

BMPs TO CONSERVE WOODED AREAS AT THE SUBDIVISION LEVEL

Audience

This section is primarily directed toward:

- local units of government,
- landowners and developers,
- builders and utility companies, and
- community and citizen organizations.

Overview

The development of a subdivision is always affected by state and federal laws, local comprehensive plans and regulations, zoning and subdivision ordinances, codes and policies, and housing market demand. All people involved in subdivision development should recognize the need and reasons to protect wooded areas and other natural areas, while complying with regulations. City planners, landowners, developers, and builders play a major role in subdivision development by planning and creating development plans in conformance with municipal, township, and county zoning and subdivision ordinances and by overseeing development. However, landowners, developers, builders, local units of government, and homeowners may have different agendas (Figure 10, page 32).

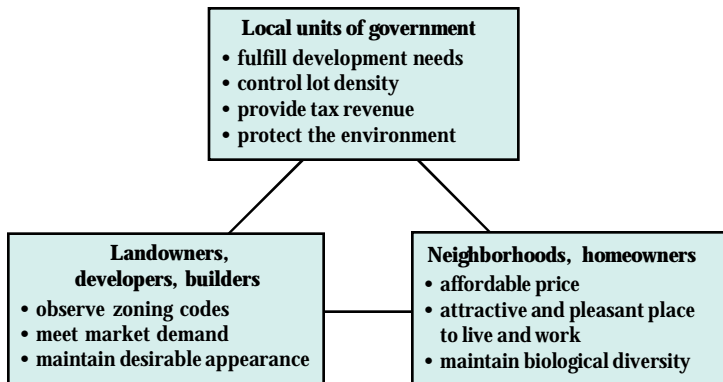


Figure 10. People involved in subdivision development may have different priorities.

Recommended practices

Protecting wooded areas and other plant communities must begin with a plan. “A planning process begins when the decision to develop the land is made and finishes when the completed development is occupied” (Watson and Neely, 1995).

■ **Define goals**

Defining goals is the first step to consider in land development. The goals should include:

- conservation of green corridors,
- conservation of wooded areas as natural open space or conservancy area, and
- protection of individual trees.

■ **Inventory and assess resource**

Resource inventory and assessment is an important step in protecting wooded areas and meeting the goals. The objective is to create a comprehensive resource map for the subdivision. This map will be the main document to use when making decisions.

A resource inventory and assessment for a subdivision can be achieved in three steps:

- evaluate existing resource information,
- conduct site review and survey trees, and
- create a comprehensive resource map for the subdivision.

◆ **Evaluate existing resource information**

A number of local and regional units of government collect information on the status of natural resources. This information is useful in planning at the subdivision level. Landowners and developers may take advantage of this information including topographic maps, aerial photography, and information on watersheds, wetlands, historic land uses, proposed greenways, soils, septic system suitability, areas occupied by rare plant and animal species, conservation easements, and protected wooded areas (see Appendix 1, page 91). Local zoning and tree preservation ordinances may also provide some information and guidelines.

◆ Conduct site review and survey trees

A site review and tree survey are the physical examination of the resources within the subdivision and adjacent land. They include:

- identification and location of wooded areas and other natural resources, and
- delineation of potential wooded areas to protect.

A site review and tree survey must be performed by a natural resource professional such as a forester, arborist, or landscape architect.

*** Obtain aerial photography**

Aerial photography can provide fast knowledge of existing resources and adjacent areas. Agencies that provide aerial photography (prints or services) include the Metropolitan Council, U.S. Geological Survey, or DNR (see Appendix 1, page 91).

*** Identify and locate wooded areas and other land types**

After identifying wooded areas using aerial photography, it is necessary to physically locate the wooded areas, measure them, profile trees by species and size distribution, determine cover types, and draw cover-type boundaries on the subdivision map using an appropriate scale. For definitions of specific cover

types use references such as Tester, J., 1995; Wovcha, D. S., B. C. Delaney, and G. E. Nordquist, 1995; Minnesota Department of Natural Resources, 1993.

Sampling techniques can be used to profile trees on wooded areas larger than 10 acres and a complete inventory of trees on wooded areas of less than 10 acres. When profiling trees, highlight wooded areas and trees with historical, cultural, or biological significance. Identify wooded areas that have been located or designated for protection by units of government, landowners, and/or community organizations, and record them on the subdivision map. Pay particular attention to younger stands of trees and trees that are suited to the site condition. Contact the Minnesota DNR's Division of Fish and Wildlife, Section of Ecological Services (County Biological Survey) to obtain information on the status and distribution of flora, fauna, and natural communities, and the State Historic Preservation Office to obtain other information.

Other land types, including wetlands, farmlands, and land classified as potential natural areas for rare plant and animal species, should be located, identified, and recorded on the comprehensive resource map.

*** Delineate potential wooded areas to protect**

The initial evaluation of natural resources should note areas of priority for protection and conservation. These areas may include:

- wooded areas protected or identified by local, state, and federal laws; policies and/or regulations, such as wetlands, and designated greenways and natural areas,
- wooded flood plains, wooded stream corridors, steep wooded slopes, and buffer zones. These areas have important ecological functions for water quality and wildlife habitat, and
- remnant tracts of wooded areas at least one acre in size with healthy trees.

Remnant tracts of wooded areas may have aesthetic values and provide recreation for surrounding neighborhoods. They may offer ecological benefits, including carbon sequestration; screening and privacy; wildlife attraction for resting, nesting, feeding, and breeding; and energy conservation and protection against drifting snow. All of these functions may have direct impact on property values and quality of life.

A site review and tree survey may have significant financial cost. The DNR provides a number of financial assistance programs to organizations and individuals to do resource inventory and assessment and to reach their conservation and natural resource stewardship goals. Landowners and developers may be able to receive assistance for some types of projects. A directory of financial assistance is available to identify existing financial assistance programs administered by the DNR (see Appendix 2, page 97).

◆ **Create a comprehensive resource map
of the subdivision**

The ultimate purpose of the resource assessment and inventory is to create a comprehensive resource map for the subdivision. This map constitutes the basic tool from which to make all decisions related to the development, including the type of the development design, location of permanent structures (buildings, roads, and utilities), and location of temporary facilities such as offices, parking lots, equipment maintenance space, and rights of way. Record on the map pertinent information including location of wooded areas and trees by outlining their canopy or tree line, wetlands and other type of land cover, planned unit development (roads and buildings), and preserved areas. A development map from North Oaks is a good example of a subdivision resource map (Figure 11, page 38). Another example from Robert Engstrom Companies shows a series of five comprehensive steps or maps to develop the final development plan for a subdivision. The steps or maps include site analysis, existing vegetation/woodlands, planned unit development/housing area, first development plan, and final development plan (Appendix 4 d, page 109).



Figure 11. A comprehensive resource map of a subdivision such as this example from North York shows location of wooded areas, individual trees, water bodies, proposed developable sites, and indicates conservation areas.

■ **Create a wooded area protection plan**

Develop a protection plan for wooded areas based on information provided on the subdivision comprehensive resource map. The protection plan should include:

- selection and delineation of the wooded areas to be protected, and
- selection of the protection method.

A successful protection plan to conserve wooded areas in a subdivision would set aside at least 50 percent to 70 percent of the total wooded area in form of natural open space, green corridors, or conservancy area. A number of local developers and builders have achieved these goals (e.g., development plans from North Oaks and Settler Ridge). If the subdivision is not covered with wooded areas, an alternative plan, including reforestation, may be initiated. Other techniques, including tree transplanting, can be used to save trees.

◆ **Select and delineate wooded areas to protect**

To achieve a successful wooded area protection plan, consider the following steps:

* **Record location of wooded areas to be protected**

Select wooded areas to be protected based on the goals and information provided on the comprehensive resource map. Record these areas on the comprehensive resource map with a distinctive pattern.

*** Record all areas likely to be adversely impacted during construction**

Wooded areas located on potentially sensitive sites such as wetlands and steep slopes may need additional protection. Identify and mark these areas as natural amenities to the development plan.

*** Record areas that can be used for reforestation and/or restoration**

These areas may be located on natural drainage or sensitive sites.

*** Locate and delineate developable and buildable sites**

Locate areas for development to meet subdivision density requirements, road sites, and other easements (sewer, water, communication and electrical lines, septic system, storm water, etc.). It is necessary to draw a few alternative sketches of concept plans before making a final decision. Alternative concept plans (Figure 12) may include the lot size, location, and distribution; road and transportation systems; utility systems, designs, and location; and location of areas to be graded (also see Appendix 4 d, page 109).

◆ Submit the development plan for approval

When submitting the final development plan, the developer and the county, city, or township planner should review the plan together.

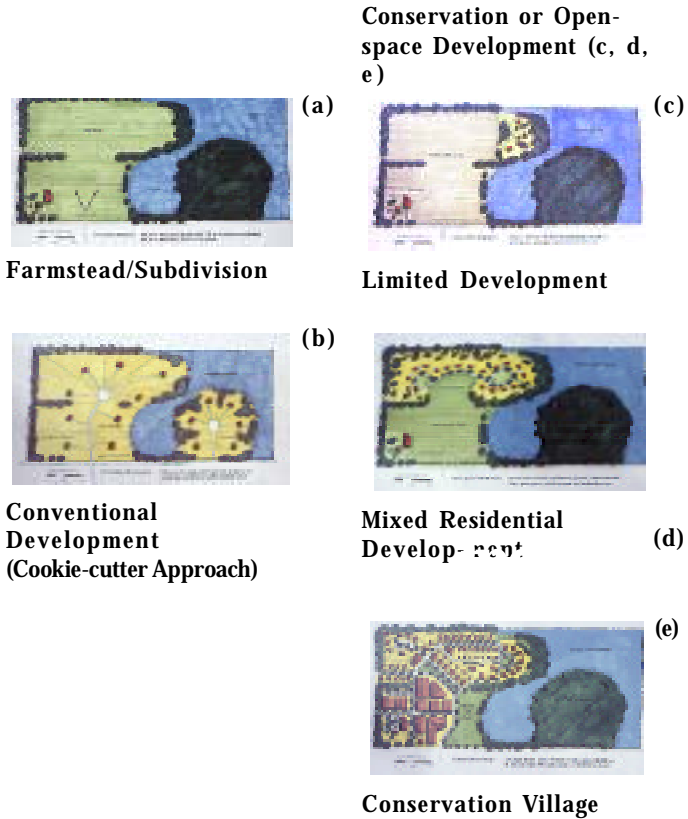


Figure 12. Drawing different alternative development plans for the subdivision provides the opportunity to look at all possible options and optimize the land use and conservation effort.

■ **Select a protection method**

Once the development plan is approved, the developer and/or builder should select the protection method that consists of several steps:

- Determine the protected root zone.
- Mark the protected root zone.
- Identify the grading area and method.
- Create the reforestation plan and method.
- Identify trees to be transplanted.

◆ **Determine the protected root zone**

The protected root zone (PRZ) is defined as optimum space needed for a group of trees or an individual tree to retain good health and vigor. The larger or wider this zone is the better for the trees' health and vigor. This zone should be protected and off limits to all construction activities, including driving and parking vehicles, storing materials, and soil excavation, to minimize site disturbance and physical damage to trees during construction. It should be determined and protected before construction begins. A number of methods including the dripline, minimum area, site occupancy, and trunk diameter methods have been developed to determine the protected root zone. These methods are described in the lot-level section of this guidebook (see page 51). Each method has

its own merit to provide adequate protection area. However, the drip line method is widely recommended and used to protect mature individual trees, groups of trees, or wooded areas. The **minimum area method** can be used to protect small mature individual trees, groups of trees, or wooded areas. The **minimum area method** can be used to protect small and young trees. On larger development sites, a **construction danger zone** up to 30 feet wide between the construction area and the protected root zone is necessary to minimize construction damage to trees (Figure13).

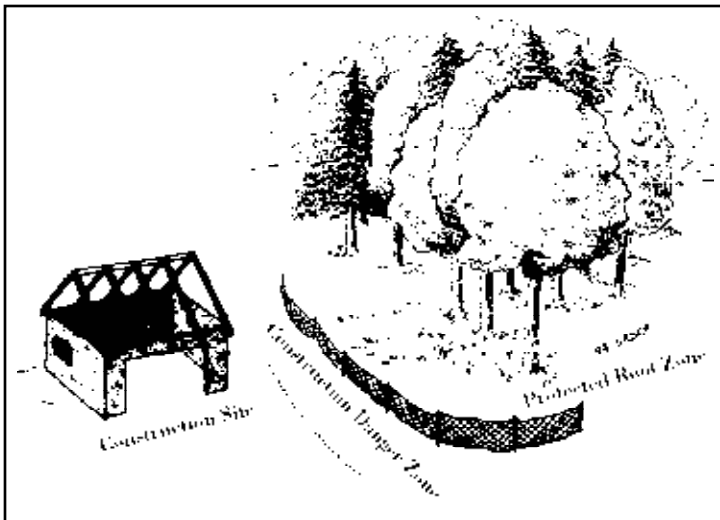


Figure 13. Determining the construction danger zone between the protective fence and the building site assists with final site and building design and selection of equipment to be used. Note that the tree protective fence is placed in front to prevent access and disturbance to the protected root zone.

◆ Mark the protected root zone

Once the protected root zone has been determined, the protection method becomes a straightforward process. It consists of marking the protected area and putting up highly visible ribbon or fencing and signs to enclose the entire area (Figure 14). This area should be off limits to all construction activities including parking vehicles, storing materials, and soil excavation.



Figure 14. Highly visible ribbon identifies protected wooded areas and trees.

If the protected areas are located on a down slope of the construction site or near wetlands, it is important to install a combination fence—a silt fence to prevent runoff and sediment, and a visual fence for enclosure (Figure 15).



Figure 15. A combination of visual fences and silt fences prevent access to the protected root zone and construction damage to trees as well as runoff.

◆ **Determine the grading area and method**

Before construction begins, evaluate the site to determine the area that needs grading and also the percentage of grading needed. When filling or cutting grades near the protected root zone, build the retaining walls before grading begins to prevent runoff into the protected root zone, stabilize the slope, and prevent soil erosion. Custom grading is recommended and encouraged because it impacts a smaller area and saves more trees than mass grading (see individual lot level, page 51).

◆ Define reforestation plan and method

On a site with few or no trees, a reforestation plan may be initiated with well-defined goals. Goals for reforestation may include the establishment of energy conservation trees, a living snow fence, a wildlife planting, windbreaks, or boulevard trees. A reforestation plan consists of selecting the most suitable tree species and planting design to meet the intended goals. Since the timing and design of the planting are important, the reforestation plan should be done by a natural resource professional.

◆ Record trees to be transplanted and the site

Some trees in the construction zone and on building sites can be transplanted to a different location. This conservation method can be cost effective and provide immediate functional and aesthetic benefits. However, tree transplanting is a highly specialized activity that needs to be done by a knowledgeable and experienced person. A number of tools is available to transplant trees. These tools may include a backhoe, tree spade, and crane. Understanding the biological limitations of each tree species to tolerate disturbance and the timing are critical for a successful transplantation. A systematic tree care program, including irrigation and fertilization, is necessary after transplanting. When possible, transplant trees two to four years before construction begins.

■ **Monitor and evaluate the conservation plan**

A successful conservation plan requires the participation and commitment of all parties involved in the development project. Before the project begins, communicate the tree conservation goals and methods to all participants, including landowners, developers, builders, contractors, and utility companies. The plan monitoring and evaluation should include education, site inspection, and financial penalties.

◆ **Educate**

Plan implementation should begin with education about the goals and tree protection measures. All people involved in the project should know about the tree protection goal and method. They should be informed about the protected root zone and the purpose of protective fences and signs. Contracts (including those with subcontractors) should explicitly state that any disturbance in the protected root zone (including human or machine activity, storage of material, and soil excavation) violates the contract and that specified penalties will be applied. A provision binding the contractor to the survival of protected trees up to five years from the date the construction was completed should be written into the contract.

◆ **Site inspection**

Monitor the program as the project proceeds. The monitoring program may include frequent visits to the site by the landowner, local unit of government, or citizen organization to check for violations of the tree protection

plan. Project managers, including the supervisor, superintendent, crew leader, or an outside consultant may be assigned this task.

◆ **Financial penalty**

The penalty may be monetary or replacement of trees. *The Minnesota Supplement to the Guide for Plant Appraisal with Regional Tree Appraisal Factors* can be used as a guide defining the financial penalty (Minnesota Society of Arboriculture, 1996).

Check list

- Define goals**
- Inventory and assess resource (subdivision scale)**
 - Evaluate existing resource information
 - Conduct site review and survey trees
 - Obtain aerial photography
 - Identify and locate wooded areas and other land types
 - Delineate potential wooded areas to protect
 - Create a comprehensive resource map of the subdivision
- Create a wooded area protection plan**
 - Select and delineate wooded areas to protect
 - Record location of wooded areas to be protected
 - Record all areas likely to be adversely impacted during construction
 - Record areas that can be used for reforestation and/or restoration
 - Locate and delineate developable and buildable sites
 - Submit the development plan for approval
- Select a protection method**
 - Determine the protected root zone
 - Mark the protected root zone
 - Determine the grading area and method
 - Define reforestation plan and method

- Record trees to be transplanted and site
- Monitor and evaluate the conservation plan**
 - Educate
 - Site inspection
 - Financial penalty