CMAP

City of Elgin Ordinance Assessment

An Implementation Step of the Ferson-Otter Creek Watershed Plan

November 2013

Acknowledgments

As an implementation step of the Ferson-Otter Creek Watershed Plan, the City of Elgin Ordinance Assessment is the cumulative effort of many individuals to help improve the natural resources of their community. The City of Elgin and the Chicago Metropolitan Agency for Planning would like to thank all of the people who participating in this assessment.

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Funding Acknowledgment

This project was supported through CMAP's Local Technical Assistance (LTA) program, which is funded by the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), U.S. Department of Housing and Urban Development (HUD), Illinois Department of Transportation (IDOT), and the Chicago Community Trust. The City of Elgin and CMAP would like to thank these funders for their support for this project.

The Chicago Metropolitan Agency for Planning (CMAP) is the region's official comprehensive planning organization. Its GO TO 2040 planning campaign is helping the region's seven counties and 284 communities to implement strategies that address transportation, housing, economic development, open space, the environment, and other quality-of-life issues.

See **www.cmap.illinois.gov** for more information.

Cover image by JDZ Adon.

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Introduction

Development and redevelopment can help bring in new residents, businesses, and investments, which in turn can give a community the resources to revitalize a downtown, build new schools, and undertake additional actions to improve the quality of life for its residents. However, because land development, capital improvements, and other actions directly affect watershed quality and function, the environmental impacts of development can make it difficult to achieve these goals while also protecting water quality and other natural resources. For example, when development occurs in previously undeveloped areas, the land alterations can affect how water moves into and through the landscape. This is primarily due to the creation of impervious surfaces and compacted soils that can no longer filter nor infiltrate as much water compared to the undeveloped landscape, thereby increasing surface stormwater runoff, decreasing groundwater infiltration, and increasing downstream flooding and erosion. In addition, conventional stormwater controls collect contaminated stormwater from impervious surfaces and transport the flow off site through channels and buried pipes to detention facilities or directly to receiving bodies of water. While this approach efficiently collects and transports stormwater, it can lead to the pollution of local streams and the Fox River, limiting their ability to support fishing, recreation, and water supply uses.

Development also can significantly impact the quality and quantity of natural areas and habitat. The design and layout of the lots, buildings, and streets of new development can lead to further encroachment into remnant natural areas or open spaces. Large, core open space areas, along with connecting corridors, are essential to maintaining well-functioning natural ecosystems that provide high-quality habitat for wildlife and plant communities. Within a development area, construction practices, such as clearing, grading, and tree removal, can remove valuable features of development sites that could otherwise be incorporated into the design and contribute to both the natural environment as well as the quality of life of future residents.

Communities throughout the Chicago region have been regularly updating stormwater regulations to improve the quality and reduce the quantity of stormwater runoff. One of the strategies is to require or encourage the use of green infrastructure and other best management practices (BMPs) that can filter, infiltrate, cool, and cleanse stormwater runoff before it reaches the receiving body of water. These techniques also reduce the amount of stormwater runoff during major storm events and thereby prevent flooding of private property and reduce channel and bank erosion within the community's waterways. Steps to improve the infiltration of stormwater can also help communities maintain groundwater capacity and maintain lake levels during drought conditions. In addition to stormwater ordinances, municipalities are gradually updating local plans and subdivision, zoning, and landscaping ordinances to remove barriers and ensure that development codes reduce natural resource impacts.

While the Kane County Stormwater Management Ordinance establishes standards for managing stormwater runoff once it is generated, it is the plans and ordinances at the municipal level that have the ability to guide the location of development and reduce the amount of impervious surfaces associated with new construction. These same local land use policies and regulations can also promote the preservation of natural areas and open spaces by encouraging infill development in areas that are already served by existing infrastructure, as well as by allowing flexible layout options to keep natural areas and features intact. Working to ensure that subdivision, zoning, landscaping, and stormwater ordinances are working together can also make it easier for developers to meet multiple requirements simultaneously.

When taken together, these practices offer cost-effective alternatives to conventional practice for both private developers and municipalities. For private developers, green infrastructure practices can reduce initial land acquisition, diminish land clearing and grading, reduce needed stormwater management facilities, and other infrastructure material costs. For example, clustered conservation design subdivisions have been shown to have significantly lower infrastructure costs than conventional subdivisions. And even when natural drainage practices are cost neutral to the developer, the lower life-cycle costs of certain green infrastructure practices should be considered. For municipalities, green infrastructure can lower ongoing maintenance and replacement costs. For example, a narrower neighborhood street will cost less to resurface in the coming years. Recent experience also suggests that green infrastructure designs, like permeable paving, often have longer lives than traditional designs and, hence, lower life-cycle costs. In addition, municipalities can benefit from indirect cost savings, such as reducing expenses related to downstream pipes and culverts, water treatment, and flood damage. The Kane County 2040 Green Infrastructure Plan includes a review of the cost effectiveness of these strategies using local case studies.[1]

1 Kane County, Illinois, "Kane County 2040 Green Infrastructure Plan," 2013. See http://bit.ly/1dWEUbO.

Project purpose and background

Completed in 2011, the Ferson-Otter Creek Watershed Plan was developed for this approximately 54 square mile subwatershed of the Fox River in east-central Kane County. The Ferson-Otter Creek Watershed includes the Cities of Elgin and St. Charles, Villages of Campton Hills, South Elgin, and Lily Lake, as well as unincorporated areas of Kane County. The planning process was driven by local stakeholders (including City of Elgin staff and residents) with assistance from CMAP and partner agencies The Conservation Foundation and Fox River Ecosystem Partnership.

Seven main goals of the Watershed Plan were developed by the planning participants:

1. Reduce fecal coliform contributions to Ferson and Otter Creek.
2. Reduce nutrients, sediments, and other pollutant contributions to Ferson and Otter Creek.
3. Raise stakeholder (residents, public officials, etc.) awareness about the importance and best management practices of proper watershed stewardship.
4. Promote land use and best management practices that minimize increases in the volume of stormwater runoff and reduce the risk of flood damage.
5. Protect the quality and quantity of our water supplies.
6. Improve the physical condition of our waterways.
7. Develop an effective and lasting Watershed Coalition to foster continuing stewardship efforts in the watershed.

While these goals are probably all relevant to Elgin, perhaps an even more important goal is to protect and improve the health of the Fox River which is important to the City's community image and vitality, its water supply, and to recreational uses such as fishing and paddling.

The Watershed Plan inventories existing natural resources and land use features in the watershed planning area; identifies policy, planning, and stormwater management recommendations to protect and improve water quality; and recommends site-specific actions and projects. One of the central recommendations is to update municipal ordinances to better protect surface water and groundwater quality and quantity as well as natural areas and open space.

The Ferson-Otter Creek Watershed Ordinance Assessment is a continuation of efforts to reduce the negative impacts of stormwater runoff, protect natural resources, and improve the quality of life in our region's watersheds. The purpose of this project is to provide suggested ordinance revisions to the City of Elgin. As identified in the Ferson-Otter Creek Watershed Plan, this project recommends changes to municipal subdivision, zoning, landscaping, and stormwater ordinances in order to ensure that they complement each other and lead to improvements in water quality and overall watershed health. The recommended changes are strongly encouraged and have the potential to provide significant protection and improvement for the Ferson-Otter Creek Watershed, as well as the Fox River.

Project process

This project included several tasks to develop ordinance recommendations for the City of Elgin.

1. **Establish a steering committee.** A steering committee composed of representatives from the City of Elgin's Community Development and Engineering departments, Planning & Zoning Commission, and attorney's office; Kane County Development and Community Services Department, and The Conservation Foundation was formed to assist in guiding the development of the recommendations. The committee reviewed materials and provided feedback in coordination with relevant municipal staff and leadership.
2. **Review best practices.** The project team consulted key resources relevant to reducing development impacts on water quality and other natural resources, collected from a variety of agencies and organizations. A reference list from the research can be found in Appendix A.
3. **Review Watershed Action Plan.** The project team used the recently completed Ferson-Otter Creek Watershed Plan as essential background information on the natural resource assets and key issues faced in this area. The proposed recommendations for reducing development impacts on water quality and other natural resources and improving watershed health provided the foundation for the recommended actions proposed in this report
4. **Review subdivision, zoning, and stormwater ordinances.** The existing subdivision, zoning, stormwater, and other related ordinances for the City of Elgin were analyzed. The analysis highlights specific areas of the City's ordinance that they may wish to revise to reduce development impacts within the Ferson-Otter Creek Watershed, as well as to the Fox River.
5. **Create draft report.** A draft of the final report was created and sent to the steering committee for their review and comment in coordination with relevant municipal staff and leadership.
6. **Create final report.** Recommended changes to the subdivision, zoning, landscaping, stormwater, and related ordinances were compiled into a report for the City.

Relationship with the GO TO 2040 comprehensive regional plan

As part of the larger Chicago metropolitan region, Crystal Lake, McHenry, Oakwood Hills, and Prairie Grove both influence and are influenced by the region. CMAP is the official regional planning organization of the northeastern Illinois Counties of Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will. CMAP developed and now guides the implementation of GO TO 2040, metropolitan Chicago's first truly comprehensive regional plan in more than 100 years. To address anticipated population growth of more than 2 million new residents, GO TO 2040 establishes coordinated strategies that will help the region's 284 communities address transportation, housing, economic development, open space, the environment, and other quality of life issues. The plan contains four themes and 12 major recommendation areas:

Livable communities

1. Achieve greater livability through land use and housing
2. Manage and conserve water and energy resources
3. Expand and improve parks and open space
4. Promote sustainable local food

Human capital

1. Improve education and workforce development
2. Support economic innovation

Efficient governance

1. Reform state and local tax policy
2. Improve access to information
3. Pursue coordinated investments

Regional mobility

1. Invest strategically in transportation
2. Increase commitment to public transit
3. Create a more efficient freight network

The livable communities, efficient governance, and regional mobility chapters are most relevant to this Ferson-Otter Creek Watershed Ordinance Assessment, particularly those recommendations that relate to:

- Water and natural resource protection and enhancement
- Green infrastructure protection and enhancement
- Water and energy conservation and efficiency
- Open space and trails enhancement
- Collaborative planning and interjurisdictional communication

GO TO 2040 states, "municipalities are critical to the success of GO TO 2040 because of their responsibility for land use decisions, which create the built environment of the region and determine the livability of its communities. The most important thing that a municipality can do to implement GO TO 2040 is to take this responsibility very seriously." By undertaking this comprehensive plan and ordinance assessment to reduce the negative impacts of development on watershed health, Crystal Lake, McHenry, Oakwood Hills, and Prairie Grove have taken responsibility for guiding their future and have demonstrated their commitment to helping shape the future of the region as well.

Report organization

This report is focused on the City of Elgin. Section 2 reviews the existing development-related ordinances and identifies recommended alternatives. Tables 1 through 11 include the full checklist used in the analysis divided by topic area. Appendix A provides a list of resources and reference materials that were used to guide the recommendations and could be helpful as the City begins to update their development-related ordinances.

Ordinance Assessment

Summary of recommendations

The following ordinances were analyzed using a checklist developed from a number of best practices:[2] City of Elgin's Subdivision; Zoning; Health and Safety; Water and Sewers; and Building and Construction; and the Kane County Stormwater Management Ordinance as adopted and amended by the City. The following summary provides insight into the rationale behind the ordinance changes that are recommended in Tables 1 through 11, organized around the 11 major topic areas. The tables contain the full checklist, which includes sections of the municipal code of ordinances that already address water and other natural resource protection goals. The areas where the existing Elgin or Kane County ordinance currently meets best practice are highlighted in green. The 11 ordinance subject areas are:

- Stormwater drainage and detention
- Soil erosion and sediment control
- Floodplain management
- Stream and wetland protection
- Natural areas and open space
- Conservation design and infill
- Landscaping
- Transportation
- Parking
- Water efficiency and conservation
- Pollution prevention

While the City has the authority to adopt, revise, and enforce provisions in each of these areas, the first four (stormwater drainage and detention; soil erosion and sediment control; floodplain management; and stream and wetland protection) are derived directly from the Kane County Stormwater Management Ordinance. All municipalities, including Elgin, are required to adhere to the minimum provisions of the countywide ordinance. While the City can adopt more stringent standards, it has largely adopted the standard provisions with little variation. Ideally, the County's stormwater committee would consider updating the ordinance based on the recommended changes in these four sections so that improvements could be made uniformly throughout the county. This would result in more comprehensive water quality and natural resource protection; maintain consistent standards between municipalities; and a more level playing field for developers. At a minimum, Elgin is encouraged to advocate for these updates to the Kane County Stormwater Management Ordinance. The City also is encouraged to independently adopt improvements to individual ordinance provisions that are in its own interest. Several specific recommendations are provided in the subsequent report sections.

2 See Appendix A for resources and references used to develop the checklist.

Stormwater drainage and detention

Stormwater runoff is responsible for a number of impacts to communities, including flood damage to susceptible properties, the erosion and destabilization of stream channels and lake shorelines, and a significant portion of nonpoint source pollution[3] to valuable stream, lake, and wetland resources. Development should use, to the extent practicable, the natural landscape and naturalized drainage and detention features to filter and infiltrate stormwater runoff from impervious surfaces on site. It is also important to reduce the effective impervious area of a site, which means the amount of impervious area that drains water directly into pipes, channels, and sewers without flowing over pervious areas. Methods of reducing the effective impervious areas focus on integrating (versus segregating) the pervious and impervious areas on a site. In particular, it is desirable to route runoff from parking lots, roads, and rooftops through such practices as bioswales, rain gardens, naturalized detention basins, natural landscaping, green roofs, filter strips, level spreaders, and rain barrels and cisterns.

Stormwater detention facilities should be designed as multi-purpose, naturalized, wet or wetland basins, naturally landscaped above and below the water line. These practices serve multiple functions including but not limited to recreation, habitat, and improved aesthetics. Requests to allow detention basins with vertical retaining walls generally should be discouraged (unless there are not practical alternatives) because such designs can eliminate important pollutant removal functions of wetland edges that are preferred on the periphery of detention basins. Below grade stormwater storage such as in aggregate layers beneath permeable paving systems and rain gardens also should be allowed as temporary detention mechanisms.

Stormwater runoff should not be directly discharged into natural areas, particularly streams, lakes, and wetlands. Discharge of pretreated stormwater runoff may be allowed via accepted methods of pre-treatment such as naturalized swales, biofiltration practices, naturalized wetland detention basins, and other measures that filter and/or detain runoff. Other communities are beginning to require conformance to numerical water quality performance standards – such as percent removal of sediment or phosphorus.

The City of Elgin uses the Kane County Stormwater Management Ordinance to regulate stormwater drainage and detention, and there are several areas of this ordinance that could be strengthened to better protect water quality, natural hydrology, and aquatic resources. Ideally, these changes would be made within the County ordinance and the City of Elgin is encouraged to advocate for these updates at that level, see Table 1. However, these improvements could be made as City amendments to the County ordinance, which would allow the community to advance water quality goals in the interim before County action. Table 1 also identifies areas of the City's subdivision ordinance that should be updated to allow for, encourage, and/or require the use of natural drainage practices and detention. Elgin's ordinance is relatively prescriptive, encouraging or requiring traditional "gray infrastructure" design approaches. By providing greater ordinance flexibility and removing barriers to preferred natural drainage practices and detention, developers are more likely to willingly implement innovative designs.

In addition, proper management and maintenance of these elements is critical to maintaining their function and effectiveness. Like other "grey" infrastructure, communities may be challenged by the long-term maintenance, legal authority, and staff capacity to enforce compliance. Establishing performance standards at the outset for stormwater infrastructure design and maintenance, particularly landscaping elements, can give measurable objectives for both the land owner to follow and the City to refer to when action is required. Performance standards should identify proposed methods for establishing practices and require monitoring and maintenance to ensure that the overall design and function is achieved and maintained. Tables 1 and 5 include recommendations and references for management and maintenance for natural areas. These address ownership, easements, funding arrangements, vegetative performance criteria, and inspections.

Many local governments implement demonstration projects of innovative stormwater management practices to ensure that their local staff has experience implementing and maintaining green infrastructure site designs. For example, Kane County installed a permeable parking lot and bioswale at the County complex in Geneva, in part to evaluate the effectiveness of these practices. The City of Aurora has similarly implemented permeable paving and related green infrastructure at a new police station and has installed numerous bioswales via funding from a recent Illinois Green Infrastructure grant. This level of experience is valuable when discussing new designs with private landowners and developers; Elgin should look to include these practices in upcoming municipal projects.

3 According to the U.S. Environmental Protection Agency, nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. NPS is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters. It can include excess fertilizers, herbicides and insecticides from agricultural lands and residential areas, oil, grease and toxic chemicals from urban runoff and energy production, salt, pet wastes, faulty septic system, sediment from improperly managed construction sites and eroding streambanks, and atmospheric deposition.

Soil erosion and sediment control

Development and construction can result in excessive quantities of soil eroding from a site, which can clog sewers and ditches and pollute and impair rivers, streams, lakes, and wetlands. The City uses the Kane County Stormwater Management Ordinance to regulate soil erosion and sediment control. This largely follows the Northeastern Illinois Planning Commission's (NIPC) Model Soil Erosion and Sediment Control Ordinance which is focused on minimizing the area and time of disturbance, following natural contours, avoiding sensitive areas, and requiring that sediment control measures be in place before significant grading or disturbance is allowed. However, a few updates could be made and Elgin is encouraged to make these changes as City amendments and/or advocate for these changes at the County level, see Table 2. One recommendation is to add a statement that the delivery of sediment from sites affected by land disturbing activities should be limited, as closely as practicable, to that which would have occurred if the land had been left in its natural undisturbed state. Second, the City should require a stormwater permit for any land disturbing activity in excess of 500 square feet if adjacent to a stream, lake, or wetland. Currently, a permit is required only if the development is larger than 5,000 square feet or if it is located in the regulatory floodplain.

As a priority, Elgin should consider amending this section of the ordinance to add more details on how inspections will work for phased projects and to specifically require inspections at critical stages of the construction process to assure that development practices and erosion control measures are effective. Erosion control practices can fail over time, especially during lengthy construction processes. While inspections may require more initial staff involvement; the relative costs of inspection can be minimal compared to the problems and damages that could arise without proper practices in place. The Illinois Field Manual for Implementation and Inspection of Erosion and Sediment Control Plans is a good resource for conducting inspections and includes a detailed checklist of inspection criteria. Penalties and stop-work orders are essential enforcement tools municipalities can use to limit erosion from construction sites. Elgin should consider establishing a graduated fine if current penalties do not result in improved performance or use the stop-work order to make sure that projects are complying with County ordinance.

Floodplain management

Floodplains provide multiple benefits related to environmental quality, natural resource management, and recreational opportunity and are best able to provide these benefits if kept in a natural condition. Alterations within the floodplain often result in increased flood and stormwater hazards, reduced water quality, and loss of habitat and recreational opportunities. The City follows the Kane County Stormwater Management Ordinance, which includes floodplain management provisions. Further improvements, as identified by the NIPC Model Floodplain Ordinance, should be made to preserve and enhance water quality, habitat, recreational opportunities, aesthetics, and/or provide an additional margin of safety, see Table 3. State law allows local regulations that are more restrictive if they are reasonable.

Currently, the City's ordinance allows a number of modifications in the floodway[4] that we recommend removing because of concerns that they will increase flood damages, interfere with natural functions of floodways, and/or impair water quality and habitat. These include new treatment plants and pumping facilities, detached garages, sheds, and other non-habitable structures, parking lots and aircraft parking aprons, and roadways which run longitudinally along a watercourse. Based on the NIPC Model Floodplain Ordinance, it is recommended that the City restrict modifications in the floodway to the following appropriate uses: public flood control projects, public recreation and open space uses, water dependent activities, and crossing roadways and bridges. For reference, the NIPC Model Floodplain Ordinance provides rationale for limiting specific types of modifications. For example, garages and sheds within the floodway are not advised because historically they have been severely damaged by floods, sometimes get swept away with flowing water, and may disrupt drainage and increase downstream flood damages. Structures such as garages could be allowed in the floodway by variance if there are hardship situations and no practicable alternatives. Elgin's subdivision ordinance already limits any construction or development located wholly or partially within a Special Flood Hazard Area, see 18.48.010 A.

Channel modifications are of particular concern because of their potential impacts on erosion, water quality, and habitat, as well as flood height and velocity. The City's ordinance already outlines a number of standards a project must meet if the proposed activity involves channel modification. The City should consider adding an analysis of different alternatives and the impacts of the proposed project, considering cumulative effects on the physical and biological conditions of the body of water affected.

4 A floodway is not the same as a floodplain. The floodplain is an area of land adjacent to a stream or river that is susceptible to being inundated by water during storm events. The floodplain includes the floodway, which consists of a stream channel and adjacent areas that actively carry flood flows downstream, and the flood fringe, which are areas inundated by the flood, but do not experience a strong current.3 Transportation demand management is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles) or to redistribute this travel demand in space and in time to reduce congestion.

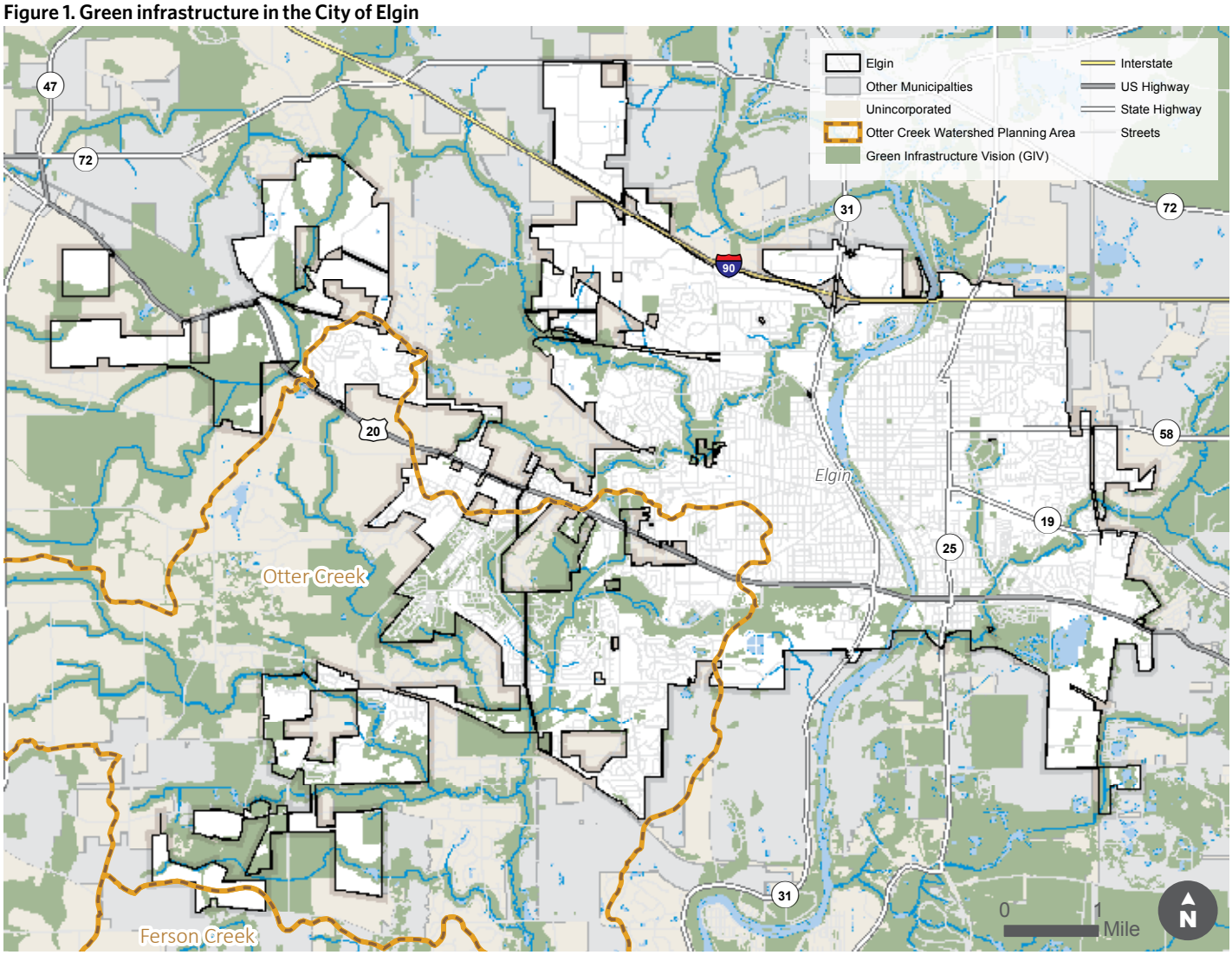
Stream and wetland protection

The City of Elgin uses the Kane County Stormwater Management Ordinance to regulate stream and wetland protection, and there are several areas of this ordinance that could be strengthened to better protect the water quality and function of streams and wetlands. Table 4 highlights potential amendments to the adopted County ordinance. Alternatively, the City could adopt a separate overlay district for these resources based on the NIPC Model Stream and Wetland Protection Ordinance to provide a higher level of stream and wetland protection.

Natural vegetation buffer strips along streams and around wetlands and ponds provide pollution control by allowing vegetation to filter sediments and contaminants from surface runoff before it enters waterbodies. The vegetation also stabilizes the natural drainageways and streambanks from erosion and can provide a significant amount of open space, wildlife habitat, and scenic beauty. For sites containing floodplain areas, the City's subdivision ordinance already requires a minimum 25-foot drainage maintenance and open space easement from the edge of the watercourse. It is recommended that the City update several of the existing buffer requirements to emphasize the use of natural landscaping buffers from the ordinary high water mark of streams, lakes, ponds, or wetlands regardless of their size or quality.

In addition to natural vegetative buffers, establishing development setbacks of 75 to 100 feet from the ordinary high water mark will further minimize adverse water quality, habitat, and drainage impacts. Within the setback, development should be limited to the following types of activities: minor improvements like walkways and signs, maintenance of existing highways and utilities (but no new construction), and park and recreational area development. Conservation design, described in more detail in the following sections, allows for site designs that can more easily accommodate stream and wetland protection objectives due to more flexible site layout and design requirements.

Figure 1. Green infrastructure in the City of Elgin



Source: Chicago Metropolitan Agency for Planning, 2013.

Natural areas and open space

In addition to the protection of streams, lakes, and wetlands covered above, other important natural resources that should be protected, restored, and managed include prairies, savannas, and woodlands. These features often buffer aquatic systems and provide critical landscape linkages for wildlife. The City of Elgin's subdivision and zoning ordinances identify natural features and include some mechanisms to set aside and then maintain open space. The recommendations outlined in Table 5 are focused on two main strategies: expanding the definition of natural resources to reflect the existing assets of the City, and providing additional guidelines for setting aside open space and then maintaining natural areas, natural features, common open space, buffers, and naturalized stormwater facilities in perpetuity.

The City of Elgin's subdivision ordinance calls for every subdivision to preserve the natural beauty and topography and to provide for open spaces through efficient designs. With the recent creation of the Kane County 2040 Green Infrastructure Plan, the valuable prairies, grasslands, savannas, and woodlands have been identified and can be incorporated into the subdivision ordinance as important features to protect. Elgin should consider developing a conservation design overlay district and map this district for areas that contain or are adjacent to natural resource areas. Conservation design allows for clustering new development in order to preserve large open spaces. The overlay district can also encourage or require the use of natural drainage practices, native landscaping, and other techniques that help maintain natural systems. The McHenry County Subdivision Ordinance on Conservation Design and the City of Crystal Lake's Conservation Design Ordinance are models that Elgin can use to create this district. The Village of Algonquin's Conservation Design ordinance identifies the natural resource criteria that would trigger conservation design requirements. It also outlines the types of resources that should be protected and provides additional guidelines for setting aside open space and maintaining natural areas, natural features, common open space, buffers, and stormwater best management practices in perpetuity.

For both conventional and conservation design subdivisions, funding, management, and maintenance of natural areas, natural features, common open space, buffers, and stormwater best management practices should be the responsibility of property owners and/or the homeowners association (HOA), who will be responsible for creating and implementing management plans for such areas. Common open space may be managed by a third party non-owner, homeowners association, conservation organization, or the City. At the time of plan approval, the City should require establishment of a management funding mechanism and revenue source such as a Special Service Area (SSA) or a backup SSA to fund the recommended management activities if necessary management is not being conducted by the HOA. Other options include deeding the property to a local land conservancy or requiring that the developer establish an escrow account to pay for necessary management

Conservation design and infill

Redevelopment of previously developed land—known as infill—is one of the best ways to create vibrant downtowns and neighborhoods while also minimizing the impacts of our built environment on the watershed. When combined with stormwater best management practices, which are tailored to their context, redevelopment can actually lead to a net improvement in watershed conditions. The City already has policies in place that encourage compact, pedestrian- and transit-oriented, mixed-use development. Continuing to encourage infill development is recommended and should be seen as an important technique for improving watershed health.

Where infill development is not possible, greater flexibility within the City's Zoning and Subdivision Ordinances should be allowed to encourage clustering of buildings and preservation of natural areas, features, and open space, see Table 6 As previously discussed, a new conservation design overlay district should be zoned for areas with natural resources and conservation design should be required or allowed by right. In addition, conservation design guidelines should be required if sites outside of these designated areas are found to contain priority natural resources. Elgin currently allows clustering and open space preservation through residential planned developments; establishing a conservation design overlay district will allow the community to target the application of these design principles in priority areas.

Conservation design would ideally incorporate a six-step site design process:

1. Identify all natural resources, conservation areas, open space areas, and physical features on the site through a site analysis.
2. Perform a site capacity analysis based on the remaining developable land after removing floodplains, streams, wetlands, and other legally undevelopable land. This allows for a more objective analysis of the number of units that the zoning allows and the starting point for density bonuses for design excellence.
3. Locate the buildable area to minimize impacts on natural areas and highly permeable soils and to take advantage of open space and scenic views that were identified in the site analysis.
4. Design the street network to minimize encroachment into sensitive natural areas while still maintaining internal and external connectivity.
5. Allow flexibility in lot and block layouts to provide the required open space and accommodate naturalized stormwater management features and natural landscapes, while also maintaining a connected street network.
6. Minimize clearing, grading, and modification of the site and ensure compatibility with the site's natural areas, features, topography, soils, and water resources.

Landscaping

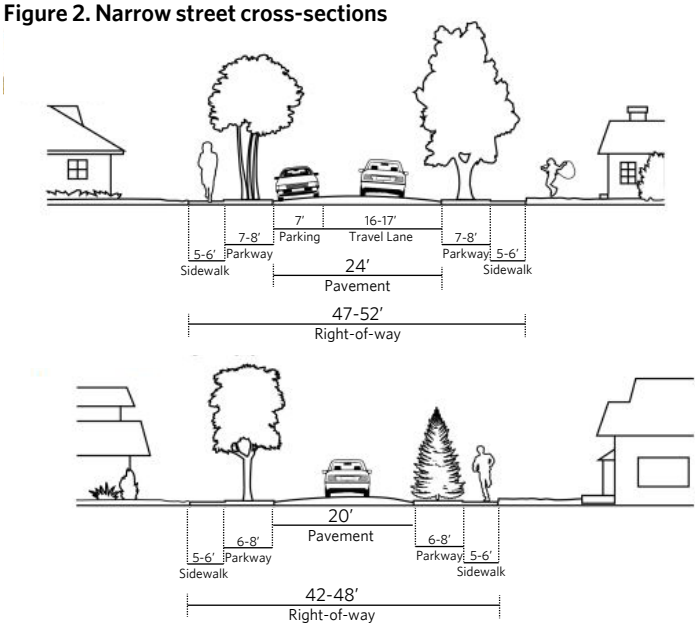
Natural landscaping can greatly benefit the preservation of water quality and natural hydrology. Native landscaping requires little or no chemical pesticides or fertilizers, which are common pollutants impacting streams and waterbodies in watersheds. In addition, the type of landscaping can influence the amount and rate of stormwater runoff. Wherever feasible and appropriate, deep-rooted natural landscaping should be used in lieu of conventional, shallow-rooted turf grass landscaping. Landscaping provisions are included within the City's Zoning and Subdivision ordinances as well as in the Plants and Weeds chapter of the Health and Safety ordinance. Native landscaping should be encouraged and/or required, where appropriate, in common areas in lieu of conventional turf grass landscapes, see Table 7. It also can be targeted specifically to stormwater management applications, such as biofiltration swales, rain gardens, filter strips, and naturalized detention basins. Unfortunately, some landscaping ordinances may unintentionally discourage the use of native landscaping via "weed" prohibition language and should be updated to allow native vegetation, including native grasses. Currently, Elgin prohibits grasses that are taller than eight inches unless they are part of a cultivated garden. The City should consider adding buffer guidelines along property lines and updating the vegetative height requirements to help encourage appropriately scaled native landscaping while also ensuring that the use of native plants on individual private lots fit the neighborhood context.

The City has recently added a tree protection and replacement ordinance, which distinguishes native and desirable tree species from undesirable tree species, adds additional protective measures, provides flexibility to allow the removal of trees where appropriate for proper forest and natural area management, and advances the replacement criteria for the unavoidable removal of desirable species. The tree preservation plan is required to include a tree survey of every tree within the property; the community should consider updating this survey to include consideration of trees that are outside of the property line but may have their critical root zone extending into the subject site.

Transportation

Streets compose a substantial proportion of a community's impervious surfaces and are thereby a significant generator of stormwater runoff. The City's Subdivision Ordinance plays a large role in the design and layout of new streets and driveways; a key to ecologically-sensitive design is limiting the amount of impervious cover to that which is necessary and to the most appropriate areas, see Table 8

Figure 2. Narrow street cross-sections



Streets should be designed for the minimum required pavement width needed to support travel lanes, on-street parking, and emergency access. Reductions in street width standards are recommended in new subdivisions. Minor decreases in width can result in large reductions in impervious surfaces when executed over the length of a street. Narrower streets have been shown to be safer streets with slower speeds, addressing a common neighborhood concern. Narrower street requirements should be paired with connectivity thresholds to ensure that access is maintained Connectivity is essential for emergency response, giving emergency vehicles several, more direct routes; shortening response times; and potentially providing service to more buildings per station.

In addition to narrowing the pavement width, naturalized stormwater infiltration and conveyance systems also should be encouraged. The City's Parkway Rain Garden Program shows the willingness of the community to retrofit streets to incorporate these techniques. Instead of requiring conventional curb and gutters, Elgin already allows new low-density subdivisions to use swales and rain gardens as part of the stormwater management system along streets. Further updates would allow streetside bioswales in additional residential districts.

Parking

Parking lot and driveway design should first minimize stormwater runoff and then treat the remaining runoff to the greatest extent practical. A prime focus is to maintain as much pervious or unpaved surface as possible, followed by managing the runoff that does occur. Maintaining pervious surfaces can be accomplished primarily by reducing the overall size of parking lots and driveways and by replacing impervious materials with appropriate pervious materials. Once the amount of impervious surface has been minimized, BMPs that filter and/or infiltrate runoff are the best tools for controlling runoff volumes and protecting water quality; see Table 9.

A number of recommendations are focused on reducing parking requirements as well as parking space and aisle design standards. Additional recommendations include encouraging shared parking with nearby uses, further reducing parking requirements based on location, and including credits for bicycle parking. Encouraging the use of permeable parking surfaces such as interlocking concrete pavers, porous asphalt, and porous concrete is recommended except for specific areas used for transfer or storage of hazardous materials. These types of permeable paving systems, interlocking concrete pavers in particular, have been shown to be as durable as conventional asphalt and concrete paving, require less repair and rehabilitation, and need not be limited to overflow parking areas. However, it should be recognized that permeable paving systems do require sweeping or vacuuming to minimize clogging by fine sediments and maintain their long-term permeability. Driveways also create a significant portion of impervious surface on individual parcels; recommendations encourage reduced widths and lengths, shared driveway designs, alleys, and use of permeable surfaces.

Portions of the existing City Zoning Ordinance require the physical separation of pervious and impervious surfaces within parking areas, thereby effectively preventing runoff from impervious surfaces from flowing onto or into pervious areas where it can be filtered and infiltrated. For example, the City currently requires raised, fully curbed landscaped islands instead of recessed islands that could hold and treat stormwater runoff in parking lots. Language to specifically allow or require integration of biofiltration into parking lot islands and street side landscaping strips is recommended.

Water efficiency and conservation

For the community's drinking water supply, the City of Elgin relies primarily on surface water from the Fox River, supplemented with groundwater from several community wells. Water efficiency and conservation practices can help preserve both surface water and groundwater resources for the City as well as its Ferson-Otter Creek Watershed and downstream neighbors. Measures are recommended for sections of the City's building and subdivision codes as well as the Water and Sewer Ordinance, see Table 10

Water efficiency measures, such as reducing water use by toilets, showers, and faucets, through installation of high-efficiency fixtures, is recommended for new development and redevelopment that meets a specific threshold. CMAP's Model Water Use Conservation Ordinance can be used as a reference for a number of updates within the municipal code. Homes with high-efficiency plumbing fixtures and appliances also yield substantial savings on water, sewer, and energy bills. In addition, the market for greener, energy efficient homes has consistently been and is expected to remain one of the healthiest segments of the residential real estate industry. Municipalities can counter the few lingering misperceptions about high-efficiency fixtures and appliances through education campaigns; the City of Algonquin's Water Conservation Plan is a successful model. Conservation measures, such as establishing landscaping irrigation days and schedules, have been proposed by the Northwest Water Planning Alliance, a consortium of municipal and county governments (including the City of Elgin and Kane County) which has created the Regional Water Conservation Lawn Watering Ordinance.

Pollution prevention

Nonpoint source pollution is a leading cause of water quality problems across the country. These pollutants have harmful effects on our drinking water supplies, recreation, fisheries, and wildlife. Not only are our surface waters degraded, but studies have shown that Illinois groundwater quality is being degraded and that chloride concentrations are trending upward in shallow wells throughout the region.

As both a surface water and groundwater-dependent community, the City can take additional measures to protect their surface and groundwater resources from contamination, see Table 11. For example, steps to reduce phosphorus applications to lawns, more strictly regulate storage locations for hazardous substances, and encourage sensible and eco-friendly salting practices can all help protect surface water quality. For groundwater protection, the City should also consider such measures as adopting a groundwater protection ordinance, establishing a wellhead protection program, and encouraging demand-initiated water softeners. Conservation design can be designated for groundwater sensitive recharge areas to help balance the protection of this resource with new development. Elgin's Ferson-Otter Creek Watershed neighbor, the City of St. Charles, has a groundwater protection ordinance that establishes regulations for land uses within groundwater protection areas. McHenry County's model groundwater protection program also has a number of resources Elgin could use, including establishing regulations for activities within sensitive groundwater aquifer recharge areas, prohibiting phosphorous fertilizers on turf areas, and managing salt storage and handling.

Current codes and recommended code revisions

Tables 1 through 11 summarize the existing codes and recommended code revisions covering eleven topics for the City of Elgin. Each table is divided into eight columns, each described below.

1. **Reference number.** This first column numbers every recommendation and is provided for reference.
2. **Category and checklist question.** The second, third, and fourth columns identify the main topic area, the checklist question that was used to evaluate the current ordinance, and a quick statement of whether the current ordinance meets the best practice objective.
3. **Local code reference.** If the municipality's existing ordinance addresses the category area in the third column, the location of that language within the community's code is referenced in the fifth column. If the code does not address the category, then an appropriate location for inserting the recommended language within the codes is identified and listed in this column (e.g., Subdivision Code Section 19.72 – 3).
4. **Current standard.** The sixth column briefly summarizes the municipality's current standard (e.g., bike trails must be a minimum of eight feet wide). If the ordinance does not address this particular standard, then "N/A" or not applicable is indicated.
5. **Recommended standard or action.** The seventh column contains the recommended language for insertion into the community's ordinance or a recommended action. Wording options are provided (e.g., require/allow, may/shall) depending on the municipality's preference.
6. **References.** The eighth column identifies references, including model ordinance language, examples from neighboring municipalities, and other design guidelines. The references are intended to provide the municipality with materials that can be used to update the current municipal ordinance.

Table 1. Stormwater drainage and detention

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Purpose**	Include control of runoff rate, volumes, and quality in the purpose statement?	Yes	KCSMO Article 1, Sec. 102.	Protect the public from the degradation of water quality on a watershed basis; preserve and enhance the natural hydrologic and hydraulic functions and natural characteristics of watercourses and floodplains to protect water quality, aquatic habitats, reduce flood damage, reduce soil erosion; require appropriate and adequate provision for site runoff control, especially when the land is developed with a large amount of impervious surface; encourage the use of stormwater storage and infiltration of stormwater in preference to stormwater conveyance; protected and improve surface water quality and protecting the beneficial uses of ponds, lakes, wetlands, rivers and streams by reducing point source and non-point source discharges of pollutants; require control of stormwater quantity and quality at the most site-specific or local level and preventing unauthorized or unmitigated discharge of flow offsite.		
2	**Minimize stormwater quantity**	Encourage the use of permeable paving, greenroofs, and similar practices that reduce the quantity of runoff that must be handled with innovative or conventional drainage practices?	Mostly addressed	KCSMO Article 2, Sec. 200 e5	Sites meeting established criteria are eligible to receive credit for BMP-in-lieu of site runoff storage requirements with permeable pavements and rain gardens and rain garden-infiltration trench systems.	Add language about additional best management practices, such as greenroofs and other techniques that reduce the quantity of runoff, and indicate that such practices may allow for an approved reduction in the size of the required conveyance and detention facilities.	Village of Lakewood's Best Management Practices for R-2 Zoning, BMP hierarchy.
3	**Natural drainage practices**	Encourage or require the use of natural drainage practices (e.g., swales, filter strips, bio-infiltration devices, and natural depressions over storm sewers) to replace storm sewer infrastructure?	Mostly addressed	KCSMO Article 2, Sec. 201.(f) & (g)	The design of any development shall incorporate the following specific planning principles: impervious surfaces are the minimum necessary to satisfy the intended design function; where feasible, allow sufficient right-of-way and easement widths so that stormwater runoff may be conveyed in vegetated swales; existing open channels have been preserved and incorporated into the design; best management practices have been used in the site drainage plan; retention and infiltration of stormwater onsite have been enhanced to the extent practicable to reduce the volume of stormwater runoff and the quantity of runoff pollutants. The function of existing onsite depressional storage shall be preserved as an additional volume to required site runoff storage.	Consider creating a hierarchy of treatment methods and requiring the use of vegetated filter strips and swales.	NIPC Model Stormwater Drainage and Detention Ordinance, Sections 500.0 and 711.
4			Mostly addressed	Subdivision 18.28.060 B.1.b.	Where minimum building lots are more than 20,000 sq. ft. and are at least 100 ft. wide, a surface drainage system may be permitted provided that all regulatory requirements of stormwater management of this code are met.	Encourage or require the use of natural drainage systems in place of storm sewers in subdivisions where the average distances between driveways is more than 50 feet and there are diminished on-street parking needs. Where curb and gutter is required, flat or "ribbon" curbs or curb cuts may be used to allow use of naturalized drainage systems and streetside bioswales.	Campton Hills Zoning Code Analysis and Ordinance Language Recommendations.
5			No	Subdivision 18.28.020 H	Each lot within a plotted subdivision shall be given access to a storm sewer structure for the purpose of connecting a sump pump. Each residential building within a subdivision that includes a sump pump shall be provided with a connection to a storm sewer structure and a six in. diameter drain tile from the structure to the building. The owner of the property shall be responsible for the maintenance of the six in. diameter drain tile and the connection to the storm sewer structure.		
6	**Detention design**	Require detention design standards that maximize water quality mitigation benefits, with a requirement for "naturalized" wet bottom and/or wetland basins over dry basins?	Mostly addressed	KCSMO Sec. 203(g) and 203(h)	Site runoff storage requirements allow the facility to be designed for evapotranspiration and infiltration of this volume into a subsurface drainage system and shall not be conveyed through a direct connection to downstream areas. Native wetland plantings shall be introduced. Storage facilities shall minimize impacts of stormwater runoff on water quality by incorporating best management practices. No preference for wet basins over dry basins is identified.	Designers shall give preference to wet bottom and wetland designs. Requests to allow detention basins with vertical retaining walls generally should be discouraged (unless there are no practical alternatives) because such designs can eliminate important pollutant removal functions of wetland edges that are preferred on the periphery of detention basins. Design of wetland-type detention basins can sometimes lead to growth of nuisance cattail populations. While cattails provide a beneficial water quality function, large/dense stands can be problematic to maintain via controlled burning in urban/suburban locations because of the intense heat generated. To minimize this problem, it is recommended that wetland basins be constructed with water depths of two feet or more in the interior of the basin to limit growth of cattails and associated emergent wetland plants to the periphery of the basin.	NIPC Model Stormwater Drainage and Detention Ordinance, Sections 600, 705, and 706, provide design guidelines.
7	**Detention credits**	Provide detention credit for practices, such as permeable paving or bio-infiltration, that provide temporary storage of runoff in the sub-surface void spaces of stone or gravel?	Yes	KCSMO Article 2, Sec. 200 e5	Sites meeting established criteria are eligible to receive credit for BMP-in-lieu of site runoff storage requirements with permeable pavements and rain gardens and rain garden-infiltration trench systems.		
8	**Discharge**	Require that peak post-development discharge from events less than or equal to the two-year, 24-hour event be limited to 0.04 (cubic feet per second) cfs per acre of watershed?	Yes	KCSMO Sec. 203 (b)	Absent any applicable watershed plan or interim watershed plan, sufficient storage shall be provided such that the probability of the post-development release rate exceeding 0.1 cfs/acre of development shall be less than 1 percent per year and the probability of the post-development release rate exceeding 0.04 cfs/acre of development shall be less than 50 percent per year. Design runoff volumes shall be calculated using event hydrograph methods. The administrator may specify more restrictive release rates when downstream conditions warrant.		
9	**Water quality performance standards**	Require conformance to numerical water quality performance standards (such as percent removal of sediment or phosphorus)?	No		N/A	Consider requiring conformance to numerical water quality performance standards (such as percent removal of sediment or phosphorus).	New practice being used elsewhere in the country. It has yet to be implemented in Northeastern Illinois, but could be in the next few years.

The community's ordinance was evaluated using a checklist developed from a number of best practices, see Appendix A. The areas where the existing City or County ordinance currently meets best practices are highlighted in green.

Table 1. Stormwater drainage and detention (continued)

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
10	**Floodway restrictions**	Prohibit detention in the floodway?	No	KCSMO Article 2, Sec. 203. (i) and (j)	Storage facilities located within the regulatory floodway shall (a) comply with Article 4 [Protection of special management areas]; and (b) store the required amount of site runoff to meet the release rate requirement under all streamflow and backwater conditions up to the ten-year flood elevation on the adjacent receiving watercourse. The Administrator may approve designs which can be shown by detailed hydrologic and hydraulic analysis to provide a net watershed benefit not otherwise realized by strict application of the requirements set forth in (a) and (b) of this subsection. Storage facilities located within the regulatory floodway shall (a) meet the requirements for locating storage facilities in the regulatory floodplain; (b) be evaluated by performing hydrologic and hydraulic analysis consistent with the standards and requirements for watershed plans; and (c) provide a net watershed benefit.	Consider updating to include the environmental criteria listed in NIPC Model Stormwater Drainage and Detention Ordinance Section 708.3	NIPC Model Stormwater Drainage and Detention Ordinance Section 708.3 .
11	**On-stream detention restrictions**	Prohibit on-stream detention, unless it provides a regional stormwater storage benefit (e.g., for upstream properties and/or multiple sites) and is accompanied by other upstream water quality BMPs, such as bio-infiltration?	Yes	KCSMO Article 2, Sec. 203.(m)	Structures built across the channel to impound water to meet site runoff storage requirements shall be prohibited on any perennial stream unless part of a public flood control project with a net watershed benefit.		
12	**Stormwater discharge**	Prohibit the direct discharge of undetained stormwater into wetlands?	Mostly addressed	KCSMO Article 2, Sec. 201.(f) and Article 4, Sec. 418 h.	The design of any development shall incorporate the following specific planning principles: existing high quality wetlands have been avoided, preserved or enhanced. Undetained stormwater which has not passed through a site runoff storage facility shall discharge through an area or structure meeting the definition of best management practices or buffer before entering a jurisdictional Waters of the U.S. or wetland.	Wetlands and other depressional storage areas shall be protected from damaging modifications and adverse changes in runoff quality and quantity associated with land development. NIPC Model Stormwater Drainage and Detention Ordinance, Section 709.4 outlines that all runoff from the development shall be routed through a preliminary detention/sedimentation basin designed to capture the two-year, 24-hour event with the release rate of 0.04 cfs per acre which should provide a holding time of at least 24 hours, before being discharged to the wetland.	NIPC Model Stormwater Drainage and Detention Ordinance, Section 709.4.
13	**Maintenance**	Require formal maintenance plans and contracts for the long-term maintenance and vegetative management of all new detention facilities?	Mostly addressed	County Stormwater V.F.9	A plan for the ongoing maintenance of all stormwater management system components including wetlands and buffer areas is required. However, specific vegetative maintenance standards are not outlined.	Consider updating to require the maintenance plan to include performance standards for all natural open space areas and naturalized stormwater management facilities and buffers. The performance standards shall identify proposed methods for establishing the areas and shall require monitoring and maintenance for at least three full growing seasons following initial enhancement, restoration, and planting, or until initial performance standards have been met. The standards are intended to address the establishment of native vegetation cover and control of invasive plant species. The maintenance plan should be included in the requirements for site plan submittal.	Performance criteria outlined in the stewardship plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures. NIPC Model Stormwater Drainage and Detention Ordinance, Section 713 and 1100.
14			Yes	Right-of-way Bioretention Basins 13.21	Establishes a program for the installation and maintenance of bioretention basins, or rain gardens, in the parkways abutting the property owners that have agreed to participate in the program.		

The community's ordinance was evaluated using a checklist developed from a number of best practices, see Appendix A. The areas where the existing City or County ordinance currently meets best practices are highlighted in green.

Table 2. Soil erosion and sediment control

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Limiting sediment delivery**	Include a comprehensive purpose statement which limits sediment delivery, as close as practicable, to pre-disturbance levels and minimizes effects on water quality, flooding, and nuisances?	No	KCSMO Article 1, Sec. 102.	Controlling sediment and erosion in and from stormwater facilities, developments, agricultural fields, and construction sites and reducing and repairing streambank erosion.	Add that the delivery of sediment from sites affected by land disturbing activities should be limited, as closely as practicable, to that which would have occurred if the land had been left in its natural undisturbed state.	NIPC Model Soil Erosion and Sediment Control Ordinance, Section 100.
2	**Minimize sediment transport**	Include a comprehensive set of principles that minimize sediment transport from the site for all storms up to the ten-year frequency event?	Yes	KCSWO Article 3, Sec. 300 a	Erosion and sediment control planning shall be part of the initial site planning process; the applicant shall consider the sensitivity of existing soils to erosion and topographical features such as steep slopes, stream corridors, and special management areas which must be protected to reduce the amount of erosion and sediment which occurs. In the planning process the applicant shall also address the following: for phased projects, if existing land cover lacks vegetation, then these phases shall be planted temporarily to reduce erosion; and preference shall be given to reducing erosion rather than controlling sediment.		
3	**Ordinance applicability—size**	Require ordinance applicability for any land disturbing activity in excess of 5,000 square feet?	Yes	KCSWO Article 5, Sec. 500 a4	A stormwater management permit is required if the development disturbs more than 5,000 sq. ft. of ground or 250 cubic yards of soil.		
4	**Ordinance applicability—location**	Require ordinance applicability for any land disturbing activity in excess of 500 square feet if adjacent to stream, lake, or wetland?	Mostly addressed	KCSWO Article 5, Sec. 500 a1-3	A stormwater management permit is required if the development is located in the regulatory floodplain; a substantial improvement is to be located in the regulatory floodplain; or there is any regulatory floodplain within the site.	Consider updating to include land disturbing activity that will affect an area in excess of 500 square feet if the activity is within 25 feet of a lake, pond, stream, or wetland.	NIPC Model Soil Erosion and Sediment Control Ordinance, Section 400.
5	**Site design requirements**	Include explicit site design requirements for sediment control measures, conveyance channels, soil stabilization, construction adjacent to water bodies, construction entrances, etc.?	Yes	KCSWO Article 3, Sec. 300	Includes specific site design requirements for sediment control measures, conveyance channels, soil stabilization, construction adjacent to water bodies, construction entrances, etc.		
6	**Site design references**	Adopt by reference the "Illinois Urban Manual" published by the Natural Resources Conservation Service and the Illinois Environmental Protection Agency (1995, updated 2010) and the "Illinois Procedures and Standards for Urban Soil Erosion and Sedimentation Control" published in 1988 (the Greenbook)?	Yes	KCSWO Article 3, Sec. 300 b	Current standard references the Illinois Urban Manual and Procedures and Standards for Urban Soil Erosion and Sedimentation Control in Illinois.		
7	**Maintenance**	Require routine maintenance of all erosion and sediment control practices?	Yes	KCSWO Article 3, Sec. 300 [Erosion and sediment control]	A maintenance schedule of each measure used shall be indicated on the plan. As a minimum, all erosion and sediment control measures onsite shall be inspected weekly or after a one-half inch or greater rainfall event and any required repairs shall be made to keep these measures functional as designed.		
8	**Inspection**	Require inspection by appropriately trained personnel of construction sites at critical points in the development process to ensure that measures are being correctly installed and maintained?	Mostly addressed	KCSWO Article 3, Sec. 300 and Article 7, Sec. 701	A maintenance schedule of each measure used shall be indicated on the plan. As a minimum, all erosion and sediment control measures onsite shall be inspected weekly or after a one-half inch or greater rainfall event and any required repairs shall be made to keep these measures functional as designed.	Consider adding language on how inspections will be scheduled for phased projects and specifically require inspections at critical stages of the construction process.	NIPC Model Soil Erosion and Sediment Control Ordinance, Section 506.
9	**Enforcement**	Provide effective enforcement mechanisms including performance bonds, stop-work orders, and penalties, as appropriate?	Yes	KCSMO Article 7, Sec. 702 and Sec. 703 and Article 12, Sec. 1202	If a person is found guilty of an offense under this ordinance, the administrator may impose a civil fine, revoke any stormwater management permit, issue an order requiring the suspension of any further work on the site, require the area impacted be fully restored to its existing condition prior to such development, and/or require the person apply after the fact for the appropriate permit for an unpermitted development. The administrator may bring any action, legal or equitable, including an action for injunctive relief, as they deem necessary. Erosion and sediment control plans are required to include a letter of credit in an amount equal to 110 percent of the approved estimated probable cost to install and maintain the required erosion and sediment control measures.		

The community's ordinance was evaluated using a checklist developed from a number of best practices, see Appendix A. The areas where the existing City or County ordinance currently meets best practices are highlighted in green.

Table 3. Floodplain management

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Purpose**	Include protection of hydrologic functions, water quality, aquatic habitat, recreation, and aesthetics in the purposes for the ordinance?	Yes	KCSMO Article 1, Sec. 102. [Purposes of this ordinance]	Preserving and enhancing the natural hydrologic and hydraulic functions and natural characteristics of watercourses and floodplains to protect water quality, aquatic habitats, reduce flood damage, reduce soil erosion, provide recreational and aesthetic benefits and enhance community and economic development.		
2	**Floodway restrictions—use**	Restrict modifications in the floodway to the following appropriate uses—public flood control projects, public recreation and open space uses, water dependent activities, and crossing roadways and bridges?	No	KCSMO Article 4, Sec. 411 a	Allows public flood control structures and private improvements relating to the control of drainage and flooding; modifications and improvements to existing wastewater treatment plants and facilities (not including new wastewater treatment plants or habitable structures at existing wastewater treatment plants); storm and sanitary sewer outfalls; recreational facilities and improvements relating to recreational boating; detached garages, storage sheds, boat houses or other non-habitable structures without sanitary facilities; bridges, culverts and associated roadways, sidewalks and railway; parking lots built at or below existing grade; floodproofing activities; repair, replacement, an deconstruction of a damaged building, and modifications to an existing building.	Consider updating to the alternative language presented in NIPC Model Floodplain Ordinance, Section 802.1, which is more restrictive than the appropriate uses allowed by State rules. In particular, uses such as pumping and treatment facilities, garages and sheds, roadways running longitudinally along a watercourse, and parking lots are not considered appropriate because of concerns that they will increase flood damages, interfere with natural functions of floodways, and/or impair water quality and habitat.	NIPC Model Floodplain Ordinance, Section 802.1 Alternative.
3			Yes	Subdivision 18.48.010 A	No variance shall be granted for any construction or development located wholly or partially within a Special Flood Hazard Area unless the applicant demonstrates that it cannot be located elsewhere, would result in substantial economic hardship, and there will be no additional public expense for flood protection, in addition to other criteria.		
4	**Floodway restrictions—erosion**	Require effective soil erosion and sediment control measures for ALL disturbances in the floodway?	Yes	KCSWO Article 5, Sec. 500 a1-3 and Sec 504 a	A stormwater management permit is required if the development is located in the regulatory floodplain; a substantial improvement is to be located in the regulatory floodplain; or there is any regulatory floodplain within the site. All stormwater permit applications shall include a sediment and erosion control plan.		
5	**Limit stream channel modification**	Discourage stream channel modification and require mitigation of unavoidable adverse water quality and aquatic habitat impacts?	Mostly addressed	KCSMO Article 2, Sec. 201, Article 4, Sec. 405, and Article 5, Sec. 507	The design of any development shall incorporate the following specific planning principle: existing open channels have been preserved and incorporated into the design. General performance standards require that for all projects involving a channel modification, fill, stream maintenance or a levee, the flood conveyance and storage capacity of the regulatory floodplain shall not be reduced. For permit applications, involving stream modifications, the following shall be submitted: (a) a plan and profile of the existing and proposed channel; and (b) supporting calculations for channel width, depth, sinuosity, riffle locations and the like.	Consider updating so that for proposed channel modification, the applicant shall submit the following information: (i) a discussion of the purpose of and need for the proposed work; (ii) a discussion of the feasibility of using alternative locations or methods to accomplish the purpose of the proposed work; (iii) an analysis of the extent and permanence of the impacts each feasible alternative would have on the physical and biological conditions of the body of water affected; (iv) an analysis of the impacts of the proposed project, considering cumulative effects on the physical and biological conditions of the body of water affected. Designated floodway regrading, without fill, to create a positive non-erosive slope toward a watercourse.	NIPC Model Floodplain Ordinance, Sections 801.1.q and 802.1.i.

The community's ordinance was evaluated using a checklist developed from a number of best practices, see Appendix A. The areas where the existing City or County ordinance currently meets best practices are highlighted in green.

Table 4. Stream and wetland protection

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Purpose**	Include a comprehensive purpose statement that addresses the protection of hydrologic and hydraulic, water quality, habitat, aesthetic, and social and economic values and functions of wetlands?	Mostly addressed	KCSMO Article 1, Sec. 102.	Protecting and improving surface water quality and promoting beneficial uses of ponds, lakes, wetlands, rivers and streams by reducing point source and non-point source discharges of pollutants; and protecting the quantity and quality of wetlands.	Consider updating to include the ten objectives in the NIPC Model Stream and Wetland Protection Ordinance, Section 3.00.	NIPC Model Stream and Wetland Protection Ordinance, Section 3.00.
2			Mostly addressed	Subdivision 18.04.030 J and K	To prevent the pollution of air, streams, and ponds; to assure the adequacy of drainage facilities; to safeguard the water table; and to encourage the wise use and management of natural resources throughout the Municipality in order to preserve the integrity, stability, and beauty of the community and the value of the land. To preserve the natural beauty and topography of the Municipality and to ensure appropriate development with regard to these natural features.		
3	**Protection**	Protect the beneficial functions of streams, lakes, and wetlands from damaging modifications, including filling, draining, excavating, damming, impoundment, and vegetation removal?	No	KCSMO Article 15, Sec. 1501 and 1503.	Wetlands identified as having an Floristic Quality Index (FQI) greater than or equal to 25 shall not be filled or dredged as part of any development. Activities are subject to mitigation requirements with performance standards and monitoring.	Establish a minimum setback of development activity from streams, lakes, ponds, and wetlands. Development activities will only be approved based upon a report, prepared by a qualified professional, which demonstrates that they will not adversely affect water quality; destroy, damage, or disrupt significant habitat area; adversely affect drainage and/or stormwater retention capabilities; adversely affect flood conveyance and storage; lead to unstable earth conditions, etc.	NIPC Model Stream and Wetland Protection Ordinance, Sections 6.03, with the definition of development outlined in Section 4.00.h.
4	**Modification**	Prohibit the modification of high quality, irreplaceable wetlands, lakes, and stream corridors?	Mostly addressed	KCSMO Article 2, Sec. 201 f5 and Article 15, Sec. 1501.	The design of any development shall incorporate the following specific planning principles: existing high-quality wetlands have been avoided, preserved or enhanced. Wetlands identified as having an FQI greater than or equal to 25 shall not be filled or dredged as part of any development.	Expand development design principles to also include avoiding, preserving, and/or enhancing high-quality lakes and streams. Prohibit modifications unless no feasible alternatives exist and all applicable regulatory approvals or clearances are granted.	
5	**Wetland modification—stormwater**	Discourage the modification of wetlands for stormwater management purposes unless the wetland is severely degraded and nonpoint source BMPs are implemented on the adjacent development?	No	KCSMO Article 15, Sec. 1503 b	Wetland impacts upon wetlands with an FQI of less than seven shall be mitigated at a ratio of 1:1. The applicant may request permission to mitigate within the site runoff storage facility area. The applicant may earn wetland credits by enhancing preserved wetlands with an FQI of five or less at the ratio of one-quarter wetland credit per acre of wetland enhanced. If this option is chosen the entire wetland shall be enhanced even if credit in excess of that required for the development is generated.	Consider updating to state that modification of degraded wetlands for purposes of stormwater management is permitted where the quality of the wetland is improved (e.g. via removal of invasive plant species) and total wetland acreage is preserved.	NIPC Model Stream and Wetland Protection Ordinance, Section 6.03.
6	**Waterbody setback**	Designate a minimum 75- to 100-foot setback zone from the edge of identified wetlands and water bodies in which development is limited to the following types of activities: minor improvements like walkways and signs, maintenance of highways and utilities, and park and recreational area development?	No	KCSMO Article 4	N/A	Update to state that absolutely no development activity (except as provided) may occur within the minimum setback that is defined as at least 75- to 100-feet from the ordinary high water mark of streams, lakes, and ponds, or the edge of wetlands, or within a designated depressional area.	NIPC Model Stream and Wetland Protection Ordinance, Section 6.03.
7	**Waterbody buffer**	Establish a minimum 25-foot wide protected native vegetation buffer strip along the edge of identified wetlands and water bodies?	Mostly addressed	KCSMO Article 4, Sec. 418	Buffers shall be identified on development plans for all areas defined as Waters of the U.S. Buffer areas are divided into two types, linear buffers and waterbody buffers. The required buffer width ranges from 15 to 50 ft., depending on factors such as resource quality. Buffers shall be replanted or reseeded using appropriate predominately native deep-rooted vegetation, appropriately managed and maintained.	Update to require a natural vegetation strip to extend landward a minimum of 25 feet from the ordinary highwater mark of a perennial or intermittent stream, lake, or pond and the edge of a wetland regardless of size or quality.	NIPC Model Stream and Wetland Protection Ordinance, Section 6.08; U.S. EPA Aquatic Buffer Model Ordinance.
8			Mostly addressed	Subdivision 18.24.040 B.	Where a subdivision contains a flood plain there shall be provided a drainage maintenance and open space easement if it is to remain. The easement shall be a minimum distance of 25 ft. from each side of the normal edge of the watercourse.		
9	**Relocation**	Prohibit watercourse relocation or modification except to remedy existing erosion problems, restore natural habitat conditions, or to accommodate necessary utility crossings; and require mitigation of unavoidable adverse water quality and aquatic habitat impacts?	No	KCSMO Article 4, Sec. 405 b and Article 5, Sec. 507 b4	For all projects involving a channel modification, fill, stream maintenance or a levee, the flood conveyance and storage capacity of the regulatory floodplain shall not be reduced. For all stream modifications, the following shall be submitted: a plan and profile of the existing and proposed channel; and supporting calculations for channel width, depth, sinuosity, riffle locations and the like.	Prohibit watercourse relocation or modification except where certain problems can be mitigated by relocation and/or minor modification, including improvements to water quality, habitat, and other natural functions and to remedy erosion and flooding problems and unstable soil and geologic conditions. Modification and relocation plan must address specific environmental criteria.	NIPC Model Stream and Wetland Protection Ordinance, Sections 7.00, 7.01, and 7.02.
10	**Restoration**	Encourage the restoration of stream and wetland habitat, hydrology, and morphology on development sites that contain degraded aquatic systems? (This could be accomplished through a streamlined permitting process and/or other development incentives.)	No	KCSMO Article 15, Sec. 1502 a	A wetland impact created by the dredging of a wetland with an FQI of less than seven need not be mitigated.	Update to encourage restoration of stream and wetland habitat, hydrology, and morphology on development sites that contain degraded aquatic systems. Consider combining this with a streamlined permitting process and/or other development incentive, as well as encouraging it through conservation design provisions.	Minimum performance standards for restoration, planting, maintenance, and monitoring of natural open space and naturalized stormwater facilities are included in Stewardship Plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.

The community's ordinance was evaluated using a checklist developed from a number of best practices, see Appendix A. The areas where the existing City or County ordinance currently meets best practices are highlighted in green.

Table 5. Natural areas and open space

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Natural areas protection**	Protect remnant natural areas, including steep slopes, prairies, woodlands, and savannas (in addition to regulated wetlands and floodplains)?	Mostly addressed	Subdivision 18.04.030 J, K, and L	Purpose of subdivision regulation is to preserve the natural beauty and topography of the Municipality and to ensure appropriate development with regard to these features; to provide for open spaces through the most efficient design and layout of the land, including the use of average density in providing for minimum width and area of lots, while preserving the density of land as established in the zoning ordinance.	Expand definition of natural features to include woods and savannas, wetland buffers, prairies and grasslands, and slopes greater than 12 percent, in addition to inherently unbuildable areas like wetlands and floodplains.	
2			No	Zoning 19.14.600 B.1.	The site should be planned to meet, if not exceed, setbacks and to establish, protect, and enhance buffer yards between properties and to minimize disturbance to the natural landscaping on the site. Further, the project should be designed to preserve and enhance natural features on the site, including, without limitation, existing trees, wooded areas, buffer yards, and landscaping.	Create a conservation design overlay for areas that contain and/or abut sensitive natural resource areas, and that is also mandatory due to automatic and cumulative triggers based on the presence of specific features present on the site. Automatic and cumulative triggers could include woods and savannas, wetland buffers, prairies and grasslands, and slopes greater than 12 percent, in addition to inherently unbuildable areas like wetlands and floodplains.	Applicability section (A1102) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Village of Algonquin Conservation Design Standards and Procedures (Zoning Sec. 21.11 J); City of Crystal Lake Conservation Developments (UDO Article 5 Section 5-300).
3			No	Zoning 19.14.600 D	Landscaping plans should be consistent with the natural environment of the site. Existing natural features should be appropriately preserved and integrated into the project. Under appropriate circumstances, a conservation strip consisting of landscaping and natural growth but excluding lawns and any impervious surface between adjacent properties would promote this objective.		
4			No	Zoning 19.60.010	Purpose of Planned Developments is to accommodate unique development situations if they demonstrate a number of characteristics, including the preservation of significant natural features including topography, watercourses, wetlands, and vegetation.		
5	**Open space—amount**	Set aside onsite open space for residential development, generally conforming to the following guidelines: estate residential: 60 percent; moderate residential: 45 percent; urban residential: 30 percent?	No	Zoning 19.07	N/A	Using a Conservation Design District, require specific amounts of open space depending on the underlying zoning. For example, for residential conservation developments, at least 40 percent of the site shall be set aside as required open space. Common open space is preferable, but deed-restricted open space also is acceptable.	Bulk requirements section (A1112) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
6	**Restoration**	Encourage the restoration of protected natural areas to reduce invasive species and enhance biodiversity?	No	Zoning 19.14.600	N/A	For Conservation Design Districts, update to require that development shall preserve, restore, and/or create environmentally sensitive areas and shall include plans and the means to restore, manage, and maintain such areas. Degraded remnant natural areas shall be restored to a natural state.	Stewardship plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
7	**Open space—ownership**	Require the identification of an open space ownership entity, with a preference for a qualified public or private land conservation organization?	No	Subdivision 18.20.020 J	Subdivision Final Plat to include the homeowners' association ownership and maintenance responsibility of common open space, floodplain, wetlands, detention areas, stormwater control facilities, and special features.	For Conservation Design Districts, require identification of the ultimate owner of the dedicated open space as well as the entity responsible for maintaining it. Ownership options for common open space includes qualified public or private land conservation organizations with experience in managing natural areas.	Open space ownership and funding section (A1117) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures
8			No	Subdivision 18.20.030	For Planned Developments, final plat to include common open space documents indicating that common open space shall be as follows: conveyed to a municipal or public corporation, or conveyed to a not-for-profit corporation or entity; all lands conveyed shall be subject to the right of the grantee or grantees to enforce maintenance and improvement of the common open space. OR, Guaranteed by a restrictive covenant describing the open space and its maintenance and improvement, running with the land for the benefit of residents.		
9	**Open space—easement**	Require the dedication of natural open space via a binding conservation easement or similar binding legal instrument that ensures protection in perpetuity?	Mostly addressed	Subdivision 18.24.040 A and C	Easements shall be provided for stormwater major and minor drainage systems. The developer and subsequent property associations shall be responsible for maintenance of rear and side yard easements containing major drainage system components. The City may use the easement to perform maintenance at the owner's expense if they fail to perform maintenance.	For Conservation Design Districts, require dedicated open space shall be protected in perpetuity by a binding conservation easement or similar legal instrument.	Open space ownership and funding section (A1117) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
10			Mostly addressed	Subdivision 18.24.040 B	Where a subdivision contains a flood plain there shall be provided a drainage maintenance and open space easement if it is to remain. The easement shall be a minimum distance of 25 ft. from each side of the normal edge of the watercourse.		
11			Mostly addressed	Zoning 19.60.160 D	For Planned Developments, the development plan shall include common open space documents indicating that common open space shall be provided for in one of the following ways: 1. Conveyed to a municipal, public, or not-for-profit corporation or entity established for the purpose of benefitting the owners or residents of the planned development; or 2. Guaranteed by a restrictive covenant describing the open space and its maintenance and improvement, running with the land for the benefit of residents of the planned development or adjoining property owners, or both.		

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Table 5. Natural areas and open space (continued)

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
12	**Open space—management**	Require secure and permanent funding arrangements for the long-term management and maintenance of open space, natural areas, and stormwater facilities once responsibilities are turned over to a conservation entity or the homeowners/property owners association?	No	Zoning 19.30.100 and 19.60.160 D	N/A	For standard development and Conservation Design Districts, outline specific options for secure and permanent funding arrangements for the long-term management and maintenance of open space, natural areas, and stormwater facilities once responsibilities are turned over to a homeowners/property owners association or conservation entity.	Open space ownership and funding section (A1117) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
13	**Open space—funding**	Encourage the establishment of a back-up SSA in order to provide funds necessary to support the maintenance of open space and stormwater management areas (in the event that the responsible land owner/manager does not meet the required maintenance standards)?	No	Zoning 19.30.100 and 19.60.160 D	N/A	For standard development and Conservation Design Districts, outline specific options for secure and permanent funding arrangements for the long-term management and maintenance of open space, natural areas, and stormwater facilities once responsibilities are turned over to a homeowners/property owners association or conservation entity.	Open space ownership and funding section (A1117) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
14	**Open space—management plans**	Require or encourage long-term management/stewardship plans for all common open space areas, natural areas, and stormwater facilities?	No	Zoning 19.30.100 and 19.60.160 D	N/A	Update to require a stewardship plan be submitted to identify the means to properly maintain and manage dedicated open space in perpetuity.	Stewardship plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
15			Yes	Streets and Sidewalks 13.21.050	For Parkway bioretention basins, the City is required to develop an Operations and Maintenance Plan to provide participating property owners as they take on maintenance responsibilities.		
16	**Open space—performance criteria**	Establish measurable performance criteria for managed natural areas, including ground coverage, species diversity, and control of invasive species?	No	Zoning 19.30.100 and 19.60.160 D	N/A	Update to require that the stewardship plan include performance standards for all natural open space areas and naturalized stormwater management facilities and buffers. The performance standards shall identify proposed methods for establishing the areas and shall require monitoring and maintenance for at least three full growing seasons following initial enhancement, restoration, and planting.	Minimum performance standards for restoration, planting, maintenance, and monitoring of natural open space and naturalized stormwater facilities are included in the Stewardship Plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.

The community's ordinance was evaluated using a checklist developed from a number of best practices, see Appendix A. The areas where the existing City or County ordinance currently meets best practices are highlighted in green.

Table 6. Conservation design and infill

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Natural Resource inventory**	Require a site analysis map that includes a natural resources inventory at the Concept Plan stage or prior to the Preliminary Plan stage?	No	Subdivision 18.16.020 G and 18.16.030 B and H	Preliminary plat requires mapping of topography, watercourses, floodplains, floodways, ponds, wetlands, rock outcrops, trees of 12 inch diameter or more, other significant features, and soil bearing data. Impact assessments may be required to adequate evaluate the effect of the proposed development on the environment. A wetlands assessment report shall be required.	Expand natural resource inventory mapping requirements to include hydrologic soil groups; highly erodible soils; steep slopes; zero-order (ephemeral) streams; farmed wetlands; springs and seeps; stream buffers; wetland buffers; forest stand, savanna, and prairie delineation; high-priority groundwater recharge areas (Class III Special Resource Groundwater areas); designated natural areas; threatened and endangered species; existing drainage patterns/flow paths; and existing drainage areas to the site's perennial and ephemeral streams, ponds, and wetlands. Broaden the inventory requirements to extend to a distance of at least 200 ft. beyond the project site. Update to match tree survey requirements in new tree protection ordinance (requires the location, species, Diameter at Breast Height (DBH), and condition of every tree with a DBH of 2 inches or larger).	Site analysis (A1104.1) requirements of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
2			No	Zoning 19.60.160 G	For Planned Developments, the development plan shall include an existing conditions plan sheet with topography, significant natural features, including, but not limited to floodplains, wetlands, watercourses, rock outcrops, and trees of six inch diameter or more; within the property and to a distance of 100 ft. beyond the property.		
3	**Site Design**	Require that the proposed development be designed to preserve natural drainage patterns, use and preserve native vegetation, stabilize soils during construction, and protect, enhance, and maintain natural resources (such as remnant woodlands, prairies, and steep slopes)?	No	Subdivision 18.04.030 J, K, and L	To prevent the pollution of air, streams, and ponds; to assure the adequacy of drainage facilities; to safeguard the water table; and to encourage the wise use and management of natural resources throughout the municipality in order to preserve the integrity, stability, and beauty of the community and the value of the land; to preserve the natural beauty and topography of the Municipality and to ensure appropriate development with regard to these features; to provide for open spaces through the most efficient design and layout of the land, including the use of average density in providing for minimum width and area of lots, while preserving the density of land as established in the zoning ordinance.	The existing natural features shall be preserved and protected to the greatest extent possible from any negative impacts generated as a result of the development or other land disturbing activities. For Conservation Design Districts, areas to be preserved shall be identified on a site-specific basis in an effort to conserve and provide the best opportunities to restore and enlarge the best quality natural features of each particular site. Establish an open space protection hierarchy to guide the decision-making process of which areas are the priority areas to preserve.	Site analysis (A1104.1), general standards for design (A1108), and open space (A1114) requirements of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Village of Algonquin Conservation Design Standards and Procedures (Zoning Sec. 21.11 J); City of Crystal Lake Conservation Developments (UDO Article 5 Section 5-300 E2).
4			No	Zoning 19.12.735	Existing vegetation that does not restrict the development of a zoning lot, being of a size and type, and in good health such that it would be an asset rather than detrimental to site development shall be preserved as may be required by the development administrator.		
5			No	Zoning 19.14.600 D1 and 2	Landscaping plans should be consistent with the natural environment of the site. Existing natural features should be appropriately preserved and integrated into the project.		
6			No	Zoning 19.60.040 J	For Planned Developments, approval is contingent on the extent to which affirmative findings are made with respect to natural preservation, specifically, the suitability of the subject property for the intended planned development with respect to the preservation of all significant natural features including topography, watercourses, wetlands, and vegetation.		
7	**Clearing and Grading**	Restrict to on-site clearing and grading locations and extent?	No	Subdivision 18.24	N/A	On-site clearing and grading shall be restricted to avoid environmentally sensitive areas and mass grading should be avoided wherever possible.	Campton Hills Zoning Code Analysis and Ordinance Language Recommendations.
8	**Clustering**	Encourage or require clustering of residential lots around sensitive natural areas, thereby creating a protected common open space area?	No	Zoning 19.60.080 A	For Residential Planned Developments, when calculating the maximum allowable number of dwelling units, certain land area encompassing woodlands, slopes, etc., may be permanently preserved without such land area being deducted from the total residential land area, as may be approved or required by the city council; and required wetland and floodplain buffers shall be permanently preserved without such land area being deducted from total residential land area.	For Conservation Design Districts, require a site capacity analysis to first establish the buildable acreage. The resulting acreage shall then be multiplied by the maximum allowable dwelling units per acre for the underlying zoning district. Lots, buildings or building sites should be clustered to minimize the negative impacts on the natural, visual, and cultural resources of the site and between incompatible uses and activities.	Site capacity (A1105) and conservation design development standards (A1108.1) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Crystal Lake's Conservation Development District (Sec 5-300 E3, Sec 5-300 F2).
9			No	Zoning 19.14.600 B1	The site should be planned to meet, if not exceed, setbacks and to establish, protect, and enhance buffer yards between properties and to minimize disturbance to the natural landscaping on the site. Further, the project should be designed to preserve and enhance natural features, including, without limitation, existing trees, wooded areas, buffer yards, and landscaping.	Consider removing statement encouraging larger setbacks in favor of clustering development in order to preserve larger, intact natural areas that can provide better habitat.	
10	**Open space**	Require a minimum area of protected naturalized open space in new residential developments?	No		N/A	For Conservation Design Districts, require at least 40 percent of the site shall be set aside as required open space for residential developments, and require open space for nonresidential land uses based on the site coverage ratio and any associated site coverage bonuses and a minimum of 25 percent of the gross acreage.	Bulk requirements section (A1112) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Crystal Lake's Conservation Development District (Sec 5-300 G1).
11	**Density bonus**	Provide density bonuses for conservation developments that exceed minimum standards (such as additional open space, providing for regional trails and greenways, or incorporating environmentally sensitive design features beyond what is required by the Ordinance)?	No		N/A	For Conservation Design Districts, allow applicants to request an increase in density if it is demonstrated that the proposed conservation design plan offers a superior layout and quality of design which incorporates environmentally sensitive design features that substantially exceed the minimum requirements of the ordinance. The maximum increase in density shall be limited to 20 percent of the permitted density.	Density bonuses for open space and innovative design section (A1106) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Crystal Lake's Conservation Development District (Sec 5-300 E4).
12	**Conservation design—by right**	Allow conservation design as a "by-right" form of development?	No		N/A	Allow conservation design as a by-right form of development by either adding conservation design to the list of permitted uses in existing zoning districts, creating a conservation design overlay district, or designating certain districts on the zoning map as conservation design districts.	NIPC Conservation Design Resource Manual; Applicability section (A1102) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures; Village of Plainfield Conservation District (Zoning 9-52).

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Table 6. Conservation design and infill (continued)

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
11	**Conservation design—zoning map**	Does the zoning map indicate areas where conservation development is required?	No		N/A	After creating a Conservation Design District or Overlay District, establish areas where the standards apply on the zoning map. These areas should correspond with known green infrastructure resources, such as streams, wetlands, floodplains, groundwater recharge areas, mature tree stands, prairies, savannahs, and steep slopes.	Applicability section (A1102) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
12	**Mixed use**	Is there a downtown overlay district or another mechanism to encourage mixed-use development in neighborhood centers?	Yes	Zoning 19.07	Several zoning districts allow mixed use, such as RB Residence Business District 19.35.200; NB Neighborhood Business District 19.35.300; AB Area Business District; CC1 Center City District 19.35.500; and CC2 Center City District 19.35.700		
13			No	Zoning 19.14.600 F1	Except in the CC1 Center city zoning district, the building layout should maximize the distance between buildings on the site and buildings on adjacent properties.	Encourage compact development in specific business and neighborhood centers.	
14			No	Zoning 19.60.040 C 1	For Planned Developments, the nonresidential land uses should be located central and accessible to the population served without requiring traffic movements through or into a residential neighborhood. Nonresidential land uses should not be located within residential neighborhoods, but on the periphery as defined by the arterial street systems.	Consider allowing non-residential uses to follow traditional development patterns, with neighborhood centers on collectors as well as arterial streets.	
15	**Impact fees**	Are there reduced impact fees or other incentives to encourage infill development?	Mostly addressed	Development Impact Fees	Development of property located within a redevelopment area designed by the City Council.	Consider tailoring fees based on the location to encourage redevelopment of previously developed land that is already connected to City infrastructure.	

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Table 7. Landscaping

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Native landscaping—preclusion**	Include "noxious weed" provisions that might intentionally, or unintentionally, preclude natural landscaping because of vegetation height standards or similar restrictive provisions?	Yes	Plants and Weeds 9.16.020	All premises and exterior property shall be maintained free from weeds in excess of eight inches. Weeds are defined to include all grasses, annual plants, and vegetation, other than trees or shrubs; provided, however, this term shall not include cultivated flowers and gardens.	Identify native plant growth, which should consist of grasses, wildflowers, shrubs, and trees that are indigenous to the greater Chicago region, as an example of a cultivated garden. Consider adding buffer provisions along property lines and updating vegetative height to encourage appropriately-scaled native landscaping on individual private lots.	Plants of the Chicago Region (Swink and Wilhelm, 1994); Green Landscaping: Greenacres; A Source Book on Natural Landscaping for Public Officials (NIPC); City of Naperville, Private naturally landscaped lots (4-3-2.6)./
2	**Native landscaping—common areas**	Encourage/require the use of native plant materials for the default landscaping of common areas, stormwater facilities, common open space areas, and the buffers of streams, lakes, wetlands, and other natural areas?	No	Subdivision 18.28.050 I	All parkways within the dedicated right of way shall be sodded in accordance with City standard specifications.	Encourage the use of native plant materials as the default landscaping of stormwater facilities and for the buffers of streams, lakes, wetlands, and other natural areas and encourage integrating native plant materials in common areas. For standard subdivisions, the City could set a minimum percent coverage using native vegetation.	Natural landscaping standards section (A1110) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
3			Mostly addressed	Zoning 19.12.730 D	The use of native trees, shrubs, and ground cover is encouraged as an alternative to conventional turf grass, ornamental plans, and nonnative trees and shrubs.	For Conservation Design Districts, encourage the use of native plant materials as the default landscaping of stormwater facilities and for the buffers of streams, lakes, wetlands, and other natural areas and encourage integrating native plant materials in common areas.	
4	**Native landscaping—management**	Require provisions for long-term oversight, management, funding, and performance criteria for common areas and natural landscapes (as referenced above in greater detail)?	No	Zoning 19.12.700	N/A	For Conservation Design Districts, require that the stewardship plan include performance standards for all natural open space areas and naturalized stormwater management facilities and buffers (not individual residential lots). The performance standards shall identify proposed methods for establishing the areas and shall require monitoring and maintenance for at least three full growing seasons following initial enhancement, restoration, and planting. Long-term monitoring after initial restoration has been completed should also be required.	Stewardship plan section (A1118) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Procedures.
5	**Street trees**	Require planting street trees? If yes, how many trees?	Mostly addressed	Subdivision 18.28.050 J. and 18.28.060 B.3.f.	Trees shall be planted not more than 40 feet apart along both sides of all streets where trees do not exist. This requirement will be satisfied if an equivalent number of trees of the same size or larger are planted in a naturalistic manner in the front yards of the lots abutting the street.	Consider relocating this provision to the zoning ordinance so that it applies to all new development, not just subdivisions, in order to help establish street trees in already developed areas.	Park Forest Sustainability Audit of Zoning and Subdivision Codes.
6	**Tree protection ordinance**	Require protection of native/desirable trees (i.e., a tree protection ordinance)?	Yes	Zoning 19.16.040	It shall be unlawful for any person to cut down, destroy, remove or move, or effectively destroy through damaging, or authorize the cutting down, destroying, removing, moving or damaging of any tree without first obtaining a tree removal permit. When a tree removal permit is sought in connection with a building permit, the application shall be accompanied by a tree preservation plan.		
7	**Tree replacement**	Require replacement of any trees that are unavoidably impacted by construction activities?	Yes	Zoning 19.16.050 D	The replacement of trees is based on the condition rating and species group. The amount of inches of tree caliper to be replaced is a percentage, based on group and condition rating, of the total amount of DBH being removed. Replacement trees shall be chosen lists which include species native to Illinois. Replacement ratios are established.		
8			Yes	Zoning 19.16.070	Trees to be preserved shall be protected during construction by tree protection devices around the Critical Root Zone of each tree to prevent compaction of soil and other damage to the tree by equipment or materials.		
9			Mostly addressed	Zoning 19.16.090 B and C	All buildings and other structures shall be located to minimize tree damage and/or removal. The tree preservation plan shall include a tree survey of every tree with a DBH of two inches or larger on the property.	Tree survey could include consideration of trees that are outside of the property line but may have their Critical Root Zone extending into the subject site.	
10	**Tree replacement—funding**	Require payment into a tree replacement fund or "mitigation bank" when removed trees cannot be replaced/mitigated on site?	Yes	Zoning 19.16.050 G	If there is insufficient space in the lot to allow for the planting of all replacement trees, or replacement at the required rate would otherwise be inconsistent with current standards generally observed by professionals in the forestry, landscaping and landscape architecture professions, including by way of example prairie restoration projects involving the removal of invasive trees, tree banking can be used. In such instance, the city shall charge a fee in lieu of some or all of the replacement trees otherwise required. The proceeds of any fee shall be used for the planting of trees on public parkways or other public properties in the city.		

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Table 8. Transportation

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Street network—location**	Require the street network to minimize encroachment in sensitive natural resources and take advantage of open space vistas, while providing an interconnection of internal streets and street connections to adjoining land parcels to create opportunities for future connectivity?	No	Subdivision 18.24.010	The arrangement, character, extent, width, grade, and location of all streets shall be considered in their relation to existing and planned streets, to reasonable circulation of traffic within the subdivision and adjoining lands, to topographical conditions, to runoff of stormwater, etc.	To the greatest extent possible, new roadways shall respect natural contours and ridgelines to minimize grading. The street layout should minimize encroachment onto sensitive natural resources such as wetlands, designated natural areas, woodlands, significant tree stands, and wildlife habitats, and should be designed to take advantage of open space vistas.	Blackberry Creek Zoning Code Analysis and Ordinance Language Recommendations.
2	**Street network—stream crossings**	Limit stream crossings by the street network?	No	Subdivision 18.24.010	The arrangement, character, extent, width, grade, and location of all streets shall be considered in their relation to existing and planned streets, to reasonable circulation of traffic within the subdivision and adjoining lands, to topographical conditions, to runoff of stormwater, etc.	Stream crossings shall be limited to the minimum necessary to provide safe circulation and ensure two ingress/egress locations. Stream crossings shall be located to minimize stream disturbance. Bridges or culverts of sufficient size shall be used for all perennial stream crossings to preserve stream channel width and natural stream substrates.	Campton Hills Zoning Code Analysis and Ordinance Language Recommendations.
3	**Street connectivity—external**	Require connections to surrounding areas?	Mostly addressed	Subdivision 18.24.010	The arrangement, character, extent, width, grade, and location of all streets shall conform to the Official Plan and shall be considered in their relation to existing and planned streets, to reasonable circulation of traffic within the subdivision and adjoining lands, to topographical conditions, to runoff of storm water, to public convenience and safety, and in their appropriate relation to the proposed uses of the area to be served.	Consider adding a connectivity measurement to ensure future connections at regular intervals that promote walkability. For example, the standard of one through-street intersecting or terminating at the project boundary at least every 800 feet could be established, with exceptions for natural resources, open spaces, existing buildings, and other physical obstructions.	LEED for Neighborhood Development Walkable Streets Prerequisite.
4	**Street connectivity—internal**	Require subdivisions to achieve a certain score on an index for internal street connectivity?	No	Subdivision 18.24.050 B	Block standards do not include a maximum block length.	Consider establishing a maximum block length of 800 feet and a preferred length of 300 feet to 600 feet for residential subdivisions.	Park Forest Sustainability Audit of Zoning and Subdivision Codes
5	**Street—widths**	Encourage narrower street widths to reduce the amount of impervious surface?	No	Subdivision 18.24.020 B and 18.28.050 A	Right-of-way widths of major arterials, minor arterials, and collector streets shall be in accordance with those designated on the Official Plan. Larger right-of-way widths shall be required on minor streets intersecting a collector or arterial street to accommodate future signals and turn bays. Larger right-of-way widths shall be accommodated for a minimum of 500 ft.	Design streets for the minimum required pavement width needed to support travel lanes, on-street parking, and emergency access. These widths should be based on desired travel speeds as well as traffic volumes. For example, the pavement width of minor local streets could be reduced from 30 to 22 ft, which is currently allowed for estate residential districts.	Model language in Conservation Design Resource Manual, NIPC and Chicago Wilderness; Center for Watershed Protection Better Site Design; ITE Designing Walkable Urban Thoroughfares: A Context Sensitive Approach; CNU Emergency Response & Street Design; Village of Plainfield Traditional Neighborhood District (Zoning Sec. 9-54); City of Crystal Lake Street Standards for Conservation Design (UDO Article 4 Section 4-100 E).
6			No	Subdivision 18.24.020 L	Commercial and industrial subdivision streets shall be constructed to a minor street standard except the pavement shall be 36 ft. wide.		
7	**Street—frontage roads**	Discourage frontage roads?	No	Subdivision 18.24.020 J.	To provide adequate protection for residential properties and to afford separation of through and local traffic, provisions shall be made for serving lots abutting major and minor arterial streets and railroad rights of way by either the use of frontage access streets, or backing lots to the arterial street with a screening planting contained in a nonaccess reservation along the rear property line.	Consider language discouraging frontage roads since they create additional impervious surfaces. Identify additional options to provide access to sites along arterial streets without having to build an additional street. Multi-way boulevards could be an option.	ITE Designing Walkable Urban Thoroughfares: A Context Sensitive Approach.
8	**Street—length**	Encourage reduced or flexible lot widths to reduce imperviousness and street length?	No	Zoning 19.20, 19.25, 19.30, 19.35, and 19.40.	Minimum lot areas, front and side setback are specified for each zoning district.	Reduce lot widths to limit the total length of the street network in the community and overall site imperviousness.	Center for Watershed Protection Better Site Design; Village of Plainfield Traditional Neighborhood District (Zoning Sec. 9-54).
9	**Cul-de-sacs**	Discourage cul-de-sacs and promote smaller scale design?	No	Subdivision 18.24.020 G.	Each cul-de-sac shall have a terminus of nearly circular shape with a minimum diameter of 110 ft.	Cul-de-sac streets shall be limited to a maximum of 15 percent of total road footage in a residential development, maximum of 10 percent in a non-residential or mixed-use development with exemptions for natural resource protection or other barriers. Reduce the impervious cover by reducing the radius of the turnaround bulb, with a minimum radius allowed of less than 35 feet, maximum of 45 feet. Allow landscaped island in center of cul-de-sac to store and treat stormwater runoff. Allow other turnaround options such as T-shaped turnarounds or loop roads. Clarify discrepancy in ordinance.	Center for Watershed Protection Better Site Design.
10			No	Subdivisions 18.28.050 A.	Pavement in a cul-de-sac turnaround shall have a minimum diameter of 90 ft. measured from back to back of curbs.		
11	**Curb radius**	Encourage short curb radii for intersections?	No	Subdivision 18.28.050 H	All curb corners (returns) shall have minimum radius of 20 ft.	Consider shortening curb radii for intersections where pedestrian activity is encouraged. Shorter curb radii make streets more pedestrian-friendly by lowering the speeds of turning vehicles.	ITE Designing Walkable Urban Thoroughfares: A Context-Sensitive Approach
12	**Curb and gutter requirements**	Encourage/require the use of natural drainage practices?	Yes	Subdivision 18.28.060 B.1.b and B.3.b.	In subdivisions wherein certain minimum lot areas are met in association with specific combinations of water supply and sewerage disposal systems, surface drainage systems may be allowed and curb and gutters are not required.		
13			Yes	Right-of-way Bioretention Basins 13.21	Establishes a program for the installation and maintenance of bioretention basins, or rain gardens, in the parkways abutting the property owners that have agreed to participate in the program.		

The community's ordinance was evaluated using a checklist developed from a number of best practices, see Appendix A. The areas where the existing City or County ordinance currently meets best practices are highlighted in green.

Table 8. Transportation (continued)

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
14	**Paving materials—streets**	Promote use of pervious materials for streets?	Mostly addressed	Zoning 19.45.170	Vehicle use areas shall be paved with a bituminous concrete, Portland cement concrete, paver brick, or gravel base (if in residential areas).	Update to encourage permeable surfacing materials (e.g., interlocking concrete pavers, porous concrete, or porous asphalt) in all such vehicle use areas except for vehicle service stations, gas stations, and other areas used for transfer or storage of hazardous materials.	Center for Watershed Protection Better Site Design; Campton Hills Zoning Code Analysis and Ordinance Language Recommendations.
15	**Sidewalks**	Promote connected sidewalks in new developments and use of pervious materials?	Mostly addressed	Subdivision 18.28.050 E	Concrete sidewalks shall be required on both sides of streets and shall be installed in accordance with City standard sidewalk specifications and laws governing handicap accessibility. Access shall be available to all lots.	Consider allowing wider sidewalks in areas where pedestrian traffic warrants, such as on retail or mixed-use blocks. Encourage permeable pavement (interlocking concrete pavers, porous concrete, or porous asphalt), while also maintaining other design considerations like the Americans with Disabilities Act.	Blackberry Creek Zoning Code Analysis and Ordinance Language Recommendations; LEED for Neighborhood Development Walkable Streets Prerequisite.

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Table 9. Parking

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Purpose**	Does the purpose include a statement about tailoring parking requirements to meet average day-to-day demand as opposed to peak demand?	No	Zoning 19.45.010	To establish the minimum required number of parking stalls and minimum design requirements for the construction of off street parking facilities.	Establish off-street vehicle and bicycle parking requirements that balance the City's goal to encourage walking, bicycling, and transit use with the goal to provide adequate off-street parking to meet the needs of shoppers, visitors, and residents and reduce on-street parking demand on nearby residential streets. Parking requirements are designed to accommodate average day-to-day demand, as opposed to peak demand, in order to reduce excessive off-street parking and free up land for other uses.	
2	**Applicability**	Apply off-street parking requirements only to parcels of a certain size or greater?	No	Zoning 19.45.070	Parking requirements apply to any existing or new development regardless of lot size.	Create an exemption for small lots regardless of use to ensure economically productive use of small parcels.	Village of Riverside: no off-street parking spaces required for non-residential uses under 3,000 sq. ft GFA. City of Evanston: no off-street parking spaces required for buildings between 2,000 to 3,000 sq. ft. GFA in specific districts.
3	**Requirements**	Establish parking requirements as a maximum or a minimum?	Minimum	Zoning 19.45.080	Sets minimum off-street parking requirements.	In addition to the minimum requirements, establish a maximum threshold (for example, 10 percent over the requirement) to prevent projects from including too much off-street parking. Require that all parking provided in excess of the maximum shall be designed and maintained as permeable paving.	Center for Watershed Protection Better Site Design; Campton Hills Zoning Code Analysis and Ordinance Language Recommendations.
4	**Parking ratio—office**	Require a parking ratio for a professional office building that is three spaces or less, per 1,000 square feet?	No	Zoning 19.45.080	One space per 250 sq. ft. (four spaces per 1,000 sq. ft.) of floor area	Consider model standards that require a minimum of two or three spaces per 1,000 feet of GFA. Could be tied to providing or supporting alternatives to driving. For example, bicycle parking or carpool programs.	NW Connecticut Model Zoning Regulations for Parking; State of Oregon's Model Development Code and User's Guide for Small Cities.
5	**Parking ratio—retail**	Require a parking ratio for retail that is three spaces or less, per 1,000 square feet?	No	Zoning 19.45.080	General retail, one space per 250 sq. ft. (four spaces per 1,000 sq. ft.) of floor area; Restaurants, one space per 60 sq. ft. (16.6 spaces per 1,000 sq. ft.) of floor area; Retail located in shopping centers with more than 250,000 sq. ft., one space per 200 sq. ft. (five spaces per 1,000 sq. ft.). Home furnishings, one space per 300 sq. ft. (3.3 spaces per 1,000 sq. ft.).	Consider model standards that require a minimum of two spaces per 1,000 sq. ft. of GFA for Big Box or Large Scale Retail, one space per 1,000 sq. ft. of GFA for Free Standing Retail, and three spaces per 1,000 sq. ft. of GFA for small shopping centers.	
6	**Parking ratio—residential**	Require a parking ratio for a single family home that is two spaces or less?	No	Zoning 19.45.080	One space per 500 square feet of floor area with a minimum of two spaces and a maximum of four spaces per dwelling unit. Efficiency units are required to have 1.5 spaces and elderly public housing 0.5 spaces.	One space per studio and one-bedroom units, 1.5 spaces per two-bedroom units, and two spaces per three-bedroom or larger units.	
7	**Requirements—flexibility**	Provide flexibility regarding alternative, reduced parking requirements and discourage over-parking of developments?	No	Zoning 19.45.250 B	Reductions in the required minimum number of parking stalls, a reduction in the required minimum size of parking stalls and aisles, a reduction in the required minimum size of parking lot or driveway setbacks, or a reduction in the required minimum size of islands at the ends of parking rows requires a variation.	Provide flexibility to reduce parking spaces if it can be demonstrated that the original provision of parking was in excess of the day-to-day demand for parking. Simplify process by allowing this to be an administrative decision instead of requiring a variance.	Campton Hills Zoning Code Analysis and Ordinance Language Recommendations.
8	**Off-site parking**	Provide flexibility regarding alternative, reduced parking requirements (e.g., shared parking, off-site parking), and discourage over-parking of developments?	Yes	Zoning 19.45.050	Off street parking facilities for separate uses may be provided collectively, if the total number of stalls so provided is not less than the sum of the separate requirements of each land use.		
9			Mostly addressed	Zoning 19.45.055 B.	Off site parking stalls shall be within 400 ft. from the land use served.	Consider increasing the distance off-site parking can be located from the land use served. For example, 1,000 ft. from the property owned can open up more opportunities for off-site parking still within easy walking distance.	NW Connecticut Model Zoning Regulations for Parking
10	**Shared parking**	Provide flexibility regarding alternative, reduced parking requirements (e.g., shared parking, off-site parking), and discourage over-parking of developments?	Mostly addressed	Zoning 19.45.055	Two or more land uses may share off street parking without providing the minimum required spaces for each land use, under the following conditions: analysis of peak parking demand for the combined uses shows no overlap; the off site parking is within 400 feet from the land use served; off site parking location is owned by at least one of the land uses being served; and no changes shall be made to the parking area which would reduce the parking unless other arrangements are made.	In addition to current shared parking standards, consider adding an option that allows sharing for uses that do have parking demand overlap. For example, allow up to 30 percent of the parking spaces required for the predominant use on a site may be shared with other uses operating during the same time of day and days of the week.	NW Connecticut Model Zoning Regulations for Parking; Village of Plainfield Shared parking (Zoning Sec. 9-74).
11	**Requirements—location**	Provide for uses in downtown areas by reducing or not requiring parking given the walkable, transit served location?	Yes	Zoning 19.45.040 C 3	Off street parking is not required for land uses within the CC1 Center City District. Land uses located within the CC2 center city district and located within 800 ft. of a municipal off street parking facility shall not be required to provide off street parking if it is determined that they cannot otherwise locate the parking in compliance with the requirements.		
12	**Credits—on-street parking**	Allow a reduction in off street parking requirements when nearby on street parking is available?	No	Zoning 19.45.040	N/A	For all business and industrial zoning districts, allow off-street parking credit for existing on-street parking space located either directly adjacent to the property line or within a certain number of feet from the property on the same side of the street.	State of Oregon's Model Development Code and User's Guide for Small Cities.
13	**Credits—bicycle parking**	Allow a reduction in off street parking requirements when bicycle parking is provided?	No	Zoning 19.45.087 D	Bicycle parking requirements provide parking in addition to motor vehicle parking requirements, they do not reduce the off street parking requirements. All land uses within the CC1 center city district shall be exempt from the requirements.	Consider allowing the amount of motor vehicle parking spaces be reduced by one space for every eight bicycle parking spaces.	Campton Hills Zoning Code Analysis and Ordinance Language Recommendations.

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Table 9. Parking (continued)

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
14	**Size—parking stall**	Require parking stalls to be less than or equal to 9 x 18 feet?	No	Zoning 19.45.140	Parking stalls shall be a minimum of nine linear feet in width by 18.5 linear feet in length, or equivalent for angle parking.	Establish standard parking stall size as follows: Regular, 90-degree space: 9 ft. by 18 ft.; On-street: 8 ft. by 23 ft.; Compact space: 7.5 ft. by 15 ft. Up to two feet of the required vehicle parking space depth used for a vehicle overhang may be improved and maintained as a landscaped island or perimeter landscaping.	Center for Watershed Protection Better Site Design, State of Oregon's Model Development Code and User's Guide for Small Cities.
15	**Size—compact stalls**	Specify that a percentage of all parking stalls can be dedicated for compact cars, with correspondingly smaller stall dimensions?	No	Zoning 19.45.140	N/A	Consider specifying a minimum percentage of all required vehicle parking spaces, excluding accessible spaces, that shall be sized for compact cars (e.g., 15-35 percent).	
16	**Size—parking aisles**	Establish narrower aisle widths to minimize impervious surfaces?	No	Zoning 19.45.140	Parking aisles shall be a minimum of 22 linear feet in width, or an equivalent for angle parking.	Encourage one-way aisles with angled parking to significantly reduce the overall size of the parking lots. Maximum aisle width: 0 degree (parallel): one-way: 12 ft.; two-way: 22 ft.; 45 degree: one-way: 12 ft.; 60 degree: one-way: 18 ft.; 90 degree: 22 ft.	Blackberry Creek Zoning Code Analysis and Ordinance Language Recommendations; Model Zoning Regulations for Parking for Northwestern Connecticut
17	**Driveways**	Encourage/require reduced commercial driveway widths?	Mostly addressed	Zoning 19.45.120 A.	Driveways to parking structures and parking lots shall have a minimum width of 9 ft. for a one-way vehicular movement and a minimum width of 18 ft. for a two-way vehicular movement, and a maximum width as may be approved or required by the Development Administrator in order to provide a safe and efficient means of vehicular access.	Consider establishing a maximum width to prevent large commercial driveways.	Center for Watershed Protection Better Site Design.
18		Encourage/require reduced residential driveway widths?	No	Zoning 19.45.120 B.	Maximum driveway widths vary from 10 ft. to 25 ft. depending on the residential district. With garages less than 10 ft. from the street setback, no driveway shall exceed the width of the garage plus an additional driveway width which varies by district.	Design residential driveways for the minimum required pavement to access a garage, 9 feet or less for one lane or 18 feet for two lanes for multi-family developments.	
19		Encourage reduced front setbacks to limit the length (and amount of impervious surface) associated with a driveway?	No	Zoning 19.20, 19.25, 19.30, 19.35, and 19.40.	Minimum lot areas, front and side setback are specified for each zoning district.	Identify opportunities to reduce front setbacks to limit the amount of impervious surface associated with a driveway;	
20	**Driveways—shared**	Encourage/require shared driveways?	No	Zoning 19.45.120 B.	N/A	Shared or common drives shall be permitted and shall comply with the following standards, provided there is a recorded covenant applicable to the properties utilizing such drive which establishes standards for its maintenance and use. A common drive may serve multiple units and may be built to serve residential or non-residential uses. A common drive shall extend from a public or private street and may connect to other existing or planned public or private streets. A maintenance agreement running with the land for the shared driveway must be executed by all units served and recorded with the County Recorder's office.	Center for Watershed Protection Better Site Design, Street and trail standards section (A1108.1 H) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Practices; NIPC Conservation Design Resource Manual, Common Drives model ordinance. Crystal Lake Conservation Design Districts (Sec 4-100 E4b).
21	**Alleys**	Encourage alleys to reduce impervious surfaces generated by driveways?	No	Subdivision 18.24.020 F and I	Public alleys are not permitted. Private streets and alleys shall be permitted only in planned unit developments.	Alleys should be permitted as an alternative to individual driveways.	Center for Watershed Protection Better Site Design.
22	**Paving materials**	Promote use of pervious materials for paved areas, including parking lots and driveways?	Mostly addressed	Zoning 19.45.170	Vehicle use areas shall be paved with a bituminous concrete, portland cement concrete, paver brick, or gravel base (if in residential areas). Where the number of parking stalls provided exceeds the number of stalls required, the excess number of parking stalls shall be constructed with permeable surfacing materials, such as permeable paver brick, porous concrete, grass pavers, gravel pavers, and interlocking concrete blocks.	Encourage the use of pervious materials over conventional pavement for parking spaces, as well as parking aisles for all areas, not just excess areas, provided that the grades, subsoils, drainage characteristics, and groundwater conditions are suitable. Encourage the use of "cool" pavement—with a solar reflectance index (SRI) of at least 29—to reduce the urban heat island effect.	Center for Watershed Protection Better Site Design; LEED for Neighborhood Development Heat Island Reduction Credit.
23	**Landscaping—amount**	Specify a minimum percentage of pervious landscaping for parking lots?	No	Zoning 19.45.180	The ends of parking stall rows, which adjoin a parking aisle or driveway shall be protected by a curbed or striped island, which shall have a minimum width of three linear ft. and a minimum length equal to the length of the adjoining parking row.	Define purpose of landscaped islands to include minimizing impervious surface area, maximizing the opportunity to infiltrate and filter stormwater runoff from the lot, reducing heat island effect, and making parking areas more pleasant and comfortable. Require a landscaped island for every 10 spaces and a minimum amount of tree canopy coverage (using a minimum percentage or ratio per parking space).	City of Crystal Lake: Site Landscaping (UDO Article 4 Section 4-400 F1 and F2) and Standards for Parking Areas in Conservation Developments (UDO Article 4 Section 4-200 E5); Village of West Dundee Parking Lot Design and Maintenance Standards (Zoning 10-9-1-6 C).
24			No	Zoning 19.12.720 B 3 a and b	Outlines tree and shrub guidelines along the perimeter of the vehicle use area.		
25	**Landscaping—design**	Encourage/require the use of recessed landscape islands (vs. raised islands) to facilitate the infiltration and filtering of parking lot runoff?	No	Zoning 19.45.160 and 19.45.180	The perimeter of parking lots, landscaped islands, access driveways, and other vehicle use areas which contain 13 or more parking stalls shall be defined with 6 x 18 inch PC concrete reinforced curb or an equivalent in design and function as may be approved by the city engineer. Sections of depressed curb may be provided for the purpose of facilitating snow removal.	Encourage or require that parking lot runoff shall be routed to internal and/or peripheral swales and bio-swales. Update to allow a determination of whether curbing is necessary. If deemed necessary, allow frequent curb cuts to allow stormwater runoff to enter stormwater BMPs (bioretention facilities, dry swales, bioswales, perimeter sand filters, filter strips).	Parking lot standards section (A1111.1) of the McHenry County Subdivision Ordinance on Conservation Design Standards and Practices.
26			No	Zoning 19.45.190	For off street parking facilities, surface water shall be discharged into an adequate storm sewer system, or alternate drainage system if storm sewer is not available. The city engineer may require that the facilities be designed with on site stormwater detention capabilities where the existing storm sewer system has insufficient capacity.		

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Table 10. Water efficiency and conservation

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Water conservation—indoor**	Encourage plumbing fixtures and fittings and appliances in all new and remodeled construction to not exceed specific flow rates and must be a labeled Water Sense product if available?	No	Water and Sewers 14.04.390 and Plumbing Code 16.20	Elgin uses the State of Illinois Plumbing Code (77 Ill. Administrative Code 890.110 et seq., as amended, published by the Illinois Dept. of Public Health).	Update to require new and remodeled construction to use the most current, water efficient plumbing fixtures, fittings, and appliances (i.e., WaterSense and US EPA Energy Star Program products). Tailor requirements for residential, commercial, industrial, and institutional uses.	CMAP Model Water Use Conservation Ordinance, 1.0, 2.0, 3.0, 8.0, 9.0, 10.0, 11.0, 12.0, and 13.0.
2	**Water conservation—outdoor**	Set guidelines for the amount of development area dedicated to turf, high water use plants, or water features; and the minimum amount of topsoil for turf areas?	No	Subdivision 18	N/A	Update to minimize the amount of turf area, require a minimum of six inches of topsoil depth for areas planted with turf grass, and encourage the use of native or low water use plants. Tailor requirements for residential, commercial, industrial, and institutional uses.	CMAP Model Water Use Conservation Ordinance, 4.0., 14.0
3		Set requirements for automatic landscape irrigation systems?	No	Water and Sewers 14.04.390	N/A	Update to set requirements on landscape irrigation equipment (such as requiring rain and moisture sensing devices and freeze gauges) and prohibit watering of impervious surfaces. Tailor requirements for residential, commercial, industrial, and institutional uses.	CMAP Model Water Use Conservation Ordinance, 5.0., 15.0
4		Set requirements for landscape watering days and schedules?	No	Water and Sewers 14.04.390 B	The city manager is authorized to temporarily limit or prohibit the use of water from the city's water supply system for the irrigation of outdoor vegetation. Five levels with different types of restrictions and schedules are established.	Update to set everyday requirements for landscape irrigation days and schedules, establish irrigation permit system for new landscape watering. Tailor requirements for residential, commercial, industrial, and institutional uses.	Northwest Water Planning Alliance's Regional Water Conservation Lawn Watering Ordinance; CMAP Model Water Use Conservation Ordinance, 5.0., 6.0, 7.0, 15.0, 16.0, 17.0, and 23.0.
5	**Rainwater harvesting and water reuse**	Establish a water reuse model ordinance to encourage preservation of groundwater supplies?	No		N/A	Pending state legislation permitting the use of rainwater harvesting for non-potable purposes, the City should prepare to allow rainwater harvesting for landscape irrigation and toilet flushing.	CMAP Model Water Use Conservation Ordinance, 18.0 and 19.0; McHenry County Water Reuse Model Ordinance
6	**Downspout—sanitary sewer connection**	Restrict downspouts from being directly connected to a sanitary or storm sewer?	Yes	Water and Sewers 14.08.020	It is unlawful for any person, firm or corporation to connect, cause to be connected, assist or take part in connecting any storm sewer with any sanitary sewer, or any part thereof, or any sanitary sewer with any storm sewer or any part thereof. All downspouts, outside stairwells and roof drains shall discharge onto the ground or be connected to storm sewers, drainage ditches or storm drainage systems.		
7	**Downspout—storm sewer connection**	Restrict downspouts from being directly connected to a storm sewer?	No	Explosive and Flammable Liquids 9.40.360	Garage construction procedures limit connection to sewer system with an exception for downspouts carrying surface water from the roof.	Allow downspouts to connect to storm sewers only in areas where soil conditions or other natural features make infiltration and or dispersal difficult.	City of Milwaukee Downspout Disconnection ordinance.
8			No	Water and Sewers 14.08.010	In combined sewer areas, when a separate storm sewer system becomes available, all adjacent property owners shall, upon notice from the city, at their expense, disconnect any stormwater discharge from the combined sewer system and reconnect said stormwater discharge to the newly available storm sewer system. This paragraph includes roof drains, downspouts, yard drains, and footing drains.		
9			No	Water and Sewers 14.08.020	All downspouts, outside stairwells and roof drains shall discharge onto the ground or be connected to storm sewers, drainage ditches or storm drainage systems.		
10	**Water waste prevention**	Prohibit water waste or inefficient use of water?	Mostly addressed	Water and Sewers 14.04.140	It shall be the duty of all consumers of city water at any and all times to exercise due diligence to prevent waste of the water supply and to this end shall stop any leaks on their premises. The city water supply will be shut off from any and all premises until such violation of this rule is corrected.	Consider adding requirements for fixing leaks in private water lines within a specified number of days of notification by water utility or discovery of leak.	CMAP Model Water Use Conservation Ordinance, 21.0.
11			Yes	Water Pollution 9.32.250 A1	Water used for irrigation purposes shall not be allowed to run off the premises on which the irrigation is occurring. In addition, washing down paved areas shall be prohibited unless necessary for health or safety purposes.		
12			Yes	Water and Sewers 14.04.070	No water shall be turned on at any service location until a water meter is installed.		
13	**Water pricing**	Establish a conservation pricing structure or other economic incentive to promote water conservation?	Mostly addressed	Water and Sewers 14.04.180	Monthly user rates using a uniform rate structure of $3.38 per 100 cubic feet plus a monthly water availability charge, based on size of the water service, which represents the cost associated with providing enough water storage capacity to meet the customer peak demands and maintaining the water system.	Consider implementing conservation pricing structures and economic incentives that encourage desirable water management practices. Conservation pricing structures include seasonal rates (higher per unit water rate during the peak usage summer months), uniform rates or increasing block rates in which the unit price of water increases as the quantity of water used increases.	CMAP Model Water Use Conservation Ordinance, 32.0.

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Table 11. Pollution prevention

	CATEGORY	CHECKLIST QUESTION	YES/NO	CODE SECTION	CURRENT STANDARD	RECOMMENDED STANDARD OR ACTION	REFERENCE
1	**Groundwater protection**	Regulate activities within groundwater protection areas?	No	Setback Zones for Deep Water Supply Wells 9.34	Elgin adopts by reference the regulations of 415 Illinois Compiled Statues 5/14.2 and 5/14.3, 1993, as amended, for minimum and maximum setback zones for community water supply wells.	Minimize intensive development activities, minimize impervious surfaces and mass grading, and employ stormwater best management practices that promote infiltration and treatment where possible in sensitive groundwater aquifer recharge areas, including Class III Special Resource Groundwater areas.	City of St. Charles, IL Chapter 13: Groundwater Protection; City of Marengo, IL, M.C. Chapter 30: Groundwater protection; Fox River Grove, IL, M.C. Article IX, Section 23-200 Groundwater protection; McHenry County Groundwater Protection Action Plan; U.S. EPA Model Ground and Surface Protection Overlay District.
2	**Surface water protection**	Regulate activities within the flood plain or buffer areas of waterbodies?	Mostly addressed	Hazardous Substance Control 9.41	Provides general guidelines on the use, storage, and delivery of hazardous substances or materials.	Specify that such materials as chemicals, explosives, animal wastes, fertilizers, flammable liquids, pollutants or other hazardous or toxic materials shall not be located or stored below the flood plain elevation or in the buffer areas of waterbodies.	
3			Yes	Urban runoff requirements 9.32.250	The uncovered outdoor storage of unsealed containers of building materials containing hazardous substances shall be prohibited in areas susceptible to runoff.		
4	**Phosphorus reduction**	Discourage the use of phosphorus in manufactured fertilizers in order to reduce the amount of phosphorus that enters water resources?	No	Water Pollution 9.32	N/A	Prohibit commercial and non-commercial application to any turf area any fertilizer, liquid or granular, which contains any amount of phosphorus or other compound containing phosphorus, such as phosphate, except naturally occurring phosphorus in unaltered natural or organic fertilizing products such as yard waste compost. Exceptions are made where soil tests show a need for phosphorus and for newly seeded or sodded lawns.	McHenry County Phosphorus Model Ordinance; Village of Long Grove (8-14-2).
5		Discourage the use of phosphorus in dishwasher detergents in order to reduce the amount of phosphorus that enters water resources?	Mostly addressed	Water Pollution 9.32.130	It is unlawful for any person, firm or corporation to sell, offer or expose for sale, give or furnish any synthetic detergent or detergent containing more than 8.7 percent or more than 7 seven grams of phosphorus by weight expressed as elemental phosphorus.	Update to reflect current Illinois law as of July 1, 2010, which limits phosphorus in dishwasher detergents to 0.5 percent by weight for non-commercial use	
6	**Chloride management**	Specify road salt storage and handling requirements that ensure proper storage, handling, and transport?	No	Water Pollution 9.32	N/A	Specify that road deicing salts shall not be located or stored below the flood plain elevation or in the buffer areas of waterbodies unless such materials are stored in a specified way. Address the proper handling, transport, and application of road deicing salts.	
7		Specify alternative compounds or methods for dust control?	No	Zoning 19.90.015 C	Where a gravel surface is approved by the development administrator and the city engineer, dust control for the commercial operations yard shall be provided including an application of calcium chloride or an equivalent approved by the Illinois department of transportation and the city engineer. Reapplications of the dust control measures shall be made at the direction of the code enforcement officer.	Consider requiring appropriate alternatives to calcium chloride for this use.	
8		Encourage water softeners be set to recharge on demand?	No	Water Pollution 9.32	N/A	Encourage the setting of water softeners to recharge on an as-needed/on demand basis rather than via a timer.	
9	**Coal tar sealants**	Discourage use of coal tar sealants to prevent loss of aquatic life?	No	Zoning 19.45.170	Off-street parking lots located within parks or golf courses shall be improved with a 8 inch compacted gravel base with a type A3 sealcoat overlay or an equivalent as approved by the city engineer.	Prohibit the use, sale, or retail display of sealcoat products for use on an asphalt or concrete surface, including driveways or parking areas, which contain high levels of carcinogens and are harmful to aquatic life.	McHenry County Coal Tar Sealants Model Ordinance.
10	**Pet waste disposal**	Has a pet waste disposal ordinance?	Yes	Good Housekeeping Requirements 9.32.250 C2	Fuel and chemical residue or other types of potentially harmful material, such as animal waste, garbage or batteries, which is located in an area susceptible to runoff, shall be removed immediately and disposed of properly.		
11			Yes	Animals 7.04.100 F	It shall be unlawful for any person to fail to remove any excrement of a dog or other animal under that person's control from the public right of way, from any property under the ownership or control of the city, or from any private property without the express consent of the owner or lawful occupant of the property.		
12	**Private sewage treatment and disposal ordinance**	Adopted the McHenry County Private Sewage Treatment and Disposal Ordinance?	No	Private Disposal System	Establishes system for inspecting septic systems prior to the sale, transfer, or conveyance of the property.	Consider adopting the Illinois Private Sewage Disposal Code, or use the McHenry Co. Code as a model, and amending it to require a regular schedule of inspections and maintenance by the landowner.	Public Health Ordinance for McHenry County, Article X, Wastewater & Sewage Treatment and Disposal for McHenry County Illinois .

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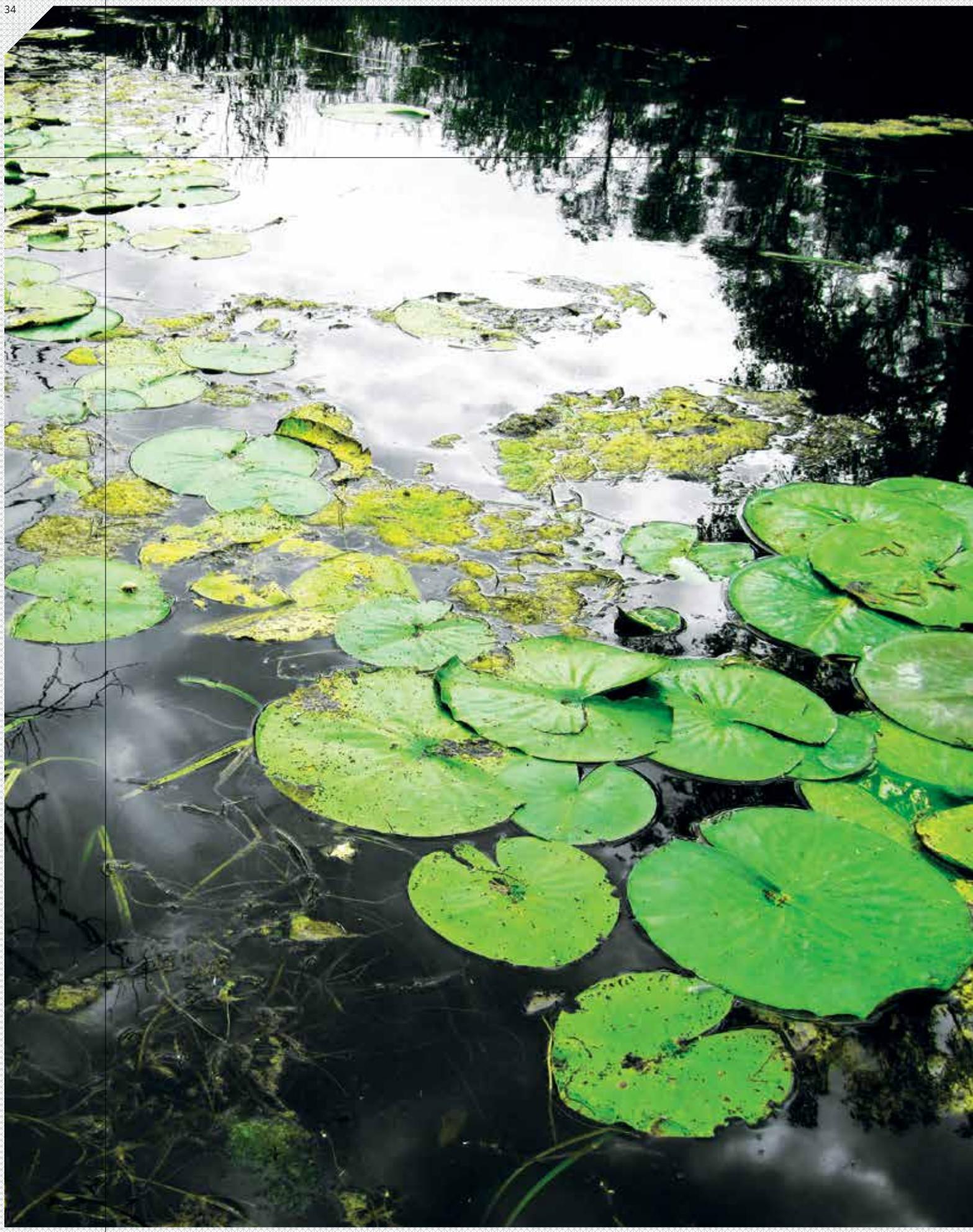

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Implementation Steps

This report identifies a number of recommendations to help better align Elgin's development-related ordinances with watershed protection. Elgin is currently in the process of updating the City's Comprehensive Plan and has an opportunity to establish a long-term vision for the community that includes water quality and natural resource objectives. While all of the recommendations within this report merit consideration, there are a number of key initial steps the City can prioritize to implement the recommendations in this report within the next year:

1. Incorporate the Kane County 2040 Green Infrastructure Plan, Ferson-Otter Creek Watershed Plan, and other natural resource mapping layers into the City's Comprehensive Plan.
2. Advocate for amendments to the adopted Kane County Stormwater Management Ordinance that encourage additional natural drainage practices, further improvements to soil erosion and sediment control, updated limits on floodplain activities, and additional measures to protect streams and wetlands.
3. Create a Conservation Design Overlay District using Algonquin's or McHenry County's conservation design ordinance as a model and zone areas of the City using the Chicago Wilderness Green Infrastructure Vision as a foundation.
4. Update street design standards to the minimum required pavement width needed to support travel lanes, on-street parking, and emergency access while at the same time outlining maximum block sizes or minimum intersection densities to improve connectivity

Appendix A: References

Algonquin, Illinois, "Conservation Design Standards and Procedures, Zoning Sec. 21.11 J." See **http://www.algonquin.org**.

Association of Illinois Soil and Water Conservation Districts, "Illinois field manual for implementation and inspection of erosion and sediment control plans," 1990.

Campton Hills, Illinois, "Village of Campton Hills Comprehensive Plan and Code Assessment," 2010.

Center for Watershed Protection, "Better Site Design: Code and Ordinance Worksheet," 1998. See **http://www.cwp.org/documents/cat_view/77-better-site-design-publications.html**.

Chicago Metropolitan Agency for Planning, "Ferson-Otter Creek Watershed Plan," 2011. See **http://cmap.is/198vurA**.

Chicago Metropolitan Agency for Planning, "Model Water Use Conservation Ordinance," 2010. See **http://cmap.is/1biqDop**.

Chicago Wilderness, Chicago Metropolitan Agency for Planning, "Green Infrastructure Vision," 2012. See **http://www.cmap.illinois.gov/green-infrastructure**.

Congress for the New Urbanism, "Emergency Response and Street Design," 2009. See **http://www.cnu.org/emergencyresponse**.

Crystal Lake, Illinois, "Conservation Developments, UDO Subdivision Standards: Article 5, Section 5-300." See **http://www.crystallake.org/index.aspx?page=367**.

Crystal Lake, Illinois, "Street Standards for Conservation Design, UDO Development & Design Standards: Article 4, Section 4-100 E." See **http://www.crystallake.org/index.aspx?page=372**.

Crystal Lake, Illinois, "Tree Preservation, UDO Development & Design Standards: Article 4, Section 4-300." See **http://www.crystallake.org/index.aspx?page=377**.

Crystal Lake, Illinois, "Landscaping and Screening Standards, UDO Development & Design Standards: Article 4, Section 4-400 F1 and F2." See **http://www.crystallake.org/index.aspx?page=379**.

Evanston, Illinois, "Exemption of Required Parking Spaces, Municipal Code 6-16-1-4." See **http://bit.ly/12AYXeE**.

Fox River Grove, Illinois, "Groundwater Protection Regulations – Chemical Substance Controls, Article IX, Section 23-200." See **http://bit.ly/19gZoxv**.

Geosyntec, "Hickory Creek Watershed Plan Ordinance Review and Checklist," 2011. See **http://www.hickorycreekwatershed.org/learn/plan**.

Geosyntec, "Jelkes Creek-Fox River Watershed Action Plan, Appendix C: Ordinance Checklist Highlights/Summary of Results," 2012. See **http://www.kanedupageswcd.org/Jelkes/Docs/JelkesCreekPlan12-12.pdf**.

Institute of Transportation Engineers, "Designing Walkable Urban Thoroughfares: A context Sensitive Approach," 2010. See **http://www.ite.org/css**.

Kane County, Illinois, "Blackberry Creek Watershed: Zoning Code Analysis and Ordinance Language Recommendations," 2004. See **http://www.co.kane.il.us/kcstorm/blackberry/zoning/FinalReport.pdf**.

Kane County, Illinois, "Kane County Stormwater Management Ordinance," 2009. See **http://www.co.kane.il.us/kcstorm**.

Lakewood, Illinois, "Best Management Practices for R-2 Zoning, BMP hierarchy," 2012. See **http://bit.ly/13RLU44**.

Low Impact Development Center, et al, "Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets," 2008. See **http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf**.

Low Impact Development Center, et al, "Managing Wet Weather with Green Infrastructure Municipal Handbook: Rainwater Harvesting Policies," 2008. See **http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_harvesting.pdf**.

Low Impact Development Center, et al, "Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Infrastructure Retrofit Policies," 2008. See **http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_retrofits.pdf**.

Low Impact Development Center, et al, "Managing Wet Weather with Green Infrastructure Municipal Handbook: Incentive Mechanisms," 2008. See **http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_incentives.pdf**.

Marengo, Illinois, "Groundwater Protection ordinance, Chapter 30" See **http://bit.ly/11aP3di**.

McHenry County, Illinois, "Green Infrastructure Plan," 2012. See **http://bit.ly/12mkvbK**.

McHenry County, Illinois, "Wastewater and Sewage Treatment and Disposal, County Code, Article X,"2007. See **http://bit.ly/ZF1yjP**.

McHenry County, Illinois, "Groundwater Protection Action Plan," 2009. See **http://www.co.mchenry.il.us/departments/waterresources/Pages/GroundwaterProtectionProgram.aspx**.

McHenry County, Illinois, "McHenry County Water Resources Action Plan," 2010. See **http://bit.ly/13xzKhM**.

McHenry County, Illinois, "McHenry County Phosphorus Model Ordinance." See **http://bit.ly/13tKTyw**.

McHenry County, Illinois, "Addendum to the McHenry County Subdivision Ordinance Conservation Design Developments: Standards and Procedures," 2009. See **http://bit.ly/14sjwrt**.

McHenry County, Illinois, "Water Reuse Model Ordinance." See **http://bit.ly/13RLNFK**.

Minnesota Planning, "Model Community Conservation Subdivision District, From Policy to Reality: Updated Model Ordinances for Sustainable Development," 2008. See **http://www.crplanning.com/_ordinances/pud.pdf**.

Minnesota Planning, "Planned Unit Development Ordinance, From Policy to Reality: Updated Model Ordinances for Sustainable Development," 2008. See **http://www.crplanning.com/_ordinances/conservation.pdf**.

Naperville, Illinois, "Private Naturally Landscape Lots, Plants and Weeds, Chapter 3 Trees, Plants, Weeds, and Composting, (4-3-2.6)." See **http://bit.ly/1f8sC1C**.

New Jersey Department of Environmental Protection, "Pet Waste Model Ordinance," See **http://www.state.nj.us/dep/stormwater/tier_A/ordinances.htm**.

Northeastern Illinois Planning Commission, "Conservation Design Resource Manual," 2003. See **http://bit.ly/105Lyd2**.

Northeastern Illinois Planning Commission, "Green Landscaping: Greenacres, a source book on natural landscaping for public officials," 1997. See **http://www.epa.gov/greenacres/toolkit**.

Northeastern Illinois Planning Commission, "Natural Landscaping for Local Officials: Design and Management Guidelines," 2004. See **http://bit.ly/15LnknQ**.

Northeastern Illinois Planning Commission, Illinois Department of Natural Resources, and Office of Water Resources, "Model Floodplain Ordinance for Communities Within Northeastern Illinois," 1996. See **http://cmap.is/15UXgGJ**.

Northeastern Illinois Planning Commission, "Model Stormwater Drainage and Detention Ordinance: A Guide for Local Officials," 1994. See **http://cmap.is/1cRfXz4**.

Northeastern Illinois Planning Commission, "Model Stream and Wetland Protection Ordinance for the Creation of a Lowland Conservancy Overlay District," 1999. See **http://cmap.is/18horf3**.

Northeastern Illinois Planning Commission, "Model Soil Erosion and Sediment Control Ordinance: A Guide for Local Officials," 1991. See **http://cmap.is/1cAiAGE**.

Northwestern Connecticut Council of Governments, et al. "Model Zoning Regulations for Parking for Northwestern Connecticut," 2003. See **http://www.nwctplanning.org/ParkingStudyPhase2.pdf**.

Northwest Water Planning Alliance, "Regional Water Conservation Lawn Watering Ordinance," 2013. See **http://bit.ly/105IBZX**.

Oregon Transportation and Growth Management, "Neighborhood Street Design Guidelines: An Oregon Guide for Reducing Street Widths," 2000. See **http://www.oregon.gov/LCD/docs/publications/neighstreet.pdf**.

Oregon Transportation and Growth Management Program, "Model Development Code and User's Guide for Small Cities, 2nd Edition," 2005. See **http://www.oregon.gov/LCD/TGM/docs/modelcode05/pdf/guide.pdf**.

Park Forest, Illinois, "Sustainability Audit of Zoning and Subdivision Codes," 2011. See **http://www.cmap.illinois.gov/park-forest**.

Plainfield, Illinois, "TN Traditional Neighborhood District, Zoning Sec. 9-54." See **http://bit.ly/16mXPtV**.

Plainfield, Illinois, "CV Conservation District, Zoning Sec. 9-56." See **http://bit.ly/1aZsKom**.

Plainfield, Illinois, "Shared Parking, Zoning Sec. 9-74." See **http://bit.ly/135V77V**.

Riverside, Illinois, "Required Off Street Parking Spaces, Municipal Code 10-8-8 and 10-8-9," See **http://bit.ly/1bon8Lv**.

Saint Charles, Illinois, "Groundwater Protection, Municipal Code Chapter 13.18," See **http://bit.ly/16AiOYs**.

Swink, Floyd and Gerould Wilhelm, Plants of the Chicago Region, Bloomington: Indiana University Press. 1994.

U.S. Environmental Protection Agency, "Green Infrastructure Case Studies: Municipal Policies for Managing Stormwater with Green Infrastructure," 2010. See **http://1.usa.gov/cgrVHw**.

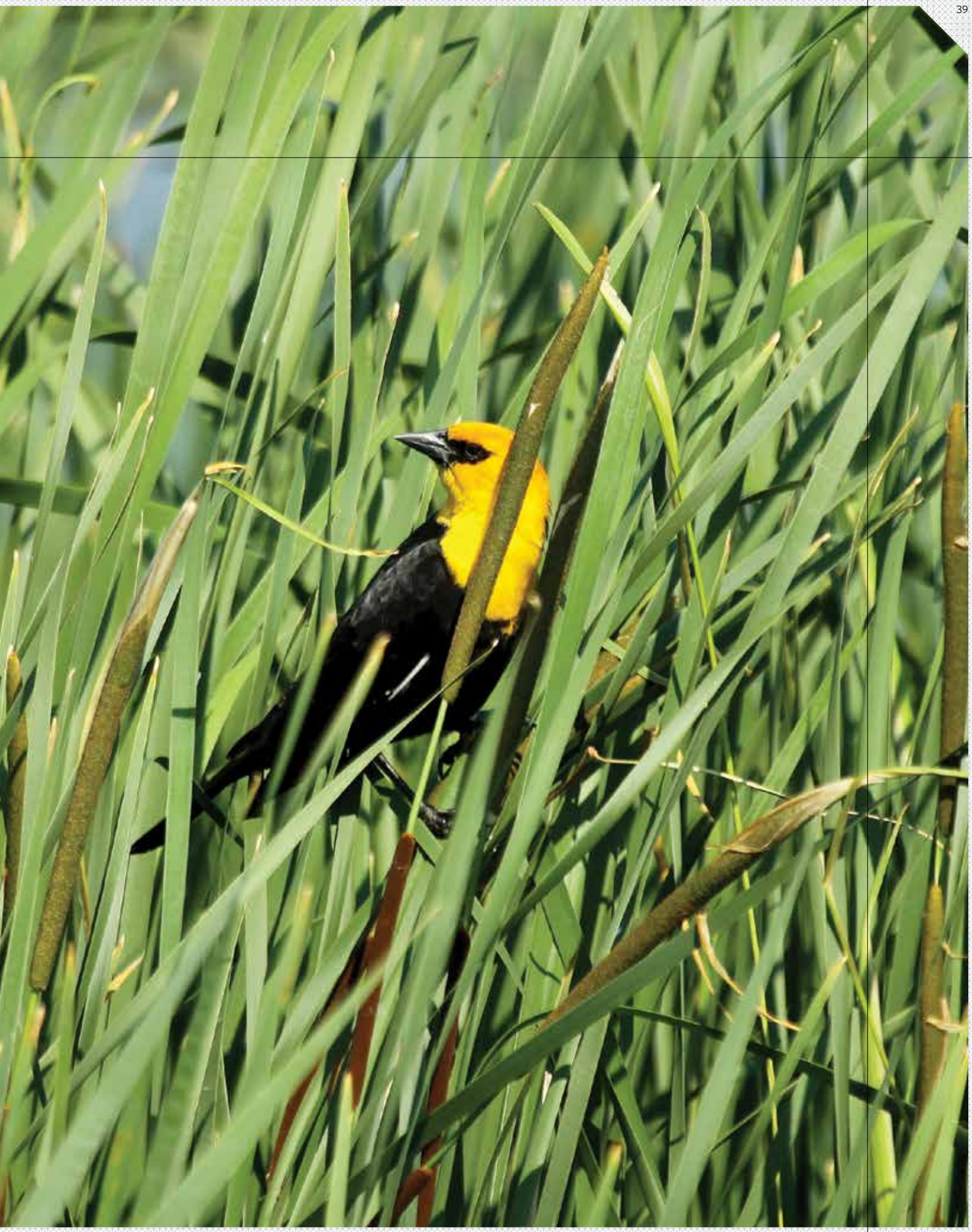
U.S. Environmental Protection Agency, "Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales," 2009. See **http://www.epa.gov/smartgrowth/water_scorecard.htm**.

U.S. Environmental Protection Agency, "Model Ordinances Language: Aquatic Buffer Model Ordinance," See **http://water.epa.gov/polwaste/nps/mol1.cfm**.

U.S. Environmental Protection Agency, "Model Ordinances Language: Ground and Surface Water Protection Overlay District," See **http://water.epa.gov/polwaste/nps/mol7.cfm**.

U.S. Environmental Protection Agency, "What is Nonpoint Source Pollution?" See **http://water.epa.gov/polwaste/nps/whatis.cfm**.

U.S. Green Building Council, "LEED for Neighborhood Development Rating system,"2011. See **http://www.usgbc.org/neighborhoods**.



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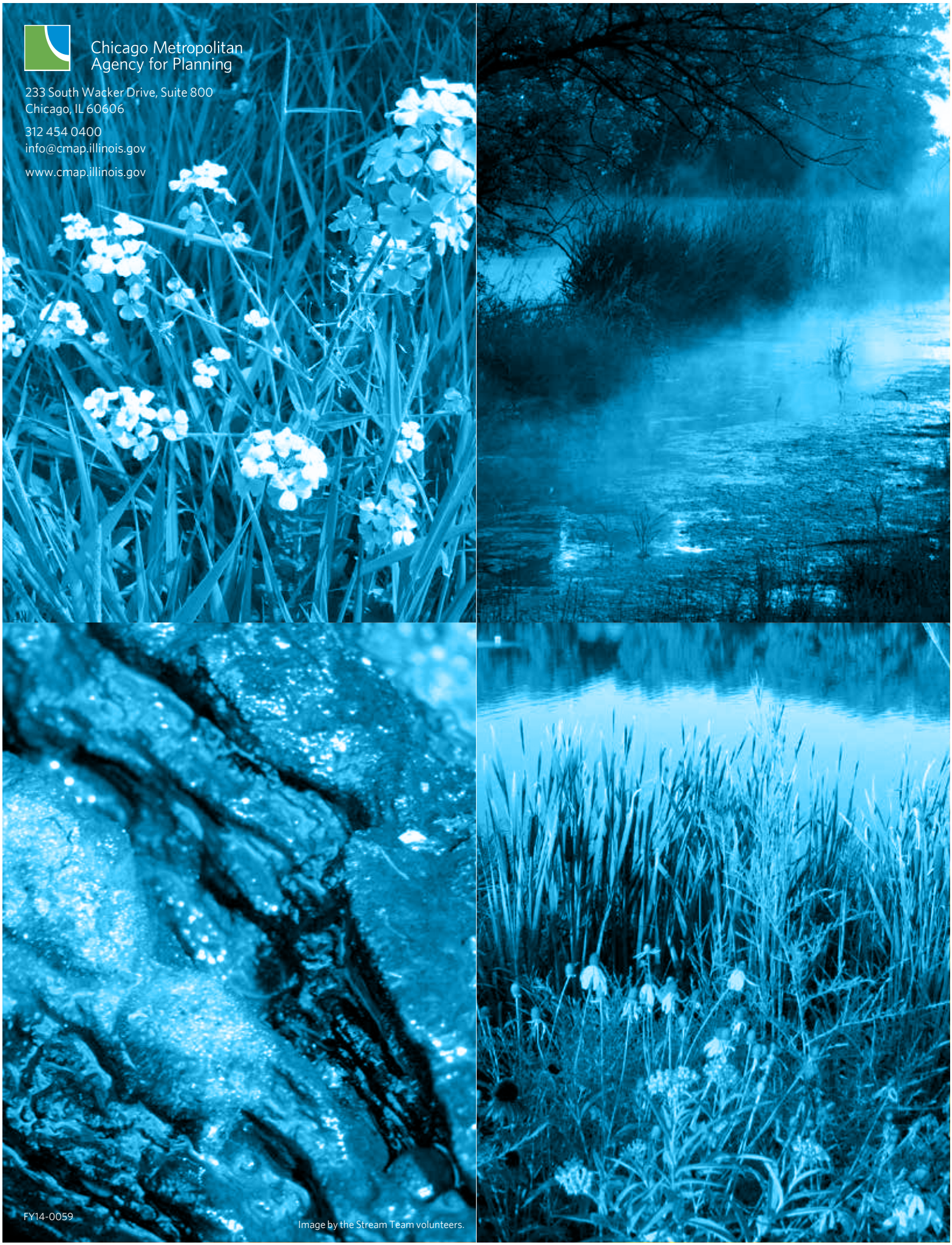

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Image by the Stream Team volunteers.