Central Corridor Transit Service Study Existing Conditions Report

Metro Transit

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1 INTRODUCTION, PURPOSE & SCOPE

This report provides an evaluation of current transit service provided in the Central Corridor to determine its effectiveness and efficiency. It examines existing conditions as well as potential new service, transit market opportunities and facility needs.

Improvement and expansion of the public transit system is a central element of the Metropolitan Council's 2030 Transportation Policy Plan's (TPP) approach to accommodating the population and employment growth forecast for the region. The TPP calls for development of a network of transitways consisting of bus-only shoulders, high-occupancy vehicle lanes, bus rapid transit, exclusive busways, Light Rail Transit (LRT) and commuter rail service.

As part of this transitway plan, the Central Corridor light-rail line is scheduled to open in 2014 between Minneapolis and St. Paul as the Green Line. The line is expected to carry an estimated 13.2 million of the annual rides by year 2030, or 9 percent of total regional annual rides. Ridership models project that 40 percent of the Green Line riders will ride bus service to reach the trains at an LRT station. That is a total of 5.3 million annual bus rides.

Metro Transit uses a sector-based approach to address the emerging transit needs within the region. As shown in **Figure 1**, the region is broken into nine transit planning sectors. Sectors 1, 2, 5, 7 and 8 have undergone prior planning studies similar to the process planned for the Central Corridor review. Pieces of the Central Corridor study area were previously included as part of the NE Minneapolis (Sector 1), NE St. Paul (Sector 2) and Central-South (Sector 5) transit studies. The Central Corridor Transit Service Study will revisit transit needs in this area as well as coordinating bus routes with the new Green Line service.

The study area for the Central Corridor Transit Service Study, shown in **Figure 2**, is bounded by the Mississippi River on the south, I-35E on the east, Larpenteur/East Hennepin avenues on the north and by Hiawatha Avenue, East Lake Street and the Mississippi River on the west. The Study Area is almost completely urban, including downtown Minneapolis, downtown Saint Paul and the University of Minnesota, and covering many neighborhoods of St. Paul, Minneapolis and the suburbs of Lauderdale, Falcon Heights and Roseville. The population of the Study Area is about 246,170, with minorities making up 35 percent. There are 113,378 housing units. In the neighborhoods immediately adjacent to the Green Line, the population is about 163,790, with minorities comprising 45 percent, in 113,378 housing units. As of 2008, there were about 357,587 jobs in the Study Area, of which, 348,558 jobs were located in the neighborhoods adjacent to the Green Line or about 22 percent of the employment in the entire metropolitan area.

The routes included in the study include all those which operate a significant portion of their total service in the study area and which provide a connection to the Green Line. This includes routes 2, 3, 6, 8, 16, 21, 50, 53, 62, 63, 65, 67, 84, 87, 94, 134, and 144. These routes are indicated in bold lines on **Figure 2**. Several other routes provide a significant portion of their total service in the study area but do

not provide a connection to the Green Line. This includes routes 46, 61, 68, 70, 74, and 272. These routes are not included in the study, but they are included on maps and other materials in the study for reference. Public transit service provided by the University of Minnesota, including the Campus Connector and circulator routes are also not included in this study.

This report will address the existing conditions of the routes in the study, examining the markets and unmet opportunities that exist for the current transit service being provided. It will also document the development patterns, major attractions and destinations in the Study Area as well as current and future travel patterns.

The Central Corridor Transit Service Study will provide a review of the performance and structure of existing transit service and also examine the integration and expansion of transit service to connect with the Central Corridor Green Line that is expected to begin operating in 2014.

Figure 1 – Map of Metropolitan Area Transit Planning Sectors and Central Corridor Study Area

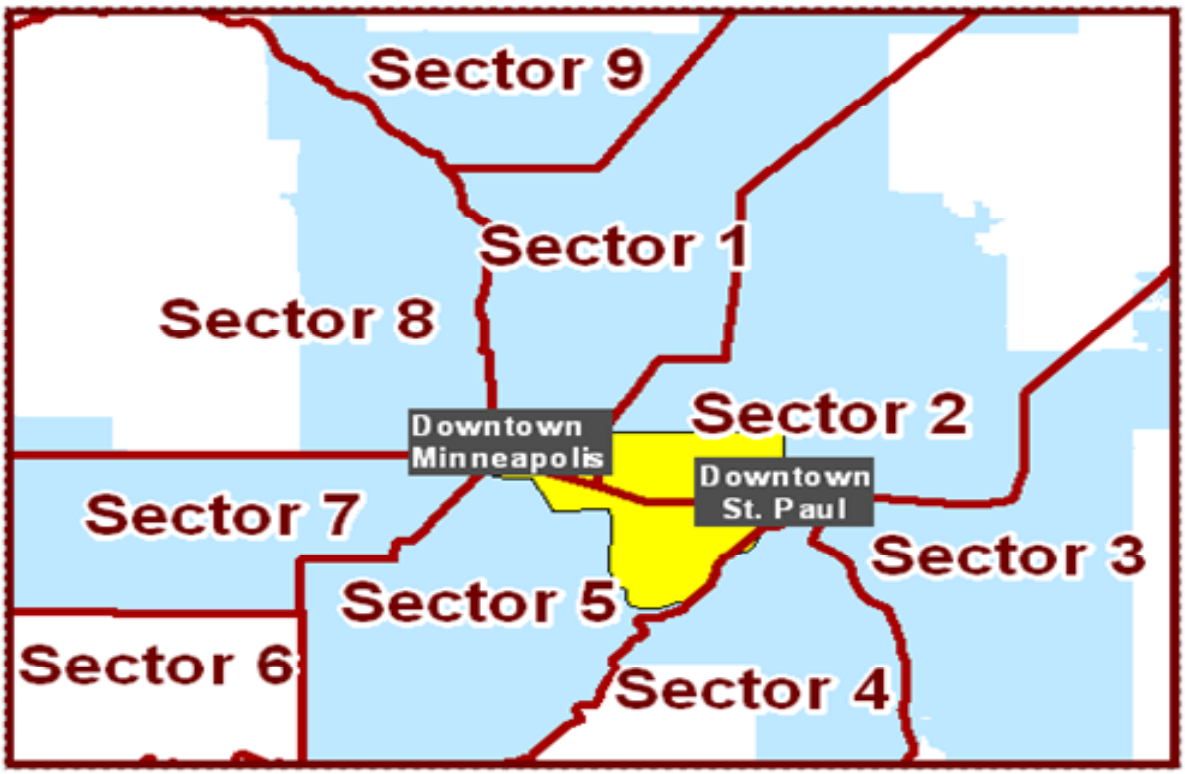
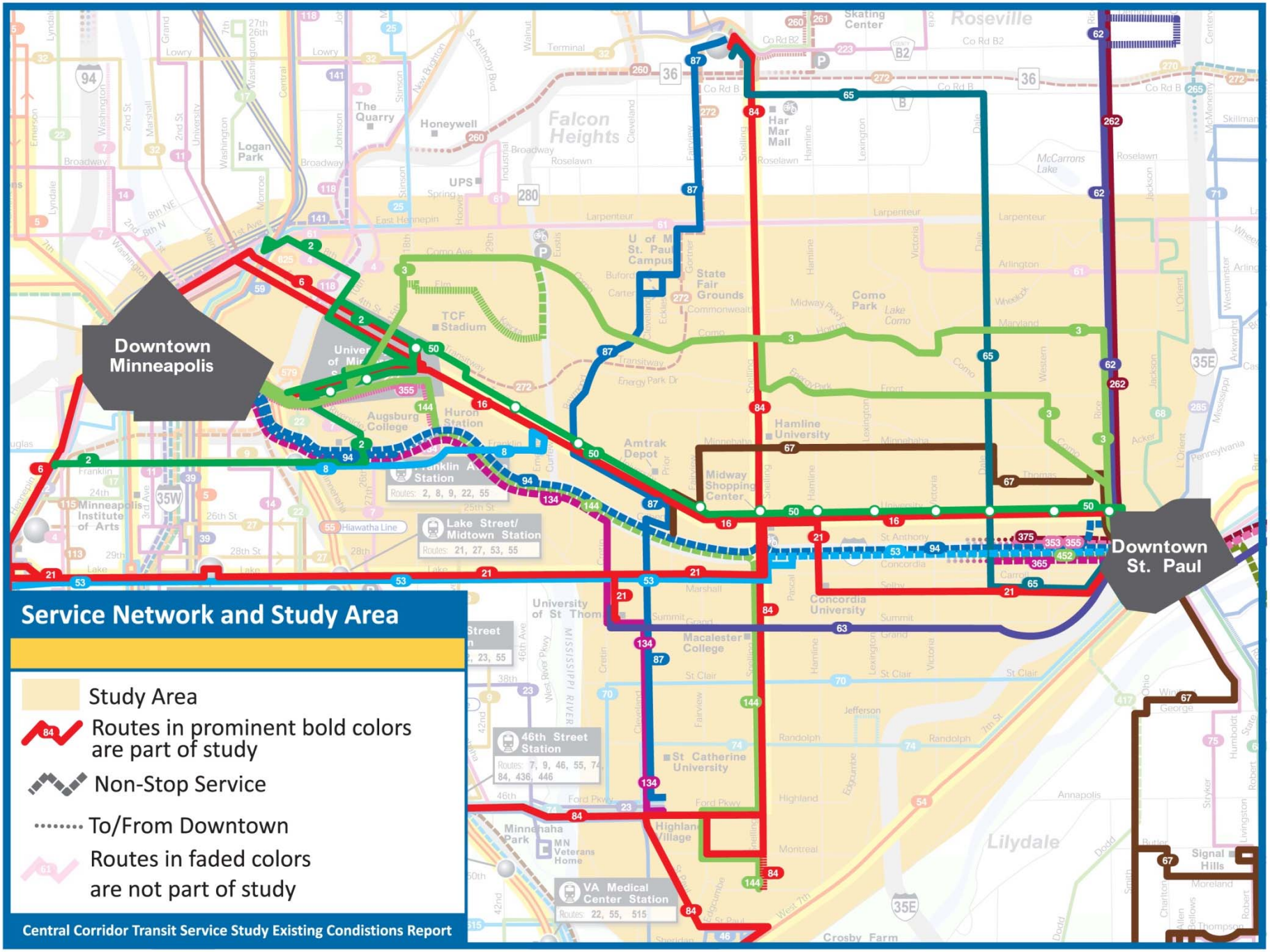


Figure 2 - Map of the Central Corridor Existing Bus Service Network and Study Area



2 EXISTING ROUTE STRUCTURE AND SERVICE LEVELS

In the Study Area, as in most of the Metro Transit network, there are two distinct route structures. The 'base' service structure operates all day and the 'peak' service structure operates just during weekday rush hour periods.

Base Route Structure

The base route structure in the Study Area is designed to provide a variety of transportation needs. The overall structure is both radial, that is oriented to downtown St. Paul and/or Minneapolis, and a grid of cross-town routes perpendicular to the radial routes. These cross-town routes are spaced about 1-2 miles apart and extend into the suburban areas to the north and to the Highland area of St. Paul on the south and Minneapolis neighborhoods east of downtown. To the north of University Avenue, most of these routes extend to the Roseville area where they terminate at Rosedale Shopping Center at the transit center located there. Rosedale Transit Center is a timed-transfer focal point where eight local routes connect.

Peak Route Structure

During peak hours, the base network remains, generally with improved service levels, and is overlaid by additional peak-only commuter routes. Peak-only routes from the Highland area of St. Paul offer local pick-up from these neighborhoods then operate express service to the University of Minnesota and downtown Minneapolis and Saint Paul. These routes operate in addition to base local routes, either on the same street or on close parallel streets. For example, on Snelling Avenue, Route 84 provides base local service and Route 144 provides peak commuter service. On Cleveland Avenue, Route 87 provides base local service and on Cretin Avenue, a close parallel street, Route 134 provides peak service. On Lake Street/Marshall Avenue, Route 21 provides base local service and Route 53 provides peak service to downtown Saint Paul.

[is route 94 a base route or a peak route??] It's a base route. In other words it's a floor wax and a desert topping

OFF-STREET FACILITIES

Regionally, major off-street transit facilities consist of transit centers and park-and-ride facilities.

Transit Centers

There are no major transit centers in the Study Area. However, Rosedale Transit Center in Roseville is an important destination and transfer point just to the north of the Study Area.

• ***Rosedale Transit Center*** – Located on the east side of the shopping center, just southwest of Snelling Avenue and Co Rd B-2. It is served by routes 32, 65, 84, 87, 223, 225, 227, 260, 264, 272 and 801.

Park and Ride lots

There is one small 60 space park and ride lot in the Study Area at Como and Eustis in St. Paul. Park and ride activity is not encouraged in this corridor given the current and expected future transit service density and land uses. This study does not include consideration of park & ride service or facilities.

ON-STREET FACILITIES

Regionally, while there are thousands of bus stops, major on-street transit facilities consist of large waiting shelters with passenger comfort and informational amenities and dedicated rights of way for transit vehicles.

Transit Waiting Shelters

There are many transit waiting shelters in the Study Area, and major facilities are in place in both downtowns and at the University of Minnesota.

Dedicated Transit Rights of Way

There are some significant dedicated transit rights of way in the Study Area. Bus lanes are in place on Cedar, Minnesota, 5th and 6th streets in Downtown St. Paul and on 4th Street, Marquette and 2nd Avenue S. in Downtown Minneapolis. Downtown Minneapolis also has the light rail right of way on 5th Street. There is a bus-way connecting the Minneapolis and St. Paul campuses of the University of Minnesota.

REGIONAL TRANSIT STANDARDS

While several factors influence the propensity to use transit, the primary predictors of transit productivity are density of development at the origin and destination of trips. Transit markets in the seven county Twin Cities region are identified using the Transit Market Index, which is calculated using three primary factors: 1) population density, 2) employment density, and 3) automobile availability. The Transit Market Index measures the potential market for transit services in a given area. Different types and levels of transit services are appropriate for each transit market area.

The region has five distinct Transit Market Areas, shown in Figure 3, that are determined based on the Transit Market Index for a given location and nearby areas. Transit Market Area I has the highest density of population, employment, and people without access to automobiles. Because of this, Market Area I is able to support intensive transit service.
Transit Market Area II has high to moderately high population and employment densities yielding a market area that is conducive to fixed route transit operations, but not as intensive as in Market Area I.

Appendix G of the 2030 Transportation Policy Plan outlines service design standards for routes based on the market area they service. Transit Market Area I standards for service include:

- 15-minute peak and 30 minute off-peak minimum frequency on radial routes to downtown30-minute peak and off-peak, minimum frequency on cross-town routes
- Maximum desired distance between radials routes is ½ mile;
- Maximum desired distance between cross-town routes is 1 mile.

Most of the rest of the Study Area lies in Transit Market Area II and the guidelines for service are as follows:

- 30-minute peak and 60-minute off-peak minimum frequency on radial and cross-town routes;
- Maximum desired distance between radials routes is 1 mile;
- Maximum desired distance between cross-town routes is 2 miles;

Most of the Study Area within one mile north and south of University Avenue between the University of Minnesota and the State Capitol and including Downtown St. Paul and Downtown Minneapolis lies in Transit Market Area I, and opportunities exist to add significantly more population. The City of St. Paul is pursuing policies that are supportive of intensification of the corridor's population density, especially between about Fairview Avenue and Rice Street. Minneapolis is planning for more jobs concentrated in the southeast area of the city, mainly to the north of University Avenue. Primary planning emphasis will therefore be focused on the parts of the Study Area that are covered by Transit Market Area I.

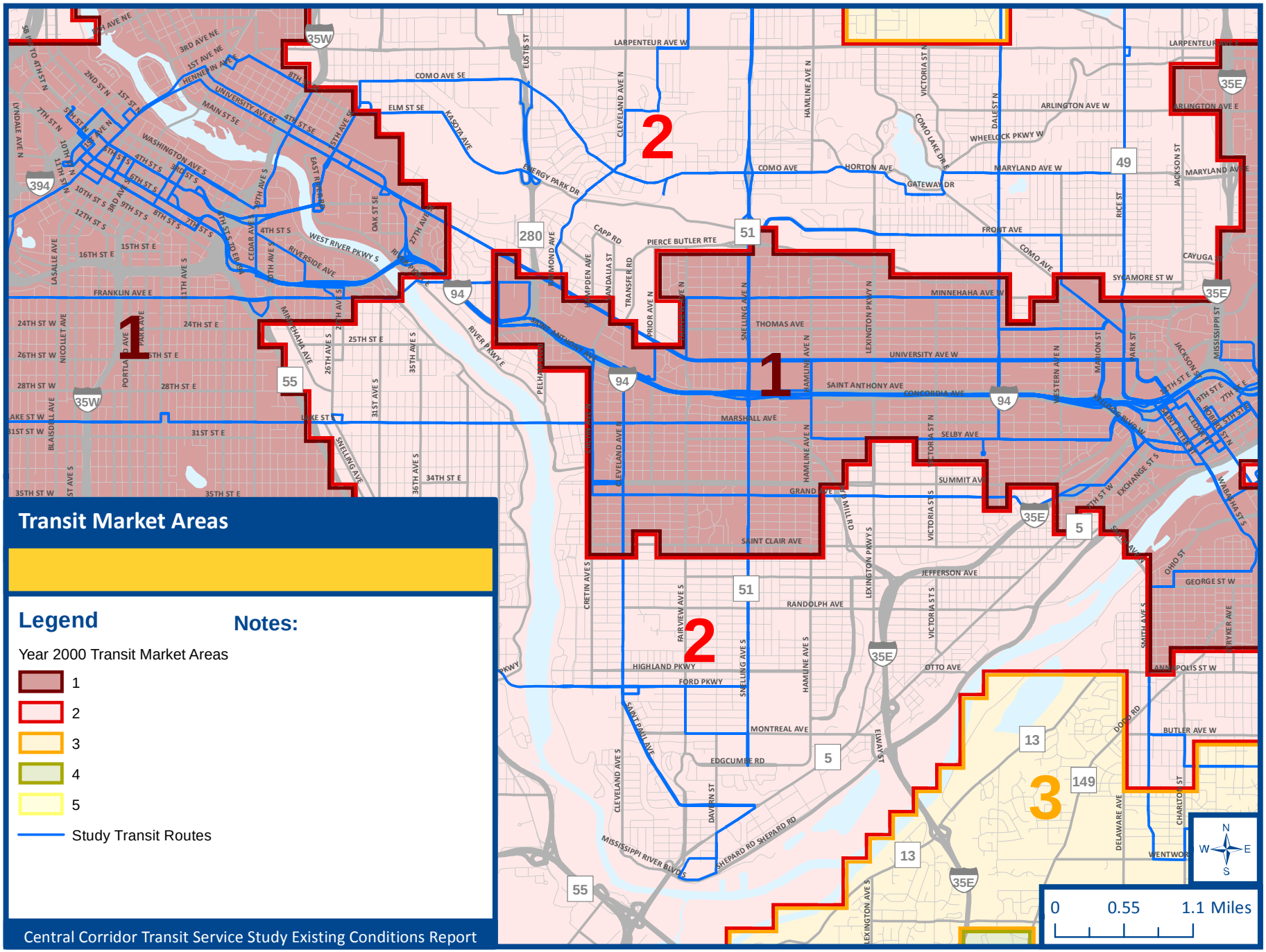
STUDY AREA ROUTE COVERAGE AND LEVEL OF SERVICE

Transit route coverage and hours of service in the Study Area on weekdays generally meet service standards defined in the 2030 Transportation Policy Plan, with a few major exceptions.

Along University Avenue itself, Route 16 operates every 12 minutes at peak times and every 10 minutes midday and early evening. Route 50 operates every 12 minute at peak times and very limited service at other times. Route 16 service operates 24 hours a day. The University Avenue corridor is comprised of denser, more mature neighborhoods with a better established, traditional transit riding patterns.

In the remainder of the Study Area, coverage and frequency varies by time of day and day of the week. During the weekday peak periods, coverage is good. During off-peak times, however, many routes do not operate or operate only limited hours, with several significant corridors or streets that do not have service at certain off-peak times. Some areas have relatively low populations or population densities that do not generate enough ridership to need more service, but some other areas in this category do have good densities, but lack service.

Figure 3-Map of Central Corridor's Transit Market Areas



These areas are discussed and illustrated below.

• **Weekday Peak Periods** (**Figures 4** and **6**) – Coverage is good in the Study Area during peak periods, and there are time-saving commuter express and limited-stop routes that overlay or closely parallel local routes:

Route 53 provides service to downtown St. Paul for commuters living along Lake Street, Marshall Avenue, and Snelling Avenue. Frequencies range from 20 to 30 minutes. This route provides a faster alternative to Route 21.

Route 94 provides express service between the two downtowns via I-94. About half the trips make stops at Snelling Avenue and on Marion Street with the remaining trips operating non-stop from downtown to downtown.
Frequencies range from 5 to 10 minutes. This route provides a faster alternative to routes 16 and 50.

Route 134 provides service to downtown Minneapolis for commuters living along Cleveland and Cretin avenues. Limited service also connects Minneapolis residents with Cretin Avenue destinations such as the University of St. Thomas. Frequencies range from 10 to 30 minutes.

Route 144 provides service to downtown Minneapolis via the University of Minnesota Minneapolis Campus for commuters living along Snelling Avenue South. Frequencies range from 15 to 30 minutes.

Route 262operates as a limited stop route on Rice Street and extends to the northern suburbs of Circle Pines, Lexington, and Blaine. Frequency is every 30 minutes.
Local routes supplemented by these commuter lines have peak frequencies of every 10 to 30 minutes.

• **Weekday Midday** (**Figure 5**) – Coverage is good - essentially the same as in the peak periods in the Study Area, with the exception of Cretin Avenue between Marshall Avenue and I-94, which has no off-peak service. Local route frequencies range from every 10 minutes (Route 16) to every 40 minutes (Route 8), and almost all the others have frequencies of every 20 to 30 minutes. Route 84 and Route 94 have 15-minute frequency.

• **Weekday Evenings** (**Figure 7**) – Coverage in the Study Area is less than during the midday. Most urban routes operate evenings, but there are some gaps in service, even in some areas that are part of Transit Market Area I:
- Route 8 ends service at 6:30 pm.
- Route 62 operates hourly after 9:00 pm.
- Route 65 operates hourly after 6:00 pm.
- Route 67 operates hourly after 7:00 pm.
- Route 87 ends service at 7:00 pm.

Route 16 runs every 15 minutes. Routes 84 and 94 run every 30 minutes into the late evening.

Travel by transit is easy and convenient along the major corridors in the Study Area such as Snelling Avenue and University Avenue during the daytime and evening hours when many workers and students make trips.

• **Owl** (**Figure 8**) – Daily coverage in the Study Area is limited to Route 16, with hourly service from 1:00 to 5:00 am.

• **Saturday Daytime** (**Figure 9**) – Coverage in the Study Area is less on Saturdays than on weekdays. Virtually all urban routes operate Saturdays, except routes 8 and 87, leaving some small pockets of Transit Market Area I without coverage.
Frequencies vary more widely on Saturdays, and there are low frequencies in some areas that are part of Transit Market Area I, notably:
- Route 65 operates hourly and from about 8:00 am to 7:00 pm.
- Route 67 operates hourly and from about 7:30 am to 8:30 pm.
Route 16 maintains 10-minute frequency, and Route 84 has 15-minute frequency.
Route 94 has 30- minute frequency on Saturdays. These routes offer attractive service for the many shoppers making errands in the Study Area.

• **Saturday Evenings** (**Figure 10**) – Coverage in the Study Area is significantly less on Saturday evenings and this results in service gaps in Transit Market Area I:
- Routes 65 and 67 have no service after about 8:00 pm.
- Route 62 operates hourly after 7:00 pm.
- Route 16 maintains 15 to 20 minute frequency; most other routes have 30-minute service.

• **Sunday Daytime** (**Figure 11**) – Coverage is the same as it is on Saturdays. Most routes, even sections in Transit Market Area I, have lower frequency on Sunday than on Saturday. With most routes having frequencies that are below standards for Transit Market Area I.
- Routes 62, 63, 65, and 67 operate hourly.
- Route 65 has no service before about 11:00 am and Route 67 has no service before 8:30 am.
Route 16 has 15-minute frequency, Route 21 has 20-minute service, and the other high performing routes - 84 and 94 have 30-minute frequency. These routes offer attractive service for the many shoppers making errands in the Study Area.

• **Sunday Evenings** (**Figure 12**) – Coverage is less than during Saturday evenings, leaving longer gaps in service, leaving major discrepancies from service expected in Market Area I. Route 16 has 20-minute service and Routes 21 and 84 have 30-minute frequency, but Route 94 drops to hourly service.
- Route 65 has no service after about 6:00 pm.
- Route 67 has no service after about 6:30 pm.

Figure 4-Map of Transit Service Frequencies Weekday AM Peak

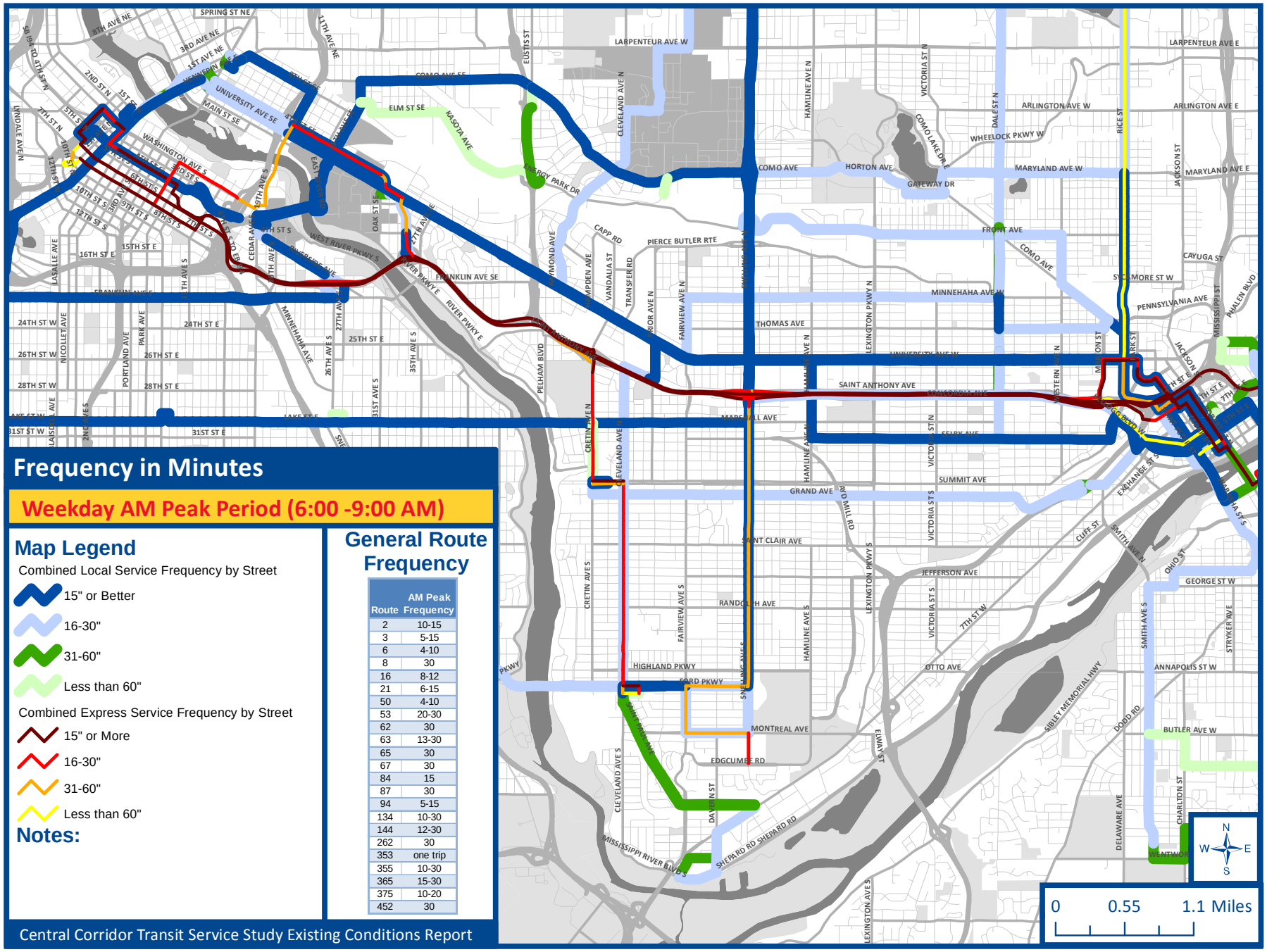


Figure 5-Map of Transit Service Frequencies Weekday Midday

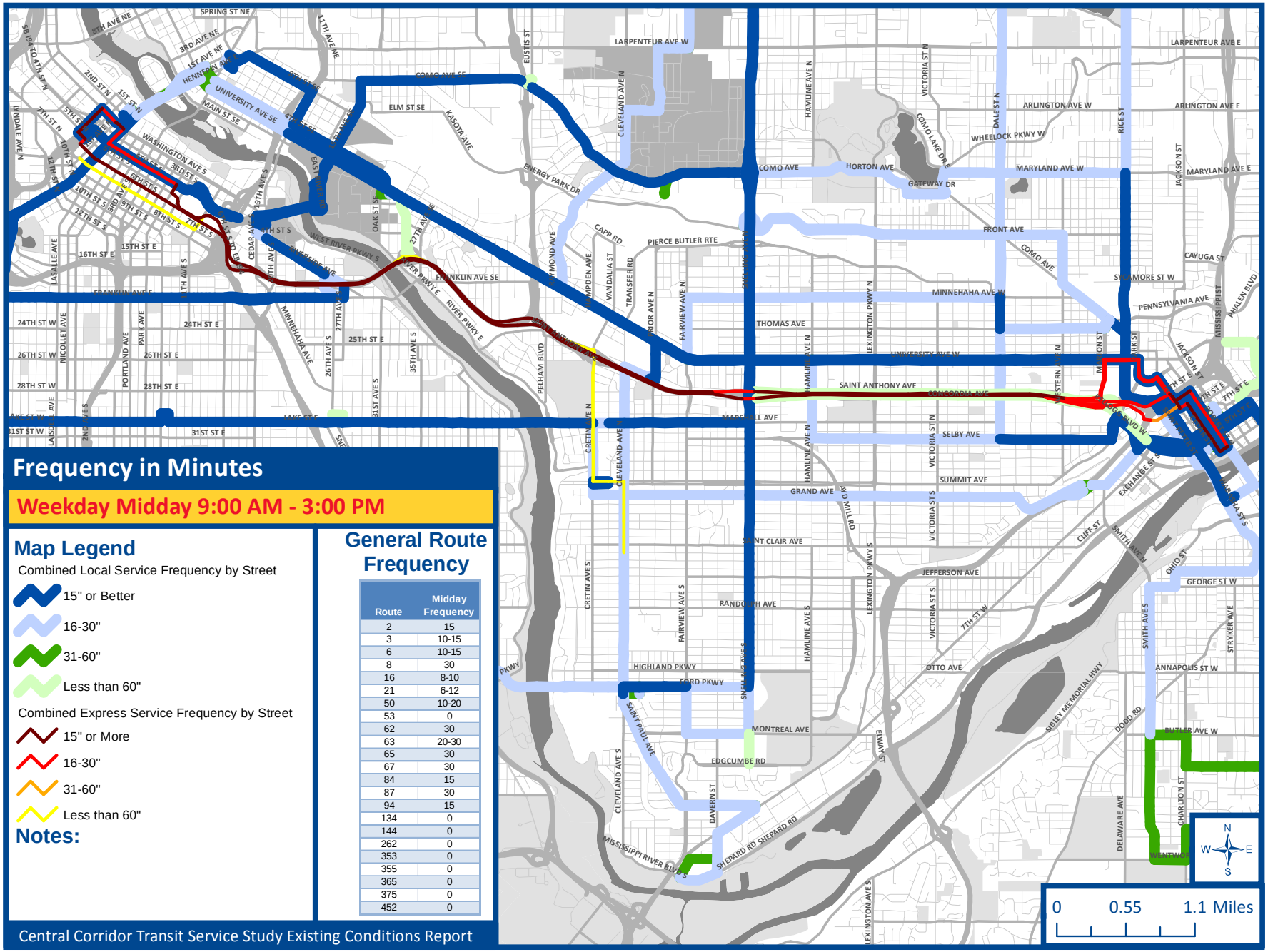


Figure 6-Map of Transit Service Frequencies PM Peak

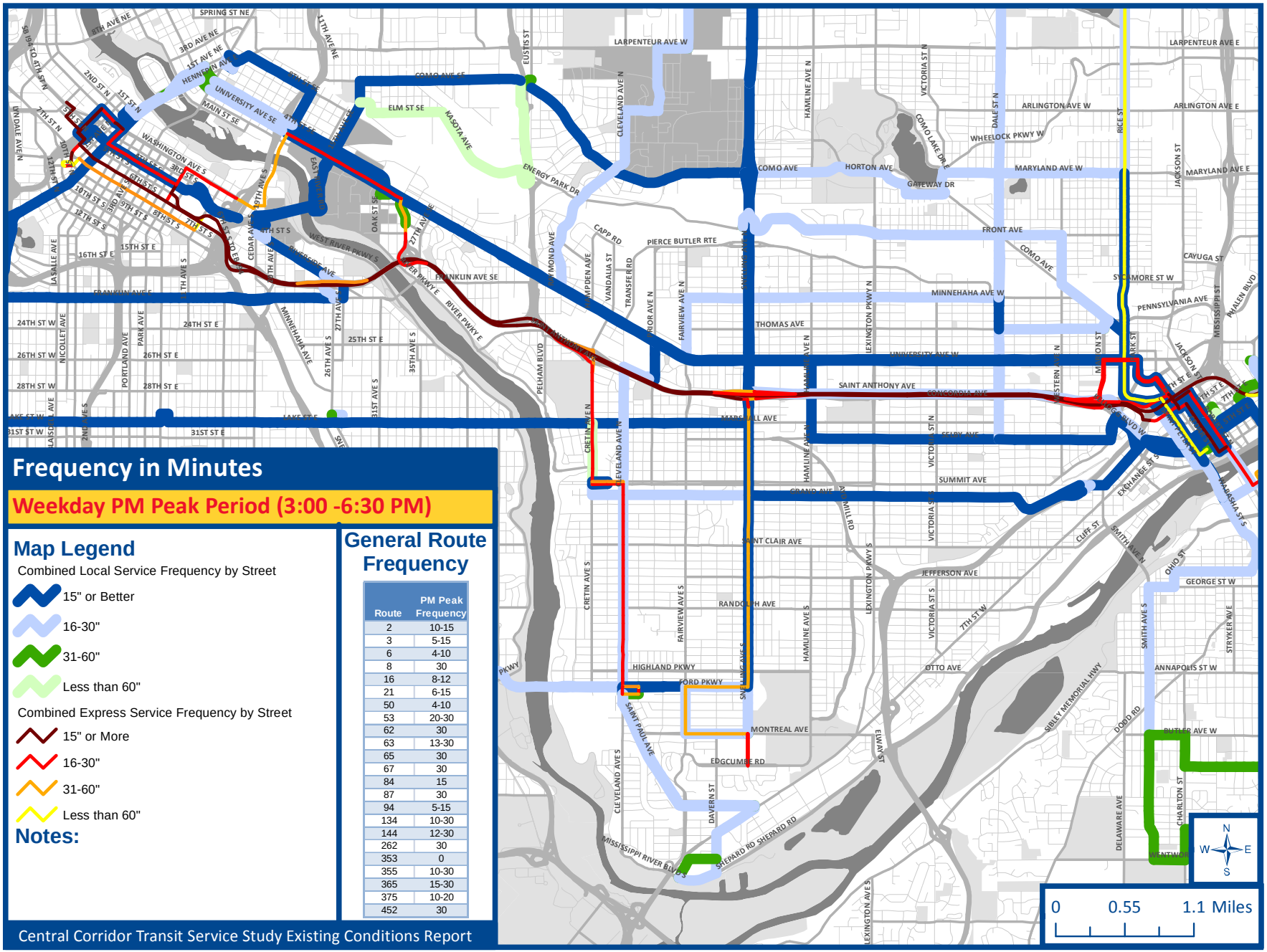


Figure 7-Map of Transit Service Frequencies Weekday Evening

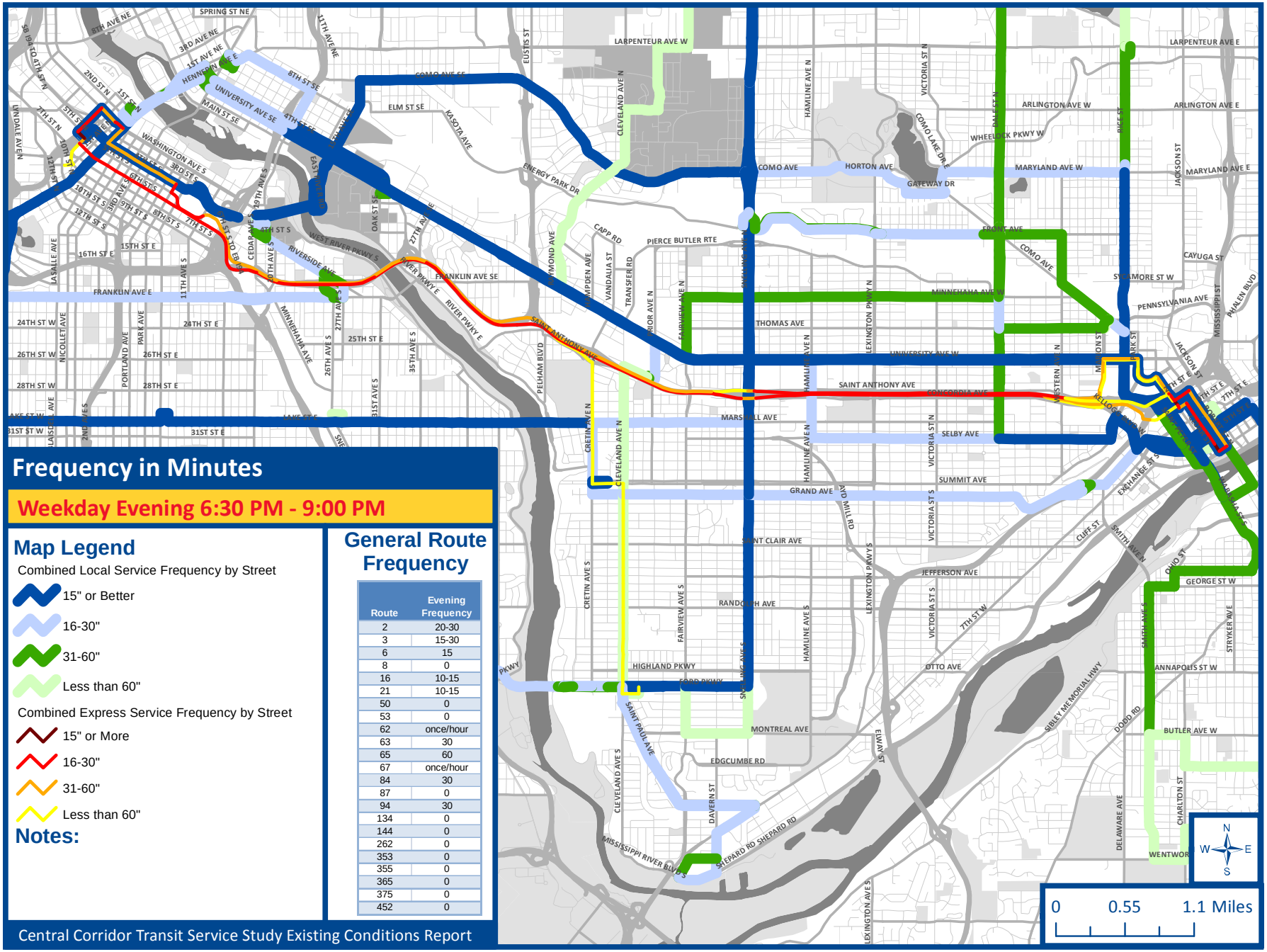


Figure 8-Map of Transit Service Frequencies Daily Owl (Between 1:00 and 5:00 AM)

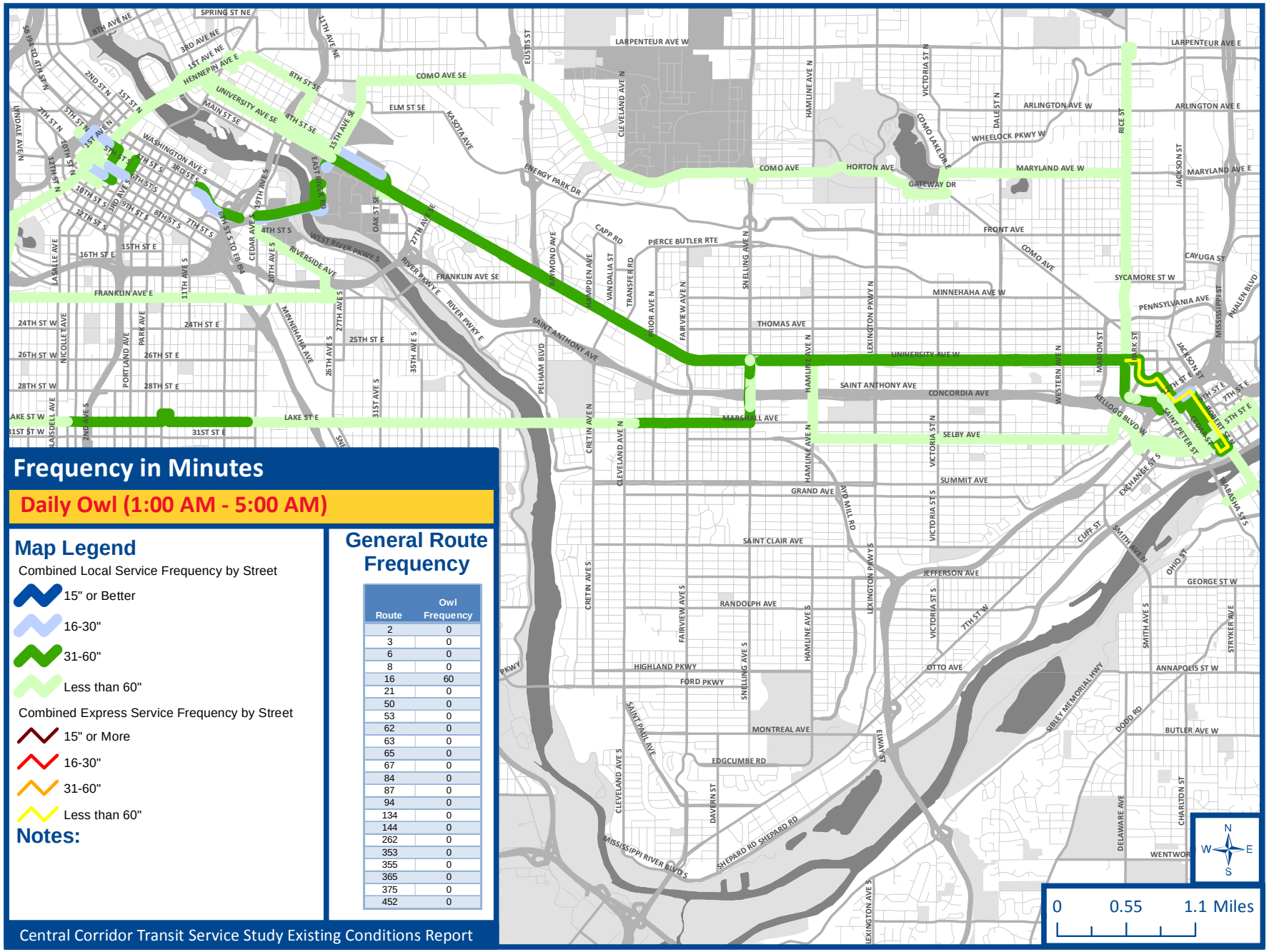


Figure 9-Map of Transit Service Frequencies Saturday

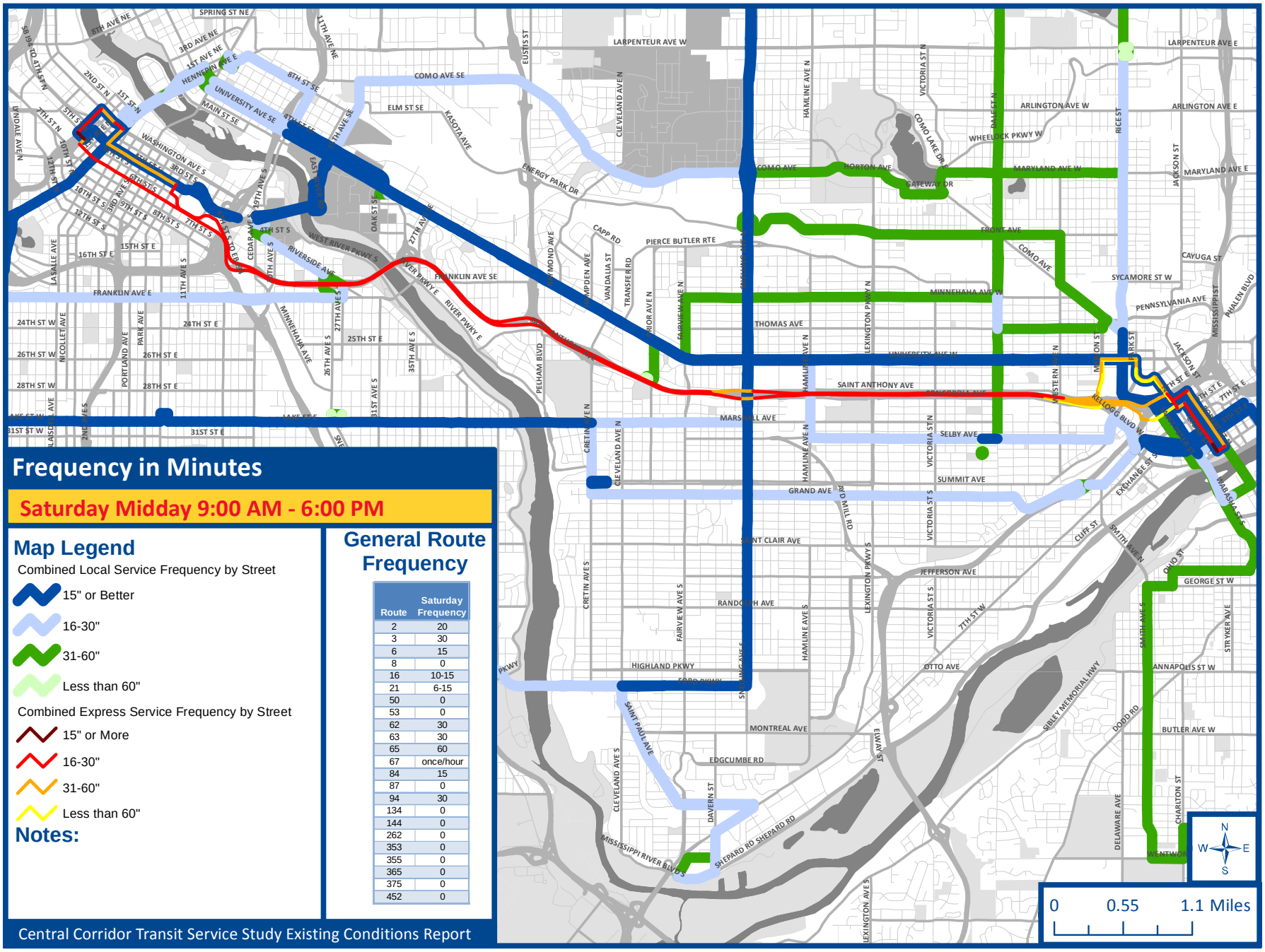


Figure 10-Map of Transit Service Frequencies Saturday Evening

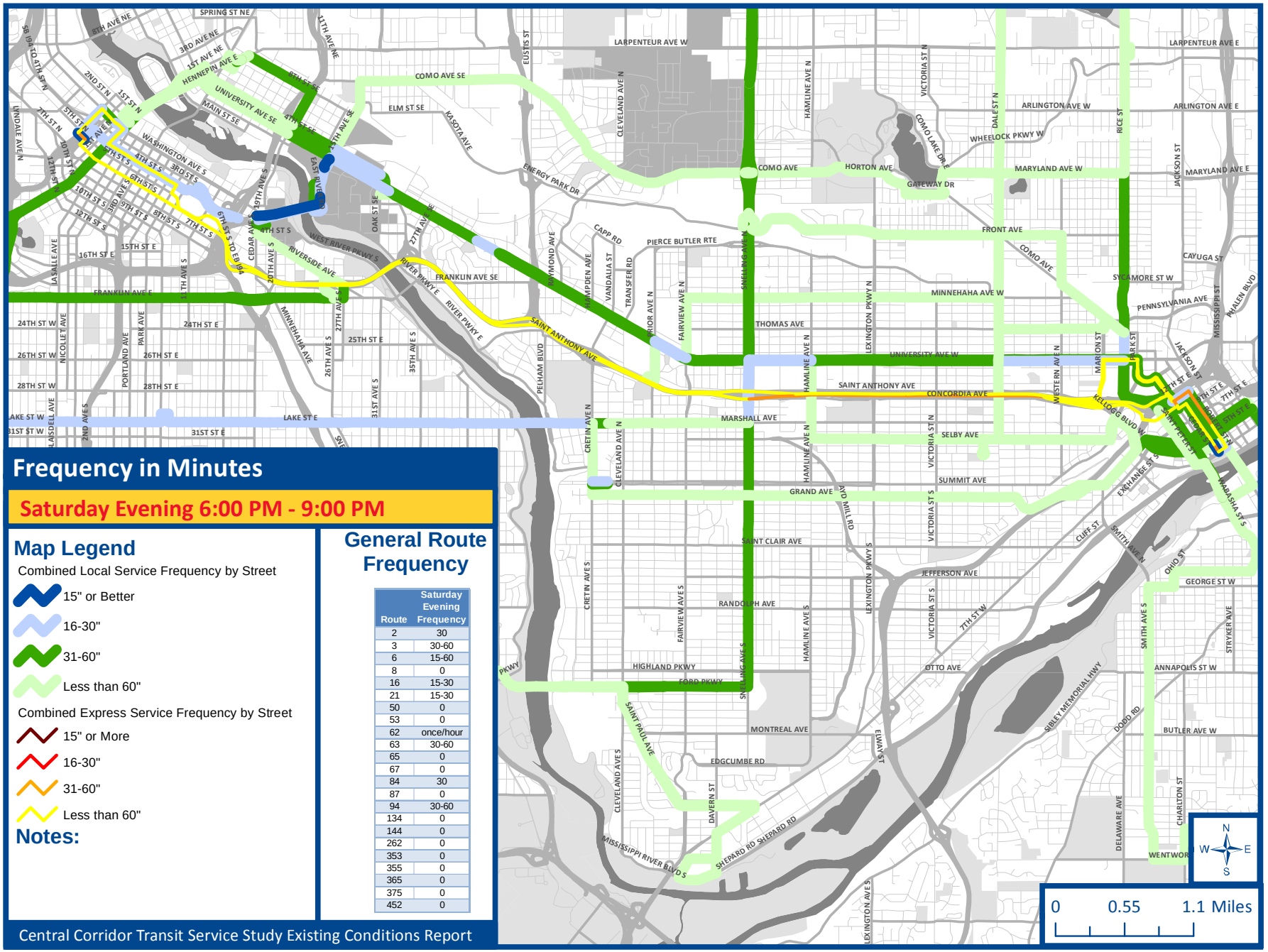


Figure 11-Map of Transit Service Frequencies Sunday

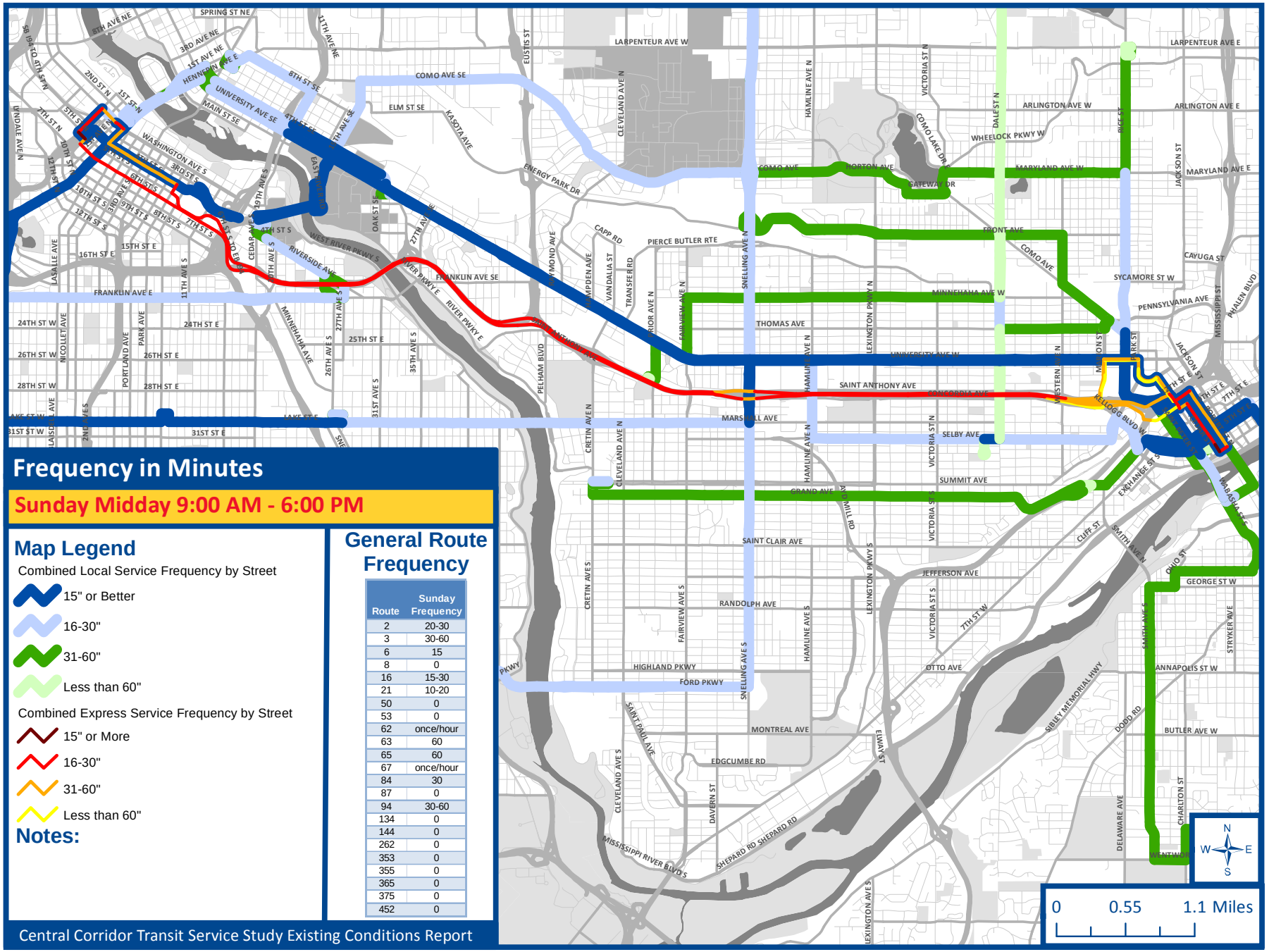
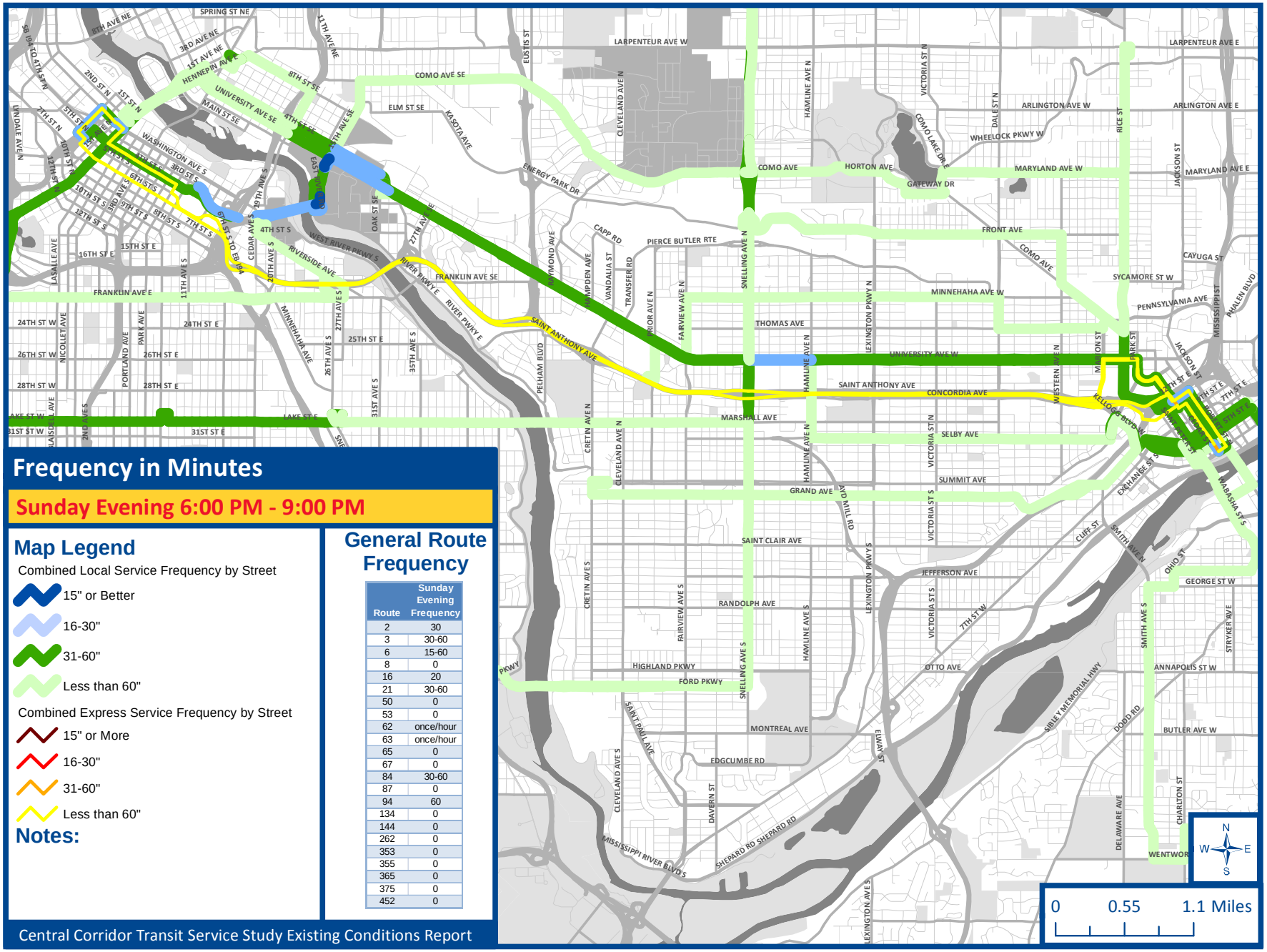


Figure 12-Map of Transit Service Frequencies Sunday Evening



SERVICE FREQUENCIES

The trunk service frequencies for all of the Study Area routes are summarized in the following table. The service frequency may be lower on branches.

FREQUENCIES

Route	AM Peak	Midday	PM Peak	Evening	Owl	Saturday	Saturday Evening	Sunday	Sunday Evening
2	10-15	15	10-15	20-30	0	20	30	20-30	30
3	5-15	10-15	5-15	15-30	0	30	30-60	30-60	30-60
6	4-10	10-15	4-10	15	0	15	15-60	15	15-60
8	30	30	30	0	0	0	0	0	0
16	8-12	8-10	8-12	10-15	60	10-15	15-30	15-30	20-60
21	6-15	6-12	6-15	10-15	0	6-15	15-30	10-20	30-60
50	4-10	10-20	4-10	0	0	0	0	0	0
53	20-30	0	20-30	0	0	0	0	0	0
62	30	30	30	once/hour	0	30	once/hour	once/hour	once/hour
63	13-30	20-30	13-30	30	0	30	30-60	60	once/hour
65	30	30	30	60	0	60	0	60	0
67	30	30	30	once/hour	0	once/hour	0	once/hour	0
84	15	15	15	30	0	15	30	30	30-60
87	30	30	30	0	0	0	0	0	0
94	5-15	15	5-15	30	0	30	30-60	30-60	60
134	10-30	0	10-30	0	0	0	0	0	0
144	12-30	0	12-30	0	0	0	0	0	0
262	30	0	30	0	0	0	0	0	0
353	one trip	0	0	0	0	0	0	0	0
355	10-30	0	10-30	0	0	0	0	0	0
365	15-30	0	15-30	0	0	0	0	0	0
375	10-20	0	10-20	0	0	0	0	0	0
452	30	0	30	0	0	0	0	0	0

BUS STOP SPACING

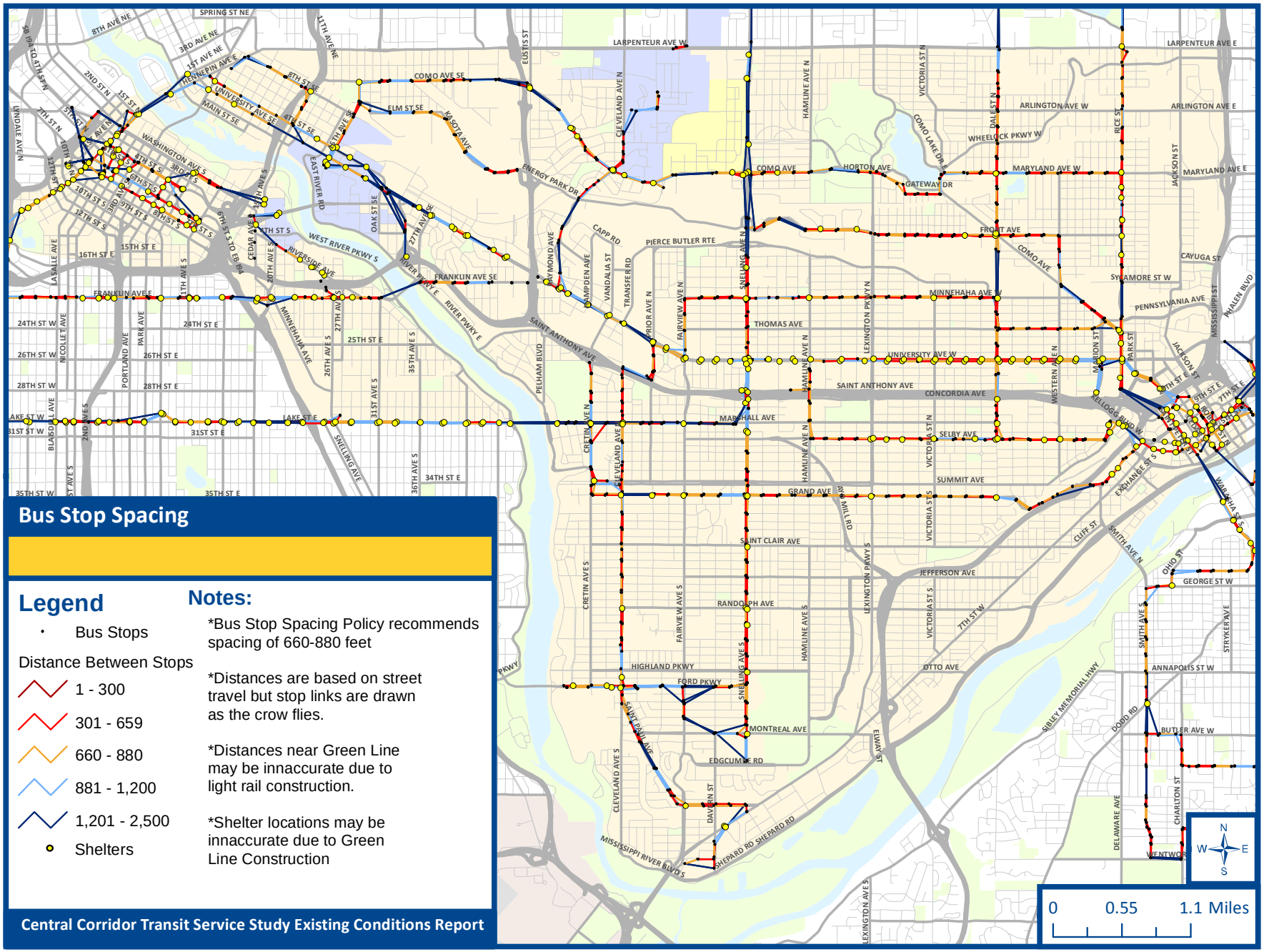
The bus stop spacing standard applicable for the Study Area calls for six to eight stops per mile.

• ***North-South Routes (e.g. Routes 65, 84 and 87)*** – The north-south routes tend to stop at every other cross street. These blocks, however, are shorter at 16 blocks to the mile. Therefore, stop spacing on many of these routes or route segments are in compliance with stop-spacing standards.

• ***East-West Routes (e.g. Routes 3, 16, 63 and 67)*** – The east-west routes usually stop at every cross street. In Minneapolis and St. Paul, these are relatively long blocks at 8 blocks to the mile. Therefore, most of the east-west portions of these routes or route segments are in compliance with bus stop-spacing standards.

Please see Figure **13** for the map showing bus stops in the Study Area.

Figure 13-Map of Transit Stop Spacing



BUS SERVICE SPEEDS AND TRAVEL TIMES

Bus service speeds and travel times are affected by a number of factors. Slow traffic, frequent red lights and close bus stop spacing may result in lower bus speeds. Bus-only lanes, transit advantages such as queue jumps and ramp-meter bypasses and free flow traffic result in higher bus speeds.

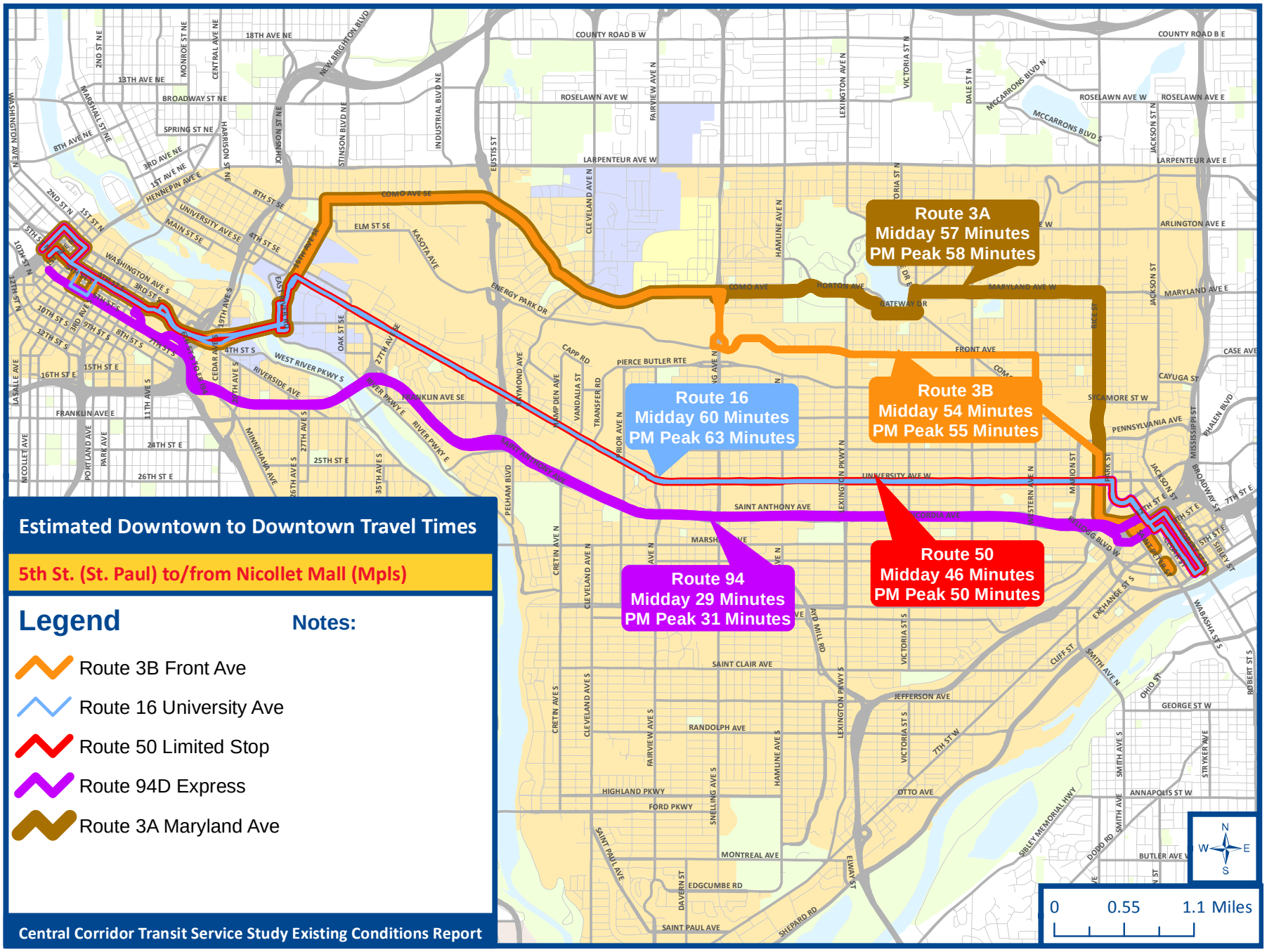
Local buses and express buses operate at quite different speeds and provide different travel times. In order to demonstrate the different speeds for the two types of bus services, travel times from downtown Minneapolis to transit stops throughout the Study Area have been determined and plotted as travel time contours.

Figure 14 presents the travel time during the PM peak period and midday from downtown St. Paul to downtown Minneapolis by local and express bus service. Peak travel times from downtown to Minneapolis on local bus routes vary from approximately 50 minutes on Route 50, to approximately 63 on Route 16. Although Route 3 on Como and Maryland avenues is a longer route, the route has a faster average speed, making the downtown-to-downtown trip in less time than Route 16. The travel time for Express Route 94 bus service, shows higher bus speeds and much lower travel times between the downtown areas reflecting the routing of buses on I-94. Travel time from downtown St. Paul to Minneapolis is about 31 minutes.

Midday travel times from downtown to Minneapolis on the local routes vary from approximately 46 minutes on Route 50, to approximately 60 on Route 16. Although Route 3 on Como and Maryland avenues is a longer route, the route has a faster average speed, making the downtown-to-downtown trip in less time than Route 16. The travel time for Express Route 94 bus service, shows higher bus speeds and much lower travel times between the downtown areas reflecting the routing of buses on I-94. Travel times from downtown St. Paul to Minneapolis are about 29 minutes.

Local bus and express bus services serve different markets and provide different types of service. Local bus routes provide accessibility and frequent connections along the route, but are often slower and less direct than a private auto trip. Express routes provide higher speed service for longer distance travel compared to the local bus and provide faster travel times between the downtowns, but with much more restricted access to various points. Fare payment has a significant impact on travel times. Cash payment on the bus is the slowest, while proof of payment off-vehicle fare collection is the fastest. Proof of payment fare collection is already successfully applied for rapid service on the two rail lines now operating in the Twin Cities region. Bus routes, or even certain trips, that receive most fares via the proximity-read “Go To” cards will have less delay and travel faster than when cash payment or magnetic strip ticket use dominates. The introduction of light-rail line service in this corridor is expected to result in faster travel times between major destinations along University Avenue. This will be possible with a well designed semi-exclusive right of way and proof of payment fare collection.

Figure 14-Map of Travel Time from Downtown to Downtown PM Peak



3 ANALYSIS OF EXISTING RIDERSHIP AND ROUTE PERFORMANCE

DATA COLLECTION

A comprehensive bus stop-level data collection effort was undertaken to inventory existing transit use and to develop a better understanding of the current travel patterns in the Study Area. This section of the report summarizes the results of these data collection efforts. The numbers of passengers on and off by stop were surveyed for weekday, Saturday, and Sunday service periods for each route that operates in the Study Area. All of the scheduled bus trips - 1,998 weekday, 751 Saturday, and 455 Sunday - were sampled multiple times. Data collection was completed during the winter and spring of 2010.

To provide a larger sample at a lower cost, Metro Transit used its automatic passenger counters (APCs) to collect the data. Since only about one-third of the fleet is equipped with APCs, buses equipped with APC equipment were rotated through the Study Area routes to collect the sample.

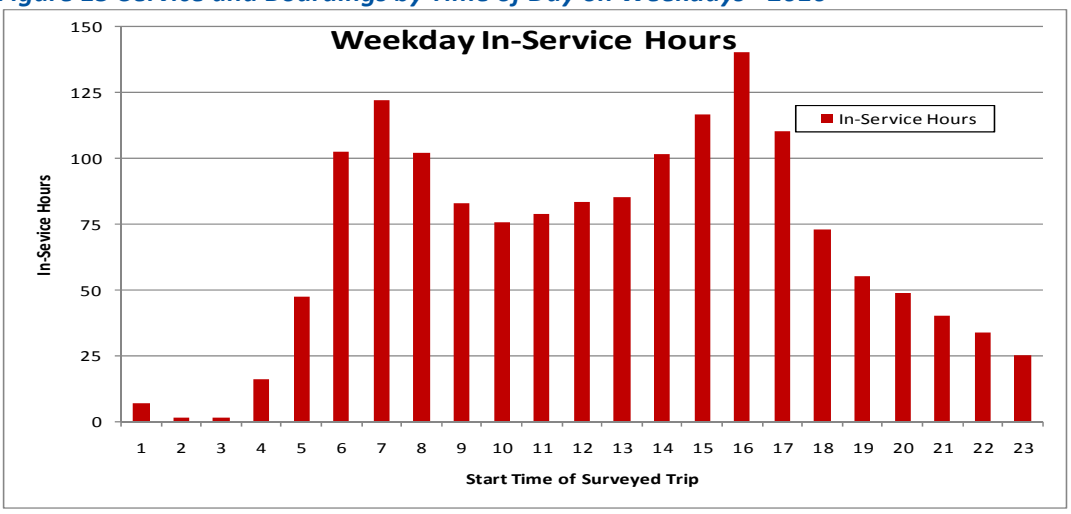
Weekday Transit Ridership

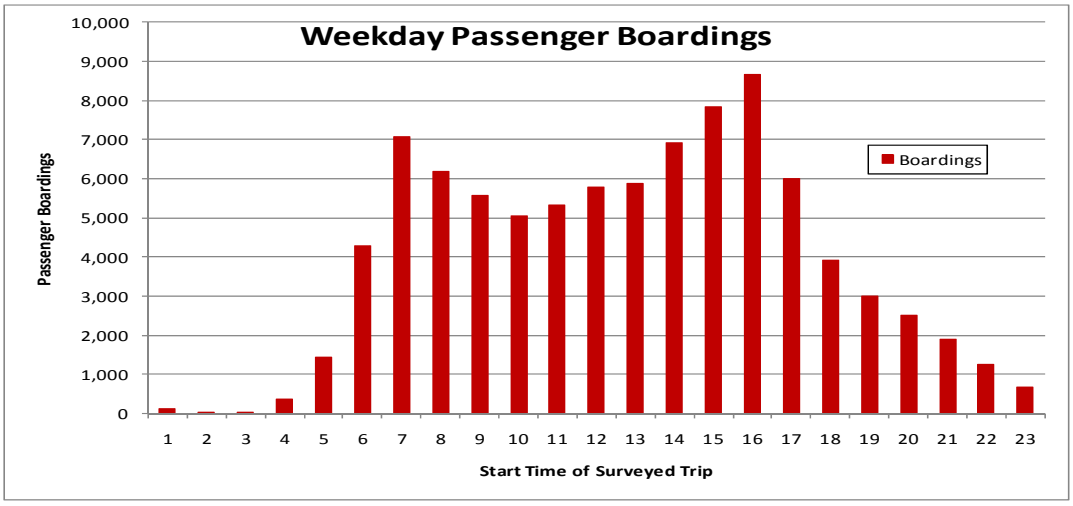
On weekdays 1,568 in-service hours are provided in the Study Area. The distribution of these in-service hours by time of day is illustrated in the first chart of **Figure 15**. Approximately 20 percent of in-service hours are provided during the AM peak period (6:00 to 9:00am), another third during the mid-day period (9:00 am to 3:00 pm), a quarter during the PM peak period (3:00 pm to 6:30 pm), with the remaining revenue hours provided during the evening hours (including less than two percent between 1:00 and 5:00 am). The second chart of **Figure 15** illustrates the distribution of the total number of passengers boarding throughout the day. An average of about **90,000** weekday boardings were counted, with 19 percent occurring during the AM peak period, 38 percent during the mid-day period, and 25 percent during the PM peak period. The final chart in **Figure 15** illustrates the average number of boarding passengers per in-service hour throughout the day. This chart shows that the level of transit service in the Study Area throughout the day is reasonably well matched with the distribution of demand throughout the day. **Figure 15a** shows the average passengers per in service by route on weekdays.

Weekend Transit Ridership

On weekends 897 in-service hours are operated each Saturday and 609 in-service hours each Sunday in the Study Area. The distribution of these revenue hours is illustrated in the top chart of **Figure 16**. Approximately 60 percent of these revenue hours are provided between 9:00 am and 6:00 pm. This chart also illustrates the distribution of total number of passenger boardings counted with the APC equipment throughout Saturdays and Sundays. An average of about 45,600 boarding passengers was observed on Saturday, with 65 percent occurring between 9:00 am and 6:00 pm. On Sunday, an average of about 29,400 boarding passengers was observed with 70 percent occurring between 9:00 am and 6:00 pm. This chart shows that the level of transit service in the Study Area throughout weekend days is reasonably well matched with the distribution of demand throughout the day. **Figure 16a** shows the average passengers per in service by route on weekends.

Figure 15-Service and Boardings by Time of Day on Weekdays - 2010





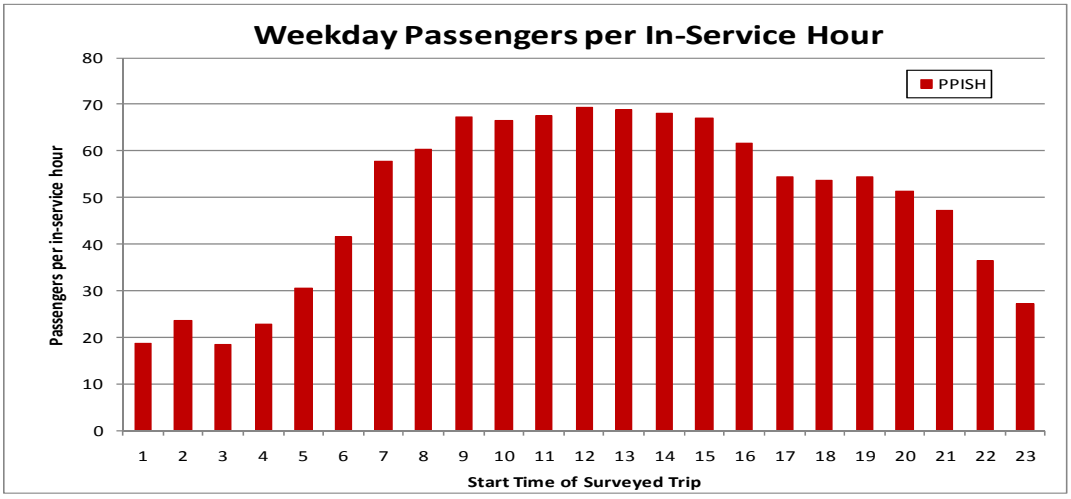


Figure 15a-Chart Passengers per Revenue Hour by Route Weekdays - 2010

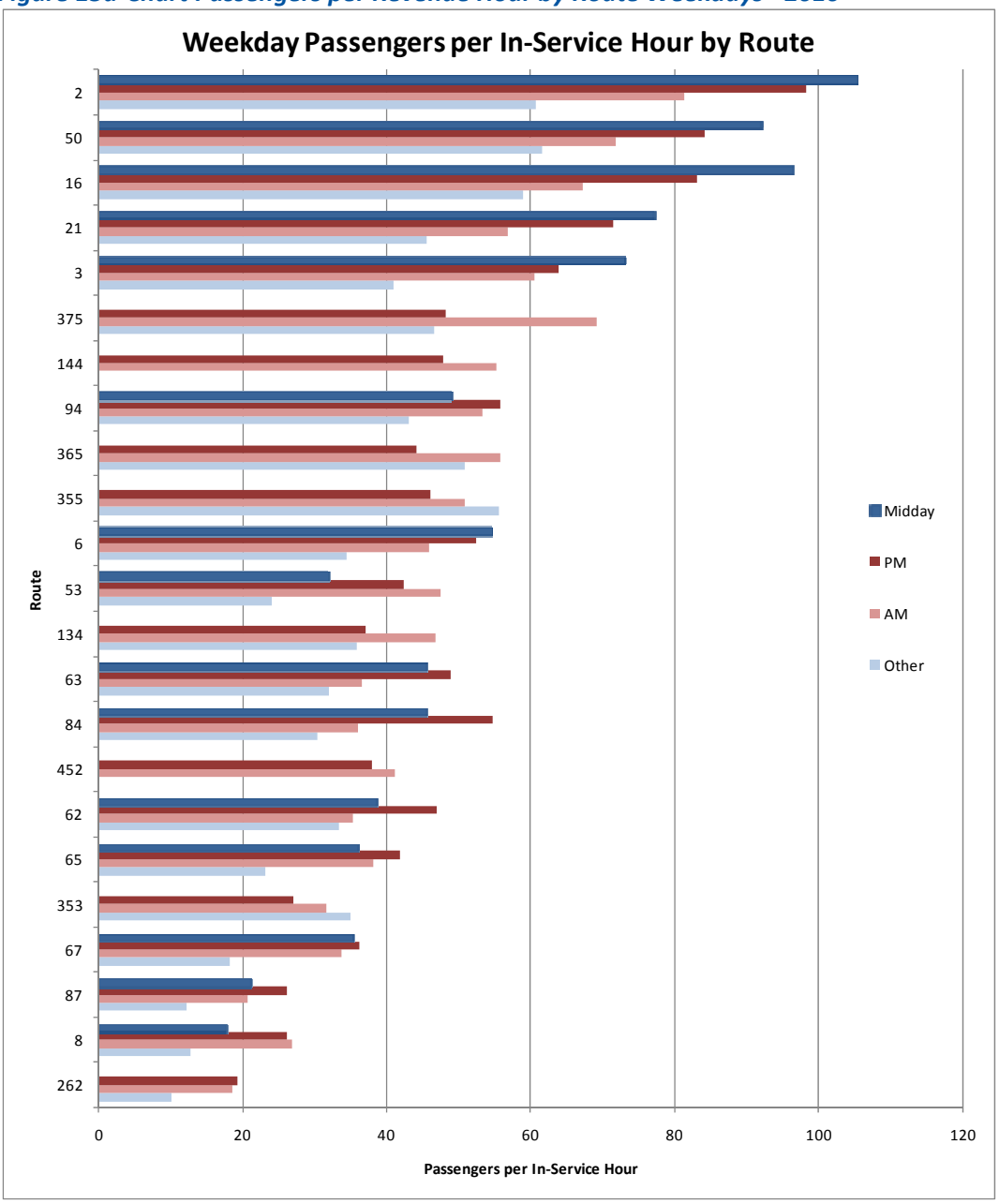
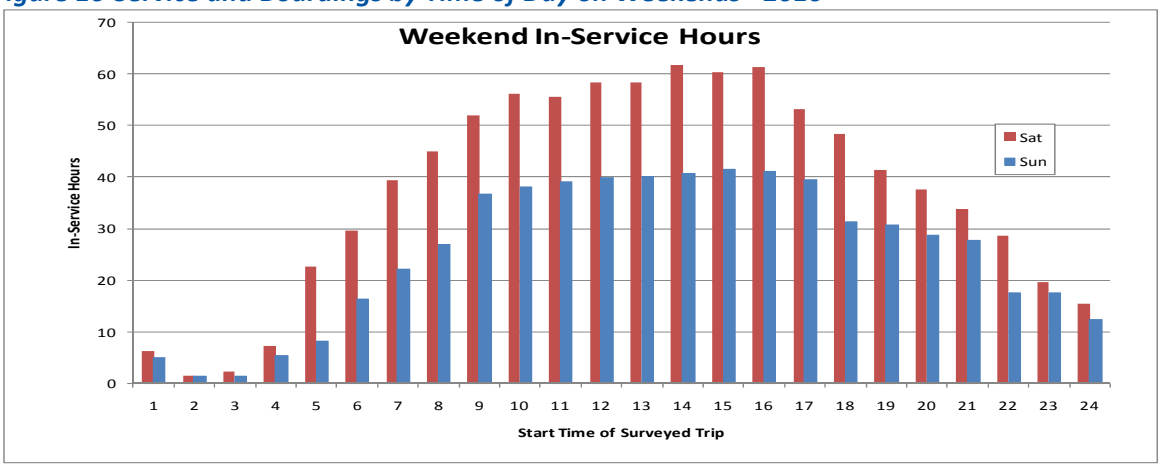
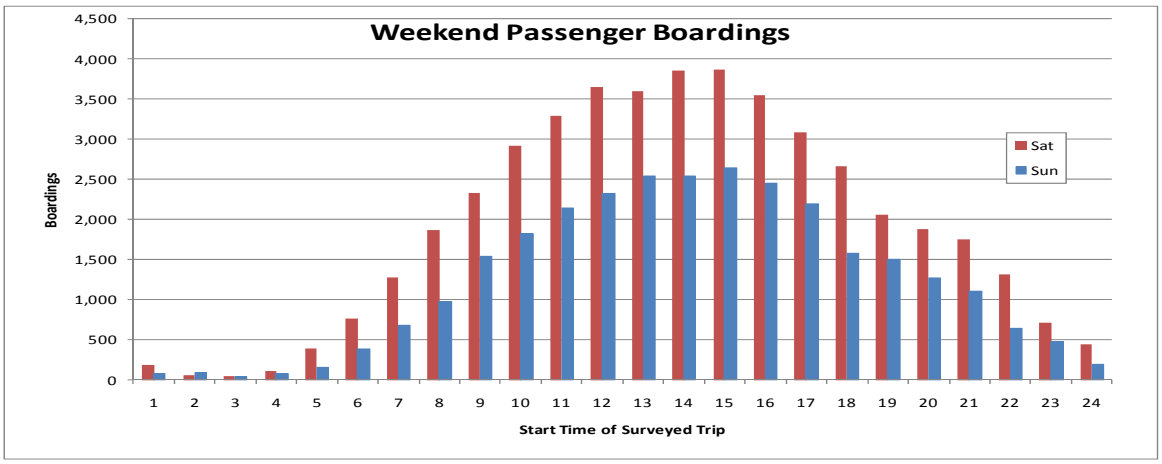


Figure 16-Service and Boardings by Time of Day on Weekends - 2010





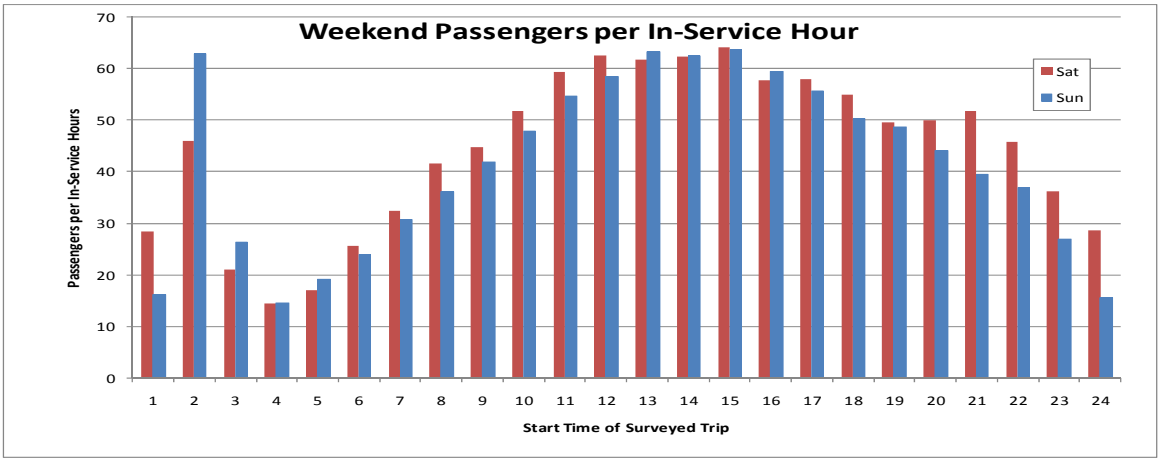
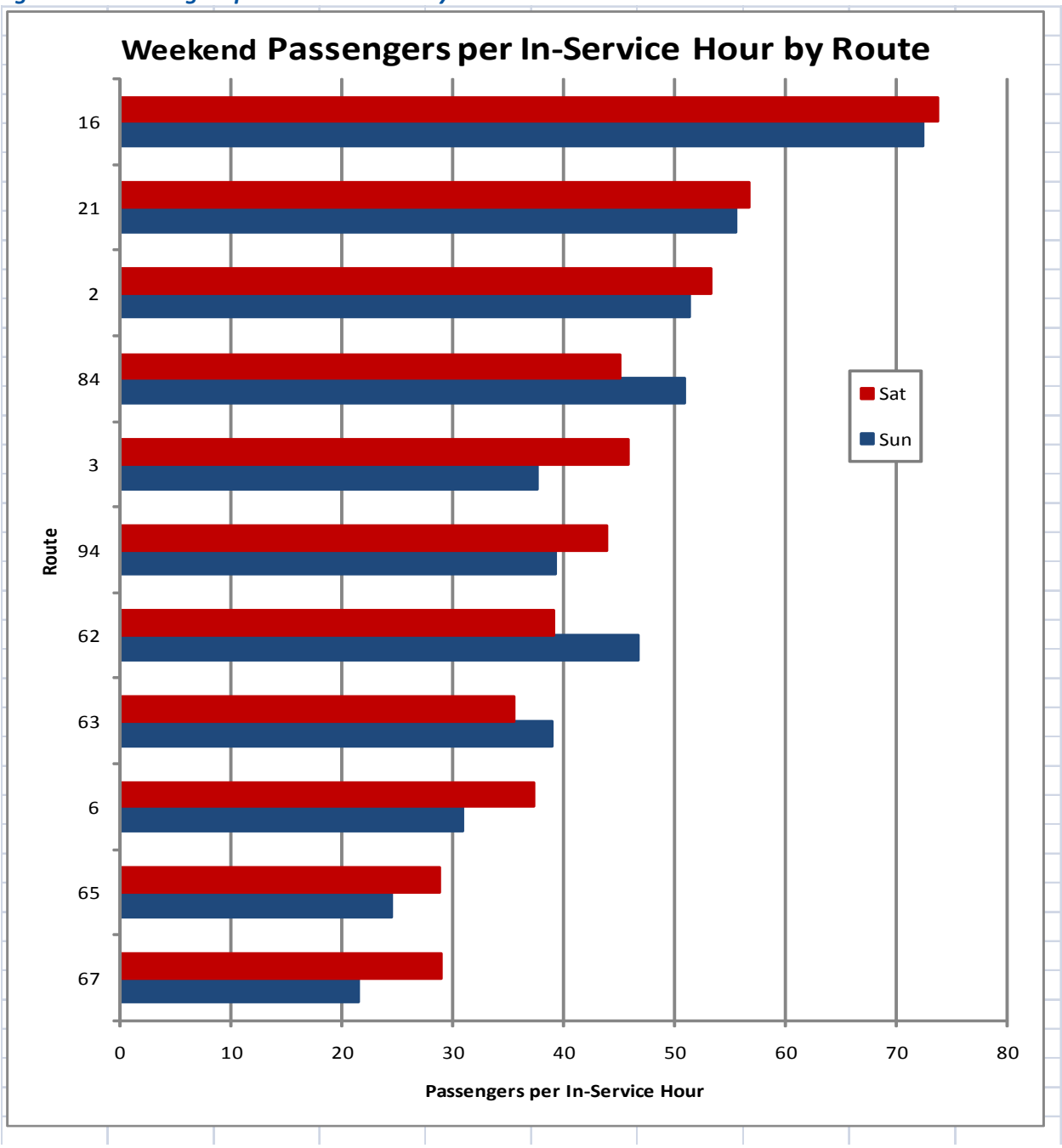


Figure 16a-Passengers per Revenue Hour by Route on Weekends - 2010



BOARDINGS BY ROUTE AND DAY OF WEEK

All day boardings per bus stop on each route for an average weekday, Saturday and Sunday during the survey period are presented in **Figure 18** – Weekday, **Figure 19** – Saturday, and **Figure 20** - Sunday.

Routes are overlaid on the land use / density map to show the correlation between boardings and population and employment densities.

This exhibit shows that University (routes 16, 50), Selby (Route 21), Grand (Route 63) and Snelling (Route 84) avenues, are the highest ridership lines.
The exhibits indicate some very high volume transit routes in the east-west direction along University Avenue and in the north-south direction along Snelling Avenue.

Figure 17-Map of Weekday Ridership

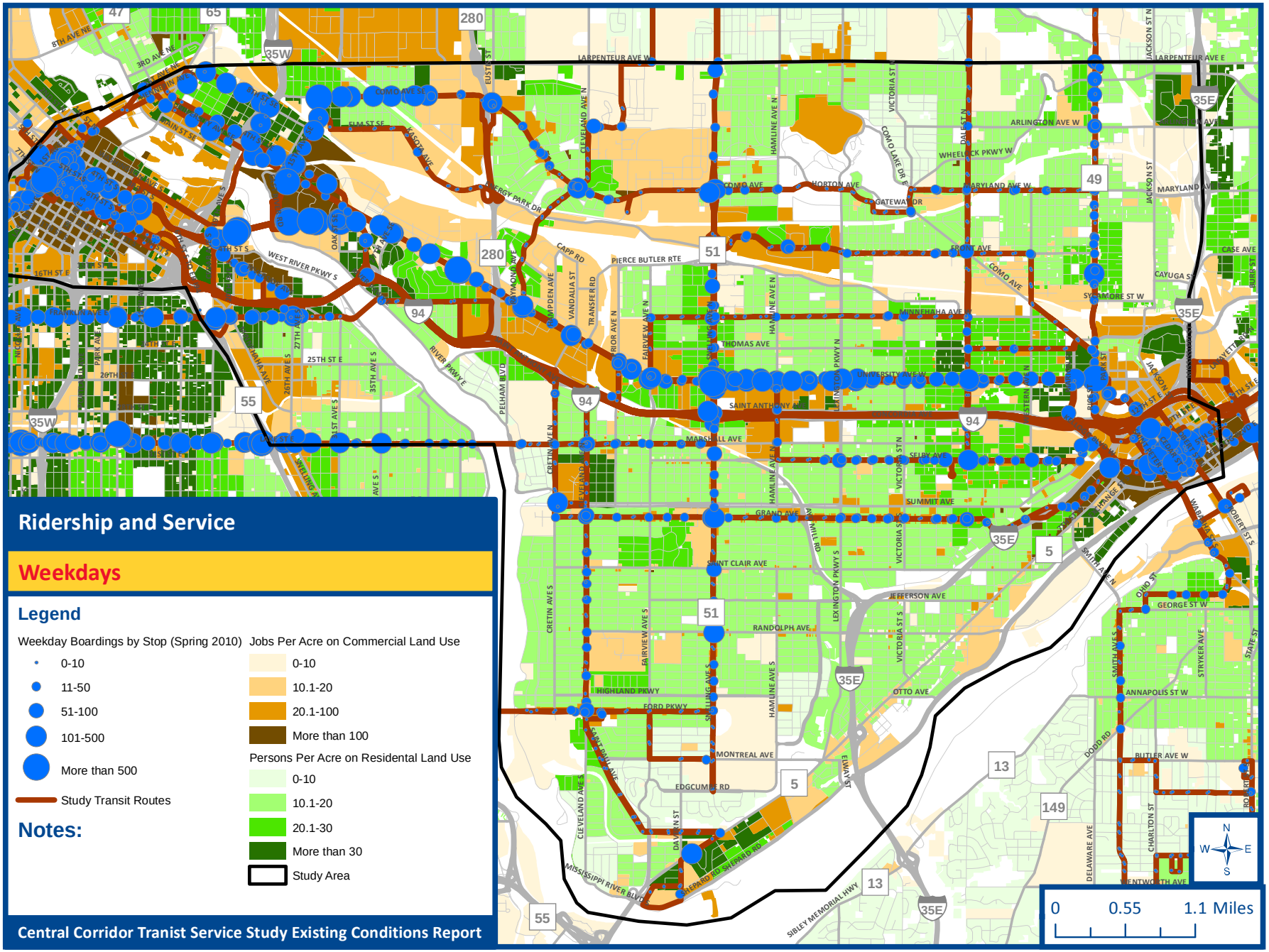


Figure 18-Map of Saturday Ridership

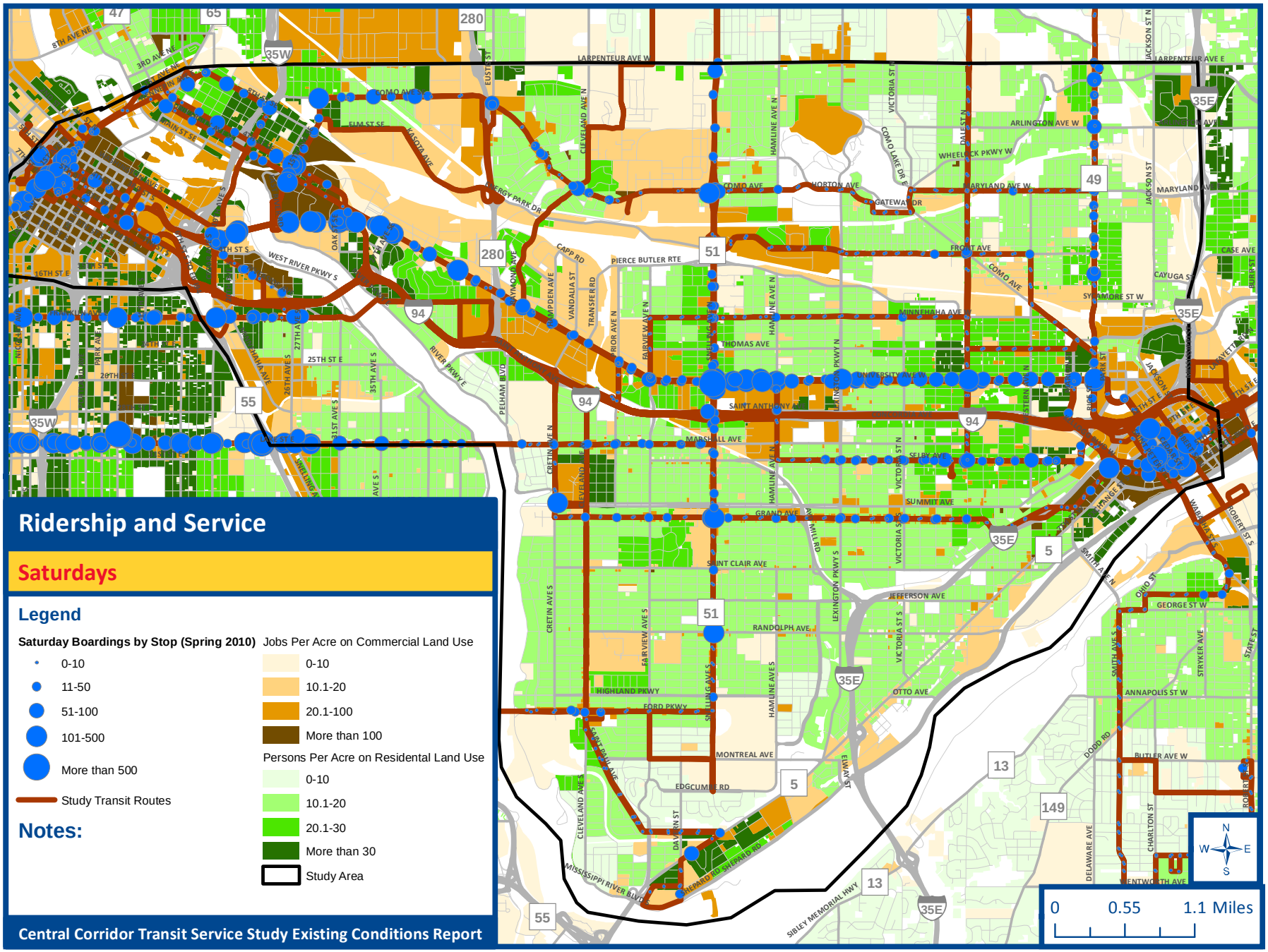
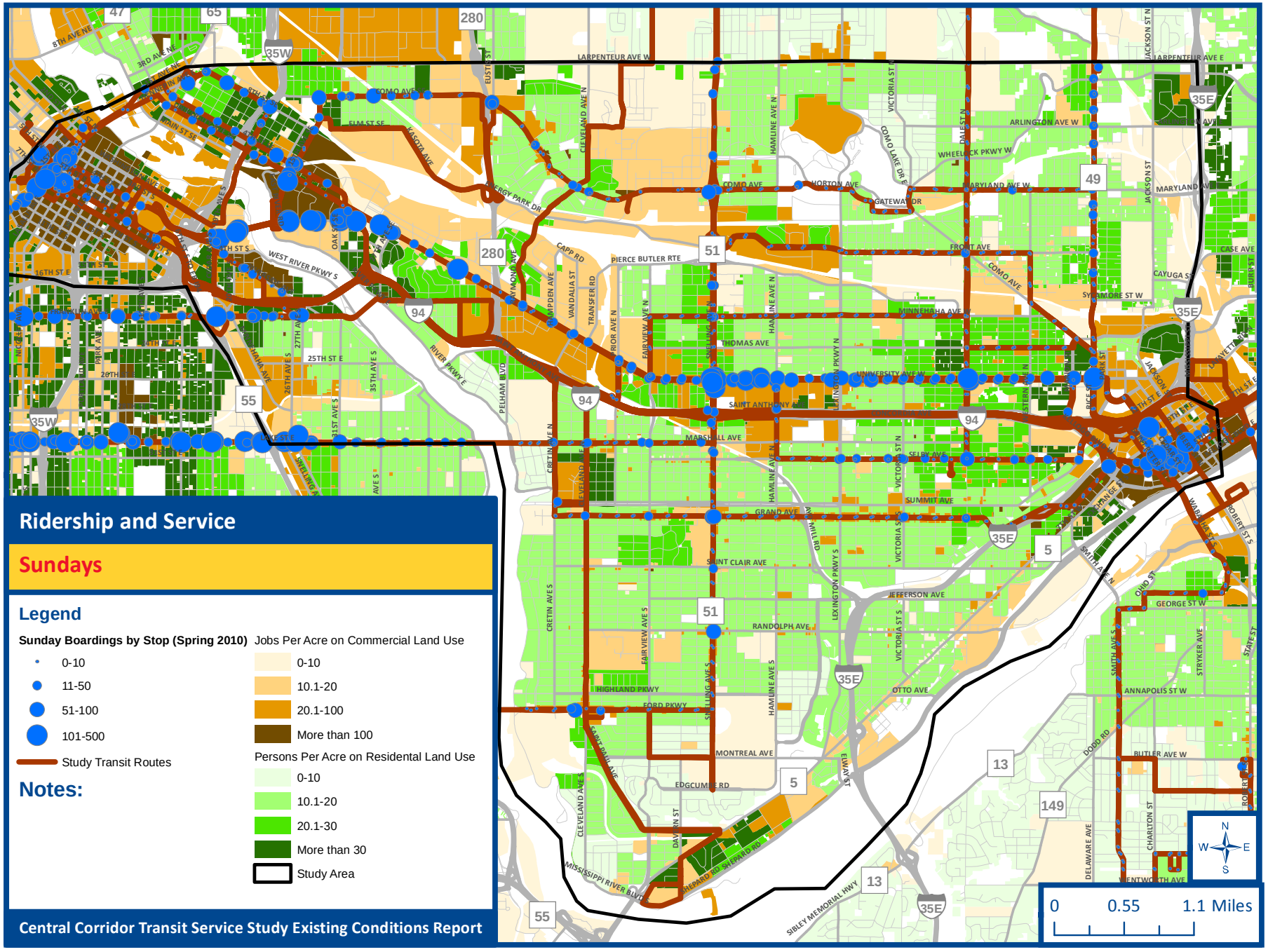


Figure 19-Map of Sunday Ridership



SERVICE PERFORMANCE BY ROUTE

Service performance is summarized for each of the routes on the following pages for the local and express services, respectively. For weekdays, please see **Figure 20**, Saturdays, **Figure** 21, and Sundays, **Figure 22**. The routes are sorted by high performance to low performance in terms of their average passengers per in-service hour.

The values in these tables reflect the service levels and ridership during the winter of 2010. The in-service hours and passengers per in-service hour are calculated for the entire route and not just for the route segment within the Study Area. The passengers per route are the total average Automatic Passenger Counter (APC) counts per day.

Figure 20-Weekday Route performance

Service	Route Type	Route	In-Service Hours	Boardings	PPISH
Weekday					
	Express				
		375	13.8	778	56.25
		94	83.3	4,238	50.89
		365	12.1	596	49.23
		355	20.4	990	48.61
		452	4.8	190	39.51
		353	3.7	117	31.95
	Express Total		138.1	6,909	50.04
	Limited Stop				
		50	88.1	7,227	82.05
		144	8.9	455	51.44
		53	26.8	1,115	41.58
		134	15.7	651	41.57
		262	6.3	110	17.51
	Limited Stop Total		145.7	9,559	65.60
	Local				
		2	103.2	9,040	87.63
		16	218.5	17,037	77.97
		21	218.7	13,972	63.90
		3	177.9	10,857	61.03
		6	198.4	9,238	46.56
		63	101.1	4,190	41.45
		84	93.7	3,879	41.40
		62	38.3	1,468	38.35
		65	37.3	1,320	35.37
		67	55.9	1,743	31.16
		87	31.6	683	21.59
		8	9.3	195	20.96
	Local Total		1,283.9	73,622	57.34
Weekday Total			1,567.7	90,090	57.47

Boardings are the total average of Automatic Passenger Counter (APC) counts per day.

PPISH is the average Passengers per In-Service Hour.

Figure 21-Saturday Route performance

Service	Route Type	Route	In-Service Hours	Boardings	PPISH
Saturday					
	Express				
		94	31.6	1,384	43.84
	Local				
		16	164.4	12,123	73.76
		21	211.8	12,012	56.72
		2	65.5	3,491	53.27
		3	68.8	3,150	45.78
		84	74.9	3,379	45.08
		62	27.5	1,074	39.03
		6	150.8	5,629	37.31
		63	69.9	2,480	35.48
		67	22.3	645	28.96
		65	9.0	259	28.81
	Local Total		865.0	44,243	51.15
Saturday Total			896.5	45,627	50.89

Figure 22-Sunday Route performance

Service	Route Type	Route	In-Service Hours	Boardings	PPISH
Sunday					
	Express				
		94	22.9	899	39.29
	Local				
		16	106.9	7,729	72.30
		21	144.6	8,025	55.49
		2	53.4	2,744	51.36
		84	36.4	1,850	50.87
		62	11.1	516	46.72
		63	29.7	1,154	38.85
		3	58.2	2,182	37.51
		6	123.1	3,809	30.93
		65	5.7	139	24.47
		67	17.0	365	21.40
	Local Total		586.1	28,513	48.65
Sunday Total			609.0	29,412	48.30

Boardings are the total average of Automatic Passenger Counter (APC) counts per day.

PPISH is the average Passengers per In-Service Hour.

4 DEMOGRAPHICS AND LAND USE

Transit ridership levels are affected by population and employment densities, major generators such as shopping malls, schools and universities, as well as population groups most likely to use transit such as youth, seniors, and lower income households. This section of the report outlines the existing demographics in the Study Area.

POPULATION AND EMPLOYMENT DENSITY

Population Density

The Study Area has one of the densest areas of residential population in the region as seen in Figure **23**. Within Minneapolis, there is continuous high density residential area extending east of downtown to the University of Minnesota in the Cedar-Riverside neighborhood, and then east of the campus as far as the city limits with St. Paul. The majority of the residential density within St. Paul extends east-west due to the geographic layout of the city. The higher density residential area in the Study Area extends west of the State Capitol to Lexington Parkway and south of Minnehaha Avenue, north of Summit Avenue. There are additional pockets of residential density centered on Energy Park Drive east of Snelling Avenue, along Rice and Jackson streets, near the St. Paul Campus of the University of Minnesota, at Cleveland and Marshall avenues (near the University of St. Thomas) and along West 7th Street near Sibley Plaza Shopping Center.

Employment Density

The majority of the employment density in the region focuses on downtown Minneapolis and St. Paul. Within the Study Area, the corridors with significant employment density are Lake Street in Minneapolis, and University Avenue, 7th Street and Energy Park Drive in St. Paul, as shown in **Figure 24**. The University of Minnesota and the five schools that make up the Associated Colleges of the Twin Cities (ACTC): Augsburg, Hamline, Macalester, St. Catherine, and St. Thomas are also significant employers in the Study Area.

Retail Centers

Retail centers, like other major activity centers, are large trip generators that usually serve as focal points for transit service. **Figure 25** shows the location of shopping centers in the Study Area. Most of the retail shopping centers are community and neighborhood retail centers. They are mainly located along University Avenue, Grand Avenue, and Ford Parkway. The closest regional retail center is Rosedale. It is complemented by the nearby HarMar Mall shopping area in Roseville, just outside the limits of the Study Area. The next closest regional retail center is the Mall of America located to the south. However, both downtown Minneapolis and St. Paul have subregional retail as well as the area around Midway Shopping Center along University Avenue east of Snelling. Recent research has shown that there is more retail area in the Midway area than at Rosedale. Highland Village on Ford Parkway and Unidale Mall at Dale Street and University Avenue has a concentration of community retail.

Colleges, Universities and Secondary Schools

The Study Area is particularly known for its concentration of post-secondary educational campuses. See **Figure 26** for a map of their locations and the concentrations of student populations, persons aged 20 – 24 years. These are the post-secondary schools are in the Study Area, with full time students, both under-graduate and graduate level:
The University of Minnesota – Minneapolis, University of Minnesota – St. Paul, the Associated Colleges of the Twin Cities (ACTC): Augsburg College, Hamline University, Macalester College, St. Catherine's University - St. Paul, St. Catherine's University – Minneapolis, University of St. Thomas – Minneapolis, and St. Thomas – St. Paul. Other significant educational institutions include the College of Visual Arts, Concordia College, William Mitchell College of Law, and St. Paul Vocational Technical Institute. As summarized in **Figure 27**, there are a total of about 91,542 students at all the post secondary schools in the Study Area and in, or close to Transit Market Area I.

Figure 23-Map of Residential Density

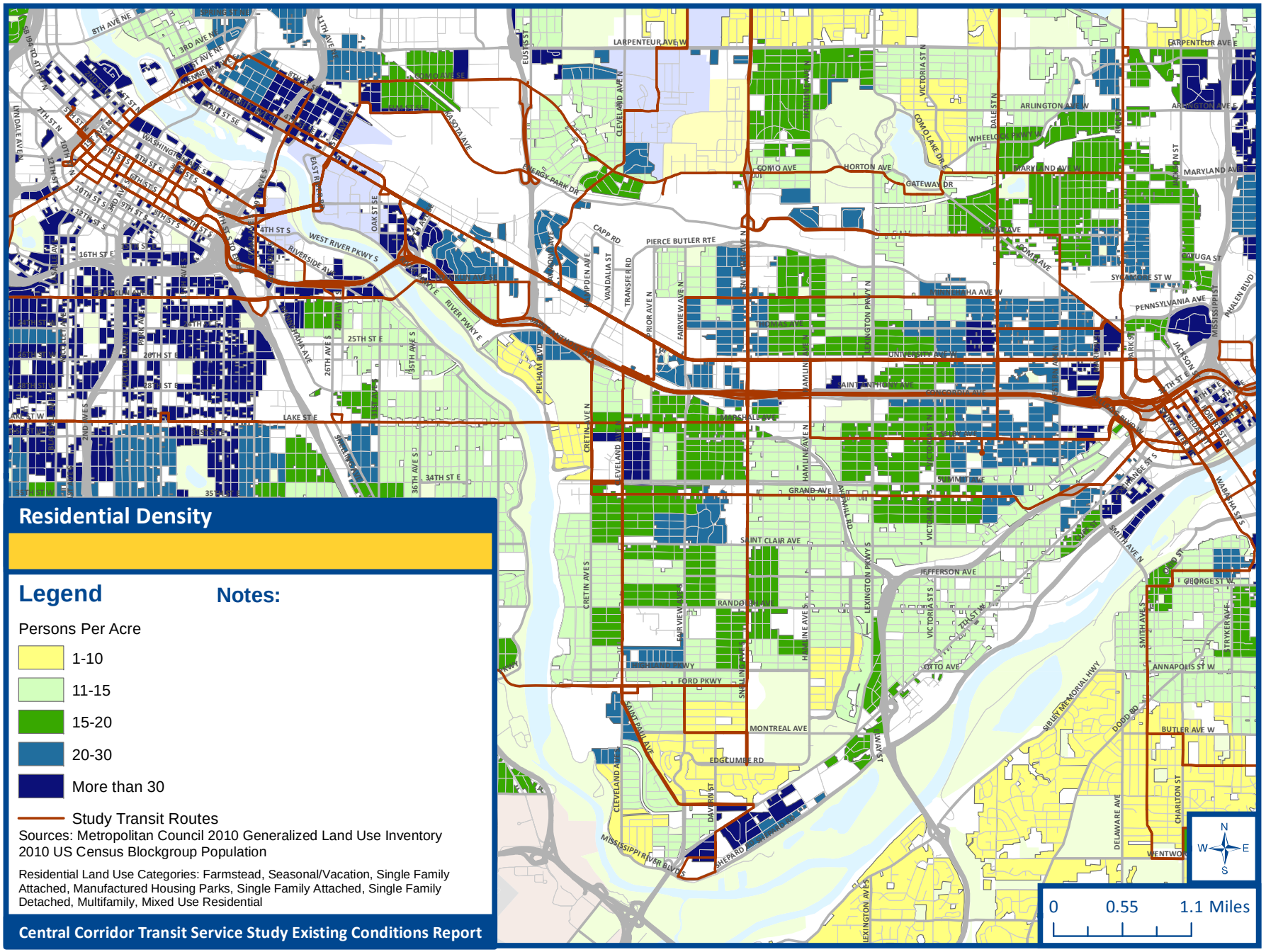


Figure 24-Map of Employment Density

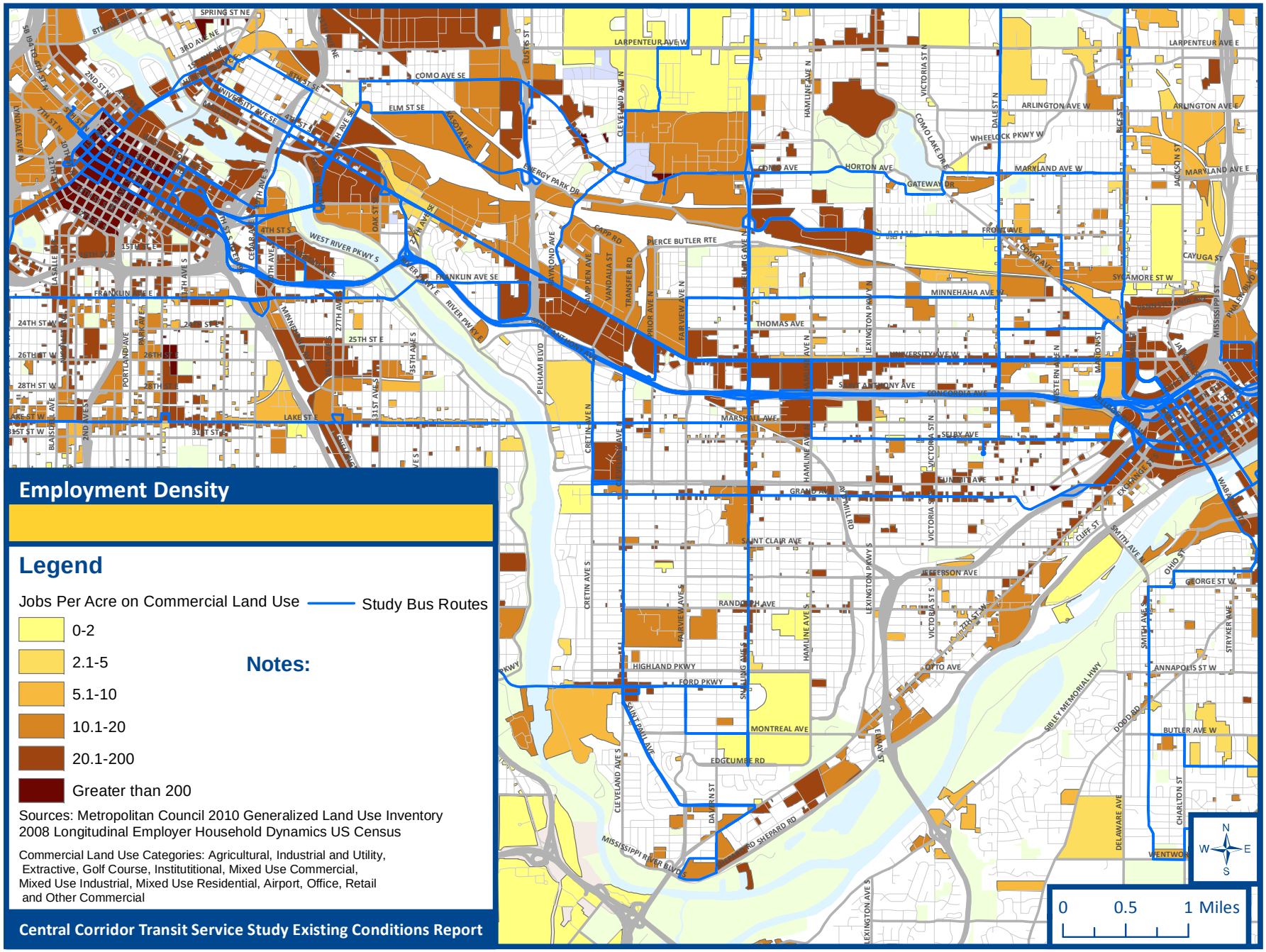


Figure 25-Map of Retail Centers

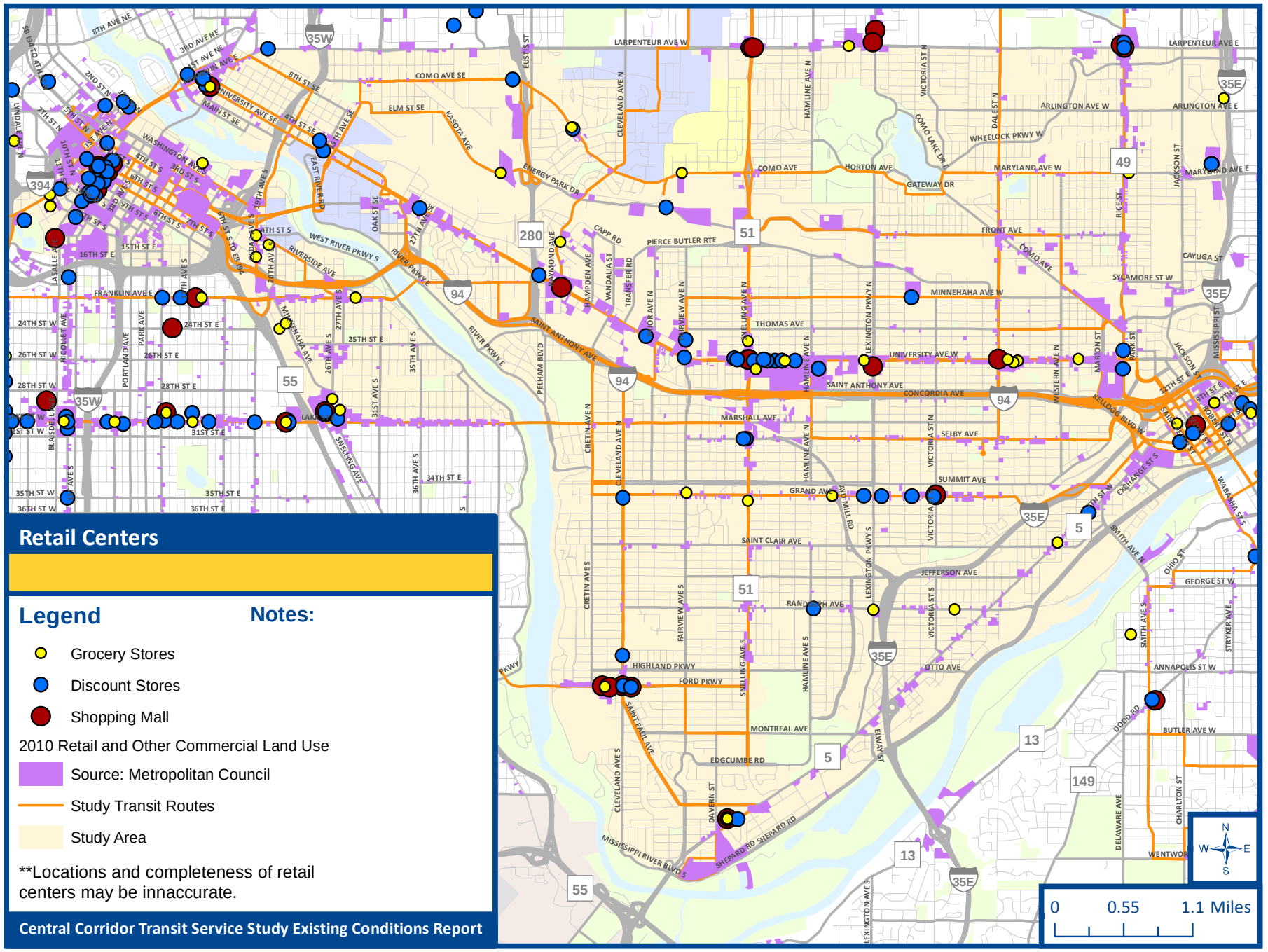


Figure 26-Map of Post-Secondary Schools and Population Ages 20 – 24 Years Old

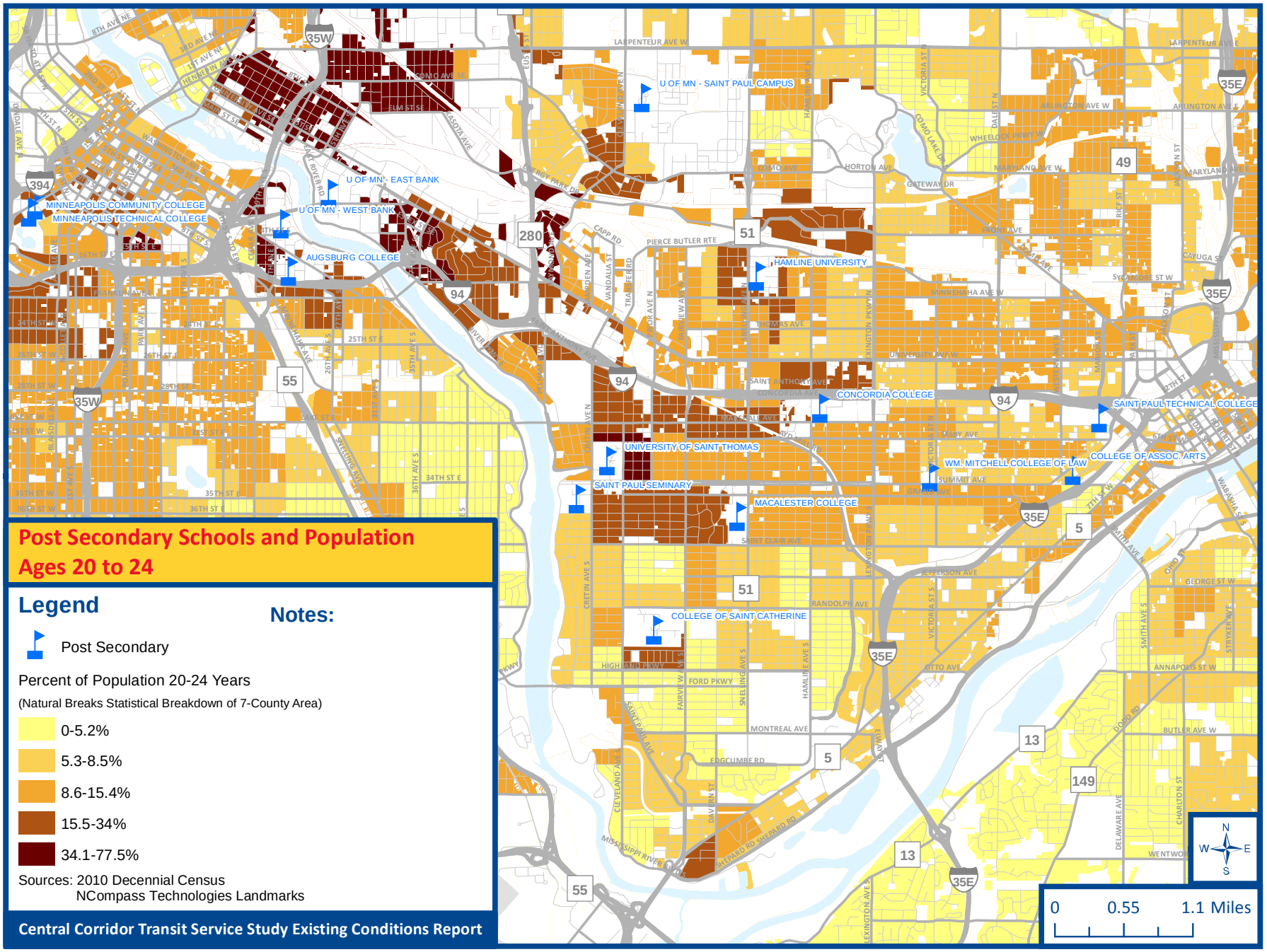


Figure 27-Enrollments in Post-Secondary Schools - Fall 2011

Post-secondary Schools	Weekday Students	Weekend Classes?
Augsburg College, Riverside Ave., Minneapolis	3,936	Minor
Hamline University, Hewitt Ave., St. Paul	4,871	Yes*
Macalester College, Grand Ave., St. Paul	1,987	Minor
St. Catherine's University, Randolph Ave., St. Paul	2,932	Yes
St. Catherine's University, Riverside Ave., Minneapolis	964	Yes
University of St. Thomas, Summit Ave., St. Paul	7,348	Yes
University of St. Thomas, S. 10th St., Minneapolis	3,152	Yes *
Concordia University, Concordia Ave., St. Paul	2,842	Yes
St. Paul College (Technical), Marshall Ave., St. Paul	9,728	Minor
William Mitchell College of Law, Summit Ave., St. Paul	1,025	None
College of Visual Arts, Summit Ave., St. Paul	200	None
University of Minnesota, Minneapolis *(estimate)*	*42,440*	Yes
University of Minnesota, St. Paul *(estimate)*	*10,117*	Yes
Total University of Minnesota	52,557	Yes
Total post-secondary schools	**91,542**	

* School of Law

Youth Population

School-aged children are major contributors to transit ridership, mainly because their mobility needs are dependent on others. **Figure 28** presents the current locations of secondary schools, as well as the percentage of the population in the older high school age category, 16 years to 18 years of age. There are four large High Schools in the Study Area. These include "Central" on Lexington Parkway at Marshall Avenue, "Como Park" on Como at Grotto Street, "Highland Park" on Snelling Avenue near Highland Parkway in St. Paul, and "South" on 31st Street, just west of Hiawatha Avenue in Minneapolis. Other secondary St. Paul schools in the Study Area include "AGAPE", "Gordon Parks High School" and "Washington Tech Secondary Magnet" (ex-Arlington High School). **Figure 29** shows Fall 2010 enrollment of 4,415 at all St. Paul secondary schools in the Study Area for the 10th – 11th – 12th grades. The 9th grade counts indicate that student population will remain stable for the next four years overall for these schools. The school districts in both cities are considering moving toward transportation of high school students via city bus rather than school bus so there is a potential for higher ridership during the school year on Metro Transit bus lines that serve these schools.

The exhibit indicates the highest concentration of youth population is located in St. Paul along the east end of University and Marshall avenues and also along Jackson Street north of downtown. As expected, school enrollment appears to closely match the youth population distribution. The youth market is particularly important to transit in both the short term and long term. In the short term, youth are dependent on others for mobility making them a prime market for transit, especially with after-school travel. The long term potential is based on retaining them as riders into their adult lives by providing superior service that meets their changing mobility needs. The Minneapolis school district is considering regular route bus service for middle and high school students to replace yellow school bus service. A key element for refining transit service in this sector will be consideration that universities, colleges, and senior high schools have good connections to their student communities.

Figure 28-Map of Secondary Schools and Population Ages 16 to 18 Years Old

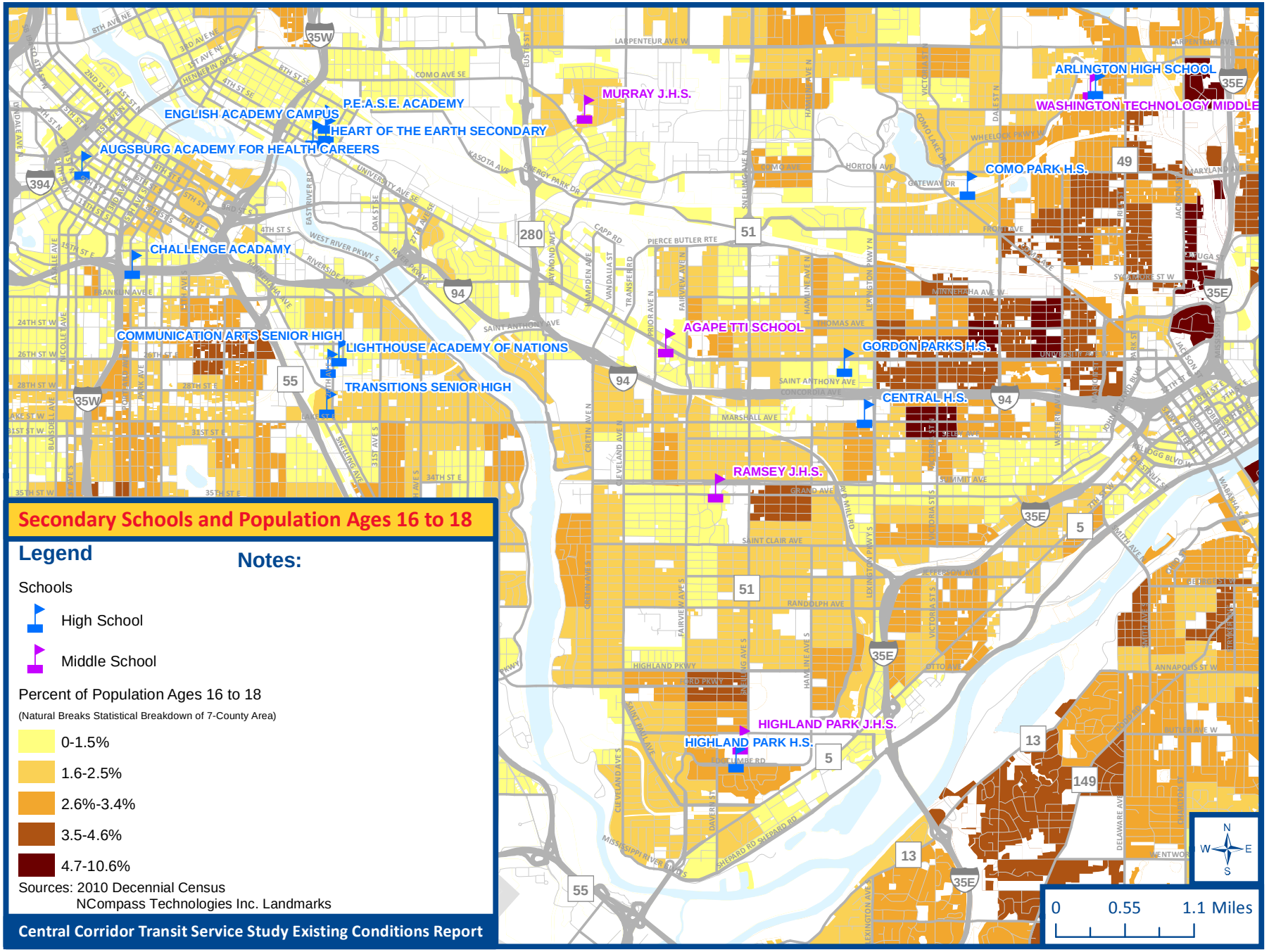


Figure 29-Enrollments in St. Paul Secondary Schools - Fall 2010

Students in 10th, 11th and 12th grades ages about 16 - 18 years.

Secondary Schools in St. Paul CC Study Area	Weekday Students
AGAPE Teen Parent High School, Prior Ave.	104
Central High Senior School, Lexington Ave. S.	1,665
Como Park Senior High School, Maryland Ave. W.	1,200
Highland Park Senior High School, Snelling Ave. S.	1,125
Gordon Parks High School	247
Washington Tech Secondary Magnet School, Arlington*	74
Total secondary schools in CC Study Area =	**4,415**

Note* Washington Technical Secondary was Arlington High School until 2010.

Senior Population

Like the youth population, the senior population is a market segment that has special mobility needs that can be served well by transit. Transit can replace the personal vehicle when driving is no longer possible or available and transit is much less costly for those on fixed incomes. The areas with the greatest senior population density are primarily in the more suburban areas of the region. **Figure 30** shows the senior population concentrations within the Study Area as well as senior housing sites.

It is evident that the majority of these housing sites account for much of the senior population density in a given location. St. Paul has a notable concentration of seniors living along the southern end of Lexington Parkway in high-rise residential centers as well as south of the West 7th Street corridor and west of I-35E. Como, Minnehaha Avenue, Franklin Avenue SE and the east end of University Avenue also have concentrations of senior population. The principal mobility focuses for seniors are good access by transit to community activities, medical appointments, and shopping.

Households in Poverty

The areas with greatest amount of poverty are situated near the downtown/urban core of both Minneapolis and St. Paul. **Figure 31** shows the greatest concentrations are located just south of downtown Minneapolis as well as north of downtown St. Paul and along 7th Street and University Avenue in St. Paul. These areas of high poverty are also known for their ethnic diversity and are often homes to first generation immigrants. Effective transit can be the substitute for the expense of automobile ownership and contribute in a strong way to the climb out of poverty. **Figure 32** maps household incomes to complete the picture of the economic situation of residents in all parts of the Study Area.

Figure 30-Map of Population Aged 65+

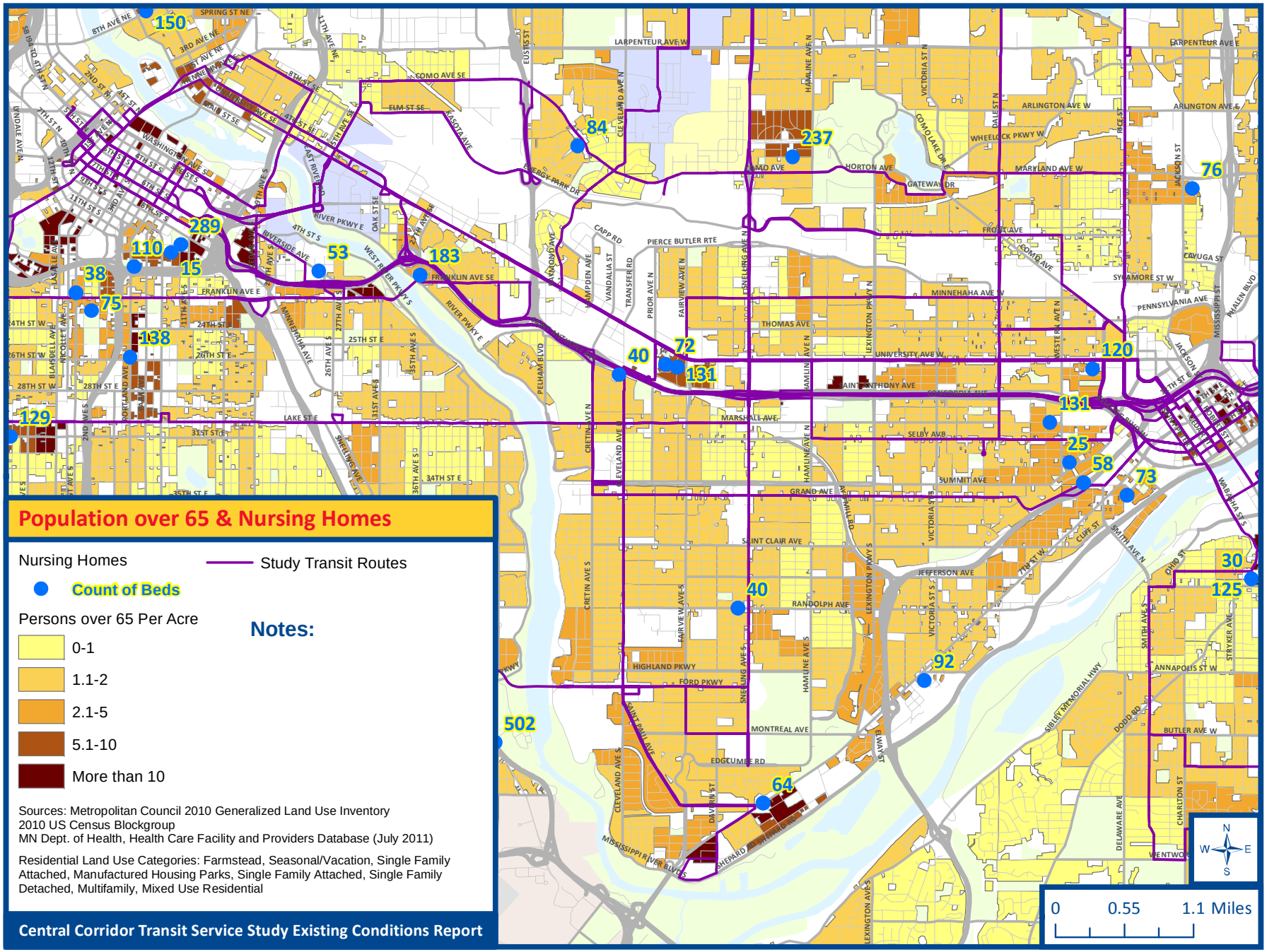


Figure 31-Map of Population in Poverty

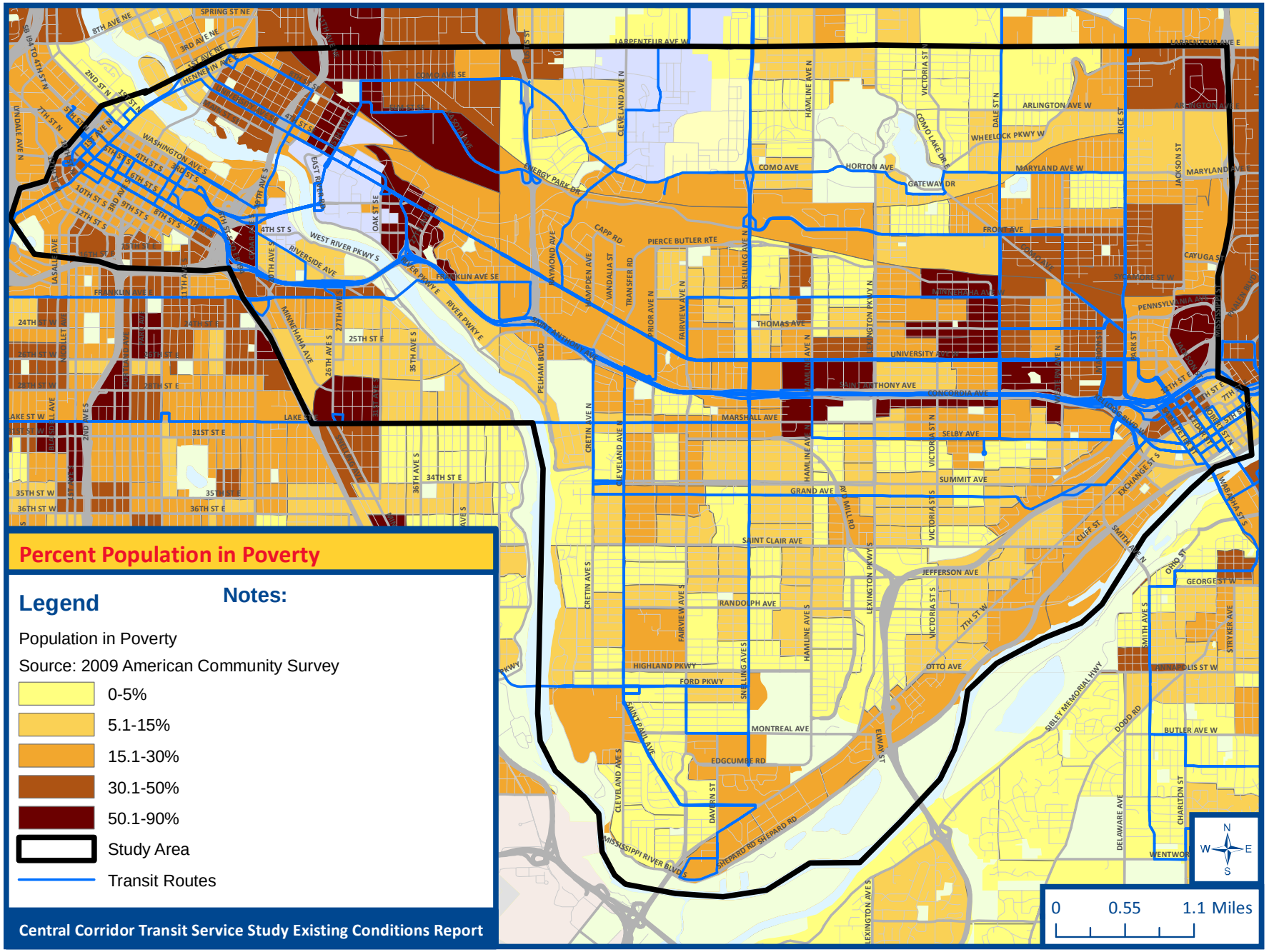
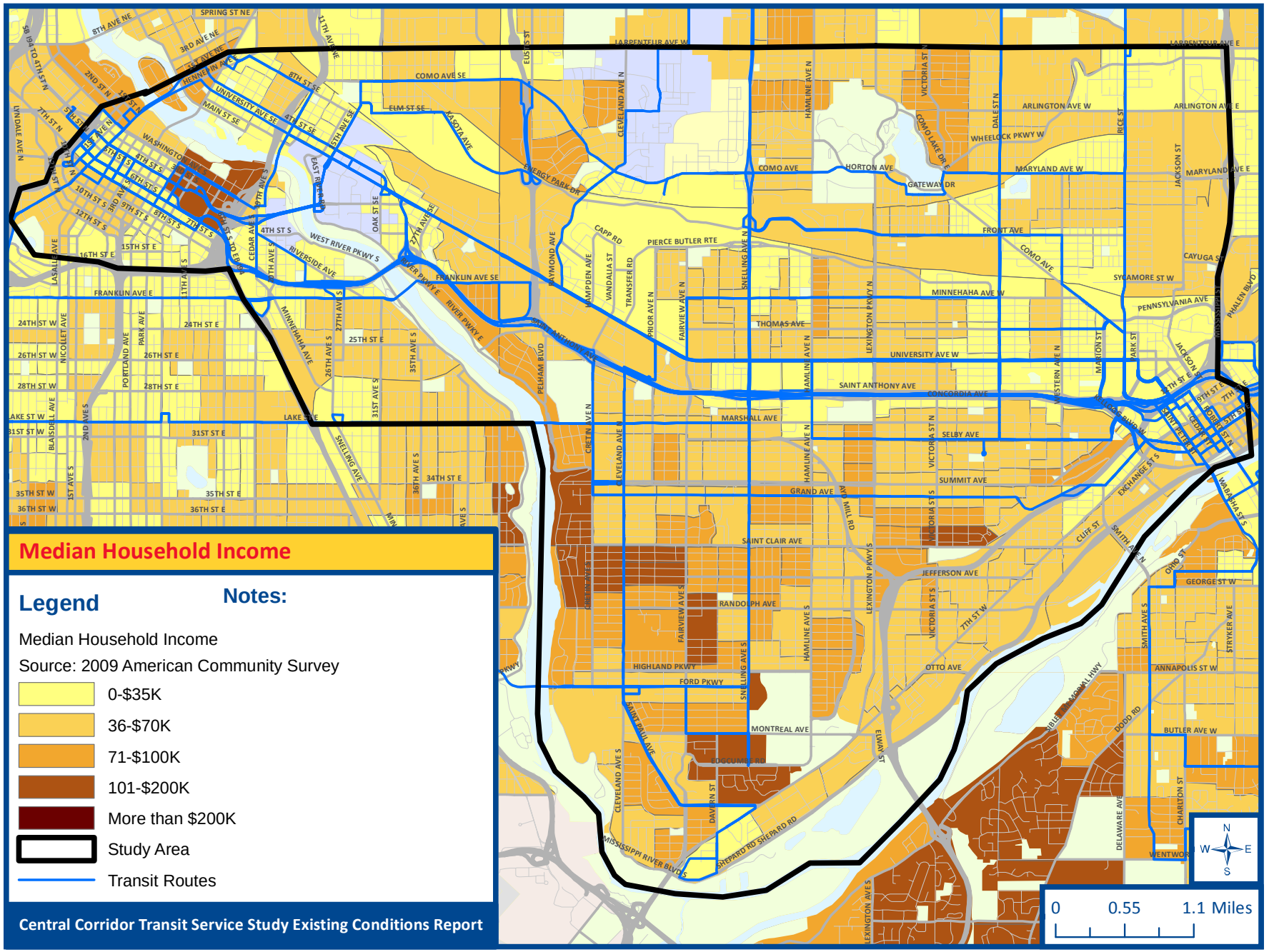


Figure 32-Map of Household Income



5 SUMMARY OF DEFICIENCIES AND OPPORTUNITIES

The Study Area is dominated by Transit Market Area I in the core area that lies about one mile either side of University Avenue. In the City of St. Paul this is the area south of Como Avenue and north of St. Clair Avenue. This core area generally has existing transit service characteristics that fit the standards for Transit Market Area I, with the exception of *frequency and span*, which are substandard on evenings and weekends. On Sundays, the only consistently high frequency service (defined as every 15 minutes or better) is found on the University Avenue bus line itself. Examples of bus routes that do not meet Transit Market Area I standards are routes 8, 65 and 67.

Transit Market Area II is found in the Study Area between the University of Minnesota and the St. Paul City limits with Minneapolis, north of Pierce Butler Route and generally south of Grand Avenue in St. Paul. Route 87 is located mostly in Transit Market Area II in the Study Area. But it doesn't meet the service standards for Transit Market Area II, since it has no evening or weekend service.

Frequencies in Transit Market Area I should be no less than every 30 minutes every day, according to service design standards in the Transportation Policy Plan, but on many of the routes that serve the core part of the Study Area, hourly service is the rule on evenings and on weekends.

Similarly, service design standards call for span of service for Transit Market Area I of at least 18 hours, seven days per week, but most bus routes that closely parallel or cross University Avenue in the adjacent neighborhoods operate for eight to 10 hours on Saturday or Sunday. These bus routes usually begin service at 9:00 am and end service by 9:00 pm on Saturdays and as early as 6:00 pm on Sundays.

Service coverage is generally in compliance with service design standards, with the exception of urban cross-town route spacing. Dale Street and Snelling Avenue are two miles apart, but cross-town bus routes should be one mile apart in Transit Market Area I. Therefore, there should be another cross-town bus route added between Snelling and Dale, at least in Transit Market Area I from roughly Selby Avenue to Energy Park.

At the current span of service, the Green Line trains would not have any connecting bus service to large areas of Transit Market Area I on late evenings and weekends. Every opportunity should be explored to re-invest in the local connecting bus route network, especially in Transit Market Area I.

Opportunities will exist for a significant improvement in the connecting bus service network given a strong emphasis on providing frequent connecting bus service with Green Line trains at all times. Duplicative radial bus lines to the downtowns should be curtailed to the maximum extent possible during the peak and off-peak hours. The resources should be reinvested in more frequent cross-town and feeder bus lines that operate at compatible frequencies to the Green Line for reliable connections every time. Bus hours should be added to fill in the gaps in bus service span daily. Priority should be placed on improving the frequencies of bus service operating in Transit Market Area I. This approach could require that some cross-town bus routes end near the borders of Transit Market Areas I and II. Investment in improved bus turnarounds could be necessary to provide the most efficient bus service possible.

Connecting bus service will be much more critical to the success of the Green Line than has been the case with the Hiawatha or “Blue” Line. This is because the critical difference between the Central Corridor and the Hiawatha Corridor is that Hiawatha is not strictly an urban corridor, but a hybrid urban/suburban corridor with significant park & rides at most of its suburban stations. Access by automobile to the Hiawatha Corridor line is significant, but will be insignificant in the Central Corridor Study Area. Every effort should be made to achieve the ridership goals for the Green Line without the undesirable impacts of unsanctioned park & riding (or “hide and riding”) near the Green Line stations along University Avenue. Access by foot, by bus, and by bicycle must be the rule along the Green Line.

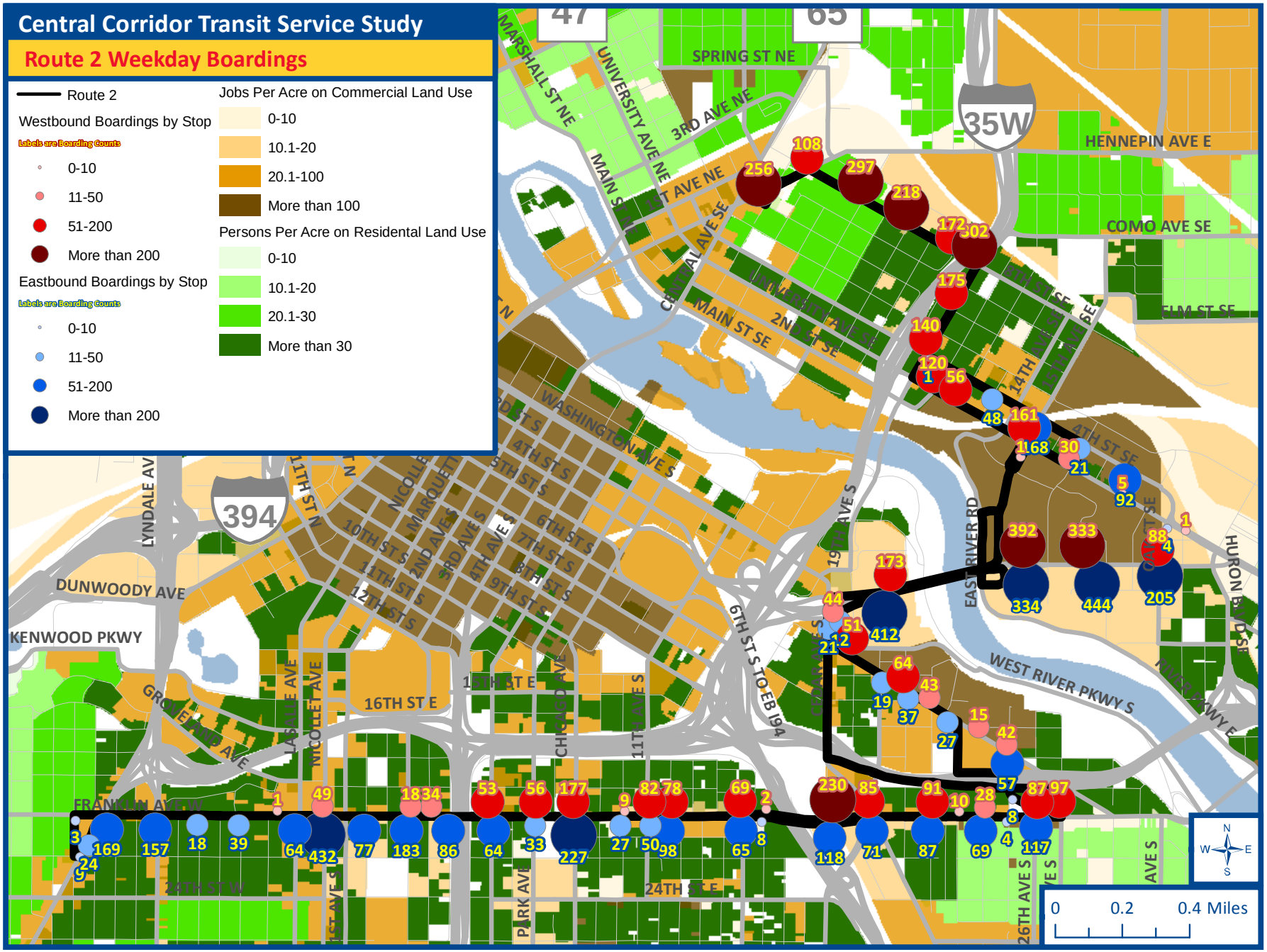
APPENDIX

Route Profile Table

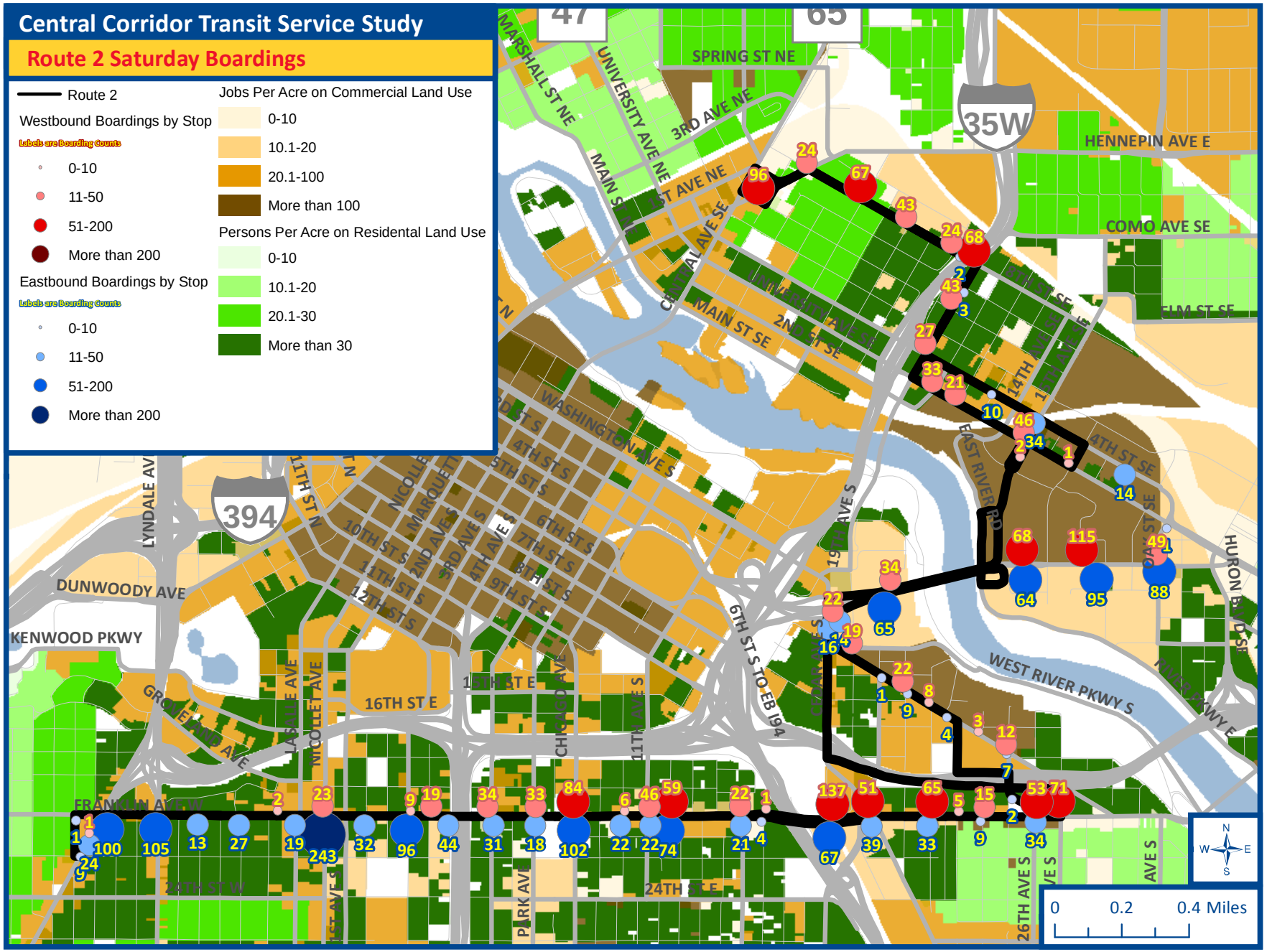
2010 Central Corridor Study Area Bus Routes

	General Information	Weekday							Saturday							Sunday							Annual		
Route	Route Description	In-service hours	Platform Hours	Daily bus trips	Peak buses	Average Speed	Average daily rides	Passenger/ In-Service Hour	In-service hours	Platform Hours	Daily bus trips	Peak buses	Average Speed	Average daily rides	Passenger/ In-Service Hour	In-service hours	Platform Hours	Daily bus trips	Peak buses	Average Speed	Average daily rides	Passenger/ In-Service Hour	Annual Cost	Annual Revenue	Subsidy/ Passenger
2	Franklyn, Riverside,Washington, 8 th St SE	103.2	141.0	150	9	10.0	7606.0	73.7	65.5	85.5	103	5	11.2	3542.0	54.1	53.4	73.3	87	6	11.6	2270.0	42.5	$4,824,231	$1,694,791	$1.53
3	Rice, Maryland, Como, 15th Ave, Washington	177.9	252.2	231	20	13.5	10661.0	59.9	68.8	90.7	76	5	14.3	3036.0	44.1	58.2	70.1	68	5	15.2	2089.0	35.9	$7,981,063	$2,276,298	$2.27
6	University, 4th St, Hennepin, Xerxes, France	198.4	262.7	216	21	12.2	8856.0	44.6	150.9	195.0	164	14	12.9	5446.0	36.1	123.2	161.0	139	10	13.4	3355.0	27.2	$9,596,906	$2,689,809	$2.61
8	Franklyn Ave. East, Emerald, University	9.3	14.0	50	1	13.3	172.0	18.5															$400,655	$49,739	$7.60
16	University, Washington	218.5	281.9	230	15	10.6	16880.0	77.3	164.4	211.6	191	14	12.2	12082.0	73.5	106.9	137.4	128	9	12.5	7110.0	66.5	$10,025,016	$3,731,286	$1.26
21	Selby, Hamline,University, Snelling, Marshall, Lake	218.7	281.8	245	18	10.0	13138.0	60.1	211.8	275.1	267	18	10.1	11242.0	53.1	144.6	195.3	186	13	10.8	7351.0	50.8	$10,810,708	$3,004,830	$1.82
50	University, Washington	88.1	132.8	144	17	11.8	6886.0	78.2															$3,532,795	$1,307,643	$1.47
53	I-94, Snelling, Marshall, Lake	26.8	35.2	30	6	13.2	1054.0	39.3															$992,385	$303,536	$2.47
62	Rice , Hodgson	38.3	60.1	74	3	15.6	1474.0	38.5	27.5	43.1	67	3	15.4	987.0	35.9	11.1	19.4	38	1	12.8	523.0	47.3	$2,034,153	$671,301	$3.01
63	Grand, East 3rd St	101.1	128.2	109	10	13.1	4037.0	39.9	69.9	88.1	74	5	13.6	2365.0	33.8	29.7	37.3	36	2	14.3	1068.0	36.0	$4,381,157	$1,110,230	$2.75
65	Selby, Dale, Co Rd B, Snelling	37.3	49.7	58	4	15.1	1268.0	34.0	9.0	11.6	22	1	18.2	256.0	28.4	5.7	7.6	14	1	18.3	122.0	21.4	$1,523,064	$337,643	$3.56
67	Fairview, Minnehaha, Dale, Thomas, Smith	55.9	71.0	68	5	14.8	1665.0	29.8	22.3	27.1	27	2	15.5	607.0	27.2	17.0	20.1	20	2	14.9	336.0	19.7	$2,301,998	$464,619	$3.98
84	Snelling, Ford Pkwy, 46th St, St Paul Ave,	93.7	132.1	143	8	16.0	3763.0	40.2	75.0	105.0	123	7	16.7	3372.0	45.0	36.4	51.5	64	3	17.3	1637.0	45.0	$4,741,185	$945,430	$3.20
87	Cleveland, University, Raymond, Fairview	31.6	42.8	52	3	15.1	675.0	21.3															$488,415	$181,645	$1.89
94	I-94	83.3	121.2	154	13	20.4	4213.0	50.6	31.6	50.0	68	3	23.2	1492.0	47.3	22.9	37.8	48	3	22.9	947.0	41.4	$3,975,924	$1,367,141	$2.28
134	Cleveland, Cretin, I-94	15.7	27.4	30	5	15.5	574.0	36.7															$769,086	$291,954	$3.26
144	Snelling, I-94	8.9	16.5	12	4	14.2	423.0	47.8															$467,693	$197,142	$2.60
262	Rice, Hodgson, 85th Ave, Lexington	6.3	9.4	6	3	18.0	146.0	23.2															$203,887	$43,174	$5.52
353	Queens Dr, Valley Creek, I-494, I-94	3.7	6	4	0.0	22.1	110.0	30.0																	
355	Queens Dr, Valley Creek, I-494, I-94, University	20.4	38	25	10.0	24.2	932.0	45.8																	
365	Point Douglas, Hwy. 61, I-94	12.1	26	15	5.0	28.9	544.0	45.0																	
375	Inwood/Radio, I-94	13.8	30	20	7.0	27.0	755.0	54.6																	
452	Dodd, Mendota,<arie, Oakdale, I-94	4.8	7	6	3.0	24.1	165.0	34.3																	
		1567.7							896.6							609.0									

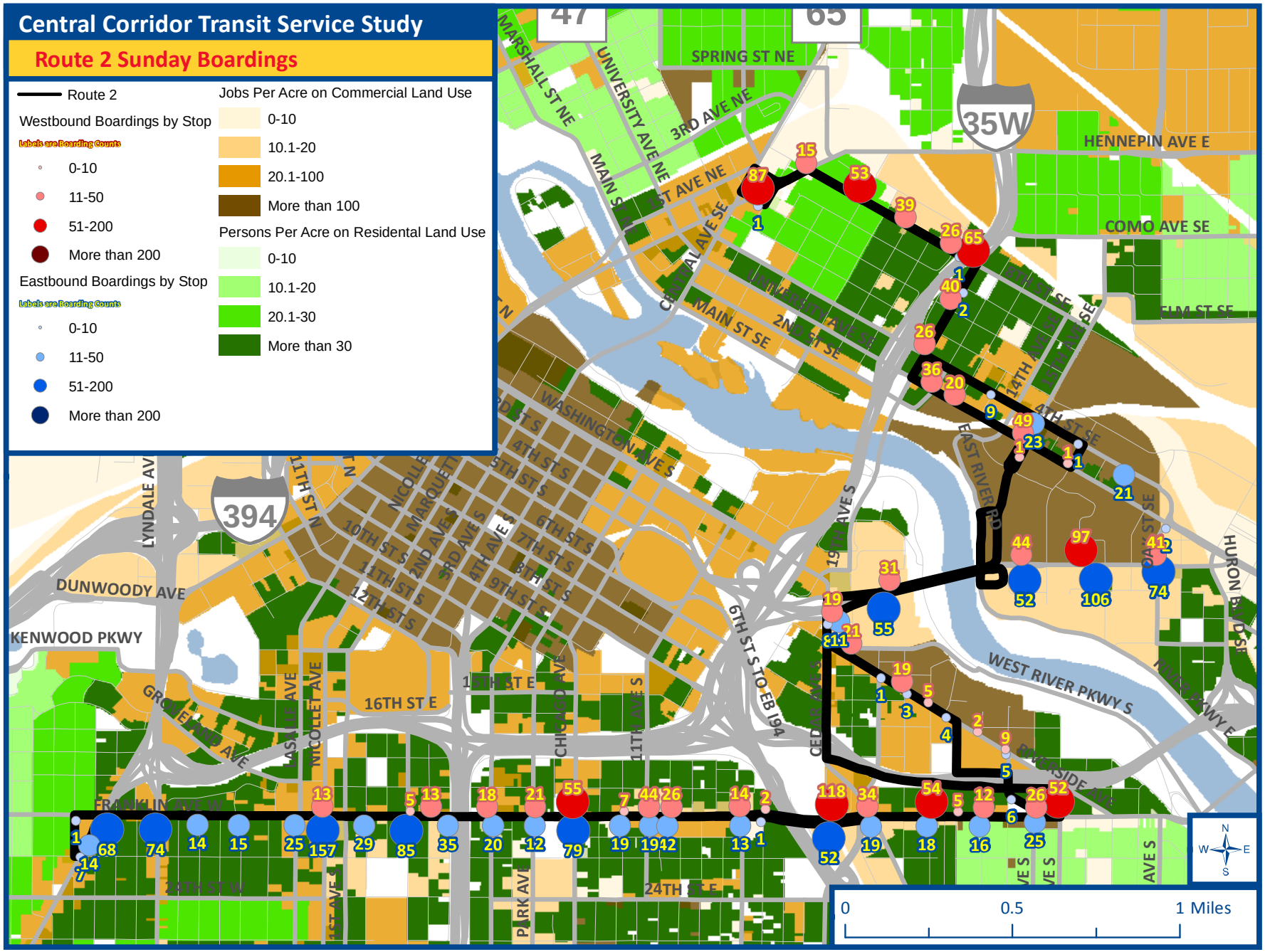
Route 2 Weekday Boardings



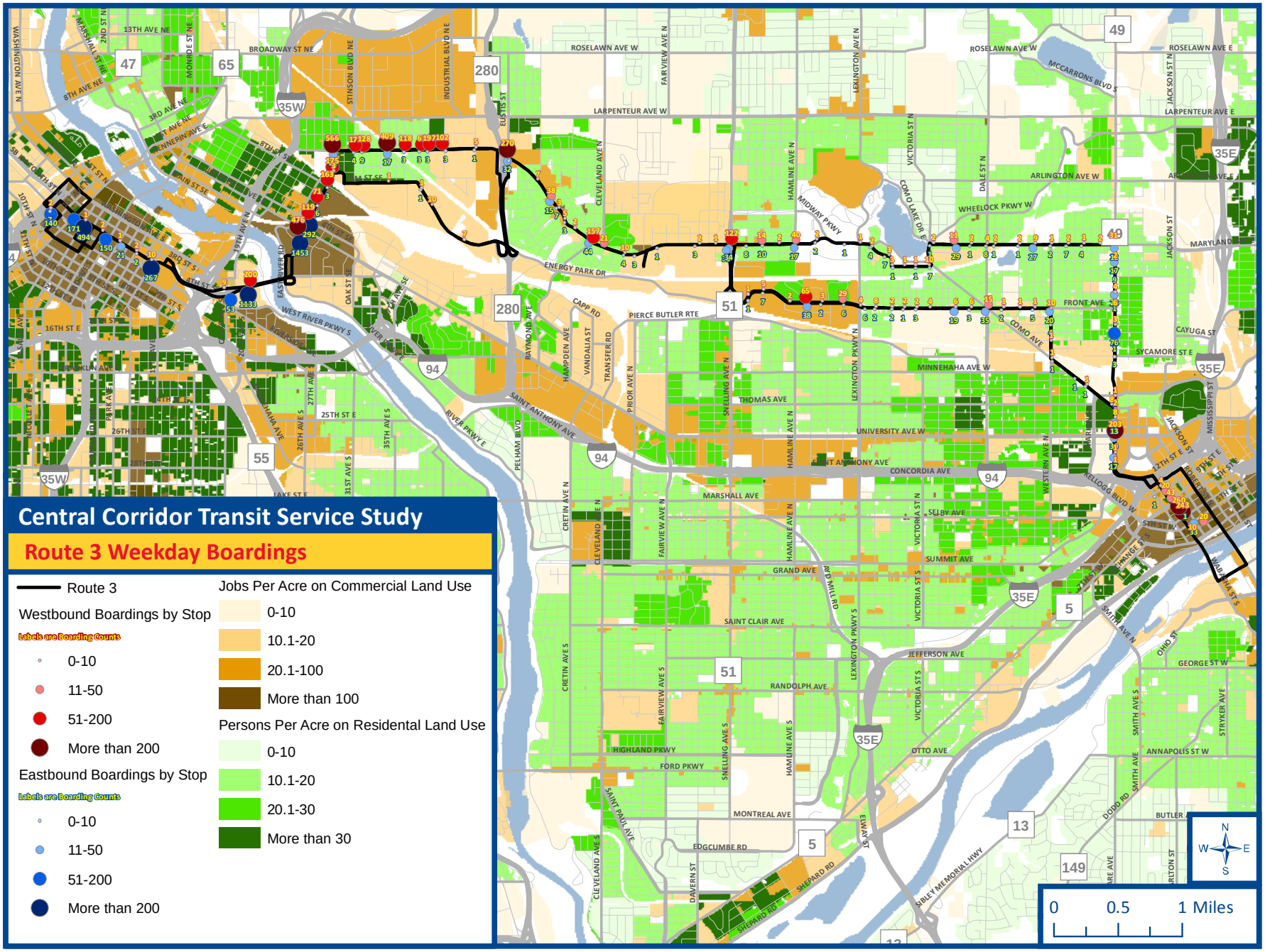
Route 2 Saturday Boardings



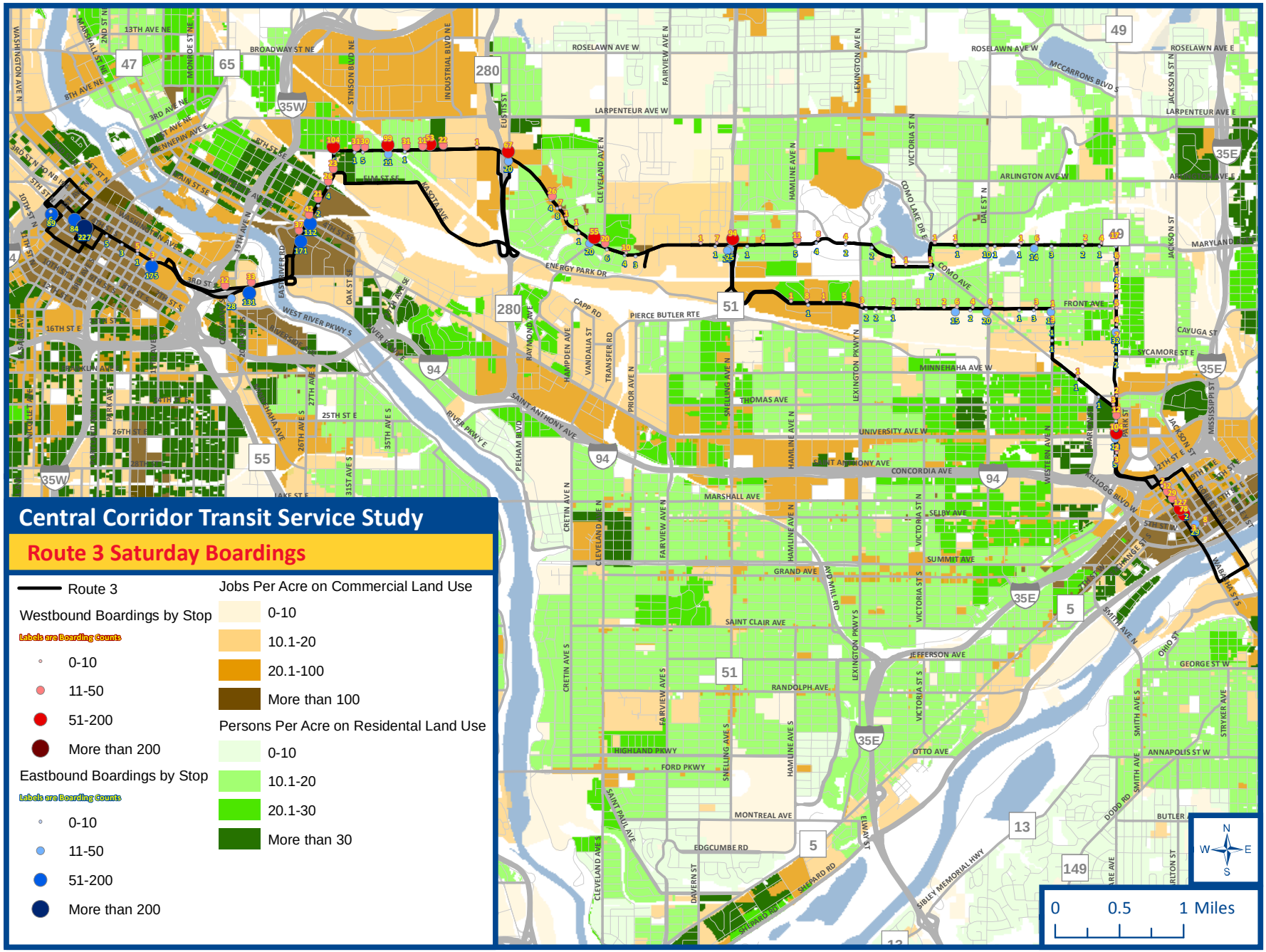
Route 2 Sunday Boardings



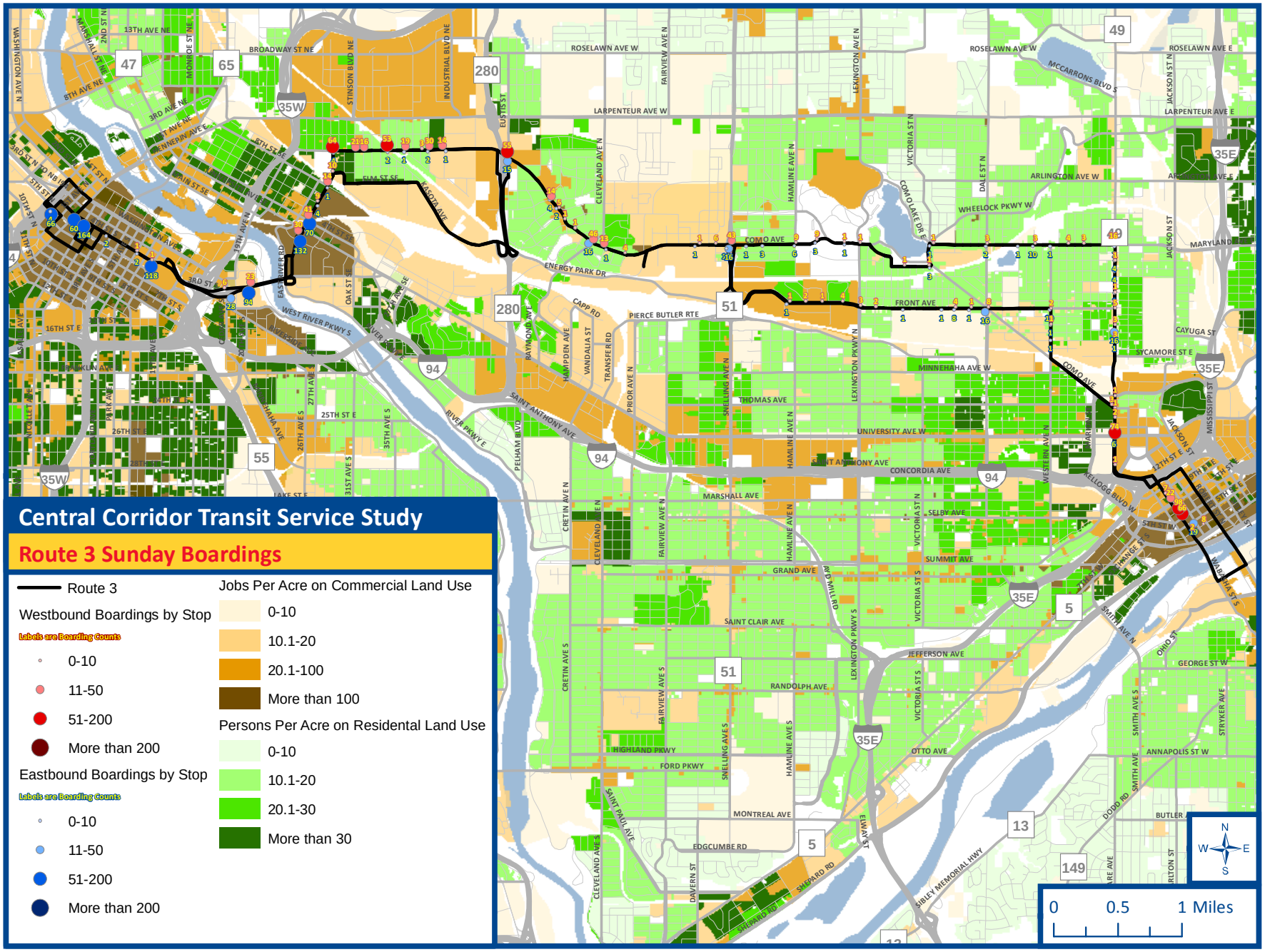
Route 3 Weekday Boardings



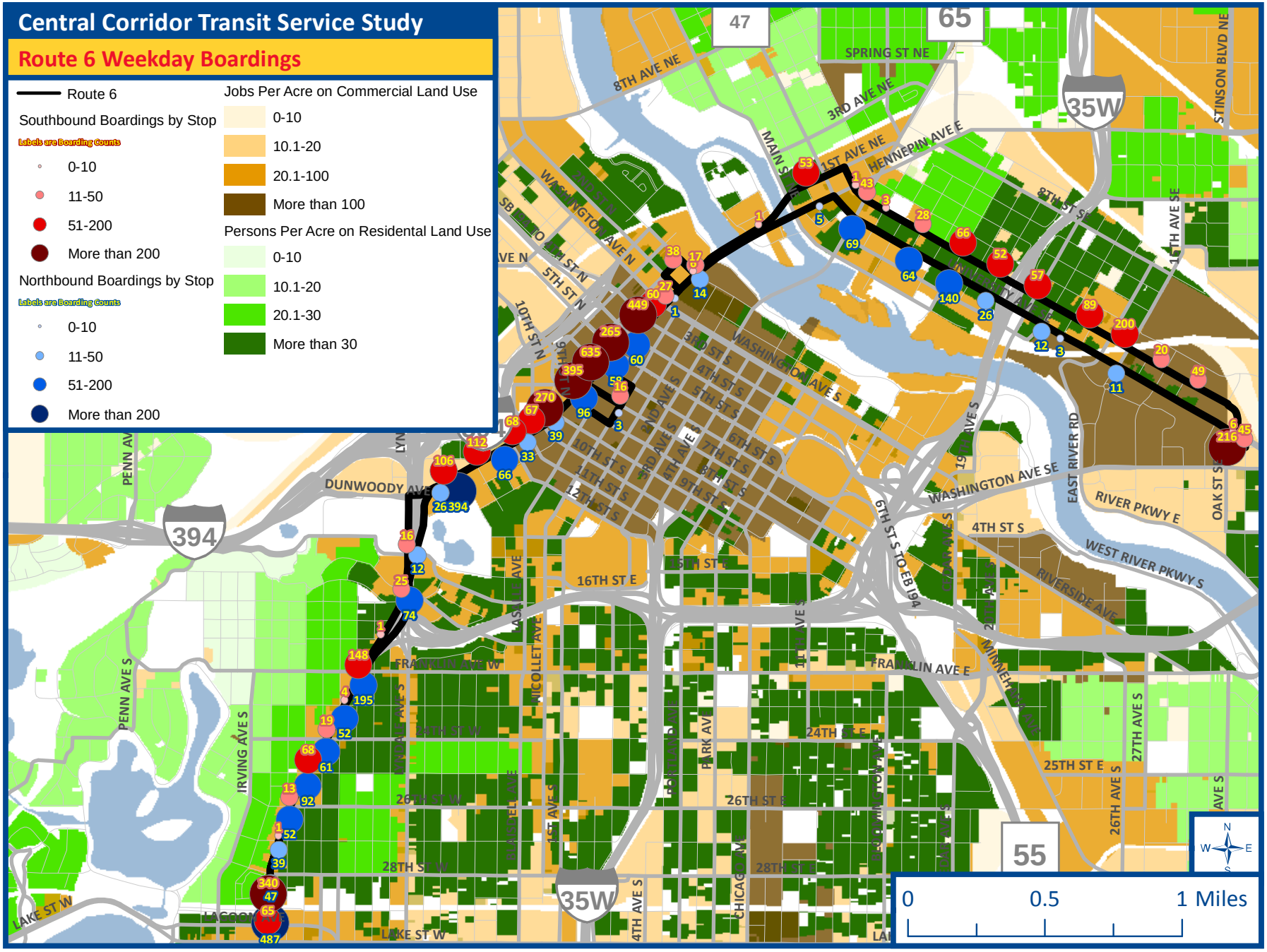
Route 3 Saturday Boardings



Route 3 Sunday Boardings



Route 6 Weekday Boardings



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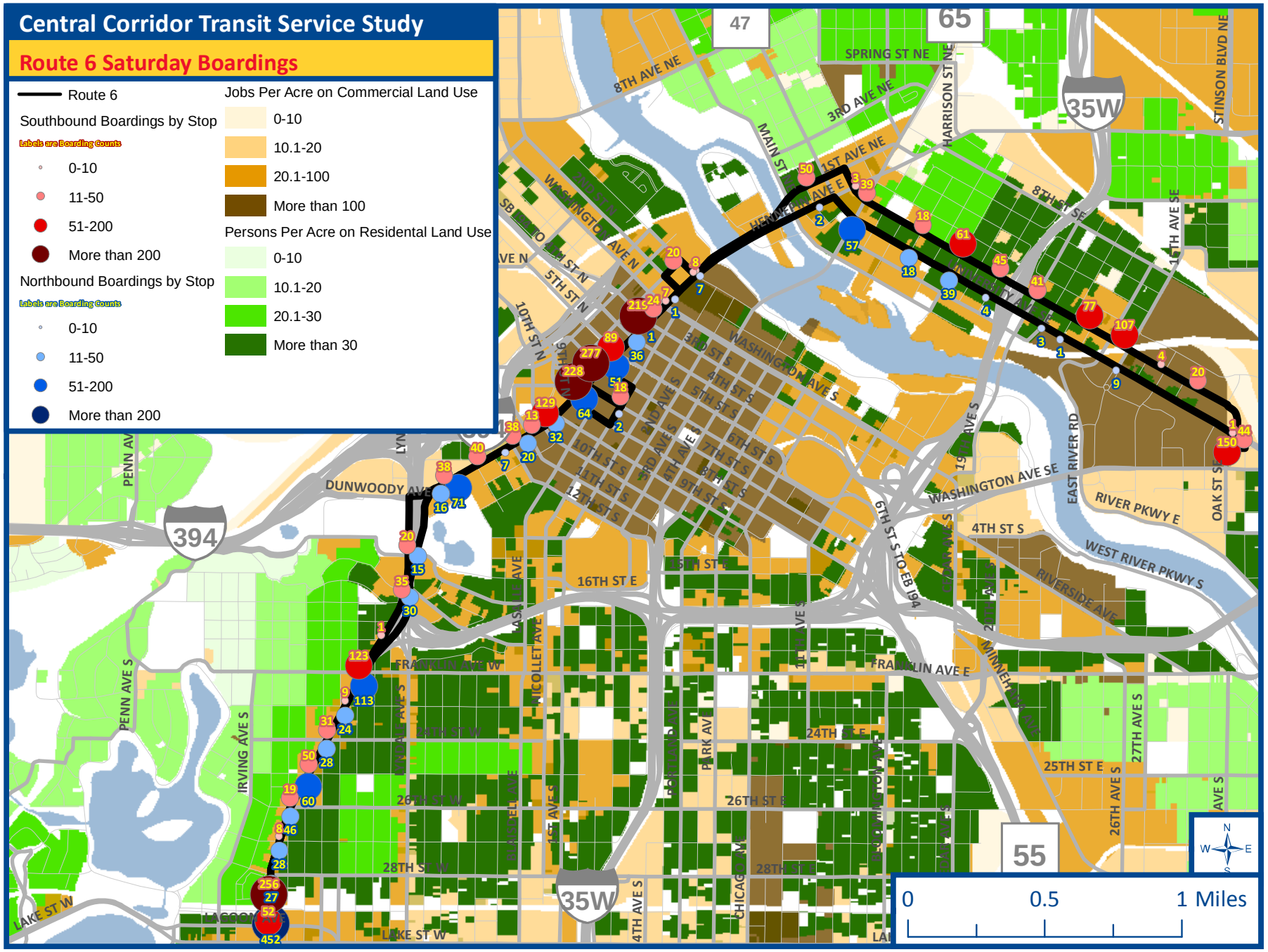
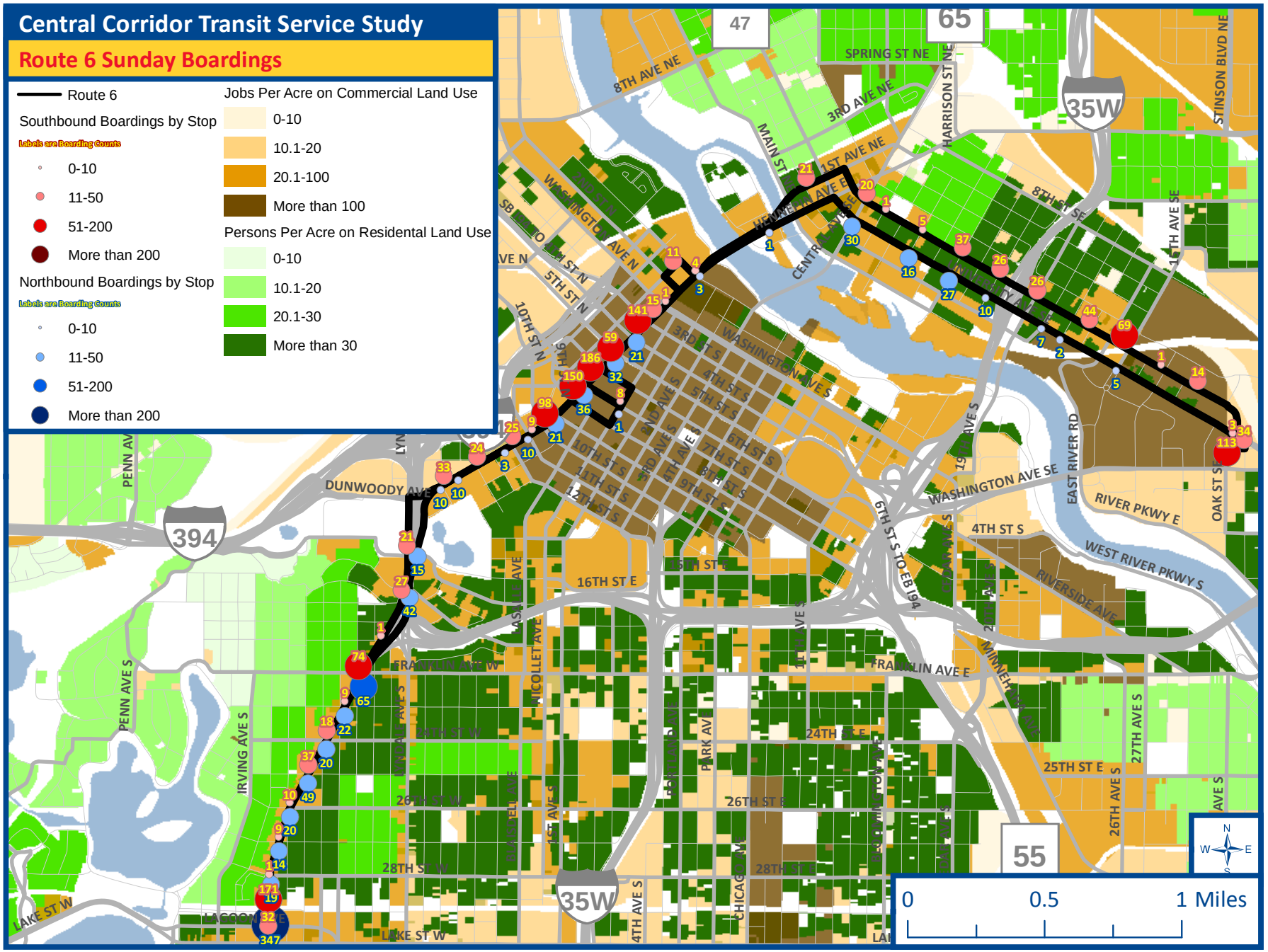
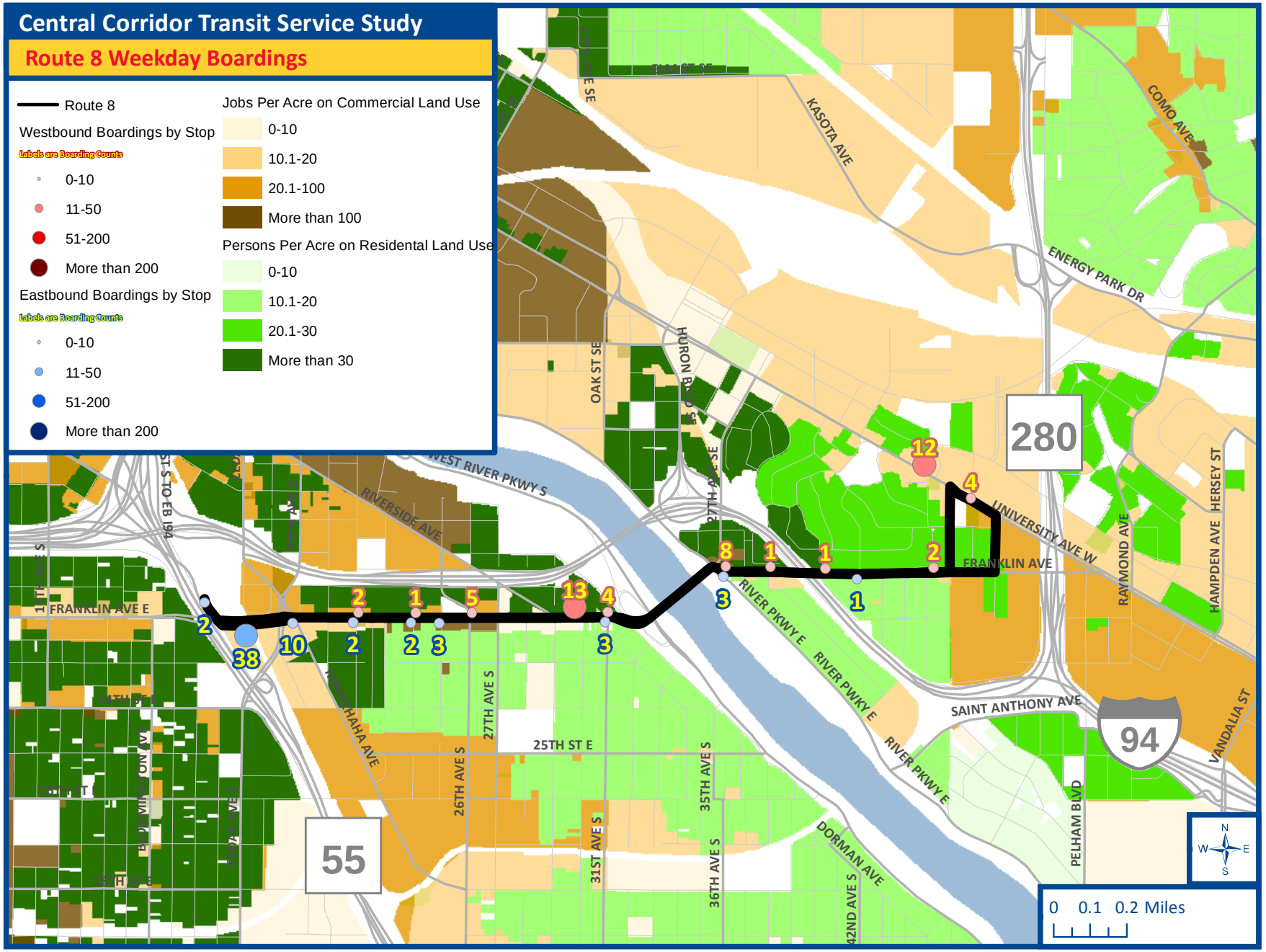


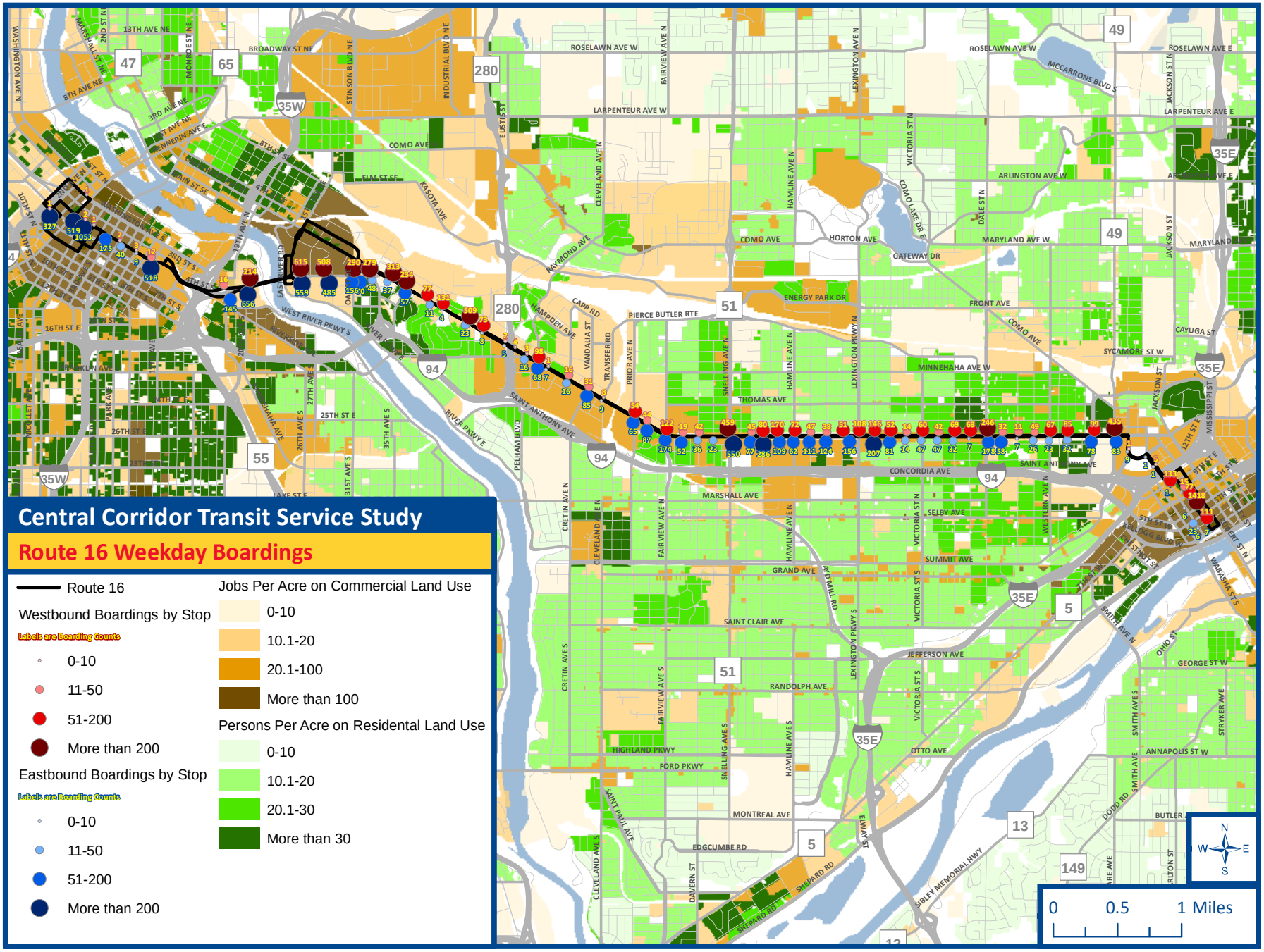
Route 6 Sunday Boardings



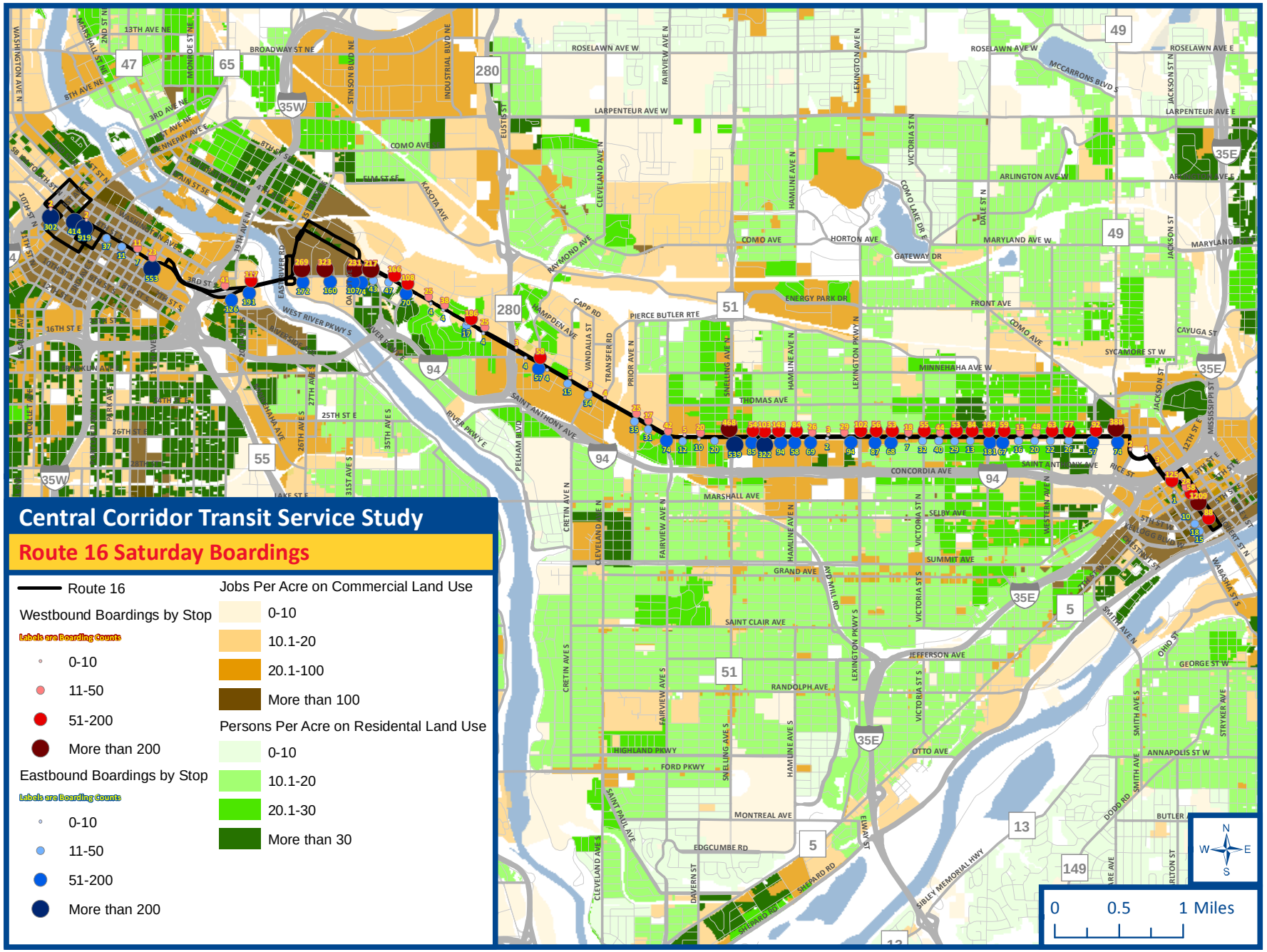
Route 8 Weekday Boardings



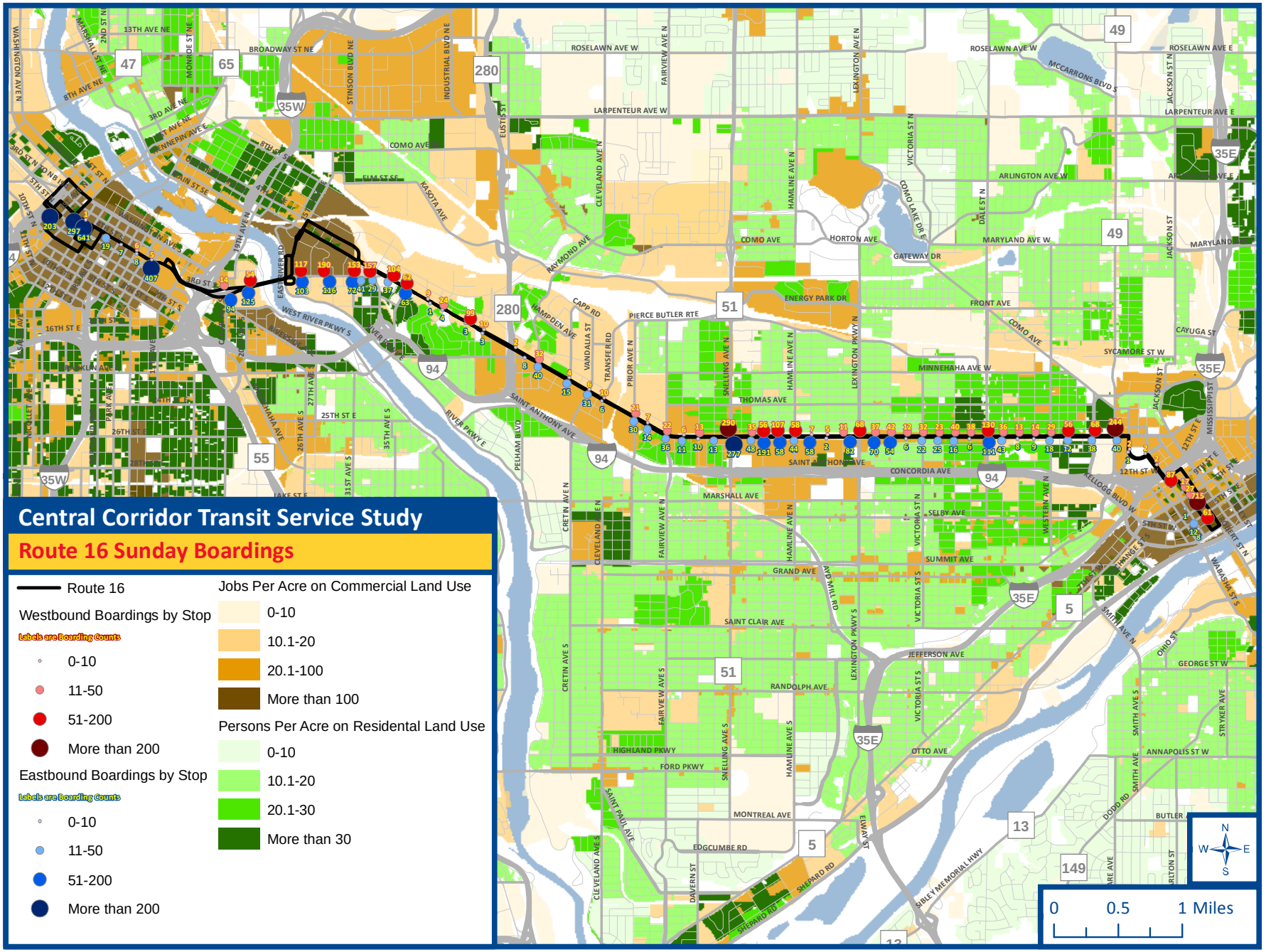
Route 16 Weekday Boardings



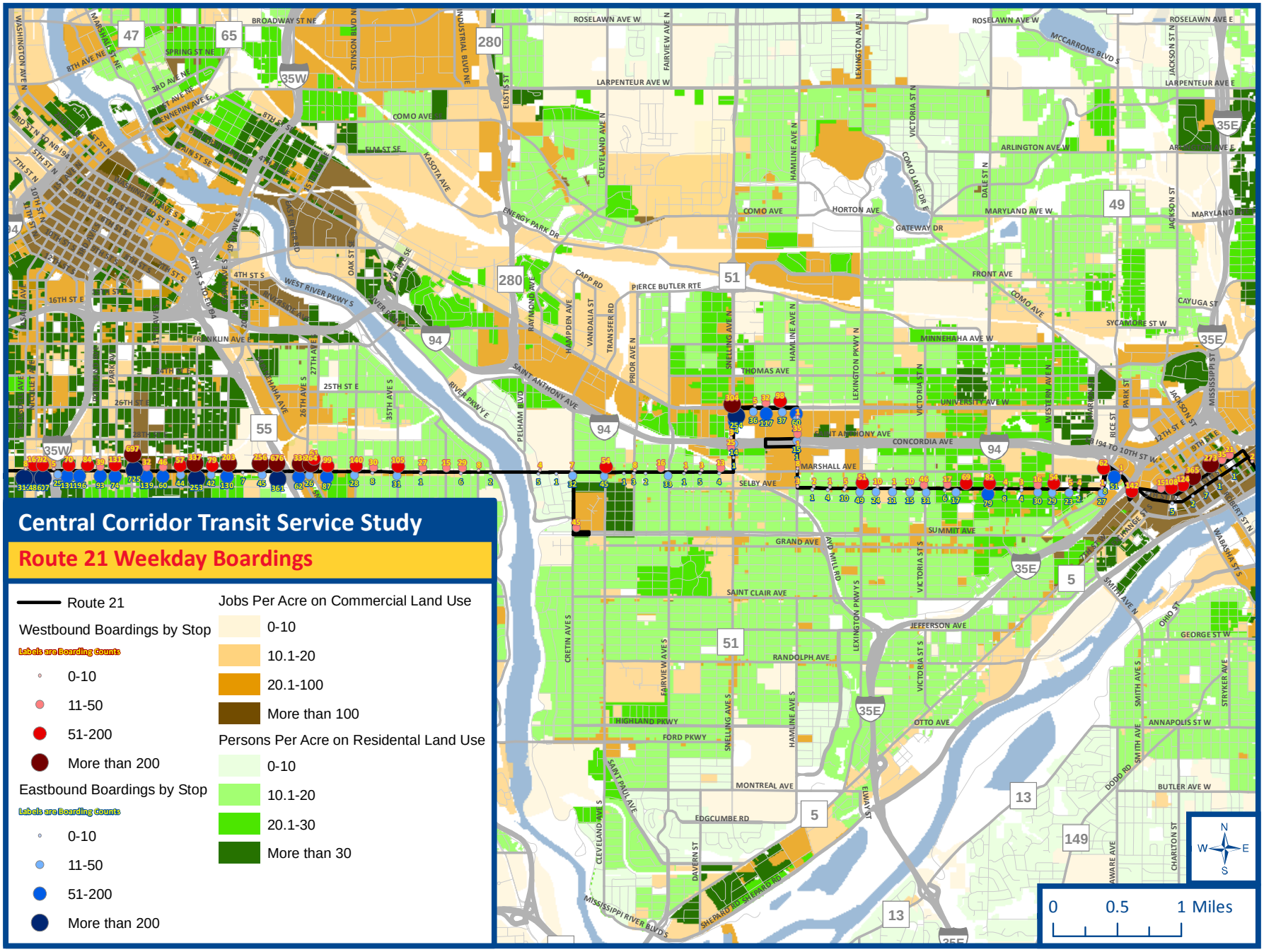
Route 16 Saturday Boardings



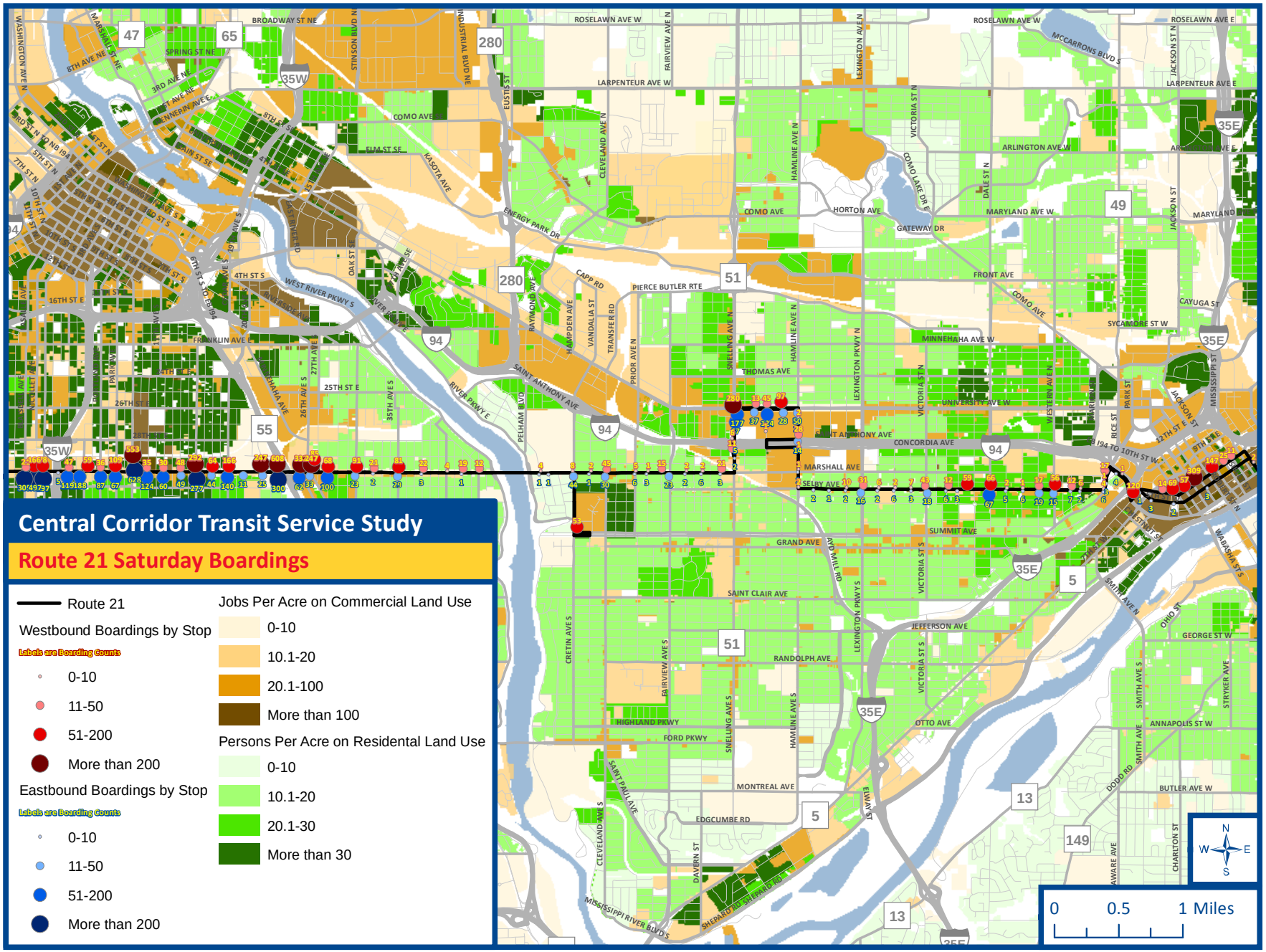
Route 16 Sunday Boardings



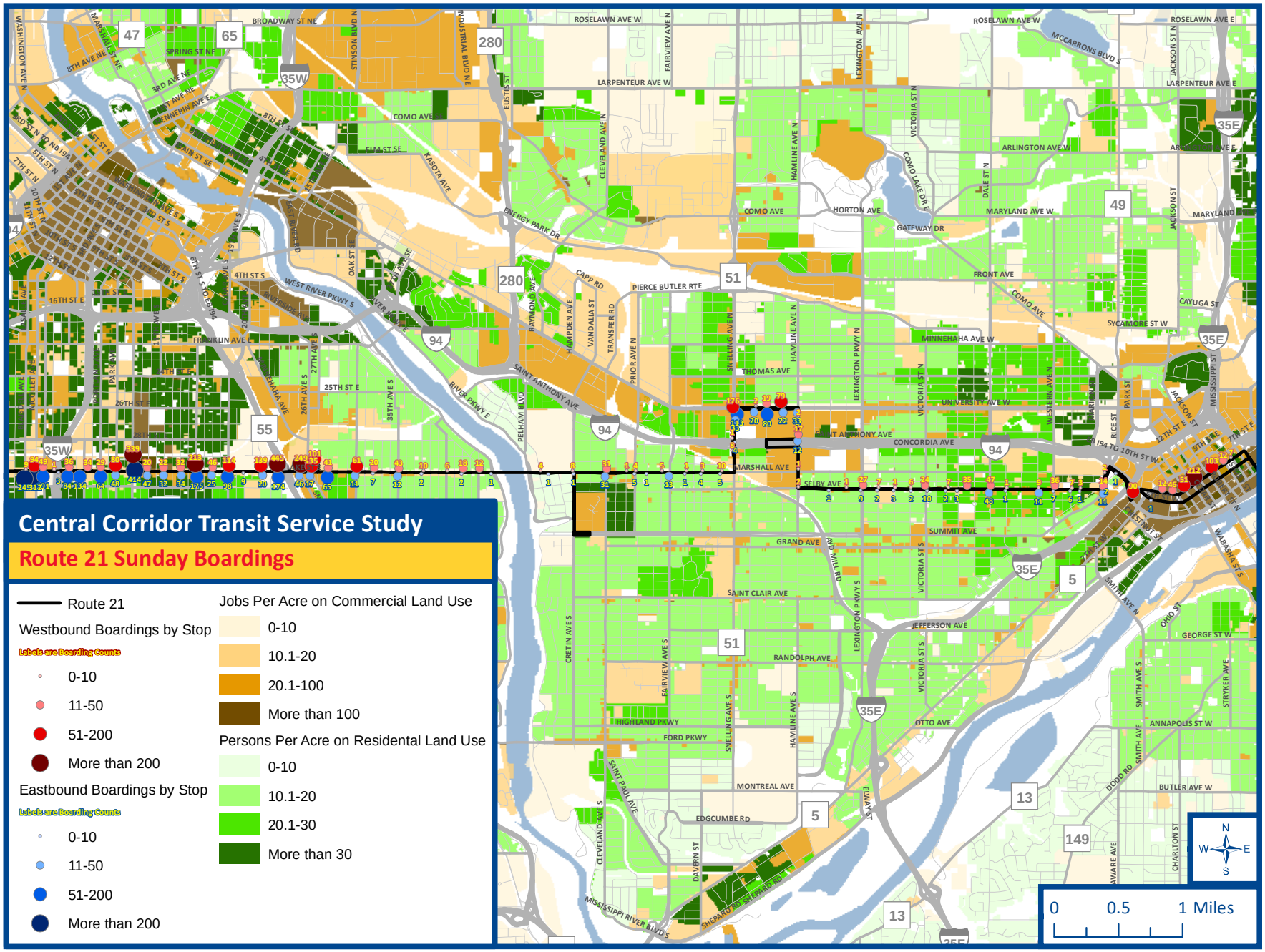
Route 21 Weekday Boardings



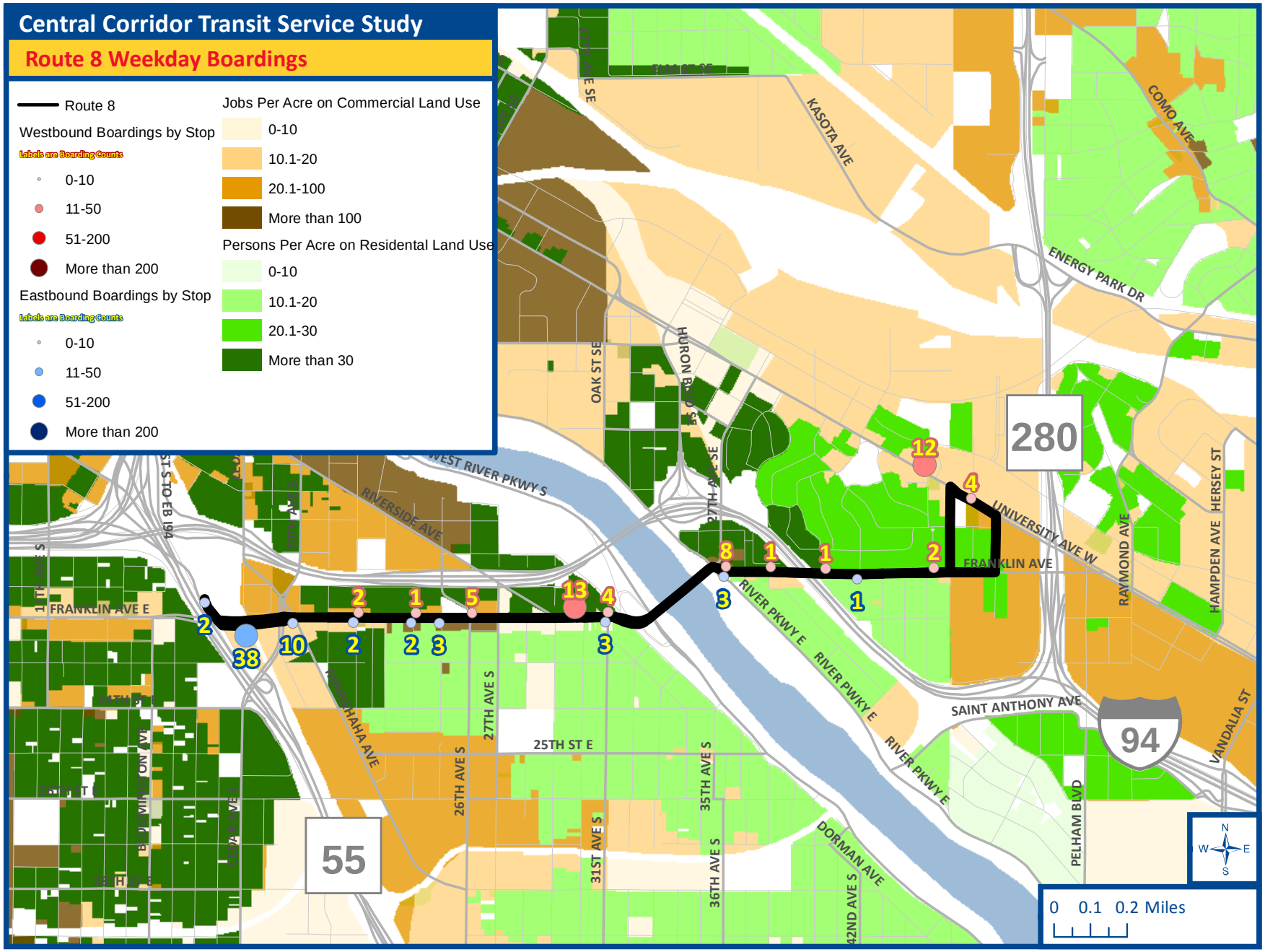
Route 21 Saturday Boardings



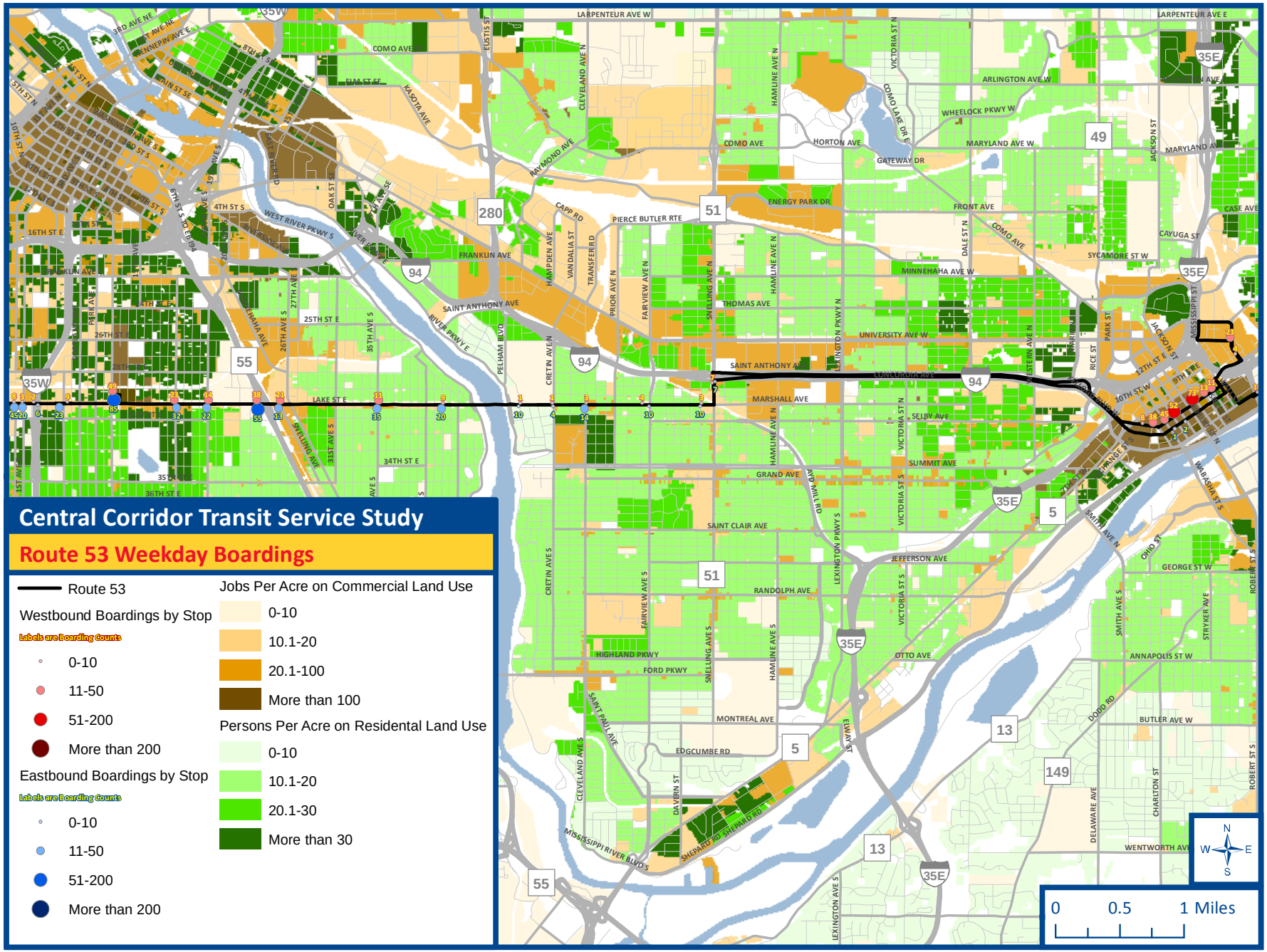
Route 21 Sunday Boardings



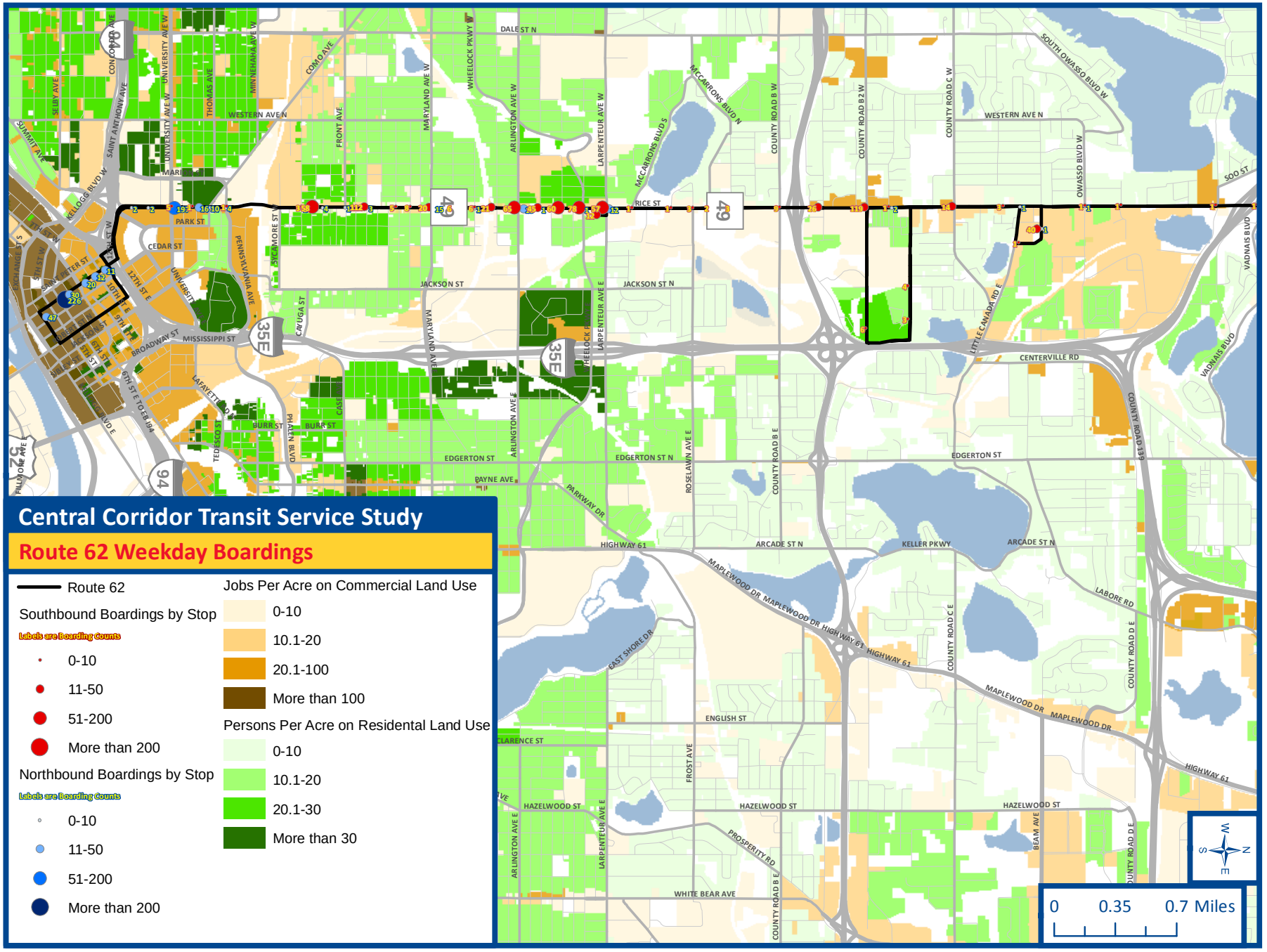
Route 50 Weekday Boardings



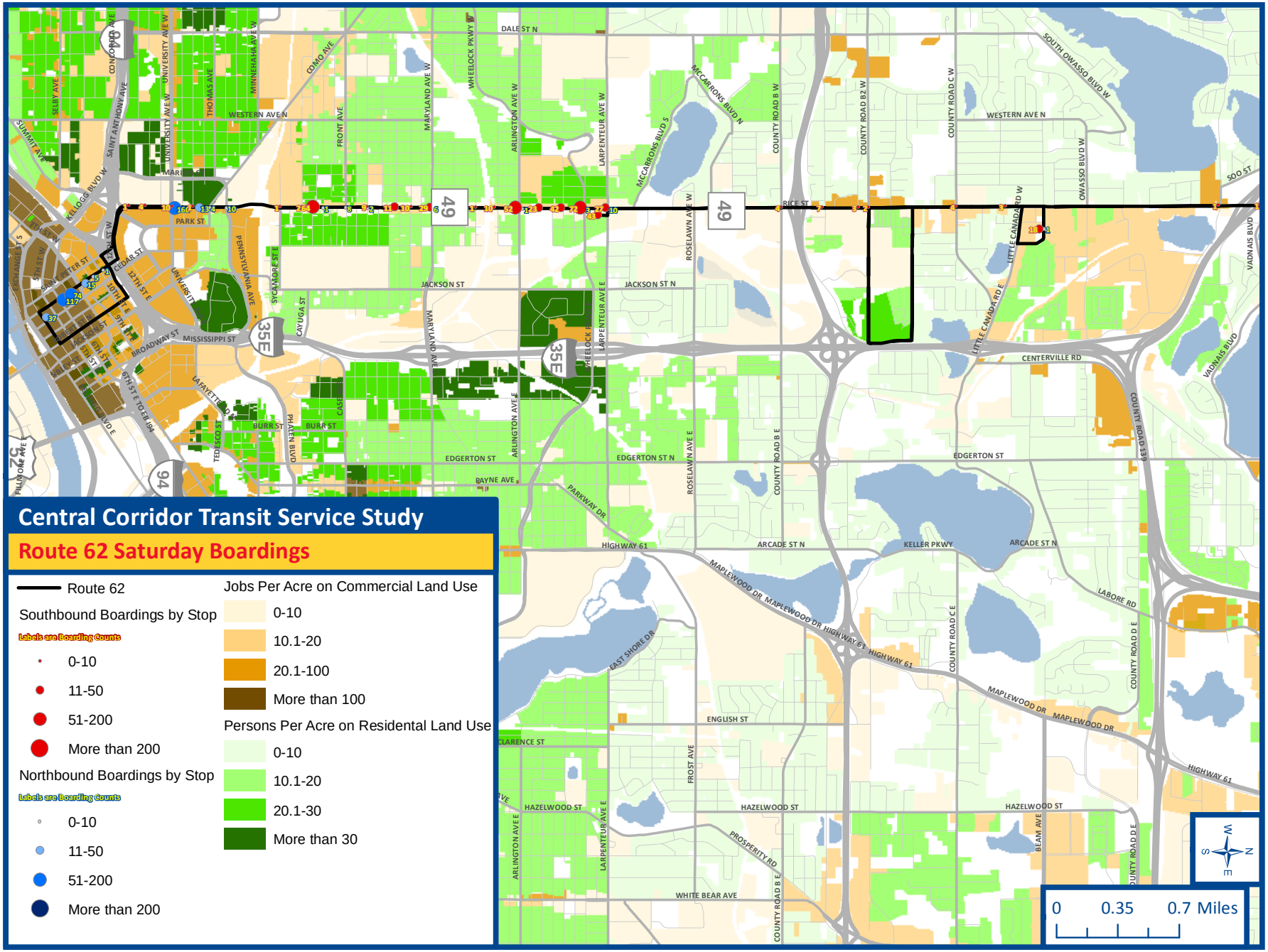
Route 53 Weekday Boardings



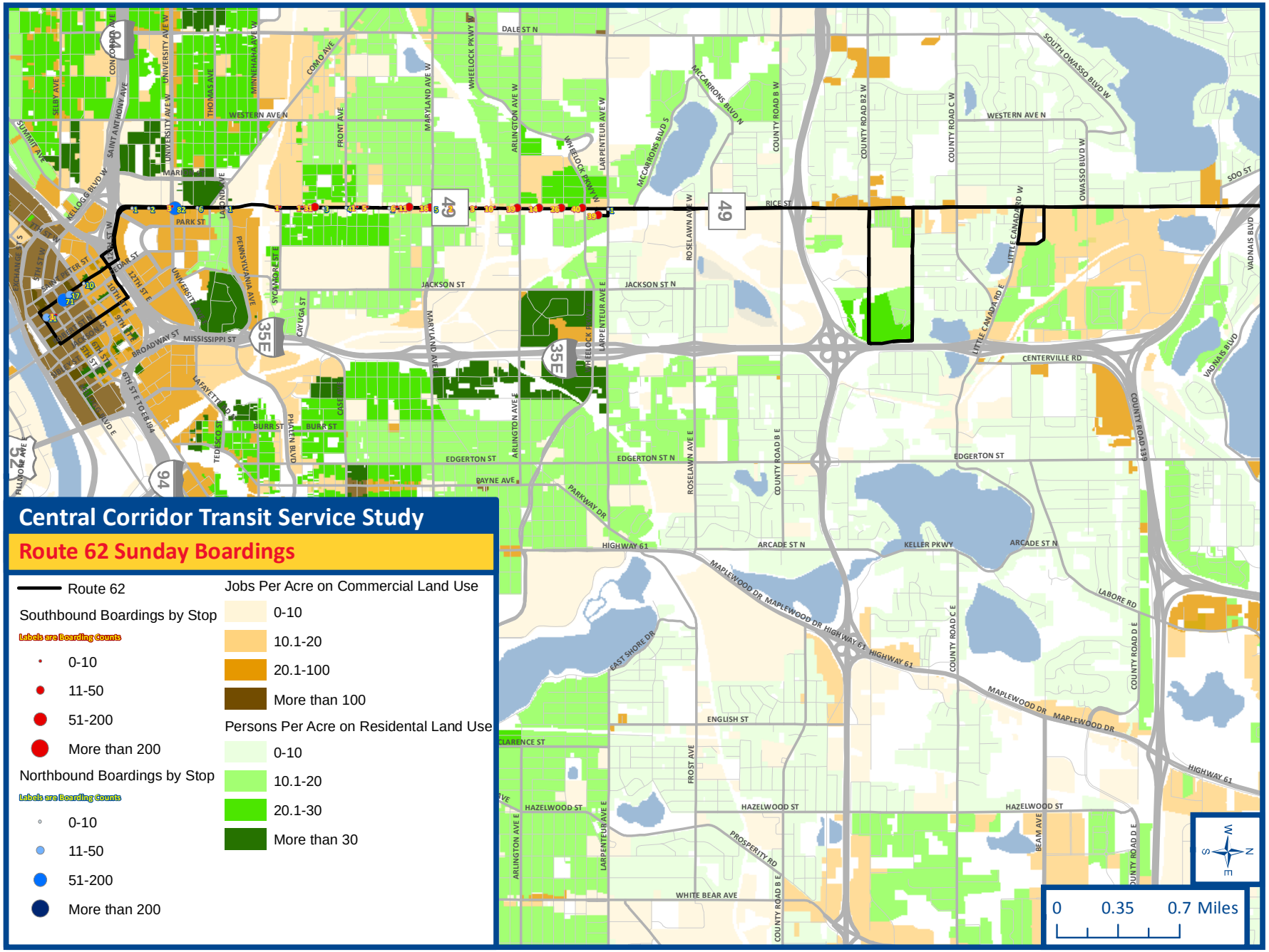
Route 62 Weekday Boardings



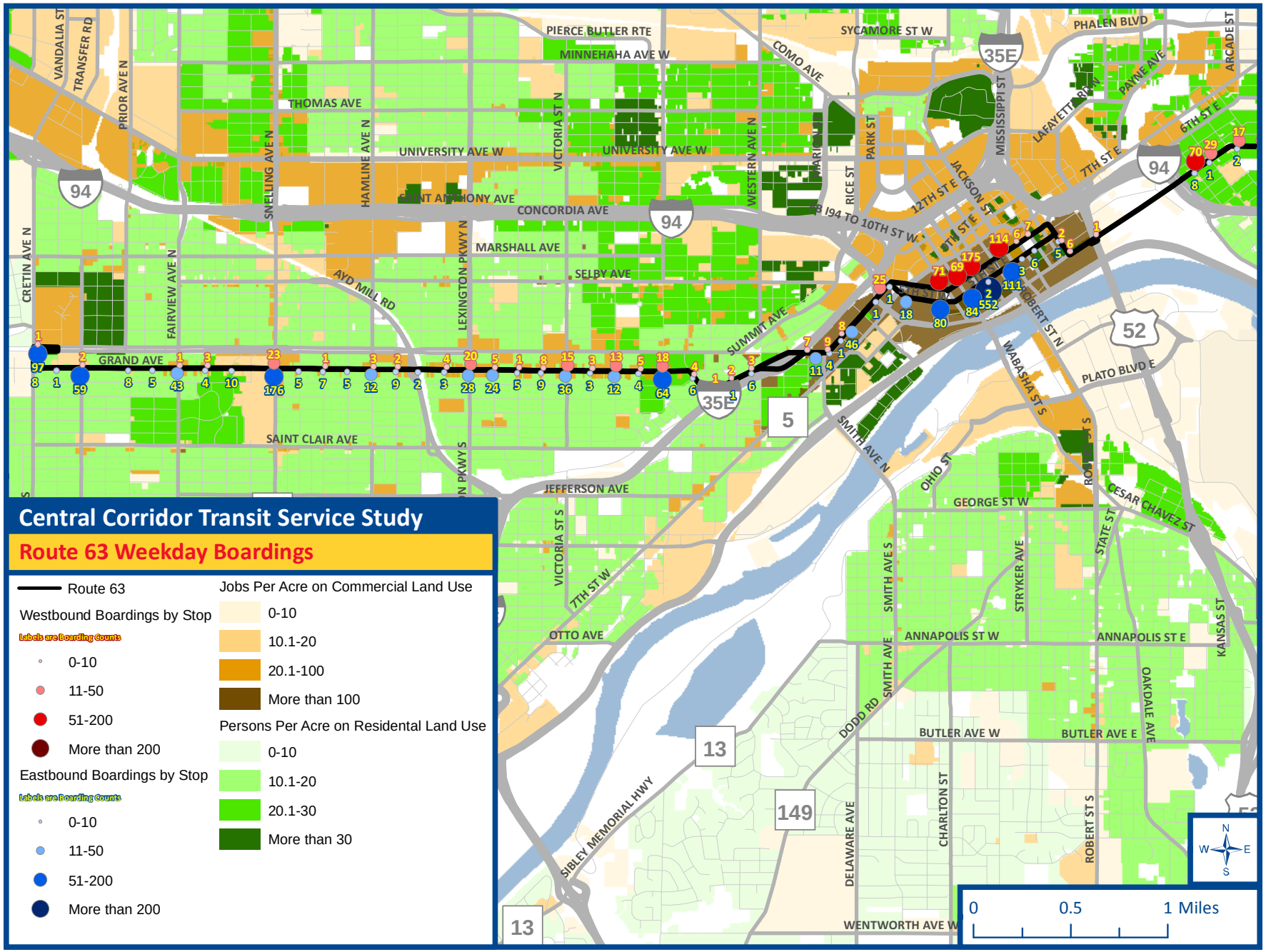
Route 62 Saturday Boardings



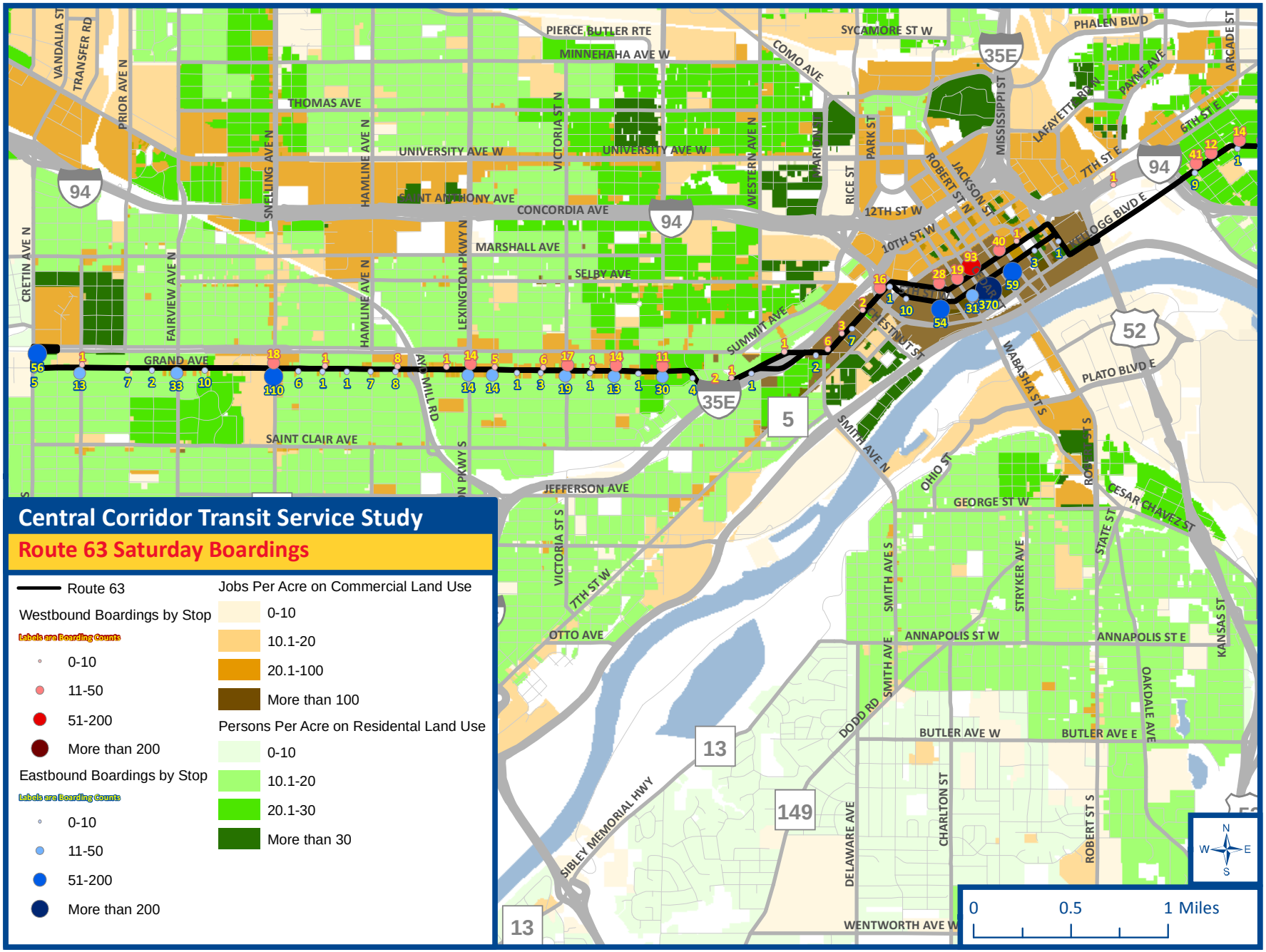
Route 62 Sunday Boardings



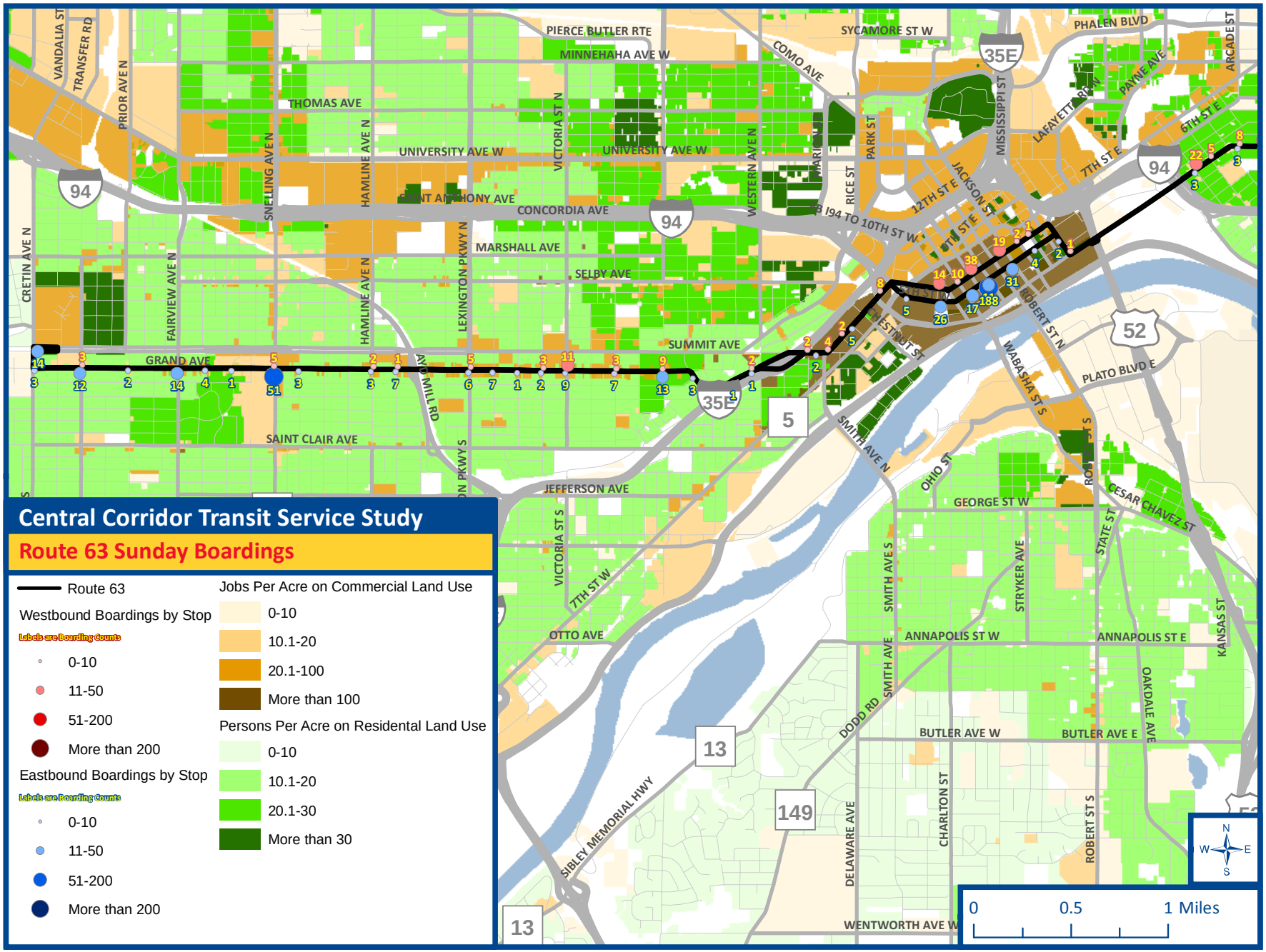
Route 63 Weekday Boardings



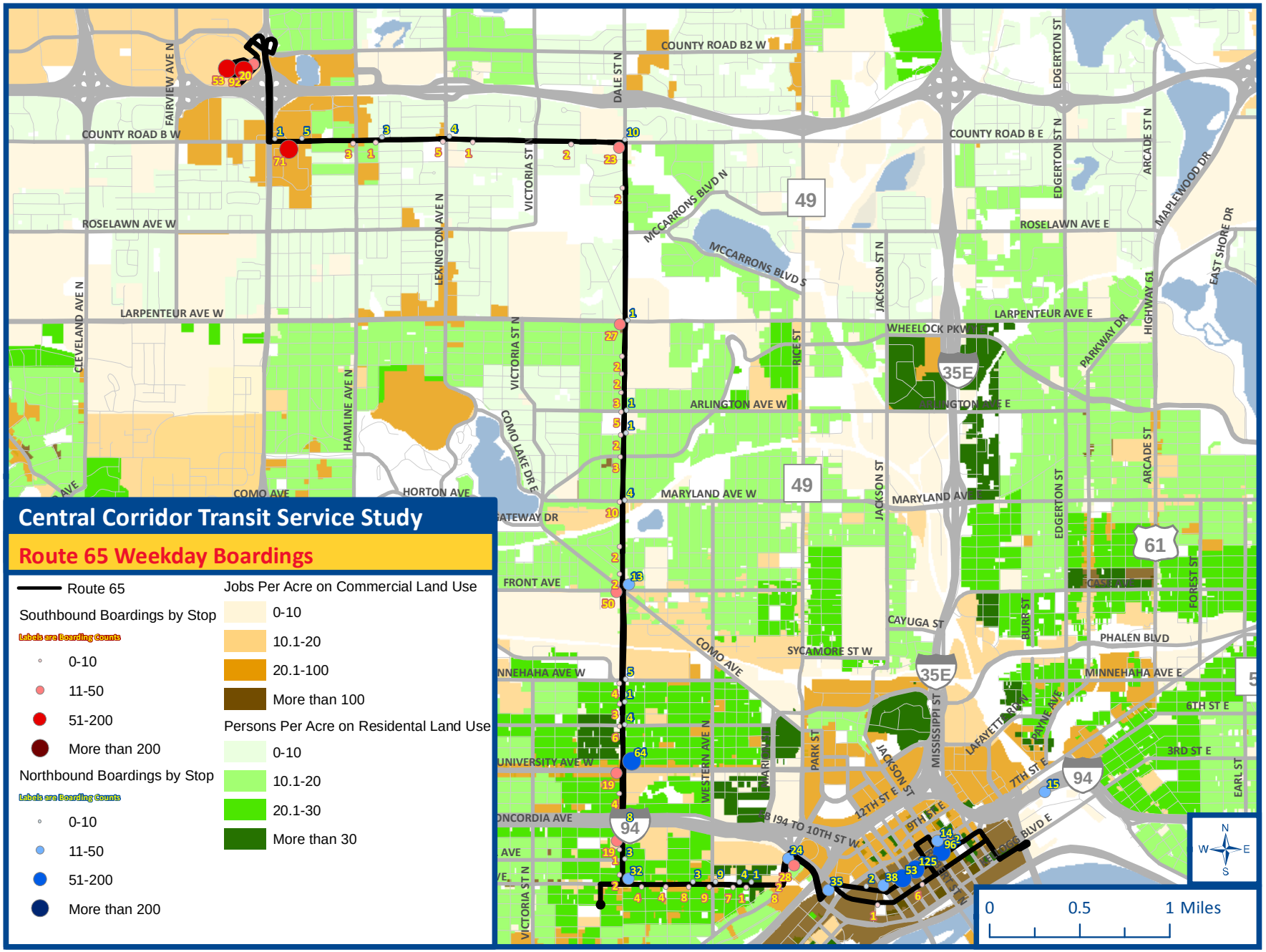
Route 63 Saturday Boardings



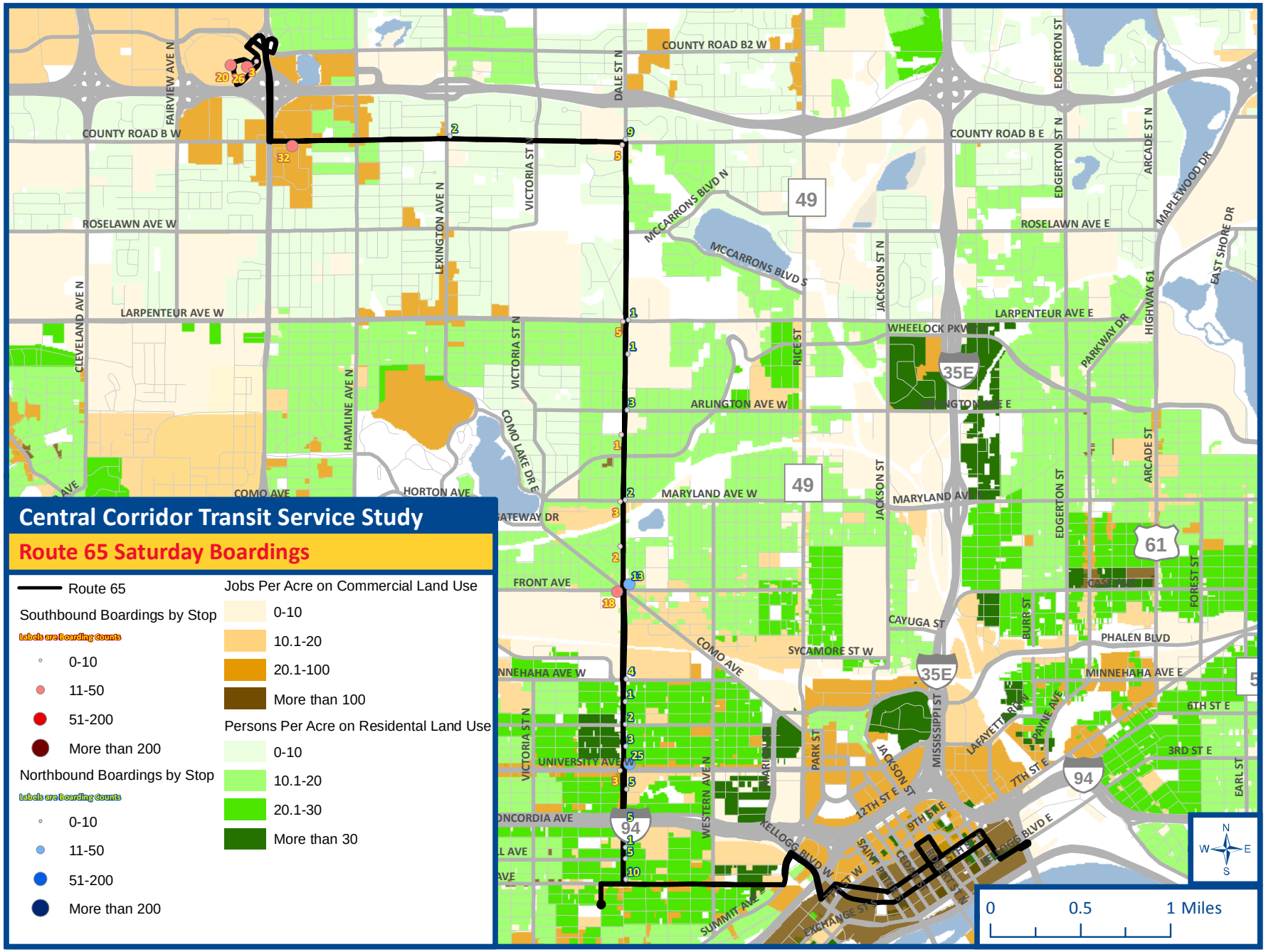
Route 63 Sunday Boardings



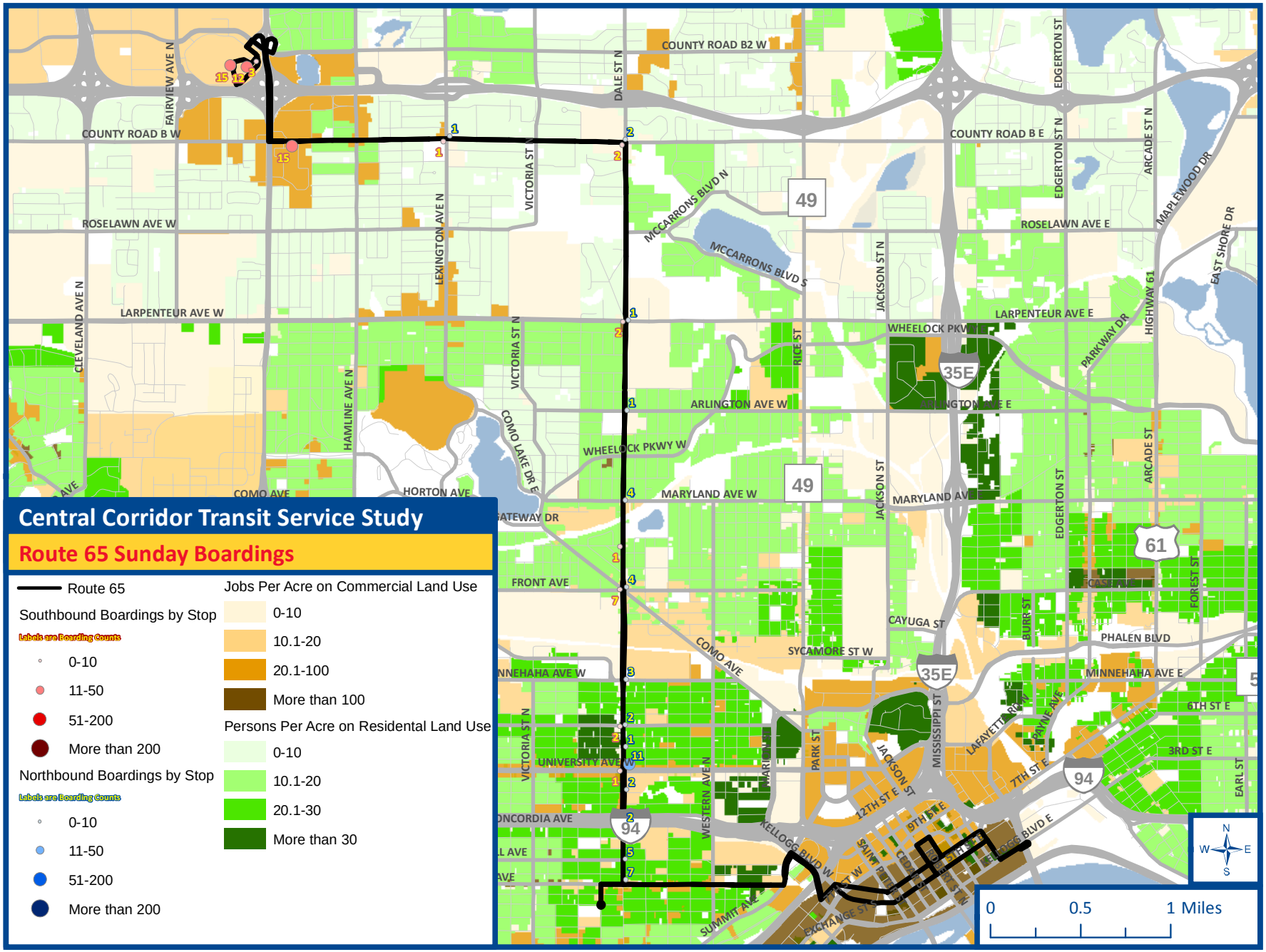
Route 65 Weekday Boardings



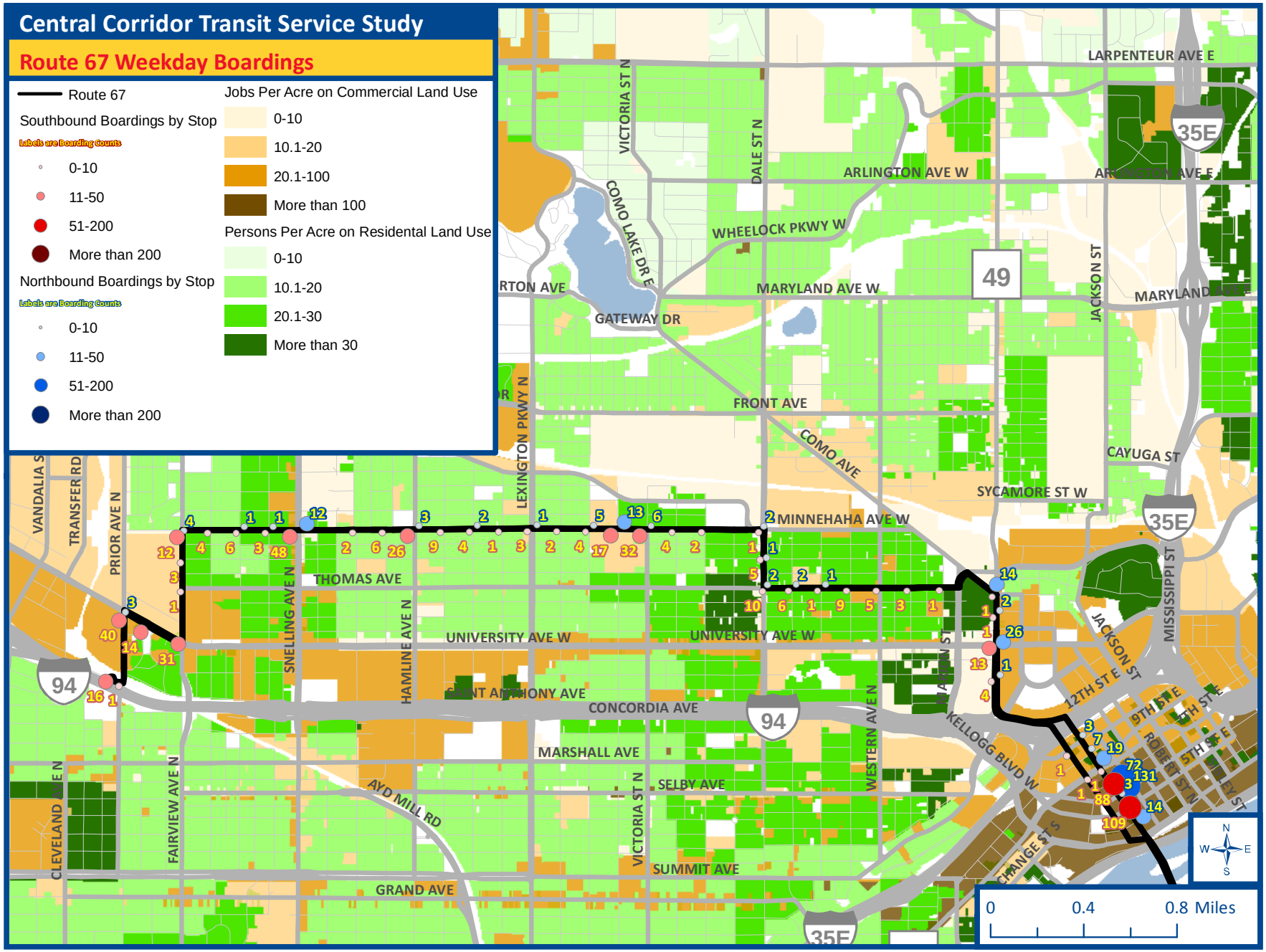
Route 65 Saturday Boardings



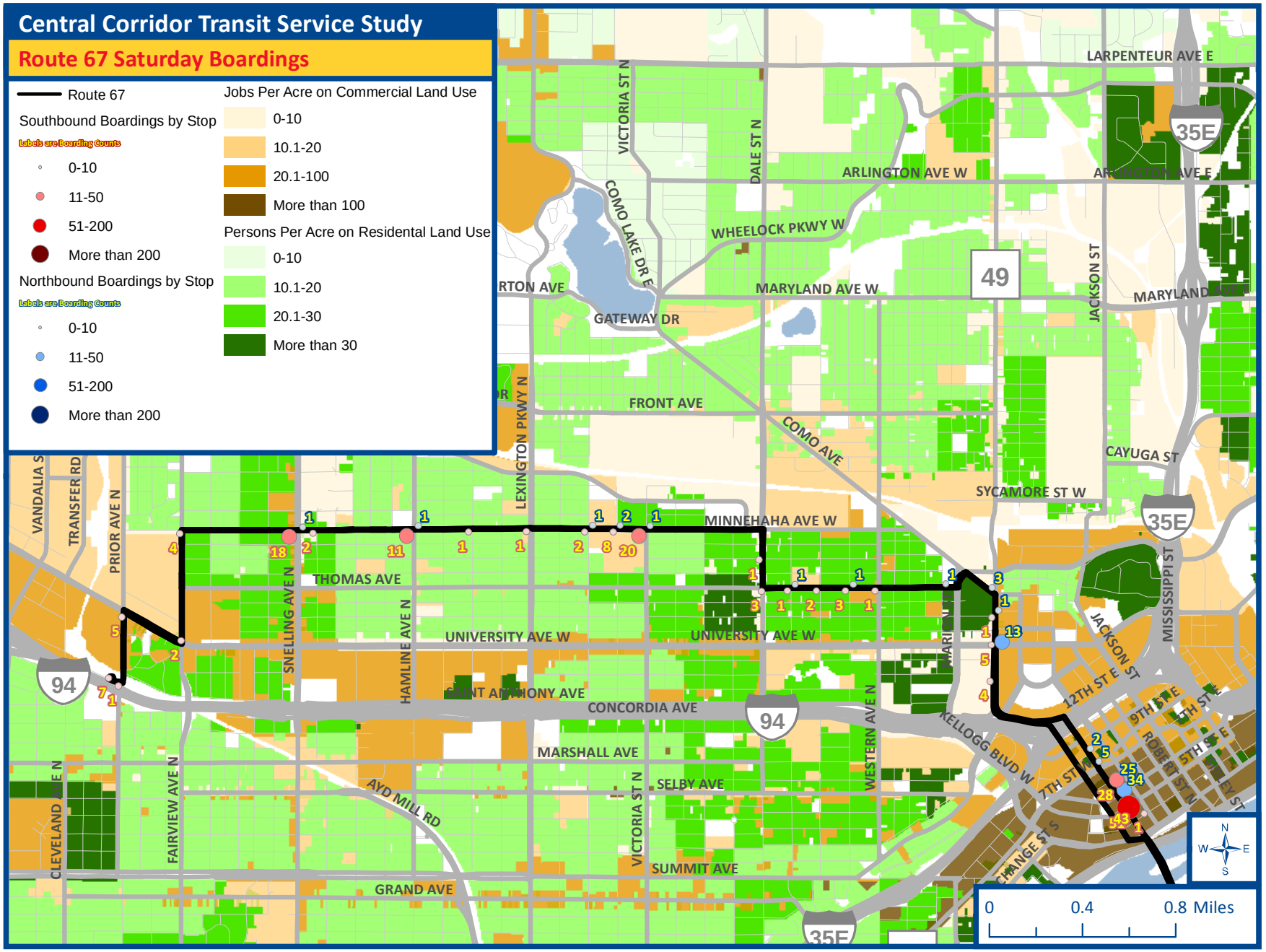
Route 65 Sunday Boardings



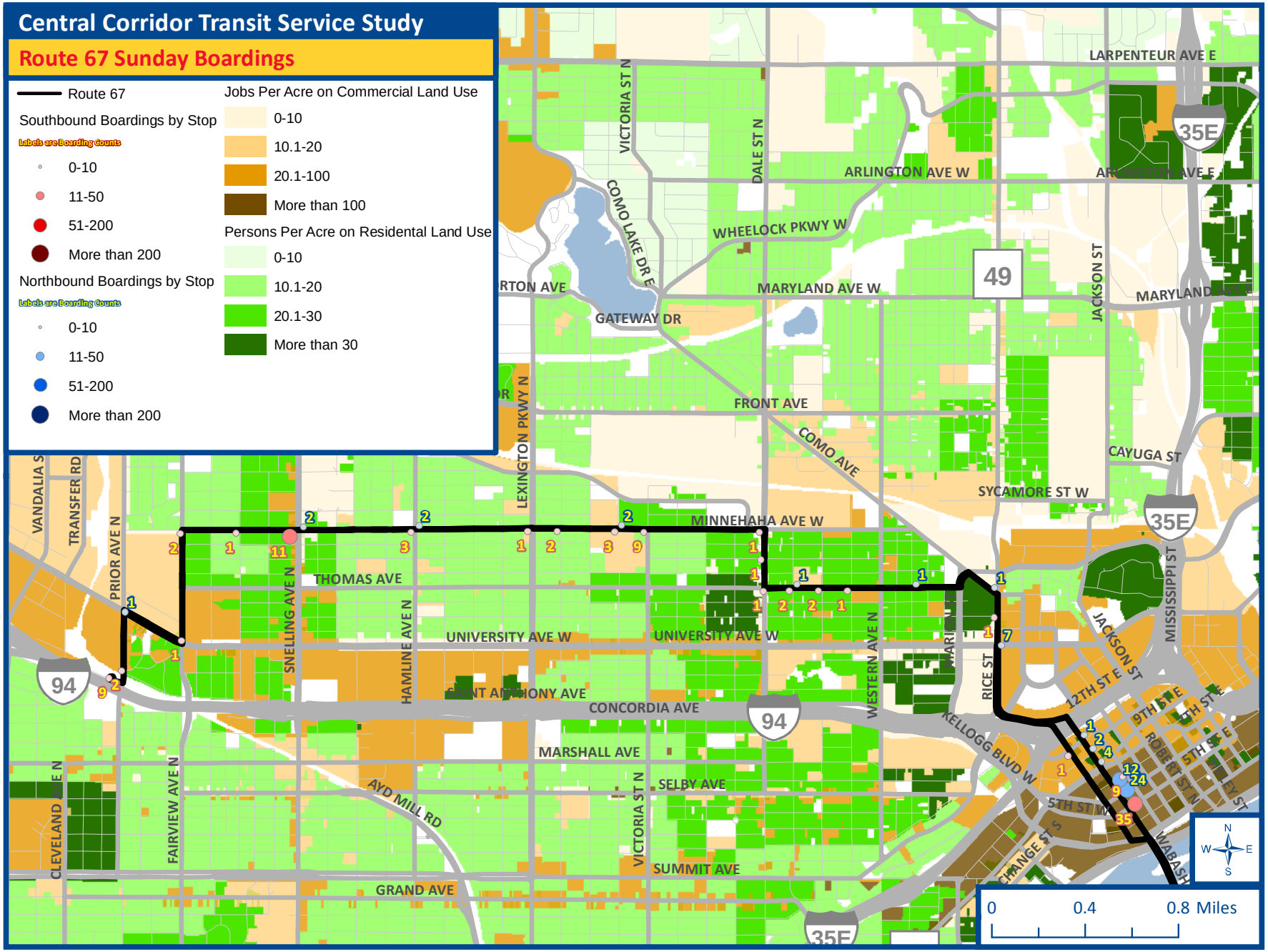
Route 67 Weekday Boardings



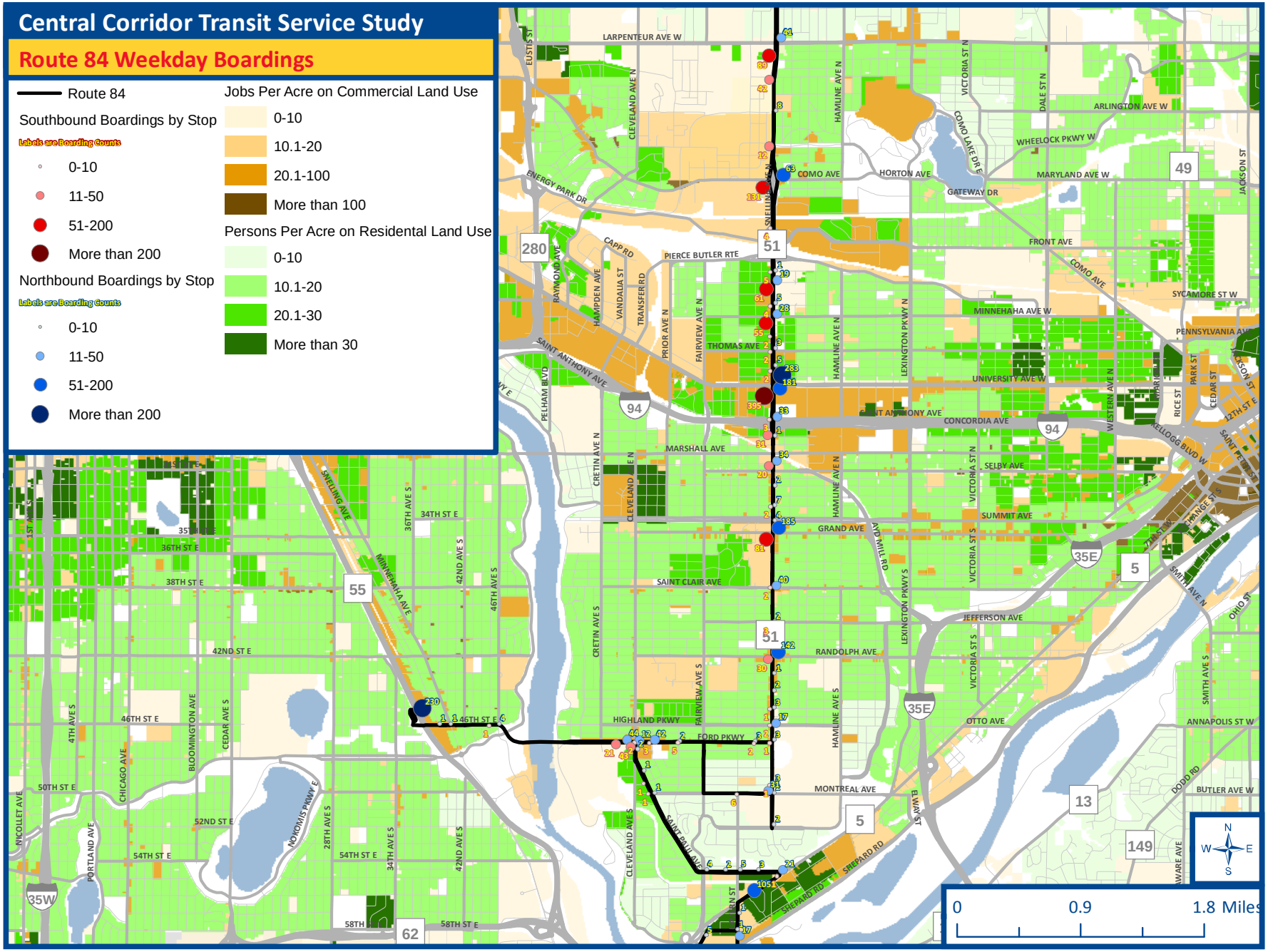
Route 67 Saturday Boardings



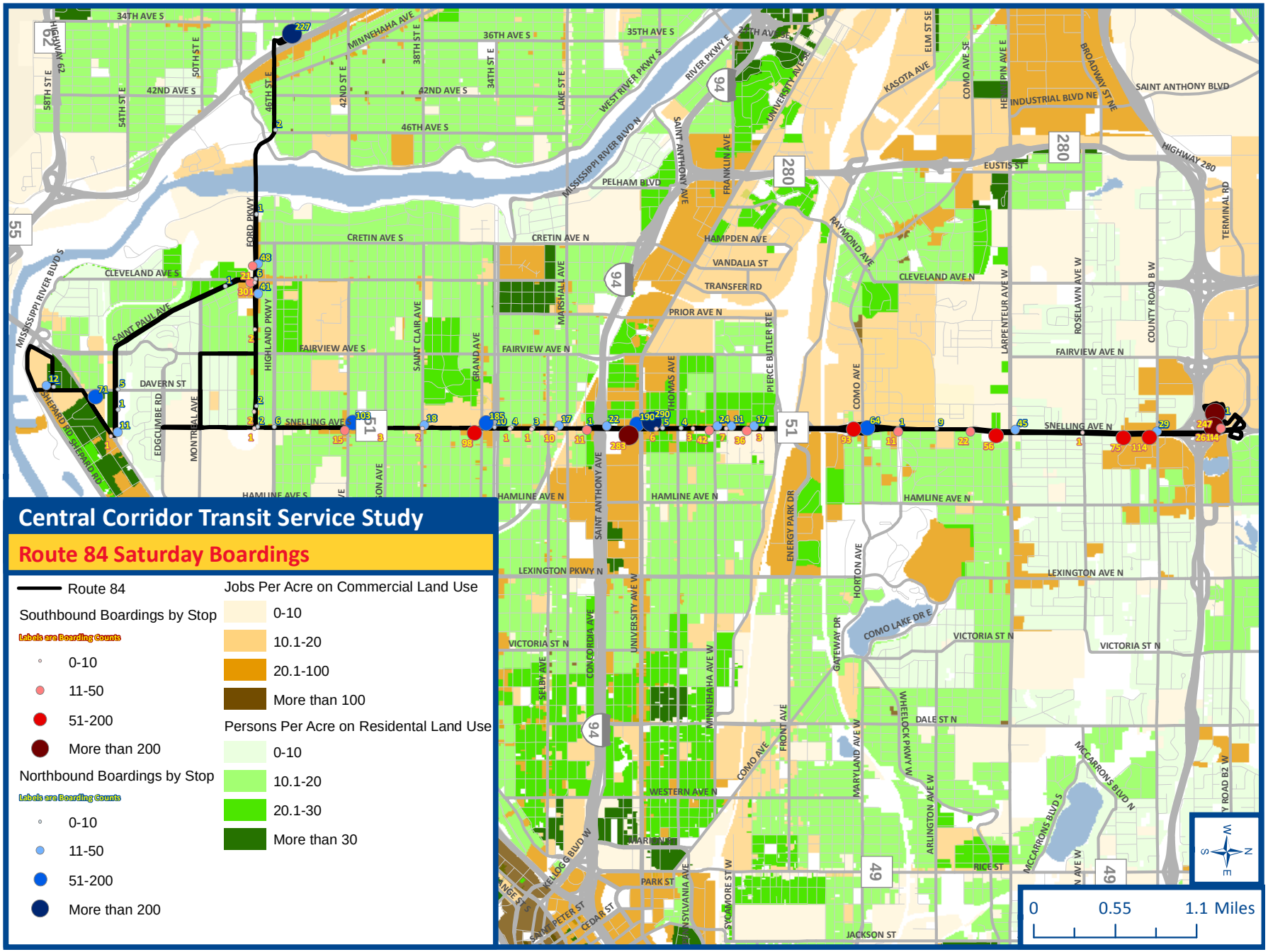
Route 67 Sunday Boardings



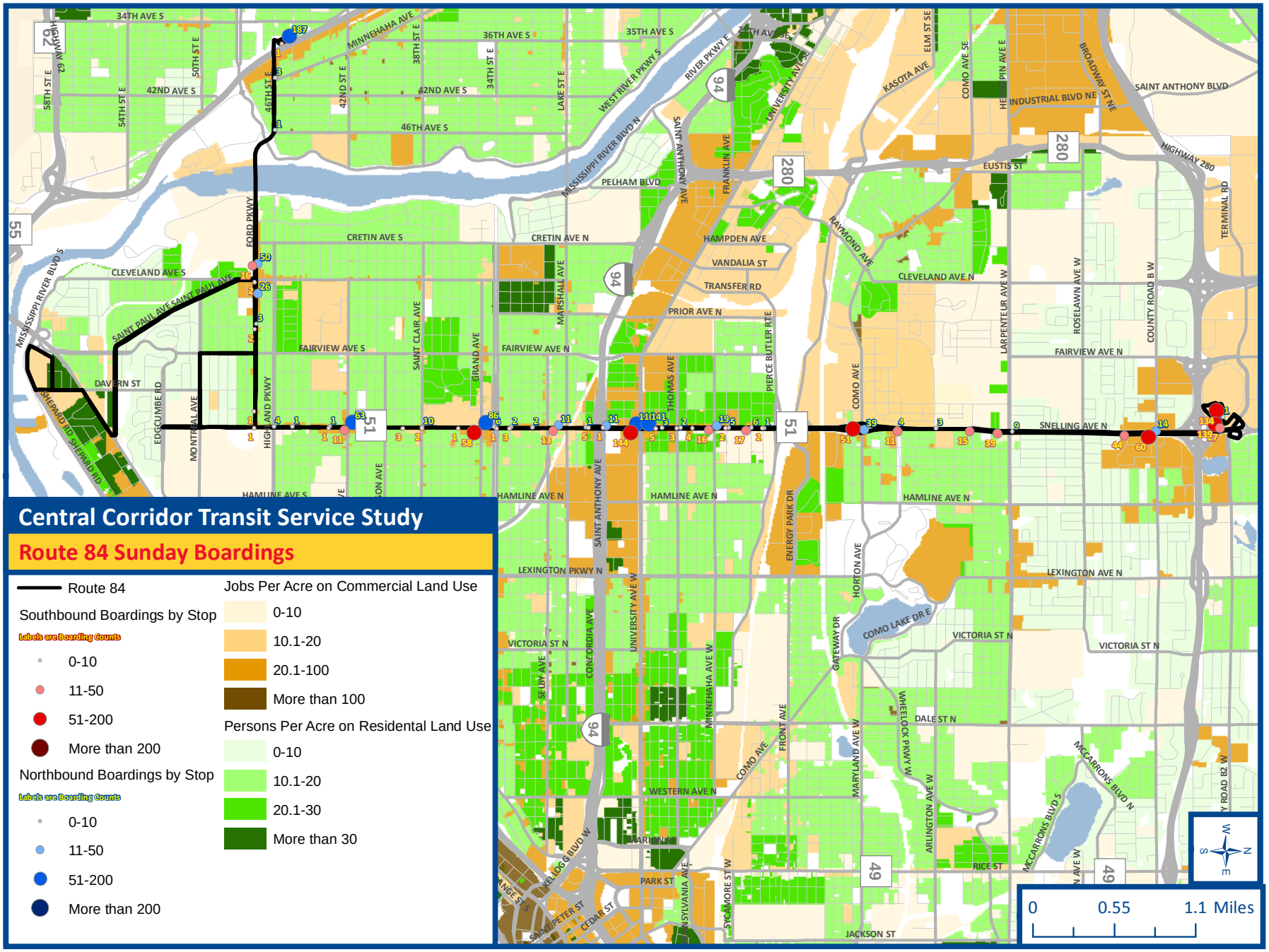
Route 84 Weekday Boardings



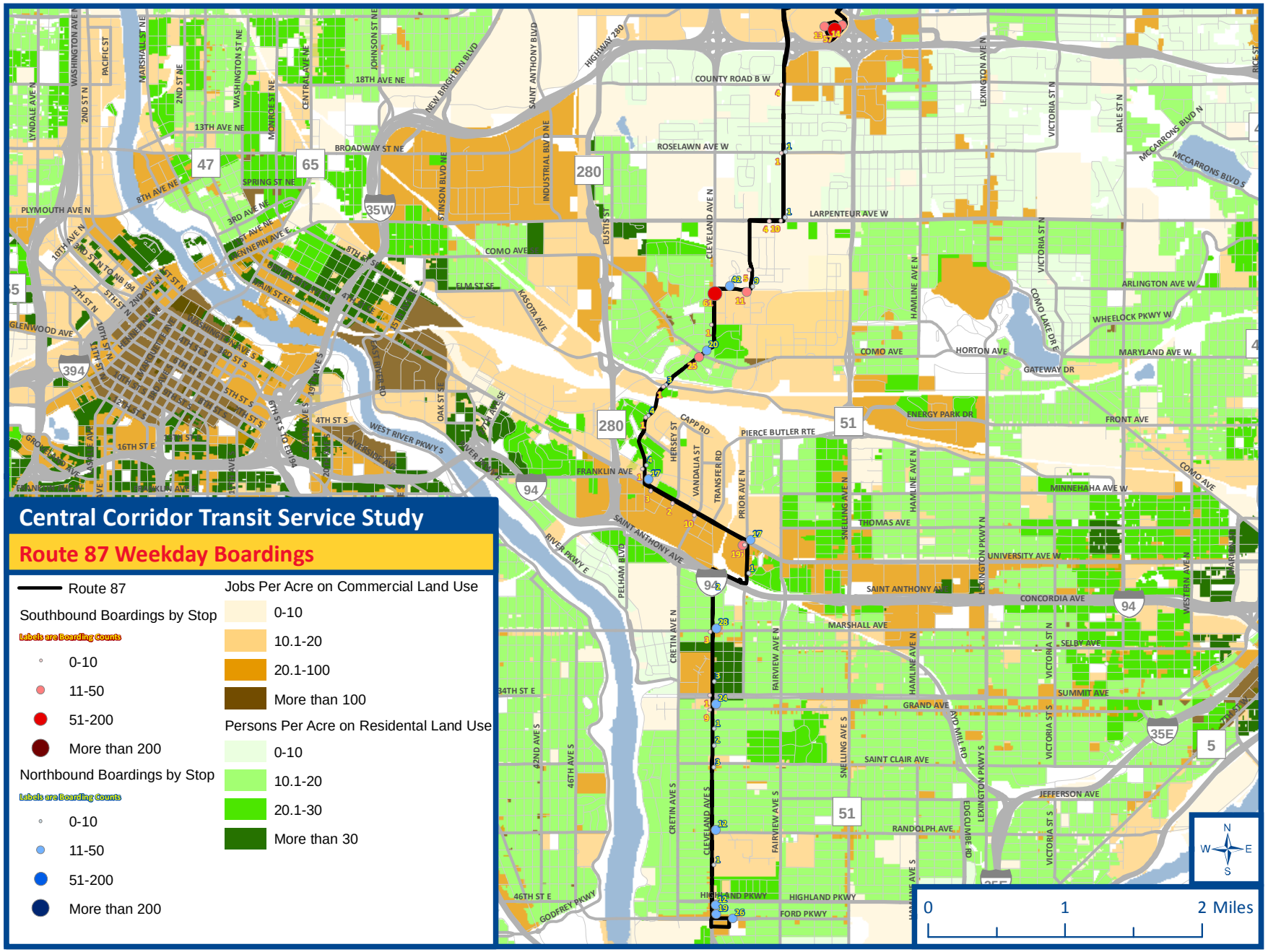
Route 84 Saturday Boardings



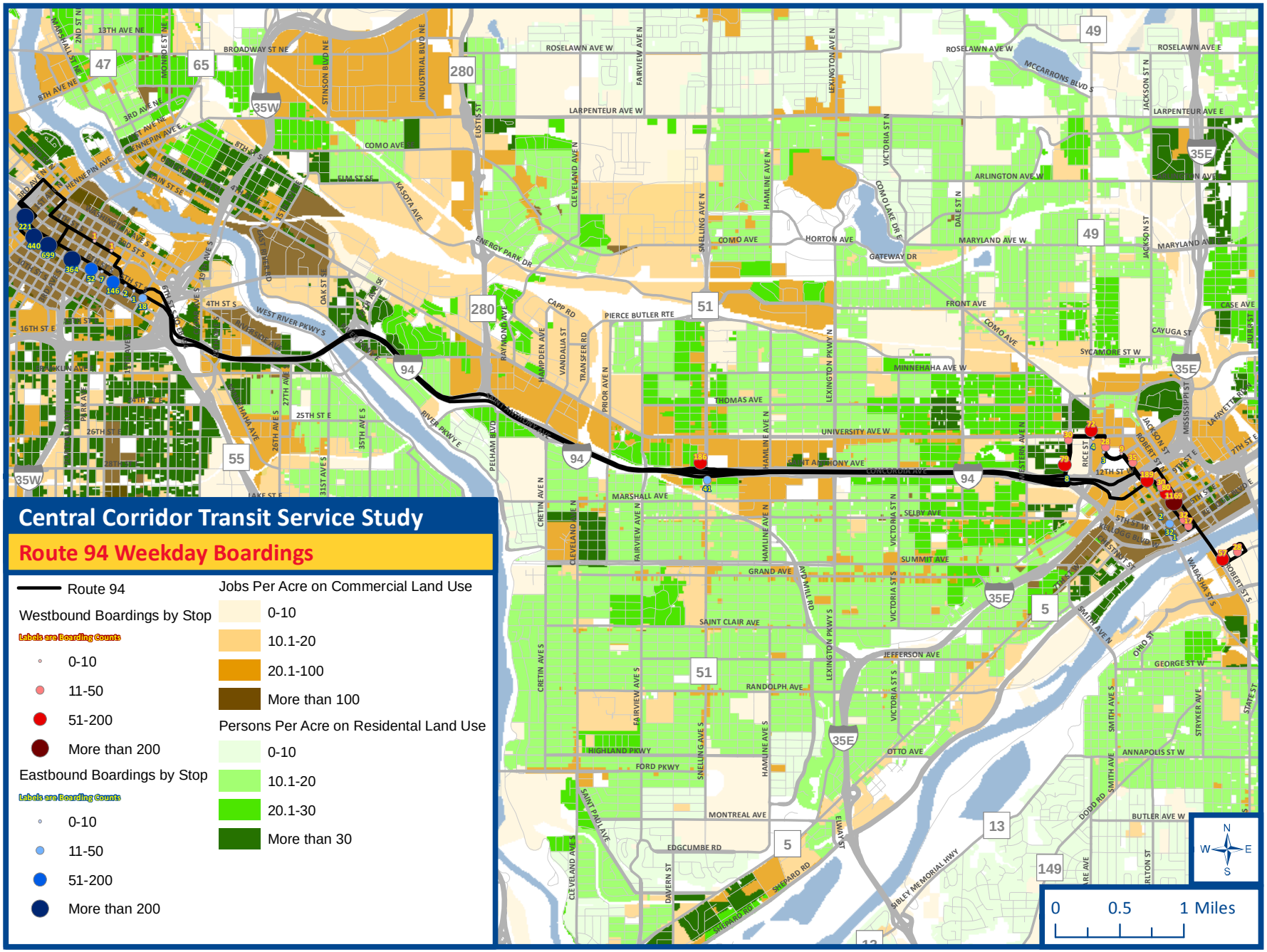
Route 84 Sunday Boardings



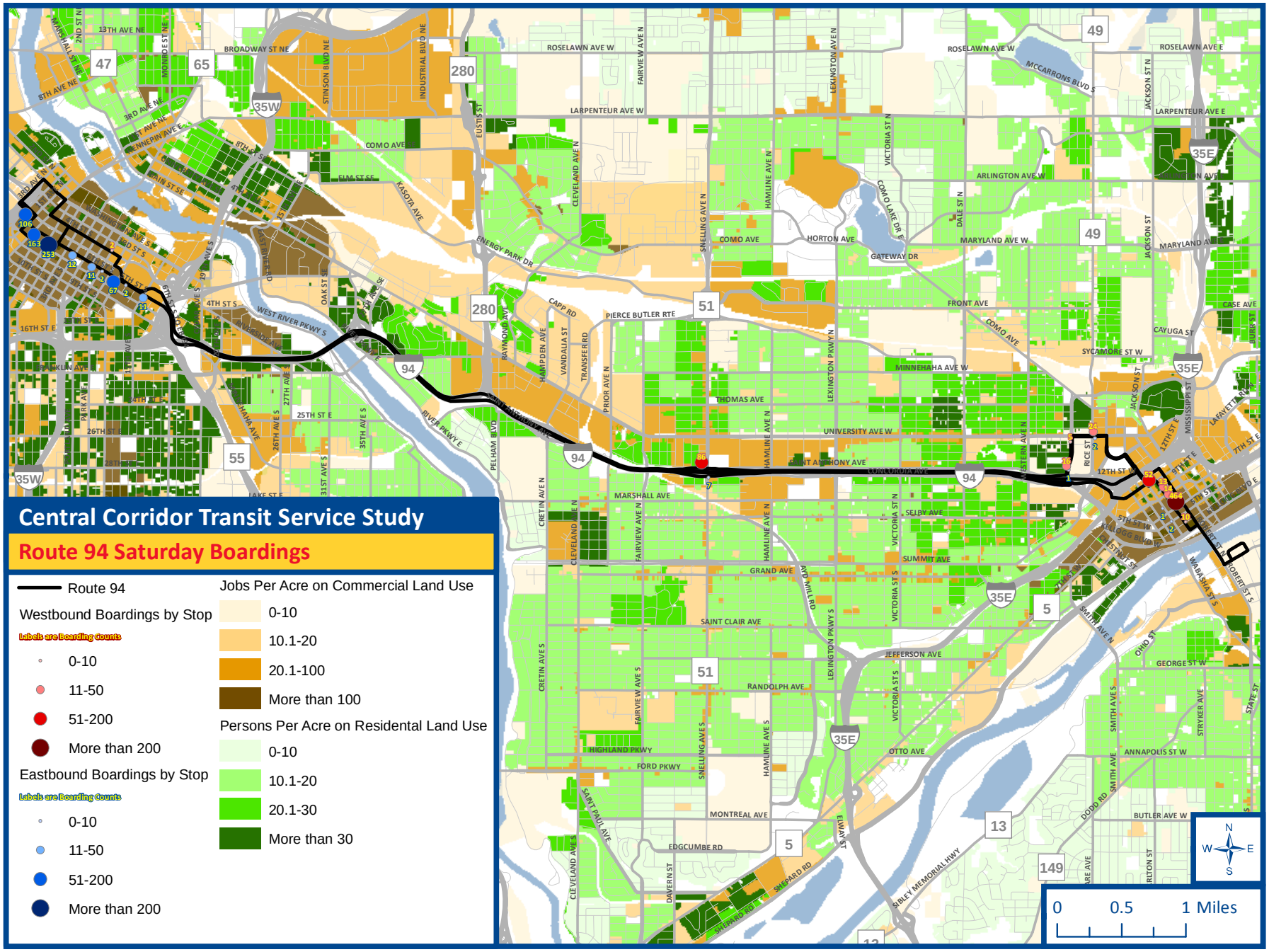
Route 87 Weekday Boardings



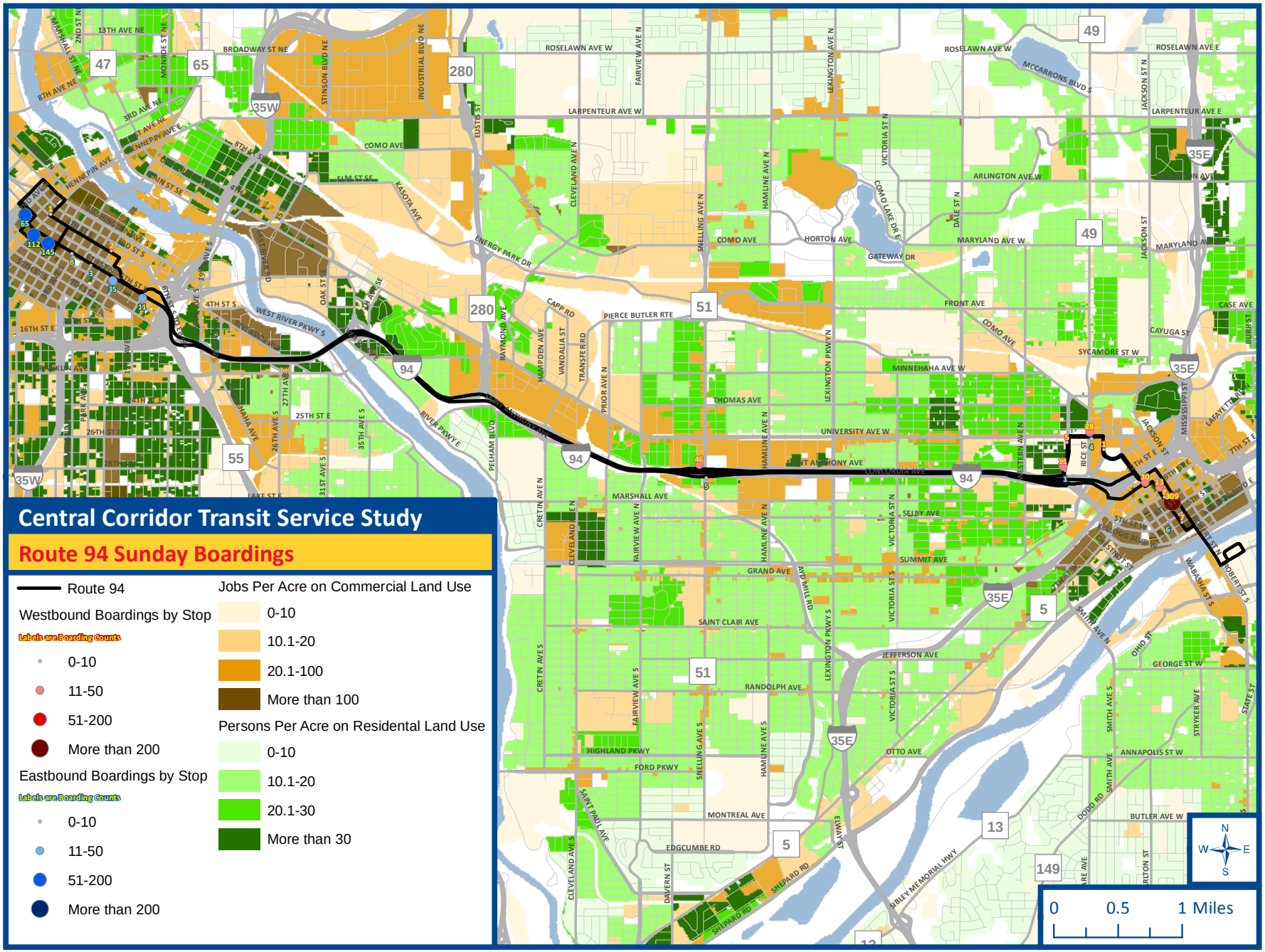
Route 94 Weekday Boardings



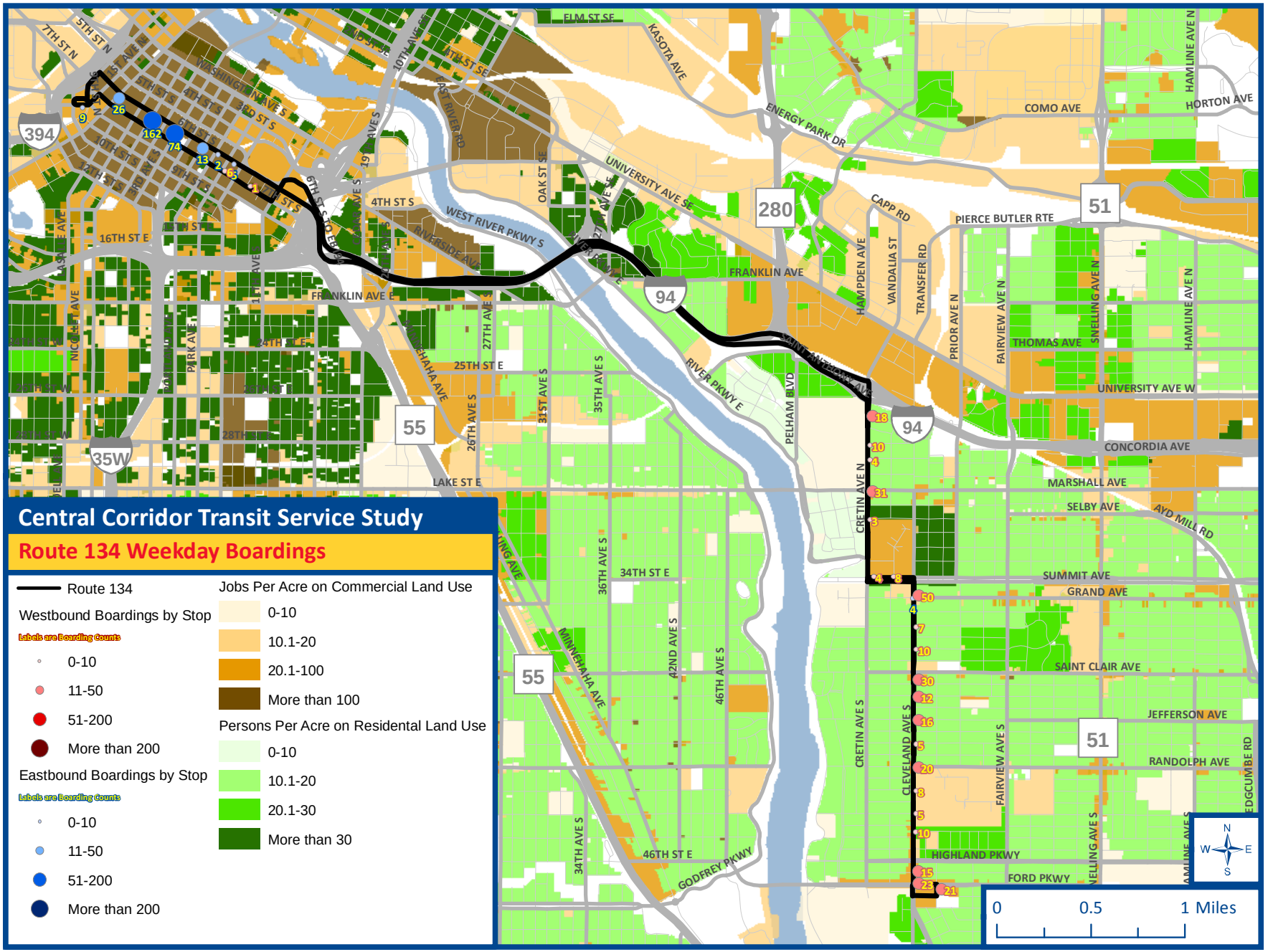
Route 94 Saturday Boardings



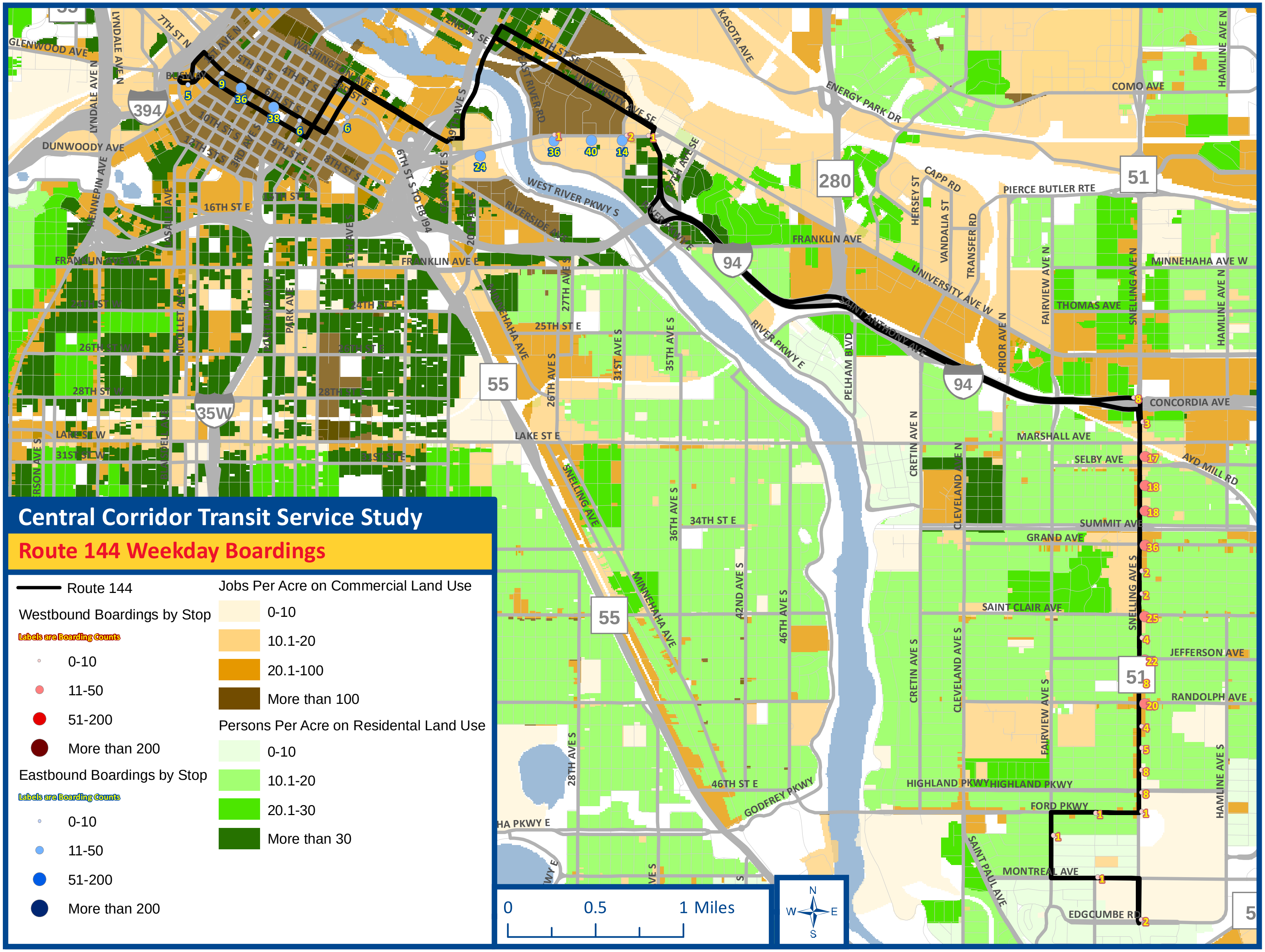
Route 94 Sunday Boardings



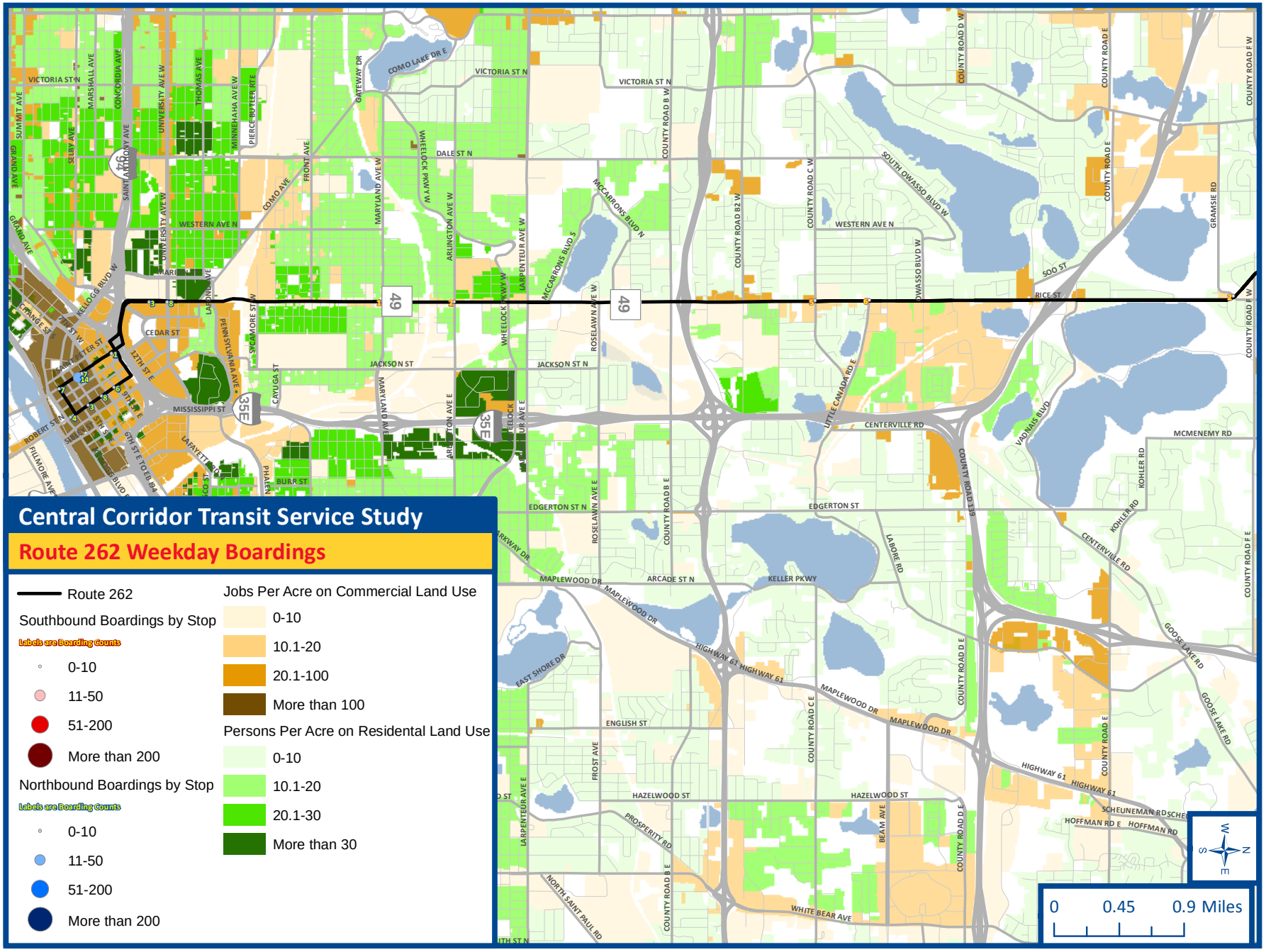
Route 134 Weekday Boardings



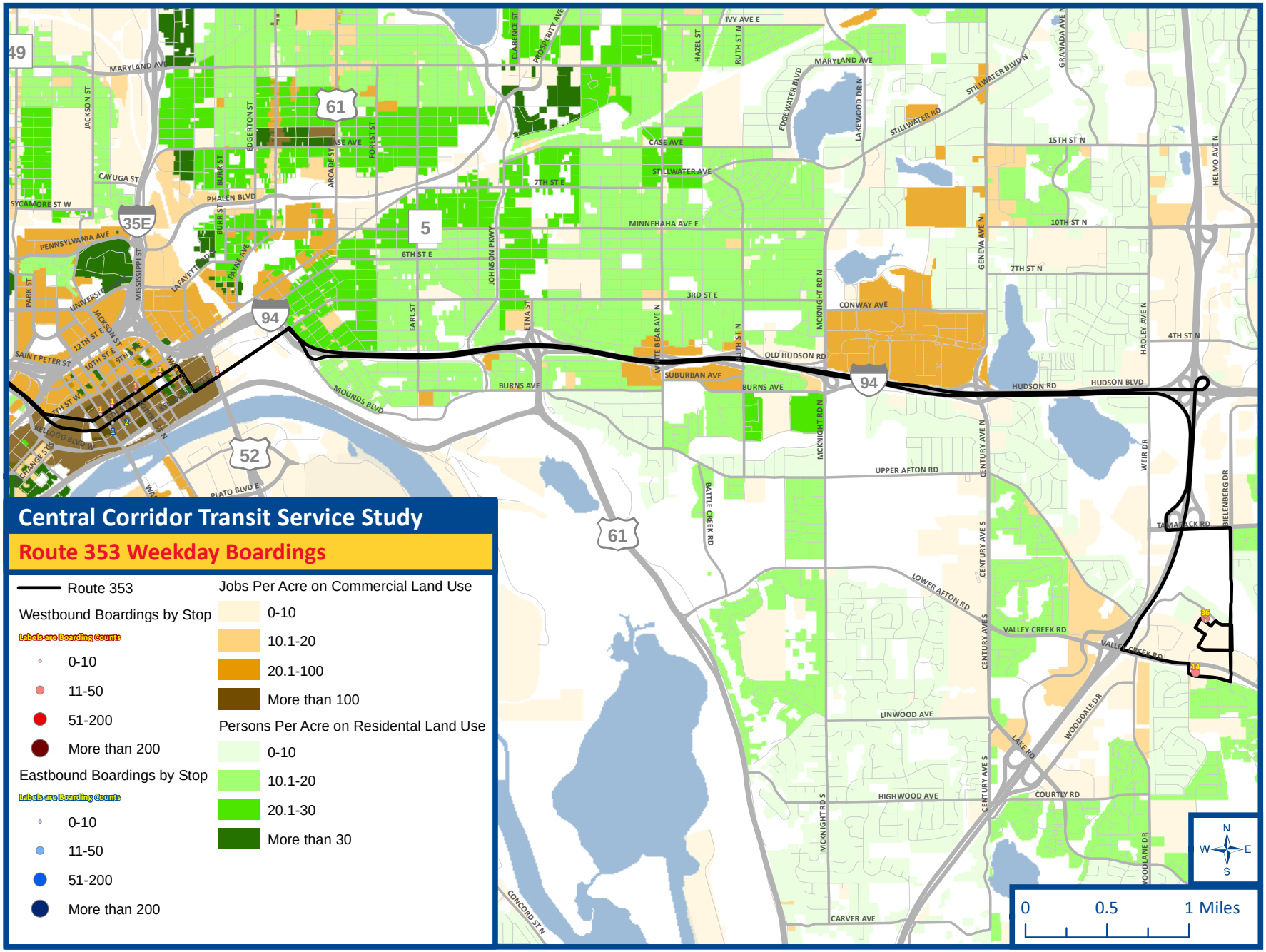
Route 144 Weekday Boardings



Route 262 Weekday Boardings



Route 353 Weekday Boardings



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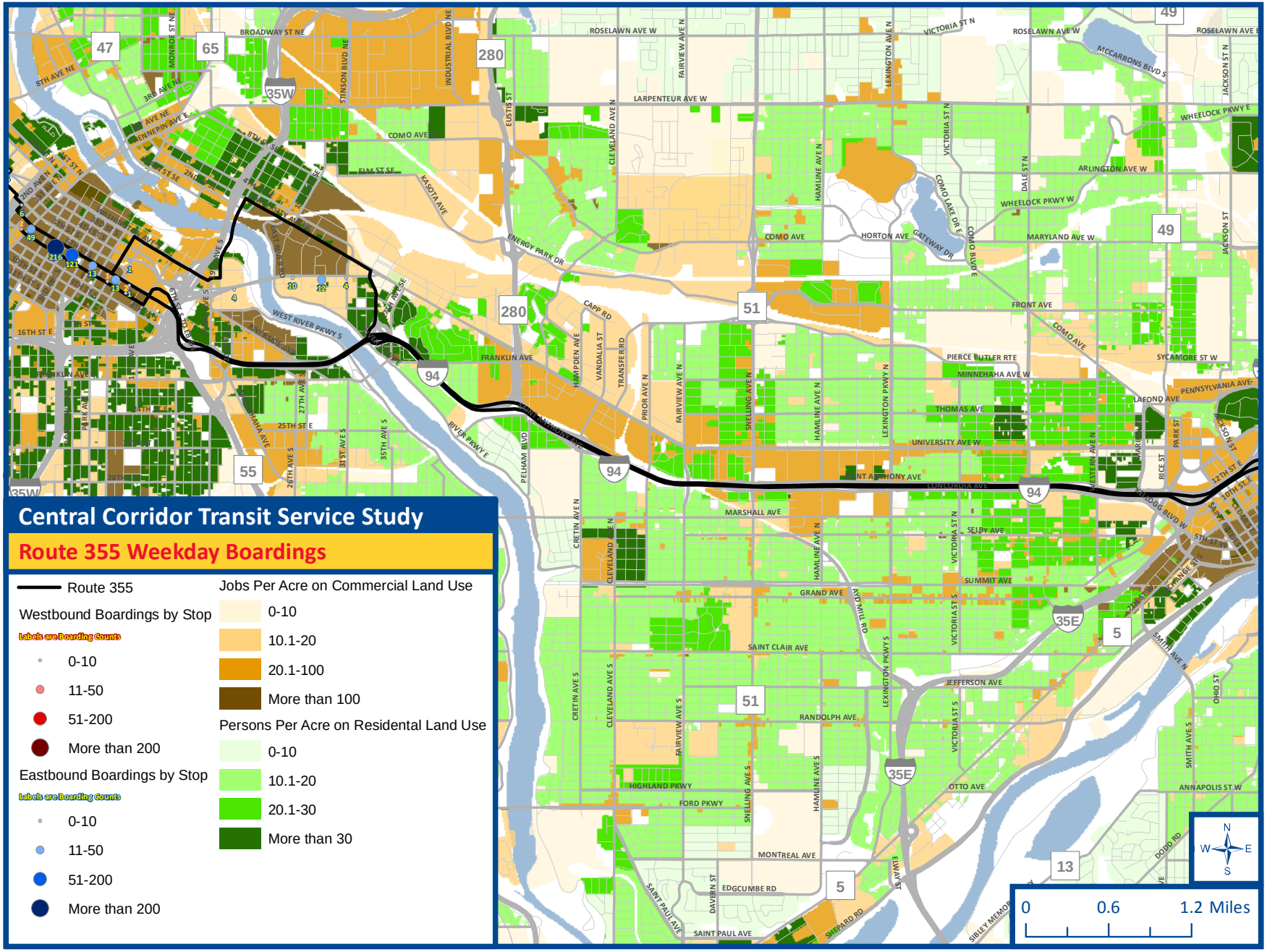

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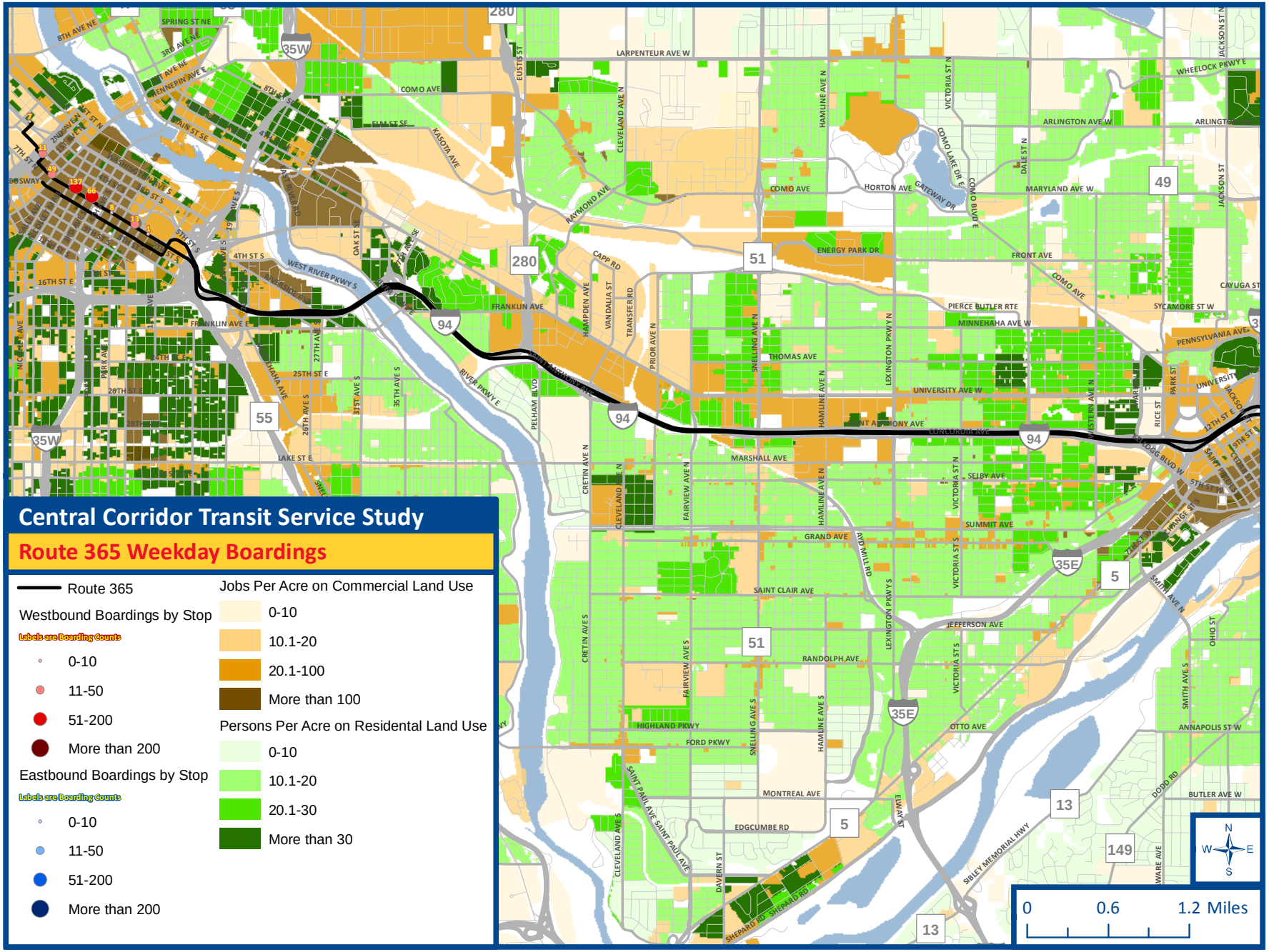
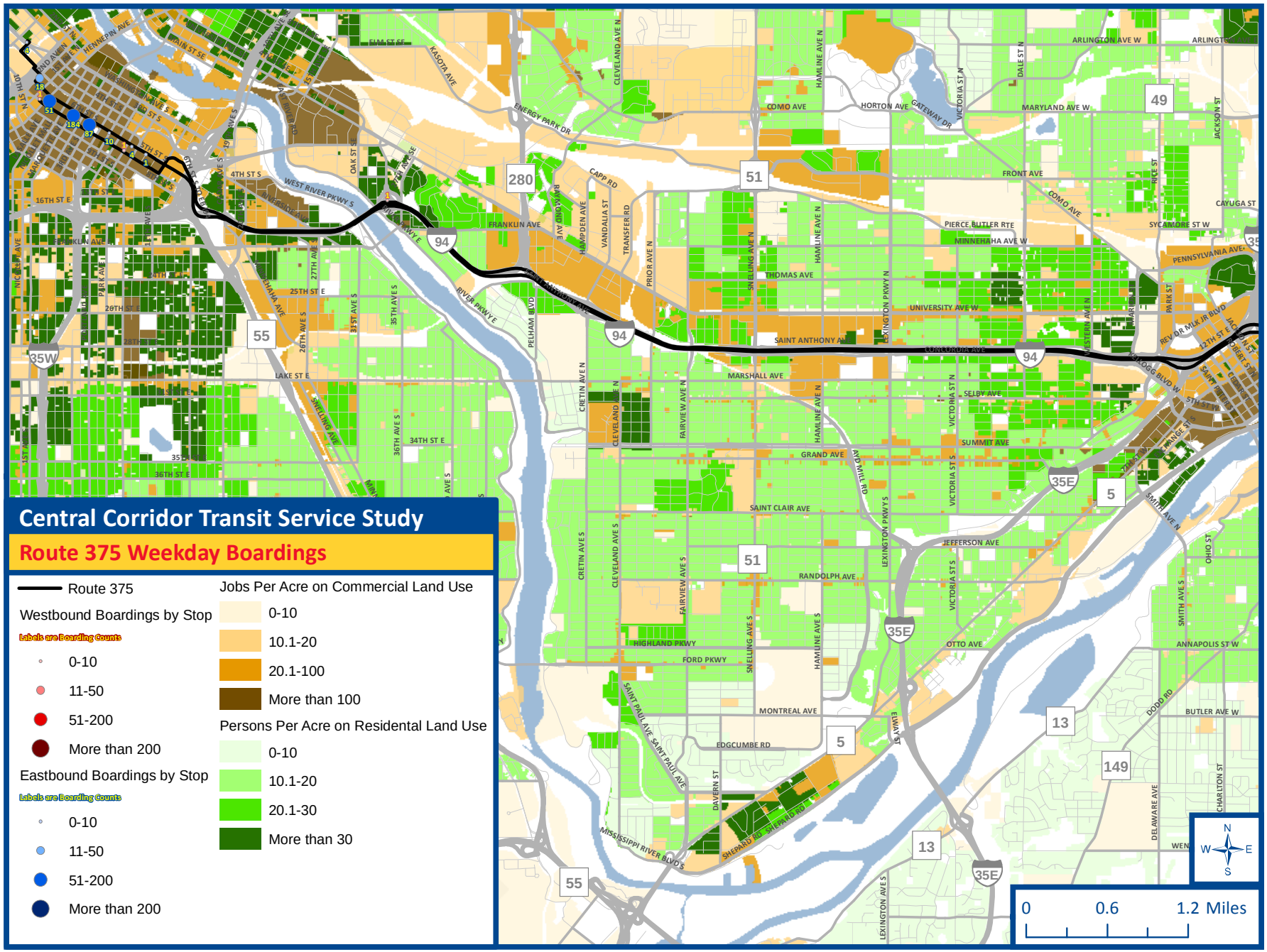


Route 375 Weekday Boardings



Route 452 Weekday Boardings