Local Wellhead Protection Program Plan

Town of Oakboro, Stanly County, PWSID: NC-01-84-020

JUNE 17, 2024

Town of Oakboro

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BACKGROUND

In 1986, Safe Drinking Water Act (SDWA) amendments added Section 1428, "State Programs to Establish Wellhead Protection Areas", which requires each state to develop a program to "protect wellhead areas within their jurisdiction from contaminants which may have any adverse effects on the health of persons." The term wellhead protection area is defined in the law as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field." North Carolina's Environmental Protection Agency (EPA) approved Wellhead Protection Program (WHPP) provides technical support to local governments and public water supply systems in their endeavors to develop and implement their own Wellhead Protection Plans.

One of North Carolina's objectives in developing a protection program is to provide a process for public water system operators to learn more about their groundwater systems and how to protect them. Wellhead Protection Plans allow communities to take charge of protecting the quality of their drinking water by identifying and carefully managing areas that supply groundwater to their public wells.

Regulations of the **Division of Water Resources (DWR), under the Department of Environmental Quality (DEQ)** require wellhead protection measures for any public water supply wells to be used as a community or non-transient, non-community water system to meet the following requirements:

(1) The well shall be located on a lot so that the area within 100 feet of the well is owned or controlled by the person supplying the water. The supplier of water shall be able to protect the well lot from potential sources of pollution and to construct landscape features for drainage and diversion of pollution.

(2) The minimum horizontal separation between the well and known potential sources of pollution shall be as follows:

a) 100 feet from any sanitary sewage disposal system, sewer, or a sewer pipe unless the sewer is constructed of water main materials and joints, in which case the sewer pipe shall be at least 50 feet from the well;
b) 200 feet from a subsurface sanitary sewage treatment and disposal system designed for 3000 or more gallons of wastewater a day flows, unless the well water source is from a confined aquifer;
c) 500 feet from a septage disposal site;
d) 100 feet from buildings, mobile homes, permanent structures, animal houses or lots, or cultivated areas to which chemicals are applied;
e) 100 feet from surface water;
f) 100 feet from a chemical or petroleum fuel underground storage tank with secondary containment;
g) 500 feet from a chemical or petroleum fuel underground storage tank without secondary containment;
h) 500 feet from the boundary of a ground water contamination area;

i) 500 feet from a sanitary landfill or non-permitted non-hazardous solid waste disposal site;
j) 1000 feet from a hazardous waste disposal site or in any location that conflicts with the North Carolina Hazardous Waste Management Rules cited as 15A NCAC 13A;
k) 300 feet from a cemetery or burial ground; and
l) 100 feet from any other potential source of pollution.

(3) The Department may require greater separation distances or impose other protective measures if necessary to protect the well from pollution, taking into consideration factors such as:

a) the hazard or health risk associated with the source of pollution;
b) the proximity of the potential source to the well;
c) the type of material, facility, or circumstance that poses the source or potential source of pollution;
d) the volume or size of the source or potential source of pollution;
e) hydrogeological features of the site that could affect the movement of contaminants to the source water;
f) the effect that well operation might have on the movement of contamination; and
g) the feasibility of providing additional separation distances or protective measures.

(4) The lot shall be graded or sloped so that surface water is diverted away from the wellhead. The well shall not have greater than a one percent annual chance of flooding.

(5) If a supplier of water demonstrates that it is impracticable, taking into consideration feasibility and cost, to locate water from any other approved source and an existing well can no longer provide water that meets the requirements of this Subchapter, a representative of the Division may approve a variance for a smaller well lot and reduced separation distances to meet existing demands. Additional monitoring under this Part or other conditions shall be imposed if necessary to mitigate the increased risk from the variance.

In addition, communities are encouraged to establish wellhead protection plans, which include the following:

(1) The formation of a wellhead protection committee to establish and implement the wellhead protection program whose role it is to conduct a potential contaminant source inventory, provide options for the management of the Wellhead Protection (WHP) area, seek public input into the creation of the WHP plan, seek approval for the WHP program and to implement the WHP program;
(2) Delineation of the contributing areas of the water sources;
(3) Identification of potential contamination sources within the wellhead protection area;
(4) Develop and implement wellhead protection area management actions to protect the water sources;

(5) Develop an emergency contingency plan for alternative water supply sources in the event the groundwater supply becomes contaminated and emergency response planning for incidents that may impact water quality;
(6) Development of a public education program;
(7) Conduct new water source planning to ensure the protection of new water source locations and to augment current supplies.

Wellhead protection for public water supply wells is a voluntary program, but water systems across the state are encouraged to take the above steps in protecting all groundwater sources.

The Public Water Supply Section (PWSS) provides the final approval for WHP Programs. The NC Wellhead Protection Program Coordinator is:

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INTRODUCTION

This Local Wellhead Protection Plan has been developed and updated for the Town of Oakboro to better protect its groundwater supply. The utility wishes to educate the public about best management practices so that groundwater contamination is prevented. This is an update to the Local Wellhead Protection Plan approved in 2015.

The Town of Oakboro is located in western Stanly County. The water system (PWS ID 01-84-020) has agreements in place to purchase water from Stanly County (PWS ID 01-84-035).

The town's public water system has approximately 1300 service connections and serves a population of about 3170 people. The water system operates a single well which pulls water from the bedrock aquifer. The pumped water is treated with sodium hypochlorite for disinfection before it enters the distribution system. Table 1 provides the depth and the yield for the well. The pumping cycle is less than twelve hours per well per day for the well. The system has two water storage tanks that have a total capacity of 500,000 gallons of finished water storage.

Table 1- Oakboro Well Information

Well ID	Well Depth (ft)	Well Yield (gpm)	Aquifer
Well 3	327	150	Surficial / Bedrock

I. THE WELLHEAD PROTECTION COMMITTEE

A Wellhead Protection Committee was formed to update this Local Wellhead Protection Plan for the Town of Oakboro. Members of this committee are as follows:

- Reggie Bowers, Utilities Director
- Georgia Harvey, Town Administrator
- Tommy Gibbons, Water ORC
- Rodney Eury, Oakboro Volunteer Fire Chief
- Jordan Jackson, NC Rural Water Association

Jordan Jackson of North Carolina Rural Water Association provided technical assistance throughout the development of this plan. The Oakboro Board of Commissioners has authorized Reggie Bowers and the Wellhead Protection Committee the authority to review and accept this Wellhead Protection Plan. The implementation of the Wellhead Protection Plan will be completed by Reggie Bowers. The Town of Oakboro will begin implementation of the plan immediately following its approval by the Public Water Supply Section of the North Carolina Division of Water Resources and will complete the implementation within ninety (90) days. Upon completion of the implementation phase of the Plan, notification will be made to the Public Water Supply Section by Reggie Bowers.

II. DELINEATING THE WELLHEAD PROTECTION AREA

Wellhead protection is essentially protection of all or part of the area surrounding a well from which the well's groundwater is drawn. The area is called a Wellhead Protection Area (WHPA). The Safe Drinking Water Act defines a WHPA as: "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such well water or wellfields".

WHPA delineation methods typically involve estimating the size of the contributing area to the well or wellfield. The contributing area is the land area which supplies the water being pumped from a well. If a contaminant reaches groundwater within a well's contribution area, the contaminant can move with the groundwater into the well. If the contributing area for the well is identified, and management strategies are set in place to manage certain activities, the possibility that the well might become contaminated can be significantly reduced.

There are several methods that are used to delineate WHPA. "The North Carolina Wellhead Protection Guidebook" is a great resource to learn about the different methods that can be used. The one that is most appropriate for each well system depends upon many factors such as the well's geographic location, depth, and characteristics of the subsurface geology. Based on the data for Oakboro's well, it was determined to use the Recharge Method for the calculations.

The Recharge Method involves estimating the size of the contributing area to the well or wellfield based on the rate of recharge to the aquifer. The recharge rate used for the aquifer was 300,000 gallons per day per square mile. The size of the contributing area is controlled by the rate at which water is pumped from the well and the rate at which the aquifer is replenished by recharge. For a given recharge rate, the larger the well pumping rate, the larger the contributing area to supply the water being withdrawn.

State regulations require that all public water-supply wells have a 24-hour drawdown test to determine their well yield. State regulations also require that the yield of the well provide the average daily demand in 12 hours. Therefore, the well yield (in gallons per minute) determined from the drawdown test is multiplied by 720 (the number of minutes in 12 hours) to define the "maximum permitted withdrawal" in gallons per day, or:

$$\boldsymbol{Q_{MPW} = Q_{MAX} \times 720}$$

where:

Q_{MPW} = maximum permitted withdrawal in gallons per day,

Q_{MAX} = well yield in gallons per minute, and

720 = a factor for converting the pumping rate from gallons per minute to gallons per day based on a 12 hour pumping day. If the actual pumping period exceeds 720 minutes per day, then the actual pumping period is used in the calculation.

Once the maximum permitted withdrawal has been determined, the approximation for the size of the contributing area becomes:

$$A_C = \frac{Q_{MPW}}{W}$$

where:

A_C = contributing area in square miles,

Q_{MPW} = maximum permitted withdrawal in gallons per day, and

W = estimated average recharge rate in gallons per day per square mile. 300,000-gallons per day per square mile in the Oakboro area.

After determining the contributing area, the area was then doubled because transmissivity may be directional due to cracks in the bedrock aquifer. And then the radius (r) for the WHPA was determined using the following formula:

$$r = \sqrt{(A/\pi)} \times 5280$$

where:

r = radius of the wellhead protection area in feet

A = contributing area, in square miles

π = 3.1416

The radius of the individual wellhead protection area was calculated. The calculations to determine the wellhead protection area match the method and calculations provided in the Local Wellhead Protection Plan developed for Oakboro and approved in 2015. The final wellhead protection area for the Town of Oakboro is shown on the following page.

Table 2-Oakboro Delineation Data

Well ID	Well Yield (gpm)	Max Daily Well Operation (minutes / day)	Max Daily Permitted Withdrawal (gallons / day)	Recharge Rate (gpd/mi^2)	Contributing Area Doubled A_{cmax} (sq ft)	Radius of Doubled A_{cmax} (ft)
Well #3	150	720	108,000	300,000	20,072,448	2528

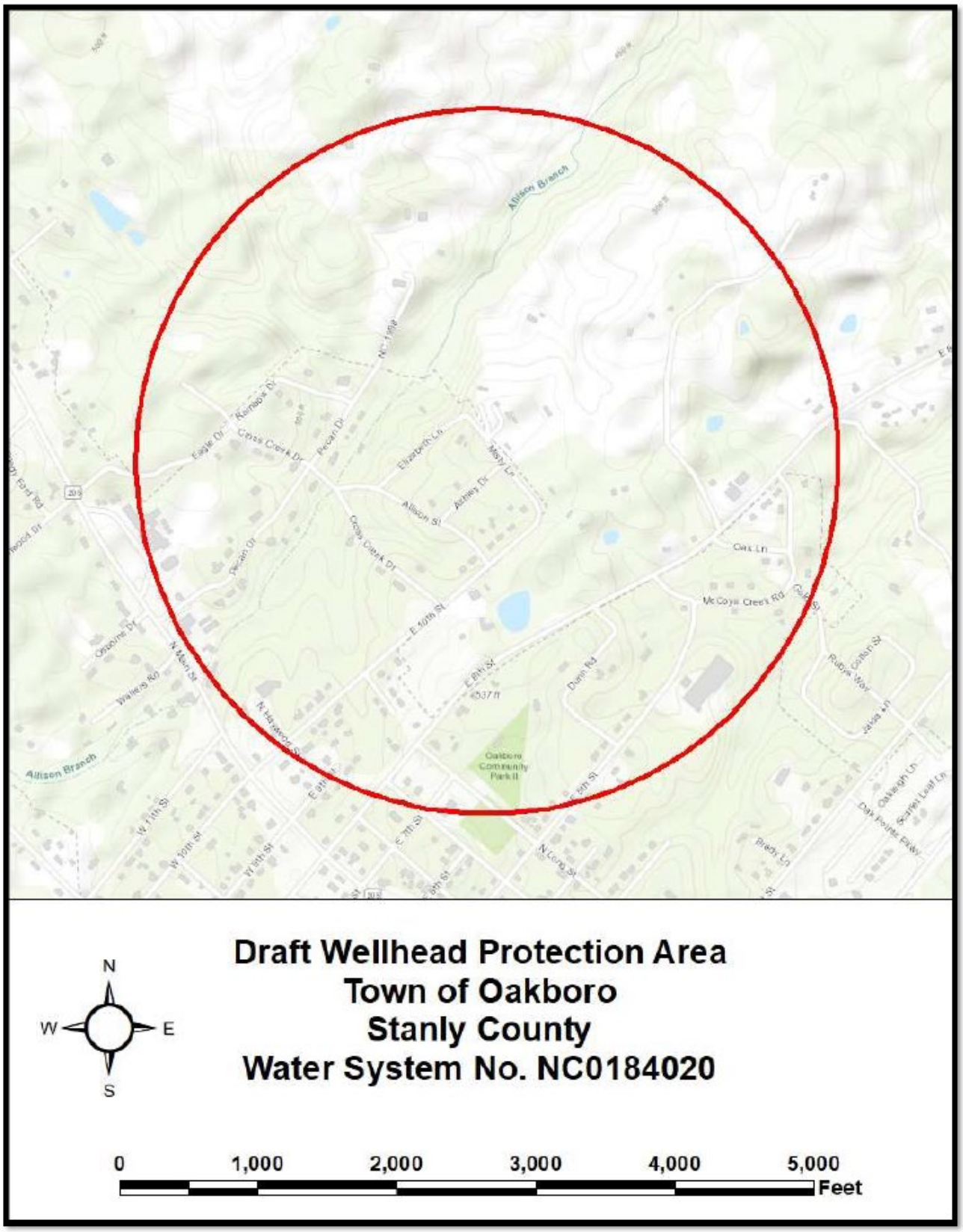


Figure 1- Final Wellhead Protection Area for Oakboro, NC

III. POTENTIAL CONTAMINANT SOURCE INVENTORY

A Potential Contaminant Source (PCS) is any substance or activity that could adversely affect the quality of your drinking water supply. The PCS inventory is a complete listing, including mapped locations, of past and present land use activities within the wellhead protection area (WHPA) that threaten groundwater quality.

The inventory process began by gathering information from the NCDEQ Source Water Assessment Program (SWAP) Report for the Oakboro Water System. The SWAP reports are compiled by the NCDEQ Public Water Supply (PWS) Section by combining information from twenty (20) State and Federal Databases, and this information is used as a starting point to research files at the various state/federal agencies. More information about each regulatory databases researched, and the associated types of contaminants can be found in the appendix. All relevant information found in the SWAP reports was included in the PCS Inventory.

The SWAP information is a valuable starting point for generating the PCS inventory, but because it includes only databases with statewide coverage, PCS information specific to the focus area may not be included in the SWAP reports. Databases (both hardcopy and electronic) maintained by local, county, state and federal agencies may contain additional information about known PCSs occurring within the WHPA (e.g. areas of pesticide or fertilizer application, landfills or dumps, inactive hazardous waste sites, underground storage tanks, well construction, septic tanks, etc.).

After SWAP information was added to the PCS inventory, a windshield survey was conducted to determine if additional sites and facilities that are categorized as potential contaminant source are located in the wellhead protection area. A list of facilities that are generally recognized as a potential contamination source type is included in the appendix. Jordan Jackson, NCRWA Source Water Specialist, surveyed the WHPA to positively identify each potential contaminant source facility that might exist within the WHPA. Onsite visits were made by Jordan Jackson to obtain additional information regarding quantity and types of contaminants kept on site from each location remaining on the final list of PCS. Site Evaluations forms completed during onsite field visits are provided in the appendix. Relevant information gathered with the site evaluations is included in the PCS Data Charts refer to appendix. The PCS Data Charts show the sources identified during the inventory along with quantities and types of contaminants found onsite.

The potential contaminant categories that are located within Oakboro's WHPA are listed below. The PCS Inventory Map shows the location of each of the identified potential contaminant sources within the WHPA.

Table 3-Potential Contaminant Source Inventory with the assigned Map Code.

PCS Categories	Map Code	Risk Category
Pollution Incidents	X	Known Contamination
Auto Repair	A	High
Cemetery	B	Moderate
Engine Repair	C	High
Laundromat	D	High
Maintenance Facility	E	Moderate
Manufacturer	F	High
Pump Station	G	Moderate
Recreation	H	Moderate
Storage	J	Low
UST (Underground Storage Tank)	K	High

The sections below briefly describe special details about many of the different categories of potential contaminant sources.

Septic Tanks - There are septic tanks within the WHPA, but their locations were not assessed individually.

Abandoned Wells - NCDEQ requires abandoned wells to be properly decommissioned per state regulations. Considered a potential source of contamination because Surface water runoff can travel into groundwater well casing and contaminate the groundwater. No records of additional abandoned wells have been identified with the creation of this plan.

Agriculture - There are fields within the wellhead protection area which are farmed. These fields are within WHPA, but their locations were not assessed individually.

Auto / Engine Repair - Ranked as a high risk to groundwater quality because of the presence of engine fluids (i.e. oils).

Pump Stations – Oakboro's wastewater collection system includes more than 10 sanitary sewer pump stations, two (2) of which are within the final WHPA. Pump stations are an essential part of the wastewater collection system, their purpose is to hold and pump wastewater to the wastewater treatment plant. Pump stations are ranked as a moderate risk to groundwater.

Recreation – Recreational facilities use fertilizers and pesticides to maintain fields of turfgrass. These sites are ranked as a moderate risk to groundwater.

Pollution Incidents- The pollution incidents database contains information regarding the release of pollutants into the environment that have or are likely to have, impact on the groundwater resources of the State. The initial information regarding these releases is usually obtained from concerned citizens or responsible parties, who report the release to the Department of Environmental Quality. The NCDEQ Emergency response number to report a spill is 800-858-0368. After an incident is reported, regional office staff investigate the reported incident and enter the results of their investigation into a statewide database. The pollution incidents databases typically include petroleum releases associated with aboveground storage tanks (AST), underground storage tanks (UST) and sites contaminated with dry-cleaning solvents. Brief summaries of the pollution incidents, clean-up activities and closure status are provided below.

23689, MO-6248 550 E. 5th Street (Map Code: X)

Responsible Party: Stanly Knitting Mills, Inc.

In 2001, a UST release was discovered during tank closure. The removed tank was sized to hold 10,000 gal. and was used for heating oil. Groundwater contamination exceeded the groundwater quality standards established in 15A NCAC 2L .0202. Notice of Residual Petroleum was filed that restricts the use of the property. The property can only be used for industrial / commercial use and groundwater from the site is prohibited from use as a water supply. The incident was closed with No Further Action by NCDEQ on April 2, 2002.

36748, MO-8159 1206 N. Main Street

Responsible Party: Oakboro Laundromat

In 2009, 2 USTs were removed, and soil contamination was discovered during the removal. Both tanks were 550 gallons, one was for heating oil and the other was for gasoline. Approximately 32.5 tons of contaminated soil was removed and disposed of. A temporary monitoring well was installed, and groundwater was analyzed. The soil contamination did not exceed the residential maximum soil contamination concentrations (MSCCs) established in Title 15A NCAC 2L .0411 and the groundwater contamination did not exceed the groundwater quality standards established in Title 15A NCAC 2L .0202. The incident was closed with No Further Action by NCDEQ on January 21, 2010. This information is provided for context only and the site is not included as a pollution incident on the potential contaminant site list or in the risk assessment.

36564, MO-7887 1244 N. Main Street

Responsible Party: Stanly County Board of Public Education

On June 24, 2008, a 10,000 gallon heating oil UST was removed. During the removal, soil contamination was observed. A total of 107 tons of contaminated soil was removed and disposed of from beneath and the surrounding the UST. Afterwards, samples were collected from 5 separate locations around the tank and soil contamination did not exceed maximum soil contaminant concentrations (MSCCs) established in Title 15A NCAC 2L .0411. NCDEQ

issued a Notice of No Further Action on September 3, 2008. This information is provided for context only and the site is not included as a pollution incident on the potential contaminant site list or in the risk assessment.

PCS Inventory

Table 4 lists the potential sources of contamination sites identified within Oakboro Wellhead Protection Area and sites are mapped on Figure2. The exception to this are septic tanks and home heating oil tanks used at many residences but are not included in State Databases. The table uses map codes to identify the potential sources of contamination on the maps created for this plan. If a location is identified to be more than one category, the map code incorporates all category types and numbers, if needed, so that each PCS has its own unique map code. For more detailed information about each potential contaminant source, including information relevant in providing educational materials to owners, please see the PCS Data Charts located in the appendix. Where listed on the PCS Data Chart, "small quantities" refers to unknown amounts totaling less than 100 gallons of chemicals that are listed in the survey section of the appendix.

Table 4- List of Potential Contaminant Sites located within the Well #3 Wellhead Protection Area.

PCS Category	Map Code	PCS Site	Physical Location
Auto Repair	A	Camo Magic Inc.	1148 N. Main Street
Cemetery	B	Cemetery	E. 10th Street
Engine Repair	C	Oakboro Tractor and Equipment	1160 N. Main Street
Laundromat	D	Oakboro Laundromat	1214 N. Main Street
Maintenance	E	Oakboro Public Works	624 N. Dorsett Street
Manufacturer	F	FAB-CON	201 E. 10th Street
Pollution Incident	X	550 E. 5th Street Incident # 23689	550 E. 5th Street
Pump Station	G1	Pump Station #2	330 E. 10th Street
Pump Station	G2	Pump Station #3	behind 1148 N. Main Street
Recreation	H	Oakboro Community Building	626 Long Street
Storage	J	Oakboro Mini Storage	1156 N. Main Street
UST Recreation	KH	Oakboro Choice STEM Elementary School UST #0-00032856	1244 N. Main Street

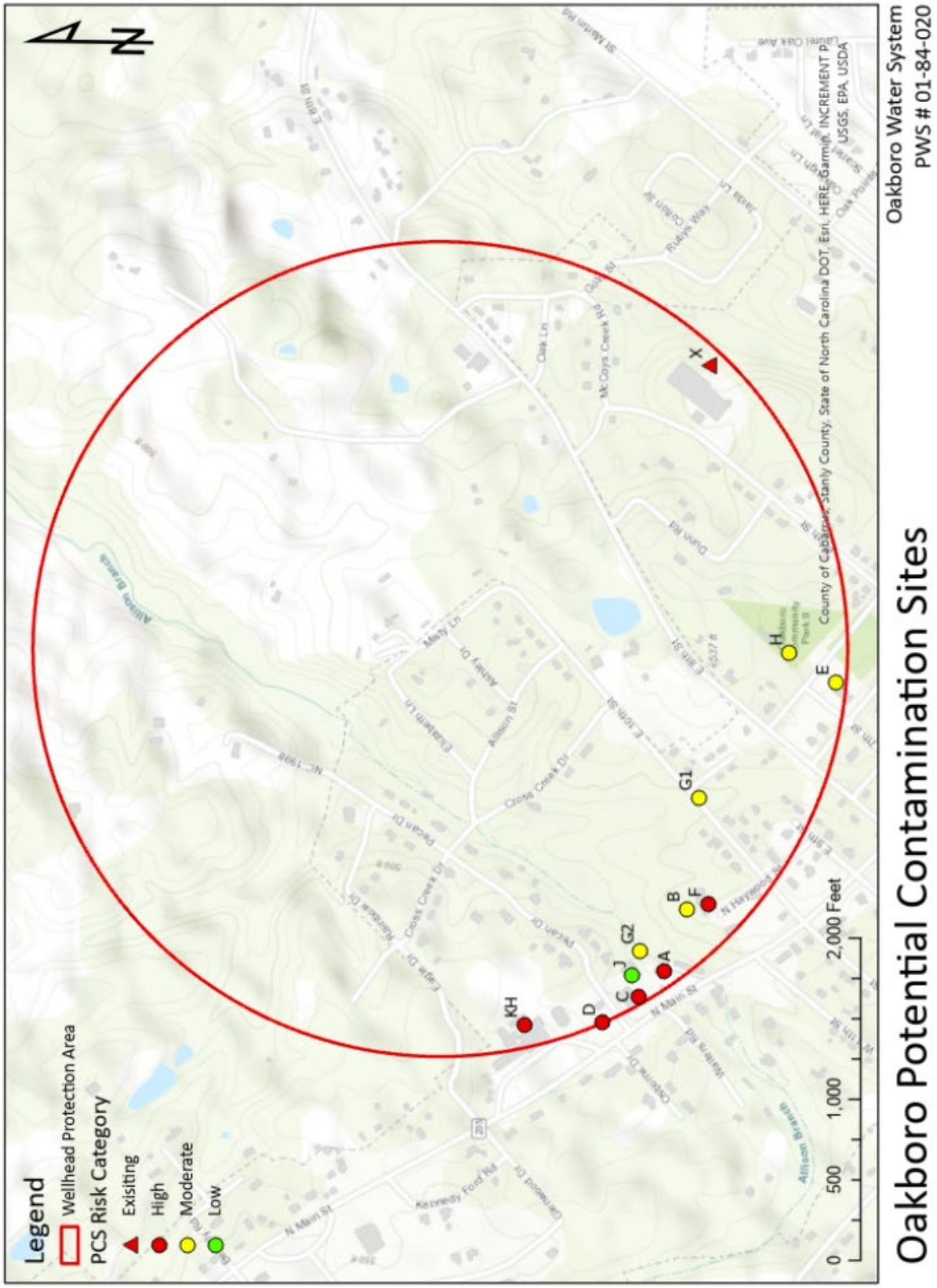


Figure 2- PCS Inventory Map for Oakboro Well #3.

IV. RISK ASSESSMENT

A Risk Assessment for Oakboro Well #3 can be calculated by ranking the PCSs according to the threat each presents to the water supply well. The following method was used to rank each PCS in the WHPA:

The PCS was assigned to a risk category of *higher, moderate, or lower* based on information adapted from the EPA (1993), and from the Oregon Wellhead Protection Program. The PCS was assigned a numerical "category" score to correspond with the risk category [e.g., Higher-3, Moderate-2, and Lower-1]. Sites with known soil and/or groundwater contamination are assigned a score of "4" and a symbol of "X". If a site belongs to more than 1 category, the category score is calculated by combining each corresponding category score.

The site of potential contamination was then assigned a "proximity" score calculated with the following equation:

proximity score = 1 - (distance from well/radius of the WHPA)

The final PCS ranking was obtained by multiplying the category score by the proximity score. The result is a relative ranking of the PCS according to the threat it poses to the water supply well. Assessing the relative risk of contamination within each WHPA from the PCS(s) it contains allows for a determination of (1) which water supply wells are at the greatest risk of contamination and (2) which PCSs should be considered first with respect to wellhead protection. Once the risk assessment is carried out, priorities can be set to effectively manage the PCSs.

The risk assessment utilizes the well's individual WHPA radius to assess risk based on proximity. This Plan strives to provide information about all identified PCSs, even those not assessed individually in the risk assessment, i.e. septic systems. Management strategies shall be implemented for all PCS sites located in the WHPA.

The chart below shows the results of the risk assessment.

Well #3 Potential Contaminant Ranking

PCS Category	Map Code	PCS Site	Risk	Distance from Well (ft)	WHPA Radius (ft)	Proximity Score	Category Score*	Final Score
Pollution Incident	X	550 E. 5th Street Incident # 23689	X	1846	2528	0.270	4	1.079
Engine Repair	C	Oakboro Tractor and Equipment	H	2219	2528	0.122	3	0.367
Pump Station	G2	Pump Station #3	M	2160	2528	0.146	2	0.291
Manufacturer	F	FAB-CON	H	2293	2528	0.093	3	0.279
Pump Station	G1	Pump Station #2	M	2249	2528	0.110	2	0.221
UST Recreation	KH	Oakboro Choice STEM Elementary School	H, M	2417	2528	0.044	5	0.220
Recreation	H	Oakboro Community Building	M	2345	2528	0.072	2	0.145
Cemetary	B	Cemetary	M	2431	2528	0.038	2	0.077
Laundromat	D	Oakboro Laundromat	H	2484	2528	0.017	3	0.052
Maintenance	E	Oakboro Public Works	M	2460	2528	0.027	2	0.054
Storage	J	Oakboro Mini Storage	L	2391	2528	0.054	1	0.054
Auto Repair	A	Camo Magic Inc.	H	2526	2528	0.001	3	0.002
							Total Risk Score	**2.840**

It is important to understand that the risk ratings do not imply poor water quality. The rating is an indication of the source's potential to become contaminated by the identified PCSs within the wellhead protection area.

NCDEQ Vulnerability Assessment

The NCDEQ Public Water Supply Source Water Assessment Program (SWAP) Report considers potential contaminants and the inherent vulnerability to determine the susceptibility of any public drinking water source. The contaminant rating for each well was determined based on the number, type, and location of identified PCSs within the delineated assessment area (which may differ from the wellhead protection area in this plan) to receive a rating of higher, moderate, or lower.

The vulnerability rating refers to the geologic characteristics or existing conditions of the well and its delineated area. These characteristics include aquifer rating, unsaturated zone rating and well integrity/well construction rating. The aquifer rating is an assessment of the water transmitting characteristics of the aquifer. The unsaturated zone rating is an assessment of the likelihood that contaminants from surface and shallow sources will follow the path of aquifer recharge and reach the water table. The well integrity/ construction rating is an assessment of the quality of the construction of the well. An inherent vulnerability rating of higher, moderate or lower was assigned to Oakboro's well.

The NC SWAP Report of the inherent vulnerability, contaminant and susceptibility ratings for the Town's wells were ranked by the NC PWS Section as shown in Table 4. Susceptibility is an indication of a water supply's potential to become contaminated by the identified PCSs within the assessment area. Oakboro's entire SWAP Report from year 2020 can be found on the NC Division of Water Resources PWS website.
https://www.ncwater.org/SWAP_Reports/NC0184020_SWAP_Report-20200909.pdf

Table 5-Oakboro SWAP Vulnerability, Sept 2020

Source	Inherent Rating of Vulnerability	Contaminant Rating	Susceptibility Rating
Well #3	Higher	Lower	Moderate

V. MANAGEMENT OF THE WELLHEAD PROTECTION AREA

There are two methods of managing Wellhead Protection Areas, regulatory or non-regulatory. The Town of Oakboro has selected a non-regulatory approach to manage the wellhead protection area, which will include management strategies that focus of Public Education and Staff Training. Several brochures and bulletin documents are provided in the appendix to assist with public education. Management Strategies are included for all identified potential contaminant sites and can be used as reference.

Public Education

A Wellhead Protection Brochure will be made available to each resident, business, agriculture operation and institution within the Wellhead Protection Area. Copies of this brochure will be made available at Oakboro Town Hall, and other locations deemed necessary for public education of Wellhead Protection. The PCS Data Charts provides owner contact information for the identified potential contaminant sources within the WHPA for distribution of educational brochures on best management practices.

In general, the brochure and/or newsletter will convey to each citizen/business the following information:

- An explanation of what groundwater is and the number of Oakboro water wells,
- An explanation of the Wellhead Protection Program,
- Source of groundwater pollution,
- Tips on protecting their water supply,
- Information on proper disposal of household hazardous wastes and oils (i.e., not disposed of through septic systems, pouring on ground, or through regular garbage collection)
- Information of proper use of fertilizers, herbicides, and pesticides,
- Information on household hazardous waste collection opportunities,
- Information on proper maintenance of heating oil tanks and septic systems, and
- Phone numbers to contact for more information.

Waste Management

The Oakboro will provide information to each of the businesses, industries, and farms located within the WHPA on waste handling practices, best management practices, standard operating procedures, and waste oil disposal methods which could be employed to reduce the potential for ground water contamination. Also provided will be information regarding the North Carolina Division of Environmental Assistance and Customer Service (DEACS) to the businesses, industries and farms located within the WHPA. Owners/operators of potential contamination sources will be encouraged to contact DEACS. DEACS provides free technical and other non-regulatory assistance to reduce the amount of waste released into the air and water and on the land. DEACS serves as a central repository for waste reduction and pollution prevention information. DEACS emphasizes waste reduction through pollution prevention, encourages companies and government agencies to go beyond compliance, and provides information about the environmental permitting process. This information is provided at no charge to North Carolina businesses, industries, government agencies, and the general public upon request.

For additional information, DEACS may be contacted at (877) 623-6748 or https://deq.nc.gov/about/divisions/environmental-assistance-and-customer-service

Staff Training

Oakboro employees will be educated on the Wellhead Protection Area and steps they can take to reduce the potential for contamination (e.g. information about source water protection practices). They will be advised to be observant, while performing their duties, for any potential contaminant incidents. They will also be provided training and education on standard operating procedures and emergency measures for dealing with contamination incidents. Personnel at facilities owned and/or operated by the Town will be educated on steps they can take to reduce the potential for contamination (e.g. information about best management practices, standard operating procedures, waste handling practices, etc.). Oakboro will also contact the DEACS to investigate steps that can be taken to reduce the amount of waste released into the air and water and on the land at town owned and/or managed facilities.

Trash and Recycle

Oakboro residents have trash and recyclables pick-up service which is provided by the third-party vendor, Republic Services. Hazardous waste items are not accepted pick-up items. The Stanly County Solid Waste Department also provides solid waste and recycling services to county residents through the operation of multiple convenience centers, contact 704-986-3692 for more information. The Austin Road Site serves the Oakboro area and is located at 13106 Austin Road, Oakboro NC. Once a year, Stanly County has a Hazardous Waste Collection Day so households can properly dispose of old paints, pesticides, fertilizers and automotive products.

Septic Tanks

Educational efforts will be focused on owners of septic systems within the wellhead protection area. All residents, businesses, farms, and industries in the WHPA with septic tanks and home heating oil tanks will be distributed a copy of the Wellhead Protection Brochure and any other information the town can obtain from Federal and State agencies on proper septic tank and heating oil tank maintenance. EPA's SepticSmart Program has educational materials about septic system maintenance and operation. EPA's *A Homeowner's Guide to Septic Systems* is provided in the appendix and additional information can be found at: www.epa.gov/septic.

Chemical Storage

The Oakboro will provide information to each business, industry, and farm located within the WHPA on chemical storage practices, best management practices for handling and disposal of chemicals, and resources for the development of spill response plans. Operators/owners of potential contaminant sources which store hazardous chemicals will be encouraged to follow all OSHA regulations and standards including proper labeling of chemicals, proper chemical storage and handling practices, and maintaining records of Safety Data Sheets (SDS)

for all chemicals onsite. Businesses, industries, and agricultural operations who employ staff will be encouraged to train their employees on the proper handling and disposal of all hazardous chemicals. All owners/operators of potential contaminant sites which use, store, or handle hazardous chemicals will be provided with a contact name and number for the Oakboro for reporting any chemical release or spill to the ground surface or if damage is found to any sewage or drain lines or chemical storage disposal containers that could potentially cause a contamination event. In the event of any large chemical release reported, the utility will contact the NC Hazardous Materials Charlotte Regional Response Team at 704-336-2441 (dispatch). An EPA Source Water Protection Practices Bulletin is provided in the appendix.

Aboveground Storage Tanks (AST)

Owners of above ground storage tanks (ASTs) containing oil with a volume greater than 660 gallons or a combination of ASTs with an aggregate volume greater than 1320 gallons are subject to the Oil Pollution Prevention regulations contained in Federal Regulations found at 40 CFR 112. In most cases, these facilities must prepare and implement a Spill Prevention Control and Countermeasures (SPCC) Plan. The Oakboro will verify the compliance status with regard to this regulation of each subject AST located within the WHPA. Facilities with ASTs found not to be in compliance with this regulation will be notified of their regulatory responsibility under this regulation and notify the NC Department of Environmental Quality, UST Section. EPA Source Water Protection Practices Bulletins are provided in the appendix.

Agriculture

The Town of Oakboro will contact all agricultural operations within the WHPAs with pesticide storage or otherwise involved with the application of pesticides to ensure that they are pesticide operators licensed by the State of North Carolina and that proper records are maintained to ensure that all NC Pesticide Laws are adhered to. Oakboro will provide an Agricultural Fertilizer Application brochure (provided in appendix) that contains information about application best management practices and storage methods which could be employed to reduce the potential for ground water contamination. Additionally, Stanly County Cooperative Extension is a great resource for more information and a pesticide collection day. For more details on this event, contact the Stanly County Extension Office at 704-983-3987.

Auto Repair and Engine Repair

All businesses in the wellhead protection area that utilize petroleum products and generate petroleum and automobile waste streams including oils, acids, antifreeze, etc. will be provided information on waste handling practices, best management practices, standard operating procedures, and waste oil disposal methods which could be employed to reduce the potential for ground water contamination. They will also be provided information regarding the North Carolina Division of Environmental Assistance and Customer Service (DEACS). Owners/operators of these potential contamination sources will be encouraged to contact DEACS. The DEACS provides free technical and other nonregulatory assistance to reduce the amount of waste released into the air and water and on the land. The DEACS serves

as a central repository for waste reduction and pollution prevention information. The DEACS emphasizes waste reduction through pollution prevention, encourages companies and government agencies to go beyond compliance, and provides information about the environmental permitting process. This information is provided at no charge to North Carolina businesses, industries, government agencies, and the general public upon request. For additional information, the DEACS may be contacted at 1-877-623-6748 or to report an environmental emergency, call 1-800-858-0368.

Laundromat

The Town of Oakboro will provide laundromats located within the wellhead protection areas with a copy of the Wellhead Protection Brochure and remind them that all wash water should be managed and disposed of according to state and federal regulations. Should the site contain a Class V injection well, the business will be expected to demonstrate excellent compliance with all applicable state/federal regulations.

Maintenance Facilities

Maintenance facilities which contain materials potentially hazardous to the water supply shall follow all OSHA guidelines regarding safe material handling and appropriate material storage. In the event a facility carries hazardous chemicals (ae. Industrial cleaners, solvents, etc.), the management strategy for Chemical Storage should be referred to. In the event a facility has an underground storage tank (UST) or an above ground storage tank (AST), the respective management strategies should be referred.

Manufacturer

The Oakboro will provide manufacturers with appropriate Best Management Practices found in the appendix. The town will frequently monitor federal databases to determine compliance of manufacturers with special classifications (ae. RCRA, TRI, etc.). Notification will be made to the appropriate State and Federal (when required) organizations of any compliance violations with regards to special classifications (ae. RCRA, TRI, etc.) manufacturing facilities will be encouraged to contact the DEACS with regards to waste reduction. These facilities will also be encouraged to follow all applicable OSHA regulations regarding facility operations and maintenance as well as material storage and handling. Please see the Chemical Storage management strategy for manufacturers that also store chemicals.

Pollution Incidents

For soil or ground-water contamination incidents occurring within the WHPA, the Oakboro will contact the State agencies with oversight responsibilities for remediation to determine if remediation efforts are proceeding in a timely fashion and in accordance with any schedules established by these agencies. Through this process, the Town will bring to the attention of the State agencies with oversight responsibilities for remediation any failures by the responsible parties to comply with required monitoring and corrective action. The Oakboro will also notify the State agencies with oversight responsibilities for remediation of the location of the facilities within the WHPA and their proximity to a public water supply well.

The Oakboro will also contact the State agencies with oversight responsibilities for the contamination incidents and notify them of the locations of any sites issued notices of "No-Further Action" occurring within the WHPA and will request a review of this assessment.

No Further Action (NFA): a determination that no further action is required to assess or remediate soil and/or groundwater. For all releases, the responsible party is required to restore soil and groundwater quality to concentration levels that are equal to or less than the standards established by State groundwater classification and water quality standards (15A NCAC 2L) before being granted No Further Action status. For the majority of releases, the groundwater contamination must be remediated, using one or more technologies, to these standard levels. However, for some releases, if stringent requirements are met, the contamination may be allowed to naturally attenuate to the standard levels or to be remediated actively to alternate concentration levels and then allowed to attenuate to the standard levels.

Pump Station

Town of Oakboro personnel inspect the wastewater pump stations weekly.

Recreation

The Town of Oakboro will require proper maintenance of recreational facilities (buildings and grounds) to any standards upheld by State or Federal agencies. Should these facilities use pesticides, the pesticide management strategy will be followed (provided in appendix). Should these facilities use fertilizers, the turfgrass fertilizer management strategy will be followed (provided in appendix). If the recreational facility utilizes an Above Ground Storage tank or an Underground Storage tank, the UST and AST strategies. If the facility stores chemicals on site, the Chemical Storage strategy should be followed.

Storage (non-chemical or unknown)

The Oakboro will require facilities and containment based on any existing OSHA or other State or Federal standards for the storage and/or handling of both unknown and known materials. An updated contact and/or tax parcel owner will be kept on file for each storage hazard of concern within the WHPA in the event of an emergency.

Underground Storage Tanks

Oakboro will notify any individual, industry, business, or government agency installing or planning to install a regulated underground storage tank within the wellhead protection area of the following regulation:

North Carolina Underground Storage Tank (UST) Regulation 15A NCAC 2N .0301 stipulates specific siting and secondary containment requirements for UST systems installed after January 1, 1991. The rule is summarized as follows:

- No UST system may be installed within 100 feet of a public water supply well or within 50 feet of any other well used for human consumption.

- Secondary containment is required for UST systems within 500 feet of a well serving a public water supply or within 100 feet of any other well used for human consumption.

Violations of this regulation will be reported to the Division of Waste Management, Underground Storage Tank Section. The UST Section will also be notified of the location of the facility within the WHPA and its proximity to a public water supply well or any other well used for human consumption.

A regulated UST system is any underground storage tank and associated piping that contains petroleum (including gasoline, diesel and used oil) or a hazardous substance as defined by the State rules (15A NCAC 2N). Tanks containing heating oil for use on the premises where stored are not regulated.

All owners/operators of regulated underground storage tanks (USTs) and other facilities subject to federal and/or state regulations located within the WHPA will be requested to supply documentation that their facility is in compliance with said regulations. UST owners and operators will be encouraged to visit https://www.epa.gov/ust/resources-ust-owners-and-operators and https://www.epa.gov/ust/musts-usts for more information. If any UST sites are found to be noncompliant, the Underground Storage Tank Section of the State Division of Waste Management will be notified.

If an abandoned UST site is found, the town will contact the North Carolina Division of Waste Management, UST Section, to determine if a closure report was submitted demonstrating that no soil or groundwater contamination was identified during the removal of UST's. If a closure report was not submitted, the town will notify the UST Section of the location of the facility within the WHPA and its proximity to a public water supply well.

Improperly Constructed or Abandoned Wells

In the instance that an improperly constructed or abandoned well is discovered and identified within the WHPA, the owner will be provided information regarding the threat posed to the water supply by these wells. Owners of improperly constructed/abandoned wells will be encouraged to have these wells properly abandoned in accordance with N.C.'s well construction standards found at 15A NCAC 2C.0100, "Criteria and Standards Applicable to Water Supply and Certain Other Wells". If information exists that a well is improperly constructed or is contributing to the contamination of groundwater, the town will notify the Division of Water Resources.

Monitoring Groundwater Conditions

Static water levels can be measured (well conditions allowing) quarterly after pumping in the well has stopped for at least 12 hours. The static water levels will be graphed against time to determine trends or changes that can support and assist in long term water supply decision-making. Comparing the intake level with the pumping water levels can be used to estimate the life expectancy of the wells or to predict well maintenance.

The specific capacity of the wells will be taken annually (well conditions allowing). Specific capacity is the pumping rate in gallons per minute, divided by the draw down in feet. Draw

down, or pumping water level, is measured after the water has stabilized after pumping. Measuring specific capacity will be part of a well maintenance schedule, to predict:

- The need to repair or rehabilitate a well,
- Life expectancy estimation for the wells,
- Declines in static water levels, and
- Pump failure

VI. EMERGENCY CONTINGENCY PLAN

The primary person responsible for implementing the emergency contingency plan is Oakboro's Utility Director, Reggie Bowers. The secondary (back-up) person responsible is Tommy Gibbons, the ORC. All local and state agency emergency contact information is provided in the appendix.

Short Term Contingency Plan (less than 48 hours)

Oakboro's water system has a total storage capacity of 0.500 million gallons. This volume provides approximately 2 days of water storage when considering the average daily usage is 0.248 MGD. The Oakboro water system is interconnected to Stanly County and can be used in times of emergency.

If power is lost to the well, generators will be utilized. The town has 3 portable generators. Generators could also be rented from a local provider, if needed.

Long Term Contingency Plan (more than 48 hours)

If evidence exists that a well is contaminated, it will immediately be taken off-line and not returned to service until it is determined that water quality from the impacted well is in compliance with standards governing public water supplies. Each well can be isolated from the system by using the gate valve at the appropriate wellhead. The contaminant source inventory may prove useful in determining sources of contamination and providing emergency response contact numbers. If contamination enters the distribution system, residents will be notified not to drink the water until further notice. The notice could be distributed to customers by knocking on doors in Oakboro, website updates, radio, television and/or by publishing a notice in the Stanly News and Press (Oakboro's local newspaper). Tier I incidents may involve additional methods of contact based on requirements.

If contamination occurs, the regional office of the Public Water Supply Section shall be notified immediately of the situation and asked for assistance. The Mooresville Regional Office Public Water Supply Contact is 704-235-2180. Sampling (i.e. bacteriological, VOCs, SOCs, etc.) will begin to determine the contaminant involved and the extent of contamination. A systematic flushing of the distribution system will begin with follow-up sampling conducted as needed until the system is determined to be free of contamination and in compliance with standards governing public water supplies. Determination shall be made if all or part of the distribution system was affected by through testing and sample analysis. The testing performed would be determined by what the contaminant was thought to be (bacteriological, SOCs, VOCs, etc.). If only a portion of the system was affected, that portion would be isolated from the rest of the system by closing valves around the contaminated section. The affected portion, or the entire system, if necessary, would be systematically flushed and purged until sample results showed the contaminant was no longer present. Once sample analysis showed the contaminant was no longer present in the public water supply system, and after consultation with the Public Water Supply Section of NCDEQ, a notice would be announced through by doorhangers or by a publication in the newspaper that Oakboro's water system was once again safe for consumption. *Tier I* incidents may involve additional methods of contact based on requirements.

Should a major oil or chemical spill occur within the Wellhead Protection Area, appropriate emergency agencies will be notified. The first agency contacted will be the Stanly County Emergency Services.

Stanly County Emergency Services: 704-986-3650

Fire Department: 911

Additional emergency contact numbers and resources are listed in the appendix.

NC WaterWARN

Water/Wastewater Agency Response Network (WARN), is a group of utilities committed to helping each other conduct response and recovery operations. A WARN provides a system aid that may be utilized by water/wastewater utilities requiring emergency assistance from member utilities. NC WaterWARN provides a voluntary mutual aid and assistance network to combat water-related incidents throughout the state of North Carolina and an organized system for requesting assistance in the form of personnel, emergency equipment, materials and other required resources. If they have not already, Oakboro is strongly encouraged to join the NC Water Warn network. They can find additional information and a mutual aid agreement here Join NCWaterWARN - NC Water WARN.

VII. IMPLEMENTING, MAINTAINING, AND UPDATING THE WHP PLAN

Public Participation

The Town of Oakboro will have a copy of their updated Wellhead Protection Plan at the Town Hall and on the town's website. A notice will be posted at Town Hall. The public will be invited to review a draft copy of the plan and make comments. Any substantive comments received from the public will be considered for inclusion into the final version of the Oakboro's plan. An example of the Public Notification for the intended implementation of this Wellhead Protection Plan is in the appendix.

New Public Water Supply Wells

The Town of Oakboro will amend its Local Wellhead Protection Program Plan to include any new wells that are added to its water system. The following steps will be taken to address any new wells added to the water system:

1. Develop a preliminary WHPA for the proposed well to determine the area of vulnerability.
2. Develop a contaminant source inventory for the preliminary WHPA.
3. Submit the information obtained in Steps 1 and 2 above to the Wellhead Protection Committee (WPC). Any information required by the Public Water Supply Section (PWSS) relating to the development and construction of new public water supply (PWS) wells must also be submitted.
4. If the WPC grants provisional approval of the proposed Wellhead Protection Plan, and the PWSS grants approval to construct or expand the PWS well or well system, then work may proceed with well construction.
5. Finalize the WHPA delineation for the new well.
6. Finalize the contaminant source inventory for the WHPA.
7. Submit finalized WHPA and contaminant source inventory to the WPC.
8. Once approval is received, implement any necessary regulatory and/or non-regulatory potential source management practices.
9. Submit the amended WHP Plan and all necessary supporting information to the Public Water Supply Section for review and approval.

Future Wellhead Protection

The Town of Oakboro is aware that an effective Local Wellhead Protection Program is an ongoing process requiring monitoring of the Wellhead Protection Area (WHPA) and periodic review and updating of an approved plan. Therefore, Oakboro's Wellhead Protection Committee will monitor the Wellhead Protection Area (WHPA) for any new or previously unidentified potential contaminant sources (PCSs) and activities occurring within the approved WHPA. The Town will amend the PCS inventory and other plan components (e.g. the management strategies, emergency contingency plan, etc.) as necessary to incorporate any new threats to the system's groundwater source of drinking water. The PCS inventory will be updated annually using the same procedures used to develop the original PCS

inventory. The Town will also fully update the WHP Plan every five years or at any time a new well is constructed for use with the Town's water supply system, or a major land use change occurs within a WHPA. The individual(s) responsible for implementation of the WHP Plan will submit notification to the Public Water Supply Section annually upon completion of the PCS inventory update or immediately following the completion of a major revision. Any amended or revised sections of the approved WHP Plan resulting from an update or revision will also be submitted upon completion.

APPENDIX

Glossary of Acronyms and Abbreviations

AST – Above ground Storage Tank
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CWA – Clean Water Act
DEACS – Division of Environmental Assistance and Customer Service
DEQ – Division of Environmental Quality
DWR – Division of Water Resources
ECHO – Enforcement and Compliance History Online
EPA – Environmental Protection Agency
EPCRA – Emergency Planning and Community Right to Know Act
Gpm – gallons per minute
LWPPP – Local Wellhead Protection Program Plan
NCDA – North Carolina Department of Agriculture
NCP – National Contingency Plan
NCRWA – North Carolina Rural Water Association
NED - National Elevation Dataset
NPDES – National Pollutant Discharge Elimination System
OERR – Office of Emergency and Remedial Response
ORC – Operator Responsible in Charge
PCS – Potential Contamination Source
PIRF – Pollution Incident Reporting Form
PWS – Public Water Supply
PWSS – Public Water Supply Section
RCRA – Resource Conservation and Recovery Act
SOC – Synthetic Organic Compound
SPCC – Spill Prevention Control and Countermeasures
SWAP – Source Water Assessment Program
SWDA – Solid Waste Disposal Act
TRI – Toxic Release Inventory
UIC – Underground Injection Control
UST – Underground Storage Tank
VOC – Volatile Organic Compound
WHPA – Wellhead Protection Area
WHPP – Wellhead Protection Program or Plan
WPC – Wellhead Protection Committee
WQCS – Water Quality Collection System

References

Environmental Protection Agency. Envirofacts Warehouse. Available at: http://www3.epa.gov/enviro/

Ground Water Division, North Carolina Division of Water Resources, NC Division of Environmental Quality: http://www.ncwater.org/?page=20

North Carolina Department of Environmental Quality, Division of Environmental Health, Public Water Supply Section, The North Carolina Wellhead Protection Guidebook, Developing a Local Wellhead Protection Program, 2003.

North Carolina Department of Environmental Quality. Division of Water Resources' Ground Water Management Branch Map Interface. Available at: https://www.ncwater.org/GWMS/openlayers/ol.php?menulist=bl

Stanly County Website. Available at: https://www.stanlycountync.gov/

Source Water Assessment Program. Informational Mapper 2.0. Available at: https://www.arcgis.com/apps/webappviewer/index.html?id=5fee819063f241d685d569ef1be357cf

Source Water Assessment Report for Oakboro. Available at: https://www.ncwater.org/SWAP_Reports/NC0184020_SWAP_Report-20200909.pdf

Town of Oakboro Website. Available at: https://oakboro.com/

Emergency Contacts

Resources	Contact Information	
Primary Emergency Respondent	Name: Office #:	Reggie Bowers 704-485-3351
Secondary Emergency Respondent	Name: Office #:	Georgia Harvey 704-485-3351
Local Resources		
Emergency Management	Facility: Office #:	Stanly County Emergency Services **704-986-3650**
Environmental Health Department	Facility: Contact #:	Stanly County Environmental Health Dept. 704-986-3675
Police	Facility: Contact# Facility: Contact #:	Oakboro Police Department 704-485-4214 Stanly County Sheriff's Office 704-986-3714
Fire	Facility: Contact #: Emergency #:	Oakboro Volunteer Fire Department 704-485-3731 911
Local Newspaper	Facility: Contact #:	Stanly News and Press 704-982-2123
Emergency Connection	Facility: Contact #: Facility: Contact #:	City of Albemarle 704-961-6149 Stanly County-West 704-986-3686
State & National Agencies		
Public Water Supply Emergency	Office: Contact #:	NCDEQ PWS Mooresville Office 704-235-2180
Technical Assistance **Water Regulatory Agency** **Regional Water Quality** **SSO's** **UST Section** **Aquifer Protection Section** **Hazardous Waste Section Spills**	Facility: Address: Contact #:	**NC DEQ - Mooresville Regional Office** 610 East Center Avenue, Suite 301 Mooresville, NC 28115 704-663-6040
NC DEQ Public Water Supply Section **Technical Assistance** **Regulatory Guidance**	Facility: Address: Contact #:	**NC DEQ Public Water Supply Section** 1634 Mail Service Center Raleigh, NC 27699-1634 919-707-9100

NC Department of Transportation	Facility: Contact: Address: Contact #:	**Highway Division 10** **Brett Canipe**, Division Engineer 716 W. Main Street Albemarle, NC 28001 704-983-4400
Technical Assistance and Education	Facility: Address: Contact #:	**NC Rural Water Association** P.O. Box 590, Welcome, NC 27374 (336) 731-6963
Educational Brochures Publications	Facility: Address: Contact #: Website:	**NC State Extension** Campus Box 7602 Raleigh NC 27695-7602 (919) 515-2813 www.ces.ncsu.edu
Educations Brochures Publications (GW & UIC Section)	Facility: Address: Contact #: Website:	**US EPA Regional Office** 61 Forsyth St SW Atlanta, GA 30303 (404) 562-8761 www.epa.gov
NC Emergency Management Regional Response Team	Contact: Work #: Report #:	**JR Griffin**, RRT Coordinator (984) 683-9246 (919) 733-3300 or 1-800-858-0368
EPA Spill Reporting	Facility: Contact #:	**US EPA Regional Office** (800) 424-8802
Technical & Non-regulatory Waste Reduction Assistance	Facility: Address: Contact #: Website:	**NC DEACS** 1639 Mail Service Center Raleigh, NC 27699-1639 877-623-6748 http://ncenvironmentalassistance.org/

Description of Regulatory Databases Researched for PCSs

Animal Operations

This database contains permitted facilities for animal operations consisting of swine, cattle, poultry and horse farms that are required to have Certified Animal Waste Management Plans (CAWMP). Animal operations are defined by General Statute 143-215.10B as feedlots involving more than 250 swine, 100 confined cattle, 75 horses, 1,000 sheep, or 30,000 poultry with a liquid waste management system.

Division of Water Resources (DWR) rules mandate that all facilities in operation prior to January 1, 1994 register with the division. Since January 1, 1994, any new facilities were required to obtain a CAWMP before starting their animal operation. In addition, any facilities in operation prior to January 1, 1994 were required to obtain a CAWMP by December 31, 1997. As of January 1, 1997, all new facilities were required to obtain a permit from DWR prior to construction and be certified prior to startup, and all existing facilities were to be permitted by DWR over the next 5 years.

The data set was obtained from the DWR, Water Quality Regional Operations, Animal Feeding Operations Branch in February of 2019. For additional information about this data, contact the Animal Feeding Operations staff by phone at 919-707-9129 or visit their website at: https://deq.nc.gov/about/divisions/water-resources/water-quality-permitting/animal-feeding-operations.

CERCLA Sites

This data set was provided by the Federal Remediation Branch (FRB), which is part of the Superfund Section within the N.C. Division of Waste Management. It represents sites where the FRB is working with USEPA, and in some cases the Department of Defense, to investigate, assess, remediate, or monitor hazardous waste contamination. These sites are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which established authority for the government to respond to the release/threat of release of hazardous waste, including cleanup and enforcement actions. Some of these sites, which meet specific criteria set out in the USEPA's Hazard Ranking System (HRS), are included on the National Priorities List (NPL). The NPL identifies sites that appear to warrant cleanup measures. The NPL sites are eligible for remedial action financed by a federal trust fund with a state cost share or by potential responsible parties (PRP).

The data set was downloaded from the *NC Department of Environmental Quality Online GIS* website at: https://data-ncdenr.opendata.arcgis.com/datasets/federal-remediation-branch. It was dated May 23, 2019. For additional information about this data, contact the Division of Waste Management, Federal Remediation Branch by phone at 919-707-8213 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/superfund-section/federal-remediation-branch.

Non-Discharge Permits

The non-discharge database identifies domestic, industrial, and municipal facilities that are permitted to apply treated wastewater effluent, reclaimed water, and residuals to the land surface.

Data was obtained from the DWR, Water Quality Permitting Section, Non-Discharge Branch in April of 2019. For additional information about this data, contact the program staff by phone at 919-707-3654 or visit their website at: http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/non-discharge-permitting.

NPDES Permits

The National Pollutant Discharge Elimination System (NPDES) PCS category consists of multiple data sets identifying facilities permitted for the operation of point source discharges to surface waters in accordance with the requirements of Section 402 of the Federal Water Pollution Control Act. Point sources are discrete conveyances such as pipes or man-made ditches. The NPDES Permit Program controls water pollution by regulating point sources that discharge pollutants into public waters. This category also include facilities with active and expired State Stormwater Permits. The individual data sets that comprise this category include the following:

NPDES Stormwater Permits

This data set represents the location of facilities with active or expired NPDES Stormwater Permits and facilities with No Exposure Certifications. The goal of the NPDES Stormwater Permitting Program is to prevent stormwater runoff from washing harmful pollutants into surface waters. Both individual and general permits are included.

Data was obtained from the Division of Energy, Mineral, and Land Resources, Stormwater Permitting Program in February of 2019. For additional information about this data, contact the program staff by phone at 919-707-3639 or visit their website at: https://deq.nc.gov/about/divisions/energy-mineral-land-resources/stormwater.

NPDES Wastewater General Permits

The non-discharge database identifies domestic, industrial, and municipal facilities that are permitted to apply treated wastewater effluent, reclaimed water, and residuals to the land surface.

Data was obtained from the DWR, Water Quality Permitting Section, Non-Discharge Branch in April of 2019. For additional information about this data, contact the program staff by phone at 919-707-3654 or visit their website at: http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/non-discharge-permitting.

NDPES Wastewater Individual Permits

This data set represents the location of active wastewater treatment facilities that are permitted under the NPDES Permit Program. Each listed facility is covered by an individual NPDES permit that is written to reflect the site-specific conditions of the facility based on submitted information. The individual NPDES permit is unique to the facility.

Data was obtained from the DWR, Water Quality Permitting Section, NPDES Wastewater Permitting Program in February of 2019. For additional information about this data, contact the program staff by phone at 919-707-3601 or visit their website

at: https://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/npdes-wastewater-permits.

State Stormwater Permits

This data set contains the locations of facilities with active and expired State Stormwater Post-Construction Permits. The Post-Construction Permit Program requires subject new developments to install and maintain permanent stormwater management measures that are designed to protect surface waters from the impacts of the development's stormwater runoff after the construction process is complete.

Data was obtained from the Division of Energy, Mineral, and Land Resources, Stormwater Permitting Program in March of 2019. For additional information about this data, contact the program staff by phone at 919-707-3639 or visit their website at: https://deq.nc.gov/about/divisions/energy-mineral-land-resources/stormwater.

Old Landfill Sites

This data set contains the locations of non-permitted landfills that closed prior to January 1, 1983, when waste disposal permitting regulations commenced. These sites are not currently in operation.

The data set was downloaded from the NC Department of Environmental Quality Online GIS website at: http://data-ncdenr.opendata.arcgis.com/datasets/pre-regulatory-landfill-sites-1. It was dated November 14, 2018. For additional information about this data, contact the Division of Waste Management, Pre-regulatory Landfill Program staff by phone at 919-707-8327 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/superfund-section/pre-regulatory-landfill-program.

PCB Sites

This data set identifies generators, transporters, commercial storers and/or brokers and disposers of Polychlorinated Biphenyls (PCBs). Concern over the toxicity and environmental persistence of PCBs resulted in the Toxic Substances Control Act (TSCA). This act prohibits the manufacture, processing, and distribution in commerce of PCBs. Thus, TSCA legislates true "cradle to grave" (from manufacture to disposal) management of PCBs in the United States. PCBs are mixtures of synthetic organic chemicals with the same basic chemical structure and similar physical properties ranging from oily liquids to waxy solids. Due to their non-flammability, chemical stability, high boiling point and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications. These included electrical applications, heat transfer materials, hydraulic equipment, plastics, rubber, and many others.

The data set was obtained from the USEPA, Office of Pollution Prevention and Toxics in February of 2019. For additional information about this data, contact the PCB staff at 404-562-8512 or visit their website at: https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs.

Each record that contained a physical address that could be address matched was included in the data set. Public Water Supply Section staff performed the address matching.

Pollution Incidents

The Pollution Incidents PCS category consists of multiple data sets containing information regarding the release of pollutants into the environment that have, or are likely to have, impact on the groundwater resources of the State. The initial information regarding these releases is usually obtained from responsible parties or concerned citizens, who report a release to the NC Department of Environmental Quality. After an incident is reported, regional office staff investigate the reported incident and enter the results of their investigation into a state-wide database. The individual data sets that comprise this category include the following:

AST Incidents

This data set represents sites where there has been a discharge of petroleum to the soil and/or groundwater, from a source other than an Underground Storage Tank (UST) system, e.g., Aboveground Storage Tank (AST) system, spills, dumping, etc. All included records have an incident number and have not been closed out.

This data set was downloaded from the NC Department of Environmental Quality Online GIS website at: https://data-ncdenr.opendata.arcgis.com/datasets/ast-incidents. It was dated June 13, 2019. For additional information about this data, contact the Division of Waste Management, Underground Storage Tank Section staff by phone at 919-707-8171 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/ust/ast-program.

Dry-Cleaning Sites-Contaminated

This data set contains an inventory of reported incidents from sites contaminated with dry-cleaning solvents. Substances released into the environment include solvents used in the dry-cleaning process.

This data set was downloaded from the NC Department of Environmental Quality Online GIS website at: https://data-ncdenr.opendata.arcgis.com/datasets/dry-cleaning-sites-contaminated-1. It was dated May 23, 2019. For additional information contact the Division of Waste Management, Dry-Cleaning Solvent Cleanup Act Program staff by phone at 919-707-8365 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/dry-cleaning-solvent-cleanup-act-program.

UST Incidents

This data set represents sites where there has been a release of petroleum to the soil and/or groundwater, from an UST system. All included records have an incident number and have not been closed out.

The data set was downloaded from the NC Department of Environmental Quality Online GIS website at: https://data-ncdenr.opendata.arcgis.com/datasets/ust-incidents?geometry=-166.201%2C-29.535%2C168.311%2C29.229. It was dated June 13, 2019. For additional information about this data, contact the Division of Waste Management, Underground Storage Tank Section staff by phone at 919-707-8171 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/ust.

Septage Disposal Sites

This data set represents all active and permitted Septage Land Application Site (SLAS) and Septage Detention and Treatment Facility (SDTF) sites in North Carolina. The Septage Management Program assures that septage (a fluid mixture of untreated and partially treated sewage solids, liquids, and

sludge of human or domestic origin that is removed from a septic tank system) is managed in a responsible, safe and consistent manner across the state.

The data set was obtained from the Division of Waste Management, Solid Waste Section in May of 2019. For additional information about this data, contact the Septage Management Program staff by phone at 919-707-8283 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/waste-management-rules/septage.

Soil Remediation Sites

This data set represents sites that have received a permit from the NC Underground Storage Tank Section, under the Petroleum Contaminated Soil Remediation Permit Program. These sites are used to bioremediate soil that has been contaminated by leaking petroleum storage tanks. Bioremediation is a treatment process that uses naturally occurring microorganisms (yeast, fungi, or bacteria) to break down, or degrade, hazardous substances. These microorganisms break down organic compounds, such as petroleum products that are hazardous to humans, into harmless products (mainly carbon dioxide and water). Sites that have been "closed out" were excluded.

The data set was obtained from the Division of Waste Management, Underground Storage Tank Section in February of 2019. For additional information about this data, contact the Underground Storage Tank Section staff by phone at 919-707-8171 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/ust.

Solid Waste Facilities

This data set represents all the permitted Municipal Solid Waste (MSW), Construction and Demolition (CDLF), Land-Clearing and Inert Debris (LCID) and Demolition (older facilities) landfill facilities. Coal Ash landfills and Tire landfills are also included. These facility types undergo inspections and groundwater monitoring as part of facility management. This data set also includes active solid waste facility types that are not designated as landfills, such as compost, household hazardous waste, incinerators, medical waste, tire processing and transfer stations.

The data set was obtained from the Division of Waste Management, Solid Waste Section in May of 2019. For additional information about this data, contact the Solid Waste Section staff by phone at 919-707-8247 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/solid-waste-section.

Tier II Sites

This data set contains an inventory of facilities that store hazardous materials and are subject to the reporting requirements of the Emergency Planning and Community Right to Know Act (EPCRA). EPCRA was authorized by Title III of the Superfund Amendments and Reauthorization Act (SARA). Tier II forms require basic facility identification information, employee contact information for both emergencies and non-emergencies, and information about chemicals stored or used at the facility including:

- The chemical name or the common name as indicated on the Safety Data Sheet (SDS);
- an estimate of the maximum amount of the chemical present at any time during the preceding calendar year and the average daily amount;
- a brief description of the manner of storage of the chemical;

- the location of the chemical at the facility; and
- an indication of whether the owner of the facility elects to withhold location information from disclosure to the public.

Data, from the 2018 reporting year, was obtained from the Department of Public Safety, Division of Emergency Management. For additional information about this data contact the Division of Emergency Management staff at 919-436-2746 or visit their website at: http://www.ncdps.gov/Emergency-Management/Hazardous-Materials/EPCRA-Tier-2.

UIC Permits

The Underground Injection Control (UIC) Program protects groundwater quality by preventing illegal waste disposal and by regulating the construction and operation of wells used for injecting approved substances, aquifer recharge, and other activities. The most common types of injection wells in North Carolina are used for:

- Aquifer Storage and Recovery (ASR)
- Geothermal Heating and Cooling
- In-Situ Groundwater Remediation
- Stormwater Infiltration - effective May 1, 2012

The data set was obtained from the DWR, Groundwater Protection Program in March of 2019. For additional information about this data, contact the UIC Program staff by phone at 919-807-6496 or visit their website at: https://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/ground-water-protection/injection-wells.

UST Permits

A UST system is a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume underground. The federal UST regulations apply only to underground tanks and piping storing either petroleum or certain hazardous substances. These facilities are regulated under Subtitle I of RCRA and must be registered with the state and receive an operating permit annually. Until the mid-1980s, most USTs were made of bare steel, which is likely to corrode over time and allow UST contents to leak into the environment. Faulty installation or inadequate operating and maintenance procedures also can cause USTs to release their contents into the environment. The greatest potential hazard from a leaking UST is that the petroleum or other hazardous substance can seep into the soil and contaminate groundwater. A leaking UST can also present other health and environmental risks, including the potential for fire and explosion. The facilities included in this data set have active Underground Storage Tank systems registered with the UST Section.

Data was obtained from the Division of Waste Management, Underground Storage Tank Section in May of 2019. For additional information about this data, contact the Underground Storage Tank Section staff by phone at 919-707-8171 or visit their website at: https://deq.nc.gov/about/divisions/waste-management/ust.

Higher, Moderate and Lower Risk Potential Contamination Sources for Ground Water PWS Systems

Higher Risk PCSs

COMMERCIAL/INDUSTRIAL

- Automobile body shops
    - Gas stations
    - Repair shops
- Chemical/petroleum processing/storage
- *Sewer lines
- Utility right-of-way/pesticide use
- Chemical/petroleum pipelines
- Wood/pulp/paper processing and mills
- Dry cleaners
- Electrical/electronic manufacturing
- Fleet/trucking/bus terminals
- Furniture repair/manufacturing
- Home manufacturing
- Junk/scrap/salvage yards
- Machine shops
- Metal plating/finishing/fabricating
- Mines/sand or gravel excavations
- Parking lots/malls (> 50 spaces)
- Photo processing/printing
- Plastics/synthetics producers
- Research laboratories

OTHER

- Road salt storage areas
- Military installations
  (for classified risks not otherwise listed)

AGRICULTURAL/RURAL

- Farm machinery repair
- Rural machine shops
- *Intensive livestock operations
    - Lagoons, spray fields
- Fertilizer, pesticide, and petroleum storage, distribution, handling, mixing, and cleaning areas
- *Sewage sludge (biosolids) storage, handling, mixing, and cleaning areas
- *Sewage sludge (biosolids) land application
- Unauthorized/illegal disposal of wastes/chemicals

RESIDENTIAL/MUNICIPAL

- Airports – maintenance/fueling areas
- Railroad yards – maintenance/fueling areas
- Landfills/dumps
- Utility stations – maintenance areas
- *Septic systems – high density (>1/acre)
- *Sewer lines
- *Stormwater drains/discharges
- Fertilizer, pesticide, sewage sludge

Notes:

1. *This is a list of potential sources of contamination not a list of known databases of contaminants.*
2. *Higher risk potential contaminant sources are considered to have a higher potential for drinking water contamination than those designated moderate risk or lower risk. Facility-specific management practices are not taken into account in estimating risks and assigning these categories.*
3. *An asterisk [*] indicates activities that may be associated with microbiological contamination.*

Moderate Risk PCSs

COMMERCIAL/INDUSTRIAL

- Car washes
- Cement/concrete plants
- Food processing
- Hardware/lumber/parts stores

AGRICULTURAL/RURAL

- *Auction lots
- *Boarding stables
- Crops: Irrigated
  (Berries, Christmas trees, hops, mint, orchards, vineyards, nurseries, greenhouses, vegetables, sod)
- Drinking water treatment plant residuals/sludge application

RESIDENTIAL/MUNICIPAL

- Drinking water treatment plants
- Golf Courses
- Housing – high density
  (>1 house/.5 acres)
- Motor pools
- Parks
- Waste transfer/recycling stations
- Wastewater treatment plants collection stations

OTHER

- Above ground storage tanks
- Construction/demolition areas
- Hospitals
- Transportation corridors
  - Freeways/state highways
  - Railroads
  - Right-of-way maintenance
    (herbicide use areas)
- Irrigation, water supply, or monitoring wells

Lower Risk PCSs

COMMERCIAL/INDUSTRIAL

- Office buildings/complexes
- RV/mini storage

AGRICULTURAL/RURAL

- Crops: non-irrigated
  (grains, grass seeds, hay)
- Crops: drip irrigated
- *Rangeland
- Managed forests/silviculture

RESIDENTIAL/MUNICIPAL

- Apartments and condominiums
- Campgrounds/RV parks
- Fire stations
- Schools
- Housing – low density
  (<1 house/.5 acres)

OTHER

- Medical/dental offices/clinics
- Veterinary offices/clinics

SOURCE: Adapted from EPA (1993), and from the Oregon Wellhead Protection Program

Example Public Notice

Town Of Oakboro
Local Wellhead Protection Program Plan Notice

The Town of Oakboro, with assistance from the North Carolina Rural Water Association, is in the process of updating its Local Wellhead Protection Program Plan. This is a voluntary program intended to assist us in protecting the system's water supply from contamination, and to identify vulnerable areas around our well called the "Wellhead Protection Area". Another goal of this program is to make residents and businesses aware that chemicals and other pollutants spilled or dumped in the vicinity of the "Wellhead Protection Area" can be drawn into the well, possibly contaminating the system's drinking water supply.

The town is asking for your assistance in developing this program. A draft copy of the Wellhead Protection Plan will be available for review and comment at Oakboro's Town Hall, 109 N. Main Street, Oakboro NC 28129. You are invited to review the program and submit any comments or suggestions to the town. All written public comments will be reviewed by the Wellhead Protection Committee, and any suggestions or comments that may be beneficial will be incorporated into the program.

If you have any questions or comments, please feel free to contact the Public Works Department at 704-485-8322.

NC Division of Environment Assistance and Customer Service (DEACS) Brochure

N.C. DIVISION OF ENVIRONMENTAL ASSISTANCE AND CUSTOMER SERVICE

Customer service through technical, compliance and financial assistance

NCDENR

N.C. DIVISION OF ENVIRONMENTAL ASSISTANCE AND CUSTOMER SERVICE

The **N.C. Division of Environmental Assistance and Customer Service (DEACS)** assists citizens, businesses, local governments and communities statewide on a diverse range of environmental issues.

DEACS technical services:

- **Toll-free hotline** with experienced staff to answer your environmental questions
- **On-site assessments** and training for waste, water and energy management
- **Compliance** information and tips
- Environmental **recognition** programs
- **Grants** for recycling businesses and local governments
- **Recycling** infrastructure support
- Statewide points of contact for **permit information** and **environmental assistance**

Within the N.C.Department of Environment and Natural Resources, DEACS works to protect and improve North Carolina's environment while supporting a strong economy.

Environmental Assistance Hotline
1-877-623-6748 (toll-free)
eac@ncdenr.gov
ncenvironmentalassistance.org

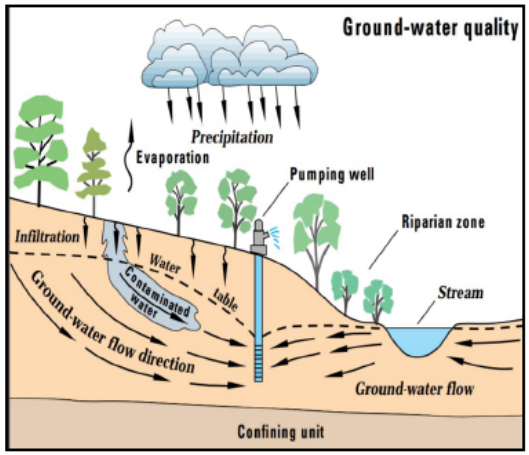
2000 copies of this public document were printed on 100% recycled content and FSC certified paper at a cost of $713.79 or $0.24 each.

Educational Tri-fold Brochure on Wellhead Protection

Pollution Prevention

Groundwater can be contaminated when hazardous materials are not properly managed. You can help:

- Safely store, handle and use chemicals / fuels,
- Monitor underground fuel tanks and chemical tanks. If possible, replace with above ground tanks (leaks are then visible),
- Reduce or substitute the use of chemicals,
- Keep chemicals protected from rain and prevent runoff,
- Participate in Hazardous Waste Collections.



Reduce, Reuse and Recycle

You can help your community, and the environment by saving money, energy and natural resources by reducing, reusing and recycling. The Stanly County Solid Waste accepts various types of waste, contact 704-986-3692 for more information.

Town of Oakboro
PO Box 610
Oakboro, NC 28129
PH: 704-485-3351

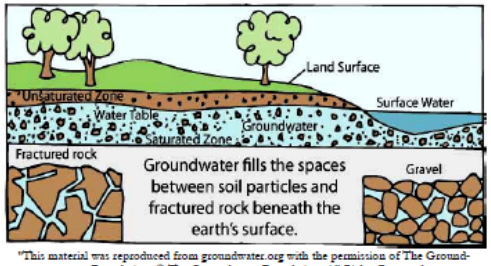
Town of Oakboro

How Can You Help?

Protect our Source Water

WHAT IS GROUNDWATER?

Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. It is stored in and moves slowly through geologic formations of soil, sand and rocks called aquifers. The Town of Oakboro water system uses groundwater it pumps from the ground using a single well located in our service area.



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THE WELLHEAD PROTECTION PROGRAM

The Town of Oakboro is developing a Local Wellhead Protection Program to protect its water supply from contamination. As a part of the program, we have identified the vulnerable area around our well site called the "Wellhead Protection Area". Chemicals and other pollutants spilled or dumped in this area can be drawn into the well, possibly contaminating our community's drinking water supply. Residents and businesses in this area must be very careful with chemicals and other pollutants. Help us to preserve our water quality for our current and future needs.

POLLUTION SOURCES

Many of our daily activities can pollute our surface water and groundwater. Sources of groundwater pollution include:

- **Used oil, paint thinner, gasoline and other chemicals poured on the ground.**
- **Leaking fuel storage tanks (aboveground and underground).**
- **Overuse of pesticides and fertilizers on lawns, golf courses and agriculture fields.**
- **Chemical spills at businesses, farms and along highways.**
- **Illegal dumps and poorly managed landfills.**
- **Failing septic tanks.**
- **Leaking sewer lines.**
- **Improperly abandoned wells.**
- **Unlined waste pits, ponds and lagoons.**
- **Farm machinery repair shops/ Automobile repair shops**
- **Cemeteries/Funeral Homes**
- **Golf Courses**
- **Animal Feedlot / Animal Waste Storage**

HOW CAN YOU HELP?

Water is our most valuable natural resource and we are responsible for protecting it! You can help by doing your part to protect our supply by supporting this program. Here are some tips:

- Never pour used oil, paint thinner or other hazardous chemicals on the ground or down the drain. Take them to the Stanly County Convenience Site or to a Hazardous Waste Collection Event.
- Check for and fix leaks in storage tanks (i.e. home heating oil/kerosene) at your home or business.
- Inspect and pump your septic tank as needed.
- Have any unused wells on your property properly abandoned.
- Minimize your use of pesticides and fertilizers, storing them properly.
- Clean up junk and debris on your property.
- Report all chemical spills immediately.
- Encourage community leaders and businesses to do everything possible to protect our drinking water supply.

NC RWA TRAINING SUPPORT

WELLHEAD PROTECTION PROGRAM PLAN

What to know about Agricultural Fertilizer Application

Help us preserve our water quality for our current and future needs (more information on reverse). For more information, please contact the Town of Oakboro at 704-485-3351.

MANAGING FERTILIZER USE NEAR DRINKING WATER SUPPLIES

If improperly managed, elements of fertilizer can move into surface water through field runoff or leach into ground water. The two main components of fertilizer that are of greatest concern to public drinking water supplies are nitrogen (N) and phosphorus (P). Crop producers need to match nitrogen applications to crop uptake to minimize nitrate leaching and maximize efficiency. Due to health risk, the EPA set a drinking water maximum contaminant level (MCL) of 10 milligrams per liter (mg/l) for nitrate measured as nitrogen. The goal of the prevention measures, as described below, are to minimize nutrient losses from agricultural land occurring by edge-of-field runoff and by leaching from the root zone. This can be achieved by developing a comprehensive nutrient management plan and using only the types and amounts of nutrients necessary to produce the crop, applying nutrients at the proper times and with proper methods, implementing additional farming practices to reduce nutrient losses, and following proper procedures for fertilizer storage and handling.

APPLICATION RATES AND FERTILIZER TYPES

- Limit fertilizer to an amount necessary to achieve a realistic goal
- Perform yearly soil sampling to determine nutrient needs
- When calculating rate of application, credit other sources to include nitrogen and phosphorous contributions from previous legume crops, irrigation water, manure, and organic matter
- Understand and follow fertilizer yield goals based on soil properties, available moisture, yield history, and management level
- Apply the appropriate form of nitrogen fertilizer based on soil and weather conditions.

APPLICATION PRACTICES
Apply product during maximum crop uptake periods
Inspect and calibrate equipment annually to ensure accurate application amounts
Correctly place fertilizer in the root zone to enhance plant nutrient uptake which minimalizes loss
Manage irrigation water due to the large amount of water applied. Sprinklers, precision applicators, surges and drips can apply water uniformly.

EPA NC RWA TRAINING SUPPORT

United States Environmental Protection Agency | Office of Water (4606) | EPA 816-F-01-025 July 2001

Source Water Protection Practices Bulletin

Managing Small Quantity Chemical Use to Prevent Contamination of Drinking Water

Many small businesses, government agencies, and academic institutions use chemicals to carry out their business functions. Although varying greatly in purpose, these small quantity chemical users share in their ability to potentially contribute to the pollution of drinking water. Many small businesses understand their day-to-day business operations but may lack familiarity with procedures for proper use and management of chemicals. This fact sheet provides an overview of prevention measures and demonstrates how precaution must be taken in all areas regarding chemical use. Businesses that generate hazardous waste, as it is defined under the Resource Conservation and Recovery Act, should consult with their State hazardous waste agency regarding proper handling and disposal.

PLACES WHERE SMALL QUANTITY CHEMICAL USE OCCURS

Small quantity chemical users include dry cleaners, beauty shops, photo finishers, vehicle repair shops, printers, laboratories, water supply facilities, academic institutions, nursing homes, medical facilities, and many others. It is the daily practices of these businesses that use chemicals and produce chemical waste. Degreasing, cleaning, polishing, paint preparation, rust removal, and photo processing are just a fraction of the activities in which small businesses are engaged.

Improper disposal of chemicals from these users can reach ground or surface water through a number of pathways. If substances from these businesses are accidentally or intentionally discharged into sewers, contamination of ground and surface waters can occur. Improper disposal into sewers can also endanger the ability of publicly-owned treatment works (POTWs) to properly treat wastewater. Chemicals poured into septic systems or dry wells can leach into ground water or contribute to treatment system failure. Chemical users should always ensure that haulers they hire to carry their waste off-site are properly licensed and that they deliver the waste to appropriate disposal sites.

WHY IS IT IMPORTANT TO MANAGE SMALL QUANTITY CHEMICAL USE NEAR THE SOURCES OF YOUR DRINKING WATER?

Many ordinary businesses use chemicals and produce chemical waste that can be harmful to humans if ingested. Types of chemicals used by these businesses include solvents, corrosives, dry cleaning agents, heavy metals and inorganics, inks and paint, lead-acid batteries, plating chemicals, cyanide, and wood preserving agents. Each set of contaminants has its own environmental and health hazards. For example, a dry cleaning filtration residue, perchloroethylene, causes kidney and liver damage in both humans and animals. It is among the most common contaminants in ground water and a very small amount can contaminate many thousands of gallons of water. Used cyanide, a common waste product of metal finishing, is considered an acutely hazardous waste and can be toxic in very small doses. Chemical manufacturers can supply Material Safety Data Sheets (MSDS) which list these kinds of dangers and help to categorize products and their waste.

AVAILABLE PREVENTION MEASURES TO ADDRESS SMALL QUANTITY CHEMICAL USE

Due to the large number and variety of businesses that use chemicals, there are a vast number of prevention measures, many of which are specific to the facility of interest. This fact sheet discusses some prevention measures that are common to most chemical using facilities. Before a facility can implement any pollution prevention practice, it must first assess what kinds of chemicals are used and how they are used. Monitoring chemical use can help operators decide which option will be the most beneficial. Businesses should start with easy and inexpensive practices before considering more costly measures such as equipment and process modifications. Some of the easiest and least expensive practices can produce the most effective pollution prevention results.

Please keep in mind that individual prevention measures may or may not be adequate to prevent contamination of source waters. Most likely, individual measures should be combined in an overall prevention approach that considers the nature of the potential source of contamination, the purpose, cost, operational, and maintenance requirements of the measures, the vulnerability of the source waters, the public's acceptance of the measures, and the community's desired degree of risk reduction.

Ways to Avoid Excess Chemical Use

Good waste reduction and management strategies can significantly reduce the threat of hazardous materials to drinking water sources. Make sure employees carefully follow the manufacturer's directions when mixing or using chemicals to prevent producing large quantities of useless material that must be disposed of as waste. The toxicity of waste can be reduced by using the least hazardous or least concentrated products available to accomplish their processes. Such substitutions include the use of water based paints, or high solids solvent based paints when water based paints are not available. Cleaning products and solvents, which can contain highly toxic or harsh chemicals, can be replaced with less hazardous counterparts. Printing businesses can use nontoxic inks that are free of heavy metal pigments.

Responsible purchasing can also drastically decrease the amount of waste for disposal. This includes ordering materials on an as-needed basis and returning unused portions back to vendors. A facility may unwittingly create excess harmful materials by mixing hazardous with

nonhazardous waste. Avoiding this practice can significantly reduce the toxicity of waste disposed and increase the possibility of recycling materials. Another method of waste reduction is trading waste with other businesses. ***Waste exchanges*** reduce disposal costs and quantities, reduce the demand for natural resources, and increase the value of waste.

Proper Use and Handling of Chemicals

Reading the label on chemical containers is one of the simplest and most important prevention measures. The label provides information on proper use, storage, and disposal and may provide emergency information in the event the product is accidentally spilled or ingested. In cases where the chemical is highly dangerous, the label will contain special warnings or use restrictions.

Employee training is critical in preventing source water pollution by chemical using facilities. While many preventive measures seem simple and straightforward, if they are not followed or employees are unaware of them, significant consequences can result. All staff should be trained to store materials properly and be aware of spill control and response protocols. Employees can be encouraged to learn and retain proper procedures through periodic drills, pollution prevention training workshops, and company incentive or reward programs.

Proper Storage and Disposal of Chemicals

Chemical audits are a good starting point. It is important to understand chemical needs for the facility and compare these to the chemical supply on hand. Where appropriate, excess chemicals should be removed (and properly disposed), or future purchasing adjusted to reduce stored inventories. A ***chemical management plan*** that includes a list of chemicals used, the method of disposal such as reclamation or contract hauling, and procedures for assuring that toxic chemicals are not discharged into source water should be implemented.

Proper on-site storage of hazardous substances helps to prevent accidental leaks and applies to both storage areas and containers. Designated storage areas should have paved or impervious surfaces, a protective cover, and secondary containment around all containers to catch spills. Containers should have clear and visible labels which include purchase date and all information presented on the distributer's original label. Dating materials allows facilities to use older materials first. When not in use, storage containers must be sealed to prevent spills and evaporation. Storage areas and containers should be thoroughly inspected on a weekly basis and secured against unauthorized entry. Care should be taken that chemical storage and handling areas do not allow for contamination of storm water flows. EPA has developed extensive guidance providing BMPs for storm water management in industrial settings.

Hazardous waste should never be discharged into floor drains, storm drains, toilets, sinks, other improper disposal areas, or other routes leading to public sewers, septic systems, or dry wells. Chemical waste should be disposed of according to the manufacturer's directions and State and local requirements. Many local communities sponsor household hazardous waste events to collect and properly dispose of small quantities of chemicals.

A useful tool for making disposal decisions is the ***Material Safety Data Sheet*** (MSDS). These sheets provide important information regarding contents of commercial products and enable a facility to determine whether materials will produce hazardous waste. MSDS data (i.e., chemical name, ingredients, possible carcinogens, and other known hazards) are also important for chemical use, storage and spill control. MSDS documents can be obtained from manufacturers and should be kept readily accessible.

When hazardous substances are unintentionally released, the event is considered a spill and must be treated appropriately. ***Spill prevention and control*** includes spill response plans which serve as guidance for employees in the event of a large spill. A good plan minimizes environmental impact and reduces liability for clean-up costs and possible bodily injuries. It should be kept where it can be easily viewed by employees near mixing and storage areas. Besides detailed instructions for staff, a spill response plan includes a diagram showing the location of all chemicals, floor drains, exits, fire extinguishers, and spill response supplies. Spill response supplies (e.g., mop, pail, sponges, absorbent materials) should also be listed. Someone trained in these procedures must be on site or easily reachable during hours of operation.

Other practices to control spills include the use of funnels when transferring harmful substances and drip pans placed under spigots, valves, and pumps to catch accidental leakage. Sloped floors allow leaks to run into collection areas. Catch basins in loading dock areas, where nearly one third of all accidental spills occur, can help recapture harmful chemicals. All practices should be performed in a way that allows the reuse or recycling of the spilled substance.

FOR ADDITIONAL INFORMATION

These sources contain information on small quantity chemical use pollution prevention practices. All of the documents listed are available free of charge on the Internet.

Assistance is available to communities wishing to enact ordinances to protect water supplies from contamination due to small quantity chemical use or to small businesses seeking to improve their operations with management measures. Local fire departments or departments of health have the authority to pass ordinances or regulations covering chemical use and safety. Contact local government authorities in your area to see if there are ordinances in place to manage small quantity chemical use. Numerous examples of local source water protection-related ordinances for various potential contaminant sources can be found at http://www.epa.gov/r5water/ordcom/, http://www.epa.gov/owow/nps/ordinance/, and http://www.epa.gov/owow/nps/ordinance/links.htm. The Small Business Environmental Home Page (http://www.smallbiz-enviroweb.org/fundstat.html) provides links to financial assistance programs and other available assistance in all 50 States.

The following resources provide information on selection and design of specific management measures:

Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program. (1996, June). *Tips for Protecting Your Drinking Water Supply*. Retrieved February 26, 2001, from the World Wide Web: http://www.state.ma.us/dep/brp/dws/files/donts.htm

Minnesota Pollution Control Agency. (1999, July). *Disposal of Industrial Wastewater and Alternatives*. UICP/8-02/July 1999. Retrieved February 21, 2001, from the World Wide Web: http://www.pca.state.mn.us/water/pubs/8-02.pdf

New Hampshire Department of Environmental Services. (1999, February). *Best Management Practices (BMPs) for Groundwater Protection*. WD-WSEB-22-4. Retrieved February 26, 2001, from the World Wide Web: http://www.des.state.nh.us/factsheets/ws/ws-22-4.htm

New York State Department of Environmental Conservation, Pollution Prevention Unit. (1998, March). *Environmental Compliance and Pollution Prevention Guide for Small Quantity Generators*. Retrieved January 2001, from the World Wide Web: http://www.dec.state.ny.us/website/ppu/ecppsqg.pdf

Ohio Environmental Protection Agency, Division of Hazardous Waste Management. (1997, August). *Your Business and Hazardous Materials Management*. Retrieved February 21, 2001, from the World Wide Web: http://www.epa.state.oh.us/dhwm/dwatt/brochure.htm

U.S. EPA, Envirosense. (1993, February). *Case Study: Preventing Ground Water Contamination.* #1903. Retrieved February 21, 2001, from the World Wide Web: http://es.epa.gov/techinfo/case/michigan/michcs15.html

U.S. EPA, New England. (2000, April). *What Role Does Your Business Have in Protecting Drinking Water Sources*. EPA-901-F-00-001. Retrieved February 21, 2001, from the World Wide Web: http://www.epa.gov/region01/eco/drinkwater/sourcewater.pdf

U.S. EPA, Office of Solid Waste. (1996, April). *Understanding the Hazardous Waste Rules*. EPA530-K-95-001. Retrieved May 1, 2001, from the World Wide Web: http://www.epa.gov/epaoswer/hazwaste/sqg/handbook/sqg_pdf.pdf

U.S. EPA, Office of Wastewater Management. (1992, September). *Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and BMPs*. Retrieved May 1, 2001, from the World Wide Web: http://www.epa.gov/owm/sw/indguide/index.htm

The following sites provide information on preventive measures for small quantity chemical use:

downthedrain.org is a site dedicated to reducing the threat of hazardous materials to our drinking water supply. http://www.downthedrain.org

The Miami-Dade Department of Environmental Resource Management provides several best management practices fact sheets for various types of facilities. http://www.co.miami-dade.fl.us/derm/

The Small Business Environmental Home Page (http://www.smallbiz-enviroweb.org) helps small business access environmental compliance and pollution prevention information. Its publication section provides documents and web sites for various small quantity chemical users.

The U.S. EPA's Office of Enforcement and Compliance Assistance (http://es.epa.gov/oeca/main/compasst/index.html) provides documents and links related to small quantity chemical users.

Information on waste exchange can be found on U.S. EPA's Envirosense web site for Materials/Waste Exchange. http://es.epa.gov/program/iniative/waste/waste.html.

United States Environmental Protection Agency | Office of Water (4606) | EPA 916-F-01-022 July 2001

Source Water Protection Practices Bulletin

Managing Above Ground Storage Tanks to Prevent Contamination of Drinking Water

Above ground storage tanks (ASTs) are tanks or other containers that are above ground, partially buried, bunkered, or in a subterranean vault. These can include floating fuel systems. This fact sheet focuses on the management of facilities with ASTs to prevent contamination of drinking water sources (ground water and surface water used as public drinking water supplies).

ABOVE GROUND STORAGE TANK USE

The majority of storage tanks contain petroleum products (e.g., motor fuels, petroleum solvents, heating oil, lubricants, used oil). Oil storage facilities with ASTs are typically found in marketing terminals, refineries, and fuel distribution centers. Storage tanks may also be found in airports, school bus barns, hospitals, automotive repair shops, military bases, farms, and industrial plants. Discharges of chemicals, petroleum, or non-petroleum oils from storage tanks can contaminate source water. Product spilled, leaked, or lost from storage tanks may accumulate in soils or be carried away in storm runoff.

Some of the causes for storage tank releases are holes from corrosion, failure of piping systems, and spills and overfills, as well as equipment failure and human operational error. The Spill Prevention Control and Countermeasures (SPCC) regulations require owners or operators of certain above ground oil storage facilities to prepare and comply with written, site-specific, spill prevention plans (see 40 CFR Part 112):

- Facilities with a total above ground oil storage capacity of more than 1,320 gallons;
- Single above ground tanks with an oil storage capacity of more than 660 gallons; and
- Facilities with a combined underground oil storage capacity greater than 42,000 gallons.

Above ground storage tanks

Please note, however, that State AST regulations may be more stringent or differ in other ways from the Federal requirements. You must check with local regulatory authorities to make sure which ASTs are subject to what requirements. All AST facility owners or operators exempt from these regulations should still consider implementing the prevention measures described in this fact sheet to preclude future storage tank problems.

WHY IS IT IMPORTANT TO MANAGE ABOVE GROUND STORAGE TANKS NEAR THE SOURCES OF YOUR DRINKING WATER?

Storage tank releases can contaminate soil and drinking water supplies. Petroleum products are composed of volatile organic compounds (VOCs). Any oil spill can pose a serious threat to human health and the environment, requires remediation that extends beyond your facility's boundary, and results in substantial cleanup costs. Even a small spill can have a serious impact. A single pint of oil released into the water can cover one acre of water surface area and can seriously damage an aquatic habitat. A spill of only one gallon of oil can contaminate a million gallons of water. It may take years for an ecosystem to recover from the damage caused by an oil spill. The location of the facility must be considered in relation to drinking water wells, streams, ponds and ditches (perennial or intermittent), storm or sanitary sewers, wetlands, mudflats, sandflats, farm drain tiles, or other navigable waters. Factors such as the distance to drinking water wells and surface water, volume of material stored, worse case weather conditions, drainage patterns, land contours, and soil conditions must also be taken into account.

AVAILABLE PREVENTION MEASURES TO ADDRESS ABOVE GROUND STORAGE TANKS

The following list of prevention measures is not all-encompassing; others can be found in the references provided at the end of the document. Furthermore, detailed explanations of each device mentioned below are found in the supporting documents. Please keep in mind that individual prevention measures may or may not be adequate to prevent contamination of source waters. Most likely, individual measures should be combined in an overall prevention approach that considers the nature of the potential source of contamination, the purpose, cost, operational, and maintenance requirements of the measures, the vulnerability of the source water, the public's acceptance of the measures, and the community's desired degree of risk reduction.

Federal AST Requirements under 40 CFR Part 112

Follow standard tank filling practices when filling tanks to prevent spills and overfills. Furthermore, all ASTs should have a ***secondary containment*** area that contains spills and allows leaks to be more easily detected. The containment area surrounding the tank should hold 110 percent of the contents of the largest tank plus freeboard for precipitation. Secondary containment for ASTs must be impermeable to the materials being stored. Methods include berms, dikes, liners, vaults, and double-walled tanks. A manually controlled sump pump should be used to collect rain water that may accumulate in the secondary containment area. Any discharge should be inspected for petroleum or chemicals prior to being dispensed.

Routinely monitor ASTs to ensure they are not leaking. An audit of a newly installed tank system by a professional engineer can identify and correct problems such as loose fittings, poor welding, and poorly fit gaskets. After installation, inspect the tank system periodically to ensure it is in good condition. Depending on the permeability of the secondary containment area, more frequent containment area checks may be necessary. Areas to inspect include tank foundations, connections, coatings, tank walls, and the piping system. Integrity testing should be done periodically by a qualified professional and in accordance to applicable standards.

If an AST has remained out of service for more a year or more, many States require owners to maintain and monitor the tank, declare the tank inactive, or remove it. If the tank is declared inactive, remove all substances from the AST system (including pipes) and completely clean the inside. Secure tanks by bolting and locking all valves, as well as capping all gauge openings and fill lines. Clearly label tanks with the date and the words "Out of Service." Samples may be required when removing tanks to determine if any contamination has occurred. Most States require out-of-service tanks to be inspected and meet leak detection requirements before they are put back into service.

Additional AST Prevention Measures

The following prevention measures go beyond the Federal regulations under 40 CFR Part 112, but are highly recommended:

The location of the facility must be considered in relation to drinking water wells, streams, ponds and ditches (perennial or intermittent), storm or sanitary sewers, wetlands, mudflats, sandflats, farm drain tiles, or other navigable waters. The distance to drinking water wells and surface water, volume of material stored, worse case weather conditions, drainage patterns, land contours, and soil conditions must also be taken into account.

ASTs should have ***corrosion protection*** for the tank. Options include elevating tanks, resting tanks on continuous concrete slabs, installing double-walled tanks, cathodically protecting the tanks, internally lining tanks, inspecting tanks according to American Petroleum Institute standard, or a combination of the options listed above. All underground piping to the tank should be double-walled or located above ground or cathodically protected so you can inspect it when it fails.

To maximize system safety, seal the floors, containment area, and sump pump pit with an appropriate coating (e.g., petroleum resistant coating). Any accumulated water should be inspected for petroleum or chemicals prior to discharge

Accumulated minor spillage, over time, may result in a film or sheen on collected rain water, making it unsuitable for discharge to the soil or drains. ***Periodic cleanup*** of the containment areas (e.g., sweeping with a broom and using limited absorbent) can prevent unnecessary dirt and contaminant buildup.

While not a preventative measure for source water protection, ***preventing evaporation*** has economic and air quality benefits. To keep out rain and reduce evaporation losses and moisture condensation, paint tanks a reflective color, install them in an east-west direction, install a low-pressure valve on top of the tank, and cover the structure. A roof structure covering a 10,000 gallon tank will conserve 600 to 1,000 gallons of gasoline per year, which would have escaped by evaporation without the shade cover.

Local jurisdictions may want to implement ***registration programs*** for exempt tanks, in order to exercise some oversight of their construction and operation. Furthermore, most States also require inspections for ASTs by fire marshals. Inspection programs can be expanded to cover water contamination issues.

Covered AST with secondary containment

FOR ADDITIONAL INFORMATION

The following documents contain more detailed information on ASTs and are available for free on the Internet. You can contact your EPA Regional SPCC or Oil Coordinator for more information, as well. There are also State and local authorities that are often located in Oil, Environmental, or Pollution Control Divisions who can provide you with local regulations for ASTs.

Contact local government authorities in your area to see if there are ordinances in place to manage ASTs. Numerous examples of local source water protection-related ordinances for various potential contaminant sources can be found at:
http://www.epa.gov/r5water/ordcom/
http://www.epa.gov/owow/nps/ordinance/
http://www.epa.gov/owow/nps/ordinance/links.htm

The following documents provide additional information on AST prevention measures and regulations:

Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida.. *Above-Ground Fuel Storage Systems* (EES-61). (1992, October). Retrieved February 9, 2001 from the World Wide Web:
http://www.cdc.gov/niosh/nasd/docs2/as04300.html

Minnesota Pollution Control Agency. *Above-Ground Storage Tank Systems*. (2000, October 18). Retrieved February 9, 2001 from the World Wide Web:
http://www.pca.state.mn.us/cleanup/ast.html

Minnesota Pollution Control Agency. *Out-of-Service Tank Systems*. (1998, November). Retrieved February 9, 2001 from the World Wide Web:
http://www.pca.state.mn.us/cleanup/ast.html

Purdue University Extension Service. *Petroleum Product Storage Practices on the Farm*. (1991). Retrieved February 12, 2001 from the World Wide Web:
http://pasture.ecn.purdue.edu/~epados/farmstead/fuel/src/title.htm

South Dakota Department of Environment and Natural Resources, Ground Water Quality Program.. *Frequently Asked Questions about UST and AST Systems*. (n.d.). Retrieved February 19, 2001 from the World Wide Web:
http://www.state.sd.us/denr/DES/Ground/tanks/FAQTANK.htm

U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. *SPCC Requirements and Pollution Prevention Practices for Bulk Storage Facilities.* (n.d.). Retrieved February 9, 2001 from the World Wide Web:
http://www.epa.gov/oilspill/spcc/index.htm

U.S. Environmental Protection Agency, Office of Water. *Storm Water Management for Industrial Activities – Developing Pollution Prevention Plans and Best Management Practices*. Section 3.6 – Liquid Storage in Above-Ground Storage Tanks (EPA 832/R-92-006). (1992, September). Retrieved February 9, 2001 from the World Wide Web:
http://www.epa.gov/owm/sw/indguide/index.htm

U.S. Environmental Protection Agency, Oil Spill Program. *Introduction and Background to the Oil Pollution Prevention Regulation*. (n.d.). Retrieved May 1, 2001 from the World Wide Web: http://www.epa.gov/oilspill/spcc/index.html

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Source Water Protection Practices Bulletin

Managing Underground Storage Tanks to Prevent Contamination of Drinking Water

This fact sheet focuses on the management of underground storage tanks (USTs) to prevent contamination of drinking water sources (ground water and surface water used as public drinking water supplies). USTs are tanks and any connected underground piping that have at least ten percent of their combined volume underground. USTs contain either petroleum or hazardous substances identified by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), except those substances listed as hazardous wastes. Over 95 percent of USTs contain petroleum.

UNDERGROUND STORAGE TANK USE

You are likely to find many USTs in the vicinity of the water sources you want to protect. Currently, the U.S. EPA regulates about 714,000 active USTs located at about 269,000 sites nationwide. Many USTs are located at filling stations that fuel vehicles. In addition to thousands of roadside filling stations, USTs can be found at airports, school bus barns, hospitals, automotive repair shops, military bases, industrial plants, residential areas and other facilities.

Some USTs, like the following, do not need to meet the Federal requirements:

- USTs not storing either petroleum or certain hazardous substances;
- Farm and residential tanks of 1,100 gallons or less capacity holding motor fuel used for noncommercial purposes;
- Tanks storing heating oil used on the premises where it is stored;
- Tanks on or above the floor of underground areas, such as basements; and
- Septic tanks and systems for collecting storm water and wastewater.

Please note, however, that State UST regulations may be more stringent or differ in other ways from the Federal requirements. You must check with local regulatory authorities to make sure which USTs are subject to what requirements. For example, some States regulate heating oil tanks and farm and residential tanks. Even if your UST does not need to meet Federal, State, or local requirements, you should strongly consider implementing some of the prevention measures mentioned in this fact sheet to preclude future releases.

WHY IS IT IMPORTANT TO MANAGE UNDERGROUND STORAGE TANKS NEAR THE SOURCES OF YOUR DRINKING WATER?

Most UST releases result from the corrosion of parts, improper installation, failure of piping systems, poorly conducted fuel deliveries (spills and overfills), and improper operation and maintenance of the UST system.

UST releases can contaminate soil and drinking water supplies. As of September 2000, almost 412,000 UST releases had been confirmed. Once in the soil, these releases can move rapidly and threaten drinking water supplies. EPA estimates that about half of UST releases reach ground water.

Leaking pipe from UST

Petroleum includes carcinogenic compounds such as benzene. Even at very low levels, fuel contaminants in water may not be detected by smell or taste, yet they can affect human health. Petroleum can also contain the additive methyl tertiary butyl ether (MTBE), which can make water smell and taste bad enough to be undrinkable. And it does not take much pollution to create a drinking water problem. For example, an unrestricted gasoline leak of one drop per second releases about 400 gallons per year. Even a few quarts of gasoline in the ground water can pollute a drinking water well. Also, cleaning up contaminated soil and ground water involves expensive operations. Average cleanup costs at leaking UST sites are about $125,000, and ground water cleanup at some sites exceeds $1 million.

AVAILABLE PREVENTION MEASURES TO ADDRESS UNDERGROUND STORAGE TANKS

Federal UST regulations were promulgated in 1988 to prevent and detect UST releases (see 40 CFR Part 280). The following paragraphs briefly identify some basic UST requirements. Please keep in mind that individual prevention measures may or may not be adequate to prevent contamination of source waters. Most likely, individual measures should be combined in an overall prevention approach that considers the nature of the potential source of contamination, the purpose, cost, operational, and maintenance requirements of the measures, the vulnerability of the source water, the public's acceptance of the measures, and the community's desired degree of risk reduction.

Federal UST Requirements

Proper installation. USTs must be installed according to industry standards with great care to maintain the integrity and the corrosion protection of the tank.

Tanks must also be ***properly sited*** away from wells, reservoirs, and floodplains. Ideally, all types of USTs should be located outside of source water protection areas.

Excavated USTs

Corrosion protection. UST systems must be made of noncorrodible material, such as fiberglass, or have corrosion protection provided in other ways, such as by being made of externally coated and cathodically protected metal, having double-walls, metal having a thick corrosion resistant cladding or jacket, or having an internal tank lining.

Spill protection. USTs must have catchment basins that can catch spills that may occur when the delivery hose is disconnected from the fill pipe. A catchment basin is basically a bucket sealed around the fill pipe.

Overfill protection. When an UST is overfilled, large volumes can be released at the fill pipe and through loose fittings on the top of the tank or a loose vent pipe. USTs must have overfill protection devices, such as automatic shutoff devices, overfill alarms, and ball float valves. In addition, proper filling procedures during fuel delivery must be followed to reduce the chance of spills or overfills.

Leak detection. Leak detection options include automatic tank gauging, interstitial monitoring, statistical inventory reconciliation, vapor monitoring, and ground water monitoring. All leaks must be detected in a timely manner, before they become big cleanup and liability problems.

Proper closure. The regulatory authority needs to be notified 30 days before UST closure, and a determination must be made if any contamination of the environment has occurred. The tank must be emptied and cleaned, after which it may be left underground or removed. Standard safety practices should always be followed when emptying, cleaning, or removing tanks.

Additionally, some large capacity UST owners — those who have more than 42,000 gallons of oil storage capacity at one site — may need to comply with Federal Spill Prevention Control and Countermeasures (SPCC) regulations. Refer to the above ground storage tank fact sheet or 40 CFR Part 112 for information.

Additional Prevention Measures

Local jurisdictions may want to implement ***registration programs*** for exempt tanks, in order to exercise some oversight of their construction and operation.

Local governments can use ***land use controls*** to address some of the potential risks from USTs. For example, zoning can restrict these activities to specific geographic areas that are away from drinking water sources. Prohibition of gas stations (which use USTs) or residential

heating oil tanks in source water protection areas can reduce the risk that harmful contaminants may enter source water. Local governments may also require permits that impose additional requirements such as setbacks, open spaces, buffers, walls and fences; street paving and control of site access points; and regulation of hours and methods of operation.

Work with your State and local UST regulatory authorities to ensure that ***adequate inspection*** of UST sites takes place regularly — inspections that verify whether USTs are properly equipped, operated, and maintained so they will not pose a threat to your water source. State UST program contacts are among the many resources found at the Web site described below.

FOR ADDITIONAL INFORMATION

Information and publications on UST regulations and best management practices can be obtained at no cost on the Internet at the following Web site address maintained by EPA's Office of Underground Storage Tanks: http://www.epa.gov/OUST/. You can also call an EPA Hotline at 1-800-424-9346 for assistance and to order helpful publications about USTs. The most useful general publication is called "Musts For USTs," a basic plain language description of UST types and Federal requirements. Also, see EPA's Drinking Water Academy Web site at http://www.epa.gov/safewater/dwa.html for a listing of documents on management measures.

Contact local government authorities in your area to see if there are ordinances in place to manage USTs. Numerous examples of local source water protection-related ordinances for various potential contaminant sources can be found at:
http://www.epa.gov/r5water/ordcom/
http://www.epa.gov/owow/nps/ordinance/
http://www.epa.gov/owow/nps/ordinance/links.htm

The following documents provide additional information on UST prevention measures and regulations:

American Petroleum Institute. *Preventing Spills in Storage Tanks.* (1999, February 16). Retrieved February 9, 2001 from the World Wide Web: http://www.api.org/oilspills/tanks.htm

Iowa Department of Natural Resources. *Groundwater Protection Fact Sheet – Underground Storage Tanks.* (1996, August). Retrieved February 9, 2001 from the World Wide Web: www.state.ia.us/dnr/organiza/wmad/lqbureau/ust/genust1.htm

Iowa Department of Natural Resources, Waste Management Assistance Division. *Underground Storage Tanks – Frequently Asked Questions*. (2001, January 15). Retrieved February 9, 2001 from the World Wide Web:
http://www.state.ia.us/dnr/organiza/wmad/lqbureau/ust/index.htm

Minnesota Pollution Control Agency. *Underground Storage Tank (UST) Systems*. (2000, December 27). Retrieved February 9, 2001 from the World Wide Web:
http://www.pca.state.mn.us/cleanup/ust.html

Purdue University Extension Service. *Petroleum Product Storage Practices on the Farm*. (1991). Retrieved February 12, 2001 from the World Wide Web:
http://pasture.ecn.purdue.edu/~epados/farmstead/fuel/src/title.htm

South Dakota Department of Environment and Natural Resources, Ground Water Quality Program. *Don't Wait Until 98*. (n.d.). Retrieved February 9, 2001 from the World Wide Web: http://www.state.sd.us/denr/DES/Ground/tanks/dont-2.htm

South Dakota Department of Environment and Natural Resources, Ground Water Quality Program. *Frequently Asked Questions about UST and AST Systems*. (n.d.). Retrieved February 19, 2001 from the World Wide Web: http://www.state.sd.us/denr/DES/Ground/tanks/FAQTANK.htm

U. S. Environmental Protection Agency, Region 7. *Region 7 Underground Storage Tank Fact Sheet – Understanding the 1998 Requirements.* (1998/1999, winter). Retrieved February 9, 2001 from the World Wide Web: http://www.epa.gov/region7/programs/artd/ustbx/index2.htm

U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. *Musts for USTs – A Summary of Federal Regulations for Underground Storage Tank Systems* (EPA 510/K-95-002). (1995, July). Retrieved January 31, 2001 from the World Wide Web: http://www.epa.gov/swerust1/pubs/

U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. *Straight Talk on Tanks – Leak Detection Methods for Petroleum Underground Storage Tanks and Piping* (EPA 510/B-97-007). (1997, September). Retrieved January 31, 2001 from the World Wide Web: http://www.epa.gov/swerust1/pubs/

U.S. Environmental Protection Agency, Office of Underground Storage Tanks. *Upgrading UST Systems.* (1998, May 27). Retrieved January 31, 2001 from the World Wide Web: http://www.epa.gov/swerust1/ustsystm/upgrade.htm

U.S. Environmental Protection Agency, Office of Underground Storage Tanks. *What Do You Need to Know about Underground Storage Tanks?* (1999, June 7). Retrieved January 31, 2001 from the World Wide Web: http://www.epa.gov/swerust1/cmplastc/knowneed.htm

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Source Water Protection Practices Bulletin

Managing Small-Scale Application of Pesticides to Prevent Contamination of Drinking Water

Pesticides (including insecticides, herbicides, and fungicides) contain a variety of chemicals used to control pests, insects, and weeds. They are used in many applications to reduce the damage to plants by insects and other pests, and to control overgrowth of undesirable plant species. This fact sheet describes measures to prevent contamination of drinking water sources from small-scale pesticide application (i.e., on lawns, golf courses, cemeteries, parks, and roadways); see also the fact sheet on prevention measures for large-scale pesticide application for agricultural or farm conditions.

SOURCES OF PESTICIDES

Pesticides are used in a variety of applications in areas with green spaces. They are used by homeowners, in commercial establishments such as golf courses and cemeteries, and along roadways. Homeowners use pesticides in lawn care and gardening activities. Many homeowners plant non-native plant species, which require pesticides, fertilizers, and watering to keep them healthy.

Golf courses and recreational areas such as parks and other open spaces use pesticides for similar purposes. Shorter grasses typical of golf courses are less resistant to insects and require application of pesticides to keep them healthy. Pesticides are also used to maintain lawns in cemeteries and commercial areas. Herbicides are used along roadways and transportation and utility corridors to limit vegetation growth and increase visibility for drivers or access to power lines.

Excess rain can wash pesticides from plants and soil. This can, in turn, run off into streams. Pesticides can leach into the soil if plants are watered or rainfall occurs soon after application. Some pesticides resist degradation by microbes in the soil and will eventually leach into the ground water. Pesticides can reach ground water through drains, sink holes, and other conduits as well.

WHY IS IT IMPORTANT TO MANAGE SMALL SCALE APPLICATION OF PESTICIDES NEAR THE SOURCES OF YOUR DRINKING WATER?

Pesticides contain a variety of organic and inorganic compounds. By nature, they are poisonous, and while they can be safely used if manufacturers' usage directions are followed, they can, if

mismanaged, seep into surface water and ground water supplies. They can be difficult and expensive to remove, and, if inhaled or consumed, be hazardous to human health. The synthetic organic chemicals in pesticides have been linked to serious health problems, including cancer, liver and kidney damage, reproductive difficulties, and nervous system effects.

Once a water supply becomes contaminated with a pesticide, it can be very difficult and costly to treat. Treating the water supply is a lengthy process and is not always successful. Using an alternative water source may also be costly and impractical. For example, it would be very expensive to connect to another public water system, and drilling new wells does not necessarily guarantee that the new ground water source will not be contaminated.

AVAILABLE PREVENTION MEASURES TO ADDRESS SMALL-SCALE PESTICIDE APPLICATION

Prevention measures are available to protect source water from pesticide contamination. They range from simple, common-sense activities (e.g., reading the label) to more complex activities such as properly storing and disposing pesticides. Most prevention measures for small-scale application of pesticides tend to be easy, low cost activities. The most effective pesticide contamination prevention measures encompass both simple and complex practices to reduce the potential for pesticides to move into source water. Prevention measures can be divided into those that protect surface water from pesticide runoff and those that protect ground water from leaching or percolation.

Please keep in mind that individual prevention measures may or may not be adequate to prevent contamination of source waters. Most likely, individual measures should be combined in an overall prevention approach that considers the nature of the potential source of contamination, the purpose, cost, operational, and maintenance requirements of the measures, the vulnerability of the source waters, the public's acceptance of the measures, and the community's desired degree of risk reduction. The following are the more conventional prevention measures used to avoid contamination from small-scale application.

There are many options available to minimize the need for pesticides. ***Integrated Pest Management (IPM)*** is the use of all means of pest control (chemical and non-chemical) in a compatible fashion to reduce pesticide use. Pesticides are the last line of defense and are used only when pest levels are causing sufficient damage to offset the expense of the application. IPM includes ***regular monitoring*** to check levels of pest populations and their damage to determine management needs, be it pesticide application or other management actions. Monitoring can be accomplished by a trained employee such as a facility manager. IPM also includes ***non-chemical control measures*** such as mechanical, cultural and biological controls, sanitation, and pesticide-resistant plants are highly recommended. Where possible ***alternate plants***, select ***pest-resistant plant varieties***, and mulch the gardens or flower beds to reduce weeds. Maximize the benefits of naturally occurring ***biological controls*** by using pesticides only when necessary. Many insecticides are broad spectrum materials and affect beneficial insects and other arthropods as well as pests. If pesticides must be used, select those that are designed specifically for the pests you wish to control, and are ***low-persistent*** in the environment.

Ladybugs are a natural control for aphids

Proper Pesticide Application

Reading the label on the pesticide container is one of the simplest and most important prevention measures. The label indicates the proper use, rate of application, whether the pesticide is broad spectrum or selective (i.e., kills everything or only a certain type of insect), and proper handling of the pesticide. The label also provides information on proper storage and disposal, and emergency contact numbers, if accidentally ingested. In cases where the pesticide is highly toxic, the label will contain special warnings and use restrictions, such as ***setbacks*** for mixing and application away from wells or drinking water sources. Reading the label and following the directions will ensure that pesticides are ***not over-used*** and are used in a way that is ***consistent*** with the pest problem.

Proper application of pesticides reduces the amount of chemicals applied to the ground and saves landowners money by reducing the amount of pesticides purchased. Calibrate application equipment to allow correct application, follow pesticide manufacturers' directions, and select leaching-resistant or "slow release" pesticides. Apply in large droplets to resist carrying away by the wind. Mix and load pesticides only over impervious surfaces, such as cement, that do not contain floor drains or storm water drain inlets; these drains may convey spills to ground water sources. Check the pesticide label for pesticide application procedures; do not over-apply the pesticide.

Pesticides should not be applied immediately before or after rainfall, as this may cause soil runoff at the application site and the need to reapply the pesticide. The soil in the runoff can carry the pesticide to the local storm water drain, and contaminate local source waters.

Ways to Reduce Pesticide Use

Select healthy seeds and seedlings that are known to resist diseases and are suited to the climate. Strong seeds are likely to produce mature plants with little need for pesticides. Planting pest-resistant plant varieties and local plant species will also reduce pesticide needs.

Alternate your plants each year; plants will not be vulnerable to the pests that survive the winter. Insects will move to another location where they can find nutrients, and weeds will remain dormant until their nutrient source is replenished.

Manual activities such as spading, hoeing, hand-picking weeds and pests, setting traps, and mulching are all good ways to get rid of pests without using pesticides. Homeowners have a tendency to over-use pesticides, and should take care to use only what they need.

Proper ***plant management*** can improve plant health, reduce the need for pesticides, and reduce runoff and infiltration. Use mowing and watering techniques that maintain a healthy lawn and minimize the need for chemical treatment. Maintain proper drainage and aeration to encourage the growth of microbes that can degrade pesticides. Reduce watering to control seepage of pesticides to the ground water; this conserves water and reduces runoff.

Use of ***biological controls*** reduces the need for chemical pesticides. Plants that attract predatory species, such as birds and bats, can enhance landscaping and naturally reduce pests.

Proper Pesticide Storage and Handling

Proper storage is important in preventing both surface water and ground water contamination. Store pesticides in intact containers in a shed or covered structure on an impermeable surface such as concrete. You must follow directions for storage on pesticide labels, although the directions are usually general, such as "Do not contaminate water, food, or feed by storage or disposal." Do not store pesticides in areas prone to flooding. Keep pesticides in their original containers; if the label is unreadable, properly dispose of the product.

Spill clean up is another important prevention measure. Promptly sweep up dry spills and reuse the pesticides as intended; dry spills are usually easier to clean. For liquid spills, recover as much of the spill as possible and reuse it as intended. It may be necessary to remove some contaminated soil. Have cat litter or other absorptive materials available to absorb unrecovered liquid from the floor. Be sure to have an emergency contact number to call for help, if necessary. Be sure to check the label for proper handling of the chemicals.

Disposal of pesticide containers can lead to ground water contamination if the containers are not stored or cleaned properly. Chemical residues from these containers can leak onto the ground. Homeowners and other users may have smaller quantities of pesticides and empty containers and different disposal options than farmers.

Homeowners usually use nonreturnable containers, and have the option of participating in their local community household hazardous waste collection events. Partially-full and empty containers may be given to household hazardous waste collection. Homeowners should only triple rinse pesticide containers if they are able to use the rinse water immediately, e.g., on plants that require pesticides. Rinse water should never be disposed down a drain or into a sewer system. Recycle plastic and metal containers whenever possible, keeping in mind that non-hazardous container recycling programs may refuse to take pesticide containers. Empty containers may be disposed in regular trash. Shake out bags, bind or wrap them to minimize dust, and put them in regular trash. Do not bury or burn pesticide containers or bags on private property. Homeowners may give unused pesticides to a neighbor rather than throw them away.

Farmers and users of larger quantities of pesticides (e.g., golf course managers) may have larger quantities of pesticides to store and dispose, and are often prohibited from participating in community household hazardous waste collection events. To prevent ground water contamination, use returnable containers as often as possible and take them back to the dealer. For non-returnable containers, pressure-rinse or triple-rinse containers immediately after they are empty, since residue can be difficult to remove after it dries, and apply the rinse water appropriately (i.e., on plants that require pesticides). Most States have collection programs for farmers and other pesticide users with unwanted pesticides, often referred to as Clean Sweep programs. Many States also have pesticide container and recycling programs. Puncture nonreturnable containers and store them in a covered area until they can be disposed according to your State's guidelines. Shake out bags, bind or wrap them to minimize dust, and take them to a permitted landfill. Do not bury or burn pesticide containers or bags on private property. Contact your State Department of Agriculture or Department of Environmental Quality for information. If containers are full or partially full and the pesticide is in good condition, it may be given to another pesticide user. However, if the pesticide is labeled a restricted use pesticide, it can only be distributed and used by certified applicators.

FOR ADDITIONAL INFORMATION

These sources contain information on pesticide management measures. All of the documents listed are available for free on the Internet. Contact local government authorities in your area to see if there are ordinances in place to manage pesticides.

AgSafe Coalition. *Safely Handling Pesticides*. Retrieved February 15, 2001, from the World Wide Web: http://www.agsafe.org/series_1/pesticide.html.

California Environmental Protection Agency, Department of Pesticide Regulation. *Tips for Handling Pesticides Safely*. Retrieved March 12, 2001, from the World Wide Web: http://www.cdpr.ca.gov/docs/factshts/safeuse.htm.

EXTOXNET FAQs. *Pesticides: How They Affect You and The Environment*. Retrieved March 8, 2001, from the World Wide Web: http://ace.orst.edu/info/extoxnet/faqs/.

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Home*A*Syst. *National Home*A*Syst Program.* Retrieved May 22, 2001, from the World Wide Web: http://www.uwex.edu/homeasyst/index.html.

Massachusetts Department of Food and Agriculture, Pesticide Bureau. *A Homeowner's Guide to Environmentally Sound Lawncare.* Retrieved June 4, 2001, from the World Wide Web: http://www.massdfa.org/pesticides/publications/homeowner.htm

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National Pesticides Telecommunications Network. *Pesticide Fact Sheets.* Retrieved June 4, 2001, from the World Wide Web: http://nptn.orst.edu/nptnfact.htm

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United States
Environmental Protection
Agency

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Source Water Protection Practices Bulletin

Managing Turfgrass and Garden Fertilizer Application to Prevent Contamination of Drinking Water

Fertilizers are made up of organic and inorganic materials that are added to soil to supply nutrients required for plant growth. If improperly managed, fertilizer elements, specifically phosphorus (P) and nitrogen (N), can run off into surface water or leach into ground water. This fact sheet focuses on the management of small-scale fertilizer applications to prevent contamination of drinking water sources (ground water and surface water used as public drinking water supplies); see the fact sheets on pesticide application and storm water for other preventative measures related to lawn and garden care.

FERTILIZER USE IN TURFGRASS AND GARDENS

The care of landscaped areas can contribute to the pollution of surface water and ground water. Heavily landscaped areas include residential yards, commercial lawns, golf courses, ball fields, and parks. The soils in many of these areas require frequent fertilization to maintain their turf grass. Because excess fertilizer use and poor application methods can cause fertilizer movement into sources of drinking water, the increased application of lawn and garden fertilizers in recent years has raised concern over the pollution of surface water and ground water.

The two main components of fertilizer that are of the greatest concern to source water quality are nitrogen and phosphorus. Nitrogen is used to promote green, leafy, vegetative growth in plants. Plants with nitrogen deficiency show stunted growth. Phosphorus promotes root growth, root branching, stem growth, flowering, fruiting, seed formation, and maturation.

A recent nonpoint source loading analysis from a New Jersey study indicated that ten percent of the nitrogen and four percent of the phosphorus applied annually in a 193-square-mile area of landscaped residential development ended up in surface waters as a result of over-application. Another study (South Jersey Resource Conservation and Development Council, Inc.) found that more than 50 percent of the nitrogen in fertilizer leaches from lawns when improperly applied. This kind of nutrient loss can be reduced by following the prevention measures given in this fact sheet.

WHY IS IT IMPORTANT TO MANAGE FERTILIZER USE NEAR THE SOURCES OF YOUR DRINKING WATER?

Improper or excessive use of fertilizer can lead to nitrate pollution of ground or surface water. Nitrogen fertilizer, whether organic or inorganic, is biologically transformed to nitrate that is highly soluble in water.

Use of nitrogen-containing fertilizers can contribute to nitrates in drinking water. Consumption of nitrates can cause methemoglobinemia (blue baby syndrome) in infants, which reduces the ability of the blood to carry oxygen. If left untreated, methemoglobinemia can be fatal for affected infants. Due to this health risk, EPA set a drinking water maximum contaminant level (MCL) of 10 milligrams per liter (mg/l) or parts per million (ppm) has been set for nitrate measured as nitrogen.

Phosphorus is the other element of concern in fertilizer. Under certain conditions phosphorus can be readily transported with the soil. In fact, 60 to 90 percent of phosphorus moves with the soil. Phosphorus is the major source of water quality impairments in lakes nationwide. Even though regulations that affect the taste and odor of water are not Federally enforceable under the Safe Drinking Water Act, municipalities often must treat their drinking water supplies for these aesthetic reasons.

AVAILABLE PREVENTION MEASURES TO ADDRESS TURFGRASS AND GARDEN APPLICATIONS OF FERTILIZER

This section discusses some of the most often used prevention measures, but is not an exhaustive list of all known measures. For information on additional prevention measures, see the documents referenced in the last section of this fact sheet. Please keep in mind that individual prevention measures may or may not be adequate to prevent contamination of source waters. Most likely, individual measures should be combined in an overall prevention approach that considers the nature of the potential source of contamination, the purpose, cost, operational, and maintenance requirements of the measures, the vulnerability of the source water, the public's acceptance of the measures, and the community's desired degree of risk reduction.

Ways to Eliminate Excess Fertilizer Use

Fertilizer applications should be based on ***soil tests*** to avoid the economic and environmental costs that can be incurred with excess fertilizer use. A soil test will show the levels of phosphorus and potassium present in the lawn; however, soil tests for nitrogen are rare. Nitrogen is highly mobile in the soil and tests generally provide little useful information relative to lawns. Most newly planted areas should be tested during initial planting and every one or two years following that. A minimum of three to four weeks after the last fertilization should pass before sampling. For sampling, 15 to 20 cores should be taken at about three to four inches in depth and mixed in a plastic container. Samples can be tested using readily available field kits or submitted to a private laboratory or extension office for testing and interpretation.

Selecting the appropriate fertilizer is the next crucial step after receiving soil testing results. Most homeowners use blended fertilizers that list percentages of nitrogen, phosphorus, and potassium in the fertilizer. For example, a 100-pound bag of 10-5-10 would contain ten pounds of nitrogen, five pounds of phosphorus, and ten pounds of potassium. The remainder of the bag contains micronutrients and filler materials that allow for an even application of nutrients. If the soil test shows phosphorus is high, then a fertilizer with a low percentage of phosphorus should be chosen (such as 20-0-10 or 24-3-8). Most lawns contain adequate phosphorus, and continuous use of fertilizers high in phosphorus can result in excessive buildups. These lawns are more likely to contribute high levels of phosphorus to surface water during storm runoff events. The use of organic nutrient sources, such as manure, can supply all or part of the

nitrogen, phosphorus, and potassium needs for turfgrass and gardens. However, organic fertilizers can also cause excessive nutrient loads if improperly applied.

Nitrogen should be applied as recommended for the type of grass being grown. It is often recommended that 1,000 square feet of lawn requires 0.5 pounds of nitrogen per month of active growth. A good rule is never to apply more than one pound of nitrogen fertilizer per 1,000 square feet of lawn in any one application. For vegetable and flower gardens only 0.1 to 0.2 pounds of nitrogen per 100 square feet should be applied per year, although corn, tomatoes, and cole crops may require more.


Mulching lawnmower

To help maintain a healthy lawn it is best to mow frequently at a height of 2.5 to 3 inches. ***Grass clippings should remain*** on the lawn to decompose and recycle nutrients back to the lawn. By leaving grass clippings on the lawn, nitrogen applications can be reduced by 30 to 40 percent.


Native plants

Wherever possible, ***low maintenance, native plants and grasses should be planted*** to minimize the use of fertilizer. Plants that are adapted to the local soils require less fertilization and watering (for example, xeriscaping is a landscaping method to minimize the use of water in dry climates). In fact, these practices can reduce required lawn maintenance up to 50 percent. Local planting suggestions may be obtained from State and county extension offices and Web sites.

Proper Fertilizer Application

The use of an ***appropriate form of nitrogen*** fertilizer can reduce the potential for leaching and runoff problems. Quick-release fertilizers should be used on heavy clay or compacted soils, because the longer a fertilizer granule remains intact, the greater the chances it will be washed away into surface water. On sandy soils, however, nitrogen can leach through the soil quickly. On these soils, slow-release nitrogen sources provide soluble nitrogen over a period of time so a large concentration of nitrogen is not made available for leaching. Fertilizer bags are generally labeled as a ratio of water-insoluble nitrogen (WIN) slow-release fraction, to water-soluble nitrogen (WSN) quick-release fraction. A large WIN/WSN ratio indicates a high percentage of slow-release nitrogen is contained in the product.

While the ***proper time of year to fertilize*** varies by location, applying a smaller amount of fertilizer at a higher frequency is often best. Eliminating excess nutrients in soil reduces the chances of polluting surface runoff and ground water. Ideally, fertilizer application should be timed to coincide as closely as possible to the period of maximum uptake and growth. The most active growth periods are spring and fall in cool climates and early and late summer in warm climates. Avoid fertilizer applications before heavy rains.

Core compacted soils before ***applying fertilizer to insure incorporation***. In all types of soil, it is always best to incorporate organic fertilizers into the lawn. When the phosphorus in organic fertilizer remains on top of the soil it has an increased chance of washing away during heavy

rains. Fertilizer should never be applied to frozen ground, and also should be limited on slopes and areas with high runoff or overland flow.

It is important to ***irrigate*** with ¼ to ½ inch of water immediately after application of phosphorus or water-soluble nitrogen fertilizer. Afterwards, the key is to add only enough water to compensate for that removed by plant uptake and evaporation; this will minimize potential pollution problems from runoff and leaching. Over-watering can increase nitrogen loss five to 11 times the amount lost when proper watering strategies are used. Soaker hoses and trickle or drip irrigation systems are preferred alternatives to sprinkler systems. These systems deliver water at lower rates, which can conserve water, increase the volume infiltrated, and reduce surface runoff.

To ensure the proper amount of fertilizer is applied, ***spreaders should be properly calibrated***. As spreaders get older, settings gradually change because of wear and tear. Regular cleaning and lubrication of the spreader will help it perform properly. Labels on fertilizer bags often list the proper spreader settings for different types of spreaders. In general, drop spreaders are slower and more precise than rotary spreaders. Drop spreaders should be used near bodies of water because rotary spreaders can easily cast granules into the water bodies.

Buffer strips or filter strips can be created to slow runoff and help filter nitrogen and phosphorus from runoff. Buffers to runoff can be created simply by avoiding consistent mowing near water bodies. Additionally, natural deep-rooted vegetation can be planted to enhance nutrient filtering. Soil is held in place by the root systems of these plants. This decreases the velocity of runoff and helps prevent erosion near sources of surface water. The vegetation and soil strain and filter sediments, nutrients, and chemicals. For more information on buffer strips and filter strips see the fact sheet on storm water runoff.

Fertilizer Storage and Handling

Closely follow label directions when storing and handling fertilizer and when disposing empty containers. Stored dry fertilizer poses little threat to ground water as long as it is kept dry. Therefore, stored fertilizer should be kept covered to keep precipitation off. Keep bags on pallets to reduce the possibility of water damage.

Fill spreaders on hard or paved surfaces where spills can be cleaned up easily by sweeping or scooping up the spilled granules.

Additional Prevention Measures for Golf Courses

Golf course fairways, tees, and greens should be located where the seasonal water table is not excessively high. Fertilizer movement will be lowest on these sites.

State or local governments can produce guidelines for the design and maintenance of golf courses. These guidelines can require golf course developers and managers to submit plans for approval that show how they intend to lessen the impact of the site on the natural resources of the area. Plan requirements could include ground water and surface water monitoring, and design specifications, such as vegetative buffers or erosion controls.

FOR ADDITIONAL INFORMATION

These documents contain information on fertilizer use and best management practices. All sources are available for free on the Internet. See EPA's Guide to Source Water Information at www.epa.gov/safewater/protect/sources.html for a listing of resources on management measures. You can also contact your local Extension Service for more information.

Contact local government authorities in your area to see if there are ordinances in place to manage fertilizer use. Numerous examples of local source water protection-related ordinances for various potential contaminant sources can be found at:
http://www.epa.gov/r5water/ordcom/
http://www.epa.gov/owow/nps/ordinance/
http://www.epa.gov/owow/nps/ordinance/links.htm

The following documents provide more detailed information on prevention measures for fertilizer use in lawns and gardens.

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Purdue University Extension Service. *Beneficial Lawn Care and Chemical Management*. (n.d). Retrieved February 12, 2001 from the World Wide Web: http://pasture.ecn.purdue.edu/~epados/lawn/src/title.htm

South Jersey Resource Conservation and Development Council, Inc. *Non-Point Pollution Prevention – Homeowner*. (n.d.). Retrieved February 9, 2001 from the World Wide Web: http://www.sjrcd.org/ce/erosion3.htm

University of Idaho, College of Agriculture. *Fertilizer BMPs for Your Lawn*. (1994, April). Water Quality Update, volume 4, number 2. Retrieved February 9, 2001 from the World Wide Web: http://www.uidaho.edu/wq/wqu/wqu42.html

University of Maryland – Cooperative Extension. *Information Central – Greenhouse, Nursery, Landscape, & Turf.* Retrieved May 22, 2001 from the World Wide Web: http://www.agnr.umd.edu/CES/greennursury.html

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University of Minnesota Extension Service. *Turfgrass Management for Protecting Surface Water Quality* (BU-5726-GO). (1997). Retrieved February 12, 2001 from the World Wide Web: http://www.extension.umn.edu/distribution/horticulture/DG5726.html

University of Wisconsin – Extension. *Lawn and Garden Fertilizers* (GWQ002). (1999). Retrieved January 23, 2001 from the World Wide Web: http://www.clean-water.uwex.edu/pubs/stewards/index.html

University of Wisconsin – Extension. *Step in the Right Direction with Proper Lawn Fertilizing*. (n.d.). Retrieved January 23, 2001 from the World Wide Web: http://www.clean-water.uwex.edu/pubs/stewards/index.html

University of Wisconsin – Extension. *Steps for Maintaining Healthy Lawns and Quality Waters.* (n.d.). Retrieved January 23, 2001 from the World Wide Web: http://www.clean-water.uwex.edu/pubs/stewards/index.html

The following documents are examples of local guidelines for the design and maintenance of golf courses:

Baltimore County Environmental Protection and Resource Management. *Environmental Guidelines for the Design and Maintenance of Golf Courses.* (n.d.). Retrieved May 17, 2001 from the World Wide Web: http://www.epa.gov/owow/nps/ordinance/golf.htm

Worcester County Department of Planning, Permits & Inspections. *Voluntary Guidelines Recommended for Golf Courses in Worcester County & the Delmarva Peninsula.* (n.d.). Retrieved May 18, 2001 from the World Wide Web: http://www.dnr.state.md.us/bay/tribstrat/golf.html

The following University of Florida website details their outreach program to reduce non-point source pollution, which includes proper nutrient management techniques: http://hort.ufl.edu/fyn/

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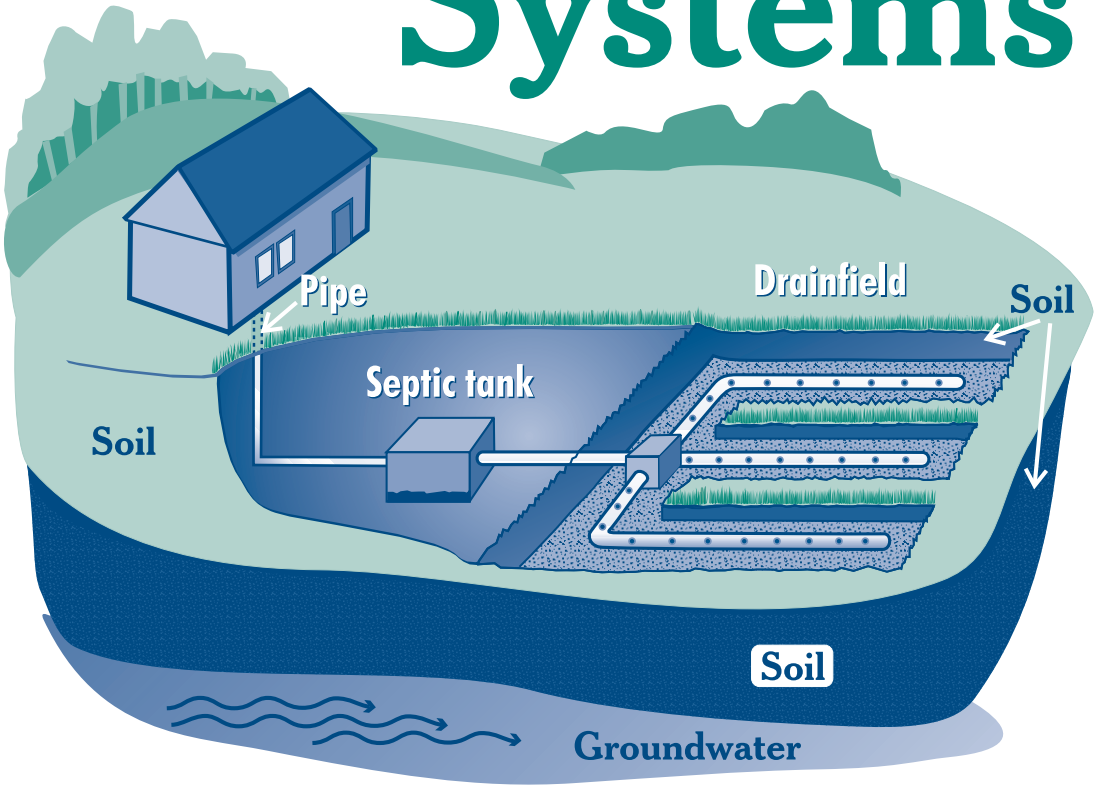
A Homeowner's Guide to Septic Systems



What's Inside

Your Septic System is your responsibility!

Did you know that as a homeowner you're responsible for maintaining your septic system? Did you know that maintaining your septic system protects your investment in your home? Did you know that you should periodically inspect your system and pump out your septic tank?

If properly designed, constructed and maintained, your septic system can provide long-term, effective treatment of household wastewater. If your septic system isn't maintained, you might need to replace it, costing you thousands of dollars. A malfunctioning system can contaminate groundwater that might be a source of drinking water. And if you sell your home, your septic system must be in good working order.

Top Four Things You Can Do to Protect Your Septic System

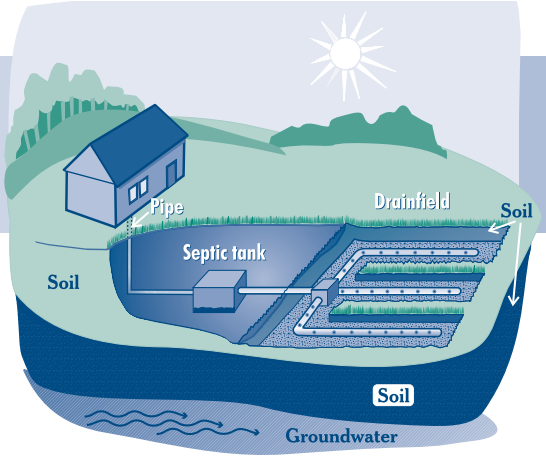
1. **Inspect your system (every 3 years) and pump your tank as necessary (generally every 3 to 5 years).**
2. **Use water efficiently.**
3. **Don't dispose of household hazardous wastes in sinks or toilets.**
4. **Care for your drainfield.**

This guide will help you care for your septic system. It will help you understand how your system works and what steps you can take as a homeowner to ensure your system will work properly. To help you learn more, consult the resources listed at the back of this booklet. A helpful checklist is also included at the end of the booklet to help you keep track of your septic system maintenance.

How does it work?

Components

A typical septic system has four main components: a pipe from the home, a septic tank, a drainfield, and the soil. Microbes in the soil digest or remove most contaminants from wastewater before it eventually reaches groundwater.



Typical onsite wastewater treatment system

Septic system aliases:

- **On-lot system**
- **Onsite system**
- **Individual sewage disposal system**
- **Onsite sewage disposal system**
- **Onsite wastewater treatment system**

Pipe from the home

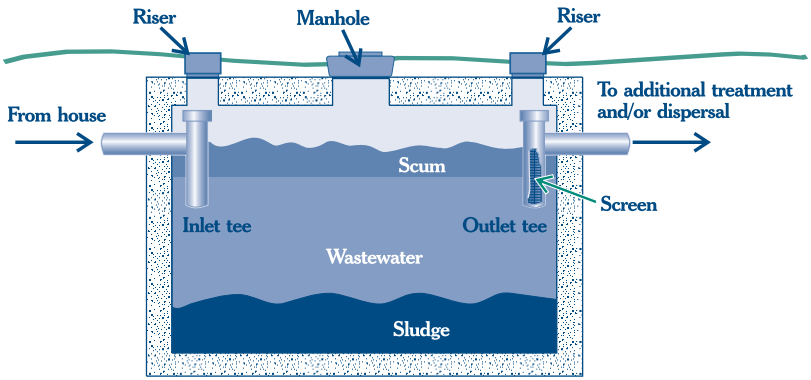
All of your household wastewater exits your home through a pipe to the septic tank.

Septic tank

The septic tank is a buried, watertight container typically made of concrete, fiberglass, or polyethylene. It holds the wastewater long enough to allow solids to settle out (forming sludge) and oil and grease to float to the surface (as scum). It also allows partial decomposition of the solid materials. Compartments and a T-shaped outlet in the septic tank prevent the sludge and scum from leaving the tank and traveling into the drainfield area. Screens are also recommended to keep solids from entering the drainfield.

Newer tanks generally have risers with lids at the ground surface to allow easy location, inspection, and pumping of the tank.

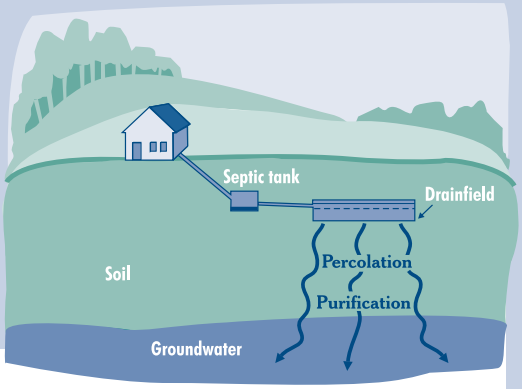
Typical single-compartment septic tank with ground-level inspection risers and screen



Tip **To prevent buildup, sludge and floating scum need to be removed through periodic pumping of the septic tank. Regular inspections and pumping as necessary (generally every 3 to 5 years) are the best and cheapest way to keep your septic system in good working order.**

Finding Your System

Your septic tank, drainfield, and reserve drainfield should be clearly designated on the "as-built" drawing for your home. (An "as-built" drawing is a line drawing that accurately portrays the buildings on your property and is usually filed in your local land records.) You might also see lids or manhole covers for your septic tank. Older tanks are often hard to find because there are no visible parts. An inspector/pumper can help you locate your septic system if your septic tank has no risers.



Drainfield

The wastewater exits the septic tank and is discharged into the drainfield for further treatment by the soil. The partially treated wastewater is pushed along into the drainfield for further treatment every time new wastewater enters the tank.

If the drainfield is overloaded with too much liquid, it will flood, causing sewage to flow to the ground surface or create backups in plumbing fixtures and prevent treatment of all wastewater.

A reserve drainfield, required by many states, is an area on your property suitable for a new drainfield system if your current drainfield fails. Treat this area with the same care as your septic system.

Soil

Septic tank wastewater flows to the drainfield, where it percolates into the soil, which provides final treatment by removing harmful bacteria, viruses, and nutrients. Suitable soil is necessary for successful wastewater treatment.

Alternative systems

Because many areas don't have soils suitable for typical septic systems, you might have or need an alternative system. You might also have or need an alternative system if there are too many typical septic systems in one area or the systems are too close to groundwater or surface waters. Alternative septic

systems use new technology to improve treatment processes and might need special care and maintenance. Some alternative systems use sand, peat, or plastic media instead of soil to promote wastewater treatment. Other systems might use wetlands, lagoons, aerators, or disinfection devices. Float switches, pumps, and other electrical or mechanical components are often used in alternative systems. Alternative systems should be inspected annually. Check with your local health department or installer for more information on operation and maintenance needs if you have or need an alternative system.

Why should I maintain my septic system?

When septic systems are properly designed, constructed, and maintained, they effectively reduce or eliminate most human health or environmental threats posed by pollutants in household wastewater. However, they require regular maintenance or they can fail. Septic systems need to be monitored to ensure that they work properly throughout their service lives.

Saving money

A key reason to maintain your septic system is to save money! Failing septic systems are expensive to repair or replace, and poor maintenance is often the culprit. Having your septic system inspected regularly (at least every 3 years) is a bargain when you consider the cost of replacing the entire system. Your system will need pumping (generally every 3 to 5 years), depending on how many people live in the house and the size of the system. An unusable septic system or one in disrepair will lower your property value and could pose a legal liability.

Protecting health and the environment

Other good reasons for safe treatment of sewage include preventing the spread of infection and disease and protecting water resources. Typical pollutants in household wastewater are nitrogen, phosphorus, and disease-

causing bacteria and viruses. If a septic system is working properly, it will effectively remove most of these pollutants.

With one-fourth of U.S. homes using septic systems, more than 4 billion gallons of wastewater per day is dispersed below the ground's surface. Inadequately treated sewage from septic systems can be a cause of groundwater contamination. It poses a significant threat to drinking water and human health because it can contaminate drinking water wells and cause diseases and infections in people and animals. Improperly treated sewage that contaminates nearby surface waters also increases the chance of swimmers contracting a variety of infectious diseases. These range from eye and ear infections to acute gastrointestinal illness and diseases like hepatitis.

How do I maintain my septic system?

Inspect and pump frequently

You should have your septic system inspected at least every 3 years by a professional and your tank pumped as recommended by the inspector (generally every 3 to 5 years). Systems with electrical float switches, pumps, or mechanical components need to be inspected more often. Your service provider should inspect for leaks and look at the scum and sludge layers in your septic tank. If the bottom of the scum layer is within 6 inches of the bottom of the outlet tee or the top of the sludge layer is within 12 inches of the outlet tee, your tank needs to be pumped. Remember to note the sludge and scum levels determined by your service provider in your operation and maintenance records. This information will help you decide how often pumping is necessary. (See the checklist included at the end of the booklet.)

What Does an Inspection Include?

- Locating the system.
- Uncovering access holes.
- Flushing the toilets.
- Checking for signs of backup.
- Measuring scum and sludge layers.
- Identifying any leaks.
- Inspecting mechanical components.
- Pumping the tank if necessary.

Four major factors influence the frequency of pumping: the number of people in your household, the amount of wastewater generated (based on the number of people in the household and the amount of water used), the volume of solids in the wastewater (for example, using a garbage disposal increases the amount of solids), and septic tank size.

Some makers of septic tank additives claim that their products break down the sludge in septic tanks so the tanks never need to be pumped. Not everyone agrees on the effectiveness of additives. In fact, septic tanks already contain the microbes they need for effective treatment. Periodic pumping is a much better way to ensure that septic systems work properly and provide many years of service. Regardless, every septic tank requires periodic pumping.

In the service report, the pumper should note any repairs completed and whether the tank is in good condition. If the pumper recommends additional repairs he or she can't perform, hire someone to make the repairs as soon as possible.

Use water efficiently

Average indoor water use in the typical single-family home is almost 70 gallons per person per day. Leaky toilets can waste as much as 200 gallons each day. The more water a household conserves, the less water enters the septic system. Efficient water use can improve the operation of the septic system and reduce the risk of failure.

High-efficiency toilets

Toilet use accounts for 25 to 30 percent of household water use. Do you know how many gallons of water your toilet uses to empty the bowl? Most older homes have toilets with 3.5- to 5-gallon reservoirs, while newer high-efficiency toilets use 1.6 gallons of water or less per flush. If you have problems with your septic system being flooded with household water, consider reducing the volume of water in the toilet tank if you don't have a high-efficiency model. Plastic containers (such as ½-gallon plastic milk jugs) can be filled with small rocks and placed in a toilet tank to reduce the

amount of water used per flush. (Be sure that the plastic containers do not interfere with the flushing mechanisms or the flow of water.) You'll save about ½ gallon of water per flush! You might also consider replacing your existing toilet with a high-efficiency model to achieve even more water savings.

Faucet aerators and high-efficiency showerheads

Faucet aerators help reduce water use and the volume of water entering your septic system. High-efficiency showerheads or shower flow restrictors also reduce water use.

Water fixtures

Check to make sure your toilet's reservoir isn't leaking into the bowl. Add five drops of liquid food coloring to the reservoir before bed. If the dye is in the bowl the next morning, the reservoir is leaking and repairs are needed.

A small drip from a faucet adds many gallons of unnecessary water to your system every day. To see how much a leak adds to your water usage, place a cup under the drip for 10 minutes. Multiply the amount of water in the cup by 144 (the number of minutes in 24 hours, divided by 10). This is the total amount of clean water traveling to your septic system each day from that little leak.

Use Water Efficiently!

- **Install high-efficiency showerheads**
- **Fill the bathtub with only as much water as you need**
- **Turn off faucets while shaving or brushing your teeth**
- **Run the dishwasher and clothes washer only when they're full**
- **Use toilets to flush sanitary waste only (not kitty litter, diapers, or other trash)**
- **Make sure all faucets are completely turned off when not in use**
- **Maintain your plumbing to eliminate leaks**
- **Install aerators in the faucets in your kitchen and bathroom**
- **Replace old dishwashers, toilets, and clothes washers with new, high-efficiency models.**

For more information on water conservation, please visit www.epa.gov/owm/water-efficiency/index.htm

Watch your drains

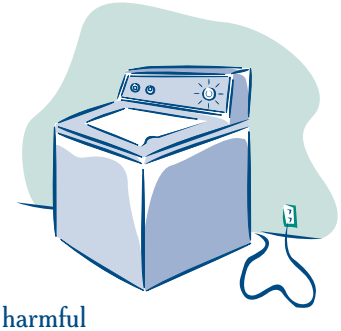
What goes down the drain can have a major impact on how well your septic system works.

Waste disposal

What shouldn't you flush down your toilet? Dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, and other kitchen and bathroom items that can clog and potentially damage septic system components if they become trapped. Flushing household chemicals, gasoline, oil, pesticides, antifreeze, and paint can stress or destroy the biological treatment taking place in the system or might contaminate surface waters and groundwater. If your septic tank pumper is concerned about quickly accumulating scum layers, reduce the flow of floatable materials like fats, oils, and grease into your tank or be prepared to pay for more frequent inspections and pumping.

Washing machines

By selecting the proper load size, you'll reduce water waste. Washing small loads of laundry on the large-load cycle wastes precious water and energy. If you can't select load size, run only full loads of laundry.



Doing all the household laundry in one day might seem like a time-saver, but it could be harmful to your septic system. Doing load after load does not allow your septic tank time to adequately treat wastes. You could be flooding your drainfield without allowing sufficient recovery time. Try to spread water usage throughout the week. A new Energy Star clothes washer uses 35 percent less energy and 50 percent less water than a standard model.

Care for your drainfield

Your drainfield is an important part of your septic system. Here are a few things you should do to maintain it:

- Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drainfield.
- Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage the pipes, tank, or other septic system components.
- Keep roof drains, basement sump pump drains, and other rainwater or surface water drainage systems away from the drainfield. Flooding the drainfield with excessive water slows down or stops treatment processes and can cause plumbing fixtures to back up.

What can make my system fail?

If the amount of wastewater entering the system is more than the system can handle, the wastewater backs up into the house or yard and creates a health hazard.

You can suspect a system failure not only when a foul odor is emitted but also when partially treated wastewater flows up to the ground surface. By the time you can smell or see a problem, however, the damage might already be done.

By limiting your water use, you can reduce the amount of wastewater your system must treat. When you have your system inspected and pumped as needed, you reduce the chance of system failure.

A system installed in unsuitable soils can also fail. Other failure risks include tanks that are inaccessible for maintenance, drainfields that are paved or parked on, and tree roots or defective components that interfere with the treatment process.

Failure symptoms

The most obvious septic system failures are easy to spot. Check for pooling water or muddy soil around your septic system or in your basement. Notice whether your toilet or sink backs up when you flush or do laundry. You might also notice strips of bright green grass over the drainfield. Septic systems also fail when partially treated wastewater comes into contact with groundwater. This type of failure is not easy to detect, but it can result in the pollution of wells, nearby streams, or other bodies of water. Check with a septic system professional and the local health department if you suspect such a failure, and remember to have your septic system inspected by a professional at least every 3 years.

Stop, look, and smell!

Failure causes

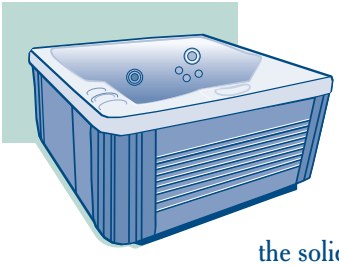
Household toxics

Does someone in your house use the utility sink to clean out paint rollers or flush toxic cleaners? Oil-based paints, solvents, and large volumes of toxic cleaners should not enter your septic system. Even latex paint cleanup waste should be minimized. Squeeze all excess paint and stain from brushes and rollers on several layers of newspaper before rinsing. Leftover paints and wood stains should be taken to your local household hazardous waste collection center. Remember that your septic system contains a living collection of organisms that digest and treat waste.

Household cleaners

For the most part, your septic system's bacteria should recover quickly after small amounts of household cleaning products have entered the system. Of course, some cleaning products are less toxic to your system than others. Labels can help key you into the potential toxicity of various products. The word "Danger" or "Poison" on a label indicates that the product is highly hazardous. "Warning" tells you the product is moderately hazardous. "Caution" means the product is slightly hazardous. ("Nontoxic" and "Septic Safe"

are terms created by advertisers to sell products.) Regardless of the type of product, use it only in the amounts shown on the label instructions and minimize the amount discharged into your septic system.



Hot tubs

Hot tubs are a great way to relax. Unfortunately, your septic system was not designed to handle large quantities of water from your hot tub. Emptying hot tub water into your septic system stirs the solids in the tank and pushes them out into the drainfield, causing it to clog and fail. Draining your hot tub into a septic system or over the drainfield can overload the system. Instead, drain cooled hot tub water onto turf or landscaped areas well away from the septic tank and drainfield, and in accordance with local regulations. Use the same caution when draining your swimming pool.

Water Purification Systems

Some freshwater purification systems, including water softeners, unnecessarily pump water into the septic system. This can contribute hundreds of gallons of water to the septic tank, causing agitation of solids and excess flow to the drainfield. Check with your licensed plumbing professional about alternative routing for such freshwater treatment systems.

Garbage disposals

Eliminating the use of a garbage disposal can reduce the amount of grease and solids entering the septic tank and possibly clogging the drainfield. A garbage disposal grinds up kitchen scraps, suspends them in water, and sends the mixture to the septic tank. Once in the septic tank, some of the materials are broken down by bacterial action, but most of the grindings have to be pumped out of the tank. Using a garbage disposal frequently can significantly increase the accumulation of sludge and scum in your septic tank, resulting in the need for more frequent pumping.

Improper design or installation

Some soils provide excellent wastewater treatment; others don't. For this reason, the design of the drainfield of a septic system is based on the results of soil analysis. Homeowners and system designers sometimes underestimate the significance of good soils or believe soils can handle any volume of wastewater applied to them. Many failures can be attributed to having an undersized drainfield or high seasonal groundwater table. Undersized septic tanks—another design failure—allow solids to clog the drainfield and result in system failure.

If a septic tank isn't watertight, water can leak into and out of the system. Usually, water from the environment leaking into the system causes hydraulic overloading, taxing the system beyond its capabilities and causing inadequate treatment and sometimes sewage to flow up to the ground surface. Water leaking out of the septic tank is a significant health hazard because the leaking wastewater has not yet been treated.

Even when systems are properly designed, failures due to poor installation practices can occur. If the drainfield is not properly leveled, wastewater can overload the system. Heavy equipment can damage the drainfield during installation which can lead to soil compaction and reduce the wastewater infiltration rate. And if surface drainage isn't diverted away from the field, it can flow into and saturate the drainfield.

For more information

Local Health Department

Name

Agency

Address

Address1

Phone and e-mail

EPA Onsite/Decentralized Management Homepage

www.epa.gov/owm/onsite

EPA developed this Web site to provide tools for communities investigating and implementing onsite/decentralized management programs. The Web site contains fact sheets, program summaries, case studies, links to design and other manuals, and a list of state health department contacts that can put you in touch with your local health department.

National Small Flows Clearinghouse

www.nesc.wvu.edu

Funded by grants from EPA, the NSFC helps America's small communities and individuals solve their wastewater problems. Its activities include a Web site, online discussion groups, a toll-free assistance line (800-624-8301), informative publications, and a free quarterly newsletter and magazine.

Rural Community Assistance Program

www.rcap.org

RCAP is a resource for community leaders and others looking for technical assistance services and training related to rural drinking water supply and wastewater treatment needs, rural solid waste programs, housing, economic development, comprehensive community assessment and planning, and environmental regulations.

National Onsite Wastewater Recycling Association, Inc.

www.nowra.org

NOWRA is a national professional organization to advance and promote the onsite wastewater industry. The association promotes the need for regular service and educates the public on the need for properly designed and maintained septic systems.

Septic Yellow Pages

www.septicyellowpages.com

The Septic Yellow Pages provides listings by state for professional septic pumpers, installers, inspectors, and tank manufacturers throughout the United States. This Web site is designed to answer simple septic system questions and put homeowners in contact with local septic system professionals.

National Association of Wastewater Transporters

www.nawt.org

NAWT offers a forum for the wastewater industry to exchange ideas and concerns. The NAWT Web site lists state associations and local inspectors and pumpers.

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Septic System Dos and Don'ts

(adapted from National Small Flows Clearinghouse)

Dos

- Check with the local regulatory agency or inspector/pumper if you have a garbage disposal unit to make sure that your septic system can handle this additional waste.
- Check with your local health department before using additives. Commercial septic tank additives do not eliminate the need for periodic pumping and can be harmful to the system.
- Use water efficiently to avoid overloading the septic system. Be sure to repair leaky faucets or toilets. Use high-efficiency fixtures.
- Use commercial bathroom cleaners and laundry detergents in moderation. Many people prefer to clean their toilets, sinks, showers, and tubs with a mild detergent or baking soda.
- Check with your local regulatory agency or inspector/pumper before allowing water softener backwash to enter your septic tank.
- Keep records of repairs, pumpings, inspections, permits issued, and other system maintenance activities.
- Learn the location of your septic system. Keep a sketch of it with your maintenance record for service visits.
- Have your septic system inspected at least every 3 years and pumped periodically (generally every 3 to 5 years) by a licensed inspector/contractor.
- Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drainfield.

Don'ts

- Your septic system is not a trash can. Don't put dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, latex paint, pesticides, or other hazardous chemicals into your system.
- Don't use caustic drain openers for a clogged drain. Instead, use boiling water or a drain snake to open clogs.
- Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage the pipes, tank, or other septic system components.

Homeowner Septic System Checklist

Septic System Description

Contact your local authority if you don't have this information.

Date system installed _____

Installer _____

Phone _____

Tank size _____ **gallons**

Capacity _____ **bedrooms**

Type ☐ **conventional**

☐ **alternative (type)** _____

For more information about septic systems, contact:

Clean Water starts at Home

Name

Agency

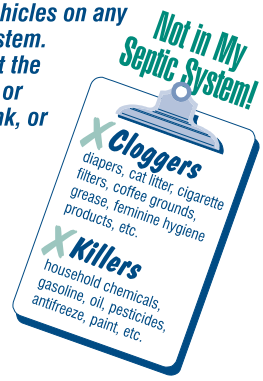
Phone and e-mail

U.S. Environmental Protection Agency

www.epa.gov/owm/onsite/

Things to keep in mind:

- ✓ *Inspect your system (every 1 to 3 years) and pump your tank (as necessary, generally every 3 to 5 years).*
- ✓ *Use water efficiently.*
- ✓ *Don't dispose of household hazardous wastes in sinks and toilets.*
- ✓ *Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drainfield.*
- ✓ *Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage the pipes, tank, or other septic system components.*



Septic System Maintenance Record

Next Service	Scheduled Activity	Pumping Co./ Phone	Activities Completed	Comments
Jan. 2003	inspection	Joe Pumper 555-1234	inspection	sludge layer okay-may need pumping next year

Place on electrical box (fuse box) or other convenient location.

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