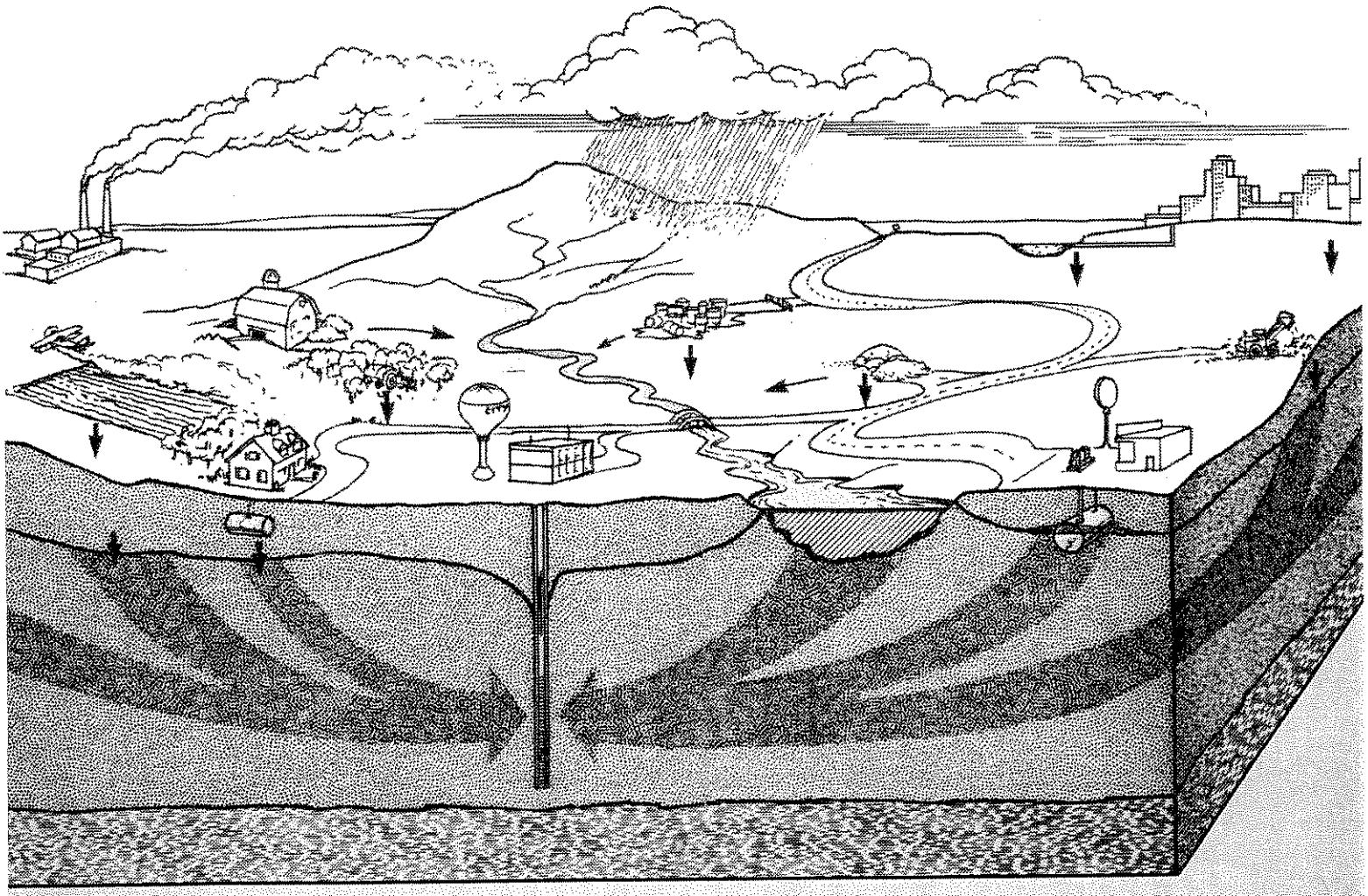
Groundwater Protection by Local Government



A publication prepared for the

Illinois Department of Energy and Natural Resources

and the **Illinois Environmental Protection Agency**

A project of the

Department of Urban and Regional Planning

University of Illinois at Urbana-Champaign

In cooperation with the

Illinois Chapter – American Planning Association

GROUNDWATER PROTECTION BY LOCAL GOVERNMENT

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I. INTRODUCTION

Almost half of the population of the United States receives its drinking water from underground sources, or groundwater. It is also a major source for irrigation, industrial processes, and livestock watering. Half of the residents of Illinois depend on groundwater for their drinking water. Groundwater comprises most of the small fraction of the earth's water that is in a form usable by humans. For these reasons it is extremely imperative that these water supplies be adequately protected.

For centuries, people have disposed of liquid waste into the subsurface environment. Harmful substances placed on the land surface or buried underground can seep through and contaminate groundwater supplying public and private drinking water wells. Substances which have the potential to harm water quality include: industrial wastes, landfill leachate, agricultural chemicals, septic system effluent, oil and gasoline, animal wastes, acid-mine drainage, oil-field-brine wastes, road salts, hazardous wastes, and lawn and household chemicals.

State and local governments shoulder the responsibility to protect Illinois' groundwater resources. State efforts to protect groundwater are spread out among numerous agencies and complex laws. Recognizing the need to unify the State's groundwater protection programs, the Illinois General Assembly passed the *Illinois Groundwater Protection Act* (IGPA) 415 /ILCS 55/1 et. seq (1992) in 1987. The intent of the IGPA is to protect Illinois' groundwater reserves as a natural and public resource, establish new policies and coordinate existing programs. Two existing statutes, *The Environmental Protection Act* 415 ILCS 5/1 et. seq. (1992) and the *Illinois Water Well Construction Code* 415 ILCS 30/3 (1992), were amended to assign additional duties to existing regulatory agencies.

State responsibilities include: research and education; establishing minimum setback zones for public and private water supply wells; conducting hazard reviews for smaller communities upon request; conducting contaminant source inventories for all public water supply wells; establishing technical requirements for certain activities which could contaminate wells; establishing comprehensive groundwater quality standards; implementing priority groundwater protection planning regions; and providing for the establishment of regulated recharge areas.

Local government authority to protect groundwater includes: adopting maximum setback zone ordinances; conducting groundwater protection needs assessments: participating in the establishment of priority groundwater planning regions and regulated recharge areas; and adopting setbacks as a zoning overlay district.

The threat of groundwater pollution can be significantly reduced by utilizing the best management practices available at the regional and local level. To increase water supply protection, local governments have various powers available. These include subdivision ordinances, site plan reviews, design standards, operating standards, source prohibitions, purchase of property or development rights, public education, groundwater monitoring, household hazardous waste collection, and water conservation programs. With the technical support of state agencies, local government can use its powers and local presence to complement the work of the Illinois Environmental Protection Agency (IEPA), Pollution Control Board (PCB), and Illinois Department of Public Health (IDPH).

An important aspect of the IGPA is to protect groundwater by controlling contaminating land uses near wells and groundwater recharge areas. Although the state regulates both new wells and contaminating land uses, local government has an important role in assisting in the implementation of the Act. It is in a community's self-interest to be aware of wells and potential contamination sources. Communities may also increase the water supply protection by initiating their own regulation procedures.

The primary purpose of this document is to provide information to local governments on how to help implement the IGPA. It explains the major causes of groundwater contamination, clarifies the application of the IGPA and other existing groundwater legislation to local governments, and outlines ways in which local Illinois governments can help to protect their groundwater quality.

II. GROUNDWATER AS A RESOURCE

WHAT IS GROUNDWATER?

Groundwater is water which occurs beneath the earth's surface. Groundwater comes from the land surface, by water draining downward through spaces between soil particles.

WHAT IS AN AQUIFER?

An *aquifer* is water-saturated soil and rock that can yield usable amounts of water to a well. Groundwater professionals define different types of aquifers based on physical characteristics. If the saturated zone is sandwiched between layers of impermeable material such that the water is under pressure, it is called a *confined aquifer*. If there is no impermeable layer immediately above the saturated zone then it is called an *unconfined aquifer* (FIGURE 1). (Official definitions in the Act can be found in Appendix C).

Aquifers are replenished by water percolating through the earth above. The area replenishing groundwater is called a *recharge area*. All aquifers, whether confined or unconfined, are recharged from upland areas at the land surface. Conversely, lakes, streams, wetlands and other low-lying areas generally are areas where groundwater *discharges* at the land surface.

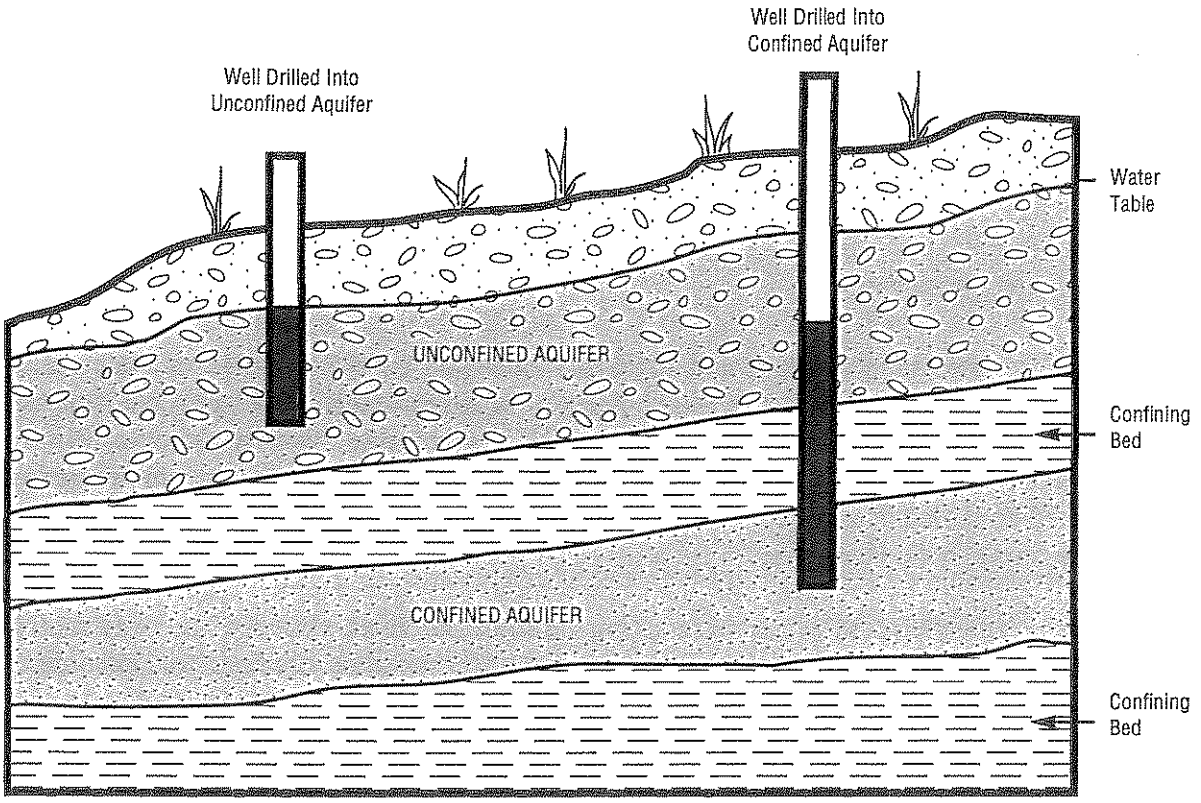
In an unconfined aquifer the top of the saturated zone is called the *water table*. The depth to the water table fluctuates from season to season. The spaces between the soil particles directly connect the unconfined aquifer to the ground surface. Therefore, what is spilled or dumped at the surface will eventually reach the aquifer. Unconfined aquifers, such as sand and gravel aquifers common in Illinois, generally contain water of excellent quality. Because they are highly permeable, water readily and rapidly moves through them and has less opportunity to accumulate dissolved minerals. Due to this rapid water movement, contaminants from human activities can also move through the aquifers relatively quickly.

A confined aquifer lies below a soil or rock layer that limits the amount of water able to pass. The confining layer protects the groundwater from spilled contaminants only if the layer is not split or cracked. Confining layers can be punctured by human activities, such as wells or mines.
Deep bedrock aquifers sometimes have poor water quality. The deeper the groundwater source, the longer the water has remained in the aquifer and the more likely it is to have picked up dissolved minerals, thereby degrading its quality. Some deep confined aquifers contain groundwater so highly mineralized that it is no longer suitable for drinking water purposes.

There are five principal aquifer systems in Illinois. Sand and gravel aquifers are generally the closest to the surface, consisting of unconsolidated material deposited by rivers and glaciers. More than half of the state's groundwater withdrawals are from these aquifers, which overlie bedrock. The four principal bedrock aquifers are: Pennsylvanian-Mississippian

FIGURE 1

Types of Aquifers



This diagram shows the difference between a confined and unconfined aquifer. In a well drilled into an unconfined aquifer, the water level will be at the level of the water table. In a well drilled into a confined aquifer, the water level in the well will reflect the pressure conditions within the aquifer.

sandstones and limestones (primarily in the southern two-thirds of the state); shallow dolomite of Silurian and Ordovician age; deep Cambrian-Ordovician sandstones, and the Mount Simon sandstone of Cambrian age.

NATURAL QUALITY AND QUANTITY OF GROUNDWATER IN ILLINOIS

Illinois residents use groundwater for various purposes, such as drinking water, irrigation, industrial processes, and livestock watering. About 5.5 million people in Illinois, nearly 50% of the state population, rely on groundwater for their drinking water. In some Illinois counties, all the drinking water comes from wells.

Publicly-owned water supply systems use about one-third of groundwater withdrawn in Illinois. As of January 1992, 1,435 community water systems, representing a total of 3,353 water supply wells, used groundwater. This number comprises nearly 74% of the community water supply systems in the state.

Groundwater quality in the principal withdrawal areas of the state generally falls within the drinking water standards set by the Illinois Pollution Control Board. Illinois groundwater quality is adequate for most uses such as drinking, irrigation, and industrial processes. Typically, groundwater in Illinois is very hard, meaning it has a high concentration of calcium and magnesium, and the concentrations of iron and manganese commonly exceed the State standard. The southern two-thirds of the state does not use the Cambrian-Ordovician and Mount Simon aquifers because the naturally occurring dissolved minerals are too highly concentrated. Other naturally occurring contaminants occur in Illinois. Some central Illinois counties have reported arsenic levels that exceed the drinking water standard. In parts of northern and western Illinois, naturally-occurring radium in the deep Cambrian-Ordovician aquifer causes water to exceed the drinking water standard for radium.

GROUNDWATER MOVEMENT

Water moves through an aquifer from higher pressure to lower pressure. Usually (but not always), this means that it flows from higher to lower elevations, and the flow directions generally reflect the regional topography. Groundwater flows from the recharge area to an area of natural discharge or well withdrawal. People commonly call aquifers "underground streams", but this is not a correct description of actual groundwater processes. Unlike streams, the water moves very slowly and over wide areas. Depending on the type of geologic material, water may move only fractions of inches to a few feet per day. Thus, once contaminated, groundwater can rarely cleanse itself.

Groundwater flows through permeable materials, such as sandstone, and is blocked by less permeable materials, such as clay. In nature, few materials are completely impermeable. Even solid bedrock has minute cracks through which groundwater can flow.

GROUNDWATER RECHARGE

Groundwater recharge occurs when water infiltrates the soil faster than it is evaporated, withdrawn by plants, or used to create soil moisture. Water loss from evaporation and plant withdrawal is termed evapotranspiration. The rate of evapotranspiration changes with the seasons. Most recharge occurs during the Spring when it rains frequently and the evapotranspiration is small. During Summer and early Fall evapotranspiration and soil moisture requirements normally exceed precipitation, so little water percolates to the water table. Recharge is negligible during the winter months when the ground is frozen.

Recharge to near-surface deposits can occur at relatively high rates, especially when these deposits contain significant amounts of permeable sand and gravel. However, large areas of Illinois are covered by fine grained glacial drift, which commonly exceeds 50 feet in thickness. Sand-and-gravel and bedrock aquifers are often deeply buried by this material, which typically has a low vertical permeability. Therefore, recharge to many of the deep aquifers is limited to slow leakage through the drift.

Therefore, a drought that occurs during the recharge season will tend to have a greater impact on groundwater levels than a drought that occurs during the growing season, and recovery of groundwater levels from storage removals during the growing season is dependent on moisture (recharge) during the subsequent late fall and early spring. If recharge does not occur during this time period, groundwater levels will remain low going into the next growing season and will then fall more rapidly as groundwater is taken out of storage by evapotranspiration and groundwater discharge.

GROUNDWATER WITHDRAWAL AND THE WATER TABLE

Water is removed from aquifers through wells. Wells are vertical holes, either drilled, bored, or driven, that penetrate into water saturated soils or rock. A pump within the well forces water to the surface. As the pump operates, it removes water adjacent to the hole, causing water from further out in the aquifer to flow toward the well from all directions.

In unconfined aquifers, as water is drawn down by a well, it lowers the water table locally. The water table forms a cone shape, with the well at its apex (FIGURE 2 next page). This *cone of depression* or *cone of influence* shows how a well can influence water levels at some distance away. This also illustrates how wells draw from a large part of an aquifer, and users of the water, therefore, depend on clean groundwater some distance from the well.

FIGURE 2

Cone of Influence in an Unconfined Aquifer

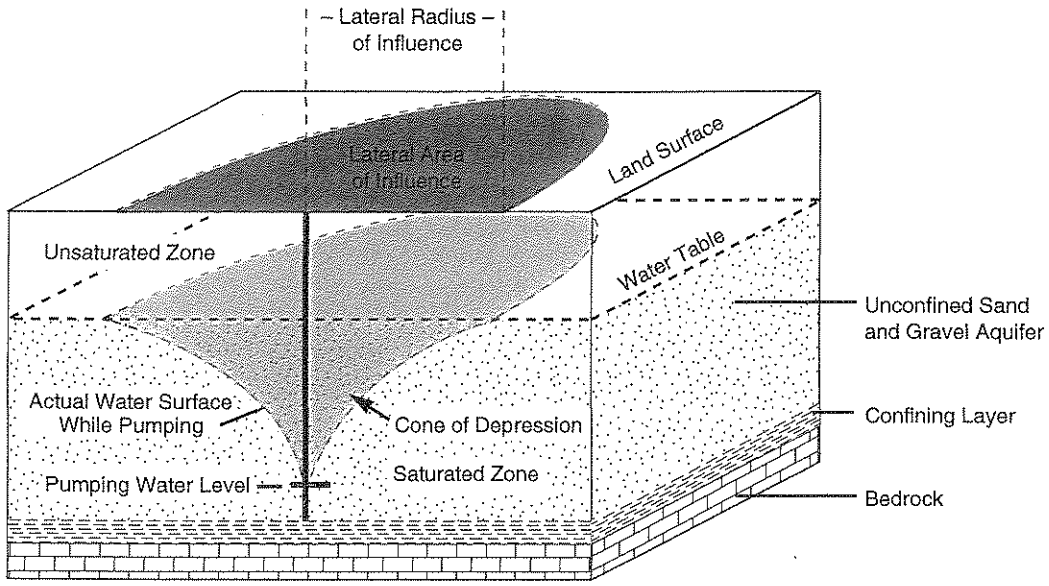


Figure 2 illustrates the cone of depression and lateral area of influence produced by pumping a well under normal operating conditions. The lateral area of influence consists of the area on the surface of the water table which is affected by the cone of depression and the land surface above this area. The radius of influence is the horizontal distance from the center of a well to the limit of depression. In other words, it is the distance from the well to where there is no drawdown in water level.

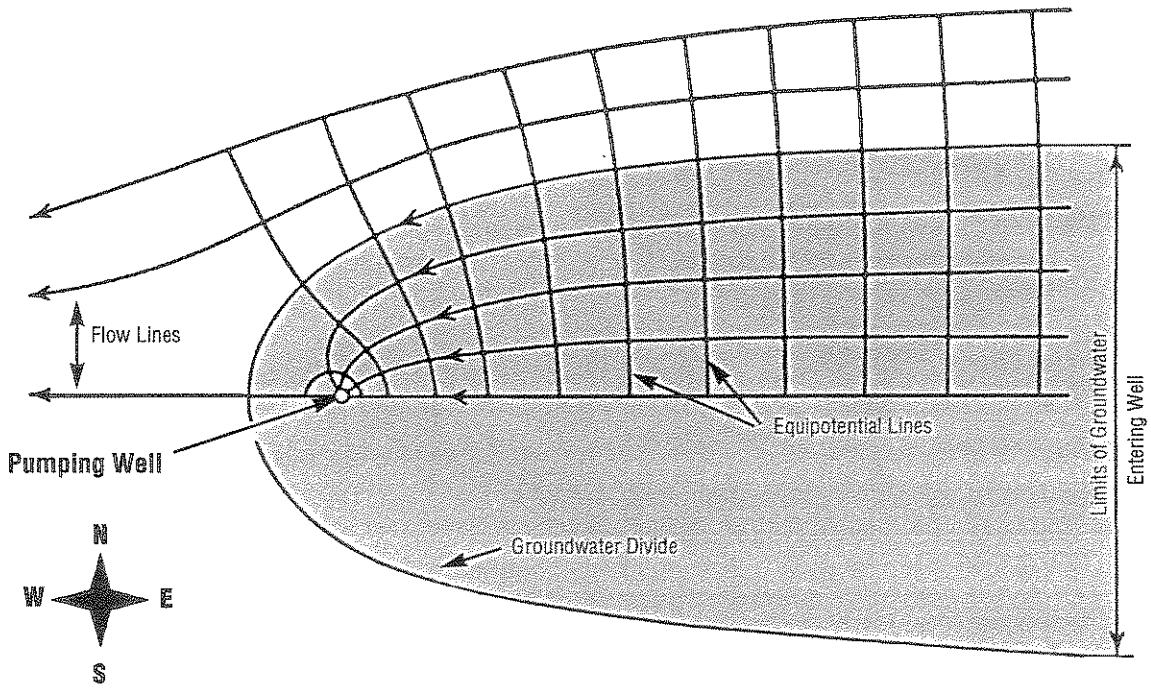
CAPTURE ZONES

As a pump withdraws water and forces it to the surface, groundwater withdrawn from around the well is replaced by water stored within the aquifer. This drawing of distant water to the well is called *groundwater capture*. The area affected is termed the *zone of capture* or the *area of influence*. The edge of the capture zone is the division line between where a water particle will eventually reach the well and where the water particle will flow around the well, never being captured by the well (FIGURE 3).

It is important to identify capture zones because any pollution within them will be drawn toward the well, eventually contaminating the water supply. The closer to the well that pollution occurs, the sooner it will be drawn into the water supply.

FIGURE 3

Capture Zone of a Pumping Well



This diagram shows the spatial characteristics of a capture zone of a well. The regional groundwater flow here is from east to west, as shown by the flow lines. The well disrupts the east–west flow by withdrawing some of the water. The flow lines that converge at the well show the portions of the regional flow that are intercepted, or captured, by the well. Groundwater, as well as contaminants, within the shaded area will be captured by the well.

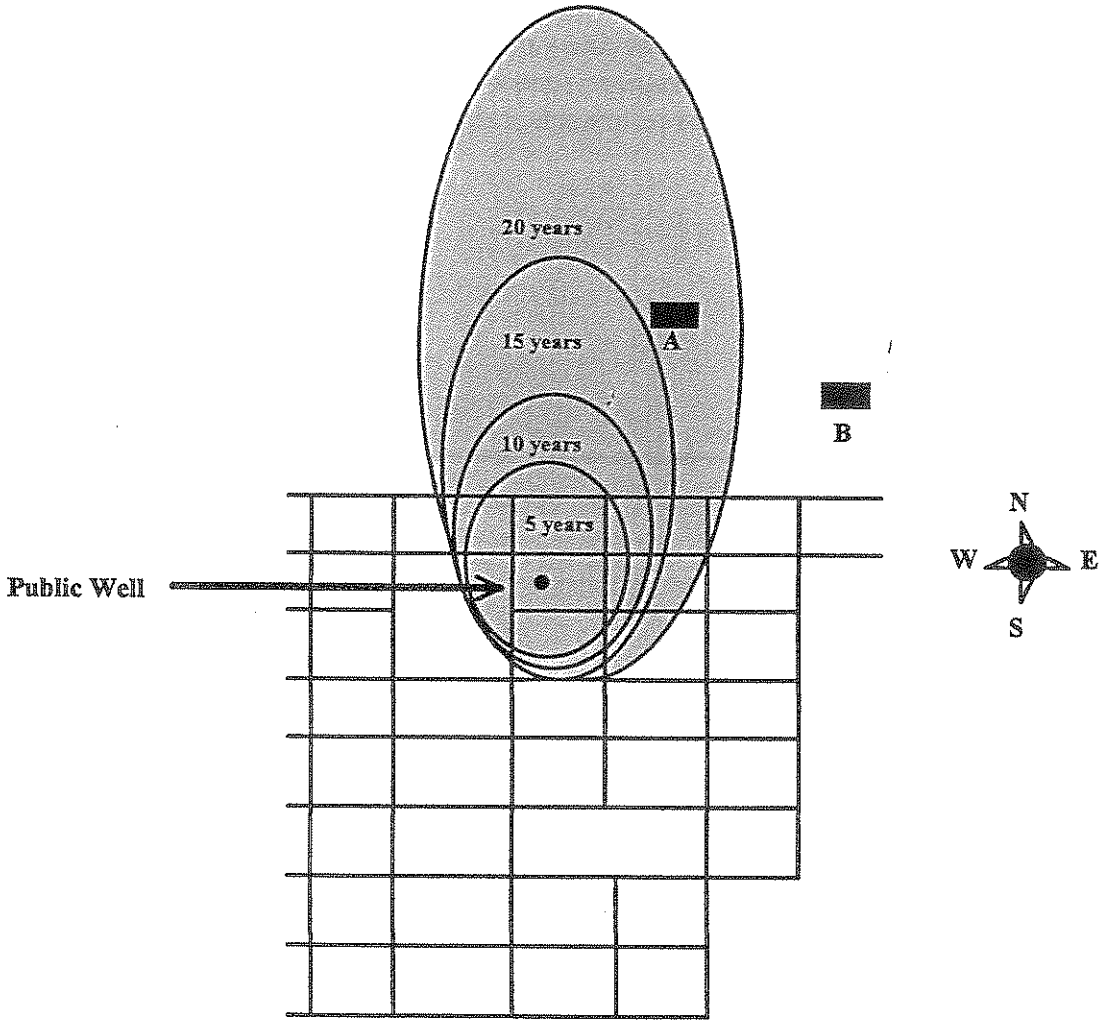
Adapted from Gibb, *et al., Hazardous Waste in Ogle and Winnebago Counties: Potential Risk Via Groundwater Due to Past and Present Activities* (Illinois Department of Energy and Natural Resources, State Water Division, Doc. No. 83/26, September 1983).

Capture zones are usually defined in terms of time of travel. For example, a "five-year capture zone" is the area within which water stored in the aquifer will be pulled into the well within five years. A numerical example follows: water that is being pulled into a well at 1 foot per day (speed = distance/time) and is 200 feet (distance) from the well has a capture time of 200 (feet) / 1 (foot/day) = 200 days (time). Conversely, given groundwater flow of 5 feet per day the distance to the edge of the 2 year capture zone is 5 (feet) x 2 (years) x 365 (days/year) = 3650 feet.

Capture zones are usually asymmetrical. Because they are affected by the natural flow direction and speed of groundwater, the capture zone will extend further upflow of the well than downflow (FIGURE 4). This is analogous to streamflow: a water intake pump in a stream will primarily take in water flowing from the upstream direction. Contamination upstream is more problematic than contamination downstream. Thus, well operators are more concerned with groundwater quality in the upflow direction than downflow.

FIGURE 4

Time-Related Capture Zone for a Public Well



This diagram shows the value of delineating a time-related capture zone for a public well. For example, it tells us that a contaminant spill at land use A could reach the well in 10 to 15 years, whereas a spill at land use B would not reach the well.

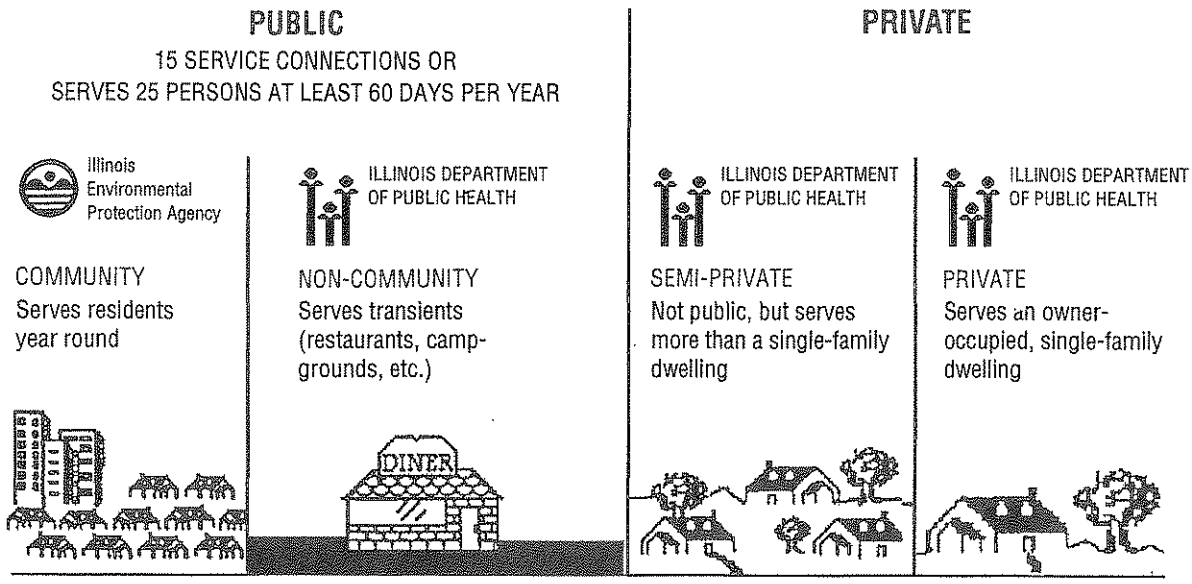
The IGPA has established *setback zones* for wells (discussed further in the next chapter). In the absence of detailed subsurface d ata, these zones are surrogates for capture zones. Because the setbacks are given distances, the actual capture time will vary from well to well. For example, a setback zone of 200 feet with groundwater flow into a well of 0.5 feet/day is equivalent to a 400-day capture zone. If a toxic spill occurs 200 feet away from the well and the spill seeps into the groundwater, the community could have about 400 days after the spill reaches the groundwater to begin remediation or find an alternative water source. If the flow velocity was only 0.25 feet/day, the 200-foot setback would correspond to an 800-day capture zone and a community would have twice the response time for a spill in the same spot as originally described. If the flow was 0.25 feet/day, the 200-foot setback would be equal to a 800-day capture zone.

WELLS

Wells in Illinois are classified in the IGPA (415 ILCS 55/9) according to use (FIGURE 5). *Public wells* have a minimum of 15 service connections or serve 25 persons at least 60 days per year. *Community public wells* serve residents year round. *Non-community public wells* serve non-residential populations at places such as restaurants, campgrounds, hotels, schools and factories.

FIGURE 5

Water Systems under the IGPA

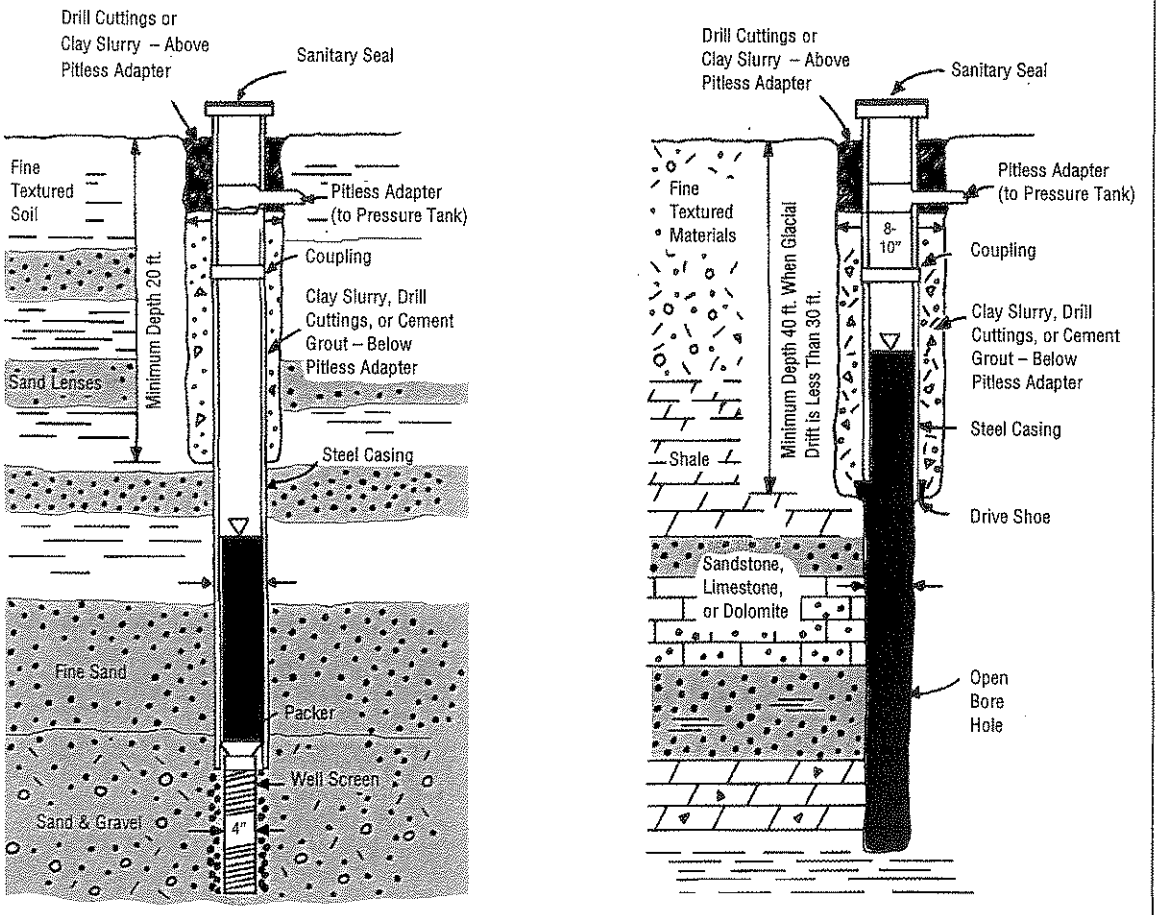


Wells that do not meet the requirements for public wells are classified as either semi-private or private. *Semi-private wells* serve more than one single-family dwelling, but fewer than 15 connections or 25 persons. *Private wells* serve an owner-occupied single-family dwelling.

Wells are also classified into types according to the method used in establishing the hole into the ground. The most common well types are *bored* and *drilled*. The type of well constructed for a given location depends on the aquifer to be tapped, the needs and economic limitations of the user (FIGURES 6,7).

FIGURE 6

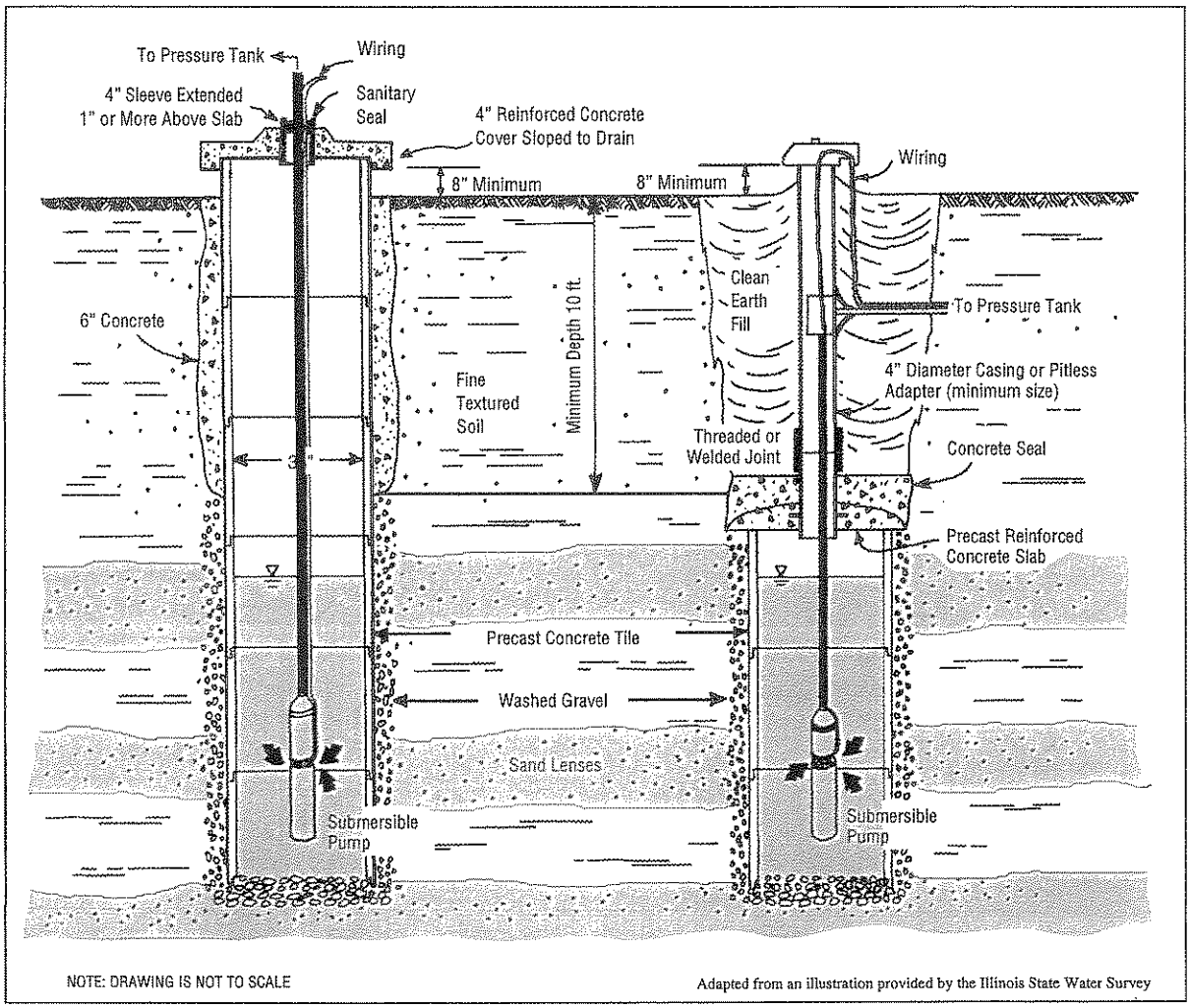
Small Diameter Drilled Wells



Pictured here are two types of small-diameter drilled wells, one into sand and gravel and the other into bedrock. When digging these wells, installers had to dig down to water-bearing formations that were large enough to provide a sufficient amount of water. They drilled past smaller water-bearing formations that wouldn't provide enough water to meet the homeowners needs. With the well on the left, for example, installers bypassed thin layers of sand, known as "sand lenses." These thin layers yield water, but they are too small to yield a sufficient amount.

FIGURE 7

Large Diameter Drilled Wells



Here are two types of large-diameter bored wells, each showing a different way to protect the upper 10 feet of the well from surface contamination. Note that the reinforced concrete cover is at ground level on the well to the left. In contrast, the concrete cover is at least 10 feet below the surface on the well to the right. Because its cover is below the ground, the well on the right is generally better at keeping out surface contaminants.

Dug or bored wells 1.5 to 5 feet in diameter are commonly constructed in areas where water yields are low. Their wide diameter and large storage volume help to overcome the disadvantages of the aquifer's low flow rate. Many of the large diameter wells in use today are very old wells which were excavated with hand tools and lined with uncemented brick or stone. These wells are often subject to contamination by surface seepage and may be unsuitable for domestic use (TABLE 1). Large-diameter bored wells sometimes extend only several feet into the water table. Consequently, they can go dry when the water table drops during periods of drought. Because of this drawback, a large-diameter bored well is usually only constructed when no better option is available.

TABLE 1

Examples of Conditions under Which Water Wells Can Cause Groundwater Contamination

IMPERFECT CONSTRUCTION	• Inadequate surface protection • Poor or no grouting • Well finished at or below land surface • Open annulus around casing
ILLEGAL CONSTRUCTION	• Poor location • Split screen where prohibited by situation • Improper abandonment of well • Improper backfill of test holes
WELL FAILURE	• Casing corrosion • Casing electrolysis (chemical) • Stray currents in ground • Accidental holing of casing during construction or maintenance
WELL USE	• Direct recharge of contaminant • Movement of contaminants caused by pumping • Salt water intrusion

Source: G.W. Page, ed., Planning for Groundwater Protection, Academic Press, Inc., 1987, p. 172

Small-diameter drilled wells are usually 4-6 inches in diameter. They are constructed where aquifers are capable of supplying water to the well as quickly as it is pumped. Drilled wells tap water-bearing sand and gravel formations as well as bedrock formations of permeable or fractured rock. The depth to which these wells are drilled varies greatly, depending on the geologic conditions.

Construction features of wells vary with the type of well and the characteristics of the aquifer. Some of the features commonly employed in various types of wells are *casing, screening, gravel packing, and grouting*. These features help to ensure that a well draws water from an aquifer at the desired depth, protect the upper parts of the well from infiltration of surface contaminants, and prevent caving of sides. Detailed requirements are given in the rules and regulations of the Illinois Water Well Construction Code.

Casings: Drilled wells are cased to maintain an open hole and assist in protecting the quality of the water supply. A steel or plastic pipe is inserted into the borehole and extends from the land surface into the aquifer. This casing of the bore hole prevents the overlying materials from caving in and minimizes contamination of the water. Wells penetrating bedrock aquifers are cased in the overlying unconsolidated materials and in any bedrock formations subject to caving.

Screening: Most successful drilled wells tapping sand and gravel are equipped with a length of well screen placed immediately below the casing to hold back sand particles and permit water to flow freely into the well. A properly selected and installed screen is designed to retain the aquifer material yet permit water to freely enter the well.

Grouting: The space between the casing and the bore hole must be sealed to minimize the chance of contamination from the surface. In drilled wells a clay slurry, or cement or bentonite grout must be used to seal the opening between the casing and the upper part of the bore hole.

Disinfection: New wells, or old installations after rehabilitation, are usually bacterially contaminated and should be disinfected before being placed in service. After the disinfection is completed, the well should be sealed to safeguard against future contamination. The Illinois Department of Public Health (IDPH) has specifications on the disinfection process. Typically, a solution of laundry bleach and water is used for disinfection.

Methods of pumping water: Most wells are equipped with electrically driven pumps of the jet, submersible, or turbine types. Farm and domestic pumps generally are of the jet or submersible types. Sizes of commercially available submersible pumps limit their use to wells with a minimum inside diameter of 4 inches. Larger capacity municipal and industrial wells utilize the submersible and vertical turbine type pumps.

Abandonment of Wells: Abandoned wells provide avenues for contaminants to enter groundwater. The procedures for filling abandoned wells are designed to eliminate these hazards and to restore geologic conditions that existed before the well was constructed. In

Illinois, the owner of a water well is responsible for sealing a well within 30 days after it is abandoned. The well must be sealed in accordance with the Illinois Water Well Construction code by a licensed water well contractor. The responsibility for filling a non-producing well resides with the individual who drills the well. This is usually either a well contractor or the property owner.

Sealing requirements: The Illinois Water Well Construction Code sets sealing requirements for abandoned wells. Water wells, borings, or monitoring wells which are abandoned must be sealed by placing the sealing material from the bottom of the well to the surface by methods that will avoid segregation or dilution of material. The Department of Public Health must be notified before work on sealing a well begins. If the property owner is performing the well abandonment, he or she must obtain prior approval from the Department of Public Health and must work under the Department's supervision. A completed sealing report must be submitted to the Department of Public Health or approved local health department after the well is sealed.

GROUNDWATER CONTAMINATION

Many substances have the potential to harm water quality. These include: industrial wastes, landfill leachate, agricultural chemicals, septic system effluent, oil and gasoline, animal wastes, acid-mine drainage, oil-field-brine waste, road salts, hazardous wastes, and lawn and household chemicals. If these substances are placed on the land surface or buried underground, they can seep through the ground and contaminate the groundwater.

When a contaminant is carried through an aquifer, it forms a *plume* of contaminated water. When this plume reaches a well, the well water becomes contaminated and threatens human health. Although hazardous materials from many miles away can contaminate a well, areas closest to wells are of particular concern. Contaminated groundwater near a well has a higher chance of eventually reaching the well than if it were further away. Furthermore, spilled material near a well can contaminate it before anyone has a chance to clean it up or divert it.

WHAT ARE GROUNDWATER CONTAMINANTS?

Groundwater contaminants, like surface water contaminants, include metals, bacteria, viruses, and pesticides. The U.S. EPA has regulated specific water contaminants since the adoption of the Safe Drinking Water Act (1972). The Safe Drinking Water Act lists maximum contaminant levels (MCLs) that are not to be exceeded in drinking water. In response to requirements of the IGPA, the Illinois Pollution Control Board (PCB) now requires the IEPA to continually update their list of MCLs based on the U.S. EPA's MCLs. Illinois' groundwater standards are incorporated in 35 Illinois Administrative Code 620.

Typical contaminants are classified by general chemical groups. Some classifications are: metals (lead, mercury, etc), radionuclides (radium), pesticides, and volatile organic compounds (gasoline,

paint thinner). Although all the contaminants that are regulated pose serious health hazards, the most frequently reported groundwater contaminants are the volatile organic compounds (VOCs).

VOCs are chemicals that are made of carbon, hydrogen, and oxygen and have a vapor pressure less than 1 atmosphere. That is, these liquid chemicals, such as gasoline or dry cleaning fluid, evaporate when left open to the air. A significant property of VOCs is the ease with which they mix with water. Over the last decade numerous incidences of VOC contamination have been reported nationwide, often caused by leaking underground storage tanks.

Groundwater contaminated by volatile organic compounds poses cancer risks to humans (TABLE 2). The risk of cancer is from exposure to the VOC either by ingestion of drinking water or inhalation. A study performed for the IDENR in 1987 showed that inhalation of VOCs from showering in an enclosed stall provides as much as eight times the intake from ingestion. In contrast, inhalation intake due to enrichment of indoor air, from appliances such as humidifiers and dishwashers, is usually a minor contributor to VOC intake. However, in instances where the dwelling is small and tight, with many appliances operating frequently, indoor air can be enriched to a significant extent. In some people (infants, women at home all day), inhalation intake can approach or equal the intake due to ingestion.

HOW DO LAND USES THREATEN GROUNDWATER?

Groundwater contaminants may come from leaking waste impoundments, leaking storage containers of hazardous materials, or uncontrolled waste disposal (TABLE 3, FIGURE 8). Local government has some authority over these land uses.

Industrial/Commercial

Industrial and commercial establishments that handle hazardous products and by- products may threaten groundwater through accidental spills, stormwater runoff from material storage areas, or improper disposal.

Industries that require chemical storage and holding facilities may threaten groundwater. Above-ground and underground tanks, surface impoundments, and waste piles can rupture or leak, allowing their contents to seep through the ground and contaminate the groundwater. Even local commercial establishments, such as gas stations and dry cleaners, may store substances that can contaminate the groundwater.

Municipal

Landfilling has and will continue to be the most common method of disposing municipal solid and hazardous wastes. However, no matter how well a landfill is constructed, it will eventually leak its liquid contents into the ground. The liquid, called *leachate*, is formed when water

TABLE 2

Estimated Upper Statistical Confidence Limits on Cancer Risks from Lifetime Consumption of Water Containing 1 ppb of a Given Chemical

CHEMICAL	CANCER RISK 95% CONFIDENCE	SEX, SPECIES	TUMOR TYPE
Benzene	1: 4,4000,000	Human	Leukemia
alpha-BHC	1: 3,500,000	M rat	Hepatocellular carcinoma
gamma-BHC	1: 1,300,000	M mouse	Hepatocellular carcinoma (pooled controls)
Carbon tetrachloride	1: 1,900,000	M mouse	Hepatocellular carcinoma
Chloroform	1: 4,100,000	F mouse	Hepatocellular carcinoma
Dibromochloropropane(DBCP)	1: 20,000	M rat	Squamous cell carcinoma of the stomach
1,1-Dichloroethane	1: 15,000	M mouse	All malignant tumors
1,2-Dichloroethane	1: 1,000,000	M rat	Hamangiosarcoma of circulatory system
Dioxane	1: 39,000,000	M rat	Nasal squamous cell carcinoma
Ethylene dibromide (EDB)	1: 48,000	M rat	Squamous cell carcinoma of forestomach
Parathion	1: 290,000	F rat	Adrenal cortical adenoma or carcinoma
Tetrachloroethylene	1: 93,000,000	M mouse	Hepatocellular carcinoma
1,1,2-Trichloroethane	1: 1,600,000	M mouse	Hepatocellular carcinoma
Trichloroethylene (TCE)	1: 30,000,000	M mouse	Hepatocellular carcinoma
Vinyl chloride	1: 4,100,000	M,F rat	Liver angiosarcoma

Adapted from: Harris, "The Health Risks of Toxic Chemicals Found in Groundwater," in C. Travis and E. Etnier (eds.), Groundwater Pollution: Environmental and Legal Problems, AAAS Selected Symposium 95 (Boulder: Westview Press, 1984), pp.83-84.

This table indicates cancer risks in certain populations from lifetime consumption of water contaminated with one part per billion of certain chemicals. For example, we can predict with 95% confidence that in a population of 4.4 million humans, at least one would develop leukemia as a result of drinking water with one part per billion of benzene.

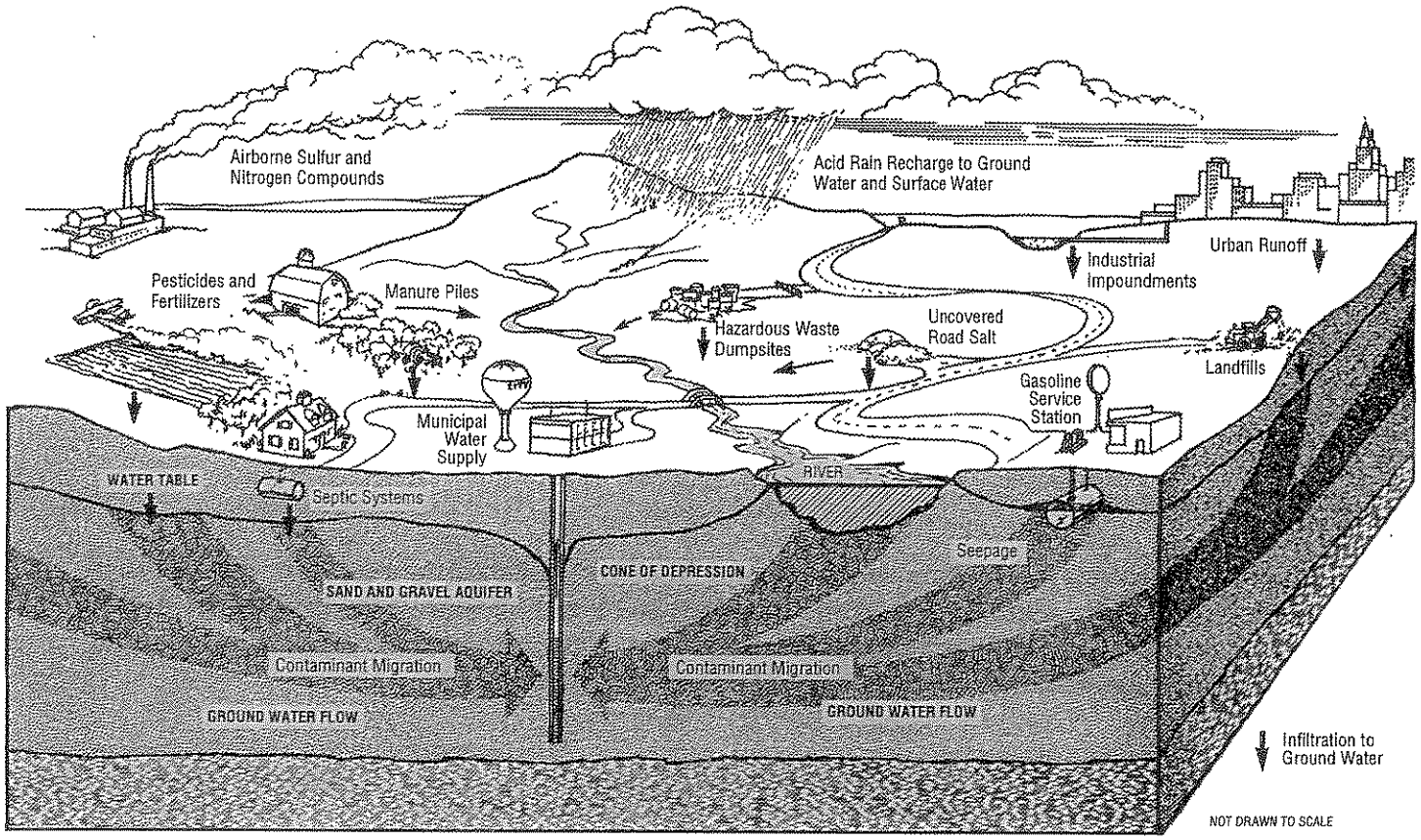
TABLE 3

Activities That Can Cause Ground-Water Contamination

GROUND SURFACE	• Infiltration of polluted surface water • Land disposal of wastes • Stockpiles • Dumps • Sewage sludge disposal	• De-icing salt use & storage • Animal feedlots • Fertilizers & pesticides • Accidental spills • Airborne source particulates
ABOVE WATER TABLE	• Septic tanks, cesspools, & privies • Holding ponds & lagoons • Sanitary landfills • Waste disposal in excavations • Underground storage-tank leaks	• Underground pipeline leaks • Artificial recharge • Sumps and dry wells • Graveyards
BELOW WATER TABLE	• Waste disposal in wells • Drainage wells & canals • Underground storage • Mines • Ground-water withdrawal	• Exploratory wells • Abandoned wells • Water-supply wells

FIGURE 8

Potential Sources of Groundwater Contamination



trickles down through the waste, absorbing chemicals and microorganisms, like water percolating through coffee grounds. The leachate can pose health risks if it seeps from the landfill and reaches the groundwater. Landfills built according to current standards, however, pose minimal hazards to groundwater. Modern landfills contain leachate collection systems, to prevent groundwater contamination, and have monitoring systems to verify adjacent groundwater quality. In contrast, older landfills pose continuing threats to groundwater quality.

Municipalities that spread and store de-icing salts pose a risk to groundwater. Excessively spread or improperly stored salts eventually wash down to groundwater.

Abandoned water supply wells can sometimes provide another route for contamination. An abandoned or improperly abandoned well provides direct access to the groundwater for any contaminant that enters the well from spills, contaminated surface runoff, or contaminated groundwater from other geologic formations. Other possible routes include quarries, sand and gravel pits, and stormwater infiltration basins.

Agricultural

Agricultural threats come from animal wastes, fertilizers, herbicides, pesticides, and livestock waste. Storage locations of agricultural chemicals and livestock waste pose the greatest risks to groundwater. Accidental spillage and leakage in agricultural chemical facilities pose a risk. Overapplied agricultural chemicals also can leach to the groundwater.

Residential

Residential land uses threaten groundwater quality in numerous ways. The U.S. EPA estimates that 25% of homes in the Unites States rely on septic systems to dispose of human wastes. Septic systems are a source of bacteria, nitrates, viruses, synthetic detergents, household chemicals, and chlorides entering groundwater. Residents also contribute to groundwater contamination by improper use of garden chemicals, auto products (such as used motor oil), and paint products. Even the proper use of garden chemicals can cause groundwater problems.

THE COSTS OF CONTAMINATION: A CASE FOR *PREVENTION*

Groundwater contamination can not be cleaned up easily. Because groundwater flows slowly, the natural process of dilution can take years or decades. Technological methods to clean up groundwater are very expensive and not always effective. The most common response to a contaminated well is to abandon it and drill a new well in a safer location. Thus, a contaminated well can be very costly to a community. The Illinois Groundwater Protection Act emphasizes the *prevention* of contamination, because it is much easier to prevent groundwater contamination then clean it up.

Rockford: A Costly Problem

In December, 1981, the Rockford Water Utility shut off Municipal Wells 7 and 7A because of contamination by volatile organic compounds. This facility, with a capacity of 7.5 million gallons per day, representing one-fourth of Rockford's water needs, was permanently lost to the city. To replace it, the City has had to drill new wells, into deeper, safer, and less productive aquifers. Over the past five years, Rockford has added five new well facilities at a cost of approximately $7.5 million. In addition, several hundred private wells in South Rockford have been replaced with piped water connections, at a cost of approximately more than $9 million, fortunately covered by the federal government but, possibly, to be recovered by the responsible parties.

Whose fault was it? Was one sloppy industrial facility to blame? Probably not. Southeast Rockford is an industrial area, with numerous factories making such products as machine tools and furniture. The contamination problems were likely caused collectively by all these land uses, legally dumping small amounts of wastes on the ground. Eventually, these materials seeped into the shallow aquifer under the city. Land disposal methods, once thought to be harmless, probably led to this costly public health hazard.

The Minnesota Study

The Freshwater Foundation of Minnesota sought to profile both the direct and indirect costs of groundwater contamination to cities and companies by surveying and interviewing representatives of cities, their utilities, industries and one state agency, all of which had experienced groundwater contamination.

In this survey, a minimum estimate of groundwater contamination was $24,045,500 in total cost to 17 Minnesota cities, and $43,026,500 to 18 Minnesota companies. In these few instances, groundwater pollution costs in Minnesota alone were estimated by the participants at over $67 million.

For the cities surveyed, the major cost associated with groundwater pollution was the loss to the tax base due to real estate devaluations (residential and commercial) and lack of business development. Other major costs included construction of new water treatment plants; purchase of new equipment for existing water treatment facilities; cleanup and remediation; and consulting and additional staff expenditures. The Freshwater survey revealed that five of the eight cities with the highest economic impacts from pollution were smaller, rural cities, outside the metropolitan area.

Lessons

The Rockford and Minnesota examples provide several lessons about groundwater contamination.

First, most groundwater contamination incidents occur as a result of years of disposal practices which compromised both private and municipal drinking water supplies. The remediation of these contaminants requires major expenditures for legal fees, staff time, treatment, equipment and maintenance.

Second, serious groundwater problems are located in all types of cities--metropolitan, metro suburban areas, and rural communities. But in smaller cities with less industrial development and lower tax bases, groundwater contamination results in disproportionate economic impacts.
Well closure strains a city's ability to meet industrial and residential water demand. Relocation of business to other communities instead of redevelopment, results in loss of jobs for the community and subsequent losses to the tax base. Costs for buying water can be passed on to the residents in the form of increased water rates of up to 1,000 percent. Overseeing remediation or construction of new treatment facilities can strain small city budgets.

Third, the costs and problems associated with managing groundwater contamination diminish the attractiveness of these sites for redevelopment and reuse, encouraging their abandonment and the development of new uncontaminated sites.

This impact is especially significant in smaller cities where the contaminated sites may be the only areas available for development. If the site is abandoned and the business relocated to another city, it means the loss of a major employment center for the city and loss to the city's tax base.

Fourth, water supply and treatment will change dramatically in the coming years, with tighter water quality standards, and increasing demand from new residential and commercial development. Cities need to reexamine how these water supply, quality and land use questions will affect their future economic development.

Finally, if companies and cities can better anticipate the broad-based economic implications of groundwater contamination, they will be able to develop preventive, proactive management strategies to alleviate such problems in the future. To do so, more positive land management strategies for prevention of groundwater contamination must be developed and more cooperation must be fostered between industry and government regulators.

III. REGULATION OF GROUNDWATER IN ILLINOIS

FEDERAL MANDATES

Section 1428 of the Federal Safe Drinking Water Act (SDWA) requires each state to submit a *wellhead protection program* to the U.S. EPA. The Illinois Environmental Protection Agency (IEPA) received approval in 1991 for its groundwater protection program, which includes activities undertaken pursuant to the Illinois Groundwater Protection Act (IGPA). The wellhead protection program is consistent with the provisions of the IGPA and does not contradict or subordinate that law.

SUMMARY OF ILLINOIS AGENCY RESPONSIBILITIES UNDER THE IGPA

The Groundwater Protection Act was approved on September 24, 1987 by the Illinois State General Assembly. Based on the need to recognize and protect Illinois' groundwater reserves as a vulnerable natural resource, the General Assembly declared:

> ". . . it is the policy of the State of Illinois to restore, protect, and enhance the groundwater of the State, as a natural and public resource. The State recognizes the essential and pervasive role of groundwater in the social and economic well-being of the people of Illinois, and its vital importance to the general health, safety, and welfare. It is further recognized as consistent with this policy that the groundwater resources of the State be utilized for beneficial and legitimate purposes; that waste and degradation of the resources be prevented; and that the underground water resources be managed to allow for maximum benefit of the people of the State of Illinois" 415 ILCS 55/2 (1992).

The IGPA establishes new policies, rules and regulations and coordinates existing programs. The IGPA consists of two distinct parts. The first establishes two new official bodies, and the second defines new responsibilities of existing agencies. The Act created an *Interagency Coordinating Committee on Groundwater* to coordinate the activities of state agencies, and a *Groundwater Advisory Council,* representing public interest groups. These two organizations help to develop and coordinate Illinois' groundwater policy.

The Act amended the *Environmental Protection Act* and *The Illinois Water Well Construction Code* to assign additional responsibilities to existing agencies: the Illinois Environmental Protection Agency (IEPA), Illinois Department of Energy and Natural Resources (DENR), Illinois Department of Public Health (IDPH), and the Pollution Control Board (PCB).

Interagency Coordinating Committee on Groundwater (ICCG)

The Interagency Coordinating Committee on Groundwater provides a linkage between State agencies that are concerned with groundwater policy development, evolution, and implementation. The ICCG is chaired by the director of the IEPA, with members from ten state agencies which have some jurisdiction over groundwater. The committee must meet twice a year to review and coordinate the State's groundwater protection policy, evaluate groundwater regulations, and assess the effectiveness of Illinois' groundwater protection programs. The Committee's role is to "review and recommend procedures to coordinate the State's response to specific incidents of groundwater pollution and coordinate dissemination of information between agencies responsible for the State's response" 415 ILCS 55/40 (1992).

The ICCG is required to report biennially to the Governor and General Assembly on groundwater quality, groundwater quantity, and the State's enforcement efforts.

Groundwater Advisory Council

The IGPA also created a Groundwater Advisory Council to allow the public, industry, and local governments to meet with the State Government. The Council consists of nine public members appointed by the Governor. Each member is a citizen representing a specific groundwater interest group. Conceptually, the Council balances the Committee's review and recommendation process by incorporating the general public's concerns. The Council's responsibilities mirror those of the Committee, although with less emphasis on implementation procedures. Council members serve three-year terms and are compensated for up to three meetings per calendar year.

Department of Energy and Natural Resources

The IGPA requires the DENR, along with other departments, to develop, coordinate, and conduct an education program for groundwater protection. The education program is to provide groundwater information at appropriate degrees of complexity to the general public, businesses, agricultural groups, government agencies, private water supply owners, users, and operators. The Committee has placed a high emphasis on education of local public officials.

In addition to the education program, the DENR is to develop the following programs:

- Coordinate groundwater data collection
- Automate groundwater information
- Develop and administer basic and applied groundwater research
- Establish a groundwater monitoring network
- Assess state-wide groundwater
- Evaluate pesticide impacts upon groundwater
- Study the economic impacts of groundwater regulations

Illinois Environmental Protection Agency

The Act places additional responsibilities on the IEPA. IEPA is now responsible to assist the DENR's education program, data collection and automation program, and the groundwater regulation economic impact study. IEPA also proposes regulations establishing comprehensive groundwater quality standards and technology regulations It provides technical assistance in all aspects of community water well protection, including maximum setback zones, needs assessments, and the voluntary identification and management of potential sources of contamination. Additional groundwater protection authority is outlined in the Environmental Protection Act Summary section below.

Illinois Department of Public Health

The IGPA gives extensive responsibilities to the Illinois Department of Public Health. The IDPH is responsible for regulating private, semi private, and non community wells. The sweeping authority includes: well construction review and approval, alteration and abandonment of wells, promulgation of construction and operation rules, compliance inspection of wells, monitoring and closed loop wells, and enforcement of the Act.

Pollution Control Board

The IGPA required the PCB to promulgate the IEPA recommended groundwater regulations and standards. Adoption of administrative procedures is also required.

STANDARDS FOR GROUNDWATER PROTECTION

The Pollution Control Board regulates Illinois groundwater based on a classification system that recognizes the different resource characteristics statewide. Classification allows groundwater protection to be tailored to the groundwater resources.

The PCB has established four classes of groundwater in Illinois. Every groundwater in the State belongs to one of the four classes or to the waters in a groundwater management zone.

Basic to the groundwater classification effort is the concept that groundwater constitutes a valued resource. It is recognized, however, that not all groundwaters constitute the same level of resources; some groundwaters have greater resource value by virtue of their higher quality, quantity, or accessibility. Moreover, the degree of protection required is a function of the nature of the particular groundwater resource. This concept constitutes the basis for groundwater classification, and the application of different water quality standards, monitoring, and remedial requirements, to the different classes.

Groundwater that is generally fit for human consumption called *potable*, constitutes the highest use 415 ILCS 55/3(h) (1992). Potability requires the highest degree of protection, although

the most stringent standards, to maintain the use. Potable-use is by far the largest use for groundwaters in Illinois. Given these circumstances, it is apparent that any successful program of groundwater management must give special focus to potable groundwaters. Emphasis on potable groundwaters is recognized in the declaration that the first class of Illinois groundwaters consist of the potable resource groundwaters.

Class I: Potable Groundwater

Includes all groundwaters that are located 10 feet or more below the land surface and that, by any one of several criteria, produce groundwater in quantities sufficient to sustain a potable use. This class includes groundwaters of potential potable use as well as groundwaters currently being used.

In general, the groundwater quality standards for potable resource groundwater are equal to the U.S. EPA's Maximum Concentration Levels (MCLs) applicable at-the-tap pursuant to the Safe Drinking Water Act. The rationale behind this class is that potable groundwaters should be available for drinking water supply without treatment.

Class II: General Resource (default) Class

Class II consists of those groundwaters that are not Class I, III, or IV. In general, a groundwater could fall into Class II if it is not potable by virtue of quantity or quality limitations, if it has not been otherwise specifically classified according to Class III procedures, or if it is not otherwise limited pursuant to Class IV qualifications.

Groundwaters are placed in Class II because they are quantity-limited. Therefore, it is necessary that the standards that apply to these waters reflect this range of possible attributes. Among the factors considered in determining the Class II numerical standards are the capabilities of treatment technologies to bring Class II waters to qualities suitable for potable use. Thus, many Class II standards are based on MCLs as modified to reflect treatment capabilities. For some parameters the Class II standards are based on support of a use other than potability (e.g., livestock watering, irrigation, industrial use) where the different use requires a more stringent standard.

Class III: Special Resource Groundwater

Class III covers groundwater that takes on an ecologically vital role, for example when its discharge supports a vital wetland. Other examples might include groundwater discharging to caves, lakes, ponds, streams, and perhaps even moist prairies and forests. In general, the PCB supports the concept of more stringent standards for unique or ecologically vital groundwaters.

The standards applicable to special resource groundwaters are the same as Class I standards, except as may be provided by the PCB in a proceeding pursuant to Section 620.260. Accordingly, the default value of the standards are the Class I standards, with more stringent standards if a justification is made for them.

Class IV: Other Groundwaters

The purpose of this class is to accommodate certain waters that, due to particular practices or natural conditions, have limited resource potential. Included are groundwaters that are naturally saline, groundwaters that occur in the zone of attenuation surrounding a solid waste landfill, groundwaters in mining-disturbed areas, and affected groundwaters associated with potential primary or secondary sources, as defined in the IGPA. The class also includes any groundwater designated by the PCB as an exempt aquifer.

The PCB addresses the special circumstance of groundwaters associated with hazardous waste treatment, storage, and disposal sites.

Groundwater Management Zone

The PCB provides for establishment of a *management zone* within each class of groundwater. In any designated management zone the goal is remediation, if practicable, of the groundwater to the level of the standards applicable to that class of groundwater.

THE ENVIRONMENTAL PROTECTION ACT PROVISIONS

The Environmental Protection Act's legislative declaration is as follows:

> The General Assembly finds that state supervision of public water supplies is necessary in order to protect the public from disease and to assure an adequate supply of pure water for all beneficial uses.
>
> It is the purpose of this Title to assure adequate protection of public water supplies.
>
> It is the obligation of the State Government to manage its own activities so as to minimize environmental damage; to encourage and assist local governments to adopt and implement environmental-protection programs consistent with this Act; to promote the development of technology for environmental protection and conservation of natural resources; and in appropriate cases to afford financial assistance in preventing environmental damage.
>
> In order to alleviate the burden on enforcement agencies, to assure that all interests are given a full hearing, and to increase public participation in the task of protecting the environment, private as well as governmental remedies must be provided.

> Despite the existing laws and regulations concerning environmental damage there exist continuing destruction and damage to the environment and harm to the public health, safety and welfare of the people of this State, and that among the most significant sources of this destruction, damage, and harm are the improper and unsafe transportation, treatment, storage, disposal, and dumping of hazardous wastes 415 ILCS 5/2.

The Groundwater Protection Act amended the Environmental Protection Act in order to enhance protection of community wells. The amendments provide for well setbacks, land use regulation, groundwater quality standards, and detailed assessment of threatened community wells and their aquifers, as necessary. The IEPA regulates community wells and potentially contaminating land uses.

The Groundwater Protection Act also was designed to be consistent with the 1986 Federal Safe Drinking Water Act Amendments, which required each state to submit a wellhead protection program to the U.S. EPA. Title IV of the Environmental Protection Act authorizes the IEPA and the PCB to implement the Illinois wellhead protection program for community water systems. Illinois' wellhead protection program was approved by the U.S. EPA on September 26, 1991. Illinois' wellhead protection program, based on the IGPA, authorizes land use restrictions within well setback zones and aquifer recharge areas.

The amended Environmental Protection Act specifically defines three types of potentially contaminating land uses: *potential primary sources, potential secondary sources*, and *potential routes*. The *primary sources* include disposal areas for hazardous or municipal wastes, and storage sites with large amounts of hazardous substances. *Secondary sources* include storage facilities for smaller amounts of hazardous substances and domestic wastewater treatment facilities. Secondary sources, for example, include above- and below-ground petroleum storage, agricultural chemical facilities, and storage of de-icing agents, but do not include private septic systems, which have at least a 75 foot setback with separate rules administered by the local or state health department.. *Potential routes* refer to possible pathways for contamination of groundwater, and include abandoned wells, drainage wells, and sand and gravel mining operations.

The components of Illinois' protection policy are:

- Minimum Setback Zone
- Maximum Setback Zone
- Regulated Recharge Area
- Community Well site Survey
- Groundwater Protection Needs Assessment
- Hazard Review
- Regional Groundwater Protection Planning Program
- Education Program

- Groundwater Protection Regulations
- Groundwater Quality Standards
- Technology Control Regulations
- Minimal Hazard Certification System

The provisions in Title IV are only for public water supplies. All other wells are regulated by the IDPH under the authority granted by the Illinois Water Well Construction Code 415 ILCS 30/1 et. seq. (1992).

Setback Zones

Under the IGPA, public and private drinking water supplies are protected from potential sources of groundwater contamination by the use of *setback zones*.

Each community well must have a setback zone, which restricts land uses near the well (FIGURE 9). The purpose of the setback zone is to provide a buffer between the public water supply wells and potential contamination sources or routes. The buffer provides time for the well users to begin cleanup efforts or obtain an alternative water supply before the existing water supply becomes unfit for use.

Minimum Setback Zones

Minimum setback zones are mandatory for all public wells. Siting of new potential primary or secondary sources or potential routes is prohibited within the setback zone. The IGPA established a minimum setback zone of 200 feet for every potable well. In accordance with the IGPA, the IEPA also has designated some community wells to be "vulnerable", because of the nature of the aquifer and the depth of the well, and these wells have minimum setbacks of 400 feet. No new potential contamination sources or routes may locate within these setback zones, unless an exception or waiver is obtained from the PCB or well owner. Conversely, new water wells must be at least 200 feet from an existing source or route (with certain exceptions, as shown in FIGURE 9).

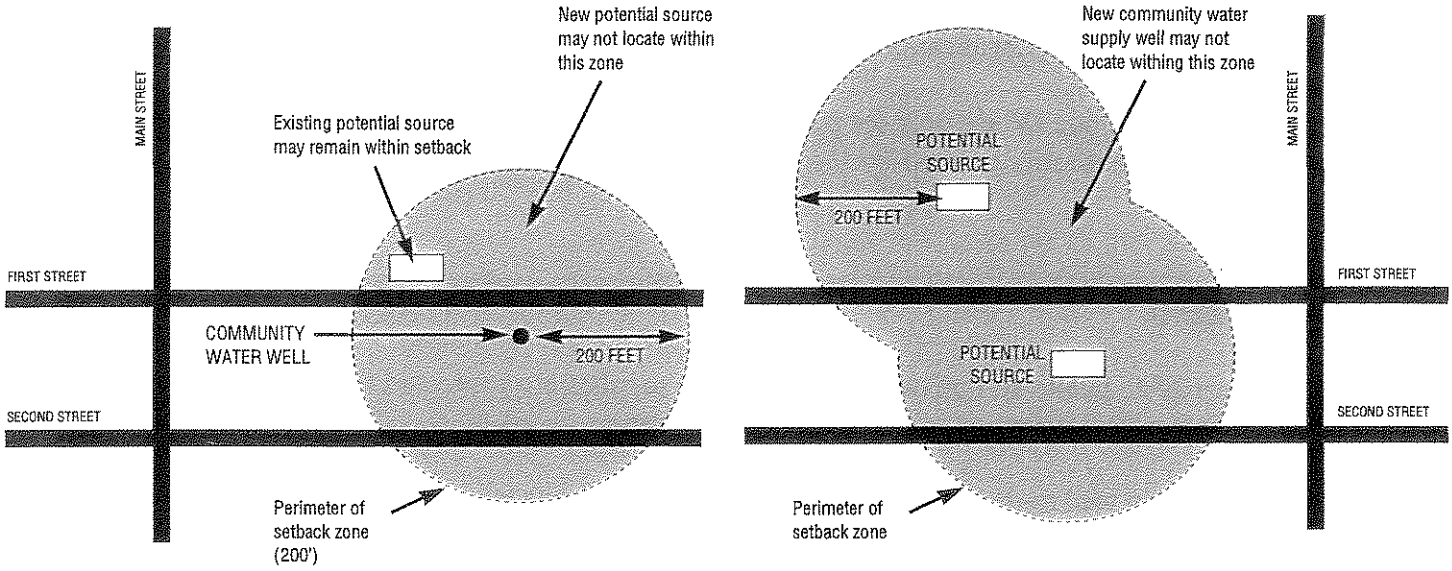
Maximum Setback Zones

The second level of protection provided under the IGPA involves the use of a *maximum setback zone* of up to 1,000 feet for community water supply wells (FIGURE 10). Maximum setback zones allow the well owner, state, county or municipal government to regulate land use beyond the required minimum setback zone.

The establishment of a maximum zone is a voluntary process. A request to determine the technical adequacy of a maximum setback zone determination must first be submitted to the IEPA by a county or municipality.

FIGURE 9

Minimum Setback Zones Under the IGPA



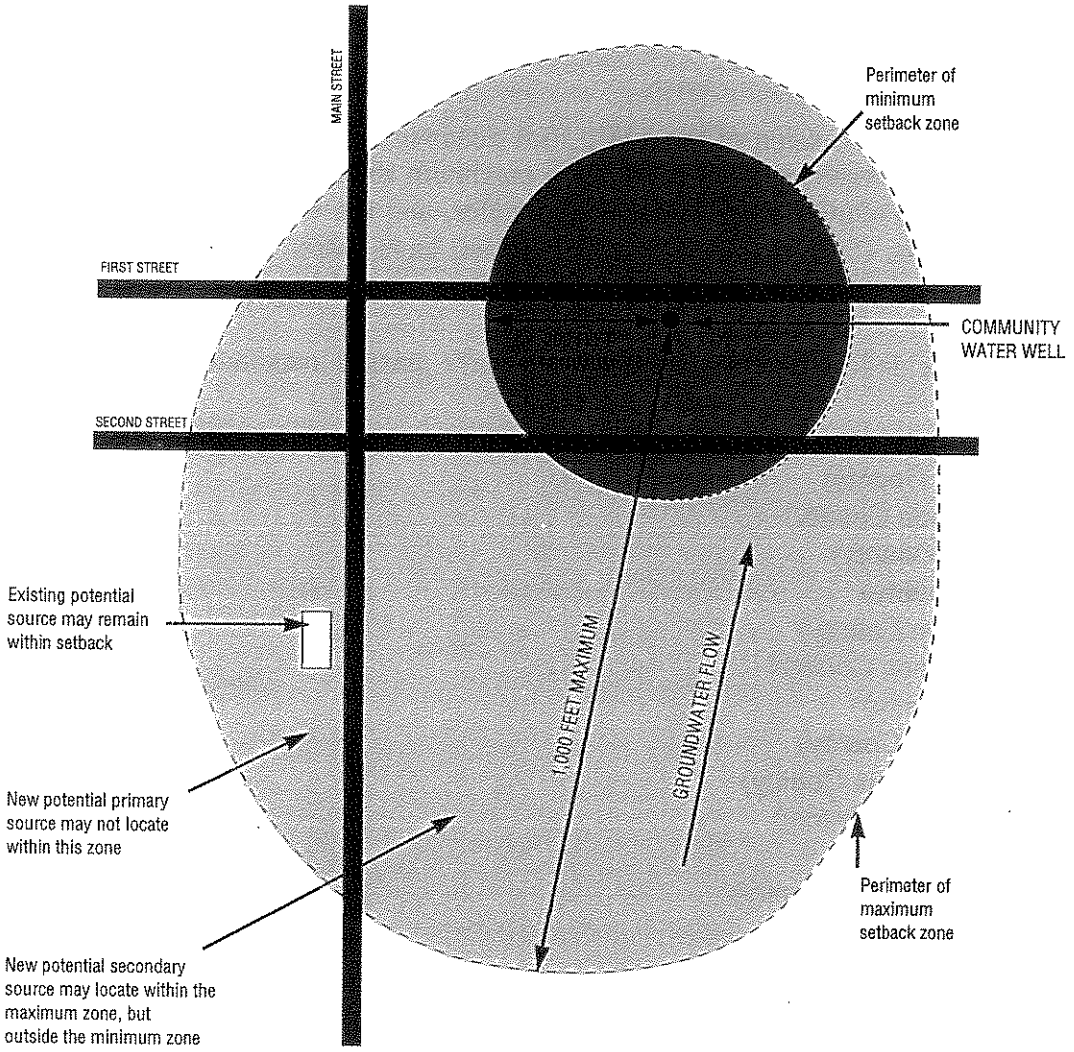
Minimum Setback Zone Around Community Water Supply Well

Minimum Setback Zone Around Two Potential Sources of Contamination

The technical procedure for establishing a maximum setback zone consists of estimating the well's lateral area of influence, using the step-by-step procedures prescribed in the IEPA's Maximum Setback Zone Workbook (see Appendix H). Communities may request assistance from the IEPA and the Illinois State Water Survey (ISWS) to complete the required maximum setback calculations. The IEPA provides the technical assistance and the ISWS can provide the required aquifer characteristics to complete the calculations. It is not necessary to retain a professional engineer to perform the calculations.

FIGURE 10

Maximum Setback Zone Around a Community Water Supply Well



After the IEPA confirms the technical adequacy of the determination, the county or municipality is authorized to establish a maximum setback zone ordinance under the authority of the IGPA. The maximum setback is established only by local ordinance. The Maximum Setback Zone Workbook contains a model ordinance.

The IGPA also provides for expansion of the 1,000 foot maximum setback up to 2,500 feet in special cases. A community water well is eligible for a maximum setback zone up to 2,500 feet when the well is utilizing an alluvial (sand and gravel) aquifer, and the wellhead is within 1,000 feet from public waters. The Cities of Jacksonville and Athens have passed 2,500 foot maximum setback ordinances.

To date (July 1993) the following local governments have passed maximum setback zone ordinances.

- Albion (Edwards County)
- Alhambra (Madison County)
- Athens (Menard County)
- Bement (Piatt County)
- Bethalto (Madison County)
- Blue Mound (Macon County)
- Carmi (White County)
- Chillicothe (Peoria County)
- Edwardsville (Madison County)
- Fairbury (Livingston County)
- Geneva (Kane County)
- Green Valley (Tazewell County)
- Greenview (Menard County)
- Harvard (McHenry County)
- Havana (Mason County)
- Jacksonville (Morgan County)
- Lexington (McLean County)
- Marengo (McHenry County)
- Marshall (Clark County)
- Morrisonville (Christian County)
- Mt. Pulaski (Logan County)
- Normal (McLean County)
- Ogden (Champaign County)
- Petersburg (Menard County)
- Pleasant Valley Public Water District (Peoria County)
- Poplar Grove (Boone County)
- Princeton (Bureau County)
- Sadorus (Champaign County)
- Tampico (Whiteside County)
- Thomson (Carroll County)
- Trivoli PWD (Peoria County)

·Virginia (Cass County)
·Winchester (Scott County)
·Wood River (Madison County)

Additionally, sixteen communities have maximum setback zone ordinances which are pending, currently undergoing technical review by the IEPA, or being proposed by the IEPA for PCB rule making.

See Appendix H for more information on completing the maximum setback zone application and calculating the area of influence.

Well Site Survey Program

The IEPA is responsible for conducting well site surveys of all community wells throughout the State. As of October 1993, 97% of the well site surveys had been completed. The well site survey contains a geographic description, an aerial photograph and a topographic map depicting potential contamination sites within 1000 feet of the well, identification of potential sources and routes, and a physical history of the well. The IEPA may determine that a well site survey is not necessary if a Groundwater Needs Assessment has been completed.

If the IEPA conducts a well site survey and identifies the area as having a high potential for contamination, it may publish an *Advisory of Groundwater Contamination Hazard.* After one or more advisories are issued, the IEPA may propose a *Regulated Recharge Area* (described on page 38).

Once the well site survey is completed by the IEPA, copies are distributed to the well owner/operator, the mayor, county board, county zoning board, the State Surveys, State Library, IEPA Library, and priority groundwater protection planning region. In addition, 5 to 10 copies are available to fill requests. Six months after distribution the IEPA contacts the community and inquires about the steps the community has taken to protect their public water supply. Each quarter the IEPA publishes a *Quarterly Wellhead Protection Status Report*, which includes the responses of the communities to the well site survey. The Quarterly Wellhead Protection Status Report contains a listing of communities and their responses for adoption, no action, or rejection of the IEPA's protection suggestions. The well site survey is a valuable and readily available source of information for each community well and should be consulted first for answers to questions regarding community wells.

A well site survey describes the character, number, and distance of potential sources of contamination adjacent to a community well to help increase awareness of potential hazards to groundwater. For example:

> *The Oakford Well Site Survey*, completed by the IEPA in February, 1989, contains a description of the facility, a geologic profile of well sites, history of groundwater sampling and monitoring, and identifies possible problem sites or potential sources that could impact groundwater utilized by Oakford's water supply lines.
>
> *The Groveland Township Water District Well Site Survey* was completed by the IEPA in November, 1991. This well site survey is similar to the Oakford Well Site survey, but also contains a section on recommendations. The IEPA strongly recommends the establishment of maximum setback zones for these wells in order to prohibit the siting of new potential primary sources of groundwater contamination to a distance of 1,000 feet from the wellhead, and to enhance future protection of the community water supply.

See Appendix G for an example of a well site survey.

Groundwater Protection Needs Assessments

A community or municipality may prepare a groundwater protection needs assessment, to identify groundwater recharge areas and potential contamination activities. The needs assessment documents potential groundwater recharge areas and potential contamination activities. Investor-owned community water supplies can prepare assessments for local governments, with technical assistance available from the IEPA or DENR. A groundwater needs assessment provides information to the public by documenting potential hazards and the community's protection response to maintain a potable water supply. A groundwater needs assessment identifies potential contamination activities beyond what is provided by the statewide application of minimum setback zones. An assessment includes evaluating setback zone protection, identifying recharge areas within its jurisdiction, identifying and analyzing potential contamination sites, evaluating how local controls can directly or indirectly influence groundwater protection, and identifying contingency measures for alternative water supplies. For larger communities, this effort will likely extend beyond the maximum setback zone.

Three Needs Assessments have been completed, as of mid 1993: The Pleasant Valley Public Water District (Peoria County), prepared by Clark Engineers MW, Inc.; Pekin Public Water Supply (Tazewell County), prepared by the IEPA; and Village of Cary (McHenry County), prepared by Baxter and Woodman Environmental Engineers. One other is in process: City of Woodstock (McHenry County), prepared by DENR and IEPA. See Appendix G for a more detailed description of the Pekin and Pleasant Valley Needs Assessments.

Hazard Review

Hazard Reviews are for communities with less than 5,000 people, or where the county population is less than 25,000. After receiving a well site survey, a community can request that the IEPA prepare a Hazard Review in lieu of a Needs Assessment. An IEPA-prepared Hazard Review includes a detailed audit of all agency records and permits for the area, underground tank locations, and community right-to-know information. The cost of the Hazard Review report is paid by the IEPA. An example is summarized in Appendix G.

If a potential hazard to groundwater is identified, the IEPA issues an *Advisory of Groundwater Contamination Hazard*, published in a local newspaper. This advisory identifies potential primary and secondary sources or routes that pose a significant hazard. The advisory can lead to enforcement actions and development of a Regulated Recharge Area.

The purpose of the Hazard Review is to document all land uses in the jurisdiction that potentially could contaminate the public water supply. This documentation is used for the purpose of educating the public and elected officials as to what existing land uses and problems they should be concerned about. With this knowledge the community can direct specific groundwater protection programs at these potential contaminants.

The IEPA will use Hazard Review Reports to request the PCB to establish Regional Groundwater Recharge Areas if the reports so indicate. The groundwater movement is modeled using computer simulation that predicts the actual movement.

Regulated Recharge Areas

The IEPA or any private party may petition to the PCB to establish a regulated recharge area for aquifers needing regional protection. These are sensitive areas for which the maximum setback of 1,000 feet is insufficient. The boundaries of regulated recharge areas have no predetermined maximum areal limit, but depend on the underlying geological formations. New and existing land uses within a regulated recharge area are subject to PCB regulations. A regulated recharge area may encompass several jurisdictions, and can help insure that they do not affect each others' water supplies. A regulated recharge area provides the opportunity to design a customized management plan for a threatened aquifer.

The PCB is directed to: ". . . only promulgate a regulation which establishes the boundary for a regulated recharge area if the Board makes a determination that the boundary of the delineated area is drawn so that the natural geological or geographic features contained therein are shown to be highly susceptible to contamination over a predominant portion of the recharge area" 415 ILCS 5/17.4(b) (1992). Other factors to be considered are existing setbacks, technical regulations, groundwater quality standards and sole-source aquifers.

Typically, a detailed hydrogeologic analysis, such as performed for a groundwater protection needs assessment, would be necessary in order to provide evidence sufficient to delineate a regulated recharge area.

Groundwater Protection Planning Program

The Groundwater Protection Planning Program coordinates regional protection policy. The IEPA and DENR designate priority groundwater protection planning areas. These designations must take into account regional aquifer recharge areas mapped by the DENR.

A regional planning committee is designated for each priority groundwater protection planning region. The committee, appointed by the IEPA director, includes State and local government and general public representatives. The primary function of the committee is to facilitate and advocate groundwater protection in the region. The IEPA supplies support services to the committee.

As of 1992, the IEPA established three priority groundwater protection planning regions. The northern region includes Winnebago, Boone, and McHenry Counties; the central region consists of Peoria, Woodford, Tazewell, and Mason Counties; and the southern region consists of Madison, Monroe, St. Clair, and Randolph Counties. For each region an 11 person planning committee has been established, consisting primarily of local public officials, environmental advocates, and water supply operators. All four of the state's Pilot Groundwater Protection Needs Assessments are in the northern and central groundwater protection planning areas.

GROUNDWATER TECHNOLOGY CONTROL REGULATIONS

As required by 415 ILCS 55/8 et seq (1992) of the IGPA, the PCB has promulgated regulations for certain existing and new activities within setback zones and regulated recharge areas (35 Ill. Adm. Code 615, 616, and 617 "Technical Standards"). The intent of the regulations is to assure that all potential contamination sources have appropriate monitoring, reporting, technology controls, and closure requirements.

Sections 615 and 616 regulate:

- Groundwater Monitoring Requirements
- General Closure and Post-closure Requirements
- On-site Landfills
- On-site Land Treatment Units for wastes
- On-site Surface Impoundments of wastes
- On-site Waste Piles
- Underground Storage Tanks
- Pesticide Storage and Handing Units
- Fertilizer Storage and Handling Units
- Road Oil Storage and Handling Units
- De-icing Agents Storage and Handling Units

TABLE 4 summarizes requirements and standards for the protection of groundwater for certain types of *existing facilities* located within a setback area.

TABLE 5 summarizes groundwater protection requirements for *new facilities* located within a setback area.

TABLE 4

Regulations for *Existing* Land Uses under IGPA

LAND USE	WITHIN MINIMUM SETBACK	WITHIN MAXIMUM SETBACK	WITHIN REGULATED RECHARGE AREA
ON-SITE LANDFILLS	Closure Begin by 1994. Finish by 1995.	Closure Begin by 1994. Finish by 1995.	Closure if within 2,500' of well. Begin by 1994. Finish by 1995.
ON-SITE LAND TREATMENT (except water or waste water treatment)	Closure Begin by 1994. Finish by 1995.	Closure Begin by 1994. Finish by 1995.	Groundwater monitoring.
ON-SITE SURFACE IMPOUNDMENTS	Closure Begin by 1994. Finish by 1995.	Closure Begin by 1994. Finish by 1995.	Groundwater monitoring.
ON-SITE WASTE PILES (except sludge from water or wastewater treatment)	Closure	Closure	Groundwater monitoring.
UNDERGROUND STORAGE TANKS (only UST not regulated by other legislation)	Design according to 35 IL ADM code 731	Design according to 35 IL ADM code 731	Design according to 35 IL ADM code 731
PESTICIDE STORAGE & HANDLING UNITS	Groundwater monitoring, design and operations requirements, post closure care.	Groundwater monitoring, design and operations requirements, post closure care.	Groundwater monitoring, design and operations requirements, post closure care.
ROAD OIL STORAGE & HANDLING UNITS (>25,000 gallons storage)	Closure Start by 1994. Finish by 1995.	Groundwater monitoring, design and operations requirements, post closure care.	Groundwater monitoring, design and operations requirements, post closure care.
DE-ICING AGENT STORAGE & HANDLING UNITS (>50,000 lbs. storage)	Groundwater monitoring, design and operations requirements, post closure care.	Groundwater monitoring, design and operations requirements, post closure care.	Groundwater monitoring, design and operations requirements, post closure care.

TABLE 5

Regulations for *New* Land Uses under IGPA

LAND USE	WITHIN MINIMUM SETBACKS	WITHIN MAXIMUM SETBACKS	WITHIN REGULATED RECHARGE AREA
ON-SITE LANDFILL	Prohibited if primary or secondary source.	Prohibited if primary source.	Prohibited if within 2,500' of well and primary or secondary source.
ON-SITE LAND TREATMENT UNITS	Prohibited if primary or secondary source.	Prohibited if primary source.	Allowed*
ON-SITE WASTE PILES (except sludges from water or wastewater treatment)	Prohibited if primary or secondary source.	Prohibited if primary source.	Allowed*
UNDERGROUND STORAGE TANKS (only UST not regulated by other legislation)	Design and operating requirements.	Design and operating requirements.	Design and operating requirements.
PESTICIDE STORAGE & HANDLING UNITS	Prohibited if primary or secondary source.	Prohibited if primary source.	Allowed*
FERTILIZER STORAGE & HANDLING UNITS	Prohibited if primary or secondary source.	Prohibited if primary source.	Allowed*
ROAD OIL STORAGE & HANDLING UNITS (>25,000 gallons)	Prohibited if primary or secondary source.	Prohibited if primary source.	Allowed*
DE-ICING AGENT STORAGE & HANDLING UNITS:			
Indoor	Prohibited if primary or secondary source.	Prohibited if primary source.	Allowed*
Outdoor	All prohibited.	All prohibited.	Allowed*

*with groundwater monitoring, design and operating, post closure requirements.

Regulation of Underground Storage Tanks

The IGPA regulates underground storage tanks that are not covered by other statutes. The following is an outline of the other statutes that regulate underground storage tanks.

The Office of the State Fire Marshal (OSFM) is responsible for regulating the daily operation and maintenance of Illinois' Underground Storage Tank (UST) systems. The OSFM is authorized to register tanks, license tank installation and removal contractors, monitor compliance with leak prevention and leak detection requirements, permit tank system installations, closures and removals, and administer the financial responsibility requirements. An UST includes not only the tank, but all of the piping and any part of the system that contains product.

The OSFM also regulates farm tanks, which are defined as a tank on a tract of land devoted to the production of crops or raising animals. A farm tank must be located on the farm property. A farm includes fish hatcheries, rangeland and nurseries with growing operations. Farm tanks over 1,100 gallon capacity need to be registered.

In Illinois, 64,000 tanks have been registered with the OSFM; approximately 18,000 tanks are unregistered. The OSFM indicates that 70-80% of the underground fuel storage tanks removed in Illinois have had some type of petroleum releases.

The IEPA also plays a role. If a storage tank leaks, it is then classified as a leaking underground storage tank (LUST). The IEPA responds to the release and takes regulatory responsibility.

The Illinois Underground Storage Tank Fund was created to act as an insurance pool to assist tank owners and operators in meeting the stringent financial responsibility requirements. The fund reimburses tank owner/operators for costs associated with corrective action. The IEPA oversees this fund and determines tank owner or operator eligibility, the appropriate deductible amount, and which corrective costs are eligible for reimbursement.

THE ILLINOIS WATER WELL CONSTRUCTION CODE PROVISIONS

The Groundwater Protection Act amended the Illinois Water Well Construction Code, requiring IDPH to regulate all water wells except community wells. In much of the state, the IDPH delegates the enforcement authority to local Health Departments.

The declaration of policy is:

> "It has been established by scientific evidence that improperly constructed water wells can adversely affect the public's health. Consistent with its duty to safeguard the public health in this State, the General Assembly therefore declares that the proper location, construction and modification of water wells is essential for the protection of the public health" 415 ILCS 30/2, (1992).

IDPH is required to adopt and amend rules and regulations for location and construction for all water wells other than community wells.

The code requires a 200-foot setback between potential contamination sources and wells (with certain exemptions). It also includes new standards for construction, location, and abandonment of water wells. For *new wells*, the IDPH enforces these regulations through licensed drilling contractors, according to the Illinois Water Well and Pump Installation Contractor's License Act. When a new well is installed, the contractor's permit application must identify any potential contamination sources within 200 feet. If there is an *existing well*, new potentially contaminating land uses are regulated by various state agencies, depending on the use. These include the IEPA, IDPH (for septic systems), Department of Agriculture (for Ag-chem facilities), and Fire Marshal's Office (for underground storage tanks). When permitting these land uses, the appropriate agency must verify that there is no well within 200 feet.

The Code includes the assurance of potable water supply. If a well is contaminated, the contamination source owner or operator must provide an alternative source, water treatment, or a mutually agreed-upon remedy to protect public health. All costs are borne by the responsible contamination source owners and operators.

The Illinois Department of Public Health under the IGPA assumed responsibility for issuing all water well permits except those to community water supplies. The Water Well Construction Code was revised to respond to this need and rules were promulgated for fees for construction permits. As of January 1, 1992, a total of 60 local health departments have assumed permit delegation authority. In addition, health departments are responsible for the inspection and sampling of over 5,600 non-community public water supplies. IDPH also has assumed the permit responsibility for all water wells (e.g. irrigation etc.) in addition to potable water wells.

A significant group of wells regulated by the IDPH are the *non-community public wells*. These are wells that serve specific public uses, such as restaurants, schools, motels, and campgrounds. As with all wells, the IDPH (or local health department) enforces the setback regulations for new wells through water well drilling contractors.

IV. LOCAL ACTIONS FOR GROUNDWATER PROTECTION

AUTHORITY FOR GROUNDWATER PROTECTION BY LOCAL GOVERNMENT

The IEPA, IDPH, and other agencies have major primary responsibility for regulating wells and potential contamination sources. Other statutes authorize local governments (municipalities and counties) to enact groundwater protection programs.

Questions may be raised regarding legal authority of local government to effectively plan and regulate to accomplish groundwater protection in Illinois, despite the fact that a fundamental purpose of government is to protect the health and safety of its citizens. Potable water is basic to the health and safety as well as the economic viability of Illinois residents, and there is little disagreement on the wisdom of safeguarding water resources from contamination. It is not surprising, therefore, that municipalities and counties have authority to engage in planning and regulation pursuant to a variety of Illinois laws to protect water. Legislation authorizes regulations to protect wells and groundwater resources by setbacks, zoning, nuisance ordinances, subdivision regulation and plan implementing ordinances. Both constitutional and statutory authority also are in place to authorize intergovernmental agreements between units of government to accomplish the protection of public water supplies and other groundwater resources. However, the law is scattered about in the statutes and cases, and therefore some identification of authority is useful.

Police power

Our legal system provides each of the fifty states with inherent powers, one of which is the police power. In general, the police power is defined as that authority of a state to enact and enforce laws for the common benefits of health, safety, morals and general welfare, *Sherman-Reynolds, Inc. v. Mahin*, 47 Ill.2d 323, 265 N.E.2d 640 (1970). Building codes, pollution regulations, traffic codes, and various licensing statutes are common examples of the exercise of such power. A state may delegate its police power to local governments, such as municipalities and counties. Local governments are dependent upon a grant of authority from the state in order to take action.

Delegation is accomplished by statutes, Common Law, the Illinois Constitution and by specific charters to municipal corporations. Examples of delegation are statutes that grant authority and establish procedures for planning, zoning, subdivision approval, environmental ordinances, building codes, or fire codes. Illinois courts have ruled that zoning and other police power ordinances may, in the public interest, restrict the uses and purposes to which private property may be devoted and that such legislative determinations are not subject to judicial review as to the wisdom of such actions or inactions, *Taylor v. Peoria County*, 30 Ill App3d 685, 333 N.E.2d 726 (1975).

As we will see in the following discussion, many of the delegating or enabling statutes include a grant of authority to promote the general health, safety and welfare. This grant is significant because efficiency of legislation is achieved by invoking the "health safety and welfare" phrase. A number of activities affecting public safety may be subject to regulation by implication due to a specific grant. For example, housing for the elderly was regulated under the general authority to regulate housing conditions, *Father Basil's Lodge Inc v. City of Chicago*, 393 Ill.246, 65 N.E.2d 805 (1946). Another prior decision authorized the regulation of dry cleaning as implied by the authority to impose fire regulations, *Klever Karpet Kleaners Inc. v. City of Chicago*, 323 Ill 368, 154 N.E. 131 (1926). In addition Illinois court decisions are favorable to municipal exercise of police power authority for the protection of health; in fact, they nearly construe the municipal authority to be inherent for health and safety purposes, *People ex rel. Slutzkin v. Village of Lincolnwood*, 346 Ill.App. 469, 105 N.E.2d 331, (1952) and *Village of Spillertown v. Prewitt*, 21 Ill.2d 228, 171 N.E. 2d 582 (1961). It is also useful to know that where as in the case of groundwater legal authority may be found in several sources, they may all be used by local programs, such as imposing parking meters based on statutes that included authority to regulate streets, *City of Bloomington v. Wirrick*, 381 Ill. 347, 45 N.E.2d 852 (1942). Thus, activities late found to affect health and safety of residents of a municipality may be added to the regulatory field if necessary. Such grants are therefore somewhat elastic in their coverage and inclusive topics. Delegations of authority may be dependant upon the problems addressed and our current understanding of the potential health and safety harms to be minimized.

Groundwater protection is an area of public concern that is only recently the subject of government regulation. The fact is that more scientific knowledge of ecology, geology and subsurface hydrology now provides an understanding of the nature of this resource and the actions necessary to protect it. Therefore the police power is necessarily broad, as Justice Stevens wrote in *Keystone Bituminous*, 480 U. S. 470, 107 S. Ct. 1252 (1987):

> "Here by contrast, the (state) is acting to protect the public interest in the health, the environment . . . . The Subsidence act is a prime example that "circumstances may so change in time . . . as to clothe with such a (public) interest what at other times . . . would be a matter of purely private concern." (quoting from *Block v. Hirsh*, 256 U. S. 135 (1921).)

A considered and reasonable view of the nature of our government system, legislative enactments and growing awareness of the magnitude of the problem calls for constructive analysis of the law, to enable local government to use authority to effectively protect water resources as a vital necessity for the general health, safety and welfare.

Local Police Power Authority Not Preempted

Legal authority of local government to enact environmental regulation is sometimes complicated by state and federal laws on the same subject that may preclude local regulations under the

preemption doctrine. When a higher level of government has enacted a law it may preempt a subordinate government's authority. Whether this is the effect of federal or state statutes with respect to local ordinances requires an examination of the statutes and a determination of the intent of the legislative body. A recent case, *Village of Carpentersville v. Pollution Control Board*, 135 Ill.2d 463, 533 N.E.2d 362 (1990) which sustained a local ordinance that prohibited a smokestack height for which a use had secured a state permit, makes two important points:

1. a local zoning ordinance is not necessarily preempted by state and federal law, and
2. the state constitutional provision Article XI Sec 1. on maintaining a "healthful environment" as a responsibility does not preempt local ordinances even if they may conflict with a uniform state standard.

Current Illinois statutes on the subject of public water supply provides that no new pollution sources may be placed within the minimum or maximum setback areas without approval as required by the act and,

> ". . . nothing in this subsection shall be construed as limiting the power of any county or municipality to adopt ordinances which are consistent with but not more stringent than the prohibition as stated herein." 415 ILCS 5/14.3(e)

The statute makes it clear that the state intends to establish a cooperative program with local government and does not intend to preempt statutory authority that is exercised concurrently with the state program.

A recent ruling of the U.S. Supreme Court on environmental preemption is *Wisconsin Public Intervenor et al v. Mortier*, 59 L.W.4755, June 21, 1991. The case dealt with a municipal ordinance which prohibited certain pesticide spraying and was upheld against a challenge of preemption Under the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA). The court stated,

> "When considering pre-emption, we start with the assumption that the historic police power of the States were not to be superseded by the federal Act unless that was the clear and manifest purpose of Congress."

The Court went on to find that the federal act "implies a regulatory partnership" between federal, state and local governments even thought the local ordinance was enacted under general police power authority to protect the health, safety and welfare. Authority for such partnerships exists in Illinois law.

The following specifics may be of use to your legal advisor to determine the proper basis for action.

Home Rule Units

An Illinois municipality with a population of over 25,000, a municipality electing to be home rule and a county with an elected chief executive officer have home rule authority to "regulate for the protection of the public health, safety, morals and welfare." Art VII. Sec.6(a) Illinois Constitution. A Home rule unit may enact a valid zoning ordinance to serve legitimate public purposes, within constitutional limits, *Cain v. American National Bank & Trust*, 26 Ill 3d 574, 325 N.E.799, (1975).

This broad constitutional authority to regulate to protect the health, safety and welfare includes the authority to protect the water supply of 80% of the Illinois population. These powers are also specifically required to be "construed liberally" Art.VII Sec. 6(m)Ill.Con., therefore, unless denied by the General Assembly, Home Rule units are understood to have authority to enact regulations for the classic police power purposes of protecting health and safety by regulating activities that contaminate or threaten water supplies.

Home rule regulations are limited to those topics that "are of local concern" and have not been preempted by state action. The most recent Illinois decision on the authority of home rule authority involves the right to totally exclude billboards from a part of a city, *Scadron v. City of Des Plaines*, 153 Il.2d 164, 606 N.E.2d 1154 (1992). In *Des Plaines* the court construed various federal and state action on billboard regulation to not preempt the local authority to impose regulations for aesthetic and traffic safety purposes. Concerns about local water may in fact be addressed by both state and local authority. In *County of Cook v. Sexton*, 75 Ill.2d 494, 398 N.E.2d 553 (1979) the Illinois Supreme Court upheld a county zoning requirement despite the fact that a landfill operator had an Illinois EPA permit. Thus the court approved concurrent jurisdiction to accomplish the purposes of landfill regulation and also expressed the hope that there would be a cooperative exercise of powers between the governing bodies.

Municipal Authority - Non Home Rule

Non-home rule municipalities are often unjustly limited in their powers by a strict interpretation of authority delegated to them. This approach is in direct conflict with specific statutory direction to "liberally" construe the provisions of state statutes so that the intent of the General Assembly may be carried out, 5 ILCS 70/1.01. When this statutory directive is considered with the well known rule of interpretation,

> "The first and most elementary rule of construction is that it is to be assumed that the words and phrases of technical legislation are to be used in their technical meaning, if they have one and, otherwise in their ordinary meaning . . .", Nutting, Elliot & Dickerson, *Legislation*, West, 1969 p. 411.

Legislation at 65 ILCS 5/11-12-5 authorizes the preparation and adoption of a comprehensive plan and necessary implementing ordinances that establish reasonable regulations for subdivision of land and improvements including *water supply*. The plan and regulations may be applicable

within the municipality and in unincorporated areas within 1 and 1/2 mile of the municipal limits.

Zoning enabling authority at 65 ILCS 5/11-13-1 et seq permits the enactment of local ordinances to promote" the public health, safety, comfort, morals and welfare. . ." and classify and regulate the use of property and building construction to achieve the purposes of the Act.

The wording of the statutes is clear and is only technical in the sense of applying the meaning of the police power terms. Therefore the ordinary meaning of the words is sufficient to find municipal authority to enact regulations that protect groundwater. What the state has done is to enable the municipalities to use the police power of the state for municipal purposes and to regulate the activities that are listed.

Zoning and Nuisance Authority

In addition Illinois case law establishes that zoning laws and laws prohibiting nuisances are often related to zoning ordinances, *Mid-West Emery Freight Inc v. City of Chicago*, 120 Ill App.2d 425, 257 N.E.2d 127 (1970). Abatement of a septic tank sewage system as a nuisance is a common law right of a municipality, *Village of Riverside v. Untermyer*, 54 Ill App.3d 816, 369 N. E. 2d 1385 (1977). Statutes also grant, "The corporate authorities of each municipality may define, prevent, and abate nuisances" 65 ILCS 5/11-60-2. Nuisance prohibition by a zoning ordinance may also be applicable to existing property uses since no owner ever acquires a vested right to create or maintain a nuisance in connection with an otherwise lawful business, *Dube v. City of Chicago*, 7 Ill.2d 313, 131 N.E.2d 9 (1955).

It is clear that Illinois legislation to protect the environment (415 ILCS 5/1 et seq) has not removed the common law right to protection of nuisance, trespass, negligence and strict liability through both damages and injunctive relief, *Village of Wilsonville v. SCA Services Inc.*, 86 Ill.2d 1, 426 N.E.2d 824 (1981).

County Authority to Protect Groundwater

The Illinois governmental structure has also given counties extensive authority to protect groundwater resources under specific statutes which delegate the state's police power authority.

County Zoning and Planning

"For the purpose of promoting the public health, safety, morals, comfort and general welfare, . . ." and for other specific purposes 55 ILCS 5/5-12001 et seq grants authority to counties to regulate land uses through zoning. In order to best promote the "health, safety, morals, order, convenience, prosperity, efficiency and economy in the process of development and general welfare" of the region, counties are authorized to engage in planning.

County Groundwater Protection Ordinance

At 55 ILCS 5/5-15016 counties are specifically authorized to cooperate with the purposes of the Environmental Protection Act by performing "a groundwater protection needs assessment and may by ordinance adopt a minimum or maximum setback zone around a wellhead . . . ." Thus, authority to participate in the state program has been established independent of a planning or zoning program. If the unit is located within the jurisdiction of the Northeastern Illinois Metropolitan Area Planning Commission plans should be presented for their review and recommendations.

Local Land Resources Management Planning Act

A 1985 Enabling Act, 50 ILCS 805/2 et seq, provides authority for municipalities and counties acting individually or jointly and with state and other units of government to engage in a variety of planning and police power regulatory activities. Topics of planning and regulation include specific authority to consider land use and development with reference to water facilities and natural resources including air, water and land quality management systems. The Act clearly states that such activities are "furthering the policy of the state in land resource management" Sec 502/2. Sec. 805/9 authorizes the resolution of disputes between municipalities and other units of government without resorting to an arbitrary application of a preemption rule. Although there are no reported cases involving the Act, the wording of the statute permits cooperative planning and regulations between several of the key units of local government that might be involved in water protection, such as Health Boards, Water and Sewer Districts, Conservation Districts and others.

The Act requires that the municipality or county involved prepare and adopt a: *Local Land Resource Management Plan*, which may include *A Statement of Goals, Implementing Ordinances, Zoning Ordinances, Subdivision Ordinances, Three Year Capital Improvement and Maintenance Plan*, and *A System and Timetable of Review and Update*.

These minimal requirements are consistent with objectives of the existing state law regarding groundwater protection. More importantly, it provides specific authority for agreements with respect to air, water and land environmental resource aspects of local regulation that may permit constructive sharing of powers "notwithstanding general statutory limitations concerning county and municipal zoning," 50 ILCS 805/6. Agreements between local units and state agencies may in fact provide greater effectiveness of government in tight budgetary times.

Intergovernmental Cooperation

Units of government have the constitutional and statutory authority to enter into agreements to "obtain or share services and to exercise, combine, or transfer any power or function, in any

manner not prohibited by law or ordinance . . ." Art.VII, Sec.10, Ill Con. In addition, authority to cooperate between governmental units is granted by 5 ILCS 220/1 et seq:

> ". . . any power or powers, privileges or authority exercised or which may be exercised by a public agency of this state may be exercised and enjoyed jointly with any other public agency . . ." except those prohibited by law.

The intent of the statute was to authorize the expansion of local government authority between units of government. In fact the act, modeled on the Federal Advisory Commission On Intergovernmental Relations, intended that if one unit was enabled to perform a function or provide a service it could with agreement of a unit which did not have the authority extend its authority throughout both jurisdictions. The logic of these authorities is to permit municipalities, counties and any other unit of local government in Illinois to enter into agreements with departments of state government in order to achieve purposes related to the health and safety of its citizens.

See Appendix F for suggested local ordinance provisions.

THE ROLE OF LOCAL GOVERNMENTS IN GROUNDWATER PROTECTION

Local government can help in implementing the IGPA by:

- Assembling information and integrating it into normal ongoing activities.

  The most important basic responsibility of local governments in implementing the IGPA is to know locations of wells and potential contamination sources in the community, so that it can act in an informed manner. Where *community wells* exist, local governments have or will have a copy of the *well site survey* completed by the IEPA. The well site survey contains valuable information that can be used as a basis to control land uses that may threaten the community's water supply. For *non-community wells*, local governments will need to contact the IDPH or State Water Survey to determine well locations.

- Using planning and zoning maps to inform citizens and developers of locations of well setbacks areas and potentially contaminating land uses.

  In addition to collecting information, local governments should show all setbacks for community and public wells on their official planning and zoning maps, and treat these areas as environmentally sensitive, water-recharge areas. The purpose is to inform the public of these setbacks in advance, rather than wait until individuals apply for permits for potentially contaminating land uses.

- Regulating land uses beyond those covered by the state.

  Local regulations may go beyond those of the state, if warranted by local conditions or community concern. Local governments may use planning and zoning powers to regulate additional land uses, such as septic systems or gas stations, or to extend setback zones, if local justification exists.

- Assisting and coordinating with state agencies to ensure that the community is receiving the attention it deserves.

  In particular, local governments should become aware of all *non-community wells*, and potential threats to them. Local communities are often unaware of the existence of these wells, although they can serve large numbers of people. Because of the number of different state agencies and permitting systems involved, some potential problems may not be recognized and corrected as expeditiously as possible. It is in the best interest of the community to know where these wells are, in order to facilitate and coordinate state actions and to inform potential developers before they initiate any plans for potentially contaminating land uses. It is in a community's best interest for local government to be aware of all such water wells and incorporate the setbacks into local plans and ordinances.

- Coordinating actions with neighboring communities.

  Local governments should share groundwater information and coordinate programs with neighboring communities. This is especially important where well setbacks cross municipal or county boundaries, or in areas with aquifers of regional significance. Several communities could share in producing a regional groundwater needs assessment.

For *community wells*, actions available to local governments for safeguarding well quality include:

- Apply to IEPA to establish a maximum setback zone, and then adopt a maximum setback ordinance (IEPA provides a model ordinance).

- Perform a Groundwater Protection Needs Assessment, or, in the case of a smaller community, request the IEPA to perform a Hazard Review.

- Request the IEPA and the PCB to establish a Regulated Recharge Area, if warranted by a needs assessment.

- Apply to the IEPA to locally administer the minimum hazard certification program.

For both *community* and *non-community wells*, local governments can:

- Share information on wells and land uses with adjacent communities.

- Cooperate with adjacent jurisdictions if well setbacks or recharge areas cross municipal or county boundaries.

- Adopt setbacks or recharge areas as a zoning overlay district, within which contamination sources and routes can be prohibited or otherwise regulated.

- Regulate uses in addition to those in the IGPA, if warranted.

- Identify all wells, potential contaminant sources, setbacks and recharge areas in the local comprehensive plan. This would clarify, in one document, potential threats to groundwater and areas of restriction on future land uses.

The most common local tools for regulating land uses are zoning, subdivision regulation, and site plan review. Following are some examples of how local government can use these tools to help protect groundwater.

COMPREHENSIVE PLANNING TO PROTECT GROUNDWATER

Any local groundwater protection program, to be most effective, should begin with the local comprehensive land use plan. The plan can provide the basic data and establish the community's policy with respect to groundwater protection.

At minimum, the comprehensive plan should include a map that shows the locations of all public wells, both community and non-community. If possible, the map should also show all private wells in the community. This basic data, in an easily-understood map, is essential for a community that intends to consider groundwater effects of future land use decisions. The map also should show appropriate setback radii or recharge areas around the wells.

The map should show the locations of all potentially contaminating land uses in the community, especially all primary and secondary sources, as classified by the IEPA. This information will help in future decisions regarding siting of new wells.

A comprehensive plan also can summarize basic groundwater data in a form understandable to local officials. It should outline the characteristics of local groundwater: quality, quantity, aquifer locations, and groundwater levels. It should also identify any recent trends in these characteristics. Numerous publications by the State Water Survey contain extensive information on local groundwater, but the comprehensive plan can be the vehicle for making this information accessible and understandable to local community leaders.

A comprehensive plan can serve as a policy statement. Declarations of policy in the plan can set the stage for the community's future regulation of land uses. For example, if a community chooses to exceed state minimum standards regarding setback zones or types of land uses in well recharge areas, the comprehensive plan is a logical place to declare and justify these policies.

ZONING REGULATIONS TO PROTECT GROUNDWATER

Zoning and subdivision ordinances are effective means of controlling the location and performance of land uses that threaten groundwater resources. Ordinances are less useful in areas that are already substantially built-up because existing land uses may survive, while nonconforming uses and nuisances can be abated very quickly. Zoning and subdivision ordinances are best suited to controlling future land uses. Voluntary pollution prevention may be successfully used for existing potential sources.

The traditional focus of zoning has been to prevent conflicts between incompatible land uses and to prevent overcrowding of land in an urban context. More recently, zoning has taken on an environmental focus through regulation of environmentally sensitive lands such as shorelands, floodplains, hillsides, and wetlands. Zoning ordinances can require that new land uses be undertaken in a way to protect groundwater quality. Courts have upheld zoning for groundwater protection in cases where the regulations:

- prohibited a use that was hazardous to groundwater;
- made a use conditional because of potential adverse effects;
- delineated areas particularly susceptible to groundwater contamination as special management areas; and
- limited development intensity to protect groundwater.

Zoning use provisions establish districts in which certain uses are permitted as a matter of right, others are prohibited, and still others are conditionally permitted. Conditional uses allow flexibility in deciding whether a particular use is appropriate for a specific site.

Regulation of the density of development indirectly reduces the amount of potential contaminants that reach groundwater. Zoning controls intensity by regulating the dimensions of lots and structures, the percentage of lot coverage by structures, and the location of structures on the lot. The basic purpose of dimensional provisions is to provide open space and control density. Maintaining naturally vegetated open space can improve the amount and quality of water that infiltrates into the groundwater.

Overlay Zoning

Overlay zoning can add flexibility and precision to land-use controls. The boundaries of an overlay zone do not coincide with the underlying conventional zoning district but instead follow the location of the feature being regulated, such as a wellhead setback zone, a hillside prone to erosion, a floodplain, or an important aquifer recharge area. The overlay zone establishes requirements over and above those of the underlying zoning district. Thus, a groundwater protection overlay district applied to the basic zoning residential district might impose additional controls (such as reduced density) and special provisions relating to the use, storage, handling, and disposal of hazardous materials. Flexibility is added by making many of the uses in overlay zones conditional.

The city of Austin, Texas enacted ordinances in 1982 which established three zones within three separate watersheds. The zones include: critical water quality zones, buffer zones, and uplands zones. All development in the watersheds must be able to meet special platting requirements to enable adequate site plan review by the city and to ensure compliance with the ordinances. The controls embodied in the ordinances led some Austin area builders to use compliance with the regulations as a selling point in marketing their projects. See Appendix E for an excerpt from the City of Austin Ordinance.

The city of Dayton, Ohio passed an ordinance in 1988 amending their official zoning map to include a Well Head Operation District (WO) and a Well Field Protection Overlay District (WP). The stated purpose of these districts is "to safeguard the public health, safety and welfare of citizens and institutions that are customers of the Dayton Water System by regulating the land use and the storage, handling, use, and/or production of Regulated Substances within the land area adjacent to the existing and proposed municipal water well fields . . ."

The Well Head Operation District is the area that lies within the one-year capture zone, including a 1,000-foot strip of land outside the direct recharge area. Within this area, sanitary landfills and dry wells are prohibited. Excavation and mining of sand, gravel, and limestone are regulated, and use or storage of regulated substances is limited. The ordinance includes a hazard potential ranking system, which ranks, on a scale of 1 to 9, potential hazards of various land use activities.

Portage County, Wisconsin has developed a model ordinance for groundwater protection, based on existing regulatory approaches from around the country. The ordinance calls for the creation of a Groundwater Protection Overlay District to protect key groundwater recharge areas by imposing appropriate land use restrictions in these areas. This overlay district is imposed in designated groundwater protection recharge zones which reflect the potential for land use activities to adversely impact the well fields.

Flexible Zoning

The flexible conditional use technique allows individualized treatment of certain land uses according to the terms spelled out in the zoning ordinance. Conditional uses are authorized in the county, town, and city zoning enabling laws. Unlike permitted uses which are automatically allowed if they meet the dimensional standards of the zoning district, conditional uses are not automatically allowed because they have the potential to create special problems or hazards. Instead, a public hearing or other approval process is required for the use to be permitted.

Dade County, Florida established a well field protection ordinance in 1980, regulating the type and density of wastewater discharges depending on soil conditions and location of sewers. The ordinance establishes concentric zones within the area defined by the 210-day travel time distance around public water supply fields and prohibits the use of hazardous materials within the area of influence, except for household products and agricultural chemicals.

Approval of a building permit, certificate of use and occupancy, municipal occupancy license, plat, or zoning for any land use served by a septic tank, sanitary sewage, stormwater disposal method, and located within a designated cone of influence, requires written approval of the Department of Environmental Resource Management.

See Appendix E for more details on the Dade County Ordinance.

Cluster Zoning

In cluster zoning, dwellings may be constructed on lots that do not meet the dimensional standards otherwise specified by the zoning ordinance. This process allows clustering of dwellings at a higher density over a portion of the site if open space and natural areas are preserved on the remainder.

To encourage the use of cluster zoning, some local governments allow more housing units per acre than would be allowed under the conventional zoning. Others require that the overall density remain the same, feeling that the cost reductions to the developer resulting from shorter lengths of roads and utilities provide sufficient incentive. Cluster developments may be established as conditional uses, overlay zones, floating zones, or planned-unit developments. A floating zone is described in the zoning text but is not mapped. The text describes the conditions that must be met to establish the zone. The district floats until a landowner petitions to have it apply to a particular parcel by amendment of the zoning map, which is then processed as a regular map amendment. Cluster zoning allowed through a floating zone technique is commonly called a planned unit development district. Cluster zoning provisions should be cross-referenced to the local subdivision ordinance.

Cluster zoning aids in the protection of groundwater quality in several ways. It can help to direct new development away from recharge areas or wellhead protection areas, without reducing the overall density permitted for a parcel. It also can help to provide natural open space, which would improve the quality of water that infiltrates to the subsurface.

SUBDIVISION REGULATIONS

Subdivision regulations control the process of dividing larger tracts of land into lots for sale or building. Subdividers are required to prepare plats, detailed maps of the land proposed to be subdivided. The plats must be approved by local regulatory agencies before they can be recorded and the lots sold. Plats can be reviewed to ensure the physical suitability of the area for a subdivision, sufficiency of water supply and waste disposal systems, proper stormwater management, control of erosion and sedimentation, the adequacy of the street system, proper dimensions and layout of lots, and adequate open space. Towns, cities, and villages and counties can require as a condition of plat approval that a safe water supply system be installed or a bond be posted to ensure this will take place.

Local subdivision ordinances vary widely in form and content. Some subdivision ordinances spell out detailed design, construction, and review standards; others contain only relatively general provisions that are then broadly interpreted to determine the specific measures that the local governments will require for the site in question. Most ordinances do not focus upon groundwater protection as a major concern. Zoning and subdivision regulations can be complementary tools in accomplishing groundwater protection. Subdivision regulations can be used to further the same groundwater-protection purposes: they can require well setbacks, clustering, open-space provision, and minimum lot sizes. Subdivision regulations also can control siting and construction of on-site water supply and waste disposal systems, common in rural subdivisions.

A local unit of government can exercise zoning and subdivision control outside their corporate limits. In Illinois each municipality can regulate land use up to 1 1/2 miles beyond their city limits.

OTHER TOOLS

Local governments have authority to increase their water supply protection by using many other types of regulatory tools, review procedures, and educational or clean-up programs. These include:

- Purchase or trading of property or development rights near wells

  Ensure complete control of land uses in wellhead areas. May be preferable if regulatory restrictions on land use are not politically feasible and the land purchase is affordable.

- Design standards for potentially contaminating land uses

  Prevent groundwater contamination by setting site-specific design and construction standards, such as containment structures, secure storage areas, monitoring wells, and leak detection systems. Can ensure that new buildings within a wellhead protection area are designed so as not to pose a threat to the water supply.

- Operating standards for potentially contaminating land uses

  Regulate potentially hazardous practices in the storage and disposal of certain materials. Can minimize threats to wellhead areas from ongoing activities, such as the application of agricultural pesticides or the storage and use of hazardous substances.

- Source prohibitions

  Prohibit certain land uses or materials that threaten groundwater. Can restrict the storage or handling of large quantities of hazardous materials within a wellhead protection area to eliminate the threat of contamination.

- Groundwater monitoring
  Assess groundwater quality, and warn of potential problems before they reach the well. Can verify the effects of a potentially contaminating land use, or monitor the progress of a contaminant plume.

- Household hazardous waste collection programs
  Reduce threats to groundwater from cumulative effects of household hazardous waste disposal. Reduce amount of hazardous materials at large in the community.

- Pollution Prevention Programs
  With Rechnical Assisstance from state agencies or industry consultants, businesses can often reduce the hazardous material threats by changing processes within their operation. Local governments can provide incentives for pollution prevention.

- Public education
  Use brochures, pamphlets, or seminars to explain wellhead protection to the public. Promote voluntary efforts and build public support for the community's protection program.

- Standards for local government operations
  Establish groundwater protection practices for operations by public works departments and other local agencies, such as for de-icing operations, chemical storage, and stormwater management.

In summary, local governments have considerable existing regulatory authority with respect to planning and building decisions. The importance of groundwater protection needs to be recognized in all of these existing regulatory processes. When making land use and development decisions, local governments should be aware of the locations of wells and setback zones. With the technical support of state agencies, local government can use its powers and local knowledge to complement the work of the IEPA, PCB, and the IDPH, thereby protecting vital groundwater sources.

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INDEX

APPENDIX A

ACRONYMS

ACRONYMS

DATCP	Department of Agriculture, Trade, and Consumer Protection
DENR	Department of Energy and Natural Resources
DILHR	Department of Industry, Labor, and Human Relations
GAC	Groundwater Advisory Council
ICCG	Interagency Coordinating Committee on Groundwater
IDPH	Illinois Department of Public Health
IEPA	Illinois Environmental Protection Agency
IGPA or GPA	Illinois Groundwater Protection Act
ISGS	Illinois State Geological Survey
ISWS	Illinois State Water Survey
MCL	Maximum Concentration Level
OSFM	Office of the State Fire Marshall
PCB	Pollution Control Board
RWU	Rockford Water Utility
SDWA	Safe Drinking Water Act
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WHPA	Wellhead Protection Area

APPENDIX B

ANSWERS TO COMMON QUESTIONS

ANSWERS TO COMMON QUESTIONS

What do we have to do under the IGPA?

The Groundwater Protection Act does not mandate any specific local government actions. The IGPA has established the minimum setback zones around all community wells. Various state agencies are responsible for regulating well installation and potentially contaminating land uses. The municipality's responsibility, if it should act, is to be consistent with the land use and activities regulations specified in the Act.

What does the IEPA expect of us?

The IEPA after completing the well site survey for your well may request you to increase the setback zone to a maximum setback zone. This will require you to complete a maximum setback zone petition and have it approved by the IEPA. To assist you in completing the petition, the IEPA has published step-by-step instructions contained in the Maximum Setback Workbook.

Do we need to hire an engineer to work on the maximum setback application?

No. The Groundwater Protection Act does not require a professional engineer to complete, sign, or seal a maximum setback petition or request. The IEPA and DENR provide free assistance to you should you request it. The IEPA will explain the process of completing the maximum setback zone petition and the DENR through the ISWS will provide the necessary data to you.

What does IEPA do, and what do we do?

The role of the IEPA is described earlier in this document. The IEPA's most valuable role to you is as a technical resource. IEPA will review and comment on the adequacy of all your documents regarding the IGPA.

What you do is to protect the wellhead protection area, often by the adoption of a a maximum setback zone, through a local ordinance. If the minimal hazard program is delegated to you it requires the evaluation of petitions requesting exemption from IGPA regulations. Many other means are available to municipalities and counties to protect community water supplies.

Why is the state asking us to help out, with no state funding provided to us?

It's your water and partly your responsibility. The state is requesting your help because groundwater protection is so complex that it requires local cooperation to ensure adequate enforcement. Groundwater protection, to be most effective, begins at the local level and must be sensitive to local conditions and land uses. Direct funding is not supplied because the mandated requirements are minimal and do not place a large financial burden on local governments. Through voluntary actions, local governments can, with minimal additional effort, greatly improve protection of local groundwater quality.

How much will it cost us?

The total cost is low. The IEPA estimates approximately $500 for staff time to complete a maximum setback zone application. A hazard review can run a large municipality with several wells several thousand dollars. Small communities can request the IEPA to conduct the hazard review free of charge.

Do these setback zones ensure safety of our water supply?

No. The setback zones do not ensure your water supply from ever being contaminated. The setbacks are to provide time for you to begin remediation or locate a different well water source should the groundwater become contaminated.

We don't currently have planning or zoning. How does this apply to us?

The minimum setback zone is mandatory and is enforced by the IEPA. The state legislature has passed the IGPA requiring the establishment of land use regulations within the setback zones. Therefore, with or without current planning or zoning, local development must be consistent with these regulations.

What if our neighboring jurisdiction has contaminating land uses?

Those land uses that are within established setback zones are subject to IGPA regulations regardless of municipal jurisdiction. If the land uses are not within your well's setback zone, but you have cause for concern, you can petition the PCB to establish a regulated recharge area to help protect your supply. Finally, if the land uses are still outside these areas, authority to protect your water supply up to 7 miles from your source is granted by other Illinois State Statutes.

APPENDIX C

DEFINITIONS

DEFINITIONS

The words and terms defined in the appendix have the meaning given under The Environmental Protection Act 415 ILCS 5/1 (1992) and apply to Illinois Groundwater Protection Act (415 ILCS 55/1 (1992) and the Illinois Water Well Construction Code (415 ILCS 30/3 (1992).

§ 3.05 *community water supply* means a public water supply which serves or is intended to serve at least 15 service connections used by residents or regularly serves at least 25 residents.

Non-community water supply means a public water supply that is not a community water supply.

§ 3.06 *Contaminant* is any solid, liquid, or gaseous matter, any odor, or any form of energy, from whatever source.

§ 3.08 *Disposal* means the discharge, deposit, injection, dumping, spilling, leaking or placing of any waste or hazardous waste into or on any land or water or into any well so that such waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

§ 3.12 *Generator* when used in connection with hazardous waste means any person whose act or process produces hazardous waste.

§ 3.14 *Hazardous substance* means: (A) any substance designated pursuant to § 311(b)2(A) of the Federal Water Pollution Control Act (P.L. 92-500), as amended, (B) any element, compound, mixture, solution, or substance designated pursuant to § 102 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (P.L. 96-510), as amended, (C) any hazardous waste, (D) any toxic pollutant listed under § 307(a) of the Federal Water Pollution Control Act (P.L. 92-500), as amended, (E) any hazardous air pollutant listed under § 112 of the Clean Air Act (P.L. 95-95), as amended, (F) any imminently hazardous chemical substance or mixture with respect to which the Administrator of the U.S. Environmental Protection Agency has taken action pursuant to § 7 of the Toxic Substance Control Act (P.L. 94-469), as amended. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied gas and such synthetic gas.

§ 3.15 *Hazardous waste* means a waste, or combination of wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause or significantly

contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible, illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed, and which has been identified, by characteristics or listing, as hazardous pursuant to § 3001 of the Resource Conservation and Recovery Act of 1976 (P.L. 94-580) or pursuant to PCB regulations.

§ 3.20 *Landscape waste* means all accumulations of grass or shrubbery cuttings, leaves, tree limbs and other materials accumulated as the result of care of lawns, shrubbery, vines and trees.

§ 3.21 *Municipal waste* means garbage, general household and commercial waste, landscape waste and construction or demolition debris.

§ 3.22 *Municipality* means any city, village or incorporated town.

§ 3.28 *Public water supply* means all mains, pipes and structures through which water is obtained and distributed to the public, including wells and well structures, intakes, and cribs, pumping stations, treatment plants, reservoirs, storage tanks and appurtenances, collectively or severally, actually used or intended for use for the purpose of furnishing water for drinking or general domestic use and which serve at least 15 service connections or which regularly serve at least 25 persons at least 60 days per year. A public water supply is either a *community water supply* or a *non-community water supply*.

§ 3.45 *Special waste* means any industrial process waste, pollution control waste or hazardous waste, except as may be determined pursuant to § 22.9 of this Act.

§ 3.46 *Storage* when used in connection with hazardous waste, means the containment of hazardous waste, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste.

§ 3.49 *Treatment* when used in connection with hazardous waste means any method, technique or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume. Such term includes any activity or processing designed to change the physical form or chemical composition of hazardous waste so as to render it nonhazardous.

§ 3.57 *Well* means a bored, drilled or driven shaft, or dug hole, the depth of which is greater than the largest surface dimension.

§ 3.58 *Potential Route* means abandoned and improperly plugged wells of all kinds, drainage wells, all injection wells, including closed loop heat pump wells, and any excavation for the discovery, development or production of stone, sand, or gravel.

A new potential route is:

a potential route which is not in existence or for which construction has not commenced at its location as of January 1, 1988; or,

a potential route which expands laterally beyond the currently permitted boundary or, if the potential route is not permitted, the boundary in existence as of January 1, 1988.

Construction shall be deemed commenced when all necessary federal, state, and local approvals have been obtained, and work at the site has been initiated and proceeds in a reasonably continuous manner to completion.

§ 3.59 *Potential primary source* means any unit at a facility or site not currently subject to a removal or remedial action which:

is utilized for the treatment, storage, or disposal of any hazardous or special waste not generated at the site; or

is utilized for the disposal of municipal waste not generated at the site, other than landscape waste and construction and demolition debris; or

is utilized for the landfilling, land treating, surface impounding or piling of any hazardous or special waste that is generated on the site or at other sites owned, controlled or operated by the same person; or

stores or accumulates at any time more than 75,000 pounds above ground, or more than 7,500 pounds below ground, of any hazardous substances.

A new potential primary source is:

a potential primary source which is not in existence or for which construction has not commenced at its location as of January 1, 1988; or

a potential primary source which expands laterally beyond the currently permitted boundary or, if the primary source is not permitted, the boundary in existence as of January 1, 1988; or

a potential primary source which is part of a facility that undergoes major reconstruction. Such reconstruction shall be deemed to have taken place where the fixed capital cost of the new components constructed within a 2-year period exceed 50% of the fixed capital cost of a comparable entirely new facility.

Construction shall be deemed commenced when all necessary federal, State and local approvals have been obtained, and work at the site has been initiated and proceeds in a reasonably continuous manner to completion.

§ 3.60 *Potential secondary source* means any unit at a facility or site not currently subject to a removal or remedial action, other than a potential primary source, which:

is utilized for the landfilling, land treating, or surface impounding of waste that is generated on the site or at other sites owned, controlled or operated by the same person, other than livestock and landscape waste, and construction and demolition debris; or

stores or accumulates at any time more than 25,000 but not more than 75,000 pounds above ground, or more than 2,500 but not more than 7,500 pounds below ground, of any hazardous substances; or

stores or accumulates at any time more than 25,000 gallons above ground, or more than 500 gallons below ground, of petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance; or

stores or accumulates pesticides, fertilizers, or road oils for purposes of commercial application or for distribution to retail sales outlets; or

stores or accumulates at any time more than 50,000 pounds of any de-icing agent; or

is utilized for handling livestock waste or for treating domestic waste waters other than private sewage disposal systems as defined in the *Private Sewage Disposal Licensing Act.*

A new potential secondary source is:

a potential secondary source which is not in existence or for which construction has not

commenced at its location as of July 1, 1988; or

a potential secondary source which expands laterally beyond the currently permitted boundary or, if the secondary source is not permitted, the boundary in existence as of July 1, 1988, other than an expansion for handling of livestock waste or for treating domestic waste waters; or

a potential secondary source which is part of a facility that undergoes major reconstruction. Such reconstruction shall be deemed to have taken place where the fixed capital cost of the new components constructed within a 2-year periods exceed 50% of the fixed capital cost of a comparable entirely new facility.

Construction shall be deemed commenced when all necessary federal, State and local approvals have been obtained, and work at the site has been initiated and proceeds in a reasonably continuous manner to completion.

§ 3.61 *Setback zone* means a geographic area, designated pursuant to the Act, containing a potable water supply well or a potential source or potential route, having a continuous boundary, and within which certain prohibitions or regulations are applicable in order to protect groundwaters.

§ 3.63 *Groundwater* means underground water which occurs within the saturated zone and geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure.

§ 3.65 *Potable* means generally fit for human consumption in accordance with accepted water supply principles and practices.

§ 3.66 *Resource groundwater* means groundwater that is presently being or in the future capable of being put to beneficial use by reason of being of suitable quality.

§ 3.67 *Regulated recharge area* means a compact geographic area as determined by the PCB, the geology of which renders a potable resource groundwater particularly susceptible to contamination.

APPENDIX D

ADDITIONAL ILLINOIS WATER SUPPLY PROTECTION LEGISLATION

ADDITIONAL ILLINOIS WATER SUPPLY PROTECTION LEGISLATION

Groundwater Protection Act
(P.A. 85-863 eff. Sept. 24, 1987)

415 ILCS 55/1 et seq (1992)

The Groundwater Protection Act was approved on September 24, 1987 by the Illinois State General Assembly. It establishes new policies and coordinates existing programs to recognize and protect Illinois' groundwater reserves as a vulnerable natural resource. (Refer to the *Summary of Illinois Groundwater Protection Legislation: Groundwater Protection Act; Environmental Protection Act; and Illinois Water Well Construction Code.)*

Environmental Protection Act
(P.A. 76-2429 eff. July 1, 1970)

415 ILCS 5/1 et seq (1992)

Title IV: Public Water Supplies of the Environmental Protection Act was amended in 1987 by the GPA, and grants authority to the IGPA and the Pollution Control Board to implement the Illinois well head protection program for community water supplies. The well head protection program authorizes land use restrictions within prescribed setback zones and recharge areas. (Refer to the *Summary of Illinois Groundwater Protection Legislation: Groundwater Protection Act; Environmental Protection Act; and Illinois Water Well Construction Code.)*

Illinois Water Well Construction Code
(Laws 1965, p. 3217 eff. Aug. 20, 1965)

415 ILCS 30/3 (1992)

The Code grants the Illinois Department of Public Health the authority to regulate the location, construction, and operation of all water wells except community wells. (Refer to the *Summary of Illinois Groundwater Protection Legislation: Groundwater Protection Act; Environmental Protection Act; and Illinois Water Well Construction Code.)*

Public Water Districts
(Laws 1945, p. 1187 eff July 25, 1945. Amended by Laws 1951, p. 1625, eff July 16, 1951)

70 ILCS 3705/1 (1992)

Residents within any contiguous area of less than 500,000 people can create a public water district by referendum. Public water districts construct or acquire, maintain, operate, manage, and extend waterworks property within the district. It performs these duties to be conducive to the preservation of public health, comfort and convenience of their district. Waterworks property means: wells, springs, streams, or other water supply source, pumping equipment,treatment or purification plants, distribution mains, cisterns, reservoirs, necessary fire protection equipment, and lands, right of way and easements necessary for the proper water supply development and distribution.

Public Water Districts' authority specific to water supply protection include:

·Acquiring by purchase or condemnation, waterworks properties within the district to preserve the public health, comfort and convenience of the district; and make, enact, and enforce all rules and regulations related to the acquisition.

·Annexing contiguous territory which is not included in any other public water district.

·Acquiring any part of a city, village, incorporated town, or private corporation's water works property, if requested.

Water Authorities
(Laws 1951, p. 1964 approved and eff Aug 2, 1951)

70 ILCS 3715/1 (1992)

The Act provides for the establishment of Water Authorities and to define their powers and duties. Any contiguous area may incorporate as a water authority if approved by public referendum. Water Authorities can:

·Inspect wells and other withdrawal facilities and require provision of information on the supply, withdrawal and water use.

·Require registration of wells or other withdrawal facilities.

·Require all additional wells or other withdrawal facilities and existing wells or withdrawal facilities being deepen, extended, or enlarged obtain a permit.

·Require plugging of abandoned wells or the repair of any well or withdrawal facility to prevent

loss of water or contamination of supply.

· Regulate the use of water and during any period of actual or threatened shortage establish limits upon or priorities as to the use of water.

·Supplement the existing water supply or provide additional water supply by such means as may be practicable or feasible.

·Arrest and penalize violators of ordinances and police territory.

·Make such regulations as it deems necessary to protect public health, welfare and safety and to prevent pollution of its water supply.

Cities and Villages

Construction of Wells and Waterworks by Cities and Villages.
65 ILCS 5/11-125-1 et seq (1992)

·Acquisition of Property
5/11-125-2

A city or village may go beyond its corporate limits and acquire and hold property for the purpose of establishing, supplying, purchasing, extending, improving, and operating waterworks. The jurisdiction of the city or village to prevent or punish any pollution or injury to the stream or source of water, or to the waterworks, extends 20 miles beyond its corporate limits, or so far as the waterworks extends.

·Groundwater Protection
5/11-125-4

The municipality may conduct a groundwater protection needs assessment and may adopt by ordinance a minimum or maximum setback zone.

Joint Construction of Water Supply
65 ILCS 5/11-126-1 (1992)

·Acquisition of Property
5/11-126-3

Each municipality may go beyond its corporate limits and acquire and hold property for the purpose of locating, constructing, maintaining, or supplying a waterworks. The jurisdiction of each joint municipality extends 10 miles beyond its corporate limits to prevent or punish any pollution or injury to the stream or water source supplying its waterworks.

Plan Commissions
65 ILCS 5/11-12-4 et seq (1992)

Every municipality may create a plan commission or a planning department or both. The general powers include the preparation and recommendation of a comprehensive plan. The comprehensive plan may implement by ordinance reasonable requirements governing water supply and distribution and subdivision of land within the municipality and within 1 & 1/2 miles.

Zoning
65 ILCS 5/11-13-1 et seq (1992)

Objectives - Classification, regulation and location of uses - Nonconforming uses.

Municipalities may restrict or regulate land uses that pose a threat to the public health, safety, comfort, morals, and welfare.

Counties Code

Maps, plats and subdivisions
5 ILCS 5-1041 et seq (1992)

This paragraph outlines county's authority to establish rules and regulations regarding subdivisions within their jurisdiction. "A county board may prescribe, by resolution or ordinance, reasonable rules and regulations . . . The rules and regulations may include such reasonable requirements with respect to water supply and sewage treatment and collection as may be established by the Environmental Protection Agency . . ."

Water Supply, Drainage and Flood Control
55 ILCS 5/3-1501 et seq (1992)

This division applies to any county upon the county board's adoption.

15003
Department of Public Works

The county board may establish a department of public works with the authority to exercise complete supervision of waterworks system and sewerage system projects.

15007
General powers of county board

The county board's general authority is " . . . to protect the quality of the environment and the quality of life from adverse effects caused by the improper storage, treatment or disposal of wastes, and to accomplish all other purposes of the county, . . ."(¶ 5-15007)

15009
Acquisition of lands and construction of facilities

The county board is empowered to adopt and enforce water supply protection ordinances, and exercise the right of eminent domain.

15015
Pollution of streams

The county board has the authority to prevent pollution of any stream or any other body of water within the county and cause any polluter to cease; provided the authority of the Pollution Control Board is not superseded.

15016
Groundwater Protection

The county board may perform a groundwater protection needs assessment and adopt a minimum or maximum setback zone ordinance.

APPENDIX E

EXAMPLES OF ORDINANCES FROM OTHER STATES

Dade County, Florida Ordinance No. 81-23 (Example of Flexible zoning)

The Board of County Commissioners of Dade County, Florida has ordained an ordinance that regulates land use for the protection of groundwater. Excerpts follow:

"Whereas, there is an urgent need to further protect existing and future potable water supply wells from the irreversible and adverse effects of bacterial, viral, and chemical contamination; and

Whereas, the replacement cost of each public utility potable water supply well is approximately one million dollars and the cost of replacement of a major well field is in excess of thirty million dollars; and

Whereas, the Biscayne Aquifer has been declared by the United States Environmental Protection Agency to be a `sole source aquifer', i.e., the only practical source of drinking water for the residents of Dade County . . ."

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF DADE COUNTY, FLORIDA . . .:

A. Legislative Intent

The intent and purpose of this ordinance is to safeguard the public health, safety, and welfare by providing scientifically established standards for land uses within the cone of influence thereby protecting potable water supply wells from contamination . . .

C. Maps of Cones of Influence

The Director of the Department of Environmental Resources Management (DERM) shall maintain maps of cones of influence of public utility potable water supply wells . . .

D. Septic Tanks, Sanitary Sewers, Stormwater Disposal, and Wastewater Disposal Within Cones of Influence

. . . no county or municipal officer, agent, employee, or board shall approve or issue any building permit, certificate of use and occupancy, municipal occupancy license, plat, or zoning for any land use served to be [sic] served by a septic tank, sanitary, sewage, stormwater disposal method, or wastewater disposal method, and which is located within a cone of influence, until the county, municipal officer, agent, employee or board has obtained the prior written approval of the DERM.

E. Prohibition of Hazardous Materials Within Cones of Influence

. . . no county or municipal officer, agent, employee, or board shall approve or issue any building permit, certificate of use and occupancy, municipal occupancy license, plat, or zoning for any nonresidential land use, other than a bona fide agricultural land use or a public water supply facilities use, within two hundred and ten (210) days travel time from a public utility potable water supply well without obtaining the prior written approval of the DERM. The director shall issue his written approval only after the owner of the property submits to the director an executed covenant running with the land in favor of Metropolitan Dade County which provides that hazardous materials shall not be used, generated, handled, disposed of, discharged, or stored on the property. Said covenant shall be in a form prescribed by the director and approved by the Board of County Commissioners. The covenants shall be recorded by the Department of Environmental Resources Management at the expense of the owner of the property."

City of Austin Ordinance 82 1118-N (Example of a Water Quality Overlay Zone)

Section 9-10-331 Purpose

A. The Barton Creek watershed is divided into four water quality zones, the Critical Water Quality Zone, the Lowland Water Quality Zone, the Edwards Aquifer Zone, and the Upland Water Quality Zone.

B. The widths and location of the zones are calculated to protect the water quality of Barton Creek and Barton Springs by attenuating the contaminants and sediments transported by runoff, reducing the rate and volume of runoff, maximizing infiltration and recharge of the seeps and springs in the watershed, and preserving the delicate vegetation of the mesic woodlands.

Section 9-10-332 Critical Zone

A. Within the Critical Water Quality Zone, development activities shall be limited to:

1. Collector street crossings, maintenance of existing roadways, and reconstruction and widening of existing roadways;
2. Utilities which cannot reasonably be located in other zones;
3. Fences, other than in the 25-year floodplain.
4. Public and private parks and open space, with development in the parks and open space limited to trails and facilities (other than stables and corrals for animals) for hiking, jogging, biking, horseback riding, and nature walks; and
5. Flood control projects approved by the city council.

Section 9-10-333 Lowland Zone

A. Development in the lowland Water Quality Zone is limited to:

1. Development authorized in the Critical Water Quality Zone;
2. One- and two-family residential housing structures;
3. Streets and driveways;
4. Drainage facilities other than storm drainage facilities for commercial structural controls for commercial development; and
5. Public and private parks and open space, exclusive of parking lots.

Development or

Section 9-10-334 Edwards Aquifer Zone

A. Development in the Edwards Aquifer Zone is limited to:

1. Development authorized in the Lowland Water Quality Zone;
2. Commercial [site development regulations apply.] . . .

Section 9-10-335 Upland Zone

A. Development in the Upland Water Quality Zone is limited to:

1. Development authorized in the Lowland Water Quality Zone;
2. Commercial [site development regulations apply] . . ."

A Minnesota Model Groundwater Protection Ordinance has been developed by the Minnesota Center for Public Policy and Community Development. The Ordinance may be referenced in THE ENVIRONMENTAL PROFESSIONAL, National Association of Environmental Professionals Vol. 6 pp 331-349, 1984. While it's provisions might serve as a coordinating document, it does not fit the Illinois legal and organizational structure required of our local governments. The model has no specific provisions that apply to Setbacks for land use unless some of many Minnesota statutes adopted by reference are included. Provisions with individual, definitions, administrative and enforcement responsibilities for each section included the following:

1. SINKHOLES
2. WATER WELL CONSTRUCTION
3. WATER WELL ABANDONMENT
4. INDIVIDUAL SEWAGE DISPOSAL SYSTEM
5. LIVESTOCK WASTE
6. EROSION CONTROL

Steps for protecting groundwater as recommended by the Clinton River Michigan Watershed Council *Site Plan Review and Groundwater Protection: Guidebook for Local Government Officials*

"For groundwater protection purposes, the following steps are recommended:

1. Pre-site plan review: Determine if the facility is likely to use, store, or generate hazardous substances or polluting materials. Provide guidance and information.

2. Receive site plan information from applicant: Review for completeness, need for state county permits, and environmental concerns. Forward Environmental Permits Checklist to the Michigan Department of Natural Resources

3. Obtain review comments from county and state agencies, if needed: Assurances that groundwater discharge permits, septic system permits, and pollution incident prevention plans will be approved are particularly important for groundwater protection.

4. Review the site plan according to standards in the ordinance: Identify areas of non-compliance, areas of impact, and mitigation measures.

5. Identify reasonable conditions related to ordinance standards: As required by Michigan's zoning enabling law, standards in the zoning ordinance provide the basis for site plan conditions.

6. Site plan review decisions: The planning commission, local governing body, and/or the designated administrative official must decide upon the site plan. Options include denial, approval, or approval with conditions.

7. Building permit approval: The building permit stage is an essential point in the process to assure compliance with state and county permits. Building plans submitted should be compared with approved site plans.

8. Occupancy inspection and permit: Such inspections are needed to assure that construction is carried out as specified on the site plan. The actual types and quantities of hazardous substances stored on the site can be checked at this stage.

. . . Two administrative forms are recommended for use in conjunction with local government site plan review standards for groundwater protection:

1. State/County Environmental Permits Checklist - A form designed to alert the property owner to state and county requirements which may apply to their development as well as provide the planning commission with information useful during the site plan review process.

2. Hazardous Substance Reporting Form for Site Plan Review - A form designed to provide the planning commission with key information about the proposed project. The type of information requested are typically not displayed on a map . . ."

Businesses which may store, use, or generate hazardous substances and polluting materials:

Users of Pesticides and Pesticide Application Services

Agricultural pesticide application services
Lawn, garden, and tree services
Disinfecting and structural pest control services
Arboreta, botanical, and zoological gardens
Golf courses and other facilities using pesticides

Chemical, Paint and Plastics Manufacturing

Industrial chemicals
Pigments
Plastics
Pesticides
Synthetic rubber and synthetic fibers, etc

Furniture Manufacturing and Refinishing

Cabinet wooden furniture manufacturing
Furniture reupholster and repair
Particle board; veneer and plywood manufacturing
Antique refinishing and repair

Commercial Printing and Photography

Typesetting, lithography, letterpress, engraving, etc
Printing businesses
Loose leaf binder manufacturers, book binding, magazine binding, etc
Photography laboratories and workrooms

Medical and Scientific laboratories

Research and development laboratories
Commercial testing laboratories
University and high school laboratories
Medical laboratories, including hospital and dental labs

Vehicle Maintenance

Bump shops; automotive repair shops
Service stations
Trucking and transportation-related businesses
Contractors
Government offices with fleets of cars, trucks, etc.
Shops which repair or maintain heavy equipment or farm equipment

Laundries and Dry Cleaners

Retail dry cleaning stores
Industrial and linen supply plants with dry cleaning operations
Leather and fur cleaning plants
Self-service laundromats with dry cleaning equipment

Junk Yards and Auto Salvage Yards

Junk yards
Auto salvage yards

Metal Manufacturing

Metal furniture, cabinets, and fixtures
Primary metal products
Fabricated metal products
Machinery, including electrical and electronic machinery and equipment
Clocks and watches
Metal jewelry; notions
Signs and advertising displays
Photographic, medical or optical equipment

Metal Plating and Finishing

Metal coating, engraving, and plating
Metal finishing and heat treating

Transportation Terminals

Terminal facilities used by highway vehicles
Truck maintenance and service operations
Railroad terminal facilities
Motor freight terminals"

Site Plan Review Standards for Groundwater Protection should include:

Definitions of Hazardous Substances and Polluting Materials

Applicability

Site Plan Information Requirements

Site Plan Review Standards
- Groundwater protection standards
- Aboveground storage and use areas for hazardous substances and polluting materials
- Underground storage tanks
- Sites with contaminated soils and/or groundwater

"The regulatory threshold is 100 kilograms per month of hazardous substances and polluting materials (equal to 25 gallons or 220 pounds). This regulatory threshold has been recommended by district supervisors of the Waste Management Division, Michigan Department of Natural Resources. A business or facility with 100 kilograms of any hazardous substance or polluting material is completely subject to regulation. The threshold is applied to determine whether the facility is required to provide secondary containment or other groundwater protection measures and meet other site plan review standards."

Hazardous substances and polluting materials are broadly defined to include chemicals and materials listed on regulatory lists of certain state and federal agencies . . .

Emphasis is placed on spill prevention through secondary containment for above ground storage of hazardous substances and polluting materials. Secondary containment is a structural measure which is often provided through permanent berms and dikes, either inside or outside the building. In addition, general purpose floor drains are prohibited, unless connected to a public sewer system, an on-site holding tank, or system authorizes through a state groundwater discharge permit.

Since some land uses cannot be regulated at the local level due to other state or county regulatory programs, coordination with state and county environmental permit requirements is essential. Site plan review standards include the requirement that state and county permits and approvals be obtained. The local government site plan review (through the use of the environmental permits checklist) can help assure proper permits.

"It is essential that the zoning ordinance include standards on which site plan conditions are based.

Inspections after construction of the facility are often needed to assure that the site plan has been carried out in accordance with the approved plan. Some communities depend upon building inspectors or fire inspectors to assure that secondary containment is provided. Occupancy permits for new developments are increasingly recognized as an important regulatory tool to assure compliance."

APPENDIX F

SUGGESTED TEXT FOR ILLINOIS GROUNDWATER PROTECTION ORDINANCE

SUGGESTED LOCAL TEXT FOR ILLINOIS GROUND WATER PROTECTION ORDINANCE

[Note: This draft suggests provisions to be included in amendments to county or municipal zoning, subdivision, land resources management ordinance, a free-standing wellhead setback ordinance, or a nuisance ordinance by a municipality. Care should be taken in selecting the appropriate clauses to establish the authority of the local government involved and the purposes being pursued. Any draft should be converted into final form by your own attorney after he/she has read this manual and a statement of what the adopting body wishes to achieve. Blanks below should be filled with the name of the jurisdiction.]

Section 1. Authority
This ordinance is adopted pursuant to authority conferred upon:
municipalities by 65 ILCS 5/11-12-4 et seq (Planning); 65 ILCS 5/11-13-1 et seq(Zoning); 65 ILCS 5/11-60-2 et seq (Nuisance);

home rule units by the Illinois Constitution Art VII.Sec 6;

counties by 55 ILCS 5/5-15001 et seq(Planning); 55 ILCS 5/5-12001 et seq (Zoning); 55 ILCS 5/5-1041 et seq(Plats); 55 ILCS 5/5-15016 (Groundwater Ordinance);

counties and municipalities, in addition to the above, by 50 ILCS 805/1 et seq(Local Land Resource Management Planning); 55 ILCS 55/1 et seq (Groundwater Protection);
415 ILCS 5/1 through 5/7.5 Environmental Protection Act;
415 ILCS 5/14 et seq (Water Supplies); 415 ILCS 30/1 et seq (Water Well Construction);

Section 2.Purpose.
This ordinance shall serve the following purposes;

(a) To protect the public interest in the health, safety and general welfare by protecting groundwater resources from contamination by uses of property or other activities of individuals.

(b) To implement the policy of the State of Illinois to restore, protect, and enhance the groundwater of the State, as a natural and public resource under all lawful authority of
the_____.

(c) To recognize the essential and pervasive role of groundwater in the social and economic well-being of the people of _____ and its vital importance to the general health, safety and welfare.

(d) To protect potable water supply wells from the adverse effects of biological, bacterial, viral, radiological, toxic and chemical contamination.

(e) To prevent costs to the public of millions of dollars for the replacement of contaminated water wells that have afflicted Illinois communities.

(f) To promote the beneficial and legitimate use of groundwater resources consistent with a policy of sustainability of quality and quantity.

Section 2. Definitions

Except as stated in this ordinance, and unless a different meaning of a word or term is clear from the context, the definition of words or terms in this ordinance shall be the same as those used in the Act and the Illinois Groundwater Protection Act.

"Act" means the Environmental Protection Act, 415 ILCS 5/1.

"Agency" means the Illinois Environmental Protection Agency.

"Attachment A" means the map which is adopted and incorporated as a part of this ordinance which establishes overlay zones in addition to other ordinances of
in which uses may be additionally restricted by this ordinance.

"Board" means the Illinois Pollution Control Board.

"Maximum setback zone" means the area around a community water supply well, including any "Minimum Setback zone," established under section 415 ILCS 5/14.314.3 of the Act and by the authority of this ordinance and described in Attachment A to this ordinance

"Minimum setback zone" means the area around a community water supply well established under section 415 ILCS 5/14.1-14.2 of the Act and by the authority of this ordinance and described in Attachment A.

"Primary", "Secondary" and "Route" sources means those new potential uses and activities identified and listed by the local government, Board or the Agency and hereby incorporated by reference in Attachment B.

Section 4. Prohibited Uses and Activities.
(a) Except as provided in Sections 5 or 6 , no person shall place a new potential primary source, new potential secondary source, or new potential route within the minimum setback zone.

(b) Except as provided in Section 5 , no person shall place a new potential primary source within the maximum setback zone.

(c) Except as provided in section 5 or 6 no person shall alter or change an existing primary source, secondary source, or potential route in a manner that would be prohibited by a new source or route.

(d) The zones designated on Attachment A shall be

created based on available geologic, hydrologic and other scientific data in order to prevent locations of uses and activities which may cause bacterial, viral, or chemical contamination. Such designation shall be entitled to a presumption of validity when challenged by any affected party.

(e) (Municipalities only clause) No person shall conduct any activity or engage in a use of property which shall constitute an interference with the health and safety or welfare of a community water supply well or other water well by the accidental, negligent, or intentional introduction of contaminants. Such activities are declared to be a public nuisance and are prohibited by this ordinance.

Section 5. Waivers, Exceptions and Certification of Minimal Hazard.

(a) If pursuant to the act the owner of a new potential primary source, new potential secondary source , or new potential route is granted a waiver by the Agency or an exception by the Board (other than land filling or land treating), such owner shall be deemed to have a waiver or exception to the same extent from section 4 (a) of this ordinance.

(b) If pursuant to The Act, the owner of a new potential primary source, new potential secondary source, or new potential route is issued a certificate of minimal hazard by the Agency, such owner shall not be subject to section 4(a) of this ordinance to the same extent that such owner is not subject to the Act.

(c) Any action by the Agency or Board pursuant to this Section 5. shall not be final until the _____(local government) has had at least thirty days notice of such a proposed action and has had the opportunity to present evidence concerning its interest.

Section 6. Exclusion.

Section 4(a) of this ordinance shall not apply to new common sources of sanitary pollution as specified pursuant to Section 5/17 of the act and the regulations adopted thereunder by the agency; however no such

common sources may be located within the applicable maximum distances from a community water supply well specified in Attachment A.

Section 7. Permit

(a) In addition to an Agency or Board approval any activity subject to Section 4 of this ordinance shall not be established without application for and obtaining of a Groundwater Protection Permit issued by the _____. Such permit may be part of and a precondition for issuance of any other permit required by ordinance, including but not limited to zoning, subdivision, building, construction or disposal.

(b) A fee for the issuance of the Groundwater Protection Permit shall be in the amount of $_____, and is intended to be sufficient to defray the cost of review of necessary construction and drainage documentation and for necessary inspections of the use or activity.

(c) Application for a Groundwater Protection Permit shall be on forms provided by the _____. Such Application shall authorize reasonable inspection of the property involved without necessity of a warrant.

(d) Pursuant to formal agreement of the Agency, other responsible units of government and the _____ they may delegate and share permitting, inspection and enforcement authority as specified in such agreements.

Section 8. Violations

Violation of this ordinance shall be punishable by a fine in keeping with the provisions of the Act and in an amount of $1,000 or imprisonment for thirty days and each day of violation constitutes a separate offence. Enforcement of the terms of this ordinance may ALSO be sought by temporary and permanent injunction in any court of competent jurisdiction.

Section 9. Severability.
The several provisions of this ordinance are severable and if any court of competent jurisdiction shall adjudge any portion of this ordinance to be invalid or that any provision is invalid as applied to a particular property interest, such judgement shall not affect the validity of other parts of this ordinance or its validity too properties not included in the courts judgement.

Section 10.
This ordinance shall be effective_____
_____.