

land use planning and zoning



The Water Resource Protection and Conservation Toolkit

This is one of a series of 12 fact sheets developed by the Northwestern Indiana Regional Planning Commission with funding from the Joyce Foundation for the Water Resources Protection and Conservation Toolkit. The toolkit provides background on, and methods to protect and conserve local water resources. These tools are intended to help citizens and local officials to manage and protect water resources for future generations.

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How Land Use Planning And Zoning Can Protect And Conserve Water Resources:

A Guide for Local Governments

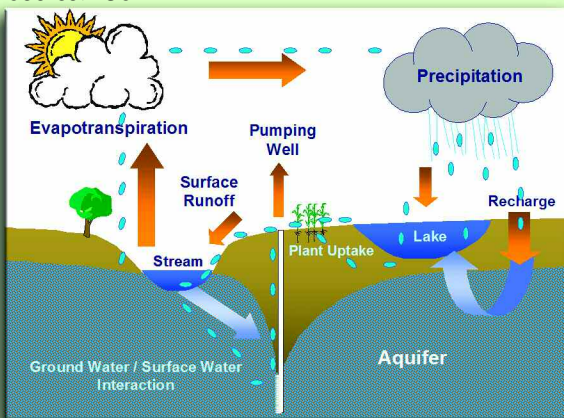
All communities must guide development so that public water supply is protected and replenished.

This can be done through revision of local planning and zoning ordinances to encourage the use of low impact development (LID). It may be necessary to first update the local comprehensive plan to set a goal for open space and conservation planning and design. LID design integrates stormwater management and erosion and sedimentation control into natural systems that keep rainwater on site. This is different from traditional development that uses pipes and drains, ponds, and storm sewers to move water quickly off site and into streams, rivers, and lakes.

Why is Low Impact Development Important for Water Resource Protection?

- In an undeveloped area, over one-third of rainfall flows to the groundwater, replenishing it, and supporting the local environment.
- When development occurs, that amount is reduced to 15% or less because hard surfaces and movement of water through storm sewers prevents water from seeping into the ground.
- The flow of water on the surface increases from less than one percent to over 30%. This reduces water going into the natural system, increasing the risk of flooding and erosion.
- Rainwater washing over hard surfaces picks up pollutants that pollute surface and groundwater. This contaminates water sources and increases the cost of drinking water treatment.

Source: USEPA



Water Resources and The Natural Water (or Hydrologic) Cycle

Water resources can be significantly affected by development activities. Water resources move through the water cycle, sometimes called the hydrologic cycle. The water cycle is the continuous movement of water from ocean, lakes, rivers, and other water bodies to air and land then back to these water bodies through rain and snow in a cyclic pattern as water is used and re-used. Some water infiltrates (or seeps into) the ground or evaporates back into the atmosphere.



What are the Impacts of Traditional Development on Water Resources?

Traditional land development can significantly impact waterways.

Increased runoff due to the channeling of stormwater directly into streams, ponds, and storm sewers often leads to:

- Flooding
- Erosion
- Stream channel alteration
- Environmental damage
- Groundwater depletion

What are the Benefits of Low Impact Development?

Prevents pollution. LID removes common urban pollutants including nutrients, metals, and sediment in addition to protecting groundwater. LID preserves and improves environmental quality and protects public health.

Protects groundwater replenishment. LID allows stormwater to seep into the ground where it is naturally filtered and replenishes groundwater.

Saves money on construction. LID allows communities and developers to spend less on constructing pavement, curbs, gutters, piping, and inlet structures. The Center for Watershed Protection found that construction cost savings are between 11% and 66%.

Saves money on public works budgets. By not building pipe and drain systems to manage stormwater and by building narrower roads, communities have lower maintenance costs. The reduced direct flow of stormwater to streams decreases the risk of flooding.



Source: Northeastern Illinois Planning Commission

The Franklin Best Development Practices Guidebook
www.franklin.ma.us/town/planning/HANDBOOK.PDF

Impacts of Development on Waterways, Planning with Power, Purdue University,
www.planningwithpower.org/pubs/id-257.htm

An Introduction to Better Site Design
www.cwp.org/better_site_design.htm

Low Impact Design Strategies, Prince George's County, Maryland,
www.epa.gov/owow/nps/lid/lidnatl.pdf

Low Impact Development Center,
www.lowimpactdevelopment.org

Nonpoint Education for Municipal Organizations Network,
www.nemo.uconn.edu/national/index.htm

Planning with Power,
www.planningwithpower.org

The Practice of Low Impact Development, U.S. Department of Housing and Urban Development
www.huduser.org/Publications/PDF/practLowImpctDevel.pdf

The Relationship Between Land Use Decisions and the Impacts on Our Water and Natural Resources, Planning with Power, Purdue University,
www.planningwithpower.org/pubs/id_260.pdf

Improves the tax base. LID creates a desirable product that often sells faster and at a higher price than equivalent conventional developments, increasing property values and tax bases.

Enhances quality of life. Increased natural landscapes and open spaces augment recreational opportunities and reduces flooding on private and public property.

Source: Conservation Design Forum (2003)



Traditional development design



Low-impact development design

What Issues Should Be Included in Planning and Zoning Ordinances to Protect Water Resources?



Source: Franklin Best Development Practices Guidebook

Site Planning. Best site planning practices minimize impervious surface, alteration of natural vegetation and topography, and unnecessary development expenses.

Erosion and sedimentation control. Erosion and sediment control is important in reducing the amount of soil that wears away and into local waterways. The most important erosion control practice is to minimize clearing and re-grading on a development site. In LID, clearing is done in phases to minimize the amount of bare ground at any one time.

Landscape design. Landscape design integrates natural features into the footprint of a parcel under development. Effective landscape design ensures that water resources are protected and supportive of plants, animals and people who use the land.

Stormwater management. Natural and vegetated stormwater management systems such as swales, constructed wetlands, and bioretention cells can be used to manage stormwater and comply with federal and local stormwater regulations.

Predicting Impacts of Land Use Changes on Water Resources: L-THIA – An On-line Tool

There are new tools for reviewing the impacts of proposed land use changes on local water resources. The Long-Term Hydrologic Impact Assessment (L-THIA) (www.ecn.purdue.edu/runoff/lthianew/) model was developed by Purdue University as an accessible online tool for local decision makers to assess the water quality impacts of land use change. L-THIA estimates impacts of proposed land uses on water resources. It can be used to assist in the evaluation of potential effects of land use change and to identify the best location of a particular land use so as to have minimum impact on a community's natural environment.



What are Some Incentives for Low Impact Development?

Incentives established by local governments to encourage the use of conservation design can be based on credit or bonus systems that encourage developers, designers, builders, and municipal officials to implement better site design and locate new development that causes less impact to natural resources. Example incentives are:

More Predictable Approval Process. One of the best incentives for developers is to increase the predictability of the approval process. A community may wish to create a list of design standards that, if included, will automatically be approved.

Special Designations. A community may provide incentives for which only conservation designs can qualify, such as eligibility for Special Service Area (SSA) designation, if allowable by law.

Density Bonuses. One example of density bonuses is if open space is dedicated to public use including, but not limited to, trails, parks, and other active recreation facilities, the developer may be eligible for a density bonus of up to a specific percentage allowed by law.

Impact Fee Reduction. "Impact fees" are financial contributions (i.e., money, land, etc.) imposed by communities on developers or builders to pay for capital improvements within the community which are necessary to service/accommodate the new development. To the extent that conservation design reduces development impact, the municipality may consider reducing relevant impact fees.

See the Low Impact Development Practices and Benefits Fact Sheet for more details on techniques.

Low Impact Development Ordinances

The Codes & Ordinances Worksheet,
Center for Watershed Protection,
www.cwp.org/COW_worksheet.htm.

This is a simple worksheet to determine how local development rules in a community compare to the Center for Watershed Protection's model development principles.

Conservation Design Resource Manual:
Language and Guidelines for Updating
Local Ordinances, Northeastern Illinois
Planning Commission and Chicago
Wilderness,

www.nipc.org/environment/sustainable/conservationdesign.

This provides information on modifying local comprehensive plans, zoning, and ordinances to implement low impact development. It includes model ordinance language.

Subdivision Ordinance,
Walworth County, Wisconsin

[www.lagrangetalkofthetown.com/downloads/CZA%20approved%20conservationsubdivision%20\(6-18-04\).doc](http://www.lagrangetalkofthetown.com/downloads/CZA%20approved%20conservationsubdivision%20(6-18-04).doc).

The purpose of this Ordinance is to regulate and control the division of land within unincorporated areas where there is limited regulation of land use.

For more information, please contact:

Northwestern Indiana Regional Planning Commission

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