

PRELIMINARY ENGINEERING REPORT

PHASE 12 WATER SYSTEM IMPROVEMENTS

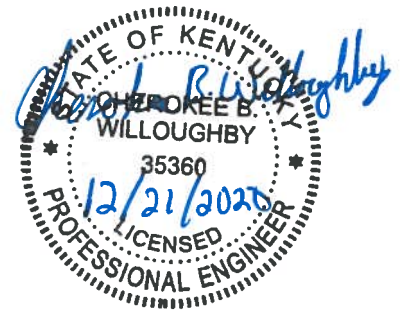
FOR THE

NICHOLAS COUNTY WATER DISTRICT

1639 Old Paris Road
Carlisle, Kentucky 40311

BE Project No. 20016

December, 2020



PREPARED BY:



222 East Main Street, Ste. 1 • Georgetown, KY 40324

SECTION 1 PROJECT PLANNING

1.01 LOCATION

The Nicholas County Water District (NCWD) was organized in 1964 after being privately maintained for approximately four years. The existing system consists of approximately fifty (50) miles of water mains with three (3) water storage tanks and four (4) booster pump stations that serve approximately 1600 customers in Nicholas and Bourbon counties.

NCWD's service area is located in Northeastern Kentucky, approximately thirty miles northeast of Lexington. NCWD covers approximately 204 square miles with the water office a few miles north of the City of Carlisle. NCWD serves all of Nicholas County that is not served by the City of Carlisle, and a few customers in northern Bourbon County, close to the City of Millersburg. Included in these areas are the communities of Barbersville, Hooktown, Miranda, Moorefield, and Pleasant Valley.

The topography of Nicholas County and its service area is an agriculture area with slightly rolling hills in most areas of the county with a more diverse, more highly elevated regions in the western portion of the county. The differences in elevations range from 575 feet in elevation in the northern part of the county in the bottoms of the Licking River basin to over 1000 feet on the hilltops in the northwest. These divergent elevations are reflective in the three (3) pressure zones using three (3) tanks to provide service to its customers. Elevations of communities within the NCWD service area include Myers at 640 feet, Headquarters at 950 feet, East Union at 840 feet and Moorefield at 960 feet. The NCWD service area is rural with scattered residences and agriculture that is primarily used for pasture.

1.02 ENVIRONMENTAL RESOURCES PRESENT

The major environmental features within the proposed area feature a minimum number of landforms and topographic changes are slight from rolling hills to moderately steep inclines. The steeper terrain changes require four (4) booster pump stations, and elevated and ground storage tanks. Water pressures range from 30 psi to over 220 psi in sections of the system. Several of the hollows are in floodplains due to the numerous creeks located in the valleys. Rock walls are evident along the US 68 corridor of the county, but known historic sites are not expected in the planning area.

1.03 POPULATION TRENDS

The calculated population based on the 2010 Census and the number of customers in Nicholas County was 7,135. The Kentucky State Data Center currently projects that both counties will lose population over the next 35 years. The table below shows the

total number of customers by county, medium household incomes, and the estimate of county population served by the Nicholas County Water District.

County	Serviceable Population	No. Customers	MHI
Nicholas	3,413	1,597	\$40,259
Bourbon	15	3	\$47,367
TOTALS:	3,428	1,600	\$40,259

1.04 COMMUNITY ENGAGEMENT

The NCWD will be holding a public meeting inviting all individuals affected by this project. This meeting will communicate the need for the project and the resulting system improvements that will be accomplished through the project.



SECTION 2 EXISTING FACILITIES

2.01 LOCATION

The NCWD is located in northeastern Kentucky near the City of Carlisle in Nicholas County. The NCWD serves all of Nicholas County that is not served by the City of Carlisle and small part of Bourbon County, including the communities of Hooktown, Moorefield, East Union, and Myers. The District does not produce their own water, but instead purchases their water from Western Fleming Water District and the City of Carlisle. They also have master meters for emergency connections to Kentucky American Water in Millersburg and the Buffalo Trail Water Association located in Sardis. Maps of the project showing the extent of the water system improvements is located at the end of this report (Appendix A).

2.02 HISTORY

The NCWD system was privately organized in 1960 but did not begin service until about 1964. Besides being a customer of the City of Carlisle and Western Fleming Water District, the District can also purchase water from Buffalo Trail Water Association and Kentucky American Water located in Millersburg in case of emergency situations. The District purchases water from Carlisle at three different locations within the system. The District also sells a limited supply of water to the Harrison County Water Association. Several water line extension projects have been developed over the past fifty (50) years to establish the current NCWD customer base which serves approximately 97% of potential customers in the service area of NCWD. Those without service are located in very remote areas of the system that are not financially feasible to serve at this time.

2.03 CONDITION OF EXISTING FACILITIES

The 50-mile distribution system consists of 8", 6", 4", 3" and 2" PVC water mains and a limited amount of ductile iron in the extremely high-pressure areas. The existing water mains are generally located on private easements and road right of ways due to the semi-challenging topography the District has to navigate. This area is difficult in that it has a rock sub-surface in areas that can be detrimental to PVC pipe if not installed correctly. Due to the age of parts of the system, and the rocky subsurface the District has been able to maintain a 29% water loss. Recently completed tank inspections, reveal the need for all three tanks to have interior work completed as well as some minor exterior improvements. The District has four existing pump stations that are all aged and in poor condition, and are in need of replacement.

2.04 FINANCIAL STATUS OF ANY EXISTING FACILITIES

The financial condition of the District is dire and unsustainable if action is not taken in a timely manner to rectify with a new rate increase as part of this project. For whatever reasons, past rate increases were developed to cover the cost of the capital improvement loans, but has not addressed the increases in regular operating costs. Annual audits will be submitted to Rural Development as required by the RD bond issue. A customer breakdown will be provided in the Summary Addendum.

As with the majority of utilities across the country, the NCWD has seen its operating expenses rise over the past several years. Electric costs, material costs, state retirement and health insurance are the expenses that have seen the largest increase.

Currently, NCWD has limited staff and field personnel to conduct daily tasks as well as any unexpected repairs or maintenance activities. NCWD has discussed the possibility of upgrading their meters to a radio read system, reducing the days to read meters from three weeks to 1.5 days. This upgrade will allow the District to save the monthly payments to a subcontractor that currently reads the meters.

SECTION 3 NEED FOR PROJECT

3.01 HEALTH, SANITATION, AND SECURITY

The proposed project will address several conditions that can cause unsatisfactory health, sanitary and security of the distribution system: replace problematic water lines, replacement of existing booster stations and recoating of storage tanks.

The problematic water lines on Myers Road (North) and Stoney Creek/Scott Road have created problems for the District and its customers both financially and with regard to public relations. These line breaks require boil water advisories, flushing and water quality sampling.

The booster station replacement portion of the project would replace three booster pump stations that have severed beyond their useful life. The new booster stations will include new highly efficient motors and controls allowing for a more financial efficient pumping source. The existing pump stations on US 68 (office), US 68 (Blue Licks), and East Union Road will all be replaced. The Concord pump station will be decommissioned and the service area of the booster station will be supplied by the East Union Road booster station. The Blue Licks station will be moved out of the flood plain to protect from flood events, easier access and better security.

After tank inspections were conducted at all of the storage tanks it was determined that all of the coating systems were in disrepair and needed to be recoated to protect water quality and ultimately the structural integrity of the tanks. The interior of the twenty-three-year-old Barbersville standpipe tank, the twenty-year-old Concord standpipe tank, and the twelve-year-old, Hickory Ridge elevated tank will have a full SP10 interior blast and repaint. This will allow for a better quality of water and will also provide for a longer life of each tank. As stated above the tank inspection reports stated that rusting and moderate pitting of the interior steel were evident. These issues must be addressed as they can also cause a premature breakdown of the chlorine.

The proposed project will help to improve the overall service from a water quality and reliability standpoint to the Nicholas County Water District customers.

3.02 AGING INFRASTRUCTURE

The existing water mains (Stoney Creek, KY 32, and Myers Roads) to be replaced with this project are about thirty (30) years old and have been problematic for an extended period of time. Due to the age of these water mains the District has experienced continued operational issues that have only increased over time. These issues include breaks and leaks of the PVC water mains which create financial strains on the District through the allocation of its limited resources. All of the four pump stations that require

replacement are approximately thirty years old, and are beyond the state of rehabilitation. The fourth pump station will be removed from service as it will not be required with larger pumps going into the third pump station. The three existing tanks are between eleven and twenty-two years old and each tank is in need of an interior blast and repaint to improve the life and serviceability of each.

3.03 REASONABLE GROWTH

The Kentucky State Data Center currently projects very little to no growth in the next thirty-five years. However, the existing customers will pay a heavy price financially in the cost of water if some of these problems are not rectified in the short term.

SECTION 4 ALTERNATIVES CONSIDERED

4.01 Description

Several alternatives were considered for all aspects of the project: water mains, booster station, tanks and meters.

The alternatives for the water mains were limited as the only recourse to remedy the current reliability of the existing water mains was to replace the lines with the only alternative being the material of the pipe. After looking at the budget impact of the different materials it was determined that the best option for NCWD was to replace the existing water mains with PVC due to costs of ductile iron pipe.

The booster station alternatives included, rehabilitation of the existing booster stations and replacement. Due to existing conditions of the booster stations, it was determined that replacement was the most cost-effective alternative. The existing booster stations were also determined to have limited access during maintenance and were located in close proximity to the flood plain.

The storage tank alternatives considered were rehabilitation or replacement of the tank. The tanks are not close to the point of replacement, as the exterior of the tanks are in good condition with limited spotting, but the interior of the tanks have problems with rusting and pitting of the steel surfaces, therefore the most cost-effective alternative was to rehabilitate the interior of the existing tanks by a blasting the existing steel and the application of a new interior paint system..

NCWD considered a traditional meter system and a drive by radio read system as the alternatives for meter replacement. However, it was determined the District could pay for the radio read meters in several years for what the District was paying an outside sub-contractor to read each month. This will provide flexibility to the District with their limited manpower and financial means, as it is expected the radio read meter readings would only take 1.5 days to read by one employee and provide a consistency to the readings.

4.02 Design Criteria

The design criteria that will be used on the project include hydraulic analysis of the existing system to determine that adequate pressures are available throughout the distribution system along with examining flushing velocities. By properly sizing the distribution mains to be installed the District will provide improved service to its customer base while also maintaining potable water of high quality.

4.03 Map

Maps of the project, showing the water main replacement, water main extension, location of the new booster pump stations, and water storage tanks are located at the end of this report (Appendix A). The meter replacements are system wide.

4.04 Environmental Impacts

An environmental report detailing the potential impacts of the project may be undertaken with this project. Once the report is finalized any potential impacts will be taken into consideration and any necessary remediation measures will be taken to avoid any negative impact to the environment.

4.05 Land Requirements

Land requirements associated with this project will include the need for easements and encroachment permits, both public and private, for the installation of the extension and replacement water mains. In some areas the existing easements may be utilized. Those easements and permits will be obtained prior to any construction beginning. The new pump stations will either be installed on new purchased property or new easements will be obtained from the impacted property owners.

4.06 Potential Construction Problems

Potential problems can occur anytime an existing tank is removed from service for rehabilitation purposes. No tank will be removed from service until the pump station replacements are completed with the installation of the VFD's. With the booster station having VFD controls it will allow the District to operate as constant pressure. This will prevent any possibility of the system over pressurizing, or the need to exhaust water onto the ground needlessly. Also, the replacement of existing water mains can be problematic, when installing the new water main on the existing easement. Working too closely to the existing line could cause some unexpected outages if the District does not have command of where the existing line is located. These problems are considered during the design of the project and all precautions are taken to limit this potential risk.

4.07 Cost Estimates

A preliminary project cost estimate is included at the end of this report (Appendix B).

SECTION 5 SELECTION OF AN ALTERNATIVE

5.01 Life Cycle Cost Analysis

In the selection of the preferred alternative for this project the life cycle cost of the materials to be utilized has been considered. The main material to be utilized is the water main. The water main will be of PVC material and the reconnected service line will be HDPE material. Recent studies estimate a service life of both the HDPE and the PVC up to one hundred years. In addition, the new pump stations will all utilize Variable Frequency Drives which should reduce electrical costs as much as thirty percent and also provide flexibility to the system if the storage tanks need to be removed from service for any reason. This length of service life and VFD's provides for lower operating and maintenance costs to be realized by the District.

5.02 Non-Monetary Factors

The non-monetary factors considered are the ability to provide reliable service to the existing customer base. With new water mains the existing customer base will have improved service and a higher quality product due to the elimination of problematic water lines and the increased reliability of accurate meter readings. The new pump stations are desperately needed in this project to provide consistency and reliability to the entirety of the water distribution system.

SECTION 6 PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

6.01 Preliminary Project Design

The proposed project consists of a wide variety of capital improvements that will enhance the operation of the NCWD in the years ahead. Approximately 9000 LF of new water main will be installed to replace existing problematic PVC water main in two different areas of the county, while another 1600 LF of new water main will be installed to provide service to the prospective customers on the west side of the newly realigned US 68 highway. The District will also replace three existing pump stations (US 68, Blue Licks, and East Union) that are in distress, and demo a fourth pump station (Concord). The new East Union pump station is located in an area of the system that can be designed to replace the existing Concord and East Union pump stations. A new RTU will also be installed in order to allow the system to operate in an automatic mode which currently requires daily attention from the District personnel. Another proposed update will be to touch up the exterior of the Bartersville, and Concord tanks, and full blast and repaint of the interiors of Hickory Ridge, Bartersville and Concord tanks. Three (3), 2020 tank inspections (Appendix C) revealed degradation of the interior surface steel on each tank and the recommendation was a full SP10 blast and three coat epoxy repaint. This work will provide years of additional service to these tanks and reliability to the District. The proposed project will also include 1600 new radio read meters and the labor to install each. These new meters will replace old outdated meters and should improve water loss with more accurate readings, and will also allow the District to save money by not paying outside contractors for this monthly service.

Various other items included in this project are the purchase of a portable generator for emergency situations; removing an existing secondary AC water main from service by a simple cutting and plugging of the main. Five (5) new meter setters in one area on Headquarters Road that never received setters when they were originally installed; and payment for three (3) tank inspections;

Additionally, should project funds be available the project may include the purchase of general day to day equipment such as a new truck(s); water pumps; trailer; backup lap top; computers and software updates; improvements to their storage facilities. and other miscellaneous tools to maintain the water distribution system in a professional and efficient manner.

6.02 Project Schedule

The proposed project schedule is:

1. Secure Letter of Conditions from USDA RD – May, 2021
2. Secure Land/Easement/Encroachment Permits – February, 2021
3. Division of Water Submittal – March, 2021
4. Advertise for Bids – June, 2021
5. Contract Award/Initiate Construction – September, 2021
6. Substantial Completion – March, 2022
7. Final Completion/Initiation of Operation – April, 2022

6.03 Permit Requirements

The project will include the need for Division of Water Approval and other potential permits to be identified within the environmental report.

6.04 Total Project Cost Estimate (Engineer's Opinion of Probable Cost)

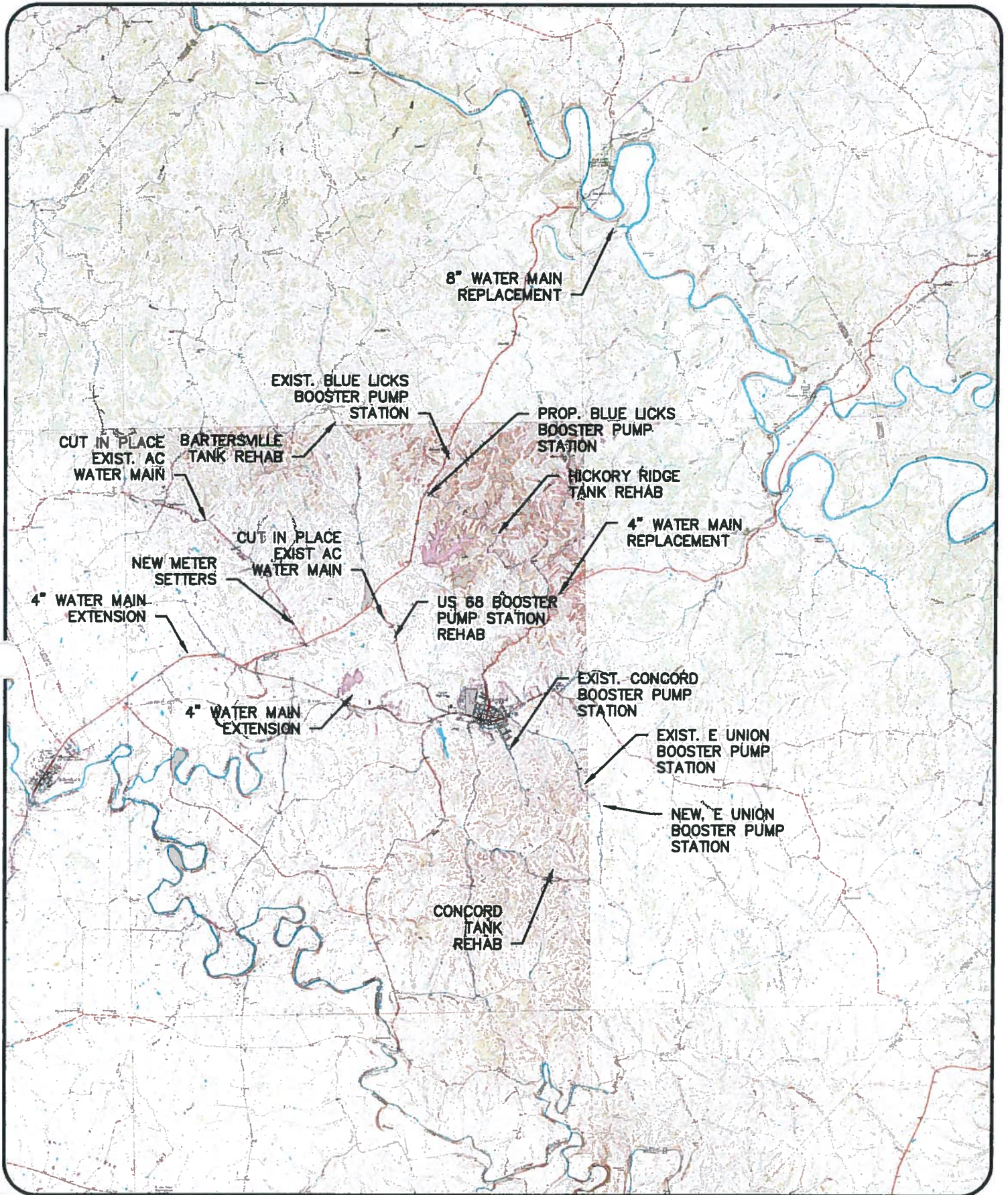
A preliminary project cost estimate is included at the end of this report (Appendix B).

6.05 Annual Operating Budget

A Summary Addendum will be prepared for the project which will examine the District's current and future financial position. Included within the Summary Addendum will be an analysis of the District's current income, annual O & M costs, current and future debt repayments and current reserves. This Summary Addendum will propose a suggested rate for the District in order to meet its current and future debt obligations.

APPENDIX A **PROJECT MAPS**





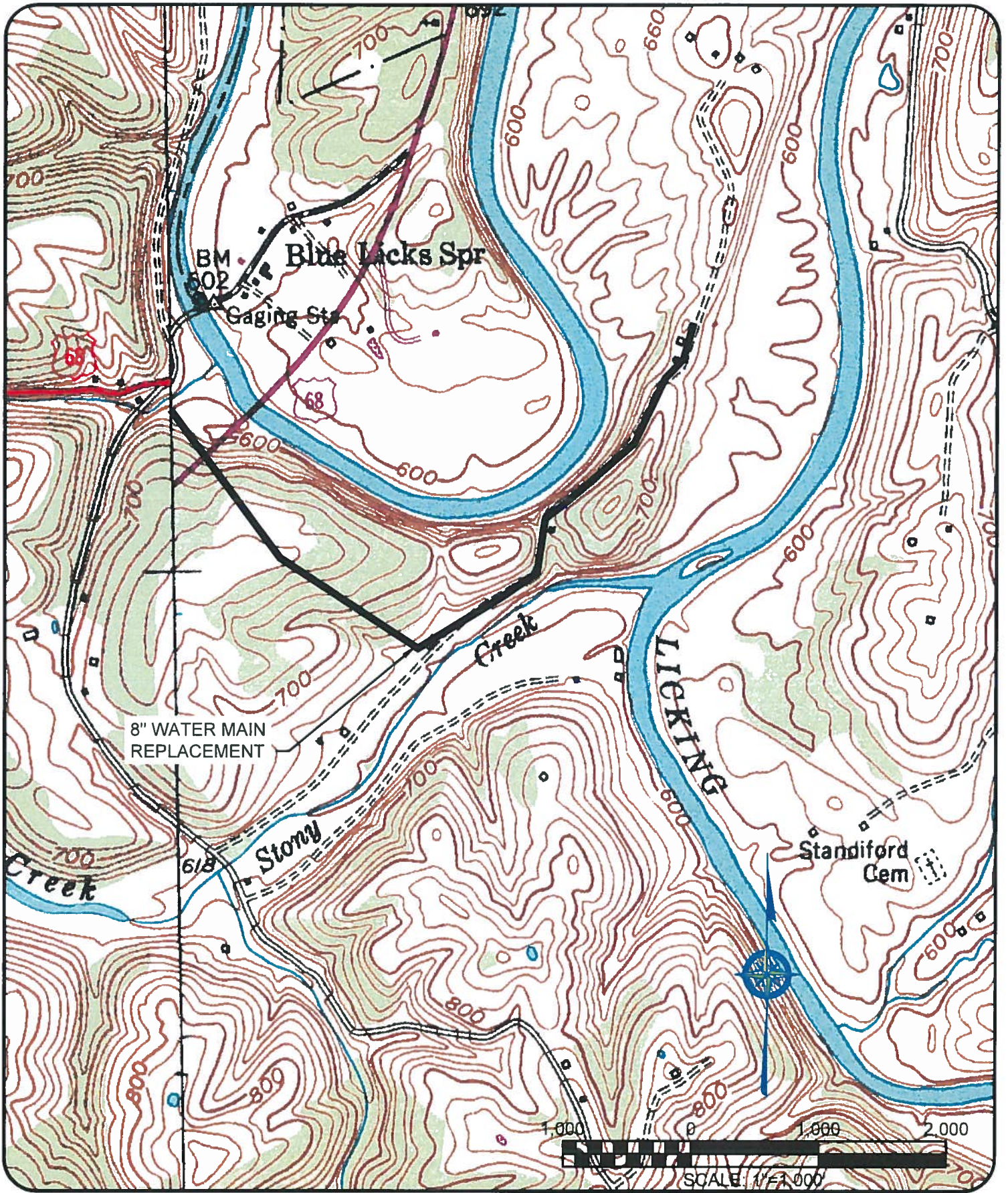
232 East Main Street, Ste. 1 • Georgetown, KY 40324

PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

Project
No. 20016

Date
DEC. 2020

Dwg.
No. 1

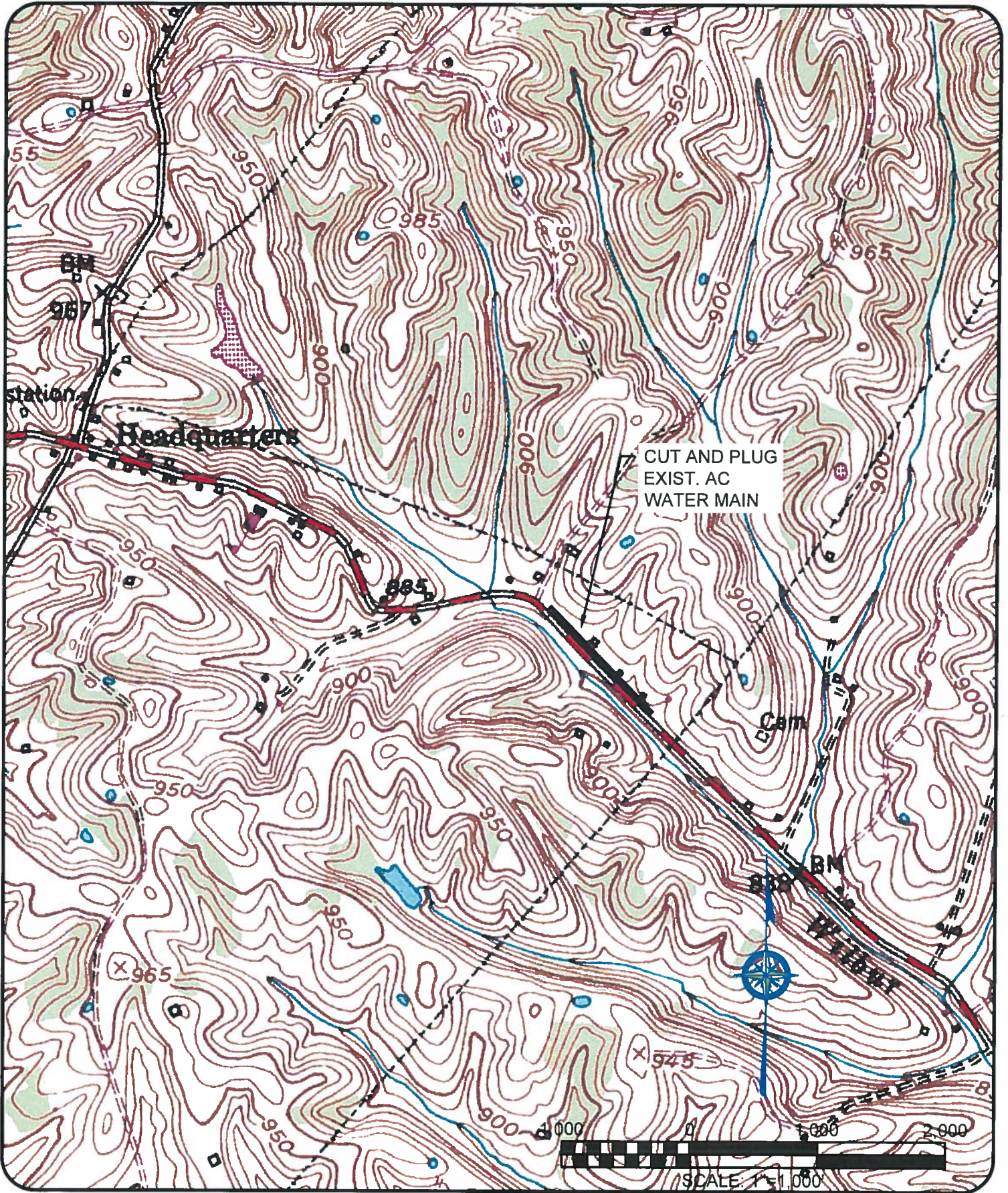


BLUEGRASS
ENGINEERING
PLLC

222 East Main Street, Ste. 1 • Georgetown, KY 40324

PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

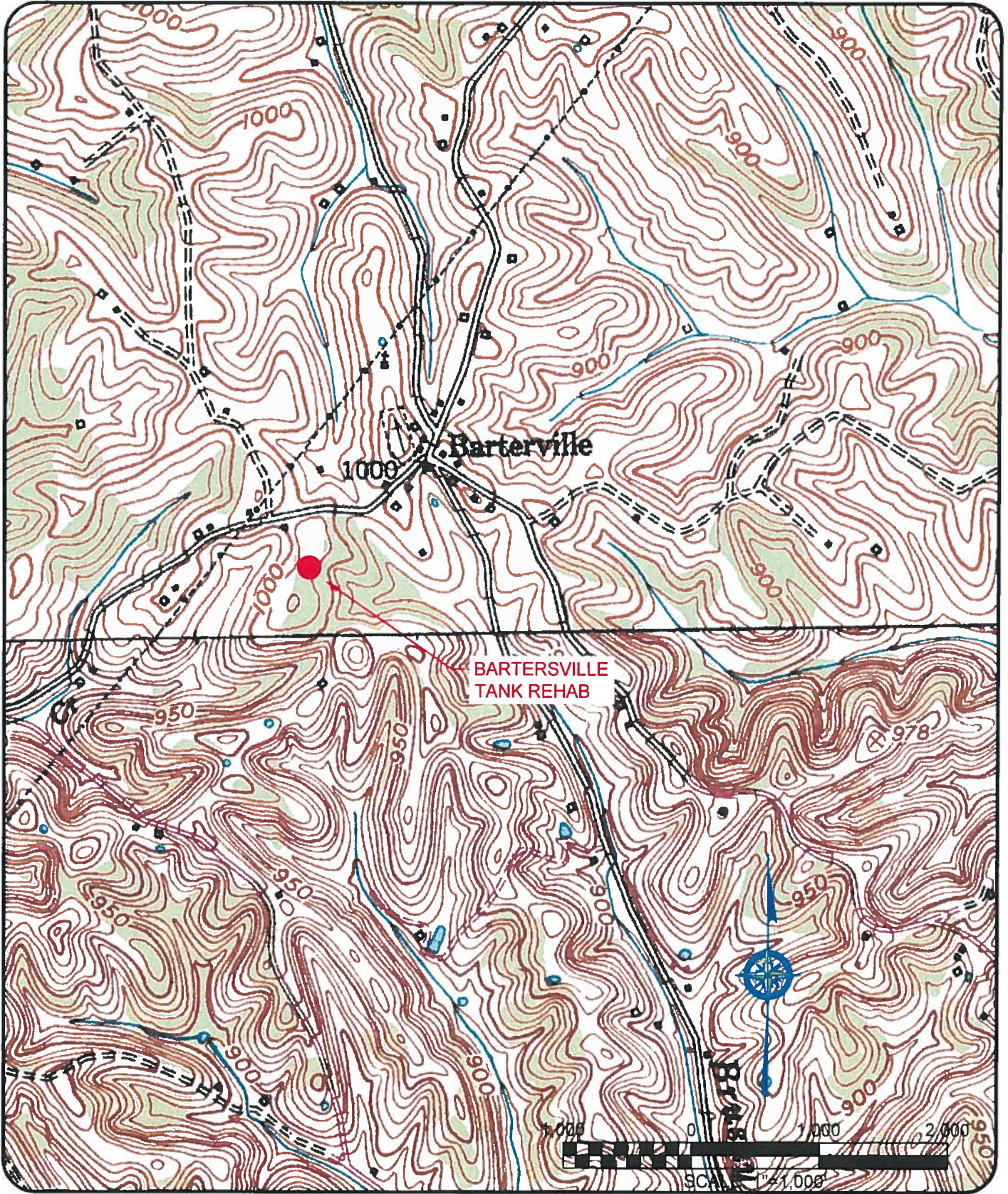
Project No.20016
Date DEC. 2020
Dwg. No. 1



BLUEGRASS
ENGINEERING
PLLC
222 East Main Street, Ste. 1 - Georgetown, KY 40324

PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

Project
No. 20016
Date
DEC. 2020
Dwg.
No. 2



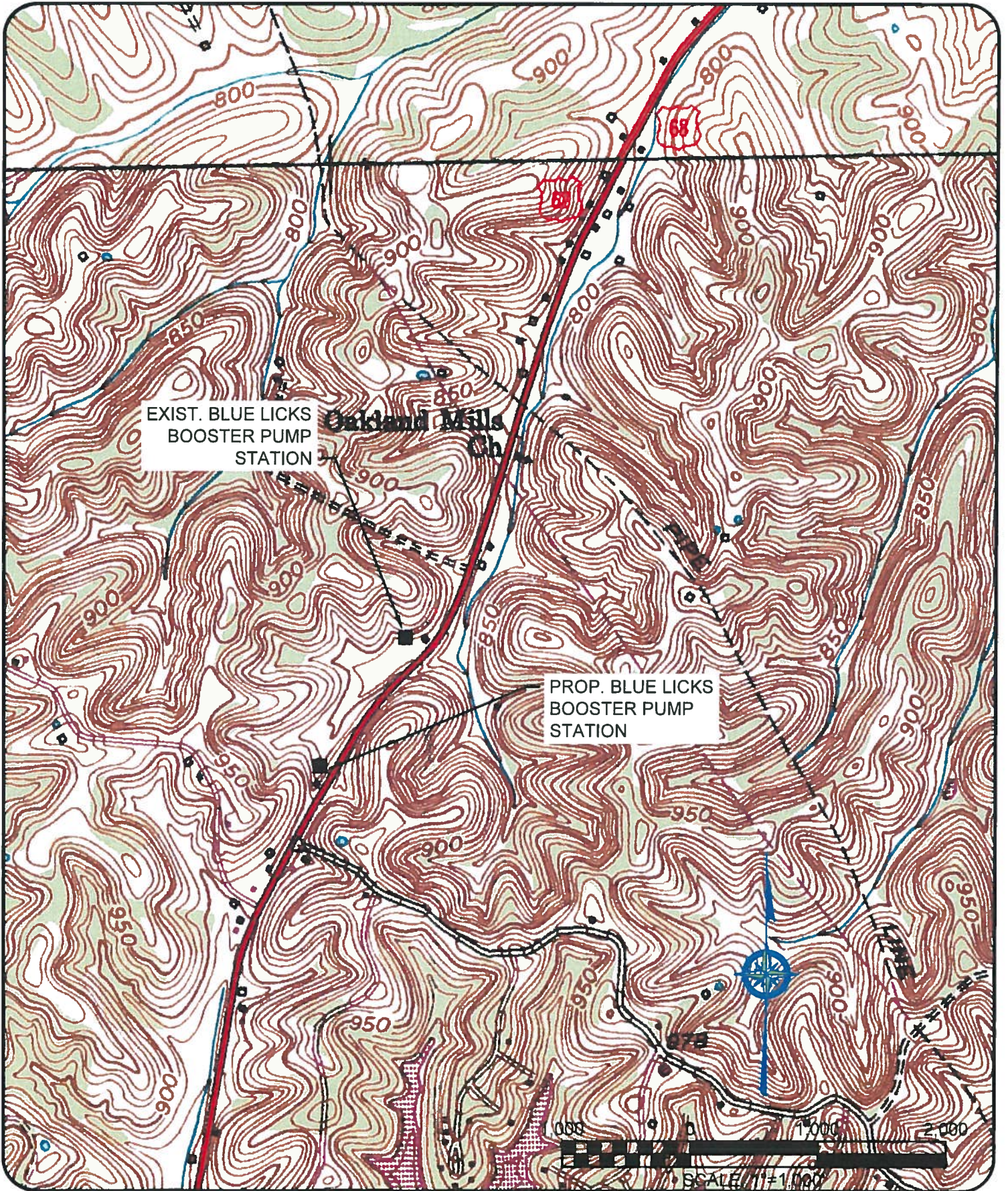
222 East Main Street, Ste. 1 Georgetown, KY 40324

PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

Project
No. 20016

Date
DEC. 2020

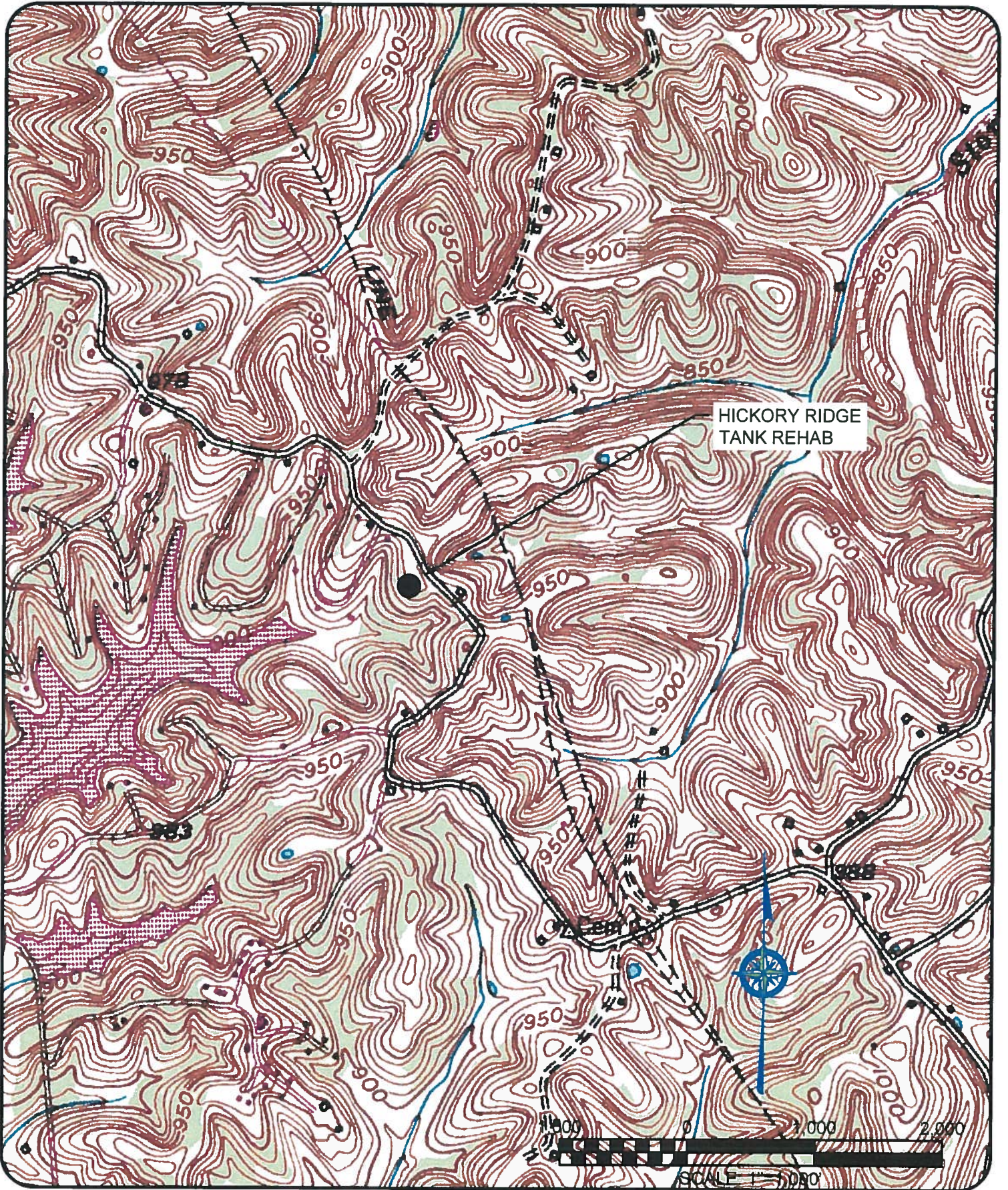
Dwg.
No. 3

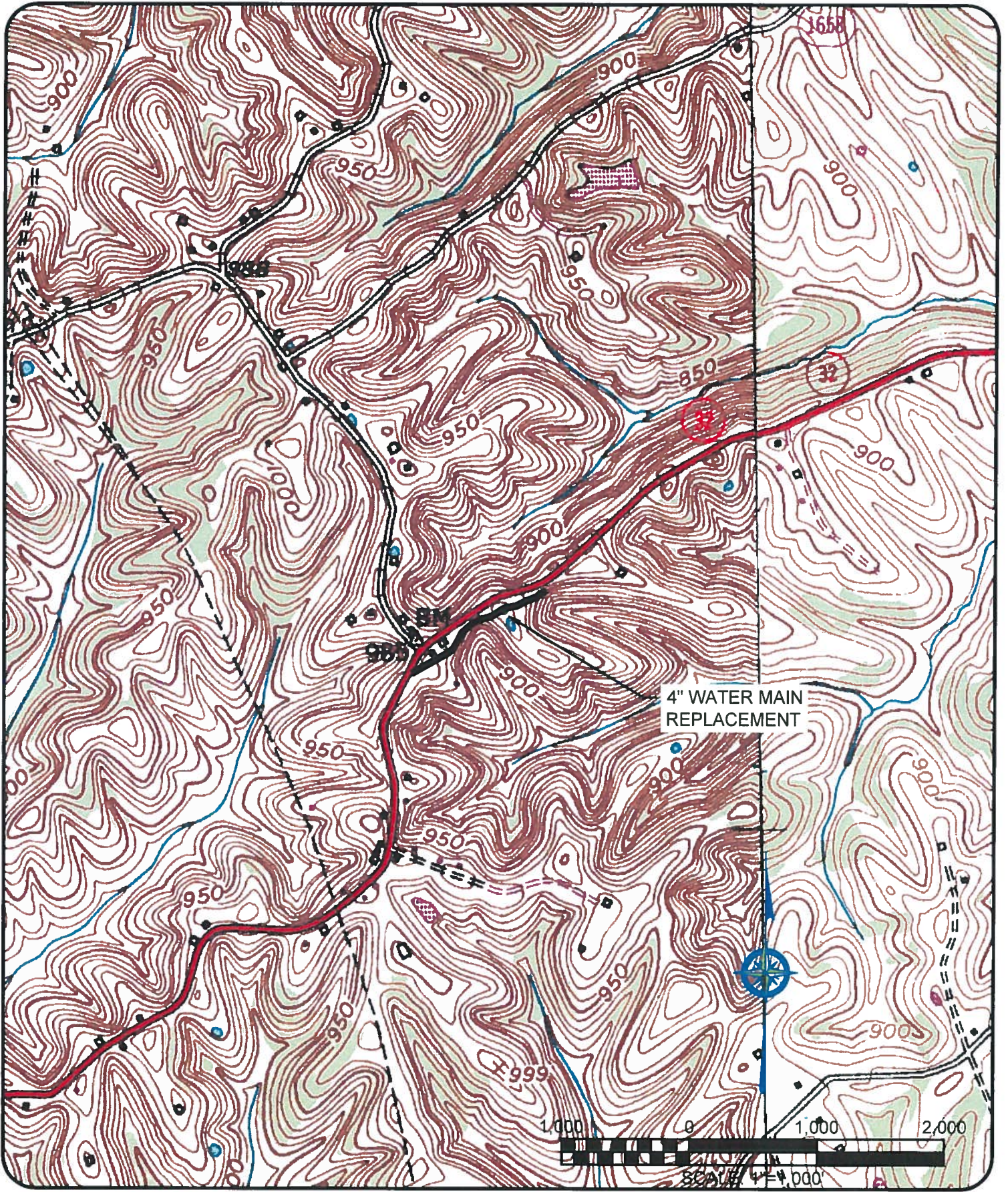


BLUEGRASS
ENGINEERING
PLLC
222 East Main Street, Ste. 1 • Georgetown, KY 40324

PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

Project No.20016
Date DEC. 2020
Dwg. No. 4



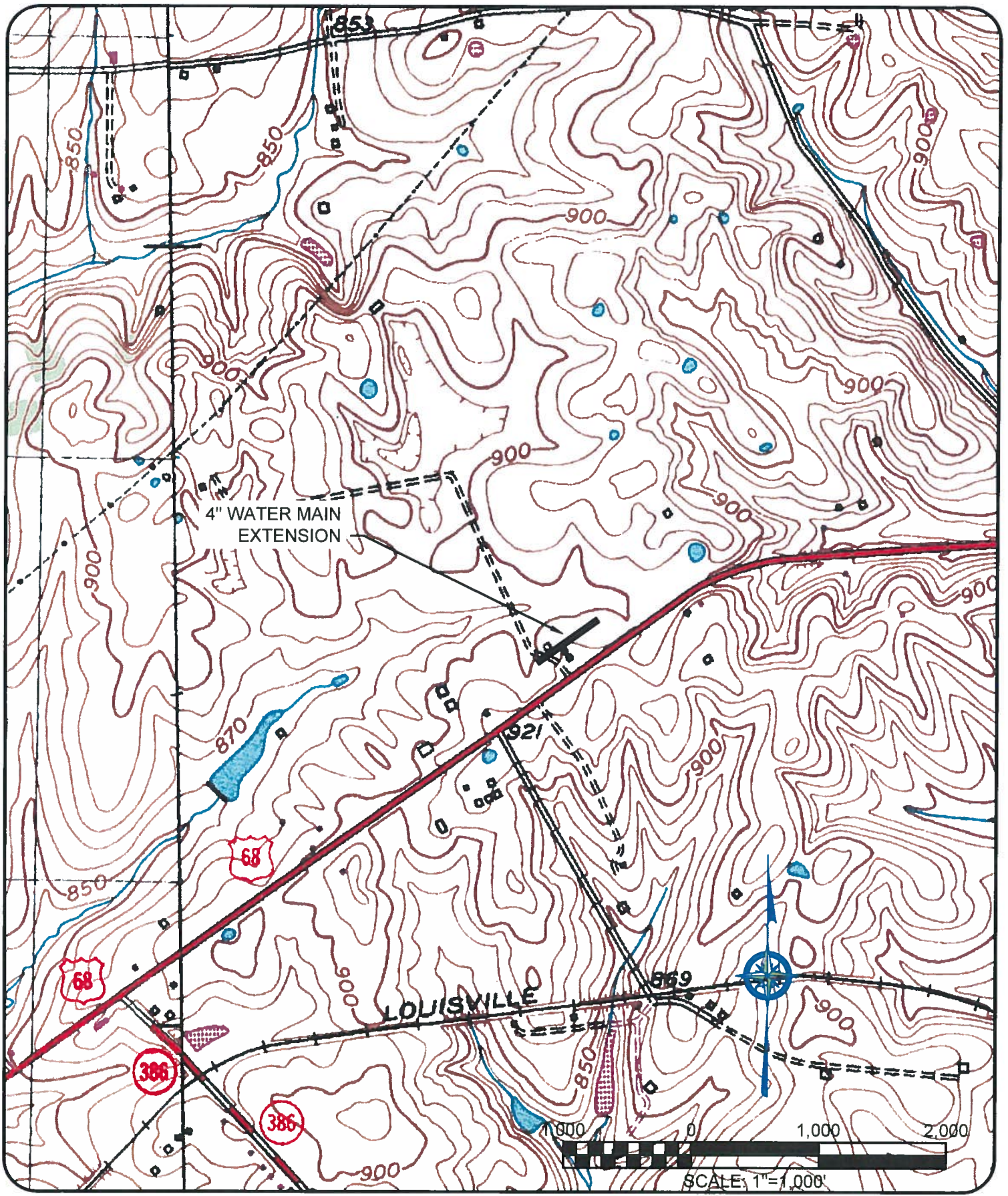



BLUEGRASS
ENGINEERING
PLLC

222 East Main Street, Ste. 1 • Georgetown, KY 40324

PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

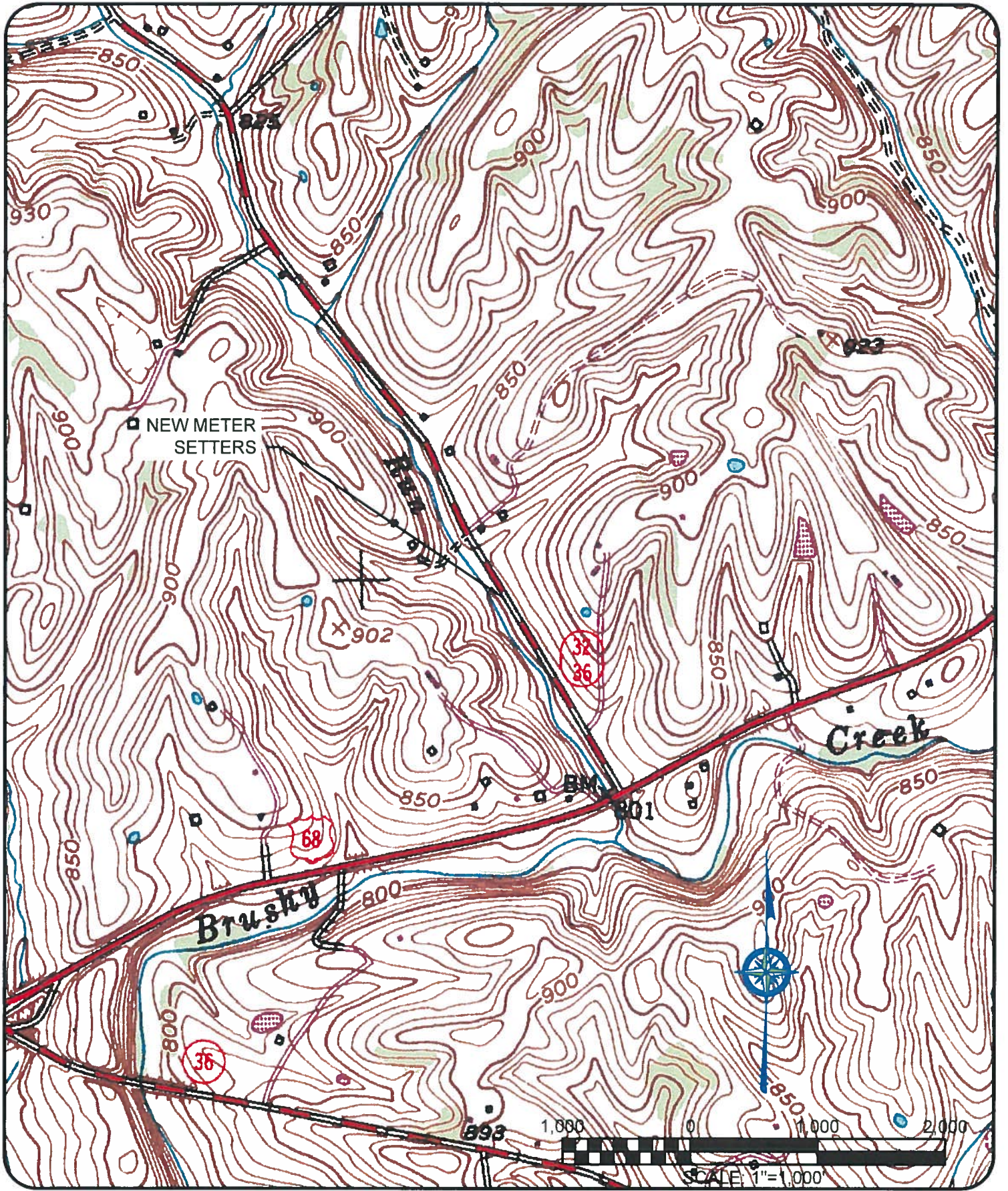
Project No. 20016
Date DEC. 2020
Dwg. No. 6



BLUEGRASS
ENGINEERING
PLLC
222 East Main Street, Ste. 1 • Georgetown, KY 40324

PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

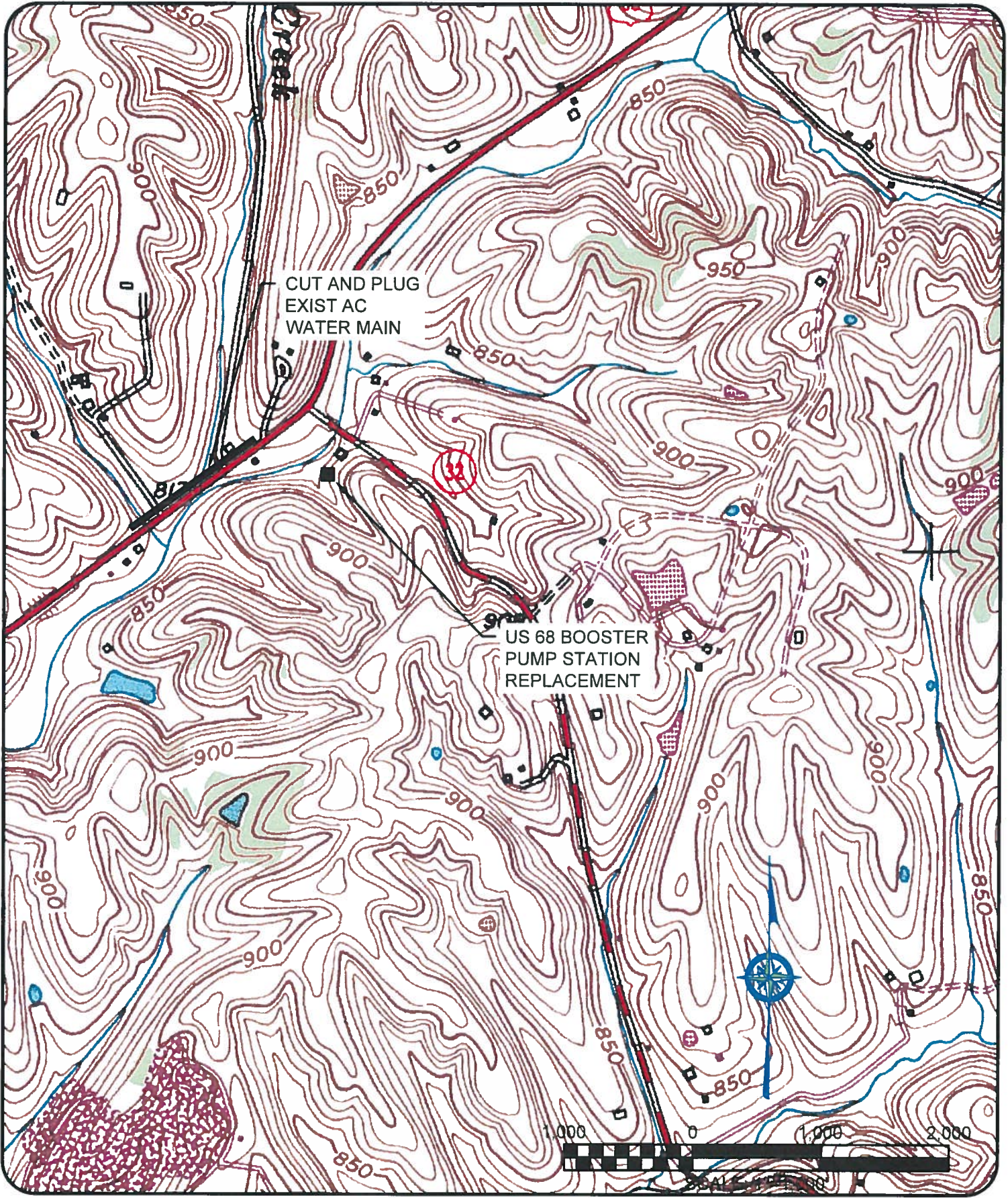
Project No. 20016
Date DEC. 2020
Dwg. No. 7



BE BLUEGRASS
ENGINEERING
PLLC
222 East Main Street, Ste. 1 • Georgetown, KY 40324

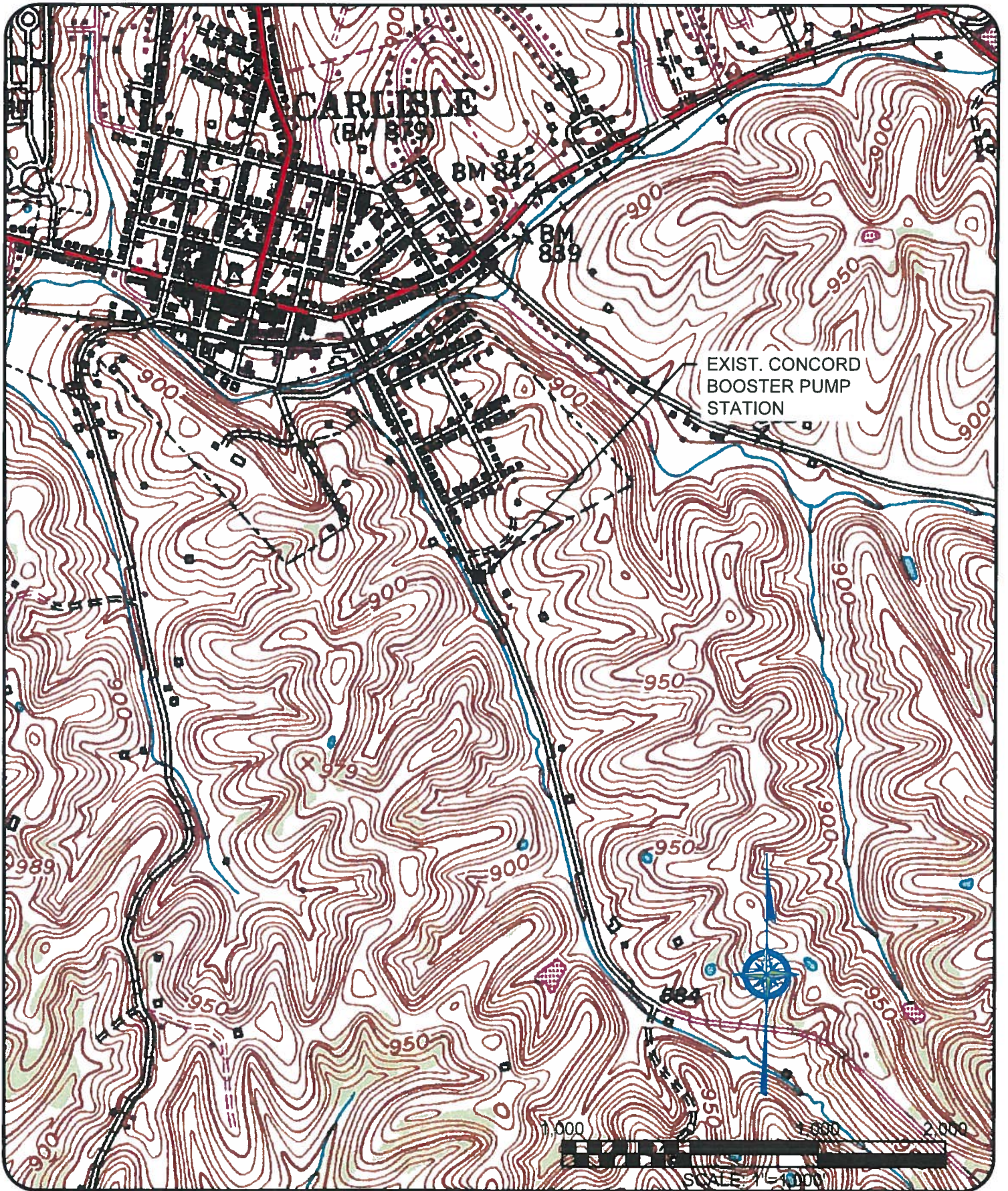
PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

Project No. 20016
Date DEC. 2020
Dwg. No. 8



PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

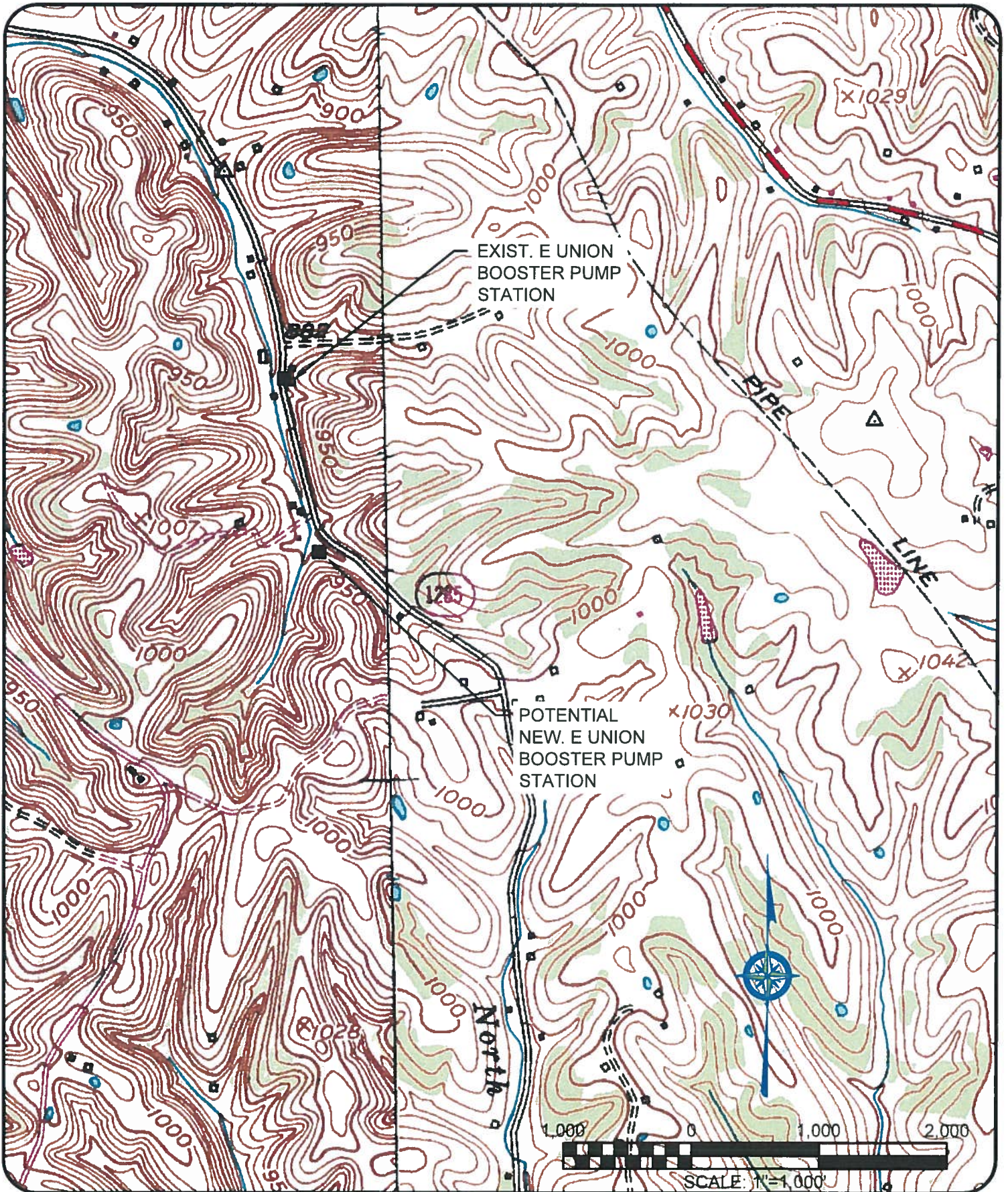
Project No. 20016
Date DEC. 2020
Dwg. No. 9



BLUEGRASS
ENGINEERING
PLLC
222 East Main Street, Ste. 1 - Georgetown, KY 40324

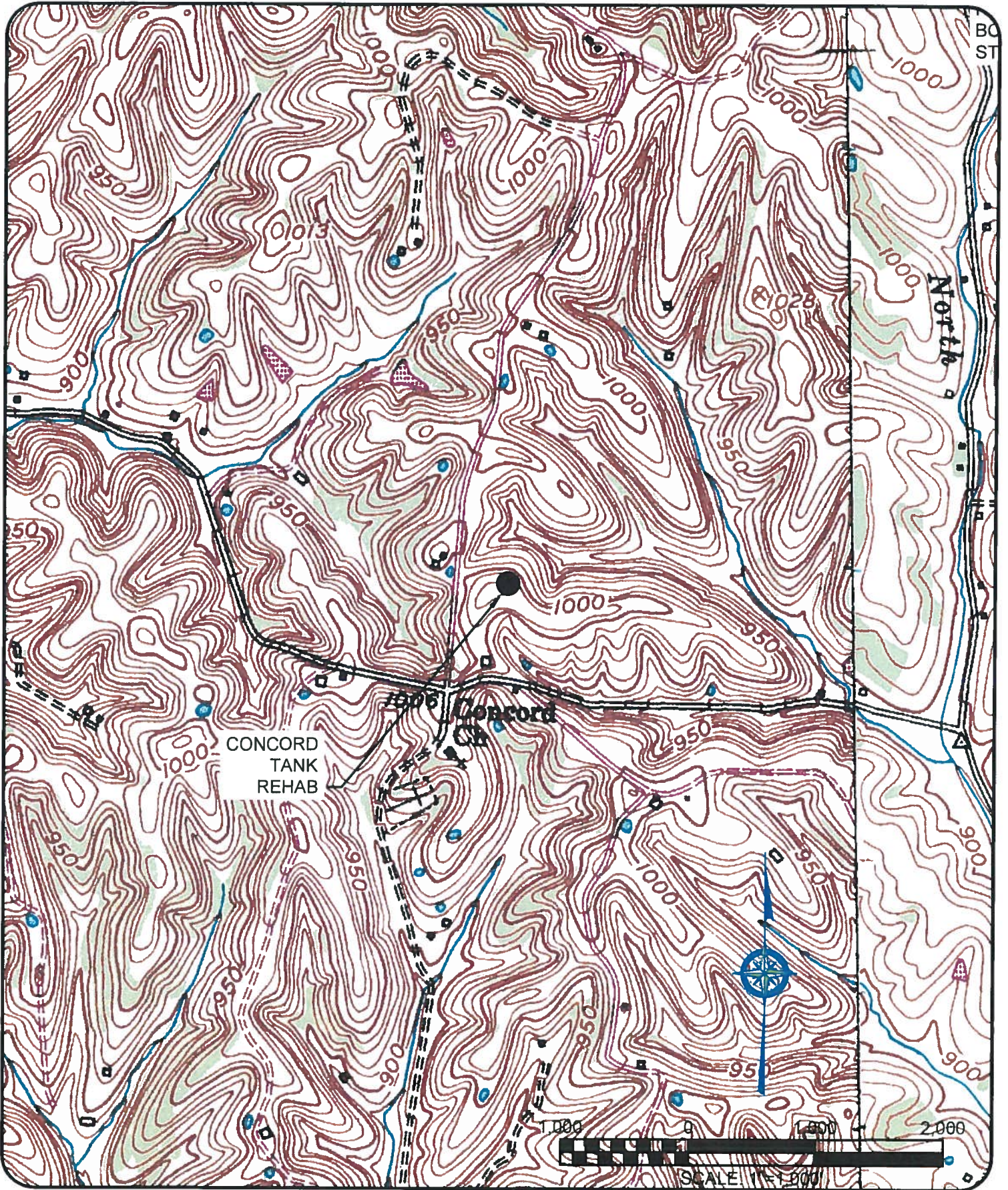
PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

Project No. 20016
Date DEC. 2020
Dwg. No. 11



PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

Project No. 20016
Date DEC. 2020
Dwg. No. 12



BLUEGRASS
ENGINEERING
PLLC
222 East Main Street, Ste. 1 • Georgetown, KY 40324

PHASE 12 WATER SYSTEM IMPROVEMENTS
NICHOLAS COUNTY

Project No.20016
Date DEC. 2020
Dwg. No. 13

APPENDIX B PRELIMINARY PROJECT COST ESTIMATE





222 East Main Street, Ste. 1 • Georgetown, KY 40324

Client: Nicholas County Water District
 Project: Phase 12 Water System Improvments
 Date: 12/21/2020

Construction Costs

Item #	Description	Quantity	Unit	Unit Cost	Item Cost
1	8" Water Main Replacement (Old 68 to River)	7,000	LF	\$ 30	\$ 210,000
2	4" Water Main Replacement (Myers Road)	1,400	LF	\$ 20	\$ 28,000
3	Portable Generator for Pump Stations	1	LS	\$ 45,000	\$ 45,000
4	Telemetry Installation @ Pump Stations	2	EA	\$ 25,000	\$ 50,000
5	New Customer Radio Read Meters, lap top, transceiver, train	1,600	EA	\$ 221	\$ 354,096
6	Replace Exist. East Union BPS with New Skid Mounted BPS	1	LS	\$ 100,000	\$ 100,000
	with New 7.5 HP Pumps, VFD's, 1-Phase, Various Piping and New 8' x 8' Metal Building				
7	Replace Exist. Blue Lick BPS with New Skid Mounted BPS	1	LS	\$ 175,000	\$ 175,000
	with New 30 HP Pumps, VFD's, 3-Phase, Various Piping and New 10' x 10' Metal Building				
8	Replace Exist. US 68 (Office) BPS with New Skid Mounted BPS with New 20 HP Pumps, VFD's, 3-Phase, Various Piping and New 10' x 10' Metal Building	1	LS	\$ 150,000	\$ 150,000
9	Demolition of Existing Concord BPS and Cap Exist. Line	1	LS	\$ 2,500	\$ 2,500
10	Cut and Plug Existing AC Water Main on US 68	2	EA	\$ 1,500	\$ 3,000
11	New 5/8" x 3/4" Standard Copper setters in Existing Services	5	EA	\$ 600	\$ 3,000
12	Barterville Tank - Exterior power wash, power tool spot repair, 1 coat spot prime epoxy and one final epoxy coat	1	LS	\$ 30,000	\$ 30,000
13	Barterville Tank - Interior SP 10 Commercial Blast and repaint with three coat epoxy system	1	LS	\$ 65,000	\$ 65,000
14	Concord Tank - Exterior power wash, power tool spot repair 1 coat spot prime epoxy, and final epoxy coat	1	LS	\$ 30,000	\$ 30,000
15	Concord Tank - Interior SP 10 Commercial Blast and repaint with three coat epoxy system	1	LS	\$ 65,000	\$ 65,000
16	Old Hickory Tank - Interior SP 10 Commercial Blast and repaint with three coat epoxy system	1	LS	\$ 65,000	\$ 65,000
17	Labor to install new radio read meters	1600	EA	\$ 40	\$ 64,000
18	US 68 - 4" Water Main Extension	480	LF	\$ 20	\$ 9,600
19	New Flushing Hydrant and 4" Tapping Sleeve and Valve	1	LS	\$ 6,000	\$ 6,000
20	10" Steel Casing Bore on KY 36	80	LF	\$ 100	\$ 8,000
21	New 4" Water Main @ Miller Station Road for New Service	1200	LF	\$ 20	\$ 24,000

Total - Construction Cost \$ 1,487,196

Non-Construction Costs

Contingencies @ 10.0%	\$ 148,719.6
Administrative & Legal Expenses	\$ 15,000
Interest Expenses	\$ 40,000
Land, Appraisals, Easements	\$ 5,000
Planning - PER, Environmental, SA	\$ 25,000
Engineering Fees - Design	\$ 98,000

Engineering Fees - Construction Administration	\$ 25,000
Engineering Fees - Inspection	\$ 76,000
Tank Inspections - 3 x \$1700	\$ 5,100
Total - Non-Construction Costs	\$ 437,820
Total - Project Costs	\$ 1,925,016

APPENDIX C TANK INSPECTION REPORTS



2020



Bartersville Tank

Nicholas Co. Water District



502.727.2828



Nicholas County Water District
Bartersville Tank
139K Welded Steel (Standpipe) Storage Tank

To: NCWD
Bluegrass Engineering

Copies: Horizon QC File

From: Mike Topp Horizon QC

Date: October 2020

On October 26, 2020, Horizon QC inspected the 139,000-gallon steel (Standpipe) storage tank. The purpose of the inspection was to evaluate the exterior and interior coatings, tank structure, sanitary conditions, and safety related issues. The tank's interior was inspected while in service.

This report summarizes Horizon QC's (Horizon's) observations and recommendations of the ground water storage tank (139K Gal. Standpipe Tank). Photographs from this evaluation are provided in Attachment A.

BACKGROUND

The Bartersville Tank was constructed in 1998. Tank dimensions are 17' in diameter and 80' tall.

The tank is located in Nicholas Co, Kentucky. The tank site is situated off of gravel road and adjacent to a residential home. The tank site is boarded on three sides with fields and is fenced. The site is accessible by vehicles and has adequate parking.

OBSERVATIONS

Horizon QC (Horizon) visually inspected the water tank for coating related issues, obvious structural problems, and safety related problems. The inspection covered the interior and exterior portions of the tank. The interior of the tank was inspected while in service. The following observations were noted: Condition Scale: Excellent-Good-Fair-Poor.

Interior

- Overall condition of the interior should be considered fair to poor. Moderate corrosion found throughout the interior.
- Interior floor is in fair condition with approximately 2" or less of sediment.
- Interior sidewalls is in fair to poor condition with widespread pinhole corrosion found in the middle section. Pinhole depth is shallow in appearance. The upper and lower sidewalls have a few random spots.
- Ceiling portions of the tank should be considered good with a few pinhole corrosion spots.
- Overflow inlet attached to the sidewall is in good condition with minor corrosion spots.
- Interior roof vent has moderate corrosion.
- No interior ladder was found.
- Outlet pipe is in fair condition with minor corrosion on edges.
- Interior man-way has moderate corrosion along the edges and collar portion.

Coatings test Interior

- Dry Film Thickness ranged from 8.7 – 14.0 mils.
- ASTM 3359 Adhesion testing (good adhesion) of protective coatings.

Exterior

- Over all condition of the exterior should be considered good with several small random areas of spot corrosion.
- Base plates are in fair condition. The flexible sealant has deteriorated in some areas due to the growth of vegetation between the base plate and the foundation.
- Foundation is in good condition. A section of the foundation is covered with grass.
- Anchor bolts are in good condition with some small corrosion spots.

- Sidewalls are in good condition with some random areas of corrosion to the substrate and heavy mildew on the bottom sheets.
- Sidewall man way hatch (2) 24" is in good condition with light corrosion on nuts, bolts.
- Roof portion of the tank is in good condition some small random areas of corrosion and coating deterioration from UV attack.
- Roof Vent is in good condition with minor corrosion found along the entire surface. The screen is in place. (24" diameter).
- Overflow pipe is in good condition with delamination and corrosion on its bottom angle.
- Exterior ladder is in good condition.
- Site perimeter is in good condition with light vegetation on all four sides.
- Site is fenced and locked.
- Tank site was properly maintained.

Coatings Test Exterior

- Average DFT (dry film thickness) range was 8.4 to 12.4 mils.
- ASTM 3359 Adhesion testing (good adhesion) of protective coatings.
- Solvent Sensitivity Test-ASTM D5402 found exterior finish coat with a moderate/good resistance to MEK solvent.

Recommendations

Interior

At present the interior coating system is in fair to poor condition without adequate protection to the steel substrate. The corrosion spots throughout the interior will only increase and deepen if repairs are not taken within the next 1-3 years. Due to the widespread corrosion, System Officials should consider a full abrasive blast on the interior and new three-part coating system. A new system should last 20-25 years.

The following remediation is recommended: (1-3years)

1. Surface Preparation **SP-10 Near White Blast to 100% of the interior.**
2. Apply three coats of immersion grade **epoxy 15-20** mils DFT.

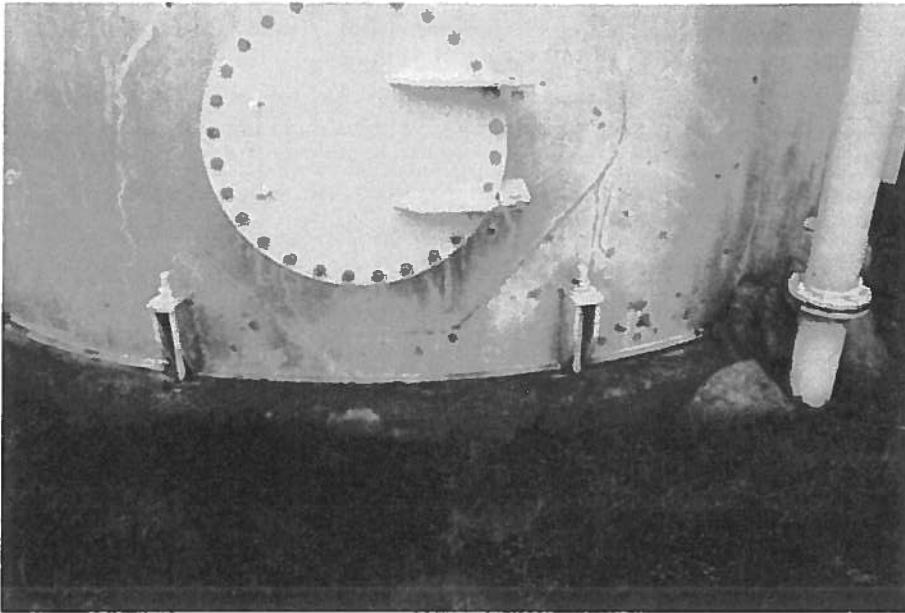
Exterior

At present the exterior coating system is in good condition with adequate protection to the underlying substrate. The few minor corrosion spots are random and very small. System Officials should monitor these spots and repair if corrosion becomes more significant in the next 1-3 years.

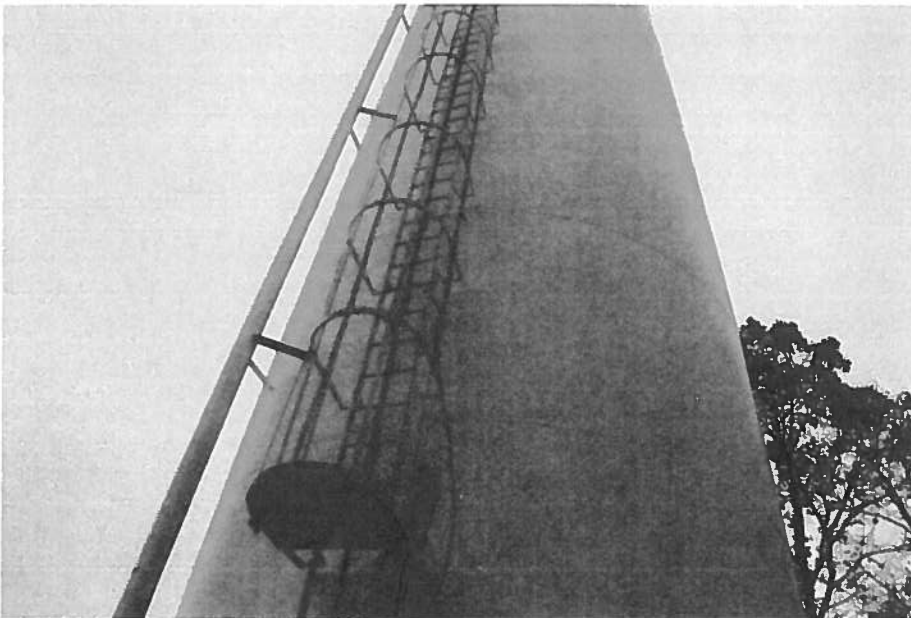
The following remediation is recommended: (1-3 years)

3. Power Wash Exterior 3000psi min. to remove all loose material and debris.
4. Spot Repair cleaning **SP 3 Power Tool Cleaning** on all corrosion areas.
5. Apply one coat of Rustoleum 9800 3-4 mils.
6. Clean off all debris from the foundation.
7. Caulk or Grout baseplate to concrete.

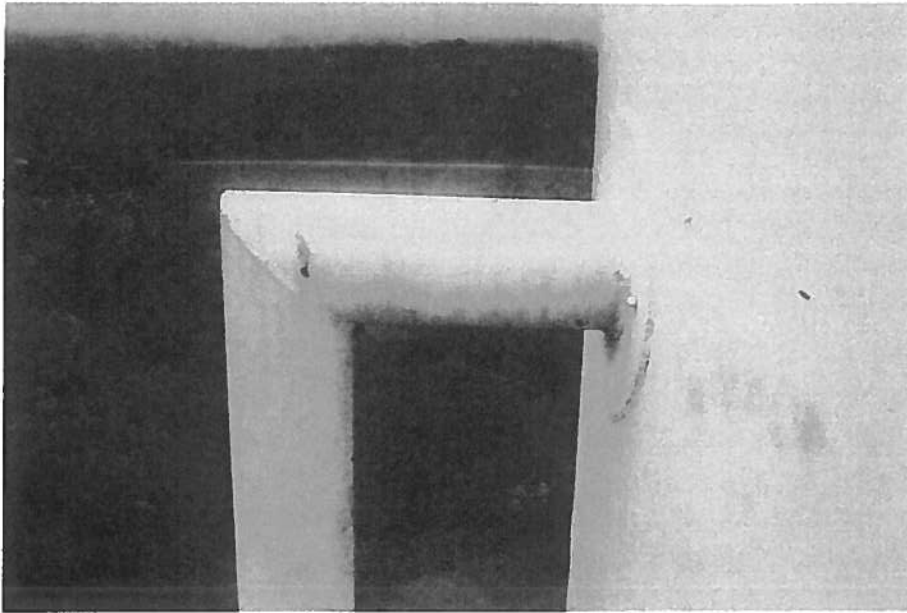
Foundation and Manway



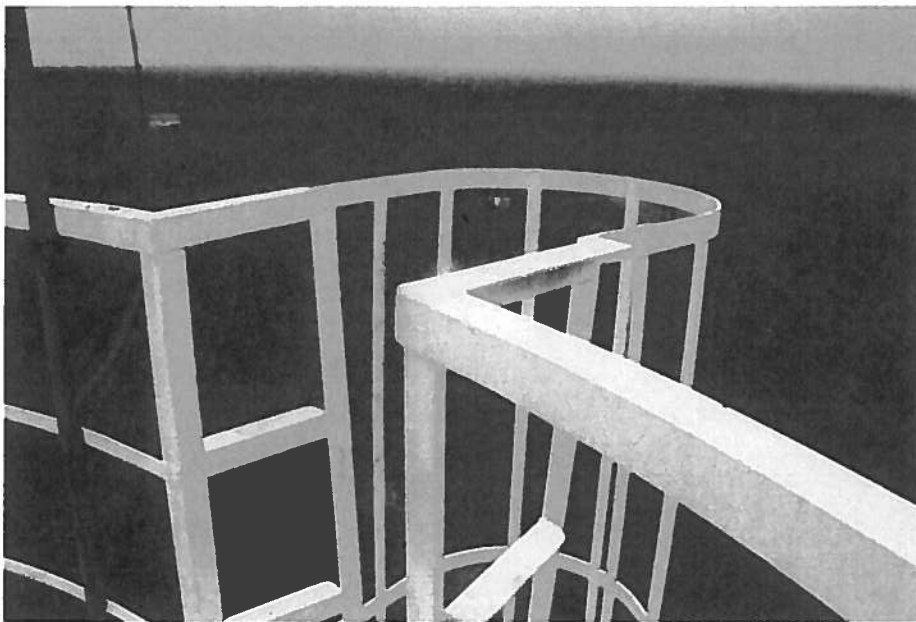
Sidewall and ladder



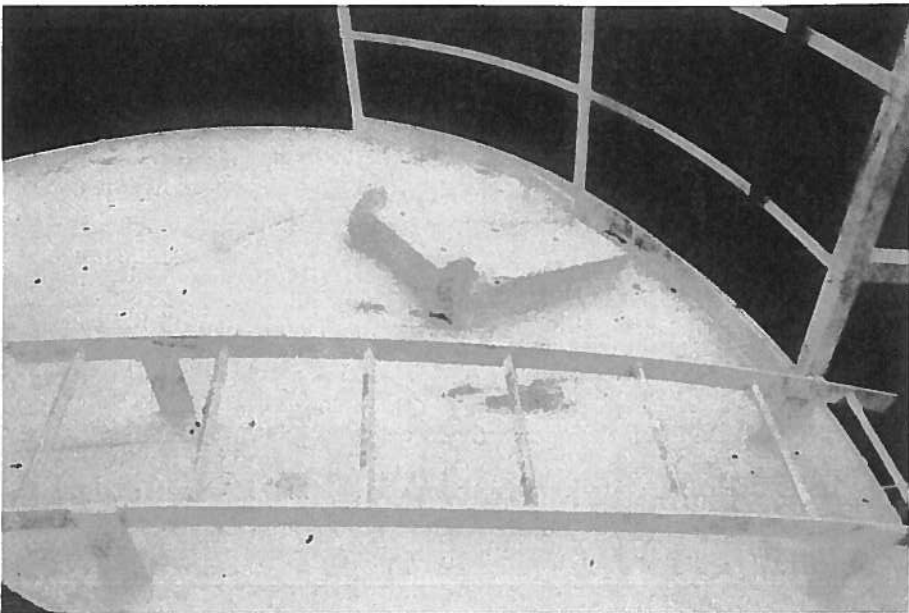
Overflow



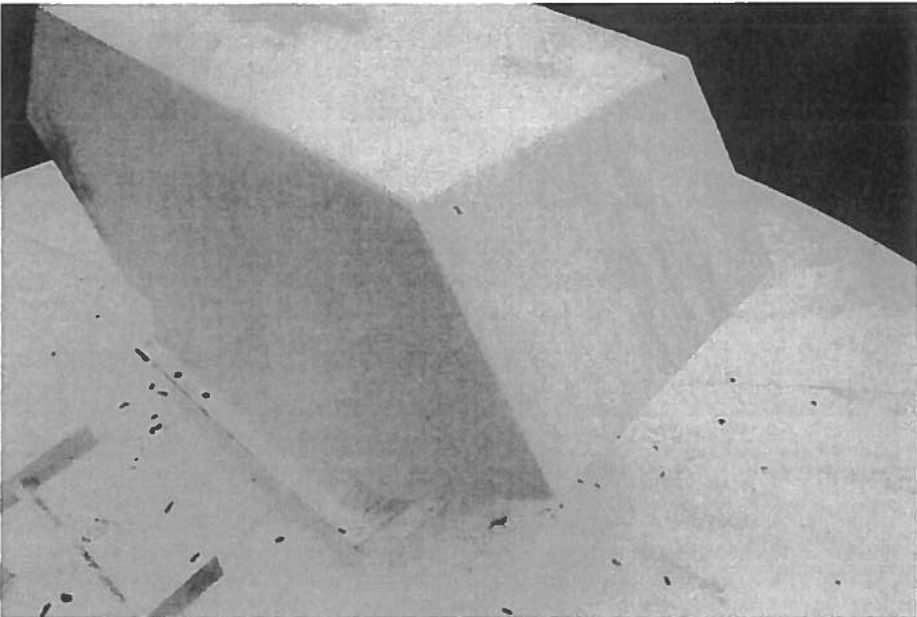
Handrail



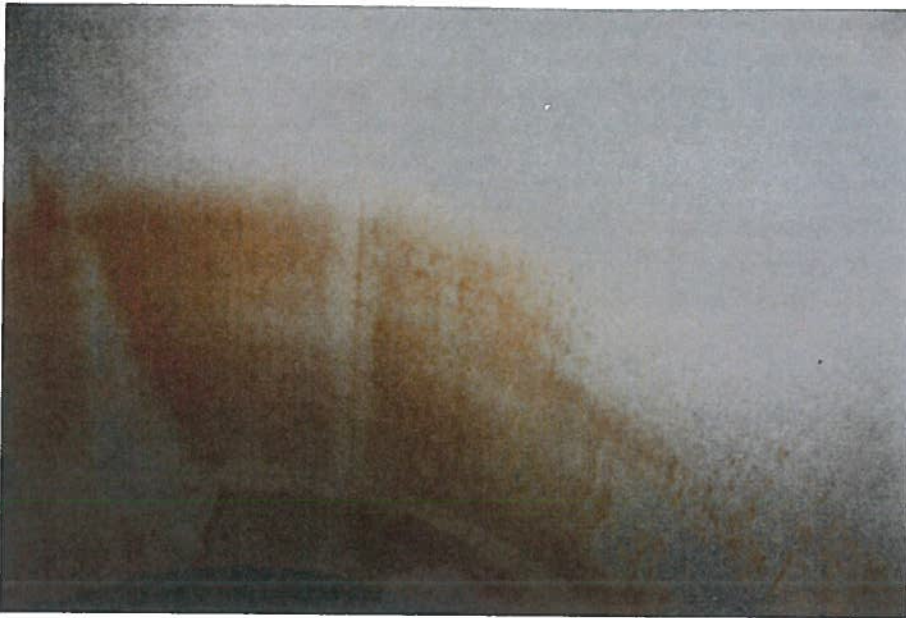
Roof



Vent



Sidewall



Sidewall



Ceiling and Overflow Pipe



Sidewall - Lower



2020



Concord Tank

Nicholas Co. Water District



502.727.2828

Manway and Foundation



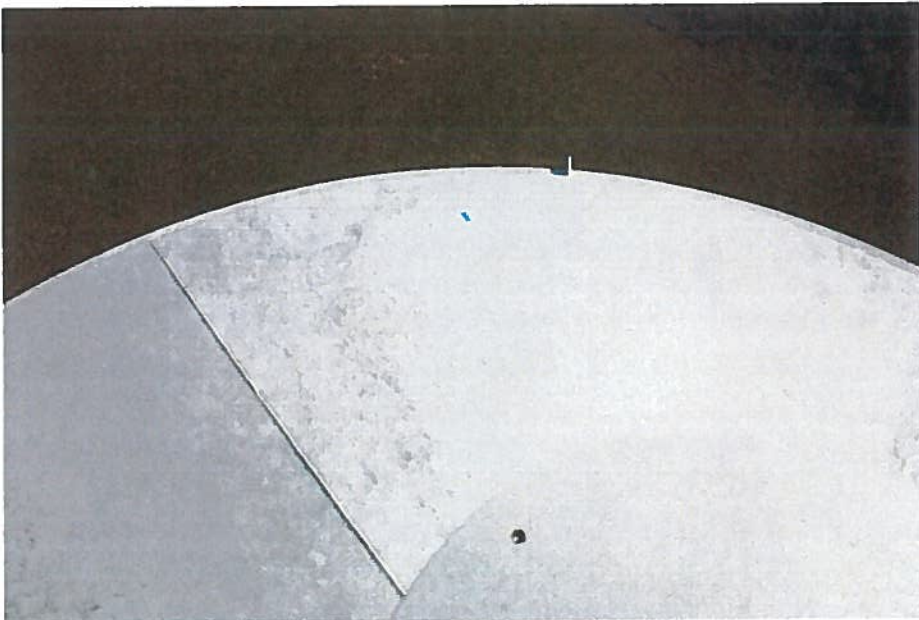
Sidewall and Overflow



Roof Section and Handrail



Roof



Roof Access Hatch



Vent



Interior Floor and Manway



Sidewall



Interior Sidewall, Ceiling and Overflow



Sidewall





Nicholas County Water District
Concord Tank
100K Welded Steel (Standpipe) Storage Tank

To: NCWD
Bluegrass Engineering

Copies: Horizon QC File

From: Mike Topp Horizon QC

Date: November 2020

On November 20, 2020, Horizon QC inspected the 100,000-gallon steel (Standpipe) storage tank. The purpose of the inspection was to evaluate the exterior and interior coatings, tank structure, sanitary conditions, and safety related issues. The tank's interior was inspected while in service.

This report summarizes Horizon QC's (Horizon's) observations and recommendations of the ground water storage tank (100K Gal. Standpipe Tank). Photographs from this evaluation are provided in Attachment A.

BACKGROUND

The Concord Tank was constructed in 2001. Tank dimensions are 14' in diameter and 93' tall.

The tank is located in Nicholas Co, Kentucky. The tank site is situated off of gravel road and adjacent to a barn. The tank site is boarded on three sides with fields and is fenced. The site is accessible by vehicles and has adequate parking.

OBSERVATIONS

Horizon QC (Horizon) visually inspected the water tank for coating related issues, obvious structural problems, and safety related problems. The inspection covered the interior and exterior portions of the tank. The interior of the tank was inspected while in service. The following observations were noted: Condition Scale: Excellent-Good-Fair-Poor.

Interior

- Overall condition of the interior should be considered fair. Moderate corrosion found throughout the interior.
- Interior floor is in fair condition with approximately 1" or less of sediment.
- Interior sidewalls are in fair condition with widespread pinhole corrosion found in the middle section. Pinhole depth is shallow in appearance. The upper and lower sidewalls have a few random spots.
- Ceiling portions of the tank should be considered fair with random pinhole corrosion spots.
- Inlet pipe is attached to the sidewall is in fair condition with random corrosion spots.
- Interior roof vent has moderate corrosion.
- No interior ladder was found.
- Float is not operational.
- Outlet pipe on the floor is in poor condition with heavy corrosion.
- Overflow Pipe is in good condition with minor corrosion.
- Interior man-way has moderate corrosion along the edges and collar portion.

Coatings test Interior

- Dry Film Thickness ranged from 8.2 – 13.5 mils.
- ASTM 3359 Adhesion testing (good adhesion) of protective coatings.

Exterior

- Over all condition of the exterior should be considered good with several small random areas of spot corrosion.
- Base plates are in fair condition. The flexible sealant has deteriorated in some areas due to the growth of vegetation between the base plate and the foundation.
- Foundation is in good condition. A section of the foundation is covered with grass.
- Anchor bolts are in good condition with some small corrosion spots.
- Sidewalls are in good condition with some random areas of corrosion to the substrate and heavy mildew on the bottom sheets.
- Sidewall man way hatch (2) 24" is in good condition with light corrosion on nuts, bolts.
- Roof portion of the tank is in good condition some small random areas of corrosion and coating deterioration from UV attack. Antennas are attached.
- Roof Vent is in good condition with minor corrosion found along the entire surface. The screen is in place. (24" diameter).
- Overflow pipe is in good condition with some random spots of corrosion.
- Exterior ladder is in good condition.
- Site perimeter is in good condition with light vegetation on all four sides.
- Site is fenced and locked.
- Tank site was properly maintained.

Coatings Test Exterior

- Average DFT (dry film thickness) range was 7.0 to 10.3 mils.
- ASTM 3359 Adhesion testing (good adhesion) of protective coatings.
- Solvent Sensitivity Test-ASTM D5402 found exterior finish coat with a moderate/good resistance to MEK solvent.

Recommendations

Interior

At present the interior coating system is in fair to poor condition without adequate protection to the steel substrate. The corrosion spots throughout the interior will only increase and deepen if repairs are not taken within the next 1-3 years. Due to the widespread corrosion, System Officials should consider a full abrasive blast on the interior and new three-part coating system. A new system should last 20-25 years.

The following remediation is recommended: (1-3years)

1. Surface Preparation **SP-10 Near White Blast to 100% of the interior.**
2. Apply three coats of immersion grade **epoxy 15-20** mils DFT.
3. Repair float assembly.

Exterior

At present the exterior coating system is in good condition with adequate protection to the underlying substrate. The few minor corrosion spots are random and very small. System Officials should monitor these spots and repair if corrosion becomes more significant in the next 1-3 years.

The following remediation is recommended: (1-3 years)

4. Power Wash Exterior 3000psi min. to remove all loose material and debris.
5. Spot Repair cleaning **SP 3 Power Tool Cleaning** on all corrosion areas.
6. Apply one coat of Rustoleum 9800 3-4 mils.
7. Clean off all debris from the foundation.
8. Caulk or Grout baseplate to concrete.

2020



Hickory Ridge Tank

Nicholas Co. Water District



502.727.2828



Nicholas County Water District
Hickory Ridge Tank
150K Welded Steel (Elevated) Storage Tank

To: NCWD
Bluegrass Engineering

Copies: Horizon QC File

From: Mike Topp Horizon QC

Date: November 2020

On November 20, 2020, Horizon QC inspected the 150,000-gallon steel (Elevated) storage tank. The purpose of the inspection was to evaluate the exterior and interior coatings, tank structure, sanitary conditions, and safety related issues. The tank's interior was inspected while in service.

This report summarizes Horizon QC's (Horizon's) observations and recommendations of the ground water storage tank (150K Gal. Elevated Tank). Photographs from this evaluation are provided in Attachment A.

BACKGROUND

The Hickory Ridge Tank was constructed in 2009 by Caldwell Tanks. Tank is 117' to the overflow. No. E-6658

The tank is located in Nicholas Co, Kentucky. The tank site is situated off of gravel road and adjacent to a county road. The tank site is boarded on three sides with fields and is fenced. The site is accessible by vehicles and has adequate parking.

OBSERVATIONS

Horizon QC (Horizon) visually inspected the water tank for coating related issues, obvious structural problems, and safety related problems. The inspection covered the interior and exterior portions of the tank. The interior of the tank was inspected while in service. The following observations were noted: Condition Scale: Excellent-Good-Fair-Poor.

Interior

- Overall condition of the interior should be considered fair. Moderate corrosion found throughout the interior.
- Interior floor is in fair condition with approximately 1" or less of sediment. A few random corrosion spots.
- Interior Riser Pipe is in good condition with a few random pinhole corrosion spots. The safety cable support has heavy corrosion.
- Interior sidewalls are in fair condition with widespread pinhole corrosion found in the middle section. Pinhole depth is shallow in appearance. The upper and lower sidewalls have a few random spots. Heavy mineral staining.
- Interior for ladder is in fair to poor condition with heavy corrosion.
- Ceiling portions of the tank should be considered fair with random pinhole corrosion spots. Corrosion is centered primarily around the roof vent.
- Interior roof vent has moderate corrosion.
- Float is not operational.
- Overflow Pipe is in good condition with minor corrosion.
- Interior man-way has moderate corrosion along the edges and collar portion.

Coatings test Interior

- Dry Film Thickness ranged from 9.5 – 16.2 mils.
- ASTM 3359 Adhesion testing (good adhesion) of protective coatings.

Exterior

- Over all condition of the exterior should be considered good with several small random areas of spot corrosion.
- Base plates are in fair condition. The flexible sealant has deteriorated in some areas due to the growth of vegetation between the base plate and the foundation.
- Foundation is in good condition.
- Anchor bolts are in good condition with some small corrosion spots.
- Columns are in good condition, some mildew staining.
- Lower Container is in good condition with some mildew staining.
- Balcony is in good condition, some spots of corrosion. Antennas attached.
- Sidewalls are in good condition.
- Sidewall man way hatch (1) 24" is in good condition with light corrosion on nuts, bolts.
- Roof portion of the tank is in good condition some small random areas of corrosion and coating deterioration from UV attack. Antennas are attached.
- Roof Vent is in good condition with minor corrosion found along the entire surface. The screen is in place. (24" diameter).
- Overflow pipe is in good condition with some random spots of corrosion.
- Exterior ladder is in good condition.
- Site perimeter is in good condition with light vegetation on all four sides.
- Site is fenced and locked.
- Tank site was maintained..

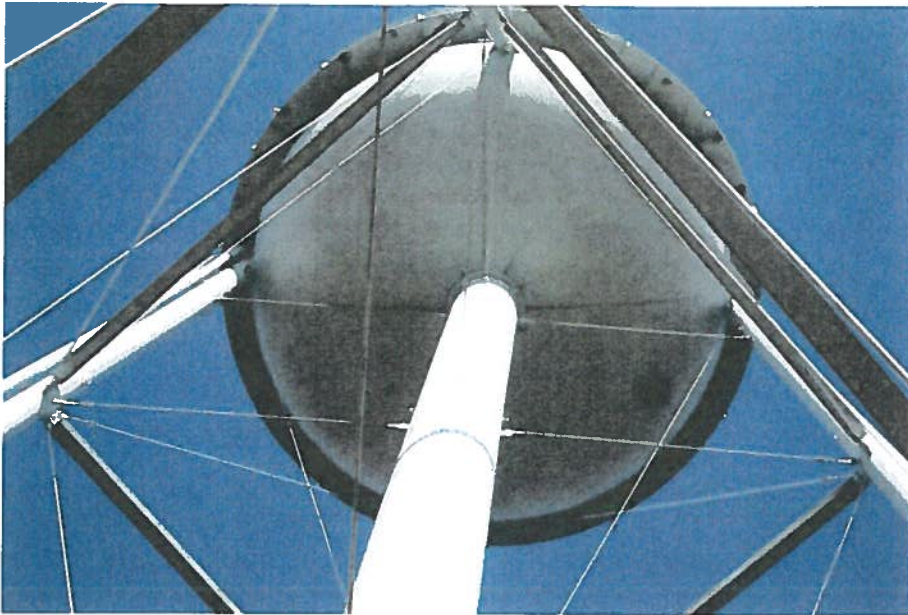
Foundation



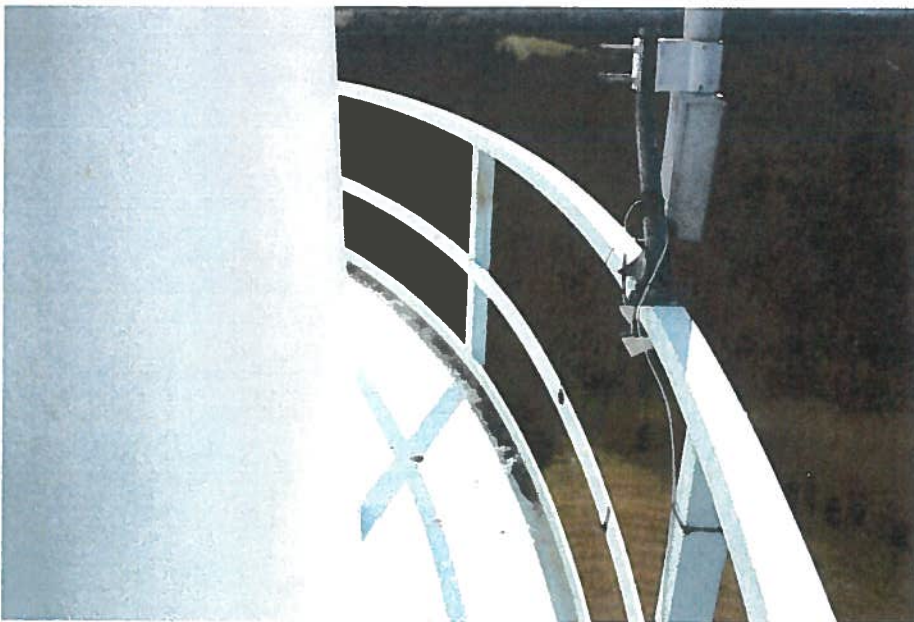
Riser Manway



Lower Container



Balcony



Vent



Roof antennas



Interior Floor



Interior Ladder



Ceiling Vent



Upper Sidewall

