Introduction

Miami Valley Land Development Suitability Assessment

Purpose

The Miami Valley Regional Planning Commission (MVRPC) conducted the *Miami Valley Land Development Suitability Assessment* as the final portion of the physical existing conditions evaluation of "Going Places – An Integrated Land Use Vision for the Miami Valley Region." The main purpose of this assessment is to examine the regional landscape in a comprehensive manner and to identify developable land that is not currently fully developed and/or protected.

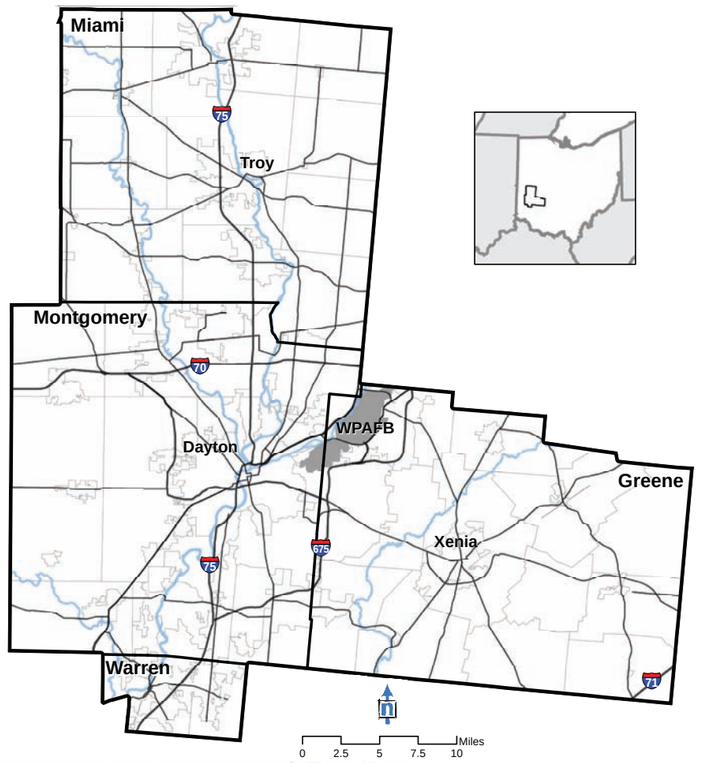
The entire Region will benefit if development is planned and executed in a manner that takes full advantage of existing infrastructure and does not threaten the quality of natural resources. Further, the Region would be best served when future land development plans take into account the development intensity of surrounding areas. Not all locations are equal in terms of their potential for physical development. Therefore, this assessment is an attempt to determine the Miami Valley Region's capacity to accomodate future development in order to facilitate desirable development patterns in appropriate areas. It is based on an evaluation of the various constraints and opportunities present in the Region and an examination of this capacity in relation to the geographic distribution of different types of development intensity.

This assessment was built from two previously published assessments: the *Miami Valley Land Suitability Assessment – Natural Environmental Factors* and the *Miami Valley Land Suitability Assessment – Built Environmental Factors*. Each assessment provided geographically referenced information regarding various features, such as sensitive natural resources and man-made infrastructure, to identify constraints and opportunities that the Region's land offers. This assessment includes a comprehensive land suitability measure – a combination of the results from the previous assessments – as well as an analysis of this measure to identify land that is suitable for development or re-development and an illustration of how the results of this analysis could be applied in local planning initiatives.

Study Area

The study area covers a three county region in the Dayton Metropolitan area, along with three cities in northern Warren County, located in southwest Ohio (see figure 1). It includes Greene, Miami, and Montgomery counties along with the cities of Carlisle, Franklin, and Springboro in Warren County, covering approximately 1,313 square miles with three interstates: I-70, I-75, and I-675.

Figure 1 - Study Area



Report Structure

This report is a summary of the land development suitability assessment. It is divided into seven sections:

1. The Introduction section is an explanation of the overall purpose of the study, study area, and report structure.

2. The Methodology section is an outline of the general process adopted for this assessment and explains the methods used to carry out this assessment.

3. The Historical Development Trends section contains an overview of the historical urbanization processes of the Region to contextualize the present regional landscape.

4. The Land Suitability Measure section presents the comprehensive land suitability measure, developed based on information from the two previously published assessments: the *Miami Valley Land Suitability Assessment – Natural Environmental Factors* and the *Miami Valley Land Suitability Assessment – Built Environmental Factors*.

5. The Developability Analysis section compares the Land Suitability Measure to findings from an examination of existing land use to identify land in the Region most suitable for development or re-development.

6. The Applications section illustrates how the findings from the land developability analysis can be used as a tool and guide for local planners and decision makers.

7. The Conclusion section provides a summary of the findings from the study.

Acknowledgements

The study was made possible by datasets that were made available by various agencies listed throughout the report. MVRPC is grateful for this data and would like to thank those Federal, State, and local agencies for making the data available.

Methodology

Miami Valley Land Development Suitability Assessment

This assessment is an examination of the Region through a four-phase analysis of development suitability. In the first phase, a review of historical development trends is presented in order to contextualize the discussion of the current state of regional land development. For the second phase, a regional Land Suitability Measure was created by combining the results of two previous suitability measures, one which focused on the natural environment and one which focused on the built environment. The third phase is an analysis of the Land Suitability Measure with respect to current land development conditions – including development intensity – in the Region with the purpose of identifying developable land. For the final phase of this assessment, developable land in the Region is compared to two common local land use policies – zoning maps and future land use plan maps – to demonstrate how the findings from the analyses may be used as a resource for local planners and decision makers.

A Geographic Information System (GIS) was used to conduct technical data analyses due to its unique capacity for spatial database management and analysis. Various databases developed and/or acquired for this assessment were all brought into the GIS environment and analyzed using a raster-based spatial overlay technique based on grid cells measuring 2,500 square feet (50 feet by 50 feet). The databases used in this assessment include:

- 1975 Regional Land Use/Land Cover Database, MVRPC, 2008
- 2000 Regional Land Use/Land Cover Database, MVRPC, 2008
- Regional Natural Environment Suitability Measure Database, MVRPC, 2007
- Regional Built Environment Residential Suitability Measure Database, MVRPC, 2008
- Regional Built Environment Non-Residential Suitability Measure Database, MVRPC, 2008
- Regional Parcel Database, MVRPC, 2007 (compiled from Greene, Miami, Montgomery, and Warren county parcel databases)
- 2008 Regional Vacant Property Database, MVRPC, 2008
- 2007 Impervious Surface Database developed from National Land Cover Database from the Multi-Resolution Land Characteristics (MRLC) Consortium, MVRPC, 2008
- Decennial Census, U.S. Census Bureau, 2000
- Regional Zoning Database, MVRPC, 2008 (compiled from the zoning databases from local jurisdictions)
- Regional Future Land Use Database, MVRPC, 2008 (compiled from the future land use databases from local jurisdictions)

Historical Development Trends

The Region's historical development trends were examined in order to better understand the characteristics of the Region's urbanization process. The Region's Urbanized Areas from 1950 to 2000, defined by the U.S. Census Bureau, were mapped and analyzed in conjunction with population figures from each decennial Census. In addition, historical land use data were analyzed to identify land use changes between 1975 and 2000.

Land Suitability Measure

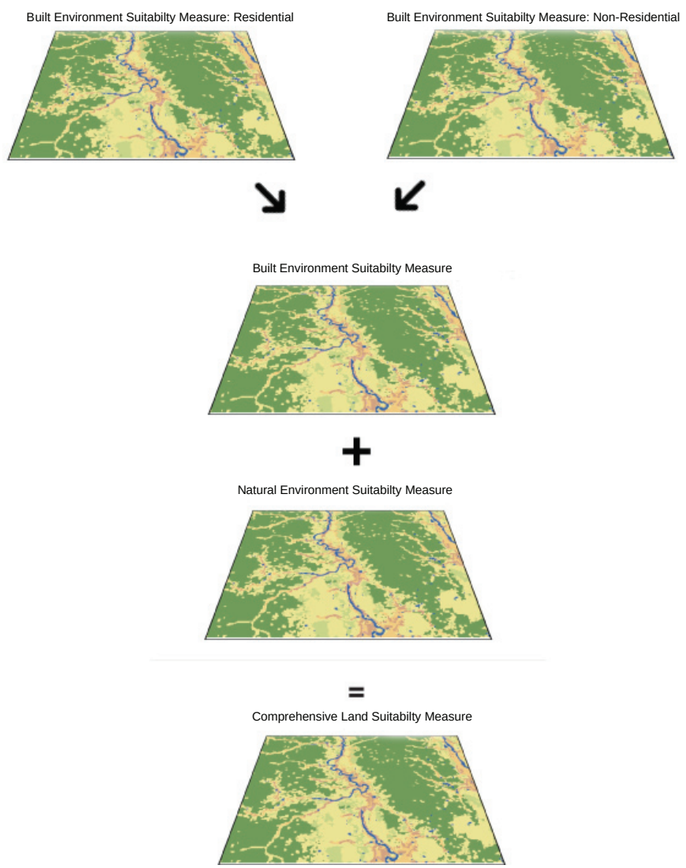
A comprehensive Land Suitability Measure was developed using three datasets that were created in the two previous suitability assessments: the *Miami Valley Land Suitability Assessment – Natural Environment Factors* and the *Miami Valley Land Suitability Assessment – Built Environment Factors*. The three datasets, which were derived from 15 Natural Environment Factors and 15 Built Environment Factors, are:

- The Natural Environment Land Suitability Measure
- The Built Environment Land Suitability Measure: Residential
- The Built Environment Land Suitability Measure: Non-Residential

The three datasets were developed independently, making data standardization necessary in order to construct a single comprehensive land suitability measure. The original land suitability measure score included in each of the composite grid layers was first translated into a standardized score so that the three could be integrated. Next, the built environment residential suitability composite grid layer and the non-residential suitability composite grid layer were overlaid and the two standardized composite scores were averaged to create a single standardized built environment score representative of both residential and non-residential suitability. Finally, the standardized built environment land suitability score was averaged with the natural environment land suitability standardized composite score by spatially overlaying the two grid layers (see figure 2).

The data standardization and spatial overlay processes resulted in a dataset that quantifies a single, comprehensive land suitability measure. This dataset was then ranked into four suitability classes: Highly Suitable, Moderately Suitable, Suitable, and Not Suitable.

Figure 2 - Development of the Land Suitability Measure



Developability Analysis

The Developability Analysis was conducted by combining the Land Suitability Measure with a Land Development Condition Measure. The Land Suitability Measure defines whether the land is suited to accommodate development or not based on land characteristics and provides information regarding whether the land poses any developmental constraints or opportunities. The Land Development Condition Measure classifies land based on its current physical development status. The two measures, when combined, determine the developability of the Region's land. Table 1 shows the framework that was used in combining these two measures. In general, land that is classified as either partially developed or undeveloped in the Land Development Condition Measure and as suitable in the Land Suitability Measure was determined to be developable.

Figure 3 - Developability Analysis Overlay Process

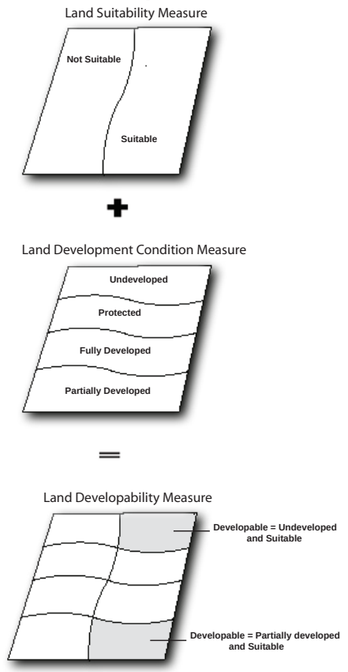


Table 1 - Developability Analysis Framework

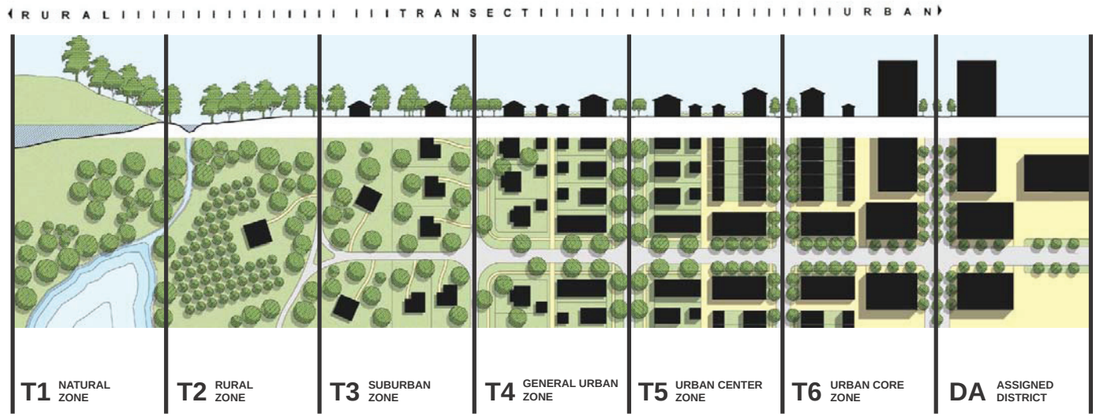
			Land Suitability Measure	
			Suitable	Not Suitable
Land Development Condition Measure	Developed	Fully Developed	NA	NA
		Partially Developed	Developable	Not Developable
	Undeveloped		Developable	Not Developable
	Protected		Not Developable	Not Developable

Figure 3 depicts how the developability analysis framework was implemented using the spatial overlay technique in a GIS environment. First, for the Land Development Condition Measure, the regional landscape was divided into a grid with cells measuring 2,500 square feet (50 feet by 50 feet) and classified into 4 classes: undeveloped, fully developed, partially developed, and protected. Next, similar to the method used in developing the Land Suitability Measure, the Land Development Condition Measure grid was spatially overlaid onto the Land Suitability Measure grid. These two measures were then combined in order to determine the Land Developability Measure, which presents data on the amounts and geographic locations of developable land in the Region.

The second step in the Developability Analysis was to contextualize the Region's developable land by examining development intensity. Throughout the Region, there are areas that can be characterized as urban or rural. However, different development intensities can be found within both categories. Therefore, the purpose of this part of the analysis was to identify these various levels of existing physical development intensity and compare them to the results of the Land Developability Measure.

Land development intensity was examined using the concept of Transect, a planning theory developed by Andrés Duany and other members of the Congress for New Urbanism which emphasizes urban form and development intensity (see figure 4). Three indicators were used to determine the different levels of development intensity: impervious surface, residential density, and non-residential intensity. These indicators were used to classify the Region's land into Transect Zones (T-Zones), ranging from T-Zone 1 to T-Zone 5, where T-Zone 1 represents the lowest development intensity and T-Zone 5 represents the highest. For a more detailed description of the method used for evaluating development intensity, please see Appendix B.

Figure 4 - Transect Concept



Source: Duany, Andrés. 2002. Introduction to the Special Issue: The Transect. *Journal of Urban Design* 7(3): 251 - 260.

Application of the Developability Analysis

For the fourth, and last, phase of this assessment, the results of the Developability Analysis were compared to local zoning maps and future land use plan maps to demonstrate how the findings from this analysis could be used as a resource for local planners and decision makers in future land use planning efforts. The areas identified as zoned for development and planned for future development are based on the review of both zoning maps and future land use plan maps. They were compared to the Developability Analysis findings and highlight where the two conflict.