



*Michigan State University Extension*  
*Land Use Series*

# Sample Zoning Amendments and Program for Groundwater Protection

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## Introduction

This pamphlet is to introduce one sample of a community groundwater protection program and a couple samples of zoning for groundwater protection. Once groundwater has been contaminated, it is very expensive and difficult to clean up. The strength behind a zoning approach is that it can help prevent groundwater pollution in the first place. In contrast to clean up, prevention is very easy and inexpensive.

This sample zoning language includes two different strategies for county-wide (wall-to-wall) groundwater protection by (1) suggesting zoning language to implement county-wide groundwater protection from land use activities which have been rated “very high” and “moderate-high” threats to groundwater, and (2) an overlay zone to provide even more protection around Type I water wells. The overlay zone is just one part of several parts (historic research, existing business inventory, education campaign) of a comprehensive wellhead protection program. A Wellhead Protection Program is a long term plan to protect the area of groundwater which is the source of water for municipal (public) water wells and well fields. Use of the overlay zone should not take place until after a wellhead delineation study has been done.

This document was developed from material prepared by the local Groundwater Task Force of the Manistee County Planning Commission (June 15, 1994). The Groundwater Task Force was part of the Michigan Association of Planning (MAP) three pilot counties project for groundwater protection. The project was funded by a W. K. Kellogg Foundation Groundwater Education in Michigan (GEM) grant. One of the purposes of the grant was to develop a model for groundwater protection which can be promoted and used state-wide.

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*“Thirty seven million acres is  
all the Michigan we will ever have”*  
William G. Milliken

This is a fact sheet developed by experts on the topic(s) covered within MSU Extension. Its intent and use is to assist Michigan communities making public policy decisions on these issues. This work refers to university-based peer reviewed research, when available and conclusive, and based on the parameters of the law as it relates to the topic(s) in Michigan. This document is written for use in Michigan and is based only on Michigan law and statute. One should not assume the concepts and rules for zoning or other regulation by Michigan municipalities and counties apply in other states. In most cases they do not. This is not original research or a study proposing new findings or conclusions.

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## Groundwater Protection Program; County-wide Coordination

A major part of a county-wide groundwater protection effort is to have a uniform county-wide approach for the problem. Groundwater does not pay attention to political boundaries. To be truly effective, groundwater protection must happen at a larger scale than just one municipality.

This is accomplished two ways:

1. Have uniformity in zoning for groundwater protection in each municipality (everyone use the same sample zoning),
2. Coordination by providing expertise for municipal zoning and planning commissions and zoning administrators for implementation of groundwater protection.

This expertise and coordination best fits the role of a county planning commission/department. The county planning commission has the statutory role of reviewing all plans in a county and township zoning review where it can exercise its ability to promote county-wide uniformity in groundwater protection zoning. The county planning commission can provide technical assistance to municipalities to help them make informed decisions on the technical aspects of groundwater protection. The municipality retains

its local zoning control. This coordination means a zoning administrator or planning commission to be able to contact an expert (staff at public health or county planning department) to provide technical site plan review assistance.

One way the county can do this is for the county planning commission to create a standing committee, a County Groundwater Staff Review Group. County Planning Commissions have authority to create committees composed of members which are not members of the County Planning Commission. In this case the standing committee is composed of staff of various agencies which work in the county. The committee would be charged with the responsibility of providing a technical review of site plans for groundwater protection purposes. Members of the Group would be:

- The County Planning Director,
- The Registered Sanitarian for the Health Department,
- The County Drain Commissioner,
- The Soil Conservationist providing technical assistance to the county's Conservation District,
- The County Emergency Management Coordinator,
- The Michigan State University Extension Director,
- The Fire Chief for the first responder fire department covering the area of the site plan being reviewed,
- The zoning administrator for the municipality the land covered by the site plan is located in, and
- The Type I water well operator (or department head) if the land covered by the site plan is within a 10-year delineated zone of transport for that well.



This Staff Group should have the ability to use (consult with, or include as non voting advisory members) experts from:

- Michigan Department of Natural Resources and Environment Environmental Response Division.
- Michigan Department of Natural Resources and Environment Waste Management Division.
- State Police Fire Marshal Division.
- Michigan Department of Community Health.
- Michigan Department of Agriculture.

The Planning Department would be responsible to summarize the comments of each, and prepare a "Groundwater Staff Review Group report" to be submitted as part of a site plan for a local zoning ordinance. The procedure is:

1. An applicant will obtain all applicable environmental permits for a project.
2. An applicant would submit their site plan to the county Group for review if required, or could choose to do so if not required. Review by the county Group would be required when the proposed project is within a wellhead protection overlay zone. It could be reviewed by the Group at the applicant's option if not within a wellhead protection overlay zone.
3. That same site plan (plus the Group's report if done) would then be submitted to the municipality for site plan review. If the Group's report is not required and not included, the

zoning administrator or municipal planning commission could choose to require the county Group review. It would be reviewed by the Group at the zoning administrator's/municipal planning commission's option if not within a wellhead protection overlay zone.

4. The municipality reviews the site plan.
5. The municipality acts on a zoning permit or special use permit.

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## Sample Zoning Amendments

A major part of a county-wide groundwater protection effort is to have a uniform county-wide zoning approach. What is presented here is a sample that can be used for that uniform zoning. A municipality may want to modify it further to fit their local needs. This model is presented as a starting point.

The following is offered as sample ordinance or ordinance amendment language. It is intended as a starting point for a community to use when considering this issue.

This is a sample, meaning that it is not a definitive recommendation by the authors or MSU Extension. A sample is a starting point for discussion and development of a ordinance, ordinance amendment, or zoning ordinance amendment that is appropriate for a particular community. Conversely a model ordinance, or amendment, would be presented as the ideal or utopia intended as a recommended approach. This is not a model ordinance, or ordinance amendment. That means any numerical standard (dimensional standard) offered in the sample zoning amendment is just a starting point for discussion. Often there is already discussion about the standard in the commentary which is intended to provide a community with information to decide what the numerical standard should be for a particular community.

This document is written for use in Michigan and is based only on Michigan law and statute. One should not assume the concepts and rules for an ordinance or zoning by Michigan municipalities and counties apply in other states. In most cases they do not.

**If zoning exists:** If this is being done in a city, village, township, or county with its own existing zoning, then these provisions must be adopted pursuant to the Michigan Zoning Enabling Act. A step-by-step checklist of procedures to amend a zoning ordinance is available from Michigan State University Extension's *Land Use Series*: "Checklist # 4: For Adoption of a Zoning Ordinance Amendment (including some PUDs) in Michigan" is available from [www.lu.msue.msu.edu](http://www.lu.msue.msu.edu).

**Township with county zoning:** If this is being done in a township that relies on county zoning, then the township must work with the county planning commission so these provisions are placed in the county's zoning ordinance pursuant to the Michigan Zoning Enabling Act. Checklist #4 is also applicable here.

**Zoning done by a Joint Planning Commission:** If this is being done in a municipality that relies on joint zoning, then the municipality must work with the joint planning commission so these provisions are placed in the joint zoning ordinance pursuant to the Michigan Zoning Enabling Act, Municipal Joint Planning Act, and the Joint Planning Ordinance and Agreement. Checklist #4 is also applicable here.

**Zoning does not exist:** If this is being done in a township, village or city where zoning does not exist, then it is not possible to adopt these regulations apart from the adoption of a complete zoning ordinance establishing rules and creating the public offices and bodies necessary pursuant to the Michigan Zoning Enabling Act.

There are many different ways for a zoning ordinance to deal with the issues outlined here. The sample provided here is just one. It is written with the following assumptions:

1. The municipality already has a site plan review process in its zoning ordinance.
2. The section numbering system follows the standard system of codification presented in Michigan State University Extension's Land Use Series: "Organization and Codification of a Zoning Ordinance", available from [lu.msue.msu.edu](http://lu.msue.msu.edu).
3. The municipality's attorney whom is experienced in municipal law (planning and zoning) will review any proposed amendments before they are adopted.

Following are the sample zoning ordinance [amendments] with commentary.

There are many different ways for an ordinance to deal with the issues outlined here. The sample provided here is just one. It is written with the assumption municipality's attorney whom is experienced in municipal law will review any proposed ordinance or amendments before they are adopted.

1. Following are the sample ordinance with commentary.

## Groundwater Protection Zoning Amendments

### First, Add to Definitions

**Commentary:** Add, for all options, the following definition of "Hazardous Substances" to Section 503 (the section of the zoning ordinance where words are defined): [End of commentary]

HAZARDOUS SUBSTANCES means one or more of the following:

- A. A chemical or other material which is or may become injurious to the public health, safety, or welfare or to the environment.
- B. "Hazardous substance" as defined in the comprehensive environmental response, compensation and liability act of 1980, Public Law 96-510, 94 Stat. 2767.
- C. "Hazardous waste" as defined in Article II Chapter 3 Part 111 of P.A. 451 of 1994, as amended, (being the Hazardous Waste Management part of the Natural Resources and Environmental Protection Act, M.C.L. 324.45101 et. seq.)
- D. "Petroleum" as defined in Article II Chapter 8 Part 213 of P.A. 451 of 1994, as amended, (being the Leaking Underground Storage Tanks part of the Natural Resources and Environmental Protection Act, M.C.L. 324.45101 et. seq.).

**Commentary:** (M.C.L. 324.45101 et. seq. is formerly P.A. 64 of 1979 (being M.C.L. 299.501 to 299.551, the Hazardous Waste Management Act) and M.C.L. 324.45101 et. seq. is formerly P.A. 478 of 1988 (being M.C.L. 299.831 to 299.850, the Leaking Underground Storage Tank Act).) [End of commentary]

### Second; Add to Permit Application Requirements

**Commentary:** For all options, in order to require all other permits to be obtained prior to a zoning permit (regular and special use) add the following to Section 8402.B.7. (the section which

lists the information required with a zoning permit application) to the ordinance: [End of commentary]

- X. A copy of any other necessary permits required prior to a Construction Code Permit or a copy of a written agreement for, or written intent for concurrent approval for those permits.

### Third; Add to Site Plan Requirements

**Commentary:** All site plans should show any modifications required for all other permitting agencies [add to 9404.G. (section listing the basic data required in a site plan) so the requirement is for a basic and all other (more detailed) site plans]: [End of commentary]

- X. Show any changes or modifications required for any applicable regulatory agencies' approvals. (Site plan or design plan changes required after the Commission issues a Special Use Permit shall also be changed in accordance with procedures established in this Ordinance for minor adjustments or amendments to Special Use Permits.)

### Fourth; Add to What is Shown on a Site Plan

**Commentary:** For all options, in order to implement the use of site plan review for groundwater protection, additional specific information is needed for a site plan for “very high” and “moderate-high” hazard-to-groundwater land uses. Thus add a new section to the following language right after Section 9406 (so it is 9406½) (in the article on site plans, following the listing of what is required in a site plan): [End of commentary]

#### 9407. Required data for a site plan involving special groundwater protection provisions.

- A. All businesses and facilities which use or generates hazardous substances (except (1) fuel stored in a fuel tank which is part of a motor vehicle for purposes of use by that vehicle's motor, (2) materials in a five gallon, or smaller, pre-packaged sealed containers and is for purposes of resale and located inside a retail establishment):
1. in quantities greater than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) per month or ninety five (95) liters (approximately twenty five (25) gallons) per month, whichever is less, or
  2. stores greater than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) or ninety five (95) liters (approximately twenty five (25) gallons), whichever is less
- shall be subject to site plan review requirements.
- B. In addition to all the data required for a Basic Site Plan, set forth in Section 9404., Medium Site Plan set forth in Section 9405., or a Detailed Site Plan set forth in Section 9406., whichever is applicable; the following shall also be shown in the site plan:
1. Location and size of interior and exterior areas and structures to be used for storage, use, loading/unloading, recycling, or disposal of hazardous substances.
  2. Location of all underground and above ground storage tanks for such uses as fuel storage, waste oil holding tanks, chemical storage, hazardous waste storage, collection of contaminated stormwater or wash water, and all similar uses.
  3. Location of exterior and interior drains, on-site sewage systems, dry wells; catch basins; retention/detention areas; sumps and other facilities designed to collect, store or transport



stormwater or wastewater. The point of discharge for all drains and pipes shall be specified on the site plan.

4. Location of all water wells on the site and within 150 feet surrounding the parcel's property boundaries.
5. Delineation of areas on the parcel which are known or suspected to be contaminated, together with a report on the status of site cleanup.
6. Submission of the "Hazardous Substances Reporting Form for Site Plan Review".
7. Submission of the "DNRE Environmental Permit Information Checklist" (<http://www.deq.state.mi.us/documents/deq-ess-permits-eqp3580.pdf>).
8. If the area covered by the site plan includes territory within a Wellhead Protection Overlay Zone submit a site plan review report prepared by a County Groundwater Staff Review Group (c/o County Planning Department). The site plan review report shall be a written document reporting on a county review of the same site plan prepared for this section. If the area covered by the site plan does not include territory within a Wellhead Protection Overlay Zone a site plan review report prepared by the County Groundwater Staff Review Group may be submitted at the option of the applicant or may be required at the option of the Commission or administrator, whichever is applicable.

## Fifth; Add to General Regulations

**Commentary:** This next part is to add the regulations, requirements, designed to protect groundwater. It can be done one of two ways. First is in detail, and best suited for a zoning ordinance which allows the zoning administrator to review site plans and issue a permit or a situation where in some circumstances the zoning administrator does it, and in other circumstances the Commission reviews the site plan (special use permit).

OPTION 5A: Add the following to Article 10 (the article on General Regulations), so both permitted and special uses are subject to the requirements. This Option 5A is recommended because:

1. It avoids hearings and meetings when the zoning Administrator can process the application and site plan himself, providing faster service to the public with less red tape.
2. It requires the ordinance to be more specific in spelling out regulation, so there is not a discretionary decision, so the Commission and public hearing process does not always have to be used.
3. The presentation of the more specific requirements provides a presentation of rules up front, so an applicant can determine what is expected before starting a zoning permit application with a site plan.

A municipality may want to consider, by policy, follow up inspections for all projects, not just those in a Wellhead Protection Overlay Zone (see 1012.B.1.g., below). [End of commentary]

### 1012. Hazardous Substance Groundwater Protection.

- A. All businesses and facilities which use or generates hazardous substances (except (1) fuel stored in a fuel tank which is part of a motor vehicle for purposes of use by that vehicle's motor, (2) materials in a five gallon, or smaller, pre-packaged sealed containers and is for purposes of resale and located inside a retail establishment):

1. in quantities greater than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) per month or ninety five (95) liters (approximately twenty five (25) gallons) per month, whichever is less, or
  2. stores greater than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) or ninety five (95) liters (approximately twenty five (25) gallons), whichever is less,
- shall comply with the following groundwater protection requirements.

B. Groundwater Protection requirements:

1. Groundwater Protection, generally:

- a. The project and related improvements shall be designed to protect the natural environment, including lakes, ponds, streams, wetlands, floodplains, groundwater, street slopes, and natural and man-made drainage systems.
- b. Stormwater management and drainage facilities shall be designed to retain the natural retention and storage capacity of any wetland, water body, or watercourse, and shall not increase flooding or the potential for pollution of surface or groundwater, on-site or off-site.
- c. General purpose floor drains and storm drains shall be:
  - i. connected to an on-site holding tank (not a septic tank/drain field or a dry well) in accordance with state, county and municipal requirements, or
  - ii. authorized through a state groundwater discharge permit, or
  - iii. connected to a public sewer system.
- d. State and federal agency requirements for storage, spill prevention, record keeping, emergency response, transport, and disposal of hazardous substances and polluting materials shall be met. No discharge to groundwater, including direct and indirect discharges, shall be allowed without appropriate state and county permits and approvals.
- e. In determining conformance with the standards in this Ordinance, the Administrator or Commission, whichever one is applicable, shall take into consideration the publication titled Small Business Guide to Secondary Containment; Practical Methods for Above-ground Storage and Containment of Hazardous Substances and Polluting Materials published by the Clinton River Watershed Council, May 1990, and other references.
- f. Out-of-service water wells shall be sealed and abandoned in accordance with applicable requirements of the Michigan Department of Public Health and the District Health Department.
- g. If the site plan includes territory within a Wellhead Protection Overlay Zone submit a signed statement providing permission for periodic follow-up groundwater protection inspections by the Administrator, county and state officials.

2. Above-ground Storage

- a. Primary containment of hazardous substances shall be product-tight containers which are protected from weather, leakage, accidental damage, and vandalism.
- b. Secondary containment for the storage of hazardous substances and polluting materials is required. Secondary containment shall be one of the following, whichever is greatest:
  - i. sufficient to store the substance for the maximum anticipated period of time necessary for the recovery of any released substance, or
  - ii. shall be at least as great as volumes required by state or county regulations, or



- iii. shall, if not protected from rainfall, contain a minimum of
    - (a) 110 percent of the volume of the largest storage container within the dike of the secondary containment area, plus
    - (b) the volume that is occupied by all other objects within and below the height of the dike of the secondary containment area plus
    - (c) the volume of a 6 inch rainfall.
  - c. Secondary containment structures such as out buildings, storage rooms, sheds and pole barns shall not have floor drains which outlet to soils, groundwater, or nearby drains or rivers.
  - d. Areas and facilities for loading/unloading of hazardous substances and polluting materials, as well as areas where such materials are handled, stored or used, shall be designed and constructed to prevent discharge or runoff to floor drains, rivers, lakes, wetlands, groundwater or soils.
  - e. At a minimum, State of Michigan and Federal agency requirements for storage, leak detection, record keeping, spill prevention, emergency response, transport and disposal shall be met.
  - f. Bulk storage of pesticides shall be in accordance with requirements of the Michigan Department of Agriculture.
3. Underground Storage
- a. Underground storage tank installation, operation, maintenance, closure and removal shall be in accordance with the requirements of the State Police Fire Marshal Division and the DEQ.
  - b. Bulk storage facilities for pesticides and fertilizers shall be in compliance with requirements of the Michigan Department of Agriculture.

**Commentary:** OR, OPTION 5B: Because some municipalities may not want to delegate site plan review to their zoning Administrator, or may want to exercise more discretionary decision making powers, this option is presented. In order for this option to be effective each respective zoning district must list (by specific name) all land uses as special uses which may be considered to use hazardous substances. (The list of land uses found in the proposed Article 76, below (page 9) is one attempt at listing those types of enterprises likely to use hazardous substances.) In this option land uses which are not handled as special uses are not subject to these regulations.

Add the following to Article 16 (the article on Special Use Specific Standards), if all “very high” and “medium-high” hazard land use categories are listed as special use permits. [End of commentary]

#### **16XX. Hazardous Substance Groundwater Protection.**

- A. All businesses and facilities which use or generates hazardous substances (except (1) fuel stored in a fuel tank which is part of a motor vehicle for purposes of use by that vehicle's motor, (2) materials in a five gallon, or smaller, pre-packaged sealed containers and is for purposes of resale and located inside a retail establishment):
- 1. in quantities greater than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) per month or ninety five (95) liters (approximately twenty five (25) gallons) per month, whichever is less, or
  - 2. stores greater than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) or ninety five (95) liters (approximately twenty five (25) gallons), whichever is less;
- shall comply with the following groundwater protection requirements.

B. Groundwater Protection Requirements:

1. Sites at which hazardous substances are stored, used or generated shall be designed to prevent spills and discharges to the air, surface of the ground, groundwater, lakes, streams, rivers or wetlands.
2. Secondary containment for the storage of hazardous substances and polluting materials is required. Secondary containment shall be one of the following, whichever is greatest:
  - a. sufficient to store the substance for the maximum anticipated period of time necessary for the recovery of any released substance, or
  - b. shall be at least as great as volumes required by state or county regulations, or
  - c. shall, if not protected from rainfall, contain a minimum of
    - i. 110 percent of the volume of the largest storage container within the dike of the secondary containment area, plus
    - ii. the volume that is occupied by all other objects within and below the height of the dike of the secondary containment area plus
    - iii. the volume of a 6 inch rainfall;
3. General purpose floor drains shall only be allowed if they are approved by the responsible agency for connection to an on-site closed holding tank (not a septic system), or regulated through a State of Michigan groundwater discharge permit.
4. State and federal agency requirements for storage, spill prevention, record keeping, emergency response, transport and disposal of hazardous substances shall be met. No discharges to groundwater, including direct and indirect discharges, shall be allowed without required permits and approvals
5. Out-of-service water wells shall be sealed and abandoned in accordance with applicable requirements of the Michigan Department of Public Health and the District Health Department.
6. If the site plan includes territory within a Wellhead Protection Overlay Zone submit a signed statement providing permission for periodic follow-up groundwater protection inspections by the Administrator, county and state officials.

## Sixth, Surface Water Protection.

**Commentary:** One of the characteristics of groundwater in sandy soil glacial geology, is that ultimately groundwater and surface water are interconnected. Thus part of groundwater protection is also protection of surface water. Thus the following is recommended to be added to Article 10 (the article on General Regulations), so both permitted and special uses are subject to the requirements. [End of commentary]

### 1011. Water Protection

Notwithstanding anything to the contrary contained in this Ordinance, the following provisions shall apply:

- A. No structure shall be built, located or constructed closer than fifty (50) feet for buildings, or one hundred (100) feet for nutrient sources (such as but not limited to drain fields, highly fertilized areas, manure storage), measured on a horizontal plane to the water's edge. In the event the water's edge recedes (moves landward), the setback line shall also be construed as to have moved landward a distance equal to the water's edge recession. In cases where parcels are smaller than the minimum

parcel size allowed in the particular district so that applicable setbacks given here and in a particular district result in a building envelope less than 25 by 40 feet the Appeals Board shall grant a further reduction of side yard setback and/or a front yard setback prior to reducing the required water front setback.

- B. Within ten (10) feet of the water's edge (or landward beach/vegetation line) a vegetation belt shall be maintained by not removing trees with a trunk diameter of three inches at breast height, or greater, unless dead or chronically diseased. Trees and other woody plant material of a smaller diameter at breast height, shall not be removed, except to prune or clear a filtered view of the water body. It shall be the landowner's responsibility to maintain this vegetation belt in a healthy state.
- C. No building or structure shall be built, located or constructed within a 100 year flood plane of any water bodies in any land use district as may be determined by the DNR or DEQ.

## Sample Wellhead Protection Zoning Amendments

A Wellhead Protection Program is a long term plan to protect the area of groundwater which is the source of water for municipal (public) water wells and well fields. This area is often defined by estimating the distance away from the well by a given number of years it would take groundwater to enter the well.

A major part of zoning for Wellhead Protection is uniformity of zoning requirements for the ten-year time of travel around a wellhead, or well field, even though the ten-year time of travel is in different municipalities. What is presented here is a sample that can be used for that uniform zoning. A municipality may want to modify it further to fit their local needs. This model, or standard, is presented as a starting point.

This type of wellhead protection zoning should not be used unless a hydrogeological study has been conducted to determine the size and shape of the area around a Type I well to be protected. Use of arbitrary circles around a well for this purpose is not recommended, and will not be acceptable for purposes of approval by the Michigan Wellhead Protection Program. There are costs and possible benefits for providing wellhead protection. The costs and benefits will be different for each municipality. Thus it is recommended each municipality obtain actual costs and decide based on what is best for that municipality. If the municipality chooses to go ahead with wellhead protection, help is available from your MSU Extension office for each step in the process. The pros (+) and cons (-) are:

- + The program's biggest value is that it takes steps to protect groundwater, which many depend on for drinking, washing, irrigation and so on. This is a prevention program, to avoid pollution before it happens.
- - A hydrogeological study will be needed. Estimates to do such a study range from \$10,000 to \$40,000 per well (or well field), depending on how much background work is already done. A municipality should determine how much this will actually cost.
- + If the wellhead protection program can be effective the municipality might be able to save money in quarterly water quality testing. This savings would occur if the federal Environmental Protection Agency phase II and V water testing is actually required. That testing is estimated to cost between \$10,000 to \$12,000 per well per year. Protecting an area around a well, to show certain contaminants are not likely to exist, can reduce these costs.
- - There is a risk in conducting the hydrogeological study. It may find a groundwater contamination problem which was not known about, thereby increasing costs to monitor or correct. It may show that there are already land uses in the area which should be protected which are high risk, in terms of causing contamination. Thus costs of testing will not be reduced.

- + The municipality may find out before it is a real problem, and is able to take steps to correct it (new well, design changes, etc.) before it is a health/safety problem. There is a social responsibility to provide clean drinking water.
- - The wellhead protection zone is more regulation and a more complex zoning ordinance to administer.

For the section 7602. of the proposed Article 76; the following is intended for each sector:

- Sector A should only be the boundaries of the parcel(s) of land the well is located on; the boundaries of the park it is in; the immediate surface drainage area where water may flow on the ground to the wellhead. Without any delineation, then generally this should not be more than 200 feet from each well (Department of Community Health required isolation distance).
- Sector B is the one year zone of transport--a one year zone of protection. That is the area which extends away from the well (usually "upstream" from the direction groundwater and surface water flow) so that the most "upstream" extent is where groundwater would take one year to reach the well point.
- Sector C is the ten year zone of transport--a ten year zone of protection. That is the area which extends away from the well (usually "upstream" from the direction groundwater and surface water flow) so that the most "upstream" extent is where groundwater would take ten years to reach the well point.

The process of conducting a hydrogeological study to delineate the areas around the well should also use/illustrate other times, though the 10 year time of travel is needed to meet state requirements.

The land use categories listed in Article 76 of the sample zoning language are considered by Michigan groundwater compliance specialists to pose hazards for groundwater contamination. The hazard rankings reflect the types of substances used and stored, the degree of regulation, and typical on-site management practices. Although these hazardous land uses can be identified, groundwater compliance specialists recommend that local governments address, at least, all "very high hazard" and "medium-high hazard" categories in their regulations. Their list of hazardous land uses<sup>1</sup> have been "translated" into Standard Industrial Classification (SIC) code categories and titles. Those listed for sector C are the "very high hazard" categories of land uses. Those listed for sector B are the "medium-high hazard" and "very high hazard" categories of land uses.

The zoning approach for wellhead protection should not be the only technique used. Other management options should be considered. Those options can be used alone or in combination with or as mitigation techniques for issuing a special use permit. If Article 76 (page 9) is used, the delineated area must be accurate and the hydrogeological study for the delineation must be done first. Instead of (or until) the delineation, the alternatives options can also be used. Those options are:

- Frequent onsite inspections by Fire Chief or another similar empowered person.
- Enforcement of best management practices (BMP):<sup>2</sup>
  - Secondary Containment for above-ground storage

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<sup>1</sup> Dean, Lillian F. and Wyckoff, Mark A.: *Community Planning & Zoning for Groundwater Protection in Michigan: A Guidebook for Local Officials*. Michigan Association of Planning, (219 South Main, Suite 300, Ann Arbor, MI 48104) for DNR Office of Water Resources. May 1991. Appendix A, page A-1 for "Very High Hazard" land uses; page A-2 to A-4 for "Medium-High Hazard" land uses.

<sup>2</sup> Dean, Lillian F. and Wyckoff, Mark A.: *Community Planning & Zoning for Groundwater Protection in Michigan: A Guidebook for Local Officials*. Michigan Association of Planning (219 South Main, Suite 300, Ann Arbor, MI 48104) for DNR Office of Water Resources. May 1991. Chapter 2, page 9.

- Blocking of interior floor drains
  - Secondary containment for loading and unloading areas
  - Closed holding tanks with off-site disposal of contaminated water
  - Water well isolation distances for underground storage tanks and above-ground hazardous substance storage
  - Density restrictions for unsewered development
  - Natural infiltration by minimizing impervious surfaces
  - Spill prevention and waste reduction plans
  - Groundwater monitoring requirements.
- Aggressive education programs targeted toward local businesses and industry.
  - Purchase property around the well(s).
  - Purchase development rights around the well(s).
  - Household hazardous waste collection.

The model language provided here is written making the following assumptions, in addition to those made, above:

1. The wellhead delineation has already been done by a qualified hydrologist.
2. The county wide groundwater protection sample zoning (above) have already been adopted or are being adopted at the same time the wellhead protection zoning amendments is being adopted. If not, then at a minimum, those parts in steps one to four are necessary.)

The process to amend the zoning ordinance is listed as a series of steps in Land Use Series “Check List # 4; For Adoption of a Zoning Ordinance Amendment (including some PUDs) in Michigan” available at [www.msue.msu.edu/lu](http://www.msue.msu.edu/lu).

**Commentary:** To implement additional protection around public Type I groundwater wells (wellhead protection zone) the following article should be added (associated with other overlay zoning districts) as ARTICLE 76. This only applies where the ten-year zone of travel area around a Type I well includes territory within the municipality: [End of commentary]

## **ARTICLE 76: WELLHEAD PROTECTION OVERLAY DISTRICT**

### **7601. Area Affected**

Every parcel of land which lies in whole or in part within Wellhead Protection Overlay Zone as depicted on the Official Zoning Map around public Type I water wells is subject to the regulations of this Overlay Zone to the extent the parcel lies within this Overlay Zone. The regulations of this Overlay Zone are in addition to any regulations in the underlying Land Use Districts, however these regulations supersede all conflicting regulations of the underlying Land Use District to the extent of such conflict but no further.

### **7602. Wellhead Protection Zones**

As shown on the Official Zoning Map, there shall be three concentric sectors within this Overlay Zone:

- A. Sector A shall be an area around the water well intended to be protected by this Overlay Zone which shall include \_\_\_\_\_ around the well.
- B. Sector B shall be the next largest area around the water well, as shown on the Official Zoning Map, intended generally to include, at a minimum, an area necessary for a one year zone of protection for the well.



- C. Sector C shall be the remainder of this Overlay Zone outside of Sectors A and B, as shown on the Official Zoning Map, intended generally to include, at a minimum, a ten year zone of protection for the well.

### 7603. Sector A Land Use Prohibitions

The underlying zoning district notwithstanding, no person shall use land within sector A for any land use which involves any of the following:

- A. Any use listed in Section 7604 of this Ordinance
- B. Any use listed in Section 7605 of this Ordinance
- C. Any other land use except:
  - 1. A water well pump station.
  - 2. A water tower.
  - 3. Open space area, planted to grass, garden, or other ground cover.
  - 4. A park which is planted to grass and does not include any motorized rides, entertainment, and so on.

### 7604. Sector B Land Use Restrictions

The underlying zoning district notwithstanding, no person shall use land within sector A or B for any land use except as provided for here. The list of permitted and special uses allowed in the land use district underlying this overlay district shall remain unchanged in Sector B of this overlay district, except as follows. All uses listed in section 7604.C of this Ordinance shall be prohibited uses or special uses, notwithstanding the provisions of the underlying zoning district.

- A. The uses listed in section 7604.C of this Ordinance shall be prohibited except when one of the two following conditions exist:
  - 1. All businesses and facilities which use or generates hazardous substances (except (1) fuel stored in a fuel tank which is part of a motor vehicle for purposes of use by that vehicle's motor, (2) materials in a five gallon, or smaller, pre-packaged sealed containers and is for purposes of resale and located inside a retail establishment):
    - a. in quantities less than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) per month or ninety five (95) liters (approximately twenty five (25) gallons) per month, whichever is less, or
    - b. stores less than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) or ninety five (95) liters (approximately twenty five (25) gallons), whichever is less,
  - or
  - 2. The business and facilities use, store or generate hazardous substances
    - a. above the amounts established in section 7604.A.1, and
    - b. has an approved permit by a county, state or federal agency with authority to issue such permit for the use of the hazardous substances.
- B. If the proposed uses listed in section 7604.C of this Ordinance are not prohibited pursuant to section 7604.A of this Ordinance, then it shall be considered a special use pursuant to Section ? [article on special use permits] *et. seq.* of this Ordinance.
- C. Affected Land Uses:
  - 1. Any use listed in Section 7605 of this Ordinance



2. Dwellings, Duplexes, Apartment buildings which are connected to on-site sewage disposal and include more than one (1) living unit per \_\_\_\_\_ (\_\_,\_\_\_\_) [20,000 suggested minimum] square feet of land area.
3. Agricultural Production-Crops, Agricultural Production-Livestock [01-0299] (farm) vehicle maintenance and chemical storage areas; tanks for mixing chemicals; power washing; nitrate contamination due to over fertilizing; pesticide and herbicide infiltration
4. Lawn care [0782] (threats from pesticides and containers with residues; improper disposal of washout water)
5. Any Manufacturing [D: 20-3999] that uses: (category includes any business which uses chemical solvents or petroleum-based products)
  - a. Petroleum and coal products (fossil fuel storage; solvent storage and use; blending of materials; outdoor storage piles; large tanks; bulk storage)
  - b. Chemicals and allied products, including paints (chemical storage, use and production; equipment cleaning; industry has made major improvements; management and disposal of hazardous chemicals is the concern)
  - c. Rubber and miscellaneous plastic products (raw materials; hazardous substances; machine shops)
  - d. Furniture manufacturing and refinishing (threats due to chemical solvents, oil-based paints, lacquers, varnishes, etc.)
  - e. Primary metal industry; fabricated metal products (threats due to solvents, strong acid or alkaline solutions, paints, cyanide solutions, and oils; much variation among businesses; floor drains; gondolas with dripping parts; dip tanks; cutting oils; messy products are a concern)
  - f. Electronic and other electric equipment, including metal plating and finishing (threats due to plating solutions, plating sludge, solvents and still bottoms; management and disposal of acids and other hazardous wastes; floor drains are a concern)
  - g. Food processing and food products (processing wastes; caustics from in-line cleaning; wastewater disposal; brine storage; outdoor storage of pulp and other organic wastes)
  - h. Lumber and wood production (chemical treatment of wood; chemical storage)
  - i. Apparel and textile products (hazardous substances; equipment cleaning)
  - j. Paper and allied products; pulp and paper manufacturing (materials storage; pulp waste)
  - k. Printing and publishing (storage and use of chemicals; equipment cleaning; engraving; silk screen residues)
  - l. Leather and leather products (storage and use of hazardous substances)
  - m. Stone, clay and glass products (storage and use of hazardous substances)
  - n. Electronic and other electric equipment (hazardous substances; equipment cleaning; machine shops)
  - o. Other manufacturing or processing which uses chemical solvents, oils, and/or chemicals
  - p. Mining, including iron ore and sand and gravel excavation (spoil disposal; equipment maintenance)
  - q. Oil and gas well drilling and production (threats due to drilling mud, oils, and brine solutions; dehydrating gas condensate)

6. Rail Transportation [40] (chemical solvents used in vehicle maintenance, paints, thinners, etc.)
7. Local and Interurban Passenger transit [41] (chemical solvents used in vehicle maintenance, paints, thinners, etc.)
8. Trucking and Courier services (except. air [421]) (chemical solvents used in vehicle maintenance, paints, thinners, etc.)
9. Trucking terminal facilities [423] (chemical solvents used in vehicle maintenance, paints, thinners, etc.)
10. Transportation by Air [45] e.g. airports (threats due to chemical solvents used in vehicle and aircraft maintenance and de-icing, etc.)
11. Electric Services [491] e.g. electric power generation substations; other electric services (threats due to acids, oil, PCBs, etc.) and fossil fuel power plants (solvents and oils; equipment repair).
12. Combination Utility Services [493] e.g. electric power generation substations; other electric services (threats due to acids, oil, PCBs, etc.) and fossil fuel power plants (solvents and oils; equipment repair).
13. Sewerage systems [4952] (wastewater treatment plants and sludge application sites) (Improper septage waste application)
14. Refuse Systems [4953] (hazardous waste treatment or disposal, sanitary landfills, recycling facilities, hazardous material recycling, used oil collection sites)
15. Chemicals and Allied Products [516]; warehouse operations where paints, solvents, or chemicals are blended or mixed prior to distribution or sale (floor drains; septic systems may connect to groundwater)
16. Petroleum and Petroleum Products [517] (fuel oil tanks; spills and leaks; transfer of product increases potential for spills)
17. Paints, Varnishes and supplies [5198]; warehouse operations where paints, solvents, or chemicals are blended or mixed prior to distribution or sale (floor drains; septic systems may connect to groundwater)
18. Gasoline service stations [554] without vehicle maintenance (spilled fuel runs off to nearby ditch; public drips oil and gasoline; leaking underground tanks)
19. Disinfecting and pest control services [7342] (pesticides and containers with residues)
20. Building Maintenance Services, nec [7349] (small leftover amounts of paints and solvents; improper disposal of hazardous materials; container washout; soaps and rinse water)
21. Photofinishing laboratories [7384] (chemical use and disposal; should be connected to sewer)
22. Miscellaneous repair services [76] (e.g. small engine and electrical equipment repair (solvents; oils; leaks and spills)
23. Reupholstery and Furniture Repair [764], including antiques (threats due to chemical solvents, ignitable or oil-based paints, varnishes, shellac, washing on bare ground; some very small businesses)
24. Golf courses [7922 and 7997] vehicle maintenance and chemical storage areas; tanks for mixing chemicals; power washing; nitrate contamination due to over fertilizing; pesticide and herbicide infiltration
25. Medical and Dental Laboratories [807] (unused chemicals, solvents, reagents, and hazardous wastes; small labs on septic systems are a concern; should not pour chemicals down the drain)

26. Research, Development and Testing Services [873] (unused chemicals, solvents, reagents, and hazardous wastes; small labs on septic systems are a concern; should not pour chemicals down the drain)
27. Home occupations which are auto repair, furniture refinishing, and pesticide applicators.
28. Municipal and state garages for highway and public works departments (vehicle maintenance and chemical storage areas; underground storage tanks; de-icing salts, including storage and application)

#### **7605. Sector C Land Use Prohibitions**

The underlying zoning district notwithstanding, no person shall use land within sector A, B or C for any land use except as provided for here. The list of permitted and special uses allowed in the land use district underlying this overlay district shall remain unchanged in Sector C of this overlay district, except as follows. All uses listed in section 7605.C of this Ordinance shall be prohibited uses or special uses, notwithstanding the provisions of the underlying zoning district.

- A. The uses listed in section 7605.C of this Ordinance shall be prohibited except when one of the two following conditions exist:
  1. All businesses and facilities which use or generates hazardous substances (except (1) fuel stored in a fuel tank which is part of a motor vehicle for purposes of use by that vehicle's motor, (2) materials in a five gallon, or smaller, pre-packaged sealed containers and is for purposes of resale and located inside a retail establishment):
    - a. in quantities less than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) per month or ninety five (95) liters (approximately twenty five (25) gallons) per month, whichever is less, or
    - b. stores less than one hundred (100) kilograms (approximately two hundred twenty (220) pounds) or ninety five (95) liters (approximately twenty five (25) gallons), whichever is less,or
  2. The business and facilities use, store or generate hazardous substances
    - a. above the amounts established in section 7605.A.1, and
    - b. has an approved permit by a county, state or federal agency with authority to issue such permit for the use of the hazardous substances.
- B. If the proposed uses listed in section 7605.C of this Ordinance are not prohibited pursuant to section 7605.A of this Ordinance, then it shall be considered a special use pursuant to Section ? [article on special use permits] *et. seq.* of this Ordinance.
- C. Affected Land Uses:
  1. Oil and Gas drilling [13]
  2. Chemicals and Allied Products [28]
  3. Petroleum and Coal Products [29]
  4. Metal Services, nec [347]
  5. Electronic and other equipment [36]
  6. Scrap and Waste Materials [5093]
  7. Automotive Dealers & Service Stations [55] EXCEPT:
    - a. gasoline service stations [554]

8. Laundry, Cleaning & Garment Services [721]
9. Auto Repair, Services and Parking [75]
10. Other types of facilities that use, store or manufacture hazardous substances

#### **7606. Conflicting Federal or State Regulations**

The regulations of this Overlay Zone are not intended to conflict with any law or administrative regulation, on groundwater protection, of the United States, the State of Michigan or any agencies thereof.

#### **7607. Nonconforming Land Uses in this Overlay Zone**

If a land use exists within this Overlay Zone on the date this section takes effect which is not permitted within the respective sector of this Overlay Zone then;

- A. Such nonconforming use of land shall not be moved in whole or in part to any other portion of such land, added to, extended, reconstructed, structurally altered or expanded during its life, Section ? [article on nonconformities] notwithstanding.
- B. Nothing herein shall prevent the completion of structures for a land use which shall have been diligently prosecuted prior to the passage of this section.
- C. Nothing herein shall prevent the normal repair, reinforcement, rehabilitation of a structure.

In the future it is possible new technology, or new manufacturing or processing results in some of the land uses listed above no longer being “medium-high hazard” or “very high hazard.” In that case it is appropriate for an applicant to ask to amend the above zoning provisions to remove, or modify, that particular land use from the lists presented above. Such an amendment request should be accompanied by data, such as a hazardous substances management plan which shows how that land use will not pose any threat to groundwater quality. Such a request should be considered with the advice and consent of appropriate state experts.

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## Appendix A - Recommended Reading

- Michigan Department of Natural Resources and Environment *Environmental Permit Information Checklist* (<http://www.deq.state.mi.us/documents/deq-ess-permits-eqp3580.pdf>) and *Permit Guidebook* (<http://www.deq.state.mi.us/documents/deq-ess-permits-permitguidebook.pdf>) both found at web page <http://www.michigan.gov/deq/0,1607,7-135-6844-89034--,00.html>
- Dean, Lillian F.; *Reinventing Government for Groundwater Protection: The Need for County Local Partnerships*; Michigan Association of Planning; 1995; \$15; 219 South Main, Suite 300, Ann Arbor, Michigan 48104; (734)913-2000.
- Lusch, David P. and Mark A. Wyckoff and Lillian Dean; *Using Groundwater Protection Data to Improve Planning and Zoning Decisions*; Michigan Association of Planning; 1995; \$17.50; 219 South Main, Suite 300, Ann Arbor, Michigan 48104; (734)913-2000.
- Dean, Lillian F. and Peggy B. Johnson; *Local Government Regulations for Groundwater Protection*; July 1988; Clinton River Watershed Council, 101 Main Street, Suite 100, Rochester, Michigan 48307; (248) 601-0606.
- Dean, Lillian F. and David P. Lusch; *Wellhead Protection Planning Guide for Michigan Communities*; Michigan State University Groundwater Education in Michigan (GEM) Program, Institute of Water Research; 1994; IWR, 101A Manly Miles Building, Michigan State University, 1405 S. Harrison Road, East Lansing, Michigan 48823-5243; (517)353-3742.
- Olsson, Kris and Lisa Brush; *Wellhead Protection Community Guide, Supplementary Resources*; The Huron River Watershed Council; 1998; 1100 North Main Street, Suite 210, Ann Arbor, Michigan 48104; (734)769-5123.
- Dean, Lillian F. and Mark A. Wyckoff; *Community Planning & Zoning for Groundwater Protection in Michigan: A Guidebook for Local Officials*; Office of Water Resources, Michigan Department of Natural Resources (now Department of Natural Resources and Environment); May 1991.

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## Appendix B - Internet Contacts for more Information:

- MSU Institute for Water Research: <http://www.iwr.msu.edu/>
- MSU: <http://www.msu.edu>
- MSU Extension: <http://www.msue.msu.edu>
- Michigan Association of Planning (MAP) (formerly the Michigan Society of Planners and Michigan Society of Planning Officials (MSPO)): <http://www.planningmi.org>
- Michigan Department of Natural Resources and Environment wellhead protection program: <http://www.michigan.gov/deq/0,1607,7-135-331336753695--,00.html>



## Appendix C – Hazardous Substances Reporting Form for Site Plan Review

### Hazardous Substances Reporting Form for Site Plan Review

Note: This form should be completed and submitted as part of the site plan for facilities which may use, store, or generate hazardous substances or polluting materials (including petroleum-based products)

Name of business: \_\_\_\_\_

Name of business owner: \_\_\_\_\_

Street and mailing address: \_\_\_\_\_

Telephone: ( \_\_\_ ) \_\_\_ - \_\_\_\_

I affirm that the information submitted is accurate.

Owner's signature: \_\_\_\_\_

Information compiled by: \_\_\_\_\_

#### Part I: Management of Hazardous Substances and Polluting Materials

1. Y N Will the proposed facility store, use or generate hazardous substances, as defined in the Zoning Ordinance, or polluting materials (including petroleum-based products) now or in the future?  
If yes, please complete this form and submit with your site plan.
2. Y N Will hazardous substances or polluting materials be reused or recycled on-site?
3. Y N Will any hazardous substances or polluting materials be stored on-site? If yes, identify the storage location on the site plan. Describe the size and type of secondary containment structure here or on an attached page:
4. Y N Will new underground storage tanks be located less than 2,000 feet from drinking water wells serving two or more establishments or less than 300 feet from a single family drinking water well?
5. Y N Are existing underground storage tanks on-site less than 200 feet from a drinking water well serving more than a single household?  
If the answers to #4 or #5 are yes, you may be in violation of State of Michigan underground storage tank regulations. Contact the State Police Fire Marshal Division, Lansing Central office for specific requirements. Telephone (517)322-5470 or 1(800)MICH UST (1(800)642-4878).
6. Y N Will the interior of the facility have general purpose floor drains?\* If yes, the floor drain will connect to: (circle one)
  - a. Sanitary sewer system;
  - b. On-site holding tank; or
  - c. On-site system approved by the Michigan Department of Natural Resources and Environment in accordance with groundwater discharge permit requirements (Telephone Waste Management Division, \_\_\_\_\_ District Office ( \_\_\_ ) \_\_\_ - \_\_\_\_.)\*NOTE: General purpose floor drains should not be connected to a stormwater drainage system, dry well, or septic system.
7. Y N Will hazardous substances or polluting materials be stored, used, or handled out-of-doors near storm drains which discharge to lakes, streams, or wetlands? If yes, describe the type of catch basin or spill containment facilities which will be used (use an attached sheet with diagram, if appropriate):

Additional information may be requested from the municipality to assure that site plans comply with local, county and state environmental protection requirements.



**Part II: Types and Quantities of Hazardous Substances and Polluting Materials Which Will be Used, Stored, or Generated On-site.**

Please list the hazardous substances and polluting materials (including chemicals, hazardous materials, petroleum products, hazardous wastes and other polluting materials) which are expected to be used stored or generated on-site. Quantities should reflect the maximum volumes on hand at any time. Attach additional pages, if necessary to list all hazardous substances and polluting materials.

Common Name (trade name)	Chemical Name (components)	Form  KEY: Liq=liquid P.Liq=Pressurized liquid S=Solid G=Gas PG=Pressurized gas	Maximum quantity on hand at a time	Type of Storage Containers  KEY: AGT=Above ground tank DM=Drum(s) UGT=Under ground tank CY=Cylinders CM=Metal container CW=Wooden or composition container TP=Portable Tank
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

Turn this form in with a copy of the DNRE Environmental Permit Information Checklist attached (<http://www.deq.state.mi.us/documents/deq-ess-permits-eqp3580.pdf> found at web page <http://www.michigan.gov/deq/0,1607,7-135-6844-89034--,00.html>)