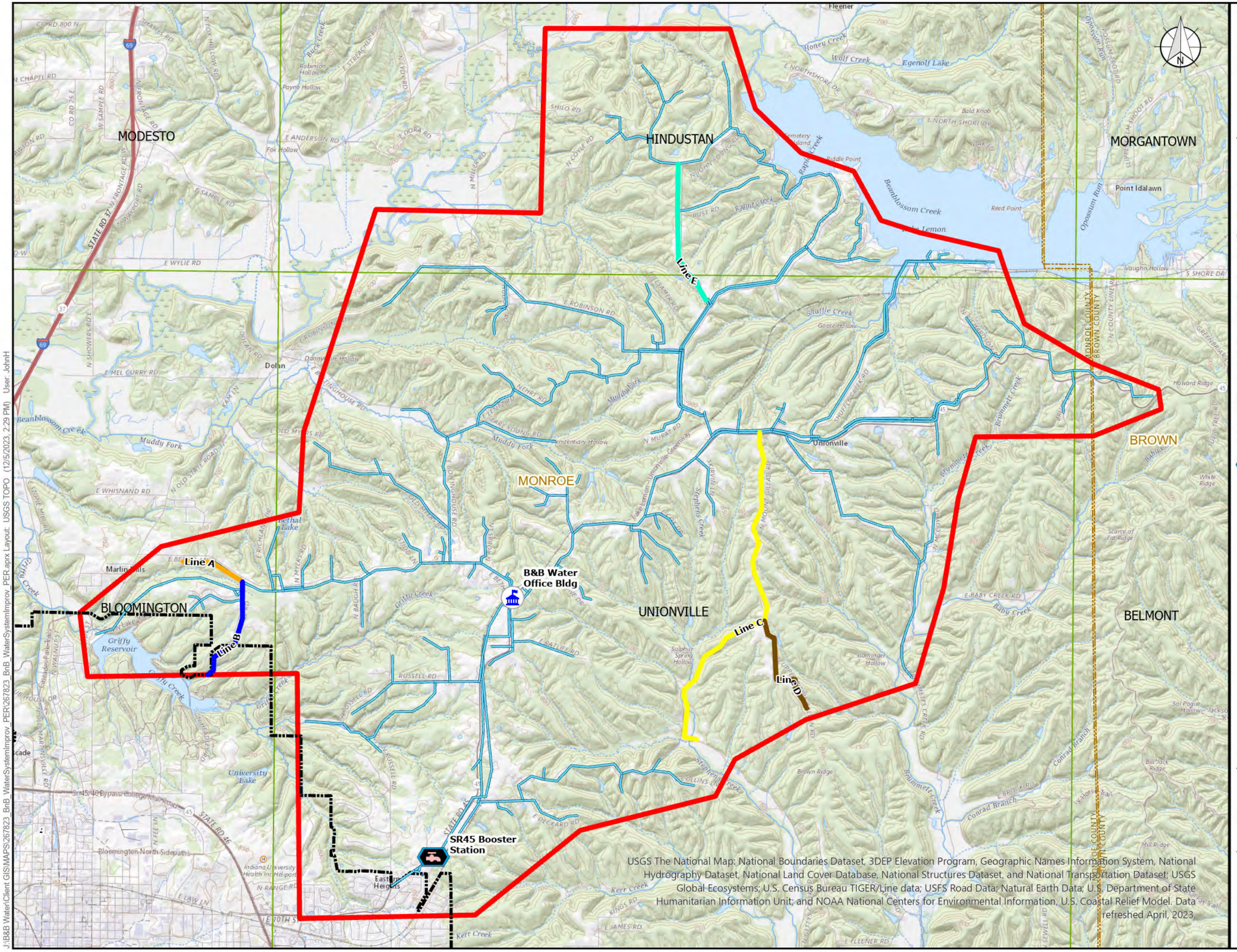
Parcels
County Boundary
Incorporated Areas

0 2,000 4,000 8,000 FT

FIGURE A-3
PROPOSED PHASE II & III WATER MAIN IMPROVEMENTS

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report for Water System Improvements
January 2024
ProjectNo-267823-01-001

U:\ GIS Projects\BBWater\BBWater_MHI\BBWater_MHI aprx Layout: Figure A-2 (10/3/2023, 1:52 PM) User: AaronA



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Legend

B&B Water Mains

- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Utility Water Mains
- 24K USGS Quadrangle Boundaries
- Bloomington City Limits
- County Boundary
- B&B Water Office, Phase II Proposed Project
- State Road 45 Booster Station, Phase II Proposed Project

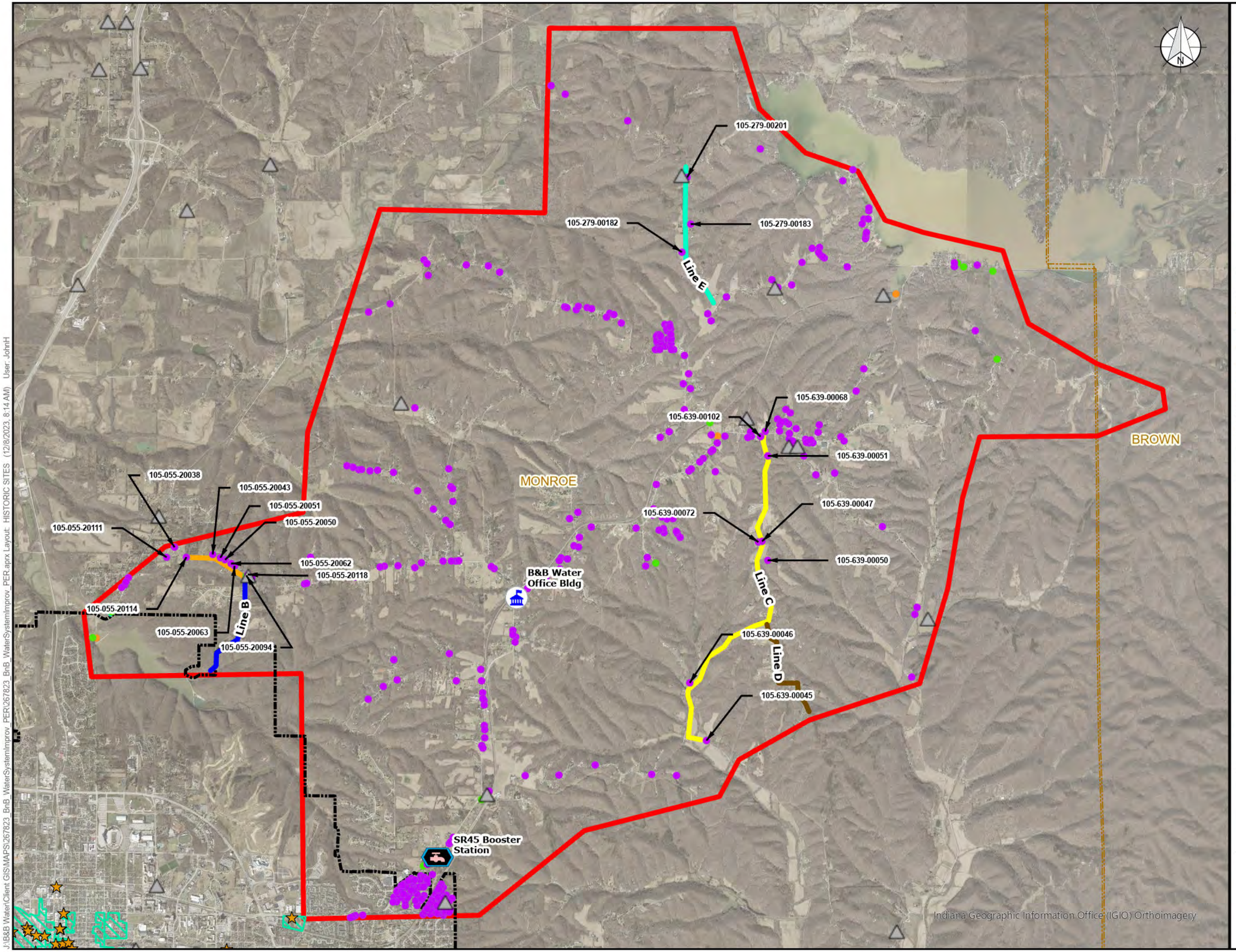
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed April, 2023.

FIGURE A-4

USGS TOPOGRAPHIC MAP

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: USGS TOPO (12/5/2023, 2:29 PM) User: JohnH



WESSLER ENGINEERING
More than a Project™

Legend

- National Register of Historic Places IDNR 2022
- Cemeteries
- Outstanding Survey Sites
- Notable Survey Sites
- Contributing Survey Sites
- Historic Sites

B&B Water

- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- B&B Water Office, Phase II Proposed Project
- State Road 45 Booster Station, Phase II Proposed Project

0 2,000 4,000 8,000 FT

FIGURE A-5
HISTORIC SITES AND STRUCTURES (1 of 3)

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER aprx Layout: HISTORIC SITES (12/8/2023, 8:14 AM) User: JohnH

WESSLER ENGINEERING
More than a Project™

Legend

- National Register of Historic Places IDNR 2022
- Cemeteries
- Outstanding Survey Sites
- Notable Survey Sites
- Contributing Survey Sites
- Historic Sites

B&B Water

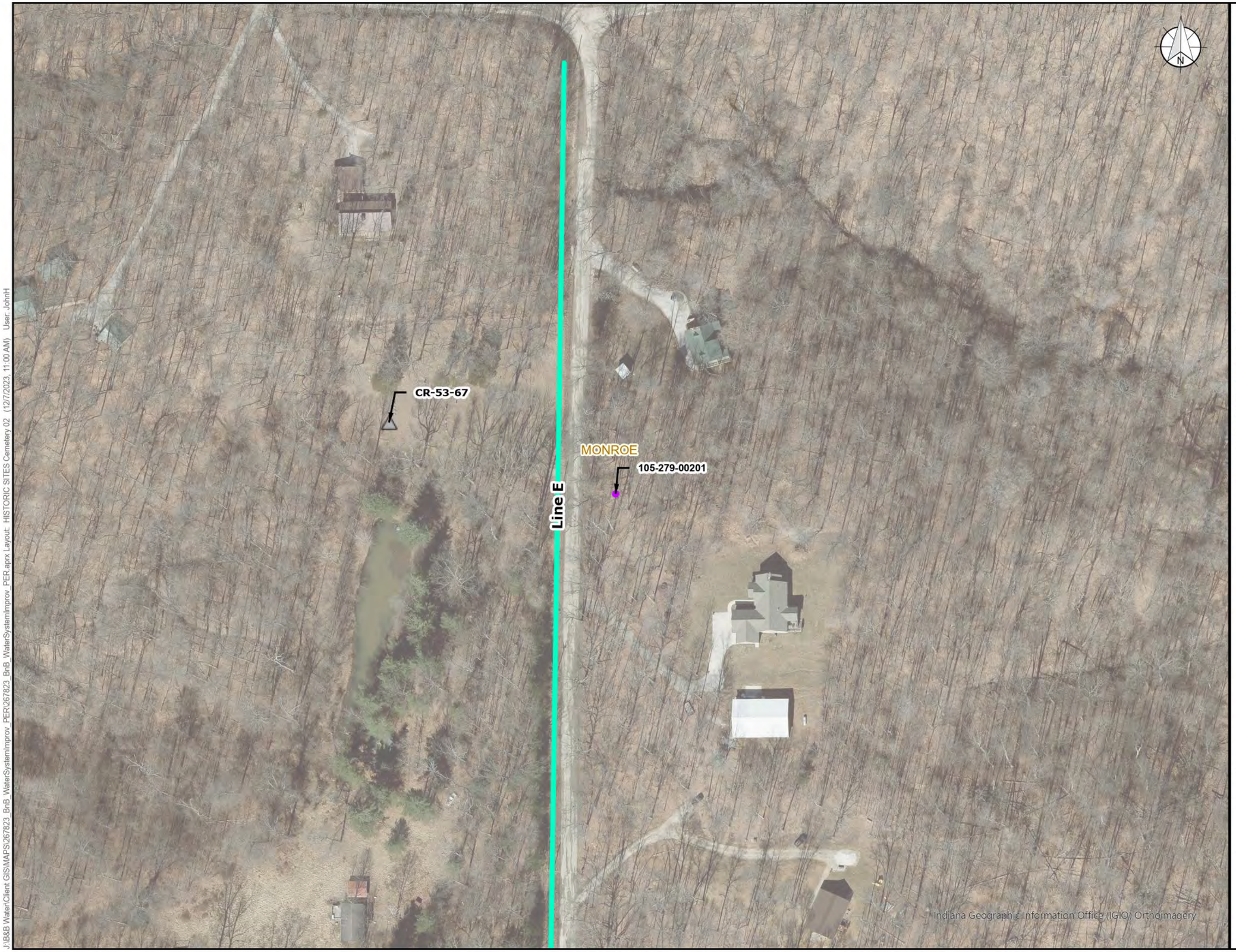
- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- B&B Water Office, Phase II Proposed Project
- State Road 45 Booster Station, Phase II Proposed Project

0 100 200 FT

FIGURE A-5
HISTORIC AND STRUCTURES BETHEL LN CEMETERY (2 of 3)

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: HISTORIC SITES Cemetery 01 (12/7/2023, 10:58 AM) User: JohnH



WESSLER ENGINEERING
More than a Project™

Legend

- National Register of Historic Places IDNR 2022
- Cemeteries
- Outstanding Survey Sites
- Notable Survey Sites
- Contributing Survey Sites
- Historic Sites

B&B Water

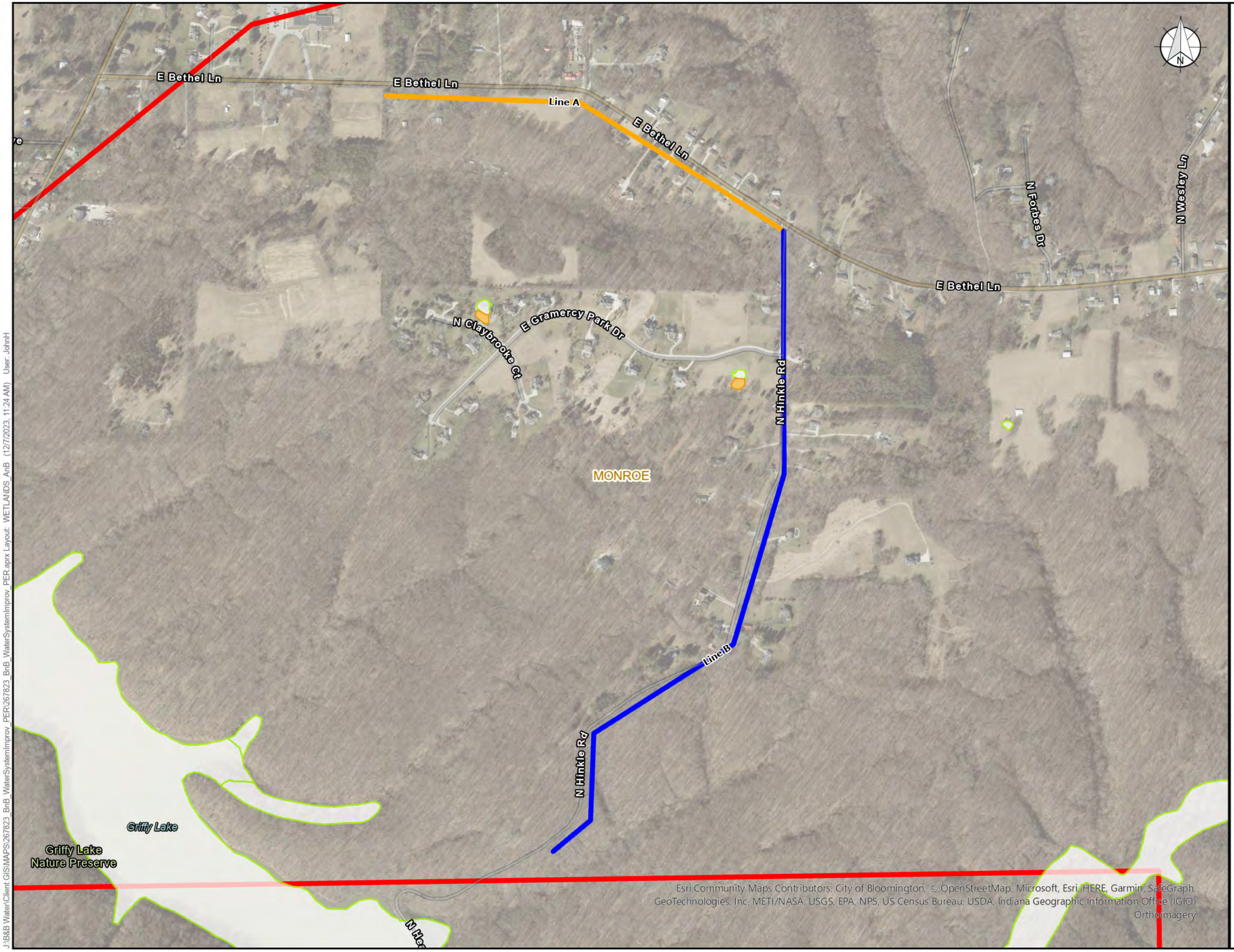
- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- B&B Water Office, Phase II Proposed Project
- State Road 45 Booster Station, Phase II Proposed Project

0 50 100 200 FT

FIGURE A-5
HISTORIC AND STRUCTURES SHILOH CEMETERY (3 of 3)

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: HISTORIC SITES Cemetery 02 (12/7/2023, 11:00 AM) User: JohnH



J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: WETLANDS_AnB (12/7/2023, 11:24 AM) User: JohnH

WESSLER ENGINEERING
More than a Project™

Legend

- Historic Wetlands (USFWS)
- Wetlands NWI (USFWS)

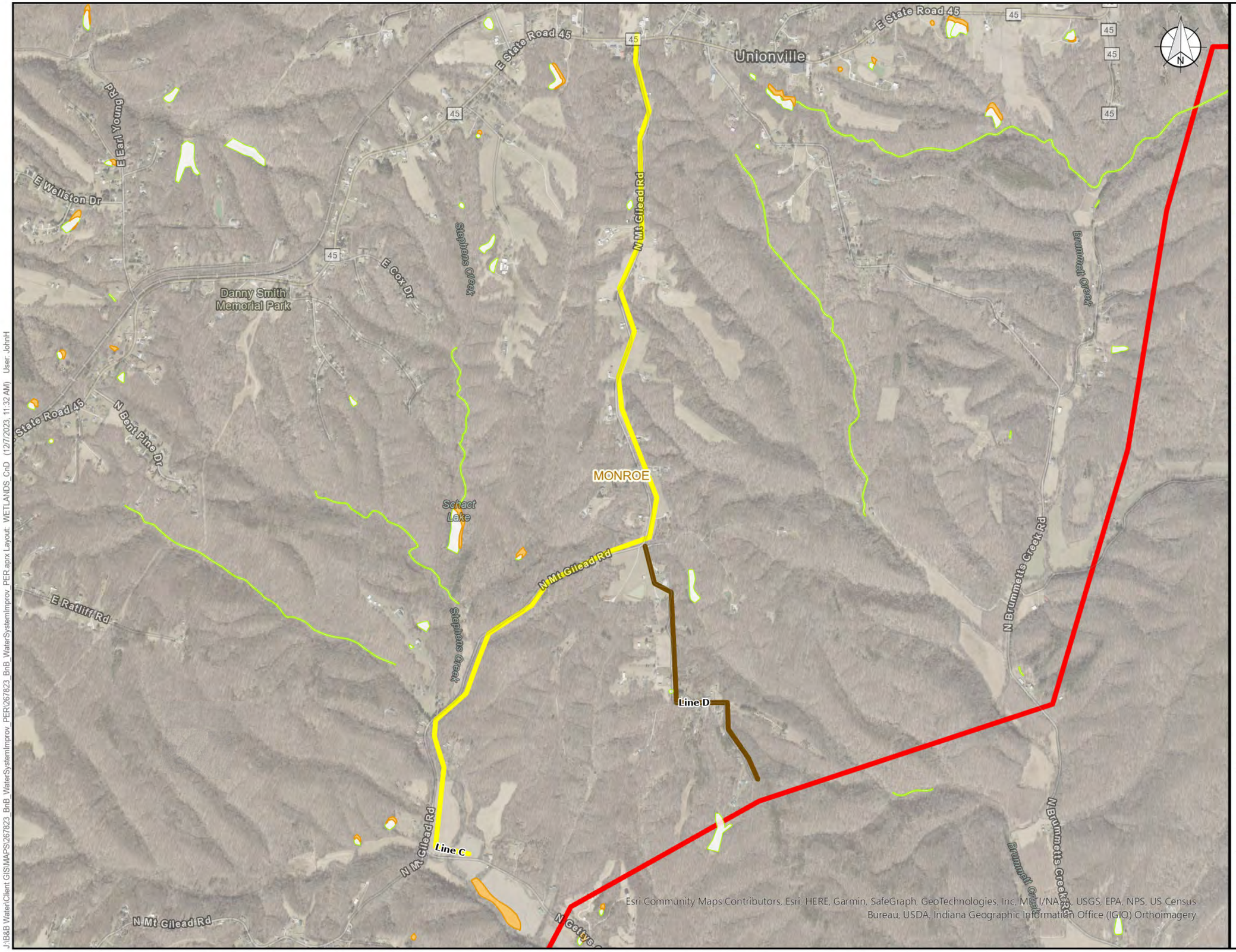
B&B Water Mains

- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary

0 600 1,200 FT

FIGURE A-6
WETLANDS MAP
(1 of 3)

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
January 2024
ProjectNo-267823-01-001



J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: WETLANDS_CnD (12/7/2023, 11:32 AM) User: JohnH

WESSLER ENGINEERING
More than a Project™

Legend

- Historic Wetlands (USFWS)
- Wetlands NWI (USFWS)

B&B Water Mains

- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- State Road 45 Booster Station, Phase II Proposed Project
- B&B Water Office

0 1,500 3,000 FT

FIGURE A-6
WETLANDS MAP
(2 of 3)

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
January 2024
ProjectNo-267823-01-001

WESSLER ENGINEERING
More than a Project™

Legend

- Historic Wetlands (USFWS)
- Wetlands NWI (USFWS)

B&B Water Mains

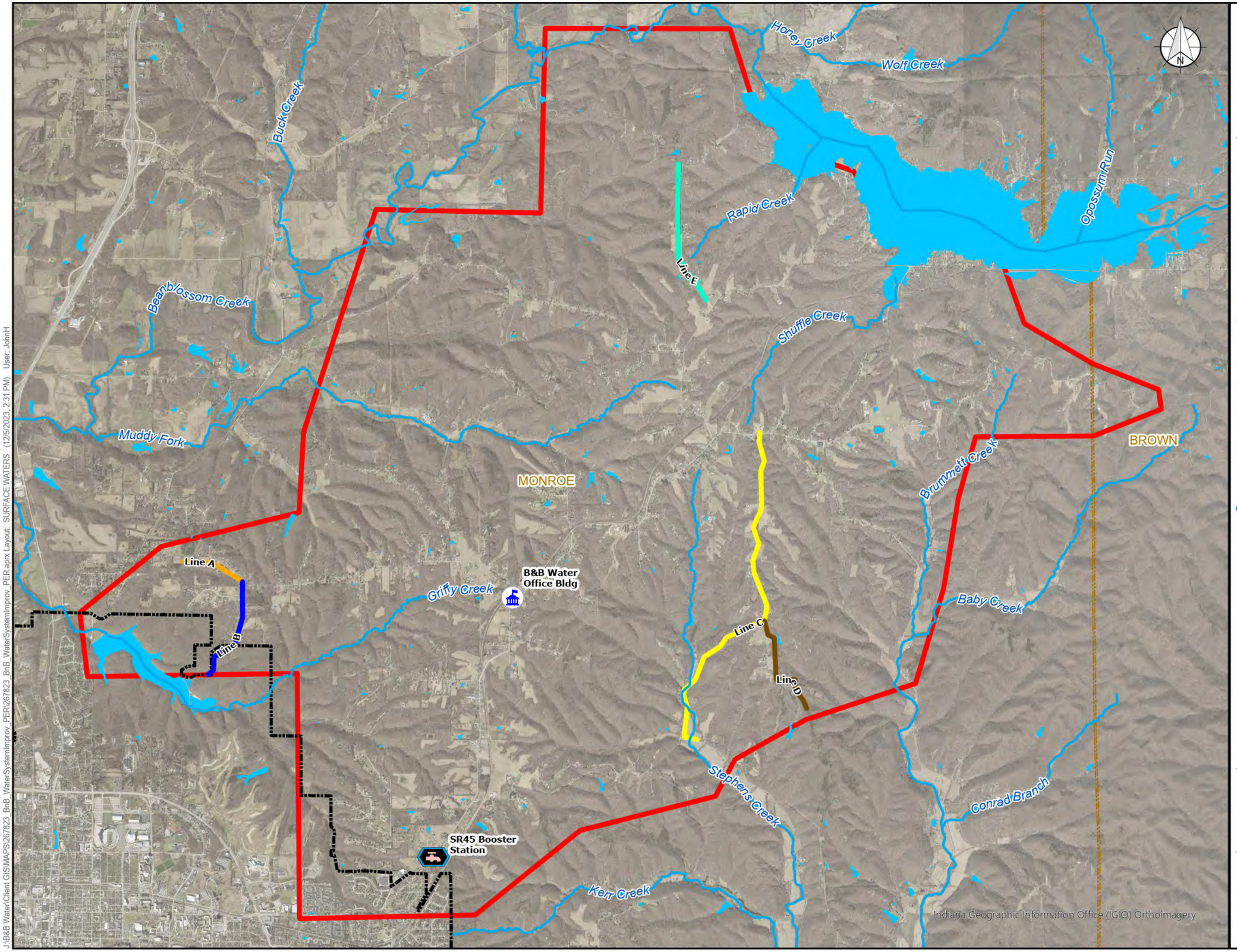
- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- State Road 45 Booster Station, Phase II Proposed Project
- B&B Water Office

0 600 1,200 FT

FIGURE A-6
WETLANDS MAP
(3 of 3)

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: WETLANDS_E (12/7/2023, 11:33 AM) User: JohnH



WESSLER ENGINEERING
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Legend

- Named Rivers, Streams, etc (NHD)
- Lake/Pond (NHD)
- Reservoir (NHD)
- Swamp/Marsh (NHD)

B&B Water

- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- B&B Water Office, Phase II Proposed Project
- State Road 45 Booster Station, Phase II Proposed Project

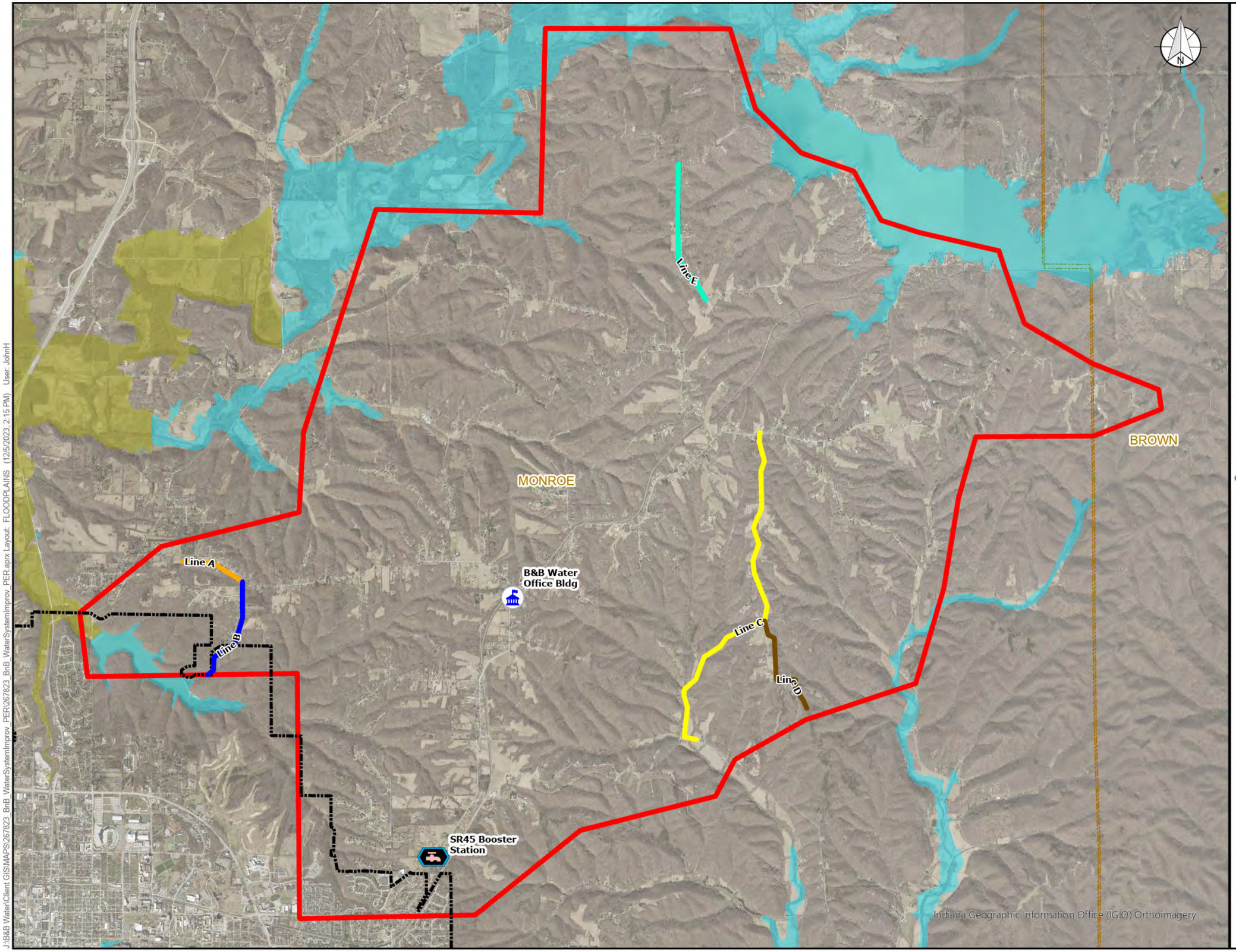
0 2,000 4,000 8,000 FT

FIGURE A-7

SURFACE WATERS MAP

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: SURFACE WATERS (12/5/2023, 2:31 PM) User: JohnH



WESSLER ENGINEERING
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Legend

- Floodway
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Protected by Levee
- 0.2% Annual Chance Flood Hazard

B&B Water

- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- B&B Water Office, Phase II Proposed Project
- State Road 45 Booster Station, Phase II Proposed Project

0 2,000 4,000 8,000 FT

FIGURE A-8

FLOODPLAINS MAP

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: FLOODPLAINS (12/5/2023, 2:15 PM) User: JohnH

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MONROE
BROWN
B&B Water Office Bldg
SR45 Booster Station
Line A
Line B
Line C
Line D
Line E

Indiana Geographic Information Office (IGIO) Orthoimagery

Legend

SSURGO Units

MUSYM
Ba
BcrAW
BdB
BgF
BkF
Bo
CaD
Cb
CoF
CrB
CrC
CtB
CtC
Cu
EbE
EkB
EkF
GpD
GrD
HaD
HbD3
Hd
HoB
HoC
HtB
Omz
PeA
PeB
Sf
St
TlB
Ud
W
Wa
WaD
WeC
Wr
WyqD
<all other values>
Soil Special Feature Points SSURGO

B&B Water
Line A, Phase II Proposed Project
Line B, Phase III
Line C, Phase II Proposed Project
Line D, Phase III
Line E, Phase II Proposed Project
B&B Water Utility Territory Boundary
Utility Water Mains
Bloomington City Limits
County Boundary
B&B Water Office, Phase II Proposed Project
State Road 45 Booster Station, Phase II Proposed Project

0 2,000 4,000 8,000 FT

FIGURE A-9

SOILS SURVEY MAP (1 of 2)

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: SOILS (12/5/2023, 2:21 PM) User: JohnH

Map unit symbol	Map unit name— Brown County, Indiana (IN013)	Rating (centimeters)	Acres in AOI	Percent of AOI
BgF	Berks-Trevlac-Wellston complex, 20 to 70 percent slopes	>200	95.2	0.40%
TlB	Tilsit silt loam, 2 to 6 percent slopes	46	3.9	0.00%
WaD	Wellston-Berks-Trevlac complex, 6 to 20 percent slopes	>200	41.9	0.20%
Subtotals for Soil Survey Area (Brown County (IN013)			**140.9**	**0.70%**
Map unit symbol	**Map unit name - Monroe County, Indiana (IN105)**	**Rating (centimeters)**	**Acres in AOI**	**Percent of AOI**
Ba	Bartle silt loam, 0 to 2 percent slopes	43	28	0.10%
BcrAW	Beanblossom silt loam, 0 to 3 percent slopes, occasionally flooded, very brief duration	>200	621.8	2.90%
BdB	Bedford silt loam, 2 to 6 percent slopes	54	1,933.20	8.90%
BkF	Brownstown-Gilwood silt loams, 25 to 75 percent slopes	>200	12,286.30	56.90%
Bo	Bonnie silt loam, frequently flooded	0	22.6	0.10%
CaD	Caneyville silt loam, 12 to 18 percent slopes	>200	934.8	4.30%
Cb	Caneyville-Hagerstown silt loams, 2 to 18 percent slopes, karst	>200	177.3	0.80%
CoF	Corydon Variant-Caneyville Variant complex, 25 to 70 percent slopes	>200	99.2	0.50%
CrB	Crider silt loam, 2 to 6 percent slopes	>200	58.2	0.30%
CrC	Crider silt loam, 6 to 12 percent slopes	>200	1,560.30	7.20%
CtB	Crider-Urban land complex, 2 to 6 percent slopes	>200	14.2	0.10%
CtC	Crider-Urban land complex, 6 to 12 percent slopes	>200	49.4	0.20%
Cu	Cuba silt loam, frequently flooded	>200	98.2	0.50%
EbE	Ebal-Gilpin-Hagerstown silt loams, 18 to 25 percent slopes	76	4.5	0.00%
EkB	Elkinsville silt loam, 2 to 6 percent slopes	>200	0.5	0.00%
EkF	Elkinsville silt loam, upland, 20 to 40 percent slopes	>200	318.4	1.50%
GpD	Gilpin silt loam, 12 to 18 percent slopes	>200	50	0.20%
GrD	Gilpin-Gullied land complex, 12 to 22 percent slopes	>200	59.7	0.30%
HaD	Hagerstown silt loam, 12 to 20 percent slopes	>200	318.7	1.50%
HbD3	Hagerstown silty clay loam, 12 to 22 percent slopes, severely eroded	>200	3	0.00%
Hd	Haymond silt loam, frequently flooded	>200	245.6	1.10%
HoB	Hosmer silt loam, 2 to 6 percent slopes	46	19.4	0.10%
HoC	Hosmer silt loam, 6 to 12 percent slopes	46	29	0.10%
HtB	Hosmer-Urban land complex, 2 to 12 percent slopes	46	33.7	0.20%
Omz	Orthents, earthen dam	>200	4.7	0.00%
PeA	Pekin silt loam, 0 to 2 percent slopes	64	47.2	0.20%
PeB	Pekin silt loam, 2 to 6 percent slopes	46	29	0.10%
Sf	Steff silt loam, 0 to 2 percent slopes, frequently flooded	58	12.9	0.10%
St	Stendal silt loam, 0 to 2 percent slopes, frequently flooded, brief duration	46	90.7	0.40%
TlB	Zanesville silt loam, 2 to 6 percent slopes	57	87	0.40%
Ud	Udorthents-Pits complex	>200	3.9	0.00%
W	Water	>200	330.6	1.50%
Wa	Wakeland silt loam, 0 to 2 percent slopes, frequently flooded	15	39.8	0.20%
WeC	Wellston silt loam, 6 to 12 percent slopes	>200	35.7	0.20%
Wr	Wilbur silt loam, frequently flooded	46	18.7	0.10%
WyqD	Wrays-Gilwood silt loams, 6 to 20 percent slopes	>200	1,803.20	8.30%
Subtotals for Soil Survey Area (Monroe County IN015)			**21,469.40**	**99.30%**
Totals for Area of Interest			**21,610.40**	**100.00%**

WESSLER ENGINEERING
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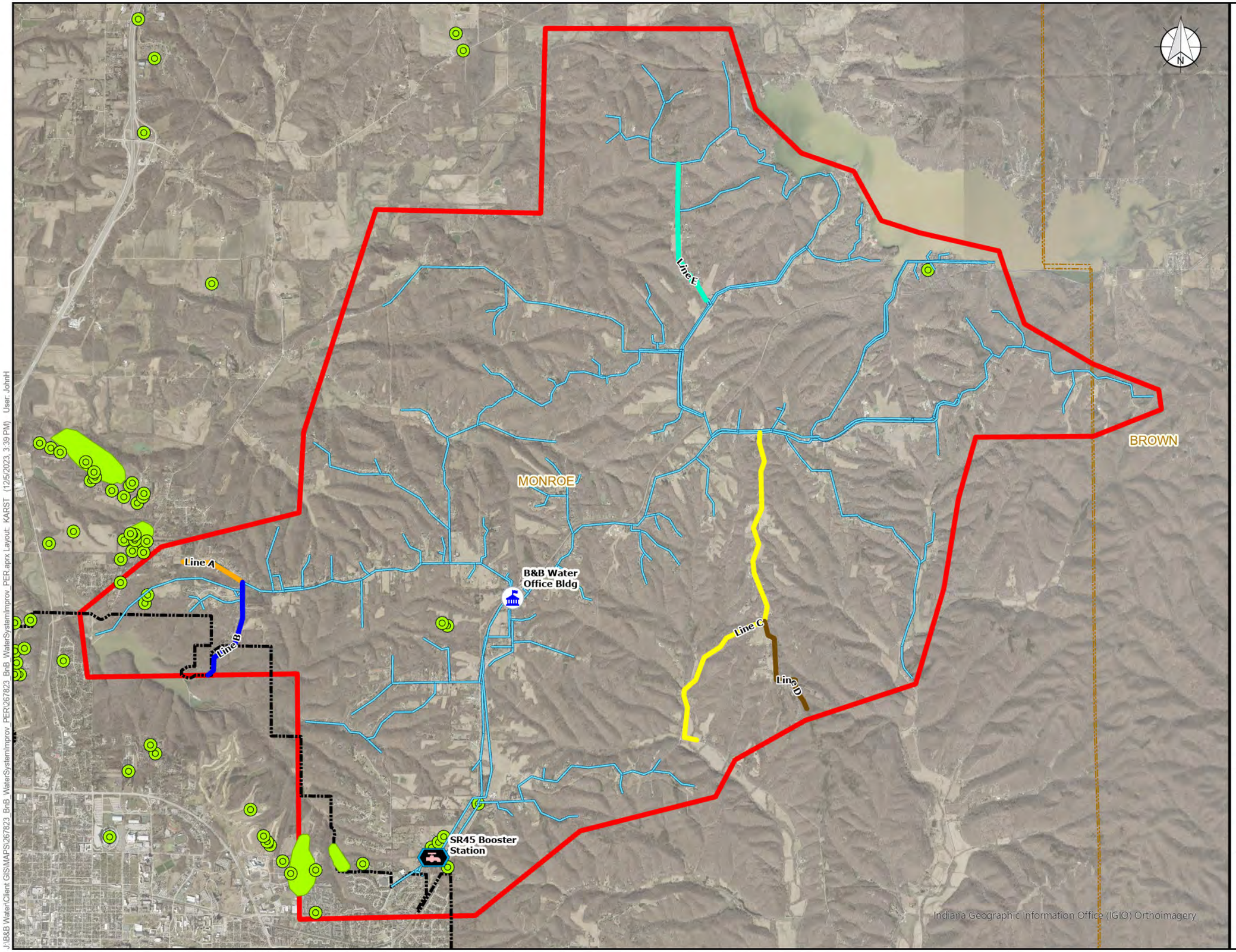
FIGURE A-9

SOILS SURVEY MAP (2 of 2)

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER.aprx Layout: SOILS2 (12/5/2023, 2:27 PM) User: JohnH



WESSLER ENGINEERING
More than a Project™

Legend

- Sinkhole Inventory (IGWS)
- Karst Sinkhole Areas (IGWS)

B&B Water

- Line A, Phase II Proposed Project
- Line B, Phase III
- Line C, Phase II Proposed Project
- Line D, Phase III
- Line E, Phase II Proposed Project
- B&B Water Utility Territory Boundary
- Utility Water Mains
- Bloomington City Limits
- County Boundary
- B&B Water Office, Phase II Proposed Project
- State Road 45 Booster Station, Phase II Proposed Project

0 2,000 4,000 8,000 FT

FIGURE A-10
KARST MAP

B&B Water Project Inc
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
January 2024
ProjectNo-267823-01-001

J:\B&B Water\Client GIS\MAPS\267823_BnB_WaterSystemImprov_PER\267823_BnB_WaterSystemImprov_PER aprx Layout: KARST (12/5/2023, 3:39 PM) User: JohnH

APPENDIX B

COST ESTIMATES

Table of Contents

Table B-1: Storage Alternative 2 (S2): New Elevated Water Storage Tank 175,000 Gallon

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	175,000 - Gallon Elevated Storage Tank (Multi-legged)	1	LS	$ 1,100,000	$ 1,100,000
2	10" PVC C900 Water Main	150	LF	$ 160	$ 24,000
3	Security Fencing	400	LF	$ 75	$ 30,000
4	Crushed Stone Drive	300	SYD	$ 125	$ 37,500
5	10" Gate Valve	2	EA	$ 7,500	$ 15,000
6	H-3 Hydrant Assembly	1	EA	$ 13,500	$ 13,500
7	Mixer	1	EA	$ 35,000	$ 35,000
8	Sample Station	1	LS	$ 5,000	$ 5,000
9	Electrical & SCADA	1	LS	$ 85,000	$ 85,000
10	Site Grading and Driveway	1	LS	$ 34,000	$ 34,000
11	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 69,000	$ 69,000
12	Erosion & Sediment Control	1	LS	$ 13,800	$ 13,800
13	Final Cleanup & Restoration	1	LS	$ 27,600	$ 27,600
				Subtotal	**$ 1,489,000**
				10% Contingency	$ 149,000
				Total Probable Alternative Construction Cost	**$ 1,638,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

Table B-2: Booster Station Alternative 2 (BS2): Rehablitate Pumps & Piping at State Road 45

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	400 GPM Booster Pump @ 240 TDH & Motor	2	EA	$ 50,000	$ 100,000
2	Recoat Process Piping & Valves	1	LS	$ 20,000	$ 20,000
3	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 6,000	$ 6,000
4	Erosion & Sediment Control	1	LS	$ 3,000	$ 3,000
5	Final Cleanup & Restoration	1	LS	$ 6,000	$ 6,000
				Subtotal	**$ 135,000**
				10% Contingency	$ 14,000
				Total Probable Alternative Construction Cost	**$ 149,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *Cost of Line Item 2- Recoat Process Piping and Valves, will be primarily dependent on method of surface preparation used. If sandblasting is used, the cost is expected to be $10,000.*

Table B-3: Booster Station Alternative 3 (BS3): Portable Power at State Road 45 Booster Station, Hinkle Road Booster Station, and Office Building

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	Portable Generator (Diesel, 200 kW)	1	EA	$120,000	$ 120,000
2	Double Throw Switch (NEMA 4X, 200A) @ Water Office	1	EA	$ 16,000	$ 16,000
3	Double Throw Switch (NEMA 4X, 400A) @ SR 45 BS	1	EA	$ 20,000	$ 20,000
4	Cam-Lock Box @ Water Office, SR45 BS and Hinkle BS	3	LS	$ 4,000	$ 12,000
5	Electrical Wiring and Conduit	1	LS	$ 30,000	$ 30,000
6	Demo Existing Main Disconnect Switch @ SR 45 BS	1	LS	$ 2,000	$ 2,000
7	Mobilization, Demo, Bonds, & Insurance	1	LS	$ 4,000	$ 4,000
8	Erosion & Sediment Control	1	LS	$ 1,000	$ 1,000
9	Final Cleanup & Restoration	1	LS	$ 2,000	$ 2,000
				Subtotal	**$ 207,000**
				10% Contingency	$ 21,000
				Total Probable Alternative Construction Cost	**$ 228,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

Table B-4: Booster Station Alternative 4 (BS4): Permanent Power at Booster Stations & Office Building

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	Generator (Diesel, 25 kW) @ Water Office	1	EA	$ 30,000	$ 30,000
2	Generator (Diesel, 200 kW) @ SR 45 BS	1	EA	$ 90,000	$ 90,000
3	Generator (Diesel, 125 kW) @ Hinkle BS	1	EA	$ 70,000	$ 70,000
4	Automatic Transfer Switch (NEMA 4X, 200A) @ Water Office	1	EA	$ 20,000	$ 20,000
5	Automatic Transfer Switch (NEMA 4X, 400A) @ SR 45 BS	1	EA	$ 25,000	$ 25,000
6	Automatic Transfer Switch (NEMA 4X, 400A) @ Hinkle BS	1	EA	$ 25,000	$ 25,000
7	Electrical Wiring and Conduit	1	LS	$ 40,000	$ 40,000
8	Demo Existing Main Disconnect Switch @ SR 45 BS	1	LS	$ 2,000	$ 2,000
9	Mobilization, Demo, Bonds, & Insurance	1	LS	$ 5,000	$ 5,000
10	Erosion & Sediment Control	1	LS	$ 1,000	$ 1,000
11	Final Cleanup & Restoration	1	LS	$ 2,000	$ 2,000
				Subtotal	**$ 310,000**
				10% Contingency	$ 31,000
				Total Probable Alternative Construction Cost	**$ 341,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

Table B-5: WM2: Water Main Replacement Line Summary

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Total Price
1	Line A - Bethel Lane	$ 512,000
2	Line B - North Hinkle Road	$ 686,000
3	Line C - North Mount Gilead	$ 2,074,000
4	Line D - North Birdie Galyan Road	$ 692,000
5	Line E - Shilo Road	$ 937,000
	Subtotal	$ 4,901,000
	10% Contingency	$ 491,000
	Total Probable Construction Costs	**$ 5,392,000**

Note:

1 *All probable construction costs are based upon 2023 dollars and will likely increase with time. Construction materials and costs have been volatile in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, materials, or contractors' methods of pricing. The cost estimates were made without the benefit of final design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-6: WM2: Line A - Bethel Lane

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	6" C900 PVC (Open Cut)	550	LFT	$ 95	$ 52,300
2	3" PVC SDR-21 (Open Cut)	2,400	LFT	$ 60	$ 144,000
3	8"x 8" Tapping, Sleeve and Box and 8" Tapping Valve	1	EA	$ 15,000	$ 15,000
4	5" Line Stop	1	EA	$ 5,000	$ 5,000
5	5" Cut and Caps	2	EA	$ 3,500	$ 7,000
6	3" Gate Valve & Box	2	EA	$ 1,500	$ 3,000
7	H-1 Flushing Hydrant	2	EA	$ 6,000	$ 12,000
8	3/4" New Service Line and Meter Pit (Long)	9	EA	$ 4,000	$ 36,000
9	3/4" New Service Line and Meter Pit (Short)	19	EA	$ 3,500	$ 66,500
10	Remove Existing Valve Box	1	EA	$ 500	$ 500
11	Crushed Stone Surface Repair	195	LFT	$ 100	$ 19,500
12	Asphalt Drive Repair	90	LFT	$ 150	$ 13,500
13	Concrete Drive Repair	15	LFT	$ 180	$ 2,700
14	Rock Excavation[2]	756	CY	$ 110	$ 84,000
15	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 21,000	$ 21,000
16	Erosion & Sediment Control	1	LS	$ 9,000	$ 9,000
17	Final Cleanup & Restoration	1	LS	$ 21,000	$ 21,000
				Subtotal	**$ 512,000**
				10% Contingency	$ 51,000
				Total Probable Alternative Construction Cost	**$ 563,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-7: WM2: Line B - North Hinkle Road

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	8" C900 PVC (Open Cut)	400	LFT	$ 120	$ 48,000
2	3" PVC SDR-21 (Open Cut)	3,700	LFT	$ 60	$ 222,000
3	8"x 8" Tapping, Sleeve and Box and 8" Tapping Valve	2	EA	$ 15,000	$ 30,000
4	3"x 3" Tapping, Sleeve and Box and 3" Tapping Valve	1	EA	$ 4,000	$ 4,000
5	Abandon Small Diameter Main (<4")	1	EA	$ 1,000	$ 1,000
6	8" Line Stop	2	EA	$ 5,500	$ 11,000
7	3" Line Stop	1	EA	$ 5,000	$ 5,000
8	8" Cut and Caps	4	EA	$ 3,000	$ 12,000
9	3" Gate Valve & Box	2	EA	$ 1,500	$ 3,000
10	H-1 Flushing Hydrant	2	EA	$ 6,000	$ 12,000
11	3/4" New Service Line and Meter Pit (Long)	11	EA	$ 4,000	$ 44,000
12	3/4" New Service Line and Meter Pit (Short)	11	EA	$ 3,500	$ 38,500
13	Remove Existing Hydrant	1	EA	$ 1,500	$ 1,500
14	Remove Existing Valve Box	1	EA	$ 500	$ 500
15	Crushed Stone Surface Repair	200	LFT	$ 100	$ 20,000
16	Asphalt Drive Repair	100	LFT	$ 150	$ 15,000
17	Asphalt Road Repair	50	LFT	$ 190	$ 9,500
18	Concrete Drive Repair	20	LFT	$ 180	$ 3,600
19	Rock Excavation[2]	1,177	CY	$ 110	$ 130,000
20	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 31,000	$ 31,000
21	Erosion & Sediment Control	1	LS	$ 13,000	$ 13,000
22	Final Cleanup & Restoration	1	LS	$ 31,000	$ 31,000
				Subtotal	**$ 686,000**
				10% Contingency	$ 69,000
				Total Probable Alternative Construction Cost	**$ 755,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-8: WM2: Line C - North Mount Gilead Road

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	3" PVC SDR-21 (Open Cut)	17,000	LFT	$ 60	$ 1,020,000
2	6"x 6" Tapping, Sleeve and Box and 3" Tapping Valve	1	EA	$ 6,000	$ 6,000
3	Abandon Small Diameter Main (<4")	1	EA	$ 1,000	$ 1,000
4	3" Line Stops	1	EA	$ 5,000	$ 5,000
5	3" Gate Valve & Box	3	EA	$ 1,500	$ 4,500
6	H-1 Flushing Hydrant	8	EA	$ 6,000	$ 48,000
7	3/4" New Service Line and Meter Pit (Long)	20	EA	$ 4,000	$ 80,000
8	3/4" New Service Line and Meter Pit (Short)	28	EA	$ 3,500	$ 98,000
9	Remove Existing Hydrant	1	EA	$ 1,500	$ 1,500
10	Remove Existing Valve Box	2	EA	$ 500	$ 1,000
11	Crushed Stone Surface Repair	450	LFT	$ 100	$ 45,000
12	Concrete Drive Repair	20	LFT	$ 180	$ 3,600
13	Rock Excavation[2]	4,880	CY	$ 110	$ 536,800
14	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 93,000	$ 93,000
15	Erosion & Sediment Control	1	LS	$ 38,000	$ 38,000
16	Final Cleanup & Restoration	1	LS	$ 93,000	$ 93,000
				Subtotal	**$ 2,074,000**
				10% Contingency	$ 207,000
				Total Probable Alternative Construction Cost	**$ 2,281,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-9: WM2: Line D - North Birdie Galyan Road

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	3" PVC SDR-21 (Open Cut)	5,000	LFT	$ 60	$ 300,000
2	3" Gate Valve & Box	2	EA	$ 1,500	$ 3,000
3	H-1 Flushing Hydrant	2	EA	$ 6,000	$ 12,000
4	3/4" New Service Line and Meter Pit (Long)	14	EA	$ 4,000	$ 56,000
5	3/4" New Service Line and Meter Pit (Short)	18	EA	$ 3,500	$ 63,000
6	Remove Existing Hydrant	1	EA	$ 1,500	$ 1,500
7	Remove Existing Valve Box	1	EA	$ 500	$ 500
8	Crushed Stone Surface Repair	230	LFT	$ 100	$ 23,000
9	Rock Excavation[2]	1,435	CY	$ 110	$ 157,900
10	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 31,000	$ 31,000
11	Erosion & Sediment Control	1	LS	$ 13,000	$ 13,000
12	Final Cleanup & Restoration	1	LS	$ 31,000	$ 31,000
				Subtotal	**$ 692,000**
				10% Contingency	$ 69,000
				Total Probable Alternative Construction Cost	**$ 761,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-10: WM2: Line E - Shilo Road

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	3" PVC SDR-21 (Open Cut)	7,200	LFT	$ 60	$ 432,000
2	6"x 3" Tapping, Sleeve and Box and 3" Tapping Valve	1	EA	$ 5,000	$ 5,000
3	3"x 3" Tapping, Sleeve and Box and 3" Tapping Valve	3	EA	$ 4,000	$ 12,000
4	Abandon Small Diameter Main (<4")	4	EA	$ 1,000	$ 4,000
5	3" Line Stop	3	EA	$ 5,000	$ 15,000
6	2" Line Stop	1	EA	$ 5,000	$ 5,000
7	6" Gate Valve & Box	4	EA	$ 3,000	$ 12,000
8	H-1 Flushing Hydrant	4	EA	$ 6,000	$ 24,000
9	3/4" New Service Line and Meter Pit (Long)	8	EA	$ 4,000	$ 32,000
10	3/4" New Service Line and Meter Pit (Short)	12	EA	$ 3,500	$ 42,000
11	Remove Existing Valve Box	4	EA	$ 500	$ 2,000
12	Crushed Stone Surface Repair	200	LFT	$ 100	$ 20,000
13	Asphalt Drive Repair	20	LFT	$ 150	$ 3,000
14	Rock Excavation[2]	2,067	CY	$ 110	$ 228,000
15	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 42,000	$ 42,000
16	Erosion & Sediment Control	1	LS	$ 17,000	$ 17,000
17	Final Cleanup & Restoration	1	LS	$ 42,000	$ 42,000
				Subtotal	**$ 937,000**
				10% Contingency	$ 94,000
				Total Probable Alternative Construction Cost	**$ 1,031,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-11: WM3: Water Main Replacement Line Summary

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Total Price
1	Line A - Bethel Lane	$ 660,000
2	Line B - North Hinkle Road	$ 864,000
3	Line C - North Mount Gilead	$ 2,872,000
4	Line D - North Birdie Galyan Road	$ 926,000
5	Line E - Shilo Road	$ 1,280,000
	Subtotal	$ 6,602,000
	10% Contingency	$ 661,000
	Total Probable Construction Costs	**$ 7,263,000**

Note:

1 *All probable construction costs are based upon 2023 dollars and will likely increase with time. Construction materials and costs have been volatile in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, materials, or contractors' methods of pricing. The cost estimates were made without the benefit of final design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-12: WM3: Line A - Bethel Lane

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	6" C900 PVC (Open Cut)	3,000	LFT	$ 95	$ 285,000
2	8"x 8" Tapping, Sleeve and Box and 8" Tapping Valve	1	EA	$ 15,000	$ 15,000
3	5" Line Stop	1	EA	$ 5,000	$ 5,000
4	5" Cut and Caps	2	EA	$ 3,500	$ 7,000
5	6" Gate Valve & Box	2	EA	$ 3,000	$ 6,000
6	H-3 Hydrant Assembly	2	EA	$ 13,500	$ 27,000
7	3/4" New Service Line and Meter Pit (Long)	9	EA	$ 4,000	$ 36,000
8	3/4" New Service Line and Meter Pit (Short)	19	EA	$ 3,500	$ 66,500
9	Remove Existing Valve Box	1	EA	$ 500	$ 500
10	Crushed Stone Surface Repair	195	LFT	$ 100	$ 19,500
11	Asphalt Drive Repair	90	LFT	$ 150	$ 13,500
12	Concrete Drive Repair	15	LFT	$ 180	$ 2,700
13	Rock Excavation[2]	944	CY	$ 110	$ 104,000
14	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 30,000	$ 30,000
15	Erosion & Sediment Control	1	LS	$ 12,000	$ 12,000
16	Final Cleanup & Restoration	1	LS	$ 30,000	$ 30,000
				Subtotal	**$ 660,000**
				10% Contingency	$ 66,000
				Total Probable Alternative Construction Cost	**$ 726,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-13: WM3: Line B - North Hinkle Road

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	8" C900 PVC (Open Cut)	400	LFT	$ 120	$ 48,000
2	6" C900 PVC (Open Cut)	3,700	LFT	$ 95	$ 351,500
3	8"x 8" Tapping, Sleeve and Box and 8" Tapping Valve	2	EA	$ 15,000	$ 30,000
4	3"x 3" Tapping, Sleeve and Box and 3" Tapping Valve	1	EA	$ 4,000	$ 4,000
5	Abandon Small Diameter Main (<4")	1	EA	$ 1,000	$ 1,000
6	8" Line Stop	2	EA	$ 5,500	$ 11,000
7	3" Line Stop	1	EA	$ 5,000	$ 5,000
8	8" Cut and Caps	4	EA	$ 3,000	$ 12,000
9	6" Gate Valve & Box	2	EA	$ 3,000	$ 6,000
10	H-3 Hydrant Assembly	2	EA	$ 13,500	$ 27,000
11	3/4" New Service Line and Meter Pit (Long)	11	EA	$ 4,000	$ 44,000
12	3/4" New Service Line and Meter Pit (Short)	11	EA	$ 3,500	$ 38,500
13	Remove Existing Hydrant	1	EA	$ 1,500	$ 1,500
14	Remove Existing Valve Box	1	EA	$ 500	$ 500
15	Crushed Stone Surface Repair	200	LFT	$ 100	$ 20,000
16	Asphalt Drive Repair	100	LFT	$ 150	$ 15,000
17	Asphalt Road Repair	50	LFT	$ 190	$ 9,500
18	Concrete Drive Repair	20	LFT	$ 180	$ 3,600
19	Rock Excavation[2]	1,290	CY	$ 110	$ 142,000
20	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 39,000	$ 39,000
21	Erosion & Sediment Control	1	LS	$ 16,000	$ 16,000
22	Final Cleanup & Restoration	1	LS	$ 39,000	$ 39,000
				Subtotal	**$ 864,000**
				10% Contingency	$ 86,000
				Total Probable Alternative Construction Cost	**$ 950,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-14: WM3: Line C - North Mount Gilead Road

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	6" C900 PVC (Open Cut)	17,000	LFT	$ 95	$ 1,615,000
2	6"x 6" Tapping, Sleeve and Box and 6" Tapping Valve	1	EA	$ 6,000	$ 6,000
3	Abandon Small Diameter Main (<4")	1	EA	$ 1,000	$ 1,000
4	3" Line Stops	1	EA	$ 5,000	$ 5,000
5	6" Gate Valve & Box	3	EA	$ 3,000	$ 9,000
6	H-3 Hydrant Assembly	8	EA	$ 13,500	$ 108,000
7	3/4" New Service Line and Meter Pit (Long)	20	EA	$ 4,000	$ 80,000
8	3/4" New Service Line and Meter Pit (Short)	28	EA	$ 3,500	$ 98,000
9	Remove Existing Hydrant	1	EA	$ 1,500	$ 1,500
10	Remove Existing Valve Box	2	EA	$ 500	$ 1,000
11	Crushed Stone Surface Repair	450	LFT	$ 100	$ 45,000
12	Concrete Drive Repair	20	LFT	$ 180	$ 3,600
13	Rock Excavation[2]	5,352	CY	$ 110	$ 588,800
14	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 129,000	$ 129,000
15	Erosion & Sediment Control	1	LS	$ 52,000	$ 52,000
16	Final Cleanup & Restoration	1	LS	$ 129,000	$ 129,000
				Subtotal	**$ 2,872,000**
				10% Contingency	$ 287,000
				Total Probable Alternative Construction Cost	**$ 3,159,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-15: WM3: Line D - North Birdie Galyan Road

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	6" C900 PVC (Open Cut)	5,000	LFT	$ 95	$ 475,000
2	6" Gate Valve & Box	2	EA	$ 3,000	$ 6,000
3	H-3 Hydrant Assembly	2	EA	$ 13,500	$ 27,000
4	3/4" New Service Line and Meter Pit (Long)	14	EA	$ 4,000	$ 56,000
5	3/4" New Service Line and Meter Pit (Short)	18	EA	$ 3,500	$ 63,000
6	Remove Existing Hydrant	1	EA	$ 1,500	$ 1,500
7	Remove Existing Valve Box	1	EA	$ 500	$ 500
8	Crushed Stone Surface Repair	230	LFT	$ 100	$ 23,000
9	Rock Excavation[2]	1,574	CY	$ 110	$ 173,200
10	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 42,000	$ 42,000
11	Erosion & Sediment Control	1	LS	$ 17,000	$ 17,000
12	Final Cleanup & Restoration	1	LS	$ 42,000	$ 42,000
				Subtotal	**$ 926,000**
				10% Contingency	$ 93,000
				Total Probable Alternative Construction Cost	**$ 1,019,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-16: WM3: Line E - Shilo Road

Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Est Qty	Unit	Unit Price	Total Price
1	6" C900 PVC (Open Cut)	7,200	LFT	$ 95	$ 684,000
2	6"x 6" Tapping, Sleeve and Box and 6" Tapping Valve	1	EA	$ 6,000	$ 6,000
3	3"x 3" Tapping, Sleeve and Box and 3" Tapping Valve	3	EA	$ 4,000	$ 12,000
4	Abandon Small Diameter Main (<4")	4	EA	$ 1,000	$ 4,000
5	3" Line Stop	3	EA	$ 5,000	$ 15,000
6	2" Line Stop	1	EA	$ 5,000	$ 5,000
7	6" Gate Valve & Box	4	EA	$ 3,000	$ 12,000
8	H-3 Hydrant Assembly	4	EA	$ 13,500	$ 54,000
9	3/4" New Service Line and Meter Pit (Long)	8	EA	$ 4,000	$ 32,000
10	3/4" New Service Line and Meter Pit (Short)	12	EA	$ 3,500	$ 42,000
11	Remove Existing Valve Box	4	EA	$ 500	$ 2,000
12	Crushed Stone Surface Repair	200	LFT	$ 100	$ 20,000
13	Asphalt Drive Repair	20	LFT	$ 150	$ 3,000
14	Rock Excavation[2]	2,267	CY	$ 110	$ 250,000
15	Mobilization, Demob, Bonds, & Insurance	1	LS	$ 58,000	$ 58,000
16	Erosion & Sediment Control	1	LS	$ 23,000	$ 23,000
17	Final Cleanup & Restoration	1	LS	$ 58,000	$ 58,000
				Subtotal	**$ 1,280,000**
				10% Contingency	$ 128,000
				Total Probable Alternative Construction Cost	**$ 1,408,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of field survey, design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *It is assumed that rock will be encountered 2' deep throughout the entire water main replacement.*

Table B-17: Phase I, II, & III Probable Construction Costs

I. Phase I Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Total Price
1	Water Mains Alternative 4 (WM4): Replace Meters	$ 600,000
	Subtotal	**$ 600,000**
	Probable Construction Costs	**$ 600,000**

I. Phase II Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Total Price
1	Water Mains Alternative 3 (WM3): Line A - Bethel Lane	$ 660,000
2	Water Mains Alternative 3 (WM3): Line C - North Mount Gilead Road	$ 2,872,000
3	Water Mains Alternative 3 (WM3): Line E - Shilo Road	$ 1,280,000
4	Booster Station Alternative 3 (BS3): Portable Power at State Road 45 Booster Station, Hinkle Road Booster Station, and Office Building	$ 207,000
	Subtotal	**$ 5,019,000**
	10% Contingency	$ 502,000
	Probable Construction Costs	**$ 5,521,000**

III. Phase III Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Total Price
1	Water Mains Alternative 2 (WM2): Line B - North Hinkle Road	$ 686,000
2	Water Mains Alternative 2 (WM2): Line D - North Birdie Galyan Road	$ 692,000
3	Booster Station Alternative 2 (BS2): Rehabilitate Pumps & Piping at State Road 45 Booster Stati	$ 135,000
	Subtotal	**$ 1,513,000**
	10% Contingency	$ 151,000
	Probable Construction Costs	**$ 1,664,000**

Table B-18: Proposed Project

I. Phase II Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Total Price
1	Water Mains Alternative 3 (WM3): Line A - Bethel Lane	$ 660,000
2	Water Mains Alternative 3 (WM3): Line C - North Mount Gilead Road	$ 2,872,000
3	Water Mains Alternative 3 (WM3): Line E - Shilo Road	$ 1,280,000
4	Booster Station Alternative 3 (BS3): Portable Power at State Road 45 Booster Station, Hinkle Road Booster Station, and Office Building	$ 207,000
	Subtotal	**$ 5,019,000**
	10% Contingency	$ 502,000
	Probable Construction Costs	**$ 5,521,000**
	Probable Non-Construction Costs (25%)	**$ 1,380,000**

Total Probable Overall Project Cost	**$ 6,901,000**
Total Anticipated SRF Loan Amount	**$ 6,901,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *The cost estimates are based on past similar projects and were made without the benefit of field survey, design plans and specifications. These estimates are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

APPENDIX C

NET PRESENT WORTH COMPARISONS

Table of Contents

Table C-1: Storage Alternatives Net Present Worth Comparison

	Storage Alt 1 (Selected) No Construction	Storage Alt 2 New Elevated Storage Tank
Capital Costs		
Construction Costs - Equipment	$ -	$ 1,225,000
Construction Costs - Structures	$ -	$ -
Construction Costs - Piping	$ -	$ 52,500
Construction Costs - Miscellaneous	$ -	$ 212,000
Non-Construction Costs	$ -	$ -
SUBTOTAL CAPITAL COST	$ -	$ 1,489,000
SUBTOTAL CAPITAL COST (PV)	**$ -**	**$ 1,489,000**
Annual Operation & Maintenance Costs		
Salaries and Wages	$ 248,000	$ 248,000
Tank Inspection & Maintenance	$ 14,400	$ 14,400
Electricity	$ 1,800	$ 1,800
SUBTOTAL ANNUAL O&M COST	$ 265,000	$ 265,000
SUBTOTAL ANNUAL O&M COST (USPW)(1, 2)	**$ 4,333,000**	**$ 4,333,000**
Salvage Value @ Year 20		
Equipment (20-year Design Service Life)	$ -	$ -
Structures (50-year Design Service Life)	$ -	$ -
Piping (75-year Design Service Life)	$ -	$ 38,500.00
SUBTOTAL SALVAGE VALUE @ YR 20	$ -	$ 38,500.00
SUBTOTAL SALVAGE VALUE @ YR 20 (SPPW)(1, 2)	**$0.00**	**$ 26,000.00**
NET PRESENT WORTH OF ALTERNATIVE	$ 4,333,000.00	$ 5,796,000.00
NET PRESENT WORTH COMPARISON (NPW/NPW of Selected Alternative)	1	1.337641357

Notes & Assumptions:

PV Present Value

USPW Uniform Series Present Worth

SPPW Single Payment Present Worth

(1) 2.0% "real" interest rate from latest version of Appendix C of OMB Circular No. A-94

(2) Assumes 20-year planning period.

(3) All probable project costs are based upon 2023 dollars and will likely increase with time. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.

Table C-2: Booster Station Alternatives Net Present Worth Comparison

	Booster Station Alt 1 No Construction	Booster Station Alt 2 (Selected, Phase III) Rehab Pumps & Piping @ SR 45	Booster Station Alt 3 (Selected, Phase II) Portable Power @ SR 45, Hinkle Rd, & Office	Booster Station Alt 4 Permanent Power @ SR 45, Hinkle Rd, & Office
Capital Costs				
Construction Costs - Equipment	$ -	$ 100,000	$ 200,000	$ 302,000
Construction Costs - Structures	$ -	$ -	$ -	$ -
Construction Costs - Piping	$ -	$ 20,000	$ -	$ -
Construction Costs - Miscellaneous	$ -	$ 15,000	$ 7,000	$ 8,000
Non-Construction Costs	$ -	$ -	$ -	$ -
SUBTOTAL CAPITAL COST	$ -	$ 135,000	$ 207,000	$ 310,000
SUBTOTAL CAPITAL COST (PV)	**$ -**	**$ 135,000**	**$ 207,000**	**$ 310,000**
Annual Operation & Maintenance Costs				
Salaries and Wages	$ 248,000	$ 248,000	$ 248,000	$ 248,000
Maintenance	$ 5,000	$ 5,000	$ 5,000	$ 5,000
Electricity	$ 24,000	$ 24,000	$ 24,000	$ 24,000
SUBTOTAL ANNUAL O&M COST	$ 277,000	$ 277,000	$ 277,000	$ 277,000
SUBTOTAL ANNUAL O&M COST (USPW)[1, 2]	**$ 4,529,000**	**$ 4,529,000**	**$ 4,529,000**	**$ 4,529,000**
Salvage Value @ Year 20				
Equipment (20-year Design Service Life)	$ -	$ -	$ -	$ -
Structures (50-year Design Service Life)	$ -	$ -	$ -	$ -
Piping (75-year Design Service Life)	$ -	$ 14,700	$ -	$ -
SUBTOTAL SALVAGE VALUE @ YR 20	$ -	$ 14,700	$ -	$ -
SUBTOTAL SALVAGE VALUE @ YR 20 (SPPW)[1, 2]	**$ -**	**$ 10,000**	**$ -**	**$ -**
NET PRESENT WORTH OF ALTERNATIVE	$ 4,529,000	$ 4,654,000	$ 4,736,000	$ 4,839,000
NET PRESENT WORTH COMPARISON (NPW/NPW of Selected Alternative)	0.973141384	0.982685811	1	1.021748311

Notes & Assumptions:

PV Present Value

USPW Uniform Series Present Worth

SPPW Single Payment Present Worth

(1) 2.0% "real" interest rate from latest version of Appendix C of OMB Circular No. A-94

(2) Assumes 20-year planning period.

(3) All probable project costs are based upon 2023 dollars and will likely increase with time. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.

Table C-3: Watermain Line A - Bethel Lane Alternatives Net Present Worth Comparison

	Water Main Alt. 1 No Construction	Water Main Alt 2 Replace In-Kind Size	Water Main Alt 3 (Selected, Phase II) Replace & Upsize
Capital Costs			
Construction Costs - Equipment	$ -	$ -	$ -
Construction Costs - Structures	$ -	$ -	$ -
Construction Costs - Piping	$ -	$ 341,300	$ 448,000
Construction Costs - Miscellaneous	$ -	$ 170,700	$ 211,700
Non-Construction Costs	$ -	$ -	$ -
SUBTOTAL CAPITAL COST	$ -	$ 512,000	$ 660,000
SUBTOTAL CAPITAL COST (PV)	**$ -**	**$ 512,000**	**$ 660,000**
Annual Operation & Maintenance Costs			
Salaries and Wages	$ 248,000	$ 248,000	$ 248,000
Water Purchase	$ 300,000	$ 300,000	$ 300,000
Maintenance & Repairs	$ 3,000	$ -	$ -
SUBTOTAL ANNUAL O&M COST	$ 551,000	$ 548,000	$ 548,000
SUBTOTAL ANNUAL O&M COST (USPW)(1, 2)	**$ 9,010,000**	**$ 8,961,000**	**$ 8,961,000**
Salvage Value @ Year 20			
Equipment (20-year Design Service Life)	$ -	$ -	$ -
Structures (50-year Design Service Life)	$ -	$ -	$ -
Piping (75-year Design Service Life)	$ -	$ 250,300	$ 328,600
SUBTOTAL SALVAGE VALUE @ YR 20	$ -	$ 250,300	$ 328,600
SUBTOTAL SALVAGE VALUE @ YR 20 (SPPW)(1, 2)	**$ -**	**$ 168,000**	**$ 221,000**
NET PRESENT WORTH OF ALTERNATIVE	$ 9,010,000	$ 9,305,000	$ 9,400,000
RESENT WORTH COMPARISON (NPW/NPW of Selected Alternative)	0.958510638	0.989893617	1

Notes & Assumptions:

PV Present Value

USPW Uniform Series Present Worth

SPPW Single Payment Present Worth

(1) 2.0% "real" interest rate from latest version of Appendix C of OMB Circular No. A-94

(2) Assumes 20-year planning period.

(3) All probable project costs are based upon 2023 dollars and will likely increase with time. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.

Table C-4: Watermain Line B - Hinkle Road Alternatives Net Present Worth Comparison

	Water Main Alt. 1 No Construction	Water Main Alt 2 (Selected, Phase III) Replace In-Kind Size	Water Main Alt 3 Replace & Upsize
Capital Costs			
Construction Costs - Equipment	$ -	$ -	$ -
Construction Costs - Structures	$ -	$ -	$ -
Construction Costs - Piping	$ -	$ 432,500	$ 580,000
Construction Costs - Miscellaneous	$ -	$ 253,100	$ 284,100
Non-Construction Costs	$ -	$ -	$ -
SUBTOTAL CAPITAL COST	$ -	$ 686,000	$ 864,000
SUBTOTAL CAPITAL COST (PV)	**$ -**	**$ 686,000**	**$ 864,000**
Annual Operation & Maintenance Costs			
Salaries and Wages	$ 248,000	$ 248,000	$ 248,000
Water Purchase	$ 300,000	$ 300,000	$ 300,000
Maintenance & Repairs	$ 2,000	$ -	$ -
SUBTOTAL ANNUAL O&M COST	$ 550,000	$ 548,000	$ 548,000
SUBTOTAL ANNUAL O&M COST (USPW)[1, 2]	**$ 8,993,000**	**$ 8,961,000**	**$ 8,961,000**
Salvage Value @ Year 20			
Equipment (20-year Design Service Life)	$ -	$ -	$ -
Structures (50-year Design Service Life)	$ -	$ -	$ -
Piping (75-year Design Service Life)	$ -	$ 317,200	$ 425,400
SUBTOTAL SALVAGE VALUE @ YR 20	$ -	$ 317,200	$ 425,400
SUBTOTAL SALVAGE VALUE @ YR 20 (SPPW)[1, 2]	**$ -**	**$ 213,000**	**$ 286,000**
NET PRESENT WORTH OF ALTERNATIVE	$ 8,993,000	$ 9,434,000	$ 9,539,000
NET PRESENT WORTH COMPARISON (NPW/NPW of Selected Alternative)	0.953254187	1	1.011129955

Notes & Assumptions:

PV Present Value

USPW Uniform Series Present Worth

SPPW Single Payment Present Worth

(1) 2.0% "real" interest rate from latest version of Appendix C of OMB Circular No. A-94

(2) Assumes 20-year planning period.

(3) All probable project costs are based upon 2023 dollars and will likely increase with time. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.

Table C-5: Watermain Line C - Mount Gilead Alternatives Net Present Worth Comparison

		Water Main Alt. 1 No Construction	Water Main Alt 2 Replace In-Kind Size	Water Main Alt 3 (Selected, Phase II) Replace & Upsize
Capital Costs				
	Construction Costs - Equipment	$ -	$ -	$ -
	Construction Costs - Structures	$ -	$ -	$ -
	Construction Costs - Piping	$ -	$ 1,265,000	$ 1,924,500
	Construction Costs - Miscellaneous	$ -	$ 809,400	$ 947,400
	Non-Construction Costs	$ -	$ -	$ -
	SUBTOTAL CAPITAL COST	$ -	$ 2,074,000	$ 2,872,000
	SUBTOTAL CAPITAL COST (PV)	**$ -**	**$ 2,074,000**	**$ 2,872,000**
Annual Operation & Maintenance Costs				
	Salaries and Wages	$ 248,000	$ 248,000	$ 248,000
	Water Purchase	$ 300,000	$ 300,000	$ 300,000
	Maintenance & Repairs	$ 8,000	$ -	$ -
	SUBTOTAL ANNUAL O&M COST	$ 556,000	$ 548,000	$ 548,000
	SUBTOTAL ANNUAL O&M COST (USPW)[1, 2]	**$ 9,091,000**	**$ 8,961,000**	**$ 8,961,000**
Salvage Value @ Year 20				
	Equipment (20-year Design Service Life)	$ -	$ -	$ -
	Structures (50-year Design Service Life)	$ -	$ -	$ -
	Piping (75-year Design Service Life)	$ -	$ 927,700	$ 1,411,300
	SUBTOTAL SALVAGE VALUE @ YR 20	$ -	$ 927,700	$ 1,411,300
	SUBTOTAL SALVAGE VALUE @ YR 20 (SPPW)[1, 2]	**$ -**	**$ 624,000**	**$ 950,000**
	NET PRESENT WORTH OF ALTERNATIVE	$ 9,091,000	$ 10,411,000	$ 10,883,000
	NET PRESENT WORTH COMPARISON (NPW/NPW of Selected Alternative)	0.83533952	0.956629606	1

Notes & Assumptions:

PV Present Value

USPW Uniform Series Present Worth

SPPW Single Payment Present Worth

(1) 2.0% "real" interest rate from latest version of Appendix C of OMB Circular No. A-94

(2) Assumes 20-year planning period.

(3) All probable project costs are based upon 2023 dollars and will likely increase with time. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.

Table C-6: Watermain Line D - North Birdie Galyan Rd Alternatives Net Present Worth Comparison

		Water Main Alt. 1 No Construction	Water Main Alt 2 (Selected, Phase III) Replace In-Kind Size	Water Main Alt 3 Replace & Upsize
Capital Costs				
	Construction Costs - Equipment	$ -	$ -	$ -
	Construction Costs - Structures	$ -	$ -	$ -
	Construction Costs - Piping	$ -	$ 436,000	$ 629,000
	Construction Costs - Miscellaneous	$ -	$ 255,900	$ 297,200
	Non-Construction Costs	$ -	$ -	$ -
	SUBTOTAL CAPITAL COST	$ -	$ 692,000	$ 926,000
	SUBTOTAL CAPITAL COST (PV)	**$ -**	**$ 692,000**	**$ 926,000**
Annual Operation & Maintenance Costs				
	Salaries and Wages	$ 248,000	$ 248,000	$ 248,000
	Water Purchase	$ 300,000	$ 300,000	$ 300,000
	Maintenance & Repairs	$ 500	$ -	$ -
	SUBTOTAL ANNUAL O&M COST	$ 549,000	$ 548,000	$ 548,000
	SUBTOTAL ANNUAL O&M COST (USPW)[1, 2]	**$ 8,977,000**	**$ 8,961,000**	**$ 8,961,000**
Salvage Value @ Year 20				
	Equipment (20-year Design Service Life)	$ -	$ -	$ -
	Structures (50-year Design Service Life)	$ -	$ -	$ -
	Piping (75-year Design Service Life)	$ -	$ 319,800	$ 461,300
	SUBTOTAL SALVAGE VALUE @ YR 20	$ -	$ 319,800	$ 461,300
	SUBTOTAL SALVAGE VALUE @ YR 20 (SPPW)[1, 2]	**$ -**	**$ 215,000**	**$ 310,000**
	NET PRESENT WORTH OF ALTERNATIVE	$ 8,977,000	$ 9,438,000	$ 9,577,000
	NET PRESENT WORTH COMPARISON (NPW/NPW of Selected Alternative)	0.951154906	1	1.014727697

Notes & Assumptions:

PV Present Value

USPW Uniform Series Present Worth

SPPW Single Payment Present Worth

(1) 2.0% "real" interest rate from latest version of Appendix C of OMB Circular No. A-94

(2) Assumes 20-year planning period.

(3) All probable project costs are based upon 2023 dollars and will likely increase with time. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.

Table C-7: Watermain Line E - Shilo Road Alternatives Net Present Worth Comparison

	Water Main Alt. 1 No Construction	Water Main Alt 2 Replace In-Kind Size	Water Main Alt 3 (Selected, Phase II) Replace & Upsize
Capital Costs			
Construction Costs - Equipment	$ -	$ -	$ -
Construction Costs - Structures	$ -	$ -	$ -
Construction Costs - Piping	$ -	$ 585,000	$ 868,000
Construction Costs - Miscellaneous	$ -	$ 352,000	$ 412,000
Non-Construction Costs	$ -	$ -	$ -
SUBTOTAL CAPITAL COST	$ -	$ 937,000	$ 1,280,000
SUBTOTAL CAPITAL COST (PV)	**$ -**	**$ 937,000**	**$ 1,280,000**
Annual Operation & Maintenance Costs			
Salaries and Wages	$ 248,000	$ 248,000	$ 248,000
Water Purchase	$ 300,000	$ 300,000	$ 300,000
Maintenance & Repairs	$ 500	$ -	$ -
SUBTOTAL ANNUAL O&M COST	$ 549,000	$ 548,000	$ 548,000
SUBTOTAL ANNUAL O&M COST (USPW)[1, 2]	**$ 8,977,000**	**$ 8,961,000**	**$ 8,961,000**
Salvage Value @ Year 20			
Equipment (20-year Design Service Life)	$ -	$ -	$ -
Structures (50-year Design Service Life)	$ -	$ -	$ -
Piping (75-year Design Service Life)	$ -	$ 429,000	$ 636,600
SUBTOTAL SALVAGE VALUE @ YR 20	$ -	$ 429,000	$ 636,600
SUBTOTAL SALVAGE VALUE @ YR 20 (SPPW)[1, 2]	**$ -**	**$ 289,000**	**$ 428,000**
NET PRESENT WORTH OF ALTERNATIVE	$ 8,977,000	$ 9,609,000	$ 9,813,000
NET PRESENT WORTH COMPARISON (NPW/NPW of Selected Alternative)	0.914806889	0.97921125	1

Notes & Assumptions:

PV Present Value

USPW Uniform Series Present Worth

SPPW Single Payment Present Worth

(1) 2.0% "real" interest rate from latest version of Appendix C of OMB Circular No. A-94

(2) Assumes 20-year planning period.

(3) All probable project costs are based upon 2023 dollars and will likely increase with time. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.

APPENDIX D

REFERENCE INFORMATION

Table of Contents

ATTACHMENT D-1

Month	Sum of Water Supplied (1000 Gallons)	Average of Water Supplied (1000 Gallons)	Max of Water Supplied (1000 Gallons)	Min of Water Supplied (1000 Gallons)
2020				
Jul	13634	439.8	797	280
Aug	12673	408.8	631	242
Sep	12893	429.8	670	169
Oct	11601	374.2	560	132
Nov	10887	362.9	458	225
Dec	11108	358.3	466	250
2021				
Jan	11410	368.1	468	147
Feb	11537	412.0	642	298
Mar	10777	347.6	486	213
Apr	10835	361.2	593	36
May	11807	380.9	452	183
Jun	11734	391.1	504	87
Jul	12082	389.7	764	219
Aug	12813	413.3	828	215
Sep	11486	382.9	571	232
Oct	11265	363.4	522	282
Nov				
Dec	11491	370.7	438	312
2022				
Jan	-	-	-	-
Feb	11464	409.4	532	298
Mar	11468	369.9	450	285
Apr	11559	385.3	492	262
May	12644	407.9	681	242
Jun	-	-	-	-
Jul	13404	432.4	556	252
Aug	13561	437.5	576	172
Sep	11567	385.6	575	170
Oct	11684	376.9	522	239
Nov	11129	371.0	538	266
Dec	11893	383.6	515	256
2023				
Jan	11903	384.0	523	272
Feb	10658	380.6	651	279
Mar	11573	373.3	660	261
Apr	12710	423.7	604	285
May	12289	396.4	598	207
Jun	12837	427.9	597	305
Jul	12782	412.3	525	344

ATTACHMENT D-2

AWWA Free Water Audit Software v6.0

FWAS v6.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format and is not meant to take the place of a full-scale, comprehensive water audit format. Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targeting loss reduction levels. This tool contains several separate worksheets. Sheets can be accessed using the tabs at the bottom of the screen, or by clicking the TOC links below.

Table of Contents (TOC)

AWWA Web Resources for Water Loss Control
https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control
Items referenced in the Free Water Audit Software v6.0 on the web:
- Data Grading Matrix v6.0
- Example Water Audit v6.0
- Water Audit Compiler v6.0
- AWWA Reports on Performance Indicators
- M36 Manual

Enter Basic Information

Name of Utility:	B&B Water Project Inc.
Name of Contact Person:	Jeffrey Underwood
Email:	junderwood@alumni.iu.edu
Telephone | Ext.:	812-332-0577
City/Town/Municipality:	Bloomington
State / Province:	Indiana (IN)
Country:	US
Audit Preparation Date:	Jul 12 2022
Audit Year:	2021
Audit Year Label:	Calender (Fiscal, Calendar, etc)
Audit Period Start Date:	Jan 01 2021
Audit Period End Date:	Dec 31 2021
Volume Reporting Units:	Million gallons (US)
Water System Structure:	Wholesale
Water Type:	Potable Water
System ID Number:	IN5253001
Validator Name/ID:	Rick Coppock - WV220078
Validator Email:	rcoppock@bynumfanyo.com
Estimated Total Population Served by Water Utility:	5,075

Key of Input Acronyms

In order of appearance in the Worksheet

VOS	Volume from Own Sources
VOSEA	VOS Error Adjustment
WI	Water Imported
WIEA	WI Error Adjustment
WE	Water Exported
WEEA	WE Error Adjustment
BMAC	Billed Metered Authorized Consumption
BUAC	Billed Unmetered Authorized Consumption
UMAC	Unbilled Metered Authorized Consumption
UUAC	Unbilled Unmetered Authorized Consumption
SDHE	Systematic Data Handling Errors
CMI	Customer Metering Inaccuracies
UC	Unauthorized Consumption
Lm	Length of mains
Nc	Number of service connections
Lp	Average length of (private) customer service line
AOP	Average Operating Pressure
CRUC	Customer Retail Unit Charge
VPC	Variable Production Cost

Color Key User input | Calculated | Optional default

Guidance for the Worksheet

Choosing to enter unit of **percent** or **volume** (applies to VOSEA, WIEA, WEEA, CMI)
choose entry option:

1.00%	percent	*or*
	volume	25.000

Choosing to enter **default** or **custom input** (applies to UUAC, SDHE, UC)
choose entry option:

0.25%	default	*or*
	custom	75.000

Guidance for the Interactive Data Grading

Use acronym buttons in IDG header to navigate among inputs. Acronym Key above. White = needs answers, orange = complete, clear = not required. Example below.

After clicking an acronym button, answer all visible questions in the order they're presented, choosing best-fit answer

Grade will populate when all visible questions are complete for an input: **7**

The limiting criteria will be labeled along the right. If only 1 limiting criterion is shown, improving on that criterion will achieve a higher data grade. If multiple limiting criteria are shown, improving on *each* limiting criterion is necessary to achieve a higher data grade. A complete inventory of data grading criteria is available in the Data Grading Matrix v6.0 (see web resources)

Limiting

If you have questions or comments regarding this software please contact us at: wlc@awwa.org

AWWA Free Water Audit Software: Worksheet

FWAS v6.0
American Water Works Association.

Water Audit Report for: B&B Water Project Inc.
Audit Year: 2021 | Jan 01 2021 - Dec 31 2021 | Calender

Click 'n' to add notes
Click 'g' to determine data validity grade

To edit water system info: go to start page

To access definitions, click the input name

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

Water Supplied Error Adjustments

WATER SUPPLIED

choose entry option:

		n	g									
VOS	Volume from Own Sources:	n	g	n/a		MG/Yr						VOSEA
WI	Water Imported:	n	g	7	137.632	MG/Yr	n	g	9	0.25%	percent	under-registration WIEA
WE	Water Exported:	n	g	n/a		MG/Yr						WEEA

WATER SUPPLIED: 137.977 MG/Yr

AUTHORIZED CONSUMPTION

BMAC	Billed Metered:	n	g	7	78.924	MG/Yr						
BUAC	Billed Unmetered:	n	g	n/a		MG/Yr						
UMAC	Unbilled Metered:	n	g	n/a		MG/Yr						
UUAC	Unbilled Unmetered:	n	g	1	0.143	MG/Yr	choose entry option:			custom	0.143	MG/Yr

AUTHORIZED CONSUMPTION: 79.067 MG/Yr

WATER LOSSES

58.910 MG/Yr

Apparent Losses

Default option selected for Systematic Data Handling Errors, with automatic data grading of 3

choose entry option:

SDHE	Systematic Data Handling Errors:	n	g	3	0.197	MG/Yr	0.25%	default	
CMI	Customer Metering Inaccuracies:	n	g	2	0.198	MG/Yr	0.25%	percent	under-registration
UC	Unauthorized Consumption:	n	g	3	0.197	MG/Yr	0.25%	default	

Default option selected for Unauthorized Consumption, with automatic data grading of 3

Apparent Losses: 0.592 MG/Yr

Real Losses

Real Losses: 58.318 MG/Yr

WATER LOSSES: 58.910 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 59.053 MG/Yr

SYSTEM DATA

Lm	Length of mains:	n	g	6	74.5	miles	(including fire hydrant lead lengths)
Nc	Number of service connections:	n	g	5	1,856		(active *and* inactive)
	Service connection density:				25	conn./mile main	

Are customer meters typically located at the curbstop/property line? Yes

Lp: n g 10

Average length of customer service line has been set to zero and a data grading of 10 has been applied

AOP: Average Operating Pressure: n g 5 65.0 psi

COST DATA

CRUC	Customer Retail Unit Charge:	n	g	5	$7.58	$/1000 gallons (US)	Total Annual Operating Cost	
VPC	Variable Production Cost:	n	g	8	$2,407.49	$/Million gallons	$819,451	$/yr (optional input)

WATER AUDIT DATA VALIDITY TIER:

***** The Water Audit Data Validity Score is in Tier III (51-70). See Dashboard tab for additional outputs. *****

go to dashboard

A weighted scale for the components of supply, consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION TO IMPROVE DATA VALIDITY:

Based on the information provided, audit reliability can be most improved by addressing the following components:

1: Water Imported (WI)
2: Customer Metering Inaccuracies (CMI)
3: Billed Metered (BMAC)

KEY PERFORMANCE INDICATOR TARGETS:

OPTIONAL: If targets exist for the operational performance indicators, they can be input below:

Unit Total Losses:		gal/conn/day
Unit Apparent Losses:		gal/conn/day
Unit Real Losses[A]:		gal/conn/day
Unit Real Losses[B]:		gal/mile/day

If entered above by user, targets will display on KPI gauges (see Dashboard)

AWWA Free Water Audit Software
Water Balance

FWAS v6.0

Water Audit Report for: B&B Water Project Inc.
Audit Year: 2021 Jan 01 2021 - Dec 31 2021
Data Validity Tier: Tier III (51-70)

		Water Exported (WE) (corrected for known errors) 0.000	Billed Water Exported			Revenue Water (Exported) 0.000
Volume from Own Sources (VOS) (corrected for known errors) 0.000	System Input Volume 137.977	Water Supplied 137.977	Authorized Consumption 79.067	Billed Authorized Consumption 78.924	Billed Metered Consumption (BMAC) (water exported is removed) 78.924	Revenue Water 78.924
					Billed Unmetered Consumption (BUAC) 0.000	
				Unbilled Authorized Consumption 0.143	Unbilled Metered Consumption (UMAC) 0.000	Non-Revenue Water (NRW) 59.053
					Unbilled Unmetered Consumption (UUAC) 0.143	
			Water Losses 58.910	Apparent Losses 0.592	Systematic Data Handling Errors (SDHE) 0.197	
					Customer Metering Inaccuracies (CMI) 0.198	
					Unauthorized Consumption (UC) 0.197	
Water Imported (WI) (corrected for known errors) 137.977				Real Losses 58.318	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

AWWA Free Water Audit Software: Determining Water Loss Standing

FWAS v6.0

Water Audit Report for: B&B Water Project Inc.
Audit Year: 2021 Jan 01 2021 - Dec 31 2021
Data Validity Tier: Tier III (51-70)

Water Loss Control Planning Guide

	Water Audit Data Validity Tier (Score Range)				
Functional Focus Area	**Tier I (1-25)**	**Tier II (26-50)**	**Tier III (51-70)**	**Tier IV (71-90)**	**Tier V (91-100)**
Audit Data Collection	Launch auditing and loss control team; address supply metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations; Identify data gaps; improve supply metering	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs; Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or AMR/AMI system	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon with PIs for performance comparisons for real losses	Performance Benchmarking with PIs is meaningful in comparing real loss standing	Identify Best Practices/ Best in class; PIs are very reliable as real loss performance indicators for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

AWWA Free Water Audit Software: Definitions

FWAS v6.0

Item Name	Description
Apparent Losses Find	= systematic data handling errors + customer metering inaccuracies + unauthorized consumption Apparent Losses include all types of inaccuracies associated with customer metering (worn meters as well as improperly sized meters or wrong type of meter for the water usage profile) as well as systematic data handling errors (meter reading, billing, archiving and reporting), plus unauthorized consumption (theft or illegal use). NOTE: Over-estimation of Apparent Losses results in under-estimation of Real Losses. Under-estimation of Apparent Losses results in over-estimation of Real Losses.
AUTHORIZED CONSUMPTION Find	= billed metered + billed unmetered + unbilled metered + unbilled unmetered consumption The volume of metered and/or unmetered water taken by registered customers, the water utility's own uses, and uses of others who are implicitly or explicitly authorized to do so by the water utility; for residential, commercial, industrial and public-minded purposes. Typical retail customers' consumption is tabulated usually from established customer accounts as billed metered consumption, or - for unmetered customers - billed unmetered consumption. These types of consumption, along with billed water exported, provide revenue potential for the water utility. Typically a lag will exist between timing for reading of supply meters and reading of customer meters. A lag-time correction should typically be calculated to account for this. **Be certain to tabulate the water exported volume as a separate component and do not "double-count" it by including in the billed metered consumption component as well as the water exported component.** Unbilled authorized consumption occurs typically in non-account uses, including water for fire fighting and training, flushing of water mains and sewers, street cleaning, watering of municipal gardens, public fountains, or similar public-minded uses. Occasionally these uses may be metered and billed (or charged a flat fee), but usually they are unmetered and unbilled. In the latter case, the water auditor may use a default value to estimate this quantity, or implement procedures for the reliable quantification of these uses. This starts with documenting usage events as they occur and estimating the amount of water used in each event. (See Unbilled Unmetered Authorized Consumption)
View Service Connection Diagram **Average Length of (private) Customer Service Line (Lp)** Find	This is the average length of underground customer service line, Lp, that is owned and maintained by the customer; from the point of ownership transfer to the customer water meter, or building line (if unmetered). The quantity is one of the data inputs for the calculation of Unavoidable Annual Real Losses (UARL), which serves as the denominator of the performance indicator: Infrastructure Leakage Index (ILI). The value of Lp is multiplied by the number of customer service connections to obtain a total length of customer owned piping in the system. The purpose of this parameter is to account for the unmetered service line infrastructure that is the responsibility of the customer for arranging repairs of leaks that occur on their lines. In many cases leak repairs arranged by customers take longer to be executed than leak repairs arranged by the water utility on utility-maintained piping. Leaks run longer - and lose more water - on customer-owned service piping, than utility owned piping. If the customer water meter exists near the ownership transfer point (usually the curb stop located between the water main and the customer premises) this distance is zero because the meter and transfer point are the same. This is the often encountered configuration of customer water meters located in an underground meter box or "pit" outside of the customer's building. The Free Water Audit Software asks a "Yes/No" question about the meter at this location. If the auditor selects "Yes" then this distance is set to zero and the data grading score for this component is set to 10. If water meters are typically located inside the customer premise/building, or properties are unmetered, it is up to the water auditor to estimate a system-wide average Lp length based upon the various customer land parcel sizes and building locations in the service area. Lp will be a shorter length in areas of high density housing, and a longer length in areas of low density housing and varied commercial and industrial buildings. General parcel demographics should be employed to obtain a total Lp length (Lc) and subsequently a weighted average Lp length for the entire system. Refer to the "Service Connection Diagram" worksheet for a depiction of the service line/metering configurations that typically exist in water utilities. This worksheet gives guidance on the determination of the Average Length, Lp, for each configuration.
Average Operating Pressure (AOP) Find	This is the average pressure in the distribution system that is the subject of the water audit. If the water utility is compiling the water audit for the first time, the average pressure can be approximated, but with a low data grading. In subsequent years of auditing, effort should be made to improve the accuracy of the average pressure quantity. This will then qualify the value for a higher data grading. In the absence of a hydraulic model, the average pressure may be approximated by obtaining readings of static water pressure from a representative sample of fire hydrants or other system access points evenly located across the system. A weighted average of the pressure can be assembled; but be sure to take into account the elevation of the fire hydrants, which typically exist several feet higher than the level of buried water pipelines. If your water utility has an up-to-date and calibrated hydraulic model of the water distribution system, it can be utilized to obtain a very accurate quantity of average pressure. However using the average pressure of all “nodes” in the system model is not necessarily the most accurate way to calculate the average operating pressure. This is especially true if there are significant pressure differences throughout the system, and the “nodes” are not evenly distributed throughout the distribution system. The most accurate calculation is to obtain the average pressure that each pipe segment experiences. The way to do this is to calculate the pressure at each end of the pipe. Then calculate the average of those two values and multiply this average value by the length of that pipe. This must be calculated for all pipe segments in the model. Finally calculate the sum of all of these values and and divide by the total pipe length. This effectively calculates a weighted average of pressure over the total pipe length. For low density systems (<32 connections/mile), average mains pressures at the service connection or curb stop may have greater influence and should be considered.
Billed Authorized Consumption	All consumption that is billed and authorized by the utility. This may include both metered and unmetered consumption. See "Authorized Consumption" for more information.

Item Name	Description
Billed Metered Authorized Consumption (BMAC) Find	All metered consumption which is billed to retail customers, including all groups of customers such as domestic, commercial, industrial or institutional. **It does NOT include water supplied to neighboring utilities (water exported) which is metered and billed. Be sure to subtract any consumption for exported water sales that may be included in these billing roles. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.** The metered consumption data can be taken directly from billing records for the water audit period. The accuracy of yearly metered consumption data can be refined by including an adjustment to account for customer meter reading lag time since not all customer meters are read on the same day of the meter reading period. However additional analysis is necessary to determine the lag time adjustment value, which may or may not be significant.
Billed Unmetered Authorized Consumption (BUAC) Find	All billed consumption which is calculated based on estimates or norms from water usage sites that have been determined by utility policy to be left unmetered. This is typically a very small component in systems that maintain a policy to meter their customer population. However, this quantity can be the key consumption component in utilities that have not adopted a universal metering policy. **This component should NOT include any water that is supplied to neighboring utilities (water exported) which is unmetered but billed. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.**
Customer Metering Inaccuracies (CMI) Find	Apparent water losses caused by the collective under-registration of customer water meters. Many customer water meters gradually wear as large cumulative volumes of water are passed through them over time. This causes the meters to under-register the flow of water. This occurrence is common with smaller residential meters of sizes 5/8-inch and 3/4 inch after they have registered very large cumulative volumes of water, which generally occurs only after periods of years. For meters sized 1-inch and larger - typical of multi-unit residential, commercial, institutional and industrial accounts - meter under-registration can occur from wear or from the improper application of the meter; i.e. installing the wrong type of meter or the wrong size of meter, for the flow pattern (profile) of the consumer. For instance, many larger meters have reduced accuracy at low flows. If an oversized meter is installed, most of the time the routine flow will occur in the low flow range of the meter, and a significant portion of it may not be registered. It is important to properly select and install all meters, but particularly large customer meters, size 1-inch and larger. The auditor has two options for entering data for this component of the audit. The auditor can enter a percentage under-registration (typically an estimated value), this will apply the selected percentage to the two categories of metered consumption to determine the volume of water not recorded due to customer meter inaccuracy. Note that this percentage is a composite average inaccuracy for all customer meters in the entire meter population. The percentage will be multiplied by the sum of the volumes in the Billed Metered and Unbilled Metered components. Alternatively, if the auditor has substantial data from meter testing activities, he or she can calculate their own loss volumes, and this volume may be entered directly. Note that a value of zero will be accepted but is not recommended, as all metered systems tend to have some degree of inaccuracy. A positive value should be entered. A value of zero in this component is generally valid only if the water utility does not meter its customer population. The formula for caculating a volume of CMI from a percentage input is as follows: CMI volume = (BMAC+UMAC)/(1-CMI%)-(BMAC+UMAC)
Customer Retail Unit Charge (CRUC) Find	The Customer Retail Unit Charge represents the volumetric portion of the total charges that customers pay for water service. The CRUC does not include fixed charges. This unit charge cost is applied routinely to the components of Apparent Loss, since these losses represent water reaching customers but not (fully) paid for. Since most water utilities have a rate structure that includes a variety of different charges costs based upon class of customer, a volume-weighted average of water sold at each unique rate should be calculated to determine a single composite charge that should be entered into this cell. Finally, the weighted average charge should also include additional charges for sewer, storm water or biosolids processing, but only if these charges are based upon the volume of potable water consumed. For water utilities in regions with limited water resources and a questionable ability to meet the drinking water demands in the future, the Customer Retail Unit Charge Cost might also be applied to value the Real Losses; instead of applying the Variable Production Cost to Real Losses. In this way, it is assumed that every unit volume of leakage reduced by leakage management activities will be sold to a customer. Note: the Free Water Audit Software allows the user to select the units that are charged to customers (either $/1,000 gallons, $/hundred cubic feet, or $/1,000 litres) and automatically converts these units for purpose of calculating Apparent Loss valuations. The monetary units are United States dollars, $.
Infrastructure Leakage Index (ILI) Find	The ratio of the Current Annual Real Losses (Real Losses) to the Unavoidable Annual Real Losses (UARL). This performance indicator is dimensionless. **NOTES ON THE UARL AND ILI:** 1. This Free Water Audit Software version 6 presents the calculated UARL and ILI for systems of all sizes and all pressures. Some published research is now available on predicting how UARL is likely to be modified when modeling low leakage limits in systems that are very small (< 3000 conn), or have very low average pressures, or have very high pressures (aka boundary cases). Inherent over- or under- estimation of UARL volume may exist in these boundary cases, as they operate at or near the limits of the UARL model assumptions. More widespread application and understanding of system specific corrections to the UARL model in these boundary cases is now likely to occur, but are not included in the FWAS at the time of this publication. Caution is advised when using the standard UARL modeled value (and subsequently the ILI) for boundary cases. In boundary cases, the ILI may still be considered a general Performance Indicator, but not used as an absolute performance measurement or for benchmark comparisons. 2. The UARL term is based on average operating pressure in a given audit year, and a utility's current pressure conditions may not be optimized. Thus, ILI should always be interpreted with some measure of pressure, and only used for tracking progress if all justifiable pressure management has already been completed.

Item Name	Description
Length of Mains (Lm) Find	Length of all pipelines (except service connections) in the system starting from the point of system input metering (for example at the outlet of the treatment plant). It is also recommended to include in this measure the total length of fire hydrant lead pipe. Hydrant lead pipe is the pipe branching from the water main to the fire hydrant. Fire hydrant leads are typically of a sufficiently large size that is more representative of a pipeline than a service connection. The average length of hydrant leads across the entire system can be assumed if not known, and multiplied by the number of fire hydrants in the system, which can also be assumed if not known. This value can then be added to the total pipeline length. Total length of mains can therefore be calculated as: Length of Mains, miles = (total pipeline length, miles) + [{(average fire hydrant lead length, ft) x (number of fire hydrants)} / 5,280 ft/mile] or Length of Mains, kilometres = (total pipeline length, kilometres) + [{(average fire hydrant lead length, metres) x (number of fire hydrants)} / 1,000 metres/kilometre]
NON-REVENUE WATER Find	= Apparent Losses + Real Losses + Unbilled Metered Consumption + Unbilled Unmetered Consumption. This is water which does not provide revenue potential to the utility.
Number of Service Connections (Nc) Find	Number of customer service connections, extending from the water main to supply water to a customer. This includes the actual number of pressurized piping connections, including fire connections, **whether active or inactive**. This may differ substantially from the number of customers (or number of accounts). **Note: this number does not include the pipeline leads to fire hydrants. The total length of piping supplying fire hydrants should be included in the "Length of mains" input, and excluded from the Number of service connections input.**
Real Losses Find	Physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. In metered systems this is the customer meter, in unmetered situations this is the first point of consumption (stop tap/tap) within the property. The annual volume lost through all types of leaks, breaks and overflows depends on frequencies, flow rates, and average duration of individual leaks, breaks and overflows.
Revenue Water	Those components of System Input Volume that are billed and have the potential to produce revenue.
Service Connection Density Find	=number of customer service connections / length of mains
Systematic Data Handling Errors (SDHE) Find	Apparent losses caused by accounting omissions, errant computer programming, gaps in policy, procedure, and permitting/activation of new accounts; and any type of data lapse that results in under-stated customer water consumption in summary billing reports. **Systematic Data Handling Errors occur as a customer consumption volume and can result in a direct loss of revenue potential. Water utilities can find "lost" revenue by keying on this component.** Utilities typically measure water consumption volumes registered by water meters at customer premises. The meter should be read routinely (ex: monthly) and the data transferred to the Customer Billing System, which generates and sends a bill to the customer. Data Transfer Errors result in the registered consumption volume value being less than the actual consumption volume, creating an apparent loss. Such error might occur from illegible and mis-recorded hand-written readings compiled by meter readers, inputting an incorrect meter register unit conversion factor in the automatic meter reading equipment, or a variety of similar errors. Apparent losses also occur from Data Analysis Errors in the archival and data reporting processes of the Customer Billing System. Inaccurate estimates used for accounts that fail to produce a meter reading are a common source of error. Billing adjustments may award customers a rightful monetary credit, but do so by creating a negative value of consumption volume, thus under-stating the actual consumption. Account activation lapses may allow new buildings to begin using water for months without meter readings and billing. Poor permitting and construction inspection practices can result in a new building water service commencing without a billing account, a water meter and meter reading; i.e., the customer is unknown to the utility's billing system. Close auditing of the permitting, metering, meter reading, billing and reporting processes of the water consumption data trail can uncover data management gaps that create volumes of systematic data handling error. Utilities should routinely analyze customer billing records to detect data anomalies and quantify these losses. For example, a billing account that registers zero consumption for two or more billing cycles should be checked to explain why usage has seemingly halted. Given the revenue loss impacts of these losses, water utilities are well-justified in providing continuous oversight and timely correction of data transfer errors & data handling errors. If the water auditor has not yet gathered detailed data or assessment of systematic data handling error, it is recommended that the auditor apply the default value of 0.25% of the Billed Authorized Consumption volume. However, if the auditor has investigated the billing system and its controls, and has well validated data that indicates the volume from systematic data handling error is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations and select an appropriate grading. Negative or zero values are not allowed for this audit component. Note: occasionally billed consumption volumes for a customer account may be over-stated due to issues of double-counting an account or applying an over-stated meter multiplier. The possibility of such occurrences should be explored in the data validation process, particularly if billed authorized consumption volumes for the year, or for any sub-group of customers (by classification or meter size), appears to be inordinately high. It is recommended to correct any such errors in the billed consumption total for the year, rather than consider these volumes part of Systematic Data Handling Error.
Total annual operating cost (optional input) Find	*This input has been made optional, as it is no longer used in calculating a Performance Indicator. Auditors are welcome to continue to track this input as desired.* These costs include those for operations, maintenance and any annually incurred costs for long-term upkeep of the drinking water supply and distribution system. It should include the costs of day-to-day upkeep and long-term financing such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply. Depending upon water utility accounting procedures or regulatory agency requirements, it may be appropriate to include depreciation in the total of this cost. This cost should not include any costs to operate wastewater, biosolids or other systems outside of drinking water.

Item Name	Description
Unauthorized Consumption (UC) Find	Includes water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment; as well as any other ways to receive water while thwarting the water utility's ability to collect revenue for the water. Unauthorized consumption results in uncaptured revenue and creates an error that understates customer consumption. In most water utilities this volume is low and, if the water auditor has not yet gathered detailed data for these loss occurrences, it is recommended to use the default value of 0.25% of the Billed Authorized Consumption volume. However, if the auditor has investigated unauthorized occurrences, and has well validated data that indicates the volume from unauthorized consumption is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations. Note that a value of zero will not be accepted since all water utilities tend to have some volume of unauthorized consumption occurring in their system.
Unavoidable Annual Real Losses (UARL) Find	The UARL is a theoretical reference value representing the technical low limit of leakage for well managed systems in good condition, with aggressive active leakage control. It is a key variable in the calculation of the Infrastructure Leakage Index (ILI). UARL (gallons) = (5.41Lm + 0.15Nc + 7.5Lc) x P x 365 d/year, or UARL (litres) = (18.0Lm + 0.8Nc + 25.0Lc) x P x 365 d/year where: Lm = length of mains (miles or kilometres) Nc = number of customer service connections Lp = the average length of customer service connection piping (feet or metres) (see the Worksheet "Service Connection Diagram" for guidance on deterring the value of Lp) Lc = total length of customer service connection piping (miles or km) Lc = Nc X Lp (miles or kilometres) P = Average operating pressure (psi or metres) (see Average Operating Pressure definition) **NOTES ON THE UARL AND ILI:** 1. This Free Water Audit Software version 6 presents the calculated UARL and ILI for systems of all sizes and all pressures. Some published research is now available on predicting how UARL is likely to be modified when modeling low leakage limits in systems that are very small (< 3000 conn), or have very low average pressures, or have very high pressures (aka boundary cases). Inherent over- or under- estimation of UARL volume may exist in these boundary cases, as they operate at or near the limits of the UARL model assumptions. More widespread application and understanding of system specific corrections to the UARL model in these boundary cases is now likely to occur, but are not included in the FWAS at the time of this publication. Caution is advised when using the standard UARL modeled value (and subsequently the ILI) for boundary cases. In boundary cases, the ILI may still be considered a general Performance Indicator, but not used as an absolute performance measurement or for benchmark comparisons. 2. The UARL term is based on average operating pressure in a given audit year, and a utility's current pressure conditions may not be optimized. Thus, ILI should always be interpreted with some measure of pressure, and only used for tracking progress if all justifiable pressure management has already been completed.
Unbilled Authorized Consumption	All consumption that is unbilled, but still authorized by the utility. This includes Unbilled Metered Authorized Consumption (UMAC) + Unbilled Unmetered Authorized Consumption (UUAC). See "Authorized Consumption" for more information.
Unbilled Metered Authorized Consumption (UMAC) Find	Metered consumption which is authorized by the water utility, but, for any reason, is deemed by utility policy to be unbilled. This might for example include metered water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic institutions free of charge. **It does not include water supplied to neighboring utilities (water exported) which may be metered but not billed.**
Unbilled Unmetered Authorized Consumption (UUAC) Find	Any kind of Authorized Consumption which is neither billed nor metered. This component typically includes water used in activities such as fire fighting, flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. In most water utilities it is a small component. This component does NOT include water supplied to neighboring utilities (water exported) which is unmetered and unbilled – an unlikely case. Also, if any potable water used at a water treatment plant is tapped from a location upstream of the meter(s) used to determine the Volume from Own Sources in the audit, this is outside of the boundary of the audit and should therefore not be included as part of Unbilled, Unmetered Authorized Consumption. This component has many sub-components of water use which may not yet be quantified. The default is 0.25% of the Billed Authorized Consumption volume (BMAC + BUAC), and is recommended for temporary use if customized estimates are not yet available, with recommendation to begin tracking and estimating these volumes for the next audit. Note that a value of zero is not permitted, since all water utilities likely have some volume of water in this component occurring in their system.
Units and Conversions	The user may develop an audit based on one of three unit selections: 1) Million Gallons (US) 2) Megalitres (Thousand Cubic Metres) 3) Acre-feet Once this selection has been made in the instructions sheet, all calculations are made on the basis of the chosen units. Should the user wish to make additional conversions, a unit converter is provided below (use drop down menus to select units):

Item Name	Description
	Enter Units: 100 | Convert From… Million Gallons (US) = Converts to….. 306.888329 Acre-feet (conversion factor = 3.0689)
Variable Production Cost (VPC) (applied to Real Losses) Find	The cost to produce and supply the next unit of water (e.g., $/million gallons). This cost can include both short-run and long-run marginal costs. See the VPC data grading questions on IDG tab for examples of short-run and long-run marginal costs that may be included. It is common to apply the VPC unit cost to the volume of Real Losses. However, if water resources are strained and the ability to meet future drinking water demands is in question, then the water auditor may be justified in applying the Customer Retail Unit Charge to the Real Loss volume, rather than applying the Variable Production Cost.
Volume from Own Sources (VOS) Find	The volume of water withdrawn (abstracted) from water resources (rivers, lakes, streams, wells, etc) controlled by the water utility, and then treated for potable water distribution. Most water audits are compiled for utility retail water distribution systems, so this volume should reflect the amount of treated drinking water that entered the distribution system. Often the volume of water measured as treated effluent of the treatment works is slightly less than the volume measured at the raw water source, since some of the water is used in the treatment process. Thus, it is useful if flows are metered at the effluent of the treatment works. Water treatment plants are also often supplied potable drinking water and therefore are a "customer" of the water utility. If the service connection line serving the water treatment plant is downstream of treated water effluent flowmeters, this water should be metered and billed as billed authorized consumption. In this case, this volume of water does not enter into any calculations for Volume from Own Sources. If the service connection line suppling potable water to the treatment plant is upstream of treated water effluent flowmeters, then this water is considered "process" water and included with calculations accounting for process water use. If metering exists only at the raw water source, an adjustment for water used in the treatment process should be included to account for water consumed in treatment operations such as filter backwashing, basin flushing and cleaning, plant potable water consumption (if the supply is drawn upstream of effluent flowmetering.) and similar uses. If the audit is conducted for a wholesale water agency that sells untreated water, then this quantity reflects the measure of the raw water, typically metered at the source.
Volume from own sources: error adjustment Find	An estimate or measure of the degree of inaccuracy that exists in the master (production) meters measuring the annual Volume from own Sources, and any error in the data trail that exists to collect, store and report the summary production data. This adjustment is a weighted average number that represents the collective error for all master meters for all days of the audit year and any errors identified in the data trail. Meter error can occur in different ways. A meter or meters may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Data error can occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of inaccuracy in master meters and data errors in archival systems are common. Enter a positive percentage or volume, then select 'under-registration' or 'over-registration' from the drop-down immediately adjacent. **See Water Supplied Error Adjustments definition for guidance on how to calculate this input.**
Water Exported (WE) Find	The Water Exported volume is the bulk water conveyed or sold by the water utility to neighboring water systems that exists outside of their service area. Typically this water is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water utility that is selling or transfering the water: i.e. the exporter. If the water utility who is compiling the annual water audit sells or transfers bulk water in this manner, they are an exporter of water. Note: The Water Exported volume is typically sold to wholesale customers who are charged a wholesale rate that is different than retail rates charged to the retail customers existing within the service area. Many state regulatory agencies require that the Water Exported volume be reported to them as a quantity separate and distinct from the retail customer billed consumption. For these reasons - and others - the Water Exported volume is always quantified separately from Billed Authorized Consumption in the standard water audit. **Be certain not to "double-count" this quantity by including it in both the Water Exported box and the Billed Metered Consumption box of the water audit Worksheet. This volume should be included only in the Water Exported box.**
Water Exported: Error Adjustment (WEEA) Find	An estimate or measure of the volume by which the Water Exported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived exported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of error in their metered data, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived data. Enter a positive percentage or volume, then select 'under-registration' or 'over-registration' from the drop-down immediately adjacent. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. Corrections to data gaps or other errors found in the archived data should also be included as a portion of this meter error adjustment. **See Water Supplied Error Adjustments definition for guidance on how to calculate this input.**
Water Imported (WI) Find	The Water Imported volume is the bulk water purchased to become part of the Water Supplied volume. Typically this is water purchased from a neighboring water utility or regional water wholesale supplier, and is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water supplier selling the water to the utility conducting the water audit. The water supplier selling the bulk water usually charges the receiving utility based upon a wholesale water rate.

Item Name	Description
Water Imported: Error Adjustment (WIEA) Find	An estimate or measure of the volume by which the Water Imported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived imported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some level of meter inaccuracy, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived metered data. Enter a positive percentage or volume, then select 'under-registration' or 'over-registration' from the drop-down immediately adjacent. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. **See Water Supplied Error Adjustments definition for guidance on how to calculate this input.**
Water Supplied Error Adjustments Find	**Disclaimer**: The guidance provided below should be considered general, representing a typical approach to determining Error Adjustment. Supply metering setups, metering technologies, instrumentation, data recording/archival, and data management systems can vary significantly from one water utility to the next. Inherent margins of error will also vary among different testing and calibration methods and the measurement systems being tested. Other factors that may be important include, but are not limited to, frequency of testing and calibration practices, data communication outages in the audit period, tested flowrates versus typical operating flowrates, and test durations. All of these factors must be considered when assessing Error Adjustment for the Water Supplied inputs. Each specific situation should be carefully analyzed to determine the most appropriate approach for determining the Error Adjustment to input, if any. **General**: For the Water Supplied inputs, there are three typical sources of error that may warrant an Error Adjustment on the Worksheet. 1. **Meter error:** measurement inaccuracy in the meter(s) used to derive the input volume, typically identified through in-situ flow accuracy testing. Applicable for VOS, WI and WE. If no such testing has been performed, adjustment for meter error is not typically recommended. 2. **Data transfer error**: inaccuracy in archived volumes, typically due to gaps in data, programming errors impacting unit conversions, and/or programming errors impacting totalization of measured volumes over the audit period. Applicable for VOS, WI and WE. These errors are typically identified through electronic calibration to verify data transfer at the secondary device (i.e. conversion to mA, meter transmitter or similar instrumentation) and/or the tertiary device (i.e. SCADA, historian or other computerized archival system). 3. **Net distribution storage change**: The difference between end of audit period and beginning of audit period for total finished water stored, downstream of the system input meter(s). Typically applicable for VOS or WI. This volume is typically derived by comparing distribution storage tank water levels at end and beginning of the water audit period and using approximate tank geometry to convert levels to volumes. **Derivation Guidance**: If an Error Adjustment input is being calculated as a volume, each source of error (described above) may be separately calculated, with careful consideration of under- vs over-registration, then added together to determine the composite volume to input. The composite input should be entered on the Worksheet as a positive number, then under- or over-registration selected on the adjacent dropdown. If an Error Adjustment input is being calculated as a percent, some very general guidance for calculating each error source (described above) is provided below. The auditor is again cautioned that each specific water supply setup needs to be evaluated closely as noted in the Disclaimer. Refer to the latest AWWA M36 Manual for additional discussion and guidance on this matter. 1. Meter error: If in-situ flow accuracy testing has been performed, and inherent testing method error is understood, first the *meter accuracy %* may be determined as follows: *meter accuracy % = System input meter(s) volume / Reference volume* Then, the *meter error %* may be determined as follows: *meter error % = meter accuracy % - 100%* 2. Data transfer error: If electronic calibration at the secondary (i.e. conversion to mA, meter transmitter or similar instrumentation) and/or tertiary (i.e. SCADA, historian or other computerized archival system) devices has been performed, first the *data transfer accuracy %* may be determined as follows: *data transfer accuracy % = Tertiary device volume / Reference volume (typically at Secondary device)* Then, the *data transfer error %* may be determined as follows: *data transfer error % = data transfer accuracy % - 100%* If no error is identified, or if electronic calibration has not been performed, or if no secondary or tertiary devices exist, a *data transfer error %* adjustment is not typically recommended. 3. Net distribution storage change. If meter error and/or data transfer error are being calculated as a %, it is recommended to make the adjustment for net distribution storage change as a volume adjustment, directly in the VOS or WI input, as applicable. The final step is to add *meter error %* and *data transfer error %*: *Error Adjustment % = meter accuracy % + data transfer error %* If the total Error Adjustment % calculates out as a negative number, it represents an under-registration. Vice versa, if positive. The composite input should be entered on the Worksheet as a positive number, then under- or over-registration selected on the adjacent dropdown.
WATER LOSSES Find	= apparent losses + real losses = water supplied - authorized consumption Water Losses are the difference between Water Supplied and Authorized Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission systems, pressure zones or district metered areas (DMA), if one of these configurations are the basis of the water audit.

AWWA Free Water Audit Software: Customer Service Line Diagrams

Average Length of Customer Service Line

The three figures shown on this worksheet display the assignment of the Average Length of Customer Service Line, Lp, for the three most common piping configurations.

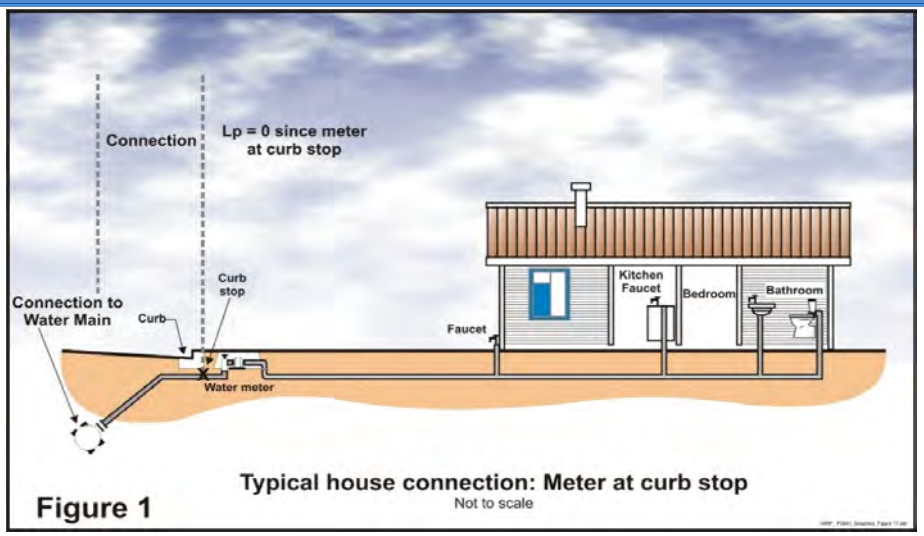
Figure 1 shows the configuration of the water meter outside of the customer building next to the curb stop valve. In this configuration Lp = 0 since the distance between the curb stop and the customer metering point is essentially zero.

Figure 2 shows the configuration of the customer water meter located inside the customer building, where Lp is the distance from the curb stop to the water meter.

Figure 3 shows the configuration of an unmetered customer building , where Lp is the distance from the curb stop to the first point of customer water consumption, or, more simply, the building line.

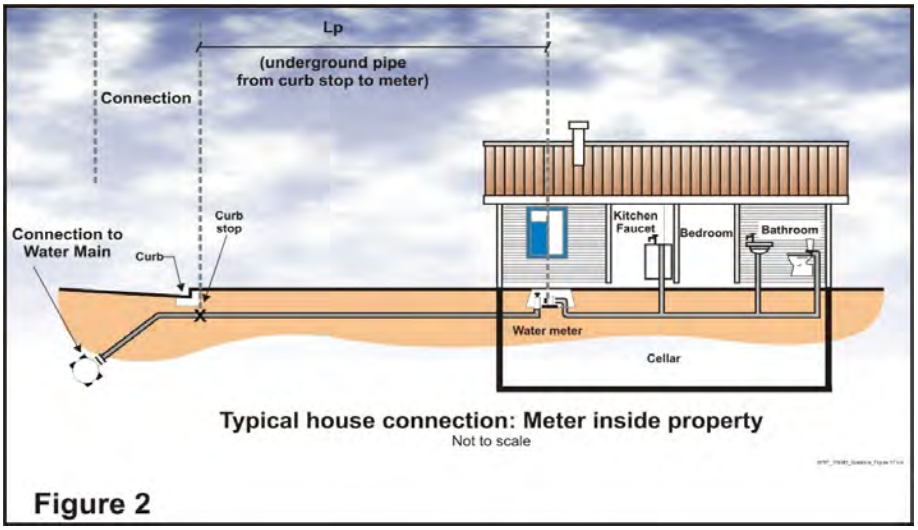
In any water system the Lp will vary notably in a community of different structures, therefore the average Lp value is used and this should be approximated or calculated if a sample of service line measurements has been gathered.

Click for more information



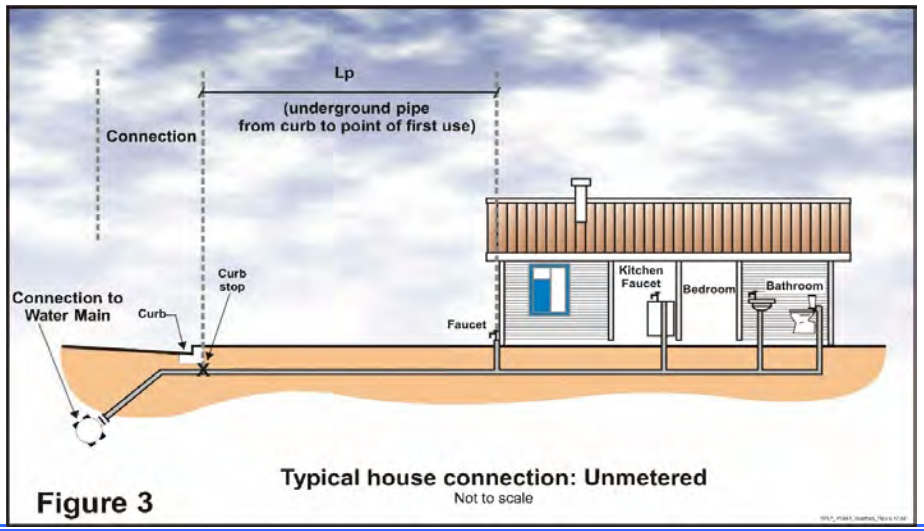
Typical house connection: Meter at curb stop
Not to scale

Figure 1



Typical house connection: Meter inside property
Not to scale

Figure 2



Typical house connection: Unmetered
Not to scale

Figure 3

American Water Works Association
Dedicated to the World's Most Important Resource

AWWA Free Water Audit Software - Version 6.0
developed by the
Water Loss Control Committee of the American Water Works Association
December 2020

World Water Loss Day 4th December

This software is intended to serve as a basic tool to compile a preliminary, or "top-down", water audit. It is recommended that users also refer to the current edition of the AWWA M36 Publication, Water Audits and Loss Control Programs, for detailed guidance on compiling a comprehensive, or "bottom-up", water audit using the same water audit methodology.

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A special thanks to those members of the AWWA Water Loss Control Committee and other water industry stakeholders who assisted in the review and testing of this software.

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VERSION HISTORY:

Version:	Release Date:	Number of Worksheets:	Key Features and Developments
v1	2005/ 2006	5	The AWWA Water Audit Software was piloted in 2005 (v1.0 beta). The early versions (1.x) of the software restricted data entry to units of Million Gallons per year. For each entry into the audit, users identified whether the input was measured or estimated.
v2	2006	5	The most significant enhancement in v2 of the software was to allow the user to choose the volumetric units to be used in the audit, Million Gallons or Thousand Cubic Metres (megalitres) per year. Two financial performance indicators were added to provide feedback to the user on the cost of Real and Apparent losses.
v3	2007	7	In v3, the option to report volumetric units in acre-feet was added. Another new feature in v3 was the inclusion of default values for two water audit components (unbilled unmetered and unauthorized consumption). v3 also included two examples of completed audits in units of million gallons and Megalitres. Several checks were added into v3 to provide instant feedback to the user on common data entry problems, in order to help the user complete an accurate water audit.
v4 - v4.2	2010	10	v4 (and versions 4.x) of the software included a new approach to data grading. The simple "estimated" or "measured" approach was replaced with a more granular scale (typically 1-10) that reflected descriptions of utility practices and served to describe the confidence and accuracy of the input data. Each input value had a corresponding scale fully described in the Grading Matrix tab. The Grading Matrix also showed the actions required to move to a higher grading score. Grading descriptions were available on the Reporting Worksheet via a pop-up box next to each water audit input. A water audit data validity score is generated (max = 100) and priority areas for attention (to improve audit accuracy) are identified, once a user completes the requied data grading. A service connection diagram was also added to help users understand the impact of customer service line configurations on water losses and how this information should be entered into the water audit software. An acknoweldgements section was also added. Minor bug fixes resulted in the release of versions 4.1 and 4.2. A French language version was also made available for v4.2.
v5	2014	12	In v5, changes were made to the way Water Supplied information is entered into software, with each major component having a corresponding Master Meter Error Adjustment entry (and data grading requirement). This required changes to the data validity score calculation; v5 of the software uses a weighting system that is, in part, proportional to the volume of input components. The Grading Matrix was updated to reflect the new audit inputs and also to include clarifications and additions to the scale descriptions. The appearance of the software was updated in v5 to make the software more user-friendly and several new features were added to provide more feedback to the user. Notably, a dashboard tab has been added to provide more visual feedback on the water audit results and associated costs of Non-Revenue Water. A comments sheet was added to allow the user to track notes, comments and to cite sources used.
v6	2020	11	v6 brings an overhaul to the user interface for data grading, now presented as a series of questions on the Interactive Data Grading (IDG) tab for each input that, when answered (by selecting best-fit answer from a dropdown menu), automically determines the data grade for the given input. This provides transparency to the data practices selected and which specifically are limiting, removes subjectivity in data grade assignments, and provides clarity on candidate next steps for data validity improvements. IDG tab includes navigation buttons across top banner for ease of movement between inputs, and color signals for completion. The Worksheet (fka Reporting Worksheet) includes overt designation of error adjustment as "under" or "over" for the 3 Water Supplied inputs, as well as Customer Metering Inaccuracies. This makes the convention consistent, transparent, and reduces chance of user error. A Blank Sheet has been added allowing the user to, as desired, perform supplemental calculations or capture additional relevant information. The Dashboard has been overhauled to include Data Validity, NRW Components and Key Performance Indicators (KPIs). KPIs are presented in gauge format, depicting the specific KPI result against the range of results from Level 1 validated data in North America (see Web Resources, Start Page). Percentage-based indicators (% of supply, % of cost) removed as these indicators were deemed unreliable and sunset by the AWWA Water Loss Control Committee, subsequent to research and reporting from its NRW Performance Indicators Task Force.

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

go to input

Volume from Own Sources (VOS) - Data Grading Criteria

go to notes

vos	Criteria Question	Select Best-Fit Answers to All Visible Questions
vos.0	Did the water utility supply any water from its own sources during the audit year?	No
vos.1		

For questions 2-10 below: Choose the answer that applies for those meters that measure >90% of the finished water volume.
In-situ flow accuracy testing = a test process that confirms the flow measuring accuracy of the primary device (the flowmeter), in its installed location, using an independent reference volume.
Electronic calibration = a process that checks for error in the metering secondary device(s) and/or the tertiary device(s).
Secondary device can include conversion to mA, meter transmitter or similar instrumentation.
Tertiary device can include SCADA, historian or other computerized archival system.

vos.2		
vos.3		
vos.4		
vos.5		
vos.6		
vos.7		
vos.8		
vos.9		
vos.10		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**

go to input

Volume from Own Sources Error Adjustment (VOSEA) - Data Grading Criteria

go to notes

vosea	Criteria Question	Select Best-Fit Answers to All Visible Questions	
vosea.1			Limiting
vosea.2			
vosea.3			
vosea.4			
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**	

go to input

Water Imported (WI) - Data Grading Criteria

go to notes

wi	Criteria Question	Select Best-Fit Answers to All Visible Questions	
wi.0	Did the water utility import any water during the audit year?	Yes	
wi.1	What percent of water imported is metered?	>99%	

For questions 2-10 below: Choose the answer that applies for those meters that measure >90% of the water imported volume.
In-situ flow accuracy testing = a test process that confirms the flow measuring accuracy of the primary device (the flowmeter), in its installed location, using an independent reference volume.
Electronic calibration = a process that checks for error in the metering secondary device(s) and/or the tertiary device(s).
Secondary device can include conversion to mA, meter transmitter or similar instrumentation.
Tertiary device can include SCADA, historian or other computerized archival system.

wi.2	What is the frequency of electronic calibration?	Annually	Limiting
wi.3	What level of data transfer errors are checked as part of the electronic calibration process?	Data transfer errors are checked at secondary device(s) AND tertiary device(s)	
wi.4	Is the most recent electronic calibration documentation available?	Yes	
wi.5	What is the frequency of in-situ flow accuracy testing?	None, or Not within last 5 years	Limiting
wi.6			
wi.7			
wi.8	Have testing and calibration procedures been closely scrutinized for compliance with procedures described in the AWWA M36 and/or M33 Manual(s)?	Yes	
wi.9	Which best describes the frequency of meter readings (data collection frequency as opposed to billing frequency)?	Daily	
wi.10	What is the frequency of data review & correction by Exporting or Importing Utility for data gaps and/or anomalies? These can include numbers that are outside of typical patterns, and zero or 'null' values that may reflect a gap in data recording.	More frequently than monthly, but not every day	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**7**	

go to input

Water Imported Error Adjustment (WIEA) - Data Grading Criteria

go to notes

wiea	Criteria Question	Select Best-Fit Answers to All Visible Questions	
wiea.1	Is an agreement in place between Exporting and Importing Utility for the purchase of water?	Yes, written	
wiea.2	Are meter accuracy testing or electronic calibration requirements stipulated in the water purchase agreement?	Yes, and stipulated frequency as annual	Limiting
wiea.3	Are flow accuracy test and/or electronic calibration results used to inform the error adjustment input in the water audit?	Yes, results are analyzed and incorporated	
wiea.4	Who has access to the import meter readings including current and archived data?	Exporting and Importing Utility	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**9**	

go to input

Water Exported (WE) - Data Grading Criteria

go to notes

we	Criteria Question	Select Best-Fit Answers to All Visible Questions
we.0	Did the water utility export any water during the audit year?	No
we.1		

For questions 2-10 below: Choose the answer that applies for those meters that measure >90% of the water exported volume.
In-situ flow accuracy testing = a test process that confirms the flow measuring accuracy of the primary device (the flowmeter), in its installed location, using an independent reference volume.
Electronic calibration = a process that checks for error in the metering secondary device(s) and/or the tertiary device(s).
Secondary device can include conversion to mA, meter transmitter or similar instrumentation.
Tertiary device can include SCADA, historian or other computerized archival system.

we.2		
we.3		
we.4		
we.5		
we.6		
we.7		
we.8		
we.9		
we.10		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**

go to input

Water Exported Error Adjustment (WEEA) - Data Grading Criteria

go to notes

weea	Criteria Question	Select Best-Fit Answers to All Visible Questions
weea.1		
weea.2		
weea.3		
weea.4		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**

go to input

Billed Metered Authorized Consumption (BMAC) - Data Grading Criteria

go to notes

bmac	Criteria Question	Select Best-Fit Answers to All Visible Questions	
bmac.0	Were any customers metered in the audit year?	Yes	
bmac.1	For billed metered accounts, what % of bills are estimated in a typical billing cycle?	5% or less	
bmac.2	How often does the utility read its customer meters? For systems with multiple read frequencies, select the reading frequency that describes the majority of your customers.	Monthly	
bmac.3	Is the BMAC volume pro-rated to represent consumption occuring exactly during the audit period?	No	
bmac.4	How frequently does internal review by utility staff of the BMAC volumes occur?	Every billing cycle	
bmac.5	What level of detail is examined in the internal review of BMAC volumes?	Sum total only	Limiting
bmac.6	When was the most recent billing data review by someone who is independent of the utility billing process?	More than 5 years ago, or not sure	
bmac.7			
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**7**	

go to input

Billed Unmetered Authorized Consumption (BUAC) - Data Grading Criteria

go to notes

buac	Criteria Question	Select Best-Fit Answers to All Visible Questions
buac.0	Was there any billed consumption on unmetered accounts in the audit year?	No
buac.1		
buac.2		
buac.3		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**

go to input

Unbilled Metered Authorized Consumption (UMAC) - Data Grading Criteria

go to notes

umac	Criteria Question	Select Best-Fit Answers to All Visible Questions
umac.0	Did the water utility have any unbilled-metered consumption in the audit year?	No
umac.1		
umac.2		
umac.3		
umac.4		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**n/a**

go to input

Unbilled Unmetered Authorized Consumption (UUAC) - Data Grading Criteria

go to notes

uuac	Criteria Question	Select Best-Fit Answers to All Visible Questions	
uuac.0	On the Worksheet, the status of the default option is:	A system specific volume has been entered	
uuac.1	How well-understood is the extent of unbilled unmetered use?	Unknown	Limiting
uuac.2	Which best describes the records that are kept for events of unbilled unmetered use?	Each event is documented	
uuac.3	How is the majority of unbilled unmetered use estimated?	Guesstimation	Limiting
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**1**	

go to input

Systematic Data Handling Error (SDHE) - Data Grading Criteria

go to notes

This Data Grading Criteria is hidden when the 'default' input is used on the Worksheet

FINAL DATA GRADE FOR THIS AUDIT INPUT: 3

go to input

Customer Metering Inaccuracies (CMI) - Data Grading Criteria

go to notes

cmi	Criteria Question	Select Best-Fit Answers to All Visible Questions	
cmi.0	Was there any metered customer usage during the audit period?	Yes	
cmi.1	Do you test meters reactively (when triggered by customer complaint or billing/consumption flag)?	Reactive testing conducted	
cmi.2	For small size customer meters, which best describes the frequency of proactive testing (effort beyond when triggered by customer complaint or billing/consumption flags)?	No proactive small meter testing activity to date	
cmi.3			
cmi.4	For mid and large size customer meters, which best describes the frequency of the proactive testing program?	No proactive large meter testing activity to date	
cmi.5			
cmi.6	Which best describes how the input was derived?	Guesstimated without any customer meter testing data as a reference	Limiting
cmi.7	Has the input derivation been reviewed by someone with expert knowledge in the M36 methodology?	No	
cmi.8	To what extent does meter replacement occur and for which meters?	Replacement upon complete failure or special circumstance (as needed)	
cmi.9	Which best describes the reliability of meter installation records?	Records are kept for meter installations, and they include data on installation date, type, size, and manufacturer	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**2**	

go to input

Unauthorized Consumption (UC) - Data Grading Criteria

go to notes

This Data Grading Criteria is hidden when the 'default' input is used on the Worksheet

FINAL DATA GRADE FOR THIS AUDIT INPUT:	3

go to input

Length of Mains (Lm) - Data Grading Criteria

go to notes

Lm	Criteria Question	Select Best-Fit Answers to All Visible Questions	
Lm.1	How was the input derived?	Derived directly from Mains inventory (GIS, ledger, etc)	
Lm.2	Are hydrant laterals included in the input derivation?	Yes	
Lm.3	Which best describes how the Mains inventory (GIS, ledger, etc) is kept up to date?	Additions or subtractions are updated in the mains inventory (GIS, ledger, etc), but less than annually	Limiting
Lm.4	Which best describes how the Mains inventory (GIS, ledger, etc) is field validated to confirm field conditions match the inventory?	Field validation is accomplished (i.e. in daily operations or specific validation projects)	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**6**	

go to input

Number of Service Connections (Nc) - Data Grading Criteria

go to notes

Nc	Criteria Question	Select Best-Fit Answers to All Visible Questions	
Nc.1	How was the input derived?	Extracted from Services inventory (GIS, billing system, etc)	
Nc.2	What is the count of services based on?	Non-premise based, i.e. meter count, customer count	
Nc.3	Are inactive (but still pressurized) service lines included in the input? These may be metered or unmetered.	No	Limiting
Nc.4	Which best describes how the inventory of service connections (GIS, billing system, etc) is kept up to date?	Additions or subtractions are updated in the service line inventory (GIS, billing system, etc), at least annually	
Nc.5	Which best describes how the inventory of service connections (GIS, billing system, etc) is field validated to confirm field conditions match the inventory?	Field validation is accomplished for a portion of the system (i.e. in daily operations or specific validation projects)	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**5**	

go to input

Average Length of (Private) Customer Service Line (Lp) - Data Grading Criteria

go to notes

Lp	Criteria Question	Select Best-Fit Answers to All Visible Questions
Lp.0	Are customer meters typically located at the curbstop or property line?	Yes
Lp.1		
Lp.2		
Lp.3		
Lp.4		
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**10**

go to input

Average Operating Pressure (AOP) - Data Grading Criteria

go to notes

aop	Criteria Question	Select Best-Fit Answers to All Visible Questions	
aop.1	Which best describes checks on the boundary integrity for the system's pressure zone(s)?	Not applicable, the system operates as a single pressure zone	
aop.2	Which best describes how one-time pressure readings (i.e. from hydrants) are collected?	Collected annually during routine system flushing and/or hydrant testing	
aop.3	Which best describes where continuous pressure data (via temporary data loggers or permanent telemetry) is collected?	Continuous pressure data is not collected	
aop.4			
aop.5	How was the input derived?	Loose estimate inferred from field measurements, but no analysis nor calculations performed	Limiting
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**5**	

go to input

Customer Retail Unit Charge (CRUC) - Data Grading Criteria

go to notes

cruc	Criteria Question	Select Best-Fit Answers to All Visible Questions	
cruc.0	Was any metered consumption billed on a volumetric basis in the audit period?	Yes	
cruc.1	Which best describes the use and reliability of the current rate structure?	Customer bill calculations have been checked to confirm the rate structure is correctly implemented	
cruc.2	Choose the option that best describes how the input was derived	Rate structure has multiple volumetric rates, but only one rate was selected for this input	Limiting
cruc.3	Is there any additional volumetric revenue the utility receives that depends on water meter readings, such as sewer?	No	
cruc.4	Has the input derivation been reviewed by someone with expert knowledge in the M36 methodology?	No	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**5**	

go to input

Variable Production Cost (VPC) - Data Grading Criteria

go to notes

vpc	Criteria Question	Select Best-Fit Answers to All Visible Questions	
vpc.1	Choose the option that best describes how the input was derived	Only one source of water exists, which was the basis for the input derivation	
vpc.2	Choose the option that best describes which short-run marginal costs have been included in the input, using the definitions below for reference. Short-run marginal costs can include the following: - chemicals + power for treatment, typically applicable if the utility is producing/treating water - power for distribution, typically applicable if pumps exist in the distribution network - water acquisition costs, typically applicable if the utility is purchasing water or incurs any extraction costs for withdrawing from a source Some short-run marginal costs may not be applicable. The auditor should analyze the system characteristics to determine which costs are applicable for inclusion in the VPC input derivation. See also the latest AWWA M36 Manual for further guidance.	All applicable short-run marginal costs are included	
vpc.3	Choose the option that best describes which long-run marginal costs have been included in the input, using the definitions below for reference. Long-run marginal costs can include the following: - water treatment residuals management, typically applicable if solids are produced from water treatment process - accelerated wear & tear on dynamic equipment, typically applicable if pumps exist for treatment and/or distribution, or any other equipment exists that wears out as a function of use instead of time (i.e. filter media, chemical dosing pumps, uv disinfection bulbs, etc) - payouts for damage claims from main and service line breaks, typically applicable if damage claims are paid by the utility - accelerated expansion of supply capacity, typically applicable if the utility is at or nearing supply capacity, or scarecity costs in water scarce areas - full cost pricing that includes all lifecycle costs and externalities (internalized or not) Some long-run marginal costs may not be applicable. The auditor should analyze the system characteristics to determine which costs are applicable for inclusion in the VPC input derivation. See also the latest AWWA M36 Manual for further guidance.	Long-run marginal costs have not been evaluated for applicability, and are not included	Limiting
vpc.4	Has the input derivation been reviewed by someone with expert knowledge in the M36 methodology?	No	
	FINAL DATA GRADE FOR THIS AUDIT INPUT:	**8**	

FWAS v6.0

AWWA Free Water Audit Software: Dashboard

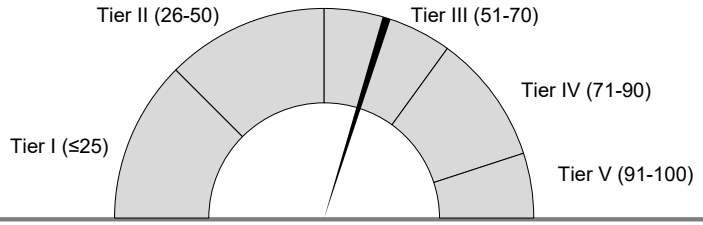
go to worksheet | go to grading | go to references

Water Audit Report for: B&B Water Project Inc. **Audit Year: 2021 Calender** **Jan 01 2021 - Dec 31 2021**

Data Validity

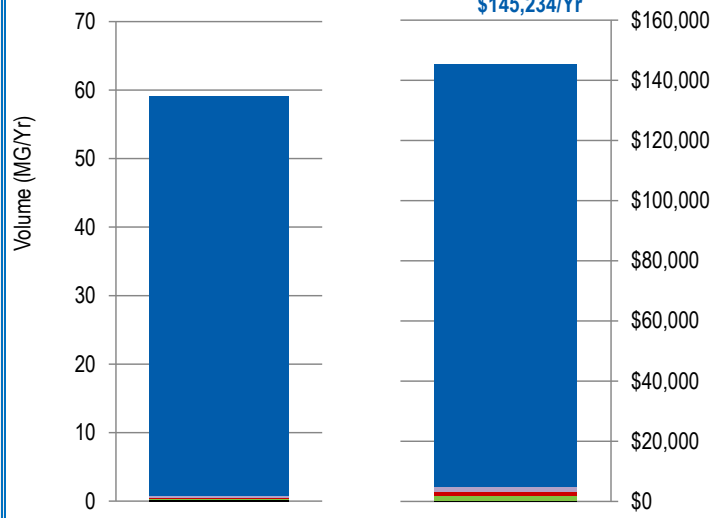
Data Validity Score: 59 **Data Validity Tier:** Tier III (51-70)

See Loss Control Planning for Tier Details



NRW Components Summary

Total Volume of NRW = 59 MG/Yr **Total Cost of NRW = $145,234/Yr**



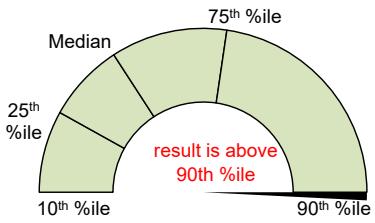
Real Losses
Systematic Data Handling Errors
Customer Metering Inaccuracies
Unauthorized Consumption
Unbilled Unmetered Auth Cons
Unbilled Metered Authorized Cons

	Volume MG/Yr	Value $/Yr	Basis of Valuation
Apparent Losses	0.6	$4,491	CRUC
Real Losses	58.3	$140,399	VPC
Unbilled Authorized Cons	0.1	$344	VPC
Non-Revenue Water	59.1	$145,234	Blended

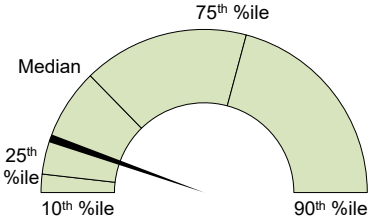
Key Performance Indicators

Actual KPI result | Target (see Worksheet)

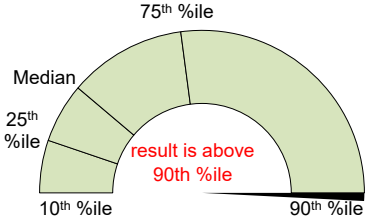
gauge %iles per validated industry ranges[2]



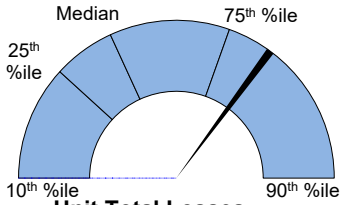
Total Loss Cost Rate
78.07 $/conn/year



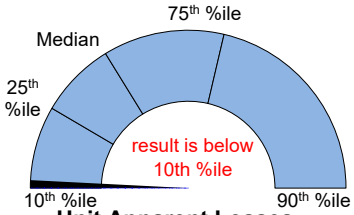
Apparent Loss Cost Rate
2.42 $/conn/year



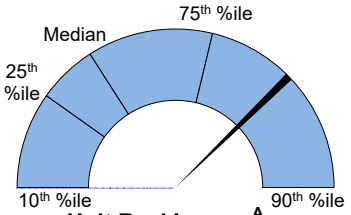
Real Loss Cost Rate
75.65 $/conn/year



Unit Total Losses
87.0 gal/conn/day

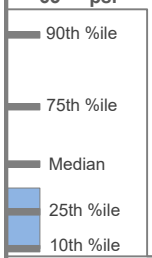


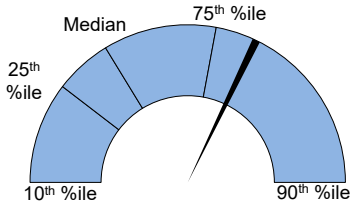
Unit Apparent Losses
0.9 gal/conn/day



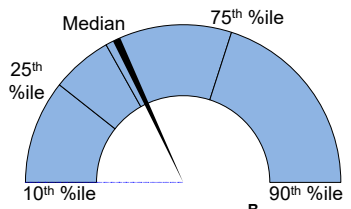
Unit Real Losses[A]
86.1 gal/conn/day

Average Operating Pressure
65 psi





Infrastructure Leakage Index (ILI)
3.6 dimensionless



Unit Real Losses[B]
2,145 gal/mile/day

See UARL definition for additional guidance on the ILI

(UARL) Unavoidable Annual Real Losses	16.2	MG/Yr	23.9	gal/conn/day

Guidance Information for Key Performance Indicators

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs[1].
- A suite of KPIs is necessary, as no single KPI can holistically communicate water loss performance for a given water system.
- See Table 1 below for Uses and Limitations for each KPI, excerpted from the AWWA Water Loss Control Committee Report (2020)[1], with naming conventions updated.
- Percentiles (%iles) shown on KPI gauges come from Level 1 validated data in the AWWA WLCC Reference Water Audit Dataset (2020)[2].
- KPI %iles shown above are not segregated by cohorts. Limited KPI data by cohorts may be found in WRF 4895 Guidance Manual, Appendix B (2019)[5].
- Actual KPI results that fall below 10th %ile or above 90th %ile do not necessarily imply error, but should be viewed with scrutiny.
- Percentiles not intended to imply targets. Targets may be input by user for operational KPIs, if desired, on Worksheet.
- See UARL and ILI in Definitions tab for discussion of size and pressure limitations.
- Systems that fall on the extreme ends of size or connection density should use caution when interpreting Unit Losses KPIs.

Table 1

Source: AWWA Water Loss Control Committee Report (2020)[1], with naming conventions updated

2020 AWWA Water Audit Method – Water Audit Outputs and Key Performance Indicators: Uses and Limitations

Type	Indicator	Description	Suitable Purposes					Uses and Limitations	Principal Users
			Assessment	Bench-Marking	Target-Setting	Planning	Tracking		
Attribute	Apparent Loss Volume	Calculated by Free Water Audit Software	✓				✓	Assess loss level	Utility, Regulators
	Apparent Loss Cost	Calculated by Free Water Audit Software	✓				✓	Assess cost loss level	Utility, Regulators
	Real Loss Volume	Calculated by Free Water Audit Software	✓				✓	Assess loss level	Utility, Regulators
	Real Loss Cost	Calculated by Free Water Audit Software	✓				✓	Assess loss cost level	Utility, Regulators
	Unavoidable Annual Real Loss (UARL)	Calculated by Free Water Audit Software	✓				✓	Reveal theoretical technical low level of leakage	Utility, Regulators
Volume	Unit Apparent Losses (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓	✓	✓	Used for performance tracking and target-setting	Utility, Regulators
	Unit Real Losses[A] (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓	✓	✓	Used for performance tracking and target-setting	Utility, Regulators, Policy Makers
	Unit Real Losses[B] (vol/pipeline length/ day)	Strong and understandable indicator for use by utilities with low connection density.	✓	✓	✓	✓	✓	Data collection and assessment of systems with "low" connection density	Utility, Regulators, Policy Makers
	Unit Total Losses (vol/conn/day) **New KPI**	Strong and understandable indicator, suitable for high-level performance measurement.	✓				✓	High level indicator for trending analysis. Not appropriate for target-setting or benchmarking	Utilities, Customers
	Infrastructure Leakage Index (ILI)	Robust, specialized ratio KPI; can be influenced by pressure and connection density.	✓	✓			✓	Benchmarking after pressure management is implemented	Utilities
Value	Apparent Loss Cost Rate (value/conn/year) **New KPI**	Indicators with sufficient technical rigor. Provide the unit financial value of each type of loss, which is useful for planning and assessment of cost efficiency of water loss reduction and control interventions and programs.	✓			✓	✓	Data collection and assessment on AWWA indicators or contextual parameters to use in conjunction with Loss Cost Rates	Utilities, Regulators, Customers
	Real Loss Cost Rate (value/conn/year) **New KPI**		✓			✓	✓		Utilities, Regulators, Customers
Validity	Data Validity Tier (DVT)	Strong indicator of water loss audit data quality, if data has been validated. Tier provides guidance on priority areas of activity.	✓	✓		✓	✓	Assess caliber of data inputs of the water audit	Regulators, Utilities

AWWA Free Water Audit Software: User Notes

Water Audit Report for: B&B Water Project Inc.
Audit Year: 2021

Calender
Jan 01 2021 - Dec 31 2021

General Notes:	Information for validation included the IURC Annual Report for 2021 and the profit and loss statement for 2021

	Audit Item	Notes on Input Derivation	Notes on Data Validity Grading
go to worksheet / go to grading	**Volume from Own Sources (VOS)**		
go to worksheet / go to grading	**Volume from Own Sources Error Adjustment (VOSEA)**		
go to worksheet / go to grading	**Water Imported (WI)**	Water is purchase from City of Bloomington	
go to worksheet / go to grading	**Water Imported Error Adjustment (WIEA)**	Assumed 0.25% under registration	
go to worksheet / go to grading	**Water Exported (WE)**	na	

	Audit Item	Notes on Input Derivation	Notes on Data Validity Grading
go to worksheet / go to grading	**Water Exported Error Adjustment (WEIA)**		
go to worksheet / go to grading	**Billed Metered Authorized Consumption (BMAC)**		
go to worksheet / go to grading	**Billed Unmetered Authorized Consumption (BUAC)**		
go to worksheet / go to grading	**Unbilled Metered Authorized Consumption (UMAC)**		
go to worksheet / go to grading	**Unbilled Unmetered Authorized Consumption (UUAC)**	Included in IURC report as an estimated value for line flushing	
go to worksheet / go to grading	**Systematic Data Handling Errors (SDHE)**	Used default	
go to worksheet / go to grading	**Customer Metering Inaccuracies (CMI)**	Used 0.25% under registration	

	Audit Item	Notes on Input Derivation	Notes on Data Validity Grading
go to worksheet / go to grading	**Unauthorized Consumption (UC)**	Used default	
go to worksheet / go to grading	**Length of Mains (Lm)**	Information from system mapping. No line extensions since last audit	
go to worksheet / go to grading	**Number of Service Connections (Nc)**	From IURC report	
go to worksheet / go to grading	**Average Length of (private) Customer Service Line (Lp)**	Meters are located at the property line per the water company's policy	
go to worksheet / go to grading	**Average Operating Pressure (AOP)**	Obtained from system operator	
go to worksheet / go to grading	**Customer Retail Unit Charge (CRUC)**	Tiered rate is in effect but used lower end which is the predominate rate as most customers are residential	
go to worksheet / go to grading	**Variable Production Cost (VPC)**	Power cost for booster stations plus cost of purchased water divided by the annual operational costs	

ATTACHMENT D-3

USG WATER SOLUTIONS

B And B Water Project Inc

CONDITION ASSESSMENT REPORT

Tank Name:
New Unionville
Location:
New Unionville
Tank Size and Style:
100,000 Elevated
Project Number:
116776
Inspection Date:
October 13, 2023
Inspected By:
Blake Iafollo

B And B Water Project Inc Contact Information:

Administrative:
Mike Farmer

Job:
Shannon Jones

Address:
Po Box 7287
Bloomington, IN 47407

Phone/Email:
812-336-7644
bandwater@comcast.net

Utility Service Co., Inc.

Address
535 Courtney Hodges Blvd
PO Box 1350
Perry, GA 31069

Email and Website
Website: www.usgwater.com
Email: customerservice@usgwater.com

Customer Service Information
Beth Watson
800-568-6043

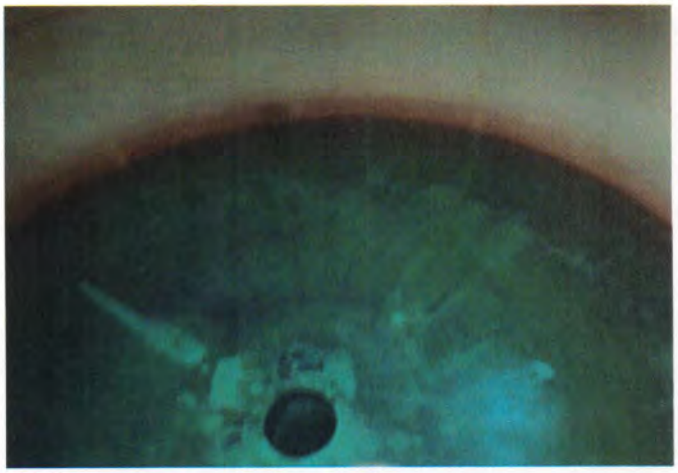
Summary

All interior tank surfaces were inspected with a submersible remotely operated vehicle (ROV) to assess the overall coatings and structural conditions while allowing the tank to remain in-service. The ROV unit is strictly used for potable water use, and was disinfected consistent with AWWA C652-Method 2 prior to entry into the tank.

The tank will be scheduled for a Visual Inspection in 2024.

Coating Type & Conditions

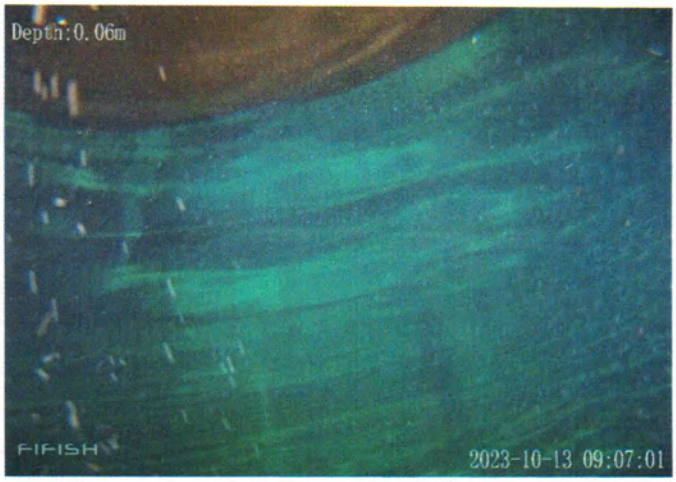
- **Interior Coating Condition:** Minor rust streaking/staining deficiencies were noted with the interior coating. Areas will continue to be monitored.
- **Exterior Coating Condition:** No deficiencies noted in the exterior coating.



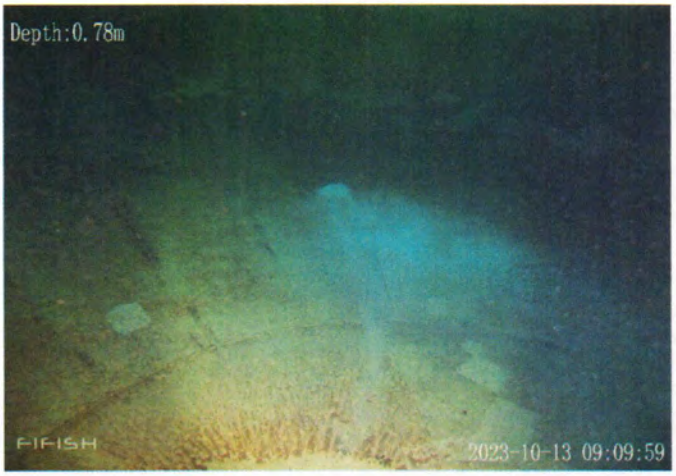
Interior Sidewall Coating

Interior Sidewall Coating

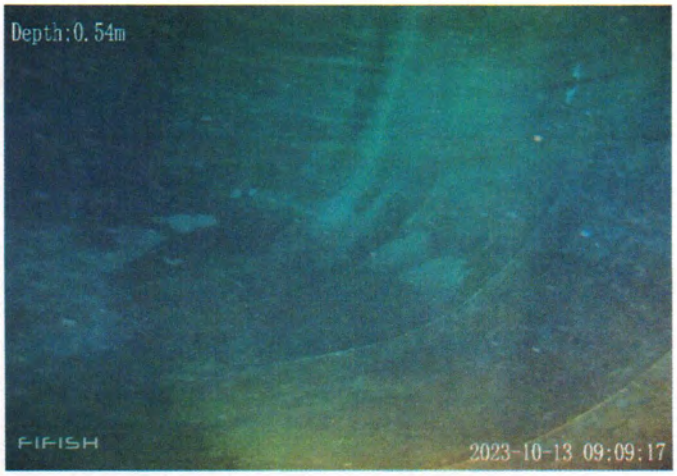
ROV Interior Sidewall Coating



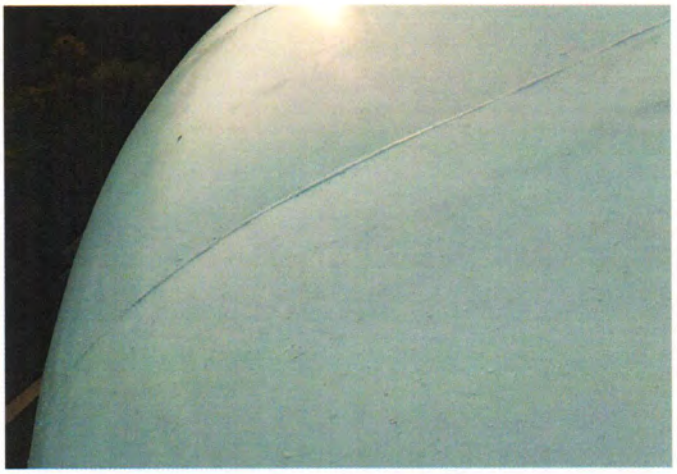
ROV Interior Sidewall Coating



ROV Interior Bowl Coating

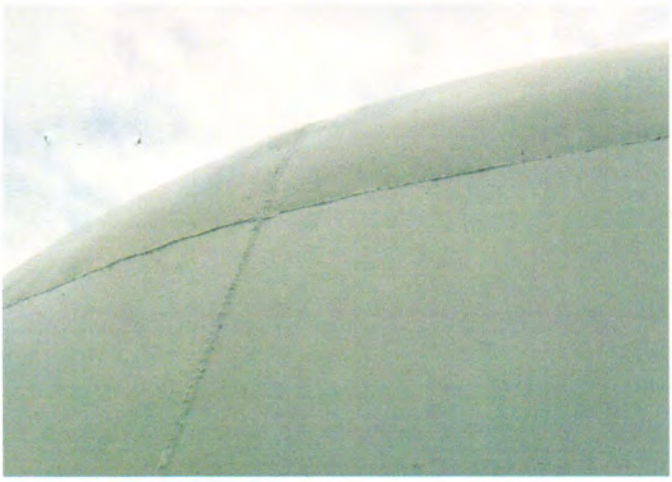


ROV Interior Bowl Coating



Exterior Roof Coating

Exterior Roof Coating

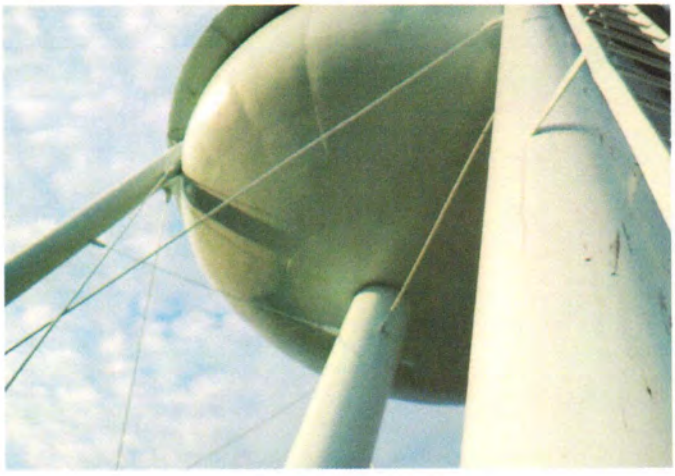


Exterior Sidewall Coating

Exterior Sidewall Coating

Exterior Sidewall Coating

Exterior Sidewall Coating



Exterior Under Belly Coating

Exterior Under Belly Coating

Safety

- **Safety Climbing Devices:** Ladders are equipped with secured safety climb devices.
- **Access Hatch1:** No deficiencies noted.
- **Access Hatch2:** Good

Safety Climb on Access Ladder

Wet Interior Access Hatch

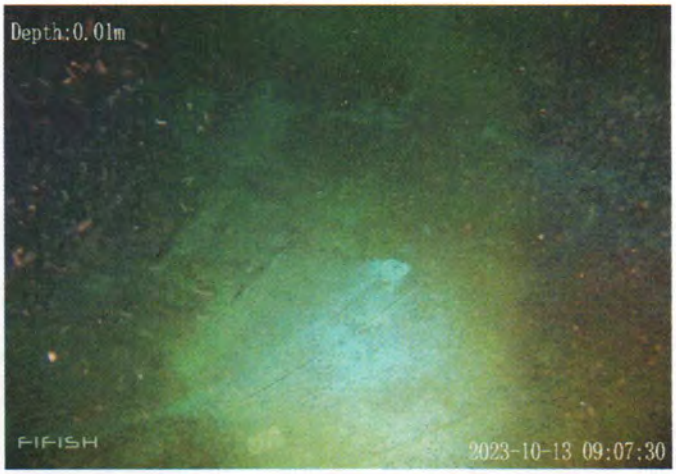
Sanitary

- **Vent Screen:** No deficiencies noted with vent screen.
- **Overflow Pipe Screen Flapper:** Overflow pipe is equipped with screen. No deficiencies noted with screen.
- **Evidence Of Foreign Matter:** No evidence of foreign matter observed.
- **Sediments:** Sediment is present in bottom of tank. Tank will be cleaned at next scheduled washout.

Vent Screen

Overflow Screen

ROV Sediment Present



ROV Sediment Present

Security

- **Fence Around Site:** Tank is not located inside a fenced-in area.
- **Ladder Gate/Access Door:** Exterior ladder did not have a ladder gate installed. Ladder gate installed during inspection.
- **Access Hatch Locked:** Access hatch is locked and secured.
- **Evidence Of Vandalism:** No evidence of vandalism was found.

Ladder Gate Locked

Wet Interior Access Hatch Locked

Structural

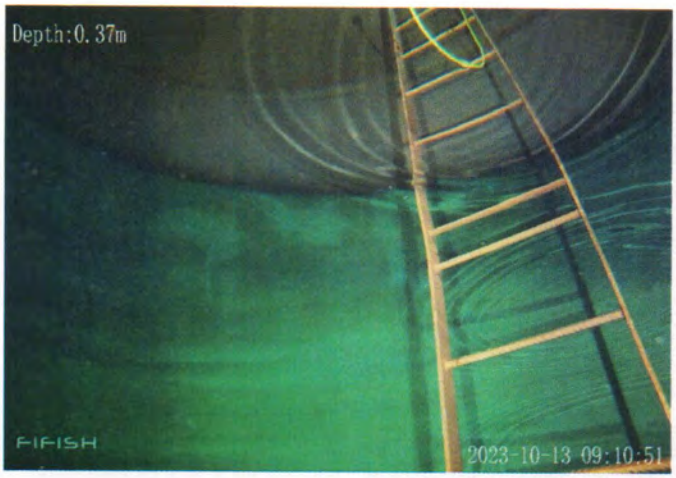
- **Foundation:** Foundation appears in good condition. No deficiencies noted.
- **Legs:** No deficiencies noted with tank legs. Paint coating continues to protect the substrate.
- **Access Ladders:** No deficiencies noted for dry-side access ladder stiles, rungs and connections.
- **Column Flanges:** Column flanges are painted and no corrosion is present.
- **Anchor Bolts:** Anchor bolts are protected and show no rust or corrosion.
- **Riser Pipe:** No deficiencies noted with riser. Paint coating continues to protect the substrate.
- **Riser Rods:** No deficiencies noted with riser rods.
- **Wind Rods:** No deficiencies noted with wind rods.
- **Watertight Conditions:** There are no visible leaks at manway, riser or legs.
- **Balcony:** No deficiencies or corrosion damage noted for balcony railings and landings.
- **Interior Ladders:** No deficiencies noted for the interior ladder stiles, rungs and connections.
- **Roof:** The interior roof does not have roof beams. No deficiencies noted.
- **Vents:** No deficiencies noted with vent.
- **Overflow Pipe:** No deficiencies noted. Overflow pipe extends to ground level.
- **Welds:** No deficiencies noted with weld seams.
- **Level Indicator:** Level indicator is in working condition with no deficiencies noted.

Foundation/Leg Structure

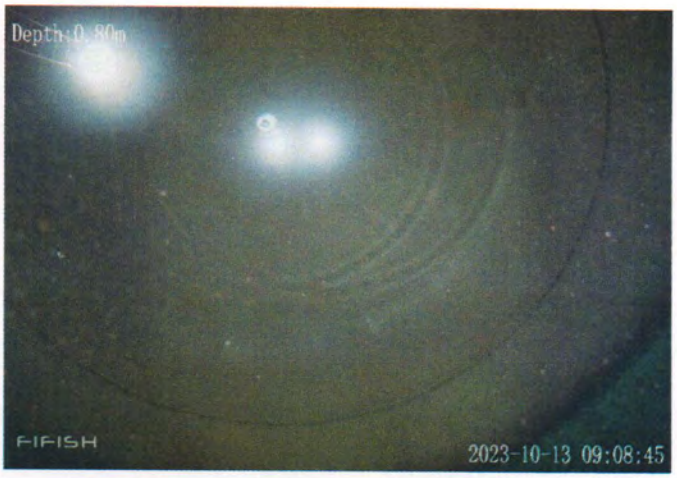
Riser Manway

Tank ID Plate

Vent Structure



ROV Interior Ladder Structure



ROV Interior Roof Structure

Steel Tanks

The determinations and recommendations made within this report with respect to the condition of the steel structure, integrity, or other surface defects are based upon visual observations made during the inspection. Extensive testing or investigation of the steel to determine the extent of the metal loss or capacity of the structure was not completed.

B And B Water Project Inc
ATTN: Shannon Jones
Po Box 7287
Bloomington, IN 47407

APPENDIX E

LEGAL, FINANCIAL, & MANAGERIAL INFORMATION

Table of Contents

ATTACHMENT E-1

B & B Water Project, Inc.
P.O Box 7287
Bloomington, Indiana 47407

Schedule of Water Rates and Charges

(Pursuant to IURC Order No. 45810-U approved October 18, 2023)

A. Metered User Block Schedule

For use of and service rendered by the waterworks system of this Corporation, based upon the use of water supplied by said waterworks system:

Monthly Water Usage

Monthly Rates Per:	Rate
First 3,000 Gallons	$ 11.51 *
Next 3,000 Gallons	10.37 *
Next 4,000 Gallons	9.51 *
Next 10,000 Gallons	8.82 *
Next 30,000 Gallons	8.12 *
All over 50,000 Gallons	7.58 *

B. Metered User Minimum Schedule

Each user shall pay a minimum charge in accordance with the following applicable size meter installed, for which the user will be entitled to the quantity of water set out in the above schedule of rates:

	Gallons Allowed for Minimum	Per Month
5/8 or 3/4 Inch Meter	3,000	$ 34.53 *
1 Inch Meter	7,500	79.91 *
1.25 Inch Meter	12,000	121.32 *
1.5 Inch Meter	15,000	147.78 *
2 Inch Meter	24,000	224.36 *
3 Inch Meter	45,000	394.88 *
4 Inch Meter	75,000	624.98 *
6 Inch Meter	150,000	1,193.48 *

*Subject to the wholesale water tracking factor listed in Appendix A

Issued Pursuant to
Cause No. 45810 - U
October 18, 2023
Indiana Utility Regulatory Commission
Water/Wastewater Division

EFFECTIVE
November 13, 2023
Indiana Utility Regulatory Commission

B & B Water Project, Inc.
P.O Box 7287
Bloomington, Indiana 47407
Schedule of Water Rates and Charges
(Pursuant to IURC Order No. 45810-U approved October 18, 2023)

APPENDIX A

Water Tracking Adjustment - The Water tracking factor set forth in this schedule is applicable where clearly denoted on other rate schedules and shall be occasioned solely by changes in the wholesale cost of water, in accordance with 170 IAC 6-5-1.

Current Water Tracking Rate: $0.00 per 1,000 Gallons

Issued Pursuant to
Cause No. 45810 - U
October 18, 2023
Indiana Utility Regulatory Commission
Water/Wastewater Division

EFFECTIVE
November 13, 2023
Indiana Utility Regulatory Commission

B & B WATER CORPORATION

RULES AND REGULATIONS

RULES AND REGULATIONS

B & B WATER PROJECT INC.

INDEX

B & B Water Project, Inc.
Rules and Regulations

I. SERVICE CLASSIFICATION

A. There shall be no distinction of this category.

II. SERVICE APPLICATION

A. Any bonafide occupant of a single family dwelling; or to each residential unit in a mobile home park, duplex, or multiple dwelling building; or persons holding property having reasonable accessibility to the source of and who is in need of having water supplied to his/her place of occupancy or property may be a member of this company by obtaining approval of the board of directors and by signing such agreements for the purchase of water as may be provided and required by the company, provided that no person otherwise eligible shall be permitted to subscribe for or require a membership of the company if the capacity of the company's water system is exhausted by the needs of its existing members. The membership fee shall be set forth in the company's tariff, which is on file with the Indiana Utility Regulatory Commission (IURC).

B. The company shall make determinations of the credit worthiness of prospective members and/or present customers in accordance with 170 IAC 6-1-15.

C. Disconnection of service shall be governed in accordance with 170 IAC 6-1-16. Reconnection charges are set forth in the company's tariff, which is on file with the IURC.

III. INITIAL OR MINIMUM CHARGES

A. The minimum monthly rate is set forth in the company's tariff and is due and payable irrespective of seasonal use.

B. The tap fee shall be made for each new water installation regardless of location. Each meter requires a separate meter reading sheet, and each meter reading sheet will cover a separate and individual account. The tap fee shall be in accordance with the current tariff schedule.

C. Water furnished for a given lot or farmstead shall be used on that lot only. Each member's service must be

separately metered at a single delivery and metering point. All commercial use, including storerooms and stalls for business purposes, shall be metered separately from any residential use, and vice versa.

IV. COMPANY'S RESPONSIBILITY

A. The Company will install, maintain and operate a main distribution pipe line or lines from the source of water supply, and service lines from the main distribution line or lines to the property line of each member of the Company at which points, designated as delivery points, meters to be purchased, installed owned and maintained by the Company, shall be placed. The cost of the service line or lines from the main distribution line or lines of the company to the property line of each member shall be paid by the Company. The Company will also purchase and install a cut-off valve to be owned and maintained by the Company and to be installed on some portion of the service line owned by the Company. The company shall have the sole and exclusive right to use such cut-off valve to turn it on and off.

B. Each member shall be entitled no more than one (1) service line from the company's water system. No new service line or change in an existing service line may be made which will interfere with an existing service line or the delivery of water therein. Each service line shall connect with the company's water system at the nearest available place of desired use, so long as the delivery of water through a service line at that place does not interfere with the delivery of water through an existing service line.

If the Company's water system is adequate to permit the delivery of water through a new service line, and does not interfere with the delivery of water through a prior service line, then the new service line shall be installed at such place as may be designated by the company. Each Member will be required to dig or have dug a ditch, to purchase and install, and to sustain such portion of the service line or lines from the Company's meter to the Member's own dwelling or other desired place of use at the Member's own expense.

V. COMPANY'S LIABILITY

A. The Company does not assume the responsibility of inspecting the member's piping or apparatus and will not be responsible therefor.

B. The company reserves the right to refuse service unless the member's lines or piping are installed in such manner as to present cross-connections or back-flow.

C. The Company shall not be liable for damage of any kind whatsoever resulting from water or the use of water on the member's premises, unless such damage results directly from negligence on the part of the Company. The Company shall not be responsible for any damage done by, or resulting from , any defects in piping, fixtures, or appliances on the member's premises. The Company shall not be responsible for the acts or negligence of third persons, or forces beyond the control of the Company resulting in any interruption of service.

D. In accordance with 170 IAC 6-1-22, members who will be affected by interruptions in service will be notified in advance, to the extent practical.

VI. MEMBER'S RESPONSIBILITY

A. Piping on the premises of the member must be so installed that the connections are conveniently located with respect to Company lines and mains.

B. If the company is called upon to provide additional meters, each place of metering will be considered as a separate and individual account.

C. The Member shall provide a place of metering, which is unobstructed and accessible at all times.

D. The Member shall furnish and maintain a private cut-off valve on the member's side of the meter. The Company is to provide a like valve on the Company's side of such meter.

E. The Member's piping and apparatus shall be installed and maintained by the member at the member's expense in a safe and efficient manner and in accordance with the Company rules and regulations and in full compliance

with all regulations that may be established by any regulating agency.

F. The Member shall guarantee proper protection for the Company's property placed on the member's premises and shall permit access to it only by authorized representatives of the Company.

G. In the event of any loss or damage to the property of the Company, or any accident or injury to persons or property, any of which is caused by or results from the negligence or wrongful act of the member, his agent or employees, the cost of the necessary repairs or replacements shall be paid by the member to the Company, and any liability paid by the member to the Company, and any liability otherwise resulting shall be assumed by the member. The amount of such loss or damage, or the cost of repairs, shall be added to the member's bill, and if not paid, service may be discontinued by the Company.

H. Water furnished by the Company shall be used for domestic consumption by the member, members of his household, and employees only. The member shall not sell water to any other person or permit any other person or entity to use said water. Water shall not be used for irrigation, fire protection or other purposes, except that when is available in sufficient quantity without interfering with the regular domestic consumption, then the water may be used for any other purpose. Disregard for this shall be sufficient cause for suspension of service pursuant to 170-IAC-6-1-16.

VII. EXTENSIONS TO MAINS AND SERVICES

A. The Company may supply service for temporary purposes at the actual cost, but not less than the minimum rate for connections set forth in the company's tariff, provided that the Company has water available in excess of the Company's regular needs, and provided the Company has available materials and equipment necessary to supply said service. Each applicant for such service must pay in advance to the Company the Company's estimate of cost of labor or materials, less salvage value on removal, for installing and cost of removing such services.

B. Extensions to water lines may be installed by the Company within the requirements of 170-IAC 6-1.5 et seq. All such extensions must be evidenced by an agreement between the Company and the person or entity for who the extension is installed.

VII. ACCESS TO PREMISES

A. Duly authorized agents of the Company shall have access, at all reasonable hours, to the premises of the member for the purpose of installing or removing Company property, inspecting piping, reading or testing meters or for any other purpose in connection with the Company's service and facilities.

B. Each member shall grant or convey, or shall cause to be granted or conveyed to the Company, a permanent easement and right of way across any property owned or controlled by the member wherever said permanent easement and right of way is necessary for the Company water facilities and lines, so as to be able to furnish service to the member.

IX. CHANGE OF OCCUPANCY

A. Not less than three days' notice must be given in person or in writing to the Company to discontinue service or to change occupancy.

B. The outgoing member shall be responsible for all water consumed up to the time of departure or the time specified for departure whichever period is longer.

C. A transfer fee shall be charged to members for transferring the account to a new member or tenant. The transfer fee is set forth in the company's tariff.

X. METER READING - BILLING - COLLECTION

A. Meters shall be read by the member and payments submitted monthly.

B. Charges for water will be figured in accordance with the Company's tariff and will be based on the amount consumed for the period covered by the meter readings. The minimum bill to members shall be equal to the minimum charge for one full month's service, except where a member orders turn-on.

C. The minimum monthly charge for service commences when the meter is installed and connection is made, whether used or not.

D. Reading from different meters will not be combined for billing, irrespective of the fact that said meters may be for the same or different premises, or the same or different members, or the same or different services.

E. Payments are due on the first day of each month, and are delinquent if unpaid after seventeen (17) days following the due date. Delinquency charges will be assessed in accordance with the Company's tariff.

F. Delinquent notices will be mailed to the member during the first week of the month after the due date. Such notice shall state that service will be disconnected on the 17th day of month after the due date, that service will be disconnected for failure to pay for service, the telephone number of the Company, and a reference to these rules and regulations. If payment is not received by the 17th day of the month in which notice is given, service will be disconnected.

G. Upon discontinuance of service for non-payment of bills, the membership fee will be applied by the Company toward settlement of the account. Any balance will be refunded to the Member, but if membership is not sufficient to cover the bill, the Company may proceed to collect the balance in the usual way provided by law for the collection of debts.

XI. SUSPENSION OF SERVICE

A. Involuntary disconnection of service to a member shall be conducted in accordance with 170 IAC 6-1-16, and these Rules and Regulations.

B. When services are discontinued, the membership fee will be refunded by the Company at its original cost, less any outstanding charges.

C. The Company may, in addition to prosecution by law, disconnect service to any member who tampers with a meter or other measuring device. Such disconnection may occur without prior notice to the Member, and a tampering charge will be charged in accordance with the Company's tariff.

XII. COMPLAINTS - ADJUSTMENTS

A. If the Member believes his bill to be in error, he shall present his claim, in person or in writing, to the board of directors before the bill becomes delinquent. The Member may pay such bill under a protest, and said payment shall not prejudice his claim.

B. The Company will make special meter readings at the request of the member for the fee set forth in the Company's tariff.

C. Members may request special meter testing, and such testing shall comply with the requirements of 170 IAC 6-1-11.

D. If the seal of a meter is broken by other than the Company's representative, or if the meter fails to register correctly or is stopped for any cause, the Member shall pay an amount estimated from the record or his previous bills and/or other proper data.

XIII. ABRIDGEMENT OR MODIFICATION OF RULES

A. No promise, agreement or representation of any employee of the Company shall be binding upon the Company except as it shall have been agreed upon in writing, signed and accepted by the acknowledgement of officers of the Company.

B. No modification of rates or any of the rules and regulations shall be made by any agent of the Company.

C. The word "Company" used herein applied to B & B WATER PROJECT INC. The word "Member" used herein applied to the Members of said Company.

B & B Water Project, Inc.
4125 East Bethel Lane
Bloomington, IN 47408

Schedule of Rates and Charges

(H)	Membership Fee	$100.00
(I)	Minimum Charge For Connection	Actual Cost, but not less than $575.00
(J)	Charge for tampering with a meter or any of the Company's equipment.	$50.00
(K)	Special reading of meter at customer's request	$25.00

ATTACHMENT E-3

SRF Loan Program
Signatory Authorization Resolution

Whereas, B&B Water Project, Inc, (the "Participant") has plans for a drinking water infrastructure improvement project to meet State and Federal regulations and the Participant intends to proceed with the construction of such project:

Now, therefore, be it resolved by Board of B&B Water Project, Inc, the governing body of the Participant, that:

1. Dale Lisby, President, be authorized to make application for a State Revolving Fund Loan ("SRF Loan") and provide the SRF Loan Program such information, data and documents pertaining to the loan process as may be required, and otherwise act as the authorized representative of the Participant; and

2. The Participant agrees to comply with State and Federal requirements as they pertain to the SRF Loan Program; and

3. Two certified copies of this Resolution be prepared and submitted as part of the Participant's Preliminary Engineering Report.

Adopted and Passed by the Board of B&B Water Project, Inc. this 19th Day of March of 2023. 2024 BDC

Board

Dale Lisby

Dale Lisby, President

Attest:

Jeff Underwood, Treasurer BDC

Brian D. Couch

ATTACHMENT E-4

SRF Loan Program
PER Acceptance Resolution

Whereas, B&B Water Project, Inc, has caused a Preliminary Engineering Report ("PER"), dated January 2024, to be prepared by the consulting firm of Wessler Engineering; and

Whereas, said PER has been presented to the public at a public hearing held on March 19th, 2024, at the B&B Water Project Office, for public comment; and

Whereas, B&B Water Project, Inc. finds that there was not sufficient evidence presented in objection to the recommended project in the PER.

Now, therefore be it resolved that:

1. The PER dated January 2024 be approved and adopted by the B&B Water Project, Inc. Board; and

2. Said PER be submitted to the State Revolving Fund Loan Program for review and approval.

Adopted and Passed by the Board of B&B Water Project, Inc. this 19th day of March of 2024.

Board

Dale Lisby

Dale Lisby, President

Attest:

~~Jeff Underwood,~~ Treasurer

BDC

BRIAN D CROUCH

ATTACHMENT E-5

DRINKING WATER SRF PROJECT FINANCING INFORMATION

Proposed Project Costs

a.	Water Supply/Wells cost	$ 207,000
b.	Treatment System cost	$ 0
c.	Water Storage cost	$ 0
d.	Transmission/Distribution System cost	$ 4,812,000
e.	Lead Service Line Replacement cost	$ 0
f.	**Subtotal Construction Cost**	**$ 5,019,000**
g.	Contingencies (should not exceed 10% of construction cost)	$ 502,000
h.	Non-construction cost e.g., engineering, legal, and financial services related to the project, land costs, start-up costs, and construction inspection	$ 1,380,000
i.	**Total Project Cost (lines f+g+h)**	**$ 6,901,000**

Ineligible costs (see below) $ 0

Proposed Funding Information

a.	Requested SRF Financing	$ 6,901,000
b.	Co-Source: _____	$ -
c.	Co-Source: _____	$ -
d.	Co-Source: _____	$ -
e.	**Total Funding Sources**	**$ 6,901,000**

CALCULATIONS FOR INELIGBLE COSTS

The following are not eligible for Drinking Water SRF reimbursements:

1.	Materials & work done on private property	$ 0
2.	Grant applications and income surveys completed for other agencies	$ 0
3.	Project components with the primary intent of promoting economic development and growth	$ 0
4.	Project components with the sole purpose of providing fire protection	$ 0
	Expenses incurred as a part of forming RWDs, CDs, etc., or changing boundaries, or other non-SRF District activities	$ 0
5.	Costs for preparing Wellhead Protection Plans and other tasks unrelated to the SRF project	$ 0
6.	Cleaning of equipment or other routine operation and maintenance activities.	$ 0
7.	**Total Ineligible Costs**	**$ 0**

APPENDIX F

PUBLIC HEARING INFORMATION

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ATTACHMENT F-1 PUBLIC NOTICE

LOCALiQ
South Bend Tribune | The Herald Times
The Times-Mail | Evening World
The Reporter Times
PO Box 630485 Cincinnati, OH 45263-0485

PROOF OF PUBLICATION

Brian Crouch
B & B Water Project Inc
Po Box 7287
Bloomington IN 47407-7287

STATE OF INDIANA, COUNTY OF MONROE

The Herald Times is a public newspaper of general circulation, printed in the town of Bloomington, in said County and State, that the notice, of which the annexed is a true copy, was published in regular edition of said paper, issued upon the following dates, to wit:

03/08/2024

Sworn to and subscribed before on 03/08/2024

Legal Clerk

Notary, State of WI, County of Brown

My commission expires

Publication Cost:	$81.14		
Order No:	9934512	# of Copies:	
Customer No:	1054078	1	
PO #:			

THIS IS NOT AN INVOICE!

Please do not use this form for payment remittance.

KAITLYN FELTY
Notary Public
State of Wisconsin

Notice of Public Hearing
B&B Water Project, Inc,
Indiana
Preliminary Engineering Report (PER) to obtain assistance from The Drinking Water State Revolving Fund (DWSRF) Loan Program

B&B Water Project, Inc. will hold a public hearing on March 19, 2024, at 6:30 pm at the utility office at 6023 E. State Road 45, Bloomington, IN 47408. The public hearing will present the findings and recommendations of the Water System Preliminary Engineering Report, including water meter replacement, replacing and upsizing high-priority water mains, and rehabilitation of the State Road 45 booster station, as described in the PER. The project is anticipated to be funded through a Drinking Water State Revolving Fund Loan.

At this hearing, there will be the opportunity for questions and comments from the public. Participation is welcomed and encouraged. If special assistance is required at the meeting, please contact B and B Water Project at (812) 336 7644 or bandbwater@comcast.net at 6023 East State Road 45 Bloomington, Indiana 47408. Copies of the required Preliminary Engineering Report (PER) are available for public viewing from March 9, 2024, through March 24, 2024, at the utility office at 6023 E. State Road 45, Bloomington, IN 47408. Written comments regarding this project should be sent to B and B Water Project (812) 336 7644 or bandbwater@comcast.net, located at 6023 East State Road 45 Bloomington, Indiana 47408, before March 24, 2024.

HSPAXLP

Form Prescribed by State Board of Accounts

General Form No. 99P (Rev. 2002)

To: BLM Herald Times

_____

(Government Unit)

_____County, Indiana _____

52 lines, 1.0000 columns wide which equals 52 equivalent lines at $1.56 per line @ 1 days	$81.14
Website Publication	$0.00
Charge for proof(s) of publication	$0.00
TOTAL AMOUNT OF CLAIM	$81.14

Acct #: 1054078

Ad #: 9934512

DATA FOR COMPUTING COST

Width of single column 1.53 in

Number of insertions 1

Size of type 7 point

Claim No. _____ Warrant No. _____

IN FAVOR OF

Herald Times
1900 S Walnut
Bloomington, IN 47402

I have examined the within claim and hereby certify as follows:

That it is in proper form.

That it is duly authenticated as required by law.

That is is based upon statutory authority.

That it is apparently (correct)

(incorrect)

_____

$_____

On Account of Appropriation For

FED ID

83-2810977

Allowed _____, 20_____

In the sum of $_____

_____

I certify that the within claim is true and correct, that the services there-in itemized and for which charge is made were ordered by me and were necessary to the public business.

_____

_____

ATTACHMENT F-2 ATTENDANCE RECORD

B&B Water Project

Sign-in attendance and to address the B&B Water Board of Directors for three(3) minutes of comments at the B&B Directors meeting DATE:

NO.	Name	Address	PHONE	EMAIL	Reason: Member Service Issue or Member Comment
01	Madeline Pritchett		317-718-4551	madelinep@wesslerengineering.com	
02	Taylor Greathouse -		317-718-4551	taylorg@wesslerengineering.com	
03					
04					
05					

ATTACHMENT F-3 MEETING MINUTES

03/19/2024 SPECIAL MEETING MINUTES

B & B Board of Directors Meeting

Board of Directors

Dale Lisby, President (24)
Jay Floyd, Vice President (26)
Jeff Underwood, Treasurer (25)
Brian Crouch, Secretary (24)
Don Housman (25)
*(XX) Election Year

Scott Moore, Director (26)
Jodie Richardson, Director (24)
Jon Richardson, Director (26)
Alain Bouvier, Director (25)

The B & B Water Project Inc. special meeting was on 03/19/2023. Seven Directors were present, with Jeff and Jodie absent. Taylor Greathouse and Madeline Pritchett with Wessler were present. Dale opened the meeting at 6:30 pm.

New Business:

A public meeting was called and advertised correctly in the Herald Times on 3/8/2024, posted on our website, and posted at the Office. The purpose of the meeting was to take public comment on the PER prepared by Wessler for use in our application for the SRF due in April 2024.

Notice of Public Hearing
B&B Water Project, Inc, Indiana
Preliminary Engineering Report (PER) to obtain assistance from
The Drinking Water State Revolving Fund (DWSRF) Loan Program

B&B Water Project, Inc. will hold a public hearing on March 19, 2024, at **6:30 pm** at the utility office at 6023 E. State Road 45, Bloomington, IN 47408. The public hearing will present the findings and recommendations of the Water System Preliminary Engineering Report, including water meter replacement, replacing and upsizing high-priority water mains, and rehabilitation of the State Road 45 booster station, as described in the PER. The project is anticipated to be funded through a Drinking Water State Revolving Fund Loan.
At this hearing, there will be the opportunity for questions and comments from the public. Participation is welcomed and encouraged. If special assistance is required at the meeting, please contact B and B Water Project at (812) 336 7644 or bandbwater@comcast.net at 6023 East State Road 45 Bloomington, Indiana 47408. Copies of the required Preliminary Engineering Report (PER) are available for public viewing from March 9, 2024, through March 24, 2024, at the utility office at 6023 E. State Road 45, Bloomington, IN 47408. Written comments regarding this project should be sent to B and B Water Project (812) 336 7644 or bandbwater@comcast.net, located at 6023 East State Road 45 Bloomington, Indiana 47408, before March 24, 2024.

No visitors were present, and no comments or questions were submitted to the board before or during the meeting.

Dale opend with comments on why we are having the meeting.

Taylor Greathouse, Wessler, reviewed the PER final report.

No director comments.

Resolution 2401: Brian motioned to reaffirm and accept the PER as presented by Wessler. Scott seconded the motion.

Attendance vote taken:

Jon Richardson, Director	(26)	YA
Jay Floyd, Vice President	(26)	YA
Jodie Richardson, Director	(24)	Absent
Jeff Underwood, Treasurer	(25)	Absent
Alain Bouvier, Director	(25)	YA
Don Housman, Director	(25)	YA
Scott Moore, Director	(26)	YA
Dale Lisby, President	(24)	YA
Brian Crouch, Secretary	(24)	YA

The motion was approved, and seven members voted yes.

Don motioned to nominate Dale to be the signature authority for the SRF Loan Program. Brian seconded, and the motion was accepted.

Don motioned to accept the 'Signatory Authorization Resolution' as read aloud by Brian for the SRF Loan Program. Scott seconded, and the motion was accepted.

Jay motioned to accept the 'PER Acceptance Resolution' as read aloud by Brian for the SRF Loan program. Jon seconded, and the motion was accepted.

Dale signed the cover letter for the DWSRF program manager.

Adjournment: 02/27/2024: Dale adjourned at 6:44 pm.

Brian Crouch, the Secretary, recorded this 03/19/2024 meeting for meeting transcription accuracy)

Approval of minutes on March 26, 2024:

- Date:3/26/2024
- Corrections: NONE
- Motioned_Jon_Seconded Jay Motion Carried_X_ YA_7_ NA_0

APPENDIX G

USFWS IPAC VERIFICATION LETTER & SPECIES LIST

Table of Contents

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Indiana Ecological Services Field Office
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

In Reply Refer To:
Project code: 2024-0016310
Project Name: Water System Improvements Project

November 14, 2023

Federal Nexus: yes
Federal Action Agency (if applicable): State of Indiana

Subject: Technical assistance for 'Water System Improvements Project'

Dear Michael Ellis:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on November 14, 2023, for 'Water System Improvements Project' (here forward, Project). This project has been assigned Project Code 2024-0016310 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements are not complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project. **Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter.**

Determination for the Northern Long-Eared Bat

Based on your IPaC submission and the standing analysis for the Dkey, your project has reached the determination of "May Affect" the northern long-eared bat.

Next Steps

Your action may qualify for the Interim Consultation Framework for the northern long-eared bat. To determine if it qualifies, review the Interim Consultation Framework posted here https://www.fws.gov/library/collections/interim-consultation-framework-northern-long-eared-bat. If you

determine it meets the requirements of the Interim Consultation Framework, follow the procedures outlined there to complete section 7 consultation.

If your project does **not** meet the requirements of the Interim Consultation Framework, please contact the Indiana Ecological Services Field Office for further coordination on this project. Further consultation or coordination with the Service is necessary for those species or designated critical habitats with a determination of "May Affect".

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Indiana Bat *Myotis sodalis* Endangered
- Monarch Butterfly *Danaus plexippus* Candidate
- Round Hickorynut *Obovaria subrotunda* Threatened
- Salamander Mussel *Simpsonaias ambigua* Proposed Endangered
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered
- Whooping Crane *Grus americana* Experimental Population, Non-Essential

Critical Habitats:

- Indiana Bat Myotis sodalis Endangered

You may coordinate with our Office to determine whether the Action may cause prohibited take of the species listed above.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Water System Improvements Project

2. Description

The following description was provided for the project 'Water System Improvements Project':

Portions of Monroe County, Indiana

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.173200449999996,-86.52673677851524,14z

DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of "may affect" for the Endangered northern long-eared bat (*Myotis septentrionalis*).

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. Does any component of the action involve construction or operation of wind turbines?

   Note: For federal actions, answer 'yes' if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

   No

3. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   Yes

4. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

   No

5. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

   Note: This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

   No

6. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

   No

7. Is the lead federal action agency the Federal Energy Regulatory Commission (FERC)?

   No

8. Have you determined that your proposed action will have no effect on the northern long-eared bat? Remember to consider the effects of any activities that would not occur but for the proposed action.

   If you think that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, answer "No" below and continue through the key. If you have determined that the northern long-eared bat does not occur in your project's action area and/or that your project will have no effects whatsoever on the species despite the potential for it to occur in the action area, you may make a "no effect" determination for the northern long-eared bat.

   Note: Federal agencies (or their designated non-federal representatives) must consult with USFWS on federal agency actions that may affect listed species [50 CFR 402.14(a)]. Consultation is not required for actions that will not affect listed species or critical habitat. Therefore, this determination key will not provide a consistency or verification letter for actions that will not affect listed species. If you believe that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, please answer "No" and continue through the key. Remember that this key addresses only effects to the northern long-eared bat. Consultation with USFWS would be required if your action may affect another listed species or critical habitat. The definition of Effects of the Action can be found here: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

   No

9. [Semantic] Is the action area located within 0.5 miles of a known northern long-eared bat hibernaculum?

   Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

   Automatically answered

   Yes

10. Will the proposed action result in the cutting or other means of knocking down, bringing down, or trimming of any trees suitable for northern long-eared bat roosting?

    Note: Suitable northern long-eared bat roost trees are live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities.

    No

PROJECT QUESTIONNAIRE

Will all project activities by completed by April 1, 2024?

No

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Michael Ellis
Address: 1130 AAA Way
City: Carmel
State: IN
Zip: 46032
Email michaele@wesslerengineering.com
Phone: 3177884551

LEAD AGENCY CONTACT INFORMATION

Lead Agency: State of Indiana

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Indiana Ecological Services Field Office
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

In Reply Refer To:
Project Code: 2024-0016310
Project Name: Water System Improvements Project

November 14, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website at - http://www.fws.gov/midwest/endangered/section7/s7process/index.html. This website contains step-by-step instructions which will help you

determine if your project will have an adverse effect on listed species and will help lead you through the Section 7 process. For all **wind energy projects** and **projects that include installing towers that use guy wires or are over 200 feet in height**, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project or may be affected by your proposed project.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of

Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. **Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.**

Attachment(s):

- Official Species List
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Indiana Ecological Services Field Office
620 South Walker Street
Bloomington, IN 47403-2121
(812) 334-4261

PROJECT SUMMARY

Project Code: 2024-0016310
Project Name: Water System Improvements Project
Project Type: Distribution Line - Maintenance/Modification - Below Ground
Project Description: Portions of Monroe County, Indiana
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.173200449999996,-86.52673677851524,14z

Counties: Monroe County, Indiana

ENDANGERED SPECIES ACT SPECIES

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Whooping Crane *Grus americana* Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

CLAMS

NAME	STATUS
Round Hickorynut *Obovaria subrotunda* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9879	Threatened
Salamander Mussel *Simpsonaias ambigua* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/6208	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Indiana Bat *Myotis sodalis* https://ecos.fws.gov/ecp/species/5949#crithab	Final

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds elsewhere

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read the supplemental information and specifically the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

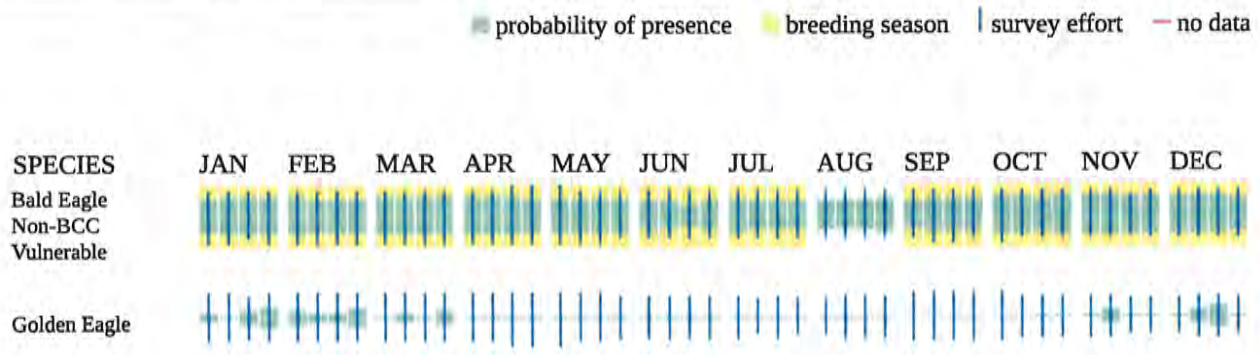
Probability of Presence (▪)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Non-BCC
Vulnerable

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Cerulean Warbler *Dendroica cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 23 to Jul 20
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Field Sparrow *Spizella pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9446	Breeds Mar 1 to Aug 15
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds elsewhere
Henslow's Sparrow *Ammodramus henslowii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds May 1 to Aug 31
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443	Breeds Apr 20 to Aug 20
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31

NAME	BREEDING SEASON
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read the supplemental information and specifically the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

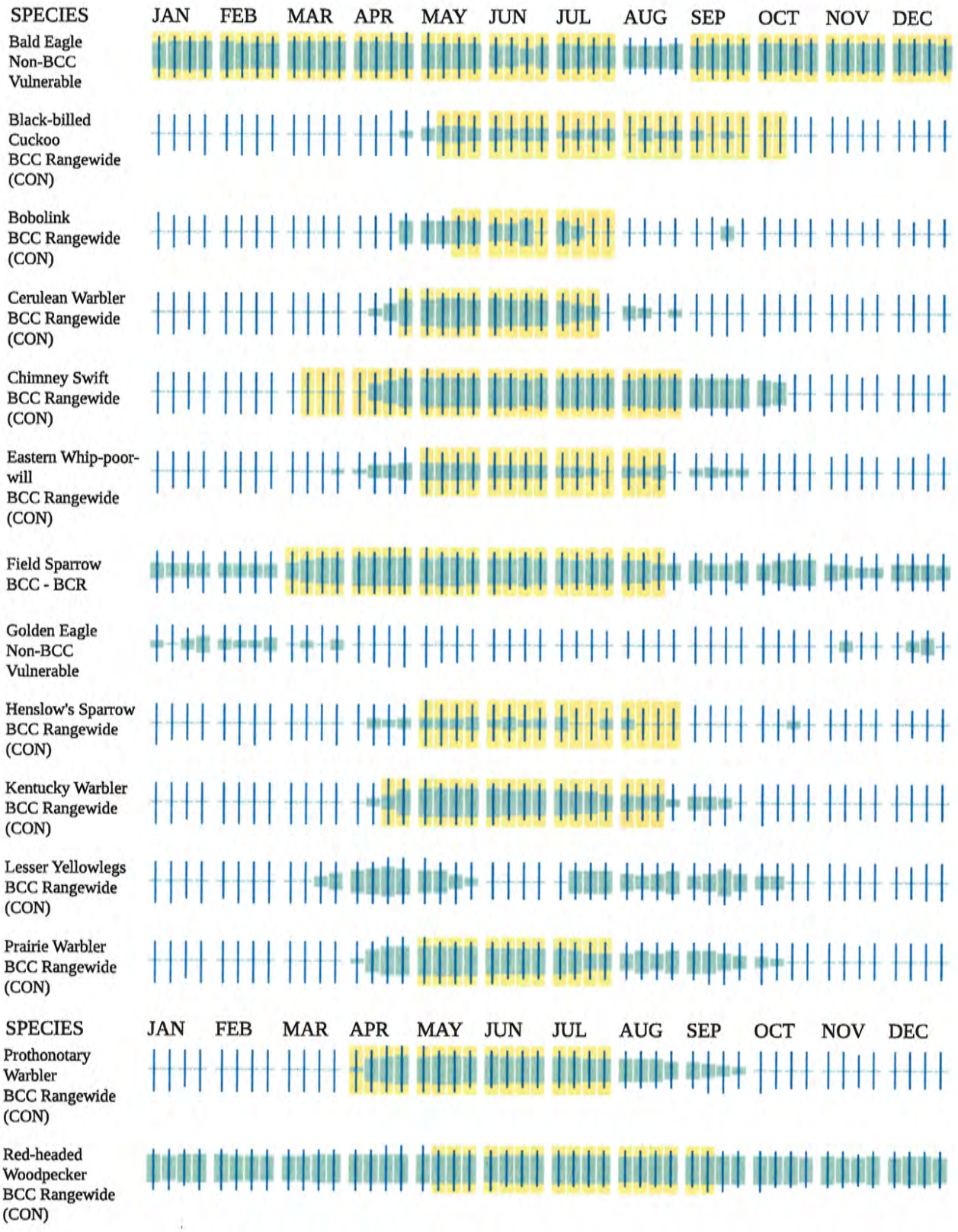
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

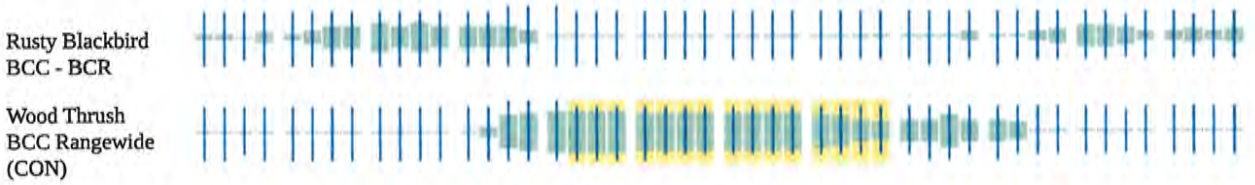
Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

▪ probability of presence ▪ breeding season | survey effort – no data


SPECIES
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Bald Eagle
Non-BCC
Vulnerable
Black-billed
Cuckoo
BCC Rangewide
(CON)
Bobolink
BCC Rangewide
(CON)
Cerulean Warbler
BCC Rangewide
(CON)
Chimney Swift
BCC Rangewide
(CON)
Eastern Whip-poor-
will
BCC Rangewide
(CON)
Field Sparrow
BCC - BCR
Golden Eagle
Non-BCC
Vulnerable
Henslow's Sparrow
BCC Rangewide
(CON)
Kentucky Warbler
BCC Rangewide
(CON)
Lesser Yellowlegs
BCC Rangewide
(CON)
Prairie Warbler
BCC Rangewide
(CON)
SPECIES
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Prothonotary
Warbler
BCC Rangewide
(CON)
Red-headed
Woodpecker
BCC Rangewide
(CON)



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Michael Ellis
Address: 1130 AAA Way
City: Carmel
State: IN
Zip: 46032
Email michaele@wesslerengineering.com
Phone: 3177884551

LEAD AGENCY CONTACT INFORMATION

Lead Agency: State of Indiana

APPENDIX H

NRCS FARMLAND CONVERSION CORRESPONDENCE

Table of Contents

Michael Ellis

From: Stucker, Kacie - FPAC-NRCS, IN <Kacie.Stucker@usda.gov>
Sent: Thursday, December 21, 2023 12:58 PM
To: Michael Ellis
Cc: Allen, John - FPAC-NRCS, IN
Subject: Monroe County, IN - B&B Water Project LLC - Water Systems Improvements Project
Attachments: Letter_ B&B Water Project LLC - Water Systems Improvements Proj Monroe Co.pdf; MonroeCo_B and B_Water Proj_LLC_Sites A_B_C_1006_NO Impact.pdf

WARNING: External email, verify sender before opening attachments or clicking on links.
Please find attached the NRCS response to the above project.

Respectfully,

Kacie Stucker
United States Department of Agriculture
Natural Resources Conservation Services
6013 Lakeside Blvd.
Indianapolis, IN 46278
Office: (317) 295-5800

USDA United States Department of Agriculture
Farm Production and Conservation
Natural Resources Conservation Service
Indiana State Office
6013 Lakeside Boulevard
Indianapolis, Indiana 46278
317-295-5800

December 21, 2023

Micheal Ellis
Wessler Engineering, Inc.
1130 AAA Way
Carmel, Indiana 46032

Dear Mr. Ellis:

The proposed water system improvement project in Monroe County, Indiana, as referred to in your letter received December 8, 2023, will not cause a conversion of prime farmland.

If you need additional information, please contact John Allen at 317-295-5859 or john.allen@usda.gov

Sincerely,

JOHN ALLEN

Digitally signed by JOHN ALLEN
Date: 2023.12.21 12:44:39 -05'00'

JOHN ALLEN
State Soil Scientist

Enclosures

NO Impact--all sites will not be a conversion

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 12/08/2023	
Name of Project Water System Improvements		Federal Agency Involved USDA	
Proposed Land Use Utility Improvements		County and State Monroe County, Indiana	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS	Person Completing Form: JRA
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☑	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS 12/21/2023	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	0	0	0	
B. Total Acres To Be Converted Indirectly	0	0	0	
C. Total Acres In Site	48.9	151.5	49.6	
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form: Michael Ellis | Date:

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

Michael Ellis

From: Michael Ellis
Sent: Friday, December 8, 2023 2:56 PM
To: Allen, John - NRCS, Indianapolis, IN
Subject: Monroe County, IN - B&B Water Project LLC - Water Systems Improvements Project
Attachments: NRCS Figures (Sites A-B-C).pdf; Soils Map.pdf; Farmland Conversion AD-1006 (B&B - Monroe County).pdf

Good afternoon, John.

Please review the following attachments for the proposed Water System Improvements project located in Monroe County, Indiana. The proposed project includes the replacement of approximately 7,100 linear feet of water main (Site A), the replacement of approximately 22,000 linear feet of water main (Site B), and the replacement of approximately 7,200 linear feet of water main (Site C).

1. NRCS Figures (Sites A, B, & C);
2. Soils Map; and
3. Farmland Conversion Impact Rating Form.

Please let me know if you have any questions.

Thank you,

Michael Ellis, MA, CFM, CPESC, CESSWI | Environmental Scientist III
Wessler Engineering, Inc.
1130 AAA Way Carmel Indiana 46032

P: 317-788-4551
C: 317-353-5353
D: 317-550-4609

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 12/08/2023
Name of Project Water System Improvements	Federal Agency Involved USDA
Proposed Land Use Utility Improvements	County and State Monroe County, Indiana
PART II *(To be completed by NRCS)*	Date Request Received By NRCS / Person Completing Form:

Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☐	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	0	0	0	
B. Total Acres To Be Converted Indirectly	0	0	0	
C. Total Acres In Site	48.9	151.5	49.6	
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form: Michael Ellis | Date:

(See Instructions on reverse side)

Form AD-1006 (03-02)

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

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Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

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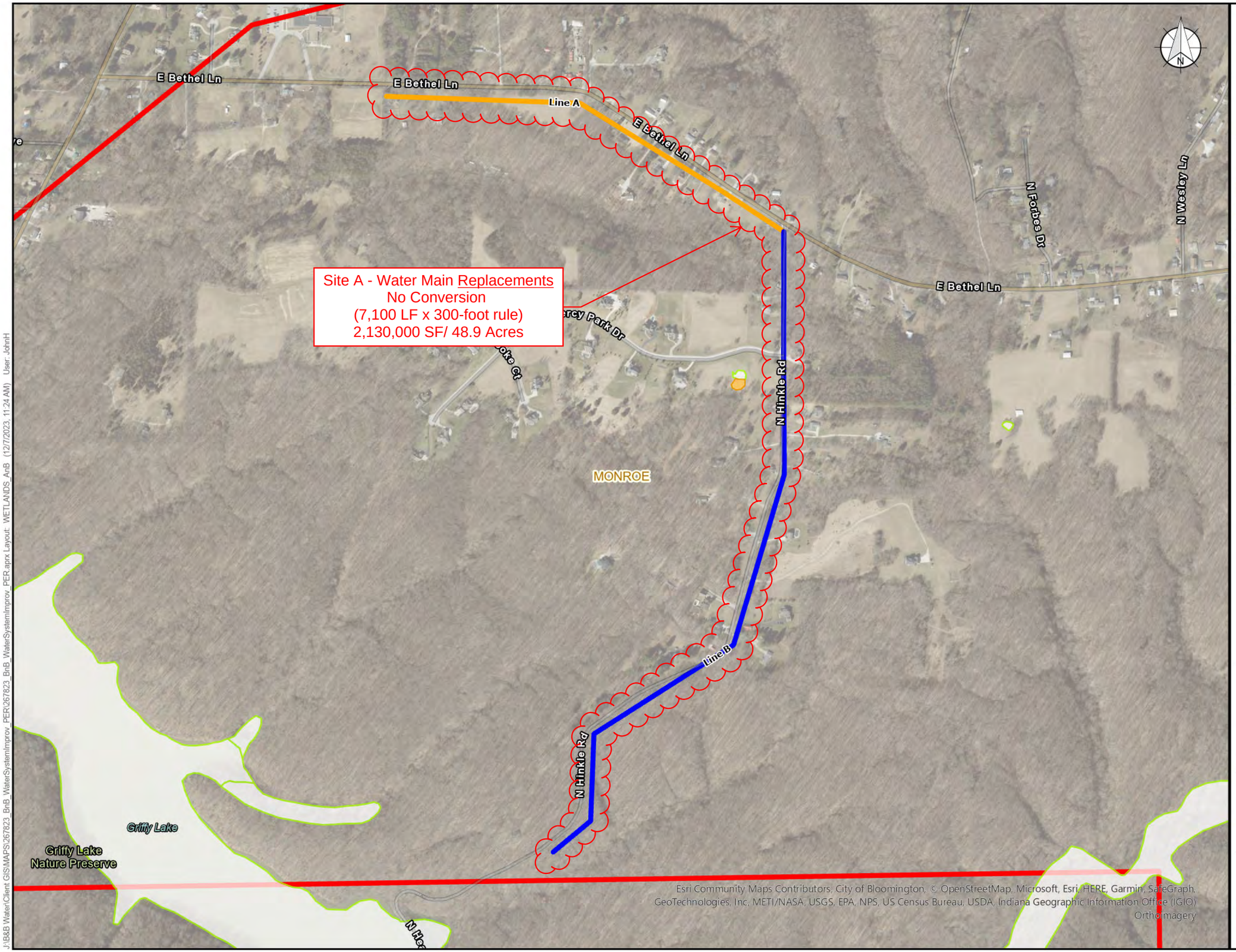
NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.



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WESSLER ENGINEERING
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Legend

- Historic Wetlands (USFWS)
- Wetlands NWI (USFWS)

B&B Water Mains

- Line A
- Line B
- Line C
- Line D
- Line E
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary

0 600 1,200 FT

FIGURE A-5.3
WETLANDS MAP
(1 of 3)

B&B Water Project LLC
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
December 2023
ProjectNo-267823-01-001

Site B - Water Main Replacements
No Conversion
(22,000 LF x 300-foot rule)
6,600,000 SF/ 151.5 Acres

Unionville
MONROE
E State Road 45
N Mt Gilead Rd
E Earl Young Rd
E Wellston Dr
N Bent Pine Dr
E Ratliff Rd
Stephens Creek
Schact Lake
Line C
Line D
N Brummetts Creek Rd
Brummett Creek
N Gatys

Esri Community Maps Contributors, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Indiana Geographic Information Office (IGIO) Orthoimagery

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WESSLER ENGINEERING
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Legend

- Historic Wetlands (USFWS)
- Wetlands NWI (USFWS)

B&B Water Mains

- Line A
- Line B
- Line C
- Line D
- Line E
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- State Road 45 Booster Station
- B&B Water Office

0 1,500 3,000 FT

FIGURE A-5.3
WETLANDS MAP
(2 of 3)

B&B Water Project LLC
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
December 2023
ProjectNo-267823-01-001

Site C - Water Main Replacements
No Conversion
(7,200 LF x 300-foot rule)
2,160,000 SF/ 49.6 Acres

N Shilo Rd
E Rust Rd
Rapid Creek
MONROE
Hillsaner Rd
Line E
N Tunnel Rd

Indiana Geographic Information Office (IGIO) Orthoimagery, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

WESSLER ENGINEERING
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Legend

- Historic Wetlands (USFWS)
- Wetlands NWI (USFWS)

B&B Water Mains

- Line A
- Line B
- Line C
- Line D
- Line E
- B&B Water Utility Territory Boundary
- Bloomington City Limits
- County Boundary
- State Road 45 Booster Station
- B&B Water Office

0 600 1,200 FT

FIGURE A-5.3
WETLANDS MAP
(3 of 3)

B&B Water Project LLC
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
December 2023
ProjectNo-267823-01-001

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MONROE

BROWN

Line A

Line B

Line C

Line D

Line E

B&B Water Office Bldg

SR45 Booster Station

Indiana Geographic Information Office (IGIO) Orthoimagery

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SSURGO Units

MUSYM

- Ba
- BcrAW
- BdB
- BgF
- BkF
- Bo
- CaD
- Cb
- CoF
- CrB
- CrC
- CtB
- CtC
- Cu
- EbE
- EkB
- EkF
- GpD
- GrD
- HaD
- HbD3
- Hd
- HoB
- HoC
- HtB
- Omz

Legend

- PeA
- PeB
- Sf
- St
- TlB
- Ud
- W
- Wa
- WaD
- WeC
- Wr
- WyqD
- <all other values>
- Soil Special Feature Points SSURGO

B&B Water

- Line A
- Line B
- Line C
- Line D
- Line E
- B&B Water Utility Territory Boundary
- Utility Water Mains
- Bloomington City Limits
- County Boundary
- B&B Water Office
- State Road 45 Booster Station

0 2,000 4,000 8,000 FT

FIGURE A-5.6

SOILS SURVEY MAP (1 of 2)

B&B Water Project LLC
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
December 2023
ProjectNo-267823-01-001

Map unit symbol	Map unit name— Brown County, Indiana (IN013)	Rating (centimeters)	Acres in AOI	Percent of AOI
BgF	Berks-Trevlac-Wellston complex, 20 to 70 percent slopes	>200	95.2	0.40%
TlB	Tilsit silt loam, 2 to 6 percent slopes	46	3.9	0.00%
WaD	Wellston-Berks-Trevlac complex, 6 to 20 percent slopes	>200	41.9	0.20%
Subtotals for Soil Survey Area (Brown County (IN013)			**140.9**	**0.70%**
Map unit symbol	**Map unit name - Monroe County, Indiana (IN105)**	**Rating (centimeters)**	**Acres in AOI**	**Percent of AOI**
Ba	Bartle silt loam, 0 to 2 percent slopes	43	28	0.10%
BcrAW	Beanblossom silt loam, 0 to 3 percent slopes, occasionally flooded, very brief duration	>200	621.8	2.90%
BdB	Bedford silt loam, 2 to 6 percent slopes	54	1,933.20	8.90%
BkF	Brownstown-Gilwood silt loams, 25 to 75 percent slopes	>200	12,286.30	56.90%
Bo	Bonnie silt loam, frequently flooded	0	22.6	0.10%
CaD	Caneyville silt loam, 12 to 18 percent slopes	>200	934.8	4.30%
Cb	Caneyville-Hagerstown silt loams, 2 to 18 percent slopes, karst	>200	177.3	0.80%
CoF	Corydon Variant-Caneyville Variant complex, 25 to 70 percent slopes	>200	99.2	0.50%
CrB	Crider silt loam, 2 to 6 percent slopes	>200	58.2	0.30%
CrC	Crider silt loam, 6 to 12 percent slopes	>200	1,560.30	7.20%
CtB	Crider-Urban land complex, 2 to 6 percent slopes	>200	14.2	0.10%
CtC	Crider-Urban land complex, 6 to 12 percent slopes	>200	49.4	0.20%
Cu	Cuba silt loam, frequently flooded	>200	98.2	0.50%
EbE	Ebal-Gilpin-Hagerstown silt loams, 18 to 25 percent slopes	76	4.5	0.00%
EkB	Elkinsville silt loam, 2 to 6 percent slopes	>200	0.5	0.00%
EkF	Elkinsville silt loam, upland, 20 to 40 percent slopes	>200	318.4	1.50%
GpD	Gilpin silt loam, 12 to 18 percent slopes	>200	50	0.20%
GrD	Gilpin-Gullied land complex, 12 to 22 percent slopes	>200	59.7	0.30%
HaD	Hagerstown silt loam, 12 to 20 percent slopes	>200	318.7	1.50%
HbD3	Hagerstown silty clay loam, 12 to 22 percent slopes, severely eroded	>200	3	0.00%
Hd	Haymond silt loam, frequently flooded	>200	245.6	1.10%
HoB	Hosmer silt loam, 2 to 6 percent slopes	46	19.4	0.10%
HoC	Hosmer silt loam, 6 to 12 percent slopes	46	29	0.10%
HtB	Hosmer-Urban land complex, 2 to 12 percent slopes	46	33.7	0.20%
Omz	Orthents, earthen dam	>200	4.7	0.00%
PeA	Pekin silt loam, 0 to 2 percent slopes	64	47.2	0.20%
PeB	Pekin silt loam, 2 to 6 percent slopes	46	29	0.10%
Sf	Steff silt loam, 0 to 2 percent slopes, frequently flooded	58	12.9	0.10%
St	Stendal silt loam, 0 to 2 percent slopes, frequently flooded, brief duration	46	90.7	0.40%
TlB	Zanesville silt loam, 2 to 6 percent slopes	57	87	0.40%
Ud	Udorthents-Pits complex	>200	3.9	0.00%
W	Water	>200	330.6	1.50%
Wa	Wakeland silt loam, 0 to 2 percent slopes, frequently flooded	15	39.8	0.20%
WeC	Wellston silt loam, 6 to 12 percent slopes	>200	35.7	0.20%
Wr	Wilbur silt loam, frequently flooded	46	18.7	0.10%
WyqD	Wrays-Gilwood silt loams, 6 to 20 percent slopes	>200	1,803.20	8.30%
Subtotals for Soil Survey Area (Monroe County IN015)			**21,469.40**	**99.30%**
Totals for Area of Interest			**21,610.40**	**100.00%**

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FIGURE A-5.6

SOILS SURVEY TABLE (2 of 2)

B&B Water Project LLC
Bloomington, Indiana
Preliminary Engineering Report
for Water System Improvements
December 2023
ProjectNo-267823-01-001

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6219 South East Street
Indianapolis, IN 46227

P (317) 788-4551
F (317) 788-4553

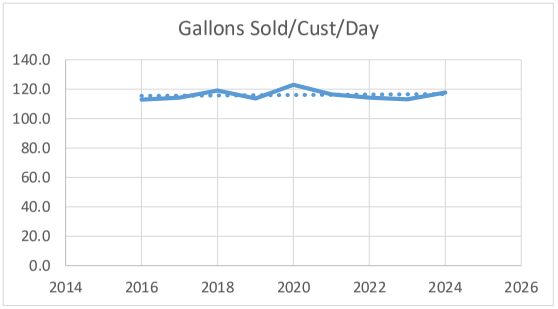
WesslerEngineering.com
Project #267823-01-001

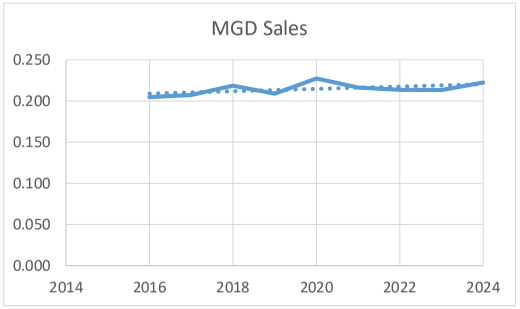
Utility Dashboard
B & B Water Project, Inc.
Cause No. 46219-U

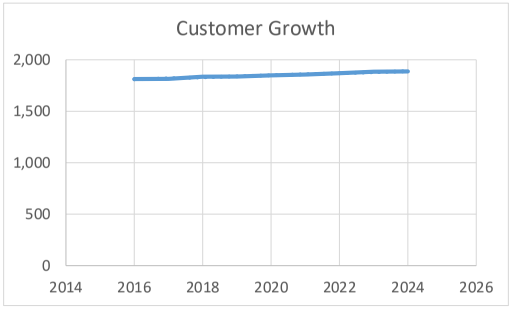
Year	W-1 Customers Year-End	W-6 Total Pumped & Purchased	W-6 Total Sold	W-6 Non-Revenue (C - D)	W-6 System Usage	Water Loss (E - F)	Percent Loss (G / C)	Average MGD Sold	Gallons Sold/ Cust/Day	W-6 Main Breaks
2016	1,813	132,800	74,920	57,880	1,500	56,380	42.5%	0.205	112.9	7
2017	1,814	135,921	75,625	60,296	1,259	59,037	43.4%	0.207	114.2	10
2018	1,835	141,598	79,777	61,821	683	61,138	43.2%	0.219	119.1	15
2019	1,838	135,193	76,246	58,947	1,255	57,692	42.7%	0.209	113.7	15
2020	1,848	149,816	83,195	66,621	2,998	63,623	42.5%	0.227	123.0	20
2021	1,856	137,632	78,924	58,708	1,428	57,280	41.6%	0.216	116.5	22
2022	1,869	145,644	77,936	67,708	1,447	66,261	45.5%	0.214	114.2	22
2023	1,885	146,998	77,820	69,178	543	68,635	46.7%	0.213	113.1	14
2024	1,887	156,305	81,360	74,945	831	74,114	47.4%	0.222	117.8	17

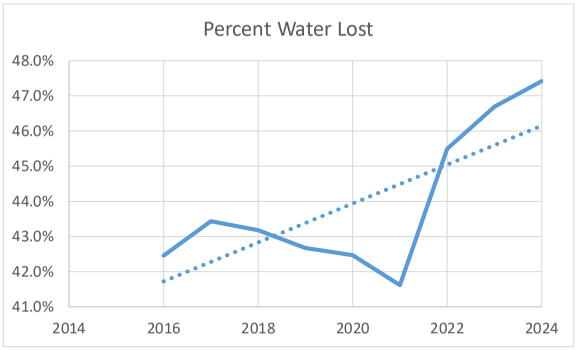
average mgd sales 2024	0.223 mgd
average cust growth	7 /yr

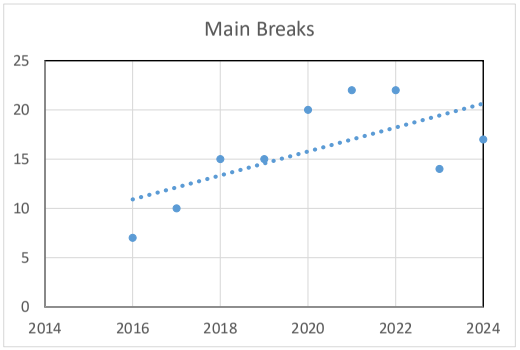
All reported in thousand gallons unless otherwise noted
System usage includes water reported as used for firefighting, backwashing, main flushing, etc.
Source: IURC Annual Reports W-1, W-6.
Customers year-end includes private fire protection and irrigation customers











Dashed lines show results of linear regression (trend) over period shown

II. Data Request

Q-7-1: Please refer to Table 2.5.1.2 page on page 15 of B&B's January 2024 Preliminary Engineering Report. Given the number of breaks (14) on State Road 45 main, please explain why B&B or Wessler Engineering isn't recommending that any work be performed there?

Response: The water lines listed in the PER for potential replacement are those identified by B&B Water Company as the highest priority and factored in the number of main breaks, along with other criteria

Q-7-2: Please confirm whether B&B monitors system pressure at any locations throughout its system. If confirmed, please explain the extent of the monitoring. If not confirmed, please explain why.

Response: Pressure is monitored at both booster stations and at each of the elevated water storage tanks using both pressure gauges and pressure sensors connected to SCADA at each location.

Q-7-3: Please confirm whether B&B or Wessler Engineering considered pressure management (i.e. reduction of high pressures in low-lying areas) as a strategy to reduce main breaks. If confirmed, please provide any documents related to this consideration. If not confirmed, please explain why.

Response: It is not believed that system pressure is contributing to main breaks. Instead, the cause of the main breaks is believed to be related to pipe installation conditions on underlying bedrock, aged pipe and PVC pipe material. Therefore, pressure management is not expected to improve main break frequency.

Q-7-4: Please confirm whether B&B or Wessler Engineering have considered the possibility of loss of disinfectant residual from slower water movement/longer times in mains caused by upgrading to six-inch mains in certain areas. If confirmed, please provide any documents related to this consideration. If not confirmed, please explain why.

Response: Section 2.1.3 discusses water quality and chlorine residual data available at the time of the study. While systems with long mains and dead ends often experience low chlorine residual, chlorine levels are not reported as an operational concern and were not extensively analyzed in the PER.

Q-7-5: Please confirm whether any efforts were or will be made to reduce parallel water mains, which increase the opportunity for mislocates, potentially complicate utility

Q-7-12 Please list and describe all leak detection services performed by third parties in the last five years. What were results and was corrective action taken?

Response:

M.E. Simpson was contracted with in 2015. Due to the type of materials used for most B&B mains the work was discontinued with no results and no associated cost for this work.

Alliance of Indiana Rural Water Association was contacted and just recently began to assist B&B/BFU with leak detection. The results of their work to date are the suggestions of areas with possible leaks. BFU has just begun to investigate these areas, no result has been determined at this time.

The Board of Directors has been aggressive in addressing water loss with limited resources. B&B is a rural water system with less than 1900 customers covering a wide service area that consists of very hilly terrain in a karst area. Most of our mains were installed in the late 1960's. Based on our efforts to date we believe that our water loss is due to a number of factors that point to not one or two large leaks, but a high number of small leaks spread out over our service area making it difficult to find and repair and making any gains marginal.

Working in conjunction with our operator, Bynum Fanyo Utilities, we have taken the following steps.

- Upgraded an outdated pumping station located on Hinkle Road
- Upgrading our telemetry system along with adding new components to increase reliability
- Replacement of radio read water meters
- Updating our system maps, purchasing a GPS locating system, mapping meters, valves, hydrants, and mains.
- Upgraded our billing system, replacing postcard billing with 8.5x11 invoices that show past usage, allows for additional information and messaging from the company with an emphasis on having our customers report suspected leaks.
- Installation of valves and master meters allowing us to isolate smaller sections of mains and measure for water loss.
- Aggressively verifying meter, valve, hydrant and main locations allowing us to update our system map.
- Adopted a policy to locate meters within the normal utility right-of-way closer to our mains. As a part of this policy when we find a meter out of compliance with this policy, we relocate the meter to the proper location, eliminating long service lines that we must maintain.
- Locating all meters, reviewing zero read meters, and inactive meters.
- Responding quickly to any visible signs or water leaks or calls by customers to investigate and repair leaks
- Receive and review monthly reports from our operator discussing repairs, replacements, locates, valve program, hydrant program and other system & administration issues.
- Working with our operator to develop a water main replacement plan that prioritizes those mains with frequent leaks, undersized or inconsistent main size while adding valves and hydrants.

The Board has and will continue to dedicate time and resources to address our water loss and while continuing to provide safe, reliable, and quality water.

Respectfully

B&B Water Project Board of Directors

II. Data Request

Q-7-9 Please explain where B&B keeps its spares (e.g. meters) and repair materials (clamps, etc.)?

Response: Spare parts including clamps, pipe, fittings are stored in the shed next to the B&B office building, along with old meters. New meters are kept in the B&B office building.

Q-7-10 Please provide B&B's schedule for inspection, testing, or replacement of consumer water meters in a comparable format to that shown in 170 I.A.C. 6-1-10(b) included below:

(b) Each consumer water meter installed shall be periodically inspected and tested or replaced in accordance with the following schedule, or more often if the results may warrant, to ensure that the meter accuracy is maintained within the limits set out in section 9 of this rule:

5/8 inch meters	10 years, or for 100,000 cubic feet or equivalent units registered
5/8 by 3/4 inch meters	10 years, for 100,000 cubic feet or equivalent units registered
3/4 inch meters	8 years, or for each 150,000 cubic feet or equivalent units registered
1 inch meters	6 years, or for each 300,000 cubic feet or equivalent units registered
1 1/2 inch and over	On an as needed basis, based on consumption and revenue, but not less frequently than 4 years

Response: B&B along with BFU intend to follow this schedule.

Q-7-11 Please list and describe all leak detection services performed by the utility in the last five years. What were results and was corrective action taken?

Response: BFU performed and will continue to perform the following:

- **Monthly reads on inactive meters to ensure no water theft or non-paying customer leaks**
- **On-site inspections of master meters with CBU to make sure they are accurate and free of debris**
- **Walking and visually inspecting B&B mains**
- **Continuing to solicit assistance from Alliance of Indiana Rural Water**
- **B&B/BFU Water Loss Prevention Program attached.**

B&B Water Project Water Loss Prevent on Plan

Installation of new Neptune meters

Goal: New meters will reduce water loss at the pit and ensure that B&B is getting accurate radio reads each month, thus billing the customer the correct rate. Having functional customer meters is also integral in the sub-metering plan below.

BFU and other subcontractors have replaced approximately 1,020 failing or aged Badger meters with new Neptune meters

Installation of sub-meters at up to 13 strategic locations

Goal: By using the reads from the sub-meter and the customer meters on the applicable main, BFU can deduce whether significant water is being lost on that stretch of main.

- Map exists with proposed sub-meter locations
    - All sites are on 3" PVC mains that are not looped
- Plan: Install 3" meters in-line with a 3" bypass and valve configuration
    - Diagram on existing map
    - Bypass allows for maintenance to meter and max flow to customers
    - Meter remains online 24/7 to allow for reading as needed
    - With the 90 day loads available with Neptune systems, we can detect upswing in flow
    - Trends and normal usages related to seasonal use can be established
- Location priority to be determined
- Cost per sub-meter location: $21,000-$25,500
    - Variance due to depth and placement of sub-metering system
    - Estimate assumes existing valving in place to shut down flow during construction
    - Estimate assumes no rock removal needed
- Time frame: Subject to board funding

-Discovered two previously installed sub-meters and verified their functionality

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-Shilo Rd

-Corner of Shilo/Rust

-Covers to the north Shilo, Coyle, N John Young

-Riddle Point

-Covers area around Lower Tunnel Road

-

-Installed new sub-meter

-

-Shuffle Creek

-Corner of SR 45/Shuffle Creek

-Covers to the north Shuffle Creek and to the east E Southshore

-Russell Rd

-Corner of N Russell Rd and Ward Ln

-Covers to the west Russell, Lanam, Timbercrest, Greylock, Serendipity, Bittersweet, Trailridge

-

Will begin running monthly reports on sub-meter usage vs customer usage to identify trends and possible leaks

When significant water loss mains are located, BFU will present plan to locate and repair/replace.

Geophones

Goal: Use Geophones for spot leak detection when crew is opening a meter pit, turning valves, or at flush hydrants.

- Allows for point leak detection
- Would be standard operating procedure for crews as time allows
- Recommendation: BFU purchase one set, B&B purchase one set
- Cost: approximately $450 per

Recommendation is to purchase of electronic leak detection equipment for precision leak detection.

BFU purchased leak detection equipment
Alliance of Indiana Rural Water and BFU used leak detection equipment to listen to all hydrants in the system

Accounting

It is standard practice to estimate water loss on each leak repaired and to include information on monthly IDEM MROs. This allows for water loss through metering adjustments, leaks, firefighting events, and hydrant flushing to be properly identified as accounted for water loss. Customer action reports will be filled out for any event including leaks, meter failures, complaints requiring crew to be dispatched, or other miscellaneous issues reported to office that requires response.

Estimated water loss for hydrant flushing and leaks are tracked monthly on field report

II. Data Request

Q-4-1: B&B stated it is requesting $2 million of borrowing authority in this Cause, which will be used to fund the following projects: Water Mains Line A - Bethel Lane, North Mount Gilead, Shilo Road, Booster Station: Portable Power at State Road 45 Booster Station, Hinkle Road Booster Station, and Office Building in response to DR-2-1. However, Table B-18 of the PER B&B provided in response to DR-2-2 (included below) states a Total Probable Overall Project Cost for these projects of $6,901,000.

Table B-18: Proposed Project

I. Phase II Engineer's Preliminary Opinion of Probable Construction Costs

Item	Description	Total Price
1	Water Mains Alternative 3 (WM3): Line A - Bethel Lane	$ 660,000
2	Water Mains Alternative 3 (WM3): Line C - North Mount Gilead Road	$ 2,872,000
3	Water Mains Alternative 3 (WM3): Line E - Shilo Road	$ 1,280,000
4	Booster Station Alternative 3 (BS3): Portable Power at State Road 45 Booster Station, Hinkle Road Booster Station, and Office Building	$ 207,000
	Subtotal	**$ 5,019,000**
	10% Contingency	$ 502,000
	Probable Construction Costs	**$ 5,521,000**
	Probable Non-Construction Costs (25%)	**$ 1,380,000**
	Total Probable Overall Project Cost	**$ 6,901,000**
	Total Anticipated SRF Loan Amount	**$ 6,901,000**

Notes:

1 *All probable construction costs are based upon 2023 dollars, and estimated project costs will likely increase with time. Construction costs are volatile and have increased significantly in recent years. In providing these cost estimates, Wessler Engineering has no control over the costs of labor, equipment, and materials, or the contractors' methods of pricing. The cost estimates were made without the benefit of design plans and specifications and are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

2 *The cost estimates are based on past similar projects and were made without the benefit of field survey, design plans and specifications. These estimates are provided on the basis of the Engineer's qualifications and experience. Wessler Engineering makes no warranty, expressed or implied, as to the accuracy of such cost estimates as compared to bids or actual costs.*

a. Please reconcile the statement that B&B will fund all four projects, which are estimated to cost $6,901,000 in 2023 dollars, with the borrowing of $2 million.

Response: The projects included in the PER were identified to the development of the PER. The estimated cost at that time was approximately $2M. Between that estimate and the completion of the PER construction costs had risen significantly resulting in an increase in the estimated costs for the projects.

b. Please specifically identify what projects will be completed with the $2 million proposed borrowing.

Response: We are currently working with Wessler and Bynum Fanyo Utilities to identify which of these projects has the greatest potential to impact water loss.

c. Please confirm the use of these funds will be for some combination of the projects listed in the response to DR-2-1 and table B-18 in the PER.

Response: That is currently the plan, the only thing that might impact the list would be if another area is identified with significant water loss. In that case, the PER would be amended to reflect that project. The Board however confirmed that due to the impact on rates they do not intend to request more than $2M in funding with this application.

Q-4-2: B&B stated the borrowing is estimated to close no later than 12/31/27 in response to DR-2-1-g.

a. Please confirm whether 12/31/27 is the anticipated date of borrowing, or the date B&B is requesting its borrowing authority would expire.

Response: Correct. The only exception would be if the financing is in the final stages and B&B needs some additional time to complete the financing.

b. If 12/31/27 is not the anticipated date of the borrowing, please state the approximate date B&B expects to close on this borrowing.

Response: B&B is requesting a closing date no later than 12/31/2027. The timing will be predicated on when the rates are finalized, and then when we can get into an SRF pool program. If we are aggressive, maybe spring 2026, but most likely it will be either Fall 2026 or spring 2027.

Q-4-3: B&B stated that the forecasted interest rate is 5.08% in response to DR-2-1-b. Please identify the source of this estimate. Please also provide any documents that support this estimate.