SCENARIO PLANNING

Scenario planning represents the next generation of analytical processes created to evaluate the influence of development intensities and land use patterns on the efficiency of a proposed transportation system. Visualization of the interaction between land use and transportation decisions, as well as causational factors that explain the push-pull relationship between them, provide community leaders with the information they need to evaluate the consequences of potential actions. Building on this momentum, the Federal Highway Administration and other federal agencies are actively promoting the use of scenario planning models by state departments of transportation, metropolitan planning organizations, and local governments to better integrate transportation and land use decisions.

The Brownsville MPO and the City of Brownsville have taken leadership roles in Texas by taking a proactive approach to integrating land use, urban design, and transportation planning processes. Evaluating the relationship between land use, urban design, and regional travel behavior in a scenario planning analysis produces several benefits. When considered together, decisions and investments regarding all three elements can have a significant bearing on the study area:

- The impacts to sensitive land uses can be minimized when facilities identified for transportation investments are located after considering appropriate land use patterns and development intensities for the area.
- Prime locations for development can be stimulated if transportation investments consider available capacity or appropriate mobility options.
- Complementary activities can be placed next to existing or planned transportation infrastructure, making the most of land use opportunities and dedicated transportation investments.
- The quantity and location of travel demand can be influenced by land use decisions, making the possibility of real choices for various modes of travel both accessible and attractive.

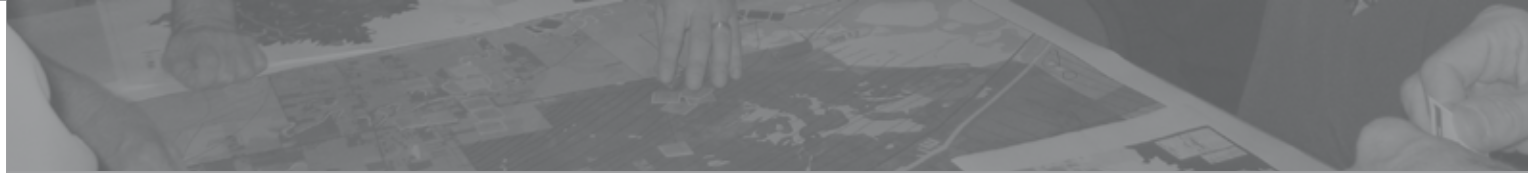
Scenario Planning Toolbox

Chip Game

The Chip Game was used in a public workshop to solicit public opinion on growth trends. The workshop process was intended to challenge residents and stakeholders to decide where land use and transportation improvements should and should not occur within the region. Two workshops were held (one for stakeholders) including representatives from the regional planning council, MPO, and TxDOT, and another for the general public. Each workshop group created several maps which were then synthesized into one workshop map. The map represented the preferred land use and transportation improvements desired by participants in the workshops.

Participants relied on resource maps to guide them as they moved through the process. Available maps included the thoroughfare plan, environmental resources, and a suitability or likelihood of development map. Before placing land uses and transportation improvements on the map, each group came up with goals and up to three general policies that would guide their development pattern. Examples of development patterns included trend, vibrant centers, or hybrid. By setting down a list of principles and goals, each team was able to agree on a general development pattern before they began laying down their assigned chips.

Each group was then given a packet of information containing a controlled number of chips of different character areas. These areas included residential, employment, and mixed-use types. These types are urban neighborhood, multifamily suburban neighborhood, suburban neighborhood, rural living, industrial park, business park, suburban regional activity center, strip commercial corridor, metropolitan center, town center,

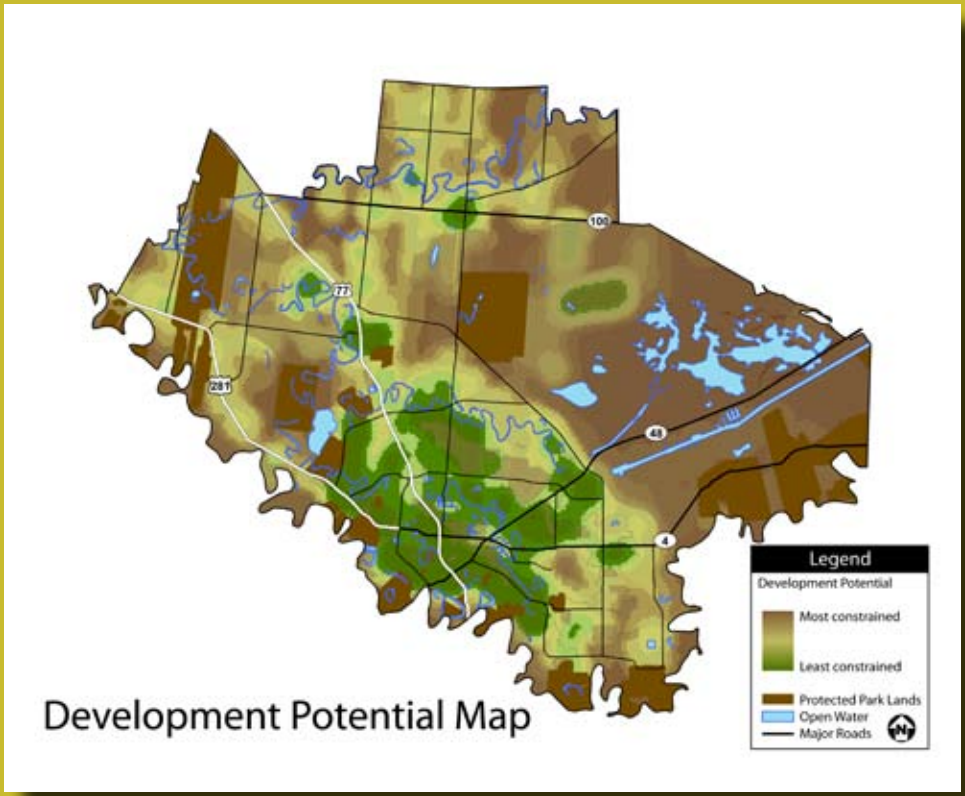


and mixed-use neighborhood. Each scenario packet, trend, vibrant centers, or hybrid was comprised of a unique mix of chips, equaling the same total population and employment.

Each group determined how they would distribute the chips across the study area. Groups were also allowed to trade chips according to the "trading sheet" (see attached). The trading sheet was created to maintain quantified relationships between land uses. For example, four suburban neighborhoods equal only one urban neighborhood, while 10 rural living chips equaled one suburban neighborhood chip.

Scenario Development

Based on current trends, future demographic data, and public participation direction, three land use scenarios were developed. Furthermore, development allocations were based on a suitability score. This score was based on the elements discussed in the *Regional Scan* section. Below is an image of the areas that are constrained more than others. This suitability provides a market force for the allocation of population and employment.



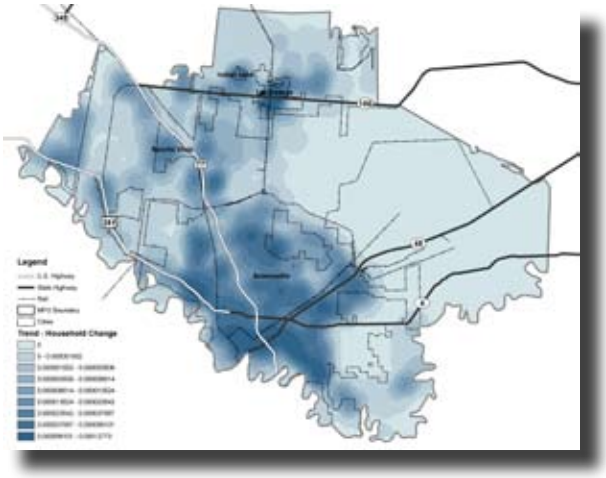
As previously mentioned, three scenarios were developed. Each scenario assumed different development patterns and densities. These can be described as:

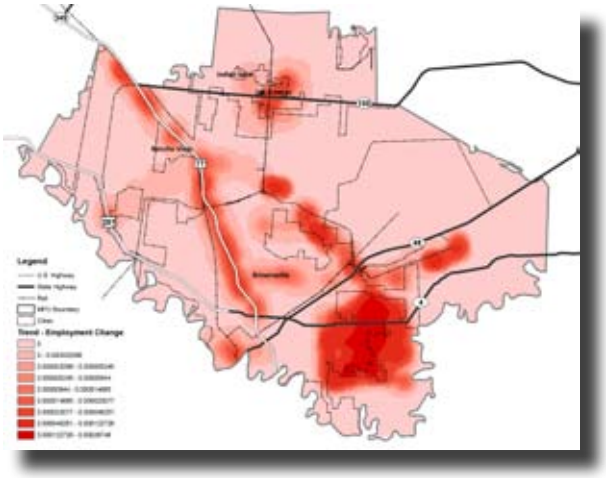
Scenario A: Continuation of current trends and existing land use policies.
Scenario B: A mid-range scenario that features more mixed uses and density than the trend scenario.
Scenario C: Creates an urbanized area with diverse, mixed-use development centers.

The following paragraphs discuss the scenarios and illustrate the differences between each.

Scenario A

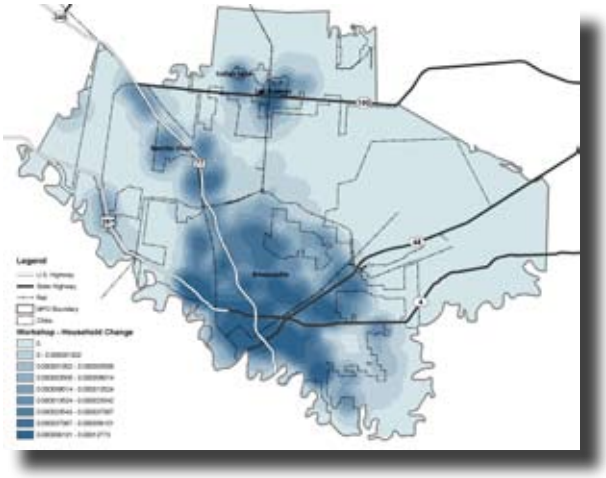
The trend scenario represents continuation of an emerging suburban development pattern prevalent in the study area. New construction is characterized by isolated, single-use developments surrounded by low-density rural residential home sites. The regional activity centers located at major intersections continue to be the social and economic center of the study area. Low-density development patterns and the physical distance between complementary land uses tends to promote automobile travel, particularly since safe, convenient facilities are not easily available for pedestrians, bicyclists, and transit riders. Increased traffic congestion on the rural road network means less mobility for residents and visitors to the study area. It also decreases mobility for others traveling through the community.

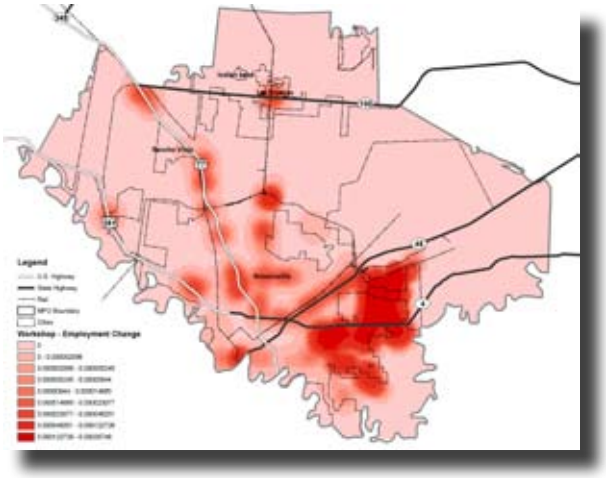




Scenario B

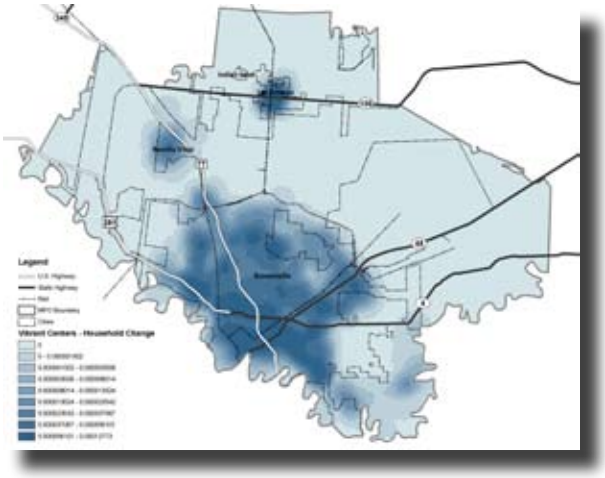
Scenario B consists of the largest mix of housing types. This scenario includes townhomes, multifamily, single family subdivisions, and rural residential. These developments will be clustered near jobs and infrastructure. Developments largely occur near existing infrastructure with moderate growth that will require additional water and sewer lines. The primary transportation mode will continue to be the automobile; however, due to more centrally located housing and employment, residents will have additional options (i.e., public transit, biking, or walking). Clustered mixed-use developments will serve as centers for small business and entrepreneurs. Some large retail centers will continue to occur. Rural clustered development will be designed to preserve open areas and farmland.

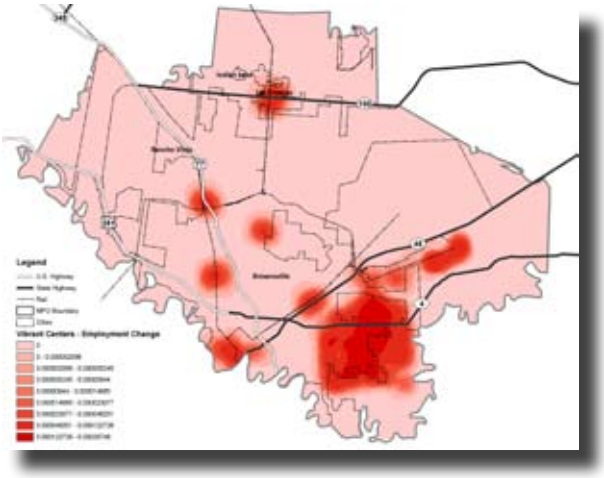




Scenario C

Scenario C represents the most dense and highest use of land. This scenario represents the most dramatic change, in terms of altering land use policies, of the three scenarios. Many new renter and owner-occupied multi-unit buildings and townhomes will be built in cities for working families, seniors, and those who prefer compact low-maintenance residences that are walkable to jobs and commercial areas. Sewer, water infrastructure, and road improvements will be focused in area cities, while rural areas will receive relatively less infrastructure funding. While the primary transportation mode will continue to be the automobile, most people will also use an expanded transit system within and between cities. Investment will be made into new walking and biking options. These options will be designed for year-round use. There will also be limited investment in new and widened roadways. Jobs will be centrally located. The downtown area and port/airport will utilize centrally located housing and infrastructure to generate an economically vibrate region. Major investments will be placed in this area. Among all three scenarios, C possesses the highest densities and preserves the most open areas and farmland.





Scenario Planning Results

Summary statistics for evaluating the impacts generated by the three development scenarios were reported using CommunityViz software® and the 2030 TDM. Measures of effectiveness (MOEs) generated by the two software programs articulate the significance of reorganizing land use patterns and development densities/intensities to improve efficiency of the regional transportation system (i.e., trend scenario vs. recommended workshop scenario).

Viable travel alternatives and more compact, mixed-use development centers reduce travel distance between complementary land uses and reliance on the automobile for day-to-day activities. This leads to less VMT/VHT and higher average automobile travel speeds (system-wide) compared to the sprawling development pattern in the business-as-usual scenario. Further, VMT during the transportation system peak period were reduced by approximately 7%, resulting in a more efficient transportation system. The following tables on page 21 summarize all the MOEs generated from the 2035 Model for the three development scenarios.

SCENARIO	A	B	C
VMT	4,430,000	4,400,000	4,390,000
per Capita (miles)	10.7	10.6	10.5
VHT	146,000	152,000	144,000
per Capita (min)	21.1	21.9	20.7
Delay	28,000	34,000	26,000
per Capita (min)	4	4.9	3.7
Value of Time Lost (per year)	$198,000,000	$240,000,000	$184,000,000
Gallons of Fuel Wasted Annually	6,130,000	7,450,000	5,690,000
Air Quality (per year)			
NoX (tons)	2,674	2,655	2,649
CO2 (tons)	646,780	642,400	640,940
VOC (tons)	3,208	3,187	3,179

A compact development scenario also reduces the spatial footprint of the built environment on the surrounding hinterlands. Urban centers and surrounding walkable neighborhoods identified in the hypothetical compact development scenario limits creeping low-density, sprawl development patterns and reduces accompanying public infrastructure costs. Output data from Community Viz® indicates that up to 71% of the total land area identified within the study area could remain in a rural or natural setting — compared to 58% in the business-as-usual scenario — while accommodating the same magnitude of growth projections for 2035. The difference in development cost between doing this "as usual" scenario versus a more sustainable development pattern as shown in Scenario B, can save the region and developers as much as $900 million dollars; of which $780 million occurs in the City of Brownsville, $100 million in Los Fresnos and $20 million in Rancho Viejo. These costs lessen the burden on the City's budget, which translates into higher ad valorem values.

Beyond environmental stewardship, the compact development scenario supports prudent fiscal responsibility for capital improvements planning and room for purposeful growth beyond the 2035 planning horizon. The table below summarizes development characteristics associated with the development scenarios. Compact development generates a higher yield portfolio of land uses while reducing public expenditures. Beyond savings in construction costs, less environmental land loss means more pristine view corridors are maintained and land is available for enjoyment by the citizens of Brownsville. If the land within the region is protected, future generations will reap the benefits.

SCENARIO	A	B	C
Total Employees Outside City Limits	29,000	28,000	31,000
Total Employees Inside City Limits	34,000	35,000	32,000
Dwelling Units Outside City Limits	12,000	7,000	5,000
Dwelling Units Inside City Limits	52,000	57,000	58,000
Acres Developed	67,700	41,000	40,500
Impervious Surface Coverage (Acres)	41,100	25,500	24,800
Water Run Off (gallons)	1,120,000,000	690,000,000	670,000,000
Water Consumption(gallons)	7,440,000,000	5,790,000,000	4,830,000,000
Cost of Water	$14,900,000	$11,600,000	$9,700,000
Local Street Construction Cost	$240,000,000	$210,000,000	$200,000,000
Utility Cost	$1,050,000,000	$860,000,000	$700,000,000
Development Cost	$3,270,000,000	$2,370,000,000	$1,830,000,000

- Costs are based on Burchell, R. Lowenstein, G. Dolphin, W. Galley, C. "Costs of Sprawl - 2000." Transit Cooperative Research Program Report 74. 2002

Preferred Scenario

Based on the performance of the modeling and community / stakeholder input, Scenario B has been selected as the preferred development scenario. The input was used to mold the scenario into a common vision. With an improvement in cost of almost $1billion in future development costs between Scenario B versus Scenario A, the region stands benefit at both the regional and local levels if local leaders follow up by securing the adoption of new land use policies. The charge is for the member agencies and the MPO to strive to embrace a series of actions to implement Scenario B. The following sections will lay out a Call to Action. Actions for agency coordination, sustainable development practices, Complete Streets, and multimodal planning are provided to begin to bridge the gap between the current development patterns and the preferred development pattern found in Scenario B.