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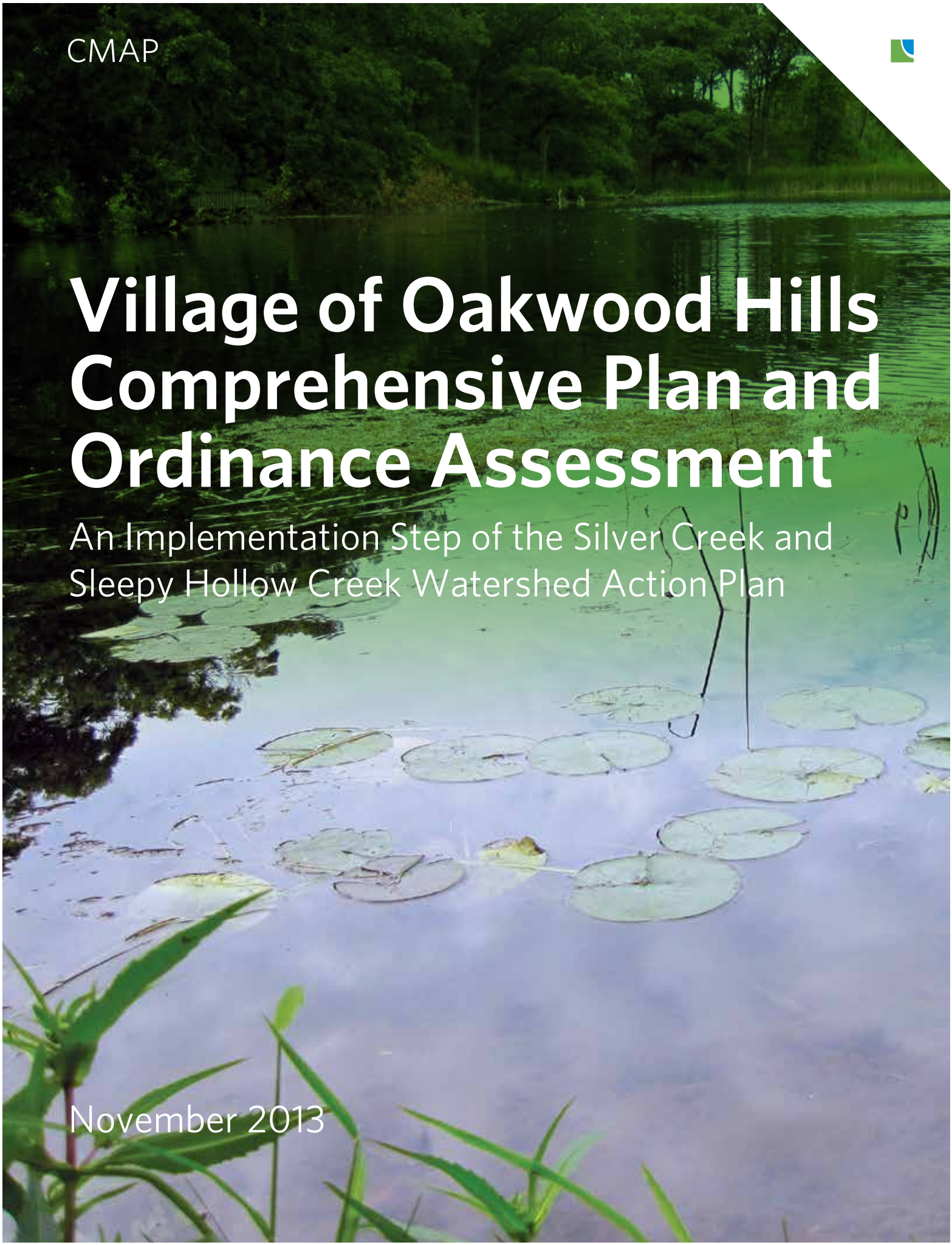

Village of Oakwood Hills Comprehensive Plan and Ordinance Assessment

An Implementation Step of the Silver Creek and Sleepy Hollow Creek Watershed Action Plan

November 2013

Acknowledgments

As an implementation step of the Silver Creek and Sleepy Hollow Creek Watershed Action Plan, the Village of Oakwood Hills Comprehensive Plan and Ordinance Assessment is the cumulative effort of many individuals to help improve the natural resources of their community. The Village of Oakwood Hills and the Chicago Metropolitan Agency for Planning would like to thank all of the people who participating in this assessment.

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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 Flickr user Bristol Pix .

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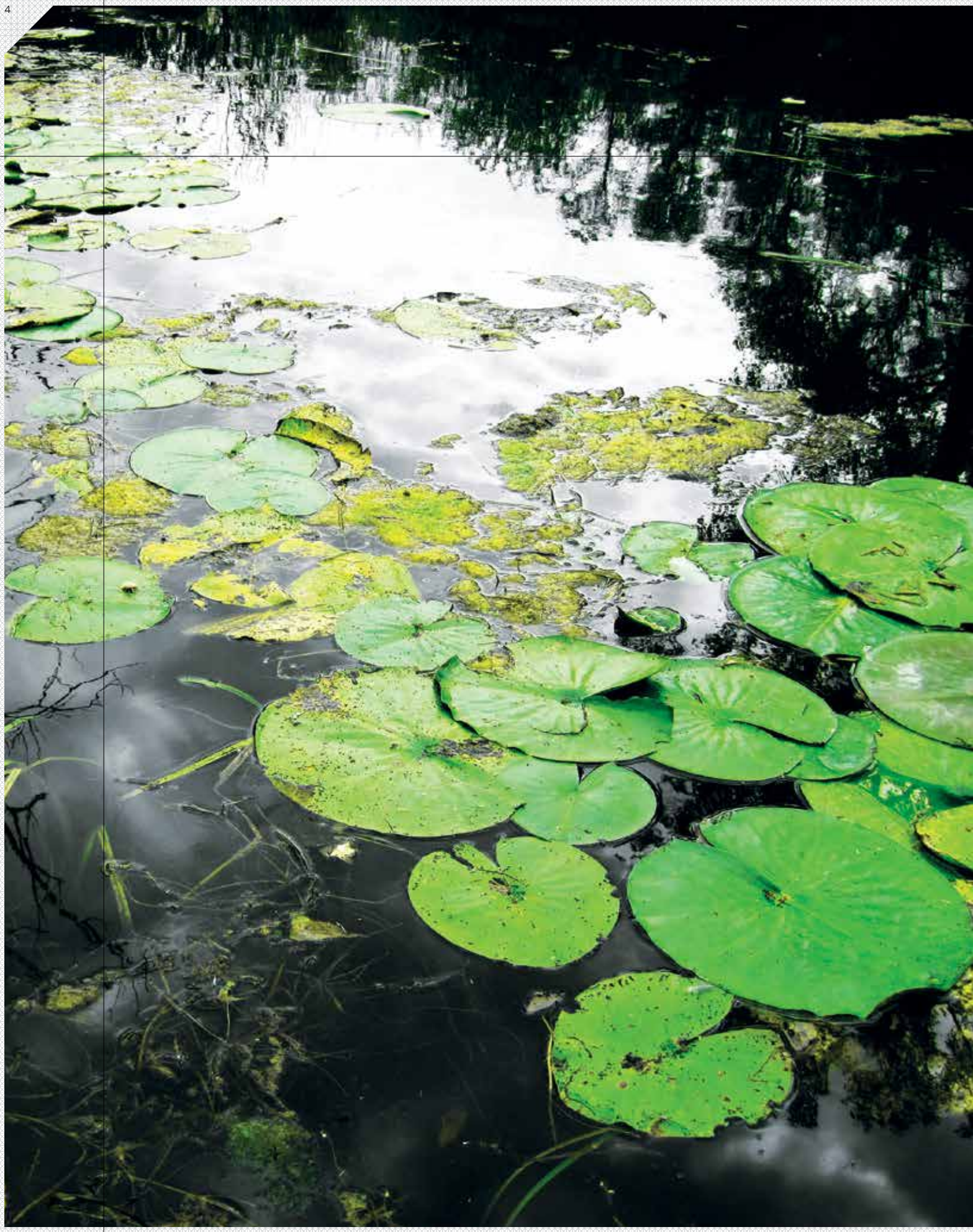

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Introduction

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 McHenry 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 Silver Creek and Sleepy Hollow Creek Watershed Action Plan was developed for two subwatersheds of the Upper Fox River Basin. The Silver Creek watershed has a drainage area of approximately 11 square miles and includes the Village of Oakwood Hills, portions of the Villages of Prairie Grove and Cary, the City of Crystal Lake, Nunda and Algonquin Townships, and unincorporated McHenry County. The Sleepy Hollow Creek watershed, with a drainage area of approximately 20 square miles, covers portions of the cities of Crystal Lake and McHenry, encompasses the majority of the Village of Prairie Grove, borders the Village of Bull Valley, and includes portions of unincorporated McHenry County. The planning process was driven by local stakeholders (including Village of Oakwood Hills and residents) with assistance from CMAP and partner agencies The Environmental Defenders of McHenry County and Fox River Ecosystem Partnership.

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

1. Maintain/achieve healthy surface waters within the adjacent watersheds of Silver Creek and Sleepy Hollow Creek.
2. Protect the quality of groundwater.
3. Protect the quantity of groundwater.
4. Restore natural areas and increase native species diversity.
5. Increase public awareness and knowledge to motivate needed action to implement the watershed plan.
6. Establish an ongoing community participation group to expand watershed planning and protection efforts and support project implementation.

The Watershed Action 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 Silver Creek and Sleepy Hollow Creek Watershed Comprehensive Plan and 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 comprehensive plan and ordinance revisions to participating municipalities located within the Silver Creek and Sleepy Hollow Creek watersheds—the Cities of Crystal Lake and McHenry and the Villages of Oakwood Hills and Prairie Grove. This report is focused on the Village of Oakwood Hills.

As identified in the Watershed Action Plan, this project recommends changes to municipal comprehensive plans, as well as 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 Silver Creek and Sleepy Hollow Creek Watersheds, as well as the Fox River.

Project process

This project included several tasks to develop comprehensive plan and ordinance recommendations for each participating municipality within the Silver Creek and Sleepy Hollow Creek watersheds.

1. **Establish a steering committee.** A steering committee composed of representatives from each municipality 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 B.
3. **Review Watershed Action Plan.** The project team used the recently completed Watershed Action 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 resource and improving watershed health provided the foundation for the recommended actions proposed in this report.
4. **Review Comprehensive Plans.** The existing comprehensive plans for each of the participating jurisdictions in the watershed were analyzed. The analysis highlights specific areas within the comprehensive plan that the municipality may wish to revise to improve watershed health and to be more consistent with the Watershed Action Plan.
5. **Review subdivision, zoning, and stormwater ordinances.** The existing subdivision, zoning, stormwater, and related ordinances for each of the participating jurisdictions in the watershed were analyzed. The analysis highlights specific areas of each municipality's ordinance that they may wish to revise to reduce development impacts to the Silver Creek and Sleepy Hollow Creek watersheds.

6. **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.
7. **Discuss recommendations with municipalities.** A workshop was held with representatives from municipalities within the Silver Creek and Sleepy Hollow Creek watersheds, as well as McHenry County, to discuss and review the reasoning behind key recommendations.
8. **Create final report.** Recommended changes to the comprehensive plan and subdivision, zoning, landscaping, stormwater, and related ordinances were compiled into individual reports for each municipality.

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 Silver Creek and Sleepy Hollow Creek Watershed Comprehensive Plan and 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 Village of Oakwood Hills. Section 2 identifies areas for improvement within the Village's 2009 Comprehensive Plan and Development Policies. Section 3 reviews the existing development-related ordinances and identifies recommended alternatives. Section 4 identifies priority steps the Village should take within the next year to implement the recommendations in this report.

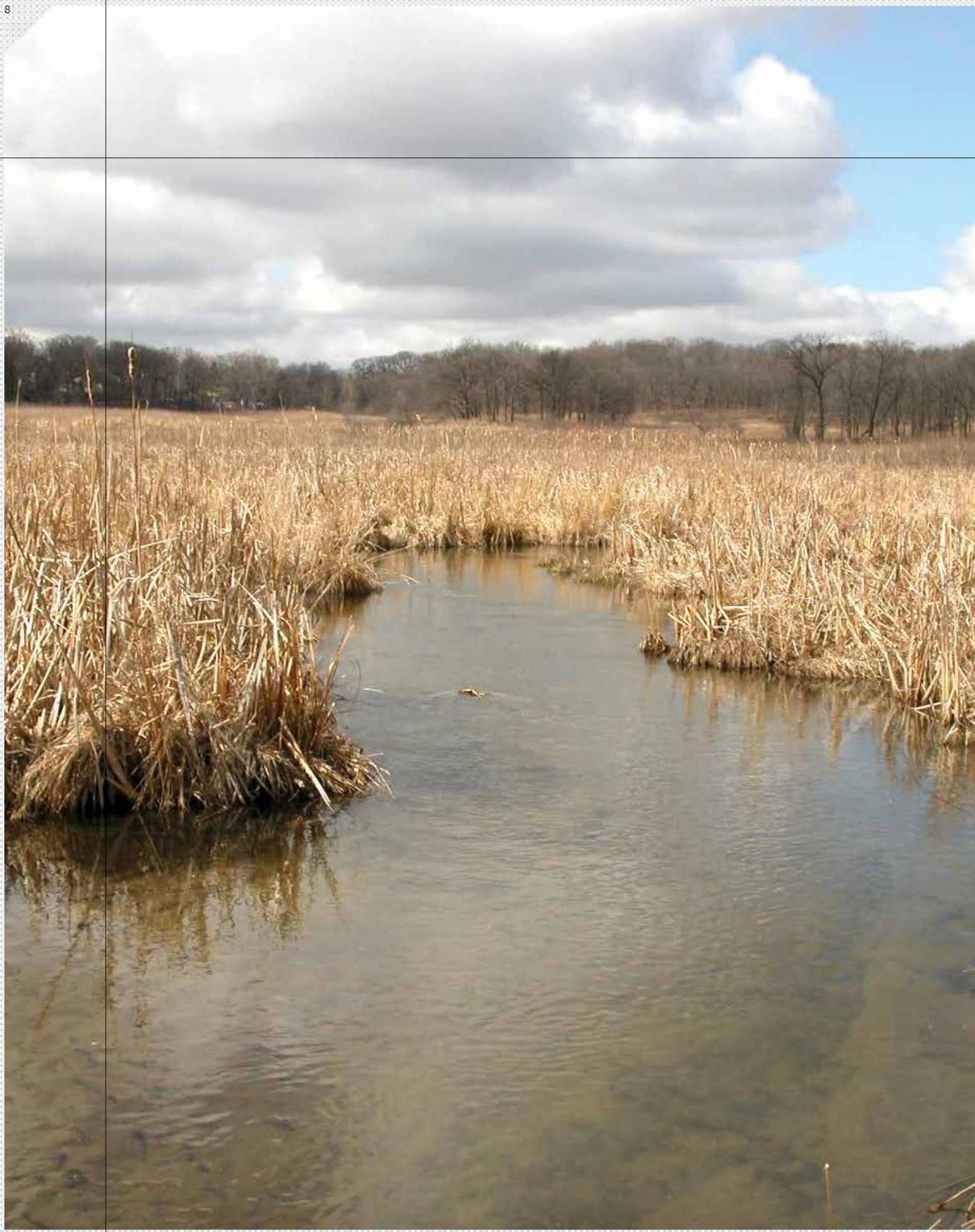


Image courtesy of the Stream Team volunteers.

Comprehensive Plan Assessment

In 2009, the Village of Oakwood Hills made updates to its 1993 Comprehensive Plan. Using the U.S. Environmental Protection Agency's Water Quality Scorecard and the Watershed Action Plan as a starting point, the Oakwood Hills Comprehensive Plan was analyzed to see how it addresses a number of natural resources, water resources, open space, trees, development type and location, transportation, and parking indicators. See Appendix A for the checklist. This section of the report identifies areas for improving the Comprehensive Plan to be better aligned with watershed plan goals.

The Plan provides a review of the soils, existing land uses, transportation, and services within the community. The goals of the Plan are sporadically embedded within the discussion of the existing conditions; the Plan should be updated to more clearly articulate the community's goals and objectives. A Comprehensive Plan should provide a vision and policy framework to guide decision-making for the community. It is intended to play a pivotal role in shaping the future of the village. The Plan can guide annual work programs and budgets, development approvals, capital investments, economic incentives, and private development decisions.

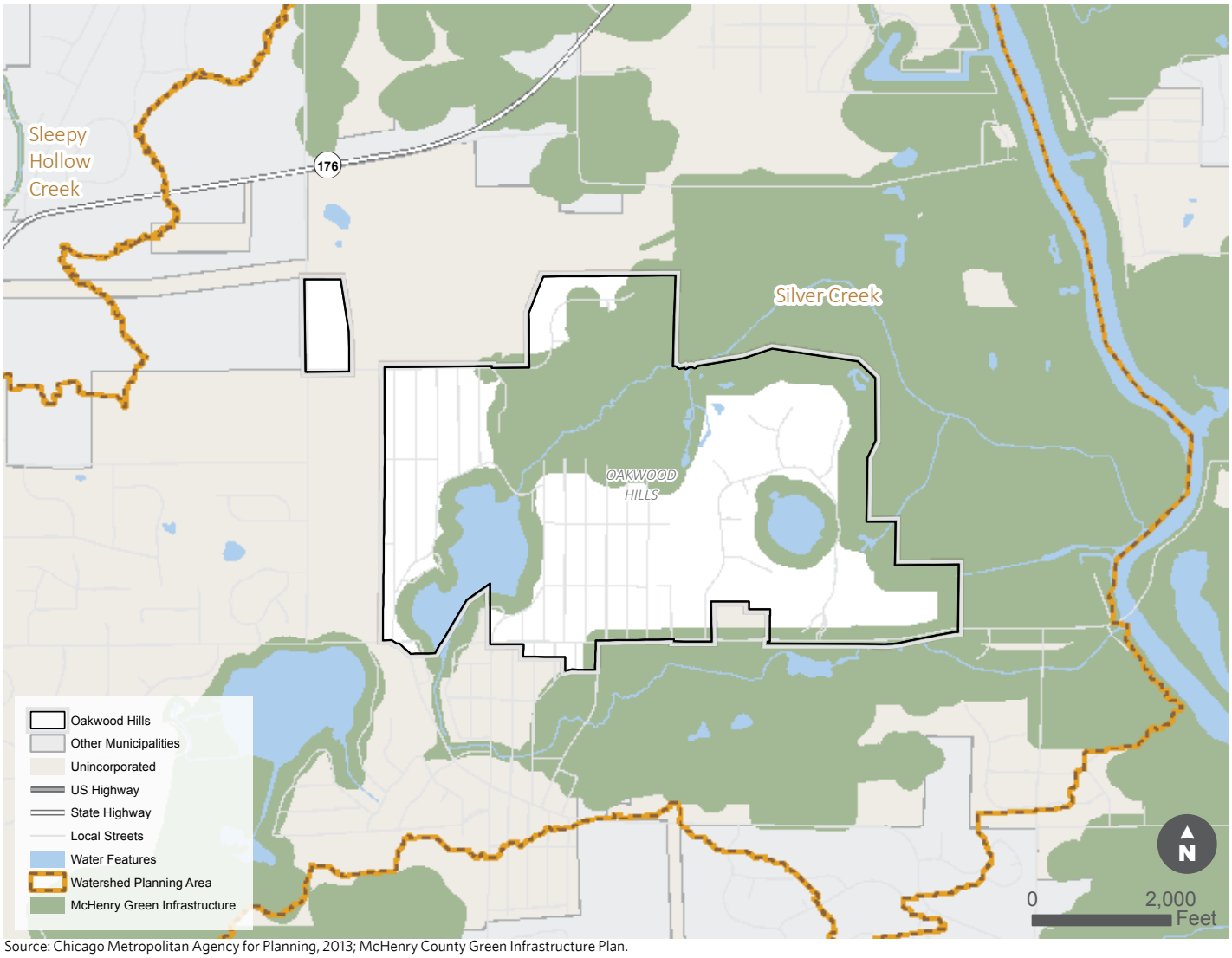
Restructuring the Plan to outline the goals and associated strategies for achieving those goals is a high priority and will provide the policy framework for the recommended zoning, subdivision, and related ordinance updates included within this report. As the community starts the planning process, the Village should go through an existing conditions analysis to assess their existing land uses, resident population, housing stock, economic conditions, transportation system, natural resources, infrastructure, and community services. By establishing an overview of the current conditions, the Village can provide a starting point for the community to create a shared vision.

Given the attention the current Plan pays to soil conditions and their septic system suitability, parks and open spaces, and nature preserves maintained by the McHenry County Conservation District, an implied goal of this Plan is to preserve and enhance natural resources. While the Plan implicitly recognizes the value of natural resources, it can be improved to further protect water quality and reduce negative development impacts. Additional information about streams, wetlands, floodplains, groundwater recharge areas as well as prairies, grasslands, savannas, woodlands, and oak groves should also be included to help inform the future land use plan. McHenry County has created a Green Infrastructure Plan that identified and mapped the valuable natural resources of the County; the Village should work with the County to utilize these resources. In addition, the Village should incorporate the findings of the Silver Creek and Sleepy Hollow Creek Watershed Action Plan and the Nunda Township Open Space Plan.

The Plan also identifies potential sites for future McHenry County Conservation District acquisitions and recognizes that these land purchases would preserve sensitive areas and serve as linkages between already protected properties. The Plan should elevate this idea to a goal of preserving expanding, and connecting environmental corridors to maintain wildlife diversity, protect wetlands, floodplains, the fen, woodlands, and other environmental features.

With more information in hand about what natural areas to preserve, the community can then work on limiting the impacts of sites that are developed. The Village should consider conservation design principles, which clusters development to preserve open spaces and can also incorporate the use of native landscaping, natural stormwater management, and other sustainable design techniques. As a separate zoning district or an overlay district, conservation design should be targeted for those areas identified as containing important natural resources.

Figure 1. Green infrastructure in the Village of Oakwood Hills



Source: Chicago Metropolitan Agency for Planning, 2013; McHenry County Green Infrastructure Plan.

The Plan recognizes that the Oakwood Hills community is primarily composed of single-family residential land uses and parks and that this land use composition is not likely to change much in the coming years. The Plan states that commercial and industrial development potential is limited, but if development happens, it should be located in central areas with convenient access to the street network. The Plan goes on to identify Valley View Road and Terra Cotta Avenue as potential locations, which are currently home to the larger agricultural lands within the planning area. The Plan states that remaining agricultural lands are expected to gradually change to other uses. The community should promote efficient, compact development patterns and infill wherever possible to preserve open spaces and agricultural lands. While the opportunity for infill – development on previously developed sites – may be limited within the community, developing new residential, commercial, and industrial land uses on contiguous parcels can help to preserve the large open spaces that give the community its more rural character.

The Plan pays close attention to septic suitability and encourages low-density residential land uses based on soil conditions. Prospective subdivisions are zoned with one acre lots or larger. The Village should keep in mind that national and regional housing studies show both demographic and preference shifts that highlight the need for more compact housing types to meet demand. By 2030, the nation is expected to have an oversupply of low-density housing which could lead to a significant devaluation of this housing type.[2] Given the limitations with septic suitability, the Village should explore alternative or shared systems for wastewater treatment. Using shared systems within conservation developments will allow homes to be built in a more compact manner. In the coming years, the preserved natural areas and open spaces will likely become a highly valued amenity and will distinguish these developments from conventional subdivisions.

Transit and automobiles are recognized as the primary modes of travel in the Village. The Plan should also include walking and cycling, which can reduce vehicle miles traveled and lower household transportation costs. Improving the infrastructure for walking and biking can allow residents to use these modes for shorter trips. Enhancing walking and cycling connections to the available Metra commuter rail stations should be an objective of the Plan. The Plan should call for pedestrian access and circulation to be fully integrated into the design of streets and major land development. The Village should consider adopting walkability standards for new subdivisions and identifying opportunities to improve the walkability of existing neighborhoods. The Plan should call for sidewalks and bike trails to be installed as road improvements are made. It should also emphasize both the environmental and safety benefits of a compact and connected street network, which allows for safer travel on narrower street widths.

The Plan should also promote the use of green infrastructure practices in new development, capital improvements, and parks. Naturalized stormwater infiltration and conveyance systems should be encouraged throughout the Village. New subdivisions should use swales and rain gardens as part of the stormwater management system along streets instead of conventional curb and gutters. Driveways also create a significant portion of impervious surface on individual parcels; the Village should encourage reduced widths and lengths, shared driveway designs, alleys, and permeable surfaces. The Plan should include a goal that encourages runoff prevention and supports permeable pavements, biofiltration, rain gardens, and native landscaping as a way to reduce runoff, increase infiltration, minimize pollution, and improve water quality.

The Plan should be updated to include a discussion of parking. Not only does the amount and availability of parking have a large influence on how residents make travel decisions, it dictates how much land is required for a given development, contributes to stormwater impacts, and influences neighborhood vitality. The discussion should outline goals and objectives for reducing the amount of land devoted to off-street parking facilities, promote use of pervious materials, and utilize practices that facilitate the infiltration and filtering of parking lot runoff.

2 Nelson, Arthur C. Reshaping Metropolitan America: Development Trends and Opportunities to 2030. 2013. Island Press: Washington D.C.

Image by the Stream Team volunteers.

Ordinance Assessment

Summary of recommendations

The following ordinances were analyzed using a checklist developed from a number of best practices:[3] Village of Oakwood Hills' Subdivision Regulations, Zoning, Building and Construction, and Municipal ordinance; and the McHenry County's Stormwater Management Ordinance as adopted by the Village. The following summary provides insight into the rationale behind the ordinance changes that are recommended in Tables 1 - 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 Village or McHenry County ordinance currently meets best practices 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

The City of McHenry has the authority to adopt, revise, and enforce provisions in each of these areas. All municipalities, including McHenry, are required to adhere to the minimum provisions of the McHenry County Stormwater Management Ordinance, which are covered in the first four topic areas: stormwater drainage and detention; soil erosion and sediment control; floodplain management; and stream and wetland protection. The City can adopt more stringent standards, and McHenry has done this to a large degree by using the NIPC model ordinances. Currently, McHenry County is conducting a comprehensive review and revision of the Stormwater Management Ordinance and one of the primary objectives of the project is to establish regulations to implement the County's Water Resources Action Plan and the Green Infrastructure Plan. 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, McHenry is encouraged to advocate for these updates to the McHenry 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. Appendix B 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 the Comprehensive Plan and development-related ordinances.

3 See Appendix B 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[4] 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. Below grade stormwater storage, such as in aggregate layers beneath permeable paving systems and rain gardens, also should be allowed as temporary detention mechanisms.

Ideally, stormwater runoff from new development 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 Village of Oakwood Hills uses the McHenry 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. Table 1 highlights potential amendments to the adopted County ordinance, which could be addressed during the County's revision process. The Village of Oakwood Hills could consider Village amendments to the updated County Ordinance if some of these items remain unaddressed. Table 1 also identifies areas of the Village's subdivision ordinance that should be updated to allow for and encourage the use of natural drainage practices and detention. 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 Village to refer to when action is required. Performance standards should identify proposed methods for establishing the areas 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; Oakwood Hills should look to include these practices in upcoming municipal projects.

4 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.

5 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.

Soil erosion and sediment control

Development and construction can result in excessive quantities of soil eroding from a site, which can clog ditches and pollute and impair rivers, streams, lakes, and wetlands. The Village uses the McHenry 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 Oakwood Hills is encouraged to make these changes as Village 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. A second recommendation is to update the main purpose of this section to include a comprehensive list of principles. The NIPC Model Soil Erosion and Sediment Control Ordinance provides 12 general principles that establish how development should fit within the topography and soils of the site.

A third recommendation is 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.

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 Village follows the McHenry County Stormwater Management Ordinance which has provisions for floodplain management. 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 Village's ordinance allows a number of modifications in the floodway[5] that we recommend removing due to 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, roadways and parking lots. Based on the NIPC Model Floodplain Ordinance, it is recommended that the Village 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, wastewater treatment plants within the floodplain are not advised because historically they have been severely damaged by floods and disrupted plant operations have resulted in degraded water quality and increased flood damages.

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 ordinance already outlines a number of standards a project must meet if the proposed activity involves channel modification. The ordinance should be updated to 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.

Stream and wetland protection

The Village uses the McHenry 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 ordinance. Alternatively, the Village could adopt a separate overlay district for these resources and use the NIPC Model Stream and Wetland Protection Ordinance as a template.

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. It is recommended that the Village 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, can allow for site designs that can more easily accommodate stream and wetland protection objectives due to more flexible site layout and design requirements.

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 Village of Oakwood Hills Subdivision and Zoning Ordinances identify natural features and includes some mechanisms to set aside and then maintain open space. The recommendations outlined in Table 5 are focused on three main strategies: expanding the definition of natural resources to reflect the existing assets of the Village, providing guidelines for setting aside open space, and then maintaining natural areas, natural features, common open space, buffers, and naturalized stormwater facilities in perpetuity.

The Village's Subdivision Ordinance does not explicitly call for the protection of natural resources, though it does state that streets shall be designed in relation to topographic conditions and natural terrain features. The Village should update the main purpose of this ordinance to call for every subdivision to preserve to the fullest extent possible the natural resources of the site, including but not limited to wetlands, lakes, streams, riparian buffers, floodplains, and steep slopes. With the creation of the McHenry County Green Infrastructure Plan, valuable prairies, grasslands, savannas, woodlands, and oak groves have been identified and can be incorporated into the subdivision ordinance as important features to protect.

Oakwood Hills should develop a conservation design overlay district and use the McHenry County Subdivision Ordinance on Conservation Design or the City of Crystal Lake's Conservation District Ordinance as models. As a fully operational conservation design overlay district, the Village can then zone this district for areas where natural resources exist as identified through the McHenry County Green Infrastructure Plan.

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, 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 Village. At the time of plan approval, the Village 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 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 Village should work to encourage infill development where possible; this is an important technique for improving environmental health.

Where infill development is not possible, greater flexibility within the Village'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 newly established conservation design district or overlay should be zoned for areas with green infrastructure and 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.

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

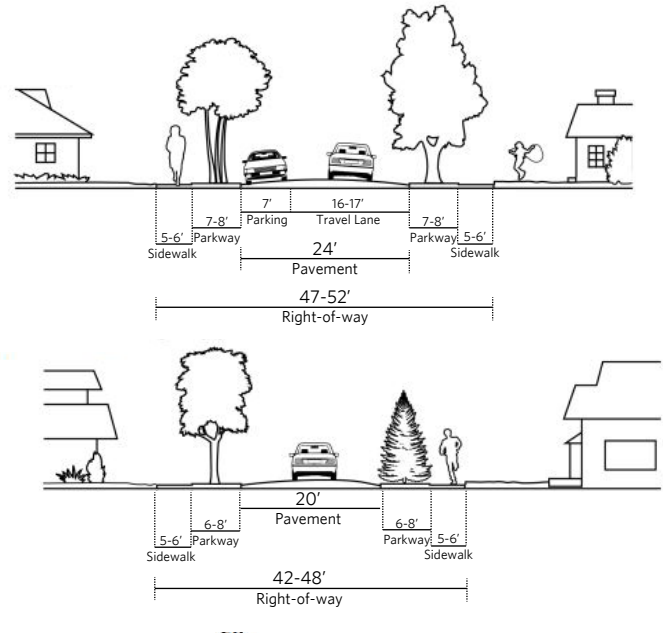
Natural landscaping can greatly benefit the preservation of water quality and natural hydrology. Native landscaping requires little or no chemical pesticides or fertilizers, common pollutants impacting streams and water bodies in watersheds. In addition, the type of landscaping can influence the amount 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 Village's Zoning, Subdivision, and Trees, Shrubs, and Noxious Growths ordinances. The Village should be commended for exempting native plantings from its "weed" prohibition ordinance. Oakwood Hills should continue to encourage and/or require native landscaping where appropriate, in common area in lieu of conventional turf grass landscapes, see Table 7. It also can be targeted specifically to stormwater management measures applications, such as biofiltration swales, rain gardens, filter strips, and naturalized detention basins.

The Village should update their landscaping ordinance to adequately protect trees during the development process. Recommended improvements include distinguishing native and desirable tree species from undesirable tree species for protection; requiring tree surveys on all properties during the development process; adding additional protective measures; providing flexibility to allow the removal of trees where appropriate for proper forest and natural area management; and advancing the replacement criteria for the unavoidable removal of desirable species. The Village should redefine the tree preservation area as the Critical Root Zone (CRZ) for each tree preserved. The Village should also consider requiring the identification and protection of trees that are outside of the property line but may have their CRZ extending into the construction site. Lastly, the Village should require street trees for all new developments and subdivisions.

Transportation

Streets compose a substantial proportion of a community's impervious surfaces and are thereby a significant generator of stormwater runoff. The Village'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.

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 should also be encouraged. Instead of requiring conventional curb and gutters, new subdivisions should be allowed to use swales and rain gardens as part of the stormwater management system along streets. Since new stream crossings can cause significant stream impacts these should be minimized wherever possible and then designed to reduce harmful impacts.

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 creating a purpose statement for the parking requirements section of the Plan, encouraging more 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 maintenance, and need not be limited to overflow parking areas. Driveways also create a significant portion of impervious surface on individual parcels; recommendations encourage reduced widths and lengths, shared driveway designs, and permeable surfaces.

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

Water efficiency and conservation

Groundwater withdrawals can negatively impact wetlands, streams, and lakes, as well as lead to shortages in drinking water. While the techniques outlined above can help reduce impervious surfaces and promote natural groundwater recharge, additional measures are needed to reduce the quantity of groundwater withdrawn for every day uses. With growing concerns about groundwater shortages for portions of southeastern McHenry County by 2030, water efficiency and conservation measures are recommended for sections of the Village's Building, Subdivision, and Water and Sewers ordinances, 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. 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 McHenry 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. 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 a groundwater-dependent community that appreciates clean surface waters, the Village can take additional measures to protect its 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 proper disposal of pet waste can all help protect surface water quality. For groundwater protection, the Village should also consider such measures as adopting a groundwater protection ordinance, establishing a wellhead protection program, encouraging demand-initiated water softeners, and promoting sensible and eco-friendly salting practices. Conservation design can be designated for groundwater recharge areas to help balance the protection of this resource with new development. McHenry County's model groundwater protection program has a number of resources the Village could use, including establishing regulations for activities within groundwater protection 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 Village of Oakwood Hills. 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.

Image by the Chicago Metropolitan Agency for Planning.

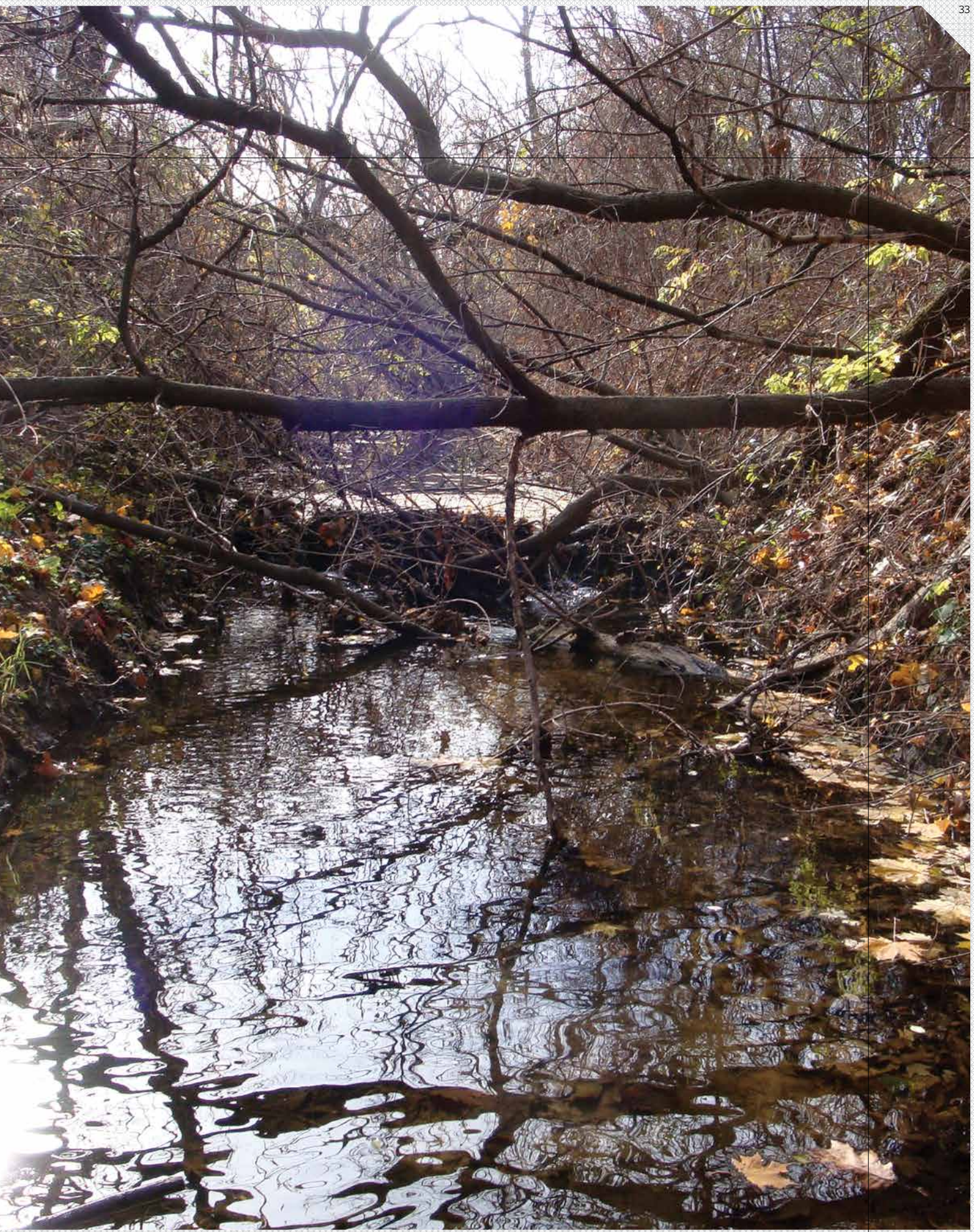


Image by the Stream Team volunteers.

Image by the Stream Team volunteers.

Implementation Steps

This report identifies a number of recommendations to help better align the Village's Comprehensive Plan and development-related ordinances with watershed protection. Updating the Village's Comprehensive Plan can set the stage for more specific ordinance changes in the future. While all of the recommendations within this report merit consideration, there are a number of key steps the Village can prioritize to implement the recommendations in this report within the next year:

1. Update the Village's Comprehensive Plan to include a more comprehensive list of goals and strategies for achieving the community's vision. The future land use plan should incorporate the McHenry County Green Infrastructure Map.
2. Create a new Conservation Design Overlay District using McHenry County's Conservation Design ordinance as a model and zone areas of the Village using the Green Infrastructure Map as a foundation.
3. Advocate for amendments to the McHenry County Stormwater Management Ordinance and/or consider Village amendments 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.
4. Adopt water efficiency and conservation measures to ensure that new development and significant redevelopment uses water efficient plumbing fixtures and appliances and advances landscape irrigation practices to minimize water loss.

Appendix A: Comprehensive Plan Checklist

	CHECKLIST QUESTION	YES/NO	NOTES	PAGE
	NATURAL AND WATER RESOURCES			
1	**Identify and map critical natural and water resource areas?**	**N**	**Plan does not include a future land use map. Instead, the Plan provides a table describing natural resource areas within the Village. The table does not include wetlands, floodplains, groundwater recharge areas, waterbodies, etc. A natural fen is identified however, this feature and other critical water resource features are not mapped.**	**3, 4, 8**
2	**Contain a natural resource protection element with goals calling for preservation of identified critical natural resource areas?**	**N**	**Goals for preservation of critical natural resource areas are not identified. The Plan identifies the McHenry County Conservation District (MCCD) as a partner in preserving some key critical areas.**	**3**
3	**Contain a water quality protection element with goals calling for protection of identified water bodies and other water resource areas such as wetlands?**	**N**	**Plan calls for protection of the natural fen through cooperation with the MCCD. However, other water resources including Silver Lake are not identified. The Plan does not identify goals for water resource areas.**	**3, 4**
4	**Identify key natural resource areas for protection in jurisdiction's parks and open space plan?**	**N**	**The Plan lacks a comprehensive open space plan with mapped areas of parks and open space. It does include a description of parks and open space areas within the Village.**	**8**
5	**Identify key critical water resource areas for protection in jurisdiction's parks and open space plan?**	**N**	**The Parks and Recreation section describes a natural fen and wetland. This section does not include a map or map critical water resource areas.**	**8**
6	**Establish and enforce areas which are available for development and which lands are a priority for preservation?**	**N**	**Plan identifies areas managed by the MCCD and Illinois Nature Preserve areas. Watershed areas and woodlands not specifically identified in the Parks and Recreation Section. The Plan does not include a land use map with these areas specifically.**	**8**
7	**Outline protection measures for source water protection areas through land use controls and stewardship activities?**	**N**	**Protection of the natural fen and wetland administered by the MCCD is the Plan's primary focus for water resource protection. Other source water protection areas including Silver Lake are not identified or protected through land use controls.**	**8**
8	**Identify and map aquifer recharge/ source water areas and/or wellheads and recommend protective measures?**	**N**	**N/A**	
	OPEN SPACE			
9	**Identify adequate open space in both developed and greenfield areas of the community?**	**N**	**Describes potential sites for future MCCD acquisitions. These sites would preserve sensitive areas and serve as linkages between lands currently owned by MCCD. No additional sites identified. Plan does not include an open space map.**	**9**
10	**Contain an open space/parks element that recognizes the role of open space in sustainable stormwater management?**	**N**	**N/A**	

This checklist was developed from the U.S. Environmental Protection Agency's Water Quality Scorecard.

	CHECKLIST QUESTION	YES/NO	NOTES	PAGE
	TREES			
11	**Include tree preservation and replacement as community goals?**	**N**	**N/A**	
12	**Support the planting of street trees by all private and public development projects?**	**N**	**N/A**	
	DEVELOPMENT TYPE AND LOCATION			
13	**Direct development to previously developed areas?**	**N**	**N/A**	
14	**Identify potential brownfield and greyfield sites and support their redevelopment?**	**N**	**N/A**	
15	**Direct growth to areas with existing infrastructure, such as sewer, water, and roads?**	**N**	**Plan states the unavailability of public utility services, including water and sewage, limits development opportunities.**	**6**
16	**Are mixed-use and transit-oriented developments allowed or encouraged?**	**Y**	**A balanced land use pattern encouraged including mixed uses. Transit oriented developments not specifically mentioned. However, the Plan calls for development of commercial facilities near collector streets which provide access to the network of surrounding major streets.**	**7**
17	**Identify appropriate areas for higher-density mixed-use developments (e.g., at transit stops) and recommend policies to encourage their development?**	**Y**	**Plan states logic would dictate that mixed use developments will have a central location with access to a street network including Crystal Lake Avenue, Valley View Road, and Terra Cotta Avenue with connections to Silver Lake Road. No policies recommended to encourage development.**	**7**

	CHECKLIST QUESTION	YES/NO	NOTES	PAGE
	TRANSPORTATION AND PARKING			
18	**Emphasize alternative modes of transportation (walking, biking, and transit) to reduce vehicle miles traveled and width and prominence of roads/streets?**	**N**	**Plan identifies bus service and train service as alternative modes of transportation. Emphasis is not placed on reducing vehicle miles traveled. Silent on walking and biking.**	**5**
19	**Call for distributing traffic across several parallel streets, reducing the need for high capacity streets with wide rights-of-way?**	**N**	**N/A**	
20	**Include or recommend the creation of a formal bicycle/pedestrian master plan?**	**N**	**N/A**	
21	**Recommend supporting "safe routes to school" programs or other pedestrian/bike safety initiatives?**	**N**	**N/A**	
22	**Recommend improvements to walking/ biking conditions**	**N**	**N/A**	
23	**Promote green infrastructure practices in street design?**	**N**	**N/A**	
24	**Recognize the advantages to reduced parking requirements generally and specifically for mixed-use and transit-oriented developments?**	**N**	**N/A**	
25	**Recommend alternative, flexible approaches to meeting parking demands?**	**N**	**N/A**	
26	**Recommend provision of bicycle parking spaces and reduction in vehicle parking spaces?**	**N**	**N/A**	
27	**Recognize transportation demand management as an approach to reducing vehicle miles traveled and parking requirements?**	**N**	**N/A**	
28	**Call for landscaping in parking lots to help reduce stormwater runoff?**	**N**	**N/A**	

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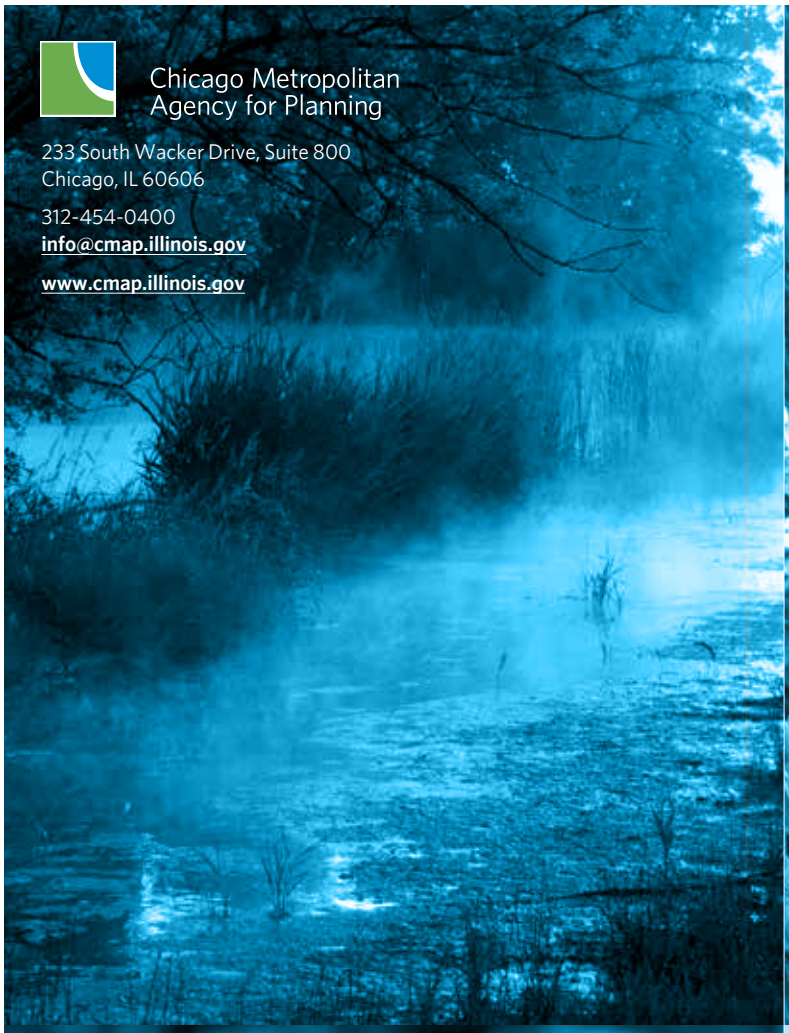

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