DRINKING WATER
SOURCE PROTECTION PLAN

for the

Belmont County Water & Sewer District

PWS ID# OH0700412

February 4, 2025

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1.0 INTRODUCTION

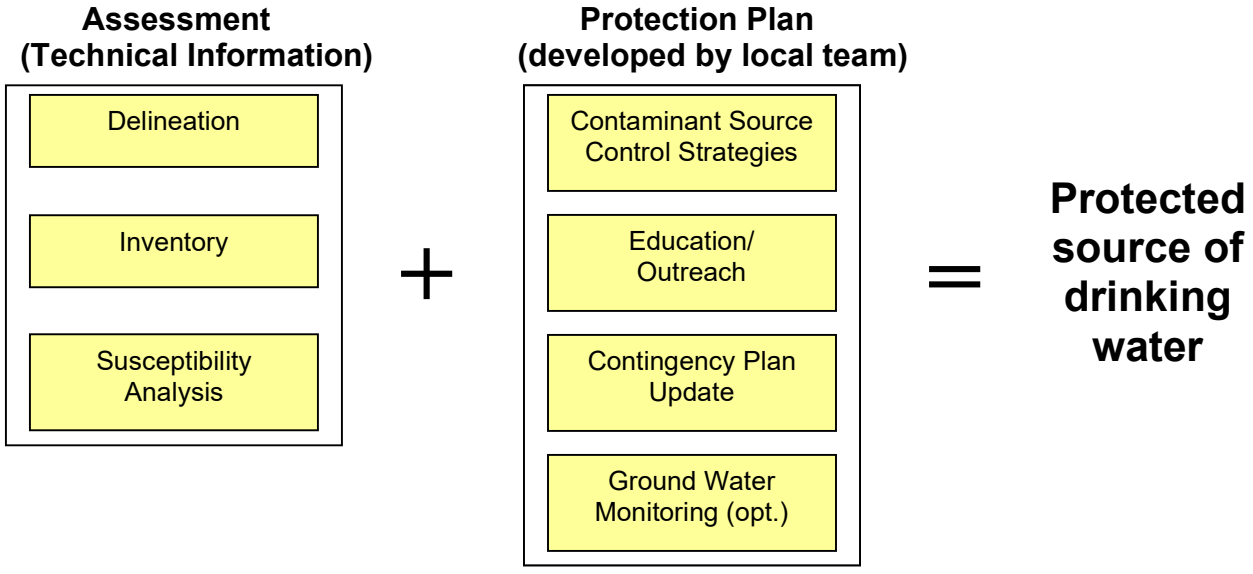
The Belmont County Water & Sewer Dist. has developed a Source Water Protection Plan ("Protection Plan") to document the strategies we will implement to protect the aquifer that supplies our drinking water from land-based contamination. Components of the Protection Plan include: contaminant source control strategies, education and outreach strategies, contingency plan update, and –in some cases—ground water monitoring.

This Protection Plan builds on the Source Water Assessment Report that was completed for Belmont County in June 2024 by Steve Saines and Ryan Ellis, OEPA Southeast Dist. Office. This assessment (see Appendix A) includes delineation of the one-year and five-year time of travel areas, a potential contaminant source inventory and a susceptibility analysis. The potential contaminant source inventory was updated in June 2024 by OEPA/ Steve Saines and Ryan Ellis, to ensure the protective strategies documented here are based on currently existing contaminant sources.

1.1 BENEFITS OF A PROTECTION PLAN

A Protection Plan:

- Helps Belmont County Water & Sewer Dist. provide the safest and highest quality drinking water to its customers at the lowest possible cost;
- Helps to plan for future expansion, development, zoning and emergency response issues; and
- Can provide more opportunities for funding in order to improve infrastructure, purchase land in the protection area, and other improvements to the wellfield.



1.2 SUMMARY OF Belmont County Water & Sewer District's SOURCE WATER ASSESSMENT

The Belmont County Water & Sewer District's water system operates a collector well that pumps approximately 5 million gallons of water per day from a Sand & Gravel aquifer (water-rich zone) within the Ohio River Buried Valley aquifer system.

The drinking water source protection area for Belmont County Water & Sewer District's well is illustrated in the Drinking Water Source Assessment report prepared by OEPA in 2024. The source water protection area includes two zones, one inside the other. The "inner protection zone" is the area that provides ground water to the wells within one year of pumping. The "outer protection zone" is the area that contributes water when the wells are pumped for five years.

Although the well provides water to Belmont County, the wellfield is located in the Village of Bellaire, and extends into other sub-divisions.

Based on relevant databases and a field inspection of the area, potential sources of contamination were identified within the protection area. These include Agricultural, Municipal, Commercial and Industrial sources.

Belmont County's source of drinking water has a high susceptibility to contamination due to:

- The presence of a relatively permeable layer of silty clay and fill overlying the aquifer
- The shallow depth of the aquifer (<20' below ground service)
- Past identification of VOC contaminated soils within the one-year time of travel
- The presence of significant potential contaminant sources in the protection area
- The past presence of manmade contaminants in the treated water

2.0 FORMING A PROTECTION TEAM

Communities with successful protection plans form a protection team to help develop and implement the plan. A protection team provides a broader level of oversight and should include individuals familiar with protective strategies. Team members may include water supply staff, local decision makers, business and industry representatives, concerned citizens, and emergency response personnel.

All members of the protection team should become familiar with the Belmont County Water and Sewer District's Drinking Water Source Assessment Report. If local emergency responders are not represented on the team, a copy of the plan should be provided to the local fire department.

Members of the Protection Team

NAME	ORGANIZATION	TITLE	PHONE #
Kelly Porter	BCW&SD	Director	740-695-3144
Craig Harris	BCW&SD	Water Plant Manager	740-676-7666
Chad Sutton	BCW&SD	Distribution Mgr.	740-695-3144
David McMillen	BCW&SD	Operator of Record	740-676-7666
Dave Ivan	Belmont County EMA	Director	740-695-5984
Tim Bell	Bellaire Fire Dept	Chief	740-676-5880

3.0 STRATEGIES FOR CONTAMINANT SOURCES

The goal of this section is to develop protective strategies for the potential contaminant sources in BCWSD's protection area. The potential contaminant sources listed in the Source Water Assessment Report (see Appendix A) were evaluated. The BCWSD developed specific protective strategies the community will use to protect its drinking water from the types of potential contaminant sources identified. A listing of the potential contaminant sources in the BCWSD's protection area and the protective strategies selected to address them is presented in the following table.

Potential Contaminant Source	Priority/ Threat Level	Protective Strategies	Timeline for Implementation	Who will Implement?
Ohio River	1	In the event of a hazardous spill, contact ORSANCO & OEPA for information and guidance	Ongoing	PWS Operator
Railroad	2	Request Best Management Practices (BMPs) from railroads, prioritize track maintenance, notifications of spills and prevention of spraying pesticides in Protection Area	Yearly	PWS Operator
EORWA Wastewater Plant	3	Require BMPs by EORWA, Annual inventory accounting of flow rates	Yearly	PWS Operator
SR 7	4	Coordinate with local Fire Dept and EMA regarding spill response protocols	Yearly	PWS Operator
Industrial/Agricultural Runoff	5	Contact local entities to promote practices to minimize potential spills and runoff into nearby tributaries	Ongoing	PWS Operator

4.0 EDUCATION AND OUTREACH

The purpose of the Protection Team's education and outreach efforts is to inform people who live and work in BCWSD's drinking water source protection area about where their drinking water comes from and why it is important to protect this valuable resource. Education and outreach efforts will also inform the community how their activities can potentially impact groundwater and what they can do to prevent contamination.

Table 4-1. Educational Strategies

Education and Outreach Strategies	Target Audience	Time line for Implementation	Who (name and title) will implement this strategy?
Consumer Confidence Report – include information about actions residents can take to protect source water quality	Water customers	Distribute annually, in June	PWS Operator
Distribute Source Water Protection brochures	Local Businesses	Jan 2025	PWS Operator
Offer Water Treatment Plant tours to interested groups	Area citizens	Jan 2025	PWS Operator
Source Water Protection Plan posted on County Web Site	Residents/ Businesses	Jan 2025	BCWSD office staff
ODOT Road Signs	Residents	Jan 2025	PWS Operator

5.0 UPDATE OF CONTINGENCY PLAN

A well-formulated contingency plan enables a utility to prepare for, respond to, and recover from crisis conditions without wasting time on futile or unnecessary efforts or spending funds unnecessarily. The plan defines the duties, responsibilities, and functions of all water system personnel with respect to each specific emergency condition. The BCWSD has developed procedures to address specific situations that can be expected to arise, and these are documented in BCWSD's water plant contingency plan. BCWSD's Contingency Plan is updated annually.

Emergency Notification of Water Users

In the event of a water related emergency, information will be provided to the public by the Director or other responsible person through mass media communications, radio, TV and newspaper.

WTRF TV7	304-232-7777
WTOV TV9	740-282-0911
WWVA Radio	304-232-1170
Times Leader Newspaper	740-633-1131
The Intelligencer Newspaper	304-233-0100
Belmont County 911 Code Red	

1.) Advise the public as to the expected nature and duration of emergency.

2.) Advise of 48-hour Boil Order if needed.

3.) Set limit of water usage if needed

4.) Advise if potable water is available at any location in the County with any limits for human consumption.

5.) Advise when water is available for sanitation purposes.

6.) Advise when water conditions return to normal.

Contingency Planning-Spill Response

Procedures should be in place for the kinds of catastrophic spills that can reasonably be expected in the wellfield. The chain-of command, notification procedures and response actions should be known by all water system employees.

The fire department or hazardous materials response team that would respond to a spill in the wellfield is: **Bellaire Volunteer Fire Dept. (Call 911)**

Ohio EPA's Division of Emergency and Remedial Response can provide expertise and assistance related to prevention, containment, and clean-up of chemical spills. Ohio EPA Emergency Response 24 Hour Phone # (800)-282-9378.

Ohio EPA District Office Drinking Water Program Southeast Dist. Office: (740) 380-5250. Additional contact information can be found on page 8 of Belmont County's Contingency Plan.

Responsibility for coordinating the response procedures will rest upon key water system staff. This person will oversee and co-ordinate activities with other water system staff and external organizers.

	Name	**Day time Phone#**	**After Hours Phone#**
Primary Contact	Kelly Porter	740-695-3144	740-296-1799
Backup Contact	Craig Harris	740-676-7666	740-827-0697
Backup Contact	Chad Sutton	740-695-3144	740-338-1732
Emergency Contact	Dave Ivan Belmont County EMA	740-695-5984	740-391-0201

Spill Response

If a spill release occurs within the 1-year time of travel of the source water protection area, Belmont County Water will:

1.) Communicate with emergency responders to determine spill information, specifically:

a.) Type of containment spilled

b.) Volume of contaminant

c.) Specific location of spill

d.) Has containment been achieved? If not, shut down well pumps

2.) Obtain and analyze water samples

3.) At discretion of Water Plant Manager, stop pumping raw water, shut down treatment plant, and close the main line finished water valve.

4.) Coordinate activities with the Ohio EPA District Office, Bellaire Volunteer Fire Dept., Belmont County Disaster Services (Dave Ivan 740-695-5984), law enforcement, media, and other utilities. If needed, OEPA Division of Emergency Remedial Response can assist in containment and clean-up.

5.) Contact the following water departments to see if water can be supplied; Area Code 740 for all the following:

a.) City of Martins Ferry	740-633-1378
b.) Tri-County Water	740-546-3310
c.) Village of Barnesville	740-425-3444
d.) Village of Bridgeport	740-635-0729

Notify the following critical users of the situation:

Belmont Community Hospital	740-671-1200
Country Club Retirement Center	740-676-2300
Woodland Acres Nursing Home	740-695-0800
Belmont Manor/ Lancia Nursing Home	740-695-4404
Fox Run Hospital	740-695-2131
Crest View Health Care	740-695-2500
Village of New Athens	740-968-3388
Village of Morristown	740-782-1308
Village of Flushing	740-968-3123
Village of Bethesda	740-484-1250
Village of Belmont	740-484-1989
City of St. Clairsville	740-695-1410
Tri-County Water	740-546-3745
Belmont County Jail / Sheriff's Office	740-695-7933
Belmont Correctional Center	740-695-5169
Rolling Hills Rehab	740-635-4600

Notify customers by media (radio, TV, newspaper) handbills, telephone or Belmont County 911 Code Red of the following:

To conserve water until further notice

The estimated time for restoration of service from wellfield

Where, if necessary, they can access drinking water

When the emergency is over

Contingency Planning-Source Water

These procedures expand on those established for Source Failure (Pumps, Wells, and/or Intakes). In the event of a source water shortage, Belmont County Water & Sewer Dist. #3 will:

1.) Contact critical water users and notify them of the situation

2.) Contact OEPA

3.) Issue use restrictions for the affected areas

Short term alternative sources of water include:

Water hauled by:

Morristown Fire Dept	740-782-1421
Cumberland Trail Fire Dept	740-695-5147
Neffs Fire Dept	740-676-5563
Dave Ivan, Disaster Services	740-695-5984

Activate an existing emergency connection to another public water system or install a new emergency connection to another public water system (with approval of OEPA) Contact:

Village of Bridgeport	740-635-0729
City of Martins Ferry	740-633-1378

Provide bottled water for potable use from the following organizations:

Deans Water Service	800-833-1002
United Dairy	740-633-1451

In consultation with OEPA, develop an alternate source of drinking water.

Funding

Is money budgeted for emergency use? Yes

Who can authorize expenditures? Major expenditures of funds require action by the Belmont County Commissioners. Their action is required for all emergency expenditures over $11,000. Expenditures of less than $11,000 can be approved by the Director of the Belmont County Water & Sewer Dist.

Under what conditions can such expenditure occur? Any water-related incident involving the health and welfare of the community.

Drinking Water Shortage/Emergency Response

The following agencies will be notified should a drinking water shortage or emergency occur:

1) Ohio EPA, Southeast Dist. Office, Division of Drinking and Ground Waters

2) Belmont County Dept of Health

3) Belmont County EMA

Belmont County Water & Sewer Dist. #3 will respond during a drinking water shortage by doing the following:

1) Determine amount of water that can be pumped daily

2) Notify consumers of existing conditions through mass media

3) Contact fire departments of existing conditions

4) Issue water conservation measures for general public, i.e., car washing, pool filling, lawn and garden watering

5) Issue level warnings of usage requirements to consumers as follows:

a) Level 1 – Normal Conditions

b) Level 2 - Human consumption and sanitation

c) Level 3 – Human consumption

6) As appropriate, issue boil order and emergency disinfection of drinking water if system depressurizes

7) Monitor all tank levels daily

8) Monitor all main line meters to guard against unnecessary waste of water due to line breaks, etc.

9) Contact State Legislator to issue monetary penalties against consumers that abuse local request to limit consumption of water. Must be accomplished for rural systems that are organized under the Ohio Revised Code.

Contingency Planning/Water Supply Planning

Future water supply needs may involve expanding a current wellfield or developing a new one. A community needs to plan for such major expenditures and may need to acquire options on or secure relatively undeveloped land many years in advance.

Belmont County Water & Sewer Dist. #3 currently supplies 4.5 MGD on average to 10,000 service connections (approximately 26,882 people). Source capacity (wellfield) and plant capacity is 6 MGD.

6.0 Ground Water Monitoring

Belmont County Water & Sewer District #3's collector wells have monitoring capabilities, which currently monitors for pH, alkalinity, iron, manganese and fluoride in our raw groundwater entering the Water Treatment Plant. In the event of nearby spills or releases in the future, BCWSD will re-evaluate whether the addition of other chemical parameters to monitor is warranted.

7.0 Periodic Review

A protection plan is not a static document. Over time many issues related to protection planning will change- wells will be added or removed from the wellfield, existing potential contaminant sources will close, new education and outreach opportunities will become available, new partners in protecting the drinking water source will be identified. The protection plan needs to plan for these and other events.

BCWSD commits to reviewing the Drinking Water Source Protection Plan every 3 years, beginning with November 1, 2027.

7.1 Updating the SWAP Assessment

Delineation Updates

- Has the amount of pumping increased or decreased since the date OEPA provided the Drinking Water Source Assessment report?
- Have any wells been added or removed?
- Has a new wellfield been added or are there any plans for a new wellfield?
- Is there new hydrogeologic data to refine the delineation model (e.g., flow direction, pump tests, new well logs etc.)?

If the answer to any of the above questions is yes, BCWSD will contact Ohio EPA's Source Water Assessment and Protection Program staff in the Southeast district office to determine whether the protection area should be re-delineated.

Potential Contaminant Source Inventory

- Has the extent of the protection area changed?
- Has the community developed rapidly?
- Have land uses in and around the protection area changed?
- Has management of businesses in the protection area changed?

If the answer to any of the above questions is yes, SYSTEM will update the inventory or conduct a new inventory. SYSTEM may contact Ohio EPA's SWAP staff in the district office for guidance or assistance in conducting the inventory.

Other

- Is the list of Protection Team members and contact numbers current?

7.2 Evaluating the Effectiveness of the Protective Strategies

In order to evaluate if the protective strategies in this Source Water Protection Plan are achieving the desired outcomes, BCWSD will consider the following types of questions and write any changes into the Protection Plan.

- *[If local protection area ordinances are in place]:* Has the ordinance achieved its purpose? (If not, why not?) Should it be revised to be more effective?

- *[If local protection area ordinances are <u>not</u> in place]:* Do we have reason to be concerned about how the drinking water source protection area may be used in the future? Should we consider trying to better protect it through a local ordinance? Would such an ordinance need to be enacted and implemented by another jurisdiction?

<u>Pollution Source Control Strategies:</u>

- Have we followed our own schedule of implementation/timeline (Section 2, Table 2-1) for each of the pollution source control strategies?
- Are there new potential contaminant sources that need to be addressed with new pollution source control strategies?
- Have we implemented any new protective strategies that are not documented here?
- Did any of our strategies result in removal or elimination of a potential source?
- Did any of our strategies result in business owners or individuals modifying practices to decrease the risk of contaminating the drinking water source?
- Did our coordination with other groups (SWCDs, county EMAs, local health dept., local watershed group, etc.) contribute to the implementation of protective strategies?
- Have the partnerships developed during plan implementation been productive?

<u>Education and Outreach:</u>

- Have we followed our own schedule of implementation/timeline for each of the educational strategies?
- Are there any new groups in the population that we need to target with education and outreach strategies?
- Have we implemented any new educational strategies that are not already documented here?
- Has education and outreach targeting any specific group resulted in actions that reduced or could potentially reduce the risk of contaminating the drinking water source (e.g., septic system owners conducting regular maintenance, farmers using best management practices, properly sealing abandoned wells)?
- Have we received additional funding to continue any particular education and outreach strategy?

- Have we received any accolades, awards or recognition from outside entities or organizations for our educational efforts?
- Have we had any unsolicited requests for SWAP-related education (such as requests for plant tours, requests for presenters/speakers at events, etc.)?
- Did our coordination with other groups (SWCDs, SWEET Team, local health dept., local watershed group, etc.) contribute to the successful development and dissemination of SWAP-related information?
- Did we have sufficient staff and resources to complete all the planned educational efforts?
- Have educational efforts been cost effective? Efficient? (Consider level of attendance, attentiveness and participation by audience, comments received, etc., vs. the cost to facilitate the event) Should the frequency of the outreach be increased, decreased, or remain the same?
- Have the partnerships developed during plan implementation been productive?
- Have any of the target groups contacted the public water system for additional information about something they saw or heard about through these activities?

Drinking Water Shortage/Emergency Response:

- Are there any updates to the Drinking Water Shortage/Emergency Response Plan?
- Did our coordination with emergency responders at the local and county level result in better communication and handling of spill incidents that could impact our drinking water?

Ground Water Monitoring:

For systems that are monitoring raw ground water quality:

- Have we followed our ground water monitoring plan (i.e., sampled at the specific frequency, analyzed for the appropriate parameters, etc.)?
- Have there been any significant changes to our water quality?
- Do we have sufficient water quality data or other reasons (e.g., the source was removed) to conclude that ground water monitoring can be cut back or is no longer needed?
- Is there new water quality, potential contaminant source or land use issues that would influence the need to expand our ground water monitoring network?
- Does our ground water monitoring plan need to be updated for any reason?

For systems that are NOT monitoring raw ground water quality:

- Have there been any significant changes to our water quality?
- Are there new water quality, potential contaminant source or land use issues that may make it necessary to develop and implement a ground water monitoring program?

7.3 Revising the Plan

Upon review, if any revisions of the SWAP Assessment Report are needed, BCWSD will contact Ohio EPA's [district] office for guidance. Also, if the local planning team makes any substantial changes to the BCWSD's Protection Plan, a copy will be forwarded to Ohio EPA for concurrence. The revision will be documented on the front cover by adding "Revised [date]" beneath the date at the bottom of the page.

Appendix A

Ohio EPA's Drinking Water Source Assessment

for

BCWSD

SOURCE WATER ASSESSMENT REPORT

for Belmont County Sanitary Sewer District #3

March 2003
Revised June 2024

INTRODUCTION. The 1996 Amendments to the Safe Drinking Water Act establish a program for states to assess the drinking water source for all public water systems. Ohio's Source Water Assessment and Protection Program is designed to help public water systems protect their sources of drinking water from becoming contaminated. This assessment:

- identifies the drinking water source protection area, based on the area that supplies water to the well(s),
- inventories the potential contaminant sources in the area,
- evaluates the susceptibility of the drinking water source to contamination, and
- recommends protective strategies.

The purpose of the assessment is to provide information that Belmont County Sanitary Sewer District #3 (Belmont Sewer District #3) can use to help protect its source of drinking water from contamination.

SYSTEM DESCRIPTION & GEOLOGY. Belmont Sewer District #3 is a community public water system serving 26,822 people directly in Belmont County, Ohio. Total population served including all satellite systems includes 42,742 people. This system operates 1 radial collector well that pumps approximately 4,349,000 gallons of water per day from a sand and gravel aquifer (water-rich zone) within the Ohio River Buried Valley aquifer system.
The aquifer is covered by approximately 40 feet of moderately permeable fill and silty clay, which provides some protection from contamination. Depth to water in this aquifer is 15 to 20 feet below the ground surface.

Soils in the area are silty clays and fill which are moderately well-drained, meaning that much of the rainfall and snowmelt will infiltrate into the soil, instead of running off or ponding. The topography is generally flat with little relief. Ground water in this area is replenished by the gradual flow of water underground from higher to lower elevations and by approximately 7 -10 inches per year of precipitation that infiltrates through the soil. At the Belmont Sewer District #3 wellfield, ground water flows generally toward the east and south, based on topography and the direction of flow in the Ohio River.

PROTECTION AREA. The drinking water source protection area for Belmont Sewer District #3's well is illustrated in Figure 1. This figure shows two areas, one inside the other. The "inner management zone" is the area that provides ground water to Belmont Sewer District #3's well within one year of pumping. A chemical spill in this zone poses a greater threat to the drinking water, so this area warrants more stringent protection. The "source water protection area" is the additional area that contributes water when the well is pumped for five years. Together, they comprise the drinking water source protection area.

Method Selection An analytic element model computer program called GFLOW (Ground water FLOW) was used to determine the areal extent of the protection area. Protection areas based on computer modeling can be significantly more credible than those produced by simpler methods, especially in areas with complex geology. The time and effort required to develop a computer model are warranted when the wellfield is located in a complex hydrogeologic setting, and the hydrogeologic data needed to run the program are available for the area. Both criteria were met for Belmont Sewer District #3's source water assessment.

Model Set-up

The GFLOW model for Belmont Sewer District #3's wellfield was designed to simulate the characteristics of a sand and gravel buried valley aquifer that is bounded by a sandstone and shale bedrock aquifer. Figure 2 shows that the sand and gravel aquifer was modeled as an area of different flow properties (called an "inhomogeneity") within the bedrock aquifer. The Ohio River was modeled as lines along which ground water enters or leaves the aquifer (called "line sink strings").

Model Values

Information needed to run the model includes, at a minimum, **pumping rate** of the well, **hydraulic conductivity** of the aquifer (that is, the ease with which water moves through it), **aquifer thickness**, and **aquifer porosity**. For this model, the pumping rate of 4,349,000 gallons per day represents the average daily pumping rate as recorded in Ohio EPAs files, plus an additional 15 percent, to provide a more protective area. The hydraulic conductivity of 333 to 1100 feet per day for the sand-and-gravel aquifer was based the 2012 studies conducted by Layne in support of installing a radial collector well for the Bellaire public water system just downstream from Belmont Sewer District #3. An aquifer thickness of 24 feet was used, based on this same study and well logs and glacial aquifer maps. Site specific information on the hydraulic conductivity of the sandstone and shale bedrock was not available, and measured porosity values were unavailable for any of the units. In these cases, the values used in the model were based on values typically found in these kinds of rock and sediments. They were: 20% porosity for the sand-and-gravel aquifer, and 1 foot per day hydraulic conductivity for the sandstone and shale bedrock.

The protection area was determined based on the best information available at the time of the assessment. If you would like to have more information about how this protection area was derived, or if you would like to collect additional information and revise your protection area, please call Ohio EPA staff listed at the end of this report.

Also, a more detailed discussion of the technical aspects of modeling drinking water source protection areas, can be found in the *Delineation Guidelines and Process Manual* (Ohio EPA, 2010) on Ohio EPAs Source Water Assessment and Protection Web page (www.epa.ohio.gov/ddagw/swap.aspx).

INVENTORY. On May 30, 2024, an inventory of potential contaminant sources located within the drinking water source protection area was conducted by Ohio EPA (Figure 1). Table 2 provides additional information about these types of potential contaminant sources.

A facility or activity is listed as a potential contaminant source if it has the **potential** to release a contaminant, based on the kinds and amounts of chemicals typically associated with that type of facility or activity. It is beyond the scope of this assessment to determine whether any specific potential source is **actually** releasing (or has released) a contaminant to ground water. Also, the inventory is limited to what Ohio EPA staff were able to observe on the day of the site visit. Therefore, Belmont Sewer District #3's staff should be alert to the possible presence of potential sources of contamination that are not on this list.

GROUND WATER QUALITY.

At this time, there is evidence indicating the quality of water provided by Belmont Sewer District #3 has been impacted. Samples collected during the 1990's contained VOC's on 13 occasions. Cis-1,2dichloroethylene was detected 11 times with concentrations between 2.0 and 6.9 µg/l, 1,1,1trichloroethane was detected once at a concentration of 0.6 µg/l, and cis-1,2-dichloroethene was detected once at a concentration of 1.3 µg/l. Ohio EPA led a ground water investigation of the well field in 1997 which ultimately identified a source of VOC contamination to the south of the Ranney well, within the one-year time of travel zone. Later, ODOT initiated a cleanup project that removed contaminated soil. Sample results from 2000 to 2024 had no detections of 1,1,1-trichloroethane, and 7 detections of Cis-1,2-dichloroethylene which were all below 2 µg/l. Manganese was once detected in 2019 at a concentration of 0.206 mg/l, above the concentration of concern of 0.05 mg/l.

Please note that this water quality evaluation has some limitations:

- the data evaluated are mostly for treated water samples only, as Ohio EPAs quality requirements are for the water being provided to the public, not the water before treatment.

- sampling results for coliform bacteria and naturally-occurring inorganics (other than arsenic) were not evaluated for this assessment, because they are not a reliable indicator of aquifer contamination.

Current information on the quality of the treated water supplied by Belmont Sewer District #3's Public Water System is available in the Consumer Confidence Report for the system, which is distributed annually. It reports on detected contaminants and any associated health risks from data collected during the past five years. Consumer Confidence Reports are available from Belmont Sewer District #3.

SUSCEPTIBILITY ANALYSIS. This assessment indicates that Belmont Sewer District #3's source of drinking water has a **high** susceptibility to contamination because of:

- the presence of a relatively permeable layer of silty clay and fill overlying the aquifer,
- the shallow depth (less than 20 feet below ground surface) of the aquifer,
- the past identification of VOC contaminated soils within the one yeartime of travel,
- the presence of significant potential contaminant sources in the protection area,
- and the past presence of manmade contaminants in treated water.

This susceptibility means that under currently existing conditions, the likelihood of the aquifer becoming contaminated is relatively high. This likelihood can be minimized by implementing appropriate protective measures.

The risk of future contamination can be minimized by implementing appropriate protective measures.

PROTECTIVE STRATEGIES. Protective strategies are activities that help protect a drinking water source from becoming contaminated. Implementing these activities benefits the community by helping to:

- protect the community's investment in its water supply.
- protect the health of the community residents by preventing contamination of its drinking water source.
- support the continued economic growth of a community by meeting its water supply needs.
- preserve the ground water resource for future generations.
- reduce regulatory monitoring costs.

Ohio EPA encourages Belmont Sewer District #3 to update their Drinking Water Source Protection Plan. The plan can be revised with information provided in this Source Water Assessment Report. The potential contaminant source inventory provides a list of facilities or activities to focus on. Table 3 lists protective strategies that are appropriate for the kinds of facilities/activities listed in the inventory. Finally, a document titled *Developing Local Drinking Water Source Protection Plans in Ohio* is available from Ohio EPA. This document offers comprehensive guidance for updating and implementing a municipal Drinking Water Source Protection Plan. Ongoing implementation of the plan will help protect Belmont Sewer District #3's valuable drinking water resources for current and future generations.

Belmont Sewer District #3's drinking water source protection area overlaps the drinking water source protection area of the City of Bellaire. This overlap is shown in Figure 1. Ohio EPA recommends these public water systems work cooperatively together to protect this shared resource.

For further technical assistance on drinking water source protection, please contact the Ohio EPA Southeast District Office at (740) 385-8501, or visit Ohio EPA's Source Water Assessment and Protection Program website at ***epa.ohio.gov/ddagw***.

This report was written by Steve Saines and Ryan Ellis, Ohio EPA, Division of Drinking and Ground Waters, Southeast District Office.

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Table 1. Data Used in Construction of Ground Water Flow Model

Type of Information	Value Used	Source of Information
Pumping rate	4.3 million gallons per day	Plant Capacity, Ohio EPA public drinking water files
Aquifer porosity (sand-and gravel)	20%	Estimated, based on typical porosity of sand and gravel aquifer
Aquifer thickness	24 feet	Data from Layne study, Well logs for area, filed at Ohio Department of Natural Resources, Division of Water
Hydraulic conductivity of aquifer (sand and gravel)	333 - 1100 feet per day	Data from Layne study
Hydraulic conductivity of bedrock (shale)	1 foot per day	Estimated, based on typical porosity of shale
Precipitation recharge	7 to 10 inches per year	From Ohio Department of Natural Resources, 2002, *Ground Water Pollution Potential of Belmont County, Ohio (*digital DRASTIC data)

Table 2. Potential Sources of Contamination Around the Belmont Sewer District #3's Drinking Water Source Protection Area

Potential Contaminant Source	Environmental Concerns	# within the IMZ (Inner Management Zone)	# within the OMZ (Outer Management Zone)
AGRICULTURAL SOURCES			
Agricultural Chemical/Equipment Facilities.	Facilities associated with agricultural chemicals and/or equipment may be a source of leaks or spills.	1	1
MUNICIPAL SOURCES			
Sanitary Sewer Lines	If poorly maintained/operated, may be a source of household and business chemicals and pathogens.	Several	Several
Municipal Garages	May be a source for automotive chemicals and fuel.	1	1
COMMERCIAL SOURCES			
Fleet/Truck/Bus May be Terminals & Railroad automotive Yard/Maintenance Facilities	associated with the potential for leaks and spills of oil, gasoline, other petroleum products, and fluids. Potential for spilled cargo. [3 4]		
INDUSTRIAL SOURCES			
Asphalt/Cement/Concrete Plant	These types of facilities may be associated with emulsifiers, surface water contaminants, and the potential for oil, gasoline, and automotive fluid leaks and spills.	1	1
Electrical Substation	May be a source for oil and PCBs.	1	1
Mines and Mine Waste	Potential source of acid mine drainage, heavy metals and total dissolved solids	1	Multiple

WASTE DISPOSAL SOURCES			
Lagoon/Impoundment: Industrial & Non-Industrial Waste	If poorly maintained/operated, municipal wastewater discharge sites can be sources for nutrients, ammonia, and pathogens. Poorly maintained/operated industrial wastewater discharge sites could contribute various chemicals depending on operation.	1	1
Wastewater Treatment Facilities	If poorly maintained/operated, may be a source of household and business chemicals and pathogens.	Several	Several

Potential Contaminant Source	**Environmental Concerns**	**# within the IMZ** (Inner Management Zone)	**# within the OMZ** (Outer Management Zone)
INFRASTRUCTURE RELATED SOURCES			
Highway / Transportation Route	Accidents on transportation routes pose the threat of leaks and spills of fuels and chemicals. Weed killers used to control vegetation can elevate levels of pesticides in drinking water sources. Runoff may contain oil, metals, and deicers.	Route 7	
Pipelines	Spills and leaks from pipelines the potential to impact drinking water sources, even at small quantities. Condensate in natural gas pipelines may contain PCBs and other chemicals.	One gas pipeline	
GENERAL POINT SOURCES			
Aboveground Storage Tanks	May present a potential for leaks and spills that could impact surface or ground water.	6	6
Non-salt Material Stockpile	May be a source of a variety of chemicals or contaminants depending on material stored and storage method.	7	9
Underground Storage Tanks	If poorly maintained, may be a potential source of leaks and spills for gasoline and other chemicals.	2	3

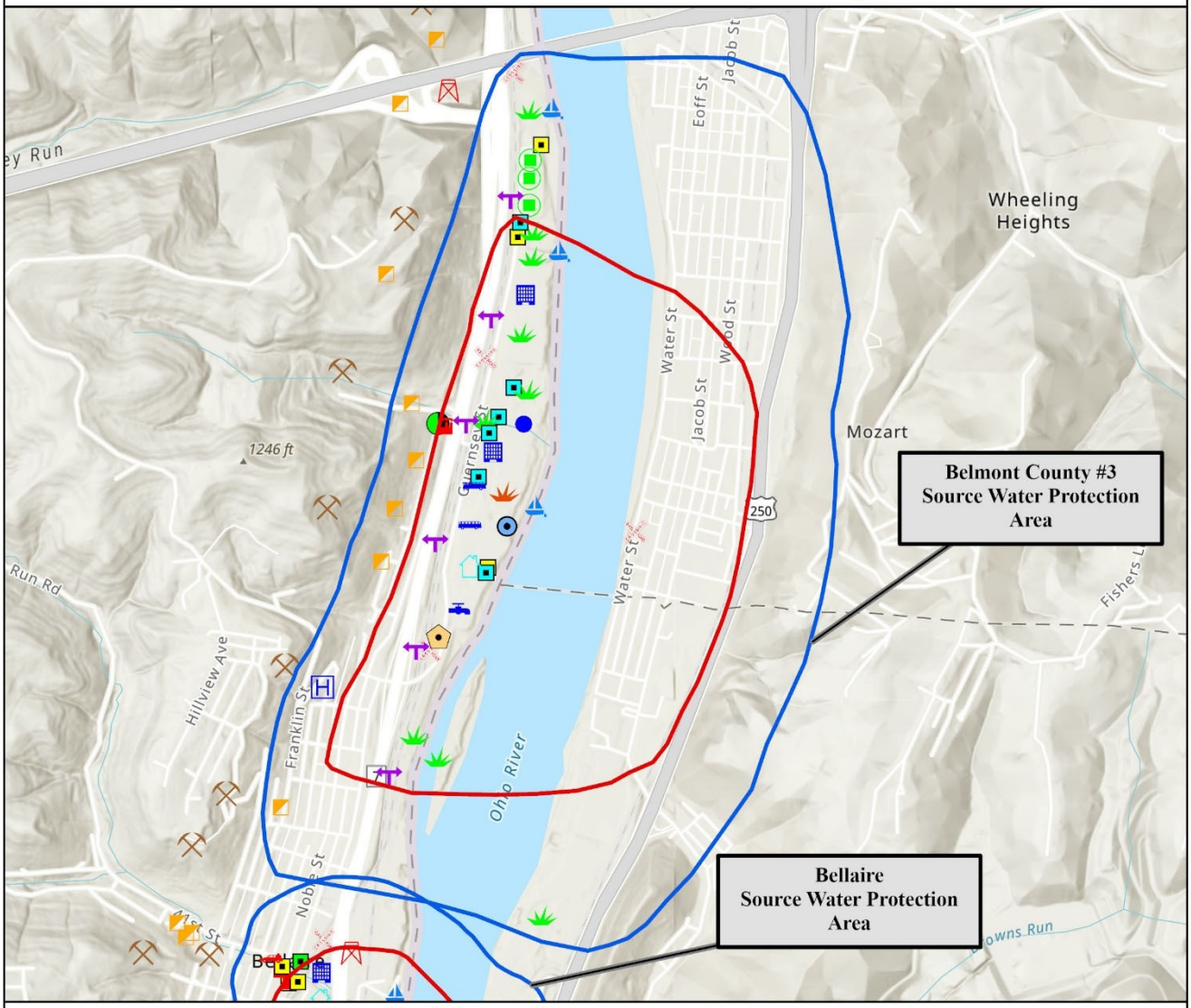
Table 3. Examples of Protective Strategies that Belmont Sewer District #3 may choose to protect their source of drinking water.

Potential Contaminant Source	**Protective Strategies to Consider**
General	• Purchase additional property. • Provide educational material to members of the community on topics regarding the drinking water source protection area. • Include drinking water source protection into the local school curriculum. • Provide education (material/meetings) local businesses and industries on topics relating to drinking water source protection. • Encourage 'ground water friendly' development. • Form partnerships with neighboring jurisdictions and potential contaminant source owners • Develop/enact/enforce a local ordinance which may include any of the following: changing zoning; illegal waste disposal; requiring registration of existing facilities; banning certain new types of activities; dictating chemical handling procedures; maintaining/filing a chemical inventory; facility spill/contingency planning; engineering controls for existing/new facilities; paralleling existing federal or state requirements.
Residential Sources	• Inventory/remove underground home heating oil tanks in the protection area. • Identify areas used for illegal dumping. • Provide education (material/meetings) to homeowners on: drinking water protection; use/maintenance of septic systems; illegal dumping; proper well abandonment (both the reason and the process). • Develop a centralized wastewater collection/treatment system. • Encourage/require (and provide incentives) for sealing unused wells. • Ensure enforcement of existing requirements for closing unused wells. • Ensure the proper construction of new wells.

Municipal Sources	• Monitor compliance with existing regulations through inspections and/or contact with regulatory agencies (such as the local fire department, State Fire Marshal, or the Ohio EPA). • Encourage/arrange hazardous materials training or waste and disposal assessments for employees. • Develop an early release notification system for spills and emergency planning; educate emergency responders to be aware of drinking water protection areas; or coordinate facility spill/contingency planning. • Encourage compliance with materials handling procedures/requirements. Install engineering controls at municipal facilities Implement pollution prevention strategies. • Work with the street department and Ohio DOT to minimize use of road salt. • Evaluate and close fire cisterns or other city owned wells. • Conduct routine sewer inspections, maintenance & upgrades.
Commercial Sources	• Monitor compliance with existing regulations through inspections and/or contact with regulatory agencies. • Use routine inspections as an educational opportunity. • Encourage compliance with materials handling procedures/requirements.
Potential Contaminant Source	**Protective Strategies to Consider**
	• Encourage/arrange hazardous materials training or waste and disposal assessments for local businesses (and their employees). • Request installation of engineering controls for existing facilities. • Encourage facility spill/contingency planning in conjunction with the fire department. • Encourage local businesses to implement pollution prevention strategies.
Industrial Sources	• Monitor compliance with existing regulations through inspections and/or contact with regulatory agencies. • Use routine inspections as an educational opportunity. • Encourage compliance with materials handling procedures/requirements. • Encourage/arrange hazardous materials training or waste and disposal assessments for local industries (and their employees). • Encourage facility spill/contingency planning in conjunction with the fire department. • Request installation of engineering controls for existing facilities. • Encourage local industries to implement pollution prevention strategies. • Encourage compliance with materials handling procedures/requirements. • Encourage/arrange waste and disposal assessments for local businesses.
Oil & gas wells	• Provide education (material/meetings) to owners on maintenance. • Ensure/monitor proper operation and maintenance. • Develop an early release notification system for spills.

Spills	• Develop an early release notification system for spills and an emergency response plan. • Include drinking water protection in response planning and training. • Post signs indicating the extent of the protection area.
Transportation	• Create hazardous materials routes around the protection area and require/encourage transporters to use them. • Work with local transporters on protection area awareness. • Encourage road safety with chemicals. • Post signs indicating the extent of the protection area.

Belmont County Sanitary District #3, PWSID#: OH0700412
Pultney Township, Belmont County



Legend

- Active Wells for Public Water Systems
- Source Water Protection Area
- Inner Management Zone
- Above Ground Storage Tank
- Auto Repair/Body Shop
- Drinking Water Treatment Plant
- Electrical Substation
- Fleet/Truck/Bus Terminal
- Food/Beverage Processing Facility
- Gas Station: Active
- Groundwater Impact
- Hardware/Home Improvement/Lumber Store
- Hospital
- Lagoon/Impoundment: Industrial Waste
- Marina/Boat Dock
- Material Stockpile (not salt)
- Mine Waste (Gob Pile/Tailings)
- Mine: Abandoned
- Mine: Abandoned Entry Point
- Power Plant
- Railroad Yard/Maintenance Facility
- Sanitary Sewer Line
- Underground Storage Tank: Leaking
- Underground Storage Tank: Non-Leaking
- Wastewater Treatment Facility
- Well: Oil & Gas

LOW MODERATE HIGH
AQUIFER SUSCEPTIBILITY

Protection Area Data

Number of Wells = 1 radial collector well
Pumping Rate = 4,349,000 gpd
Porosity = 20%
Aquifer Thickness = 24 feet
Hydrogeologic Setting = Buried Valley
Land Use = Industrial/Residential

Ohio Environmental Protection Agency

Drinking Water Source Protection Area

June 24, 2024

0 300 600 1,200 1,800 2,400 3,000
Feet

Figure 1: Belmont #3 Drinking Water Source Protection Area with Potential Contaminant Sources

Figure 2: GFLOW model setup in 2024 for Belmont Sewer District #3. Multiple well sinks were placed in sequence to simulate the radial collector laterals. Valley walls are modeled as an inhomogeneity region (orange) with lower hydraulic conductivity. Rivers and streams modeled as nearfield line sinks.

Appendix B
Source Water Protection Brochure