

Integrating Spatial Analysis in Decision Modeling for Smart Growth Initiatives

A Demonstration

by

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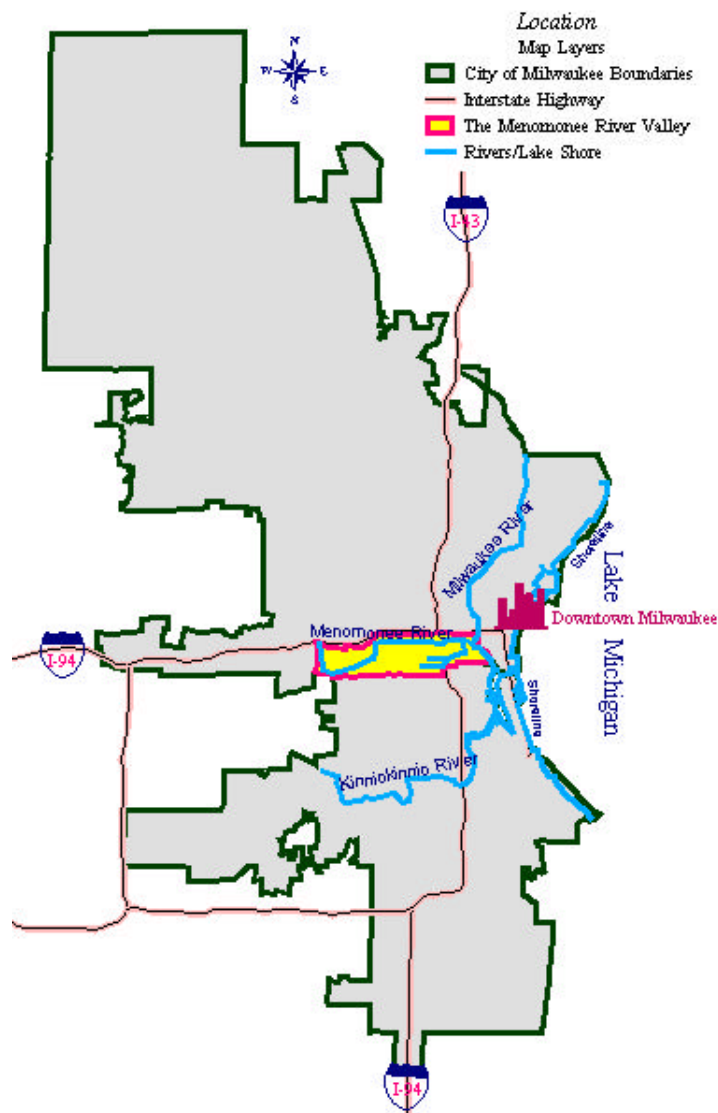


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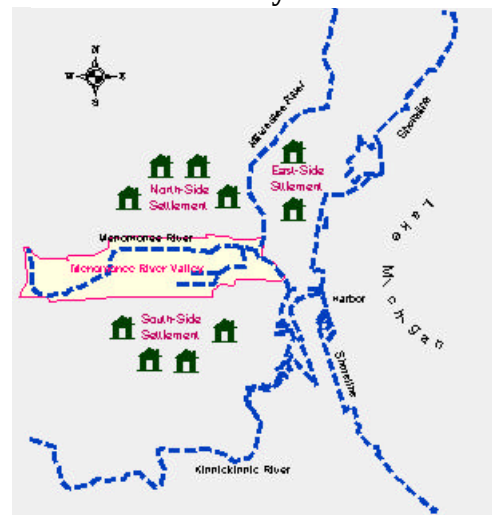
Using GIS in the Menomonee River Valley Sustainable Development Initiative

Project's Background

The Menomonee River Valley (Valley) is the geographic center of the City of Milwaukee and it is surrounded by the most densely populated neighborhoods in Wisconsin. The Valley was once a marshy natural gateway to the harbor on Lake Michigan where wild rice, fish and wildlife were plentiful. The Valley was also the center for Milwaukee's expansion as a major industrial/manufacturing center with global distribution at the beginning of this century. By 1920, more than 50,000 people were employed in the Valley in manufacturing jobs. Many of these employees lived in nearby neighborhoods bordering the Valley on the north and south. However, in the post World War II era, major worldwide economic changes occurring in manufacturing processes and heightened health concerns about industrial discharges and emissions worked together to substantially reduce the Valley's role as a thriving employment center.



Milwaukee's Early Settlements



Today, only 7,000 people are employed in the Valley, the Menomonee River has little or no recreational appeal and the majority of the land in the Valley either stands vacant or is 'under-utilized' for storage of sand, salt, coal and junked vehicles.

In the last few years however, the public and private sectors have expressed renewed interest in the redevelopment of the Menomonee Valley. This interest has been spurred in part by the attention surrounding the construction of the Milwaukee Brewers' new baseball park at the west end of the Valley, the ever-increasing projected costs for new infrastructure to serve development in urban fringe areas, employers seeking proximity to large pools of potential workers and perhaps most significantly, new changes to state and federal policies and regulations that will provide greater flexibility to potential investors and landowners to encourage redevelopment of contaminated industrial parcels now known as 'brownfields'. Even with the increase in public and private sector interest in reviving brownfields in general, and the Menomonee Valley in particular, [impediments to sustainable redevelopment](#) remain, including:

- Lack of information on the extent of environmental contamination at specific sites and uncertainties about potential costs for clean-up
- Absence of a clear vision for potential redevelopment scenarios that are geographically focused on the Valley
- Incentives to developers are not structured to achieve broader community-wide interests for neighborhood employment and enhancement of the Valley's natural features.

The Smart Growth Solution

A consortium of private and public sector partners have linked together to demonstrate that they can design, market and build, energy efficient environmentally sensitive industrial and commercial facilities in Milwaukee's older and under utilized central city Menomonee Valley. The project will demonstrate 'green design with a profitable bottom line' is possible by addressing a specific developer's particular facility needs in the Valley and bring new jobs to hard pressed neighborhoods. Milwaukee's Smart Growth will:

- ◆ Incorporate the restoration of environmentally contaminated brownfields as part of a green redevelopment design charrette process that will address real development needs at a site and, through community visioning and GIS mapping create smart growth models that can be replicated and have state and regional impact.
- ◆ Create permanent linkages for new design and development scenarios with the implementation of the Henry Aaron State Park Trail, which will link with Milwaukee's downtown RiverWalk system ultimately bridging a system of public bikepaths and hiking trails that will cross the state from Lake Michigan to the Mississippi River.
- ◆ Document for private investors the competitive advantages of developing in central city locations versus exurban sprawl communities by creating a system of measures for environmental, financial and community benchmarking.
- ◆ Demonstrate with identified parcels of property the utility of this benchmarking system and with a sophisticated GIS mapping process, lay the foundation for a marketing strategy to attract additional development.
- ◆ Build on the City of Milwaukee's efforts of the past year that have resulted in substantive amendments to the Menomonee Valley Land Use Plan and begin environmental analysis, wetland restoration and site preparation to permit Smart Growth to go forward.
- ◆ Provide a practical test case and help shape the City of Milwaukee's new design standards for industrial and commercial developments.

- ◆ Create of a new non-profit regional design and development organization to oversee project activities and continue marketing efforts.

Long term objectives of this project include:

- The successful redevelopment of the Valley as a major employment center with state of the art building design and landscaping
- Family supporting jobs for area residents
- Restoration of important environmental features and natural ecology
- Maximum public access and best environmental management systems practices.

Achieving these objectives will require

- The active engagement of key public and private sector players
- A cost effective and flexible sustainable redevelopment program (one that is community based and environmentally sensitive)
- An environmental remediation and protection plan ensuring that abandoned/underutilized parcels in the Valley will not become brownfields again in 20 years.

The GIS and SDSS Application Solution

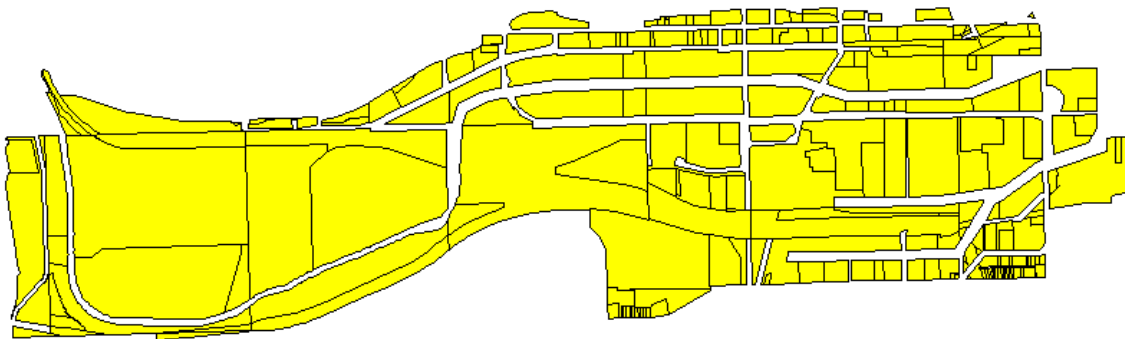
GIS and SDSS will be used

- As a resource for assembling and visualize spatial information and to publicly demonstrate various development scenarios to the investment community and general public.
- To built an information and decision making framework for state-of-the-art design charrette teams of professional architects and engineers to be convened to lay out high quality sustainable development designs tailored to the specific parcels for the investment community's use.
- To assists in assessing candidate sites for redevelopment and the implications of alternatives, land uses plans.
- To support customized community planning through interactive geographic review, plan experimentation, and sustainable indicator evaluation
- To support interactive land use design and infrastructure specification using a hands-on "What-If" approach

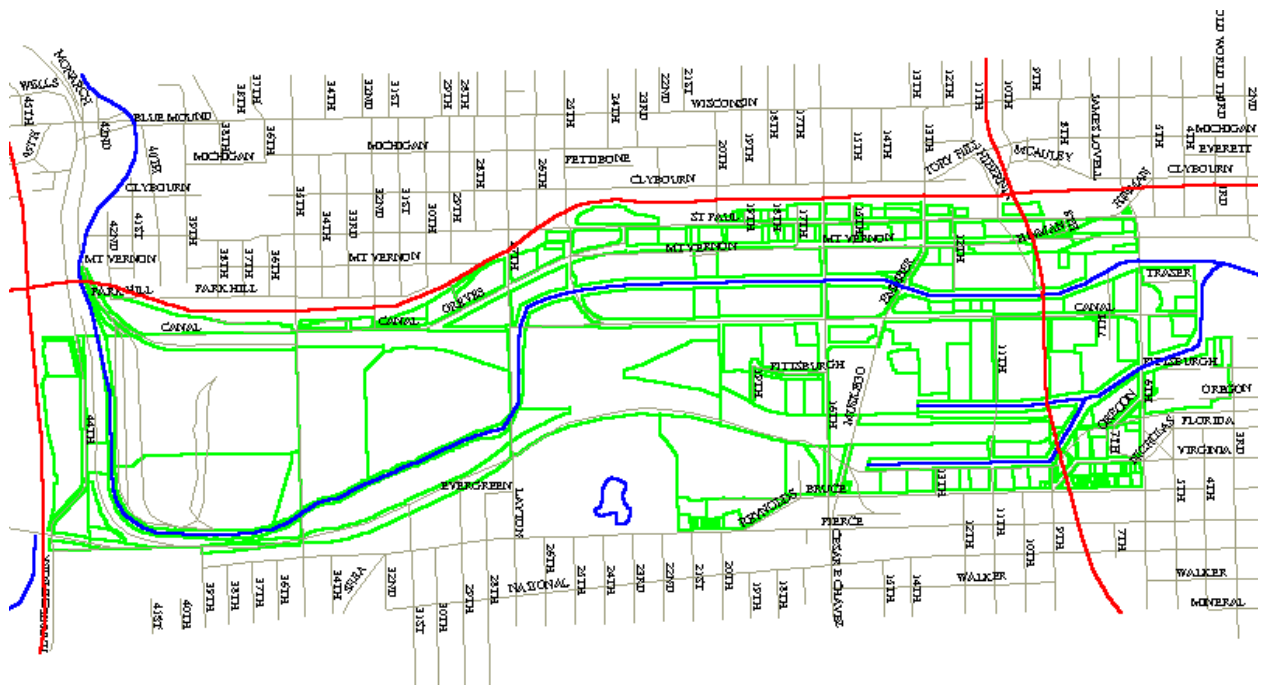
SmartPlaces (EPRI; Palo Alto, CA), a GIS software that adds land use planning, design and resource modeling to the functionality of *ArcView GIS* (ESRI; Redlands CA) and *Active Response GIS* (CIESIN; Saginaw, MI) is used to provide a strategic support application which integrates decision models with spatial analysis.

- The Menomonee River Valley GIS integrates digital maps and attribute data for site and building characteristics, natural resources, existing utilities, transportation infrastructure, and topography.
- In the Spatial Decision Support System (SDSS) environment these spatial data will provide strategic support by integrating decision models with spatial analysis.

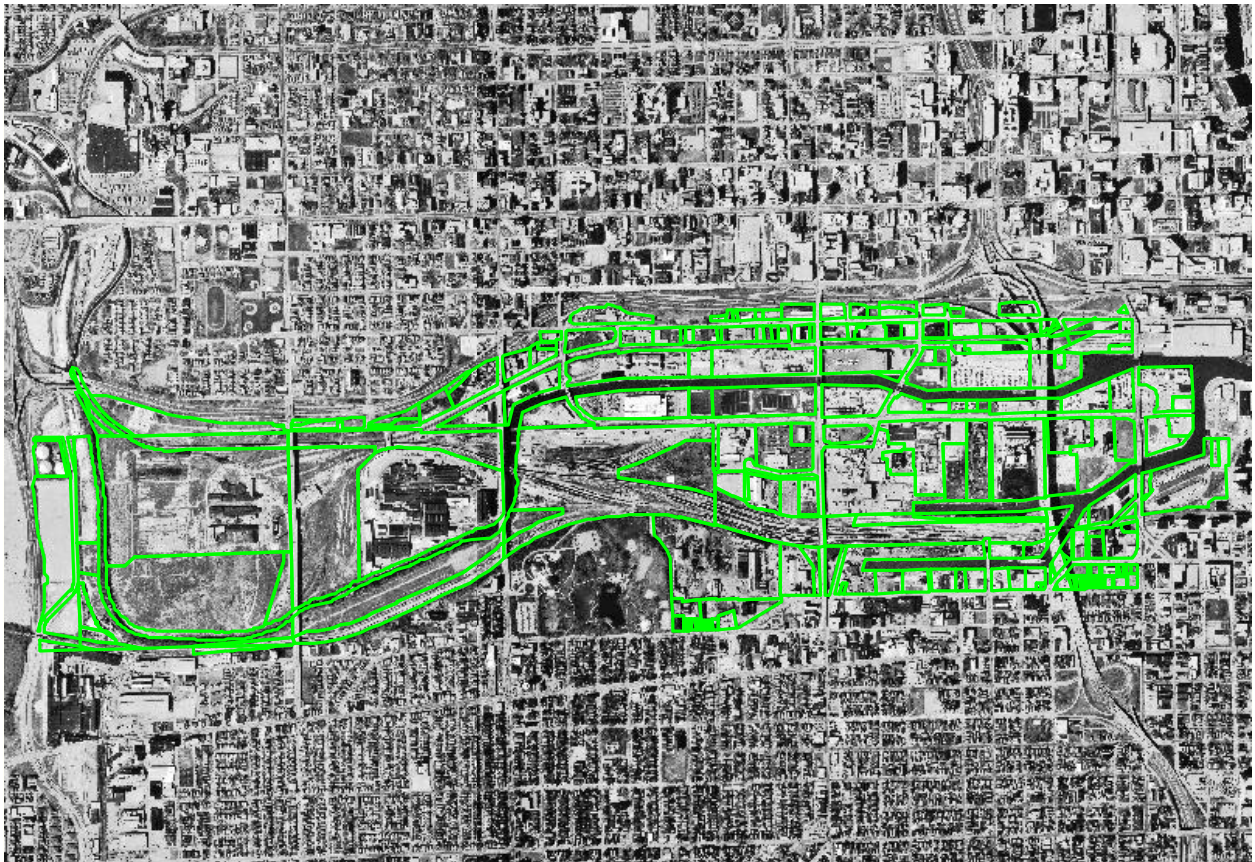
The Menomonee River Valley Parcel Base Map



In addition to the 82 data items contained in the Milwaukee Property File (MPROP)*, the land use base map for the Menomonee River Valley GIS will be supplemented with information on environmental conditions and access to existing utilities and transportation networks.



*The Milwaukee Property File (MPROP) is a geo-relational database of land and building information for each of the approximately 160,000 properties in the city. These data, originated and updated by the Office of the Tax Commissioner at the City of Milwaukee, are a rich source of housing and land-related data (land use, type of building, year built, assessed value, name and address of owner, number of dwellings units, date of last conveyance, etc.).

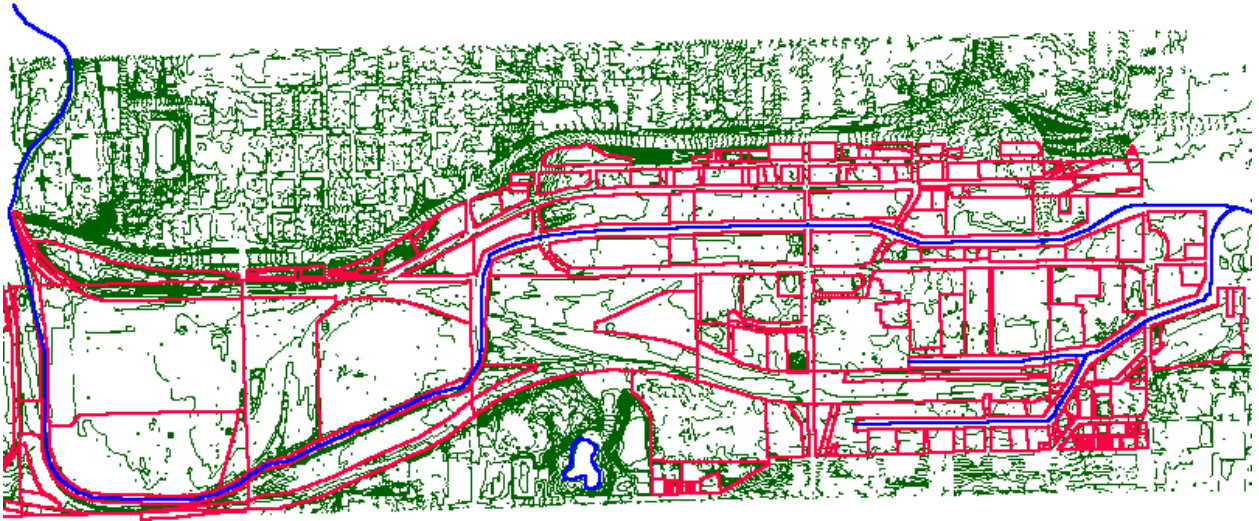


Visualization of the Valley's built environment is facilitated through the use of aerial photography.



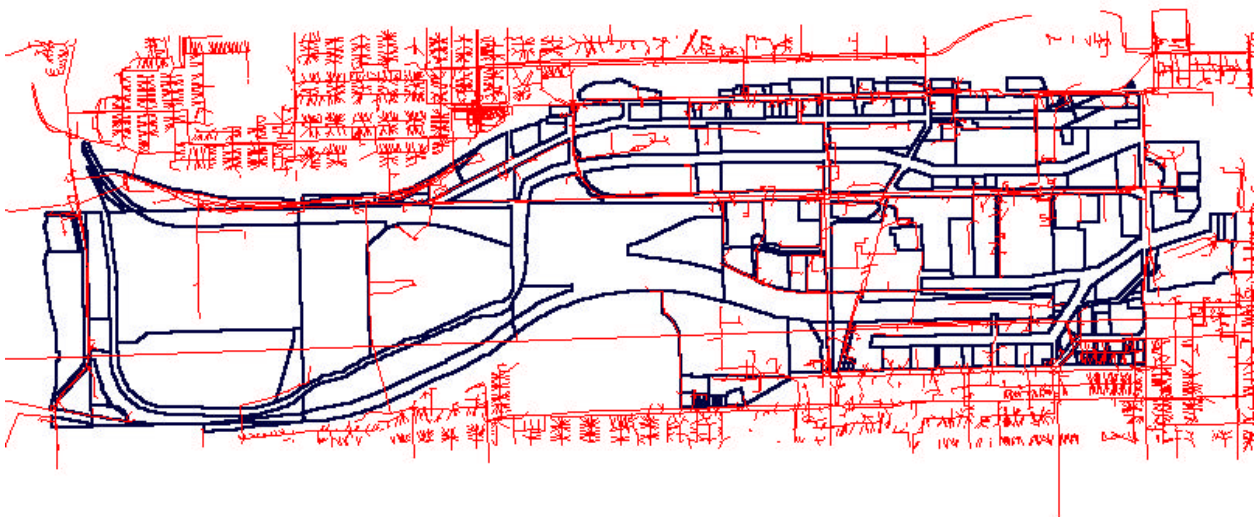
Digital topographic maps obtained by digital compilation directly from stereoscopic aerial photography are also included in the Menomonee River Valley GIS. These include

- Map sheet elements
- Geodetic and geographic reference elements
- Hydrographic elements
- Planimetric elements
- Hypsometric elements



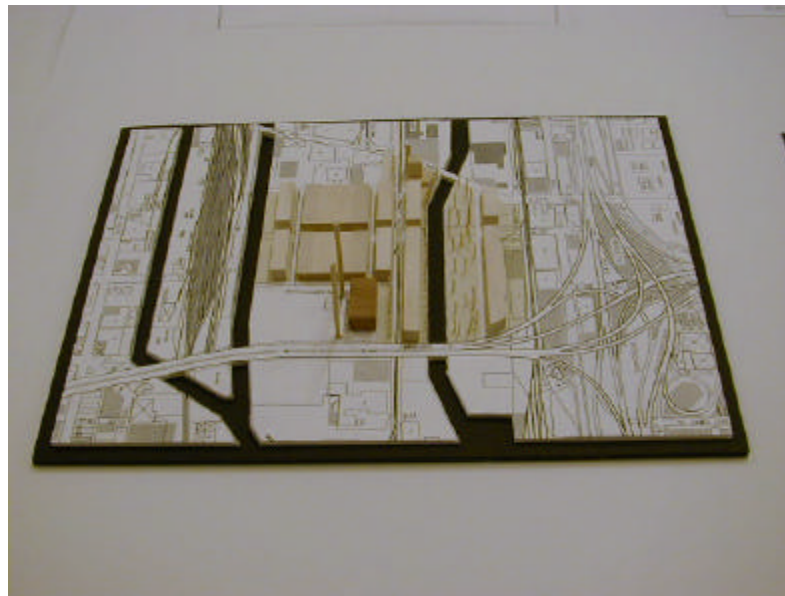
The Menomonee River Valley GIS also includes existing utilities.

- Electric Power
 - Voltage available
 - Amperage available
 - Phase (Single, Dual, etc.)
 - Other characteristics
- Gas, Water, Sewage, Storm lines
 - Size of line
 - Other characteristics



GIS is also being used

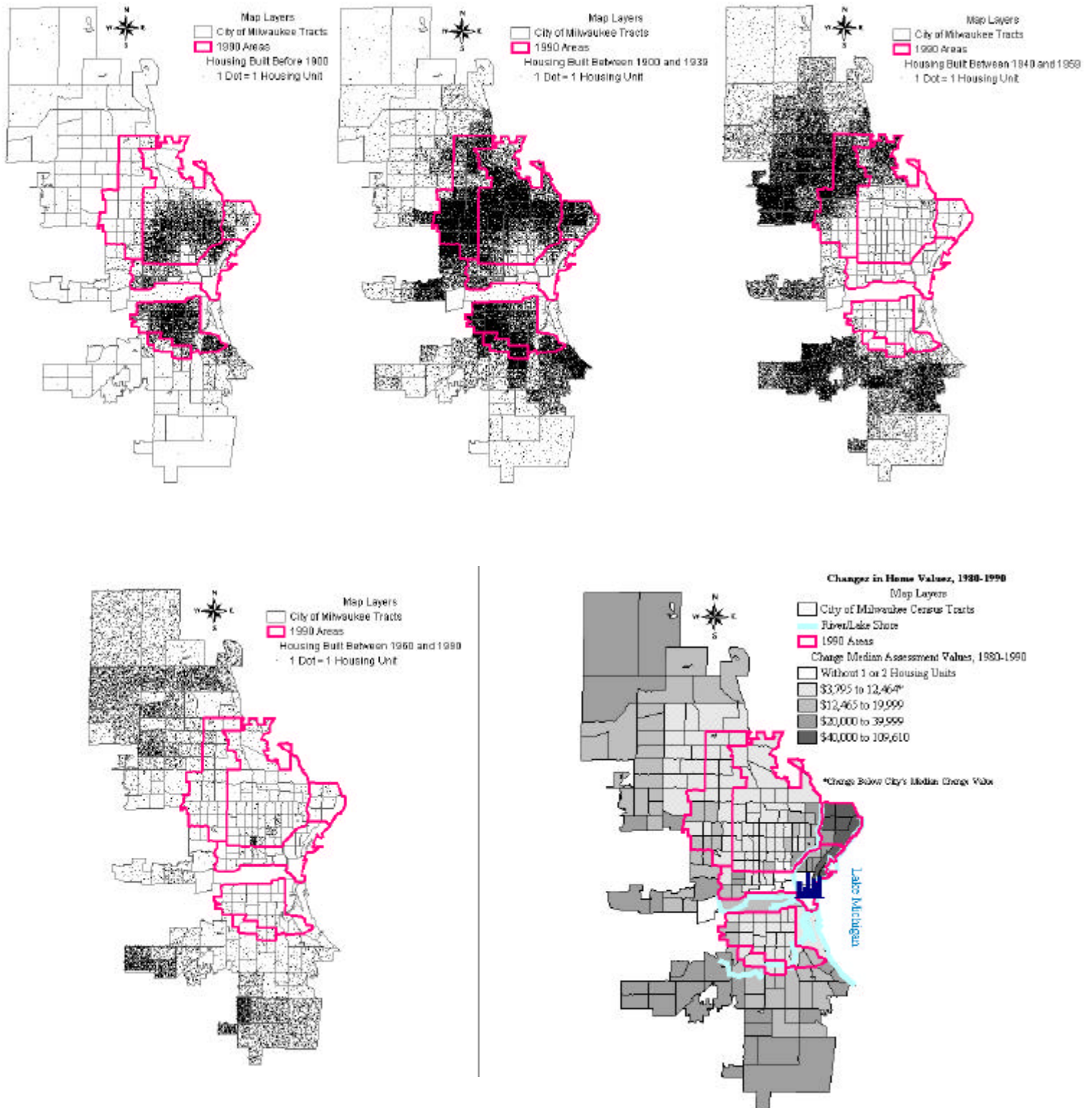
- **As a resource for assembling and visualize spatial information and to publicly demonstrate various development scenarios to the investment community and general public.**



- **To built an information and decision making framework for state-of-the-art design charrette teams of professional architects and engineers to be convened to lay out high quality sustainable development designs tailored to the specific parcels for the investment community's use.**

GIS is also being used to examine the Valley's surrounding built and social environments. Once in the Spatial Decision Support System, these data will support social, economic and environmental impact analysis

The Valley and Milwaukee's Residential Development



The Valley and Milwaukee's Social Geography

