Introduction

So your plan commission has completed a current land use inventory and collected a lot of other background information. What comes next? Should the commission sit around a table with markers and start drawing a future land use map? What basis will the commission use to make recommendations for future land use? How can this be more than guesswork?

Certainly, public participation and discussions with interest groups—like neighboring communities, real estate experts, large land holders, and environmental advocates—will help.

The next step is to analyze the inventory data, public input, and the unique assets, opportunities and challenges facing your community. Information should be used from previous elements that have been drafted. Analysis is the bridge from all the background information to the recommendations and maps for the land use element. Thoughtful analysis can lead to a future land use pattern that is efficient, practical, responsive to the public, and focused on your community’s unique character. While there will always be a need for judgment in the planning process, analysis leads to informed judgment. This often leads to greater ownership, understanding, and confidence among the community, and a more understandable and defensible plan.

Included in this chapter:
- Overview of Analysis Techniques
- Description of Eleven Analysis Techniques
- Completing the Analysis
Overview of Analysis Techniques

This chapter lays out eleven different analysis techniques that may be considered to help prepare the land use element, and the entire comprehensive plan itself. Several techniques depend on bringing together data your community may have collected in other elements. The techniques described in this chapter include:

1. Regional Context Analysis
2. Community Opportunities Analysis
3. Community Visualization Techniques
4. Demographic and Economic Data Interpretation
5. Natural Resources and Soils Analysis
6. Cultural Resources Analysis
7. Utility Analysis
8. Transportation System Analysis
9. Growth Factors Analysis
10. Existing Zoning/Build-out Analysis
11. Land Use Demand Projections

Your community should consider completing a number of these techniques. They may be performed to various degrees of depth, depending on how complex your community is, what types of information are available, and how much budget, people, and time are available. Your community’s values—expressed earlier in the planning process—may point you in the direction of some techniques over others. Also, whether your community is an “urban” city, village or town or considers itself “rural” affects which techniques are appropriate.

Completing some of these land use analysis techniques will lead to a more defensible plan. It will make your future land use recommendations easier to justify to the public and to possible skeptics. Responsible analysis will also help your community in the event of a legal challenge. To serve this function, it is wise to describe the types of analysis that were completed in the land use element of the comprehensive plan. Explaining why certain land use choices were made can be as important as explaining what those choices are. These “whys” are based on thoughtful analyses combined with your community’s values expressed through the planning process.

Ultimately, it is important for community planners to take a step back from the data and input collected and ask the question: What does it mean for where we should head in the future? Completing these techniques adds meaning to the information.

Description of Eleven Analysis Techniques

The following section describes eleven land use analysis techniques. The description of each technique considers why it is important, what aspect of land use planning it is most useful for, and whether it is more applicable to an urban or rural setting (or both).

1. Regional Context Analysis

• Helps to learn how regional surroundings affect your community’s possibilities.
• Aid in planning for future land uses that complement what is taking place in the surrounding region.
• Use for all types of communities.

No community exists in a vacuum. All communities are influenced by their place in the larger region that includes and surrounds them. This regional context has a major influence on future land use possibilities. The regional context is formed by regional or
statewide natural features, economic development efforts, transportation locations and decisions, and the plans and actions of nearby communities and other agencies. At a minimum, your community should understand what neighboring communities and government agencies with some jurisdiction within your community are planning. The combined experience of your community may be all that you need to uncover and understand other aspects of the regional context.

The regional context is different for every community. See Figure 6 for an example. Each bullet below links to another element in the plan. For example:

- Projected job growth (or job loss) in one community influences the type and amount of housing pressure in a nearby community. For example, the growth of Lands’ End in Dodgeville had a significant effect on housing construction in nearby communities. The community should refer to the economic development element.

- County or state programs to preserve farms or forest lands—such as a purchase of development rights initiative or the Managed Forest Land program—may result in large areas being removed as possible future development areas. The Managed Forest Land program, for example, requires the property owner to
agree that most enrolled land will not be developed. Refer to your agricultural, natural and cultural resources element.

- A community located where three Interstate Highways join may have unique economic opportunities given traffic volumes or a potential new interchange. These might include traveler-oriented commercial development or distribution businesses.

- A community located somewhere away from this Interstate may be affected in different ways—such as pressure for new housing because of easy access to the Interstate and a nearby metropolitan area. Refer to your transportation element.

- A county may have major tourist destinations, contain unique natural areas and quaint villages, and be within a short drive of large cities—suggesting tourism and retirement community opportunities. This is what occurred in Green Lake County in central Wisconsin—located a short drive from Milwaukee, the Fox Valley, Madison, and Chicago. Refer to your economic development and natural resources elements.

- The community may have a role in a major regional initiative to expand agricultural-based technology businesses. For example, agricultural operations in a town may be able to provide raw materials to businesses in a proposed business park in a neighboring city. This opportunity makes planning for continued agricultural use in the town more realistic. Refer to your economic development and agricultural resources elements.

Analysis of your community’s regional context suggests future trends, pressures, opportunities, and constraints for different land uses in your community. Community planners should consider how the regional context can and should influence the future land use pattern and map, and what role and responsibility your community may have in the larger region. Time and budget permitting, it can be helpful to describe or map this regional context for public forums or in the comprehensive plan to provide the basis or justification for land use recommendations.

2. Community Opportunities Analysis

- Helps to decide how unique opportunities affect future land use.
- Aids in planning for enough land to take advantage of future opportunities.
- Use for all types of communities.

A community opportunities analysis can provide new insight on “big picture” ideas inspired by the community’s unique mix of assets and potentials. Your community’s economic, physical, environmental, transportation, and social attributes together provide direction for future changes in the land use pattern. The particular opportunities will vary depending on your community’s unique attributes and particular areas of interest. For instance, a community opportunities analysis may suggest opportunities for:

- Capitalizing on unique community resources, new development opportunities, or revitalization activities in a way that also enhances community character. For example, planning for the reuse of an old warehouse area next to a downtown for housing may provide both affordable housing and more foot traffic for downtown businesses.

- Improving the economic viability of a downtown, highway corridor commercial area, or rural crossroad community. For example, the introduction of a community
waste treatment system to a declining rural community with groundwater quality problems may spur additional investment.

- Promoting new directions in economic development or maximizing the advantage of existing industries that relate to new or emerging markets. For example, a county with large forested areas and related processing facilities may explore how “new uses” for forest products might lead to a need for preserved or additional land for forestry, manufacturing, and affordable housing for future workers.

- Protecting and promoting agricultural, natural and historic resources as a means to preserve community identity, better manage the environment, or promote tourism. For example, minimizing future housing density next to a world-class trout stream may help preserve water quality and the area’s remote feeling, which may in turn bring more anglers to the area.

Your community’s land use element should be designed to take advantage of these opportunities through a complementary future land use pattern and map. As suggested by the examples above, the impacts on the future land use pattern and map will differ depending on what particular opportunities your community identifies.

3. Community Visualization Techniques

- Translates easily misunderstood land use desires into easily understood pictures.
- Identify desired character (such as appearance) of future land uses.
- Use in all types of communities.

There are few effective substitutes to graphics, particularly photographs, in communicating desirable or undesirable types or traits of future land uses. Most people have an easier time sharing their ideas of the “good community” by pointing to photos of good (or bad) development than trying to share these ideas verbally or in writing. Visualization techniques to help analyze desired types and locations of future land uses include visual preference surveys and community photo exercises. At this point the community should refer back to any visioning that was done as part of the issues and opportunities element.

These photos, taken by Plan Commissioners from the Town of Bradley in northern Wisconsin, helped inform the types of future land uses they wanted to show on their future land use map.
Chapter 4 – Land Use Analysis

The visual preference survey involves rating a collection of photographs that depict different options for new development, preservation, or community change. A visual preference survey usually involves a digital presentation using “stock” photographs of different options taken from outside of the community. This exercise may be administered to community planners in a small meeting or in a large public forum. Highly rated photos are then analyzed for common characteristics (for example, preferences for pastoral landscapes, high architectural standards, traditional or contemporary neighborhood forms). These may lead to the creation of different future land use map categories to help bring about desired land use types. For example, if a visual preference survey shows a strong community desire for “traditional neighborhood” development (grid streets, small lots, short setbacks, front porches), that community might create and map a “traditional neighborhood” land use category on their future land use map.

A community photo survey is another visualization technique useful in preparing the land use element. It is designed to help planners communicate community traits that are worthy of preserving, repeating, or correcting. This exercise is done through photographs, taken by community members, of preferred traits either found locally or in other communities. These places may include scenic vistas, historic buildings, archaeological sites, gathering spots, rural crossroads, groups of houses, parks, trails, streams, lakes, farms, forests, undeveloped areas that should stay undeveloped, promising development sites, signs, or other scenes. It is then useful for community planners to review these images, map locations where the photos were taken, and gain consensus on how this reflects future land use desires.

4. Demographic and Economic Data Interpretation

- Helps to decide future land use impacts of population and job trends.
- Aids in planning land use amounts and types to reflect demographic trends.
- Use in all types of communities.

The comprehensive planning law requires collecting and reporting demographic information about your community. This information—particularly an analysis of trends and forecasts—can be useful in preparing the land use element. However, the amount of available population and employment information can be overwhelming. Also, population and job growth projections included in plans can be either an objective look at the future or a community “wish” for more or less growth than what an outsider might suggest is likely. Sorting through and correctly interpreting demographic information is therefore critical.

Demographic and economic data that was collected as part of the issues and opportunities, housing, or economic development elements can be particularly useful in preparing the land use element. This data includes:

- **Population growth**—Population trends help inform how much land will be needed in the future for housing, jobs, schools, parks, and shopping. Trends in household size are also important in uncovering the relationship between population growth and housing demand. Land use demand forecasting based on population growth projections are covered
in greater detail under the “Land Use Demand Projections” technique described below.

- **Age levels**—Wisconsin communities will need to plan for the retirement of the large Baby Boom population—more and more of which will not head to the Sun Belt. This has important land use implications for emergency service facilities, and likely future demand for different types of housing such as condominiums and senior apartments, and large retirement communities.

- **Workforce size and skills**—A workforce with high educational levels, strong technical skills, or available capacity (in other words, some unemployment) may suggest different economic growth opportunities, which may lead to decisions on business or industrial park locations. For example, one community with a large number of post-graduates might be a strong candidate for a new research or office park, while another community with a highly-trained workforce and a technical college may be a good location for a future industrial park.

- **Economic activity**—Learning about the number and type of jobs, mix of existing industries and retail uses, availability of sites for new commercial and industrial development and expansion, and existing local economic development efforts is important to understand future opportunities for additional commercial and industrial areas—and residential areas to support their future expansion.

In short, collecting demographic and economic data for the other elements should be actively used and analyzed to help inform the land use element.

### 5. Natural Resources and Soils Analyses

- Helps to analyze/determine the physical suitability of lands for different land uses.
- Aids in planning for all types of land uses, such as industrial, and will not result in property or environmental damage.
- Use for all types of communities, but especially rural communities.

Understanding the underlying physical characteristics of land is critical in making responsible land use planning decisions. The agricultural, natural, and cultural resources element often includes information and maps on natural resources and soil suitability for different types of land uses. This data should also include prime agricultural soils, soils with limitations for development, groundwater recharge areas, aggregate resources (sand and gravel), drainage basins, sensitive natural areas, parks, and archaeological and historical resources. This element should identify all the things a community wants to protect.

Connecting different natural areas—such as floodplains, wetlands, and stormwater drainage routes—can form areas called “environmental corridors.” These are generally long, continuous blocks of natural areas. These form a framework for land use planning by serving as areas for public and other permanent open space, and by providing logical edges between different planned land use areas where incompatibilities may otherwise result. For example, an environmental corridor might serve as a buffer to separate a heavy industrial area from a residential neighborhood. It is important for a community to understand the physical and legal limitations for development that many of these environmental features create for
Determining the suitability of soil types for certain uses is also critical in preparing a responsible future land use map, particularly for rural communities. See Figure 7 for an example. Sorting lands according to criteria like productivity for agriculture, or ability to withstand certain types of development (for example, septic suitability or subsurface stability) can provide the rationale for many important future land use decisions. County soil surveys and land conservation staff employed by counties can provide a wealth of information on the characteristics, productivity, and limitations of the various soil types in your community. This information may be supplemented with interviews or mapping exercises with local farmers and others familiar with soil quality (e.g., septic system installers). Identifying former landfill (dump) sites through the Wisconsin Department of Natural Resources and local inventories is also critical—new wells are generally not permitted within 1,200 feet of such locations.

6. Cultural Resources Analysis

- Helps to identify land uses important to community history and character.
- Aids in planning for future land uses in locations that do not impair cultural resources.
- Use in all types of communities.

Cultural resources identification and analysis plays an important role in the preparation of the future land use map. Here is where the cultural resources element will need to be consulted. For example, a historic
downtown could be a community’s focus to either preserve or revitalize. A historic city hall might serve as a community symbol, important for both practical and aesthetic reasons. A rural town may decide to preserve its countryside by helping to preserve older farmsteads and barns.

A variety of national and local sources of information should be sought and reviewed to see if there are significant cultural resources in your community worth preserving and considering in preparation of the land use element. One key indicator of significance is whether or not a resource is listed in the National Register of Historic Places. The National Register is the official national list of historic properties in America worthy of preservation. A list of resources included in the National Register can be found at www.wisconsinhistory.org/hp/register. Local historical societies and landmarks commissions are also excellent resources. A list of local historical societies (www.wisconsinhistory.org/localhistory/directory/regionsearch.asp) and local landmarks commissions (www.wisconsinhistory.org/hp/smartgrowth/getting_started.asp) can be found on the Wisconsin Historical Society’s website. For areas with archaeological sites like burial or effigy mounds, the appropriate Native American tribe should be consulted, a list of which can be found at www.500nations.com/Wisconsin_Tribes.asp. Consulting directly with the Office of Preservation Planning at the Wisconsin Historical Society is also worth considering.

7. Utility Analysis

- Helps to coordinate future land uses with utility system capabilities.
- Aids in planning for future locations and types of land uses that can efficiently be served by public utilities.
- Use primarily in “urban” communities with public utilities.

For this analysis, you should refer to the utilities and community facilities element. For communities with public sewer and water systems, an analysis of the locations, and planned or logical service areas of those systems is an important part of developing the land use element. It is also critical to understand the physical condition and capacity of major utility systems, such as the wastewater treatment plant and sanitary sewer interceptor lines. See Figure 8 for an example map. Most communities with municipal water wells have also mapped wellhead protection areas—where

![Figure 8: Sewer Interceptor Service Area Map](image-url)
groundwater recharges those wells. Planning for amounts, densities, types, and locations of future land uses that relate well to utility system possibilities and limitations will result in a land use pattern that is less difficult and costly to achieve, and will protect those systems from damage.

Most communities with utility systems have a utility manager, municipal engineer, or a public works director that can help community planners understand the capacities and constraints of the utility system. They can also help you understand where the most cost-effective locations for future growth may be, based on an analysis of drainage basins. For example, a sanitary sewer system that relies on gravity flow as much as possible will be more cost effective. USGS maps, other topographic maps, and field observations can also aid in determining drainage basins.

Communities with over 10,000 people statewide, and all communities with sanitary sewer systems in certain regions, must have a Sanitary Sewer Service Area. These areas—also called Urban Service Areas—identify places in and around these communities where sanitary sewer extensions may legally occur. They are generally drawn with reference to logical drainage basins, natural areas, and future population and land use demand forecasts. The land use element requires identification of these boundaries and staging of service provision as identified in the utilities and community facilities element.

It is important to understand the locations and effect of Sewer/Urban Service Area boundaries when preparing the land use element. In general, these are areas that should be considered for future development on public sanitary sewer service. It is also important to learn how changes to these boundaries might occur in the future, in case your community’s land use interests are different from what these boundaries suggest. This information can be obtained from the regional planning commission in your area or from the Wisconsin Department of Natural Resources.

8. Transportation System Analysis

- Helps to coordinate future land uses with transportation facilities.
- Aids in arriving at realistic assessments of relationships between land uses and transportation facilities, such as access control.
- Use in all types of communities.

The comprehensive planning law requires an understanding of the locations, conditions, and capacity of roads and other transportation facilities. It also requires an understanding of local, county, regional, and state transportation programs and plans that may result in future changes to transportation facilities. Not only roads and highways, but when appropriate, bus, rail, and bike and pedestrian programs and plans need to be understood.

Planned transportation projects can have a major influence over future land use opportunities and patterns. For example, plans for a state highway bypass can have a significant influence on farmland preservation, natural area protection, economic development, and housing location decisions.

It is essential that community planners take into account all planned and potential changes to the transportation system in...
preparation of their land use element. It is also important to note that local communities frequently do not have direct control over the placement, type, or timing of many major transportation facilities. The district office of the Wisconsin Department of Transportation should be consulted to uncover relationships between future land uses and state and federal highways.

9. Growth Factors Analysis

• Aids in compiling different natural and man-made physical factors that affect where community growth may be appropriate.

• Helps to plan for large areas where future land development may be more or less appropriate given physical and other opportunities and limitations.

• Use in all types of communities, but particularly urban communities.

A growth factors analysis charts the direction and pace of recent development and identifies areas with the greatest potential, lowest costs, and minimal impacts for future development. This type of analysis can help guide where a community should and should not grow—particularly a community that uses public utility systems. This analysis should refer to many of the other elements: economic development, housing, transportation, agricultural, natural, and cultural resources, and utilities and community facilities.

It is important to map key growth factors to complete this analysis successfully, although this map does not have to be of presentation-quality. See Figure 9 for an example map.
Many of these factors may have already been determined through earlier analyses, and from other elements in the comprehensive plan. Factors that should be mapped as part of this analysis include:

- **Past growth patterns**—This could be a picture of how much growth has been added to the community in each decade and where growth occurred, perhaps accompanied by a table that shows land consumption over time.

- **Drainage basins**—An analysis of drainage basins at community boundaries is important for communities with public sanitary sewer and stormwater management systems. In general, growth is more cost effective in areas when sanitary sewage can flow downhill to the treatment plant. Your community’s engineer may already have mapped the drainage basins for your community. If not, interpretation of topographic maps—such as USGS quadrangle maps—can be completed with relatively little training and Wisconsin Department of Natural Resources can be contacted as well.

- **Environmental corridors**—This involves layering different natural and environmentally sensitive areas where development should not occur. Environmental corridors should include floodplains and wetlands, but may also include steep slopes, mature woodlands, rare or endangered species, archaeological sites, or other natural features important to your community.

- **Productive farmlands**—This may include large blocks with significant farming activity, areas with high-quality soils as determined through the county soil survey, or other factors determined to be important.

- **Planned transportation projects**—Projects like new roads, bypasses, and transit improvements can have significant impacts on future growth.

Each category explained above can be layered within a Geographical Information System (GIS) through input by the community. These categories can be prioritized, with the assistance of a trained facilitator.

The future land use map can then be created within the template formed by the growth factors analysis. The growth factors analysis is best at helping decide where future development should or should not occur, not what types of development should occur.

### 10. Existing Zoning/Build-out Analysis

- Relate what can be done today under existing zoning to what the community wants to see in the future through the land use element and future map.
- Determine areas where future land use desires and existing zoning are out of alignment.
- Use in all types of communities, but particularly communities with a lot of undeveloped land.

It is often useful and enlightening to think about how your community would look if it became fully developed in accordance with the zoning map and rules in place today. This is referred to as a build-out analysis. For example, a county in northern Wisconsin completed a simple build out analysis for towns with a “recreational” zoning district, which allowed houses on 30,000 square foot lots. This revealed allowable numbers of housing units that were not in line with the rural character objectives that plan participants voiced. This led to a recommendation in the land use element.
that many of these parcels be rezoned in the future to a new “rural lands” zoning district with lower development densities.

Ideally, the comprehensive plan and land use element should be prepared before, and serve as a guide for developing the community’s zoning map. In reality, many communities already have a zoning map before beginning the comprehensive planning process. That zoning map may or may not have been prepared following an earlier comprehensive or land use planning process.

For communities that are zoned, the current zoning map and zoning district rules are useful to review before preparing a future land use map. In certain cases, existing zoning districts and boundaries may correspond quite directly to community interests. In those cases, the future land use map can be generally reflective of the existing zoning map. Minimizing the number of zoning changes that have to be made following the comprehensive planning process is often a reasonable goal. In other cases, the community’s interests might be quite different from what existing zoning allows. In those cases, the new comprehensive plan might advise future zoning map changes.

11. Land Use Demand Projections

- Identify how much land may be shown in different land use categories on future land use map.
- Provide a basis for the size of future residential, commercial, industrial, and agricultural areas.
- Use in all types of communities.

Projecting demand for future land uses is required under the comprehensive planning law. Specifically, your community’s plan should include projections for the demand for future residential, commercial, industrial, and agricultural uses over the next 20 years, in five year increments. These demand projections will help advise what a reasonable supply of land in these different land use categories should be. The supply of land available for different future land uses is then depicted on the future land use map.

Community planners can use a variety of techniques to project demand for different types of future land uses. These may rely on state and industry population and job forecasts, discussions with local real estate experts, analysis of past land consumption trends in the different land use categories, and explorations of community opportunities, regional context, and emerging trends. The following is one relatively simple approach for making land use demand projections:

- **Residential**—Multiply the housing unit demand projections developed as part of the comprehensive plan’s housing element by expected average residential densities over the next 20 years. Expected densities may be based on recent trends or on community desires for different future densities.
- **Commercial and Industrial**—Perhaps the simplest way to project demand for commercial and industrial land uses is to assume a constant proportion of land in these respective categories to residential land use acreage. This allows for a relatively simple calculation once projected residential land use is obtained.
Another method that could be used to determine the future land use needs is to first determine the current employees per acre ratio, using total employment and existing land area. Next, project future employment based on historic trends, usually 20 years, and apply that ratio for future employment related land uses. Rural communities with little to no commercial or industrial use (or any real potential or desire for any) may suggest that this is the case in their plan.

- **Agricultural**—Analyzing past trends in conversion of agricultural use to other land uses is usually the simplest way to project future demand for agricultural lands. However, relying only on past trends may not capture new trends in agriculture. Referring to the agricultural resources element should be useful. Local farmland preservation desires and opportunities may suggest that past trends may change. Data on past conversion rates should be available from your UW Extension office. These rates may be combined with the count of existing acres in agricultural use, ideally obtained through the current land use inventory. Urban communities with little or no farmland may simply suggest that this trend is likely to continue. However, agricultural land in many “urban” areas is actually increasing with the growth of community gardens, for example.

It is also important to remember that the analysis stage will help the community to prepare the land use element and the comprehensive plan, but it will not substitute for judgment and some difficult decisions. In some cases, communities consider, map, and illustrate different alternatives for future growth and change based on their analyses, and allow the public and other participants to evaluate those different alternatives.

Chapter 5 of the guide discusses the task of developing land use goals, objectives, policies and programs. It also discusses public participation needs, implementation of goals, and ways to monitor progress.

**Completing the Analysis**

Once your community has collected, analyzed, and understood the various information and possibilities for your community, you will move to the next step in the process. First, it is important to share that information with the public and get feedback.