

Mode Share and Origin / Destination Study Fall 2014

Parking and Transportation Services



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Executive Summary

Background

In the Fall of 2014, the University of Minnesota's Parking and Transportation Services (PTS) commissioned the Mode Share and Origin / Destination Study. The study's purpose was to collect data in order to establish benchmarks and inform communication campaigns and planning efforts regarding new bus routes, bicycle infrastructure, pedestrian amenities and parking facilities. The research was conducted on behalf of PTS by the Office of Measurement Services (OMS), University of Minnesota.

The online survey was administered to employed faculty and staff and enrolled students within the University of Minnesota, Twin Cities campus. Data collection occurred from November 18th to December 29th, 2014. A total of 2384 survey responses were included in the final dataset, after incomplete records were removed. This number represents 3.02% of the total student, faculty and staff population of 79,055 enrolled at or employed by the University of Minnesota. This includes active, full-time or part-time faculty, staff, graduate student staff, and students. The study included questionnaire design, sample planning, data collection, data cleaning and weighting, and analysis. This report documents this process and the statistical results and findings for mode share and origin and destination.

Methodology

Population and Sampling Plan

The participant list for this study was supplied by the Office of Institution Research, who also provided demographic information such as subpopulation (student, faculty or staff), Age, Gender, Academic Level, Full-Time or Part-Time status, and Job Code.

The sample plan intended to collect responses that were proportionally representative of each of these subpopulations. See Table 1.1 below for the distribution of population and responses.

Table 1.1

Group	% of Population	Resp. Freq.	Resp. %
Faculty	4%	116	5%
Staff	25%	683	29%
All Students	71%	1585	66%
TOTAL	100%	2384	100%

Additionally, the student sample was further stratified by the campus where students spend most of their scheduled class time. This is referred to as a student's main campus. This method was utilized to ensure the study accounted for students who traveled on all three locations within the Twin Cities campus (East Bank, West Bank, and St. Paul). More specifically,

- Classroom schedules were used to determine a student's main campus.
- A coin flip was used to determine a student's main campus in the instance where their time was equally distributed across more than one campus location.
- In the absence of classroom schedule data, students without a main campus were grouped separately. A random sample of these students was drawn for inclusion in the study. Respondents were included in the student subpopulation for analysis.

See Table 1.2 on the next page, for the distribution of student population and responses by main campus assignment.

Table 1.2

Student Main Campus	% of Population	Resp. Freq.	Resp. %
St. Paul Students	8%	142	9%
West Bank Students	18%	301	19%
East Bank Students	50%	817	52%
No Meeting Patterns	24%	325	21%
TOTAL	100%	1585	100%

In order to ensure this methodology was sound for all students and accounted for students who did not have class time scheduled on campus, students were asked to self-report the campus where they spend most of their time. This item allowed students to include time spent outside of class and for students who had no meeting patterns (i.e., classes) to select a campus. Students with no meeting patterns were included in the data analysis because they reported to be on campus more times than not. Additionally, the final percentages of response to this item are consistent with the population percentages calculated with classroom data. Therefore, reports by campus for all students were based on the self-reported survey item.

Response Rates

The survey was sent to 10,056 faculty students and staff. There were 89 email address failures. 2808 complete and partial responses were submitted. After applying the Data Cleaning Protocol (Appendix C), 2384 surveys were included in the final dataset. Fifteen percent or 484 (out of 2808) survey responses were removed from the dataset. The total number of valid responses (2384) represents 3.02% of the total student, faculty and staff population of 79,055 enrolled at or employed by the University of Minnesota.

The overall response rate for the study was 25%. This obtained a confidence interval of 99% and an error range of +/- 2.6%. See Table 1.3 for response rate by subpopulation.

Table 2.0

By Subpopulation	Population Size	Sample Size	Responses	Response Rate
Faculty	3553	300	116	39%
Staff	19376	1550	683	44%
Students	56126	8206	1585	19%

Questionnaire Design

The Mode Choice and Origin and Destination survey was created by the Office of Measurement Services, University of Minnesota in consultation with Parking and Transportation Services (Appendix A). The survey consisted of three main sections, which included travel mode and origin/destination to campus, from campus and around campus. Respondents were asked to locate their origin and destination zones (or zip code) on a map embedded in the survey and were also given the option to open a web page to access a dynamic map of campus. Respondents also reported trip information such as time of day and percentage of mode use. Respondents were able to report up to fifteen unique trips around campus.

The survey was pre-tested by a small number of faculty, students and staff. OMS collected feedback, made recommendations and worked with PTS to revise the questionnaire accordingly.

Data Collection

The online survey was administered by the Office of Measurement Services. A general invitation was on November 18, 2014 with a follow-up reminder on November 26th. Response goals were met for staff at this time. Targeted reminders were sent to students and faculty on December 4th. A second targeted email was sent to students based on their main campus on December 11th. The recruitment message promoted students to help meet our response goal for their main campus. A final reminder was sent to faculty on December 14th. Response goals were met for faculty; a final reminder was sent to students on Dec. 18th notifying them of an extension of the survey to December 29th. Due to low response from students, a second stratified, random sample was pulled on December 17th. This panel of students was sent an email invitation on December 18th and a reminder on December 22nd. The survey was closed on December 29, 2014.

Weighting

A weighting adjustment was applied for data analysis of mode share and origin and destination in order for the response distribution to meet the population distribution. This year, students were slightly under represented. See table below for weighting scheme.

Table 3.0

Subpopulation	% of Population	Resp. Freq.	Resp. %	Weights	% with Weighting
Faculty	4%	116	5%	0.82	4%
Staff	25%	683	29%	0.87	25%
All Students	71%	1585	66%	1.07	71%
TOTAL	100%	2384	100%		100%

Data Privacy and Security

Identifying information was collected in order to remove survey respondents from the reminder email lists and to collect demographic data. Respondents used their University of Minnesota email credentials to log in to the survey and verify they were included in the participant list. Throughout data collection, respondents' identity was confidential and accessible only to OMS staff. No one outside of OMS, including PTS, has had or ever will have access to information that would link respondents to their responses.

Terms

Group – Subpopulations within the University of Minnesota population. Includes active faculty, students and staff employed or enrolled on the Twin Cities campus.

Academic Level – Determined by the total number of credits a student has completed at the beginning of the term.

Undergraduate Student - A student enrolled in a 4- or 5-year bachelor's degree program, an associate's degree program, or a vocational or technical program below the baccalaureate. For the purposes of this study undergraduate students include Freshmen, Sophomores, Juniors, and Seniors based on total credits obtained at the beginning of the term.

Graduate Student - A student who holds a bachelor's degree or above and is taking courses at the post baccalaureate level. These students may or may not be enrolled in graduate programs.

Degree-Seeking Graduate Student – A graduate student enrolled in courses for credit who are seeking a degree, certificate, or other formal award. High school students also enrolled in postsecondary courses for credit are not considered degree/certificate-seeking.

Non-Degree Seeking Graduate Student - A graduate student enrolled in courses for credit who is not recognized by the institution as seeking a degree or formal award.

Professional Student – A student enrolled in a college that is offering a graduate program and has obtained their undergraduate degree. For the purposes of this study, Professional students include Year One (Professionals), Year Two (Professionals), Year Three (Professionals), Year Four (Professionals) and Fellows.

Fellow – A graduate student who receives grants-in-aid and trainee stipends. Includes degree-seeking and employed fellows.

Origin / Destination and Trip – The origin and destination denote the start and end location of a journey. A trip is a survey response that includes an origin and a destination (OD), time of day, mode of transportation (defined below) of a journey. One respondent may report several trips. In this report, number of trips per typical week is naturalized by campus visits frequency and group (student, faculty and staff).

Mode – a means of transport. This study focused on the following modes (UofM campus shuttle bus, Public Transit, walk, bicycle, drive alone, carpool, moped, motorcycle and other). A respondent may report percentage of multiple modes in a single trip. Mode shares in this report means the percentage of modes within a certain group.

Trip-Based Mode Share – Mode shares in this reports are based on trips instead of person. For example, 20% bicycle mode share for a certain group means 20% of trips traveled by this group, instead of 20% of the population of this group are using bicycle. Mode percentages by each trip were calculated by multiplying the number of trips by the reported mode percentages. The mode frequencies were subtotaled by mode and divided by the total number of trips in order to get obtain trip-based mode share overall and by group.

To and From Campus Mode Share – Respondents were asked to report the percentage of mode share for **all** trips during a typical week to and from campus in a single mode share item.

Around Campus Mode Share – Respondents reported percentage of mode for **each** trip starting and ending on campus.

Mode Share Summary

Overall

- Once travelers reach campus, driving alone mode share decreases while UofM campus shuttle bus and walk mode shares increase.
 - 75% of trips to or from campus use the following modes: drive alone, public transit or walking.
 - Once on campus, 87% of trips are made by walking (74%) or taking the UofM campus shuttle bus (13%).
- Students and staff decrease their use of public transit substantially in favor of the UofM campus shuttle bus or walking once they reach campus.

To and From Campus

- Faculty and staff have a higher drive alone mode share than students.
- Student mode shares are more evenly dispersed among the various modes. The mode share of walking decreases and public transit increases after students' freshman year.
- Non-Degree and degree-seeking graduate students reported similar mode shares. However, degree-seeking graduate students have higher bicycle mode share than non-degree graduate students.
- Males have higher bicycle mode share and lower drive alone mode share than females.
- Those whose gender is unspecified have a lower mode share in walking and higher mode share in bicycle.
- Full-time students have lower drive alone and higher walk mode share than part-time students.
- Those that are under 30 have the highest UofM campus shuttle bus, public transit and walk mode shares (74%).
- The bicycle mode share is maintained from under the age of 30 by those who are in the 31-45 age range. However, driving alone mode share increases over 30% for those who are in the 31-45 age range. The highest mode share of those who carpool are in the 31-60 age range.
- When comparing travelers who start in a campus zone to those who start off campus, a higher mode share of walk or UofM campus shuttle bus was reported for those who start on campus. Drive alone and public transit mode shares were lower when reported for trips to and from campus.

Around

- The primary mode for **all** trips around campus is walking (74%). This is a consistent finding across all demographic variables, except stated below.
- Staff have slightly lower mode share of UofM campus shuttle bus than faculty and students, while students have higher bicycle and lower drive alone mode share than faculty and staff.
- Freshman and professional students have slightly lower mode share of UofM campus shuttle bus than students of another academic level.
- Degree-Seeking graduate students have higher mode share of walking and lower of UofM campus shuttle bus or public transit than non-degree seeking graduate students.
- Males have a higher mode share of bicycle and lower UofM campus shuttle bus or public transit than females.
- Those whose gender is unspecified have a much lower mode share of walking and higher mode shares of public transit and bicycle.
- Trips made by travelers in the 31-45 age range have the lowest mode share of walking.
- Travelers in the 46-60 age range have the highest mode share of drive alone and lowest of UofM campus shuttle bus or public transit.

Mode Share Results

Travel by Mode - To and From Campus Only

The following set of tables is based on the reported percent of mode use among people making either a trip to or from campus. After applying weights to the data set, the percentages are based a total of 19,878 reported trips.

Chart 1: Overall Mode – To and From Campus

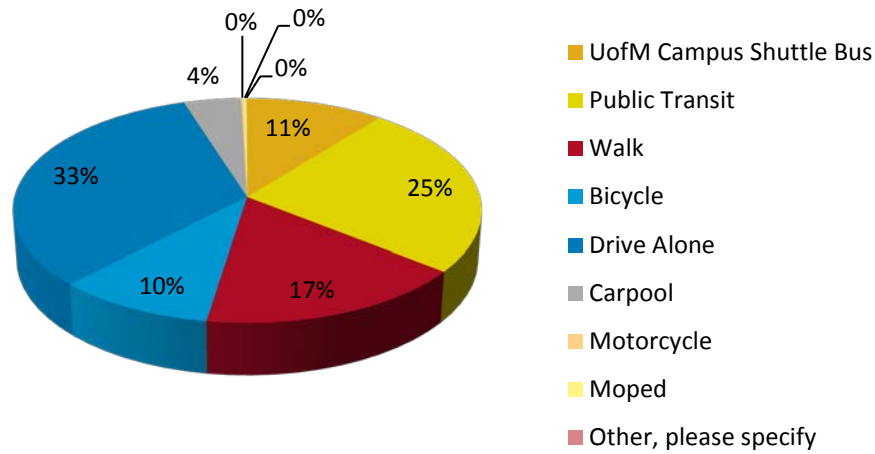


Chart 2: Mode by Group – To and From Campus

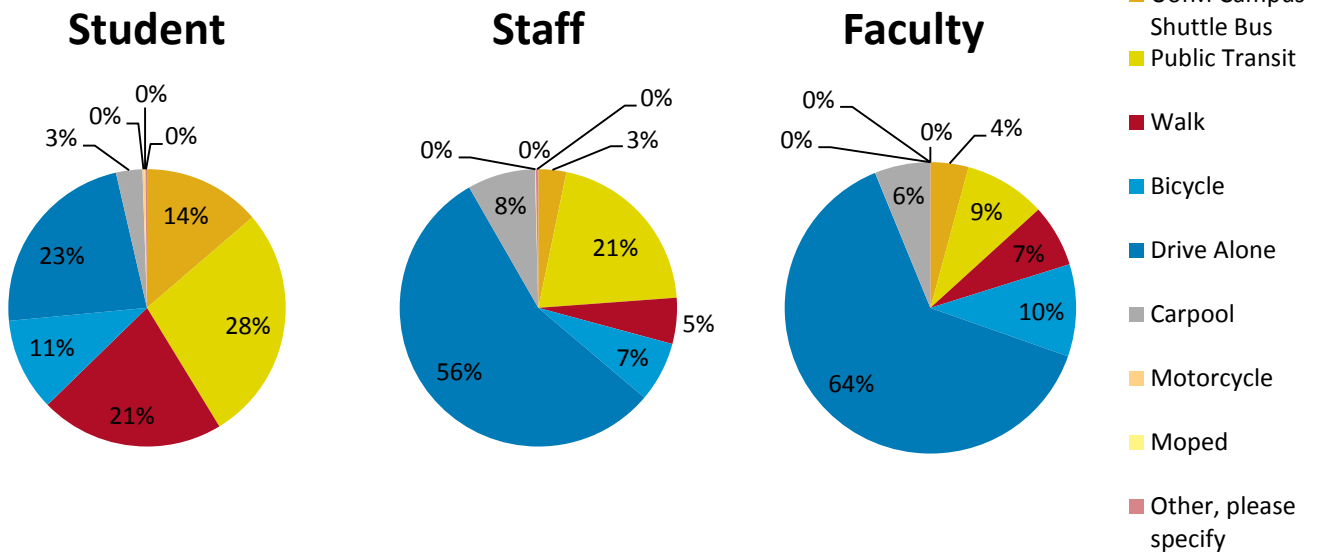


Table 4.0: Mode by Academic Level – To and From Campus

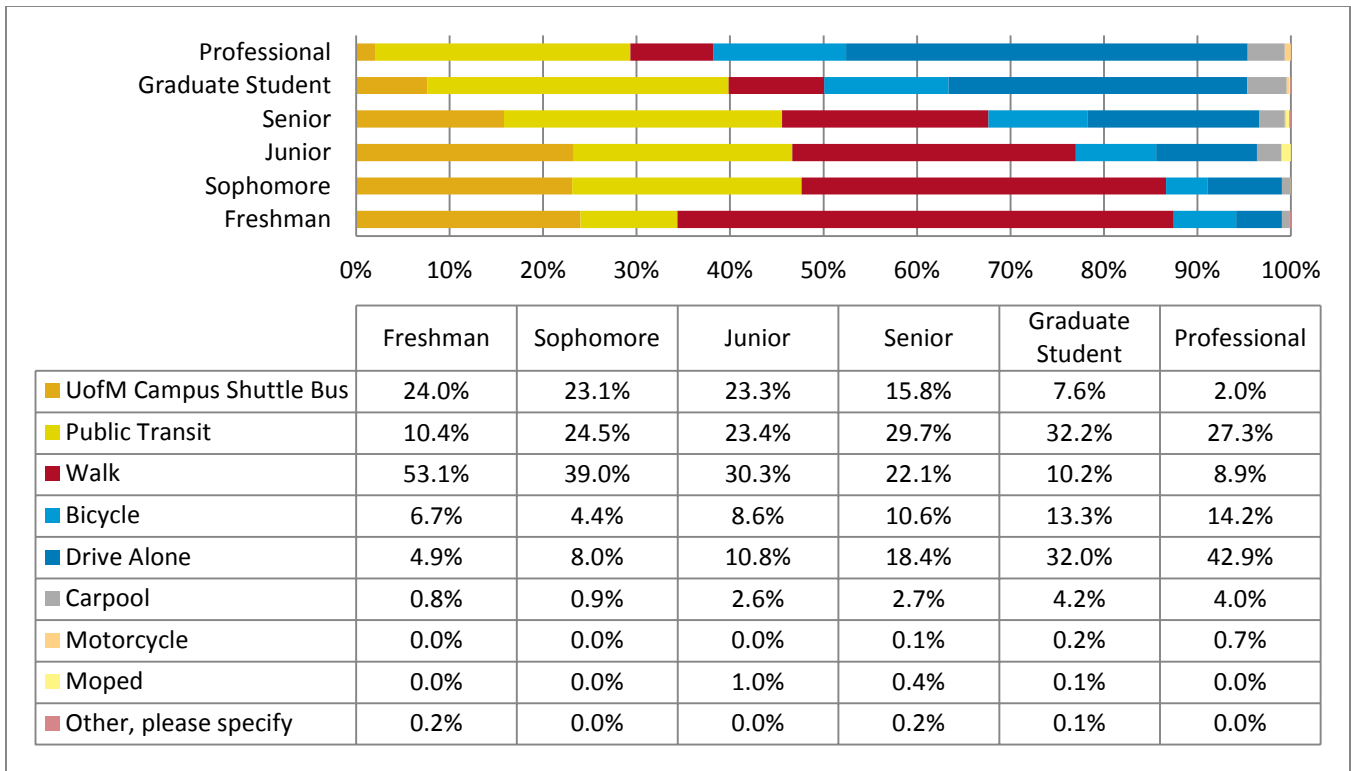


Table 4.1: Mode by Degree-Seeking or Non-Degree Seeking Graduate Student – To and From Campus

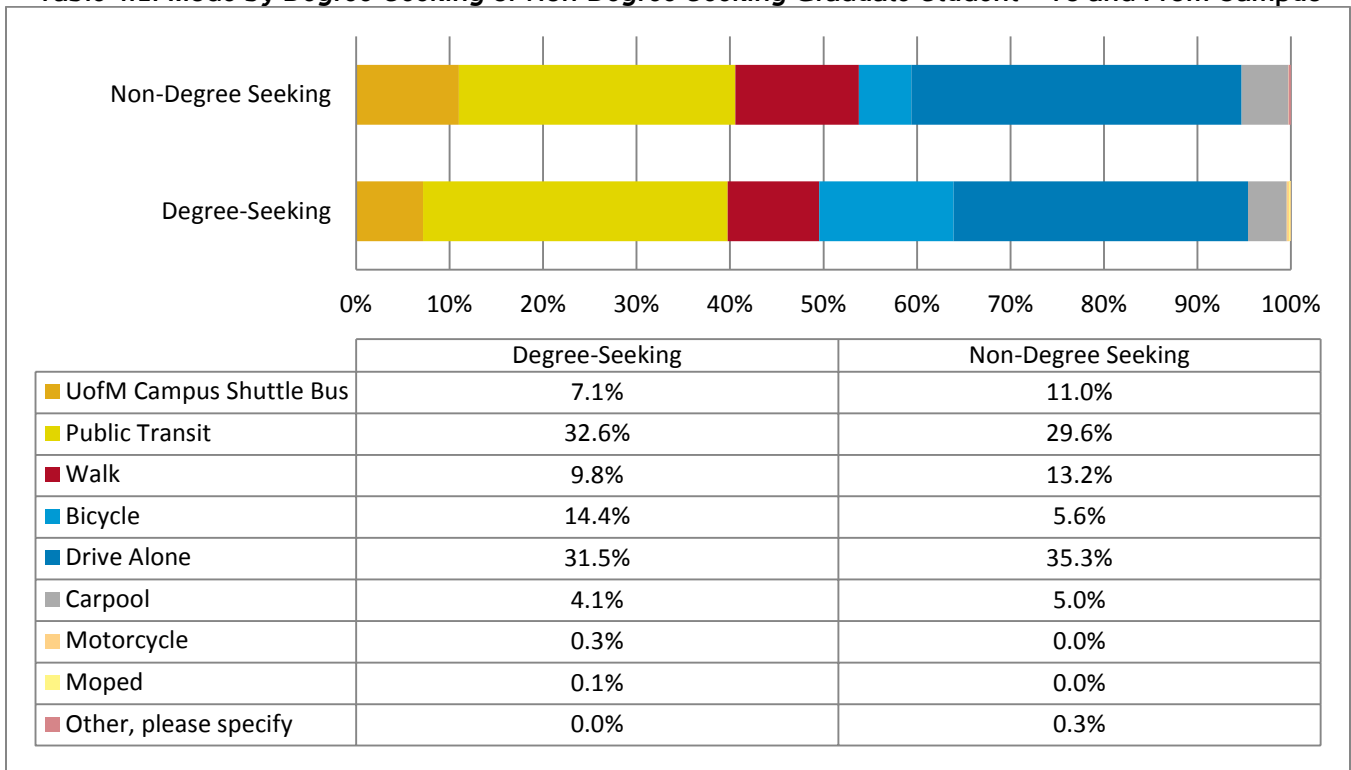
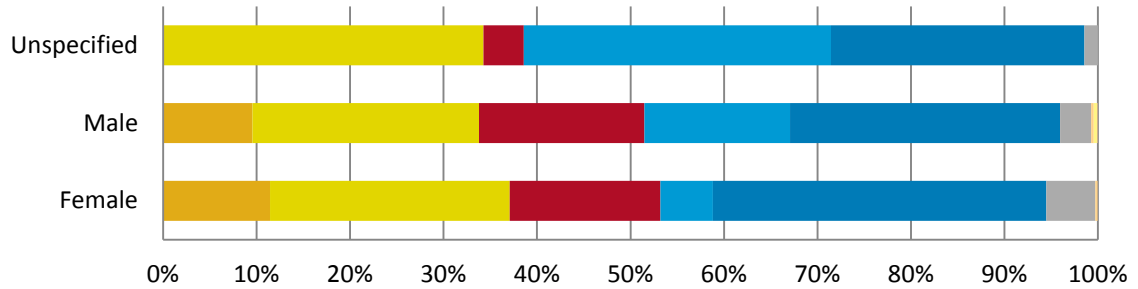
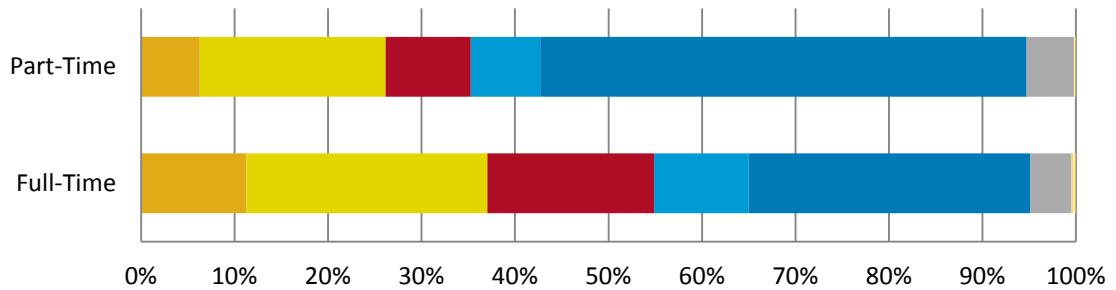


Table 4.2: Mode by Gender – To and From Campus



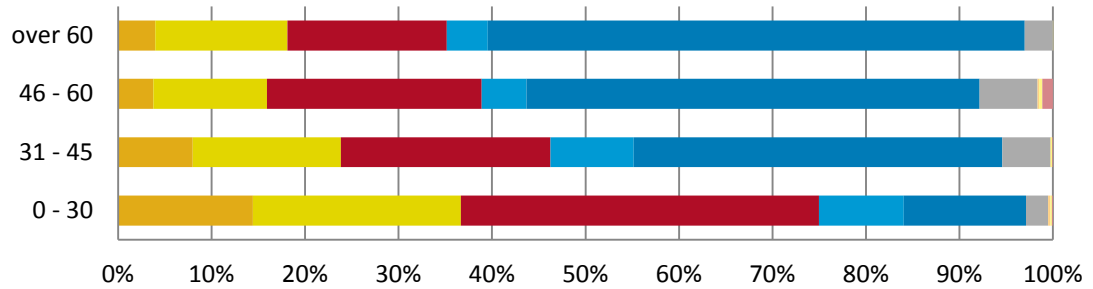
	Female	Male	Unspecified
UofM Campus Shuttle Bus	11.4%	9.6%	0.0%
Public Transit	25.6%	24.2%	34.3%
Walk	16.1%	17.7%	4.3%
Bicycle	5.6%	15.6%	32.9%
Drive Alone	35.7%	28.9%	27.1%
Carpool	5.2%	3.3%	1.4%
Motorcycle	0.2%	0.3%	0.0%
Moped	0.1%	0.4%	0.0%
Other, please specify	0.1%	0.1%	0.0%

Table 4.3: Mode by Status – To and From Campus



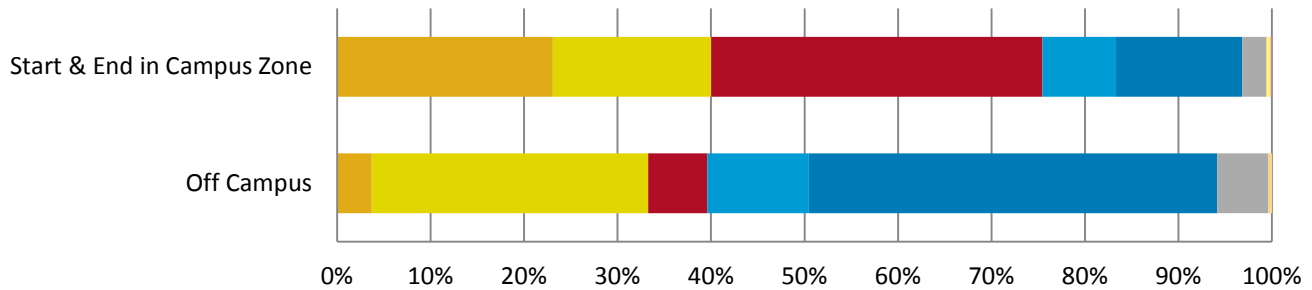
	Full-Time	Part-Time
UofM Campus Shuttle Bus	11.3%	6.3%
Public Transit	25.8%	19.9%
Walk	17.8%	9.1%
Bicycle	10.1%	7.4%
Drive Alone	30.2%	52.0%
Carpool	4.4%	5.0%
Motorcycle	0.2%	0.0%
Moped	0.2%	0.2%
Other, please specify	0.1%	0.0%

Table 4.4: Mode by Age Range – To and From Campus



	0 - 30	31 - 45	46 - 60	over 60
UofM Campus Shuttle Bus	14.4%	8.0%	3.8%	4.0%
Public Transit	22.3%	15.8%	12.1%	14.1%
Walk	38.3%	22.4%	23.0%	17.0%
Bicycle	9.1%	8.9%	4.8%	4.4%
Drive Alone	13.1%	39.4%	48.5%	57.4%
Carpool	2.4%	5.2%	6.2%	3.0%
Moped	0.3%	0.0%	0.2%	0.0%
Motorcycle	0.2%	0.1%	0.3%	0.0%
Other, please specify	0.1%	0.1%	1.1%	0.0%

Table 4.5: Mode by On and Off Campus – To and From Campus



	Off Campus	Start & End in Campus Zone
UofM Campus Shuttle Bus	3.7%	23.1%
Public Transit	29.6%	16.9%
Walk	6.3%	35.4%
Bicycle	10.9%	7.9%
Drive Alone	43.7%	13.5%
Carpool	5.5%	2.6%
Motorcycle	0.3%	0.1%
Moped	0.1%	0.4%
Other, please specify	0.0%	0.1%

Travel by Mode - Around Campus Only

The following set of tables is based on the reported percent of mode use among people making either a trip to or from campus. After applying weights to the data set, the percentages are based a total of 7,330 reported trips.

Chart 3: Overall Mode – Around Campus

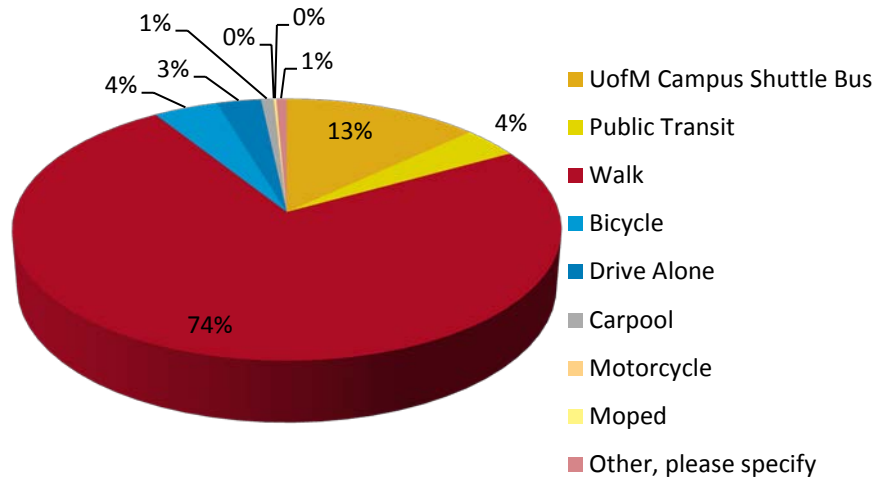


Chart 4: Mode by Group – Around Campus

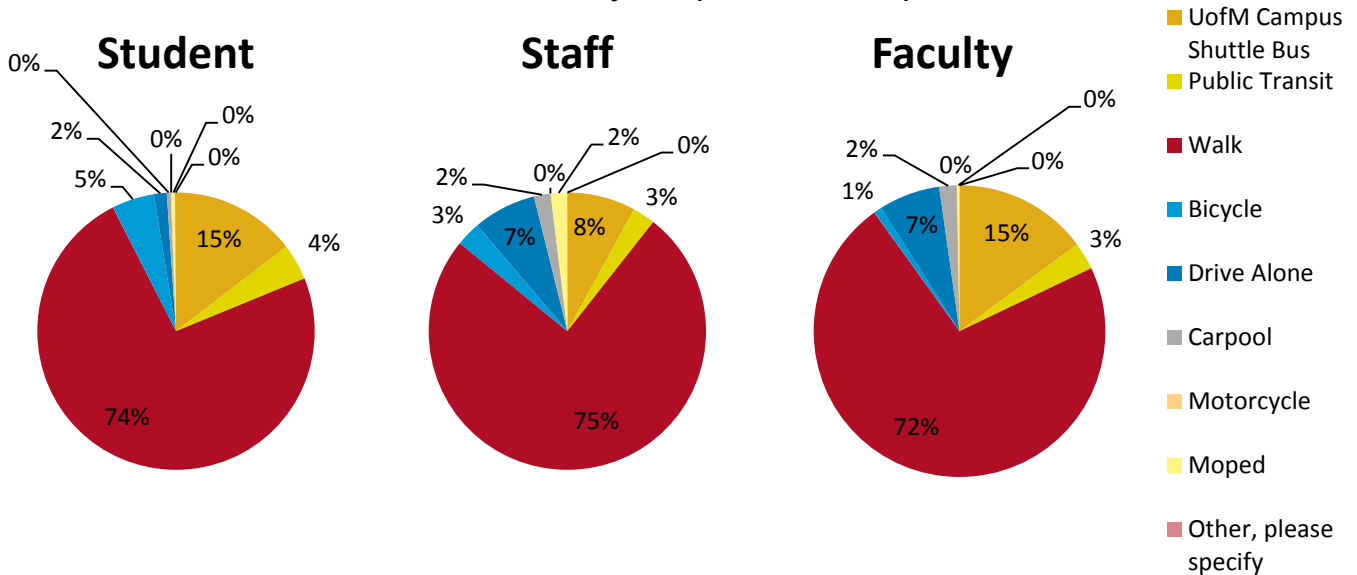
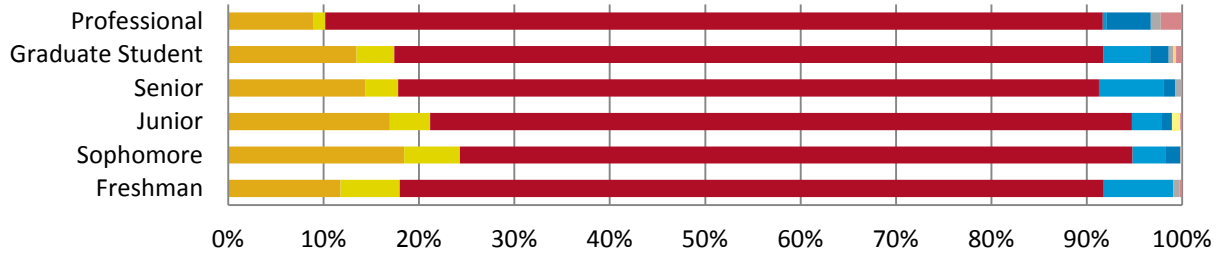
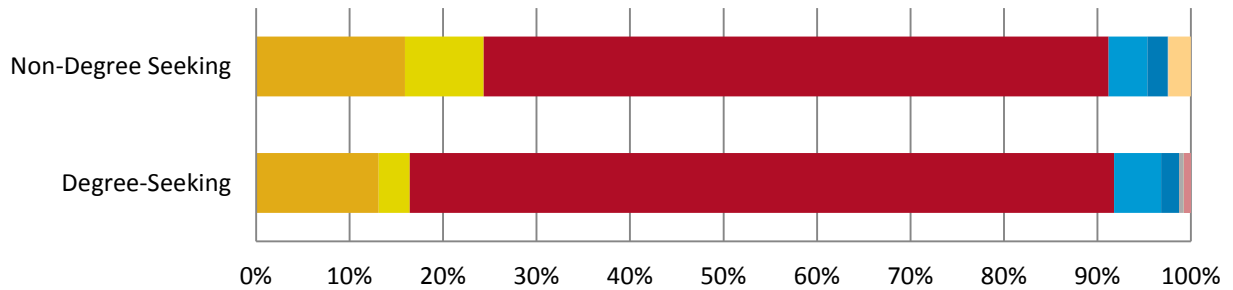


Table 5.0: Mode by Academic Level – Around Campus



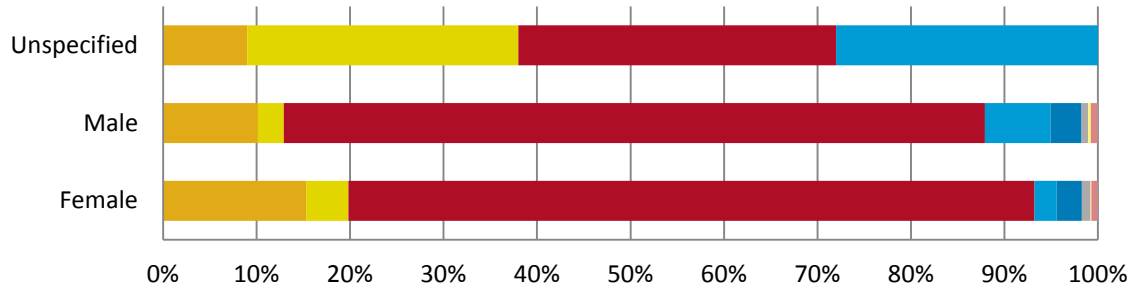
	Freshman	Sophomore	Junior	Senior	Graduate Student	Professional
UofM Campus Shuttle Bus	11.8%	18.5%	16.9%	14.4%	13.5%	8.9%
Public Transit	6.2%	5.8%	4.2%	3.5%	3.9%	1.2%
Walk	73.8%	70.5%	73.6%	73.4%	74.3%	81.5%
Bicycle	7.3%	3.4%	3.2%	6.8%	4.9%	0.4%
Drive Alone	0.0%	1.6%	1.0%	1.2%	2.0%	4.7%
Carpool	0.7%	0.2%	0.0%	0.7%	0.5%	1.0%
Motorcycle	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%
Moped	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%
Other, please specify	0.3%	0.0%	0.2%	0.0%	0.6%	2.3%

Table 5.1: Mode by Graduate Student Academic Level – Around Campus



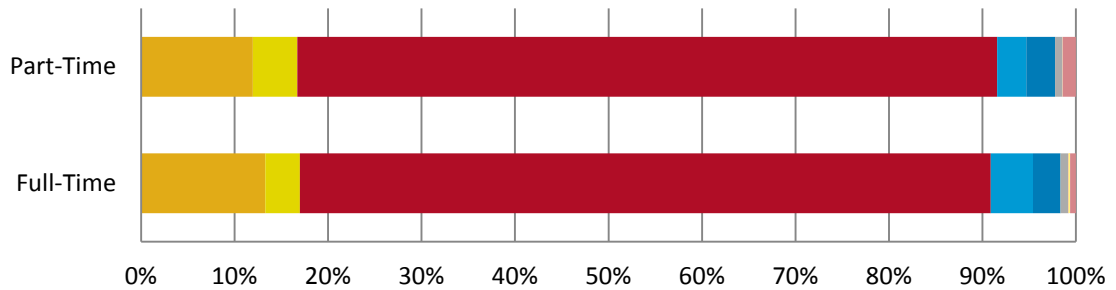
	Degree-Seeking	Non-Degree Seeking
UofM Campus Shuttle Bus	13.1%	15.9%
Public Transit	3.3%	8.4%
Walk	75.3%	66.9%
Bicycle	5.0%	4.1%
Drive Alone	1.9%	2.2%
Carpool	0.5%	0.1%
Motorcycle	0.0%	2.4%
Moped	0.0%	0.0%
Other, please specify	0.7%	0.0%

Table 5.2: Mode by Gender – Around Campus



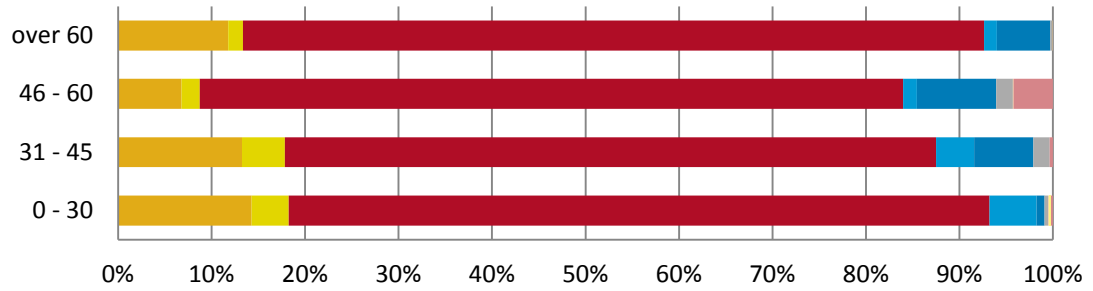
	Female	Male	Unspecified
UofM Campus Shuttle Bus	15.3%	10.1%	9.0%
Public Transit	4.5%	2.8%	29.0%
Walk	73.4%	75.0%	34.0%
Bicycle	2.3%	7.0%	28.0%
Drive Alone	2.7%	3.3%	0.0%
Carpool	0.9%	0.7%	0.0%
Motorcycle	0.1%	0.0%	0.0%
Moped	0.0%	0.2%	0.0%
Other, please specify	0.7%	0.8%	0.0%

Table 5.3: Mode by Status – Around Campus



	Full-Time	Part-Time
UofM Campus Shuttle Bus	13.3%	11.9%
Public Transit	3.7%	4.8%
Walk	73.9%	74.9%
Bicycle	4.5%	3.1%
Drive Alone	3.0%	3.1%
Carpool	0.8%	0.8%
Motorcycle	0.1%	0.0%
Moped	0.1%	0.0%
Other, please specify	0.6%	1.4%

Table 5.4: Mode by Age Range – Around Campus



	0 - 30	31 - 45	46 - 60	over 60
UofM Campus Shuttle Bus	14.3%	13.2%	6.8%	11.8%
Public Transit	4.0%	4.6%	2.0%	1.6%
Walk	74.9%	69.7%	75.2%	79.3%
Bicycle	5.0%	4.1%	1.5%	1.3%
Drive Alone	0.9%	6.3%	8.5%	5.7%
Carpool	0.4%	1.7%	1.8%	0.2%
Motorcycle	0.1%	0.0%	0.1%	0.0%
Moped	0.2%	0.0%	0.0%	0.0%
Other, please specify	0.2%	0.4%	4.2%	0.0%

Origin / Destination Study Results

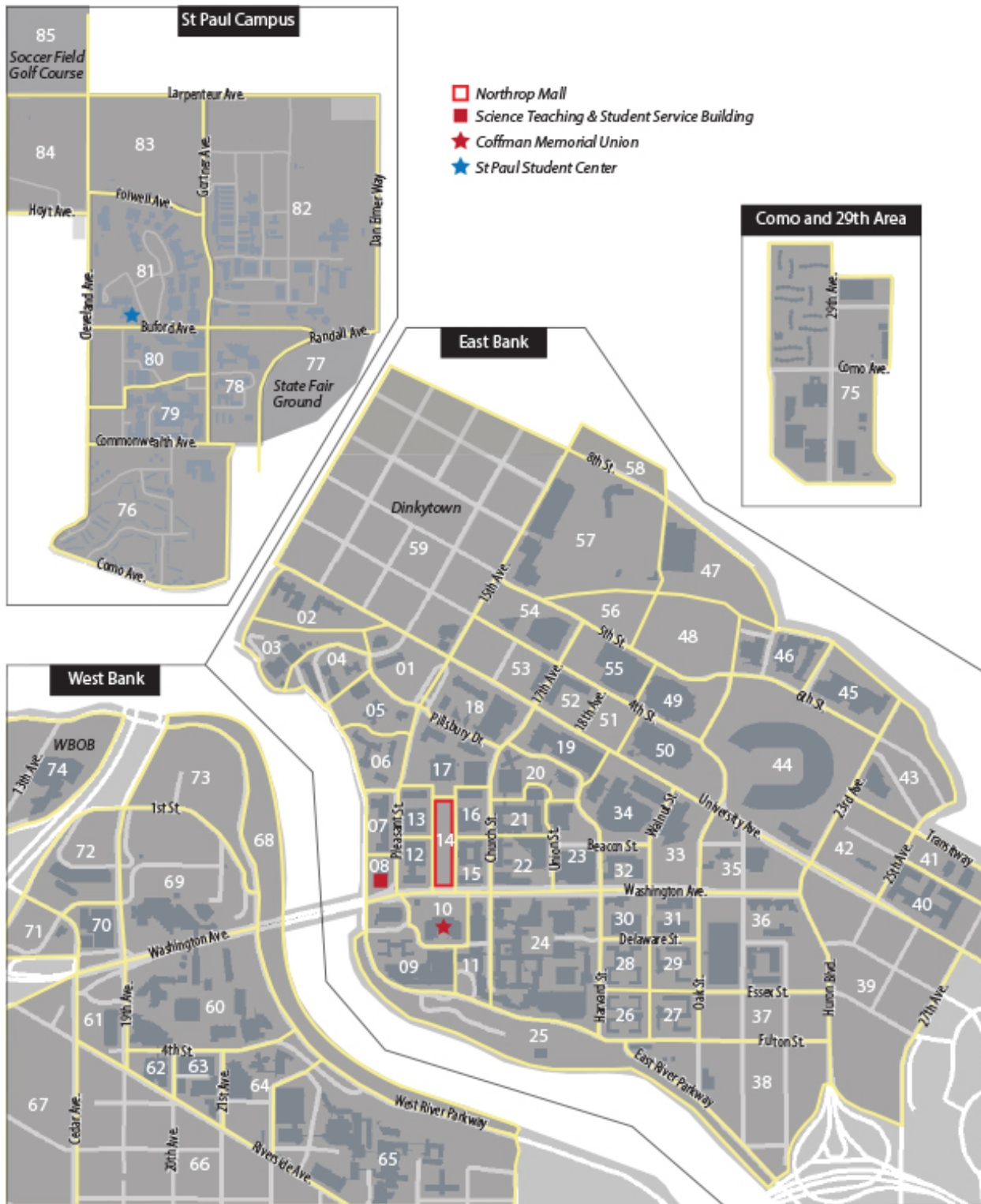


FIGURE 1 CAMPUS ZONES IN 2014 OD SURVEY

In the 2014 OD survey, the total campus area is defined as areas with University buildings and their immediately adjacent neighborhoods with densely populated student housing such as Dinkytown, Seven Corners, University Village, or Prospect Park. The campus zones are shown in Figure 1. Usually a zone delineates buildings or area of similar function. However, building(s) with less attraction were combined with adjacent building(s) with more attractions to form a zone; or sometimes buildings of similar functions were broken down to several zones because of their (high) level of attraction. The boundary of a zone is usually, if not always, coincides with a street or walkway centerline.

The OD results will serve as the foundation for PTS to plan for future bus routes, bicycle infrastructure, pedestrian amenities and parking facilities.

Refer to the Appendix D for high definition (PDF) versions of maps mentioned in this OD results section.

Campus Origin and Destination for Transit Planning

For campus transit system planning purpose, trips within 5 minutes walking distance (or 1,050 ft in length assuming 3.5 ft/sec walking speed) have been excluded.

In order for a meaningful illustration of the OD's, only OD's that are highly or moderately demanded are shown on the maps below. "Highly demanded" OD's are defined as those demanded with 2 plus standard deviation higher than the average demand of all OD; while the "moderately demanded" OD's are 1-2 standard deviation higher than the average. The demand for a specific trip is indicated by the number of trips for this OD in a typical week in fall 2014. The number of trips is based on the 2384 valid survey responses that is 3.02% of the total population of 79,055.

The colors in the two maps below denote the level of demand (number of trips) for specific OD's.

Highly Demanded Origin and Destination

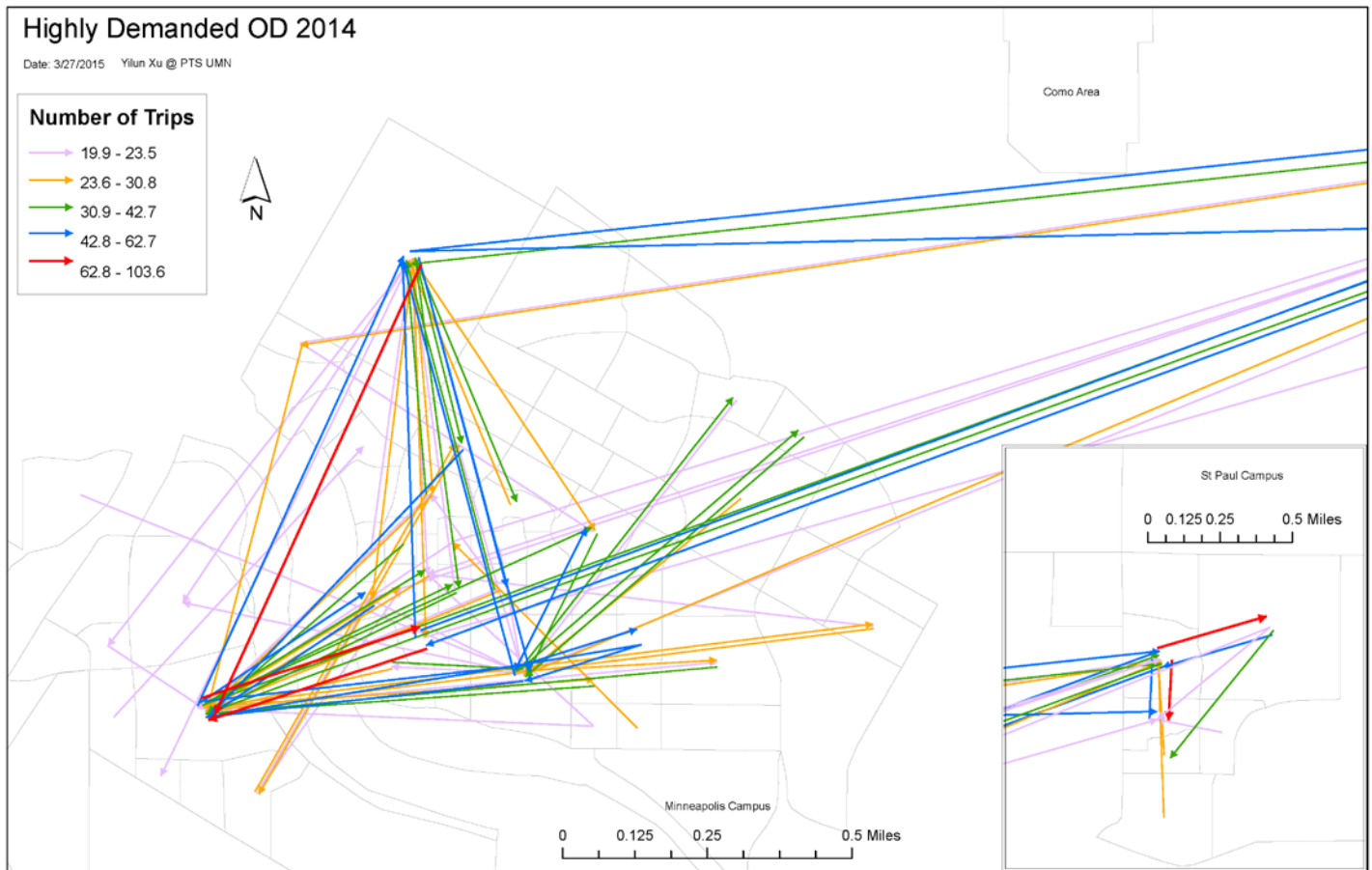


FIGURE 2 HIGHLY DEMANDED OD'S FOR TRANSIT PLANNING

According to the highly demanded OD map above, Below is a list of most highly ranked origin and destination "areas." Refer to the campus map for detailed areas (<http://www1.umn.edu/pts/>).

1. Coffman area (East Bank) from/to St Paul Student Center Area;

2. Coffman area (East Bank) from/to West Bank plaza area (south of Washington)
3. Dinkytown from/to St Paul Student Center Area;
4. East Bank (Health/Medical area, Knoll area) from/to Dinkytown;
5. West Bank from/to Dinkytown;
6. BDD area from/to Health/Medical area;

Moderately Demanded Origin and Destination

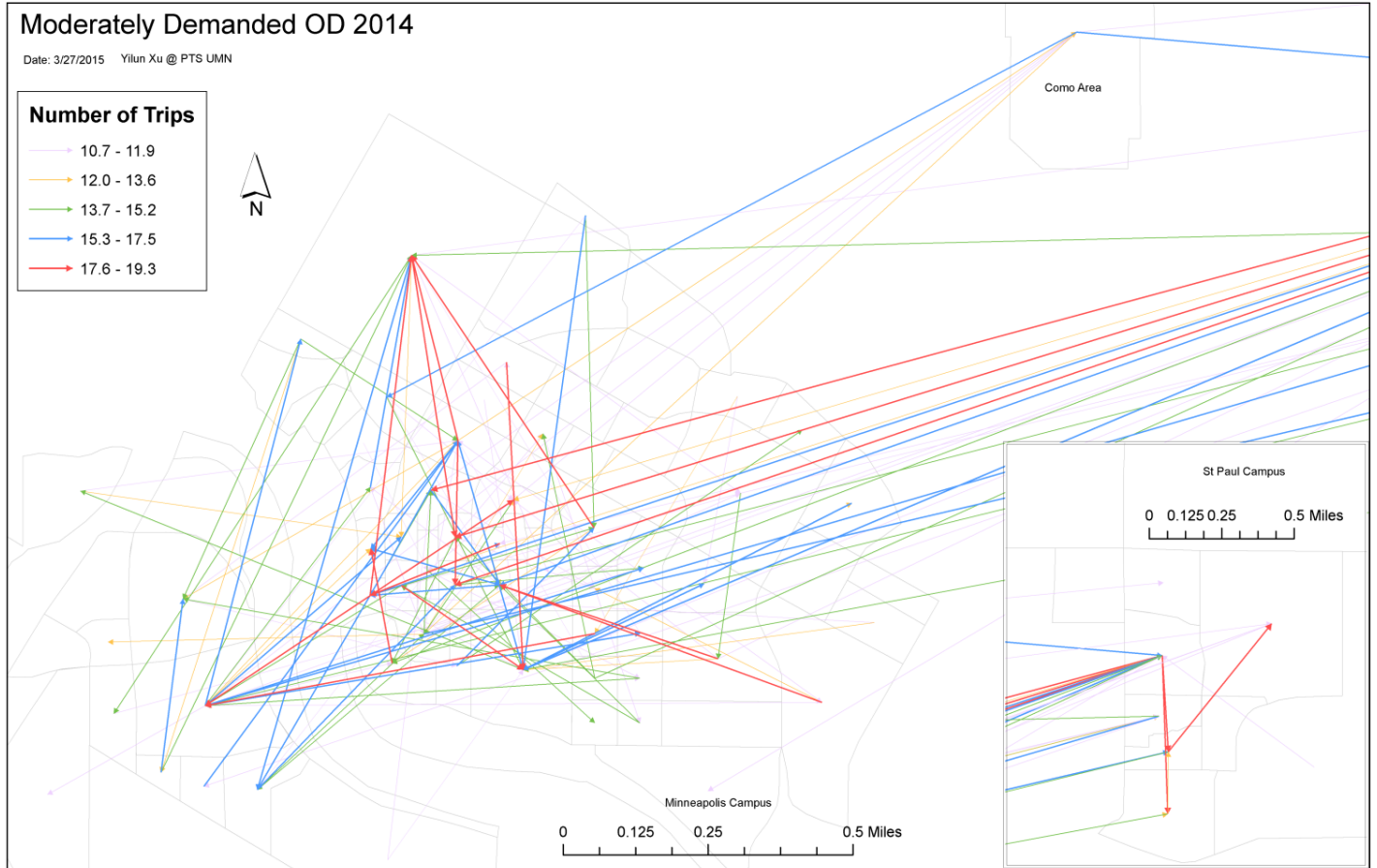
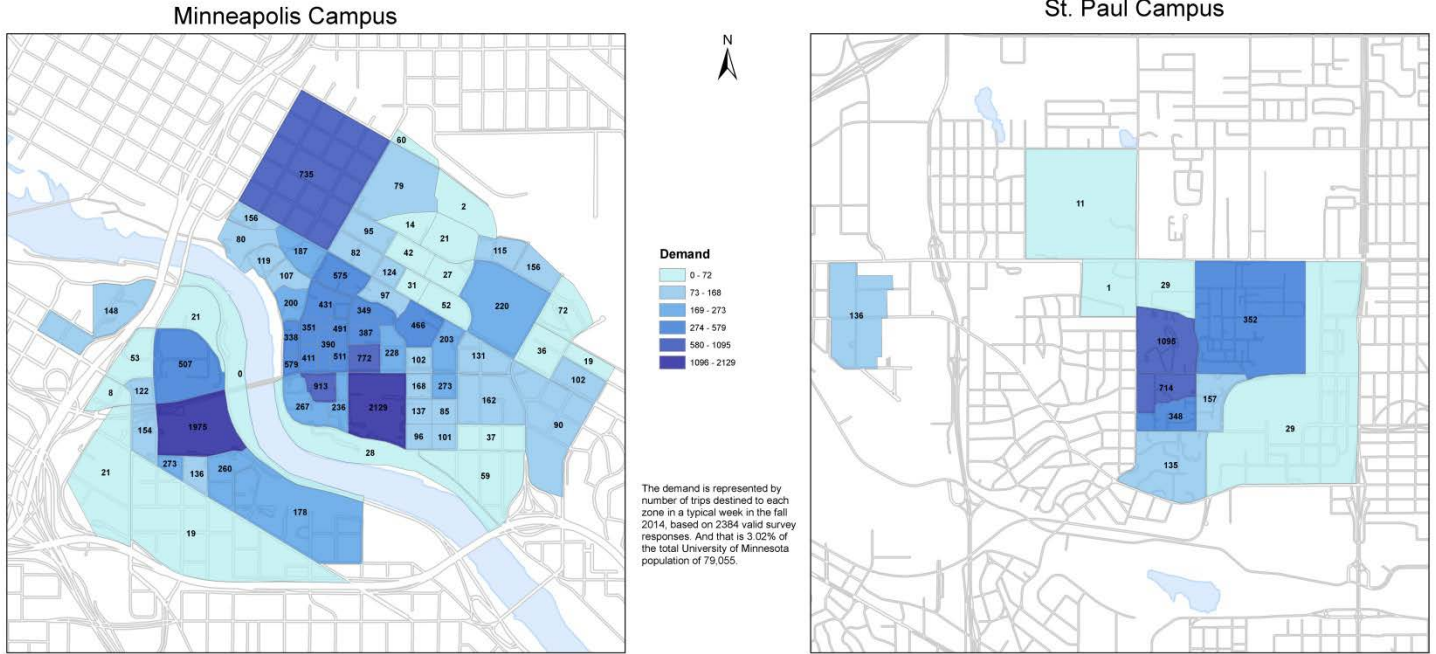


FIGURE 3 MODERATELY DEMANDED OD'S FOR TRANSIT PLANNING

Further review of the moderately demanded OD map reveals that there are additional demands especially between East Bank zones to St Paul zones, between Dinkytown and East Bank zones, and to/from the Como area. This map also shows busy short internal trips among the East Bank, Dinkytown and West Bank areas.

Campus Destination Demand

Destination Demand - All Mode



Destination Density - All Mode

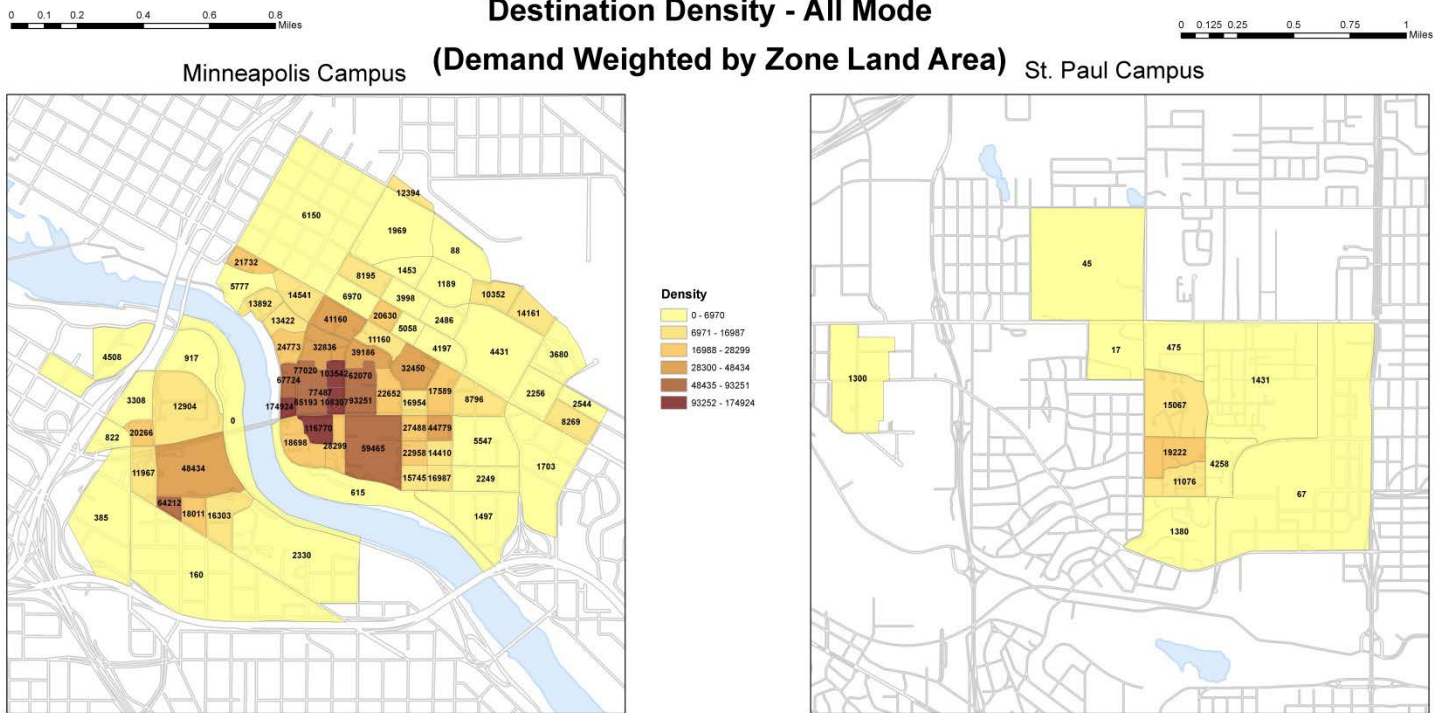


FIGURE 4 CAMPUS DESTINATION DEMAND AND DENSITY OF ALL MODES

The upper two maps in Figure 4 plot the number of trips (based on the survey responses) with all modes destined to each zone. The darker colors indicate higher destination demand. The lower two maps plot the density of trips with all modes destined to each zone. Density is calculated by dividing the number of trips destined a specific zone by the physical land area of the zone. The darker colors indicate higher destination density. Refer to the Appendix D for campus destination demands and density by vehicle, transit, bicycle or walk. These maps in Figure 4 and Appendix D indicate the level of land use in each zone, which is essential to transportation service and facility planning.

Mode Share by Campus Destination

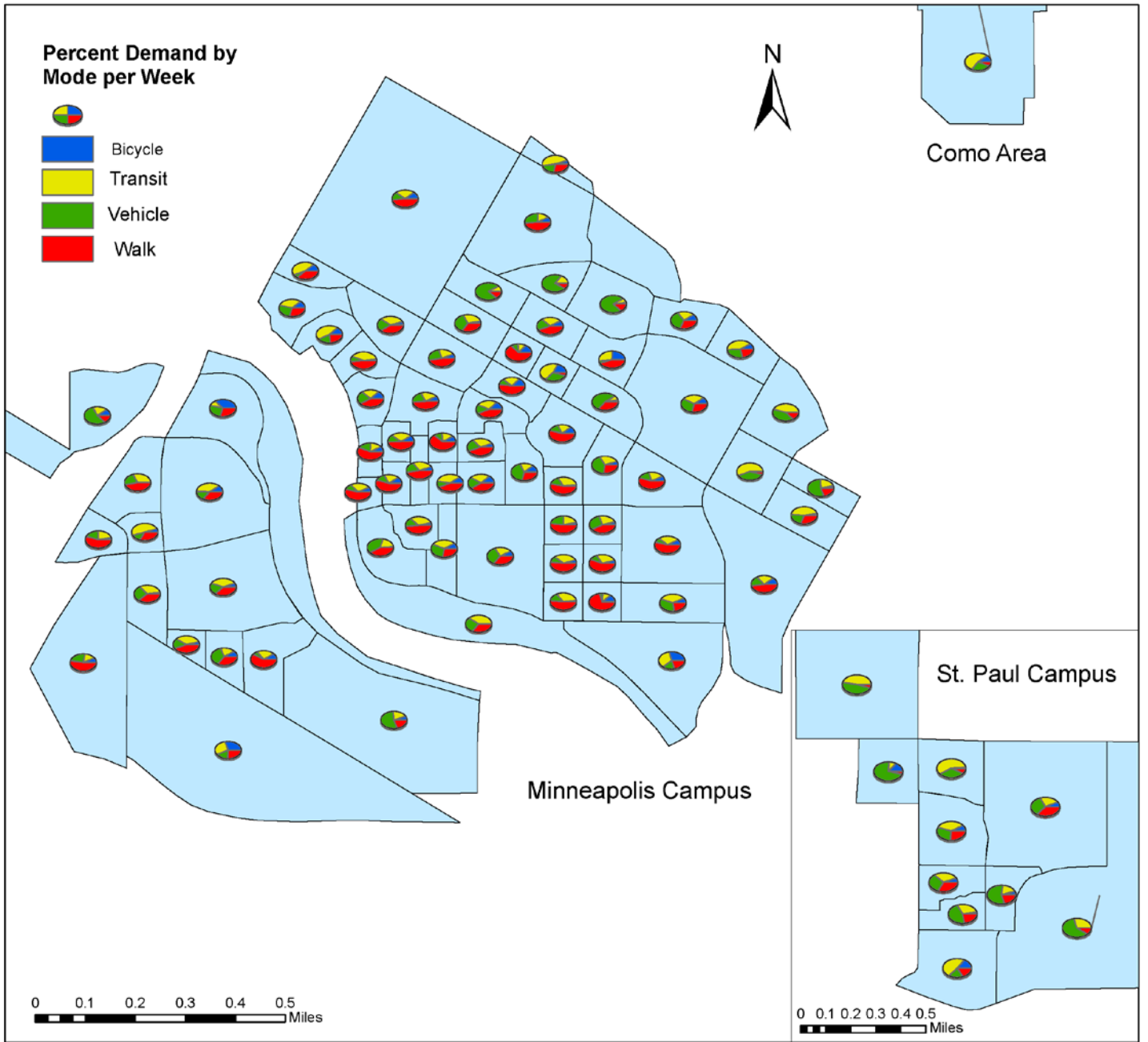


FIGURE 5 DESTINATION MODE SHARES

Figure 5 shows mode share (of bicycle, transit, vehicle and walk) of all trips going to specific zones. For example, the walk mode share is higher for trips destined to superblock than the stadium.

Appendix A Survey

PTS Mode Share and Origin and Destination Survey

Q1 Please be sure to read the instructions to each question or set of questions. Answer each question based on your experience during a typical week this semester.

Answer If GRP Is Equal to Student

Q2 Please select the part of Twin Cities campus where you spend the majority of your time.

- East Bank (1)
- West Bank (2)
- St. Paul Campus (3)
- I do not physically go to campus (4)

Q3 In a typical week, which days do you travel TO a destination on campus? (Select all that apply)

- Monday (1)
- Tuesday (2)
- Wednesday (3)
- Thursday (4)
- Friday (5)
- Saturday (6)
- Sunday (7)

Q4 Instructions: In the next series of questions, you will be presented with a map of the Twin Cities campus that is divided into Zones. Each Zone has been assigned a number. Please select the Zone number where you are traveling from (origin) and where you are traveling to (destination). Origin and Destinations include buildings such as classrooms, offices, restaurants, athletic/rec facilities, etc. Do NOT include parking facilities, bus stops or train stations.

Q5 Please use the map to report your trip information TO your first campus destination each day you travel to campus. Fill in your Zip Code, ONLY if your origin zone is not listed.

[MAP]

[Click here to view the interactive map for building details.](#)

Origin Zone	Origin Zip Code	Destination Zone	Time of Day
-------------	-----------------	------------------	-------------

[Day(s) of the week selected in Q3]

Origin Zone: Not listed, 1-85

Origin Zip Code: open-ended

Destination Zone: Not listed, 1-85

Time of Day: 5AM – 1PM, 1PM – 8PM, 8PM – 5AM

Q7 Please use the map to report your trip information FROM your last campus destination.

[MAP]

Click here to view the interactive map for building details.

Origin Zone	Destination Zone	Destination Zip Code	Time of Day
-------------	------------------	----------------------	-------------

[Day(s) of the week selected in Q3]

Origin Zone: Not listed, 1-85

Destination Zone: Not listed, 1-85

Destination Zip Code: open-ended

Time of Day: 5AM – 1PM, 1PM – 8PM, 8PM – 5AM

Q9 Please use the slider scale to indicate the percentage use of the following modes of transportation to and from campus during a typical week. Do not include a mode if it does not contribute to a significant portion of that trip. Must total 100%.

*Public Transit includes Metro Transit Buses, Light Rail Transit, and other regular route transit (Southwest, MVTA, Jefferson Buses, Commuter Train, etc.)

- _____ UofM campus shuttle bus
- _____ *public transit
- _____ bicycle
- _____ carpool
- _____ drive alone
- _____ moped
- _____ motorcycle
- _____ walk
- _____ other, please specify:

Q10 After you reach your first campus destination, do you travel AROUND campus to other destinations (i.e., building to building)?

- Yes (1)
- No (2)

If No Is Selected, Then Skip To End of Survey

Q11 Instructions: In the next series of questions, select Zone numbers based on where you are traveling from (origin) and where you are traveling to (destination) while traveling AROUND campus. Please report ALL Trips that you take around campus in a typical week, this semester. Please ONLY include Trips from building to building (i.e., residence, classroom, office, restaurant, athletic/recreation facilities). Do NOT include parking facilities, bus stops or train stations.

Q12 Please use the map to report your travel information for this trip around campus.

[MAP]

Click here to view the interactive map for building details.

Origin Zone	Destination Zone	# of Trips	Time of Day
-------------	------------------	------------	-------------

Origin Zone: 1-85

Destination Zone: 1-85

of Trips: open-ended

Time of Day: 5AM – 1PM, 1PM – 8PM, 8PM – 5AM

Q14 Please use the slider scale to indicate the percentage use of the following modes of transportation for this trip. Must total 100%.

*Public Transit includes Metro Transit Buses, Light Rail Transit, and other regular route transit (Southwest, MVTA, Jefferson Buses, Commuter Train, etc.)

_____ UofM campus shuttle bus

_____ *public transit

_____ bicycle

_____ carpool

_____ drive alone

_____ moped

_____ motorcycle

_____ walk

_____ other

Q15 Would you like report another trip?

Yes (1)

No (2)

If No Is Selected, Then Skip To End of Survey

Repeat Items 12, 14 and 15 up to 15 times.

Appendix B Reminders

Reminder Email #1 - General

Subject: Help us Plan for Transportation at the U
From: Parking and Transportation Services

Dear [First Name],

Parking and Transportation Services can't plan for new bus routes, bicycle infrastructure, pedestrian amenities and parking facilities without YOUR help.

Surveys are due Monday, December 29th.

The survey will take approximately 15 minutes depending on your travel experience.

To thank you for your time, all respondents will qualify for a chance to win \$100 certificate for a transportation product. The drawing will be held upon conclusion of the survey.

Follow this link to the Survey:

[\\${://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${://SurveyURL}](#)

Thank you for your time.

Parking and Transportation Services

Reminder Email #2 – Targeted to Faculty

Subject: Help Plan for Campus Travel
From: Parking and Transportation Services

Dear [First Name],

Our records show that you have not completed your survey. There is still time to respond!

You are one of a select few faculty who have been invited to participate in a survey that will help plan new bus routes, bicycle infrastructure, pedestrian amenities and parking facilities. Your participation to this study is critical to the future planning of Parking and Transportation Services.

You will be asked to report information regarding your travel behavior to, from and around the Twin Cities campus. The survey will take approximately 10 minutes depending on your travel experience. Responses are due by December 15, 2015.

To thank you for your time, all respondents will qualify for a chance to win a \$100 certificate towards a transportation product. The drawing will be held upon conclusion of the survey. All responses are confidential. Identifiable information will only be used for reminder purposes and incentive selection. All responses will be reported in aggregate.

Follow this link to the Survey:

[\\${://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${://SurveyURL}](#)

Thank you for your time.

Parking and Transportation Services

Reminder Email #2 – Targeted to Students

Subject: Due Dec. 15th: Help us Plan for Transportation at the U
From: Parking and Transportation Services

Dear [First Name],

Wouldn't it be nice to say:

“I helped the University plan the....new bus routes, bicycle infrastructure, pedestrian amenities and parking facilities.”

Leave your mark on the U by helping to prioritize the planning for improvements to our transportation facilities and services. Faculty and staff are responding. But we need to hear from student like **YOU**, so that PTS can work to meet your needs too.

The survey will take approximately 15 minutes depending on your travel experience. Responses are due by December 15th.

To thank you for your time, all respondents will qualify for a chance to win \$100 certificate for a transportation product. The drawing will be held upon conclusion of the survey.

Follow this link to the Survey:

[\\${://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${://SurveyURL}](#)

Thank you for your time.

Parking and Transportation Services

Reminder Email #3 – Targeted to Faculty

Subject: Final Reminder: Campus Traveler Study from PTS

From: Parking and Transportation Services

Dear [First Name],

We only need a few more responses from faculty, like you, to reach our total response goal. Your input will inform the PTS plan for new bus routes, bicycle infrastructure, pedestrian amenities and parking facilities.

We know this study requires a lot of thought; we are very appreciative of your time.

The survey will take approximately 15 minutes depending on your travel experience. Responses are due by tomorrow, December 15th.

To thank you for your time, all respondents will qualify for a chance to win \$100 certificate for a transportation product. The drawing will be held upon conclusion of the survey.

Follow this link to the Survey:

[\\${://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${://SurveyURL}](#)

Thank you for your time.

Parking and Transportation Services

Reminder Email #3 – Targeted to Students by Campus

Subject: Due Dec. 15th: Help us Plan for Transportation at the U
From: Parking and Transportation Services

Dear [First Name],

We only need [# of responses] more responses to meet our goal!

We need students who travel on the [Main Campus Assignment] campus to help us with our study. Without participating from students like YOU, the needs of [Main Campus Assignment] travelers may be under represented.

We would greatly appreciate you taking the time to think about your travel patterns. Wouldn't it be nice to say,

“I helped the University plan the....new bus routes, bicycle infrastructure, pedestrian amenities and parking facilities.”

Leave your mark on the U by helping to prioritize the planning for improvements to our transportation facilities and services.

The survey will take approximately 15 minutes depending on your travel experience. Responses are due by the end of the day Monday, December 15th.

To thank you for your time, all respondents will qualify for a chance to win \$100 certificate for a transportation product. The drawing will be held upon conclusion of the survey.

Follow this link to the Survey:
\${://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
\${://SurveyURL}

Thank you for your time.

Parking and Transportation Services

Reminder Email #4 – Targeted to Students by Campus

Subject: Due Dec. 15th: Help us Plan for Transportation at the U
From: Parking and Transportation Services

Dear [First Name],

Parking and Transportation Services can't plan for new bus routes, bicycle infrastructure, pedestrian amenities and parking facilities without YOUR help.

The deadline has been extended to Monday, December 29th.

The survey will take approximately 15 minutes depending on your travel experience.

To thank you for your time, all respondents will qualify for a chance to win \$100 certificate for a transportation product. The drawing will be held upon conclusion of the survey.

Follow this link to the Survey:

[\\${://SurveyLink?d=Take the Survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${://SurveyURL}](#)

Thank you for your time.

Parking and Transportation Services

Appendix C Data Cleaning

Data Cleaning Protocol and Summary

Protocol – To Campus, From Campus and Around Campus

- Responses with omitted Origin or Destination will be excluded from analysis
- Responses with an O and D, but omit time of day or zip code will be included in analysis
- Responses with an Origin of zero, but omitted zip code will be included in analysis
- Responses with mode data, but omitted O,D data will be included in analysis
- Response in the around campus section will be included if they either have complete mode or OD data.
- Recode the Age data into the following ranges:
 - 0-30
 - 31-45
 - 46-60
 - Over 60
- If 1 was selected for the zone origin, but a zip code was entered, change the zone to 0
- If the zip code contains an destination zone #, move the destination zone number to the zone column and put a space in the zip code column
- If the zip code was entered incorrectly, update the zip code. The zip code may be found in a correct entry by the same respondent or in the demographic information for students only.
- If text or an erroneous number was entered into the zip code field, remove and leave blank
- If the number of trips per week is omitted, enter a 1 and include in the data set
- If the respondent entered 100 in the mode share section, but did not include zeros in the other columns, add the zeros and include in the data set
- If decimals were entered in number of trips per week, leave as is.
- If ranges were entered in number of trips per week, enter the average. You may need to first reformat the cell if excel has changed the ranges to dates.
- If times per month increments were used when reporting trips per week, take the average (if necessary) and divide by 4. Round up.
- Text entries in trips per week column will need to be handled on a case by case basis. Examples include: many = 5; up to 15 = 10
- If a respondent is excluded in all three sections, remove them from the original data set and all sections.
- The following should be applied when cleaning the text entry for the Mode items. If recoding, the percentage indicated in other should be moved to the appropriate mode:
 - Car 2 Go = Drive Alone
 - Comments indicating that they are dropped off by someone = Drive alone
 - Comments indicating they drive alone, but were entered as 'other'= Drive alone
 - Green Line Train = Public transit
 - Handicap Transit = Public transit
 - Light Rail = Public transit
 - Run = Walk
 - Washington Ave. Bridge Circulator = U of M shuttle
 - Other comments should be analyzed each year and added to the protocol

Cleaning Summary

Data Cleaning – Partial Responses

There were a total of 2808 partial and completed responses.

- 2252 completed responses
- 556 partial responses

The following were removed from the dataset:

- 2.5% of completed responses
 - 57 completed responses (submitted survey without responding a single question)
- 66% of partial responses
 - 29 partial responses that did not answer the first question
 - 11 partial responses that did not answer beyond Q2
 - 313 partial responses with no To and From campus information
 - 14 partial responses that did not include complete, usable data in any section

2384 records remain

- 2195 completed responses
- 189 partial responses

To Campus Data

- 11,114 reported trips
- 2.6% of the records were removed
 - 287 are missing either the Origin or Destination and have been removed
 - 34 records were cleaned based on the protocol
- 10,827 records remaining

From Campus Data

- 9811 reported trips
- 1.6% of the records were removed
 - 154 are missing either the Origin or Destination or Zip Code
 - 55 records were cleaned based on the protocol
- 9,657 records remaining

To/From Mode Data

- 2260 records
- 3 records were cleaned (adding 0 when omitted)

Around Campus Data

- 2602 reported trips
- .01% of the records were removed
 - 5 are missing OD and Mode information and were removed from the OD and Mode dataset
 - 2597 records remain
- OD data set
 - 2.5 % of the records were removed from the OD section
 - 62 are missing Origin or Destination data
 - 58 records were cleaned in the OD section based on the protocol
 - 2535 OD records remain

Mode Data

- .01% of the records were removed
 - 9 are missing mode data and will be removed from the mode data set
 - 4 records were cleaned in the mode section based on the protocol
 - 2588 mode records remain
- 2526 records with complete OD and Mode data remain

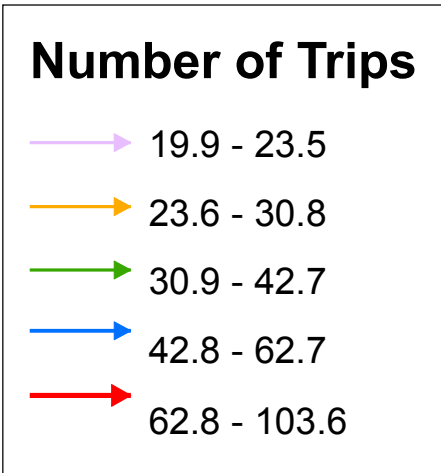
Appendix D Maps

OD Maps:

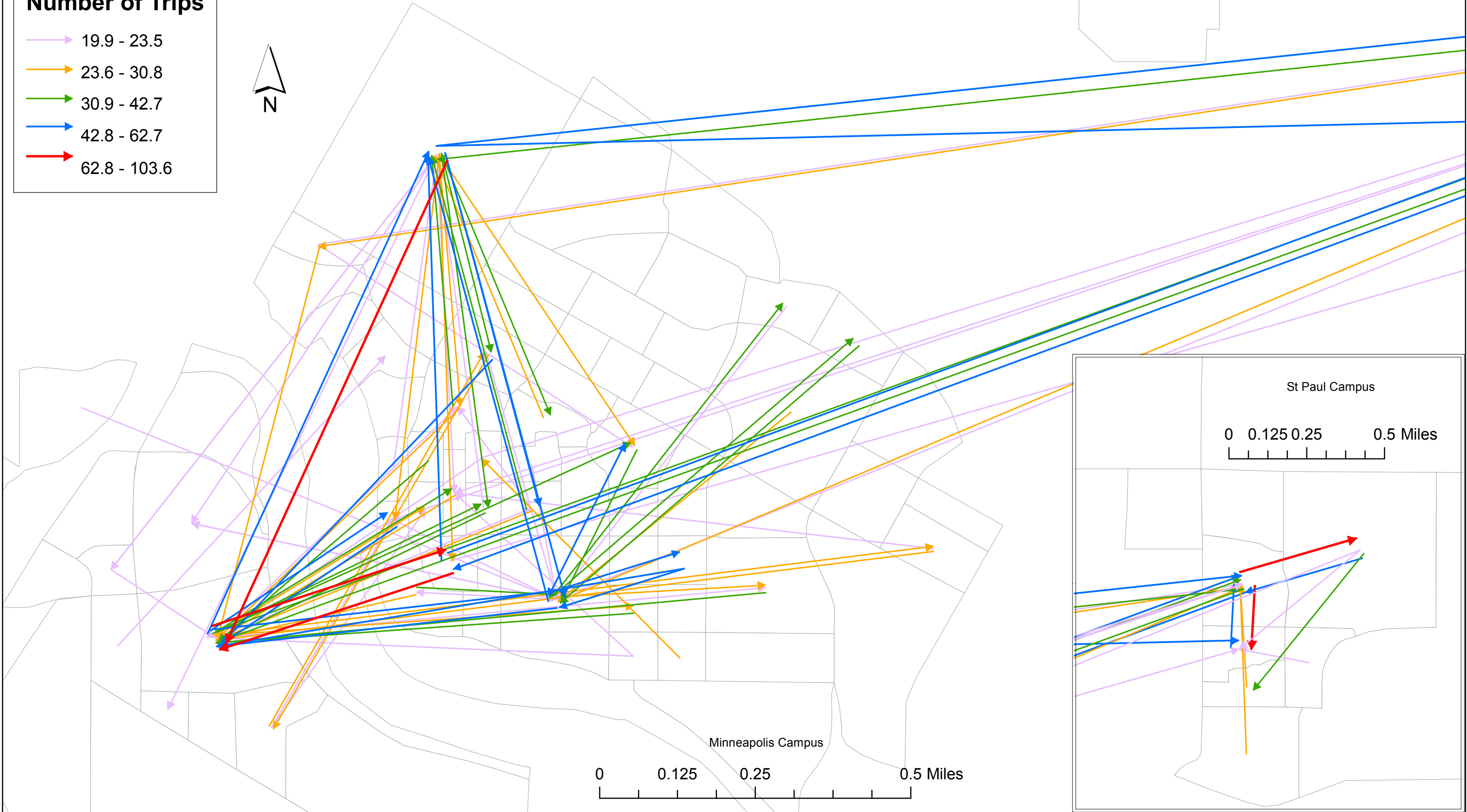
1. Campus Zones for 2014 OD Survey
2. Highly demanded OD's for Transit planning
3. Moderately demanded OD's for Transit planning
4. Campus destination demands by modes
5. Destination mode shares

Highly Demanded OD 2014

Date: 3/27/2015 Yilun Xu @ PTS UMN



Como Area



0 0.125 0.25 0.5 Miles

St Paul Campus

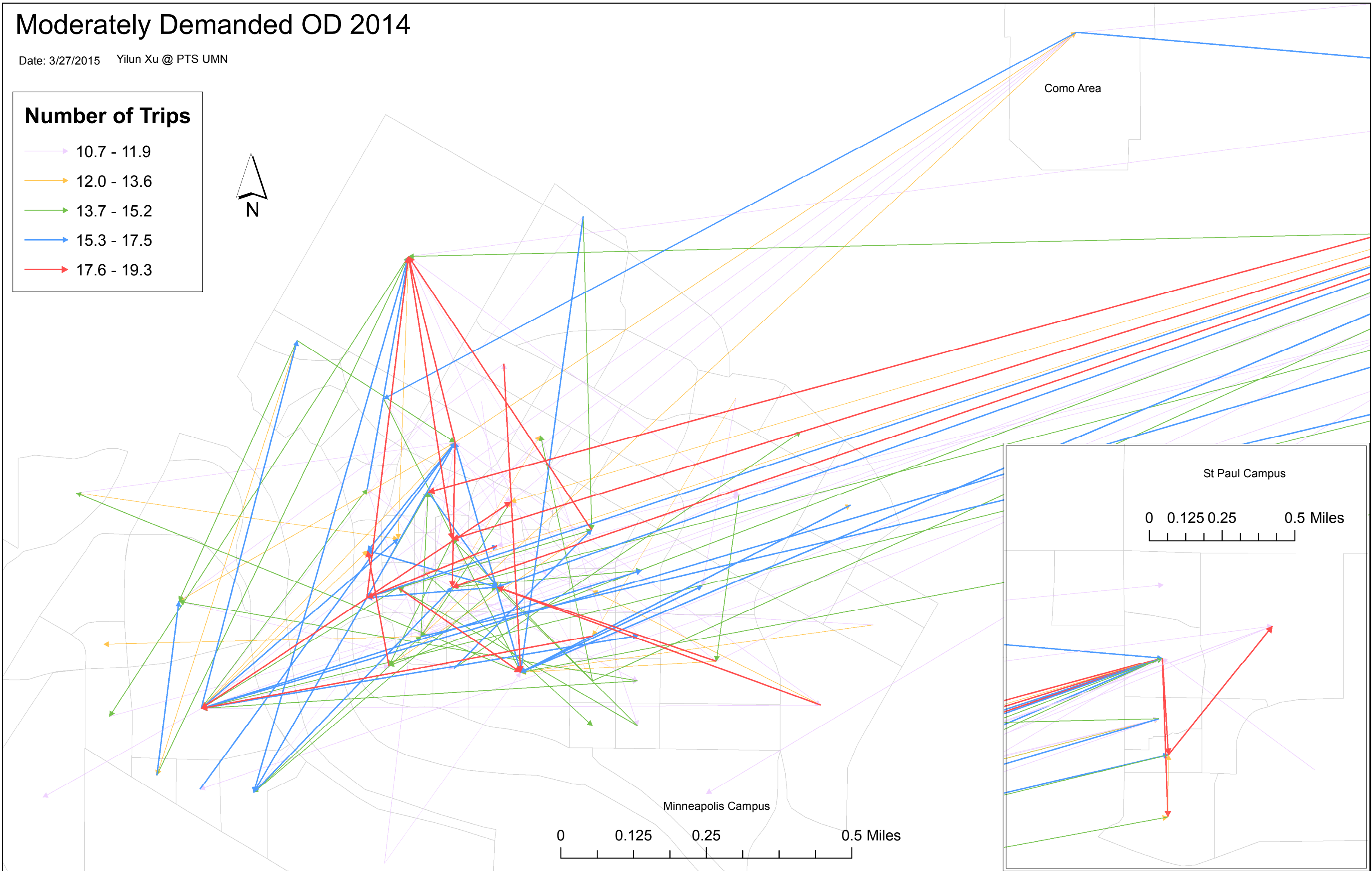
0 0.125 0.25 0.5 Miles

Moderately Demanded OD 2014

Date: 3/27/2015 Yilun Xu @ PTS UMN

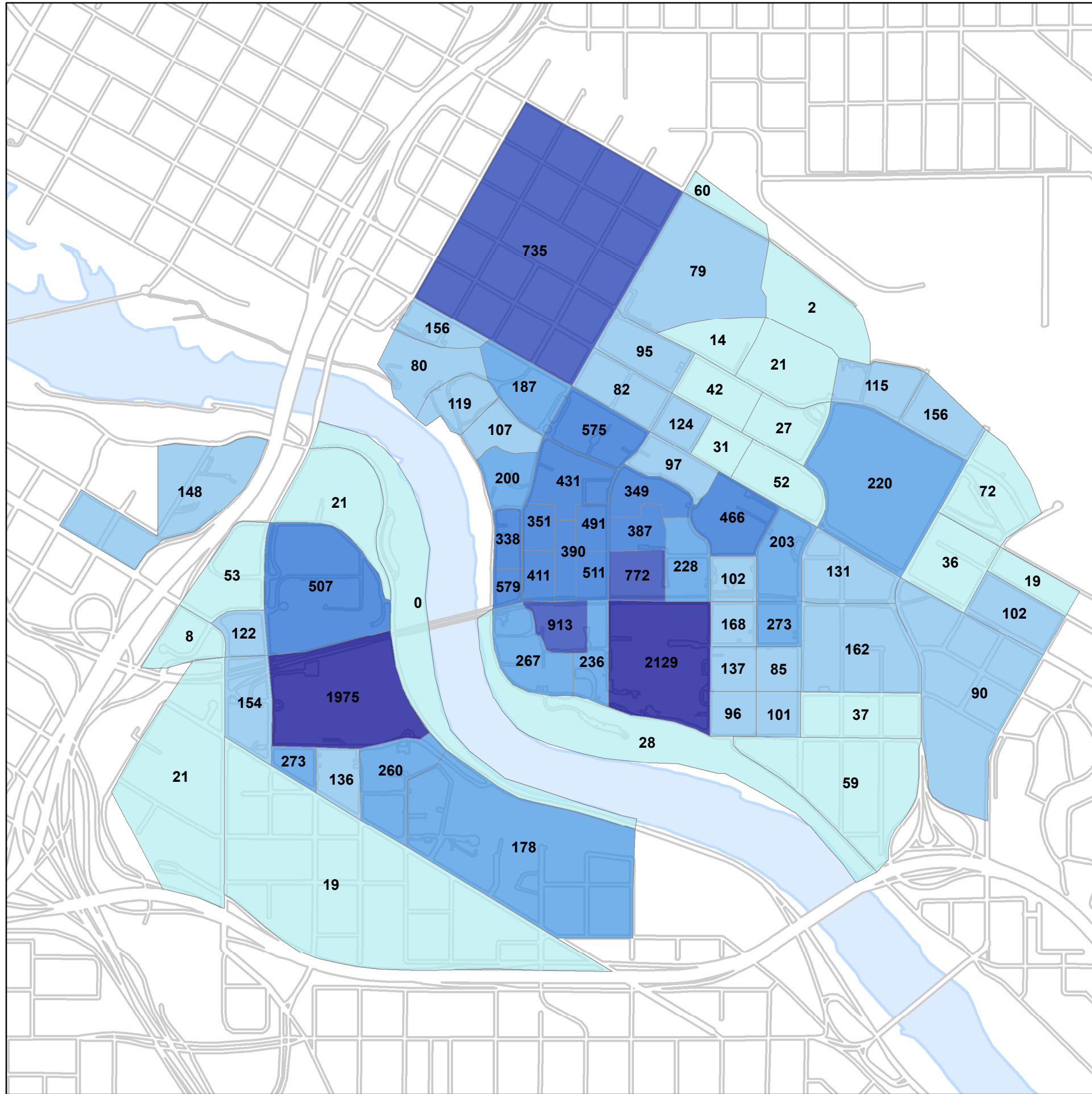
Number of Trips

- 10.7 - 11.9
- 12.0 - 13.6
- 13.7 - 15.2
- 15.3 - 17.5
- 17.6 - 19.3

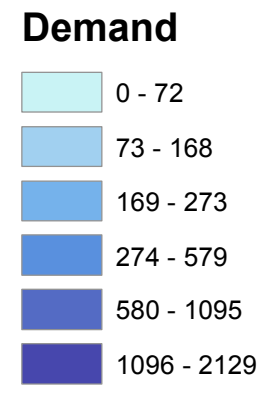
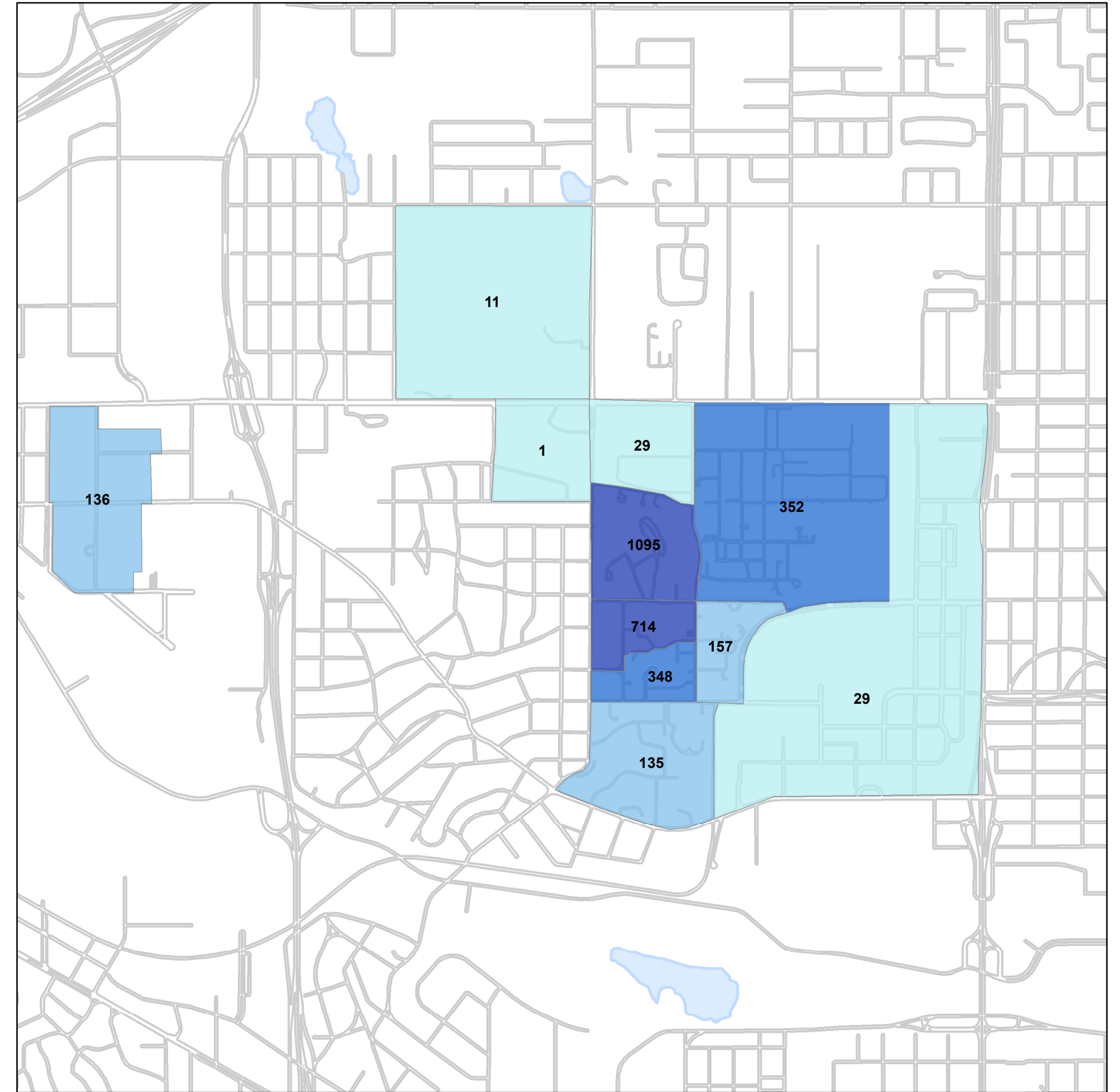


Destination Demand - All Mode

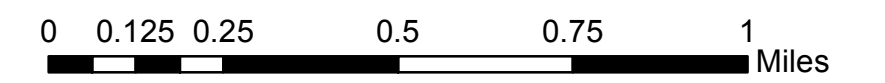
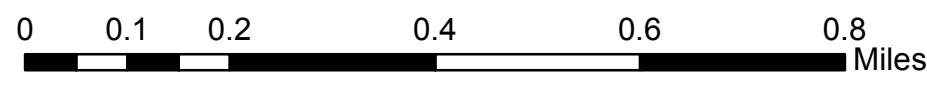
Minneapolis Campus



St. Paul Campus



The demand is represented by number of trips destined to each zone in a typical week in the fall 2014, based on 2384 valid survey responses. And that is 3.02% of the total University of Minnesota population of 79,055.

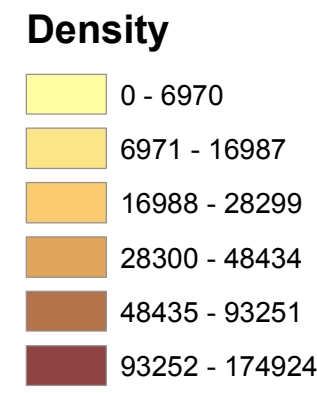
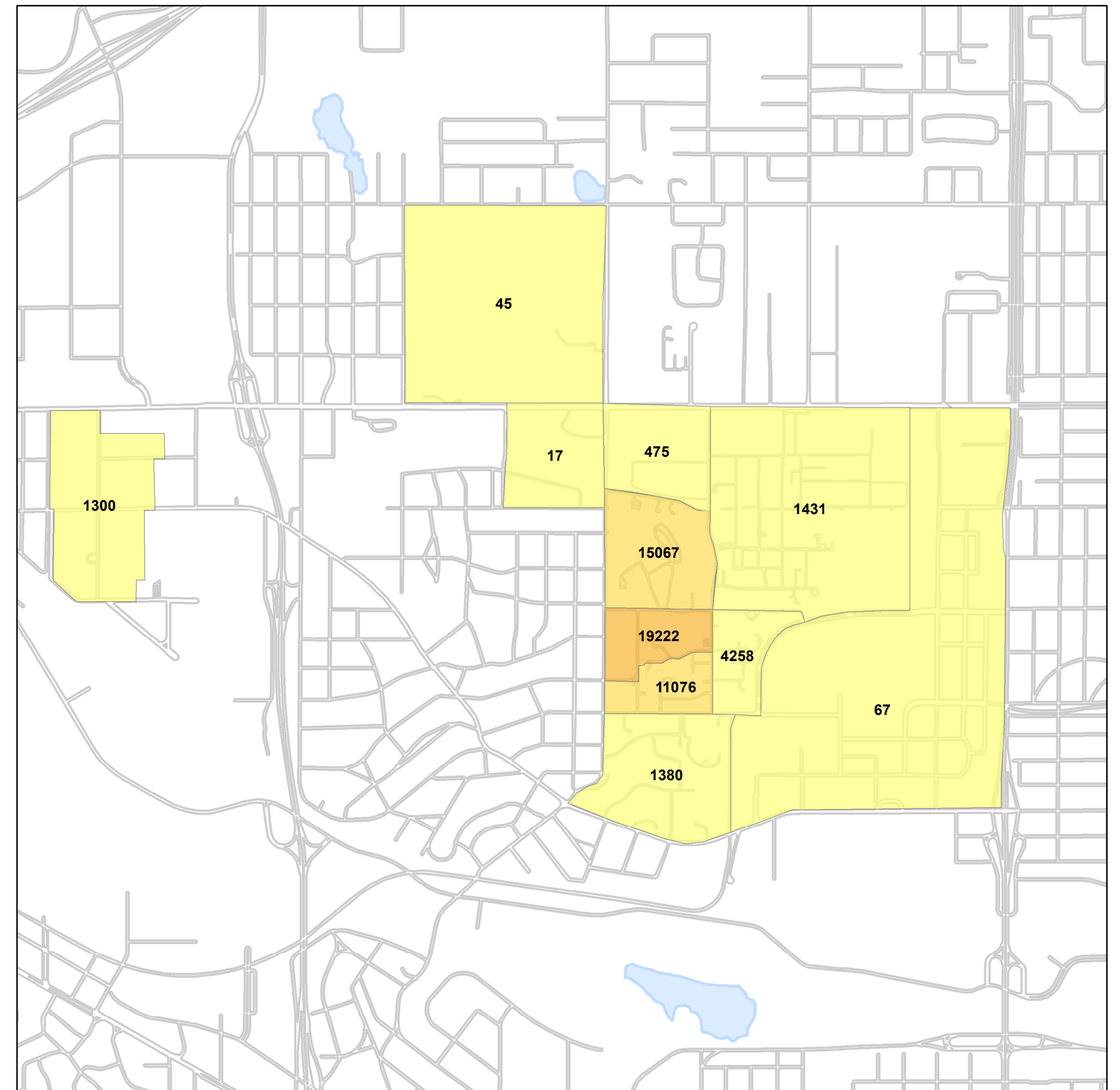
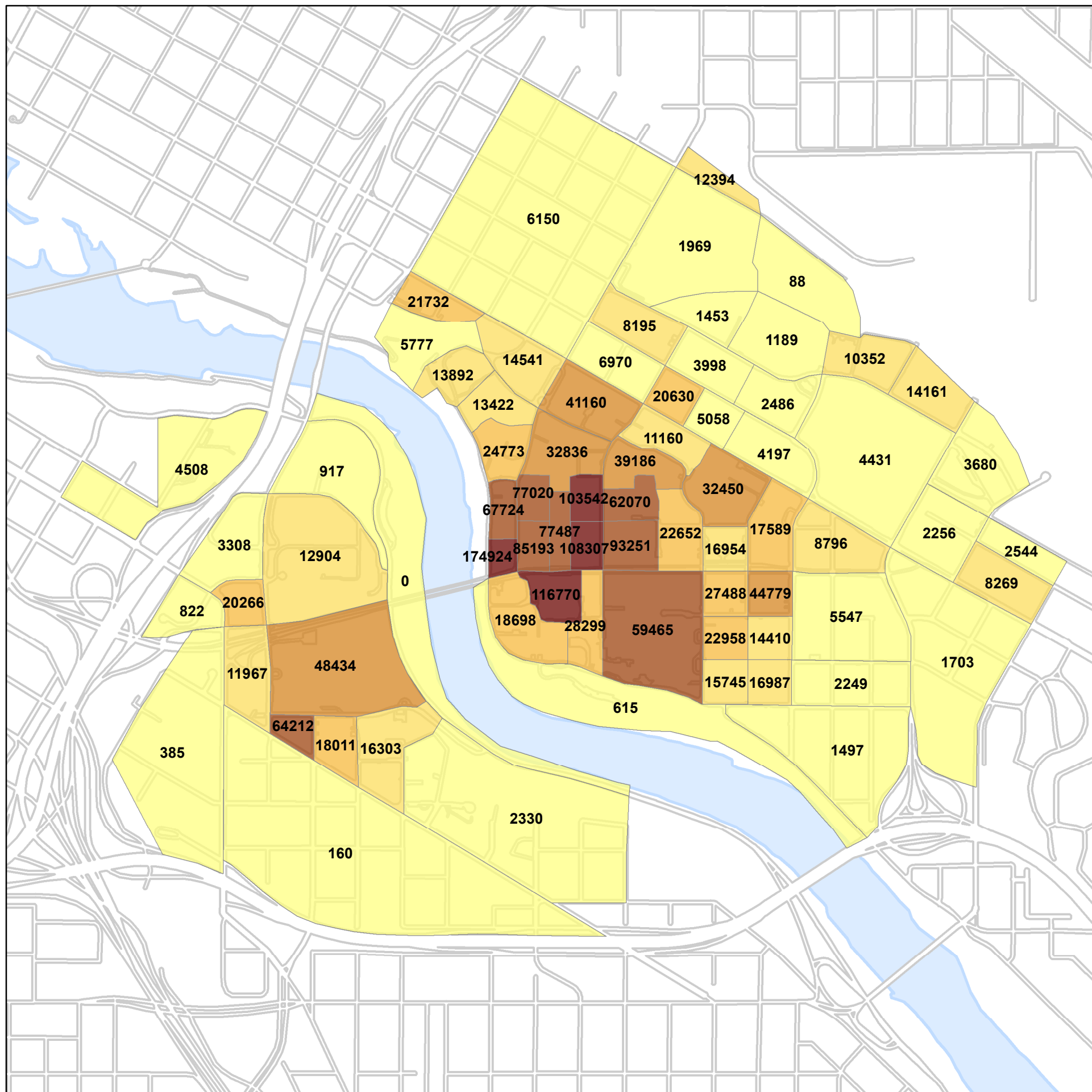


Destination Density - All Mode

Minneapolis Campus

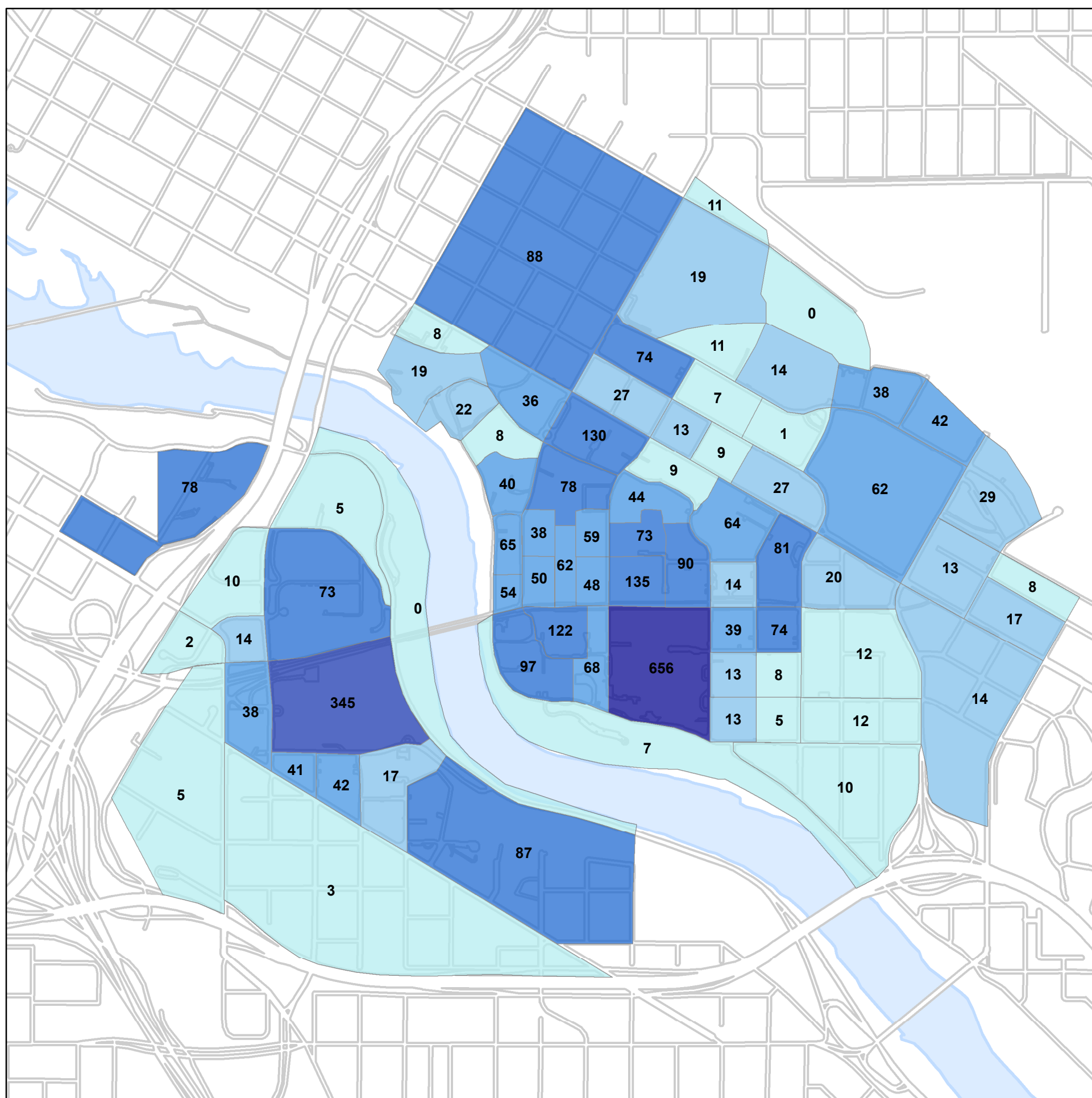
(Demand Weighted by Zone Land Area)

St. Paul Campus

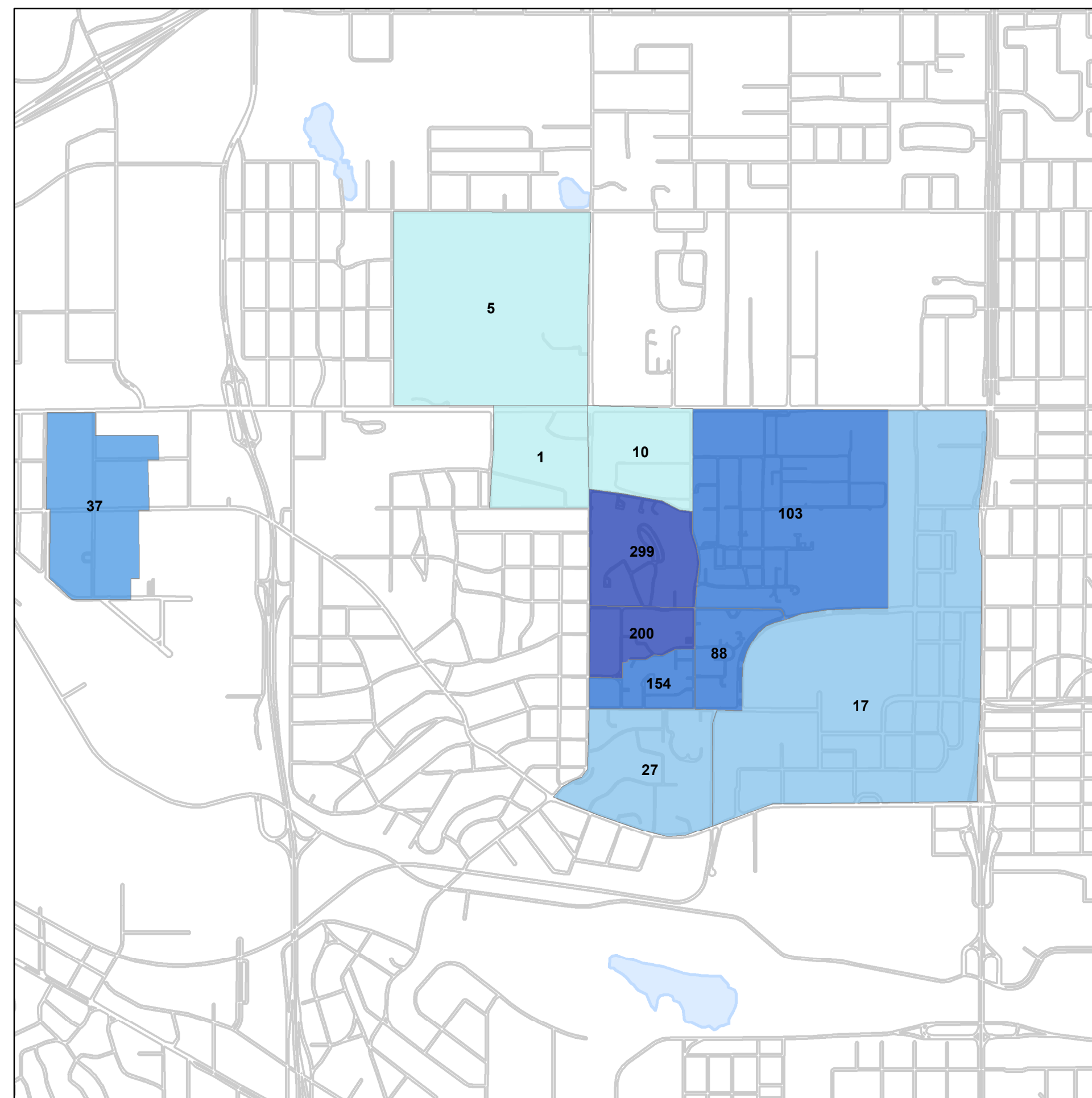


Destination Demand by Vehicle

Minneapolis Campus



St. Paul Campus

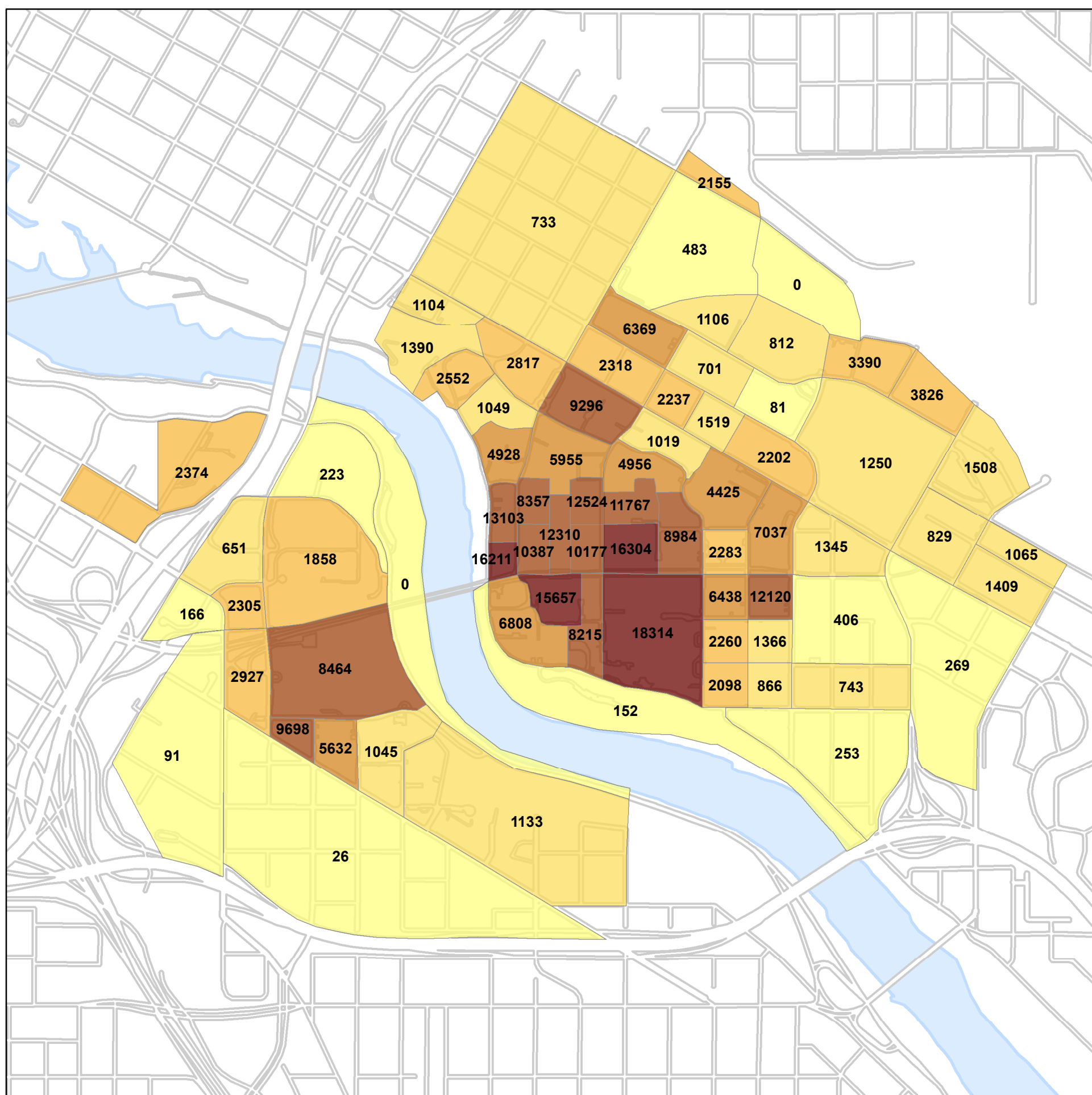


The demand is represented by number of trips destined to each zone in a typical week in the fall 2014, based on 2384 valid survey responses. And that is 3.02% of the total University of Minnesota population of 79,055.

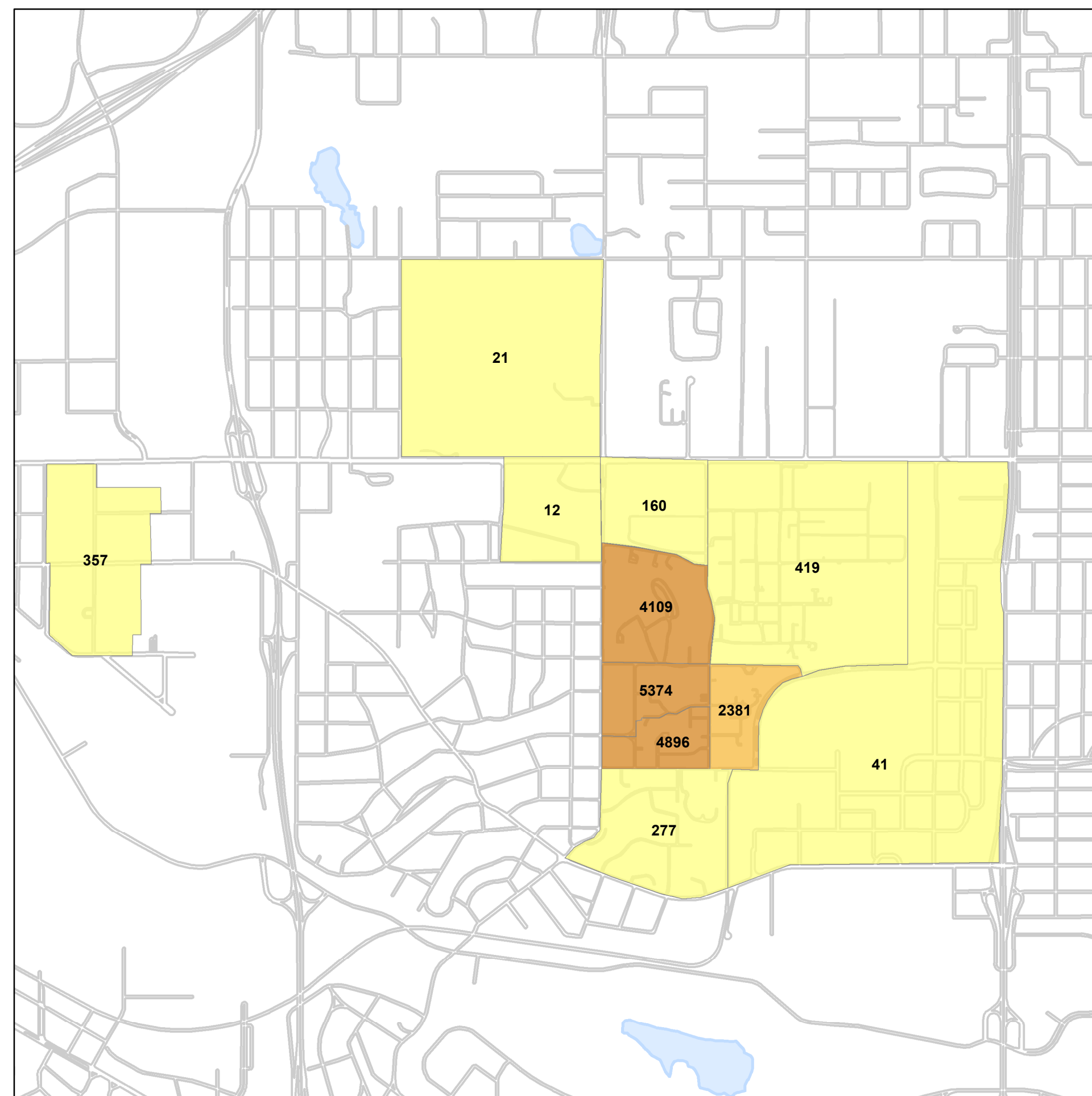
0 0.1 0.2 0.4 0.6 0.8 Miles

Destination Density by Vehicle

Minneapolis Campus



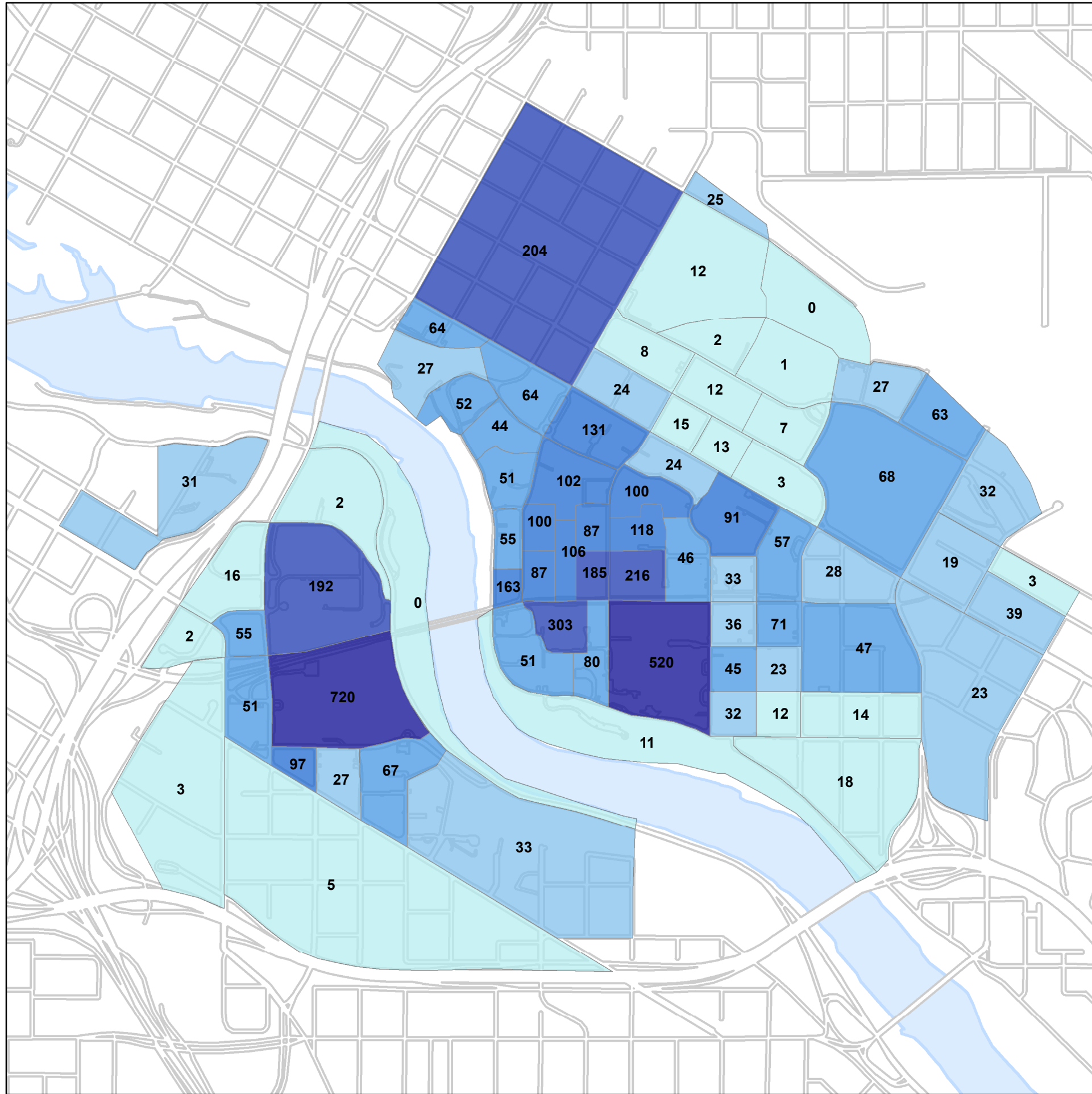
St. Paul Campus



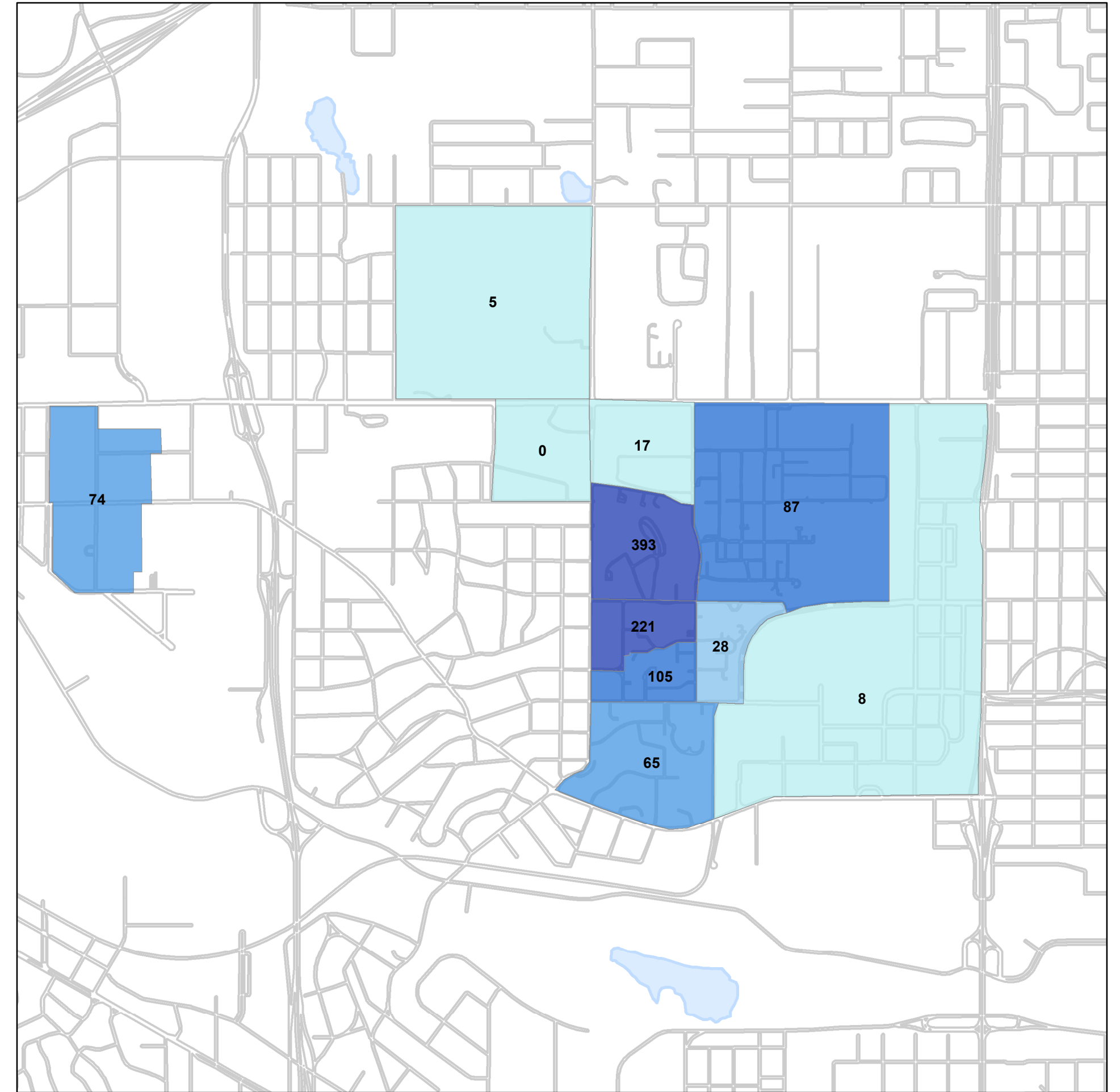
0 0.125 0.25 0.5 0.75 1 Miles

Destination Demand by Transit

Minneapolis Campus



St. Paul Campus

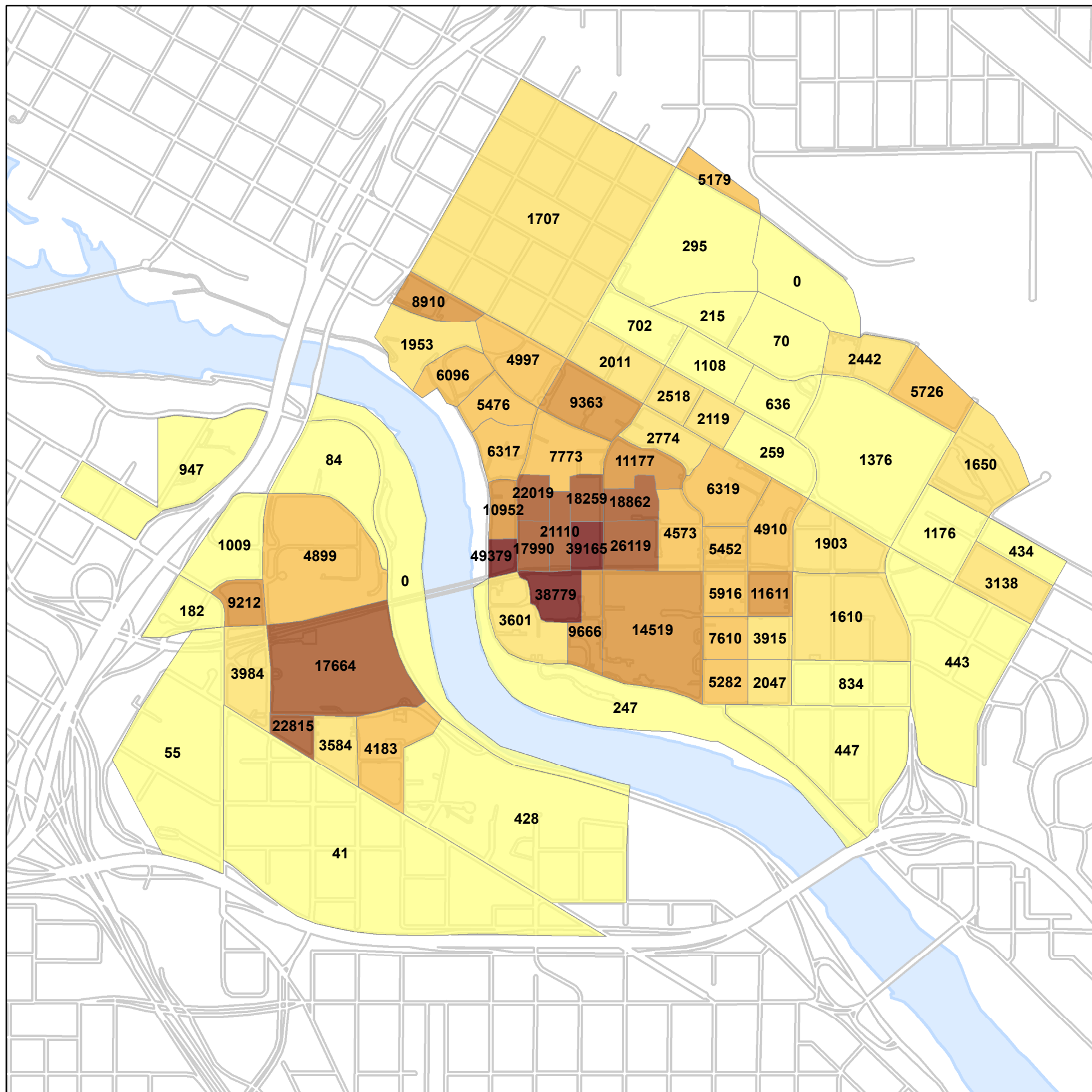


0 0.1 0.2 0.4 0.6 0.8 Miles

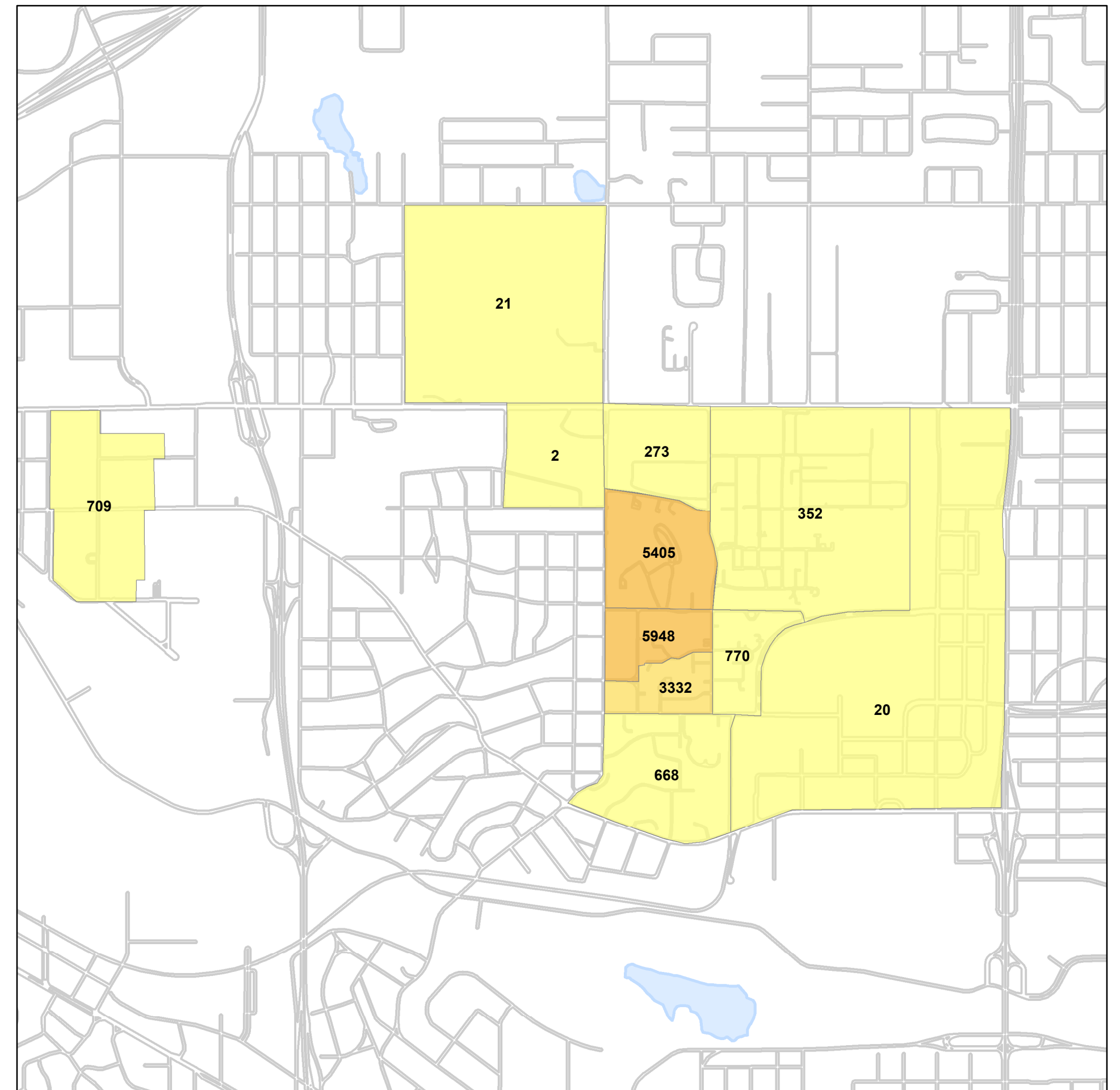
Destination Density by Transit

0 0.125 0.25 0.5 0.75 1 Miles

Minneapolis Campus

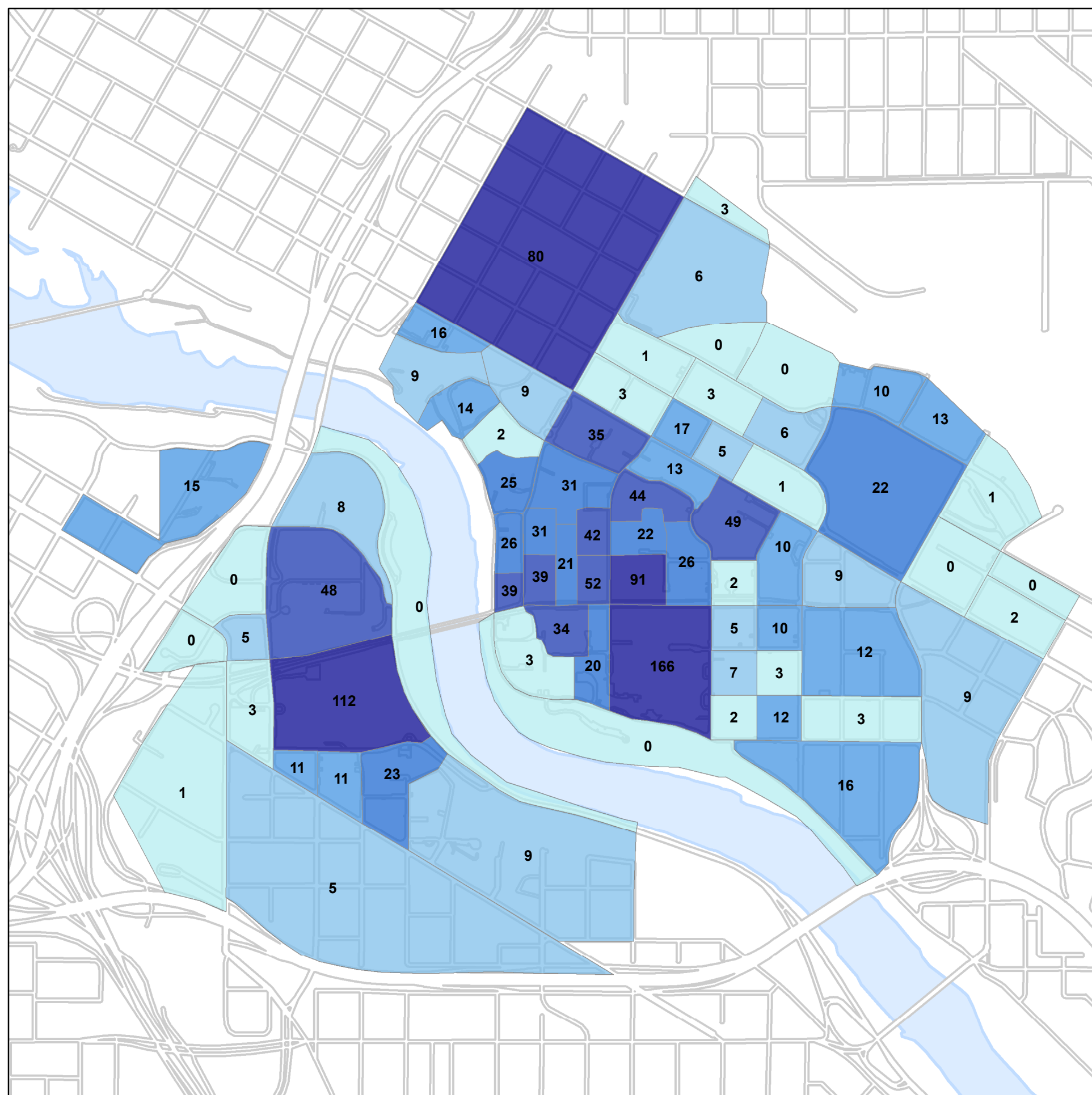


St. Paul Campus

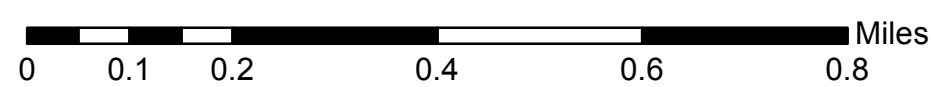
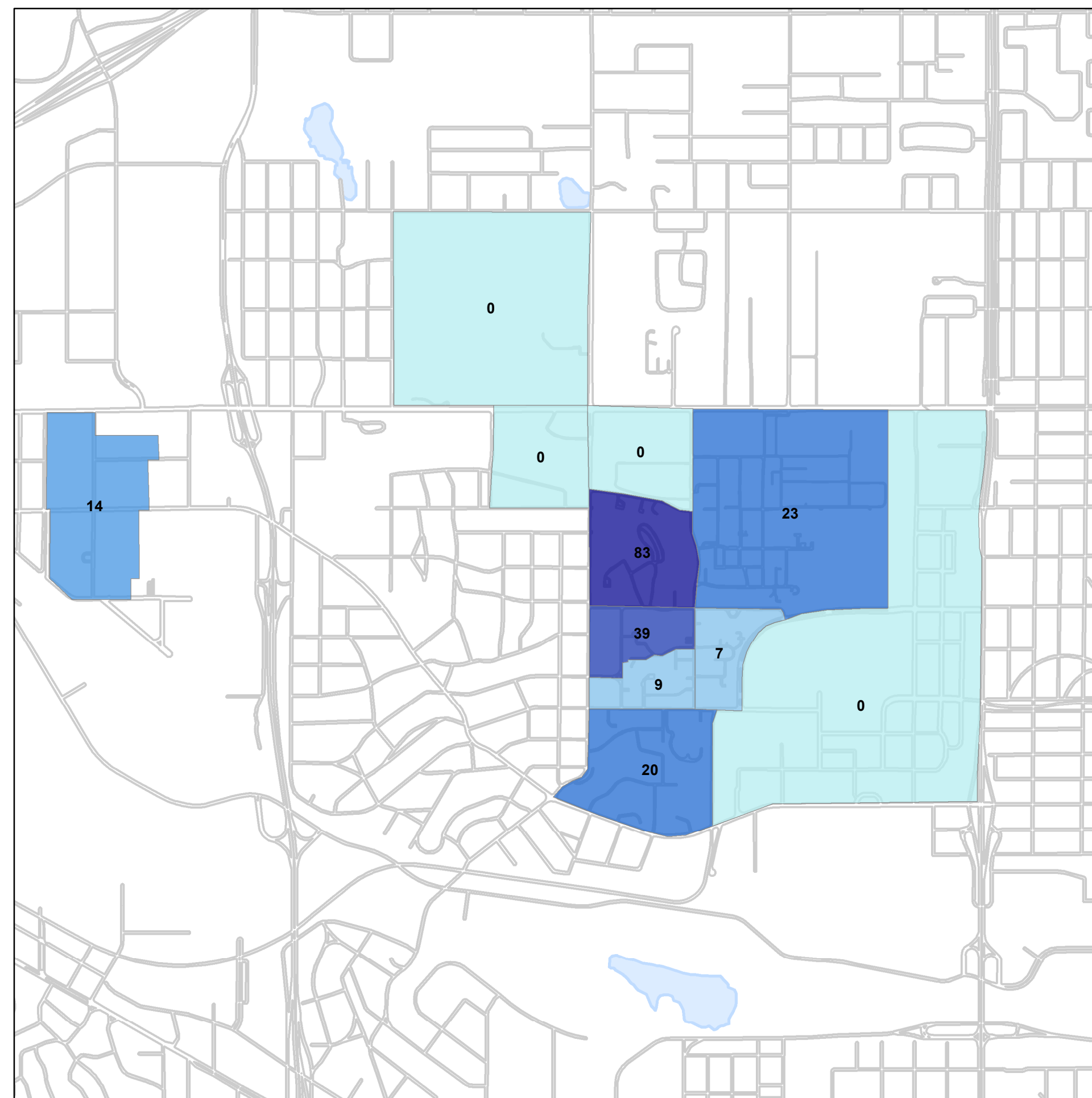


Destination Demand by Bicycle

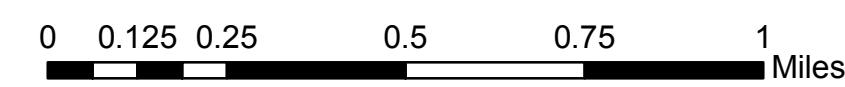
Minneapolis Campus



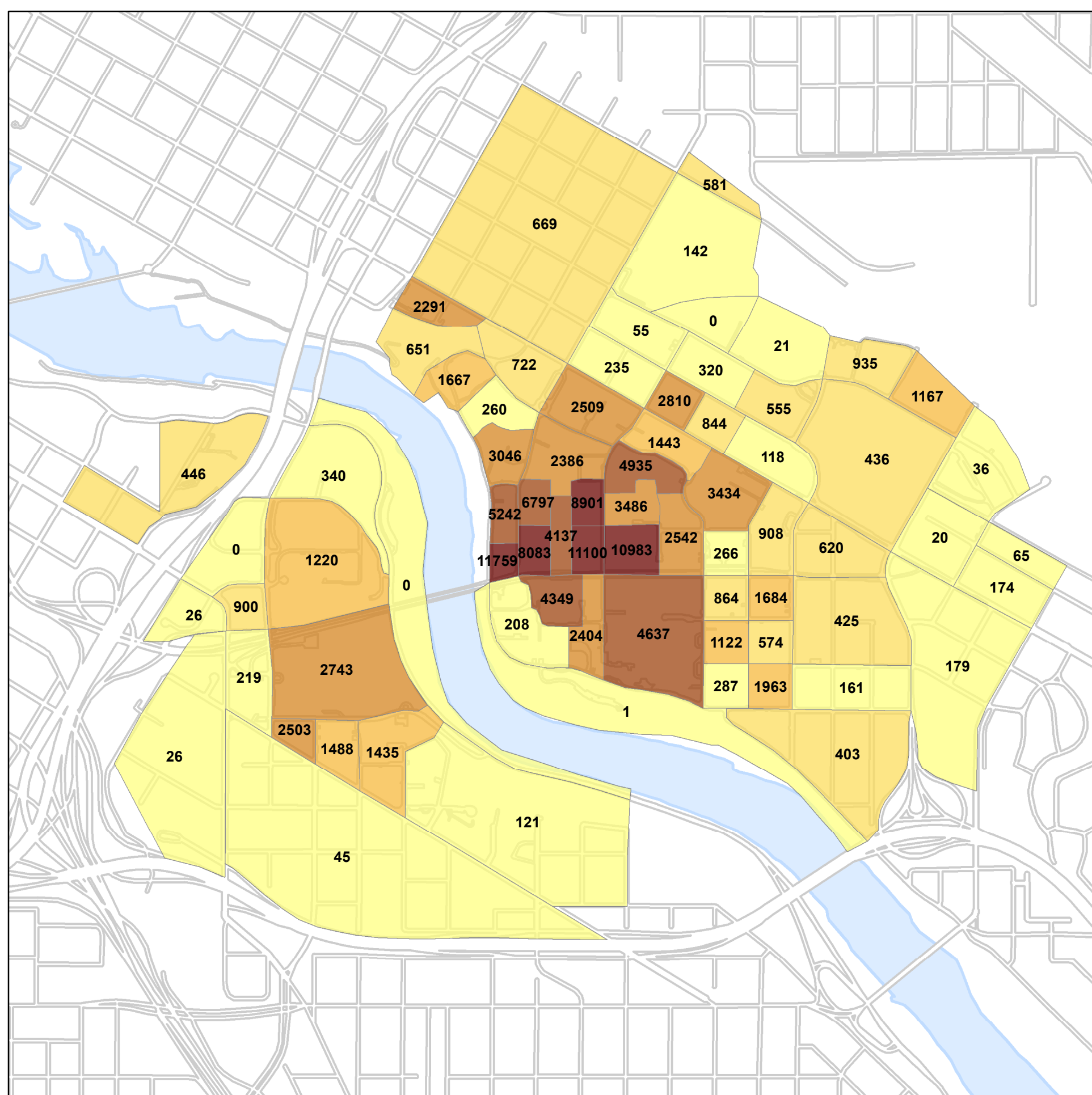
St. Paul Campus



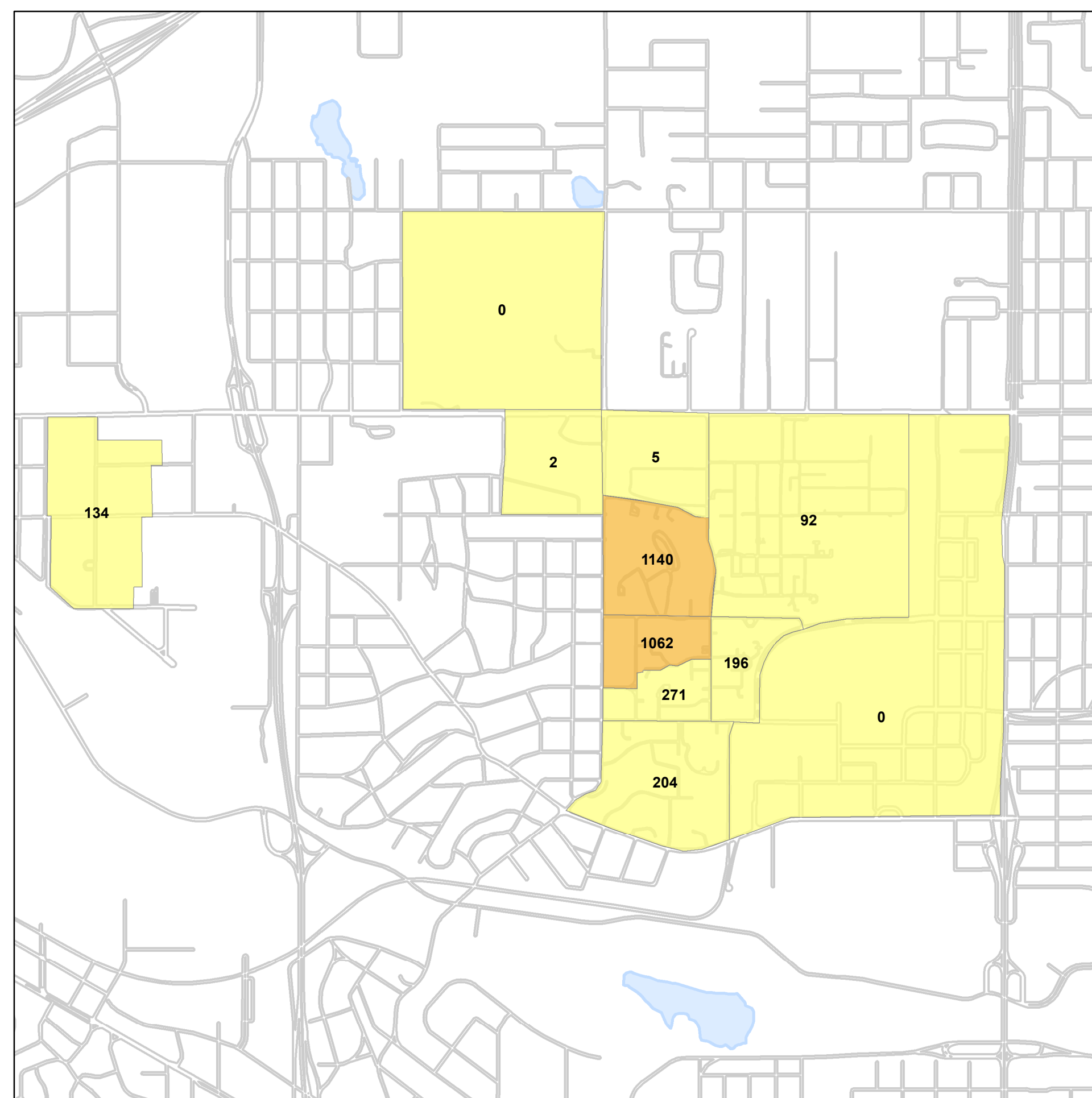
Destination Density by Bicycle



Minneapolis Campus

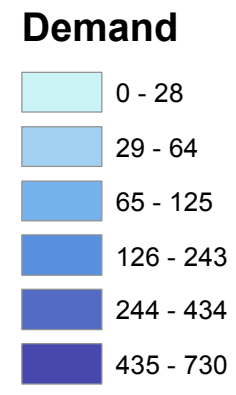
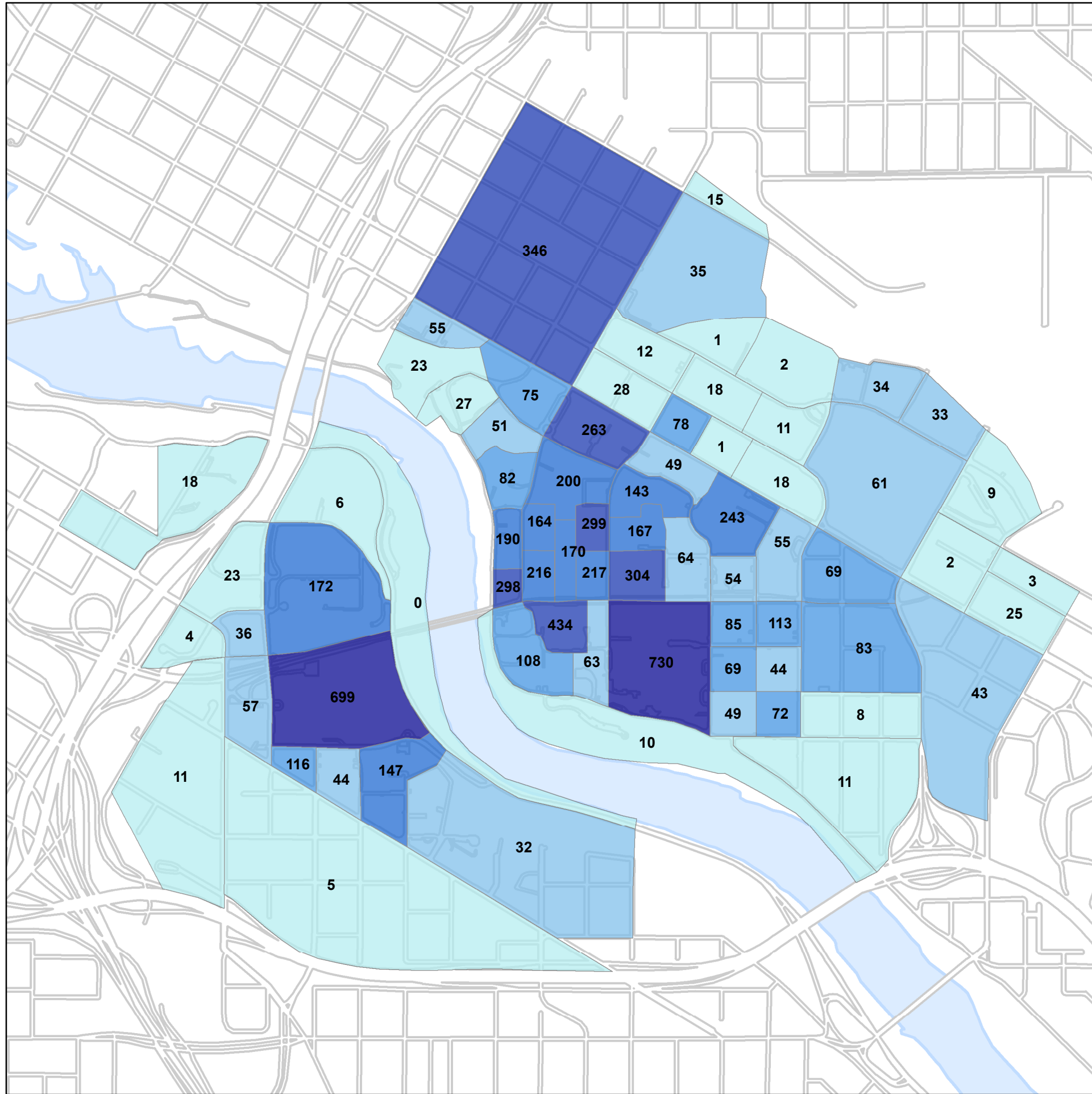


St. Paul Campus



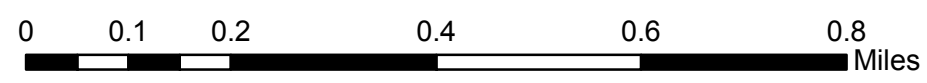
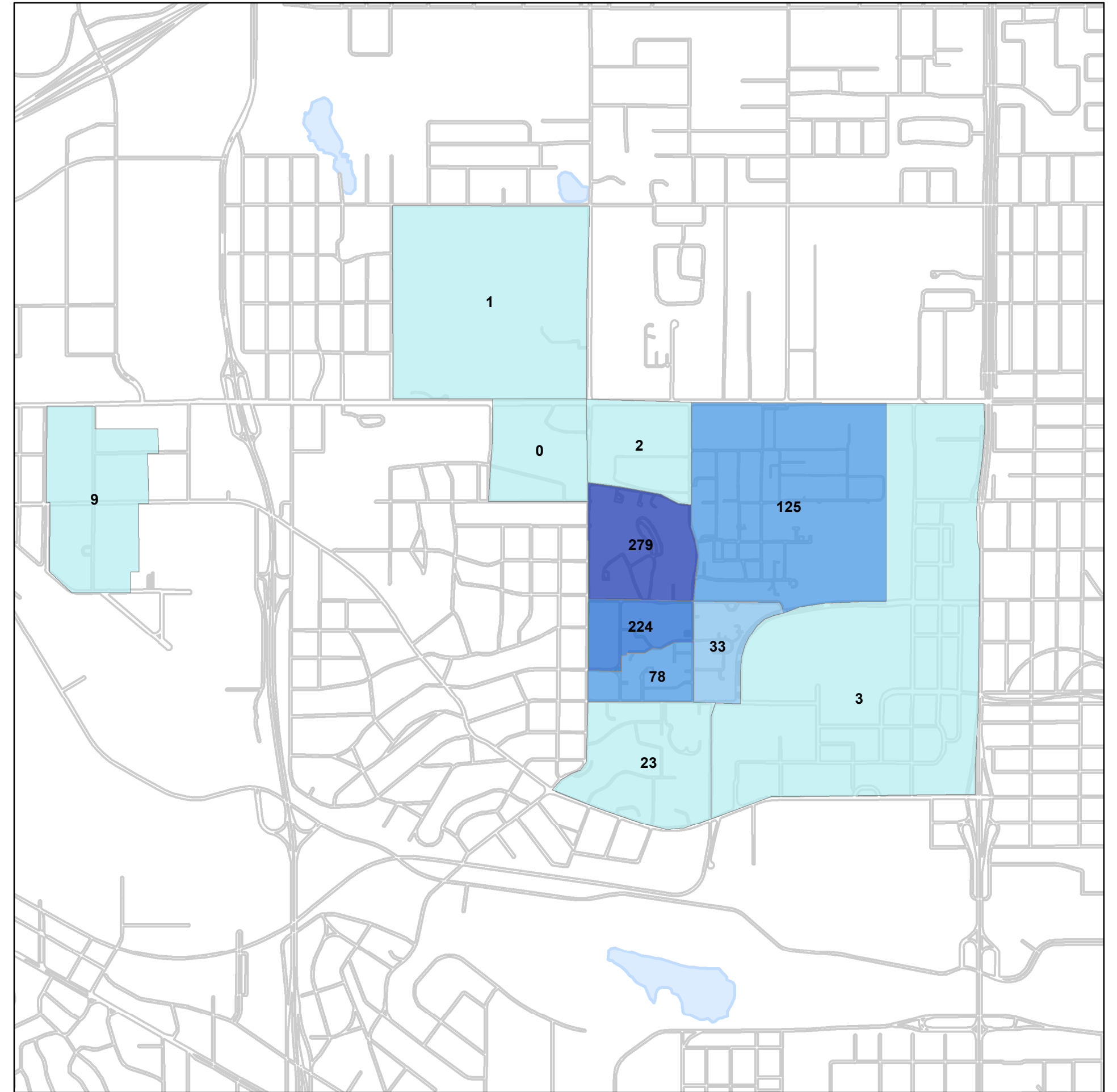
Destination Demand by Walking

Minneapolis Campus

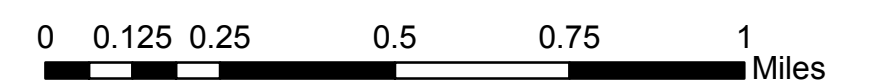


The demand is represented by number of trips destined to each zone in a typical week in the fall 2014, based on 2384 valid survey responses. And that is 3.02% of the total University of Minnesota population of 79,055.

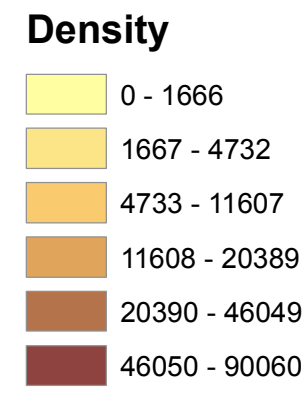
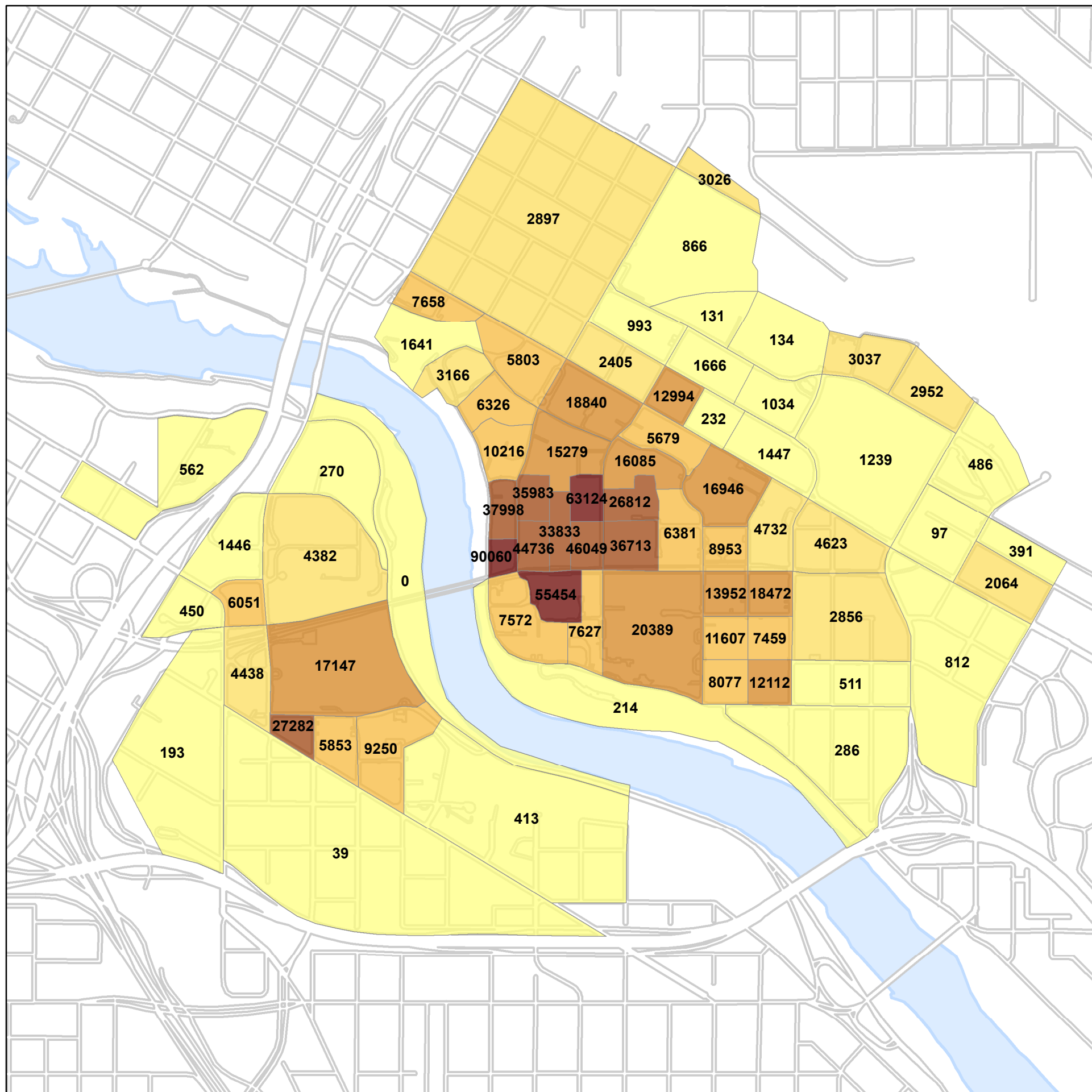
St. Paul Campus



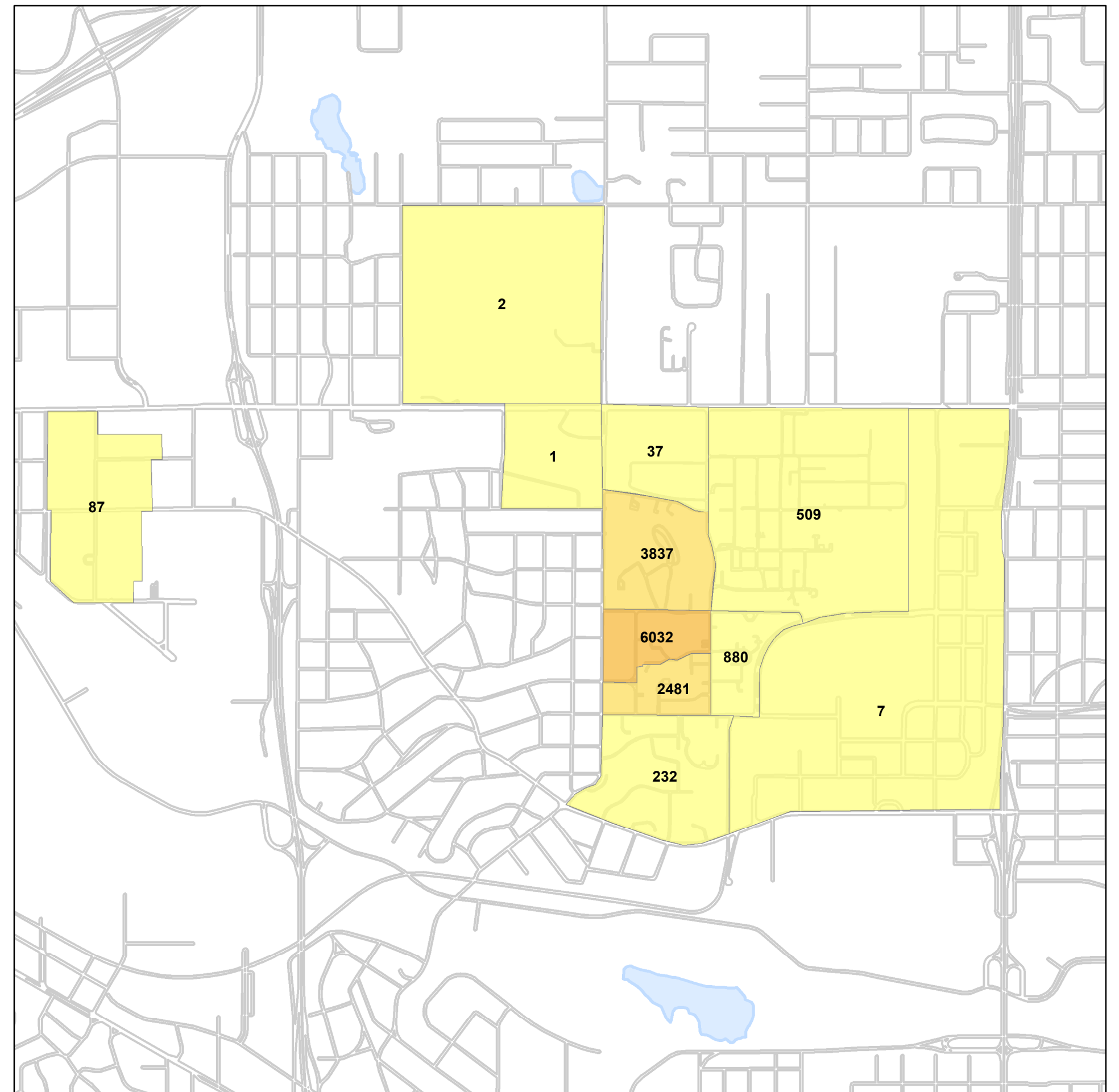
Destination Demand by Walking Weighted by Zone Area



Minneapolis Campus

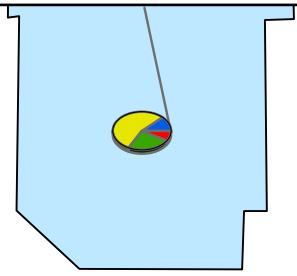
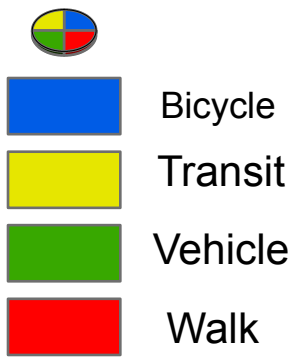


St. Paul Campus

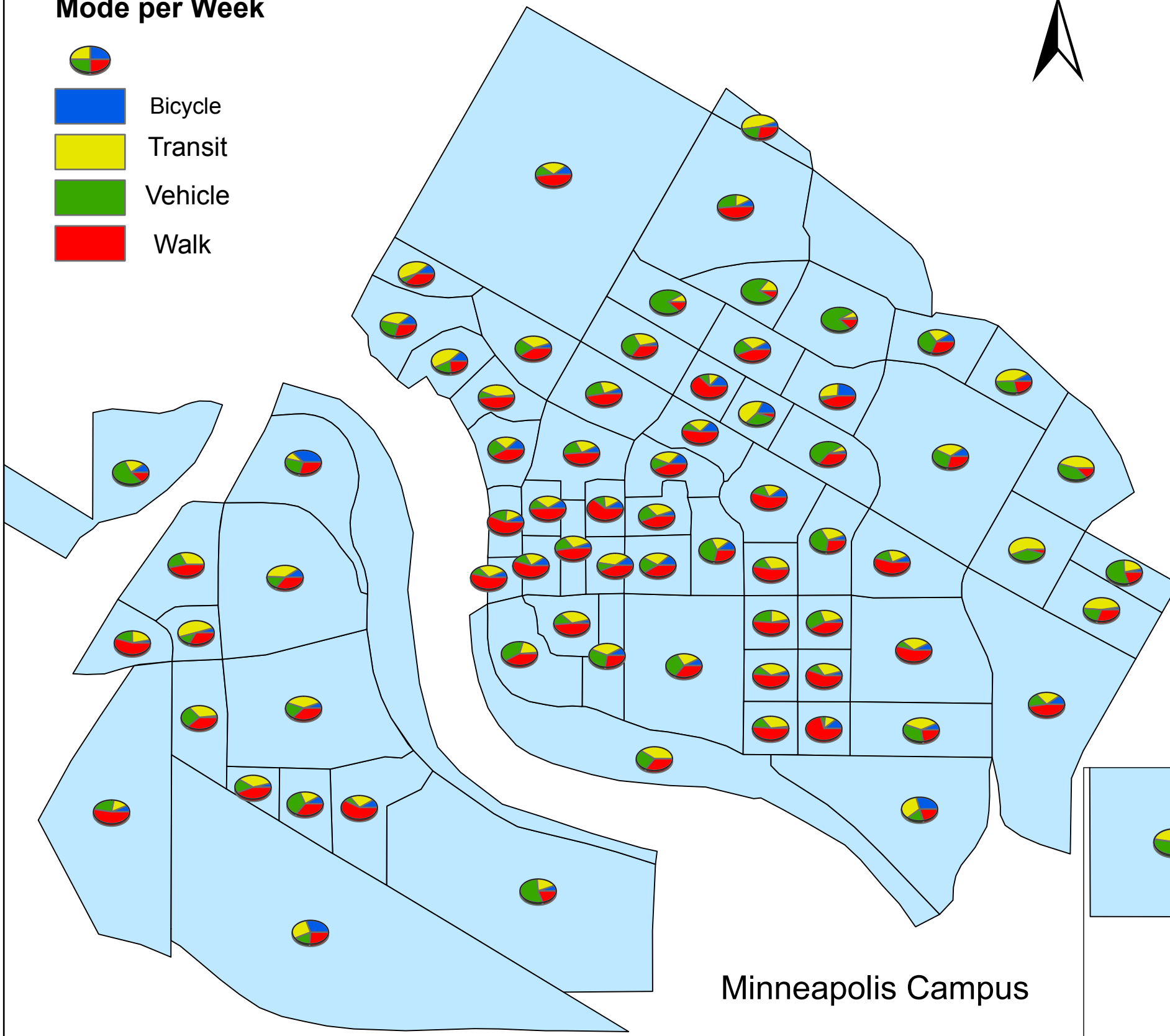


Destination Mode Share

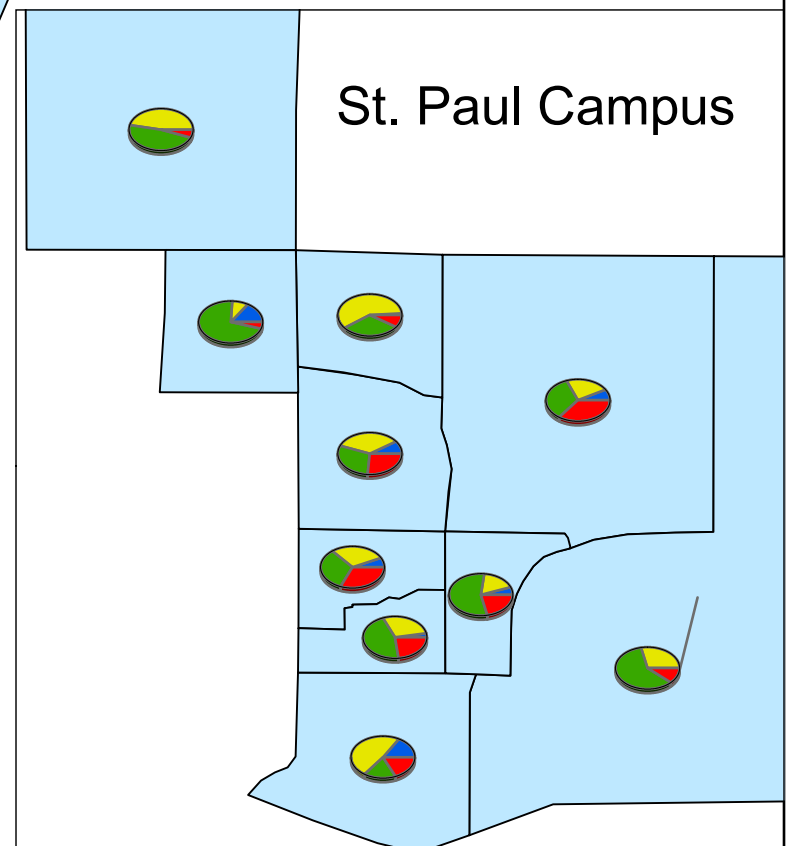
Percent Demand by Mode per Week



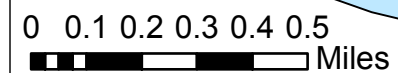
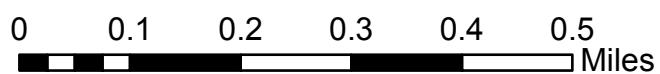
Como Area



Minneapolis Campus



St. Paul Campus



Made by John Galt

Date: 3/27/2015

These maps were produced using the North American Datum coordinate system with the Universal Transverse Mercator projection for Zone 15N.