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# Source Water Protection Plan

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# EXECUTIVE SUMMARY

In 2002, the Province of Nova Scotia adopted an improved drinking water strategy focusing on municipalities and water utilities. The strategy requires all water utilities to prepare a Source Water Protection Plan (SWPP) to ensure that drinking water supplies remain clean and safe and that all reasonable precautions are taken to protect these sources from contamination.

The Town of Wolfville appointed a committee in the spring of 2005 to initiate source water protection activities. The committee engaged a hydrogeologist to determine the boundary of the Source Water Protection Area, to identify potential contamination risk sites within this area, and to prepare a draft SWPP. The committee reviewed and finalized the plan following two public engagement sessions in 2007.

Since the development of the original SWPP, Wolfville has grown, and new commercial and industrial land uses have developed. As of October 2024, a new municipal well was being developed to supplement the two existing wells that supply the Town's water. The SWPP has been reviewed and updated, providing mapping of the Source Water Protection Area that delineates where source water for the wells is understood to originate. The boundary of this area was updated in 2024 to account for new information and the anticipated effects of the new well. Field reconnaissance was completed to visit risk sites that were identified in 2007, and to identify any new risk sites.

Highlights of the information and recommendations of the SWPP are as follows:

1. Figure 1 shows the outer boundary of the Source Water Protection Area.
2. Figure 2 shows the groundwater time of travel zones and an overview of potential risk sites.
3. The Committee Terms of Reference are provided in Appendix A.
4. Appendix B lists the potential contaminants identified by the committee and their relative risk to the water supply.
5. Appendix C provides an excerpt of the Wolfville Land Use By-Law.

This update to the SWPP is not the end of source water protection initiatives, but rather a continuation of the ongoing process to provide safe clean drinking water to Wolfville.

# 1 Introduction

## 1.1. Clean Safe Drinking Water

Throughout the twentieth century there were numerous outbreaks of disease related to contaminated drinking water in developed countries. Historical incidents of waterborne disease in drinking water in Walkerton, Ontario in 2000 and North Battleford, Saskatchewan in 2001, highlighted the need for increased efforts by water utilities to ensure safe drinking water. Most water utilities now employ the multibarrier approach. The three parts of the multibarrier approach are:

- Keeping clean water clean – source water protection.
- Making it safe – removing contaminants through treatment.
- Proving it's safe – monitoring, testing, and regulatory oversight.

Protecting the quality of water at its source is the most effective and least costly method of ensuring safe drinking water. Once water is contaminated, removal of the contaminants through treatment can be prohibitively expensive. Source water protection is the critical first step to ensure safe drinking water.

## 1.2. Provincial Water Strategy

In 2002 the province adopted a Drinking Water Strategy for Nova Scotia. This strategy reinforced the multibarrier approach and the importance of source water protection. Through regulations and Approvals to Operate, Nova Scotia Environment and Climate Change (NSECC) now requires that all water utilities prepare a Source Water Protection Plan. The Town of Wolfville maintains and updates this Source Water Protection Plan to ensure continued safe drinking water for its customers and to meet regulatory requirements.

## 1.3. Source Water Protection Guide for Municipal Water Supplies

NSECC maintains a Guide for Municipal Water Supplies that outlines a five-step process for development of a Source Water Protection Plan. The Town has completed and continues to update these steps, which are as follows:

1. Form a Source Water Protection Advisory Committee (Updated annually).
2. Delineate the Source Water Protection Area Boundary (Updated 2024).
3. Identify Potential Contaminants and Assess Risks (Updated 2024).
4. Develop and Adopt a Source Water Protection Management Plan (this document, Updated 2024).
5. Monitor and Evaluate the Plan (ongoing).

## 1.4. History of Wolfville Source Water

The development of a central water supply for Wolfville began in 1889 with the acquisition of approximately 600 acres of land on the South Mountain at Forest Hill Road. A dam was constructed on Duncanson Brook to provide a small lake with a reservoir of approximately 33 million gallons of water. This water was piped by gravity under the Gaspereau River to a storage reservoir at the East end of Pleasant Street. Treatment was provided at the Pleasant Street Reservoir site and from there water entered the distribution system. This system was upgraded several times and was retired in 1997.

By 1968 the South Mountain water supply was no longer adequate and suffered from quality issues during the summer. A new groundwater system was therefore developed in 1970. This system consisted of two wells constructed in the glacial sand and gravel aquifer that underlies much of the Town. From 1972 to 1997, the Town was supplied by both the surface water and groundwater. Due to continuing quality issues with the surface water, it was abandoned in 1997, but remains available as a backup supply for emergency situations. In 2006 a third well was drilled in the sand and gravel aquifer, eventually replacing one of the original wells on Wickwire Ave.

The current system is supplied by two wells (located on Cherry Lane and Wickwire Avenue), 40 to 50 m deep, and operated on an alternating cycle at an average rate of ~2400 $m^3$/d. During times of peak water use the wells have shown a proven short-term yield of up to 12,680 $m^3$/d. A third well is scheduled to be added to the system, providing needed redundancy and capable of supporting future growth.

# 2 Source Water Protection Committee

An Advisory Committee, originally appointed by Town Council in the spring of 2005, has met periodically to review, revise, and update source water protection efforts. The Committee has generally included residents of the Town and surrounding County, farmers, business operators, elected officials, system operators, and technical support personnel. The Terms of Reference for the committee is attached as Appendix A, providing a list of current members and a summary of committee duties. The minutes of the regular meetings are maintained on the Town website.

# 3 Source Water Protection Area

Groundwater supplies come from complex and largely undefined underground water storage areas, or aquifers. Water in aquifers begins as rainwater that infiltrates into the ground over a relatively broad land area. Wells in an aquifer can thus capture water that originated over a broad area, referred to as the Source Water Area. The boundary of a Source Water Protection Area defines the land area where water flowing to a well is understood to originate, and potential risks to water quality within this area need to be monitored and mitigated.

Delineation of the Source Water Protection Area requires an understanding of groundwater flow paths, as determined by climate, geology, topography, and patterns of groundwater use. For most municipal systems a computer model is used to create a 3D representation of wells and aquifers, which simulates groundwater flow paths and allows for the best available representation of the Source Water Protection Area. Wolfville's groundwater flow model was created in 2005 and updated in 2024 (CBCL, 2005; CBCL, 2024). The outer boundary of the Wolfville Source Water Protection Area is shown in Figure 1.

The computer model was used to generate a map showing time of travel zones plotted around each of the Town's wells, including the new well to be installed (Figure 2). Each zone represents the average time for water in the aquifer, along with any contaminants in the water, to travel from the edge of the zone to the well. The zones are as follows:

- Well Site Control Zone – the municipal property where the well is located, where land use is limited to water production only.
- Zone A – Up to 2-year travel time to wellhead.
- Zone B – Up to 5-year travel time to wellhead.
- Zone C – Up to 25-year travel time to wellhead.

Zone C (25-year travel time) represents the outer boundary of the Source Water Protection Area and defines the area of consideration for strategies to protect the water supply. Zones A & B delineate zones of the aquifer closer in time to the wellheads, where more stringent protections or monitoring may be needed.

# 4 Risk Assessment

Potential risks to source water depend on land uses that are present in the Source Water Protection Area, and the types of contamination that each land use could produce. The following tasks were updated in 2024:

- An inventory of land uses within the Source Water Protection Area.
- Identification/review of risk sites, based on contaminants that could be associated with each land use.
- Overlay of risk sites with travel-time capture zones (Figure 2).
- Assessment of risk to public health based on:
    - Type of contaminant and related health risk (pathogen [acute], chemical [chronic], aesthetic).
    - Mobility and persistence of contaminant in groundwater compared to time of travel zone.
    - Scope of the activity and likelihood of release.

Prioritization of levels of risk is focused on time of travel zones as follows:

- The Well Site Control Zone is the property where well is located. An arbitrary radius of 60 m and/or a travel time of 90 days can also be used to determine this zone. Efforts are made to limit the use of this area exclusively to the production of water.
- In Zone A the focus is on protecting the water supply from pathogen sources such as sewage and manure storage. Pathogens are treated as a risk within travel times of up to two years and represent an immediate, acute threat to human health.
- In Zone B the focus is on protecting the water supply from petroleum products and similar liquid chemicals. Petroleum products present the highest risk over travel times of less than five years.
- In Zone C contaminants that persist in groundwater (e.g. dry-cleaning fluids) or which travel at the speed of the groundwater (e.g. chloride) can be a threat to the water supply, even with travel times of up to 25 years.

Appendix B provides a summary of risk sites and risk scores. The risk scores provide a relative, qualitative ranking system, determined based on the land use, the types of contaminants that could be associated with the observed land use, the time of travel zone, and the scope of the activity / likelihood of release. Tables B5 and B6 group point sources and non-point sources separately.

**Home Heating Oil Tanks**
Home heating oil tanks located within the Well Site Control Zone, Zone A, and Zone B present a degree of risk to the municipal water supply. A 2005 survey provided an approximate inventory of home heating oil tanks (Figure 2). Although several tanks were confirmed during site reconnaissance work in 2024, a more comprehensive questionnaire would be needed to further update Figure 2. In general, it is anticipated that the risk posed by home heating oil tanks has decreased due to the replacement of older steel tanks with fiberglass tanks, and the conversion of heating systems by some homes to conventional heat pumps (non-groundwater source).

# 5 Management Plan

## 5.1. Management Strategies

The Town shall take all reasonable measures to protect the municipal water supply and keep it safe for current and future drinking water use, as outlined in this Management Plan. The objectives of the plan are generally to:

- Limit new development of high-risk land uses within the Source Water Protection Area.
- Provide controls on land uses and activities that could affect source water.
- Monitor risk sites to reduce the potential for a contaminant release.
- Educate stakeholders and the public as to the value and sensitivity of our groundwater source and what they can do to help keep it safe.
- Maintain an emergency response plan to control and contain the effects of contaminant spills or other incidents.

Options to manage land use and mitigate risk include:

- Acquisition of land.
- Designation as a Protected Water Area (PWA), under the Environment Act.
- Land Use By-laws and Municipal Planning.
- Best management practices (BMPs).
- Education and stewardship.
- Emergency / Contingency Response.

**Acquisition of Land**: The acquisition of land by the Town of Wolfville gives direct ownership and control of portions of the Source Water Protection Area to the Town. This allows for a high level of control over land uses and activities. Due to cost this activity is generally limited to the Well Site Control Zone(s) but may be extended to other high-risk areas if and as needed.

**Designation of Protected Water Area**: The Nova Scotia Environment Act (Section 106) permits the designation of an area surrounding a drinking water source as a *Protected Water Area* (PWA). The Town may request that the Wolfville Source Water Protection Area be designated as a PWA by providing the following information to the province:

- A detailed description of the area to be protected (i.e. updated mapping of the Source Water Protection Area).
- A list of regulations required to control or prohibit activities or development which may harm water quality. The proposed regulations would typically be developed to mitigate the specific risks as identified in Appendix B.

PWAs allow for prohibition of existing land uses, and for the designation of a Compliance Officer, empowered to inspect properties and issue fines.

**Land Use By-law**: Municipal By-laws may be used to restrict land uses and activities and are usually focused on future development. This is intended to lead to a long-term reduction in risk, as fewer high-risk activities will be present in zones closest to municipal wells. In most cases existing developments that do not satisfy the intended land uses are identified and categorized as 'non-conforming'. Non-conforming land uses present a risk to source water and must be addressed through Risk Assessment, Education & Stewardship, Monitoring, and Contingency Planning. The risk sites in Figure 2 and Appendix B represent non-conforming land uses.

**Best Management Practices (BMPs)**: These standardized and widely accepted practices for activities and products are an accessible and practical means of reducing risk. BMPs can be applied to various aspects of residential development, including septic system and oil tank installation and maintenance, and construction activities. Agricultural operations can employ BMPs that are specifically designed to protect water quality. BMPs are also available for many industrial products, services, and activities related to motorized recreation and transportation. BMPs can be encouraged through education and stewardship.

**Education and Stewardship Initiatives**: Education of landowners and businesses is intended to encourage voluntary personal stewardship of a publicly shared resource. Each landowner needs to be aware of the zone their property is in, and the kinds of activities that can be a risk to source water in that zone. For homeowners this can take the form of responsible storage of liquid chemicals and fuels, inspection and upkeep of home heating oil tanks, and limiting the use of household products such as pesticides and de-icing salt. In the case of non-conforming businesses, the owner will need to be provided with a targeted list of BMPs, mitigation measures, and an emergency contact in case of an accidental release.

This approach benefits from low cost and the lowest level of restriction to landowners but depends on continuous work and updates by the SWP committee to provide compelling educational materials, and to reach stakeholders either by direct contact or through public forums. Education should include feedback to landowners based on the committee's monitoring activities.

Options for education include public meetings, social media, signage, mailouts, and direct engagement with owners and occupants of the highest-risk parcels.

**Monitoring and Emergency / Contingency Response**: Monitoring is a means of ensuring that risks are being mitigated to the greatest possible extent, and to determine whether risks have changed over time. In most SWPPs monitoring is limited to windshield surveys of land uses and infrastructure, and communication with property owners. In some circumstances the utility may establish monitoring wells and collect water samples from high-risk areas. A Monitoring Plan is described in Section 6.

The utility's routine sampling of raw water produced by the municipal wells, although critical for day-to-day operation and quality assurance, is not a part of source water protection monitoring, as it does not provide protection to the broader source water area for the well.

Contingency plans identify personnel, testing equipment, procedures, and materials that can be used to mitigate or correct incidents which threaten the water supply. The most common threat is the spill of a hazardous substance that could enter the water supply. An Emergency Contingency Plan is described in Section 7.

## 5.2. Management Initiatives

The Committee will review, on an annual basis, specific activities to be completed for the coming year. Ideally this review will identify specific activities or actions that will be completed by the Committee members, Town staff, or through engagement of a third party. The intent of these activities is to ensure sustained and ongoing work to actively engage stakeholders, and to monitor activities in the Source Water Protection Area. Example topics for review are provided below.

**Signage**: All existing home heating fuel tanks within Zone B could be tagged / labelled to remind both the homeowner and the fuel delivery service, that the tank is located within a Source Water Protection Area and that care must be taken and spills reported to the Emergency Response Team, in addition to NSECC. Contact information for reporting of spills would be included.

**Public Information**: The water utility / Committee should issue, on a regular basis, reminders via social media or other platform of Source Water Protection issues. Topics may include a reminder of the Source Water Protection zones, best management practices, the high cost of locating and maintaining a pristine water source, and the importance of shared stewardship and ownership of the resource. Education focuses on a voluntary 'Best Management' approach, which outlines ways that residents can help to protect the community's aquifer.

The public were engaged at two critical points in the development of the original plan. The first was at a Public Information/Input meeting on January 23, 2007. Approximately 30 members of the public attended this meeting which provided information about the Wolfville Water Supply and the work to date of the Source Water Protection Committee in identifying risks to the source water and the methods under consideration for mitigating these risks. This meeting was advertised in the community through newspaper ads, posters and a water bill insert.

The second public meeting was held October 10, 2007. At this meeting the draft management plan was presented to obtain public input and feedback on the recommended management strategies.

**Targeted Information and Cooperative Agreements**: Relationships between the municipality and businesses should be established to encourage future cooperation in management and monitoring. Communication with businesses could include:

- Making owners and operators aware of the zone of the SWPA in which they reside.
- Informing owners and operators about risks their operations pose to source water in Wolfville, and steps to limit these risks (e.g. regular inspection and protection of fuel storage tanks).
- Working with owners and operators to phase out potential sources of contamination in their operations, if possible.

**Wolfville Land Use By-Law**: Section 5.2 of the Wolfville Land Use By-law (LUB) is provided in Appendix C. Updated in 2020, the LUB includes the source water protection zones as defined in 2005, and the recommended restrictions on development described in the original SWPP. The LUB should be updated at the next available opportunity to show the new zones as delineated through updated groundwater modelling in 2024.

Highlights of source water protection measures covered by the LUB as of 2020 are as follows:

- In the Wellhead Constraint Area (=Well Site Control Zone), land uses are limited to public parkland and uses relating of operation of the town water system. Existing residential uses, including home heating oil storage, are permitted as non-conforming uses.
- In Zones A and B, land uses such as bulk/commercial storage of chemicals, salt, fuel, and manure are prohibited, as are operation of dry-cleaning facilities, gas stations, automotive painting/service, salvage yards, and commercial nurseries.
- In Zone C bulk/commercial storage of manure and fertilizers are permitted, as is salt storage below 100 tonnes.

As infill development proceeds, there will be opportunities to work with Planning staff to update the by-law further. Example topics for discussion include:

- Prohibiting the installation of new steel home heating oil tanks within Zone B.
- A requirement for secondary containment of home heating oil tanks within Zone B.
- No new fueling stations within Zone B
- Prohibition of dry-cleaning facilities within the Source Water Protection Area.
- Third party inspection and reporting on fuel tanks within Zone A.

**Alternative Deicing Products**: The municipality current limits road salt use on municipal surfaces, in areas closest to the well heads. The water utility should engage Nova Scotia Transportation and Public Works in discussions toward the use of alternate products which may be used on provincial routes, and to confirm / monitor the use of best management practices to reduce the quantities of road salt used.

**Abandoned Wells**: Abandoned wells located within the protection area should be identified, fully decommissioned, and professionally sealed, to prevent surface runoff from entering them. The NS Water Well Regulation requires that an official record of decommissioning be provided to NSECC. New wells that are constructed within the Source Water Protection Area should be added to the risk tables, with notification of the owner and regular inspection of the well head and cap. The committee has recommended updated inspections of Zones A and B in 2025-2026 to identify any unused wells. If abandoned wells are identified, measures should be taken to decommission these wells according to the provincial regulations. This work should include a follow-up inspection of the property at 654 Main Street to determine if the abandoned well, identified by work in 2007, was properly decommissioned.

**Sewer Line Maintenance/Upgrades**: Leaking sewer lines have the potential to introduce pathogens into adjacent groundwater. The most recent complete inspection program was concluded in 2011, and as such, the system is due for an updated inspection of areas in Zones A and B. As of 2024, there are parallel efforts in progress by the Public Works department as a matter of ongoing and routine maintenance.

**Saltwater Intrusion Monitoring**: The committee has confirmed a need to install a new monitoring well between the Cherry Lane well and the coastline. This well should be instrumented with an automated sensor capable of measuring and recording the water level, temperature, and electrical conductivity of the water in the well. The data are to be reviewed annually by engineering staff or a contracted third party.

**Home Heating Oil Tank Inspections / Survey**: The committee has identified a need to complete an updated survey of existing homes in Zones A and B that have heating oil tanks. To the extent possible, the survey should identify the locations of tanks beginning with a windshield survey and inspection of high-resolution aerial imagery. A follow-up mail-out survey may be needed. Future committee discussions are needed to determine if Council can support a tank replacement program for aging steel tanks.

**Kings County Land Use By-Law**: Zone C intersects areas outside of the town, under the jurisdiction of the County. The Committee recommends initiation of work to incorporate the restrictions of the Wolfville LUB concerning Zone C into the County LUB.

# 6 Monitoring Plan

## 6.1. Purpose

The purpose of the monitoring plan is to ensure that:

- The status and health of the Source Water Protection area are evaluated.
- Potential risks are identified and updated.
- Owners and operators are notified of specific high-risk activities and associated BMPs.
- The plan is adapted to changing conditions and priorities in the Source Water Protection Area.

## 6.2. Water Quality Monitoring

Parameters to be monitored reflect the types of potential contaminants that are listed in Appendix B. Parameters to be monitored include contaminants such as pesticides, and parameters that are inexpensive to monitor, such as conductance or pH, which are indicators of potential contamination.

Monitoring of water quality in source water zones of the aquifer can provide an early indication of contaminants that may be migrating toward the well heads. There are currently two monitoring wells available, each adjacent to the existing production wells on Wickwire Avenue and Cherry Lane. As these wells are located within Zone A, a detection of a contaminant of concern would represent a high risk, as the travel time to the well would be less than two years.

The following parameters should be sampled annually:

- General Chemistry (major ions and physical parameters).
- Trace Metals and fluoride (filtered samples).
- Volatile Organic Compounds (VOCs).

Additionally, the following parameters should be sampled every five years:

- Petroleum Hydrocarbons (TPH).
- Semi-volatile organic compounds (SVOCs).
- Polycyclic Aromatic Hydrocarbons (PAHs).
- Pesticides (organophosphate and organochlorine).
- Polychlorinated biphenyls (PCBs).
- Mercury.

Recognized and established protocols for the collection of water quality samples from monitoring wells will be followed and will be conducted by qualified operators of the water utility. Baseline data is available for many of the testing parameters and will be used as comparison over time to identify changes in the raw water quality.

## 6.3. Inspection of High-Risk Sites

The sites listed in Appendix B should be reviewed on an annual basis, focusing on any changes to the risks they may pose. This can involve a visual inspection of above ground storage tanks or visual changes in site activity, via 'windshield' drive-by observations, or through a cooperative agreement with the property owner.

Inspection should also focus on identifying any changes in general land use across the Source Water Protection Area. Figure 2 and Table B5, as updated from time to time, should be consulted to ensure that no new land uses are being developed in contravention of Town By-laws. Observable activities that could impact groundwater quality include:

- Dumping.
- Road salting.
- Manure storage.
- Mismanagement of industrial waste, liquid waste.
- Outhouses, overfilled septic tanks, failing septic fields.
- Unauthorized use of motor vehicles or maintenance / autobody work.
- Deteriorating SWPA boundary signage.
- Unauthorized camping or burning.
- Unauthorized or excessive use of pesticide / biocide.
- Unused wells / poor cap or casing condition.

An inspection report should follow, noting observations and follow up actions. If inspections identify an issue on a property, the SWP Committee or water utility should contact the landowner to discuss the issue and mitigation needed to protect the community's source water. As a part of this activity the landowner should be informed of the relevant SWP zone, relative risk as identified by the Committee, and BMPs needed to mitigate the risk.

## 6.4. Saltwater Intrusion

Municipal wells that are located near the coastline have the potential to be affected by saltwater, if over-pumping occurs. In these settings the constant flow and pressure of fresh groundwater from the aquifer to the coastline prevents the inflow of salt water. Over-pumping disrupts and reverses this flow and can lead to saltwater intrusion. As the Wolfville aquifer is adjacent to the tidal Minas Basin, monitoring is needed to ensure that over-pumping does not lead to saltwater intrusion.

During the 55 years of testing and use of the existing wells, there has been no indication of saltwater intrusion into the aquifer.

The utility currently monitors daily water withdrawals and water levels in each of the wells. By installing a third monitoring well between the Cherry Lane well and the coastline, adjacent to the coastal trail, the utility would gain a third water quality monitoring location. The salinity of water in this type of well would typically be monitored using an automated sensor capable of measuring the water level, temperature, and electrical conductivity.

# 7 Emergency Response Plan

## 7.1. Purpose

The purpose of the Emergency Response Plan is to reduce the potential for a spill or other incident (e.g. release of pathogens, power outage, failure of well casing/surface seals/flooding) to contaminate source water. A typical plan defines a predetermined set of actions and communications to be initiated after the occurrence of an incident or spill. The emergency response plan includes the contact information for key personnel and other resources, and information on the availability of specialized equipment and services.

## 7.2. Response Team Leader

The Response Team Leader will act on behalf of the Town and will work to protect the interests of the water utility. The authority of the Response Team Leader, in the context of this plan, is limited to the geographic area of the Wolfville Source Water Protection Area. The Response Team Leader shall:

- Have the authority to commit personnel, municipal resources, and budget that may be required.
- Manage and direct the use of resources and coordinate activities.
- Make decisions on behalf of the utility and the Town.
- Ensure the collection of samples of the spilled contaminant.
- Prepare and submit a report detailing the response, when necessary.
- Be responsible for all communication with government personnel.
- Work collaboratively with the lead response agency.

The Response Team Leader must be familiar with the following:

- Equipment and expertise available from local sources.
- Safety requirements in handling spilled contaminants, including use of protective clothing and necessary handling procedures.
- The following Acts:
    - Emergency Management Act (1990).
    - Environment Act (1994-95).
    - Transportation of Dangerous Goods Act (1989).

Unless otherwise specified the default Response Team Leader shall be the Town Director of Engineering and Public Works.

## 7.3. Notification

The first step following the identification of a spill is the notification of groups critical in the execution of the plan. The notification procedures outlined in this plan will be operational 24 hours per day. The plan lists the contact information for agencies and groups that must be contacted.

Local fire departments, RCMP, provincial government, and municipal employees must report any incidents that involve the release of dangerous goods or hazardous wastes anywhere within the boundaries of the Wolfville Source Water Protection Area. In general, the fire department will be the lead agency in coordinating a response to a release of dangerous goods or hazardous wastes.

In the event of an emergency, the following departments or individuals should be contacted:

- Police/Fire – 911.
- Response Team Leader [Alex de Sousa]: (902) 599-2270.
- Town Clerk: (902) 542-5767.
- NS Department of Environment & Climate Change: (902) 679-6086.
- NS Department of Public Works (as needed): (902) 679-6122.

The following resources are available and may be needed:

- CANUTEC: (613) 996-6666.
- Natural Resources and Renewables: (902) 679-6097.
- Federal Department of Environment emergency event number - (800) 565-1633.
- Environmental Consulting Firm.

Callers should be prepared to report the following:

- Location of the spill.
- Source of the spill.
- The substance, if known, and the amount.
- Time of the spill.

## 7.4. Spill Response

Observations of potential contaminants or any foreign substance spilling directly into the ground, or any tributary streams should be reported to the Town at the number(s) above. Reporting such an incident is necessary regardless of the estimated volume of the discharge. The Emergency Response Team Leader is always responsible for the response of the Town and the Wolfville water utility and coordinating efforts with the lead response agency.

An oil or gasoline slick should not be flushed into ditches, watercourses, or storm sewers. Every attempt should be made to contain spilled substances and recover them before they can enter any watercourse or sewer system. Excavation of contaminated material should begin as soon as possible. Official reports of spills and accidents will include detail on the key watercourses to be monitored including catch basins, culverts, streams, and tributaries. In the case of vehicle related accidents, attendance to accident victims and fires will take precedence over environmental considerations.

Almost all hazardous material spills and fires are dangerous. For this reason, safety should be the primary concern.

The general response guidelines for oil spills also applies to hazardous materials. The 2024 North American Emergency Response Guidebook describes actions to be taken by first responders during the initial phase of a hazardous materials or dangerous goods incident. The publication is available from CANUTEC (Canadian Transportation Emergency Centre) and includes emergency information on hundreds of chemicals. Operated by Transport Canada, CANUTEC seeks to be of service to Canadians who need and request help in case of transportation and non-related accidents involving dangerous goods.

## 7.5. Containment and Cleanup Procedures

The intent of this plan is to present common-sense guidelines for responding to a variety of possible scenarios. Rapid and effective containment is critical as it limits the spread of the source material and improves the ability to recover the substance from the spill area before contaminants area able to escape into environmental systems. This leads to a significantly reduced threat to human and ecological health and reduces the scope and cost of clean-up.

Techniques to contain a spill vary according to the nature of the contaminant and the spill environment.

### 7.5.1. Containment on Land

Many spills occur on land. Whenever possible, containment on land is preferred over permitting the contaminant to migrate to a water source.

- The flow of escaped contaminants should be intercepted, whenever possible, to reduce the extent of contamination and the cost and magnitude of cleanup.
- Open drains containing water can be blocked with soil dams or weirs.
- Once the flow of contaminants has been stopped, the dam or weir should be monitored to ensure against backup to adjacent dwellings or residences.
- Contaminated material must be excavated and trucked away to an approved site as soon as possible.

### 7.5.2. Containment on Water

Practical containment measures for small streams include use of an earthen dam and a water barrier. A barrier can be installed to prevent the spread of product on a small waterway. This simple barrier, using snow fencing and hay bales, should run at an angle of at least 30 degrees to normal to facilitate the collection. Booms and floating absorbents may be appropriate for larger water bodies.

### 7.5.3. Site Restoration

If site restoration is necessary, qualified personnel would need to be retained to work with NSECC to restore the site to its prior condition or to an acceptable condition. All contaminated soil would need to be removed from the site and brought to an approved location to be stored or treated. In select circumstances residual soil contamination can be treated on-site.

Every attempt will be made to ensure that the affected site is restored so that it can safely be used for the same purposes as it was prior to the incident. In the case of a spill of a carcinogenic chemical, asphalted areas will be broken up and trucked away to a designated disposal site, and new asphalt will be laid. All such areas will be clearly secured until such a time as rehabilitation is complete.

It will be necessary to remove and replace contaminated soil. Care must be taken to remove only the earthen material that has been subjected to the contamination. Excavation precautions are particularly important when using mechanical equipment to ensure that underground infrastructure, such as that related to communication, gas, natural gas, oil, power, sewer, or water are not damaged or dislodged.

Severely eroded areas will be properly prepared and seeded, depending on the time of the year. In the case where planting is not possible, temporary diversion terraces or other acceptable forms of temporary surface cover, such as geo-textile filter fabric, straw, or temporary matting, will be used to minimize further erosion and sediment loading into water courses.

### 7.5.4. Disposal

Under no circumstances will contaminated materials remain within the watershed area. All contaminated materials will be placed and transported in closed and secure containers and taken to an approved disposal site.

Prior to relocation of the closed and secure containers, approvals must be obtained from NSECC and the NS Department of Public Works. In addition, notification of the intention to transport the contaminated material out of the area, including the destination, mode of transportation, and planned travel route, must be provided by the transportation company to:

- Local fire department(s).
- The RCMP.
- The Response Team Leader.

### 7.5.5. Equipment and Resources

The inventory of heavy equipment owned by the Town may not be adequate to manage a spill. Therefore, the following list of qualified and certified prospective contractors and municipal units has been assembled to provide equipment of varying sizes and payload:

- G.K. Morse & Sons Transport Limited.
- Howard Little Excavating.
- Mid Valley Construction (1997) Limited.
- Municipality of Kings.
- Town of Kentville.

Equipment required may include:

- 1 Ton Trucks.
- 3 Ton Trucks.
- Backhoes.
- Dump Trucks.
- Graders.
- Sewer Cleaner.
- Small Excavator.
- Street Sweeper.
- Vacuum Truck.

## 7.6. Public Relations and Reporting

The Town will advise all residents and property owners in the Source Water Protection Area what action to take, should an incident or event occur, which presents a risk to the aquifers used by the utility.

If an incident attracts public interest, the Response Team Leader will serve as the spokesperson and should be familiar with this plan and be prepared to enact the prescribed format for media relations during an emergency. Such events of public interest may include accidents, chemical leaks or spills, explosions, fire, or any situation that may be damaging to water quality. The Town will use every means possible to notify the public and keep them informed of the situation and the remedial action being undertaken. All official communication will be channeled through the Response Team Leader and may take the form of news releases, radio, public meetings, or social media.

The Response Team Leader will provide, upon request, a detailed report of the incident to NSECC.


## Legend

- Source Water Protection Area
- Municipal Well
- Geothermal Well
- Monitoring Well
- Future Well
- Gravel Aquifer
- Town Boundary

**FIGURE 1**

**Source Water Protection Area**

**Town of Wolfville Source Water Protection Plan**

N W E S

0 250 500 m

Coordinate System: NAD 1983 UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983
Scale 1:20,000
when printed @ 11 x 17

CBCL

## Legend

- Geothermal Wells (Acadia University)
- Municipal Wells (Town of Wolfville)
- Future Well
- Risk Site
- Exclusion zone
- Zone A (3 wells)
- Zone B (3 wells)
- Zone C and boundary of SWPA

| Map Number | Potential Contamination Source |
|---|---|
| 1 | Private Wells |
| 2 | Irving Gas Station |
| 3 | Sterling Farms |
| 4 | Home Heating Oil Tank |
| 5 | Landmark East School - Lab Chemicals |
| 6 | Oil Spills from Past |
| 7 | Former Dyke Salvage Yard |
| 8 | Home Heating Propane Tanks |
| 9 | Former Dry Cleaning Shop |
| 10 | Former Juice Plant |
| 11 | Pesticides |
| 12 | Abandoned Well (Wickwire #1) |
| 13 | Construction Material Dumping |
| 14 | Wickwire Assisted Living Complex - Above Ground Fuel |
| 15 | Wolfville Children's Centre - Heating Oil |
| 16 | EKM Health Centre - Diesel and Furnace Oil |
| 17 | Acadia Sciences Building (Chemicals) |
| 18 | Acadia Pool |
| 19 | Natural Gas Storage Facility |
| 20 | Salt Storage |
| 21 | Acadia Heating Plant Fuel |
| 22 | Acadia Services Building (Garage) |
| 23 | Public Works - Above Ground Gas and Diesel Tank |
| 24 | Cemetary |
| 25 | Acadia Fuel Tank |
| 26 | Wolfville School Fuel Storage |
| 27 | Fire Hall |
| 28 | Laundromat |
| 29 | Blomidon Nursuries |

**FIGURE 2**

**Risk Sites**

**Town of Wolfville Source Water Protection Plan**

N W E S

0 150 300 m

Coordinate System: NAD 1983 UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983
Scale 1:12,000
when printed @ 11 x 17

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# APPENDIX A

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A cultivated experience for the mind, body, and soil.

# Source Water Protection Committee
# Terms of Reference

## Update Log

To be updated following any amendments made to the Terms of Reference by the Source Water Protection Committee.

| Resolution Date | Changes Made |
|---|---|
| October 2024 | Updates to TOR Text |
| October 2024 | Updates to SWPP Text, WHPA, Time of Travel Zones, Risk Sites |
| 2007 | First draft of SWPP |
| | |

## 1.0 Purpose

As a part of the multi-barrier approach to ensuring clean, safe drinking water, the Wolfville Utility has developed and maintains a Source Water Protection Plan to ensure that the source water remains clean. Guided by the Source Water Protection Plan, the objective of the Source Water Protection Advisory Committee (the Committee) is to provide the Water Utility with advice that will attempt to satisfy the water quality and quantity concerns of stakeholders. The Committee's activities will focus on known or potential sources of contamination in the source water supply area, the management options that are available and that are currently being used, and regular updates on the progress / success of the Plan.

## 2.0 Duties

The Source Water Protection Committee Shall:

- Review and be familiar with the Source Water Protection Plan (SWPP).
- Discuss and update Management Strategies, as identified in the SWPP.
- Discuss risk sites and mitigation measures at Committee Meetings.
- Prepare educational materials and disseminate information to stakeholders.
- Appoint member(s) or external resources to complete and report on monitoring activities.
- Review and respond to incidents within the Source Water Protection Area.
- Complete or commission reviews and updates to the SWPP as needed.
- Provide regular reporting and/or requests to Council.

## 3.0 Committee Members

The Committee shall be composed of stakeholders of the Wolfville Water System and the Source Water Protection Area. Membership of the Advisory Committee shall reflect the broad spectrum of landowners, interested groups and government officials that have a stake in the monitoring of the Plan. As the protection zones extend outside of the Municipal boundary into Kings County, representatives from the County will participate on the Committee.

The members of the Committee shall be appointed by the Town of Wolfville and shall consist of the following seven (7) voting members, who serve without pay:

- The Town Mayor.
- Two (2) members of the Municipal Council.
- One (1) member of the Municipality of the County of Kings.

- One (1) member of Acadia University.
- Two (2) members at large from the Town of Wolfville (two-year term).
- One (1) member at large from the County of Kings (two-year term).

Non-voting members shall include:

- The Town Clerk, who shall also serve as the Recording Secretary.
- The Director of Engineering and Public Works, Town of Wolfville.
- One representative of the Nova Scotia Department of the Environment and Climate Change.
- Planning Staff, County of Kings.
- Consultant.
- Other resources as needed (e.g. engineer or geoscientist)

Any member of the Committee is eligible for reappointment. A vacancy on the Committee shall be filled at the earliest possible opportunity and that appointment shall serve the remainder of the term of the office of the member being replaced.

## 4.0 Operating Procedures

The following operating procedures shall apply:

- The committee shall meet quarterly.
- Meetings are open to the public.
- A majority of the voting members of the Committee constitutes a quorum.
- Committee business will endeavor to be conducted by a consensus-based approach to its decision making.
- If unable to attain a consensus on an issue, the Chair may put a matter to a vote if it is deemed that a consensus is not achievable. Each voting member is entitled to one (1) vote and decisions shall be majority vote of those present. In the event of a tie, the matter is defeated.
- Minutes of all meetings shall be posted on the Town website.
- No voting member may abstain from voting, except for the purposes of a declared Conflict of Interest.
- The Committee may appoint sub-committees to deal with any special matters coming within the powers and jurisdiction of the Committee.

## 5.0 Schedule

| Schedule Item | Frequency | Next Update |
|---|---|---|
| Committee Meetings | Quarterly | |
| TOR Review and Acceptance | Annually | |
| Review and Discussion of top 10 Risk Sites | Annually | |
| Review and Documentation of Prior Years Activities | Annually | |
| Review and Documentation of Upcoming Year's Activities | Annually | |
| Detailed Review and Update of the TOR | 5 Years | 2030 |
| Review and Discussion of SWPP Approach (PWA, By-Laws, Land Use Planning, Education & Agreements) | 5 Years | 2030 |
| Peer Review of SWPP and Risk Tables | 10 Years | 2035 |
| Review and Update of Recommended By-Laws to Council | 10 Years | 2035 |
| Review and Update of Recommendations to Planning Document and Policies | 10 Years | 2035 |
| Detailed Update of Numerical Model and SWPP | 20 Years | 2045 |

# APPENDIX B

**Table B1 - Contaminant Mobility**

| Mobility Index | Risk | Description |
|---|---|---|
| 3 | Low | Substance degrades readily or is filtered by aquifer material |
| 4 | Moderate | The substance is moderately attenuated by aquifer material |
| 5 | High | Substance moves at groundwater velocity |

**Table B2 - Zone Index**

| Zone Index | Risk | Description |
|---|---|---|
| 1 | Very high | Exclusion Zone |
| 2 | High | 2-Year ToT |
| 3 | Moderate | 5-Year ToT |
| 4 | Low | 25-Year ToT |

**Table B3 - Human Toxicity**

| Human Toxicity Index | Risk | Description |
|---|---|---|
| 1 | Low | Aesthetic/ nuisance concern |
| 2 | Moderate | Health-related parameter with chronic toxicity |
| 3 | High | Acute pathogen health risk |

**Table B6 - Likelihood of Release**

| Human Toxicity Index | Risk | Description |
|---|---|---|
| 1 | Low | Static or infrequent use, used in small quantities, effectively controlled and contained |
| 2 | Moderate | More frequent use, larger quantities, some potential for accidental spill |
| 3 | High | High frequency of use, large quantities, high potential for spill or known releases in the past |

**Table B5. Calculated Risk Scores**

| Risk Site – Point Sources | Contaminant | Mobility Index | Toxicity Index | Likelihood of Release | Zone Index | | | | Risk Score | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Exclusion Zone | A 2yr | B 5yr | C 25yr | Exclusion Zone | A 2yr | B 5yr | C 25yr |
| | | 3-5 | 1-3 | 1-3 | 1 | 2 | 3 | 4 | 0-21 | | | |
| Acadia Heating Fuel | Fuel Oil | 4 | 2 | 2 | | | | 4 | | | | 4 |
| Public Works Fuel Storage | Fuel Oil | 4 | 2 | 2 | | | | 4 | | | | 4 |
| EKM Diesel Fuel | Fuel Oil | 4 | 2 | 2 | | | | 4 | | | | 4 |
| Transportation Corridor–Highway 1 | Gasoline | 4 | 2 | 1 | 1 | 2 | 3 | 4 | 8 | 6 | 4 | 2 |
| Abandoned Wells | Any | 5 | 3 | 1 | 1 | | | | 15 | | | |
| Acadia Injector Well | Warm Water | 5 | 1 | 1 | | | | 4 | | | | 2 |
| Acadia Physical Plant Fuel | Fuel Oil | 4 | 2 | 2 | | | | 4 | | | | 4 |
| Acadia Science Chemicals | Organic Solvents | 4 | 2 | 1 | | | 3 | | | | 4 | |
| Acadia Physical Plant Vehicle Storage | Gasoline, Oil | 4 | 2 | 2 | | | | 4 | | | | 4 |
| Wolfville Nursing Home Fuel | Fuel Oil | 4 | 2 | 2 | 1 | | | | 10 | | | |
| Land Mark East Chemicals and Fuel | Fuel Oil | 4 | 2 | 2 | 1 | | | | 10 | | | |
| Public Works Salt Storage | Salt | 5 | 1 | 3 | | | | 4 | | | | 4 |
| Former Dike Salvage Yard | Metals, Fuel | 4 | 2 | 3 | | | | 4 | | | | 6 |
| Former Dry Cleaner | DNAPL, Vinyl Chloride | 5 | 2 | 3 | | 2 | | | | 12 | | |
| Funeral Home | Embalming Fluids | 4 | 2 | 1 | | | 3 | | | | 4 | |
| Cemetery | Nutrients | 5 | 2 | 1 | | | | 4 | | | | 4 |
| Cemetery | Pathogens | 3 | 3 | 1 | | | | 4 | | | | 0 |
| Assisted Living Complex | Fuel Oil | 4 | 2 | 2 | | 2 | | | | 8 | | |
| Abandoned Service Stations | Gasoline | 4 | 2 | 2 | | | 3 | 4 | | | 6 | 4 |
| Wolfville School Fuel Storage | Fuel Oil | 4 | 2 | 2 | | | | 4 | | | | 4 |
| Sterling Farms Distribution Facility | Fuel Oil, Pesticides | 4 | 2 | 1 | | | 3 | | | | 4 | |
| Fire Department | Foam, PFAS | 5 | 2 | 1 | | | | 4 | | | | 4 |
| Irving Gas Station | Gasoline | 4 | 2 | 2 | | | | 4 | | | | 4 |

**Risk Ranking**: **16-21: Very High Risk  11-15: High Risk  6-10: Medium Risk  0-5: Low Risk**

**Table B5 (Cont'd). Calculated Risk Scores**

| Risk Site – Non-Point Sources | Contaminant | Mobility Index | Toxicity Index | Likelihood of Release | Zone Index | | | | Risk Score | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Exclusion Zone | A 2yr | B 5yr | C 25yr | Exclusion Zone | A 2yr | B 5yr | C 25yr |
| | | 3-5 | 1-3 | 1-3 | 1 | 2 | 3 | 4 | 0-21 | | | |
| Road Salt | Salt | 5 | 1 | 3 | 1 | 2 | 3 | 4 | 7 | 6 | 5 | 4 |
| Agriculture | Pesticides | 4 | 2 | 3 | | 2 | 3 | 4 | | 10 | 8 | 6 |
| Agriculture | Fertilizers | 5 | 2 | 3 | | 2 | 3 | 4 | | 12 | 10 | 8 |
| Septic Systems | Nutrients | 5 | 2 | 3 | | 2 | 3 | 4 | | 12 | 10 | 8 |
| Septic Systems | Pathogens | 3 | 3 | 1 | | 2 | 3 | 4 | | 6 | 3 | 0 |
| Cleaning Agents | Organic Solvents | 4 | 2 | 1 | 1 | 2 | 3 | 4 | 8 | 6 | 4 | 2 |
| Heat Pumps (Geothermal Wells) | Warm Water | 5 | 1 | 1 | | 2 | 3 | 4 | | 4 | 3 | 2 |
| Heating Oil Tanks | Fuel Oil | 4 | 2 | 2 | 1 | 2 | 3 | 4 | 10 | 8 | 6 | 4 |
| Brine Pumping | Salt | 5 | 1 | 1 | | | 3 | 4 | | | 3 | 2 |
| Transportation Corridors | Gasoline | 4 | 2 | 1 | 1 | 2 | 3 | 4 | 8 | 6 | 4 | 2 |
| Manure | Pathogens | 3 | 3 | 3 | | | 3 | 4 | | | 9 | 6 |
| Compost Storage | Pathogens | 3 | 3 | 2 | | | 3 | 4 | | | 6 | 3 |
| Compost Storage | Nutrients | 5 | 2 | 3 | | | 3 | 4 | | | 10 | 8 |
| Municipal Sanitary and Storm Sewer | Pathogens | 3 | 3 | 1 | 1 | 2 | 3 | 4 | 9 | 6 | 3 | 0 |
| Private Wells | Pathogens | 3 | 3 | 1 | | | | 4 | | | | 0 |
| Residential Construction Dumping | Metals, Fuel | 4 | 2 | 1 | | | 3 | 4 | | | 4 | 2 |
| Parking Lots | Fuel | 4 | 2 | 1 | 1 | 2 | 3 | 4 | 8 | 6 | 4 | 2 |

**Risk Ranking**: **16-21: Very High Risk  11-15: High Risk  6-10: Medium Risk  0-5: Low Risk**

**Table B6. Risk Sites, Ranked**

| Risk Site – Point Sources | Risk Score |
|---|---|
| Abandoned Wells | 15 |
| Former Dry Cleaner | 12 |
| Wolfville Nursing Home Fuel | 10 |
| Land Mark East Chemicals and Fuel | 10 |
| Transportation Corridor–Highway 1 Exclusion | 8 |
| Assisted Living Complex | 8 |
| Transportation Corridor–Highway 1 Zone A | 6 |
| Former Dike Salvage Yard | 6 |
| Abandoned Service Stations Zone B | 6 |
| Acadia Heating Fuel | 4 |
| Public Works Fuel Storage | 4 |
| EKM Diesel Fuel | 4 |
| Transportation Corridor–Highway 1 Zone B | 4 |
| Acadia Physical Plant Fuel | 4 |
| Acadia Science Chemicals | 4 |
| Acadia Physical Plant Vehicle Storage | 4 |
| Public Works Salt Storage | 4 |
| Funeral Home | 4 |
| Cemetery Nutrients | 4 |
| Abandoned Service Stations Zone C | 4 |
| Wolfville School Fuel Storage | 4 |
| Sterling Farms Distribution Facility | 4 |
| Fire Department | 4 |
| Irving Gas Station | 4 |
| Transportation Corridor–Highway 1 Zone C | 2 |
| Acadia Injector Well | 2 |
| Cemetery Pathogens | 0 |

**Table B6 (cont'd). Risk Sites, Ranked**

| Risk Site – Non-point Sources | Risk Score |
|---|---|
| Agriculture Fertilizers Zone A | 12 |
| Septic Systems Nutrients Zone A | 12 |
| Agriculture Pesticides Zone A | 10 |
| Agriculture Fertilizers Zone B | 10 |
| Septic Systems Nutrients Zone B | 10 |
| Heating Oil Tanks Exclusion | 10 |
| Compost Storage Nutrients Zone B | 10 |
| Manure Zone B | 9 |
| Sewer Exclusion | 9 |
| Agriculture Pesticides Zone B | 8 |
| Agriculture Fertilizers Zone C | 8 |
| Septic Systems Nutrients Zone C | 8 |
| Cleaning Agents Exclusion | 8 |
| Heating Oil Tanks Zone A | 8 |
| Transportation Corridors Exclusion | 8 |
| Compost Storage Nutirents Zone C | 8 |
| Parking Lots Exclusion | 8 |
| Road Salt Exclusion Zone | 7 |
| Road Salt Zone A | 6 |
| Agriculture Pesticides Zone C | 6 |
| Septic Systems Pathogens Zone A | 6 |
| Cleaning Agents Zone A | 6 |
| Heating Oil Tanks Zone B | 6 |
| Transportation Corridors Zone A | 6 |
| Manure Zone C | 6 |
| Compost Storage Pathogens Zone B | 6 |
| Sewer Zone A | 6 |
| Parking Lots Zone A | 6 |

**Table B6 (cont'd). Risk Sites, Ranked**

| Risk Site – Non-point Sources | Risk Score |
|---|---|
| Road Salt Zone B | 5 |
| Road Salt Zone C | 4 |
| Cleaning Agents Zone B | 4 |
| Heat Pumps (Geothermal Wells) Zone A | 4 |
| Heating Oil Tanks Zone C | 4 |
| Transportation Corridors Zone B | 4 |
| Dumping Zone B | 4 |
| Parking Lots Zone B | 4 |
| Septic Systems Pathogens Zone B | 3 |
| Heat Pumps (Geothermal Wells) Zone B | 3 |
| Brine Pumping Zone B | 3 |
| Compost Storage Pathogens Zone C | 3 |
| Sewer Zone B | 3 |
| Cleaning Agents Zone C | 2 |
| Heat Pumps (Geothermal Wells) Zone C | 2 |
| Brine Pumping Zone C | 2 |
| Transportation Corridors Zone C | 2 |
| Dumping Zone C | 2 |
| Parking Lots Zone C | 2 |
| Septic Systems Pathogens Zone C | 0 |
| Sewer Zone C | 0 |
| Private Wells | 0 |

# APPENDIX C

# PART 5 Development Constraints

## 5.1 FLOOD RISK AREA DEVELOPMENT STANDARDS

(1) Prohibited uses in the Flood Risk Areas as shown on Schedule B: Development Constraints Map include:

(a) hospitals

(b) seniors care facilities

(c) special care facilities

(d) schools

(e) warehousing or storage of hazardous materials

(f) essential services

(2) New development within the Flood Risk Areas as shown on Schedule B: Development Constraints Map, are required to sign a "*Flood Risk Area Development Undertaking Form*" acknowledging recognition of risks and responsibility for damages in the event of a flood and confirming that:

(a) The finished floor elevation is no lower than 8m geodetic.

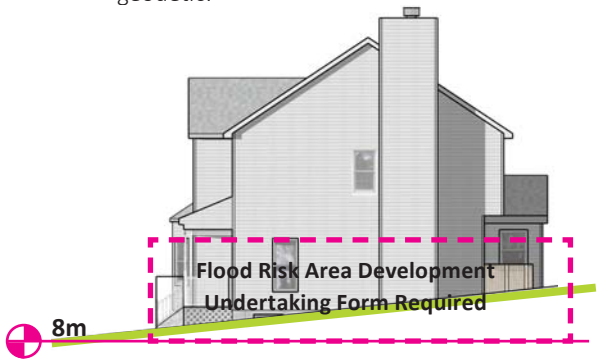


FIGURE 5.1 Flood Risk Area Requirements

(b) Consideration is given to walls and floors below 10m geodetic being constructed in a flood tolerant manner.

(c) Consideration is given to the placement of flood vulnerable mechanical and electrical equipment.

## 5.2 SOURCE WATER PROTECTION

There are three sub-zones in the Source Water Protection area as shown on Schedule B:

- Source Water Protection Area – Wellhead Constraint Area;
- Source Water Protection Area – Zone A and B, and
- Source Water Protection Area – Zone C.

Development within these areas, may require the completion of an environmental impact assessment, secondary containment measures and/or a risk mitigation plan prepared by a qualified professional and shall be subject to the following:

(1) **Source Water Protection Area - Wellhead Zone:** Development within the Wellhead Constraint Area as identified on Schedule B of the Bylaw is limited to:

(a) Existing residential uses.

(b) Public parkland .

(c) Uses relating to the operation of the Town of Wolfville's water supply.

(d) Existing furnace oil storage.

(2) **Source Water Protection Area – Zone A and B**: Certain land uses which present a significant risk to the groundwater contamination will be prohibited, including:

(a) Automotive painting, engine and auto body repair shops

(b) Bulk chemical storage

(c) Bulk storage of salt

(d) Commercial nurseries

(e) Commercial storage and/or distribution of chlorinated solvents

(f) Commercial storage and/or distribution of fertilizers

(g) Commercial storage and/or distribution of pesticides and herbicides

(h) Commercial storage and/or distribution of petroleum fuel

(i) Commercial storage and/or distribution of petroleum solvents

(j) Dry cleaners

(k) Gas station or accessory gas bars

(l) Manure storage facility

(m) Scrap metal and salvage yards and/or processing

(3) **Source Water Protection Area – Zone C:** Similar to 5.2.2, uses that present an identified risk to groundwater contamination will be prohibited, including:

(a) Automotive painting, engine and auto body repair shops

(b) Bulk storage of salt in excess of 100 tonnes

(c) Commercial storage and/or distribution of chlorinated solvents

(d) Commercial storage and/or distribution of pesticides and herbicides

(e) Commercial storage and/or distribution of petroleum fuel

(f) Commercial storage and/or distribution of petroleum solvents

(g) Dry cleaners

(h) Gas station or accessory gas bars

(i) Scrap metal and salvage yards and/or processing

(4) Expansion or redevelopment of existing non-conforming uses within the Source Water Protection Area Wellhead zone, zone A and B, and C may be considered by development agreement.

(5) Development of new private geothermal wells in the Source Water Protection Areas are required to provide a risk mitigation plan prepared by a qualified professional.

## 5.3 WATERCOURSE, WETLANDS AND STEEP SLOPES

(1) No structures shall be erected within 8 metres of the top of banks of watercourses as identified on Schedule B: Development Constraints Map. An erosion and sedimentation control plan prepared by a qualified professional will be required with any application for development of any lot within 15m of a watercourse.


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