

# Land Use Scenarios

for Lee County, Florida

*Final Report  
January 2015*



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# 1. Introduction

The Lee County Metropolitan Planning Organization (MPO) is the county’s transportation planning partnership between the cities of Bonita Springs, Cape Coral, Fort Myers, Fort Myers Beach, Sanibel, unincorporated Lee County, and the Florida Department of Transportation (FDOT). The MPO is responsible for planning a multi-modal transportation system to serve the entire county.

This document describes the planning and evaluation of alternative land use scenarios for Lee County, which followed these general phases:

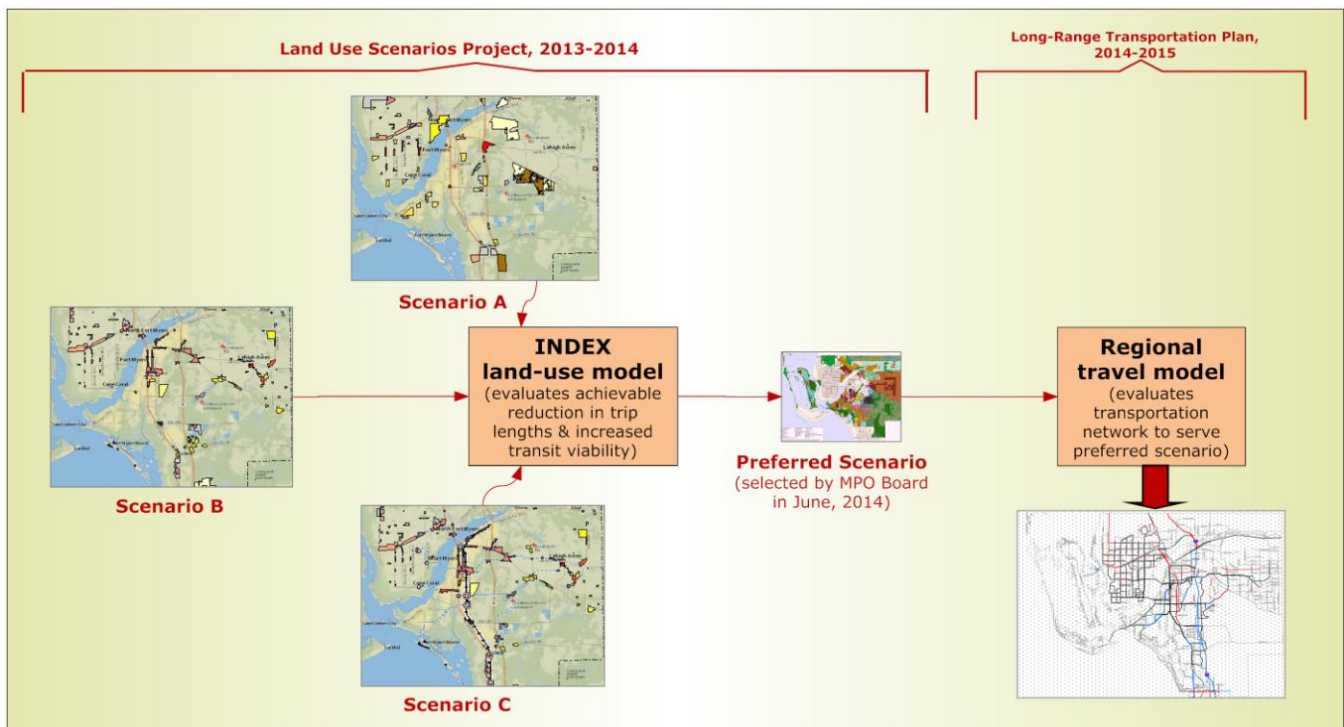
- Identify a community vision and establish specific goals and objectives
- Develop alternative scenarios for future growth in Lee County
- Evaluate the scenarios using technical criteria.
- Gauge public responses to the scenarios
- Select a preferred alternative for use in creating the MPOs 2040 long-range transportation plan

Scenario planning was used by the MPO because quality transportation planning requires specific assumptions on the intensity and location of future development. Instead of relying on assumptions created entirely by transportation experts, the MPO wanted broader input and a firm community consensus on anticipated growth patterns before creating a transportation plan for the year 2040.

Future land use patterns are a key variable that affects transportation networks and the public investments required to build and maintain them. Other important variables include demographic and economic trends, the future cost of fuel, and social factors such as the willingness to commute by private vehicle or public transit.

The MPO hopes to reduce or shorten vehicle trips and increase travel options in future years.

Scenario planning is a widely used analytical process that assesses alternative futures. The Federal Highway Administration (FHWA) strongly endorses scenario planning at the MPO level. This scenario planning process was organized and developed by the MPO and its consultants in close cooperation with local and state government staffs and in accordance with FHWA guidance.



## 2. Community Vision, Goals, and Objectives

An early step in planning is defining the desired outcome in broad terms, followed by setting specific goals and objectives that are most likely to produce that outcome. For this project, a vision statement plus goals and objectives were written to guide the creation of land use scenarios.

The vision statement and the goals and objectives were based on two distinct efforts. The first was the “New Horizon” evaluation and appraisal report carried out by the Lee County Planning Division and approved by the Board of County Commissioners in March 2011. During that process, dozens of meetings were held throughout Lee County to receive input on future directions for the county.

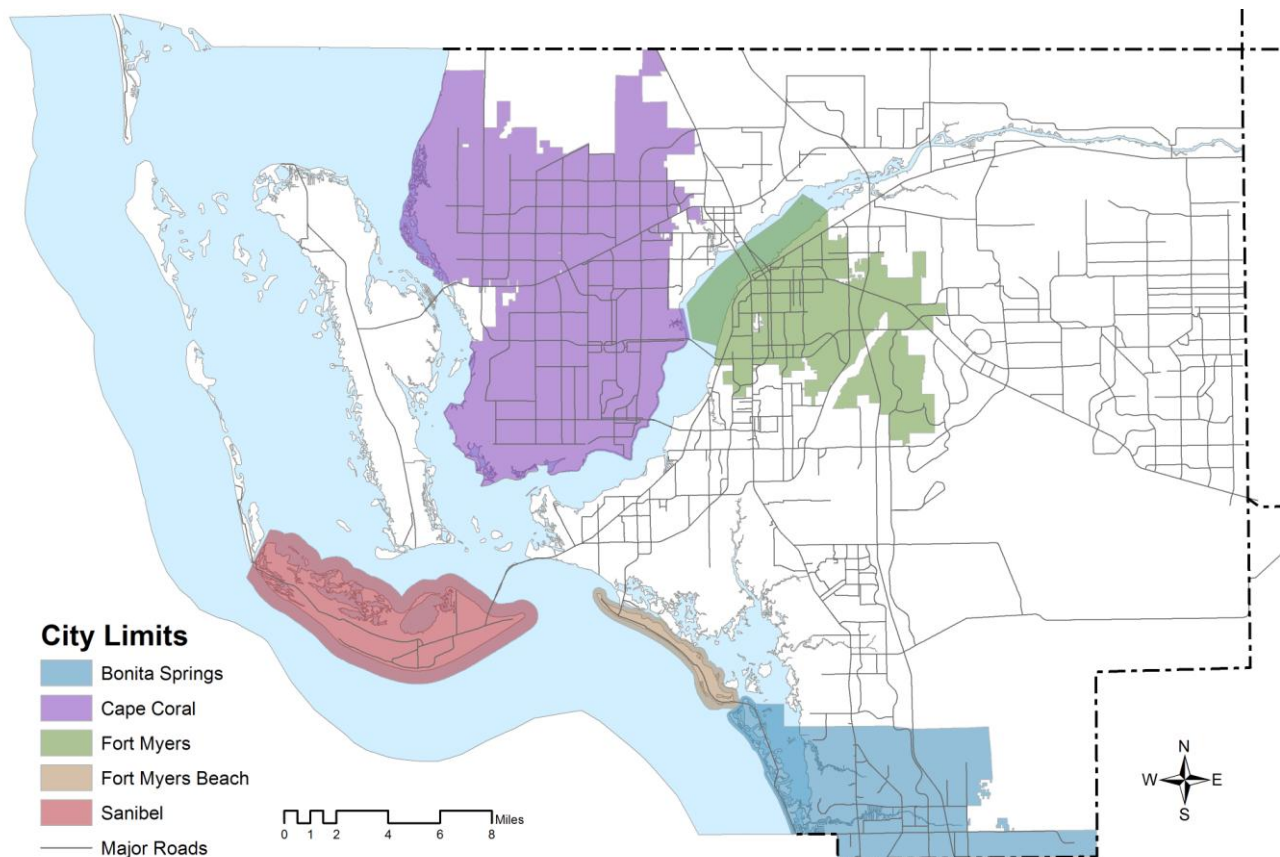
### Staff and Stakeholder Input

The second effort was a series of meetings with government and agency staff and key stakeholders selected by MPO staff in the fall of 2013.

Eight meetings were held with staff members of agencies and local governments. The participants included the lead contacts from each entity who would later participate in an interactive workshop to formulate the scenarios. The meetings introduced staff members to the project and allowed them to comment on the emerging vision, goals, and objectives. The discussion included potential “place types” that would be used to build the scenarios and indicators that could measure effectiveness.

Seven meetings were held with stakeholders active in land use and transportation issues in Lee County. Some were small group discussions and a few were presentations to larger groups. All began with an overview of the project. Each group had ample time to ask questions and share their opinions. A detailed questionnaire was provided prior to each meeting to generate discussion.

Short summaries of the discussions that occurred during these meetings are presented in Appendix A, organized by agency and by topic.



## Vision Statement, Goals, and Objectives

A vision statement was prepared to guide the creation and analysis of the scenarios. Five specific goals and related objectives elaborated on the vision statement. This work was based in large part on the 2010 “New Horizon” evaluation and appraisal report for the Lee County Comprehensive Plan, expanded to incorporate input from the stakeholder and staff interviews. In November 2013, the MPO committees and board formally approved the following vision statement and goals and objectives:

**VISION STATEMENT:** Lee County will be a highly desirable place to live, work, and visit—recognized for its commitment to a sustainable future characterized by a healthy economy, environment, and community. Lee County will be a community of choice—valued for its quality of life; varied natural environment; unique sense of history and place; distinct urban, suburban, and rural communities; diverse economy and workforce; and varied travel options.

### 1. SCENARIOS GOAL FOR COUNTY-WIDE ISSUES:

- To improve the quality of Lee County’s unique mix of diverse vibrant communities, affordable pre-platted subdivisions, coastal waterways, and interior wetlands.
- Increase employment and shopping opportunities in areas such as Cape Coral, Lehigh Acres, and North Fort Myers to minimize the need for residents to drive long distances for daily needs.
  - Provide convenient public transportation between Cape Coral and Lehigh Acres and the regional jobs centers between them.
  - Minimize haphazard building on remote pre-platted lots by focusing infrastructure improvements in clearly designated growth areas.
  - Recognize the differences and similarities between urban and suburban neighborhoods.
  - Discourage further development in vulnerable low-lying areas that are threatened by intense tropical storms and rising sea levels.
  - Limit new development in rural areas.
  - Link conservation areas together to restore natural water flows, allow wildlife movement, and improve the ability to manage and restore natural patterns.

### 2. SCENARIOS GOAL FOR NEW MIXED-USE PLACES:

- To introduce mixed-use activity centers to serve existing and planned residential neighborhoods.
- Provide a wider range of options for housing types, shopping and dining, employment, transportation alternatives, and recreation/social venues to attract residents and jobs and create unique lively destinations throughout the county.
  - Focus on livability priorities such as walkable blocks, public transit, civic spaces, public services, and multiple street connections to surrounding neighborhoods.
  - Promote mixed-use activity centers at five different scales: regional, community, neighborhood, rural, and infill/redevelopment corridors.
    - Regional mixed-use centers serve county residents, visitors, businesses, institutions, and the surrounding region. These centers are larger and

more intense than the others and often serve as transit hubs.

- Community mixed-use centers serve nearby neighborhoods or an entire community. They may include a grocery store and a compact mix of housing, offices, and services and are typically served by public transit.
- Neighborhood mixed-use centers serve one or more neighborhoods and provide small-scale services and housing. They are compact and pedestrian-friendly and may be at the edge of a neighborhood or within it.
- Rural mixed-use centers provide services and some housing in rural or natural areas to reduce the need for rural residents or visitors to travel longer distances to meet their daily needs.
- Mixed-use infill/redevelopment corridors can revitalize existing commercial strips over time. Enhanced pedestrian, bicycle, and transit connections are supplemented with on-street parking.

### 3. SCENARIOS GOAL FOR NEIGHBORHOODS AND STREETS:

To maintain Lee County’s healthy neighborhoods and revitalize or build others to higher standards of connectivity and convenience.

- Promote a more compact pattern of development in new and revitalized neighborhoods, with a greater variety of housing types for all income levels, ages, and preferences.
- Provide additional services, jobs, transit, and other amenities in or near these neighborhoods.
- Provide interconnected “Complete Street” networks in new neighborhoods that accommodate all users, including bicyclists and pedestrians.

### 4. SCENARIOS GOAL FOR THE REGIONAL TRANSPORTATION NETWORK:

- To optimize the existing regional transportation network to improve existing shortcomings and respond to evolving preferences in living and travel patterns.
- Vary the physical characteristics of arterial and collector roads to match the surrounding context, which often includes urban, suburban, and/or rural areas along a single road.
  - Today’s arterial and collector network is too sparse to provide optimal regional connectivity. There is little opportunity to further widen roadways to provide additional capacity on this network. New road links in urban areas could improve connectivity, provide redundancy in potential travel routes, and shorten travel distances to many destinations.
  - Consider costs of maintaining existing roads and bridges when evaluating potential growth patterns and when considering new or wider roads.
  - Reduce the number and length of automobile trips and vehicle-miles traveled and avoid planning new roads that draw development away from existing urban areas.

### 5. SCENARIOS GOAL FOR PUBLIC TRANSIT AND OTHER TRAVEL MODES:

To provide a wider variety of transportation choices for Lee County’s diverse population.

- Create “Complete Streets” to accommodate all travel modes, including walking, bicycling, and transit use, along all roadway types (except for Interstate 75).
- Improve public transportation in response to rising fuel prices, which are making longer trips less practical even for those owning cars.

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### 3. Scenario Development

Three conceptual growth scenarios were created. Each scenario represented a pattern for the distribution of future residential and job growth throughout Lee County.

A day-long planners' workshop brought together key planning and transportation staff members from each jurisdiction to develop the scenarios. The consulting team then cleaned up data inconsistencies and finalized three scenarios.

A summary of the scenario development process is provided below.

#### Place Types

Lee County and all of its cities have their own comprehensive plans, each with a Future Land Use Map. These maps do not follow a common format; each has its own system of land use designations. These designations frequently allow residential densities far higher than existing conditions or the current development trends; and few of them identify how much non-residential development each designation might include.

These maps show the presumed character of land when neighborhoods are completely developed, without projecting when that build-out state might occur. Especially in Cape Coral and Lehigh Acres, build-out will occur many decades after the year 2040, whereas Sanibel and Fort Myers Beach are essentially built-out today.

In order to evaluate each land use scenario fairly, these inconsistencies had to be resolved. The method selected was to identify a series of "place types" that would describe potential conditions in Lee County when neighborhoods were fully developed.

For instance, neighborhoods that are developed with ¼-acre lots, such as most of Cape Coral and much of Lehigh Acres, will have a predictable residential density regardless of their differing designations. They will also include some offices and stores whose intensity can be estimated based on actual data from completed neighborhoods. All of these neighborhoods were assigned the "suburban neighborhood" place type.

Other recognizable development conditions also have predictable average densities that could be reflected in specific place types, such as multifamily neighborhoods like Pine Manor, rural/residential communities like Buckingham, and office parks.

New place types were also created to match adopted or pending classifications in local comprehensive plans. For instance:

- Cape Coral: commercial activity centers
- Lee Plan Evaluation and Appraisal Report: regional, town/community, and neighborhood mixed-use centers, and redevelopment corridors
- Potential opportunities for transit-oriented development

Average densities, ratios, and standards for each place type were customized to existing and potential Lee County conditions. Seventeen place types are described on pages 5 and 6.

#### Combining Future Land Use Maps









Most of the land in Lee County has a clearly defined pattern, including fully-developed neighborhoods, areas that will remain rural, and protected areas such as wetlands. Most of this pattern will not change, and thus will be the same under all reasonable land use scenarios.










The first step in the scenario development process was to create a base map that identified the likely future character of land in the absence of any forces that would change that pattern. This base map is the common link between all scenarios, with each scenario identifying specific changes to that pattern.

In all, seventeen place types were needed to generalize the conditions shown on the future land use maps of Lee County and the five cities. The resulting map, referred to as the "base canvas" during the scenario development process, was broken down using the same traffic analysis zones that will be used to create the Long-Range Transportation Plan.

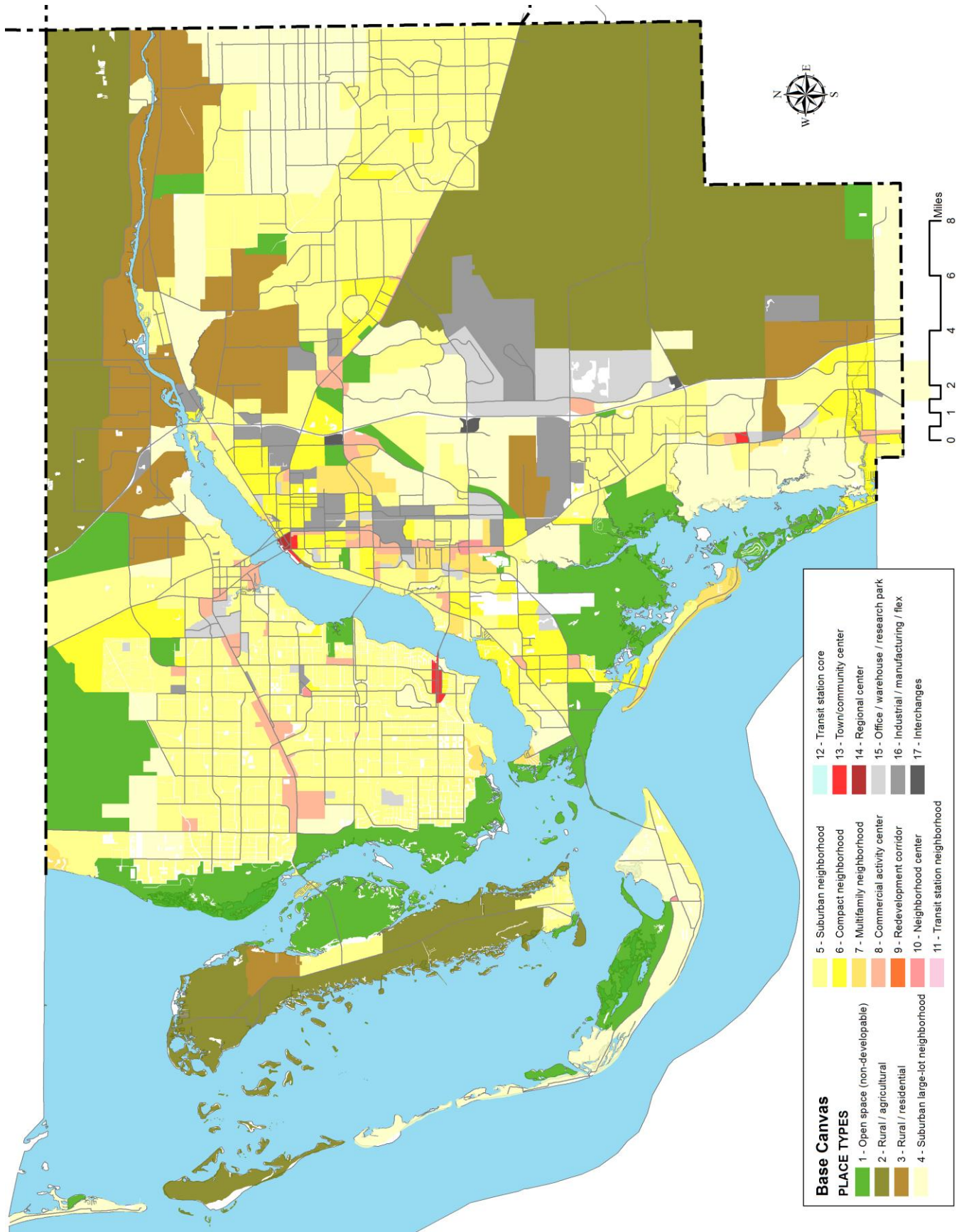
Each scenario was a variation on the base canvas. A map of the base canvas is shown on page 7.

## Place Types For Scenarios, With Land Use and Transportation Assumptions

Place Type	#	Land Uses			Transportation			Local Examples
		DU / net acre	Non-Res F.A.R.	Jobs/ Housing	Inter-sections / sq. mile	Bike route miles / sq. mile	Transit Stops / sq. mile	
<b>Open space (non-developable)</b> 	1	0	0	0	0	0	0	Coastal & interior wetlands
<b>Rural / agricultural</b> 	2	0.1	0	0.1	10	0	0	Wildcat Farms; Coastal rural (5–10 acre lots)
<b>Rural / residential</b> 	3	0.5	0	0	20	0	0	Buckingham (1–2 acre lots)
<b>Suburban large-lot neighborhood</b> 	4	2	0.05	0.2	35	0	0	Lehigh Acres (north and east) (1/2-acre lots)
<b>Suburban neighborhood</b> 	5	4	0.10	0.2	90	5	0	Cape Coral; Lehigh Acres, San Carlos Park; Sanibel Estates (1/4-acre lots)
<b>Compact neighborhood</b> 	6	6	0.20	0.2	130	15	10	Central and east Fort Myers; Fort Myers Beach (1/6-acre lots)
<b>Multifamily neighborhood</b> 	7	12	0.30	0.2	140	25	20	Park Meadows Dr.; Pine Manor
<b>Commercial activity center</b> 	8	4	0.25	4.0	75	20	20	Typical shopping centers; Redevelopment specified on Cape Coral FLUM along arterials (future)

Place Type	#	Land Uses			Transportation			Local Examples
		DU / net acre	Non-Res F.A.R.	Jobs/Housing	Inter-sections / sq. mile	Bike route miles / sq. mile	Transit Stops / sq. mile	
<b>Redevelopment corridor</b> 	9	4	1.0	4.0	125	20	40	Redevelopment of mixed-use overlay areas on Lee Plan FLUM (future)
<b>Neighborhood center</b> 	10	15	0.80	0.4	250	20	25	US 41 at Daniels (if redeveloped)  (25 acres typical)
<b>Transit station neighborhood</b> 	11	15	0.80	0.5	250	25	30	Out to 1/2-mile radius from stations along rail corridor suitable for TOD (future)  (375 acres typical)
<b>Transit station core</b> 	12	20	1.25	0.6	300	30	40	First 1/4-mile radius from stations along rail corridor suitable for TOD (future)  (125 acres typical)
<b>Town/community center</b> 	13	25	1.25	0.8	300	30	45	Downtown Bonita Springs; Estero town center (potential); Downtown North Fort Myers (potential)  (250 acres typical)
<b>Regional center</b> 	14	30	1.75	1.0	325	30	40	Downtown Fort Myers; Downtown Cape Coral (future); Downtown Lehigh Acres (potential)  (500 acres typical)
<b>Office / warehouse / research park</b> 	15	0	0.20	0	35	10	20	Hancock Creek commerce park (now VA medical clinic); Gateway Park of Commerce
<b>Industrial / manufacturing / flex</b> 	16	0	0.60	0	70	5	10	Mid-Cape commerce park; Hanson Street businesses; Lehigh Acres Westgate industrial park Page Park;
<b>Interchanges</b> 	17	0	0.40	0	35	10	10	Various, with mix of hotels, restaurants, fuel, offices





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## Areas with Limitations

Before beginning to create land use scenarios, the consulting team identified areas subject to potential limitations on future development, along with other areas where more intense development could further public policy. Both types of areas were mapped and continuously available for reference throughout the scenario creation process.

During the staff input meetings discussed earlier, each local government was asked to identify specific factors that might limit future development within their jurisdictions. These limitations might be:

- Legal, such as comprehensive plan prohibitions, or land purchased for conservation or park purposes
- Physical, such as jurisdictional wetlands
- Policy, such as comprehensive plan or community plan policies, or existing or potential limitations based on floodplain, evacuation, or sea-level rise factors

Wherever possible, the consulting team located spatial data sources for these areas and converted them to layers that could be viewed with geographic information systems (GIS) software or through a proprietary on-line map viewer available to staff participants.

The following areas with potential limitations were identified and mapped:

- Coastal high-hazard areas (previous and current)
- Conservation lands owned by public agencies and conservation non-profits
- Conservation easements held by public agencies and conservation non-profits
- Wetlands as identified by local governments
- Utility expansion plans in Cape Coral
- 'Reserve' and 'Lehigh Acres Tier 3' areas in Cape Coral and Lee County comprehensive plans
- Historic districts in Fort Myers
- Restrictive land use designations in comprehensive plans

## Areas for Intensification

During the same staff meetings, each local government identified areas where more intense development could further public policy. These areas might be:

- Legal, such as vested rights for entitled development
- Policy, such as comprehensive plan designations encouraging more intense development
- Pending policy, based on ongoing studies by government agencies or recognized planning panels

The following areas for potential intensification were identified and mapped:

- Formal land use designations that strongly encourage more intense development, such as:
  - Five most intense land use designations in Cape Coral
  - Five most intense land use designations in Fort Myers
  - Town center, vested developments, and five most intense land use designations in Bonita Springs
  - Seven most intense land use designations in pending Lee Plan amendments
  - Lee County's mixed use overlays (adopted plus pending amendments)
  - Mixed use communities along perimeter of Lee County's DR/GR
  - Intensification nodes in Lehigh Acres
  - Civic core on Sanibel
  - Pedestrian commercial areas at Fort Myers Beach
- Three proposed 'town center' nodes in Estero
- Research Diamond surrounding Florida Gulf Coast University
- Potential transit stations along the rail corridor and in major connecting routes in Cape Coral and Lehigh Acres

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## Land Use Scenarios

Three land use scenarios were created and evaluated for the Lee County MPO. Each is a variation on a composite map (the ‘base canvas’) that generalized likely outcomes from the future land use maps of Lee County and its five cities, assuming a continuation of recent development practices.

Many factors could change how portions of Lee County will be developed or redeveloped. For instance, today’s comprehensive plans can be amended by local governments. Development often responds to infrastructure improvements such as future highway and transit investments. Changing social and economic trends can increase or decrease the flow of jobs into Lee County; they can also increase or decrease household formation and residents’ willingness to commute by private car or public transit.

The three scenarios modify certain areas of Lee County to visualize how various changes might affect the distribution of population and jobs. The three scenarios lie on a continuum from more geographically dispersed development (Scenario A) to more compact development (Scenario C).

**Scenario A** assumed a package of changes that would place a major concentration of jobs in far northwest Cape Coral, suburbanize some rural areas that are protected under today’s comprehensive plans, and redevelop some single-family neighborhoods into multifamily neighborhoods. This scenario is essentially the land use pattern on which the MPO’s existing long-range transportation plan for the year 2035 was based.

**Scenario B** assumed placing nearly all new development and redevelopment within the urban areas designated in today’s comprehensive plans.

**Scenario C** is similar to Scenario B except that it assumed some additional intensification along major transportation corridors and it eliminated new development outside designated urban areas.

Each scenario is described in further detail below. Maps of each scenario are provided on pages 11, 12, and 13. A chart highlighting the changes within each local government’s jurisdiction is provided on page 14.

### Scenario A

In Scenario A, development would be spread more evenly across the county and would extend further out than the other scenarios.

Some areas that are currently planned to remain rural-residential would become suburban in character, including Buckingham, portions of Bayshore near I-75, and east of the regional airport. Lee County’s comprehensive plan would have to be amended for these changes to take place.

Intensification would take place in specific areas:

- In Cape Coral, a major concentration of about 13,000 jobs would be placed in the far northwest near Burnt Store Marina.
- In Estero, rural/residential would be added at Edison Farms and new retail would be placed west of US 41 south of Williams Road.
- In North Fort Myers, intensification would take place near the river from Cape Coral to N. Tamiami Trail.
- Some areas that are already or were planned to become single-family residential would be changed to multifamily neighborhoods in southwest Cape Coral and the Iona/McGregor area.
- Mixed-use neighborhoods that include homes, jobs, schools, and shops would emerge along Pine Island Road and other locations in Cape Coral and in “The Forum” in Fort Myers, but otherwise would be fairly rare, similar to current conditions in Lee County.

Home construction in Lehigh Acres would be slow, with few new jobs or shopping opportunities.

Fort Myers Beach would not intensify in this scenario. Sanibel Island would not intensify in any of the three scenarios.

Scenario A would be served with a transportation network that remains car-oriented.

Scenario A is shown on a map on page 11. Areas where Scenario A differs from the base canvas are highlighted and cross hatched on that map.

## Scenario B

In Scenario B, pockets of more intense development would be added at key locations across the county, primarily along transportation corridors. Nearly all new development and redevelopment would take place within potential urban areas already designated in today's comprehensive plans.

Intensification would take place in specific areas:

- In Cape Coral, intensification would take place downtown, along Pine Island Road, and in crossroads locations as depicted in the Cape Coral comprehensive plan.
- In Fort Myers, intensification would take place near downtown and along major corridors in accordance with the Fort Myers comprehensive plan.
- In Bonita Springs, the area east of I-75 now designated as Density Reduction / Groundwater Resource would become suburban in character.
- In Fort Myers Beach, some intensification would take place in redevelopment areas along Estero Boulevard near Times Square.
- In Lehigh Acres, intensification would take place in numerous areas that have been identified in recent planning efforts.
- South of the airport, intensification for the proposed Research Diamond would take place as envisioned in the ULI report.
- Mixed use corridors and centers would emerge in North Fort Myers and Estero along US 41, in Bonita Springs along Old 41, and at several other locations.

Higher intensities would include more mixed-use neighborhoods that include homes, jobs, schools, and shops in closer proximity.

Scenario B would be served with a transportation network that remains primarily car-oriented, but the intensification areas would allow vehicular trips to be shorter and more effectively served by walking, bicycling, and transit.

Scenario B is shown on a map on page 12.

## Scenario C

Scenario C is similar to Scenario B. However, no development would take place outside the areas already designated for urban or suburban development in today's comprehensive plans.

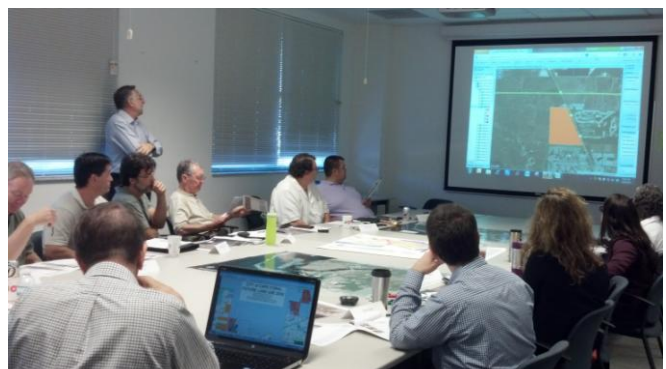
Additional intensification would take place along major transportation corridors, including College Parkway and around potential transit stations along the CSX/Seminole Gulf rail corridor or U.S. 41. Transit station areas were identified that could take advantage of the potential for enhanced transit services along this corridor, which could be rail or 'bus rapid transit' service. Three transit stations would be located in Cape Coral at likely connection points to the future north-south service.

Intensification for the Research Diamond would take place as envisioned in the American Institute of Architects report.

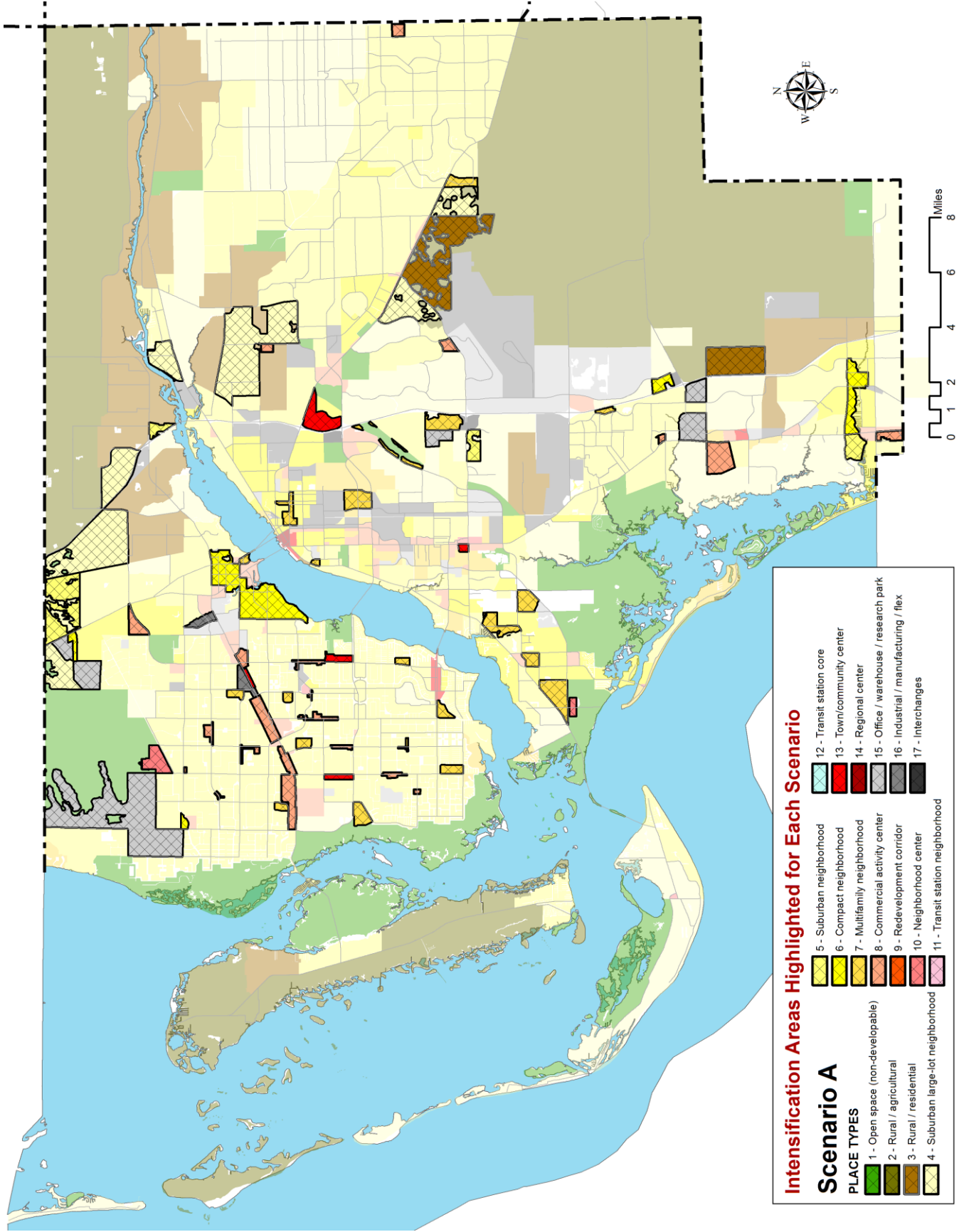
In Bonita Springs, the area east of I-75 now designated as Density Reduction / Groundwater Resource would remain rural/residential in character.

Like Scenario B, Scenario C would be served with a transportation network that remains primarily car-oriented, but the expanded intensification areas would be transit-oriented, focused along potential transit corridors to allow more trips to be made with transit.

Scenario C is shown on a map on page 13.

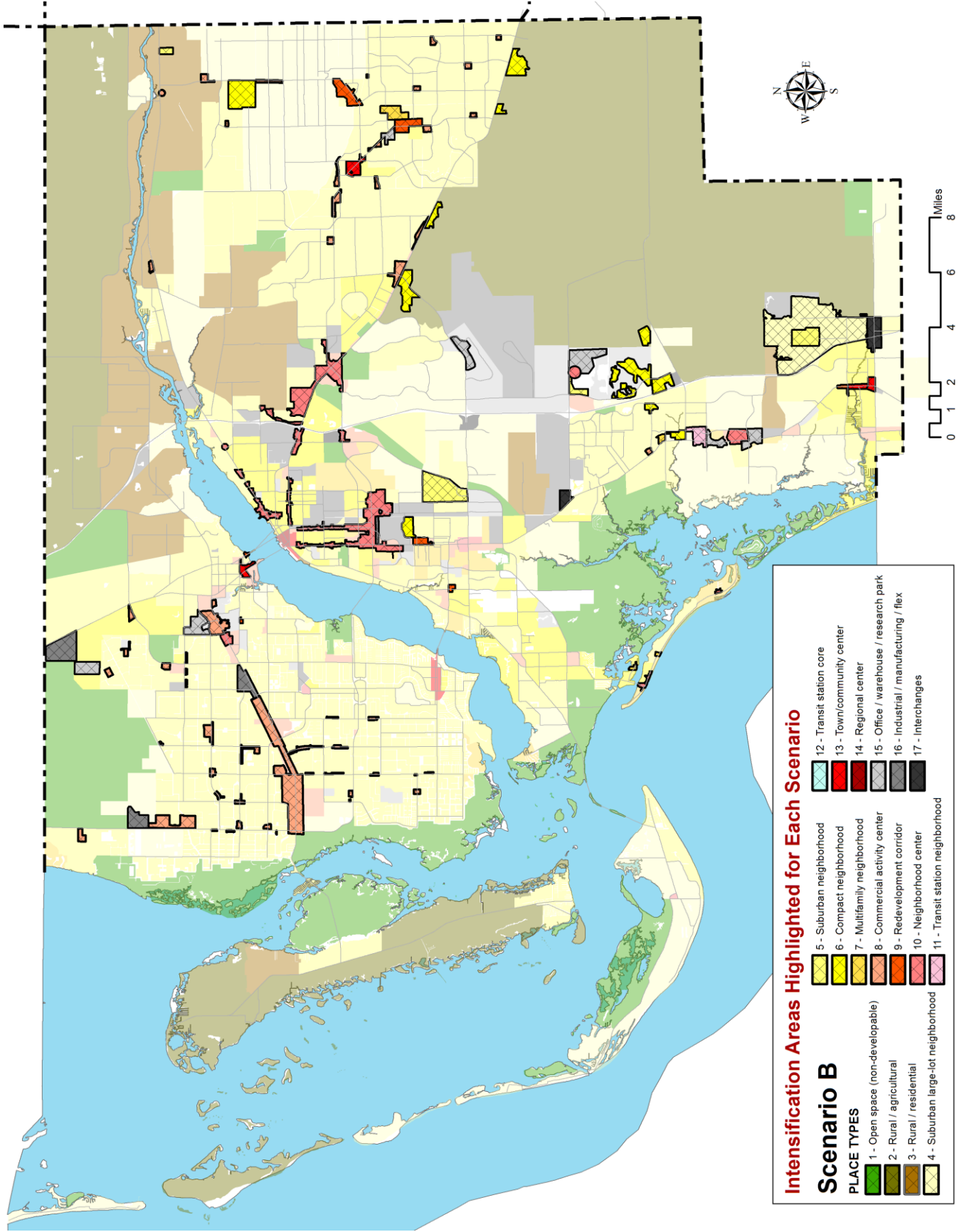


*Planners' Workshop in December 2013*



**Intensification Areas Highlighted for Each Scenario**

Scenario A	
PLACE TYPES	
1 - Open space (non-developable)	12 - Transit station core
2 - Rural / agricultural	13 - Town/community center
3 - Rural / residential	14 - Regional center
4 - Suburban large-lot neighborhood	15 - Office / warehouse / research park
5 - Suburban neighborhood	16 - Industrial / manufacturing / flex
6 - Compact neighborhood	17 - Interchanges
7 - Multifamily neighborhood	
8 - Commercial activity center	
9 - Redevelopment corridor	
10 - Neighborhood center	
11 - Transit station neighborhood	



**Intensification Areas Highlighted for Each Scenario**

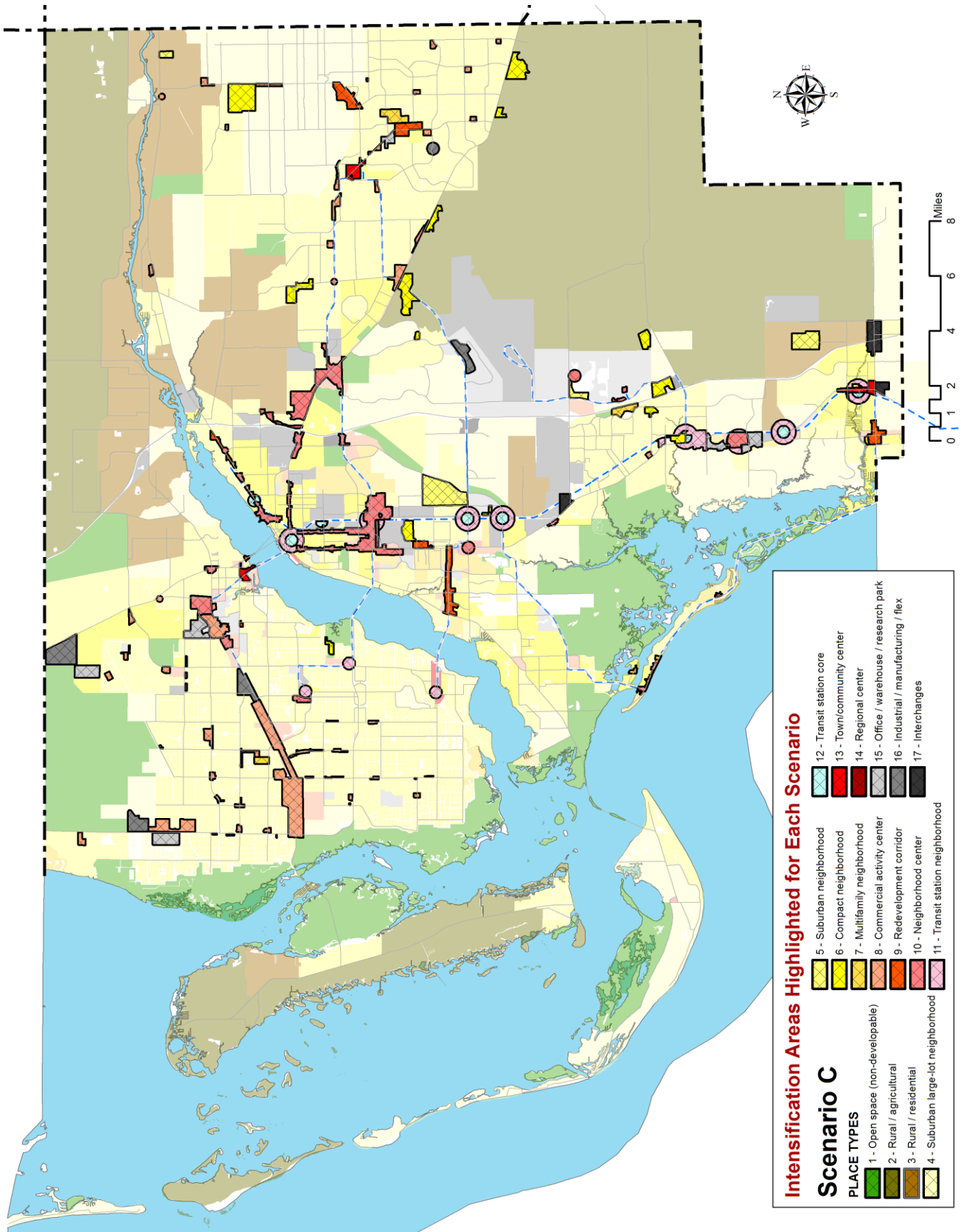
	12 - Transit station core
	13 - Town/community center
	14 - Regional center
	15 - Office / warehouse / research park
	16 - Industrial / manufacturing / flex
	17 - Interchanges

**Scenario B**

**PLACE TYPES**

	1 - Open space (non-developable)
	2 - Rural / agricultural
	3 - Rural / residential
	4 - Suburban large-lot neighborhood
	5 - Suburban neighborhood
	6 - Compact neighborhood
	7 - Multifamily neighborhood
	8 - Commercial activity center
	9 - Redevelopment corridor
	10 - Neighborhood center
	11 - Transit station neighborhood



## Variations by Jurisdiction & Subject

TOPIC	Scenario A	Scenario B	Scenario C
<b>Outward expansion</b>	As permitted by current comprehensive plans, plus expansion into Buckingham, Prairie Pines, Yucca Pens, Edison Farms, and south of Lehigh Acres	As permitted by current comprehensive plans, plus Bonita Springs DR/GR	As permitted by current comprehensive plans only
<b>Cape Coral Retrofit</b>	Significant growth of employment and shopping at multiple locations; major new employment centers (13,000 jobs) in far northwest along Burnt Store; redevelopment of some residential areas in southwest Cape Coral; new town center at Coralwood	Significant growth of employment and shopping at multiple locations, including Pine Island Road and near VA clinic; smaller new employment centers at northerly city limits along Burnt Store	Significant growth of employment and shopping at multiple locations, including Pine Island Road and near VA clinic; smaller new employment centers at northerly city limits along Burnt Store; transit-oriented development at three locations (downtown, Coralwood, city hall)
<b>Lehigh Acres Retrofit</b>	None	Significant growth of employment and shopping at multiple locations throughout Lehigh Acres	Significant growth of employment and shopping at multiple locations throughout Lehigh Acres
<b>Fort Myers Infill / Intensification</b>	New town center at The Forum; residential redevelopment in Metro Park area; little other growth in Fort Myers	Intensification per city's comprehensive plan	Intensification per city's comprehensive plan; transit-oriented development at four transit stations (downtown, Colonial, Hanson, Veronica Shoemaker)
<b>Bonita Springs Infill / Intensification</b>	Residential redevelopment of Edison Farms; redevelopment of residential areas south of Terry and north of Imperial River	Residential development of DR/GR; downtown redevelopment along Old 41; intensification of I-75 interchange area	Downtown redevelopment along Old 41; intensification of I-75 interchange area; transit-oriented development at two transit stations (downtown, Strike Ln)
<b>Sanibel Infill / Intensification</b>	None	None	None
<b>Fort Myers Beach Infill / Intensification</b>	None	As permitted by current comprehensive plan only	As permitted by current comprehensive plan, plus a small extension further southeast on Estero Blvd
<b>Estero Infill / Intensification</b>	New commercial centers between Corkscrew and Williams from US 41 to I-75, and west of US 41 south of Williams	New mixed-use development between US 41 and railroad from Broadway to Bonita Springs city limits	Redevelopment between US 41 and railroad south of Broadway; transit-oriented development at two potential stations (Coconut Point, Corkscrew)
<b>South Fort Myers Infill / Intensification</b>	Significant redevelopment of residential areas in Iona/McGregor	None	Redevelopment along College Parkway; transit-oriented development at two transit stations (Daniels, Gladiolus)
<b>North Fort Myers Infill / Intensification</b>	Significant redevelopment of residential areas near Caloosahatchee east of Orange Grove and south of Bayshore Rd	New town center along US 41 south of Pondella	New town center along US 41 south of Pondella
<b>FGCU Area</b>	As permitted by current comprehensive plan only	As permitted by current comprehensive plan, plus major intensification between s. of Alico (per ULI)	As permitted by current comprehensive plan, plus minor intensification at FGCU entrance (per AIA)
<b>Residential Intensification</b>	North Fort Myers along river; South Cape Coral; Iona/McGregor; Metro Park; Imperial river	Six Mile Parkway; FGCU	Six Mile Parkway
<b>Mixed-Use Centers/Corridors</b>	Coralwood; The Forum	NFM along US 41; central Fort Myers; SR 82 between FM and Lehigh Acres; many in Lehigh Acres; Estero along 41; downtown Bonita Springs; College Parkway	NFM along US 41; central Fort Myers; SR 82 between FM and Lehigh Acres; many in Lehigh Acres; Estero along 41; downtown Bonita Springs; College Parkway
<b>Transit-Oriented Development</b>	Not relevant to Scenario A	Not relevant to Scenario B	Around thirteen potential transit stations (three in Cape Coral)



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## 4. Scenario Evaluation

Each scenario was formally evaluated using quantitative and subjective professional techniques. These evaluations were essential because the conventional four-step travel demand model used by MPOs has known shortcomings:

- Four-step models are not very sensitive to certain variables that affect travel patterns. These variables are often referred to as the “5 Ds” (density, diversity, design, destinations, and distance to transit).
- Four-step models are so complex and highly technical, essentially ‘black boxes,’ that public officials and the general public cannot understand or be involved in decisions that must be made during the modeling process.
- Today’s four-step models assume the future will be fairly similar to the past as to demographic characteristics and travel preferences, even though this is a time of extreme variations in fuel costs, increasing acceptance of public transit, changes in basic climatic conditions, delayed household formation, and changing family characteristics.

The evaluation process began before any scenarios were created. Potential indicators, also known as ‘measures of effectiveness,’ were identified at that stage.

After the scenarios were prepared, each was evaluated by INDEX land use modeling software and independent GIS analysis to assess the likely performance of each scenario when considering the 5 Ds and similar relevant factors.

A sophisticated online survey was used in February and March 2014 to solicit public input on planning priorities and to show respondents how each land use scenario would perform relative to their own priorities.

The MPO’s technical and citizen advisory committees made formal recommendations on a preferred scenario in June 2014 after reviewing the analyses of all scenarios and the public responses.

Each step in the evaluation process is described below.

### Potential Indicators

Potential indicators, also known as “measures of effectiveness,” were identified early in this process to assess whether reliable data would be available to meaningfully evaluate those indicators and whether other indicators outside the INDEX model might also be valuable.

Potential indicators included:

- Number of jobs relative to population
- Mix of housing types
- Development intensity
- Location of new development relative to jobs and shopping
- Vehicle-miles of travel required
- Interconnectivity of new development
- Access to transit
- More intense use of previously developed land

One potential indicator, the number of jobs relative to population, was eliminated because this ratio will ultimately be determined by economic and demographic factors beyond the control of local governments. Variations in this ratio among the scenarios would not change the eventual outcome.

Some other potential indicators were eliminated because the size of the area being analyzed (all of Lee County) was too large to allow meaningful analysis. For instance, INDEX software can be set to assume certain characteristics for typical employment centers such as high levels of transit and bicycle access, but the location of the employment center can have significant effects on whether such access can ever be achieved.

The relative weight that should be given to any particular indicator is a matter of judgment. Potential weighting scales were discussed by participants while indicators were being considered.

The final indicators and the consensus weighting scale are described on the following pages.

## Technical Evaluation

Each scenario was analyzed through a rigorous technical process using tools designed for comparing the likely costs and benefits of alternate land use patterns.

The three scenarios fall along a continuum of “compactness,” with Scenario A being the most dispersed and Scenario C being the most compact.

The term “compact development does not imply high-rise or even uniformly high density, but rather higher average “blended” densities. Compact development also features a mix of land uses, development of strong population and employment centers, interconnection of streets, and the design of structures and spaces at a human scale.

--- *Urban Land Institute*

The core tool used in the technical evaluation was the latest version of INDEX, an integrated suite of planning support tools for neighborhoods, communities, and regions. INDEX has been used extensively in Florida and across the country since its introduction in 1994 by Criterion Planners.

Primary users of INDEX have been land use, transportation, and environmental professionals who are engaged in:

- Designing future scenarios and measuring them with performance indicators,
- Ranking scenarios by goal achievement, or
- Monitoring adopted plans.

Scenario applications of INDEX typically compare alternate land use patterns for a future date with the pattern likely to occur under existing development trends and/or local plans.

INDEX was created as a GIS application but now is used in conjunction with an on-line service created by the same team, the SPARC data transformation service. These tools together provide full access to the data underlying various scenarios to all participants, even those with little or no GIS expertise.

## Final Indicators

In addition to the potential indicators that could be generated by INDEX, other indicators were evaluated that were appropriate to the county-wide scale of the land use scenarios and could be generated through GIS analysis of each scenario.

The chart below shows the final selection of indicators and how each is to be measured.

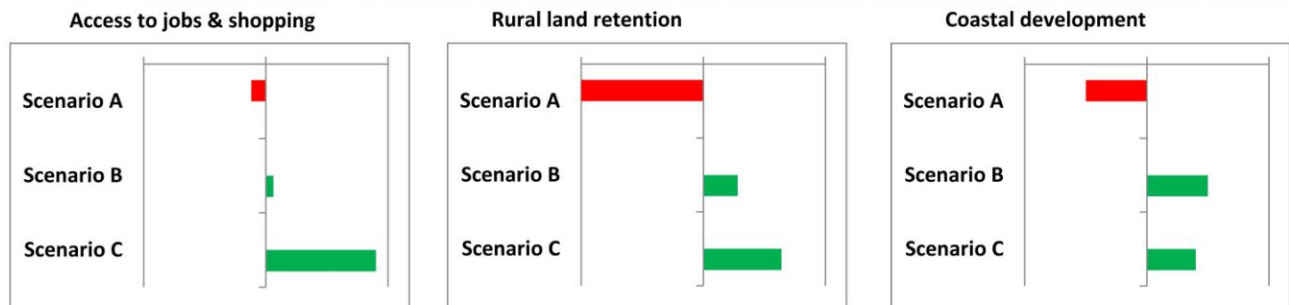
Indicators (Measures of Effectiveness)		
Indicator	Unit of measurement	Data Source
<b>Development Patterns</b>		
<b>Access to jobs &amp; shopping</b>	Miles to closest center, weighted by total persons	Computed by INDEX as centeredness: centers are downtowns, regional shopping centers & major employment concentrations
<b>Rural land retention</b>	Amount of designated rural areas that would remain rural	Computed by GIS: percentage of rural land shown on base canvas that remains rural
<b>Coastal development</b>	New homes in designated coastal high hazard areas	Estimated by amount of new development in state-designated coastal high hazard areas
<b>Housing</b>		
<b>Diverse housing options</b>	Multifamily as % of total dwelling units	Computed by INDEX
<b>Homes on large lots</b>	Amount of rural & suburban areas that would have homes on large lots	Computed by GIS: percentage of rural and single-family land that would have homes on large lots
<b>Transportation</b>		
<b>Amount of driving</b>	Home-based vehicle-miles traveled (VMT)/capita/day	Computed by INDEX: 2007 and 2035 dataset from Lee MPO; every 1% increase in density and mix, VMT decreases by 4% and 9%, respectively, from Table 1, Improved Data & Tools for Integrated Land-Use/ Transportation Planning, Caltrans, September 2012
<b>Access to transit</b>	Development focused along major corridors & commercial nodes	Estimated by consulting team
<b>Walking &amp; bicycling</b>	Intersections/square mile	Computed by INDEX
<b>Energy, Water, Greenhouse Gases</b>		
<b>Energy use</b>	Million BTUs /DU/year	Computed by INDEX: SF DU = 46 MMBtu/yr and MF = 42 MMBtu/yr, from Table 2, Lee County GHG Emissions Inventory, 2007
<b>Water use</b>	Gallons /DU/day	Computed by INDEX: SF water use includes 60 gallons/capita/day indoor and 40 gallons/capita/day outdoor; MF includes 60 indoor and 4 outdoor; adapted from Tampa data, Figure 3-2, Handbook of Water Use & Conservation, A. Vickers, 2001
<b>Green-house gas emissions</b>	Equivalent carbon dioxide /DU/year	Computed by INDEX: 388.11 lbs CO2e/MMBtu, from Table 7, Lee County GHG Emissions Inventory, 2007

## Indicator Ratings for Each Scenario

The indicator ratings for each scenario are illustrated below. The rating for the existing comprehensive plans is set at the midpoint (the vertical bar in the center of each rating box). A red bar means this scenario scored poorly on that indicator, relative to the existing plans. A green bar means this scenario scored well.

### Indicator Ratings For Each Scenario

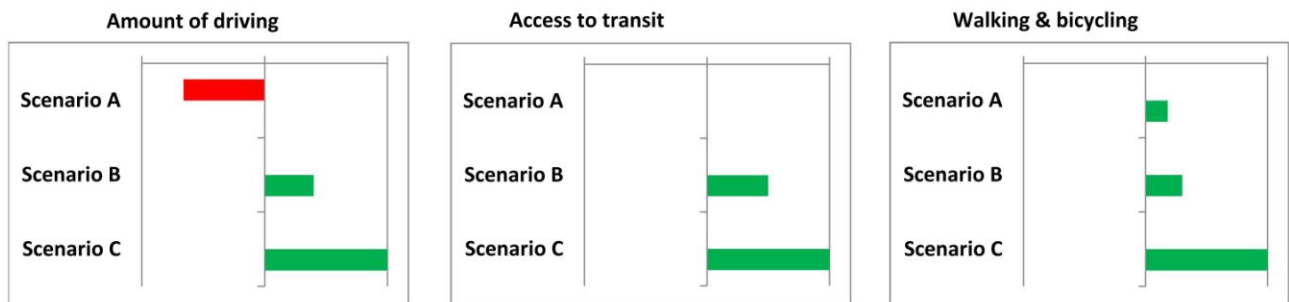
#### DEVELOPMENT PATTERNS



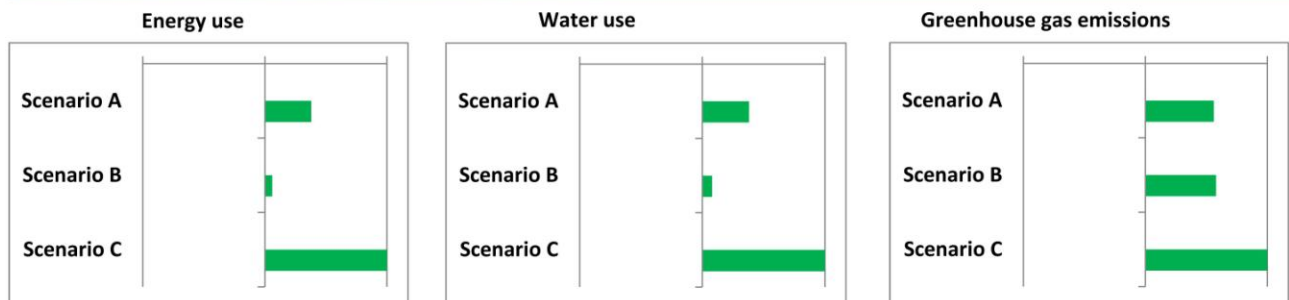
#### HOUSING



#### TRANSPORTATION



#### ENERGY, WATER, GREENHOUSE GASES



## Weighting of Indicators

Not all indicators are of equal importance for evaluating land use scenarios. However, the relative weighting that should be assigned to each indicator is a matter of judgment upon which reasonable people may disagree.

Various weighting scales were considered during this planning effort. The weighting scale below reconciles various views as to the importance of the indicator ratings shown on the previous page.

The heaviest weight is given here to the amount of driving that will be required for each scenario, a primary objective of this planning effort. Less driving is mainly a result of locating more homes closer to jobs and shopping; driving is also reduced when some trips can be accomplished by bicycle, walking, or on transit.

Heavier weight is also given to the number of households who would have greater access to transit, another primary objective; and to “access to jobs and shopping,” a critical issue throughout the county but especially in Cape Coral and Lehigh Acres due to the shortage of land for jobs and shopping in those communities.

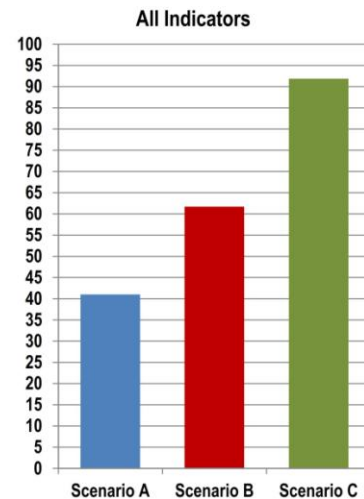
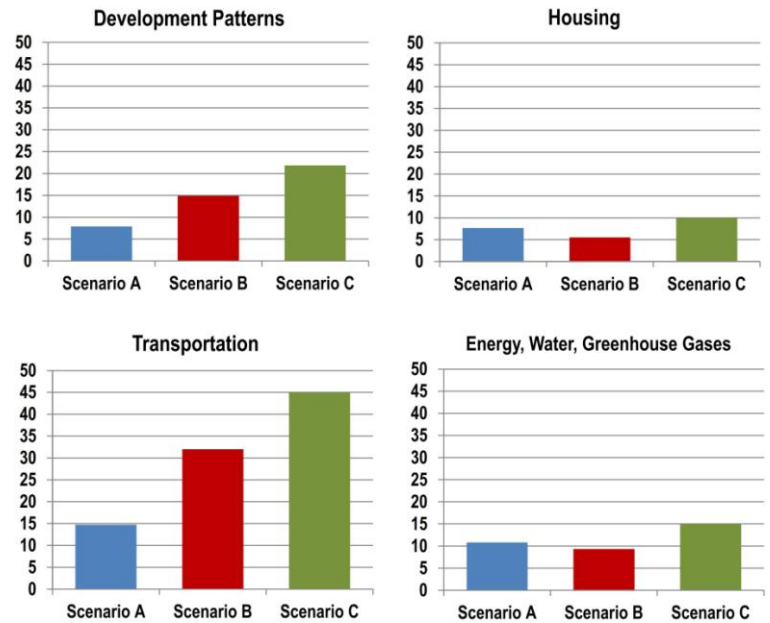
Additional weight is also given to “diverse housing options” because of changing household characteristics such as a larger percentage of single-occupant households.

Weighting of Indicators	
Indicator	Percent of Total Rating
<b>Development Patterns</b>	
Access to jobs & shopping	15%
Rural land retention	5%
Coastal development	5%
<b>Housing</b>	
Diverse housing options	10%
Homes on large lots	5%
<b>Transportation</b>	
Amount of driving	25%
Access to transit	15%
Walking & bicycling	5%
<b>Energy, Water, Greenhouse Gases</b>	
Energy use	5%
Water use	5%
Greenhouse gas emissions	5%
<b>TOTAL:</b>	<b>100%</b>

## Composite Technical Scores

Based on this indicator weighting, composite technical scores were calculated for each scenario — first for each of the four groups of indicators, then for all indicators together.

A higher score means that the scenario would perform better for that group of indicators.



## Vehicle-Miles Traveled

The primary means of meeting increasing travel demand in southwest Florida has been the expansion of roads and highways. An underutilized means of responding to this demand is to configure new development in ways that require less travel, for instance by placing homes, shopping, and jobs in closer proximity. Potential travel reductions were modeled using INDEX software by calculating “vehicle-miles traveled” (VMT) for each scenario.

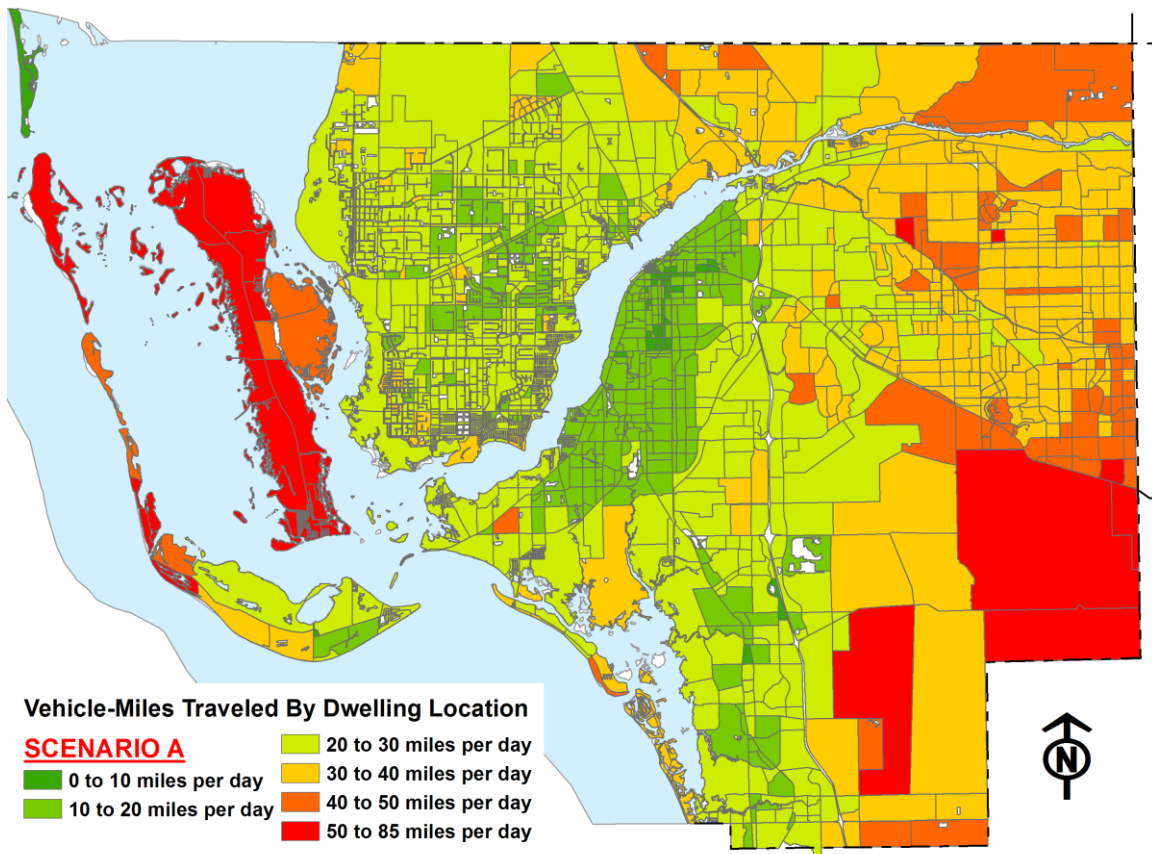
Base data for VMT was obtained from the travel model used by the Lee County MPO to create the current long-range transportation plan (LRTP) for the year 2035. The 2035 LRTP was based on the land use pattern in Scenario A; per-capita VMT results are shown below for that pattern.

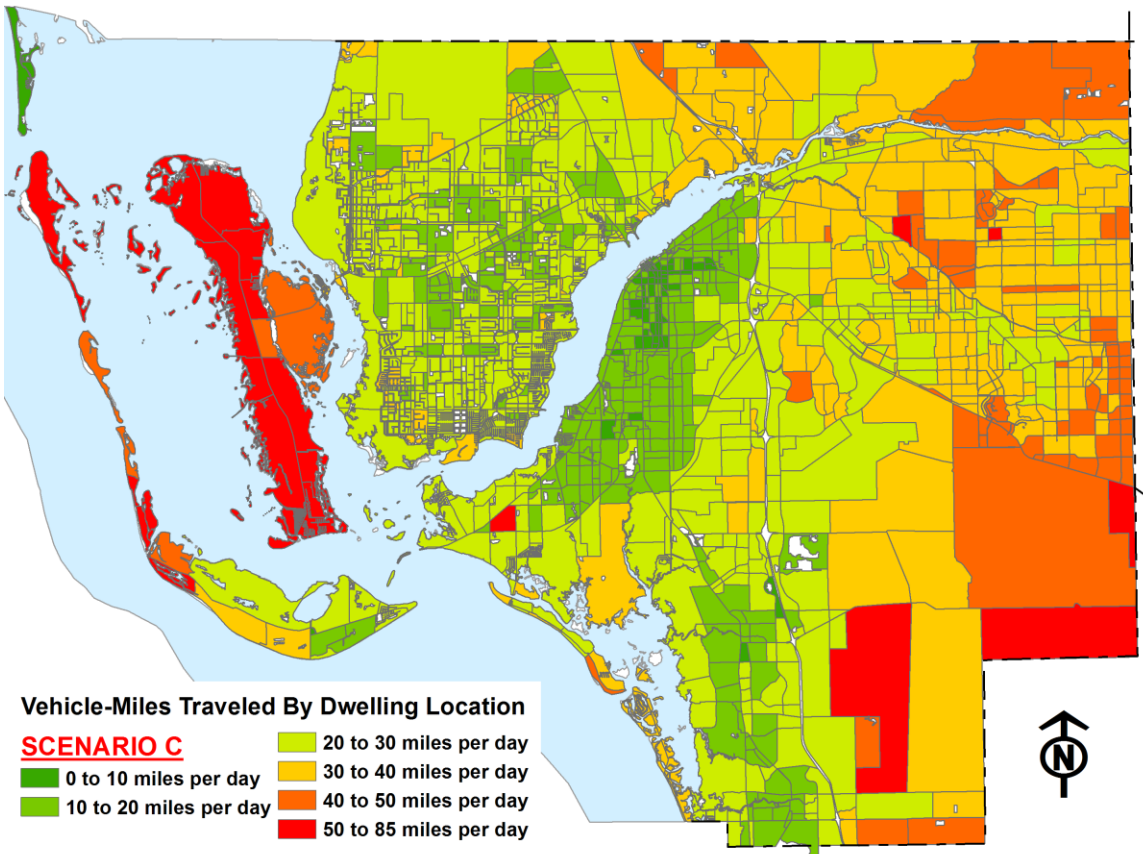
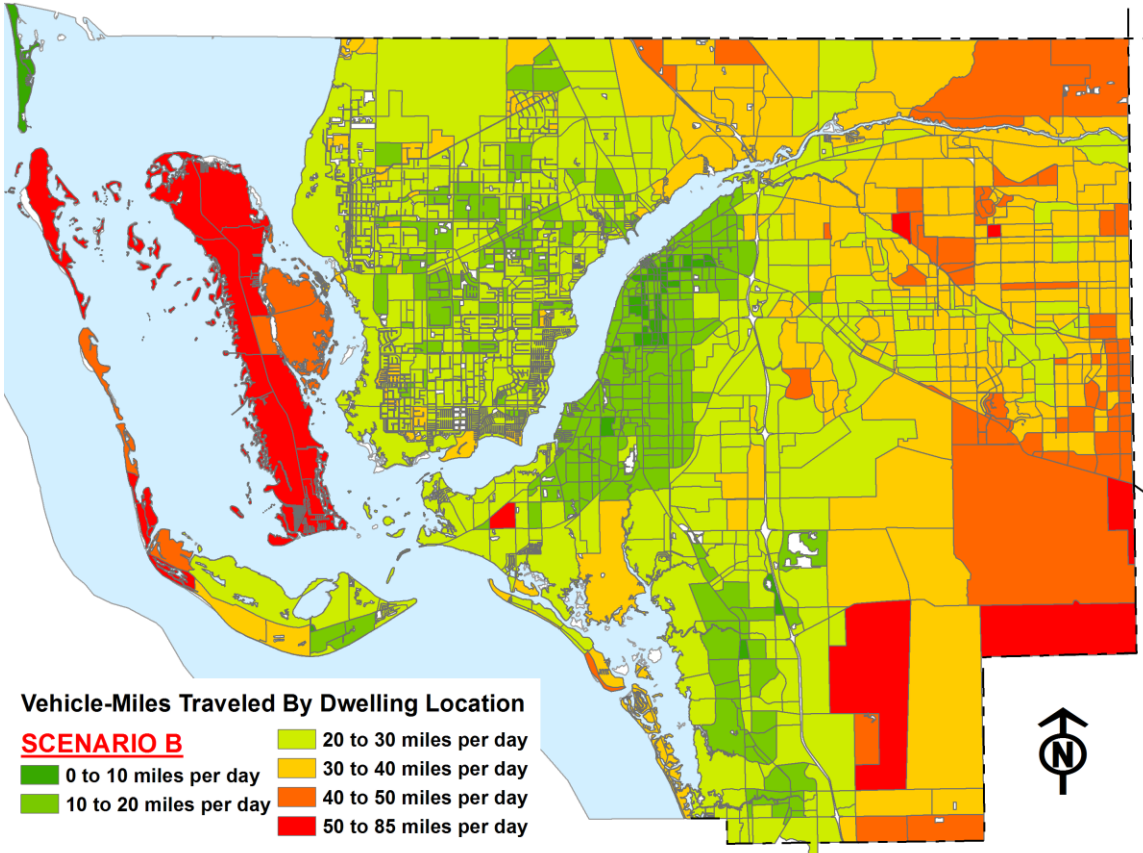
Another VMT data source, based on U.S. Census data and compiled by the Center for Neighborhood Technology, was also evaluated but it did not provide the same level of detail. The LRTP data appears to understate VMT levels in north Cape Coral due to exceptional employment that had been projected near Burnt Store Marina, but overall it provides the base available source of VMT data.

INDEX software adjusted the 2035 VMT values for Scenarios B and C to reflect increasing or decreasing density and land-use mix, based on research compiled by the California Department of Transportation.

Spatial implications of VMT changes can be observed on the Scenario B and C maps on page 20:

- Difference are fairly minor for Cape Coral because all three scenarios reflect Cape Coral’s sustained efforts to add jobs and shopping throughout the city.
- Major improvements are observed for Lehigh Acres because Scenarios B and C reflect success from Lee County’s efforts to add jobs and shopping there.
- Scenarios B and C show significant improvement in Estero as jobs and other destinations are anticipated to offset the current imbalance of residential uses.
- Scenarios B and C show increasing improvements in Bonita Springs that reflect success from city efforts to add jobs and shopping there.





## Public Review through MetroQuest

After completion of the technical evaluation of all three scenarios using INDEX, public input was solicited from residents and landowners through an online survey. Participants were asked to choose and rank their highest priorities and to rate each scenario. The survey is summarized here; further details are in Appendix A.

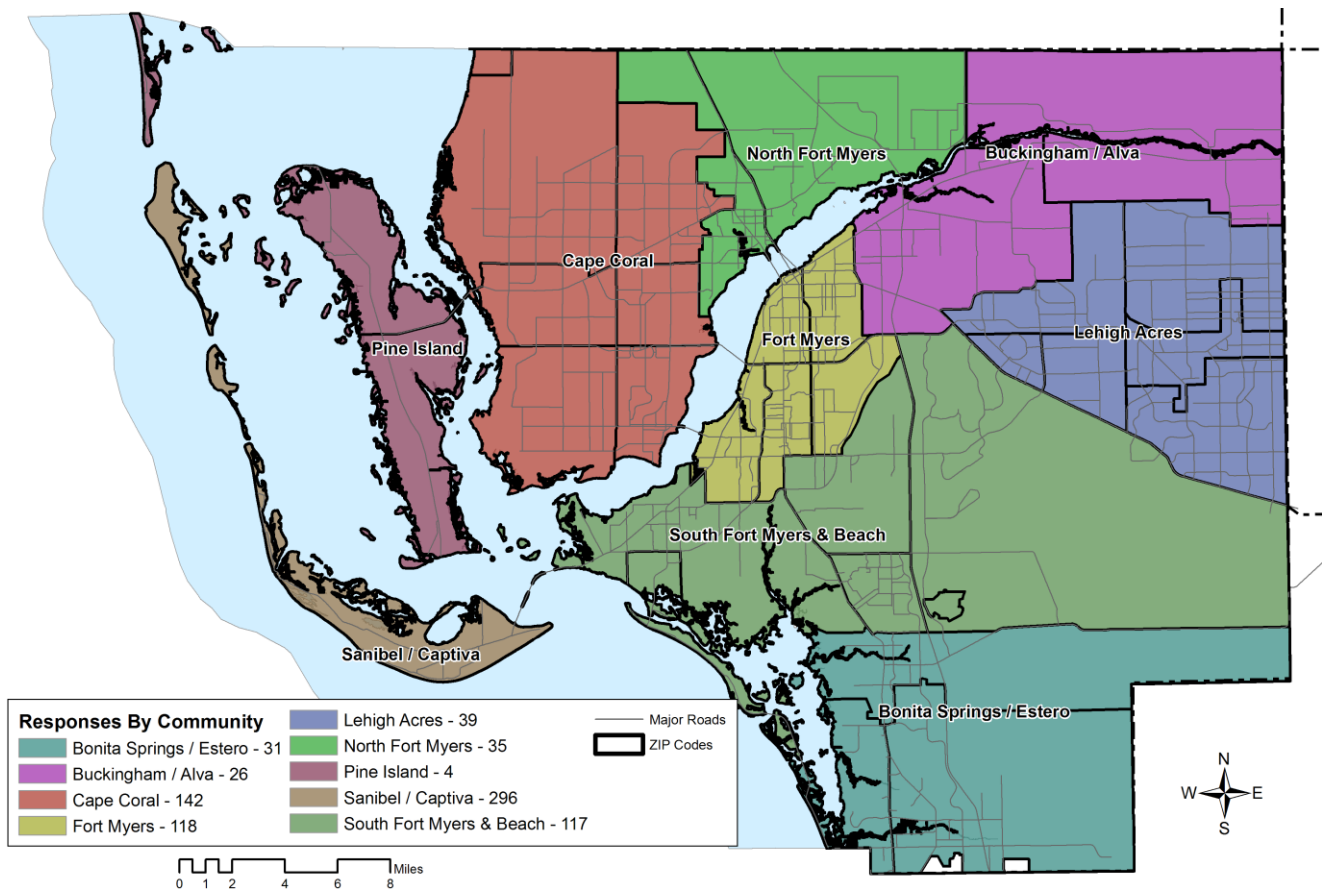
The survey was created using MetroQuest, a well-established tool for evaluating complex scenarios. MetroQuest is highly visual, with interactive displays that let participants learn about potential priorities and review the technical evaluation of the scenarios before being asked to rank each scenario.

**Participation in the Survey** – The survey was available for six weeks in early 2014. Participants were actively solicited via web links and e-mail distribution lists from Lee County government, its five cities, all chambers of commerce, schools, hospitals, and the MPO’s own distribution list. Flyers were posted in libraries and on local buses. Social media links were also used to solicit input.

The survey was completed by 1,227 individuals. Each was asked to provide their home zip code; 808 did so, which allowed their results to be compiled by geographic area (see map below).

Participants could also volunteer information about their age and occupation, allowing some tabulations using that information. A significant majority were over 55. Those under 24 years of age participated the least, despite considerable effort to reach this group. Of the 66 percent who listed an occupational status, just over half worked outside their home, a third were retired, and 12 percent worked from home. Less than five percent were students, unemployed, or visitors.

The survey elicited a strong response compared to standard public input methods for transportation planning. The survey generated over 18,500 data points and over 900 written comments, many of them quite detailed. However, the survey did not attempt to poll a statistically valid subset of the population. Participation was voluntary and thus caution is advised regarding how well this survey represents the overall perspectives of all Lee County residents.



**Priorities** – Survey participants began by viewing a list of eleven priorities they might see as important for the future. Each priority represented a numerical measure from the INDEX model or from GIS analysis. A description of each priority was provided, along with the data that was being measured (as shown in the chart below). Each participant was asked to select their personal top five priorities and rank each from #1 to #5.

The chart at the bottom of this page summarizes the priority rankings from each community, with the number of participants shown for each. The top five priorities overall are highlighted in yellow:

1. **Walking and Bicycling**
2. **Water Conservation**
3. **Less Driving**
4. **Preserve Rural Land**
5. **Access to Transit**

<b>Diverse Housing Options</b> <i>(ratio of total number of multi-family homes to total number of homes)</i>	Homes come in many shapes and sizes; price and location also vary. With a wider selection of housing types, residents can choose that which suits them the best during different periods of their lives.
<b>Walking and Bicycling</b> <i>(intersections per square mile)</i>	Neighborhoods with small block sizes create an environment that is safer and easier for walking and bicycling. Being able to walk and bike more places increases travel options and reduces miles traveled in cars.
<b>Less Driving</b> <i>(home-based vehicle miles travelled per person, per day)</i>	Compact neighborhoods with a blend of jobs, schools and shops can reduce the miles a person must drive. This can affect time spent in traffic, air quality, and energy consumption.
<b>Water Conservation</b> <i>(water use in gallons per home, per day)</i>	A growing population will require more water. Multi-family homes use less water than single-family homes due to lawn size. Outdoor irrigation is a major factor in water use.
<b>Reduce Greenhouse Gas</b> <i>(tons of CO<sub>2</sub> emissions per home, per year)</i>	Car exhaust contributes a large proportion of greenhouse gas emissions which have significant impacts that could impact the climate, sea level rise, and public health.
<b>Access to Jobs &amp; Shopping</b> <i>(number of residents near major employment and shopping centers)</i>	Jobs and shopping being close to home is convenient. This can reduce transportation costs, and offer more opportunities to find rewarding work.

<b>Homes on Large Lots</b> <i>(amount of rural and suburban areas that would have homes on large lots)</i>	Extra living and yard space found in more rural or suburban areas is appealing, particularly to families with children.
<b>Access to Transit</b> <i>(development focused along major corridors and commercial nodes)</i>	Public transit is important to those who cannot or prefer not to drive. Focusing development along major corridors and commercial nodes helps transit work efficiently.
<b>Less Coastal Development</b> <i>(new homes in designated coastal high hazard areas)</i>	Homes near the coast are appealing and in high demand. However, those homes are susceptible to storm damage, can impact the natural environment, and are vulnerable to rising sea levels.
<b>Grow in Undeveloped Areas</b> <i>(amount of rural areas that would be developed)</i>	Rural uplands offer new opportunities to grow. However, the cost of extending roads and utilities to new areas is often greater than the new tax revenue generated.
<b>Preserve Rural Land</b> <i>(amount of rural areas that would remain rural)</i>	Rural lands include agricultural land and undeveloped, natural resources such as wetlands and wildlife habitats. Rural lands can provide jobs, healthy ecosystems, and recreational opportunities.

Priority Ranking	Bonita Springs (31)	B'ham/Alva (26)	Cape Coral (142)	Fort Myers (118)	Lehigh Acres (39)	North Fort Myers (35)	Pine Island (4)	S. FM & Beach (117)	Sanibel/Captiva (296)	Combined (808)
1	walking and bicycling	walking and bicycling	access to jobs/shopping	walking and bicycling	access to transit	preserve rural land	preserve rural land	walking and bicycling	walking and bicycling	walking and bicycling
2	water conservation	access to transit	walking and bicycling	access to jobs/shopping	access to jobs/shopping	access to transit	water conservation	water conservation	less coastal development	water conservation
3	less driving	less driving	less driving	access to transit	less driving	less driving	reduce ghg	less driving	preserve rural land	less driving
4	access to jobs/shopping	water conservation	water conservation	less driving	walking and bicycling	water conservation	less coastal development	access to transit	water conservation	preserve rural land
5	access to transit	preserve rural land	access to transit	preserve rural land	preserve rural land	access to jobs/shopping	walking and bicycling	less coastal development	less driving	access to transit
6	less coastal development	access to jobs/shopping	preserve rural land	water conservation	grow in undeveloped	walking and bicycling	access to transit	access to jobs/shopping	access to transit	less coastal development
7	diverse housing	diverse housing	less coastal development	diverse housing	less coastal development	less coastal development	homes on large lots	preserve rural land	reduce ghg	access to jobs/shopping
8	preserve rural land	less coastal development	diverse housing	less coastal development	water conservation	diverse housing	access to jobs/shopping	diverse housing	access to jobs/shopping	reduce ghg
9	reduce ghg	reduce ghg	reduce ghg	reduce ghg	reduce ghg	reduce ghg	diverse housing	reduce ghg	diverse housing	diverse housing
10	grow in undeveloped	grow in undeveloped	homes on large lots	grow in undeveloped	diverse housing	homes on large lots	grow in undeveloped	homes on large lots	grow in undeveloped	grow in undeveloped
11	homes on large lots	homes on large lots	grow in undeveloped	homes on large lots	homes on large lots	grow in undeveloped	less driving	grow in undeveloped	homes on large lots	homes on large lots



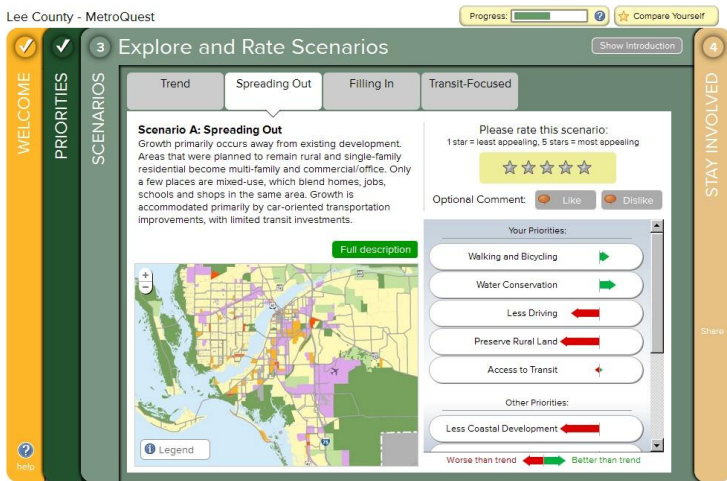
**Scenario scoring by survey participants** – After participants had ranked their top five priorities, they were presented with a map of each land use scenario. The list of priorities was shown next to each map, with that participant’s five top priorities listed first. The technical score for each priority was symbolized by either:

- a red left-facing arrow, meaning this scenario scored poorly regarding that particular priority; or
- a green right-facing arrow, meaning this scenario scored well regarding that particular priority.

The length of the red and green arrows approximated how much negative or positive effect each scenario would have on that priority.

A short description of each scenario was presented above the map, with a link to a more detailed description. The maps could be enlarged or reduced in size. Participants were asked to rate each scenario on a scale of 1 to 5 stars, 1 being the lowest score and 5 being the highest, according to their own viewpoints.

An image from the MetroQuest survey is shown below; it is an example of one participant’s view of the “Filling In” scenario map, with that participant’s own priorities shown at the top of the priority list.



■ Average of C: TRANSIT-FOCUSED  
■ Average of B: FILLING IN  
■ Average of A: SPREADING OUT

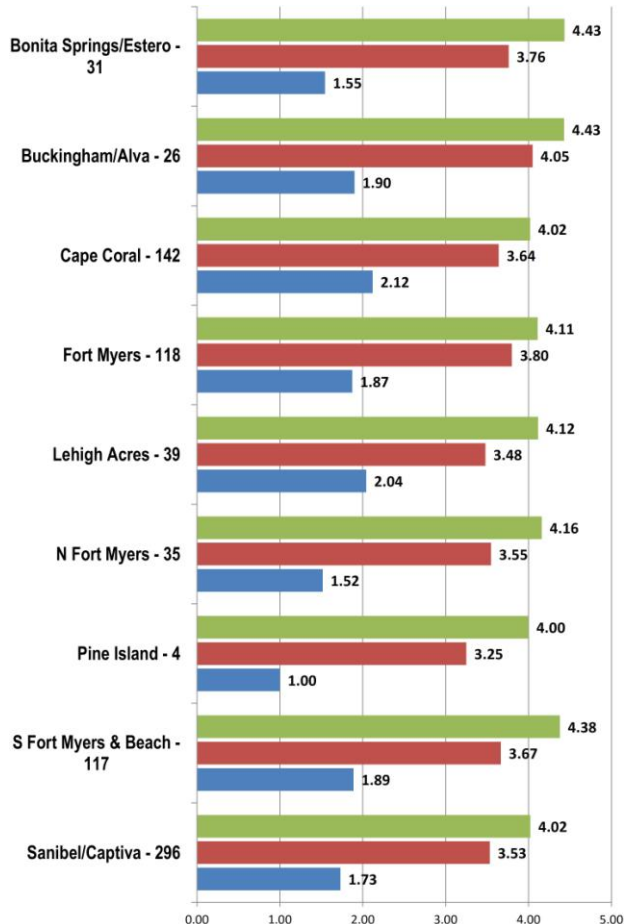
**Scenario Ranking By Community** –

The bar charts below break down the scenario rankings by community and show the number of participants from each community.

**A: Spreading Out** – 57% of participants gave this scenario 1 star and another 17% gave it 2 stars; 5% of respondents gave it 5 stars. The county-wide average of the scores was 1.85. The scores for each community are shown with a blue bar.

**B: Filling In** – This scenario received a better response. More than 56% of respondents gave this scenario a 4- or 5-star rating, while only 13% gave it a 1- or 2-star rating. The county-wide average of the scores was 3.63. The scores for each community are shown with a red bar.

**C: Transit-Focused** – This scenario received the best response from every community. More than half of the respondents gave this scenario 5 stars, with only 10% of respondents giving 1- or 2-star ratings. The county-wide average of the scores was 4.12. The scores for each community are shown with a green bar.



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## 5. Preferred Scenario

### Technical Summary of Scenarios

The three scenarios lie along a continuum from most dispersed (Scenario A) to most compact (Scenario C).

**Scenario A** replicates the land use pattern that was used to create the MPO's 2035 long-range transportation plan.

- Scenario A scored reasonably well – better than the 'base canvas' that represents existing comprehensive plans – due to two primary factors:
    - The addition of major multifamily concentrations in south Cape Coral, the Iona/McGregor area, and near the river in North Fort Myers.
    - The addition of a major concentration of jobs (about 13,000) in far northwest Cape Coral near Burnt Store Marina.
- These additions were significant enough to offset negative scoring caused by the substantial outward expansion of low-density residential areas that were also part of Scenario A.
- However, the jobs concentration in Cape Coral overstates what is possible or desirable due to its remote location from much of Lee County's population and the state's purchase of much of the land for preservation. Some of the multifamily expansions would displace stable single-family neighborhoods and would increase densities in coastal areas.
  - The outward expansion in Scenario A is inconsistent with Lee Plan and several community plans; for instance, suburban development is shown in parts of the Buckingham, Bayshore, Yucca Pens, Prairie Pines, and Edison Farms areas.

**Scenario B** was based on current comprehensive plans, assuming that considerable intensification will take place as encouraged (but not required) by those plans.

- Scenario B scored quite well because land uses would be intensified where they can offset problems created by current land use patterns, not only in Cape Coral but also in Lehigh Acres, Estero, and Bonita Springs.

- The only outward expansion in Scenario B is in Bonita Springs east of I-75 in the DR/GR (density reduction / groundwater resource) area. This expansion is inconsistent with the current Bonita Springs comprehensive plan, although studies of that area are ongoing.

**Scenario C** assumes that the intensification encouraged by current comprehensive plans is more successful than portrayed in Scenario B. Scenario C intensifies land-use patterns on College Parkway and also along north-south transportation corridors to take advantage of potential public transit along the rail corridor or U.S. 41, as well as recent improvements to north-south roads such as the Michael G. Rippe/ Metro Parkway and Three Oaks/Imperial Parkway.

- Scenario C scored extremely well, improving on Scenario B's scores on nearly every indicator. An exception is the coastal development indicator; one of the three transit-oriented development locations added in Cape Coral in Scenario C is in downtown Cape Coral, which is in the coastal high-hazard area.
- No outward expansion is shown in Scenario C. There are no inconsistencies with local comprehensive plans.
- Scenario C scored best of the three scenarios in reducing vehicles miles traveled (VMT), a primary goal of this planning effort. Scenario C would allow more households to have greater access to transit, another primary goal, and would provide better access to jobs and shopping.

### Scenario Selection Process

The selection of a preferred scenario is a community decision made by elected officials in their capacity as the governing board of the Lee County MPO.

The MPO's technical advisory committee (TAC) and citizens' advisory committee (CAC) discussed the land use scenario project at their meetings in November of 2013 and January, May, and June of 2014. At the June meetings, each committee endorsed the consulting team's recommendation and selected Scenario C as its preferred scenario.

On June 20, 2014 the MPO Board reviewed recommendations from its staff and committees and unanimously selected Scenario C as the basis for the 2040 long-range transportation plan.

## Scaling Scenario to 2040 Conditions

The comprehensive plans adopted by local governments in Lee County depict the ultimate development pattern in each jurisdiction.

Sanibel and Fort Myers Beach are already close to achieving this pattern, often called “build-out,” although some development potential remains. Fort Myers, Cape Coral, Bonita Springs, and unincorporated Lee County all anticipate a great deal of additional development through and beyond the year 2040. Their comprehensive plans do not attempt to show the level of development anticipated at any point before build-out, or to assess how many dwelling units are used only during the peak season. In the same manner, the three scenarios depicted development patterns at build-out.

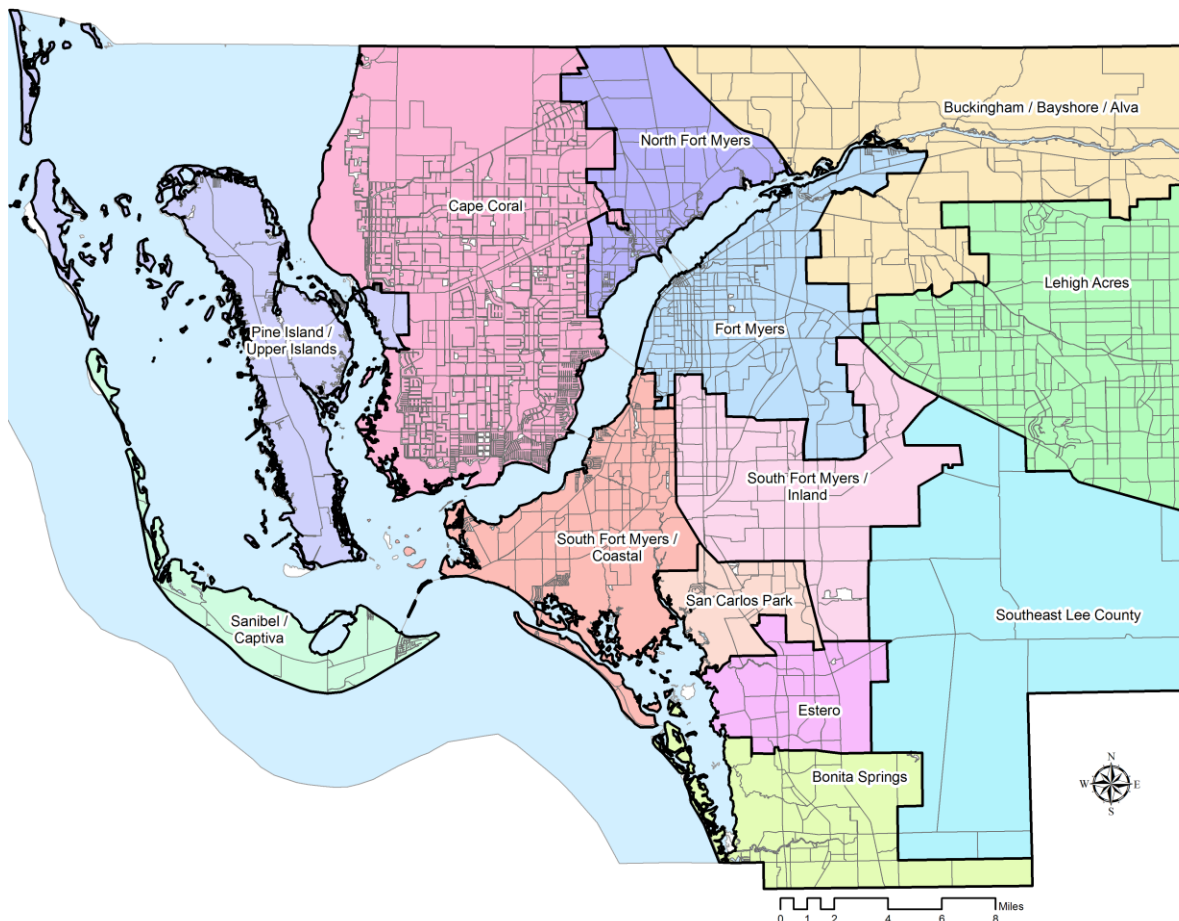
During development of the 2040 long-range transportation plan, the preferred scenario will be used in a computer model that will simulate travel patterns across twelve southwest Florida counties at a specific stage of development, defined as the population forecasted for each county in 2040.

For Lee County, that population level is 1,044,323 permanent residents, as residents are defined by the U.S. Census Bureau. Seasonal residents aren't included in this total; their dwelling units are counted, but listed as vacant in the census.

To adapt Scenario C for use in the regional travel model, two significant adjustments were required:

- Identify how many dwelling units would not have permanent residents; and
- Scale the level of development (population and employment) back from build-out levels to anticipated 2040 levels.

The travel model divides Lee County into “traffic analysis zones” (TAZ). The raw data from Scenario C was converted for all 1,434 TAZs. These zones have been grouped into 13 community areas so that development patterns and anticipated growth can be assessed at sub-county levels. The map below shows the 13 communities and TAZ outlines.



## Conversion of Dwelling Units

The results for Scenario C were assigned by INDEX software to the same TAZs used in the regional travel model. The key outputs for population growth were the number of single-family and multifamily dwelling units in each TAZ.

The expected county-wide population for the year 2040 is 1,044,323, based on the formal projection from the University of Florida as shown in the table below. Counties use this figure as a population forecast for their comprehensive plans; because MPO plans are often incorporated into comprehensive plans, the same figure is used by MPOs.

Like census data, these figures are the number of permanent residents. MPO travel models, however, use a figure that is typically about 1% lower: the number of permanent residents in single-family or multifamily dwellings (thus disregarding group homes, dormitories, jails, etc.). This “residential population” for 2010 and 2040 became the control total for the travel model and for the adjustments to Scenario C.

The dwelling unit counts produced by INDEX were based on generalized density ratios assigned for the various “place types,” as discussed earlier in this report. In some TAZs, the INDEX dwelling unit counts were below the actual counts from the 2010 census. For those TAZs, the 2040 projections were set at small fixed percentages above the 2010 counts.

For all other TAZs, the number of dwelling units was increased above the actual 2010 census counts using the pattern defined by Scenario C.

The greatest uncertainty in this process was the outer reaches of Cape Coral and Lehigh Acres. Those communities have such a surplus of vacant lots that build-out will not have occurred by 2040. Their 2040 population expectations were set after reviewing the most recent detailed forecasts for each community:

- 145,000 dwelling units in Cape Coral <sup>1, 2</sup>
- 215,000 residents in Lehigh Acres by 2040 <sup>3</sup>

The TAZs assumed to have the largest number of lots still vacant in 2040 were based on observed development patterns and on the distance of TAZs from existing and anticipated jobs, shopping, and entertainment.

The population totals for 2010 and 2040 are shown on the next page, broken down by the thirteen communities.

<sup>1</sup> *Build-out Analysis, City of Cape Coral, 2011*, by Derek C. S. Burr, AICP, Cape Coral Community Development Department, March 2012

<sup>2</sup> *Interactive Growth Model*, Van Buskirk, Ryffel & Associates, [www.interactivegrowthmodel.com/igm.html](http://www.interactivegrowthmodel.com/igm.html)

<sup>3</sup> *Population Model to Forecast Population Growth of Lehigh Acres Over Time to Build-out*, Van Buskirk, Ryffel & Associates, April 2004, <http://archive.smartgrowthlee.com/LehighStudy/POPULATION-MODEL-LEHIGH%20ACRES-WITH%20MAPS.pdf>

### Population Projections by Age, Sex, Race, and Hispanic Origin for Florida and Its Counties, 2015–2040, With Estimates for 2013

County and State	Age/ Sex	Census 2010	Estimates 2013	Projections					
				2015	2020	2025	2030	2035	2040
<b>LEE</b>									
All Races	Total	618,754	643,367	673,826	758,621	837,828	911,479	980,632	1,044,323
	0-4	32,866	33,869	35,351	38,738	43,600	46,871	50,552	52,781
	5-17	88,003	89,702	92,953	102,363	109,690	118,667	128,990	138,439
	18-24	47,476	49,987	52,817	55,352	62,894	63,912	68,521	71,549
	25-54	218,111	222,938	231,142	250,880	276,457	299,734	331,283	349,365
	55-64	87,192	93,384	99,431	112,935	118,870	113,414	118,165	126,979
	65-79	108,041	114,386	120,899	157,859	172,397	208,907	205,918	221,919
	80+	37,065	39,101	41,233	40,494	53,920	59,974	77,203	83,291

*Population Projections by Age, Sex, Race, and Hispanic Origin for Florida and Its Counties 2015-2040 With Estimates for 2013*, Florida Population Studies Bulletin 169, June 2014, Bureau of Economic and Business Research, University of Florida

## Conversion of Employment

The target for employment for the year 2040 was 487,469 full-time and part-time jobs, which is the 2014 forecast by Woods & Poole.<sup>1</sup> This is a 72% increase over the 284,120 jobs that Woods & Poole estimated for 2010.

The expected jobs produced by INDEX are based on generalized employment densities assigned to each of the place-types. As with dwelling units, in some TAZs the INDEX counts were below the 2010 employment counts, which were based on an InfoGroup database acquired by Florida DOT. For those TAZs, the 2040 projections were set as a 20% increase over the 2010 counts.

INDEX used two place-types for office and industrial parks. Both assumed high levels of employment density. When these place types were applied to TAZs with modern warehouse districts, such as those being constructed along Treeline Avenue South, the employment levels were too high and had to be adjusted to levels typical of that land-use type. For all other TAZs, the number of employees was increased above the 2010 estimates using the pattern defined by Scenario C.

Employees are assigned to the TAZs where they work, regardless of where they live. The location of employees represents not only trips made by the employees, but also trips by others who are shopping or seeking services or entertainment.

The travel model divides jobs into three categories: industrial, service, and commercial (retail). The Woods & Poole breakdowns for each of these categories were used as 2040 control totals.

The chart below compares these breakdowns:

<i>Job Type</i>	<i>2010 from Travel Model</i>	<i>2040 from Woods &amp; Poole</i>
<i>Industrial</i>	14%	13%
<i>Service</i>	73%	73%
<i>Retail</i>	13%	14%
<i>All Jobs</i>	100%	100%

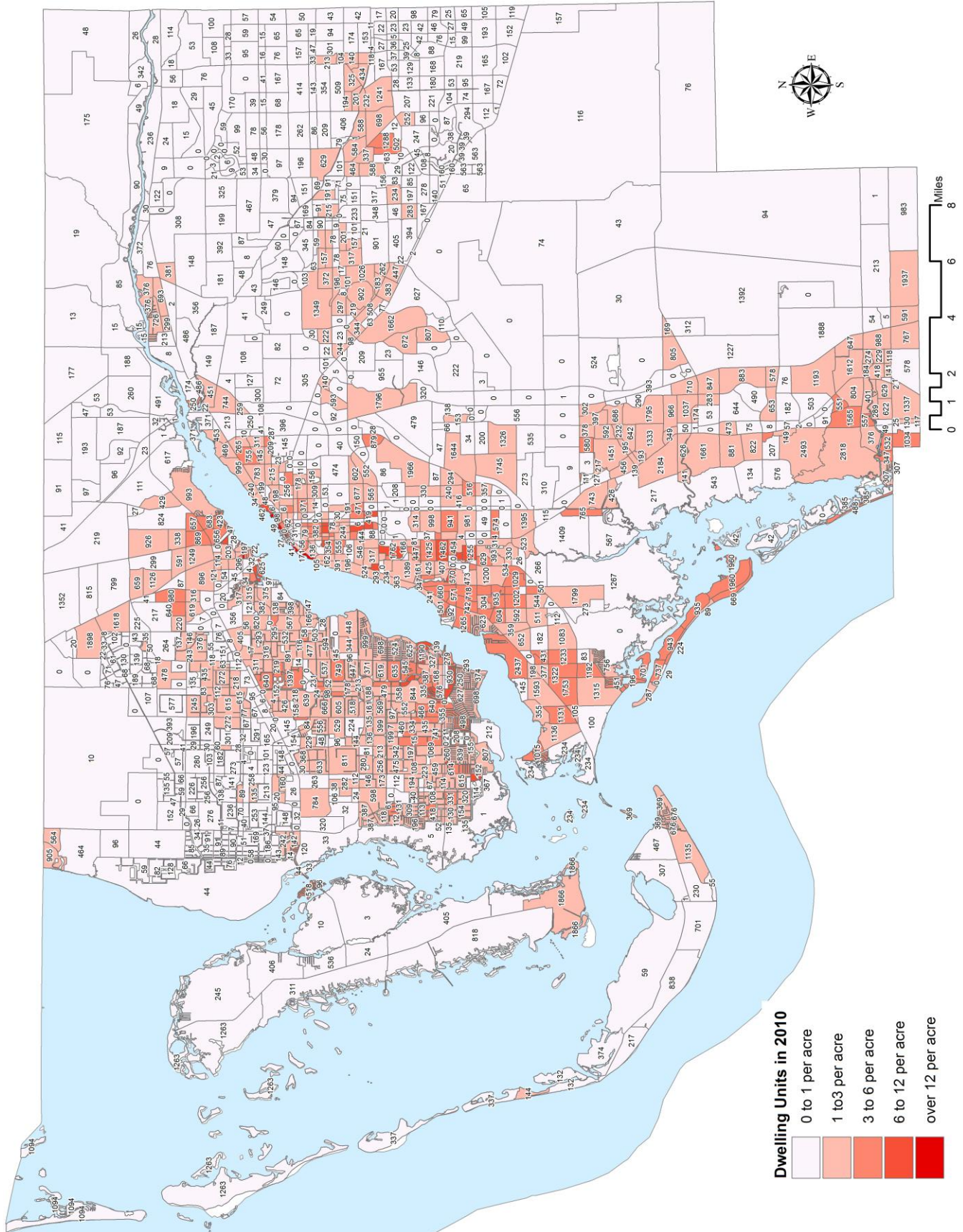
The 2040 breakdowns were achieved through adjustments based on the place types in Scenario C, future land use maps, existing conditions, and the location of existing concentrations of shopping centers and commercial strips.

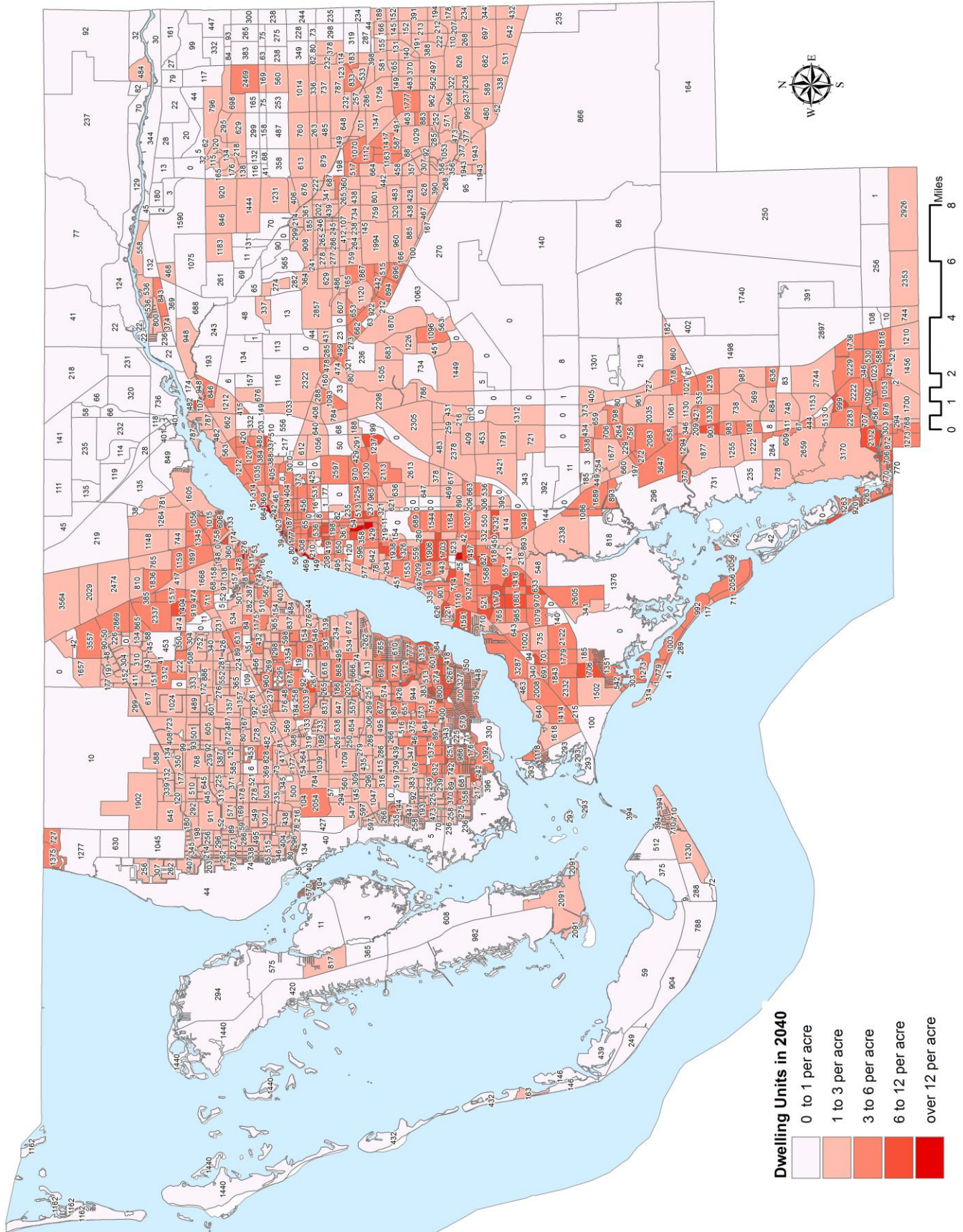
The total employment figures being used in the travel model for 2010 and 2040 are shown below, broken down by the thirteen communities. The current ratio of employees to residents is highest in and south of Fort Myers and on Sanibel / Captiva, and very low in Cape Coral, Lehigh Acres, and San Carlos Park.

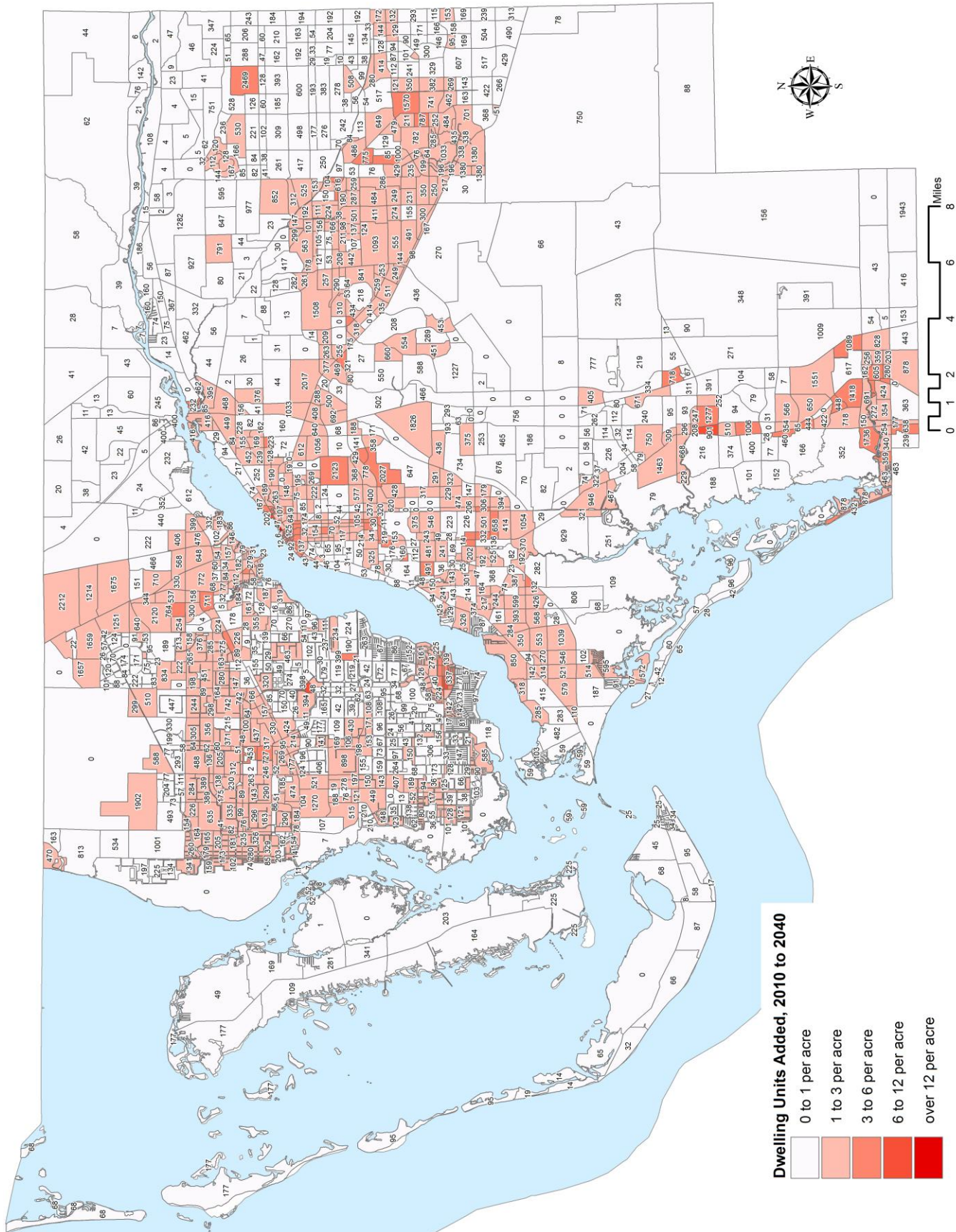
Maps showing the assignments of dwelling units and jobs to all TAZs are provided on the following pages.

<sup>1</sup> Lee County, Florida, 2014 Data Pamphlet, Woods & Poole Economics, Washington, DC

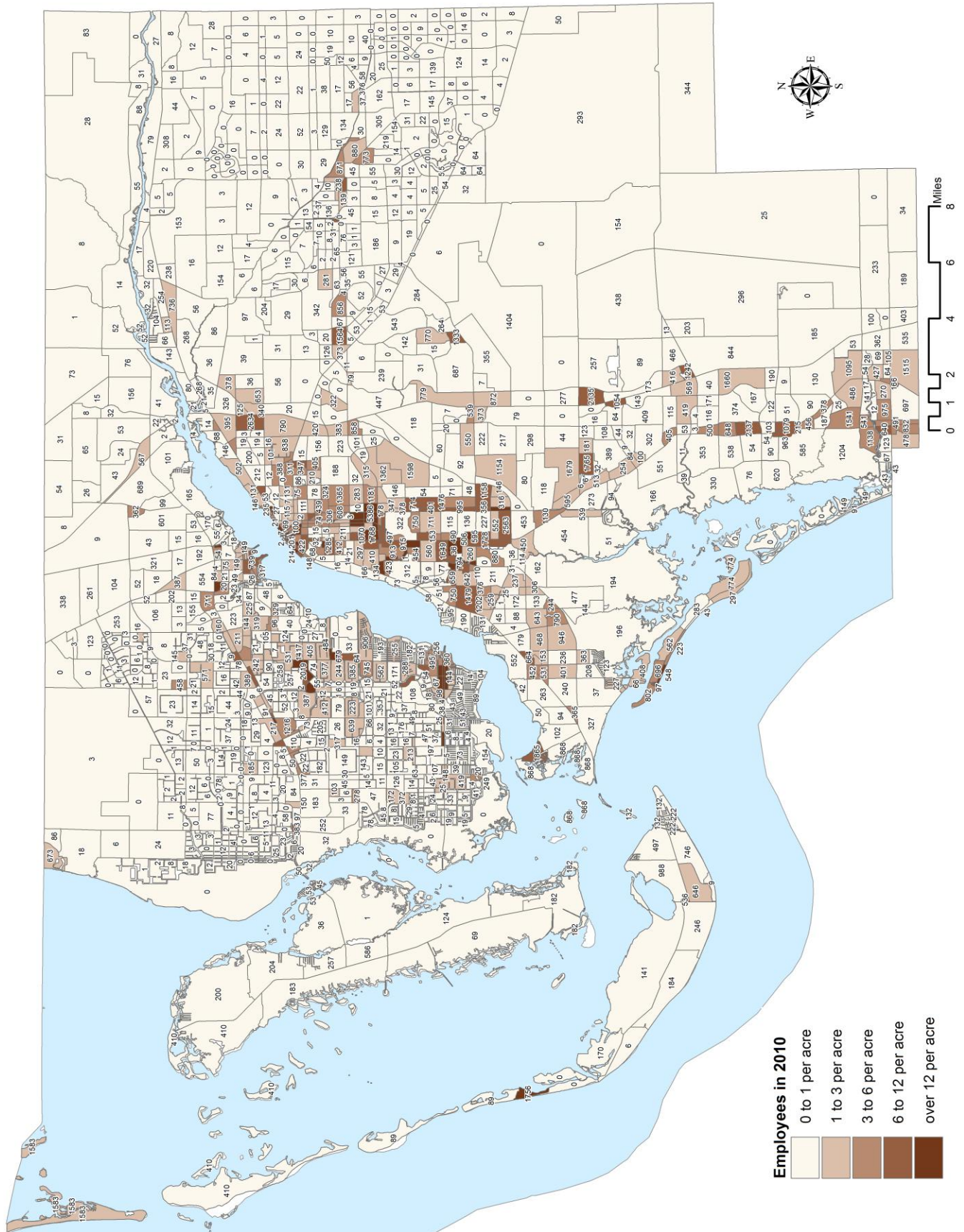
<i>Community</i>	<i>Permanent Residents</i>			<i>Employees</i>		
	<i>2010</i>	<i>2040</i>	<i>increase</i>	<i>2010</i>	<i>2040</i>	<i>increase</i>
Cape Coral	155,469	262,021	68.5%	43,889	105,760	141.0%
Fort Myers	75,848	129,574	70.8%	79,008	114,057	44.4%
Lehigh Acres	86,287	219,205	154.0%	11,583	29,584	155.4%
Buckingham / Alva / Bayshore	16,323	23,689	45.1%	3,734	5,295	41.8%
North Fort Myers	44,688	71,032	59.0%	13,483	25,434	88.6%
Pine Island / Upper Islands	10,362	11,689	12.8%	4,287	5,772	34.6%
Sanibel / Captiva	6,904	7,407	7.3%	6,368	7,646	20.1%
South Fort Myers / Coastal	80,691	101,465	25.7%	40,657	55,584	36.7%
Bonita Springs	43,936	76,086	73.2%	20,640	31,071	50.5%
San Carlos Park	27,676	36,081	30.4%	7,000	8,711	24.4%
South Fort Myers / Inland	34,558	54,947	59.0%	39,667	80,642	103.3%
Southeast Lee County	4,610	8,174	77.3%	1,871	2,312	23.6%
Estero	23,042	31,507	36.7%	12,827	18,362	43.2%
<b>ALL LEE COUNTY</b>	<b>610,394</b>	<b>1,032,877</b>	<b>69.2%</b>	<b>285,014</b>	<b>490,230</b>	<b>72.0%</b>

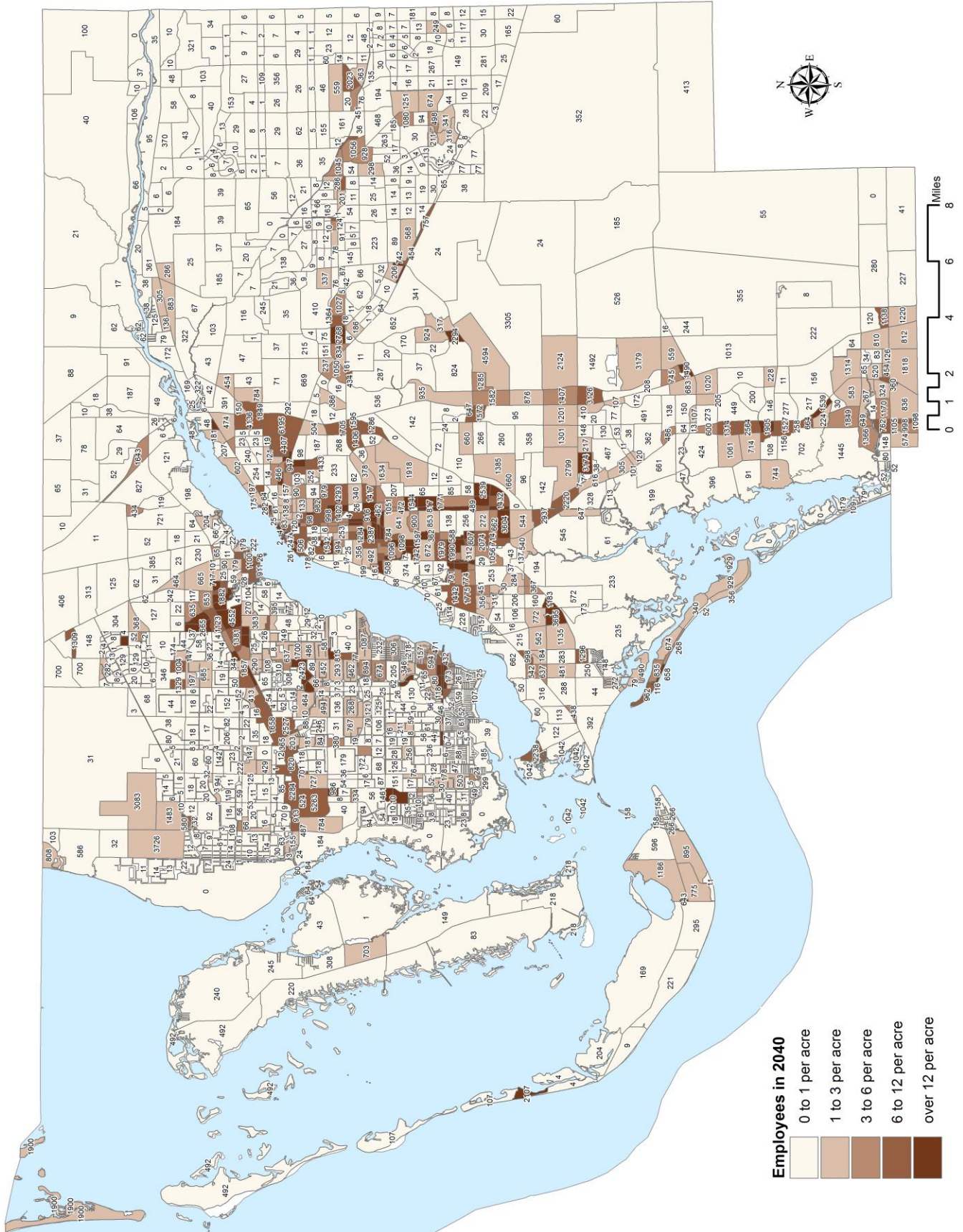


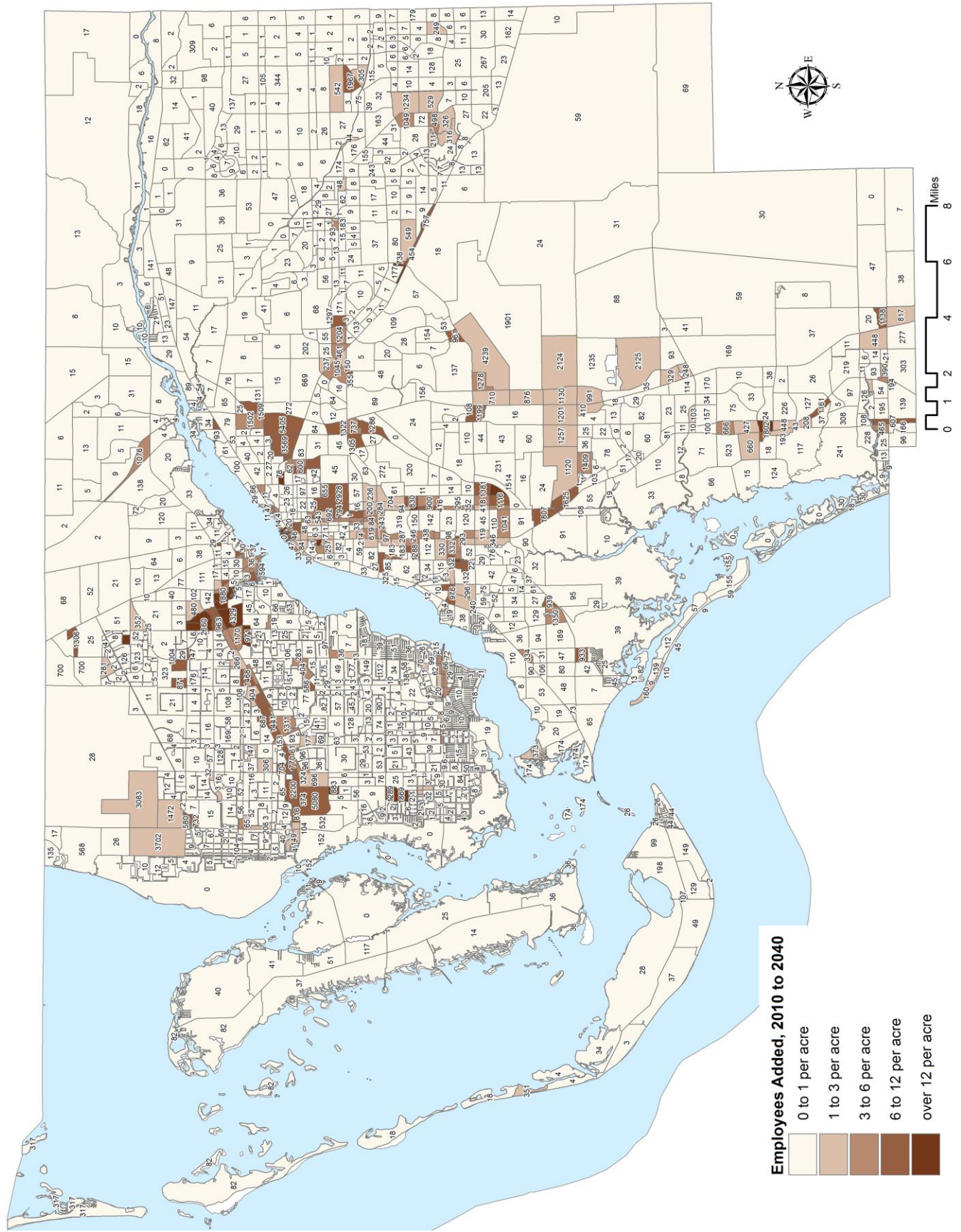












**Employees Added, 2010 to 2040**

- 0 to 1 per acre
- 1 to 3 per acre
- 3 to 6 per acre
- 6 to 12 per acre
- over 12 per acre

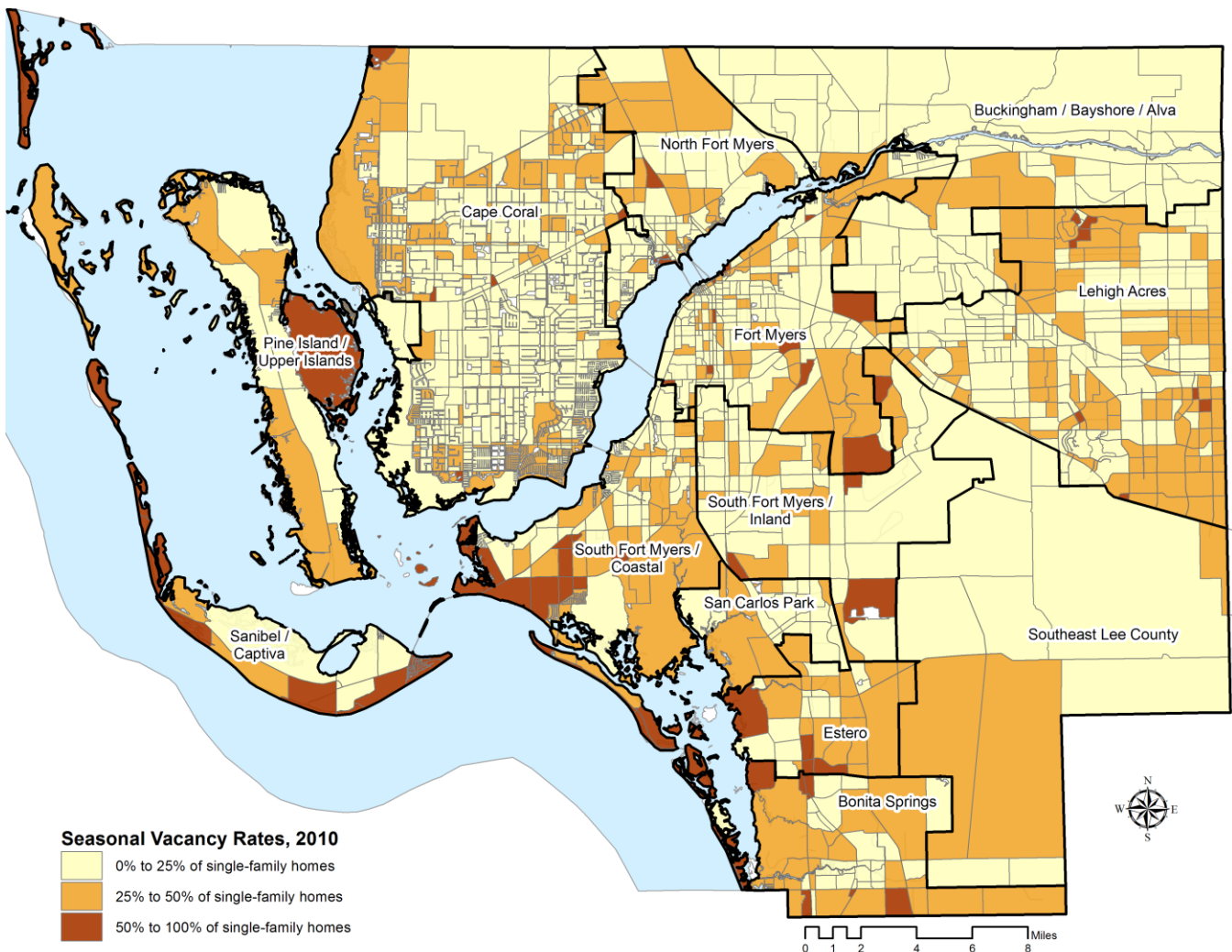
## Conversion of Population

To convert the number of dwelling units in each TAZ into population, the travel model uses a series of adjustments similar to those used by the Census Bureau:

- **SEASONALLY VACANT UNITS:** A percentage of dwelling units are considered to be vacant because they are used only by seasonal residents who have a permanent residence somewhere else.
- **OTHER VACANT UNITS:** Another percentage of dwelling units are considered vacant for all other reasons, including units that are for sale or for rent, or have recently been sold or abandoned.

- **HOUSEHOLD SIZE:** Each remaining “non vacant” unit is considered to be occupied by one household made up of one or more permanent residents. The ratio of persons per household (“household size”) is multiplied by the number of households in each TAZ; subtotals for single-family and multifamily units are summed to yield the permanent residential population per TAZ.

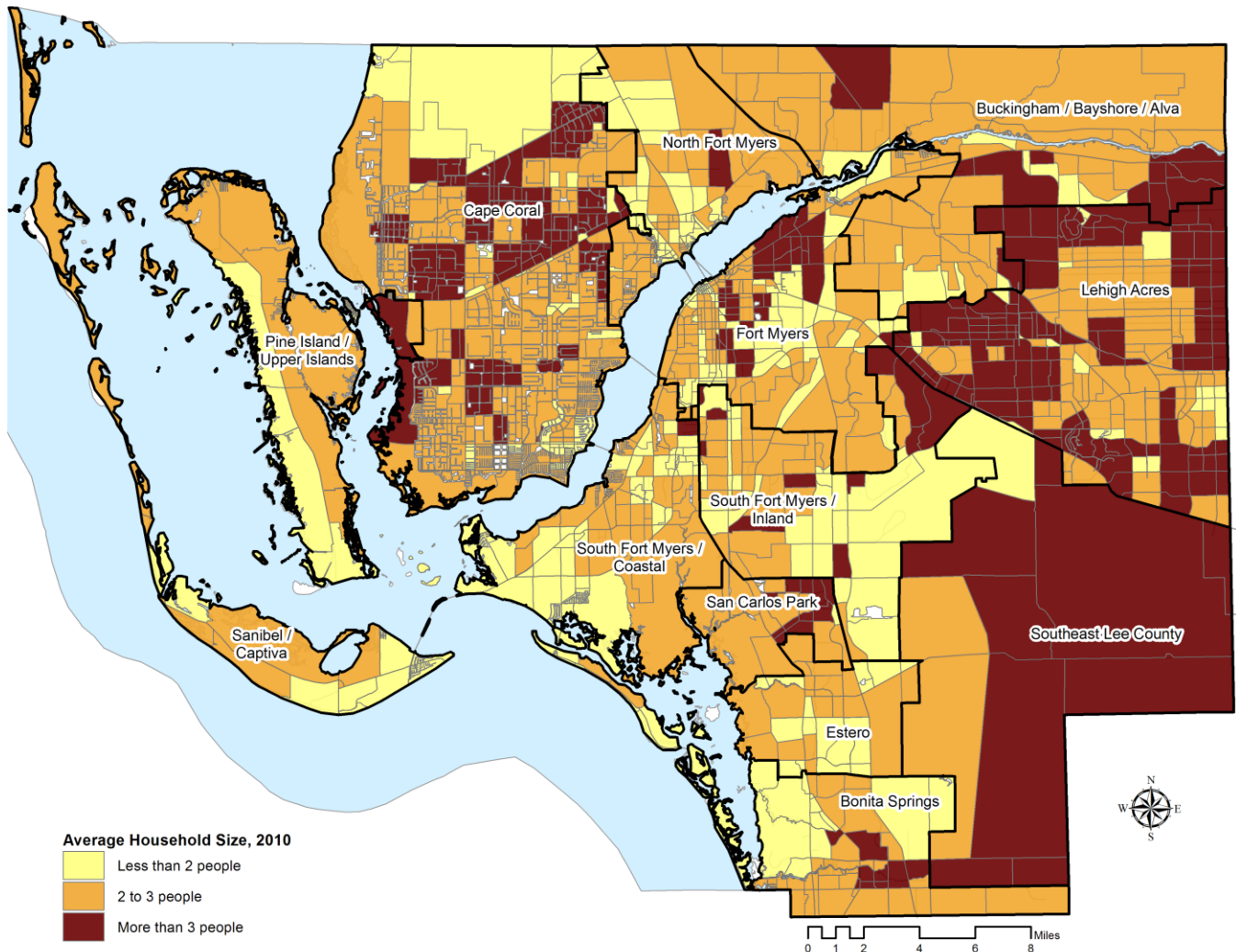
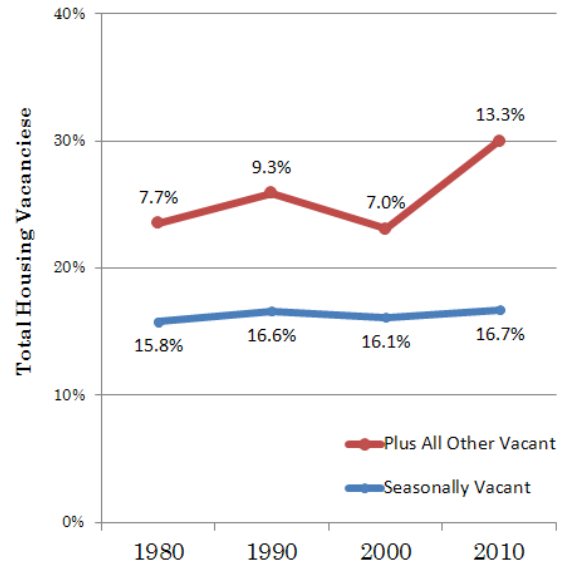
**SEASONALLY VACANT UNITS:** The percentage of dwelling units that are used only seasonally was assumed to be the same for each TAZ in 2040 as it was in 2010. The countywide seasonal percentage has remained fairly constant since 1980 even though the seasonal percentage varies dramatically across the county. The map below shows seasonal vacancy rates by TAZ in 2010.



**OTHER VACANT UNITS:** The percentage of dwelling units that are vacant for all other reasons can vary significantly over time. The 2010 census recorded the highest vacancy rates in Lee County's recent history due to the lingering recession, which peaked from 2008 through 2011. The graph to the right shows vacancy rates from the 1980, 1990, 2000, and 2010 censuses. Another high vacancy rate was recorded in 1990 due to the 1989-1991 recession. For 2040, the non-seasonal vacancy rate was set at 7% lower than the 2010 rate for each TAZ to reflect typical (non-recessionary) conditions.

**HOUSEHOLD SIZE:** The number of permanent residents per household varies widely across Lee County, as shown in the map below. For 2040, this ratio was set to match 2010 conditions for each TAZ (which were based on 2010 census data).

**Lee County  
Housing Vacancy Rates  
From Decennial Census**



## School Enrollment (K-12)

School enrollment data for 2010 was gathered from the Lee County School District for public and charter schools and from the Florida Department of Education for private schools. The number of students in each TAZ for each type of school is shown on the map below. This map also shows the “school choice” zones and sub-zones, as defined by the Lee County School District, adjusted here to follow TAZ boundaries.

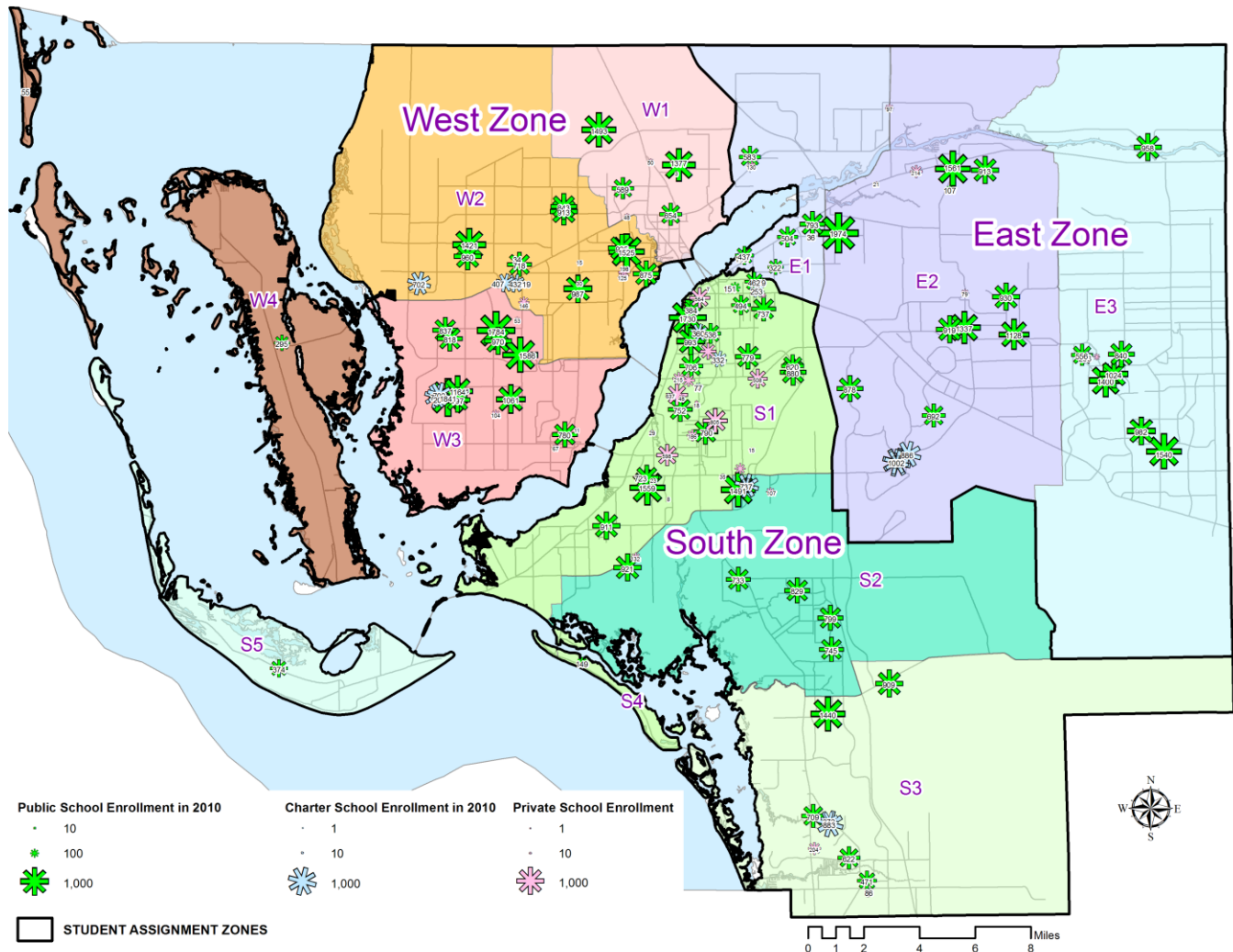
The existing population for 2010 and the forecast for 2040 have been broken down by age groups (see the chart on page 26). In 2010, 98% of the number of children aged 5 to 17 were enrolled in schools in Lee County. That same percentage was applied to the 2040 forecast for children aged 5 to 17, yielding a control total of 135,670 enrolled students for 2040. Therefore about 49,700 additional students are expected to be enrolled in Lee County in 2040.

The percentages of students in each type of school in 2040 were assumed as follows:

- Private schools would retain their existing share of students.
- Charter school enrollment would not grow as quickly as public school enrollment.

Private schools were assumed to expand at their existing locations. About 8,000 students were assigned to unused space in existing public schools in the west zone, plus 4,400 more students in existing east and south zone schools.

The remaining students were assigned to TAZs deemed to be in highest need of additional schools capacity by Lee County School District officials. TAZs with existing vacant school sites were selected first, followed by TAZs with undeveloped tracts large enough for a new school.



## Colleges and Universities

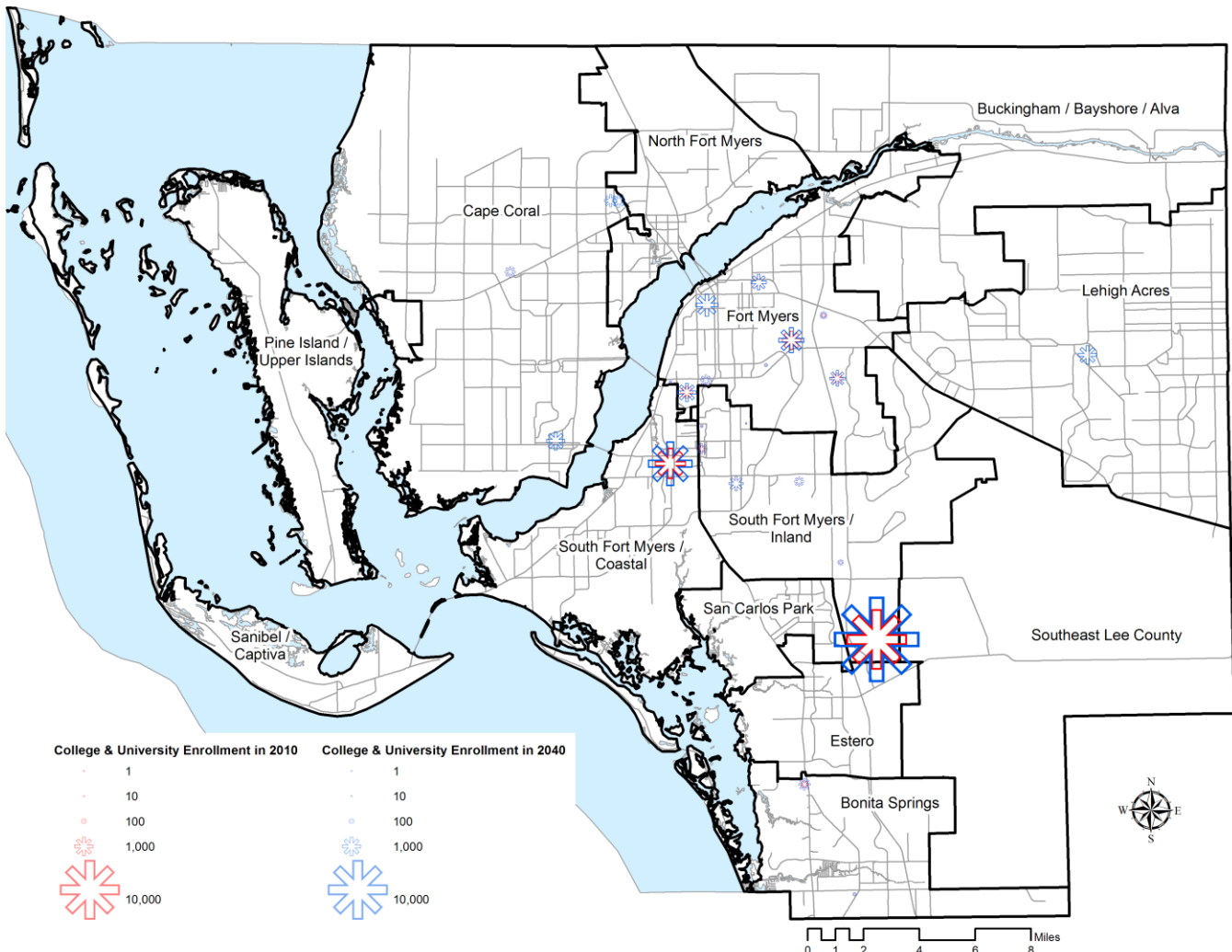
The travel model uses college and university enrollment data differently than for K-12 schools. College and university statistics for 2010 were gathered from the National Center for Education Statistics, whose data includes trade and vocational schools. Where data included more than one campus for a single institution, school administrators were contacted by telephone. Where enrollment data included part-time students, each was counted as one-third of a full-time student. The resulting number of full-time equivalent students is shown for each TAZ on the map below.

	<u>2010</u>	<u>2040</u>
<b>FGCU, main campu</b>	10,348	20,696
<b>FSW, main campus</b>	2,790	5,580
<b>Other colleges</b>	1,600	3,200
<b>Vocational schools</b>	3,250	3,950
<b>Satellite campuses</b>	<u>0</u>	<u>4,500</u>
<b>TOTALS:</b>	<b>17,988</b>	<b>37,926</b>

Future enrollment is not expected to mirror population growth because many local students attend college outside Lee County and some colleges recruit students from outside Lee County.

A control total was selected that is 25% higher than population growth through 2040 to reflect intensive recruitment efforts underway by Florida Gulf Coast University (FGCU) and Florida SouthWestern State College (FSW, formerly Edison State College).

Enrollment forecasts for the largest institutions were established after reviewing published documents and discussing recruitment efforts with school administrators. The remaining students were assigned to expansions at existing locations for smaller schools and assumed satellite campuses (possibly for FGCU or FSW) in four locations in Cape Coral, Fort Myers, and Lehigh Acres.



## Hotels and Motels

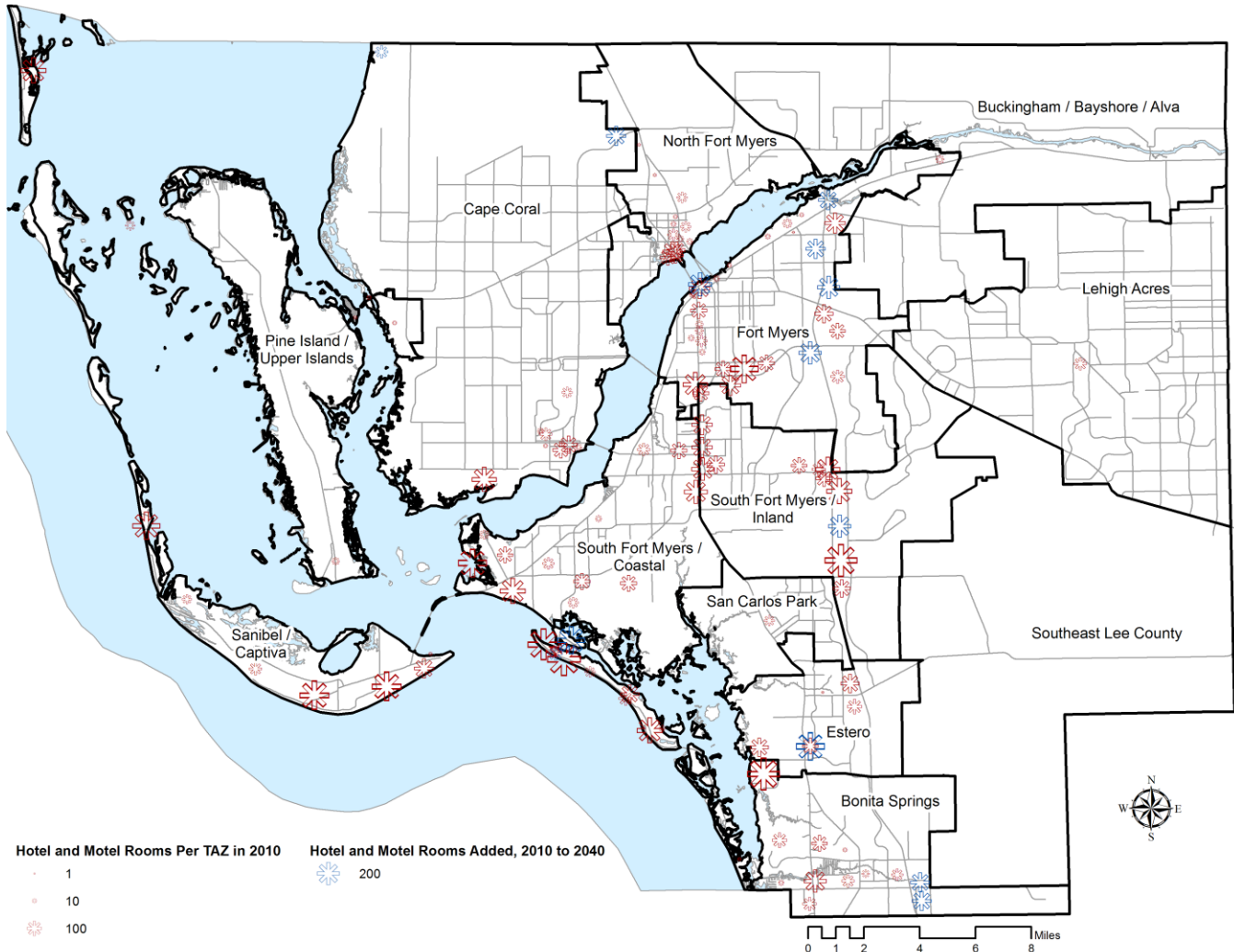
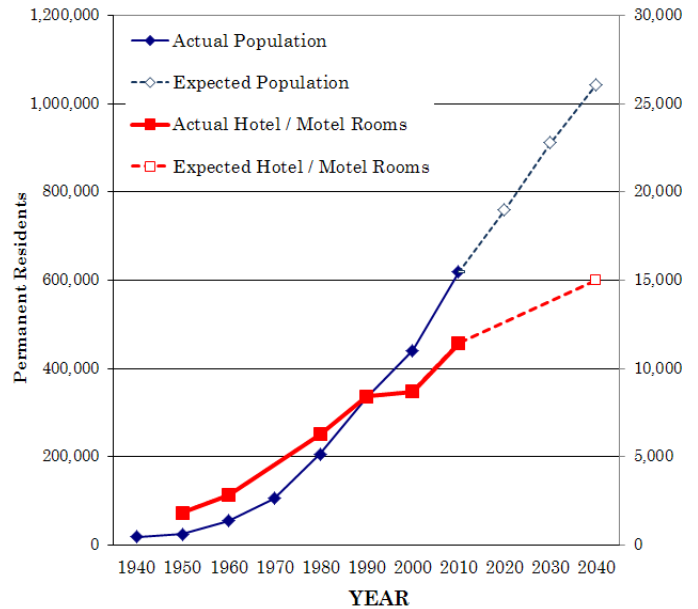
The location and size of hotels and motels in 2010 was compiled by the Lee County MPO and is shown below. When two or more establishments are in the same TAZ, this map combines the number of rooms.

Historic data on the number of available rooms was obtained from state records and is shown on the graph to the right, which also provides the historic and projected population for Lee County.

From the early 1990s until about 2006, hotel development was essentially stalled. During the late 2000s, many new hotels were opened at the same time near I-75.

Extending the growth rate from 1950 through 2000 beyond 2010 would yield about 15,000 hotel rooms in 2040. Thus an additional 2,340 rooms were assigned to TAZs with easy accessibility to travelers and in resort locations where land is still available.

Lee County Population  
(With Projections Through 2040) &  
Number of Hotel/Motel Rooms



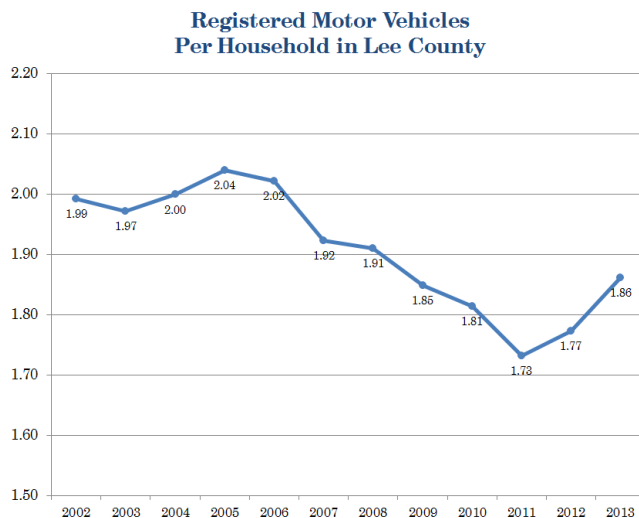


## Vehicle Availability

Data on the number of motor vehicles available per household is collected by the American Community Survey (ACS). For each TAZ, the travel model uses the percentage of single-family and multifamily households having 0, 1, or 2+ cars or light trucks kept at home. ACS data on vehicle availability in 2010 was converted to TAZs for the travel model.

This data is important because higher vehicle availability leads to more vehicular trips being generated, while lower availability increases the likelihood of transit, biking, and walking trips.

Following national trends, Lee County's ratio of motor vehicles per household began to fall after 2005. The fall accelerated during the recession, but rose in 2012 and 2013.



For 2040, the vehicle availability rates for each TAZ were lowered slightly from the 2010 data, as follows:

- A modest (+2%) increase in 0-car households
- A modest increase (+3%) in 1-car households
- A corresponding decrease (-5%) in households with 2 or more vehicles

## Additional Uses for 2040 Data

The 2040 socioeconomic forecasts that were prepared for the regional travel model have many other potential uses. For example:

- School planners and merchants can use this data to locate new schools and stores near expected population growth.
- Transportation planners can use these forecasts to estimate impact fee revenues and can use the travel model to simulate changes in travel patterns that may be caused by changing development patterns.
- Utility planners can estimate the size and location of collection and distribution pipes and the size of treatment facilities.

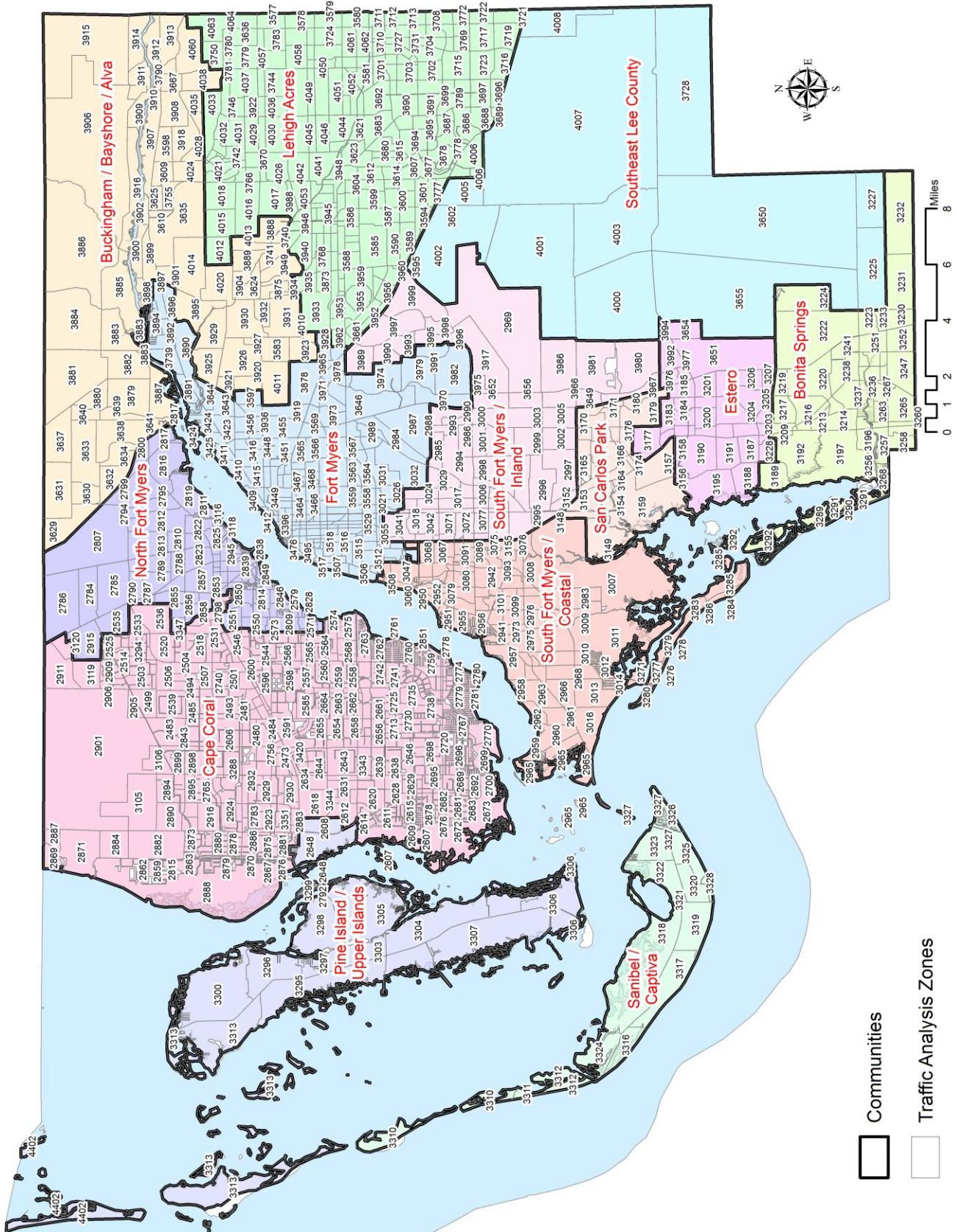
## Data for Preferred Scenario

The complete dataset, including 2010 and 2040 data by TAZs, can be downloaded in GIS or spreadsheet format from the Lee County MPO website or from [www.spikowski.com/details/LeeMPOscenarios.html](http://www.spikowski.com/details/LeeMPOscenarios.html)

A summary of this data is provided on the following pages, organized by the thirteen communities mapped on page 25. A larger map on page 40 identifies each TAZ by number and by community.

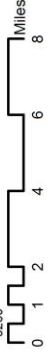
## Public Engagement Report

Immediately following the data pages, Appendix A describes the public engagement process that was undertaken for the land use scenarios project.



□ Communities

□ Traffic Analysis Zones



	Cape Coral	Fort Myers	Lehigh Acres	B'ham / Alva / Baysshore	North Fort Myers	Pine Island / Upper Islands	Sanibel / Captiva	S. Fort Myers / Coastal	Bonita Springs	San Carlos Park	S. Fort Myers / Inland	SE Lee County	Estero	ALL LEE COUNTY
SF_DU10	64,119	20,489	35,092	6,128	11,612	5,303	3,819	22,501	16,389	10,142	12,082	1,668	10,749	220,093
SF_POP10	129,975	40,829	79,371	13,138	18,953	6,867	4,530	33,403	24,602	22,233	22,266	3,283	14,506	413,956
MF_DU10	15,652	21,565	3,504	1,615	18,080	2,809	2,223	36,329	13,867	3,546	8,047	593	6,664	134,494
MF_POP10	25,494	35,019	6,916	3,185	25,735	3,495	2,374	47,288	19,334	5,443	12,292	1,327	8,536	196,438
ALL_DU10	79,771	42,054	38,596	7,743	29,692	8,112	6,042	58,830	30,256	13,688	20,129	2,261	17,413	354,587
RES_POP10	155,469	75,848	86,287	16,323	44,688	10,362	6,904	80,691	43,936	27,676	34,558	4,610	23,042	610,394
TOT_EMP10	43,889	79,008	11,583	3,734	13,483	4,287	6,368	40,657	20,640	7,000	39,667	1,871	12,827	285,014
IND_EMP10	6,898	10,545	2,581	1,247	1,736	568	332	2,653	3,818	1,838	7,492	706	1,019	41,433
COMM_EMP10	12,250	16,801	3,261	783	4,883	1,268	2,022	11,842	5,643	1,728	15,525	528	5,193	81,727
SERV_EMP10	24,741	51,662	5,741	1,704	6,864	2,451	4,014	26,162	11,179	3,434	16,650	637	6,615	161,854
SF_DU40	112,405	42,195	88,198	11,608	30,226	6,796	4,388	35,964	32,833	14,748	22,349	3,497	16,172	421,379
SF_POP40	210,982	71,703	189,382	20,130	43,614	8,070	5,019	48,610	46,937	28,568	37,869	6,571	20,027	737,482
MF_DU40	34,706	43,272	16,262	2,216	23,285	3,302	2,382	46,181	23,178	5,311	15,067	874	11,748	227,784
MF_POP40	51,039	57,871	29,823	3,559	27,418	3,619	2,388	52,855	29,149	7,513	17,078	1,603	11,480	295,395
ALL_DU40	147,111	85,467	104,460	13,824	53,511	10,098	6,770	82,145	56,011	20,059	37,416	4,371	27,920	649,163
RES_POP40	262,021	129,574	219,205	23,689	71,032	11,689	7,407	101,465	76,086	36,081	54,947	8,174	31,507	1,032,877
TOT_EMP40	105,760	114,057	29,584	5,295	25,434	5,772	7,646	55,584	31,071	8,711	80,642	2,312	18,362	490,230
IND_EMP40	15,972	16,304	4,925	1,221	2,583	576	309	2,603	4,206	2,256	12,878	665	1,482	65,980
COMM_EMP40	14,677	14,179	4,838	391	5,383	710	999	10,247	4,160	1,035	8,592	98	3,721	69,030
SERV_EMP40	75,111	83,574	19,821	3,683	17,468	4,486	6,338	42,734	22,705	5,420	59,172	1,549	13,159	355,220
Area_Acres	73,275	34,463	59,532	68,085	24,414	31,704	14,003	32,001	25,548	10,241	36,035	47,386	15,164	471,851

Field name for 2010	Field name for 2040	Description of data in each field
D1_TAZ	(same)	Unique number for each traffic analysis zone in Florida DOT's travel model for District 1
SF_DU10	SF_DU40	Number of single-family dwelling units
SF_P_VAC10	SF_P_VAC40	Percentage of single-family dwelling units that are vacant because they are for sale, for rent, or for other reasons.
SF_P_VNP10	SF_P_VNP40	Percentage of single-family dwelling units that are deemed vacant because they are not used by permanent residents; they are used by seasonal residents who live somewhere else
SF_POP10	SF_POP40	Permanent population in single-family dwelling units
SF_0auto10	SF_0auto40	Percentage of single-family dwelling units with 0 automobiles
SF_1auto10	SF_1auto40	Percentage of single-family dwelling units with 1 automobile
SF_2auto10	SF_2auto40	Percentage of single-family dwelling units with 2 or more automobiles
MF_DU10	MF_DU40	Number of multi-family dwelling units
MF_P_VAC10	MF_P_VAC40	Percentage of multi-family dwelling units that are vacant because they are for sale, for rent, or for other reasons.
MF_P_VNP10	MF_P_VNP40	Percentage of multi-family dwelling units that are deemed vacant because they are not used by permanent residents; they are used by seasonal residents who live somewhere else
MF_POP10	MF_POP40	Permanent population in multi-family dwelling units
MF_0auto10	MF_0auto40	Percentage of multi-family dwelling units with 0 motor vehicles
MF_1auto10	MF_1auto40	Percentage of multi-family dwelling units with 1 motor vehicles
MF_2auto10	MF_2auto40	Percentage of multi-family dwelling units with 2 or more motor vehicles
ALL_DU10	ALL_DU40	Sum of single-family and multi-family dwelling units
RES_POP10	RES_POP40	Permanent population in single-family and multi-family dwelling units
TOT_EMP10	TOT_EMP40	Total number of employees
IND_EMP10	IND_EMP40	Number of industrial employees
COMM_EMP10	COMM_EMP40	Number of commercial (retail) employees
SERV_EMP10	SERV_EMP40	Number of service employees
SCHOOL_10	SCHOOL_40	Number of students enrolled in schools (K-12)
UNIVERS_10	UNIVERS_40	Number of students enrolled in post-secondary schools (colleges, universities, trade schools)
HMDU_10	HMDU_40	Number of hotel and motel rooms
HMOCC_10	HMOCC_40	Percentage of hotel and motel rooms occupied during the peak season
HMPOP_10	HMPOP_40	Number of occupants in hotel and motel rooms during the peak season
HHLDSIZE	(same)	Average number of permanent residents per household
Area_Acres	(same)	Gross number of acres in traffic analysis zone

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# Appendix A – Public Engagement Report