

Scenario 3: Mandated Regional Smart Growth

2008 Capstone

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Scenario 3 Executive Summary

Scenario 3 assumed away all political or other limitations on the use of existing planning tools in order to study area growth under a high degree of regulatory intervention. Whereas Scenarios 1 and 2 projected unaltered growth and growth resulting from mild, willful participation in regional growth initiatives, respectively, Scenario 3 employed an aggressive system of six directives that mandate Smart Growth on a regional level. The Smart Growth directives primarily redirect growth toward established communities with existing infrastructure, increase protection of undeveloped greenspace, and enhance connectivity and social interaction among and within communities. Scenario 3 began by repealing the legal basis for Ohio's fragmented "Home Rule" approach to land use and then mandated Smart Growth policies under a regional planning commission. The regional planning commission then created urban growth boundaries around the two established urban cores and facilitated infill development through brownfield remediation. Social networks and quality of life in turn were enhanced by promoting mixed use redevelopment under a form-based code, creation of new transit options throughout the study area, increased access to greenspace amassed through landbanks, and sharing of recreational amenities.

Population distribution as influenced by Scenario 3 directives was then projected to the year 2030. Results were compared to Scenarios 1 and 2 using a Weighting Matrix (Appendix) that was established according to concerns expressed by respondents to an informal survey. As expected, the growth boundaries effectively redistributed population into established urban areas while holding population constant in outlying areas. At the same time, and as shown in Appendix, Scenario 3 received a more favorable overall assessment (2.55) than both Scenarios 1

and 2 (1.321 and 1.756, respectively). In fact, as shown in the Weighted Ranks for each Impact Factor, Scenario 3 equaled or outscored Scenarios 1 and 2 in most Impact Factors. Specifically, Scenario 3 (1) beneficially required a coordinated regional land use plan; (2) diminished low-density development required for use of septic tanks; and (3) increased (i) access of all constituents to community recreation facilities, (ii) the density of commercial establishments, (iii) the percent of population using public transit, (iv) the amount of preserved green space, and (v) neighborhood sustainability.

Two shortcomings of Scenario 3 probably have little actual detrimental effect on the standard of living projected under Scenario 3. While the number of people paying higher tax rates projects to increase, the matrix assessment of income taxes fails to consider decreases in tax rates likely to arise with increased population density. Also, while fewer people project to have highway access in comparison to Scenario 1, the multi-modal transportation regime implemented in Scenario 3 provides citizens with alternative, less expensive means of transportation intended to diminish use of the automobile. Scenario 3 thus produced a highly sustainable regional community that reaps all of the benefits possible under available planning tools.

Scenario 3 “No-Limits” Approach to Planning

Whereas Scenarios 1 and 2 projected unaltered growth and growth resulting from willful municipal participation in mild regional growth initiatives, respectively, Scenario 3 sought to project growth under aggressive, legally mandated Smart Growth measures. One or more of the government-initiated control measures utilized in Scenario 3 would likely encounter significant or even insurmountable political obstacles under current socioeconomic conditions in Northeast Ohio. Therefore, in order to theoretically achieve the Scenario 3 projections using mandates, Scenario 3 assumes away all political, economic, and social constraints that may limit the use of current planning tools to demonstrate projected growth redistribution under a high degree of regulatory intervention. Particular obstacles, where anticipated, are discussed below in conjunction with the associated measure.

Smart Growth Primer

The planning profession introduced the idea of “smart growth” in the 1990s as a comprehensive means to simultaneously deal stop sprawling growth and remediate the associated problems of decay of the urban core as well as loss of greenfields and other natural resources. (Edwards & Haines, 2007) Since its introduction, the scope of the term has continued to grow, today encompassing a multitude of slightly different versions created by a host of independent planning organizations. (Ye et al. 2005)

Although the smart growth version implemented in Scenario 3 may overlap with several different versions of smart growth, the version initially designed was found to most closely resemble the well-balanced version espoused by the U.S. Environmental Protection Agency.

(U.S. EPA, 2007 Smart Growth Award Publication) The EPA's holistic smart growth approach focuses on positively affecting "the economy, the community, and the environment." (Ye et al. 2005) Similarly, Scenario 3 pursued three overarching goals:

1. Prevent inefficiencies through duplication and suboptimization of existing infrastructure.
2. Preserve green space and promote sustainable development.
3. Enhance lively and equitable social networks within neighborhoods and among municipalities.

Justification of Scenario 3 Approach

One of the primary motives for implementing Smart Growth in Scenario 3 includes maximizing efficiency and utilization of existing infrastructure. Once prominent urban cores within the study area contain massive investments in underutilized infrastructure. The City of Cleveland, for example, now listed as the 40th largest city in the U.S., still maintains service supply lines and other infrastructure built to supply a much larger population (as recently as 1960, Cleveland was the seventh largest city in the U.S.). (Case Western Reserve University; City-Data.com)

Efficiency, as one scholar wrote, "is attained if land rents, net of taxes and the alternative cost of land, are maximized." (Hochman, 1990) The underutilization of former expenditures in infrastructure and duplication of infrastructure in low-density areas represents just such a suboptimal use of land rents and thus a massive loss of efficiency. Public goods such as service supply lines and roadways are non-rival goods that, despite use or consumption by consumer A, remain available in undiminished capacity to consumer B. (Pecorino & Temimi, 2007)

Accordingly, the marginal cost per user can be continually diminished by adding additional users until use nears congestion (the point at which availability of the good actually becomes diminished with each additional use). (Hochman) Therefore, regions stand to benefit from cost savings associated with increased density in areas of existing infrastructure. (Teera & Hudson, 2004) Conversely, the provision of new infrastructure to new low-density growth duplicates expenditures across a region and imposes a high marginal cost per user. The current growth patterns in the study area therefore represent a twofold loss of opportunity to realize cost savings through efficiency and maximize the net wealth of the region's taxpayers.

Ultimately, prolonged inefficiency can prove economically fatal. The following quote seems particularly relevant to the Scenario 3 study area:

“It should be noted that in the long run inefficient cities without relative advantage cannot survive on their own and cease to exist. In practice, such cities decay slowly until, if at all, an efficient local government is elected.” (Hochman, 1990)

Furthermore, studies suggest that economic areas and labor markets are urban-centered, with little contribution derived from outlying, rural areas. (Barnes & Ledebur) Additionally, studies suggest that regional economies are the true fundamental economic building blocks. (Barnes & Ledebur) Thus, where inefficient utilization of land and/or land rents plague Northeast Ohio as a region and particularly endanger the central urban core, such inefficiency endangers the continued existence of the region as a whole. (Barnes & Ledebur) The mandated legal changes imposed in Scenario 3 represent a schematized “election” of the efficient government mentioned

in the block quote above that may one day be necessary to cure Northeast Ohio's land use practices.

Various Smart Growth success stories arise each year to further validate the beneficial effects of Smart Growth initiatives. The pre-Smart Growth state of such case studies often pose striking similarities to the urban cores in Northeast Ohio, supporting the relevance of a Smart Growth approach to the study area at hand in Scenario 3. For example, development in the town of Barnstable, Massachusetts, was characterized by low-density residential and retail growth at its edges with a related onslaught of vacant storefronts and disinvestments in the established urban core. (U.S. EPA, 2007 Smart Growth Award Publication) As a result, Barnstable experienced strained local infrastructure and a deterioration of the town's natural resources and town character. Facing these ill-effects of sprawling growth, Barnstable initiated smart growth measures. (U.S. EPA, 2007 Smart Growth Award Publication) Through such a plan, Barnstable achieved such a dramatic turnaround that the village was awarded a 2007 EPA Award for Smart Growth Achievement. Accolades aside, the Smart Growth initiatives were responsible for turning a blighted and underperforming town center into a lively social center. (U.S. EPA, 2007 Smart Growth Award Publication) With similar hopes for the Scenario 3 study area, Scenario 3 proposed a smart growth plan with the following six directives:

1. Repeal Article XVIII § 3 of the Ohio Constitution and create a regional planning body whose directives carry the weight of law.
2. Require a regional comprehensive plan that initiates a growth moratorium through urban growth boundaries located around established urban cores.
3. Enhance connectivity among and within two smart growth centers through Transit-Oriented Development.
4. Redirect growth toward established communities through Brownfield development.

5. Establish form-based zoning codes that increase the heterogeneity of available uses while promoting aesthetic beauty of streetscapes.
6. Increase access to greenspace and recreational amenities through a regional greenspace land bank program and sharing of recreational facilities among municipalities.

Creating a Legal Environment that Permits Smart Growth

In the first step of the proposed Smart Growth plan, Northeast Ohio must create a regional planning commission *whose directives carry the weight of law*. Smart Growth aspirations face significant obstacles in multi-jurisdictional focus areas that transcend political boundaries. In such cases, no single body of governance may possess the legal capacity to mandate policy change among the many local municipalities.

Moreover, while fundamental land use doctrine in some states may be conducive to the adoption of a regional planning commission, Ohio's regime of land use governance, known as Home Rule, does not provide for such an easy transition. The Ohio State Constitution at Article XVIII § 3 equips local municipalities with the right of Home Rule, stating that

“[m]unicipalities shall have authority to exercise all powers of local self-government and to adopt and enforce within their limits such local police, sanitary and other similar regulations, as are not in conflict with general laws.”

The antagonism between Ohio's Home Rule doctrine and the modern planning emphasis on smart growth and regional cooperation should be immediately apparent. For example, local municipalities generally possess the right to adopt unique zoning codes that separate uses and promote low-density development inconsistent with Scenario 3 goals such as mixed-use development and efficient use of existing infrastructure. (*Hausmann & Johnson, Inc. v. Berea Bd. of Bldg. Code Appeals*, 40 Ohio App. 2d 432, 320 N.E.2d 685 (8th Dist. 1974)) Thus, while the regionally cooperative approach associated with smart growth purports to achieve efficiencies associated with economies of scale, Northeast Ohio remains mired in a highly fragmented, inefficient pattern of land use decisions facilitated by Home Rule.

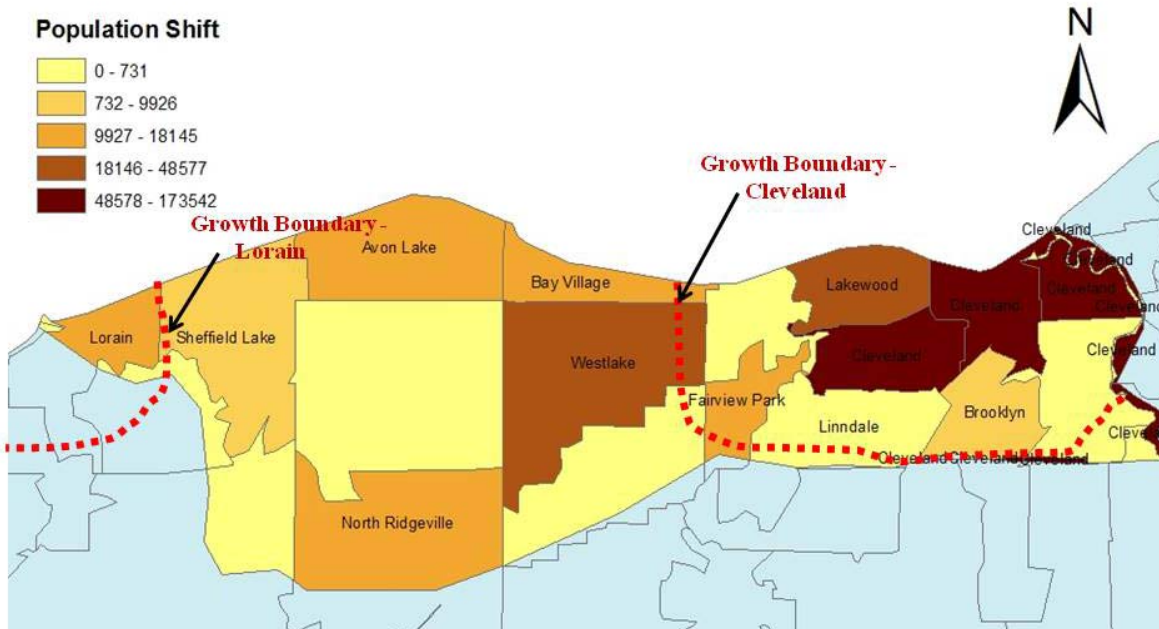
Scenario 3 thus faced significant upfront legal challenges in order to implement its planned Smart Growth measures: The Scenario 3 study area encompasses 21 municipalities that, in most cases, possess the ability to resist regional planning directives. In order to achieve the Scenario 3 redirection in Northeast Ohio's land use policy, Ohio must first repeal the Home Rule provision found in Article XVIII § 3 in the Ohio State Constitution. Such an amendment can be instituted either as a legislative enactment, through constitutional convention, or initiative and referendum of the people. (16 Ohio Jurisprudence 3d Constitutional Law § 11)

Redirection of Growth Using Urban Growth Boundaries

After Ohio's Home Rule doctrine is repealed, Ohio and NEO must then mandate regional planning commissions with directives that carry the weight of law. In Scenario 3, Ohio specifically would implement the still pioneering legislation enacted by the state of Oregon. Numerous growth control techniques with varying degrees of stringency have been pursued by states, including: prioritization of funding for development in urbanized areas (Maryland), inter-municipal planning cooperation (Colorado), assessment of impact fees on greenfield development (Delaware), and designation of smart growth areas slated for infill development (Wisconsin). (Salkin, 2007) While these measures provide benefits tailored to the needs of the respective state and may produce benefit in Ohio as well, Oregon's approach presents the aggressive type of growth redirection sought in Scenario 3. Accordingly, and in line with Oregon's smart growth approach, Ohio legislation would require the establishment of regional planning commissions, the creation of regional comprehensive plans, and, most importantly, the designation of urban growth boundaries. Growth boundaries are designated in a manner that separates urbanized land from undeveloped land, and areas outside of the boundary are down-zoned to decrease opportunities for development as of right. (Salkin, 2007)

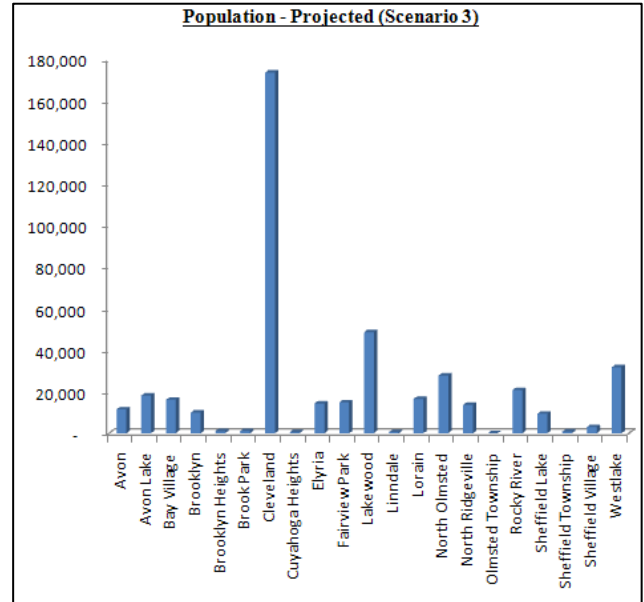
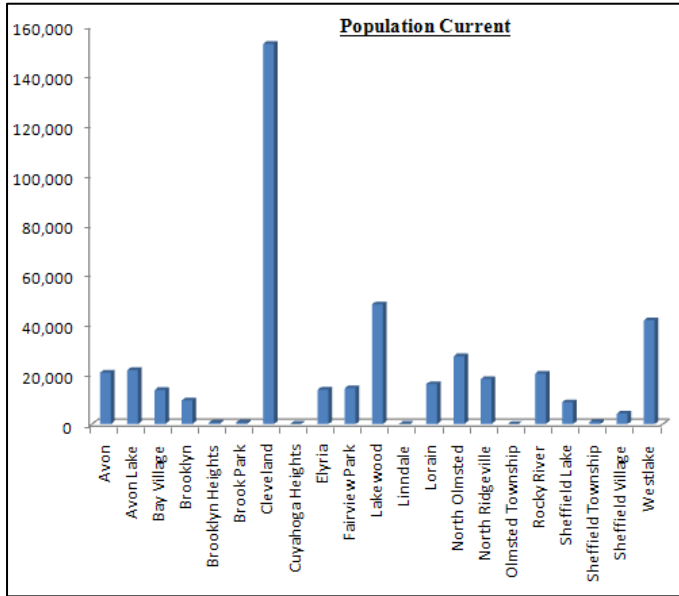
Notably, continued opposition from owners of down-zoned parcels outside of the boundaries has eroded the efficacy of Oregon's smart growth approach. Subsequently enacted Oregon Measure 37 requires compensation of owner's of down-zoned parcels, and municipalities often simply exempt such parcels as a result. (Salkin, 2007) While such opposition can be anticipated in Ohio, the no-limits framework of Scenario 3 nonetheless warrants adoption of Oregon's

aggressive approach. Furthermore, most if not all of the projections in Scenario 3, discussed below, rely significantly on the imposition of urban growth boundaries. Below is a map indicating the proposed Growth Boundary and the projected population after imposition.

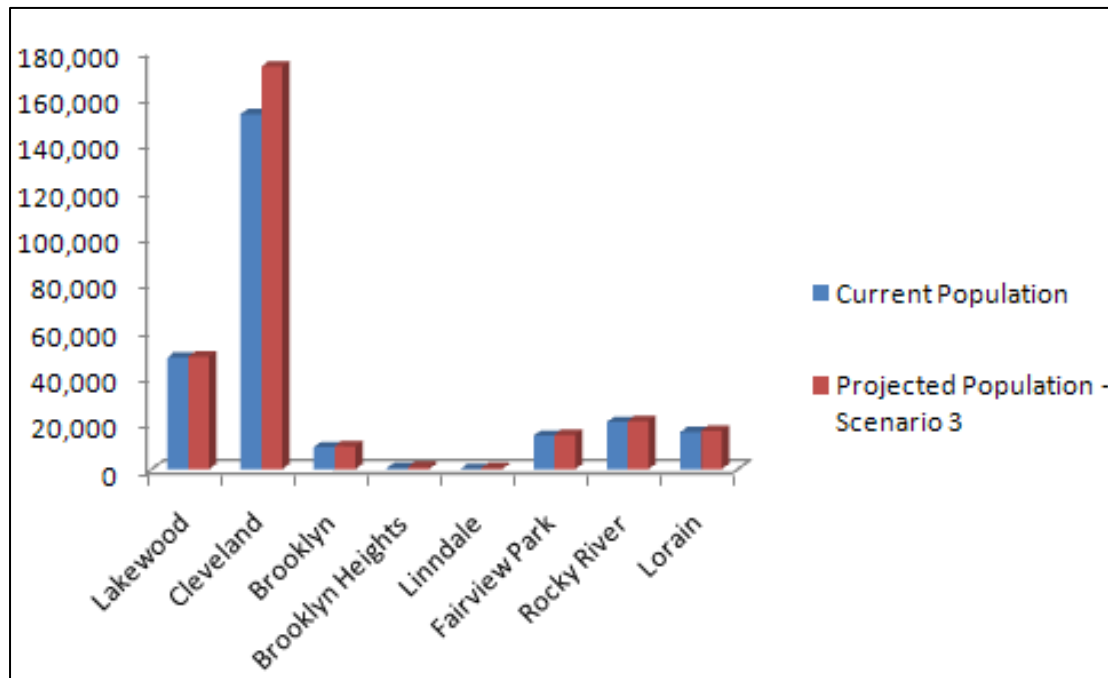


As indicated above, the proposition of creating smart growth legislation and urban growth boundaries in the Home Rule culture of Ohio becomes possible only under the obstacle-free premise driving the Scenario 3 approach. Under current socioeconomic conditions, alteration of the Home Rule provision would face insurmountable political friction. However, less aggressive measures involving either willful regional cooperation or market-based smart growth initiatives that overlay an unasserted right of Home Rule would likely face similar levels of opposition from constituents. The opposition to regional smart growth initiatives in Ohio is expected to continue unless more severe changes in the socioeconomic conditions arise and shake constituent faith in Ohio’s current land use doctrine. (Salkin, 2007)

The projections in Scenario 3 in Population



After the imposition of the Growth Boundary, the cities that received population growth were as indicated in the graph below



Connecting Growth Centers through Transit-Oriented Development

Transportation is a vital part of the nation's economy. Business, consumer, and government spending on transportation represent 10% of gross domestic product (GDP) by most estimates. But if household contributions and other missing components are included, transportation is estimated to be as much as *16% to 18%* of the economy, composite national average cost of *56.1 cents per mile* over *15,000 miles* of driving in one year. This amounts to an annual cost of *\$8,415*, including fuel, maintenance, tires, insurance, license, registration and taxes, depreciation, and financing.

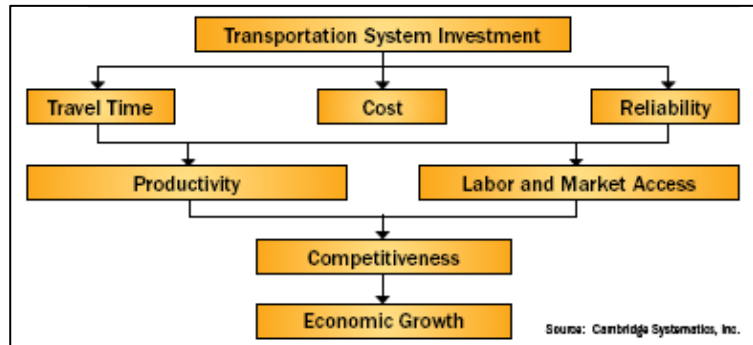


The Role of Mass Transit

The incorporation of public transportation options and considerations into broader economic and land use planning helps a region expand business opportunities, reduce sprawl, and create a sense of community through transit-oriented development (TOD). By creating a locus for public activities, such development contributes immensely for the development of a region. Areas with good public transit systems are economically thriving communities and offer location advantages to businesses and individuals choosing to work or live in them. Public transportation also helps to reduce road congestion and travel times, air pollution, and energy and oil consumption, all of which benefit both riders and non-riders alike.

Transit-Oriented Development (TOD)

A TOD is a mixed-use residential or commercial area designed to maximize access to public transport, and often incorporates features to encourage transit ridership. A TOD neighborhood typically has a center with a train station, metro station, tram stop, or bus station, surrounded by relatively high-density development with progressively lower-density



development spreading outwards from the center. TODs generally are located within a radius of one-quarter to one-half mile (0.4 to 0.8 km) from a transit stop, as this is considered to be an appropriate scale for pedestrians. TODs have been hailed as a model for integrating land use with transportation in the interest of smart growth. The picture shows how Transportation System Investment would generate Economic Development.

*"Transit Oriented Development as an approach to combat traffic congestion and protect the environment has caught on all across the country. The trick for real estate developers has always been identifying the hot transportation system. Today, highways are out; **urban transit systems are in.**"* -The Urban Land Institute (ULI)

Issues and Challenges in Northeast Ohio

Across the Northeast Ohio, sprawling developments are consuming land, congesting roads and highways, and leading to a host of other economic, environmental, and social problems. This can be attributed to the ability of people to buy automobiles and move out of



the central city. The central cities like Cleveland and Elyria have lost significant amounts of population and Cleveland particularly is left with the urban poor. Sprawling developments can be directed towards the Central city through Growth Management techniques and lessening the auto dependency of people. This can be achieved by Transit oriented development (TOD) which would be predominantly Public transit. The transportation energy use per passenger mile is about 40% above the European practice, a significant difference caused largely by average vehicle weight and the mix of mass and individual transit. In our automobile culture, transit gets little respect, but it's a vital part of a *healthy, sustainable city*. In Northeast Ohio, cities haven't come close to realizing the promise of transit especially at a time of rising gasoline costs when people need affordable transportation choices.

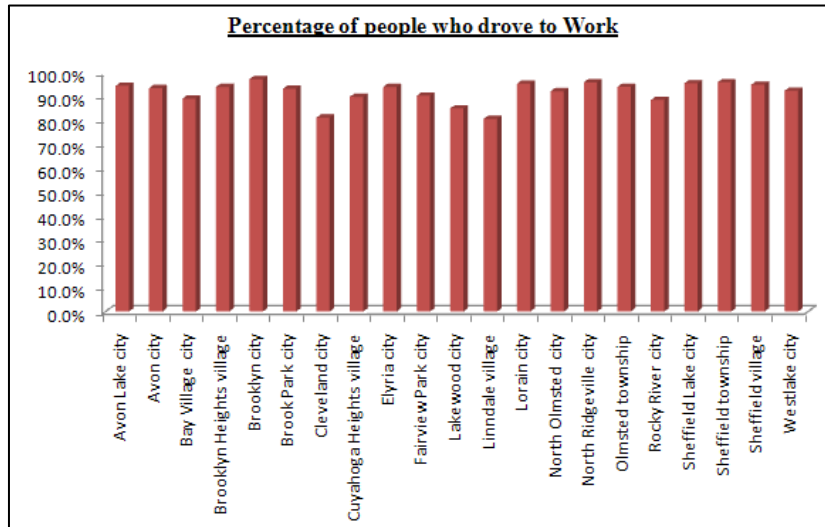
Some expert opinions:

- ❑ *Hill*: The largest problem we have in terms of transportation is using our transit money in a way that creates not only transportation possibilities, but also for recreational possibilities.
- ❑ *Bob Layton (an economist who retired from NOACA)*: An agency with the potential to push solutions for our regional woes, especially urban sprawl, instead sticks with its basic

transportation-planning duties. "The agency could well take a more muscular stance on a wider range of issues . . . without a whole lot of pushback.

- ❑ The National Surface Transportation Policy and Revenue Study Commission, citing a looming crisis in America's transportation infrastructure and proposing a gradual increase in federal motor fuel taxes to help address it, has stirred up a heated national controversy involving broad transportation policy issues, ideological dogma, a dispute over the relative responsibilities of the public vs. private sectors in infrastructure development and maintenance, and apparent hanky-panky by the current Bush administration. Passenger rail transportation – both urban rail transit and intercity rail – is a key component of the Commission’s vision for the future

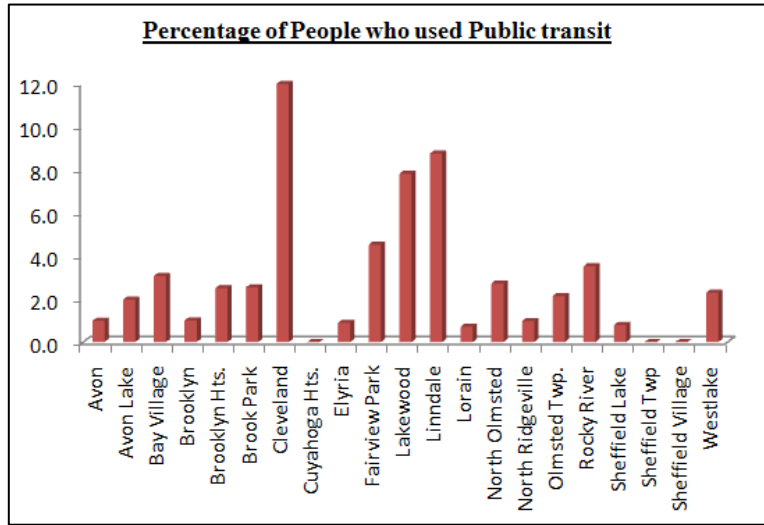
A recent survey of the residents, the 4th biggest concern expressed was about the highway access. Nearly 92% of the people who live in our study area, drove to work. The graph below shows the percentages in each city in our



study area (Source: NEOCANDO).

Communities across the country are searching for ways to reduce dependence on the private automobile and increase the use of public transit. The graph above in contrast, portrays that there is huge auto-dependence in Northeast Ohio. There is not much integration of public

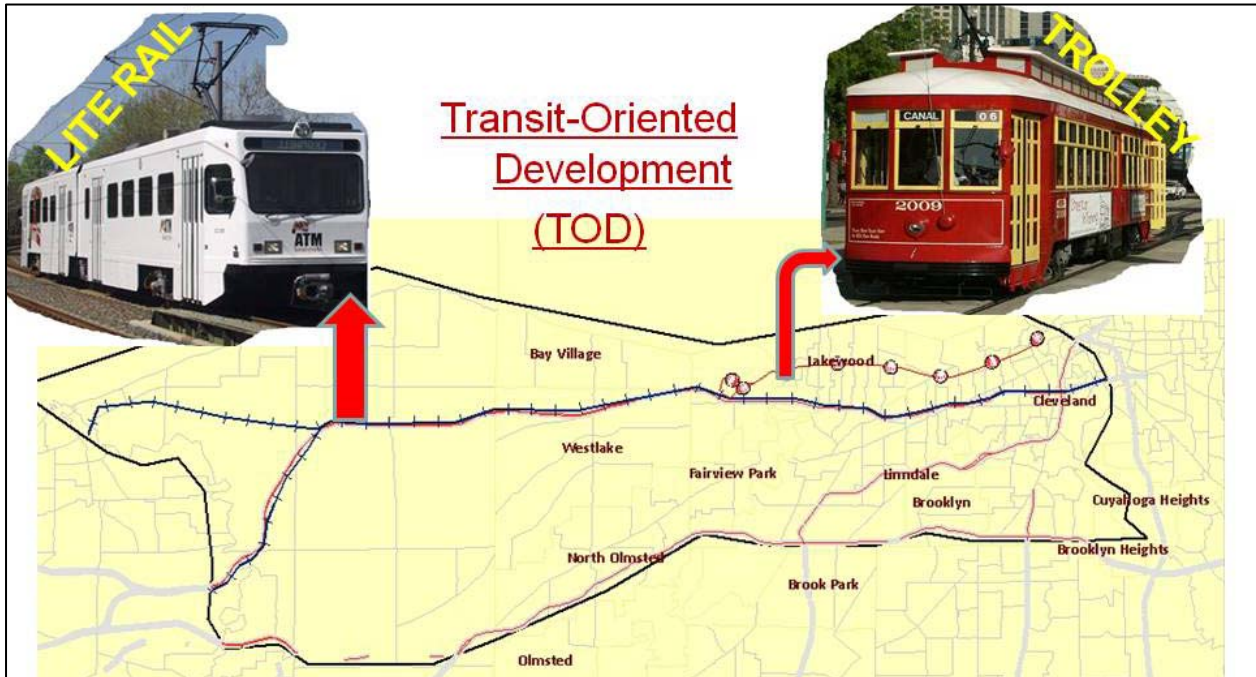
transit in the NEO region. Here, the development patterns alone will not entice people to give up their cars. The adjoining graph shows the percentage of people who travel using public transit. In order to improve ridership, the transit system has to offer safe, efficient,



comfortable, affordable service. According to the Transportation Research Board, “The quality of the customer experience” is a crucial determinant of both overall satisfaction and general community attitudes towards transit.

Specific Transit-Oriented Development Proposal:

- Light Rail** inter-city, along the I-90 from downtown, Cleveland to Elyria and City of Lorain: 35 miles long
- Loop-Trolley** along the Detroit Shore-way till Wager rd, Lakewood: 10 miles long



Goals to be accomplished:

- Train station as prominent feature of each of the City centers.
- A regional node containing a mixture of uses in close proximity including office, residential, retail, and civic uses
- To create attractive places those bring people and dollars into the community.



- ❑ To provides more travel options and create a recreational mix which would reflect the culture and fit to the context
- ❑ High density, high-quality development within 10-minute walk circle surrounding train station
- ❑ Collector support transit systems like trolleys to the Light rail.
- ❑ Design to include the easy use of bicycles, scooters, and rollerblades as daily support transportation systems
- ❑ Reduced and managed parking inside 10-minute walk circle around City centers / train station

Costs-Benefit Analysis of TOD Project

Cost:

- ❑ Light Rail¹: Over the U.S. as a whole, new light rail construction costs average about \$35 million per mile. Hence in our proposal, it amounts to \$1.05 billion.
- ❑ Trolley²: \$0.8 million

Source of Funding: The funding is anticipated to be partially Federal, State and tax levied on the cities in the region. Tax Increment Financing might also be considered.

¹ The cost of light rail construction varies widely, largely depending on the amount of tunneling and elevated structures required. A survey of North American light rail projects shows that costs of most LRT systems range from \$15 million per mile to over \$100 million per mile. Seattle's new light rail system is by far the most expensive in the U.S. at \$179 million per mile, since it includes extensive tunneling in poor soil conditions, elevated sections, and stations as deep as 180 feet below ground level. These result in costs more typical of subways or rapid transit systems than light rail. At the other end of the scale, four systems (Baltimore MD, Camden NJ, Sacramento CA, and Salt Lake City UT) incurred costs of less than \$20 million per mile. Over the U.S. as a whole, excluding Seattle, new light rail construction costs average about \$35 million per mile.(Source: http://en.wikipedia.org/wiki/Light_rail#Costs_of_light_rail_construction_and_operation)

² The study done for Euclid corridor also considered some rail alternatives which could be the comparables for the proposed Detroit Shore-way loop trolley project: <http://www.euclidtransit.org/history/default.asp>

Benefits: Light Rail

Rail transit costs less to operate³ than buses

- ❑ New light-rail lines "skim the cream" of transit riders because they tend to be built in the busiest transit corridors. Since costs per passenger mile depend heavily on ridership, the cost of any transit running in a busy corridor is likely to be less than the cost of a bus roaming through low-density suburbs.
- ❑ Light Rail "trains" operate as either single or multiple car consists. Passenger capacity of each car in a multiple car consist can be up to as many as 250 passengers (standees included). The number of cars that can be operated in any one consist are limited by several factors. One of the major factors is station platform length.
- ❑ Compared to heavy rail, light rail can be very practical for urban applications, due to its ability to operate in mixed traffic settings. This ability can severely reduce construction costs of an urban rail system. However, within the same system, light rail has the ability of traveling at speed of up to 60 miles/hr (100 km/hr), when separated from these mixed traffic settings.

Benefits: Trolley Service:

- ❑ Trolley reduces traffic congestion and the emissions that pollute our air. And it makes our roads safer. Decreases the need to use valuable space for more roads and parking so we can preserve Northeast Ohio's historic character, open green spaces and natural beauty.

³ Rail supporters point to St. Louis, where the Bi-State transit agency says it spent 29 cents per passenger mile operating light rail but 88 cents per passenger mile on buses in 2003. Since the agency reports that it carried 125 million light-rail passenger miles, this savings amounts to \$72 million per year. That would cover the \$800 million cost of building light rail in a little more than 11 years

- ❑ By taking people to work, services, shopping and leisure-time activities, trolley helps support economic development. To revitalize cities and grow the economy of our towns transit is a vital tool. For tourists, it offers a fun way to travel between and within our region's major cities. For commuters, it provides an economical, alternate mode of transportation.
- ❑ The investment in construction of a permanent way, such as a street trolley, conveys a long-term commitment to provide a high quality service now and into the future. Bus options, making no such commitment, are too easily rerouted or curtailed. The presence of such permanent facilities demonstrates tangible, positive, private sector economic and social spin off effects.
- ❑ The permanent commitment demonstrated by these kind of trolleys and overhead wire conveys to potential investors and residents that transportation will be available.
- ❑ Using a simple, reliable form of transit from 50 or 100 years ago can bring history to life for 21st century Americans. More than viewing photographs, movies, or reading about transportation in earlier periods, actually using a heritage trolley for transportation can create a far deeper understanding of the experiences of bygone eras

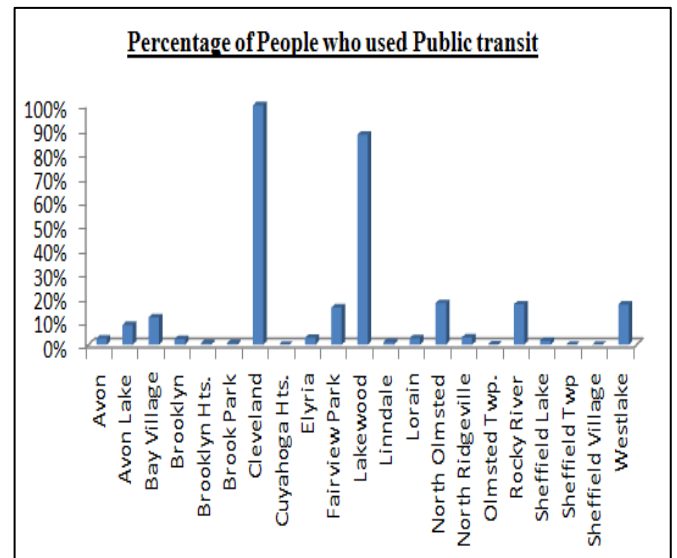
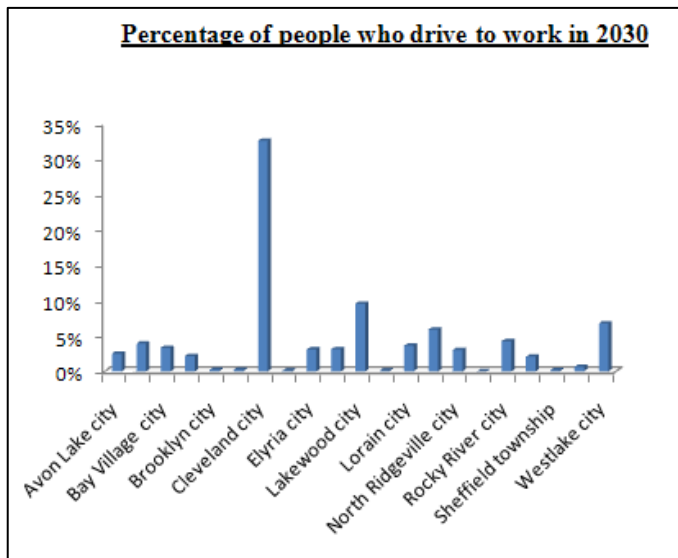
Overall benefits of the proposed TOD:

- ❑ Better places to live, work, and play
- ❑ Greater mobility with ease of moving around
- ❑ Increased transit ridership
- ❑ Reduced traffic congestion and driving and reduce car accidents and injuries
- ❑ Reduced household spending on transportation, resulting in more affordable housing

- Higher, more stable property values
- Increased foot traffic and customers for area businesses
- Greatly reduced dependence on foreign oil
- Reduced incentive to sprawl, increased incentive for compact development**
- Less expensive than building roads and sprawl
- Enhanced ability to maintain economic competitiveness
- TOD provides more travel options. Fewer automobiles and parking spaces are needed.
- Land for parking can instead be used for other purposes.
- Environmental Benefits of TOD
 - Air quality is improved
 - Green space is preserved
 - Parking lot rainwater run-off to sewers is minimized
- Social Benefits of TOD
 - TOD facilitates labor force involvement for those without, and those who choose not to own an automobile
 - Livability and other quality of life factors are enhanced throughout communities and the region
 - TOD creates attractive places that bring people and dollars into the community.**
 - TOD supports neighborhood revitalization, which in turn promotes economic development and long-term growth

Transit-Related Projections: Matrix Results

Projections for 2030 based on the Weighting Matrix (Appendix) suggest that the percentage of people using their private vehicles to drive to work will decrease by 42%. The graph below shows the change from current situation in 2008 to 2030 with an assumption that the ridership of the Light Rail and Trolley would be encouraging.



Policy Considerations

Land Use Strategies

- Proactively develop and promote station area plans and land use policies that:
 - Encourage intensive, high quality development oriented towards transit on and around station properties
- Develop performance-based station access strategies on a corridor or line segment basis rather than on a station basis. Encourage direct connections to stations from surrounding development in order to promote pedestrian and non-motorized access.

- ❑ Evaluate access facilities (including commuter and development parking) as a commodity and locate them according to best planning, design and real estate practices.
- ❑ Ensure that transit-oriented development opportunities are explicitly accounted for in acquisition of new properties, location of new station sites and design and construction of station facilities.

Process Strategies

- ❑ Form sustainable partnerships with local jurisdictions, other transit and regional agencies like NOACA, and the private sector to implement development plans on and off District property.
- ❑ In concert with local jurisdictions, employ community involvement techniques that reflect where communities are in the planning and development continuum.
- ❑ Solicit proposals for transit-oriented development of District-owned property through a competitive selection process, except in cases where sole source negotiations would result in more favorable conditions for the District.

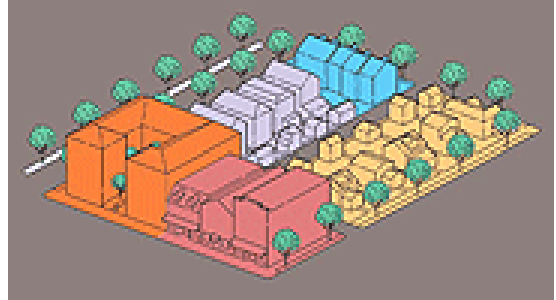
Financial Strategies

- ❑ Evaluate the financial performance of proposed projects based on sound financial parameters and the ability to generate transit ridership, fare revenue, lease payments, parking revenues, and grant resources, other financial participation, and/or cost savings. Consider the opportunity cost to the District of delaying development opportunities.
- ❑ When appropriate, use transit-oriented development revenues to foster additional transit oriented development projects to assist in financing TOD in general.

- Generally favor long-term ground leases, rather than the sale of property, as the standard disposition strategy for joint development projects, except in cases where alternative approaches are required to achieve specific development objectives or where other strategies would generate greater financial returns to the District.
- Where land sales are pursued as part of a development project, ensure fulfillment objectives from the project as a whole, including generating revenue over the long-term, continuing control of land for TOD purposes, leveraging land bank's land as an equity investment, and protecting the District's long-term ridership goals.

Implementation of Form-Based Zoning Codes

Form-Based zoning is a method of regulating development to achieve a specific urban form. Form-based codes create a predictable public realm primarily by controlling physical form, with a lesser focus on land use, through city or county regulations.



The Role of the Form Based Codes

Form-based codes place a primary emphasis on building type, dimensions, parking location and façade features, and less emphasis on uses. They stress the appearance of the streetscape, or public realm, over long lists of different use types. These codes have the following characteristics:

- ❑ *Zoning Districts* – Form-based codes are defined around districts, neighborhoods and corridors where conventional zoning districts may bear no relationship to the transportation framework or the larger area.
- ❑ *Regulatory Focus* – Form-based codes de-emphasize density and use regulation in favor of rules for building form. They recognize that uses may change over time, but the building will endure.
- ❑ *Uses* – Form-based codes emphasize mixed use and a mix of housing types to bring destinations into close proximity to housing and provide housing choices to meet many individuals' needs at different times in their lives.

- ❑ *Design* – Greater attention is given to streetscape and the design of the public realm, and the role of individual buildings in shaping the public realm. Form-based codes recognize how critical these public spaces are to defining and creating a “place.”
- ❑ *Public Participation* – A design-focused public participation process is essential to assure thorough discussion of land use issues as the code is created. This helps reduce conflict, misunderstanding and the need for hearings as individual projects are reviewed.

How Do Form-Based Codes Work?

Form-Based Codes usually consist of three primary components (and one optional component) that are employed to implement a community’s vision-based physical plan. These components include: Regulating Plan, Building Envelope Standards, Definitions, and the optional Architectural Standards.

The Regulating Plan: Provides the coding key for the building envelope standards, and specific information for the character of each building site. Regulating plans indicate the type of building that can be constructed on a given site in a community

Building Envelope Standards: Specifications regarding height, siting, elements, and uses are described in the building envelope standards

Definitions: The glossary of Definitions is another integral part of the Form-Based Code. This component allows for a full explanation of all vital design elements of the Form-Based Code.

Architectural Standards: They relate primarily to aesthetics of a community, and are only included in a Form-Based Code at the discretion of the local stakeholders

Form-Base Code Goals and Policy Initiatives:

- ❑ Establishments of Form-based zoning districts by identifying the form, function and character of the cities in the study area
- ❑ Formation of a regional authority in collaboration with the Institute of Form-based codes, Regional educational institutions like the Cleveland State, Case Western and Kent State Universities. The regional authority would
 - Identify the specific corridors and districts which could adopt the Form-based approach of Zoning.
 - Emphasis on mixed use and a mix of housing types to bring destinations into close proximity to housing and provide housing choices to meet many individuals' needs at different times in their lives.
 - Greater attention would be given to streetscape and the design of the public realm, and the role of individual buildings in shaping the public realm.
 - A design-focused public participation process would be taken to assure thorough discussion of land use issues as the code is created. This helps reduce conflict, misunderstanding and the need for hearings as individual projects are reviewed

Preserving Parkland and Green Space

Frederick Law Olmsted, “Father of American Landscape Architecture”, and the nation’s foremost park maker, understood the value of green space to the city dweller. His most famous created green landscape for the urban environment of a large city is Central Park, an internationally recognized marvel of

landscape architecture. It is with this example in mind that Scenario 3 is committed to creating long-range land use plans for the region that include a cohesive plan for maintaining greenspace both in and around the



older urban cores of Lorain and Cuyahoga counties.

The study area’s older urban core cities of Cleveland, Lorain, and Elyria have a strong industrial past, and the greenspace that remains is in public hands. The “North Coast” of both Greater Cleveland and Lorain County, which contains Avon Lake, Sheffield Lake, Sheffield Village, and the City of Lorain, has greenspace in the form of public park space owned and managed by the city “metroparks” system, county park system, state park, or the national park system. As such, these areas are “protected” and cannot be developed without special permission from their respective government agencies.

The privately owned greenspace has no such protection, and once sold can be used by the owner in whatever way suits his/her purposes – and becomes unavailable for public use. It is the

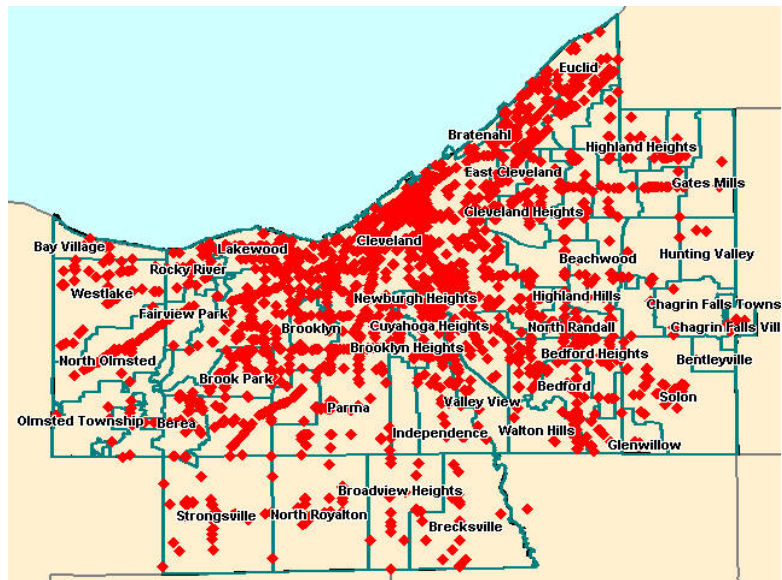
opinion of this team that there must be a comprehensive regional plan for the management of and preservation of area greenspace, for the future enjoyment of all residents.

Scenario 3 Approach

- ❑ The plan would create a “greenspace land bank” that acquired suitable local parcels as they became available.
 - Parcels would be “banked” until there were enough to either add to existing greenspace, or create a new green area.
 - The bank would be operated on the regional level, with all three park agencies, Cleveland Metroparks, Lorain County, and representatives of the national park system having equal access to parcels.
 - Creation of such a bank would facilitate communications between agencies, and allow areas in the region to receive “allotments” of parcels, either according to need or due to special greenspace development efforts in targeted areas.
 - Currently, each park management system operates independently, and plans for further park development or parcel acquisition are made in isolation. This creates a “patchwork” effect, with no overall strategy to manage parcel acquisition; it creates a “layering” of parks management – with residents unsure who to contact, and gives the purchasing advantage to the agency with the most available funds.

- Brownfield: At the opposite end of the open space spectrum is the brownfield. Where the previous discussion focused on the maintenance and increasing of public space, the urban brownfield parcel, a holdover from the region’s manufacturing past, is the type of parcel local governments struggle to eliminate. Brownfields are land parcels that have been rendered unsuitable for development due to contamination from industrial waste products that have remained in the soil long after the firm has gone.

As residents and companies move farther and farther from the urban core to take advantage of the lower construction costs made possible by the seeming abundance of uncontaminated land, acres



of land go unused and undeveloped due to previous contamination. The map above shows the density of Brownfield sites in Cuyahoga County which are pushing the developments further out. The inability to build on large sites in the urban core pushes firms out of the city in search of adequate sites for building, free of contamination. Residents move out as well seeking open space, and moving away from vacant parcels filled with weeds and debris. One might look at brownfields as an *indirect cause of sprawl* – pushing both business and development further out, away from the urban core.

Remediation of Brownfield is both time-consuming and expensive, another reason that the land goes unused. However, there are steps that can be taken by local area

governments to revitalize and reuse some sites, and by so doing, increase local greenspace.

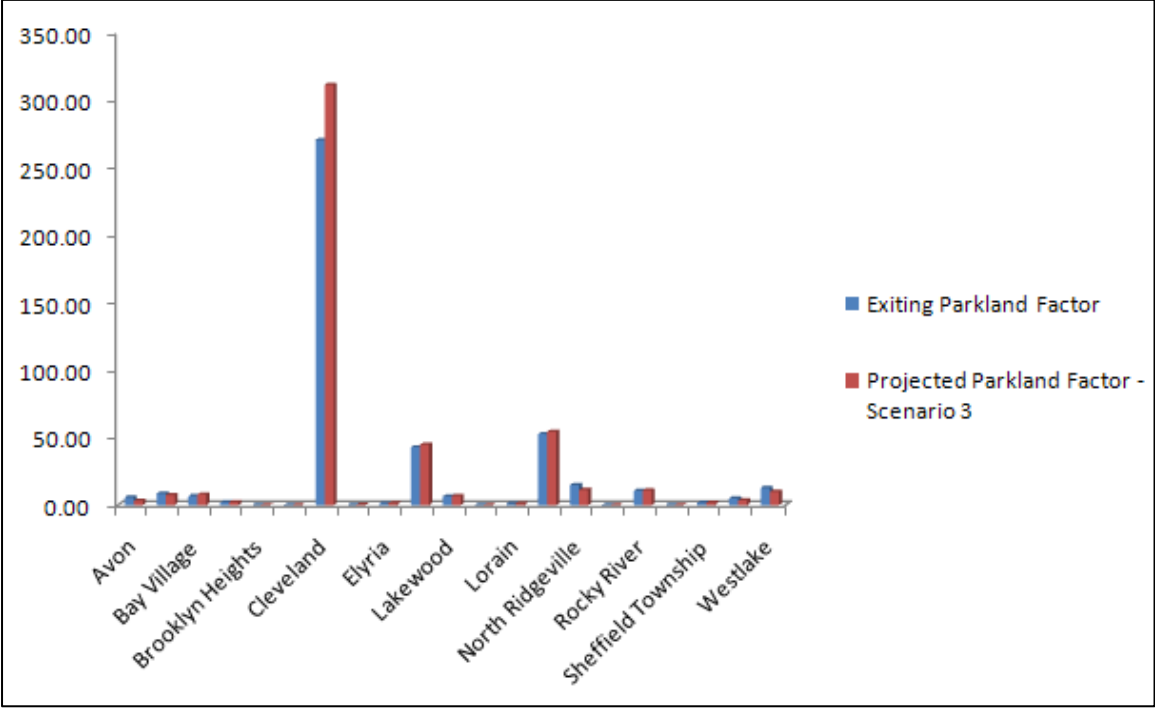
- ❑ Urban Garden: Ironically, the presence of weeds, which makes the vacant lots so unattractive, indicates that the site can generate living plants. Those same weeds indicate that the same site might possibly function as an “*urban garden*”, providing fresh fruits and vegetables for local residents’ consumption if the site is safe for humans - flowers and green plants if not.

Northeast Ohio is becoming a focal point for research on urban agriculture. The New Agrarian Center, located in Oberlin, Ohio is working to create a regional network that links rural farmers to urban residents in order to decrease the “leakage” of revenues out of the region and the state as shoppers purchase produce shipped into the area. The New Agrarian Center also works with the Ohio State University Extension Urban Program to promote “City Fresh”, a local program created to stimulate interest in “urban farming” in the inner city, and increase both the availability of, and access to, fresh fruits and produce for local residents. One of the program’s successes is the George Jones Farm, formerly a deserted asphalt parking lot. That a formerly vacant parking lot can be turned into a fully functioning produce farm in the inner city is visible proof that some local brownfields have excellent potential for re-use.

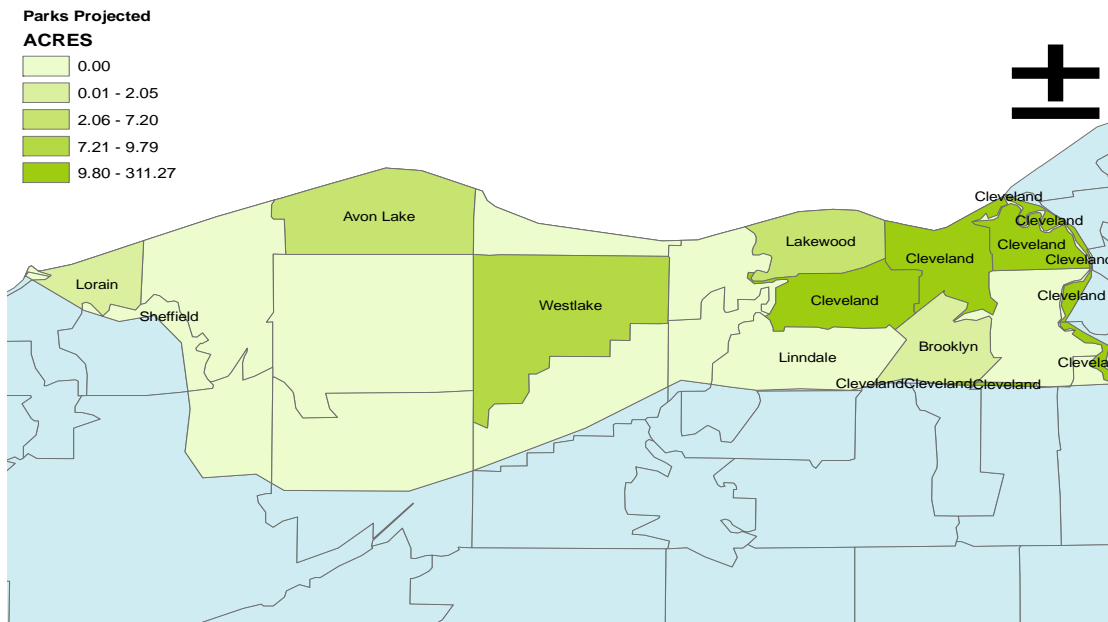
Developing vacant lots into gardens is also an indirect way to raise property values by creating more visually appealing neighborhoods. Instead of acres vacant lots strewn with rubbish, there could be acres of fresh fruits and vegetables on the

“farm”, a farm employing local residents. Location near an urban farm could become a desirable amenity for the “baby-boom” generation as their ability to stay mobile diminishes with age.

Projected Results



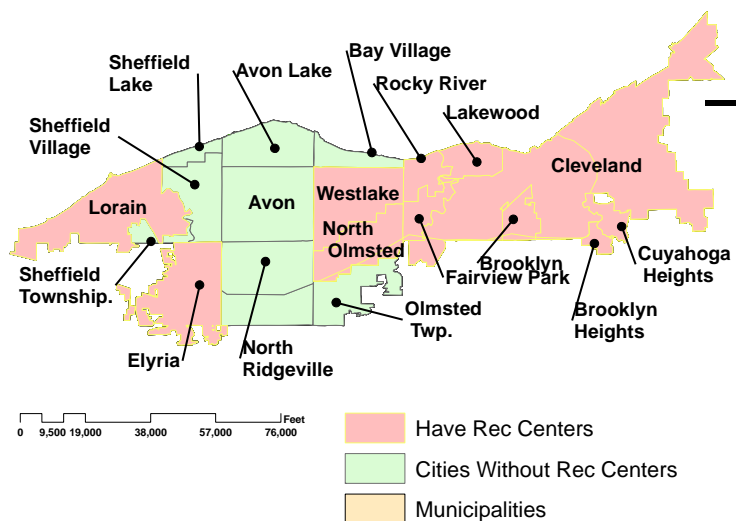
The above graph shows the scenario 3’s objectives in increasing the Parkland in the study area. Refer appendix for detailed tables. The map below shows the projection to 2030, where darker colors indicate higher density of preserved greenspace.



Increasing Access to Recreation Centers

Scenario 3 Approach: The scenario calls for the continued sharing of recreation centers, as well as for the building of smaller recreation facilities in the municipalities of Avon and North Ridgeville, enhancing public access to these facilities across the study area, while also serving to minimize the commute time between home and facility.

The municipalities of Avon and North Ridgeville have no city operated recreation facilities. The adjacent map



shows the Cities that have recreational centers. Their residents must travel out of their municipality into bordering cities in order to use a public recreation center, if they are unable to afford working out at a private gym. With the price of gasoline rising, and the desire to decrease the number of vehicles on the highway, there will be strong incentives to shorten the commute necessary for personal trips and entertainment. Plugging the “hole” on the map by building small/medium, but reasonably complete, recreation facilities will both facilitate the sharing of facilities by those closest to the facility, it also makes a city operated recreation facility accessible to most residents of the region.

By managing both the placement and operation of municipal recreation centers on the regional level, situations such as having a “hole” in one area of the region can be avoided. In addition, regional management of recreational facilities will promote a more equal distribution of the funding for public recreation, eliminating the competition created between municipalities by the need to build ‘the latest and the greatest’ facility for its residents, leaving funds available for other municipal goods and services.

Effect on Taxation

As described above, the Scenario 3 study area suffers from inefficiencies stemming from low-density growth patterns and suboptimal use of infrastructure. Urban areas with substantial existing infrastructure within the study area may be seeking increased tax rates in order to cope with such inefficiencies. For example, Cleveland and Lorain, both central cities, impose 2% income tax rates on constituents, while outlying municipalities such as Avon and Avon Lake impose only 1.5% income tax rates (See Income Tax Factor chart below). Therefore, a primary goal of Scenario 3 included the remediation of these inefficiencies.

As described at the outset, increases in population density in areas with existing infrastructure produce economies of scale in provision and utilization of public goods such as infrastructure. It was therefore expected that Scenario 3 would naturally result in increased efficiency and ultimately lower tax rates for a larger number of individuals than possible in Scenario 1 and Scenario 2. As shown in the Income Tax Factor chart immediately below, “income tax, weighted rate” was determined by multiplying the number of residents projected for each municipality times the income tax rate for the respective municipality. (RITA) As shown

Income Tax Factor			
City	Income Tax Rate (%)	Weighted Pop	Factor
Avon	1.5	0.0264	0.0396
Avon Lake	1.5	0.0419	0.0628
Bay Village	1.5	0.0371	0.0557
Brooklyn	2.0	0.0229	0.0458
Brooklyn Heights	2.0	0.0023	0.0046
Brook Park	2.0	0.0024	0.0048
Cleveland	2.0	0.4005	0.8010
Cuyahoga Hts.	2.0	0.0011	0.0023
Elyria	1.8	0.0329	0.0576
Fairview Park	2.0	0.0343	0.0685
Lakewood	1.5	0.1121	0.1682
Linndale	2.0	0.0012	0.0024
Lorain	2.0	0.0381	0.0762
North Olmsted	2.0	0.0639	0.1279
North Ridgeville	1.0	0.0315	0.0315
Olmsted Township	0.0	0.0001	0.0000
Rocky River	1.5	0.0479	0.0718
Sheffield Lake	1.5	0.0216	0.0324
Sheffield Township	0.0	0.0017	0.0000
Sheffield Village	1.5	0.0068	0.0102
Westlake	1.5	0.0732	0.1098
Calculated Economic Value =			1.7732

in the Weighting Matrix in Appendix, and contrary to expectations, Scenario 3 produced a higher Calculated Economic Value (1.77) than Scenarios 1 and 2 (1.72 and 1.76, respectively) because a greater proportion of the population was distributed into areas that, under current socioeconomic conditions, impose higher income tax rates.

At face value, Scenario 3 appears to create the least favorable income tax conditions among all three scenarios. However, the Weighting Matrix scoring system was based on two assumptions, one of which

is invalid. First, the scoring is based upon a definition of “beneficial” that is derived from the standpoint of residents. Where survey responses expectedly indicated that lower income tax bills were more desirable than higher income tax bills, the Weighting Matrix accordingly awarded a superior score to the scenario that placed the largest number of persons in municipalities with the lowest income tax rates. Second, as discussed immediately below, the investigation only considered population and tax rate as determinants.

In order to fully explain the impact of population shift toward increased density on income taxation, several other factors must be considered. Generation of revenue through income taxation relies on the tax potential of a jurisdiction, which in turn involves several interdependent variables. (Teera & Hudson) These variables may include cost per unit of services (efficiency), type and quality or scope of services provided, population and average income, type and number of taxable commercial entities, and scope of tax incentives granted in order to overcome competitive disadvantages. (Teera & Hudson) Additional considerations like tax-sharing arrangements among municipalities must also be studied in order to achieve a comprehensive analysis of the impact of population shifts on taxation. The depth of analysis for each matrix category was established at the outset of the study to focus results on general effects of regional population shifts.

The predetermined constraints on the income tax analysis thus produced an oversimplification of effects that may underlie the scoring in the Weighting Matrix. Thus, while the first taxation assumption discussed above remains justified, the second taxation assumption constrained the investigation too severely, producing a result incoherent with sound, widely held theory regarding efficiency through

optimization. The results found for the “income tax, weighted rate” are therefore inconclusive and highlight a need for further analysis of impacts on income taxation as it relates to population shift.

Lending additional credibility to the belief that the results for the impacts on income taxation are inconclusive, Scenario 3 produced the highest density of commercial establishments among all three scenarios. The Smart Growth measures implemented in Scenario 3 caused a redistribution of commercial establishments into infill areas within established urban cores. According to efficiency theory discussed at the outset, increased density of users of public goods decreases the cost per unit of service provided. As a result, factors relating population shifts to changes in density may be a more reliable indicator of the tax benefit to be expected from the Smart Growth-induced population shift in Scenario 3.

Acres Per Commercial Establishment					
City	Number of Establishments	Acres	Acres per Establishment	Weighted Population	Factor
Avon	470.86	13349.81	28.35	0.03	0.75
Avon Lake	306.71	7114.35	23.20	0.04	0.97
Bay Village	177.86	2959.98	16.64	0.04	0.62
Brooklyn	1098.57	2464.19	2.24	0.02	0.05
Brooklyn Heights	1785.14	370.79	0.21	0.00	0.00
Brook Park				0.00	0.00
Cleveland	5985.14	21165.86	3.54	0.40	1.42
Cuyahoga Heights	98.00	376.74	3.84	0.00	0.00
Elyria	276.29	3241.46	11.73	0.03	0.39
Fairview Park	438.43	2812.79	6.42	0.03	0.22
Lakewood	1353.14	3559.46	2.63	0.11	0.29
Linndale	694.14	56.11	0.08	0.00	0.00
Lorain	467.71	3418.65	7.31	0.04	0.28
North Olmsted	128.86	6352.16	49.30	0.06	3.15
North Ridgeville	261.14	9160.67	35.08	0.03	1.11
Olmsted Township		24.54		0.00	0.00
Rocky River	349.86	3047.07	8.71	0.05	0.42
Sheffield Lake	196.00	1612.16	8.23	0.02	0.18
Sheffield Township	749.43	272.68	0.36	0.00	0.00
Sheffield Village		6914.09		0.01	0.00
Westlake	983.14	10162.85	10.34	0.07	0.76
			Calculated Economic Value =		10.60

Accordingly, the Weighting Matrix factor “acres per commercial establishment” may be a more reliable indicator than “income tax, weighted rate” in assessing the tax benefit to be expected from the Smart Growth-induced population shift in Scenario 3. As shown in the Acres Per Commercial Establishment chart immediately above, Scenario 3 growth redistribution projects to decrease the Calculated Economic Value relating to the number of acres per commercial establishment from 11.46 and 10.90 for Scenarios 1 and 2, respectively (Weighting Matrix, Appendix) to 10.60. This shift represents a 7.5% increase in density of commercial establishments across the study area. This translates into a superior rating for Scenario 3 in the Weighting Matrix (Appendix).

Therefore, if the literature emphasis on cost savings through increased density is correct, Scenario 3 would actually achieve greater population density, greater savings in cost per unit of services, and thus

lower tax rates. A modified “income tax, weighted rate” variable involving greater resolution should demonstrate this conclusion. However, the creation of such a system requires a complex regression analysis beyond the scope or intent of the present study.

Effect on Use of Septic Tanks

Use of septic tanks provides sustainable, onsite remediation of waste but may easily contaminate groundwater supplies under the wrong conditions. Safe use of septic tanks requires specific soil types and, more importantly for discussion herein, placement at distances from groundwater sources and other septic tanks sufficient to avoid contamination. (EPA Septic Tank Fact Sheet) As a result, development utilizing septic tanks would impose limitations on density that were deemed contradictory to Scenario 3 Smart Growth policies. As a result, Scenario 3 sought to significantly reduce the use of septic tanks in areas outside of the urban growth boundary.

As shown in the chart below (Acres Developed with Septic Tanks), only four municipalities possess significant acreage serviced or available for service by septic tanks. These four municipalities also happen to be outside the urban growth boundaries. As a result, Scenario 3 projects diminished development of acreage serviced by septic tanks. Ultimately, Scenario 3 achieved a Calculated Economic Value of 151.42, which ranked more favorably than the values achieved by Scenarios 1 and 2 in the Weighting Matrix (236.65 and 186.22, respectively; see Appendix). The superiority of Scenario 3 derives from the redistribution of population into areas serviced by existing water and sewer lines. As described at length above, this maximizes the use of existing infrastructure, achieving efficiency through economies of scale. In addition, the decreased reliance on septic tanks increases the density available for future development in outlying areas when such development becomes necessary.

Acres Developed with Septic Tanks			
Name	Acres	Weighted Population	Factor
North Ridgeville	1874	0.03154	59.10596
Avon	2982	0.02640	78.7248
Sheffield Township	10	0.00169	0.0169
Sheffield Village	1993	0.00681	13.57233
Calculated Economic Value =			151.42

Effect on Neighborhood Quality

Scenario 1 projects communities that lack transit options and rely fully on the automobile, underutilize infrastructure, and possess little preserved greenspace. Such communities represent modes of living that are inconsistent with imminent limitations on energy, resource utilization, and land availability. In short, the communities in the unaltered study area will contradict recommended modes of sustainable land use. (EPA, Sustainability)

Scenario 3 policies sought to alleviate the unsustainable projections in Scenario 1. Consistent with general recommendations on sustainability, Scenario 3 Smart Growth policies preserved greenspace through a greenspace land bank program, remediated Brownfields for infill development, increased use of public transit through its Transit-Oriented Development program, and redirected growth toward urban cores to avoid duplicative resource utilization in low-density developments. (EPA, Sustainability) As a result of the sustainable modes of operation projected under Scenario 3, Scenario 3 ranked more favorably than either Scenario 1 or 2 in the Weighting Matrix (Appendix).

Conclusion

Under a “no-limits” approach to land use planning, Scenario 3 projects study area growth under an aggressive system of six directives that mandate Smart Growth on a regional level. Scenario 3 repealed the legal basis for Ohio’s fragmented framework for land use planning and imposed two urban growth boundaries around established urban cores without regard for political limitations. In addition, Scenario 3 enhanced connectivity and transit choice among and within the smart growth centers through the introduction of Transit-Oriented Development, redirected growth toward established communities through Brownfield development, increased the heterogeneity of available uses while promoting aesthetic beauty of streetscapes through form-based zoning codes, and increased access to greenspace and recreational amenities through a regional greenspace land bank program and sharing of recreational facilities among municipalities.

The effects of Scenario 3 policies were encouraging. Increased density and increased utilization of existing infrastructure produced a cascade of benefits to the region as a whole. As shown in the Weighting Matrix in Appendix, Scenario 3 received a more favorable overall score (2.550) than both baseline projections under Scenario 1 (1.321) and projections under the mild, good faith regulations of Scenario 2 (1.765). Scenario 3 tied or ranked more favorably in all Weighting Matrix categories except “income tax, weighted rank” and transportation-related factors. However, the sub-par ranking in “income tax, weighted rank” appears to be an inconclusive data artifact produced by the research methodology. Instead, and according to literature reviewed, the increased density projected in Scenario 3 should actually decrease tax rates as municipalities achieve greater efficiency. Also, the transit-related projections under Scenario 3 may fail to properly account for the increased availability of public transit associated with the Transit-Oriented Development project. Regardless of these potential shortcomings,

the mandated Smart Growth measures mandated within the study area under Scenario 3 succeeded in creating maximally beneficial development conditions for the region under study.

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Appendix

1. Highway Access Matrix – Weighing factor: Percentage of people who drove to work

City	# of people who drove to work	Percentage of People who drove to work	Factor for Scenario # 3	Result of Factor applied	Percentage of People who drove to work - Projected
Avon Lake city	8,551	94.6%	0.02642	0.024995	2%
Avon city	5,189	93.6%	0.04188	0.03921	4%
Bay Village city	7,178	89.2%	0.03713	0.033125	3%
Brooklyn Heights village	783	94.1%	0.02291	0.021558	2%
Brooklyn city	4,899	97.4%	0.00228	0.002217	0%
Brook Park city	9,582	93.4%	0.00239	0.002237	0%
Cleveland city	142840	81.3%	0.40052	0.325584	33%
Cuyahoga Heights village	243	90.0%	0.00114	0.001029	0%
Elyria city	24861	94.1%	0.03289	0.030944	3%
Fairview Park city	7990	90.5%	0.03427	0.031003	3%
Lakewood city	26863	85.1%	0.11211	0.095418	10%
Linndale village	46	80.7%	0.00122	0.000985	0%
Lorain city	26946	95.5%	0.03809	0.036387	4%
North Olmsted city	16311	92.4%	0.06393	0.059047	6%
North Ridgeville city	11775	96.1%	0.03154	0.030299	3%
Olmsted township	4930	94.2%	0.00009	8.81E-05	0%
Rocky River city	8639	88.7%	0.04786	0.042443	4%
Sheffield Lake city	4715	95.7%	0.02163	0.020689	2%
Sheffield township	1675	96.1%	0.00169	0.001621	0%
Sheffield village	1423	95.1%	0.00681	0.00647	1%
Westlake city	14401	92.6%	0.07320	0.067758	7%

2. Public transit Matrix – Weighing factor: Percentage of people who used Public transit

City	Public Transportation Percent, 2000	Factor	Factor applied	Percentage of people in 2030 - Scenario 3
Avon	1.0	0.026416	0.025888	3%
Avon Lake	2.0	0.041877	0.082498	8%
Bay Village	3.1	0.037128	0.113981	11%
Brooklyn	1.0	0.022909	0.022909	2%
Brooklyn Hts.	2.5	0.002276	0.005691	1%
Brook Park	2.5	0.002395	0.006083	1%
Cleveland	12.0	0.400522	4.806264	100%
Cuyahoga Hts.	0.0	0.001143	0.000000	0%
Elyria	0.9	0.032888	0.029270	3%
Fairview Park	4.5	0.034272	0.154911	15%
Lakewood	7.8	0.112111	0.876712	88%
Linndale	8.8	0.001220	0.010704	1%
Lorain	0.7	0.038094	0.027047	3%
North Olmsted	2.7	0.063931	0.173893	17%
North Ridgeville	1.0	0.031535	0.030589	3%
Olmsted Twp.	2.1	0.000094	0.000200	0%
Rocky River	3.5	0.047861	0.168472	17%
Sheffield Lake	0.8	0.021628	0.017086	2%
Sheffield Twp	0.0	0.001687	0.000000	0%
Sheffield Village	0.0	0.006806	0.000000	0%
Westlake	2.3	0.073205	0.167639	17%

3. Parkland factor matrix

Municipality	Acres of Parks Land	Weighted Factor	Current Parkland Factor	Parkland factor projected-Scenario 3
Avon	119.73	0.02642	5.64	3.16
Avon Lake	171.98	0.04188	8.49	7.20
Bay Village	211.81	0.03713	6.58	7.86
Brooklyn	89.48	0.02291	1.93	2.05
Brooklyn Heights	0.00	0.00228	0.00	0.00
Brook Park	0.00	0.00239	0.00	0.00
Cleveland	777.17	0.40052	270.35	311.27
Cuyahoga Heights	213.65	0.00114	0.03	0.24
Elyria	37.50	0.03289	1.18	1.23
Fairview Park	1304.46	0.03427	42.77	44.71
Lakewood	58.23	0.11211	6.37	6.53
Linndale	0.00	0.00122	0.00	0.00
Lorain	28.56	0.03809	1.04	1.09
North Olmsted	848.89	0.06393	52.64	54.27
North Ridgeville	357.46	0.03154	14.69	11.27
Olmsted Township	0.00	0.00009	0.00	0.00
Rocky River	226.24	0.04786	10.45	10.83
Sheffield Lake	0.00	0.02163	0.00	0.00
Sheffield Township	912.95	0.00169	1.66	1.54
Sheffield Village	513.86	0.00681	4.91	3.50
Westlake	133.74	0.07320	12.71	9.79

4. Population Matrix

City	Current Population	Projected - Scenario 3
Avon	20,735	11,446
Avon Lake	21,706	18,145
Bay Village	13,674	16,087
Brooklyn	9,499	9,926
Brooklyn Heights	558	986
Brook Park	610	1,038
Cleveland	153,007	173,542
Cuyahoga Heights	68	495
Elyria	13,822	14,250
Fairview Park	14,422	14,850
Lakewood	48,149	48,577
Linndale	101	529
Lorain	16,078	16,506
North Olmsted	27,273	27,701
North Ridgeville	18,077	13,664
Olmsted Township	60	41
Rocky River	20,310	20,738
Sheffield Lake	8,763	9,371
Sheffield Township	799	731
Sheffield Village	4,201	2,949
Westlake	41,807	31,719

FINAL WEIGHTING MATRIX- SCENARIO 3

Weighting Matrix for Impact Factors of Regional Development Plan Scenarios

Survey Weight	Survey Results Sub-Weight	Scope of Impact Factors Descriptions	Calculated Economic Values			Polarity of Value and units	Unweighted Ranks			Weighted Ranks				
			low	med	hi		low	med	hi	low	med	hi		
0.0734		building code												
0.0951	0.095	city rec center												
		percent who have community center	81.7%	96.5%	100.0%	higher is better	1	2	3	0.095	0.095	0.190	0.285	
0.1067	0.107	water and sewer rates and service												
		acres of septic tanks, weighted rate	236.65	186.22	151.42	lower is better	1	2	3	0.107	0.095	0.190	0.285	
0.1717	0.065	tax bill												
		income tax, weighted rate	1.72	1.76	1.77	lower is better	3	2	1	0.065	0.195	0.130	0.065	
0.107	0.107	acres per commercial establishment	11.46	10.90	10.60	lower is better	1	2	3	0.107	0.107	0.213	0.320	
0.1121	0.112	public transit												
		transit to work, weighted rate	6.11	6.70	6.72	higher is better	1	2	3	0.112	0.112	0.224	0.336	
0.1506	0.151	parks												
		acres of parkland	441.46	474.90	476.55	higher is better	1	2	3	0.151	0.151	0.301	0.452	
0.1382	0.138	highway access												
		drive to work	86.2%	87.6%	87.3%	lower is better	3	1	2	0.138	0.415	0.138	0.276	
0.1521	0.152	neighborhood quality												
		neighborhood sustainability	1	2	3	higher is better	1	2	3	0.152	0.152	0.304	0.456	
1.000	1.000									1.000	1.321	1.765	2.550	HIGHEST IS BEST