Village of Granville & Granville Township
Comprehensive Plan Update
Environmental Analysis

Prepared for:

Poggemeyer Design Group

POGGEMEYER
DESIGN GROUP

***Project* # 873-1821**

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1.0 Introduction

This report provides an inventory of the environmental conditions within the Village of Granville and Granville Township to provide the basis for wise land use decisions. These baseline data and analyses regarding Granville's existing environmental conditions are intended to inform the planning process and serve as a resource of environmental planning data about the Village and Township. This compilation of natural resource data is discussed and interpreted in terms of key issues for planning purposes. Preliminary recommendations are provided regarding conservation initiatives and policies for consideration during the comprehensive planning process.

The compilation of the secondary source data in this report is intended to aid the community in making better decisions about land stewardship. Growth that significantly diminishes environmental quality, community character, and ecological systems is shortsighted and is a poor legacy to leave future generations. If we build, pave, and develop the landscape without regard for the environment, fewer natural areas will be left to provide public health and safety functions. Such practices in the past have made those remaining areas with high ecological integrity even more critical. These resources are an important part of the quality of life in Granville. It is important that we have a thorough inventory and understanding of these resources. Preserving the ecological health and function of our natural areas depends on more people being informed and knowledgeable about the impacts of developments.

This report is organized into the following sections:

- *Current Land Cover*
- *The Natural Environment*
  - *Watersheds*
  - *Surface Waters*
  - *Floodplains*
  - *Wetlands*
  - *Hydric Soils*
  - *Topography*
  - *Riparian Corridors*
  - *Groundwater*
  - *Soils Suitable for Septic*
  - *Woodlands*
  - *Wildlife Corridors*
  - *Rare, Threatened, and Endangered Species*
- *Farmland*
- *Urban Forestry*
- *Green Infrastructure*
- *Open Spaces*
- *Conclusion*

2.0 Current Land Cover

A review of the most recent aerial photography and satellite imagery gives a snapshot of current conditions in Granville. Map 1 shows the most recent aerial photography flown in 2004 for Village and 1990 for the Township.

The most recent available satellite imagery dates back to 1994. Although dated, it can be used for planning purposes to identify general patterns of developed/undeveloped areas. The dataset illustrates conditions across Granville. Within certain limitations, land cover datasets are useful in determining general areas such as canopy cover. Map 2 and Table 1 show land cover data developed from ODNR 1994 satellite imagery.

Table 2.1 Land and Vegetation Cover

DESCRIPTION	PERCENT OF GRANVILLE	PERCENT OF VILLAGE	PERCENT OF TOWNSHIP
Wooded	50	56	49
Non-forested Wetlands	<1	<1	<1
Shrub/scrub	1	1	1
Agricultural/Open Urban	46	36	48
Urban	2	6.5	1
Water	<1	<1	<1

Source: ODNR 1994

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Aerial View

Source:
1990 County Aerials
2004 Village Aerials

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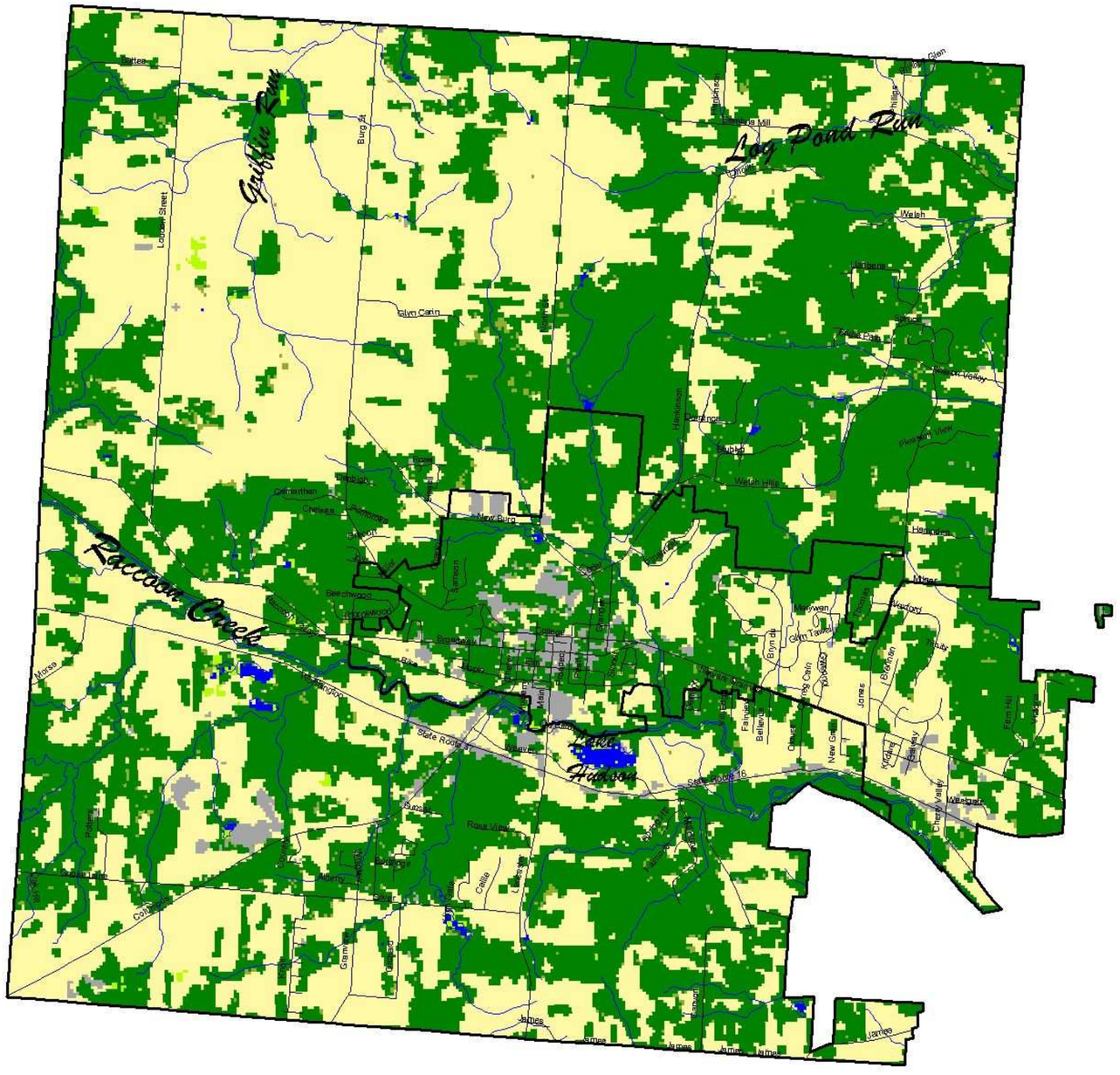

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Land Cover

🟩 Wooded
🟩 Non-forested Wetlands
🟩 Shrub/scrub
🟨 Agricultural/Open Urban
⬜ Urban
🟦 Water

Source:
ODNR
1994 Satellite Imagery

ES Enviro Science Incorporated

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3.0 Watersheds

Raccoon Creek

All land eventually drains into a stream, river, pond, or lake. This land area that drains into a particular stream or river is called a watershed. A watershed is defined as an area of land within a drainage divide from which precipitation (rain & snowmelt) drains via gravity to a body of water. As smaller streams come together and form larger rivers, their associated watersheds also join. In this manner, Raccoon Creek, Griffin Run, Log Run, Dry Creek, and Ramp Creek are part of the larger Licking River watershed. A watershed is a dynamic system that includes land, soils, plants, wetlands, water bodies, land cover, and people. These all affect the water flowing down through the watershed to the streams and rivers, influencing flooding, erosion, water quality, water temperature, and habitat.

Map 3 and Table 2 show watersheds delineated by Ohio Department of Natural Resources (ODNR). In disciplines such as resource management, storm water planning, flood management, and land use planning, watersheds are increasingly recognized as key geographic units for analysis and planning. Alterations to watershed characteristics affect downstream landscape, water bodies, land uses, and habitat. By examining features within a watershed, resource managers can identify potential sources of problems and potential effects of alteration, and may develop strategies to minimize or reduce problems related to alteration.

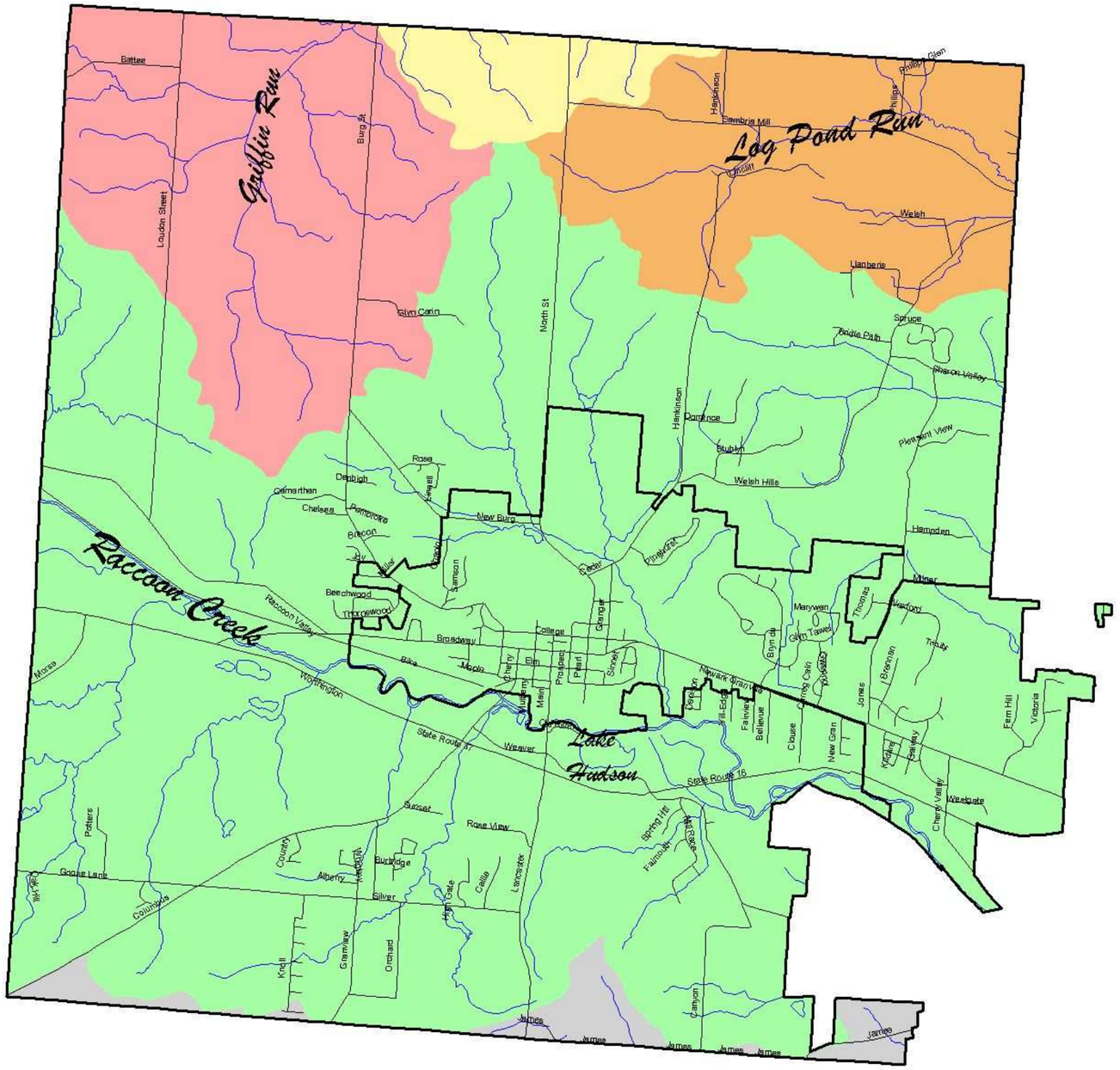
Table 3.1 Watersheds in Granville

Watershed	Size of the Watershed (Acres)	Granville's Percentage of Watershed	Percentage of Granville	Percentage of Village	Percentage of Township
Raccoon Creek	53,089	22	71	100	66
Griffin Run	2,768	83	14		16.5
Log Run	4,931	34	11		12.5
Dry Creek	7,885	5	2		3
Ramp Creek	10,690	3	2		2

Source: ODNR

Granville influences the quality and quantity of the water that flows from the Village and Township into Newark and other downstream jurisdictions. Decisions that Granville makes concerning surface water protection will affect neighboring communities far beyond its borders. Conversely, upstream communities such as Johnstown, Alexandria, and adjacent townships affect water quality and quantity issues in Granville.

Many serious resource degradation problems have developed gradually as the combined outcome of numerous actions and choices that alone may have had relatively minor impacts in watersheds. These impacts have broad spatial and temporal dimensions, resulting in the gradual alteration of structure and functioning of ecological systems, leaving fewer natural areas to provide public health and safety functions.



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Watersheds

- Raccoon Creek
- Griffin Run
- Log Run
- Dry Run
- Ramp Creek

Source:
ODNR

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Granville needs to conserve critical habitats and aquatic corridors and address areas with high risk of potential water pollution such as septic systems, hazardous waste generators, above or below ground tanks, and impervious surfaces. Watershed protection is critical to sustain the watershed services that Granville and other adjacent communities stand to lose as development occurs. The underlying cause of threats to watershed quality and health is development. To minimize these threats, Granville and adjacent communities must work at the watershed level to solve water resource problems. Granville should consider working with adjacent communities to develop watershed plans, and take the lead in developing ***a watershed plan for Raccoon Creek***. Johnstown, Alexandria, Newark, Harford Township, Monroe Township, Jersey Township, Liberty Township, At. Albans Township, and Harrison Township should be included in the effort.

Similarly, Granville Township should work with St. Albans and McKean Townships on the Griffin Run watershed; and Newark and McKean and Newark Townships on the Log Run Township. Granville Township might want to encourage Fredonia and McKean, Newton, and Liberty Townships to work on Dry Creek; and Heath and Harrison and Union Townships to work on Ramp Creek.

The watershed plan is a plan for protecting and improving the watershed. Watershed planning is unlike comprehensive planning in that it is multi-jurisdictional, makes only recommendations to communities for implementation, and does not necessarily result in land use controls. Watershed analysis makes sense as a way to understand and organize ecosystem information. The watershed is the most useful unit for land use management and conservation. It follows the way nature organizes and divides the landscape.

A watershed plan includes an inventory of the watershed resources and identifies and evaluates problems within the watershed. As with a comprehensive planning effort, Granville and adjacent communities need long-term visioning for development and redevelopment, evaluating water quality and quantity issues, and identifying priority conservation and development areas. This effort should illustrate how the path of community change can be redesigned to avoid loss of environmental services provided by natural systems, using a scientifically defensible quantitative methodology to identify the integrity and function of natural areas. The plan then details goals to protect the high quality resources and to address identified problem areas. Watershed planning initiatives should include identifying critical natural areas, key environmental issues, and preservation and restoration strategies for implementation. Granville and other communities in the watershed need to evaluate the feasibility of the various resource protection tools and to choose a realistic combination of resource protection measures to recommend for implementation.

Many government agencies and non-profits have become involved in watershed planning. The Center for Watershed Protection is a good resource to review planning and implementation that has been done. In Northeast Ohio, the Chagrin Watershed Partners has also been recognized as a leader in Ohio in watershed planning, having conducted numerous studies and developed model ordinances for their communities.

4.0 Surface Waters

Raccoon Creek.

Streams support a vast array of organisms and are important components of a number of inter-related ecological processes. It is important to protect watercourses for the following reasons:

- Stormwater runoff and flood prevention are more easily accommodated by the presence of healthy streams, thereby protecting private property from flood damage.
- Wildlife habitat can be supported – both aquatic and terrestrial – through forested buffers, and by shading water which moderates temperatures.
- Water quality is enhanced by filtering storm runoff and chemicals through forested buffers and riparian areas.
- Passive recreational opportunities are supported by natural corridors such as streams.

Community character is enhanced by preserving open space corridors and related natural features, including streams.

Watercourses are defined as any perennial, ephemeral, or intermittent stream, river, or creek with a defined bed and bank that flows through or borders a landscape. An ephemeral stream is dry except during and shortly after rain/melt events. An intermittent stream is frequently flowing but with seasonal dry periods. A perennial stream is permanently flowing.

Raccoon Creek is a moderate to high quality stream flowing through Granville, affected by nonpoint source (NPS) pollution and point source pollution. Livestock and on-site septic systems are listed by the Ohio EPA as non point source pollutants for Raccoon Creek as well the point sources of Johnstown's and Granville's waste water treatment plants (WWTP) and Owens Corning industrial discharge. The fecal coliform for Raccoon Creek exceeds numerical bacteriological criterion for primary contact waters. Water quality monitoring indicates that Log Run Dry Run have good water quality. Other streams are affected by crop production, livestock, construction, storm sewers, urban runoff, and channelization.

4.1 Water Quality

Aquatic features provide numerous valuable functions, including drinking water, habitat, and recreation, transportation, waste disposal, and other industrial uses. The federal Clean Water Act requires that each state designate the optimal feasible use and quality for each water body and watercourse. Ohio's designations represent achievable water quality/water use goals, which meet the Clean Water Act goal of restoring the "chemical, physical, and biological integrity" of the nation's waters (i.e., attaining "fishable, swimmable" waters). The Ohio Environmental Protection Agency (OEPA) uses biological monitoring and biological indices to monitor water pollution (and polluters), rank the quality of Ohio streams, and regulate various water and land use permit applications (requests to consume a natural resource). Water quality designations indicate how sensitive certain waters are to alteration and contaminants. These designations also permit certain uses that could affect water quality, such as wastewater discharges. Use designation helps resource managers identify especially sensitive waters and monitor how well water quality goals are being met.

Table 4.1 Water Quality Designations for Granville

Waterway	Ohio EPA River Code	Aquatic Life Habitat Use Designation and Attainment
Raccoon Creek	17-221	Warmwater habitat (WWH) Full, But Threatened
Ramp Creek	17-237	Warmwater habitat (WWH) Full, But Threatened

Sources: Ohio Environmental Protection Agency Division of Surface Water, Appendices to the Year 2000 Ohio Water Resource Inventory (305(b) Report), Ohio Environmental Protection Agency Division of Surface Water State of Ohio Water Quality Standards Chapter 3745-1 of the Administrative Code

Water quality designations reflect water quality goals for water bodies and watercourses. A given water quality designation does not necessarily reflect existing conditions or imply that it has been thoroughly sampled by the Ohio EPA. Some waterways receive designations by default when adequate data is lacking. ***The watercourses in Granville have warmwater habitat water (WWH) quality designations.*** Ohio EPA defines warmwater habitats *as* waters capable of supporting and maintaining a balanced, integrated, adaptive community of warmwater aquatic organisms having a species composition, diversity, and functional organization comparable to the 25th percentile for identified reference sites within each of Ohio's ecoregions.

The aquatic life use designation is one of the most important characteristics that is considered when regulatory agencies are considering permitting activities that might impact water quality. Small package wastewater treatment plants are more likely to be allowed to discharge into a WWH stream than a higher quality Exceptional Warmwater Habitat (EWH) stream. For example, a developer is more likely to be granted permits to culvert a stream with a lower use designation or one that has no designation at all.

4.2 Water Quality Monitoring

In Ohio, the Ohio EPA uses biological monitoring and biological indices to monitor water pollution (and polluters), rank the quality of streams, and regulate various water and land use permit applications (requests to consume a natural resource). Stream biota are very sensitive to habitat changes and water quality degradation and they are easily monitored.

The Ohio EPA uses biological criteria primarily to assess the effects of larger aquatic pollution sources such as industrial and wastewater treatment facilities that hold

National Pollutant Discharge Elimination System (NPDES) permits. The data can be used to assess the overall health of the waterway and identify potential problems or other trends. Adverse impacts to aquatic habitat (and thus water quality) may stem from point sources (discreet discharge points such as municipal sewage treatment systems or industries) or non-point sources (dispersed sources such as road or agricultural runoff). Having identified potential problem areas, resource managers can then begin to assess target watersheds for sources of degradation and possible solutions.

The biomonitoring reports, individually, provide accurate snapshots in time of the current condition of portions of selected waterways. Most sampling sites are chosen for their proximity to effluent dischargers. Unusual conditions such as lower/higher than average water levels, spills, or cold/heat spells occurring during the sampling season could affect scores either positively or negatively. However, when all of the indices are evaluated together using professional experience, they provide an important tool for assessing the improvement or decline of water quality over time.

A preliminary recommendation is that Granville should consider formalizing the protection of surface waters through riparian setbacks and conservation easements. ***Biomonitoring of Streams*** should follow Ohio EPA protocols and results should be compared to Warmwater, Exceptional Warmwater, and Coldwater standards. A Village and Township wide survey should focus on collecting data from streams not previously sampled by the Ohio EPA and these data should be submitted to that agency for review and possible use designation changes. Granville should implement a biomonitoring program to re-evaluate the current use designations.

The goals of water quality protection would be to provide for the preservation, proper maintenance, and use of Granville's watercourses in order to minimize or eliminate disturbance; to prevent damage from erosion, turbidity, or siltation; and to prevent a loss of beneficial aquatic organisms, wildlife, and vegetation. Monitoring would allow the identification of potentially significant water quality trends and the possible occurrence of specific violations. Ideally, the regulated parameters would include those routinely measured by the Ohio EPA so that continual monitoring occurs with no expenditure of the township's resources. Some examples include turbidity, dissolved oxygen, various nitrogen compounds, fecal coliform bacteria, physical habitat, fish communities, and aquatic insects.

4.3 NPDES Discharge Permits

National Pollution Discharge Elimination System (NPDES) permits are required for any discharge of pollutants into the waters of the United States. These permits limit the quantities of pollutants discharged in wastewater and require water quality monitoring

and reporting to ensure the discharge does not lower water quality or impact people's health. In Ohio, this permit system is administered by Ohio EPA.

NPDES permits indicate potential sources of water quality degradation. There are eleven NPDES permitted discharges in Granville. Collectively, these discharges should allow the watercourse to meet state water quality standards if the dischargers are meeting their NPDES permit requirements. Some discharges may have effects beyond the permitted constituents, e.g., temperature or nutrients, which can harm water quality or habitat. Dischargers that do not meet permit requirements may be contributing to water quality problems and will be required to improve their operations. In some cases, such as small-scale privately operated sewage treatment facilities that fail to operate correctly; alternate solutions may be required, such as connecting to a municipal sewer system. Each individual (other than general) NPDES permit specifies the constituents that may be discharged. To further investigate potential sources of water quality problems, resource managers can research the individual permit limits and permit compliance. An additional use of this information is to identify potential conflicts with water use. NPDES permits are based on the discharger having a certain volume of water to dilute the discharge. Changing the volume of the watercourse (e.g., through drought or water use) may affect the water quality and the operations or permit requirements for the discharger. For example, withdrawing water from a stream may increase the concentration of constituents on the watercourse, thereby reducing water quality.

4.4 Impaired Waters/TMDL Listed Stream Reaches

The Clean Water Act requires states to monitor the quality of their waters to determine whether they are attaining their designated uses. Waters not attaining their designated use standards are noted as "impaired," and listed in accordance with Section 303d of the Clean Water Act. Impaired waters are listed based on the likely contaminants and prioritized for Total Maximum Daily Load (TMDL) development based on the type of impairment and designated use, among other factors. The TMDL process involves intensive sampling and modeling to determine the contaminants of concern, the amounts that the stream can assimilate and still meet water quality standards, and measures to reduce pollutant loads from point or non-point sources. Because TMDL recommendations may involve major changes to land use, discharges, or stream use/characteristics, the TMDL process involves considerable public participation. Because of the labor-intensive nature of these studies, it may take many years from listing to TMDL development. Where water quality improves to the degree that the water body attains its designated use, it can be removed from the Section 303d list.

Designation of a stream for TMDL development indicates that the waterbody is not currently supporting its designated use. The TMDL list parameters usually provide some general information concerning likely sources of impairment. Resource managers

can use this information to identify likely problems within the watershed and begin to address them, improving the water quality and habitat of the watercourse or waterbody long in advance of completion of the TMDL process. Often, TMDL-listed waters are given priority for water quality improvement funding. The Licking River is on Ohio EPA's 303d list and scheduled for TMDL development.

4.5 Nonpoint Source Impacts to Water Quality

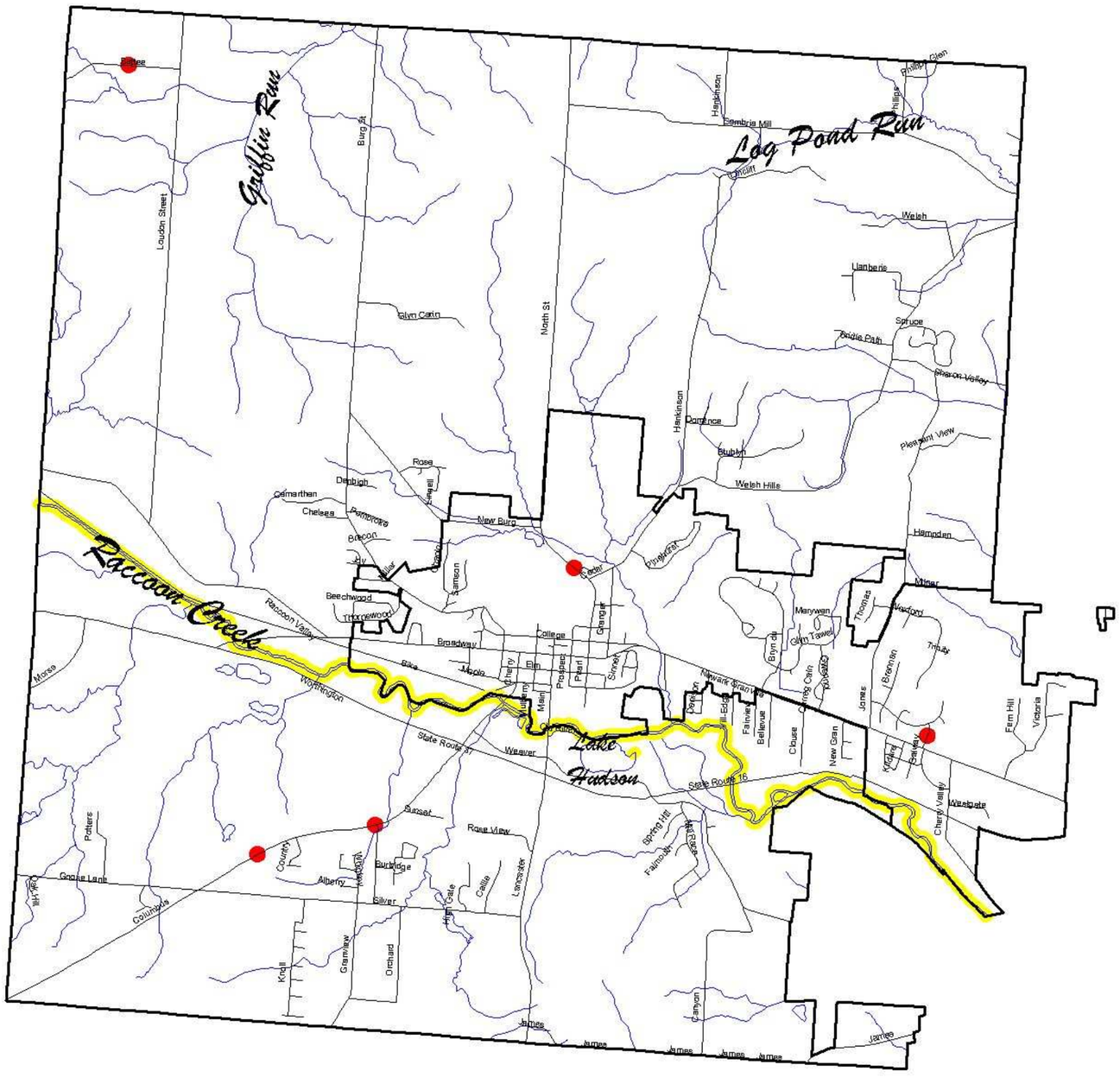
Improvements in treating point sources of pollution, such as municipal and industrial wastes, have led to major improvements in water quality. However, increases in intensive land use have occurred simultaneously. Development, urbanization, agriculture, and deforestation create a different kind of pollution known as nonpoint source (NPS) pollution. Pesticides and fertilizers, eroded sediment from developing areas, increased impervious surfaces, and urban and agricultural runoff are generally considered greater threats to water quality today than industrial and municipal waste.

Unlike point sources, NPS pollution is difficult to identify, manage, and quantify. There are no pipe or outflow sources to monitor, and it can be difficult to locate sources and the pathways these pollutants travel prior to entering downstream receiving waters. Because nonpoint source pollution can arise anywhere in a watershed, and is a direct result of land use activities and practices, growing attention is being directed toward addressing water quality issues from a watershed perspective. This approach treats streams and rivers as a part of a larger ecosystem. Water quality is reflective of the surrounding landscape and any efforts to preserve, protect, or improve the integrity of rivers, streams, and lakes should address the long-term management of watersheds

Granville should consider water quality preservation as it manages growth. To be effective, water quality protection measures should consider not only the main stem of Raccoon Creek, but minor tributary streams as well. When, minor tributary streams run through private residential or commercial properties, ***citizen education and vegetated riparian corridor zones*** are necessary to obtain long-term solutions. Sanitary wastes could be one of the prime pollution sources of Granville's streams; if not properly controlled, the wastes may threaten groundwater supplies.

Bank erosion and wandering stream channels are natural characteristics of most streams. As woodlands are cleared and land is developed, the rates at which a stream erodes is often accelerated as the stream attempts to achieve a new equilibrium with its altered watershed. In developed areas, it is often necessary to control this phenomenon to prevent property damage. The construction of retaining walls and channelization of streambanks is often employed to slow erosion, prevent flooding, and drain surrounding land. However, the natural evolution of streams will eventually undermine even the best-built retaining wall.

Channelized streams and retaining walls can be functional, but they offer little habitat to fish and other aquatic wildlife. In the past decade, a technique has emerged that seeks a balance between the needs of humanity and those of wildlife. ***Bioengineering and stream channel restoration*** is a new field that seeks to stabilize eroding streambanks, address human concerns associated with public safety issues, and still provide habitat for wildlife. Using these proven techniques, streams that were once considered poor-quality ditches can be restored to a more natural state.



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Surface Waters

(Use Designation and Attainment, NPDES, TMDL Listing)

● NPDES Permit Holders

〰 Warmwater habitat, Full Attainment But Threatened, TMDL Listed

Source:
OEPA

ES ENVIRO SCIENCE INCORPORATED

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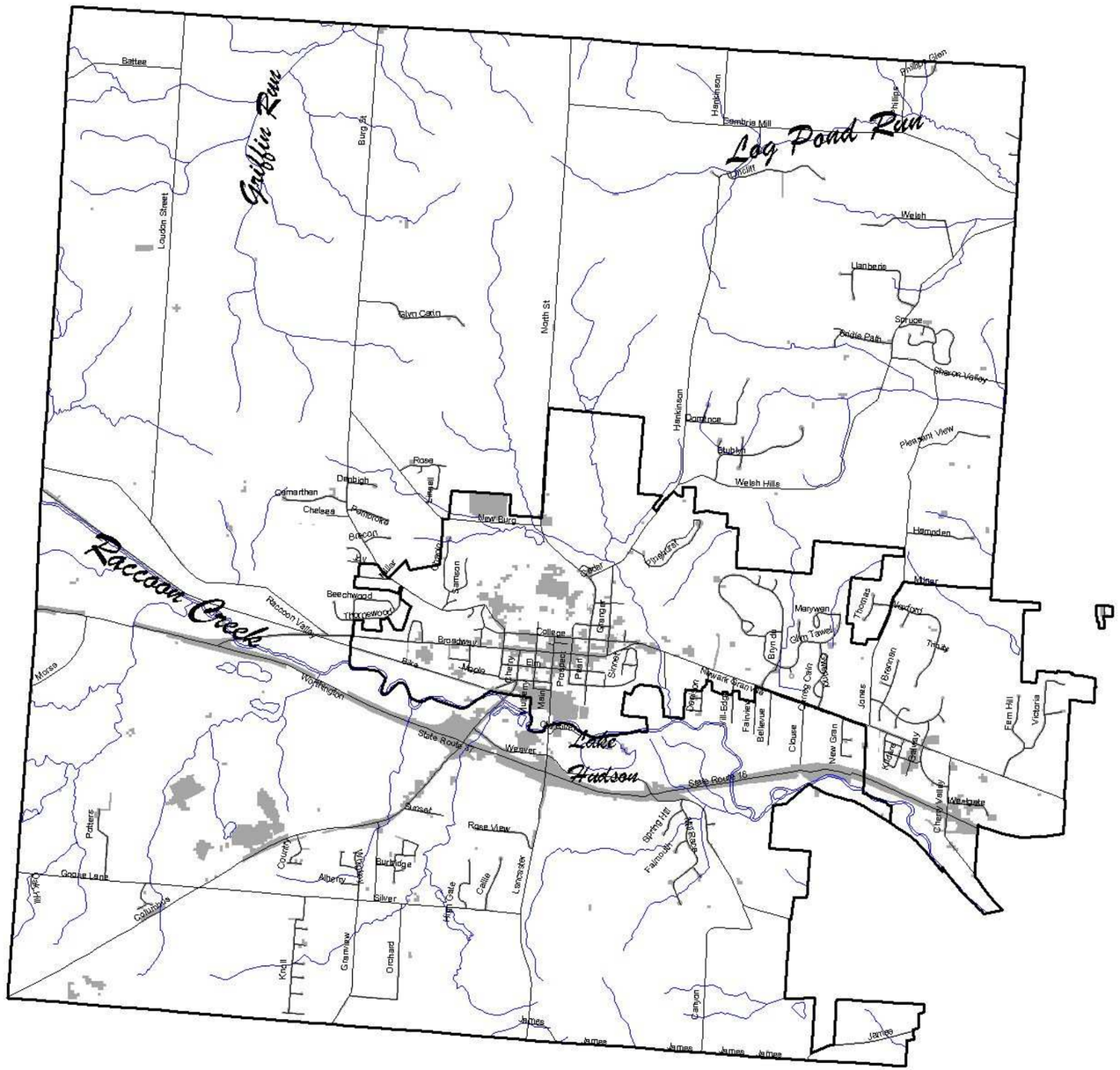
4.6 Impervious Surfaces

A land cover that negatively affects water quality and quantity is impervious surface. Impervious surfaces restrict permeability into the soil and replace natural areas that function to store and filter water. Reducing impervious surfaces ultimately prevents environmental degradation and related costs to communities. As impervious surface area increases, stormwater runoff increases. Excessive levels of stormwater runoff affect natural systems contributing to erosion, sediment loading, and stream channel alteration, greater frequency of flood events, decreased storage and drainage capacity, reduction of groundwater recharge, increased pollutant levels decreasing water quality, and degradation or destruction of habitat

To characterize this significant source of nonpoint source pollution, large areas of impervious surfaces in Granville were mapped. Areas such as parking lots, industrial areas, high density residential areas, and commercial areas were included. Small areas such as driveways and building footprints were not mapped. In general, areas larger than several acres were mapped. Many of these areas have inclusions of pervious areas, mostly lawn and landscape plantings. Percentages of impervious surfaces within these areas were estimated based on visual inspection. The following figure shows impervious surfaces in Granville. However, building footprints, driveways and rooftops need to be calculated. Water quality problems set in between 10 and 15 percent imperviousness.

Limiting impervious surface area serves to reduce storm water runoff volume. The greater the area of impervious surfaces, the more runoff will occur, carrying water downstream and out of Granville. To the extent possible, Granville should encourage the occurrence of *run-on*. Runoff is defined as the direction of storm water flow from pervious cover to impervious cover (for example, sloping lawn to paved road); whereas, run-on can be defined as the flow of storm water from impervious cover to pervious cover. If sites are graded to produce run-on, water is much more likely to infiltrate the soil and reduce storm water runoff. Some examples of run-on include: rooftop discharge that travels through downspouts and across grassed yards, road drainage that is directed into swales rather than curbs and gutters, small parking lots that drain into forests or fields, and isolated sidewalks and bike paths.



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Impervious Surfaces

Source:
ODNR
Aerial Photography

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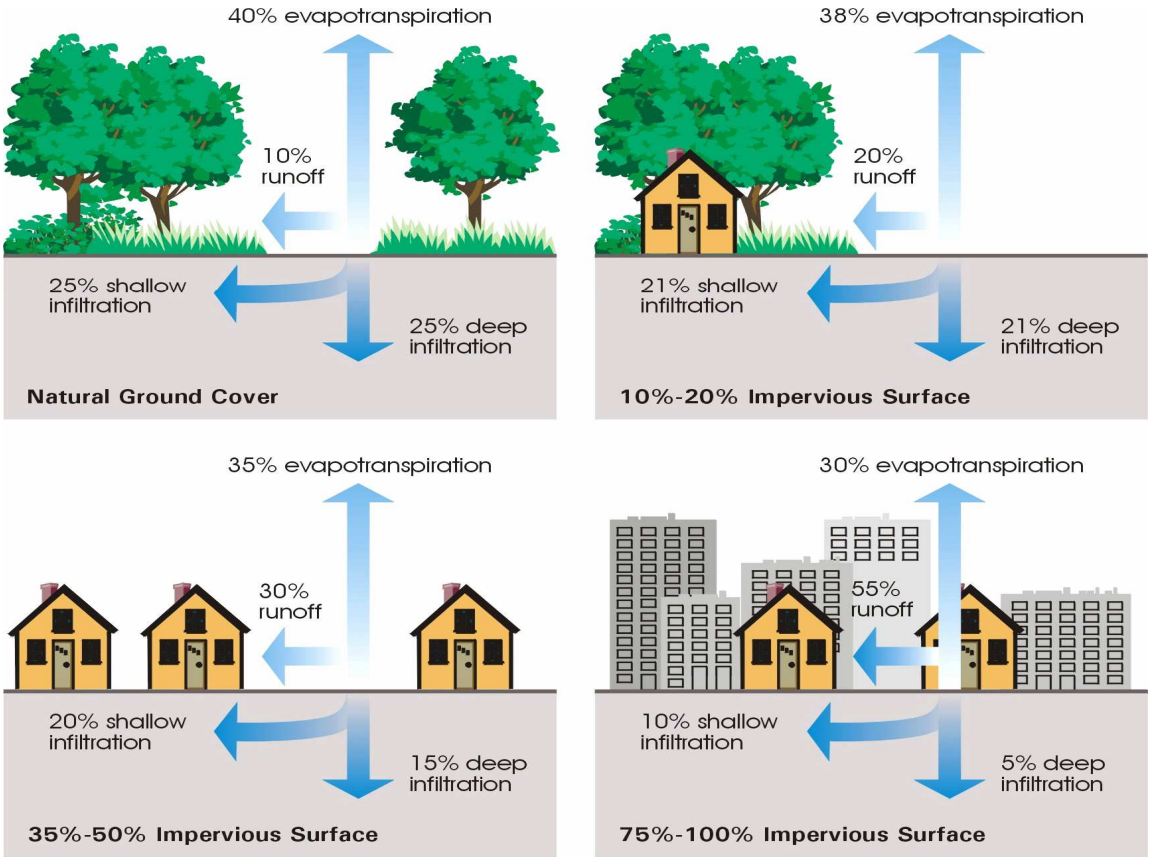


Source: CRWP

With the new Storm Water Phase II Regulations and Plans required by the U.S. EPA, Granville should be encouraging new approaches to engineering in terms of site design, detention standards, water quality practices, and stream and floodplain access. U.S. EPA is looking for communities to retain existing stream functions, prevent typical urban problems (i.e., flooding, increased pollutants, unusable channels, etc.), save money by preventing problems, and protect community health and aesthetics. They want to improve retention and detention practices to better address flooding, water quality, habitat, and recharge. Storm Water Management Plans (SWMP) are to include six minimum control measures:

- Public education and outreach
- Public involvement and participation
- Illicit discharge detection and elimination
- Construction site runoff control
- Post construction runoff control
- Best management practices (BMPs)

The development of a SWMP plan and its implementation could be funded through some sort of local cost sharing such as storm water utilities or charging property owners based on impervious surfaces (an average of $3 per equivalent residential unit). It is recommended that Granville consider giving credits based on wetlands, woodlands, and vegetated riparian areas.

In addition, limiting the amount of impervious surfaces in groundwater recharge areas is an effective way to preserve groundwater supplies, especially during times of drought. Groundwater recharge is the replenishment of groundwater sources by seepage of precipitation, surface water, and runoff. The maintenance of mature vegetation (preferably large, native tree species) on recharge areas also preserves and protects groundwater quality and quantity. The groundwater recharge potential of an area is a key issue that Granville should consider when making future land-use determinations. Granville should identify significant recharge areas and should also take measures to assure the preservation of mature vegetation within them.

Conventional

LID

Source: USEPA

An effective ***low impact development*** (LID) approach to land use regulation provides flexible performance-based goals and design criteria where innovative management practices and site planning techniques can be incorporated to compensate for development disturbance. LID components include: infrastructure, stormwater management, grading, natural resources protection, and site layout.

In shaping land use in relation to natural resources at the site level, an important technique to minimize runoff and downstream flooding and better manage drainage is to use LID principles of design. This includes using layout principles that preserve and protect natural features, reduce the discharge from impervious surfaces into surface waters, reduces sedimentation, and treats stormwater on-site for volume and contaminants. Where possible, natural features should be used to store stormwater.

The objectives of LID Principles are:

- Runoff reduction
- Groundwater recharge
- Volume control
- Stream protection
- Water quality enhancement

The five basic steps include:

- *Conservation of existing natural areas through land use planning*
- *Minimizing disturbance* - minimize clearing and grading, preserve permeable soils, use alternate surfaces, disconnect roof drains, minimize use of drainpipe.
- *Strategic timing of stormwater release* – use open drainage, maximize flow over vegetated land before water enters stream or other channels, determine best use of detention time based on position in watershed to minimize peak flows.
- *Integration of management practices*: *storage, detention, and infiltration* – use open drainage, depressions for storage and infiltration (could be rain gardens), smaller pipes and culverts to allow ponding, rooftop storage.
- *Preventing pollution in the watershed* - use erosion control and stormwater best management practices pre- and post-development, including good site housekeeping, chemical storage, spill control, and pavement sweeping.

The Watershed Management Institute's *Stormwater Operation and Maintenance* is also a good reference for stormwater management.

Stormwater management should:

- Reduce impervious surfaces to allow absorption of storm runoff
- Place a percentage limit on impervious surfaces
- Provide incentives for more pervious surfaces
- Encourage porous/permeable pavement materials
- Incorporate bio-retention areas and dense vegetated buffer strips in parking lots and other landscaped traffic islands.
- Slow and infiltrate stormwater
- Use vegetated open channels & natural features
- Utilize pond/wetlands cisterns
- Direct rooftop run-off to pervious, bioretention areas
- Require erosion & spill control
- Protect/maximize natural drainage flows with strategic timing of stormwater release
- Require stream bank stabilization
- Encourage stream buffers
- Require native ground cover to absorb run-off
- Require street sweeping

Granville should consider the following:

- Reduce impervious surfaces to allow absorption of storm runoff and reduce runoff volume
- Limiting impervious surfaces to 10% in low density residential areas and 30% in commercial areas and high density residential development is recommended.
- Provide incentives for more high quality pervious surfaces
- Concentrate runoff where it can be most effectively treated; meadows, woodlands, wetlands, ponds, bioretention areas, etc., or use a combination of these elements to divert stormwater through series of these diverse landscapes to simulate a natural treatment process.
- Adopt erosion and sediment control BMP's in local regulations and reference them in zoning regulations.

Granville could discourage rooftop downspouts from connection to roadway and stormwater collection systems, instead directing rooftop runoff to selected pervious areas in yards or vegetated areas. Formal landscaping with native species should be encouraged close to homes and buildings.

In addition, site design should consider imperviousness of adjacent land and where necessary, locate and design open space to compensate for external impact.

These LID principles should be incorporated into zoning, subdivision, and stormwater requirements to encourage development that protects the public health and safety benefits provided by natural systems, minimizes infrastructure costs, protects and increases property values, preserves important natural resources, and improves the quality of life.

5.0 Topography and Steep Slopes

Another part of looking at the characteristics of the watershed is looking at the topography. The following figure shows topography.

Vegetated steep slopes are an important resource to be preserved because any significant disturbance to the hillside's environment may result in: landslides or land instability; unacceptable alteration in the drainage patterns; and loss of scenic value. When development takes place on or near steep slopes, vegetative cover is greatly reduced. Loss of this vegetative cover on steep terrain significantly increases soil instability, and thus the risk of erosion. Soil erosion and sedimentation into waterways poses several threats to public health and safety, which are difficult and expensive to correct. Property damage is commonly associated with development on steep slopes. Soil erosion and sedimentation into nearby waters increase the potential for flooding.

When development takes place on steep slopes, vegetative cover is greatly reduced. Loss of this vegetative cover on steep terrain significantly increases soil instability, and thus the risk of erosion. Soil erosion and sedimentation into waterways poses several threats to public health and safety, which are difficult and expensive to correct. Property damage is commonly associated with development on steep slopes. Soil erosion and sedimentation into nearby waters increase the potential for flooding.

For these reasons, steep slopes along stream valleys should be maintained with a vegetative cover to prevent soil loss and siltation. Clearing and grading of forests and natural vegetation on slopes over 30% should be prohibited and on slopes over 12% should be avoided and permitted only conditionally. The need to protect these slopes is site specific. It should be subject to criteria based on percent slope, the length of that percent slope, soil erodibility, percent of vegetation, and proximity to streams or wetlands.

This protection should focus on influencing the design of new subdivisions and the location of soil disturbing activities. Depending on the site, mitigation plans should be conducted to describe proposed additional protective measures. The maximum retention of natural topographical features such as natural drainage swales, slope ridge lines, and trees and other natural plant formations should be encouraged.

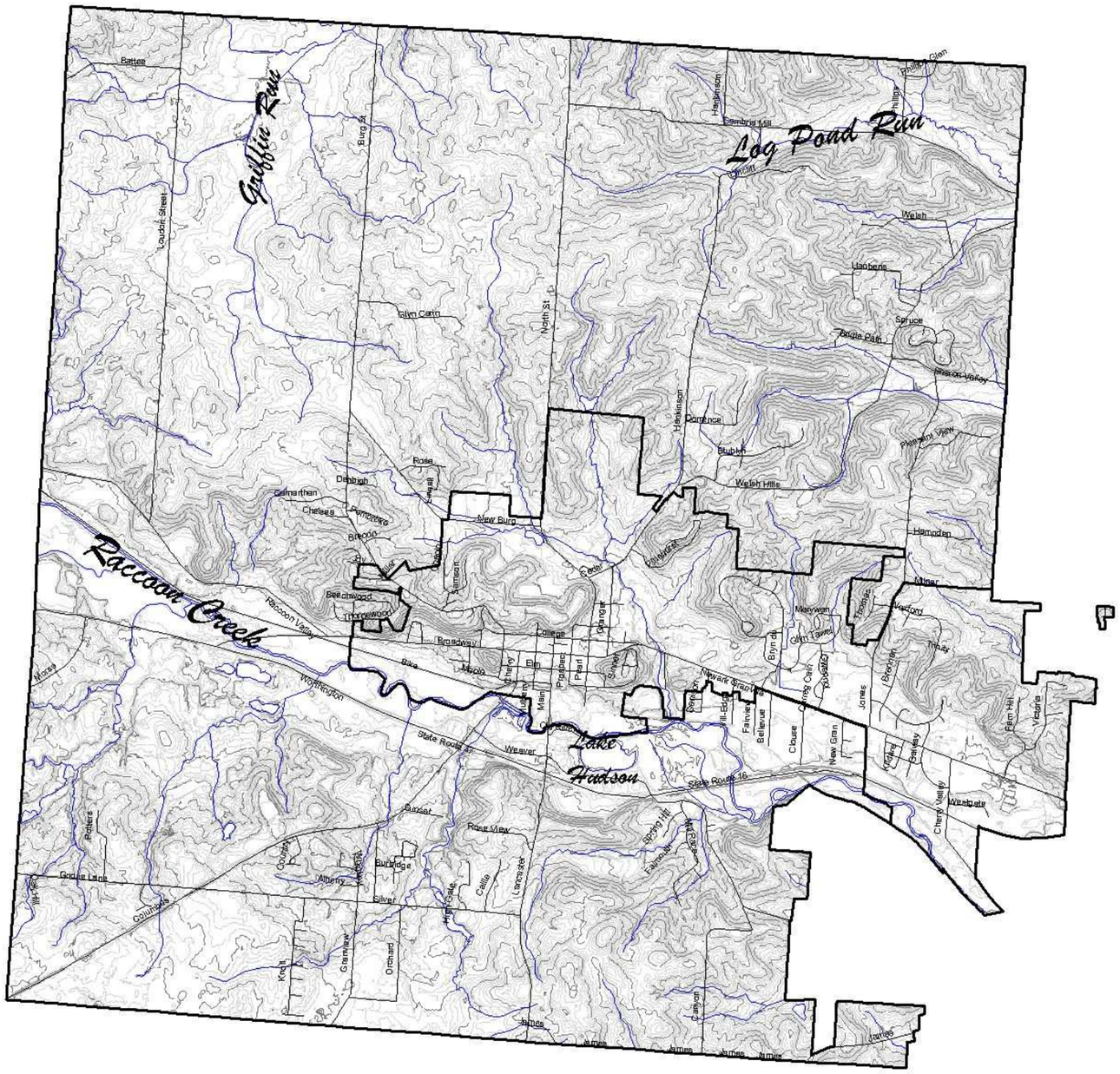
Steep slope protection will conserve and promote public health and safety by minimizing problems due to water runoff and soil erosion incurred in adjustments of topography to meet developmental needs. In addition to public health and safety concerns, protecting steep slopes preserves the unique scenic resources and habitats of Granville.

One approach to dealing with the problem of development on steep slopes is to simply make any construction of a principal use on property with natural slopes greater than 12% a conditional use through local zoning. Conditional use approval could be predicated on the applicant demonstrating that concern over both environmental and structural issues are addressed.

Evidence that structural issues are adequately addressed could include the requirement that the applicant provide foundation plans approved by a Professional Engineer. This would verify that the foundation and structure will be stable and will not slide down to adjacent property. Most professional engineers would not approve such foundation plans without the benefit of some type of geo-technical evaluation of each building site.

Local zoning should require evidence that erosion and sedimentation issues are addressed. This could include imposing the requirement that a Storm Water Pollution Prevention Plan (SWPPP) be submitted when construction of a principal use on slopes greater than 12% is proposed.

Granville should consider adopting steep slope protection. A model resolution is provided in Appendix A



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Topography

Source:
Licking County

2000 0 2000 4000 6000 8000 10000 Feet

6.0 Floodplains

Floodplains are the areas adjacent to rivers and streams that are subject to periodic or regular flooding. They are defined by designated recurrence intervals at which a storm of a given magnitude could occur. For example, the 100-year flood has a one-in-one-hundred chance of occurring in any given year. Due to periodic scouring of the areas, floodplains are very unstable and potentially dangerous areas for human use; however, they form a unique ecological niche, and support biotic communities that are adapted for occasional inundation. Floodplain wetlands absorb large volumes of water during high flows, reducing local flooding and delaying the release of water downstream.

Floodplains support a diverse assemblage of plant and animal life. In addition, they serve an important role in water quality protection, since stream bank vegetation can filter pollutants from runoff before they enter a waterway. In some instances, the established riparian zone, or the land adjacent to the stream, extends beyond or does not have a mapped 100-year floodplain boundary.

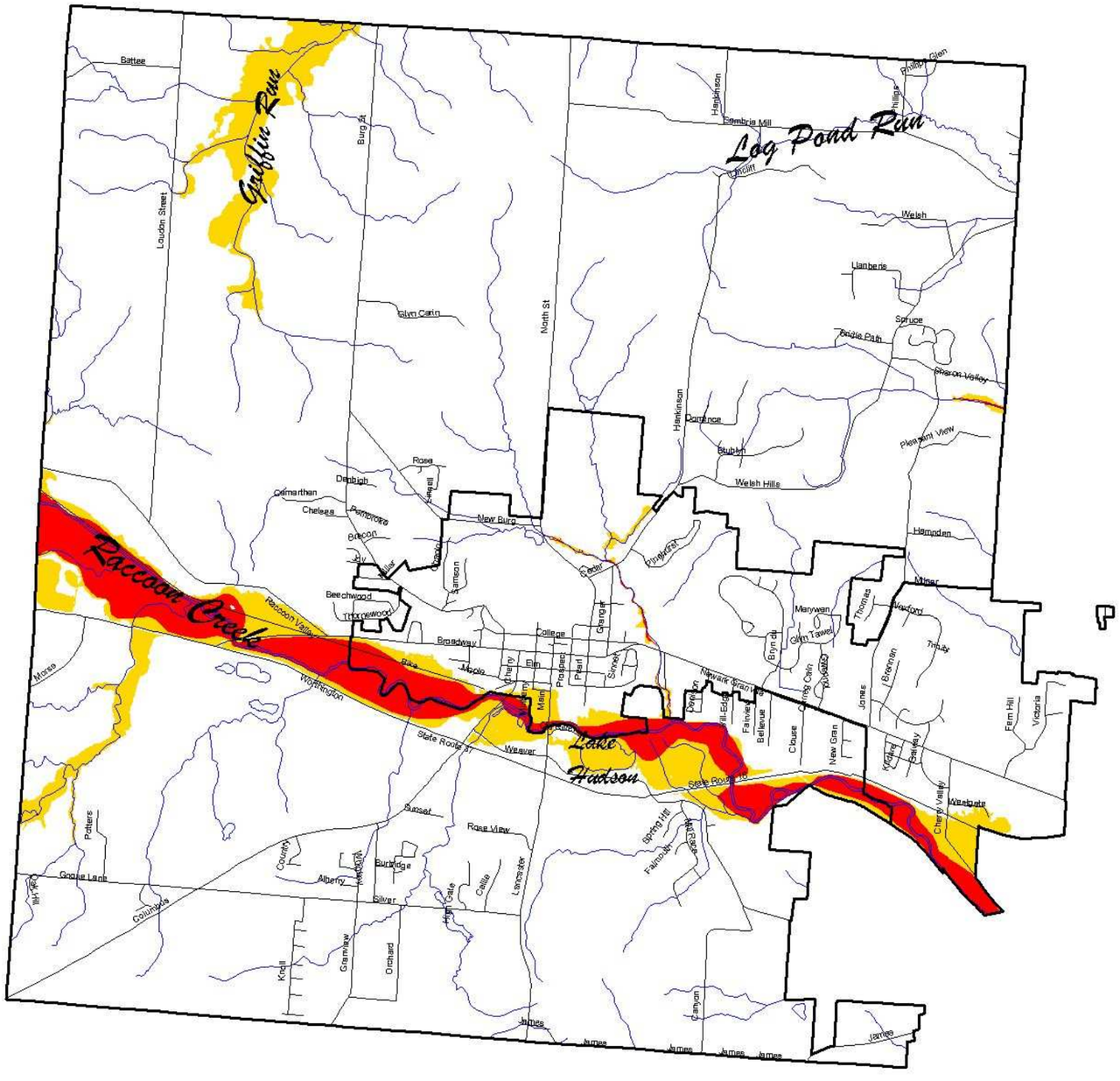
According to the Federal Emergency Management Agency (FEMA) floodplain, eight percent of Granville lies within the flood hazard zone (ten percent of the Village and seven percent of the Township) and three percent in the floodway (less than one percent of the Village and three percent of the Township) along Raccoon Creek. FEMA commissions modeling and mapping of the flood hazard areas for the major storms. The floodplain map gives a general location of the floodplains and represents areas most likely to flood during the most severe storms. Flood insurance rates paid by property owners are based on risk level as determined by their location relative to floodplains and floodways. The Village of Granville restricts development in these areas to reduce the risk of flood damage and to preserve their flood-storage capacity. Communities are required to develop appropriate standards for development in floodplains and floodways, and may restrict development there, to minimize safety hazards and preserve flood storage capacity.

Development in the floodplain, or even within the watershed, may change flooding characteristics. In addition, it should be noted that the FEMA map is a modest representation of where flooding is likely to occur. Therefore, it is important to protect all lands adjacent to watercourses.

Flooding is an important function of streams and water bodies. Areas that flood upstream in the watershed actually protect properties downstream, in addition to providing important habitat, groundwater recharge, and sediment deposition areas. Flooding occurs in the context of water traveling through a watershed. Flooding in the middle or lower reaches of a watershed may be influenced by factors well upstream, including soil permeability, slope, stream channel, land use, vegetative cover, wetlands, and obstructions. Problems arise where flooding conflicts with and threatens land use.

Factors influencing flooding include ground permeability/imperviousness, slope, and the presence of flood-mitigating factors. Flooding is increased where storm water runs directly off the land and into streams, as with impermeable soils, development, and unvegetated steep slopes. Flooding is reduced by the presence of woods, wetlands, and permeable soils.

It is a preliminary recommendation that Granville protect its floodplains through riparian setbacks and overlays.



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Floodplains

Floodway
Flood Hazard

Source:
ODNR

2000 0 2000 4000 6000 8000 10000 Feet

7.0 Wetlands

Emergent cattail marsh.

Wetlands are transitional vegetation communities between deepwater aquatic habitats and terrestrial communities. Wetlands are defined as: those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

According to the accepted methods contained in the Army Corps of Engineers Wetland Delineation Manual (1987), wetlands are delineated based upon three parameters: a predominance of hydrophytic (water loving) vegetation, wetlands hydrology, and hydric soils. These factors are discussed in more detail later in this section.

To date, the State of Ohio has lost over 90% of its original wetlands and significant wetland acreage has been lost or degraded in Ohio due to draining, dredging, filling, excavating, and other acts.

The wetlands in Granville, as depicted on the 1995 National Wetlands Inventory (NWI), are shown on Figure 7.1 and Table 7.1. Granville's wetlands comprise about 233 acres as identified on the NWI maps, or less then one percent of the Village and Township.

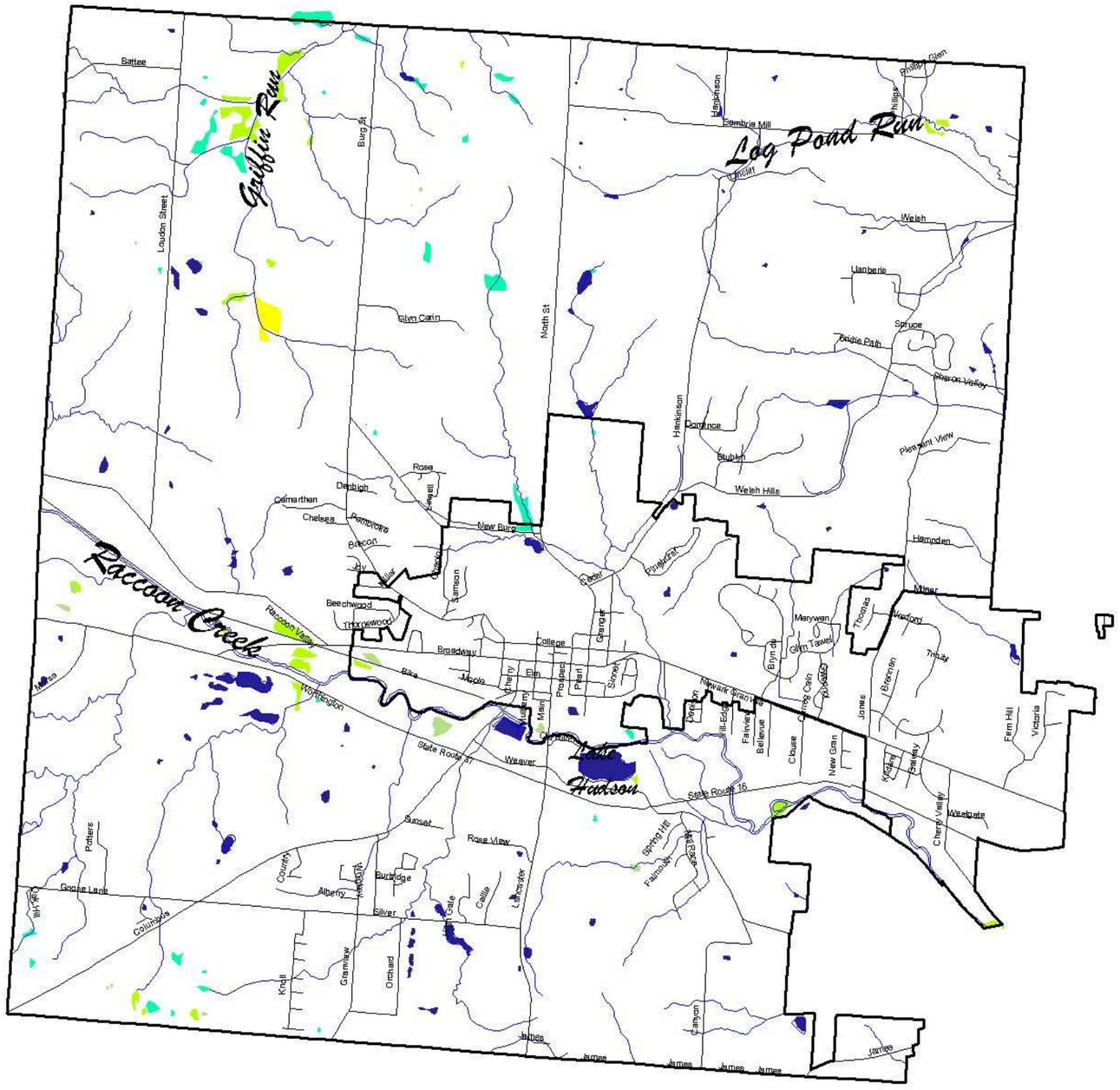
Table 7.1: Wetlands Types Found in Granville (National Wetlands Inventory)

Wetlands code	Wetlands Type	Total Approximate Acreage	Village Approximate Acreage	Township Approximate Acreage
PEM	Marsh	64	1	63
PFO	Forested Wetlands	60	1	59
PSS	Scrub/shrub Wetlands	12	3	9
PUB	Ponds	109	7	102
TOTAL		245	15	233

Most of the wetlands in Granville are dominated by PUB wetlands and these include open water bodies such as ponds, lakes, and reservoirs which can have an abundance of aquatic macrophytes (e.g., pondweed, coontail, duckweed). PEM wetlands are marshes or wet meadows with emergent vegetation like cattails, grasses, and sedges. PFO are wooded areas having saturated soils and tree and shrub species such as willows, elms, red maple, ash, viburnums, dogwoods, and a herbaceous layer such as skunk cabbage or jewelweed. PSS are wetlands having mostly scrub-shrub vegetation such as buttonbush, swamp rose, viburnums, and dogwoods.

The National Wetlands Inventory is based on analysis of aerial imagery. The wetlands identified on the U.S. Fish and Wildlife Service National Wetlands Inventory presents a fairly accurate representation of existing wetlands, but many wet meadows, lowland woods, and small vernal pools are not discernible with this methodology. The occurrence of wetlands often coincides with the presence of hydric soils and non-hydric soils with hydric inclusions. Wetlands are delineated based on the presence of hydric soils, wetlands hydrology, and the dominance of hydrophytic vegetation. Hydric soils and non-hydric soils with hydric inclusions, as identified in the *Soil Survey of Licking County*, *Ohio* were also mapped as part of the study. Assuming the presence of other wetlands that are too small to be mapped by the Inventory, probably no more than one to two percent of Granville's land area is wetlands.

Ground truthing is needed to more accurately determine the location of wetlands. These mapped wetlands may well represent only a portion of the total amount of wetlands within Granville. This mapping should be considered an approximation of wetlands locations and sizes within the Village and Township. It is intended for planning purposes to give Granville an idea of where wetlands might be; however, it should never be used as a substitute for a wetlands delineation.



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Wetlands

- Marsh
- Forested Wetlands
- Scrub/shrub Wetlands
- Ponds

Source:
NWI

2000 0 2000 4000 6000 8000 10000 Feet

Wetlands provide valuable environmental functions and social benefits that include filtration and purification of water, flood storage, ground water recharge, supporting diverse communities of flora and fauna, and recreation (hunting and fishing) and commercial use (fur and fish harvesting).

7.1 Regulated Wetlands

In Ohio, all wetlands and other waters are regulated by either Army Corps or Ohio EPA. Since the 2001 SWANCC vs. USACE Supreme Court ruling, the Corps only has jurisdiction of wetlands and other waters connected to the surface tributary system of navigable waters. Recently Supreme Court cases (Rapanos vs. USACE, Carabel vs. USACE) have tested the definition of hydrologic connections to navigable water. The June 2006 Supreme Court decision could lead to significant changes in the Corps's jurisdiction and the definition of hydrologic connection; however, the implications of this split decision remain to be seen. The Ohio EPA has jurisdiction over water quality in all wetlands (isolated & connected) and fills in isolated wetlands.

The formal determination of a wetland is based on 1987 *Corps of Engineers Wetlands Delineation Manual.* The manual uses three characteristics:

- Vegetation
- Hydrology
- Soils

All three parameters must reflect wetland conditions.

To meet the criteria of wetland vegetation, the majority of the dominant plants within the community must be well-suited to wet or poorly drained soils (hydrophytic). These plants have the ability to grow, effectively compete, reproduce and/or persist in anaerobic (low oxygen) soil conditions. They must have indicators of sustained inundation or saturation (>5% of the growing season).

For the hydrology, indicators include:

- Persistent soil saturation
- Watermarks on trees
- Water stained (blackened) leaves
- Sediment deposits (from high water)

Wetlands can be *seasonally* flooded or saturated.

With soils, the root zone must contain indicators of hydric (or anaerobic) conditions. Wetland soil indicators include:

- Organic (peat or muck) soils
- Gley (grey) or low-chroma (black-white) colors; often mixed with orange mottles
- Hydric soil from NRCS soil survey
- Sulfidic odor

Wetlands are placed into four primary classes:

- Aquatic beds
- Emergent
- Scrub shrub
- Forested

Larger wetlands can consist of more than one class.

Aquatic beds are areas of floating or submergent vegetation, usually at the periphery of large water bodies. Common plants include water lilies.

Emergent wetlands are areas dominated by erect herbaceous vegetation. Common plants include cattail, rice cutgrass, and reed canary grass.

Scrub shrub wetlands are areas dominated by woody vegetation less than 20 feet tall. Common plants include northern arrowwood, steeplebush, willows, buttonbush, and red dogwoods.

Forested wetlands are areas dominated by woody vegetation more than 20 feet tall. Common plants include American elm, pin oak, red maple, and silver maple. These wetlands are often dry in the summer.

As mentioned, wetlands protect the public health and safety of residents by:

- Reducing peak flood flows, storing flood waters, and maintaining stream flow patterns.
- Minimizing streambank erosion by reducing runoff volume and velocity.
- Protecting ground water quality by filtering pollutants from storm water runoff.
- Recharging groundwater reserves.
- Maintaining surface water quality by minimizing sediment pollution from streambank erosion, and trapping sediments, chemicals, salts, and other pollutants from flood waters and storm water runoff, and,
- Providing habitat for aquatic and terrestrial organisms, many of which are on Ohio's endangered and/or threatened species listings.

Wetlands cannot continue to provide these functions unless protected from the effects of fluctuations in storm water flow; urban pollutants; disposal of fill or dredged materials; and other impacts of land use change. Furthermore, the replacement of the public health and safety benefits of wetlands including flood control, erosion control, ground water recharge, and water quality protection, if possible, will require significant public expenditure.

Because wetlands hold exceptional environmental value, Federal law regulates the discharge of dredged or fill material into waters of the United States, including wetlands. These regulations are found under Sections 401 and 404 of the Clean Water Act.

7.2 ASSESSING WETLANDS

Wetland functional quality in Ohio is usually assessed using the ***Ohio Rapid Assessment*** *Method* for Wetlands (ORAM), developed by the Ohio EPA. The current version of ORAM is v. 5.0 which uses six metrics to place wetland systems into one of three functional categories.

ORAM metrics include:

- Wetland Size
- Upland Buffers and Surrounding Land Use
- Hydrology
- Habitat Alteration and Development
- Special Wetlands
- Plant communities, interspersion, microtopography

Category 1 wetlands are the lowest quality wetlands. These wetlands support minimal wildlife habitat and minimal hydrological and recreational functions. They are usually disturbed or dominated by invasive plant species.

Category 2 wetlands are moderate quality. They support moderate wildlife habitat and moderate hydrological and recreational functions and usually consists of predominately native plant species. These wetlands may be recovering from past disturbances.

Category 3 wetlands are the highest quality wetlands. These wetlands support exceptional wildlife habitat and exceptional hydrological and recreational functions. They are usually highly diverse or unique systems and may contain threatened or endangered species.

The scoring boundaries are based on breakpoints developed by the Ohio EPA. The current version is located online at http://www.epa.state.oh.us/dsw/401/oram50sc.pdf

Table 7.2 ORAM Categories

ORAM v. 5.0 Score	Category
0-29.9	1
30-34.9	1 or 2 gray zone
35-44.9	Modified 2
45-59.9	2
60-64.9	2 or 3 gray zone
65-100	3

Because development in wetlands and streams is sometimes necessary, the Army Corps and Ohio EPA have developed a permit system to allow limited development and protect the resources. The goal is a no net loss of functions, and modifications are considered impacts on a case-by case basis. Permitting varies from simple process to detailed document preparation and coordination. Complexity is usually determined by the amount of impact. Permits, which should be obtained prior to any construction activity, include:

- Section 404 Permit (Corps)
- 401 Water Quality Certification (Corps & Ohio EPA)
- Isolated Wetlands Permit (Ohio EPA)

Nationwide 404 Permit (Corps) are for common activities on less than a half an acre. These take six to eight months; and 401 Certification is granted automatically if conditions are met.

Individual 404 Permits are for areas greater than a half acre, lengths over 200 linear feet of stream, or Category 3 wetlands. These permits require 401 Water Quality Certification from Ohio EPA, and take 12 to 24 months.

Most wetlands fills will require some form of mitigation. Mitigation is the creation and/or restoration of wetlands to replace wetlands that are lost to development. The ORAM assessments of the function and quality of wetlands is required in order to determine the appropriate level of mitigation that should be required.

Current wetlands regulations do not require that buffer zones be maintained around preserved wetlands. To protect wetlands, Granville could enact legislation to establish ***wetland setbacks*** of its remaining wetlands. A model resolution is provided in Appendix A. Wetland setbacks are recommended as part of a community's management program for flood control, erosion control, ground water recharge, and water quality protection.

Wetlands regulations can also be combined into one or more general conservation or sensitive lands zoning districts. The purpose is to preserve and protect existing wetlands from degradation and environmental damage, to restore the quality of

degraded and damaged wetlands, and to plan and control development around wetlands with acceptable levels of quality and ecological character.

The model in Appendix A outlines setbacks based on the integrity of the wetlands. When wetlands are scarce in a drainage basin, the low quality Category 1 wetlands still provide valid public health and safety, as well as water quality and quantity functions. The wetlands sample language outlines setbacks for low quality wetlands in watersheds where wetlands compose less than two percent of the land cover. This standard is based on surface runoff infiltration. A 75 foot setback is recommended for Category 2 wetlands and for protected Category 1 wetlands. The setback is increased to 120 feet for Category 3 and forested wetlands. These setbacks are intended to be used in conjunction with conservation development so that the protected area serves also as the open space dedication. A reduction in the setbacks should avoided and should never be less than 50 feet, according to the Ohio EPA.

Granville could also adopt a policy of no net loss of wetlands within the Village, Township and Raccoon Creek watershed for mitigation required when destroying wetlands. Wetlands regulations can be combined into one or more general conservation or sensitive lands zone districts. The purpose is to preserve and protect existing wetlands from degradation and environmental damage, to restore the quality of degraded and damaged wetlands, and to plan and control development around wetlands with acceptable levels of quality and ecological character.

8.0 Hydric Soils

The presence of wetlands often coincides with the occurrence of hydric soils and non-hydric soils with hydric inclusions. Wetlands are delineated based on hydric soils, the presence of wetlands hydrology, and the dominance of hydrophytic vegetation. Hydric soils, as identified in the Soil Survey of Licking County, were also used as part of the study.

Hydric soils are formed over time under conditions of inundation and/or saturation. The soils will retain hydric characteristics even after draining; therefore, areas having hydric soils are often more extensive than the associated wetlands. Drainage can be a result of land use, such as tiling and dredging of stream channels, or natural causes such as the natural down cutting of stream channels over long periods of time. Some non-hydric soils contain small wetlands and "inclusions" of associated hydric soils in depressions, along drainage ways, and in other areas, that are too small for mapping on the soil survey maps.

Table 8.1 Hydric Soils in Granville

Hydric Soil	Percentage of Granville	Percentage of Village	Percentage of Township
Hydric Soils	7	2	8
Non hydric Soils with Hydric Inclusions	38	43	37

Source: Soil Survey of Licking County

8% of Granville has hydric soils and 37% has non-hydric soils with hydric inclusions. These soils are non-hydric, but can have small hydric soils in depressions, along drainage ways, and in other areas. Hydric soils are generally limited to areas along larger streams and drainage ways, and generally correspond with wetlands areas. Non-hydric soils with hydric inclusions are scattered throughout the Village, especially on the relatively level, higher ground above the streams. Small, isolated wetlands can be expected to occur in these areas.

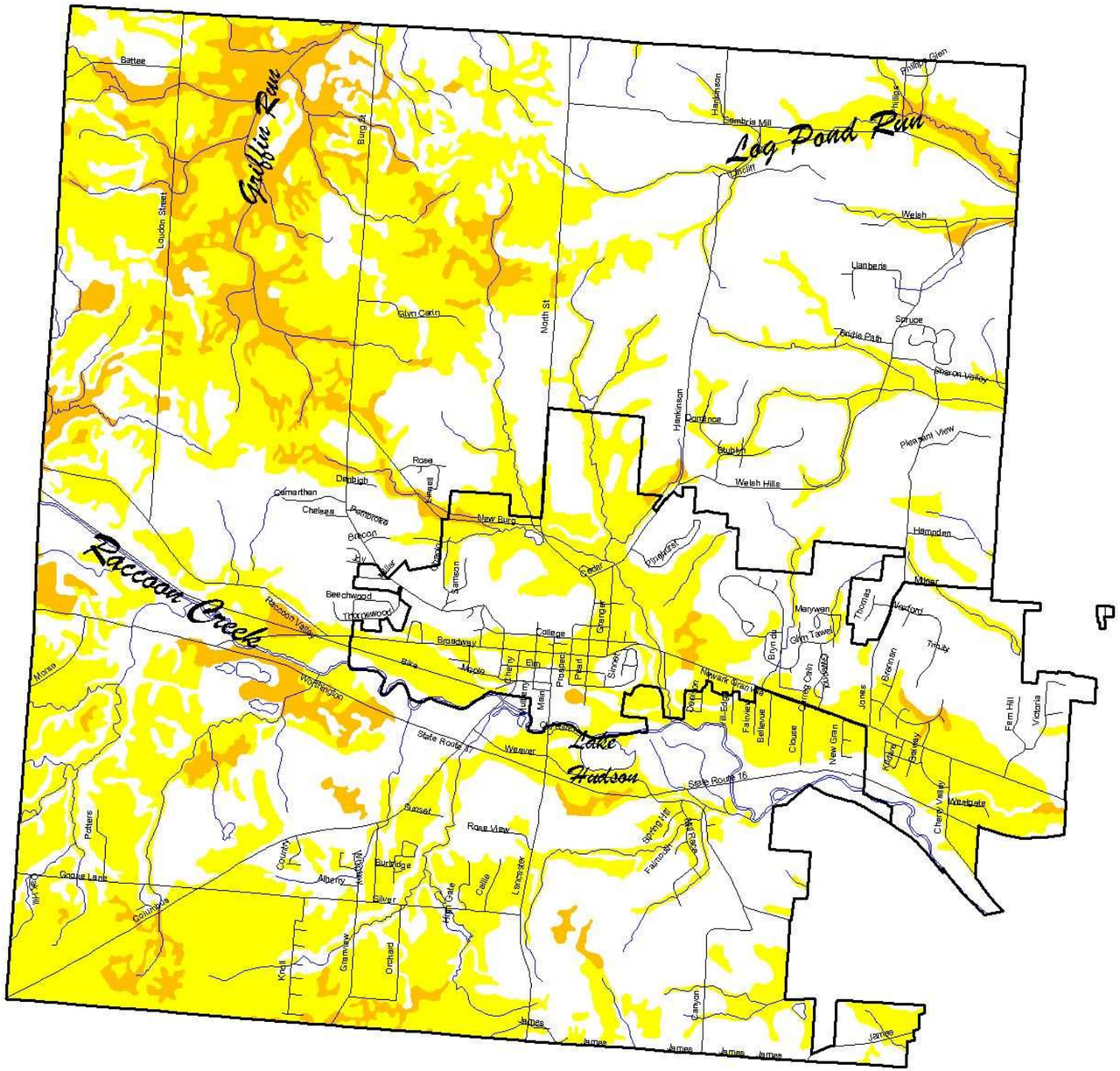
Hydric soils and non-hydric soils with hydric inclusions are often not suitable for building because of stability concerns, frequent association with wetlands, permeability characteristics that preclude septic tank use, and other septic system problems. Hydric soils affect development by their poor drainage. These soils can be developed if proper drainage is provided. Ditching and tiling are usually necessary. Most of these soils will pond surface water, so proper grading is also important. Heavy clay soils tend to swell when wet and shrink during dry periods. This can result in cracks and settling in foundations and concrete

roads and driveways. Hydric soils and non-hydric soils with hydric inclusions are often not suitable for building due to stability concerns, permeability characteristics that preclude septic tank use, frequent association with wetlands, and septic system problems. Soils that are poorly drained or that have high water tables are usually unsuitable for septic systems.

Hydric soils affect development by their poor drainage. Hydric soils are poorly drained and very poorly drained soils. These soils can be developed if proper drainage is provided. Ditching and tiling are usually necessary. Most of these soils will pond surface water, so proper grading is also important. Heavy clay soils tend to swell when wet and shrink during dry periods. This can result in cracks and settling in foundations and concrete roads and driveways.

Hydric soils are often found in the lowest landscape positions in conjunction with wetlands and are thus prone to flooding. These soils tend to collect and pond runoff from adjacent areas due to their poorly drained nature, thus compounding the flooding problem.

It is recommended that Granville require specific soils information as part of the development review process.



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Hydric Soils

Hydric Soils
Non-hydric Soils
with Hydric Inclusions

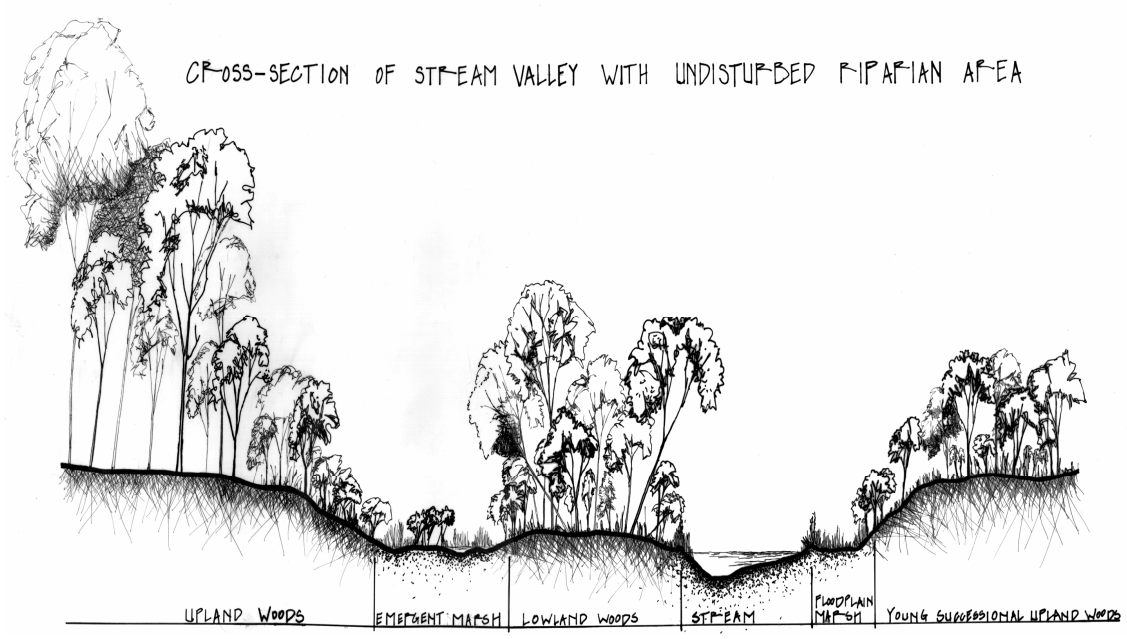
Source:
Soil Survey

2000 0 2000 4000 6000 8000 10000 Feet

9.0 Riparian Corridors

Riparian corridors include stream banks and associated areas adjacent to a flowing waterway. When vegetated, riparian areas function as stream buffer zones. There are many benefits of stream bank setbacks, including the protection from erosion. In addition, vegetative setbacks filter water pollutants (toxic chemicals, nutrients, and sediment) from runoff entering streams. They also function to prevent stream warming, and provide food, cover, and habitat structure for wildlife. The linear corridors provided by stream bank setbacks enhance wildlife movement and migration for sensitive species. Protection of existing natural riparian corridors is critical to the long-term health of streams and downstream receiving waters and is also instrumental in adding aesthetic and economic well-being to the community.

Flooding, erosion, sedimentation of surface waters, increased storm water runoff, loss of wetlands and riparian areas, increased pollution, and wildlife habitat losses are some of the problems could occur if riparian corridors are not protected. If a riparian area is developed to the water's edge, water quality degradation may be occurring at that site. However, if younger vegetative communities or wetlands line the banks, some level of protection is realized depending on the successional stage and disturbance level of the vegetation.



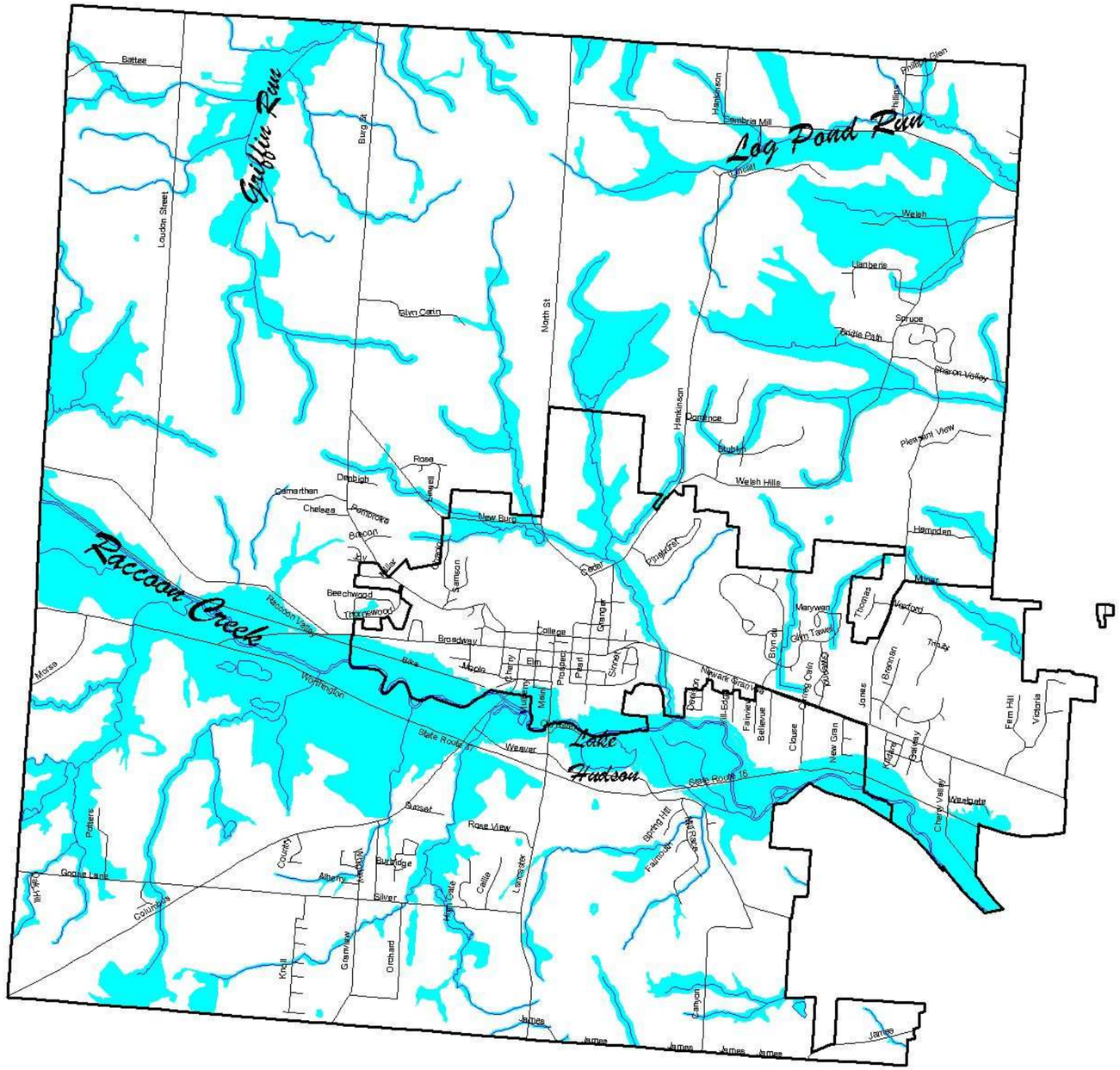
Source: Fredrick

In addition to environmental importance, riparian corridors also possess significant economic value. Riparian corridors provide for recreational and health benefits, non-consumptive secondary benefits, cultural enhancement, increased property values, and an improved quality of life. In so contributing to human welfare, both directly and indirectly, riparian corridors represent part of the total economic value of natural resources.

Residential development is impacting these headwater streams.

Riparian corridors within Granville were delineated based on aerial photographs, topographic maps, and mapped water features. The riparian corridor includes all floodplains, steep slopes, and wetlands adjacent to streams or within the floodplains. The top of the valley slope was used as the riparian boundary in areas with well-defined topography. All small tributaries mapped as streams were included within the riparian corridor. In addition, other small, unmapped streams with obvious, well-defined valleys were included.

The following map depicts the riparian corridors delineated for Granville. Riparian areas make up 26% of Granville.



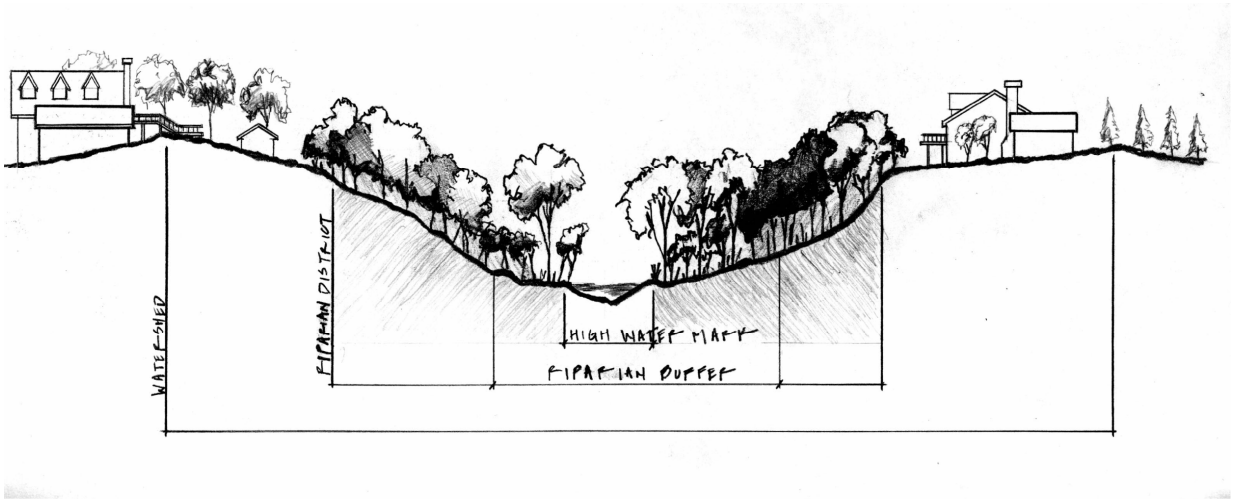
Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Riparian Corridors

Source:
Aerial Photography

2000 0 2000 4000 6000 8000 10000 Feet

Acquiring or protecting these valuable strips of green space along stream or river corridors with conservation easements is recommended. This standard should be integrated into all community zoning review provisions. The width of setback or buffer zone can vary according to the characteristics of the floodplain and adjacent steep slopes. Buffers have been designated as wide as 300 feet based on areal nutrient dilution models. The Ohio Department of Natural Resources recommends a minimum buffer of 120 feet; this guideline is based on the minimum width needed to establish a mature forest - the most effective vegetative buffer. For habitat preservation, buffers have been established as wide as 600 feet; however, this number has never been used for regulations as it is not based on public health and safety issues. In head water streams, a reduction in the setback should be avoided and should never be less than 40 feet.



Source: Frederick

Granville should consider adopting ***riparian setbacks***. A model resolution is provided in Appendix A. Some communities consider a flexible buffer determination based on where the actual existing riparian corridors are. Setbacks are determined based on a number of site specific factors such as:

- *Slope*: Steep slopes would be included within the buffers when in close proximity to streams. This situation is most common in headwater streams.
- *Stream Order:* Stream order can be used to determine the effectiveness of removing sediments and pollutants.
- *Vegetation:* Mature forests with undisturbed understory vegetation will be the preferred buffer vegetation type. Buffers can only be reduced if the current vegetation is mature forest. Mowed and disturbed areas should have the maximum buffer width.

- *Soil Type*: Moderate and well-drained soils are effective at absorbing surface runoff, while fine-textured soils (usually somewhat poorly drained and poorly drained soils) are better at dentrification. Buffers can be increased or decreased based on soil type and the most important buffer function based on surrounding land use. Dentrification will probably be most important in residential areas with chemically treated lawns.
- *Adjacent Land Use:* Both current and anticipated land use should be considered in determining buffer width and desired buffer functions.
- *Sustainability:* Narrow buffers cannot maintain a healthy forest ecosystem.

These flexible buffer criteria also require proof of the following buffer functions:

- *Nitrogen Removal:* Most nitrogen removal occurs within the first 35 to 90 feet of the buffer. Woody plants are the most effective at removing nitrogen.
- *Sediment Removal*: Buffers of 50 to 100 feet are required to adequately remove sediments.
- *Pesticide Removal*: Buffers of 45 feet or more are generally required to provide some removal of pesticides.

In general, a 120-foot setback is needed to provide a variety of buffer functions. The vegetation goal should be mature forests. In head water streams, a reduction in the setback should be avoided and should never be less than 40 feet. Adopting a fixed-width policy for a single buffer type is common, but can lead to unnecessarily large or small buffers which may deny landowners the use of a portion of their land, or can compromise protected areas. However, although a flexible-width policy would allow the consideration of site-specific conditions, it would require greater expenditure of resources and offer less predictability for land use planning.

Vegetative goals for each buffer area should be determined as part of any resolution. For example, the ultimate vegetation target near protected streams may be riparian forest cover, yet grassy meadows may be sufficient near impacted streams where water quality maintenance, not improvement, is important.

Riparian setback zoning requires a strong education and enforcement program. Two primary goals are to make the setback visible to the community by mapping boundaries, and to encourage greater buffer awareness and stewardship among adjacent residents.

In terms of prohibited and permitted uses in a setback:

- All development activities should be prohibited. This includes such land use activities as single-family homes, commercial development, parking lots, any construction, dredging or dumping, roads or driveways, as well as surface and subsurface disposal or treatment areas.
- Recreational trails and related crossings may be appropriate, when resilience to trampling is low, and when part of a greenway trail system. Because a trail

system would reduce the buffer's impact on water quality and habitat, trails should be constructed of ecologically friendly materials such as wood mulch. These trails should be set back at least 10 to 30 feet from the ordinary high water mark areas.

- Pasturing of livestock should be discouraged.
- Selective tree removal could be permitted for maintenance purposes, such as to clear dead or dying trees that could pose a public hazard or interfere with the water flow of the watercourse. Log jams and other obstructions to water flow should be removed to prevent flooding. Removal of existing trees with a diameter greater than nine inches (diameter at breast height) should be prohibited.
- Cutting, mowing, brush hogging, clearing, burning, or poisoning of existing vegetation should be discouraged. However, removal of invasive and non-native species is recommended.
- Crossings of the stream buffers should be restricted to no more than one crossing per 1,000 linear feet of the watercourse. Outfall culverts should discharge at the stream invert elevation to allow for upstream fish passage. Bottomless culverts are preferred.
- Only trees, shrubs, and herbaceous vegetation native to the area should be planted. Formalized landscaping plantings, using non-native, invasive species should be discouraged.
- Altering, dumping, filling, or removal of riverine materials or dredging should be prohibited.

Granville should also consider creating a ***riparian overlay zoning district*** for additional regulations to be applied to the riparian corridor, such as permitted, conditional, and prohibited land uses. A model resolution is provided in Appendix A. The extent of riparian corridor is often significantly larger than the riparian setbacks because there is a need to prohibit certain uses and densities in these corridors that extends beyond the limits of the setbacks.

In terms of uses for a riparian overlay district:

Structures are not recommended. If buildings and structures are permitted, they should be set back an additional 10 feet from the inner zone.

- Impervious surfaces should be discouraged.
- Land use activities that could be appropriate include conservation and forest management, lawns and gardens, passive recreation, and open space. The use of pesticides, herbicides, and fertilizers should be discouraged. Allowing natural ecological succession to occur is encouraged. Removal of existing trees with a diameter greater than 18 inches (diameter at breast height) should be discouraged.

- Prohibited land uses should include asphalt plants; dry cleaners; gasoline service stations, car washes, and other auto-related uses; junkyards, landfills, transfer stations, and recycling facilities; oil and gas wells; storage or discharge of hazardous materials and chemicals, commercial storage and petroleum storage, sales and distribution; quarries and borrow pits; sand and gravel extraction; and transportation facilities (exclusive of highways, roads, and alleys), road maintenance facilities, and road salt storage.
- The alteration of existing contours should be discouraged. On slopes of 15 to 20%, no more than 30% of the slope may be cleared. A setback of 15 feet must be maintained from the crest of the slope to any structure. No on-site sewage disposal systems should be allowed on any slope exceeding 20%.
- Underground storage tanks should be prohibited.

Variance provisions should allow townships to flex other setbacks, such as front and side yards, to maintain the riparian and wetland setbacks while allowing relief based on site constraints should be included.

Regulations should enable the zoning inspector or community engineer to inspect the riparian and wetland setbacks during construction and any time evidence of a violation is brought to the Granville's attention. These regulations should also provide the township with the ability to require riparian and wetland restoration for unpermitted impacts in the setback.

10.0 Groundwater Resources

Granville Solvents Superfund site in the Granville well field and adjacent to water plant.

Groundwater resources are important to understand because they supply public drinking water and also their hydrologic connection to surface waters. Groundwater in Granville flows through surficial sediments and bedrock, the shale and sandstone of the Mississipian Age. Groundwater most easily flows through sands and gravels of glacial outwash, the sediments deposited by glacial rivers. Geologic formations capable of yielding substantial groundwater supplies are considered aquifers. The Raccoon Valley aquifer is a buried-valley filled by glacial outwash, dominated by course sand and gravel. Groundwater in surficial deposits, especially sand and gravel, is most susceptible to pollution. Where the groundwater is near the surface, it often interacts with surface waters, flowing through streams, wetlands, and water bodies. Groundwater often provides water to surface water resources and may also be recharged by water from surface water bodies. The bedrock in Granville is recharged in the uplands.

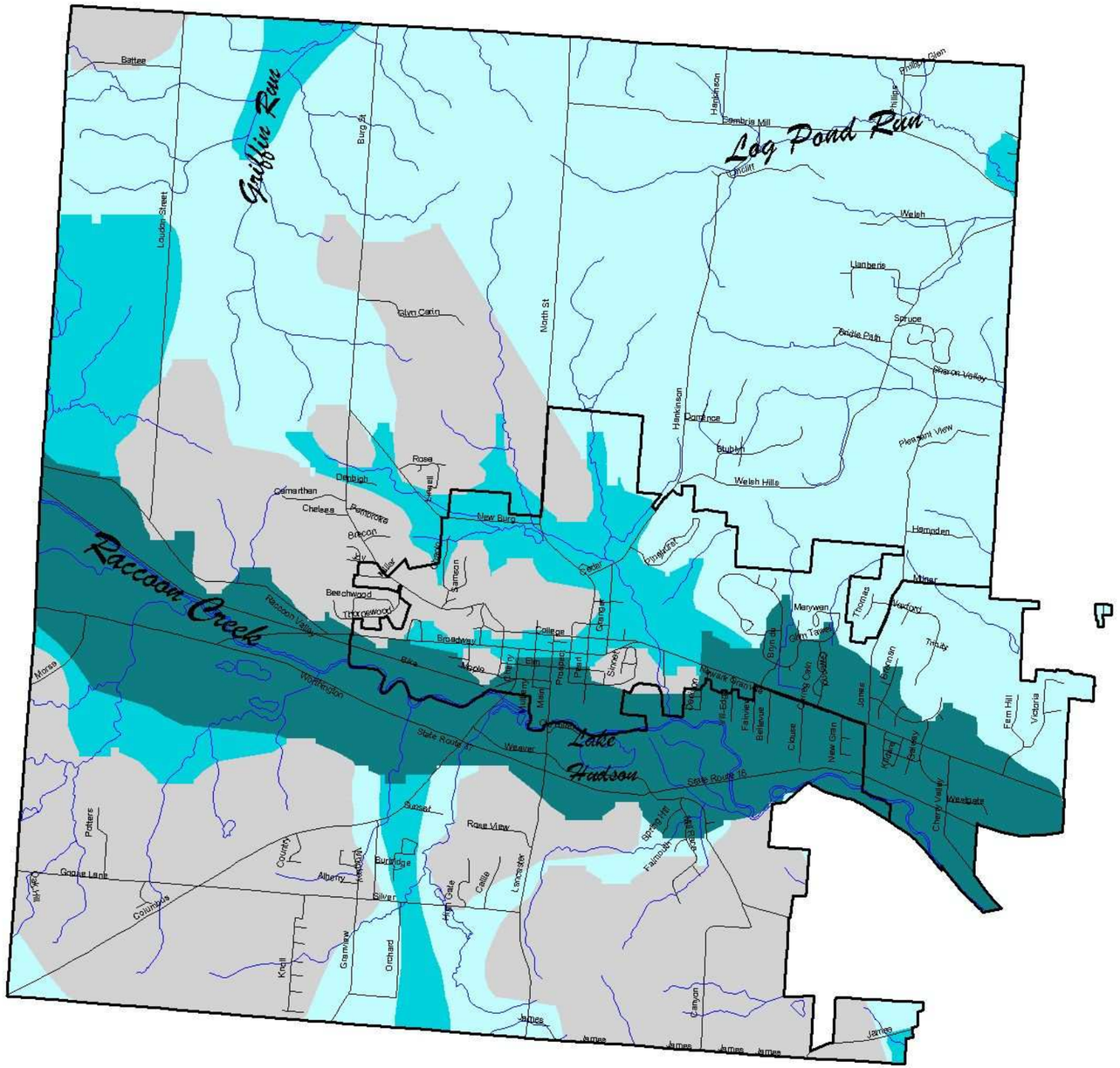
As a classic glacial outwash valley setting, the Raccoon Creek aquifer is transmissive, but vulnerable to contamination from inappropriate land use. Protection of this resource is critical as it is the sole drinking water supply for Granville, producing 850,000 gallons per day (gpd) with a peak supply of over 1,000,000 gpd from three wells about 110 feet deep. The groundwater is treated for harness in a lime softening plant. The well field is located under Raccoon Creek.

Figure 10.1 presents the groundwater resources of Granville and the surrounding area. The mapping is general in nature and may not reflect site-specific conditions. However, it shows that the aquifer along Raccoon Creek yields 200-500 gallons per minute. Figure 10.2 shows the bedrock and glacial history of the Granville area; and Figure 10.3 considers the aspects of ground water production, protection and remediation.

Agriculture, septic, and lawn care practices all affect ground-water quality. In a 1987 study by Heidelberg College, Licking County was sampled for nitrate-nitrogen content, an indicator of water quality. Results showed that less than two percent tested over the safe drinking-water standard of 10 ppm nitrate-nitrogen. The design, location, and condition of a well, combined with the characteristics of the soils and geologic formations in which the well is constructed, influence the potential for pollutants to enter the well. The Licking County Department of Health provides bacteriological water sampling for local citizens, and results from these tests generally indicate that the water meets current bacteriological health standards.

Granville has some identified sites of toxic release, including the Granville Solvents Superfund site. In addition, there are likely other potential sources of contamination within the Granville, ranging from major hazardous materials sites to leaking underground storage tanks.

The Granville Solvents site was ordered closed in 1986 at which time it had acquired 900 drums and about a dozen underground storage tanks, resulting in a contaminated vadose zone and a large plume of contaminated groundwater migrating toward the well field. As a Superfund site, operation of groundwater treatment systems is ongoing and will continue for several years. No contamination has been detected in the domestic water derived from the municipal supply.



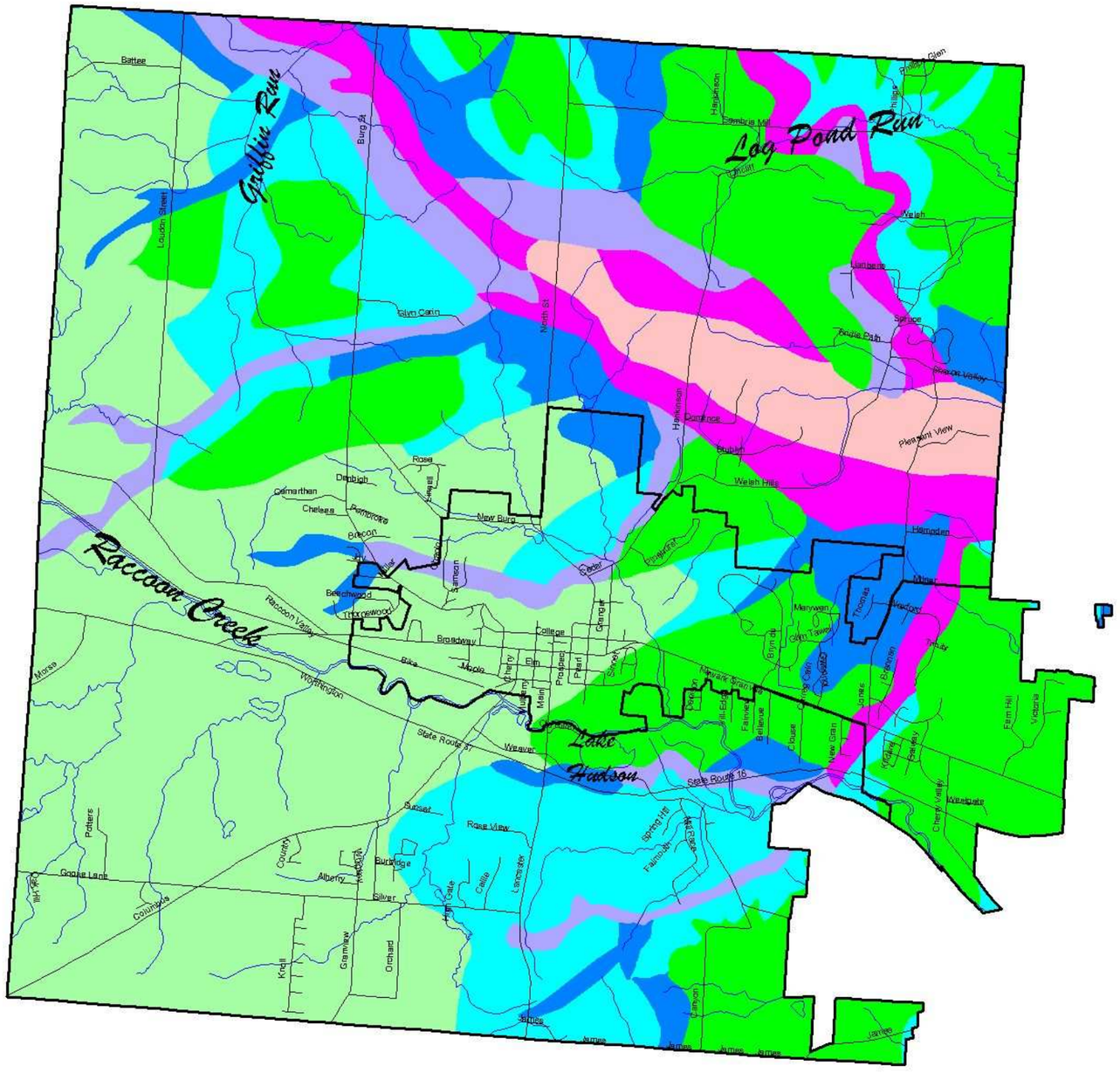
Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Groundwater Resources

- 100-500 gpm
- 25-100 gpm
- 10-25 gpm
- >10 gpm

Source:
ODNR

2000 0 2000 4000 6000 8000 10000 Feet



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

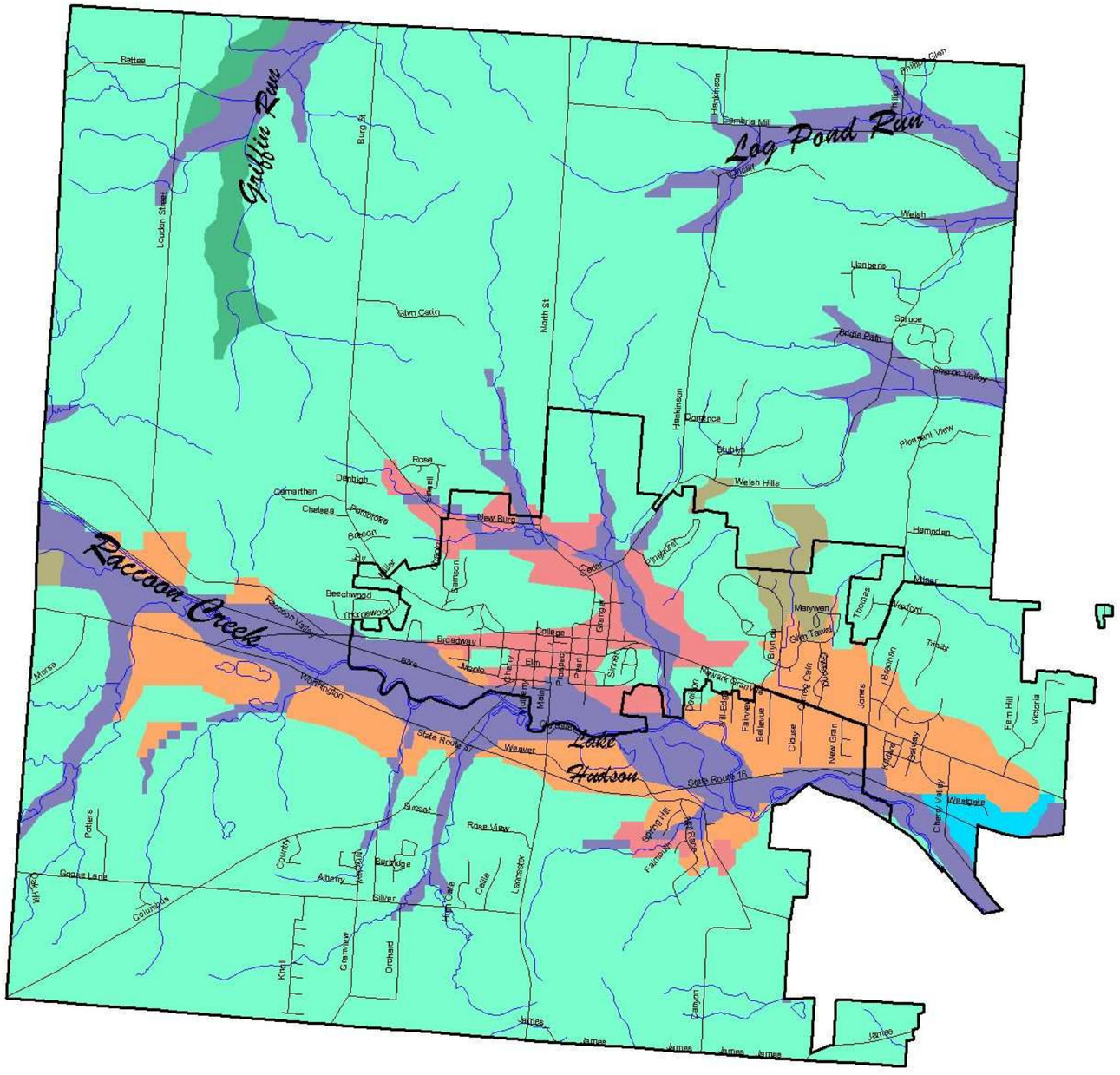
Groundwater Pollution Potential

Computed Index Value

- >50
- 50-75
- 75-100
- 100-125
- 125-150
- 150-175
- >175

Source:
ODNR

2000 0 2000 4000 6000 8000 10000 Feet



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Glacial Geology

- Granville outwash terrace, Wisconsin
- Ground morain, Wisconsin
- Kames, Wisconsin
- Lake deposits, Wisconsin
- Low-level cut outwash terrace, Wisconsin
- Stream alluvium, Recent
- Vanatta outwash terrace, Wisconsin

Source:
ODNR

2000 0 2000 4000 6000 8000 10000 Feet

Given Granville's dependence upon groundwater for drinking water, it is critical to protect groundwater resources and watercourses from which recharge is received. By recognizing and incorporating the interchange between surface water and groundwater, a healthy environment will be provided to all citizens of the township. Specifically, the quality and composition of groundwater can be affected by both natural processes and human activity. As water infiltrates the ground and moves through the aquifer systems, it picks up minerals and other natural or man-made substances that may seep from the surface and carries them in the solution.

The overall quality of a groundwater source depends on chemical composition, as well as biological factors, physical properties, and radiological influences. Natural chemical constituents that impact groundwater quality include dissolved minerals which affect hardness (calcium, magnesium), taste, staining (iron, manganese), and odor problems (sulfur). A high concentration of dissolved minerals in groundwater can render that source unsuitable for drinking. Elevated concentrations of nitrogen compounds in groundwater, resulting from infiltration of sewage and manure, can be toxic, especially to children less than six months of age. Groundwater quality can also be affected by man-made chemicals, such as pesticides and petroleum products, when these chemicals come into contact with a groundwater source.

Biological, physical, and radiological constituents also impact groundwater quality. Bacterial contamination can be introduced from various sources, such as leaky septic systems, agricultural operations, wellhead installation, and surface runoff, into improperly sealed well casings. Physical properties of water, such as acidity (pH) and turbidity (suspended solids), also affect the suitability of groundwater as a drinking water source. Highly acidic water can corrode piping, releasing metals into the water. Highly turbid water is unsuitable for aesthetic reasons, and the suspended particles can also harbor harmful toxic contaminants and bacteria. Naturally occurring radioactive materials found within the shales and glacial deposits in Ohio can introduce radon or radium into the groundwater.

Examination of topographical features, the location of wetlands, and the identification of important groundwater recharge areas will provide additional insight into the quality of groundwater resources in Granville and may provide insight into the existence of potential threats to these resources as well.

It is recommended that Granville conduct a ***pollution source inventory*** to identify any past, present, or proposed activities or land uses that have the potential to contaminate drinking water sources. After potential sources of contamination are identified, options to prevent, eliminate, or mange those sources can be evaluated and developed. Should groundwater contamination become evident, the inventory would also allow for the expedient identification of likely sources. Further, the inventory could be used as a

zoning tool by limiting high-risk land use in vulnerable areas. Drinking water must be protected from potential pollution sources in order to limit the likelihood of residents contracting various water-borne illnesses. Groundwater resources must be examined in order to articulate the public health and safety values associated with the protection of these natural resources.

By working together, the residents of Granville can take steps to preserve and protect their groundwater, helping to ensure that an adequate supply of good quality groundwater will continue to be available for future generations. A comprehensive ***groundwater protection policy*** should be published in a document clearly defining the township's policy with regards to its groundwater resources. The overall goal of the resolution should be to protect Granville's potable water supplies from the dangers of drought, contamination, overdraft, and mismanagement. This resolution may include such items as development limitations over vulnerable parts of the aquifer, guidelines for underground storage tank installation, maintenance, and removal, and the safe storage of hazardous chemicals.

Public participation in groundwater resource protection can be fostered by a ***community education*** program that encourages good stewardship of the aquifers. A variety of community outreach and education programs are possible. Some may include:

- Formation of a drinking water protection committee.
- Education programs for homeowners (for example, education on the link between residential activities and groundwater impacts and in the proper use/maintenance of septic systems and water wells).
- Education programs for children (fostering good stewardship of drinking water sources among children is critical and leads to adult education via parent-child discussions).
- Implementation of a semi-annual residential waste collection day.
- Many communities have initiated waste collection days to encourage homeowners to properly dispose of hazardous materials.

A very common source of groundwater pollution is ***underground storage tanks*** (USTs). Commercial USTs are currently regulated by the Ohio State Fire Marshall's Office, Bureau of Underground Storage Tanks. The installation and removal of private residential USTs under 1,100 gallons are regulated by the Ohio State Fire Marshall's Office Inspection Bureau. Local fire departments can have regulations that apply above and beyond those set by the state, such as a more stringent inspection, testing, and maintenance program for USTs located in sensitive areas. In cooperation with the Granville Fire Department, the Village and Township should also consider a UST management program that would include an inventory of all residential USTs within the township accompanied by an education program focusing on the proper storage, handling, and spill management of USTs.

Limiting the amount of impervious surfaces in ***groundwater recharge areas*** is an effective way to preserve groundwater supplies, especially during times of drought. Groundwater recharge is the replenishment of groundwater sources by seepage of precipitation, surface water and runoff. The amount of recharge available to aquifers in Granville varies according to local conditions and is influenced by soil and glacial till type and infiltration capacity, topography, depth to the water table, and amount of precipitation. The maintenance of mature vegetation (preferably large, native tree species) on recharge areas also preserves and protects groundwater quality and quantity. The groundwater recharge potential of an area is a key issue that the Granville should consider when making future land-use determinations. Granville should identify significant recharge areas and should also take measures to assure the preservation of mature vegetation within them.

Neither the Village nor Township actively protect their groundwater resources at the present time. The Center for Watershed Protection (CWP) provides a model ***groundwater overly district*** protecting the area within the 6-month time-of-travel distance mapped around all the public water supply wells which typically constitutes the area within about 1000 feet of a well. Its purpose is to protect public health and safety by minimizing contamination of shallow/surficial aquifers and preserving and protecting existing and potential sources of drinking water supplies. A model resolution can be found in Appendix A. The sample language developed for groundwater setbacks is based on the average water system demand and the potential or known sources of contamination.

Granville should consider:

- regulating uses or limiting density to maintain groundwater recharge and quality; decrease stormwater runoff and increase on-site infiltration;
- reducing the amount of impervious surfaces in recharge areas;
- maintaining native vegetation to slow down water and allow for infiltration;
- disconnect or redirect rooftop downspouts and direct runoff from other impervious surfaces to infiltration areas; design stormwater retention/detention areas to contribute to aquifer recharge;
- making attempts to retain recharge areas as natural open space; and
- grouping roads, parking areas and structures together in areas that will have a limited impact on ground water recharge rates. When homes are serviced by wells, gradients within an aquifer and the direction of ground water flow should be considered.

11. 0 Soil Suitability for Septic Systems

Since sanitary sewer service is not available to a large portion of Granville Township, it is useful to evaluate the soil capability for septic systems. Land with very poor suitability for septic systems should be served by centralized sanitary sewer or alternative sewage disposal systems.

Table 11.1 Soils Suitable for Septic in Granville

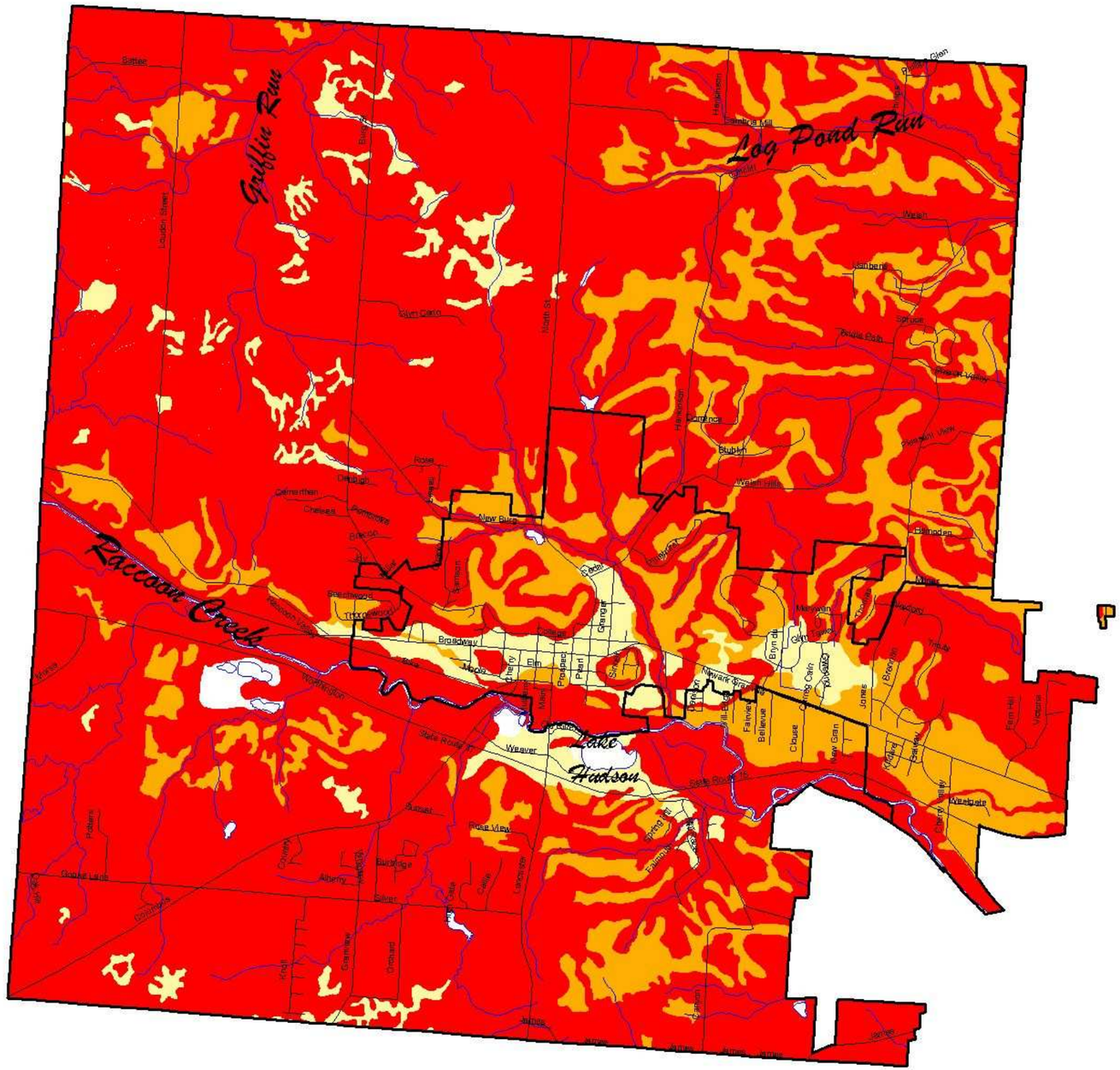
Watershed	Percentage of Granville	Percentage of Village	Percentage of Township
Severe	78	54	82
Moderate	17	31	14
Slight	5	15	4

A majority of Granville is underlain by soils poorly suited for septic systems. Only five percent of the land within Granville has soils that have only slight limitations for septic tank absorption fields. Common limitations include a seasonal high water table, restricted permeability, poor natural drainage, the hazard of flooding, excess slope, and a shallow depth to bedrock. Soils with very slow or moderately slow permeability are rated as having severe limitations for septic system use. Restrictive layers such as bedrock are also a severe limitation. Septic systems placed on slopes greater than 12% may result in erosion and seepage downslope. The high seasonal water table, common within somewhat poorly drained, poorly drained, and very poorly drained soil types, prevents the proper functioning of septic disposal fields for varying time periods.

Unfortunately, many of the soils suitable for septic systems are located on alluvial soils near streams and drainage ways. These alluvial soils tend to be sandy and well-drained, which is good for septic systems, but these areas pose other problems for septic tank absorption fields such as flooding and groundwater contamination.

In areas not served by sewer systems, it is recommended that only low-density development will be allowed, in order to avoid potential public health problems should failing septic systems discharging off-lot. Proper siting, maintenance, and operation of home sewage disposal systems are critical to ensure proper functioning. Leaks from these systems can travel through the subsurface soils and can contaminate groundwater supplies. Regular inspection, maintenance, and pump-out is necessary to avoid failing septic systems, yet local governments often refrain from aggressive enforcement of these activities in privately owned systems. ***Educating homeowners*** on the importance of these activities is a first priority. Some jurisdictions have charged homeowners a maintenance fee in exchange for inspection, maintenance, and education programs. Others have instituted revolving loan programs to provide low-cost

loans to repair failed systems. At a minimum, stringent siting and technology criteria should be enforced and followed by a post-installment inspection.



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Soils Suitable for Septic

- Severe Limitations
- Moderate Limitations
- Slight Limitations

Source:
Soil Survey

2000 0 2000 4000 6000 8000 10000 Feet

12.0 Woodland Resources

Woodlands resources are aesthetically pleasing and contribute significantly to the rural and scenic character of Granville. Forests support ecosystems of plants and animals, and may or may not be conducive to development depending on the soils, hydrology and species present. Severe problems can arise when a natural woodland is developed without proper planning. These include:

- Soil compaction
- Soil erosion
- Increase in stormwater runoff
- Degradation of surface and ground water sources
- Irreparable damage to trees including roots, trunk and branches
- Physical destruction of wildlife habitat
- Fragmentation of wildlife habitat and corridors
- Increase in potential fire hazards
- Increase in maximum temperatures and wind velocities of local microclimates

In natural settings, the most important role of forests is habitat for wildlife and biodiversity. Natural forests support plants and animals that are dependent on the structure of the woodlands. Trees provide habitat for birds, reptiles, amphibians, and arboreal mammals. Woodlands also contribute to overall biodiversity by harboring bacteria, fungi, and many species of insects and other invertebrates. Vegetation includes many species of trees, shrubs, herbaceous plants (including wildflowers), and other understory plants such as ferns, mosses, liverworts, and lichens.

Significant woodland resources were mapped using the aerial photography by Licking County. Natural forests as were mapped. In general areas greater than an acre were mapped. Fencerows and very narrow strips of trees were not mapped, and urban forests with lawn and landscape plantings were not mapped. Analysis of the larger tracts of woodland cover reveals that Granville actually has 30% woodland resources; 295 of the Village and 31% of the Township. It is the large tracts of woodlands that provide the most public health and safety benefits, as well as aesthetic and ecological benefits.

As discussed, riparian woodlands- the narrow strips of treed vegetation along the sides of rivers and streams- provide the best option for stream or river system protection. Riparian woodlands provide many benefits to the nearby waterways, including: absorption and removal of pollutants from runoff, reduction in temperature extremes, and a source of organic matter to provide carbon nutrients (the most basic link in the food chain of a river ecosystem). When woodlands along stream corridors are converted to agricultural and urban uses, potential problems that can occur include:

- increase in volume and rate of stormwater runoff
- soil compaction and erosion
- degradation of surface and groundwater sources
- irreparable damage to trees including roots, trunk, and branches
- physical destruction of wildlife habitat
- fragmentation of wildlife habitat and corridors
- increase in maximum temperatures and wind velocities of local microclimates

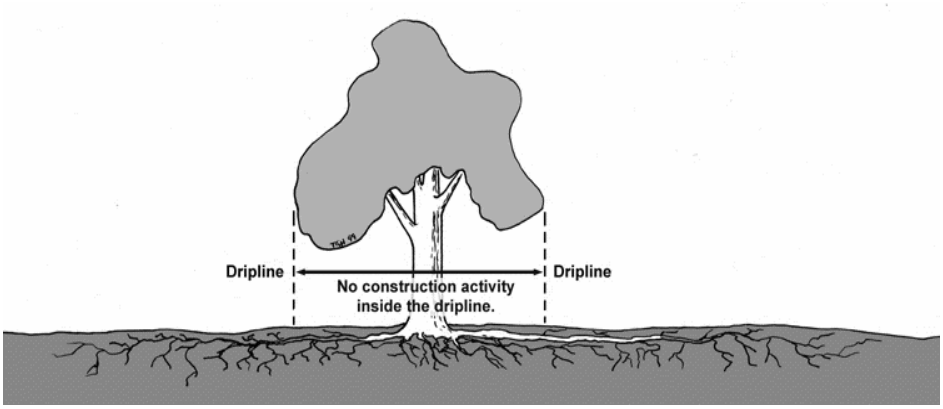
The presence of trees and the high percentages of canopy cover positively impact the health and vitality of Granville's ecosystems. Woodlands are important environmental assets that provide a number of public health and safety functions for Granville residents.

Trees are a form of vegetative cover. Tree roots help to keep soil in place and reduce soil erosion. Tree cover, especially in areas of steep slope, help to significantly reduce stormwater runoff rates. Slowing runoff rates can reduce the incidence and severity of floods. Moreover, woodland resources increase groundwater recharge and promote watershed protection. As the trees simultaneously reduce runoff, soil erosion, and flooding and increase groundwater recharge, a well-canopied area's ability to function as a buffer to protect water quality is drastically improved.

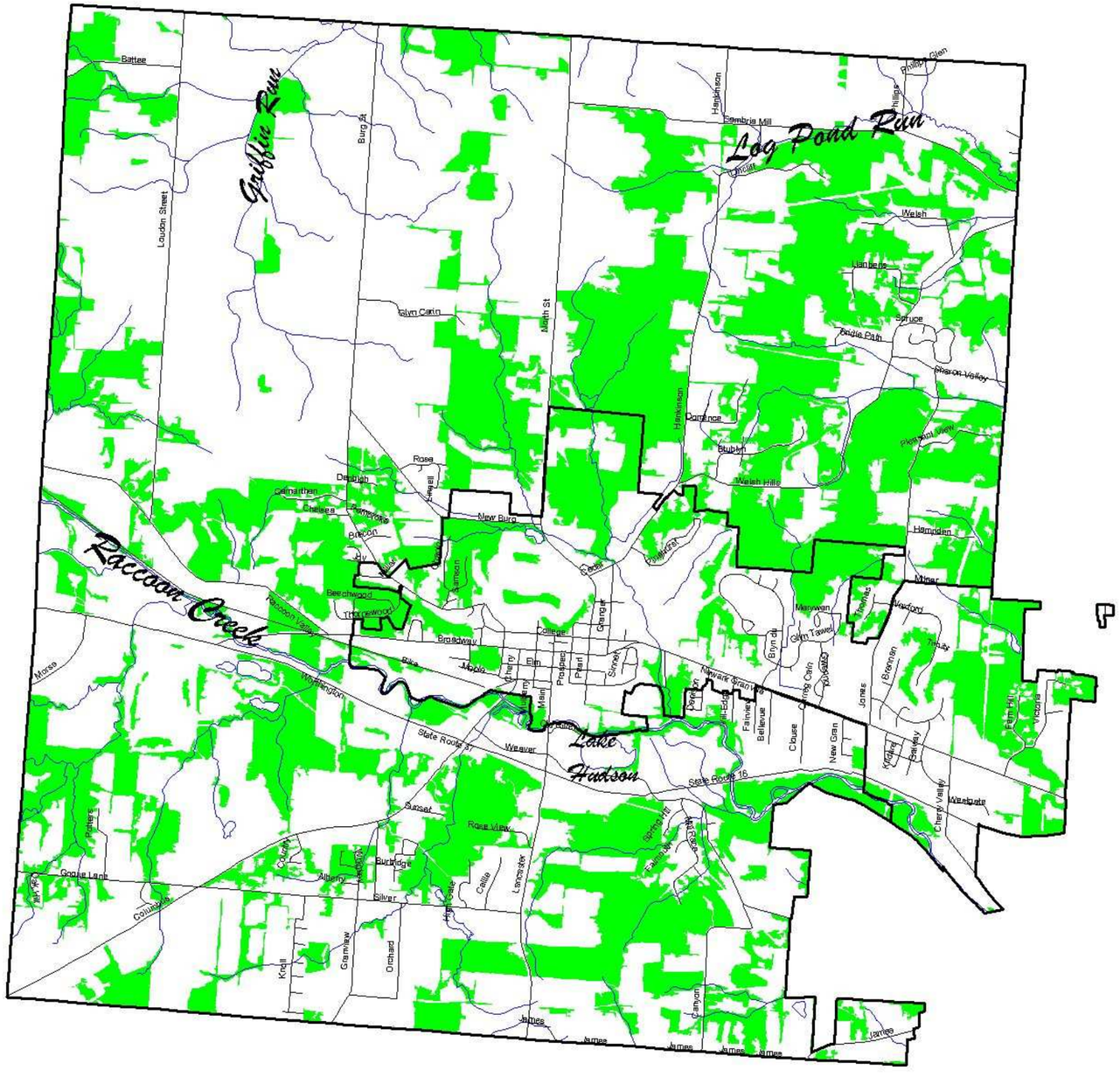
In addition, woodlands can collectively provide measurable improvements in air quality by filtering pollutants and lowering the incidence and severity of ozone production. Trees capture particulate matter and produce oxygen. Canopy cover helps to reduce local and global air pollution by ingesting carbon dioxide, nitrogen oxides, carbon monoxide, and sulfur dioxides.
Granville should consider developing guidelines for tree preservation as part of the subdivision regulations, requiring mapping of trees on the site and encouraging design around woodlands where soil and slope characteristics are conducive to building, and

where development would cause minimal disruption of natural features.

When building in natural wooded areas, simply protecting the aboveground portion of large trees is not enough. The integrity of the soil and root zones is critical to the survival of trees. Removal of understory shrubs and herbaceous plants will also impact light infiltration and wildlife habitat. Recognizing that the forest environment involves close interaction between soil, plants, water, and wildlife is essential to successfully integrating the build and natural environment



Tree protection zone source: Countryside Program



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Woodlands

Source:
Licking County

2000 0 2000 4000 6000 8000 10000 Feet

13.0 Wildlife Corridors

A wildlife corridor is any long, linear natural area that connects two larger natural areas, allowing wildlife to move between them. Fragmentation of natural habitats within Ohio and surrounding states has reduced natural areas to small, isolated areas. It is important to maintain or establish connectors between these areas to allow for wildlife movement and migration.

Within Granville, wildlife corridors are mostly restricted to riparian areas. The canopy cover map gives an approximation of the existing wildlife corridors within the township. The maps illustrate that although many corridors exist, there are still significant gaps between the corridors, particularly near roadways.

Many animals depend on these corridors for survival and for transportation. Migratory birds will often not fly over developed areas and will move along small wooded riparian zones and connecting tree lines. If large tracts of land are cleared of trees, then birds that normally pass through that area may now move around rather than through. This causes the migratory animals to spend more time traveling and expend greater amounts of energy. In extreme situations, this can lead to decreased health and even death of the animal.

Wildlife corridors should be developed along riparian zones. Gaps in the riparian areas near roadways and developed areas should be restored. Natural woody vegetation consisting of trees and shrubs are preferred whenever possible. If not, unmowed herbaceous vegetation is an alternative.

The best way to restore most riparian and wildlife corridors is to allow natural succession to take its course, with very limited planting and maintenance. Non-native, invasive plant species such as *Phragmites australis* (common reed) and *Polygonum cuspidatum* (Japanese knotweed) may need to be removed in some areas. Even a narrow corridor will provide continuity through urban and disturbed areas and allow many plant and animal species to move and migrate.

Open spaces that are left in a natural condition should be adequately connected with neighboring riparian corridor areas. In order to ensure the health and vitality of wildlife corridors, zoning standards should incorporate provisions that recognize the need for connected open space corridors. Provisions ***for open space subdivision design and riparian setbacks*** regulations recognize the importance of connecting these open spaces. In particular, provisions should be made to conserve parallel open spaces as well as adjoining and existing rights-of-ways. In so doing, further promoting unfettered movement of local plant and animal species.

14.0 Rare, Threatened, and Endangered Species

Rare, threatened, and endangered species are not always considered in initial stages of the development process.

Federal and state listed species have legal protection under the Endangered Species Act (1973), National Environmental Policy Act (1969), Ohio Endangered Plant Act, Ohio Endangered Animal Act, and Sections 1518 and 1531 of the Ohio Revised Code. Protection of species generally requires protection of the habitat in which they live, minimizing impacts from disturbance, and provision of adequate migration routes.

The Ohio DNR Division of Natural Areas and Preserves (DNAP) Natural Heritage Data Services was queried for any records of rare, threatened, or endangered species and the locations of special interest. The DNAP inventory program relies on information supplied by individuals and organizations; not all areas have been surveyed. It is possible that additional rare species are present in Granville, but have not yet been identified.

A report from the Ohio Department of Natural Resources (ODNR) Division of Natural Areas and Preserves (DNAP) Natural Heritage Database was reviewed for rare, threatened, and endangered species that are known to reside within the limits of Bath. It should be noted that the database from which this information was gathered is incomplete, so it is possible that the species presented in this report are only a portion of the rare species that truly reside within the township.

Given the vast acres of undeveloped land, high-quality natural resources, and unique habitats within Granville, the known rare, threatened, and endangered species identified in DNAP's report is a poor representation of what is likely to actually inhabit Granville's wildlands. Most of the listings in DNAP's report are for larger, obvious encounters like champion trees and vulture roosts. There are hundreds of more secretive, less obvious creatures that probably inhabit the township whose presence have not yet been documented. It is believed that every day, some undiscovered species goes extinct and humanity is never aware that the creature ever existed. It is possible that a similar phenomenon is happening in Granville.

These data may be used to identify areas for protection, impact minimization, or restoration. It may be used as an initial assessment of impacts of large proposed projects or other landscape alterations, but is no substitute for field investigation for potential habitats and species of concern.

Granville has 2 listed species, which are listed in the table below and shown in Figure 14.1.

Table 14.1. Unique Natural Resources

Scientific Name	*Ohio Status*	*Common Name*
Cordulegaster erronea	Special Concern	Tiger Spiketail
Triphora trianthorphora	Threatened	Three-birds Orchid

The Tiger Spiketail is large blackish dragonfly with green eyes, yellow thoracic stripes, and yellow rings around the abdomen. They are usually found along small cold streams in forested areas.

Tiger Spiketail

Three-birds orchid grow to about three to twelve inches with the flower size of ¾ inch. The plant is difficult to find in bloom flowers can be found on only a few days a year. The plant grows in rich, moist woods, and is often associated with rotting logs.

Three-birds Orchid

In addition to the species named above, three federally listed species are known to range over Ohio: the federally endangered Indiana bat (*Myotis sodalis*), the federally threatened bald eagle (*Haliaeetus leucocephalus*), and the federal candidate for listing Eastern massassauga (*Sistrurus catenatus catenatus*). There are no records of these species. However, efforts should be made to preserve any remaining habitat suitable for these species.

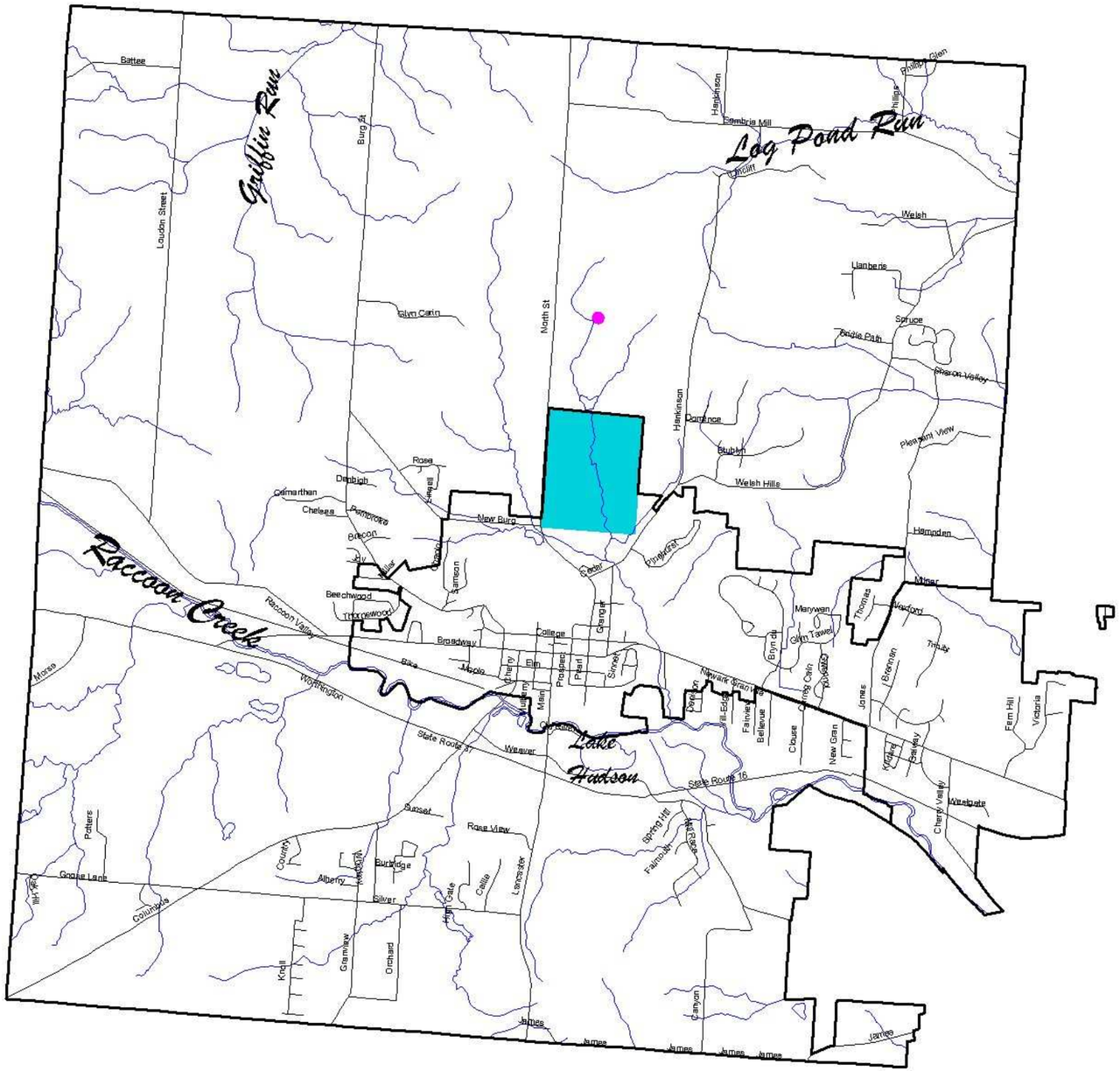
Unique plant and animal life are easily taken for granted. Among other things, these entities help to furnish raw materials, renew soils, prevent erosion, and help to purify our air and water. Moreover, scientists are increasingly learning of the medicinal properties present within a number of these life forms. Loss of unique plant and animal life clearly entails a cost to society.

It is important to be aware of the status of various plant and animal species in a given locale. Some animals, like amphibians, are ecological indicator species. Like canaries in coal mines, these species act as early warnings of environmental problems that may impact people.

Granville should take action to inventory the unique plant and animal life present within the confines of its boundaries. An intensive examination of public lands is

recommended. In addition, a community educational program should be developed that encourages private landholders to allow biologists access to their properties. There is a great deal of fear on the part of the general public concerning endangered species issues. Many believe that if such species are found on their property that the government will take their lands or place restrictions on their land that will prevent them from selling or developing the property. In most cases this is not true and it may even benefit the landowner to identify these species on their property. Of course, these inventories should be conducted by well-trained, professional biologists. Documentation is critical and efforts should be made to coordinate with DNAP's database managers.

Open spaces that are left in a natural condition should be adequately connected with neighboring riparian corridor areas. In order to ensure the health and vitality of wildlife corridors, zoning standards should incorporate provisions that recognize the need for connected open space corridors. Provisions within zoning standards and open space subdivision design regulations can recognize the importance of connecting these open spaces. In particular, provisions have been made to conserve parallel open spaces as well as adjoining and existing rights-of-ways. In so doing, further promoting unfettered movement of local plant and animal species.



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Rare, Threatened, and Endangered Species

Tiger Spiketail
Tree-birds Orchid

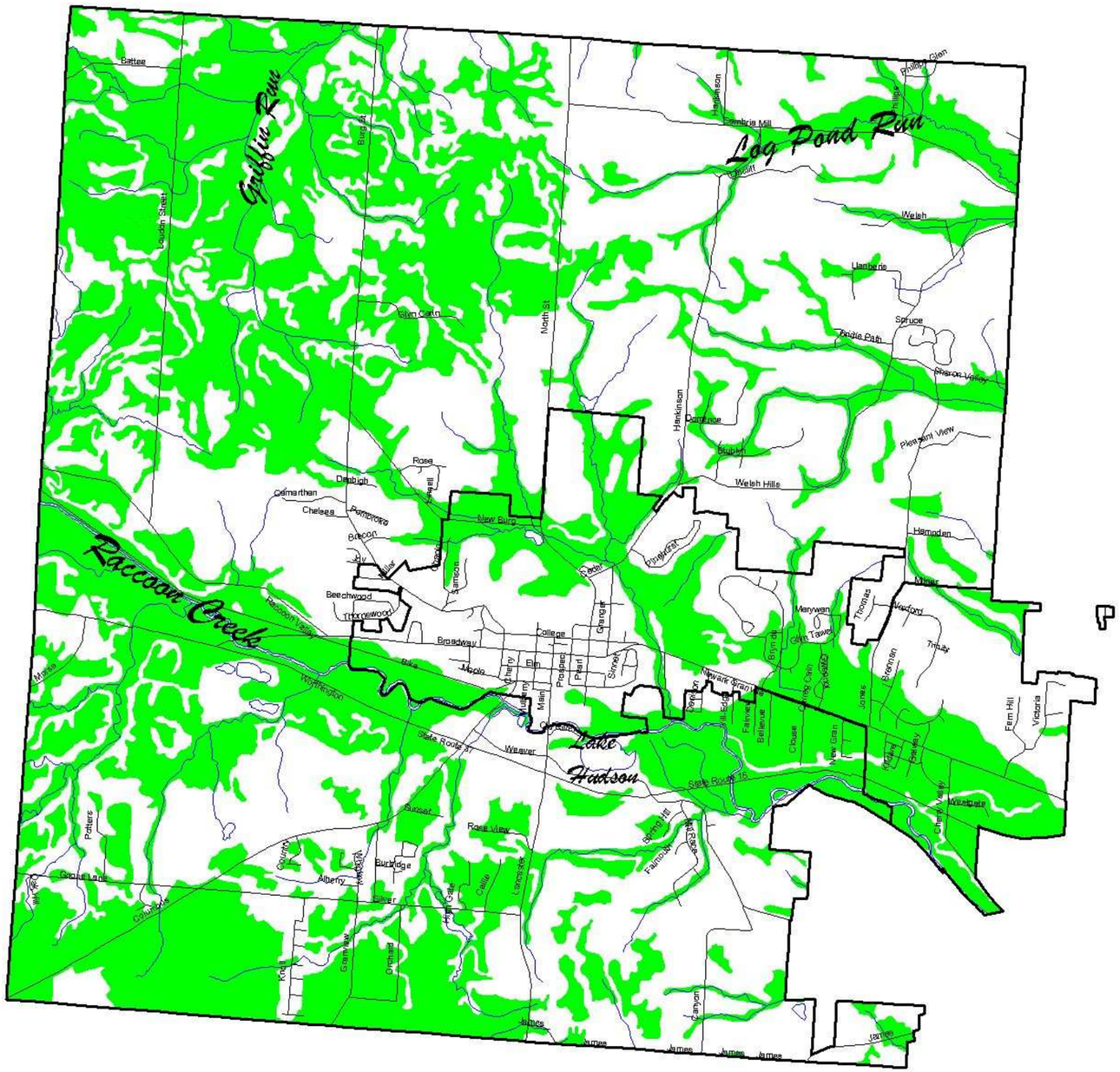
Source:
DNAP

2000 0 2000 4000 6000 8000 10000 Feet

15.0 Farmland

Nearly half (43%) the soils in Granville meet the definition of prime farmland and are of high quality. Consequently, Granville is dominated by important farmlands and areas of local and regional importance. Potential productivity is primarily dependent on soil inherent quality and soil management, and is often expressed in terms of land capability, suitability and expected yield. These interpretations involve predictions about soil behavior or attributes that are based largely on a known or obtainable set of soil properties that are maintained or predicted for each kind of soil.

In general, most soils of Granville have high potential productivity and the potential for increased production of food is good. Inherent quality of most soils is high and most limitations, such as wetness and erosion can be alleviated through proper drainage and conservation techniques.



Village of Granville & Granville Township Comprehensive Plan Update: Environmental Analysis

Prime Farmland

Source:
Soil Survey

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Agriculture for Tomorrow: The Licking County Agriculture Preservation Plan (2000) found that the number of farms in Licking County had been halved; and the value of farmland has nearly doubled. The study suggested that the aging populations was contributing to loss of farmland. .A survey of Current Agricultural Use Value (CAUV) land owners found that support for farmland protection goals, programs to strengthen the agricultural industry, and preservation of rural character. The plan recommended comprehensive planning and "proper" zoning. This plan also endorses the use of the following tools:

- Increase the recoupment period for lands removed from CAUV
- Establish Agricultural Districts
- Enact Right to Farm Ordinances/Resolutions
- Utilize Agricultural Supportive Zoning
- Vigorously promote the use of Agricultural Conservation Easements through:
    - Purchase of Development Rights
    - Transfer of Development Rights
    - Donation of Development Rights
- Establish programs to strengthen agriculture
- Establish a Licking County Farmland Preservation Coordinator

16.0 Green Infrastructure

Preservation and restoration of green infrastructure in Granville is important to maintain the natural ecological processes, such as sustaining air and water resources. Green infrastructure includes:

- Trees & Woodlands
- Streams & Lakes
- Wetlands
- Meadows
- Inorganic Habitat
- Living Organisms
- Soil, Water, & Air

It is as important as the built, or gray, infrastructure. Gray infrastructure includes:

- Transportation Networks
- Storm sewers
- Sanitary & Water Treatment Facilities
- Bridges & Culverts
- Buildings & Structures
- Gas, electric, water lines

According to the World Resource Institute(2003), there are a number of services that green infrastructure provides. Supporting services include: soil formation; nutrient cycling; and primary production. Provisioning services include: food; fresh water; fuel;

fiber; biochemicals; and genetic resources. Regulating services include: climate regulation; disease regulation; water regulation; and water purification. And, cultural services include: spiritual and religious benefits; recreation and ecotourism; aesthetics and social value; educational opportunities; and cultural heritage.

Granville's green infrastructure goal should be large, connected deep patches of woodlands; healthy wide stream corridors including healthy vegetation structure, natural channel alignment, intact flood plain and adjacent riparian slopes; large healthy connected wetlands; and naturalized meadows succeeding into hardwood forests. Granville should avoid impervious surfaces; roads that fragment the landscape into small isolated pieces and their adjacent impacts; and manicured and managed lawns.

Lawns are not green infrastructure. Lawns eliminate ecosystem diversity and promote monoculture; contribute to use of pesticides, nitrogen, and phosphorus entering the water supply; compact soil layers, loosing the natural ability of infiltration, and increase runoff; contributes to global warming and air pollution; and can increase stresses on water supply and solid waste. The result is impaired water quality and increase flooding, erosion, and channelization.

When possible lawns and impervious surfaces should be replaced with meadows. Even meadows can maintain diverse ecosystems; filters pesticides, nitrogen, phosphorus to water supply; minimizes runoff; sequester carbon, reducing global warming; promote soil formation, maintaining natural porosity; remove air pollution; promote water table replenishment and protect water quality; and stabilize flooding, erosion, and channelization.

Granville should consider designing a green infrastructure network to link diverse green space elements. To do so, Granville needs to gather additional data across the landscape to layout this network, evaluating and prioritizing land cover.

17.0 Urban Forestry

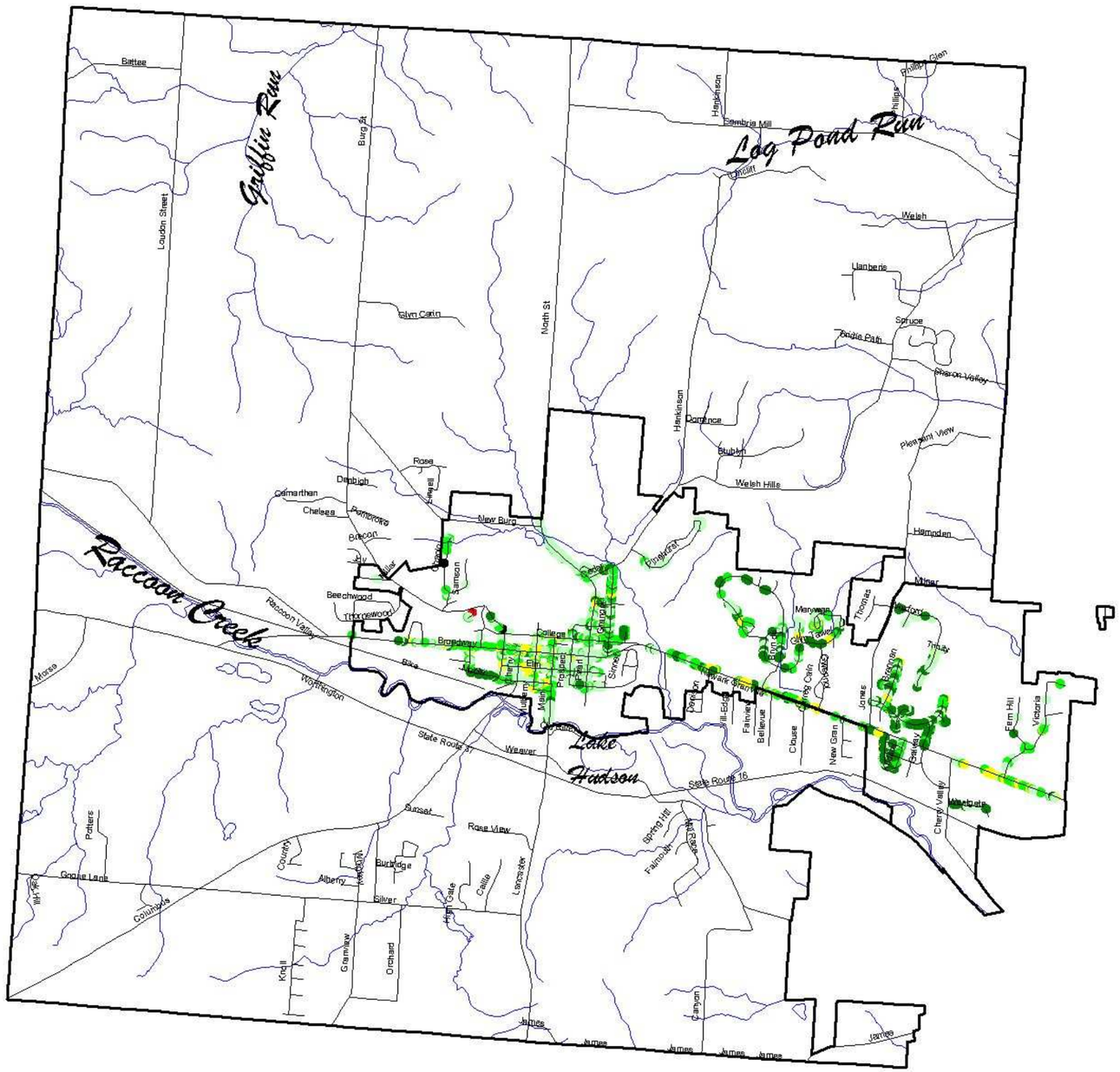
Trees are a critical component of Granville's ecological health, environmental quality, aesthetics, and livability. The urban forest includes all woody vegetation that are managed as individual trees, street trees, or park trees in landscaped areas. Trees and other natural resources in the urban forest provide a wide range of environmental, social and economic benefits to communities.

Trees provide scale and texture to concrete landscapes of streets like Broadway. In residential neighborhoods, properly maintained trees contribute significantly to real estate values. Properly placed trees can also provide cooling shade to homes and measurable energy conservation benefits. Data show that healthy, beautiful urban trees have the potential to add up to 20 percent to residential property values. Properly placed trees can also provide cooling shade to homes. Collectively, Granville's urban forest can provide measurable improvements in air quality by filtering pollutants and lowering the incidence and severity of ozone production.

Trees also serve as habitat for songbirds and urban mammals (such as squirrels). And, the aesthetic value of trees in urban settings is reflected in civic pride, a healthy community image, and economic vitality.

Figure 17.1 shows Granville's tree inventory conducted in 2002 of 1861 trees. Analysis of 1994 ODNR satellite imagery shows that 32% of Granville is forested or has a canopy cover to some degree. (See Figure 17.2) The American Forestry Association, through research and numerous studies, has determined that an average of 40% canopy cover should be achieved and maintained by most urban and suburban areas

with 50% canopy cover in low-density residential areas; 25% canopy cover in high-density residential areas; and 15% cover in commercial urban corridors. These statistics are good goals and could be set as the benchmark to obtain the many benefits of urban forests. Given the general land uses and character of Granville, a goal could be to achieve an average 50% canopy cover.



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

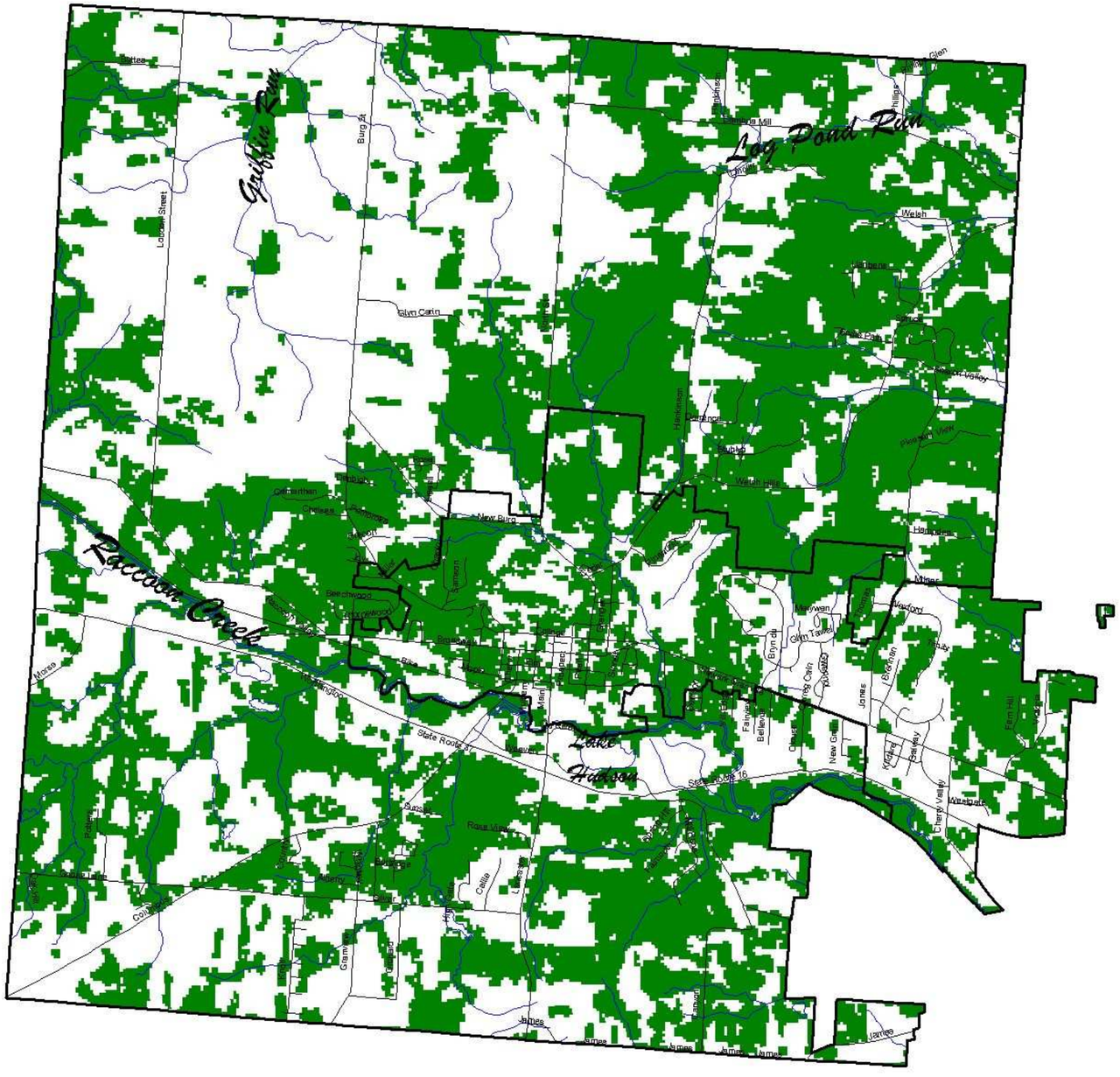
Tree Inventory

Health

- Excellent
- Good
- Fair
- Poor
- Critical
- Dead

Source:
2002 Inventory

2000 0 2000 4000 6000 8000 10000 Feet



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Canopy Cover

Source:
ODNR
1994 Satellite Imagery

2000 0 2000 4000 6000 8000 10000 Feet

Trees, their canopy cover, and associated plant and animal communities contribute many benefits and much value to Granville far in excess of the time and money invested in them for planting and maintenance. They help stabilize soil by controlling wind and water erosion, reduce noise levels, cleanse pollutants from the air, produce oxygen and absorb carbon dioxide, provide wildlife habitat, and improve water quality by filtering soil and pollutants. Granville should protect and manage its rural woodlands and urban forest resources for future generations. The Village of Granville has zoning protecting urban forestry. Granville Township should consider adopting a Tree Resolution and a model example is available in Appendix A.

A Tree Protection Resolution would provide the basis for tree management and preservation strategy. The components of a tree preservation resolution should include provisions for protecting the remaining forest by requiring tree evaluation and preservation during site design review; and for mitigation of lost canopy cover on development sites. The resolution could also make provisions for the protection of the remaining mature forest stands by requiring their evaluation and preservation during site design review.

A **Historic Or Heritage Tree Program** would identify trees that have historical interest or associations or that have ecological value in terms of size, age, or type. Persons owning property where such trees exist would be notified of their tree's status. This program would instill a sense of pride and appreciation of Granville's forest resources.

Groups of trees can be protected in the same manner. Durable chain link fencing or high visibility plastic snow fencing are useful materials for identifying protection zones. Access paths for heavy equipment should be covered with two to four inches of mulch to minimize soil compaction and erosion.

Trenching for the installation of underground utilities should be minimized. When working within tree protection zones, digging should only be done by hand, and roots cleanly cut with a hand saw. Wherever possible, underground utility lines should be installed with a tunneling device rather than trenching.

Raising or lowering the grade of soil is cannot be allowed within the tree protection zone. If a change in grade is required immediately adjacent to the tree protection zone, retaining walls should be constructed to hold soil in place. New soil must not be sloped to the base of the tree.

The collective benefits the Village of Granville receives from its urban forest can only be derived from careful planning, protection, and management of these valuable resources on all properties.

The Village of Granville is a Tree City, has a tree commission engaged in preservation,

pruning, and removal of hazardous trees including planning for the Emerald Ash Borer (EAB) due to the number of ash trees.

Granville should consider and develop programs and policies to protect, support, and expand its urban forest. Such tasks could include:

- Encouraging the Township to participate in being a Tree City as recognized by the National Arbor Day Foundation
- Creating a Tree Commission for the Township, which would be active in planting and tree maintenance projects, and educating the public
- Creating a system and putting procedures in place for residents who wish to plant, prune, or remove a tree
- Adopting tree preservation measures for public road and other civic improvement projects
- Providing incentives for tree preservation on private property during development
- Creating a tree resolution for the Township

18.0 Open Space

Open space can be defined as any parcel or area of land designed and intended for recreation, resource protection, amenity, and/or conservation easements or setbacks. Open space corridors and recreation areas are valuable assets that contribute to community identity and protect fragile environmental resources. A comprehensive system of open space linkages can be developed in a manner that serves multi-use functions and enhances the sense of community. By developing open space linkages, which could include trails and natural recreational facilities, Granville is encouraging an environment of community stewardship and is creating opportunities for outdoor education and recreational activities. Open space corridors, also referred to as "greenways", are effective tools used to link existing parks, riparian corridors, wildlife habitats, and other natural areas. Greenway corridors also maintain connections between active and passive recreational areas, provide a system of transportation and facilitate community interaction within the outdoors. Greenway corridors are an effective tool in encouraging environmentally sound means for passive recreation.

To preserve areas of connected open space, Granville should consider how dedicated open space is arranged in relation to other planned or existing developments. It also should preserve or create green corridors such as hiking and biking paths for recreational use.

Certain areas within Granville should be acquired and preserved due to the number and quality of environmental characteristics present. Further evaluation to determine

environmental quality should be conducted so that the park board, land conservancy, or other organizations can pursue acquisition/conservation easements based on the results of evaluations.

In addition to the secondary source environmental data compiled in this report, Granville show further map other land cover using the most recent and historical aerials. Undeveloped land should be divided into functional units based on vegetative communities. The vegetative communities should be classified for undeveloped and developed lands in the Village of Granville and Granville Township. These vegetative communities and ecological units could then be processed and analyzed within each community using EnviroScience's quantitative matrix called the ***Index of Ecological Welfare*** (IEW). This index uses a combination of standard habitat evaluation techniques to comprehensively assess the quality of natural areas and prioritize resource preservation based on measuring the integrity and function of resources such as the following metrics:

- Successional State (rates the stability of a natural area or habitat by its successional state in relation to manmade disturbance.)
- Rare Species (quantifies the density of rare species occurring within a habitat unit.)
- Uniqueness of Habitat (measures the uniqueness of habitat and its scarcity relative to the geographic region.)
- Patch Qualities (evaluates the effectiveness of a natural areas to support and sustain healthy wildlife populations.)
- Perimeter Adjacent Land Cover (addresses how land cover types are impacted by adjacent land uses.)
- Hydrologic Function (measures the capability of a land cover to process runoff prior to entering aquatic habitats.)
- Pollution Potential (measures point and NPS pollution potential for land cover.)
- Groundwater Interchange (measures groundwater pollution potential based on yield, soils with high permeability, and proximity to watercourses or community wells.)
- Riparian Value (measures whether the type and quality of land cover located within the riparian corridor.)
- Erosion Value (measures potential for erosion based on degree slope and vegetation coverage.)

The resulting composite scores provide a weighted average of the ecological integrity of remaining natural resources and the public health and safety functions of land cover in Granville. This quantitative measurement can then be used to prioritize land for acquisition and conservation easements; to determine areas for restoration; and to provide a framework within which informed spending and regulatory decisions can be made to determine the future character of Granville. The model would provide a

benchmark of the ecological health of Granville so that re-evaluated the Village and Township can determine if policies and efforts have improved, maintained, or degraded ecological health.
To preserve its rural and scenic character, Granville could require developers to donate a fixed percentage of land in perpetuity and encourage the acquisition of high quality areas by non-profit conservation organizations such as land conservancies.

By working to preserve vital green space and natural habitats, Granville could provide opportunities for safe, convenient recreational and transportation for residents. Preservation and enhancement of parklands and greenways can ensure the provision of the aforementioned public health and safety functions.

Greenways improve the quality of life in a community. Businesses want to locate in communities where their employees want to live. Recreational opportunities, made available through greenways help to promote fitness activities and reduce health costs.

Greenways also give rise to economic benefits. Real property values tend to increase in areas adjacent to or near trails and greenways. The existence of trails and greenways close to home keeps more money in the community as residents find recreational opportunities in their own backyard. Outdoor recreation facilities draw tourists and tourists spend money. Protecting land via the establishment of greenways and other forms of open space, has economic advantages to the community in terms of hazard mitigation. Greenways and parklands established in hazard-prone areas, such as floodplains, avoid potential public costs for damages.

Greenways not only protect environmentally important lands and native plants and animals, they also link people with the natural world and outdoor recreational opportunities. Advantages of greenways include:

- The preservation of plant and animal species biodiversity by maintaining the connections between natural communities.
- Softened urban and suburban landscapes and creating ribbons of green that improve the quality of life and enhance property values.
- The protection of water quantity and quality—a natural resource vital to people, plants, and wildlife.
- Development and growth that is directed away from important natural resource areas.
- Alternative transportation routes that connect people, communities, and the countryside.
- Outdoor classrooms.

Rural areas add immeasurably to the quality of life in Granville and are a key component of the community's character. They provide views and scenery, while maintaining a portion of Granville's historic agrarian atmosphere.

Property can also be acquired and owned by the public. In this case, public parks and trails would allow public access to open space. In addition, easements can be donated by or acquired from property owners that would allow limited public access for trails. However, resource protection can take place on private lands, where no public access or public ownership is proposed. This is often appropriate for protection of large areas of farmland, environmentally sensitive areas, and historic and archeological sites. Resource protection can be accomplished by a combination of voluntary and incentive-based measures and new or modified regulatory techniques. Techniques such as conservation easements, conservation development, and transfer of development rights could be evaluated and implemented by Granville.

Granville already has a number of parcels protected by conservation easements. In 1989, the Granville Land Conservancy was formed which later became the Licking Land Trust in 2002. To date, the Licking Land Trust has already secured numerous easements in Granville as shown in the table below.

In 1991, the land trust conducted a land use study of Raccoon Valley and found that the continuation of industrial, commercial, and residential development was creating environmental concerns.

Table 18.1: Licking Land Trust Conservation Easements

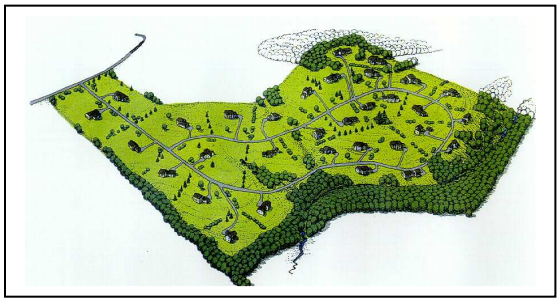
Description (Grantor and Approximate Location)	Acquired	Type of Protection	Area
Bob and Deb Harnden Harnden Mill Pond Preserve Granville Township	1991	Ownership	7.5 acres
Doug and Marilyn Bolden Bolden Reserve, Granville Township	1993	Ownership	1.2 acres
Granville Township Raccoon Valley Park, Granville Township	1993	Easement	9.73 acres
Cynthia Hill Hill Wetland Reserve, Granville Township	1996	Ownership	8.2 acres
Lee and Kathy Larson Hankinson Road, Granville Township	1997	Easement	5.2 acres
Howard LeFevre & Robert and Susan Morrison Mount Parnassus Village of Granville	1999	Ownership	0.58 acres
Granville Township Schwartzkopf Proparty Raccoon Creek Granville Township	2000	Easement	3.3 acres
Granville Township Pohm Property Raccoon Creek Granville Township	2001	Easement	3.3 acres
Judy Farris Mocking bird Hill Granville and McKean Townships	2004	Easement	53.5 acres
Dick and Ann Fryman Fryman Reserve Granville Township	2005	Ownership	36.6 acres

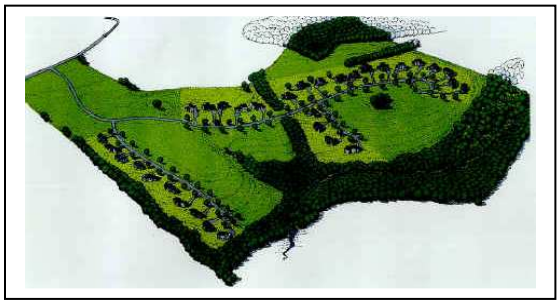
Source :Licking Land Trust

18.1 OPEN SPACE SUBDIVISION DESIGN

Traditional zoning such as large lot zoning can contribute to natural resource impacts such as excessive parking requirements and permitted density or intensity of development in environmentally sensitive areas. Many communities are implementing alternative design standards such as open space subdivision. In addition, setbacks and overlays are put into place to protect environmentally sensitive areas. These setbacks; however, should be used in conjunction with conservation development so that the protected area serves also as the open space dedication and economic hardships are not being created for potential development areas.

Common ownership of subdivision open space is a tool used by some of the oldest and most successful residential communities and commercial and industrial developments. For the purposes of this study, conservation development is considered a form of development that requires more than 40% open space and fits residential in and around resource protection criteria. In order to make open space development financially palatable to developers, codes often allow cluster/compact housing which reduces or even eliminates minimum lot sizes and setbacks and maintains the same or a higher density than conventional development.





Source: Arendt

These same principles can be applied to commercial development projects. They follow a similar approach, with an emphasis on compatibility with rural aesthetics, reduction of pavement/ impervious surfaces, and providing a community-enhancing experience for the customer/user and passerby.

The Countryside Program Resource Development Manual (1999) lists several characteristics as being generally common to development projects having conservation components are of value. Environmental and economic benefits are maximized through true conservation development projects, which meet these criteria.

- A SUBSTANTIAL PROPORTION OF PERMANENTLY PROTECTED OPEN SPACE.
  For overall densities of 1 unit or more per acre, 40% open space. For lower densities, 50%. Open space should be permanently protected through conservation easement, deed restrictions, or some combination of the above.

- OPEN SPACE IS HIGH QUALITY.
  Open space should contain large blocks of contiguous land, balanced with a maximum number of lots having direct access to open space. Fragmentation is minimized. Open space is fully accessible to residents of the development.

- OPEN SPACE IS USED FOR RESOURCE PROTECTION.
  There should be evidence that natural, agricultural, cultural/historic, and scenic resources on the site have been identified and prioritized. Highest quality resources should be protected by the open space allocated on the project.

- INTENSITY OF THE DEVELOPMENT IS APPROPRIATE FOR THE LOCATION.
  The density is in accordance with an up to date comprehensive plan. Where no comprehensive plan exists, more intense development belongs on sites with infrastructure and low priority resources; less intense development belongs on sites away from infrastructure, and/or high priority resources. The density of the development should approximate the density that could be built with the underlying conventional zoning for the site. When a density bonus is provided, a maximum of 10% increase is recommended in order to ensure a conservation benefit results.

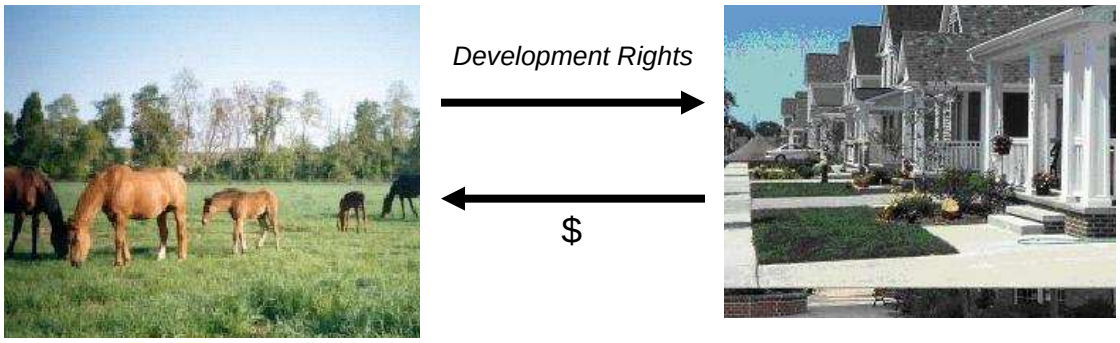
The bottom line for these criteria is that the overall environmental impact of the development project to natural, agricultural, scenic, and/or cultural resources should be less than the result from the conventional development that could be put in its place.

Following conservation development guidelines should result in development that is attractive and pleasing due to the amenities of preserved open space. Homes tend to have higher value than standard subdivisions, and often are sold more rapidly than traditional development. Providing there are minimal delays in the permitting process, the up-front costs related to road and utility line construction tends to be lower, making conservation development appealing to developers. Conservation development projects are simply better places to live and to work.

18.2 Transfer of Development Rights

Current development also vests landowners in a process that is not effective in controlling sprawl. The key element missing is Transfer of Development Rights (TDR), the process of shifting density from one parcel to another.

Priority Conservation Areas ***Priority Development Areas***



As discussed with conservation development, TDR should be designed to allow market forces to encourage conservation in high value natural, agricultural, and open space areas while compact residential and commercial development in the targeted development and development corridors or concept areas. By agreeing to relocate development or reduce densities in environmentally sensitive areas or other areas desired for low density, developers are given the right to intensify land use elsewhere above what would ordinarily be allowed through zoning

The most accepted approach is to have two permitted densities in the development/redevelopment zone. If the developer purchases development rights from a conservation zone or credits from a bank, then a formula is used and an increased density is permitted in the development zone. The profit from the increased density must outweigh the cost of purchasing the development rights. This approach was selected in the development of the sample language by Licking County.

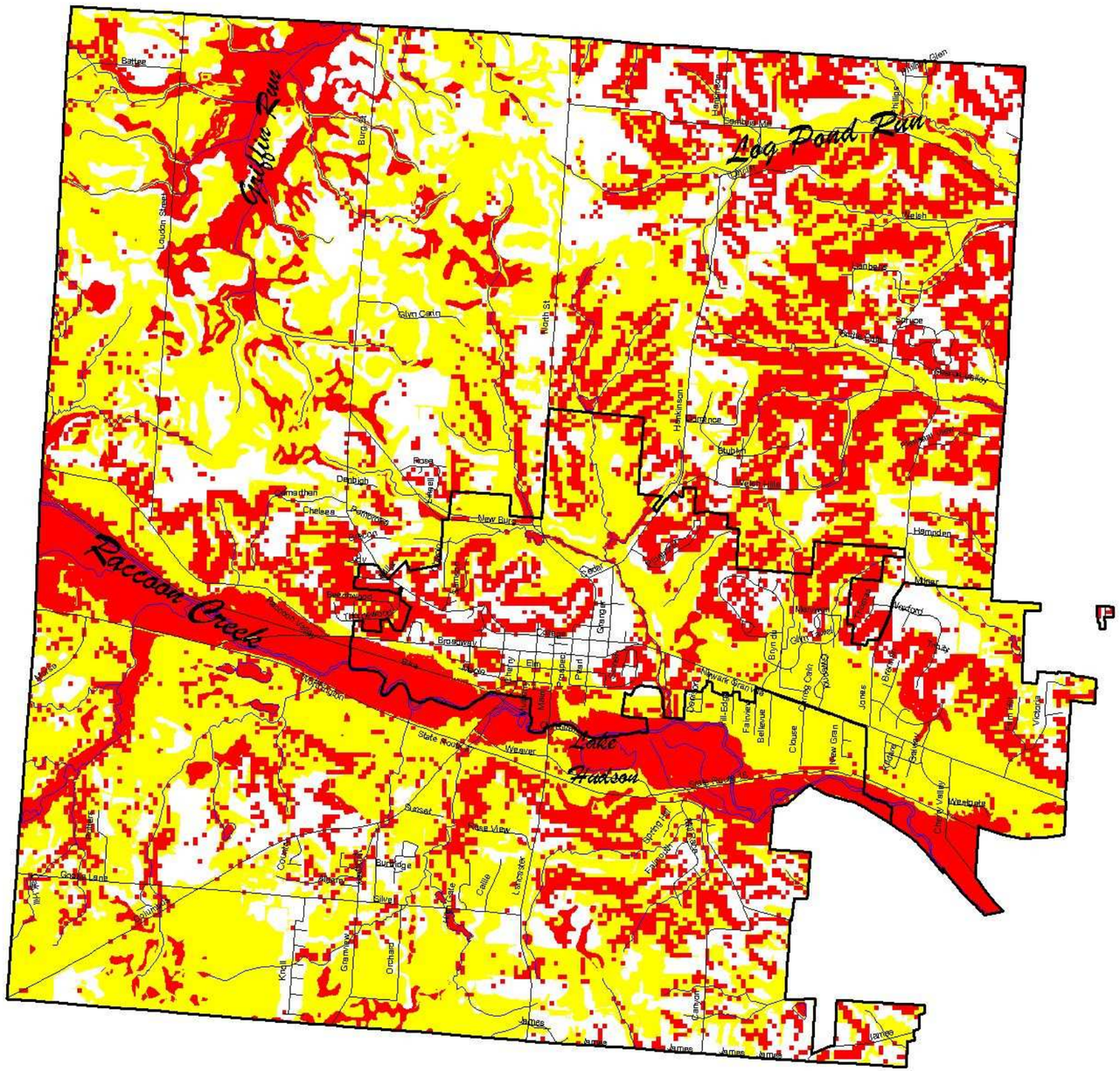
Implementation across political boundaries between the Village and Township will require further research. Both communities need to identify significant areas within their boundaries where they would like to see land protected from development (the sending zone) and the corridors where they would like to see redevelopment or development (the receiving zone). Landowners in the sending zone can be allocated a number of development credits that can be sold to developers, speculators, or the Township itself. In return for selling their development credits, the landowner in the sending zone agrees to place a permanent conservation easement on his or her land. Meanwhile, the purchaser of the development credits can apply them to develop at a higher density or use than would otherwise be allowed on a property within the receiving zone. Such a TDR program has the advantage of using free market mechanisms to create the funding

needed to protect valuable natural areas, remaining farmland, and other open spaces. This approach involves severing the right to develop an area that the Township wishes to preserve in low density or open space and transferring those rights to another site where higher than normal density would be tolerated and desirable. The development right is independent of land ownership. The development right becomes a separate article of private property and can be shifted from one area to another and can have economic value. The development rights on the piece of property are then retired through deed restriction.

19.0 Conclusions

Map 21 show a composite of environmental constraints to development and environmentally sensitive areas as they related to potential development areas.

Key issues are identified in the following table. Protecting resources will help ensure the provision of public health and safety functions. In addition, these natural features improve the quality of life in the community and translate ultimately into economic viability.



Village of Granville & Granville Township
Comprehensive Plan Update:
Environmental Analysis

Environmental Constraints to Development

Constraints to Development
(Wetlands, Floodplains, Steep Slopes, Hydric Soils)

Environmentally Sensitive Lands
(Riparian Corridor, Aquifer, Woodlands, Prime Farmland)

2000 0 2000 4000 6000 8000 10000 Feet

Table 19.1: Key Issues and Recommendations

Key Issues	Recommendations	Rationale	Implementation
Development compatible with natural resource protection	Require environmental site design review process Encourage open space developments Encourage green best management practices and other low impact development incentives	Avoid adverse impacts on remaining sensitive environments To maximize natural areas and benefits	Map and prioritize undeveloped lands based on ecological evaluation Formulate site design guidelines
Protection of groundwater resources	Protect the Raccoon Creek aquifer	Protect drinking water supply and hydrological connection to surface waters	Develop a groundwater protection policy and adopt a groundwater overlay district Conduct pollution source inventory
Protection of riparian corridors	Protect remaining vegetated riparian corridors Revegetate impacted riparian corridors	Protect steep slopes and critical habitat, improve water quality, and reduce flooding	Encourage stream bank tree planting and acquire riparian easements Secure funding to restore riparian corridors Adopt riparian setbacks, a riparian overlay district, conservation development zoning
Protection of wetlands	Include verification of wetlands permits in the site design review process	Conserve remaining wetlands	Ensure that the site design review addresses wetlands issues Adopt wetlands setbacks Develop a no net loss of wetlands policy
Protection of urban and community forests	Strengthen and adopt tree preservation ordinances and resolutions Expand duties of tree board Allocate more funding to forestry program Educate the public Develop planting program for private and public properties	Canopy cover provides numerous public health and safety benefits	Require developers to prepare tree preservation plans Provide incentives for tree planting and development Conduct public educational seminars Give preference to open space developments Implement Tree Resolution

Table 19.1: Key Issues and Recommendations Continued

Key Issues	Recommendations	Rationale	Implementation
Degradation of stream habitat	Restore stream systems Protect remaining stream systems	Improve surface water quality	Adopt Low Impact Design Guidelines Biomonitoring of streams Bioengineering and stream channel restoration Public education Assess storm drain system for potential enhancements Adopt riparian setbacks, a riparian overlay district, conservation development zoning
Nonpoint source pollution	Educate the public Include verification of stormwater pollution prevention plans (SWP3) in the site design review process Maximize vegetative cover and pervious areas	Prevent sedimentation of surface waters Decrease amount of pollutants in runoff and slow the flow of the runoff	Ensure that the site design review includes a SWP3 to specify BMPs and structural controls to minimize erosion and transportation of sediment Public education of BMPs for the general public and village administration Educate and/or require residents to stop mowing and using chemicals within riparian corridor
Protection of steep slopes	Protect remaining vegetated slopes over 12% Revegetate steep slopes	Protect steep slopes and improve water quality	Consider step slope protection of 30% slopes with setbacks, making development on slopes greater than 12 % a conditional use Encourage conservation design
Protection of watershed	Participate in watershed management plan efforts	Protect from flooding	Watershed plan for Raccoon Creek Public education of BMPs
Protection of greenways, parks, and open space	Develop greenway linkages and open space plans that provide multi-use functions and enhance the sense of community and protect sensitive natural resources	Serve the community's active and passive recreational needs Protect habitat for flora, fauna, and water quality Reduce flooding	Map contiguous open spaces and other potential corridor linkages Develop a strategy for acquisitions or easements Adopt conservation development zoning Consider Transfer of Development Rights

Educating the community on these environmental data will foster a grounded, solid understanding of the relationship between natural and human systems. A commitment to understanding ecosystems and our relationship to them will enable Granville to make more informed decisions about how to live sustainability in harmony with nature. How Granville uses these data should reflect the communities' connection to, and dependence on, the natural systems that surround citizens. Granville's decisions should commit to the improvement of stewardship of these systems.

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21.0 Appendix A: Model Zoning Examples

The following sample regulations were developed by Poggemeyer Design Group, teaming with EnviroScience, for Ohio Townships to consider as natural resource tools to protect natural resources at the local level. However, they can also be used by municipalities. These sample natural resource land use regulations are provided in three general categories: Zoning Districts; Supplemental Development Regulations; and Definitions for the terms used throughout this Appendix.

We want to clearly note that preparation of final zoning language for Granville Village and Township in a form ready for each to adopt is deserving of considerable attention and effort at the local level. Property owners and members of the development community should look closely at proposed regulations and offer valuable input into the decision-making process that often and understandably yields different results in different places. By providing sample language, the hope is to speed up the rate at which the Granville will implement these tools.

For Granville Township, each of the sample regulations will need full legal review in light of recent zoning enabling amendments to HB 411 regarding the Conservation Design authority only given to Limited Home Rule Townships, and the limitations placed by SB 18 on general welfare zoning.

A first step in implementing some of these tools is to conduct a more detailed inventory of natural resources.

TABLE OF CONTENTS

ESTABLISHMENT OF ZONING DISTRICTS

Three sample natural resource land use regulations are provided: Conservation Design Planned Unit Development; Transfer of Development Rights; and a Riparian Overlay District.

1. CD-PUD CONSERVATION DESIGN PLANNED UNIT DEVELOPMENT1

[Note: The following sample zoning text is proposed for establishing "floating" and "overlay" PUD Districts. Conditional Use PUDs should have appropriate standards from this sample text added to the supplemental regulations or conditional use regulations of the Zoning Code. The Countyside Program model is also a good alternative. We recommend that a yield plan be offered as an alternative to the formula .]

A. PURPOSE2

The purpose of the CD-PUD is to: promote the public health, safety, convenience, comfort, prosperity, and general public welfare; through the application of flexible subdivision development techniques which encourage the efficient and environmentally-sensitive use of land and preservation of prioritized natural, historic, and scenic rural resources; provide for greater efficiency in the provision of public roads and utilities than conventional subdivisions; and encourage innovation in the planning and building of all types of development to promote the conservation of high-quality open space while retaining for the property owner an equivalent amount of development density.

B. LAND USES

1) Permitted Uses

The following uses shall be permitted in a CD-PUD development only if allowed in the pre-existing Township Residential Zoning District for the site. *[**OPTION**: Any additional uses addressed in the Township Land Use Plan for a CD-PUD should be added to this regulation.]* Where permitted incompatible land uses are proposed for a CD-PUD development, buffering through graduated land use intensity or use of landscaping, mounding, walls, solid fencing, and other buffering techniques shall be required within and adjacent to the development:

a) Agriculture, as restricted by any regulations contained in the Township Code in accordance with ORC 519.21.

b) Residential development, including:

(1) Single-family dwellings in:

(a) detached buildings *[Note: definitions for this use may include*

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1 This CD-PUD model is based on the Countryside Program *Conservation Development Resource Manual*. For more information, contact: Kirby Date, P.O. Box 24825, Lyndhurst, Ohio 44124.

2 Combination of purposes provided by ORC 519.021 and ORC 519.02 (as modified November 5, 2005 by H.B. 148.)

"detached dwellings on lots," "cluster development on one lot," "zero-lot line housing" and "garden apartments"];

(b) attached buildings — *[Note: definitions for this use may include "two-family dwellings," "row housing with up to four (4) units attached," and "townhouses with up to six units attached"]*.

(2) Multi-family dwellings.

(3) Group homes permitted by right, including:

(a) Adult care facilities for three (3) to five (5) unrelated adults pursuant to ORC 3722.03

(b) MR/DD residential facilities for one (1) to eight (8) persons pursuant to ORC 5123.19(N)

c) Recreation facilities intended for use by residents of the development;

d) Restricted open space as required in Section 1.E (Restricted Open Space).

2) Permitted Accessory Uses

a) Accessory uses customarily incidental to the principal permitted use;

b) Buildings incidental to recreational uses;

c) Group homes permitted by right, including:

(1) Child day care home, Type B;

(2) Foster home for one (1) to five (5) unrelated children, pursuant to ORC 5103.03.

3) Conditional Uses.[3] Commercial and quasi-public development in natural campus settings, including:

a) Educational campuses;

b) Group homes and graduated living facilities;

c) Office parks;

d) Religious land uses used for worship.

C. MINIMUM PROJECT AREA

3 These conditional uses may not be appropriate for the Township based upon the Township Land Use Plan or other planning indicated in the underlying/preexisting zoning.

1) The gross area of a tract of land proposed for a CD-PUD shall be a minimum of twenty-five (25) acres to provide the potential for larger contiguous areas of open space and to ensure that the homeowners' association is large enough to sustain itself and fulfill its open space management and maintenance responsibilities. The Zoning Commission may reduce this requirement upon a finding a proposed smaller project area meets these objectives. A smaller project area may be found to be appropriate based upon the patterns of existing lot ownership, the extent of existing development, or when a smaller project size is a targeted component of the Township's overall open space plan for the subject parcel or area of the Township. 4

2) The area proposed shall be in one ownership or, if in multiple ownership, the application shall be filed jointly by all the owners of the properties included in the CD-PUD.

D. PERMITTED RESIDENTIAL DENSITY

The maximum number of dwelling units permitted in a CD-PUD shall not exceed the number of units permitted by the following formula, other CD-PUD regulations, or other applicable regulations, such as a minimum lot size imposed by the County General Health District for area, length, and width of on-site septic systems and minimum spacing of such systems from site elements as well as from other systems. The most restrictive regulation shall control.

1) The maximum number of dwelling units permitted in a conservation development shall be calculated by the following formula:

(TSA/MLA) X 90%, where:

a) **TSA** = the Total Site Area. TSA is determined by deducting the following from the total project area:

(1) Any area devoted to non-residential purposes;

(2) Any public right-of-way within the project boundary existing at the time the development plan is submitted;

(3) Any land subject to an existing conservation easement; and

(4) The area of "undevelopable land" in the parcel, designated as such by the fact it is an existing water body or subject to other riparian corridor, floodway, wetlands, or steep slope development setback regulations. This calculation shall be modified as follows:5

(a) Where "undevelopable lands" are found to overlap, they shall be counted only once.

4 The suggested minimum project area in some communities reaching "build-out" levels of development may need to be lower, perhaps to 10 to 15 acre minimums.

5 A third modification to the "undevelopable land" deduction from TSA could recognize that "undevelopable land" only impacts the developable area of a lot, and not the yard setback areas required on a lot. In other words, in a "yield plan," the developer might extend the required front, side, or rear setbacks of a yard into a water body, floodway, wetland, or steep slope area. In order to make the "density formula" simulate the "yield plan," an option is to only deduct two-thirds up to a three-quarters of the "undevelopable land." It is recommended that there should also be a township finding the developer will incorporate and provide an adequate mechanism for the preservation of an equivalent area of these features in required yard setbacks.

(b) Where MLA, below, exceeds one-half (1/2) acre per dwelling unit, deduct only the amount of "undevelopable land" that exceeds the minimum acreage required for restricted open space, as set forth in Section 1.E. (Restricted Open Space) below.

b) **MLA** = Minimum Lot Area (in acres). The minimum overall lot area of a CD-PUD shall be the density recommendation provided for the proposed site area in the Township Land Use Plan based on health and safety considerations, the prevailing demographic trends, and desired characteristics for the Township; in the absence of such a recommendation, use the stated density for a single-family dwelling in the pre-existing zoning district which would be replaced by the CD-PUD.

c) **90%** = A factor to account for losses in land area due to proposed roads and the fact that some of the lots in a development will be larger than the minimum required. [**OPTION**: *While 80% is the typical formula factor that is realized in a conventional development "yield plan," the Township could increase this factor up to 100% and effectively provide a density bonus incentive for a property owner to choose the conservation development option over the standard subdivision option.]*

2) When the above formula produces a fractional value for the total number of units for the total project area, this final number shall be rounded to the nearest whole number.

[**OPTION**: "Density Bonus. At the sole option of the Township, a bonus of additional housing units may be provided upon request by the applicant when required open space on nonpublic land is made available for general public use. For every whole acre of land devoted to walking/biking trails, equestrian trails, park areas, or other types of required open space listed in Section 1.F.1) that is also available for perpetual general public use, up to one additional housing unit may be added to the overall density, provided that overall density does not increase by more than ten (10) percent beyond the number of units allowed according to Section 1.D.1)b) above."]

E. RESTRICTED OPEN SPACE

The minimum restricted open space required for a CD-PUD shall be determined as a percentage of the total project area based upon the maximum density permitted, as follows:

Minimum Restricted Open Space	
% of the Total Project Area	**Maximum Density Requirement for Area**
40%	½ acre or less per unit
50%	More than ½ acre per unit up to 1.5 acres per unit
60%	More than 1.5 acres per unit

F. REGULATIONS FOR RESTRICTED OPEN SPACE

1) General Standards. The restricted open space required in Section 1.E shall comply with the following:

a) Restricted open space shall be designed and located to conserve, maintain, and incorporate large blocks of natural land and significant wildlife habitats in existing wooded areas, meadows, and hedgerows and treelines between fields, as well as significant natural features and historical and cultural elements located on the site. The design of restricted open space shall be easily accessible to all lots through the use of open space connectors and pathways.

b) Areas designated for restricted open space purposes may be:

(1) Preserved in its natural state;
(2) Designed and intended for the use and/or enjoyment of residents of the proposed development or the general public;
*[**OPTION**:* It has been suggested that allowing general public use of required open space would not be desirable to adjacent County homeowners unless the open space is acquired by a Park District for passive use; therefore, the phrase "or the general public" could be removed from b)(2) and a new provision added stating "(4) Utilized for passive recreation when purchased by a local Park District for public use."*]*
(3) Utilized for farming when authorized in a conservation easement or in the Association's covenants and restrictions.

c) Restricted open space shall be interconnected with open space areas on abutting parcels.

d) Sewage service, stormwater management, and/or water supply facilities may be approved for location partially or entirely within restricted open space areas to provide additional flexibility in the arrangement of units and to overcome hardships in meeting the minimum specified area for the conservation of open space. Where such facilities are so located, septic easements or conservation easements, as applicable, shall be established and at the option of the Township, name the Township a co-beneficiary to require and enable maintenance of such facilities by the appropriate parties. Such easements shall require approval from the County Combined General Health District, County Engineer, and Township Legal Advisor. The Zoning Commission may reduce the front building setback to increase required rear yard areas for conservation easements.

2) In order to encourage the creation of large areas of contiguous open space, areas that shall not be counted toward the requirement of restricted open space include:

   a) Private roads and public road rights-of-way;

   b) Parking areas, accessways and driveways;

   c) Required setbacks between buildings, parking areas and project boundaries;

   d) Required setbacks between buildings and streets;

   e) Minimum spacing between buildings, and between buildings and parking areas;

   f) Private yards;

   g) A minimum of fifteen (15) feet between buildings and restricted open space; and

   h) Other small fragmented or isolated open space areas that have a dimension less than fifty (50) feet in any direction. [**OPTION**: *Typical minimum dimensions range between 50' and 100'*]. The Zoning Commission may allow a fragmented or isolated open space area upon a finding the fragmented area is demonstrated to be purposeful and contextual to the development and not simply an isolated, left-over area with little or no contribution in terms of landscaped amenities, buffering, or recreation space.

      [**OPTION**: *Many communities place a limitation on the area or percentage of required open space that may be composed of ponds or lakes. See option discussion under D.1)a)(4)(b). This limitation often ranges between 50% and 80% of the required open space.* "i) The sum area of all pond and lake water bodies in the development which exceeds fifty (50) percent of the area of required open space."]

3) Any restricted open space intended to be devoted to recreational activities shall be of a usable size and shape for the intended purposes. The maximum percentage of restricted open space that may be developed for active recreation areas, including a community center, shall be five (5) percent of the total project area. [**OPTION**: *The typical range is 5% to 25%.*]

   a) Any area within the restricted open space that is disturbed during construction or otherwise not preserved in its natural state, other common areas such as required setback areas, and both sides of new streets shall be landscaped with vegetation that is compatible with the natural characteristics of the site.

   b) The restricted open space, including any recreational facilities proposed to be constructed in such space, shall be clearly shown on the general development plan.

4) Prohibition of Further Subdivision of Restricted Open Space. Restricted open space in a conservation development shall be prohibited from further subdivision or development by deed restriction, conservation easement, or other agreement in a form acceptable to the township's legal advisor and duly recorded in the office of the Recorder of Deeds of County.

5) Ownership of Restricted Open Space. Subject to such permanent restriction as set forth above restricted open space in a conservation development may be owned by an association, the township, a land trust or other conservation organization recognized by the township, or by a similar entity, or may remain in private ownership.

a) *Offer of Dedication*. The township may, but shall not be required to, accept dedication in the form of fee simple ownership of the restricted open space.

b) *Associations*. Restricted open space may be held by the individual members of a Condominium Association as tenants-in-common or may be held in common ownership by a Homeowners' Association, Community Association, or other similar legal entity. The Township's legal advisor shall determine that, based on documents submitted with the development plan, the association's bylaws or code of regulations specify the following requirements:

(1) Membership in the Association shall be mandatory for all purchasers of lots in the development or units in the condominium.
(2) The Association shall be responsible for maintenance, control, and insurance of common areas, including the required open space.
(3) Transfer of Conservation Easements. With the permission of the township, the owner(s) of the restricted open space may, in accordance with the provisions of ORC 5301.67-70, grant a conservation easement to any of the entities listed in ORC 5301.68, provided that:

(a) The entity is acceptable to the township;
(b) The provisions of the conservation easement are acceptable to the township; and
(c) The conveyance contains appropriate provision for assignment of the conservation easement to another entity authorized to hold conservation easements under ORC 5301.68 in the event that the original grantee becomes unwilling or unable to ensure compliance with the provisions of the conservation easement.

c) *Private Ownership of Restricted Open Space*. Restricted open space may be retained in ownership by the applicant or may be transferred to other private parties subject to compliance with all standards and criteria for restricted open space herein.

G. DEVELOPMENT AND SITE PLANNING STANDARDS

Buildings, structures, pavement, and streets shall be located in compliance with the following development and site planning standards.

1) Ownership. Any ownership arrangement, including, but not limited to, fee simple lots and condominiums, is permitted in a conservation development. Regardless of the ownership of the land, the arrangement of the dwelling units shall comply with the spacing requirements of this section.

2) Lot Requirements

a) Principal buildings in a CD-PUD are not required to be on separate lots.

b) When lots are included as part of a conservation development, they shall be of sufficient size and shape to accommodate dwelling units in compliance with the spacing requirements of this section.

c) The applicant shall depict on the development plan the maximum parameters, or building envelopes, to indicate where buildings shall be located, and shall demonstrate that such building locations will be in compliance with the spacing requirements of this section.

3) Setbacks

a) *Perimeter Building Regulations*. The following perimeter setbacks shall apply to a CD-PUD. At the sole discretion of Zoning Commission, the minimum setback requirement may be reduced to allow more flexibility to conserve open space when: a) natural features along the existing perimeter public street are substantial enough to provide adequate buffering between the units in the development and the road; or b) when there are significant natural features located on the interior of the site and the Township's priorities dictate that it is more important to conserve those natural features than to maintain large building setbacks along the existing perimeter public road.

(1) The minimum perimeter setback from an existing public street shall be ... ***[We suggest the Township adopt one or more of the following options]***

Option 1: ... (A dimension equivalent to the front yard setback in the standard Township single-family district zoning regulation).

Option 2: ... Where a CD-PUD is adjacent to other existing housing development, the setback shall be equivalent to the front setback requirement for those adjacent lots outside the CD-PUD on the same side of the street. At the sole discretion of the Zoning Commission, the minimum setback requirement may mirror the setback for those adjacent lots directly across the street from the CD-PUD.

Option 3: ... Where a CD-PUD is not adjacent to other existing housing development, the minimum setback from an existing perimeter public street shall be equivalent to one hundred (100) feet from an existing state highway right-of-way, seventy (70) feet from an existing county road, or sixty (60) feet from a Township road.

(2) The minimum perimeter setback for interior lots abutting the project boundary where there is no existing or proposed road shall be: ***[We suggest the Township adopt one or more of the following options]***

Option 1: ... (A dimension equivalent to the rear yard setback in the standard Township single-family district zoning regulation.)

Option 2: ... mirror the yard setback requirement of the adjoining district.

Option 3: ... fifty (50) feet with a twenty (20) foot buffer yard when adjacent to a similar use, and eighty (80) feet with a fifty (50) foot buffer yard when adjacent to an incompatible use.

b) *Interior Building Setback/Spacing Regulations*. The buildable area for structures and streets on the interior of a CD-PUD shall be in compliance with the following development site planning standards:

(1) Interior Streets. Interior streets which parallel a perimeter boundary shall be set back a minimum of twenty (20) feet from the boundary unless the Zoning Commission provides a modification pursuant to Section 1.G.(4) (Modification of Requirements).

(2) Front Yard Setback

(a) The minimum setback from a proposed local public right-of-way shall be thirty-five (35) feet.

(b) The minimum setback from the edge of the pavement of a private street shall be twenty-five (25) feet.

(c) *[Option for Consideration: Exception in a cul-de-sac which is not greater than two hundred (200) feet with no more than six (6) dwellings, the minimum building setback is fifteen (15) feet.6]*

(d) In order to maximize rear yard areas when used for conservation easements, the Zoning Commission may reduce a front yard setback.

(3) Side Yard Setback. [Select from a range of seven (7) to ten (10) feet, and/or one-half (1/2) the height of the tallest adjacent vertical wall as measured from the average grade of the vertical wall to the eave line.]

[Note: Where zero-lot line units are permitted in the PUD and are proposed for two adjacent lots, deed restrictions shall be required for both lots requiring zero-lot line construction or a separation between buildings equivalent to the requirements for separation between buildings on the same lot, below.]

(4) Separation of Buildings on the Same Lot. The minimum separation between dwellings shall be ... ***[We suggest the Township adopt one or more of the following options***7***]***

Option 1: ... (A dimension equivalent to twice the minimum side setback in the standard Township single-family district zoning regulation.)

Option 2: ... the greater of ***[Select from range of fifteen (15) to twenty (20)]*** feet, or one-half (½) the height of the tallest adjacent vertical wall as measured from the average grade of the vertical wall to the eave line.

Option 3: ... the greater of ***[Select from range of fifteen (15) to twenty (20)]*** feet, or one-half (½) the height of the tallest adjacent

6 The Northfield Center Township Zoning Code has a 10 foot setback.

7 Options 2 and 3 are quite growing in popularity in many municipalities to meet comfort and prosperity purposes; however they are not preferred by the Planning Commission. Option 3 is not preferred by the HBA.

vertical wall as measured from the average grade of the vertical wall to the eave line plus one (1) foot for each linear foot of the horizontal wall length (adjacent to the side property line) which exceeds fifty (50) feet.

Option 4: ... Spacing between buildings is based on the direction for the buildings: If side wall to side wall, spacing is ***[Select from range of fifteen (15) to twenty-five (25)]*** feet; If side wall to front/rear wall, spacing is ***[Select from range of twenty-five (25) to forty (40)]*** feet; If front/rear wall to front/rear wall, spacing is ***[Select from range of forty (40) to eighty (80)]*** feet.

Option 5: ... the minimum spacing between windows of living areas, patios, decks, and terraces is fifty (50) feet. The Zoning Commission may determine that less setback is needed if adequate landscaping and screening is provided to ensure privacy between units.

c) *Height*. The maximum building height shall be ... ***[We suggest the Township adopt one of the following options]***

Option 1: ... (A dimension equivalent to the height regulation in the standard Township single-family district zoning regulation.)

Option 2: ... 35 feet.

4) Modification of Requirements. The Zoning Commission may modify these standards based on sound planning and design principles, taking into account the degree of compatibility between adjoining uses, sensitivity to the characteristics for the site, the need for free access for emergency vehicles, the need for adequate amounts of light and air between buildings, and the need for proper amounts for open space.

H. DEVELOPMENT DESIGN CRITERIA

In addition to the development and site planning standards set forth in Section 1.G, all elements of a conservation development, particularly the restricted open space areas, shall be designed in accordance with the following criteria to ensure that the project is appropriate for the site's natural, historic and cultural features and meets the objectives of this district.

1) Priority of Open Space Conservation ***[NOTE: The Township Land Use Plan should contain a ranking of natural resource conservation priorities from highest to lowest priorities. This list determines which sites have value to the community and should be preserved in CD-PUD design. The following list is suggested by the CountrySide Program for use in planning, recognizing that this list needs to be ranked based on local priorities and some categories may not be applicable to each County Township.]***

a) *Conservation of Sloping Land*. The road system and buildings should be located to minimize changes to the topography and the need for cutting and filling.

b) *Conservation of Woodlands, Vegetation and other Natural Areas*. The design and layout of the development should conserve, maintain, and incorporate existing wooded areas, meadows, and hedgerows and treelines between fields or meadows, especially those containing significant wildlife habitats.

c) *Conservation of Wildlife Habitats*. Wildlife habitat areas of species listed as endangered, threatened or of special concern by the U.S. Environmental Protection Agency and/or by the Ohio Department of Natural Resources should be protected.

d) *Conservation of Prime Farmland*. Farmland that satisfies the USDA definition of "prime" or "locally unique" farmland should be conserved.

e) *Conservation of Existing Scenic Vistas and Visual Quality of the Environment*. Buildings should be located to ensure that scenic views and vistas are unblocked or uninterrupted.

f) *Conservation of Cultural Resources*. Sites of historic, archaeological, or cultural value and their environs should be protected insofar as needed to safeguard the character of the feature, including stone walls, spring houses, barn foundations, underground fruit cellars, earth mounds and burial grounds.

2) General Street Design Criteria. Interior street paved surfaces in a PUD should be planned as the minimum necessary to provide adequate and safe movement through the development. Street alignments should follow natural contours and be designed to conserve natural features. The locations of streets should be planned to avoid excessive stormwater runoff and the need for storm sewers.

3) Pedestrian Circulation Systems. A pedestrian circulation system shall be included in the conservation development and shall be designed to ensure that pedestrians can walk safely and easily throughout the development.

a) The pedestrian system shall provide connections between properties and activities or special features within the restricted open space system and need not always be located along streets.

b) Trails for which public right of passage has been established should be incorporated in the pedestrian circulation system.

4) Sewage Disposal. Development shall be served by individual or public sewage disposal structures consistent with the County systems. Individual sewage disposal systems shall comply with all applicable regulations of the County Combined General Health District and may be located within restricted open space areas when approved by the township and the County Combined General Health District.

I. PROJECT REVIEW PROCEDURES

Under the authority established in ORC 519.021, the Zoning Commission shall review and approve development plans for a proposed conservation development according to the procedures set forth in this Section.

1) Submission Requirements for Preliminary Development Plan. The applicant shall submit a CD-PUD Development Plan application to the Township Zoning Inspector. Maps shall be drawn at an engineer scale not less than one (1) inch = one hundred (100) feet, except that projects over two hundred (200) acres may be drawn at a scale of one (1) inch = two hundred (200) feet. The application shall include documentation illustrating

compliance with the standards and criteria set forth in this Article. The application and documentation shall include, but not necessarily be limited to:

a) Identification of existing site characteristics, including a general depiction of:

(1) Boundaries of the area proposed for development, dimensions and total acreage;

(2) Contour lines at vertical intervals of not more than five (5) feet, highlighting ridges, rock outcroppings and other significant topographical features.

(3) Location of wetlands (and potential wetlands), the floodway boundary and floodway elevation as delineated by the Federal Emergency Management Agency, rivers and streams and their related river or stream bank, ponds, and water courses;

(4) Existing soil classifications;

(5) Locations of all wooded areas, tree lines, hedgerows, and specimen trees;

(6) Delineation of existing drainage patterns on the property, existing wells and well sites;

(7) Description of significant existing vegetation by type of species, health, quality, etc.;

(8) Existing buildings, structures and other significant man-made features on the site and within two hundred (200) feet of the project boundary;

(9) Description of all structures and areas of known or potential historical significance; and

(10) Existing viewsheds and identification of unique vistas.

b) The proposed Preliminary Development Plan documentation and maps shall include:

(1) A summary of the proposed development including the total acreage, number of residential units, type of dwellings, density by type of dwelling, and acreage of restricted open space to be conserved;

(2) A sketch layout of standard single family lots, if any;

(3) The location of the restricted open space and any proposed recreational facilities;

(4) Natural features to be conserved and any required buffer areas;

(5) Natural features to be altered or impacted by the development and areas where new landscaping will be installed, etc.;

(6) General location of public street rights-of-way; and

(7) Proposed utility easement locations.

(8) An outline of the method/structure to perpetually preserve the required restricted open space which indicates:

(a) The structure of the Association;
(b) Membership requirements;
(c) Financial responsibilities; and
(d) The relationship of the entity to public agencies having responsibilities related to the project.

(9) A description of the project phasing including the phased construction of open space improvements.

2) Review For Completeness. Within five (5) business days of receiving the application, the Zoning Inspector shall review the application to determine that the application includes all the items required in Section 1.I.(1) (Submission Requirements for Preliminary Development Plan) above. If the application is deemed complete and the application fee paid, the Zoning Inspector shall officially accept the application on that date.

3) Review of Development Plan by Others. The Township Zoning Inspector shall distribute the Preliminary Development Plan application to the following officials and agencies for review and comment within thirty (30) days from the date distributed against applicable standards and criteria of the reviewing agencies.

a) Regulatory agencies which have statutory authority to subsequently review and approve any aspect of the development, including but not limited to the County Planning Commission, the County Combined General Health District, the County Sanitary Engineer, the County Water and Soil District, and the Ohio Environmental Protection Agency.

b) Other agencies which, at the discretion of the Township, may have appropriate technical expertise.

c) Appropriate local Township administrative officials, including the Township's legal advisor.

d) Consultants retained by the Township.

4) Site Visit. The Township Zoning Commission shall, together with the applicant and the applicant's consultant(s), visit the site to gain a thorough understanding of the characteristics of the site and evaluate the application against the design criteria in the CD-PUD regulations and the applicable standards and criteria of other reviewing agencies.

5) Review and Approval by Township. The Zoning Commission shall review the general development plan and the comments received from Section 1.I.(3) (Review of the Development Plan by Others) above.

a) The Zoning Commission shall take action on the submitted general development plan by either:

(1) Approving the general development plan as submitted; or

(2) Approving the general development plan subject to specific conditions not included in the plan as submitted, such as, but not limited to, improvements to the general building layout or open space arrangement; or

(3) Denying approval of the general development plan.

b) Failure of the Zoning Commission to act within sixty (60) days from the date the application was determined complete, or an extended period as may be agreed upon, shall at the election of the applicant be deemed a denial of the general development plan.

6) Significance of Approved Plan. Approval of the general development plan shall:

a) Establish the development framework for the project, including the general location of open space, development areas, densities, unit types, recreational facilities, and street alignments.

b) Be the basis for the application to proceed with detailed planning and engineering in reliance on the approved general development plan.

c) Provide the benchmark for the Zoning Commission to consider and approve amendments to the general development plan when the Township Zoning Commission determines that the amended plan is equal to or better than the approved general development plan.

d) Authorize the applicant to apply for all other required regulatory approvals for the project or subsequent phases thereof.

J. FINAL DEVELOPMENT PLAN

After a Preliminary Development Plan has been approved, an applicant shall submit for review and approval a final development plan. The final development plan may be submitted either for the entire project or for each construction phase.

1) Submission Requirements for Final Development Plan. The final development plan shall include:

a) A site plan drawn at a scale not less than one (1) inch = one hundred (100) feet indicating:

(1) Boundaries of the area proposed for development, accurate dimensions and total acreage;
(2) The exact location and dimension of private streets, common drives and public street rights-of-way;
(3) Exact location of building footprints or envelopes within which dwelling units are to be constructed, and lot lines with dimensions for all residential units for which individual ownership is proposed;
(4) Dimensions of building/unit spacing;
(5) The extent of environmental conservation and change and the exact location of all no cut/no disturb zones ; and

(6) Designated restricted open space areas and a description of proposed open space improvements.

b) A grading plan drawn at a scale of one (1) inch = one hundred (100) feet, showing all information pertaining to surface drainage.

c) A detailed landscaping plan for new landscaping, including entry features and signs.

d) The Declaration, Articles of Incorporation and either Bylaws (for a Condominium Association) or Code of Regulations (for a Homeowners' Association) and any other final covenants and restrictions and maintenance agreements to be imposed upon all the use of land and pertaining to the ownership, use, and maintenance of all common areas, including restricted open space.

e) Conditions imposed by other regulatory agencies.

2) Review For Completeness. Within five (5) business days of receiving the application, the Zoning Inspector shall review the application to determine that the application includes all the items required in Section 1.J.(1) (Submission Requirements for Final Development Plan) above. If the application is deemed complete and the application fee paid, the Zoning Inspector shall officially accept the application on that date.

3) Distribution of Final Development Plan. The Zoning Inspector shall distribute the Final Development Plan application to the Zoning Commission, the Township legal advisor, and other appropriate administrative departments or professional consultants for review and comment. Any reports, comments, or expert opinions shall be compiled by the Zoning Inspector and transmitted to the Zoning Commission prior to the time of the Commission's review.

4) Review by the Township Legal Advisor. The township's legal advisor shall review the Declaration, Articles of Incorporation and either Bylaws (for a Condominium Association) or Code of Regulations (for a Homeowners' Association) and any other final covenants and restrictions and maintenance agreements to be imposed upon the conservation development. A written legal opinion shall be provided to the Zoning Commission by the applicant certifying that the above demonstrate full compliance with the requirements of this Chapter and the Ohio Revised Code.

5) Review and Approval by Township. The Zoning Commission shall review the Final Development Plan and the comments received from Section 1.J.(3) (Distribution of Final Development Plan) and Section 1.J.(4) (Review by Township Legal Advisor) above.

a) The Zoning Commission shall determine if the final development plan is in compliance with the general development plan and take action on the submitted final development plan by either:

(1) Approving the final development plan as submitted; or
(2) Approving the final development plan subject to specific conditions not included in the plan as submitted, such as, but not limited to, improvements to the general building layout or open space arrangement; or
(3) Denying approval of the general development plan.

b) Failure of the Zoning Commission to act within (60 days) from the date the application was determined complete, or an extended period as may be agreed upon, shall at the election of the applicant be deemed a denial of the general development plan.

2. TDR - TRANSFER OF DEVELOPMENT RIGHTS DISTRICT

[Note: Since enabling language has not been enacted by the State of Ohio, it is not clear whether a statutory township may institute a transfer of development rights (TDR) program at this time. Several commentators have suggested that political jurisdictions with self-rule powers could establish a TDR Program, such as an intra-municipal TDR program, an inter-municipal TDR program, or a charter county TDR program, and that these regulations would most likely be upheld. The following sample text is suggested only for consideration and legal review. Much more community planning is required, including the targets for sending and receiving areas, the value of various identified sending areas, and maximum densities for various receiving areas.]

A. PURPOSE AND INTENT

It is the purpose and intent of this resolution to provide for the transfer of development rights (the maximum development that would be allowed on a parcel under its current zoning) from one property to another to promote the conservation of natural, agricultural, environmental, historical and cultural resources and encourage smart growth in appropriate areas. Further this resolution provides a means to achieve the visions and goals of the Township Comprehensive Land Use Plan.

B. APPLICABILITY OF REGULATIONS

The provisions of this resolution apply only to the [name of TDR planning area(s)], which is that portion of [name township] bordered to the west by [name boundary], to the south by [name boundary], and to the east by [name boundary], as illustrated on the attached map. Compliance with all other applicable Township resolutions, regulations and resolutions is required; however, when in conflict, the provisions of this resolution shall prevail.

C. TRANSFER OF DEVELOPMENT RIGHTS

The transfer of development rights is a method for permanently conserving and protecting land by transferring the rights to develop from one property (sending area) to another (receiving area).

D. SENDING AREA

Sending areas are those properties designated as priority conservation areas from which development rights may be transferred to a receiving area. Sending areas may be any properties in the ***[name of priority conservation area(s)]*** except those areas designated as receiving areas or as otherwise prohibited by this resolution. Additional sending areas may be designated through the amendment process as set forth in ***[Section XXX]*** (Zoning Amendment Procedure) of the Township Zoning Resolution.

E. RECEIVING AREA

Receiving areas are those properties which may receive development rights from a sending area. Receiving areas are those properties intended for ***[type of priority development, typically mixed-use]***, specifically the ***[name of receiving areas]*** designated in the Township Comprehensive Land Use Plan. Additional receiving areas may be designated through the amendment process as set forth in ***[Section XXX]*** (Zoning Amendment Procedure) of the Township Zoning Resolution.

F. ELIGIBILITY

Landowners or representatives with the authority to transfer fee simple ownership of any parcel in the [name of TDR planning area(s)] (except as noted below) may apply for a Transfer of Development Rights Certificate. Parcels not eligible are as follows:

1) Any parcel from which all development rights have previously been sold or transferred;

2) Any parcel on which a conservation easement (legally binding agreement between a property owner and a governmental body or charitable organization8 qualified under ORC [name of provision] that restricts the type and amount of development and use that may take place on a property) or other permanent deed restriction has been previously granted;

3) Any parcel fully developed based on its existing zoning;

4) Any parcel or portion of a parcel that has been designated as open space (land on which no additional development associated with residential, industrial or commercial purposes is allowed, except in compliance with this resolution and other Township zoning and planning regulations) in a conventional or conservation subdivision;

5) Any publicly owned parcel; and

6) Any land within riparian buffers mandated by state or local law.

G. APPLICATION REQUIREMENTS FOR A TRANSFER OF DEVELOPMENT RIGHTS CERTIFICATE

An eligible landowner or authorized representative must provide the following:

1) Name, address and telephone number of applicant and applicant's agent, if any;

2) Proof of ownership of the sending property;

3) Metes and bounds written legal description and plat prepared within ninety (90) days of the date of application by a licensed surveyor;

4) Written description of the physical characteristics of the property;

5) Site plan which illustrates existing or proposed dwellings, historic structures, easements or other encumbrances; and

6) The processing fee as established by other resolution by the Township Board of Trustees.

H. CALCULATION OF THE RESIDENTIAL TRANSFER OF DEVELOPMENT RIGHTS

Within thirty (30) days of the receipt of a complete application for a Transfer of Development Rights Certificate, the Zoning Inspector shall certify the number of transferable development rights, assign serial numbers accordingly, and issue a Transfer of Development Rights Certificate.

1) The following formula shall be used to compute the amount of land that must be preserved in the Sending Areas to develop a Receiving Area above its required density limit:

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8 A charitable corporation, charitable association, or charitable trust, the purposes or powers of which include: retaining or protecting the natural, scenic, or open-space values of real property; assuring the availability of real property for agricultural, forest, recreational, or open-space use; protecting natural resources; maintaining or enhancing air or water quality; or preserving the historical, architectural, archeological, or cultural aspects of real property.

Total number of proposed 9 residential units in the Receiving Area, minus the maximum density 10 allowed by the Zoning Code for the total acreage of the area to be developed = Transfer of Development Rights from the Sending Areas.

2) For each eligible gross acre of the sending area, one development right (TDR) will be issued. 11

3) The area of a parcel with fractional acreage will be calculated by rounding the total acreage down to the nearest whole number and issuing one TDR per acre.

Example: Suppose 100 acres are proposed to be developed at 17 units per acre for a total of (100 acres x 17 units per acre =) 1,700 units to be developed. If the existing Receiving Area zoning allows 3 units per acre to be developed for a total of (100 acres x 3 units per acre =) 300 acres, then the total number of acres to be preserved in the Sending Areas is (1,700 proposed units – 300 allowed units =) 1,400 TDRs. 1 TDR = 1 Acre. Therefore, 1,400 TDRs must be transferred to the Receiving Area resulting in the conservation of 1,400 acres of land in the Sending Area. 12

I. APPEAL OF CALCULATION

Any landowner or authorized representative aggrieved by a final decision of the Zoning Inspector related to the certification of Transfer of Development Rights may appeal such final decision to the Board of Zoning Appeals by filing, in writing, setting forth plainly and fully why the calculation is in error. Such appeal shall be filed no later than thirty (30) days after the date of the Zoning Inspector's final decision.

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9 The Township may wish to consider placing a cap on the maximum density of the receiving area when using TDRs, taking into account traffic safety, congestion, and the cost of additional public services in developing such a cap. Density bonus incentives could be considered for historic preservation, brownfield development, or redevelopment of vacated big box sites.

10 The maximum density of the parcel allowed by the Zoning Code may be determined by simply dividing the gross size of the parcel by the minimum required lot size.

11 The township should develop a method for determination of the transfer of development rights as part of the Township Land Use Plan. This residential sample calculation assumes all acres of the Sending Area are equivalent and assigns a value of one acre of Sending Area per increase of one unit of development density in the Receiving Area. One option would be to assign the required area of land necessary to develop one dwelling unit in the Sending Area per increase of one dwelling unit over the development density permitted in the Receiving Area.

12 A commercial TDR calculation could be implemented as well. For instance, if a township places a limit on the permitted size of a commercial building in the Receiving Area, this could become the threshold for TDR acquisition. If a Township concern for maximum commercial building size is 50,000 s.f., then the difference in the size of the commercial building over the threshold size could be multiplied by a factor, such as 2% to calculate the number of TDRs to be transferred to the Receiving Area from the Sending Area. It has been suggested that the factor could be increased in tiers as the building size increases. Density bonus incentives could be considered for historic preservation, brownfield development, or redevelopment of vacated big box sites.

J. APPROVAL OF TRANSFER OF DEVELOPMENT RIGHTS AND APPEAL PROCESS[13]
Any proposed transfer of development rights shall be subject to the approval of the Board of Trustees after an administrative hearing. A transfer of development rights shall be approved by the Board of Trustees if it meets the requirements of this resolution.

K. APPEAL OF TRANSFER DECISION
Any appeal or other legal challenge to the Board of Trustees' final decision regarding a Transfer of Development Rights shall be pursued by petition for writ of certiorari filed with the Common Pleas Court of County within thirty (30) days of the date of the Board of Trustee's decision.

L. RECORDATION OF TRANSFER OF DEVELOPMENT RIGHTS TRANSACTIONS (SENDING AREAS)

1) Deed of Transfer. A Deed of Transfer shall be required to convey development rights from a sending parcel to a purchaser. The Deed shall be valid only if it is signed by the owner or authorized representative of the sending parcel, complies with all legal requirements for the transfer of real estate, contains provisions established by the Zoning Inspector and is recorded in the chain of title after the conservation easement is secured against the sending parcel.

a) A Deed of Transfer shall contain a metes and bounds written legal description and a plat prepared by a licensed surveyor, the names and addresses of the Grantor and the Grantee of the development rights, the serial numbers of the TDRs being conveyed along with a copy of the TDR certificate issued by the Zoning Inspector and proof of the execution and recordation of a conservation easement on the sending parcel.

b) Conservation Easement. To convey the certified development rights on a sending area, a conservation easement between the owner of the sending area and an organization authorized by the laws of the State of Ohio to accept, hold and administer conservation easements, pursuant to ORC [name of provision which discusses conservation easement process and requirements] must be signed and recorded with the County Clerk, prior to the Deed of Transfer. Conservation easements established pursuant to this section may not be released or nullified by any party. The Zoning Inspector may develop a model conservation easement form and require it be used to fulfill the requirements of this section.

c) Each conservation easement shall contain:

(1) A metes and bounds written legal description and plat prepared by a licensed surveyor;

(2) Prohibitions against the use and development of the sending area property which are inconsistent with the terms of eligibility as required by the Township Land Use Plan and defined in *Section F* (Eligibility) above;

[13] NOTE: In areas of the country where TDR is used, landowners are reportedly eager to implement and use a TDR program, but hesitate when they see the local government approval requirement of each and every TDR transaction. It is thought to make a TDR program more viable and efficient for the townships, landowners and developers, the Township should eliminate the local government approval requirement of each TDR transfer.

(3) Assurances that prohibitions will run with the land and bind the landowner and every successor in interest to include a statement that the easement shall survive any merger of the easement interest and the fee simple interest of the property;

(4) The serial numbers of the TDRs being transferred in the Deed of Transfer from the sending area property subject to the conservation easement; and

(5) A statement that nothing in the easement shall be construed to convey to the public a right of access or use of the property and that the owner of the property, his heirs, successors and assignees will retain exclusive right to such access or use subject to the terms of the easement.

(6) Sufficiency of Documents. Prior to the recordation of the Deed of Transfer and the conservation easement, parties to the transaction must obtain an opinion from a licensed Ohio attorney that the Deed and easement have been executed by all necessary parties and is perpetual and binding on the property owner and every successor in interest. A copy of this document shall be provided to the Township.

(7) Re-issuance of TDR Certificates. In the event of the transfer of fewer than all of a landowner's development rights, the landowner must return the original TDR certificate to the Zoning Inspector upon the recordation of the conservation easement and Deed of Transfer. The landowner must provide a copy of the Deed of Transfer that contains the serial numbers of the development rights transferred.

(8) Within ninety-five (95) days of the receipt of the complete TDR certificate, the Zoning Inspector shall reissue a certificate to the landowner reflecting the remaining TDRs and the corresponding serial numbers.

M. RECORDATION OF TRANSFER OF DEVELOPMENT RIGHTS TRANSACTIONS (RECEIVING AREAS)

The following information shall be recorded on the face of any plat for property which receives development rights under the provisions of this Resolution:

1) A statement that the development rights used in the plat have been transferred in accordance with the Deed of Transfer, prescribed above.

2) The serial numbers of the TDRs conveyed along with a copy of the TDR certificate issued by the Zoning Inspector.

N. TRANSFER OF DEVELOPMENT RIGHTS BANK

Subsequent to the adoption of this resolution, the Township may create a Transfer of Development Rights Bank ("the Bank") to encourage the exchange of development rights in the private market and encourage the preservation of land. The Bank will facilitate the exchange by purchasing and selling development rights. Also for the purposes of conserving land, the Bank may hold TDRs for any length of time to include in perpetuity.

O. ORGANIZATION OF THE BANK

1) The Bank shall be directed and managed by a Bank Board.

a) The Bank Board shall consist of five (5) members who shall be residents of the Township, nominated by the Zoning Commission and appointed by the Township Board of Trustees. Specifically, one member shall be experienced in the banking or financial industry, one member shall be a private landowner in the TDR Planning area, one member shall be experienced in the legal industry, one member shall represent a conservation organization, and one member shall be a representative from the real estate development industry. If a candidate meeting the requirements for member cannot be found within the Township, the member may be a resident of County.

b) The terms of office for the Bank Board members shall be four (4) years and staggered.

c) Three (3) members shall constitute a quorum. A majority vote shall be required for any action before the Bank Board.

d) The Bank Board may adopt procedural and substantive rules to govern its powers, duties and functions. Staff support shall be provided by the Zoning Inspector.

2) Empowerments. The Bank Board shall be empowered to:

a) Enter into agreements for professional services (e.g. consulting, appraising, accounting) subject to available funding;

b) Apply for and accept grants or loans for the Bank Board's authorized purposes;

c) Purchase, receive, sell or hold TDRs;

d) Purchase properties in fee simple to preserve them through conservation easements and resell the restricted properties at fair market value; and

e) Do all other things necessary to carry out the functions and operations of the Bank.

3) Authority and Compensation. The members of the Bank Board shall receive no compensation from the Bank except reimbursement for expenses incurred for the performance of their duties as Board members.

4) Registry of TDRs. For the purposes of tracking and marketing transfer of development rights, a central registry of available Transfer of Development Rights Certificates shall be established by the Bank or the Zoning Inspector in the event the Bank is not established.

5) Acquisition Priorities. The following priorities shall be considered by the Bank Board for purchasing TDRs:14

a) Properties adjacent to the Receiving Areas;

b) Properties that border the any water features, including wetlands;

c) Development pressures on the land;

d) Price of the development rights;

14 The acquisition priorities can be prioritized by the township if desired.

e) Pre-existing perpetual restrictions against development;

f) Proximity to other properties with easement restrictions for the purpose of creating large, contiguous tracts of conserved land;

g) Environmental assessments; and

h) Other factors of public interest determined by the Bank Board.

6) Purchase, Sale and Value of TDRs. To determine purchase and/or sales price of development rights, the Bank Board may negotiate, use a competitive bid process, or any other method deemed fair and equitable by the Bank Board.

a) Purchase and sale prices must be supported by an appraisal paid for by the Bank Board.

b) Any eligible landowner may approach the Bank Board with an offer to sell TDRs. The Bank Board shall have sixty (60) days to consider and respond to such offers.

c) Landowners shall follow the procedures and requirements for certification of TDRs as prescribed by this resolution.

d) All transactions through the Bank Board must follow the recordation requirements prescribed by this resolution.

e) The Bank Board may, as a preservation measure, acquire fee simple interest in sending area parcels on a competitive basis in the open market. The intent of a purchase is to place a perpetual conservation easement on a property and then resell the restricted parcel for fair market value.

f) Purchase and resale of sending area parcels is limited to those parcels where development pressures or the prospects of a change of the use of the property are high and/or whose location and/or quality are such that the property's preservation is important to the continued viability of the TDR planning area.

7) Right of First Refusal. The Bank Board shall have the authority to enter into Right of First Refusal Agreements with sending area landowners for the purchase of either TDRs or property in fee simple.

a) The Right of First Refusal Agreement is an instrument that is recorded in the chain of title for the subject property, and is to be effective concurrent with the ownership of the signer(s) of the agreement and to be renewed by immediate family members who may become successive owners.

b) In the event that all or a portion of the TDRs or property may be sold to someone other than an immediate family member or developed or subdivided, notification by the landowner to the Bank Board shall be required.

c) Within 90 days of notification, the Bank Board may exercise the right of first refusal by acquiring either the development rights or the property in fee simple at a price which is equal to any bona fide offer which has been tendered to the landowner or the appraised fair market value, if an offer has not been tendered, plus $1.00.

3. RIPARIAN OVERLAY DISTRICT

[Note: To implement this tool, riparian corridors need to be mapped. Sample regulations which are based on setbacks are also suggested in the supplemental regulation section of this document. This overlay protects additional riparian corridor areas not protected by the setbacks that need additional limitations on development. A riparian corridor map needs to be prepared for each Township to incorporate in their Zoning Map upon the establishment of a Riparian Overlay District]

A. PURPOSE

The purpose of this regulation is to promote the public health, safety, convenience, comfort, prosperity, and general welfare and to preserve and enhance the important hydrologic, biological, ecological, aesthetic, recreational, and educational functions that stream corridors, associated riparian areas, and wetlands provide, as well as to lessen flood damage to persons and property and reduce public expenditures for flood relief and flood control projects. The specific purpose and intent of the Riparian Corridor Overlay District is to implement provisions of point and non-point pollution and ecological studies of riparian systems. As an overlay zone, this zoning district imposes additional development standards for new construction and land use beyond those of the underlying zoning district as well as the Riparian Corridor Setback requirement contained in *Section 1* of the Supplemental Regulations of this Code.

B. EXEMPT LAND USES

The following land uses are exempt from the terms and protection of the Riparian Overlay District.

1) Drainage ditches constructed along roadsides through upland areas, excluding captured streams and ditches constructed through wetlands. (See ODOT Technical Guidance Letter TG-Eco-11-02 for a full discussion.)

2) Drainage ditches created at the time of a subdivision to convey stormwater to another system.

3) Drainage tile systems.

4) Grassy swales constructed in non-wetland areas.

5) Stream culverts.

C. PERMITTED AND CONDITIONALLY PERMITTED LAND USES

1) Permitted and conditionally permitted uses include all permitted and conditionally permitted uses defined in the underlying zoning district(s) unless expressly regulated in this Riparian Overlay District.

2) All new construction within the Riparian Overlay District shall be considered a conditional use.

D. PROHIBITED USES

The following land uses are expressly prohibited in the Riparian Overlay District:

1) Asphalt plants.
2) Car washes and other auto-related uses.
3) Dredging or Dumping.

4) Dry cleaners.
5) Gasoline service stations.
6) Junk yards.
7) Landfills or transfer stations.
8) New Surface and/or Subsurface Sewage Disposal or Treatment Areas.
9) Parking Lots.
10) Pesticide, herbicide, and fertilizer applications for any purpose.
11) Petroleum and gas wells, storage, sales and distribution.
12) Quarries and borrow pits.
13) Recycling facilities.
14) Road maintenance facilities.
15) Road salt storage.
16) Sand and gravel extraction.
17) Storage or discharge of hazardous materials and chemicals.
18) Transportation facilities.
19) Underground storage tanks.

E. STANDARDS AND REGULATIONS

1) Site Plan Required. All applications for development within the Riparian Zoning Overlay District shall require Site Plan review.[15]

2) Setbacks. No filling, grading, or other construction activities shall occur within the following areas:

a) A riparian corridor setback pursuant to Supplemental Regulations, Section 1 (Riparian Corridor Setback).

b) A required setback from a wetland setback pursuant to Supplemental Regulations, Section 2 (Wetland Setback).

c) A required setback from an extreme steep slope area pursuant to Supplemental Regulations, Section 4.B.1 (Extreme Steep Slope Areas).

3) Impervious Surface. Impervious surfaces shall not exceed a ten (10) percent coverage ratio in underlying residential districts with a density lower than one-half (½) acre per unit and a thirty (30) percent coverage ratio in underlying higher density residential districts, commercial districts, and industrial districts.

4) Low Impact Development. In order to minimize the impact of development and impervious surfaces on the local watershed and control of sediment pollution of water resources, new development and related soil disturbance within the Riparian Overlay District shall adhere to low impact development (LID) practices pursuant to Supplemental Regulations, Section 6 (Low Impact Development). These regulations do not preclude the use of innovation or experimental storm water management technologies.

5) Vegetation

[15] Note: Ensure the Site Plan requirements in the Township Zoning Resolution list development in the Riparian Overlay District as a trigger for Site Plan review.

a) Existing landscaping or natural vegetation that is in satisfactory condition should be retained whenever possible within the Riparian Overlay District. On slopes greater than twelve (12) percent, no more than thirty (30) percent of the slope may be cleared.

b) Allowing natural ecological succession to occur is encouraged.

c) *Trees*. All existing trees with a trunk diameter of eighteen (18) inches or more shall be retained and protected as follows from harm, unless it is determined by the Zoning Commission that the retention of such trees would unreasonably burden the development or unreasonably limit reasonable use of the site.

(1) No excavation or other subsurface disturbance may be undertaken within the drip line of any such tree.

(2) No impervious surface (including, but not limited to, paving or buildings) may be located within twelve and one-half (12-½) feet from the center of the trunk of any such tree.

6) Grading. To the maximum extent practicable, all development shall conform to the natural contours of the land, and natural and preexisting man-made drainage ways shall remain undisturbed.

7) Stormwater. New construction shall adhere to best management practices (BMP's) to satisfy the conditions of these regulations and meeting the standards and specifications in the current edition of the State of Ohio's *Rain Water and Land Development* manual. The plans must make use of practices which preserve the existing natural condition to the maximum extent practicable (MEP). Any disturbance to the soil equal or greater than one (1) acre shall require preparation and approval of a Stormwater Pollution Prevention Plan (SWP3) by the County SWCD. Any costs associated with review of the SWP3 may be assessed to the applicant.

8) Sewage Disposal. No on-site sewage disposal systems shall be allowed on any slope exceeding twenty (20) percent.

F. RIPARIAN OVERLAY MAPPING

The riparian corridor Overlay District includes all floodplains, steep slopes and wetlands adjacent to streams or within the floodplains. The Overlay was delineated based on aerial photographs, topographic maps, and mapped water features. The top of the valley slope has been used as the riparian boundary in areas with well-defined topography. All small tributaries mapped as streams or unmapped with obvious, well-defined valleys were included in the Riparian Overlay District. The Zoning Map has been field checked using GIS coordinates where possible; however:

1) It shall be used as a reference document and the information contained therein shall be believed to be accurate.

2) It shall be a guide only.

3) Nothing herein shall prevent the Township from amending the Riparian Overlay Map from time to time as may be necessary or granting a variance where the effect of the Overlay provisions totally restricts the use of an applicant's property.

SUPPLEMENTAL ZONING REGULATIONS FOR NATURAL RESOURCE PROTECTION

The following eight sample natural resource supplemental regulations are proposed for Townships to consider as natural resource tools to protect natural resources at the local level. The first contains recommended riparian setbacks for Townships to consider. The second provides recommendations for the conservation of wetlands. The third is a sample groundwater protection ordinance and is based on the EPA and Health Department wellhead protection regulations. The fourth is a sample steep lope conservation regulation. The fifth is a sample soil and sediment erosion regulation. The sixth is a sample stormwater provision. The seventh is a sample tree preservation ordinance. The eighth is a low impact development regulation.

1. RIPARIAN CORRIDOR SETBACK REQUIREMENTS

[Note: The following sample zoning text proposes a formula for riparian setbacks. However, we recommend the option of a scientific site specific study as an option for what the setback should be.]

A. PUBLIC PURPOSE

1) **Since it is hereby determined that the system of streams within the Township contribute to the health, safety and general welfare of the residents of the Township. The purpose of these Riparian Setback Development Standards is to protect and preserve the water quality within streams of the Township and to protect residents of the Township from property loss and damage because of flooding and other impacts of the stream. These regulations shall control uses and development within a Riparian Setback that would impair the ability of the riparian area to:**

a) **Reduce flood impacts by absorbing peak flows, slowing the velocity of floodwaters and regulating base flow.**

b) **Stabilize the banks of streams to reduce bank erosion and the downstream transport of sediments eroded from stream banks.**

c) **Reduce pollutants in streams during periods of high flows by filtering, settling and transforming pollutants already present in streams.**

d) **Reduce pollutants in streams during periods of high flows by filtering, settling and transforming pollutants in runoff before they enter streams.**

e) **Provide areas for natural meandering and lateral movement of stream channels.**

f) **Reduce the presence of aquatic nuisance species to maintain diverse and connected riparian vegetation.**

g) **Provide high quality stream habitats with shade and food to a wide array of wildlife by maintaining diverse and connected riparian vegetation.**

h) **Benefit the Township economically by minimizing encroachment on stream channels and reducing the need for costly engineering solutions such as**

dams and riprap, to protect structures and reduce property damage and threats to the safety of watershed residents, and by contributing to the scenic beauty and to the environment of the Township, the quality of life of the residents of the Township and corresponding property values.

i) **Protect the health, safety, and welfare of the citizens of the Township.**

2) **This Chapter has been adopted to protect these services of riparian areas by providing reasonable controls governing structures and uses in Riparian Setbacks.**

B. COMPLIANCE, AND VIOLATIONS

1) **No zoning approvals shall be issued by the Township without full compliance with the terms of these provisions.**

2) **In addition to the enforcement powers of the Township to enforce the provisions of this Zoning Resolution, these requirements may be enforced through civil or criminal proceedings brought by the County Prosecutor on behalf of the County.**

C. ESTABLISHMENT OF A RIPARIAN SETBACK

1) **Riparian Setbacks are established as provided in this Chapter.**

2) **Streams addressed by these regulations are those which meet the definition of "stream" in** *[the Appendix]* **and appear are indicated on at least one of the following maps:**

a) **USGS topographical map**
b) **County Riparian Setback map**
c) **Soils maps located in the Soil Survey for County, Ohio, USDA, NRCS**

3) **Widths of setbacks are measured as horizontal map distance outward from the ordinary high water mark on each side of a stream, and are established as follows:**

a) **A minimum of three hundred (300) feet on each side of all streams draining an area greater than three hundred (300) square miles.**

b) **A minimum of one hundred (100) feet 16 on each side of all streams draining an area greater than twenty (20) square miles and up to three hundred (300) square miles.**

c) **A minimum of seventy-five (75) feet on each side of all streams draining an area greater than one-half (0.5) square mile (320 acres) and up to twenty (20) square miles.**

d) **A minimum of fifty (50) feet on each side of all streams draining an area greater than five-hundredths (0.05) square mile (32 acres) and up to one-half (0.5) square mile (320 acres).**

16 *Option:* 120 feet recommended by EnviroScience, Inc.

e) **A minimum of thirty (30) feet on each side of all streams draining an area less than five-hundredths (0.05) square mile (32 acres).**

4) **The following are exempt from the terms and protection of this chapter:**

a) **Grassy swales; 17**
b) **Roadside ditches; 18**
c) **Drainage ditches created at the time of a subdivision to convey stormwater to another system;**
d) **Tile drainage systems; and**
e) **Stream culverts.**

5) **The following shall apply to the Riparian Setback:**

a) **Where the hundred-year floodplain is wider than the Riparian Setback on either or both sides of the stream, the Riparian Setback shall be extended to the outer edge of the hundred-year floodplain. The hundred-year floodplain shall be defined by FEMA and approved by the CountyDepartment of Building Standards. 19**

b) **Because the gradient of the riparian corridor significantly influences impacts on the stream, the following adjustment for steep slopes will be integrated into the Riparian Setback formulae for width determination:**

Average Percent Slope	Width of Setback
15% 20 through 20%	Add 25 feet
Greater than 20% through 25%	Add 50 feet
Greater than 25%	Add 100 feet

(1) Average percent slope of the streambank is to be calculated for the area within the Riparian Setback and is to be measured as a line perpendicular to the stream channel at the location where structures or uses are proposed in the plan.

(2) All of the following measurements are to be performed using County Geographical Information System data (1994, 2000).

(3) Calculate slope as follows: The change in elevation from the edge of the stream channel to edge of Riparian Setback, *divided by* the horizontal map distance from the edge of the stream channel to the edge of the Riparian Setback.

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17 *Option:* "Grassy swales in non-wetland areas" recommended by EnviroScience, Inc.

18 *Option:* "Drainage ditches constructed along roadsides through upland areas, excluding captured streams and ditches constructed through wetlands (See ODOT Technical Guidance Letter TG-Eco-11-02 for a full discussion)" recommended by EnviroScience, Inc.

19 *Option:* If a FEMA defined floodplain does not exist for a designated watercourse, the Township may require site-specific floodplain delineation in conformance with standard engineering practices and approved by the Township. Any costs associated with reviewing this site-specific floodplain delineation may be assessed to the applicant.

20 *Option:* 12% recommended by EnviroScience, Inc.

c) Where wetlands protected under federal or state law are identified within the Riparian Setback, the Riparian Setback shall consist of the full extent of the wetlands plus the following additional setback widths:

(1) A fifty (50) foot setback extending beyond the outer boundary of a Category 3 wetlands. 21

(2) A thirty (30) foot setback extending beyond the outer boundary of a Category 2 wetlands. 22

(3) No additional setback will be required adjacent to Category 1 wetlands

d) Wetlands shall be delineated by a qualified professional under guidelines established by the U.S. Army Corps of Engineers and Ohio Environmental Protection Agency and the delineation approved by the appropriate agencies. All wetland delineations shall also include the latest version of the Ohio Rapid Assessment Method for wetland evaluation approved at the time of application of the regulations.

e) The applicant shall be responsible for delineating the Riparian Setback, including any expansions or modifications as required by subsections 2), 3), and 4) of this section, and identifying this setback on all subdivisions, site plans, and/or zoning permit applications. This delineation shall be done at the time of application of the preliminary plans, or all plans that are required, or at the time of submission of any permit applications. This delineation shall be subject to review and approval by the SWCD. As the result of this review, the SWCD may require further studies from the applicant.

f) Prior to any soil disturbing activity, the Riparian Setback shall be clearly delineated with construction fencing or other suitable material by the applicant on site, and such delineation shall be maintained throughout the soil-disturbing activities. The delineated area shall be maintained in an undisturbed state unless otherwise permitted by these regulations. All fencing shall be removed when a development project is completed.

g) No approvals or permits shall be issued by the Township prior to delineation of the Riparian Setback in conformance with these regulations.

h) Upon completion of an approved subdivision, the Riparian Setback shall be permanently recorded on the plat records for the County.

D. USES PERMITTED IN THE RIPARIAN SETBACK

1) The following uses are permitted by right within the Riparian Setbacks without prior approval. Open space uses that are passive in character shall be permitted in the Riparian Setback including, but not limited to, those listed in paragraphs a) through d) of this section. No use permitted under these regulations shall be construed as allowing trespass on privately held lands. Alteration of this natural area is strictly limited. Except as otherwise provided in these regulations, the Riparian Setback shall be preserved in its natural state.

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21 *Option:* 120 feet recommended by EnviroScience, Inc.
22 *Option:* 75 feet recommended by EnviroScience, Inc.

a) *Recreational Activity*. Passive recreational uses, as permitted by federal, state, and local laws, such as hiking, non-motorized bicycling, fishing, hunting, picnicking and similar uses and associated structures including boardwalks, pathways constructed of pervious material, picnic tables, and wildlife viewing areas.

b) *Removal of Damaged or Diseased Trees*. Damaged or diseased trees may be removed. Because of the potential for felled logs and branches to damage downstream properties and/or block ditches or otherwise exacerbate flooding, logs and branches resulting from the removal of damaged or diseased trees that are greater than six (6) inches in diameter, shall be anchored to the shore or removed from the hundred-year floodplain.

c) *Revegetation and/or Reforestation*. The revegetation and/or reforestation of the Riparian Setback shall be allowed without approval of the SWCD. Species of shrubs and vines recommended for stabilizing flood prone areas along streams within the County are listed in Section L (Woody Plants Suitable for Riparian Areas).

d) The County Engineer maintains the right of access to all streams within the County for the purposes outlined in ORC Sections 6131.01 to 6131.64, 6133.01 to 6133.15, 6135.01 to 6135.27, and 6137.05.1.

2) The following uses are permitted by right within the Riparian Setbacks with prior approval of the design.

a) *Stream bank Stabilization/Erosion Control Measures*. Best Management Practices (BMP's) for stream bank stabilization or erosion control may be allowed if such practices are within permitted uses by the local, state, and federal government regulations and are ecologically compatible and emphasize the use of natural materials and native plant species where practical and available. Such stream bank stabilization/ erosion control practices shall only be undertaken upon approval of a Stormwater Pollution Prevention Plan (SWPPP or SW3P) by the SWCD.

b) *Crossings*. In reviewing plans for stream crossings, the Township may confer with the SWCD, the Ohio Department of Natural Resources, Division of Natural Areas; the Ohio Environmental Protection Agency, Division of Surface Water; the County Engineer; the County Department of Environmental Services; the County Health Department; or other technical experts as necessary.

(1) Limited crossings of designated streams through the Riparian Setback by vehicles, storm sewers, sewer and / or water lines, and public utility lines will be per the approval of local, county, and state governing agencies and as a part of the regular subdivision review process.

(2) One (1) driveway crossing per stream per tax parcel will be allowed for individual landowners.

(3) Roadway crossings for major and minor subdivisions, open space subdivisions, or any other non-single family residential use shall be designed and constructed per the County Engineer's design standards and as approved by the County Planning Commission and approving township. If

more than two (2) crossings per one thousand (1,000) linear feet of stream center are required for these areas, the applicant must apply for a variance.

(4) All roadway crossings shall be perpendicular to the stream flow and shall minimize disturbance to the Riparian Setback and shall mitigate any necessary disturbances.

c) Placement of stormwater retention or detention facilities may be considered within the Riparian Setback if:

(1) Stormwater quality treatment that is consistent with current state standards is incorporated into the basin.

(2) The stormwater quality treatment basin is located at least fifty (50) feet from the ordinary high water mark of the stream.

E. **USES PROHIBITED IN THE RIPARIAN SETBACK**
The following uses are specifically prohibited within the Riparian Setback:

1) Construction. There shall be no structures of any kind, except as permitted under these regulations.

2) Dredging or Dumping. There shall be no drilling for petroleum or mineral products, mining activity, filling or dredging of soil, spoils, or any material—natural or man-made—except as permitted under these regulations.

3) Roads or Driveways. There shall be no roads or driveways, except as permitted under these regulations.

4) Motorized Vehicles. There shall be no use of motorized vehicles of any kind, except as permitted under these regulations.

5) Modification of Natural Vegetation. Modification of the natural vegetation shall be limited to conservation maintenance that the landowner deems necessary to control noxious weeds; for such plantings as are consistent with these regulations; for such disturbances as are approved under these regulations; and for the passive enjoyment, access and maintenance of landscaping or lawns existing at the time of passage of these regulations.

Nothing in this section shall be construed as requiring a landowner to plant or undertake any other activities in the Riparian Setback provided the landowner allows for natural succession.

F. Parking Lots. There shall be no parking lots or other human made impervious cover, except as permitted under these regulations.

G. New surface and/or subsurface sewage disposal or treatment area. Riparian Setbacks shall not be used for the disposal or treatment of sewage except for:

1) Undeveloped parcels that have received site evaluation approval and / or permit approval prior to the date this requirement went into effect.

2) Dwellings served by disposal / treatment systems when such systems are properly sited (approved site evaluation) and permitted or in accordance with the County Health

Department and / or the Ohio Environmental Protection Agency. Existing failing systems which are located within the Riparian Setback can be upgraded with approval of the County Health Department and / or the Ohio Environmental Protection Agency.

H. **NON-CONFORMING STRUCTURES OR USES IN THE RIPARIAN SETBACK**

1) Structures and uses within the Riparian Setback that are not permitted under these regulations may be continued but shall not be expanded except as set forth below.

2) If damaged or destroyed, these structures or uses may be repaired or restored within two years from the date of damage /destruction, at the property owners own risk.

3) A residential structure or use within the Riparian Setback may be expanded subject to the following provisions:

   a) The expansion conforms to existing zoning regulations.

   b) The expansion must not impact the stream channel or the hundred-year flood plain.

   c) The expansion must not exceed an area of fifteen (15) percent of the footprint of existing structure or use that lies within the Riparian Setback. Expansions exceeding fifteen (15) percent of the total footprint within the Riparian Setback must be obtained through a variance from the Board of Zoning Appeals.

4) Non-residential structure or use expansions will be permitted only through a variance from the Board of Zoning Appeals.

I. **BOUNDARY INTERPRETATION AND APPEALS PROCEDURE**

1) When an applicant disputes the boundary of the Riparian Setback or the ordinary high water mark of a stream, the applicant shall submit evidence to the SWCD, with a copy to the Township Zoning Inspector that describes the boundary, presents the applicant's proposed boundary and presents all justification for the proposed boundary change.

2) The SWCD shall evaluate all materials submitted and shall make a written recommendation to the Township Board of Zoning Appeals within a reasonable period of time not to exceed sixty (60) days. A copy of this recommendation shall be submitted to the applicant. If during this evaluation the SWCD requires further information to complete this evaluation, the applicant may be required to provide additional information.

3) The Township Board of Zoning Appeals shall decide such boundary disputes. The party contesting the location of the Riparian Setback or the ordinary high water mark of the streams as determined by these regulations shall have the burden of proof in case of any such appeal.

J. **VARIANCES WITHIN RIPARIAN SETBACK**

Applications for variances to the provisions of this Chapter shall be submitted to the Township Board of Zoning Appeals.

1) The Township Board of Zoning Appeals shall consult with representatives from the SWCD; the Ohio Department of Natural Resources, Division of Natural Areas; the Ohio Environmental Protection Agency, Division of Surface Water; the County Engineer; the

Department of Environmental Services of County; the County Health Department; or other technical experts as necessary to consider variance requests.

2) Expansions of residential structures or uses exceeding fifteen (15) percent of the footprint area and expansions of all non-residential structures or uses are subject to the following provisions:

   a) The expansion conforms to the existing zoning regulations.

   b) The expansion must not impact the stream channel or the hundred-year floodplain.

   c) The expansion of a non-residential structure or use must not affect upstream or downstream hydrologic conditions which could cause damage from flooding or streambank erosion to landowners in those areas. A hydrologic study must be completed by non-residential applicants only as a process of the variance application.

   d) The expansion of a non-residential structure or use will not exceed twenty-five (25) of the of the footprint area. The twenty-five (25) percent expansion limit is per the portion of the structure or use that lies within the Riparian Setback.

3) Requests for variances for subdivisions will be considered for the following:

   a) An additional stream crossing or crossings for a subdivision or open space development which is necessary for the health, welfare, and safety of the residents of the subdivision.

   b) A reduction of the setback width, not to exceed ten (10) of the prescribed Riparian Setback width.

4) No variances shall be granted for expansion of the following structures or uses:

   a) Facilities which use, store, distribute, or sell petroleum-based products or any hazardous materials. Such facilities include, but are not limited to: asphalt plants, dry cleaners, gasoline service stations, and road maintenance facilities.

   b) Facilities which use, store, distribute, or sell products which may contribute higher than acceptable concentrations of dissolved or particulate matter to stormwater runoff around the facility. Such facilities include, but are not limited to: landfills or transfer stations, junk yards, recycling facilities, quarries and borrow pits, sand and gravel extraction operations, and road salt storage barns.

5) In reviewing whether to grant variances, the Township Board of Zoning Appeals shall consider the following:

   a) The extent to which the requested variance impairs the functions of the riparian area. This determination shall be based on sufficient technical and scientific evidence as provided by the applicant and the agencies listed in Sections J.1) through J.4) above.

   b) The soil type and natural vegetation of the parcel as well as the percentage of the parcel that is in the hundred-year floodplain.

c) The degree of hardship these regulations place on the applicant and the availability of alternatives to the proposed activity.

d) Whether a front, side or rear yard setback zoning variance or similar variance should be considered to maintain the required Riparian Setback area.

K. **INSPECTION OF RIPARIAN SETBACK**

1) The Riparian Setback shall be inspected by the SWCD:

a) When a preliminary subdivision plat or other land development plan is submitted to the County.

b) When a building or zoning permit is requested.

c) Prior to any soil disturbing activity to inspect the delineation of the Riparian Setback as required under these regulations.

2) The Riparian Setback shall also be inspected annually or as time permits by the SWCD or approved monitoring entity for compliance with any approvals under these regulations or at any time evidence is brought to the attention of the SWCD that uses or structures are occurring that may reasonably be expected to violate the provisions of these regulations.

L. **WOODY PLANTS SUITABLE FOR RIPARIAN AREAS**

Flood Tolerance*	**Shade Tolerance****	**Common Name**
High Flood Tolerance*		
Aronia arbutifolia	3	Red chokeberry
Aronia melanocarpa	3	Black chokeberry
Cephalanthus occidentalis	5	Common buttonbush
Clethra alnifolia	2	Summersweet clethra***
Cornus amomum	4	Silky dogwood
Cornus stolonifera (sericea)	5	Redosier dogwood
Hamamelis vernalis	3	Vernal witchhazel ***
Ilex decidua	3	Possumhaw ***
Ilex glabra	2	Inkberry ***
Ilex verticillata	3	Common winterberry
Itea virginica	1	Virginia sweetspire ***
Magnolia virginiana	2	Sweetbay magnolia ***
Myrica pensylvanica	4	Northern bayberry
Physocarpus opulifolius	4	Common ninebark
Potentilla fruticosa	4	Bush cinquefoil
Sambucus canadensis	1	American elderberry
Salix x cotteti	5	“Bankers” willow ***
Salix exigua	5	Sandbar willow
Salix purpurea	5	“Streamco” willow ***
Viburnum cassinoides	2	Witherod viburnum
Parthenocissus quinquefolia	1	Virginia creeper (vine)
Moderate Flood Tolerance*		

Flood Tolerance*	**Shade Tolerance****	**Common Name**
Calycanthus floridus	1	Common sweetshrub
Hypericum kalmianum	5	Kalm St. Johnswort
Viburnum dentatum	2	Arrowwood viburnum
Xanthorhiza simplicissima	1	Yellowroot ***
Intermediate Flood Tolerance*		
Aesculus parviflora	2	Bottlebush buckeye ***
Aesculus pavia	2	Red buckeye ***
Cornus racemosa	2	Gray dogwood
Lindera benzoin	1	Common spicebush
Rosa setigera	4	Prairie rose
Campsis radicans	3	Trumpetcreeper (vine)
Lonicera dioica	2	Limber honeysuckle (vine)
Corylus americana	2	American filbert
Diervilla lonicera	1	Dwarf bushhoneysuckle
Fothergilla gardeni	1	Dwarf fothergilla ***
Fothergilla major	1	Large fothergilla ***
Hydrangea arborescens	1	Smooth hydrangea
Hydrangea quericifolia	1	Oakleaf hydrangea ***
Mahonia aquifolium	1	Oregongrape holly ***
Rosa carolina	4	Carolina rose
Rubus odoratus	1	Fragrant thimbleberry
Vaccinium stamineum	2	Common deerberry
Low Flood Tolerance*		
Arctostaphylos uva-ursi	4	Bearberry
Cornus rogusa	1	Roundleaf dogwood
Corylus Americana	2	American filbert
Diervilla lonicera	1	Dwarf bushhoneysuckle
Fothergilla gardeni	1	Dwarf fothergilla ***
Fothergilla major	1	Large fothergilla ***
Hydrangea arborescens	1	Smooth hydrangea
Hydrangea quericifolia	1	Oakleaf hydrangea ***
Mahonia aquifolium	1	Oregongrape holly ***
Rosa Carolina	4	Carolina rose
Rubus odoratus	1	Fragrant thimbleberry
Symphoricarpos albus	1	Common snowberry
Vaccinium stamineum	2	Common deerberry
No Flood Tolerance*		
Amorpha canescens	5	Leadplant ***
Ceanothus americanus	3	New Jersey tea
Comptonia peregrina	2	Sweetfern
Dirca palustris	1	Leatherwood
Hypericum frondosum	5	Golden St. Johnswort
Juniperus communis	5	Common juniper
Juniperus horizontalis	5	Creeping juniper ***
Rhus aromatica	5	Fragrant sumac
Sambucus pubens	1	Scarlet elder
Symphoricarpos albus	1	Common snowberry

***High Flood Tolerance:** Generally lowland wet species surviving when flooded or exposed to high water table morethan 40% of the growing season.

***Moderate Flood Tolerance:** Generally lowland wet species surviving when flooded or exposed to high water tablemore than 30% of the growing season but less than 40%.

***Intermediate Flood Tolerance:** Generally lowland wet-mesic species surviving occasional inundation or elevated water table between 20% and 30% of the growing season.

***Low Flood Tolerance:** Generally upland mesic and mesic-dry species rarely inundated or exposed to an elevated water table for periods of short duration, between 5% and 20% of the growing season.

***No Flood Tolerance:** Generally upland dry species exhibiting immediate and rapid decline frequently culminating in death if inundated or exposed to elevated water table for more than 5% of the growing season.

****Shade Tolerance:** Shade tolerance means able to grow in a state of health and vigor beneath dense shade. In this ranking, shrubs and vines are ranked on a scale of 1 to 5, with 1 being very shade tolerant, and 5 being very shade intolerant.

*** Denotes plant species that are not native to Ohio.

Note:

1. The majority of plants listed are available on the local commercial market and do not displace native species.
2. The cultivated varieties (“cultivars”) of the species listed above may also be used.
3. Primary information taken from Hightshoe, Gary, 1987. Native Trees, Shrubs, and vines for Urban and Rural America. Van Nostrand. NY, NY
4. For further assistance contact Roger Gettig, Landscape Consulting Program, The Holden Arboretum, or Steve Roloson, ODNR Scenic Rivers Program.
5. This list was assembled by Roger Gettig, The Holden Arboretum for Chagrin River Watershed Partners.

2. WETLANDS SETBACK REGULATIONS

A. PUBLIC PURPOSE

1) It is hereby determined that the wetlands within the Township contribute to the health, safety, and general welfare of the residents of the Township. The specific purpose and intent of this regulation is to regulate uses and developments within wetland setbacks that would impair the ability of wetlands to:

   a) Minimize flood impacts by absorbing peak flows, slowing the velocity of flood waters, regulating stream base flows, and maintaining stream flow patterns.

   b) Minimize streambank erosion by reducing runoff volume and velocity.

   c) Protect groundwater quality by filtering pollutants from storm water runoff.

   d) Recharge groundwater reserves.

   e) Protect surface water quality by minimizing sediment pollution from streambank erosion, and trapping sediments, chemicals, salts, and other pollutants from flood waters and storm water runoff.

   f) Provide habitat for aquatic and terrestrial organisms, many of which are on Ohio's Endangered and/or Threatened Species listings.

   g) Benefit the Township economically by minimizing encroachment on wetlands and the need for costly engineering solutions, such as retention/detention basins and rip rap, to protect structures and reduce property damage and threats to the safety of watershed residents; and by contributing to the scenic beauty and environment of the Township, thereby preserving the character of the Township, the quality of life of residents of the Township, and corresponding property values.

2) The following regulation has been enacted to protect these services of wetlands by providing reasonable controls governing structures and uses within wetlands.

B. APPLICABILITY, COMPLIANCE & VIOLATIONS

This regulation shall apply to all lands that are within the jurisdiction of the Township and that border Ohio EPA Category 1, 2 and 3 wetlands as defined in this regulation.

1) No approvals or permits shall be issued by the Township without full compliance with the terms of this regulation where applicable.

2) Any person who shall violate any section of this regulation shall be required to restore the wetland and the wetland setback through a restoration plan approved by the Township.

C. CONFLICTS WITH OTHER REGULATIONS & SEVERABILITY

1) Nothing within this regulation shall be construed to conflict with the Clean Water Act or ORC 6111.03 et seq.

2) Where this regulation imposes a greater restriction upon land than is imposed or required by any other provision of law, regulation, contract, or deed, the provisions of this regulation shall control.

3) This regulation shall not limit or restrict the application of other provisions of law, regulation, contract, or deed, or the legal remedies available hereunder, except as provided in Subsections 1) and 2) above.

4) If any clause, section, or provision of this regulation is declared invalid or unconstitutional by a court of competent jurisdiction, validity of the remainder shall not be affected thereby.

D. ESTABLISHMENT OF WETLAND SETBACKS[23]

1) Wetland setbacks are established as follows:

a) A minimum of one hundred twenty (120) feet surrounding all Ohio EPA Category 3 Wetlands and forested wetlands.

b) A minimum of seventy-five (75) feet surrounding all Ohio EPA Category 2 Wetlands.

c) *[**OPTION**: EnviroScience, Inc. biologists suggest townships adopt requirements for mitigation of impacts to Ohio EPA Category 1 Wetlands within the watershed. Whether devised as a mitigation fund or actual construction requirement, the mitigation wetlands should be only of Ohio EPA Category 2 quality, contain less than ten (10) percent invasive species, and establish a setback as noted above in Section 2.D.1)b).]*

2) The following conditions shall apply in wetland setbacks:

a) Wetland setbacks shall be measured in a perpendicular direction from the defined wetland boundary.

b) Except as otherwise provided in this regulation, the wetland setback shall be preserved in its natural state and shall be established prior to any soil disturbing activities.

3) No net loss of wetlands is permitted in any watershed. Where construction is shown to be necessary resulting in the loss of any regulated wetland, the applicant shall mitigate the loss of wetland by type within the same watershed.

E. PROCEDURE

1) Upon filing a request for approval of a preliminary plat or building permit, the applicant or their designated representative shall retain a qualified professional to survey the proposed development site for wetlands. If no wetlands are found, the applicant or their designated representative shall submit a letter with the preliminary plat or permit application verifying that a qualified professional has surveyed the site and found no wetlands. If wetlands are found, the following procedures shall be followed:

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23 It should be noted that these recommendations exceed the current county standards of 50 feet for Category 3 Wetlands and 30 feet for Category 2 Wetlands in riparian corridors.

a) A qualified professional shall determine the presence of any Ohio EPA Category 1, 2 or 3 wetlands, including forested wetlands and size of the watershed, on the proposed development site using the latest version of the Ohio Rapid Assessment Method for wetland evaluation approved at the time of application of this regulation. Acceptance of this determination shall be subject to approval by the Township. In the course of this approval, the Township may consult with a representative of the Ohio Department of Natural Resources; the Ohio EPA; the County Planning Commission; the County Soil and Water Conservation District; or other technical experts as necessary. Any costs associated with such consultations may be accessed to the applicant or their designated representative.

b) If Ohio EPA wetlands are located on the proposed development site, the applicant or their designated representative shall delineate these wetlands and the wetland setback on all subdivision plans, land development plans, and/or permit applications submitted to the Township.

(1) Wetlands shall be delineated by a site survey approved by the Township using delineation protocols accepted by the US Army Corps of Engineers and the Ohio EPA at the time of application of this regulation. If conflict exists between the delineation protocols of these two agencies, the delineation protocol that results in the most inclusive area of wetland shall apply.

(2) Wetland setbacks shall be delineated through a metes and bounds survey or equivalent delineation, subject to approval by the Township.

(3) In the course of approval of the delineation of wetlands and their associated setbacks, the Township may consult with a representative of the Ohio Department of Natural Resources; the Ohio EPA; the County Planning Commission; the County Soil and Water Conservation District; or other technical experts as necessary. Any costs associated with such consultations may be accessed to the applicant or their designated representative.

c) Prior to any soil disturbing activity, the applicant or their designated representative shall delineate wetland setbacks on the development site, and such delineation shall be maintained throughout construction.

d) No approvals or permits shall be issued by the Township prior to delineation of wetland setbacks in conformance with this regulation.

2) Upon completion of an approved subdivision, land development, or other improvement, wetland setbacks shall be permanently recorded on the plat records for the Township.

F. USES PERMITTED IN WETLAND SETBACKS

1) Open space uses that are passive in character shall be permitted in wetland setbacks, including, but not limited to, the following:

a) Recreational Activity. Passive recreational uses, as permitted by federal, state, and local laws, such as hiking, fishing, hunting, picnicking, and similar uses.

b) Removal of Damaged or Diseased Trees. Damaged or diseased trees may be removed.

c) Revegetation and/or Reforestation. Wetland setbacks may be revegetated and/or reforested.

2) No use permitted under this regulation shall be construed as allowing trespass on privately held lands.

G. USES PROHIBITED IN WETLAND SETBACKS

Any use not authorized under this regulation shall be prohibited in wetland setbacks. By way of example, the following uses are specifically prohibited; however, prohibited uses are not limited to those examples listed here:

1) Construction. There shall be no structures of any kind.

2) Dredging or Dumping. There shall be no drilling, filling, dredging, or dumping of soil, spoils, liquid, or solid materials, except for noncommercial composting of uncontaminated natural materials and except as permitted by this regulation.

3) Roads or Driveways. There shall be no roads or driveways.

4) Motorized Vehicles. There shall be no use of motorized vehicles of any kind.

5) Disturbance of Natural Vegetation. There shall be no disturbance of the natural vegetation, except for such conservation maintenance that the landowner deems necessary to control noxious weeds; for such plantings as are consistent with this regulation; for such disturbances as are approved under this Section; and for the passive enjoyment, access, and maintenance of landscaping or lawns existing at the time of passage of this regulation. Nothing in this regulation shall be construed as requiring a landowner to plant or undertake any other activities in wetland setbacks.

6) Parking Lots. There shall be no parking lots or other human made impervious cover.

7) New Surface and/or Subsurface Sewage Disposal or Treatment Areas. Wetland setbacks shall not be used for the disposal or treatment of sewage except in accordance with County General Health District regulations at the time of application of this regulation.

H. VARIANCES WITHIN WETLAND SETBACKS

The Township may grant a variance to this regulation as provided herein. In determining whether there is unnecessary hardship or practical difficulty such as to justify the granting of a variance, the Township shall consider the potential harm or reduction in wetland functions that may be caused by a proposed structure or use.

1) In making a determination of unnecessary hardship or practical difficulty, the Township may consider the following:

a) The soil type and natural vegetation of the parcel.

b) The extent to which the requested variance impairs the flood control, erosion control, water quality protection, or other functions of the wetland or wetland setback. This determination shall be based on sufficient technical and scientific data.

c) The degree of hardship this regulation places on the applicant or their designated representative and the availability of alternatives to the proposed activity.

d) Soil-disturbing activities permitted in the wetland setback through variances should be implemented to minimize clearing to the extent possible and to include Best Management Practices necessary to minimize erosion and control sediment.

e) The presence of significant impervious cover or smooth vegetation such as maintained lawns in the wetland setback compromises its benefits to the Township. Variances should not be granted for asphalt or concrete paving in the wetland setback. Variances may be granted for gravel driveways when necessary.

I. BOUNDARY INTERPRETATION & APPEALS PROCEDURE

1) When an applicant or their designated representative disputes the boundary of a wetland setback, the applicant or their designated representative shall submit evidence to the Township that describes the boundary, the applicant's or their designated representative's proposed boundary, and justification for the proposed boundary change.

2) The Township shall evaluate all materials submitted and shall make a written determination within a reasonable period of time not to exceed sixty (60) days, a copy of which shall be submitted to the applicant or their designated representative. If during this evaluation the Township requires further information, it may require that this be provided by the applicant or their designated representative. In the event that the Township requests such additional information, the sixty (60) day limit on the Township's review shall be halted until such information is provided by the applicant or their designated representative.

3) In evaluating these materials, the Township may consult with a representative of the Ohio Department of Natural Resources; the Ohio EPA; the County Planning Commission; the County Soil and Water Conservation District; or other technical experts as necessary. Any costs associated with such consultations may be assessed to the applicant or their designated representative.

4) Any party aggrieved by any such determination, or other decision or determination under this regulation, may appeal to the Board of Zoning Appeals under the provisions of Section ***[cite existing Board of Zoning Appeals section]***.

J. INSPECTION OF WETLAND SETBACKS

The delineation of wetland setbacks shall be inspected by the Township:

1) Prior to soil-disturbing activities authorized by the Township under a subdivision, land development plan, and/or building permit. The applicant or their designated representative shall provide the Township with at least two (2) working days notice prior to starting such soil-disturbing activities.

2) Any time evidence is brought to the attention of the Township that uses or structures are occurring that may reasonably be expected to violate the provisions of this regulation.

3. GROUNDWATER PROTECTION REGULATION

A. PURPOSE AND INTENT

The Township recognizes that many residents rely on groundwater pumped from wells that are drilled into aquifers or springs for their safe drinking water supply, and that certain land uses can contaminate groundwater particularly in shallow/surficial aquifers. In accordance with the provisions of ORC 519:

1) The purpose of these groundwater protection regulations are to protect public health, safety, convenience, comfort, prosperity, and general welfare by minimizing contamination of shallow/surficial aquifers and preserving and protecting existing and potential sources of drinking water supplies, and to minimize or eliminate costs associated with investigation, clean up, and remediation costs, which may include: the cost of purchasing a temporary water supply from another community or bottled water; new wellfield development if the affected wells must be abandoned; real estate devaluation; decline in consumer confidence in water quality; potential lawsuits from the consumption of contaminated water; and lost jobs. It is the intent to accomplish this through both public education and public cooperation, as well as by creating appropriate land use regulations that may be imposed in addition to those currently imposed by existing zoning districts or other county regulations.

2) The groundwater protection regulations shall apply to all new construction, reconstruction, or expansion of existing structures and new or expanded land uses. Applicable activities/uses allowed in a portion of any zoning district must comply with the requirements of this chapter. The mention of a land use in this chapter shall not imply that a use otherwise prohibited in a zoning district shall be permitted.

B. GROUNDWATER DRINKING WATER SYSTEM SETBACK ESTABLISHED

A well or spring used as a water source for any public or private drinking water system shall be isolated the maximum practical distance from any known or suspected source of contamination by a six (6) month time-of-travel distance.

1) Where available, hydrogeologic data shall be used to establish the six (6) month time-of-travel distance setback for a well or spring used as a drinking water system.

2) The Zoning Inspector, upon recommendation of the Ohio EPA or the County General Health District, shall require a hydrogeologic investigation prior to any required administrative review for the issuance of a zoning permit.**24**

3) Where no hydrogeologic data is available or recommended, as noted above, the following specified setback distances are established for a well or spring used as a drinking water system:

   a) *Minimum Setback Based on Average Water System Demand*. This minimum setback requirement uses a formula to determine the setback where the variable "Q" is used to represent the estimated average daily water demand of the well or spring.

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[24] Public wells within Ohio which have at least 15 service connections or serve 25 or more people at least 60 days per year are regulated by the Ohio EPA Division of Drinking and Ground Water. Private water systems are regulated by the County General Health District.

Estimated Average Daily Water Demand (Q gallons per day)	**Water Source Setback Radius** (feet)
0-2,500	50
2,501-10,000	Square Root of Q
10,001-50,000	50 + (Q / 200)
Over 50,000	300

b) *Minimum Setback Based on Potential or Known Sources of Contamination*. Where the following minimum setback standards for specified potential or known contamination sources exceed the setback distance established above in the formula based on daily water demand, the Zoning Inspector shall enforce the following setback distances:

Land Use	**Water Source Setback**
Solid waste, residual waste, industrial waste, and construction and demolition debris waste landfills	1,000'
Animal or poultry yards:	
- (1,000 or more animal units)	500'
- (Less than 1,000 animal units)	100'
Manure lagoons	300'
Underground fuel oil, liquid petroleum, chemical, or gasoline storage tanks:	
- (1,100 or more gallons without secondary containment)	300'
- (1,100 or more gallons with secondary containment)	150'
- (less than 1100 gallons)	50'
Composting facilities	200'
Storage or preparation area for fertilizers or pesticides	150'
Drainage wells	100'
Land application of septage waste or sludge	100'
Leaching privies	100'
Oil and gas wells	100'
Salt storage piles	100'
Sewage absorption fields	100'
Above ground fuel oil, liquid petroleum, chemical or gasoline storage tanks	50'
Leaching pit	50'
Sewage tanks	50'
Vault privies	50'
Vertical or horizontal geothermal loop systems with high toxicity heat transfer fluid	50'

c) *Exceptions.* The following land uses shall only require the setback specified in the following table from a well or spring used as a drinking water system.

Land Use	**Water Source Setback**
Roads and highways	25'
Streams, lakes, ponds, ditches	25'
Vertical or horizontal geothermal loop systems with low toxicity heat transfer fluid	25'
Easements granted to other persons	10'
Existing properly constructed water well	10'
Property Boundaries	10'
Properly sealed well	10'
Sewers and drains--watertight pipe	10'
Structures, buildings and foundations, except a structure designed and constructed solely to house pumping and water system equipment	10'
Parking Lot or Driveway	5'

4) The Zoning Inspector may specify greater groundwater protection setbacks in excess of those set forth in this Section if conditions are known to exist where the distance set forth in this Section is considered insufficient to protect the public health and the private water system from contamination.

C. Performance Standards for a Groundwater Drinking Water System

1) A well shall be located so it is accessible for cleaning, treatment, repair, alteration, testing, and such other actions as may be necessary.

2) No potential source of contamination may be constructed or permanently placed within the above specified setbacks distances from a well or spring water supply. The owner shall be responsible for maintaining setback distances.

3) Since it is known that improperly abandoned wells can become a direct conduit for contamination of groundwater by surface water, all permanently out of service wells, including abandoned wells, dry holes, or test holes, shall be properly sealed according to local and state regulations.

4) *Prohibited Areas for a Well or Spring*. A well or a spring used for a drinking water system shall not be located within a one hundred year flood plain without a variance, as described below in Section D (Variance).

D. Variance. In addition to the general variance requirements of this Zoning Resolution, the Board of Zoning Appeals shall not grant any variance unless the applicant demonstrates that:

1) There will be unusual and unnecessary hardship in complying with the rules;

2) Contamination of the water supply will not occur as a result of construction and operation of the system;

3) The health of persons using water from the water system will not be endangered thereby; and

4) No other technically feasible and economically reasonable means of obtaining water from the proposed type of water source exists.

E. Groundwater Recharge Area Regulations

[The groundwater recharge potential of an area is a key issue the County should consider when making future land-use determinations. The County should identify significant recharge areas and consider measures to assure the preservation of mature vegetation and minimize impervious surfaces within them. The County or Township should consider establishing the following regulations either as a zoning overlay district or as supplemental regulations applied to all districts.]

All proposed development within areas identified by the County as "significant water recharge areas" shall meet the following requirements:

1) Impervious Surface Cover Development Standard. ***[NOTE: This paragraph should be considered as an additional requirement in the development standards matrix or equivalent section of the resolution.]*** To promote replenishment of groundwater supplies by precipitation, the maximum impervious surface coverage of any lot shall be ten (10) percent in a residential district or thirty (30) percent in a commercial or industrial district. The Zoning Commission may increase the maximum impervious surface coverage where low impact development techniques are proposed to maximize retention and absorption of storm water on-site (e.g. use of parking lot islands to capture parking lot stormwater; use of porous/permeable paving material; directing of roof drains to grassy swales, depressions, or rain gardens to allow ponding). ***[NOTE: Make sure these low impervious coverage ratios work in each district prior to adoption.]***

2) Landscaping Requirements. Residential major subdivisions and developments over one (1) acre shall maintain and preserve a minimum of fifty (50) percent of the mature woodlands, twenty-five (25) percent of young woodlands, and other individual trees with a trunk diameter of eight (8) inches or more when practicable. The Zoning Inspector may approve clearance of more trees than specified only when the property owner or developer agrees to a reforestation plan at a ratio of one hundred twenty (120) percent the area or diameter of the trees otherwise required to be preserved.

3) Hazardous Material Handling and Storage Performance Standards ***[This section may be used as a stand-alone supplemental regulation applicable to all districts or just applicable to sites in the areas of "significant water recharge." State and federal regulations will continue to apply in the areas the township does not have hazardous material handling and storage requirements.]***

All permitted facilities must adhere to appropriate federal and state standards for storage, handling and disposal of any hazardous waste materials. Except where preempted by state regulation of hazardous waste facilities licensed under ORC 3734.05(E), hazardous material handling and storage in areas identified by the County

as “significant water recharge areas” shall meet the following additional performance standards.

a) Any facility involving the collection, handling, manufacture, use, storage, transfer or disposal of any solid or liquid material or wastes, including open liquid waste ponds, must have a secondary containment system which is easily inspected and whose purpose is to intercept any leak or release from the primary containment vessel or structure. Underground tanks or buried pipes carrying such materials must have double walls and inspectible sumps.

b) Storage of petroleum products in quantities exceeding twenty-five (25) gallons shall require a secondary containment system. Underground petroleum storage facilities must be constructed of non-metallic materials, such as fiberglass, or have corrosion protection using interior liners and 30-year sacrificial anodes which are connected to the tank.

c) An acceptable contingency plan for all permitted facilities must be prepared for preventing hazardous materials from contaminating the shallow/surficial aquifer should floods, fire, or other natural catastrophes, equipment failure, or releases occur:

(1) For flood control, all underground facilities (other than heating oil tanks for on-site use) shall include, but not be limited to, a monitoring system and secondary standpipe above the hundred-year flood control level, for monitoring and recovery.

(2) All above-ground facilities shall be placed within an impervious dike, which shall be above the hundred-year flood level and large enough to hold the volume of the largest tank plus anticipated rainfall, and shall be provided with an overflow recovery catchment area (sump).

(3) For fire control, plans shall include but not be limited to a safe fire fighting procedure, a fire retarding system, effective containment of any liquid runoff, and provide for dealing safely with any other health and technical hazards that may be encountered by disaster control personnel in combating fire. Hazards to be considered are pipes, liquids, chemicals, or open flames in the immediate vicinity. The above ground storage of petroleum products shall be setback fifty (50) feet from a building.

(4) For equipment failures, plans shall include but not be limited to:

(a) Below ground level, removal and replacement of leaking parts, a leak detection system with monitoring, and an overfill protection system.

(b) Above ground level, liquid and leaching monitoring of primary containment systems, the replacement or repair and cleanup and/or repair of the impervious surface.

(5) For any other release occurring on the site, the owner and/or operator shall report all incidents involving liquid or chemical material to the groundwater protection coordinator designated by the Township.

(6) Storage of petroleum products in quantities exceeding: six hundred sixty (660) gallons in any single above-ground oil storage container; or one thousand three hundred twenty (1,320) gallons aggregate total above-ground oil storage capacity; or forty two thousand (42,000) gallons total underground oil storage capacity at one locality in one tank or series of tanks, shall provide the Township with a plan which describes and documents the spill prevention, control, and response capabilities in place at the facility. At a minimum, the plan shall meet the requirements of ORC 6111.03(R) Spill Prevention, Control, and Countermeasure (SPCC) Plan.

4) Liability. Nothing in this ordinance shall be construed to imply that the Township has accepted any of an owner/developer's liability if a permitted facility or use contaminates groundwater in any aquifer.

5) Prohibited Land Uses. ***[NOTE: If this section is established as a zoning overlay district, the following uses could be prohibited in addition to uses prohibited in the underlying zoning district. As an alternative, the uses could be made conditional upon a showing that the additional performance standards have been met to ensure the protection of the groundwater system.]***

a) Automobile body/repair shop.
b) Gas station.
c) Fleet/trucking/bus terminal.
d) Dry cleaner.
e) Electrical/electronic manufacturing facility.
f) Machine shop.
g) Metal plating/finishing/fabricating facility.
h) Chemical processing/storage facility.
i) Wood preserving/treating facility.
j) Junk/scrap/salvage yard.
k) Mines/gravel pit.
l) Irrigated nursery/greenhouse stock.
m) Confined animal feeding operations.
n) Septic systems on lots of one acre or less.
o) Equipment maintenance/fueling areas.
p) Injection wells/dry wells/sumps, except for single-family residences directing gutter downspouts to a drywell.
q) Underground storage tanks, (except those with spill, overfill, and corrosion protection requirements in place).
r) All other facilities involving the collection, handling, manufacture, use, storage, transfer or disposal of any solid or liquid material or waste having potentially harmful impact on groundwater quality.

6) DISTRICT BOUNDARY DISPUTES

If the location of the area identified by the County as “significant water recharge areas” ***[or a Groundwater Protection Overlay Zoning District]*** in relation to a particular parcel is in doubt, resolution of boundary disputes shall be through an appeal application. The burden of proof shall be upon the owner(s) of the land to demonstrate where the boundaries of the district with respect to their individual parcel(s) of land show should be located. If the owner(s) request that the local government agency determine more accurately the boundaries of the district with respect to individual parcels of land, the agency may engage a professional engineer, hydrologist, geologist, or soil scientist and charge the owner(s) for the cost of the investigation.

4. STEEP SLOPE REGULATIONS

A. PURPOSE

The Township contains areas of steep topography. These naturally vegetated scenic features present erosion hazards with the potential for property damage or loss and the potential to impact downstream flooding and water quality. The following Steep Slope Regulations are established as public health, safety, convenience, comfort, and general welfare measures to achieve the following objectives:

1) To permit development on hillside areas while minimizing storm water run-off and soil erosion problems incurred in adjustment of the topography to meet development needs.

2) To use best management practices in the design, landscape architecture, architecture, and civil engineering to ensure the integrity of natural drainage systems is preserved and soil stability is maintained.

3) To preserve and enhance the natural beauty of the landscape by encouraging the maximum retention of natural topographic features such as natural drainage swales, streams, slope ridge lines, rock outcroppings, vistas from and of the hillsides, trees and other natural plant formations, and to retain the sense of identity and image that the hillside areas now impart to the Township.

B. DEVELOPMENT PROHIBITED ON EXTREME STEEP SLOPE AREAS

1) Extreme Steep Slope Areas. Any filling, grading, or other construction activities otherwise allowed by this Resolution that would occur on a steep slope area is prohibited where the average land surface gradient over any one hundred (100) foot horizontal plane segment exceeds thirty (30) percent.

2) Planned Unit Development and Subdivision design shall not establish or otherwise create new lots where the buildable area of the lot (i.e., the lot area exclusive of any portion that is within any required front, side or rear yard setback) contains a steep slope area where the average land surface gradient over any one hundred (100) foot horizontal plane segment exceeds thirty (30) percent.

C. EXTREME STEEP SLOPE SETBACKS REQUIRED

Where the average land surface gradient exceeds thirty (30) percent over any one hundred (100) foot horizontal plane segment, development shall be setback from the outer edge of this extreme steep slope area a distance of one-half (½) the length of the steep slope.

D. BASE DEVELOPMENT REQUIREMENTS

1) Finished grades in disturbed areas shall not exceed a thirty (30) percent slope.

2) Construction of retaining walls shall be avoided, but when demonstrated to be necessary, shall not exceed a height of eight (8) feet and shall be constructed to include decorative landscape elements including vegetated plantings that soften edges and create visual interest.

3) Excavation and fills should not exceed eight (8) feet in cumulative height.

4) To the greatest extent possible, new roadways shall follow natural contours and care should be taken to include areas of highest environmental significance as part of the non-building areas of each lot.

5) Substantial earth moving shall not be permitted. Excavation required for building foundations, parking, and access drives shall be minimized by site design which fits development into the slope rather than altering the slope to fit the development.

   a) Earth moving shall be limited to the minimum required for building foundations, driveways, drainage control structures, and immediate yard areas. No unnecessary cuts and/or fills shall be allowed in order to create additional lots or building sites.

   b) All earth moving shall create the lowest possible potential for airborne or waterborne transportation of soil.

      (1) Natural drainageways shall be preserved to the maximum extent possible or established by means consistent with sound professional engineering practice in order to convey the discharge without channel erosion and in such manner as to dissipate the energy of the discharge.

      (2) Run-off from concentrated impervious surfaces shall be collected in a safe, adequate, and non-erosive manner, piped to a storm sewer system, storm water retention or detention facilities, or the bottom of a ravine or steep slope.

      (3) Where required, interceptor ditches shall be established above steep slopes in such a way as not to saturate or erode soil.

      (4) The overall drainage system shall be completed and made operational at the earliest possible time during construction.

   c) All earth moving shall be accomplished in the shortest practical period of time. In no event shall the existing natural vegetation be destroyed, removed, or disturbed more than fifteen (15) days prior to the initiation of construction.

   d) All fill shall be stabilized in conformance with generally-accepted engineering standards, including a compacted density of at least ninety-five (95) percent.

6) Buildings proposed below or above the brow of a steep slope must be staggered or stepped in depth and width to match topography and slope.

7) Rooftop utilities and mechanical equipment should be avoided, but if necessary, screening and sound control must be provided to integrate them into the rooftop.

8) Buildings should be clustered where possible to retain surrounding tree cover and minimize alterations to the existing topography.

9) All pervious surfaces remaining after completion of construction must be landscaped in trees, shrubs, grass or other ground covers to promote hillside stability and reduce excessive water runoff.

E. SITE PLAN REVIEW REQUIRED FOR LAND DISTURBANCE ON STEEP SLOPES [25]
Activity on steep slopes where the average land surface gradient over any one hundred foot (100) foot distance is greater than twelve (12) percent slope requires Site Plan review by the Zoning Commission for any filling, grading, or other construction activities otherwise allowed by this Resolution. Existing steep slope areas may not undergo earthwork or any type of cutting and filling to alter topographical site conditions prior to formal zoning approval.[26]

1) A video tape record shall be filed with the Site Plan prior to any building, grading, or clearing activity on the parcel to be developed. The video tape record shall completely depict the pre-development condition of the parcel in sufficient detail to enable the evaluation of compliance with these regulations during and following completion of construction activities.

2) A grading plan shall be required for each lot. In addition to the requirements of the topographic site plan now required by the County Department of Building Standards, the grading plan shall show:

   a) The natural topography of the total parcel to be developed on a contour map with two-foot integrals. Notes and details of existing terrain shall be shown over the required topographic information.

   b) A hydrologic inventory describing the direction of flow within the local drainage basin and channels within fifty (50) feet of the perimeter of the site, natural drainageways which may affect or be affected by the proposal, and any proposed realignment of the natural ravine channel. Special notations shall be included highlighting areas subject to seepage or spring flow.

   c) Suitable cross-sections or profiles of areas where streets, driveways, buildings, utilities, or grading construction is proposed. Cross-sections shall show proposed and natural grade at the centerline of a road, the right-of-way line, and the proposed building setback line.

   d) The location and size of all structures.

   e) The finished grade of all improvement locations.

   f) The dimensions, elevations, and contours of any proposed earth moving.

   g) A description of methods to be employed in disposing of soil and other material removed, including the location of the disposal site.

   h) A schedule showing when each stage of the project will be completed, including the estimated starting and completion dates.

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[25] Note: This model requires Site Plan review by the Zoning Commission where development is proposed on steep slopes. The Township should add development on steep slopes as a trigger in the chapter of the Code which defines Site Plan requirements. As an alternative, the Bath Township steep slope regulation made development of a steep slope a conditional use which would require BZA approval.

[26] Note: A township should carefully consider the minimum slope trigger where Site Plan review is required. EnviroScience biologists believe that disturbance to the vegetative cover on as little as 12% slopes present health and safety concerns. Most steep slope regulations we reviewed did not consider slopes to be steep slopes until they were in the range of 18% to 25%.

3) Evidence that structural issues related to development on steep slopes have been addressed by the applicant shall be provided. This evidence shall include a preliminary geotechnical evaluation which addresses relative hillside stability. Foundation plans shall be approved and stamped by a Professional Engineer (P.E.).

4) Evidence that adequate measures will be taken to prevent erosion and sedimentation during and after construction shall be provided by the applicant. In areas with very steep slopes, or for areas very close to a waterway, the Zoning Commission may require the preparation of a Storm Water Pollution Prevention Plan (SWP3) for any type of construction in accordance with requirements in Section 1 (Riparian Corridor Setbacks).

5) Development in steep slope areas shall demonstrate sensitivity to natural systems and ecological features of the site as described in the County Natural Resource Protection Study.

   a) Evidence that ecological issues are addressed shall be provided by the applicant.

   b) For areas that are shown as having a high ecological value according to the County Natural Resource Protection Study, the Zoning Commission may require the applicant to present plans for vegetation preservation and tree planting/replanting and documentation from environmental scientists that the proposed development will not substantially harm downstream water quality, habitats of state or federally protected species or impact other ecological considerations. Such documentation should also address long-term impacts and cumulative effects of development.

5. SOIL AND SEDIMENT CONTROL REGULATIONS[27]

A. PURPOSE AND AUTHORITY

1) **The purpose of this chapter is to prevent degradation of properties, stream channels, waters, and other natural resources of [NAME OF LIMITED SELF-RULE TOWNSHIP] by establishing requirements for the control of soil erosion, sediment deposition, and nonagricultural runoff and by establishing procedures whereby these requirements shall be administered and enforced. This regulation will:**

   a) Allow development while minimizing increases in erosion and sedimentation.

   b) **Reduce water quality impacts to receiving water resources and wetlands that may be caused by new development or redevelopment activities.**

   c) Minimize damage to property and degradation of water resources and wetlands.

   d) Promote and maintain the public health, safety, convenience, comfort, prosperity, and general welfare of the citizens of the Township.

   e) Apply to all parcels used or being developed, either wholly or partially, for new or relocated projects involving highways, underground cables, or pipelines; subdivisions or larger common plans of development; industrial, commercial, institutional, or residential projects; building activities on farms; redevelopment activities; general clearing; and all other uses that are not specifically exempted below.

   f) This regulation does not apply to activities regulated by, and in compliance with, the Ohio Agricultural Sediment Pollution Abatement Rules.

2) These regulations are adopted in accordance with and pursuant to the legal grant of authority of Ohio Revised Code 504.21 for a limited self-rule township to establish technically feasible and economically reasonable standards to achieve a level of management and conservation practices that will abate wind or water erosion of the soil or abate the degradation of the waters of the state by soil sediment in conjunction with land grading, excavating, filling, or other soil disturbing activities on land used or being developed in the township for nonfarm commercial, industrial, residential, or other nonfarm purposes, and to establish criteria for determination of the acceptability of those

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27 HB 411 (effective May 6, 2005) expands and revises the rulemaking authority of a board of county commissioners pertaining to erosion control, sediment control, and water management, and grants limited home rule townships the same rulemaking authority for the first time. According to the Legislative Services Corporation Final Bill Analysis, HB 411 "confers authority upon limited home rule townships to adopt for their unincorporated territory rules establishing technically feasible and economically reasonable standards to achieve a level of management and conservation practices that will abate wind or water erosion of the soil or the degradation of waters of the state by soil sediment in conjunction with land grading, excavating, filling, or other soil disturbing activities on land used or being developed in the township for nonfarm commercial, industrial, residential, or other nonfarm purposes and to establish criteria for determination of the acceptability of those management and conservation practices. The latter authority is to be exercised in the same manner and in accordance with provisions (including the changes provided under the act) that are comparable to those governing county rules and their enforcement as described under "***Phase II of the Federal Water Pollution Control Act***," above. (R.C. 504.04(B)(3) and (7), 504.19, and 504.21.)"

management and conservation practices. These regulations are designed to implement the applicable area-wide waste treatment management plan prepared under section 208 of the "Federal Water Pollution Control Act," 86 Stat. 816 (1972), 33 U.S.C.A. 1228, as amended, and to implement and be consistent with phase II of the storm water program of the national pollutant discharge elimination system established in 40 C.F.R. Part 122.

B. EXEMPT ACTIVITIES

The following activities are exempt from the regulations set forth in these rules:

1) Land disturbance on less than one (1) acre, unless part of larger common development.

2) Activities inside the limits of municipal corporations.

3) A public highway, transportation, or drainage improvement or maintenance project undertaken by a government agency or political subdivision in accordance with a statement of its standard sediment control policies that is approved by the Board of Township Trustees or the chief of the Division of Soil and Water Conservation in the Department of Natural Resources.

4) Land-disturbing activities related to producing agricultural crops or silviculture operations which are regulated by the Ohio Agricultural Abatement Rules (1501: 15-3-01 to 1501: 15-3-09 of the Ohio Administrative Code)

5) Existing strip mining operations regulated by Chapter 1513 of the Ohio Revised Code.

6) Existing surface mining operations regulated by Chapter 1514 of the Ohio Revised Code.

7) Emergencies posing an immediate danger to life or property, or substantial flood or fire hazards.

C. REGULATED ACTIVITIES

1) All sites where construction activities involving any land clearing, grubbing, top soil stripping, land grading, earth moving, or land disturbance in excess of one (1) acre, or less than one (1) acre but part of a larger common development plan, shall submit a Storm Water Pollution Prevention Plan pursuant to Paragraph F.

2) The following activities shall submit an Abbreviated Storm Water Pollution Prevention Plan pursuant to Paragraph H:

a) New single-family residential construction regardless of parcel size. If such activities disturb one (1) acre or more, or are part of a larger common plan of development or sale disturbing one (1) acre or more, an Ohio EPA Construction Site General Permit and a Storm Water Pollution Prevention Plan may be required.

b) Additions or accessory buildings for single-family residential construction regardless of parcel size. If such activities disturb one (1) acre or more, or are part of a larger common plan of development or sale disturbing one (1) acre or more, an Ohio EPA Construction Site General Permit and a Storm Water Pollution Prevention Plan may be required.

c) All non-residential construction on parcels of less than one (1) acre.

d) General clearing activities not related to construction and regardless of parcel size. If such activities disturb one (1) acre or more, or are part of a larger common plan of development or sale disturbing one (1) acre or more, an Ohio EPA Construction Site General Permit and a Storm Water Pollution Prevention Plan may be required.

3) Activities disturbing one tenth (1/10) or less of an acre are not required to submit a Storm Water Pollution Prevention Plan or an Abbreviated Storm Water Pollution Prevention Plan. These activities must comply with all other provisions of this regulation.

D. APPLICATION PROCEDURES

1) Soil Disturbing Activities Submitting a Storm Water Pollution Prevention Plan. The applicant shall submit two (2) sets of the SWP3 and the applicable fees to the Township and one set of the SWP3 and the applicable fees to the County SWCD as follows:

a) For Planned Unit Developments: After the approval of the preliminary plans and with submittal of the final development plans.

b) For other construction projects: Before issuance of a zoning permit by the Zoning Inspector.

c) For general clearing projects: Prior to issuance of a zoning permit by the Zoning Inspector.

2) Soil Disturbing Activities Submitting an Abbreviated Storm Water Pollution Prevention Plan. The applicant shall submit two (2) sets of the Abbreviated SWP3 and the applicable fees to the Township and two (2) sets of the Abbreviated SWP3 and the applicable fees to the County SWCD as follows:

a) For single-family home construction: Before issuance of a zoning permit by the Zoning Inspector.

b) For other construction projects: Before issuance of a zoning permit by the Zoning Inspector.

c) For general clearing projects: Prior to issuance of a zoning permit by the Zoning Inspector.

3) The Township and the County SWCD shall review the plans submitted under this Section for conformance with this regulation and approve, or return for revisions with comments and recommendations for revisions within thirty days from the date of submission. A plan rejected because of deficiencies shall receive a narrative report stating specific problems and the procedures for filing a revised plan.

4) Soil disturbing activities shall not begin and zoning permits shall not be issued without an approved SWP3 or Abbreviated SWP3.

5) SWP3 for individual sublots in a Planned Unit Development will not be approved unless the larger common plan of development or sale containing the sublot is in compliance with this regulation.

6) Approvals issued in accordance with this regulation shall remain valid for one (1) year from the date of approval.

E. COMPLIANCE WITH STATE AND FEDERAL REGULATIONS

Approvals issued in accordance with this regulation do not relieve the applicant of responsibility for obtaining all other necessary permits and/or approvals from the Ohio EPA, the US Army Corps of Engineers, and other federal, state, and/or county agencies. If requirements vary, the most restrictive requirement shall prevail. These permits may include, but are not limited to, those listed below. All submittals required to provide proof of compliance with these state and federal regulations shall be submitted with Storm Water Pollution Prevention Plans or Abbreviated Storm Water Pollution Prevention Plans.

1) Ohio EPA NPDES Permits authorizing storm water discharges associated with construction activity or the most current version thereof: Proof of compliance with these requirements shall be the applicant's Notice of Intent (NOI) number from Ohio EPA, a copy of the Ohio EPA Director's Authorization Letter for the NPDES Permit, or a letter from the site owner certifying and explaining why the NPDES Permit is not applicable.

2) Section 401 of the Clean Water Act: Proof of compliance shall be a copy of the Ohio EPA Water Quality Certification application tracking number, public notice, project approval, or a letter from the site owner certifying that a qualified professional has surveyed the site and determined that Section 401 of the Clean Water Act is not applicable. Wetlands, and other waters of the United States, shall be delineated by protocols accepted by the U.S. Army Corps of Engineers at the time of application of this regulation.

3) Ohio EPA Isolated Wetland Permit: Proof of compliance shall be a copy of Ohio EPA's Isolated Wetland Permit application tracking number, public notice, project approval, or a letter from the site owner certifying that a qualified professional has surveyed the site and determined that Ohio EPA's Isolated Wetlands Permit is not applicable. Wetlands shall be delineated by protocols accepted by the U.S. Army Corps of Engineers at the time of application of this regulation.

4) Section 404 of the Clean Water Act: Proof of compliance shall be a copy of the U.S. Army Corps of Engineers Individual Permit application, public notice, or project approval, if an Individual Permit is required for the development project. If an Individual Permit is not required, the site owner shall submit proof of compliance with the U.S. Army Corps of Engineer's Nationwide Permit Program. This shall include one of the following:

   a) A letter from the site owner certifying that a qualified professional has surveyed the site and determined that Section 404 of the Clean Water Act is not applicable.

   b) A site plan showing that any proposed fill of waters of the United States conforms to the general and special conditions specified in the applicable Nationwide Permit. Wetlands, and other waters of the United States, shall be delineated by protocols accepted by the U.S. Army Corps of Engineers at the time of application of this regulation.

5) Ohio Dam Safety Law: Proof of compliance shall be a copy of the ODNR Division of Water permit application tracking number, a copy of the project approval letter from the ODNR Division of Water, or a letter from the site owner certifying and explaining why the Ohio Dam Safety Law is not applicable.

F. STORM WATER POLLUTION PREVENTION PLAN

In order to control sediment pollution of water resources and wetlands, the applicant shall submit a SWP3 in accordance with the requirements of this regulation. The SWP3 must contain a description of the controls appropriate for each construction operation and the applicant must implement such controls. The SWP3 must clearly describe for each major construction activity the appropriate control measures; the general sequence during the construction process under which the measures will be implemented; and the contractor responsible for implementation (e.g., contractor "A" will clear land and install perimeter controls and contractor "B" will maintain perimeter controls until final stabilization).

1) The SWP3 shall be certified by a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect.

2) The SWP3 must address all minimum components of the NPDES Permit and conform to the specifications of the most current edition of the Ohio Department of Natural Resources Division of Soil and Water and Natural Resources Conservation Service handbook, Rainwater and Land Development Manual.

3) The SWP3 shall provide:

a) Project Description. Briefly describe the nature, purpose and scope of the land disturbing activity. This may be self evident from the plan. Include total area of site and acreages of individual phases if applicable. Include a narrative describing the overall erosion and sediment control scheme for this site.

b) Vicinity Map. Location map showing the site in relation to the surrounding area. Include the location of receiving streams/surface waters.

c) Limits of Clearing and Grading Plan. Indicate limits and show the acreage of earth disturbing activity. Show borrow, spoil and topsoil stockpile areas. Include before and after contours with appropriate contour intervals. Delineate drainage watersheds before, during, and after major grading activities indicating acreage of each area.

d) Soils Information. Show existing soil types including the location of bedrock, unstable, or highly erodible soils as determined by the County Soil Survey and/or soil tests. Show the location of any soil test borings on the plan. Other soils information, such as permeability, perched water table, etc. may be mentioned and, if available, the quality of any known pollutant discharge from the site such as that which may result from previous contamination caused by prior land uses.

e) Surface Water Locations. Show locations of all lakes, ponds, surface drainage patterns, wetlands, springs, FEMA floodplain data, if applicable, etc. on or within two hundred (200) feet of the site. Include the location and name of the immediate receiving stream or surface water(s) and the first subsequent receiving water(s). If storm water will be discharging into a municipal separate storm sewer system or into a storm water management structure such as a retention basin which is off the site, clearly indicate this on the plans.

f) Site Development. Show locations of all prior land uses, existing and proposed buildings, roads, utilities, parking facilities, etc.

g) Schedule of Construction Activity. Included in this should be a schedule for implementing temporary and permanent erosion and sediment control practices

and storm water management facilities. The NPDES permit requires that all sediment ponds and perimeter barriers be constructed within seven (7) days of first grubbing. All sediment control structures must remain functional until upland areas are stabilized.

h) Location of Practices. Show locations of all structural erosion and sediment control, storm water management, and water quality practices, including post-construction best management practices. Water ponding facilities should be drawn to scale, with the area of the contributing watershed given.

i) Detail Drawings. All structural practices should be explained with detail drawings of specifications. Installation specifications may also be necessary to aid contractor. Included should be outlet structures for retention, detention facilities and any special modifications to these structures to aid in improved sediment trapping capability.

j) Land Stabilization Measures. Provide specifications for temporary and permanent seeding, mulching, blanketing, etc. and also the installation schedule for each practice. The NPDES permit requires that all areas at final grade or where construction activity has temporarily ceased for twenty-one (21) days or longer be stabilized within seven (7) days of last activity. Erosion control blankets and matting should be used to stabilize channels where the flow velocity is greater than 3.5 ft./sec. steep slopes, on highly erosive soils and on areas slow to establish a vegetative cover.

k) Special Notes for Critical Areas. Include pertinent information regarding stream bank stabilization, riparian corridors, buffer areas, stream restoration plans, wetland areas and stream crossings.

l) Existing Natural Areas. Show an aerial (plan view) extent and description of wetlands or other special aquatic sites, unusual vegetation, springs, rock outcroppings, etc. at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project. Include vegetation to remain (trees, buffer areas, etc.).

m) For subdivided developments where the SWP3 does not call for a centralized sediment control capable of controlling multiple individual lots, a detail drawing of a typical individual lot showing standard individual lot erosion and sediment control practices.

n) Maintenance and Inspections. Provide notes and information regarding maintenance of each practice to assure continued performance. Erosion and sediment control must be inspected once every seven (7) days and with twenty-four (24) hours of one-half (0.5) inch or greater rainfall. A written log of these inspections must become part of the SWPPP. This log should indicate the dates of inspection, inspector weather conditions, observations, actions taken to correct problems, and the date action was taken.

o) Storm Water Runoff Considerations and Post-construction BMPs. Show the pre- and post-construction runoff coefficients including information such as the method used to calculate runoff. Include a narrative describing post construction storm water management BMPs and the rationale for their selection. All sites larger than five or more acres in the larger plan of development MUST provide structural

controls that capture the Water Quality Volume and release it over the prescribed number of hours. Refer to the NPDES General Construction Permit for design methodology. Show the locations of all stormwater management facilities and natural vegetation to remain (trees, buffer areas, etc.). Provide an estimate of percent of site imperviousness once the site is developed.

p) Trap Efficiency, Location and Volume of Sediment Ponds. Concentrated storm water runoff and runoff from drainage areas which exceed the capacity of silt fence or inlet protection, shall pass through a sediment settling pond. Calculations must be shown for all temporary or permanent sediment traps/ponds and any retention/detention facilities to be used for this purpose. All ponds used for the purpose of trapping sediment must have a volume of sixty-seven (67) cubic yards per acre of total drainage area to the pond (*not only disturbed area*). Trapping efficiency of these structures must demonstrate at least a seventy-five (75) percent trapping efficiency. The basins must be shown to scale with the storage volume and contributing drainage area delineated on the SW3P.

q) Disposal of Solid, Sanitary and Toxic Waste – Show the manner how solid, sanitary and toxic waste is to be disposed of in accordance with local, state and federal regulations. It is prohibited to burn, bury or pour out onto the ground or into the storm sewers any solvents, paints, stains, gasoline, diesel fuel, used motor oil, hydraulic fluid, antifreeze, cement curing compounds and other such toxic or hazardous wastes. Wash-out of cement trucks should occur in a diked, designated area where the washings can collect and be disposed of properly when they harden –OR - specify that all washout be hauled off site back to the concrete plant for disposal or recycling. Fuel storage tanks should be located in diked areas away from any drainage channels. The diked area should hold a volume of 110% of the largest tank – OR – specify that the contractor use self-contained spill proof tanks.

r) Trench and Groundwater Dewatering – All sediment laden pumped water must pass through a sediment basin, filter bag, or sump pit prior to discharge. A note or detail must be provided on the SWPPP that identifies dewatering procedures. Clean ground water should be pumped to a stable outlet and shall not co-mingle with sediment.

s) Off-Site Sediment Tracking – Show how the development will minimize tracking of sediments by vehicles by making the use of gravel construction entrances and regularly scheduled sweeping/good housekeeping.

G. PERFORMANCE STANDARDS[28]

All properties and natural resource features adjacent to the soil disturbing activity shall be protected from soil erosion and sedimentation damage, including but not limited to, private properties, natural and artificial waterways, wetlands, storm sewers, and public lands. Erosion and sediment control practices at the site, and as identified in the Stormwater Pollution Prevention Plan shall include the following minimum components:

1) Construction site erosion and sediment control, and stormwater quality improvement practices used to satisfy this requirement shall conform, at a minimum, to State of Ohio

28 This section contains a list of best management practices which tend to change over time and may require periodic updates. As an option, Townships may want to reference best management practices maintained by the County Soil and Water Conservation District.

standards as set forth in the most current edition of the *Rainwater and Land Development Manual* and shall conform to the most current Ohio Environmental Protection Agency, Ohio Revised Code Chapter 6111, requirements.

2) An approved Stormwater Pollution Prevention Plan and approval letter from the SWCD or Ohio EPA shall be located on site for review.

3) Non-structural Preservation Measures. Preserve the existing natural condition to the maximum extent practicable. Such practices may include preserving riparian areas, preserving existing vegetation and vegetative buffer strips, phasing of construction operations in order to minimize the amount of disturbed land at any one time, and designation of tree preservation areas or other protective clearing or grubbing practices.

   a) Limits to clearing and grading shall be clearly marked on site with signage, flagging, and/or fencing etc.

   b) All riparian and wetland setbacks must be clearly marked in the field by construction fencing.

   c) Install all sediment perimeter controls as a first action of construction as specified by construction sequence. This shall include and is not limited to protective BMP's for stream corridors and crossings, wetlands, construction site entrance, sediment traps and basins, barriers, and diversion dikes.

4) Runoff Control Practices. The SWP3 shall incorporate measures that control the flow of runoff from disturbed areas so as to prevent erosion. Such practices may include rock check dams, pipe slope drains, diversions to direct flow away from exposed soils and protective grading practices. These practices shall divert runoff away from disturbed areas and steep slopes where practicable.

5) Sediment Control Device. All concentrated storm water runoff shall pass through a sediment control device before exiting the site boundaries.

   a) Concentrated runoff from bare soil areas shall be diverted into a settling pond or sediment control structure, or other approved sediment barrier before leaving the site.

   b) Storm sewer inlets shall be protected so that sediment-laden runoff will not enter the storm sewer system without first being filtered and/or treated. If the storm sewer system empties into an approved sediment basin or if inlet protection presents a safety hazard than it shall not be required.

6) Re-vegetate soil

   a) Temporary soil stabilization shall occur within seven (7) days after rough grading if the area will remain idle longer than twenty one (21) days.

   b) Permanent soil stabilization shall be installed within seven (7) days after final grade is reached on any portion of the site. Permanent vegetation is a ground cover dense enough to cover 80% of the soil surface and mature enough to survive winter weather conditions. For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of the lot to the individual builders.

c) Earthen structures such as dams, basins, stream modifications and water diversions shall be seeded and mulched within seven (7) days of the completion of installation or within two (2) days if adjacent to critical areas. Dams shall conform to the Ohio Dam Laws (ORC 1521.06).

d) Disturbance of critical areas shall be temporarily stabilized within two (2) days of disturbance if the area will remain inactive for twenty one (21) days or longer.

7) Construction vehicles shall avoid streams and the fifty (50) foot buffer areas. If a drainage way must by crossed by logging or construction vehicles during clearing, grubbing, and construction operations the crossing shall be limited to those areas defined on the approved SW3P. At those locations identified on the SW3P, a temporary stream crossing shall be constructed according to the Rainwater & Land Development Manual. Construction of bridges, culverts or sediment control structures shall not place soil, debris and other fine particulate material into or close to the water resource in such a manner that it may slough, slip or erode into the water resource.

8) Soil stockpiles shall be stabilized or protected to prevent soil loss.

9) Unstable soils prone to slipping or sloughing shall not be cleared, graded, excavated, filled or have loads imposed upon them unless the work is planned by a qualified professional engineer and installed in accordance with the Stormwater Pollution Prevention Plan. Cut and fill slopes should be designed to minimize erosion problems.

10) Soil shall be removed from paved surfaces and/or public roads at the end of each day in such a manner that does not create off-site sedimentation in order to ensure safety and abate off-site soil loss. Collected sediments shall be placed in a stable location on site or taken off site to a stable location.

11) Stabilize disturbed or modified drainage ways. Reduce erosive effects of storm water by using and/or maintaining grassed swales, infiltration structures, or water diversion.

12) Sediment and erosion controls shall be inspected once every seven (7) days and within 24 hours of a 0.5" or greater rainfall event. A written log of these inspections and improvements to controls shall be kept on site. The inspections shall include the date of inspection, name of inspector, weather conditions, actions taken to correct any problems and the date corrective actions were taken.

13) Trenches for underground utility lines and pipes shall be temporarily stabilized within seven (7) days if they are to remain inactive for thirty (30 days). Trench dewatering devices shall discharge in a manner that filters soil-laden water before discharging it to a receiving drainage ditch or pond. If seeding, mulching, or other erosion and sediment control measures were previously installed, these protective measures shall be reinstalled.

14) Sites greater than five (5) acres will require both structural and non-structural post construction water quality improvement practices. Design criteria shall conform to Ohio EPA requirements.

15) Maintenance. All control practices shall be maintained and repaired as needed to ensure continued performance of their intended function until final stabilization. All

sediment control practices must be maintained in a functional condition until all up slope areas they control reach final stabilization.

16) Final Stabilization. Final stabilization shall be determined by the Soil and Water Conservation District or appropriate Township-designated persons responsible to inspect for SW3P site compliance.

H. ABBREVIATED STORM WATER POLLUTION PREVENTION PLAN.
In order to control sediment pollution of water resources and wetlands, the applicant shall submit an Abbreviated SWP3 in accordance with the requirements of this regulation.

1) The Abbreviated SWP3 shall be certified by a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect.

2) The Abbreviated SWP3 shall include a minimum of the following BMPs. The Township may require other BMPs as site conditions warrant.

a) Construction Entrances. Construction entrances shall be built and shall serve as the only permitted points of ingress and egress to the development area. These entrances shall be built of a stabilized pad of aggregate stone or recycled concrete or cement sized greater than two (2) inches in diameter, placed over a geotextile fabric, and constructed in conformance with specifications in the most recent edition of the Rainwater and Land Development Manual.

b) Concrete Truck Wash Out. The washing of concrete material into a street, catch basin, or other public facility or natural resource is prohibited. A designated area for concrete washout shall be made available.

c) Street Sweeping. Streets directly adjacent to construction entrances and receiving traffic from the development area shall be cleaned daily to remove sediment tracked off-site. If applicable, the catch basins on these streets nearest to the construction entrances shall be cleaned weekly.

d) Stabilization. The development area shall be stabilized as detailed in the following table.

STABILIZATION CONTROL TIMETABLE	
Area requiring stabilization	**Time frame to apply erosion controls**
Any disturbed area within 50 feet of a stream and not at final grade.	Within 2 days of the most recent disturbance if that area will remain idle for more than 21 days.
For all construction activities, any disturbed area, including soil stockpiles, which will be dormant for more than 21 days but less than one year, and not within 50 feet of a stream.	Within 7 days of the most recent disturbance within the area.
Disturbed areas that will be idle over winter	Prior to November 1.
Note: Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques must be employed. These techniques may include mulching or erosion matting.	

e) Inlet Protection. Erosion and sediment control practices, such as boxed inlet protection, shall be installed to minimize sediment-laden water entering active storm drain systems. Straw or hay bales are not acceptable forms of inlet protection.

f) Final Stabilization: Final stabilization shall be determined by the County Soil and Water Conservation District or an appropriate person responsible for inspection for SW3P site compliance.

I. INSPECTION AND ENFORCEMENT

1) Regular inspections will be performed by the Township Zoning Inspector *[**OPTION**: The Trustees may designate another person or entity, such as the SWCD]* for compliance with these Rules.

2) The Township Zoning Inspector may, upon identification to the owner or person in charge, enter any land upon obtaining agreement with the owner, tenant, or manager of the land in order to determine whether there is compliance with the rules adopted under this section. If the Township Zoning Inspector is unable to obtain such an agreement, the Township Zoning Inspector may apply for, and a judge of the court of common pleas for the county where the land is located may issue, an appropriate inspection warrant as necessary to achieve the purposes of this section.

3) If it appears that a violation of any of these regulations has occurred:

a) The Township Zoning Inspector may issue an immediate stop work order if the violator failed to obtain any federal, state, or local permit necessary for sediment and erosion control, earth movement, clearing, or cut and fill activity.

(1) The person to whom a stop work order is issued under this section may appeal the order to the County Court of Common Pleas, seeking any equitable or other appropriate relief from that order.

(2) No stop work order shall be issued under this section against any public highway, transportation, or drainage improvement or maintenance project undertaken by a government agency or political subdivision in accordance with a statement of its standard sediment control policies that is approved by the Board of Trustees or the Chief of the Division of Soil and Water Conservation in the Department of Natural Resources.

b) In addition, if the Township Zoning Inspector determines such a violation exists, regardless of whether or not the violator has obtained the proper permits, the Township Zoning Inspector may authorize the issuance of a notice of violation.

c) If, after a period of not less than thirty (30) days has elapsed following the issuance of the notice of violation, the violation continues, the Township Zoning Inspector shall issue a second notice of violation.

d) If, after a period of not less than fifteen (15) days has elapsed following the issuance of the second notice of violation, the violation continues, the Zoning Inspector may issue a stop work order after first obtaining the written approval of the County Prosecuting Attorney if, in the opinion of the Prosecuting Attorney, the violation is egregious.

e) Once a stop work order is issued, the Zoning Inspector shall request, in writing, the Prosecuting Attorney to seek an injunction or other appropriate relief in the court of common pleas to abate excessive erosion or sedimentation and secure compliance with the rules adopted under this section. If the Prosecuting Attorney seeks an injunction or other appropriate relief, then, in granting relief, the court of common pleas may order the construction of sediment control improvements or implementation of other control measures and may assess a civil fine of not less than one hundred ($100) or more than five hundred ($500) dollars. Each day of violation of a rule or stop work order issued under this section shall be considered a separate violation subject to a civil fine.

f) No person shall violate any regulation adopted or order issued under this section. If the Board of Township Trustees determines that a violation of any regulation adopted or administrative order issued under this section exists, the Board may request, in writing, the County Prosecuting Attorney to seek an injunction or other appropriate relief in the Court of Common Pleas to abate excessive erosion or sedimentation and secure compliance with the rules or order. In granting relief, the Court of Common Pleas may order the construction of sediment control improvements or implementation of other control measures and may assess a civil fine of not less than one hundred ($100) or more than five hundred ($500) dollars. Each day of violation of a rule adopted or administrative order issued under this section shall be considered a separate violation subject to a civil fine.

4) The Township may deny the issuance of any additional permits to an applicant when it determines that the applicant is not in compliance with the provisions as outlined in this ordinance.

5) The SWCD may require revisions to the SW3P as necessary to achieve compliance to these rules.

6) A final inspection will be made at the request of the owner/developer to determine if the criteria of these regulations have been satisfied. Upon completion all remaining bonds may be released.

7) The Zoning Inspector shall review complaints and initiate enforcement procedures when violations are confirmed. Any complaint received shall be acted upon, routinely within three (3) working days and the complainant shall be notified of any action or proposed action routinely within seven (7) working days of receipt of the complaint.

J. FEES

The Storm Water Pollution Prevention Plan and Abbreviated Storm Water Pollution Plan review, filing, and inspection fee is part of a complete submittal and is required to be submitted to the Township and the County SWCD before the review process begins. Please consult with the Township for current fee schedule.

K. BOND

If a Storm Water Pollution Prevention Plan or Abbreviated Storm Water Pollution Prevention Plan is required by this regulation, soil disturbing activities shall not be permitted until a Security Bond, Escrow Account, Certified Check, or cash has been deposited with the Township Finance Department to guarantee that the planned temporary and permanent soil erosion, sediment control, and permanent water quality practices are constructed and removed in a timely manner, as determined by the Zoning Inspector**.**

1) The bond amount shall be a ***[$1,500]*** minimum, and an additional ***[$1,500]*** paid for each subsequent acre or fraction thereof.

*[**OPTION**: You may wish to require the furnishing of a performance guarantee and a maintenance guarantee maintained in an amount of not less 120% of the estimate approved by the County Engineer, of installation of the deferred improvements. The maintenance guarantee should be maintained for a period of not less than (two) 2 years after final acceptance of the soil erosion, sediment control, and water quality practices in an amount equal to 20% of the estimate approved by the County Engineer, of the construction of such practices.]*

2) The bond will be used for the Township to perform the obligations otherwise to be performed by the owner of the development area as stated in this regulation and to allow all work to be performed as needed in the event that the applicant fails to comply with the provisions of this regulation.

3) The Security Bond, Escrow Account, Verified Check, or cash shall be released, less Township administrative fees as detailed in the Township Codified Fee Schedule, after all work required by this regulation has been completed and final stabilization has been reached, all as determined by the Zoning Inspector.

L. DISCLAIMER OF LIABILITY

Compliance with the provisions of this regulation shall not relieve any person from responsibility for damage to any person otherwise imposed by law.

1) This regulation shall not be construed as authorizing any person to maintain a private or public nuisance on their property, and compliance with the provisions of this regulation shall not be a defense in any action to abate such a nuisance.

2) Failure of the Township to observe or recognize hazardous or unsightly conditions or to recommend corrective measures shall not relieve the site owner from the responsibility for the condition or damage resulting therefrom, and shall not result in the Township, its officers, employees, or agents being responsible for any condition or damage resulting therefrom.

6. STORMWATER MANAGEMENT REGULATIONS[29]

A. PURPOSE AND SCOPE

The intent of this regulation is to establish feasible and economically reasonable standards to achieve a level of storm water control that will minimize damage to public and private property and degradation of water resources and wetlands, and will promote and maintain the health, safety, and welfare of the residents of the Township.

1) This regulation will:

a) Control storm water runoff resulting from soil disturbing activities.

b) Assure that property owners control the volume and rate of storm water runoff originating from their property so that surface water and ground water are protected, soil erosion is controlled, and flooding potential is not increased.

c) Preserve to the maximum extent practicable the natural drainage characteristics of the site and minimize the need to construct, repair, and replace enclosed, below-grade storm drain systems.

d) Preserve to the maximum extent practicable natural infiltration and ground recharge, and maintain subsurface flow which replenishes water resources, wetlands, and wells.

e) Assure that storm water controls are incorporated into site planning and design at the earliest possible stage.

f) Prevent unnecessary stripping of vegetation and loss of soil, especially adjacent to water resources and wetlands.

g) Reduce the need for costly maintenance and repairs to roads, embankments, ditches, water resources, wetlands, and storm water management practices that are the result of inadequate storm water control.

h) Reduce the long-term expense of remedial projects needed to address problems caused by inadequate storm water control.

i) Encourage the construction of storm water management practices that serve multiple purposes including, but not limited to, flood control, erosion control, fire protection, water quality protection, recreation, and habitat preservation.

j) Ensure that all storm water management practices are properly designed, constructed, and maintained.

2) This regulation applies to and requires a Storm Water Management Plan from soil disturbing activities on land used or being developed, either wholly or partially, for new or relocated projects involving highways, underground cables, pipelines, subdivisions, commercial or industrial areas, building activities on farms, redevelopment of urban areas, and all other uses that are not specifically exempted in **Section 6.A.3)**

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29 This model was developed by the Chagrin River Watershed Partners for communities to meet their storm water management needs. The model also addresses applicable requirements of the Ohio Environmental Protection Agency's NPDES Storm Water Regulations, referred to as "Phase II".

3) This regulation applies to, but does not require a Storm Water Management Plan from development areas on less than one (1) acre of land that are not part of a larger common plan of development on one (1) or more acres of land. These minimal areas shall be developed in accordance with all other provisions of this regulation.30

4) Storm Water Management Plans are not required for a one-time increase in impervious cover of up to 5,000 square feet at existing commercial or industrial developments. This exemption shall apply one time per commercial or industrial parcel.31

B. **DISCLAIMER OF LIABILITY**

Neither submission of a Storm Water Management Plan under the provisions herein, nor compliance with this regulation, shall relieve any person from responsibility for damage to any person otherwise imposed by law. The provisions of this regulation are promulgated to promote the health and safety of the public and are not designed for the benefit of any individual or for the benefit of any particular parcel of property.

C. **CONFLICTS, SEVERABILITY, NUISANCES & RESPONSIBILITY**

1) Where this regulation is in conflict with existing provisions of law, ordinance, contract, or deed, whichever imposes the more stringent restriction shall prevail.

2) If any clause, section, or provision of this regulation is declared invalid or unconstitutional by a court of competent jurisdiction, validity of the remainder shall not be affected thereby.

3) This regulation shall not be construed as authorizing any person to maintain a private or public nuisance on their property, and compliance with the provisions of this regulation shall not be a defense in any action to abate such a nuisance.

4) Failure of the Township to observe or recognize hazardous or unsightly conditions or to recommend corrective measures shall not relieve the owner from the responsibility for the condition or damage resulting therefrom, and shall not result in the Township, its officers, employees, or agents being responsible for any condition or damage resulting therefrom.

30 Section 6.A.3) represents the minimum development area (1 acre) to be consistent with Phase II. Communities should determine the appropriate development area from which they want to require a Storm Water Management Plan. Because of the lot sizes in many communities, thus may often be less than 1 acre.

31 Section 6.A.4) is designed to allow minor increases in impervious cover at commercial or industrial areas while preventing piecemeal expansions that will significantly increase storm water volumes.

D. APPLICATION PROCEDURES FOR STORM WATER MANAGEMENT PLANS

The Township shall administer this regulation, shall be responsible for determination of compliance with this regulation, and shall issue such notices and orders as may be necessary. The Township may consult with the County Soil and Water Conservation District or other technical experts as necessary in reviewing the Storm Water Management Plan required by this regulation.

1) Four (4) sets of the Storm Water Management Plan and necessary data required by this regulation shall be submitted to the Zoning Inspector as follows:

   a) For subdivisions: After the approval of the preliminary plat and prior to the approval of improvement plans or drawings by the County Planning Commission.

   b) For other construction projects: Concurrently with the submittal of construction drawings to the County Engineer.

   c) For general clearing projects: Thirty (30) working days prior to any soil disturbing activities.

2) The Zoning Inspector shall review the Storm Water Management Plan with the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect) for conformance with the provisions of this regulation, and approve or return for revisions with comments and recommendations for revisions, within twenty-one (21) working days after receipt of the Storm Water Management Plan as described above. A Storm Water Management Plan rejected because of deficiencies shall receive a narrative report stating specific problems and the procedures for filing a revised Plan. At the time of receipt of a revised Plan, another twenty-one (21) day review period shall begin.

3) Approved Storm Water Management Plans shall remain valid for two (2) years from the date of approval. A copy of the approved Plan and its review report shall be forwarded by the Zoning Inspector to the County Soil and Water Conservation District.

E. COMPLIANCE WITH STATE AND FEDERAL REGULATIONS

1) Storm Water Management Plans issued in accordance with this regulation do not relieve the site owner of responsibility for obtaining all other necessary permits and/or approvals from federal, state, and/or county agencies. If requirements vary, the most stringent shall be followed.

2) Storm Water Management Plans shall be accompanied by other permits and documentation relevant to the project, including, but not limited to, those listed below. No soil disturbing activity shall begin before all necessary state and federal permits have been granted to the owner or operator.

   a) Proof of compliance with the OEPA General NPDES Storm Water Permit. Proof of compliance shall be, but is not limited to, a copy of the NPDES General Storm Water Permit Notice of Intent; the NPDES General Storm Water Permit Number; and/or the OEPA Director's Acceptance Letter for the NPDES Permit.

   b) Proof of compliance with Section 404 of the Clean Water Act administered by the U.S. Army Corps of Engineers relating to waters of the United States under its jurisdiction. Proof of compliance shall be, but is not limited to, a copy of the U.S.

Army Corps of Engineers Individual Permit, if an Individual Permit is required for the development project, showing project approval and any restrictions that apply to site activities. If an Individual Permit is not required, the site owner shall submit proof of compliance with the U.S. Army Corps of Engineer's Nationwide Permit Program. This shall include, but is not limited to, one of the following:

(1) A letter from the site owner verifying that a qualified professional has surveyed the site and found no waters of the United States. Such a letter shall be noted on site plans submitted to the Township.

(2) A site plan showing that any proposed fill of waters of the United States conforms with the general and specific conditions specified in the applicable Nationwide Permit. Wetlands, and other waters of the United States, shall be delineated by protocols accepted by the US Army Corps of Engineers at the time of application of this regulation.

c) Proof of compliance with the Ohio Dam Safety Law administered by ODNR Division of Water. Proof of compliance shall be, but is not limited to, a copy of the ODNR Division of Water permit number, a copy of the project approval letter from the ODNR Division of Water, or a letter from the site owner explaining why the Ohio Dam Safety Law is not applicable.

F. STORM WATER MANAGEMENT PLAN

1) In order to control flooding and erosion, the owner or operator shall be responsible for developing a Storm Water Management Plan. If applicable, the owner or operator shall also obtain an OEPA General NPDES Storm Water Permit and shall abide by its requirements in addition to an approved Storm Water Management Plan from the Township. In situations of conflict between OEPA requirements and Township requirements, the most stringent shall apply.

2) If the construction site is subject to OEPA's General NPDES Storm Water Permit, a copy of all the required inspection sheets shall be submitted to the Township within two (2) working days of the date that the inspection was conducted.

3) The Storm Water Management Plan shall be certified by a professional engineer registered in the State of Ohio.

4) The Storm Water Management Plan shall incorporate measures as recommended by the most current edition of *Rainwater and Land Development* and shall include the following information:

a) A project description including the type and purpose of soil disturbing activities and a description of the larger common plan of development if applicable.

b) A vicinity sketch locating the site, and the larger common plan of development if applicable, and all pertinent surrounding features including wetlands, streams, steep slopes, and other sensitive areas receiving runoff from the development area on or within 200 feet of the site.

c) The name and location of the immediate receiving water resource and the first subsequent named receiving water resource and the major watershed(s) in which the project is located.

d) The existing and proposed topography shown in 1' contour intervals for flat areas and 2' contour intervals in steeper areas.

e) The location and description of existing and proposed drainage patterns and storm water management practices, including any related storm water management practices beyond the development area and the larger common development area. Drainage patterns during major phases of construction shall also be shown as appropriate.

f) Existing and proposed watershed boundary lines, direction of flow, and watershed acreage.

g) The types and locations of soils in or affected by the development area, including unstable soils as determined by the most recent edition of the County Soil Survey and/or field investigations performed by NRCS/SWCD personnel, a professional engineer, or a professional soil scientist. The Soil Survey and interpretive assistance can be obtained from the SWCD.

h) The scheduling, phasing, and coordination of construction operations and erosion and sediment control practices, including vegetative plantings and mulch.

i) Storm water management practices to be employed on the development area both during and after soil disturbing activities, including:

(1) Their location and size, including detail drawings, maintenance requirements during and after construction, and design calculations, all where applicable.

(2) Limits of clearing and of soil disturbing activities.

(3) The name, address, and contact information of the person responsible for the continued operation and maintenance of storm water management practices.

(4) A calculation of the percent impervious cover for both the pre-development and post-development site conditions.

(5) Final site conditions including storm water inlets and permanent nonstructural and structural storm water management practices. Details of storm water management basins shall be drawn to scale and shall show volumes and sizes of contributing drainage areas.

(6) Any other structural and/or non-structural storm water management practices necessary to meet the design criteria in this regulation.

(7) Description of maintenance procedures needed to assure the continued performance of storm water management practices as required in this regulation.

(8) All other runoff information or supporting information required to conform with the storm water management design criteria detailed in this regulation.

G. PERFORMANCE STANDARDS

1) Storm Water Management Plans required by this regulation shall meet the following design criteria:

a) Practices designed for final use: Storm water management practices shall be designed for the ultimate use of the site and to function safely and with minimal maintenance.

b) Storm water management for all lots: Areas developed for a subdivision, as defined in the County Subdivision Code, shall provide storm water management for the development of all subdivided lots.

c) Redevelopment projects: To the extent that site characteristics allow, proposed redevelopment project designs shall include nonstructural and structural storm water management practices that are designed to result in a net equivalent reduction in impervious cover of at least 20 percent (20%) at the site. The following shall apply to all redevelopment projects:32

(1) "Redevelopment" refers to alterations of a property that change the footprint of a site or building so as to result in greater than 1 acre of land disturbance. This does not include activities that are not expected to negatively impact storm water quality and/or quantity and offer no new opportunities for storm water management practices, all as determined by the Zoning Inspector.

(2) Where the Zoning Inspector, upon consultation with the County Engineer (or an Engineer licensed by the State of Ohio selected by the Township), determines that site constraints prevent a reduction in impervious cover, practical alternatives may be used to result in an improvement of water quality and/or a reduction of storm water runoff from the site. Practical alternatives shall include, but are not limited to:

(a) Fees paid in an amount specified by the Township. These fees shall be applied by the Township to storm water management practices.

(b) Implementation of off-site storm water management practices.

(c) Watershed or stream restoration.

(d) Retrofitting of an existing storm water management practice.

(e) Other practices approved by the Zoning Inspector, upon consultation with the County Engineer (or a Civil Engineer licensed by the State of Ohio selected by the Township).

(3) When possible, all practical alternatives permitted above shall be implemented within the drainage area of the proposed redevelopment project.

32 Phase II requires designated communities to control post-construction storm water from new development and redevelopment. Section 6.G.1)c) provides communities with the flexibility to work with owners of currently built sites to comply with storm water regulations and take advantage of best management practices that may not have been available when the site was originally developed.

d) Easements: All storm water management practices shall have easements sufficient to provide access to the Township for inspections and maintenance. The following conditions shall apply to all easements:

(1) Easements and covenants shall be approved by the Township and shall be recorded with the County Auditor and on all property deeds prior to approval of a zoning permit.

(2) Unless otherwise required by the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township), access easements to all storm water management practices shall be no less than 20 feet wide, plus the width of the storm water management practice.

(3) Unless otherwise required by the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township), storm water management practices in subdivisions, including basins, ponds, and wetlands, shall be on separate lots held and maintained by an entity of common ownership.

(4) Those lots crossed by an easement are restricted against the planting in said easement of trees, shrubbery, or other woody growth; against the construction therein of buildings, fences, walls, and other structures that may obstruct the free flow of storm water and the passage of inspectors and maintenance equipment; and against the changing of final grade from that described by the final grading plan approved by the Township.

e) Nonstructural practices preferred: When developing a Storm Water Management Plan, a combination of nonstructural and structural storm water management practices shall be used to control storm water quantity and protect water quality. In meeting this requirement, the following shall apply:33

(1) Nonstructural storm water management practices shall be used to the maximum extent practicable.

(2) Nonstructural and structural storm water management practices shall be designed in accordance with the most recent version of the *Rainwater and Land Development Manual* and/or in accordance with specifications provided

33 **Section 6.G.1)e) allows Storm Water Management Plans to reflect a comprehensive review by site developers of the various structural and nonstructural options for preventing storm water pollution and controlling storm water quantity. This section also provides communities with the flexibility to alter site requirements to incorporate nonstructural storm water management practices. This flexibility may include modifications of lot sizes, setback requirements, or driveway and street widths to reduce impervious cover and to promote the maintenance of natural retention areas such as wetlands and riparian areas on development sites.**

***Rainwater and Land Development Manual* is Ohio's standard for storm water management and is a good starting point for nonstructural and structural storm water management practices. Its current edition, however, does not provide a great deal of information on nonstructural practices. Other manuals are available nationally that explore these practices in greater detail.**

by the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township).

(3) The Township may allow modifications in the design of a development project from those requirements established in the Township Zoning Code when nonstructural storm water management practices are incorporated into site design.

(4) Nonstructural storm water management practices shall be recorded on all property deeds and shall remain unaltered by subsequent property owners.

(5) In designing storm water basins, properly designed retention basins with water quality benefits shall be used to the maximum extent practicable. Retention basins shall not be constructed in water resources. The applicant must demonstrate the water quality benefits achieved to the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township).

f) Calculation requirements: Calculations submitted for the design of nonstructural and structural storm water management practices shall demonstrate the following:

(1) The peak rate of runoff from the Critical Storm and all more frequent storms occurring on the development drainage area does not exceed the peak rate of runoff from a one (1) year frequency, twenty-four (24) hour storm occurring on the same area under pre-development conditions.

(2) Storms of less frequent occurrence (longer return periods) than the Critical Storm, up to the 100 year storm, have peak runoff rates no greater than the peak runoff rates from equivalent storms under pre-development conditions. Consideration of the 1, 2, 5, 10, 25, 50, and 100 year storms in design and construction will be considered meeting this standard.

g) Determination of Critical Storm: The Critical Storm for a specific development drainage area shall be determined as follows:

(1) Determine, by appropriate hydrologic methods, the total volume of runoff from a one (1) year frequency, 24-hour storm occurring on the development drainage area before and after development.

(2) From the volume determined in (a), determine the percent increase in runoff volume due to development.

(3) Using the percentage increase determined in (b), select the 24-hour Critical Storm from the following table:

If the Percentage of Increase in Volume of Runoff is:		**The Critical Storm for Peak Rate Control will be:**
Equal to or Greater Than:	**and Less Than:**	

If the Percentage of Increase in Volume of Runoff is:		The Critical Storm for Peak Rate Control will be:
Equal to or Greater Than:	**and Less Than:**	
----	10	1 year
10	20	2 year
20	50	5 year
50	100	10 year
100	250	25 year
250	500	50 year
500	---	100 year

h) Calculation Methods

(1) The selection of a calculation method shall be based on the size of the development drainage area and the output information required.

(2) The engineer selecting the calculation method and/or performing the calculations shall do so with full knowledge of the method's limitations, applicable conditions, and degree of accuracy and shall state these in the calculations submitted to the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township) for review.

(3) The County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township) may reject any calculation method he/she deems inappropriate for the given situation. The "rational method" shall not be considered an appropriate calculation method in determining the Critical Storm.

2) Maintenance of Storm Water Management Practices

a) Township acceptance required: The County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township) shall approve an inspection and maintenance agreement binding on all subsequent owners of land served by the planned storm water management practices before the Township approves a zoning permit for the proposed project.

b) All inspection and maintenance agreements shall do the following:

(1) Designate the party responsible for maintenance of structural and nonstructural storm water management practices including mowing and ensuring outlet structures are clear and in good repair. Unless otherwise

approved by the Township, this shall be an entity of common ownership within the proposed subdivision or the owner of an industrial or commercial site. Each deed sold in the proposed subdivision shall require continued membership in this entity of common ownership.

(2) Prohibit unauthorized alterations of structural and nonstructural storm water management practices.

(3) Provide access to storm water management practices for inspection by the Township to document the condition of the practices.

c) The location, dimensions, and bearing (including the depth of capacity) of all storm water management practices shall be incorporated on the application plan, prior to approval by the Township, and reference thereon shall be made to the entity or individual(s) responsible for maintenance.

d) An as-built survey must be completed by qualified personnel and submitted to the Township.

3) Inspection of Storm Water Management Practices

a) The Township shall inspect storm water management practices periodically.

b) Upon finding a malfunction or other need for maintenance, the Township shall notify the responsible party of the need for maintenance.

c) Upon notification, the responsible party shall have five (5) working days, or other mutually agreed upon time, to makes repairs.

d) Should repairs not be made within this time, or a plan approved by the Township for these repairs not be in place, the Township may undertake necessary repairs and assess the responsible party.

H. BOND AND PERMIT

1) Funds shall be deposited with the Township prior to review by the Township and/or its consultants to cover professional services of the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township) and/or other experts required by the Council or Review Boards.

2) No soil disturbing activities shall be permitted until a bond has been posted to the satisfaction of the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township) sufficient for the Township to perform the obligations otherwise to be performed by the owner or as stated in this regulation and to allow all work to be performed as needed in the event that the owner or operator fails to comply with the provisions of this regulation. The bond shall be released after all work required by this regulation has been completed to the satisfaction of the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township).

3) No project subject to this regulation shall commence without a Storm Water Management Plan approved by the County Engineer (or a professional engineer, a registered surveyor, certified professional erosion and sediment control specialist, or a registered landscape architect selected by the Township).

I. VIOLATIONS

No person shall violate or cause or knowingly permit to be violated any of the provisions of this regulation, or fail to comply with any of such provisions or with any lawful requirements of any public authority made pursuant to this regulation, or knowingly use or cause or permit the use of any lands in violation of this regulation or in violation of any permit granted under this regulation.

7. TREE PRESERVATION REGULATIONS[34]

A. PURPOSE

The Township finds that continued development and increasing demands upon natural resources have had the effect of encroaching upon, despoiling, or eliminating many of the trees, vegetation, natural resources, and processes within the Township. If preserved and maintained in an undisturbed and natural condition, trees and natural vegetation constitute important physical, aesthetic, recreational, environmental, and economic assets to existing and future residents of the Township. The purposes of this Section are:

1) To provide for the paramount public concern for these natural resources in the interest of the health, safety, convenience, comfort, prosperity, and general welfare of the residents of this Township in keeping with ORC 519.02

2) To provide for the protection, conservation, proper maintenance, and use of trees and woodlands in order to minimize disturbance to them and to prevent damage from erosion and siltation, a loss of wildlife, and/or minimize the destruction of the natural habitat;

3) To protect the trees and woodlands within the Township for their economic support of property values when allowed to remain uncleared and/or unharvested, in whole or in significant part, and for their natural beauty, character, ecological, or historical significance;

4) To protect public health with trees and natural vegetation through the absorption of air pollutants and contamination, and the purification of air including the reduction of excessive noise and damage related to noise pollution, the reduction of the carbon dioxide content, and increase in the oxygen content of the air;

5) To protect public safety by stabilizing the soil and promoting soil conservation, erosion control, and flood control;

6) To contribute to the maintenance and stabilization of property values.

7) To protect the general welfare of the Township by maintaining natural beauty, recreational opportunities, wildlife habitat, and irreplaceable heritage for existing and future Township residents.

B. Definitions

The following definitions shall apply to this Section.

1) **D.B.H.** shall mean diameter at breast height or the diameter in inches of a tree measured at four and one-half (4 ½) feet above the existing grade.

2) **Land Clearing** shall mean those operations where trees and vegetation are removed and which occur previous to construction or building; e.g. road right-of-way excavation, utility excavation, grubbing, and any other necessary clearing operation.

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34 This Tree Preservation sample was adapted from standards developed for Charlevoix County, MI and guidelines provided by the National Arbor Day Foundation and Scenic America.

3) **Landmark Tree** shall mean a tree of the genus and/or species and diameter listed in **Section 7.C.2)** (Landmark Trees) of this Section, and any tree of twenty-four (24") inches D.B.H. or greater.

4) **Remove or Removal** shall mean the act of removing a tree by burning, digging up, or cutting down, or the effective removal through damage to the tree or its root system.

5) **Transplants** shall mean the digging up of a tree from one place on a property and the planting of the same tree in another place.

6) **Tree** shall mean any woody plant with at least one well-defined stem, a minimum D.B.H. of three (3) inches, and a height that will exceed ten (10) feet.

C. Identification of Protected Trees
Protected Trees shall include:

1) All existing trees with a trunk diameter at breast height (D.B.H.) of eight (8) inches or more.

2) Landmark Trees. All trees within the Township of twenty-four (24") inches D.B.H. or greater and all trees listed below by Genus and/or species of the listed minimum size D.B.H. shall be considered Landmark Trees, unless an applicant submits an Affidavit from a registered landscape architect, certified arborist, or forester that the tree is in such ill health that its anticipated life expectancy is less than five (5) years.

COMMON NAME	BOTANICAL NAME	SIZE D.B.H.
Arborvitae	Thuja	18"
Beech	Fagus	18"
Birch	Betula	18" *
Black Gum	Nyssa sylvatica	12"
Blue Beech	Carpinus caroliniana	8"
Cedar, Red	Juniperus virginiana	12"
Chestnut	Castanea	10"
Crabapple	Malus	12"
Dogwood	Cornus	8"
Douglas Fir	Pseudotsuga menziesii	18"
Fir	Abies	18"
Ginkgo	Ginkgo	18"
Hawthorn	Crataegus	12"
Hemlock	Tsuga	18"
Hickory	Carya	18"
Hophornbeam	Ostrya virginiana	8"

COMMON NAME	BOTANICAL NAME	SIZE D.B.H.
Horse Chestnut/Buckeye	Aesculus	18"
Kentucky Coffeetree	Gymnocladus dioicus	18"
Larch/Tamarack	Larix	12"
London Plane/Sycamore	Platanus	18"
Magnolia	Magnolia	8"
Maple, Red	Acer rubrum	18"
Maple, Norway	Acer platanoides	18"
Pine	Pinus	18"
Redbud	Cercis canadensis	8"
Sassafras	Sassafras albidum	15"
Serviceberry	Amelanchier	8"
Spruce	Picea	8"
Sweetgum	Liquidambar styraciflua	16"
Tulip Tree	Liriodendron tulipifera	18"
Walnut	Juglans	20"
Wild Cherry	Prunus	18"
Witch Hazel	Hamamelis virginiana	8"

*If the tree forks below 4.5 feet then measure the circumference of the largest stem at 4.5 feet. If the tree forks at 4.5 feet, then measure the circumference at the smallest place below the fork. Or, The caliper shall be interpreted to be equal to one-half of the total calipers of up to the three largest trunks.

D. Identification of Tree Activities That Must Comply with the Ordinance

1) Exempt Activities. The following activities are exempt from regulations in this Section:

a) Tree removal on occupied, single family residential property of less than five acres, on which a valid certificate of occupancy has been issued;

b) All agricultural/farming operations or commercial nursery/tree farm operations; agricultural/farming operations include removal of trees in silvicultural operations for products that include but not limited to veneer, sawlogs, pulpwood and firewood; it also includes removal of trees for cultural operations that will result in enhanced growing conditions for the residual or next stand of trees; trees that have a required forest management plan.

c) Activities of utility companies or public tree trimming agencies;

d) The removal of dead trees where the damage resulted from an accident or non-human cause;

e) The trimming or care of trees provided that the work is accomplished in accordance with standardized forestry and horticultural practices as established by the American Association of Nurserymen or the Tree Care Industry Association;

f) Actions made necessary by an emergency such as tornado, windstorm, flood, freeze, dangerous pest infestation, or other man-made or natural disaster, in order to prevent injury or damage to persons or property;

g) Tree removal in order to perform maintenance or repair of lawfully located roads, sewers, structures, and of facilities used in the service of the public to provide transportation, electric, gas, water, telephone, telecommunication, or other services.

h) Improvement or maintenance of rivers or their tributaries when such operations are organized or sponsored by the County and are specifically intended to preserve natural resources. Such activities shall include, but are not limited to:

(1) Removal of materials which may cause diverted flows and bank erosion, including the removal of trees, brush, and debris;

(2) Bank stabilization projects which require minimal disturbance of existing conditions; and

(3) Wildlife and aquatic habitat improvement projects.

(4) Selling exempted trees.

2) Pre-approved Site Plans. This Section shall not apply to a site plan that has received final approval prior to the effective date of this Section, so long as the site plan remains in effect and in good standing pursuant to this ordinance.

3) Tree Activities Where Tree Application and Permit Required

a) Any tree identified in **Section 7.C.** (Identification of Protected Trees) shall be retained and protected from harm in order to preserve the tree canopy to the maximum extent possible or to preserve a Landmark Tree specimen, unless permitted herein, or it is determined by the Zoning Commission that the retention of such trees would unreasonably burden the development or unreasonably limit reasonable use of the site.

b) It shall be a violation of this Section for any person, except as otherwise provided herein, to remove or cause the removal, transplanting, or destruction of any tree identified in **Section 7.C.** (Identification of Protected Trees) within the Township without applying for and receiving a tree permit, issued in accordance with this section.

E. Administration[35]

1) Applications for a tree permit shall be filed with the Township Zoning Inspector. When a site is proposed for development necessitating review and approval of a site plan, a conditional use approval, or a planned unit development, said application for a tree permit shall be made at the same time as such other related application. The application for a tree permit shall consist of:

a) Three (3) copies of the tree permit application;

b) A tree location survey in a form acceptable to the Township that shall bear the following information and details:

(1) Minimum scale of 1" = 50'. The scale shall be the same as a related site plan.

(2) The shape and dimensions of the lot or parcel, together with the existing and proposed locations of structures and improvements, including existing and proposed utilities.

(3) Locations and dimensions of all setbacks and existing or proposed easements.

(4) All trees of eight (8) inches D.B.H. or greater on the project site shall be tagged in the field with identifying numbers, using non-corrosive tags.

(5) Exact locations of all existing trees, determined by actual field survey, of eight (8) inches D.B.H. or greater, including trees within the adjoining street right-of-way and all trees to be affected by the development, such as trees located within areas of right-of-way improvements or off-site utility work. All such trees proposed to remain, to be relocated, or to be removed, shall be so designated and the numbered trees shall be identified by size (D.B.H.), grade at the base of each tree, and crown spread to scale. Such verified information shall be provided by a registered land surveyor or civil engineer. The survey shall be accompanied by a separate key identifying the numbered trees by size and common name. This information must be provided by a registered landscape architect, certified arborist, or forester, through an on-site inspection, who must verify the contents by seal or signature, whichever applies.

(6) If existing trees are to be relocated, the proposed location for such trees, together with a statement as to how such trees are to be moved, protected, and/or stored during land clearance and construction and how they are to be maintained after construction.

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[35] This section identifies the agency or individual responsible for ensuring compliance with the tree ordinance. Most communities assign the job to one of four types of agencies: planning and zoning; parks and recreation; public works; or environmental resources. Many communities also have shade tree commissions that, in addition to reviewing and updating the ordinance and related guidelines, may also review applications for permits. At some point or at some level of discussion, communities will need a professional arborist or forester to assess compliance and provide technical expertise. While only the larger and wealthier cities tend to have such a professional on staff, most communities can retain one in their area.

(7) A statement showing how trees to remain are to be protected during land clearance, construction, and on a permanent basis including the proposed use of tree wells, protective barriers, tunneling, or retaining walls.

(8) The number of trees to be removed that are of eight (8) inches D.B.H. or greater.

c) The requirements for a tree location survey may be waived by the Township for areas fifty (50) feet or more outside the construction zone. If waived, a statement indicating predominant species and estimated number and size of trees in this area shall be required. The area to remain undisturbed shall be snow fenced prior to any activity.

d) An on-site examination shall be made by the Township in lieu of the tree location survey under any of the following conditions:

(1) Where a permit is requested to remove or transplant trees on a lot of less than ***[two (2) to five (5) acres]***, which is zoned for single family purposes, and upon which is located, or proposed to be located, an one family dwelling; or,

(2) Where a permit is required to remove three (3) or fewer trees.

2) Fees

a) Applications for a tree permit under this section shall be accompanied by a non-refundable administrative application fee in an amount specified from time to time by resolution of the Township Board.

b) In addition, an applicant may be required to pay an additional escrow fee in an amount determined by the Township to pay for the estimated cost of any needed outside consultant(s) who may be retained by the Township in connection with the review of the application. In the event the cost of the services of the consultant(s) is less than the escrow fee, the applicant shall be refunded the balance. In the event the cost of the services of the consultant(s) exceeds the amount of the escrow fee, the applicant shall pay the deficiency to the Township prior to the issuance of a tree permit. A denial of an application for a tree permit shall not affect the applicant's obligation to pay the escrow fee provided for in this Section.

c) Civil Fee for Illegally Removed Trees. In addition to any penalty provided for in the event of a conviction for a violation of this Section, and notwithstanding whether or not the Township has commenced a civil suit for injunctive relief, any person who removes or causes any tree to be removed except in accordance with this Section shall forfeit and pay to the Township a civil fee equal to the total value of trees illegally removed or damaged as computed from the Council of Tree and Landscape Appraisers' Guide For Plant Appraisal. The civil fee shall accrue to the Township and, if necessary, the Township may file a civil action to recover such fee. The Township shall place any sum collected in the Township Tree Fund. Alternatively, the Township may require replacement of illegally removed or damaged trees as restitution in lieu of such fee. Replacement will be on an inch-to-inch basis computed by adding the total diameter measured at D.B.H. in inches of the illegally removed or damaged trees. The Township may use other reasonable means to estimate the tree loss if destruction of the illegally removed or damaged

trees prevents exact measurement. The Township may also require a combination of civil fee payment and tree replacement.

3) Review of Tree Permit. The Township shall process a tree permit application as follows:

a) The Zoning Inspector shall review the tree permit application to verify that all required information has been provided. At the request of the applicant or the Zoning Inspector, an administrative meeting may be held to review the proposed application in light of the purpose and review standards of this Section.

b) Upon receipt of a complete application, the Zoning Inspector may conduct or authorize the completion of a field investigation to review and verify the accuracy of information received. The receipt of a tree permit application shall constitute permission from the owner of the property to conduct such on-site investigation.

c) If a tree permit application relates to a proposed development or activity on a site necessitating site plan review, conditional land use, or planned unit development by the Township, the Zoning Commission shall consider said application concurrent with its review of the related site plan or other approval. If the Zoning Commission approves a site plan which conforms with the requirements of this Section, that approval together with any additional terms and conditions attached thereto, will be considered to have fulfilled the requirements for a tree removal permit.

d) When a tree permit application is not related to a development or activity necessitating review and approval of the Zoning Commission, the Zoning Inspector shall be responsible for granting or denying the application.

e) Any person denied a tree permit by the Zoning Inspector may appeal to the Township Board of Zoning Appeals pursuant to **Chapter XXX** ("Appeals to BZA").

f) Whenever an application for a tree permit is granted, the Zoning Inspector shall:

(1) Attach to the granting of the tree permit any reasonable conditions considered necessary to ensure that the intent of this Section will be fulfilled;

(2) Affix a reasonable time to carry out the activities approved in the permit; and

(3) Require the permit grantee to file with the Township cash bond or irrevocable bank letter of credit in an amount determined necessary to ensure compliance with tree permit conditions and this Article.

4) Applications That Qualify for a Mandatory Permit

a) Where a permit has been requested with regard to non-residential property for which a valid certificate of occupancy has been issued that is less than ***[select from two (2) to five (5)]*** acres in area, for the removal or transplanting of three (3) or less trees of eight (8) inches D.B.H. or more within a calendar year. This provision shall not apply to Landmark Trees.

b) Where a permit has been requested, with regard to occupied property for which a valid *[certificate of occupancy or certificate of zoning compliance]* has been issued,

for the removal or transplanting of eight (8) or less trees of eight (8) inches D.B.H. or more within a calendar year. This provision shall not apply to Landmark Trees.

5) Review Standards. The following standards shall govern the granting or denial of an application for a tree permit for property that does not otherwise qualify for a mandatory tree permit pursuant to **Section 7.E.4)** (Applications That Qualify for a Mandatory Permit):

a) The preservation and conservation of trees, woodland areas, wildlife, and related natural resources and processes shall have priority over development when there are feasible and prudent location alternatives on the site for proposed buildings, structures, or other site improvements.

b) Where the proposed activity consists of land clearing, it shall be limited to designated street rights-of-way, drainage and utility areas; and areas necessary for the construction of buildings, structures, or other site improvements.

c) Where the proposed activity involves residential development, residential units shall to the extent reasonably feasible, be designed and constructed to blend into the natural setting of the landscape.

d) The proposed activity shall comply with all applicable statutes and ordinances and shall be evaluated concerning its effect on adjacent properties, the scenic assets, and regarding wind block and noise buffer factors.

e) The proposed activity shall include necessary provisions for tree relocation or replacement in accordance with **Section 7.F.2)** (Replacement or Relocation of Trees) of this Article.

f) Tree removal or transplanting shall be limited to the following instance:

(1) When removal or transplanting is necessary for the construction of a building, structure, or other site improvement, and the permit applicant has shown there is no feasible and prudent location alternative on-site for a proposed building, structure or other site improvement; or,

(2) The tree is dead, in decline, in danger of falling, is located too close to existing buildings or structures, interferes with existing utility service or drainage, creates unsafe vision clearance, or does not conform to other Township regulations.

F. Standards[36]

1) Tree Protection Prior to and During Construction

a) Prior to construction and/or land clearing, the applicant shall do the following:

[36] One of the best ways to promote tree preservation is to provide incentives to encourage landowners to protect their trees and improve the community. Some common incentives include establishing a community grant fund for replacing or planting new trees, offering developers zoning incentives such as reduced setbacks or increased density in exchange for tree preservation, and giving property tax breaks to landowners who agree to preserve their woodlands.

(1) All trees for which application is being made for removal shall be so identified on-site by red flagging tape prior to field inspection by the Zoning Inspector. Trees selected for transplanting shall be flagged with a separate distinguishing color.

(2) Construction limit fencing shall be erected that restricts access to protected areas and tree protection devices shall be installed where required over tree roots, branches, and/or tree trunks. All tree protection fencing and tree protection devices shall be installed as approved by the Township Zoning Inspector.

(3) Fences and tree protection devices installed shall be maintained and all construction materials, supplies, and equipment shall be kept outside of the protected areas.

b) During construction, the applicant shall do the following:

(1) Maintain all fences and tree protection devices as approved by the Township Zoning Inspector and refrain from causing or permitting any activity near said trees including, but not limited to, the storage of equipment, supplies, excavation materials, disposal of fuels, solvents, or chemicals, or causing the disturbance of any soils or vegetation within protected areas without the prior approval of the Township Zoning Inspector.

(2) No damaging attachments, wires (other than cable wires for trees), signs, or permits may be fastened to any tree protected by this Section.

(3) No excavation or other subsurface disturbance may be undertaken within the drip line of any such tree.

(4) No impervious surface (including, but not limited to, paving or buildings) may be located within the drip line of any such tree.

(5) The Township Zoning Inspector shall conduct periodic inspections of the site during land clearing and/or construction in order to ensure compliance with this Section.

2) Replacement or Relocation of Trees. Whenever a tree permit allows removal of trees of eight (8) inches D.B.H. or greater, the permit grantee shall relocate or replace the trees, except as provided in **subparagraph 2)h).** below, on a one-to-one basis and all replacement trees must measure two and one-half (2 1/2") inches D.B.H or greater. In lieu thereof, the Township and the permit grantee may agree to replacement trees of varying diameters so long as the market value of said trees would approximate the value of the replacement trees. In addition:

a) Replacement trees shall have shade potential and other characteristics comparable to the removed trees, and shall comply with ANSI Z60.1 American Standard For Nursery Stock for size and quality.

b) All replacement trees or transplanted trees must be approved prior to planting and must be planted in standards for planting and transplanting, including, but not limited to, staking, mulching, and watering.

c) All nursery stock and transplanted trees shall be guaranteed for one (1) year.

d) A goal for planting will be to encourage species diversity not only within the community, but also within specific planting sites (street, park, parking lots, etc.).

e) All tree planters will receive training, including how to properly prepare the planting hole. See: ONLA/ODNR Tree Planting Specifications reference.

f) In wildfire-prone areas, selection, placement, and spacing recommendations of the National Fire Protection Association will be followed (NFPA 299, Standard for Protection of Life and Property from Wildfire).

g) The Township shall approve tree relocation or replacement locations in order to provide optimum enhancement, preservation, and protection of woodlands areas as follows:

(1) To the extent feasible and desirable, trees shall be relocated or replaced on-site and within the same general area as trees removed.

(2) Where it is not feasible and desirable to relocate or replace trees on-site, relocation or replacement may be made at another approved location in the Township.

(3) Where it is not feasible and desirable to relocate or replace trees on-site or at another approved location in the Township, the tree permit grantee shall pay into the Township Tree Fund, which fund is hereby created, an amount of money approximating the current market value of the replacement trees that would otherwise be required. The Township shall use the Tree Fund for the purpose of maintaining and preserving wooded areas, for planting and maintaining trees within the Township, and for expenses related to the administration and enforcement of this Section.

h) Replacement trees shall not be required for a tree that is removed pursuant to a tree permit granted pursuant to **Section 7.E.4)** (Applications that Qualify for a Mandatory Permit) where the tree does not qualify for a Landmark Tree, or because: the tree is dead, in decline, in danger of falling, is located too close to existing buildings or structures, interferes with existing utility service or drainage, creates unsafe vision clearance, or does not conform to other Township ordinances or regulations.

i) When Landmark Trees are permitted to be removed, replacement trees shall be provided to a minimum of thirty (30%) percent of D.B.H. of the tree to be removed. Replacement trees, measured in D.B.H. or calipers, shall be provided either individually or on an accumulative basis to meet the thirty (30%) percent D.B.H. requirement, however, if on an accumulative basis all individual trees shall measure at least two and one-half (2 l/2 ") inch diameter.

3) Removals. Removals are an action of last resort. Nearby residents or other affected individuals shall be given notice before a tree is marked or removed.

a) When contracting for removals, selected companies must show proof of adequate liability and property damage insurance.

b) When trees are removed, stumps will also be ground.

c) Removed trees will be handled as necessary to prevent spread of insects or disease.

4) Maintenance Requirements

a) In dry climates, water-conserving irrigation systems will be installed at the time of planting or a means and schedule for watering will be developed.

b) Mulch (or plastic tree guards) will be installed as part of the planting project and mowing and weed control personnel will be instructed in protecting the base of the trees.

c) When stakes are used during planting, they will be removed after one growing season.

d) Inspections to identify hazards will be conducted annually for mature trees and corrective measures taken promptly.

e) Routine pruning of mature trees will be scheduled on a rotational basis so that all trees are pruned as needed approximately every 3 – 5 years. Pruning practices will be in compliance with ANSI A300 and be done under the care of a certified arborist. When volunteers assist in any pruning, they will be trained or supervised by a certified arborist.

f) The concepts of Plant Health Care will be used.

g) In wildfire-prone areas, landscape maintenance for fire protection will be followed.

h) Techniques for enhancing wildlife habitat will be considered.

8. LOW IMPACT DESIGN STANDARDS

A. PURPOSE

Low Impact Development is an ecologically friendly approach to site development and storm water management that aims to mitigate development impacts to land, water, and air. The approach emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site. Impact Development site design and strategies may provide the means by which stormwater management objectives may be achieved. The goals of low impact development include:

1) Incorporating natural topographic features (wetlands, stream corridors, mature forests) and constraints in site design;

2) Maintaining site hydrologic functions and mitigate impacts to such functions;

3) Providing alternative layout and sizing of traditional site;

4) Maintaining the total number of buildable lots within a development (lot yield);

5) Customizing infrastructure (lots, streets, curbs, gutters, sidewalks) to each site;

6) Decentralizing and micro-management of stormwater at its source; and

7) Providing of aesthetically pleasing stormwater management controls

Maintaining natural function and mitigating impact to the hydrologic cycle of a site allows for greater protection of the water resources of the site. This benefits the health, safety, and welfare of local stakeholders by controlling stormwater at its source and minimizing the non-point source pollution that results in water resource degradation.

B. APPLICATION

Low impact design requirements are applicable design considerations and addressed during a site plan review process in the following circumstances:

1) When a proposed development involves a single structure with more than ***[Suggested range of 50,000 to 100,000]*** square feet of gross floor area.

2) When a proposed development involves a parking and/or loading area that is more than ***[Suggested range of 50,000 to 100,000]*** in size.

3) When a proposed development involves a parking and/or loading area that exceeds the minimum amount of required off-street parking and/or loading by more than ***[Suggested range of twenty-five (25) to fifty (50)]*** percent.

4) When any development exceeds non-permeable surface land coverage (including rooftops, parking areas, drives, pools, decks, and walks) of ***[Suggested range of sixty (60) to seventy-five (75)]*** percent.

5) When a proposed development involves a variance from the requirements of this resolution, the Board of Zoning Appeals may condition such a variance upon compliance with one or more of the standards contained in this Chapter.

Demonstration of compliance with this Chapter is accomplished as part of the site plan review process.

C. LOW IMPACT DEVELOPMENT STANDARDS[37]

The use of low impact development standards may provide developers with flexibility in site design and numerous environmental and economic benefits. The following site design elements should be considered in low impact development.

1) Reduce Limits of Clearing and Grading. The limits of clearing and grading refer to the site area to which development is directed. This development area includes all impervious areas (roads, sidewalks, and rooftops) and pervious areas (graded lawn areas and open drainage systems).

a) To minimize hydrologic impacts on existing site land cover the area of development should be located:

(1) In less sensitive areas or areas with lower value in terms of hydrologic function (e.g., developing barren clay soils will have less hydrologic impact than development of forested sandy soils).

(2) Outside of sensitive area buffers such as streams, floodways, floodplains, wetlands, and steep slopes.

(3) Outside of areas with soils which have high infiltration rates to reduce net hydrologic site impacts.

b) Additionally, minimal disturbance techniques may be employed to further reduce the limits of clearing and grading, by restricting ground disturbance by identifying the smallest possible area and clearly delineating it on the site. These techniques include:

(1) Reduce paving and compaction of highly permeable soils;

(2) Minimizing the size of construction easements and material storage areas during the construction phase of a development;

(3) Avoid removal of existing trees where possible, and specifically those trees over 18 inches in diameter;

(4) Minimizing imperviousness by reducing the total area of paved surfaces;

(5) Disconnecting as much impervious area as possible to increase opportunities for infiltration and reduce water runoff flow;

(6) Maintaining existing topography and associated drainage divides to encourage natural dispersed flow paths.

2) Drainage as a Design Element. To reduce impacts created by land development, site planning should incorporate drainage by carefully conducting hydrologic evaluations and reviewing spatial site layout options. These procedures should be incorporated into the

37 It has been suggested that this section could be included as a reference document instead of within the regulation itself.

site planning process early on to understand and take advantage of site conditions. Hydrologic evaluation procedures can be used to minimize runoff potential and to maintain the predevelopment time of concentration. Open drainage systems, for should be designed within natural landforms and land uses to become major design elements of a site plan or development plan. The stormwater management drainage system can suggest pathway alignment, optimum locations for open space, and potential building sites. The drainage system helps to integrate urban forms, giving the development an integral, more aesthetically pleasing relationship to the natural features of the site. Not only does the integrated site plan complement the land, but it can also save on development costs by minimizing earthwork and construction of expensive drainage structures.

3) Minimize Impervious Surfaces. The entire traffic distribution network, (roadways, sidewalks, driveways, and parking areas), are the greatest source of impervious area. Changes in the impervious area alter runoff, recharge values, and site hydrology. Managing the imperviousness contributed by road and parking area pavement is an important component of the site planning and design process. An appropriate strategy may avoid problems from runoff and water table depletion, by reducing such surfaces that prevent natural filtration. Methods that can be used to achieve a reduction in the total runoff volume from impervious surfaces are presented below:

   a) *Rooftops*. Rooftops contribute to site imperviousness, and the number of lots per acre (or lot coverage) generally determines the site's rooftop impervious area. House type, shape, and size can affect rooftop imperviousness. Vertical construction (two-story) is favored over horizontal layouts (ranch-style) to reduce the square footage of rooftops.

   b) *Vegetative Roof Systems*. Moss, grass, herbs, wildflowers, and native plants may be used to create a lightweight and aesthetically pleasing permeable vegetative surface on an impervious roof area.

   c) *Driveways*. Driveways can be planned to reduce the total site imperviousness. Some techniques that can be used include:

      (1) Using shared driveways whenever possible, but especially in sensitive areas.

      (2) Limiting driveway width (for both single and shared driveways).

      (3) Minimizing building setbacks to reduce driveway length.

      (4) Using driveway and parking area materials which reduce runoff and increase travel times such as pervious pavers or gravel.

   d) *Permeable Pavement Surfaces*. A variety of materials ranging from traditional asphalt, and concrete, gravel or pavers may be used to construct these surfaces. These roadways or parking areas must allow water to flow through, replenishing the soil areas directly beneath. The subbase underneath these permeable pavements must be engineered to accommodate temporary water storage and filtration.

4) Modify Drainage Flow Paths. The time of concentration, in conjunction with hydrologic site conditions, determines the peak discharge rate for a storm event. Site and infrastructure components such as: travel distance (flow path); slope of the ground

surface and/or water surface; surface roughness; and channel shape, pattern, and material components can affect the time of concentration. The following techniques can affect and control the time of concentration and can be incorporated into site design by managing flow and conveyance systems within the development site:

a) Disconnecting roof drains and directing flows to vegetated detention areas.

b) Directing flows from impervious (paved) areas to stabilized vegetated areas.

c) Breaking up flow directions from large paved surfaces.

d) Encouraging sheet flow through vegetated areas.

e) Carefully locating impervious areas so that they drain to natural systems, vegetated buffers, natural resource areas, or infiltratable soils.

f) Maximize overland sheet flow;

g) Increase and lengthen flow paths;

h) Lengthen and flatten site and lot slopes;

i) Maximize use of open swale systems;

j) Increase and augment site and lot vegetation.

D. LID STRATEGIES

To reduce the volume of stormwater runoff and decentralize flows, a basic strategy incorporating the following low impact development practices and techniques should be integrated in the overall site design. The following are examples of acceptable LID strategies outlined in "Rainwater and Land Development, Ohio's Standard for Stormwater Management, Land Development, and Urban Stream Protection," prepared by the Ohio Department of Natural Resources:

1) Open Swales. These may serve as alternatives to curb and gutter systems. Grass or other vegetation should be used to reduce runoff velocity and allow filtration, while channeling high volume flows safely away.

a) Plantings, checkdams, and other similar features may be incorporated to further reduce velocity and increase filtration;

b) Walkways shall be separated from roadways by such swales or relocated to another area;

c) Plant species used shall be selected for their tolerance to salt.

2) Rain Gardens. These areas provide storage for excess stormwater to collect and filter into the soil. Typical components of these gardens include grass buffers, sand beds, a ponding area for excess runoff storage, organic layers, and planting soil and vegetation.

a) They shall be located on site away from any structures and/or roadways;

b) Downspouts should be directed towards such rain gardens;

c) Permanent ponds may be incorporated into the design of the garden;

d) Temporary storage areas without ponds may be used;

e) Such areas shall be landscaped with native plants and grasses;

f) Plantings shall be selected according to their ability to tolerate pollutants;

g) Annual maintenance guarantees must be provided for these areas in the site plan or development plan.

3) Filter Strips. These areas are designed to collect flow from large impervious surfaces (parking lots, etc.). They may direct water into vegetated detention areas or special sand filters that capture pollutants and gradually discharge the water.

4) Cisterns/Rain Barrels

a) Cisterns are designed to store stormwater for irrigation during dry periods, rather than channeling it away. Cistern collection systems may be designed to be installed beneath permeable pavement areas allowing for maximum storage capacity.

b) Rain barrels are smaller and are designed to collect individual residential stormwater from roof drainage.


VILLAGE OF
GRANVILLE
Comprehensive Plan Update
GRANVILLE
TOWNSHIP

DEFINITIONS

For purpose of this regulation, the following terms shall have the meaning herein indicated:

ABBREVIATED STORM WATER POLLUTION PREVENTION PLAN (ABBREVIATED SWP3): The written document that sets forth the plans and practices to be used to meet the requirements of this regulation.

ACRE: A measurement of area equaling 43,560 square feet.

Adverse Impact: Any deleterious effect on receiving waters, including their quality, quantity, surface area, aesthetics or usefulness for human or natural uses. Such deleterious effect is or may potentially be harmful or injurious to human health, welfare, safety or property, or which unreasonably interferes with the enjoyment of life or property**,** including outdoor recreation.

APPLICANT: Any person who executes the necessary forms to procure official approval of a project or a permit to carry out a project.

AQUIFER: A geological formation, group of formations or part of a formation composed of rock, sand or gravel capable of storing and yielding groundwater to wells and springs.

BEST MANAGEMENT PRACTICES (BMPs): Schedule of activities, prohibitions of practices, maintenance procedures, and other management practices (both structural and non-structural) to prevent or reduce the pollution of water resources and wetlands. BMPs also include treatment requirements, operating procedures, and practices to control facility and/or construction site runoff, spillage, or leaks; sludge or waste disposal; or drainage from raw material storage. BMPs for construction are outlined in "Rainwater and Land Development, Ohio's Standard for Stormwater Management, Land Development, and Urban Stream Protection," prepared by the Ohio Department of Natural Resources.

BIORETENTION SYSTEMS: Rain gardens, vegetated swales, trenches, and infiltration basins used to minimize stormwater infrastructure improve the quality of groundwater.

CATEGORY 1 WETLANDS: Those wetlands classified by the Ohio Environmental Protection Agency (Ohio EPA) as Category 1 wetlands under OAC 3745-1-54 (C)(3), in accordance with generally accepted wetland functional assessment methods acceptable to the U.S. Army Corps of Engineers and Ohio EPA at the time of application of this regulation.

CATEGORY 2 WETLANDS: Those wetlands classified by the Ohio Environmental Protection Agency (Ohio EPA) as Category 2 wetlands under OAC 3745-1-54 (C)(2),

CATEGORY 3 WETLANDS: Those wetlands classified by the Ohio EPA as Category 3 wetlands under OAC 3745-1-54(C)(3), in accordance with generally accepted wetland functional assessment methods acceptable to the U.S. Army Corps of Engineers and Ohio EPA at the time of application of this regulation.

CLEARING: Any activity which removes the vegetative ground cover.

CRITICAL AREA: The land area at the top of bank of a stream or wetland boundary.

CONTAMINATION. An impairment of water quality by chemicals, radionuclides, biologic organisms, or other extraneous matter whether or not it affects the potential or intended beneficial use of water.

TOWNSHIP: Throughout this regulation, this shall refer to the Township, its designated representatives, boards, or commissions.

CONSTRUCTION ENTRANCE: The permitted points of ingress and egress to development areas regulated under this regulation.

DAMAGED OR DISEASED TREES: Trees that have split trunks; broken tops; heart rot; insect or fungus problems that will lead to imminent death; undercut root systems that put the tree in imminent danger of falling; lean as a result of root failure that puts the tree in imminent danger of falling; or any other condition that puts the tree in imminent danger of being uprooted or falling into or along a watercourse or onto a structure.

DEFINED CHANNEL: A natural or man-made depression in the terrain which is maintained and altered by the water and sediment it carries.

DESIGNATED WATERCOURSE: A watercourse within the Township that is in conformity with the criteria set forth in this regulation.

DETENTION: A practice designed for temporary storage of storm water with a controlled release rate. Generally detention basins will be “dry” between storm events.

DEVELOPMENT: To make a site or area available for use by physical alteration. Development includes but is not limited to: providing access to a site, clearing of vegetation, grading, earth moving, providing utilities and other services such as parking facilities, storm water management and erosion control systems, and sewage disposal systems, altering landforms, or construction of a structure on the land.

DEVELOPMENT AREA: A parcel or contiguous parcels owned by one person or persons, or operated as one development unit, and used or being developed for commercial, industrial, residential, institutional, or other construction or alteration that changes runoff characteristics.

DISTURBED AREA: An area of land subject to erosion due to the removal of vegetative cover and/or soil disturbing activities.

DRAINAGE: (1) The area of land contributing surface water to a specific point, and/or its watershed. (2) The removal of excess surface water or groundwater from land by surface or subsurface drains.

EROSION: The process by which the land surface is worn away by the action of wind, water, ice, gravity, or any combination of those forces.

EROSION AND SEDIMENT CONTROL: The control of soil, both mineral and organic, to minimize the removal of soil from the land surface and to prevent its transport from a disturbed area by means of wind, water, ice, gravity, or any combination of those forces.

FACILITY. Something that is built, installed, or established for a particular purpose.

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA): The agency with overall responsibility for administering the National Flood Insurance Program.

FINAL PLAT: A final tracing of all or a phase of a subdivision and its complete survey information.

FINAL STABILIZATION: All soil disturbing activities at the site have been completed and a uniform perennial vegetative cover with a density of at least 80% coverage for the area has been established or equivalent stabilization measures, such as the use of mulches or geotextiles, have been employed.

FIRST FLUSH: The delivery of a large load of pollutants during the early part of storms due to rapid runoff of accumulated pollutants. The first flush in these guidelines is defined as the runoff generated from a one year 24 hour storm event from land which has been made more impervious from pre-development conditions through land grading and construction/ development activities.

FLOODPLAIN: For a given flood event, that area of land temporarily covered by water which adjoins a watercourse.

FLOODWAY: That channel of a river or other watercourse and the adjacent land areas that is extremely hazardous due to the velocity of storm waters which carry debris and projectiles and have erosion potential such that these areas must be reserved to carry and discharge flood waters or flood flows so that confinement of flood flows to the floodway area will not result in substantially higher flood levels and flow velocities.

FLOODWAY FRINGE: That portion of a floodplain that is inundated by floodwaters but is not within a defined floodway. Floodway fringes serve as temporary storage for floodwaters.

GREY WATER. All domestic wastewater except toilet discharge water.

GROUNDWATER PROTECTION OVERLAY DISTRICT: The Township zoning district defined to overlay other Township zoning districts. This district may include specifically designated recharge areas that collect precipitation or surface water and carry it to aquifers.

GRUBBING: The removal of the vegetative underground root structure.

HAZARDOUS MATERIAL. A material in one or more of the following categories: an ignitable gas, liquid, or solid which may cause fires through friction, absorption of moisture, or which has low flash points (e.g., white phosphorous and gasoline); an explosive or reactive gas, liquid, or solid which will vigorously and energetically react uncontrollably if exposed to heat, shock, pressure or combinations thereof (e.g., dynamite, organic peroxides and ammonium nitrate); a carcinogenic gas, liquid, or solid which is normally considered to be cancer causing or mutagenic (e.g., PCB's in some waste oils); a highly toxic gas, liquid, or solid so dangerous to man as to afford an unusual hazard to life (e.g., chlorine gas); a moderately toxic gas, liquid, or solid which through repeated exposure or in a single large dose can be hazardous to man; or a corrosive material, whether acid or alkaline, which will cause severe damage to human tissue, or in case of leakage might damage or destroy other containers of hazardous materials and cause the release of their contents (e.g., battery acid and phosphoric acid).

HYDROGEOLOGIC ANALYSIS: A study by a hydrogeologist to collect information of the subsurface and geologic conditions, including the type and thickness of geologic materials, the occurrence of ground water, how it flows in pore spaces and fractures, and the quantity and quality of the ground water. The analysis of the data collected in the investigation of a site can be used: to select the location of a well where a sufficient quantity of ground water exists for the intended purpose; to identify environmentally-sensitive groundwater recharge areas; and to identify an area where potential or known contamination could be drawn into a well or spring.

HUNDRED-YEAR FLOODPLAIN: Any land susceptible to being inundated by water from a base flood. The base flood is the flood that has a one percent or greater chance of being equaled or exceeded in any given year. For the purposes of this regulation, the hundred-year floodplain shall be defined by FEMA and approved by the County Department of Building Standards.

INTERMITTENT STREAM: A natural channel that may have some water in pools but where surface flows are non-existent or interstitial for periods of one week or more during typical summer months.

IMPERVIOUS COVER: Any paved, hardened, or structural surface, regardless of its composition, that cannot effectively absorb or infiltrate water, including, but not limited to, buildings, roads, driveways, parking lots, loading/unloading areas, decks, patios, and swimming pools.

INVASIVE SPECIES: Invasive plant species are non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. They are usually characterized by fast growth rates, high fruit production, rapid vegetative spread and efficient seed dispersal and germination. Since these plants are not native to Ohio, they lack the natural predators and diseases which would naturally control them in their native habitats. Some of the top invasive non-native plants include: bush honeysuckles (Amur, Morrow and Tatarian), buckthorn (glossy and common), garlic mustard, purple loosestrife, common reed grass, reed canary grass, autumn and Russian olive, multiflora rose, Japanese honeysuckle, narrow-leaved cattail, Canada thistle and tree-of-heaven. For more information, see the website for the Ohio Department of Natural Resources Division of Natural Areas and Preserves.

LANDSCAPE ARCHITECT: A Professional Landscape Architect registered in the State of Ohio.

LARGER COMMON PLAN OF DEVELOPMENT OR SALE: A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

MAXIMUM EXTENT PRACTICABLE: The level of pollutant reduction that site owners of small municipal separate storm sewer systems regulated under 40 CFR Parts 9, 122, 123, and 124, referred to as NPDES Storm Water Phase II, must meet.

NATURAL SUCCESSION: A gradual and continuous replacement of one kind of plant and animal group by a more complex group. The plants and animals present in the initial group modify the environment through their life activities thereby making it unfavorable for themselves. They are gradually replaced by a different group of plants and animals better adapted to the new environment.

NOXIOUS WEED: Any plant species defined by the Ohio Department of Agriculture as a “noxious weed” and listed as such by the Department. For the purposes of this regulation, the most recent version of this list at the time of application of this regulation shall prevail.

NPDES: National Pollutant Discharge Elimination System. A regulatory program in the Federal Clean Water Act that prohibits the discharge of pollutants into surface waters of the United States without a permit.

OHIO ENVIRONMENTAL PROTECTION AGENCY: Referred throughout this regulation as the "Ohio EPA."

OHIO RAPID ASSESSMENT METHOD: A multi-parameter qualitative index established by the Ohio Environmental Protection Agency to evaluate wetland quality and function.

ORDINARY HIGH WATER MARK: The point of the bank or shore to which the presence and action of surface water is so continuous as to leave a district marked by erosion, destruction or prevention of woody terrestrial vegetation, predominance of aquatic vegetation, or other easily recognized characteristic. The ordinary high water mark defines the bed of a watercourse.

PARCEL: Means a tract of land occupied or intended to be occupied by a use, building or group of buildings and their accessory uses and buildings as a unit, together with such open spaces and driveways as are provided and required. A parcel may contain more than one contiguous lot individually identified by a ‘Permanent Parcel Number’ assigned by the County Auditor’s Office.

PEAK FLOW: The maximum rate of flow of water at a given point and time resulting from a storm event.

PERENNIAL STREAM: A natural channel that contains water throughout the year except possibly during periods of extreme drought.

PERMEABLE PAVERS: Permeable pavement surfaces include a variety of materials ranging from traditional asphalt, and concrete, gravel or pavers used for roadways or parking areas and which allow water to flow through to the subbase underneath, which must be engineered to accommodate temporary water storage and filtration.

PERSON: Any individual, corporation, firm, trust, commission, board, public or private partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, other legal entity, or an agent thereof.

PHASING: Clearing a parcel of land in distinct sections, with the stabilization of each section before the clearing of the next.

POLLUTION: Any contamination or alteration of the physical, chemical, or biological properties of any waters that will render the waters harmful or detrimental to: public health, safety or welfare; domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; livestock, wildlife, including birds, fish or other aquatic life.

POLLUTION: NON-POINT SOURCE pollution is generated by various land use activities rather than from an identifiable or discrete source, and is conveyed to waterways through natural processes, such as rainfall, storm runoff, or ground water seepage rather than direct discharge.

POLLUTION: POINT SOURCE pollution is traceable to a discrete point or pipe.

PRELIMINARY PLAN: A drawing of a major subdivision for the purpose of study and which, if approved, permits proceeding with the preparation of the final plat.

PRIMARY CONTAINMENT FACILITY: A tank, pit, container, pipe or vessel of first containment of a liquid or chemical.

PROFESSIONAL ENGINEER: A Professional Engineer registered in the State of Ohio.

RAINBARRELS AND CISTERNS: Cisterns are designed to store stormwater for irrigation during dry periods, rather than channeling it away. Cistern collection systems may be designed to be installed beneath permeable pavement areas allowing for maximum storage capacity. Rain barrels are smaller and are designed to collect individual residential stormwater from roof drainage.

RAINWATER AND LAND DEVELOPMENT: Ohio's standards for storm water management, land development, and urban stream protection. The most current edition of these standards shall be used with this regulation.

RELEASE: Any unplanned or improper discharge, leak, or spill of a potential contaminant including a hazardous material.

RETENTION: A practice designed to store storm water runoff by collection as a permanent pool of water without release.

RIPARIAN AREA: A transitional area between flowing water and terrestrial ecosystems, which provides a continuous exchange of nutrients and woody debris between land and water. This area is at least periodically influenced by flooding. Riparian areas, if appropriately sized and managed, help to stabilize banks, limit erosion, reduce flood size flows and/ or filter and settle out runoff pollutants, or perform other functions consistent with the purposes of these regulations.

RIPARIAN SETBACK: The real property adjacent to a designated watercourse to protect the riparian area and stream from impacts of development, and streamside residents from impacts of flooding and land loss through erosion. The Riparian Setback are those lands located in the area defined by the criteria set forth in this regulation.

RIPRAP: A combination of large stone, cobbles and boulders used to line channels, stabilize storm sewer outfalls and reduce runoff velocities.

RUNOFF: The portion of rainfall, melted snow, or irrigation water that flows across the ground surface and is eventually conveyed to water resources or wetlands.

SECONDARY CONTAINMENT FACILITY. A second tank, catchment pit, pipe, or vessel that limits and contains liquid or chemical leaking or leaching from a primary containment area; monitoring and recovery are required.

SEDIMENT: The soils or other surface materials that are transported or deposited by the action of wind, water, ice, gravity, or any combination of those forces, as a product of erosion.

SEDIMENTATION: The deposition or settling of sediment.

SETBACK: A designated transition area around water resources or wetlands that is left in a natural, usually vegetated, state so as to protect the water resources or wetlands from runoff pollution. Soil disturbing activities in this area are restricted by this regulation.

SHALLOW/SURFICIAL AQUIFER. An aquifer in which the permeable medial (sand and gravel) starts at the land surface or immediately below the soil profile.

SOIL AND WATER CONSERVATION DISTRICT: An entity organized under ORC Chapter 1515 referring to either the Soil and Water Conservation District Board or its designated employees, hereinafter referred to as the County SWCD.

SOIL DISTURBING ACTIVITY: Clearing, grading, excavating, filling, or other alteration of the earth's surface where natural or human made ground cover is destroyed and that may result in, or contribute to, erosion and sediment pollution.

SOIL AMENDMENTS: Any material added to a soil to improve its physical properties, such as water retention, permeability, water infiltration, drainage, aeration and structure. There are two broad categories of soil amendments: organic and inorganic. Organic amendments come from something that is or was alive and include sphagnum peat, wood chips, grass clippings, straw, compost, manure, biosolids, sawdust and wood ash. Inorganic amendments are either mined or man-made and include vermiculite, perlite, tire chunks, pea gravel and sand. Organic amendments improve soil aeration, water infiltration, and both water- and nutrient-holding capacity.

SPILL RESPONSE PLANS. Detailed plans for control, recontainment, recovery, and clean up of hazardous material releases, such as during fires or equipment failures.
STABILIZATION: The use of BMPs, such as seeding and mulching, that reduce or prevent soil erosion by water, wind, ice, gravity, or a combination of those forces.

STEEP SLOPE: Any land area where the greatest amount of slope over any one hundred (100) foot distance is greater than twelve (12) percent.

STEEP SLOPE, EXTREME: Any land area where the greatest amount of slope over any one hundred (100) foot distance is greater than thirty (30) percent.

STORMWATER POLLUTION PREVENTION PLAN (SW3P): The plan which describes all the elements of the stormwater strategy implemented during and after construction. The plan addresses erosion control and abatement of excess stormwater runoff quality.

STORMWATER TREATMENT PRACTICES (STPs). Measures, either structural or nonstructural, that are determined to be the most effective, practical means of preventing or reducing point source or nonpoint source pollution inputs to stormwater runoff and water bodies.

STORMWATER QUALITY TREATMENT: The removal of pollutants from urban runoff and improvement of water quality, accomplished largely by deposition and utilizing the benefits of natural processes.

STREAMS: A surface watercourse with a well-defined bed and bank, either natural or artificial, which confines and conducts continuous or periodic flowing water in such a way that terrestrial vegetation cannot establish roots within the channel. Further, a stream must appear on at least one of the following maps: USGS topographical map, County Riparian Setback map, or soils maps located in the Soil Survey for the County, Ohio, USDA, or NRCS.

SUBSTANTIAL DAMAGE: Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would be equal to, or would exceed, 50% of the market value of the structure before the damage occurred.

TIME-OF-TRAVEL DISTANCE. The distance that groundwater will travel in a specified time. This distance is generally a function of the permeability and slope of the aquifer.

TREE BOX FILTERS: Mini-bioretention systems installed beneath trees that can be very effective at controlling runoff, especially when distributed throughout the site. Runoff is directed to the tree box, where it is cleaned by vegetation and soil before entering a catch basin. The runoff collected in the tree-boxes helps irrigate the trees. Tree box filters are ideal for situations where infiltration is undesirable or not possible, such as with clay soils, karst topography, high groundwater conditions, close proximity to buildings, steep slopes, contaminated soils, brownfield sites, highly contaminated runoff, maintenance facilities, and gas stations.

UNSTABLE SOILS: A portion of land determined by the Township to be prone to slipping, sloughing, or landslides, or otherwise identified by the U.S. Department of Agriculture Natural Resource Conservation Service methodology as having low soil strength.

VARIANCE (RIPARIAN SETBACK): A modification of the enforcement of the Riparian Setback regulations which will not be contrary to the public interest and where, due to conditions peculiar to this property and not the result of the action of the applicant, a literal enforcement of the regulation would result in undue hardship to the applicant.

WATERCOURSE: Any natural, perennial, or intermittent, channel, creek, stream, river, or brook having banks, a defined bed, and a definite direction of flow, either continuously or intermittently flowing.

WATERSHED: The total area above a given point on a watercourse that contributes water to its flow.

WATERSHED DELINEATION: Mapping of a watershed requires identification of the topography and the accumulation and direction of surface water runoff and exit through the lowest “pour point” of a drainage boundary.

WATER RESOURCE: Any public or private body of water including lakes and ponds, as well as any brook, creek, river, or stream having banks, a defined bed, and a definite direction of flow, either continuously or intermittently flowing.

WELL: Any excavation made by digging, boring, drilling, driving, or other method for the purpose of removing ground water from an aquifer, except a monitoring well used to extract samples of ground water or for the purpose of determining the quality, quantity, or level of ground water.

WETLANDS: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of

vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas. (40 CFR 232, as amended). Wetlands shall be delineated by a site survey approved by the Township using delineation protocols accepted by the U.S. Army Corps of Engineers and the Ohio EPA at the time of application of this regulation. If a conflict exists between the delineation protocols of these two agencies, the delineation protocol that results in the most inclusive area of wetlands shall apply. In reviewing this wetland delineation, the Township may consult with a representative of the Ohio Environmental Protection Agency, Division of Surface Water; the U.S. Army Corps of Engineers; the County Soil and Water Conservation District; or other technical experts as necessary. Any costs associated with such consultations may be assessed to the applicant or their designated representative.

WETLAND SETBACK: Those wetland areas within the Township that fall within the setback area set forth in this regulation.