KEITH & SCHNARS

Miami Beach Town Center Multimodal Model Accessibility Study

Technical Memorandums

June 6, 2018

Executive Summary

This Technical Memorandum presents the results of a multimodal accessibility study for the North Beach Town Center (Town Center) located in the north section of the City of Miami Beach. The Town Center area is generally bounded by Collins Avenue to the east, Indian Creek Drive to the west, 69th Street to the south and 73rd Street to the north. This study evaluates the impact of increasing development intensity and density in the Town Center area on transportation and multimodal accessibility. The analysis includes the use of the Multimodal Accessibility Analysis (MAA) model to evaluate the adequacy of the mitigation strategies included in the latest master plans, a demand and capacity analysis of the study area roadways, and an estimation of off-street parking need to support future developments. The SERPM regional model was used to estimate the cut-through traffic using 71 Street and surrounding major roadways within the study area.

The MMA model was calibrated for the study area and used to forecast future modal splits assuming the various multimodal projects (Priority 1, 2 and 3) listed in the 2016 Transportation Master Plan (TMP). The MAA analysis results indicate that for the study area the auto mode share of travel will be reduced by 16% from 69% in 2017 to 53% in 2040; corresponding to an increase of 4% of transit mode split from 12% to 16% and an increase of 11% of walk/bike mode split from 20% to 31%. The 2040 travel mode shares are consistent with the master plans modal split projections of 55% for auto, 20% for transit and 25% for walk/bike modes.

The SERPM regional model was used to estimate the pass-through traffic not destined or originating from an area extending from 41 Street to 86 Street. The model result shows that pass-through traffic is around 32% along 71 Street, and around 50% along Collins Avenue and Abbott Avenue.

The traffic impact analysis based on the adjusted modal splits provided by the MAA model that indicated a shift from car to multimodal trips resulted in generally improved traffic conditions in 2035 compared to the Master Plan projections (see Table 5). Whereas six of the eight evaluated segments were projected to operate at a failing condition (V/C > 1) in 2035, only two segments are now projected to operate at failing conditions in 2035 (daily and two-way peak hour) but even these segment would operate at acceptable LOS based on peak directional analysis. This justifies the need to implement the identified multimodal projects and improve accessibility along 71st Street and the convenience and integration of multimodal systems serving the study area.

The proposed Land Use Plan Amendment should encourage compact development which includes a mixture of uses such as residential, hotel, commercial, and office that promotes pedestrian and bicycle circulation and convenient access to transit facilities. The Land Use Amendment should support and encourage the location of uses and internal circulation such that pedestrian mobility is a priority. All land uses within the Town Center districts shall be directly accessed via pedestrian ways, and accessible to existing or future alternate public transportation modes, including bicycle and transit.

It is recommended to implement strategies to enhance transit ridership. The feasibility of rapid transit depends heavily on ridership. In turn, ridership depends on the number of people who can walk to and from rapid transit stations. Since MAA model results show a significant percent of trips as bike/walk trips, it is reasonable to prioritize these projects, insure good multimodal integration at hub locations, enhance safety and convenience, promote and publicize the bike share program, and implement various TDM (Transportation Demand Management) policies to promote non-vehicular trips and work with various stakeholders to achieve mobility objectives

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KEITH& SCHNARS

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DATE: June 6, 2018

SUBJECT: Miami Beach – Town Center Multimodal Model Accessibility Study
Keith & Schnars Project No. 18237.08

I. INTRODUCTION

This Technical Memorandum presents the results of a multimodal accessibility study for the North Beach Town Center (Town Center) located in the north section of the City of Miami Beach. The Town Center area is generally bounded by Collins Avenue to the east, Indian Creek Drive to the west, 69th Street to the south and 73rd Street to the north (see Figure 1). This study evaluates the impact of increasing development intensity and density in the Town Center area on transportation and multimodal accessibility. The increase in density is based on an increase in FAR (Floor to Area Ratio) that allows additional residential units, office space and hotel rooms. The analysis includes the use of the Multimodal Accessibility Analysis (MAA) model to evaluate the adequacy of the mitigation strategies included in the latest master plans, a demand and capacity analysis of the study area roadways, and an estimation of off-street parking need to support future developments.

Figure 1. Study Area

II. MULTIMODAL ACCESSIBILITY ANALYSIS MODEL

The multimodal access travel modes for the study area were evaluated for existing and future conditions using the Multimodal Accessibility Analysis (MAA) model developed by Renaissance Planning Group (RPG). The MAA analysis was performed by RPG and the model results were reviewed by Keith and Schnars (K&S). The MAA model uses current and future land use data and multimodal transportation networks to estimate the modal splits for the study area among the car, transit, and walk/bike modes for various trip purposes. The model works at the plot/block level that are aggregated into travel zones consistent with the adopted transportation regional model used for the South Florida area (SERPM-7). The study area of the Town Center corresponds to Micro Analysis Zone (MAZ) 2189 and 2210 of SERPM-7. Two scenarios were analyzed using MAA: (1) existing 2017 conditions; and (2) future 2040 conditions that included planned multimodal improvements identified in the City's Transportation Master Plan (April 2016).

The base year (2017) and future year (2040) socio-economic data were developed for all parcels within a 1-mile radius of the study area and for all MAZs beyond the 1-mile of the study area. The socio-economic data including jobs, households, non-work opportunities, and household characteristics were developed using Miami-Dade County's 2010 and 2040 estimates both at the micro-analysis zone (MAZ) and traffic analysis zone (TAZ) geographies. This data was supplemented with household characteristics from the U.S. Census American Community Survey (ACS) and points of interest from ESRI Business Analyst by Standard Industrial Classification (SIC) code. Base year jobs data was interpolated from the 2010 and 2040 MAZ data to estimate 2017 jobs per MAZ. This interpolation was tied to the amount of development that has occurred since 2010. That is, if 20% of the parcels within an MAZ have been developed since 2010, then 20% of the expected growth to 2040 will be included. Future year data is based on the 2040 MAZ level estimates from the County. Jobs were parsed to the parcels based on both square footage and use code using some square footage/employee data from the U.S. Energy Information Agency. It is assumed that non-work opportunities will grow at a similar rate to jobs growth.

A multi-modal network was constructed to compute zone to zone travel times for transit, bike, and walk modes. The transit network was built using the general transit feed specification (GTFS). This network is schedule based and includes all stop to stop connections. A typical Wednesday 7:45AM departure time was used to develop AM period transit travel times. The walk/bike network was built using Open Street Map, which is an open-sourced mapping service which provides an all-streets network. To translate paths on this network to travel times, static speeds for walking and bicycling are used by facility type. Dedicated non-motorized facilities, such as trails, are assumed to have a speed of 3 miles per hour for walking and 12 miles per hour for biking. This drops to 2.7 miles per hour for walking and 10.8 miles per hour for biking (a 10 percent decline) on residential roads. On all other walkable/bikeable roads, 2.4 miles per hour for walking and 9.6 miles per hour for biking are used (a 20 percent decline). To create a future year walk/bike network, these speeds are all improved to that of a dedicated non-motorized facility where a non-motorized project is planned (walk speeds are improved for walk projects, bike speeds are improved for bike projects, and walk and bike speeds are improved for multi-modal projects).

For existing conditions, socio-economic data was interpolated between 2010 and 2040 for 2017 conditions and adjusted for study area using data from various sources including American Community Survey (ACS) and National Household Travel Survey (NHTS) databases. The multimodal network was also adjusted to reflect current conditions.

For future conditions in 2040, zonal data within the study area was adjusted to account for an additional 500 residential units, 382.5 KSF of office space and 2,324 hotel rooms resulting from the FAR increase. The additional office space and hotel rooms were translated into 638 and 4,648 jobs, respectively. The residential and employment growth was distributed among the parcels of the study area based on zoning and the characteristics of the parcels. Outside the study area, 2040 socio-economic data from the SERPM-7 model was used at the MAZ level.

The MAA analysis was performed for Miami-Beach north area, middle area, south area and city-wide. The modal choices were evaluated for Home Based Work (HBW) trips and Home Based Other (HBO) trips. None-home based trips were included in the home-based trips. Truck trips were assumed as auto trips. The travel modes considered in the MAA model are Auto, Transit and Bike/Pedestrian (Non-motorized) modes. The MAA model was first calibrated to existing modal splits. The mode share results and auto and transit trip distributions of the Town Center trips are summarized in Attachment A. A list of the main transit and bike/pedestrian projects included into the 2040 MAA model and graphs for the study area illustrating auto, transit and walk/pedestrian access mode levels comparison between 2017 and 2040 are provided in Attachment A, as well as the Daily Auto, Transit and Walk/Bike trip distribution figures. A complete illustrated description of the development and adjustment of the MAA model for the Miami Beach area is provided in Attachment E.

The MAA analysis results indicate that for the study area the auto mode share of travel will be reduced by 16% from 69% in 2017 to 53% in 2040; corresponding to an increase of 4% of transit mode split from 12% to 16% and an increase of 11% of walk/bike mode split from 20% to 31%. The 2040 travel mode shares are consistent with the master plans modal split projections of 55% for auto, 20% for transit and 25% for walk/bike modes.

III. ORIGIN DESTINATION AND CUT-THROUGH TRAFFIC

The SERPM 6 regional transportation model was used to perform select zone and select link analyses to estimate the origin of trips to the study area and the amount of cut-through traffic. The Town Center is located in two traffic analysis zones (#3305 and #3309) that also encompass the surrounding areas east of the bridge between 67th Street and 77th Street. The analysis indicated that the main access routes to the study area are 79th Street Causeway (28%), Indian Creek Road/Abbott Avenue (11% to the north and 24% to the south) and Collins Avenue (11% to the north and 14% to the south). Approximately 13% of the study area traffic access the Town Center via the Julia Tuttle Causeway. The trip distribution plot from the SERPM model is provided in Attachment B.

The pass-through traffic along 71st Street within the study area limits was estimated using traffic volumes from the SERPM model by comparing the traffic destined to the Town Center two traffic analysis zones to the total traffic volumes. The SERPM analysis shows that the pass-through traffic along 71st Street that does not have a destination within the study area is in excess of 75% of the total traffic as depicted in the volume summary plot provided in Attachment B.

Pass-through traffic was also estimated for traffic not destined or originating from a larger area extending from 41 Street to 86 Street. The SERPM plot is also provided in Attachment B. For this larger area, pass-through traffic is around 32% along 71 Street, and around 50% along Collins Avenue and Abbott Avenue.

IV. TRAFFIC IMPACTS OF FAR INCREASE

The traffic impacts of new developments resulting from the increased FAR were analyzed in combination with the multimodal improvements identified in the City's Transportation Master Plan. These multimodal projects enhance public transportation and non-motorized travel modes, and also improve accessibility to transit and bike/walk modes. The analysis consists of first evaluating current traffic conditions and levels of service, estimating additional trips to be generated by the Town Center from increased FAR, and analyzing future traffic conditions considering both the additional person-trips generated by the new developments and the improved accessibility and operation of the multimodal facilities.

The traffic impact analysis steps performed for this multimodal access study are the following:

1. Existing Conditions: Since no traffic counts were collected for this study, existing conditions were based on the daily, AM and PM traffic data provided in the City's Master Plan. Additional traffic counts were obtained from FDOT's count stations and from recent traffic studies that provided peak hour data.

2. New Project Trips: City staff estimated that the increased FAR will result in an increase of 500 residential units, 382.5 KSF of office space and 2,324 hotel rooms within the Town Center. The latest Institute of Transportation Engineers (ITE) Trip Generation 10th Edition was used to estimate the daily, AM and PM peak hour vehicle trips generated by these new uses. Internalization between the uses was estimated using ITE recommended factors. The ITE net external vehicle trips were converted into person trips assuming 1.2 persons per vehicle and 10% combined transit/bike/walk modes since most ITE studies are from suburban regions, then the person trips were converted back into car, transit and walk/bike modes using the MAA modal split (16% transit and 31% bike/walk) and vehicle occupancy (1.5 persons per vehicle) results developed for the study area. This resulted in significantly lower vehicle trips and higher transit and walk/bike trips compared with ITE estimates. The estimated ITE daily 25,280 vehicle-trips were reduced by 53% to 11,910 vehicle-trips by applying the MAA modal splits and vehicle occupancy factors specific to the study area. Likewise, the AM and PM peak hour vehicle-trips from the additional Town Center developments were reduced by 53% from 1,688 to 795 vehicle-trips during the AM peak hour and from 1,980 to 924 vehicle-trips during the PM peak hour. The Town Center daily trips are shown in Table 3. The trip generation analysis and internalization sheets for Daily, AM and PM peak hours are provided in Attachment C.

TABLE 1
Miami Beach Town Center Daily Trip Generation

LAND USE DESCRIPTION	DENSITY	UNITS	LAND USE CODE	ITE 10TH EDITION DAILY TRIP GEN RATE	DAILY TRIPS	INBOUND		OUTBOUND	
						%	Trips	%	Trips
Multi High-Rise	500	Units	222	T=3.94 (X) + 211.81	2,182	50%	1,091	50%	1,091
General Office	383	KSF-GLA	710	LN(T)=0.97 LN(X) + 2.50	3,899	50%	1,950	50%	1,949
Hotel	2,324	Rooms	310	T = 8.36 (X)	19,429	50%	9,715	50%	9,715
Gross Daily Trips					25,510		12,756		12,755
Internalization Rate			0.9%		230		115		115
External Vehicle Trips after Internalization					25,280	50%	12,641	50%	12,640
External Person Trips (ITE Vehicle Occupancy)			1.2	(Assume 10% Transit/Walk/Bike)	33,707		16,854		16,853
Transit Trip Reduction:			16.0%		5,393	50%	2,697	50%	2,696
Walk/Bike Trip Reduction			31.0%		10,449	50%	5,225	50%	5,224
Vehicle External Trips					17,865		8,932		8,933
NET EXTERNAL DAILY VEHICLE TRIPS:			1.5	(Miami Beach Veh Occupancy)	11,910	50%	5,955	50%	5,955

NOTES:
Trip rates are based on the Institute of Transportation Engineers' Trip Generation, 10th Edition. Average rate for hotel was used because number of rooms exceeds equation limits.
ITE Trip Rates are based mainly on suburban studies with limited transit/pedestrian facilities. A 1.2 vehicle occupancy & 10% transit/bike/walk mode share were assumed.
Transit and bike travel mode share percentages for Miami Beach are based on analysis performed by Renaissance Group for this project.
Miami Beach vehcile occupancy factor is based on analysis performed by Renaissance Group for this project.

3. Project trip Distribution: The net external project trips estimated in Step 2 were distributed over the study area roadway network using trips distribution percentages from the SERPM select zone analysis, and also taking into consideration the Miami-Dade County cardinal distribution and the MMA traffic split in the north, west and east directions.

4. Background Traffic Growth: The City's Transportation Master Plan estimated an annual growth rate of 1.4% for the north section of Miami Beach. However, since growth for the Town Center was estimated separately in this study, background growth was recalculated using SERPM-7 projected volumes for roadways within the study area. This resulted in an annual compounded growth rate of 0.43% (see Attachment C.). A 0.5% annual background growth rate was used in the analysis as shown in Table 4.

5. Modal Changes in Background Traffic: As explained in Step 2, the improved accessibility and enhanced multimodal facilities benefit directly the new traffic from the Town Center (MAA Analysis) as these improvements target this area. However, existing background traffic will also benefit from improved transit and walk/bike facilities, though not to the same extent, as most of the background traffic is pass-through not originating from the study area and therefore less impacted by enhanced accessibility. Nonetheless, the Transportation Master Plan envisions a city-wide multimodal enhancements and significant increase in transit and bike/walk trips by 2035, and therefore, it is reasonable to assume a modal shift in background traffic.

TABLE 2
Town Center Background Growth (SERPM-7)

Road	Section	2010	2040	Growth/Yr
SR 71 Street	N. Shore Dr to Indian Creek	33,944	38,832	0.45%
	Indian Creek to Abott Ave	19,123	22,241	0.50%
	Abott Ave to Collins Ave	7,859	7,758	-0.04%
Indian Creek	South of 71 Street	22,005	24,695	0.39%
	North of 71 Street	27,048	31,228	0.48%
Collins Avenue	South of 71 Street	23,096	25,779	0.37%
	North of 71 Street	27,062	31,369	0.49%
All Roads		**160,137**	**181,902**	**0.43%**
			Use	**0.50%**

6. A reasonable 10% decrease in vehicle trips was assumed for background (pass-through) traffic in 2035 that is converted to transit, walk/bike trips, shared rides or telecommuting.

7. Future Traffic Conditions: The 2035 future total traffic for the study area was developed by combining the previous analysis steps. Existing background vehicle traffic was adjusted to reflect the city-wide improvement in modal split (car trips reduced by 10%), then the calculated background traffic growth rate of 0.5% was applied to develop 2035 future background traffic volumes, and finally the new project trips as calculated in Step 2 (using ITE rates and MAA modal splits and vehicle occupancy factors) were added to future background traffic to generate 2035 total traffic volumes. These traffic volumes were compared with the Transportation Master Plan projected 2035 traffic volumes for the study area roadways. A summary of future traffic conditions is provided in Table 5. Additional analyses are provided in Attachment D.

8. Multimodal Transportation Improvements: The multimodal projects listed in the 2016 TMP impacting the study area are summarized in Table 6 (also see Attachment E). Therefore, the future roadway network includes a lane reduction (repurposing) from 3 one-way lanes to 2 one-way lanes along 71 Street and Normandy Drive as well as Collins Avenue and Abbott Avenue to accommodate potential exclusive transit lanes. In addition, a 10% capacity reduction was applied to 71 Street between Collins Avenue and Dickens Avenue for potential loss of turn lanes. The capacity of Indian Creek Drive south of 71 Street was also reduced by 10% to accommodate potential bike lane enhancements.

TABLE 3
Miami Beach Town Center Traffic Impact Analysis for Existing, TMP and Town Center Traffic Conditions

No.	Existing Road Segment	Lanes	% Trip Dist	Town Center Project Trips				Year 2016 (TMP)			Year 2035 (TMP)			Year 2035 (Town Center Study)		
				Daily	PM	AM	Dir	Daily	2-Way	Pk Dir	Daily	2-Way	Pk Dir	Daily	2-Way	Pk Dir
25	71 St Btw Dickens & E Bay Dr	4LD	29%	3454	268	231	148	11,600	1,044	547	15,319	1,380	720	14,932	1,301	689
26	71 St Btw Collins and Dickens	2LU	20%	2382	185	159	102	11,600	1,044	547	15,319	1,380	720	13,860	1,218	643
23	SR 934 / 71 St (1-Way EB)	3L-1W	13%	1548	120	103	66	20,500	1,845	1,843	27,072	2,440	2,430	21,832	1,946	1,890
24	SR 934 / Normandy Dr (WB)	3L-1W	15%	1787	139	119	77	18,500	1,665	1,663	24,430	2,200	2,200	20,092	1,786	1,722
16	Collins Ave North of 71 St	3L-1W	11%	1310	102	87	56	25,500	2,295	2,293	33,674	3,030	3,030	26,541	2,373	2,325
12	Collins Ave South of 71 St	3L-1W	17%	2025	157	135	87	21,000	1,890	1,888	27,732	2,500	2,490	22,804	2,027	1,955
17	Abbott Ave north of 71 St	3L-1W	11%	1310	102	87	56	25,500	2,295	2,293	33,674	3,030	3,030	26,541	2,373	2,325
15	Indian Creek Dr South of 71 St	4LU	18%	2144	166	143	92	3,900	351	207	5,150	460	270	6,003	513	297
	Existing Road Segment	Lanes	% Dist	Daily	PM	AM	Dir	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS	LOS
25	71 St Btw Dickens & E Bay Dr	4LD	29%	3454	268	231	148	C	C	C	D	D	C	D	D	D
26	71 St Btw Collins and Dickens	2LU	20%	2382	185	159	102	D	D	D	F	F	E	F	F	D
23	SR 934 / 71 St (1-Way EB)	3L-1W	13%	1548	120	103	66	D	D	D	D	D	D	D	D	D
24	SR 934 / Normandy Dr (WB)	3L-1W	15%	1787	139	119	77	D	D	D	D	D	D	D	D	D
16	Collins Ave North of 71 St	3L-1W	11%	1310	102	87	56	D	D	D	F	F	E	D	D	D
12	Collins Ave South of 71 St	3L-1W	17%	2025	157	135	87	D	D	D	D	D	D	D	D	D
17	Abbott Ave north of 71 St	3L-1W	11%	1310	102	87	56	D	D	D	F	F	E	D	D	D
15	Indian Creek Dr South of 71 St	4LU	18%	2144	166	143	92	C	C	C	C	C	C	C	C	C
	Existing Road Segment	Lanes	% Dist	Daily	PM	AM	Dir	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C
25	71 St Btw Dickens & E Bay Dr	4LD	29%	3454	268	231	148	0.30	0.30	0.28	0.39	0.39	0.37	0.38	0.37	0.35
26	71 St Btw Collins and Dickens	2LU	20%	2382	185	159	102	0.73	0.73	0.68	0.96	0.96	0.89	0.87	0.85	0.79
23	SR 934 / 71 St (1-Way EB)	3L-1W	13%	1548	120	103	66	0.57	0.57	0.51	0.75	0.75	0.67	0.61	0.60	0.52
24	SR 934 / Normandy Dr (WB)	3L-1W	15%	1787	139	119	77	0.51	0.51	0.46	0.68	0.68	0.61	0.56	0.55	0.47
16	Collins Ave North of 71 St	3L-1W	11%	1310	102	87	56	0.71	0.71	0.63	0.94	0.94	0.83	0.74	0.73	0.64
12	Collins Ave South of 71 St	3L-1W	17%	2025	157	135	87	0.58	0.58	0.52	0.77	0.77	0.69	0.63	0.63	0.54
17	Abbott Ave north of 71 St	3L-1W	11%	1310	102	87	56	0.71	0.71	0.63	0.94	0.94	0.83	0.74	0.73	0.64
15	Indian Creek Dr South of 71 St	4LU	18%	2144	166	143	92	0.15	0.15	0.16	0.20	0.20	0.21	0.24	0.23	0.23
	Future Road Segment	Lanes	% Dist	Daily	PM	AM	Dir	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C	V/C
25	71 St Btw Dickens & E Bay Dr	4L-10%	29%	3454	268	231	148	0.33	0.33	0.31	0.44	0.44	0.41	0.43	0.41	0.39
26	71 St Btw Collins and Dickens	2L-10%	20%	2382	185	159	102	0.81	0.81	0.75	1.06	1.07	0.99	0.96	0.94	0.88
23	SR 934 / 71 St (1-Way EB)	2L-1W	13%	1548	120	103	66	0.88	0.88	0.79	1.16	1.16	1.04	0.94	0.93	0.81
24	SR 934 / Normandy Dr (WB)	2L-1W	15%	1787	139	119	77	0.79	0.79	0.71	1.05	1.05	0.94	0.86	0.85	0.73
16	Collins Ave North of 71 St	2L-1W	11%	1310	102	87	56	1.09	1.09	0.98	1.44	1.44	1.29	1.14	1.13	0.99
12	Collins Ave South of 71 St	2L-1W	17%	2025	157	135	87	0.90	0.90	0.80	1.19	1.19	1.06	0.98	0.96	0.83
17	Abbott Ave north of 71 St	2L-1W	11%	1310	102	87	56	1.09	1.09	0.98	1.44	1.44	1.29	1.14	1.13	0.99
15	Indian Creek Dr South of 71 St	4L-10%	18%	2144	166	143	92	0.17	0.17	0.18	0.23	0.22	0.24	0.26	0.25	0.26

Notes:

Year 2035 (TMP) are the volumes projected in the 2016 Transportation Master Plan assuming a 1.4% annual growth rate. Segment numbers are same as 2016 TMP.
Year 2035 (Town Center Study) are the volumes projected for 2035 in this study assuming enhanced mobility access and multimodal services with more favorable modal splits.
LOS are based on maximum service volumes (MSM) per road jurisdiction (City or State) consistent with the 2016 TMP.
V/C for existing and future roadway lanes (with enhanced multimodal) are based on City MSV as these road segments are not on the SIS and therefore local MSV prevails.

TABLE 4
Priority Projects in TMP Impacting Styudy Area

No	Priority 1 Projects	Location	Type	From	To	Length	Description	Total Cost
4	One Way Protected Bike lanes - 73 St	North	Bike/Ped	Dickens Ave	Atlantic Trail	0.35	Protected/buffered bike lanes (Lane repurposing) Enhanced crosswalks	$4,059,000
5	One Way Protected Bike lanes - 72 St	North	Bike/Ped	Dickens Ave	Collins Ave	0.28	Protected/buffered bike lanes (Lane repurposing) Enhanced crosswalks	$4,059,000
6	Protected Bike Lane/Greenway - Byron Ave	North	Bike/Ped	73 St	Hawthorne Ave	0.56	Protected/buffered bike lanes (Lane repurposing) Crosswalks/Greenway	$850,000
19	Dickens Ave & SR 934/71 St Geometric change	North	Roadway	n/a	n/a	n/a	Feasibility study for geometric modifications to add SB lane (Done)	$50,000
26	Safety Impr.-SR 934/71 St & Normandy Dr	North	Roadway	N Shore Dr	SR A1A/Collins	0.50	Safety Improvement	$50,000
30	SR A1A & Indian Creek Dr Signal Optimization	North	Roadway	SR 907/63 ST	SR 934/71 St	0.79	Signal optimization feasibility study on SR A1A	$100,000
31	SR 934/71 St feasibility study	North	Roadway	Carlyle	SR A1A/Collins	1.02	Feasibility study-removing left turns on 71 St & adding westbound lane	$199,000
47	Neighborhood Greenway - Bay Drive	North	Bike/Ped	W 71 St	E 71 St	1.30	Neighborhood greenway/Traffic calming/Enhanced crosswalks	$3,400,000
	Subtotal Priority 1					4.80		$12,767,000

No	Priority 2 Projects	Location	Type	From	To	Length	Description	Total Cost
4	Buffered Bike Lane - 69 St	North	Bike/Ped	Indian Creek Dr	Collins Ave	0.20	Buffered bike lane	$1,529,316
7	Exlusive transit/bike-SR 934/71 St/Normandy	North	Bike/Ped	Bay Dr	SR A1A/Collins	2.60	Exclusive transit and/or protected bike lane/Lane repurpose or widen	$28,411,251
14	Shared Use Path - Fairway Dr	North	Bike/Ped	Biarritz Dr	Bay Dr	1.10	Shared-use path adjacent to the golf course	$399,465
	Subtotal Priority 2					3.90		$30,340,032

No	Priority 3 Projects	Location	Type	From	To	Length	Description	Total Cost
4	Exclusive Transit/Protected Bike Lanes-SR A1A	Middle/No	Transit/Bike/Ped	SR A1A/Collins/Ind	SR 934/71 St	2.05	Exclusive transit and protected bike lanes (lane repurpose or widen)	$25,322,465
6	Protected/buffered bike lane - Abbott Ave	North	Bike/ped	Indian creek Dr	SR 934/71 St	0.30	Protected/buffered bike lane/Lane repurpose or widen/crosswalks	$2,495,706
18	Neighborhood greenway - Bay Dr	North	Bike/Ped	Fairway Dr	SR 934/71 St	0.34	Neighborhood greenway/Sharrow markers/Enhanced crosswalks	$975,221
	Subtotal Priority 3					2.69		$28,793,392

	Total Priority 1&2&3 Projects					11.39		$71,900,424

The traffic impact analysis based on the adjusted modal splits provided by the MAA model that indicated a shift from car to multimodal trips resulted in generally improved traffic conditions in 2035 compared to the Master Plan projections (see Table 5). Whereas six of the eight evaluated segments were projected to operate at a failing condition (V/C > 1) in 2035, only two segments are now projected to operate at failing conditions in 2035 (daily and two-way peak hour) but even these segment would operate at acceptable LOS based on peak directional analysis. This justifies the need to implement the identified multimodal projects and improve accessibility along 71st Street and the convenience and integration of multimodal systems serving the study area.

V. PARKING IMPACTS OF FAR INCREASE

Current Parking Conditions

The Town Center Study Area in Miami Beach is centered along the east-west 71st Street (SR 934) corridor and is defined as the area bounded on the north by 72nd Street, on the east by the Atlantic Ocean, on the south by 69th Street, and on the west by Indian Creek Drive and the Intracoastal Waterway (Figure 1).

The current parking supply within in the Town Center study area (as of 2014) consists of a combination of public and private facilities. In the report North Beach Parking Demand Analysis, Walker Parking Consultants, October 14, 2014, approximately 3,728 parking spaces within and adjacent to the study area were inventoried (see Table 6 and Figure 2). Table 7 presents the present day (2018) city parking supply within or adjacent to the study area (Figure 3). The 560 spaces in the City lots represent 15% of the total area supply.

The distribution of the weekday peak-hour parking occupancies by block is presented in Table 6. Based on the occupancy and inventory data, the peak occupancy is approximately 92% of available supply (3,429 demand/3,728 supply). The average parking occupancy rates for the area has been estimated at 84% during the weekday periods and up to 90% on Saturdays.

Proposed Town Center Development

The City of Miami Beach is proposing changes to the zoning regulations to be consistent to the proposed 2035 development goals for the Town center, centered on making the area more pedestrian-centric and reducing dependence on the automobile. The future development based on the City's FAR analysis is as follows:

- 500 new residential units;
- 382,554 square feet of new office space which translates to 638 jobs (average of 600 SF per employee); and
- 2,324 new hotel rooms which translates to 4,648 jobs (average 2 employees per room).

Figure 2
Town Center Parking Zones

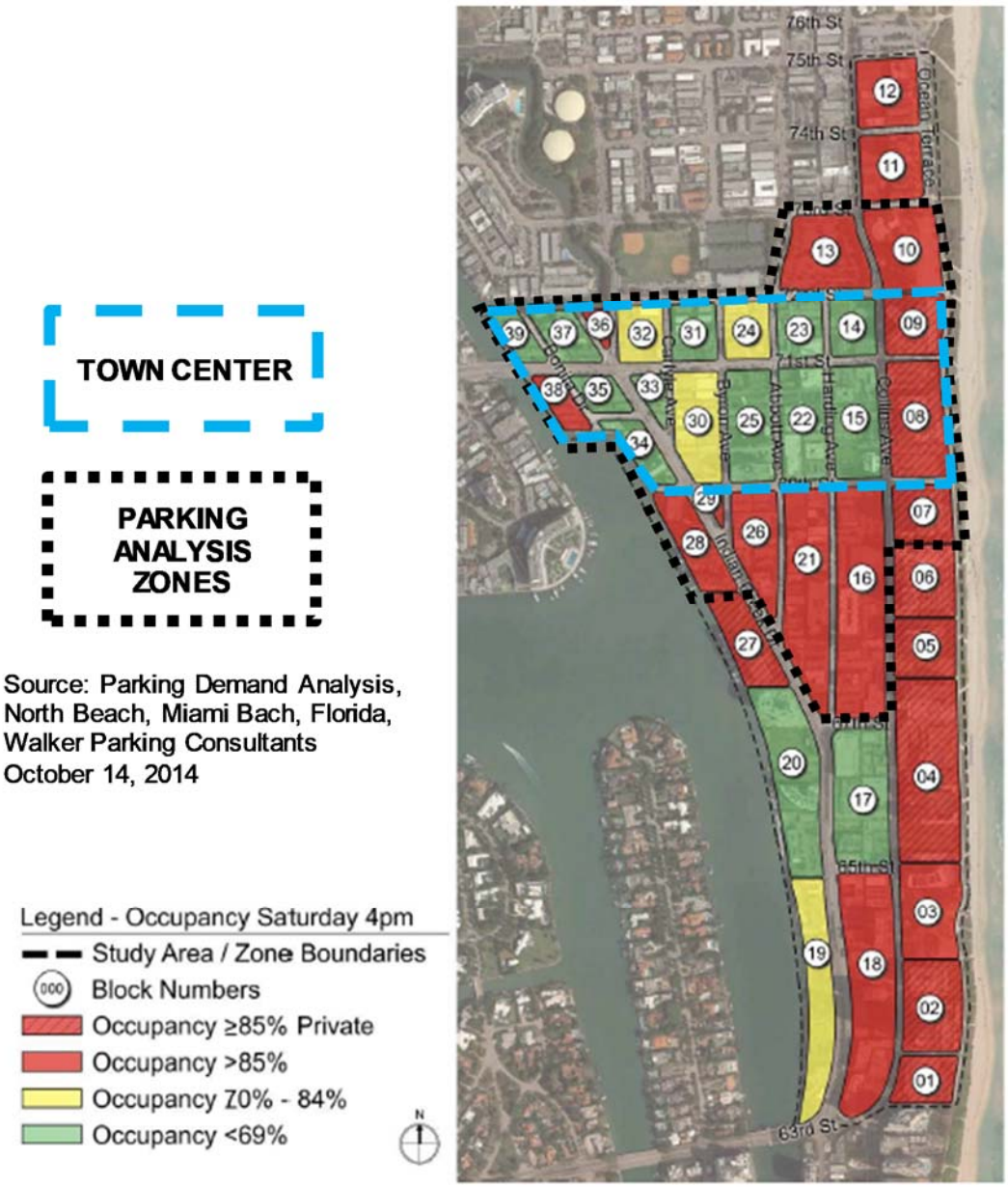


Table 5
Town Center Parking Inventory and Peak-Hour Occupancy

TOWN CENTER PARKING INVENTORY AND WEEKDAY PEAK-HOUR OCCUPANCY - 2014								
Block	On-Street	Public City Lot	Public Garage	Public Lot	Off-Street Private	Total	Effective Supply	Surplus / (Deficit)
8	0	0	0	0	485	485	461	(24)
9	15	0	0	0	540	555	513	(42)
14	19	0	0	0	9	28	44	16
15	23	17	0	0	36	76	139	63
22	26	40	0	0	49	115	164	49
23	13	0	0	0	7	20	47	27
24	8	0	0	0	8	16	19	3
25	18	16	0	0	285	319	436	117
30	42	0	0	0	33	75	82	7
31	16	0	0	0	0	16	32	16
32	13	0	0	0	29	42	52	10
33	4	0	0	0	0	4	7	3
34	7	0	0	0	9	16	69	53
35	14	0	0	0	0	14	38	24
36	16	0	0	0	0	16	11	(5)
37	18	0	0	0	0	18	32	14
38	13	0	0	0	0	13	10	(3)
39	9	0	0	0	0	9	21	12
Sub - Totals	274	73	0	0	1,490	1,837	2,177	340
FRINGE BLOCKS - ONE BLOCK NORTH OR SOUTH TOWN CENTER STUDY LIMIT								
7	0	0	0	0	311	311	295	(16)
10	16	0	0	0	0	16	13	(3)
13	29	304	0	0	0	333	312	(21)
16	71	0	0	0	473	544	557	13
21	82	0	0	0	36	118	112	(6)
26	41	0	0	0	45	86	85	(1)
28	0	0	0	0	162	162	162	0
29	22	0	0	0	0	22	15	(7)
Sub - Totals	261	304	0	0	1,027	1,592	1,551	(41)
TOTAL ACCESSIBLE PARKING FOCCUPANCY FOR TOWN CENTER								
Area Totals	535	377	0	0	2,517	3,429	3,728	299

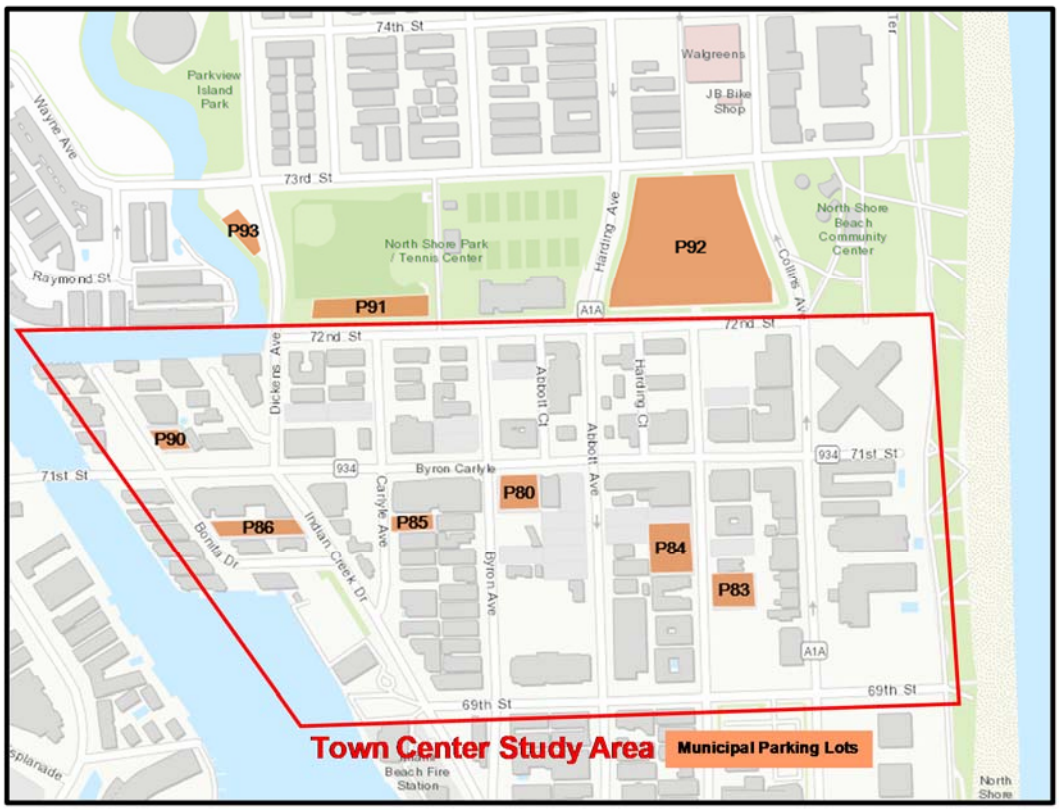
Source: Table 9: North Beach – Parking Adequacy by Block, North Beach Parking Demand Analysis, October 14, 2014, Walker Parking Consultants.

Table 6
City of Miami Beach Parking in Town Center

NO.	PARKING LOTS LOCATIONS	SPACES	Within Town Center?
P83	6933 Harding Avenue, Miami Beach, FL	29	Yes
P80	410 71 Street, Miami Beach, FL	30	Yes
P84	6950 Harding Avenue, Miami Beach, FL	53	Yes
P85	6977 Carlyle Avenue, Miami Beach, FL	14	Yes
P86	7011 Indian Creek Drive, Miami Beach, FL	36	Yes
P90	7113 Bonita Drive, Miami Beach, FL	16	Yes
P91	541 72 Street, Miami Beach, FL	50	Yes
P92	299 72 Street, Miami Beach, FL	313	Yes
P93	7270 Dickens Avenue, Miami Beach, FL	19	Yes
Total City of Miami Beach Public Parking Spaces		560	

Source: https://www.miamibeachfl.gov/city-hall/parking/parking-garages-lot-locations/north-beach/
Note: Does not inlcude facilities north of 75th Street, south of 67th Street, or on Normandy Isle.

Figure 3
Locations of City Public Parking Lots



It is estimated that this area currently (2018) has 798 households and 1,336 jobs. Therefore, the residential sector is expected to increase 62% by 2035 and the number of jobs will increase 400% by 2035. A similar increase in parking demand is not unreasonable. However, a combination of reduced parking requirements and provision and/or promotion of alternate transportation modes can help to reduce overall parking demand.

Proposed Parking Requirements for Town Center

The proposed changes to the Town Center zoning parking requirements (development ordinances) are geared to smaller and more affordable residential and hotel units, namely Co-Living Units as small as 375 square feet and Micro-Hotels with rooms as small as 175 square feet. These smaller units are expected to help to reduce the traffic throughout the study area. The proposed parking requirements, among others, for the expected developments are:

- Apartments and Townhomes: one (1) space per unit. (Affordable housing, workforce housing, co-living, and live-work: no parking requirement).

- Hotel: No parking requirement. For accessory uses to a hotel, no parking requirement provided a facility with publicly accessible parking spaces is located within 1,500 feet; otherwise, as per Parking District No. 4; and

- Office: No parking requirement provided a facility with publicly accessible parking spaces is located within 1,500 feet; otherwise, as per Parking District No. 4.

The minimum parking requirements for the three proposed uses applying the new parking requirements to the Town Center study area are as follows:

- Residential - 500 parking spaces;
- Hotel – No parking required; and
- Office – No parking required.

As per the new requirements, the residential use would require 500 parking spaces. This is consistent with the existing minimum requirement of 1 space per dwelling unit. The prior regulation required the provision of supplemental designated guest parking equal to 10% of the required residential parking spaces. Thus the required spaces with the 10% guest parking are 550 spaces. <u>These spaces would be provided on site.</u>

The hotel requirement of zero spaces is contingent on the availability of publically accessible parking spaces within 1,500. This criteria is satisfied by any hotel development within the study area since all of the parcels lie within a walking distance of 1,500 feet from a municipal lot. The largest city parking lot is Lot P92 (313 spaces) on 72nd Street on the northern border of the study area.

Based on the prior zoning parking requirements, the projected 2,324 hotel rooms would be about 1,600 parking spaces. This latter value includes reductions for short and long term bicycle parking. The value does not include site specific parking reductions or reductions such as shared parking.

Likewise, the office requirement of zero spaces is also contingent on the availability of publically accessible parking spaces within 1,500. This criteria is satisfied by any office development within the study area since all of the parcels lie within a walking distance of 1,500 feet from a municipal lot.

Based on the prior zoning parking requirements, the future 382,554 square feet of office space would require about 956 parking spaces (1 space per 400 square feet of office use). With reductions for short and long term bicycle parking, the requirement can be reduced to 905 spaces. The value does not include other site specific parking reductions.

Thus, the total unadjusted parking requirement for all proposed developments in District 8 based on the new regulations is 550 spaces. (550+0+0).

On the other hand, the total parking requirement based on the prior regulations is approximately 3,100 spaces. Since 550 spaces are for residential use and will be provided on site, the net overall requirement would be 550 spaces.

Observations and Recommendations

The aforementioned 2014 Walker parking study indicated a peak hour parking demand of 3,429 spaces, representing a surplus of about 299 spaces based on an available 2014 3,728 space inventory. This yields an adequacy of 92% occupancy within the Town Center study area.

Parking demand in Town Center will continue to grow. This condition will continue in the near term as the new regulations and the projected development begin to be implemented. The new developments will compete with the existing developments for the limited parking supply. Parking requirement reductions do not translate into a comparable reduction in parking demand. The demand is expected to continue to grow albeit with the implementation of alternate modes of transportation it can be harnessed to some extent.

As presented in the previous sections, the proposed future development consisting of a mixture of residential, office, and hotel uses are compatible with the proposed parking requirements for the Town Center. However, in order to keep pace with future parking demand, the new parking ordinances reduction in parking should be coupled with several other actions described as follows:

- Parking Monitoring:
  A regular monitoring of the area's parking conditions should be conducted as the developments are implemented and the general effects of the new units are realized. This monitoring, consisting of basic parking demand vs. supply studies, will help to address changes in parking demand, identify parking opportunities, and assess the effectiveness of the parking requirement policies. This monitoring should be conducted at least every 3 to 4 years.

- Centralization of parking:
  The future parking demand and requirements can be mitigated with the centralization of parking within and/or on the fringes of Town Center. Lot P92 at 299 72nd Street is currently a surface lot with a capacity of 313 spaces. This lot represents an opportunity for a future multi-level parking garage that will be able to help satisfy most of the parking demand in the near term. A 900-1000 space

garage at his location is not unreasonable. The need and programming for this garage can be determined via the aforementioned monitoring program.

The City can use the fee in lieu of parking program to help fund the centralized parking facilities.

- Alternate transportation modes such as local shuttle vehicles, ride-sharing services (i.e., Uber, Lyft) and bicycles should be promoted especially for hotels.

- Strategically placed locations for shared ride drop-off and pick-up areas should be considered.

- The new regulations do allow the option for developers to provide the needed parking on site based on the requirements for district 1.

- Hotel operations, especially in the tourist dominated eastern coastal areas of Miami-Dade County, are dependent in varying degrees on valet services and require on-street and/or off-street spaces for these services. The regulations allow the City to consider dedicating curb spaces to provide curb-side valet services. A centralized/shared valet program may be considered for groups of hotels, especially the boutique hotels. The program may include designated shared lots or curb spaces.

VI. PROPOSED LAND USE AMENDMENT RECOMMENDATIONS

As part of the Land Use Plan Amendment for the increase in Floor Area Ratio (FAR) in the Town Center districts, the City will introduce permitted uses. The results of the Mobility Assessment should be used to determine the allocation of certain types of uses. The Mobility Assessment is based on the following proposed uses provided by the City:

a. 500 residential units

b. 382,554 additional square feet of office space or 638 jobs

c. 2,324 hotel rooms plus an average 2 employees per room

Using this data, it is predicted that the mode-share split for each type of studied travel mode will be as follows:

Home Based Work Auto	58%
Home Based Work Transit	14%
Home Based Work Walk/Bike	29%
Non-Work Auto	52%
Non-Work Transit	16%
Non-Work Walk/Bike	32%

While this mode-share split is consistent with the City's Transportation Master Plan desired mode-share, there are opportunities in the creation of the Town Center Land Use Districts to support more transit mode trips.
A suggested change to the mix of uses to support an increase in transit and walk/bike is as follows:

d. 800 residential units

   i. 200 units 1,000 square feet or more (market rate)

   ii. 300 units 1,000 square feet or less (market rate)

iii. 300 units workforce housing 1,000 square feet or less (60% of area median income). Co-living units should be consistent with workforce housing median income goals.

e. 382,554 additional square feet of office or commercial space or 638 jobs

f. 1,824 hotel rooms plus an average 2 employees per room

Through Ordinance 2017-4138, the City established Alternative Parking Incentives to decrease parking requirements, which in turn will attract users and residents that are not dependent on "front-door" parking solutions. Future Land Development Regulations for the Town Center districts should have minimal, if any, off-street parking requirements. Centralized parking facilities should be located with 1,500 feet of future developments to encourage the use of these facilities.

The proposed Land Use Plan Amendment should encourage compact development which includes a mixture of uses such as residential, hotel, commercial, and office that promotes pedestrian and bicycle circulation and convenient access to transit facilities. Uses should be encouraged to be within a five minute (i.e., quarter-mile) walk within the Town Center districts. The Land Use Amendment should support and encourage the location of uses and internal circulation such that pedestrian mobility is a priority. All land uses within the Town Center districts shall be directly accessed via pedestrian ways, and accessible to existing or future alternate public transportation modes, including bicycle and transit.

The proposed Land Use Plan Amendment should encourage and incentivize workforce housing solutions to attract workers to support local industries within the City of Miami Beach. By attracting local workers, local transit and bicycle mobility will become a priority due to parking demands throughout the City.

VI. STRATEGIES

In addition to the multimodal projects identified in the Transportation Master Plan, the parking strategies stated above, and the recommended land use amendments, it is recommended to implement strategies to enhance transit ridership. The feasibility of rapid transit depends heavily on ridership. In turn, ridership depends on the number of people who can walk to and from rapid transit stations. Transit Oriented Development (TOD) organizes and intensifies development within a half mile of stations, a pedestrian shed, to support rapid transit ridership, and is encouraged by both the Federal Transit Administration and the Florida Department of Transportation.

The North Town Center Master Plan embodies the principles of TOD. It organizes and intensifies development within a half mile of a potential station located near the intersection of 71st Street and Collins Avenue, which will serve both the BERT express bus service along 71st and rapid transit along Collins. The transportation analysis estimates the actualized Town Center Master Plan will generate around 4,300 daily transit trips along 71st, most of which will board BERT, and around 8,500 daily transit trips along Collins to the south, most of which will board the proposed rapid transit along Collins. These anticipated boardings are high relative to most station boardings along rapid transit lines across the country.

Regarding project priorities, the analysis was based on the all the multimodal projects listed in the Transportation Master Plan that were incorporated into the MAA model. Since only one future model run was performed, it is not possible to identify the importance and benefit of individual projects. Nonetheless,

since the model results show a significant percent of trips as bike/walk trips, it is reasonable to prioritize these projects, insure good multimodal integration at hub locations, enhance safety and convenience, promote and publicize the bike share program, and implement various TDM (Transportation Demand Management) policies to promote non-vehicular trips and work with various stakeholders to achieve mobility objectives.

ATTACHMENT A

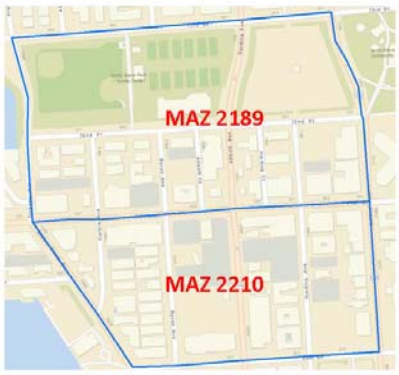
Multimodal Accessibility Analysis Model Results

Multimodal Strategies – Future Investments

- 79th Street Causeway BERT
  - Added service (10 minute headway)
- Bay Link
  - Added route as per latest alternatives analysis documents (5 minute headways)
  - LRT Collins extension to 69th added, same headway as BayLink
- Exclusive transit lanes network
  - Transit service reduces travel time 10% up to 5 minutes.
- Bike and pedestrian
  - Transportation Master Plan projects

TRIP GENERATION AND DISTRIBUTION STEPS

- Total trips by purpose (HBW and NW) estimated using generation rates from SERPM 6.5 model
  - Trips estimated for MAZs in the study area
  - Current year
  - Future year with expected growth from FAR increase
- Total trips by purpose multiplied by estimated study area mode shares
- Modal trips distributed to north, west and south based on interchange potential



ESTIMATED TRIPS BY PURPOSE AND MODE (ADJUSTED)

Trips Produced

	2189		2210		Total	
2017	Trips	%	Trips	%	Trips	%
HBW Auto	86	65%	460	72%	546	71%
HBW Transit	23	17%	70	11%	93	12%
HBW Walk/Bike	24	18%	109	17%	133	17%
NW Auto	1,112	63%	1,537	63%	2,649	63%
NW Transit	71	4%	73	3%	144	3%
NW Walk/Bike	582	33%	830	34%	1,412	34%
Total Auto	1,198	63%	1,997	65%	3,195	64%
Total Transit	94	5%	143	5%	237	5%
Total Walk/Bike	606	32%	939	30%	1,545	31%

2040	Trips	%	Trips	%	Trips	%
HBW Auto	368	53%	880	60%	1,248	58%
HBW Transit	118	17%	176	12%	294	14%
HBW Walk/Bike	209	30%	411	28%	620	29%
NW Auto	5,902	52%	8,882	52%	15,921	52%
NW Transit	1,816	16%	2,733	16%	1,706	16%
NW Walk/Bike	3,632	32%	5,466	32%	10,803	32%
Total Auto	6,270	52%	9,762	53%	16,032	52%
Total Transit	1,934	16%	2,909	16%	4,843	16%
Total Walk/Bike	3,841	32%	5,877	32%	9,718	32%

Trips Attracted

	2189		2210		Total	
2017	Trips	%	Trips	%	Trips	%
HBW Auto	725	65%	840	72%	1,565	69%
HBW Transit	190	17%	128	11%	318	14%
HBW Walk/Bike	201	18%	198	17%	399	17%
NW Auto	3,561	63%	3,635	63%	7,196	63%
NW Transit	226	4%	173	3%	399	3%
NW Walk/Bike	1,865	33%	1,962	34%	3,827	34%
Total Auto	4,286	63%	4,475	65%	8,761	64%
Total Transit	416	6%	301	4%	717	5%
Total Walk/Bike	2,066	31%	2,160	31%	4,226	31%

2040	Trips	%	Trips	%	Trips	%
HBW Auto	2,624	53%	4,300	60%	6,924	57%
HBW Transit	842	17%	860	12%	1,702	14%
HBW Walk/Bike	1,485	30%	2,007	28%	3,492	29%
NW Auto	10,296	52%	14,475	52%	24,771	52%
NW Transit	3,168	16%	4,454	16%	7,622	16%
NW Walk/Bike	6,336	32%	8,908	32%	15,244	32%
Total Auto	12,920	52%	18,775	54%	31,695	53%
Total Transit	4,010	16%	5,314	15%	9,324	16%
Total Walk/Bike	7,821	32%	10,915	31%	18,736	31%

FINAL MODE SHARES (ADJUSTED)

	Study Area All Trips	Master Plan HBW
2017		
Auto Mode	64%	69%
Transit Mode	5%	12%
Non-Motorized Mode	31%	20%
2040		
Auto Mode	53%	55%
Transit Mode	16%	20%
Non-Motorized Mode	31%	25%

2040 DAILY AUTO TRIP DISTRIBUTION (ADJUSTED)

2040 DAILY TRANSIT TRIP DISTRIBUTION (ADJUSTED)

2040 DAILY AUTO + TRANSIT TRIP DISTRIBUTION (ADJUSTED)

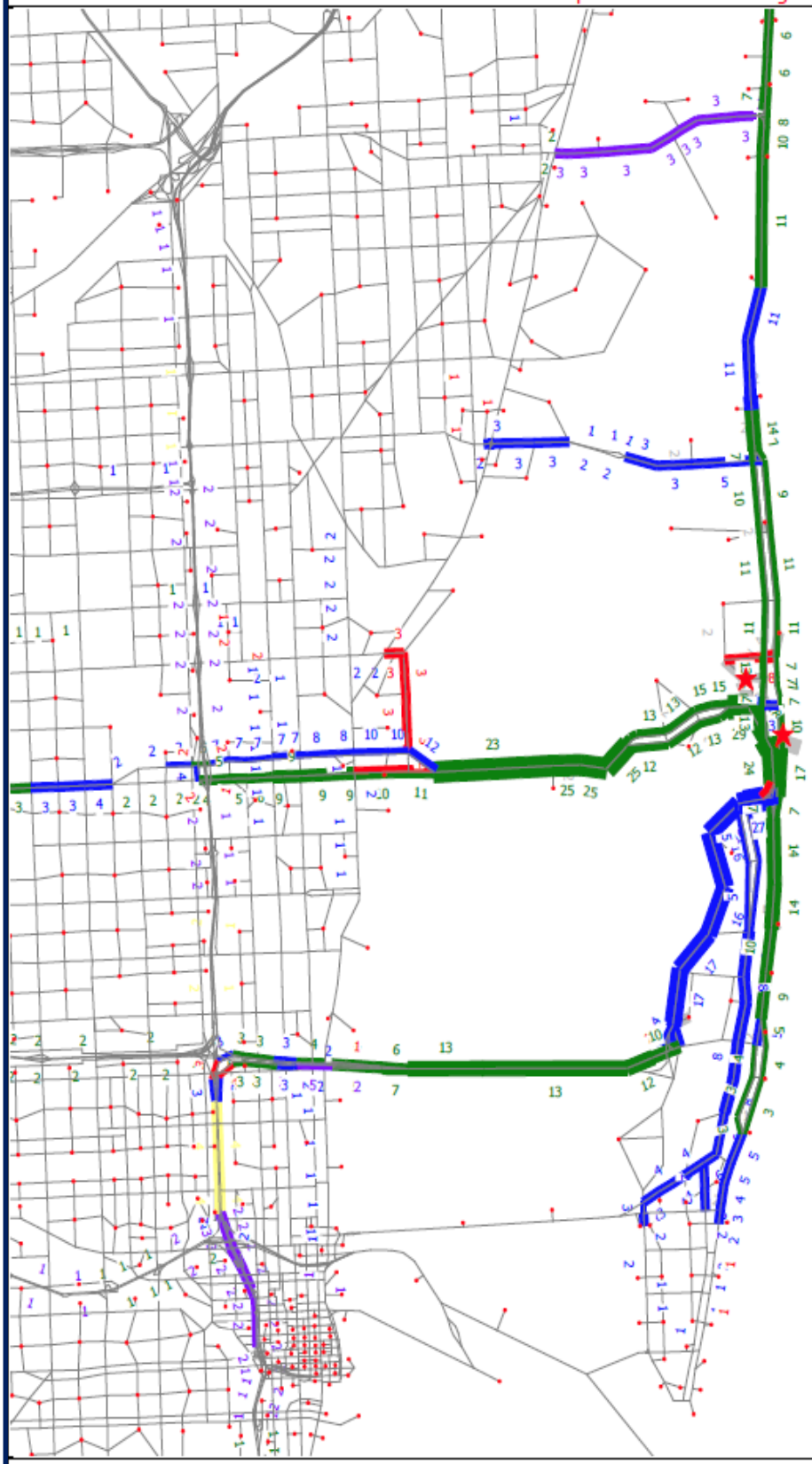
2040 NON-MOTORIZED AUTO TRIP DISTRIBUTION (ADJUSTED)

ATTACHMENT B

Town Center Trip Distribution and Pass-Through Plots

SERPM

Miami Beach Town Center Trip Distribution Percentages



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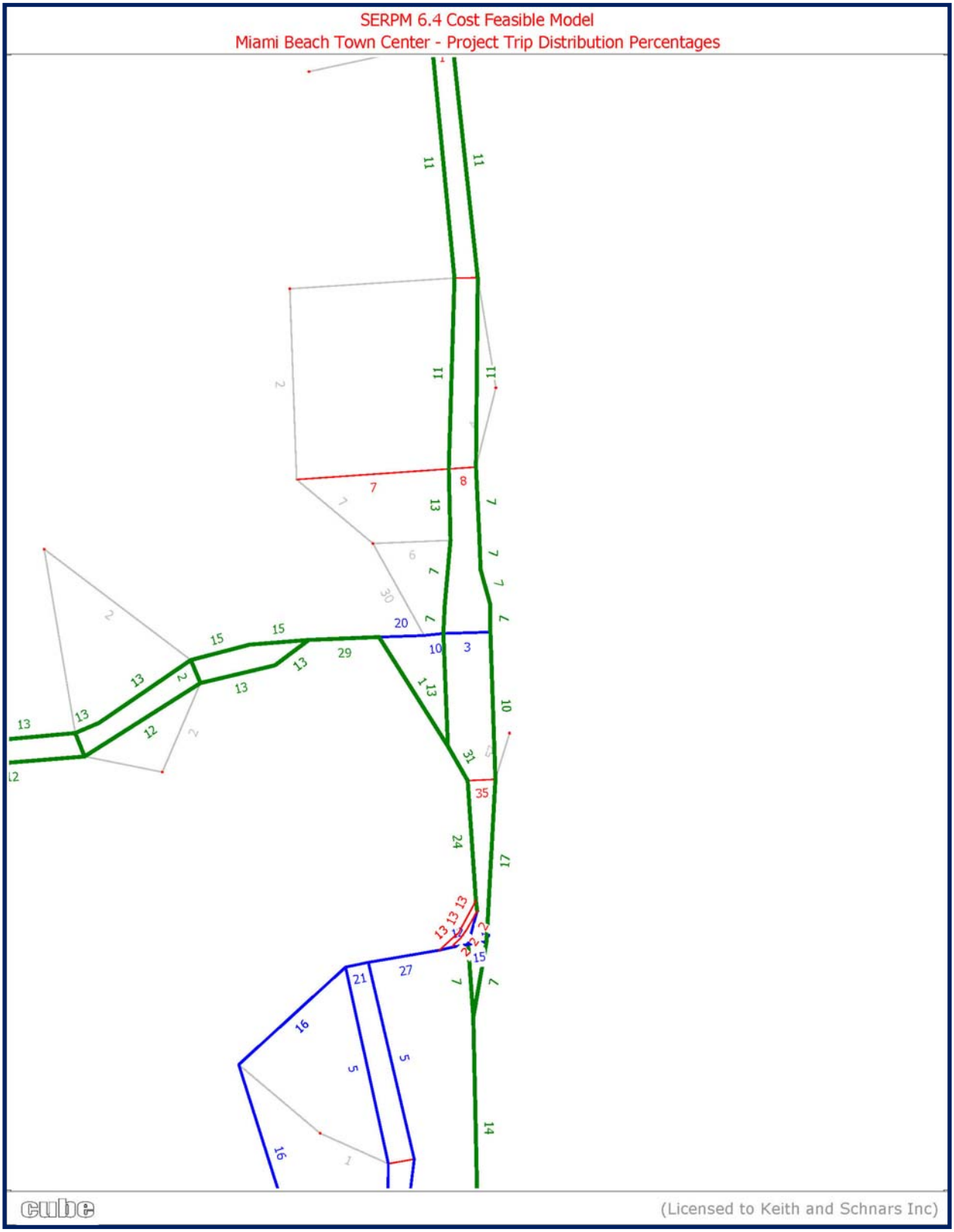
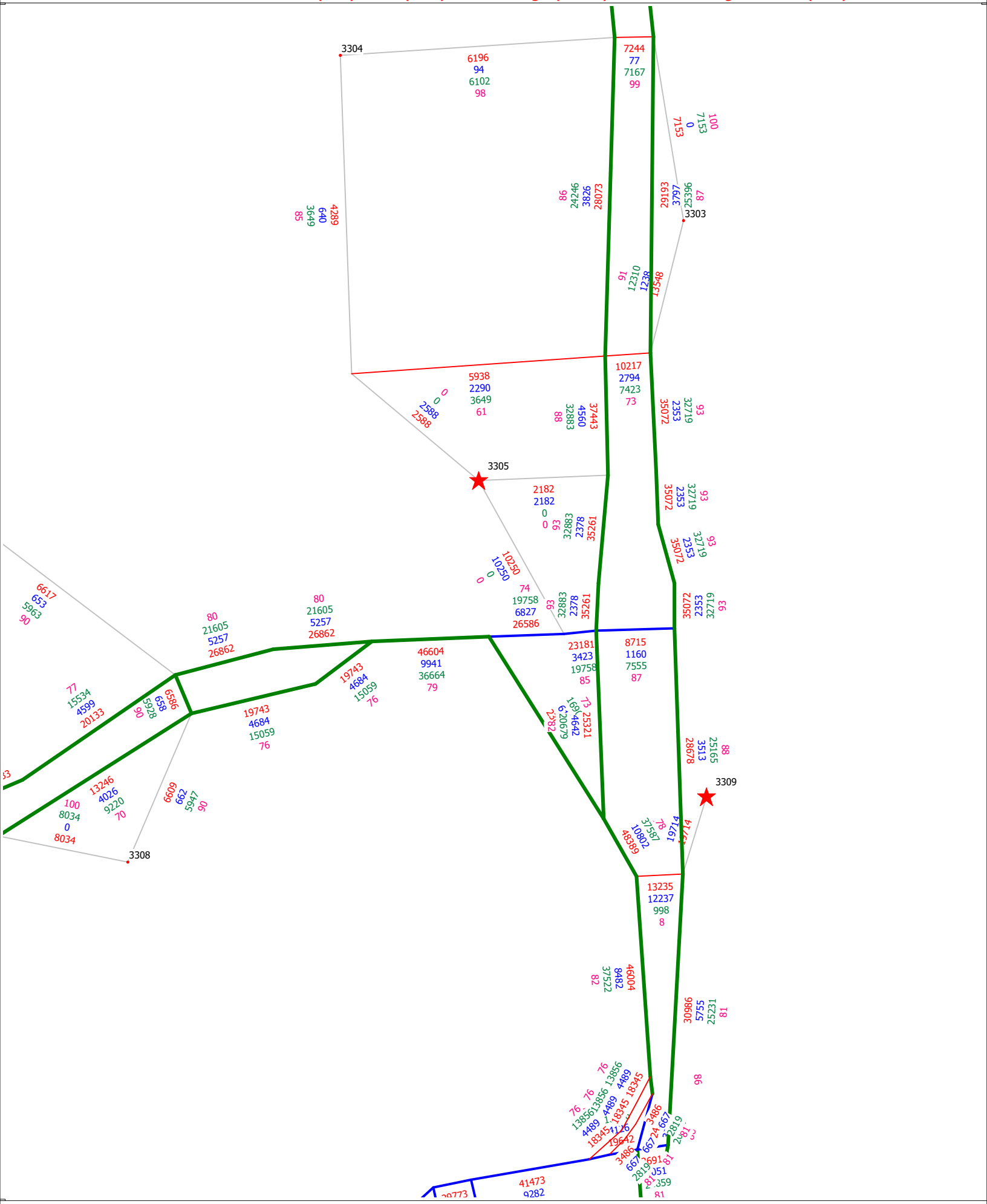
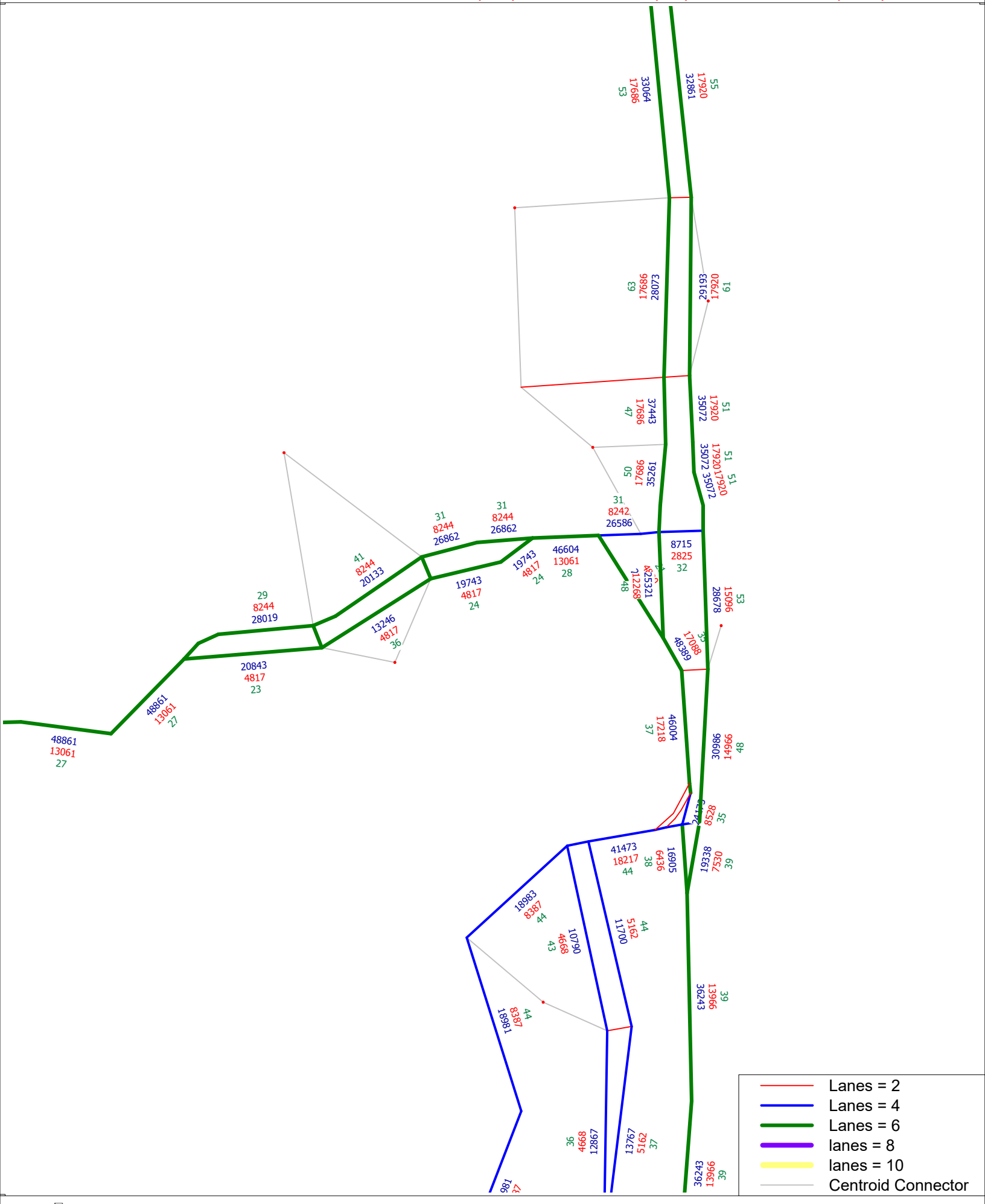
SERPM 6.4 Cost Feasible Model
Miami Beach Town Center - Project Trip Distribution Percentages



SERPM (Traffic Volumes without Origin or Destination in Study Area)
Miami Beach Town Center - Total (Red)-Local (Blue)-Pass Through (Green) and Pass Through Percent (Pink) Volumes



SERPM 2035 (Pass Thru Traffic without Origin or Destination between 41 Street and 86 Street)
Miami Beach Town Center - Total 2035 AADT Volumes (Blue) - Pass-Thru Traffic (Red) - Pass-Thru Percent (Green)



ATTACHMENT C

Town Center Trip Generation and Internalization

TABLE C-1

Miami Beach Town Center Daily Trip Generation

LAND USE DESCRIPTION	DENSITY	UNITS	LAND USE CODE	ITE 10TH EDITION DAILY TRIP GEN RATE	DAILY TRIPS	INBOUND		OUTBOUND	
						%	Trips	%	Trips
Multi High-Rise	500	Units	222	T=3.94 (X) + 211.81	2,182	50%	1,091	50%	1,091
General Office	383	KSF-GLA	710	LN(T)=0.97 LN(X) + 2.50	3,899	50%	1,950	50%	1,949
Hotel	2,324	Rooms	310	T = 8.36 (X)	19,429	50%	9,715	50%	9,715
Gross Daily Trips					25,510		12,756		12,755
Internalization Rate			0.9%		230		115		115
External Vehicle Trips after Internalization					25,280	50%	12,641	50%	12,640
External Person Trips (ITE Vehicle Occupancy)			1.2	(Assume 10% Transit/Walk/Bike)	33,707		16,854		16,853
Transit Trip Reduction:			16.0%		5,393	50%	2,697	50%	2,696
Walk/Bike Trip Reduction			31.0%		10,449	50%	5,225	50%	5,224
Vehicle External Trips					17,865		8,932		8,933
NET EXTERNAL DAILY VEHICLE TRIPS:			1.5	(Miami Beach Veh Occupancy)	11,910	50%	5,955	50%	5,955

NOTES:

Trip rates are based on the Institute of Transportation Engineers' Trip Generation, 10th Edition. Average rate for hotel was used because number of rooms exceeds equation limits.

ITE Trip Rates are based mainly on suburban studies with limited transit/pedestrian facilities. A 1.2 vehicle occupancy & 10% transit/bike/walk mode share were assumed.

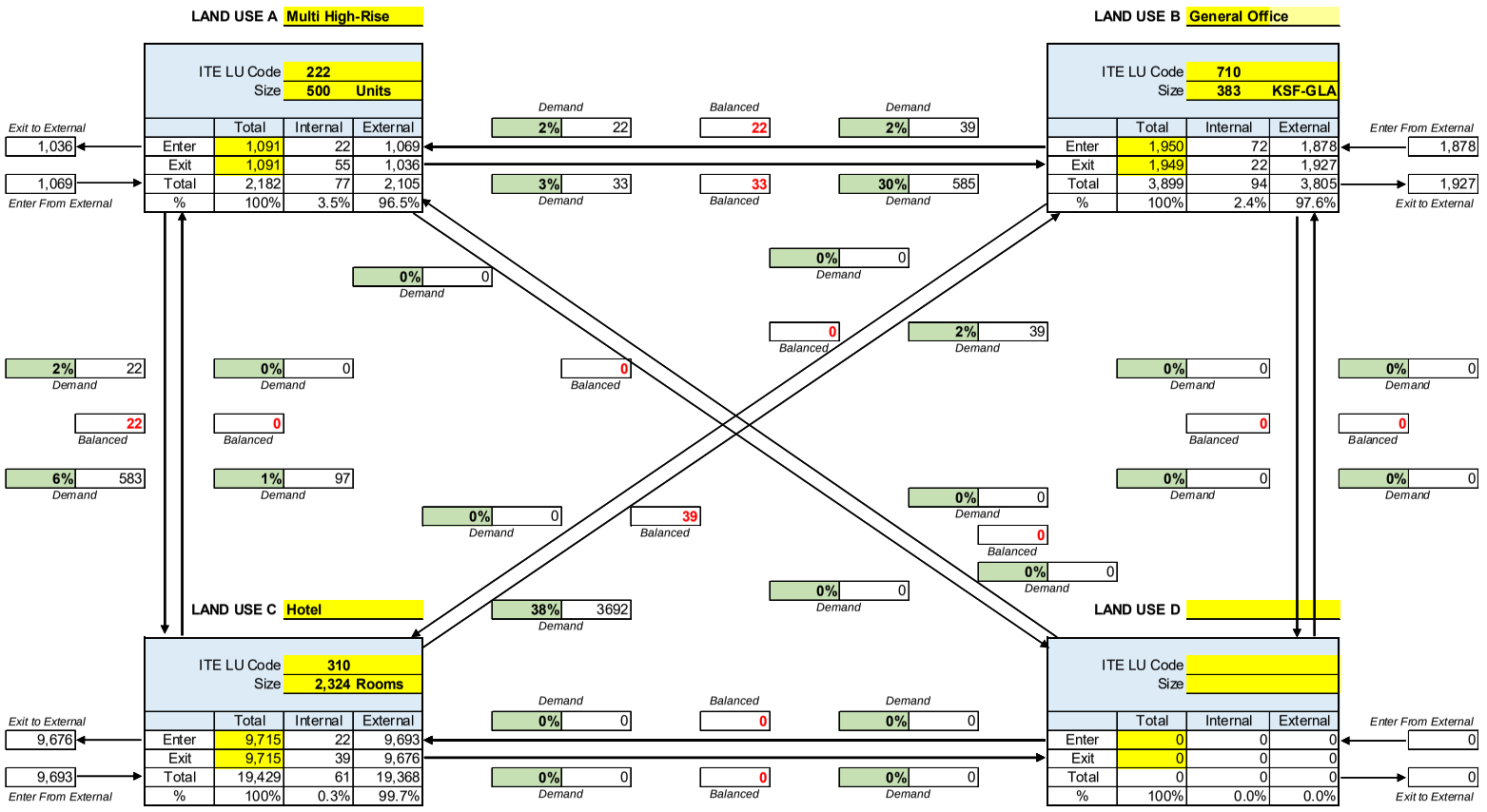
Transit and bike travel mode share percentages for Miami Beach are based on analysis performed by Renaissance Group for this project.

Miami Beach vehcile occupancy factor is based on analysis performed by Renaissance Group for this project.

Figure C-1
Miami Beach Town Center Daily Trip Generation
Daily Trip Generation Internalization Matrix

Analyst FEN
Date 05/21/18

Project Name Miami Beach Town Center
Time Period Daily



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

	Multi High-	General Office	Hotel		TOTAL
Enter	1,069	1,878	9,693		**12,640**
Exit	1,036	1,927	9,676		**12,639**
Total	2,105	3,805	19,368		**25,278**
Total Without Internalization	2,182	3,899	19,429		**25,510**

INTERNAL CAPTURE
0.9%
(232 Trips)

Notes:
Source: Institute of Transportation Engineers (ITE) Trip Generation Handbook, 10th Edition, 2017.

Values imported from trip gen sheet
Percent Internalization based on ITE

TABLE C-2
Miami Beach Town Center PM Peak Hour Daily Trip Generation

LAND USE DESCRIPTION	DENSITY	UNITS	LAND USE CODE	ITE 10TH EDITION PM TRIP GEN RATE	PM TRIPS	INBOUND		OUTBOUND	
						%	Trips	%	Trips
Multi High-Rise	500	Units	222	T=0.34 (X) + 8.56	179	61%	109	39%	70
General Office	383	KSF-GLA	710	LN(T)=0.95 LN(X)+0.36	407	16%	65	84%	342
Hotel	2,324	Rooms	310	T=0.60 (X)	1,394	51%	711	49%	683
Gross PM Peak Hour Trips					1,980		885		1,095
Internalization Rate			0.9%		18		8		10
External Vehicle Trips after Internalization					1,962	45%	877	55%	1,085
External Person Trips (ITE Vehicle Occupancy)			1.2	(Assume 10% Transit/Walk/Bike)	2,616		1,169		1,447
Transit Trip Reduction:			16.0%		419	45%	187	55%	232
Walk/Bike Trip Reduction			31.0%		811	45%	362	55%	449
Vehicle External Trips					1,386		620		766
NET EXTERNAL PM VEHICLE TRIPS:			1.5	(Miami Beach Veh Occupancy)	924	45%	413	55%	511

NOTES:

Trip rates are based on the Institute of Transportation Engineers' Trip Generation, 10th Edition. Average rate for hotel was used because number of rooms exceeds equation limits.

ITE Trip Rates are based mainly on suburban studies with limited transit/pedestrian facilities. A 1.2 vehicle occupancy & 10% transit/bike/walk mode share were assumed.

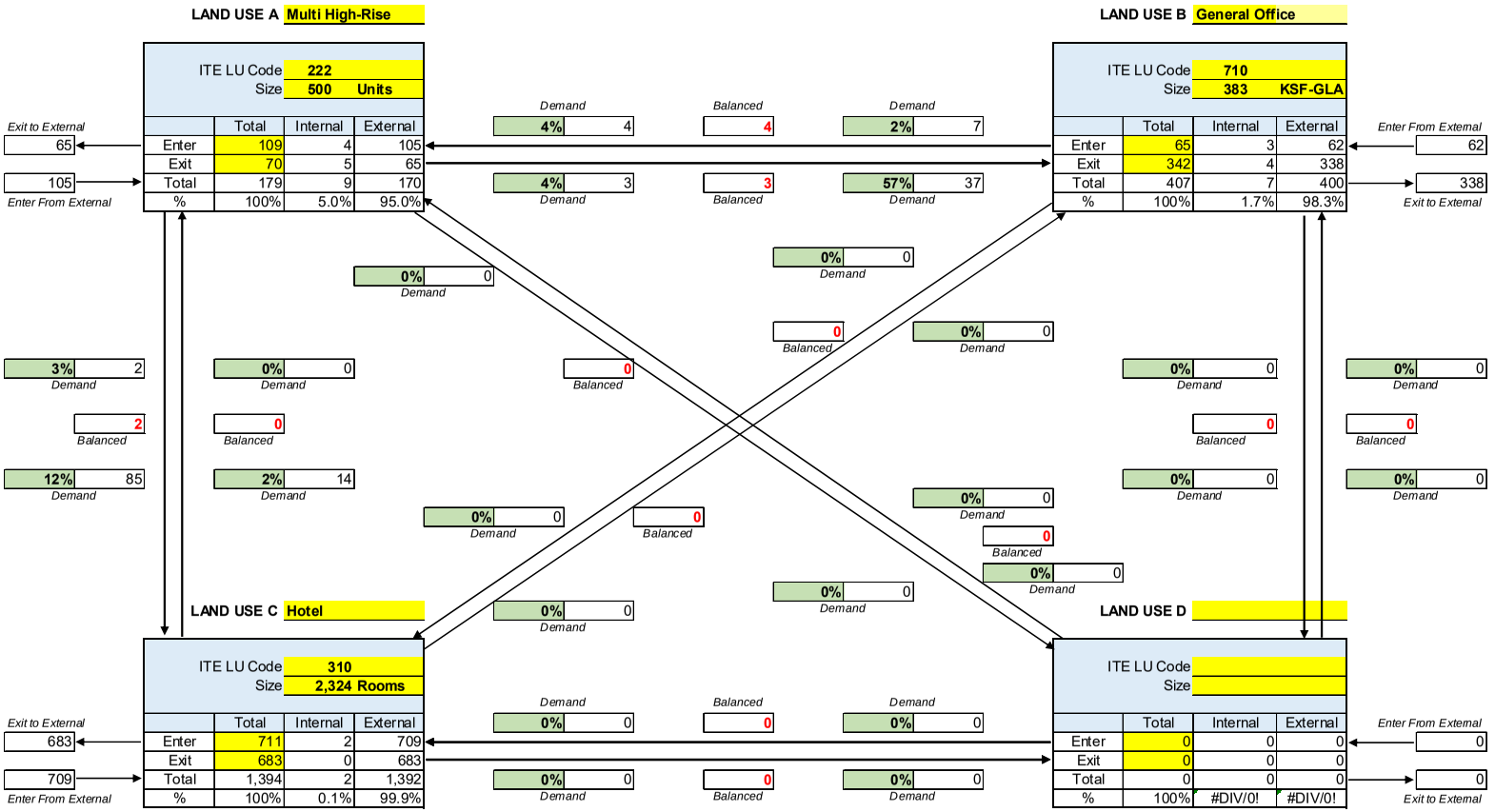
Transit and bike travel mode share percentages for Miami Beach are based on analysis performed by Renaissance Group for this project.

Miami Beach vehcile occupancy factor is based on analysis performed by Renaissance Group for this project.

Figure C-2
Miami Beach Town Center Daily Trip Generation
PM Trip Generation Internalization Matrix

Analyst FEN
Date 05/21/18

Project Name Miami Beach Town Center
Time Period PM Peak Hour



	Total	Internal	External
Enter	109	4	105
Exit	70	5	65
Total	179	9	170
%	100%	5.0%	95.0%

	Total	Internal	External
Enter	65	3	62
Exit	342	4	338
Total	407	7	400
%	100%	1.7%	98.3%

	Total	Internal	External
Enter	711	2	709
Exit	683	0	683
Total	1,394	2	1,392
%	100%	0.1%	99.9%

	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%	100%	#DIV/0!	#DIV/0!

NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

	Multi High-	General Office	Hotel		TOTAL
Enter	105	62	709		**876**
Exit	65	338	683		**1,086**
Total	170	400	1,392		**1,962**
Total Without Internalization	179	407	1,394		**1,980**

INTERNAL CAPTURE
0.9%
(18 Trips)

Notes:
Source: Institute of Transportation Engineers (ITE) Trip Generation Handbook, 10th Edition, 2017.

Values imported from trip gen sheet
Percent Internalization based on ITE

TABLE C-3

Miami Beach Town Center AM Peak Hour Daily Trip Generation

LAND USE DESCRIPTION	DENSITY	UNITS	LAND USE CODE	ITE 10TH EDITION AM TRIP GEN RATE	AM TRIPS	INBOUND		OUTBOUND	
						%	Trips	%	Trips
Multi High-Rise	500	Units	222	T=0.28 (X) +12.86	153	24%	37	76%	116
General Office	383	KSF-GLA	710	T=0.94 (X) + 26.49	386	86%	332	14%	54
Hotel	2,324	Rooms	310	T=0.50 (X) - 5.34	1,157	59%	683	41%	474
Gross PM Peak Hour Trips					1,696		1,052		644
Internalization Rate			0.5%		8		5		3
External Vehicle Trips after Internalization					1,688	62%	1,047	38%	641
External Person Trips (ITE Vehicle Occupancy)			1.2	(Assume 10% Transit/Walk/Bike)	2,251		1,396		855
Transit Trip Reduction:			16.0%		360	62%	223	38%	137
Walk/Bike Trip Reduction			31.0%		698	62%	433	38%	265
Vehicle External Trips					1,193		740		453
NET EXTERNAL AM VEHICLE TRIPS:			1.5	(Miami Beach Veh Occupancy)	795	62%	493	38%	302

NOTES:

Trip rates are based on the Institute of Transportation Engineers' Trip Generation, 10th Edition.

ITE Trip Rates are based mainly on suburban studies with limited transit/pedestrian facilities. A 1.2 vehicle occupancy & 10% transit/bike/walk mode share were assumed.

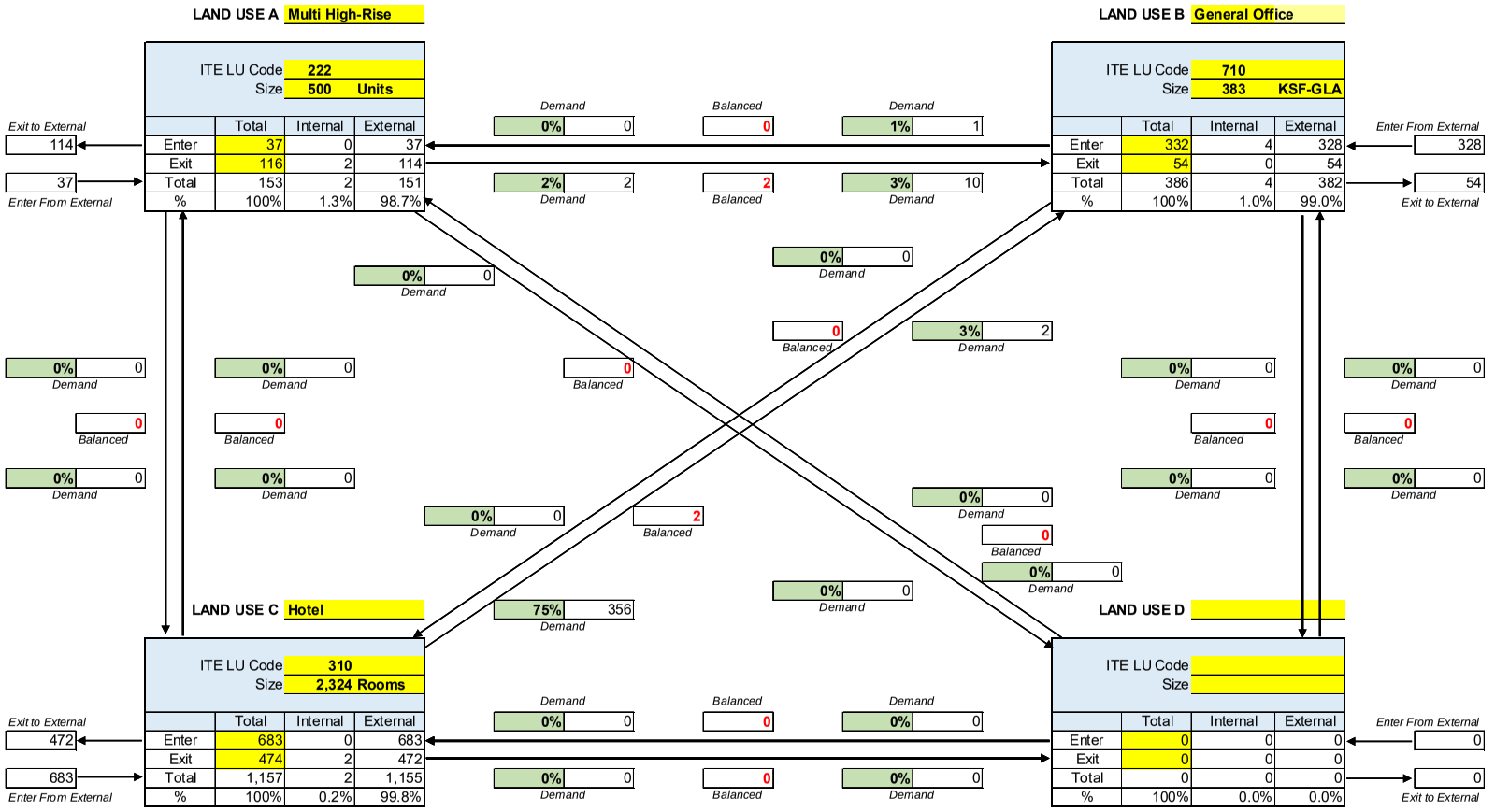
Transit and bike travel mode share percentages for Miami Beach are based on analysis performed by Renaissance Group for this project.

Miami Beach vehcile occupancy factor is based on analysis performed by Renaissance Group for this project.

Figure C-3
Miami Beach Town Center Daily Trip Generation
AM Trip Generation Internalization Matrix

Analyst FEN
Date 05/21/18

Project Name Miami Beach Town Center
Time Period AM Peak Hour



	Total	Internal	External
Enter	37	0	37
Exit	116	2	114
Total	153	2	151
%	100%	1.3%	98.7%

Exit to External: 114 | Enter From External: 37

	Total	Internal	External
Enter	332	4	328
Exit	54	0	54
Total	386	4	382
%	100%	1.0%	99.0%

Enter From External: 328 | Exit to External: 54

	Total	Internal	External
Enter	683	0	683
Exit	474	2	472
Total	1,157	2	1,155
%	100%	0.2%	99.8%

Exit to External: 472 | Enter From External: 683

	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%	100%	0.0%	0.0%

Enter From External: 0 | Exit to External: 0

NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

	Multi High-	General Office	Hotel		TOTAL
Enter	37	328	683		**1,048**
Exit	114	54	472		**640**
Total	151	382	1,155		**1,688**
Total Without Internalization	153	386	1,157		**1,696**

INTERNAL CAPTURE
0.5%
(8 Trips)

Notes:
Source: Institute of Transportation Engineers (ITE) Trip Generation Handbook, 10th Edition, 2017.

Values imported from trip gen sheet
Percent Internalization based on ITE

ATTACHMENT D

Future Traffic Projections and Levels of Service

FDOT and City Maximum Service Volume Calculations Based on FDOT Q/LOS 2013

No.	Road Segment	Lanes Ex	Lanes Future	Segment			City Adopted MSV (LOS D+20%)							EXISTING FDOT LOS D			FUTURE MSV FDOT LOS D		
							Adopted	Existing			Future								
				Jurisd	Speed	Adjust	LOS	Daily	2-Way	Pk Dir	Daily	2-Way	Pk Dir	Daily	2-Way	Pk Dir	Daily	2-Way	Ph Dir
25	71 St Btw Dickens & E Bay Dr	4LD	4L-10%	State	35	100%	D+20%	38880	3504	1956	34992	3154	1760	32400	2920	1630	29160	2628	1467
26	71 St Btw Collins and Dickens	2LU	2L-10%	State	35	-10%	D+20%	15984	1436	810	14386	1292	729	13320	1197	675	11988	1077	608
23	SR 934 / 71 St (1-Way EB)	3L-1W	2L-1W	State	35	60% 2W	D+20%	36000	3240	3629	23328	2102	2347	30000	2700	3024	19440	1752	1956
24	SR 934 / Normandy Dr (WB)	3L-1W	2L-1W	State	35	60% 2W	D+20%	36000	3240	3629	23328	2102	2347	30000	2700	3024	19440	1752	1956
16	Collins Ave North of 71 St	3L-1W	2L-1W	State	35	60% 2W	D+20%	36000	3240	3629	23328	2102	2347	30000	2700	3024	19440	1752	1956
12	Collins Ave South of 71 St	3L-1W	2L-1W	State	35	60% 2W	D+20%	36000	3240	3629	23328	2102	2347	30000	2700	3024	19440	1752	1956
17	Abbott Ave north of 71 St	3L-1W	2L-1W	State	35	60% 2W	D+20%	36000	3240	3629	23328	2102	2347	30000	2700	3024	19440	1752	1956
15	Indian Creek Dr South of 71 St	4LU	4L-10%	City	35	-35%	D+20%	25272	2278	1272	22745	2050	1145	21060	1898	1060	18954	1708	954

TABLE D-1
ROADWAY LINK ANALYSIS - FDOT COUNT STATIONS

	Roadway	DIR	Lanes	From	To	Classif.	Left Turn lane?	Right Turn Lane?	Dat Source	FDOT Count Station	2017 AADT	FDOT MSV LOS D	FDOT MSV LOS E	MSV D+20%	2017 LOS	2040 AADT LRTP	2040 LOS
1	SR 934 / Normandy Dr	WB	3	North Bay Cswy	Bay Drive	Minor	No	No	FDOT	870115	21,000	26,520	33,720	31,824	D	21,894	D
2	SR 934 / 71st Street	EB	3	North Bay Cswy	Bay Drive	Minor	No	No	FDOT	875191	17,000	26,520	33,720	31,824	D	16,938	D
3	SR 934 / 71st Street	2-Way	2	Indian Creek Dr	Collins Ave	Minor	Yes	Yes	FDOT	875189	10,800	4,200	14,300	5,040	E	7,758	E
4	SR A1A / Collins Ave	NB	3	87th Street	89th Street	Minor	Yes	No	FDOT	87025	21,000	26,520	33,720	31,824	D	31,369	E
5	SR A1A / Harding Ave	SB	3	87th Street	89th Street	Minor	Yes	No	FDOT	870520	24,500	26,520	33,720	31,824	D	31,228	E
6	SR A1A / Collins Ave	NB	3	Indian Creek Dr	63rd Street	Minor	Yes	No	FDOT	872541	18,000	26,520	33,720	31,824	D	16,729	D

Note:
Maximum Service Volume (MSV) based on FDOT 2018 QLOS Criteria

TABLE D-2

ROADWAY LINK ANALYSIS BASED ON PEAK HOUR VOLUMES OBTAINED FROM FROM TRAFFIC STUDIES

	Roadway	DIR	2018 No. Lanes (1)	From	To	FDOT State Signalized Arterial Classification for Planning LOS (2)	Exclusive LT Lane (3)	Exclusive RT Lane (3)	Traffic Count Source (4)	Count Date	Base 2017 Peak-Hour Directional Volume		2018 Growth Factor (6)	2018 Peak-Hour Directional Volume		Base FDOT MSV LOS D (7)	Base FDOT MSV LOS E (7)	One-Way and/or Median or Turn Lane Adjustment Factor (7)	LOS E + 20% Adjustment (M-D Comp Plan) (8)	Adjusted Peak-Hour Directional MSV (LOS E+20) (7)	2018 Peak Hour v/c		2018 Peak-Hour LOS	
											AM	PM		AM	PM						AM	PM	AM	PM
1	71st Street	EB	3	Normandy Isles	Indian Creek Drive	Minor	Yes*	Yes*	Kimley-Horn	6/27&7/11 2017	1,508	1,257	1.005	1,516	1,263	2,190	2,780	1.00	1.20	3,336	0.45	0.38	C	c
		WB	2	Indian Creek Drive	Normandy Isles	Minor	Yes	No	NOBE Study	6/27&7/11 2017	1,110	2,034	1.005	1,116	2,044	1,390	1,840	1.00	1.20	2,208	0.51	0.93	C	E+20
2	71st Street	EB	1	Indian Creek Drive	Byron Avenue	Minor	Yes	No	Kimley-Horn	6/27&7/11 2017	531	558	1.005	534	561	210	710	1.00	1.20	852	0.63	0.66	E	E
		WB	2	Byron Avenue	Indian Creek Drive	Minor	No	No	NOBE Study	6/27&7/11 2017	480	814	1.005	482	818	210	1,840	0.75	1.20	1,656	0.29	0.49	E	E
3	71st Street	EB	1	Byron Avenue	SR A1A/Abbott Ave	Minor	No	Yes	Kimley-Horn	6/27&7/11 2017	420	369	1.005	422	371	210	710	1.00	1.20	852	0.50	0.44	E	E
		WB	1	SR A1A/Abbott Ave	Byron Avenue	Minor	Yes	No	NOBE Study	6/27&7/11 2017	418	716	1.005	420	720	210	710	1.00	1.20	852	0.49	0.85	E	E+20
3A	71st Street	EB	1	SR A1A/Abbott Ave	SR A1A/Abbott Ave	Minor	No	Yes	FDOT	6/6-8/2017 (#5189)	351	346	1.005	353	348	210	710	1.00	1.20	852	0.41	0.41	E	E
		WB	1	SR A1A/Abbott Ave	SR A1A/Abbott Ave	Minor	Yes	No	Synopsis	6/6-8/2017 (#5189)	290	421	1.005	292	423	210	710	1.00	1.20	852	0.34	0.50	E	E
4	71st Street	EB	1	SR A1A/Abbott Ave	Harding Avenue	Minor	Yes	No	Kimley-Horn	6/27&7/11 2017	359	723	1.005	361	727	210	710	1.00	1.20	852	0.42	0.85	E	E+20
		WB	1	Harding Avenue	SR A1A/Abbott Ave	Minor	Yes	No	NOBE Study	6/27&7/11 2017	218	350	1.005	219	352	210	710	1.00	1.20	852	0.26	0.41	E	E
5	71st Street	EB	1	Harding Avenue	SR A1A/Collins Ave	Minor	Yes	No	Kimley-Horn	6/27&7/11 2017	300	330	1.005	302	332	210	710	1.00	1.20	852	0.35	0.39	E	E
		WB	1	SR A1A/Collins Ave	Harding Avenue	Minor	Yes	No	NOBE Study	6/27&7/11 2017	188	263	1.005	189	264	210	710	1.00	1.20	852	0.22	0.31	D	E
6	SR A1A/Collins Avenue	NB	3	69th Street	71st Street	Minor	Yes	No	Kimley-Horn	6/27&7/11 2017	1,164	2,269	1.005	1,170	2,280	2,190	2,780	1.20	1.20	4,003	0.29	0.57	D	E
7	SR A1A/Collins Avenue	NB	3	71st Street	72nd Street	Minor	No	No	Kimley-Horn	6/27&7/11 2017	1,302	2,356	1.005	1,309	2,368	2,190	2,780	1.20	1.20	4,003	0.33	0.59	D	E
8	SR A1A/Abbott Avenue	SB	3	72nd Street	71st Street	Minor	No	Yes	Kimley-Horn	6/27&7/11 2017	2,349	1,987	1.005	2,361	1,997	2,190	2,780	1.20	1.20	4,003	0.59	0.50	E	D
9	SR A1A/Abbott Avenue	SB	3	71st Street	69th Street	Minor	No	No	Kimley-Horn	6/27&7/11 2017	2,218	1,628	1.005	2,229	1,636	2,190	2,780	1.20	1.20	4,003	0.56	0.41	E	D
10	SR A1A/Abbott Avenue	SB	3	69th Street	South of 69th Street	Minor	No	No	Kimley-Horn	6/27&7/11 2017	2,390	1,796	1.005	2,402	1,805	2,190	2,780	1.20	1.20	4,003	0.60	0.45	E	D

NOTES:

(1) Minor (1 Signal per quarter mile) -- Table 7, Generalized Peak-Hour Directional Volumes for Florida's Urbanized Areas, 2018 FDOT Quality/Level of Service Handbook Tables.

(2) Number of lanes at intersection approach.

(3) Approach information for Median and Turn Lane Adjustments -- Table 7, Generalized Peak-Hour Directional Volumes for Florida's Urbanized Areas, 2018 FDOT Quality/Level of Service Handbook Tables.

(4) 71 NOBE, Miami Beach, Florida, Traffic Impact Analysis, Kimley-Horn and Associates, Inc., March 2018.

(5) Source: 2018 FDOT Florida Traffic Online Traffic

(6) Assumed growth rate of 0.5% per year.

(7) Median and Turn Lane Adjustment Factors -- Table 7, Generalized Peak-Hour Directional Volumes for Florida's Urbanized Areas, 2018 FDOT Quality/Level of Service Handbook Tables.

(8) Traffic Circulation Subelement, Section TC-1B, Traffic Circulation Levels of Service, Miami-Dade County Comprehensive Development Master Plan, Dec. 4, 2013.

ATTACHMENT E

Multimodal Accessibility Analysis Model Development Presentation

RENAISSANCE PLANNING

TOWN CENTER TRANSPORTATION ANALYSIS

MAY 3, 2018

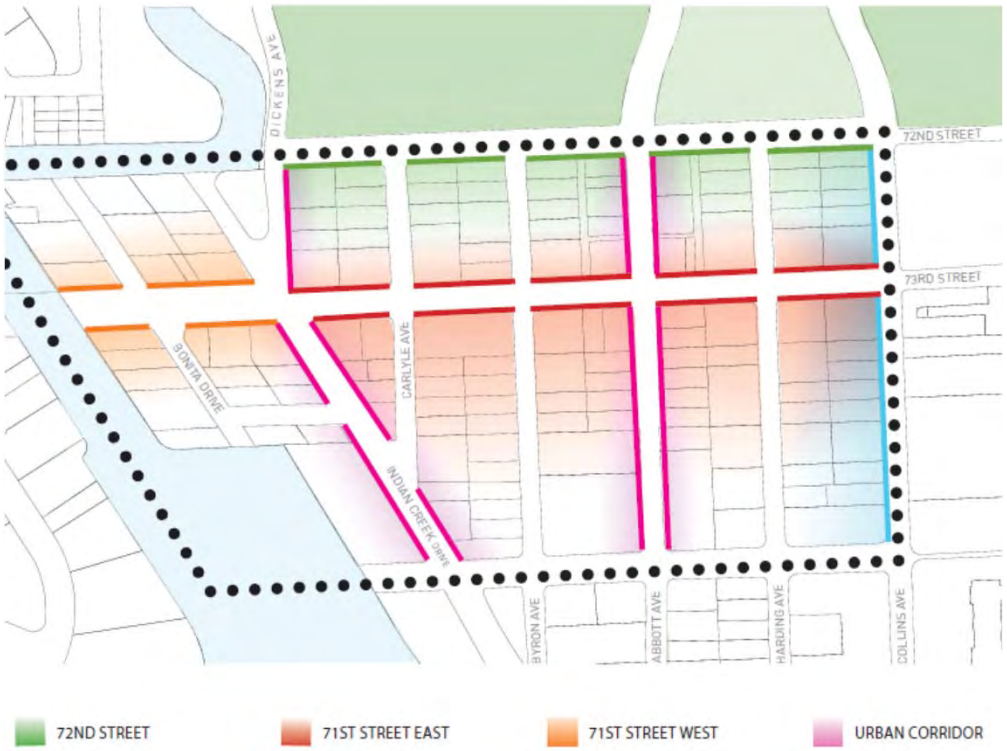
PRESENTATION OVERVIEW

- Overview and approach
- Model development
- Model calibration and mode share estimates
- Forecasts

1 OVERVIEW AND APPROACH

NORTH BEACH TOWN CENTER DISTRICT

- Existing
  - Moderate intensity
  - Mixed use
  - Older building stock
- Master Plan
  - Increased intensity (FAR up to 3.5)
  - Mixed use
  - Multimodal
    - Creating a walkable place
    - Supported by bike and transit



MULTIMODAL OUTCOMES

- Multimodal strategies
  - Transit
  - Bike path
  - Pedestrian
- Multimodal-supportive urban form
  - Higher development intensity
  - Mix of uses
  - Increase in proximity of destinations
  - Increase in walkability
- Multimodal transportation analysis
  - Focus on reaching mode share targets

PROPOSED OPTION 3

FAR	HEIGHT	FRONT SETBACKS
3.5	PEDESTAL 45' TOWER 150'	PEDESTAL 15' TOWER 10'

MODE SHARE METHODOLOGY

1. Code future year conditions
   - Multimodal strategies
   - Multimodal urban form
2. Develop model
   - MDOT model structure
   - Accessibility by mode and trip purpose
3. Calibrate HBW and NW models and estimate mode shares
   1. Targets by mode and purpose
   2. Adjustments and recommendations
4. Forecast person trips by mode
   1. Mode share shifts by purpose
   2. Person trips distribution by mode and purpose

3.1 FUTURE YEAR CONDITIONS

MULTIMODAL STRATEGES – FUTURE INVESTMENTS

- 79th Street Causeway BERT
  - Added service (10 minute headway)
- Bay Link
  - Added route as per latest alternatives analysis documents (5 minute headways)
  - LRT Collins extension to 69th added, same headway as BayLink
- Exclusive transit lanes network
  - Transit service reduces travel time 10% up to 5 minutes.
- Bike and pedestrian
  - Transportation Master Plan projects

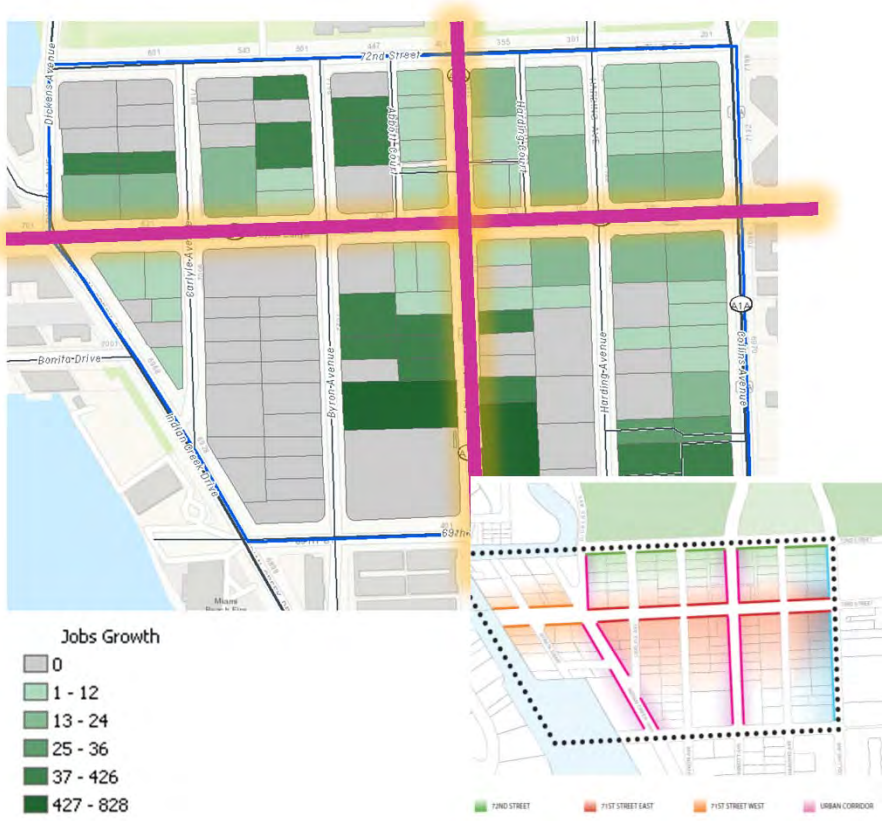
MULTIMODAL URBAN FORM – FUTURE ACTIVITIES

- 2017 activity
  - 1,336 jobs
  - 798 households
- Added activity (2040) based on City forecasts
  - 500 residential units
  - 638 jobs
    - 382,554 additional SF of office space
    - 600 SF per job
  - 4,648 hotel jobs
    - 2,324 hotel rooms
    - Average 2 employees per room

MULTIMODAL URBAN FORM – FUTURE ACTIVITIES

2017 Jobs

Added jobs from FAR Increase



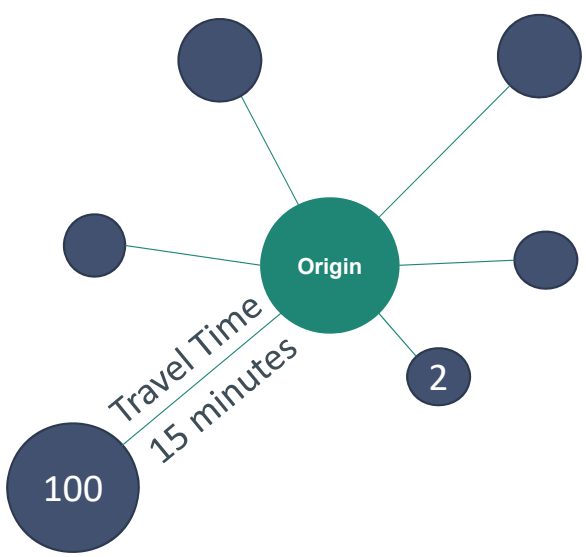
3.2 MODEL DEVELOPMENT

MODEL STRUCTURE

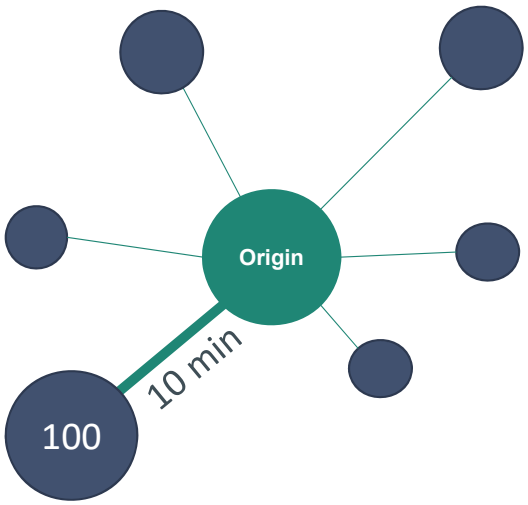
- Multimodal accessibility (decayed number of reachable jobs)
  - Purpose
    - Home based work (HBW)
    - Non-work (NW) (home based other and non-home based)
  - Mode
    - Auto
    - Transit
    - Non-motorized (bike and walk)
- Nested logit structure
  - Non-motorized trips at top of nest
  - Auto versus transit trips second nest

MULTIMODAL ACCESSIBILITY

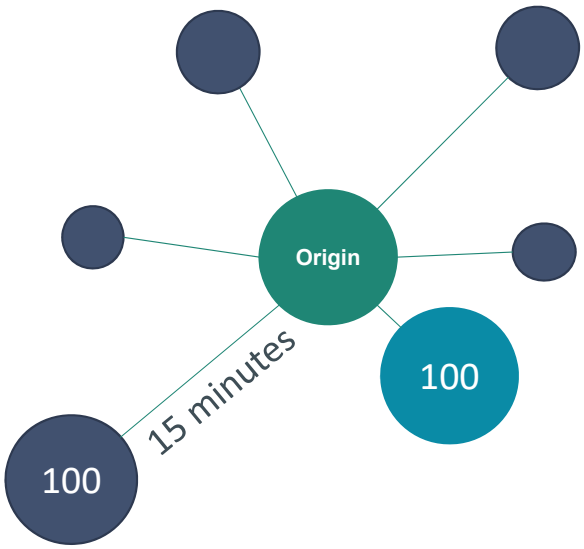
Score is total time-discounted number of reachable destinations



Base



A. Transportation Change

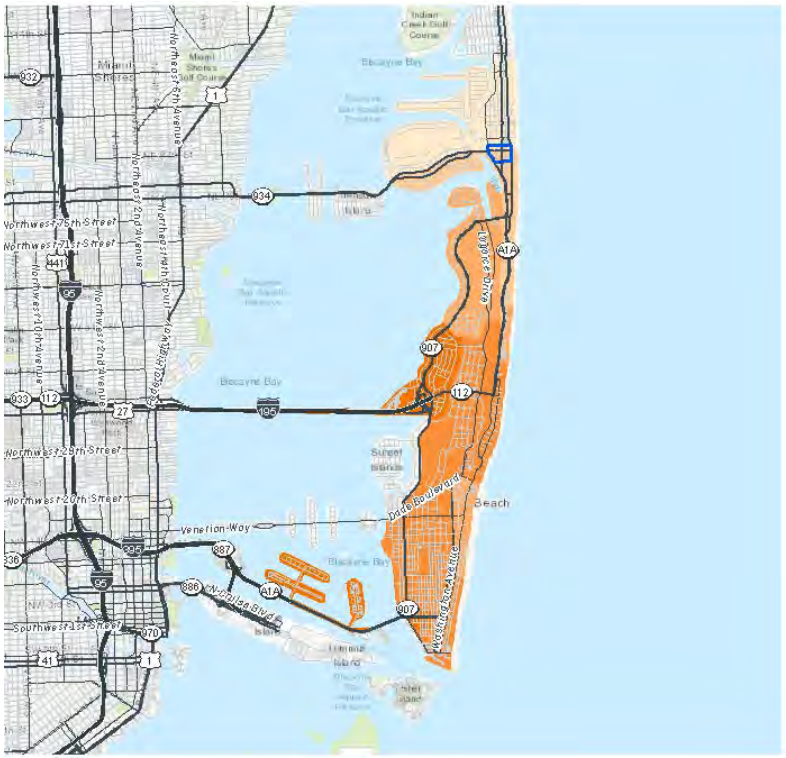


B. Land Use Change

Score can be increased with either transportation on land use changes

HBW AUTO ACCESSIBILITY TO JOBS 2017

City of Miami Beach

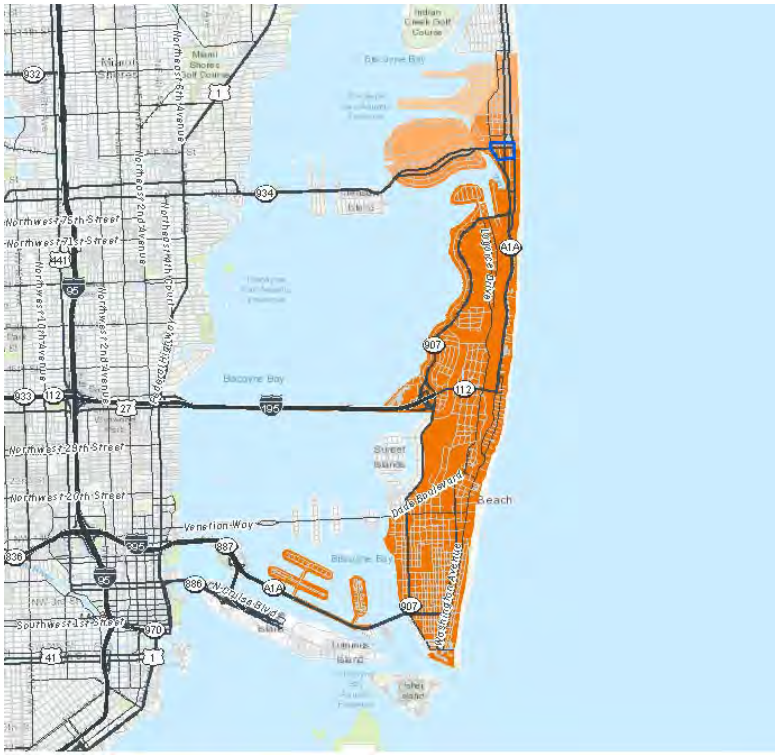


2017 auto score range:
500K to 650K

Study Area

HBW AUTO ACCESSIBILITY TO JOBS 2040

City of Miami Beach

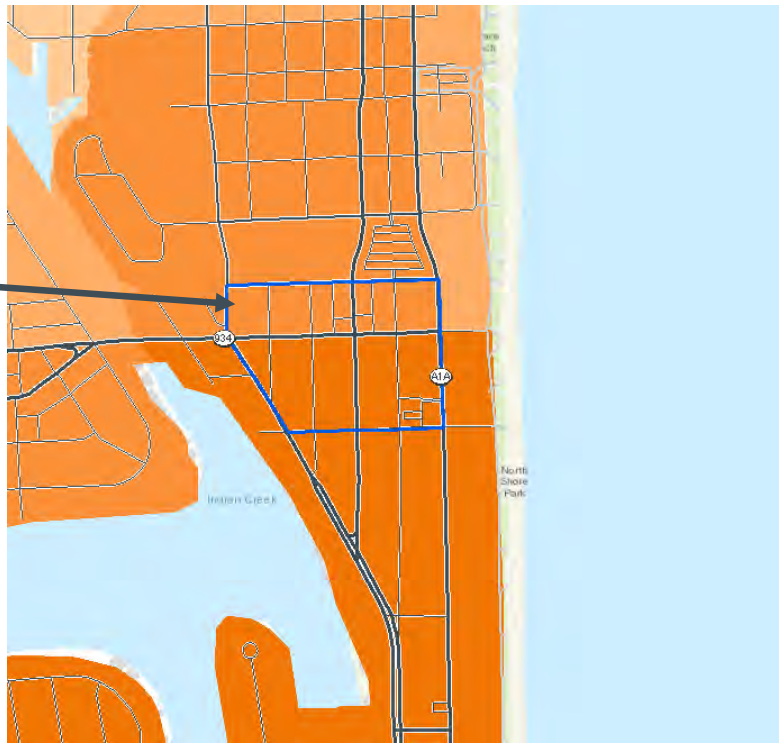


2017 auto score range: 500K to 650K

2040 auto score range: 650K to 1,000K *30% increase*

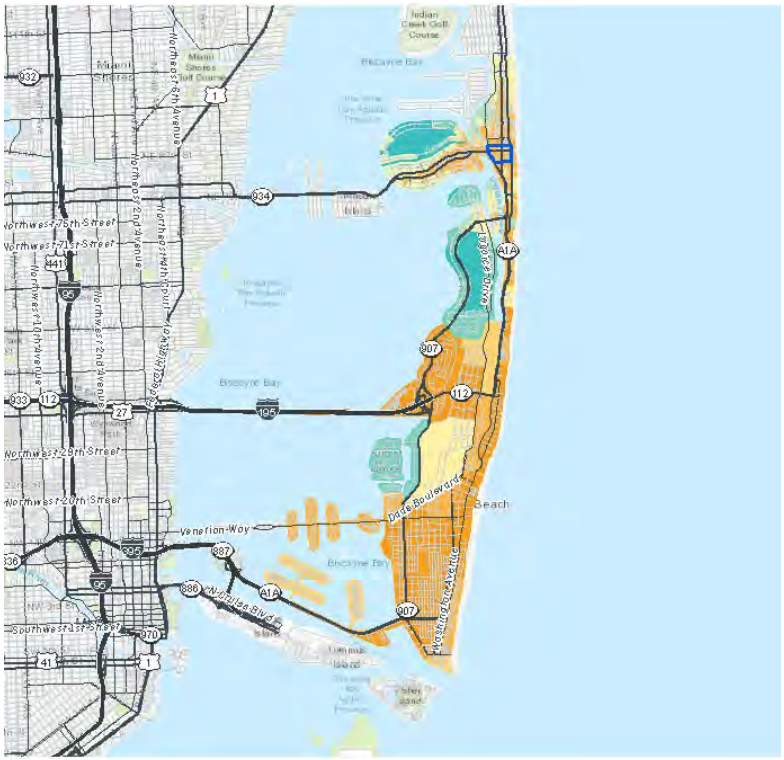
Jobs
- 593,074 - 500,000
- 500,001 - 600,000
- 600,001 - 650,000
- 650,001 - 700,000
- 700,001 - 1,070,296

Study Area



HBW TRANSIT ACCESSIBILITY TO JOBS 2017

City of Miami Beach

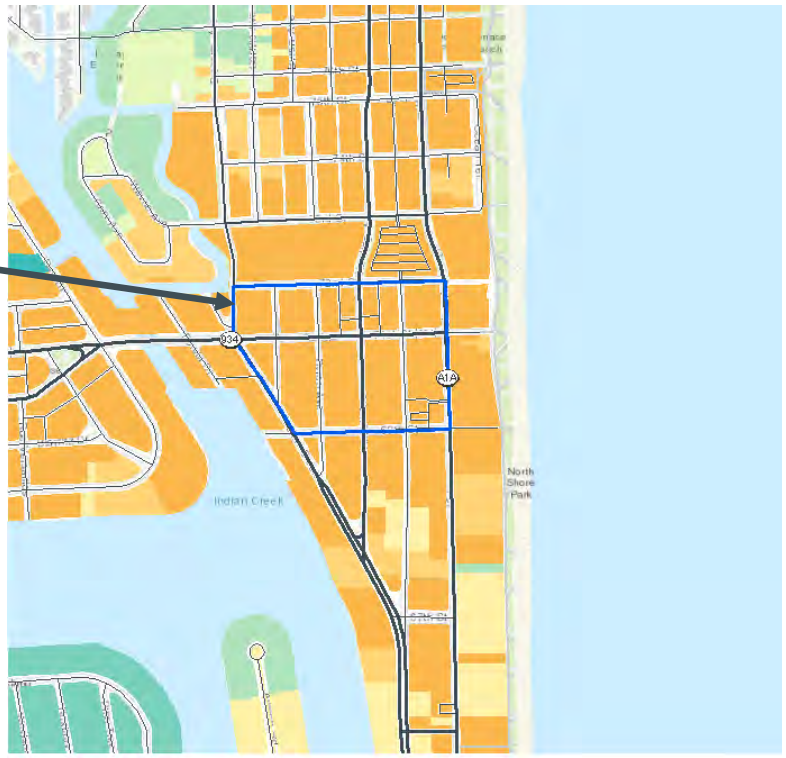


2017 auto score range:
500K to 650K

2017 transit score range:
40K to 60K
(around 10%)

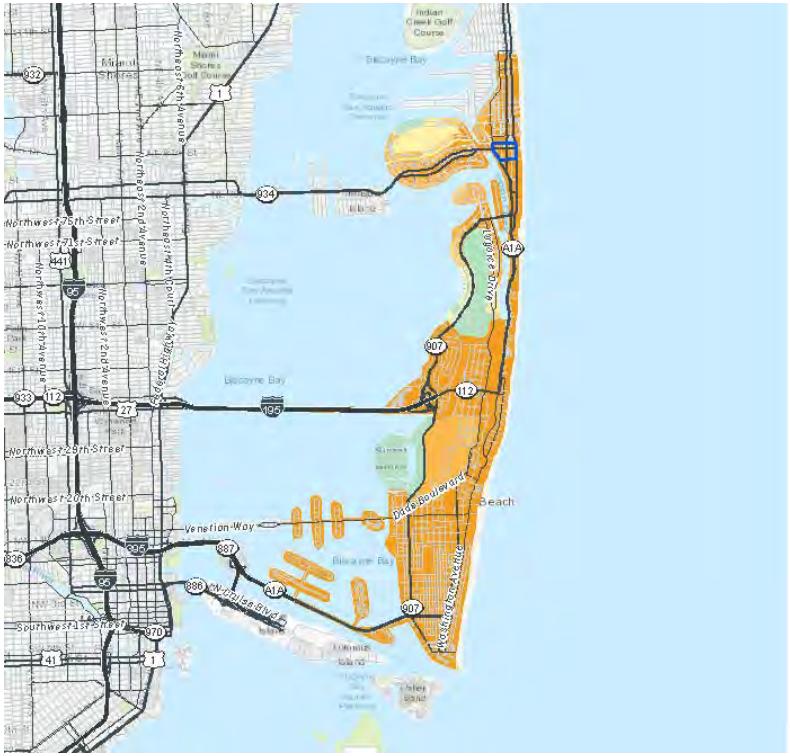
JOBS
- 12,050 - 17,000
- 17,001 - 23,000
- 23,001 - 29,000
- 29,001 - 32,000
- 32,001 - 36,000
- 36,001 - 43,000
- 43,001 - 59,000
- 59,001 - 102,465

Study Area



HBW TRANSIT ACCESSIBILITY TO JOBS 2040

City of Miami Beach

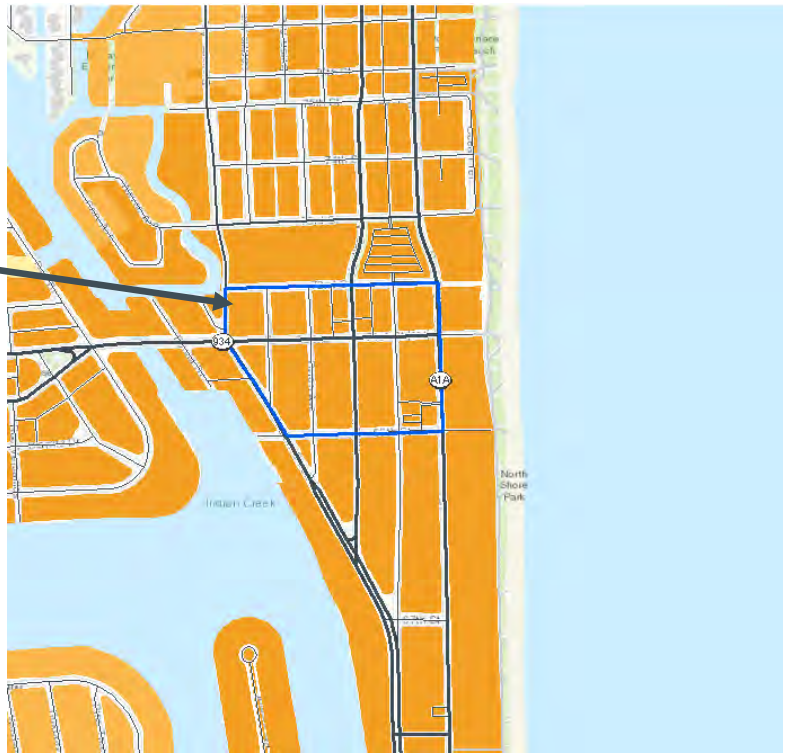


2017 transit score range:
40K to 60K

2040 transit score range:
60K to 100K
70% increase

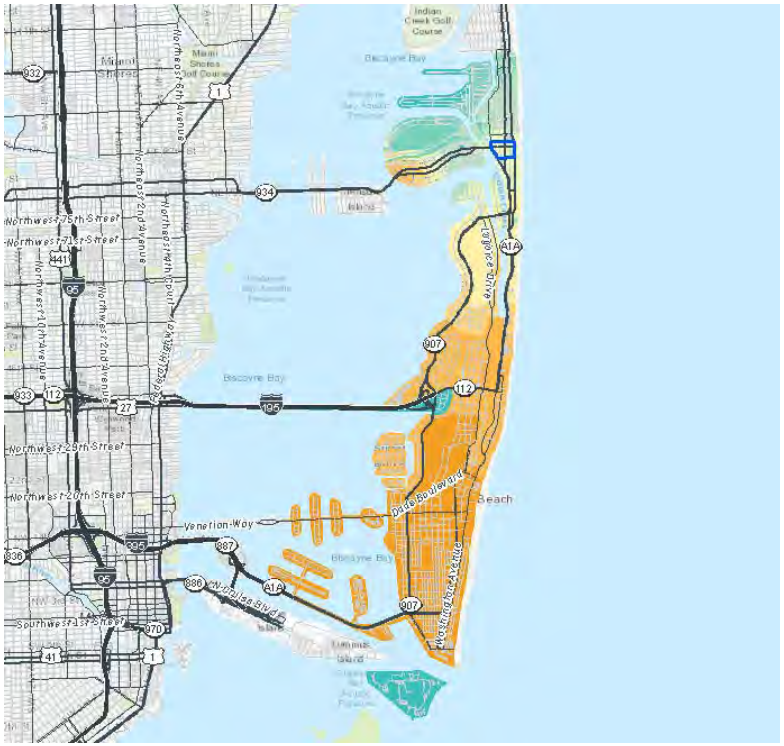
JOBS
- 12,050 - 17,000
- 17,001 - 23,000
- 23,001 - 29,000
- 29,001 - 32,000
- 32,001 - 36,000
- 36,001 - 43,000
- 43,001 - 59,000
- 59,001 - 102,465

Study Area



HBW BICYCLE ACCESSIBILITY TO JOBS 2017

City of Miami Beach

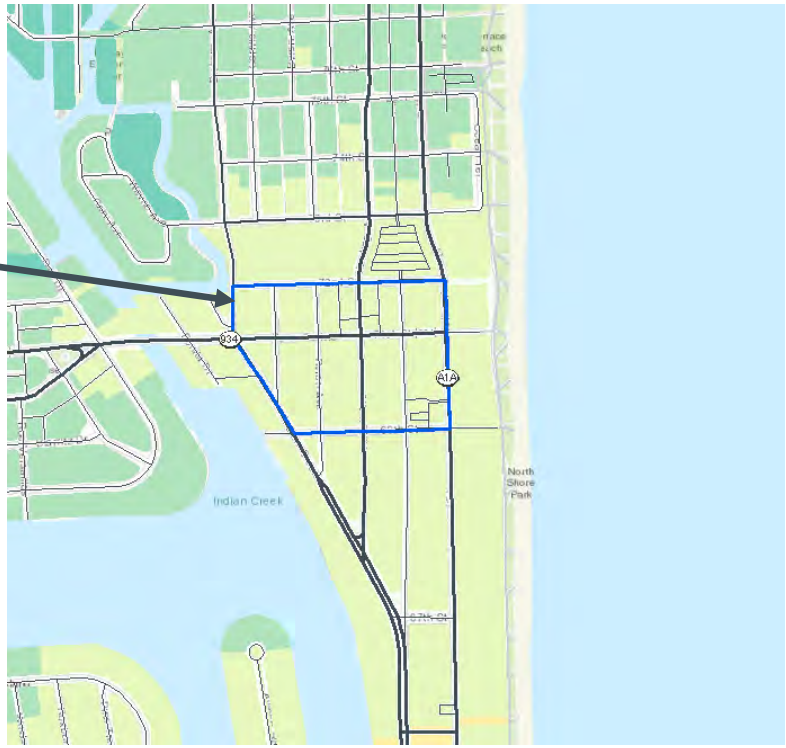


2017 auto score range:
500K to 650K

2017 bike score range:
17K to 20K
(around 3%)

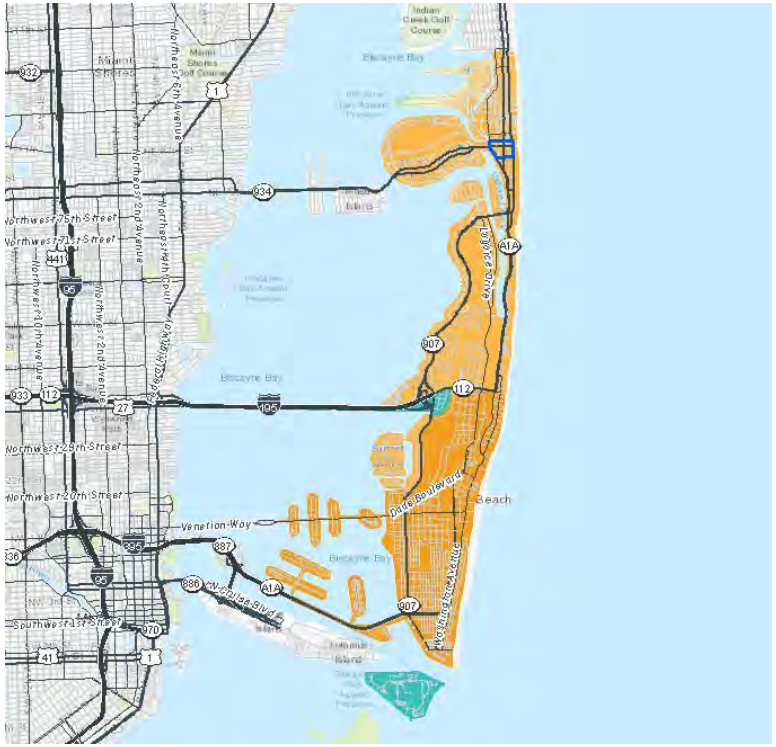
JOBS
- 26 - 12,000
- 12,001 - 15,000
- 15,001 - 17,000
- 17,001 - 20,000
- 20,001 - 23,000
- 23,001 - 27,000
- 27,001 - 57,000
- 57,001 - 156,365

Study Area



HBW BICYCLE ACCESSIBILITY TO JOBS 2040

City of Miami Beach

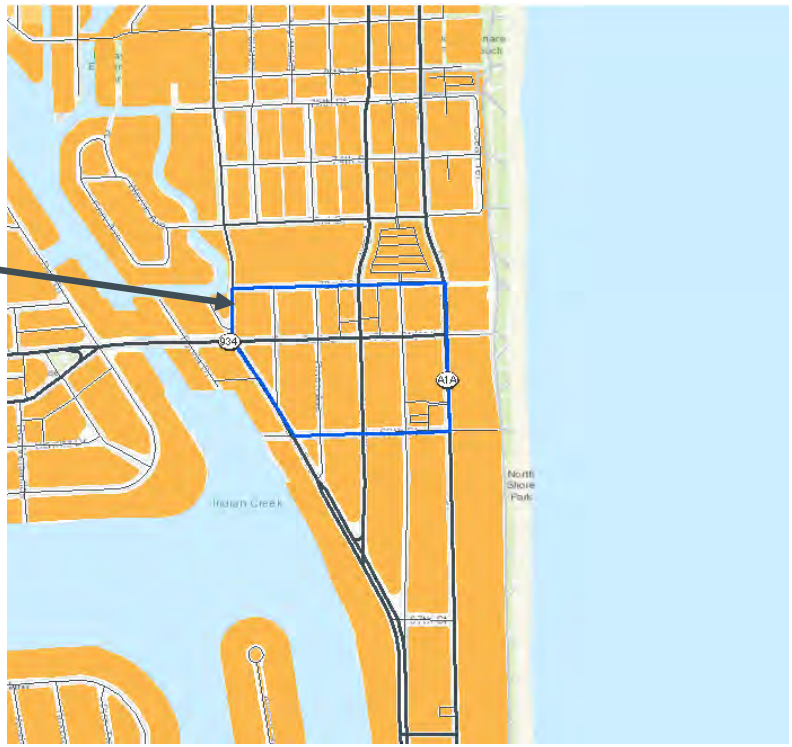


2017 bike score range:
17K to 20K

2040 bike score range:
27K to 57K
70% increase

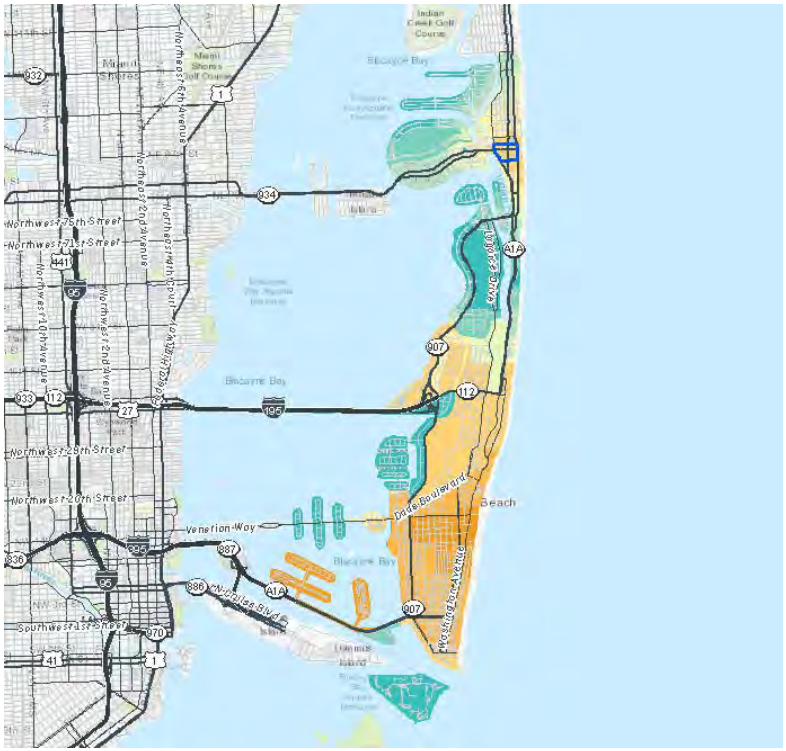
JOBS
- 26 - 12,000
- 12,001 - 15,000
- 15,001 - 17,000
- 17,001 - 20,000
- 20,001 - 23,000
- 23,001 - 27,000
- 27,001 - 57,000
- 57,001 - 156,365

Study Area



HBW WALK ACCESSIBILITY TO JOBS 2017

City of Miami Beach

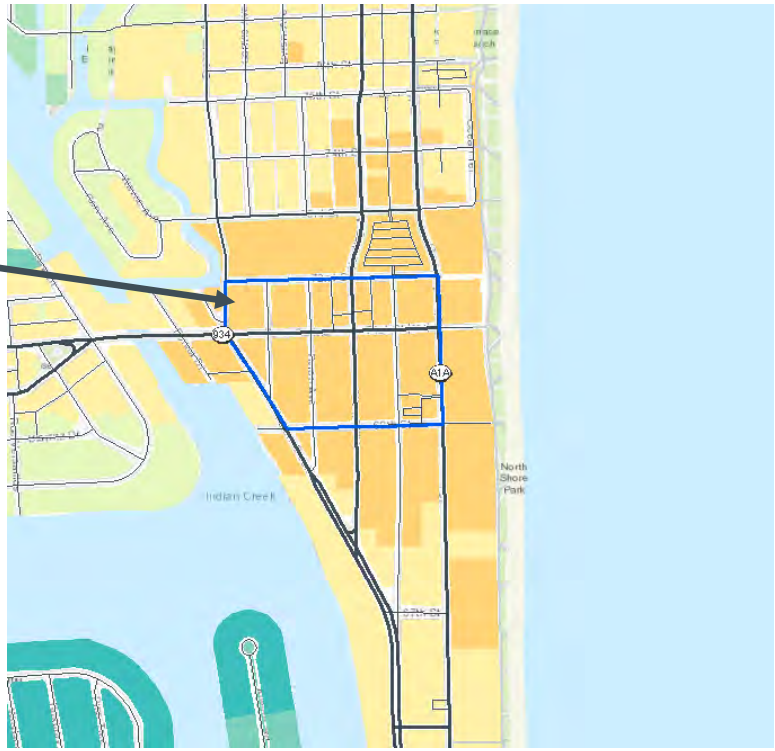


2017 auto score range:
500K to 650K

2017 walk score range:
3K to 6K
(around 1%)

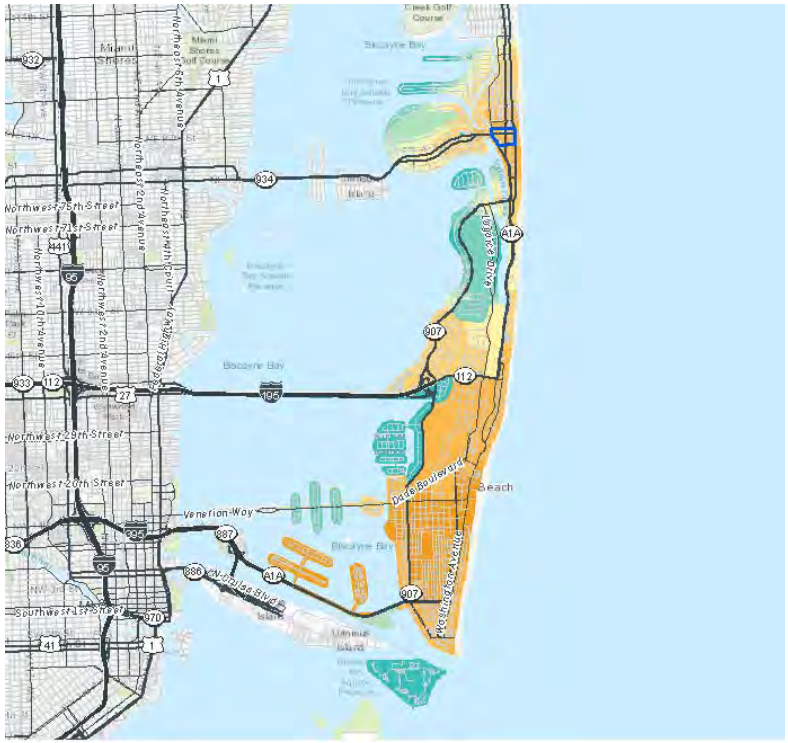
JOBS
- 26 - 700
- 701 - 1,200
- 1,201 - 1,800
- 1,801 - 2,500
- 2,501 - 3,400
- 3,401 - 6,500
- 6,501 - 13,000
- 13,001 - 33,527

Study Area



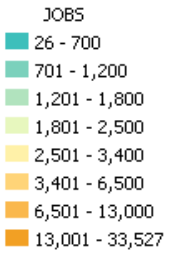
HBW WALK ACCESSIBILITY TO JOBS 2040

City of Miami Beach

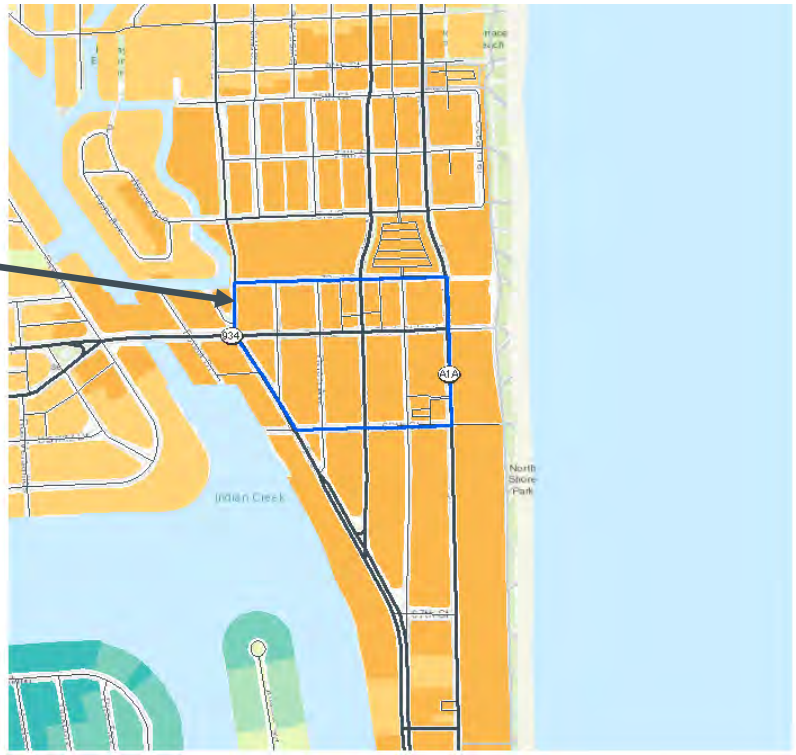


2017 walk score range:
3K to 6K

2040 walk score range:
6K to 13K
100% increase



Study Area



3.3A HBW MODEL CALIBRATION AND RESULTS

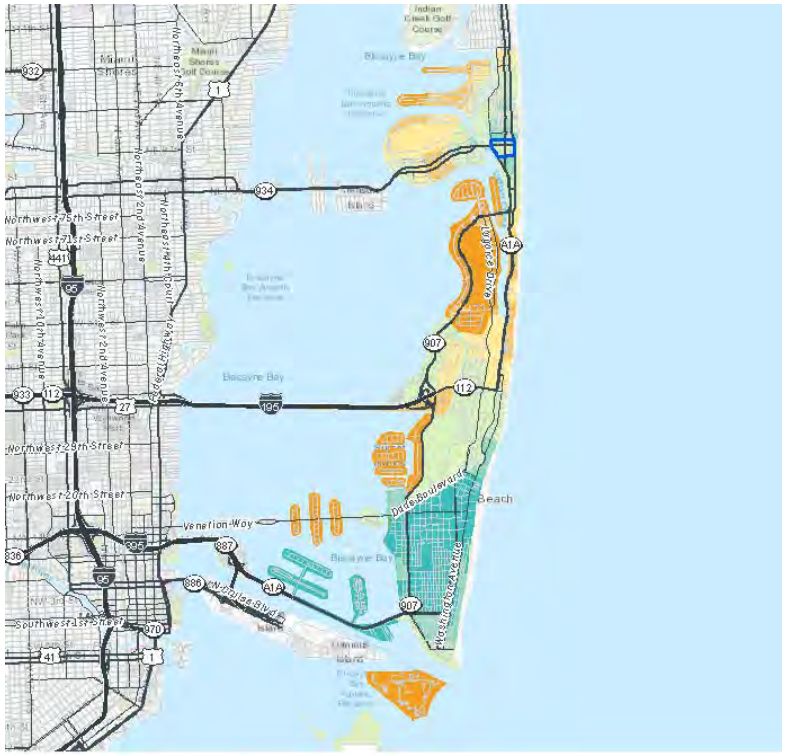
HBW MODEL VERSUS MASTER PLAN MODE SHARES

	Observed			Estimated		
Area	Auto	Transit	Non-Motorized	Auto	Transit	Non-Motorized
North	71.3%	20.5%	8.3%	74.9%	14.1%	11.0%
Middle	86.0%	6.9%	7.1%	79.6%	10.0%	10.4%
South	57.0%	10.5%	32.5%	55.9%	13.4%	30.7%
City-wide	68.5%	12.0%	19.5%	67.8%	12.7%	19.5%

- Observed city-wide shares from Transportation Master Plan
- Observed area shares from block group estimates from the American Community Survey (ACS)

HBW AUTO MODE SHARE 2017

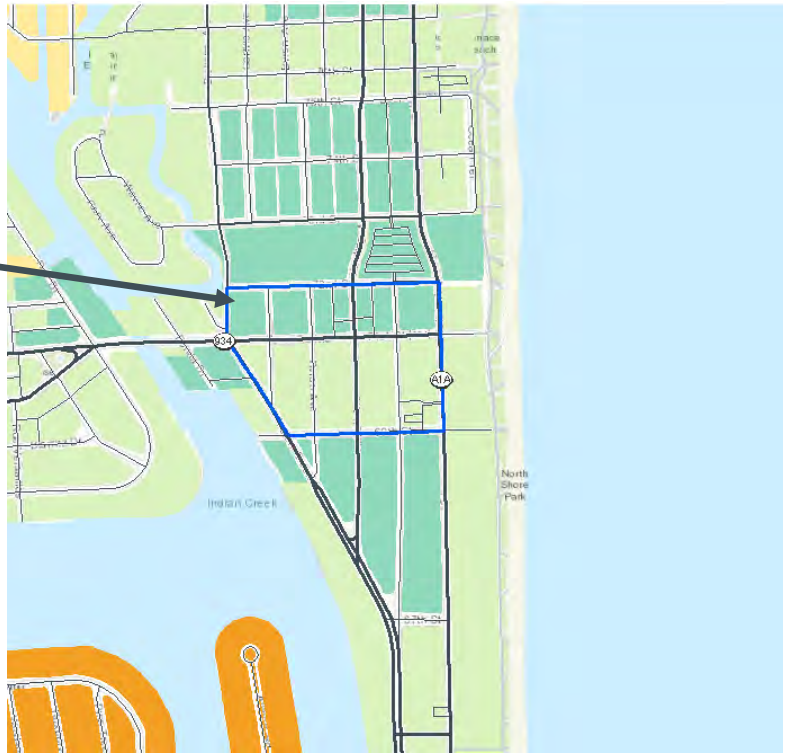
City of Miami Beach



2017 auto share
60 to 80%

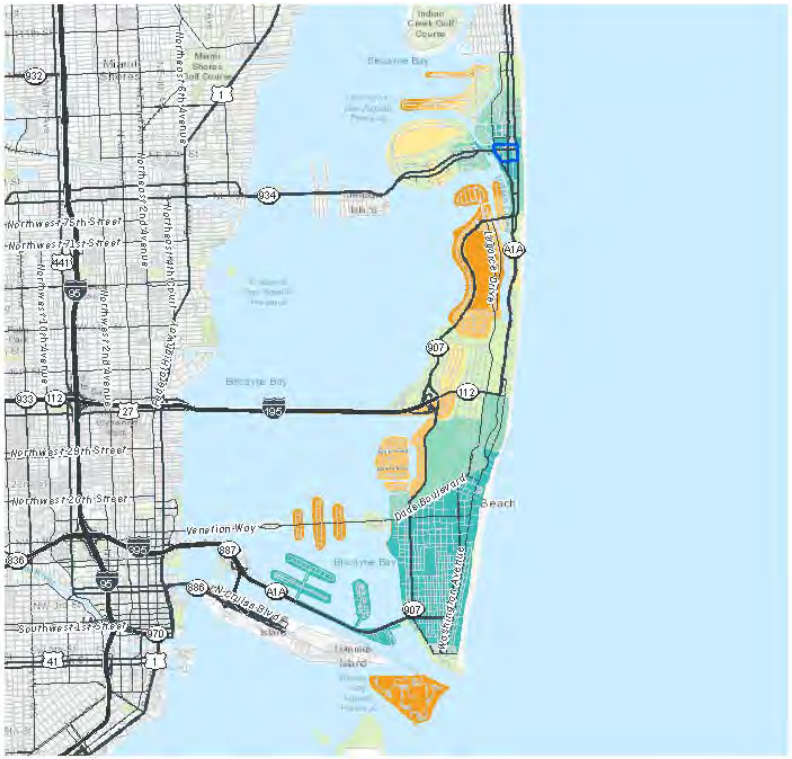
Share
- 25% - 60%
- 61% - 70%
- 71% - 80%
- 81% - 85%
- 86% - 90%
- 91% - 97%

Study Area

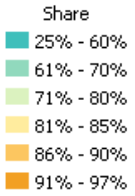


HBW AUTO MODE SHARE 2040

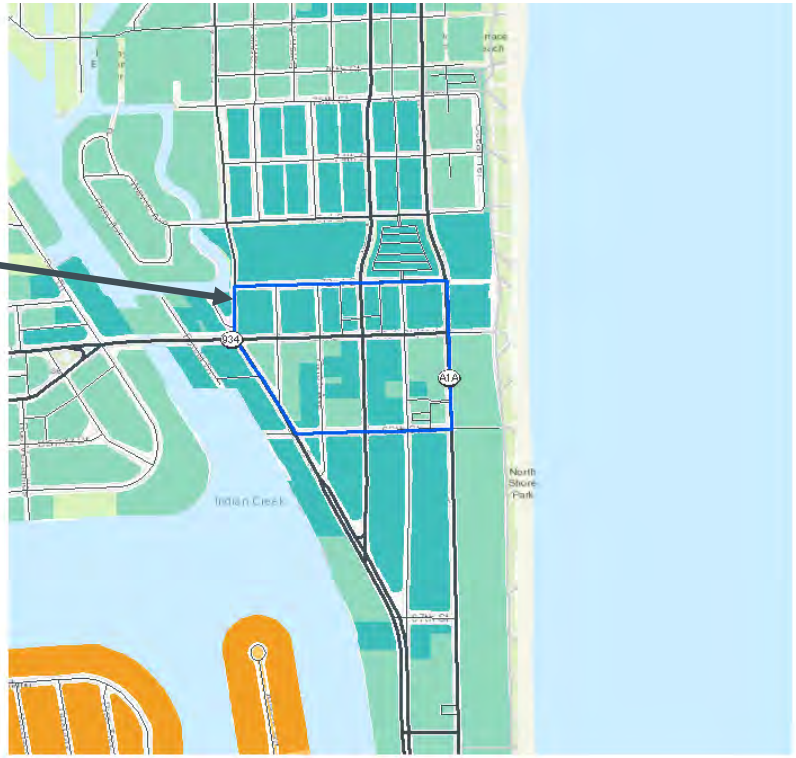
City of Miami Beach



2040 auto share
50 to 70%

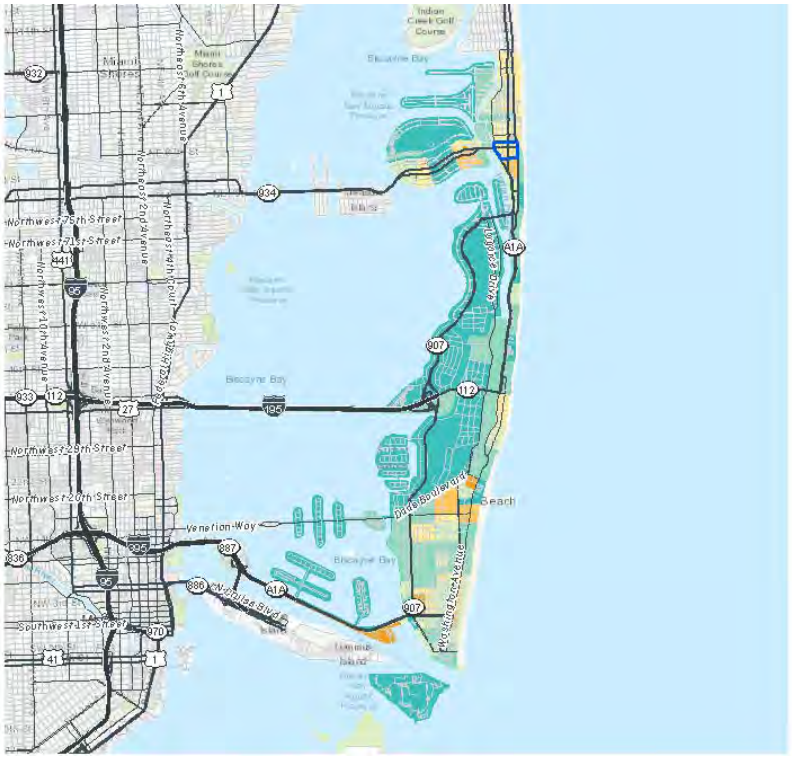


Study Area



HBW TRANSIT MODE SHARE 2017

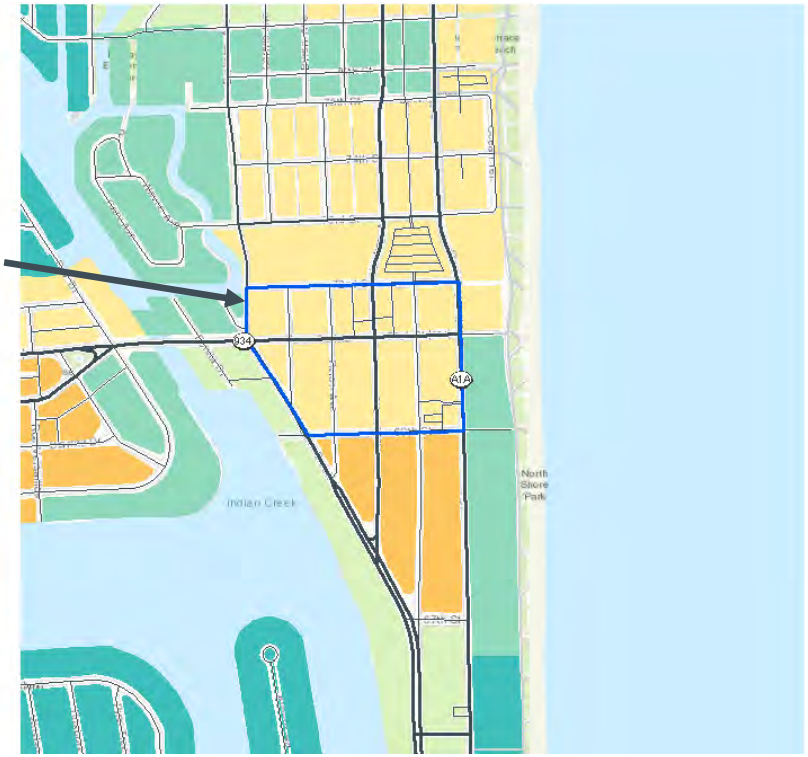
City of Miami Beach



2017 transit share
12 to 14%

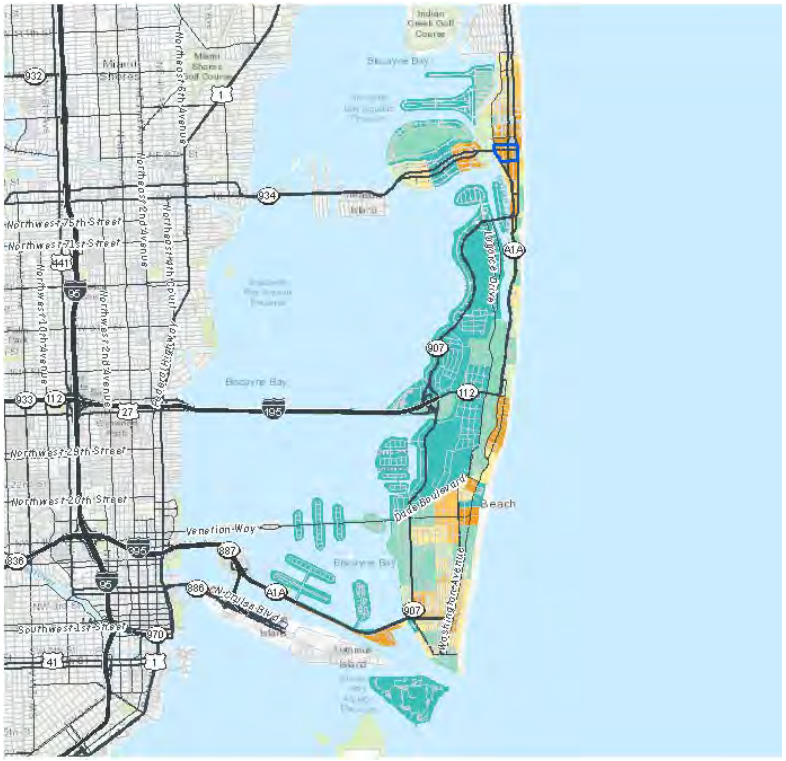
Share
2% - 6%
7% - 8%
9% - 11%
12% - 14%
15% - 17%
18% - 45%

Study Area



HBW TRANSIT MODE SHARE 2040

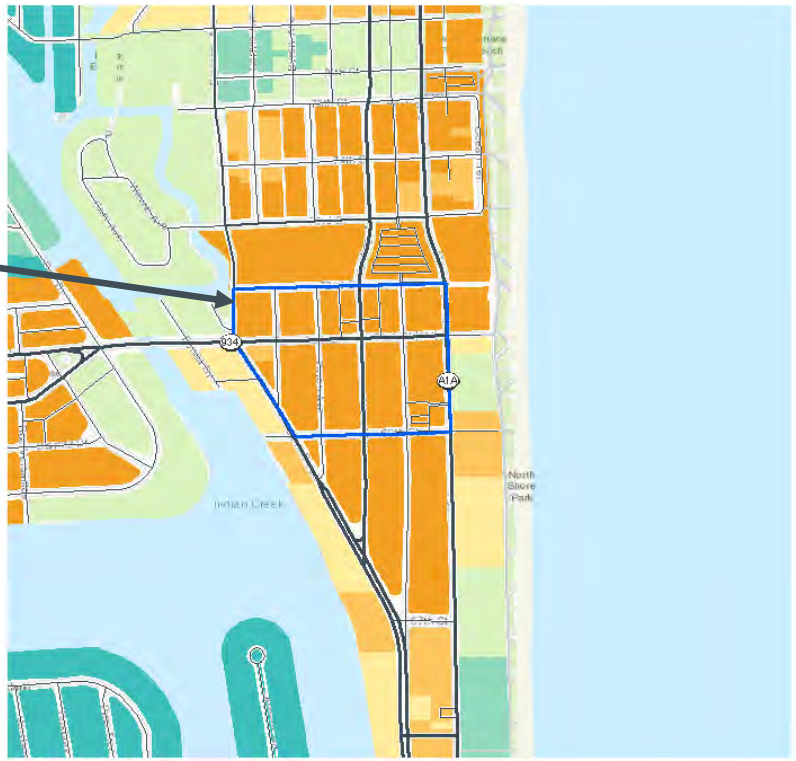
City of Miami Beach



2017 transit share
18+%

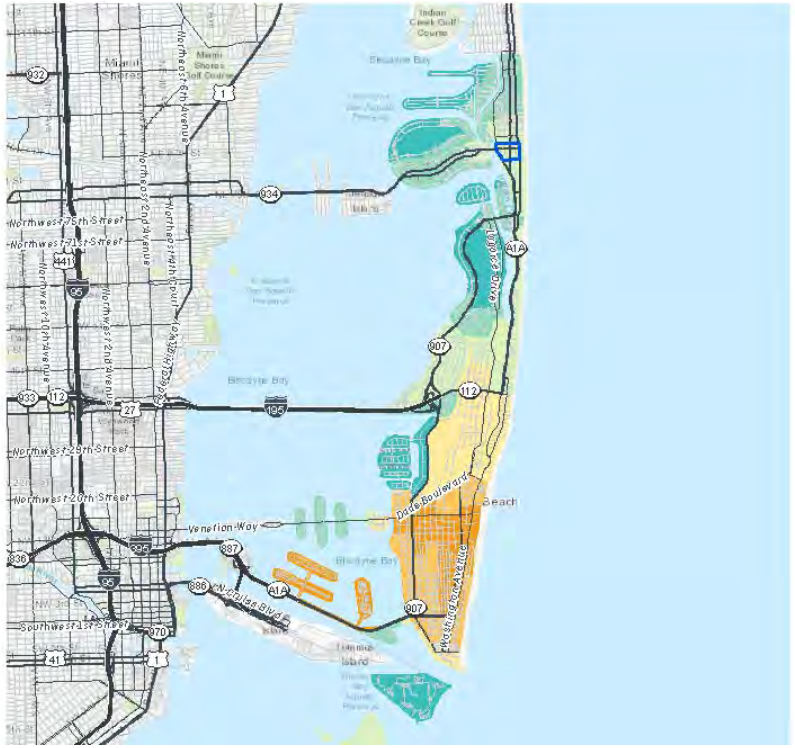
Share
2% - 6%
7% - 8%
9% - 11%
12% - 14%
15% - 17%
18% - 45%

Study Area



HBW NON-MOTORIZED MODE SHARE 2017

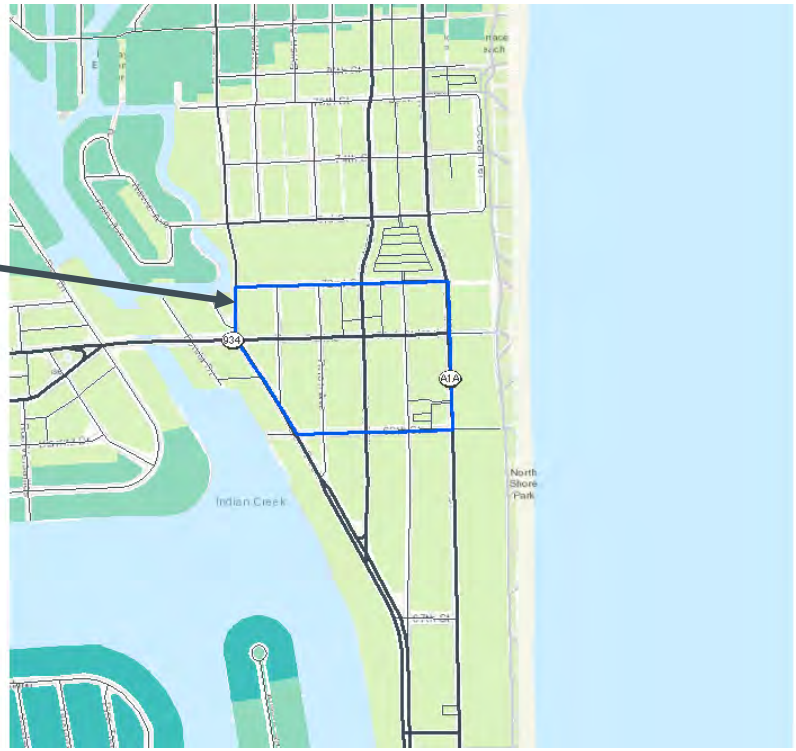
City of Miami Beach



2017 walk / bike share
11 to 15%

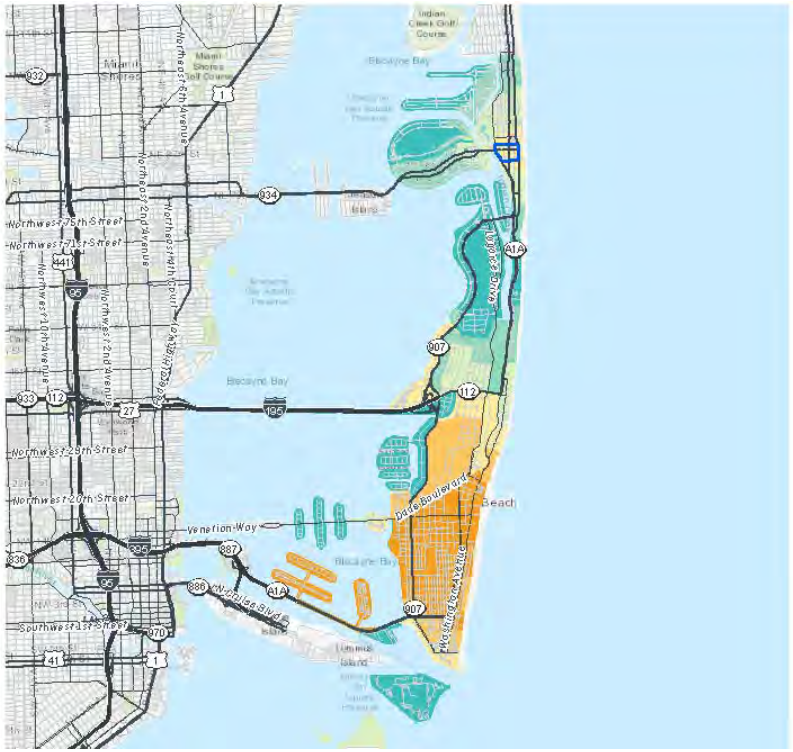
Share
- 0% - 5%
- 6% - 10%
- 11% - 15%
- 16% - 20%
- 21% - 25%
- 26% - 57%

Study Area

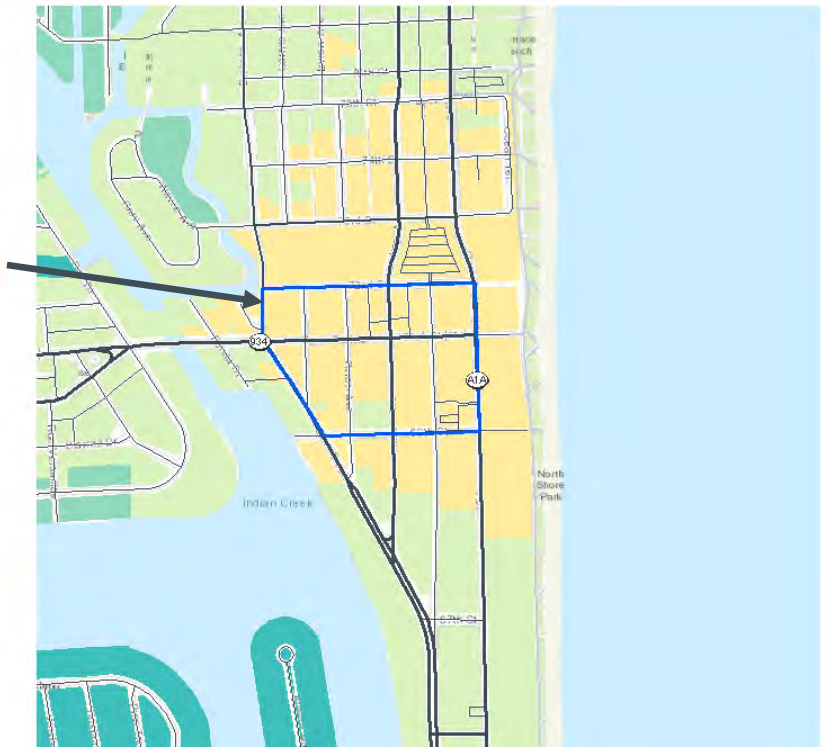


HBW NON-MOTORIZED MODE SHARE 2040

City of Miami Beach



2040 walk / bike share
16 to 20%



Study Area

ESTIMATED HBW MODE SHARES 2017 AND 2040

	2017 Estimated			2040 Estimated		
Area	Auto	**Transit**	**Non-Motorized**	**Auto**	**Transit**	**Non-Motorized**
North	74.9%	14.1%	11.0%	67.2%	15.3%	17.5%
Middle	79.6%	10.0%	10.4%	74.9%	12.1%	13.0%
South	55.9%	13.4%	30.7%	52.1%	16.2%	31.6%
City-wide	67.8%	12.7%	19.5%	62.7%	14.9%	22.5%
Master Plan				55%	20%	25%

3.3B NON-WORK MODEL CALIBRATION AND RESULTS

ESTIMATED 2017 NON-WORK (NW) MODE SHARE

	Targets			Estimated		
Area	Auto	Transit	Non-Motorized	Auto	Transit	Non-Motorized
North	69.8%	13.6%	16.5%	73.9%	2.7%	23.4%
Middle	81.2%	4.6%	14.2%	70.4%	1.4%	28.1%
South	28.0%	7.0%	65.0%	41.3%	2.4%	56.3%
City-wide	54.5%	8.3%	37.2%	58.6%	2.2%	39.2%

- Mode share targets for Non-Work (NW) trips are based relationships between the Home Based Work and NW relationships found in the National Household Travel Survey (NHTS)
- The American Community Survey (ACS) provides mode share by Census Block Groups only for HBW trips. NHTS is not available by Census Block Groups
- Key relationships
  - Non-motorized mode share for NW is approximately double HBW in the nationwide dataset
  - Transit mode share for NW is approximately half of HBW transit mode share in the nationwide dataset

ESTIMATED 2017 NON-WORK MODE SHARE

	Targets			Estimated		
Area	Auto	Transit	Non-Motorized	Auto	Transit	Non-Motorized
North	69.8%	13.6%	16.5%	73.9%	2.7%	23.4%
Middle	81.2%	4.6%	14.2%	70.4%	1.4%	28.1%
South	28.0%	7.0%	65.0%	41.3%	2.4%	56.3%
City-wide	54.5%	8.3%	37.2%	58.6%	2.2%	39.2%

- NW model results:
  - Slightly overestimates auto shares across city, lacks sensitivity among areas
  - Noticeably under-represents transit shares across all areas
  - Slight overestimates non-motorized shares, lacks sensitivity among areas
- Recommended adjustments based on HBW results (outside model):
  - Increase transit shares in study area to 10%
  - Reduce auto shares by 5% and walk shares by 2%
  - *Final recommended targets: auto 69%, transit 10%, non-motorized 21%*

ESTIMATED 2017 AND 2040 NON-WORK MODE SHARE

	2017 Estimated			2040 Estimated		
Area	Auto	Transit	Non-Motorized	Auto	Transit	Non-Motorized
North	73.9%	2.7%	23.4%	69.1%	3.6%	27.3%
Middle	70.4%	1.4%	28.1%	57.4%	2.3%	40.4%
South	41.3%	2.4%	56.3%	28.8%	3.0%	68.2%
City-wide	58.6%	2.2%	39.2%	48.2%	3.0%	48.8%

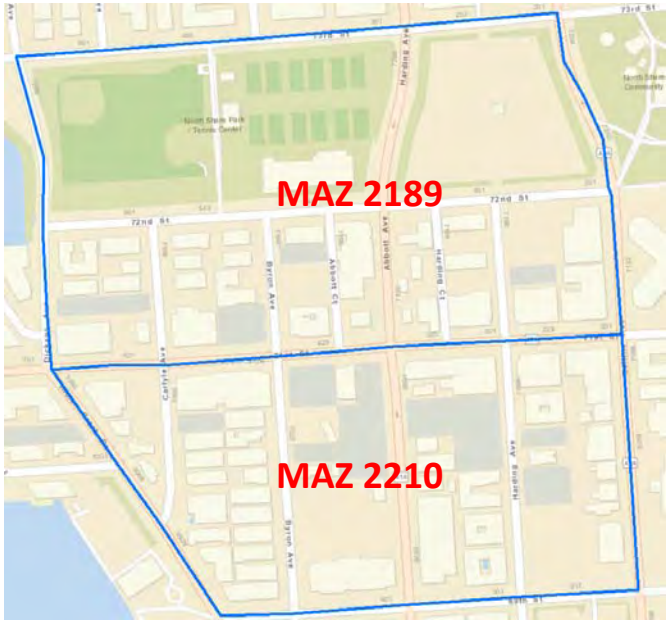
- 2040 Non-Work Mode Shares were adjusted to pivot from current mode share conditions using the expected changes in HBW mode shares between 2017 and 2040
- These adjustments were made to reflect expectations of mode share from the City and the lack of reliable existing non-work mode shares.

	2040 Adjustments		
Area	Auto	Transit	Non-Motorized
Study Area	53%	16%	31%

3.4 FORECAST PERSON TRIPS BY MODE

TRIP GENERATION AND DISTRIBUTION STEPS

- Total trips by purpose (HBW and NW) estimated using generation rates from SERPM 6.5 model
  - Trips estimated for MAZs in the study area
  - Current year
  - Future year with expected growth from FAR increase
- Total trips by purpose multiplied by estimated study area mode shares
- Modal trips distributed to north, west and south based on interchange potential



ESTIMATED TRIPS BY PURPOSE AND MODE (ADJUSTED)

Trips Produced

	2189		2210		Total	
2017	Trips	%	Trips	%	Trips	%
HBW Auto	86	65%	460	72%	546	71%
HBW Transit	23	17%	70	11%	93	12%
HBW Walk/Bike	24	18%	109	17%	133	17%
NW Auto	1,112	63%	1,537	63%	2,649	63%
NW Transit	71	4%	73	3%	144	3%
NW Walk/Bike	582	33%	830	34%	1,412	34%
Total Auto	1,198	63%	1,997	65%	3,195	64%
Total Transit	94	5%	143	5%	237	5%
Total Walk/Bike	606	32%	939	30%	1,545	31%

2040	Trips	%	Trips	%	Trips	%
HBW Auto	368	53%	880	60%	1,248	58%
HBW Transit	118	17%	176	12%	294	14%
HBW Walk/Bike	209	30%	411	28%	620	29%
NW Auto	5,902	52%	8,882	52%	15,921	52%
NW Transit	1,816	16%	2,733	16%	1,706	16%
NW Walk/Bike	3,632	32%	5,466	32%	10,803	32%
Total Auto	6,270	52%	9,762	53%	16,032	52%
Total Transit	1,934	16%	2,909	16%	4,843	16%
Total Walk/Bike	3,841	32%	5,877	32%	9,718	32%

Trips Attracted

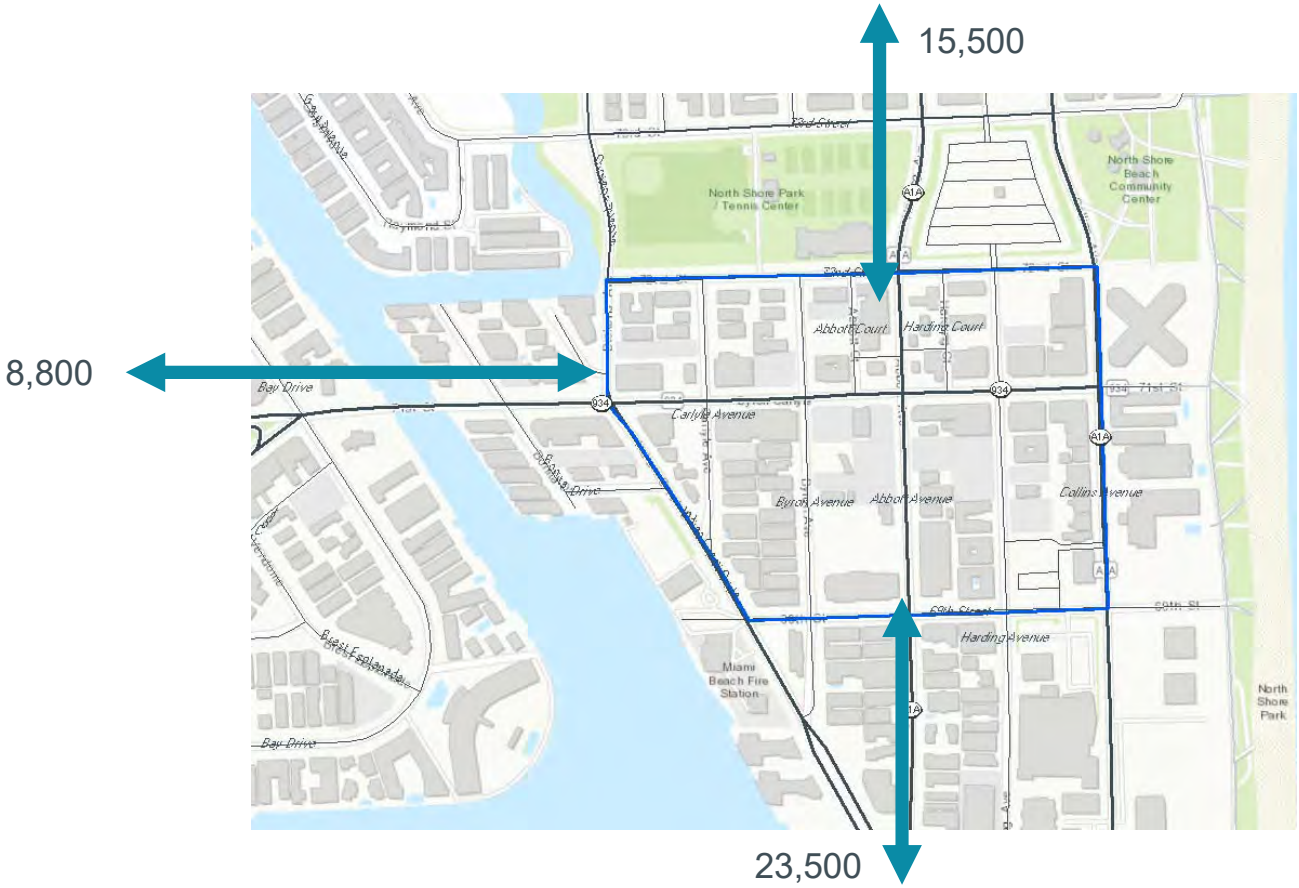
	2189		2210		Total	
2017	Trips	%	Trips	%	Trips	%
HBW Auto	725	65%	840	72%	1,565	69%
HBW Transit	190	17%	128	11%	318	14%
HBW Walk/Bike	201	18%	198	17%	399	17%
NW Auto	3,561	63%	3,635	63%	7,196	63%
NW Transit	226	4%	173	3%	399	3%
NW Walk/Bike	1,865	33%	1,962	34%	3,827	34%
Total Auto	4,286	63%	4,475	65%	8,761	64%
Total Transit	416	6%	301	4%	717	5%
Total Walk/Bike	2,066	31%	2,160	31%	4,226	31%

2040	Trips	%	Trips	%	Trips	%
HBW Auto	2,624	53%	4,300	60%	6,924	57%
HBW Transit	842	17%	860	12%	1,702	14%
HBW Walk/Bike	1,485	30%	2,007	28%	3,492	29%
NW Auto	10,296	52%	14,475	52%	24,771	52%
NW Transit	3,168	16%	4,454	16%	7,622	16%
NW Walk/Bike	6,336	32%	8,908	32%	15,244	32%
Total Auto	12,920	52%	18,775	54%	31,695	53%
Total Transit	4,010	16%	5,314	15%	9,324	16%
Total Walk/Bike	7,821	32%	10,915	31%	18,736	31%

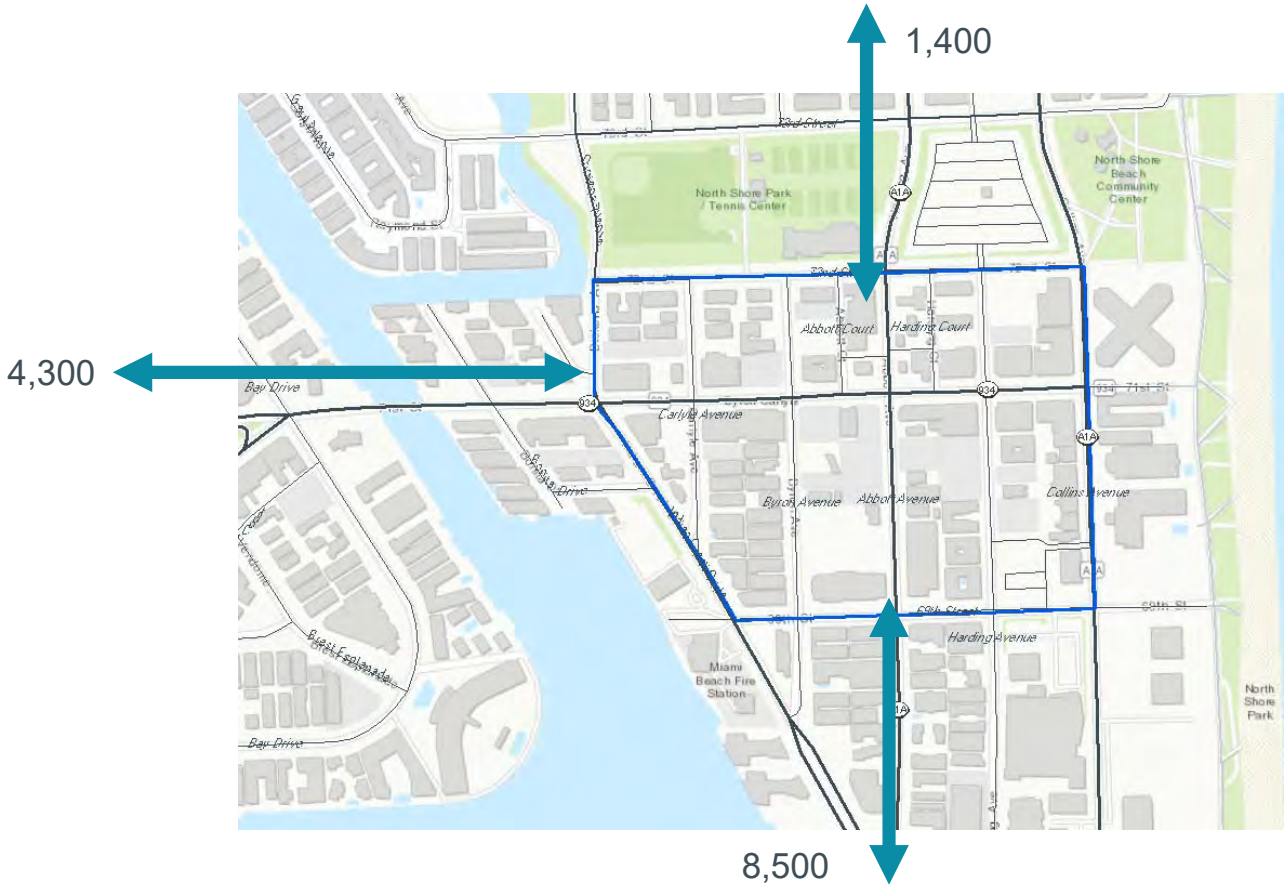
FINAL MODE SHARES (ADJUSTED)

	Study Area All Trips	Master Plan HBW
2017		
Auto Mode	64%	69%
Transit Mode	5%	12%
Non-Motorized Mode	31%	20%
2040		
Auto Mode	53%	55%
Transit Mode	16%	20%
Non-Motorized Mode	31%	25%

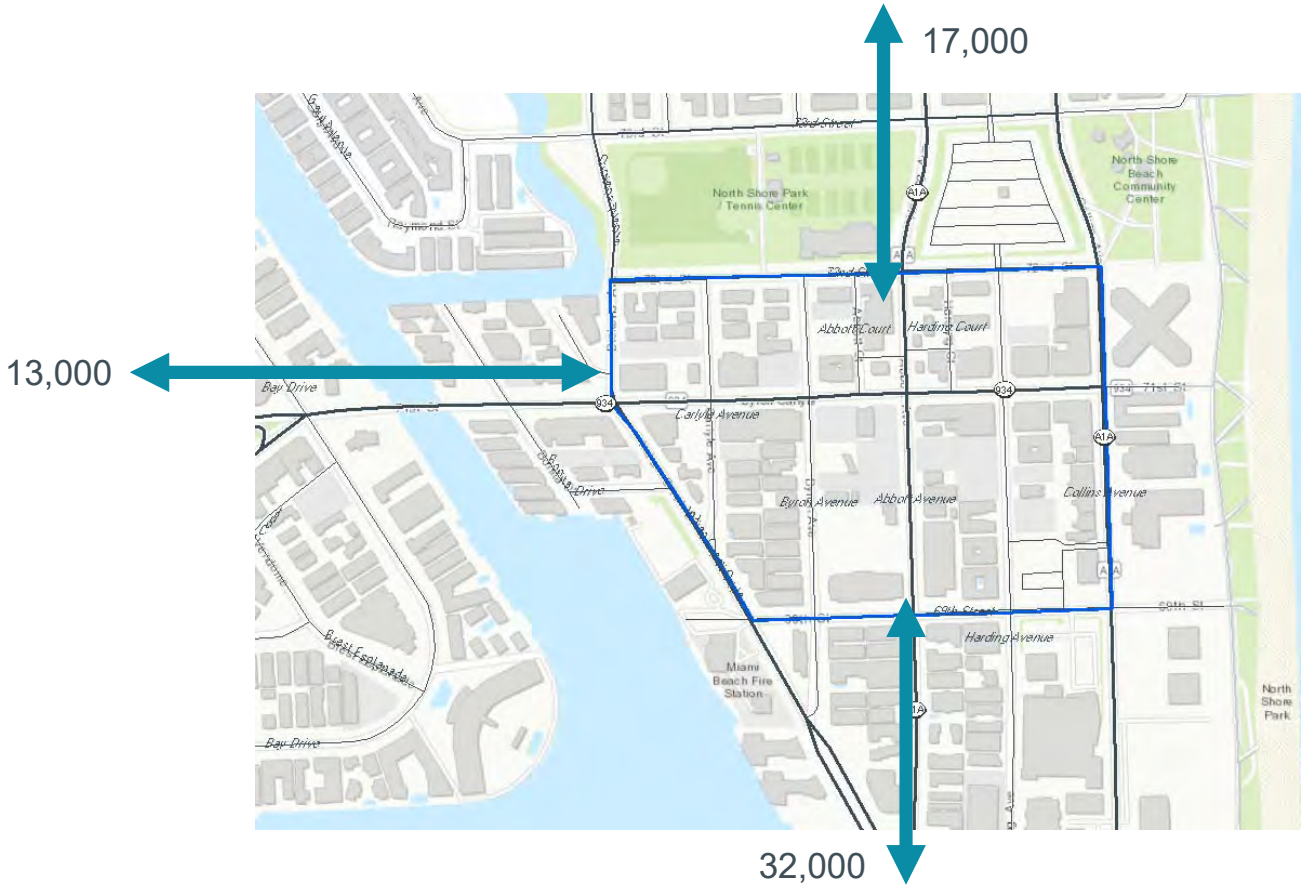
2040 DAILY AUTO TRIP DISTRIBUTION (ADJUSTED)



2040 DAILY TRANSIT TRIP DISTRIBUTION (ADJUSTED)



2040 DAILY AUTO + TRANSIT TRIP DISTRIBUTION (ADJUSTED)



2040 NON-MOTORIZED AUTO TRIP DISTRIBUTION (ADJUSTED)