MULTIMODAL QUALITY OF SERVICE

PART II: AREAWIDE LEVEL OF SERVICE
(Including the Gainesville Case Study)

Prepared by

Ruth L. Steiner, Ph. D.
Principal Investigator
University of Florida

Demian W. Miller
Graduate Research Assistant

With assistance from Karen Kolinski
Graduate Research Assistant

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The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation. This document was prepared in cooperation with the Florida Department of Transportation.

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INTRODUCTION

Given the professed desire of Floridians to improve and maintain their urban quality of life and the irrefutable fact that Florida's urban population continues to explode, it is clear that the state's planning agencies require increasingly powerful tools to mitigate the problem of automobile congestion incident to the state's dramatic progress. From its inception, the Florida Growth Management Act has recognized the implicit relationship between transportation and land use planning, but only recently have steps been taken to address this relationship explicitly. As such, the addition of Multimodal Transportation District (MMTD) and Multimodal Areawide Level of Service (MA-LOS) methodologies to Florida's concurrency management toolkit represents a bold step in understanding and coping with the Malthusian trap of expanding roadways to accommodate development.

Having consulted in the development of the Multimodal Transportation Districts and Areawide Level of Service Handbook draft, the authors of this research project took as its primary objective the critical implementation of the above methodology on a hypothetical Gainesville, FL multimodal transportation district. Through consultation with local planning agencies, a rough area of interest was outlined. This region, bisected by US 441—a major urban arterial, lies just north of the University of Florida Campus. Elements of consideration in the selection process included the city's interest in improving the district; the area's strategic importance with respect to its proximity to UF; the relatively high availability of transit service; the perception of well-mixed land uses; and the lack of existing plans for the area.

In addition to the main case study area, a summary implementation was conducted as part of a UF planning department transit-oriented design studio. The subject area for this abbreviated MA-LOS/MMTD application lies immediately south of downtown Gainesville and southeast of the main UF campus. Although this district does not meet the handbook's minimum area and employment thresholds, its abundance of transit and multifamily housing developments made it an excellent subject for application of multimodal LOS and connectivity/accessibility measures.

Following the presentation of the Gainesville case study and the Gainesville TOD abbreviated study, this report discusses implementation recommendations brought to light through the study-implementation process. Primarily discussing technical issues, this section is followed by a summary of other MMTD implementation and research efforts. Covering programs in Seminole County, Martin and St. Lucie Counties, Downtown Sarasota, Alachua County, and the City of Destin, this section describes an array of scenarios and challenges for the MMTD formula. Finally, this report concludes with a discussion of policy issues relating to MMTDs. This section discusses future needs, compares MMTDs to existing form of concurrency exception, raises the FIHS question, evaluates MMTDs from a "planning vs. regulation" standpoint, and touches on interagency concerns incident to MMTD implementation. This report was prepared in draft form in January 2002. Some of the recommendations contained herein have already been incorporated into the Multimodal Transportation Districts and Areawide Level of Service Handbook.

GAINESVILLE MMTD CASE STUDY

Although the MA-LOS handbook delineates certain thresholds with respect to population, area, and employment, many of its principles are set forth as guidelines rather than rules. Chapters in the handbook dealing with a complementary mix of land uses, density and intensity of land uses, and transit/pedestrian-friendly design examine those factors likely to render a successful MMTD while allowing flexibility in the character of individual districts. To fulfill the data and analysis requirements prescribed by these chapters, as well as the more quantifiable discourse on connectivity and areawide level of service, a wealth of information was assembled. In so doing, several techniques were identified to enhance and augment the existing MA-LOS/MMTD methodology.

Finally, having applied the MA-LOS/MMTD methodology with respect to the every intent of the handbook, this case study attempts to analyze ambiguities and inadequacies in the text. Based on theoretical concerns, the handbook has been edited and revised on several occasions. However, only by its application to the idiosyncrasies of the real world can the methodology be truly tested

Selection of General Study Area

Initially, this study presumed Gainesville's downtown area would serve as the target of MMTD implementation. However, input from the local planning staff suggested that the favorable progress of downtown redevelopment did not warrant additional planning inputs of this magnitude. Rather, they suggested an area north of the University of Florida campus roughly defined by the 13th Street and 6th Street corridors. Though less favorable than downtown, this study district appeared to possess good connectivity, and was thought to be well served by transit. Despite a propensity for single-family dwellings, the area demonstrated a fairly diverse mix of uses, particularly along the aforementioned corridors.

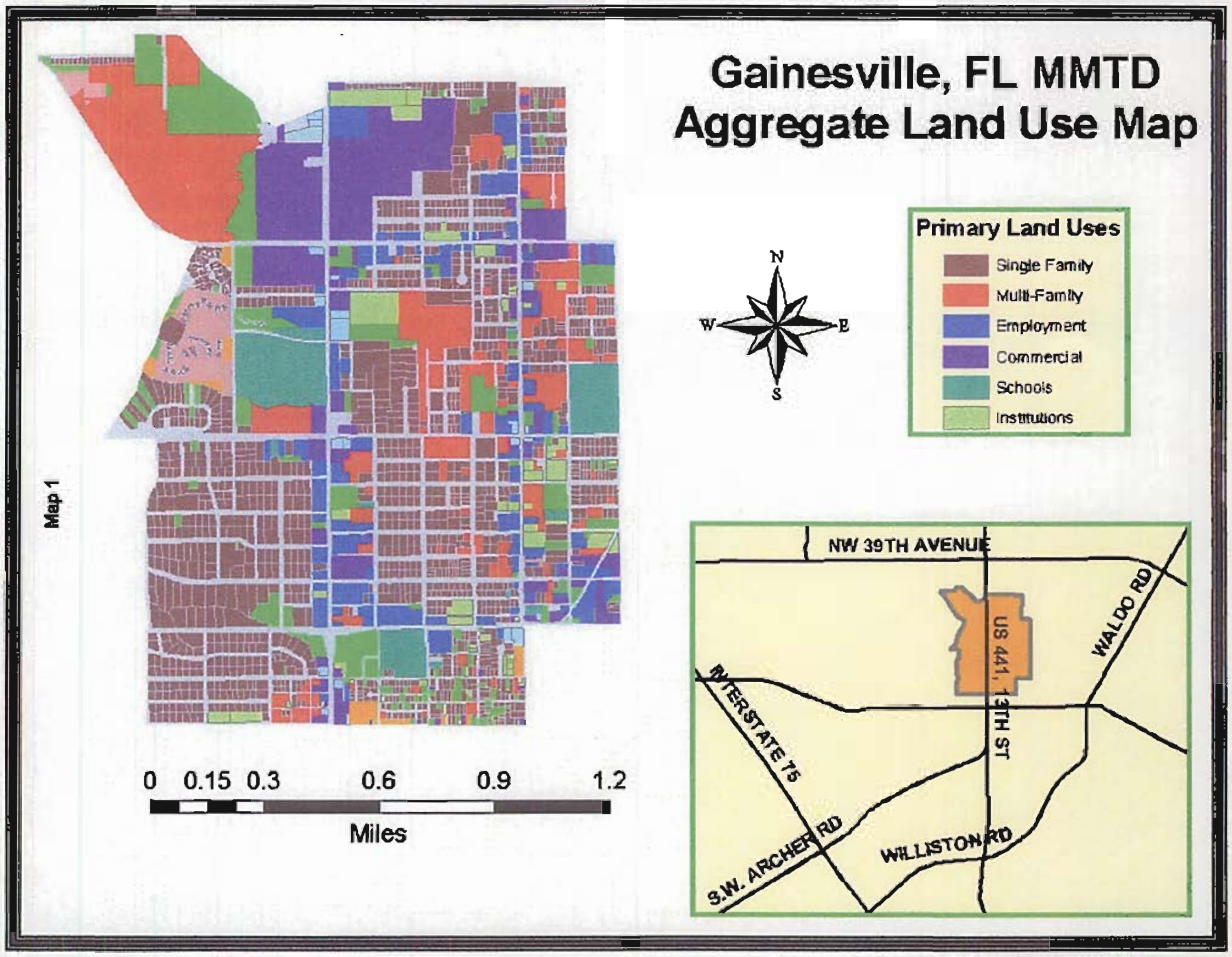
Although the study area is located in one of Gainesville's two massive Transportation Concurrency Exception Areas (TCEA), the city felt that development as an MMTD might invigorate the area by capitalizing on the large bicycle and pedestrian presence immediately to the south. The authors found the area academically fruitful because it did not represent an ideal application of the MA-LOS/MMTD methodology, thereby allowing the testing of regulatory aspects of the document while flushing out its usefulness as a planning tool.

MMTD Boundary Delineation

After settling on a general study area, further data analysis and consideration of MMTD objectives allowed strictly defined boundaries to be established. Two major considerations governed this process:

1. adherence to the population, employment, area, and land use organization guidelines established in the MA-LOS/MMTD handbook, and
2. regard for existing traffic analysis boundaries and logical neighborhood divisions.

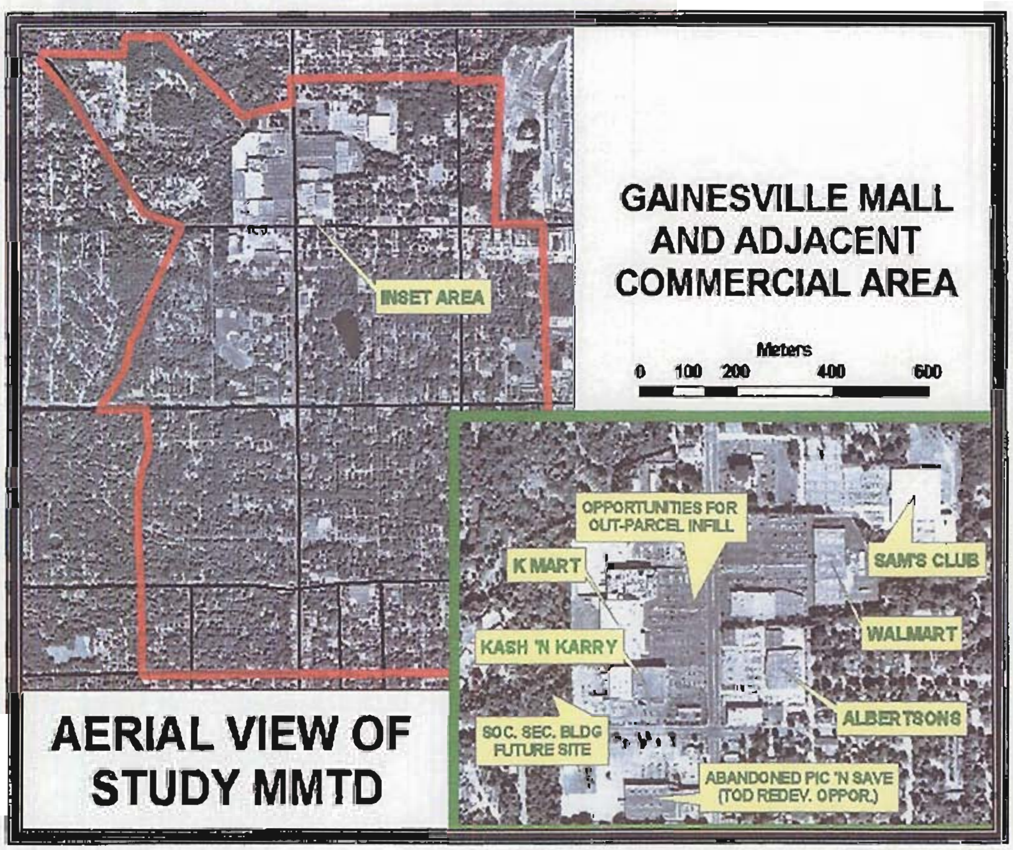
The MA-LOS/MMTD handbook establishes specific thresholds for population, employment, and area, as well as textual and tabulated suggestions for organization, density, and intensity of land uses. To be considered under the provisions of this study, an MMTD should house at least 5,000 persons and maintain a 0.5:1 ratio of jobs to population. Additionally, an MMTD must be a minimum of 2 square miles in area. These "hardwired" criteria were of foremost concern in the development of Gainesville's MMTD boundaries, but the existence of appropriate mixes of land uses; central core and corridor density/intensity nodes; and relationships between adjacent uses were scrutinized as well. Using these criteria in conjunction with the city's specified general area, the following MMTD district was defined.



By considering land use and density data prior to finalizing the MMTD boundaries, it became apparent that an adjustment of the northern MMTD boundary from 23rd Avenue to 29th Avenue was necessary. This northward adjustment captured the Gainesville Mall, an adjacent major commercial center, and several large multi-family developments. As a result, considerable relief was added to an area that had thus far been relatively flat in terms of density and intensity. Although this core is by no means central, its inclusion is appropriate given the relation of this study MMTD to the University of Florida campus.

Indeed, it is difficult to understand anything about Gainesville without considering the impact of Shands Hospital and the University of Florida. Though excluded from this MMTD, the university dramatically impacts many of the transportation and land use allocations that occur within the study area. Although a density/intensity map of the district more closely resembles a one-sided dumbbell than the more typical circular gradient, the obvious impression of an unbalanced district is inaccurate—when significant counterweights are not being taken into full consideration.

Though less massive than southwest Gainesville's Butler Plaza, the Gainesville Mall and the adjacent shopping area are anchored by two major grocery stores and two major discount department stores. Additionally, several minor anchors and a vast array of smaller shops and restaurants accommodate most consumer needs. The layout of this facility is presently indicative of Cold-War-era, automobile-friendly design. However, development of out-parcels in conjunction with a comprehensive and effective multimodal transportation system would likely capitalize on this facility's proximity to nearby multi-family uses, as well as its relationship with the UF campus. The map below demonstrates the magnitude of this commercial facility by juxtaposing its broad swath of concrete with the verdant canopy of trees representative of Gainesville's older neighborhoods.

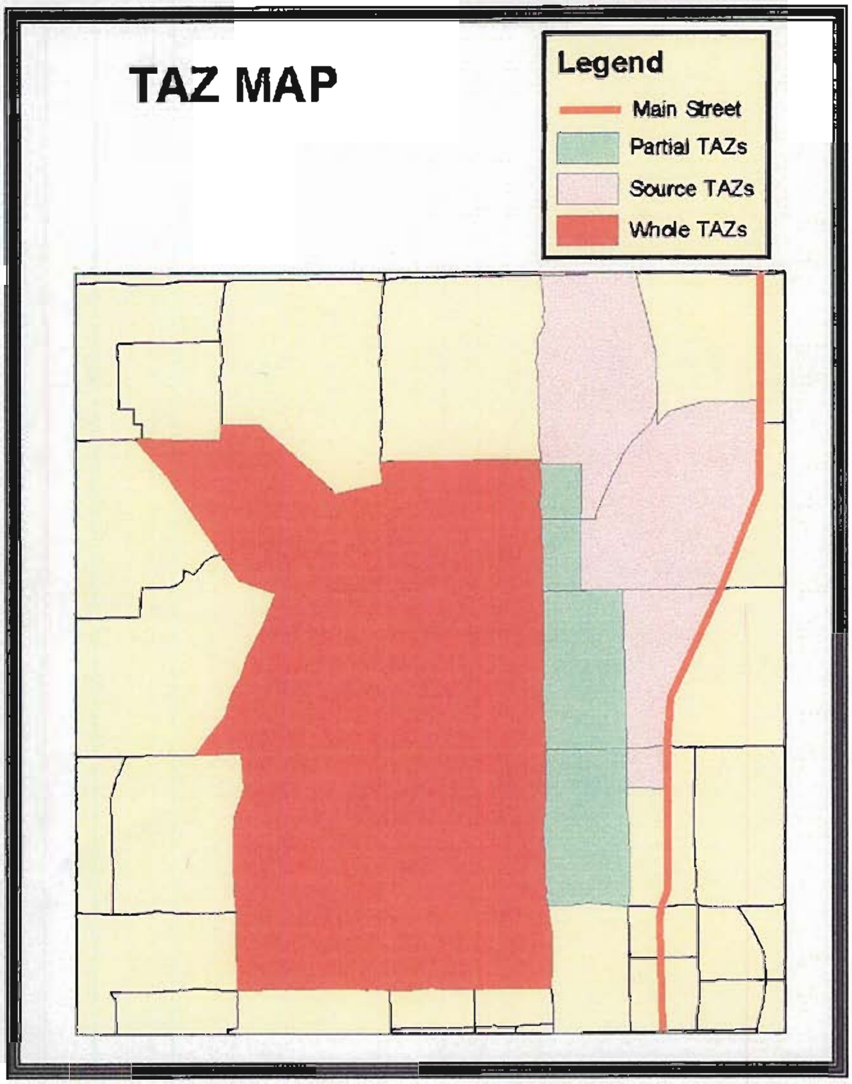


GIS Data Layers

Although the actual computation of the study MMTD's areawide level of service was determined using the beta-test ARTPLAN software package, most of the other MMTD criteria readily lends themselves to GIS analysis. Specifically, the analysis of elements such as network connectivity, land use mix, housing density, and gross population/employment, were conducted using ArcView and ArcInfo. In this regard, a multitude of data layers were assembled from the Florida Geographic Data Library (FGDL) with the assistance of the University of Florida Geoplan Center. Many of these map layers, such as digital aerial photographs and major road lines were used for strictly descriptive purposes, but other geographic data sets were manipulated to analyze land use mixtures and densities, network connectivity, and transit accessibility.

Of great use in this study was a parcel level aggregate land use map based on tax appraiser parcel data. This map grouped similar land uses into eight major categories, such as single-family, multi-family, commercial, employment, etc. The grouping of the 99 land use codes was instrumental in the process of land use analysis and aided in the boundary delineation process. Unfortunately, in spite of its high spatial resolution, it did not effectively provide gross population and employment data. These data are factored into the calculation of the areawide LOS and are necessary for the confirmation of the population and employment thresholds established in the handbook. Although section 4.2 of the handbook suggests the "dynamic segmentation of the area polygons using census tract level information," it became apparent that the layout and size of census block-groups lacked the spatial discretion necessary to accurately measure the area's demographics.

This concern, combined with the study scope of the work's specification that techniques of MMTD analysis correspond with FSUTMS data inputs when appropriate, led to the logical conclusion that traffic analysis zones (TAZs) be used as the primary geographic building block. This method worked extremely well for all areas of the Gainesville MMTD with the exception of the eastern boundary, where the TAZ boundaries were coterminous with Main Street. Because Main Street directly references downtown Gainesville, and because downtown, like the university, is not the principle target of this study, TAZ boundaries were abandoned for the eastern border of the study. For this border, as well as the ambiguous northeast corner of the MMTD, city streets and, in some instances, parcel lines were used to establish a boundary. In the map below, the red represents TAZs taken intact as MMTD boundaries, while the green represents partial TAZs extracted from the peach areas.



Other Data

Aside from GIS data layers, the North Central Florida Regional Planning Council (NCFRPC) provided the critical Zdata files which, when related to the GIS TAZ map, yielded the study MMTD's population and employment data. Additionally, this agency provided current automobile LOS tables for most of the identified major facilities in the study area. Regarding transit service in the study area, Gainesville's Regional Transit System website provided route maps, frequencies, and service spans.

These secondary sources supported the primary research activity of roadway attribute collection. Roadway attributes collected for the study MMTD's major facilities were used to develop a segment-level database of sidewalk width and separation, bike lane status, outside lane width, presence of barriers, and posted speed limits. This data, in conjunction with the aforementioned traffic data, was necessary to accurately utilize and critique the ArtPlan MA-LOS software.

MMTD Prerequisites and Land Use Analysis

Throughout the implementation of the MA-LOS/MMTD handbook's magnitude and land use methodologies, this study progressed through two distinct phases of analysis:

1. Consideration of Basic MMTD requirements
2. Analysis of MMTD land use organization and density/intensity characteristics

Basic MMTD Requirements

As noted previously, the primary data source used in the delineation of the Gainesville study MMTD was a map of traffic analysis zones from FGDL and their corresponding Zdata files provided by the NCFRPC. Besides yielding a sense of precedence with regard to existing traffic models, TAZ data proved to be the most spatially discrete source of population and employment information available.

For the most part, the use of TAZ data to estimate the MMTD's population and employment characteristics was a simple process. After joining the Zdata table with the TAZ shapefile, those polygons comprising the MMTD were selected and a table of their attributes was exported for summation. However, the efforts to exclude the Main Street area resulted in several complications. Because TAZs along the eastern perimeter of the MMTD were bisected to avoid collusion with the Main Street commercial area, the Zdata for these partial TAZs had to be extrapolated. The initial inclination was to attribute Zdata from the source TAZ to the partial TAZ that is proportional to its area. Unfortunately, due to the relatively high intensity of commercial and employment activity along the Main Street edge of the source TAZs, it is likely that the less intense partial TAZs would be misrepresented. By examining the land use parcel map, it was possible to select TAZs from the interior of the MMTD that closely resemble the land use characteristics of the partial TAZs along the eastern border. Though not statistically validated, the use of this more realistic Zdata allowed for a closer approximation of the partial TAZ's population and employment.

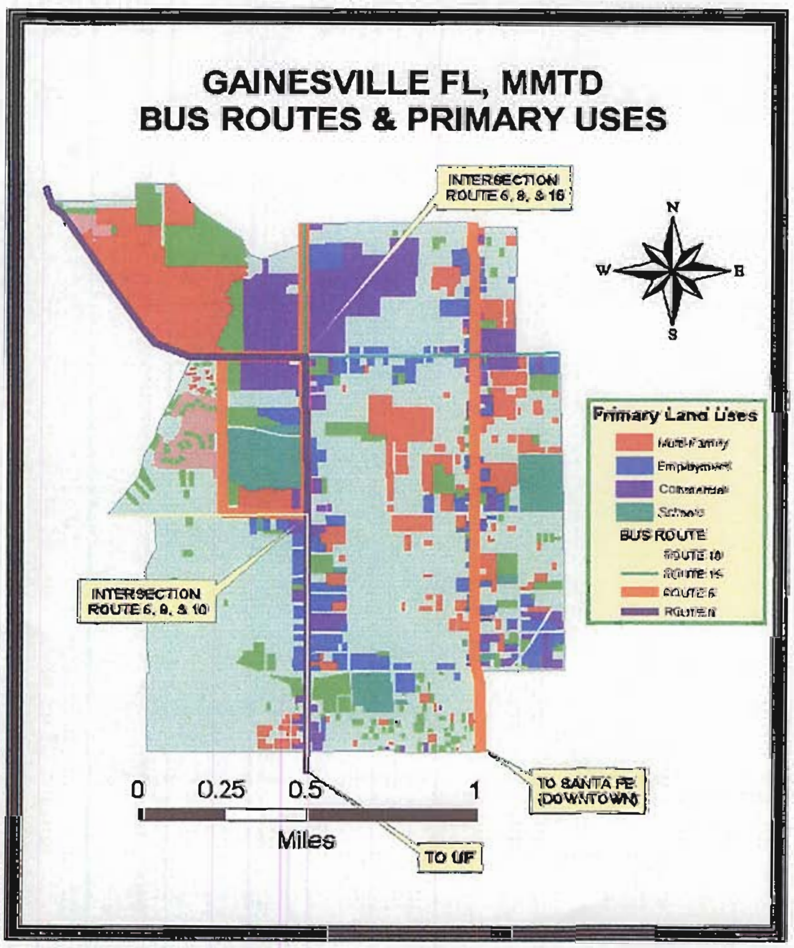
Summation of the Zdata-1 (population) and Zdata-2 (employment) tables for the MMTD TAZs yields the following results:

Single Family Pop.	3268
Multi-Family Pop.	4228
Total Population	7396
Total Employment	8349
Jobs to Population	1.13
Area	1.99

As can be seen from this table, the study Gainesville MMTD barely attains the 2 square mile area threshold, but posts favorable population and employment numbers. Of note, the area's over-square employment to population ratio more than doubles the 0.5:1 benchmark.

In addition to promising population and employment data, the study MMTD appears to be well served by Gainesville's Regional Transit System. Though varying in frequency and service span, four RTS routes (6, 8, 10, & 15) serve the study area. Portions of all four routes travel along the area's primary arterial—NW 13th Street (US 441)—effectively doubling that facility's bus frequency. Additionally, the intersection of routes 6, 10, and 15 at 23rd Avenue and 13th Street near the Gainesville Mall and nearby multi-family developments, along with the intersection of Routes 6, 8, and 10 at 16th Avenue and 13th Street near Gainesville High School provide excellent opportunities for access to the regional transportation system.

The map below depicts these intersections as well as those land uses considered crucial to a successful MMTD. Note how the overlap of bus coverage corresponds to the central core and corridor organization of land uses.



Land Use Mixture, Organization, and Density/Intensity

Having met the most basic requirements in section 3.1 regarding area, population, employment ratio, and the existence of scheduled bus service, it is necessary to determine whether a diverse mix of complementary land uses exist in this study MMTD. For this area, the identified three primary uses are regional retail, multi-family dwelling units, and educational facilities. Though the advent of big box power nodes has shifted the scope of what may be considered "regional retail," for the purposes of this exercise, the Gainesville Mall, located in the northern portion of the MMTD has been cited in this capacity. Although single-family units dominate the residential landscape spatially, TAZ data indicates that over half of the area residents dwell in multi-family units. Though many of these units are scattered throughout the MMTD, a considerable number are located in the northwest portion of the district offering good accessibility to the Gainesville Mall. Occupying the role of third primary use, Gainesville High sits near the center of the district. With an enrollment of 1964 students and 157 staff members for the 1999-2000 school year, this institution represents a large potential demand on multimodal facilities.

Supporting uses for the study area include a diverse mix of restaurants, convenience retail, automotive services, low-intensity employment, schools, and government service buildings. The majority of these uses that are not associated with the "polar" core of the Gainesville Mall are located along 13th Street and 6th Street, where they are served in varying capacities by Gainesville's RTS. Finally, it is relevant to consider the nearby University of Florida as a supporting use. Although this 800-pound gorilla places monumental demands on Gainesville's transportation infrastructure, lack of parking and peak hour congestion tends to boost transit ridership far beyond the norm for a similarly sized southern city. Because of its proximity to UF (and downtown), the study MMTD reaps the benefit of increased frequency and a diversity of transit destinations.

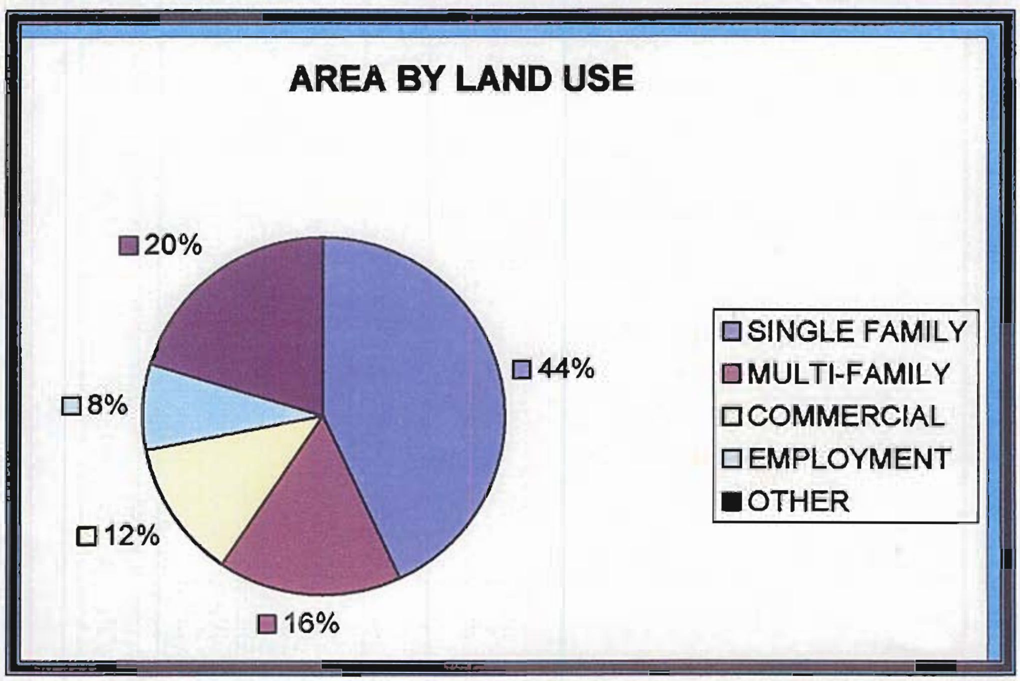
Table 7 of the MA-LOS/MMTD handbook indicates that density of residential uses and intensity of commercial and employment uses are critical to the support of transit and pedestrian modes and the subsequent health of a multimodal district. By dividing the number of dwelling units indicated in the MMTD's Zdata with the sum of the areas of the relevant land uses from the area's parcel data, it is possible to effectively estimate the study MMTD's residential density.

	Single Family	Multi-Family	Combined	Employment
Dwelling Units	1610	2162	3772	8349
Acres	450.2	171.3	621.5	210.9
Density/Intensity	3.6	12.6	6.1	39.6

Although the calculated multi-family density of 12.6 suggests "good multimodal potential," the combined density of 6.1 rates as only "marginal" according to Table 7. Likewise, the calculated employment density of 39.6 rests on the border between the table's "poor" and "marginal" classes.

> Section 5.1 of a previous draft MA-LOS/MMTD handbook stated:
> Areas with possible multimodal potential as a result of high densities along a major corridor may be considered multimodal districts on an interim basis in the first phase of development plans or implementation of a comprehensive land use plan that achieve the desired level of density, intensity, and organization of land uses within a reasonable planning horizon.

Given the significant commercial/employment organization along the 13th Street/6th Street corridor, and the presence of high residential and commercial densities in the study area's northwest quadrant, it seems that the proposed district reasonably fits this "interim" designation. Several infill multi-family developments initiated in the study area and the vast expanse of asphalt in front of the Gainesville Mall represent a potential for greater densities, but it remains undetermined whether the area could actually attain the higher densities required of a fully vested MMTD.



As indicated in the chart above, a major hindrance to the development of acceptable densities and intensities in the study area is the spatial dominance of existing single-family residential units. Presently, less than 50 acres of designated vacant space exist within the study MMTD. If these acres were developed at high residential densities, it is possible that the 7 dwelling-unit/acre, "good potential" residential density threshold could be broached. With respect to the more daunting task of raising employment intensities from the present 40 employees/acre to the "good potential" of 60 employees/acre, it must again be recognized that the presence of the university to the immediate south "subsidizes" the transit demand of the study district.

With respect to chapter 4 regarding central cores, the most identifiable point within the study district is the intersection of 23rd Avenue and 13th Street. The basic ingredients for a central core are embodied here in the intersection of three transit routes combined with ¼ to ½ mile walking distances to regional retail, Gainesville High School, and several large apartment complexes. Two issues in conflict with this status are the relative spatial homogeneity of uses within the core radius and the fact that the core is by no means "central" with respect to the district at large. Indeed, it could be estimated that this core location is more than ½ mile (seven city blocks) from the geographic centroid near 16th Avenue and 12th Street. Although a considerable mix of uses exists near the geographic center, the primarily single-family nature of this area's residential development precludes its consideration as a central core. .

Given the density of transit service at the 23rd Avenue/13th Street intersection and along 13th Street between the two lobes of the Gainesville Mall, the presence of an asphalt desert between the roadway and the commercial structures is discouraging to say the least. Being consummate optimists, it is the hope of this study's authors that this "wasted" space be converted to host a mix of uses, thereby integrating the study area's potential central core.

Though the minimal scope of this study MMTD precludes the notion of "major activity centers" along the major corridors as advocated in Figure 2 of the handbook, it is evident from the aggregate land use map that the single-family residential character of the southern portion of the study MMTD is largely suspended along 13th Street and 6th Street. Although many of these businesses are low intensity uses, and presently do not reference the street in a pedestrian friendly manner, they do represent a potential for a contiguous span of commercial activity from the university to the "central" core.

Analysis of Connectivity and Multimodal Areawide Level of Service

Assessing the Gainesville study MMTD's areawide level of service followed the six-step methodology outlined in chapter 6 of the MA-LOS/MMTD handbook.

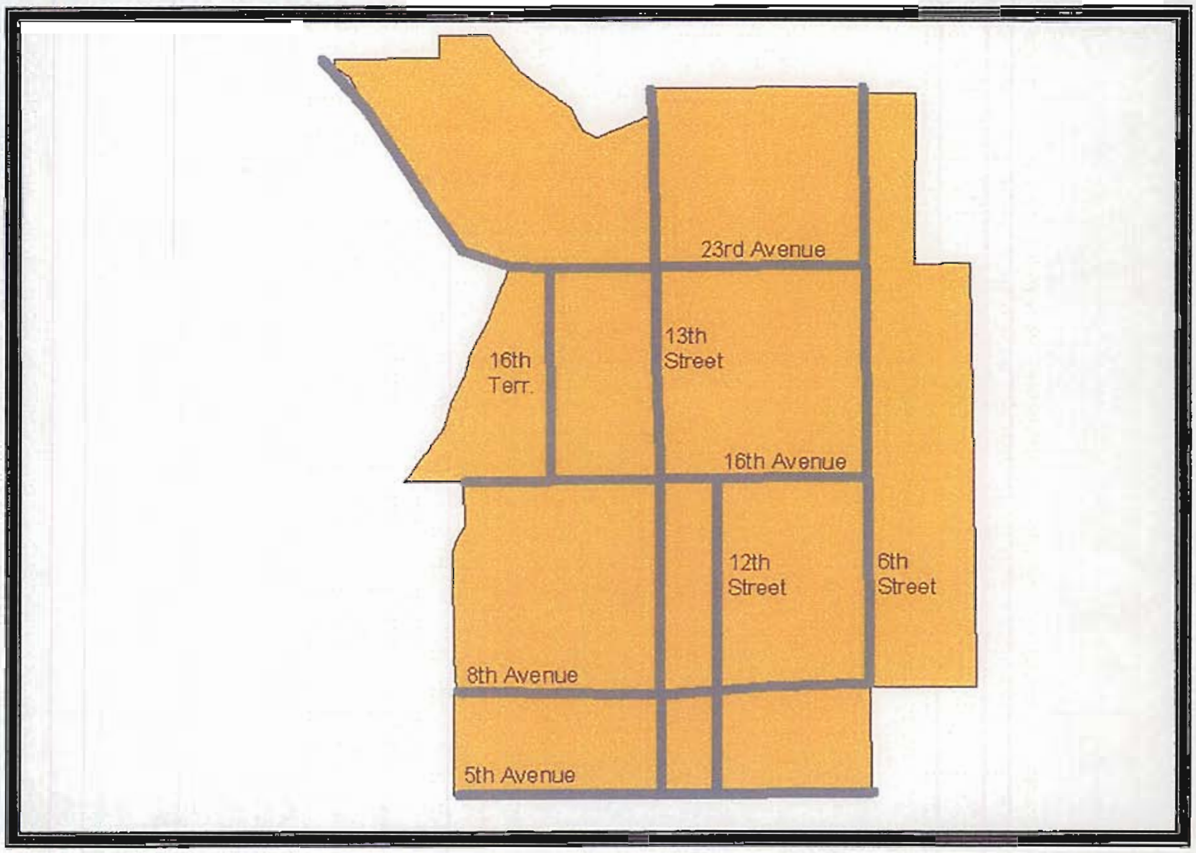
Step 1: Identify the study area's major multimodal facilities. For the most part, those roadways included in the FGDL's "Major Roads" data layer were selected for this study. Because automobile LOS calculations had been completed by the NCFRPC for most of these routes' segments, primary data collection demands of this study were reduced considerably.

In addition to these designated major roads, two additional routes were added to the areawide LOS equation. In the northwest area of the district, *16th Terrace* connects the large multi-family developments along 23rd Avenue with Gainesville High School, and provides an alternate path to southern elements of the district and the university beyond. 16th Terrace is served by one of the area's transit routes, and so is a logical addition to the district's multimodal infrastructure. For experimental purposes, 12th Street, from 5th Avenue north to 16th Avenue, was added as a substitute bike LOS source for the 13th Street facility. Given the greater service area afforded bicycles, their ability to utilize alternate parallel routes while still accessing arterial land uses should be recognized. Similar parallel facilities exist for east-west bicycle mobility along the 8th Avenue and 16th Avenue corridors, but no traffic volume data was readily accessible for these routes.

The following table and map summarize the basic characteristics of the major facilities selected for this study.

NAME	DIRECTION	DESIGNATION	AADT	LANES	TRANSIT
13TH ST (US 441)	N-S	CLASS III ARTERIAL	33981	4-D	Y
6TH ST	N-S	MAJOR CITY ROADWAY	7014	4-U	Y
5TH AVE	E-W	OTHER SIGNALIZED ROAD	2762	2-U	N
8TH AVE	E-W	CLASS II ARTERIAL	14773	2-U	N
16TH AVE	E-W	CLASS I ARTERIAL	22949	4-D	Y
23RD AVE/BLVD	E-W	CLASS II ARTERIAL	12152	2-U/4-U	Y
16TH TERRACE	N-S	OTHER SIGNALIZED ROAD	5000*	2-U	Y
12TH STREET	N-S	OTHER SIGNALIZED ROAD	4165	2-U	N

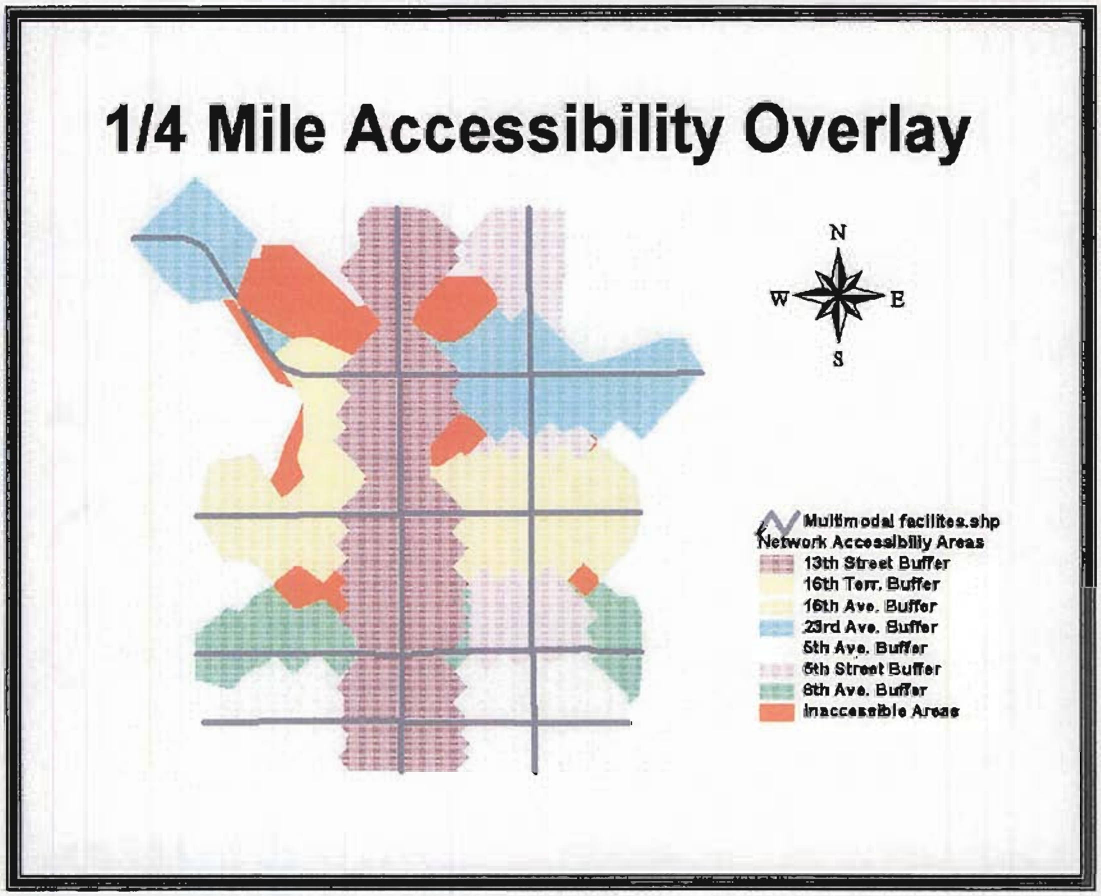
*ESTIMATED



Step 2: Apply the practical accessibility distances to establish service areas for each facility. Using the 0.25 mile transit/pedestrian radius and 2.0 mile bicycle accessibility radius, the service areas for each mode were assessed. For this task, all identified major facilities were considered for the bicycle and pedestrian modes, while only those facilities with transit service were considered for the transit mode. Rather than construct simple 0.25 mile buffers around the major facilities, ArcView Network Analyst was employed to determine more accurate service areas based on the minor road network.

The application of Network Analyst to this problem was a three-step procedure. First, using the Tiger Roads data layer, a point was created for each minor road/major facility intersection. Next, the "Service Area" tool was used to determine the area within a 0.25 mile network range of the intersection. For an ideal grid street system, these areas would resemble perfect diamonds. In the event of dead ends, double-long blocks, and other network imperfections, these diamonds are distorted, effectively reducing pedestrian access to the major multimodal facilities. The final step in the Network Analyst service area calculation utilized ArcInfo to dissolve the boundaries of the individual intersection service areas, thus rendering the service area for an entire facility.

Superior calculation of these service areas would utilize sidewalk layers, dedicated bike paths, internal roads, and pedestrian cut-through points to form a more comprehensive model. These options will be discussed further in the *Recommendations* portion of this report. In the representation below, the horizontal patterns from top to bottom represent the Tiger Roads network accessibility areas of 23rd, 16th, 8th, and 5th Avenues respectively. From left to right, the 16th Terrace, 13th Street, and 6th Street service areas are depicted. The bright red backdrop represents un-serviced areas; however, the absence of service in the northwestern quadrant of the district is primarily the product of missing internal road data, and does not reflect the true connectivity of the region. This failure may be addressed by using an intersection tool in place of the more intuitive union tool, thereby capturing the population of those areas excluded solely due to missing data.



Step 3 & 4: Determine the LOS for each mode. In its review capacity, this study employed the ARTPLAN tool to evaluate the multimodal LOS for each major facility. Data from the NCFRPC's automobile LOS tables were used to determine the roadway Class, Average Annual Daily Volume (AADT), and Signals/Mile. Number of Through Lanes, Posted Speed, Median Type, and Left Turn Lanes were physically observed. The remaining traffic and control variables reserved default values. Automobile LOS values were not calculated using ARTPLAN, rather they were taken directly from the NCFRPC source data.

After facility level data input was complete for each identified major facility, the segment data input screen was used to refine the LOS input process. In this process, a separate segment was designated for each controlled intersection. Segment length was calculated using the ArcView measurement tool, and facility variables were adjusted as needed. When inputting multimodal segment data, the *Specify Width* option was used for the outside lane value, and Paved Shoulder/Bicycle Lane was not checked unless a clear stripe (or similar division such as pavement type) separated the shoulder/bike lane from the automobile travel lane. This decision, per the advice of Dr. Linda Crider, reduced the bicycle LOS along 13th Street where the faded "house" bike symbols provide minimal bike lane definition. Unless obviously flawed, pavement condition was listed as desirable.

Although debate exists as to whether peak hour transit frequency should be used instead of average frequency, this study considered average frequency when measuring the study district's transit LOS. Because multiple transit routes, each with varying frequency and service span, serve some segments, input of bus data was somewhat more complicated than other multimodal variables. This problem was particularly acute in the case of 13th Street, where all four of the area's transit routes interact over different segments of the facility.

Using the RTS bus schedule, the total stops per day were tabulated for each route. This number was then divided by that route's service span to calculate the average hourly frequency. This step was necessary because many Gainesville bus routes offer half-hour service during peak times, but only hourly service during midday and evening. When two routes with identical operational hours serviced a segment, their average frequencies were simply added. In the event of varying service periods, however, the sum of the frequencies during dual (multi) coverage was prorated against the single bus route frequency.

	Route 6	Route 8	Route 10	Route 15
Stops/Day	24	28	12	24
Span	16	13.5	11	16
Frequency	1.5	2.07	1.09	1.5

Using the example of routes 6 & 8, route 6 begins at 6:30 and ends at 22:30 while route 8 begins at 6:00, but ends at 19:30. Therefore, for 13 hours, between 6:30 and 19:30 both routes operate simultaneously, yielding a combined average frequency of 3.57. In the early morning, and in the evening (from 19:30 to 22:30) only route 6 is in operation, with an average frequency of 1.5. In reality, the situation is slightly more complex because the frequency of route 6 declines in the evening, but mathematically, the above description is sound. To conclude: (13 hours at 3.57 bus/hour + 3.5 hours at 1.5 bus/hour) divided by 16.5 total hours of service yields a combined average frequency of 3.13 bus/hour for a 16.5 hour service span. Whether this painstaking calculation actually matters (or should matter) to ARTPLAN will be discussed in further detail in the *Recommendations* portion of the paper.

Step 5: Adjust the areawide LOS using accessibility criteria. Due to the strictly derogatory nature of the accessibility adjustment table, preliminary results suggest that accessibility will have no effect on the district's multimodal areawide LOS. Because this area of Gainesville possesses a relatively intact grid street network, and because the parallel major multimodal facilities are within ½ mile, near total coverage of the combined accessibility areas is achieved. Since measured LOS is mediocre to begin with, it will not be penalized for the few accessibility lapses per the rules of the MA-LOS/MMTD handbook. An appropriate means of calculating % population/employment served would consider the accessibility coverage of each analysis unit (TAZ) separately, rather than apply the overall coverage area to the districts gross population and employment figures. This necessity will be further discussed in the *Recommendations* section of this report.

Step 6: Report the adjusted areawide LOS for each mode. Utilizing the reported input methodologies, the ARTPLAN beta-test software provided the following segment-level results:

Facility	Segment	Segment Length (ft)	Pedestrian	Bicycle	Bus
13th Street	5th - 7th	692.0	4.00	3.80	2.40
	7th - 10th	1352.0	4.00	3.60	2.40
	10th - 16th	1969.0	4.00	3.60	2.40
	16th - 19th	1309.0	4.00	3.60	2.40
	19th - 23rd	1357.0	4.00	3.60	2.40
	23rd - 29th	898.0	4.00	3.60	2.40
	Mall - 29th	898.0	4.00	3.60	2.40
6th Street	8th - 10th	591	2.49	3.39	1.76
	10th - 16th	2022	2.57	3.47	2.10
	16th - 23rd	2688	2.39	3.47	2.20
	23rd - 31st	2519	2.39	3.47	2.20
16th Terrace	16th - 23rd	2672	2.01	0.89	2.31
5th Avenue	18th -13th	2570	2.17	2.81	–
	13th - 6th	2620	2.00	2.02	–
8th Avenue	18th - 15th	1760	3.36	4.10	–
	15th - 12th	1452	3.35	4.10	–
	12th - 6th	1969	3.27	3.94	–
16th Avenue	18th - 16th	1075	3.43	3.99	1.05
	16th - 13th	1362	3.41	3.97	2.10
	13th - 6th	2592	3.43	3.91	–
23rd Avenue	21st - 16th	3928	2.23	4.03	1.68
	16th - 13th	1362	2.57	3.58	2.52
	13th - 6th	2619	2.56	3.64	1.68

The version of ARTPLAN employed in this study behaved oddly when aggregating segment LOS results at the facility level. As such, this process was conducted manually (Excel). Using the MA-LOS/MMTD handbook formula, **MODE LOS = Σ (Segment LOS * Segment Length) / Σ Segment Length,** the following results were obtained.

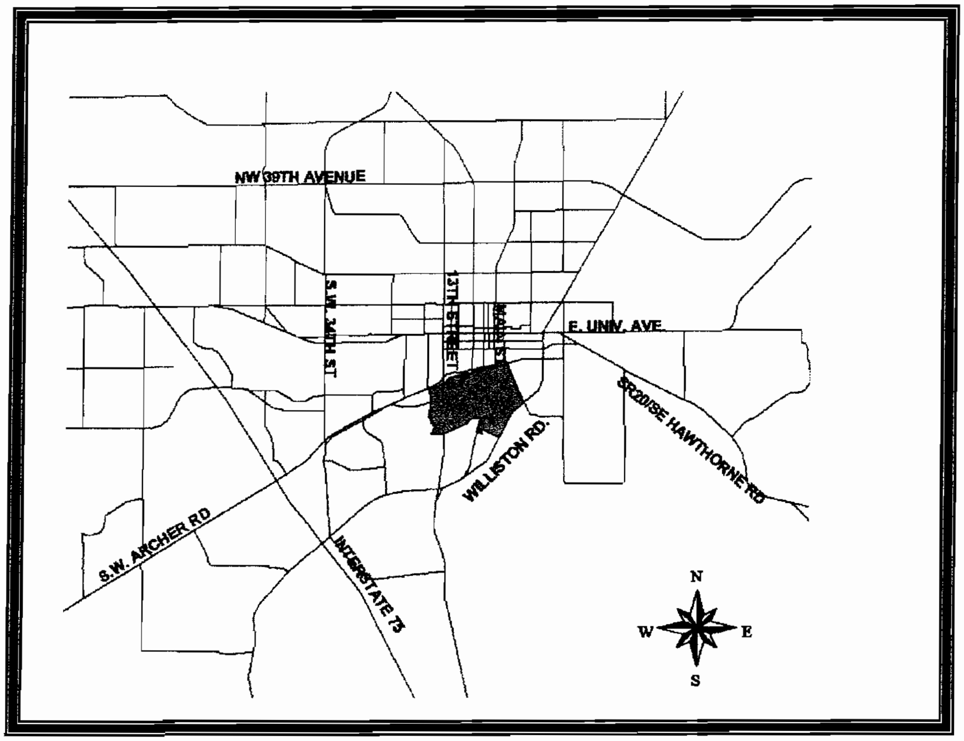
MODE	NUMERICAL SCORE	LETTER GRADE
PEDESTRIAN	2.9	"C"
BICYCLE	3.4	"C"
TRANSIT	2.1	"D"

These results were obtained by considering only those segments offering transit service in the transit LOS calculation. Although parallel bicycle corridors were considered for theoretical purposes, the bicycle and pedestrian networks are identical in this study.

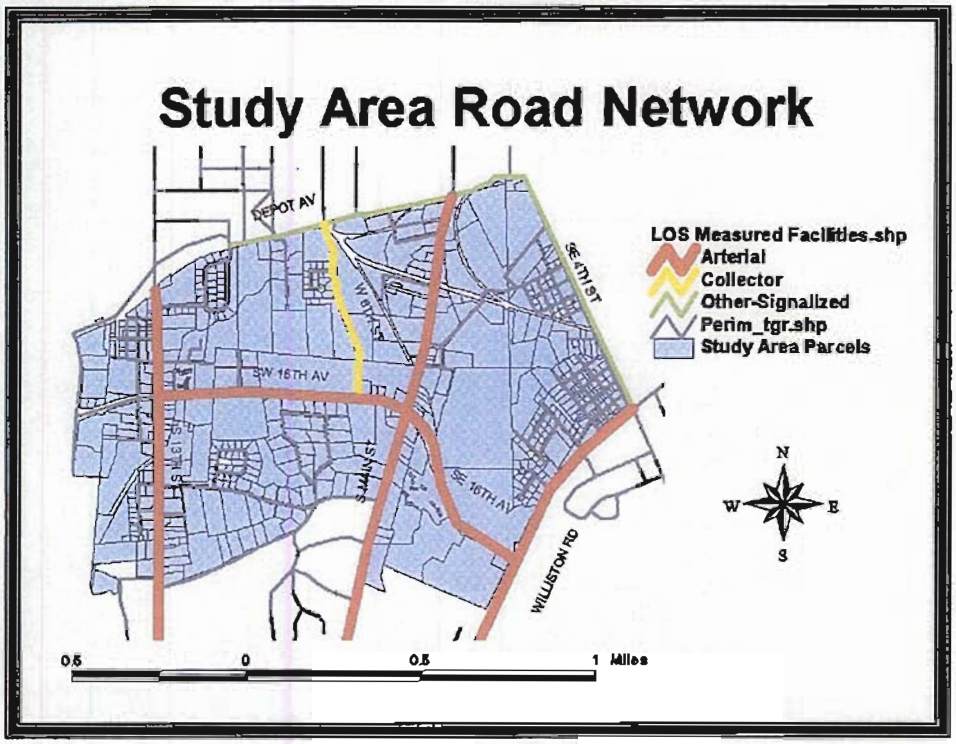
SUMMARY MMTD IMPLEMENTATION FOR TOD STUDIO STUDY AREA

Concurrent with the final stages of the Gainesville Case Study project, the University of Florida Department of Urban and Regional Planning conducted a studio class on transit-oriented development (TOD). The class was required to site a development area in the Gainesville urban area and assess its virtues and shortcomings with respect to transit service availability, access, and land use support. Although the chosen district does not meet the 2 square mile minimum area required of an MMTD, much of the MMTD methodology was applied with great success in an attempt to better understand the district's strengths and weaknesses. Additionally, this TOD project broached new ground in the development of connectivity and accessibility measures which may be incorporated into future MMTD research and implementations.

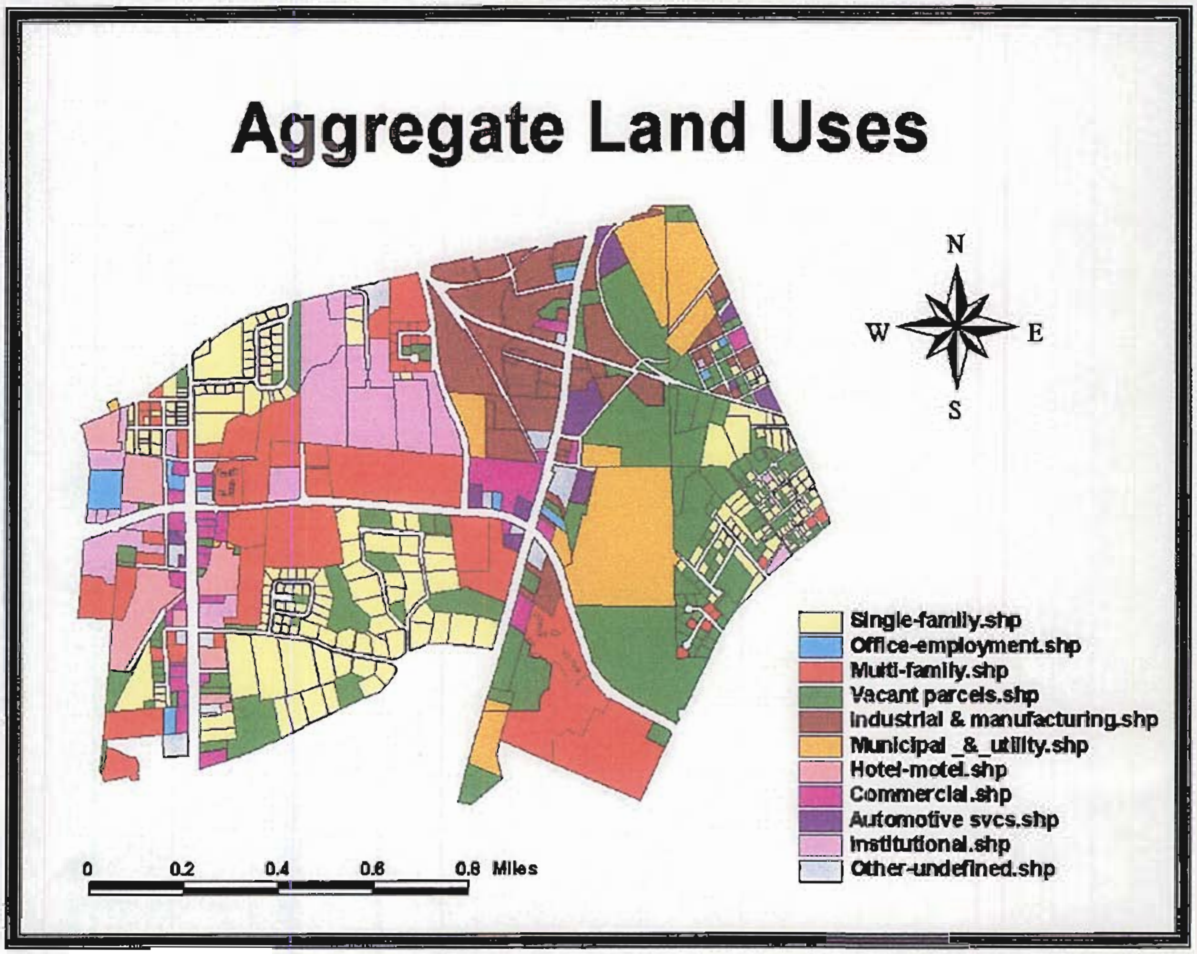
The study area for the TOD project, depicted in the map below, lies to the immediate south of Gainesville's downtown, and is southeast of the University of Florida, Shands Hospital, and Shands at AGH.



Major arterials for the district, shown below, include South 16th Avenue, connecting the district to UF/Shands and South Main Street, and the district adjacent to downtown Gainesville. South 13th Street/US 441 bounds the district on the west and Williston Road/SR 331 on the east. Other LOS measured facilities include Depot Avenue along the north boundary of the district, West 6th Street running between 13th and Main, and SE 4th Street, forming part of the district's eastern boundary.



Using an aggregate land use map similar to that constructed for the main case study, the TOD district's land use pattern was depicted. As shown below, the area's dominant contributing land use is multi-family residential. Good corridor intensity exists along 13th Street and a neighborhood shopping center anchored by Winn Dixie is sited on the northwest quadrant of 16th Avenue and South Main Street. Although a mix of uses is apparent along Main Street, many of these uses are low intensity industrial or automobile oriented, and so, not conducive to multimodal planning. Additional impediments include large areas of land near the district's presumed central core, which are tied up in public utility uses, vacant land constrained by water table and wetlands issues, and a large-lot single family neighborhood to the south of the core set apart by a large contiguous chain-link fence.

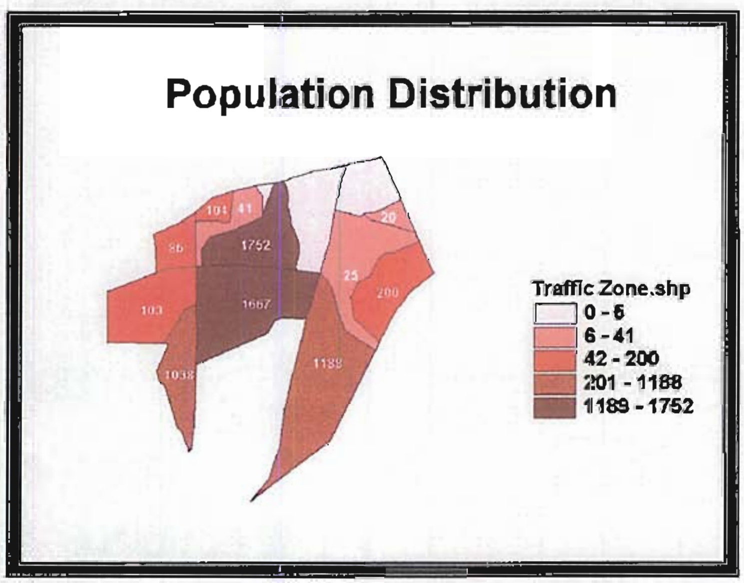


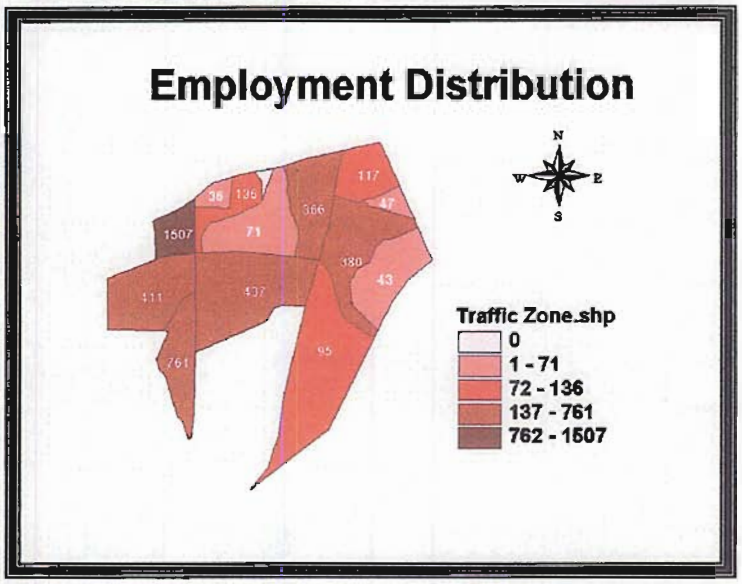
Despite these encumbrances, the TOD study district posts favorable gross population and employment figures. In particular, the wealth of multi-family land uses contributes to a favorable 15 persons/acre population density. Less impressive is the area's 13 jobs/acre, although the jobs:population ratio is in excess of the handbook's 0.5:1 threshold. As in the main Gainesville case study, a large portion of the district's area is consumed by single family uses. While generally considered a benign institution, it is clear from both Gainesville studies that an excess of single family development can hinder the effectiveness of multimodal districts. Although the logical inclusion of TAZs to the south of the district would bring the district area above the 2 square mile threshold, this qualification would be mitigated by adverse impacts on density and intensity.

	Persons	Acres by Land Use	Density
Residential	6035	397	15
Employment	4407	333	13

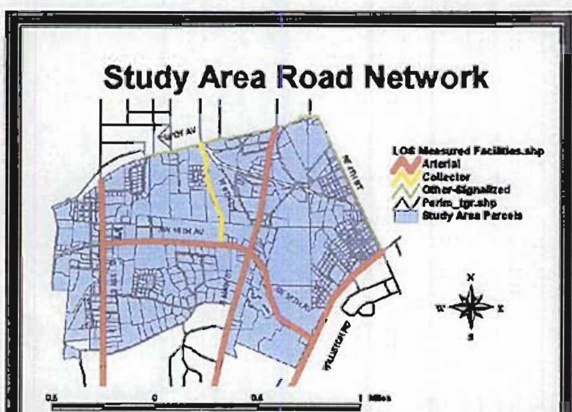
	Persons	Acres	Percent
Single Family	495	1431	39%
Multi Family	5540	1565	42%
Commercial	664	258	7%
Service	3125	369	10%
Industrial	618	73	2%

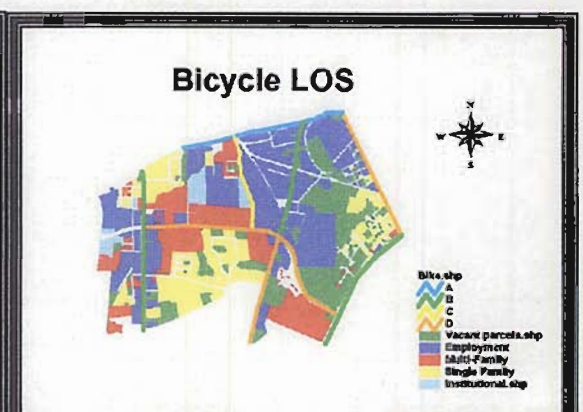
On a macroscopic scale, study of the area's Zdata 1 and Zdata 2 tables confirms the separation of land uses implied in the parcel map. With certain exceptions, the graphics below indicate that those TAZs endowed with high populations rarely host a wealth of employment opportunities. Therefore, it can be shown that while the area at large demonstrates a good mix of uses, these uses are spatially segregated within the study boundaries. Further development of connectivity and accessibility tools will aid in the quantification of land use mixture allowing an implementing agency to better evaluate the mode-split potential of a given district.

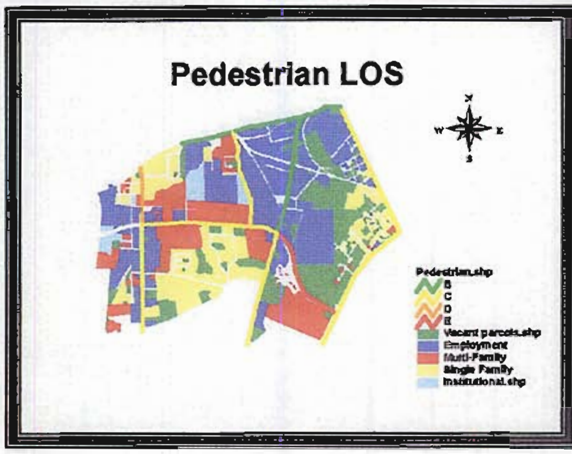




Having considered the TOD study area in terms of the MA-LOS/MMTD handbook's density, intensity, land use mix, and land use organization criteria, the studio also applied the multimodal level of service measures to the area's major multimodal network. Comprised of the roadways mentioned above, the network is a mix of four-lane arterials, two-lane major roads, and several collector streets. Many of these facilities are served by transit, although the service frequency varies dramatically. Likewise, the level of bicycle and pedestrian facilities approaches both extremes over different segments of the network. The maps below highlight the measured network, and indicate the ArtPlan derived LOS for bicycle, pedestrian, and transit modes using a red→cyan gradient.







Most noticeable is the disparity between transit LOS and bike/pedestrian LOS along the multi-family-rich South 16th Avenue corridor. This is especially apparent along the eastern segment of this facility where the LOS "E" pedestrian score negatively impacts the transit score from LOS "B" to LOS "C". Also remarkable is the failing transit LOS along South Main Street that boldly proclaims to the student population, "Don't spend your money downtown!" Finally, the excellent bike/pedestrian facilities on Depot Road along the northern boundary sadly connects nothing to nowhere.

Using the areawide LOS methodology as a planning tool, the TOD studio considered available right-of-way along the sidewalk-free eastern portion of South 16th Avenue as an obvious opportunity to improve the region's multimodal LOS. Additionally, various cross section modifications were tested using ArtPlan in an attempt to improve the bicycle LOS score for the western segment of 16th Avenue, but the heavy automobile demands on this arterial prevented a favorable solution. The studio team eventually concluded that a parallel bike/pedestrian restricted facility would be well suited to the area's needs, and so utilized the MA-LOS/MMTD handbook's alternate network option to this end. At intermediate and final build-out stages of the area's 50-year master plan, areawide LOS was retested to consider the impacts of network modifications. In summation, the MA-LOS/MMTD handbook proved a capable and useful tool regardless of the concurrency issues faced by this district.

IMPLEMENTATION RECOMMENDATIONS

Having applied the MA-LOS/MMTD handbook to two areas in Gainesville, Florida, this study generally concludes that the methodology is effective, articulate, and internally consistent. However, given the monumental nature of the task, certain elements of concern have been identified. These critical considerations can roughly be divided into *operational issues* and *theoretical issues*. Operational issues primarily involve the manner in which the land use, infrastructure, and demographics of a potential MMTD are evaluated with respect to the various thresholds and guidelines set forth in the document. Conversely, theoretical issues relate to the scope and relevancy of the document as a whole. Because of this project's advanced progress and the highly debatable nature of most theoretical considerations, the bulk of this report will address operational criticisms.

Whether viewed as a regulatory document or a technical assistance tool, it is immediately evident that the MA-LOS/MMTD handbook represents an ambitious attempt to consolidate and understand a veritable mountain of information. Rather than strictly consider transportation infrastructure, or singularly focus on land use dynamics, the handbook attempts to understand both, and then use this understanding to evaluate the relationship between the two. Though the multimodal areawide LOS calculation is the "title song" of this album, the mixture, organization, and density/intensity of land uses is an equal partner in the total equation.

The excellent hierarchical organization of the handbook, reflected in the segment→facility→corridor→area approach to LOS calculation, implies that although data will be compressed, a careful step-wise deconstruction of the final product might again reveal the source inputs. Unfortunately, the description of an MMTD is not as simple as the 3:4:5 formula behind the Giza pyramids. That is to say, the broad spectrum of relevant variables, ranging from the psychology of human behavior to the intricacies of traffic engineering, require certain sacrifices at the altar of Claude Shannon. Accepting this fact, it is critical that the "aggregation" of data be conducted in a preordained, organized fashion, and not left to the whims and preferences of individual implementing districts. As such, it is the recommendation of this study that preferred "sub-methodologies" be established to govern the data inputs and calculations necessary to satisfy the handbook criteria.

Adherence to these "suggested methods" should not prevail in the face of overwhelming circumstance, nor should it prohibit especially capable planning agencies from indulging in more precise measures. Rather, by establishing a baseline of analytical standards, the MA-LOS/MMTD handbook will benefit in universality and utility. Items in need of this specification include seemingly simple figures, such as population, jobs, and density data, but also more complex products, such as network service area.

Development of Sub-Methodologies

The following is a list of sections in the MMTD handbook that would benefit from the addition of suggested data acquisition and management techniques:

♦ **Appropriate Scale of Development.** Although intuitive in appearance, several sources of population and employment data exist with varying degrees of spatial precision. Both this study and the RS&H Orlando Case Study utilized TAZ data from existing FSUTMS traffic models. However, it is conceivable that an implementing district might attempt an extrapolation from less precise Census Tract data. If no TAZ data is available, land use information should be used to check the viability of these extrapolations. If the source data area is 5% multi-family, but the MMTD land use distribution is 20% multi-family, the populations will not be proportional to the area. Indeed, even when TAZ data is available, this study demonstrates that partial TAZs must be scrutinized in terms of land use before proportional population and employment figures are assigned.

♦ **Determining the Overall LOS—Apply the practical accessibility distances.** Although the modal accessibility distances provided in Table 14 are simple enough, the manner in which they are to be translated into service areas is less apparent. As described in the *Policy Analysis* section of this report, network distances were utilized to identify the service areas of the MMTD's major facilities. This study considered the network of minor city roads to evaluate accessibility and connectivity, but it may be prudent to consider only dedicated pedestrian facilities when measuring access for pedestrians.

Given the somewhat arbitrary nature of Table 14, especially compared to Table 6, one might consider this level of precision overkill. Certainly without the advantage of Network Analyst, the labor involved would outweigh the benefits. Fortunately, a growing number of planning departments have ready access to ArcView software, and the service area methodology, while difficult to establish, is relatively simple to perform. In addition to more accurate evaluation of access to an MMTD's major facilities, a graphic depiction of an area's connectivity is generated. In light of these benefits, this study recommends network-derived service areas as the primary measure of accessibility and as a needed supplement to the link-node and termini/square mile connectivity indexes.

♦ **Determining the Overall LOS—Adjust the areawide LOS for accessibility.** Regardless of what methodology is adopted to calculate service area, this spatial measure must be converted to a percentage of population and employment. A method known as "dynamic segmentation" is referred to in the handbook draft, though the specifics of this method are not immediately apparent nor is the term defined in the glossary. If "dynamic segmentation" refers to multiplication of an analysis unit's percent serviceable area by its population and employment data, than we concur with this methodology. If however, the total percent serviceable area is to be multiplied by the MMTD's total population and employment, too great of an approximation occurs. A superior technique would apply the population and employment data from a unit of analysis (preferably a TAZ) to the land use parcel map of that unit. If half of a TAZ was serviced by the multimodal network facilities, but consisted entirely of residential units, it would be possible to add value to the total percent population while decreasing the total percent employment. While slightly tedious, this analysis employs only elementary GIS skills.

♦ **Transit LOS**. This study encountered considerable difficulty in determining bus frequency and service span in the event of multiple bus routes. As discussed in the *Policy Analysis* section, Gainesville's bus routes do not offer universal service hours, and some routes reduce frequency during off-peak hours. Neither ARTPLAN, nor the handbook offer advice on how to consolidate multiple routes along a segment. The methodology used in this study is mathematically consistent, but its fractional outputs do not seem compatible with the ARTPLAN interface. Whether the methodology offered here is adopted, or a more straightforward technique is preferred, some concrete guidance should be provided in this regard.

♦ **Appropriate Densities and Intensities of Land Uses.** It is unclear whether the denominator in the density/intensity equation should be the area constituting residential/employment uses, or the total MMTD area. When implementing this element of the handbook, the RS&H team assumed *total MMTD area,* while the UF team assumed only *residential/employment use area*. If the latter technique is indeed the preferred method, some guidance as to acceptable land use area source data should be provided.

♦ **Organization of Land Uses in Central Cores and Along Corridors.** The language of these sections implies that a density gradient should be established to determine the degree of core/corridor organization. Though not in keeping with the "ease-of-application" design associated with the document, if such analysis is expected, guidance should be provided in this regard. Should the implementing agency inventory core/corridor uses, or should it attempt to apply some form of GIS analysis? One method suggested by this study involves calculating density/intensity as in step 5.1 for each TAZ. Because Zdata differentiates between single-family and multi-family dwellings and provides employment data by Industrial, Commercial, and Service categories, it is possible to develop a fairly accurate land use-density map. Whether this degree of analysis is necessary is not made apparently clear from the text, but should it be required, a suggested method should be prescribed.

Other Operational Considerations

From the discourse at the August 29, 2001 Multimodal Steering Committee meeting, it is evident that the presentation of the MMTD checklist in the handbook summary is a source of considerable confusion. Whether this list is intended as a development tool, or as the final measure of a potential MMTD's worth, is unclear. What is evident, however, is that the compound criteria, lack of weighting, and odd percentage-derived final score provide little insight into the relative importance of MMTD criteria and lack the solemn weight expected of final judgment.

Two possible solutions include an allusion to primary education's "Mastery Learning" and pop culture's "Magazine Quiz." Mastery Learning posits that evaluations should be organized into basic and advanced curriculum and that a student must "master" the base curriculum in order to advance. While relevant to the student's letter grade, the advanced curriculum is not stressed, and the lucky solution to an advanced problem can not substitute for failure to comprehend the basics. Whether this combination of binary and linear evaluation is the object of this handbook is uncertain, but its general wording and organization suggest that some criteria are essential while others are merely preferred. If this approach is indeed favored, and the checklist is to be retained, it should be organized accordingly.

Conversely, if no single criterion may make or break a district, it none-the-less seems plausible that some are more important than others. To better accommodate this approach and thereby lend guidance to planners attempting to develop marginal districts, the Chapter 8 checklist should offer more credit for some criteria than others. For example, as in the magazine quiz, "Give yourself three points if you exercise between 15 and 30 minutes a day…" A tally of the various scores could then be compared to a range of letter grades in keeping with the modal LOS scoring system.

Presently lacking either of these forms, the checklist serves only as a reminder that certain elements must be evaluated. In this capacity it is exemplary, but considered as such, the handbook is robbed of a final arbiter of MMTD status. It would be a shame to painstakingly quantify so many disparate variables to arrive only at a "Maybe".

Theoretical Concerns

Under the MA-LOS/MMTD handbook methodology, the practical accessibility distances used to designate service areas are largely ignored once a traveler arrives at a major multimodal facility. One is led to believe that upon stepping from a side street onto a LOS-measured facility, the multimodalist enters a slipstream and is instantly whisked away to his/her respective destination. Although language describing central cores and corridor organization suggests that a diversity of uses might be at arms length from any point along a multimodal facility, accessibility to specific uses is not quantified. Thus it remains uncertain what proportion of an MMTD occupant's functions may be satisfied *sans* automobile.

At the root of this concern is a lack of association between the well-defined modal LOS methodologies and the generally comprehensive land use analysis techniques. While the document is bold in its desire to understand both elements of the urban scene, and while it theoretically describes their relationship in detail, their analytical connection is tenuous. Without unduly worshipping the cult of GIS, methods exist whereby all parcels within a specified distance of a given point within a network may be catalogued. Given the relatively small area of an MMTD, it is conceivable that sub-categories of commercial uses could be inventoried throughout the district. Thus it could be known how many households and businesses are within walking distance of convenience stores, groceries, or restaurants. Whether it is feasible to know how many people may walk from their home to a "Mexican" restaurant or to a Taco Bell restaurant depends more on the detail of data than the analytical methodology. While this type of analysis would offer little insight into intra-MMTD employment patterns, the work trip represents only one aspect of the urban dweller's diverse mix of activities.

In a similar supply-biased mode of analysis, the MA-LOS/MMTD handbook attempts to determine transit potential by studying population and employment densities. With the exception of small-scale circulator systems such as Orlando's Lymmo, few bus routes will begin and end within the MMTD. Four routes serve the Gainesville MMTD, but none of them terminate within its bounds. While they certainly serve to move people within the district, they also carry a significant number of passengers to, from, and through the district. Given these externalities, it seems that in the case of existing transit routes, ridership data serves as at least as good a measure of transit sustainability as the density measures advocated in the document.

Failure to consider externalities may inhibit this methodology's ability to judge the potential success of an MMTD. Before the decision to use TAZs to define the MMTD boundary, this study encountered considerable difficulty in extricating a study area from the city at large. Although a top-flight MMTD might continue to thrive if the Wizard of Oz set it down in a Nebraska corn field, it is unwise to treat these entities as black boxes. The absence of methodologies to evaluate the impacts of surrounding areas was particularly apparent in the case of the Gainesville study where the University of Florida/Shands Hospital complex so dramatically dominates the urban landscape. The subsidization of transit routes, likely elongation of multimodal accessibility radii, and above average demand for pizza delivery have dramatic impacts on the nearby MMTD. Likewise, the presence of US 441 running lengthwise through the district substantially boosts the overall AADT of the district and in so doing enables larger scale commercial activity than would be indigenously supportable. These externalities may benefit the MMTD by permitting activities and municipal services generally associated with higher densities, but they may also burden an MMTD with traffic problems, the origins of which lie beyond the district's planning capabilities. Though at this stage it seems unlikely that the MA-LOS/MMTD handbook could be sufficiently modified to address these concerns in full, some deference to the whims of situational fortune should be included.

It is the conclusion of this report that the MA-LOS/MMTD handbook is generally a comprehensive and effective document. Though its approach is sometimes "surface level," its broad scope justifies this perspective. Network connectivity and multimodal LOS measurement is particularly strong, and the sections on land use magnitudes and organization are also well presented. Weaknesses of the draft include failure to recognize external factors, difficulty quantifying the land use-transportation relationship, and an inadequate method for determining a final "score". Additionally, the development of sub-methodologies, used to evaluate the various criteria set forth in the draft, would yield more uniform, accurate, and predictable results.

OTHER MMTD IMPLEMENTATION AND RESEARCH EFFORTS

This section explores describes other efforts to implement multimodal solutions to the transportation problems by considering case studies of several contexts for their implementation throughout the state.

Seminole County

Seminole County is currently undergoing a study, under a contract with Glatting Jackson Kercher Anglin Lopez Rinehart, Inc., to determine a countywide approach to concurrency. The consultants have developed an issue paper that is currently under discussion by the county commission. The issue paper evaluates three recommendations for addressing the concurrency system: (1) multi-mode Level of Service – LOS Point

System; (2) performance criteria; and (3) multi-mode sector plan. Their recommendation is to use a combination of the LOS Point System and the multimode sector plans. The LOS Point System is described as follows:

> The LOS Point System method is to identify the key components of service, attach a rating scale for each component, and then calculate an overall composite score. Like the current concurrency system, those development projects that bring the composite score below the established level of service must either wait until the County improves the transportation operating level of service, contribute to a special fund for expedited County improvements, or include transportation improvements in the development costs.

The Seminole County Comprehensive Plan would establish the LOS Point System countywide with four distinct areas in the county: rural areas, development corridors, mixed-use centers, and neighborhoods. In the rural and development corridors, the following priority of transportation modes would be established: (1) single-occupancy vehicle; (2) multiple-occupancy vehicle; (3) public transportation; (4) cyclist; and (5) pedestrian. In contrast, in mixed-use activity centers and neighborhoods, the priority would be: (1) pedestrians; (2) cyclists; (3) public transportation; (4) multiple-occupancy vehicle; and (5) single-occupancy vehicle.

The multimode sector plans would be established in areas where the Comprehensive Plan and other County plans call for redevelopment but the LOS Point system will not allow it. In the multimode sector plan, the designated area will be "failing", but the possible remedies will change. The focus of transportation improvements shifts from moving vehicles to tasks that may have not been priorities previously, such as crosswalks and building massing. The multimode sector plan is intended for redeveloping areas that are entering their second generation of growth and include a mix of land uses, combining the office and retail land use of the major corridor with the adjacent multi-family or higher density single-family housing. The areas that are candidates for multimode sector plans include the six areas covered under the Community Redevelopment Agency (CRA): Sanford Waterfront, Towne Center, US17/92 Corridor, Casselberry, Dovera, and Altamonte areas. Glatting Jackson has recommended that the Fern Park South Planning District, between the Orange County Line and SR436 be a pilot location for the implementation of a multimode sector plan along US17/92.

Martin and St. Lucie Counties

The Treasure Coast Regional Planning Council (TCRPC) is coordinating a joint study on avoiding costly interchanges along US1. In addition to the TCRPC, this project is funded by Martin County, St. Lucie County, City of Stuart, City of Port St. Lucie, City of Fort Pierce, Florida Department of Transportation District Four and the Florida Department of Community Affairs under contract with Renaissance Planning Group of Orlando. The study indicates that building two new interchanges on US1 at Jensen Beach Boulevard and Port St. Lucie Boulevard would not be needed under the proposed

Community Centers project developed under this plan. These two interchanges would cost an estimated $80 million.

Under the proposed Community Centers plan, the vision is to "establish geographically dispersed compact, mixed-use activity centers that provide for a better jobs-housing balance through complementary land uses in closer proximity to residential areas." The region will engage in the following activities in support of these activity centers: (1) develop US1 as a multi-modal transportation corridor; (2) define the scale and develop design guidelines for mixed-use centers that reflect market demand and local character; (3) invest in public transportation strategies that reduce dependence on automobile travel between activity centers in St. Lucie and Martin Counties by providing accessible and convenient transit connecting key origins and destinations; (4) create an integrated network of roadways, greenways and bicycle/pedestrian facilities that improve connectivity and accessibility throughout the region; and (5) monitor land use and transportation trends to track the effectiveness of the Community vision in meeting the area's livability and mobility objectives.

Within the next one to five years, the following strategies will be undertaken as a part of the development of US1 as a multimodal corridor: (1) initiate fixed-route bus service; (2) establish a multi-modal transportation district; (3) construct non-automobile facilities and amenities as a part of all redevelopment; and (4) develop mixed-use zones with transit-oriented design guidelines.

City of Destin

As a part of its revisions to the Transportation Element of its comprehensive plan, the City of Destin is attempting to address a number of transportation issues. During the peak tourist season, the City's population swells with the influx of tourists and workers in tourist-related industries, creating a difficult balance between the needs of year-round residents and seasonal populations. Destin's congestion problems are caused by both the lack of alternative routes for local east-west travel and the high percentage of pass-through traffic on US 98. US 98 is currently programmed for widening to six lanes to the east and west of the City of Destin. The widening of US98 through the City of Destin would permanently exacerbate access and community design problems in the corridor. The city lacks a town center and needs to improve access to its beaches and the harbor area. The focus on multimodal solutions would include improvements to its bicycle and pedestrian facility network citywide.

Renaissance Planning Group is under contract with the City of Destin in the revisions to the Transportation Element. They are currently proposing an MMTD as a means of addressing the deficit of capacity along US98. The MMTD would involve the development of three centers along US98 at the following locations: traditional Destin Village in the Harbor Area, the Town Center Redevelopment Area and the Okaloosa County Regional Activity Center. Other strategies as a part of the MMTD include the development of an interconnected pedestrian and bicycle network, the establishment of transit service along US98, the development of strategically located public parking, and the building of a more interconnected roadway system that would provide greater east-west capacity and allow local trips to avoid US98.

Downtown Sarasota

The Sarasota City Commission adopted the Downtown Master Plan prepared by Duany Plater-Zyberk & Company in January 2001. The City is currently involved in a Downtown Mobility Study to develop the implementing actions of this plan, which focuses on the need to increase walkability and enhance the attractiveness of other modes of travel such as pedestrian, bicycle and transit.

Among the issues in this study are a proposal to reroute US41 away from the downtown Bayfront area, the diversion of traffic to other roadways as traffic is slowed through the Downtown area, and the impact of changes in downtown traffic on the barrier islands.

Alachua County

As a part of the update to its Comprehensive Plan, Alachua County is in the process of developing a comprehensive set of tools to address the limited roadway capacity on several roadways. The County transmitted its Comprehensive Plan to the Department of Community Affairs in late August and has been holding a series of workshops to address issues that were raised in public hearing associated with the comprehensive plan. On November 26, the County had a public workshop on concurrency management tools. Terry Shaw, Tim Jackson and Ruth Steiner participated as panelists and made presentations on various aspects of concurrency including the use of multimodal transportation districts. The county will make decisions on their approach during the next set of hearings on the Comprehensive Plan during Spring and Summer 2002.

The county is considering three different approaches to concurrency: (1) transportation concurrency exception areas (TCEA); (2) exceptions for projects that promote public transportation (PPPT); and (3) an MMTD. These tools will need to address the challenges that the county faces in addressing transportation capacity in the different locations within the County. The examples of three plans can illustrate the issues facing Alachua County and the options it may have in developing a comprehensive approach to concurrency.

- To the west of 34th Street, the City of Gainesville, Alachua County and the Gainesville Urbanized Area Metropolitan Transportation Planning Organization (MTPO) have developed a plan for the creation of an urban village that would encompass the development and redevelopment of student housing, the development of a grid street network, and the development of a retail activity center. In this area, north of Butler Plaza, which is a major regional shopping mall, the owner has proposed to build big box retail. The area incorporates land that is located both in the City of Gainesville and Alachua County. The area within the city limits is currently included in a TCEA leaving the county with an area insufficient to meet the minimum land area for an MMTD.

♦ At the intersection of Tower Road (SW 75th Street) and Archer Road, the developer has proposed a project that is designed by Duany Plater-Zyberk, & Company that would use up more than the available traffic capacity along Archer Road.

♦ On the four corners of the intersection of I-75 and NW 39th Avenue a development of regional impact (DRI) has been approved but only the first phase can be built because the developer did not obtain a transportation concurrency certificate and major investments in transportation infrastructure would be required to support subsequent phases in the development.

POLICY ANALYSIS

The intent of Multi-modal districts is to allow development to continue to take place in locations that have specific characteristics including high density, mixed-use, and highly connected roadway systems. The critical piece in implementing this legislation is a need to show a change in mode split or the potential for a change in mode.

Whether considered as a regulatory document or a technical assistance tool, the supposition that quality of life within (and around?) an MMTD will thrive, despite degraded automobile LOS, hinges on the assumption that mode-split will benefit from a well organized mix of uses served by a high quality multimodal network. Indeed, the Multimodal Transportation District and Level of Service Handbook provides measures (some more quantitative than others) for assessing each of the above criteria, and yet the interrelationship between these factors is not well defined.

Organization and Mix of Land Uses

Further study is required to develop measures to understand the **organization** *of the* **mix of uses** rather than consider these two elements separately as is presently the case. Rigorous thresholds are established to define critical mass as 2 square miles, 5000 persons, and 0. 5:1 jobs:persons, but it might also be prudent to include criteria such as 50,000 sq ft of grocery store and 15,000 sq ft of convenience/drugstore. As a first step in measuring/modeling mode-split, definition of land use beyond the 6 ULAM classes will be a necessary prerequisite.

Armed with a spatially discreet, intelligently categorized map of land uses, it should be possible to relate these land uses to the multimodal network thereby incorporating the measured LOS of individual segments. A model in this form would provide a good measure of accessibility and would allow the implementing and regulating agency to gauge the upper extent of mode-split achievable within the district.

Finally, study is needed to assess the extent to which the multimodal accessibility **supplied** in an MMTD will be **consumed** by those who live and work within (and around?) the MMTD. In short, will Floridians walk, bicycle and take transit in larger numbers if adequate, convenient, and safe facilities are provided for each mode of travel?

Because we do not measure the differential between various sections of the MMTD and the requirement for the 2 square mile area, the risk is that we end up with a glorified TOD surrounded by single-family housing. Language of the corridor organization suggests there should be a density matrix (with several nodes organized along a corridor) but does not require it. This is especially true where a relatively good grid street network is present, like the Gainesville case study area.

TCEA vs. MMTD vs. TCMA vs. LTCMS

Why would anyone bother to use a MMTD when it is much easier and less cumbersome to use other types of area-wide exceptions? The answer to this question comes back to the requirements for each of these types of exceptions. As a practical matter, few jurisdictions seem willing to deal with the parallel capacity requirements of TCMAs. The MMTD can be seen as a substitute for a TCMA with more specific rules and less stringent definition of the roadway network (e.g., MMTD does not require parallel roadways with the same functional classification). The Long Term Concurrency Management System (LTCMS) is designed to address the timing aspect of failure to meet concurrency rather than the spatial organization or other public policy justifications for not meeting the LOS. Thus, the comparison comes to one between the MMTD and a TCEA.

While the stated purpose of the TCEA is similar to a MMTD (both are intended to promote multi-modalism), the TCEA has a different set of contexts in which it can be implemented, namely, downtown revitalization, urban infill, urban redevelopment and urban redevelopment and infill. The big loophole in TCEA is that it also includes areas within urban services boundaries, which can include large parts of communities (e.g., Gainesville, Tampa, Orlando, and Broward and Miami-Dade Counties). The TCEA however has specific criteria for density, vacant land, and other standards that may indirectly implement them. Ironically, the MMTD has a lower density threshold than the TCEA. The TCEA requires a residential density of 5 dwelling units per acre while the MMTD requires a population of 5,000 in 2 square miles for a density of about 4 persons per acre (5,000 persons/1280 acres) or somewhere around 2 dwelling units per acre, depending upon the assumption about the number of person per household. We may want to rethink this density level because it can be even lower if an area larger than 2 square miles is designated, because the population does not need to increase proportionately (as no minimum density is rigorously defined). Oddly enough while some would argue that TCEAs are given too easily (and undermine the purpose of the concurrency system), the rules on MMTDs might also be too permissive (but this depends upon how the LOS is calculated) and too favorable, especially given the lack of clear evidence of results in vehicle trip reduction.

Comparison of Characteristics of TCMAs, TCEAs and MMTDs

	TCMA		TCEA		MMTD		LTCMS
Density Requirement	X		X		--	(1)	--
Must be Infill Oriented	X		X		--		--
Limited Area	X	(2)	--		--		--
Minimum Area	--		--		X		--
Areawide LOS	X		--		X		--
Multimodal LOS	--		--	(3)	X		--
Addresses Land Use	--	(3)	--	(3)	X		--
Addresses Connectivity	X	(2)	--		X		--
Cost Feasible Element	--		--		--		X

X – Exception type has this characteristic

-- – Exception type does not have this characteristic

(1) MMTDs require a minimum population and employment, but this figure is not area specific. A good MMTD will have a population density of 7+ persons/acre and 60+ jobs/acre for residential and employment land. --*Table 7, Multimodal Areawide LOS handbook.*

(2) The TCMA may be established in " a compact geographic area with an existing network of roads where multiple, viable alternative travel paths or modes are available for common trips." --*FSA Sec. 163.3180 (7)*

(3) These elements are discussed in the text, but no measure is provided.

FIHS Issues

Although the legislation deemphasizes LOS on state roadways, the Manual does not (see Table 8). While the authors recognize the dispute between local governments and FDOT over the FIHS, the issue of the LOS standards should be considered in light of the role of its role. The FIHS has several different functions most of them related to the movement of vehicles through and between regions. The FIHS also has a role in hurricane evacuation route. But the roadways on the FIHS are not all equal in their strategic importance to the state of Florida. Presumably, the strategic importance of roadways may be reflected in the differences in negotiations between local governments and the FDOT over the LOS on specific roadways. The unintended consequence of the treatment of the FIHS with a more stringent standard may be for local governments to negotiate to move FIHS onto less critical roadways. This may be in conflict with the state's protection of hurricane evacuation routes (this is an issue in the negotiation in Sarasota over mobility in the downtown; SR41 provides access to islands and is a part of the FIHS for that reason).

Connection to Planning (Planning vs. Regulation)

While MMTD is seen as a means to ensure planning rather than regulation, how it will be implemented over the long-term is not clear from the current document. This fundamental issue can be seen in the development of greenfields. While a specific development may eventually have a buildout that could support multi-modalism, the development may take a decade or more to get to this point. Informally, the authors learned of DRIs that are designed with a mix of uses but are built as single-family. Local governments may encounter difficulty in protecting themselves from the changes to plans that are made as a part of the implementation. Developers will build what they believe the market demands. Local governments need to balance that against what they believe the community wants as reflected in the approved plan.

According to a staff member at DCA, the relationship between MMTDs and sector plans (which are currently in use in Palm Beach Co. and Orange Co.) are not clear in the legislation. This issue deserves additional attention, especially because the sector plans are designed to promote multi-modalism.

The document as currently defined shows no follow-up on the implementation of the MMTD. As discussed above, we do not have adequate quantitative research to support the reduction in impact fees based upon reduced impact on the transportation system. We need to develop a database on the reduced impacts of different forms of urban development if we are to eventually prove that this form of development truly leads to reduced automobile travel and increased use of other modes of travel.

Interagency Concerns

DCA has expressed concerns that the document does not address the planning requirements contained in recent amendments to 9J-5. These amendments require local governments to amend the following elements of the comprehensive plan: future land use, transportation, concurrency, and capital improvements elements of the comprehensive plan. While these are under the purview of DCA, they should probably be included in a single document.

Another concern across agencies is the dissemination of information across the state about MMTDs. Workshops should be targeted to specific audiences. These audiences include: DCA staff working with local governments, FDOT district staff, staff of MPOs, consulting firms, etc. The concerns of DCA and FDOT will differ with respect to the training and should be reflected in the training and in the handbook even as a common understanding of how to develop multimodal transportation districts is achieved.