PACE SUBURBAN BUS

I-355 CORRIDOR TRANSIT DEVELOPMENT

Final Report

NELSON
NYGAARD

September 2011

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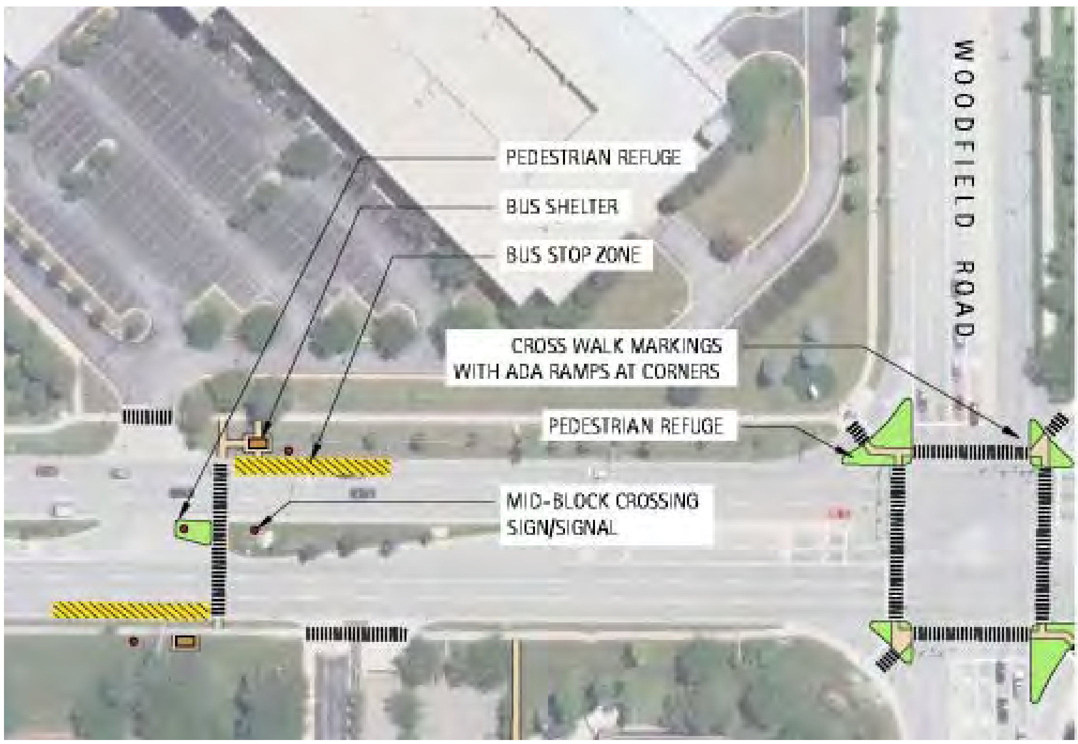
Pace Suburban Bus

I-355 Corridor Transit Development

Summary Report



September 2011

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Table of Contents

List of Figures

Page

List of Tables

Page

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Executive Summary

Introduction

If any single statement can succinctly summarize the overarching findings of this study, it would be this quote from **GO TO 2040** Comprehensive Regional Plan of the Chicago Metropolitan Agency for Planning (CMAP).

> *"For transit to be successful, it requires supportive land use planning and infrastructure investments. A new transit service in an area that is low density and not walkable is unlikely to succeed. Therefore, transit expansion efforts should be accompanied by land use planning, local infrastructure investments, and other local actions that seek to create a transit-friendly environment, and transit investments should be prioritized in places where such planning is occurring. As previously noted, a significant challenge in providing transit service in much of the region involves the "last mile" problem; local support for transit is necessary to overcome this."*[1]

The purpose of this study is to chart a course for the development of Pace service both in the long and short term considering the diversity of land uses throughout the study corridor. A wide array of transportation options are explored within the study including RideShare, traditional fixed route service, arterial rapid bus service, and express bus service.

The I-355 study corridor affects an urban area that is 30 to 50 miles long and about 10 miles wide, and it intersects many highways and commuter rail lines that connect suburban areas with other suburban areas and with the Chicago central area. Technically, the study corridor is comprised of three road components from south to north: I-355, from I-80 until it merges with I-290, continuing on I-290 to the intersection of I-290 and I-90, then on IL-53 to its intersection with West Lake Cook Rd. Note that I-290 and IL-53 are concurrent from the intersection of the Elgin-O'Hare Expressway / Thorndale Ave on the south to the interchange with I-90 on the north. For the analysis conducted and documented in the study, the market area is defined by a ten mile wide area with I-355 in the middle (see Figure 1).

The study's goals are to:

- Identify the feasibility of operating effective bus services along I-355.
- Identify key infrastructure needs to support transit service in the corridor.
- Identify supporting strategies and policies that can be adopted at the local level to develop effective transit services and markets.
- Identify potential partners to implement and support I-355 service.
- Develop an evaluation methodology to prioritize implementation of feasible service alternatives that accounts for both, locally adopted supporting strategies and policies, and markets with the greatest demand potential.

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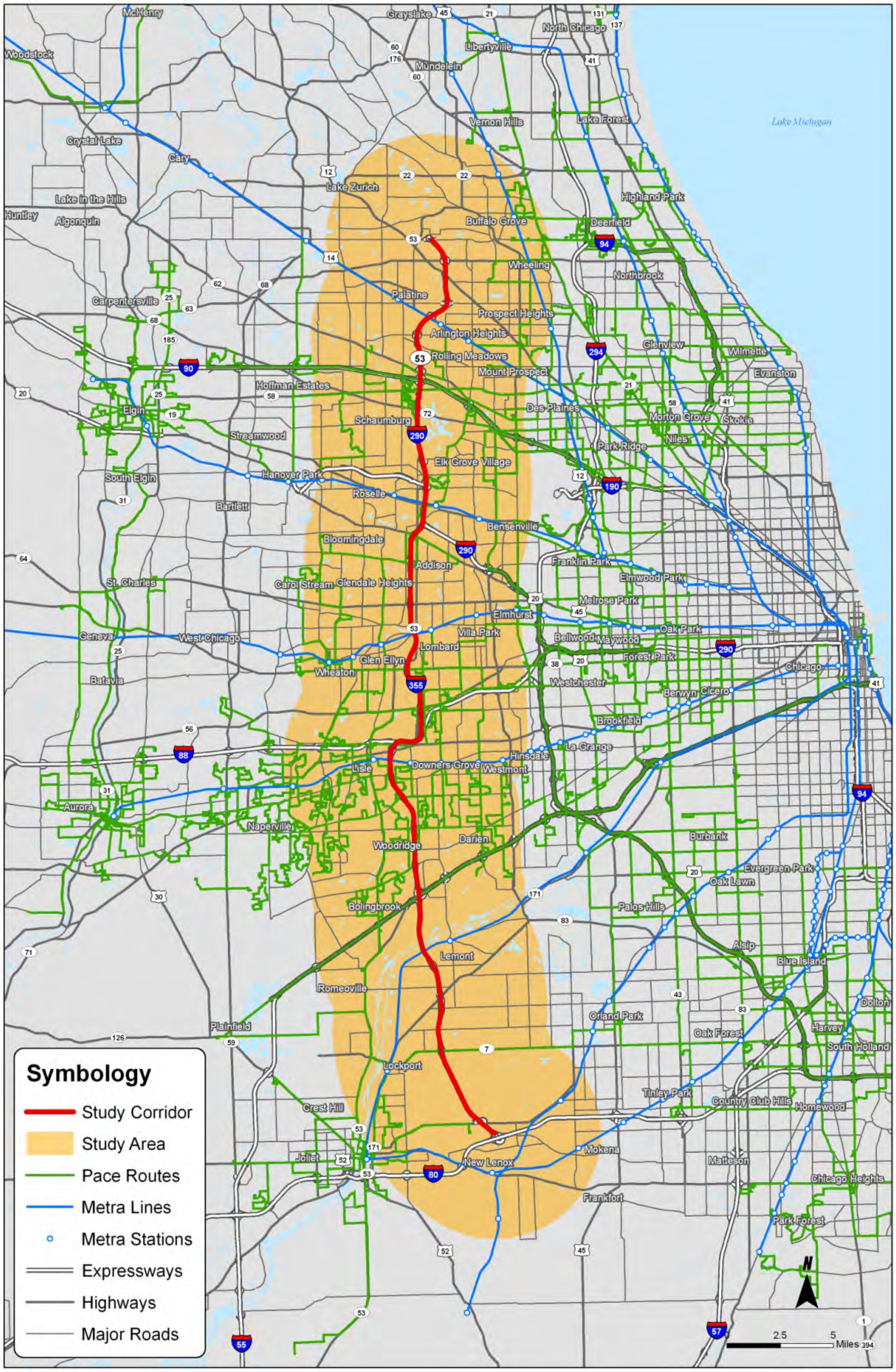
[1] Go TO 2040 CMAP page 298.

Figure 1: Definition of Study Area



Source: Pace Suburban Bus, State of Illinois, ESRI

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Key Findings, Conclusions, and Recommendations

Potential Transit Market

- **There is significant north-south travel within the corridor**, but travel in the study area tends to be short-distance five miles, or less. The most significant long-distance travel is east-west. Regional travel demand has a strong east-west orientation connecting the suburbs with Chicago. This is true for both vehicle trips and transit trips. North-south travel mainly occurs on I-355, arterial streets, and state highways.
- **Most north-south travel is done between contiguous market areas**. There is a continuous north-south travel demand pattern that encompasses many communities but tends to only occur between adjacent communities. Few trips, work or non-work, skip over communities up and down the corridor.
- **Commute-to-work trips within the corridor are roughly equal in size to commute trips between the region and points in the corridor**. According to the regional travel demand model, 45% of the home-based work (commute) travel around the I-355 tollway is internal travel to and from communities within five miles of the I-355 mainline. Travel between the corridor and places east (central Chicago and inner suburbs) is about 35% of total corridor travel. Travel between the corridor and places to the west (suburbs west of Schaumburg and Bolingbrook) is about 20% of total corridor travel.
- **Non-commute trips in the corridor generally stay within the corrido**r. Home-based non-work trips are more than two times larger than home-based work travel within the corridor and those trips tend to stay in the corridor within the community of origin or travelling no further than the immediately adjacent community.
- **Market areas showing above average propensity to use transit coincide with market areas showing the highest travel demand**. However, these are overwhelmingly choice markets. The area within five miles of the I-355 tollway appears to be experiencing a transition in the demographic and socioeconomic composition of residents. The area has average household sizes that are relatively smaller than urban Chicago or suburban areas west of the corridor and a growing population of seniors, empty nesters, and lower income and minority populations.

Potential to Reach the Transit Market

The single most relevant finding of the study is that transit service productivity and cost-efficiency in this part of Pace's service area will be limited because the existing development density, urban form, and land use patterns prevalent in the study area create a street environment that is extremely challenging for pedestrian access. The analysis found that conditions in the study area favor private vehicle traffic and speed. These conditions become major physical constraints for pedestrians and potential transit users thus limiting potential transit service performance and its effective reach to serve the potential market demand. Corridors studied share similar urban design characteristics such as:

- **Land use and urban form**: predominance of single use zoning, low density, and inaccessible density (concentrations of employment and multifamily housing surrounded by parking lots, with poor sidewalk accessibility and lack of direct pedestrian connections to the arterial street system), and street grids with limited number of connections to the arterial corridors.

- **Pedestrian accessibility issues**: sidewalks lacking direct connections to destinations, missing crosswalks at major intersections, sidewalk gaps along the corridor, long distances between traffic signals or controlled street crossings, and high vehicle speeds in the complete absence of traffic calming measures and infrastructure.
- **Street design and vehicle traffic**: wide arterial streets (5 to 7 lanes wide, with lanes 11, or more, feet wide) designed for vehicle speed (generally operating at 5 to 10 miles over the posted speed limit of 35 to 40 mph), relatively unimpeded traffic flow (few traffic controls or signals), intersections designed for vehicle traffic movement (wide right-lane turning radii or slip lanes, left turn lanes, and pedestrian islands), and absence of sidewalk buffers such as parking lanes and/or bike lanes.

Potential Transit Operations

Transit ridership on candidate corridors has limited potential due to market size limitations around corridors, and also because of transit service's inability to reach its full market potential due to adverse physical community conditions. These factors combine together to negatively impact the productivity and efficiency of potential transit services in the study area and the sustainability of operating transit service in the long run.

- **Productivity indicators** on corridors selected for detailed analysis indicate that the best candidates for transit service implementation could reach over 15 passengers per revenue hour, while most candidates will be between 10 and 15 passengers per hour. A few candidate corridors would reach less than 10 passengers per hour.
- **Efficiency indicators** show that costs across candidate corridors could reach $6 to $10 per passenger on average corridors, over $10 per passenger on low performing corridors, and between $4 and $6 on the best candidate corridors.
- **Annual operating costs** on candidate corridors range from $0.3 to $0.6 million for those operating on a 60 minute cycle, $0.9 to $1.5 million for those operating on a 90 minute cycle (10 miles long), and $1 to $2.1 million for those operating on a 120 minute cycle (15 miles long).

Route 655 Analysis

One freeway-based transit service has been tried in the 1-355 corridor. In November 2009, Pace started operation of Route 655 service running on the I-355 from the Bolingbrook Park-and-Ride to the Northwest Transportation Center in Schaumburg. The service made three stops on its way at Downers Grove/Lombard, Addison and Itasca. Route 655 ceased operations March, 2010, after just over 3 months of service due to very poor performance in the context of limited availability of funding.

In general, Route 655 provided a high level of service, with sufficient frequency and span of service, and efficient running times. Unfortunately, the service design was not a good match for the characteristics of commute travel in the corridor study area. An after analysis of the service in light of the market assessment conducted as part of this study found potential reasons for the route's poor performance and subsequent cancellation:

- The route was not reaching target markets and was not able to attract the necessary ridership to sustain service.

- The I-355 tollway is isolated from most employment markets and so providing effective accessibility required frequent and long deviations off the main line, which, in turn, creates disincentives for transit riders and longer travel times.

Corridor Improvement Strategies

To reach a sustainable level of transit market potential in arterial corridors providing major travel connections, and to augment the size of the transit market in general, a conscious and concerted market development and corridor improvement strategy is needed between Pace and the local jurisdictions in its service area. To be effective, the market development and corridor improvement strategy must involve the following programmatic elements:

- **Multimodal emphasis**. An emphasis on multimodal mobility on major arterial corridors that recognizes transit as a key strategy to improve mobility and reduce traffic congestion. Suggested approaches include:
  - Implementing a comprehensive corridor development policy that includes Pace's transit market development goals and cities/counties' traffic management, sustainable mobility and community development goals. This could be the task of a long-range transit plan led by Pace and in consultation with local jurisdictions.
  - Establishing a 'transit emphasis' or 'multimodal corridor' zoning overlay designation that targets major arterial corridors for transportation infrastructure investment and transit-oriented development, as well as for transportation demand management and other transit supportive policies.
- **Transit service standards**. The development of transit service standards that tie transit levels of service with corridor development density and physical design conditions. The intent of these standards is to provide guidance to both Pace and local jurisdictions in:
  - Identifying development density and transit performance thresholds that can trigger improvements in level of service along a corridor, and
  - Developing design improvements in the corridor that may result in potential increases in market demand and matching corridor development over time with levels of transit service consistent with the improvements.
- **Pedestrian accessibility and connectivity**. In partnership with local jurisdictions prepare a corridor improvement plan that improves the urban design and physical design characteristics of sidewalks, intersections and accessibility networks penetrating urban blocks and neighborhoods, specifically for pedestrians. The corridor improvement plan will contain provisions for:
  - Re-configuring the roadway to accommodate a 'complete streets' approach that opens corridors for all users and modes of transportation, slowing down vehicle traffic and increasing persons safety and mobility.
  - Completing sidewalks on both sides of corridors, filling in gaps, providing more frequent pedestrian crossings, providing clear and direct connections with buildings facing the street and set back from the street, and completing sidewalk networks penetrating blocks and neighborhoods.
  - Densification of corridor through regulation incentives, such as reductions in parking requirements or maximum parking standards, to attract development and renovate the corridor in a transit oriented fashion.

Transit Service Implementation

The analysis of transit markets, origin-destination travel demand, and physical design of potential corridors identified at least three corridors showing potential for implementation of arterial-based transit service, and one corridor showing potential for implementation of highway-based transit service. Specific recommendations and guidance to improve pedestrian accessibility and operational conditions are provided in the study with a particular emphasis on growing transit market demand, and matching level of service to increases in demand and transit infrastructure improvements.

Community Views of the Corridor

A significant portion of the study is a technical analysis of the current and future travel market and travel market conditions. Therefore, Pace and the study team conducted outreach to both public and private sector partners in the areas of planning, economic development, and real estate to advise the study process. Early in the study, twenty-six stakeholders were interviewed directly to better understand the views of businesses and communities located throughout the I-355 corridor. While there was a broad range of opinions offered during the interview process, there were several common themes that emerged. Together they illustrate the forces that stakeholders believe are shaping transportation throughout the corridor.

- Regional development patterns have created characteristics that make north-south transit difficult. Stakeholders orient themselves and their communities towards the City of Chicago and Lake Michigan. East-west roadways and movements were freely discussed and prioritized while most participants had barely considered north-south travel needs before attending the session. Stakeholders appeared to see the majority of transit opportunities as ones related to access to the City of Chicago as either a location of jobs for their residents or as a location where a certain sector of their workforce lives.
- The majority of stakeholders focus their attention on Metra rail when speaking of transit. The communities that have a Metra station generally prioritized improvements to parking and service ahead of other transit. Other communities that lacked rail service, or have economic centers that are not proximate to their stations (e.g. Schaumburg, Lombard, Downers Grove) prioritized shuttles connecting the rail stations to these areas.
- Some stakeholders suggested that inefficient land use patterns and development settings prohibit or severely restrict the ability of buses to quickly and easily access major employment or entertainment centers in a timely manner. This was especially discussed with the developer representatives who were positive on the potential of transit in some denser nodes/centers/ corridors, but lamented the "hodge podge" patchwork of developments that cannot be effectively accessed.
- Within the I-355 Corridor, there are few alternatives to using the freeway for north-south travel. The local street network is fragmented and indirect, forcing people onto the expressway.
- Very few stakeholders said they use I-355 for long stretches on a regular basis. Most of the trips identified used I-355 to access one of the "east-west" expressways or to reach a destination that is only a few exits away.
- While many groups attending the business sessions identified that many younger employees and professionals continue to live in the City of Chicago and commute to suburban worksites, there were mixed signals throughout the sessions regarding the size and potential of this

transit market. Several municipalities indicated that their number of reverse commuters is not large. Others noted that reverse commute patronage is low because existing services directed towards this market are inadequate.

- Most communities reported a complete halt to any development activities, including some communities having building-ready sites/pads waiting for interested developers. These conditions seemed to divide stakeholders into two separate groups. One group appeared to see transit improvements as an opportunity to generate development potential at key sites or nodes (e.g. Lockport). It seemed that these groups saw the study as a way to support or further their planning and economic development goals. The other group did not appear to see significant benefits to this study and clearly had other planning, transportation or economic development priorities.
- While most stakeholders expressed a desire for more widespread use of transit as well as increased transit opportunities, there was a range in how communities, businesses or groups supported transit. A few businesses, such as Silver Cross Hospital, participate in transit benefits for their employees, such as pre-tax fare cards. At the same time, many of these groups were hesitant to consider charging for parking to increase demand for transit. They believed that free parking gave them a competitive edge over similar businesses located in Chicago.
- Municipalities generally recognize that additional density and improved infrastructure, including additional pedestrian connections, may be needed before transit can effectively compete with private autos. Again, many communities supported these changes around their train stations, but several had a hard time envisioning additional density or character changes along key corridors.
- Several stakeholders noted that a shift in thinking about transit's role is occurring. Several mentioned a trend towards sustainability and "green" that they felt was having an impact on people's commuting practices. Additionally, stakeholders mentioned that the current economic downturn has caused many to look for ways to save money, including reducing their dependency on cars. Some also see a generational shift away from automobiles, noting that some younger professionals make concerted efforts to avoid owning a car or at least reducing their car use.
- Many stakeholders noted there is a much larger range of transit opportunities and services being offered by Pace than what the public is generally aware of. They encouraged Pace to continue with outreach and marketing programs to create awareness of the options that exist for commuters.

Existing Conditions

Two major areas of inquiry were defined for this study:

1. Research the feasibility of operating effective transit services along I-355, including:
   a. Identifying viable markets to support effective transit service along the I-355 corridor
   b. Identifying key infrastructure needs to support transit service in the corridor
   c. Identifying supporting strategies and design/land use policies that can be adopted at the local level to develop effective transit services and markets
   d. Identifying potential partners to implement and support I-355 service
2. Develop an evaluation methodology to prioritize implementation of feasible service alternatives that accounts for both locally adopted supporting strategies and policies and markets with the greatest transit demand potential.

Background Studies and Planning Context

The project approach and analysis methodology were formulated based on the study goals and the planning knowledge accumulated to date in the Chicago Metropolitan Agency for Planning (CMAP) area, which is comprised of a number of regional studies and land use/transportation plans that have been developed in the last 20 years and updated and summarized recently by GO TO 2040 CMAP's area long-range plan.

- Vision 2020: The Blueprint for the Future
- Arterial Rapid Transit Study
- DuPage Area Transit Plan 2020
- Elgin-O'Hare West Bypass Study
- Cook-DuPage Corridor Study
- Metra STAR Line
- South Cook-Will County Service Restructuring Initiative, Market Research Report
- GO TO 2040

The review of major regional studies and land use/transportation plans indicates that the region views transit as an important part of an efficient transportation network. A number of overlapping service strategies have been proposed by the studies to serve local, mid-range, and long distance travel. Vision 2020 and the DuPage Area Transit Plan both advocate for local circulator routes to serve short-distance travel, while the Cook – DuPage Corridor Study proposes the designation of employment center distribution/circulation areas where circulator routes would distribute commuters to their places of work.

Pace has undertaken restructuring efforts in five geographic areas to improve local service for those communities. For medium to long-distance travel, a number of strategies have been proposed. Under Pace's Vision 2020 plan, line-haul bus routes would operate on arterial and tollway/highway corridors. The Arterial Rapid Transit idea has been developed further and Pace will be implementing service in the future.

Other planning efforts have proposed bus and rail lines to serve north-south travel within and close to the I-355 corridor. The "J-Line," which was first proposed in the DuPage Area Transit Plan, also appeared in the Elgin-O'Hare West Bypass Study, the Cook DuPage Corridor Study, and CMAP's GO TO 2040. Exact plans for the line have not been developed, but it would likely travel from Naperville/Aurora to Schaumburg and/or O'Hare using buses or a combination of bus and rail.

A second proposal for north-south transit travel in the area is Metra's STAR Line, which would travel north-south between Joliet and Hoffman Estates and east-west to O'Hare International Airport. A third proposal that appeared in the Elgin-O'Hare West Bypass Study and the Cook DuPage Corridor Study was for express buses/BRT on I-355. Pace introduced the Route 655 service, which ran on I-355 between Bolingbrook and Schaumburg, to serve north-south travel in the corridor, but it was discontinued due to low ridership.

Route 655 Implementation

On Monday, November 30th 2009, Pace started operation of Route 655 service running on the I-355 Veterans Memorial Tollway from the Bolingbrook Park-and-Ride to the Northwest Transportation Center in Schaumburg. The service made three stops on its way at Downers Grove/Lombard, Addison and Itasca. All route stops were off the main line and required the bus to get off the tollway and make a short loop-deviation to serve the stop and then get back on route (see Figure 2 below).

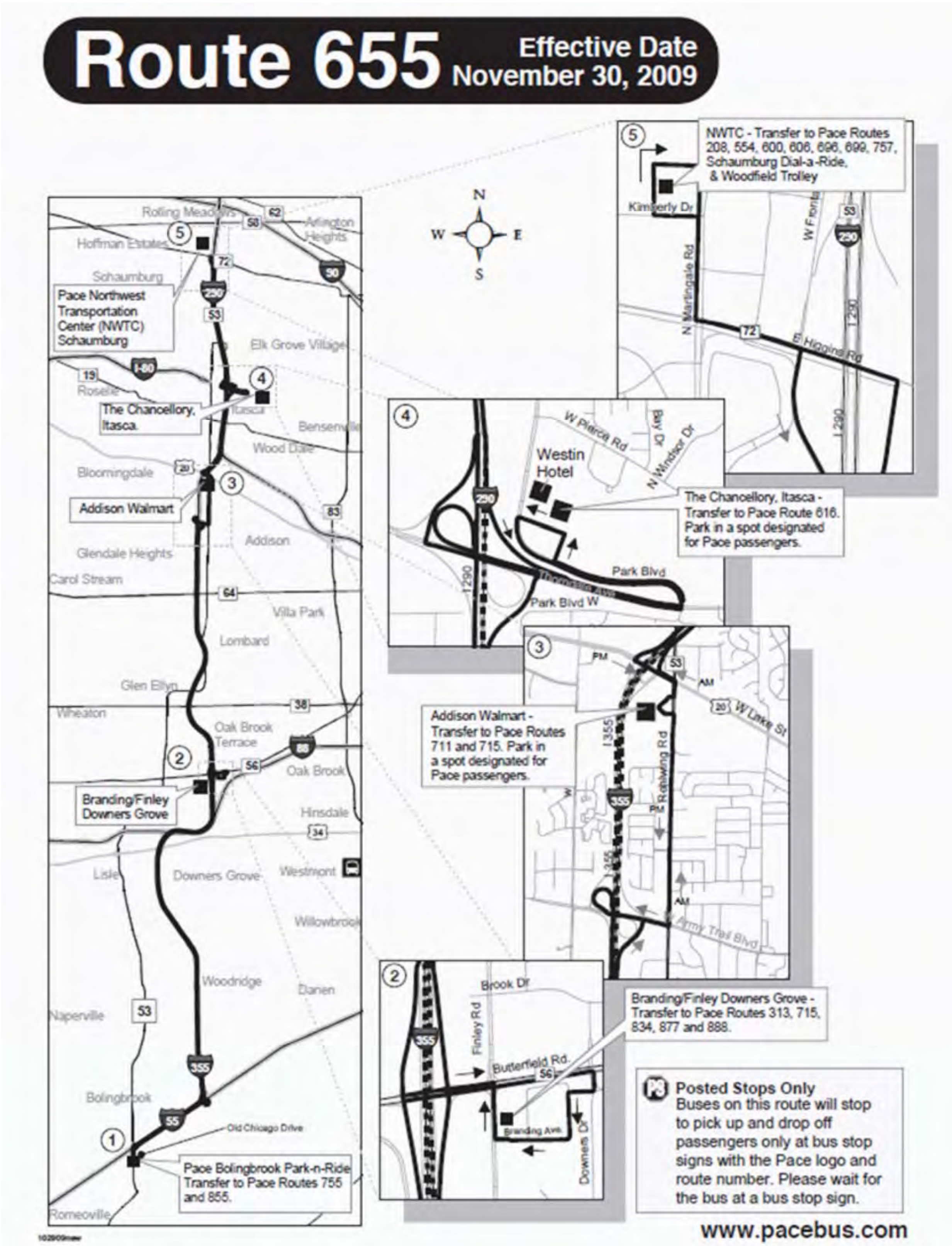
Route connections were provided with a handful of routes along the way, some of which were long-distance express routes such as Route 877 and Route 888; east-west arterial routes connecting with Chicago such as Route 313; or north-south circulation routes operating local trips in parallel corridors and reaching employment destinations such as Route 616, Route 711, Route 715, and Route 834.

Travel times between stops were generally 10 minutes, except for the first segment between Bolingbrook and Downers Grove which took about 25 minutes. In general, Route 655 provided a high level of service, with sufficient frequency and span of service, and efficient running times. Unfortunately, the service design was not a good match for the characteristics of commute travel in the corridor study area.

Route 655 stopped operating on Friday, March 5th, 2010, after just over 3 months of service due to very poor performance in the context of limited availability of funding. An after analysis of the service in light of the market assessment conducted as part of the I-355 Corridor Transit Development Plan found several potential reasons for the route's poor performance and subsequent cancellation:

- Route 655 was not reaching target markets and was not able to attract the necessary ridership to sustain its service. The OD travel demand analysis included in this report shows that north-south commute travel demand in the study area tends to be local and comprised of shorter trips. In that context a tollway-based service was not effective because, by definition, it tended to emphasize long-distance travel and regional trips.
- The I-355 Tollway is isolated from most employment markets and so providing effective accessibility required frequent and long deviations off the main line, which, in turn, creates bigger disincentives for travelers and longer travel times. Given the general dispersion, low density of employment, and the short-distance nature of home-based work trips in the corridor study area, Route 655's highway-based express bus model proved inadequate to attract significant ridership.

Figure 2: Route 655 Map



Market Analysis Methodology

The objectives of the transit market analysis were defined as follows:

- Assess the demand feasibility of north-south transit service along the corridor area.
- Understand origin-destination (OD) travel patterns in the metropolitan area, the demands pressed upon its transportation network, and the role of the I-355 corridor in the system.
- Develop a service evaluation methodology that identifies transit markets with the greatest demand potential.
- Identify corridors providing major travel demand connections and prioritize potential transit markets.
- Identify transit service gaps, needed improvements in levels of service, infrastructure, and accessibility to transit service.
- Identify local planning strategies and policies that support transit.

The transit market analysis approach sought to sort out travel demand connections and residential and employment markets that, if served with transit, would have a mode split change and/or a traffic impact in the corridor study area. To achieve this target, candidate travel demand connections and market areas would need to meet the following characteristics:

- Serve local travel demand markets within the corridor study area (defined roughly as a 5-mile buffer around the I-355 corridor).
- Serve commute travel (peak period) and/or other purpose travel (midday).
- Serve north-south travel needs in the study area, on either side of the corridor, or inside the corridor.
- Travel outside the corridor if at least one origin or destination is in the corridor study area (this would serve the local-to-regional and regional-to-local travel).
- Have an impact on traffic in the corridor (either by reducing vehicle traffic or increasing transit mode split in the study area).

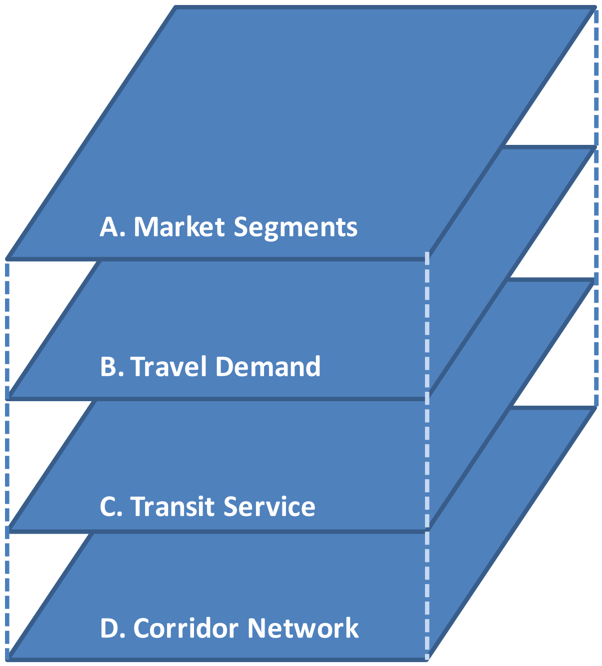
Multilayered Analysis Approach

The analysis methodology needed to account for several areas of information and so four layers or areas of information were identified and utilized in the analysis:

- **Market Characteristics and Segments**: this includes an analysis of residential and employment areas and the identification of market areas showing propensity to use transit. Analyses are based on demographic and socioeconomic characteristics from the US Census 2000, land use patterns, employment classifications, TAZs and jurisdictional boundaries, and the market segments identified in the South Cook-Will County Restructuring Initiative.
- **Origin-Destination Travel Demand**: this includes an analysis of major origin-destination travel connections at the local and regional level for home-based work, home-based other, and non-home based travel. Local travel has been defined as travel within the corridor study area (within a 5-mile buffer); regional travel has been defined as travel between the corridor and the region, having either an origin or a destination in the corridor. CMAP travel demand model forecasts for 2010 and 2030 have been utilized for this analysis.

- **Transit Service Characteristics**: this includes analysis of the transit service network (footprint), levels of service (frequency and span of service), and utilization (ridership and productivity) for both Pace bus and Metra rail services in the study area.
- **Corridor Network**: this includes analysis of the network of corridors providing logical travel connections between local and regional travel markets – encompassing freeway and arterial streets as well as the rail network, traffic volumes, and the level of accessibility and connectivity with local neighborhoods and activity centers.

Figure 3: Information Analysis Layers



Critical Questions (crossing the layers)

The four layers of information are combined to develop a set of critical questions that guided the analysis to ultimately identify travel connections and corridors that show potential for transit demand. The questions were:

1. Are there any potential markets for transit within the study area?
2. What are the major corridors connecting communities within the study area and with the region?
3. What are the major corridors that provide accessibility to existing and potential transit markets?
4. Is the current transit network serving the largest transit markets?
5. Are all major OD travel patterns being served with transit? Are there any gaps in transit service levels or coverage?
6. What types of transit service and levels of service are needed on major corridors to serve existing and potential markets?

The assessment of transit markets was carried out through a service evaluation framework that identifies potential transit service applications through a series of incremental analyses. These analyses incrementally filter through information on market segments, OD travel demand, transit service, and the corridor network to identify market priorities and transit connections with demand potential that offer favorable conditions for service implementation and performance.

Transit Propensity Markets

A Transit Orientation Index (TOI) was developed to summarize the propensity or likelihood of using transit across market areas in the study area. The TOI is an important indicator of transit demand and need that allows to quickly identifying areas with significant commute needs and potential demand for transit service, that when compared to actual transit service levels and network coverage helps identifying areas with no service and/or gaps in the regional transit service network, and identifying market areas that are receiving service but it is insufficient to meet actual demand.

Five major variables were identified that provide adequate explanation to the levels of transit use and SOV use that are observed in the study area, these variables include:

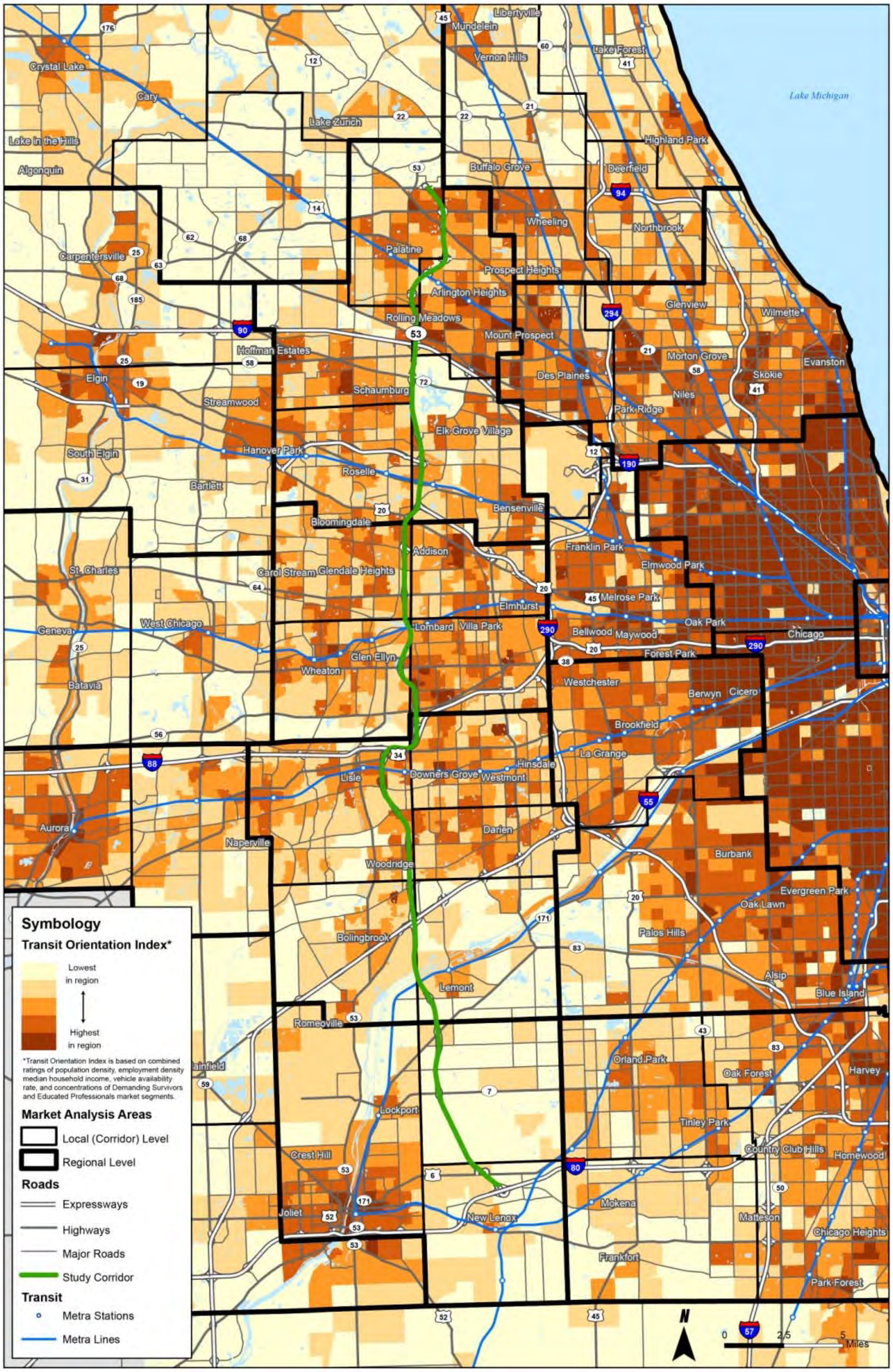
- Population Density – persons per acre
- Employment Density – jobs per acre
- Median Household Income – median household income by census block group
- Vehicle Availability Ratio – ratio of adults able to drive versus number of vehicles available
- Market Segments with Transit Potential – concentration of Demanding Survivors and Educated Professionals adults by census block group[2]

A map illustrating the results of the TOI analysis is presented on the next page (Figure 4).

All together the factors that make up the TOI indicate that the corridor study area is mostly characterized as a choice market, or comprised of potential users that will ride transit by choice more than by necessity. This obviously has major implications for service design and routing. Another important finding is the portion of the study area west of O'Hare International Airport which contains employment centers of regional significance that attract trips from all over the region as well as from inside the corridor. These areas are accounted for in the TOI and contribute to its high value in some pockets of the study area.

[2] The South Cook-Will County Service Restructuring Initiative – Market Research Report identified two market segments that were characterized as 'transit friendly': Demanding Survivors and Educated Professionals. These segments were combined to produce a fifth variable in the TOI that provides transit propensity explanation from a behavioral and attitudinal perspective

Figure 4: Market Segments and Transit Orientation Index



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

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Travel Markets with Demand Potential

Three screening steps were utilized to identify OD travel markets with demand potential for transit in the corridor area:

1. The first step was to select OD travel markets that are contained within the corridor market area. This includes OD pairs that have either an origin or a destination within the corridor analysis area, or are completely within the corridor area. In other words, it includes local trips within the corridor area and trips between the corridor and the region.
2. The second step was to establish minimum threshold levels for transit demand potential. A minimum threshold of demand was established to identify travel markets with sufficient demand for operating effective transit services. These thresholds were established at 6,000 trips for home-based work trips[3] and 9,000 trips for home-based other trips[4] (these are single direction trip thresholds).
3. The final analysis step was to screen out OD pair connections that represented a primarily east-west movement within the corridor. This study focuses on north-south travel in the I-355 corridor, so the analysis only kept those connections that require a predominantly north-south movement in the corridor. Serving these connections with transit could potentially impact travel on I-355, by either reducing traffic volume, or increasing transit mode split in the corridor.

The results of this analysis show that only a portion of OD travel markets with sufficient demand potential for transit service applications are north-south travel markets. This is true for both home-based work trips and home-based other trips. The implications for transit service design that arose from these analyses were:

- Very little demand exists for long-distance commute travel along the I-355 corridor.
- Very little demand exists for north-south commute travel beyond two contiguous market analysis areas.
- North-south demand is mostly short-distance and intra-zonal for both work trips and other trips; origins and destinations are mostly within market analysis area.
- Highway based transit service cannot appropriately make the connections between communities if travel is mostly short-distance and based on proximity.
- Potential transit service connections seem to be better suited for arterial-based service providing direct connections within communities and between neighboring market analysis areas.

[3] Home-based work trips minimum threshold: this threshold was established as a 5% mode split target for public transit trips. The assumption was that most home-based work trips are commute trips, and thus occur during the AM and PM Peak periods or roughly between 6:00 – 9:00 am and 3:00 – 6:00 pm. A 5% mode split is not unlikely for transit during the peak period. This figure was then translated into a daily demand figure, assuming that 6 trips would be provided per peak period in the peak direction of each OD pair, and that at least 25 passengers would be carried per trip on average. That creates a minimum daily demand of 300 transit trips out of 6,000 total trips.

[4] Home-based other trips minimum threshold: this threshold was established as a 2% mode split target for public transit trips. The assumption was that most home-based other trips would occur during the midday or the off-peak period, or roughly between 9:00 am and 3:00 pm. A 2% mode split is not unlikely for transit during the midday period. This figure was then translated into a daily demand figure, assuming that 12 trips would be provided over a period of 6 hours in the production and attraction direction of each OD pair, and that at least 15 passengers would be carried per trip on average. This creates a minimum daily demand of 180 transit trips out of 9,000 trips.

Corridor Network with Demand Potential

Generally, north-south OD travel markets for home-based other trips appear strongly aligned on two corridors that run parallel to the I-355, on the east side and on the west side of the tollway. In the northern segment of the corridor area, a higher level of travel demand is observed between corridor market areas and market areas outside the corridor (See Figure 5).

In contrast, home-based work trips show travel demand concentrated mostly in one corridor on the east side of I-355, and a higher level of interaction between market areas on both sides of the tollway, with more corridor crossing instances such as: Naperville/Lisle to Lombard/Oak Brook and Schaumburg/Hoffman Estates to Elk Grove Village/Bensenville (see Figure 6).

Gaps in Transit Service

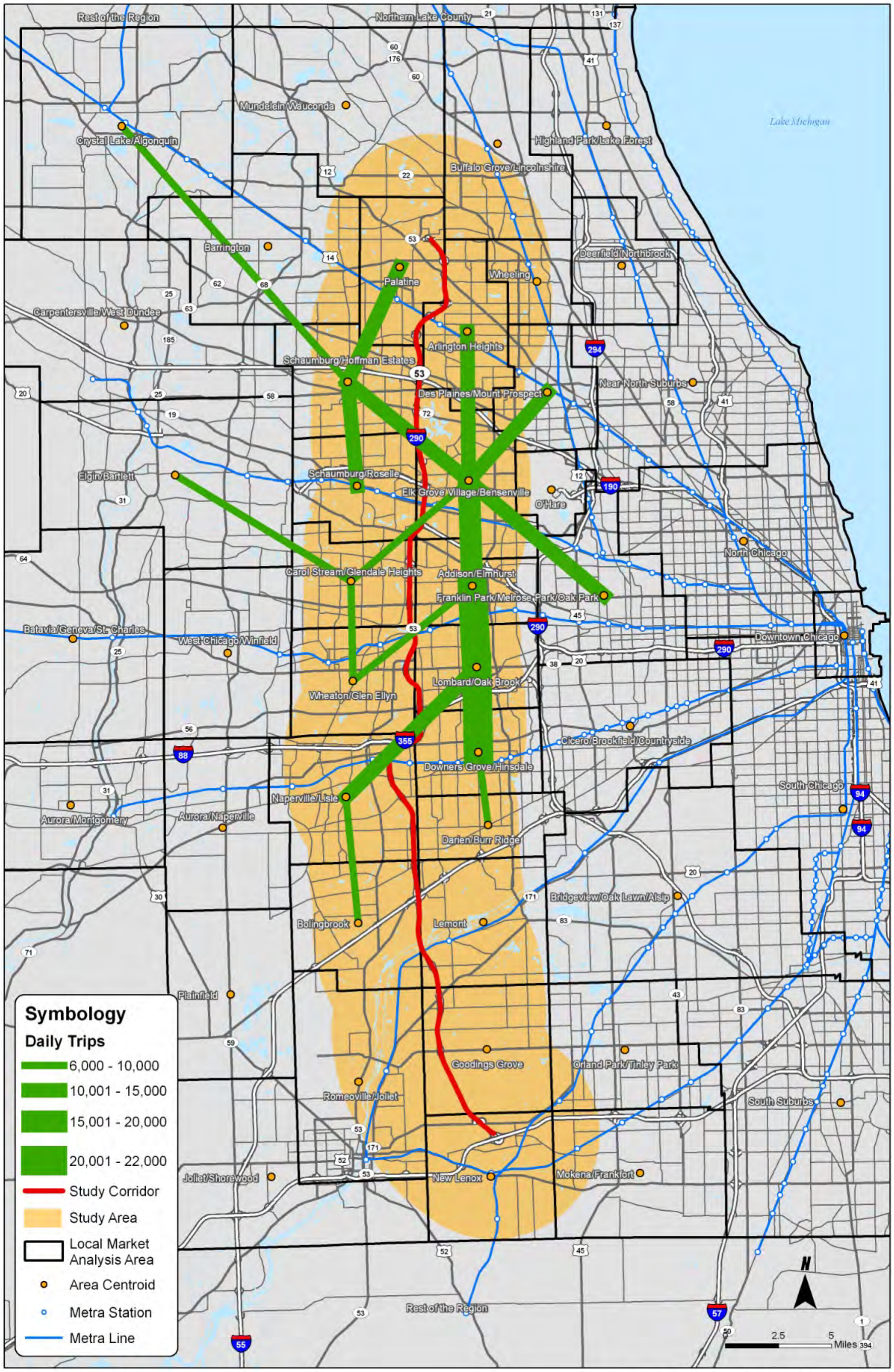
One of the critical questions in the study is to find out whether the current transit network is serving the biggest transit markets that were identified in the study area. Figure 7 overlays the transit network over the TOI or market areas that show potential for transit demand, with the intention to shed some light on the issue. At least three major observations can be made from the map:

- All together, Metra rail, Pace bus and CTA provide extensive transit coverage throughout the region and most of the network resources are dedicated to areas showing higher potential for transit demand. This applies mostly to Chicago based and Chicago bound services.
- Most market areas outside Chicago with potential for transit demand are found along commuter rail corridors and these are being served by Metra or by Pace bus routes feeding into or distributing from rail stations. This applies mostly to east-west and long-distance travel.
- Most market areas with potential for transit demand along the I-355 corridor show much less dense and thinner transit network coverage. This applies mostly to north-south and short-distance travel in the central part and northern end of the corridor area. In particular, north of I-90 and west and southwest of O'Hare International Airport.

The apparent lack of density and sparse network footprint that is observed north of I-90 and west and southwest of O'Hare provides a contrast with the apparent emphasis that Pace has given to the communities along the BNSF and UP-W rail lines. While there are many routes providing service to Naperville, Lisle, Downers Grove, Wheaton, and Oak Brook, very few routes provide service between the UP-W and UP-NW lines, except for mostly east-west services connecting Schaumburg with places east of O'Hare in Des Plaines and Rosemont.

Pace's bus network exhibits a variety of services and networks, roughly ranging from a grid structure east of the I-294 corridor, connecting with Chicago, to a radial structure in traditional rail-oriented townships such as Elgin, Aurora, or Joliet, in the west end of the metro area, to a dense community circulation and feeder/distribution shuttle network along the BNSF line, and a more hybrid model in the areas in between that combines corridor based service with feeder/distribution service and traveling north-south and east-west.

Figure 5: Home-Based Work Travel Patterns



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

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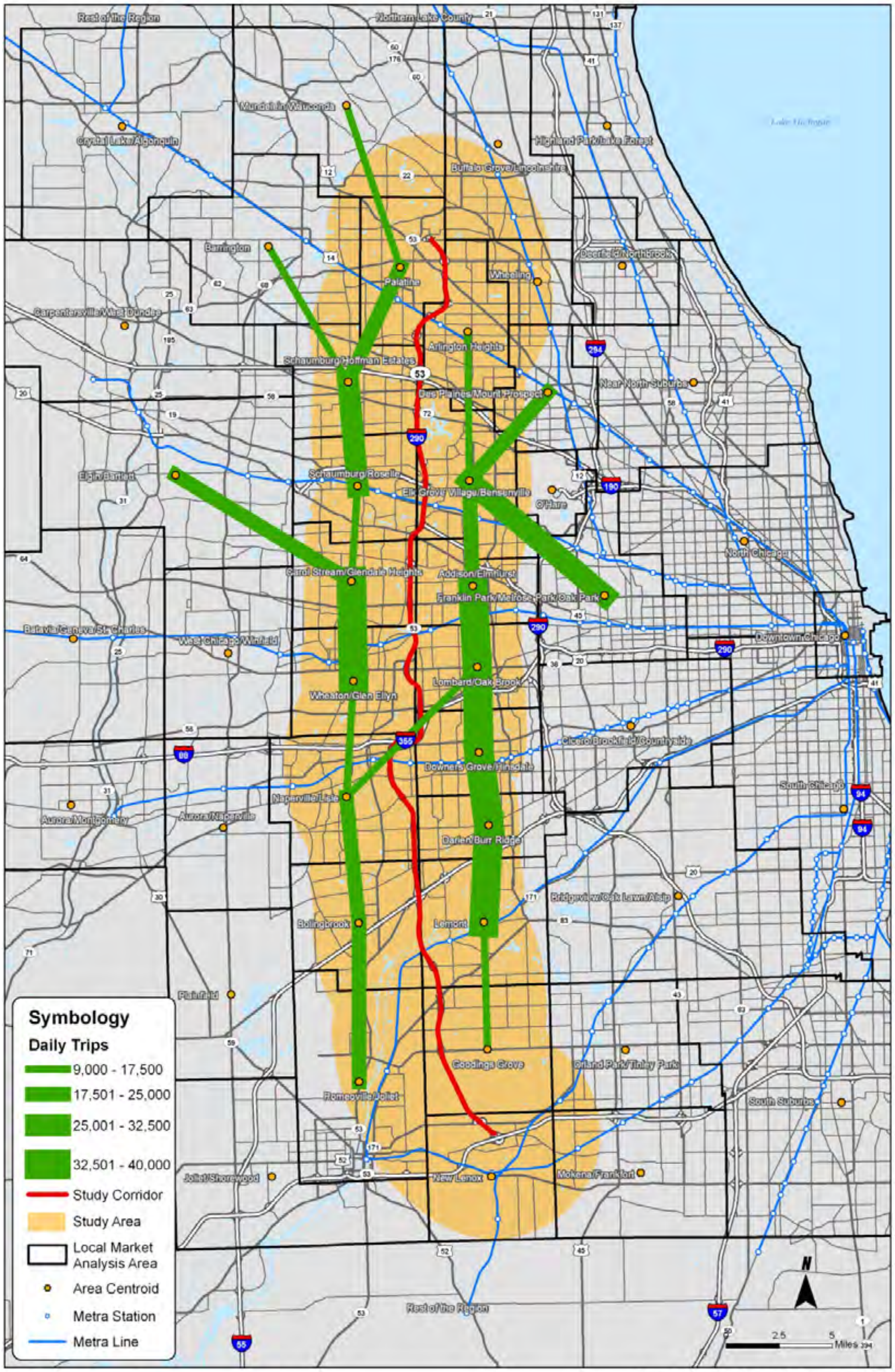
Figure 6: Home-Based Other Travel Patterns



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

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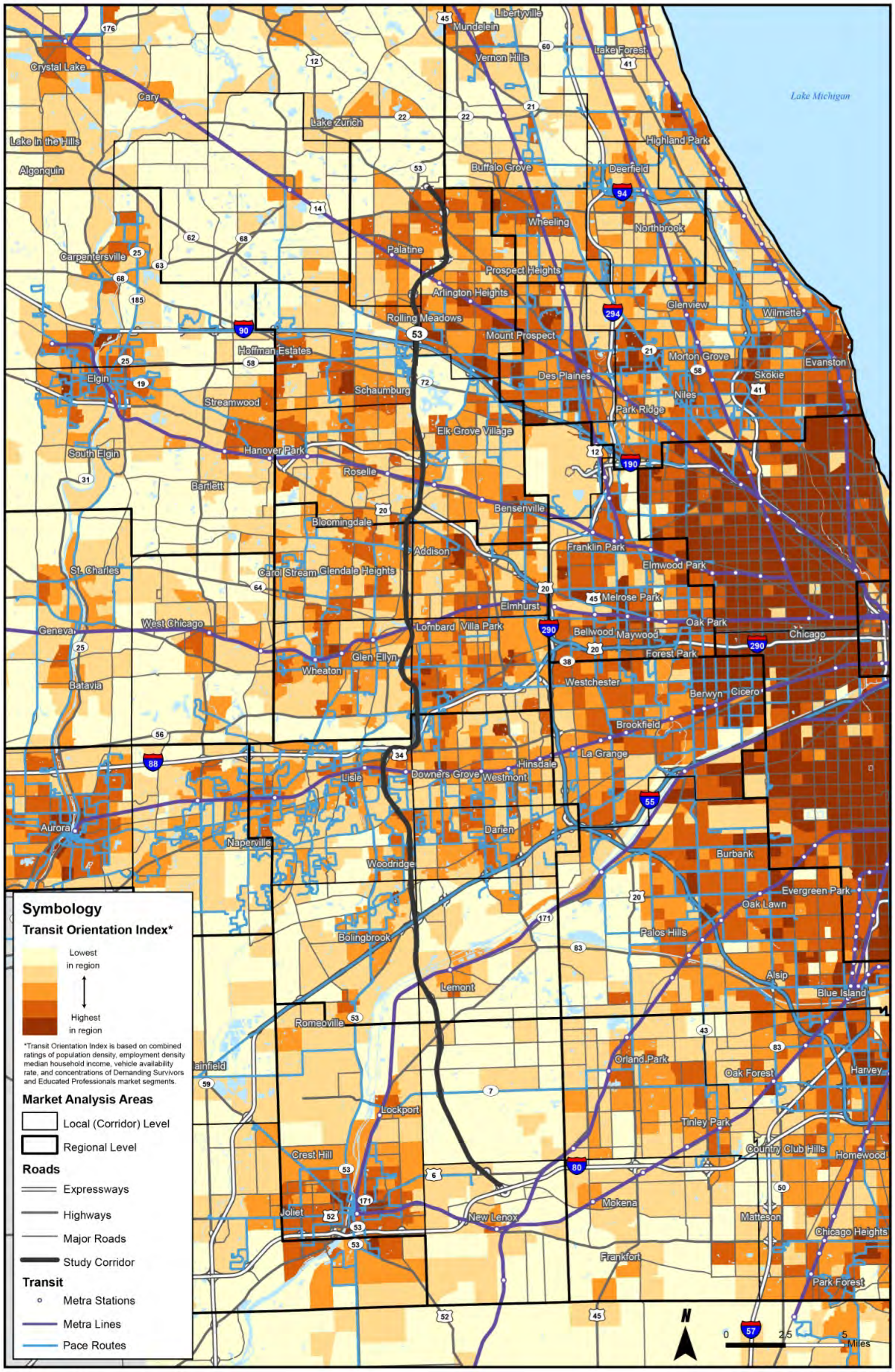
Figure 7: Gaps in the Transit Service Network



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Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

Summary of Findings

The major findings of the market analysis are summarized as follows:

- There is significant north-south travel within the corridor.
- Much of the north-south travel market, for both home-based work and home-based other trips, is short distance, i.e. less than 10 miles.
- There is significantly more travel in the northern part of the corridor (north of I-88) than in the southern part (see Figures 5 and 6).
- Preliminary analysis suggests that travel demand in the northern part of the corridor may be strong enough to support north-south transit service at the arterial level.
- Market areas that could support transit service within the corridor are service gaps in Pace's current network (see Figure 7).

These findings are supported by analytical conclusions detailed in the following sections. The first section presents major evidence that directly relates to the findings above. The second section lists other significant findings that influenced the analysis.

Major Analytical Conclusions

1. **There is significant north-south travel within the corridor, but travel in the market area, as defined for the study, tends to be short-distance.** The most significant long-distance travel is east-west. Regional travel demand has a strong east-west orientation connecting the suburbs with Chicago. This is true for both vehicle trips and transit trips, and is illustrated by the geometry of the transportation network in the corridor. The I-355 corridor is crossed by four major east-west commuter rail corridors and four major expressways and tollways, which provide strong east-west connections to/from the corridor area. North-south travel mainly occurs on I-355, arterial streets, and state highways.
2. **Most north-south travel is done between contiguous market areas.** Most north-south travel is shorter in distance than east-west travel. However, there is a continuous north-south travel demand pattern that encompasses many communities and turns over zone-by-zone. Home-based work trips show a major north-south travel pattern in the northern segment of the corridor to the east of I-355, between Downers Grove Lombard, Addison, and Elk Grove Village. Home-based other trips show a similar zone-by-zone turnover pattern on both sides of the corridor, from Palatine to Romeoville and from Arlington Heights to Lemont. This travel is illustrated in Figures 5 and 6.
3. **Non-commute trips in the corridor generally stay within the corridor.** According to the regional travel demand model, 66 percent of home-based other trips in the corridor have both origins and destinations within the corridor market area. Home-based other trips are more than two times larger than home-based work travel for trips within corridor market areas or intra-community trips.
4. **More travel occurs in the northern part of the corridor than in the southern part.** The northern segment of the corridor, from Palatine and Arlington Heights to Lisle and Downers Grove, produces and attracts more travel than the southern segment of the corridor. The difference in travel volume is illustrated in Figures 5 and 6, which display major north-south corridor connections within the study area. Travel within, to, and from the northern portion of the corridor (north of I-88) is about two times greater than travel within, to, and from the southern portion of the corridor. The difference in travel volume between the northern and

southern segment is explained mostly by larger population and employment markets. The northern part of the corridor contains denser development, more travel between market areas, and more travel to/from points outside the study area.

5. **Most east-west long-distance transit commute travel is served by commuter rail, while most north-south transit travel is served by limited bus service or no service at all.** Pace appears to be serving a number of functions: filling in the gaps between commuter rail corridors, feeding east-west travel across the Cook-DuPage boundary line, and providing limited north-south service between rail lines. Metra draws most of its riders from urbanized areas around its rail stations.

6. **Transit service demand in the corridor area appears better suited for arterial based services.** Demand for transit service in the study area appears to be better suited for all-day arterial corridor service that turns over passengers every few miles contrasted with highway-based service traveling long distances with limited stops. The travel demand analysis indicates that demand for long trips is relatively small and likely not large enough to sustain transit service. Alternatively, demand for north-south short trips is large enough to develop sustainable transit corridors for major stretches of the study area assuming other transit supportive factors are also present. For example, the analysis suggests that streamlined versions (i.e. faster, more direct and more frequent services) of Pace bus routes 711, 715, and 834 may work better than short-distance circulators and feeders or long-distance express services. The rationale lies in the ability to turnover passengers and cover trips of more than 2 miles and less than 10 miles, which appears to be the dominant trip length range for travel within the corridor market area.

7. **Market areas showing above average propensity to use transit coincide with market areas showing the highest travel demand.** However, these are overwhelmingly choice markets. The area within five miles of the I-355 Tollway appears to be experiencing a transition in the demographic and socioeconomic composition of its residents. The area has average household sizes that are relatively smaller than urban Chicago or suburban areas west of the corridor and a growing population of seniors and empty nesters. In addition, the accessibility that I-355 offers is progressively changing the residential and employment composition of the area, with new infill developments and growing commercial and employment development on east-west corridors that intersect the I-355 corridor. Market areas in the corridor that show a moderate-to-high propensity to use transit (measured through a Transit Orientation Index) coincide with market areas showing the highest travel volumes and potential for transit demand. They are also the areas where current bus service levels are thinnest, and where the transit network has visible gaps in coverage.

8. **Transit travel on north-south corridors that parallel I-355 is feasible from both a transit demand standpoint and a corridor availability standpoint.** Based on the analysis of the street network, it appears that north-south travel is possible on both sides of I-355 on a number of arterial corridors where transit service would be feasible. This is particularly true along the corridors on the east side of I-355. The next phase of the study will assess the details of these linkages in terms of the potential market and suitability for transit that will meet the needs of the market.

Other Findings

9. **Employment is dispersed throughout the region; however, a concentration of regional significance exists in the corridor area.** Employment markets are highly dispersed throughout the region for all economic sectors (i.e. retail, services and manufacturing). However, there are a few concentrations of regional significance in the study area. These are found along major transportation nodes (i.e. Schaumburg, Itasca, and Elk Grove Village on I-355 and I-90, and Lombard, Lisle and Downers Grove on I-355 and I-88), and along a few major corridors (i.e. Main Street/Highland Avenue, Arlington Heights Road, and IL-83 Busse Road). Employment areas around O'Hare International Airport are of regional significance and attract trips from the entire region. The quadrant on the west side of O'Hare between the Busse-Woods Forest Preserve, the airport, and the I-90 and I-290 corridors is a major employment magnet. It attracts significant volumes of trips from all surrounding zones and shows potential for increased transit service to connect local market areas.

10. **Residential origins outside Cook County and west of the I-294 Tri-State Tollway are dispersed throughout the urban area and are comprised mostly of low-density, single-family housing.** Residential development dispersed throughout the urban area west of Chicago is low-density with many areas lacking pedestrian accessibility to major street corridors. Transit service in these areas is challenged by the absence of sidewalks, direct paths to street corridors, lack of crosswalks, and presence of natural and man-made barriers.

11. **The I-355 corridor market area contains both a major residential market and a major employment market for internal and external trips.** Data from the US Census Bureau Longitudinal Employer-Household Dynamics program show that most residents of DuPage and Will Counties have to travel outside the county for jobs. Although many residents within the I-355 corridor study area travel long distances to places throughout the region, the majority make shorter trips that are primarily within the corridor or in areas just outside the corridor. Most north-south work trips in the corridor may be explained by this demand pattern. In contrast, most east-west travel may be explained by travel between corridor market areas and Cook County (Chicago).

12. **The I-355 corridor is a transition zone between city and suburbs, showing both the weaknesses of suburbs and the strengths of traditional urban areas to sustain transit.** Household characteristics such as size, income, and age groups vary starkly between areas east and west of the corridor mainline. Inside the corridor, residential market areas are mostly comprised of single-family, low-density housing; however, residential developments are slightly denser and older on the east side of I-355 than on the west side. Employment density is higher on the east side, as well. In addition, the street network on the east side of I-355 appears to be comprised of slightly longer and continuous corridors that are more evenly spaced (about one mile apart) than those on the west side. The corridor market area appears to have potential for significant population and employment growth and appears to provide an east-west transition zone for the region in its westward sprawl.

Potential Transit Corridors Evaluation

The market demand analysis developed for the assessment of existing conditions was at a very high level or large scale, and was useful to understand overall travel demand patterns within the corridor study area. As defined in the existing conditions analysis, each market analysis area encompassed an urban area that was connected to the next by a variety of north-south and east-west corridors, and so the analysis only reflected the overall level of travel activity and connectivity between zones. Moreover, the volume of intra-zonal travel was still large and comparable in size to major connections between market areas. In other words, each analysis area contained a high level of local mobility and connectivity between communities and neighborhoods that was not being reflected in the analysis. Thus the analysis was intended as a first ‘screening’ step to identify the major travel markets in the corridor area.

Micro-zone travel demand analysis

A “micro-level” origin-destination travel demand analysis was performed to explore these markets in more detail to: better understand local and subregional markets, the directionality of travel, its travel corridors, and potential demand for transit service (see Figure 8). Micro-level origin-destination travel demand analyses were then developed to identify arterial corridors providing internal connectivity between smaller zones within market analysis areas (these smaller zones are called ‘micro-zones’ in this analysis), and also between micro-zones in adjacent different market analysis areas. Results of this analysis are shown in the maps below:

- **Home-based work trips** (Figure 9) show a pattern with five major centers generating and attracting a significant number of person trips and market connections (or OD pairs), these include: NE Schaumburg, East Elk Grove Village, Itasca/West Wood Dale, North Oak Brook, and NE Naperville. NE Schaumburg, in particular, attracts trips from most micro-zone areas around, as well as from longer distance zones such as Long Grove/Palatine and North Arlington Heights. A similar “hub-and-spoke” pattern is observed in East Elk Grove Village and Itasca/West Wood Dale. These three markets concentrate a high number of employment centers and jobs of regional significance, which attract trips from adjacent micro-zones (roughly within 3 miles) but also from outer zones that are more than 3 miles, but less than 10 miles, away.
- **Home-based other trips** (Figure 10) show all non-work trips made between micro-zones in the study area. The person-trip volumes are larger than work trips and represent a larger proportion of all trips, about twice those of home-based work trips. OD travel demand between micro-zones shows a more grid-like pattern comprised of north-south and east-west OD pairs on both sides of the corridor. The continuity of north-south travel on the east side of the corridor from Downers Grove and Darien to Elk Grove Village and continuing to Arlington Heights is significant and reinforces preliminary findings of potential transit markets in this part of the corridor study area. No less significant is the ‘hub-and-spoke’ pattern in NE Schaumburg which is also observed for both work and non-work trips. This is a significant finding because it demonstrates that there is an all-day market for travel to/from NE Schaumburg and potentially unmet needs for transit service going into this area.

In summary, “home-based other” trips patterns show a high degree of interconnection, like a street grid, between micro-zones up and down the I-355 corridor’s north segment, while “home-based work” trips show a nodal pattern that concentrates OD pairs into a few centers or destinations.

Figure 8: Definition of Market Analysis Micro-Zones

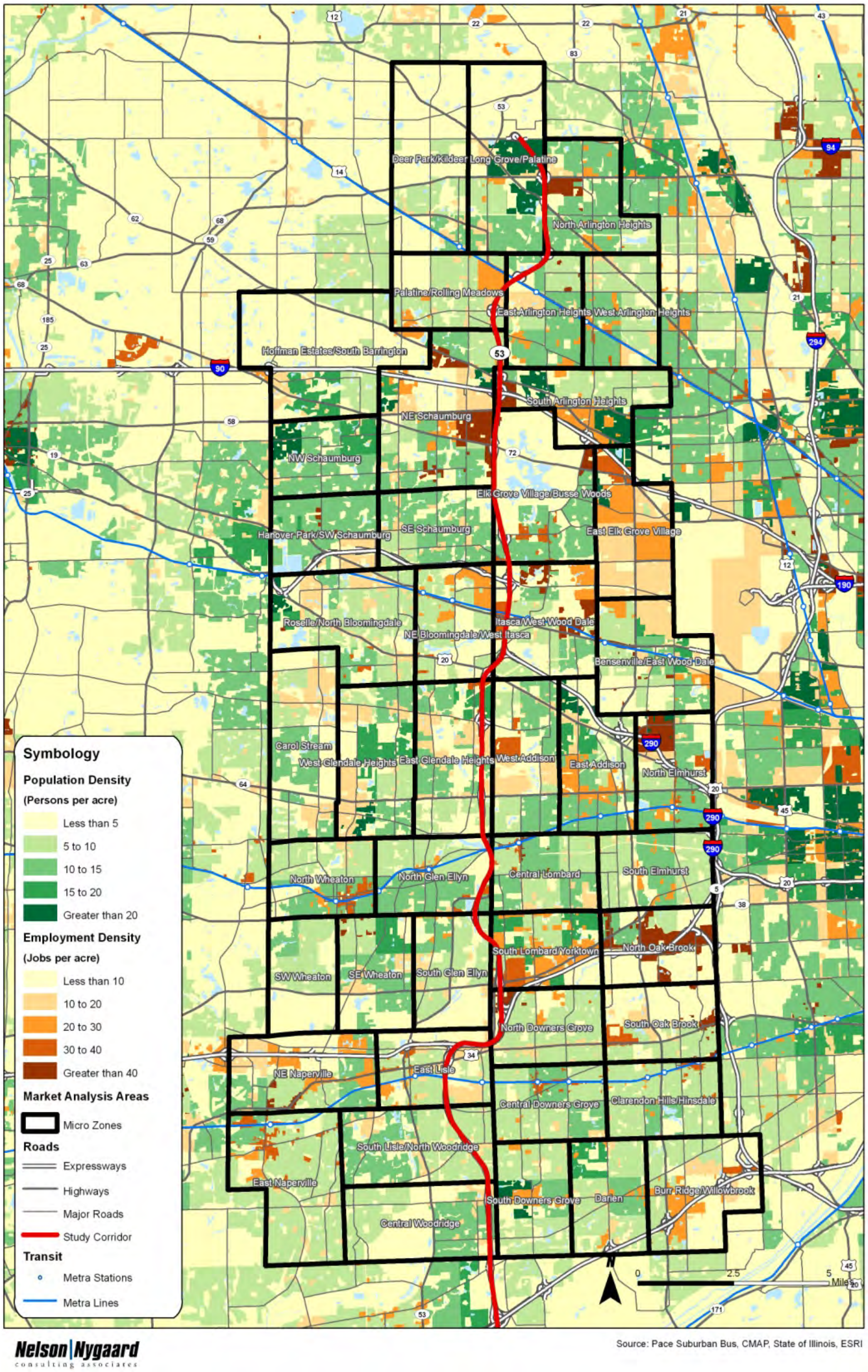
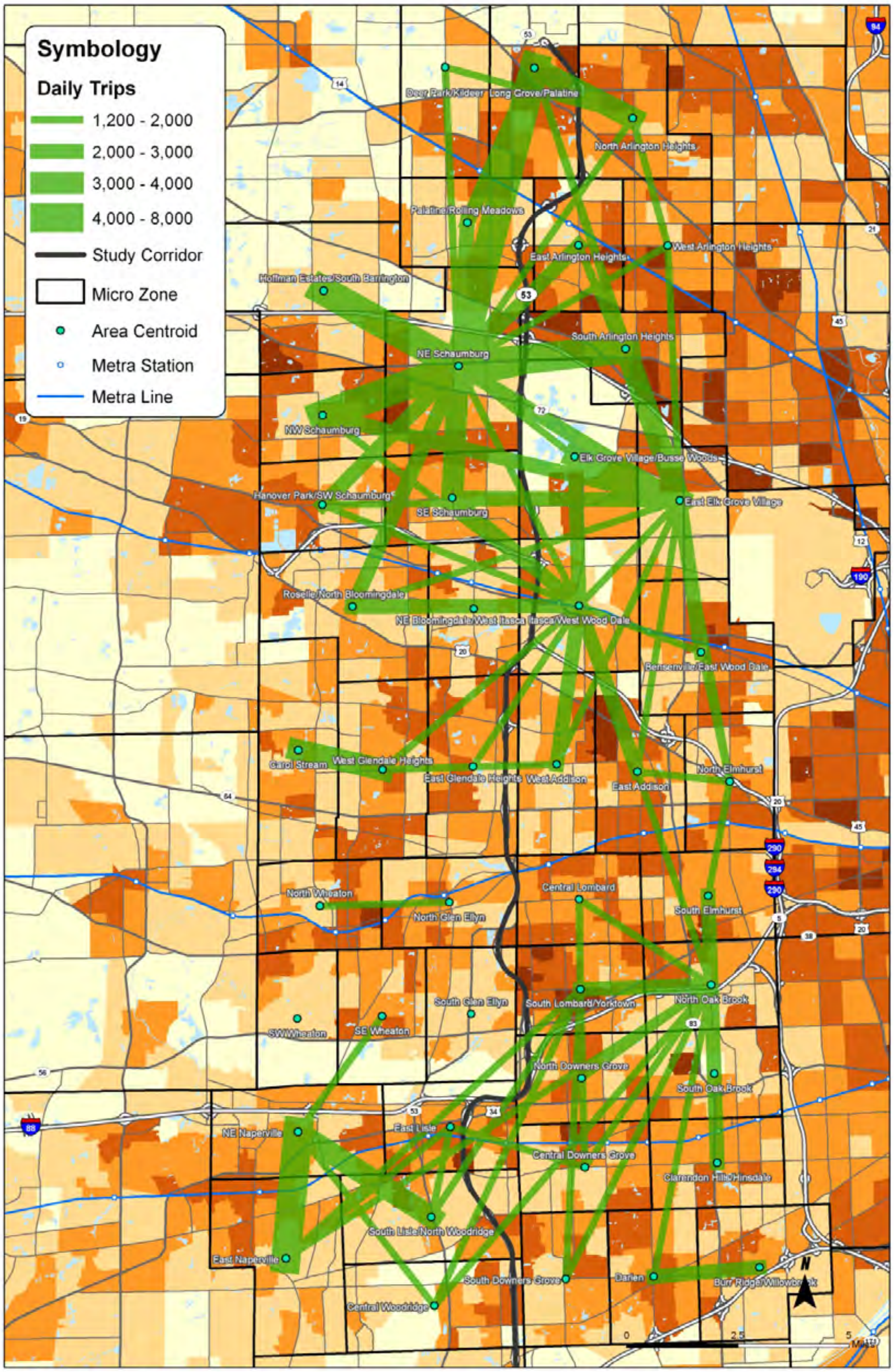


Figure 9: OD Travel Demand between Micro-Zones, Home-Based Work Trips



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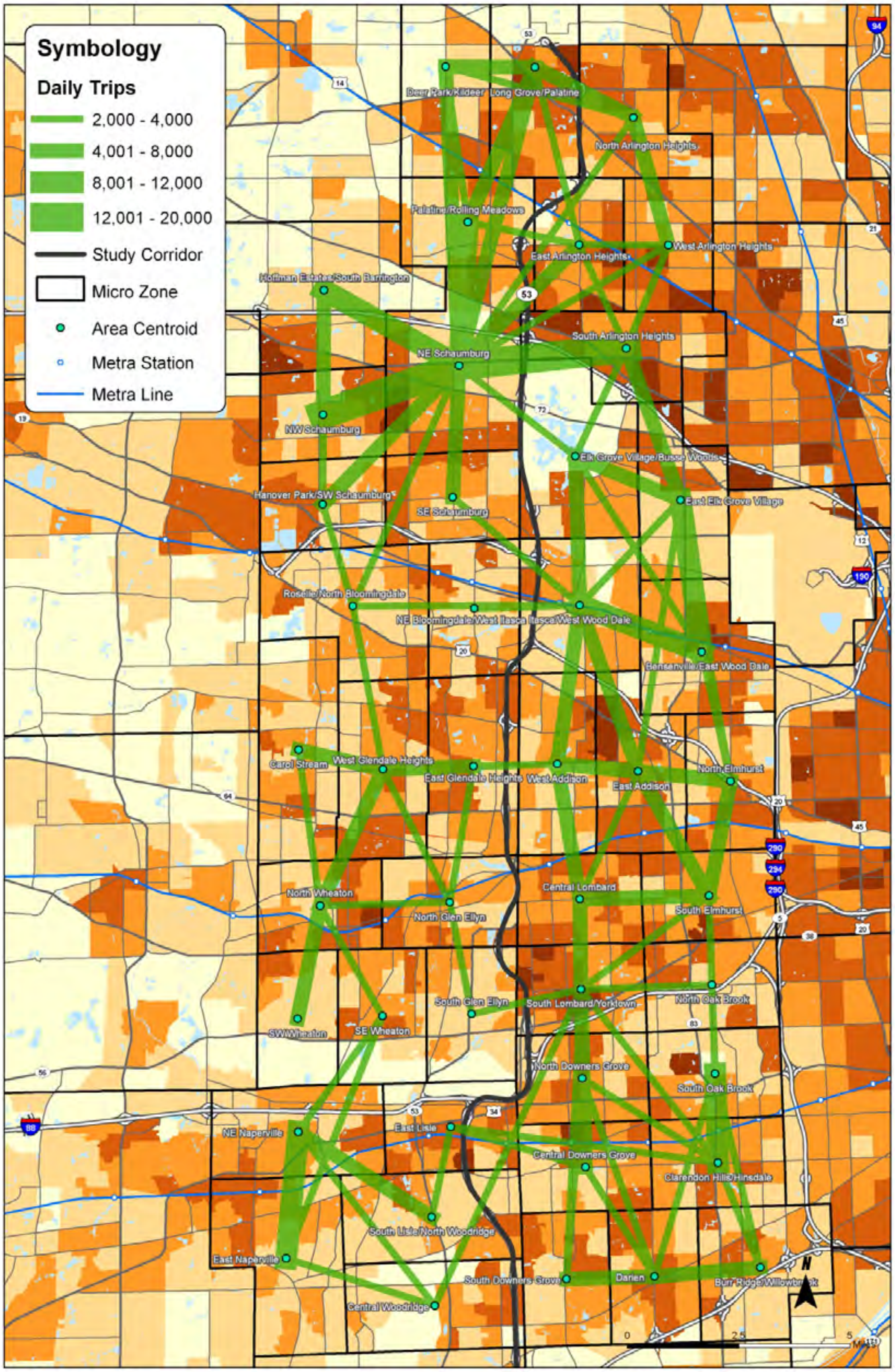
Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

Figure 10 OD Travel Demand between Micro-Zones, Home-Based Other Trips



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Zone-to-Zone Network Assignments

The purpose of the micro-zone analysis was to narrow down travel demand patterns in the corridor study area, and identify a network of potential north-south arterial corridors that can channel this demand. To this end, the most significant "work trips" and "other trips" connections, or OD pairs, were paired together to identify those connections that exhibit the greatest number of total person trips, including both work and other trips. The top 50 micro-zone connections were selected for the next step of analysis, which consisted of assigning zone-to-zone person trips onto the arterial corridor network to identify the actual street corridors that are facilitating travel in the study area.

Trips between micro-zones were assigned to the arterial street network based on the latest CMAP regional demand model, recently calibrated for the GO TO 2040 regional plan. All assignments were mapped to identify the street corridors facilitating the majority of trips between zones. As a reminder, these assignments were for significant north-south trips[5] in the corridor study area, and so they identify street segments in the network that are important for this subset of trips.

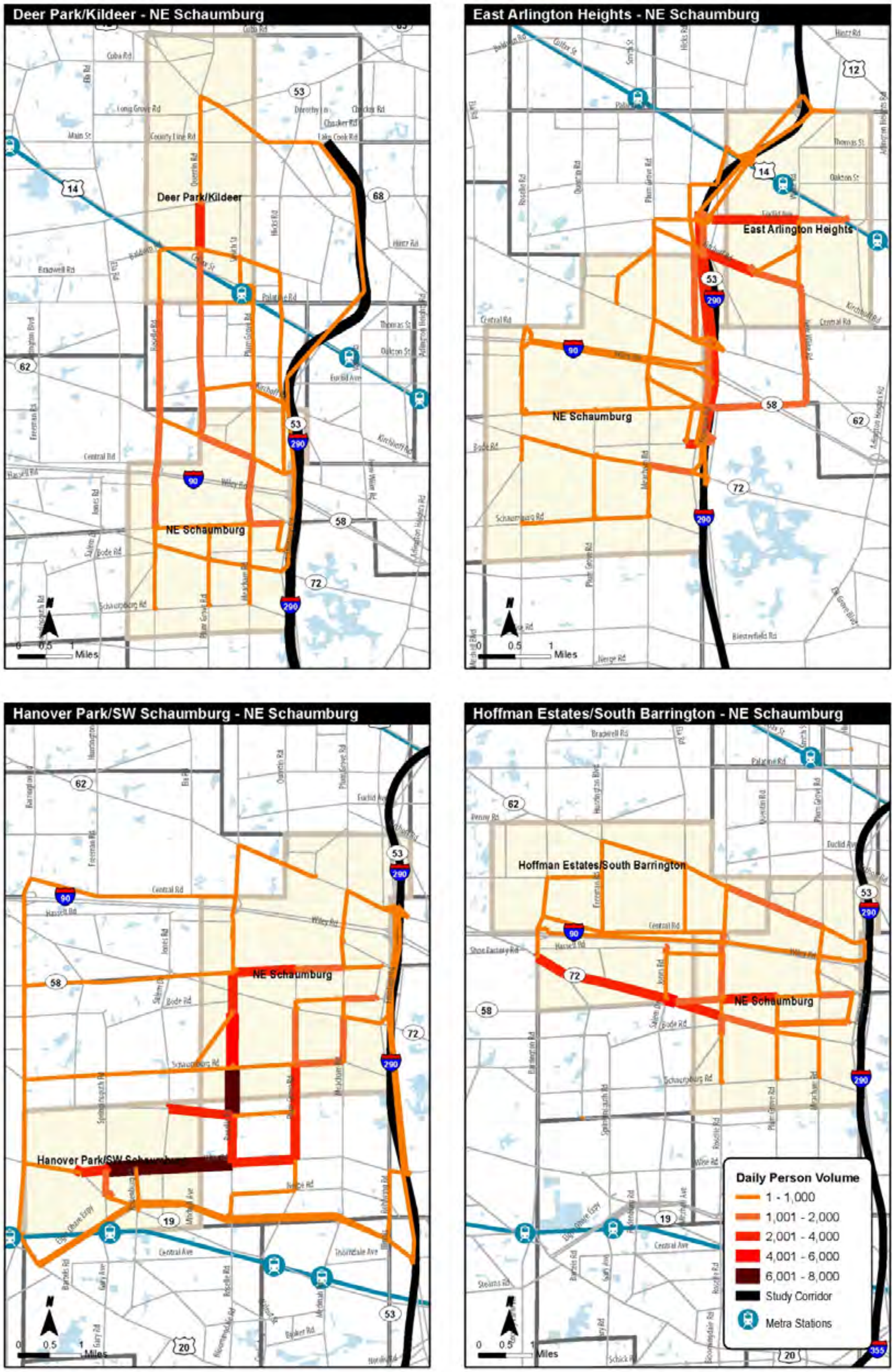
Figure 11 shows a sample Zone-to-Zone Network Assignment which includes zone-to-zone assignments between NE Schaumburg and four different micro-zones. A complete set of maps is included in Appendix of Tech Memo #3 at the end of this report. As a general observation, the most important finding in these maps is that the size and scale of both micro-zones and zone-to-zone assignments are working toward indentifying a limited number of street segments in the network that facilitate a significant number of trips between zones. For example, Figure 11 shows that between East Arlington Heights and NE Schaumburg, a segment of IL-53/I-290 is facilitating most person trips, while between Deer Park/Kildeer and NE Schaumburg only a small portion of person trips are facilitated by IL-53/I-290, and most trips are on Roselle Rd, Quentin Rd, and Meacham Rd.

Figure 12 illustrates the results of aggregating all zone-to-zone network assignments together. The map shows that a discrete number of corridors concentrate the majority of person trips in the study area. It is important to remember that person trips in these assignments are of relatively short distance, less than three (3) miles long on average, and so the map shows an aggregation of short-distance person trips. Still there are some corridors that are being used from one zone to the other. These are potentially good corridors for transit service as they facilitate significant numbers of person trips throughout the study area. A few corridors that stand out from this map include:

- Roselle Road
- Meacham Road
- Arlington Heights Road
- Schaumburg Road
- Wood Dale Road
- Bloomingdale Road
- Westmore-Meyers Road
- Highland Ave
- Plum Grove Road
- Hicks Road
- Golf Road
- Higgins Road
- Busse Road
- Addison Road
- Butterfield Road
- Meyers Road

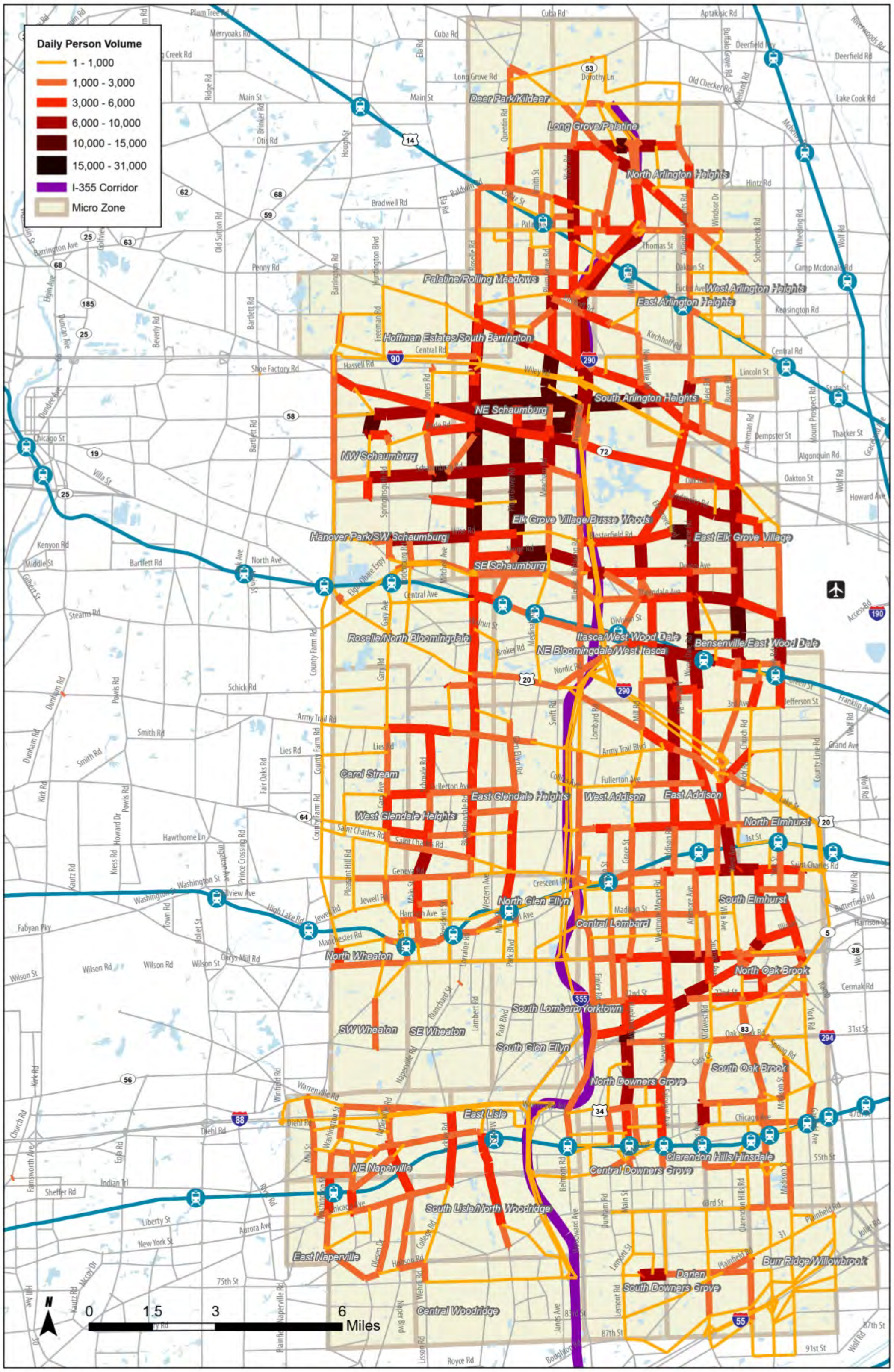
[5] Based on OD pairs between two micro-zones were at least a portion of the trip would travel in the north-south direction.

Figure 11: Zone-to-Zone Trips Network Assignment (Sample Map)



Source: Chicago Metropolitan Agency for Planning

Figure 12: Network Assignment Aggregation, Top 50 Zone-to-Zone Combinations



Nelson\Nygaard consulting associates

Source: CMAP, Pace, ESRI, State of Illinois

Corridor Segments

As indicated above, the next phase of analysis was to identify corridor segments for their transit potential evaluation. Corridors segments selected for evaluation were defined using the zone-to-zone trip assignments as guidance. This was accomplished in two steps:

1. Identifying the main corridor segments facilitating the most travel between any individual zone-to-zone combinations.
2. Identifying the main corridor segments facilitating the most travel across more than two micro-zones.

The point of this two-step selection was to identify corridor segments that function at two levels, the local level (i.e. zone-to-zone connections) and the subregional level (i.e. across several micro-zones). This was based on the concept that arterial corridors that have a continuous (zone over zone) origin-destination travel demand would be the most successful in attracting both local and sub-regional trips, and also they would generate sufficient ridership to sustain a base level of transit service (i.e. 14-hour service span, 30-minute headway, and bi-directional service).

Based on this assumption, corridor segments were combined to reflect a potential transit service route, providing a connection between an origin and a destination on each route end, for example between the Roselle Metra Rail station and Westfield Mall in Schaumburg. Combined corridor segments were selected to follow arterial street segments that showed significant person trip volumes. Corridor routings were allowed to run between 6 to 12 miles long, aiming for a minimum of three market connections (1 market connection is about 2 miles long and involves two zones).

A total of 46 corridors were selected for evaluation encompassing transit corridor options throughout all market analysis areas in the northern part of the study area (north of I-88). Figure 13 below illustrates the transit corridor alignments individually, and with respect to all other alignments selected for evaluation.

Transit Potential Evaluation by Segment

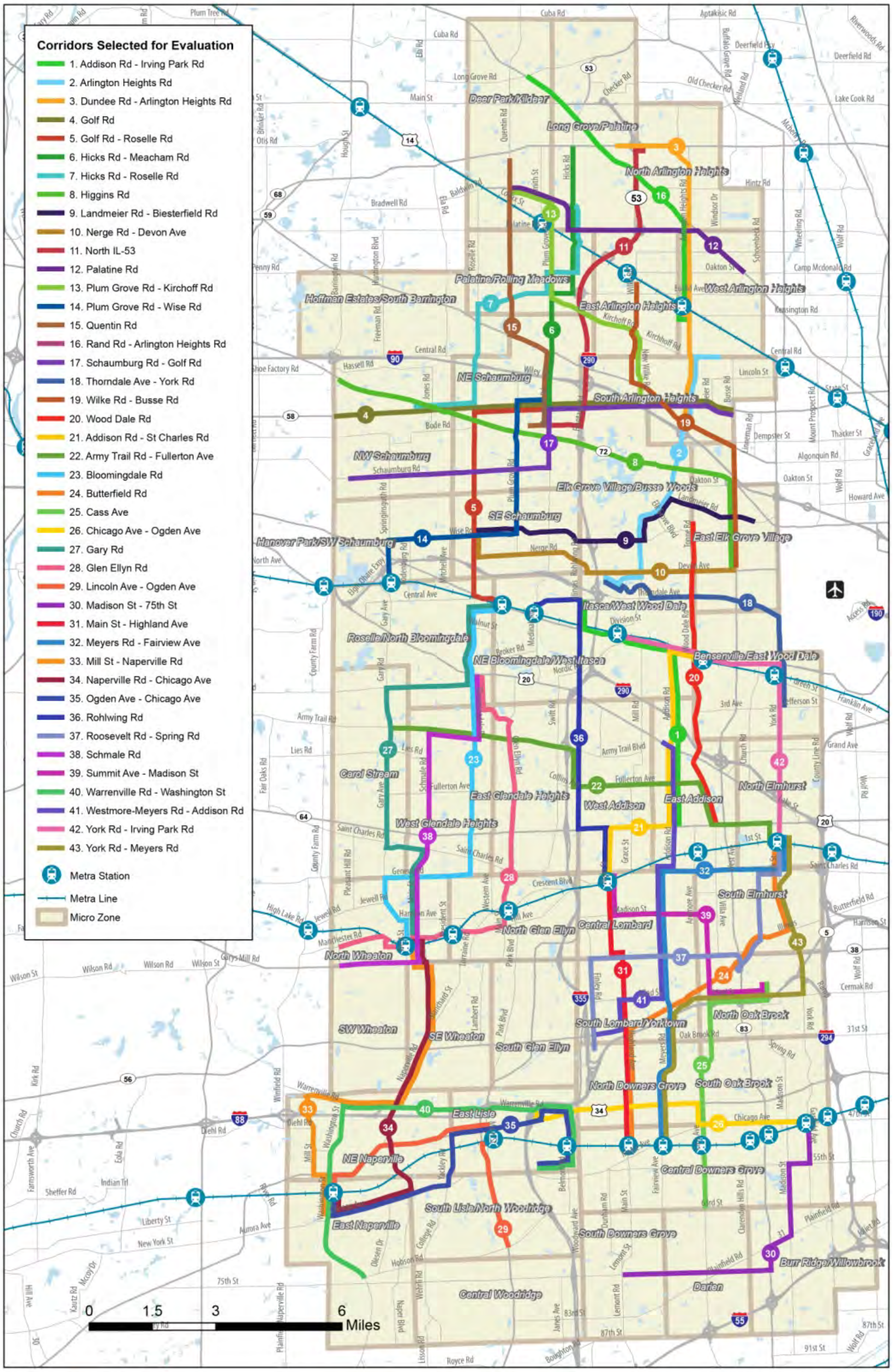
The methodology utilized to evaluate transit potential in each selected corridor includes three screening filters that include: the potential demand for transit, the population and employment market size, and the level of integration or duplication with the existing regional transit network.

Filter 1: Transit Demand Potential

The transit demand potential is measured through the average scoring of three factors that provide distinctive and complementary measures of transit demand potential, including a market potential index, a market accessibility index, and a daily trips volume index. These are described below in more detail:

1. **Market Potential Index.** This index reflects the average TOI scoring for all TAZs within a one-half mile of the corridor. The TOI is a combined score that takes into account population and employment density, income and auto ownership, and market segments with positive attitudes and attributes toward transit.

Figure 13: Corridor Alignments Selected for Evaluation



Nelson|Nygaard consulting associates

Source: CMAP, Pace, ESRI, State of Illinois

2. **Market Accessibility Index.** This index reflects the level of connectivity and accessibility in the street network along each corridor. Two variables are measured to account for this: (1) the number of street intersections or crossings (defined as complete street crossings that are connected to a network and not just a driveway or entrance to a residential or commercial development), and (2) the extent of the street network that is a one-half mile away from a street intersection, or in other words, the length (in miles) of the street network that is accessible to the corridor on a typical 10-minute walk. This was accomplished using a network analysis technique that evaluates the actual pathways available, rather than a buffer analysis that assumes connectivity to the central arterial exists.

   The benefit of this index is that it accounts for a measure of market accessibility that is based on the actual connectivity of local streets with arterial streets, thus a limited access highway or an urban arterial with limited pedestrian connections from residential or commercial developments will record a lower number of street miles and intersections per mile. In contrast, an urban arterial with many collector street intersections that distribute to a grid-like network of local streets (i.e. a traditional urban form) will record a higher number of street miles and intersections.

3. **Daily Trips Volume Index.** This index reflects the average daily person trip volumes along each corridor. This figure is calculated by multiplying daily person-trip assignments on each corridor street segment by the segment's length, to create a 'person-trips miles' measure, and then dividing the overall 'person-trips miles' by the total corridor length (in miles) to produce an average measure of person-trips volumes in the corridor. This statistic is similar to the calculation of an average bus load where passenger loads are multiplied by miles between stops to produce passenger miles and then divided by the route length to produce an average passenger load measure.

Filter 2: Population and Employment Market

Based on the Transit Potential Scoring (1st Filter), the top ranked corridors were selected for further evaluation. The threshold used to select the highest ranked corridors was the Transit Potential Score's average value. The rationale was that corridors with above average transit potential scores present the highest likelihood of attracting transit demand given that they present the best indicators of transit use propensity, network connectivity and accessibility, and daily person trip volumes. There were 26 corridors out of 46 whose scoring value was higher than average; see Table 1 below.

The size of the population and employment market that is accessible from each corridor (up to 0.5 miles away from the corridor) was measured and used as a 2nd screening filter, to account for the potential to attract transit demand on each corridor alignment. This was called the 'effective size of the market' and was defined as the number of residents and jobs that are within a 10-minute walk from the corridor and accessible through the street network that has connections with the corridor.

Corridors were again split into those whose 'effective market size' was above average (Tier 1 Group) or below average (Tier 2 Group). Figure 14 on page 36 illustrates the alignments of corridors included in the Tier 1 and Tier 2 groups. Notably most Tier 1 corridors are found in market analysis areas that combine major residential areas, of relatively high density, with major corporate, institutional, commercial and industrial employment centers such as Arlington Heights, Schaumburg, Itasca, Elk Grove Village, Carol Stream, Glendale, Addison, Elmhurst, Lombard, Downers Grove and Oak Brook. Tier 2 corridors are found in many of these market areas as well, but mostly in and around residential areas of lower density and smaller but diverse employment centers in Addison, Elmhurst, Elk Grove Village, Schaumburg, Palatine and Arlington Heights.

Filter 3: Transit Network Integration

A third level of screening was developed for all Tier 1 and Tier 2 corridors, as these were deemed to have sufficient demand potential for transit service, to evaluate for their duplication and/or integration with the existing regional transit service network. The concept was that candidate corridors for transit service implementation ideally would not duplicate existing transit services but augment service and increase connectivity and options in the regional transit network. The following criteria were utilized to assess corridor's attributes with respect to network duplication and integration:

Transit Network Duplication:

- Whether corridor alignments run on top of existing transit bus or rail services for at least 50 percent of the corridor's length.
- Whether complete corridor segments run on top of existing transit services for the full length of that segment.
- Whether corridor alignments are serving the same ODs as an existing bus route with same or different alignment.

Transit Network Integration:

- Whether corridor alignments are serving new network destinations at one or both ends of the proposed alignment.
- Whether corridor alignments are filling a network gap by operating service as an infill corridor or growing the network by operating a new outlying corridor.
- Whether corridors interact with existing services at a transit station or park-and-ride, thus augmenting travel opportunities.

Based on the criteria described above, two scoring sets were developed to account for the corridors network overlap or duplication and for their network integration and connectivity. Scores were established on a scale of 1 to 5, where a value of 1 represents a high level of overlap/duplication and poor network integration/connectivity, and a value of 5 represents a low level of overlap/duplication and rich network integration/connectivity. Screening results are presented in Table 2 below.

Tier 1 and Tier 2 Corridor Selection and Analysis

Table 2 shows the final list of corridors selected for further analysis ranked by their transit network/duplication score and the effective market size score. Although the list includes both Tier 1 and Tier 2 corridors, the intent is to continue feasibility analysis on the Tier 1 group, because these corridors have accessibility to larger population and employment markets. Corridors in the Tier 2 group provide access to smaller markets and constitute, in essence, an auxiliary group of corridors that can be evaluated for their feasibility in the future, if their effective market increases in size. Based on transit network connectivity objectives, strategic reasons, or changes in character they could be moved to the Tier 1 group in the future.

Table 1: Tier 1 and 2 Corridors' Adjusted Market Potential Scoring

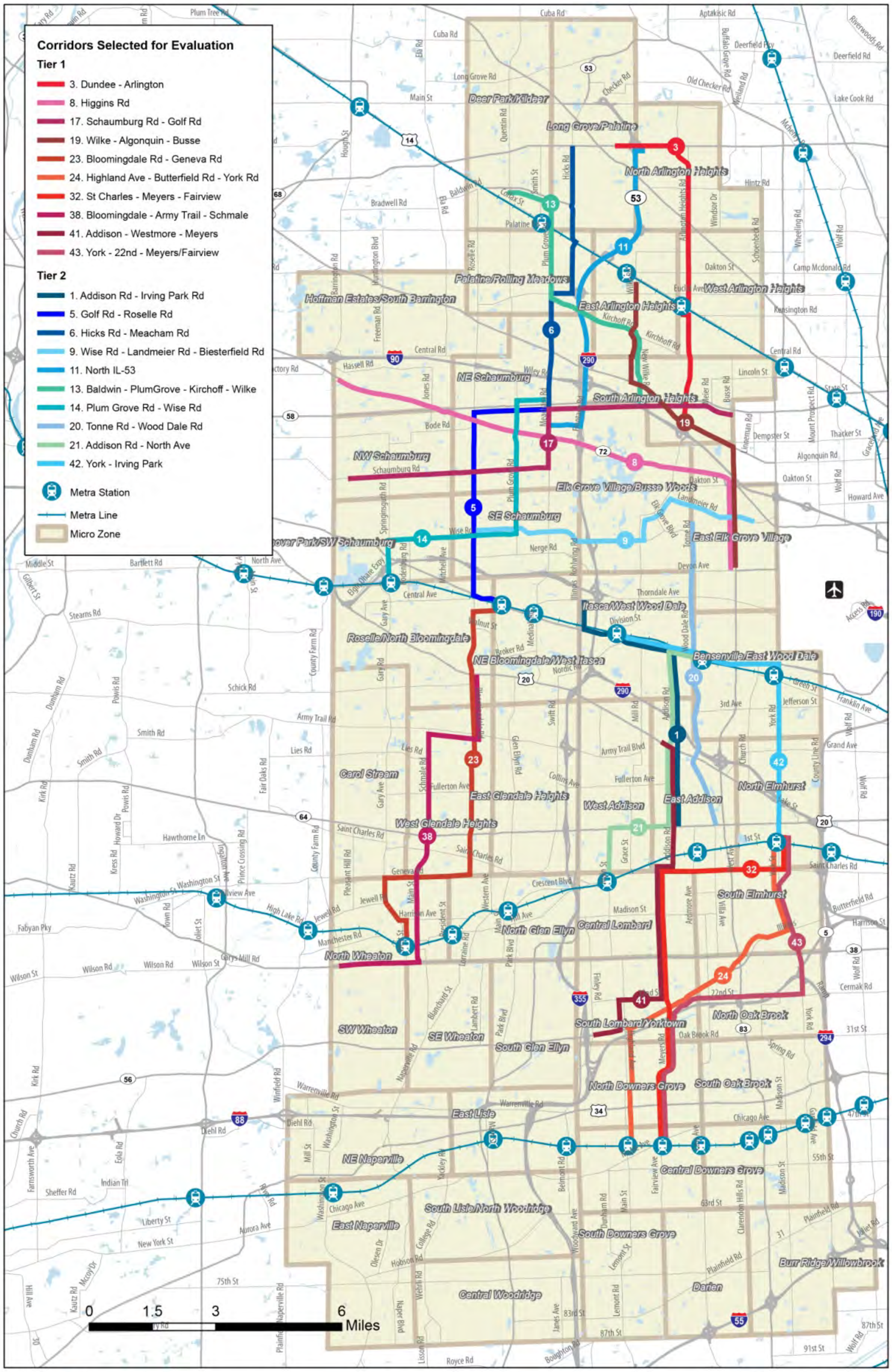
		1st Filter				2nd Filter	
		Overall Score	Variable 7 Effective Market Reach Index			Score 4 Market Reach	
ID	Selected Corridor	Average Percentile	Total Pop & Empl.	Percent Market Reach	Pop & Empl per Acre	Percentile	TIER
44	Bensenville-Downers_via_York-22nd	76.0%	102,228	88.7%	13.4	100.0%	1
45	WoodDale-Downers_via_Main	81.2%	80,051	96.4%	11.3	78.3%	1
46	WoodDale-Downers_via_Westmore	79.9%	77,931	96.6%	11.6	76.2%	1
8	Higgins	70.3%	71,585	79.8%	13.0	70.0%	1
17	SchaumburgGolf	79.9%	69,599	75.7%	13.3	68.1%	1
47	WoodDale-Fairview_via_Westmore	77.1%	67,163	103.5%	10.2	65.7%	1
43	YorkMeyers	68.9%	64,130	75.7%	12.1	62.7%	1
3	DundeeArlington	74.2%	63,873	79.3%	14.0	62.5%	1
19	WilkeBusse	69.0%	63,598	76.8%	15.1	62.2%	1
4	Golf	80.7%	63,589	72.6%	14.1	62.2%	1
37	RooseveltSpring	68.5%	62,410	73.6%	12.9	61.0%	1
24	Butterfield	78.1%	62,259	71.5%	13.1	60.9%	1
32	MeyersFairview	74.9%	58,968	81.7%	10.3	57.7%	1
41	WestmoreMeyersAddison	70.3%	58,941	76.5%	12.7	57.7%	1
38	Schmale	69.5%	56,493	81.1%	10.8	55.3%	2
23	Bloomingdale	68.7%	56,152	78.6%	9.9	54.9%	2
42	YorkIrvingPark	69.9%	50,910	79.0%	11.4	49.8%	2
6	HicksMeacham	76.5%	48,717	72.2%	13.3	47.7%	2
11	NorthIL53	72.5%	47,534	58.3%	17.0	46.5%	2
31	MainHighland	72.7%	44,537	77.8%	12.0	43.6%	2
5	GolfRoselle	87.8%	43,038	76.3%	11.4	42.1%	2
13	PlumGroveKirchhoff	69.2%	42,898	76.6%	11.3	42.0%	2
14	PlumGroveWise	78.6%	40,751	72.0%	10.5	39.9%	2
21	AddisonStCharles	73.4%	40,423	76.4%	10.5	39.5%	2
1	AddisonIrving	71.9%	35,700	78.0%	9.9	34.9%	2
20	WoodDale	69.0%	30,505	73.4%	8.6	29.8%	2

Table 2: Tier 1 and 2 Corridors' Adjusted Network Duplication and Integration Scoring

		2nd Filter	3rd Filter				
		Score 4					
		Market Reach				Transit Network Duplication/Integration Evaluation	
ID	Selected Corridor	Market Reach Score	Network Overlap	Network Integration	Network Score	Corridor Alignment Comments	TIER
47	Wood Dale to Fairview via Westmore Ave	65.7%	5	5	10	No service duplication. Serves to new corridors on Fairview and Addison. Serves to new destinations at Fairview and Wood Dale Metra.	1
3	Dundee - Arlington	62.5%	5	5	10	No service duplication. Serves new corridor on Dundee Rd and Arlington Heights RD. New destinations on Dundee Rd.	1
32	St Charles - Meyers - Fairview	57.7%	5	5	10	Duplicates Route 313 bet. Washington and 22nd. Service on new corridors (St. Charles and Fairview), and to new destinations (Fairview Metra)	1
8	Higgins Rd	70.0%	5	4	9	Duplicates Route 757 on Busse Rd. Serves on new corridor (Higgins). Service to existing destinations (Alexian Brothers Hospital and Elk Grove Village)	1
45	Wood Dale to D. Grove via Main St	78.3%	4	4	8	Duplicates Route 834 on Highland Ave. Service to new corridors on Main and Addison, and to a new destination at Wood Dale Metra.	1
41	Addison - Westmore - Meyers	57.7%	4	4	8	Duplicates Route 313 bet. Washington and 22nd. Service on new corridors (Addison and Westmore), but existing destinations (York Town Center)	1
46	Wood Dale to D. Grove via Westmore Ave	76.2%	3	3	6	Duplicates Route 834 on Highland and Route 313 on Meyers. Service to new corridor on Addison and to new destination at Wood Dale Metra.	1
17	Schaumburg Rd - Golf Rd	68.1%	3	3	6	Duplicates Route 208 bet. Meacham and Busse. Service on new corridor (Schaumburg). Serves existing destinations (Prairie Towne SC & NWTC)	1
43	York - 22nd - Meyers/Fairview	62.7%	2	4	6	Duplicates Route 332 bet. Elmhurst Metra and Oakbrook Center. New corridor service on 22nd and Meyers/Fairview. New destination at Fairview Metra.	1
24	Highland Ave - Butterfield Rd - York Rd	60.9%	3	3	6	Duplicates Route 834 on Highland Ave and Route 332 on York Rd. Serves on new corridor (Butterfield) but existing destinations (Elmhurst Metra)	1
19	Wilke - Algonquin - Busse	62.2%	2	3	5	Duplicates Route 757 on Busse Rd. Service on existing corridors and to existing destinations. Direct connection bet. Arlington Park and Elk Grove Village	1
44	Bensenville to D. Grove via York Rd - 22nd St	100.0%	1	3	4	Duplicates Route 834 on Main/Highland and Route 332 on York Rd. Serves existing corridors and destinations, but with a one-seat ride avoiding transfers	1
37	Finley - Roosevelt - Spring	61.0%	2	2	4	Duplicates Route 747 bet. Finley and Summit. New corridor service on Spring Rd. No new destinations. Direct connection bet. Elmhurst and Roosevelt.	1
4	Golf Rd	62.2%	1	1	2	Duplicates Route 554 bet. Barington and Meacham. Duplicates Route 208 between Meacham and Busse.	1
23	Bloomingdale Rd - Geneva Rd	54.9%	5	5	10	No service duplication. Service on new corridors (Bloomingdale and Geneva), and to new destination (Roselle Metra)	2
6	Hicks Rd - Meacham Rd	47.7%	5	5	10	Duplicates Route 696 bet. Algonquin and Higgins. Service on new corridor (Hicks and Plum Grove) and new destination (Dundee Rd)	2
21	Addison Rd - North Ave	39.5%	5	5	10	No service duplication. Serves on new corridor (Addison). Serves new destination (Wood Dale Metra)	2
11	North IL-53	46.5%	5	4	9	No service duplication. Although it serves on same segment as Route 556 (IL-53). Service to new destination (Dundee Rd / Plaza Verde SC)	2
5	Golf Rd - Roselle Rd	42.1%	4	5	9	Duplicates Route 554 bet. Roselle and Meacham. Service on new corridor and new destination (Roselle Rd and Roselle Metra)	2
13	Baldwin - Plum Grove - Kirchhoff - Wilke	42.0%	5	4	9	No service duplication. Service to new corridors (Baldwin, Plum Grove, Kirchoff, New Wilke), and to new destinations (Palatine Metra)	2
1	Addison Rd - Irving Park Rd	34.9%	5	4	9	Duplicates Metra Rail on Irving Park. Service on new corridor (Addison) and new destinations (Medinah Industrial Park and North Park Mall)	2
14	Plum Grove Rd - Wise Rd	39.9%	4	4	8	Duplicates Route 602 bet. Springinsguth and Roselle. Service on new corridor (Plum Grove). Serves existing destinations (Schaumburg Metra & NWTC)	2
20	Tonne Rd - Wood Dale Rd	29.8%	5	3	8	No service duplication. Service on new corridor (Tonne, Wood Dale and Villa), and new destinations (Elk Grove Village and Wood Dale Metra)	2
38	Bloomingdale - Army Trail - Schmale	55.3%	3	4	7	Duplicates Route 711 bet. Fullerton and Wheaton Metra. New corridor service on Bloomingdale, and to new destination at Roselle Metra.	2
42	York - Irving Park	49.8%	3	3	6	Duplicates Route 332 bet. Elmhurst and Bensenville Metra. Service on new corridor (Irving Park Rd) and to new destinations (Wood Dale and Itasca Metra	2
31	Main - Highland	43.6%	2	2	4	Duplicates Route 834 on Highland Ave. Serves new corridor on Main St., but existing destinations. Direct connection between Lombard and D. Grove Me	2

Corridor not selected for further analysis.

Figure 14: Tier 1 and Tier 2 Corridor Alignments



Source: CMAP, Pace, ESRI, State of Illinois

Physical Evaluation of Selected Corridors

Corridor Physical Assessment

The next step in the screening for corridors was to develop a preliminary assessment of physical and operational characteristics that would ensure corridor success. This analysis was developed for Tier 1 corridors and evaluated:

- The pedestrian environment along the corridor, including sidewalk barriers and continuity, and availability of pedestrian crossings, particularly in areas of high potential demand, such as a large office park or retail area.
- The operational environment along the corridor, including speed limit, number of travel lanes, street buffers such as parking or landscaping, and potential location of bus stops and the interface between the roadway and the sidewalk.

Summary of Findings

The findings of the physical condition analysis show that the study area is, in a nutshell, a very challenging, even hostile, pedestrian environment and a very suboptimal, even dysfunctional, environment for the successful operation of transit services. Although real travel market demands exist in the corridor that could be served with transit along many arterials and even portions of the I-355 corridor itself, the low density of development, segregation of land uses, and general lack of sidewalk accessibility, pose extremely difficult barriers to overcome for anyone wishing not to drive an automobile in this part of the metropolitan area. For example:

- Although most Tier 1 corridors show a high percentage of sidewalks availability and continuity (over 80% of length with sidewalks on both sides of the street), most of this pedestrian infrastructure is underutilized by not connecting to actual destinations or land uses with a clear and direct path to the main building or front door. This is true for the overwhelming majority of retail, commercial and industrial uses, but also for many single-family and multi-family uses and other uses. In other words, the sidewalks are great, but they do not take a pedestrian anywhere, except along the side of the arterial.
- Industrial uses and corporate/retail land uses are generally clustered in specific districts scattered throughout the study area (Schaumburg, Elk Grove, Glenn Ellyn, etc). Employment density at these clusters is relatively high (between 30-35 jobs per acre), however pedestrian accessibility is very poor by being organized in mega-block settings with buildings surrounded by parking, that do not face the main corridor, have very few street connections, no sidewalk connections with building entrances and any potential interconnectivity blocked by fences. Transit users in these areas, despite being very close to their final destination, are often faced with long walks around big blocks or walks through landscaping and parking in the best cases.
- Retail developments which typically attract midday trips are mostly the suburban type with frontages behind a continuous string of parking lots that flank a major arterial corridor. Opportunities for pedestrian accessibility and transit users are limited to major automobile entrances only, those that are signalized and provide traffic flow control. Corridor settings like this typically lack a series of urban intersections along the length of the retail corridor that aids the safe navigation of a pedestrian.

- Even corridors showing the best conditions for transit operation have population and employment densities that support a basic level of service only (e.g. every 30 minutes). The best residential areas (those in a grid-like setting with direct access to the main corridor and good sidewalk accessibility) show densities of about 10 people per acre or 3.5 dwelling units per acre. This is a very low density number that, according to industry research, supports only a limited level of transit service.
- Most arterial corridors selected for analysis are 4 lanes wide with 2 lanes operating in each direction or have a 2-lane, middle turn-lane, 2-lane configuration. Intersections with any kind of traffic control such as a stop sign or traffic light are generally 0.5 miles apart, or farther. Many traffic controlled intersections in arterial corridors lack a full set of pedestrian signals or crosswalks on all four sides of the intersection. This type of street design and traffic control favors driving and driving at high speeds, despite the speed limits of 35 to 40 miles per hour traffic speeds approaching 50 miles per hour are prevalent in most corridors. Again, the lack of opportunities for pedestrians to cross streets and high speed operation of traffic make for a generally insecure, even unsafe, environment for pedestrians and transit users.

The Transit and Urban Form Relationship

As disclosed throughout the analysis of this study, origin-destination travel demand and urban form patterns interact, each shaping the other's ability to function effectively. Academic research in the field of public transportation shows that there is a strong correlation between urban form, land use density, and transit demand. This relationship is not linear and it is influenced by a number of tangible and intangible variables. One of the most important variables that have been used across the country considers the density of development or population and employment density around transportation corridors, or bus routes, as a predictor of demand and success.

Clearly, density alone does not determine a transit route's service level. The level of service depends on several market factors that include density, size, regional location, community design and pedestrian access.

- **Density**: described by the combination of population and employment per acre.
- **Size.** Development size needs to be considered together with density to determine the overall market that has been organized in a transit-oriented way. An isolated, 50-unit apartment building surrounded by surface parking and/or open space could have a very high density rating, but this alone would not mean it deserves the same level of service as a downtown area, because that single apartment complex is a much smaller market. A particular level of service will require a *minimum density over a minimum area*.
- **Regional location.** Regional location determines whether a proposed transit route will have strong anchors to sustain ridership at the ends of the route. Regional location is addressed by ensuring that future transit corridors have major activity centers at their endpoints.
- **Community design.** A mix of development types reduces the need for longer-distance trips. When shopping, schools and community centers are located close to peoples' homes, cars become less necessary than when massive subdivisions are built in isolation from other local attractions.
- **Pedestrian access.** Universal access is another crucial, but often unnoticed, element of transit demand. Even at high densities, people will not use transit if it is uncomfortable, difficult, or dangerous to access a bus stop. Many of today's auto-oriented suburban developments, while very dense, have extremely poor access to major arterials or viable

transit streets. Throughout the study area there are abundant examples of communities that have configured density so that it is impossible to serve with transit.

Other Factors affecting Transit

A host of other factors influence transit demand and impact the potential of transit as an alternative mode of travel, these other considerations include:

- **Sidewalk continuity and connectivity**. This includes continuous sidewalks, absence of barriers, and direct connections with bus stops, safe crosswalks, low vehicular speeds, pedestrian refuges when crossing multi-lane streets, and pleasant, convenient and direct pathways from bus stops to final destinations. Avoiding the trek through parking lots or landscaping provides a safer and more pleasant experience for transit patrons.
- **Presence of a Street Grid**. Side streets allow people to access transit services operating along a corridor. Without them people may not be able to reach bus stops, even when they are nearby.
- **Traffic controls.** Traffic controls regulate traffic speed along a bus corridor through the use of traffic signals and crosswalks, the width of the street and traffic calming elements such as lane width, medians, parking buffers, or any elements that narrow down the road to influence the cruise speed of cars, without necessarily forcing a slow down such as a chicane or a roundabout .
- **Transit Priority Facilities**. This includes HOV lanes on freeways and dedicated ramps, queue jumps and transit signal priority along arterial corridors and at major intersections, as well as Bus Only lanes.
- **Bicycle Facilities**. Like park-and-ride lots, bike facilities allow potential customers to reach bus facilities that would otherwise be unavailable. Bicycles can be an important option in bridging the “last mile” between transit service and the final destination.
- **Fees for Parking**. Nothing encourages transit use more than charging a fee for auto parking. This is mostly applicable to downtown or commercial district areas such as Wheaton, Downers Grove, Elmhurst, etc.

Street Design and Network Connectivity

Street design and network connectivity are also important components of transit access and operational viability. Neighborhoods where all roads are designed to connect to arterials or collector streets allow transit customers to reach bus stops without walking out of direction and provide more efficient routing options that can support high frequency service.

The Complete Streets model has become a common approach to balancing the need for transit, bicycle, and pedestrian movement, thus moving the use of our urban and suburban streets away from auto-domination. Complete Streets are important for transit because the pedestrian network serves as the 'connective tissue' of the transit systems. Most transit trips begin and end as a pedestrian trip, and poorly planned access to bus stops is a real barrier for disabled travelers as well as a psychological barrier for all travelers.

A “Complete Street” is a design that encourages quality pedestrian environment that goes well beyond basic access and safety requirements. Land use patterns that encourage walking and are supported by transit allow people more choices. People who want to park their car and cycle to work may be more likely to do so if they know they also have convenient transit access as an alternative when the weather is poor or they have a large load to carry.

Physical Characteristics Screening

Based on these principles the characteristics of the physical environment on each of the Tier 1 corridors were analyzed. Eight major evaluation criteria were utilized in the analysis that account for physical characteristics of the roadway, physical characteristics of sidewalks, and urban form characteristics of market areas with immediate access to corridors. The evaluation was conducted on-line following the alignment of the Tier 1 corridors in Google Earth. The eight criteria used for evaluation are summarized below.

Roadway design characteristics

1. Number of Travel Lanes
2. Number of Signalized Intersections
3. Number of Intersections with Complete Crosswalks

Sidewalk design characteristics

4. Street and Sidewalk Buffering
5. Sidewalk Availability and Extent
6. Pedestrian Access to Destinations

Urban form characteristics

7. Urban Form Typologies
8. Land Use Patterns

Table 3 on the nextt page present the results of the evaluation and final scoring of corridors.

Table 3: Physical Evaluation of Tier 1 Corridors – Scoring and Ranking

ID	Selected Corridor	Travel Lanes	Signalized Intersections	Crosswalk Completion	Sidewalk Buffer	Sidewalk Availability	Pedestrian Access	Urban Form Typologies	Land Use Mix	Overall Score	Implementation Category
45	Wood Dale to D. Grove via Main St	4	3	4	5	4	5	4	4	33	Ready for operational evaluation on the field
3	Dundee - Arlington	4	3	5	4	5	4	4	3	32	Ready for operational evaluation on the field
32	St Charles - Meyers - Fairview	5	3	4	4	3	3	4	4	30	Ready for operational evaluation on the field
41	Addison - Westmore - Meyers	4	4	4	5	4	3	3	3	30	Ready for operational evaluation on the field
23	Bloomingdale Rd - Geneva Rd	5	2	3	4	5	2	4	3	28	Needs work strenghtening development and operational conditions
47	Wood Dale to Fairview via Westmore Ave	4	3	3	4	3	4	3	3	27	Needs work strenghtening development and operational conditions
24	Highland Ave - Butterfield Rd - York Rd	3	4	4	4	1	3	3	4	26	Needs work strenghtening development and operational conditions
6	Hicks Rd - Meacham Rd	3	5	4	2	3	2	3	2	24	Needs work strenghtening development and operational conditions
17	Schaumburg Rd - Golf Rd	2	3	3	3	4	2	3	3	23	Not ready for implementation
43	York - 22nd - Meyers/Fairview	3	4	3	3	1	3	3	3	23	Not ready for implementation
19	Wilke - Algonquin - Busse	3	3	2	3	4	2	2	3	22	Not ready for implementation
8	Higgins Rd	1	1	1	1	3	1	2	2	12	Not ready for implementation

Corridors were categorized in three groups or classes based on their observed roadway, sidewalk and urban form conditions. These three groups include:

- **Transit Potential.** These are corridors that are recommended for potential consideration for implementation of all-day arterial service, because they present appropriate or minimum physical conditions that would make operation of transit service viable. Market conditions and physical conditions are relatively strong in these corridors (e.g. clear anchors, market origins and destinations within the corridor, mix of land uses and all-day travel markets, and relatively high population and employment density). This group includes:
  - Wood Dale Metra to Downers Grove Main Metra (via Main/Highland)
  - Dundee Road to Arlington Heights Road
  - Elmhurst Metra to Downers Grove Fairview Metra (via St Charles/Westmore)
  - Wood Dale Metra to Downers Grove Fairview Metra (via Westmore/Meyers)

- **Need Further Evaluation.** These are corridors that present some conditions for transit service viability (high travel demand), but also have some operational and accessibility barriers (low pedestrian accessibility) that would make transit service less successful. These corridors qualify for further analysis and development of supporting partnerships (or capital investment) from local jurisdictions to improve physical environment and accessibility conditions to ensure success. This group includes:
  - Roselle Metra to Wheaton Metra (via Bloomingdale/Geneva)
  - Addison to Lombard Yorktown Center (via Addison/Westmore-Meyers)
  - Elmhurst Metra to Downers Grove Main Metra (via York/Butterfield/Highland)
  - Dundee Road to Schaumburg (via Hicks/Meacham)

- **Not Ready Yet.** These are corridors that although have high travel demand are not recommended for implementation yet. This group includes corridors that are lacking in the basics to support access to transit markets and pedestrians (no connections to land use destinations), and/or present challenges for the placement of bus stops (wide landscaping buffers and no sidewalks) and operation of transit vehicles (shoulder lanes with no parking). This group includes:
  - Schaumburg Road to Golf Road
  - Elmhurst Metra to Downers Grove Fairview Metra (via York/22nd Street)
  - Arlington Park Metra to Elk Grove Village (via Wilke/Algonquin/Busse)
  - Hoffman Estates to Elk Grove Village (via Higgins Road)

The results of the physical evaluation show that there is a very close relationship between the level of density, mix of land uses and design of the street network (or accessibility) and the potential to operate successful transit service on any of these corridors. Density, land use, and accessibility design determine the pedestrian environment and operational environment along the corridors and the provision of a built environment that is friendly or unfriendly to other modes of travel.

Ridership Modeling

A statistical single-regression model was developed using existing ridership data on selected Pace bus routes. Routes and data were selected to represent an arterial-based fixed-route service in conditions similar to those in Tier 1 and Tier 2 corridors. A different method was developed to predict ridership on highway-based express services. This methodology used a GIS-based approached that analyzed U.S. Census Bureau Longitudinal Employer-Household Dynamics (LEHD) information and utilized the "On The Map" tool.

The intent was to develop a model predicting route level ridership based on characteristics of the urban areas surrounding the corridor. Many factors affect a bus route's ridership, including socioeconomic factors, physical environment characteristics, and connections to other transit lines. An ordinary least squares regression was used to model ridership on existing Pace routes using a number of explanatory variables that were readily available. These variables included:

- Population density per acre
- Employment density per acre
- Median income per acre
- Autos per acre
- Number of residents who moved to the United States in the past 5 years per acre
- Hispanic population per acre
- Average traffic volume in the corridor (from CMAP model)
- Serves a CTA station (this was used as a yes, no condition or 'dummy' variable)
- Serves a Metra station (this was used as a yes, no condition or 'dummy' variable)

One major variable affecting transit demand is the supply of transit service, which can be measured in number of trips or service hours. However, the level of service is also affected by the demand for transit – Pace provides high levels of service where there is high demand for transit and low levels of service where there is low demand. The simultaneity of the two variables can lead to biased and inconsistent estimates of the coefficients in ordinary least squares models,[6] so the analysis elected to exclude the level of service as an explanatory variable in the model. If a route is proposed with a much higher level of service than current Pace routes, the ridership estimate could be adjusted upwards using an elasticity value.

Twenty-six (26) Pace routes were selected that provide arterial-based fixed route service throughout the day to match the type of service that could be provided on the Tier 1 and 2 corridors. The socioeconomic variables came from the year 2000 U.S. Census at the Census Transportation Planning Package (CTPP) Traffic Analysis Zone (TAZ) scale. A one-half of a mile buffer around each corridor was used to calculate values for the socioeconomic variables using ArcGIS.

After estimating a number of different models using different combinations of the variables above, it was determined that a model with ridership per mile as the explained variable and population density, employment density, and traffic volume as the explanatory variables had the best model fit. Table 4 below presents the results of the final regression model.

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[6] Brian D. Taylor, Douglas Miller, Hiroyuki Iseki, and Camille Fink, "Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas," Transportation Research Part A 43 (2009): 60-77.

Table 4: Ridership Model Variables and Coefficients

Variables	Parameter	P-value
Population per acre	4.7856	0.0002
Employment per acre	2.3892	0.0868
Traffic volume	0.0019	0.0078
Intercept	-30.8483	0.0134
Observations	26	
Adjusted R-squared	**0.5867**	

Population per acre and traffic volume were statistically significant at a 99% confidence interval while employment per acre was significant at the 90% confidence level. The adjusted R-squared for the model was 0.5867, which means that the model explains 59% of the variation in ridership on the 26 Pace routes.

Tier 1 and Tier 2 Ridership Estimates

Table 5 below presents the ridership estimates from the single-regression model for the corridors in Tiers 1 and 2. It includes point predictions as well as 85% prediction intervals. The point prediction for the Wood Dale – Downers Grove via Main corridor is 476 and the prediction interval is 153 to 798. This means that one would expect a route operated along this corridor at service levels comparable to other Pace routes in the area (roughly every 30-minute frequency on a 14-hour service-span) to have average daily boardings between 153 and 798.

The highest ridership prediction is registered by Higgins Road (529 boardings). This is consistent with the regression model by accounting for the high population and employment density as well as high traffic volumes that are present in the corridor. However, it also shows the weakness of the model by predicting high ridership in a physical environment with significant barriers for pedestrian accessibility to reach their final destinations and even for crossing the street to ride transit. In addition, Higgins Road's 85% prediction interval (247 to 810) is one of the largest intervals in absolute value, providing a general indicator that other factors can have a great influence, and add significant variability, to ridership estimates.

Highway-based Express Service

Estimating ridership for express routes is different than for arterial-based fixed-routes because of the type of service provided. A fixed-route bus picks up and drops off riders periodically along the route, so ridership can be predicted from the characteristics of the area surrounding the route. Express route buses typically pick up riders in one area, travel a long distance, and then drop them off in another area. These routes tend to serve commuters, picking up riders in the morning from residential areas and dropping them off in employment areas, and doing the reverse in the evening. Given these factors, a separate method was developed to predict ridership for highway-based corridors that is GIS-based and utilizes the U.S. Census Bureau Longitudinal Employer-Household Dynamics (LEHD) "On The Map" tool.

Table 5: Tier 1 & 2 Corridors Ridership Estimates

ID	Corridor Alignment	Tier	Point Prediction	85% Prediction Interval Lower Bound	85% Prediction Interval Upper Bound
8	Higgins Rd	1	529	247	810
17	Schaumburg Rd - Golf Rd	1	487	236	738
45	Wood Dale to D. Grove via Main St	1	476	153	798
3	Dundee - Arlington	1	475	280	671
47	Wood Dale to Fairview via Westmore Ave	1	391	99	682
19	Wilke - Algonquin - Busse	1	389	196	583
24	Highland Ave - Butterfield Rd - York Rd	1	387	156	618
41	Addison - Westmore - Meyers	1	380	163	597
43	York - 22nd - Meyers/Fairview	1	358	113	603
32	St Charles - Meyers - Fairview	1	341	106	576
38	Bloomingdale - Army Trail - Schmale	2	363	131	596
23	Bloomingdale Rd - Geneva Rd	2	354	114	594
42	York - Irving Park	2	328	142	514
5	Golf Rd - Roselle Rd	2	324	117	532
21	Addison Rd - North Ave	2	275	105	445
6	Hicks Rd - Meacham Rd	2	262	86	439
14	Plum Grove Rd - Wise Rd	2	238	68	408
1	Addison - Irving Park Rd	2	231	49	413
13	Baldwin - Plum Grove - Kirchhoff - Wilke	2	188	19	357
20	Tonne Rd - Wood Dale Rd	2	91	-77	258

Physical Characteristics Adjustment

The physical characteristics of a street can greatly impact the ease of use for transit. Arterial streets in the I-355 Corridor study area have been designed with only the automobile in mind. With almost no exception, they pose major barriers for pedestrians and potential transit riders to use because of deficient accessibility and connectivity characteristics. These can include a lack of sidewalks along the street, lack of marked crosswalks, long distances between signalized intersections, large roadway widths, and lack of pedestrian only connections from street to building front doors.

To improve ridership projections and account for corridor physical characteristics and pedestrian accessibility conditions, the study developed adjustment factors based on the same evaluation scores used before for ranking Tier 1 corridors. For each score that a corridor was given, its ridership was adjusted up or down. Ridership was adjusted downward by 10% for a score of 1 but upward by 10% for a score of 5. Scores of 2, 3, and 4 led to adjustments of -5%, 0, and +5%, respectively. These adjustment factors are summarized in Table 6 below.

Table 6: Physical Characteristic Adjustment Factors

Evaluation Score	Adjustment Factor
1	-10%
2	-5%
3	0%
4	+5%
5	+10%

Table 7: Scoring by Physical Characteristics and Overall Adjustment Factor

		Evaluation Rating						Adjustment Factor						
ID	Corridor	Travel Lanes	Signalized Intersections	Crosswalk Completion	Sidewalk Buffer	Sidewalk Availability	Pedestrian Access	Travel Lanes	Signalized Intersections	Crosswalk Completion	Sidewalk Buffer	Sidewalk Availability	Pedestrian Access	Overall Ridership Adjustment Factor
45	Wood Dale Metra - Downers Grove	4	3	4	5	4	5	5%	0%	5%	10%	5%	10%	35%
32	Elmhurst Metra - Downers Grove / Fairview	5	3	4	4	3	3	10%	0%	5%	5%	0%	0%	20%
8	Hoffman Estates - Elk Grove Village	2	1	2	2	3	2	-5%	-10%	-5%	-5%	0%	-5%	-30%
3	Dundee Road - Arlington Heights	4	3	5	4	5	4	5%	0%	10%	5%	10%	5%	35%
23	Roselle Metra - Wheaton Metra	5	2	3	4	5	2	10%	-5%	0%	5%	10%	-5%	15%
8	Wheeling Metra - Schaumburg NWTC	3	3	4	3	4	3	0%	0%	5%	0%	5%	0%	10%

The evaluation scores for six characteristics were used to calculate an overall ridership adjustment factor (see Table 7 above):

1. Number of travel lanes (or roadway section that needs to be crossed)
2. Signalized intersections (or distance between traffic controlled intersections)
3. Crosswalk completion (or availability of clear crossing markings)
4. Parking/landscape buffer (or sidewalk positioning with respect to the street)
5. Sidewalk availability/extent (or continuity/gaps on both sides of corridor)
6. Pedestrian access to destinations from sidewalks (or availability of safe pedestrian paths/connections with buildings).

The individual score adjustment factors were summed to calculate an overall ridership adjustment factor. The scores and adjustment factors for each corridor are summarized in Table 7, and the ridership projections after the adjustments are presented in the “Physical Adjustment” column of Table 8 on the next page.

Service Frequency Adjustment

After adjusting for physical characteristics, additional adjustments were made for different service operation scenarios to account for the frequency of service proposed in each corridor. Three service frequency scenarios are analyzed that match proposed transit service plans in the selected corridors:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively (80 trips daily)
- Scenario 2 – peak and off-peak frequency of 30 minutes (56 trips daily)
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively (40 trips daily)

The supply of transit service (usually measured as the daily number of trips or service hours) affects ridership demand, but demand also affects the levels of transit service. The service operation scenarios discussed in the corridor-by-corridor summaries include levels of service that are significantly greater than those used on the average Pace route, so it became clear that this must be accounted for in some way.

The general consensus in the literature is that the elasticity of demand for transit with respect to service levels is between 0.3 and 0.5,[7] meaning that for every 1% increase in service, ridership increases by 0.3% to 0.5%. We used the midpoint of 0.4 and assumed that for every 1% increase in service, ridership would increase by 0.4%. The Pace routes used to develop the ridership forecast model have an average of 39.9 trips daily, so we used 40 trips as the baseline for the model. Under Scenario 3 the proposed route alignments have 40 trips daily, so no adjustment was made. Scenarios 1 and 2 have 80 and 56 trips daily, respectively, and their ridership figures were adjusted upwards.

Table 8 below presents the final ridership projections. The “Model Projection” column includes the projections from the initial regression model and the “Physical Adjustment” column contains the projections after the physical characteristics adjustment. The 85% Interval columns illustrate the probability range of ridership estimates for each corridor.

Table 9 includes the final projections for each scenario after the service quantity adjustments were made. These figures were then used to calculate performance indicators at the route level in the corridor-by-corridor summaries appendix in Tech Memo #5.

[7] Graham Currie and Chris Loader, “High Ridership Growth from Extended Transit Service Hours: An Exploration of the Causes,” Transportation Research Record 2110 (2009): 120-127.

Table 8: Ridership Predictions Adjustment

Corridor	Model Projection	Physical Adjustment	85% Interval Prediction Lower Bound	85% Interval Prediction Upper Bound
Wood Dale Metra - Downers Grove	470	634	204	1,064
Elmhurst Metra - Downers Grove / Fairview	403	483	150	816
Hoffman Estates - Elk Grove Village	523	366	171	561
Dundee Road - Arlington Heights	599	808	477	1,142
Roselle Metra - Wheaton Metra	432	497	160	833
Wheeling Metra - Schaumburg NWTC	343	407	204	611

Table 9: Ridership Projections by Service Scenario

		Service Quantity Adjustment (Final Ridership Projection)		
Corridor	Adj. Midpoint Prediction	Scenario 1	Scenario 2	Scenario 3
Wood Dale Metra - Downers Grove	634	888	736	634
Elmhurst Metra - Downers Grove / Fairview	483	677	561	483
Hoffman Estates - Elk Grove Village	366	513	425	366
Dundee Road - Arlington Heights	808	1,132	938	808
Roselle Metra - Wheaton Metra	497	695	576	497
Wheeling Metra - Schaumburg NWTC	407	570	472	407

Implementation Recommendations

Potential Transit Operations

Field observations on corridors selected for transit service implementation show that transit buses could reach revenue operating speeds of about 15 - 17 mph. This means that buses can travel 1 mile in about 3.5 to 4 minutes. With target route cycle times of 60, 90, or 120 minutes, this translates into routes that can extend for about 7.5, 10, and 15 miles in length, respectively. This length covers sufficient distance and territory to attract passengers making both short and long trips along arterial corridors.

Revenue operating speeds of 15 to 17 mph indicate that in relative terms very little intersection delay (in the form of traffic back-ups and signal phasing) exists along the route. This means that although transit could achieve an efficient and agile operation, its travel time would not be competitive with the automobile if significant measures are not taken to reduce or slow down private vehicle traffic.

In general, low residential and employment densities, sparse street connections with main corridors (i.e. cul-de-sacs, irregular and disconnected street grids), and lack of pedestrian crossing facilities and sidewalk accessibility affect potential usage of transit services.

- **Productivity indicators** on corridors selected for detailed analysis indicate that the best candidates for transit service implementation could reach over 15 passengers per revenue hour, while most candidates will be between 10 and 15 passengers per hour. A few candidates would reach less than 10 passengers per hour.
- **Efficiency indicators** show that costs across candidate corridors could reach $6 to $10 per passenger on average corridors, over $10 per passenger on low performance ones, and between $4 and $6 on the best candidates.
- **Annual operating costs** on candidate corridors range from $0.3 to $0.6 million for those operating on a 60 minute cycle (Wheeling Metra – Schaumburg NWTC express route), $0.9 to $1.5 million for those operating on a 90 minute cycle (10 miles long), and $1 to $2.1 million for those operating on a 120 minute cycle (15 miles long).

The analyses in previous reports and in this summary report show that transit service ridership in the corridor has limited potential due to market size limitations around corridors, and also because of transit service's inability to reach its full market potential due to adverse physical design conditions. These factors combine together to negatively impact the productivity and efficiency of potential transit services in the study area and the sustainability of operating transit service in the long run.

Corridor Improvement Strategies

In order to reach the full transit market potential in each corridor and to augment the size of the transit market in general, a conscious and concerted market development and corridor improvement strategy is needed between Pace and the local jurisdictions in its service area. To be effective, the market development and corridor improvement strategy must involve the following programmatic elements:

- **Multimodal emphasis**. An emphasis on multimodal mobility on major arterial corridors that recognizes transit as a key strategy to improve mobility and reduce traffic congestion. Suggested approaches include:

- Implementing a comprehensive corridor development policy that includes Pace's transit market development goals and cities/counties' traffic management, sustainable mobility and community development goals. This could be the task of long-range transit plan led by Pace and in consultation with local jurisdictions.
- Establishing a 'transit emphasis' or 'multimodal corridor' zoning overlay designation that targets major arterial corridors for transportation infrastructure investment and transit-oriented development, as well as for transportation demand management and other transit supportive policies.

- **Transit service standards**. The development of transit service standards that tie transit levels of service with corridor development density and physical design conditions. The intent of these standards is to provide guidance to both Pace and local jurisdictions in:
  - Identifying development density and transit performance thresholds that could trigger improvements in level of service along a corridor, and
  - Developing design improvements in the corridor that may result in potential increases in market demand and matching corridor development over time with levels of service that recognize these improvements.

- **Pedestrian accessibility and connectivity**. Prepare in partnership with local jurisdictions a corridor plan that improves the urban design and physical design characteristics of sidewalks, intersections and accessibility networks penetrating urban blocks and neighborhoods. The corridor improvement plan will contain provisions for:
  - Re-configuring the roadway to accommodate a 'complete streets' approach that opens corridors for all users and modes of transportation, slowing down vehicle traffic and increasing persons safety and mobility.
  - Completing sidewalks on both sides of corridors, filling in gaps, providing more frequent pedestrian crossings, providing clear and direct connections with buildings facing the street and set back from the street, and completing sidewalk networks penetrating blocks and neighborhoods.
  - Densification of corridor through regulation incentives, such as reductions in parking requirements or maximum parking standards, to attract development and renovate corridors in a transit oriented fashion.

Transit Service Implementation

The analysis of transit markets, origin-destination travel demand, and physical design of potential corridors identified at least three corridors showing potential for implementation of arterial-based transit service, and one corridor showing potential for implementation of highway-based transit service. Specific recommendations and guidance to improve pedestrian accessibility and operational conditions are provided in this memo with a particular emphasis on growing transit market demand, and matching level of service to increases in demand and transit infrastructure improvements. Recommendations are provided for two types of implementation:

- **Implementation of Arterial-based service.** Of all the corridors analyzed, the Dundee Road – Arlington Heights Road corridor appears as the best candidate for transit service implementation and it is therefore recommended to be given consideration within Pace's normal process for evaluation of new services throughout the service area. Improvements proposed for this corridor include:

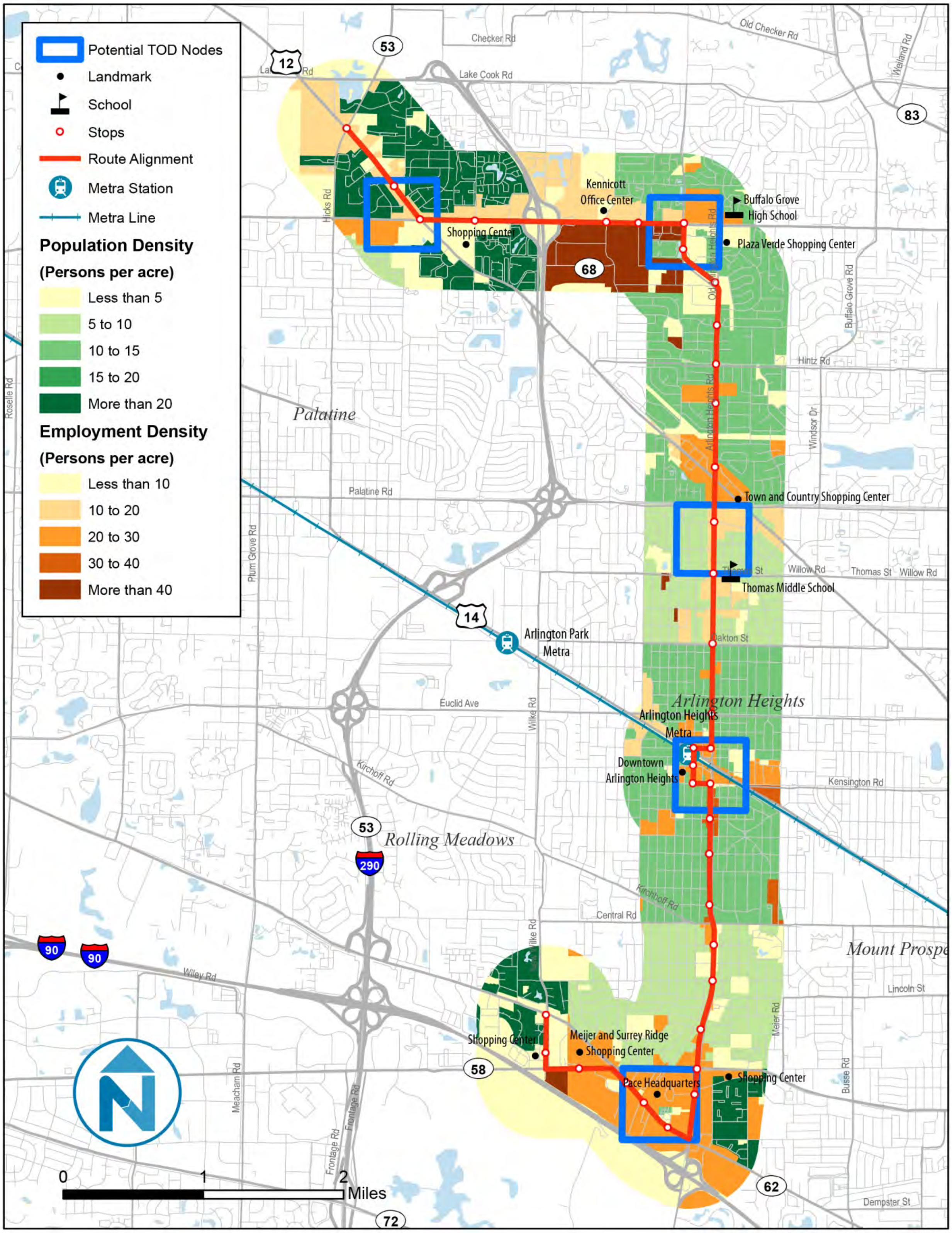
  - Implementing a full set of bus stops to operate service, completing the sidewalk network adjacent to bus stops to access the community, and improving pedestrian conditions at all bus stop intersections, such as providing crosswalks and signals.
  - Identifying opportunities for redevelopment (i.e. vacant properties, blighted properties, undeveloped parcels and major TOD nodes), and developing a land use plan and TOD master plan at major transportation accessibility nodes.
  - Developing a specific zoning plan (potentially a form-based code) for the corridor that increases residential and employment density, aims for mixed-use developments, parking requirements reductions (or maximums), and promotes a walkable urban design.
  - Developing and executing a Complete Streets design that includes roadway restriping, reducing of traffic lanes, and creating curb bulb-outs and safer pedestrian crossings, new bicycle lanes on both sides of the roadway, and concrete bus stop pads.

- **Implementation of Highway-based service.** The Wheeling Metra – Schaumburg NWTC corridor shows potential for transit service implementation, but no transit service start-up is recommended for the corridor unless some minimum infrastructure improvements are made to pedestrian access in the Schaumburg area, and the new park-and-ride facility on Dundee Road and Route 53 is built. Proposed strategies and improvements for implementation include:
  - Designing and completing pedestrian improvements (such as new sidewalks, pedestrian signals and crosswalks) at key destinations to provide direct access to major employment centers (i.e. Motorola and Meacham corporate towers). In addition, breaking large blocks with mid-block pedestrian crossings (at grade or above grade), and serving them with mid-block bus stops so that destinations can be accessed more easily.
  - Partnering with major employers in Schaumburg or the Business Association to develop direct marketing to potential users, and developing a comprehensive TDM program with Schaumburg employers, offering incentives to leave the car at home and use transit such as discounted bus passes and/or a parking cash-out program.
  - Implementing transit service on arterial streets crossing the highway corridor and feeding the park-and-ride, and developing freeway stations to avoid deviations off the corridor that provide direct access to arterials streets and transfers to local bus service.

Tables 10 and 11 below provide recommendations on how transit service could be implemented in these two corridors, and how corridors can be improved over time to grow the transit travel market base and improve the physical design conditions that support transit service and increased levels of ridership. Strategies have been organized in short-term and long-term recommendations, and interim planning thresholds have been identified where possible.

Figures 15 and 16 show the proposed route alignments with the residential and employment areas that would have access to service. Major transportation accessibility nodes have been identified along each alignment. These nodes concentrate most destinations and density and also provide most opportunities for corridor development in the short term in the form of TOD and transit supportive urban design improvements.

Figure 15: Dundee Road – Arlington Heights Road Density and TOD Nodes

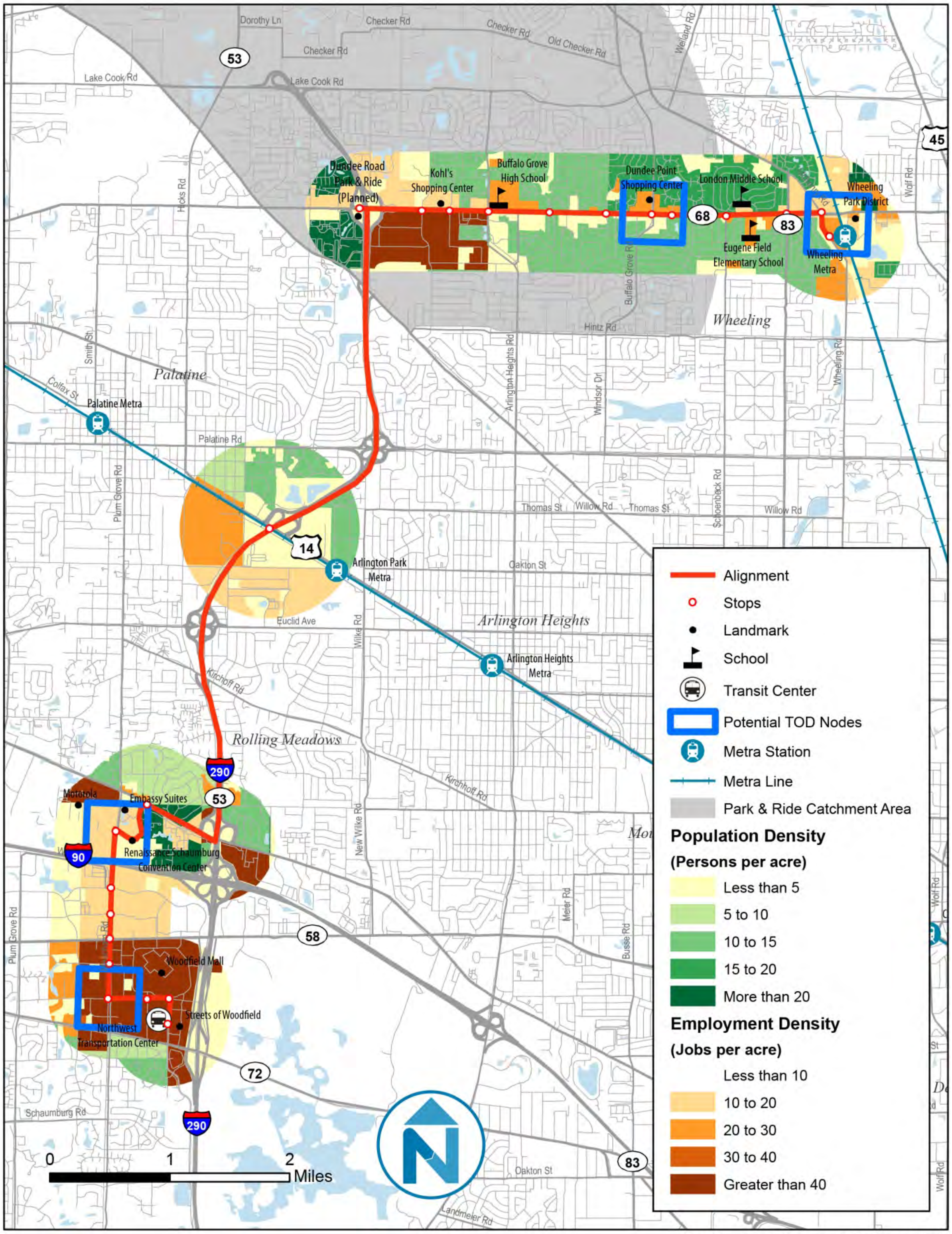


Data Sources: CMAP, Pace, ESRI, State of Illinois

Table 10: Developing the Market on Arterial Corridors: Dundee Road – Arlington Heights Road

Implementation Period	**Transit Improvement Strategies** (Local Jurisdictions)	**Market Development Strategies** (Local Jurisdictions)	**Transit Level of Service Investment** (Pace Bus)
1 – 2 years	Complete a bus stop implementation plan that builds a full set of bus stops including a sidewalk landing pad, shelters, benches and signage.	Working in consultation with local jurisdictions, develop a long-range transit plan for Pace's service area that establishes a multimodal designation on the corridor.	Start operation of transit service at baseline level, Class C – Local Transit corridor service, every 30 minutes peak, 60 minutes off-peak, 14 hours per day (from 6:00 am to 8:00 pm).
2 – 5 years	Develop and execute a sidewalk improvement plan that includes sidewalk completion, striping of crosswalks, and pedestrian improvements at major intersections (i.e. full set of crosswalks and signals). See Technical Appendix in Tech Memo #5.	Identify opportunities for redevelopment (i.e. vacant properties, blighted properties, undeveloped parcels and major TOD nodes), and develop a land use plan and TOD master plan that includes a real estate market analysis, an economic development plan.	Increase weekday service frequency on the midday period, from every 60 minutes to every 30 minutes. Extend weekday service hours from 14 hours to 18 hours (from 5:00 am to 11:00 pm).
5 – 7 years	Develop and execute a Complete Streets design that includes restriping of roadway, reduction of traffic lanes, creating curb bulb-outs and safer pedestrian crossings, new bicycle lanes on both sides of the roadway, and bus stop concrete pads.	Develop a specific zoning plan (potentially a form-based code) for the corridor that increases residential and employment density, aims for mixed-use developments, parking requirements reductions (or maximums), and promotes a walkable urban design.	Start weekend service at a frequency of every 60 minutes, for at least 12 hours (from 7:00 am to 7:00 pm). Upgrade weekday service to Class B – Arterial Transit corridor, increasing service frequency on the peak period to every 15 minutes.
7 – 10 years	Develop and execute a pedestrian improvement plan that provides direct connections between bus stops and major destinations (or buildings' front doors) and completes network of sidewalks providing access to/from adjacent neighborhoods.	Break ground with new TOD or infill developments at major transportation and accessibility nodes. Achieve a minimum average density of 30 persons/jobs per acre at TOD nodes and 15 persons/jobs per acre in the corridor overall.	Increase weekend service frequency to operate every 30 minutes. Increase weekday service frequency on the midday period to operate every 15 minutes. Extend weekend service hours from 12 hours to 16 hours (from 6:00 am to 10:00 pm).
10 – 15 years		Achieve a minimum average density of 40 persons/jobs per acre at TOD nodes and 20 persons/jobs per acre in the corridor overall.	Upgrade weekday service to Class A – Rapid Transit corridor, adding a limited-stop service during peak periods, operating every 15 or 20 minutes, for a combined 7 to 10 minutes frequency in the corridor. Extend weekday service hours from 18 hours to 20 hours (from 4:00 am to 12:00 am).

Figure 16: Wheeling Metra – Schaumburg NWTC Density and TOD Nodes



Data Sources: CMAP, Pace, ESRI, State of Illinois

Table 11: Developing the Market on Highway Corridors: Wheeling Metra – Schaumburg NWTC

Implementation Period	**Transit Improvement Strategies** (Local Jurisdictions)	**Market Development Strategies** (Local Jurisdictions)	**Transit Level of Service Investment** (Pace Bus)
1 – 2 years	Design and complete pedestrian improvements (such as new sidewalks, pedestrian signals and crosswalks) at key destinations to provide direct access to major employment centers (i.e. Motorola and Meacham corporate towers).	Partner with major employers in Schaumburg or the Business Association to develop direct marketing to potential users.	Build new park-and-ride facility at Dundee Road.
2 – 5 years	Break large blocks with mid-block pedestrian crossings (at grade or above grade), and serve them with mid-block bus stops, to more easily access destinations. Integrate stops with an extensive network of sidewalks and pedestrian connections penetrating large blocks and accessing destinations.	Develop a comprehensive TDM program with Schaumburg employers, offering incentives to leave the car at home and use transit such as discounted bus passes and/or a parking cash-out program.	Start operation of transit service at baseline level, every 30 minutes, in the peak-commute direction only, 6 hours per day (between 6:00 – 9:00 am and 3:30 - 6:30 pm).
5 – 7 years	Develop on-ramp bus stops at highway interchanges to minimize bus deviations, and complete pedestrian connections between on-ramp stops and adjacent neighborhoods/destinations.	Form a transportation management association (TMA) in the area to promote transit use, strengthen TDM programs (i.e. ridesharing and car sharing), and reduce vehicle trips.	Extend weekday service hours from 6 hours to 8 hours (between 5:30 – 9:30 am 3:00 to 7:00 pm).
7 – 10 years	Implement a complete streets design in Meacham Road, including facilities for other modes (i.e. bike, walk), and transit service priority infrastructure (i.e. lanes, queue jumpers, signal priority, etc.).	Develop a TOD densification and rehabilitation plan around the transit center that uses unutilized land currently dedicated to parking and converts it into residential and commercial uses facing the street.	Add midday service increasing weekday service from 6 to 14 hours, operating every 30 minutes from 5:30 am to 7:30 pm.
10 – 15 years	Implement transit service on arterial streets crossing highway corridor and feeding the park-and-ride. Develop freeway stations to replace on-ramp stops and providing direct access to arterials streets and transfers to local bus service.	Break ground on catalyst developments that set the TOD plan in motion.	Increase weekday service frequency on the peak period to operate every 15 minutes. Class B – Arterial Transit Corridor. Start weekend service at a frequency of every 60 minutes, for at least 12 hours (from 7:00 am to 7:00 pm).

Corridor Analysis Summary

Six of the corridors in Tier 1 were selected for further analysis, including a field evaluation, service plan, and capital plan. The corridors were selected based on evaluation results and potential performance, but also based on geography and ranking category to illustrate the breadth of policy choices and challenges of implementing transit service in the I-355 corridor study area. They include:

1. Wood Dale Metra – Downers Grove (Good Potential)
2. Dundee Road – Arlington Heights (Good Potential)
3. Elmhurst Metra – Downers Grove / Fairview Metra (Good Potential)
4. Wheeling Metra – Schaumburg NWTC (this is a potential express route that was considered separately in the analysis)
5. Roselle Metra – Wheaton Metra (Needs Further Evaluation)
6. Hoffman Estates – Elk Grove Village (Not Ready Yet)

The final evaluation of these corridors is summarized in the following section, and detailed information about each corridor is included in a Tech Memo #5 at the end of this report. Figure 17 on the next page, shows the alignments and geographic distribution of the selected corridors.

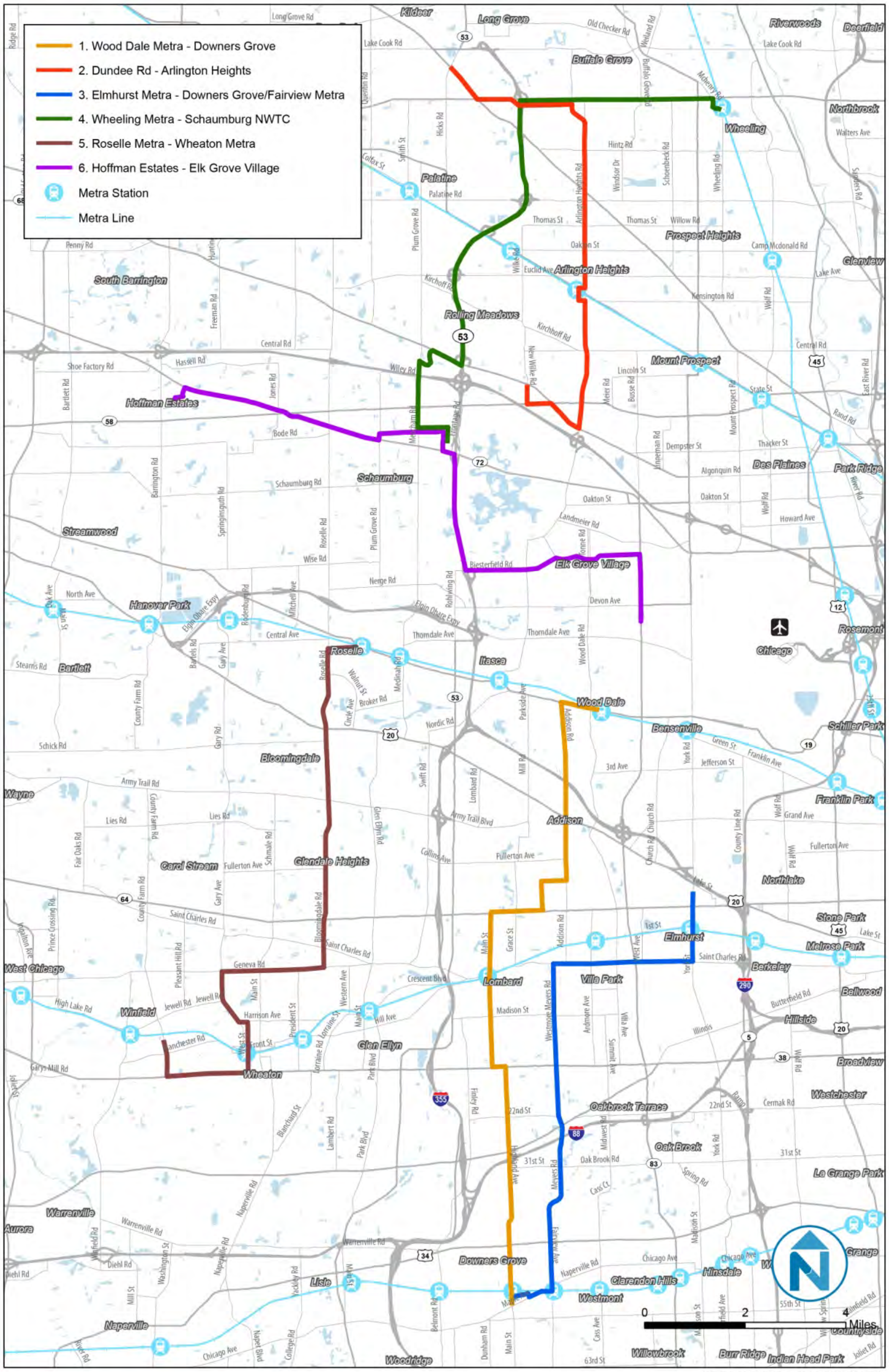
Market Characteristics

Each of the corridors analyzed had good market demand characteristics when compared to other corridors in the I-355 corridor area. Table 12 contains three measures of market demand for each corridor: combined population and employment density per acre, a Transit Orientation Index (TOI), and a measure of travel demand intensity (Average Daily Trips per mile of corridor). The strongest values vary across corridors with some showing higher density concentrations and others showing higher demand intensity measures. For this reason, additional analyses were carried out on the field to better understand demand accessibility conditions, and the capacity of each corridor to attract its potential transit market.

Table 12: Market Characteristics

Corridor	Pop/Emp Density (persons + jobs per acre)	Transit Orientation Index	Travel Demand Intensity (ADT per mile)
Wood Dale Metra – Downers Grove	11.1	17.2	10,743
Dundee Road – Arlington Heights	14.0	17.9	7,475
Elmhurst Metra – Downers Grove / Fairview Metra	10.3	16.8	7,177
Wheeling Metra – Schaumburg NWTC	14.1	15.5	14,414
Roselle Metra – Wheaton Metra	9.7	16.2	5,896
Hoffman Estates – Elk Grove Village	11.1	14.9	11,437

Figure 17: Selected Corridors for Implementation Evaluation



Source: CMAP, Pace, ESRI, State of Illinois

Service Plan

Using running time data collected directly on the field, we estimated round trip cycle times for each corridor, including time for bus stops and layover/recovery time. From a service design and level of demand perspective, we looked for route cycle times that could work with clock-face headways of 15, 30, or 60 minutes, and developed service frequency scenarios for each route based on these values. The original corridor segment alignments were adjusted accordingly (i. e. mostly by extending them) to match a service route operating a clock-face headway.

Table 13 includes characteristics of the proposed route alignments, including length, number of stops, and average distance between stops. The route lengths range from 11.3 miles to 14.5 miles, with the Dundee Road – Arlington Heights being the shortest. The average stop spacing for the arterial-based local routes ranges from 0.31 miles to 0.71 miles, with Wheeling Metra – Schaumburg NWTC being the longest at 0.71 miles.

Table 13: Route Alignment Characteristics

Route	Length (miles)	Number of Stops	Average Space bet. Stops (miles)
Wood Dale Metra – Downers Grove	14.5	46	0.32
Dundee Road – Arlington Heights	11.3	36	0.31
Elmhurst Metra – Downers Grove / Fairview Metra	11.9	32	0.37
Wheeling Metra – Schaumburg NWTC	13.6	21	0.65
Roselle Metra – Wheaton Metra	13.6	35	0.39
Hoffman Estates – Elk Grove Village	13.2	31	0.43

Costs and potential ridership were estimated for three service scenarios on the proposed routes. The three scenarios have varying service frequencies, as indicated before:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively
- Scenario 2 – peak and off-peak frequency of 30 minutes
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively

Table 14: Estimated Daily Boardings

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	888	736	634
Dundee Road – Arlington Heights	1,132	938	808
Elmhurst Metra – Downers Grove / Fairview Metra	677	561	483
Wheeling Metra – Schaumburg NWTC	570	472	407
Roselle Metra – Wheaton Metra	695	576	497
Hoffman Estates – Elk Grove Village	513	425	366

For local routes, the service hour span is proposed to be from 6:00 a.m. to 8:00 p.m., a period of 14 hours. Service would operate on weekdays only, 255 days a year. Table 14 presents the estimated daily boardings for each corridor under each service scenario. Table 15 presents an estimate of productivity in the form of boardings per revenue hour. Detailed information about ridership estimation methods for the six selected corridors was presented in the previous section.

Table 15: Estimated Boardings per Revenue Hour

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	11.1	13.1	15.9
Dundee Road – Arlington Heights	18.9	22.3	23.8
Elmhurst Metra – Downers Grove / Fairview Metra	11.3	13.3	14.2
Wheeling Metra – Schaumburg NWTC	9.5	11.2	12.0
Roselle Metra – Wheaton Metra	11.6	13.7	14.6
Hoffman Estates – Elk Grove Village	8.5	10.1	10.8

The Dundee Road – Arlington Heights route is estimated to get higher daily boardings and boardings per revenue hour than any other route; thus it is the main candidate for a potential service implementation. Also, in all corridors analyzed passengers per revenue hour tend to go down when comparing Scenarios 1 to 3. This is showing that when more service is introduced, more boardings are generated but at a lower increment rate than the amount of service hours that result from more frequency. In more practical terms this suggests that potential transit demand can grow in all corridors, but they need a long term investment plan in order to grow and strengthen their market base, and improve the accessibility conditions to their potential markets.

Table 16 below includes annual operating costs estimates for all six corridor routes under each service scenario. It shows that most routes operating on a 90-minute cycle will cost between $875,000 and $1.5 million per year. While the Wood Dale Metra – Downers Grove corridor which will operate on a 120-minute cycle would cost between $1 and $2 million.

Table 16: Annual Operating Costs

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	$2,058,564	$1,440,995	$1,029,282
Dundee Road – Arlington Heights	$1,543,923	$1,080,746	$874,890
Elmhurst Metra – Downers Grove / Fairview Metra	$1,543,923	$1,080,746	$874,890
Wheeling Metra – Schaumburg NWTC	$1,543,923	$1,080,746	$874,890
Roselle Metra – Wheaton Metra	$1,543,923	$1,080,746	$874,890
Hoffman Estates – Elk Grove Village	$1,543,923	$1,080,746	$874,890

Notes:

1. Cost estimates were calculated using a cost per hour of $100.91, which is the operating expense per vehicle revenue hour reported on Pace's 2009 NTD profile for bus operations.
2. Route recommendations included in this analysis require further study and discussion with local stakeholders regarding land use decisions, roadway infrastructure, and capital investments. It is costly to operate a high level of service. Return on investment will be higher if routes are designed and supported with appropriate roadway and pedestrian infrastructure improvements.

Capital Plan

Draft capital plans were developed for each route to estimate the need for stop improvements, vehicles, and improvements to pedestrian infrastructure. Pace's presence in the community and rider comfort can both be maximized by placing fully developed stops along the routes, including posts, signs, schedules, landing pads, and shelters. Table 17 below includes costs for improvement of one stop, using unit costs from a recent implementation in Pace's service area.

Table 17: Stop Improvement Costs

Stop Improvement	Material/ Labor Cost
Flag/Post/Schedule Holder	$50
ADA 5' x 8' Pad	$5,000
Shelter Pad	$10,750
Shelter (8')	$6,000
TOTAL	$21,800

Depending on the number of stops proposed in each corridor, the total cost of stop improvements for each route ranged from $872,000 for the Wheeling – Schaumburg NWTC route (40 stop locations) to $2,000,000 for the Wood Dale Metra – Downers Grove route (92 stop locations).

In addition, we estimated the number of buses needed to operate each route under each frequency scenario (including spare vehicles) based on cycle times and frequencies. It was assumed that buses would cost $350,000 each (for a standard low-floor diesel powered 40-foot bus), and that Pace would purchase them. Total vehicle costs for Scenario 1 ranged from $2.45 million for the Wheeling – Schaumburg NWTC route (7 buses) to $3.15 million for the Wood Dale Metra – Downers Grove route (9 buses). Table 18 below summarizes the total capital costs for each route, including stop improvements and vehicle requirements (revenue service and spares).

Table 18: Total Capital Costs (Stop Improvements + Vehicles)

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	$5,155,600	$3,755,600	$3,755,600
Dundee Road – Arlington Heights	$4,019,600	$2,969,600	$2,969,600
Elmhurst Metra – Downers Grove / Fairview Metra	$3,845,200	$2,795,200	$2,795,200
Wheeling Metra – Schaumburg NWTC	$3,322,000	$2,272,000	$2,272,000
Roselle Metra – Wheaton Metra	$3,976,000	$2,926,000	$2,926,000
Hoffman Estates – Elk Grove Village	$3,801,600	$2,751,600	$2,751,600

Table 19 presents the cost of operating each of the corridors for a period of 12 years (using as a reference the assumed life-span of a transit vehicle at 12 years). Calculations include both operating and capital costs to operate the routes under each of the proposed scenarios. Table 20 below presents this same information in annualized terms. The Wood Dale Metra – Downers Grove route would be the most expensive because of its long length and large number of stops.

Table 19: Total 12-Year Costs (Operating + Capital)

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	$29,858,400	$21,047,500	$16,107,000
Dundee Road – Arlington Heights	$22,546,700	$15,938,600	$13,468,300
Elmhurst Metra – Downers Grove / Fairview Metra	$22,372,300	$15,764,200	$13,293,900
Wheeling Metra – Schaumburg NWTC	$21,849,100	$15,241,000	$12,770,700
Roselle Metra – Wheaton Metra	$22,503,100	$15,895,000	$13,424,700
Hoffman Estates – Elk Grove Village	$22,328,700	$15,720,600	$13,250,300

Table 20: Annualized Costs (Operating + Capital)

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	$2,488,200	$1,754,000	$1,342,300
Dundee Road – Arlington Heights	$1,878,900	$1,328,200	$1,122,400
Elmhurst Metra – Downers Grove / Fairview Metra	$1,864,400	$1,313,700	$1,107,800
Wheeling Metra – Schaumburg NWTC	$1,820,800	$1,270,100	$1,064,200
Roselle Metra – Wheaton Metra	$1,875,300	$1,324,600	$1,118,700
Hoffman Estates – Elk Grove Village	$1,860,700	$1,310,000	$1,104,200

Note: Route recommendations included in this analysis require further study and discussion with local stakeholders regarding land use decisions, roadway infrastructure, and capital investments. It is costly to operate a high level of service. Return on investment will be higher if routes are designed and supported with appropriate roadway and pedestrian infrastructure improvements.

Corridor Design Improvement Strategies

The six corridors for which an operating and capital plan was developed were selected primarily on their transit demand potential, but also based on geographic distribution and physical conditions to analyze the breadth of policies and design improvements that are needed in the study area to make frequent arterial transit service a viable option of travel. With this goal in mind conceptual designs were developed on a sample of street intersections, across corridors, to provide guidance in the improvement of pedestrian connections and accessibility around potential bus stops.

The selected locations represent a variety of street and urban form conditions found in the study area that would help Pace in the development of corridor specific improvement plans, and to determine capital infrastructure, land use and urban design improvements that are needed in its service area in order to sustain transit service operations overtime.

Arterial Node Improvements

Five intersection setting typologies were identified across the corridors that share similar physical design conditions for vehicle and pedestrian traffic, crossings and land use accessibility. The five intersection settings include:

- **Residential neighborhood** – this includes street segments with 4 to 5 lanes and many intersections without pedestrian crossing facilities or signage.
- **Corporate park/buildings** – includes signalized intersections between major roads, but also the long segments between intersections that do not have pedestrian crossings. Major intersections in this setting force the pedestrian to not only cross wide arterial roads and wait for pedestrian specific phases, but also they are surrounded by surface parking that put pedestrians away from main destinations. Pedestrian crossings and bus stops mid-block (between traffic lights) in mega-block settings like these, typically offers the shortest path to buildings, as opposed to developing stops at major signalized intersections, which in most cases leads to longer walking distances.
- **Shopping mall/big box retail** – intersections in these settings share similarities with pedestrian access in corporate environments. The main difference however is that shopping malls and retail developments usually have a side of the building away from the intersection that gets closer to the street. Developing stops at least 1/10th of a mile away from major intersections is preferable because buildings are typically closer to the street at these locations. In addition, buses are less affected by backups that often occur in the right lane at major intersections.
- **Frontage retail/light industrial** – Major intersections are dominated by small properties with parking lots on every corner that put the pedestrian/transit user away from main destinations. Improvements can be made by completing sidewalks, adding dedicated crossings, and ensuring sidewalks continue to buildings front doors.
- **Heavy industrial/warehousing** – Main buildings in this setting are typically on a deep set back away from the corridor and intersections, and there is no pedestrian infrastructure. Improvements can be made by completing sidewalks and providing dedicated paths to buildings.

Conceptual designs to improve the pedestrian realm were developed in 13 different locations across five corridors. The conceptual designs involved more than completing a missing sidewalk, including developing direct pathways penetrating the block and pedestrian crossing infrastructure that can provide access to both sides of a corridor. Designs intended to connect sidewalks on both sides of the corridor, and connect sidewalks with actual destinations. For example:

- Many corridors have spacing of traffic lights and pedestrian crossings every 0.5 miles, and although these intersections need better treatment for pedestrians, the biggest barriers are found in the stretches between traffic lights, which often provide closer access to neighborhoods and destinations. Mid-block stops can put transit users closer to destinations (see Figure 18).
- Most large intersections between major arterials have significant operational issues and physical limitations when it comes to developing bus stops and also have very poor accessibility to destinations. Developing stops 0.1 miles away from the traffic node offers much better access possibilities to destinations and operational flexibility to reduce delay going through major intersections (see Figure 19).

Table 21 below lists the types of pedestrian issues found around the selected intersections and the types of solutions used to address them. Figures 18 and 19 provide design reference examples.

Table 21: Bus Stop Location Issues and Solutions

Major Issues	Design Solutions
Accessibility or linkages to building destinations from the sidewalk, including retail buildings, office parks, industrial parks, corporate towers, services, and restaurants.	Raised sidewalks, covered sidewalks, clear pavement demarcations, and other visual demarcation methods.
Accessibility to residential neighborhood areas.	Build paths and connect sidewalks to make bus stops accessible from neighborhoods.
Ability to cross the street and access both sides of the corridor at signalized and unsignalized intersections.	Crosswalk markings, curb bulb-outs, curb parking, pedestrian refuge islands, pedestrian only lights and other street design and traffic calming methods (i.e. chicanes, planters, reduced lane widths).
Sidewalk accessibility to bus stops.	Bus landing pads, space for shelters and benches, and connections with street sidewalks.
Pedestrian comfort.	Street trees, movable planters, and pedestrian-scale lighting where feasible along sidewalks.

Figure 18: Arlington Heights Road & Seegers Road

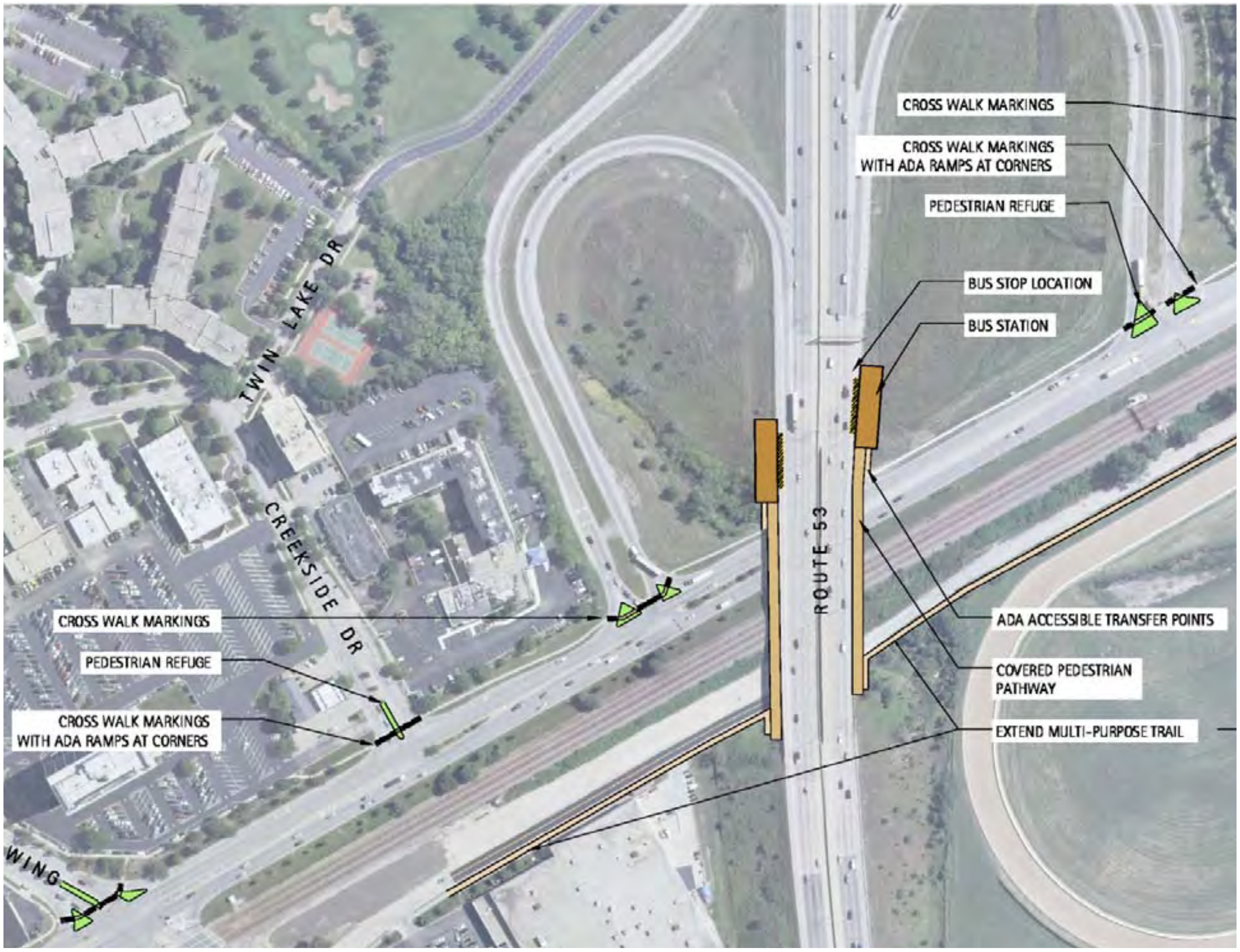
Figure 19: Arlington Heights Road & Rand Road

Freeway Node Improvements

In addition to arterial segments and intersections, the study also investigated one freeway corridor operating on IL-53 between Dundee Road and Algonquin Road. This is a service type that Pace would like to grow in the future, but its success will be limited by the current urban form and development conditions of freeways in the area, as buses are required to deviate from the highway in order to serve destinations. One way to address this issue is to design freeway stations that link transit on limited access roadways, such as IL-53, to a network of arterial services.

A conceptual design exhibit was created to illustrate this concept at the intersection of IL-53 and Northwest Highway. A sample of the design can be found in Figure 20 below. The conceptual design includes bus stops along IL-53, connections to Northwest Highway, and pedestrian connectivity improvements.

Figure 20: Route 53 & Northwest Highway



Corridor Level Improvements

Another level of improvement to pedestrian environment conditions can be achieved through a complete streets approach to reduce traffic speed and open the street to other modes of transportation while keeping traffic capacity intact. In addition, a corridor improvement plan that includes new residential and commercial development, densification, and redevelopment of vacant sites and open space can also be pursued to create a continuous street frontage and vibrant environment along each corridor. These strategies are discussed in the next section.

Complete Streets Improvement

In the Chicago area and in much of the United States, streets have been viewed primarily as places for auto conveyance. In reality, streets are large public spaces and serve many other functions and users, including:

- Pedestrians, including senior citizens, adults, and children who don't drive
- People with disabilities
- Bicyclists
- Private motor vehicle drivers
- Transit users
- Freight and goods delivery vehicles

It is common for American cities and towns to have a large portion of their land area devoted to public rights-of-way. In Chicago, right-of-way accounts for approximately 23 percent of total land area.

DuPage County, Cook County, and the Chicago Metropolitan Agency for Planning (CMAP) have all adopted policies or plans that encourage complete streets. CMAP's GO TO 2040 comprehensive regional plan emphasizes the benefits of transit, bicycling, and walking, and supports complete streets policies as a way to accommodate walking and bicycling in the roadway design. In 2004, DuPage County adopted the Healthy Roads Initiative to improve conditions for users of non-motorized transportation.

It encourages the inclusion of bicycle-friendly designs in major roadway expansion projects and allows the County to acquire right-of-way for sidewalks, bicycle lanes, and non-motorized paths.[8] Cook County established a Complete Streets Policy in 2009 to ensure that options and amenities for all modes are included in the transportation system. It states that "decisions regarding the public right-of-way shall promote use by pedestrians, bicyclists, and public transit. Cook County will incorporate this principle into our planning and design strategies."[9]

Road Diets

A 'road diet' procedure is used to balance overall capacity and demand in the transportation system by reducing the number of travel lanes and/or the effective width of vehicular travel lanes. The freed up space can be reallocated to a number of other uses, including bike lanes, turn lanes, medians, and on street parking. Typically, the width of the roadway remains the same and the transformation is made by adjusting the pavement markings.

The most common road diet involves converting a four-lane road into a road with one travel lane in each direction, a two-way center turn lane, bike lanes, and parking. Roads with average daily traffic (ADT) rates of 12,000 to 18,000 vehicles per day are good candidates for the 4-to-3 conversion, although successful road diets have occurred on roads with 25,000 vehicles a day or more. Roads should be evaluated individually to determine if road diets would be successful.

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[8] More information: Healthy Roads Initiative and Amendment, 2004 and 2008. http://www.dupageco.org/EDP/Bikeways_and_Trails/Docs/18286/

[9] More information: Cook County Complete Streets Policy, October 2009. http://www.cmap.illinois.gov/documents/20583/4a1511f2-60e6-475d-af32-fbd2a98019a0

Figure 21: 4-to-3 Lane Road Diet

Corridor Market Development Strategies

Multimodal Corridor Overlay

Multimodal corridors are a zoning designation intended to focus new development into corridors to increase densities and create transit, pedestrian and bike-oriented development, while providing appropriate transportation demand management strategies and roadway improvements that favor person capacity over vehicle capacity.

The identification and implementation of multimodal corridors requires the cooperation of counties and local municipalities. A county or municipality could choose to designate a corridor using a *multimodal overlay*, which is a planning tool used to guide the types of zoning codes and capital investments made along a corridor. The intention would be for population and employment densities along the corridor to increase while investments are made in pedestrian, bicycle, and transit infrastructure. In turn, the local transit agency (e.g. Pace) would consider and prioritize transit service improvements along the corridor.

Transit Level of Service Standards

'Transit Level of Service Standards' are also a useful policy tool that can be applied to the analysis and evaluation of corridors as demand and investments increase. At least six different types of service can be established along arterial corridors in the Pace Bus service area; these are listed in Table 22 below.

High Capacity Transit service such as light rail (LRT) or bus rapid transit (BRT) will be the highest, serving fully developed corridors; balancing the mobility needs of various user groups and containing high levels of residential and employment density (this service type does not exist in the I-355 corridor study area today, but may exist in the future).

Ridesharing and demand response service will be the lowest, serving corridors that are incomplete in their development, containing low density development and not providing an adequate environment for alternative modes of travel (this service type exists today in the study area and it may be perpetuated in the future, unless there is a radical shift in urban development policy). Table 22 summarizes the breadth of transit service types that can be tailored to local conditions.

Table 22: Corridor Service Types and Supportive Densities

Class	Corridor Service Type	Key Service Features	Density Threshold (persons + jobs per acre)
A+	High Capacity Transit	Local bus and LRT/BRT operation at high service level. 5 minutes peak, 10 minutes off-peak combined frequency minimum.	60 or more
A	Rapid Transit	Local bus and limited-stop operations at high service level. 10 minutes peak, 15 minutes off-peak combined frequency minimum.	40 to 60
B	Arterial Transit	Local bus operations at enhanced service level. 15 minutes peak, 30 minutes off-peak minimums.	20 to 40
C	Local Transit	Local bus and shuttle operations at baseline levels. 30 minutes peak, 60 minutes off-peak minimums.	10 to 20
D	Shuttle Transit	Employee shuttles and commuter bus services. Circulators and flex-route operations.	5 to 10
E	Demand Response	Ridesharing (carpool, vanpool, bus pool or van share). Demand response services.	5 or less

Transit Supportive Density and Urban Design

There is a strong correlation between land use density (mostly residential and employment density) and transit demand. However, this relationship is not linear and transit demand tends to increase most dramatically at more than 15-20 persons per acre on average.

In most metropolitan areas, population and employment density are the factors which tend to have the greatest influence on transit demand. The density of residential, retail and commercial development determines the number of people and/or activities that are in close proximity to transit services. Furthermore, as the density of development increases, so do the incentives that people may have for using transit. Factors such as traffic congestion, parking fees, and parking congestion tend to increase and encourage increased transit usage. Even more than income or age, density determines the potential market for transit. Other factors, such as the proximity of a large university or employment center, work in combination with underlying density to increase transit's market.

The service design and operating features outlined in Table 22 above also include transit supportive density thresholds. These density thresholds suggest the types of community, street design and urban form that are needed to support each category of transit service. While urban form, street design and community development are beyond Pace's responsibility, much of the transit system's ultimate success will depend upon whether transit supportive development practices are conscientiously followed by local jurisdictions. If they are, a vibrant network of corridors will be able to support high quality and productive public transportation services. Without such corridors, the operation of productive transit services will prove impossible.

Pace Suburban Bus

I-355 Corridor Transit Development Technical Memorandum #1

Public Outreach Summary

August 2010

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Table of Contents

Page

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Highlights of the Stakeholder Interviews

This technical memorandum summarizes the responses of 26 key stakeholders representing businesses and communities located throughout the I-355 corridor. This first section provides a summary of the themes that were repeated during the sessions. Subsequent sections, and the paper's appendices, offer additional details. While there was a large range of opinions offered during the interview process, there were several common themes that emerged. Together they illustrate the forces that stakeholders believe are shaping transportation throughout the corridor.

1. Regional development patterns have created characteristics that make north-south transit difficult. Stakeholders orient themselves and their communities towards the City of Chicago and Lake Michigan. East-west roadways and movements were freely discussed and prioritized while most participants had barely considered north-south travel needs before attending the session. Stakeholders appeared to see the majority of transit opportunities as ones related to access to the City of Chicago as either a location of jobs for their residents or as a location where a certain sector of their workforce lives.

2. Some stakeholders suggested that inefficient land use patterns and development settings prohibit or severely restrict the ability of buses to quickly and easily access major employment or entertainment centers in a timely manner. This was especially discussed with the developer representatives who were positive on the potential of transit in some denser nodes/centers/ corridors, but lamented the "hodge podge" patchwork of developments that cannot be effectively accessed.

3. Within the I-355 Corridor, there are few alternatives to using the freeway for north-south travel. The local street network is fragmented and indirect, forcing people onto the expressway.

4. Very few stakeholders said they use I-355 for long stretches on a regular basis. Most of the trips identified used I-355 to access one of the "east-west" expressways or to reach a destination that is only a few exits away.

5. The majority of stakeholders focus their attention on Metra rail when speaking of transit. The communities that have a Metra station generally prioritized improvements to parking and service ahead of other transit. Other communities that lacked rail service, or have economic centers that are not proximate to their stations (e.g. Schaumburg, Lombard, Downers Grove) prioritized shuttles connecting the rail stations to these areas.

6. While many groups attending the business sessions identified that many younger employees and professionals continue to live in the City of Chicago and commute to suburban worksites, there were mixed signals throughout the sessions regarding the size and potential of this transit market. Several municipalities indicated that their number of reverse commuters is not large. Others noted that reverse commute patronage is low because existing services directed towards this market are inadequate.

7. Most communities reported a complete halt to any development activities, including some communities having building-ready sites/pads waiting for interested developers. These conditions seemed to divide stakeholders into two separate groups. One group appeared to see transit improvements as an opportunity to generate development potential at key sites

or nodes (e.g. Lockport). It seemed that these groups saw the study as a way to support or further their planning and economic development goals. The other group did not appear to see significant benefits to this study and clearly had other planning, transportation or economic development priorities.

8. While most stakeholders expressed a desire for more widespread use of transit as well as increased transit opportunities, there was a range in how communities, businesses or groups supported transit. A few businesses, such as Silver Cross Hospital, participate in transit benefits for their employees, such as pre-tax fare cards. At the same time, many of these groups were hesitant to consider charging for parking to increase demand for transit. They believed that free parking gave them a competitive edge over similar businesses located in Chicago.

9. Municipalities generally recognize that additional density and improved infrastructure, including additional pedestrian connections, may be needed before transit can effectively compete with private autos. Again, many communities supported these changes around their train stations, but several had a hard time envisioning additional density or character changes along key corridors.

10. Several stakeholders noted that a shift in thinking about transit's role is occurring. Several mentioned a trend towards sustainability and "green" that they felt was having an impact on people's commuting practices. Additionally, stakeholders mentioned that the current economic downturn has caused many to look for ways to save money, including reducing their dependency on cars. Some also see a generational shift away from automobiles, noting that some younger professionals make concerted efforts to avoid owning a car or at least reducing their car use.

11. Many stakeholders noted there is a much larger range of transit opportunities and services being offered by Pace than what the public is generally aware of. They encouraged Pace to continue with outreach and marketing programs to create awareness of the options that exist for commuters.

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Chapter 1. Background and Methodology

Background and Purpose

Throughout June and July 2010 members of the consultant team, together with Pace staff members, met with local government officials, local business interests, economic development leaders, and developers from throughout the I-355 corridor. These meetings represented the initial elements of the public involvement effort for Pace's I-355 Corridor Express Bus Development Planning Study. The study's goals, which are described in detail in other project deliverables, are to:

- Identify the feasibility of operating effective regional express bus services along I-355
- Identify key infrastructure needs to support transit service in the corridor
- Identify supporting strategies and policies that can be adopted at the local level to develop effective transit services and markets
- Identify potential partners to implement and support I-355 service
- Develop an evaluation methodology to prioritize implementation of feasible service alternatives that accounts for both, locally adopted supporting strategies and policies, and markets with the greatest demand potential

This technical memorandum documents the process followed and conclusions gathered from the stakeholder interviews.

Methodology

The consultant team conducted interviews with a variety of stakeholders including local policy makers and opinion leaders. A total of eight face-to-face group interviews, supplemented by three phone interviews have been conducted to date. Additional interviews may be held as stakeholders, alerted by the project's publicity, ask to share their opinions and ideas.

To make it as convenient as possible for local stakeholders and group stakeholders with similar interests the corridor was organized into three segments.

- North Corridor – I-290 interchange to north end of IL-53 at Lake Cook Road
- Central Corridor – I-55 interchange to I-290 interchange
- South Corridor – I-80 interchange to I-55 interchange

Meetings were conducted within each segment utilizing a variety of venues including city/village halls, corporate offices, and college campuses. To publicize the meetings Pace sent out introductory letters requesting participation in the sessions and arranged meeting locations. Appendix A provides a list of the individuals and organizations that were invited to participate. The consultant team provided facilitators.

Between two and six stakeholders attended each session, which generally lasted about one hour. Figure 1 details the people who attended sessions and the organizations they represented.

Figure 1: Stakeholders Interviewed

Public Sector	Private Sector
North Corridor	
Richard Bascomb- Senior Transportation Planner, Schaumburg	Dave Van Horst – Partner, Tenant Advisors
Barry Krumstok – Assistant City Manager, Rolling Meadows	Sue Borchek-Smith – Student Activities Communications Assistant, William Rainey Harper College
Arlene Mulder – Mayor, Arlington Heights	Kathleen Prunty – Chief Workforce & Community Development Officer, Alexian Brothers Medical Center
Central Corridor	
Dave Fieldman – Village Manager, Downers Grove	Mark Hamilton – Hamilton Partners
Larry Hartwig – Mayor, Addison	Roger Hopkins – Choose DuPage
David Hulseberg – Village Manager, Lombard	Cheryl Lunt – The Alter Group
Michael Mays – Director, Community Development, Woodridge	Ron Lunt – Hamilton Partners
Emily Rodman – Senior Planner, Woodridge	
Kathleen Rush – Village Administrator, Woodridge	
Catherine Schuster – Economic Development Director, Lisle	
South Corridor	
Erin Venard – Planner, Homer Glen	John Grueling – CEO, Will County Center for Economic Development
Paul Grimes – Village Manager, Orland Park	Mark Jepson – Vice President Human Resources, Silver Cross Hospital
James Haller – Community & Economic Development Director, Joliet	
Kimberley Jones – Planner, Lockport	

The sessions were then further divided so the consultant team could separately meet with municipal leaders/planners and large businesses/institutions/local developers from each segment. Additional small group sessions and phone interviews were held as requested with individuals and groups unable to attend the scheduled sessions.

Chapter 2. Summary of Responses

Following is a summary of responses offered during the stakeholder interviews. Topics have been roughly grouped to correspond to the questions that were asked during interviews. A copy of the interview questionnaire is provided in Appendix B, while Appendix C provides a written summary of each interview.

Travel Along the I-355 Corridor

What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor?

Concerns varied depending upon the geographic area. A general comment, heard throughout the corridor was that, except for Metra, people do not consider public transit to be a viable commute option in the I-355 corridor. While several participants noted that there is increased interest in finding alternatives to auto travel, most do not believe such options are available today. They variously attributed this to a lack of information, lower transit service levels than in communities closer to Downtown Chicago, and the form or pattern that development has taken within the corridor.

Participants from throughout the corridor also noted the key economic realities that drive transportation decisions along the corridor. Housing is much more affordable at the south end of I-355, while jobs are more plentiful in the north. This drives commute patterns and congestion. That said, most subsequent discussions focused on east-west travel.

In the **North,** participants discussed the range of communities and transit services within their North jurisdiction. One person noted that buses don't efficently connect at the Northwest Transportation Center, forcing many to transfer at Woodfield Mall in order to have a more reliable connection. . One noted that recent service reductions on the Pace system had major impacts on residents, most especially those traveling to Alexian Brothers Hospital. Those reductions necessitated the introduction of a shuttle service from the Itasca Metra Station to the hospital.

Communities in the Corridor's **Central** Subarea describe I-355 as a major contributor to the area's long-term success. They report that, as congestion has increased, businesses are telling local jurisdictions that there needs to be an effective alternative to automobile usage. They see transit along the I-355 Corridor as a potential part of that solution.

Major attractors within the Central Subarea include:

- Addison with more than 20 million square feet of industrial development
- I-355 interchanges at 73^{rd} & 65^{th} are both important access points

Reported needs include:

- Unilever, would like to have expanded service as the last stop serving its site is scheduled at 4:30 pm

- Transport of people from the Downtown Lisle Train Station to their place of employment along Warrenville Road (corporate corridor), Ogden Avenue and Benedictine University
- Bus service to the Morton Arboretum
- Service from the Downtown Lisle Train Station to four hotels – the Hilton, Hyatt, Marriott and Wyndham
- Lombard's goal, and highest priority, is to secure a transit center at the Yorktown Mall

Central Subarea communities express a high level of interest in transit. Lombard is moving forward with plans to run their own circulator bus routes. Meanwhile, Downers Grove already runs its own bus system and has attracted some employers who are leaving Downtown Chicago. In keeping with this approach, a major community priority is facilitating the reverse commute, allowing people from the Chicago to reach jobs in Downers Grove on transit. This makes getting from Metra stations to local employers a high priority. The Village is developing its own shuttles to serve these employers.

South Subarea jurisdictions were very aware of the benefits they receive from the extension of I-355 to I-80. A priority for several is upgrading local streets that feed I-355 and are now experiencing congestion. Highlighting how important I-355 is to Will County, one participant noted that 60% of the Will County labor force leaves the county for their job.

Concerns about transit service focus on its absence, which some viewed as a lifeline service that is currently limited to individuals without access to an automobile

What are the primary travel markets in the larger sub-region?

In the **North** Subarea, Schaumburg seemed to express the strongest dependence upon public transportation. It was noted that 1,400 to 1,600 people a day board Metra trains in Schaumburg, making its station the busiest in their system. Meanwhile, the village has a workforce of about 80,000 with only 7% of the village population working in Schaumburg.

The following commute patterns were highlighted in North Subarea Communities:

- Rolling Meadows residents who use Pace to the Blue Line and then on to Chicago
- Naperville workers coming to Rolling Meadows corporate centers
- Buffalo Grove workers and students to Rainey Harper College
- Fox River workers to Schaumburg
- Employees take Metra rail from Chicago to Harper College. This is not convenient because bus service to the college is then slow.
- Downers Grove area residents travel to Schaumburg

Central Area stakeholders reported commute patterns that include

- Sugar Grove and Oswego to Woodridge
- Employees coming to Addison from communities in the east

- Corporate Corridor along Warrenville Road, (commuters)
- Ogden Avenue (from I355 to Naperville Blvd) (commuters)
- People traveling to Downtown Lisle Train Station to go to Chicago (commuters)
- People traveling from Chicago to Lisle Train Station to continue on to workplace in Lisle (commuters)
- People traveling from the Downtown Lisle Train Station to Morton Arboretum (visitors and commuters)
- People traveling from the Downtown Lisle Train Station to one of several universities (students)

Noting that **South** Subarea communities allowed development to occur without adequate transportation, stakeholders noted that much of I-355's traffic is localized and focused in east-west patterns Other current commute patterns include

- About 20% of employees from Chicago
- Active commute patterns between Joliet and Lockport to areas around Bolingbrook, even north to Lombard and Downers Grove.

How is travel demand different from ten years ago?

This was one area where subareas were fairly consistent in many of their answers. All noted that the reverse commute is assuming increasing importance within their area. Increasing numbers of people are taking Metra trains from Chicago. Several noted that these are a 'different' type of commuter – younger, more attracted to an urban lifestyle, and with less defined work hours and days off than in previous years.

Reflecting the rapid growth that has occurred in the last decade, the **South** Subarea reported the most significant changes. The opening of Silver Cross Hospital is viewed as one more step in a process of development that will continue for many years.

What changes do you expect to influence travel demand in the next three to five years?

Representatives from both the **North and Central** subareas expressed a common belief that transit will assume a more significant role in their communities' transportation mix. This perception was built around the sense that reverse commute travel will continue to grow and that more people will look to Metra as a travel option instead of traveling congested freeways.

One **South** Subarea stakeholder identified his sense about where the I-355 South Corridor will develop over the next few years:

- Development will continue – While we are probably three years from seeing single-family development resume, 1000-2000 homes per year county-wide (Will County) will be constructed after that. "Good healthy growth"
  - Most Will County development will occur in the I-355 corridor. There's just lots of land

- Ultimately, residential development will spur recovery of retail development
- One or two very large projects will go live after residential comes back
- Employment growth will take longer
- Not realistic to think Will County will attract big employers in the short term
  - The next regional center will be built at Route 6 and I-355

Public Transportation's Role

Why did the previous I-355 bus service fail?

Most stakeholders were not aware of the earlier bus service and could not express an opinion. One respondent who was aware of the service offered several opinions about possible causes:

- The recession and unemployment reduced traffic.
- The service started too big. It may have been best to have started with an expanded vanpool operation.
- The stakeholder suspects that Pace did not thoroughly research commute habits. They may not have known whether real people made the commute they were trying to facilitate.

What role do you see for public transportation in meeting current and future travel needs?

Throughout the corridor, but especially in the **North** and **Central** areas, stakeholders envision an increased role for public transportation solutions. While traffic mitigation is an expressed motivation, civic advancement was more often identified as a reason for sensing the need for expanded public transportation. Lisle also noted transit's potential to provide convenient access to the Arboretum.

Others noted that roadway improvements will make travel to the Airport easier, these changes will link the overall area together. They noted that communities and transportation agencies have included transit as part of Elgin–O'Hare Expressway Extension plan. This could provide a convenient travel linkage to I-355.

Many communities expressed a strong need for expanded park-and-ride capacity at Metra stations and for expanded feeder bus routes linking both employers and residential neighborhoods with Metra. Several felt there is a significant untapped market that could dramatically increase Metra patronage from their communities.

Again**, South** Subarea stakeholders expressed slightly different priorities. While stakeholders also talked about the need for access to Metra, several others said that the need for improved intra-county service is Will County's top priority.

What role will the I-355 corridor play in meeting future needs?

In the **North** Subarea one individual suggested that the extension of I-355/Route 53 north from Lake Cook Road is a compelling regional priority.

Central Subarea stakeholders referred to the highway as a major component to their transportation infrastructure that adds accessibility to local communities. Most felt that I-355 will continue to remain a major transportation corridor, possibly serving more eco friendly vehicles in the future.

What is the most effective form of public transportation in the I-355 Corridor?

At some point in the interview process virtually every public transportation mode was suggested as an appropriate transportation mode for the I-355 Corridor. Most commonly, local bus service connecting local neighborhoods with Metra stations was mentioned. Construction of the Star Line (Service connecting the outer ends of most Metra services), Bus Rapid Transit, express bus, local bus, vanpool operations, feeder vans, ridesharing, Zipcars, and expanded Metra services were all suggested by one or more respondents. There appeared to be no preference based on geography.

When discussing the feasibility of north-south services operating along I-355 most were mildly skeptical. Some suggested that express bus services along I-355 will only be successful if transit priority treatments are provided. Others suggested that the travel market is too dispersed for transit to work effectively.

There was substantial disagreement about the feasibility of park-and-ride lots. Some respondents felt they are an essential component of a successful transit strategy, most often suggesting their use at Metra stations. A smaller number were skeptical, suggesting that park-and-ride forces an unacceptable number of transfers on people traveling to dispersed worksites. One respondent noted, “Why would somebody use park-and-ride when it’s cheaper and faster to drive?”

Another theme that was repeated in all subareas was a conviction that ‘upgraded’ bus service is needed to appeal to suburbanites. Different respondents appeared to have different perceptions about what was meant by the term. Some used it to mean faster service with limited intermediate stops. Others referred to the vehicles employed for the service.

Specific services suggested during sessions included:

- Upgraded service along the Algonquin Road corridor with better connections to the transit hub at the River Road CTA Blue Line stop (Rosemont Station)
- Upgraded service from Downers Grove to Schaumburg
- Circulator service in Addison
- Development of the transit center in Lombard

Which travel market should have the highest priority for public transportation services?

Answers were consistent across subareas. Improved Metra service on the reverse commute was most commonly mentioned. This was followed by improved feeder services to Metra stations, and improved local bus service. No respondent mentioned service along I-355 unless prompted.

What are the major constraints in providing public transportation in the I-355 corridor? What opportunities do you see for addressing these constraints?

Again, answers were consistent across subareas and included:

- Financing and infrastructure constraints
- Consumer knowledge of opportunities
- The need for increased marketing and improved public knowledge of transit options
- Spoke and hub development of Chicagoland has stymied connections between suburban communities
- Subdivisions that made no allowance for transit
- Suburban residents don't see transit as a solution to congestion.

Support for Public Transportation

Do you have any ideas about innovative financing options to support public transit? Are there opportunities for successful public-private partnerships?

Without exception, public sector stakeholders immediately noted that civic budgets are tight and that they see few immediate opportunities for partnering. Their ideas for outside funding included:

- Federal grants for green initiatives or new creative ways to transport people
- Grants from eco friendly car companies
- Partner with various developers for transit oriented developments built around transportation hubs
- Larger employers that may wish to support transportation as a workforce benefit and to attract high quality staff

Several jurisdictions suggested they may be willing to change codes or land use designations to assist transit.

Employers and developers offered a number of specific locations, detailed later, where Pace may be able to coordinate future services with their own plans. One noted that charging for parking near the facilities is a hard sell. They are competing against Chicago facilities and free parking gives them an advantage.

Transit Supportive Development

What is your perspective on the pedestrian environment in the I-355 corridor?

North and **Central** stakeholders generally recognized gaps in the pedestrian network but noted existing commitments to improving the pedestrian environment.

- Schaumburg noted that sidewalk facilities are generally adequate in the vicinity of Woodfield Mall but more spotty in other parts of the village.
- Harper College noted that getting to/from bus stops during inclement weather can be challenging.
- Woodridge is spread out and not pedestrian friendly but has an extensive bike path system.
- Lombard suggested that pedestrian crossings of I-355, Roosevelt Road or Butterfield Road are not warranted by current activity.
- Addison suggested that people are not willing to walk to Metra stations. During inclement weather the pedestrian environment is not supportive.
- Downers Grove noted there is potential for betted pedestrian connections at the Cameo West complex.
- Lisle noted that the Ogden Corridor Master Plan encourages improvements to increase pedestrian traffic along the corridor. However, unless new destinations/stores/restaurants and sidewalks are built along the corridor, they doubt there will be much pedestrian traffic along this busy street.

South Corridor stakeholders freely noted substantial gaps in the pedestrian and bicycle infrastructure. They generally noted that communities and streets have been designed for autos, with little thought to pedestrians. Stakeholders did believe there is a growing recognition of the need for improved pedestrian facilities but did not feel it is a high civic priority.

How should connections from transit hubs to major employment sites be provided?

North and **Central** stakeholders uniformly suggested there is a substantial market for distributor routes that take reverse commuters from Metra stations to employment sites. While not a major source of conversation, several implied that these routes would need to be special purpose routes that are specifically designed to provide speedy and direct linkages to/from Metra stations. Other communities have or are working to initiate more generic circulator routes that link rail stations with residential neighborhoods, commercial districts and employment sites.

South Subarea employers were more concerned about recent service reductions and the impacts those reductions have had on their employees.

Do you have any new sites/locations that could serve as a transit hub?

Numerous possible locations for transit hubs were identified:

1. Woodfield Meadows – This new development will feature 750K sq ft of office space at Butterfield & I-355
2. BL – Esplanade on Butterfield Road
3. Northwest Corner of I-90 and I-355 corridor
4. The vicinity of Golf Rd. and Algonquin, where substantial new development is occurring.
5. International Center in Woodridge has room for a park-and-ride lot

6. The Promenade shopping center in Woodridge (across from Ikea) on 87th/Boughton – easy access to 355
7. Centerpoint shopping center in Woodridge on 75th is another possibility
8. Belmont Metra Station in Downers Grove was suggested
9. Walmart on Lake Street in Addison at I-355
10. Metra owns about 10 to 15 acres of land along Ogden Avenue at I-355 in Lisle. This land could be used as a transportation hub, serving Pace buses coming off of I355
11. Also, an 18 acre site (Lockformer) is steps away from the Metra land and is also for sale. Prior environmental issues would make it well suited for some type of green transportation hub. The site is buildable now, but cannot be used for residential.
12. Near to the Metra site is an 18-acre site owned by Lockformer –I-355 & Ogden South Side.
13. Finley Road north of 88th – 1 million+ of development
14. The Chancellery (an office/hotel cluster) (currently difficult to get buses into this large site)
15. Oak Brook, Route 53 and Schaumburg office clusters
16. Across the street from Silver Cross Hospital
17. IKEA in Bolingbrook Pace is working with the property owner on transit facility

Chapter 3. Potential Divergences from Technical Data

Some stakeholder comments suggest there is a divergence between public perceptions about travel in the I-355 Corridor and the technical data. These issues will likely affect how suggested new services are viewed by stakeholders and the public at large.

Perceptions that appear to be supported by data

- Metra is a major commute mode for individuals traveling to jobs in Downtown Chicago.
- Most people who work at major employment sites along the I-355 Corridor live in other places.
- Many trips use I-355 for only a fraction of their total distance. This is a key assumption that may shape many of the project recommendations. The consultant team has not seen any screen line or other data to support or refute this conclusion but it is certainly consistent with individual observations.
- Current bus travel times are significantly longer than the same trip by auto.

Perceptions that are not supported by data

- Reverse commuters represent a significant portion of people who travel to jobs within the I-355 Corridor.
- Metra provides a significant percentage of commute trips from communities within the I-355 Corridor.
- Shuttle services from Metra stations to employment sites have proven themselves to be cost-effective.

Appendix A: Stakeholders Invited to Participate in the Process

Community/Organization	Name	Title
	North Segment	
Arlington Heights	Bill Dixon	Village Manager
Buffalo Grove	Bill Brimm	Village Manager
Deer Park	Jim Connors	Village Admin.
Elk Grove Village	Kenny Jay	Chief Engineer
Hoffman Estates	James H. Norris	Village Manager
Itasca	Nicole Aranas	Community Development Director
Killdeer	Michael Talbett	Village Manager
Lake County Council of Mayors	Bruce D. Christensen	Transportation Coordinator
Lake County Division of Transportation	Emily Karry	Principal Civil Engineer
Long Grove	David Lothspeich	Village Manager
Northwest Municipal Conference	Michael Walczak	Program Manager for Transportation
Palatine	Reid Ottesen	Village Manager
Rolling Meadows	Sarah Phillips	Village Manager
Schaumburg	Ken Fritz	Village Manager
Wheeling	John Sfonditis	Village Manager
Wood Dale	John Forrest	Community Development Director
	Central Segment	
Addison	John Berley	Community Development Director
Bloomingdale	Michael Marchi	Director of Village Services
Darien	Daniel Gombac	Director of Community Development/ Public Works
Downers Grove	Naneil Newlon	Director of Public Works
DuPage County	Mr. Mark R. Avery	Planning Division Manager, Department of Economic Development & Planning
DuPage Mayors and Managers Conference	Tam Kutzmark	Transportation and Planning Director
Glen Ellyn	Staci Hulseberg	Planning & Development Director
Glendale Heights	Donna Becerra	Village Administrator
Lisle	Tony Budzikowski	Community Development Director
Lombard	Bill Heniff	Community Development Director
Naperville	Karyn Robles	Planning and Transportation Team Leader
Oak Brook	Robert Kallien, Jr.	Community Development Director
Oakbrook Terrace	Martin Bourke	City Manager
Roselle	Jeffrey D. O'Dell	Village Administrator
Villa Park	Shubhra Govind	Community Development Director
Westmont	Fred Kimble	Economic Development Director
Wheaton	Jim Kozik	Planning & Economic Development Director
Woodridge	Emily Rodman	Senior Planner

Community/Organization	Name	Title
South Segment		
Bolingbrook	Mike Drey	Village Engineer
Homer Glen	Paula Wallrich	Village Manager
Joliet	Hugh Brennan	
Lemont	Ben Wehneier	Village Admin
Lockport	Kimberly Jones	Planner
Mokena	John Downs	Village Admin
New Lenox	Will Nash	Planner
Orland Park	Paul Grimes	Village Manager
Romeoville	Steve Gulden	Village Manager
Southwest Conference of Mayors	Vicky Smith	Executive Director
Will County Governmental League	Hugh O'Hara	Transportation Director
Will County	Bruce D. Gould	County Engineer
Businesses/Organizations		
Alter Group	Stephen M. Park, AICP	Senior Vice President
Choose DuPage	Roger Hopkins	President & CEO
ComEd, An EXELON Company	Jeffrey Hettrick	External Affairs Manager
Downers Grove Economic Development Commission	Greg Bedalov	President
Hamilton Partners	Mark E. Hamilton	Partner
Hamilton Partners	Ron Lunt	Partner
Hamilton Partners	Shigeru Gary" Mori"	Partner
IKEA	Tara Lizon	Customer Convenience Manager
Schaumburg Business Association	Laurie Stone	President
Silver Cross Hospital	Paul Pawlak	President
Silver Cross Hospital	Geoffrey Tryon	Vice President of Operations
Will County Center for Economic Development	John E. Greuling	President & CEO
Arlington Park Race Track	Tony Petrillo	Vice President Facilities & Operations
Harper College	Joan Kindle	Vice President Student Affairs
Woodfield Mall (Taubman Co)	Marc Strich	General Manager
ProLogis	Joe Conroy	Property Manager

Appendix B: Stakeholder Interview Questionnaire

The full text of the stakeholder interview questionnaire is presented on the next page. A copy of the questionnaire was furnished to respondents in advance of interview sessions. In one case the respondent provided written answers. All other answers were oral.

Organization __________________________ Person(s) Interviewed ___________________________

Date ____________________

I-355 Corridor Express Bus Development Plan
Stakeholder Interviews May/June 2010

Pace is conducting a study to assess the market, current and future, for express bus service and necessary infrastructure in the I-355 corridor (broadly defined as the area within 5 miles of the expressway/toll-way system from Lake-Cook Rd. to I-80)[1]. Nelson\Nygaard Associates together with The Lakota Group have been retained by Pace to conduct this study. One of our early steps is to gain insights, opinions, and visions for the corridor from elected leaders, local jurisdictions' staff, business and development leaders and other impacted organizations. The purpose of our interviews is to inform our analysis of the corridor and its potential, near-term and long-term, for public transit services.

The questions below cover a broad range of issues with the purpose of ensuring we cover all the important areas of concern. Through the discussion, other questions may arise and you may have answers to questions that are not on this outline.

Individuals can speak to us in confidence, any quotations will be done anonymously. We want to allow individuals to speak freely about their ideas and observations of the corridor so we can initiate this project with a broad understanding of issues and priorities for public transit in the corridor.

Thank you in advance for your assistance.

Discussion outline:

1. As a stakeholder in this process, what agency, organization, company or interest group do you represent? List multiple if appropriate.

2. What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor? For purposes of the study we have defined the "corridor" very broadly, including an area up to five miles away from I-355.

3. What do you see as the primary travel markets in this larger sub-region? Are there any particular travel characteristics about the I-355 corridor that make it different than the more general travel characteristics of the larger sub-region? Please describe in terms of origins & destinations for travel, trip purposes and time of travel.

4. How is the demand for travel different from ten years ago? What changes do you expect to influence travel demand in next 3 to 5 years? Please focus on changes in settlement, employment, and travel patterns.

5. What role, if any, do you see for public transportation in meeting current and future travel needs (e.g. mitigating/avoiding congestion, providing access to jobs)?

[1] The corridor is comprised of three road components from south to north; on I-355 from the intersection of I-80 with I-355 to the intersection of I-355 with I-290 continuing on I-290 to the intersection of I-290 and I-90 then on IL-53 to its intersection with West Lake Cook Rd. Note that I-290 and IL-53 are co-linear from starting about 2 miles north of the intersection of I-355 with I-290 beginning the intersection of the Elgin-O'Hare Expressway/ Thorndale Ave continuing north to the interchange with I-90.

6. What role do you believe I-355 will play in meeting those future needs and how important is the role? What role, specifically, do you see for public transit service in the I-355 corridor?

7. If the region decides to invest in supporting some form of public transit service in the corridor, what is the most effective form of service? Examples, carpool formation support and incentives, vanpool formation support and incentives, express bus service, new park and ride facilities, new Metra rail lines or bus feeders to existing stations, bus feeder service to key activity centers in the I-355 corridor, other high capacity transit services such as Bus Rapid Transit, Light Rail, etc?.

8. The corridor has many different travel markets, commuters heading to downtown Chicago, commuters from Chicago coming to the corridor for work, local circulation, local work trips, suburb to suburb work trips, of these, which do you think should have the highest priority for public transit service and why?

9. What do you think are the major constraints in providing public transit options in the corridor?

10. What opportunities do you see for addressing these constraints?

11. Do you have any ideas about innovative financing options to support public transit in the corridor? What opportunities do you see for successful public-private partnerships to fund public transit?

12. Would your municipality or organization be willing to support the development of public transit services in the corridor? How would that support be expressed? Examples: financial contributions toward transit services, building supporting infrastructure, adopting transit supportive land use and form-based codes, operating connecting transit services, improving pedestrian connectivity.

13. What is your perspective on the pedestrian environment, generally, in areas surrounding I-355?

14. What is your perspective on how and who should provide connections from transit hubs to major employment sites that are not readily accessible on foot or existing transit?

15. Do you have any new sites/locations in mind that could serve as a transit hub for bus service/access? If so, do you envision any potential for transit-oriented development at this location?

16. What haven't we covered about the travel market in the I-355 corridor that is important to you and you think should be considered in the market assessment?

17. Any other comments, questions or concerns about this study?

Appendix C: Stakeholder Interview Transcripts

Mayor/Managers Group Sessions:

North Segment

Executive Conference Room
Tuesday, June 29, 2010 – 5:00 p.m.

Attendees
Participants: Barry Krumstok, Assistant City Manager, Rolling Meadows
Arlene Mulder, Mayor, Arlington Heights

Consultants: Daniel Grove, Lakota
George Patton, Nelson\Nygaard
Mary Donner, Pace

2. **Introduction to project and project purpose –GP**
   Arlene identified herself as a member of the Metra Board

3. **What do you see as the primary travel markets in this larger sub-region?**
   - Rolling Meadows is seeing lots of new residents who use Pace to get to the city, through service to the end of the CTA Blue Line
   - Will need some kinds of feeders to Metra stations

4. **How is the demand for travel different from ten years ago? What changes do you expect to influence travel demand in next 3 to 5 years?**
   - BK - Seeing more people from Naperville coming to Rolling Meadows

5. **What role do you believe I-355 will play in meeting those future needs and how important is the role?**
   - AM – Arlington Heights' first priority is the extension if the freeway to the Wisconsin boarder.
     i. Lake Cook to Wisconsin in CMAP constrained access category
     ii. First phase would be to Route 120
     iii. Rolling Meadows very interested in the eventual extension of 53 farther north
   - AM - Many residents have disabilities
   - BK – East-west travel is a necessary precondition for effective north-south travel
   - AM – There has only been a cursory review of possible HOV services in the I-355 Corridor.
     i. Doubts that HOV will work
     ii. Too many people cheat – Dummies in cars, etc.

6. If the region decides to invest in supporting some form of public transit service in the corridor, what is the most effective form of service?

- AM - BRT may be a great option in Illinois
    i. Upgraded bus will better appeal to suburbanites
    ii. To get BRT would need to limit stations
    iii. Bus only on freeway
- AM – Transit needs to connect to and support STAR line
    i. This is a strategy to connect rail lines
    ii. DMU technology may be appropriate

7. The corridor has many different travel markets; which do you think should have the highest priority for public transit service and why?

- AM - There is potential with the reverse commute
    i. Metra has not responded to need for reverse commute
    ii. Much of their train storage will not accommodate
    iii. More trains and increased frequency top priority for Arlington Heights
- BK – Upgrade Pace lines
    i. Create more and bigger shelters
    ii. Get knowledge of bus/transit options out to businesses
    iii. Would need to have improved parking access

8. Any other comments, questions or concerns about this study?

- Arlington Heights is planning major TOD just east of the downtown at Elk Grove & Arlington Heights
- A bunch of new employment is coming into Golf Rd. and Algonquin

Central Segment

Addison Village Hall
Monday, June 28, 2010 – 5:00 p.m.

Attendees

Participants: Kathleen Rush, Village Administrator, Village of Woodridge
Michael Mays, Director, Community Development, Village of Woodridge
Emily Rodman, Senior Planner, Village of Woodridge
Larry Hartwig, Mayor, Village of Addison
David Hulseberg, Village Manager, Village of Lombard
Dave Fieldman, Village Manager, Village of Downers Grove

Consultants: John LaMotte, Lakota (JL)
Daniel Grove, Lakota (DG)
George Patton, Nelson\Nygaard (GP)
Chris Rose, Pace

- **What do you see as the primary travel markets in this larger sub-region?**
    - Woodridge – All three representatives from Woodridge participated in the discussion, which was open-ended
        - City benefited from increased traffic & accessibility provide by I-355
        - Need transit as part of the corridor for successful employment centers
        - Affordability a key issue
        - Internationale Centre, a business park with 10 million square feet at the I-355, I-55 interchange, is a key market
            1. Employees are coming in from east and southwest – Sugar Grove and Oswego
        - Businesses are telling the city that providing alternatives to automobiles is a key part of their future business success
        - 355 interchanges at 73rd & 65th are both important access points
        - Bus routes tend to run in a north-south direction through western portion of the city
            1. This is mainly on west side of 355
        - DG – Do people use Metra as a means of accomplishing a reverse commute?
            1. Not really. Most people coming from the Chicago feel that transit not an option
            2. They see few options to cars
    - Addison
        - Their condition is much like Woodridge
        - 355 important to the village's success
        - Addison has more than 20 million square feet of industrial development
        - Employees come from all over but there seems to be a strong group that is coming into jobs from communities in the east
        - Addison has lots of small businesses. Any strategy will need to find ways to address their unique needs.
        - College of DuPage (Glen Ellyn) seems to provide a good base of ridership

    - Benedictine University (Lisle) also has night student ridership
- Lombard
    - The Village has three access points to I-355
    - The Village's goal, and highest priority, is to secure a transit center at the Yorktown Mall.
    - Lombard has noted how well bus service works when it is used for sports shuttles
    - The Village is moving forward with plans to run their own system – circulator
    - Sees need for a 355 bus route
    - When the Village's street network was designed, the streets were intentionally designed not to accommodate north-south traffic.
        1. They did not want cut-through traffic on local streets
- Downers Grove
    - Important to get people from 355
    - The Village runs its own bus system
    - A major priority is facilitating the reverse commute
        1. Getting people from the Chicago to jobs in Downers Grove
        2. People need to get from Metra stations to local employers
    - Downers Grove has attracted some employers who are leaving Downtown Chicago
        1. The Village is developing its own shuttles that will serve these employers
    - Questions whether buses can compete effectively in the I-355 corridor without transit priority treatments. There is just too much congestion, which buses are locked into.

- **The corridor has many different travel markets; which do you think should have the highest priority for public transit service and why?**
    - Maybe corridor is more suited for light rail than bus?
    - Woodridge – Train service would be ideal but that is impossible
        - The village's priority is provision of access to the Internationale Centre.
        - Shuttle service working out of a Metra station would assist
        - Marketing would also help – People don't know the options already available to them
    - Downers
        - Getting people to/from stations and employment centers.
        - Downers to Schaumburg is a big market that Pace can exploit
    - Addison – Circulator is top priority. Funding not currently available, but maybe when economy rebounds. (Will look for a copy of old study to send to team)
    - Lombard – Next thing would be development of the transit center.
        - Believe that need nice waiting places for transit to be successful
        - People need to feel safe
        - Reliability of system is critical
- **Are there locations that are ready for TOD?**
    - Woodridge
        - International Center has room for a park-and-ride lot

        - The Promenade shopping center (across from Ikea) on 87th/Boughton – easy access to 355
        - Centerpoint shopping center on 75th is another possibility
    - Downers Grove
        - Belmont Metra Station
    - Addison
        - Walmart on Lake Street at 355

- **What is your perspective on the pedestrian environment, generally, in areas surrounding I-355?**
    - Woodridge
        - Village is very spread out and not walker friendly
        - Have extensive bike path system
        - As more young people move into the community, walk/bike access is becoming more important.
        - Existing sidewalks are in good shape.
        - Need bike racks at park and ride lots
    - Lombard
        - Does not believe pedestrian crossings of 355, Roosevelt Road, or Butterfield Road are important. Not enough pedestrians to justify.
    - Addison
        - Feels that Metra has a good approach with extensive park and ride capacity at its stations.
        - People are not willing to walk to stations – the weather is too bad and the pedestrian environment is too weak.
    - Downers Grove
        - Potential for more walkability and connections at the Cameo West complex, senior condos, on Maple at 355.
    - GP – Which is more important to your jurisdiction, park and ride capacity of community circulator bus routes?
        - Addison - Community circulator routes.

South Segment

Orland Township Building, Orland Park, Illinois
Wednesday, June 23, 2010 – 5:00 p.m.

Attendees

Participants: Paul Grimes, Village Manager, Village of Orland Park
James Haller, Community & Economic Dev. Director, City of Joliet
Erin Venard, Planner, Village of Homer Glen
Kimberly Jones, Planner, City of Lockport (6:00 pm)

Consultants: Daniel Grove, Lakota
Scott Freres, Lakota
Tim Payne, Nelson\Nygaard
Pace Representatives (names not recorded)

- **What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor?**
  - Orland Park
    - Importance of east/west corridors
      1. 159th – currently under a study for widening, connected to Pace ART initiatives
      2. 143rd – widening planned for in 5 year plan
  - Homer Glen
    - See potential for growth along 143rd and 159th
  - Joliet
    - Importance of east/west corridors
      1. I-80 and Route 6 are key connections to 355
  - Lockport
    - Congestion on east-west access routes

- **How is the demand for travel different from ten years ago? What changes do you expect to influence travel demand in next 3 to 5 years?**
  - Joliet
    - Silver Cross Hospital has the ability to generate a medical/health care corridor
    - New multi-modal yard can create 12,000 to 20,000 new jobs (presentation can be found on the web)
    - If the Peotone airport ever was built, it would be a game changer for the corridor
  - Lockport
    - Sees redevelopment of downtown to more pedestrian orientation, city seems to be moving to more emphasis on local travel and travel to and from Chicago
    - Transit connections between Joliet/Lockport and Woodridge/Bolingbrook/ Downers Grove will be secondary, but important.
    - Need to consider a new connection to New Lennox.

- **What role do you believe I-355 will play in meeting those future needs and how important is the role?**

- Joliet
  - I-355 helped make Joliet more desirable and created better connectivity to region.
  - Transit will further strengthen that connectivity
  - City is working on other transit improvements including Union Station as multi-modal hub
    1. Could connect Union Station to a hub on I-355 in the future
  - Believes that I-80 is more congested due to I-355 extension.
- Lockport
  - Future appears to have more development of senior hosing including assisted living. As support facilities develop in response (medical clinics, shopping, etc) local circulation will become a larger and larger factor.

- **If the region decides to invest in supporting some form of public transit service in the corridor, what is the most effective form of service?**
  - Joliet
    - Support Metra rail due to location
    - However, does like bus service for flexibility and cost
    - Support for park and ride facilities
      1. Metra parking lots fill up by 7:00 am
      2. Often sees park and ride lots on I-55 full
      3. Some residents drive to Orland Park to park and use Metra
  - Orland Park
    - Enhance pedestrian access to station and pedestrian connectivity
  - Homer Glen
    - Improve accessibility on 159th & I-355
    - Support pedestrian improvements
  - Lockport
    - Improved Metra Service
    - Additional Park and Ride space at Metra Stations
    - Potential to add a transit hub at I-355 and 159th St. in conjunction with TOD development.

- **What is your perspective on the pedestrian environment, generally, in areas surrounding I-355?**
  - Joliet
    - Need bike routes to transit hubs
  - Lockport
    - Bike paths and access for local circulation is a high need.

Catherine Schuster – Village of Lisle

Telephone Interview
Thursday, July 22, 2010

Attendees

Participants: Catherine Schuster
Economic Development Director
Village of Lisle

Consultants: Daniel Grove, Lakota (DG)
George Patton, Nelson\Nygaard (GP)

1. **As a stakeholder in this process, what agency, organization, company or interest group do you represent? List multiple if appropriate.**
   1) The Village of Lisle representing the municipality, residents, employers/employees and visitors
      a) It has 24,000 population.
   2) Employers
      a) Morton Arboretum
         i) Increased attendance from ¼ mil to 1 mil.
         ii) 2 miles from downtown.
         iii) Lakota Downtown Master Plan has been followed which encouraged strengthening connections to the Arboreteum
         iv) Open year round. Sponsor cross-country skiing in winter. Have four hotels. Promoting tourism – business and events.
   3) Village is trying to tap into that.
      a) Ped & bike access is dangerous because of route past tollway entrance
      b) Branding takes a nature focus – use to continue economic vitality
      c) Redeveloped downtown to encourage shopping/dining – expanded to unique events
      d) Looking for eco-friendly shuttle
         i) Arboretum runs no shuttle on its own.
         ii) Interested in being a test market for eco friendly transit initiatives and funding
   4) Downtown sits on Ogden Avenue – 2 miles west of I-355
      a) Metra station in downtown.
         i) 7 year wait for parking.
         ii) Roughly 300 spaces
      b) Signed deal with firm for TOD condos – stalled – New England Builders
   5) Corridors
      a) Ogden Ave. corridor
      b) Molex Inc. is just off Ogden
      c) Warrenville corridor more prestigious businesses
         i) Unilever
         ii) Navistar
   6) Some employees use train – to get there – Pace serves some but not all of the village's employers
   7) Some employers make a concerted effort to recruit local employees. Others tap into the specialized skill sets from Chicago
   8) Also have 2 universities – Northwood University and Benedictine University

9) Working on local part of a 31 mile bike path plan

2. What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor?

a. Employers currently being served by Pace would like to ensure the service is maintained and expanded. For example, one of our largest employers, Unilever, would like to have expanded service as the last stop is scheduled at 4:30 pm and that does not meet the needs of many of their staff. Employers that are not served by Pace would like to offer it as an option to their workforce. Primary needs are to transport people from the Downtown Lisle Train Station to their place of employment along Warrenville Road (corporate corridor), Ogden Avenue and several office parks in the community.

b. Benedictine University (south Lisle) and National Louis University (north Lisle) have students that would use Pace service to transport them from Train Station to these schools.

c. The Morton Arboretum (world renowned – 1,700 acres of prairie, wetlands, meadows, dining, gift shop, children's activities, theatre hikes, classes, and other year round activities such as cross country skiing) is in north Lisle. They have approximately 1 million visitors each year. But there is no bus service to take people from the Downtown Lisle Train Station to the Morton Arboretum (2 miles north) and it would be difficult to bike ride or walk to the Arboretum as it is very congested road. If Pace service existed, we could better serve the Chicago market and people all along the train route who want to take public transportation to the Arboretum. Some people that currently drive to the Arboretum may also choose to take Pace, further reducing congestion. This includes both staff and visitors.

d. Lisle has four branded hotels (Hilton, Hyatt, Marriott and Wyndham) and it would be convenient to have transportation from the Downtown Lisle Train Station to the hotels if possible. Then we could encourage the Chicago market to spend a day/weekend in Lisle (take train, visit Morton Arboretum, stay in Lisle hotel, shop the new downtown, etc). This would greatly enhance economic vitality of the entire community. Lisle is unique in that it does not have major sales tax generating businesses. Consequently, tourism related sales tax is important.

3. What do you see as the primary travel markets in this larger sub-region? Are there any particular travel characteristics about the I-355 corridor that make it different than the more general travel characteristics of the larger sub-region?

A Corporate Corridor along Warrenville Road, (commuters)
B Ogden Avenue (from I355 to Naperville Blvd) (commuters)
C People traveling to Downtown Lisle Train Station to go to Chicago (commuters)
D People traveling from Chicago to Lisle Train Station to continue on to workplace in Lisle (commuters)
D People traveling from the Downtown Lisle Train Station to Morton Arboretum (visitors and commuters)
E People traveling from the Downtown Lisle Train Station to one of several universities (students)

4. How is the demand for travel different from ten years ago? What changes do you expect to influence travel demand in next 3 to 5 years?

1. More taking train – from Chicago
2. Very different types of people
3. More people working flex hours
4. Face of Lisle changing. Adding transit oriented development
5. Seeing more eco-friendly transportation – electric shuttle, Zipcar, improved public transportation system
6. Internal plan for Ogden Avenue on the internet
7. Metra owns 15 acres adjacent to I-355. Planned for station. Not know what will be done
8. Nearby is an 18 acre site owned by Lockformer – either might be a good transportation hub – I-355 & Ogden South Side. Bruce Granger – Grubb & Ellis the sales rep.
9. No sidewalks on Ogden Ave. Plan recommends

A Increasing numbers of people live in Chicago and take the train out to Lisle each h workday.

B Increasing number of people work flex hours (for example, we have several large call centers with employees working either round the clock or extended hours. Some of our other companies also have employees working on weekends or at night, etc.

C Lisle is landlocked, so the general layout of the community should not change much. But infill development could bring more transit oriented development and new employers.

D We hope to increase tourism using the Morton Arboretum, our hotels and shopping/dining as a draw. Our downtown just completed a $20 million redevelopment and more redevelopment is expected.

5. What role, if any, do you see for public transportation in meeting current and future travel needs (e.g. mitigating/avoiding congestion, providing access to jobs)?

Our Village brand, as “The Arboretum Village,” is all about green and sustainability. We are seeking electric or other eco friendly transportation options to be responsible and support our brand and reduce air pollution.

6. What role do you believe I-355 will play in meeting those future needs and how important is the role?

Adds to accessibility in community

A I-355 will continue to remain a major transportation corridor, hopefully serving more eco friendly vehicles. Pace connections to various destinations in Lisle (Morton Arboretum, corporate corridors, retail corridors, etc) will help transport people in a hopefully, eco friendly manner.

B Express bus service, zip cars, rideshare and other eco friendly options, etc all valuable.

7. If the region decides to invest in supporting some form of public transit service in the corridor, what is the most effective form of service? .

A Create a transportation hub on available Metra land at I-355 and Ogden Avenue. Have eco friendly van pools, rideshare, zip cars, express service available to transport people to work.

B Add eco friendly shuttle service from Downtown Lisle Train Station to commercial corridors, the Morton Arboretum, universities, etc

C Add zip cars/van pool service at major residential condos, etc so people would not have the need to buy their own car.

D Improve appearance of bus shelters along corridor (prairie theme)

E If Metra not going to use Ogden property, make it available for commercial development.
F Use Lisle as high speed rail hub (Pace, high speed rail)
G We have a 7 year waiting list for a commuter parking space in Lisle. A multi tiered parking garage in the commuter lots could help with this problem (with ground floor retail or restaurants).

8. **The corridor has many different travel markets; which do you think should have the highest priority for public transit service and why?**
A Commuters traveling to Chicago to work (largest number)
B Visitors coming to Lisle (to Arboretum and our hotels)
C Commuters coming from Chicago to work in Lisle

9. **What do you think are the major constraints in providing public transit options in the corridor?**
A Financing and infrastructure constraints

10. **What opportunities do you see for addressing these constraints?**
A Federal grants for green initiatives or new creative ways to transport people.

11. **Do you have any ideas about innovative financing options to support public transit in the corridor? What opportunities do you see for successful public-private partnerships to fund public transit?**
Would be willing to change codes or land use designations
A Perhaps eco friendly cars companies or Pace would be willing to use Lisle as a test market for eco friendly shuttles, etc.
B Partner with various developers for transit oriented developments built around transportation hubs.
C Larger employers may wish to support transportation as a workforce benefit and to attract high quality staff

12. **Would your municipality or organization be willing to support the development of public transit services in the corridor? How would that support be expressed?**

A Lisle, like other communities, is financially constrained, but open to discussing any ideas and of course, non financial support always an option.

13. **What is your perspective on the pedestrian environment, generally, in areas surrounding I-355?**
A Our newly approved Ogden Master Plan encourages improvements to increase pedestrian traffic along the corridor. However, unless new destinations/stores/restaurants and sidewalks are built along the corridor, we most likely will not see a lot of pedestrian traffic along this busy street. Most people drive in the suburbs.

14. **What is your perspective on how and who should provide connections from transit hubs to major employment sites that are not readily accessible on foot or existing transit?**
A Open to all options (Pace, private company, employers themselves, grants, Metra as more people would use Metra), etc.

15. **Do you have any new sites/locations in mind that could serve as a transit hub for bus service/access? If so, do you envision any potential for transit-oriented development at this location?**

A Metra owns about 10 – 15 acres of land along Ogden Avenue at I-355. This land could be used as a transportation hub, serving Pace buses coming off of I355, zip cars, van pools, high speed rail hub, etc. Perhaps residential/retail development could occur here too if this was transportation hub.
Metra seems to be holding the land for a station that most likely will not be built at that location. So perhaps they would consider a different land use or sell it.
B Also, an 18 acre site (Lockformer) is steps away from the Metra land and is also for sale. Prior environmental issues would make it well suited for some type of green transportation hub. The site is buildable now, but can not be used for residential.
The only caveat is that these large parcels of land are ideal for big box developments and we have very few parcels of this size left in Lisle. As noted, Lisle needs sales tax revenue. So we need to be very careful in how these few remaining big parcels of land are used and what type of revenue they will generate.

16. **What haven't we covered about the travel market in the I-355 corridor that is important to you and you think should be considered in the market assessment?**
A To reinterate, we are seeking green/sustainable, creative solutions to transportation issues. We are also open to serving as test or pilot study.

17. **Any other comments, questions or concerns about this study?**
A. Top priority a shuttle to the Arboretum – work in commute
B. Improve bus route connection
C. Open to capacity increases at P&R
D. Would like to see mixed use – P&R and retail
E. Service to schools
F. Unilever concerned that Pace service be maintained.
G. Lextech would like Pace service
H. Look on pages 40 and 43 of Ogden Avenue report

Interview with Richard Bascomb – Schaumburg

Schaumburg City Hall
Tuesday, June 29, 2010 – 9:30 a.m.

Attendees

Participants: Richard Bascomb, Senior Transportation Planner, Schaumburg

Consultants: Daniel Grove, Lakota
George Patton, Nelson\Nygaard

1. **Why did the previous I-355 bus service fail?**
   a. Doesn't know what research went into the planning for the route.
   b. Thinks several things contributed.
      i. Recession, unemployment reduced traffic
      ii. Pace may not have researched employers
      iii. Started too big. It may have been best to have started with an expanded vanpool operation.
      iv. Suspects that Pace did not research commute habits. They may not have known whether real people make the commute they were facilitating.

2. **What do you see as the primary travel markets in this larger sub-region? Are there any particular travel characteristics about the I-355 corridor that make it different than the more general travel characteristics of the larger sub-region?**
   a. People use Metra to get in and out of the city
      i. Schaumburg has the most used station in the Metra system
      ii. 1400-1600 per day board Metra
   b. Some demographics
      i. Village has a workforce of about 80,000
      ii. About 7% of village population work in Schaumburg
      iii. About 2/3 of community is in multi-family housing.

3. **What role, if any, do you see for public transportation in meeting current and future travel needs?**
   a. Rail operating along I-355 might attract people. Bus is a harder sell.
   b. To succeed, it will need to be the 'right' mode operating high frequency
   c. Service within Schaumburg
      i. Fixed route service is a high priority for the village
      ii. Much of the Village is now served by dial a ride – 75,000 rides per year
      iii. Peaked at about 100,000 rides a year
      iv. Golf Road is currently served – It needs to be expanded
      v. Meecham Rd. is the next priority. Barrington Road also needs service.
   d. The Schaumburg Trolley service
      i. Started in 2000 operating 7 days a week
      ii. There was little planning. The entire project was put together in 3 months
      iii. It was supported by businesses and did seem to attract some new tenants to the community
      iv. The service is now failing. It has been cut repeatedly over the years. It will probably not survive.

e. Future plans
    i. Village is doing its own branding study. There is a workshop on July 7
    ii. Looking for a cheaper, more flexible, vehicle.
    iii. One possibility is that the Village will fund a Metra commuter service
f. Metra Service
    i. Station has 1268 stalls. Most days it is close to full.
    ii. Sell 800 monthly parking permits.
    iii. 300 additional stalls on the Roselle side of the station.
    iv. 2 shuttle vans park there – accommodate about 10 people
    v. 100 bike lockers
    vi. 1,600 riders – most for that Metra line.
g. Commuter Bus – there are 2 a.m. and 2 p.m. trips
    i. Carries about 5,000 per year
    ii. The reverse commute is served by Route 554. There are some riders
h. Where riders come from
    i. 5-15% live and work in the community (GP note – This is somewhat different from what he said elsewhere in the interview.)
    ii. Fox River area is a big draw
    iii. Many workers come from other nearby communities
i. Current impact on the community
    i. Doesn't think the current center offers a transit benefit to Schaumburg residents. It is entirely given over to regional transit.
    ii. Would like many more routes feeding the facility.
j. Senior facilities
    i. Friendship village – 1000 residents
    ii. Sunrise Village – Plum Grove/Higgins
    iii. Emerald – Wise/Roselle
    iv. Cedar – Irving Park near Wise
    v. Lexington Health – on Roselle
k. Schaumburg just landed 2 new leases
    i. 231 N. Martingale will employ 1500 people
    ii. Nearby on Martingale will employ 800
l. TOD Opportunity
    i. Northwest Corner of I-90 and I-355 corridor

4. Any other comments, questions or concerns about this study?

a. Schaumburg Business Association may be a good source for more information
b. Woodfield Corporate Center has a TMA.

Business Organizations:

North Segment

William Rainey Harper College - Palatine
Tuesday, June 29, 2010 – 7:30 a.m.

Attendees

Participants: Dave Van Horst, Partner, Tenant Advisors (DVH)
Sue Borchek-Smith, Student Activities Communications Assistant, William Rainey Harper College (SBS)

Consultants: John LaMotte, Lakota (JL)
Daniel Grove, Lakota (DG)
George Patton, Nelson\Nygaard (GP)
Barbara Ladner, Pace (BL)
Steven Andrews, Pace (SA)

(These notes have been heavily reorganized in order to group similar subjects.)

1. **As a stakeholder in this process, what agency, organization, company or interest group do you represent?**
    a. DVH – Tenant Advisors, commercial real estate brokers
    b. SBS – William Harper Rainey College, also transit rider with years of personal experience with local Pace routes

2. **What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor?**
    a. DVH
        i. Trying to draw people from Chicago. People are not associating public transit with their commute options
        ii. Believes that within the suburbs, office tenants associate public transit with locating near O'Hare Airport
        iii. Does not think people generally associate north/south movements and 355 corridor with transit.
        iv. Sees a growing interest for public transit, getting out of their cars.
    b. SBS
        i. Much of the college district outside of corridor study area
        ii. Read letter from Buffalo Grove parent whose child could not attend because of public transportation inadequacies
        iii. Word of mouth that deaf want to attend from city
        iv. More people transfer buses at the Woodfield Mall than at the transit center. People will miss their connection if they went all the way to the transit center.
        v. Meecham & Woodfield a popular transfer location with no facilities

3. **What do you see as the primary travel markets in this larger sub-region? Are there any particular travel characteristics about the I-355 corridor that make it different than the more general travel characteristics of the larger sub-region?**
    a. SBS
        i. A number of employees take Metra rail from Chicago to College
        ii. Closest Metra stations are Palatine or Arlington Park
        iii. Pace route 696 takes a long time
        iv. Riders from Chicago take route 606
        v. Wondered whether St Alexis still have service. BL answered that it does
    b. DVH
        i. Many of his clients are close to tollway system
        ii. There is lots of inter-zonal travel within the corridor
        iii. Affordable housing an issue and people travel long distances to find it.
        iv. People from south have more affordable housing. Travel north through the corridor. Areas around Schaumburg are much more expensive.
        v. Sees routes from Downers Grove area to Schaumburg area.

4. **If the region decides to invest in supporting some form of public transit service in the corridor, what is the most effective form of service? .**
    a. SBS
        i. Rideshare may work well for students
        ii. Would like to see more direct services – recognizes this difficult in suburbs
            1. Along Algonquin Road corridor
        iii. Better connections to transit hub at River Road Blue Line stop

5. **What is your perspective on the pedestrian environment, generally, in areas surrounding I-355?**
    a. DVH
        i. It depends – The Woodfield Mall area is OK. There are sidewalks and facilities are relatively close.
        ii. Others not so good
        iii. Walk access an issue for transit users
        iv. Greenspoint complex has good pedestrian access
        v. Discussed Hamilton Lakes area – this is a spread out business park with 3-4 multi tenant buildings. May have a transit market.
    b. SBS
        i. Feels it is definitely dangerous to walk to/from transit stops in industrial areas
        ii. Doesn't see need to go on campus. Would like routes to be more direct.
        iii. Places that people can walk from a central location
        iv. Northwest Point has good walk access
        v. Bus connections are difficult and often time sensitive, leading to riders making pedestrian connections were they are not intended

6. **What is your perspective on how and who should provide connections from transit hubs to major employment sites that are not readily accessible on foot or existing transit?**
    a. DG - Any good park and ride locations
        i. DVH
            1. Woodfield Meadows - 750K sq ft of office

        2. Butterfield & 355
    ii. BL – Esplanade on Butterfield Road

Kathleen Prunty – Alexian Brothers

Telephone Interview
Thursday, July 8, 2010 – 10:00 a.m.

Attendees

Participants: Kathleen Prunty, Chief Workforce & Community Development Officer, Alexian Brothers Medical Center

Consultants: Daniel Grove, Lakota
Tim Payne, Nelson\Nygaard

1. **As a stakeholder in this process, what agency, organization, company or interest group do you represent? List multiple if appropriate.**
    a. Alexian Brothers Medical Center
        i. Facility on Biesterfield Road in Elk Grove Village
            1. 350 beds
            2. 2,910 employees
            3. About 1,000 additional employees for rehab
        ii. Facility at Higgins and Barrington
            1. About 3,600 employees
        iii. Facility off of Euclid Avenue
            1. Corporate Office
            2. About 300 employees
    b. Kathleen commutes by car from Palos Park to Arlington Heights and would love to have transit options.

2. **What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor?**
    a. Recent changes to Pace service had big impact
        i. Alexian Brothers has unique and specialized services that create demand.
            1. Only hospital in the region that treats veterans.
            2. First Magnetoencephalography (MEG) system in Illinois for advanced brain mapping
            3. Only “Virtual Iraq” treatment for post-traumatic stress in the Country
        ii. National Guard has a base in Arlington Heights and many veterans live in the area, creating a unique demand for Alexian Brothers services
        iii. Many veterans and employees counted on Pace bus (Route 305?)
        iv. Alexian Brothers runs shuttle from Itasca Metra station to address need previously met by Pace bus.

3. **What do you see as the primary travel markets in this larger sub-region? Are there any particular travel characteristics about the I-355 corridor that make it different than the more general travel characteristics of the larger sub-region?**
    a. About 10% of employees from Elk Grove Village
    b. About 20% of employees from Chicago
    c. Many employees live in Hoffman Estates
    d. Will try to get full numbers to team

4. **How is the demand for travel different from ten years ago? What changes do you expect to influence travel demand in next 3 to 5 years?**
    a. Believes employees are looking for money saving opportunities.
        i. Many examples of nurses now supporting a family that was previously two incomes before the economic downturn.
    b. Sees a heightened awareness of green/sustainable practices and the impact of transit
        i. Believes the full effect of the Gulf oil spill on public perception and thinking may not be seen for years.

5. **What role, if any, do you see for public transportation in meeting current and future travel needs?**
    a. Definitely providing access to jobs and bringing patients to facilities

6. **If the region decides to invest in supporting some form of public transit service in the corridor, what is the most effective form of service?**
    a. Alexian Brothers provides shuttle from Itasca Metra station mentioned above
    b. Would be open to pre-tax transit checks
    c. Would consider charging for parking to increase demand for transit
    d. Would support other car/van-pooling opportunities, including any new cutting edge options

7. **What is your perspective on the pedestrian environment, generally, in areas surrounding I-355?**
    a. Challenges crossing Biesterfield to their facility. Was a challenge when the bus service was active.

Central Segment

Hamilton Partners – Downers Grove
Wednesday, June 30, 2010 – 7:30 a.m.

Attendees

Participants: Roger Hopkins, Choose DuPage
Ron Lunt, Hamilton Partners
Cheryl Voltz, The Alter Group
Mark Hamilton, Hamilton Partners

Consultants: John LaMotte, Lakota (JL)
George Patton, Nelson\Nygaard (GP)
Beth Gonzalez, Pace
Barbara Ladner, Pace

1. **As a stakeholder in this process, what agency, organization, company or interest group do you represent? List multiple if appropriate.**
    a. Ron - Hamilton Partners developed/involved in several office complexes from Lake Cook Road all the way south. Suburban to suburban commute is very tough. Reverse commute easier.

2. **What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor?**
    a. Ron – Problem getting everybody on the same page. Have project on Thorndale. Got agreement with county, IDOT and others. Nothing got done. IDOT changed stuff and wanted Hamilton to pay. Need coordination with agencies. Also need to concentrate travel time element.

3. **What do you see as the primary travel markets in this larger sub-region? Are there any particular travel characteristics about the I-355 corridor that make it different than the more general travel characteristics of the larger sub-region?**
    a. Ron – Doesn't think PR strategies have the potential to influence suburban to suburban travel. It involves too many transfers.
    b. Ron – As roadway improvements make travel to the Airport easier, these changes will link area together.
        i. John – Communities and transportation agencies have included transit as part of Elgin–O'Hare Expressway Extension plan. Could be good link right into I-355.

4. **How is the demand for travel different from ten years ago?**
    a. Barb - Pace working with Ikea Bolingbrook on transit facility
        i. Use agreement will not pay for spaces
        ii. See possibility for future bus service
    b. Cheryl – Trying to appeal to younger group. This is why she's interested in transit
        i. All agree that reverse commute of young getting more common.
    c. Ron – Increased tolls would push people to transit.

d. Ron – Bad example that IDOT and Tollway headquarters are both located in places without transit.
    i. Mark – Increasing tolls would get rid of short distance driving

5. What role, if any, do you see for public transportation in meeting current and future travel needs?

Thoughts on corridor potential

a. Consensus that transit needs to get people from rail/bus station to worksites
b. Ron – Firms are going downtown to attract young techies
c. Barb – Most communities allowing feeder vans to stay over at night at stations; Barrington has not
d. John - How can transit accomplish the last mile of commute?
    i. Barb explained feeder vans from stations to work –program has 30 vans operating
    ii. Also starting to consider on station to home trip using the Metra feeder vans left at stations – Naperville first
e. Would express help at this location?
    i. Ron – EW easier than NS
        i. Discussion of how long people will ride on a bus – Consensus was that it gets tough over an hour
f. Sites for potential development of a Transit Center
    i. Finley Road north of 88th – 1 million+ of development
    ii. The Chancellory would be great (office/hotel cluster) but it is difficult to get buses into this large site (Hamilton working on this in regard to Elgin-O'Hare Expressway extension)
    iii. Oak Brook, Route 53 and Schaumburg office clusters
g. Ron – Vanpools may be a better option in many markets
h. Owners would be willing to give priority parking to vanpools/carpools
i. Other development sites
    i. Alter & Hamilton control most of the land in this Corridor segment
    ii. In middle segment lots of residential. Not like north where there are forest preserves and greenfields
j. Travel studies
    i. Hamilton has extensive traffic studies for Itasca – will send GP a copy
k. Comments on I-355
    i. Cheaper to drive
    ii. Any service must be time-competitive
    iii. Having to transfer – will send listing
l. Consider commuter lots at Toll oases

South Segment

Will County CED, Joliet
Wednesday, June 23, 2010 – 7:30 a.m.

Attendees
Participants: Mark Jepson, Vice President Human Resources, Silver Cross Hospital

Consultants: Daniel Grove, Lakota (DG)
Tim Payne, Nelson\Nygaard (TP)
Mary Robb, Pace
Barbara Ladner, Pace

(These notes have been heavily reorganized in order to group similar subjects.)

1. **As a stakeholder in this process, what agency, organization, company or interest group do you represent? List multiple if appropriate.**
    a. Silver Cross Hospital
        i. Existing facility in Joliet, building new facility in New Lenox
            1. 2,000 employees
                a. 5%-10% use public transportation at current facility
                b. Another 10% walk to current facility and may need to use public transportation to access new facility
            2. 400 volunteers
            3. 400 physicians
            4. Are a regional draw for employees
            5. New facility has 50 more beds
        ii. 9 off-site facilities in area, including one in Homer Glen on Bell Road
        iii. Making partnerships with the Veterans Administration (VA) Hospital, Children's Memorial Hospital, and Ann Martha's continuum of care facility
            1. Those uses may take up some of the existing facility site after the move.

2. **What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor?**
    a. Believes the I-355 corridor is important to the region
    b. Potential for growth, Silver Cross as key anchor on the corridor
    c. Improvements needed to Route 6 and the intersection of 6 and I-355
    d. Lifeline to Joliet needs improvement

3. **How is the demand for travel different from ten years ago? What changes do you expect to influence travel demand in next 3 to 5 years?**
    a. As growth occurs in southwest suburbs, would like to see increased access in Homer Glen and New Lenox.

4. **What do you think are the major constraints in providing public transit options in the corridor?**
    a. Consumer knowledge of opportunities

5. **What opportunities do you see for addressing these constraints?**
    a. Increased marketing, improved knowledge

6. **Would your municipality or organization be willing to support the development of public transit services in the corridor? How would that support be expressed?**
    a. Organization provides pre-tax transit benefits to employees
    b. Charging for parking on the facilities is a hard sell, competing against Chicago facilities and free parking gives them an advantage.

7. **What is your perspective on how and who should provide connections from transit hubs to major employment sites that are not readily accessible on foot or existing transit?**
    a. Almost nothing is existing around new facility, but there is little to nothing to walk to.
    b. Existing campus lacks sidewalk connections.

8. **Do you have any new sites/locations in mind that could serve as a transit hub for bus service/access? If so, do you envision any potential for transit-oriented development at this location?**
    a. New facility with proposed shopping center across the street

9. **Any other comments, questions or concerns about this study?**
    a. Top priorities
        i. Provide access to new hospital facility.
        ii. Provide range of options for employees and volunteers.
        iii. Better education of what options are currently available.

John Grueling, CEO Will County Center for Economic Development

Telephone Interview
Monday, June 28, 2010 – 5:00 p.m.

Attendees

Consultants: Tim Payne, Nelson\Nygaard
Daniel Grove, Lakota
George Patton, Nelson\Nygaard

1. **As a stakeholder in this process, what agency, organization, company or interest group do you represent? List multiple if appropriate.**
   a. Represents Will County Economic Development
      i. Business activity is about 300% ahead of last year. Lots of bargains for those who can take advantage.

2. **What concerns do you hear from your clients, tenants, and/or constituents about travel in the corridor?**
   a. Biggest challenge is tying communities to the corridor
      i. I-80 extension helped along
      ii. Some communities are in a better position to adapt than others. Most looking at auto. Hardly thinking of transit.
      iii. I-355 provides a feature that links local communities
   b. TP - What type of employer would be attracted to Will County because of types of people here?
      i. Growth is coming from other parts of Chicago area.
      ii. About 60% of labor force leaves the county for their job.
      iii. A similar percentage of people come to jobs in Will County.
      iv. Currently in a transition period where there is a disconnect between labor market and types of jobs
      v. Will Co. CED is focused on attracting larger employers. Will release a labor force projection within about 30 days. "Workforce analysis of targeted industries." Will send to us. Geared towards the skill sets needed for targeted industries.
   c. Believes the next big thing to affect growth is electric cars. Will make autos less interesting and more functional.

3. **What do you see as the primary travel markets in this larger sub-region? Are there any particular travel characteristics about the I-355 corridor that make it different than the more general travel characteristics of the larger sub-region?**
   a. Communities allowed development to occur without adequate transportation.
      i. The 355 corridor was opposed by anti-sprawl people because of its impacts
      ii. Development happened anyhow.
      iii. The freeway is both a road of regional and local significance
         1. Much of the traffic is localized.
         2. That sort of movement is different from what was expected
         3. Transit needs to think about this in addition to Journey to work
   b. Facts of life in corridor

i. Development will continue – probably 3 years from seeing single-family development resume. Put brakes on proposed retail. Believes equilibrium will be 1000-2000 homes per year county-wide. "Good healthy growth."
1. Development will occur in this corridor.
2. There's just lots of land
3. So much is available it may 'force' a housing recovery, which will spur recovery of retail development.
4. Currently about 1 ½ - 2 million square feet of retail that is now on hold.
5. Believes one or two very large project to go live after residential comes back.
6. Thinks employment growth will take longer
   a. Vacancy rates are around 35-40%
7. Not realistic to think they will land big employers in the short term.

ii. TP - What is potential for hospital development?
1. Silver Cross is a replacement facility approach 1 million square feet
2. Spawned competing health facility buildings in immediate area. Concerned that retail did not happen and area is turning to medical offices.
3. Healthcare was fastest growing market segment in 2009
4. Without supporting population growth there will be a definite equilibrium that will be reached.
5. Bolingbrook Hospital is also a new facility.
6. Concerned that prime retail space not be eaten up by medical facilities

iii. <u>Feels certain that the next regional center will be build at Route 6 and 355</u>

c. Supports transit but does not believe there currently is any of value in county
   i. There was initial opposition to the half cent sales tax
   ii. Culture of transit very different in Will County, seen as a generational problem/issue
      1. Building 355 ran counter to transit ethic.
   iii. Green/sustainable movement will shift values over time.
   iv. Creating "quality of place" to live and work will also shift trends.

4. What role, if any, do you see for public transportation in meeting current and future travel needs?

a. Consultant team has heard priorities are:
   i. Commuter rail service
   ii. Pedestrian
   iii. E-W transit
   iv. N-S transit in 355 corridor
b. JG's priorities:
   i. Would reverse the list with the exception of 355
   ii. Doesn't think trains are a big piece in the puzzle
   iii. Huge opportunity for intra-county transit.
   iv. Lots of people who would use some form of transit
   v. E-W connections important. Will County has terrible E-W travel options which transit may be able to address.
   vi. Need to worry less about how fast people can be moved into the city.
c. Was involved in a TMO in Denver

5. If the region decides to invest in supporting some form of public transit service in the corridor, what is the most effective form of service?
See previous answer.

6. What do you think are the major constraints in providing public transit options in the corridor?
   a. Spoke and hub development of Chicagoland has stymied certain types of development, and therefore transit opportunities, in the County
   b. Subdivisions made no allowance for transit
   c. Many people had understanding of transit when they moved from Chicago
   d. They moved with the expectation that transit would not be available.
   e. They don't see transit as a solution to congestion.
   f. TP – This may be an options building period. Reserve the facilities so they'll be available in the future.
      i. JG – Not sure this is on communities' agenda.
   g. All transit and bus recommendations were removed from the Will County 2030 plan.
   h. If Pace doesn't lead the discussion nobody will.

7. What is your perspective on the pedestrian environment, generally, in areas surrounding I-355?
   a. TP – What is your perspective on the pedestrian environment in Will County?
      i. Has not been happening. Problem is that traditional downtowns are not thriving and are not employment centers.
      ii. Newer communities are not built in that manner. Designed for autos only.
      iii. Walk-ability is not going to happen
      iv. Some great TOD opportunities and some plans for TOD development.
      v. Not clear whether cities and developers will support this movement. Fears communities will not aggressively pursue and developers will not pursue without incentives.
      vi. Right now TOD is not a high priority.

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Pace Suburban Bus

I-355 Corridor Transit Development Technical Memorandum #2

Existing Conditions and Initial Market Assessment

September 2010

NELSON NYGAARD

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Table of Contents

List of Figures

Page

List of Tables

Page

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Purpose of Study and Market Assessment

The I-355 Corridor is over 30 miles long end to end as defined for this project. Along its length the development pattern varies from emerging suburban development to well established suburban shopping and business centers. Areas located just a mile or two off the corridor are approaching urban densities. It is in the context of this diverse collection of land uses that this study will chart a course for the development of Pace service both in the long and short term. The diversity of the corridor is further defined by the more than 30 different city and county jurisdictions that are impacted by the corridor as well as a diverse group of other interests with varying transit needs.

A significant portion of this study will be a technical analysis of the current (subject of this technical memorandum) and future travel market and travel market conditions. The purpose of this Technical Memorandum is to clarify how the current travel market in the metropolitan area and transportation system function, while understanding the function and importance of I-355 within that market and clarifying the a potential role for transit.

Definition of Study Area

The I-355 corridor affects an urban area that is 30 to 50 miles long and about 10 miles wide, and it intersects many highways and commuter rail lines that connect suburban areas with other suburban areas and suburban areas with the Chicago central area. Technically, the study corridor is comprised of three road components from south to north: I-355, from I-80 until it merges with I-290, continuing on I-290 to the intersection of I-290 and I-90, then on IL-53 to its intersection with West Lake Cook Rd. Note that I-290 and IL-53 are concurrent from the intersection of the Elgin-O'Hare Expressway/Thorndale Ave on the south to the interchange with I-90 on the north. For the analysis conducted and documented in this technical memorandum, the market area is defined by a ten mile wide area with I-355 in the middle (see Figure A).

Summary of Findings

Major findings about the travel characteristics of the I-355 corridor and the travel market characteristics of the surrounding areas were revealed through the analysis conducted in this phase of the I-355 Market Assessment. The major findings are summarized as follows:

- There is significant north-south travel within the corridor.
- Much of the market area north-south travel, for both home-based work and home-based other trips, is short distance, i.e. less than 10 miles.
- There is significantly more travel in the northern part of the corridor (north of I-88) than in the southern part (see Figures B and C).
- Preliminary analysis suggests that travel demand in the northern part of the corridor may be strong enough to support north-south transit service at the arterial level.
- Market areas that could support transit service within the corridor are in Pace service gaps today (see Figure D).

These findings are supported by analytical conclusions detailed in the following sections. The first section presents major evidence that directly relates to the findings above. The second section lists other significant findings that influenced the analysis.

Major Analytical Conclusions

1. **There is significant north-south travel within the corridor, but travel in the market area, as defined for the study, tends to be short-distance. The most significant long-distance travel is east-west.** Regional travel demand has a strong east-west orientation connecting the suburbs with Chicago. This is true for both vehicle trips and transit trips, and is illustrated by the geometry of the transportation network in the corridor. The I-355 corridor is crossed by four major east-west commuter rail corridors and four major expressways and tollways, which provide strong east-west connections to/from the corridor area. North-south travel mainly occurs on I-355, arterial streets, and state highways.

2. **Most north-south travel is done between contiguous market areas**. Most north-south travel is shorter in distance than east-west travel. However, there is a continuous north-south travel demand pattern that encompasses many communities and turns over zone-by-zone. Home-based work trips show a major north-south travel pattern in the northern segment of the corridor to the east of I-355, between Downers Grove Lombard, Addison, and Elk Grove Village. Home-based other trips show a similar zone-by-zone turnover pattern on both sides of the corridor, from Palatine to Romeoville and from Arlington Heights to Lemont. This travel is illustrated in Figures A and B.

3. **Commute-to-work trips within the corridor are roughly equal in size to commute trips between the region and points in the corridor.** According to the regional travel demand model, 45% of the home-based work (commute) travel around the I-355 tollway is internal travel to and from communities within five miles of the I-355 mainline. Travel between the corridor and places east (central Chicago and inner suburbs) is about 35% of total corridor travel. Travel between the corridor and places to the west (suburbs west of Schaumburg and Bolingbrook) is about 20% of total corridor travel. Origin-destination analyses show that most travel between market areas within the five-mile buffer area is either community-based travel (intra-community) or short-distance travel to neighboring market areas.

4. **Non-commute trips in the corridor generally stay within the corridor.** According to the regional travel demand model, 66 percent of home-based other trips in the corridor have both origins and destinations within the corridor market area. Home-based other trips are more than two times larger than home-based work travel for trips within corridor market areas or intra-community trips.

5. **More travel occurs in the northern part of the corridor than in the southern part.** The northern segment of the corridor, from Palatine and Arlington Heights to Lisle and Downers Grove, produces and attracts more travel than the southern segment of the corridor. The difference in travel volume is illustrated in Figures A and B, which display major north-south corridor connections within the study area. Travel within, to, and from the northern portion of the corridor (north of I-88) is about two times greater than travel within, to, and from the southern portion of the corridor. The difference in travel volume between the northern and southern segment is explained mostly by larger population and employment markets. The northern part of the corridor contains denser development, more travel between market areas, and more travel to/from points outside the study area.

6. **Most east-west long-distance transit commute travel is served by commuter rail, while most north-south transit travel is served by limited bus service or no service at all.** Pace appears to be serving a number of functions: filling in the gaps between commuter rail corridors, feeding east-west travel across the Cook-DuPage boundary line, and providing limited north-south service between rail lines. Metra draws most of its riders from urbanized areas around its rail stations.

7. **Transit service demand in the corridor area appears better suited for arterial based services.** Demand for transit service in the study area appears to be better suited for all-day arterial corridor service that turns over passengers every few miles contrasted with highway-based service traveling long distances with limited stops. The travel demand analysis indicates that demand for long trips is relatively small and likely not large enough to sustain transit service. Alternatively, demand for north-south short trips is large enough to develop sustainable transit corridors for major stretches of the study area assuming other transit supportive factors are also present. For example, the analysis suggests that streamlined versions (i.e. faster, more direct and more frequent services) of Pace bus routes 711, 715, and 834 may work better than short-distance circulators and feeders or long-distance express services. The rationale lies in the ability to turnover passengers and cover trips of more than 2 miles and less than 10 miles, which appears to be the dominant trip length range for travel within the corridor market area.

8. **Market areas showing above average propensity to use transit coincide with market areas showing the highest travel demand. However, these are overwhelmingly choice markets.** The area within five miles of the I-355 Tollway appears to be experiencing a transition in the demographic and socioeconomic composition of its residents. The area has average household sizes that are relatively smaller than urban Chicago or suburban areas west of the corridor and a growing population of seniors and empty nesters. In addition, the accessibility that I-355 offers is progressively changing the residential and employment composition of the area, with new infill developments and growing commercial and employment development on east-west corridors that intersect the I-355 corridor. Market areas in the corridor that show a moderate-to-high propensity to use transit (measured through a Transit Orientation Index) coincide with market areas showing the highest travel volumes and potential for transit demand. They are also the areas where current bus service levels are thinnest, and where the transit network has visible gaps in coverage.

9. **Transit travel on north-south corridors that parallel I-355 is feasible from both a transit demand standpoint and a corridor availability standpoint.** Based on the analysis of the street network, it appears that north-south travel is possible on both sides of I-355 on a number of arterial corridors where transit service would be feasible. This is particularly true along the corridors on the east side of I-355. The next phase of the study will assess the details of these linkages in terms of the potential market and suitability for transit that will meet the needs of the market.

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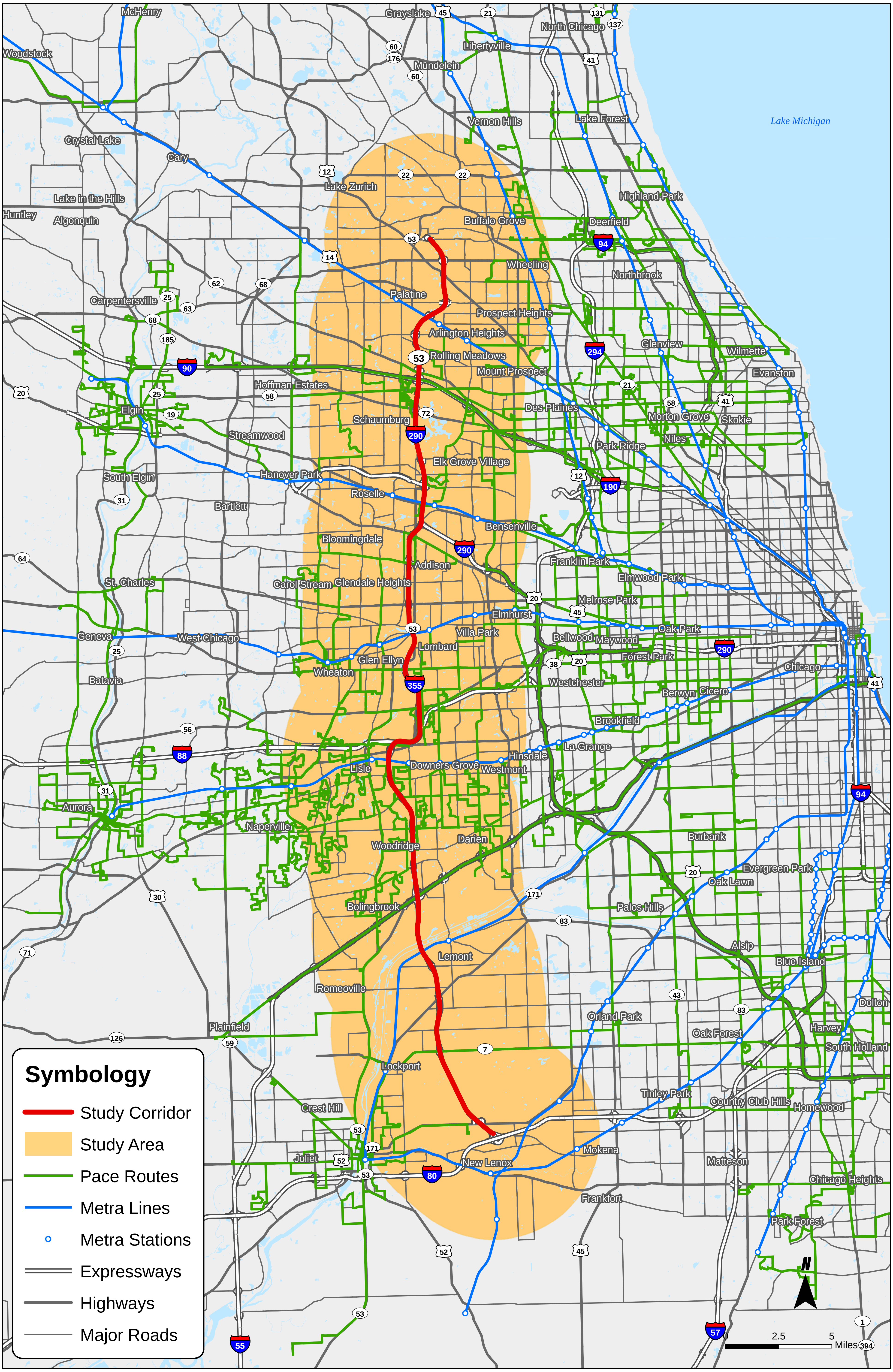
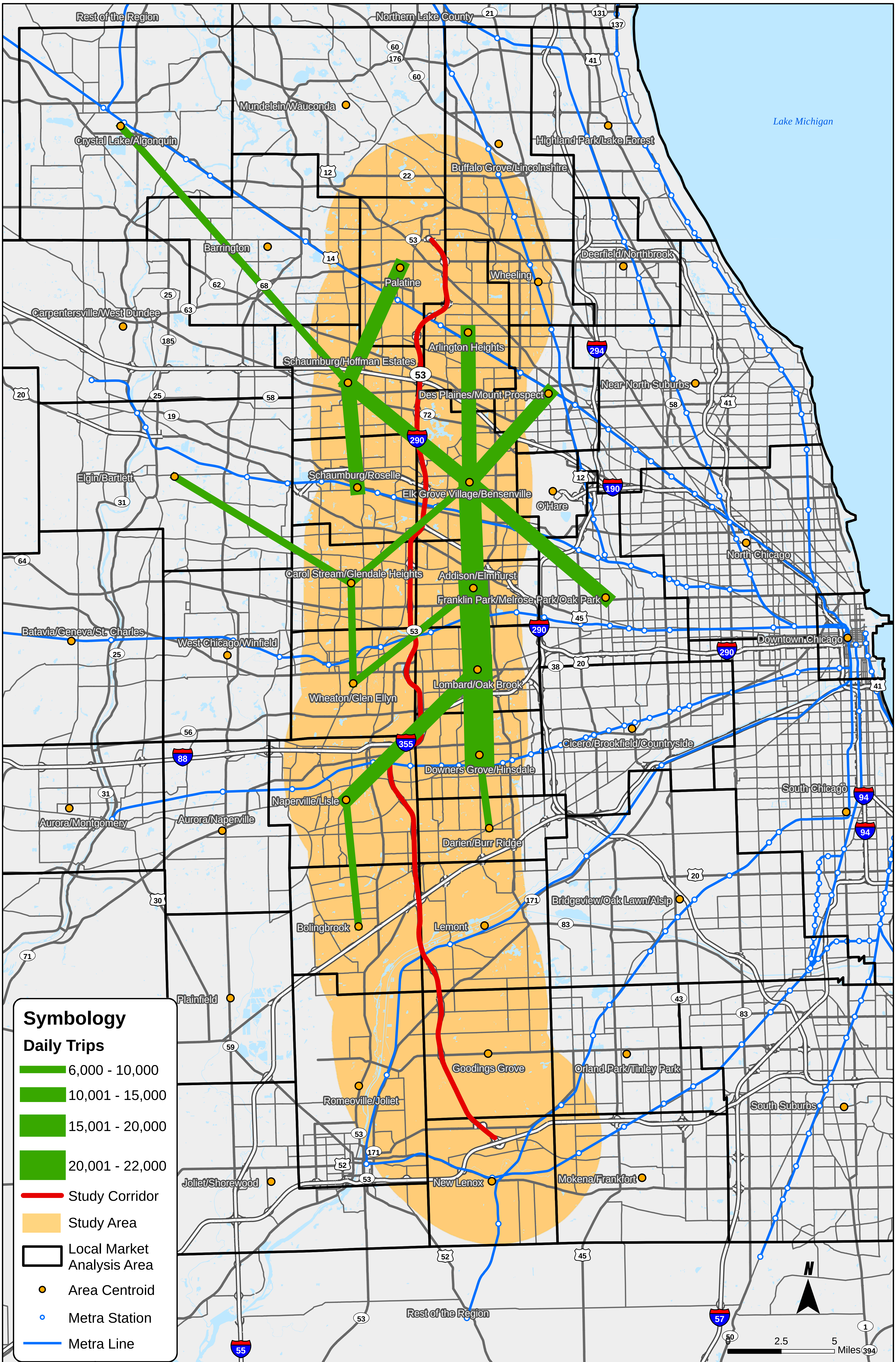
Figure A Definition of Market Area for Study



Source: Pace Suburban Bus, State of Illinois, ESRI

Nelson\Nygaard consulting associates

Figure B Corridor Connections for Major North-South Travel Patterns - Home-Based Work



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

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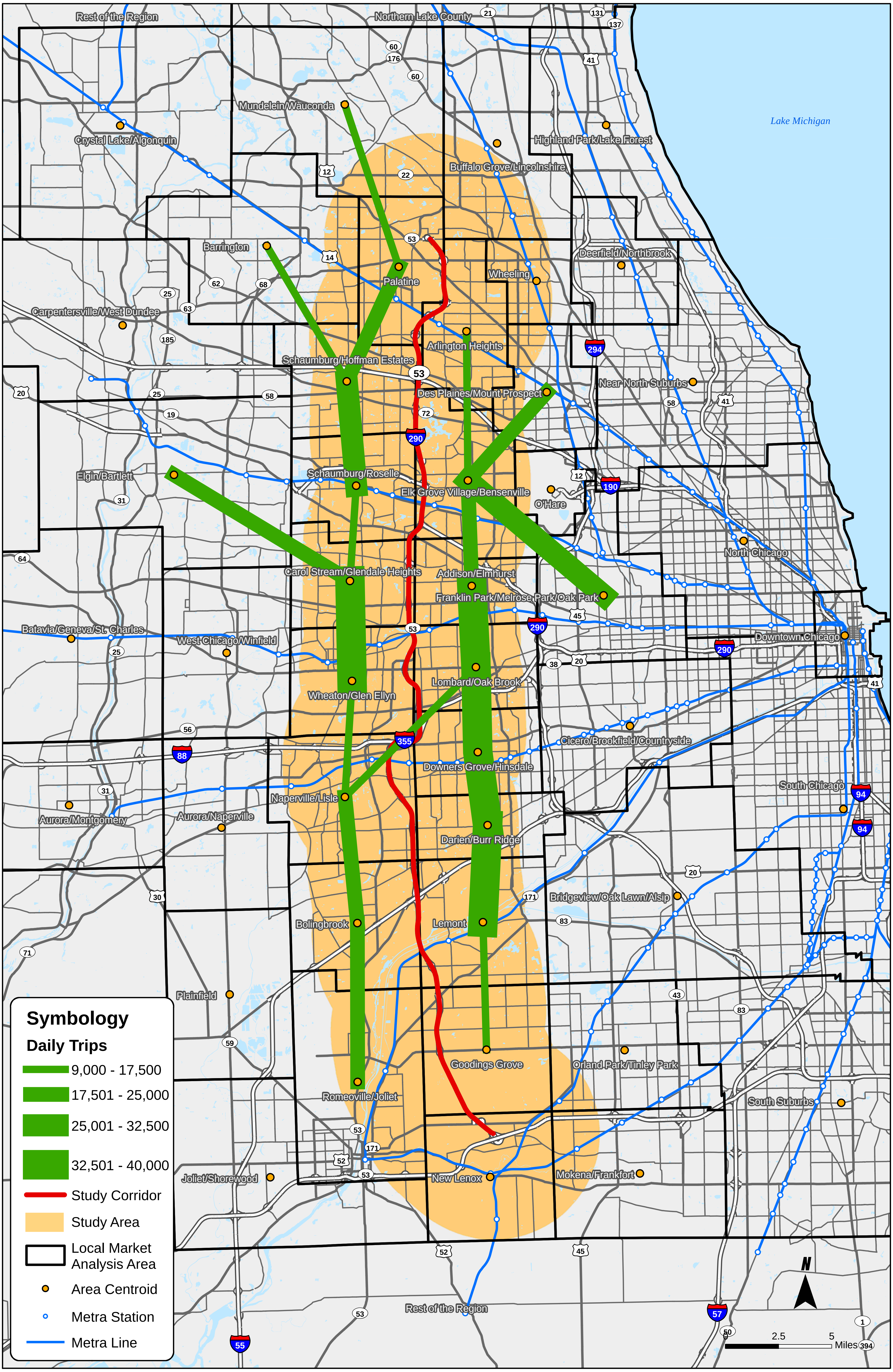
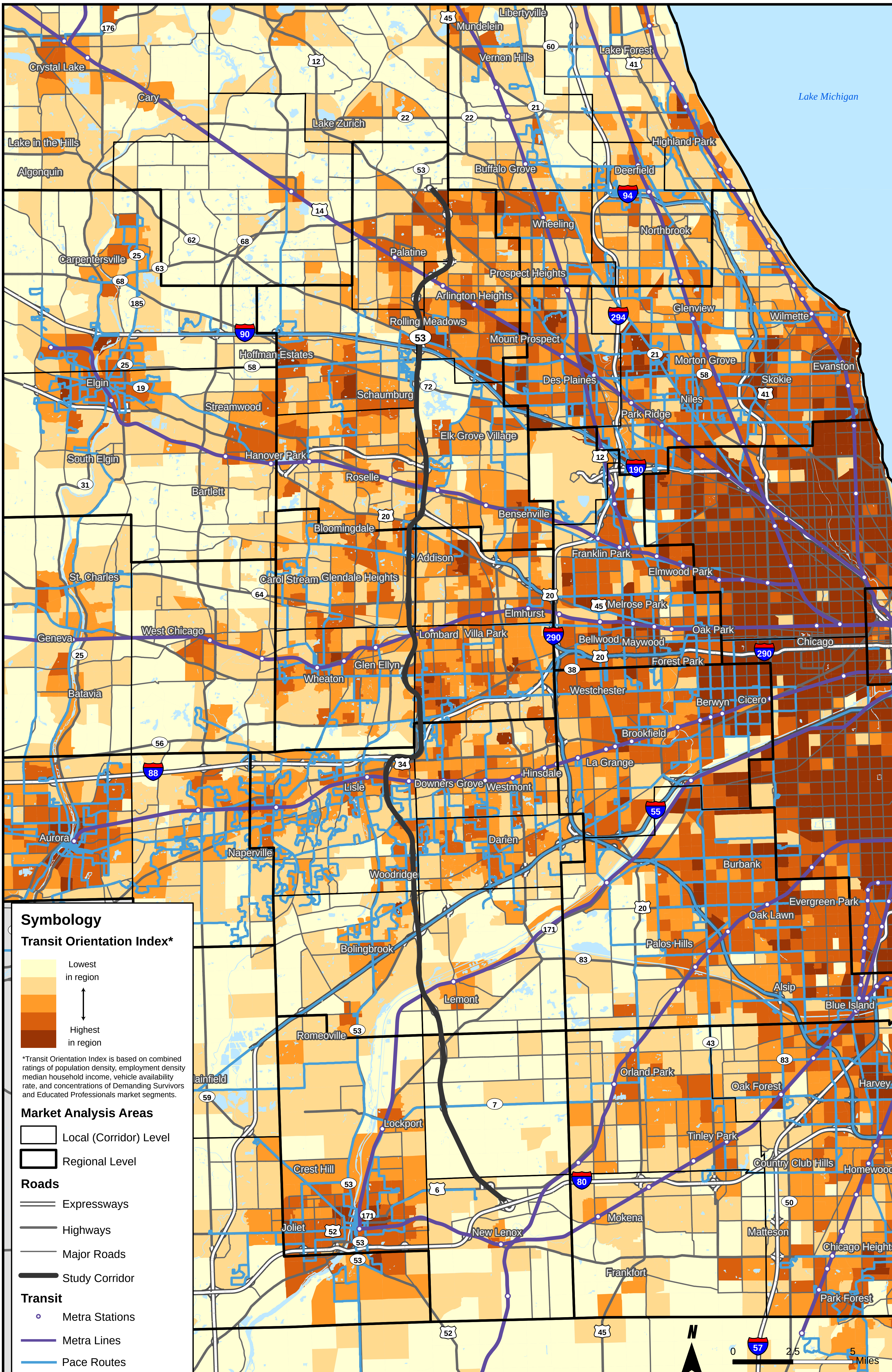
Figure C Corridor Connections for Major North-South Travel Patterns - Home-Based Other



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

Figure D Transit Orientation Index with Pace Network



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consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

Other Significant Findings

10. **Employment is dispersed throughout the region; however, a concentration of regional significance exists in the corridor area.** Employment markets are highly dispersed throughout the region for all economic sectors (i.e. retail, services and manufacturing). However, there are a few concentrations of regional significance in the study area. These are found along major transportation nodes (i.e. Schaumburg, Itasca, and Elk Grove Village on I-355 and I-90, and Lombard, Lisle and Downers Grove on I-355 and I-88), and along a few major corridors (i.e. Main Street/Highland Avenue, Arlington Heights Road, and IL-83 Busse Road). Employment areas around O'Hare International Airport are of regional significance and attract trips from the entire region. The quadrant on the west side of O'Hare between the Busse-Woods Forest Preserve, the airport, and the I-90 and I-290 corridors is a major employment magnet. It attracts significant volumes of trips from all surrounding zones and shows potential for increased transit service to connect local market areas.

11. **Residential origins outside Cook County and west of the I-294 Tri-State Tollway are dispersed throughout the urban area and are comprised mostly of low-density, single-family housing.** Residential development dispersed throughout the urban area west of Chicago is low-density with many areas lacking pedestrian accessibility to major street corridors. Transit service in these areas is challenged by the absence of sidewalks, direct paths to street corridors, lack of crosswalks, and presence of natural and man-made barriers.

12. **The I-355 corridor market area contains both a major residential market and a major employment market for internal and external trips.** Data from the US Census Bureau Longitudinal Employer-Household Dynamics program show that most residents of DuPage and Will Counties have to travel outside the county for jobs. Although many residents within the I-355 corridor study area travel long distances to places throughout the region, the majority make shorter trips that are primarily within the corridor or in areas just outside the corridor. Most north-south work trips in the corridor may be explained by this demand pattern. In contrast, most east-west travel may be explained by travel between corridor market areas and Cook County (Chicago).

13. **The I-355 corridor is a transition zone between city and suburbs, showing both the weaknesses of suburbs and the strengths of traditional urban areas to sustain transit.** Household characteristics such as size, income, and age groups vary starkly between areas east and west of the corridor mainline. Inside the corridor, residential market areas are mostly comprised of single-family, low-density housing; however, residential developments are slightly denser and older on the east side of I-355 than on the west side. Employment density is higher on the east side, as well. In addition, the street network on the east side of I-355 appears to be comprised of slightly longer and continuous corridors that are more evenly spaced (about one mile apart) than those on the west side. The corridor market area appears to have potential for significant population and employment growth and appears to provide an east-west transition zone for the region in its westward sprawl.

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Introduction

The I-355 corridor affects an urban area of 30 to 50 miles long and about 10 miles wide. This area includes dozens of cities and jurisdictions, and intersects many highways and commuter rail lines that connect suburban areas with other suburban areas, and suburban areas with the Chicago central area. The purpose of this Technical Memorandum is to clarify how the travel market of metropolitan area and transportation system function, while understanding the function and importance of I-355 within that market and system and clarifying the potential role for transit within that market.

Market analysis tasks conducted during this phase of the study include a review of existing transit service conditions, analysis of existing transit markets and market segmentation data and studies, an extensive review of origin-destination travel demand patterns in the region and within the I-355 corridor, a comprehensive review of land use patterns and employment characteristics, and the identification of transit markets with demand potential that are currently underserved or do not have access to service (network gaps).

The first step of the market assessment is to review the goals of the entire study and categorize and prioritize the objectives to define the methodology of analysis and identify the project inquiries that deserve the most emphasis. The following two major areas of inquiry are defined for this study:

- Research the feasibility of operating effective regional express services along I-355, including:
  - Identifying viable markets to support effective transit service along the I-355 corridor
  - Identifying key infrastructure needs to support transit service in the corridor
  - Identifying supporting strategies and design/land use policies that can be adopted at the local level to develop effective transit services and markets
  - Identifying potential partners to implement and support I-355 service
- Develop an evaluation methodology to prioritize implementation of feasible service alternatives that accounts for both locally adopted supporting strategies and policies and markets with the greatest transit demand potential.

The research methodology and corridor feasibility analysis are also informed by relevant regional studies and land use/transportation plans that have been developed recently (reviewed on Chapter 1 of this report), including:

- Vision 2020: The Blueprint for the Future
- Arterial Rapid Transit Study
- DuPage Area Transit Plan 2020
- Elgin-O'Hare West Bypass Study
- Cook-DuPage Corridor Study
- Metra STAR Line
- GO TO 2040
- South Cook-Will County Service Restructuring Initiative, Market Research Report

The project approach and analysis methodology were formulated based on the study goals and the planning knowledge accumulated to date in the Chicago Metropolitan Agency for Planning (CMAP) area. This memorandum discusses the transit market analysis methodology and its results.

Next Steps

In the next phase of the study, market areas with transit demand potential will be combined with more extensive analysis of specific corridors to develop potential transit service alternatives in the I-355 corridor study area. The project team will evaluate the impacts of transit service investments on corridors and markets with regards to local and regional connectivity, level of service, and transit service utilization performance. A transit demand analysis database or model that combines markets and corridors will be developed to evaluate transit service investments on a corridor-by-corridor basis. Corridors presenting the best chance for success or the biggest impact on connectivity, service, and utilization metrics will be selected for development of a detailed service implementation plan. This analysis will be developed for the year 2010 base scenario, or current demand conditions, and for the year 2030 future scenario, or future demand conditions. This report only includes results for year 2010 existing conditions. Year 2030 projections will be included in the next phase of analysis.

An important component of this implementation plan will be the determination of corridors with transit demand potential that have deficient accessibility or network connectivity with their surrounding markets, and thus cannot effectively reach their market potential. Identification of infrastructure investments, design, and land use policies and strategies for improving transit accessibility will be analyzed and discussed with local jurisdictions to gauge local support potential and partnerships.

The final product of the study will be a summary of recommendations for implementation and a transit demand analysis and evaluation tool to aid in the successful implementation of transit services and corridors.

Chapter 1. Existing Studies and Plans

Transportation in metropolitan Chicago is governed and influenced by many planning and policy bodies, including state agencies (Illinois Department of Transportation, Illinois State Toll Highway Authority), transit agencies (Regional Transportation Agency, Chicago Transit Agency, Metra, Pace), the Chicago Metropolitan Agency for Planning, councils of mayors and managers, and individual counties and jurisdictions. These entities have produced many regional planning efforts in recent years. This chapter summarizes planning efforts conducted in the past ten years that have studied and proposed improvements to transit service within and around the I-355 corridor.

1.1 Vision 2020: The Blueprint for the Future Plan

Vision 2020: The Blueprint for the Future was developed in 2002 and serves as Pace's long range plan. It proposed a "Suburban Mobility Network" to include three components:

- Community-Based Services
- Passenger Facilities
- Line-Haul Bus Routes

Community-based services include a number of different service types that vary between communities. The plan identified 90 service areas to be served by three service levels:

- "Low" service areas have the least population and employment density and are best served by vanpools, subscription services, demand-response vans, and flexible bus routes.
- "Medium" service areas have higher populations and employment densities and represent the majority of the region in terms of activity centers. A wide range of services may be considered in these areas including vanpools, subscription services, demand response vans, flexible bus routes, and traditional fixed bus routes.
- "High" service areas contain dense urban centers that may be suitable for historic trolley and/or circulator services, in addition to other services under consideration for "Medium" service areas.

Vision 2020 identified 15 regional transportation centers and 150 community transportation centers where riders can make connections between transit services. Regional transportation centers serve more routes and are located at activity centers with regional significance. Most of the transportation centers are located at transit facilities, such as rail stations and park & rides, although some are located at other centers, such as Yorktown Mall.

Line-haul bus routes are designed to be the backbone of the system using Bus Rapid Transit (BRT) technology and techniques. Two types were identified: Expressway/Tollway Routes and Arterial Routes. Expressway/Tollway Routes operate at high speeds, connecting regional activity centers with few stops in between. Arterial Routes travel on arterial streets and take advantage of Pace's Intelligent Bus System. The selection and implementation of arterial routes was the focus of the Arterial Rapid Transit study, which is discussed later in this chapter.

Figure 1 Pace Vision 2020 Transportation Plan

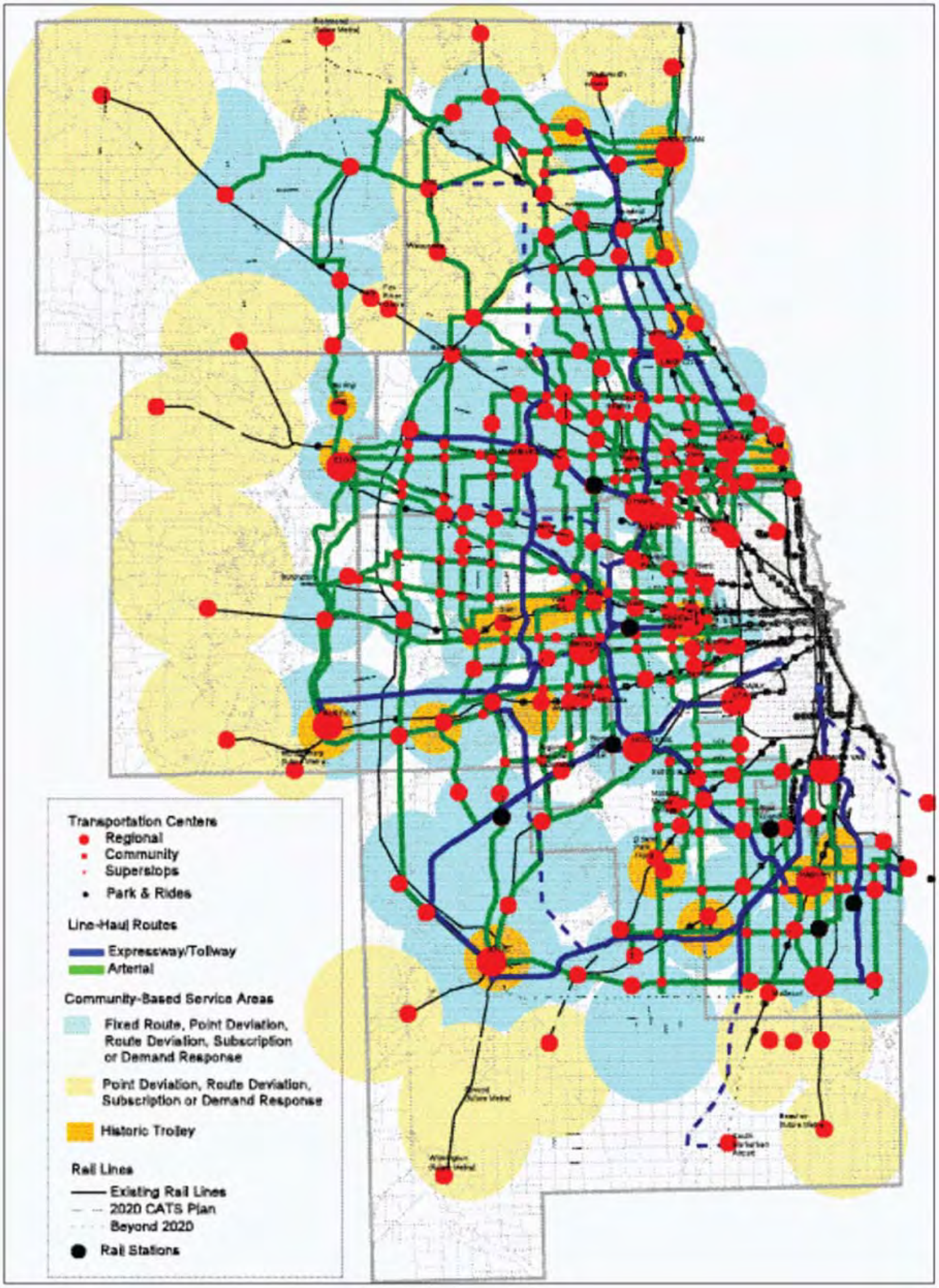


Table 1 Pace Vision 2020 Regional Transportation Centers

Name	Location
HARVEY	At existing Harvey Transportation Center / Metra MED station
95 / DAN RYAN	At existing CTA 95 / Dan Ryan Red Line Station
JOLIET	At existing Joliet Union Station
HODGKINS	At UPS Willow Springs facility
MIDWAY	At existing CTA Midway Airport Orange Line station
AURORA	At existing Aurora Transportation Center / Metra BNSF station
OAKBROOK	At Oakbrook Center Shopping Center
FOREST PARK	At existing CTA Forest Park Blue Line station
ELGIN	At existing Elgin Metra MD-W station
SCHAUMBURG	At planned Woodfield Mall-area BRT station
ROSEMONT	At existing Rosemont CTA Blue Line station
O'HARE	At existing O'Hare Transfer Metra NCS station
OLD ORCHARD	At Old Orchard Shopping Center
LAKE COOK	At existing Lake-Cook Road Metra MD-N station
WAUKEGAN	At existing Waukegan Transportation Center / Metra UP-N

Note: Highlighted cells indicate regional transportation centers that are within the I-355 corridor market area.

Restructuring Initiatives

As a part of Vision 2020, Pace has embarked on a number of restructuring initiatives throughout its service area. The goal of the initiatives has been to improve and increase service to make transit more attractive. To date, five initiatives have been completed:

- Elgin Area Restructuring Initiative
- North Shore Restructuring Initiative
- North Central Service Shuttle Restructuring Initiative
- Fox Valley / Southwest DuPage Restructuring Initiative
- South Cook County / Will County Restructuring Initiative

The initiatives most relevant to this project were the Fox Valley / Southwest DuPage and South Cook County / Will County initiatives. The Fox Valley / Southwest DuPage initiative targeted the communities of Aurora, Bolingbrook, Lisle, Naperville, Warrenville, and Woodridge. Most of the changes occurred to routes operating primarily in Aurora, and included service changes, deletions, and the addition of route 529. The South Cook County / Will County initiative has been the largest to date and includes routes that account for approximately 40 percent of Pace's ridership. Routes were restructured, deleted, and added. Changes included greater frequencies, longer service hours, and increased bus stop amenities.

1.2 Arterial Rapid Transit Study

Pace's Arterial Rapid Transit Study was completed in 2009 and expanded on the idea of line-haul bus routes introduced in the Vision 2020 plan. Twenty four key travel corridors were identified and evaluated in the Arterial Rapid Transit Study to determine which corridors should be implemented first. Five criteria were used to evaluate the corridors: existing ridership, potential to generate new riders, regional connectivity, support from local communities and regional institutions, and potential for travel time savings.

The study proposed a phasing plan for the implementation of ART routes. It recommended implementing the following six routes within 10 years:

- Milwaukee ART – from the CTA's Jefferson Park Station to Golf Mill Mall (7 miles)
- Dempster ART – from the CTA's Davis Street Station in Evanston to O'Hare K-N-F (15 miles)
- Oak Brook ART – from the CTA's Forest Park Station to Yorktown (12 miles)
- Harlem ART – from Milwaukee Avenue to 95th Street (28 miles)
- 95th Street ART – from the CTA's 95th Street Station to Harlem Avenue (9 miles)
- Halsted ART – from the CTA's 95th Street Station to 159th Street (16 miles)

On May 6, 2009, the Pace Board approved the Milwaukee, Dempster, and Oak Brook routes to proceed into implementation.

The medium-term and long-term networks identified in the study would include three lines traveling north-south close to the I-355 corridor: a line on Route 83 from Harvey to Golf Road, the J-Line identified in the DuPage Area Transit Plan (discussed below), and a line on Route 59 in Lake, Cook, DuPage, and Will Counties.

The study also defined the Arterial Rapid Transit (ART) concept, which is a form of BRT adapted to meet the needs of Pace's travel market. ART routes will have the following characteristics:

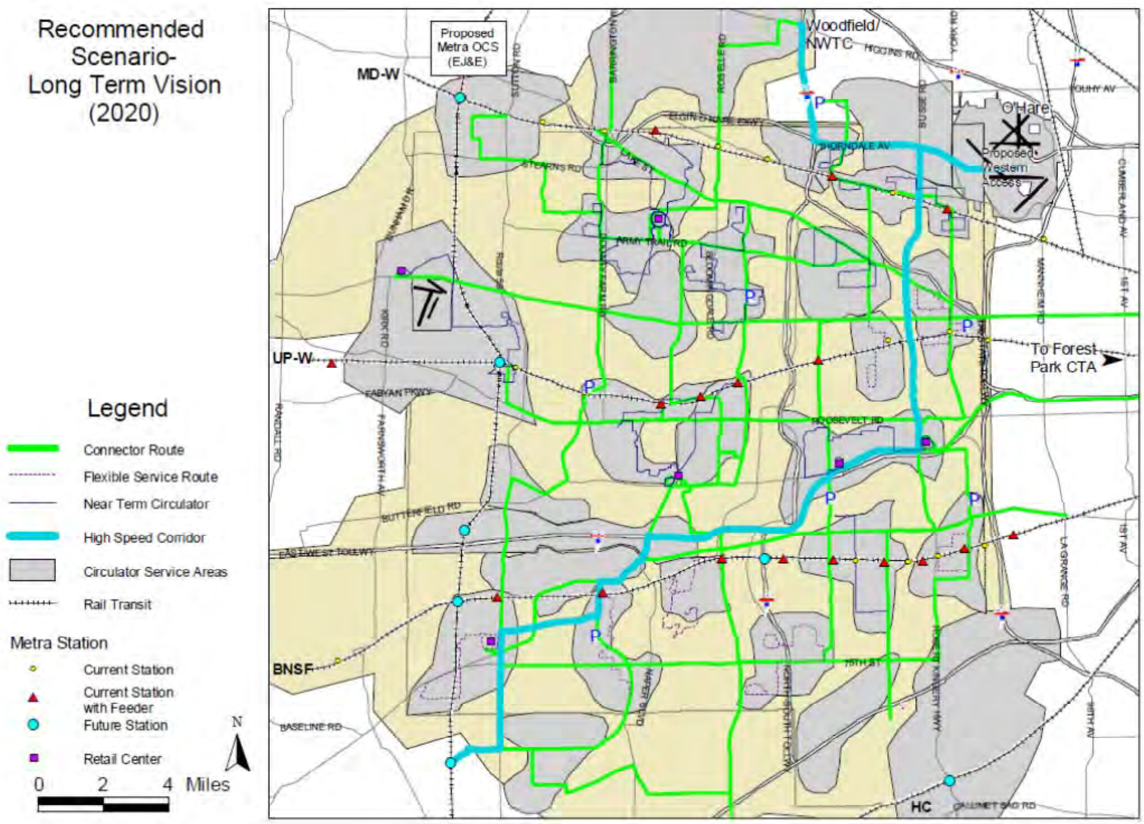
- Arterial street, mixed traffic operation with queue jumps where applicable
- Specially branded low-floor 40 foot vehicles
- Specially branded and designed ART shelters
- Primarily on-board fare collection with off-board collection at peak times and peak volume stations
- Transit signal priority and real-time information signs at stations
- Branding throughout the ART system
- Operation by dedicated ART supervisors
- ART vehicles will be given maintenance priority

1.3 DuPage Area Transit Plan 2020

In 2002 the DuPage Mayors and Managers Conference and DuPage County sponsored the creation of the DuPage Area Transit Plan to create a long-term vision for transit in the county. The plan used technical analysis and a high level of public participation to document current transit services and plan future services in the county. An update to the plan is currently underway.

The plan identified three types of transit services to serve DuPage County in 2020: a high speed corridor, connector routes, and community circulators. These routes were designed to work in conjunction with Metra rail, Pace feeder routes, and paratransit services to create an integrated transit system for the county. Transit centers would facilitate connections between different services. The long-term vision is displayed in Figure 2 below.

Figure 2 DuPage Area Transit Plan Recommended Long Term Vision



The high-speed corridor would provide fast service within DuPage County and into northern Cook County. The line would begin at the proposed 95th Street Metra STAR Line station in Naperville, serve Aurora, Naperville, and Oak Brook, and have two terminals at O'Hare International Airport and the Northwest Transportation Center in Schaumburg. The plan envisioned the route as an express bus in the short-term and as a BRT line in the long-run with transit signal priority, queue jumps, real-time information, and segments of exclusive right-of-way. Service would operate at 10 minute frequencies in peak periods and 15 minute frequencies in off-peak periods. The line has since been dubbed the "J-Line" and has continued to be considered in regional transportation plans. It was evaluated in the Cook-DuPage Corridor Study and the Elgin-O'Hare West Bypass Study, and included in GO TO 2040 on the fiscally unconstrained list of projects.

The second type of service proposed by the DuPage Area Transit Plan was a network of connector routes that would be high-frequency, limited stop routes running on arterial streets. Services would generally run north-south and east-west, creating a grid that would serve much of DuPage County. The routes would facilitate long distance travel within the county and connect to local circulator routes.

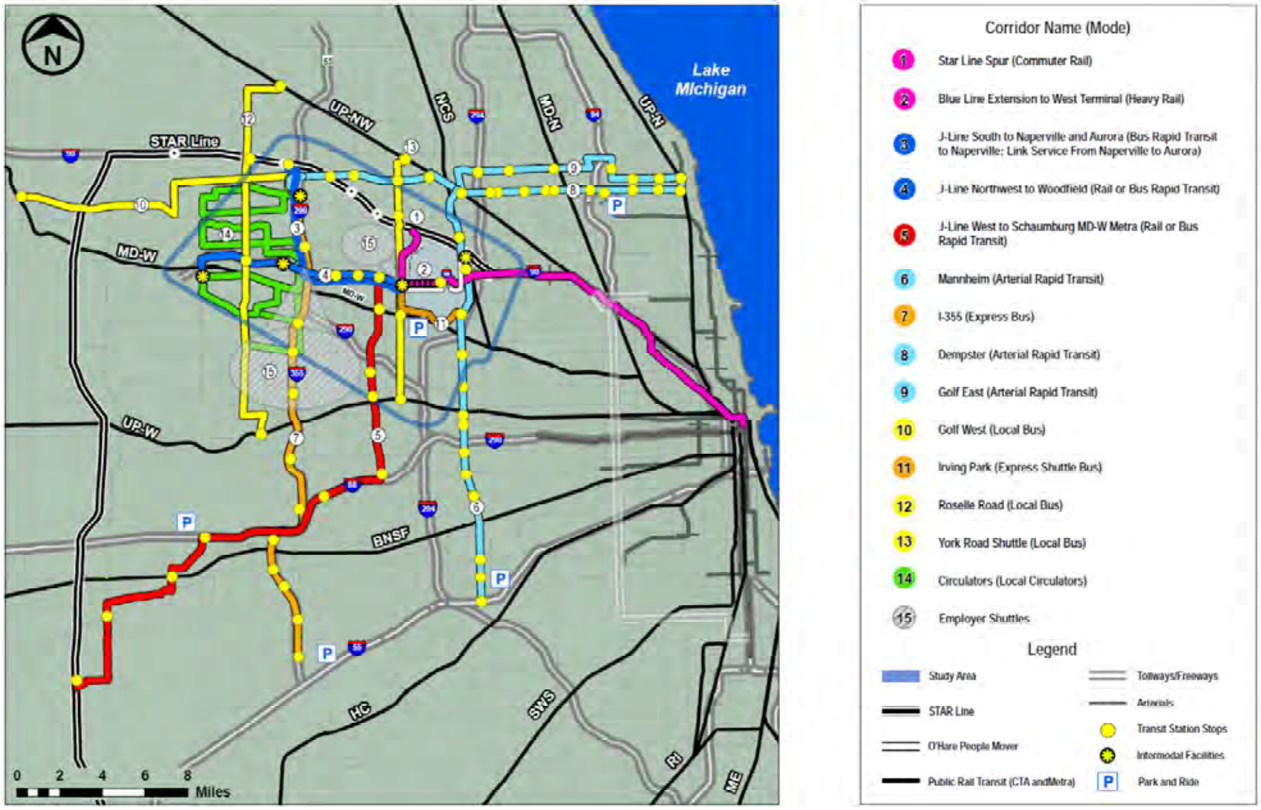
The third type of service would be local circulators operating as fixed routes, flexible routes, or dial-a-ride services. The circulators would be designed to connect residential areas to important destinations such as employment and shopping areas, and would operate with small vehicles with lengths of 30 feet or less. Partnerships could be established with local jurisdictions and employers to tailor the services to their needs.

1.4 Elgin-O'Hare West Bypass Study

The Elgin-O'Hare West Bypass Study was undertaken to improve mobility and solve transportation problems in the area to the west of O'Hare International Airport. The study area was defined as the area bounded roughly by I-90 on the north, I-294 on the east, I-290 on the south, and the Elgin O'Hare Expressway on the west. The area is a transportation and employment hub, with 18 percent of all vehicle trips in the region traveling through it. The study was broken into two phases, or tiers. The Tier One Environmental Impact Statement has identified a preferred transportation system alternative for the study area. Under Tier Two, the alternative will be broken up into individual projects and more detailed environmental/engineering studies will be conducted.

The Tier One Draft EIS for the project was released in the fall of 2009 and identified a preferred alternative. It includes two highway projects: the O'Hare West Bypass, which will connect I-294 and I-90 along the western side of O'Hare International Airport; and, upgrading and extending the Elgin O'Hare Expressway between IL 19/Gary Avenue and the O'Hare West Bypass and the proposed O'Hare West Terminal. The preferred alternative also includes many transit improvements, including a STAR Line commuter rail spur, a CTA Blue Line extension, an express bus along I-355, a modified J-Line, Arterial Rapid Transit routes, and local and shuttle buses. Figure 3 is the map of transit improvements from the Tier One Draft EIS.

Figure 3 Elgin-O'Hare West Bypass Tier One Draft EIS Transit Improvements

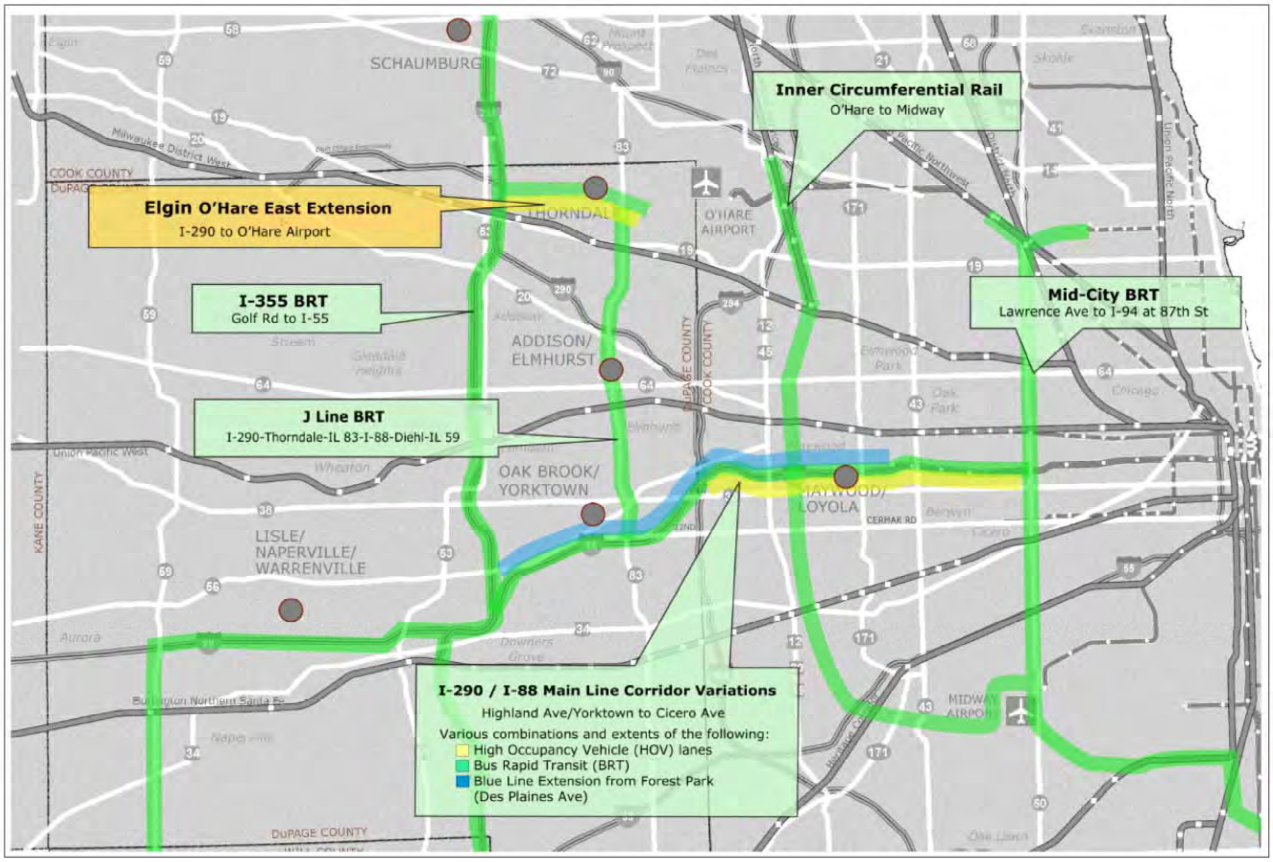


1.5 Cook – DuPage Corridor Study

The Cook DuPage Corridor Study examined transportation needs and solutions in a 300 square mile study area in Cook and DuPage Counties. The boundaries of the study area were the Kane-DuPage County line on the west, IL 50/Cicero Avenue on the east, Metra's Milwaukee District West line to the north, and Metra's BNSF line to the south. The study was originally to include three phases: 1) Travel Market Analysis, 2) Options Feasibility, and 3) System Analysis, but it was closed after the first two phases and proposed projects were evaluated in the GO TO 2040 plan. In addition, some projects are being undertaken by individual agencies.

The study proposed two types of transportation solutions: expanding the regional transportation system and enhancing existing transportation networks. The expansion projects focused on improving north-south and east-west mobility along major corridors in the study area. As the major north-south corridor in the center of the study area, I-355 was important to the project. One relevant proposal was a BRT service along the tollway from the I-55 Bolingbrook park-and-ride to the Northwest Transportation in Schaumburg. Other recommendations included the J-Line BRT, other bus and rail projects, and the Elgin-O'Hare East extension. The expansion projects are displayed in Figure 4.

Figure 4 Cook – DuPage Corridor Proposed Projects for System Expansion



The study identified four types of existing transportation network enhancements: smart corridors, connectors, employment center distribution/circulation options, and strategic roadway improvements. Smart corridors would be arterial roadways enhanced with ITS, intersection improvements, and traffic management strategies. Connector services would be limited stop bus routes on arterial streets, and are similar to the connector routes proposed in the DuPage Area Transit Plan. Employment center distribution/circulation areas would be designated at six major employment centers (Schaumburg, Thorndale, Addison/Elmhurst, Lisle/Naperville, Oak Brook/Yorktown and Maywood/Loyola), and transit circulators would serve the surrounding areas to try to solve the “last-mile” issue for people commuting by transit. Lastly, strategic roadway improvements were proposed to improve roadway connections and relieve bottlenecks in the study area. The proposed network enhancements are displayed in Figure 5.

Figure 5 Cook – DuPage Corridor Proposed Network Enhancements

1.6 Metra STAR Line

Metra has proposed the 55-mile Suburban Transit Access Route, or STAR Line, as its first suburb-to-suburb commuter rail line. The STAR Line would travel north from Joliet through western DuPage County to Hoffman Estates, then east to O'Hare International Airport. It would serve north-south and east-west travel within the region while connecting four existing Metra lines: the North Central Service, Union Pacific West, BNSF, and Milwaukee District West lines. Figure 6 is a map of the proposed line.

Figure 6 Metra's Proposed STAR Line

1.7 GO TO 2040

The development of GO TO 2040, metropolitan Chicago's comprehensive regional plan, is currently being led by the Chicago Metropolitan Agency for Planning (CMAP), the agency dedicated to regional transportation and land use planning in the area. GO TO 2040 will serve as the blueprint for the region from 2010 to 2040, when the region will have a projected 2.8 million additional residents. The draft plan has been released for public comment and implementation of the plan is to begin in fall 2010. This section discusses the components of the draft plan that relate to the I-355 corridor.

The most relevant component of the plan to this study is the Regional Mobility theme, which addresses transportation in the region and includes information on specific projects. The theme includes three sections:

- Invest Strategically in Transportation
- Increase Commitment to Public Transit
- Create a More Efficient Freight Network

The first two sections relate directly to transit in the I-355 corridor. The first section discusses financing of transportation in the region and prioritizes projects. The plan advocates for the use of innovative funding mechanisms, including congestion pricing, pricing for parking, increasing federal and state gas taxes, pursuing "value capture" strategies and transit impact fees, and pursuing a long term replacement for gas taxes. CMAP projects revenues of $385 billion over the plan horizon. The plan allocates $332.7 billion to maintenance and operations of the existing transit system and $52.8 billion for upgrades, enhancements, and expansions. Priority capital projects are identified that will be funded using project revenues. A number of projects cross the I-355 corridor, including Elgin O'Hare Expressway improvements, an extension of IL 53 to central Lake County, managed lanes on I-55 and I-90, and improvements to selected Metra lines. The plan also identified other projects that were not put on the priority list, but would still be worthwhile. Relevant projects include the Metra Suburban Transit Access Route (STAR Line), which would connect Joliet to O'Hare Airport, and the DuPage "J" Line, a BRT line that would connect Naperville to Schaumburg and O'Hare Airport.

The second section discusses the region's transit systems and strategies to improve them. It prioritizes the maintenance and operation of the existing system while making small-scale improvements, including real-time information and transit signal priority. A number of general recommendations are made for bus service. The plan recommends expanding service to underserved areas with high transit potential, working to solve the "last mile" problem to get riders to their final destinations, and using technology to make buses as attractive to riders as possible.

Other sections of GO TO 2040 also relate to transit. A section under the Livable Communities theme is "Achieve Greater Livability Through Land Use and Housing." The plan acknowledges that supportive land use is a key to success for transit. It recommends prioritizing transit oriented development (TOD), utilizing transit-supportive land use planning, and providing affordable housing near transit.

1.8 South Cook – Will County Service Restructuring Initiative, Market Research Report

As part of the South Cook – Will County Restructuring Initiative, Pace conducted a comprehensive regional market research study with a particular emphasis in the development of market segments and identification of segments with potential to ride suburban transit services for their commute trips. The study conducted a regional household travel survey that reached 1,300 valid samples, identified market segments through a series of trade-off/choice experiments and survey questions, identified the incidence of market segments across the region, and developed mode choice models for each segment using a combination of analysis factors to identify "transit competitive" origins and destinations throughout the region.

Analysis factors were included in the choice experiments and were used to identify the main dimensions driving respondents' decisions on how they travel to work. Factors reflected commuters' sensitivities to a particular theme and comprise a group of attitudinal statements, these included:

- **Transit advantages**: transit friendly attitudes, namely recognition of transit as a comfortable and stress-free means of travel.
- **Personal safety**: perceptions of safety while using transit both on-board and off-board vehicle, traveling, walking and waiting for transit.
- **Time and schedule**: speed and reliability perceptions, travel time uncertainties and wanting to know about sources of delay, and desire to save time and make productive use of time.
- **Privacy and comfort**: privacy and desire to control for personal space.
- **Driving advantages**: this included attitudinal statements focusing on desire to make trips outside commute hour, make stops on the way, use fastest route possible, received unreliability of transit.

Based on patterns of sensitivities to each of these five factors, socioeconomic characteristics, geography of travel and mode choice behavior, the 1,300 survey respondents were then grouped into seven distinct market segments through a statistical analysis. These market segments were then carried forward in the study to develop appropriate transit service recommendations and ridership estimates at the corridor level through an interactive GIS tool. The seven market segments identified by this research are re-produced below:

1. Million Milers: this segment includes those that garnered above average ratings for the driving advantage factor, so named for its members' predominantly automobile-based commutes (83 percent), suburban and exurban home and work locations and higher car ownership rates. Million Milers are mostly well-educated men living in larger households (with the highest percentage of two or more workers of any segment).

2. Great Middle: the largest segment of the seven, members yielded generally middling ratings for each of the five factors. Great Middle members' socioeconomic characteristics, home and work locations and commuting patterns largely parallel those of Million Milers; however, members of this segment are somewhat more transit-friendly as evidenced by a slightly higher incidence of transit usage (just under 20 percent) and lower scores for the driving advantages factor.

3. Demanding Survivors: members of this segment have high requirements for 'time and schedule' and 'privacy and comfort' factors; they tend to be women supporting small households, exhibit the lowest levels of education and auto ownership overall, and have a higher incidence of incomes of less than $35,000 per year. Demanding Survivors commute via transit heavily (48 percent) – including the highest usage of CTA rail and Pace bus (10 and 19 percent respectively) – while feeling secure doing so and showing positive attitudes toward the 'transit advantages' factor. Members of this segment have varying commute patterns but the highest incidence of Chicago-to-suburb commutes (15 percent).

4. Cautious Individuals: similar to Demanding Survivors, Cautious Individuals tend to be women living in one-person households with relatively lower incomes, though they are much more sensitive to 'personal safety' statements. While their attitudes toward the 'time and schedule' and 'privacy and comfort' factors also parallel those of Demanding Survivors, three of four Cautious Individuals commute by automobile. Commute patterns in this segment vary considerably.

5. Educated Professionals: members of this market segment have the highest levels of education, favorable attitudes toward commuting by transit with high usage (39 percent with a 25-percent market share for Metra) and consequently less-favorable attitudes toward commuting by automobile with relatively low usage (58 percent). Educated Professionals are typically men living in large households with at least two cars available; nearly half reside in the suburbs. Suburb-to-suburb and suburb-to-downtown Chicago are the primary commute patterns for this segment.

6. Downtown Commuters: true to its name, many of this segment's members live in suburbs or exurbs but work in downtown Chicago; many thus commute by transit, primarily Metra (36 percent) or Pace (11 percent). Downtown Commuters have very demanding schedules and rated 'personal safety' statements highly yet show the most positive attitudes toward 'transit advantages'; they carry average concerns about 'privacy and comfort' and negative attitudes toward 'driving advantages.' While the socioeconomic profile in this market segment showed great variability, most respondents belong to high-income households.

7. Determined Drivers: 95 percent of Determined Drivers commute by car, most commute between suburban and exurban locations and 'privacy and comfort' and 'personal safety' factors are of greatest concern; in short, they are strongly inclined towards using their own automobiles for commuting. Nearly 70 percent of Determined Drivers are women but their socioeconomic profile otherwise varies.

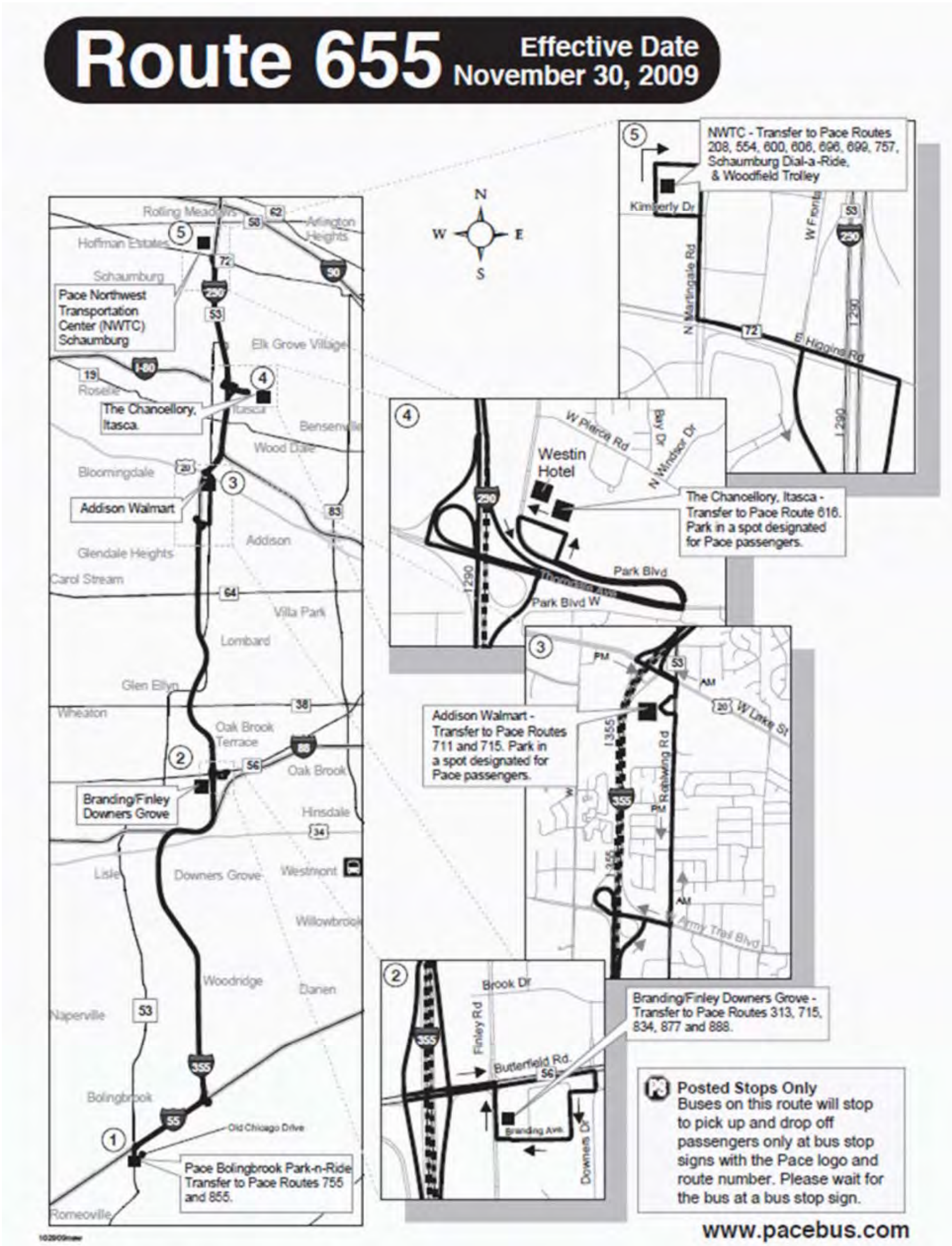
1.9 After Analysis of Route 655 Bolingbrook – Schaumburg (Discontinued)

On Monday, November 30th 2009, Pace started operation of Route 655 service running on the I-355 Veterans Memorial Tollway from the Bolingbrook Park-and-Ride to the Northwest Transportation Center in Schaumburg. The service made three stops on its way at Downers Grove/Lombard, Addison and Itasca. All route stops were off the main line and required the bus to get off the tollway and make a short loop-deviation to serve the stop and then get back on route (see Figure 7 on page 27).

- The Downers Grove stop was located off IL-56 Butterfield Road at Branding Avenue and Finley Road, close to the Finley Square Shopping Center and a few blocks away from the Yorktown Shopping Center in Lombard. There it connected with five Pace bus routes:
  - Route 313 St. Charles Road, traveling east-west along St. Charles Road and Lake Street between Lombard and the Austin CTA Station in Oak Park
  - Route 715 Central DuPage, traveling north-south between the Addison Wal-Mart in Addison and the Argonne National Laboratory in Darien, along Glen Ellyn Road/Main Street, Butterfield Road and Cass Avenue
  - Route 834 Joliet-Downers Grove, traveling north-south between downtown Joliet and the Joliet Union Station to the Yorktown Shopping Center in Lombard, along IL-53 Independence Boulevard/Bolingbrook Drive, Boughton Road and Main Street/Highland Avenue
  - Route 877 South Suburban Oak Brook, Limited Service, traveling between Harvey south of Chicago and Butterfield Road/I-355 tollway in Downers Grove/Lombard, along the I-294 corridor, 22nd Street and Butterfield Road
  - Route 888 Tri-State Flyer, traveling between Lisle, Oak Brook, and the South Holland Park-and-Ride in South Holland, along the I-294 corridor, 22nd Street, Butterfield Road, and Warrenville Road
- The Addison stop was located off Highway 20 Lake Street at the Wal-Mart Center at Rohlwing Road and Lake Street. There it connected with two Pace bus routes:
  - Route 711 Wheaton-Addison, traveling east-west and north-south between Addison, Bloomingdale, Carol Stream and Wheaton, along Army Trail Road, Gary Avenue, Main Street and Roosevelt Road
  - Route 715 Central DuPage, traveling north-south between the Wal-Mart Center in Addison and the Argonne National Laboratory in Darien
- The Itasca stop was located off the Elgin-O'Hare Expressway/Thorndale Avenue at the Chancellory business park. There it connected with only one Pace bus route:
  - Route 616 The Chancellory Connection, traveling north-south between the Spring Lake business park, the Itasca Metra station and The Chancellory, and east-west between these destinations and the Rosemont CTA Blue Line station, on the east entrance to O'Hare International Airport, via Arlington Heights Road and I-90

In summary, route connections were provided with a handful of routes along the way, some of which were long-distance express routes such as Route 877 and Route 888; east-west routes connecting with Chicago such as Route 313; or north-south routes operating local trips in parallel corridors and reaching employment destinations such as Route 616, Route 711, Route 715, and Route 834.

Figure 7 Route 655 Map



Route 655 stopped operating on Friday, March 5th, 2010, after just over 3 months of service due to very poor performance in the context of limited availability of funding. An after analysis of the service in light of the market assessment conducted as part of the I-355 Corridor Transit Development Plan found several potential reasons for the route's poor performance and subsequent cancellation:

- Route 655 provided limited north-south connections along the I-355 corridor (that is, the ability to reach more employment destinations), these included regional trips from Bolingbrook to Downers Grove/Lombard, Addison, Itasca and Schaumburg, and subregional trips between Downers Grove/Itasca and Addison, between Addison and Itasca, and between Itasca and Schaumburg.
- Route 655 was not reaching target markets and was not able to attract the necessary ridership to sustain its service. The OD travel demand analysis in the elsewhere in this report shows that north-south commute travel demand in the study area tends to be local and comprised of shorter trips. In that context a tollway-based service was not effective because, by definition, it tended to emphasize long-distance travel and regional trips.
- Although transfers were possible to collect and distribute passengers to/from local routes, commute-to-work travel in the corridor area is more local and so the north-south routes that connected with Route 655 are the ones reaching the target markets by operating in local corridors and serving short distance trips which tend to be less attractive to transit riders if transfers are required.
- The I-355 Tollway is isolated from most employment markets and so providing effective accessibility required frequent and long deviations off the main line, which, in turn, creates bigger disincentives for travelers and longer travel times. Given the general dispersion, low density of employment, and the short-distance nature of home-based work trips in the corridor study area, Route 655's highway-based express bus model proved inadequate to attract significant ridership.

Figure 8 on the next page summarizes Route 655 service levels, trips schedule and travel time. There were 6 trips operated in the AM Peak period toward Schaumburg (northbound). Trips were scheduled every 30 minutes, between 5:00 – 7:35 am, and travel time from end-to-end was 66 minutes. There were also 4 trips operated toward Bolingbrook (southbound) during the AM Peak period, between 6:00 – 8:00 am, these were direct trips with no intermediate stops between the NWTC in Schaumburg and the Bolingbrook Park-and-Ride, and were scheduled every 40 minutes.

In the PM Peak period, a reverse pattern was in operation that provided 6 trips toward Bolingbrook (southbound), and 4 trips toward Schaumburg (northbound) with no stops in between. Southbound trips were scheduled every 30 minutes, between 3:30 – 6:00 pm, and northbound trips were scheduled every 30 minutes as well, between 4:45 – 6:15 pm.

Travel times were up to 66 minutes in the peak direction and up to 45 minutes in the non-peak direction. The route schedule was based on a 120-minute cycle that utilized a maximum of 4 buses to provide service every 30 minutes. Two buses were able to complete 3 one-way trips and the other two only completed a round trip.

Travel times between stops were generally 10 minutes, except for the first segment between Bolingbrook and Downers Grove which took about 25 minutes. In general, Route 655 provided a high level of service, with sufficient frequency and span of service, and efficient running times. Unfortunately, the service design was not a good match for the characteristics of commute travel in the corridor study area.

Figure 8 Route 655 Schedule

pace

ROUTE 655 BOLINGBROOK-SCHAUMBURG

WEEKDAY NORTHBOUND

1 PACE PARK-N-RIDE BOLINGBROOK	2 BRANDING/ FINLEY DOWNERS GROVE	3 WALMART PARK-N-RIDE ADDISON	4 CHANCELLORY PARK-N-RIDE WESTIN HOTEL ITASCA	5 PACE NORTHWEST TRANSPORTATION CENTER SCHAUMBURG
5:00AM	5:22AM	5:40AM	5:50AM	6:00AM
5:30	5:52	6:10	6:20	6:30
6:00	6:25	6:46	6:56	7:06
6:30	6:55	7:16	7:26	7:36
7:00	7:25	7:46	7:56	8:06
7:35	8:00	8:21	8:31	8:41
4:45PM	**-**	**-**	**-**	**5:25PM**
5:15	**-**	**-**	**-**	**5:55**
5:45	**-**	**-**	**-**	**6:30**
6:15	**-**	**-**	**-**	**6:55**

WEEKDAY SOUTHBOUND

5 PACE NORTHWEST TRANSPORTATION CENTER SCHAUMBURG	4 CHANCELLORY PARK-N-RIDE WESTIN HOTEL ITASCA	3 WALMART PARK-N-RIDE ADDISON	2 BRANDING/ FINLEY DOWNERS GROVE	1 PACE PARK-N-RIDE BOLINGBROOK
6:10AM	-	-	-	6:50AM
6:40	-	-	-	7:20
7:20	-	-	-	8:00
8:00	-	-	-	8:40
3:30PM	**3:43PM**	**3:55PM**	**4:12PM**	**4:33PM**
4:00	**4:13**	**4:27**	**4:42**	**5:03**
4:30	**4:43**	**4:57**	**5:12**	**5:36**
5:00	**5:13**	**5:27**	**5:42**	**6:06**
5:35	**5:48**	**6:02**	**6:17**	**6:38**
6:10	**6:23**	**6:35**	**6:50**	**7:13**

Weekdays only. No Saturday, Sunday or holiday service.

Buses will stop at Posted Stops Only along the entire route.

Free parking at all Park-n-Ride locations and at the Pace Northwest Transportation Center. See map for details.

102509new

Table 2 Route 655 Ridership, January 2010

	Coach USA Daily Ridership - January 2010			
Weekdays	655	755	855	889
Monday, January 04	6	28	325	16
Tuesday, January 05	7	26	333	13
Wednesday, January 06	8	30	299	12
Thursday, January 07	12	29	257	25
Friday, January 08	6	27	276	27
Monday, January 11	9	39	316	17
Tuesday, January 12	8	51	341	17
Wednesday, January 13	8	38	318	17
Thursday, January 14	8	52	332	20
Friday, January 15	8	42	260	15
Monday, January 18	4	10	129	9
Tuesday, January 19	10	41	318	16
Wednesday, January 20	12	46	308	19
Thursday, January 21	8	52	330	20
Friday, January 22	9	40	268	13
Monday, January 25	10	40	336	22
Tuesday, January 26	8	32	306	25
Wednesday, January 27	8	42	306	26
Thursday, January 28	6	37	322	26
Friday, January 29	9	36	290	23
Weekday Total	164	738	5,970	378
Number of Days	20	20	20	20
Wkd Daily Average	8	37	299	19

Source: Coach USA Daily Ridership, January 2010

Table 2 above illustrates daily ridership counts for Route 655 and similar routes during the month of January 2010, which provided the highest monthly ridership in its short operation. Daily ridership was generally 8 passengers, with some days carrying as many as 12 passengers and other days carrying as little as 4 passengers. Considering that there were 6 trips operated in the morning and 6 return trips in the evening period, peak direction only, the route utilization was very low at about 0.67 passengers per trip on average. Accounting for all 10 trips provided in each direction, this average is even lower at 0.4 passengers per trip.

Table 2 shows other freeway based services such as Routes 755 and 855, operating between Plainfield/Bolingbrook and Chicago on the I-55 corridor and Route 889 that ran between Harvey/Blue Island and Rosemont on the Tri-State Tollway (I-294), which was also cancelled due to low ridership.

1.10 Summary

A review of the studies discussed in this section indicates that the region views transit as an important part of an efficient transportation network. A number of overlapping service strategies are proposed by the studies to serve local, mid-range, and long distance travel. Vision 2020 and the DuPage Area Transit Plan both advocate for local circulator routes to serve short-distance travel, while the Cook – DuPage Corridor Study proposes the designation of employment center distribution/circulation areas where circulator routes would distribute commuters to their places of work.

Pace has undertaken restructuring efforts in five geographic areas to improve local service for those communities. For medium to long-distance travel, a number of strategies have been proposed. Under Pace's Vision 2020 plan, line-haul bus routes would operate on arterial and tollway/highway corridors. The Arterial Rapid Transit idea has been developed further and Pace will be implementing service in the future.

Other planning efforts have proposed bus and rail lines to serve north-south travel within and close to the I-355 corridor. The "J-Line," which was first proposed in the DuPage Area Transit Plan, also appeared in the Elgin-O'Hare West Bypass Study, the Cook DuPage Corridor Study, and CMAP's GO TO 2040. Exact plans for the line have not been developed, but it would likely travel from Naperville/Aurora to Schaumburg and/or O'Hare using buses or a combination of bus and rail.

A second proposal for north-south transit travel in the area is Metra's STAR Line, which would travel north-south between Joliet and Hoffman Estates and east-west to O'Hare International Airport. A third proposal that appeared in the Elgin-O'Hare West Bypass Study and the Cook DuPage Corridor Study was for express buses/BRT on I-355. Pace introduced the Route 655 service, which ran on I-355 between Bolingbrook and Schaumburg, to serve north-south travel in the corridor, but it was discontinued due to low ridership.

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Chapter 2. Analysis Methodology

2.1 Market Analysis Objectives and Approach

Transit market analysis objectives for this study have been defined as follows:

- To understand origin-destination (OD) travel patterns in the metropolitan area, the demands pressed upon its transportation network, and the role of the I-355 corridor in the system.
- To define the corridor market reach and its interconnectedness with the region.
- To categorize travel demand connections in the corridor area and prioritize potential transit markets.
- To assess the demand feasibility for commuter express services along the corridor area.
- To identify service gaps and needed improvements in levels of service, infrastructure, and accessibility to transit.
- To develop a service evaluation methodology that accounts for transit markets with the greatest demand potential and localities that have adopted strategies and policies that support transit.

The transit market analysis approach seeks to sort out travel demand connections and residential and employment markets that, if served with transit, would have a mode split change and/or a traffic impact in the corridor study area. To achieve this target, candidate travel demand connections and market areas would need to meet the following characteristics:

- Serve local travel demand markets within the corridor study area (defined roughly as a 5-mile buffer around the I-355 corridor).
- Serve commute travel (peak period) and/or other purpose travel (midday).
- Serve north-south travel needs in the study area, on either side of the corridor, or inside the corridor.
- Travel outside the corridor if at least one origin or destination is in the corridor study area (this would serve the local-to-regional and regional-to-local travel).
- Have an impact on traffic in the corridor (either by reducing vehicle traffic or increasing transit mode split in the study area).

Therefore, the analysis methodology needs to account for several areas of information, including:

- Regional travel demand for home-based work, home-based other, and non-home based trips via automobile and transit
- Population and employment markets
- Land use patterns
- Economic activity concentration and clustering
- The street network of tollways, highways, and arterial corridors
- Rail and bus transit service levels
- Infrastructure and utilization
- Traffic volumes and congestion hot-spots

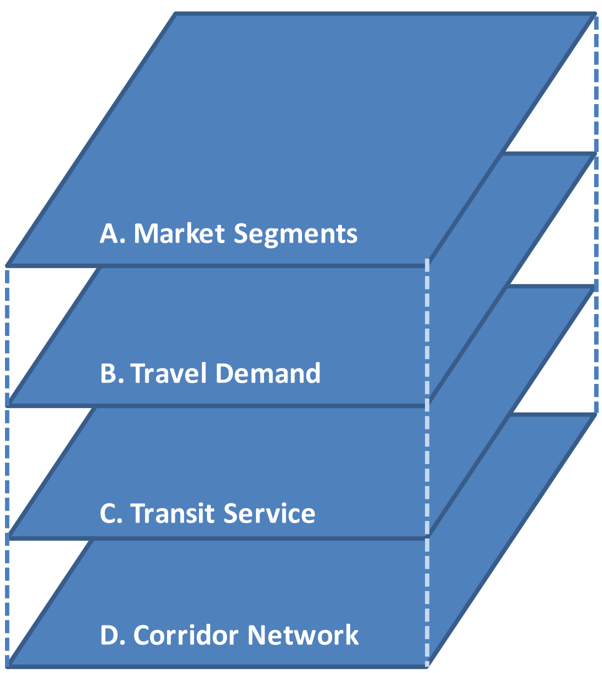
The purpose of this multi-faceted analysis described above will be to identify transit market areas and corridor connections that exhibit the biggest travel demand, accessibility, and connectivity potential to ensure transit service operations that are successful and economically sustainable in the long-run.

2.2 Multilayered Analysis

Four layers or areas of information have been identified and utilized in the analysis:

- **Market Characteristics and Segments**: this includes an analysis of residential and employment areas and the identification of market areas showing propensity to use transit. Analyses are based on demographic and socioeconomic characteristics from the US Census 2000, land use patterns, employment classifications, TAZs and jurisdictional boundaries, and the market segments identified in the South Cook-Will County Restructuring Initiative.
- **OD Travel Demand**: this includes an analysis of major origin-destination travel connections at the local and regional level for home-based work, home-based other, and non-home based travel. Local travel has been defined as travel within the corridor study area (within a 5-mile buffer); regional travel has been defined as travel between the corridor and the region, having either an origin or a destination in the corridor. CMAP travel demand model forecasts for 2010 and 2030 have been utilized for this analysis.
- **Transit Service Characteristics**: this includes analysis of the transit service network (footprint), levels of service (frequency and span of service), and utilization (ridership and productivity) for both Pace bus and Metra rail services in the study area.
- **Corridor Network**: this includes analysis of the network of corridors providing logical travel connections between local and regional travel markets – encompassing freeway and arterial streets as well as the rail network, traffic volumes, and the level of accessibility and connectivity with local neighborhoods and activity centers.

Figure 9 Information Analysis Layers



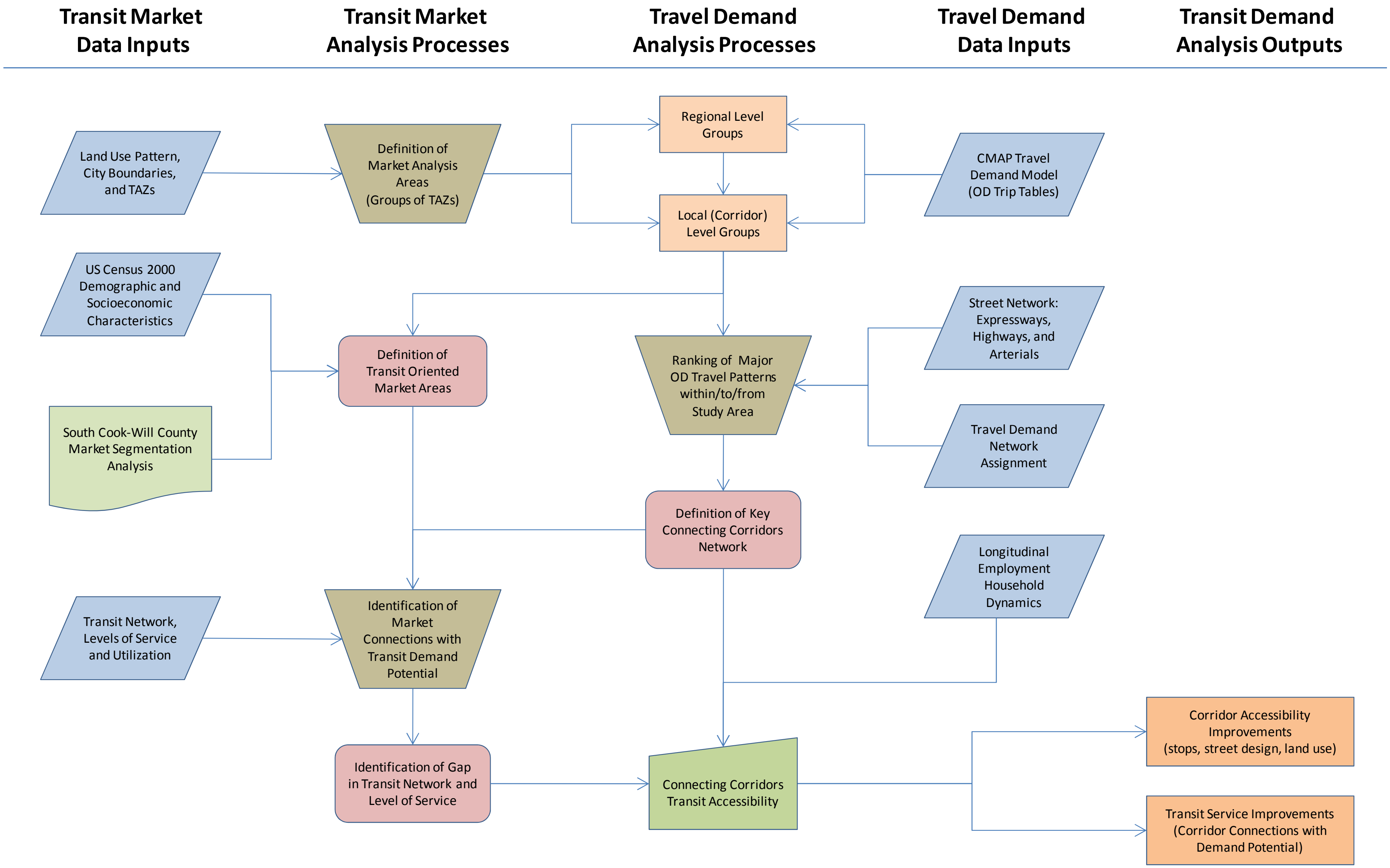
2.3 Critical Questions

The four layers of information are combined to develop a set of critical questions that will guide the analysis to ultimately identify travel connections and corridors that show potential for transit demand. Six critical questions are generated from the combination of layers:

1. **Are there any potential markets for transit within the study area?** – exploring the linkages between OD travel patterns and market segments that show potential for transit demand [*Market Segments versus Travel Demand (A/B)*].
2. **What are the major corridors connecting communities within the study area and with the region?** – identifying the critical corridors providing the connection between major OD travel demand patterns at both the local and regional level [*Travel Demand versus Corridor Network (B/D)*].
3. **What are the major corridors that provide accessibility to existing and potential transit markets?** – exploring the local and regional accessibility and connectivity that is provided to potential transit market areas in the current street network [*Market Segments versus Corridor Network (A/D)*].
4. **Is the current transit network serving the largest transit markets?** – exploring the coverage and level of service of the current transit network (rail and bus) in relation to market segments that show potential for transit demand or that have propensity to use transit [*Market Segments versus Transit Service (A/C)*].
5. **Are all major OD travel patterns being served with transit? Are there any gaps in transit service levels or coverage?** – exploring the adequacy of the current transit service network (rail and bus) to serve the biggest travel demand markets at both the local and regional level [*Travel Demand versus Transit Service (B/C)*].
6. **What types of transit service and levels of service are needed on major corridors to serve existing and potential markets?** – identifying potential service levels (and/or types of service) on critical corridors providing local and regional connectivity to potential transit demand communities in the study area [*Transit Service versus Corridor Network (C/D)*].

In reality, these critical questions are answered through a much more complex analytical process that takes into account several pieces of information within the transit market analysis (including both inputs and processes) and the travel demand model analysis (including both inputs and processes) that are interconnected and dependent upon each other. This more detailed process model is illustrated in Figure 10 below.

Figure 10 Transit Market and Travel Demand Analytical Process



Chapter 3. Information Layers

3.1 Market Characteristics and Segments

This task focuses on conducting an in-depth analysis of existing population and employment markets, their underlying characteristics, and what differentiates residential and employment areas within the corridor study area. This analysis complements the understanding of existing transit services, their performance, and whether all areas have the same propensity or need for transit. The analysis includes a comparative GIS mapping analysis of market indicators for the I-355 study area and the CMAP region as a whole. The I-355 study area is roughly defined as a 5-mile buffer around the corridor, which is roughly the urban area bounded by Route 59 in the west, I-294 in the east, Lake Cook Road in the north, and I-80 in the south.

Demographic and Socioeconomic Indicators

Several demographic and socioeconomic indicators were analyzed through GIS mapping of US Census 2000 data at the block group level, including:

- **Average Household Size**: this is a useful indicator to identify areas with large households, containing large families or extended families, or small households, containing households with no children or single-adult households. It is an indicator of population density and potential travel needs.
- **Senior Population (65 years old and over)**: this is useful to represent a typical transit dependent population group; many seniors do not have access to a car or cannot use a car for medical/health reasons. An increasing number of seniors today grew up as drivers and will continue driving until an advanced age, so their relative transit dependency as a group is dwindling; however, many seniors today are choosing to live in urban settings or downtowns as opposed to suburban settings, and so are demanding increasing mobility choices and opportunities, most of the time in the form of increased transit service.
- **High School/College Population (16 to 24 years old)**: this is useful to represent another transit dependent group that has many mobility needs and limited access to automobiles.
- **Median Household Income**: typically, household income is inversely correlated with transit use. Lower income households tend to use transit more than higher income households
- **Poverty Status**: poverty, or low income status, is positively correlated with transit use and is a typical indicator of transit dependency for the adult population (24 to 65 years old).
- **Access to Motorized Vehicles (number of drivers versus available vehicles)**: This is the percentage of residents of driving age that do not have access to motorized vehicles. It is useful as an indicator of market areas that have mobility and travel needs but no reliable access to private vehicles. These areas may have potential for transit use if service were available.

Figures 11 to 16 illustrate the concentration and distribution of the indicators described above. A more detailed analysis of the spatial distribution of the indicators and the consequences for potential transit demand is included in the sections below.

Average Household Size

The GIS mapping analysis shows that there is a predominance of large households in the Chicago area (Cook County) outside downtown and in suburban areas west of the I-355 corridor, in particular along the boundary between DuPage and Kane Counties. There are many census block groups in Chicago where households average more than 3.5 persons, while in the suburbs west of the corridor the majority of block groups average 3.0 to 3.5 persons per household. Most noteworthy is the gap between IL 43 Harlem Ave and the I-355 corridor, where block groups average 2.0 to 3.0 persons per household. This spatial distribution shows that there are differences in household types and lifestyle choice (i.e. households with children versus households with no children) between Chicago, east DuPage and west DuPage County, and that the I-355 corridor is a dividing line in DuPage County. These differences may help to explain different mobility needs and travel behavior in the study area. Average household size in Will County, at the southern segment of the I-355 corridor, is comparable to the average size in west DuPage County.

Senior Population

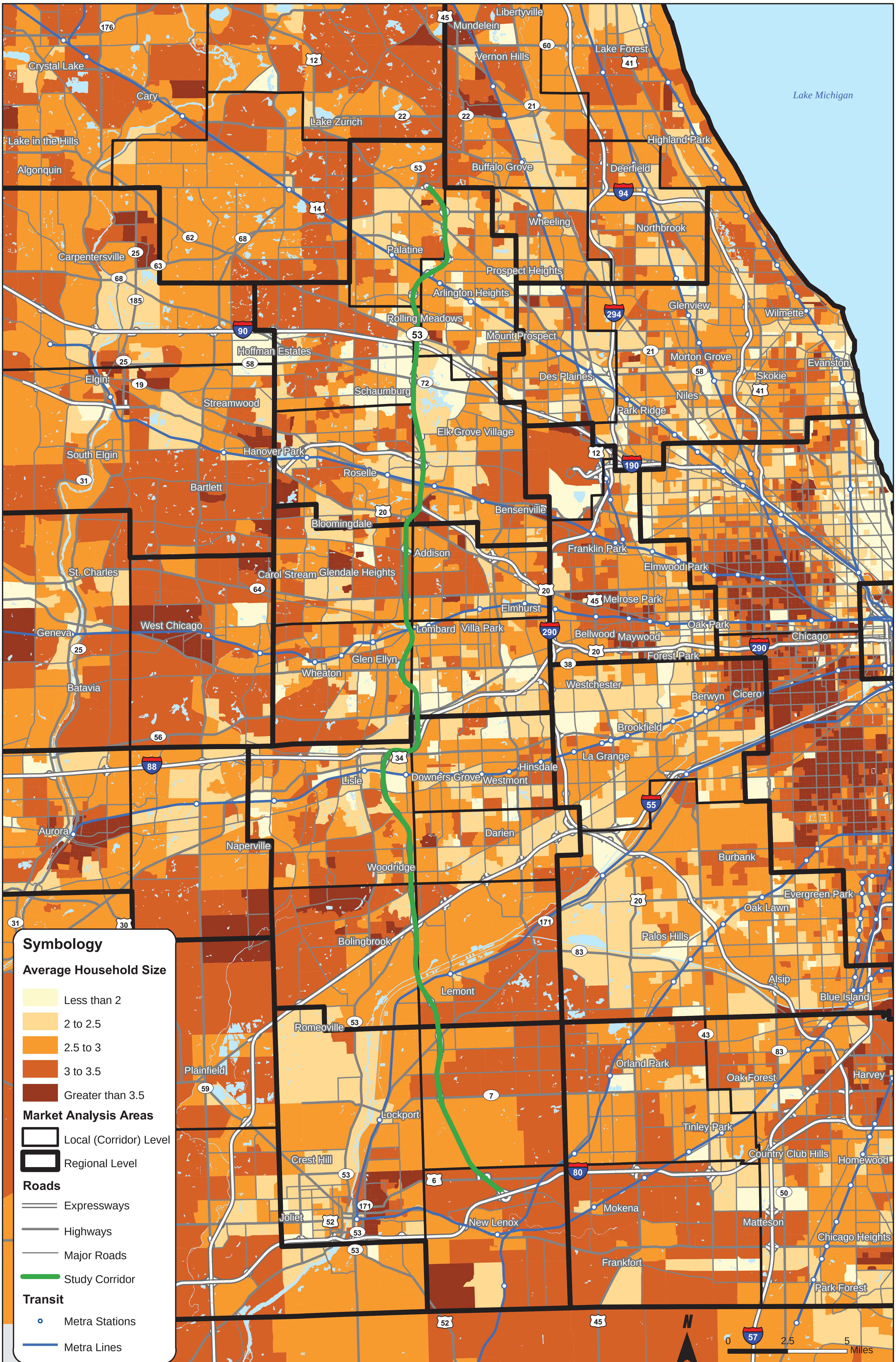
The mapping of senior population by census block group shows that the first ring of suburbs in north, west, and south Cook County have much higher concentrations of seniors (with many block groups having 20% or more senior residents) than block groups west of the I-355 corridor in west DuPage, Kane, McHenry or Will Counties (with mostly block groups having 10% or less senior residents). The urban areas between I-355 and Cook County, in particular the central-north segment of the corridor, have relatively high concentrations of seniors (over 10%, with several pockets over 20% in Oak Brook, Hinsdale, Downers Grove, Addison, and parts of Arlington Heights). There are also areas with high concentrations of senior population in a few communities scattered around the study area, such as Hoffman Estates, West Chicago, Winfield, Naperville, and Joliet. Lower concentrations of seniors exist in Bloomingdale, Wheaton, and Glen Ellyn (about 10 to 20%). This distribution pattern fits well with the average household sizes seen in the previous figure and provides an explanation for the relative concentration of households with 1 or 2 members in the eastern side of DuPage County. Potentially, this also indicates a different set of mobility needs for this particular zone of the study area.

High School/College Population

The High School/College Population map shows the distribution of population in the 15 to 24 age range throughout the region.. High concentrations (15 to 25%) of youth population are found in Chicago and in communities along the Milwaukee District West and Union Pacific West Metra rail line corridors, such as Franklin Park, Bensenville, Hanover Park, Elgin, Melrose Park, Addison, Carol Stream, Bloomingdale, Wheaton, and West Chicago. Other communities within the corridor area that show relatively high concentrations of youth include Des Plaines, Hoffman Estates, Lisle, Woodridge, Bolingbrook, Romeoville, and Joliet.

All together, the three maps described above illustrate an urban region that has experienced several residential development phases. Older suburbs house older adults and/or households with grown up children, and newer suburban areas house mostly families with young children. Residential development and land use patterns also collude to produce a varying urban environment across the region, which results in different levels of residential density, street connectivity, and accessibility.

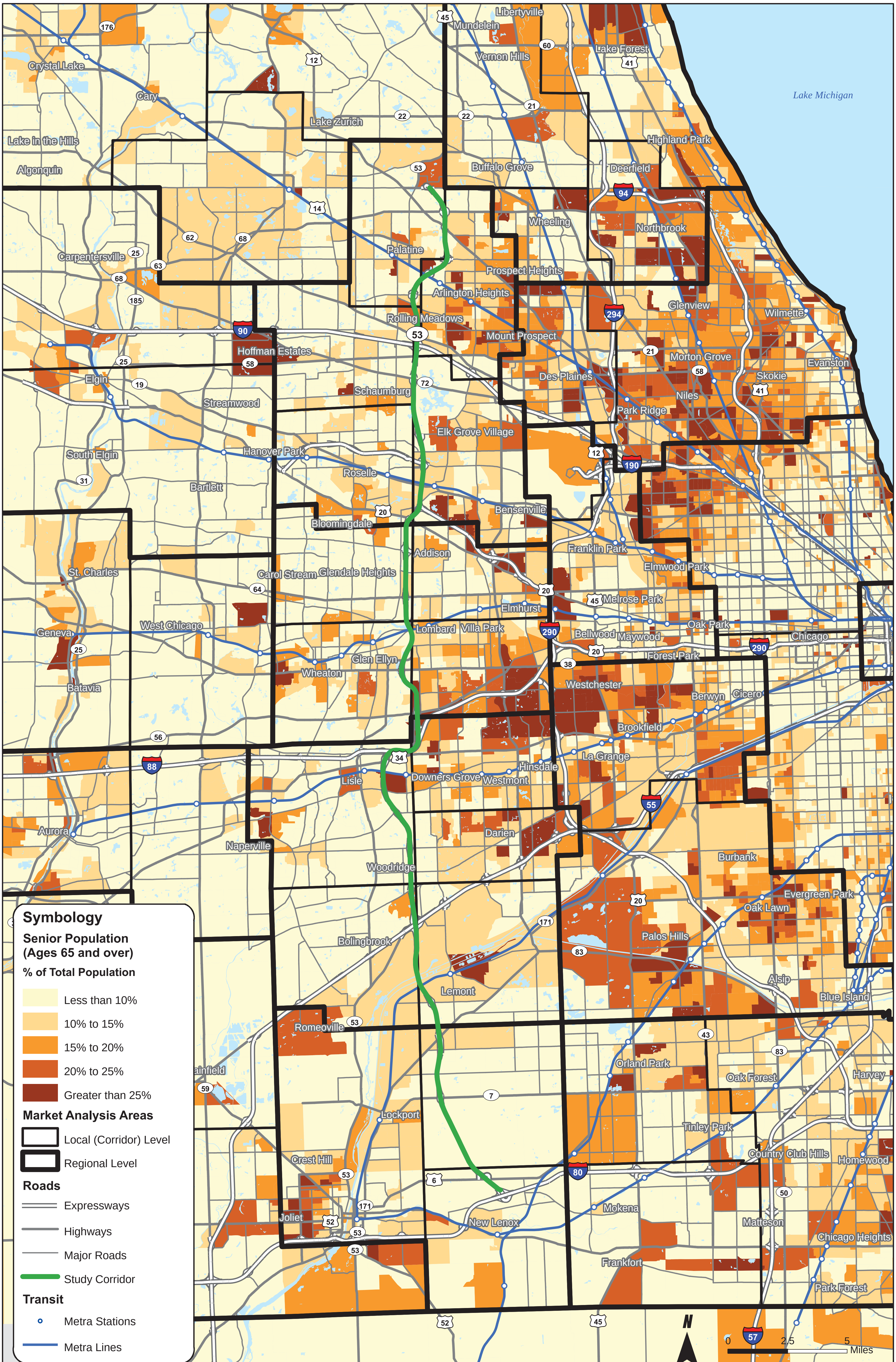
Figure 11 Average Household Size



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

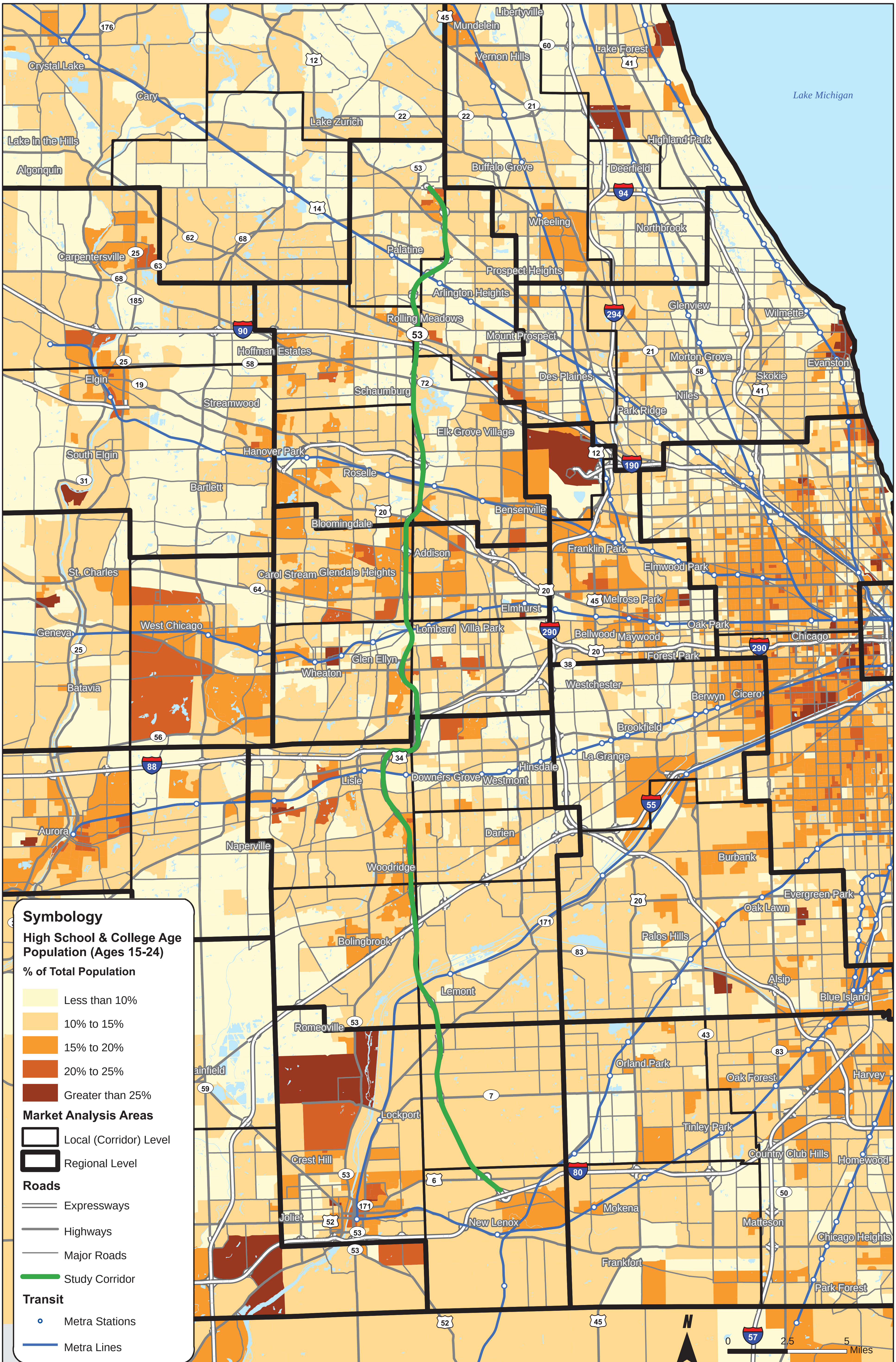
Figure 12 Senior Population



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

Nelson\Nygaard consulting associates

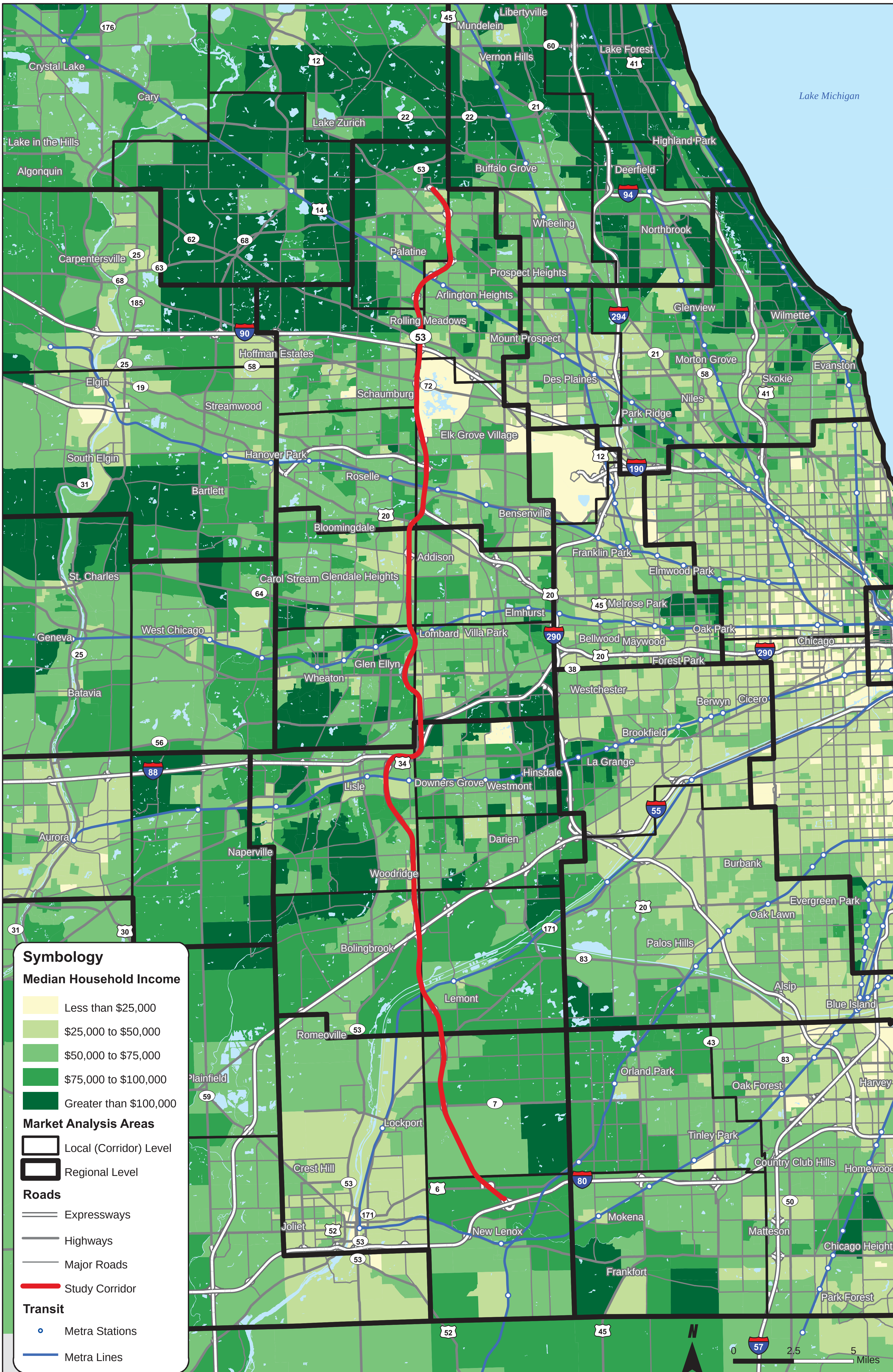
Figure 13 High School/College Population



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

Nelson\Nygaard consulting associates

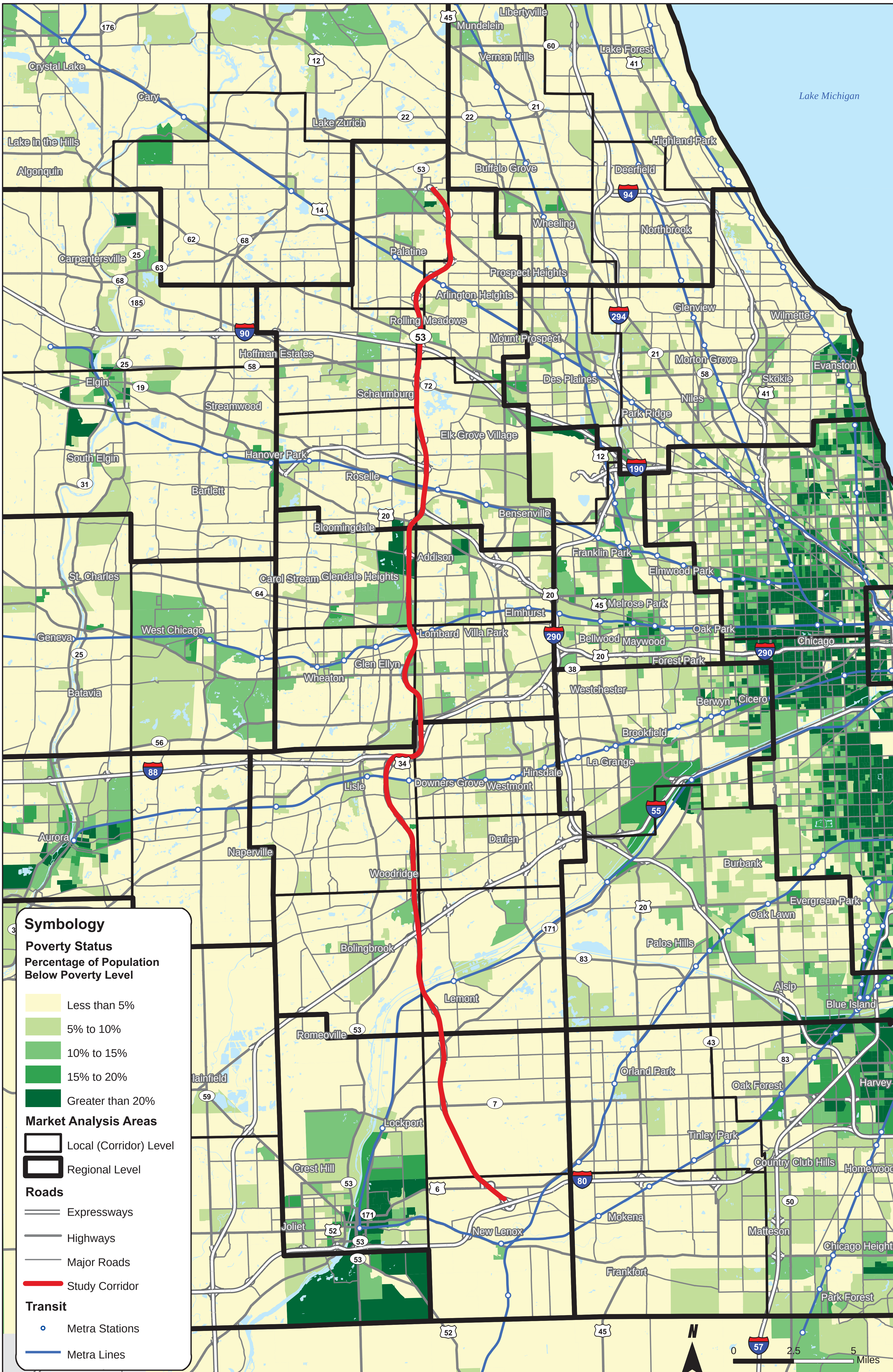
Figure 14 Median Household Income



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

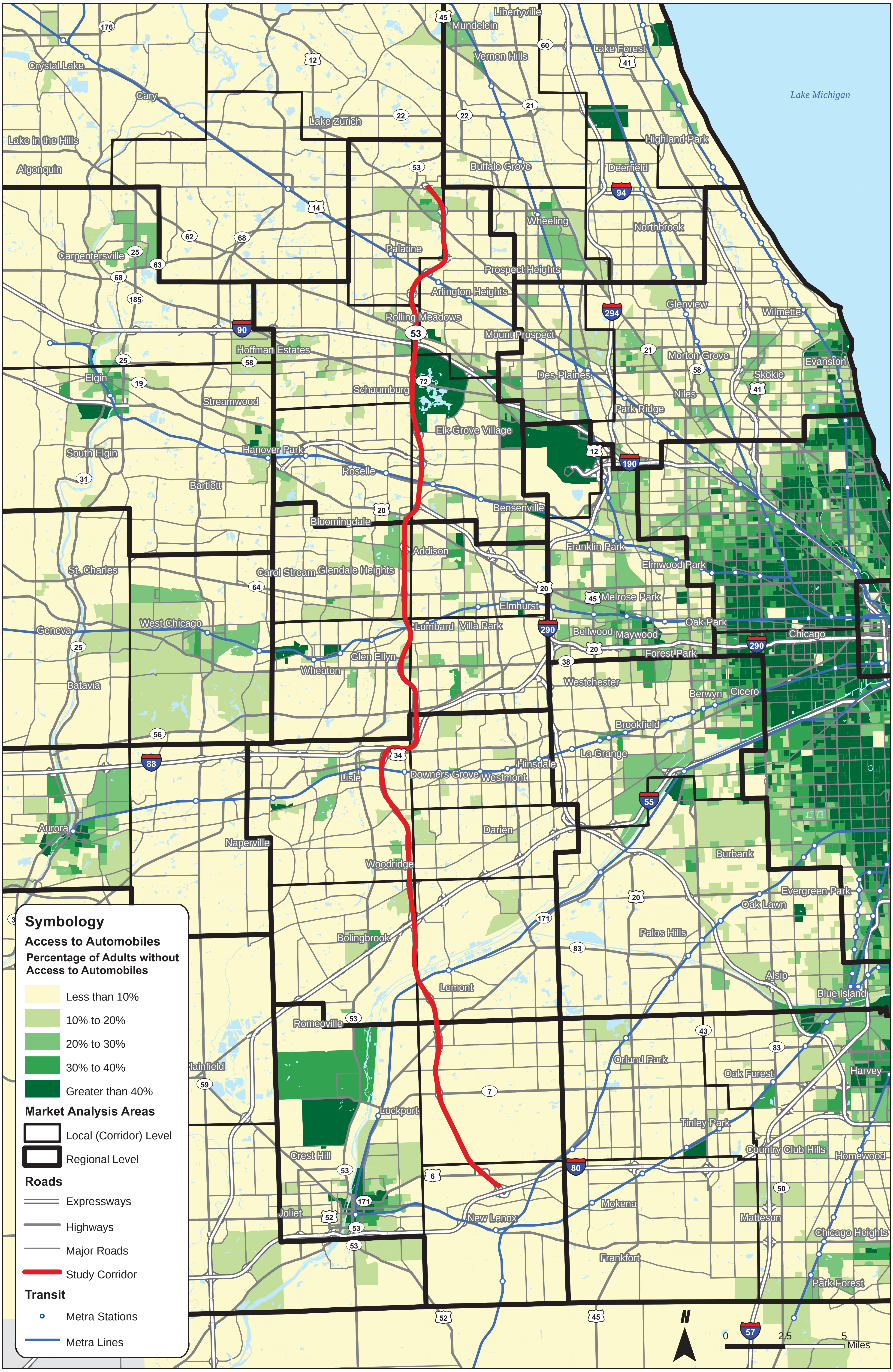
Figure 15 Poverty Level



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

Figure 16 Access to Automobiles



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

Median Household Income

Figure 14 shows the median income of households by block group (in 1999 dollars). The figure illustrates that the corridor study area is mostly comprised of households with incomes in the middle range of $50,000 to $100,000 per year. There are a few areas showing higher income levels (over $100,000 per year) in the north end of the corridor study area (Hoffman Estates and Deer Park) and also in the central-south portion of the corridor (Wheaton, Naperville, Hinsdale, and Oak Brook). To the north of the corridor study area there are high income communities in Buffalo Grove, Deerfield, and Highland Park, and to the west and south there are mostly middle income communities. In general, the communities to the east of I-355 in Chicago and the first ring of suburbs are low-middle income.

Poverty Status

The distribution of people in poverty is somewhat the opposite of median household income. Mapping poverty status is useful to identify pockets of poverty in the region and within the corridor study area. As the map shows, most persons below poverty level or in poverty status live in Chicago in the same areas that have large average household sizes (3.5 persons or more). Within the corridor study area, there are some pockets or clusters of people below poverty level, including Joliet (over 20% of the population) in the southern part of the study area, Bloomingdale, Glendale Heights, Addison and Hanover Park in the central section(over 10% of the population), and in communities such as Palatine, Schaumburg and Des Plaines in the north. Just outside the corridor study area there are concentrations of people in poverty in Elgin, West Chicago, and Aurora to the west of I-355, and also in La Grange, Maywood, and Melrose Park to the east of I-294.

Access to Private Vehicles

16 shows a very similar pattern to that of persons in poverty, indicating that there is a strong correlation in the CMAP area between poverty and access to vehicles. The figure illustrates the spatial distribution of adults that do not have access to a vehicle. The biggest concentrations (more than 40% of adults) are found in Chicago, in the same areas where households are large on average and median income is low. Within the corridor study area, only a few communities show concentrations of adults with no access to vehicles above 10 percent, including Joliet, Bolingbrook, Addison, Glendale Heights, Des Plaines and Palatine. Outside the corridor study area, West Chicago, Aurora, Elgin, Maywood and Melrose Park show concentrations of adults without access to vehicles above 20 percent.

A major finding from these maps is that the overwhelming majority of people within the corridor study area that are able to drive have regular access to automobiles. In addition, with the exception of a few pockets in a few communities, most residential neighborhoods in the corridor are relatively affluent neighborhoods of middle or high-middle income households. These are both indicators of residential markets that typically would ride transit by choice and that expect high standards of service quality and frequency to make transit a competitive alternative to the automobile.

Employment and Journey-to-Work Indicators

The following section presents GIS mapping analysis of journey-to-work and employment characteristics. The previous section gave an overview of market conditions on the residential side (trip origin); this section provides an overview of market conditions on the employment side (trip destination). Using journey-to-work data from the US Census 2000 long-form survey, the following modes were analyzed:

- **SOV Mode**: indicates market areas where the automobile is the primary commute mode
- **Public Transit Mode**: indicates areas where public transit is a major commute mode or is more successful
- **Ridesharing Mode**: indicates areas where there could be a need for better transit service, and where people choose to or are forced to carpool.

Employment information was analyzed by job classification and distribution at the census block level from Census Longitudinal Employer-Household Dynamics (LEHD) data. Three mapping categories were included in the analysis: finance, insurance, real estate, and services; wholesale and retail trade; and, construction and manufacturing. Together, they account for about 90 percent of employment in the region (58%, 17%, and15%, respectively) as shown in Table 3 below. GIS maps were developed to show the concentration of jobs by economic sector on a proportional basis (percent of all jobs within each census block) and on a density basis (number of jobs per acre), to show levels of employment dispersion and relative concentration throughout the region.

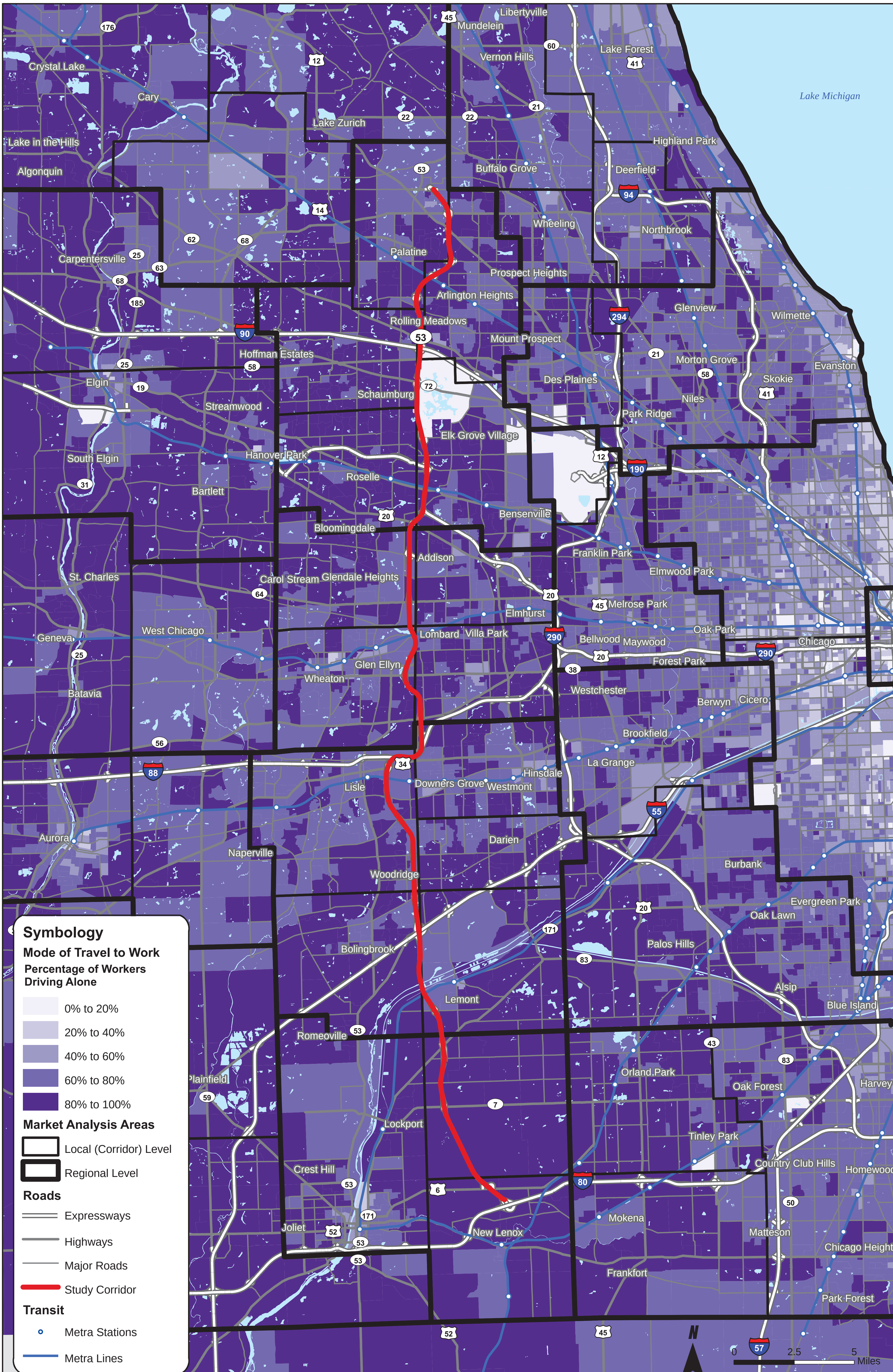
Table 3 Regional Employment by Economic Sector

Sector	*Jobs*	*Percentage*
Agriculture, Forestry, Fishing & Hunting	3,150	0%
Mining	1,628	0%
Construction	166,415	4%
Manufacturing	421,759	11%
Transportation, Communication, & Public Utilities	263,845	7%
Wholesale Trade	233,966	6%
Retail Trade	419,508	11%
Finance, Insurance, & Real Estate	290,701	7%
Services	1,995,912	51%
Government	114,381	3%
Total	**3,911,265**	**100%**

Source: Census Bureau Longitudinal Employer-Household Dynamics

The jobs-housing ratio for each traffic analysis zone (TAZ) was calculated to compare the distribution of both jobs and households throughout the region, and also to develop a measure of job-housing balance. Much has been said in the planning field about balancing the distribution of jobs and households to reduce VMT in metropolitan regions; however, the concept has proven tricky to define at the local level as a measure of economic opportunity for both employers and households. In this case, we are using it solely to illustrate both the high level of employment dispersion in the CMAP region and the relative concentration of jobs into a few transportation corridors and centers.

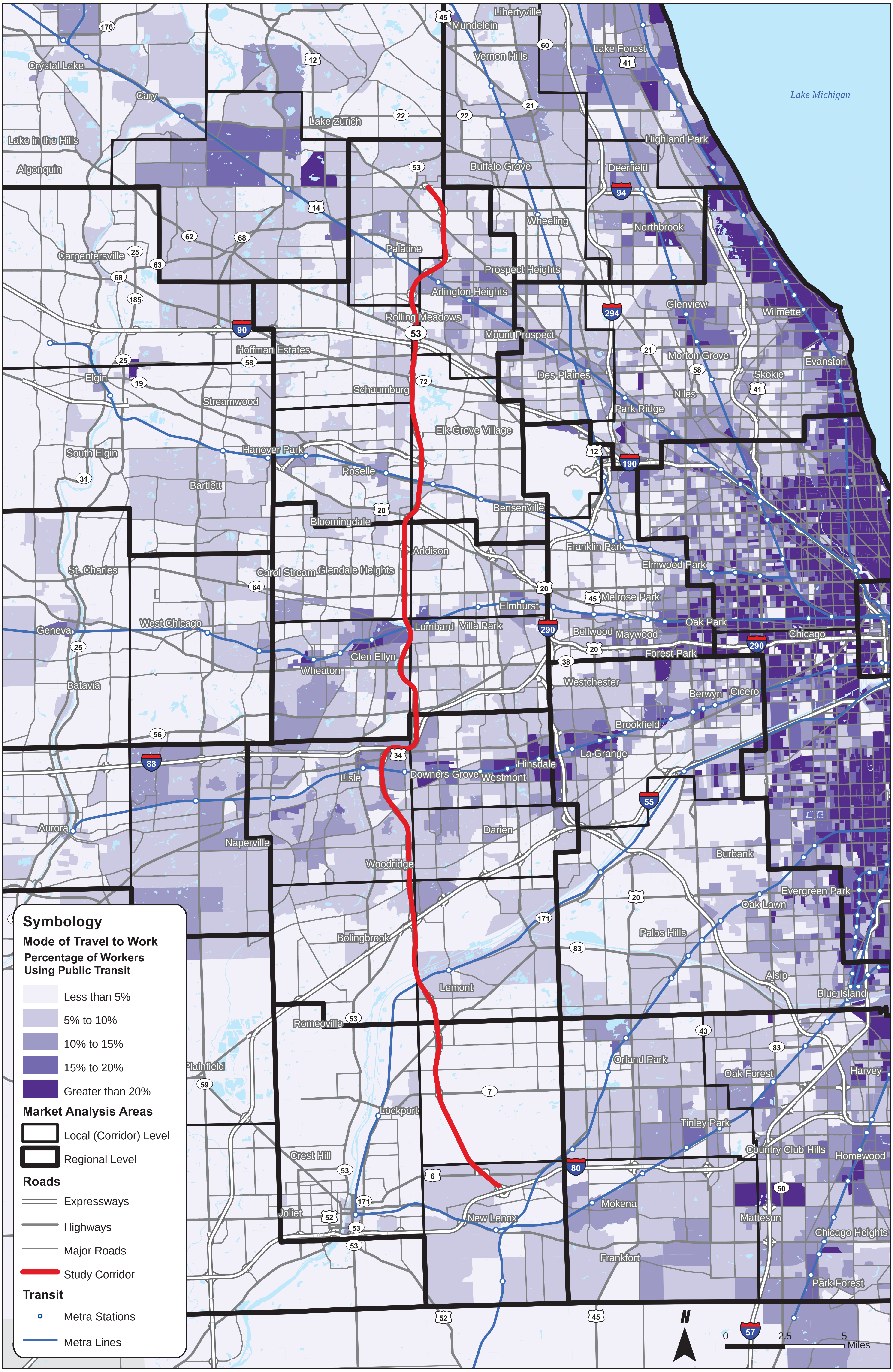
Figure 17 Mode of Travel to Work - SOV



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

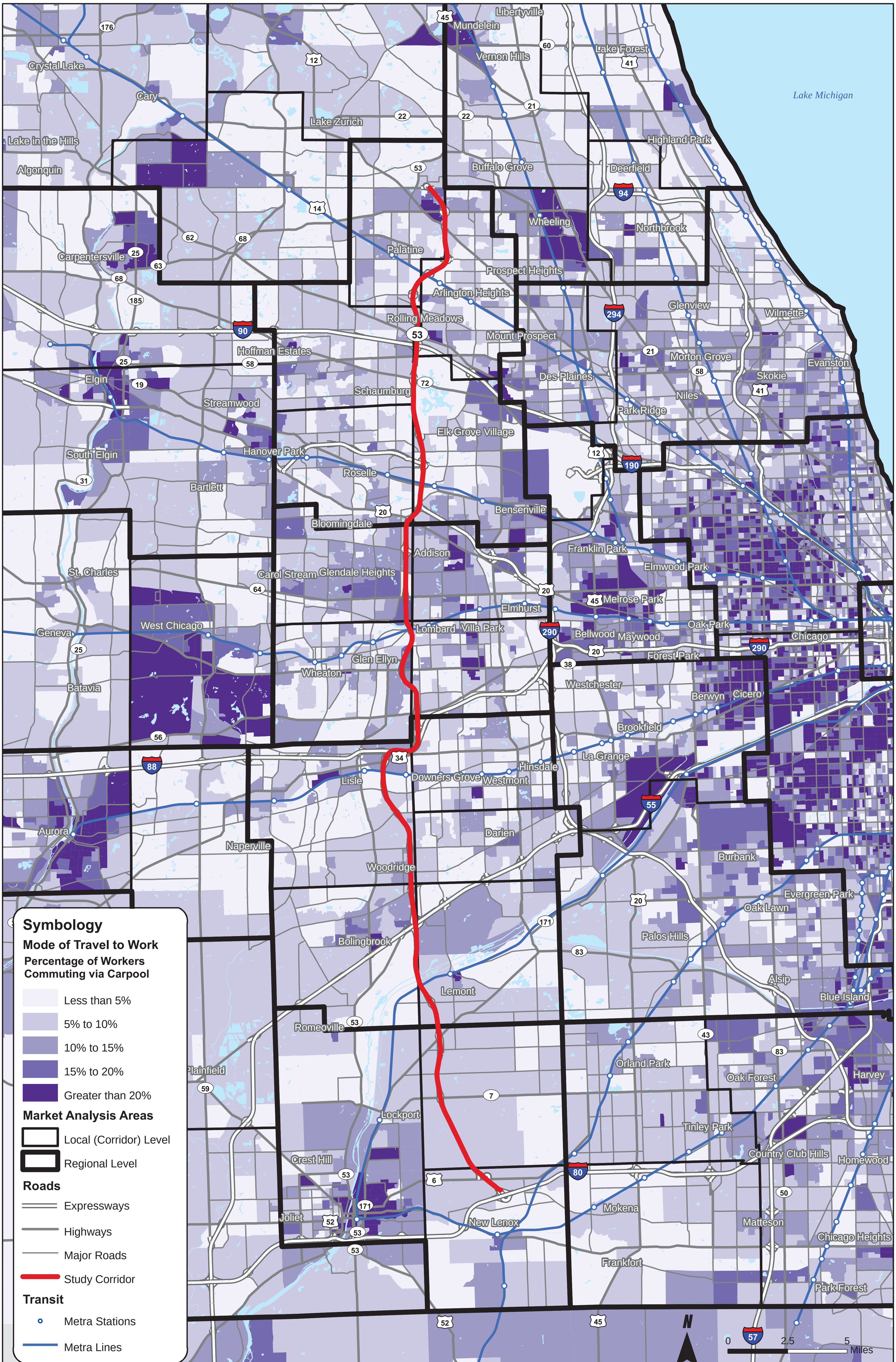
Figure 18 Mode of Travel to Work - Public Transit



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

Figure 19 Mode of Travel to Work - Carpool



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

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Driving Alone or SOV Mode

The mapping of the SOV mode (from US Census 2000 data) illustrates the widespread use of the automobile as the main means of transportation for commute-to-work travel in the region. Most urban areas outside Chicago show a mode split of 60 percent or higher, with many communities within the corridor study area having a drive-alone mode share of 80 percent or more. Both the northern end and southern end of the corridor have communities with high shares of driving alone for commute-to-work trips (80% or more), while the middle section of the corridor shows slightly lower shares of driving alone (60 to 80). This may be caused by commuters choosing to commute by rail to downtown Chicago on the Union Pacific West and BNSF corridors. As expected, the lowest shares of driving alone are observed in Chicago, which has an overall mode split of 60 percent or lower in most areas.

Public Transit Mode

Commute-to-work on public transit is, to a great extent, the opposite of the drive alone or single-occupancy vehicle figure. As presumed, the urban areas showing the strongest use of public transit for commute-to-work trips are found in Chicago (more than 20%) and along many of Metra's rail corridors (over 10%). Areas along the Union Pacific Northwest line, in the northern section of the I-355 corridor, and the Union Pacific West and the BNSF rail lines, in the central part of the corridor, stand out with higher transit use. Deserving notice are a few pockets or rail communities showing high transit mode shares (over 15%) in the middle section of the corridor, including La Grange, Hinsdale, Westmont, Downers Grove, Lombard, Glen Ellyn, and Wheaton, and in the northern segment, including Arlington Heights and Palatine. In addition, a few areas outside the rail corridors show public transit use for commute-to-work over 10 percent, including Naperville, Woodridge, Darien, south of Wheaton, south of Downers Grove, and Carol Stream. Transit use in these areas may be explained by local circulation to town centers and feeding connections with commuter rail.

Ridesharing Carpool/Vanpool

Ridesharing shows a rather interesting and more complex picture of travel in the region for commute-to-work trips that falls outside of the dichotomy between drive alone and public transit discussed above. First, there are many communities mostly outside the corridor study area that show carpool/vanpool use over 20 percent. These include mostly lower income areas in Chicago, in the first ring of suburbs east of I-294 (La Grange, Maywood, Melrose Park, and Wheeling), and west of the I-355 corridor in Carpentersville, Elgin, West Chicago, Aurora, and Joliet. Within the corridor study area, however, there are several communities showing block groups with more than 10 percent of ridesharing and a few pockets with more than 15-20 percent. These areas are located in Palatine, Rolling Meadows, Des Plaines, Elk Grove Village, Bensenville, Hanover Park, Carol Stream, Glendale Heights, Addison, Elmhurst, Bolingbrook, and Joliet, which tend to be middle income communities. The higher percentages of ridesharing may be due to commute-to-work patterns that are different than downtown Chicago (which is greatly served by Metra) and the desire to save money through reduced mileage and gas, and sharing of toll charges.

In essence, what these maps suggest is that there is a different narrative for the commute-to-work on transit outside Metra that today is served mostly by the automobile in the form of ridesharing or drive alone. Ridesharing offers one cue to finding those markets.

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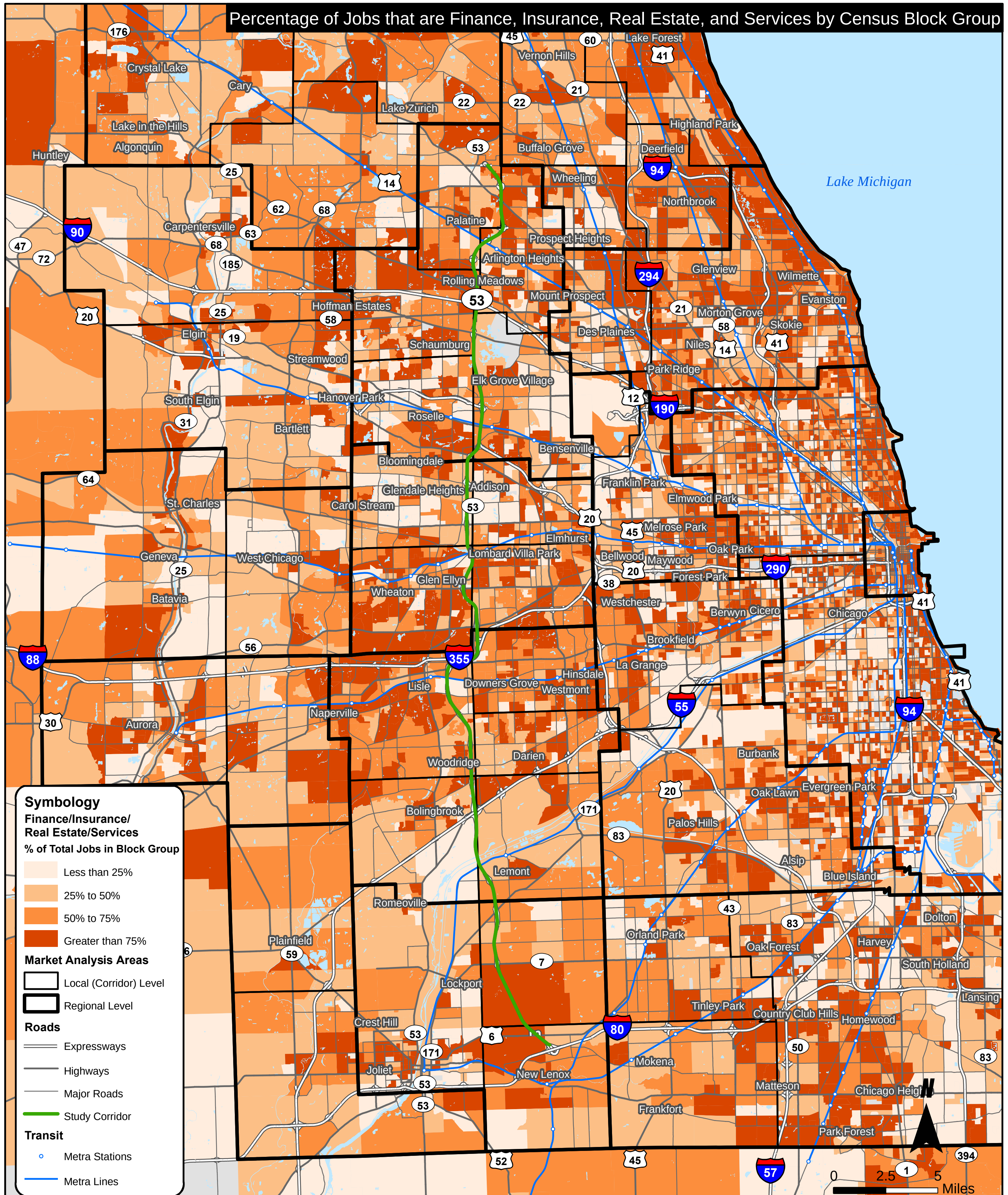
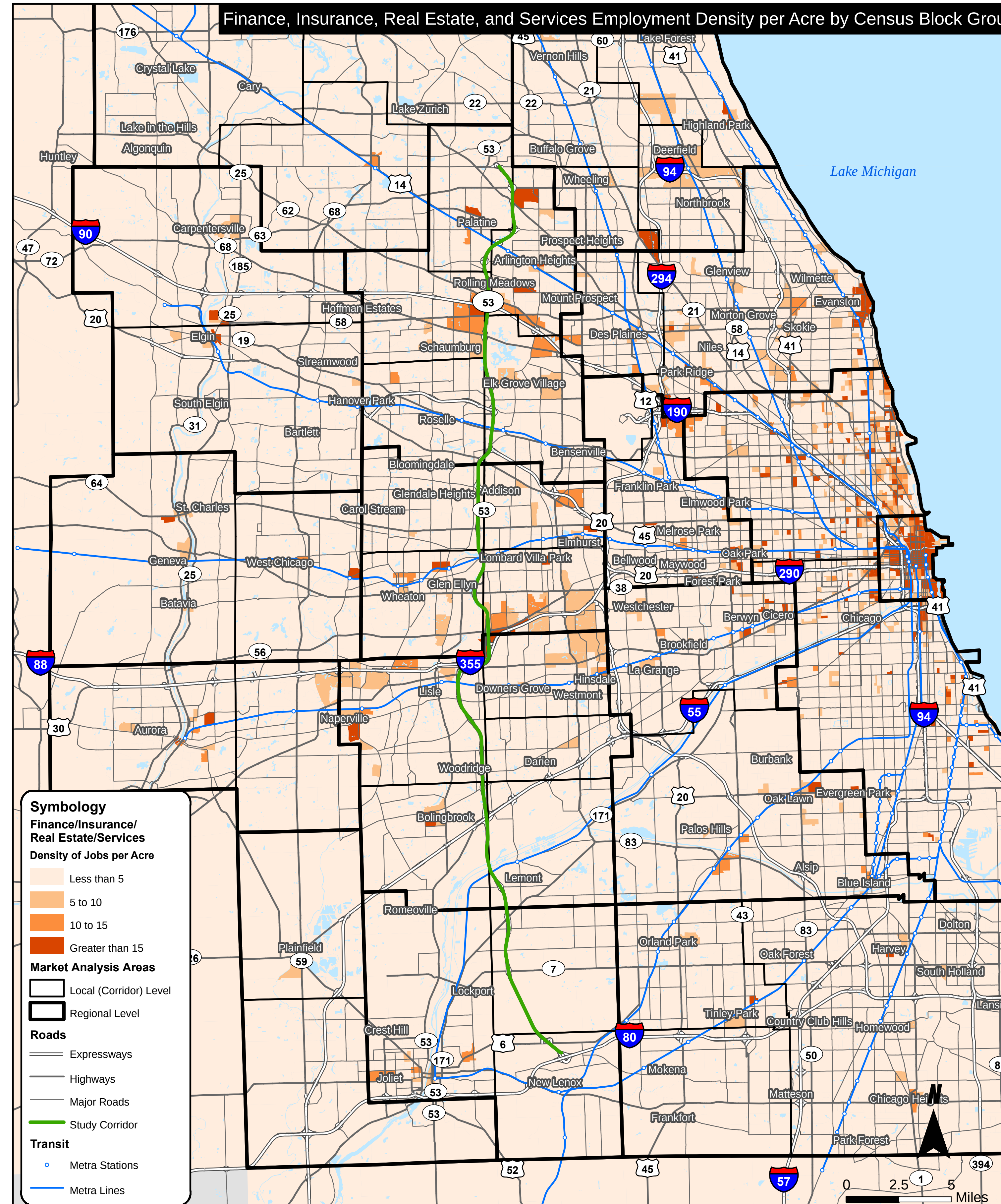
Figure 20 Finance, Insurance, Real Estate, and Services Employment

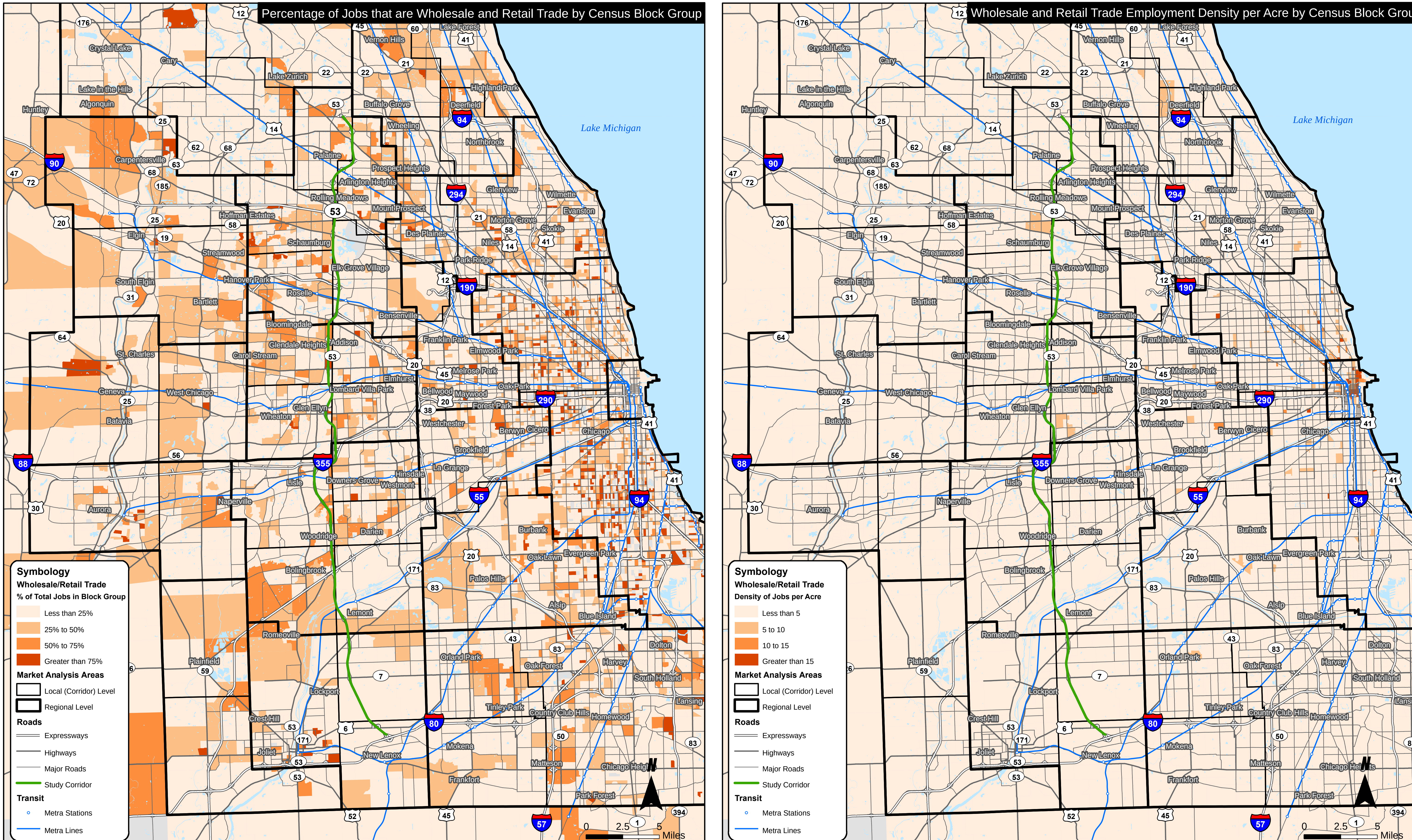




Nelson\Nygaard consulting associates

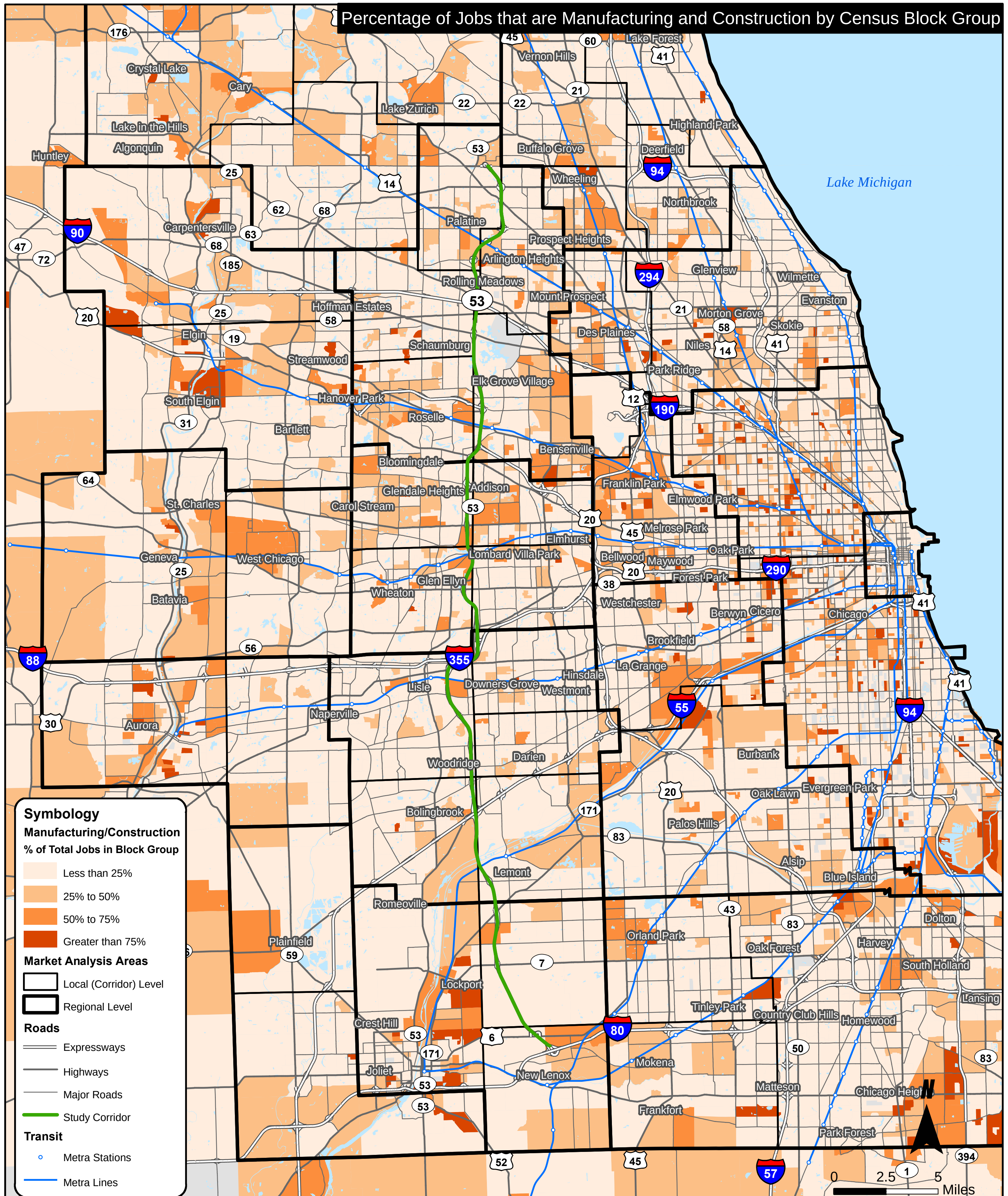
Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

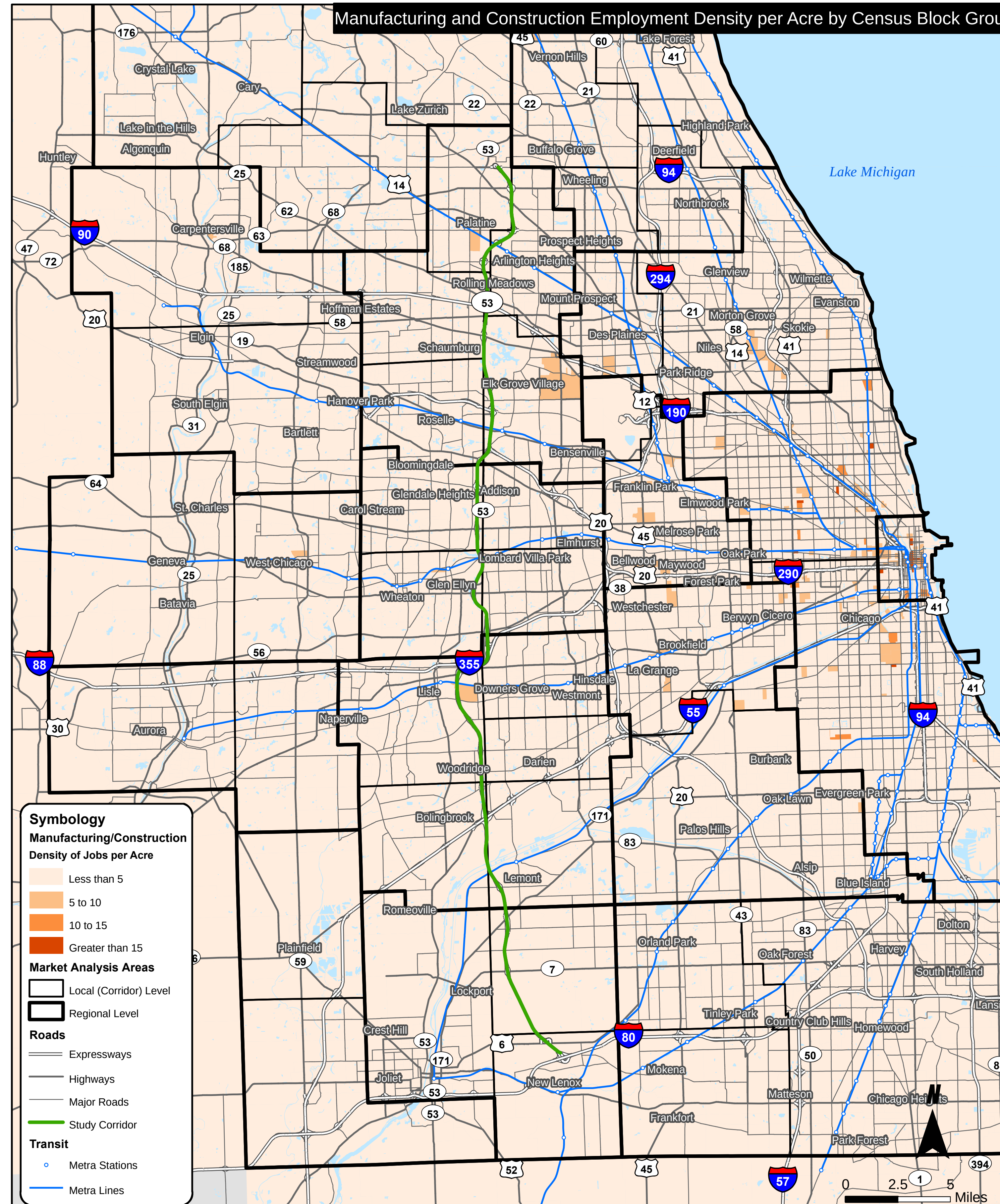
Figure 21 Wholesale and Retail Trade Employment



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

Figure 22 Manufacturing and Construction Employment





Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

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Finance, Insurance, Real Estate, and Services Employment

- **Percentage of jobs per block group**: the left hand map shows that professional service jobs are highly dispersed throughout the region, and that many jobs are concentrated in block groups within the corridor study area. This is especially true in the central and northern segments of the corridor, in communities such as Arlington Heights, Rolling Meadows, Hoffman Estates, Schaumburg, Roselle, Bloomingdale, Bensenville, Wheaton, Glen Ellyn, Lombard, Villa Park, Naperville, Lisle, Downers Grove and others, where professional service jobs make up over 50% of the jobs in the block group. Most of these concentrations are found in places that are accessible by tollways, highways, rail stations/corridors, and east-west arterials such as Golf Road, Algonquin, and IL 20.
- **Density of jobs per acre**: the right side map shows that while finance, insurance, real estate, and service jobs are highly concentrated as a proportion of all employment in many areas, the density of these jobs is low (less than 5 jobs per acre) in most areas throughout the region. Exceptions include downtown Chicago and several employment centers within the corridor study area, including Palatine/Wheeling, Schaumburg, Elk Grove Village, Glen Ellyn, Lombard, Naperville and Oak Brook/Hinsdale. These areas have 5,10, and 15 or more jobs per acre.

Wholesale and Retail Trade Employment

- **Percentage of jobs per block group**: Figure 21 shows that retail employment also tends to be dispersed throughout the region. Concentrations exist at intersections of major roads and highways, and in suburban areas west of the corridor that have larger market catchment areas, such as Carpentersville, Geneva, and West Chicago. Within the corridor, several concentrations of retail employment exist in communities such as Hoffman Estates, Schaumburg, Bloomingdale, Lombard, Darien, and Bolingbrook.
- **Density of jobs per acre**: on a job density level there are very low concentrations (less than 5 jobs per acre) throughout the region, with only a few exceptions in downtown Chicago and around Yorktown Mall in Lombard. Retail employment is more fine-grained and harder to illustrate at the block group level, as it is often at a higher density along an arterial corridor and at a lower density when concentrated in a shopping mall setting surrounded by parking.

Construction and Manufacturing Employment

- **Percentage of jobs per block group**: the distribution of construction and manufacturing employment shows higher degrees of concentration in industrial and manufacturing districts. Many of these districts lie in the first ring of suburbs west of Chicago in the south and along the I-55 corridor west of Midway Airport and in Joliet. There are also major industrial districts west and south of O'Hare International Airport (Elk Grove Village and Franklin Park) and in Addison and Glendale Heights. Outside the corridor study area, there are a few large districts west of I-355 in Crystal Lake, Carpentersville, Elgin, West Chicago, and Aurora.
- **Density of jobs per acre**: on a jobs per acre measure, construction and manufacturing shows very low density levels (less than 5 jobs per acre) throughout the region, with the sole exception of industrial areas in Chicago and west of O'Hare International Airport (in Elk Grove Village). Industrial and manufacturing employment is typically intensive in land area and thus very low density on a jobs per acre basis. This makes it difficult to serve with transit without extensive circulation, unless it is one major industry with a single access point.

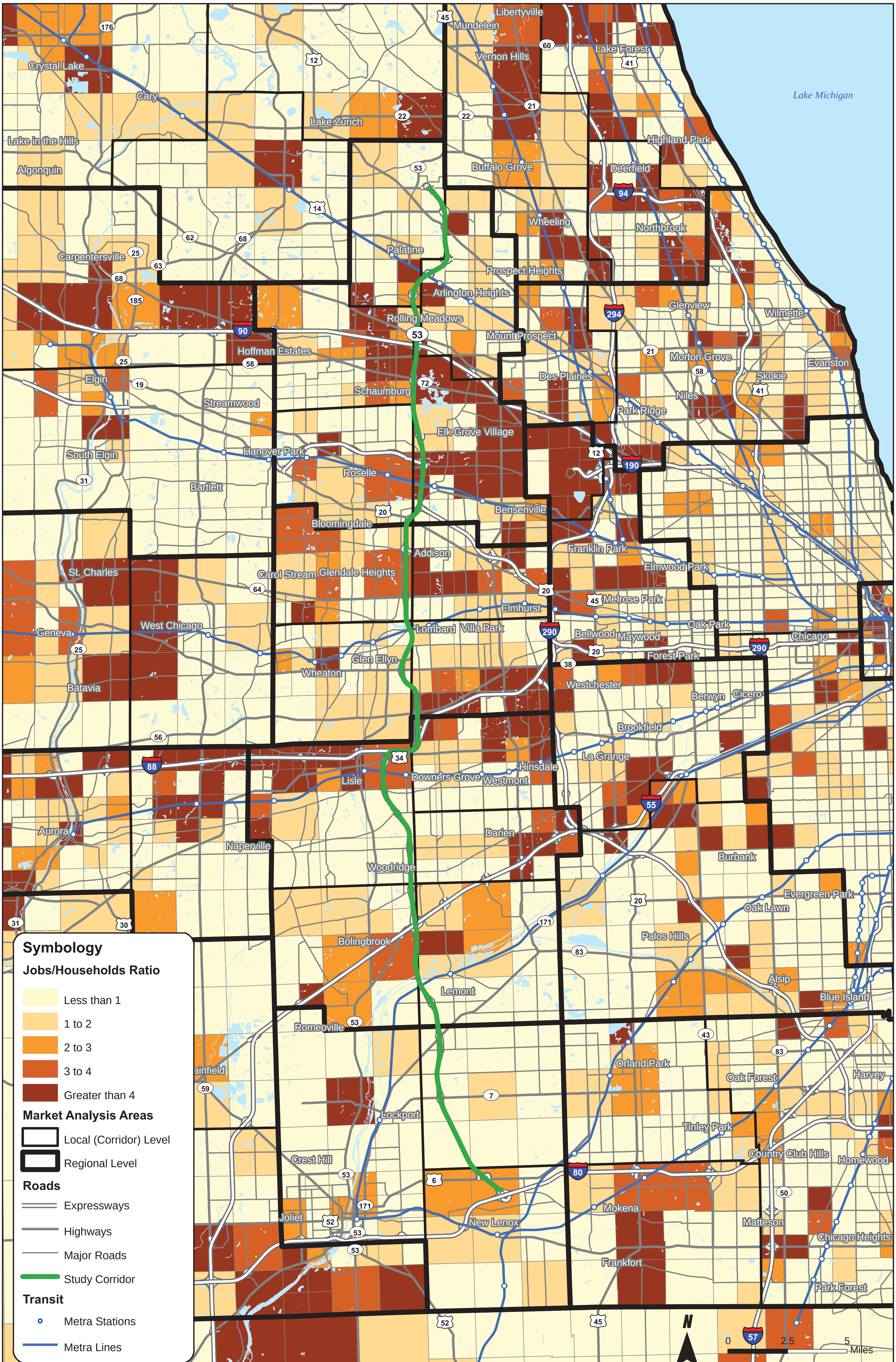
Jobs to Housing Ratio

As indicated earlier, this map shows the relative concentration of jobs in the region and around the I-355 corridor as compared to households. The ratio of jobs to housing is an effective method of showing where there are areas with employment surplus, thus attracting trips from outside the corridor study area, and surpluses of housing units, indicating mostly trip origins to a diversity of places throughout the region. The map also serves as a summary of the employment concentration by job category maps presented before.

Several major concentration/distribution patterns emerge from this map, most notably the urban area outside Chicago between I-355 and Chicago (east DuPage and west Cook Counties), which appears to concentrate large numbers of jobs. In particular, the urban area defined by I-355 on the west, I-290 on the east, I-90 on the north, and I-88 on the south contains many areas with employment concentrations and surpluses. Much of this economic activity is related to the transportation infrastructure and accessibility that is provided by highways, rail lines, airports and waterways. I-90, I-290 and I-88 are major corridors concentrating a multitude of economic activities and employment opportunities. To some extent, I-355 has opened a new axis of accessibility in the region for the location of economic activities. This is being reflected in a few east-west corridors such as Thorndale, Irving Park, Army Trail, North, Roosevelt, and Butterfield, while the north-south patterns are largely subdued.

Again, I-90 and I-88 are major east-west travel corridors interacting with I-355 and concentrating an important number of jobs and economic activity. The transportation infrastructure and apparent land use pattern that results from this infrastructure reflects the strong relationship suburban areas have with Chicago and the radial structure of the metropolitan area. North-south travel appears to be less pronounced at the regional level, and it is most likely more relevant on a local and subregional level.

Figure 23 Jobs/Households Ratio



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

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Land Use and Density Patterns

Building on the analysis of population characteristics, employment characteristics, and distribution patterns in the study area, the analysis follows with a review of land use patterns in the region and the corridor to better understand the relationship between population areas (origins) and employment areas (destinations). Two maps are produced and analyzed in this section: the existing land use patterns and the net distribution of population and employment density in the region that results from attributing population and employment data to land uses.

The mapping of existing land use patterns (Figure 24) allows for the review of population and employment areas on a disaggregated level, by the type of building and economic activity that is performed in each land use area, as follows:

- **Employment**: employment areas are broken down in several categories including: commercial uses (professional offices, retail, etc.), industrial uses (manufacturing, warehousing, extraction, etc.), institutional uses (government, education, health, etc.), agricultural uses and open space.
- **Residential**: residential areas are broken down by multifamily housing, urban mix, single family, etc.

The map illustrates a more detailed picture of both employment and residential uses. Vast portions of the region and the study area are comprised of low-density single-family housing and open space. This is particularly true in the central-south portion of the study area between I-55 and the UPW rail line. The central-north segment of the corridor (between UPW line and I-90) shows a larger mix of industrial, retail, office space, and single-family housing. The predominant development in the north end of the corridor (north of I-90) is single-family housing, which is interspersed with industrial, commercial and institutional uses. The south end of the corridor (south of I-55) is mostly low-density residential, industrial, and agricultural.

Most industrial areas are organized into districts, with the largest one consisting of the industrial parks, warehousing and manufacturing areas west of O'Hare International Airport. Other large industrial areas within the corridor analysis area are located in Addison, Carol Stream, Bolingbrook, and Romeoville. Commercial areas tend to be located on corridors, particularly those that run east-west. Significant corridors include Dundee, Golf, Army Trail, North, Roosevelt, Butterfield, and Ogden.

Population and Employment Density

As mentioned before, mapping population and employment density at the block group or TAZ level often does not represent the real distribution and concentration of residential and employment uses in the urban space. An alternative method involves cross-referencing population and employment projections with land use patterns/polygons (which are based on aerial photography and actual field surveys) to calculate a more realistic measure of both residential and employment density (or density by gross acre). This map is presented in Figure 25 below.

Figure 25 shows that within the corridor study area (largely the 5-mile buffer area around I-355), population and employment density are of varying intensity, with an 'eye-balled' average of 10 to 15 residents per acre in the northern segment of the corridor analysis area (north of I-88) and 5 to 10 residents per acre in the southern segment of the corridor. There are, of course, exceptions to this rule, with many pockets of high residential density (more than 20 residents per acre) in both the south end and north end of the corridor. West of the 5-mile buffer area, residential density is mostly low to very low (about 5 residents per acre). The highest population densities are found in Chicago (more than 20 residents per acre on average).

Employment densities are high in central Chicago (more than 40 jobs per acre) and lower in suburban areas, which typically have 10 jobs per acre or less. However, there are many employment districts showing higher concentrations of jobs per acre (over 20, 30 and 40 jobs per gross acre) along transportation corridors radiating outside of Chicago. Many of these districts are within the corridor study area, especially in the northern segment of the corridor area (north of I-88), in communities such as Oak Brook, Lombard, Addison, Bensenville, Itasca, Wood Dale, Schaumburg, and Elk Grove Village.

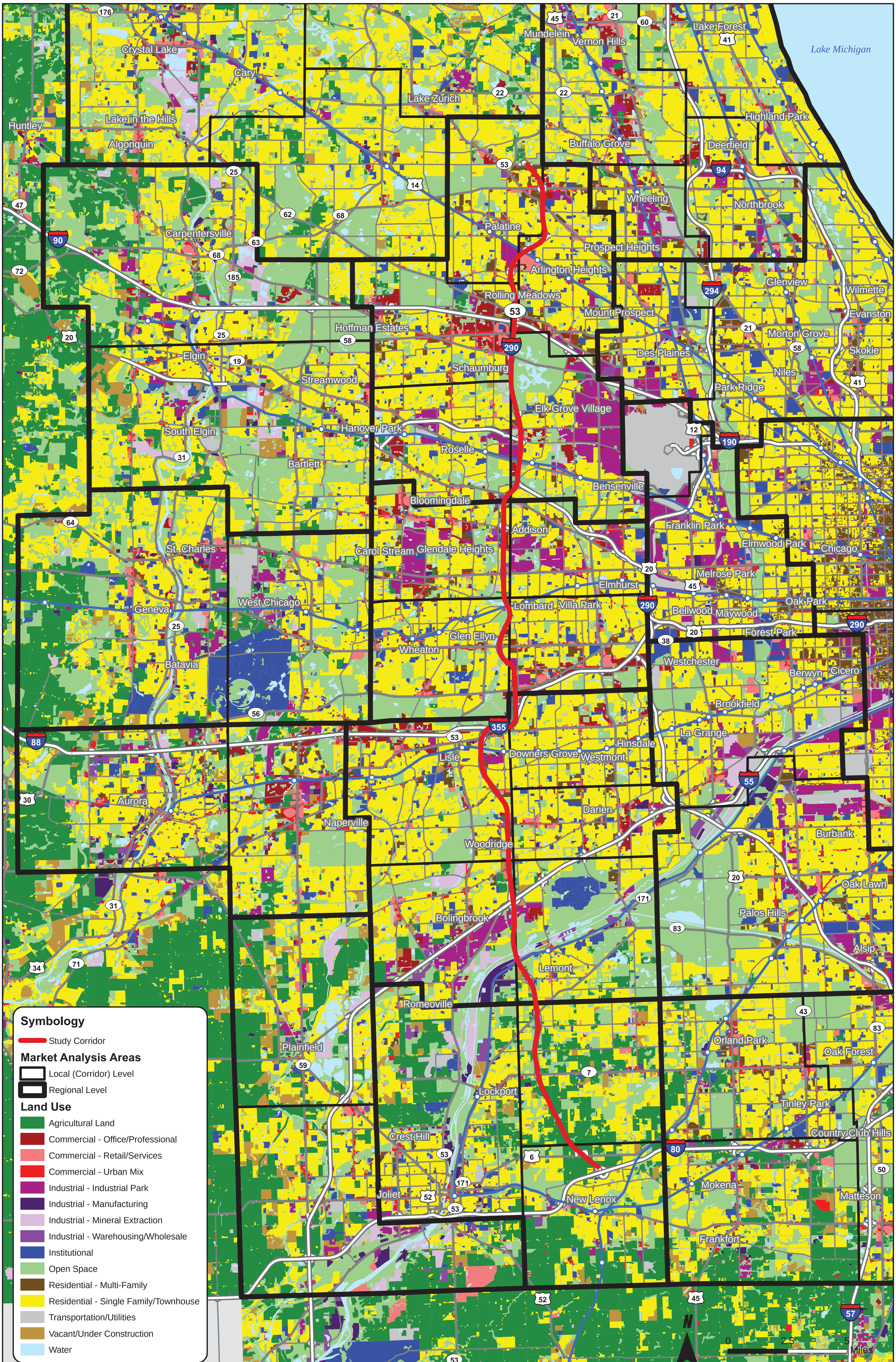
The employment concentration (and jobs-housing imbalance) in these districts is significant at the regional level, and thus they most likely attract trips from all over the region. Of particular importance is the concentration of jobs around O'Hare International Airport.

Still, the picture that is provided by the gross residential and employment density in the corridor study area is one of an area that is still in the process of development and densification. The fact that there are so many transportation projects (i.e. Elgin-O'Hare Bypass and Metra STAR Line) and re-urbanization projects (i.e. Bensenville) is a testament of this urbanization process.

In general, current residential and employment density levels in the corridor study area are not large enough to support frequent, all day, fixed-route transit services. However, there are high density employment districts that could support commute type services. The population and employment density map suggests that the market for such services in the study areas is still in development. Typically, local bus services are supported by residential densities of more than 10 persons per acre, with transit use increasing significantly at more than 20 persons per acre. Frequent bus services are typically supported by a combination of 15 or more persons per acre and 15 or more jobs per acre that are located within a quarter mile of the route corridor.[1] This level of density is not continuously present in the corridor study area, save for a few pockets of density and some corridor segments that show potential. Identifying these potential markets is the goal of this study and the next sections of this report.

[1] These figures are based on the experience of planning efforts conducted by Nelson\Nygaard for transit systems throughout the United States during the past ten years.

Figure 24 Regional Land Use Patterns



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

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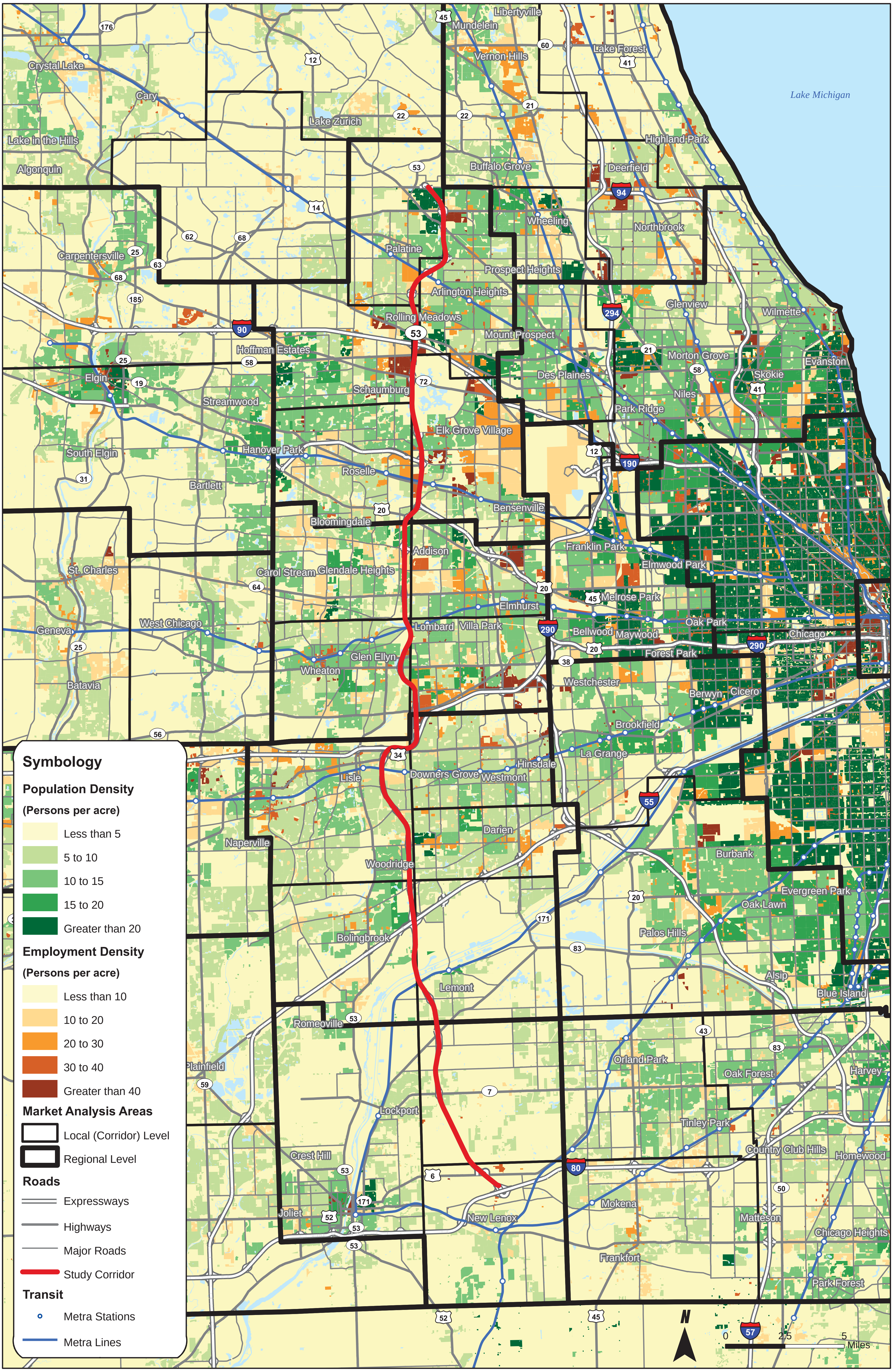
Figure 25 Population and Employment Density



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

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3.2 OD Travel Demand Analysis

Based on regional travel demand modeling data (developed and maintained by CMAP), we produced a detailed analysis of origin-destination (OD) travel patterns in the corridor on two levels: the interaction with the region (regional level), and the interaction between communities in the corridor (local level). These analyses were developed to understand demand for travel in the region, how the I-355 corridor fits in the regional transportation system, and its travel demand markets. The main goal was to understand what travel needs I-355 serves today (year 2010) and what potential needs it will be serving in the future (year 2030).

OD travel demand patterns are fully intertwined with population and employment characteristics and land use patterns. OD travel demand data are developed and analyzed at a small geographic unit called a traffic analysis zone (TAZ) that reflects both market conditions (land use, population and employment) and travel conditions (trip generation and purpose). These characteristics are combined with street characteristics (capacity, length and speed) and modes of travel (automobile and transit) to assign trips to particular street paths and modes. The CMAP region is comprised of close to 2,000 TAZs that are maintained to reflect the conditions of travel and markets at the local level. For the purpose of this analysis, these zones were aggregated into two levels: regional (comprised of 20 zones) and local (comprised of 50 zones).

Through a series of GIS maps and trip tables (or matrices) that summarize regional travel demand patterns (utilizing trip production and attraction data at the TAZ level), the analysis was conducted at the regional and local levels. The regional analysis examined the corridor's function in the region and long distance travel within the corridor, while the local analysis explored the different markets that are directly served and impacted by the corridor to understand their connectivity and relationships. The results of the analysis are presented in the sections below.

Longitudinal Employer-Household Dynamics

To provide an overview of household and employment travel dynamics, we used the Longitudinal Employer-Household Dynamics (LEHD) database from the US Census Bureau to map employment sheds for selected county areas along the corridor. The analysis allows us to understand the travel patterns of employees and residents of Cook, DuPage, and Will Counties. Household and employment travel dynamics were mapped and analyzed from two perspectives:

- **Labor shed**: where people who work in the county reside. Locations where the workers live and commute from are mapped.
- **Commute shed**: where residents of the county work. Locations where the residents commute to and work are mapped.

Cook County

Labor Shed Analysis

Out of 2.3 million jobs in Cook County, 1.6 million are filled with Cook County residents, and 651,000 are filled with out of county residents. In other words, 651,000 workers or 28% commute from the suburbs to Chicago.

Labor Shed	Residency	Percent
Cook County	1,635,017	72%
All other counties	651,395	28%
Total	2,286,412	100%

Commute Shed Analysis

Out of 2 million workers in Cook County, 1.6 million workers commute to jobs within Cook County, and 426,000 (21% of total) commute to jobs outside Cook County and make a reverse-commute to the suburbs.

Commute Shed	Work Location	Percent
Cook County	1,635,017	79%
All other counties	426,370	21%
Total	2,061,387	100%

Cook County mostly fills its jobs with county residents and less than one-third of them are filled with residents from suburban counties. However, the volume of jobs concentrated in Cook County is large enough that 28% or 651,000 is larger than the entire job market in either DuPage County or Will County.

Relationship with I-355 Corridor Study Area:

Commuters from study area: many workers commuting to Chicago are concentrated in the north end of the corridor, in Palatine, Arlington Heights, Mount Prospect, Prospect Heights, and Schaumburg, and to a lesser extent in Roselle, Bloomingdale, Oak Brook, Downers Grove, Lisle and Naperville, along Metra's BNSF corridor.

Commuters to study area: most Cook County residents working in the study area work in Elmhurst, Lombard, Bensenville, Elk Grove Village, Itasca, and Schaumburg.

DuPage County

Labor Shed Analysis

Out of 550,000 jobs, 191,000 (35% of total) are filled by DuPage County residents, while 358,000 (65% of total) jobs are filled by residents from other counties. In other words, DuPage imports two-thirds of its workers from outside the county area.

Labor Shed	Residency	Percent
DuPage County	191,361	35%
All other counties	357,717	65%
Total	549,078	100%

Commute Shed Analysis

Out of 421,000 workers residing in DuPage County, 191,000 (45% of total) workers work within the county, and 230,000 (55% of total) go to work outside the county. In other words, DuPage County exports just over one-half of its workers to outside counties.

Commute Shed	Work Location	Percent
DuPage County	191,361	45%
All other counties	229,958	55%
Total	421,319	100%

Relationship with I-355 Corridor Study Area:

Commuters from study area: interestingly, most work within the corridor study area, up and down the corridor between Schaumburg and Bolingbrook, but also in areas west of the corridor in Aurora, Naperville, West Chicago and St. Charles, but also in downtown Chicago.

Commuters to study area: most live in places up and down the corridor between Schaumburg and Bolingbrook, in Carol Stream, Glendale Heights, Glen Ellyn, and Lisle but also in Darien, Downers Grove, Lombard and Oak Brook. They also come from places west of the corridor in Aurora, Naperville and West Chicago, and also from the north and east in Cook County.

Will County

Labor Shed Analysis

Out of 179,000 jobs in Will County, 86,000 (48% of total) workers reside within the county and over 92,000 (52%) commute from outside the county.

Labor Shed	Residency	Percent
Will County	86,064	48%
All other counties	92,495	52%
Total	178,559	100%

Commute Shed Analysis

Out of 289,000 workers residing in Will County, 86,000 (30% of total) work within the county and over 200,000 (70% of total) commute to work outside the county. In other words, Will County exports more than two-thirds of its workers to other counties.

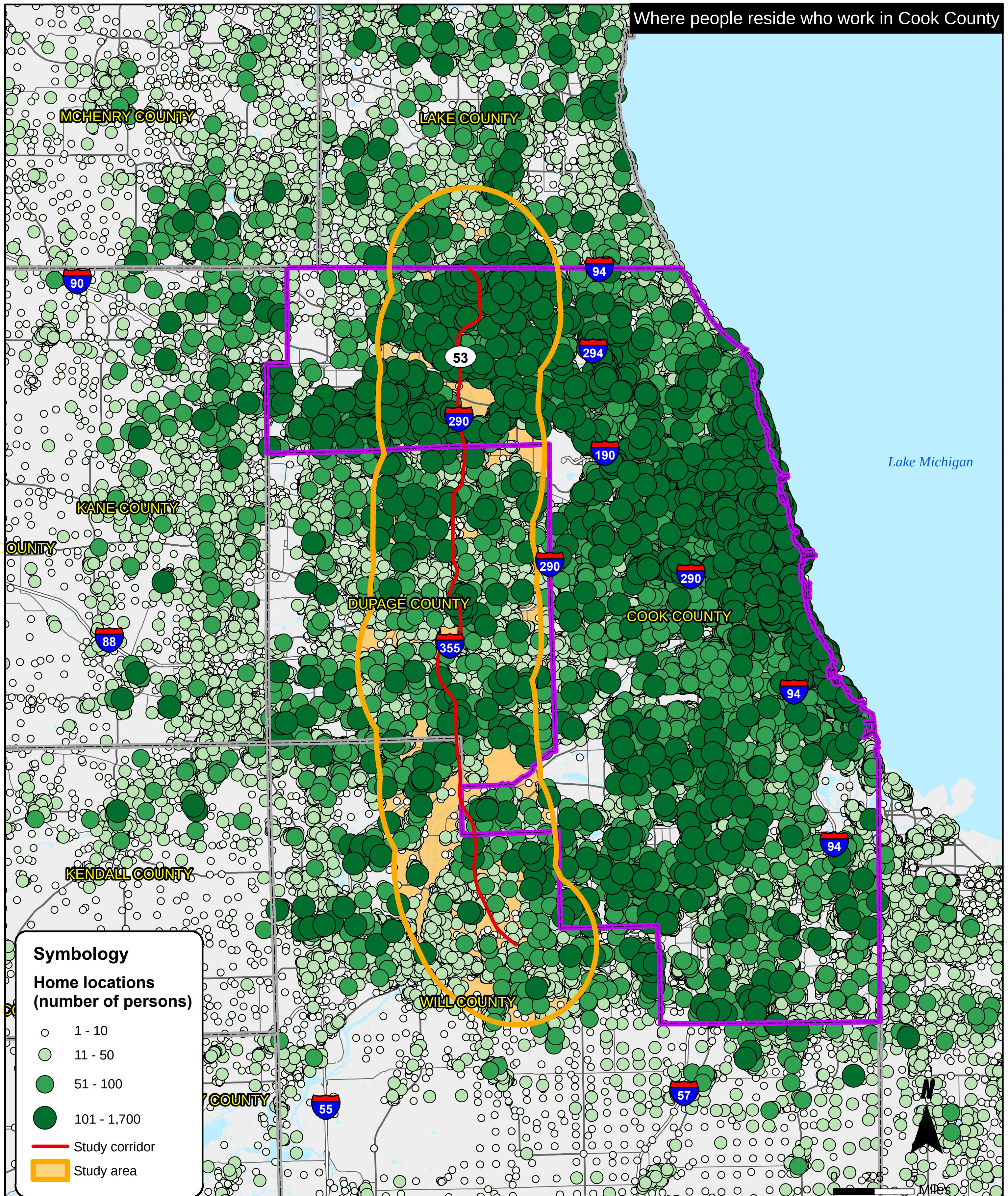
Commute Shed	Work Location	Percent
Will County	86,064	30%
All other counties	202,864	70%
Total	288,928	100%

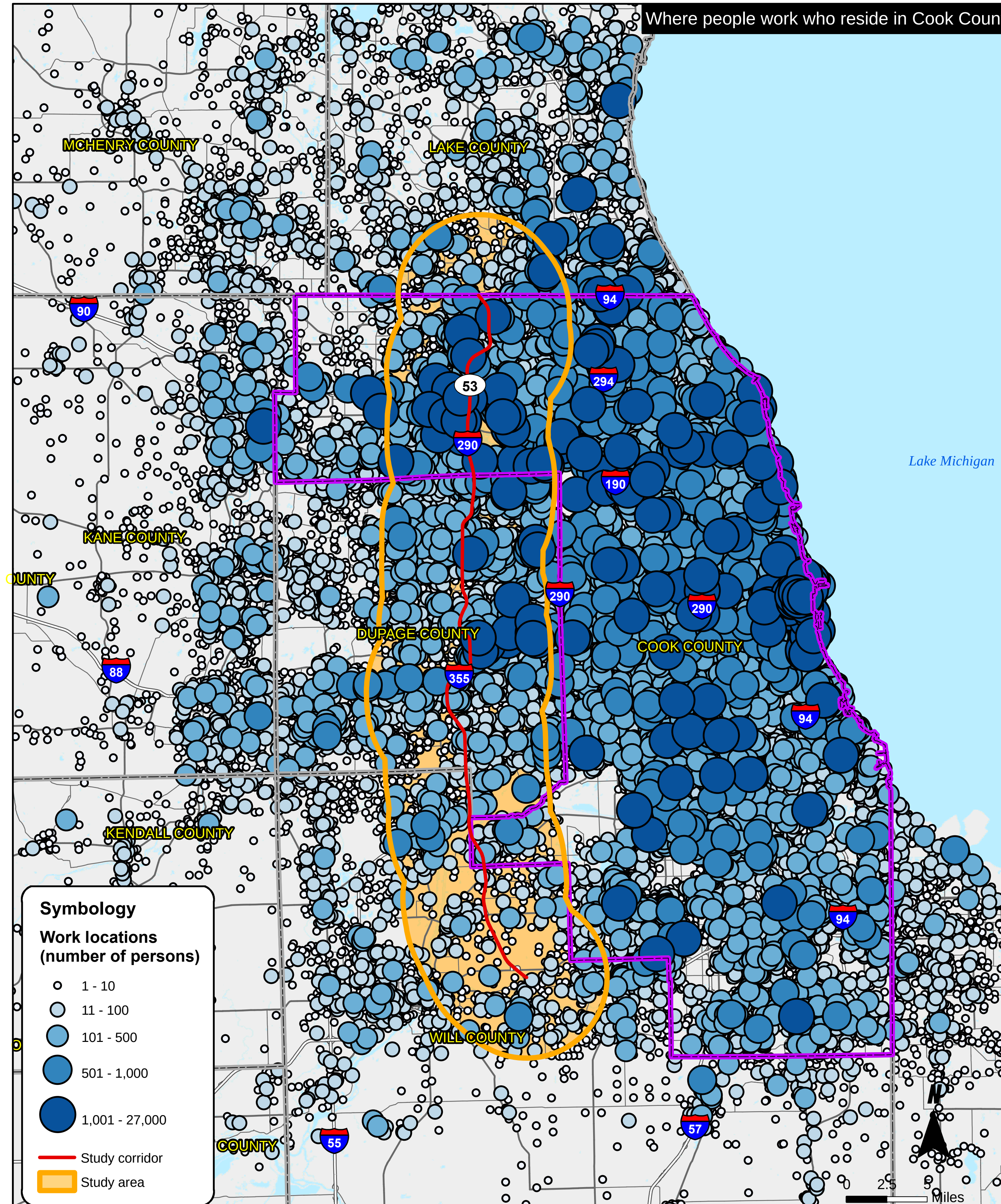
Relationship with I-355 Corridor Study Area:

Commuters from study area: most live in Joliet and New Lenox on the south end of the corridor, although they are more heavily concentrated in Joliet; they also live in Romeoville and Bolingbrook. They work in these same areas but also all over DuPage and Cook Counties.

Commuters to study area: they reside and work mostly in Joliet, New Lenox, Romeoville, Bolingbrook, Lisle and Naperville, but also commute from all over the region.

Figure 26 Home Locations of Workers & Work Locations of Residents - Cook County





Source: Pace Suburban Bus, State of Illinois, ESRI, U.S. Census Bureau LEHD

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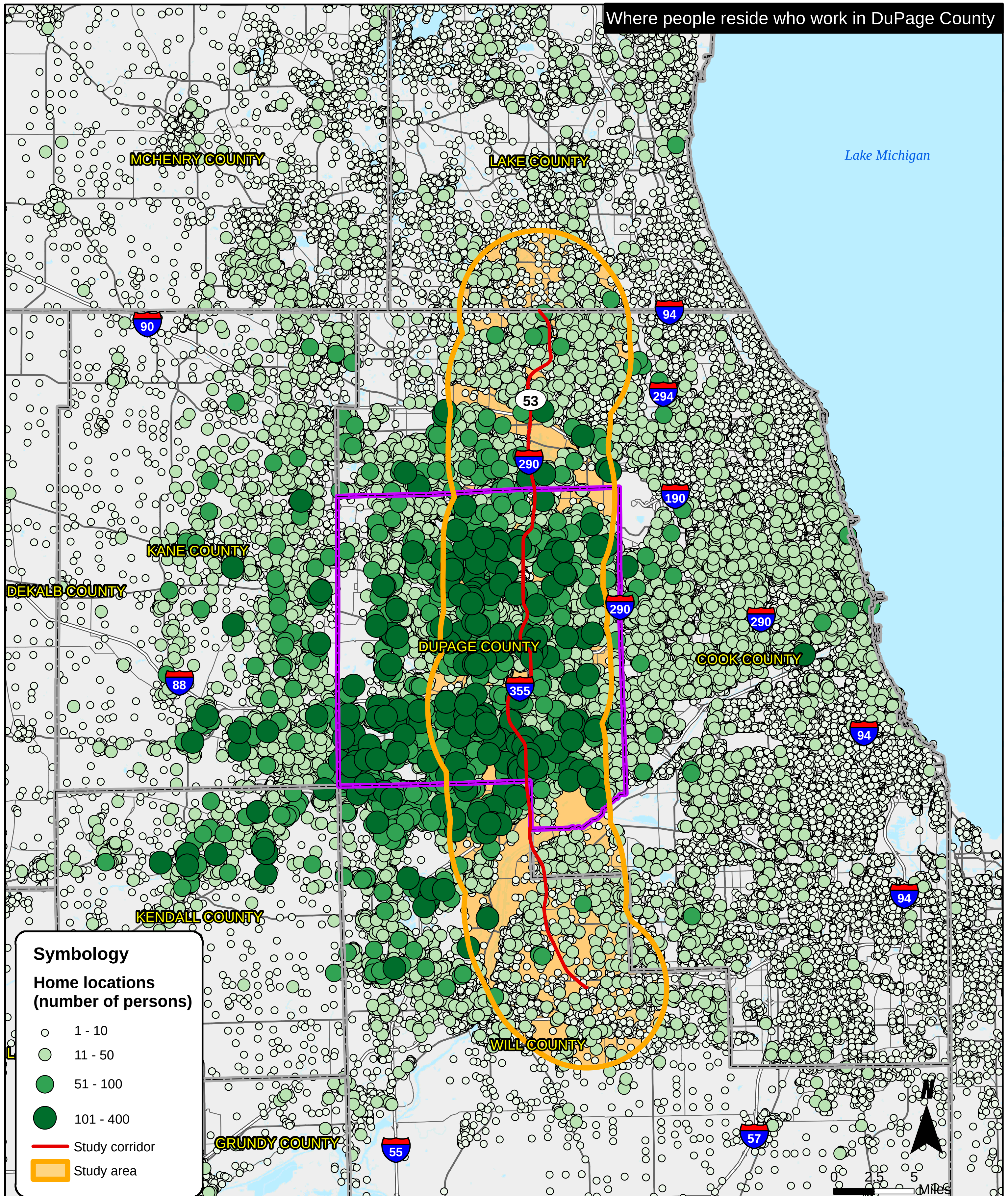
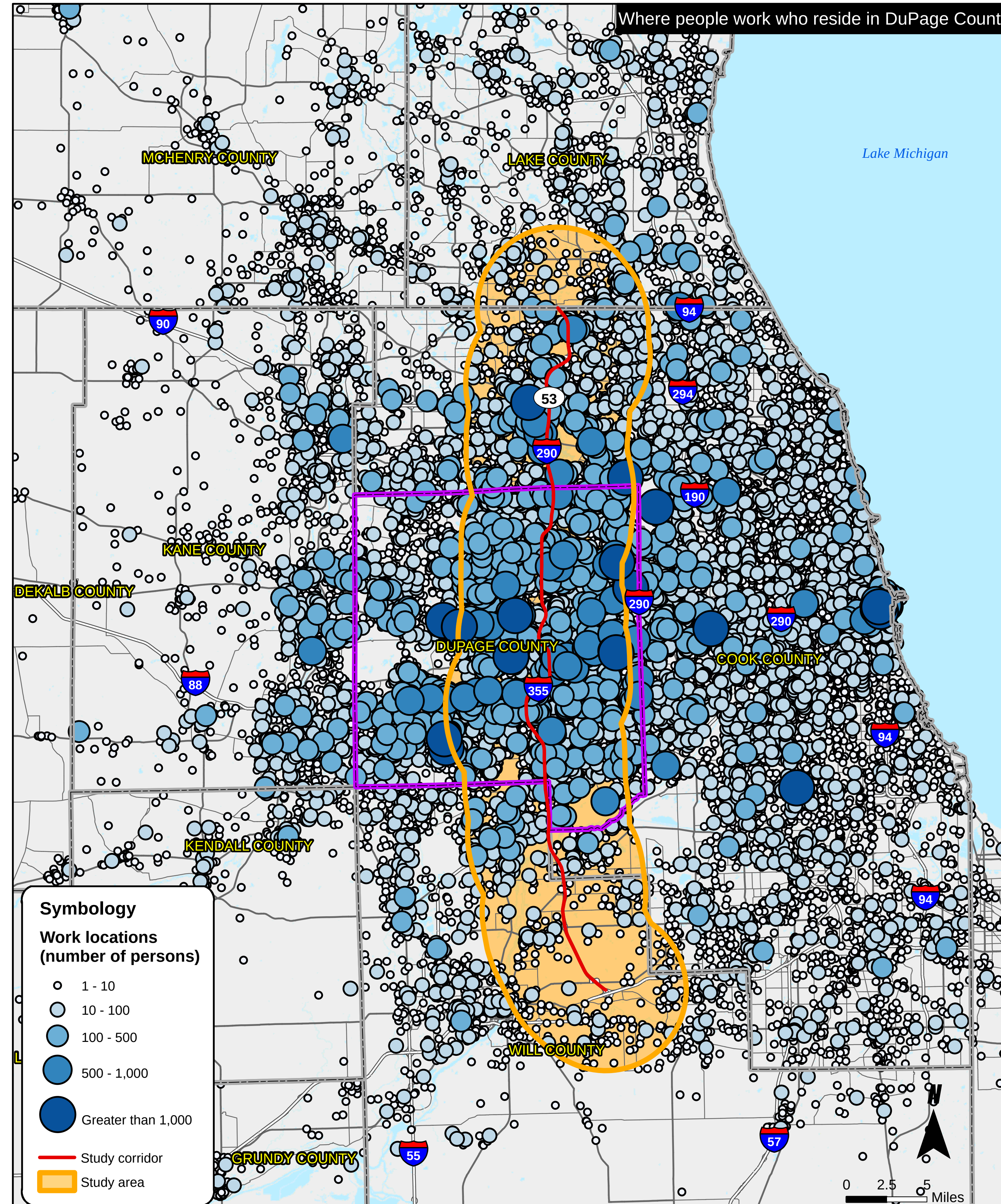
Figure 27 Home Locations of Workers & Work Locations of Residents - DuPage County





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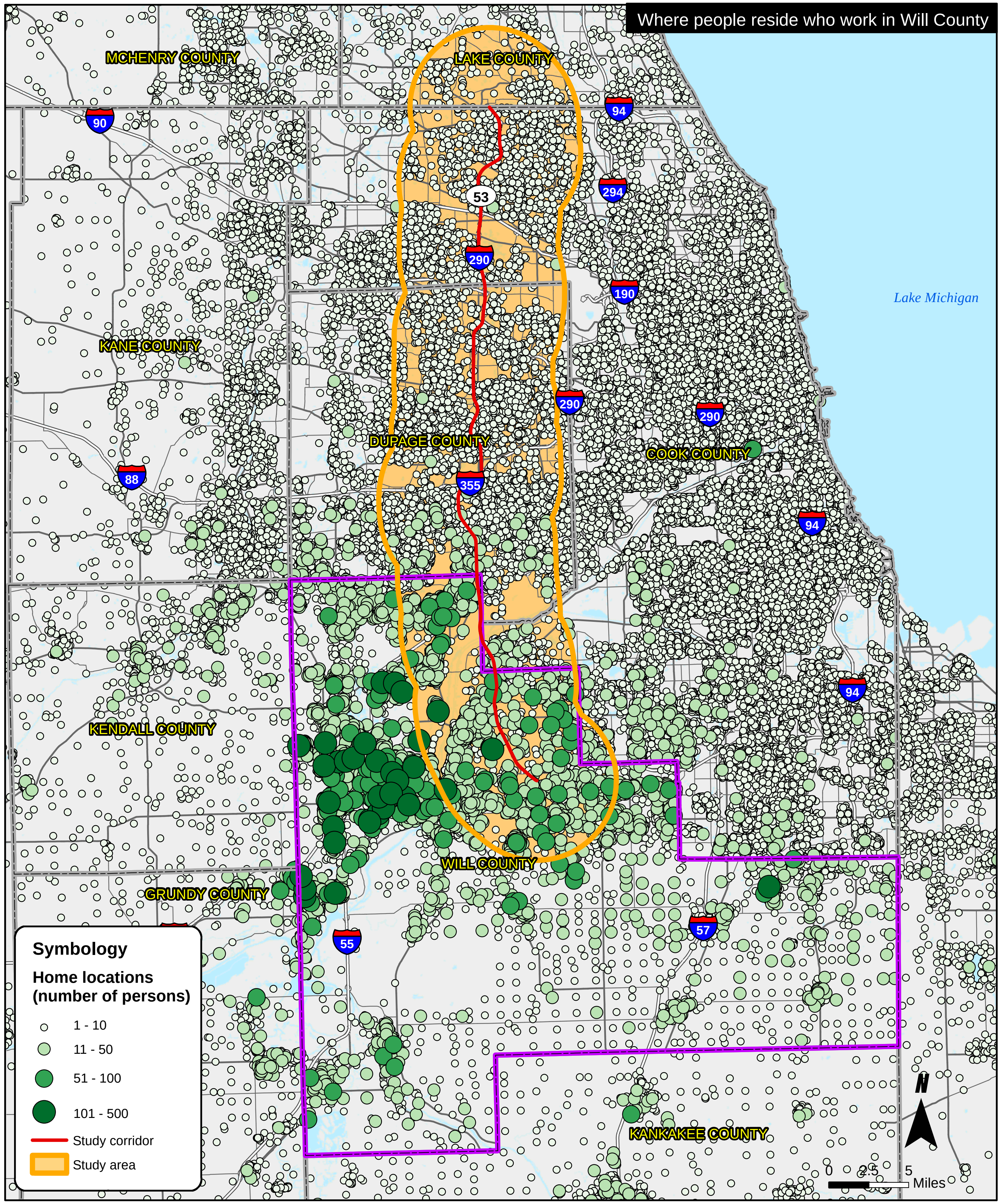
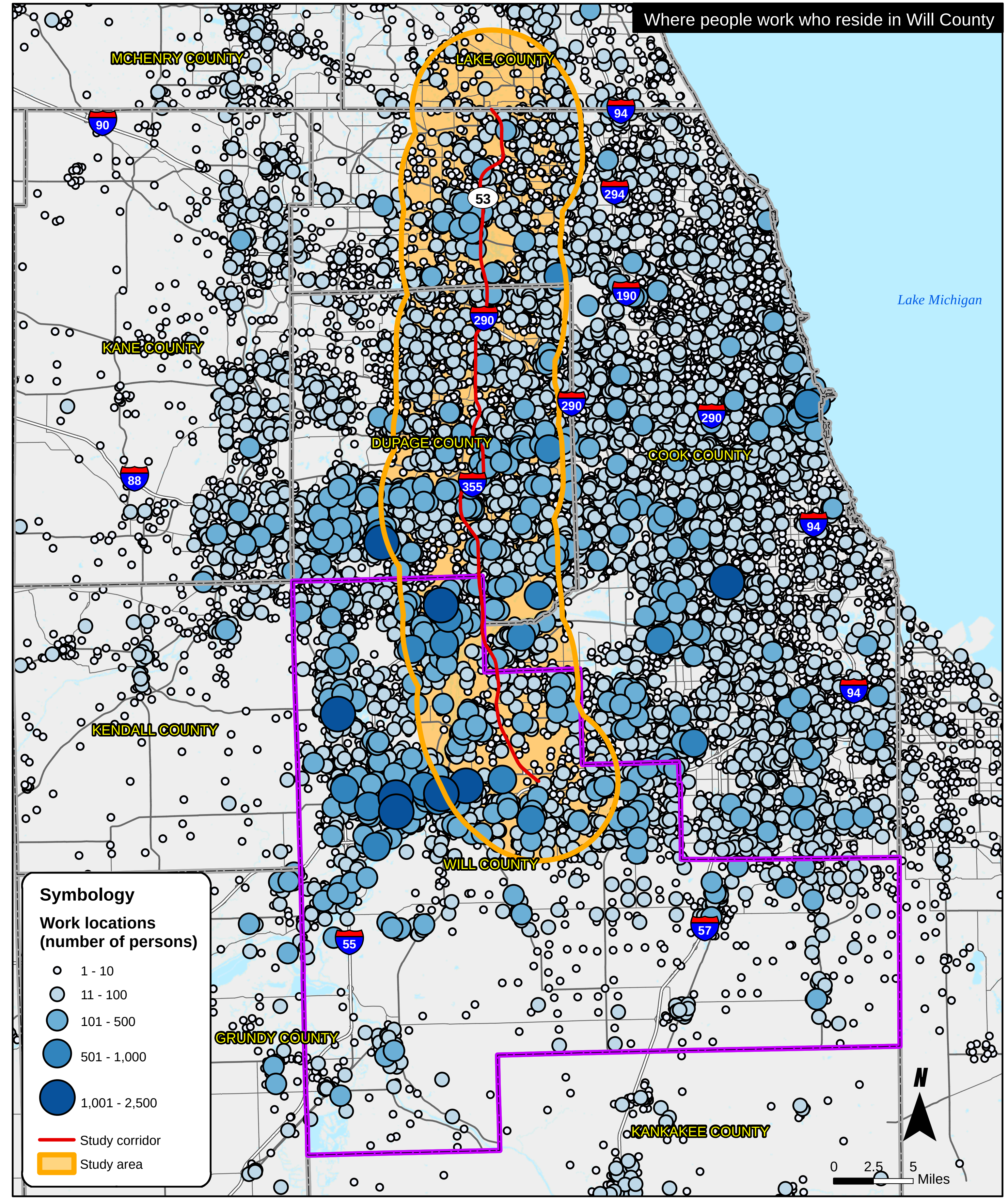
Source: Pace Suburban Bus, State of Illinois, ESRI, U.S. Census Bureau LEHD

Figure 28 Home Locations of Workers & Work Locations of Residents - Will County





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Source: Pace Suburban Bus, State of Illinois, ESRI, U.S. Census Bureau LEHD

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Local and Regional OD Travel Patterns

The section below provides a summary analysis of OD travel in the region and in the I-355 Corridor study area. Summaries are based on CMAP travel demand model data at the TAZ level for year 2010, and as such they represent existing conditions. TAZs have been grouped into areas or zone groups for purpose of analysis. These groups were developed based on land use characteristics, population and employment density characteristics, and city and county boundaries. Two levels of analysis were developed, as described below:

- **Regional Level:** a regional level of analysis comprised of 16 zones, 4 of which are within the corridor study area. The purpose of the regional level of analysis was to understand overall travel characteristics between corridor and the region (see Figure 30 on page 77).
- **Local/Subregional Level:** a local level of analysis comprised of 47 zones, 17 of which are within the corridor study area. The purpose of the local/subregional level of analysis was to understand characteristics of travel within the corridor area and between the corridor and adjacent areas (see Figure 32 on page 81).

Table 4 on page 75 provides an overall summary of regional travel as forecasted by the CMAP travel demand model for year 2010. This summary includes an overview of travel between the corridor area and the region by trip purpose and by travel mode. The CMAP model analyzes trip purpose with the following categories:

- Home-based work – commute trips (work and school)
- Home-based other – non-commute trips (social, shopping, medical, and other)
- Non-home based – all trips that are not home based (work/school and other)

The following mode splits are provided by the CMAP model

- Auto – single occupancy vehicle trips (SOV)
- Transit – public transit and ridesharing trips (rail, bus, carpool/vanpool)
- Trucks – trucks and light trucks are also included in the model, but were not included in the analyses below

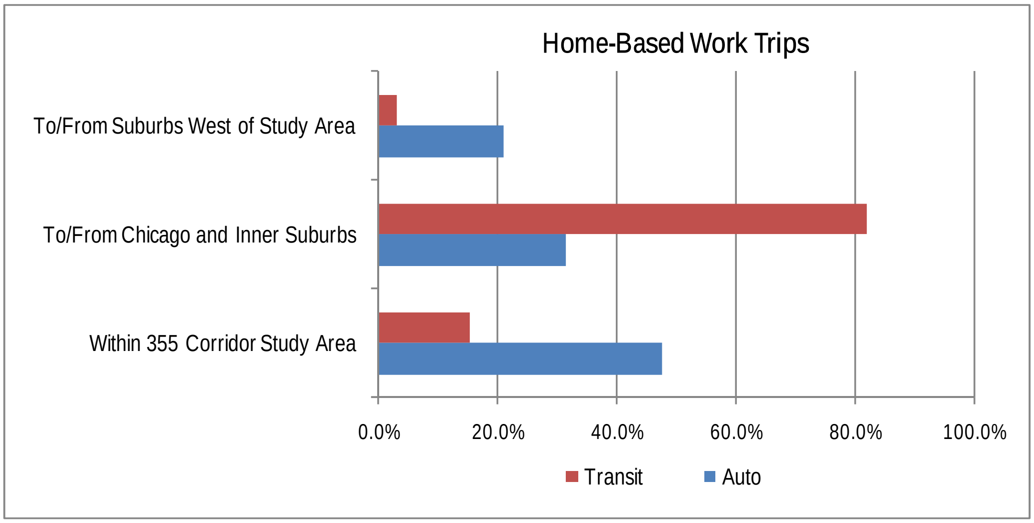
I-355 Corridor Travel Characteristics

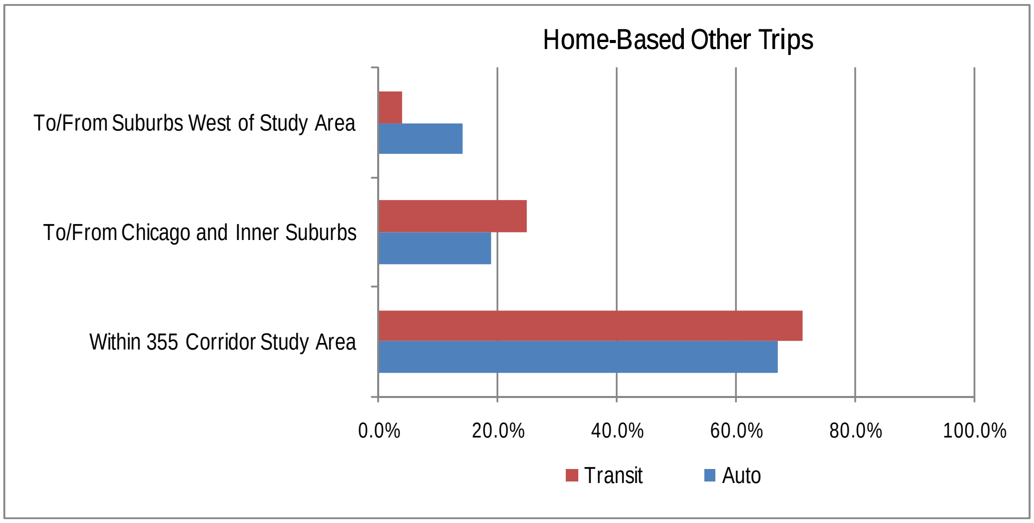
Travel within the I-355 corridor and between the corridor and the region is summarized in the charts below. There are 6.8 million trips being made that have an origin and/or a destination in the corridor. This represents about 25.5% of all auto and transit trips in the region. The breakdown is as follows:

Home-based work: 1.6 million trips, which is 26% of all home-based work trips in the region.

- 46% of all Auto trips are made within the corridor area, 32% are made between the corridor and Chicago, and only 22% are made between the corridor and the suburbs to the west.
- 81% of all Transit trips are made between the corridor and Chicago, 16% are made within the corridor area, and only 3% are made between the corridor and the suburbs to the west.
- Out of all home-based work trips between the corridor area and Chicago, 14% are Transit trips, and these represent 81% of all transit trips.

Figure 29 I-355 Corridor Trips by Geographic Split, All Trips 2010





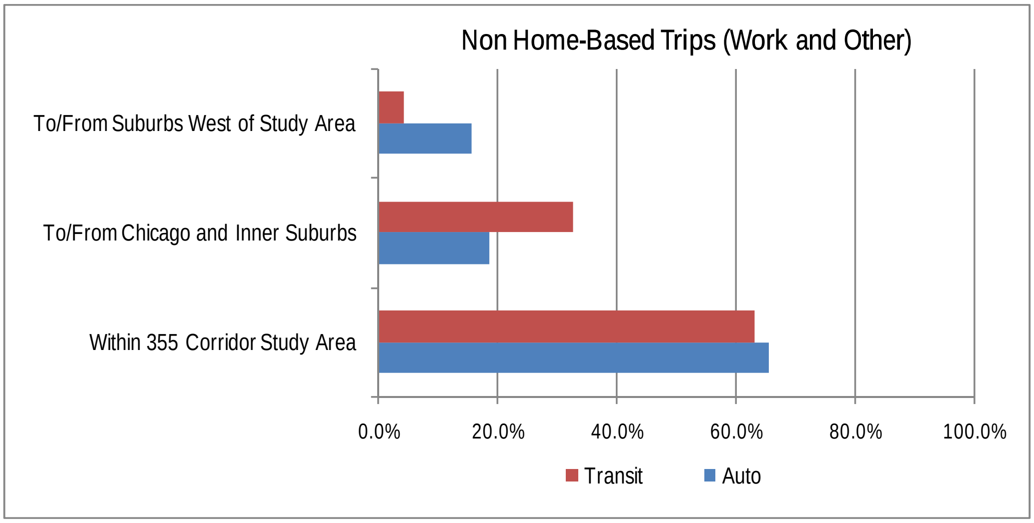


Table 4 Regional Level Summary by Mode, All Trips 2010

	Total Person Trips			Geographic Split			Mode Split		
Home Based Work	Auto	Transit	Total	Auto	Transit	Total	Auto	Transit	Total
Study Area Total	1,547,743	99,524	1,647,267	28.6%	11.6%	26.3%	94.0%	6.0%	100.0%
Within 355 Corridor Study Area	708,239	15,855	724,094	45.8%	15.9%	44.0%	97.8%	2.2%	100.0%
To/From Chicago and Inner Suburbs	499,538	80,641	580,179	32.3%	81.0%	35.2%	86.1%	13.9%	100.0%
To/From Suburbs West of Study Area	339,966	3,028	342,994	22.0%	3.0%	20.8%	99.1%	0.9%	100.0%
Subtotal	1,547,743	99,524	1,647,267	100.0%	100.0%	100.0%	94.0%	6.0%	100.0%
Within Chicago and Inner Suburbs	2,312,177	572,776	2,884,953	42.8%	66.9%	46.1%	80.1%	19.9%	100.0%
Within Suburbs West of Study Area	1,310,341	23,751	1,334,092	24.2%	2.8%	21.3%	98.2%	1.8%	100.0%
Between Chicago and Suburbs West	237,961	159,783	397,744	4.4%	18.7%	6.3%	59.8%	40.2%	100.0%
Total Region	5,408,222	855,834	6,264,056	100.0%	100.0%	100.0%	86.3%	13.7%	100.0%

Home Based Other	Auto	Transit	Total	Auto	Transit	Total	Auto	Transit	Total
Study Area Total	2,907,250	173,699	3,080,949	22.9%	14.9%	22.3%	94.4%	5.6%	100.0%
Within 355 Corridor Study Area	1,919,196	125,706	2,044,902	66.0%	72.4%	66.4%	93.9%	6.1%	100.0%
To/From Chicago and Inner Suburbs	570,111	40,565	610,676	19.6%	23.4%	19.8%	93.4%	6.6%	100.0%
To/From Suburbs West of Study Area	417,943	7,428	425,371	14.4%	4.3%	13.8%	98.3%	1.7%	100.0%
Subtotal	2,907,250	173,699	3,080,949	100.0%	100.0%	100.0%	94.4%	5.6%	100.0%
Within Chicago and Inner Suburbs	5,732,647	792,592	6,525,239	45.2%	67.9%	47.1%	87.9%	12.1%	100.0%
Within Suburbs West of Study Area	3,762,898	143,690	3,906,588	29.7%	12.3%	28.2%	96.3%	3.7%	100.0%
Between Chicago and Suburbs West	276,058	57,841	333,899	2.2%	5.0%	2.4%	82.7%	17.3%	100.0%
Total Region	12,678,853	1,167,822	13,846,675	100.0%	100.0%	100.0%	91.6%	8.4%	100.0%

Non-Home Based	Auto	Transit	Total	Auto	Transit	Total	Auto	Transit	Total
Study Area Total	1,863,683	79,760	1,943,443	24.1%	13.7%	23.4%	95.9%	4.1%	100.0%
Within 355 Corridor Study Area	1,184,216	50,556	1,234,772	63.5%	63.4%	63.5%	95.9%	4.1%	100.0%
To/From Chicago and Inner Suburbs	371,946	25,886	397,832	20.0%	32.5%	20.5%	93.5%	6.5%	100.0%
To/From Suburbs West of Study Area	307,521	3,318	310,839	16.5%	4.2%	16.0%	98.9%	1.1%	100.0%
Subtotal	1,863,683	79,760	1,943,443	100.0%	100.0%	100.0%	95.9%	4.1%	100.0%
Within Chicago and Inner Suburbs	3,690,862	429,108	4,119,970	47.8%	73.8%	49.6%	89.6%	10.4%	100.0%
Within Suburbs West of Study Area	2,027,746	61,806	2,089,552	26.2%	10.6%	25.1%	97.0%	3.0%	100.0%
Between Chicago and Suburbs West	146,460	10,649	157,109	1.9%	1.8%	1.9%	93.2%	6.8%	100.0%
Total Region	7,728,751	581,323	8,310,074	100.0%	100.0%	100.0%	93.0%	7.0%	100.0%

- 44% of home-based work trips (or commute trips) have an origin and a destination in the study area, or are fully contained within the study area; 35% of trips have an origin or a destination east of the corridor, in Chicago or Cook County; and only 21% of trips have an origin or a destination in suburban areas west of the corridor.
- Overall, Auto trips represent 94% of home-based work trips in and out of the corridor study area, and Transit trips represent only 6%.

Home-based other: 3.1 million trips, which is 22% of all home-based other trips in the region.

- 66% of all Auto trips are made within the corridor area, only 20% are made between the corridor and Chicago, and only 14% are made between the corridor and the suburbs to the west.
- 72% of all Transit trips are made within the corridor area, 23% are made between the corridor and Chicago, and only 4% are made between the corridor and the suburbs to the west.
- Out of all home-based other trips made within the corridor study area, 6% are Transit trips, and these represent 72% of all transit trips.
- 66% of home-based work trips (or commute trips) have an origin and a destination in the study area, or are fully contained within the study area; 20% of trips have an origin or a destination east of the corridor, in Chicago or Cook County; and only 14% of trips have an origin or a destination in suburban areas west of the corridor.
- Overall, Auto trips represent 94% of home-based work trips in and out of the corridor study area, and Transit trips represent only 6%.

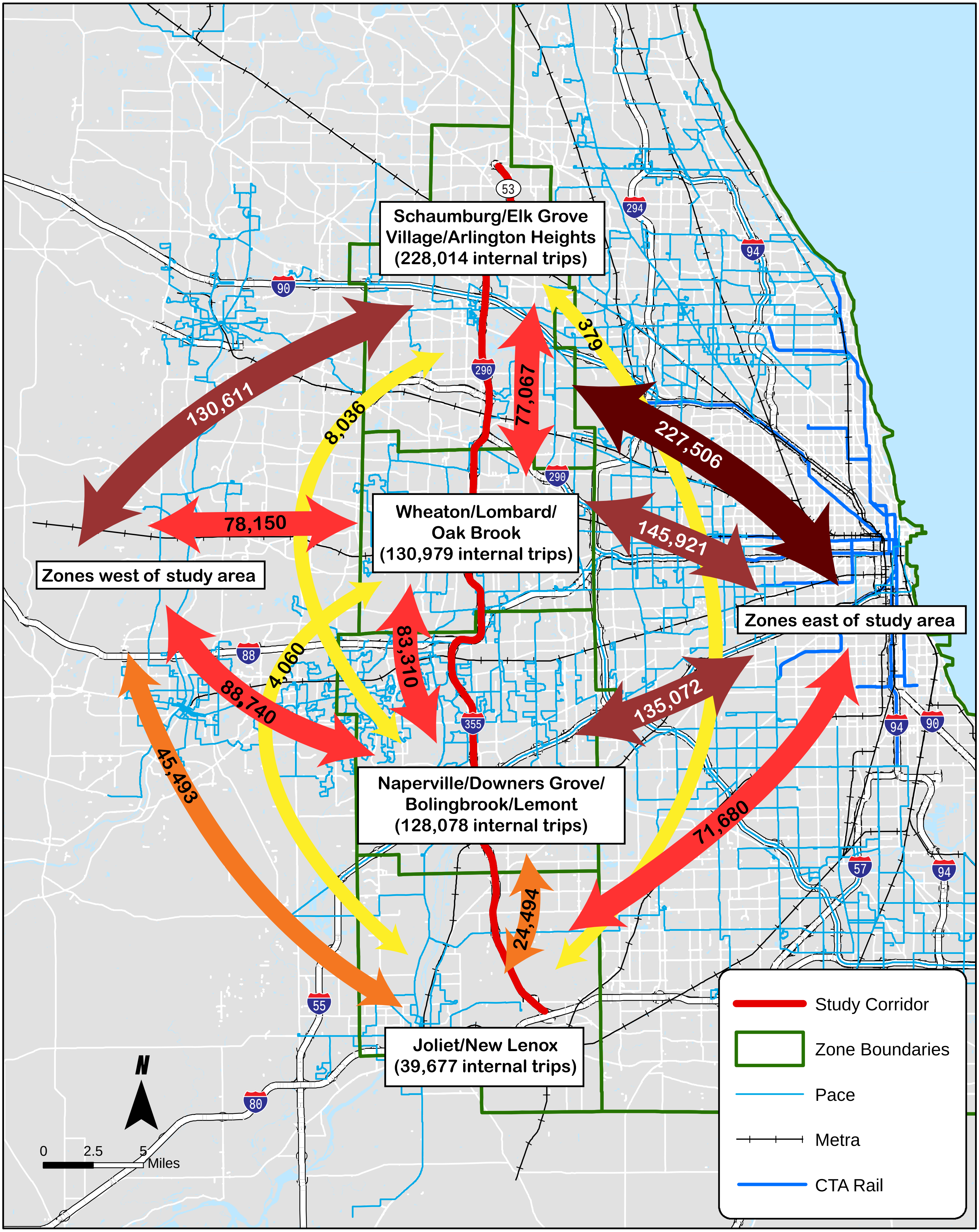
Non-home based: 1.9 million trips, which is 23% of all non-home based trips in the region.

- 64% of all Auto trips are made within the corridor area, 20% are made between the corridor and Chicago, and only 17% are made between the corridor and the west suburbs.
- 63% of all Transit trips are made within the corridor area, 33% are made between the corridor and Chicago, and only 4% are made between the corridor and the suburbs to the west.
- Out of all non home-based trips made within the corridor study area, 4% are Transit trips, and these represent 63% of all transit trips.
- 64% of non home-based trips (or commute trips) have an origin and a destination in the study area, or are fully contained within the study area; 21% of trips have an origin or a destination east of the corridor, in Chicago or Cook County; and only 16% of trips have an origin or a destination in suburban areas west of the corridor.
- Overall, Auto trips represent 96% of home-based work trips in and out of the corridor study area, and Transit trips represent only 4%.

Origin-Destination Travel to/from I-355 Corridor

Figures 30 to 33 on the following pages illustrate the major OD travel patterns for home-based work and home-based other trips at both the regional and local level. Major trends that can be observed from these figures include the following:

Figure 30 Home-Based Work Trips - Regional Level



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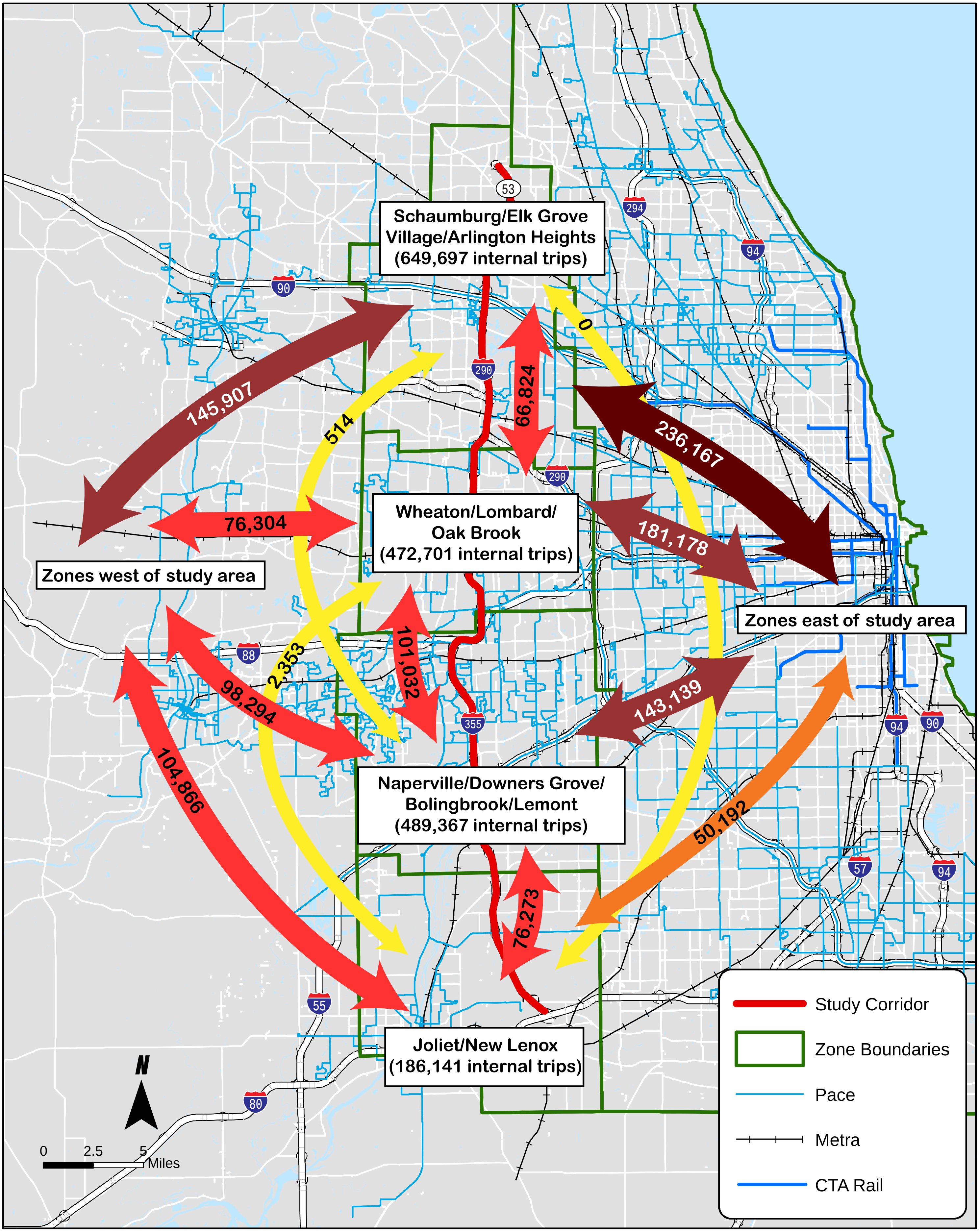
Source: CMAP, Pace Suburban Bus, State of Illinois, ESRI

Figure 31 Home-Based Other Trips - Regional Level



Nelson|Nygaard consulting associates

Source: CMAP, Pace Suburban Bus, State of Illinois, ESRI

Regional Level

Home-based work: the biggest OD trip volumes (over 100,000 trips) are registered (1) by east-west travel between the corridor analysis zones and places east of the corridor in Chicago and Cook County, and (2) by internal travel within corridor analysis zones in the central and north segments of the corridor – Schaumburg/Elk Grove Village/Arlington Heights, Wheaton/Lombard/Oak Brook, and Naperville/Downers Grove/Bolingbrook. On a secondary level, travel between the corridor and places west in the suburbs is similar in volume to north-south travel within the corridor and between analysis zones.

This means that within the corridor study area there are significant volumes of home-based work trips being made, but these trips are mostly intra-zonal trips or local trips of short distance, possibly no more than 5 miles in length. North-south demand is almost non-existent at a regional scale, and definitely weak at a subregional scale. From the southern end of the corridor to the northern end of the corridor there are virtually no trips being made (only 379 trips), and trips going beyond one contiguous zone and into a third one are much smaller in volume than trips between contiguous zones (5,000-10,000 versus 25,000-100,000, respectively).

Home-based other: home-based other trips show a similar OD travel pattern to that of work trips; however, there are more than twice as many home-based other trips. In general, the same preponderance of east-west trips between the corridor area and places east is observed, however, intra-zonal trips are much larger ranging from about 185,000 trips in Joliet/New Lenox, in the south end, to about 650,000 in the north end in Schaumburg/Elk Grove Village/Arlington Heights. North-south demand is also stronger on a zone-to-zone basis ranging from about 65,000 to 100,000 trips. At a regional scale, however, north-south demand is close to zero for trips between non-contiguous zones or from end to end.

As with the home-based work trips, this means that there are significant volumes of home-based other trips being made within the corridor, and that these trips are mostly intra-zonal trips and short-distance trips. Transit can be competitive for these trips, however, it needs to be provided along corridors with sufficient accessibility to residences and destinations, and at sufficient levels of service or frequency. The overwhelming majority of these trips are made in automobiles today.

Local Level

Home-based work: home-based work trips within the corridor are further analyzed in Figure 32 showing OD travel between locally-defined market analysis areas. The map illustrates that both intra-zonal travel and travel between zones are relatively similar in volume, with most intra-zonal and inter-zonal travel ranging between 10,000 and 20,000 trips. Interestingly, most travel between non-contiguous zones, or trips crossing more than two zones, is much smaller than travel between contiguous zones. This further shows that work related travel in the corridor area is predominantly short-distance travel. It also shows that east-west travel between any two zones is generally stronger or bigger than north-south travel.

Also, two north-south travel demand patterns emerge from the analysis, one connecting contiguous zones in the “east side” of the corridor between Palatine, Arlington Heights, Elk Grove Village, Addison/Elmhurst, Lombard/Oak Brook and Downers Grove, and another connecting contiguous zones in the “west side” of the corridor between Palatine, Schaumburg and Roselle, and to a lesser extent between Carol Stream, Wheaton/Glen Ellyn, and Naperville/Lisle.

Most noteworthy is the fact that east-west connections across the corridor are strong, but are mostly contiguous zones connections as well. In other words, there are no indications that a major market exists for travel between, for example, Wheaton and Elk Grove Village or between Schaumburg and Addison/Elmhurst. Travel markets within the corridor are mainly local and so any transit service in the corridor or parallel to the corridor will have to take into account that many origins and destinations need to be weaved together to develop a successful route. No end to end service appears to be warranted by demand, because north-south travel is eminently local and short distance, as opposed to east-west commute travel which is mostly regional and long distance.

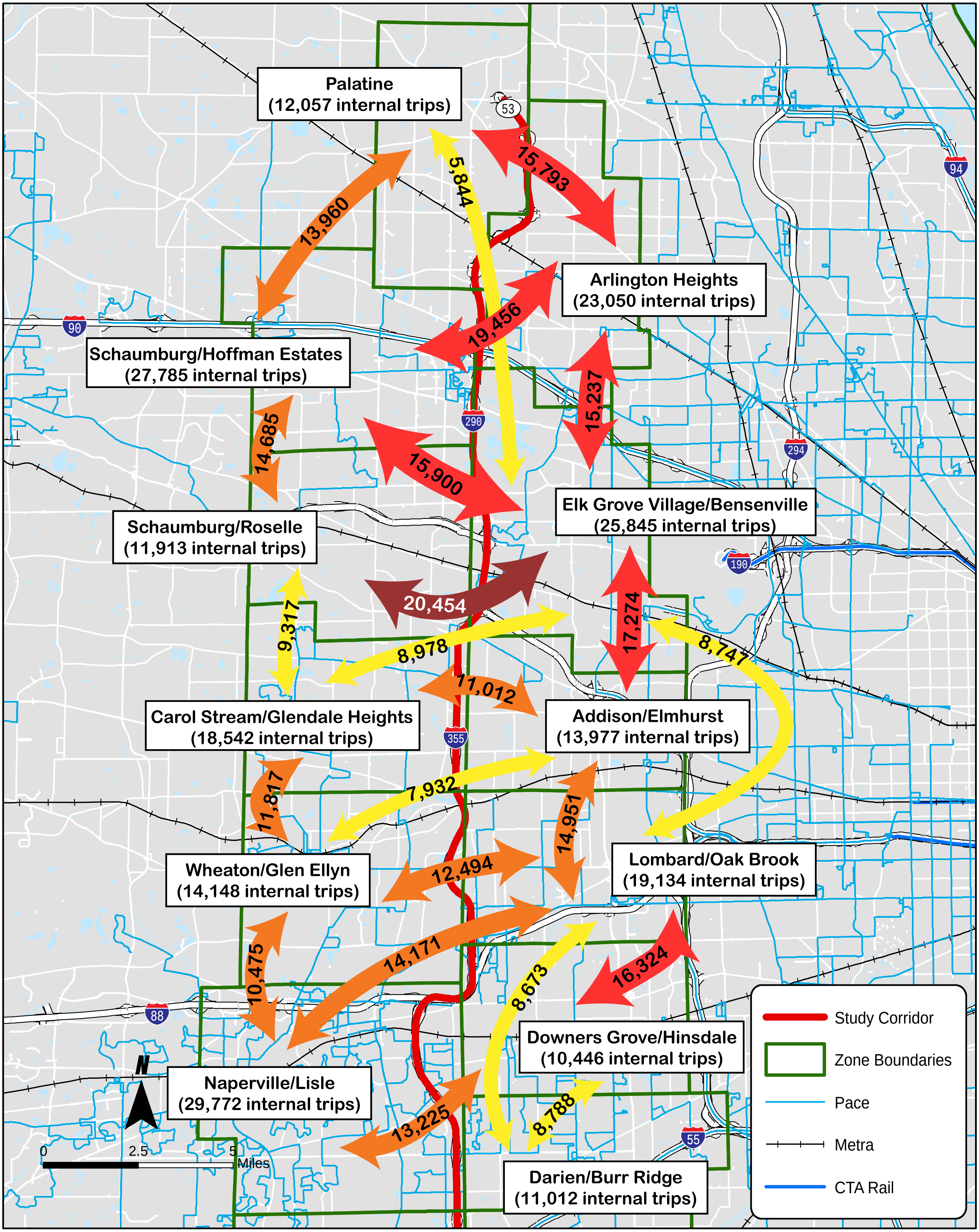
Home-based other: home-based trips are further analyzed in Figure 33, showing OD travel between locally-defined market analysis areas. The map illustrates that intra-zonal travel ranges from 60,000 to 150,000 trips in most areas (except for Lemont, Goodings Grove and New Lenox which are lower than 30,000). Intra-zonal travel is also much larger than travel between contiguous zones, which ranges mostly between 20,000 and 40,000 trips. Travel between contiguous zones is also much larger than travel across more than two zones, which is below the minimum threshold of analysis. OD travel demand connections below 10,000 trips were excluded from the map to facilitate reading, but also because they represent a travel market with insufficient demand potential for transit service.

Besides bigger intra-zonal trip volumes, home-based other travel in the corridor study area shows a slightly different pattern than work trips, where east-west trips between zones appears stronger, for example, between Schaumburg/Hoffman Estates and Arlington Heights, between Schaumburg/Roselle and Elk Grove Village/Bensenville, between Wheaton/Glen Ellyn and Lombard/Oak Brook, and between Naperville/Lisle and Downers Grove/Hinsdale.

North-south travel is also stronger than work trips in particular between Addison/Elmhurst and Lombard/Oak Brook, between Lombard/Oak Brook and Downers Grove/Hinsdale, and between Downers Grove/Hinsdale and Darien/Burr Ridge, on the east side of the corridor. The west side of the corridor shows relatively strong north-south demand between Schaumburg/Hoffman Estates and Schaumburg/Roselle, and between Carol Stream/Glendale Heights and Wheaton/Glen Ellyn.

As with home-based work trips, home-based other trips are also predominantly local and short distance, but also more geographically diverse in the sense that there are significant east-west demand connections across I-355. Still, north-south trips from one zone to the other are relatively strong in the central and northern parts of the corridor. Transit service can be effective in these areas, however, it will need to be provided at relatively high levels of service frequency and accessibility to be competitive with the automobile, which is the primary mode of travel in the corridor.

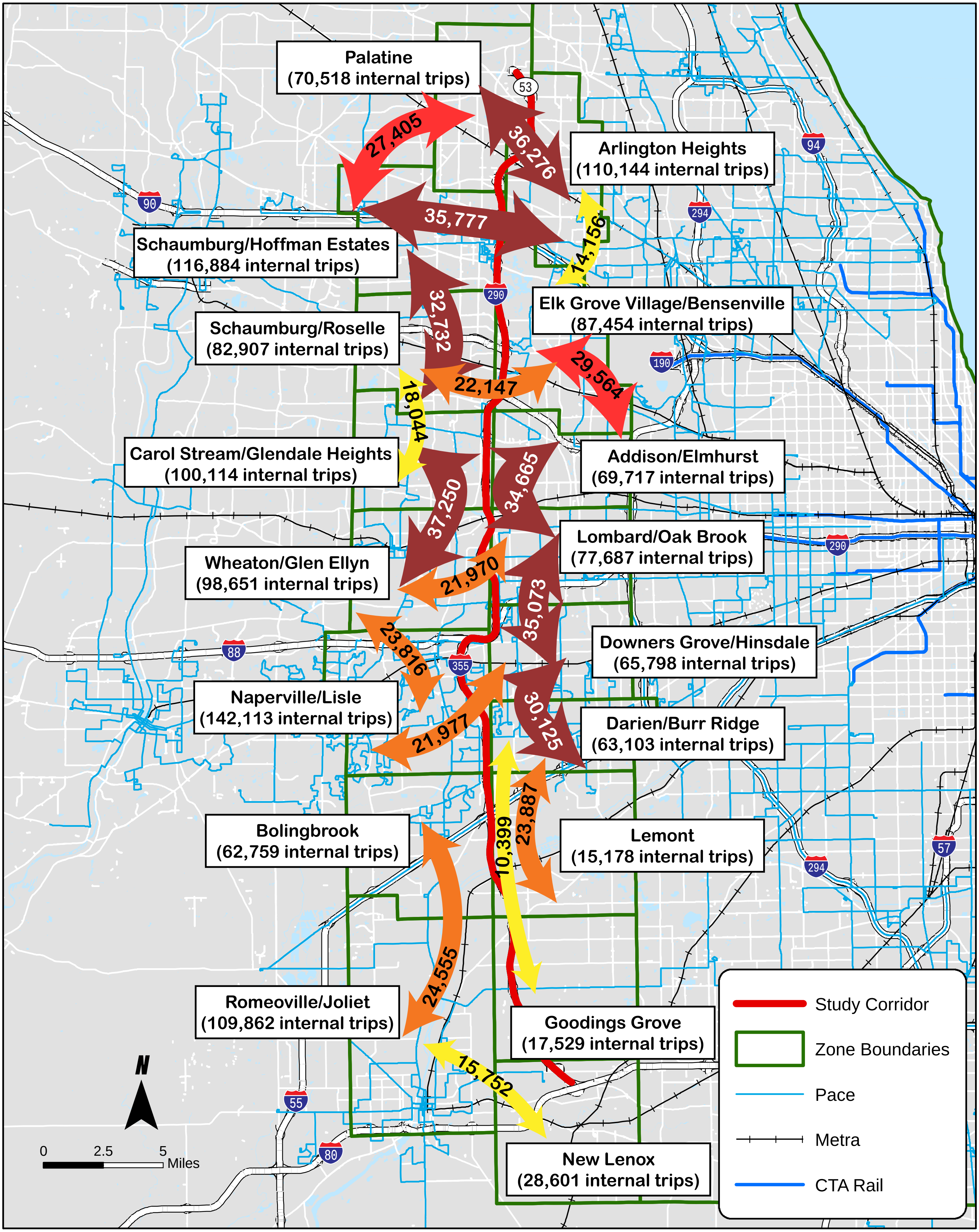
Figure 32 Home-Based Work Trips - Local Level



Nelson\Nygaard consulting associates

Source: CMAP, Pace Suburban Bus, State of Illinois, IDOT, ESRI

Figure 33 Home-Based Other Trips - Local Level



Nelson\Nygaard consulting associates

Source: CMAP, Pace Suburban Bus, State of Illinois, IDOT, ESRI

3.3 Review of Existing Transit Operations

This section provides a review of existing transit services within the study area, including commuter rail, local and express bus, and circulation and feeder shuttles. The purpose of this section is to understand the existing transit markets, the operations and performance of services, and whether there are any lessons to be learned from current and past service experiences from Pace, Metra and/or other providers. As noted before, residential, commercial and industrial development around the corridor has occurred in an urban area that extends up to five miles out from I-355 and so this review includes an extensive list of existing Pace and Metra services.

Pace Bus Services

Table 5 on the next page summarizes route-by-route ridership and service characteristics for routes intersecting the corridor – operating east-west, and routes operating in markets that could potentially use the corridor or interact with I-355 service, that is, operating north-south and/or connecting north-south markets. A number of service types are included in the analysis, including all day services, peak directional services, and peak bidirectional services. Depending on how far they travel and whether they use tollways or highways for their operation they charge different fares including: Regular/Express, Local Feeder, Premium Fare, Two-Tier Fare, Special Fare or free service. Obviously, these differences in service type and fare are associated with different levels of service and markets, and so they are generally reflected in daily ridership.

Out of the of routes included in the analysis, and summarized in Table 5 on the next page, all day services carry the highest ridership, in particular those services that operate east-west corridors and connect with Metra and/or CTA rail stations. For example, Route 208 Golf Road, Route 322 Cermak Road, Route 606 Algonquin Road, Route 313 St. Charles Road, and Route 747 DuPage Connection all carry between 1,000 and 2,300 passengers per day.

The lowest ridership is carried by peak directional local/feeder or circulation services, providing a limited number of trips along north-south roads and arterials. This group includes a number of routes that generate less than 100 passengers per day, for example: Route 461 North Downers Grove shuttle, Route 663 Darien-Clarendon Hills, Route 689 Naperville-Hobson Village, and Route 821 IL 53/83rd Street, which carry between 45 to 60 passengers a day only.

The “middle of the road” group is comprised of routes that carry 100 to 600 passengers per day. This group includes a mix of north-south and east-west services, but generally speaking they provide local bus service along major street corridors, connecting commute market destinations with rail stations, but also providing connections to local destinations and anchoring routes at non-commute travel destinations such as shopping malls and hospitals. Among the best performing routes in this group there are a handful of north-south services operating parallel to the I-355 corridor, and in areas showing some propensity to use transit (as shown in Table 5 on the next page), including: Route 834 Joliet – Downers Grove, Route 715 Central DuPage (Addison-Darien), Route 711 Wheaton – Addison, and Route 696 Randhurst – Woodfield – Harper College.

Two general observations can be made from this analysis: first, that east-west transit corridors connecting with Metra or CTA rail perform better because they follow major regional OD trends (as discussed in the previous chapter), and second that there is a market for all day transit service on streets and arterials that parallel I-355 (running north-south) that is based on local and subregional OD markets.

Table 5 Pace Bus Services

Route Number	Route Description	Service Type: Route Type	Service Type: Fare Type	Span of Service: From	Span of Service: To	Span of Service: Span of Hours	Headway: 6 AM - 9 AM	Headway: 9 AM - 3 PM	Headway: 3 PM - 7 PM	Headway: After 7 PM	Average Weekday Boardings
208	Golf Road (Schaumburg - Evanston)	All Day	Regular/Express	5:22	22:55	17:33	30	30	30	60	2,283
313	St. Charles Road (Downers Grove - Oak Park)	All Day	Regular/Express	5:21	22:26	17:05	25	60	30	60	1,283
322	Cermak Road - 22nd Street (Cicero - Oak Brook)	All Day	Regular/Express	4:12	0:15	20:03	30/20	20	20	25	2,121
461	North Downers Grove	Peak Directional	Special Fare	6:07-7:51	17:14-19:03	3:33	3 trips	-	3 trips	-	45
462	Southwest Downers Grove	Peak Directional	Special Fare	5:58-7:51	17:00-19:14	4:07	20	-	20	-	109
463	Southeast Downers Grove	Peak Directional	Special Fare	6:02-7:51	17:00-19:10	3:59	20	-	20	-	99
464	West Downers Grove	Peak Directional	Special Fare	5:30-7:50	17:03-18:59	4:16	25	-	25	-	80
554	Elgin - Woodfield	Peak Directional	Two Tier Fare	5:53-12:16	15:07-18:44	10:00	3 trips	2 trips	40	-	118
600	Northwest Express (Schaumburg - Rosemont CTA)	Peak Directional	Regular/Express	5:15-8:42	16:13-19:30	6:44	30	-	25	-	165
606	Northwest Limited (Schaumburg - Rosemont CTA)	All Day	Regular/Express	5:00	0:01	19:01	30/15	30	15/30	45	1,332
616	The Chancellory Connection (Rosemont CTA - Elk Grove/Itasca)	Peak Bidirectional	Regular/Express	5:50-9:24	15:23-18:43	6:54	30	-	35/40	-	223
661	Southwest Westmont Commuter Service	Peak Directional	Local/Feeder	5:25-8:23	17:20-19:02	5:02	4 trips	-	25	-	36
662	South Central Westmont Commuter Service	Peak Directional	Local/Feeder	6:05-8:10	17:20-19:22	4:07	25	-	25	-	107
663	Darien - Clarendon Hills	Peak Directional	Local/Feeder	5:19-8:13	17:30-19:29	4:53	4 trips	-	3 trips	-	55
664	Willowbrook - Clarendon Hills	Peak Directional	Local/Feeder	6:06-8:13	17:30-19:27	4:04	3 trips	-	3 trips	-	75
674	Southwest Lombard	Peak Directional	Local/Feeder	6:04-8:08	17:19-19:13	3:58	3 trips	-	3 trips	-	66
689	Naperville - Hobson Village	Peak Directional	Local/Feeder	5:52-7:48	17:36-18:46	3:06	3 trips	-	3 trips	-	58
696	Randhurst - Woodfield - Harper College	All Day	Regular/Express	5:40	21:06	15:26	30	55/75	50	2 trips	261
711	Wheaton - Addison	All Day	Regular/Express	5:46	20:09	14:23	60	60	60	-	198
715	Central DuPage (Addison - Darien)	All Day	Regular/Express	6:00	19:40	13:40	60	60	60	-	458
747	DuPage Connection (Forest Park - Wheaton)	All Day	Regular/Express	5:17	21:23	16:06	30	45/60	30	45/30	991
755	Plainfield - IMD Express	Peak Bidirectional	Premium Fare	5:05-8:00	15:20-18:19	5:54	2 trips	-	2 trips	-	36
757	Northwest Connection (Forest Park - Woodfield)	Peak Directional	Regular/Express	5:25-8:49	14:30-18:38	7:32	35	-	40	-	176
820	University Heights/Hobson Creek - Lisle	Peak Directional	Local/Feeder	5:11-7:38	17:08-18:31	3:50	3 trips	-	2 trips	-	68
821	IL 53/83rd St. - Belmont Metra Station	Peak Directional	Local/Feeder	5:48-7:42	17:03-18:52	3:43	4 trips	-	4 trips	-	60
824	East Bolingbrook - Lisle Commuter Service	Peak Directional	Local/Feeder	5:00-7:23	17:20-19:43	4:46	4 trips	-	4 trips	-	149
825	Central Bolingbrook - Lisle Commuter Service	Peak Directional	Local/Feeder	5:00-7:42	16:34-19:11	5:19	30	-	4 trips	-	129
832	Joliet - Orland Square	All Day	Regular/Express	6:10	18:48	12:38	60	60	60	-	103
834	Joliet - Downers Grove	All Day	Two Tier Fare	5:10	21:08	15:58	50	50	50	-	665
855	Plainfield - East Loop Express	Peak Directional	Premium Fare	5:10-8:44	15:25-20:00	8:09	20	-	30	-	293
877	South Suburban Oakbrook Limited (Harvey - Lombard)	Peak Directional	Regular/Express	5:32-8:41	15:45-20:05	7:29	4 trips	-	45	-	144
888	Tri-State Flyer (South Holland - Lisle)	Peak Directional	Regular/Express	6:01-8:41	15:45-20:20	7:15	3 trips	-	45	-	82
905	Schaumburg Trolley	Friday	Free	12:00	21:00	9:00	-	28-34	28-34	28-34	126

Table 6 Metra Stations Service Summary

				Headway/Trips to Chicago					Headway/Trips from Chicago				
Station Name	Line Name	Connecting Pace Routes	Weekday Boardings	AM Peak	Midday	PM Peak	Evening/Night	Daily Trips	AM Peak	Midday	PM Peak	Evening/Night	Daily Trips
Belmont (Downers Grove)	BNSF Railway	464, 821	1414	20 (12 trips)	60-120 (4 trips)	50 (5 trips)	60-120 (3 trips)	25	15-60 (4 trips)	30-120 (5 trips)	20 (11 trips)	60 (7 trips)	27
Clarendon Hills	BNSF Railway	663, 664, 665	799	20 (13 trips)	60-120 (4 trips)	40 (6 trips)	45-120 (4 trips)	27	2 trips	60-120 (4 trips)	20 (12 trips)	60 (7 trips)	25
Fairview Avenue (Downers Grove)	BNSF Railway	None	403	20(13 trips)	60-120 (4 trips)	30-90 (4 trips)	45-120 (4 trips)	25	2 trips	60-120 (4 trips)	20 (12 trips)	60 (7 trips)	25
Lisle	BNSF Railway	820, 824, 825, 826, 827, 828, 829	2,472	20 (13 trips)	60-120 (4 trips)	35 (6 trips)	60-120 (3 trips)	26	25 (5 trips)	30-120 (5 trips)	15 (14 trips)	60 (8 trips)	32
Main Street (Downers Grove)	BNSF Railway	461, 462, 463, 715, 834	2,328	20 (13 trips)	60-120 (4 trips)	40 (6 trips)	45-120 (4 trips)	27	25 (5 trips)	30-120 (5 trips)	15 (16 trips)	45 (8 trips)	34
Naperville	BNSF Railway	530, 676, 677, 678, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 714	4,112	15 (15 trips)	60-120 (4 trips)	40 (6 trips)	60-120 (3 trips)	28	25 (5 trips)	30-120 (5 trips)	20 (12 trips)	60 (8 trips)	30
West Hinsdale	BNSF Railway	None	323	30 (8 trips)	-	-	-	8	-	1 trip	25 (7 trips)	2 trips	10
Westmont	BNSF Railway	661, 662, 665, 715	1,168	20 (13 trips)	60-120 (4 trips)	40 (6 trips)	45-120 (4 trips)	27	25 (5 trips)	60-120 (4 trips)	20 (12 trips)	60 (7 trips)	28
Lemont	Heritage Corridor	None	381	40 (3 trips)	-	-	-	3	-	-	40 (3 trips)	-	3
Lockport	Heritage Corridor	None	552	40 (3 trips)	-	-	-	3	-	-	40 (3 trips)	-	3
Bensenville	Milwaukee District / West Line	319, 332	450	30 (8 trips)	60 (6 trips)	60 (5 trips)	60 (4 trips)	23	45 (4 trips)	60 (6 trips)	40 (7 trips)	30-120 (6 trips)	23
Itasca	Milwaukee District / West Line	616	546	35 (8 trips)	60 (7 trips)	60 (4 trips)	60 (4 trips)	23	45 (4 trips)	60 (6 trips)	40 (7 trips)	30-120 (6 trips)	23
Medinah	Milwaukee District / West Line	None	501	30 (9 trips)	60 (7 trips)	60 (4 trips)	60 (4 trips)	24	40-90(3 trips)	60 (6 trips)	40 (6 trips)	30-120 (7 trips)	22
Roselle	Milwaukee District / West Line	None	1,500	25(10 trips)	60 (7 trips)	60 (4 trips)	60 (4 trips)	25	45 (4 trips)	60 (6 trips)	30 (8 trips)	30-120 (7 trips)	25
Schaumburg	Milwaukee District / West Line	602	1,698	25 (11 trips)	60 (6 trips)	60 (4 trips)	60 (4 trips)	25	45 (4 trips)	60 (6 trips)	30 (7 trips)	30-120 (7 trips)	24
Wood Dale	Milwaukee District / West Line	None	639	30 (9 trips)	60 (7 trips)	60 (4 trips)	60 (4 trips)	24	45 (4 trips)	60 (6 trips)	30 (8 trips)	30-120 (6 trips)	24
Arlington Heights	Union Pacific / Northwest Line	696	2,317	15 (13 trips)	60-110 (5 trips)	60 (4 trips)	3 trips	25	30 (4 trips)	60-90 (5 trips)	25 (11 trips)	60 (7 trips)	27
Arlington Park (Arlington Heights)	Union Pacific / Northwest Line	None	1,614	15 (13 trips)	60-110 (5 trips)	45 (5 trips)	3 trips	26	30 (4 trips)	60-90 (5 trips)	20 (12 trips)	60 (7 trips)	28
Mount Prospect	Union Pacific / Northwest Line	234, 694	1,590	20 (11 trips)	60-110 (5 trips)	60 (4 trips)	3 trips	23	30 (4 trips)	60-90 (5 trips)	25 (10 trips)	60 (7 trips)	26
Palatine	Union Pacific / Northwest Line	None	2,105	20 (12 trips)	60-110 (5 trips)	45 (5 trips)	3 trips	25	30 (4 trips)	60-90 (5 trips)	25 (11 trips)	60 (7 trips)	27
College Avenue (Wheaton)	Union Pacific / West Line	714	952	20 (10 trip)	60-120 (5 trips)	60 (4 trips)	60 (4 trips)	23	3 trips	60-120 (5 trips)	30 (8 trips)	60 (7 trips)	23
Elmhurst	Union Pacific / West Line	309, 332	1,833	15 (13 trips)	60-120 (5 trips)	15-60 (5 trips)	60 (4 trips)	27	25 (5 trips)	60-120 (5 trips)	20 (11 trips)	60 (7 trips)	28
Glen Ellyn	Union Pacific / West Line	715	1,537	20 (12 trips)	60-120 (5 trips)	60 (4 trips)	60 (4 trips)	25	3 trips	60-120 (5 trips)	25 (9 trips)	60 (7 trips)	24
Lombard	Union Pacific / West Line	674	1,281	20 (10 trips)	60-120 (5 trips)	60 (4 trips)	60 (4 trips)	23	3 trips	60-120 (5 trips)	30 (8 trips)	60 (7 trips)	23
Villa Park	Union Pacific / West Line	None	835	25 (9 trips)	60-120 (5 trips)	60 (4 trips)	60 (4 trips)	22	3 trips	60-120 (5 trips)	35 (7 trips)	60 (7 trips)	22
Wheaton	Union Pacific / West Line	709, 714, 711, 747	1,661	20 (12 trips)	60-120 (5 trips)	60 (4 trips)	60 (4 trips)	25	3 trips	60-120 (5 trips)	30 (9 trips)	60 (7 trips)	24

Source: Metra rail ridership survey 2006

Metra Commuter Rail

Table 6 above provides a station-by-station summary for Metra rail services intersecting the corridor study area, including:

- Daily ridership for stations within the corridor market area
- Pace routes connecting and serving each station, if any
- Station service levels, frequency and number of trips operated by time period

Daily ridership varies greatly from about 300 in the West Hinsdale station, which has no connecting or feeder service from Pace, to more than 4,000 in the Naperville station, which has 12 Pace bus lines connecting with and feeding into the station. Rail service is more frequently provided in the BNSF Railway corridor, the Union Pacific Northwest and West corridors at every 15 to 20 minutes in the AM Peak period going toward Chicago.

Table 7 below provides a summary of Metra rail services at the line level for the five major lines intersecting the I-355 corridor, including total weekday boardings, and number of trips between the corridor market area and downtown Chicago.

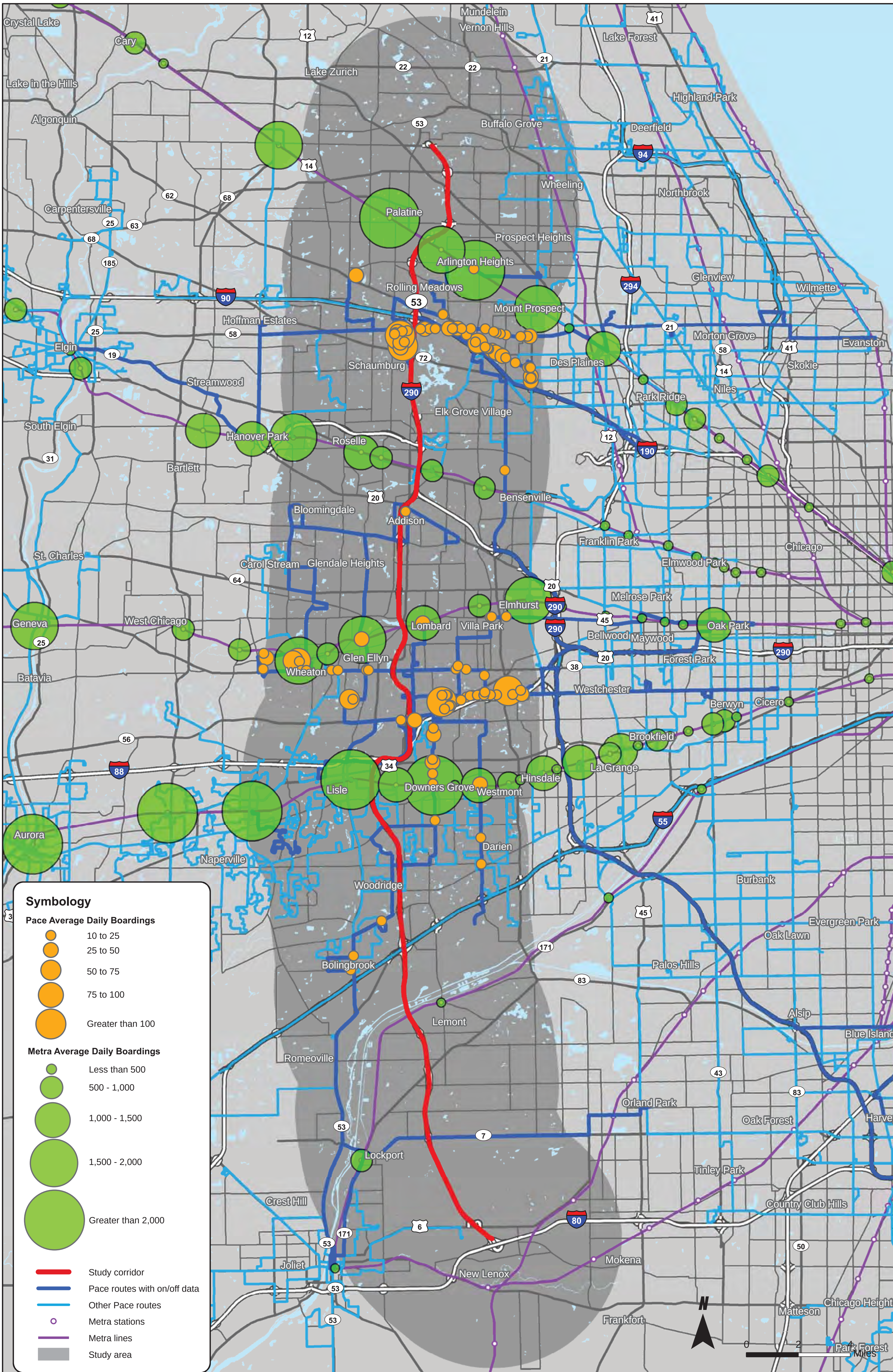
Table 7 Metra Lines Service Summary

Line Name	Weekday Boardings in Study Corridor	Weekday Trips to Chicago from Study Area	Weekday Trips from Chicago to Study Area
BNSF Railway	13,019	43	46
Heritage Corridor	933	3	3
Milwaukee District / West Line	5,334	28	27
Union Pacific / Northwest Line	7,626	29	30
Union Pacific / West Line	8,099	29	30

Three lines cross through the heart of the corridor market area; these are the MD-W, the BNSF, and the UP-W lines. The MD-W line serves the corridor from Elgin to Chicago which includes the Schaumburg, Roselle, Medinah, Itasca, Wood Dale and Bensenville stations within the study area. The BNSF line serves the corridor from St. Charles to Chicago which includes the Wheaton, Glen Ellyn, Lombard, Villa Park, and Elmhurst stations in the study area. The UP-W line serves the corridor from Aurora to Chicago which includes the Naperville, Lisle, Belmont, Main Street, Fairview, Westmont, Clarendon Hills, and West Hinsdale stations in the study area.

Figure 34 on the next page illustrates ridership on Metra rail stations along the five major lines intersecting the I-355 corridor, and it provides a relative comparison between Metra and Pace ridership at the stop/station level. Only a few major Pace bus routes operating in the area had stop-by-stop data available, and those have been colored in dark blue. Light blue lines complete Pace's bus network and depict those routes with no stop level data. The intent of the figure is to show how strong the commute-to-work to/from Chicago is, on both Metra and Pace. Although the breakdown of stop 'bubbles' follows a similar interval structure for both systems, Metra's symbols represent a scale that is at least 10 times bigger than Pace's. This shows how predominant and present the system is with at least four lines showing strong station level ridership of which the BNSF line is the biggest one, with three stations over 2,400 boardings a day – Lisle, Main Street in Downers Grove, and Naperville.

Figure 34 Pace and Metra Average Daily Boardings



Nelson\Nygaard consulting associates

Source: Pace, Metra, State of Illinois, ESRI

NOTE: Pace stops shown are those that have 10 or more daily boardings, are in the study area, and have data available. Metra stops shown are those on the 5 Metra lines that cross the study corridor.

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3.4 Corridor Network Analysis

This section provides an overview of Average Daily Traffic (ADT) in the region and the corridor study area. The purpose of the analysis is again to understand the role of I-355 in the overall transportation network and to identify alternative or parallel corridors providing the link between market areas and local travel. Figure 35 illustrates the network assignment or estimated ADT on the street network from CMAP's travel demand model. The public transit network (rail and bus) is overlaid (not showing trip assignments) to identify major travel corridors where there is transit service, but also to show corridors with significant travel demand that do not have transit service or sufficient transit service. The following observations can be made with respect to traffic volume hierarchy on the street network, including identification of north-south travel corridors with potential demand for transit service:

First Tier

- There are two major north-south corridors carrying the largest traffic volumes, over 100,000 ADT:
  - I-355 and I-294
- There is a clear east-west radial structure of highways carrying large traffic volumes, over 100,000, that includes:
  - I-90, I-290, I-88, I-55, and I-80

Second Tier

- The second tier of north-south highways and roads carrying up to 80,000 is comprised of:
  - IL 83 – Kingery Hwy, and IL 53 – Rohlwing/Lincoln/Bolingbrook Road
- The second tier of east-west radial highways and roads carrying up to 80,000 includes:
  - US 12 – Rand Road, US 14 – Northwest Hwy, IL 62 – Algonquin, Golf Road, IL 72 – Higgins Road, the Elgin-O'Hare Expwy/Thorndale Ave, 19 - Irving Park Road, 20 – Lake Street, Army Trail Road, IL 64 – North Ave, IL – 56 Butterfield, 34 – Ogden Ave, and W 75th Street

Third Tier

- The third level of north-south arterial corridors includes:
  - Arlington Heights Road, Main/Elmhurst/York Road, Addison/Westmore-Meyers Road, and Highland/Main/Lemont Road, on the east side of 355
  - Quentin/Roselle/Bloomingdale Road, Glen Ellyn/Park Road, and Schmale/Naperville Road/Naper Boulevard, on the west side of I-355
- The third level of east-west arterial corridors includes:
  - Lake Cook Road, Dundee Road, Palatine Road, Euclid Avenue, and Central Road that carry large traffic volumes between I-355 and I-294 in the near northwest suburbs of Chicago including: Wheeling, Prospect Heights, Arlington Heights, and Mount Prospect. Possibly a destination or origin or both for trips on I-355.
  - Roosevelt Road, Chicago/Maple Avenue, Hobson road/63rd Street, and IL 7 – 159th Street that carry lower levels of traffic in the southern part of the corridor.

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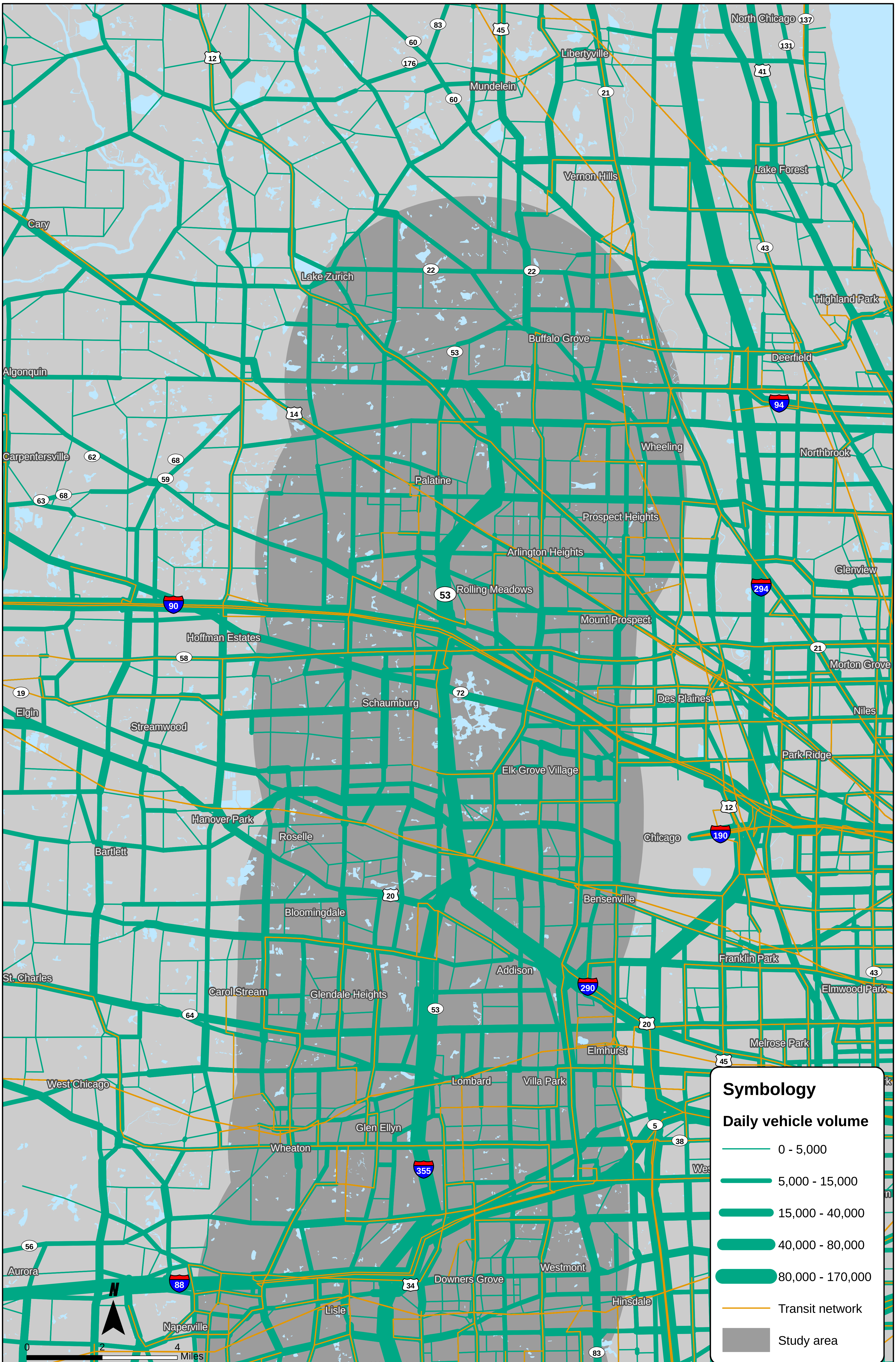
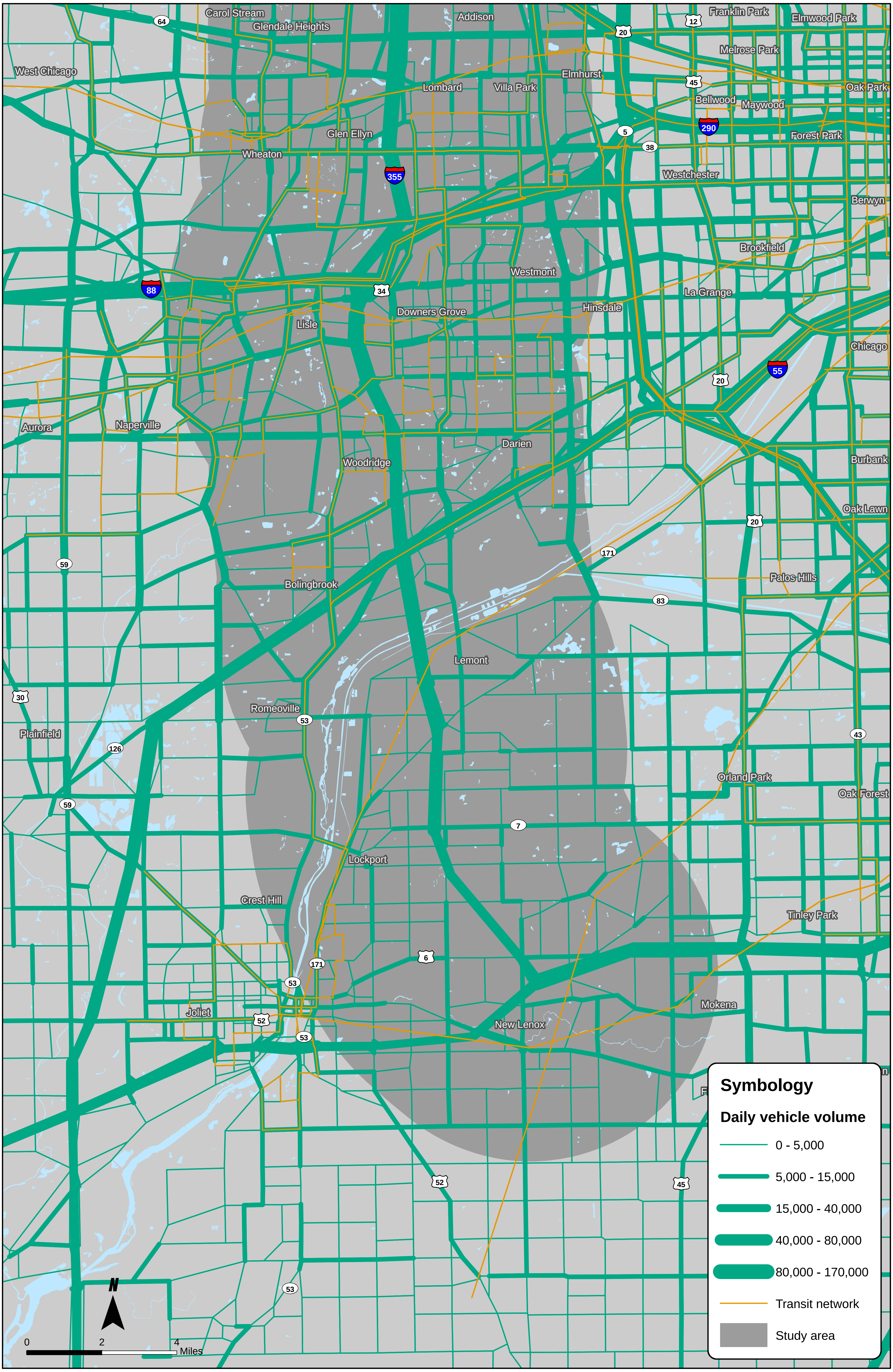
Figure 35 All Day Travel Network Assignment



Nelson\Nygaard consulting associates

Source: CMAP, Pace Suburban Bus, Metra, State of Illinois, ESRI

Figure 35 All Day Travel Network Assignment (continued)



Source: CMAP, Pace Suburban Bus, Metra, State of Illinois, ESRI

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Chapter 4. Multilayered Analysis

4.1 Transit Propensity Markets

As part of the South Cook-Will County Study, Cambridge Systematics (CS) developed a comprehensive survey of household characteristics, travel behavior and attitudes toward transit use that represented households throughout the region, in particular suburban regions surrounding Chicago, and included a representative sample of households within the I-355 corridor study area. CS's research developed a market segmentation analysis that defined seven distinct market segments within the study area, as described in Chapter 1 of this report.

Target market segments were utilized to develop a Transit Orientation Index (TOI) that also included measures of population density and employment density at both the trip origin and the trip destination. This TOI was produced to develop a GIS-based application tool to evaluate ridership potential and guide transit service planning and investments in the future.

This project utilizes a similar TOI approach to identify markets with propensity for transit use. The major difference with CS's work and methodology is that we unbundle the transit service evaluation and planning tool to develop a service evaluation framework that identifies potential transit service applications through a series of incremental analyses. These analyses slowly filter through information on market segments, OD travel demand, transit service, and the corridor network to identify market priorities and transit connections with demand potential that offer favorable conditions for service implementation and performance.

Based on the demographic and socioeconomic analysis and population and employment analysis, discussed in the previous sections of this report, four major variables were identified that provide adequate explanation to the levels of transit use and SOV use that are observed in the study area, these variables include: population density, employment density, median household income and rate of accessibility to automobiles. CS's market research identified two market segments that were characterized as 'transit friendly' segments: Demanding Survivors and Educated Professionals. These segments are combined to produce a fifth variable in the updated TOI that provides transit propensity explanation from a behavioral and attitudinal perspective. Figure 36 on page 95 illustrates the concentration and distribution of these transit friendly segments, described below:

- **Demanding Survivors**: members of this segment have high requirements for 'time and schedule' and 'privacy and comfort' factors; they tend to be women supporting small households, exhibit the lowest levels of education and auto ownership overall, and have a higher incidence of incomes of less than $35,000 per year. Demanding Survivors commute via transit heavily (48 percent) – including the highest usage of CTA rail and Pace bus (10 and 19 percent respectively) – while feeling secure doing so and showing positive attitudes toward the 'transit advantages' factor. Members of this segment have varying commute patterns but the highest incidence of Chicago-to-suburb commutes (15 percent).
- **Educated Professionals**: members of this market segment have the highest levels of education, favorable attitudes toward commuting by transit with high usage of rail (39 percent with a 25-percent market share for Metra) and consequently less-favorable attitudes toward commuting by automobile with relatively low usage (58 percent). Educated Professionals are typically men living in large households with at least two cars available; nearly half reside in the suburbs. Suburb-to-suburb and suburb-to-downtown Chicago are the primary commute patterns for this segment.

As illustrated in Figure 36, and as with the analysis of other demographic and socioeconomic variables, market segments with transit propensity are mostly concentrated in Cook County and Chicago where they make more than one-third of the adult population able to work. Within the study area transit propensity segments make up between one-quarter and one-third of the adult population, or between 25 – 33%, in particular in the northern segment of the corridor; while the southern part of the corridor and suburban areas west of it show concentrations of Demanding Survivors and Educated Professionals below one-quarter or 25% of the adult population. The exception to this last rule are older urban areas around the Milwaukee District West Line that runs between Elgin and Chicago and around the Union Pacific West line that runs from Aurora to Chicago. All along these two routes market segments with transit propensity make up one-quarter to one-third of the adult population.

As described above, the Transit Orientation Index was re-formulated based on five variables:

- Population Density – persons per acre
- Employment Density – jobs per acre
- Median Household Income – median household income by census block group
- Vehicle Availability Ratio – ratio of adults able to drive versus number of vehicles available
- Market Segments with Transit Potential – concentration of Demanding Survivors and Educated Professionals adults by census block group

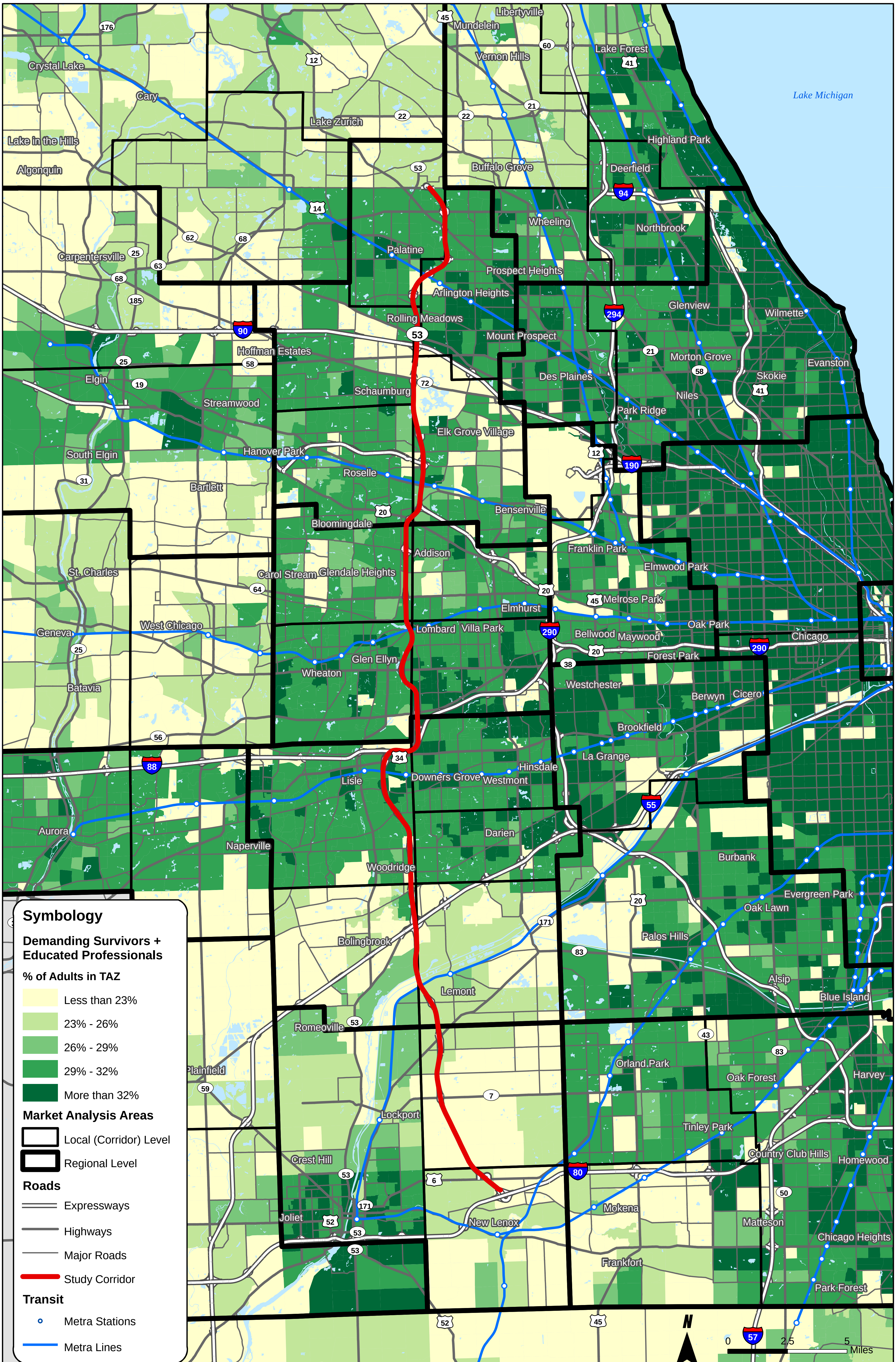
Figure 37 on page 96 presents the re-formulation of the Transit Orientation Index that is proposed in this study. The TOI is an important indicator of transit demand and need that allows to quickly identifying areas with significant commute needs and potential demand for transit service, that when compared to actual transit service levels and network coverage helps identifying areas with no service and/or gaps in the regional transit service network, and market areas receiving service that is insufficient to meet actual demand.

Critical Question 1: Are there any potential markets within the study area?

As shown by Figure 37, potential markets for transit in the study area are of moderate or average intensity, with stronger presence of transit markets in the northern portion of the study area, between I-55 and Lake-Cook Road, and weaker transit market presence in the bottom half of the study area. At the same time, transit markets north of I-55 and east of I-355 show on average a slightly stronger presence of transit markets than the west side of I-355. This north-east quadrant of the corridor study area includes Darien/Burr Ridge, Downers Grove/Hinsdale, Lombard/Oak Brook, Addison/Elmhurst, Elk Grove Village/Bensenville, and Arlington Heights. As seen before, these are market areas that present moderate-to-high population densities, moderate-to-high employment densities, moderate income levels and high auto accessibility levels.

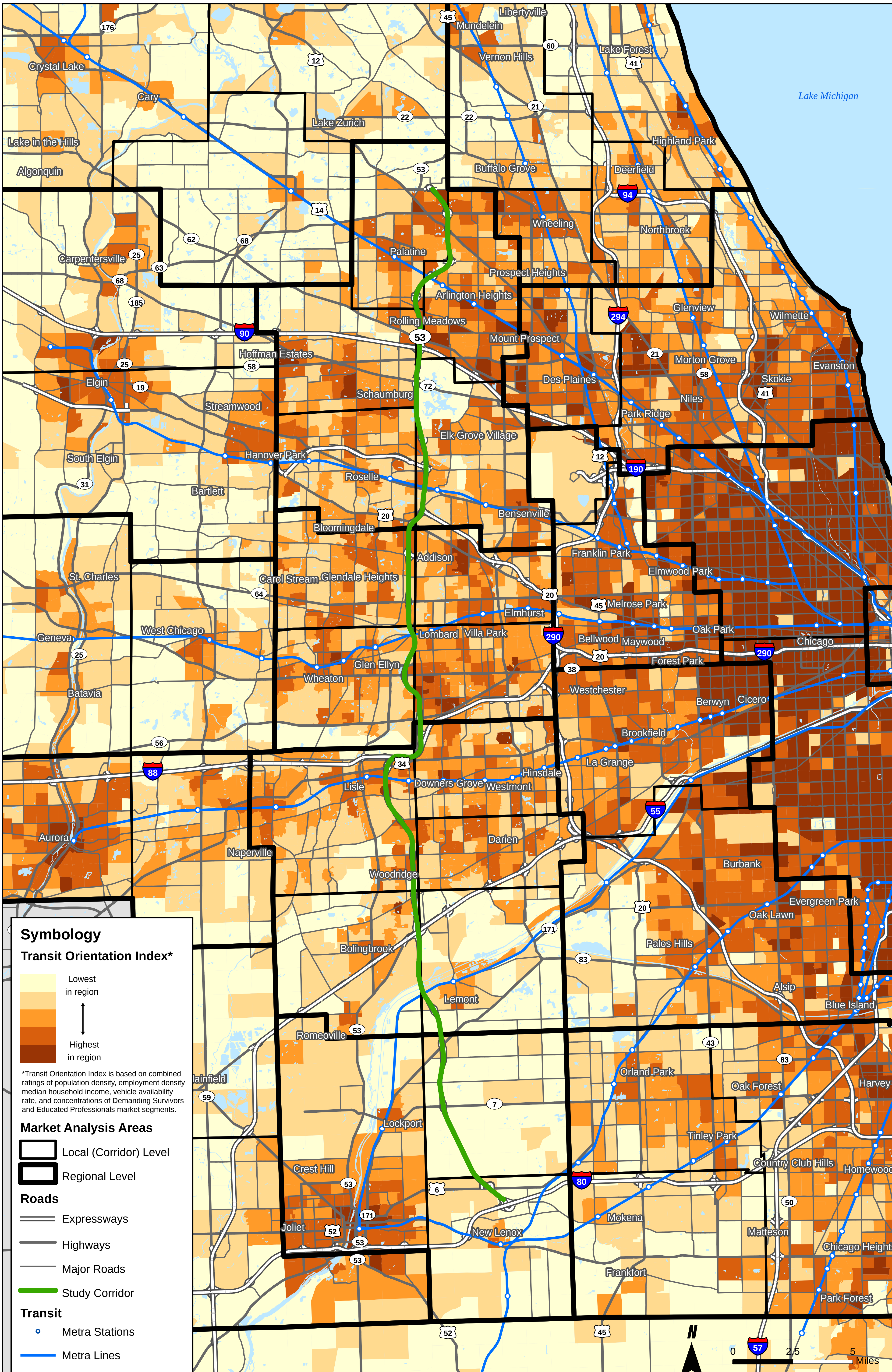
Transit market areas in the corridor are mostly middle income areas and thus market segments with transit propensity have moderate concentrations as well. All together the factors that make up the TOI indicate that the corridor study area is mostly characterized as a choice market, or comprised of potential users that will ride transit by choice more than by necessity. This obviously has major implications for service design and routing. One element that perhaps has not been highlighted strongly enough is that the portion of the study area west of O'Hare International Airport contains employment centers of regional significance that attract trips from all over the region as well as from inside the corridor. These areas are accounted for in the TOI and contribute to its high value in some pockets of the study area.

Figure 36 Demanding Survivors + Educated Professionals Incidence by TAZ



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

Figure 37 Transit Orientation Index



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

4.2 Travel Markets with Demand Potential

The TOI is, for the most part, able to represent market areas where trip origins and trip destinations have potential for transit demand and utilization. However, the TOI only provides a picture of land uses and does not account for the actual connections or street corridors that are used and the volume of trips that are made. The origin destination analysis that was developed in Chapter 3 provides a high-level description of these connections and trip volumes by market area in the corridor. The tables on the following pages list the major OD travel pairs or travel markets that were identified in the analysis for both home-based work trips and home-based other trips.

Three screening steps were utilized to identify OD travel markets with demand potential for transit in the corridor area. The first step was to select OD travel markets that are contained within the corridor market area. This includes OD pairs that have either an origin or a destination within the corridor analysis area, or are completely within the corridor area. In other words, it includes local trips within the corridor area and trips between the corridor and the region.

The second step was to establish minimum threshold levels for transit demand potential. A minimum threshold of demand was established to identify travel markets with sufficient demand for operating effective transit services. These thresholds were established at 6,000 trips for home-based work trips and 9,000 trips for home-based other trips (these are single direction trip thresholds). The rationale for the thresholds is described below:

- **Home-based work trips minimum threshold**: this threshold was established as a 5% mode split target for public transit trips. The assumption was that most home-based work trips are commute trips, and thus occur during the AM and PM Peak periods or roughly between 6:00 – 9:00 am and 3:00 – 6:00 pm. A 5% mode split is not unlikely for transit during the peak period. This figure was then translated into a daily demand figure, assuming that 6 trips would be provided per peak period in the peak direction of each OD pair, and that at least 25 passengers would be carried per trip on average. That creates a minimum daily demand of 300 transit trips out of 6,000 total trips.
- **Home-based other trips minimum threshold**: this threshold was established as a 2% mode split target for public transit trips. The assumption was that most home-based other trips would occur during the midday or the off-peak period, or roughly between 9:00 am and 3:00 pm. A 2% mode split is not unlikely for transit during the midday period. This figure was then translated into a daily demand figure, assuming that 12 trips would be provided over a period of 6 hours in the production and attraction direction of each OD pair, and that at least 15 passengers would be carried per trip on average. This creates a minimum daily demand of 180 transit trips out of 9,000 trips.

The final analysis step was to screen out OD pair connections that represented a primarily east-west movement within the corridor. This study focuses on north-south travel in the I-355 corridor, so the analysis only kept those connections that require a north-south movement in the corridor. Serving these connections with transit could potentially impact travel on I-355, by either reducing traffic volume, or increasing transit mode split in the corridor. Table 8 below shows the results of this analysis for home-based work trips. There are 43 OD travel markets that show sufficient demand potential for transit service applications. Out of these, only 19 OD pairs represent north-south travel markets. The three biggest pairs are Downers Grove/ Hinsdale to Lombard/Oak Brook, Des Plaines/Mount Prospect to Elk Grove Village/Bensenville, and Addison/Elmhurst to Elk Grove Village/Bensenville.

Table 8 Home Based Work, Top OD Pairs

ID	Origin Zone	Destination Zone	Trips	N-S	E-W*
1	Cicero/Brookfield/Countryside	Lombard/Oak Brook	19,954		X
2	Schaumburg/Roselle	Elk Grove Village/Bensenville	18,728		X
3	Aurora/Naperville	Naperville/Lisle	15,484		X
4	Elgin/Bartlett	Schaumburg/Hoffman Estates	13,341		X
5	Downers Grove/Hinsdale	Lombard/Oak Brook	13,179	X	
6	Des Plaines/Mount Prospect	Elk Grove Village/Bensenville	13,092	X	
7	Addison/Elmhurst	Elk Grove Village/Bensenville	13,003	X	
8	Arlington Heights	Elk Grove Village/Bensenville	12,905	X	
9	Franklin Park/Melrose Park/Oak Park	Elk Grove Village/Bensenville	12,810	X	
10	Romeoville/Joliet	Joliet/Shorewood	12,714		X
11	Schaumburg/Hoffman Estates	Elk Grove Village/Bensenville	12,638	X	
12	Franklin Park/Melrose Park/Oak Park	Lombard/Oak Brook	12,468		X
13	Elgin/Bartlett	Elk Grove Village/Bensenville	12,390		X
14	Franklin Park/Melrose Park/Oak Park	Addison/Elmhurst	12,372		X
15	Naperville/Lisle	Lombard/Oak Brook	12,134	X	
16	Arlington Heights	Schaumburg/Hoffman Estates	11,767		X
17	Joliet/Shorewood	Romeoville/Joliet	11,527		X
18	Palatine	Arlington Heights	10,964		X
19	Schaumburg/Roselle	Schaumburg/Hoffman Estates	10,799	X	
20	Elgin/Bartlett	Schaumburg/Roselle	10,799		X
21	Near North Suburbs	Elk Grove Village/Bensenville	10,520		X
22	Palatine	Schaumburg/Hoffman Estates	10,294	X	
23	Wheaton/Glen Ellyn	Lombard/Oak Brook	9,903		X
24	Naperville/Lisle	Aurora/Naperville	9,861		X
25	Bolingbrook	Naperville/Lisle	9,639	X	
26	Elgin/Bartlett	Carol Stream/Glendale Heights	8,613	X	
27	Lombard/Oak Brook	Addison/Elmhurst	8,443	X	
28	Wheaton/Glen Ellyn	Carol Stream/Glendale Heights	8,247	X	
29	Cicero/Brookfield/Countryside	Downers Grove/Hinsdale	8,160		X
30	Darien/Burr Ridge	Lombard/Oak Brook	8,001	X	
31	Des Plaines/Mount Prospect	Arlington Heights	7,968		X
32	Carol Stream/Glendale Heights	Elk Grove Village/Bensenville	7,914	X	
33	Near North Suburbs	Arlington Heights	7,797		X
34	Schaumburg/Hoffman Estates	Arlington Heights	7,689		X
35	Carol Stream/Glendale Heights	Addison/Elmhurst	7,675		X
36	Downers Grove/Hinsdale	Naperville/Lisle	6,865		X
37	Lombard/Oak Brook	Elk Grove Village/Bensenville	6,840	X	
38	Crystal Lake/Algonquin	Schaumburg/Hoffman Estates	6,708	X	
39	Wheaton/Glen Ellyn	Addison/Elmhurst	6,522	X	
40	Addison/Elmhurst	Lombard/Oak Brook	6,508	X	
41	Cicero/Brookfield/Countryside	Naperville/Lisle	6,374		X
42	Naperville/Lisle	Downers Grove/Hinsdale	6,360		X
43	Plainfield	Bolingbrook	6,191		X
	Total Trips		446,160	252,269	193,891
	Count		43	19	24

*Connections with Chicago were excluded from the analysis.

Table 9 Home Based Other, Top OD Pairs

ID	Origin Zone	Destination Zone	Trips	N-S	E-W*
1	Cicero/Brookfield/Countryside	Lombard/Oak Brook	68,300		X
2	Cicero/Brookfield/Countryside	Downers Grove/Hinsdale	56,080		X
3	Franklin Park/Melrose Park/Oak Park	Addison/Elmhurst	52,663		X
4	Franklin Park/Melrose Park/Oak Park	Lombard/Oak Brook	31,781		X
5	Arlington Heights	Schaumburg/Hoffman Estates	30,384		X
6	Downers Grove/Hinsdale	Lombard/Oak Brook	29,673	X	
7	Romeoville/Joliet	Joliet/Shorewood	29,206		X
8	Aurora/Naperville	Naperville/Lisle	28,848		X
9	North Chicago	Elk Grove Village/Bensenville	28,847		X
10	Wheaton/Glen Ellyn	Carol Stream/Glendale Heights	27,284	X	
11	Franklin Park/Melrose Park/Oak Park	Elk Grove Village/Bensenville	27,014	X	
12	Des Plaines/Mount Prospect	Arlington Heights	26,756		X
13	Elgin/Bartlett	Schaumburg/Hoffman Estates	26,163		X
14	Schaumburg/Roselle	Schaumburg/Hoffman Estates	26,114	X	
15	Palatine	Schaumburg/Hoffman Estates	23,587	X	
16	Lombard/Oak Brook	Addison/Elmhurst	23,155	X	
17	Romeoville/Joliet	Bolingbrook	23,089	X	
18	Palatine	Arlington Heights	22,392		X
19	Lemont	Darien/Burr Ridge	22,342	X	
20	Elgin/Bartlett	Schaumburg/Roselle	21,975		X
21	Des Plaines/Mount Prospect	Elk Grove Village/Bensenville	21,822	X	
22	Joliet/Shorewood	Romeoville/Joliet	21,432		X
23	Bridgview/Oak Lawn/Alsip	Darien/Burr Ridge	21,350		X
24	Addison/Elmhurst	Elk Grove Village/Bensenville	21,099	X	
25	Bolingbrook	Naperville/Lisle	20,723	X	
26	Darien/Burr Ridge	Downers Grove/Hinsdale	19,751	X	
27	Schaumburg/Roselle	Elk Grove Village/Bensenville	18,282		X
28	Elgin/Bartlett	Carol Stream/Glendale Heights	17,934	X	
29	Des Plaines/Mount Prospect	Schaumburg/Hoffman Estates	16,997		X
30	Naperville/Lisle	Wheaton/Glen Ellyn	15,912	X	
31	West Chicago/Winfield	Carol Stream/Glendale Heights	15,816		X
32	Naperville/Lisle	Aurora/Naperville	15,607		X
33	Cicero/Brookfield/Countryside	Naperville/Lisle	14,153		X
34	Barrington	Schaumburg/Hoffman Estates	14,115	X	
35	Arlington Heights	Palatine	13,884		X
36	Plainfield	Bolingbrook	13,668		X
37	Downers Grove/Hinsdale	Naperville/Lisle	13,428		X
38	New Lenox	Romeoville/Joliet	13,236		X
39	West Chicago/Winfield	Wheaton/Glen Ellyn	13,164		X
40	Schaumburg/Roselle	Carol Stream/Glendale Heights	12,672	X	
41	Barrington	Palatine	12,278		X
42	Addison/Elmhurst	Lombard/Oak Brook	11,510	X	
43	Wheeling	Arlington Heights	11,210		X
44	Arlington Heights	Elk Grove Village/Bensenville	11,173	X	
45	Lombard/Oak Brook	Wheaton/Glen Ellyn	11,118		X

Table 9: Home Based Other, Top OD Pairs (continued)

ID	Origin Zone	Destination Zone	Trips	N-S	E-W
46	Wheaton/Glen Ellyn	Lombard/Oak Brook	10,852		X
47	Bridgview/Oak Lawn/Alsip	Lemont	10,731		X
48	Goodings Grove	Darien/Burr Ridge	10,384	X	
49	Downers Grove/Hinsdale	Darien/Burr Ridge	10,374	X	
50	Near North Suburbs	Arlington Heights	10,333		X
51	North Chicago	Arlington Heights	10,203		X
52	Carol Stream/Glendale Heights	Wheaton/Glen Ellyn	9,966	X	
53	Naperville/Lisle	Lombard/Oak Brook	9,920	X	
54	Darien/Burr Ridge	Lombard/Oak Brook	9,898	X	
55	Mundelein/Wauconda	Palatine	9,113	X	
	Total Trips		1,119,761	711,356	408,405
	Count		55	24	31

*Connections with Chicago were excluded from the analysis.

Table 9 above shows the results of this analysis for home-based other trips. There are 55 OD travel markets that show sufficient demand potential for transit service applications. Out of these, only 24 OD pairs represent north-south travel markets. The five biggest pairs are:

- Downers Grove/Hinsdale to Lombard/Oak Brook
- Wheaton/Glen Ellyn to Carol Stream/Glendale Heights
- Franklin Park/Melrose Park/Oak Park to Elk Grove Village/Bensenville
- Schaumburg/Roselle to Schaumburg/Hoffman Estates
- Palatine to Schaumburg/Hoffman Estates

As indicated before, Elk Grove Village/Bensenville and Schaumburg/Hoffman Estates are major destinations for both work trips and other trips, and although they attract trips from a regional area, most trips are relatively local and come from neighboring market areas.

The implications for transit service design that arise from these travel demand patterns are:

- Very little demand exists for long-distance commute travel along the I-355 corridor.
- Very little demand exists for north-south commute travel beyond two contiguous market analysis areas.
- North-south demand is mostly short-distance and intra-zonal for both work trips and other trips; origins and destinations are mostly within market analysis area.
- Highway based transit service cannot appropriately make the connections between communities if travel is mostly short-distance and based on proximity.
- Potential transit service connections seem to be better suited for arterial-based service providing direct connections within communities and between neighboring market analysis areas.

4.3 Connecting Corridor Network

Critical Question 2: What are the major corridors connecting communities within the study area?

One of the critical questions proposed at the beginning of this study was to identify the corridors providing the connections between major OD travel demand patterns at both the local and regional level. Figure 38 and 39 start answering this question from a high-level analysis of OD travel demand information. The OD travel demand pairs and volumes included in the figures are a direct representation of the screening analysis developed in the previous section.

Figure 38 on page 103 illustrates the volume of home-based work trips over the 6,000 threshold for north-south travel as identified in Table 8 on page 98. Each market analysis area was given a centroid (or geometric center) and all travel within any pair of centroids was linked with a direct connector (or straight line). Relative trip volumes between any pair of centroids are depicted in the map by their line width.

- The largest trip volumes are registered from Downers Grove/Hinsdale to Lombard/Oak Brook to Addison/Elmhurst, and to Elk Grove Village/Bensenville, on a continuous north-south travel corridor that turns over zone-by-zone.
- The next largest trip volumes are registered at Elk Grove Village/Bensenville which attracts trips on a radial fashion from Schaumburg/Hoffman Estates, Arlington Heights, Des Plaines/Mount Prospect, Franklin Park/Melrose Park/Oak Park, Addison/Elmhurst, and Carol Stream/Glendale Heights (in clockwise order).
- They are followed by radial trips to Schaumburg/Hoffman Estates from Crystal Lake/Algonquin, Palatine, Elk Grove Village/Bensenville, and Schaumburg/Roselle (also in clockwise order).

Figure 39 on page 104 illustrates the volume of home-based other trips over the 9,000 threshold for north-south travel as identified in Table 9 on page 99. Relative trip volumes between any pair of centroids are depicted in the map by their line width.

- The largest trip volumes are recorded on a continuous north-south corridor that turns over trips zone-by-zone from Lemont to Darien/Burr Ridge to Downers Grove/Hinsdale to Lombard/Oak Brook to Addison/Elmhurst, and to a lesser extent, to Elk Grove Village/Bensenville and to Arlington Heights.
- The next largest trip volumes are observed on a continuous north-south corridor that also turns over trips zone-by-zone from Palatine to Schaumburg/Hoffman Estates to Schaumburg/Roselle, on a smaller volume to Carol Stream/Glendale Heights, and on a much larger volume to Wheaton/Glen Ellyn.
- They are followed by connections with market areas outside the corridor such as Franklin Park/Melrose Park/Oak Park and Elk Grove Village/Bensenville, Des Plaines/Mount Prospect and Elk Grove Village/Bensenville, and Elgin/Bartlett and Carol Stream/Glendale Heights.
- On the southwest portion of the corridor area, another continuous north-south segment is observed that also turns over trips zone-by-zone from Romeoville/Joliet to Bolingbrook to Naperville/Lisle, and to a lesser extent, to Wheaton/Glen Ellyn.

Generally, north-south OD travel markets for home-based other trips appear strongly aligned on two corridors that run parallel to the I-355, on the east side and on the west side of the tollway. In the northern segment of the corridor area, a higher level of travel demand is observed between corridor market areas and market areas outside the corridor. In contrast, home-based work trips show travel demand concentrated mostly in one corridor on the east side of I-355, and a higher level of interaction between market areas on both sides of the tollway, with more corridor crossing instances such as: Naperville/Lisle to Lombard/Oak Brook and Schaumburg/Hoffman Estates to Elk Grove Village/Bensenville.

4.4 Corridor Connections with Demand Potential

Critical Question 3: What are the major corridors that provide accessibility to potential transit markets?

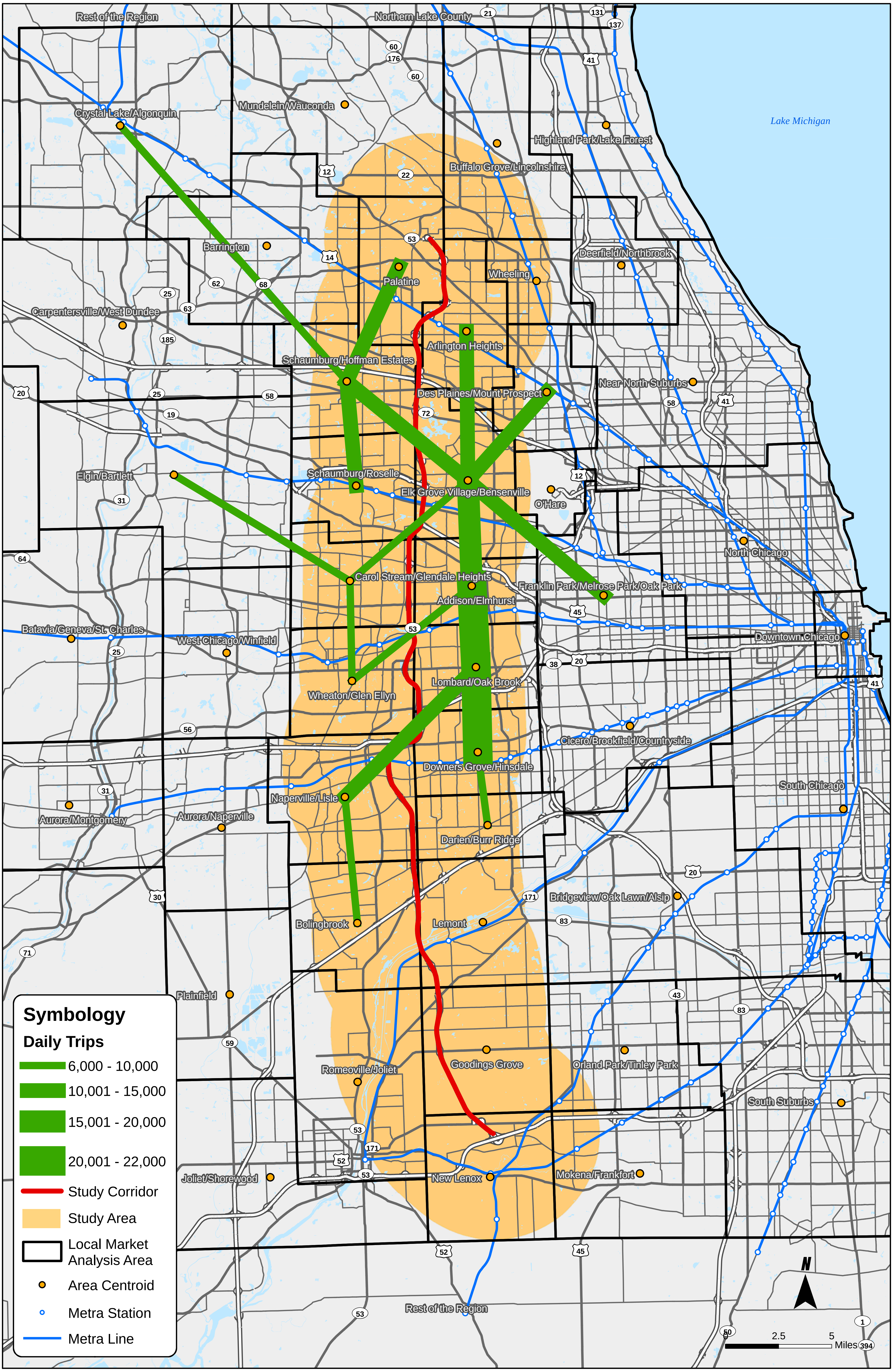
The corridor identification analysis in the previous section is only a high-level overview of origin-destination travel demand between corridor market areas. Each market area encompasses an urban area that is connected to the next by a variety of north-south and east-west corridors, and so the analysis only reflects the overall level of travel activity and connectivity between zones. Moreover, the volume of intra-zonal travel is still large and comparable in size to the major connections depicted in the maps, and so major connections cannot be assumed to represent the full universe of travel, high level of local mobility and connectivity between communities and neighborhoods that comprise each market analysis area. The analysis is only intended as a first step to identify the major travel markets in the corridor area.

Later phases in the project are envisioned to further investigate these local travel markets, and to understand in more detail the dynamics of travel within each market analysis area and within any pair of market areas with demand potential, to untangle and prioritize connections between communities, and identify corridors with transit demand potential, accessibility, and potential for successful service operation. A part of that task will be to start exploring the local and regional accessibility and connectivity that is provided to potential transit market areas in the current street network. Figure 40 on page 105 begins exploring this question by overlaying the major OD travel demand market connections for home-based work trips with the TOI. The overlay provides a compelling story to integrate transit demand, corridor connections, and travel markets. Most notably, the corridor market areas showing the highest transit orientation indicators are also the market areas showing the largest OD travel volumes and interaction between each other.

Although TOI values within major travel market areas are not the highest in the region, they are mostly above average, providing hope and reassurance that a market for transit service can be developed in these areas. This is still a premature finding, and developing a market will take more detailed analysis and understanding of the dynamics on a corridor-by-corridor and community-by-community level. This will be accomplished by narrowing down the area of analysis and mapping down the corridors that can provide the connections at the community level, and also by developing a deeper understanding of land use and demand markets along each corridor and market area; whether they serve mostly retail, school, office, services or industrial uses; whether they serve mostly a commute period or midday period or all-day demand.

In parallel, the study is casting a wide net in the community to engage with stakeholders and get their perspective on local mobility and travel demand issues (see Tech Memo #3 Stakeholders Outreach).

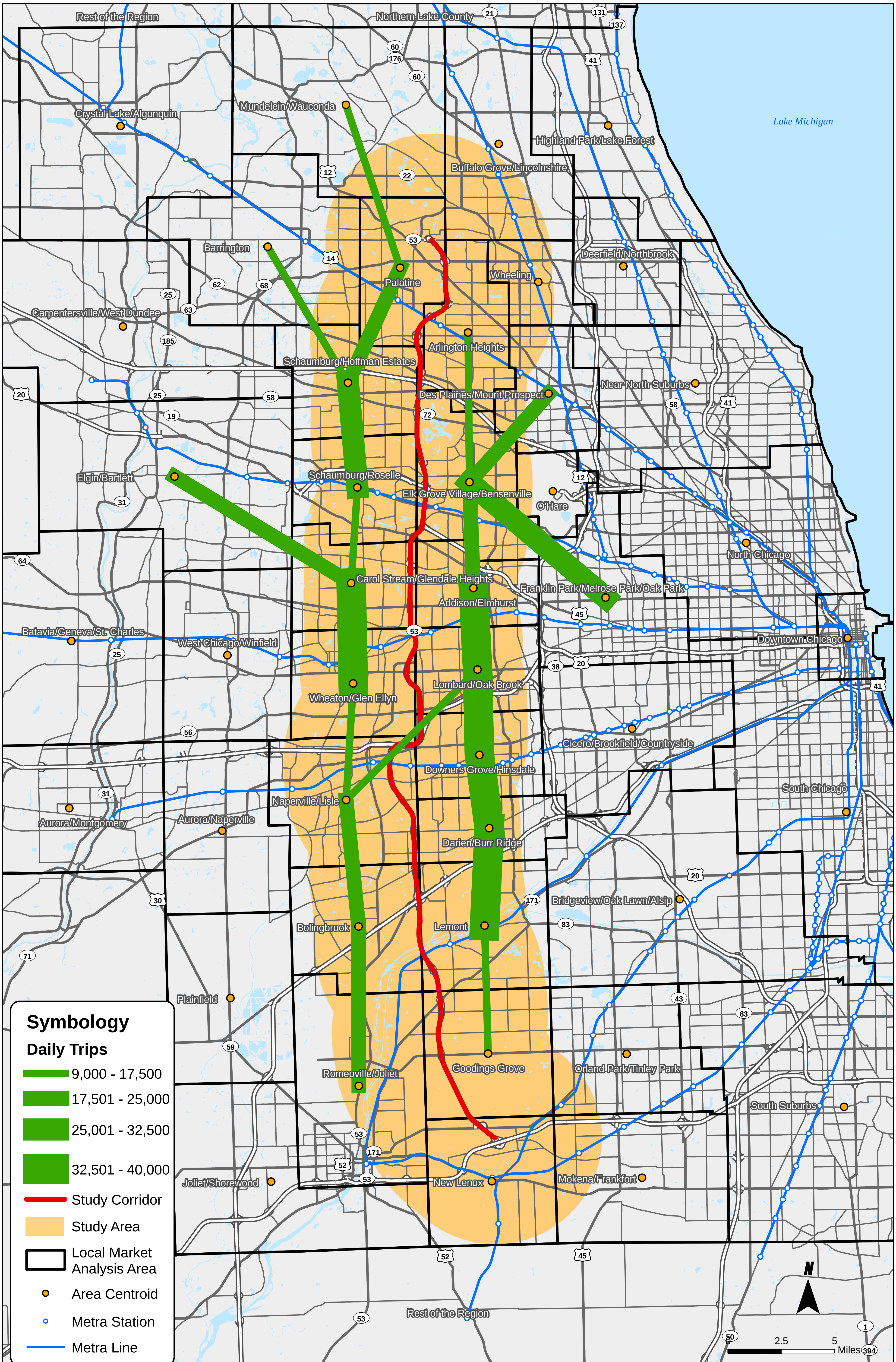
Figure 38 Corridor Connections for Major North-South Travel Patterns - Home-Based Work



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

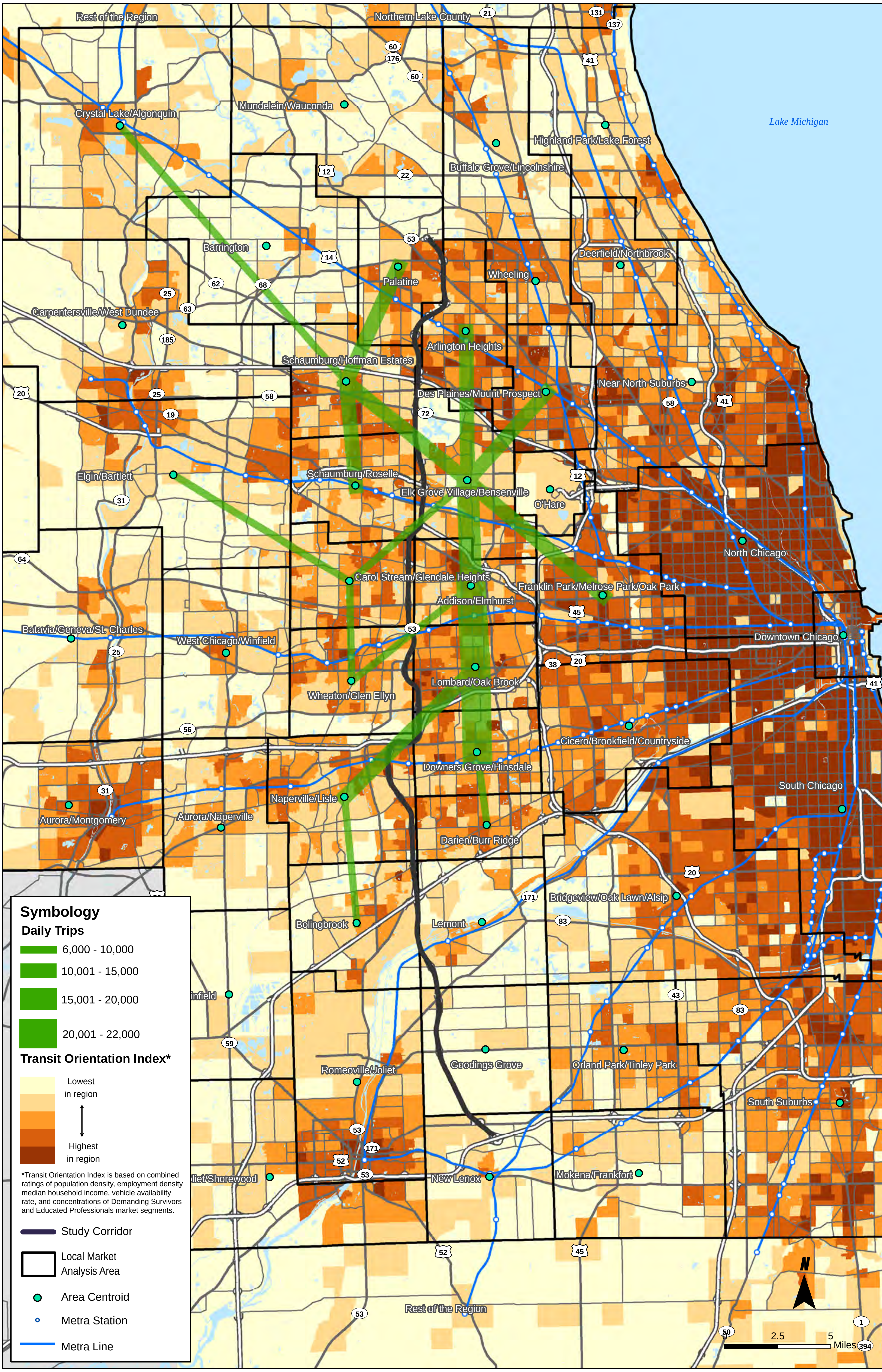
Figure 39 Corridor Connections for Major North-South Travel Patterns - Home-Based Other



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

Nelson\Nygaard consulting associates

Figure 40 Home-Based Work Corridor Connections with Transit Orientation Index



Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI

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4.5 Gaps in Transit Service

Critical Question 4: Is the current transit network serving the largest transit markets?

One of the critical questions in the study is to find out whether the current transit network is serving the biggest transit markets that were identified in the study area. There are several ways to explore this issue including: overlaying the current transit network (rail and bus) with the market segments that show potential for transit demand or that have propensity to use transit; exploring the relationship between levels of service offered in the network (frequency, travel time and hours of operation) and travel demand volumes between market areas; and exploring the relationship between OD travel at both the regional and local level and the directionality of service that is provided by the transit system network. Figure 41 on page 109 is an investigation exercise that overlays the transit network over the TOI or market areas that show potential for transit demand, with the intention to shed some light on the issue. At least three major observations can be made from the map:

- All together, Metra rail, Pace bus and CTA provide extensive transit coverage throughout the region and most of the network resources are dedicated to areas showing higher potential for transit demand. This applies mostly to Chicago based and Chicago bound services.
- Most market areas outside Chicago with potential for transit demand are found along commuter rail corridors and these are being served by Metra or by Pace bus routes feeding into or distributing from rail stations. This applies mostly to east-west and long-distance travel.
- Most market areas with potential for transit demand along the I-355 corridor show much less dense and thinner transit network coverage. This applies mostly to north-south and short-distance travel in the central part and northern end of the corridor area. In particular, north of I-90 and west and southwest of O'Hare.

Critical Question 5: Are all major OD travel patterns being served with transit? Are there any gaps in transit service level or coverage?

The apparent lack of density and sparse network footprint that is observed north of I-90 and west and southwest of O'Hare provides a contrast with the apparent emphasis that Pace has given to the communities along the BNSF and UP-W rail lines. While there are many routes providing service to Naperville, Lisle, Downers Grove, Wheaton, and Oak Brook, very few routes provide service between the UP-W and UP-NW lines, except for mostly east-west services connecting Schaumburg with places east of O'Hare in Des Plaines and Rosemont. In particular, Pace's bus network exhibits a variety of services and networks, roughly ranging from a grid structure east of the I-294 corridor, connecting with Chicago, to a radial structure in traditional rail-oriented townships such as Elgin, Aurora, or Joliet, in the west end of the metro area, to a dense community circulation and feeder/distribution shuttle network along the BNSF line, and a more hybrid model in the areas in between that combines corridor based service with feeder/distribution service and traveling north-south and east-west.

Based on the travel demand, transit market, and corridor network analyses developed in the previous sections, it appears that Pace's system exhibits major gaps in network coverage, service level, and directionality of service along I-355 corridor market areas, and that many resources are being dedicated to communities showing a relative lack of transit demand, as compared to the central and north segments of the corridor, which show relatively stronger potential and need for transit service.

4.6 Transit Corridor Investment Priorities

Critical Question 6: What types of transit service and levels of service are needed on major corridors to serve existing and potential markets?

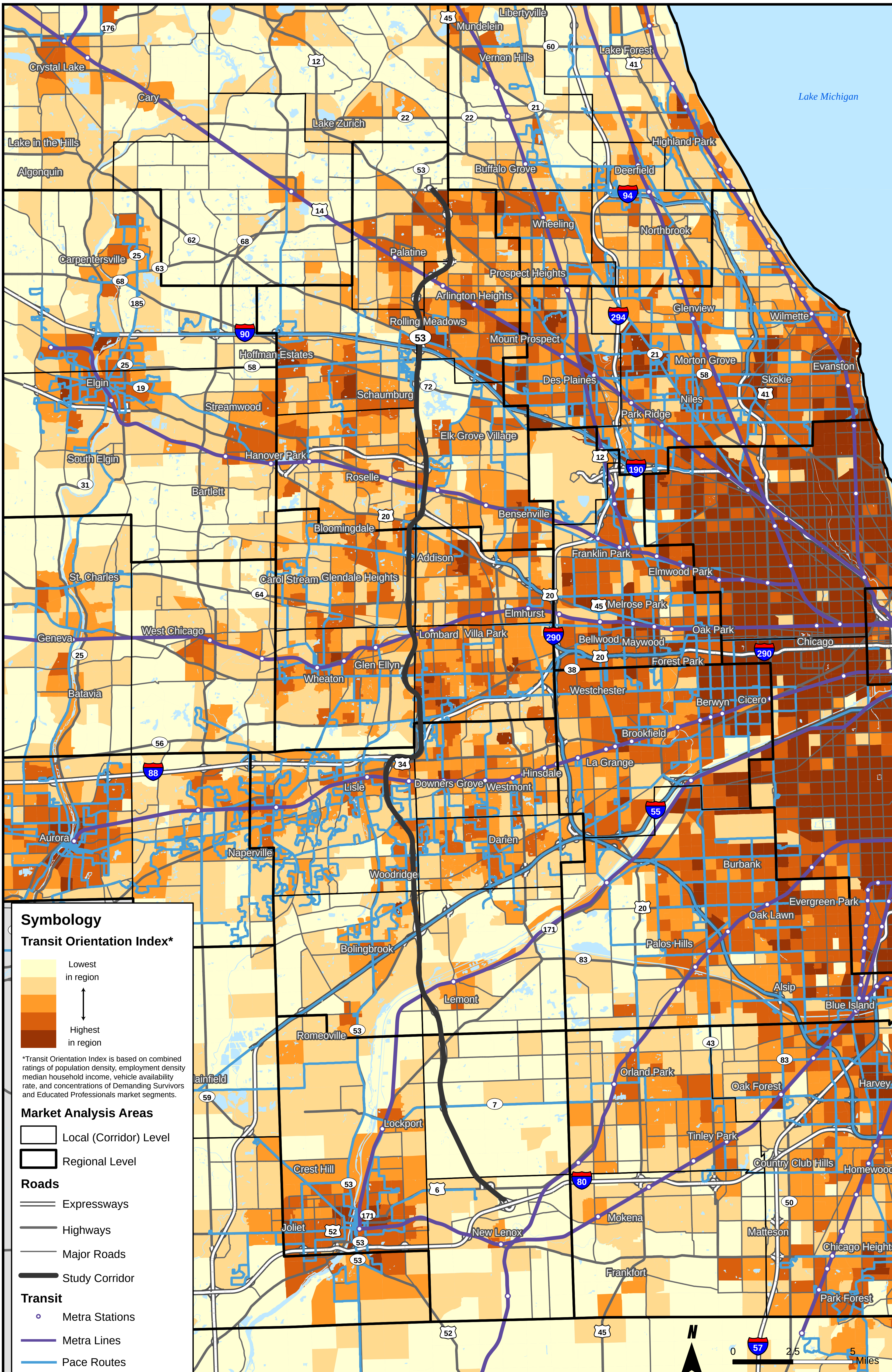
This question will be answered in the next phase of the study. Market areas with transit demand potential will be combined with more extensive analysis of specific corridors to develop potential transit service alternatives in the I-355 corridor study area. Major corridors will be extracted from the analysis in Chapter 3.4 in this study but also from discussions with the Project Steering Committee. Potential transit corridors will be identified and the methodological approach will be refined before conducting an evaluation of transit service demand and utilization performance.

The project team will evaluate the impacts of transit service investments on corridors and markets with regards to local and regional connectivity, level of service, and transit service utilization performance. A transit demand analysis database or model that combines markets and corridors will be developed to evaluate transit service investments on a corridor-by-corridor basis. Corridors presenting the best chance for success or the biggest impact on connectivity, service, and utilization metrics will be selected for development of a detailed service implementation plan. This analysis will be developed for the year 2010 base scenario, or current demand conditions, and for the year 2030 future scenario, or future demand conditions.

An important component of this implementation plan will be the determination of corridors with transit demand potential that have deficient accessibility or network connectivity with their surrounding markets, and thus cannot effectively reach their market potential. Identification of infrastructure investments, design, and land use policies and strategies for improving transit accessibility will be analyzed and discussed with local jurisdictions to gauge local support potential and partnerships.

The final product will be a summary of recommendations for implementation and a transit demand analysis and evaluation tool to aid in the successful implementation of transit services and corridors.

Figure 41 Transit Orientation Index with Pace Network



Nelson\Nygaard consulting associates

Source: Pace Suburban Bus, CMAP, State of Illinois, ESRI, U.S. Census

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Pace Suburban Bus

I-355 Corridor Transit Development Technical Memorandum #3

Selected Corridors Transit Potential Evaluation

February 2011

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Table of Contents

List of Figures

Page

List of Tables

Page

Introduction and Recap

This report continues the market analysis offered in the Existing Conditions Report. As found out in the Existing Conditions Report (ECR), there is significant north-south travel demand within the I-355 corridor study area, but travel in this area tends to be short-distance. Most north-south travel is made between contiguous market analysis areas, and most intense inter-zonal travel occurs in the northern part of the corridor, north of I-88. Another finding from the ECR was that long-distance trips originating in the corridor study area tend to be more east-west in focus and more regional in nature, with many of those trips destined for downtown Chicago. In terms of magnitude, the regional trips are roughly equal to the amount of inter-zonal travel that remains in the communities that comprise the corridor study area.

Market analysis areas (MAAs) showing above average propensity to use transit coincide with market analysis areas showing the highest travel demand. Most residential areas within this part of the corridor (north of I-88) are predominantly 'choice' markets; mostly middle-income and upper-middle income households with relatively easy access to automobiles, who place a relatively high monetary value on their time. Most employment areas within this part of the corridor are predominantly business parks developed in isolation from each other, with buildings set back from the street, and surrounded by vast parking lots or low-rise parking garage structures. Usually business parks have great automobile accessibility but poor transit and pedestrian accessibility (i.e. cul-de-sacs, non-grid street system, lack of sidewalks and pedestrian crossings).

Transit service within the I-355 corridor study area is feasible, as long as it is provided frequently and conveniently to attract choice riders. The analysis shows that there are several arterial corridor options to serve north-south demand around the I-355 highway corridor. North-south travel demand between corridor market areas is mostly made up of short-distance trips of less than 5 miles long, typically between contiguous MAAs or zones. Thus, north-south travel demand appears better suited for arterial based services as opposed to highway-based services; however some potential exists for highway-based services in the northern end of I-355 corridor when it runs concurrently with IL-53 and I-290, between Palatine and Schaumburg.

The potential for transit service demand – in the corridor study area, was evaluated through a multi-layered approach that analyzes transit markets, transit service, origin-destination travel demand and the arterial street network. By juxtaposing these layers of analysis, a series of critical questions are generated. Responses to these questions guide the analysis of transit service demand and the identification of corridors for transit service development. This report continues the market analysis in the ECR to more fully answer these critical questions, with the intent of identifying suitable corridor connections between market areas with potential demand for transit (and actual origin-destination travel), and developing successful transit services along these corridor connections.

Critical Question 1: Are there any potential markets within the study area?

Previous analysis in the Existing Conditions Report (ECR) found that the northern section of the corridor, in particular all market analysis areas west of O'Hare International Airport, show above average characteristics of transit demand and major origin-destination travel demand potential between MAAs. This is considered to be a good indicator of potential demand for transit, if frequent and convenient service was provided. For example, one major market connection showing up in the analysis is between Mount Prospect/Elk Grove Village and Schaumburg, which is currently served by PACE Route 606 with good ridership results.

Serving market connections that show both above average transit demand characteristics and origin-destination travel demand potential with transit can potentially impact vehicle travel on the I-355 corridor, by either reducing vehicle traffic volume or increasing the transit mode split for trips in the corridor study area. Major findings of the market demand analysis developed in the ECR included the following:

- North-south travel demand, within the I-355 corridor study area, is mostly short-distance and intra-zonal for both work trips and other trips; origins and destinations are mostly within any pair of contiguous market analysis areas.
- Potential transit service connections seem suited for arterial-based transit services providing direct connections within communities and between neighboring market analysis areas.
- Highway-based transit services are in general less effective at making the connections between communities, if travel is mostly short-distance, based on market proximity, and away from a highway corridor. As shown by the ECR analysis, current market demand for long-distance commute travel along the I-355 corridor is limited to a few corridor segments only. For example a major OD travel demand pattern exists between Schaumburg and Palatine in the north end. The fact that identifiable origin-destination patterns, or markets, can be identified suggests that future development along other parts of the corridor, if appropriately built out, offer the promise of becoming a transit market that may be suited to travel on I-355. As will be seen in further analysis, proximity to the corridor with proximate access points are crucial to this future market.

Critical Question 2: What are the major corridors connecting communities within the study area?

At a highly aggregated level, north-south origin-destination travel demand appears strongly aligned on two corridors that run parallel to the I-355, on both the east side and the west side of the tollway. Demand on these corridors is made up of a series of continuous OD pairs between contiguous market analysis areas. For example, there appears to be sufficient demand for transit from Downers Grove to Arlington Heights, however this demand turns over as it travels from one market area to the next, and so the "corridor" is made up of demand between Dowers Grove and Lombard, Lombard and Addison, Addison and Elk Grove Village, and Elk Grove Village and Arlington Heights.

The market demand analysis developed in the ECR was at a very "high" level or large scale[1], and was useful to understand travel demand patterns within the corridor study area. This report goes into further detail, analyzing origin-destination travel markets in the I-355 corridor that show potential for transit demand at a more granular level, in order to identify the arterial corridors that provide the connections between contiguous market areas and facilitate most of the trips in the network.

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[1] It is important to remember that the corridor study area is about 40 miles long and about 10 miles wide. This is a very large study area. As a comparison it is equivalent to the distance between Downtown San Francisco and San Jose in the Bay Area, along Highway 101, or the distance between Downtown Los Angeles and the Orange County CBD, in Irvine, California, along I-5. Both corridors have about 10 different transit agencies operating in their immediate market area and millions of people and jobs.

Critical Question 3: What are the major corridors that provide accessibility to potential transit markets?

As defined in the ECR, each market analysis area encompassed an urban area that was connected to the next by a variety of north-south and east-west corridors, and so the analysis only reflected the overall level of travel activity and connectivity between zones. Moreover, the volume of intra-zonal travel was still large and comparable in size to major connections between market areas. In other words, each market analysis area contained a high level of local mobility and connectivity between communities and neighborhoods that was not being reflected in the analysis. Thus the analysis was intended as a first 'screening' step to identify the major travel markets in the corridor area.

In this report we investigate these local travel markets further to understand in more detail the dynamics of travel within each market analysis area, and within any pair of market areas with demand potential, to untangle and prioritize connections between communities, and identify corridors with transit demand potential. This is accomplished by narrowing down the area of analysis and mapping the corridors that provide connections at the community level, and also by developing a deeper understanding of land use and demand markets along each corridor and market area; whether they serve mostly retail, school, office, services or industrial uses; whether they serve mostly a commute period or midday period or all-day demand.

Critical Question 4: Is the current transit network serving the largest transit markets?

There are three major observations that can be made from comparing or overlaying the regional transit network over market areas that show potential for transit demand (i.e. the Transit Orientation Index):

- All together, Metra Rail, Pace Bus and CTA provide extensive transit coverage throughout the region and most of the network resources are dedicated to areas showing higher potential for transit demand. This applies mostly to Chicago based and Chicago bound services.
- Most market areas outside Chicago with potential for transit demand are found along commuter rail corridors and these are being served by Metra or by Pace bus routes feeding into, or distributing from, rail stations. This applies mostly to east-west and long-distance travel.
- Most market areas with potential for transit demand along the I-355 corridor show much less dense or thinner transit network coverage. This is found mostly on north-south and short-distance travel in the central part and northern end of the corridor area. In particular, north of I-55 and west and southwest of O'Hare. This latter area is where most opportunities exist for new transit services and thus is the main analysis focus of this report.

Critical Question 5: Are all major OD travel patterns being served with transit? Are there any gaps in transit service level or coverage?

Pace's bus network exhibits a variety of services and networks, roughly ranging from a grid structure east of the I-294 corridor, connecting with Chicago, to a radial structure in traditional rail-oriented townships such as Elgin, Aurora, or Joliet, in the west end of the metro area, to a dense community circulation and feeder/distribution shuttle network along Metra's BNSF line, and a more hybrid model in the areas in between that combines corridor-based service with feeder-distribution service, traveling north-south and east-west (for example Routes 711, 715, and 834).

Table 5 in the Existing Conditions Report summarized Pace Bus routes operating in the corridor study area. All day services carry the highest ridership, in particular those services that operate east-west corridors and connect with Metra and/or CTA rail stations. For example, Route 208 Golf Road, Route 322 Cermak Road, Route 606 Algonquin Road, Route 313 St. Charles Road, and Route 747 DuPage Connection all carry between 1,000 and 2,300 passengers per day.

The lowest ridership is carried by peak directional local/feeder or circulation services, providing a limited number of trips along north-south roads and arterials. This group includes a number of routes that generate less than 100 passengers per day, for example: Route 461 North Downers Grove shuttle, Route 663 Darien-Clarendon Hills, Route 689 Naperville-Hobson Village, and Route 821 IL 53/83rd Street, which carry between 45 to 60 passengers a day only.

The “middle of the road” group is comprised of routes that carry 100 to 600 passengers per day. This group includes a mix of north-south and east-west services, but generally speaking they provide local bus service along major street corridors, connecting commute market destinations with rail stations, but also providing connections to local destinations and anchoring routes at non-commute travel destinations such as shopping malls and hospitals. Among the best performing routes in this group there are a handful of north-south services operating parallel to the I-355 corridor, and in areas showing some propensity to use transit, including: Route 834 Joliet – Downers Grove, Route 715 Central DuPage (Addison-Darien), Route 711 Wheaton – Addison, and Route 696 Randhurst – Woodfield – Harper College.

Two general observations can be made from this analysis: first, that east-west transit corridors connecting with Metra or CTA rail perform better because they follow major regional OD trends (as discussed in the ECR), and second that there is a market for all day transit service on streets and arterials that parallel I-355 (running north-south) that is based on local and subregional OD markets. This report explores these markets in more detail to better understand local and subregional markets, the directionality of travel, its travel corridors, and potential demand for transit service.

Critical Question 6: What types of transit service and levels of service are needed on major corridors to serve existing and potential markets?

In order to answer this question, micro-level origin-destination travel demand analyses are developed to identify arterial corridors providing internal connectivity between smaller zones within market analysis areas (these smaller zones are called ‘micro-zones’ in this analysis), and also between micro-zones in two different market analysis areas. Key arterial corridors providing actual trip connections between micro-zones are selected for evaluation, for their transit demand potential, market accessibility conditions, and overall person-trips volume.

Key arterial corridors are then packaged as potential transit service routes and screened for their transit demand potential, transit network duplication or integration, and transit demand characteristics (whether they serve mostly retail, school, office, services or industrial uses; whether they serve mostly a commute period or midday period or all-day demand).

An important component of this evaluation is the identification of corridors – with transit demand potential, that have deficient accessibility or network connectivity with their surrounding markets, and thus cannot effectively reach their market potential. A follow up of this evaluation will be the identification of infrastructure investments, urban design and land use policies, and strategies for improving transit accessibility that will be analyzed and discussed with local jurisdictions, to gauge local support potential and partnerships for transit corridor improvement and effective transit service.

Transit Corridor Evaluation Methodology

Figure 1: Supplemental Market Analysis and Transit Corridor Evaluation Methodology

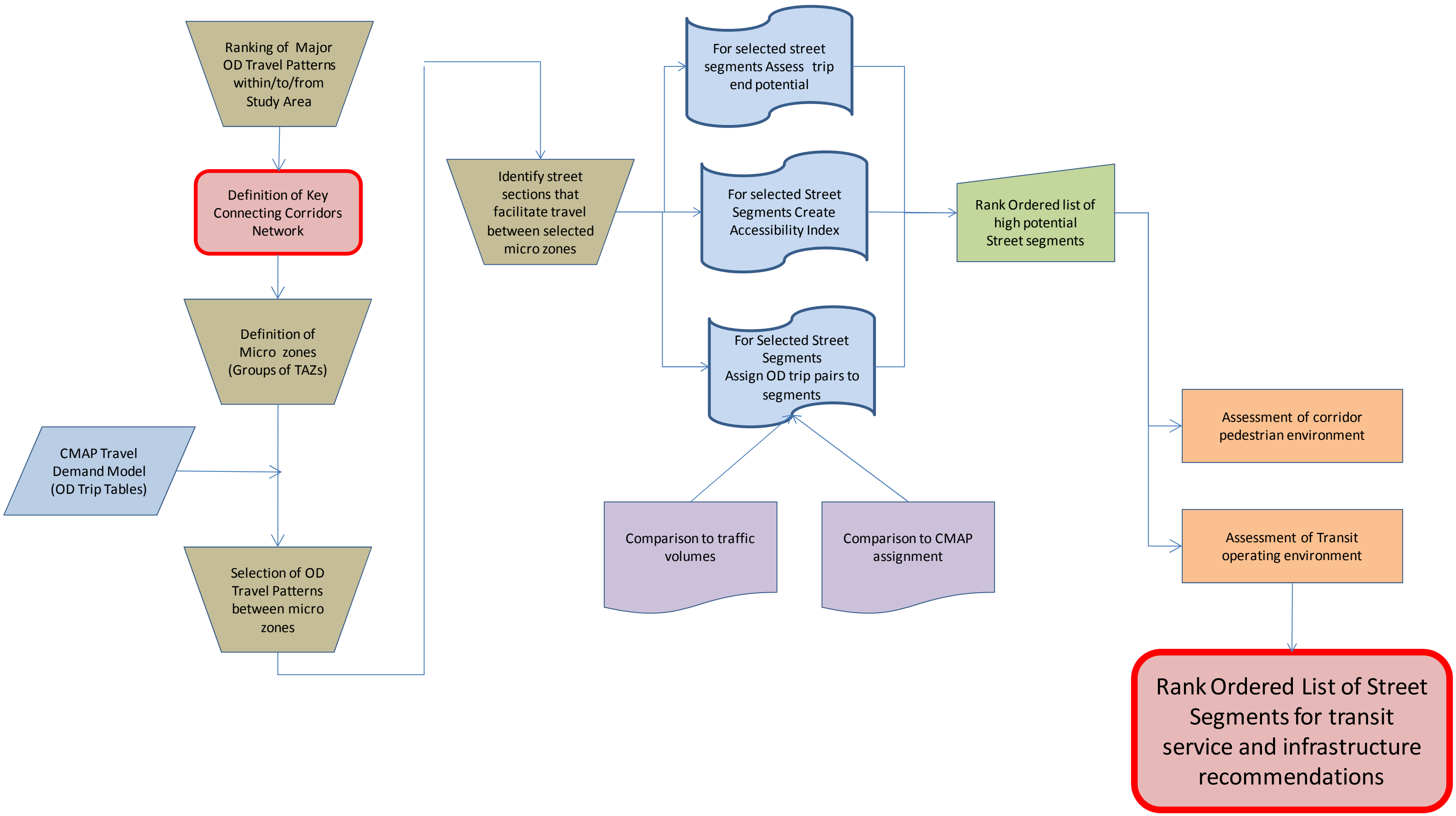


Figure 1 illustrates the analytical process utilized to evaluate candidate corridors for their transit demand potential and service implementation feasibility.

Micro-Zones Travel Demand Analysis

Out of sixteen (16) market analysis areas originally developed for the analysis in the ECR, twelve (12) lay in the northern segment of the corridor (north of I-88). These MAAs were subdivided into smaller zones or micro-zones based on population and employment density and land use patterns (see Figure 2 on the next page). Each MAA was subdivided into three or four micro-zones to reflect different communities and neighborhoods in the corridor study area. A total of 45 micro-zones were identified through this process to conduct this second phase of analysis.

Taking the analysis to a finer level of detail that more closely aligns with the scale of a community or neighborhood allowed for the identification of both origin-destination travel patterns between micro-zones within a market analysis area and between micro-zones in neighboring MAAs. As with the previous analyzes a screening person-trips threshold was developed for Home-Based Work and Home-Based Other trips to identify the most significant market connections between micro-zones. Thresholds were based on an assumed mode split and service level that could generate sufficient transit demand to justify a basic level of service. This threshold was established at 1,200 and 2,400 person trips for HBW and HBO, respectively.[2]

Figure 3 (on page 8) presents major OD travel demand pairs between micro-zones of analysis for home-based work trips. The map shows a pattern with five major centers generating and attracting a significant number of person trips and market connections (or OD pairs), these include: NE Schaumburg, East Elk Grove Village, Itasca/West Wood Dale, North Oak Brook, and NE Naperville. NE Schaumburg in particular attracts trips from most micro-zone areas around, as well as from longer distance zones such as Long Grove/Palatine and North Arlington Heights. A similar “hub-and-spoke” pattern is observed in East Elk Grove Village and Itasca/West Wood Dale. These three markets concentrate a high number of employment centers and jobs of regional significance, which attract trips from adjacent micro-zones (roughly within 3 miles) but also from outer zones that are more than 3 miles away.

Naperville, Lombard and Oak Brook also generate and attract significant numbers of person trips from zones south of the I-55 corridor (e.g. Downers Grove, Hinsdale, Woodridge, and Darien). There is also significant inter-connection of trips between these centers. This is driven mostly by employment centers and jobs spread throughout these areas, in the form of commercial/industrial business parks, retail and corporate buildings, as well as residential areas.

Figure 4 (on page 9) presents major OD travel demand pairs between micro-zones of analysis for home-based other trips. This map shows all non-work trips made between micro-zones in the study area. The person-trip volumes are larger than work trips and represent a larger proportion of all trips, about twice those of home-based work trips. OD travel demand between micro-zones shows a more grid-like pattern comprised of north-south and east-west OD pairs on both sides of the corridor. Although the continuity of north-south travel on the east side of the corridor, from Downers Grove and Darien to Elk Grove Village and continuing to Arlington Heights is significant and reinforces preliminary findings of potential transit markets in this part of the corridor study area. No less significant is the ‘hub-and-spoke’ pattern in NE Schaumburg which is also observed for both work and other trips. This is a significant finding because it demonstrates that there is an all-day market for travel to/from NE Schaumburg and potentially unmet needs for transit service going into this area.

[2] Mode split for Work Trips was established at 6% for a 30-minute service on the commute direction, and 3% for Other Trips for a 30-mintue service on both directions of travel.

Figure 2. Definition of Market Analysis Micro-Zones

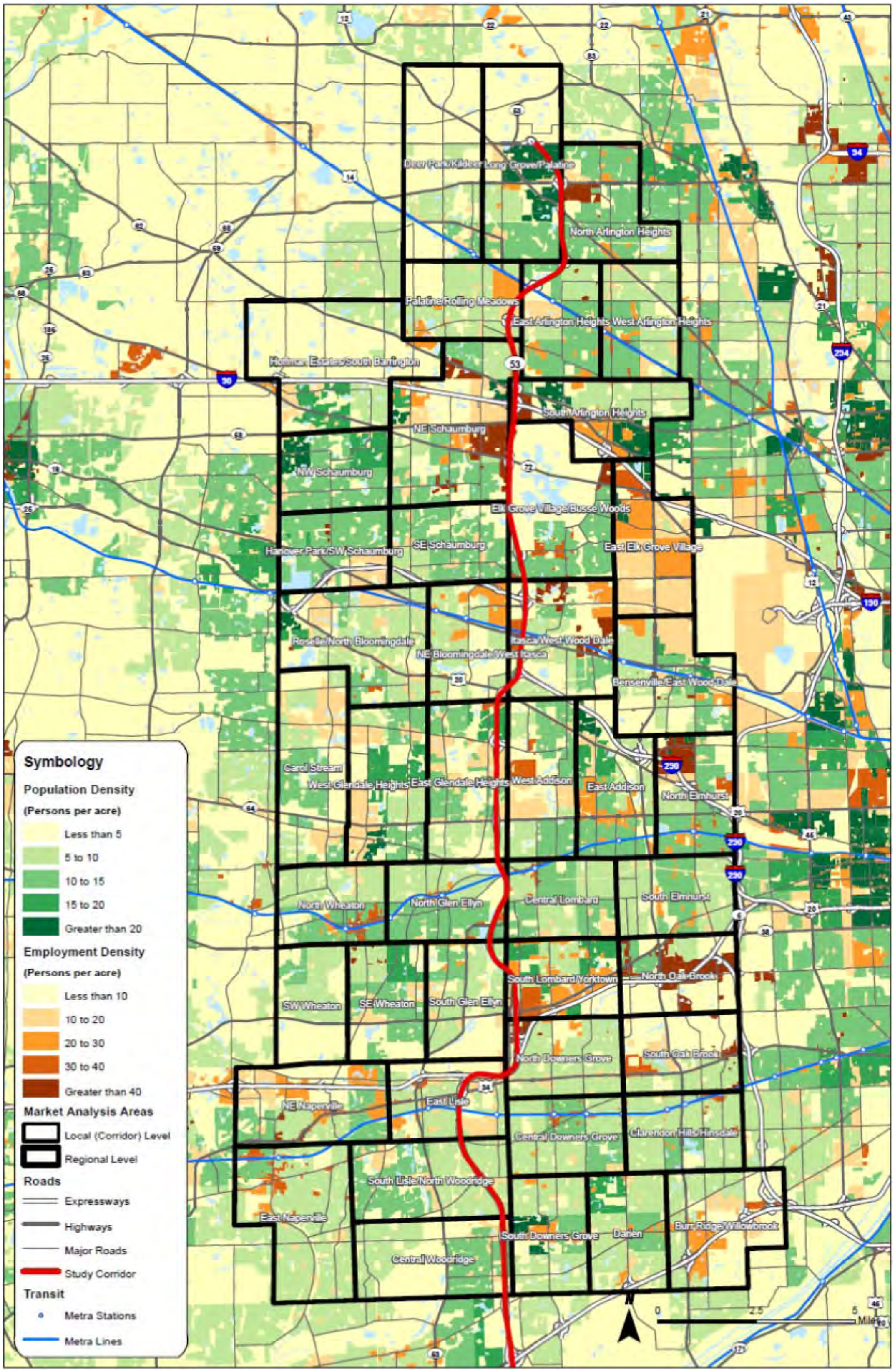


Figure 3. OD Travel Demand between Micro-Zones, Home-Based Work Trips

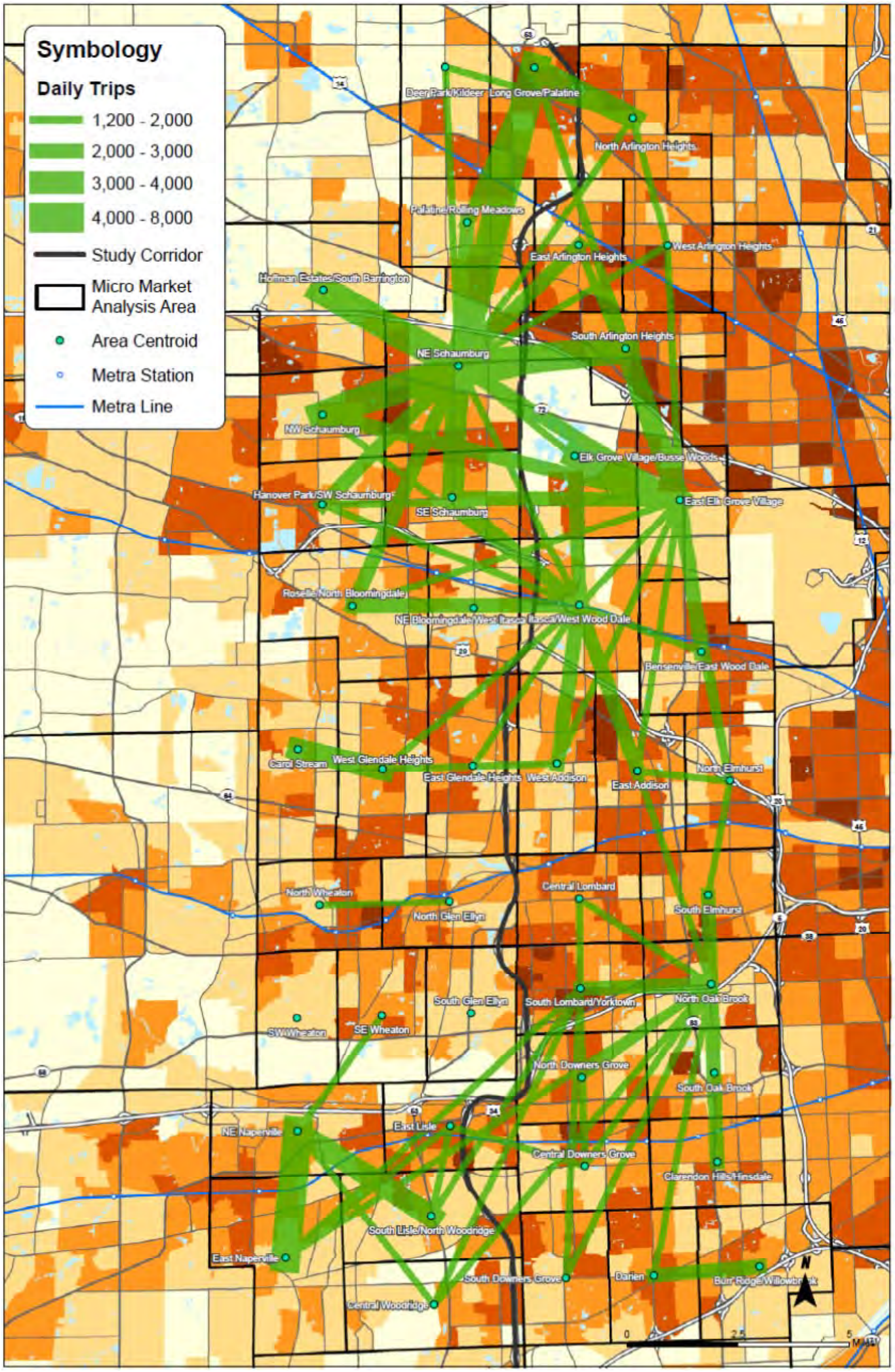
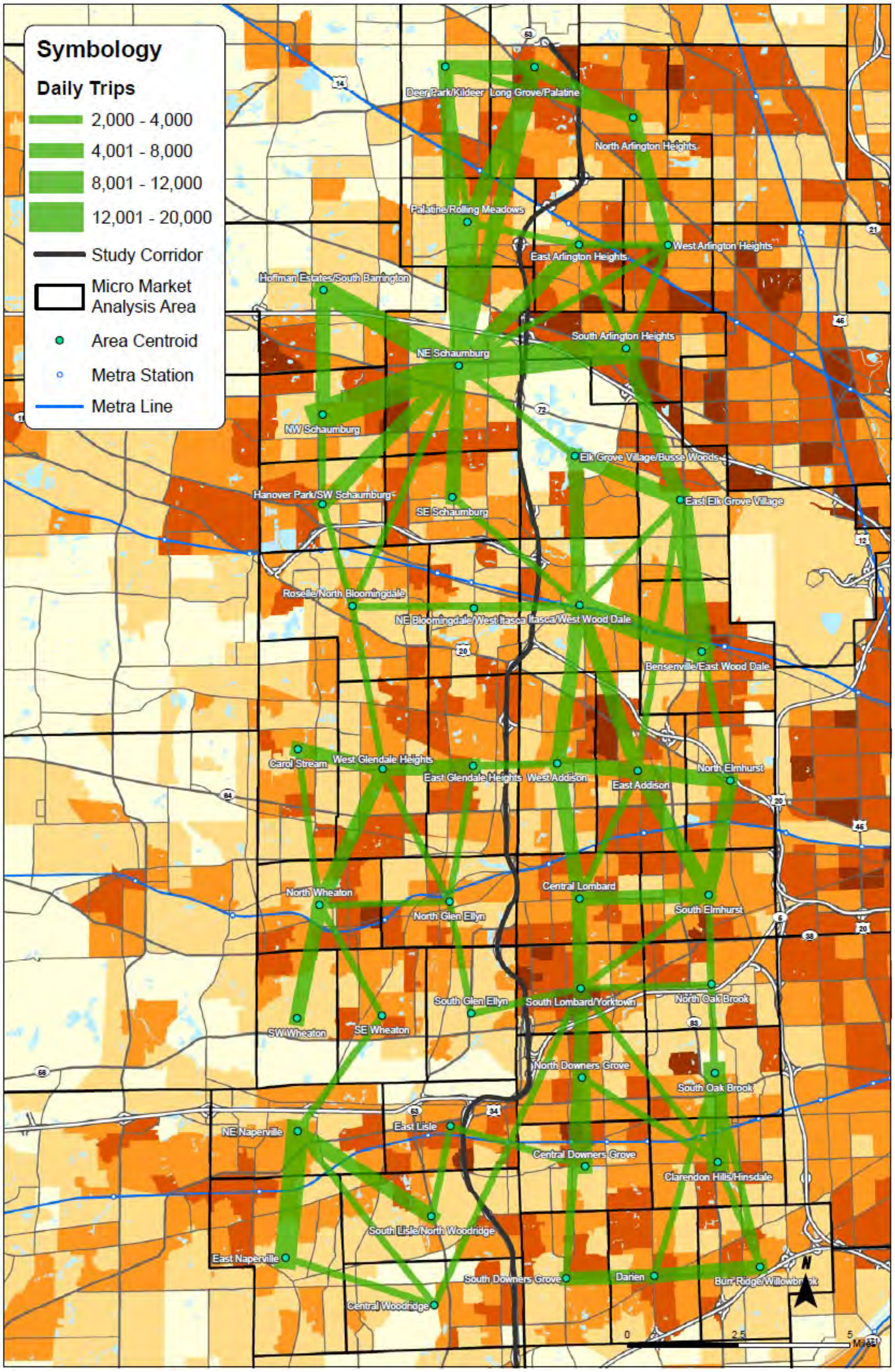


Figure 4. OD Travel Demand between Micro-Zones, Home-Based Other Trips



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In summary, “home-based other” trips patterns show a high degree of interconnection, like a street grid, between micro-zones up and down the I-355 corridor’s north segment, while home-based work trips show a nodal pattern that concentrates OD pairs into a few centers or destinations.

As mentioned before, the purpose of the micro-zone analysis is to start narrowing down travel demand patterns in the corridor study area, to identify a network of potential north-south arterial corridors that can channel this demand. To this end, the most significant work trips and other trips micro-zone connections, or OD pairs, were paired together to identify those connections that exhibit the greatest number of total person trips, including both work and other trips.

The top 50 micro-zone connections were then selected for the next step of analysis, which consisted of assigning zone-to-zone person trips in the arterial corridor network to identify the actual street corridors that are facilitating travel in the study area. Table 1 on the page 13 lists the Top 50 zone-to-zone connections selected for network assignment analysis with their respective total person trips volume for year 2010 and 2030.

Zone-to-Zone Network Assignments

Trips between micro-zones were assigned to the arterial street network based on the latest CMAP regional demand model, recently calibrated for the Go 2040 regional plan. The process that was utilized to create zone-to-zone trip assignments is as follows:

1. Person trip tables were created for the a.m. peak direction and the p.m. peak direction for each zone-to-zone combination on Table 1. Micro-zones were comprised of a number of Transportation Analysis Zones (TAZ) in the regional demand model. One-half of daily person trips, in the appropriate direction, were included in the a.m. peak table, and the other half, in the reverse direction, were included in the p.m. peak trip table.
2. The a.m. peak person trip table was then assigned to the a.m. peak network by calculating the shortest path based on existing congestion travel times that are coded in the network from the previously completed network assignment that was developed for Go 2040.
3. The p.m. peak person trip table was then assigned to the p.m. peak network by calculating the shortest path based on existing congestion travel times that are coded in the regional demand model’s network.
4. The a.m. peak and p.m. peak results were then copied into a single network and summed up, resulting in total daily directional volumes on network links. These volumes are person volumes and not vehicle volumes.

Each zone-to-zone assignment was completed separately and the results were saved in separate files. This allowed for compilation of all the files into a single GIS network shapefile, where all individual volumes were added together to show zone-to-zone trip flows in the network without double counting. As shown in Table 1, there were 50 zone-to-zone network assignments. All assignments were mapped to identify the street corridors facilitating the majority of trips between zones. As a reminder, these assignments were for significant north-south trips[3] in the corridor study area, and so they identify street segments in the network that are important for this subset of trips.

[3] Based on OD pairs between two micro-zones were at least a portion of the trip would travel in the north-south direction.

Figure 5 on page 14 shows a sample Zone-to-Zone Network Assignment which includes zone-to-zone assignments between NE Schaumburg and four different micro-zones. A complete set of maps is included in Appendix at the end of this report.

As a general observation, the most important finding in these maps is that the size and scale of both micro-zones and zone-to-zone assignments are working toward indentifying a limited number of street segments in the network that facilitate a significant number of trips between zones. For example, Figure 5 shows that between East Arlington Heights and NE Schaumburg, a segment of IL-53/I-290 is facilitating most person trips, while between Deer Park/Kildeer and NE Schaumburg only a small portion of person trips are facilitated by IL-53/I-290, and most trips are on Roselle Rd, Quentin Rd, and Meacham Rd.

Figure 6 on page 16 illustrates the results of aggregating all zone-to-zone network assignments together. The map shows that a discrete number of corridors concentrate the majority of person trips in the study area. It is important to remember that person trips in these assignments are of relatively short distance, less than 3 miles long on average, and so the map shows an aggregation of short-distance person trips. Still there are some corridors that continue or are being used from one zone to the other. These are potentially good corridors for transit service as they facilitate significant numbers of person trips throughout the study area.

A few corridors that stand out from this map include:

- Roselle Road
- Plum Grove Road
- Meacham Road
- Hicks Road
- Arlington Heights Road
- Golf Road
- Schaumburg Road
- Higgins Road
- Wood Dale Road
- Busse Road
- Bloomingdale Road
- Addison Road
- Westmore-Meyers Road
- Butterfield Road
- Highland Ave
- Meyers Road

Table 1: Top 50 OD Travel Demand Patterns between Micro-Zones, All Trips

ID	Origin Zone	Destination Zone	2010 Trips	2030 Trips	N-S	E-W
0605	NW Schaumburg	NE Schaumburg	30,047	36,252		X
1105	South Arlington Heights	NE Schaumburg	26,076	29,901		X
1615	East Naperville	NE Naperville	17,037	24,444	X	
1920	Carol Stream	West Glendale Heights	16,956	23,438		X
0005	Hoffman Estates/South Barrington	NE Schaumburg	15,703	21,537		X
3113	Bensenville/East Wood Dale	East Elk Grove Village	15,029	12,415	X	
0305	Palatine/Rolling Meadows	NE Schaumburg	14,427	20,470	X	
0209	Long Grove/Palatine	North Arlington Heights	14,360	17,698		X
0203	Long Grove/Palatine	Palatine/Rolling Meadows	13,742	15,133	X	
3130	Bensenville/East Wood Dale	Itasca/West Wood Dale	13,057	12,967		X
0205	Long Grove/Palatine	NE Schaumburg	12,766	12,810	X	
0805	SE Schaumburg	NE Schaumburg	12,357	10,820	X	
0910	North Arlington Heights	West Arlington Heights	12,320	10,319	X	
0405	East Arlington Heights	NE Schaumburg	11,426	11,285	X	
1213	Elk Grove Village/Busse Woods	East Elk Grove Village	11,425	13,934		X
2021	West Glendale Heights	East Glendale Heights	11,375	19,482		X
4414	Darien	Burr Ridge/Willowbrook	11,180	12,412		X
2815	South Lisle/North Woodridge	NE Naperville	11,113	15,849		X
4443	Darien	South Downers Grove	10,965	13,007		X
4240	Clarendon Hills/Hinsdale	South Oak Brook	10,782	9,001	X	
3332	East Addison	West Addison	10,713	10,440	X	
3634	South Elmhurst	North Elmhurst	9,880	10,829	X	
3537	Central Lombard	South Lombard/Yorktown	9,812	14,503	X	
0705	Hanover Park/SW Schaumburg	NE Schaumburg	9,658	11,845	X	
3433	North Elmhurst	East Addison	9,267	8,779		X
3330	East Addison	Itasca/West Wood Dale	9,196	10,781	X	
1230	Elk Grove Village/Busse Woods	Itasca/West Wood Dale	9,188	11,380	X	
0102	Deer Park/Kildeer	Long Grove/Palatine	8,967	7,031		X
2220	North Wheaton	West Glendale Heights	8,689	8,415	X	
0600	NW Schaumburg	Hoffman Estates/South Barrington	8,604	7,593	X	
3230	West Addison	Itasca/West Wood Dale	8,469	8,776	X	
1113	South Arlington Heights	East Elk Grove Village	8,458	7,513	X	
3738	South Lombard/Yorktown	North Oak Brook	8,380	10,651		X
3937	North Downers Grove	South Lombard/Yorktown	7,906	8,432	X	
4137	Central Downers Grove	South Lombard/Yorktown	7,873	6,457	X	
2422	SW Wheaton	North Wheaton	7,678	7,689	X	
1011	West Arlington Heights	South Arlington Heights	7,424	10,094	X	
2322	North Glen Ellyn	North Wheaton	7,193	6,766		X
1720	Roselle/North Bloomingdale	West Glendale Heights	7,166	9,306	X	
4139	Central Downers Grove	North Downers Grove	7,051	8,636	X	
4238	Clarendon Hills/Hinsdale	North Oak Brook	6,609	7,232	X	
0105	Deer Park/Kildeer	NE Schaumburg	6,473	9,942	X	
1730	Roselle/North Bloomingdale	Itasca/West Wood Dale	6,392	6,681		X
3532	Central Lombard	West Addison	6,384	5,620	X	
3633	South Elmhurst	East Addison	6,355	6,401	X	
3638	South Elmhurst	North Oak Brook	6,330	6,265	X	
3635	South Elmhurst	Central Lombard	6,069	5,265		X
1705	Roselle/North Bloomingdale	NE Schaumburg	5,952	6,183	X	
0830	SE Schaumburg	Itasca/West Wood Dale	5,786	7,717	X	
3637	South Elmhurst	South Lombard/Yorktown	5,727	5,655	X	
2321	North Glen Ellyn	East Glendale Heights	5,658	7,252	X	
2915	Central Woodridge	NE Naperville	5,470	5,762	X	
0513	NE Schaumburg	East Elk Grove Village	4,903	3,681		X
0813	SE Schaumburg	East Elk Grove Village	4,843	4,396		X
0905	North Arlington Heights	NE Schaumburg	4,756	5,428	X	
3313	East Addison	East Elk Grove Village	4,427	4,184	X	

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Figure 5. Zone-to-Zone Trips Network Assignment (Sample Map)

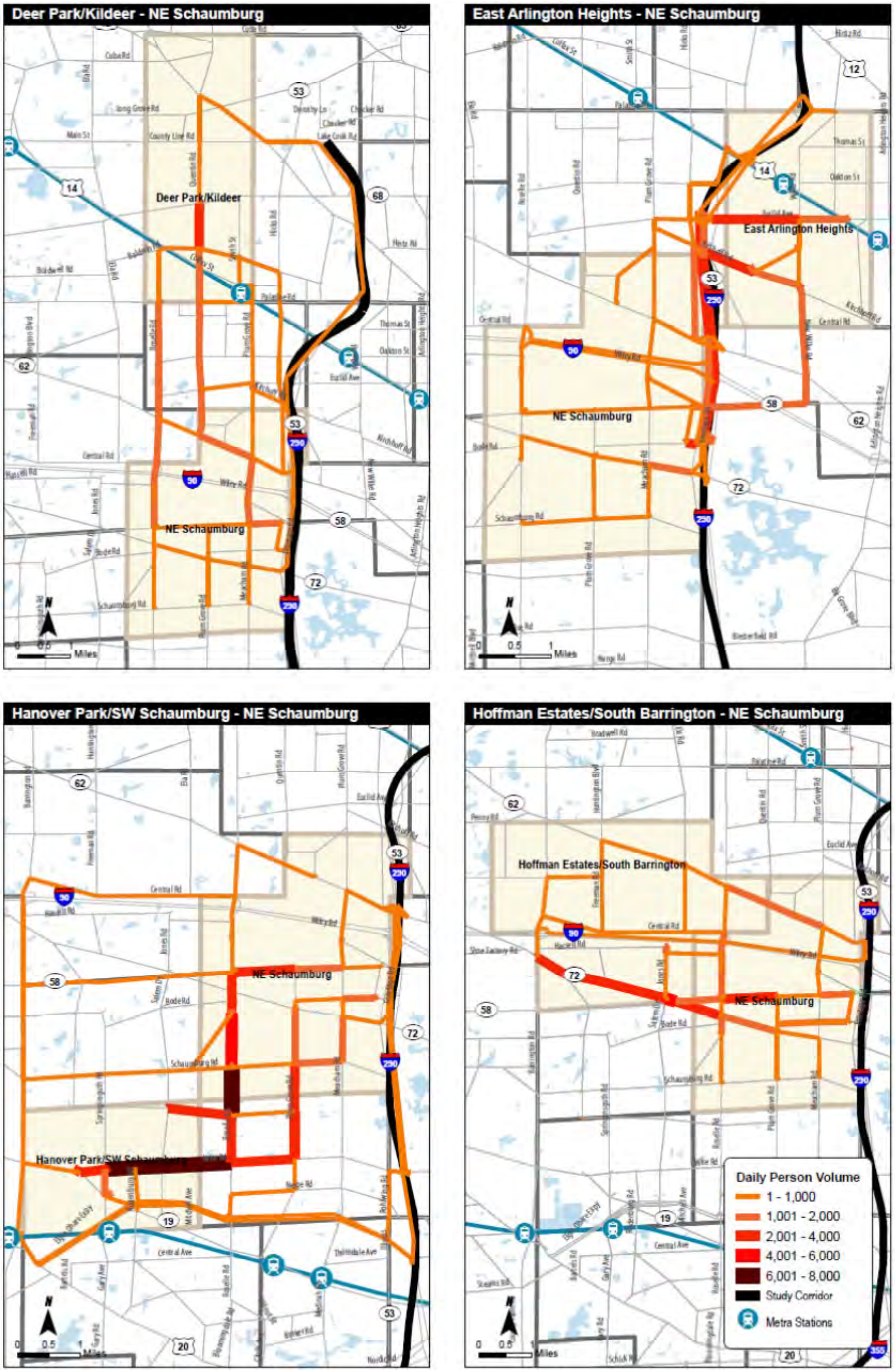
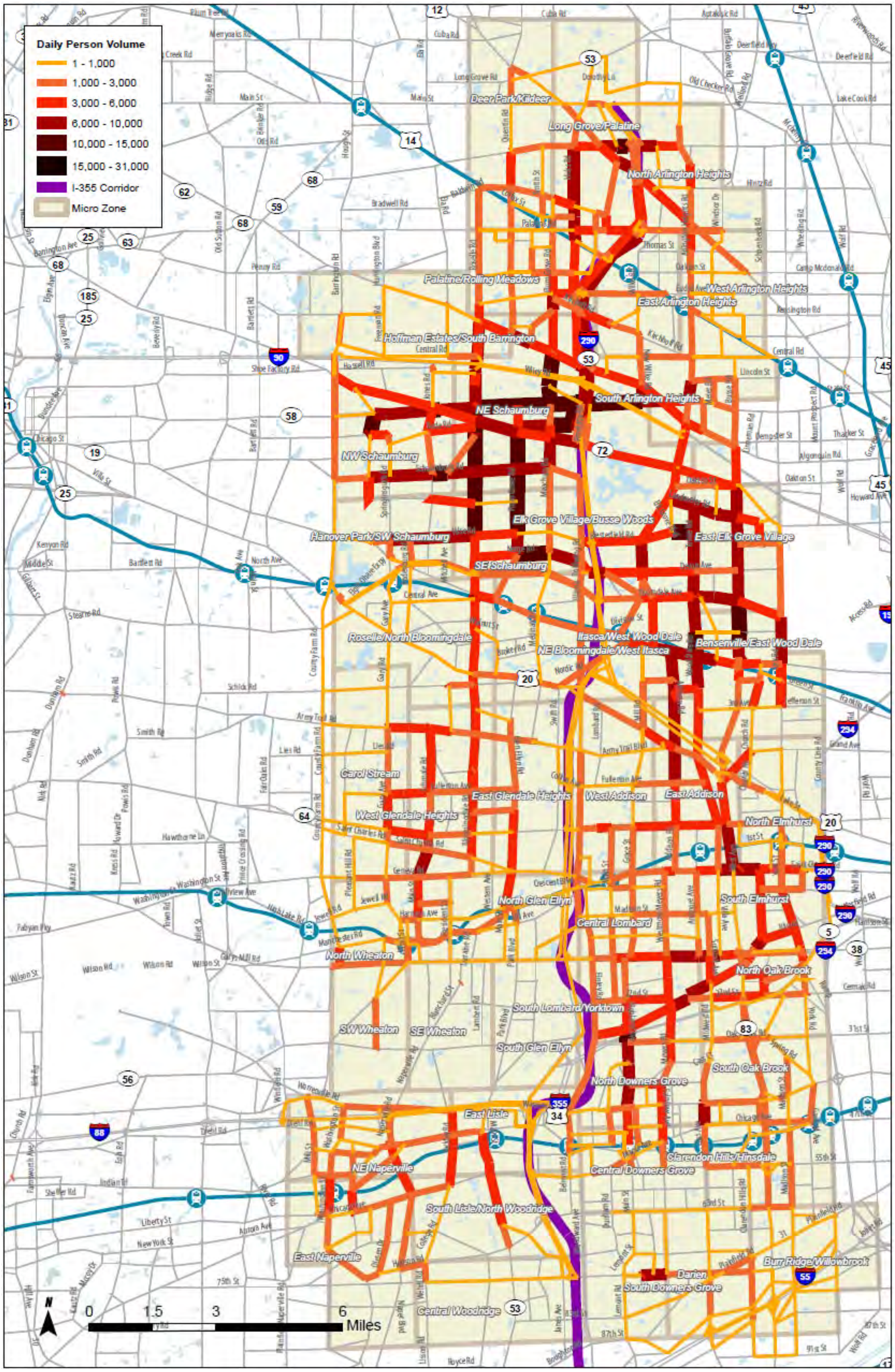


Figure 6. Network Assignment Aggregation, Top 50 Zone-to-Zone Combinations



Definition of Corridor Segments

As indicated in Figure 1 on page 5, the next phase of analysis is to identify corridor segments for their transit potential evaluation. Corridors segments selected for evaluation were defined using the zone-to-zone trip assignments as guidance. This was accomplished in two steps:

1. Identifying the main corridor segments facilitating the most travel between any individual zone-to-zone combination (see Figure 5 and maps in Technical Appendix).
2. Identifying the main corridor segments facilitating the most travel across more than two micro-zones (see Figure 6 and Figures 3 and 4).

The point of this two-step selection was to identify corridor segments that function at two levels, the local level (i.e. zone-to-zone connections) and the subregional level (i.e. across several micro-zones). This was based on the concept that arterial corridors that have a continuous (zone over zone) origin-destination travel demand would be the most successful in attracting both local and sub-regional trips, and would generate sufficient ridership to sustain a base level of transit service (i.e. 14-hour service span, 30-minute headway, and bi-directional service).

Based on this assumption, corridor segments were combined to reflect a potential transit service route, providing a connection between an origin and a destination on each route end, for example between the Roselle Metra Rail station and Westfield Mall in Schaumburg. Combined corridor segments were selected to follow arterial street segments that showed significant person trip volumes. Corridor routings were allowed to run between 6 to 12 miles long, aiming for a minimum of 3 market connections (1 market connection is about 2 miles long and involves two zones).

Table 2 on the next page lists all corridor combinations selected for their transit potential evaluation, including measures of length and market connections (or zone-to-zone links). A total of 43 corridors were selected for evaluation encompassing transit corridor options throughout all market analysis areas in the northern part of the study area (north of I-88).

Figure 7 on page 19 shows the network of transit corridors selected for evaluation as an overlay to the aggregated zone-to-zone network assignments.

Figure 8 on page 20 illustrates the transit corridor alignments individually, and with respect to all other alignments selected for evaluation.

The corridors' transit potential evaluation is presented in the section thereafter.

Table 2. Corridors Selected for Transit Potential Evaluation

ID	Selected Corridor	Corridor Length	Number of Intersections	Intersections per Mile	Market Connections
1	Addison Rd - Irving Park Rd	7.1	65	9.2	3
2	Arlington Heights Rd	7.4	64	8.7	4
3	Dundee Rd - Arlington Heights Rd	8.4	80	9.5	4
4	Golf Rd	9.5	64	6.7	5
5	Golf Rd - Roselle Rd	6.9	62	9.0	4
6	Hicks Rd - Meacham Rd	7.2	72	10.0	3
7	Hicks Rd - Roselle Rd	8.4	65	7.8	5
8	Higgins Rd	11.9	78	6.5	5
9	Landmeier Rd - Biesterfield Rd	7.6	65	8.6	3
10	Nerge Rd - Devon Ave	7.0	60	8.6	4
11	North IL-53	8.3	52	6.2	7
12	Palatine Rd	6.6	78	11.9	6
13	Plum Grove Rd - Kirchhoff Rd	7.3	86	11.8	6
14	Plum Grove Rd - Wise Rd	7.8	66	8.4	3
15	Quentin Rd	7.5	75	10.0	3
16	Rand Rd - Arlington Heights Rd	7.7	66	8.6	4
17	Schaumburg Rd - Golf Rd	10.7	82	7.7	4
18	Thorndale Ave - York Rd	7.5	43	5.8	4
19	Wilke Rd - Busse Rd	8.4	78	9.3	4
20	Wood Dale Rd	7.4	58	7.9	5
21	Addison Rd - North Ave	7.7	73	9.5	4
22	Army Trail Rd - Fullerton Rd	11.4	94	8.2	6
23	Bloomingdale Rd	10.9	105	9.6	3
24	Butterfield Rd	9.9	94	9.5	6
25	Cass Ave	6.8	92	13.5	5
26	Chicago Ave - Ogden Ave	7.3	94	12.9	4
27	Gary Ave	11.8	101	8.5	4
28	Glen Ellyn Rd	11.2	117	10.5	5
29	Lincoln Ave - Ogden Ave	7.6	67	8.8	4
30	Madison St - 75th St	7.9	77	9.7	4
31	Main St - Highland Ave	6.9	75	10.9	4
32	Meyers Rd - Fairview Ave	10.3	114	11.1	7
33	Mills St - Naperville rd	10.0	72	7.2	5
34	Naperville Rd - Chicago Ave	9.4	65	6.9	6
35	Ogden Ave - Chicago Ave	9.5	77	8.1	4
36	Rohlwing Rd	8.9	76	8.5	5
37	Roosevelt Rd - Spring Rd	10.0	77	7.7	5
38	Schmale Rd	10.0	97	9.7	5
39	Summit Ave - Madison St	6.8	70	10.2	3
40	Warrenville Rd - Washington St	11.8	86	7.3	3
41	Westmore-Meyers Rd - Addison Rd	9.0	74	8.2	3
42	York Rd - Irving Park Rd	8.5	93	11.0	3
43	York Rd - Meyers Rd	10.6	98	9.3	6

Figure 7. Selected Corridors Network vs. Zone-to-Zone Network Assignments

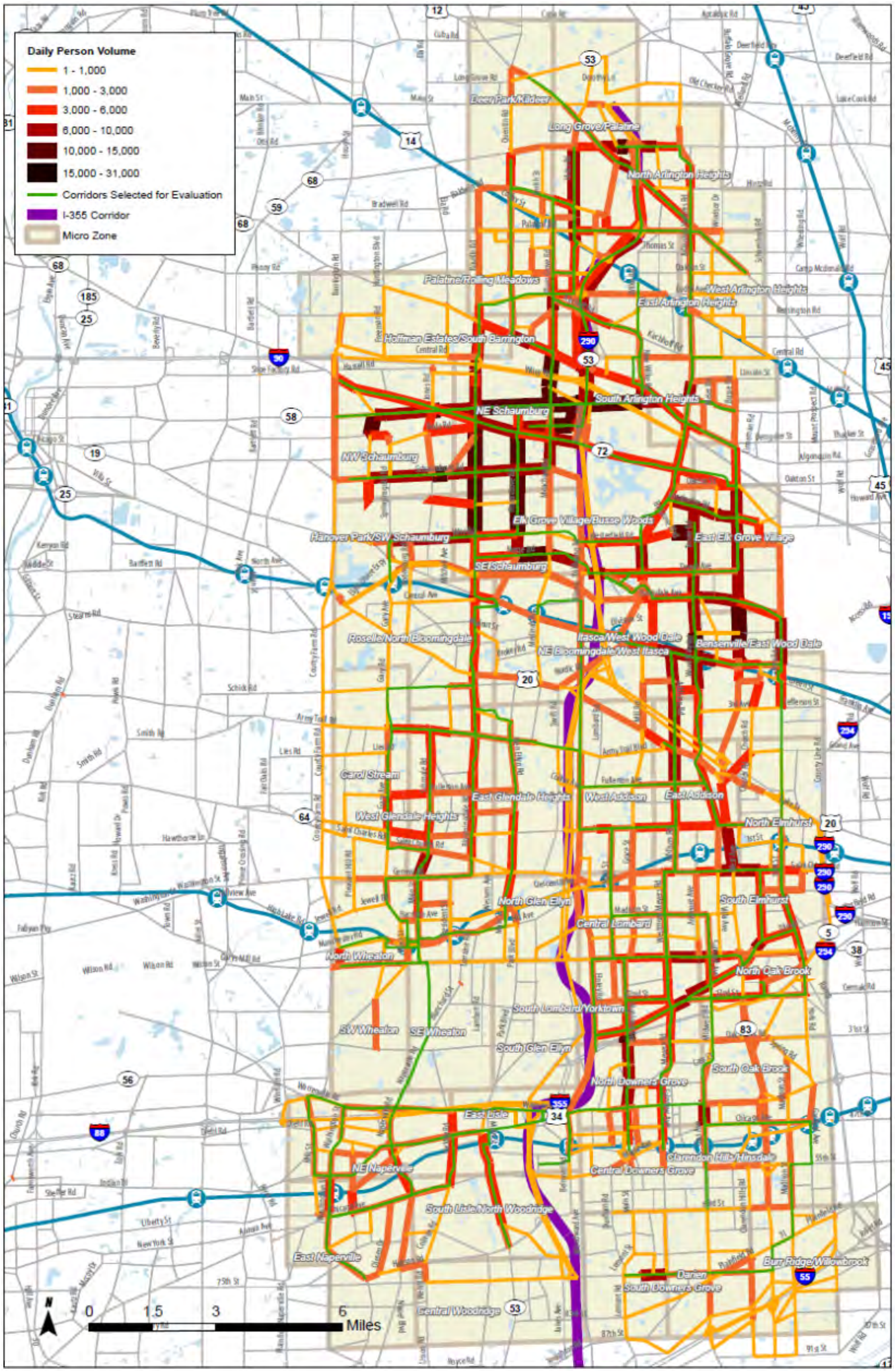
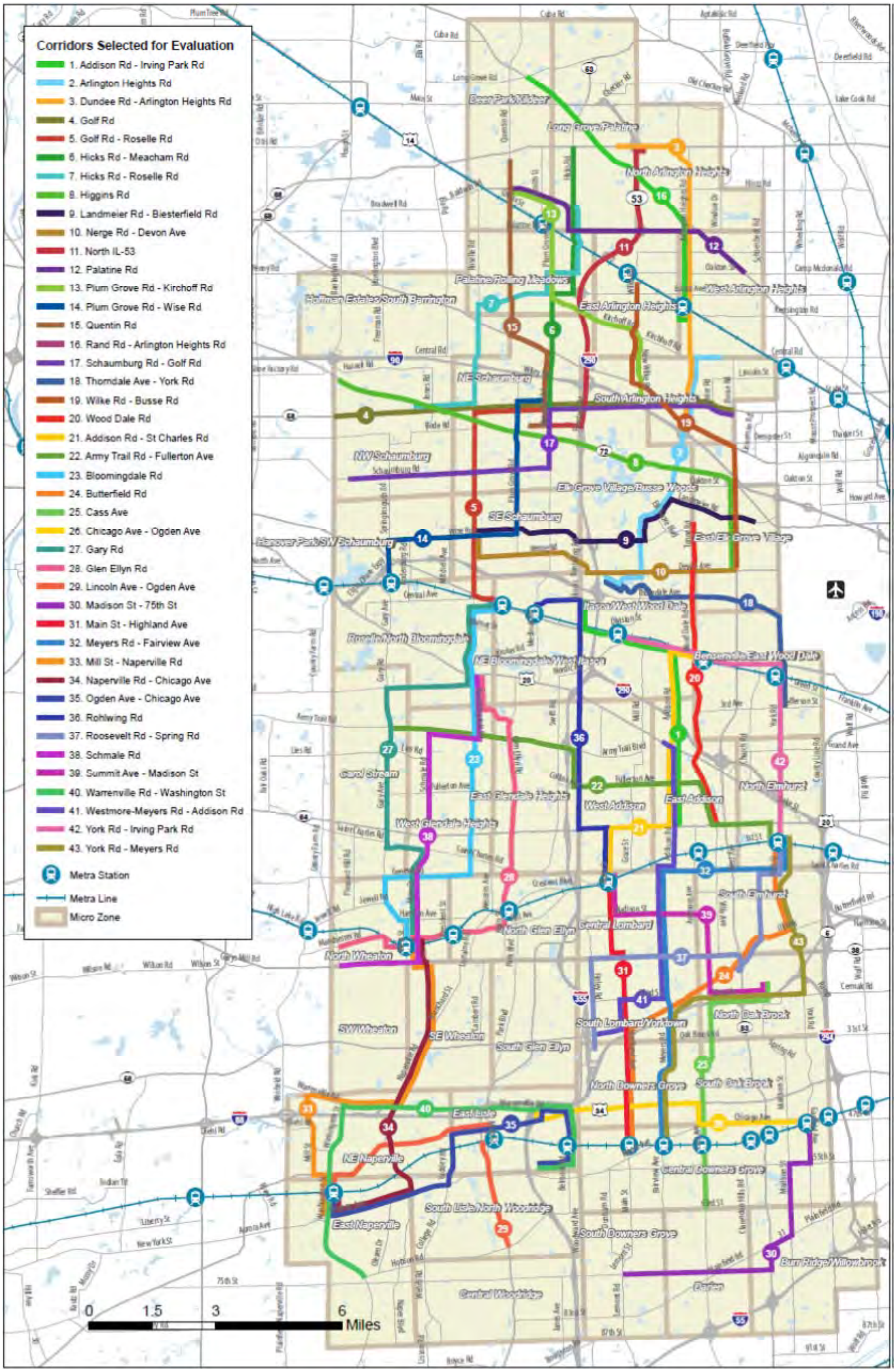


Figure 8. Corridor Alignments Selected for Evaluation



Transit Potential Evaluation by Corridor

The methodology utilized to evaluate transit potential in each selected corridor includes three screening filters that include: the potential demand for transit, the population and employment market size, and the level of integration or duplication with the existing regional transit network.

Transit Demand Potential – 1st Filter

As indicated in Figure 1, the transit demand potential is measured through the average scoring of three factors that provide distinctive and complementary measures of transit demand potential, including a market potential index, a market accessibility index, and a daily trips volume index. These are described below in more detail:

1. **Market Potential Index.** Table 3 on page 22 shows the Market Potential Index scoring for all 43 corridors selected for evaluation. This index reflects the average TOI scoring for all TAZs within a one-half mile of the corridor. This figure is listed under the 'Effective TOI' column. The score is created by calculating the percentile of each corridor Effective TOI value as compared to the maximum value (100% percentile) of all 43 corridors. The TOI is a combined score that takes into account population and employment density, income and auto ownership, and market segments with positive attitudes and attributes toward transit.
2. **Market Accessibility Index.** Table 4 on page 23 shows the Market Accessibility Index scoring for all 43 corridors selected for evaluation. This index reflects the level of connectivity and accessibility in the street network along each corridor. Two variables are measured to account for this: (1) the number of street intersections or crossings (defined as complete street crossings that are connected to a network and not just a driveway or entrance to a residential or commercial development), and (2) the extent of the street network that is a one-half mile away from a street intersection, or in other words, the length (in miles) of the street network that is accessible to the corridor on a typical 10-minute walk. The benefit of this index is that it accounts for a measure of market accessibility that is based on the actual connectivity of local streets with arterial streets, thus a limited access highway or an urban arterial with limited pedestrian connections from residential or commercial developments will record a lower number of street miles and intersections per mile. In contrast, an urban arterial with many collector street intersections that distribute to a grid-like network of local streets (i.e. a traditional urban form) will record a higher number of street miles and intersections. The final score is also calculated as a percentile value with respect the maximum scoring value.
3. **Daily Trips Volume Index.** Table 5 on page 24 shows the Daily Trips Volume Index scoring for all 43 selected corridors. This index reflects the average daily person trip volumes along each corridor. This figure is calculated by multiplying daily person-trip assignments on each corridor street segment by the segment's length, to create a 'person-trips miles' measure, and then dividing the overall 'person-trips miles' by the corridor length (in miles) to produce an average measure of person-trips volumes in the corridor. This statistic is similar to the calculation of an average bus load where passenger loads are multiplied by miles between stops to produce passenger miles and then divided by the route length to produce an average passenger load measure. The final score is created by calculating the percentile of each corridor daily person trip value as compared to the maximum value (100% percentile).

Table 6 on page 25 lists the 43 selected corridors ranked by their final Transit Potential scoring, which is an average of the three percentiles scores described above.

Table 3. Corridor Alignments Market Potential Index – Score 1

		Potential Market Reach Index		Transit Orientation Index			TOI Score
ID	Selected Corridor	Total Pop & Empl.	Pop & Empl per Acre	Total TOI	TOI Factored by Acre	Effective TOI	Percentile
31	Main St - Highland Ave	57,249	11.8	801	87,371	18.0	100.0%
3	Dundee Rd - Arlington Heights Rd	80,584	14.0	870	102,685	17.9	99.3%
41	Westmore-Meyers Rd - Addison Rd	77,084	12.7	943	108,195	17.9	99.2%
24	Butterfield Rd	87,081	12.9	1015	119,827	17.7	98.2%
37	Roosevelt Rd - Spring Rd	84,839	12.8	938	116,054	17.6	97.6%
13	Plum Grove Rd - Kirchhoff Rd	56,010	10.9	581	87,999	17.2	95.3%
19	Wilke Rd - Busse Rd	82,797	14.2	774	99,127	17.0	94.3%
42	York Rd - Irving Park Rd	64,437	11.1	765	97,760	16.8	93.5%
32	Meyers Rd - Fairview Ave	72,191	10.3	1019	117,980	16.8	93.2%
28	Glen Ellyn Rd	82,317	11.1	1045	123,475	16.6	92.3%
5	Golf Rd - Roselle Rd	56,403	11.6	467	80,214	16.5	91.6%
16	Rand Rd - Arlington Heights Rd	60,875	11.4	668	87,464	16.4	91.2%
38	Schmale Rd	69,659	10.3	843	111,180	16.4	90.8%
21	Addison Rd - North Ave	52,911	10.1	756	85,705	16.3	90.6%
23	Bloomingdale Rd	71,483	9.7	1001	119,509	16.2	90.1%
12	Palatine Rd	44,738	9.6	683	75,771	16.2	90.0%
22	Army Trail Rd - Fullerton Rd	93,543	12.2	952	124,311	16.2	90.0%
35	Ogden Ave - Chicago Ave	57,318	9.0	847	103,396	16.2	89.8%
39	Summit Ave - Madison St	62,598	13.1	661	76,649	16.0	89.1%
26	Chicago Ave - Ogden Ave	44,371	8.8	623	80,323	16.0	88.9%
1	Addison Rd - Irving Park Rd	45,771	9.2	580	79,821	16.0	88.9%
30	Madison St - 75th St	47,362	8.7	708	86,184	15.9	88.3%
9	Landmeier Rd - Biesterfield Rd	51,282	9.7	498	83,859	15.9	88.2%
4	Golf Rd	87,622	13.3	597	104,374	15.8	88.0%
29	Lincoln Ave - Ogden Ave	49,772	9.6	702	81,841	15.8	87.9%
17	Schaumburg Rd - Golf Rd	91,902	12.7	669	114,887	15.8	87.9%
43	York Rd - Meyers Rd	84,691	11.8	962	113,444	15.8	87.5%
27	Gary Ave	70,391	9.0	970	122,653	15.7	87.0%
6	Hicks Rd - Meacham Rd	67,517	13.5	521	78,303	15.6	86.8%
14	Plum Grove Rd - Wise Rd	56,625	10.4	472	84,597	15.6	86.5%
11	North IL-53	81,492	14.1	723	89,600	15.5	86.2%
25	Cass Ave	57,891	12.2	631	73,675	15.5	85.9%
20	Wood Dale Rd	41,558	8.0	566	79,552	15.3	85.0%
40	Warrenville Rd - Washington St	79,935	10.0	1016	122,333	15.3	85.0%
7	Hicks Rd - Roselle Rd	55,417	9.8	593	86,358	15.2	84.4%
34	Naperville Rd - Chicago Ave	67,188	10.6	794	95,260	15.0	83.4%
33	Mills St - Naperville rd	73,266	11.0	731	99,830	15.0	83.2%
10	Nerge Rd - Devon Ave	50,053	10.3	474	72,347	14.9	83.0%
8	Higgins Rd	89,758	11.1	826	121,231	14.9	83.0%
36	Rohlwing Rd	44,017	7.2	625	89,286	14.7	81.6%
18	Thorndale Ave - York Rd	45,995	9.6	449	69,456	14.6	80.8%
15	Quentin Rd	63,754	12.1	463	75,568	14.4	80.0%
2	Arlington Heights Rd	54,110	10.7	559	58,122	11.5	63.7%

Table 4. Corridor Alignments Market Accessibility Index – Score 2

		Corridor Accessibility Index		Corridor Accessibility Scoring		Accessibility
ID	Selected Corridor	Intersections per Mile	Street Network Miles	Intersections per Mile Score	Street Miles Score	Percentile
32	Meyers Rd - Fairview Ave	11.1	150.2	81.9%	100.0%	100.0%
28	Glen Ellyn Rd	10.5	146.5	77.4%	97.5%	96.2%
26	Chicago Ave - Ogden Ave	12.9	109.1	95.8%	72.6%	92.6%
3	Dundee Rd - Arlington Heights Rd	9.5	143.3	70.4%	95.4%	91.1%
23	Bloomingdale Rd	9.6	141.5	71.4%	94.2%	91.0%
42	York Rd - Irving Park Rd	11.0	123.1	81.2%	81.9%	89.7%
43	York Rd - Meyers Rd	9.3	136.3	68.8%	90.7%	87.7%
13	Plum Grove Rd - Kirchhoff Rd	11.8	106.3	87.7%	70.7%	87.1%
24	Butterfield Rd	9.5	129.9	70.3%	86.5%	86.2%
12	Palatine Rd	11.9	103.2	88.0%	68.7%	86.1%
25	Cass Ave	13.5	83.3	100.0%	55.4%	85.4%
38	Schmale Rd	9.7	125.5	71.8%	83.6%	85.4%
17	Schaumburg Rd - Golf Rd	7.7	143.0	56.9%	95.2%	83.6%
27	Gary Ave	8.5	125.9	63.3%	83.8%	80.8%
31	Main St - Highland Ave	10.9	97.6	80.8%	65.0%	80.1%
37	Roosevelt Rd - Spring Rd	7.7	128.0	56.9%	85.2%	78.1%
8	Higgins Rd	6.5	140.6	48.5%	93.6%	78.1%
30	Madison St - 75th St	9.7	104.0	71.8%	69.2%	77.5%
22	Army Trail Rd - Fullerton Rd	8.2	118.4	61.0%	78.8%	76.9%
39	Summit Ave - Madison St	10.2	95.1	75.7%	63.3%	76.4%
41	Westmore-Meyers Rd - Addison Rd	8.2	116.3	61.1%	77.4%	76.1%
6	Hicks Rd - Meacham Rd	10.0	95.7	74.2%	63.7%	75.8%
19	Wilke Rd - Busse Rd	9.3	103.2	68.9%	68.7%	75.6%
16	Rand Rd - Arlington Heights Rd	8.6	107.4	63.8%	71.5%	74.3%
21	Addison Rd - North Ave	9.5	97.2	70.3%	64.7%	74.2%
40	Warrenville Rd - Washington St	7.3	121.2	53.8%	80.6%	73.9%
35	Ogden Ave - Chicago Ave	8.1	111.0	59.9%	73.9%	73.5%
5	Golf Rd - Roselle Rd	9.0	98.9	66.7%	65.8%	72.9%
4	Golf Rd	6.7	124.3	49.7%	82.7%	72.8%
9	Landmeier Rd - Biesterfield Rd	8.6	103.2	63.7%	68.7%	72.8%
2	Arlington Heights Rd	8.7	101.2	64.5%	67.3%	72.4%
15	Quentin Rd	10.0	84.5	73.9%	56.2%	71.5%
29	Lincoln Ave - Ogden Ave	8.8	95.3	65.4%	63.4%	70.8%
36	Rohlwing Rd	8.5	96.3	63.2%	64.1%	69.9%
34	Naperville Rd - Chicago Ave	6.9	113.7	51.0%	75.7%	69.6%
14	Plum Grove Rd - Wise Rd	8.4	95.3	62.5%	63.4%	69.2%
7	Hicks Rd - Roselle Rd	7.8	102.3	57.4%	68.1%	69.0%
33	Mills St - Naperville rd	7.2	107.9	53.1%	71.8%	68.7%
10	Nerge Rd - Devon Ave	8.6	91.3	63.8%	60.8%	68.5%
1	Addison Rd - Irving Park Rd	9.2	84.2	68.0%	56.1%	68.2%
11	North IL-53	6.2	107.3	46.2%	71.4%	64.6%
20	Wood Dale Rd	7.9	78.4	58.2%	52.2%	60.6%
18	Thorndale Ave - York Rd	5.8	57.7	42.7%	38.4%	44.6%

Table 5 Corridor Alignments Daily Person Trips Index – Score 3

		Zone-to-Zone Demand		Overall Network Demand		Person-Trips
ID	Selected Corridor	Person-Trip Miles (ZtZ)	Average Person-Trips	Person-Trip Miles (O.N.)	Zone-to-Zone vs O. Network	Percentile
5	Golf Rd - Roselle Rd	141,055	20,501	225,211	62.6%	100.0%
4	Golf Rd	167,959	17,625	377,531	44.5%	86.0%
14	Plum Grove Rd - Wise Rd	130,647	16,690	194,662	67.1%	81.4%
17	Schaumburg Rd - Golf Rd	161,028	15,085	356,518	45.2%	73.6%
11	North IL-53	120,231	14,414	1,033,952	11.6%	70.3%
6	Hicks Rd - Meacham Rd	98,992	13,763	165,488	59.8%	67.1%
20	Wood Dale Rd	93,435	12,649	114,060	81.9%	61.7%
1	Addison Rd - Irving Park Rd	84,623	11,953	175,045	48.3%	58.3%
21	Addison Rd - North Ave	88,126	11,465	217,688	40.5%	55.9%
8	Higgins Rd	136,307	11,437	495,884	27.5%	55.8%
24	Butterfield Rd	107,519	10,861	251,291	42.8%	53.0%
10	Nerge Rd - Devon Ave	73,953	10,623	158,647	46.6%	51.8%
15	Quentin Rd	77,672	10,331	168,403	46.1%	50.4%
7	Hicks Rd - Roselle Rd	84,579	10,085	245,771	34.4%	49.2%
9	Landmeier Rd - Biesterfield Rd	69,328	9,170	181,023	38.3%	44.7%
18	Thorndale Ave - York Rd	64,146	8,593	199,753	32.1%	41.9%
2	Arlington Heights Rd	59,599	8,106	253,975	23.5%	39.5%
41	Westmore-Meyers Rd - Addison Rd	70,974	7,905	212,865	33.3%	38.6%
19	Wilke Rd - Busse Rd	65,494	7,810	273,274	24.0%	38.1%
31	Main St - Highland Ave	52,883	7,691	116,880	45.2%	37.5%
3	Dundee Rd - Arlington Heights Rd	62,965	7,475	278,926	22.6%	36.5%
43	York Rd - Meyers Rd	76,354	7,234	274,511	27.8%	35.3%
38	Schmale Rd	71,836	7,178	291,388	24.7%	35.0%
32	Meyers Rd - Fairview Ave	73,957	7,177	242,129	30.5%	35.0%
37	Roosevelt Rd - Spring Rd	70,128	6,991	223,712	31.3%	34.1%
23	Bloomingdale Rd	64,263	5,896	274,615	23.4%	28.8%
42	York Rd - Irving Park Rd	48,774	5,750	235,516	20.7%	28.0%
16	Rand Rd - Arlington Heights Rd	41,472	5,413	256,986	16.1%	26.4%
12	Palatine Rd	34,156	5,202	218,608	15.6%	25.4%
13	Plum Grove Rd - Kirchhoff Rd	36,883	5,079	112,911	32.7%	24.8%
27	Gary Ave	54,884	4,640	267,344	20.5%	22.6%
29	Lincoln Ave - Ogden Ave	33,984	4,481	200,044	17.0%	21.9%
22	Army Trail Rd - Fullerton Rd	49,847	4,369	361,404	13.8%	21.3%
25	Cass Ave	29,226	4,288	183,019	16.0%	20.9%
28	Glen Ellyn Rd	47,214	4,218	220,124	21.4%	20.6%
39	Summit Ave - Madison St	27,941	4,081	130,749	21.4%	19.9%
36	Rohlwing Rd	24,616	2,762	149,692	16.4%	13.5%
30	Madison St - 75th St	21,313	2,685	217,882	9.8%	13.1%
40	Warrenville Rd - Washington St	31,194	2,632	259,398	12.0%	12.8%
35	Ogden Ave - Chicago Ave	23,890	2,508	249,152	9.6%	12.2%
34	Naperville Rd - Chicago Ave	21,916	2,320	271,490	8.1%	11.3%
26	Chicago Ave - Ogden Ave	16,729	2,302	196,655	8.5%	11.2%
33	Mills St - Naperville rd	20,201	2,013	265,952	7.6%	9.8%

Note: the ‘Zone-to-Zone vs. Overall Network’ shows the proportion of daily person-trips in the corridor that are traveling between micro-zones of analysis, as compared to all daily person-trips assigned to the corridor by the regional model.

Table 6: Corridor Alignments Transit Potential Scoring – 1st Filter

		Score 1	Score 2	Score 3	Overall Score
		TOI Score	Accessibility	Demand Score	
ID	Selected Corridor	Percentile	Percentile	Percentile	Average Percentile
5	Golf Rd - Roselle Rd	91.6%	72.9%	100.0%	88.2%
4	Golf Rd	88.0%	72.8%	86.0%	82.2%
17	Schaumburg Rd - Golf Rd	87.9%	83.6%	73.6%	81.7%
24	Butterfield Rd	98.2%	86.2%	53.0%	79.1%
14	Plum Grove Rd - Wise Rd	86.5%	69.2%	81.4%	79.0%
6	Hicks Rd - Meacham Rd	86.8%	75.8%	67.1%	76.6%
32	Meyers Rd - Fairview Ave	93.2%	100.0%	35.0%	76.1%
3	Dundee Rd - Arlington Heights Rd	99.3%	91.1%	36.5%	75.6%
11	North IL-53	86.2%	64.6%	70.3%	73.7%
21	Addison Rd - North Ave	90.6%	74.2%	55.9%	73.6%
31	Main St - Highland Ave	100.0%	80.1%	37.5%	72.5%
8	Higgins Rd	83.0%	78.1%	55.8%	72.3%
1	Addison Rd - Irving Park Rd	88.9%	68.2%	58.3%	71.8%
41	Westmore-Meyers Rd - Addison Rd	99.2%	76.1%	38.6%	71.3%
38	Schmale Rd	90.8%	85.4%	35.0%	70.4%
42	York Rd - Irving Park Rd	93.5%	89.7%	28.0%	70.4%
43	York Rd - Meyers Rd	87.5%	87.7%	35.3%	70.1%
23	Bloomingdale Rd	90.1%	91.0%	28.8%	69.9%
37	Roosevelt Rd - Spring Rd	97.6%	78.1%	34.1%	69.9%
28	Glen Ellyn Rd	92.3%	96.2%	20.6%	69.7%
19	Wilke Rd - Busse Rd	94.3%	75.6%	38.1%	69.4%
20	Wood Dale Rd	85.0%	60.6%	61.7%	69.1%
13	Plum Grove Rd - Kirchhoff Rd	95.3%	87.1%	24.8%	69.1%
9	Landmeier Rd - Biesterfield Rd	88.2%	72.8%	44.7%	68.6%
10	Nerge Rd - Devon Ave	83.0%	68.5%	51.8%	67.8%
7	Hicks Rd - Roselle Rd	84.4%	69.0%	49.2%	67.5%
15	Quentin Rd	80.0%	71.5%	50.4%	67.3%
12	Palatine Rd	90.0%	86.1%	25.4%	67.2%
26	Chicago Ave - Ogden Ave	88.9%	92.6%	11.2%	64.2%
25	Cass Ave	85.9%	85.4%	20.9%	64.1%
16	Rand Rd - Arlington Heights Rd	91.2%	74.3%	26.4%	64.0%
27	Gary Ave	87.0%	80.8%	22.6%	63.5%
22	Army Trail Rd - Fullerton Rd	90.0%	76.9%	21.3%	62.7%
39	Summit Ave - Madison St	89.1%	76.4%	19.9%	61.8%
29	Lincoln Ave - Ogden Ave	87.9%	70.8%	21.9%	60.2%
30	Madison St - 75th St	88.3%	77.5%	13.1%	59.6%
2	Arlington Heights Rd	63.7%	72.4%	39.5%	58.6%
35	Ogden Ave - Chicago Ave	89.8%	73.5%	12.2%	58.5%
40	Warrenville Rd - Washington St	85.0%	73.9%	12.8%	57.2%
18	Thorndale Ave - York Rd	80.8%	44.6%	41.9%	55.8%
36	Rohlwing Rd	81.6%	69.9%	13.5%	55.0%
34	Naperville Rd - Chicago Ave	83.4%	69.6%	11.3%	54.8%
33	Mills St - Naperville rd	83.2%	68.7%	9.8%	53.9%

Population and Employment Market – 2nd Filter

Based on the Transit Potential Scoring (1st Filter) developed in the previous section, the top ranked corridors were selected for further evaluation. The threshold used to select the highest ranked corridors was the Transit Potential Score's average value – defined as the 68.5 percentile, of all 43 corridors included in the transit potential evaluation. The rationale was that corridors with above average transit potential scores present the highest likelihood of attracting transit demand given that they present the best indicators of transit use propensity, network connectivity and accessibility, and daily person trip volumes. There were 24 corridors out of 43 whose scoring value was higher than 68.5%; they are listed on Table 7 below.

Based on this same rationale, the size of the population and employment market that is accessible from each corridor (up to 0.5 miles away from the corridor) was measured and used as a 2nd screening filter, to account for the potential to attract transit demand on each corridor alignment. This was called the 'effective size of the market' and was defined as the number of residents and jobs that are within a 10-minute walk from the corridor and accessible through the street network that has connections with the corridor. This is opposed to the 'potential size of the market,' which typically includes all residents and jobs that are within a 0.5-mile buffer around the corridor alignment, regardless of whether they have direct street connections with the corridor or whether accessibility by foot takes more than 10 minutes (more than 0.5 miles).

The difference between these two measures is included in Table 7 below showing the results of this evaluation with corridors ranked by the effective size of their population and employment market. The 'percent of market reach' column shows the proportion of the potential market that is actually accessible to the corridor on a 10-minute walk through the street network that has connections with the corridor alignment.

Corridors were again split into those whose 'effective market size' was above average (Tier 1 Group) or below average (Tier 2 Group). The average percentile value of all population and employment market values was calculated at 75%.

Figure 9 on page 30 illustrates the alignments of corridors included in the Tier 1 and Tier 2 groups. Notably most Tier 1 corridors are found in market analysis areas that combine major residential areas, of relatively high density, with major corporate, institutional, commercial and industrial employment centers such as Arlington Heights, Schaumburg, Itasca, Elk Grove Village, Carol Stream, Glendale, Addison, Elmhurst, Lombard, Downers Grove and Oak Brook. Tier 2 corridors are found in many of these market areas as well, but mostly in and around residential areas of lower density and smaller but diverse employment centers in Addison, Elmhurst, Elk Grove Village, Schaumburg, Palatine and Arlington Heights.

Table 7. Effective Market Size Scoring by Selected Corridor Alignments – 2nd Filter

			Effective Market Reach Index			Market Reach	
ID	Selected Corridor	Transit Pot. Score	Total Pop & Empl.	Percent Market Reach	Pop & Empl per Acre	Market Reach Score	TIER
8	Higgins Rd	71.9%	71,585	79.8%	13.0	100.0%	1
17	Schaumburg Rd - Golf Rd	81.4%	69,599	75.7%	13.3	97.2%	1
28	Glen Ellyn - Wheaton - Winfield	69.7%	65,814	80.0%	12.0	91.9%	1
43	York - 22nd - Meyers/Fairview	70.1%	64,130	75.7%	12.1	89.6%	1
3	Dundee - Arlington	75.5%	63,873	79.3%	14.0	89.2%	1
19	Wilke - Algonquin - Busse	69.5%	63,598	76.8%	15.1	88.8%	1
4	Golf Rd	82.0%	63,589	72.6%	14.1	88.8%	1
37	Finley - Roosevelt - Spring	69.8%	62,410	73.6%	12.9	87.2%	1
24	Highland Ave - Butterfield Rd - York Rd	79.1%	62,259	71.5%	13.1	87.0%	1
32	St Charles - Meyers - Fairview	76.1%	58,968	81.7%	10.3	82.4%	1
41	Addison - Westmore - Meyers	71.3%	58,941	76.5%	12.7	82.3%	1
38	Bloomingdale - Army Trail - Schmale	70.5%	56,493	81.1%	10.8	78.9%	1
23	Bloomingdale Rd - Geneva Rd	69.9%	56,152	78.6%	9.9	78.4%	1
42	York - Irving Park	70.6%	50,910	79.0%	11.4	71.1%	2
6	Hicks Rd - Meacham Rd	76.9%	48,717	72.2%	13.3	68.1%	2
11	North IL-53	73.5%	47,534	58.3%	17.0	66.4%	2
31	Main - Highland	72.9%	44,537	77.8%	12.0	62.2%	2
5	Golf Rd - Roselle Rd	88.3%	43,038	76.3%	11.4	60.1%	2
13	Baldwin - Plum Grove - Kirchhoff - Wilke	69.5%	42,898	76.6%	11.3	59.9%	2
14	Plum Grove Rd - Wise Rd	79.2%	40,751	72.0%	10.5	56.9%	2
21	Addison Rd - North Ave	73.8%	40,423	76.4%	10.5	56.5%	2
9	Wise Rd - Landmeier Rd - Biesterfield Rd	68.7%	38,928	75.9%	10.2	54.4%	2
1	Addison Rd - Irving Park Rd	72.1%	35,700	78.0%	9.9	49.9%	2
20	Tonne Rd - Wood Dale Rd	69.3%	30,505	73.4%	8.6	42.6%	2

Transit Network Integration – 3rd Filter

A third level of screening was developed for all Tier 1 and Tier 2 corridors, as these were deemed to have sufficient demand potential for transit service, to evaluate for their duplication and/or integration with the existing regional transit service network. The concept was that candidate corridors for transit service implementation ideally would not duplicate existing transit services but augment service and increase connectivity and options in the regional transit network. The following criteria were utilized to assess corridor's attributes with respect to network duplication and integration:

Transit Network Duplication:

- Whether corridor alignments run on top of existing transit bus or rail services for at least 50 percent of the corridor's length.
- Whether complete corridor segments run on top of existing transit services for the full length of that segment.
- Whether corridor alignments are serving the same ODs as an existing bus route with same or different alignment.

Transit Network Integration:

- Whether corridor alignments are serving new network destinations at one or both ends of the proposed alignment.
- Whether corridor alignments are filling a network gap by operating service as an infill corridor or growing the network by operating a new outlying corridor.
- Whether corridors interact with existing services at a transit station or park-and-ride, thus augmenting travel opportunities.

Table 8 on the next page summarizes the methodology utilized to conduct this evaluation. Based on the criteria described above, two scoring sets were developed to account for the corridors network overlap or duplication and for their network integration and connectivity. Scores were established on a scale of 1 to 5, where a value of 1 represents a high level of overlap/duplication and poor network integration/connectivity, and a value of 5 represents a low level of overlap/duplication and rich network integration/connectivity. The resulting scores were summed up to create a scoring index that accounts for both measures.

Descriptive comments and observations were added to support the scoring of each corridor with regards to their regional transit network duplication and/or integration. From this analysis, four corridors were found to be duplicating existing services and/or providing poor connectivity with the network. These corridors are not selected for further analysis and include:

- Glen Ellyn – Wheaton –Winfield which duplicates mostly Route 715 and other local routes in Wheaton without providing significant new connections and corridors in the network.
- Finley – Roosevelt – Spring which duplicates Route 747 along Finley and does not provide significant new connections in the network
- Golf Road which duplicates Route 208
- Main – Highland which duplicates Route 834

Table 9 on page 30 (and Figure 9 on page 31), shows the final list of corridors selected for further analysis ranked by their transit network/duplication score and the effective market size score. Although the list includes both Tier 1 and Tier 2 corridors, the intent is to continue feasibility analysis on the Tier 1 group, because these corridors have accessibility to larger population and employment markets. Corridors in the Tier 2 group provide access to smaller markets and constitute, in essence, a bench of corridors that can be evaluated for their feasibility in the future, if their effective market increases in size. Based on transit network connectivity objectives, strategic reasons, or changes in character they could be moved to the Tier 1 group in the future.

Whether corridors identified in the Tier 1 group are physically ready or operationally feasible for transit service implementation will be evaluated in the next phase of the study in conjunction with project stakeholders and the project steering committee.

Table 8. Transit Network Duplication/Integration by Selected Corridor Alignments – 3rd Filter

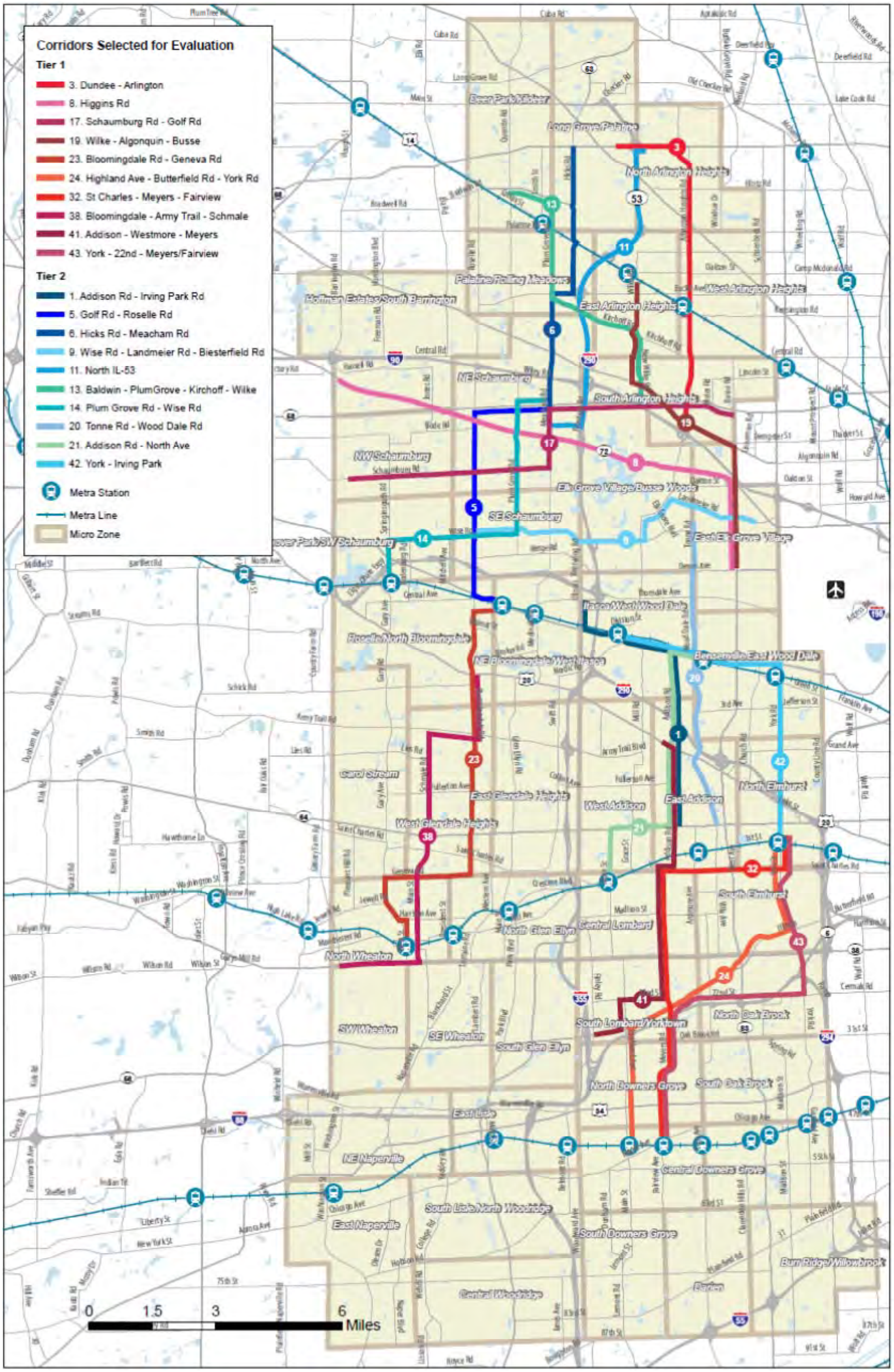
ID	Selected Corridor	Network Overlap	Network Integration	Network Score	Corridor Alignment Comments	TIER
3	Dundee - Arlington	5	5	10	No service duplication. Serves new corridor on Dundee Rd and Arlington Heights RD. New destinations on Dundee Rd.	1
32	St Charles - Meyers - Fairview	5	5	10	Duplicates Route 313 bet. Washington and 22nd. Service on new corridors (St. Charles and Fairview), and to new destinations (Fairview Metra)	1
23	Bloomingdale Rd - Geneva Rd	5	5	10	No service duplication. Service on new corridors (Bloomingdale and Geneva), and to new destination (Roselle Metra)	1
8	Higgins Rd	5	4	9	Duplicates Route 757 on Busse Rd. Serves on new corridor (Higgins). Service to existing destinations (Alexian Brothers Hospital and Elk Grove Village)	1
41	Addison - Westmore - Meyers	4	4	8	Duplicates Route 313 bet. Washington and 22nd. Service on new corridors (Addison and Westmore), but existing destinations (York Town Center)	1
38	Bloomingdale - Army Trail - Schmale	3	4	7	Duplicates Route 711 bet. Fullerton and Wheaton Metra. New corridor service on Bloomingdale, and to new destination at Roselle Metra.	1
17	Schaumburg Rd - Golf Rd	3	3	6	Duplicates Route 208 bet. Meacham and Busse. Service on new corridor (Schaumburg). Serves existing destinations (Prairie Towne SC & NWTC)	1
43	York - 22nd - Meyers/Fairview	2	4	6	Duplicates Route 332 bet. Elmhurst Metra and Oakbrook Center. New corridor service on 22nd and Meyers/Fairview. New destination at Fairview Metra.	1
24	Highland Ave - Butterfield Rd - York Rd	3	3	6	Duplicates Route 834 on Highland Ave and Route 332 on York Rd. Serves on new corridor (Butterfield) but existing destinations (Elmhurst Metra)	1
19	Wilke - Algonquin - Busse	2	3	5	Duplicates Route 757 on Busse Rd. Service on existing corridors and to existing destinations. Direct connection bet. Arlington Park and Elk Grove Village	1
28	Glen Ellyn - Wheaton - Winfield	2	2	4	Duplicates Route 715 on Glen Ellyn. New service on Hill, College, and Manchester. New service to Roselle and College Metra.	1
37	Finley - Roosevelt - Spring	2	2	4	Duplicates Route 747 bet. Finley and Summit. New corridor service on Spring Rd. No new destinations. Direct connection bet. Elmhurst and Roosevelt.	1
4	Golf Rd	1	1	2	Duplicates Route 554 bet. Barington and Meacham. Duplicates Route 208 between Meacham and Busse.	1
6	Hicks Rd - Meacham Rd	5	5	10	Duplicates Route 696 bet. Algonquin and Higgins. Service on new corridor (Hicks and Plum Grove) and new destination (Dundee Rd)	2
21	Addison Rd - North Ave	5	5	10	No service duplication. Serves on new corridor (Addison). Serves new destination (Wood Dale Metra)	2
11	North IL-53	5	4	9	No service duplication. Although it serves on same segment as Route 556 (IL-53). Service to new destination (Dundee Rd / Plaza Verde SC)	2
5	Golf Rd - Roselle Rd	4	5	9	Duplicates Route 554 bet. Roselle and Meacham. Service on new corridor and new destination (Roselle Rd and Roselle Metra)	2
13	Baldwin - Plum Grove - Kirchhoff - Wilke	5	4	9	No service duplication. Service to new corridors (Baldwin, Plum Grove, Kirchoff, New Wilke), and to new destinations (Palatine Metra)	2
1	Addison Rd - Irving Park Rd	5	4	9	Duplicates Metra Rail on Irving Park. Service on new corridor (Addison) and new destinations (Medinah Industrial Park and North Park Mall)	2
14	Plum Grove Rd - Wise Rd	4	4	8	Duplicates Route 602 bet. Springinsguth and Roselle. Service on new corridor (Plum Grove). Serves existing destinations (Schaumburg Metra & NWTC)	2
9	Wise Rd - Landmeier Rd - Biesterfield Rd	4	4	8	No service duplication. Serves on new corridors (Wise, Biesterfield, and Landmeier), and to new destinations (Alexian Brothers Medical Center)	2
20	Tonne Rd - Wood Dale Rd	5	3	8	No service duplication. Service on new corridor (Tonne, Wood Dale and Villa), and new destinations (Elk Grove Village and Wood Dale Metra)	2
42	York - Irving Park	3	3	6	Duplicates Route 332 bet. Elmhurst and Bensenville Metra. Service on new corridor (Irving Park Rd) and to new destinations (Wood Dale and Itasca Metra	2
31	Main - Highland	2	2	4	Duplicates Route 834 on Highland Ave. Serves new corridor on Main St., but existing destinations. Direct connection between Lombard and D. Grove Me	2

Corridor not selected for further analysis. (shaded rows: 28, 37, 4, 31)

Table 9. Final List of Corridors for Physical Conditions Analysis

ID	Selected Corridor	Transit Pot. Score	Market Reach Score	Network Int. Score	TIER
3	Dundee - Arlington	75.7%	89.2%	10	1
32	St Charles - Meyers - Fairview	76.3%	82.4%	10	1
23	Bloomingdale Rd - Geneva Rd	70.1%	78.4%	10	1
8	Higgins Rd	72.1%	100.0%	9	1
41	Addison - Westmore - Meyers	71.5%	82.3%	8	1
38	Bloomingdale - Army Trail - Schmale	70.7%	78.9%	7	1
17	Schaumburg Rd - Golf Rd	81.6%	97.2%	6	1
43	York - 22nd - Meyers/Fairview	70.3%	89.6%	6	1
24	Highland Ave - Butterfield Rd - York Rd	79.4%	87.0%	6	1
19	Wilke - Algonquin - Busse	69.7%	88.8%	5	1
6	Hicks Rd - Meacham Rd	77.1%	68.1%	10	2
21	Addison Rd - North Ave	74.0%	56.5%	10	2
11	North IL-53	73.8%	66.4%	9	2
5	Golf Rd - Roselle Rd	88.6%	60.1%	9	2
13	Baldwin - Plum Grove - Kirchhoff - Wilke	69.7%	59.9%	9	2
1	Addison Rd - Irving Park Rd	72.3%	49.9%	9	2
14	Plum Grove Rd - Wise Rd	79.4%	56.9%	8	2
9	Wise Rd - Landmeier Rd - Biesterfield Rd	68.9%	54.4%	8	2
20	Tonne Rd - Wood Dale Rd	69.5%	42.6%	8	2
42	York - Irving Park	70.8%	71.1%	6	2

Figure 9. Tier 1 and Tier 2 Corridor Alignments



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Corridor Physical Assessment

This analysis will be conducted in the next phase of the study. The intent is to develop a preliminary assessment of physical corridor success by evaluating:

- The pedestrian environment along the corridor, including sidewalk barriers and continuity, and availability of pedestrian crossings, particularly in areas of high potential demand, such as a large office park.
- The operational environment along the corridor, including speed limit, number of travel lanes, street buffers such as parking or landscaping, and location of bus stops.

The final list of corridors will be categorized in three classes:

1. **Sure Things.** Corridors ready for development of a service and capital implementation plan.
2. **Need Further Evaluation.** Corridors that may qualify for development of a detailed service and capital implementation plan if certain operational or accessibility conditions are met.
3. **Not Ready Yet.** Corridors lacking in the basics of supporting accessibility to a transit market and/or with major operational issues for transit vehicles.

Results of this evaluation will be discussed with the Project Steering Committee for development and initial thoughts on appropriate service levels and types (e.g. rail feeder, local circulator, arterial service, or BRT).

Service Recommendations and Implementation Plan

This plan will be framed in the final phase of the study. The intent is to develop a detailed capital improvement and service implementation plan for those corridors that are determined to be 'sure things.'

Service Plan:

- Identification of applicable service type (e.g. fixed route, express, BRT)
- Proposed service level for identified type of service
- Ridership forecast for service type and service plan
- Service plan cost estimate, capital and operating

Capital Improvements:

- Detailed supporting capital and infrastructure matching corridors with a service plan developed.

Plan for Remaining Corridors:

- Assessment of remaining corridors – Why are they not good candidates? What needs to happen to them to bring them to potential for Pace to consider service?
- Application of findings and lessons learned in "not ready, yet" corridors to south end of study area.

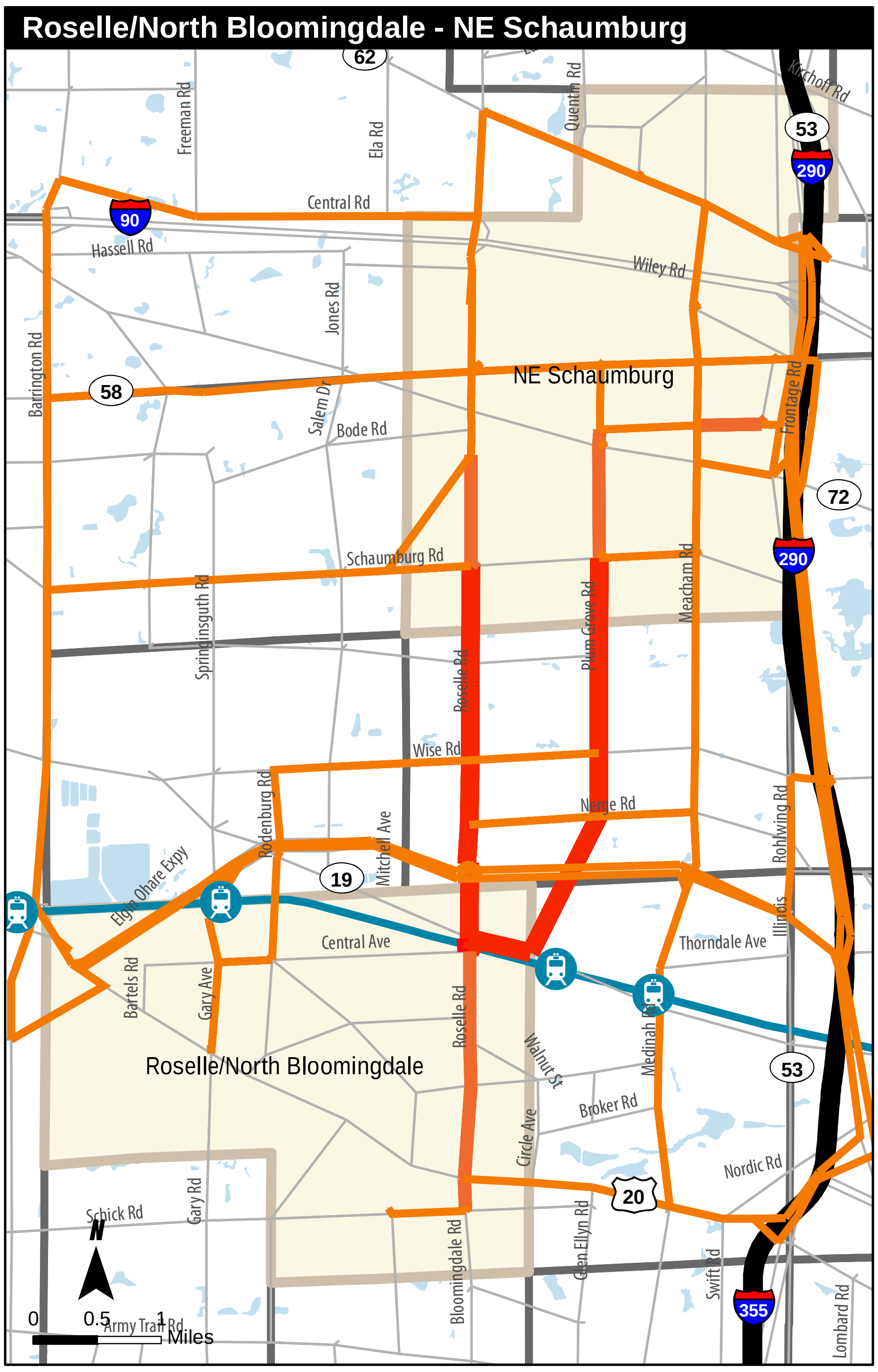
Service Implementation Plan:

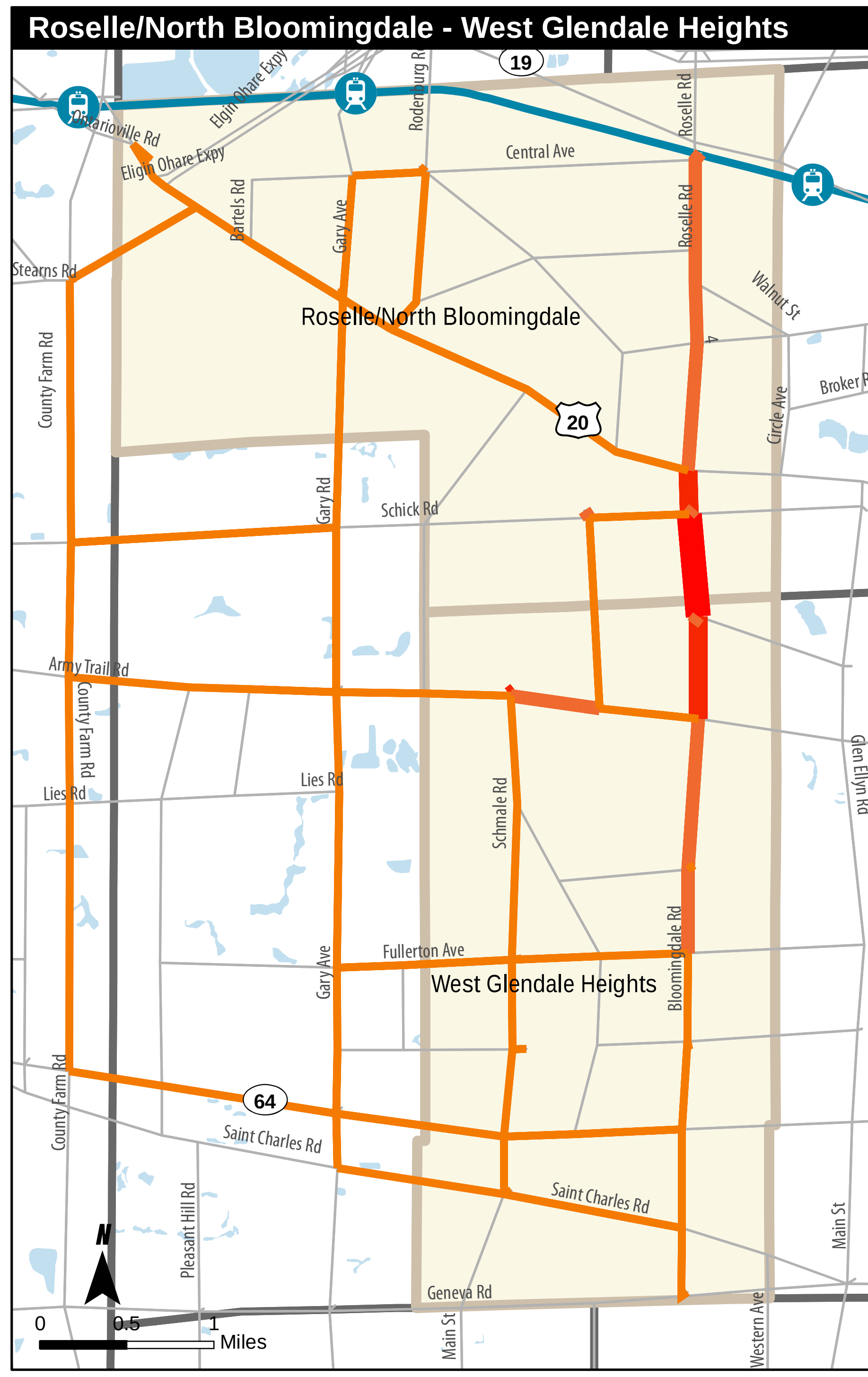
- Draft documentation of service and capital development plan, including implementation priority, financial estimates, and policies/standards and strategic approach for non-selected corridors and south end of study area.

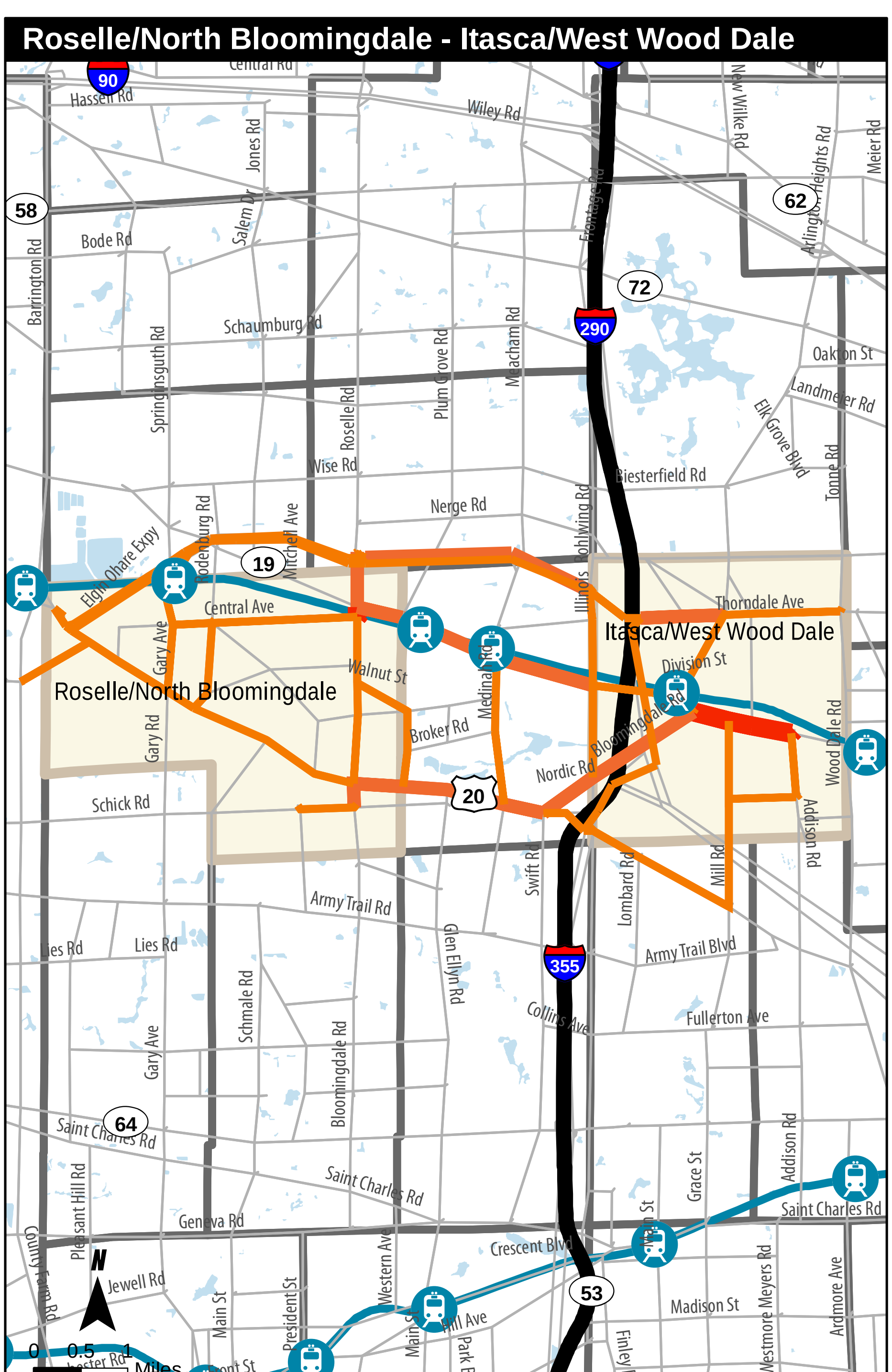
Technical Appendix

Zone-to-Zone Network Assignments Mapping

Daily Person Volume: Map 1







Daily Person Volume

- 1 - 1,000
- 1,001 - 2,000
- 2,001 - 4,000
- 4,001 - 6,000
- 6,001 - 8,000
- Study Corridor
- Metra Stations

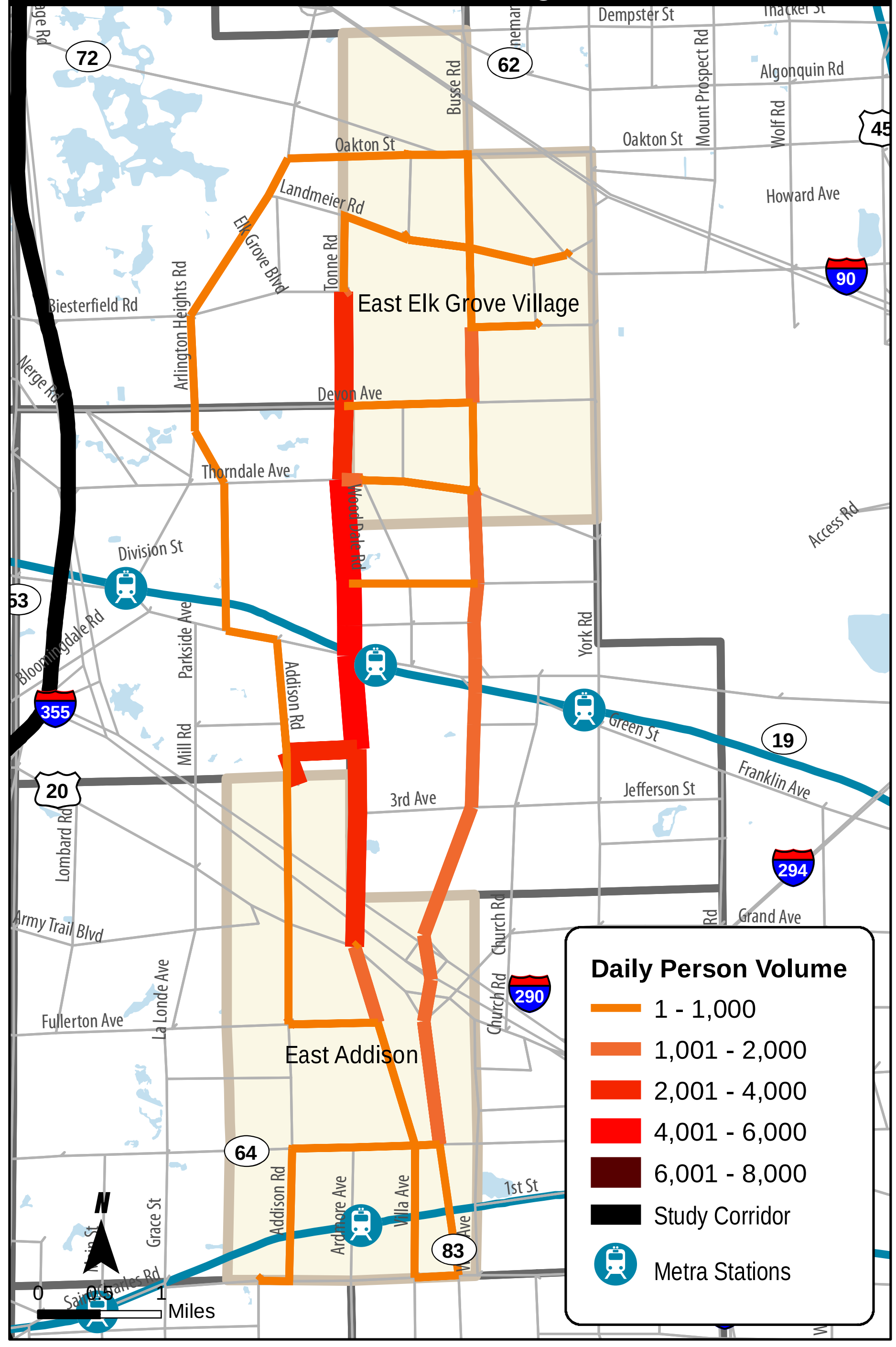
Source: Chicago Metropolitan Agency for Planning

Nelson\Nygaard consulting associates

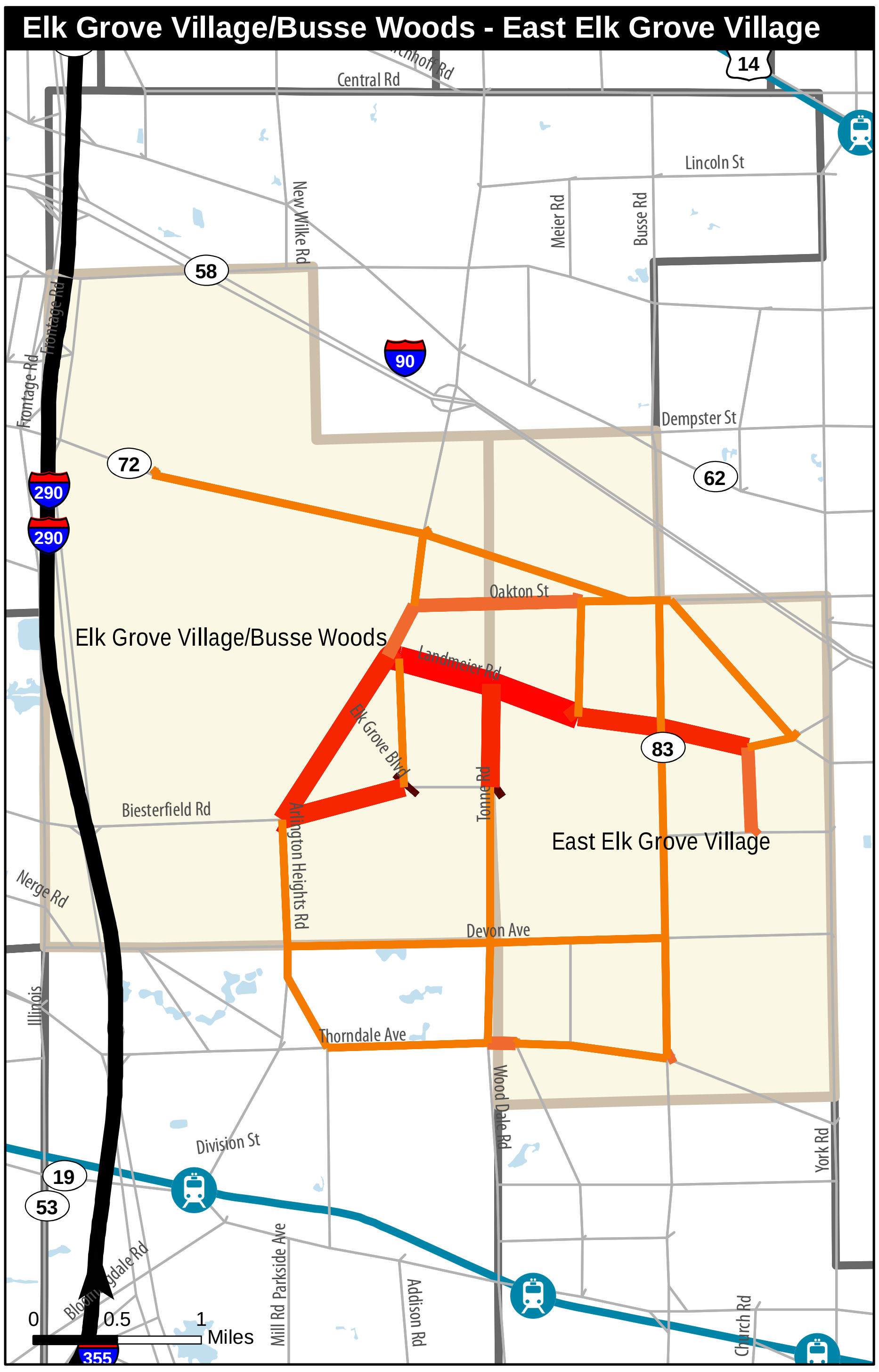
Daily Person Volume: Map 2

Bensenville/East Wood Dale - East Elk Grove Village

East Addison - East Elk Grove Village



Elk Grove Village/Busse Woods - East Elk Grove Village

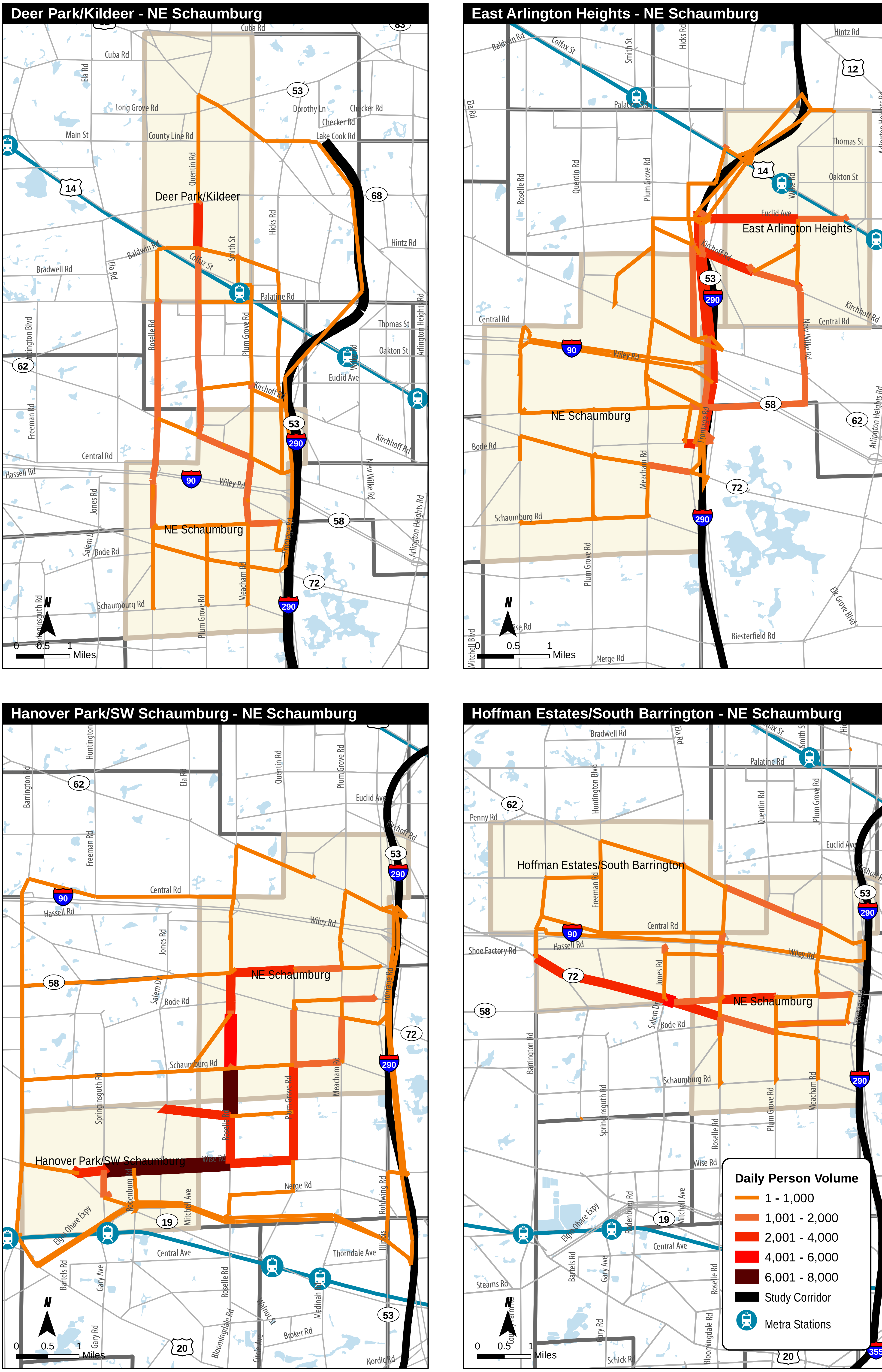


Elk Grove Village/Busse Woods - Itasca/West Wood Dale

Source: Chicago Metropolitan Agency for Planning

Nelson\Nygaard consulting associates

Daily Person Volume: Map 3

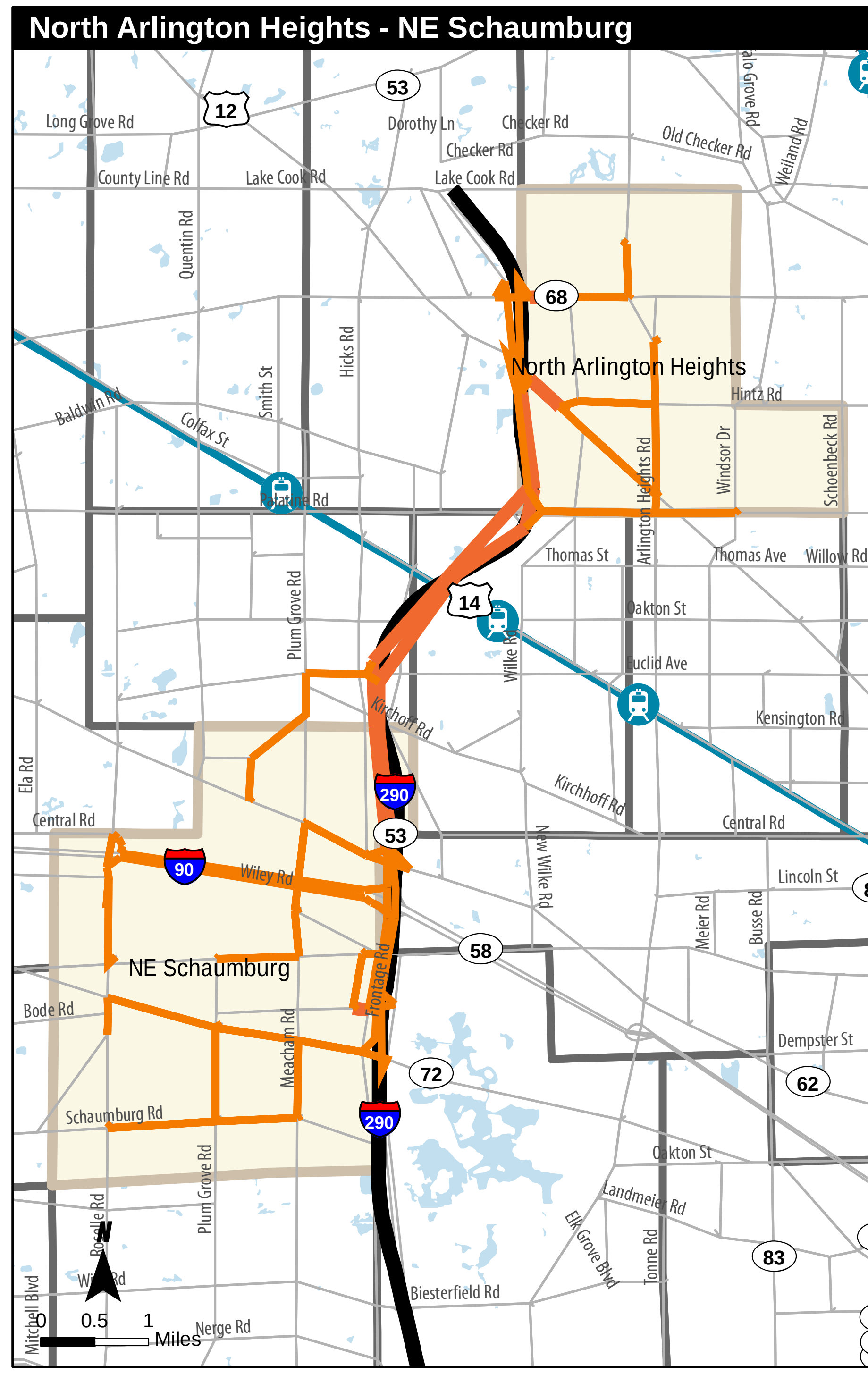


Source: Chicago Metropolitan Agency for Planning

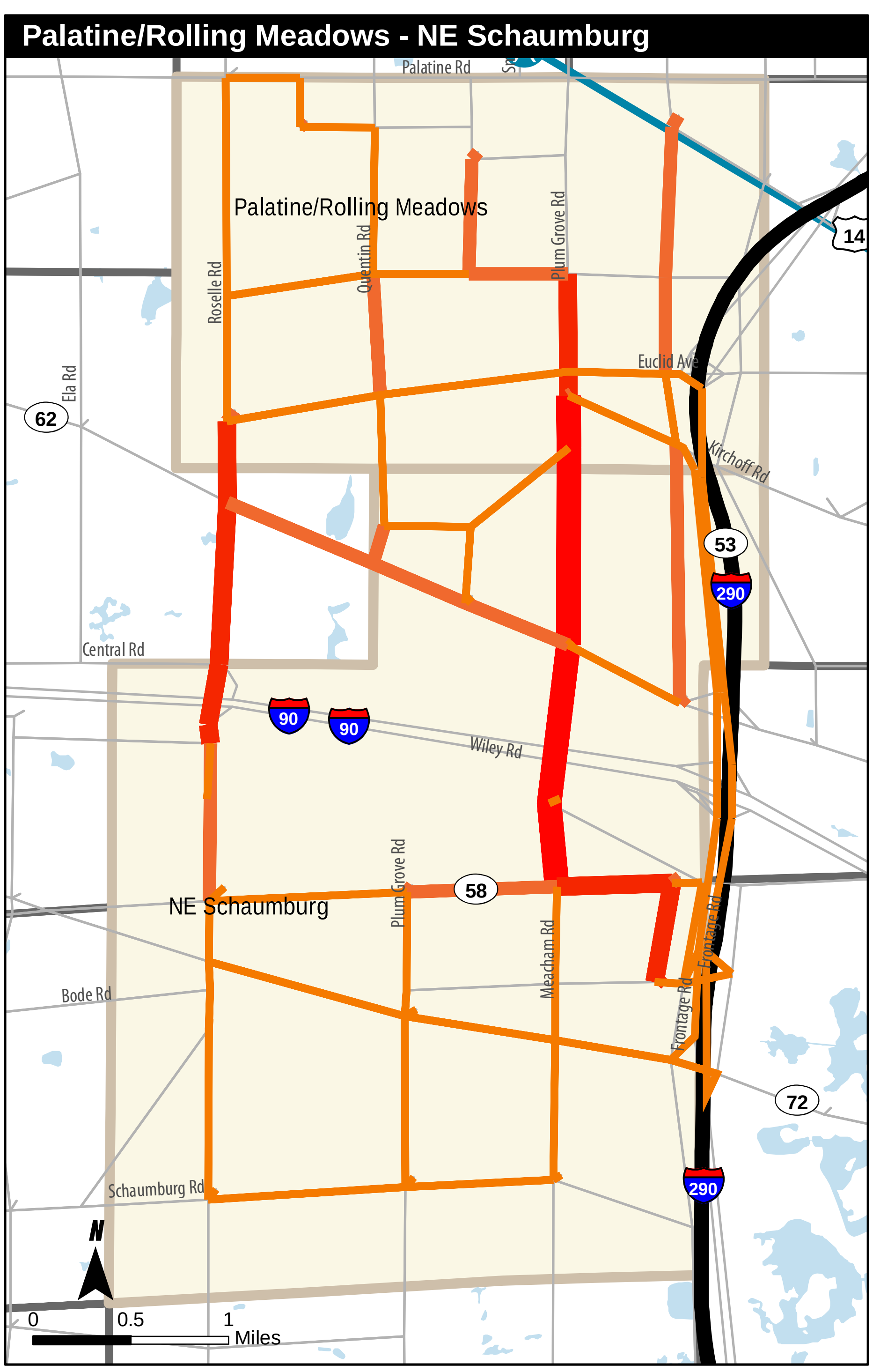
Daily Person Volume: Map 4

Long Grove/Palatine - NE Schaumburg

North Arlington Heights - NE Schaumburg



Palatine/Rolling Meadows - NE Schaumburg



Daily Person Volume

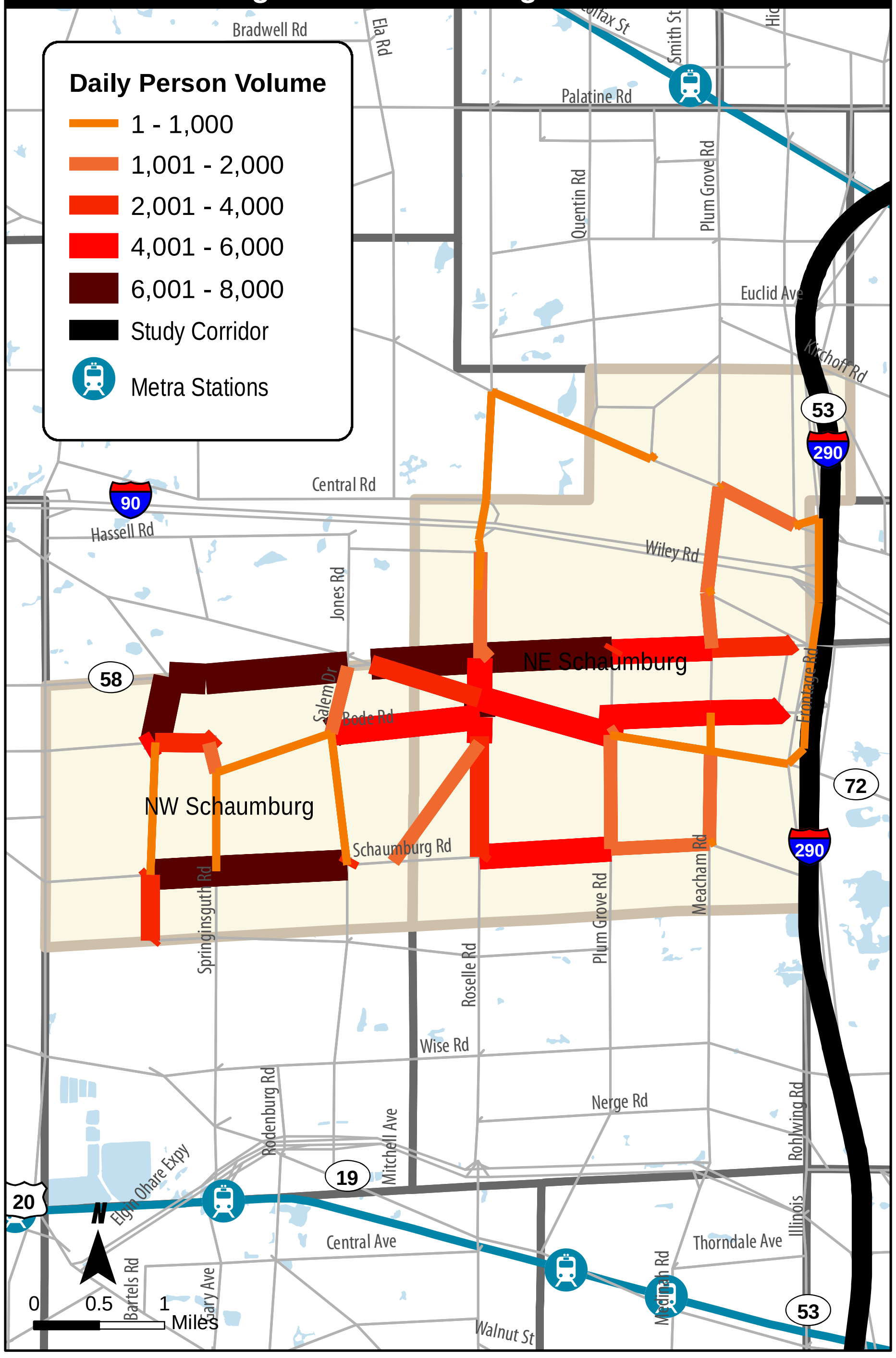
- 1 - 1,000
- 1,001 - 2,000
- 2,001 - 4,000
- 4,001 - 6,000
- 6,001 - 8,000
- Study Corridor
- Metra Stations

Source: Chicago Metropolitan Agency for Planning

Nelson\Nygaard consulting associates

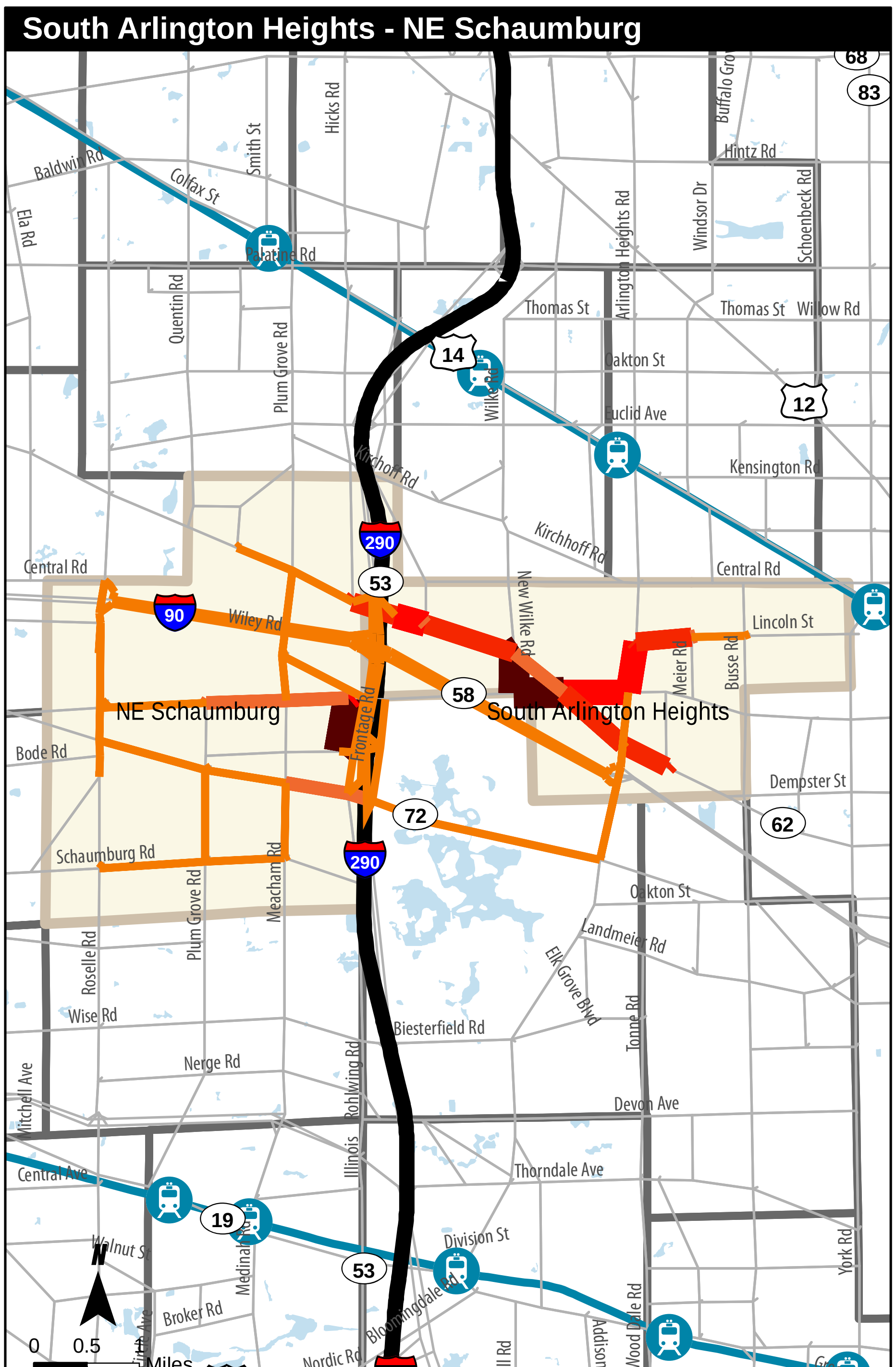
Daily Person Volume: Map 5

NW Schaumburg - NE Schaumburg

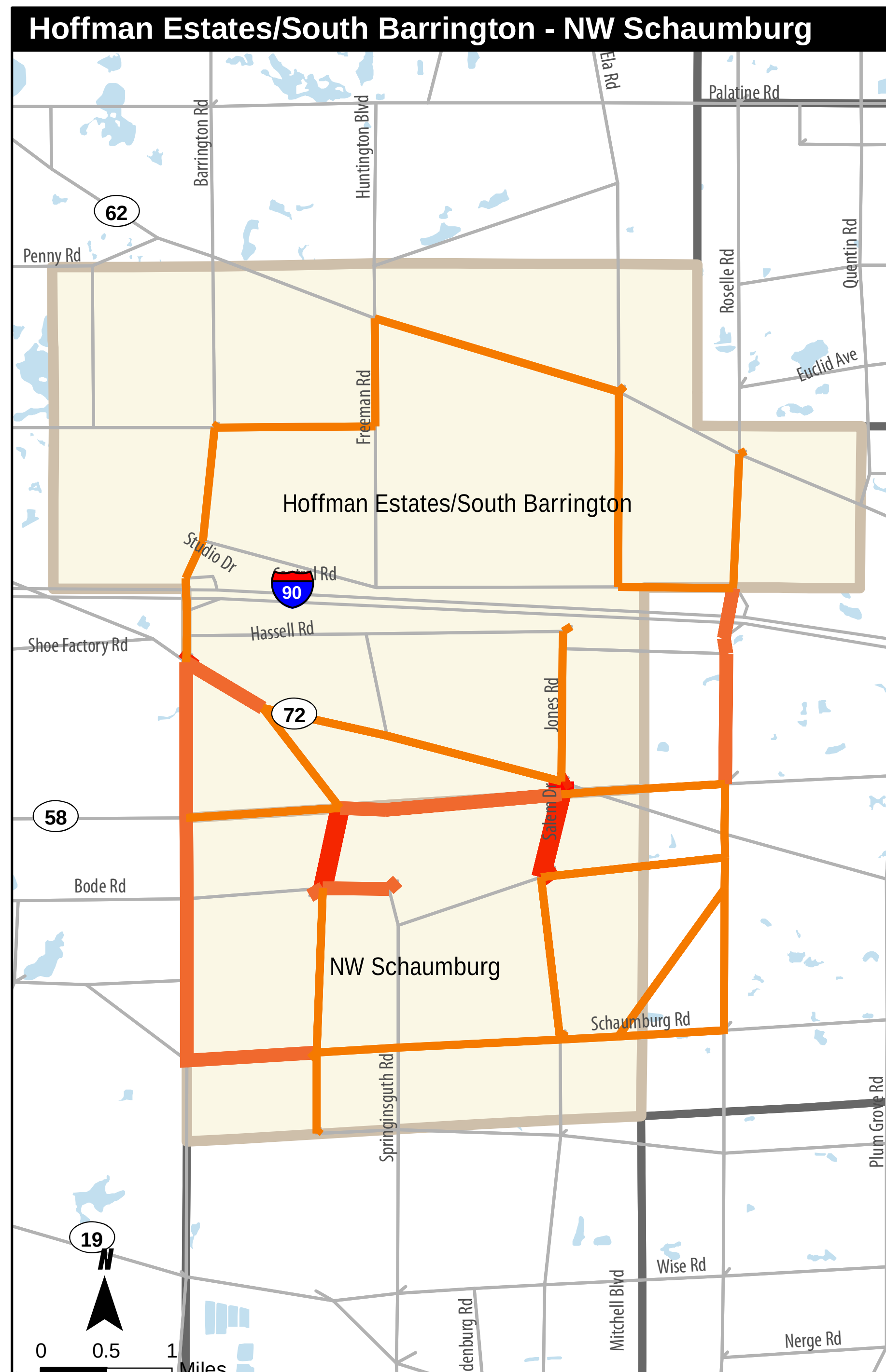


SE Schaumburg - NE Schaumburg

South Arlington Heights - NE Schaumburg



Hoffman Estates/South Barrington - NW Schaumburg

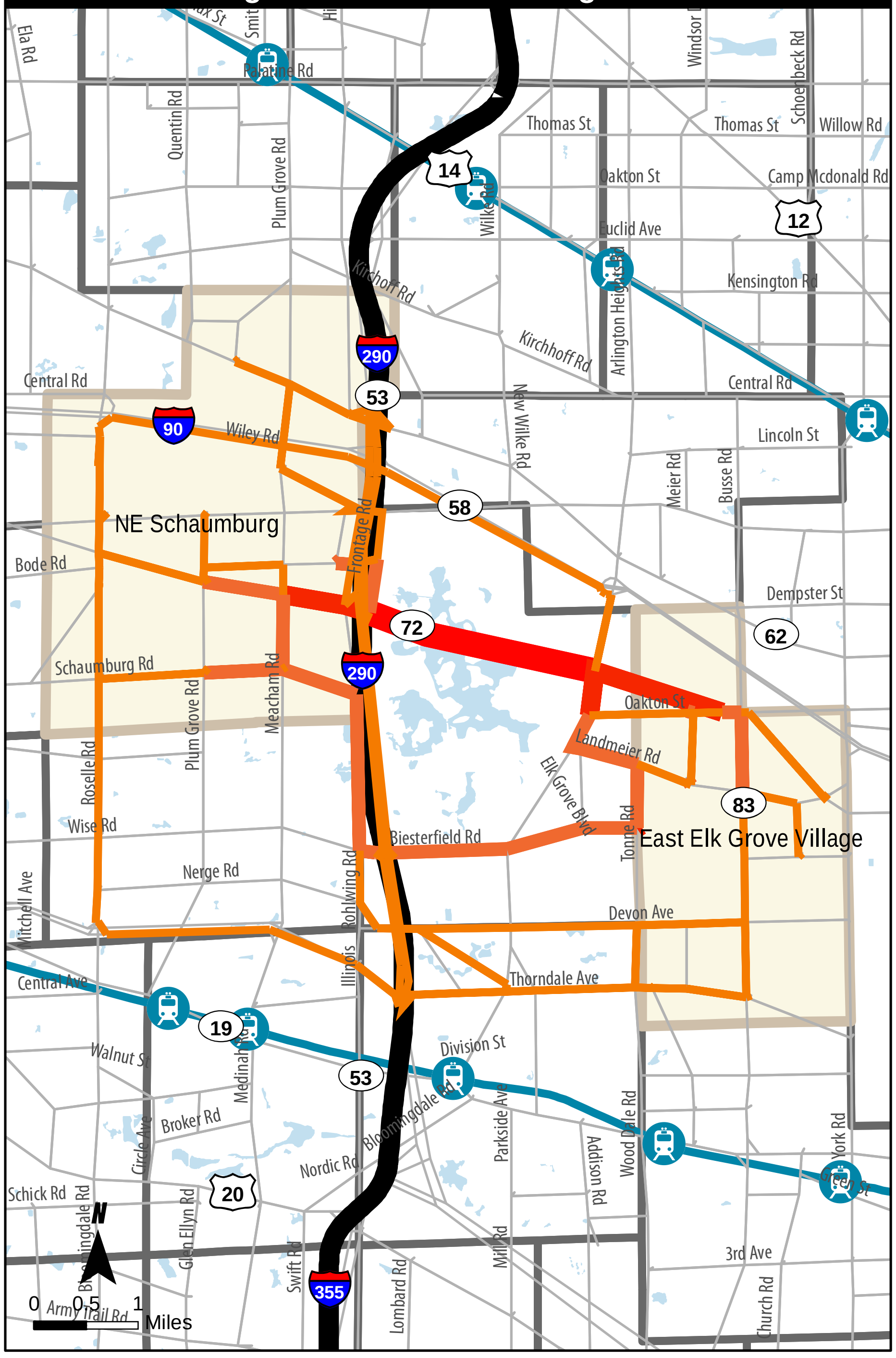


Nelson\Nygaard consulting associates

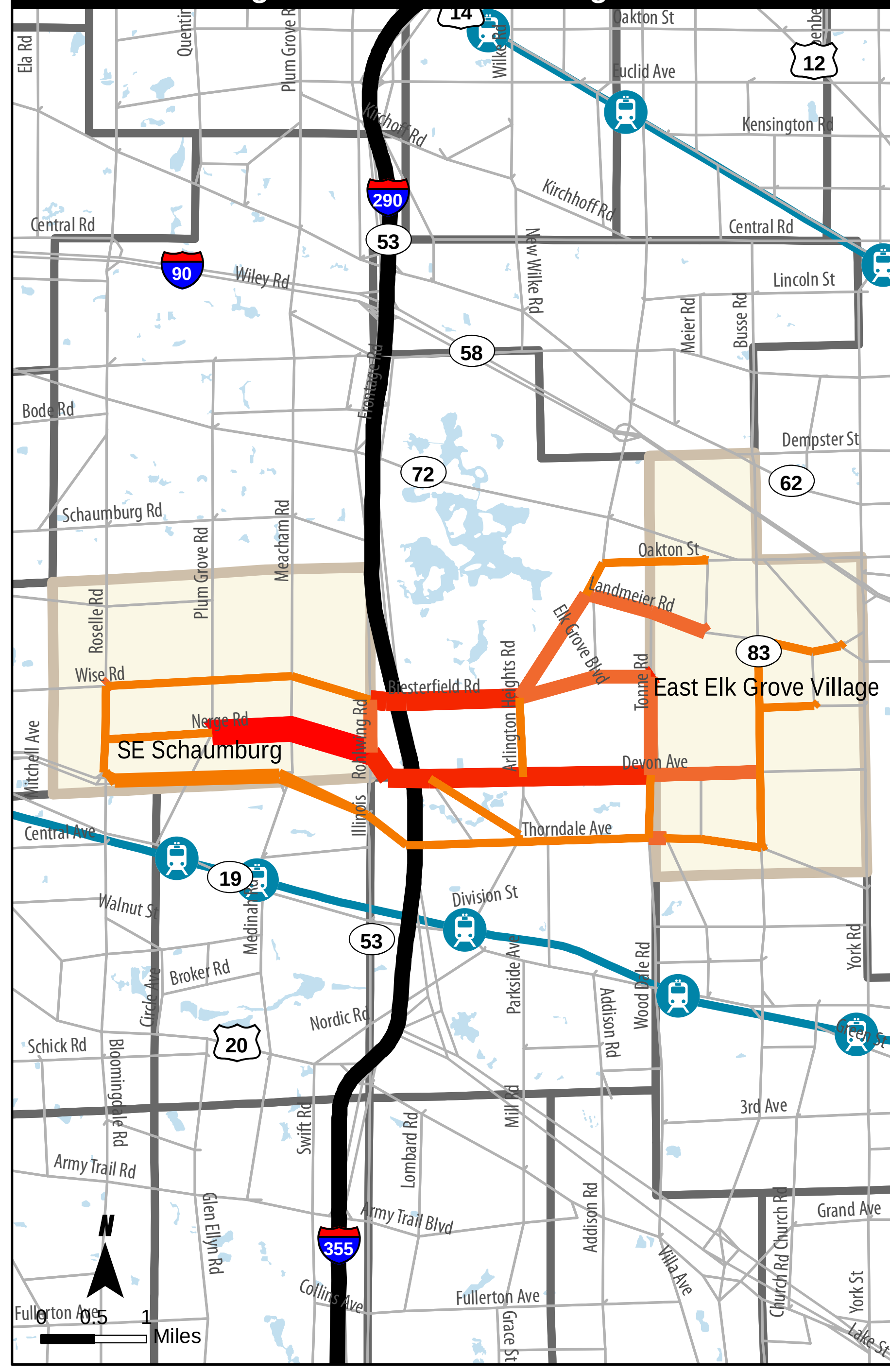
Source: Chicago Metropolitan Agency for Planning

Daily Person Volume: Map 6

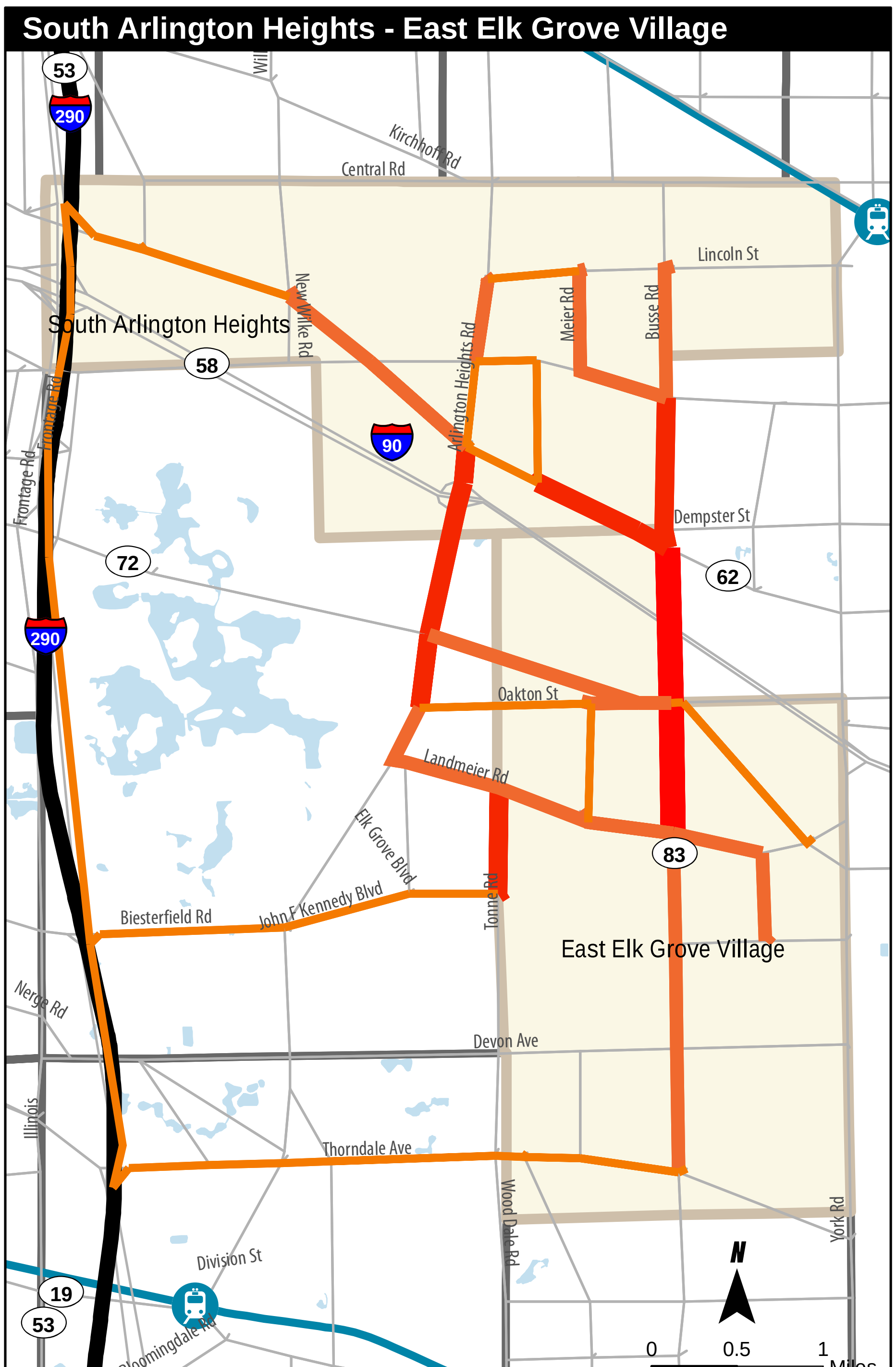
NE Schaumburg - East Elk Grove Village



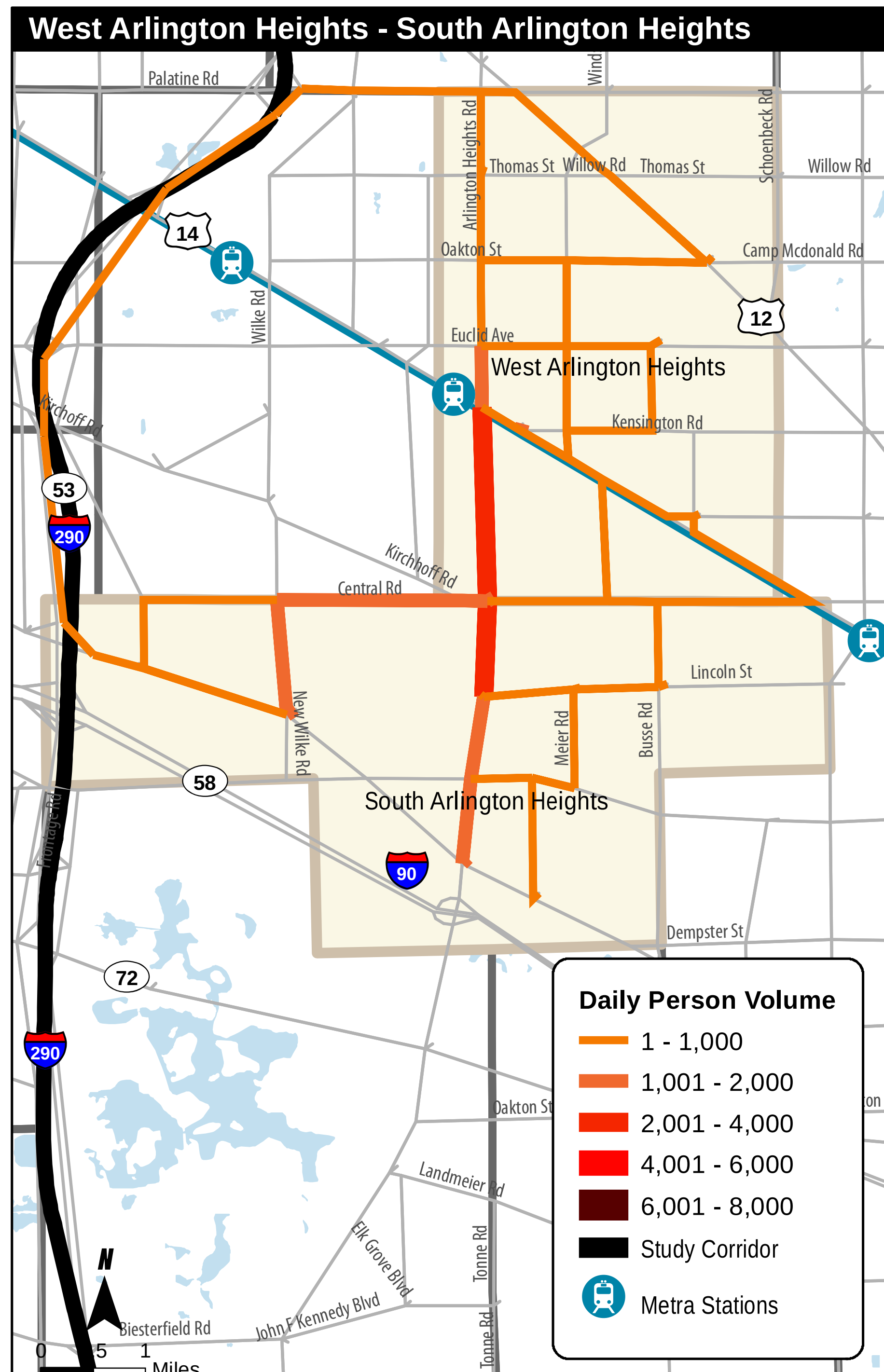
SE Schaumburg - East Elk Grove Village



South Arlington Heights - East Elk Grove Village



West Arlington Heights - South Arlington Heights

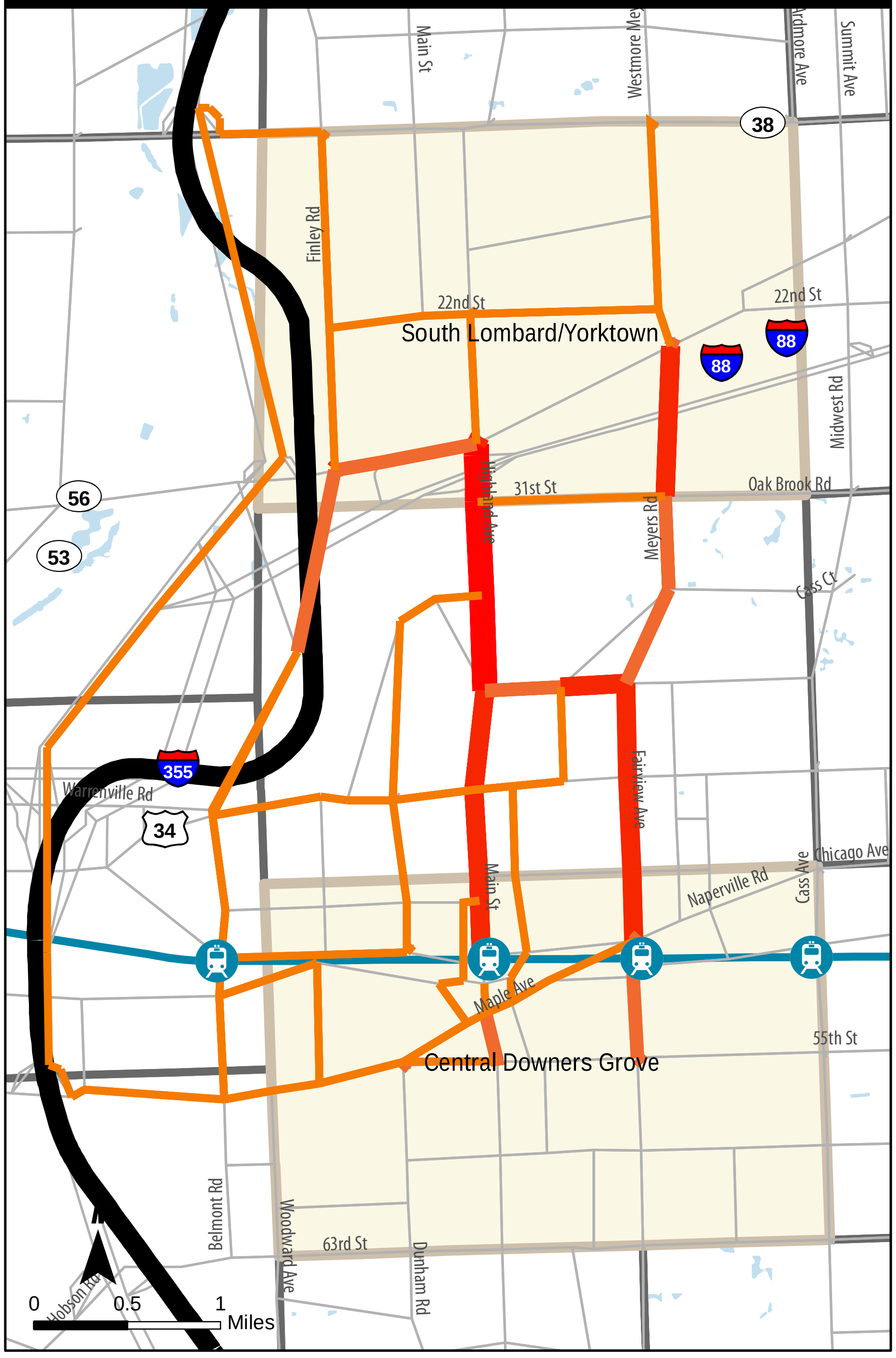


Nelson\Nygaard consulting associates

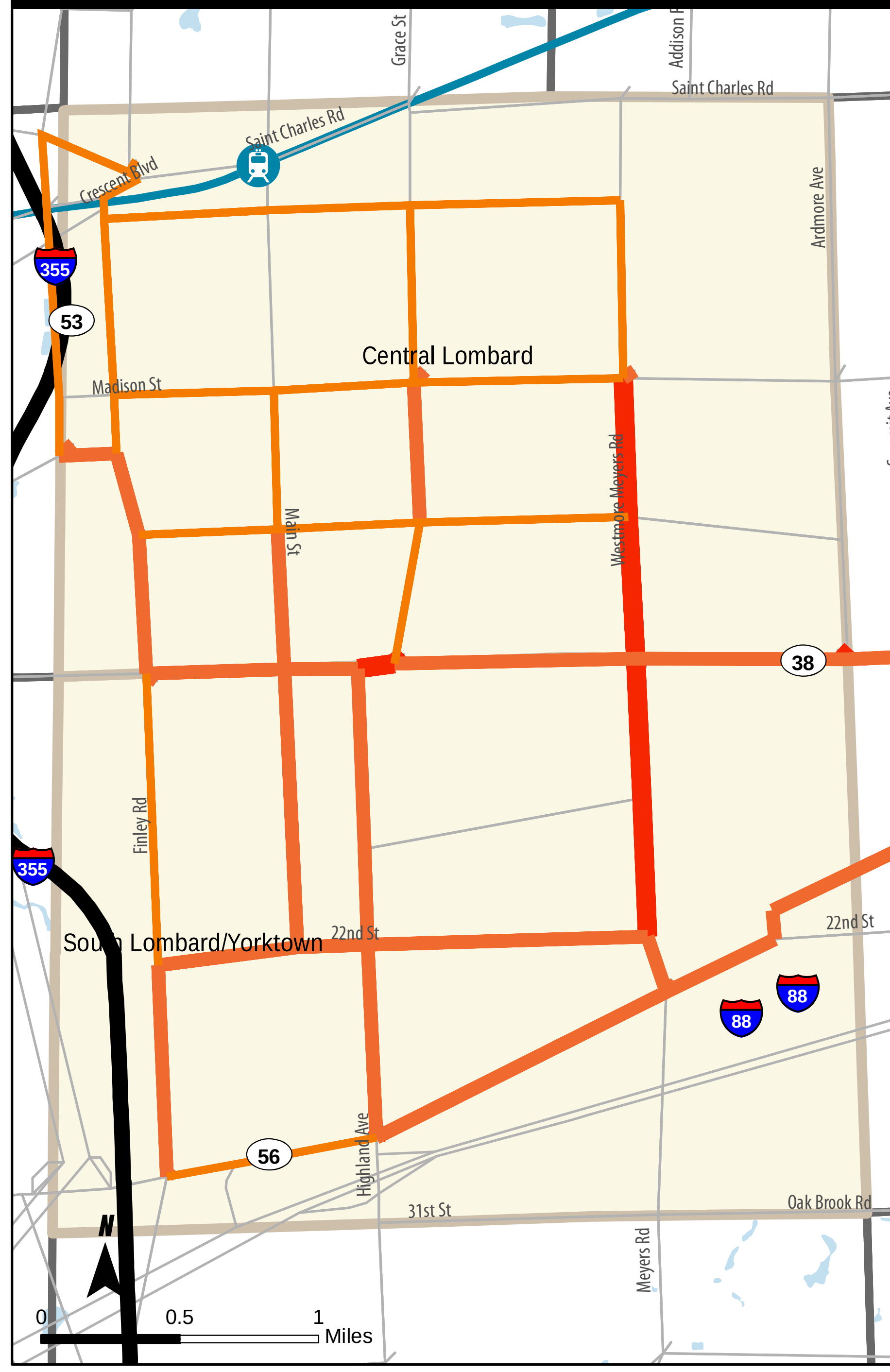
Source: Chicago Metropolitan Agency for Planning

Daily Person Volume: Map 7

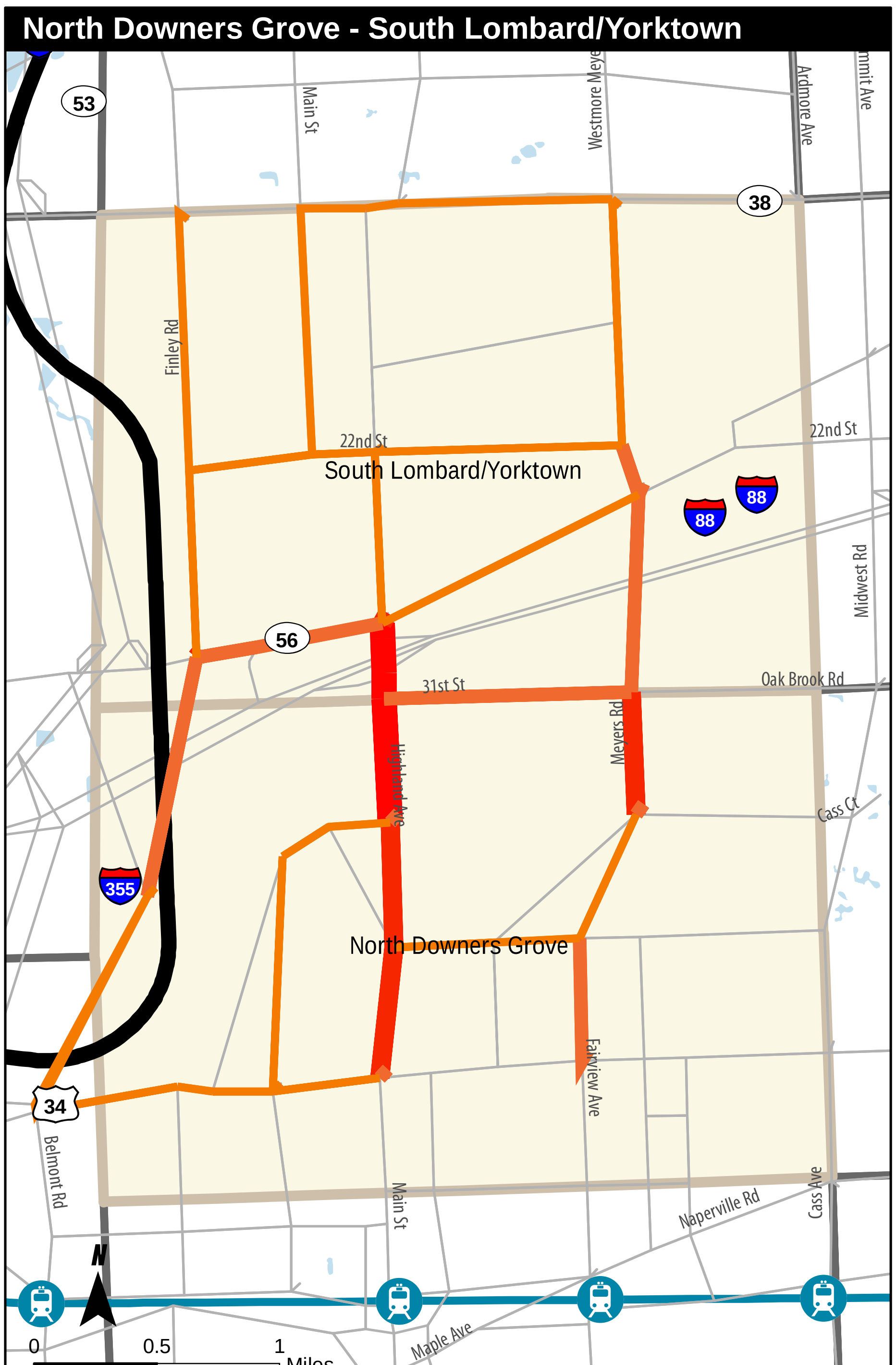
Central Downers Grove - South Lombard/Yorktown



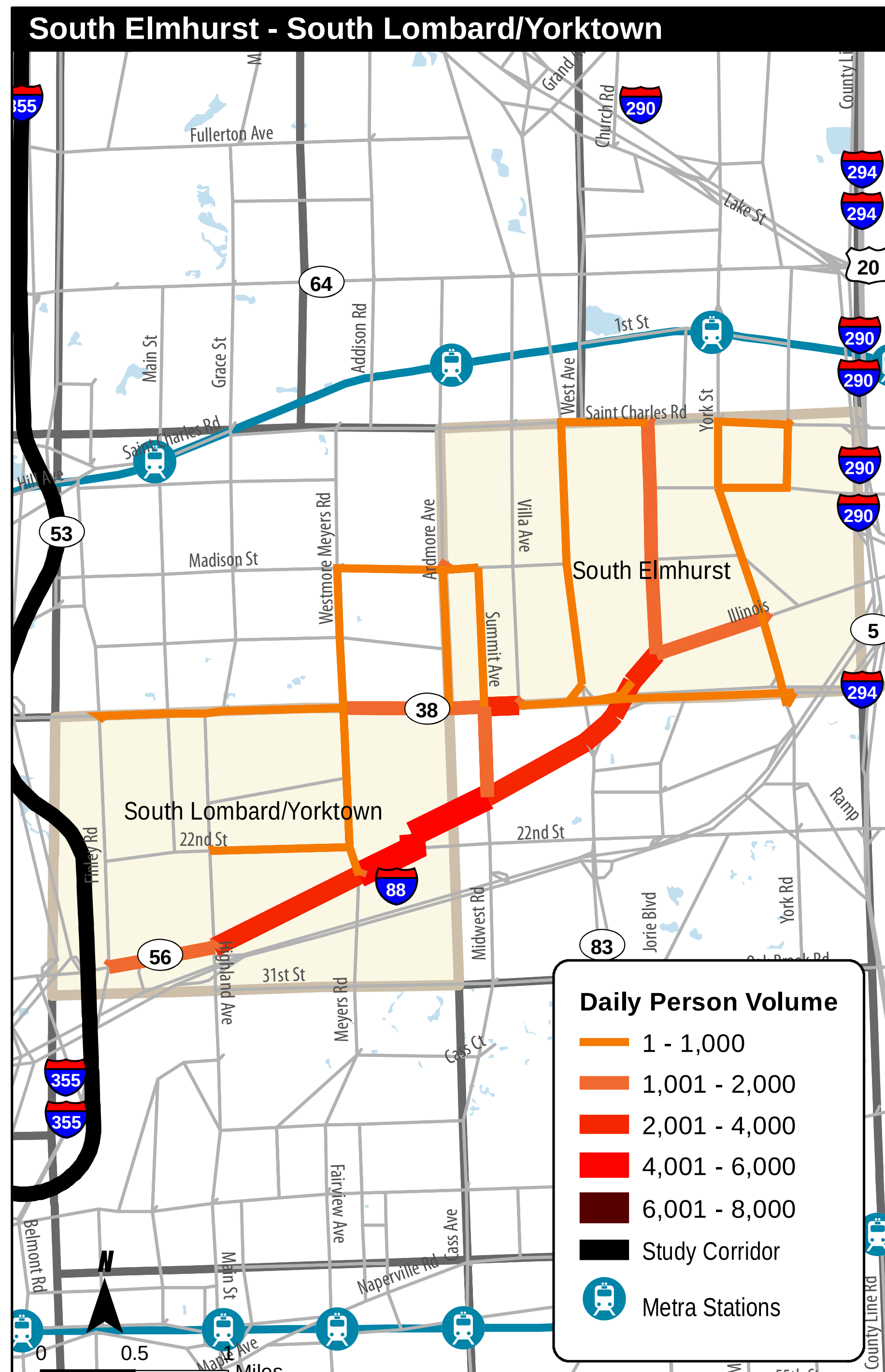
Central Lombard - South Lombard/Yorktown



North Downers Grove - South Lombard/Yorktown

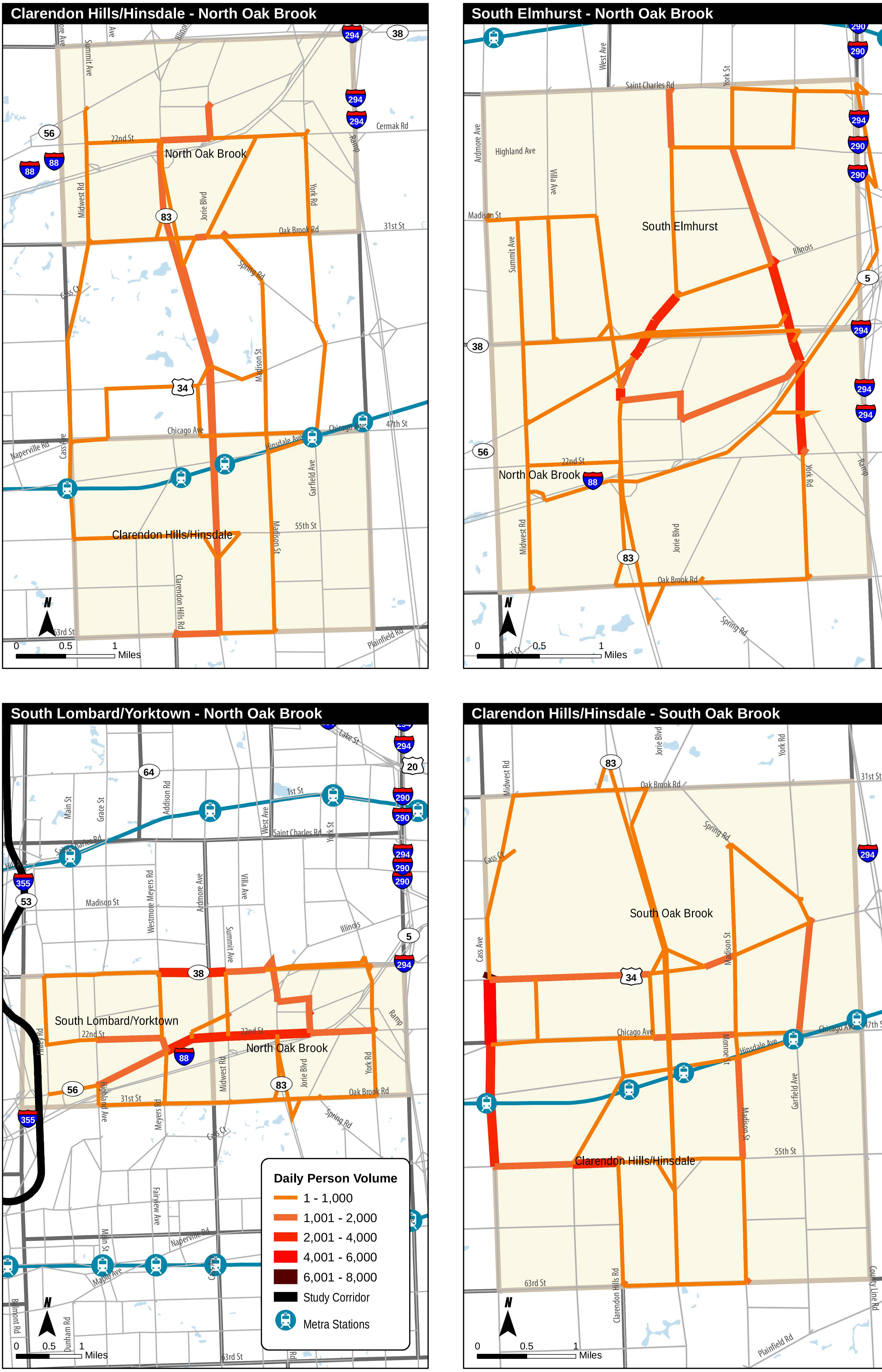


South Elmhurst - South Lombard/Yorktown



Source: Chicago Metropolitan Agency for Planning

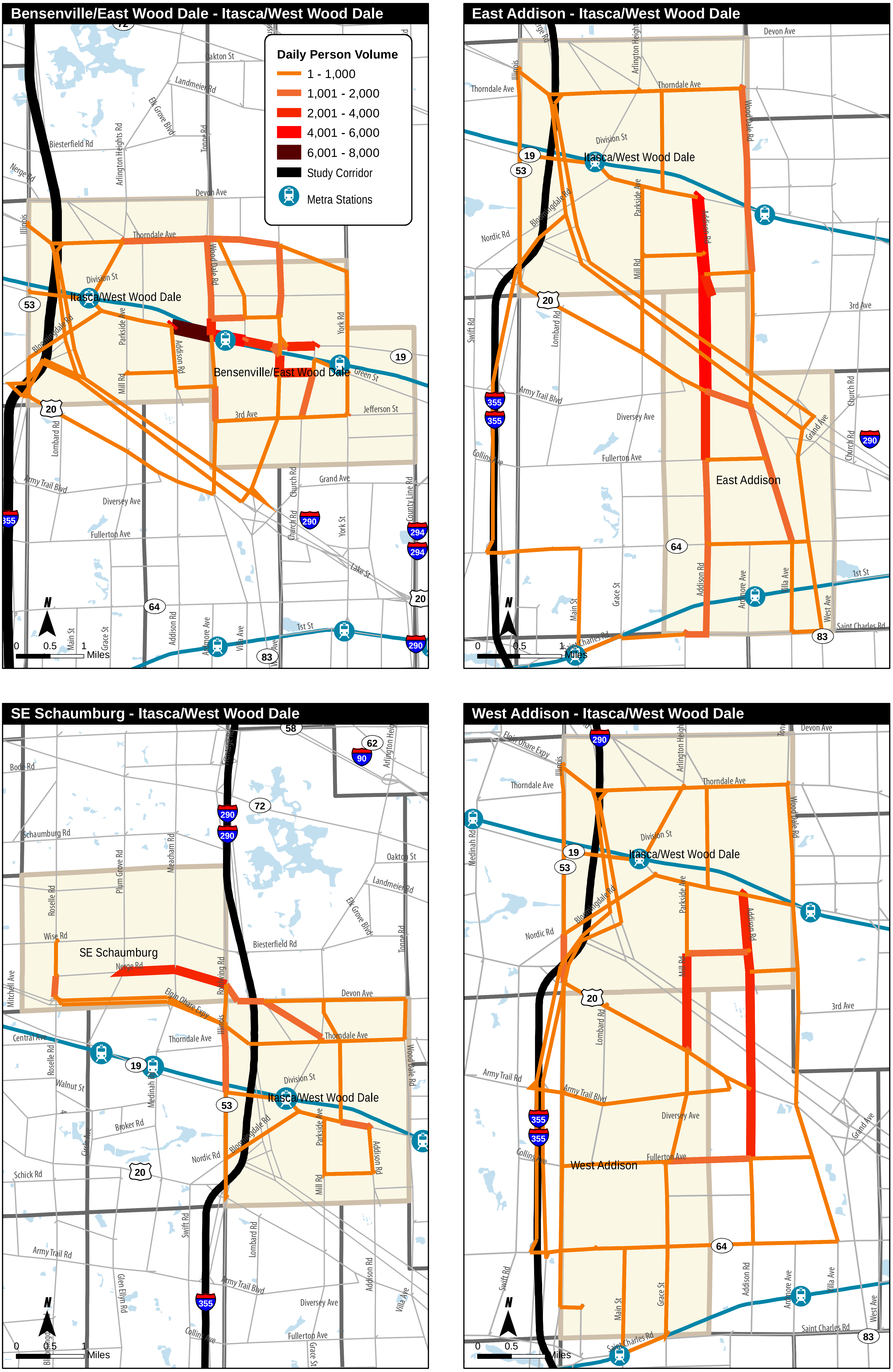
Daily Person Volume: Map 8



Source: Chicago Metropolitan Agency for Planning

Nelson\Nygaard consulting associates

Daily Person Volume: Map 9

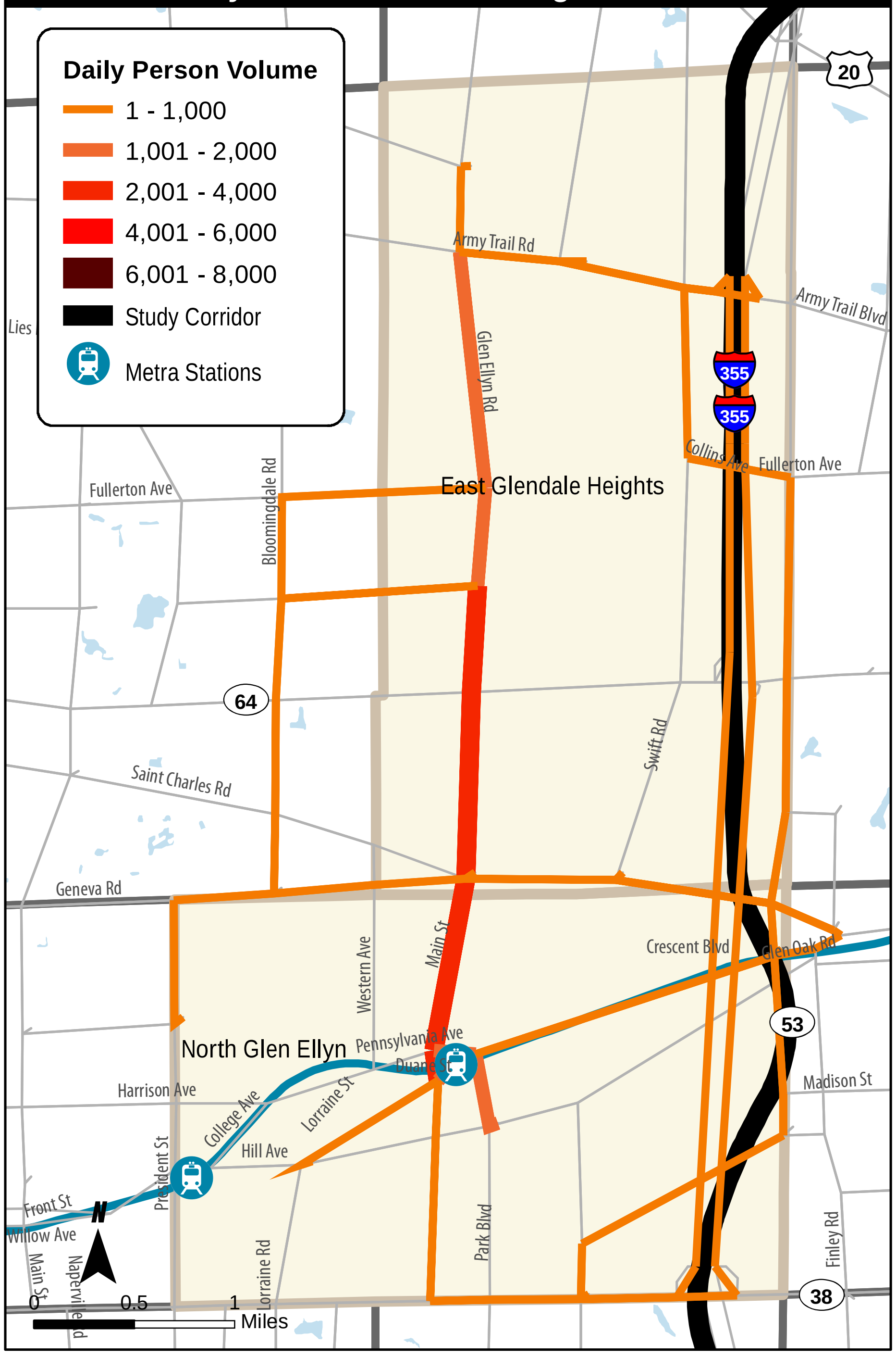


Nelson\Nygaard consulting associates

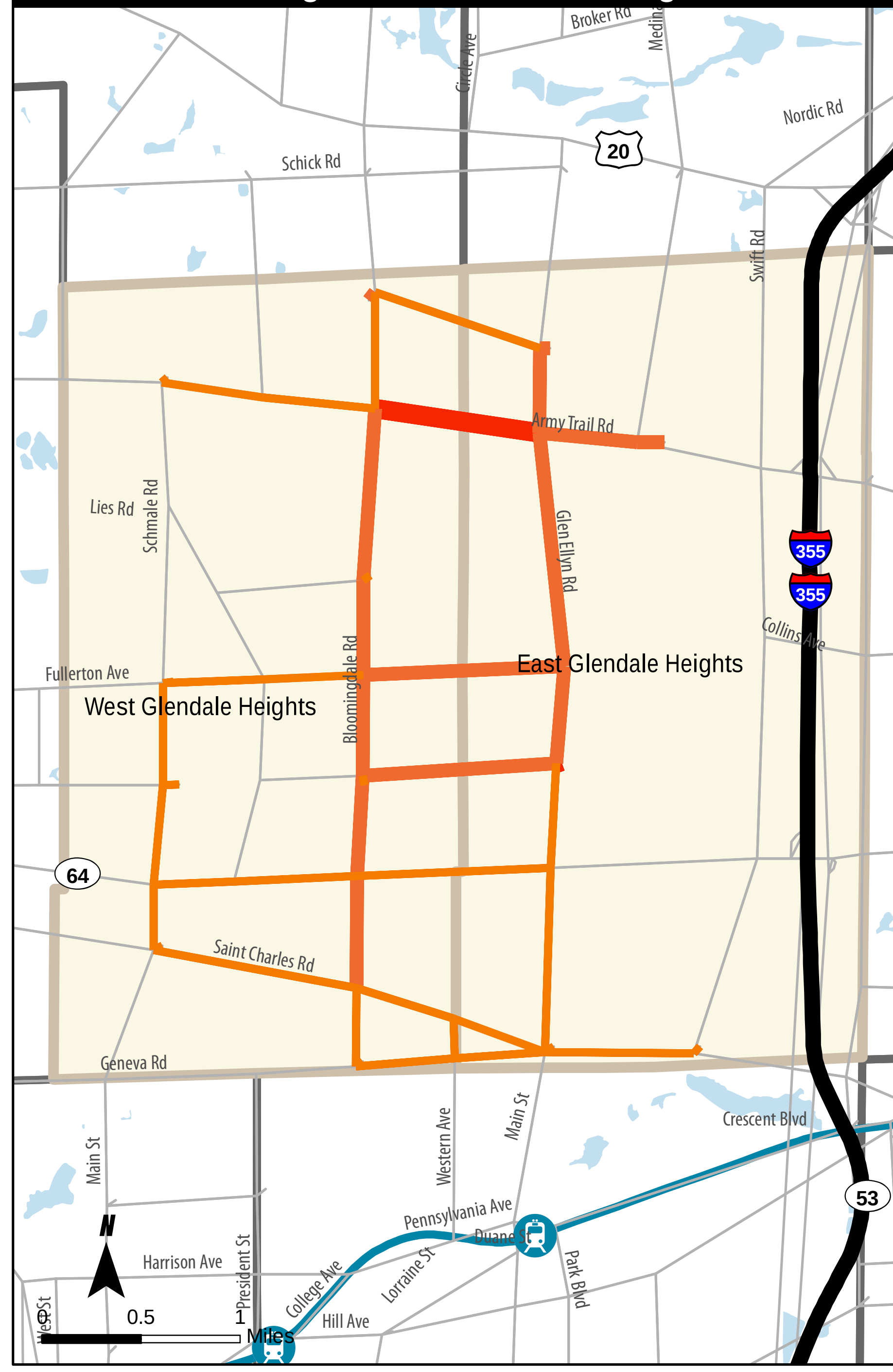
Source: Chicago Metropolitan Agency for Planning

Daily Person Volume: Map 11

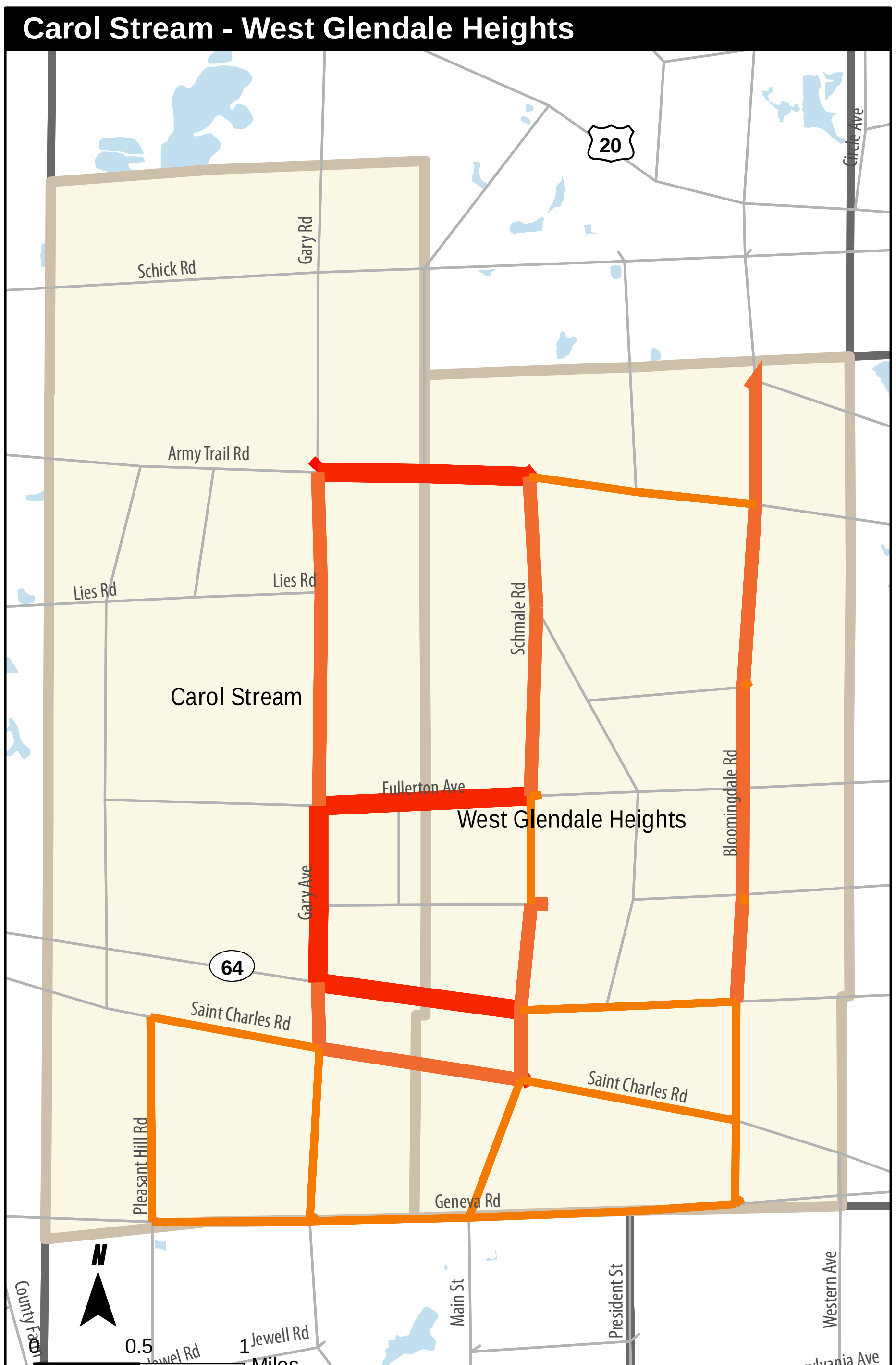
North Glen Ellyn - East Glendale Heights



West Glendale Heights - East Glendale Heights



Carol Stream - West Glendale Heights



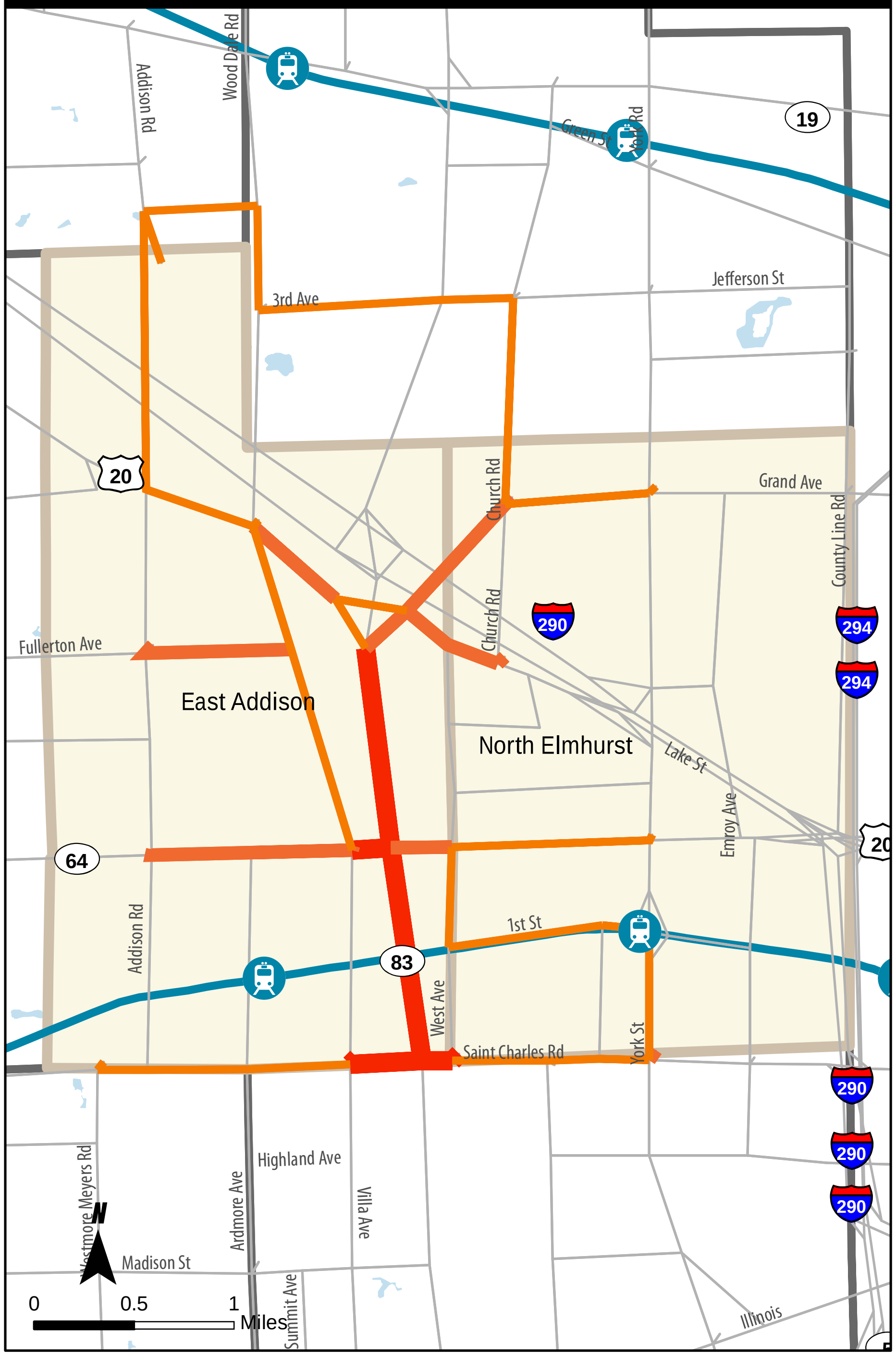
North Wheaton - West Glendale Heights

Nelson\Nygaard consulting associates

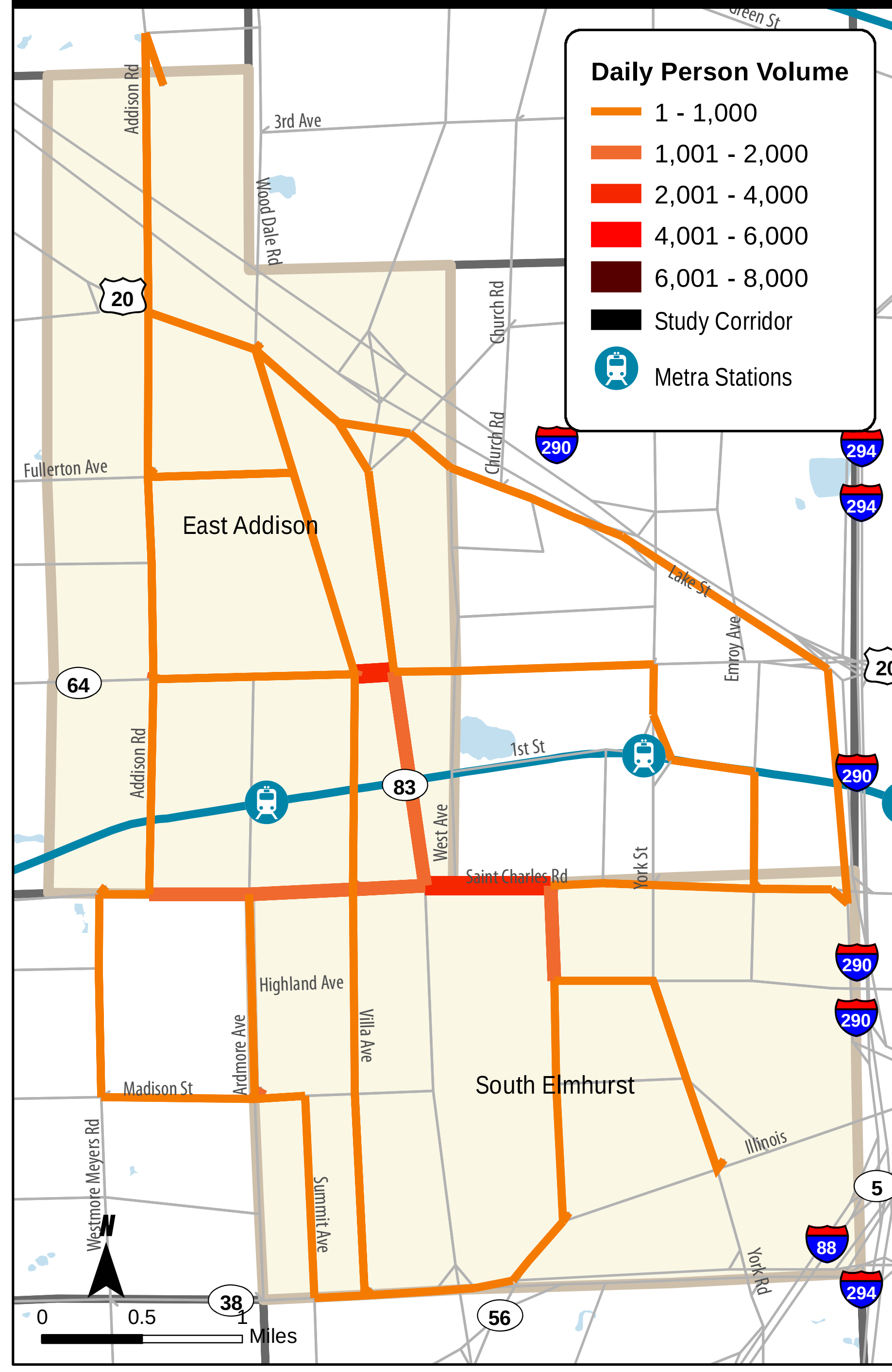
Source: Chicago Metropolitan Agency for Planning

Daily Person Volume: Map 12

North Elmhurst - East Addison



South Elmhurst - East Addison



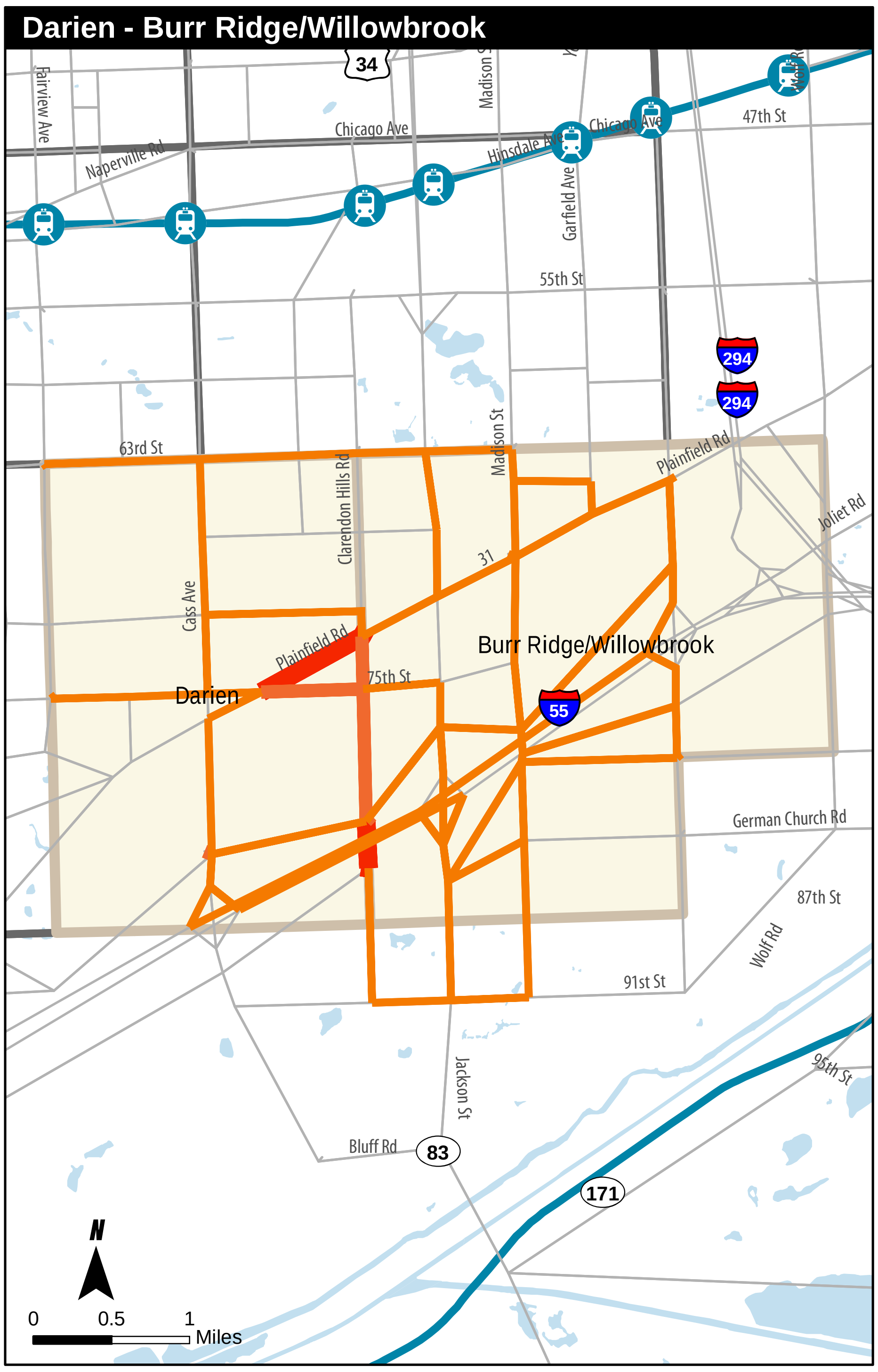
Central Lombard - West Addison

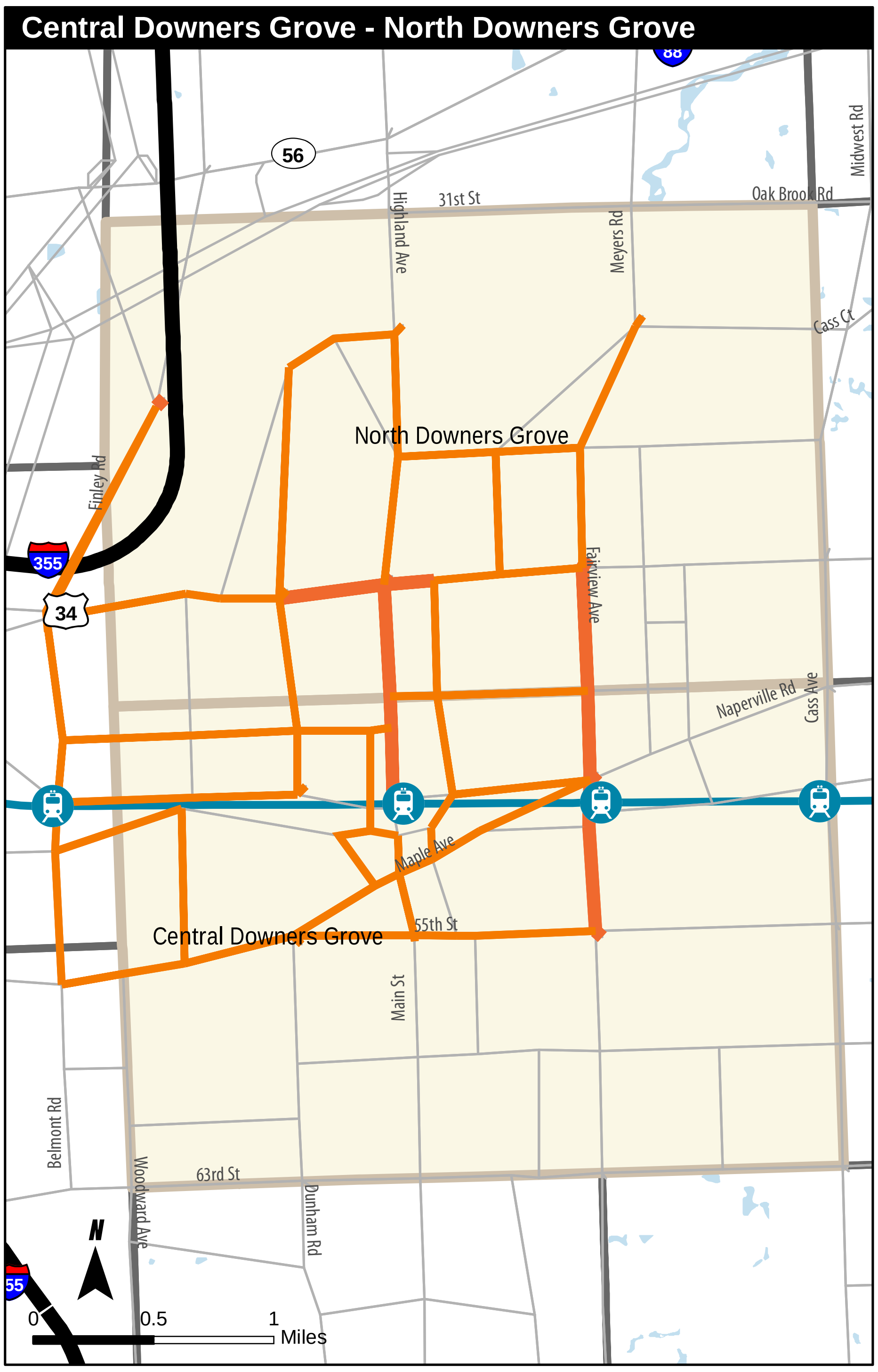
East Addison - West Addison

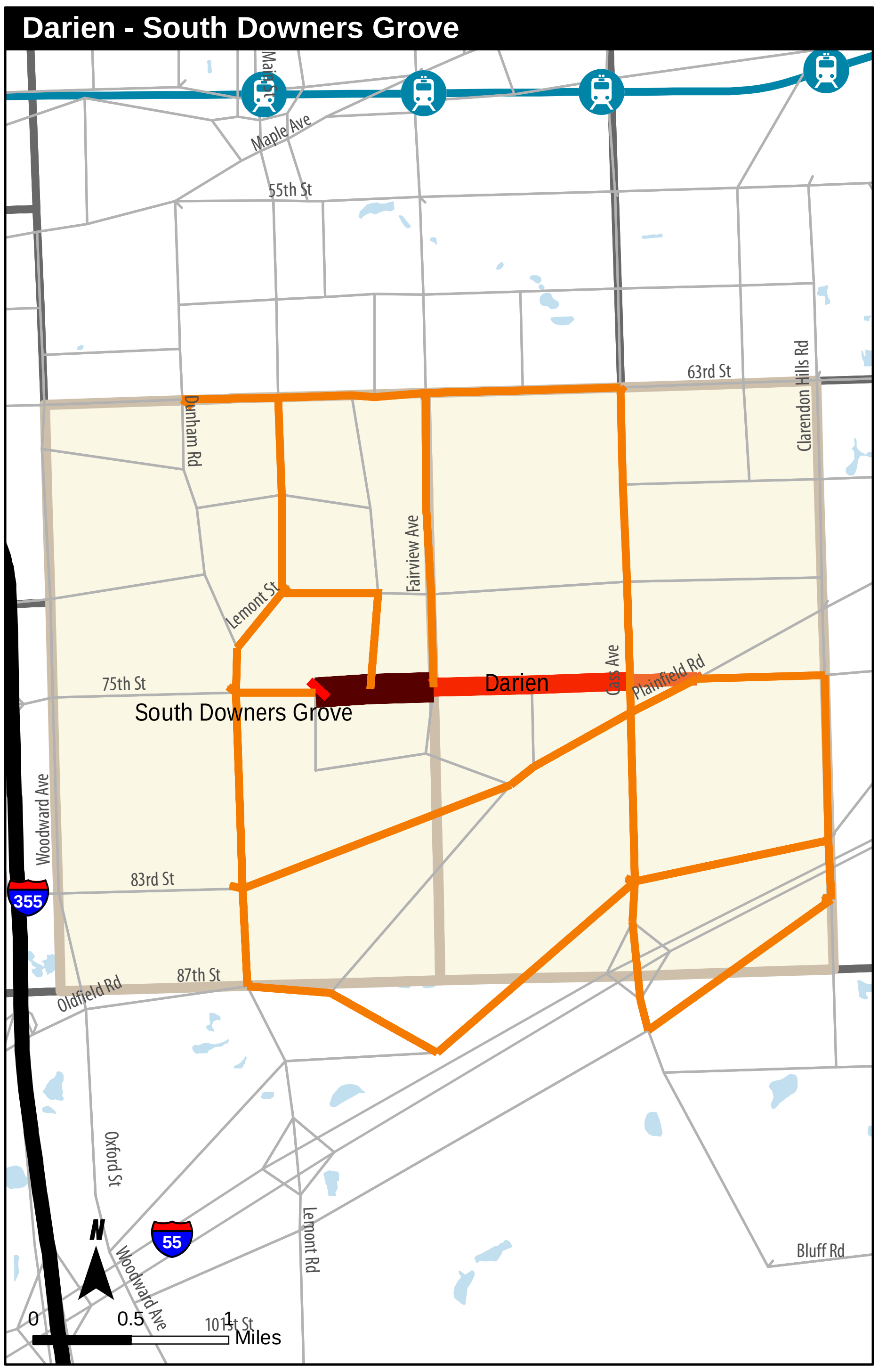
Source: Chicago Metropolitan Agency for Planning

Nelson\Nygaard consulting associates

Daily Person Volume: Map 13







Daily Person Volume

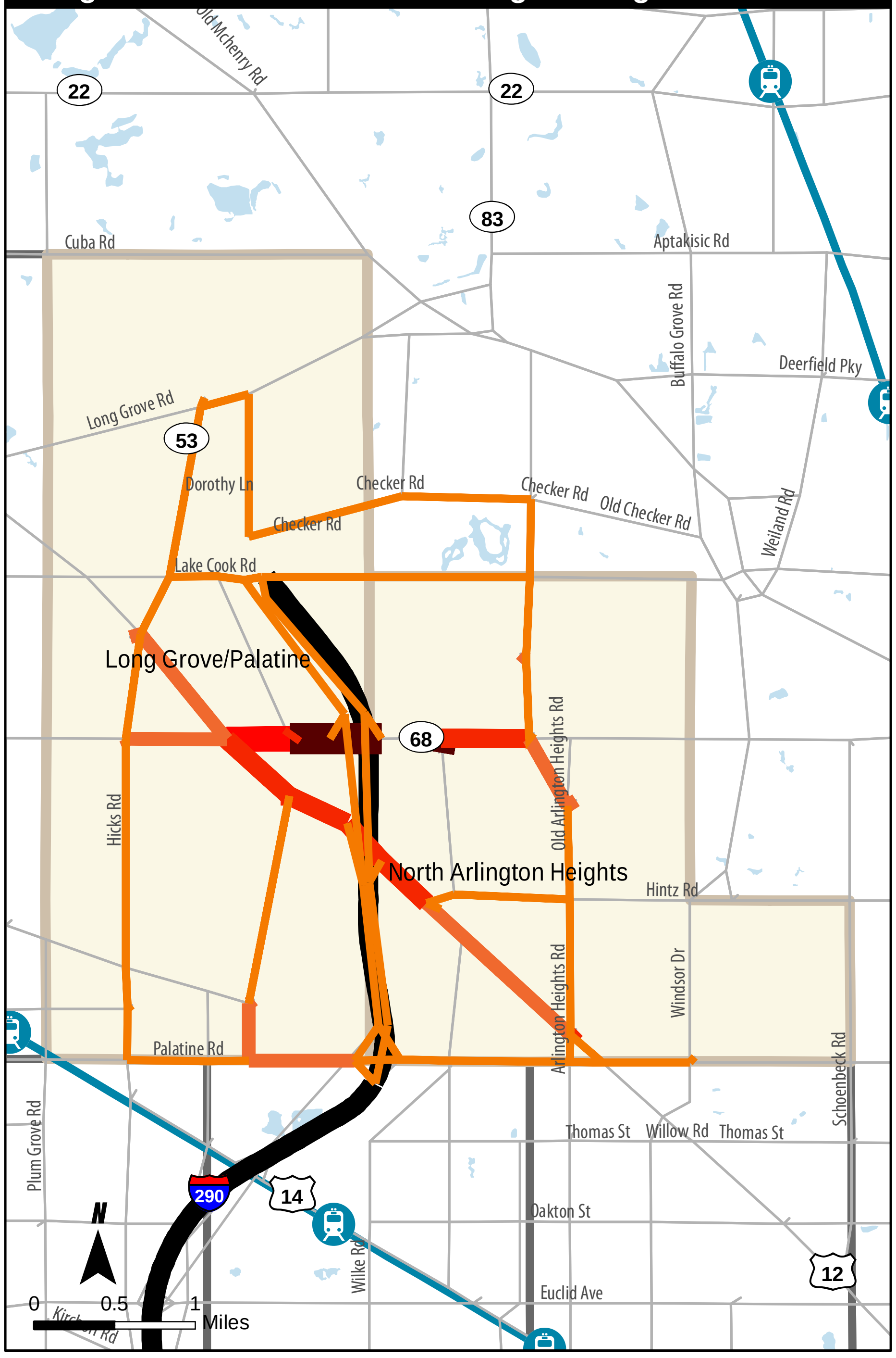
- 1 - 1,000
- 1,001 - 2,000
- 2,001 - 4,000
- 4,001 - 6,000
- 6,001 - 8,000
- Study Corridor
- Metra Stations

Source: Chicago Metropolitan Agency for Planning

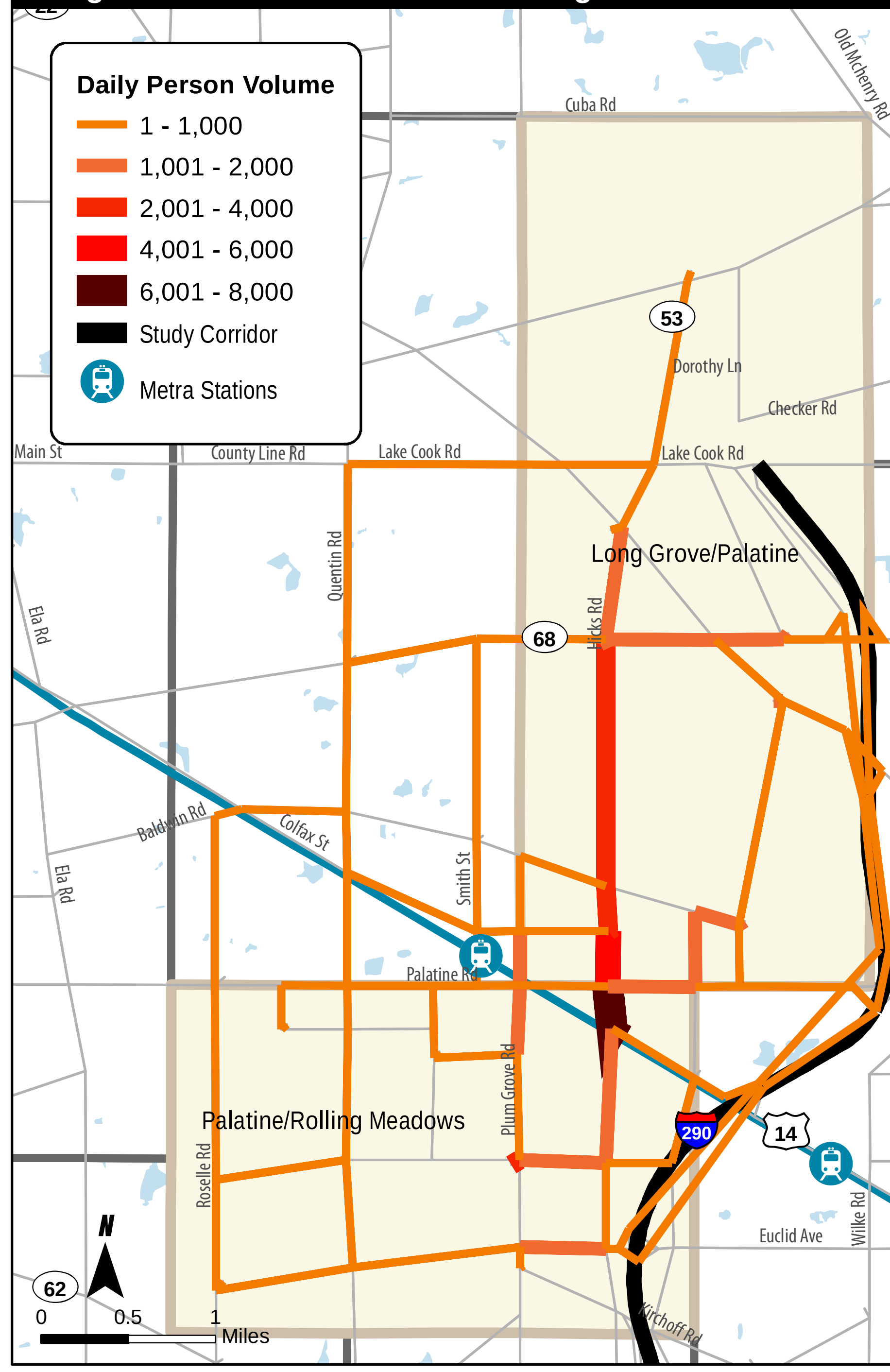
Nelson\Nygaard consulting associates

Daily Person Volume: Map 14

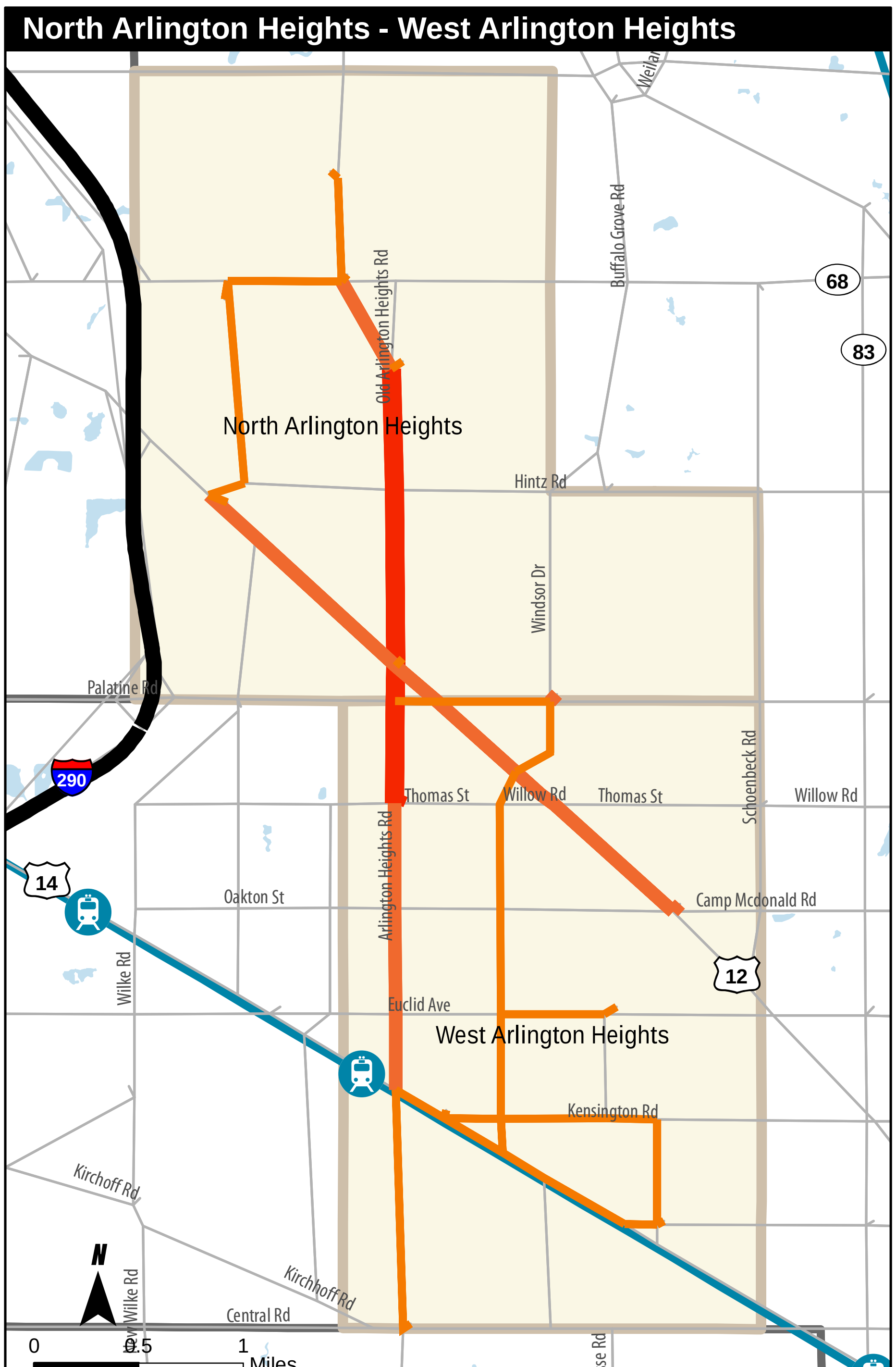
Long Grove/Palatine - North Arlington Heights



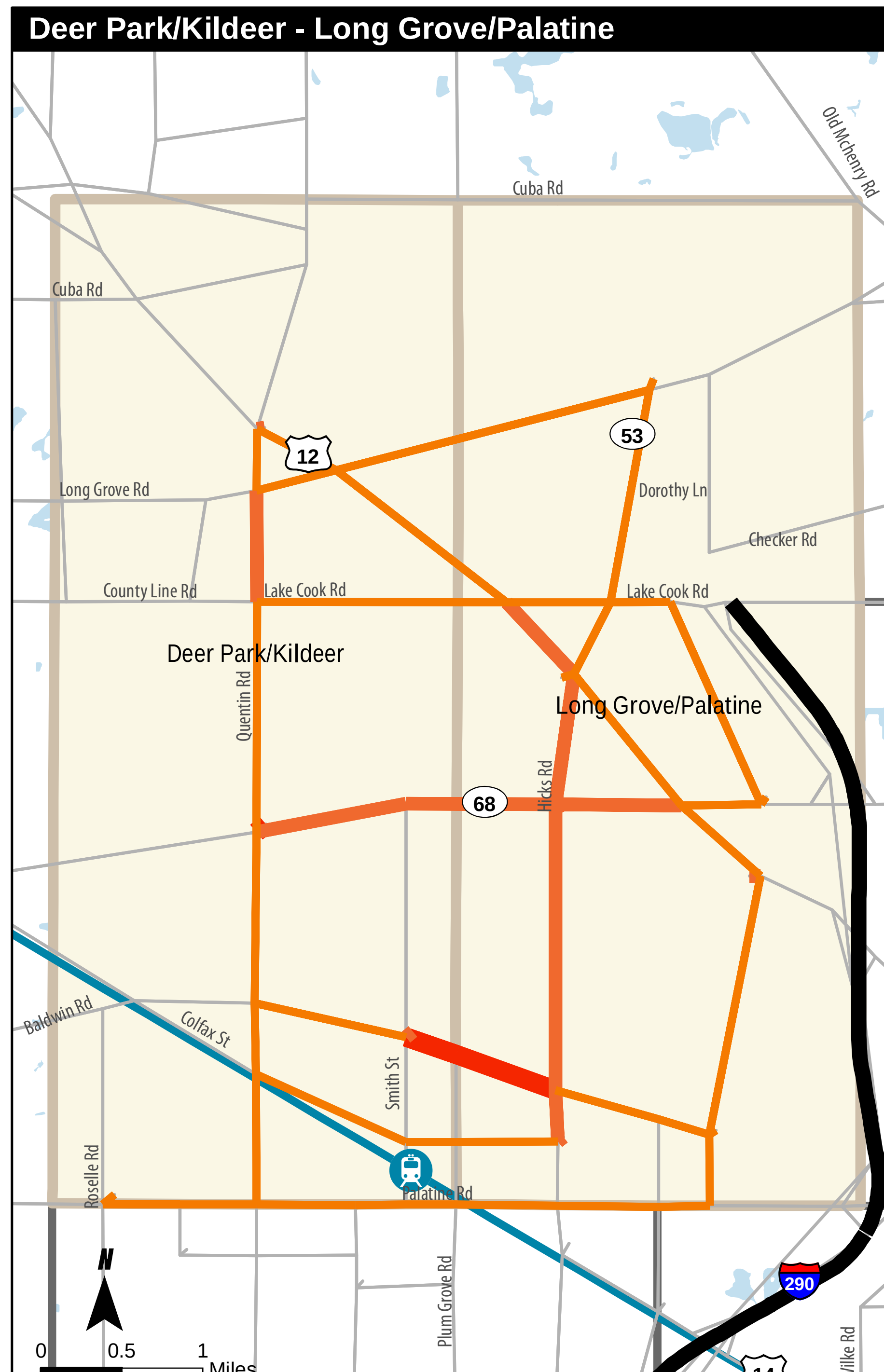
Long Grove/Palatine - Palatine/Rolling Meadows



North Arlington Heights - West Arlington Heights



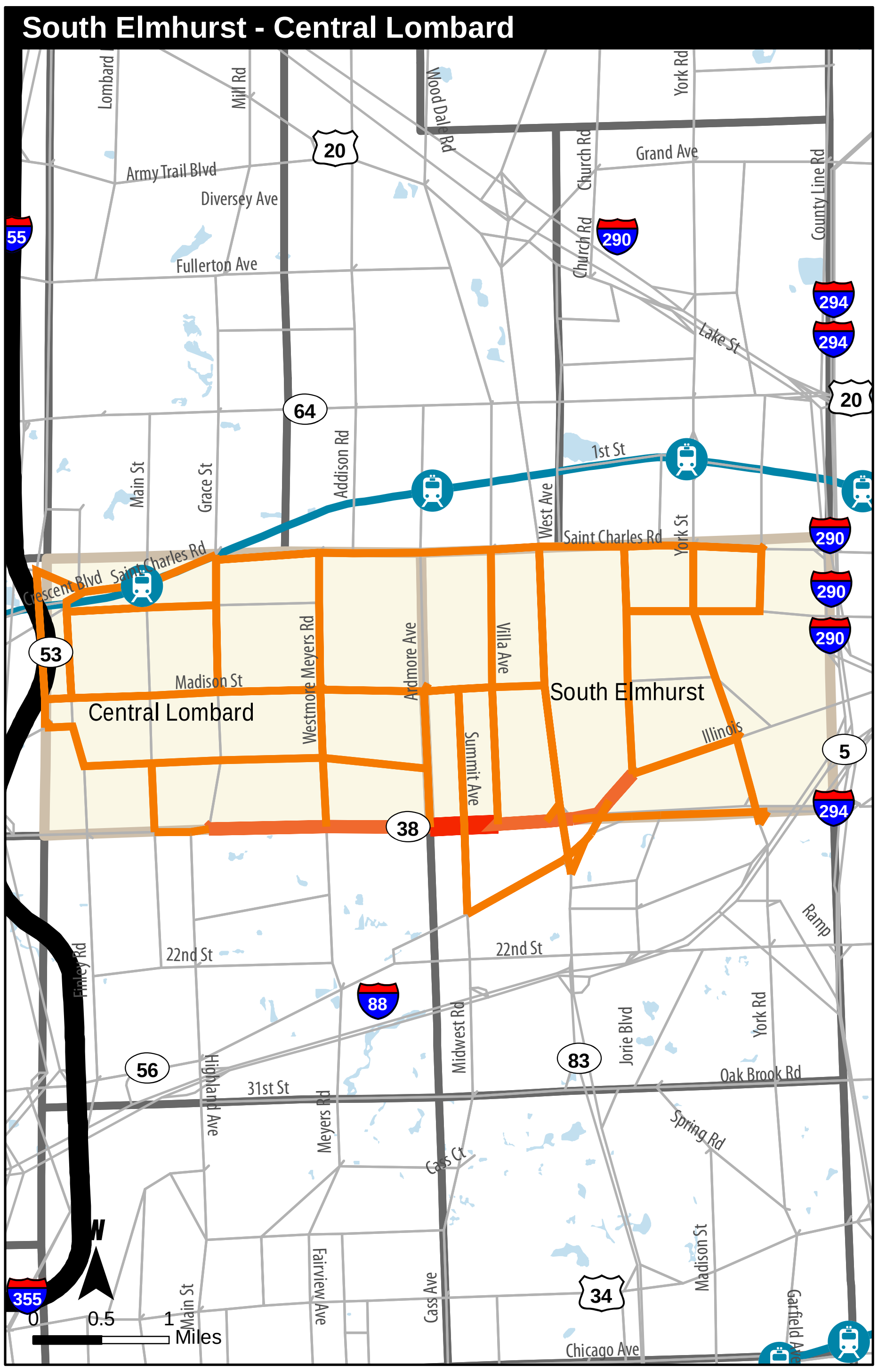
Deer Park/Kildeer - Long Grove/Palatine

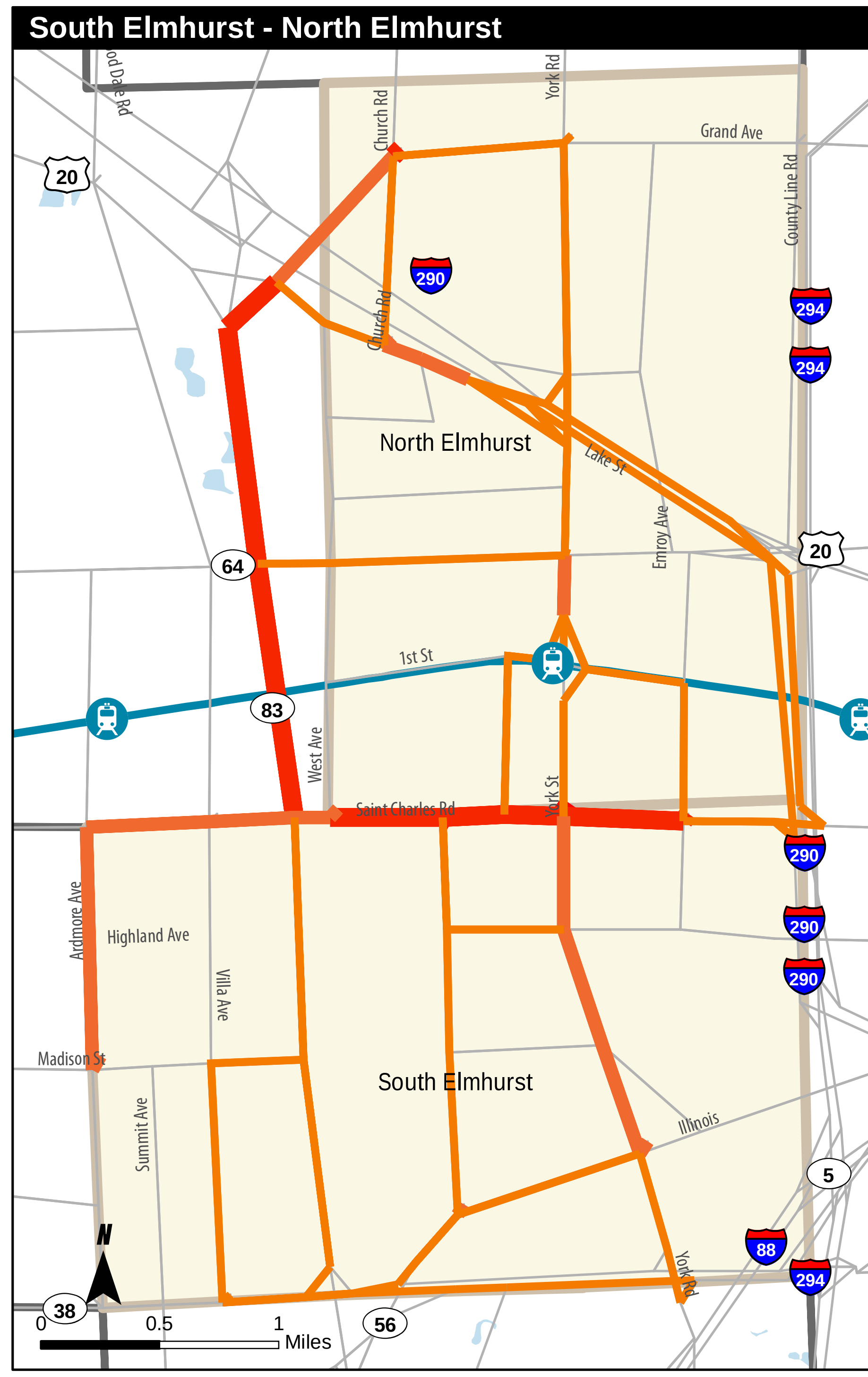


Nelson|Nygaard consulting associates

Source: Chicago Metropolitan Agency for Planning

Daily Person Volume: Map 15





Daily Person Volume

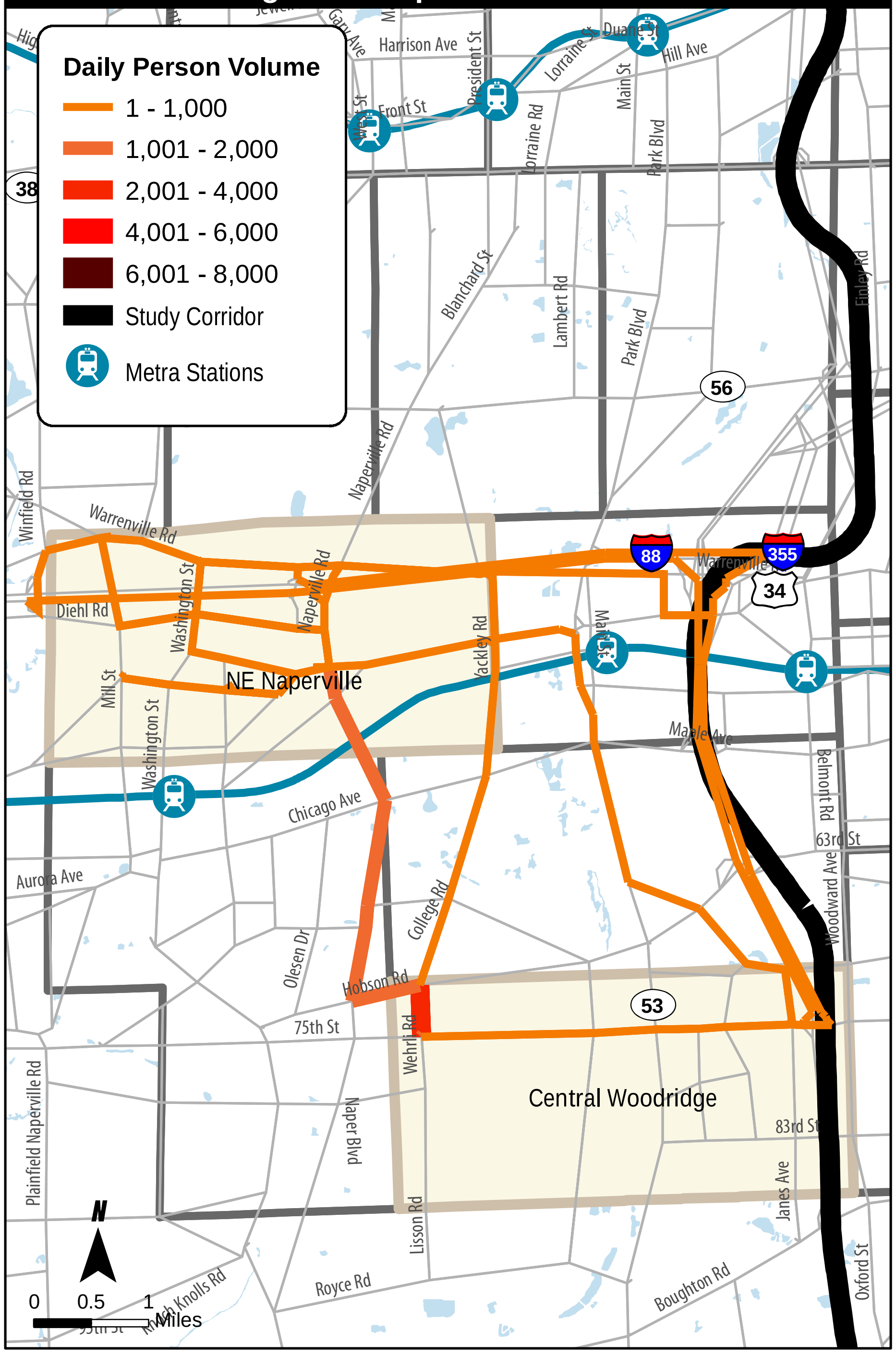
- 1 - 1,000
- 1,001 - 2,000
- 2,001 - 4,000
- 4,001 - 6,000
- 6,001 - 8,000
- Study Corridor
- Metra Stations

Source: Chicago Metropolitan Agency for Planning

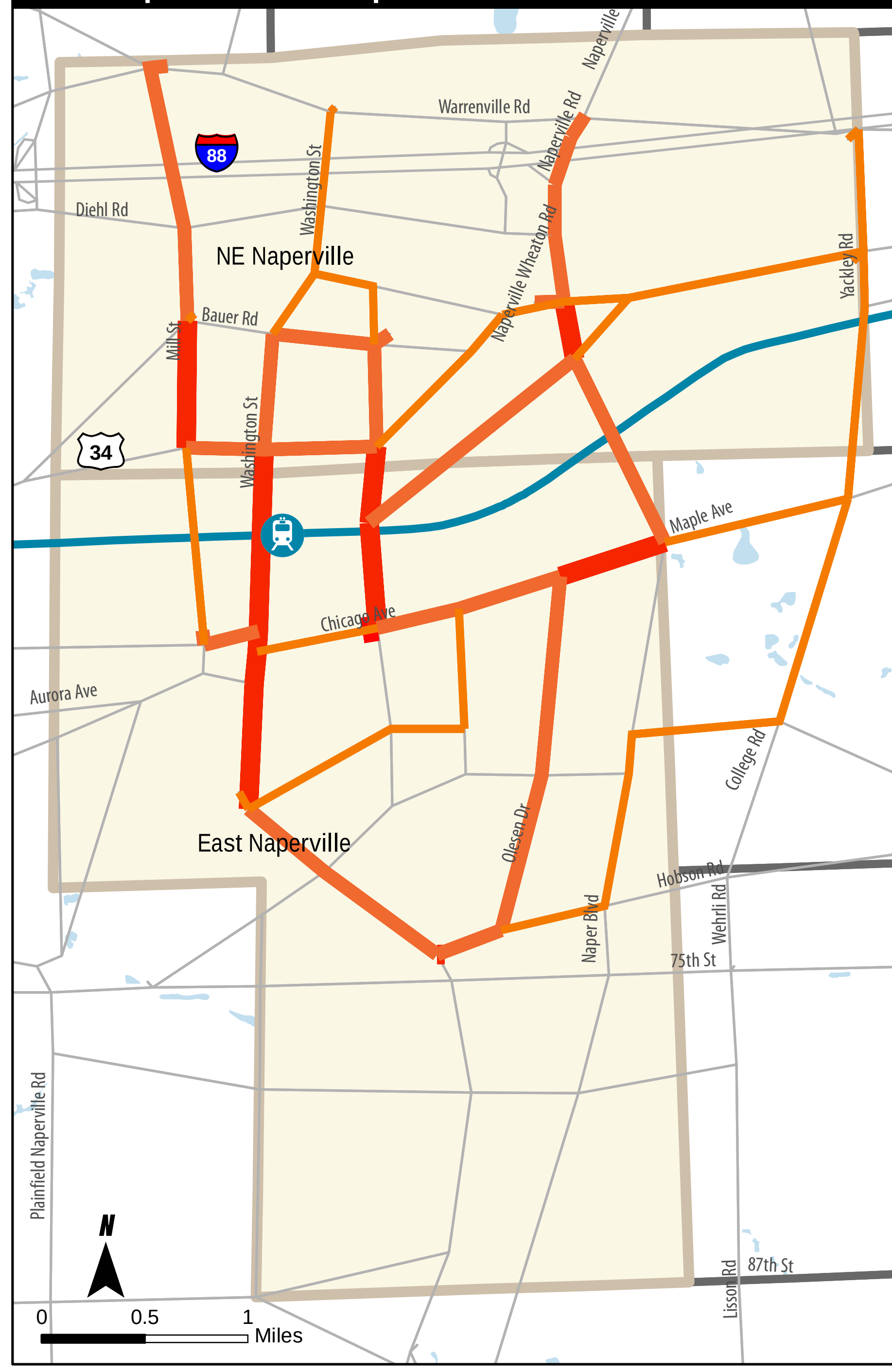
Nelson\Nygaard consulting associates

Daily Person Volume: Map 10

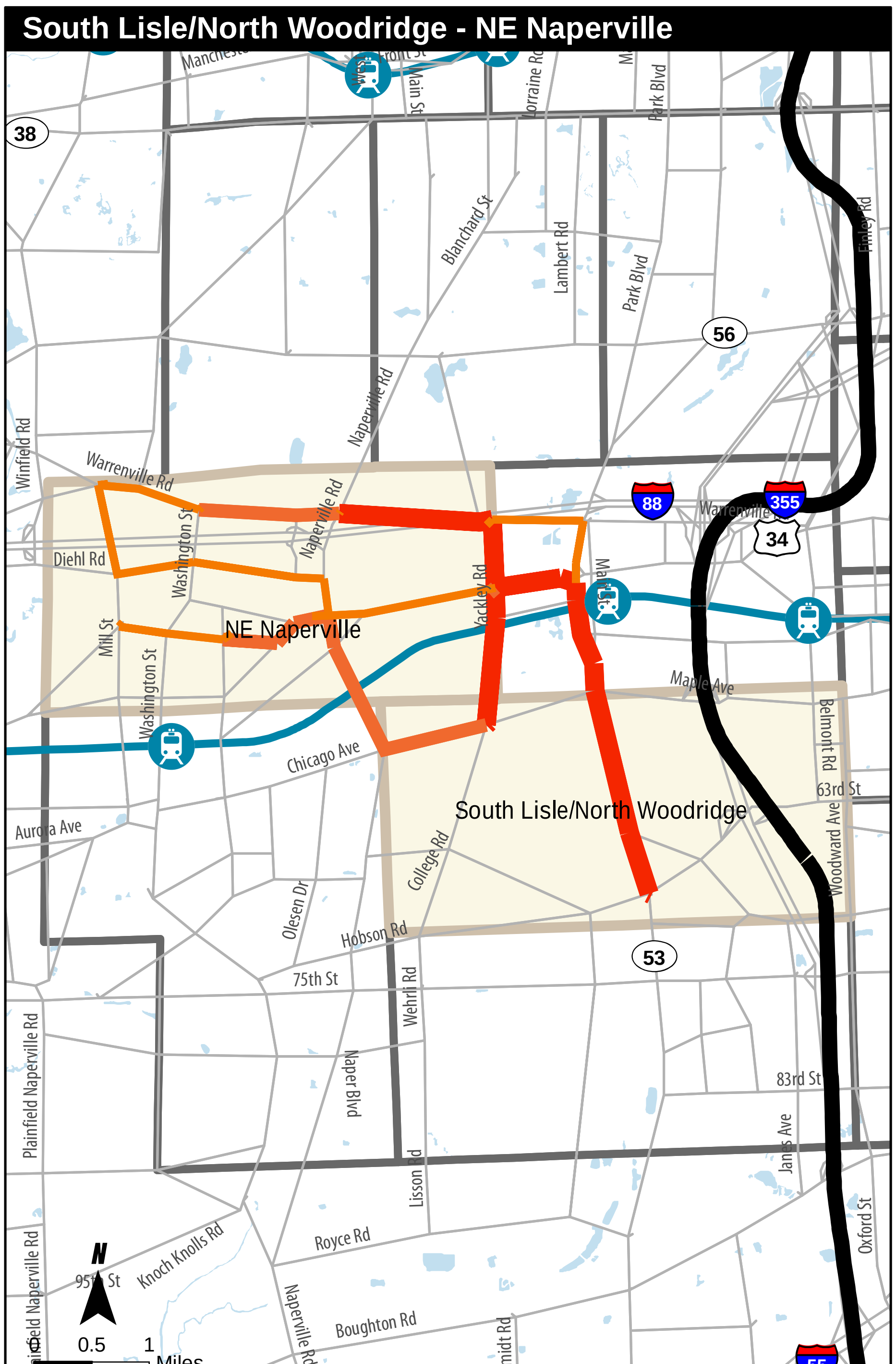
Central Woodridge - NE Naperville



East Naperville - NE Naperville



South Lisle/North Woodridge - NE Naperville



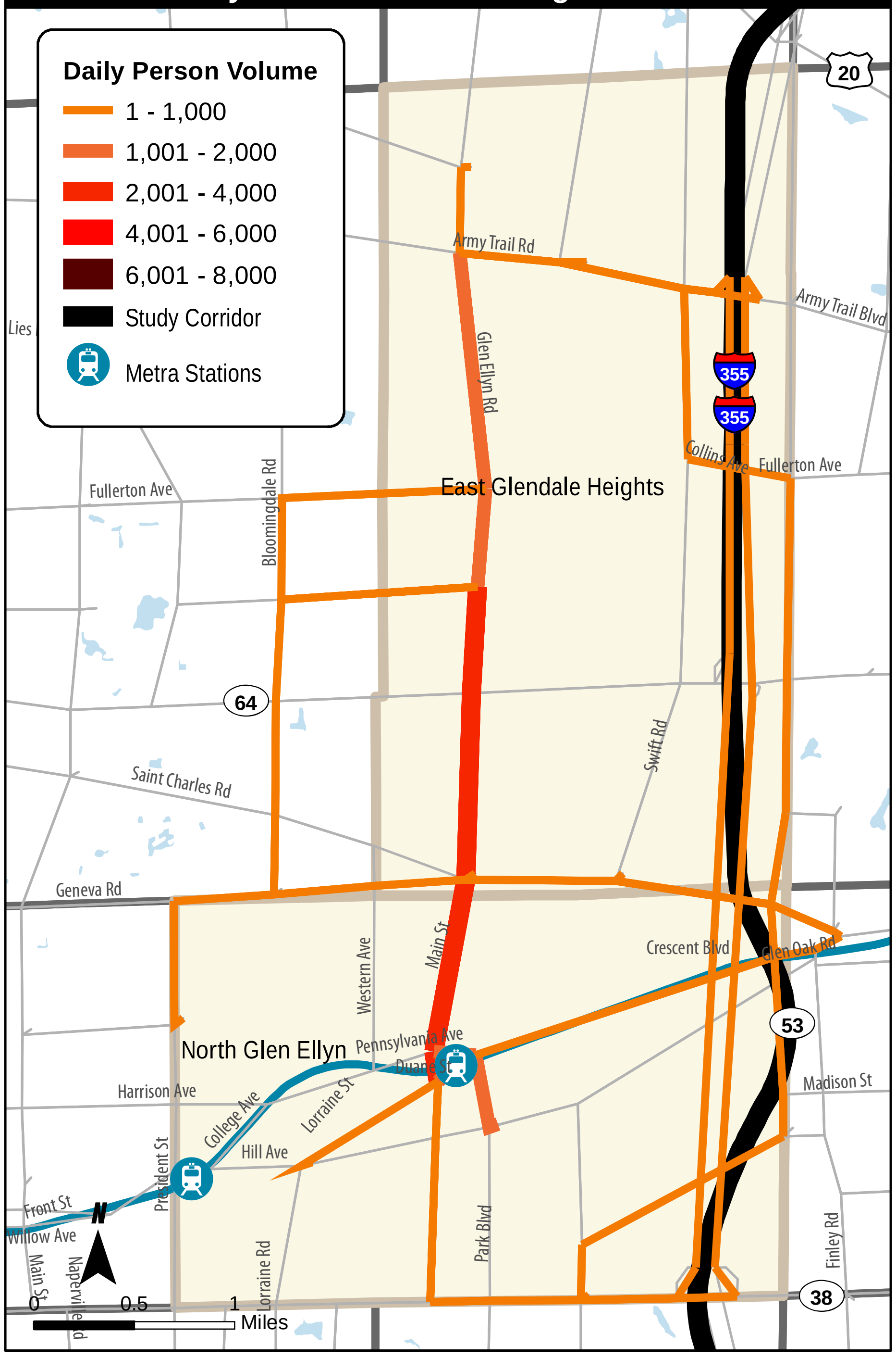
SW Wheaton - North Wheaton

Nelson|Nygaard consulting associates

Source: Chicago Metropolitan Agency for Planning

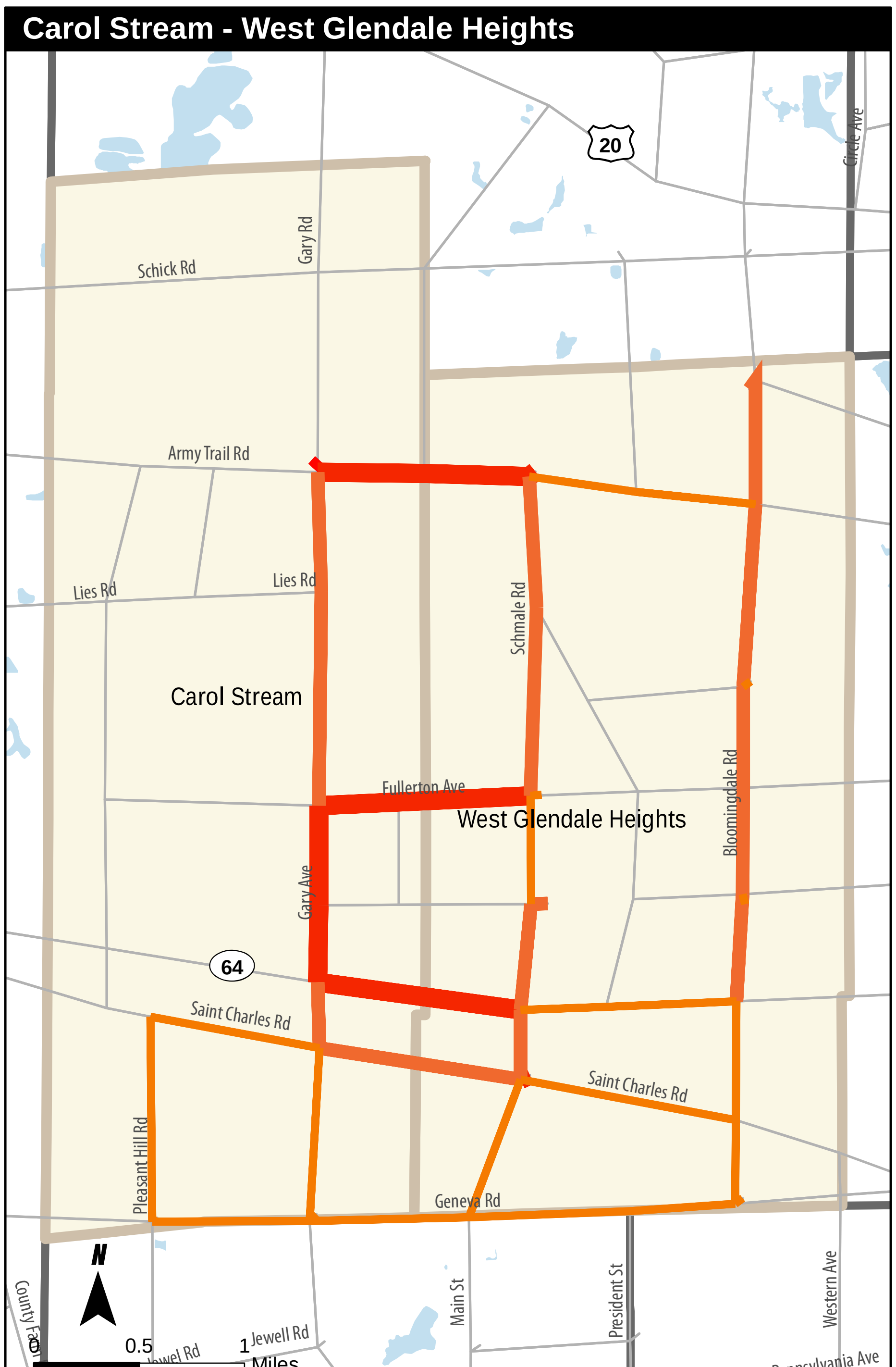
Daily Person Volume: Map 11

North Glen Ellyn - East Glendale Heights



West Glendale Heights - East Glendale Heights

Carol Stream - West Glendale Heights



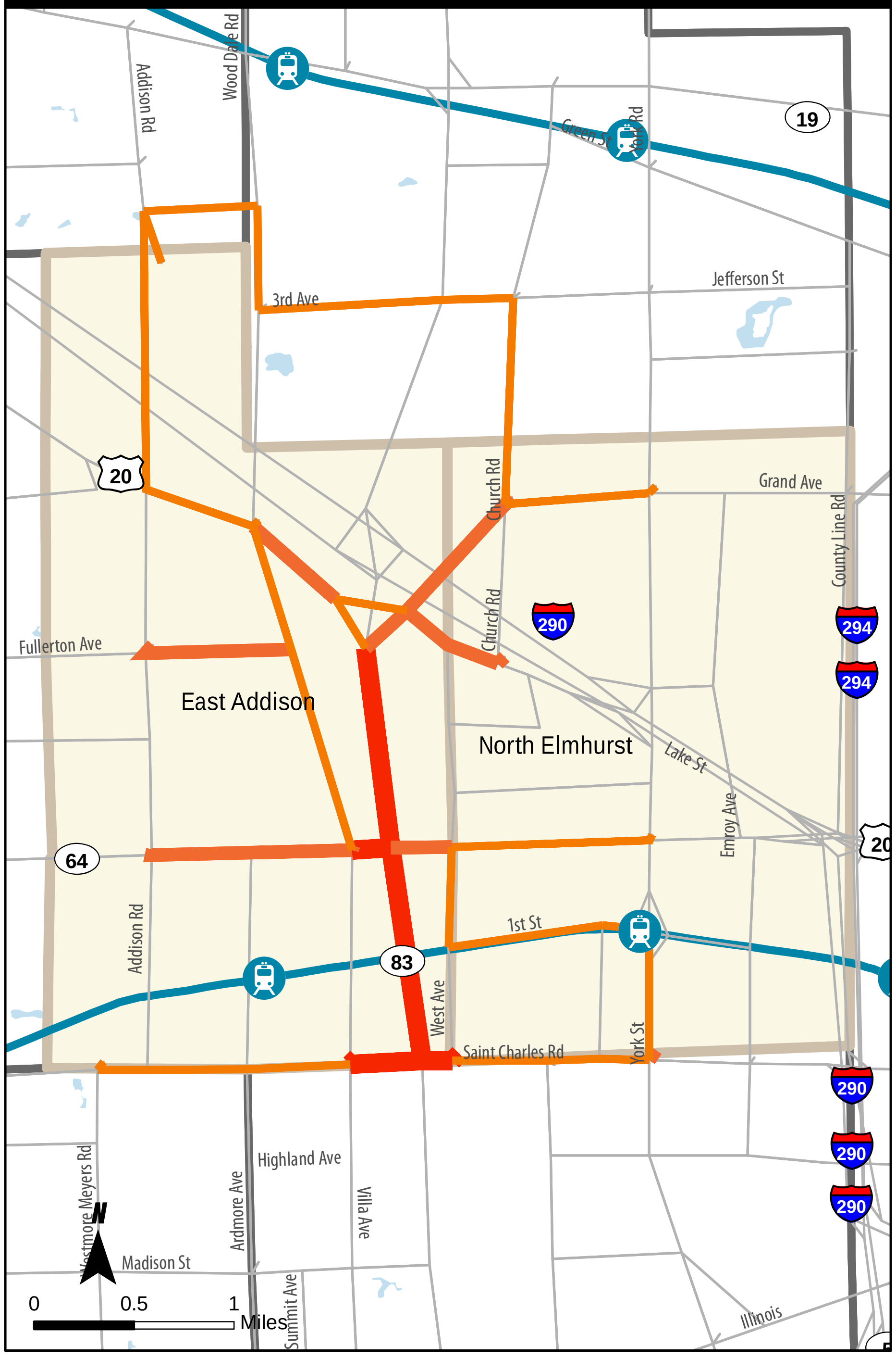
North Wheaton - West Glendale Heights

Source: Chicago Metropolitan Agency for Planning

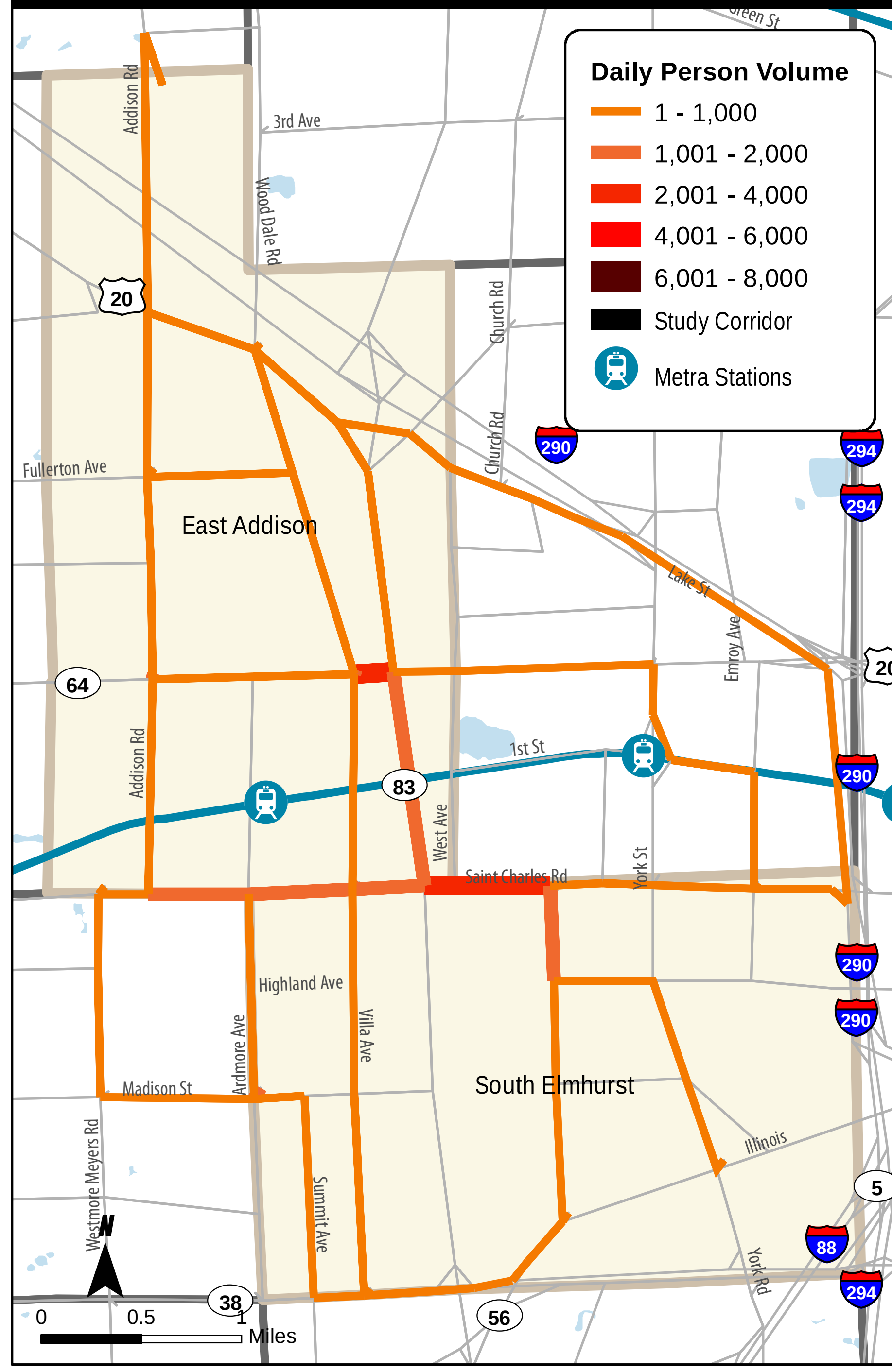
Nelson\Nygaard consulting associates

Daily Person Volume: Map 12

North Elmhurst - East Addison



South Elmhurst - East Addison



Central Lombard - West Addison

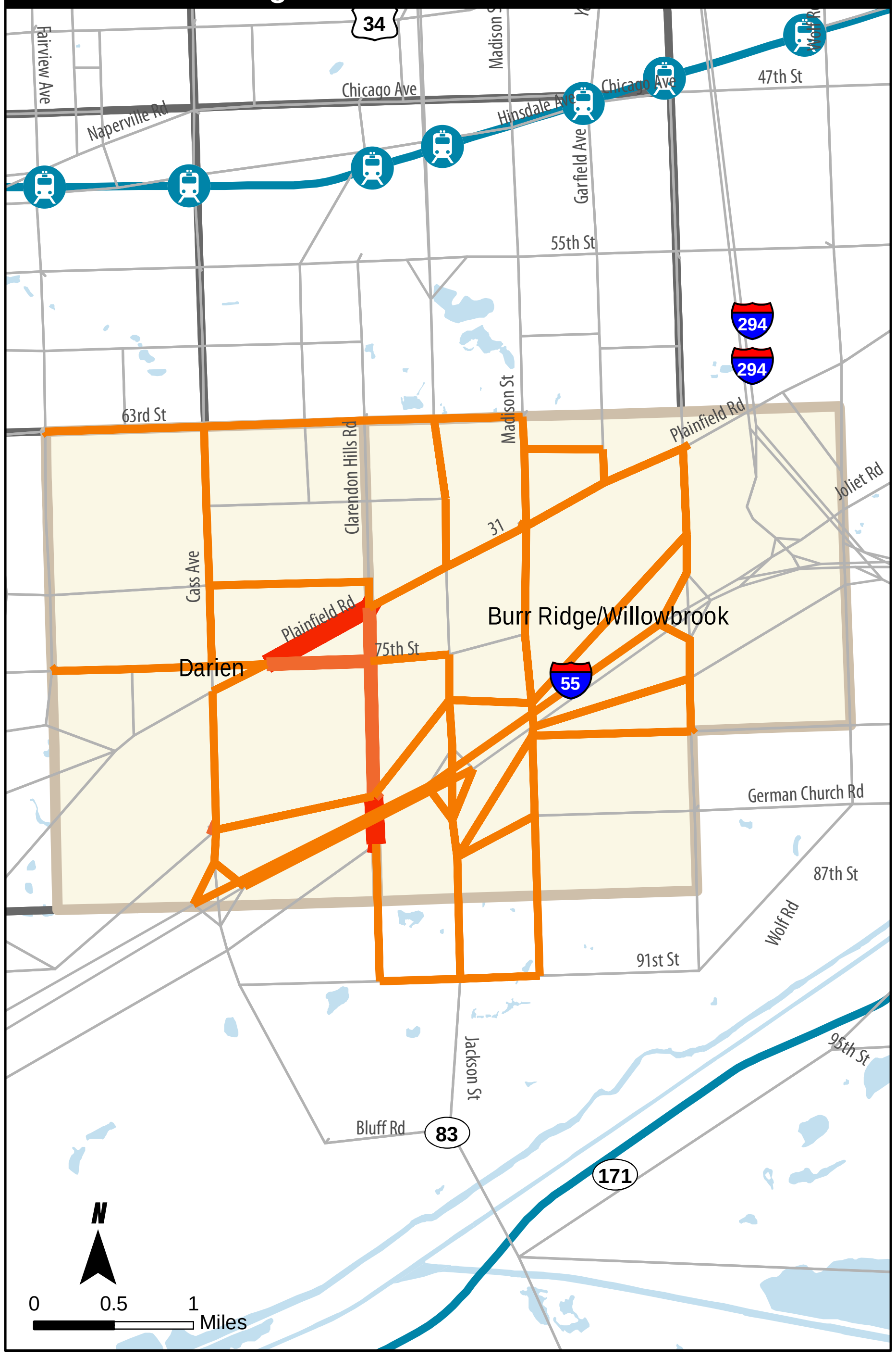
East Addison - West Addison

Source: Chicago Metropolitan Agency for Planning

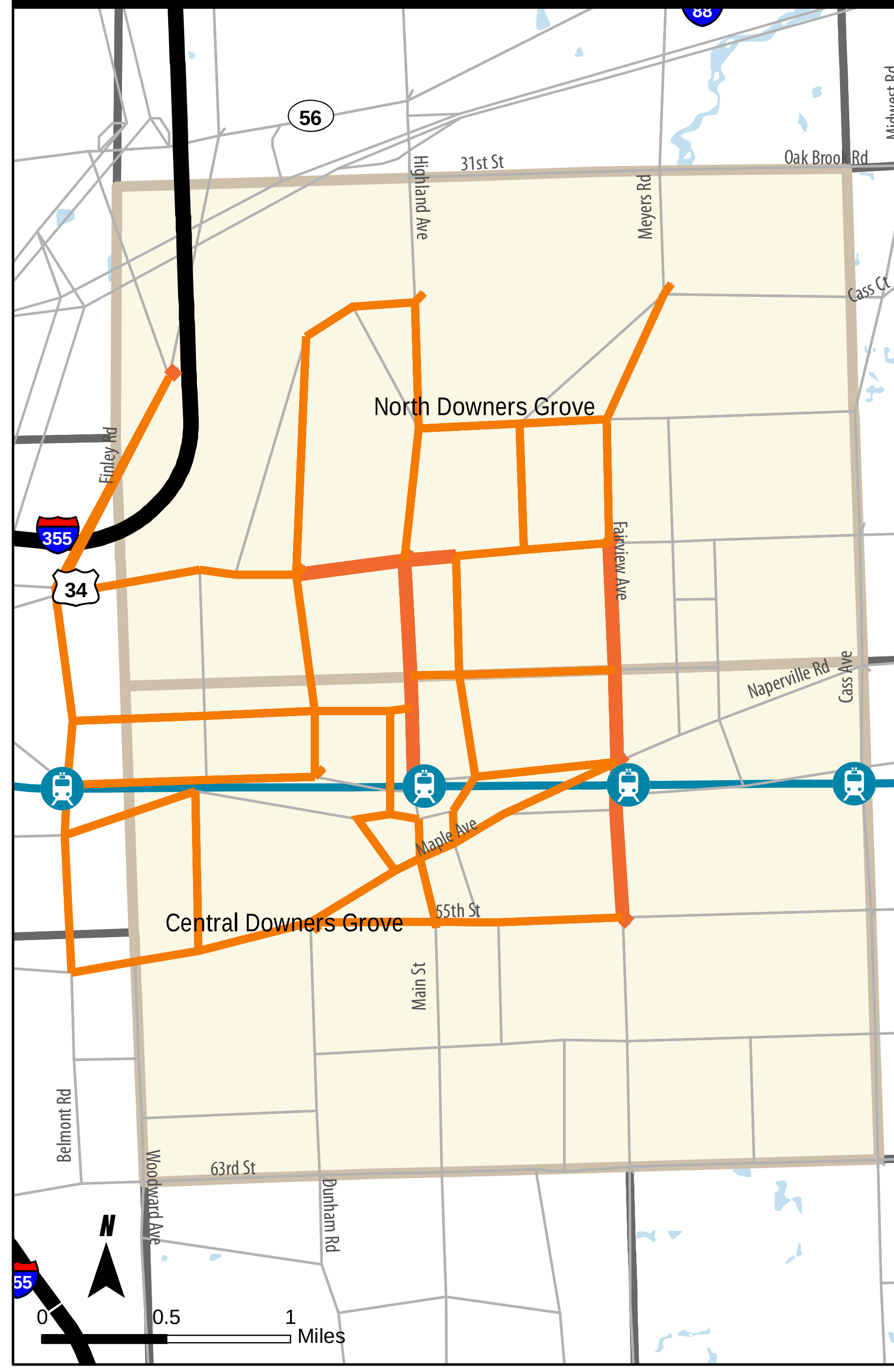
Nelson\Nygaard consulting associates

Daily Person Volume: Map 13

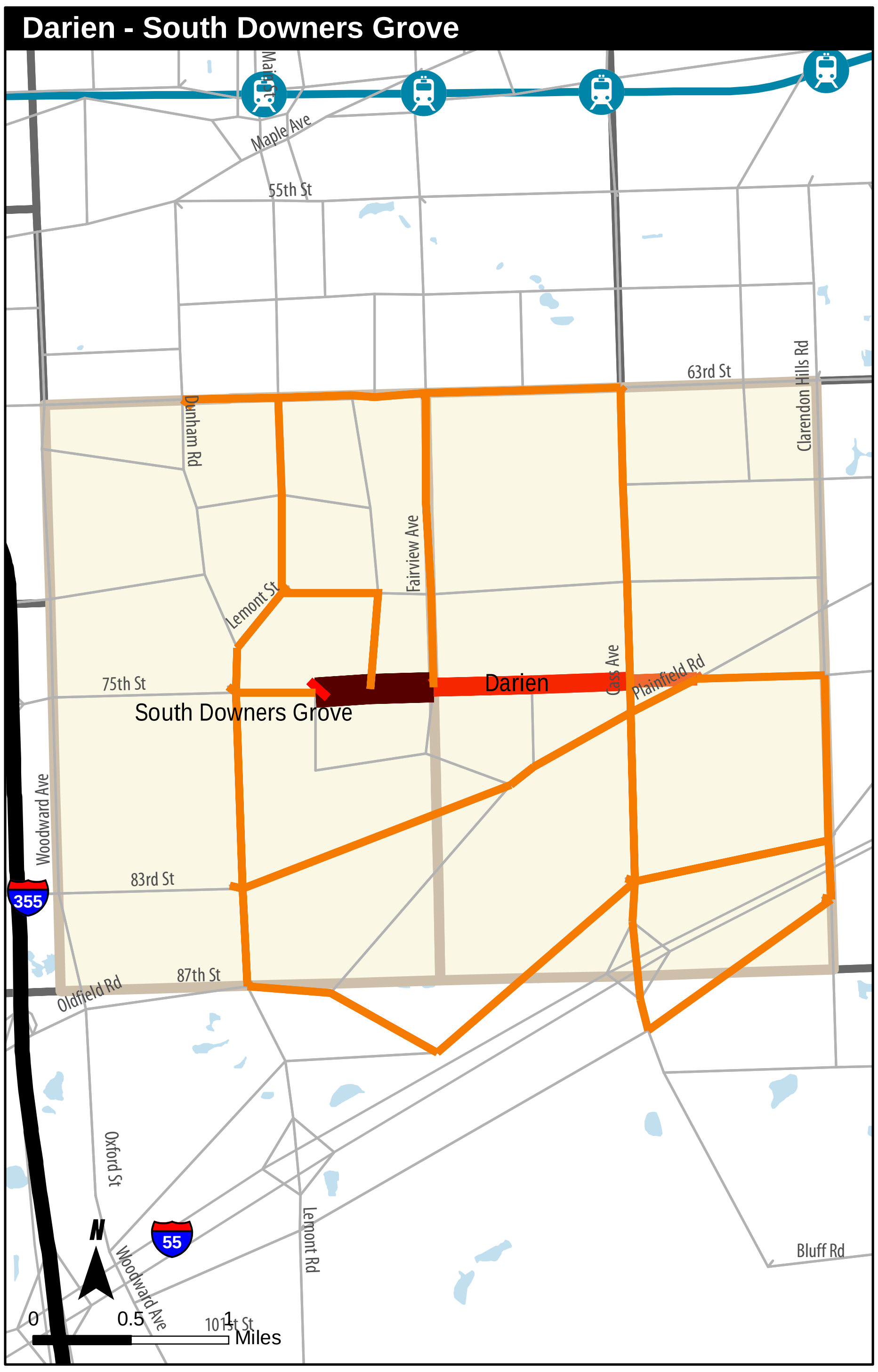
Darien - Burr Ridge/Willowbrook



Central Downers Grove - North Downers Grove



Darien - South Downers Grove



Daily Person Volume

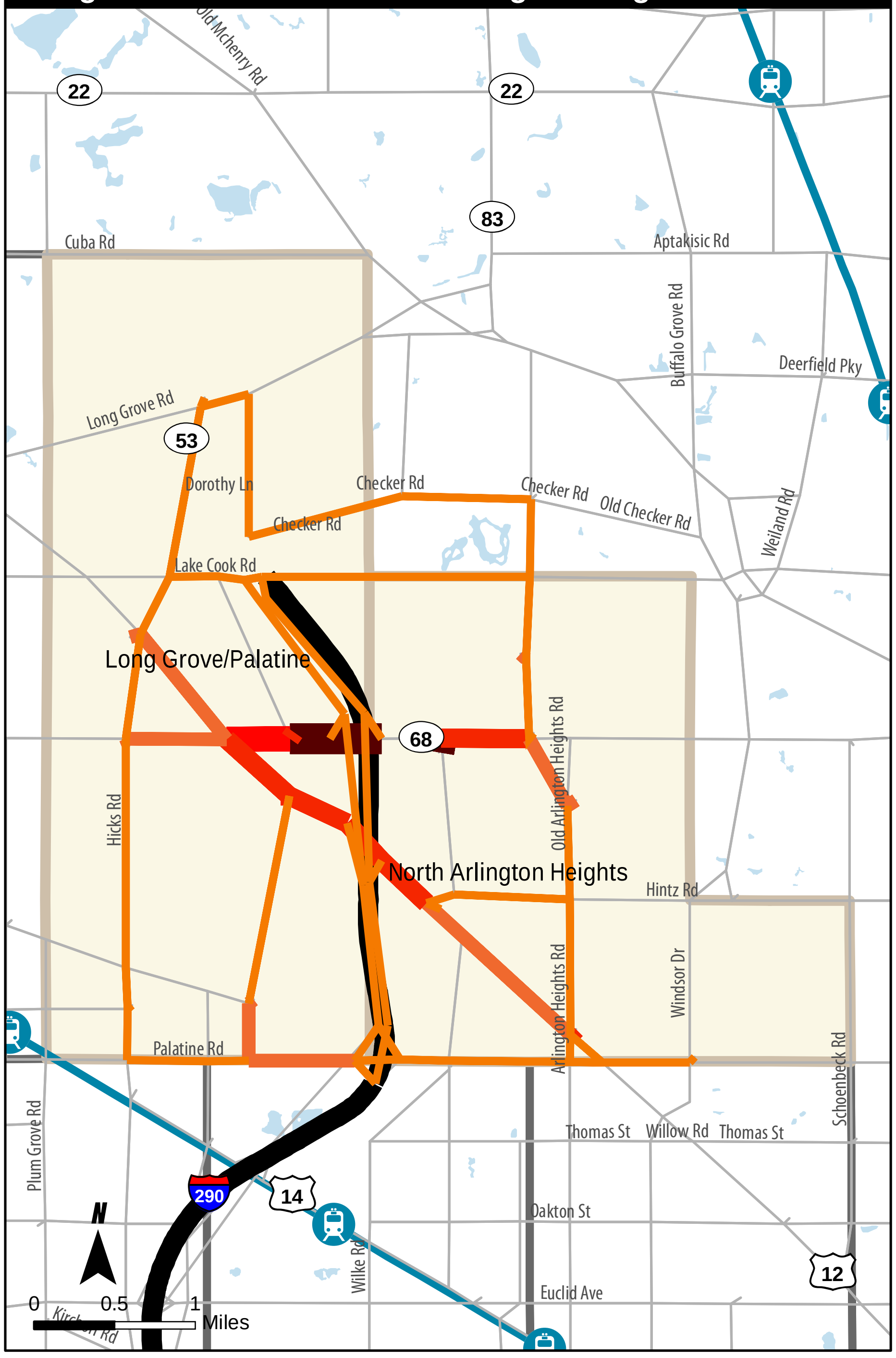
- 1 - 1,000
- 1,001 - 2,000
- 2,001 - 4,000
- 4,001 - 6,000
- 6,001 - 8,000
- Study Corridor
- Metra Stations

Source: Chicago Metropolitan Agency for Planning

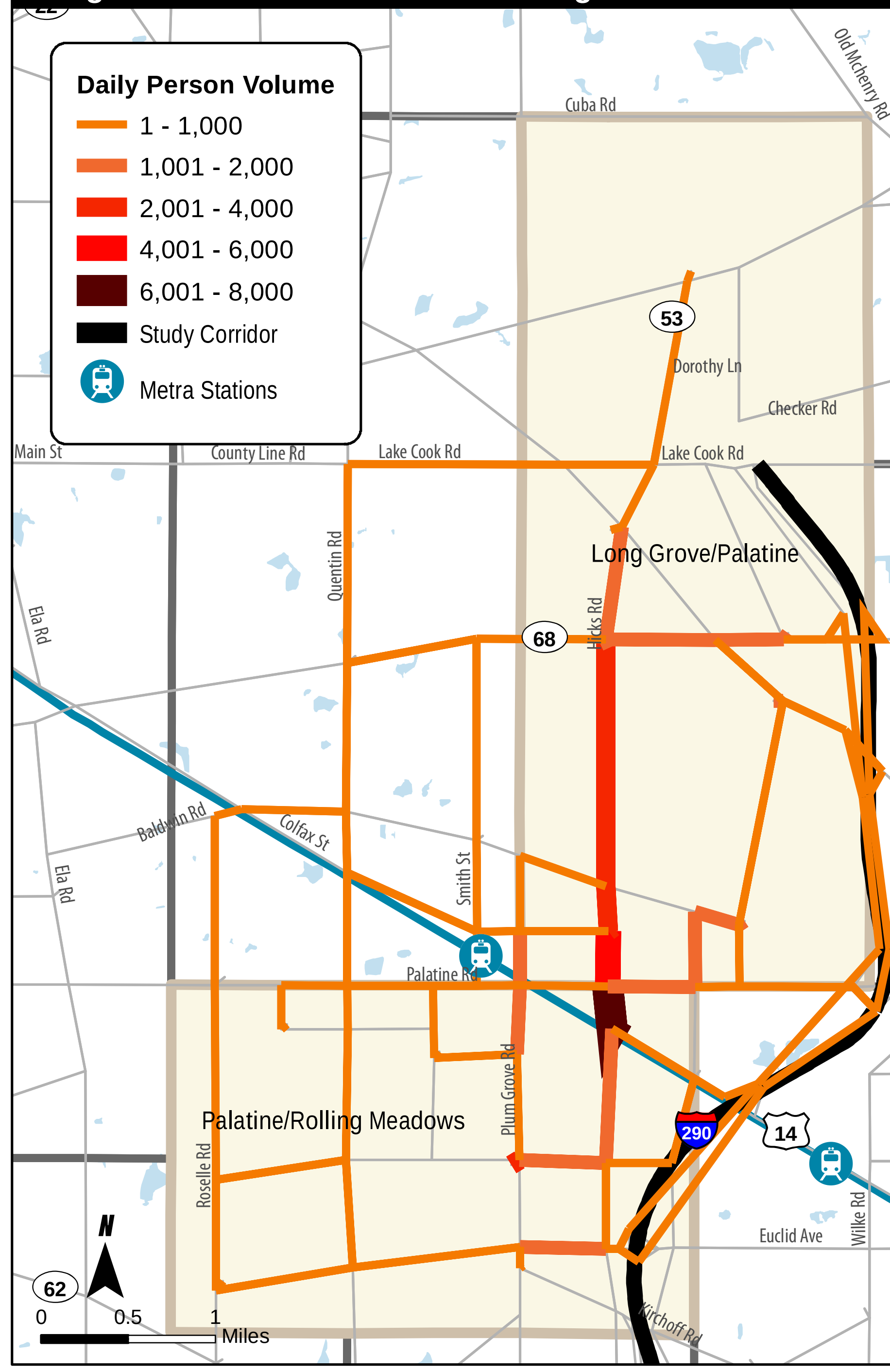
Nelson\Nygaard consulting associates

Daily Person Volume: Map 14

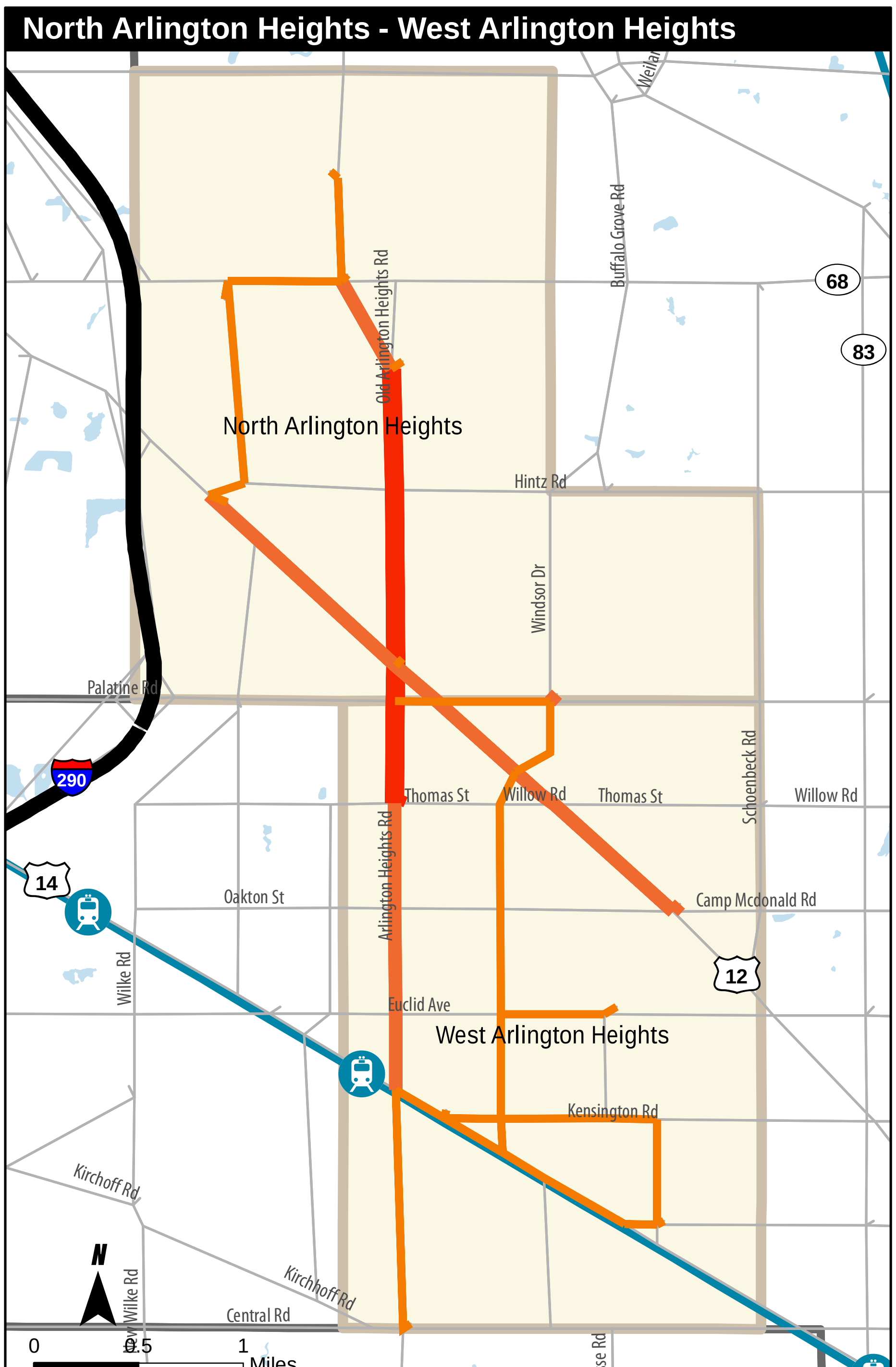
Long Grove/Palatine - North Arlington Heights



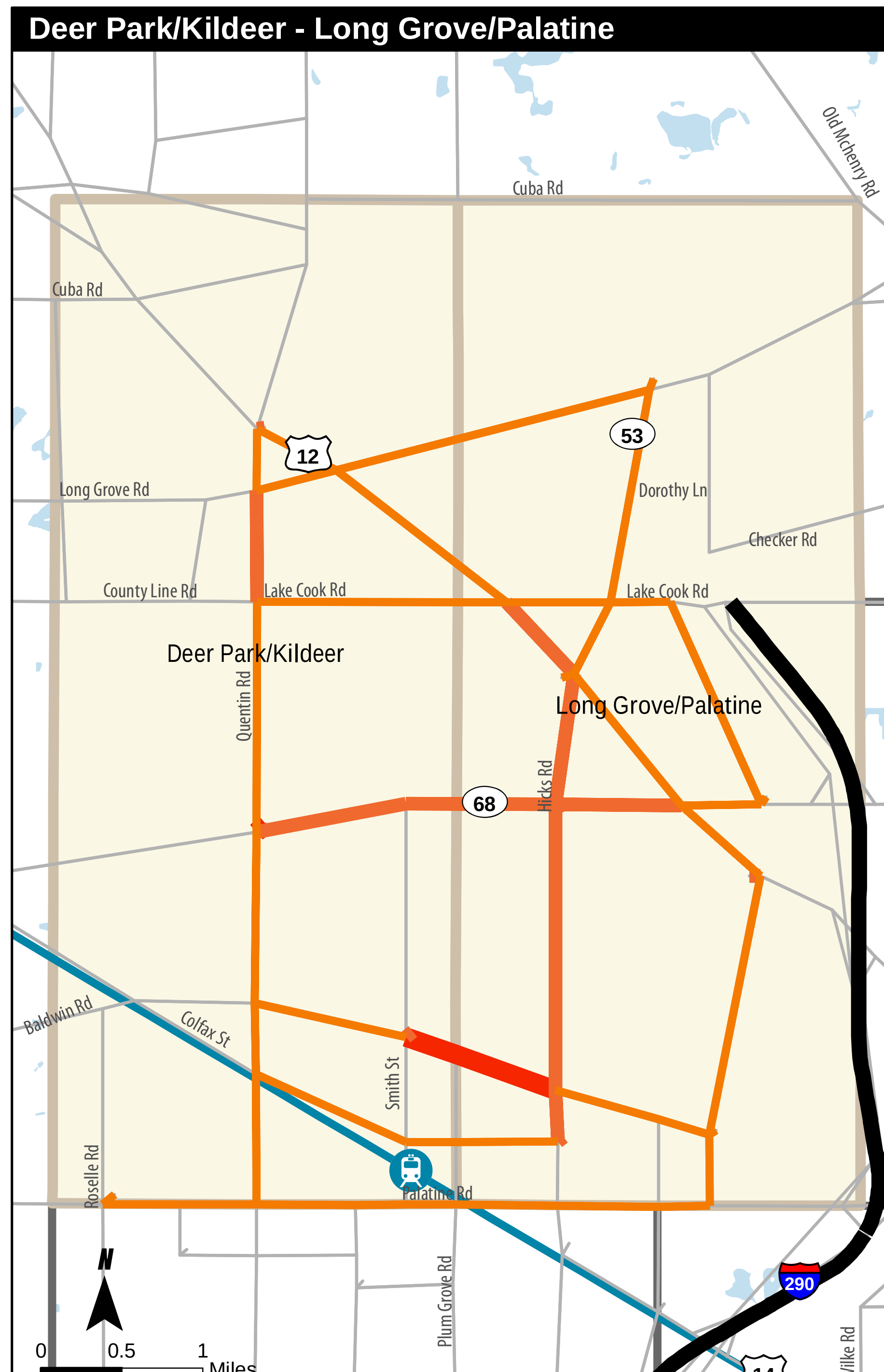
Long Grove/Palatine - Palatine/Rolling Meadows



North Arlington Heights - West Arlington Heights



Deer Park/Kildeer - Long Grove/Palatine

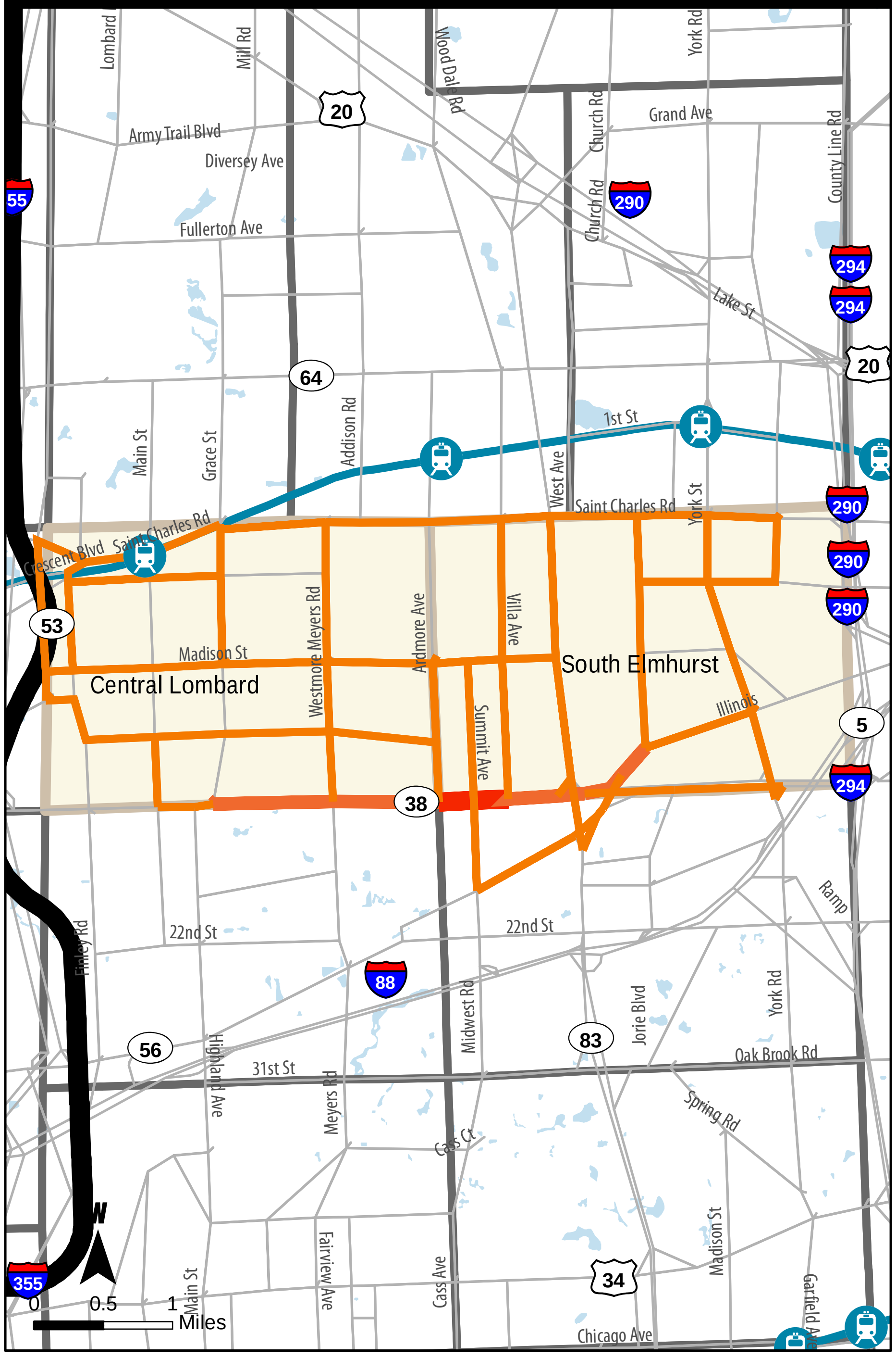


Nelson|Nygaard consulting associates

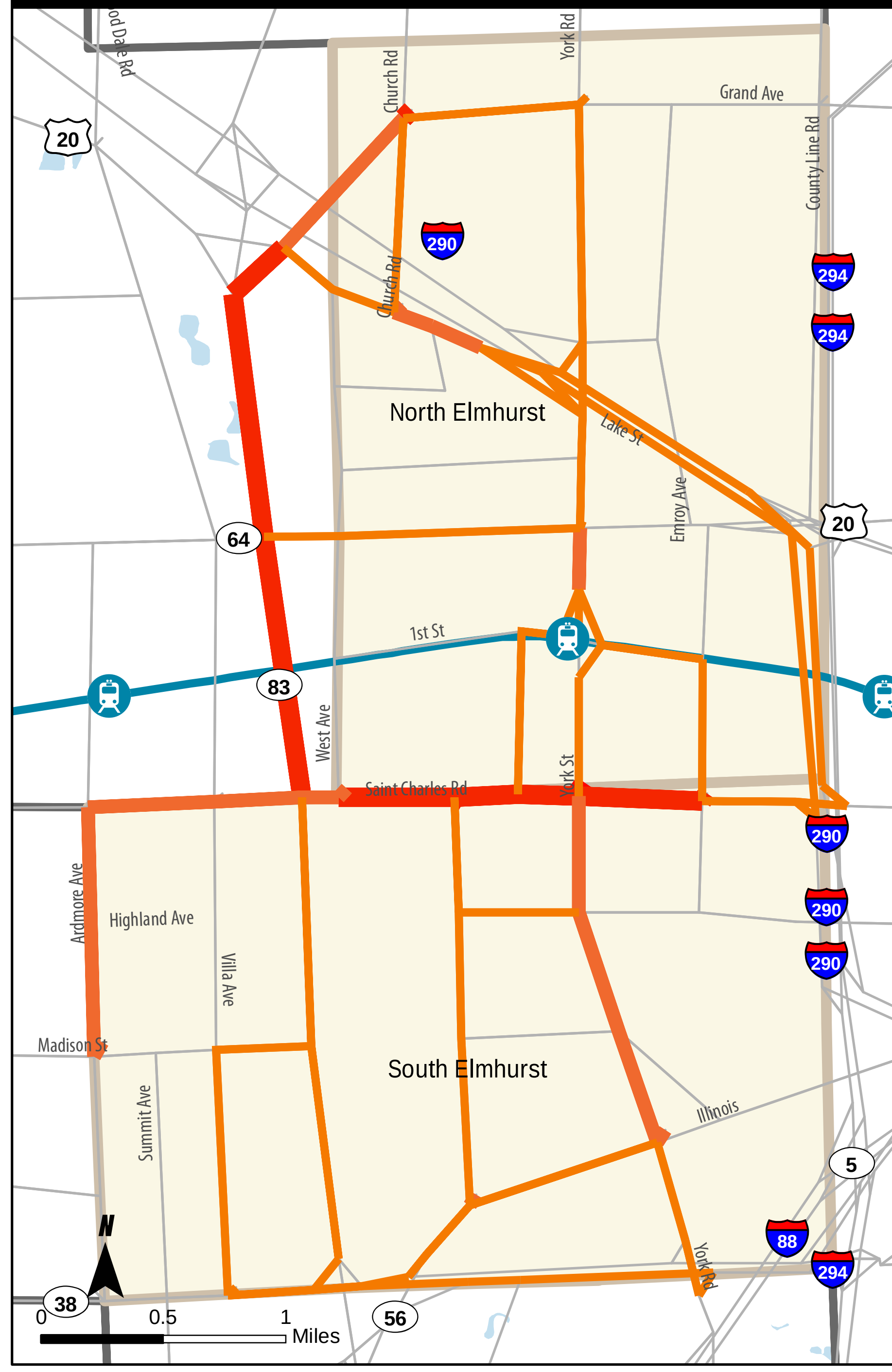
Source: Chicago Metropolitan Agency for Planning

Daily Person Volume: Map 15

South Elmhurst - Central Lombard



South Elmhurst - North Elmhurst



North Glen Ellyn - North Wheaton

Daily Person Volume

- 1 - 1,000
- 1,001 - 2,000
- 2,001 - 4,000
- 4,001 - 6,000
- 6,001 - 8,000
- Study Corridor
- Metra Stations

Source: Chicago Metropolitan Agency for Planning

Nelson\Nygaard consulting associates

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Pace Suburban Bus

I-355 Corridor Transit Development Technical Memorandum #4

Physical Evaluation of Selected Corridors

April 2011

NELSON
NYGAARD

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Table of Contents

Page

Table of Figures

Page

Physical Evaluation of Selected Corridors

In the last memo (Tech Memo #3 Transit Corridors Evaluation) we analyzed the market potential and demand intensity of a number of corridor segments that through a number of index scores and filters that accounted for market size, accessibility, and network connectivity. More than 40 different corridor segments for transit service were analyzed and ranked according to these characteristics. The outcome of this evaluation was a group of corridors that represented a Tier 1 and Tier 2 according to their market size scoring. An additional evaluation was carried over this group to account for duplication of existing PACE service routes and integration (or filling the gap) with the network of services operated by PACE and Metra.

Corridor Physical Assessment

In this memo we develop a preliminary assessment of physical and operational characteristics that would ensure corridor success. This analysis is developed for Tier 1 corridors and evaluates:

- The pedestrian environment along the corridor, including sidewalk barriers and continuity, and availability of pedestrian crossings, particularly in areas of high potential demand, such as a large office park or retail area.
- The operational environment along the corridor, including speed limit, number of travel lanes, street buffers such as parking or landscaping, and potential location of bus stops and the interface between the roadway and the sidewalk.

This analysis is used to categorize corridors in three classes:

1. **Sure Things.** Corridors that present good conditions or viability for transit service and thus are somewhat ready for development of a detailed service and capital implementation plan.
2. **Need Further Evaluation.** Corridors that present some conditions for transit service viability but also have some operational and accessibility barriers that would make transit service less successful. These corridors may qualify for development of a detailed service and capital implementation plan.
3. **Not Ready Yet.** Corridors that are lacking in the basics of supporting accessibility to a transit market and/or presenting some challenges for the placement of bus stops and operation of transit vehicles.

Results of this evaluation show that there is a very close relationship between the level of density, mix of land uses and design of the street network (or accessibility) and the potential to operate successful transit service on any of these corridors. Density, land use, and accessibility design determine the pedestrian environment and operational environment along the corridors and the provision of a built environment that is friendly or unfriendly to other modes of travel.

Results of the analysis will be discussed in more detail with the Project Steering Committee to start identifying and agreeing on conditions for success and appropriate service design guidelines, service levels and types of service (e.g. rail feeder, local circulator, arterial service, or BRT) for particular corridors.

Summary of Findings

The findings of the physical conditions analysis show that the study area is, in a nutshell, a hostile pedestrian environment and a dysfunctional environment for the successful operation of transit services. Although real travel market demands exist in the corridor that could be served with transit along many arterials and even portions of the I-355 corridor itself, the low density of development, segregation of land uses, and general lack of sidewalk accessibility, pose extremely difficult barriers to overcome for anyone wishing not to drive an automobile in this part of the ex-urban area. For example:

- Although most Tier 1 corridors show a high percentage of sidewalks availability and continuity (over 80% of length with sidewalks on both sides of the street), most of this pedestrian infrastructure is underutilized by not connecting to actual destinations or land uses with a clear and direct path to the main building or front door. This is true for the overwhelming majority of retail, commercial and industrial uses, but also for many single-family and multi-family uses and other uses. In other words, the sidewalks are great, but they do not take a pedestrian anywhere, except along the side of the arterial.
- Industrial uses and corporate/retail land uses are generally clustered in specific districts scattered throughout the study area (Schaumburg, Elk Grove, Glenn Ellyn, etc). Employment density at these clusters is relatively high (between 30-35 jobs per acre), however pedestrian accessibility is very poor by being organized in mega-block settings with buildings surrounded by parking, that do not face the main corridor, have very few street connections, no sidewalk connections with building entrances and any potential interconnectivity blocked by fences. Transit users in these areas, despite being very close to their final destination, are faced with long walks around big blocks or walks through landscaping and parking in the best cases.
- Retail developments which typically attract midday trips are mostly the suburban type with frontages behind a continuous string of parking lots that flank a major arterial corridor. Opportunities for pedestrian accessibility and transit users are limited to major automobile entrances only, those that are signalized and provide traffic flow control. Corridor settings like this typically lack a series of urban intersections along the length of the retail corridor that aids the safe navigation of a pedestrian.
- Even corridors showing the best conditions for transit operation have population and employment densities that support a basic level of service only (e.g. every 30 minutes). The best residential areas (those in a grid-like setting with direct access to the main corridor and good sidewalk accessibility) show densities of about 10 people per acre or 3.5 dwelling units per acre. This is a very low density number that according to industry research supports a limited level of transit service only.
- Most arterial corridors selected for analysis are 4 lanes wide with 2 lanes operating in each direction or have a 2-lane, middle turn-lane, 2-lane configuration. Intersections with any kind of traffic control such as a stop sign or traffic light are generally 0.5 miles apart, or farther. Many traffic controlled intersections in arterial corridors lack a full set of pedestrian signals or crosswalks on all four sides of the intersection. This type of street design and traffic control favors driving and driving at high speeds, despite the speed limits of 35 to 40 miles per hour that is prevalent in most corridors. Again, the lack of opportunities for pedestrians to cross streets and high speed operation of traffic make for an generally unsafe environment for pedestrians and transit users.

The major recommendations of this study will, therefore, include suggestions on how to operate transit service in this part of the ex-urban area, what type of services to operate, where to operate them, and what actions are needed to start addressing down some of the barriers that exist today for operation of any level of transit service. This will be of particular importance as a lessons learned for jurisdictions in the study area that will be adding new employment and residential developments anywhere along the corridor, but particularly in the largely undeveloped southern end of the I-355 corridor.

Tier 1 and 2 Corridor Selection

Tech Memo # 3 documents the conduct of an evaluation of alternative transit corridors, or corridor segments, for transit potential market and demand intensity. The methodology to evaluate each selected corridor utilized three screening filters that included: the potential demand for transit, the population and employment market size, and the level of integration or duplication with the existing regional transit network. The evaluation screened out a number of corridors and defined Tier 1 and Tier 2 corridors that presented the best market potential conditions.

In sharing this analysis with the Project Steering Committee, four new corridors were suggested and added to the evaluation; these corridors included combinations of previous corridors that showed good market potential conditions for transit service, they include:

- Wood Dale Metra Station to Downers Grove – Main Metra Station: via Addison, Westmore, Meyers, and Highland.
- Wood Dale Metra Station to Downers Grove – Main Metra Station: via Addison, North, Main, and Highland.
- Wood Dale Metra Station to Downers Grove – Fairview Metra Station: via Addison, Westmore, Meyers, and Fairview.
- Bensenville Metra Station to Downers Grove – Main Metra Station: via York, 22nd Street, and Highland.

As expected, these corridors ranked at the top of the list because they presented good market potential conditions. Table 1 on the next page presents the adjusted ranking and sorting by market size for Tier 1 and 2 corridors that resulted from adding these new corridors in the evaluation.

This list includes several corridors with high travel demand such as Higgins Road, Golf Road, Hicks Road, Meacham Road, Roselle Road, Butterfield Road and 22nd Street. The analysis to this point is non-modal and intends to account for market potential (transit orientation index), travel demand (daily traffic volumes within ODs in the study area), and street connectivity conditions or network conditions that can ensure market accessibility.

The subsequent analysis presented in Table 2 on page 6, evaluates the adjusted list of Tier 1 and 2 corridors for their network duplication and integration. The intent is to start narrowing down and re-ordering the ranking of Tier 1 and 2 corridors by their potential service duplication and/or network integration (e.g. filling gaps in the current transit network or opening new connections and destinations in the network).

Table 2 shows that two of the four corridors added in the evaluation provide a high percent of duplication to existing service, while not necessarily providing a net increment to the network in terms of filling the gap (opening a new corridor or destination). As a result two corridors, Wood Dale to Downers Grove via Westmore and Meyers, and Bensenville Metra to Downers Grove Main, are dropped from further analysis.

Corridors included in the final Tier 1 and Tier 2 list corridors were then evaluated for their transit ridership potential. The methods and results of this analysis are discussed in the next section.

Table 1: Tier 1 and 2 Corridors' Adjusted Market Potential Scoring

		1st Filter				2nd Filter	
		Overall Score	Variable 7			Score 4	
			Effective Market Reach Index			Market Reach	
ID	Selected Corridor	Average Percentile	Total Pop & Empl.	Percent Market Reach	Pop & Empl per Acre	Percentile	TIER
44	Bensenville-Downers_via_York-22nd	76.0%	102,228	88.7%	13.4	100.0%	1
45	WoodDale-Downers_via_Main	81.2%	80,051	96.4%	11.3	78.3%	1
46	WoodDale-Downers_via_Westmore	79.9%	77,931	96.6%	11.6	76.2%	1
8	Higgins	70.3%	71,585	79.8%	13.0	70.0%	1
17	SchaumburgGolf	79.9%	69,599	75.7%	13.3	68.1%	1
47	WoodDale-Fairview_via_Westmore	77.1%	67,163	103.5%	10.2	65.7%	1
43	YorkMeyers	68.9%	64,130	75.7%	12.1	62.7%	1
3	DundeeArlington	74.2%	63,873	79.3%	14.0	62.5%	1
19	WilkeBusse	69.0%	63,598	76.8%	15.1	62.2%	1
4	Golf	80.7%	63,589	72.6%	14.1	62.2%	1
37	RooseveltSpring	68.5%	62,410	73.6%	12.9	61.0%	1
24	Butterfield	78.1%	62,259	71.5%	13.1	60.9%	1
32	MeyersFairview	74.9%	58,968	81.7%	10.3	57.7%	1
41	WestmoreMeyersAddison	70.3%	58,941	76.5%	12.7	57.7%	1
38	Schmale	69.5%	56,493	81.1%	10.8	55.3%	2
23	Bloomingdale	68.7%	56,152	78.6%	9.9	54.9%	2
42	YorkIrvingPark	69.9%	50,910	79.0%	11.4	49.8%	2
6	HicksMeacham	76.5%	48,717	72.2%	13.3	47.7%	2
11	NorthIL53	72.5%	47,534	58.3%	17.0	46.5%	2
31	MainHighland	72.7%	44,537	77.8%	12.0	43.6%	2
5	GolfRoselle	87.8%	43,038	76.3%	11.4	42.1%	2
13	PlumGroveKirchhoff	69.2%	42,898	76.6%	11.3	42.0%	2
14	PlumGroveWise	78.6%	40,751	72.0%	10.5	39.9%	2
21	AddisonStCharles	73.4%	40,423	76.4%	10.5	39.5%	2
1	AddisonIrving	71.9%	35,700	78.0%	9.9	34.9%	2
20	WoodDale	69.0%	30,505	73.4%	8.6	29.8%	2

Table 2: Tier 1 and 2 Corridors' Adjusted Network Duplication and Integration Scoring

		2nd Filter	3rd Filter				
		Score 4					
		Market Reach				Transit Network Duplication/Integration Evaluation	
ID	Selected Corridor	Market Reach Score	Network Overlap	Network Integration	Network Score	Corridor Alignment Comments	TIER
47	Wood Dale to Fairview via Westmore Ave	65.7%	5	5	10	No service duplication. Serves to new corridors on Fairview and Addison. Serves to new destinations at Fairview and Wood Dale Metra.	1
3	Dundee - Arlington	62.5%	5	5	10	No service duplication. Serves new corridor on Dundee Rd and Arlington Heights RD. New destinations on Dundee Rd.	1
32	St Charles - Meyers - Fairview	57.7%	5	5	10	Duplicates Route 313 bet. Washington and 22nd. Service on new corridors (St. Charles and Fairview), and to new destinations (Fairview Metra)	1
8	Higgins Rd	70.0%	5	4	9	Duplicates Route 757 on Busse Rd. Serves on new corridor (Higgins). Service to existing destinations (Alexian Brothers Hospital and Elk Grove Village)	1
45	Wood Dale to D. Grove via Main St	78.3%	4	4	8	Duplicates Route 834 on Highland Ave. Service to new corridors on Main and Addison, and to a new destination at Wood Dale Metra.	1
41	Addison - Westmore - Meyers	57.7%	4	4	8	Duplicates Route 313 bet. Washington and 22nd. Service on new corridors (Addison and Westmore), but existing destinations (York Town Center)	1
46	Wood Dale to D. Grove via Westmore Ave	76.2%	3	3	6	Duplicates Route 834 on Highland and Route 313 on Meyers. Service to new corridor on Addison and to new destination at Wood Dale Metra.	1
17	Schaumburg Rd - Golf Rd	68.1%	3	3	6	Duplicates Route 208 bet. Meacham and Busse. Service on new corridor (Schaumburg). Serves existing destinations (Prairie Towne SC & NWTC)	1
43	York - 22nd - Meyers/Fairview	62.7%	2	4	6	Duplicates Route 332 bet. Elmhurst Metra and Oakbrook Center. New corridor service on 22nd and Meyers/Fairview. New destination at Fairview Metra.	1
24	Highland Ave - Butterfield Rd - York Rd	60.9%	3	3	6	Duplicates Route 834 on Highland Ave and Route 332 on York Rd. Serves on new corridor (Butterfield) but existing destinations (Elmhurst Metra)	1
19	Wilke - Algonquin - Busse	62.2%	2	3	5	Duplicates Route 757 on Busse Rd. Service on existing corridors and to existing destinations. Direct connection bet. Arlington Park and Elk Grove Village	1
44	Bensenville to D. Grove via York Rd - 22nd St	100.0%	1	3	4	Duplicates Route 834 on Main/Highland and Route 332 on York Rd. Serves existing corridors and destinations, but with a one-seat ride avoiding transfers	1
37	Finley - Roosevelt - Spring	61.0%	2	2	4	Duplicates Route 747 bet. Finley and Summit. New corridor service on Spring Rd. No new destinations. Direct connection bet. Elmhurst and Roosevelt.	1
4	Golf Rd	62.2%	1	1	2	Duplicates Route 554 bet. Barington and Meacham. Duplicates Route 208 between Meacham and Busse.	1
23	Bloomingdale Rd - Geneva Rd	54.9%	5	5	10	No service duplication. Service on new corridors (Bloomingdale and Geneva), and to new destination (Roselle Metra)	2
6	Hicks Rd - Meacham Rd	47.7%	5	5	10	Duplicates Route 696 bet. Algonquin and Higgins. Service on new corridor (Hicks and Plum Grove) and new destination (Dundee Rd)	2
21	Addison Rd - North Ave	39.5%	5	5	10	No service duplication. Serves on new corridor (Addison). Serves new destination (Wood Dale Metra)	2
11	North IL-53	46.5%	5	4	9	No service duplication. Although it serves on same segment as Route 556 (IL-53). Service to new destination (Dundee Rd / Plaza Verde SC)	2
5	Golf Rd - Roselle Rd	42.1%	4	5	9	Duplicates Route 554 bet. Roselle and Meacham. Service on new corridor and new destination (Roselle Rd and Roselle Metra)	2
13	Baldwin - Plum Grove - Kirchhoff - Wilke	42.0%	5	4	9	No service duplication. Service to new corridors (Baldwin, Plum Grove, Kirchoff, New Wilke), and to new destinations (Palatine Metra)	2
1	Addison Rd - Irving Park Rd	34.9%	5	4	9	Duplicates Metra Rail on Irving Park. Service on new corridor (Addison) and new destinations (Medinah Industrial Park and North Park Mall)	2
14	Plum Grove Rd - Wise Rd	39.9%	4	4	8	Duplicates Route 602 bet. Springinsguth and Roselle. Service on new corridor (Plum Grove). Serves existing destinations (Schaumburg Metra & NWTC)	2
20	Tonne Rd - Wood Dale Rd	29.8%	5	3	8	No service duplication. Service on new corridor (Tonne, Wood Dale and Villa), and new destinations (Elk Grove Village and Wood Dale Metra)	2
38	Bloomingdale - Army Trail - Schmale	55.3%	3	4	7	Duplicates Route 711 bet. Fullerton and Wheaton Metra. New corridor service on Bloomingdale, and to new destination at Roselle Metra.	2
42	York - Irving Park	49.8%	3	3	6	Duplicates Route 332 bet. Elmhurst and Bensenville Metra. Service on new corridor (Irving Park Rd) and to new destinations (Wood Dale and Itasca Metra	2
31	Main - Highland	43.6%	2	2	4	Duplicates Route 834 on Highland Ave. Serves new corridor on Main St., but existing destinations. Direct connection between Lombard and D. Grove Me	2

Corridor not selected for further analysis.

Ridership Modeling

This chapter describes the methods used to predict ridership on Tier 1 and 2 corridors. A statistical single-regression model was developed using existing ridership data on selected PACE bus routes. Routes and data were selected to represent an arterial-based fixed-route service in conditions similar to those in Tier 1 and Tier 2 corridors. A different method was developed to predict ridership on the North IL-53 corridor which it was assumed would be an express bus operation. This methodology used a GIS-based approached that analyzed U.S. Census Bureau Longitudinal Employer-Household Dynamics (LEHD) information and utilized the "On The Map" tool.

Arterial-Based Fixed-Route

Methods

As mentioned above, the intent was to develop a model predicting route level ridership based on characteristics of the urban areas surrounding the corridor. Many factors affect a bus route's ridership, including socioeconomic factors, physical environment characteristics, and connections to other transit lines. We used an ordinary least squares regression to model ridership on existing Pace routes using a number of explanatory variables that were readily available. These variables included:

- Population density per acre
- Employment density per acre
- Median income per acre
- Autos per acre
- Number of residents who moved to the United States in the past 5 years per acre
- Hispanic population per acre
- Average traffic volume in the corridor (from CMAP model)
- Serves a CTA station (this was used as a yes, no condition or 'dummy' variable)
- Serves a Metra station (this was used as a yes, no condition or 'dummy' variable)

One major variable affecting transit demand is the supply of transit service, which can be measured in number of trips or service hours. However, the level of service is also affected by the demand for transit – Pace provides high levels of service where there is high demand for transit and low levels of service where there is low demand. The simultaneity of the two variables can lead to biased and inconsistent estimates of the coefficients in ordinary least squares models,[1] so we elected to exclude the level of service as an explanatory variable in the model. If a route is proposed with a much higher level of service than current Pace routes, the ridership estimate could be adjusted upwards using an elasticity value. The general consensus in the literature is that the elasticity of demand for

[1] Brian D. Taylor, Douglas Miller, Hiroyuki Iseki, and Camille Fink, "Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas," Transportation Research Part A 43 (2009): 60-77.

transit with respect to service levels is between 0.3 and 0.5,[2] meaning that for every 1% increase in service, ridership increases by 0.3% to 0.5%.

Initially, we used data from 26 Pace routes to measure the impact of the variables on ridership. We selected routes that provide arterial-based fixed route service throughout the day to match the type of service that could be provided on the Tier 1 and 2 corridors. Twelve of the routes provide service in some portion of the I-355 study corridor. We considered estimating the model using only these 12 routes, but decided against it because the sample size would be too low and would yield a statistically weak model. The socioeconomic variables came from the year 2000 U.S. Census at the Census Transportation Planning Package (CTPP) Traffic Analysis Zone (TAZ) scale. We used a one-half of a mile buffer around each corridor to calculate values for the socioeconomic variables using ArcGIS.

After estimating a number of different models using different combinations of the variables above, we determined that a model with ridership per mile as the explained variable and population density, employment density, and traffic volume as the explanatory variables had the best model fit. Table 3 below presents the results of the final regression model.

Table 3: Ridership Model Variables and Coefficients

Variables	Parameter	P-value
Population per acre	4.7856	0.0002
Employment per acre	2.3892	0.0868
Traffic volume	0.0019	0.0078
Intercept	-30.8483	0.0134
Observations	26	
Adjusted R-squared	**0.5867**	

Population per acre and traffic volume were statistically significant at a 99% confidence interval while employment per acre was significant at the 90% confidence level. The adjusted R-squared for the model was 0.5867, which means that the model explains 59% of the variation in ridership on the 26 Pace routes. The following equation can be used to predict ridership on Pace routes:

*Ridership per mile = -30.8483 + 4.7856*population per acre + 2.3892*employment per acre + 0.0019* average traffic volume in the selected corridor*

Table 4 below presents the model results when predicting ridership on the 26 Pace routes used in the development of the model. It includes point predictions, which are the estimates calculated by inputting values for each corridor into the model equation, as well as an 85% prediction intervals. The prediction interval is a measure of probability that the true ridership will be within that interval. The point prediction for Route 319 is 590, which is relatively close to the actual ridership of 512, and

[2] Graham Currie and Chris Loader, "High Ridership Growth from Extended Transit Service Hours: An Exploration of the Causes," Transportation Research Record 2110 (2009): 120-127.

the prediction interval is 353 to 827. The interval is relatively wide in general (with a few cases including negative values for the lower bound prediction), because the model predicts approximately 60% of the variation in ridership among Pace routes, so the interval must account for variation in the factors that make up the other 40%. As such the model is only 60% perfect, over-predicting and under-predicting ridership by a wide margin in many cases.

Table 4: Ridership Model Prediction of Selected PACE Lines

Route #	Daily Trips	Average Weekday Boardings (2009)	Point Prediction	85% Prediction Interval Lower Bound	85% Prediction Interval Upper Bound
221	49	754	631	261	1,001
226	54	677	781	412	1,151
234	36	343	597	160	1,034
304	40	517	668	440	895
309	52	899	656	423	889
313	53	1,283	945	538	1,352
319	65	512	590	353	827
325	41	465	566	278	854
332	29	467	569	195	943
528	36	122	111	2	220
529	33	409	256	-143	655
530	57	765	506	142	870
532	36	149	148	-28	324
533	36	217	88	-50	226
543	34	269	239	32	447
563	27	204	261	119	403
606	79	1,332	1,111	691	1,532
696	32	261	622	257	986
711	25	198	651	201	1,101
714	35	302	343	107	579
715	28	458	697	90	1,304
801	24	201	263	-207	734
802	39	315	287	-33	607
803	42	304	144	-10	298
832	24	103	202	-21	425
834	32	665	856	134	1,579

Tier 1 and Tier 2 Ridership Estimates

Table 5 below presents the ridership estimates from the single-regression model for the corridors in Tiers 1 and 2. It includes point predictions as well as 85% prediction intervals. The point prediction for the Wood Dale – Downers Grove via Main corridor is 476 and the prediction interval is 153 to 798. This means that we would expect a route operated along this corridor at service levels comparable to other Pace routes in the area (roughly every 30-minute frequency on a 14-hour service-span) to have average daily boardings between 153 and 798.

Table 5: Tier 1 & 2 Corridors Ridership Estimates

				85% Prediction Interval	
ID	Corridor Alignment	Tier	Point Prediction	Lower Bound	Upper Bound
8	Higgins Rd	1	529	247	810
17	Schaumburg Rd - Golf Rd	1	487	236	738
45	Wood Dale to D. Grove via Main St	1	476	153	798
3	Dundee - Arlington	1	475	280	671
47	Wood Dale to Fairview via Westmore Ave	1	391	99	682
19	Wilke - Algonquin - Busse	1	389	196	583
24	Highland Ave - Butterfield Rd - York Rd	1	387	156	618
41	Addison - Westmore - Meyers	1	380	163	597
43	York - 22nd - Meyers/Fairview	1	358	113	603
32	St Charles - Meyers - Fairview	1	341	106	576
38	Bloomingdale - Army Trail - Schmale	2	363	131	596
23	Bloomingdale Rd - Geneva Rd	2	354	114	594
42	York - Irving Park	2	328	142	514
5	Golf Rd - Roselle Rd	2	324	117	532
21	Addison Rd - North Ave	2	275	105	445
6	Hicks Rd - Meacham Rd	2	262	86	439
14	Plum Grove Rd - Wise Rd	2	238	68	408
1	Addison - Irving Park Rd	2	231	49	413
13	Baldwin - Plum Grove - Kirchhoff - Wilke	2	188	19	357
20	Tonne Rd - Wood Dale Rd	2	91	-77	258

The highest ridership prediction is registered by Higgins Road (529 boardings). This is consistent with the regression model by accounting for the high population and employment density as well as high traffic volumes that are present in the corridor. However it also shows the weakness of the model by predicting high ridership in a physical environment with significant barriers for pedestrian accessibility to reach their final destinations and even for crossing the street to ride on transit. In addition, Higgins Road's 85% prediction interval (247 to 810) is one of the largest intervals in absolute value, providing a general indicator that other factors can have a great influence, and add significant variability, to ridership estimates.

Highway-Based Express Route

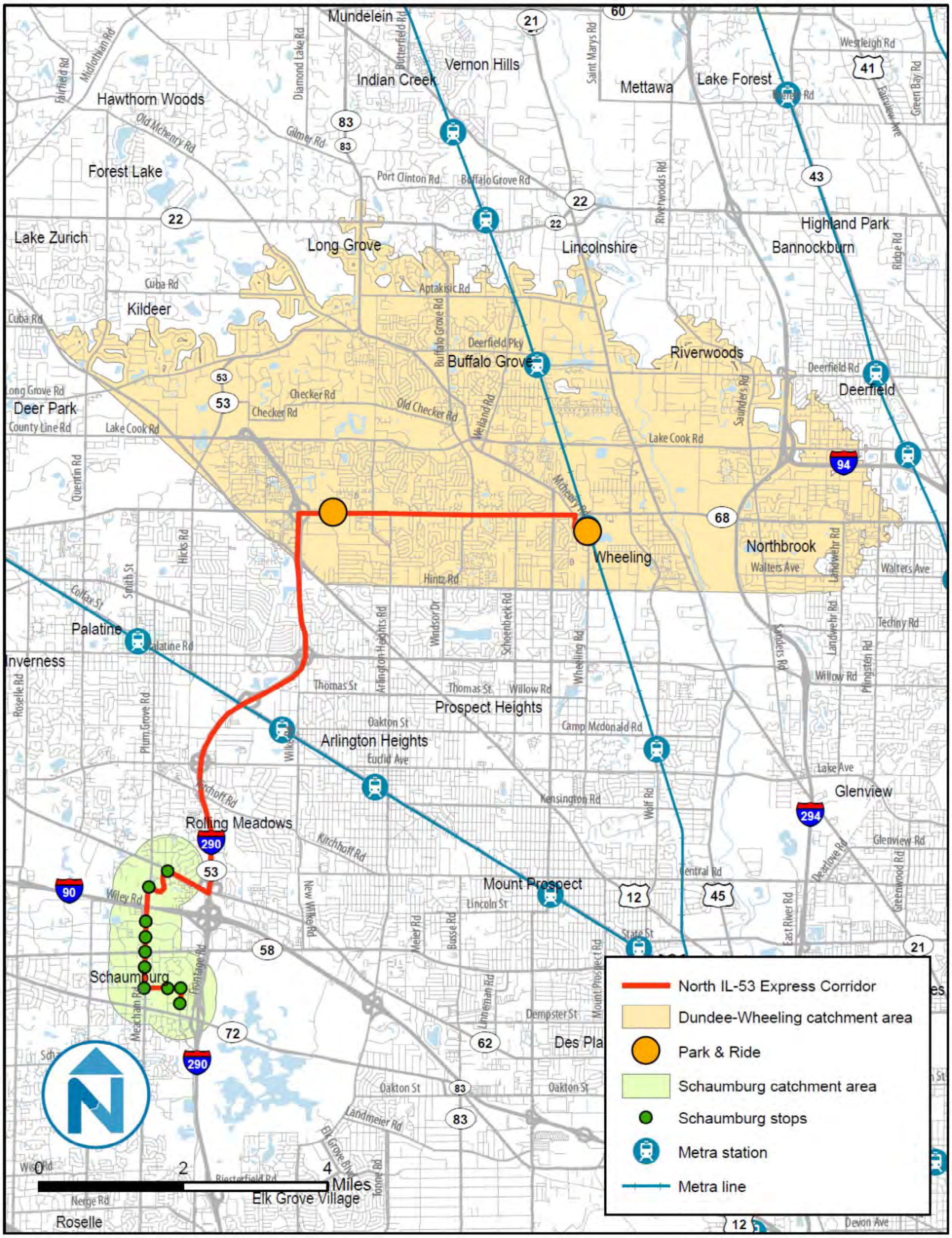
Estimating ridership for express routes is different than for arterial-based fixed-routes because of the type of service provided on each. A fixed-route bus picks up and drops off riders periodically along the route, so ridership can be predicted from the characteristics of the area surrounding the route. Express route buses typically pick up riders in one area, travel a long distance, and then drop them off in another area. These routes tend to serve commuters, picking up riders in the morning from residential areas and dropping them off in employment areas, and doing the reverse in the evening. Given these factors, and the fact that Pace does not have many express routes similar to the proposed North IL-53 corridor, we developed a separate method to predict ridership for that corridor.

We assumed that a route serving the North IL-53 corridor would travel along Dundee Rd. from the Wheeling Metra station to IL-53, then proceed south on IL-53 before exiting at Algonquin Rd. and serving the Schaumburg area along Thoreau Dr, Meacham Rd, and Woodfield Rd. Riders would be able to park at the Wheeling Metra station and at a park & ride near Dundee Rd. & Kennicott Ave. We assumed that the catchment area for riders around a park & ride would be 5 miles, but that potential riders to the south and west of the park & ride would be less likely to ride given that they would be driving in the opposite direction from where they were going, so we trimmed the area on the southern and eastern edges. The catchment area was calculated through the street network using the ArcGIS Network Analyst tool. The catchment area around the stops in Schaumburg was assumed to be ½ mile, and a pure ½ mile buffer was used because riders would not necessarily be limited to walking next to streets in the area, as the area is dominated by large parking lots. Figure 1 illustrates the alignment and catchment areas. We also evaluated a slightly different alignment using park & rides further north at the Buffalo Grove Metra station and the intersection of Arlington Heights Rd. & Lake Cook Rd

After defining the origin and destination areas, we used the LEHD OnTheMap tool to estimate the number of people who live in the origin area and work in the destination area for their primary jobs. The tool produced an estimate of 1,115 people. The estimate for the Arlington Heights Rd./Lake Cook Rd. alignment was 930. These figures can be converted to ridership estimates by assuming a transit mode share. According to the 2001 National Household Travel Survey, the national average for transit mode share to work is 4.9%. Assuming a 5% mode share, an express route offering peak directional service to Schaumburg in the morning and Dundee Rd./Wheeling in the evening would serve 56 people daily and have 112 daily boardings. The Arlington Heights Rd./Lake Cook Rd alignment would serve 47 people daily and have 94 daily boardings.

If the Il-53 Route from Wheeling Metra to Schaumburg was very successful attracting as much as 10% of its direct catchment area, it would only produce just over 220 passenger trips every day, at levels of service similar to those implemented for Route 655 (6 trips in morning and 6 trips in the evening in the peak direction of travel) this would be an average ridership of 18 passengers per trip. A performance like this would not be a resounding success, but a moderate success. The issue, however, is to actually achieve a 10% mode split in a service like this, operating in an environment that provides significant advantages to the automobile and all many barriers to transit users to access destinations.

Figure 1: Wheeling Metra to Schaumburg Express Bus Service Example



Data Sources: CMAP, Pace, ESRI, State of Illinois

Physical Evaluation of Tier 1 Corridors

Physical Characteristics Screening

The characteristics of the physical environment on each of the Tier 1 corridors are analyzed in this section to look for clues that may help Pace review service design guidelines and level of service standards for current and new service in the future. Eight major evaluation criteria were utilized in the analysis that account for physical characteristics of the roadway, physical characteristics of sidewalks, and urban form characteristics of market areas with immediate access to corridors. The evaluation was conducted on-line following the alignment of the Tier 1 corridors in Google Earth. The eight criteria used for evaluation are summarized below.

Roadway Physical Characteristics

1. Number of Travel Lanes

The number of travel lanes was measured as a proxy for roadway width and likely speed of traffic. Most arterial corridors in the study area have speed limits between 30 and 40 miles per hour. However, field observations show that on corridors with a narrower roadway (i.e. 1 lane or 1 lane + turning lane) traffic operates closer to the speed limit (at about 35 mph), while on corridors with a wider roadway (i.e. 2 or 3 lanes) traffic operates well above the speed limit (at about 50 mph). Tier 1 corridors show a combination of roadway segments of different width. The scoring methodology was to assign values from 1 to 5 according to the following characteristics:

5 = corridors with combinations of 1 lane, 1+1 lanes and 2 lanes

4 = corridors with combinations of 2 lanes and 2+1 lanes

3 = corridors with combinations of 1 lane or 2+1 lanes and 3 lanes

2 = corridors with combinations of 2+1 lanes or 3 lanes and 3+2 lanes

1 = corridors with combinations of 3 lanes and 3+2 lanes or 3 lanes + shoulder lane

2. Number of Signalized Intersections

The number of signalized intersections (i.e. with traffic signals) is measured to represent traffic and speed control opportunities and potential impacts on bus service operations. Most Tier 1 corridors have an average of about 10 street crossings or intersections per mile. However the majority of crossings are with small streets and do not have traffic signals. The scoring methodology assigned values from 1 to 5 according to the number of signalized intersections per mile. More signalized intersections was deemed to be a positive characteristic for transit service operations as this would allow more pedestrian crossings and traffic and speed control opportunities.

5 = an intersection every 0.25 miles

4 = an intersection every 0.30 miles

3 = an intersection every 0.35 miles

2 = an intersection every 0.40 miles

1 = an intersection every 0.45 miles

3. Number of Intersections with Complete Crosswalks

The number of intersections with complete crosswalks (i.e. at least 3 crosswalks striped in place at intersections) is measured to characterize pedestrian crossings opportunities and accessibility to potential bus stops and destinations. Most Tier 1 corridors contain signalized intersections with limited or no pedestrian phases. The scoring methodology assigned values from 1 to 5 according to the number of intersections with crosswalks or the average interval between these intersections.

5 = an intersection every 0.30-0.45 miles

4 = an intersection every 0.45-0.60 miles

3 = an intersection every 0.60-0.80 miles

2 = an intersection every 0.80-1.00 miles

1 = an intersection every 1.00 mile or more

Physical Characteristics of Sidewalks

4. Street and Sidewalk Buffering

The street and sidewalk buffering provides a qualitative assessment of the roadway buffering or the space between GP traffic lanes and the sidewalk. This criterion assesses the position of the sidewalk whether it is up to the curb and behind a street parking buffer or behind a landscaping buffer. The idea is to account for street parking, shoulder lanes, and pedestrian accessibility to the curb as it relates to potential bus stops and service. Tier 1 corridors did not show significant differences in the way this intermediate space is handled. In general there is no street parking along any of the corridors except for a few short segments in downtowns of cities like Elmhurst, Downers Grove or Wheaton. Only a few corridors have shoulder lanes that buffer GP travel lanes from the curb or sidewalk. All corridors are characterized by a landscaping strip of varying width that buffers the sidewalk from traffic lanes. In this context the scoring methodology assigned values from 1 to 5 based on the following mix of conditions:

5 = Mostly on street side and narrow landscaping buffer and no shoulder lane

4 = Mostly behind narrow landscaping buffer and some segments on street side

3 = Behind both wide and narrow landscaping buffer

2 = Mostly behind wide landscaping buffer

1 = Behind wide landscaping buffer, long segments of no sidewalk and shoulder lane

5. Sidewalk Availability and Extent

This criterion is a quantitative measure of sidewalk availability on both sides of the corridor and the length in miles of continuous sidewalk and gaps of no sidewalk. It is provided as a measure of pedestrian accessibility in general. The scoring methodology assigned values from 1 to 5 according to the extent of sidewalk along both sides of the corridor:

5 = Available on 95-100% of corridor

4 = Available on 85-90% of corridor

3 = Available on 75-80% of corridor

2 = Available on 65-70% of corridor

1 = Available on 50-60% of corridor

6. Pedestrian Access to Destinations

This is mostly a qualitative assessment of accessibility to destinations and land uses along corridors. In most cases direct pedestrian access from the sidewalk to buildings is observed for residential uses, schools, churches and other institutions. Access to suburban retail (i.e. strip malls, big box retail, and shopping malls) as well as business parks, corporate parks and industrial parks is mostly indirect (i.e. through off-street parking or side streets), and in some cases there is no access at all. The scoring methodology assigned values from 1 to 5 according to directness of access based in the following mix of conditions:

5 = Direct access to residential and retail uses

4 = Direct access to residential and indirect access (i.e. through parking lot) to retail uses

3 = Direct and indirect access (i.e. through side streets) to residential

2 = Indirect access to residential and retail

1 = No access (i.e. no sidewalk) to residential and retail

Urban Form Characteristics

7. Urban Form Typologies

A number of urban form patterns are repeated throughout the corridor study area. Eight (8) urban form typologies were identified that illustrate distinctive conditions of population and employment market accessibility, development density, and actual market reach and size. The scoring methodology assigns values from 1 to 5 based on the mix or presence of the following typologies along each corridor. More description and details about these urban form typologies are provided in the next chapter of this memo.

5 = Rectangular grid perpendicular or parallel to corridor

4 = Modified grid curvilinear

3 = Megablock with development intrusions or suburban commercial frontage

2 = Megablock with developed perimeter or suburban commercial megablock

1 = Disconnected suburban grid or ‘fish bones’ or industrial megablock

8. Land Use Patterns

The mix of land use activities along corridors was also measured to account for trip generators and destinations along Tier 1 corridors. The scoring methodology assigns values from 1 to 5 according to the mix of uses and potential travel markets (i.e. all day, midday or peak hour only) based on the following conditions.

5 = Multi-family residential, street front retail, schools, churches, and hospitals

4 = Single-family residential, schools, and churches

3 = Single-family residential, strip malls, big box retail and business parks

2 = Big box retail, corporate parks and industrial/warehousing

1 = Suburban shopping malls, corporate parks and industrial/warehousing

Table 6: Physical Evaluation of Tier 1 Corridors

		Street and Intersections Conditions		
ID	Selected Corridor	Number of Travel Lanes	Signalized Intersections	Crosswalk Completion (at least 3 sides of intersection)
45	Wood Dale to D. Grove via Main St	2 to 2+1 lanes in Addison. 3+2 lanes/median in North. 2 to 1 to 2 lanes in Main 2+1 to 2 lanes in Highland/Main	44 signalized intersections. 1 every 0.35 miles. 30% of all intersections.	29 intersections with crosswalks. 1 every 0.50 miles. 66% of signalized intersections.
3	Dundee - Arlington	2+1 lanes in Dundee. 2 lanes in North Arlington. 2+1 lanes in South Arlington.	25 signalized intersections. 1 every 0.35 miles. 31% of all intersections.	25 intersections with crosswalks. 1 every 0.35 miles. 100% of signalized intersections.
32	St Charles - Meyers - Fairview	1+1 lane in S Fairview. 2+1 to 2 lanes in Fairview/Meyers 2+1 lanes in St. Charles. 1+1 to 1 lane in E St. Charles/York	32 signalized intersections. 1 every 0.35 miles. 28% of all intersections.	23 intersections with crosswalks. 1 every 0.45 miles. 72% of signalized intersections.
41	Addison - Westmore - Meyers	2+1 to 2 lanes in Addison. 2 lanes in Westmore-Meyers. 2 lanes + median in 22nd/Highland. 3 lanes + median in Butterfield	32 signalized intersections. 1 every 0.30 miles. 43% of all intersections.	18 intersections with crosswalks. 1 every 0.50 miles. 56% of signalized intersections.
23	Bloomingdale Rd - Geneva Rd	2 to 2+1 lanes in Bloomingdale 2 to 2+1 lanes in Geneva 1 lane in Gary/West	28 signalized intersections. 1 every 0.40 miles. 27% of all intersections.	21 intersections with crosswalks. 1 every 0.55 miles. 75% of signalized intersections.
47	Wood Dale to Fairview via Westmore Ave	2 to 1+1 to 2 lanes in Fairview 2+1 lanes in Meyers 2 lanes in Westmore 2 to 2+1 lanes in Addison	37 signalized intersections. 1 every 0.35 miles. 30% of all intersections.	23 intersections with crosswalks. 1 every 0.60 miles. 62% of signalized intersections.
24	Highland Ave - Butterfield Rd - York Rd	1+1 w/parking to 2 lanes in Main 2+1 lanes in Highland. 3+2 to 2+1 lanes in Butterfield. 2 to 1 lanes in York.	33 signalized intersections. 1 every 0.30 miles. 35% of all intersections.	20 intersections with crosswalks. 1 every 0.50 miles. 61% of signalized intersections.
6	Hicks Rd - Meacham Rd	2+1 lanes w/shoulder in Dundee. 2+1 lanes in Hicks. 2 lanes in Euclid 1 lane in Plum Grove 3+2 lanes in Meacham	28 signalized intersections. 1 every 0.25 miles. 39% of all intersections.	16 intersections with croswalks. 1 every 0.50 miles. 57% of signalized intersections.
17	Schaumburg Rd - Golf Rd	2+1 lanes in Schaumburg 3+2 Lanes in Meacham 3+2 to 2+1 in Golf Road	33 signalized intersections. 1 every 0.35 miles. 40% of all intersections.	19 intersections with crosswalks. 1 every 0.60 miles. 58% of signalized intersections.
43	York - 22nd - Meyers/Fairview	1 lane to 2 lanes In York 3+2 lanes or median in 22nd 2+1 to 1+1 lanes in Fairview.	36 signalized intersections. 1 every 0.30 miles. 37% of all intersections.	16 intersections with croswalks. 1 every 0.70 miles. 44% of signalized intersections.
19	Wilke - Algonquin - Busse	2+1 lanes in Wilke. 2+2, 3+1, 2+1 lanes in Algonquin. 2+1 to 3+2 lanes in Busse.	24 signalized intersections. 1 every 0.35 miles. 31% of all intersections.	10 intersections with crosswalks. 1 every 0.90 miles. 42% of signalized intersections.
8	Higgins Rd	2 lanes + wide median + shoulder. 3 lanes + 2 turn lanes + shoulder. 2 lanes + median at B Woods. 3 lanes + 1 lane + shoulder.	27 signalized intersections. 1 every 0.45 miles. 35% of all intersections.	10 intersections with crosswalks. 1 every 1.30 miles. 37% of signalized intersections.

Table 6: Physical Evaluation of Tier 1 Corridors (Cont.)

		Sidewalk Conditions		
ID	Selected Corridor	Parking/Landscape Buffer (sidewalk position)	Sidewalk Availability/Extent (one or two sides of corridor)	Pedestrian Access to Destinations from Sidewalks
45	Wood Dale to D. Grove via Main St	Behind buffer for most of corridor. Street side segments along Addison and Main. No street parking except in Main at south end.	Mostly on both sides of the road for about 85% of corridor. About 2 miles of no sidewalk in Addison and Highland.	Most residential uses with direct access. Street front retail with direct access. Shopping malls and industrial thru off-street parking.
3	Dundee - Arlington	Landscaping buffer along Dundee. Buffer and street side in A. Heights. No street parking along corridor. Shoulder lane in W Dundee.	On both sides of the road for about 100% of corridor.	Residential uses with direct ped access from sidewalk. Commercial uses with access thru off-street parking.
32	St Charles - Meyers - Fairview	Mostly no sidewalk in S Fairview. Landscaping buffer in Meyers. On street side in St. Charles. No street parking along corridor.	On both sides of the corridor for about 75% of corridor. 2 miles of continuous no sidewalk south of Butterfield Road.	Residential uses with both direct and no ped access from sidewalk. Commercial uses with access thru off-street parking.
41	Addison - Westmore - Meyers	Narrow landscaping buffer and on-street side along Addison/Westmore Street side and landscaping along 22nd/Highland. No street parking.	On both sides of the road for about 90% of corridor. Mostly one side or discontinuous at major intersections, and along Highland/Butterfield.	Residential uses with direct access. Industrial uses with access thru side streets. Retail/commercial uses with access thru off-street parking.
23	Bloomingdale Rd - Geneva Rd	Landscaping buffer along most of corridor. On street side in portions of Bloomingdale.	On one or two sides for 95% of corridor. Mostly one side on Geneva and S Bloomingdale.	Most residential uses with no ped access from sidewalk. Commercial uses with access thru off-street parking.
47	Wood Dale to Fairview via Westmore Ave	On street side and behind narrow buffer along Fairview, Westmore, Addison. No street parking. No sidewalk in N. Fairview/N. Addison.	On both sides of the road for 75% of corridor. 3.2 miles of continuous no sidewalk in southern segment of Meyers and Oak Meadows Golf.	Residential uses mostly with direct access; segments thru side streets. Commerical and industrial with no access, or thru parking/side street.
24	Highland Ave - Butterfield Rd - York Rd	Street side and landscaping along Main/Highland and York. Mostly no sidewalk along Butterfield. Street parking in D. Grove and Elmhurst.	On both sides of the road for about 50% of the corridor. 4.5 miles of no continuous sidewalk along Butterfield.	Residential and commercial uses in Main and York with direct access. Retial, corporate/industrial parks in Butterfield with no access.
6	Hicks Rd - Meacham Rd	Behind wide buffer along Dundee and Meacham. Narrow buffer or street side along Hicks. No sidewalk in South portion of Hicks.	On one or two sides of the road for about 80% of corridor. Minor gaps in Dundee, Hicks, and Euclid. 1 mile of no sidewalk in Plum Grove.	Most residential uses with access trhu side streets or parking. Retail uses with access thru parking. Industrial uses with no access.
17	Schaumburg Rd - Golf Rd	Landscaping buffer on Schaumburg, Meacham and Golf. No street parking along corridor. No sidewalks in B. Woods.	On both sides of the road for about 90% of corridor. 1.5 miles of continuous no sidewalk at B. Woods.	Most residential uses with no direct access; thru side street. Retail and corporate parks with access mostly thru parking, a few sidewalk links.
43	York - 22nd - Meyers/Fairview	Street side and landscaping in York. Mostly no sidewalk in 22nd. Street side and landscaping in Fairview. Street parking In Elmhurst	On both sides of the road for about 60% of the corridor. 4 miles of continuous no sidewalk along 22nd and Meyers.	Residential uses with both direct access and no access. Commercial uses with both no access or access thru parking.
19	Wilke - Algonquin - Busse	Wide landscaping along Busse. Street side and narrow landscaping in Algonquin. Landscaping buffer in Wilke. No street parking.	On both sides of the road for about 90% of corridor. Few segments with sidewalk on one side only. Few gaps with no sidewalk.	Mostly no direct access to industrial sites in Busse. Mostly no direct access to multi-family residential and businesses in Algonquin.
8	Higgins Rd	Wide landscaping buffer along most corridor. No buffer along B. Woods. Shoulder lane along Higgins/Busse. No street parking along corridor.	One or two sides for 75% of corridor. Discontinuous on S side of Higgins. 3.5 miles of no sidewalk in H. Estates and B. Woods.	Retail and residential uses with no ped access from sidewalk. Industrial sites with indirect access thru off-street parking or side street

Table 6: Physical Evaluation of Tier 1 Corridors (Cont.)

		Urban Design Conditions	
ID	Selected Corridor	Urban Form Typologies	Land Use Mix
45	Wood Dale to D. Grove via Main St	Rectangular grid parallel. Disconnected suburban grid. Suburban commercial frontage.	Street frontage retail, shopping malls. Single-family and multi-family residential. School, churches, hospitals. Industrial/corporate parks.
3	Dundee - Arlington	Suburban commercial frontage. Megablock with intrusions. Curviliniear modified grid, and Rectangular blocks parallel.	Big box retail and business parks. Single-family residential. Schools, parks, churches.
32	St Charles - Meyers - Fairview	Suburban commercial frontage. Rectangular blocks perpendicular. Curvilinear modified grid, and Disconnected suburban cul-de-sacs	Single-family and some multi-family residential. Retail, business/corporate parks. Schools and open space.
41	Addison - Westmore - Meyers	Rectangular blocks parallel. Industrial megablock/grid. Suburban commercial frontage and megablock. Modified grid.	Big box retail, strip malls and corporate parks. Industrial parks and warehousing. Single-family and multi-family residential.
23	Bloomingdale Rd - Geneva Rd	Rectangular blocks perpendicular. Disconnected suburban grid. Modified grid curvilinear. Suburban commercial frontage.	Single-family and some multi-family residential. Big box retail and business/industrial parks. Schools, parks, and open space.
47	Wood Dale to Fairview via Westmore Ave	Rectangular grid parallel/across. Disconnected suburban grid. Suburban commercial frontage. Industrial megablock.	Mostly single-family residential. Strip mall and big box retail. Industrial and business parks. Golf course and treatment plants. Schools.
24	Highland Ave - Butterfield Rd - York Rd	Rectangular grid parallel. Disconnected suburban grid. Suburban commercial megablock.	Single-family residential. Street frontage retail. Strip malls and shopping malls. Corporate bldgs. Schools, churches, hospitals.
6	Hicks Rd - Meacham Rd	Commercial/industrial megablock. Modified grid curvilinear. Disconnected suburban grid. Suburban commercial frontage.	Single-family and multi-family residential. Strip malls, big box and shopping malls. Industrial/business parks and corporate buildings.
17	Schaumburg Rd - Golf Rd	Suburban commercial megablock. Surburban commercial frontage. Modified grid curvilinear. Disconnected suburban grid.	Big box retail, corporate buildings, shooping malls and strip malls. Single-family housing, schools, churches, parks and open space.
43	York - 22nd - Meyers/Fairview	Rectangular blocks perpendicular and parallel. Suburban commercial megablock and frontage. Disconnected suburban grid.	Street frontage retail, big box retail and shopping malls. Corporate and industrial parks. Single-family residential. Schools, churches.
19	Wilke - Algonquin - Busse	Industrial megablock. Suburban commercial megablock. Modified grid curvilinear. Disconected suburban grid.	Single-family and multi-family residential. Retail and commercial strip mall and big box. Industrial, warehousing, and business parks.
8	Higgins Rd	Industrial Megablock. Modified grid curvilinear. Disconnected suburban grid. Suburban commercial megablock.	Big box retail and business parks. Single-family and multi-family residential. Open space, industrial parks and warehousing sites.

Table 7: Physical Evaluation of Tier 1 Corridors – Scoring and Ranking

ID	Selected Corridor	Travel Lanes	Signalized Intersections	Crosswalk Completion	Sidewalk Buffer	Sidewalk Availability	Pedestrian Access	Urban Form Typologies	Land Use Mix	Overall Score	Implementation Category
45	Wood Dale to D. Grove via Main St	4	3	4	5	4	5	4	4	33	Ready for operational evaluation on the field
3	Dundee - Arlington	4	3	5	4	5	4	4	3	32	Ready for operational evaluation on the field
32	St Charles - Meyers - Fairview	5	3	4	4	3	3	4	4	30	Ready for operational evaluation on the field
41	Addison - Westmore - Meyers	4	4	4	5	4	3	3	3	30	Ready for operational evaluation on the field
23	Bloomingdale Rd - Geneva Rd	5	2	3	4	5	2	4	3	28	Needs work strenghtening development and operational conditions
47	Wood Dale to Fairview via Westmore Ave	4	3	3	4	3	4	3	3	27	Needs work strenghtening development and operational conditions
24	Highland Ave - Butterfield Rd - York Rd	3	4	4	4	1	3	3	4	26	Needs work strenghtening development and operational conditions
6	Hicks Rd - Meacham Rd	3	5	4	2	3	2	3	2	24	Needs work strenghtening development and operational conditions
17	Schaumburg Rd - Golf Rd	2	3	3	3	4	2	3	3	23	Not ready for implementation
43	York - 22nd - Meyers/Fairview	3	4	3	3	1	3	3	3	23	Not ready for implementation
19	Wilke - Algonquin - Busse	3	3	2	3	4	2	2	3	22	Not ready for implementation
8	Higgins Rd	1	1	1	1	3	1	2	2	12	Not ready for implementation

Tables 6 and 7 above present the results of the evaluation and final scoring of corridors. Corridors were categorized in three groups or classes based on their observed roadway, sidewalk and urban form conditions. These three groups include:

1. **Sure Things.** These are corridors that are recommended for implementation of all-day arterial service, because they present appropriate or minimum physical conditions that would make operation of transit service viable. Market conditions and physical conditions are relatively strong in these corridors (e.g. clear anchors, market origins and destinations within the corridor, mix of land uses and all-day travel markets, and relatively high population and employment density). This group includes:
   - Wood Dale Metra to Downers Grove – Main Metra via Main/Highland
   - Dundee Road to Arlington Heights Road
   - Elmhurst Metra to Downers Grove – Fairview Metra via St Charles/Westmore
   - Wood Dale Metra to Downers Grove – Fairview Metra via Westmore/Meyers
2. **Need Further Evaluation.** These are corridors that present some conditions for transit service viability (high travel demand), but also have some operational and accessibility barriers (low pedestrian accessibility) that would make transit service less successful. These corridors qualify for further analysis and development of supporting partnerships (or capital investment) from local jurisdictions to improve physical environment and accessibility conditions to ensure success. This group includes:
   - Roselle Metra to Wheaton Metra via Bloomingdale/Geneva
   - Addison to Lombard Yorktown Center via Addison/Westmore-Meyers
   - Elmhurst Metra to Downers Grove – Main Metra via York/Butterfield/Highland
   - Dundee Road to Schaumburg via Hicks/Meacham
3. **Not Ready Yet.** These are corridors that although have high travel demand are not recommended for implementation yet. This group includes corridors that are lacking in the basics to support access to transit markets and pedestrians (no connections to land use destinations), and/or present challenges for the placement of bus stops (wide landscaping buffers and no sidewalks) and operation of transit vehicles (shoulder lanes with no parking). This group includes:
   - Schaumburg Road to Golf Road
   - Elmhurst Metra to Downers Grove – Fairview Metra via York/22nd Street
   - Arlington Park Metra to Elk Grove Village via Wilke/Algonquin/Busse
   - Hoffman Estates to Elk Grove Village via Higgins Road

The results of the physical evaluation show that there is a very close relationship between the level of density, mix of land uses and design of the street network (or accessibility) and the potential to operate successful transit service on any of these corridors. Density, land use, and accessibility design determine the pedestrian environment and operational environment along the corridors and the provision of a built environment that is friendly or unfriendly to other modes of travel.

Urban Form Typologies in the Study Area

As mentioned in the previous chapter. There were eight urban form patterns that repeated throughout the study area and along potential transit service corridors. These eight urban form patterns or typologies are analyzed in more detail in the paragraphs below to better understand their relationship with transit service accessibility, operation and ridership potential. This eight urban form patterns include:

1. Rectangular Grid Parallel
2. Rectangular Grid Perpendicular
3. Modified Grid Curvilinear
4. Disconnected Suburban Grid (Fishbone or Cul-de-Sac)
5. Megablock with Developed Perimeter and Intrusions
6. Surburban Commercial Frontage
7. Suburban Commercial Megablock
8. Industrial Megablock

It is worth noting that these urban form typologies are a simplification of urban development forms found along most corridors included in the analysis of transit market potential and demand intensity (presented in Tech Memo #3) and corridors included in Tiers 1 and 2.

We developed an Index Card summary for each urban form typology (see pages below) that provides a snapshot view (taken from Google Earth) of a one-quarter square mile thumbnail or urban tile. A blue square representing a 0.5 by 0.5 mile area (or 0.25 square miles) is shown in each view to illustrate a 0.5 mile long segment of a Tier 1 or 2 corridor, and the market area within a 0.25 mile on each side of the corridor.

Major findings of this Index Card analysis include:

- Residential areas in traditional street grid settings only have a development density of 10 persons per acre. This density supports a minimum level of service transit operation (based on industry research and professional opinion).
- Suburban megablock developments either corporate services, retail and industrial uses concentrate high employment densities; however these jobs are clustered in physical environments that are auto-oriented and provide limited or no pedestrian access to destinations from potential transit services running in the main corridor.
- The segregation of land uses and absence of mixed-use developments provides for an over-specialization of the urban form that serves to isolate one development from the other and duplicates the amount of space dedicated to off-street parking. This not only degrades the street environment for pedestrians but also encourages driving by providing parking for free and in abundance at every destination in the study area.
- The design of the street network in most non-grid settings reduces accessibility points for transit and pedestrians, favors automobile accessibility, and promotes driving at high speeds by controlling traffic infrequently. This further reduces the competitiveness of transit as a travel mode and the safety of pedestrians and safe operation of transit vehicles in the corridor.

1. Rectangular Blocks Parallel

Housing:	545 dwelling units; 2,180 DU per sq. mile
Population*:	1,635 residents; 6,540 people per sq. mile
Employment:	n/a
Combined Density:	10.2 persons/jobs per acre
Street Intersections:	5 connections with corridor; every 0.10 miles
Land Use:	Single-family residential
Sidewalks Access:	Direct access to destinations
Network Miles:	6.5 miles of street connected to corridor

Observations:

This traditional grid-like setting provides for good connectivity with the corridor and an effective market reach, by allowing anyone living one-quarter mile away to access the corridor on a direct path.

Sidewalks have direct access to all housing units and destinations, and frequent street intersections provide several access points to the corridor.

This type of network design provides for a dense single-family residential development, although at 10 persons per acre its density is not enough to support frequent transit service.

Higher densities, in particular along the main corridor, and a diverse mix of land uses are needed to increase activity and trip generation along the corridor.

* Population figures are estimated at an average of 3 persons per dwelling unit

2. Rectangular Blocks Perpendicular

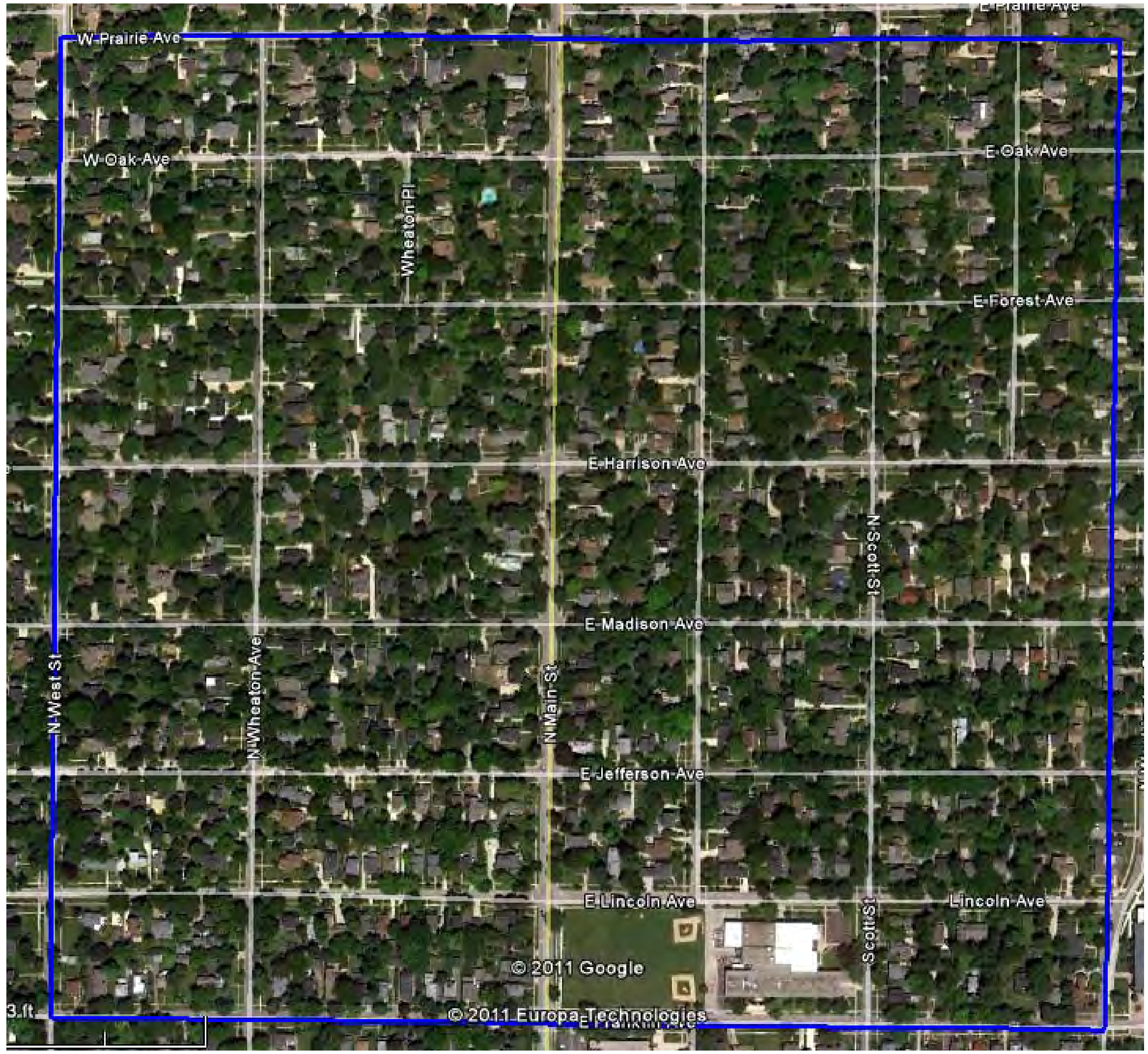
Housing:	480 dwelling units; 1,920 DU per sq. mile
Population*:	1,440 residents; 5,760 persons per sq. mile
Employment:	n/a
Combined Density:	9 persons/jobs per acre
Street Intersections:	8 connections with corridor; every 0.06 miles
Land Use:	Single-family residential
Sidewalks Access:	Direct access to destinations
Network Miles:	6.5 miles of street connected to corridor

Observations:

This traditional grid-like setting in Wheaton is also common in the study area. Similar to the parallel blocks grid, streets crossing the corridor are closer together creating a more perpendicular orientation.

The main corridor has sidewalks with direct accessibility to housing units and destinations, and many crossing streets provide direct accessibility to the rest of the neighborhood.

Lot subdivisions provide for a density of development similar to the parallel grid at 9 persons per acre.



* Population figures are estimated at an average of 3 persons per dwelling unit

3. Modified Grid Curvilinear

Housing:	410 dwelling units; 1,640 DU per sq. mile
Population*:	1,230 residents; 4,920 persons per sq. mile
Employment:	n/a
Combined Density:	7.5 persons/jobs per acre
Street Intersections:	3 connections with corridor; every 0.17 miles
Land Use:	Single-family residential
Sidewalks Access:	Mostly no direct access to destinations
Network Miles:	4.8 miles of street connected to corridor

Observations:

Residential uses in a modified curvilinear grid provide for some seclusion from the main corridor and indirect connections to it. Most housing units are accessible from minor streets leading into the corridor, but no units are accessible from the corridor itself.

The modified grid design reduces street contacts with the main corridor and so potential transit riders are faced with less direct and longer walks to/from the corridor.

Curvilinear streets and blocks create odd lot shapes that provide for a slightly lower density than traditional grid-like neighborhood settings.

* Population figures are estimated at an average of 3 persons per dwelling unit

4. Disconnected Suburban Grid

Housing:	175 dwelling units; 700 DU per sq. mile
Population*:	525 residents; 2,100 persons per sq. mile
Employment:	n/a
Combined Density:	3.5 persons/jobs per acre
Street Intersections:	2 connections with corridor; every 0.25 miles
Land Use:	Single-family residential
Sidewalks Access:	No direct access to destinations
Network Miles:	2.7 miles of street connected to corridor

Observations:

Disconnected suburban developments come in several forms: a limited access grid that shares one entry point with the corridor and no connections to adjacent developments, cul-de-sac developments like the one in the photo, or a fishbone type development where a major spine connecting with the corridor leads to a series of smaller cul-de-sacs.

All of them result in low density residential, although cul-de-sacs are the most inefficient.

Disconnected suburban grids provide for very limited access points to the main corridor and no direct access from corridor sidewalks to any residential uses. Potential transit riders are faced with a long walk to access their destination.

* Population figures are estimated at an average of 3 persons per dwelling unit

5. Megablock with Intrusions

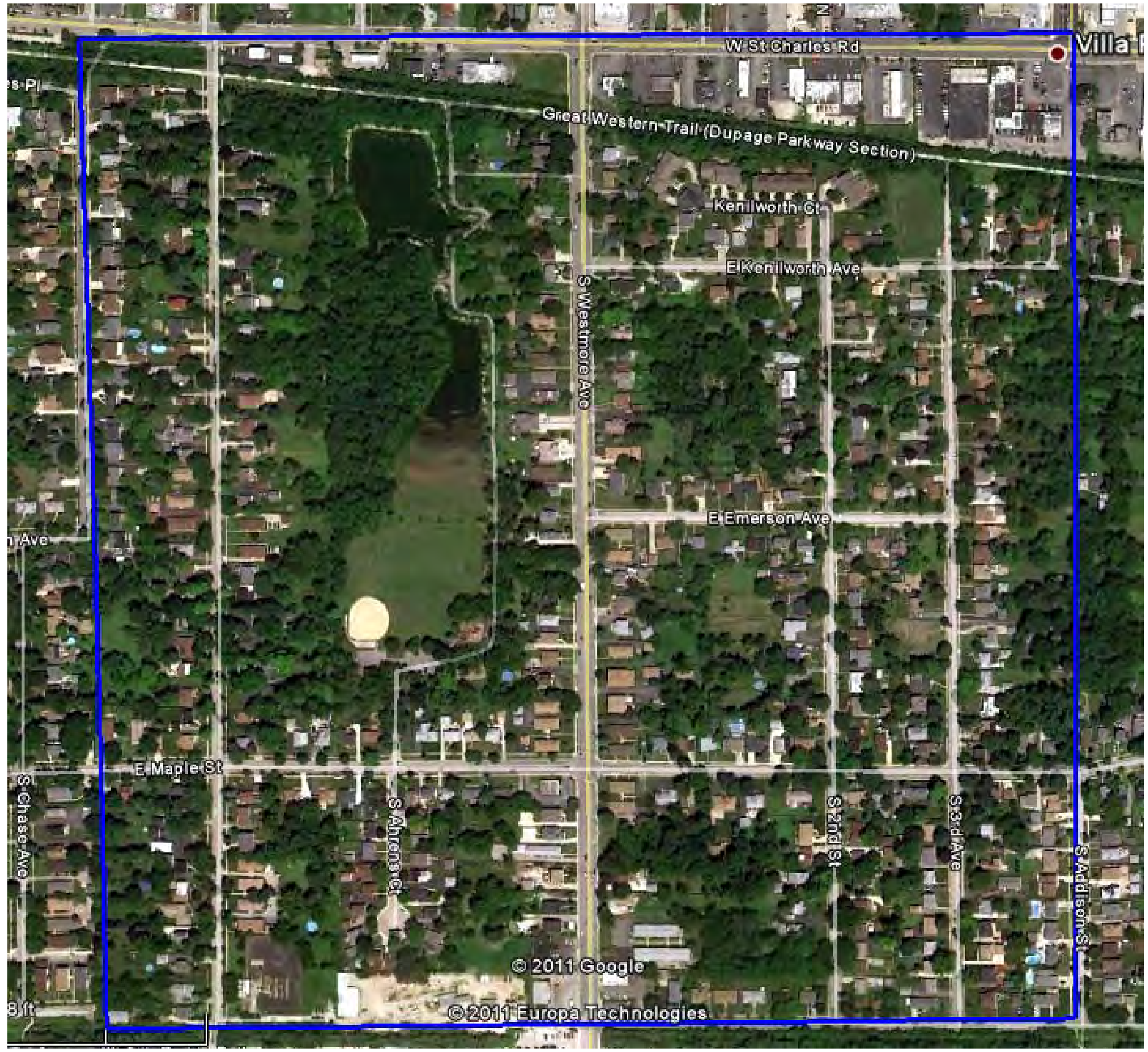
Housing:	285 dwelling units; 1,140 DU per sq. mile
Population*:	855 residents; 3,420 persons per sq. mile
Employment:	175 jobs
Combined Density:	6.5 persons/jobs per acre
Street Intersections:	4 connections with corridor; every 0.12 miles
Land Use:	Single-family residential, retail and industrial
Sidewalks Access:	Direct access to destinations
Network Miles:	2.85 miles of street connected to corridor

Observations:

Residential uses are predominantly single-family housing or small multi-family developments. Megablocks have a developed perimeter with few intrusions or access streets.

The core of large blocks is undeveloped or kept in its natural state and thus overall density is low at about 6 persons per acre.

Land uses have direct accessibility from sidewalk in most cases. Big blocks however provide for longer walking distances to main corridor for pedestrians wishing to ride transit.



* Population figures are estimated at an average of 3 persons per dwelling unit

6. Suburban Commercial Frontage

Housing:	415 dwelling units; 1,660 DU per sq. mile
Population*:	1,245 residents; 4,980 persons per sq. mile
Employment:	325 jobs
Combined Density:	10 persons/jobs per acre
Street Intersections:	5 street intersection; every 0.10 miles
Land Use:	Multi-family residential, retail and services
Sidewalks Access:	No direct access to destinations
Network Miles:	2.75 miles of street connected to corridor

Observations:

Suburban retail developments provide for low employment density environments because majority of land is dedicated to parking, while buildings are one-story high.

Pedestrian accessibility from corridor is very poor at large shopping centers, but more acceptable at smaller businesses in individual lots with buildings closer to the street.

Residential uses behind the commercial frontage have direct access to sidewalks via side streets. Some multi-family residential developments although close to corridor have no access to it.

* Population figures are estimated at an average of 3 persons per dwelling unit

7. Suburban Commercial Megablock

Housing:	n/a
Population:	n/a
Employment:	5,875 jobs; 23,500 jobs per sq. mile
Combined Density:	36.5 persons/jobs per acre
Street Intersections:	3 connections with corridor; every 0.17 miles
Land Use:	Corporate services and retail
Sidewalks Access:	No direct access to destinations
Network Miles:	5.2 miles of driveways connected to corridor

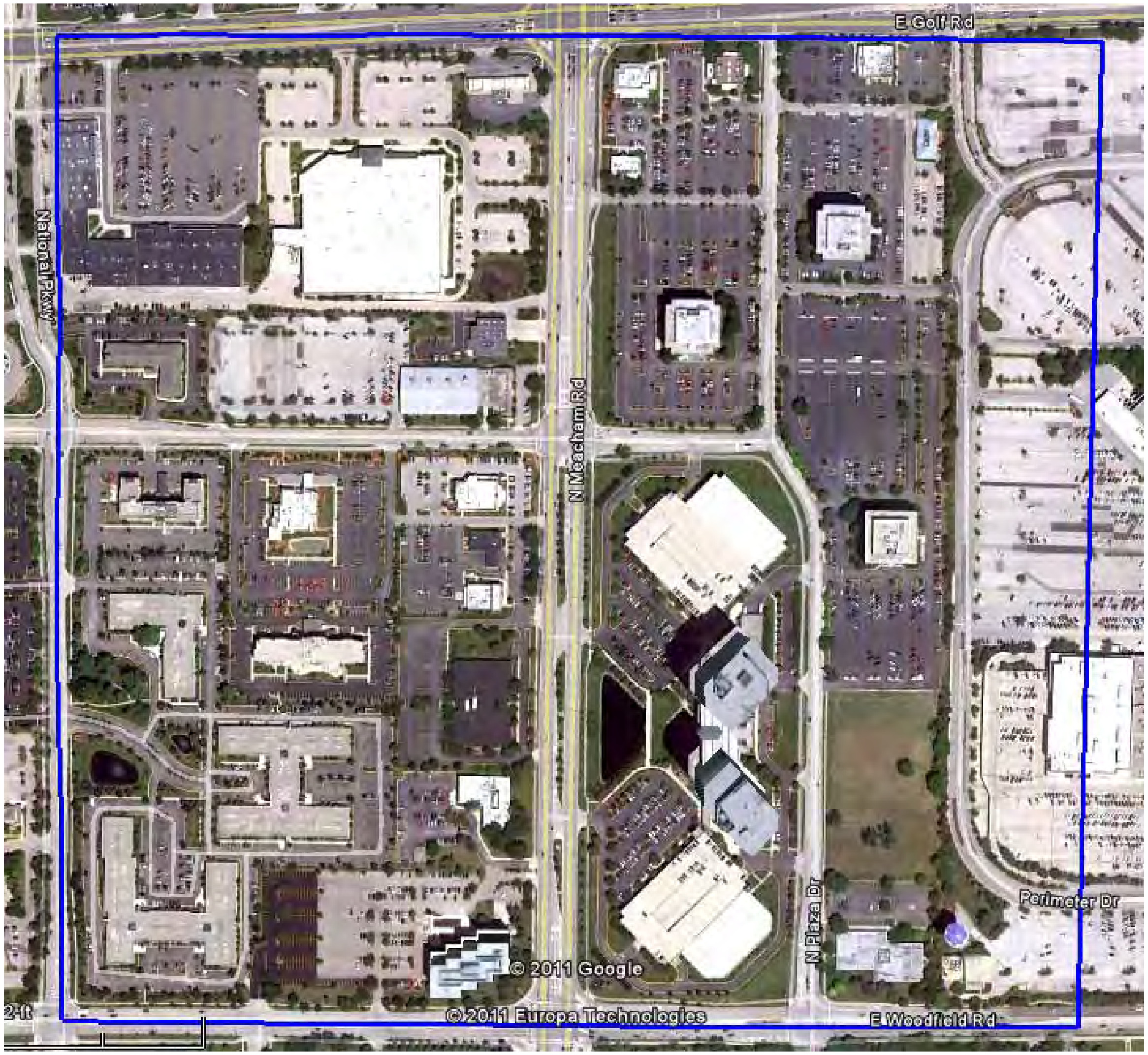
Observations:

High density of employment but poor pedestrian access from corridor. Although sidewalks are available along corridor, these do not get to front door of buildings in most cases.

Crosswalks are not provided anywhere except at major corridor intersections.

Wide spacing of intersections provides very few opportunities for pedestrians to cross the corridor and streets and driveways inside the megablock.

The auto-oriented design of streets and driveways forces pedestrians to cross through parking lots and jaywalking to access destinations.



8. Industrial Megablock

Housing:	n/a
Population:	n/a
Employment:	4,850 jobs; 19,400 jobs per sq. mile
Combined Density:	30 persons/jobs per acre
Street Intersections:	3 connections with corridor; every 0.25 miles
Land Use:	Industrial, construction and manufacturing
Sidewalks Access:	No sidewalks or access to destinations
Network Miles:	0.9 miles of street connected to corridor

Observations:

High density of employment, but poor pedestrian access from main corridor. Transit users do not have sidewalks available to them to access destinations.

Wide spacing of street intersections provides for reduced mileage of streets connected to corridor. Pedestrians need to walk around the block in order to access destinations away from corridor.

Operational Evaluation of Corridors

Six Tier 1 and Tier 2 corridors were selected for further analysis, consisting of an operational evaluation on the field, and development of a service plan and capital improvements plan. The first three corridors in the list below correspond to corridors in the *Sure Things* category, with the best ranking on both the transit market potential evaluation (Tech Memo #3) and the physical environment conditions evaluation (in the previous chapter of this memo). These are:

1. Wood Dale Metra to Downers Grove – Main Metra via Main/Highland
2. Dundee Road – Arlington Heights Road
3. Elmhurst Metra to Downers Grove – Fairview Metra via St. Charles/Westmore-Meyers

The other three corridors are comprised of one corridor in the *Need Further Evaluation* category, one corridor in the *Not Ready Yet* category, and one Tier 2 corridor that is different from the rest in that it would operate as an Express Bus service.

4. Roselle Metra to Wheaton Metra via Bloomingdale/Geneva
5. Hoffman Estates to Elk Grove Village via Higgins Road
6. Wheeling Metra to Schaumburg NWTC via Dundee/IL-53

The six corridors were selected based on evaluation results and potential performance, but also based on geography and ranking category to illustrate the breadth of policy choices and challenges of implementing transit service in the I-355 corridor study area. As a group of corridors with different ranking categories, they represent three levels of need and improvement (e.g. roadway, sidewalk, and urban form/design) for the successful operation of transit service, and offer lessons that can be learned for transit service provision and urban development in the southern end of the I-355 corridor.

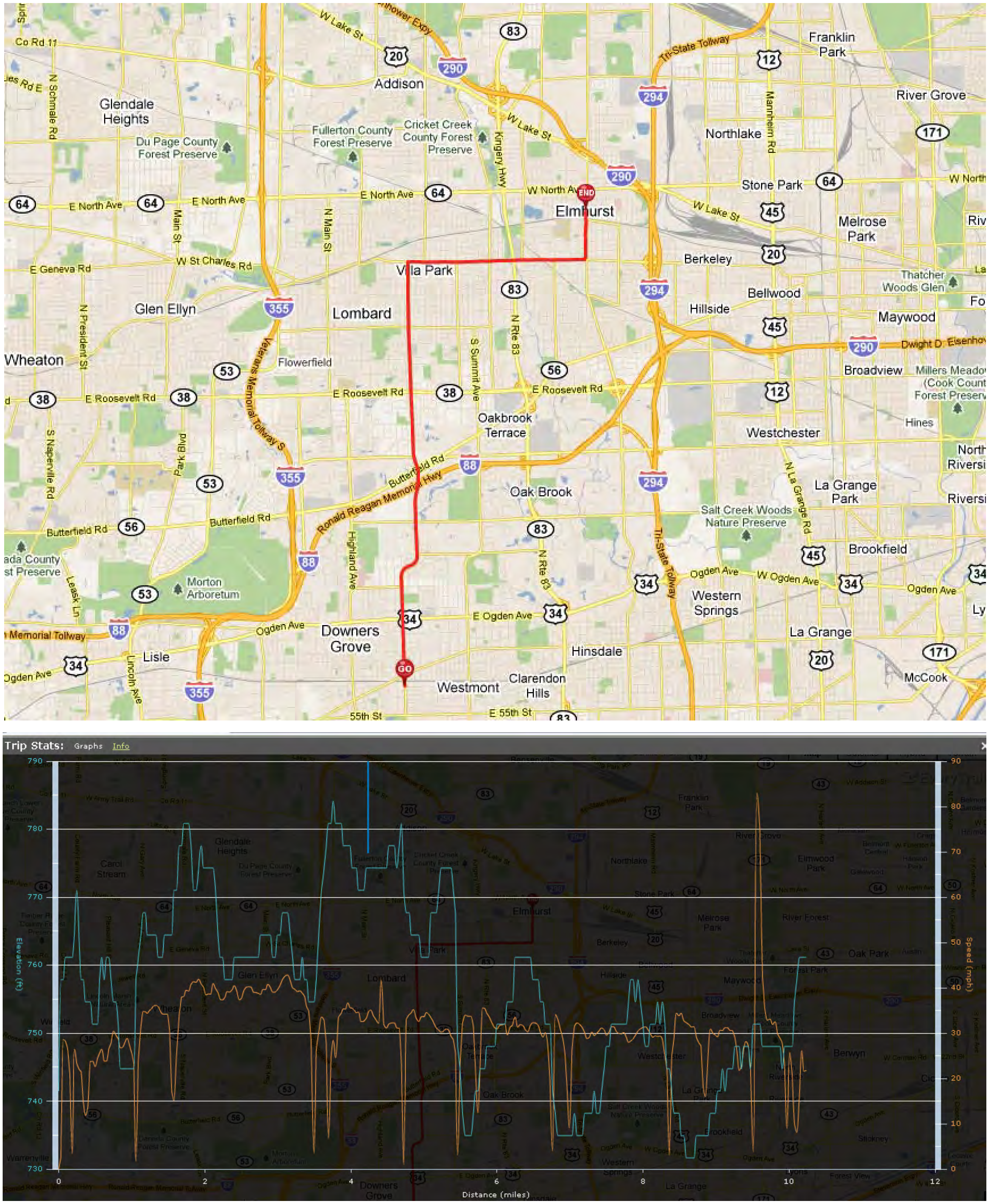
Operational Evaluation

A field test was carried out for the *Elmhurst Metra to Downers Grove – Fairview Metra via St. Charles/Westmore-Meyers* corridor. The goal of the test was to confirm physical assessments developed following the corridor in *Google Earth*, but mostly to measure travel time and traffic conditions in the corridor, identifying urban design/land use strengths and weaknesses, and identifying potential transit and pedestrian infrastructure needs, such as bus stop locations and pedestrian crossings or refuges in the roadway.

Field tests and measurements were carried on an automobile following the corridor and driving on the right lane or curb lane, and not faster than the speed limit, to mimic the operation of a public transit bus. A GPS enabled smart phone was used to keep track of the route and travel time, utilizing the *Every Trail* software application. This application is free of charge and allows for sharing of all types of trips on a website for others to view and experience. By loading the trip up on the Internet, users can download the GPS data for analysis. The following URL links to a trip sample for the Elmhurst to Downers Grove Corridor: http://www.everytrail.com/view_trip.php?trip_id=1019683

This corridor was sampled on Wednesday March 30, 2011. We drove the corridor four (4) times during the morning rush-hour, between 7:00 and 9:00 am, and also during the afternoon rush-hour, between 4:30 and 6:30 pm. Figure 2 on the next page shows the corridor route, elevation and travel speed charts, and trip statistics summary that is produced.

Figure 2: Elmhurst Metra to Downers Grove – Fairview Metra



The statistics of trips sampled were approximately as follows:

Table 8: Corridor Field-Test Samples Summary Stats

Trip ID	Trip Time	Distance (miles)	Travel Time (mm:ss)	Average Speed (mph)
AM 1	7:00 - 7:30 am.	10.4	30:04	21.2
AM 2	7:32 - 8:00 am.	10.2	27:36	22.2
AM 3	8:05 - 8:30 am.	10.4	25:06	24.9
AM 4	8:32 - 8:59 am.	10.3	26:43	23.1
PM 1	4:35 - 5:03 pm.	10.2	28:14	21.8
PM 2	5:05 - 5:35 pm.	10.4	30:01	20.8
PM 3	5:37 - 6:12 pm.	10.2	31:42	18.6

Source: Every Trail Website and Every Trail app for iPhone

Vehicle Traffic Observations

Generally, vehicle traffic on the corridor moves on a free flow and there is no congestion, except in the afternoon when the corridor has noticeable more congestion and traffic slows down below the posted speed limit on a few locations such as St. Charles between Berkley Avenue and York Street.

Overall travel time in the corridor increases in the early morning at around 7:00am and in the early evening at around 5:30 pm. Most delay is caused by vehicle back-ups at signalized intersections. Two locations – St. Charles/Ardmore and Meyers/Butterfield, take more than one cycle to get through if driving like a bus.

In most cases, vehicle traffic moves slightly above the speed limit. There are several areas where traffic moves even faster (approximately 5 to 10 mph over the speed limit). These appears to happen mostly at areas where the speed limit changes from 35 to 30 mph (cars continue at 35 to 40 mph), and vice-versa at segments where the speed limit is increased from 35 to 40 mph (cars start accelerating before they get to the higher speed limit zone).

At most major street intersections with the corridor, the amount of traffic turning off of the subject corridor onto cross streets was equal to or higher than the through movements. This was observed in particularly at Kingery Highway, Roosevelt Road, 22nd Street, Butterfield Road, 31st Street, and Ogden Avenue. In many cases the number of vehicles that cued up to turn exceeded the turning lane size and they backed-up into through lanes.

Land Use Observations

There were several schools observed along the subject corridor, in the vicinity of the following intersections:

- York Road and Arthur Street. Close to Hawthorne Elementary School with School Zone marked on York Road.
- St. Charles Road at Cottage Hill. There is an additional signal that is used for pedestrians or buses coming to/from Hawthorne Elementary.

- St. Charles Road at Berkley Street. Close to York High School
- Westmore Road at Madison Street. Close to St. Pius School with School Zone marked on Westmore Road.

Beyond the schools, there were few major vehicular destinations directly on the corridor, which seemed to be supported by the number of observed turning movements. The largest destinations were:

- The two train stations at both ends of the corridor – Elmhurst and Fairview
- Downtown Elmhurst in general
- The Jewel Grocery Store at St. Charles Road and Ardmore Road

There is also a collection of government/public land uses in the shopping center at the southeast corner of Westmore Road and Jackson Street, including:

- DuPage Health Center
- Driver's License Facility
- Illinois Employment Center
- Corporate Center at the northeast corner of Meyers Road and 22nd Street

This last one appeared to have the most potential for its own dedicated bus stop. The intersection of Meyers Road and 22nd Street does not seem to have an appropriate nearside or farside location for a bus stop, whereas the corporate center has its own signal and potential for easy access and drop-offs. The flow of cars into the campus was consistent throughout the morning rush-hour and the parking lot was mostly full during the day.

Pedestrian Traffic Observations

There was little pedestrian traffic observed on the corridor, although the majority of the corridor has sidewalks. In the morning rush-hour there was virtually no pedestrians, with the exception of the areas around the two train stations. In the afternoon, there was a noticeable increase in pedestrian activity, particularly in the following locations:

- St. Charles Road between Ardmore and Salt Creek. This is a commercial shopping corridor with fast food options. Many teens and preteens on bicycles. Several jaywalking and bicycle crossings noted, including at Admore, Harvard and Euclid Avenues.
- Fairview Road between Maple and Prairie. This is close to Hummer Park which is very heavily used. One jaywalking instance noted.

Table 9 on the next page summarizes information collected with respect to street intersections, including traffic signals, crosswalk locations, and signal wait times that were observed and experienced on each sample trip. Table 9 shows that the Elmhurst to Downers Grove corridor has many street intersections with traffic controls and complete pedestrian crosswalks. This is a positive attribute from a pedestrian and transit user accessibility perspective. At the same time, traffic speeds are relatively high and traffic congestion slow-downs are reduced along the corridor, which make for a negative attribute from a pedestrian safety and transit competitive advantage perspective.

Table 9: Operational Evaluation of York – St. Charles – Fairview Corridor

	Traffic Signals		Pedestrian Cross-Walks			
Street Intersection	Signalized	Stop Control	North	East	South	West
N. Palmer Drive	Y		X	X	X	X
Schiller St/York St	Y		X	X	X	
Schiller St/Palmer Dr	Y		X	X	X	X
1st St/York St		Y	X	X		X
1st St/ Palmer						
Park Ave/York St		Y		X	X	X
Park Ave/ Palmer Dr						
Adelaide St/ York St		Y	X	X	X	X
S. Palmer Drive	Y		X	X	X	
Arthur St		Y			X	X
St. Charles Rd/York St	Y		X	X	X	X
Cottage Hill Ave	Y*		X	X	X	X
Hagans Ave	Y		X	X	X	X
N. Berkley Ave	Y		X	X		
S. Berkley Ave						X
S. West Ave	Y		X	X	X	X
Kingery Hwy (Route 83)	Y		X			
Salt Creek Trail			X			
Villa Ave	Y		X	X	X	X
Ardmore Ave	Y		X	X	X	X
Addison Rd	Y		X	X		X
Westmore Ave/St. Charles Rd	Y		X	X	X	X
Great Western Trail	Y					
E. Maple St	Y		X	X	X	X
Illinois Prairie Path	Y					
Washington Blvd	Y		X	X	X	X
Madison St	Y		X	X	X	X
Jackson St/Lombard Cir	Y		X	X	X	X
Wilson Rd	Y		X	X	X	X
Highridge Rd	Y		X	X	X	
Roosevelt Rd	Y		X	X	X	X
14th St	Y		X	X	X	X
16th St	Y		X			X
Corporate Campus Entrance	Y					
22nd St	Y		X	X	X	X
Butterfield Rd	Y					
31st	Y			X		
35th	Y			X	X	
39th	Y					
Ogden Ave	Y				X	X
Lincoln Ave	Y			X	X	X
Prairie Ave	Y		X		X	X
Maple Ave	Y		X	X	X	X
2nd St	Y			X	X	
Train Tracks						

* = Signal only used during school hours

The Transit and Urban Form Relationship

As we have learned throughout this study, origin-destination travel demand and urban form patterns interact, each shaping the other's ability to function effectively. Academic research in the field of public transportation shows that there is a strong correlation between urban form, land use density and transit demand. This relationship is not linear and it is influenced by a number of tangible and intangible variables. One of the most important variables that have been used across the country considers the density of development or population and employment density around transportation corridors or bus routes, as a predictor of demand and success.

Development Density

Table 10 summarizes results from a comparative research on urban form in major North American cities that was conducted during the 1970's and still considered valid.[3] It relates residential densities to the type of transit service that is appropriate for neighborhoods.

Table 10: Transit Density Requirements

Mode	Service Type	Minimum Density	Area and Location
Dial-a-Bus	Demand response serving general public (not just people with disabilities).	3.5 to 6	Community-wide
"Minimum" Local Bus	½ mile route spacing, 20 buses per day.	4	Neighborhood
"Intermediate" Local Bus	½ mile route spacing, 40 buses per day.	7	Neighborhood
"Frequent" Local Bus	½ mile route spacing, 120 buses per day.	15	Neighborhood
Express Bus – Foot access	5 buses during two-hour peak period.	15	Average density over 20-square-mile area within 10 to 15 miles of a large downtown.
Express Bus – Auto access	5 to 10 buses during two-hour peak period.	15	Average density over 20-square-mile tributary area, within 10 to 15 miles of a large downtown.

Minimum Density: minimum number of dwelling units per acre.

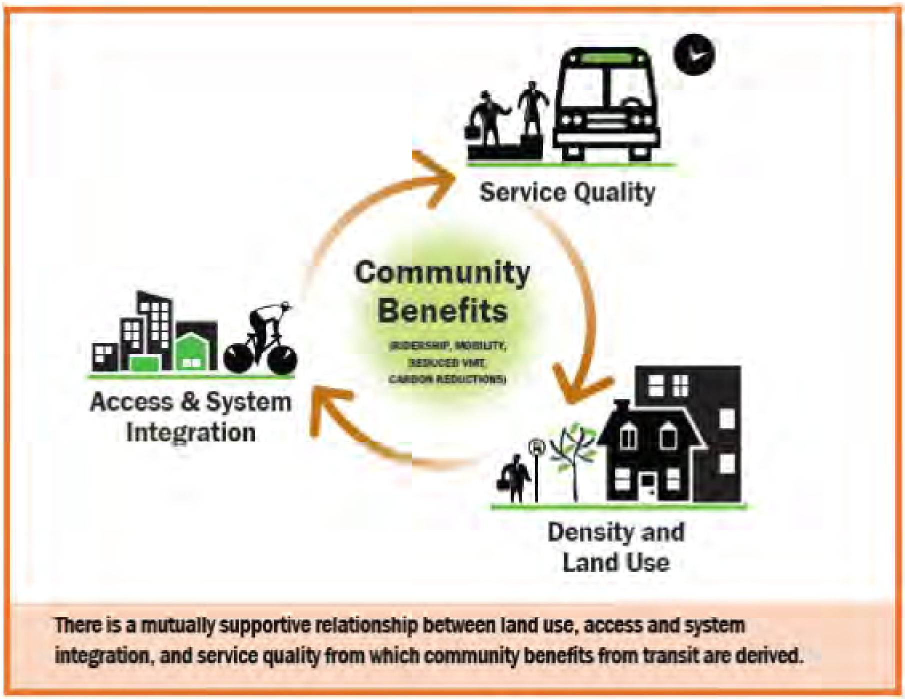
Results from this research show that transit demand tends to increase most dramatically between about 7 and 15 households per acre. Below 7 households per acre, it is usually difficult to operate

[3] Boris S. Pushkarev and Jeffrey M. Zupan. Public Transportation and Land Use Policy. Indiana University Press, Bloomington, IN, USA, 1977

productive transit services. Above 15, alternate modes often become the dominant method of travel in a community.

Clearly, density alone does not determine a transit route's service level. The graphic below illustrates how land use types, intensity of use, built environment and service quality all interact to support environmental, community and economic goals. The level of service depends on several market factors: *density, size, regional location, community design and street design.*

Figure 3: The relationship between Transit and Urban Form



- **Density**, for the purpose of this study, is described by the combination of population and employment per acre or square mile.
- **Size** must be considered together with density to determine the overall market that has been organized in a transit-oriented way, which in turn will determine the level of service that can be supported. An isolated, 50 unit apartment building surrounded by surface parking and/or open space could have a very high density rating if analyzed within a fine enough zone, but this alone would not mean it deserves the same level of service as a downtown area, because that single apartment complex is a much smaller market. A particular level of service will require a *minimum density over a minimum area*.
- **Regional location.** Travel demand between two points tends to be inversely related to the distance between them. If there are other transit-oriented places close by, it is more likely that transit will be attractive as a mode. In addition, regional location determines whether a proposed transit route will have strong anchors to sustain ridership at the ends of the route. Regional location is addressed by ensuring that future transit corridors have major activity centers at their endpoints.

- **A mix of development types** reduces the need for longer-distance trips. When shopping, schools and community centers are located close to peoples' homes, cars become less necessary than when massive subdivisions are built in isolation from other local attractions.
- **Access** is another crucial, but often unnoticed, element of transit demand. Even at high densities, people will not use transit if it is uncomfortable, difficult, or dangerous to access a bus stop. Many of today's auto-oriented suburban developments, while very dense, have extremely poor access to major arterials or viable transit streets. Throughout the country there are abundant examples of communities that have configured density so that it is impossible to serve with transit.

Other Factors affecting Transit

As we have shown in our physical environment evaluations a host of other factors influence transit demand and impact the potential of transit as an alternative mode of travel, these other considerations include:

- **Mixed Land Use**. The presence of residential, commercial, and employment uses along a corridor.
- **Presence of a Street Grid**. Side streets allow people to access transit services operating along a corridor. Without them people may not be able to reach bus stops, even when they are nearby.
- **Quality Pedestrian Access**. This includes continuous sidewalks, absence of barriers, and direct connections with bus stops, safe crosswalks, low vehicular speeds, pedestrian refuges when crossing multi-lane streets, and appropriate scale aesthetics.
- **Traffic controls.** Traffic controls regulate traffic speed along a bus corridor through the use of traffic signals and crosswalks, the width of the street and traffic calming elements such as lane width, medians, parking buffers, or any elements that narrow down the road to influence the cruise speed of cars, without necessarily forcing a slow down such as a chicane or a roundabout .
- **Pleasant, convenient and direct pathways from bus stops to nearby businesses**. Avoiding the trek through parking lots or landscaping provides a safer and more pleasant experience for transit patrons.
- **Fees for Parking**. Nothing encourages transit use more than charging a fee for auto parking. This is mostly applicable to downtown or commercial district areas such as Wheaton, Downers Grove, Elmhurst, etc.
- **Transit Priority Facilities**. This includes HOV lanes on freeways and dedicated ramps, queue jumps and transit signal priority along arterial corridors and at major intersections, as well as Bus Only lanes.
- **Park-and-Ride Facilities**. Park-and-Ride facilities compensate for dispersed residential patterns, allowing a low-density housing or employment pattern to be served. These may be particularly appropriate at corridor end points in the urban-rural transition area where development densities are lower.

- **Bicycle Facilities**. Like park-and-ride lots, bike facilities allow potential customers to reach bus facilities that would otherwise be unavailable. Bicycles can be an important option in bridging the "last mile" between transit service and the final destination.

Street Design and Network Connectivity

Street design and network connectivity are also important components of transit access and operational viability. Neighborhoods where all roads are designed to connect to arterials or collector streets allow transit customers to reach bus stops without walking out of direction and provide more efficient routing options that can support high frequency service.

Integrating Transit into Street Design: A Case for Balance

The Complete Streets model has become a common approach to balancing the need for transit, bicycle, and pedestrian movement, thus moving the use of our urban and suburban streets away from auto-domination. The Complete Streets organization defines a complete street as one:

> *Designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street.*

Many cities around the nation have adopted Complete Streets ordinances and are incorporating practices into planning and street design. Complete Streets are important for transit because the pedestrian network serves as the 'connective tissue' of the transit systems. Most transit trips begin and end as a pedestrian trip, and poorly planned access to bus stops is a real barrier for disabled travelers as well as a psychological barrier for all travelers. A "Complete Street" is a design that encourages quality pedestrian environment that goes well beyond basic access and safety requirements.

Better street design also encourages new and more intensive land uses and encourages developers to build in a more pedestrian-oriented fashion. This, in turn, creates more demand for top-quality transit.

People walk most frequently and farthest in places where they rely on transit for mobility. Manhattan has the highest transit mode share of any place in the United States, not coincidently it also has the highest rates of walking and greatest distance walked per capita of any place in the United States. The I-355 corridor study area doesn't have the density of Manhattan, or even Central Chicago, nor does it aspire to. Nonetheless, land use policies focused on creating dense corridors and centers with a healthy mix of land uses will ultimately increase transit ridership and help to justify investment in the pedestrian environment.

Land use patterns that encourage walking and are supported by transit allow people more choices. People who want to park their car and cycle to work may be more likely to do so if they know they also have convenient transit access as an alternative when the weather is poor or they have a large load to carry.

Technical Appendix

Community Transportation Best Practices

The following section provides a review of best practices in community transportation and alternative serviced models. We have pulled information from recent Nelson\Nygaard work documenting Community Transportation and Alternative Service Models for low-density dispersed-demand areas such as the one found in many communities in the I-355 corridor.

Both the analysis of origin-destination travel markets and the physical environment assessment of selected corridors show that transit demand in the best of cases is weak, because there is not enough density, mixing of land uses, and streets are designed for cars and not for pedestrians or other users. The transit market analysis shows that there is not sufficient critical mass for transit, because most trips are off-peak trips and not rush-hour trips, but also because trips are mostly short (less than 3 miles long) and are made to community destinations such as shops, schools, banks, churches, business parks, etc.

This review gives an overview of best practices in community transit and community-based transportation. The discussion of each type of service covers the basic characteristics, benefits and challenges, the circumstances under which they may be most effective, and gives examples of successful programs.

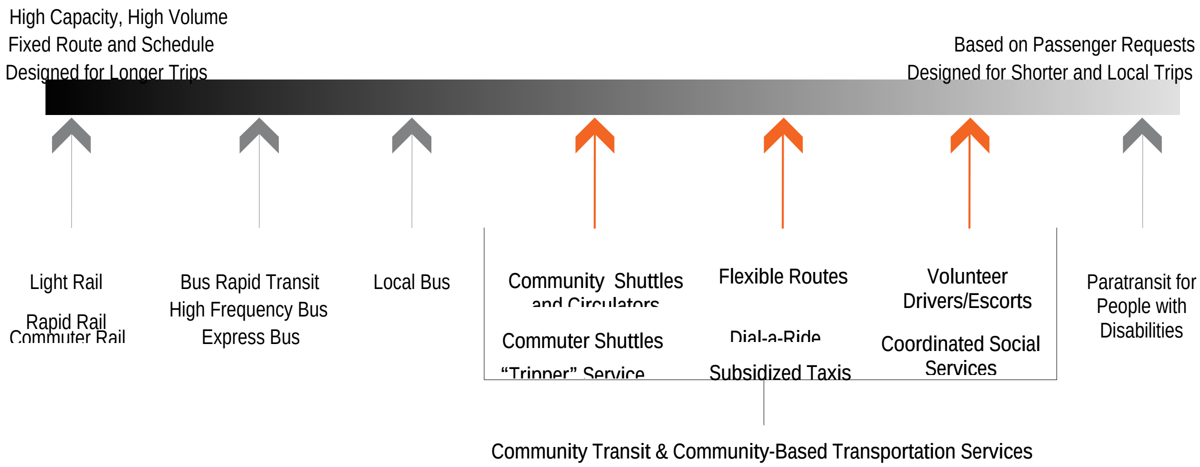
What is Community Transit?

Community transit consists of *local transportation services that use smaller capacity vehicles to serve short trips within communities to local transportation stations, shopping, appointments, employment, and other activities*. Community transit services typically serve residents of a community, but sometimes are operated in combination with commuter shuttles that carry employees between rail stations and employment sites. Community transit services usually connect to major local transit routes, or to regional transportation services, such as Metra, enabling riders to make trips to other cities and throughout a metropolitan area.

Types of community transit include shuttles, local circulators, dial-a-ride (also known as demand responsive transportation), and flexible routes (also known as route deviation). In addition to transit run by agencies, community transportation needs can be met through programs such as ridesharing, subsidized taxi services, volunteer programs, and coordinated social service transportation. Community transit is one piece of the larger public transit system, as shown below in Figure 1.

Community transit services are not designed to compete with or replace traditional transit services, but rather are designed to fill gaps and meet needs left by existing transit services. Community transit services should also coordinate with regional transit services, for example, Metra, PACE and CTA, enabling riders to make connections for longer trips. This coordination makes both the community service and the regional service more attractive for riders.

Figure 4: Spectrum of Transit Services



Fixed-Route Community Services

Fixed-route transit service conforms to the common notion of bus service – transit vehicles operating on specified routes, following set schedules, and stopping at specific bus stops. Fixed-route service is very convenient for people making trips that begin and end along the route. It can carry large numbers of people and is the most efficient way of moving people in areas of concentrated travel demand. Planners generally assume that passengers are willing to walk up to one quarter mile to reach a bus stop.

Aside from standard fixed-route bus and rail service, varieties of fixed-route service used in community transit service include business district shuttles, community circulators, and employment-oriented shuttles. The terms "shuttle" and "circulator" are used interchangeably in practice. The key distinctions among these services concern the type of area and types of trips that are served.

Business District Shuttles

Business District Shuttles typically travel short routes in areas of relatively dense development, such as a downtown shopping district. Large employers, government buildings of interest to the general public, and concentrated residential areas may also be served. These services let people park once and conduct all their business, let employees who have commuted by transit conduct business during their lunch hour, and let downtown area residents conduct business without using a car. A well-designed business district shuttle should follow these basic principles:

- **Clearly defined purpose**, since good shuttles can never serve all possible markets well.
- **Frequency**, sufficient to compete with walk trips and short car trips.
- **Directness**, to improve travel time and ensure passengers can understand the service, using the same street in both directions.
- **Easy to understand**, including the route, frequency, stop locations and hours of operation.
- **Free of charge**, nothing encourages non-regular riders to take transit more than free service.

- **Strong identity**, vehicles, stops and marketing should clearly distinguish the shuttle from the "regular bus."

Community Circulators

Community bus routes, also known as "service routes," are fixed-route, fixed-schedule transit routes. They have a number of features that distinguish them from regular fixed-route bus routes, primarily that they are designed to be particularly attractive to specific groups such as older adults or school children. For a circulator designed to appeal to older people, drivers are trained to provide extra assistance in boarding and alighting, sometimes even helping with packages. The focus is on convenience, with an emphasis on ease of use and highly-personalized driver service, at the expense of direct routing.

Community circulators often have winding routes that provide "front door" service to key locations like community or senior centers, major retail locations, and schools. While community bus routes have the greatest applicability and success rate in medium to high-density areas, they also work in places where they can link high density housing to shopping, medical, and public services and more regional services (bus/rail) within a confined area. Community bus routes typically use small low floor buses able to operate on neighborhood streets and enter easily driveways and parking lots.

Community bus routes can enhance travel options in areas which lack fixed-route systems, increasing traveler independence, and possibly reducing demand for paratransit services. In order to create a community route system, funds must be secured for capital, administrative and operating expenses, and the sponsoring agency must develop service, implementation and marketing plans.

Commuter Shuttles

Commuter shuttles are not always considered community transit, since passengers are likely not to be residents of the community covered by the service. But they share some features with community transit, such as use of small vehicles and short routes. Commuter shuttles typically connect a transit hub and one or more employment sites. They usually operate only during the morning and evening peak, so opportunities exist to share vehicles and/or drivers with community service during the midday.

Agency/Employment "Tripper" Services

Regular "tripper" service typically involves the scheduled deviation of fixed-route buses in order to accommodate the needs of school students and personnel at key bell times only. These stops become part of the routes' schedules. The only other real qualifier for this "tripper" service is that these buses must be open to the general public.

Using this type of service as a template, some transit systems have provided tripper service to human service agencies or employment centers located near, but not on, routes, during specific or peak times when clients or employees are going to/from these destinations. Sometimes only a minor deviation may be needed, e.g., to let off or pick-up agency clients on the agency side of a busy street.

This kind of service has the potential to reduce demand for paratransit service and lower system-wide costs, while increasing service options and improving mobility. One challenge to setting up this kind of service is that it may require multi-agency agreement on service characteristics, cost sharing, and other aspects of service. Other obstacles may arise depending on time and distance associated with service changes.

Demand-Responsive Transit Services

An alternative to fixed-route service is demand-responsive transit service, so named because vehicle routing changes in response to passenger requests. Demand-responsive transit services include flexible-route services, also called route deviation service, dial-a-ride service, and subsidized taxis. These services can allow a vehicle to cover a larger area than a fixed route, at least in situations where demand is relatively low. They are commonly used in low-density areas (e.g. newer suburbs, small cities, and rural areas) and to serve limited populations who may have difficulty walking to a bus stop. One of the primary challenges with demand-responsive service is the additional work required for vehicle dispatching and scheduling. To provide a reasonable amount of flexibility, a lenient definition of on-time performance is typically used.

Flexible-Route Services

In flexible-route services (or route deviation service), transit vehicles follow a specific route but leave the route in response to requests to pick up or drop off passengers at other locations. Usually passengers telephone requests for pickups off the route but may also request off-route drop-offs while on-board the vehicle. Flexible transit services usually fall into two categories:

- ***Route deviation***, the bus operates along a fixed route with a fixed schedule but may deviate to pick-up or drop off customers within a certain distance from the route, returning to the route at or as near as possible to the point of exit, before continuing on the route
- ***Point deviation***, the bus may operate along any path to serve “in-between” requests, as long as the bus gets to the next scheduled bus stop on time.

Policies vary about how far off-route vehicles can flex. Typically there are marked bus stops along the route where service is guaranteed without a reservation. The more closely spaced these stops are, the less flexibility there is in how the vehicle will flex from the route. If it is desired to serve all intersections along the route, then vehicles need to return to the designated route within one block of the point of deviation. Passengers on the bus may have a longer travel time than for fixed-route service; passenger travel times and arrival times at stops will be less predictable.

Some means is needed for passengers to phone in requests, either through a dispatcher or by calling the driver directly. Policies vary about how far in advance passengers should call to request an off-route pickup. Requiring requests a day in advance allows for advance planning, and is convenient if passengers call into an office. For passenger convenience, however, it is common to allow calls up to an hour before the requested time. Calls coming directly to the driver may be the simplest and most practical policy. Since a flexible route needs to keep to a schedule, the number of deviations needs to be limited, usually to a handful each time a bus completes a circuit of the route.

Policies also need to be established for how far off the route buses will deviate, and whether passengers can request a deviated drop-off at the time of boarding. The larger the allowed deviation area the more time must be allowed for deviations. For example, OmniLink, a well-known service in Manassas, Virginia, will deviate up to three-quarters of a mile off the route and began by allowing a 25% cushion for deviations, or about ten minutes per run, and then made adjustments based on experience[4]. No matter how much time is allowed, it will never be possible to accept all deviation requests.

Benefits of flexible services are that they can provide an alternative service in less-densely populated areas where fixed-routes are not feasible; because they deviate from the set route, they can meet the needs of passengers over a wider area but only on a demand basis. Since the service area expansion is on-demand rather than a regular route, this type of service expands coverage without triggering an ADA paratransit obligation. Flexible routes can also be used to test demand and build ridership for eventual fixed-route service.

At the same time, this type of service is more complicated than fixed-route for operators and dispatchers, and drivers may find it more difficult to stay on schedule. Passengers need to be educated on how the system works, and must be willing to call ahead to be picked up. Operators considering establish a flexible route service need to study and evaluate costs differentials between flex and fixed route services.

Dial-a-Ride

In dial-a-ride service, vehicle routing is determined entirely or primarily in response to passengers' requests. Typically passengers may request to be picked up from and taken to any safe location within the defined service area. Dial-a-ride services are called "door-to-door" if drivers assist passengers between vehicles and the front door of pickup and drop-off locations, otherwise the service is called "curb-to-curb." In a large dial-a-ride system, with multiple buses operating throughout a large service area, trips must be requested through a call center where vehicles are scheduled and dispatched. In community transit services, however, it is common to have a single vehicle providing dial-a-ride service in a small area, with all requests received and scheduled by the driver. Dial-a-Ride service sometimes includes taxi subsidy programs, described below.

A common approach of dial-a-ride service is to make regularly scheduled stops at a rail station, transit hub, or large activity center. The stop locations are sometimes called "checkpoints" and the service type is sometimes called "feeder" or "connector" service. Passengers who board at the checkpoint do not need a reservation and may request to be dropped off anywhere in the defined service area. Passengers who want to be picked up at other locations need to call, usually directly to the driver. In order to serve all the passengers who board without a reservation (as well as some pickup requests that may have been phoned in) and still make it back to the checkpoint at the scheduled time, the driver may negotiate pickup and drop-off points up to a few blocks from some passengers' ultimate destination or origin.

Dial-a-Ride service is highly personalized service, somewhat like a shared taxi ride. Once clients understand how to make reservations and standing appointments, this kind of service can be extremely valuable for those who can't walk far or take regular public transportation.

Critical decisions for a dial-a-ride service include the size of the area to be served, how far in advance requests will be taken, whether requests will be phoned directly to the driver or through a dispatcher, and whether unscheduled boardings will be allowed at a transfer point with a bus or rail route. A large service area may generate high levels of demand, but also limits the number of trips that can actually be served with each vehicle since each trip is likely to be longer than in a smaller

[4] Eric Bruun and Eric Marx, "OmniLink--A Case Study of a Successful Flex-Route Capable ITS Implementation," paper presented at the January 2006 Annual Meeting of the Transportation Research Board.

service area. If unscheduled boardings are allowed at a transfer point, the area served needs to be balanced against the service frequency and the number of vehicles used. For example, if it is desired to meet a train every 30 minutes using one vehicle, then the service area needs to be small enough that all the likely drop-off points can be served and the vehicles can return to the transfer point in 30 minutes.

Taxi Subsidies

Taxi subsidy programs typically involve an arrangement between a sponsoring organization (or its agent) and a participating taxi company or companies. These programs accept and accommodate requests from sponsored customers, clients, or residents and/or accept vouchers provided by the sponsoring organization to riders as partial payment for the trip. Most taxi subsidy programs focus on seniors and/or persons with disabilities residing within the sponsoring municipality or agency service area, but some are available to general public residents as well. Human service agencies that employ this strategy generally limit taxi subsidies to agency clientele or program participants.

For example, a city may give or sell scrip or coupons to eligible people which they can redeem for taxi rides. The amount of subsidy may vary from as much as 90% to 50% or less. Usually, each participant is limited to taking a small number or value of rides per month. Taxi subsidy programs can be very popular, so strict limits on trips per month and the amount of the subsidy may be needed to control costs.

A taxi subsidy program requires a mechanism for paying the subsidy and decisions about the amount of subsidy per trip and limits on the number or value of trips that will be provided per month. Some large taxi subsidy programs use automated means and central call centers, but small-city or community programs usually use coupons or scrip in some form. If the program is limited to one or a small number of selected taxi companies, it may be possible to establish a system administered by the companies with City oversight. Auditing and fraud control measures need to be established.

Potential obstacles and challenges with taxi subsidy programs include the lack of accessible taxi vehicles to accommodate wheelchairs, fraud by taxi drivers or participants (for example selling coupons) and complaints about service quality, including reluctance by drivers to accept the scrip or coupons. A program of this type is most likely to be successful if the area is well served by taxis, the public entity has effective taxi regulations in place, and there is good communication among all parties.

The DuPage County (IL) Pilot II Subsidized Taxi Service is a nearly county-wide, user-side taxi subsidy program. Each sponsor (municipalities and human service agencies) defines its eligibility criteria and decides how much to charge for a voucher/coupon that is worth $5.00 towards a taxi fare. Service is available countywide 24 hours per day, 365 days per year.

Community-Based Transportation

In addition to fixed-route and flexible route services, social services which provide transportation can fill transportation gaps for people with particular needs, and when coordinated, can expand their area and client population.

Volunteer Driver/Escort Programs

Volunteer driver programs typically provide mileage reimbursement to individuals that operate their own vehicles when they take individuals to medical appointments or other services, thereby negating the need for additional labor and capital costs. Volunteer escort programs (e.g., “Bus Buddies”) have volunteers accompanying riders to/from their destination on transit or paratransit. This kind of program can provide service to riders who may otherwise be unreachable and/or are too costly to serve.

Many community transit services use volunteers for some aspect of service delivery. Leveraging volunteer labor can make community transit services more affordable. Having volunteer drivers can increase schedule flexibility and reduce costs. Volunteers can develop into program advocates in community, and can provide physical and emotional support to riders.

As might be expected, recruiting and retaining volunteers can be challenging and requires on-going effort/attention; in addition, most volunteer drivers are limited to ambulatory passengers. Most volunteers are reimbursed for mileage; the higher the reimbursement, the greater the number of people willing to become volunteers. The IRS guideline (raised to $58.5 per mile on 2009) is the amount volunteers can be "reimbursed" without it counting as income they would have to declare as income. Any program should consider paying the maximum; if this is beyond current funding, then getting the funding to bring reimbursement up to the maximum should be considered a need in the program’s plan.

If volunteers are used, time needs to be devoted to continuing volunteer recruitment, recognition, and training. Volunteer programs may take years to establish, and volunteers can be in short supply. Some shifts are hard to cover with volunteers, who may prefer not to drive at night. Fuel costs and vehicle insurance can be prohibitive, and insurance coverage requirements may limit participation. However, in some communities, a local transit agency is willing to cover some of the insurance under their policy.

Coordinated Community Transportation

Within a community, many social services provide transportation for their particular clients. These facilities may include people with disabilities, seniors, or even church groups or schools. Often the vehicles and drivers are idle for at least part of the day, and may be picking up or dropping off people close to those in other programs. With some coordination, these resources can be more fully utilized, Where there is room, some groups can travel together, or vehicles not in use can be loaned to other organizations needing to transport their clients. Some coordinating agencies combine the coordination function with a volunteer program, such as Ride Connection described above.

The benefits to coordinating transportation resources are obvious; with funding for social services scarce, coordinating transportation resources can save everyone money. Sometimes agencies with vans and drivers are reluctant to participate, particularly if doing so would require comingling their clients with others. The coordinating task would be likely to require a funded position for such a program to be effective.

Ridesharing

Carpool, Vanpool, and Vanshare

Carpooling is the shared use of a car by the driver—usually the owner of the vehicle—and one or more passengers. When carpooling, people either get a ride or offer a ride to others instead of each driving separately. Carpooling arrangements and schemes involve varying degrees of formality and regularity. Carpools may be formal - arranged through an employer, public website, etc., or casual, where the driver and passenger might not know each other or have advanced agreed upon arrangements. Carpooling can be used as a first mile/last mile connector by efficiently connecting with public transit or other alternative commute modes.

Vanpools generally consist of 5 to 15 people, including a volunteer driver-member that elects to commute together in a van. Vanpooling is distinguished from carpooling not only by size, but also by the greater degree of management and institutional involvement required. Vanpooling often uses rented vans supplied by employers and administered by not-for-profit organizations or government agencies, with the operating costs divided among members.

Vanshares are similar to vanpools in that they consist of at least 5 people using borrowed vans. They are used to solve the "last-mile" problem by providing a connection between a transit station and the travelers' final destination. Commuters could take Metra to a station, and then vanshare to their employment locations. It can be more efficient to serve dispersed employment locations from a Metra station using vanshares than with fixed-route buses or shuttles.

Carpools, vanpools, and vanshares help to improve the efficiency of road/freeway systems by increasing the number of people per vehicle. Ridesharing reduces the number of cars on the road, carbon dioxide emissions, oil consumption and other positive environmental benefits. They provide a viable option to commuters and others who want to share a ride and do so without restricting personal mobility or incurring high operating costs.

Carpools are most effective for short commutes and vanpools work best for long commutes (20+ miles). Vanshares are ideal for connections between a transit station and a workplace. Participants of rideshare programs often are part of commute trip reduction programs, which can provide economic and time-saving benefits, including:

- Discounts on parking permits
- Access to priority parking spaces reserved for car or vanpool vehicles
- Shared vehicle expenses and tolls
- Use of dedicated carpool or vanpool 'diamond' or high-occupancy vehicle (HOV) lanes on major roadways, tunnels, or bridges
- Waived or reduced tolls

There are little or no direct costs for a sponsoring organization associated with carpooling. For vanpools or vanshares, employer sponsored programs can keep fares low by absorbing administrative, insurance, and sometimes maintenance costs. Most vanpool and vanshare programs either charge a flat per person fee or a distance or zone based fare. Some programs may have additional fees for added services such as guaranteed ride home programs. The costs to offer preferential parking for car/vanpools are zero to minimal.

Specific intended benefits to employers and the general public include reduction of automobile congestion around major employment centers, reduction of parking requirements at employment sites, conservation of energy, and reduction of air pollution. Intended user benefits for the journey-to-work trip include low costs, acceptable travel time, ability to read and relax, and convenience.

Traveler Benefits	Public Benefits
Time savings	Reduced congestion
Cost savings	Increased efficiency of the transportation system
Preferential parking	Reduced environmental impacts

Carpools, vanpools, and vanshares can be difficult to form because of the challenges associated with matching users, and can be difficult to maintain due to changing travel patterns and needs. Drivers carry the additional burden of potential legal action from passengers in case of an accident. In addition, the lack of HOV facilities on Chicago-area roadways decrease the time savings that can come with carpooling or vanpooling.

King County Metro in Washington State has a comprehensive carpool, vanpool, and vanshare program. Ridematching for carpools is facilitated by RideshareOnline.com, a project managed by the Washington State Department of Transportation that serves Washington and Idaho. The program provides free carpool, vanpool, and bicycle ride matching services as well as information about other commuting options. It also provides a free online tool to assist employers in managing their employment program. The agency provides vans for vanpools and vanshares, provides ridematching services, and performs the administrative functions associated with vanpooling and vansharing.[5]

Dynamic Ridesharing

The main objective of dynamic ridesharing is to improve the efficiency of road/freeway systems by increasing the number of people per vehicle. Dynamic ridesharing is also known as real-time ridesharing or ad-hoc ridesharing as it forms carpools “on the spot.” It also differs from regular carpooling and vanpooling in that ridesharing is arranged on a per trip basis rather than for trips made on a regular basis.

Rideshare programs can be implemented by a number of different organizations such as an individual employer as part of a Commute Trip Reduction program, a Transportation Management Association (TMA), a Campus Trip Management program, a transit agency, or a regional ridesharing agency. Large ride matching programs use computerized partner matching systems that take into account each commuter’s origin, destination, schedule, and special needs. Smaller programs may simply manually match potential partners or use ride notice boards including sites on the web.

The requirements for success include:

- An institutional sponsor committed to the project
- Sufficient incentives (for example, scarce parking spaces provided to project participants)

[5] http://metro.kingcounty.gov/tops/van-car/van-car.html

- Sufficient marketing (including start-up incentives to create "critical mass").

Dynamic ridesharing systems consider each trip individually and are designed to accommodate trips to random points at random times by matching user trips without regard to trip purpose. The systems have to provide match information close to the time when users need to travel. Dynamic ridesharing can either be an organized program run by an agency or an informal system run by users (casual carpooling).

There are a number of benefits to dynamic ridesharing:

- Minimal advance planning is required and it accommodates variable travel times.
- Can provide a link to or from transit stations and help bridge first/last mile gaps.
- Increase mobility by promoting more-efficient use of existing freeway infrastructure (as filling up empty seats in a car).
- Allows households to limit their car ownership by providing opportunities to use an alternative form of transportation that does not sacrifice convenience.

The main challenge involved with dynamic ridesharing is making commuters aware of the service. Dynamic ridesharing exhibits what economists call a network effect; if more commuters register for a ride-match, commuters can more easily find a match. It is difficult to reach a "critical mass" of users so that ride-matching is easy. In addition, people may be hesitant to ride in a car with a stranger.

- **Avego** has developed a dynamic ridesharing system that matches riders and drivers using smartphones and a website. The firm is currently running a dynamic ridesharing pilot project on State Route 520 in King County, Washington. http://www.avego.com
- **ZimRide** is a model which provides some pre-screening for people looking to rideshare. ZimRide is a social-networking site that matches drivers and passengers on university campuses or at companies. http://www.zimride.com/

Taxi Sharing

Taxi sharing service differs from rental car and car-sharing services in that the person making the trip: a) does not drive themselves, b) does not need to reserve in advance, and c) can access the service at many different locations. Under a taxi sharing program, cab drivers can pick up multiple passengers at the same time, provided each passenger is headed in the same direction. A taxi sharing program is especially beneficial when passengers have a common destination, such as from a transit station. Taxi sharing allows passengers to pay lower fares for door-to-door journeys than they would if travelling alone. Sharing taxis results in fewer taxi trips overall, which reduces traffic congestion and pollution. These arrangements not only benefit customers, but the trade and local communities too.

Taxis provide on-demand door-to-door travel and are best for short-distance trips. For these reasons, taxis are an excellent first / last mile connector to bridge the gap between a transit station and a person's origin or destination.

Providing additional taxis at transit centers or developing a taxi sharing program can assist passengers that have a common destination, such as from a transit station to downtown or to residential neighborhoods. Taxi sharing can provide better access to employment sites or downtown shopping areas for a lower cost (usually a flat fee).

Taxi capital and operating costs are largely accounted for by the private sector and are recaptured through fares. Costs to consumers are around $2.60 per mile with a $3.00 flag fee. Measures to simplify the customer experience for occasional taxi passengers (such as a downtown "flat fare") could increase the number of short distance trips taken. Shared taxis can also be used to reduce consumer costs.

The benefits of taxi sharing include:

- Taxi service supports transit use by bridging first mile/last mile gap by enhancing access to and from transit stations.
- It supports the use of alternative modes, including walking, cycling, ridesharing and transit use, by giving people who use those modes a better "fallback option" in emergencies. Especially effective as part of a Guaranteed Ride Home program, as experience indicates that improving the availability of fallback options can significantly increase use of alternative modes.
- Can reduce VMT by replacing single occupancy vehicle trips with high occupancy vehicle trips.
- Improves availability of parking near key destinations.
- Flat fare can encourage the use of taxis for short trips.
- Increases mobility for those who do not have access to a car, particularly the elderly and disabled, or those who chose not to use their car.

Challenges include:

- Measures to enhance the integration of transit and taxi will require minor capital investments to pay for installation of telephones and other supporting capital equipment.
- Measures to expand the overall availability of taxis by increasing the number of cabs on the street could have a detrimental effect on driver incomes unless market demand increased in tangent with expanded availability.

Shared taxis are a common public transportation mode in Latin American cities. In May 2009, New York taxi passengers were able to share rides under a pilot program approved by the New York City commission that regulates the city's 13,000 yellow cabs. The 12-month program outfitted 1,000 taxis with meters to allow for multiple fares and electronic signs showing their neighborhood destination.[6] A similar pilot program could be an attractive alternative for passengers to and from their residential neighborhood to or from a Metra station.

[6] Chris, Dolmetsch, "New York to Allow Shared Taxis Under Pilot Program, "Bloomberg Press [New York] 29 May 2009, http://www.bloomberg.com/apps/news?pid=20601093&sid=amxbdcrsRPkQ&refer=home

Figure 5: Types of Community Transit and Community Transportation Services

Type	Route	Schedule	Locations served	Market
Fixed-Route				
Business District Shuttles	Fixed	Established timetables	Transit hubs, major activity centers, shopping districts, mixed-use and high-density residential development.	Shoppers, business district employees, residents, hotel guests.
Community Circulators	Fixed	Established timetables	Concentrated residential locations, community centers, shopping that can be linked by a workable route and schedule.	Residents, but mainly targeted to youth, seniors, and disabled
Commuter Shuttle	Fixed	Established timetables	Transit hub, employment center.	Rail or bus commuters
"Tripper" Services	Fixed with scheduled deviations	Established timetables	Schools, large employers, especially with unusual hours	Students, employees
Demand-Responsive				
Flexible-Route	Fixed stops with deviations between stops	Stops served on a fixed schedule. Deviations are scheduled based on passenger requests.	Similar to community circulators	Residents, but mainly targeted to youth, seniors, and disabled
Dial-a-Ride	Route based on passenger requests, except for one or two checkpoints, usually at a transit hub.	Stops at a checkpoint are scheduled, otherwise all stop times based on passenger requests.	Any defined residential area within proximity of a transit hub or significant destinations	Residents, sometimes targeted to seniors and disabled
Taxi Subsidy	Routing determined by passenger request.	Pickups at times requested by passengers.	Usually a city and nearby areas, limited by subsidy amount and taxi fares	Usually seniors and/or people with disabilities
Community-Based Transportation				
Volunteer Driver Programs	Routing determined by passenger request.	Pickups at times requested by passengers.	Usually a city and nearby areas, limited by subsidy amount and taxi fares	Usually seniors and/or people with disabilities
Coordinated Social Services	Routing determined by passenger request.	Pickups at times requested by passengers.	Usually a city and nearby areas, limited by subsidy amount and taxi fares	Usually seniors and/or people with disabilities
Ridesharing				
Volunteer Driver Programs	Routing determined by passenger request.	Pickups at times requested by passengers.	Usually a city and nearby areas, limited by subsidy amount and taxi fares	Usually seniors and/or people with disabilities

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Pace Suburban Bus

I-355 Corridor Transit Development Technical Memorandum #5

Selected Corridors & Service Policy Recommendations

September 2011

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Table of Contents

List of Tables

List of Figures

Page

Executive Summary

Summary of Analysis

The single most relevant finding of the Transit Market Analysis and Potential Transit Corridor Evaluation reports is that transit service productivity and cost-efficiency in this part of Pace's service area will be limited, because the existing development density, urban form and land use patterns, that are prevalent in the study area create a street environment that is extremely challenging for pedestrians to use. The efficiency and effectiveness of any transit service operating in this environment is hampered by the physical design of streets and traffic management policies that favor automobile travel versus any other mode of transportation.

Transit Market Analysis

The analysis process consisted of a series of demographic, socioeconomic and travel demand data analysis to identify potential transit markets in the study area (summarized in the Existing Conditions Report and Tech Memo #3) that included:

- Identifying major origin-destination travel patterns, with special emphasis on north-south travel around the I-355 corridor.
- Developing discrete zone-to-zone network assignments to identify primary corridors channeling north-south trips in the study area.
- Estimating potential transit demand along primary corridors, and
- Evaluating and ranking corridors for their transit market potential.

The main finding of this analysis was that most north-south travel in the study area is generally short distance (no more than five miles) and for trip purposes other than work. Therefore, a peak-hour express bus service on the I-355 expressway would not offer the best fit for this demand pattern. However, a few arterial corridors running parallel to the I-355 expressway appear to have sufficient demand potential to support transit service.

Physical Condition of Corridors

Arterial corridors showing the highest demand potential were selected for further analysis and evaluation. In particular they were evaluated for their physical design condition with respect to streetscape design (roadway and sidewalks), land use patterns, street grid and urban form, development densities and overall accessibility to destinations. This was developed with an emphasis on the pedestrian experience, as pedestrians would be the principal users of any transit service along corridors. In general, the analysis found the study area to share similar urban design characteristics along its arterial corridors such as:

- **Land use and urban form**: with predominance of single use zoning, low density, and inaccessible density (or concentrations of employment and multifamily housing surrounded by parking lots, with poor sidewalk accessibility and lack of direct pedestrian connections to the street), and street grids with limited number of connections to the main corridor.
- **Pedestrian accessibility issues**: sidewalks lacking direct connections to destinations, missing crosswalks at major intersections, sidewalk gaps along the corridor, long distances

between traffic signal or controlled street crossings, and complete absence of traffic calming measures and infrastructure.

- **Street design and vehicle traffic**: wide arterial streets (5 to 7 lanes wide, with lanes 11 feet wide) designed for vehicle speed (generally operating at 5 to 10 miles over the posted speed limit of 35 to 40 mph), relatively unimpeded traffic flow (few traffic controls or signals), intersections designed for vehicle traffic movement (wide right-lane turning radii or slip lanes, left turn lanes, and pedestrian islands), and absence of sidewalk buffers such as parking lanes and/or bike lanes.

All of these conditions favor private vehicle traffic and speed. In addition, they become major physical constraints for pedestrians and potential users that limit transit service performance and their effective reach of potential market demand along corridors.

Potential Transit Operations

Field observations on corridors selected for a potential transit service implementation show that transit buses could reach revenue operating speeds of about 15 - 17 mph. This means that buses can travel 1 mile in about 3.5 to 4 minutes. With target route cycle times of 60, 90, or 120 minutes, this translates into routes that can extend for about 7.5, 10, and 15 miles in length, respectively. This length covers sufficient distance and territory to attract passengers making both short and long trips along arterial corridors.

Revenue operating speeds of 15 to 17 mph indicate that in relative terms very little intersection delay (in the form of traffic back-ups and signal phasing) exists along the route. This means that although transit could achieve an efficient and agile operation, its travel time would not be competitive with the automobile if significant measures are not taken to reduce or slow down private vehicle traffic.

In general, low residential and employment densities, sparse street connections with main corridors (i.e. cul-de-sacs, irregular and disconnected street grids), and lack of pedestrian crossing facilities and sidewalk accessibility affect potential usage of transit services.

- **Productivity indicators** on corridors selected for detailed analysis indicate that the best candidates for transit service implementation could reach over 20 passengers per revenue hour, while most candidates will be between 10 and 15 passengers per hour. A few candidates would reach less than 10 passengers per hour.
- **Efficiency indicators** show that costs across candidate corridors could reach \$6 to \$10 per passenger on average corridors, over \$10 per passenger on low performance ones, and between \$4 and \$6 on the best performing candidates. Similarly, farebox recovery on good candidates could reach 20 to 30%, 15 to 20% on average corridors, and 10 to 15% on low performing ones.
- **Annual operating costs** on candidate corridors range from \$0.9 to \$1.5 million for those operating on a 90 minute cycle (10 miles long), and \$1 to \$2.1 million for those operating on a 120 minute cycle (15 miles long).

The analyses in previous reports and in this memo show that transit service ridership in the corridor has limited potential due to market size limitations around corridors, and also because of transit service's inability to reach its full market potential due to adverse physical design conditions. These factors combine together to negatively impact the productivity and efficiency of potential transit services in the study area and the sustainability of operating transit service in the long run.

Summary of Recommendations

Corridor Improvement Strategies

In order to reach the full transit market potential in each corridor and to augment the size of the transit market in general, a conscious and concerted market development and corridor improvement strategy is needed between Pace and the local jurisdictions in its service area. To prepare the region for future transit when funding becomes available, the alignments that have the fewest barriers to attracting ridership, uphold the principles of Pace's Vision 2020 and the region's GOTO40 will be prioritized for further evaluation. It is recommended that the market development and corridor improvement strategy includes the following programmatic elements:

- **Multimodal emphasis**. An emphasis on multimodal mobility on major arterial corridors that recognizes transit as a key strategy to improve mobility and reduce traffic congestion. Suggested approaches include:
  - Implementing a comprehensive corridor development policy that includes Pace's transit market development goals and cities/counties' traffic management, sustainable mobility and community development goals. This could be the task of long-range transit plan led by Pace and in consultation with local jurisdictions.
  - Establishing a 'transit emphasis' or 'multimodal corridor' zoning overlay designation that targets major arterial corridors for transportation infrastructure investment and transit-oriented development, as well as for transportation demand management and other transit supportive policies.

- **Transit service standards**. The development of transit service standards that tie transit levels of service with corridor development density and physical design conditions. The intent of these standards is to provide guidance to both Pace and local jurisdictions in:
  - Identifying development density and transit performance thresholds that can trigger improvements in level of service along a corridor, and
  - Developing design improvements in the corridor that may result in potential increases in market demand and matching corridor development over time with levels of service that recognize these improvements.

- **Pedestrian accessibility and connectivity**. Prepare in partnership with local jurisdictions a corridor improvement plan that improves the urban design and physical design characteristics of sidewalks, intersections and accessibility networks that penetrate urban blocks and neighborhoods. The corridor improvement plan should contain provisions for:
  - Re-configuring the roadway to accommodate a 'complete streets' approach that opens corridors for all users and modes of transportation (i.e. transit, bicycles, and pedestrians), slowing down vehicle traffic and increasing persons safety and mobility.
  - Completing sidewalks on both sides of corridors, filling in gaps, providing more frequent pedestrian crossings, providing clear and direct connections with buildings facing the street and set back from the street, and completing sidewalk networks penetrating blocks and neighborhoods.
  - Densification of corridor through regulation incentives, such as reductions in parking requirements or maximum parking standards, to attract development and renovate corridors in a transit oriented fashion.

Transit Service Implementation

The analysis of transit markets, origin-destination travel demand, and physical design of potential corridors identified a number of corridors showing potential for implementation of arterial-based transit service, and one corridor showing potential for implementation of highway-based transit service. Specific recommendations and guidance to improve pedestrian accessibility and operational conditions are provided in this memo with a particular emphasis on growing transit market demand, and matching level of service to increases in demand and transit infrastructure improvements. Recommendations are provided for two corridors (Dundee Road - Arlington Heights Road and Wheeling Metra – Schaumburg NWTC), these are given as examples of arterial-based and highway-based operations and are not being presented as the only two corridors recommended for service implementation:

- **Implementation of Arterial-based service.** Of all the corridors analyzed, the Dundee Road – Arlington Heights Road corridor (see Figure 1) appears as the best candidate for transit service implementation because it combines relatively dense residential neighborhoods, with dense employment and retail centers at both ends, and halfway, of the corridor. Also because there is significant market demand volume and travel paths utilizing the corridor, and good market accessibility conditions. Therefore it is recommended for a service start up. Improvements proposed for the corridor include:
  - Implementing a full set of bus stops to operate service, completing the sidewalk network adjacent to bus stops to access the community, and improving pedestrian conditions at all bus stop intersections, such as providing crosswalks and signals.
  - Identifying opportunities for redevelopment (i.e. vacant properties, blighted properties, undeveloped parcels and major TOD nodes), and developing a land use plan and TOD master plan at major transportation accessibility nodes.
  - Developing a specific zoning plan (potentially a form-based code) for the corridor that increases residential and employment density, aims for mixed-use developments, parking requirements reductions (or maximums), and promotes a walkable urban design.
  - Developing and executing a Complete Streets design that includes roadway restriping, reducing of traffic lanes, and creating curb bulb-outs and safer pedestrian crossings, new bicycle lanes on both sides of the roadway, and concrete bus stop pads.

- **Implementation of Highway-based service.** The Wheeling Metra – Schaumburg NWTC corridor (see Figure 2) shows potential for transit service implementation, but no transit service start-up is recommended for the corridor unless some minimum infrastructure improvements are made to pedestrian access in the Schaumburg area (e.g. the improvements in Figure 31: Meacham Road & Woodfield Road on page 120), and the new park-and-ride facility on Dundee Road and Route 53 is built. Improvements proposed include:
  - Designing and completing pedestrian improvements (such as new sidewalks, pedestrian signals and crosswalks) at key destinations to provide direct access to major employment centers (i.e. Motorola and Meacham corporate towers). In addition, breaking large blocks with mid-block pedestrian crossings (at grade or above grade), and serving them with mid-block bus stops so that destinations can be accessed more easily.
  - Partnering with major employers in Schaumburg or the Business Association to develop direct marketing to potential users, and developing a comprehensive TDM program with

Schaumburg employers, offering incentives to leave the car at home and use transit such as discounted bus passes and/or a parking cash-out program.

- Implementing transit service on arterial streets crossing the highway corridor and feeding the park-and-ride, and developing freeway stations to avoid deviations off the corridor that provide direct access to arterials streets and transfers to local bus service.

Fulfillment of GO TO 2040 Principles

The Chicago Metropolitan Agency for Planning (CMAP) in its GO TO 2040 plan supports the coordination of projects that integrate transit and pedestrian access with roadways. This is being supported by the creation of working groups in the 2012-16 Regional CMAQ programs, where a series of coordinated projects have been proposed. There are four focused planning groups[1]:

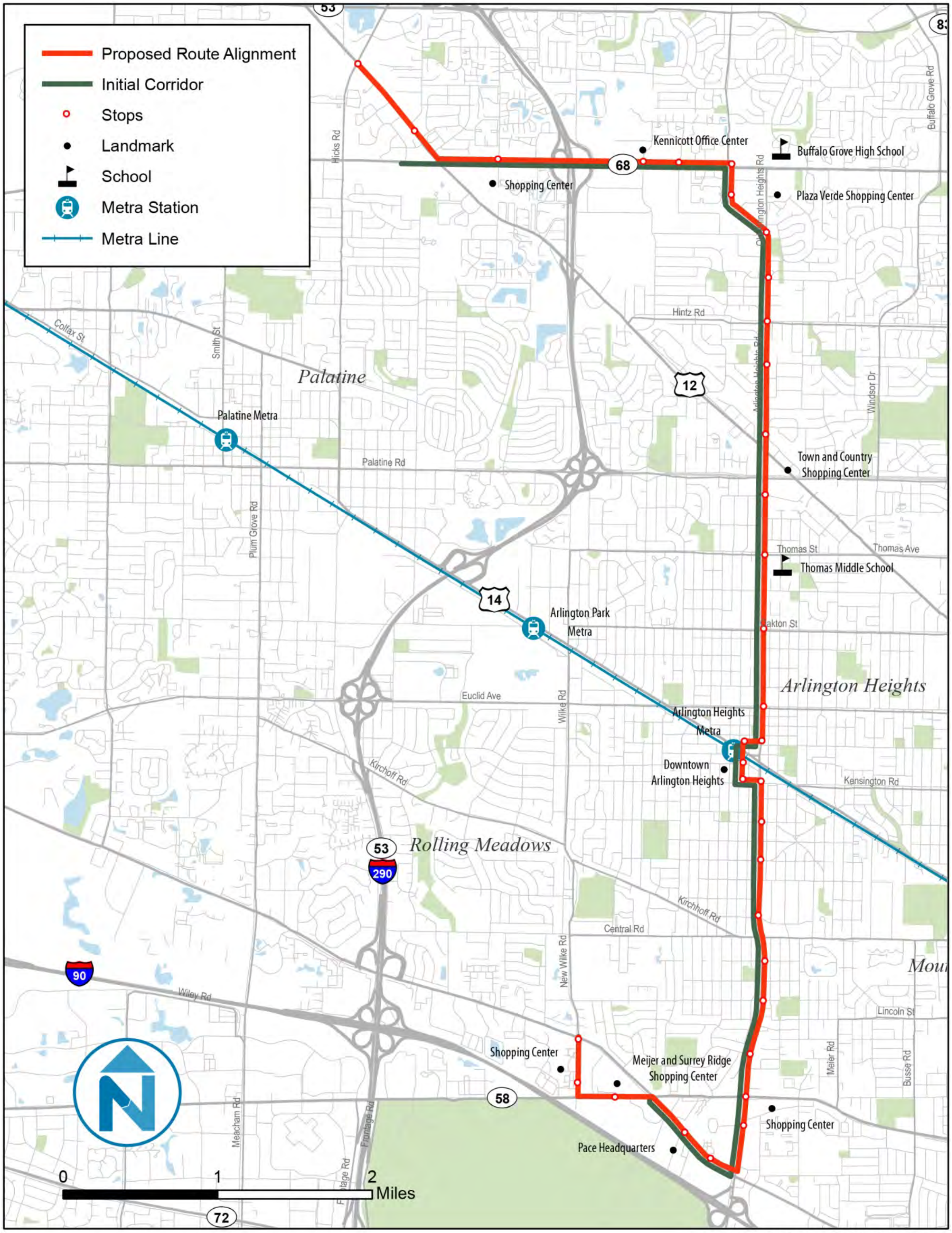
- The Regional Transportation Operations Coalition
- The Transit Focus Group
- The Bicycle and Pedestrian Task Force, and
- The Direct Emissions Reduction Focus Group

The I-355 Corridor Transit Development Study is in essence an extension of these working groups in that it seeks to lay out the design and policy strategies that will achieve the regional sustainability goals contained in GO TO 2040 principles:

> *GO TO 2040 seeks a world-class transit system in our region, making transit the preferred travel option for as many of the region's residents as possible. This requires attention to not only how transit operates, but how it is perceived. A system that functions well, with on-time and frequent service and seamless connections between modes, is a necessity. But so are features that make transit attractive, such as clean stations, modern transit vehicles, clear information, and easy pedestrian access. – GO TO 2040, p. 19*
>
> *A good walking and bicycling environment is essential for our region. Barriers to pedestrians, bicyclists, and people with disabilities can discourage mobility, require expensive auto trips, or even prevent trips. GO TO 2040 supports improving conditions for non-motorized transportation. – GO TO 2040, p. 359*
>
> *One important precondition for successful transit service is an extensive pedestrian and bicycle infrastructure that makes direct connections from transit stops to nearby destinations. This goes beyond sidewalks and bicycle facilities to include roadway design, pedestrian treatments at signalized road crossings, safety islands, or other improvements that provide safe ways to cross busy streets. GO TO 2040, P. 298*
>
> *The GO TO 2040 plan also supports policy-based efforts to improve the bicycle and pedestrian systems, such as the use of Complete Streets principles to accommodate non-motorized travel in roadway design. – GO TO 2040, p. 272*

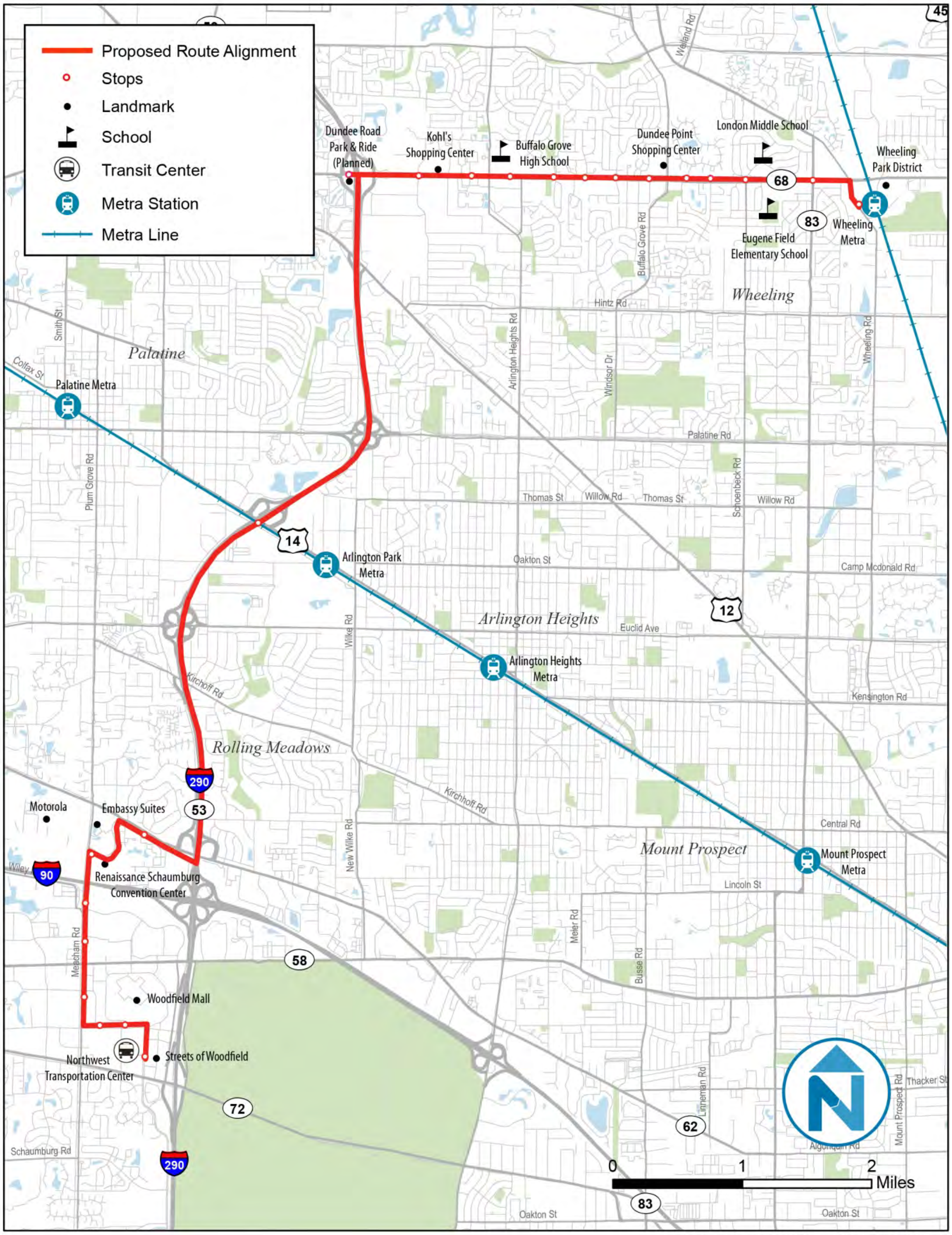
[1] http://www.cmap.illinois.gov/cmaq/minutes

Figure 1: Dundee Road – Arlington Heights Road Alignment



Data Sources: CMAP, Pace, ESRI, State of Illinois

Figure 2: Wheeling Metra – Schaumburg NWTC Alignment



Data Sources: CMAP, Pace, ESRI, State of Illinois

Candidate Corridors Summary

Corridor Selection Recap

The evaluation of transit demand in the I-355 corridor and the assessment of transit corridors has been a multi-step process described in a series of technical memoranda. Initially, an existing conditions report (Tech Memo #2) was prepared and stakeholder outreach was conducted to understand the overall travel markets and demand for transit in the areas surrounding the corridor. Significant activities during this phase included defining market analysis areas to aid in the analysis of travel demand model outputs and creating a transit orientation index to identify the geographic areas with the greatest demand for transit. Major analytical conclusions from these efforts include the following concepts:

- There is significant north-south travel demand within the corridor study area, but trips tend to be short-distance (i.e. less than 3 miles long). Long distance travel (i.e. over 3 miles) is more commonly oriented east-west.
- More travel occurs in the northern portion of the corridor (north of I-88 hwy) than the southern portion of the corridor (south of I-88 hwy).
- Within the corridor study area, there is likely to be greater demand for arterial-based transit service than for highway-based service, as people are traveling relatively short distances for which getting on and off the highway is not convenient.

In the following phase, described in Tech Memo #3, the market analysis areas were broken down into “micro zones” to analyze travel demand at a finer-grained level. Travel demand model data were used to identify the strongest connections between micro zones. Once the most significant connections were identified, zone-to-zone network assignments were performed to identify the streets that carry the most trips between zones. Using the results from the network assignments, a total of 43 corridors were identified that provide connections between contiguous micro zones as well as longer distance connections. These 43 corridors were then evaluated using three analysis filters:

1. **Transit demand potential** – measured through the average scoring of three factors, including a market potential index, a market accessibility index, and a daily trips volume index.
2. **Population and employment market reach** – the size of the population and employment market that is accessible from each corridor.
3. **Transit network integration** – Candidate corridors that would duplicate existing transit service received low scores, while corridors that would augment existing service and increase connectivity received high scores.

Through the filtering process, the list of 43 corridors was reduced to 20 corridors in two tiers: 10 each in tiers 1 and 2. These corridors were selected to move on to the next evaluation phase.

In the next phase, which is described in Tech Memo #4, a model for projecting ridership was developed and ridership estimates were produced for the Tier 1 and Tier 2 corridors. In addition, an assessment of the physical characteristics of the Tier 1 corridors was performed. The assessment was based on eight criteria that summarize the conditions of the pedestrian environment; including roadway design and traffic control/calming conditions, and development patterns affecting transit and pedestrians accessibility:

1. Number of travel lanes – roadway width
2. Number of signalized intersections – distance between crossings
3. Number of intersections with complete crosswalks – availability of crossings
4. Street and sidewalk buffering – sidewalk integration/relationship with the street
5. Sidewalk availability and extent – availability and continuity on both sides of the street
6. Pedestrian access to destinations – dedicated connections to building front doors
7. Urban form typologies – development density and neighborhood accessibility
8. Land use patterns – mix of uses and trip destinations

Corridors were given scores for each individual category, and those scores were added up to produce an overall score. The corridors were then categorized into three groups based on their observed roadway, sidewalk, and urban form conditions:

1. **Good Potential** – Corridors that have relatively strong market conditions and a pedestrian environment that works for potential users. They are recommended for potential implementation of all-day arterial service.
2. **Need Further Evaluation** – Corridors that present some conditions for transit service viability (high travel demand), but that also have some operational and accessibility barriers (low pedestrian accessibility) that would make transit service less successful.
3. **Not Ready Yet** – Corridors with high travel demand but that are not yet ready for implementation because of poor physical environment characteristics.

Six of the corridors in Tier 1 were selected for further analysis, including a field evaluation, service plan, and capital plan. The corridors were selected based on evaluation results and potential performance, but also based on geography and ranking category to illustrate the breadth of policy choices and challenges that will be confronted when implementing transit service in the I-355 corridor study area (see Figure 3). The six corridors include:

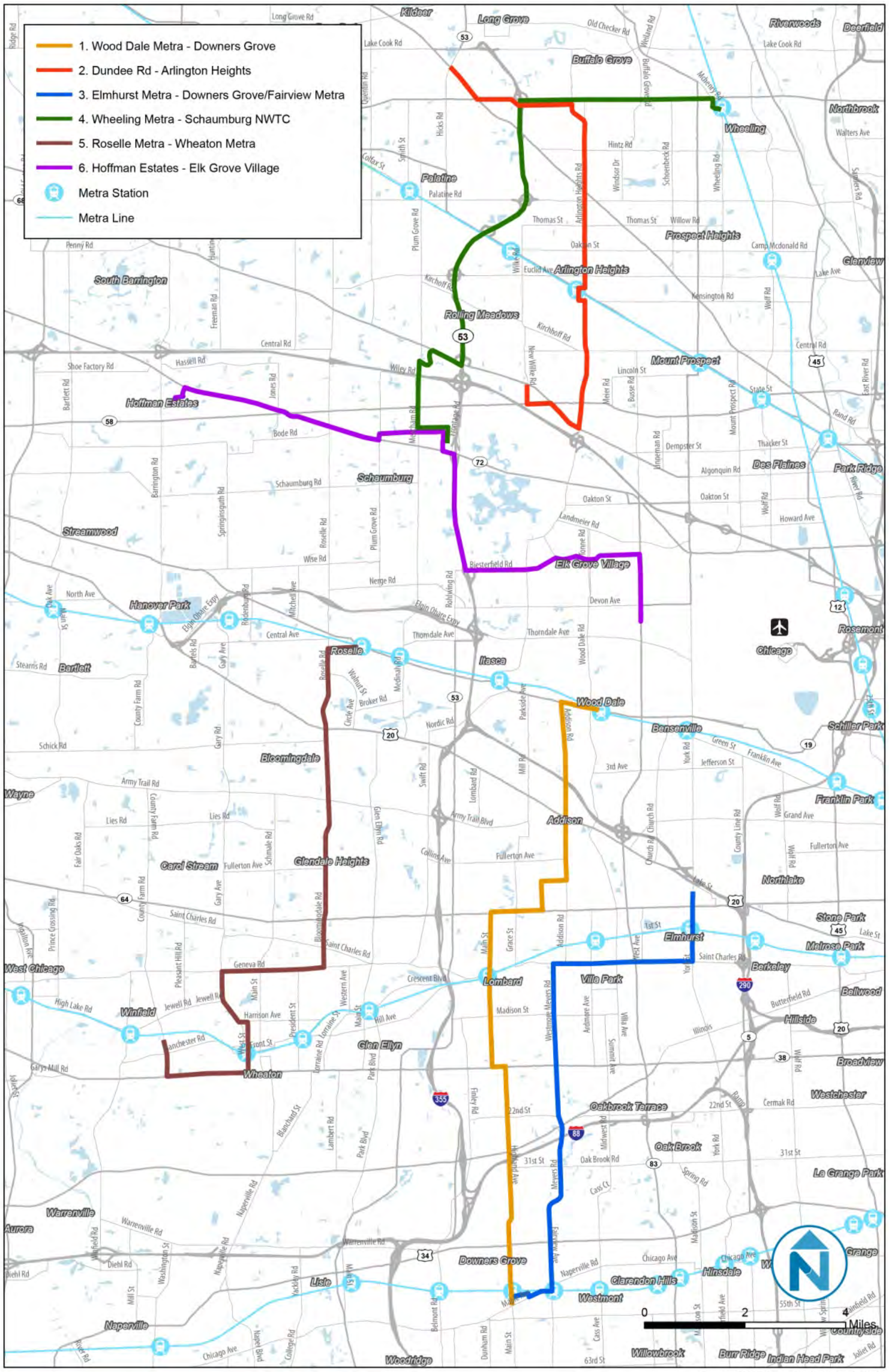
1. Wood Dale Metra – Downers Grove (Good Potential)
2. Dundee Road – Arlington Heights (Good Potential)
3. Elmhurst Metra – Downers Grove / Fairview Metra (Good Potential)
4. Wheeling Metra – Schaumburg NWTC (this is a potential express route that was considered separately, because physical characteristics analysis would not apply)
5. Roselle Metra – Wheaton Metra (Needs Further Evaluation)
6. Hoffman Estates – Elk Grove Village (Not Ready Yet)

As a cautionary note, corridor alignments require further analysis on the field to identify potential operational issues and determine running times with more precision before a final route alignment is established. For example, in previous phases of the study a potential transit corridor along Roselle Road or Meacham Road connecting Bloomingdale with Schaumburg. This northern segment performed lower than the Bloomingdale corridor (connecting Wheaton with the Roselle Metra station) and thus was screened out of the final list of corridors. However, it is a segment that can be added to the Bloomington Road corridor when studying a more detailed implementation as an alternative alignment option.

An overall evaluation of selected corridors is summarized in the following section, and detailed corridor-by-corridor assessments are included in a Technical Appendix at the end of this report. Two corridors are selected in the analysis and recommended for a potential service implementation, these include: Dundee Road – Arlington Heights Road and Wheeling Metra – Schaumburg NWTC.

- **Dundee Road – Arlington Heights Road**: in addition to market potential, travel demand, and good accessibility characteristics this corridor also has strategic importance in the regional transit network.
  - It is a designated Arterial Rapid Transit (ART) corridor.
  - It is a designated Transit Signal Priority (TSP) corridor, and
  - It reformulates the discontinued Route 690 service by extending the corridor, following origin-destination demand patterns and connecting a higher number of communities and mobility needs.
- **Wheeling Metra – Schaumburg NWTC**: in addition to market potential and travel demand this corridor also has strategic importance in the regional transit network.
  - It is a designated ART extension corridor.
  - It is a designated TSP corridor.
  - The City of Wheeling is developing a TOD around the Metra station including a residential/commercial component. The City has applied for CMAP assistance to develop a transportation and land use plan in support of GO TO 2040, and has expressed previous interest in local community service along the Dundee corridor.
  - In addition, east-west local travel markets, along the Dundee corridor, allow for future development and market growth for additional service, as well as provide connections with the Arlington Heights Road corridor.
  - The cities of Wheeling and Buffalo Grove support pedestrian access and a bus shelter implementation program.
  - The Regional Transportation Operations Committee recommended the Dundee Corridor as a proposed CMAQ project to the CMAQ committee. This includes signal and intersection improvements at McHenry Road, IL 83, Buffalo Grove Road, and Kennicott Avenue.

Figure 3: Candidate Corridors for Transit Service Implementation



Source: CMAP, Pace, ESRI, State of Illinois

Corridor Analysis Summary

Market Characteristics

Each of the corridors analyzed has good market demand characteristics when compared to other corridors in the I-355 corridor area. Table 1 contains three measures of market demand for each corridor: combined population and employment density per acre, a Transit Orientation Index (a composite of population and employment density, automobile availability, and market segments with propensity to use transit), and a measure of travel demand intensity (Average Daily Trips per mile of corridor). The strongest values vary across corridors with some showing higher density concentrations and others showing higher demand intensity measures. For this reason, additional analyses were carried out on the field to better understand demand accessibility conditions, and the capacity of each corridor to attract its potential transit market.

Table 1: Market Characteristics

Corridor	Pop/Emp Density (persons + jobs per acre)	Transit Orientation Index (TOI)	Travel Demand Intensity (ADT per mile)
Wood Dale Metra – Downers Grove	11.1	17.2	10,743
Dundee Road – Arlington Heights	14.0	17.9	7,475
Elmhurst Metra – Downers Grove / Fairview Metra	10.3	16.8	7,177
Wheeling Metra – Schaumburg NWTC	14.1	15.5	14,414
Roselle Metra – Wheaton Metra	9.7	16.2	5,896
Hoffman Estates – Elk Grove Village	11.1	14.9	11,437

Field Observations

Field observations and running time checks were conducted on each corridor during the AM and PM peak periods. Each trip was tracked using the EveryTrail smartphone application to record the travel time of different segments along the corridor. Observations were recorded about vehicle traffic, pedestrian traffic, turning movements, and land use conditions.

- In general, traffic moved smoothly along the corridors, although backups were observed in certain locations. These were commonly found in downtown areas, near Metra stations, at railroad crossings, and at intersections with major east-west roads. Traffic speeds in free flow conditions were generally at or slightly above the posted speed limits. Major intersections typically generated backups on the curb lane of vehicles waiting to turn. Many times clearing these intersections on this lane took more than one signal cycle and was a major source of travel time delay.
- Pedestrian traffic was low or nonexistent along most of the length of the corridors. Locations that did have significant pedestrian traffic were Metra stations before or after a train arrived and at certain commercial areas, such as the shopping corridor along St. Charles Road between Ardmore Avenue and Salt Creek. Pedestrians were also observed near activity generators, such as the Bloomingdale Public Library and Wheaton North High School along the Roselle Metra – Wheaton Metra Corridor. Instances where pedestrians were observed to be jaywalking were noted for each corridor

- Land uses along the corridors vary widely and include single family and multifamily residential, downtown environments, big box, and frontage retail, business and office parks, industrial parks, and open space. Major destinations were noted along each corridor.

Service Plan

Using running time data from the field observations, we estimated round trip cycle times for each corridor, including time for bus stops and layover/recovery time. Table 2 includes the estimated cycle time, two-way length, and average revenue speed (including layover time) for each corridor.

Table 2: Route Cycle Times and Average Revenue Speed

Corridor	Cycle Time*	Miles	MPH
Wood Dale Metra – Downers Grove	1:57:50	28.60	14.56
Dundee Road – Arlington Heights	1:17:32	18.40	14.24
Elmhurst Metra – Downers Grove / Fairview Metra	1:20:17	20.48	15.31
Wheeling Metra – Schaumburg NWTC	1:17:32	27.10	20.97
Roselle Metra – Wheaton Metra	1:16:15	21.72	17.09
Hoffman Estates – Elk Grove Village	1:21:01	24.17	17.90

* Includes stop time (15 seconds per stop) and 15% layover/recovery time at end of route.

From a service design and level of demand perspective, we looked for route cycle times that could work with a clockface headway of 15, 30, or 60 minutes, and developed service frequency scenarios for each route based on these values. Table 2 shows that most routes evaluated get cycle times between 75 and 80 minutes, which do not work efficiently with 15, 30 or 60 minutes headways. The only exception is the Wood Dale Metra – Downers Grove corridor, which gets close to 120 minutes. However, for the other five corridors to operate efficiently routes would need to be modified (either extended or shortened) to achieve cycle times that 'fit' in a 60, 90 or 120 minute cycle.

At 120 minutes the Wood Dale Metra – Downers Grove corridor could be served efficiently with 15, 30, or 60 minute headways. The remaining five corridors were modified by extending them slightly to fit into a 90-minute cycle. Table 3 below summarizes the route alignment modifications.

Table 3: Route Modifications

Route	Old Length	New Length	Cycle Time	Modifications
Wood Dale Metra – Downers Grove	14.5	14.5	120	None
Dundee Road – Arlington Heights	9.2	11.3	90	Route extended at northern and southern termini. Route starts at Rand Rd. & Hicks Rd. and ends at New Wilke Rd. & Algonquin Rd.
Elmhurst Metra – Downers Grove / Fairview Metra	10.3	11.9	90	Route extended at southern end to serve Downers Grove Main Street station
Wheeling Metra – Schaumburg NWTC	13.6	13.6	90	None.

Route	Old Length	New Length	Cycle Time	Modifications
Roselle Metra – Wheaton Metra	10.9	13.6	90	Route extended at southern end to serve Du Page County offices.
Hoffman Estates – Elk Grove Village	12.3	13.2	90	Route deviates to serve Woodfield Rd. Travels along I-290 south to Biesterfield Rd., then east to Elk Grove Village Business Park.

Table 4 includes characteristics of the proposed route alignments, including length, number of stops, and average distance between stop. The lengths range from 10.5 miles to 14.5 miles, with the Wheeling Metra – Schaumburg NWTC being the shortest. The average stop spacing for the arterial-based local routes ranges from 0.31 miles to 0.43 miles, and the stop spacing for the express route is 1.17 miles.

Table 4: Route Alignment Characteristics

Route	Length (miles)	Number of Stops	Average Space bet. Stops (miles)
Wood Dale Metra – Downers Grove	14.5	46	0.32
Dundee Road – Arlington Heights	11.3	36	0.31
Elmhurst Metra – Downers Grove / Fairview Metra	11.9	32	0.37
Wheeling Metra – Schaumburg NWTC	13.6	21	0.65
Roselle Metra – Wheaton Metra	13.6	35	0.39
Hoffman Estates – Elk Grove Village	13.2	31	0.43

Costs and projected potential ridership were estimated for three service scenarios on the proposed routes. The three scenarios have varying service frequencies:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively
- Scenario 2 – peak and off-peak frequency of 30 minutes
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively

For all routes, the service hour span is proposed to be from 6:00 a.m. to 8:00 p.m., a period of 14 hours. Service would operate on weekdays only, 255 days a year.

Table 5 presents the estimated daily boardings for each corridor under each service scenario. Table 6 presents an estimate of productivity in the form of boardings per revenue hour. Detailed information about ridership estimation methods for the six selected corridors can be found in Technical Appendix 2 at the end of this report.

Table 5: Estimated Daily Boardings

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	888	736	634
Dundee Road – Arlington Heights	1,132	938	808
Elmhurst Metra – Downers Grove / Fairview Metra	677	561	483
Wheeling Metra – Schaumburg NWTC	570	472	407
Roselle Metra – Wheaton Metra	695	576	497
Hoffman Estates – Elk Grove Village	513	425	366

Table 6: Estimated Boardings per Revenue Hour

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	11.1	13.1	15.9
Dundee Road – Arlington Heights	18.9	22.3	23.8
Elmhurst Metra – Downers Grove / Fairview Metra	11.3	13.3	14.2
Wheeling Metra – Schaumburg NWTC	9.5	11.2	12.0
Roselle Metra – Wheaton Metra	11.6	13.7	14.6
Hoffman Estates – Elk Grove Village	8.5	10.1	10.8

The Dundee Road – Arlington Heights Road route is estimated to get higher daily boardings and boardings per revenue hour than any other route; thus it is the main candidate for a potential service implementation. Also, in all corridors analyzed passengers per revenue hour tend to go down when comparing Scenarios 1 to 3. This is showing that when more service is introduced, more boardings are generated but at a lower increment rate than the amount of service hours that result from more frequency. In more practical terms this suggests that potential transit demand can grow in all corridors, but they need a long term investment plan in order to grow and strengthen their market base, and improve the accessibility conditions to their potential markets.

Table 7 below includes annual operating costs estimates for all six corridor routes under each service scenario. It shows that most routes operating on a 90-minute cycle will cost between $875,000 and $1.5 million per year, while the Wood Dale Metra – Downers Grove corridor would cost between $1 and $2 million to operate.

Table 7: Annual Operating Costs

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	$2,058,600	$1,441,000	$1,029,300
Dundee Road – Arlington Heights	$1,544,000	$1,080,700	$874,900
Elmhurst Metra – Downers Grove / Fairview Metra	$1,544,000	$1,080,700	$874,900
Wheeling Metra – Schaumburg NWTC	$1,544,000	$1,080,700	$874,900
Roselle Metra – Wheaton Metra	$1,544,000	$1,080,700	$874,900
Hoffman Estates – Elk Grove Village	$1,544,000	$1,080,700	$874,900

Note: cost estimates were calculated using a cost per hour of $100.91, which is the operating expense per vehicle revenue hour reported on Pace's 2009 NTD profile for bus operations.

Capital Plan

Draft capital plans were also developed for each route to estimate the need for stop improvements, vehicles, and improvements to pedestrian infrastructure. Pace's presence in the community and rider comfort can both be maximized by placing fully developed stops along the routes, including posts, signs, schedules, landing pads, and shelters. Table 8 below includes costs for improvement of one stop, using unit costs from a recent implementation in the Pace service area.

Table 8: Stop Improvement Costs

Stop Improvement	Material/ Labor Cost
Flag/Post/Schedule Holder	$50
ADA 5' x 8' Pad	$5,000
Shelter Pad	$10,750
Shelter (8')	$6,000
TOTAL	$21,800

Depending on the number of stops proposed in each corridor, the total cost of stop improvements for each route ranged from $900,000 for the Wheeling – Schaumburg NWTC route (42 stop locations) to $2,000,000 for the Wood Dale Metra – Downers Grove route (92 stop locations).

In addition, we estimated the number of buses needed to operate each route under each frequency scenario (including spare vehicles) based on cycle times and frequencies. It was assumed that buses would cost $350,000 each (for a standard low-floor diesel powered 40-foot bus), and that Pace would purchase them. Total vehicle costs for Scenario 1 ranged from $2.5 million for the Wheeling – Schaumburg NWTC route (6 buses) to $3.15 million for the Wood Dale Metra – Downers Grove route (8 buses). Table 9 below summarizes the total capital costs for each route, including stop improvements and vehicle requirements (revenue service plus spares).

Table 9: Total Capital Costs (Stop Improvements + Vehicles)

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	$5,155,600	$3,755,600	$3,755,600
Dundee Road – Arlington Heights	$4,019,600	$2,969,600	$2,969,600
Elmhurst Metra – Downers Grove / Fairview Metra	$3,845,200	$2,795,200	$2,795,200
Wheeling Metra – Schaumburg NWTC	$3,322,000	$2,272,000	$2,272,000
Roselle Metra – Wheaton Metra	$3,976,000	$2,926,000	$2,926,000
Hoffman Estates – Elk Grove Village	$3,801,600	$2,751,600	$2,751,600

Table 10 presents the cost of operating each of the corridors for a period of 12 years (using as a reference the assumed life-span of a transit vehicle at 12 years). Calculations include both operating and capital costs to operate the routes under each of the proposed scenarios. Table 11 below presents this same information in annualized terms. The Wood Dale Metra – Downers Grove route is the most expensive ($29.8 million) because of its long length and large number of stops. The Wheeling Metra – Schaumburg NWTC is the cheapest ($21.8 million) because of its short length, reduced number of stops and faster operation.

Table 10: Total 12-Year Costs (Operating + Capital)

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	$29,858,400	$21,047,500	$16,107,000
Dundee Road – Arlington Heights	$22,546,700	$15,938,600	$13,468,300
Elmhurst Metra – Downers Grove / Fairview Metra	$22,372,300	$15,764,200	$13,293,900
Wheeling Metra – Schaumburg NWTC	$21,849,100	$15,241,000	$12,770,700
Roselle Metra – Wheaton Metra	$22,503,100	$15,895,000	$13,424,700
Hoffman Estates – Elk Grove Village	$22,328,700	$15,720,600	$13,250,300

Table 11: Annualized Costs (Operating + Capital)

Route	Scenario 1 (15/30)	Scenario 2 (30/30)	Scenario 3 (30/60)
Wood Dale Metra – Downers Grove	$2,488,200	$1,754,000	$1,342,300
Dundee Road – Arlington Heights	$1,878,900	$1,328,200	$1,122,400
Elmhurst Metra – Downers Grove / Fairview Metra	$1,864,400	$1,313,700	$1,107,800
Wheeling Metra – Schaumburg NWTC	$1,820,800	$1,270,100	$1,064,200
Roselle Metra – Wheaton Metra	$1,875,300	$1,324,600	$1,118,700
Hoffman Estates – Elk Grove Village	$1,860,700	$1,310,000	$1,104,200

Corridor Design Improvement Strategies

A major finding from the physical conditions analysis described in Tech Memo #4 was that pedestrian conditions along all corridors with transit demand potential (Tier 1 corridors) need improvement. There is a wide spectrum of conditions across corridors, with some corridors exhibiting very poor pedestrian conditions, such as lack of sidewalks for long stretches of the corridor, lack of marked crosswalks or missing crosswalks at major intersections, while others have generally good conditions such as continuous sidewalks, frequent crossings, and relatively narrow roadway widths. However, the analysis shows that even the best corridors (e.g. Dundee Road – Arlington Heights) have significant room for improvement.

One area for improvement is pedestrian connections. Although most Tier 1 corridors show a high percentage of sidewalk availability and continuity (over 80% of length with sidewalks on both sides of the street), most of this pedestrian infrastructure is underutilized by not connecting to actual destinations or land uses, and not having a clear and direct path to the main building or front door of activity generators along the corridor. This is true for the overwhelming majority of retail, commercial and industrial uses, but also for many single-family and multi-family uses. In other words, there is wide availability of sidewalks along corridors, but they do not take a pedestrian anywhere, except along the side of the arterial. These sidewalks are good for jogging or walking the dog, but they are not good for people that want to get somewhere on foot or transit, because crossing the street is difficult or unsafe, and because there is no access to final destinations. The first part of this section discusses pedestrian improvements that would make traveling to and from bus stops along the corridors easier.

A second area for improvement is the design of the street and its use by other modes of transportation. Most arterial corridors selected for analysis are 4 lanes wide with 2 lanes operating in each direction or 5 lanes wide with 2 lanes in each direction and a 2-way center turn lane. Many traffic controlled intersections on the corridors lack pedestrian signals or crosswalks, and most intersections that do have them lack a full set on all four sides of the intersection. In addition, the typical distance between signalized intersections is about one-half of a mile (0.5 mile or a 10 minute walk). This is a very long distance for any transit user and pedestrian that needs to cross the street to access his/her final destination. Also, traffic lanes are generally wide (11 feet) and there are no parking lanes or shoulders buffering and slowing down traffic along the roadway. This type of street design and distance between traffic controls favors driving and driving at high speeds, despite the speed limit of 35 to 40 miles per hour that is prevalent along most corridors. The lack of opportunities for pedestrians to cross streets, the lack of bicycle facilities, and high traffic speeds make for a generally unsafe environment for pedestrians, bicyclists, and transit users. Interestingly, the analysis of traffic volumes along the six selected corridors shows that there is excess capacity on the roadways and room for a different approach to traffic management. It is possible to calm traffic and improve some of these conditions through the use of complete streets policies and road diets; these are discussed in the second part of this section.

Pedestrian Connectivity Improvements

The six corridors for which an operating and capital plan was developed were selected primarily on their transit demand potential, but also based on geographic distribution and physical conditions to analyze the breadth of policies and design improvements that are needed in the study area to make frequent arterial transit service a viable option of travel. With this goal in mind conceptual designs were developed on a sample of street intersections, across corridors, to provide guidance in the improvement of pedestrian connections and accessibility around potential bus stops.

The selected locations represent a variety of street and urban form conditions found in the study area that would help Pace in the development of corridor specific improvement plans, and to determine capital infrastructure, land use and urban design improvements that are needed in its service area in order to sustain transit service operations overtime.

This plan envisions the improvement of selected corridors through the reconfiguration of street sections, reconfiguration of travel lanes and buffer zones, densification and more intensive development, and development of clear and direct paths between potential bus stops, buildings and neighborhoods.

Arterial Node Improvements

Five intersection setting typologies were identified across the corridors that share similar physical design conditions for vehicle and pedestrian traffic, crossings and land use accessibility. The five intersection settings include:

- **Residential neighborhood** – this includes street segments with 4 to 5 lanes and many intersections without pedestrian crossing facilities or signage.
- **Corporate park/buildings** – includes signalized intersections between major roads, but also the long segments between intersections that do not have pedestrian crossings. Major intersections in this setting force the pedestrian to not only cross wide arterial roads and wait for pedestrian specific phases, but also they are surrounded by surface parking that put pedestrians away from main destinations. Pedestrian crossings and bus stops mid-block (between traffic lights) in mega-block settings like these, typically offers the shortest path to buildings, as opposed to developing stops at major signalized intersections, which in most cases leads to longer walking distances.
- **Shopping mall/big box retail** – intersections in these settings share similarities with pedestrian access in corporate environments. The main difference however is that shopping malls and retail developments usually have a side of the building away from the intersection that gets closer to the street. Developing stops at least 1/10th of a mile away from major intersections is preferable because buildings are typically closer to the street at these locations. In addition, buses are less affected by backups that often occur in the right lane at major intersections.
- **Frontage retail/light industrial** – Major intersections are dominated by small properties with parking lots on every corner that put the pedestrian/transit user away from main destinations. Improvements can be made by completing sidewalks, adding dedicated crossings, and ensuring sidewalks continue to buildings front doors.
- **Heavy industrial/warehousing** – Main buildings in this setting are typically on a deep set back away from the corridor and intersections, and there is no pedestrian infrastructure. Improvements can be made by completing sidewalks and providing dedicated paths to buildings.

Conceptual designs to improve the pedestrian realm were developed in 13 different locations across five corridors. The conceptual designs involved more than completing a missing sidewalk, including developing direct pathways penetrating the block, and pedestrian crossing infrastructure that can provide access to both sides of a corridor. Designs intended to connect sidewalks on both sides of the corridor, and connect sidewalks with actual destinations. For example:

- Many corridors have spacing of traffic lights and pedestrian crossings every 0.5 miles, and although these intersections need better treatment for pedestrians, the biggest barriers are found in the stretches between traffic lights, which often provide closer access to neighborhoods and destinations. Mid-block stops can put transit users closer to destinations.
- Most large intersections between major arterials have significant operational issues and physical limitations when it comes to developing bus stops and also have very poor accessibility to destinations. Developing stops 0.1 miles away from the traffic node offers in many cases much better access possibilities to destinations and operational flexibility to reduce delay going through major intersections.

Table 12 below lists the types of pedestrian issues found around the selected intersections and the types of solutions used to address them.

Table 12: Bus Stop Location Issues and Solutions

Major Issues	Design Solutions
Accessibility or linkages to building destinations from the sidewalk, including retail buildings, office parks, industrial parks, corporate towers, services, and restaurants.	Raised sidewalks, covered sidewalks, clear pavement demarcations, and other visual demarcation methods.
Accessibility to residential neighborhood areas.	Build paths and connect sidewalks to make bus stops accessible from neighborhoods[2].
Ability to cross the street and access both sides of the corridor at signalized and unsignalized intersections.	Crosswalk markings, curb bulb-outs, curb parking, pedestrian refuge islands, pedestrian only lights and other street design and traffic calming methods (i.e. chicanes, planters, reduced lane widths).
Sidewalk accessibility to bus stops.	Bus landing pads, space for shelters and benches, and connections with street sidewalks.
Pedestrian comfort.	Street trees, movable planters, and pedestrian-scale lighting where feasible along sidewalks.

Table 13 lists the conceptual design locations for each corridor, and Figures 18 and 5 are two samples of the conceptual design exhibits produced for each location. They provide examples of the types of improvements that could be made to enhance pedestrian accessibility along the Dundee Road – Arlington Heights Road corridor.

[2] One of the main goals of the study is to identify corridors that offer the best potential to develop transit service demand. For that reason the analysis aims at identifying those corridors and prioritizing them according to their estimated performance success. The recommended approach is to focus capital investments in pedestrian infrastructure and accessibility in those corridors that offer the biggest return for investment (or market potential). One of the analysis' major findings is that pedestrian accessibility from the neighborhood to the corridor, from the corridor to its adjacent land uses, and even for crossing the corridor to access bus stops on both sides of the street is deficient and one of the biggest barriers to transit service development. Building and completing a rich network of pedestrian paths in and around corridors is one of the most fundamental building blocks to change conditions and make mobility options other than the car a viable option in this part of the service area.

Table 13: Conceptual Design Locations

Intersection Setting Typology	Corridor	Stop Location	Figure/Page # of Design Exhibit
Residential neighborhood	Wood Dale Metra - Downers Grove	Addison Road & Michael Lane	Figure 18 on page 73
	Dundee Road - Arlington Heights Road	Arlington Heights Road & Fairview Street	Figure 24 on page 90
	Elmhurst Metra - Downers Grove (Fairview Metra)	Meyers Road & 16th Street	Figure 27 on page 105
	Hoffman Estates - Elk Grove Village	Higgins Road & Ash Road	Figure 35 on page 147
Corporate park/building	Wood Dale Metra - Downers Grove	Highland Avenue & 31st Street	Figure 19 on page 74
	Wheeling Metra - Schaumburg NWTC	Meacham Road & Center Drive	Figure 30 on page 119
	Wheeling Metra - Schaumburg NWTC	Meacham Road & Woodfield Road	Figure 31 on page 120
Shopping mall/big box retail	Wood Dale Metra - Downers Grove	Highland Avenue at Yorktown Mall	Figure 20 on page 75
	Dundee Road - Arlington Heights Road	Arlington Heights Road & Rand Road	Figure 23 on page 89
Frontage retail/light industrial	Dundee Road - Arlington Heights Road	Arlington Heights Road & Seegers Road	Figure 25 on page 91
	Elmhurst Metra - Downers Grove (Fairview Metra)	Fairview Avenue & Ogden Avenue	Figure 28 on page 106
Heavy industrial/warehousing	Wood Dale Metra - Downers Grove	Addison Road & Factory Road	Figure 21 on page 76
	Hoffman Estates - Elk Grove Village	Busse Road (Route 83) & Pratt Boulevard	Figure 36 on page 148

The complete exhibits for each corridor can be found in the individual corridor analysis summaries in Technical Appendix 1; their page numbers are listed in Table 13.

Figure 4: Arlington Heights Road & Rand Road

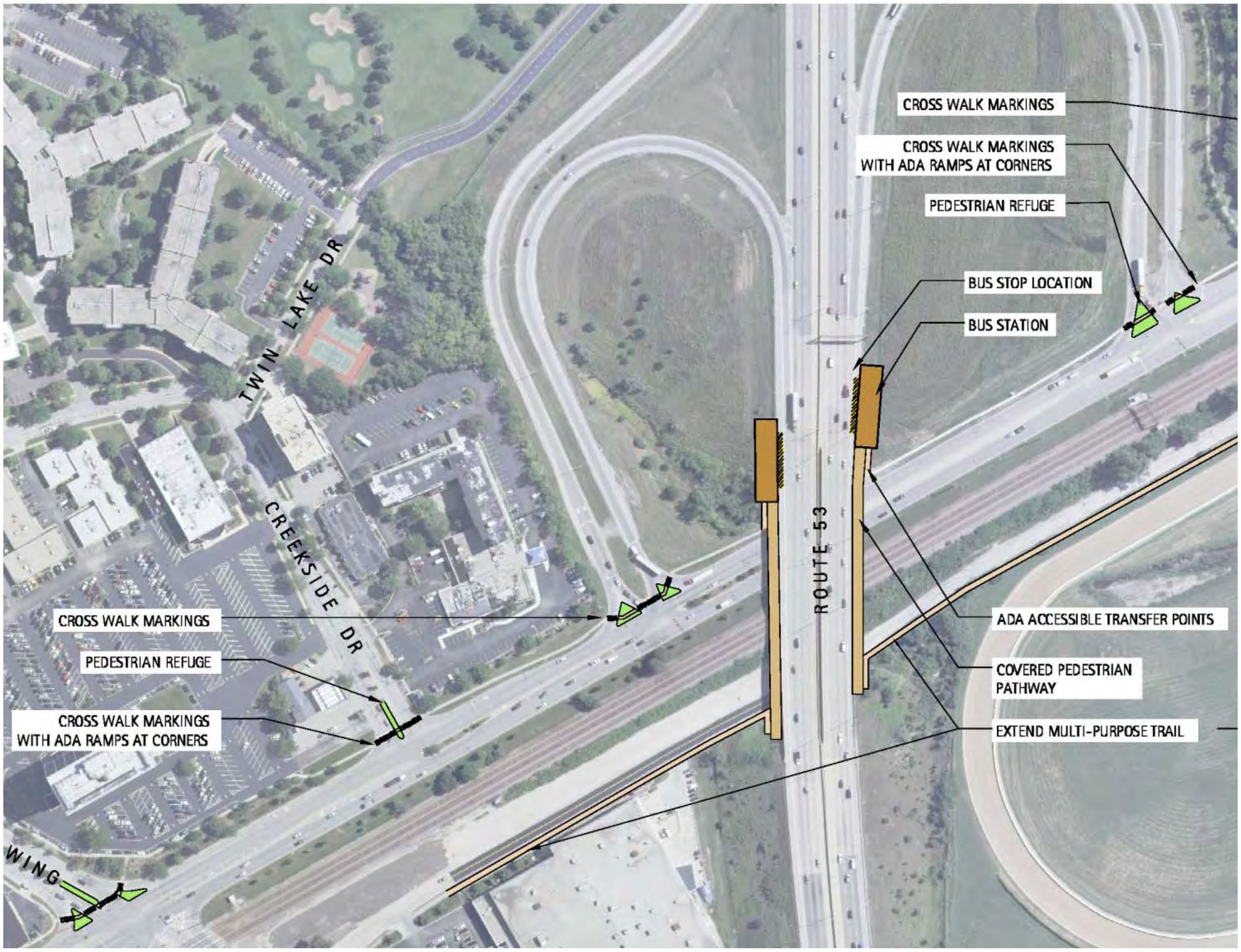
Figure 5: Arlington Heights Road & Seegers Road

Freeway Node Improvements

In addition to arterial segments and intersections, the study also investigated one freeway corridor operating on IL-53 between Dundee Road and Algonquin Road. This is a service type that Pace would like to grow in the future, but its success will be limited by the current urban form and development conditions of freeways in the area, as buses are required to deviate from the highway in order to serve destinations. One way to address this issue is to design freeway stations that link transit on limited access roadways, such as IL-53, to a network of arterial services.

A conceptual design exhibit was created to illustrate this concept at the intersection of IL-53 and Northwest Highway. A sample of the design can be found in Figure 6 below, and the full exhibit is in Figure 32 on page 121. The conceptual design includes bus stops along IL-53, connections to Northwest Highway, and pedestrian connectivity improvements.

Figure 6: Route 53 & Northwest Highway



Corridor level improvements

Another level of improvement to pedestrian environment conditions can be achieved through a ‘complete streets’ approach to reduce traffic speed and open the street to other modes of transportation while keeping traffic capacity intact. In addition, a corridor improvement plan that includes new residential and commercial development, densification, and redevelopment of vacant sites and open space can also be pursued to create a continuous street frontage and vibrant environment along each corridor. These strategies are discussed in the next section.

Complete Streets Improvements

In the Chicago area and in much of the United States, streets have been viewed primarily as places for auto conveyance. In reality, streets are large public spaces and serve many other functions and users, including:

- Pedestrians, including senior citizens, adults, and children who don’t drive
- People with disabilities

- Bicyclists
- Private motor vehicle drivers
- Transit users
- Freight and goods delivery vehicles

It is common for American cities and towns to have a large portion of their land area devoted to public rights-of-way. In Chicago, right-of-way accounts for approximately 23 percent of total land area, and in Atlanta it is 15 percent. Many jurisdictions have realized that this large portion of total land area yields disproportionately little benefit to the public realm when it is focused solely on carrying motor vehicles. As a result, they have begun to encourage the enrichment of streets as public spaces by developing complete streets policies. It is understood that the street's primary purpose will continue to be transportation, but it can be transportation of those on foot, on bicycle, or on transit as well as those in a car. In addition, it can add to community aesthetics, provide a place for vibrant neighborhoods and businesses, and serve as meaningful, engaging public space.

The key to a complete streets policy is its focus on a broader range of users than simply moving vehicles, and within the envelope of the entire right-of-way. Design guidelines addressing these fundamentals include (but are certainly not limited to the following):

- General travel lane widths and operation
- Sidewalk widths
- Bicycle accommodation
- Parking widths, location along a block, and position relative to the curb
- Street lighting for pedestrians and/or vehicles
- Accessibility (addressing the Americans with Disabilities Act)

The State of Illinois enacted "Complete Streets" legislation in 2007, responding in part to a bridge in Cary, IL that was built in the early 1990s without a safe bike or pedestrian crossing and where the Illinois DOT was forced to subsequently retrofit the bridge with a side path. The law stipulates that "in or within one mile of an urban area, bicycle and pedestrian ways shall be established in conjunction with the construction, reconstruction, or other change of any State transportation facility," with some exceptions.[3]

DuPage County, Cook County, and the CMAP have all adopted policies or plans that encourage complete streets. In 2004, DuPage County adopted the Healthy Roads Initiative to improve conditions for users of non-motorized transportation. It encourages the inclusion of bicycle-friendly designs in major roadway expansion projects and allows the County to acquire right-of-way for sidewalks, bicycle lanes, and non-motorized paths.[4] Cook County established a Complete Streets Policy in 2009 to ensure that options and amenities for all modes are included in the transportation system. It states that "decisions regarding the public right-of-way shall promote use by pedestrians, bicyclists, and public transit. Cook County will incorporate this principle into our planning and design

3 More information: CMAP Memo on IDOT Complete Street Implementation, April 2010. http://www.cmap.illinois.gov/WorkArea/DownloadAsset.aspx?id=19619

4 More information: Healthy Roads Initiative and Amendment, 2004 and 2008. http://www.dupageco.org/EDP/Bikeways_and_Trails/Docs/18286/

strategies."[5] CMAP's GO TO 2040 comprehensive regional plan emphasizes the benefits of transit, bicycling, and walking, and supports complete streets policies as a way to accommodate walking and bicycling in the roadway design.

One way to have complete streets without major new construction is to reallocate existing infrastructure using road diets. This technique is described in the following section.

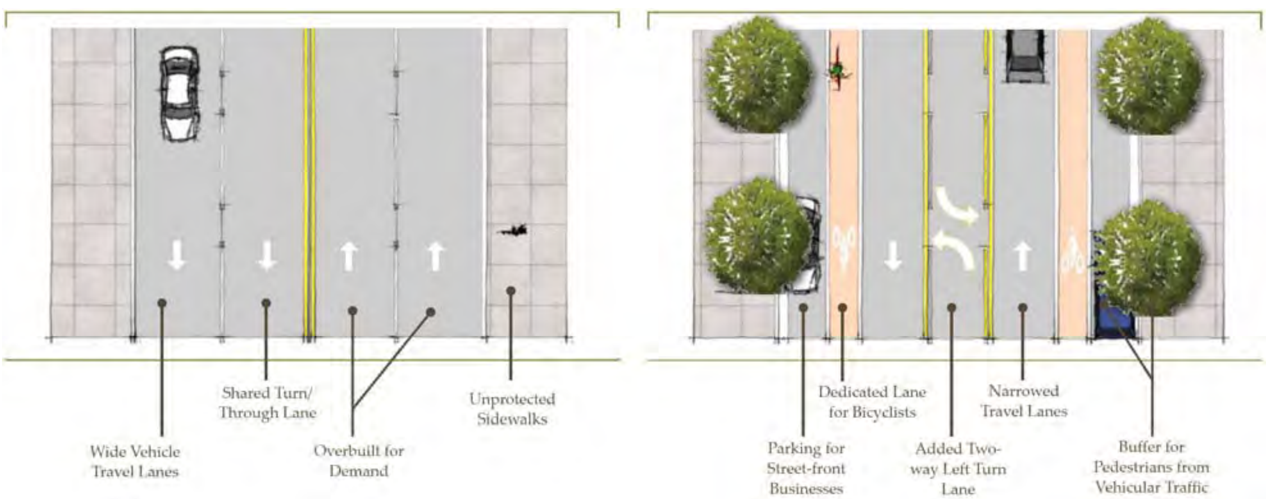
Road Diets

What is a Road Diet?

A road diet is used to balance overall capacity and demand in the transportation system by reducing the number of travel lanes and/or the effective width of vehicular travel lanes. The freed up space can be reallocated to a number of other uses, including bike lanes, turn lanes, medians, and on street parking. Typically, the width of the roadway remains the same and the transformation is made by adjusting the pavement markings.

The most common road diet involves converting a four-lane road into a road with one travel lane in each direction, a two-way center turn lane, bike lanes, and parking. Roads with average daily traffic (ADT) rates of 12,000 to 18,000 vehicles per day are good candidates for the 4-to-3 conversion, although successful road diets have occurred on roads with 25,000 vehicles a day or more. Roads should be evaluated individually to determine if road diets would be successful.

Figure 7: 4-to-3 Lane Road Diet



The diagrams above show how a four-lane road could be converted to a three-lane road. This type of reconfiguration keeps the existing curb line for the 55-foot travel space. The only major reconstruction depicted is creating tree wells that act as a buffer between the travel space and the effective sidewalk area.

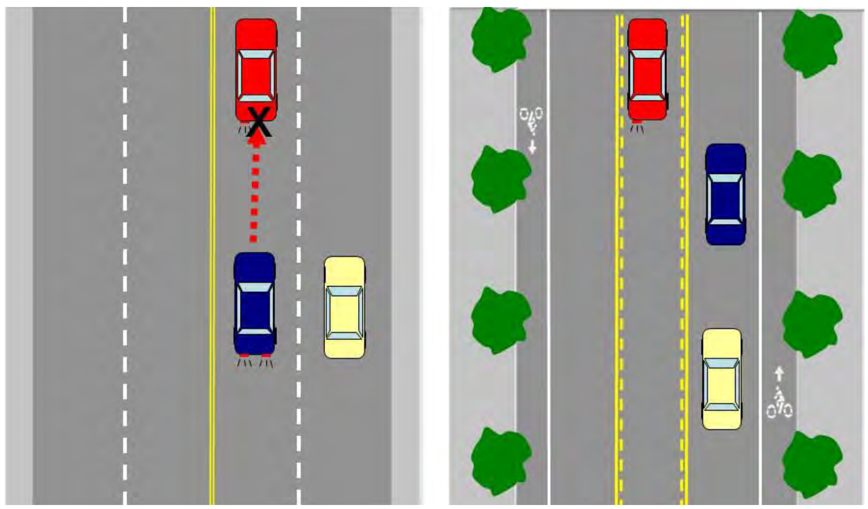
5 More information: Cook County Complete Streets Policy, October 2009. http://www.cmap.illinois.gov/documents/20583/4a1511f2-60e6-475d-af32-fbd2a98019a0

Benefits

The safety benefits of road diets include:

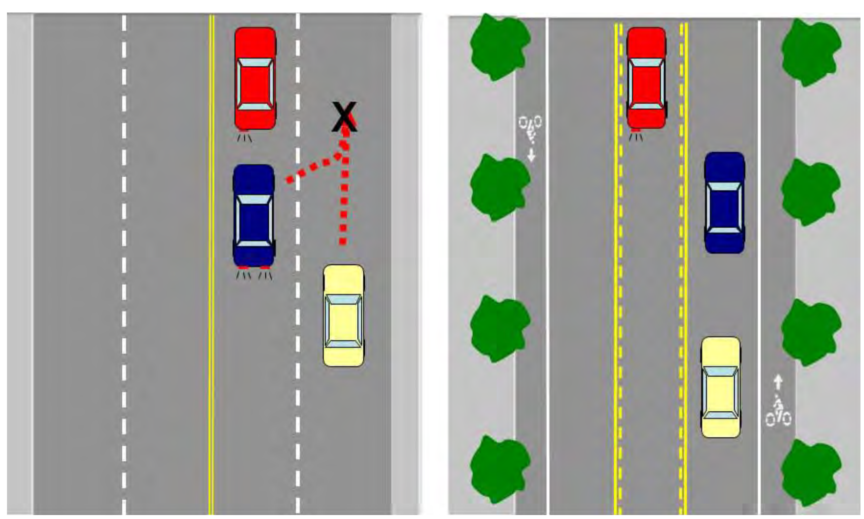
- **Fewer rear-end crashes** – Motorists making left-hand turns can wait in the center turn lane instead of a through lane, which reduces the risk of rear-end crashes.

Figure 8: Rear-End Crash Example



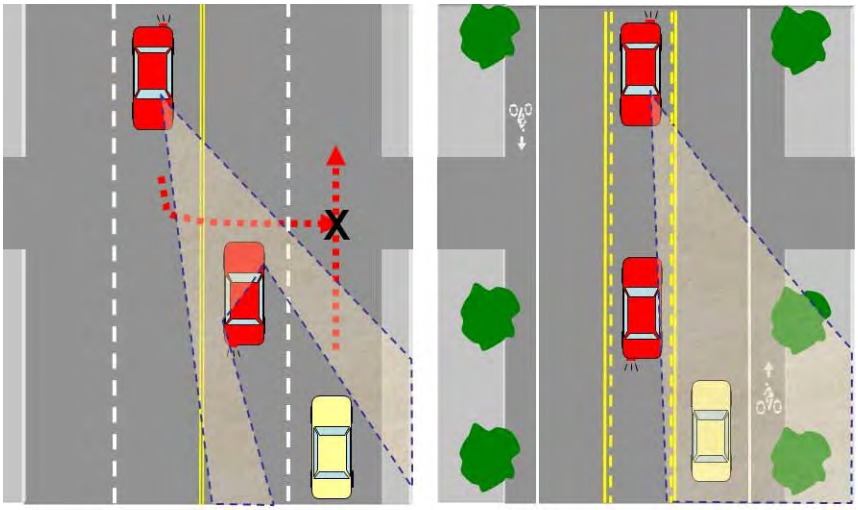
- **Fewer sideswipe crashes** – Motorists do not have to swerve to avoid left-turning vehicles that are waiting in a through lane.

Figure 9: Sideswipe Crash Example



- **Fewer left turn crashes** – Turning motorists face only one lane of oncoming traffic, and their view is not blocked by vehicles in the adjacent lane.

Figure 10: Left Turn Crash Example



- **Reduced speeds** – With two lanes in each direction, faster motorists can pass slower ones, which leads to faster traffic speeds. After a road diet, slower motorists set the pace, resulting in reduced top-end speeds and slower overall speeds.
- **Safer pedestrian crossings** – The road is safer and easier to cross for pedestrians because they only need to cross three lanes, not four. When there are two lanes in each direction, it is common for vehicles in the curb lane to stop and vehicles in the adjacent lane to continue driving, creating an unsafe crossing situation. In addition, it is possible to create pedestrian refuge islands in the center turn lane to make crossing easier.

The **operational** benefits of road diets include:

- **Fewer delays** – Motorists do not have to wait behind a vehicle making a left-hand turn.
- **Easier right turns** – There is a buffer between the curb and the lane, making right turns easier.
- **Passing bicycles is easier** – Bicycles have their own lane and can travel at their own pace, allowing motorists to pass them without changing lanes.

The **livability** benefits of road diets include:

- **More space between moving traffic and pedestrians** – Bicycle lanes and/or parked cars create a buffer between moving traffic and the sidewalk, making walking on the sidewalk more pleasant.
- **More people walking and bicycling** – Roads that have undergone the four-to-three conversion are more comfortable for pedestrians and bicyclists because they have their own spaces along the street and because of slower traffic speeds.

Case Studies

Before and after studies of road diets show that they achieve clear safety benefits without negative effects on the ability of the converted roads to handle traffic demand. As illustrated in the following examples, road diets have been successful in cities of varying sizes and on streets with a range of traffic volumes.[6]

- **Orlando, FL. Edgewater Drive:** a commercial street in the College Park neighborhood underwent a very successful 4-to-3 conversion. Crashes were reduced by 37 percent and injuries were reduced by 68 percent. The percent of vehicles speeding dropped, and both pedestrian and bicycle volumes increased.

Figure 11: Before and After Photos of Edgewater Drive

- **Sioux City, IA:** A 4-to-3 lane conversion of US 75 (ADT of 14,500) in Sioux City's commercial business district to a three-lane cross section, with on-street parallel parking retained, resulted in a peak travel time increase from about 50 seconds to 68 seconds and a decrease in overall average travel speeds (including delay at traffic signals) from about 28/29 mph to 21 mph. The average free-flow or uncongested speed was reduced from about 35 mph to about 32 mph. The percentage of vehicles traveling more than five mph over the posted speed limit decreased from about 43% to 13%, or a 70% decrease. There were 30 total crashes prior to the conversion compared to 13 crashes the year after the conversion, or a reduction of about 57 percent.[7]
- **Helena, MT:** Following the 4-to-3 lane conversion of US 12 (ADT of 18,000) in a commercial area with numerous commercial access points and rear-end and sideswipe collisions, safety was improved with no notable decrease in travel speed. The Montana state engineer stated that the "number of accidents decreased, good traffic flow was maintained, and community residents prefer the three-lane facility over the former four-lane roadway."[8]
- **Portland, OR:** At the high-end, a 4-to-3 lane conversion on Tacoma Street (ADT of 30,000) calmed traffic and enabled pedestrian crossings with curb extensions and refuge islands across a major artery through a neighborhood. It also allowed on-street parking to be provided on one side of the street. Speeding decreased and traffic diversion was minimal.

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[6] Many more examples can be found in Dan Burden and Peter Lagerway, Road Diets: Fixing the Big Roads, Walkable Communities, Inc., 1999. http://www.walkable.org/assets/downloads/roaddiets.pdf.

[7] Keith K. Knapp and Karen Giese, Guidelines for the Conversion of Urban Four-Lane Undivided Roadways to Three-Lane Two-Way Left-Turn Lane Facilities, Center for Transportation Research and Education, Iowa State University (Sponsored by Iowa DOT Office of Traffic and Safety), Final Report, 2001.

[8] Thomas M. Welch. The Conversion of Four Lane Undivided Urban Roadways to Three Lane Facilities, Office of Transportation Safety, Engineering Division, Iowa Department of Transportation. Presented at TRB/ITE Urban Street Symposium, 1999.

Potential Road Diet Locations

Conceptual designs were developed for 14 locations on five of the corridors. In addition to doing the conceptual design, we examined the locations to determine if any would be a good candidate for a 'road diet' treatment. The traffic characteristics of the locations are summarized in Table 14 below. Most locations are on major arterials with heavy traffic volumes of more than 20,000 vehicles and thus are not good candidates. Others have lower traffic volumes but already have center turn lanes, and a road diet would require a different solution than the typical 4-to-3 lane conversion. Three locations did show potential for being good candidates: Addison Road north and south of Michael Lane, Fairview Avenue north and south of Ogden Avenue, and Arlington Heights Road north and south of Fairview Lane. Proposed cross-sections for the three locations are included below.

Table 14: Traffic Characteristics of Conceptual Design Locations

Corridor	Stop Location	Lanes	AADT
Wood Dale Metra - Downers Grove	Addison Road & Michael Lane	4	13,200
	Addison Road & Factory Road	4 + center turn lane	21,100
	Highland Avenue at Yorktown Mall	4 + center turn lane	18,100
	Highland Avenue & 31st Street	4/5 + turn lanes	22,500
Dundee Road - Arlington Heights Road	Arlington Heights Road & Rand Road	4 + center turn lane	27,100
	Arlington Heights Road & Fairview Street	4	26,200
	Arlington Heights Road & Seegers Road	6 + center turn lane	34,400
Elmhurst Metra - Downers Grove (Fairview Metra)	Meyers Road & 16th Street	2 + center turn lane	19,200
	Fairview Avenue & Ogden Avenue	4	15,100
Wheeling Metra - Schaumburg NWTC	Meacham Road & Center Drive	6 + turn lanes	18,200
	Meacham Road & Woodfield Road	6 + turn lanes	31,100
Hoffman Estates - Elk Grove Village	Higgins Road & Ash Road	6 + turn lanes	38,900
	Busse Road (Route 83) & Pratt Boulevard	6 + turn lanes	39,300

Note: Shaded locations are those that are good candidates for road diets.

Addison Road & Michael Lane

The Addison location has 4 lanes of traffic (2 lanes in each direction) and ADT of 13,200. Road diets with 4-to-3 conversions can be successful with ADT of 12,000 to 18,000 or higher, and this location is at the lower end of that range. The road diet could potentially be implemented along Addison from Lake Street to Irving Park Road, a distance of about one mile. To the south of Michael, Addison has a mix of commercial and single-family and multi-family residential development. To the north there is the Addison Waste Water Plant, golf courses, and single-family housing. Adding bicycle lanes and connecting sidewalks along this stretch of the corridor would make it more comfortable for cyclists, pedestrians, and transit riders and would improve access to the Salt Creek Greenway Trail, which runs along a portion of the corridor.

Arlington Heights Road & Fairview Street

The Arlington Heights Road location has ADT of 26,200. There is a 4 lane stretch between Park Street and Orchard Street with good sidewalk connectivity that could potentially be converted to 3 lanes, and it may be possible to convert wider sections to the north and south as well. The ADT of this location is higher than what is considered to be the prime range for road diets, although conversions have occurred on roads with similar traffic volumes. Development along the stretch is primarily single-family residential.

Fairview Avenue & Ogden Avenue

The Fairview location has ADT of 15,100 with 4 lanes of traffic north of Ogden Avenue and 2 lanes with a center turn lane south of Ogden Avenue. It may be possible to restripe the roadway south of Ogden to Maple Avenue to add bicycle lanes. This section has primarily single-family residential development and good sidewalk connectivity. To the north of Ogden, Fairview Avenue has 4 lanes until the intersection with 39th Street, and it may be possible to implement a 4-to-3 conversion along this section. There are sidewalks along this section until 39th Street, at which point they become rare.

Potential Issues for Development of Complete Streets

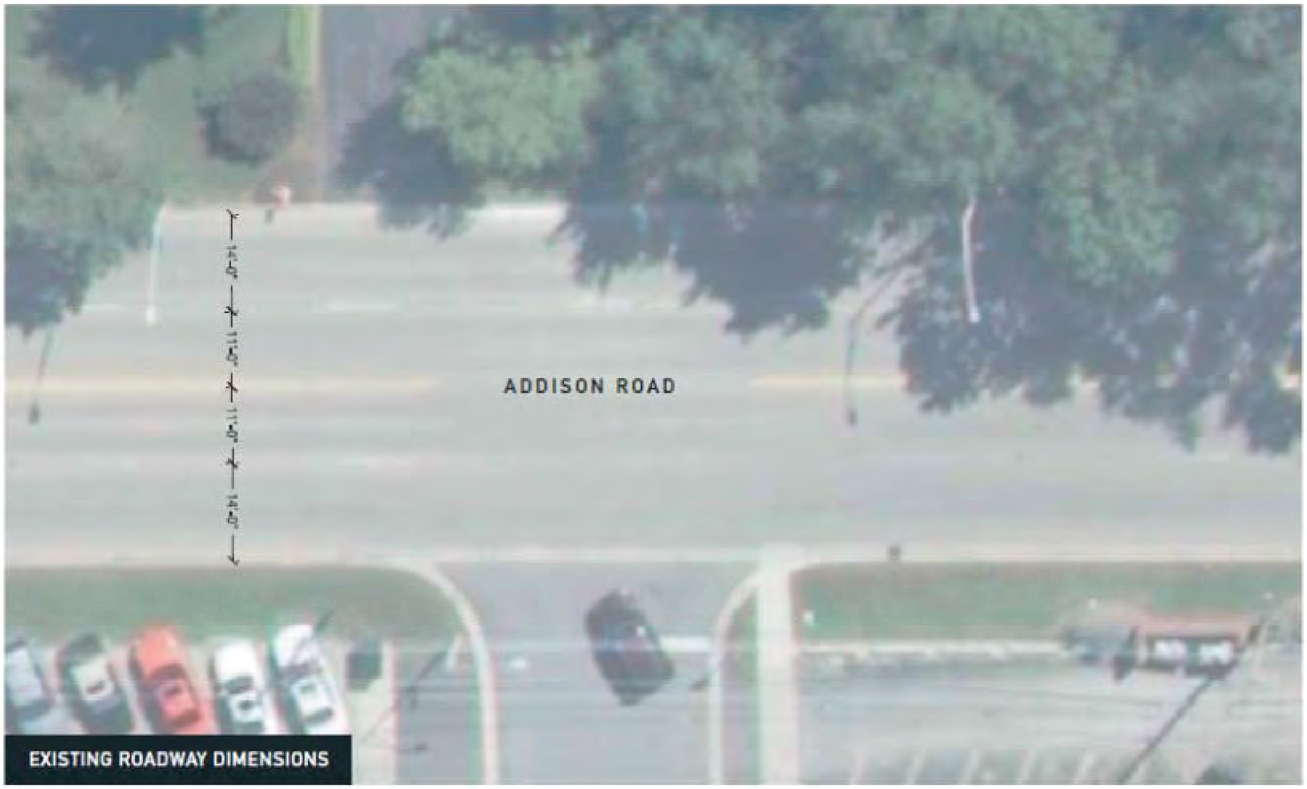
A more substantial study would need to be conducted on these locations to determine if road diets would indeed work. It is clear, however, that potential candidates for road diets do exist in the study area. This analysis only looked at a small subset of locations along selected transit corridors, and there may be additional candidates in other locations. At the same there is potential for local opposition to many of these complete street measures, in particular to traffic calming measures that seek to reduce speeds, incorporation of bike lanes, and parking management measures.

The important point to make about reducing speeds is that they would increase the safety and livability of the corridor. Arterial corridors in this part of the service area are designed for just one type of user, the automobile. This is an old suburban area with many people aging in the neighborhood and in need of alternative mobility options. At the same time areas around corridors will compete for newer and younger residents to come live with their families and renovate neighborhoods. Designing streets for a wider range of users and activities will help provide a more urban experience and attract new residents.

In relation to bike lanes, it is realistic to think that many of these arterial corridors will be used by cyclists, because in most cases they are the roadway facilities providing connections between one development and the other, but also because most trips in this part of the service area are relatively short trips of 1 to 5 miles that can be effectively completed in a bicycle if good facilities and supporting transportation policies are in place.

One of the main reasons automobile use is so prevalent in the study area is the availability of free and abundant parking. There is no visible cost for driving and parking at any destination in the service area. However, there are significant costs imposed onto everyone for this behavior and these are hidden into the price of everything we buy or do at any of these destinations. Parking also occupies a significant portion of the developable land, reducing the average density of persons and jobs per acre and at the same time creating accessibility barriers for other users to access destinations. Simply stated, there will be no progress in any of the candidate corridors if parking availability and supply is not managed in a way that discourages driving and encourages more development. Parking maximum requirements can provide that option.

Figure 12: Addison Road & Michael Lane – Complete Street Design Concept



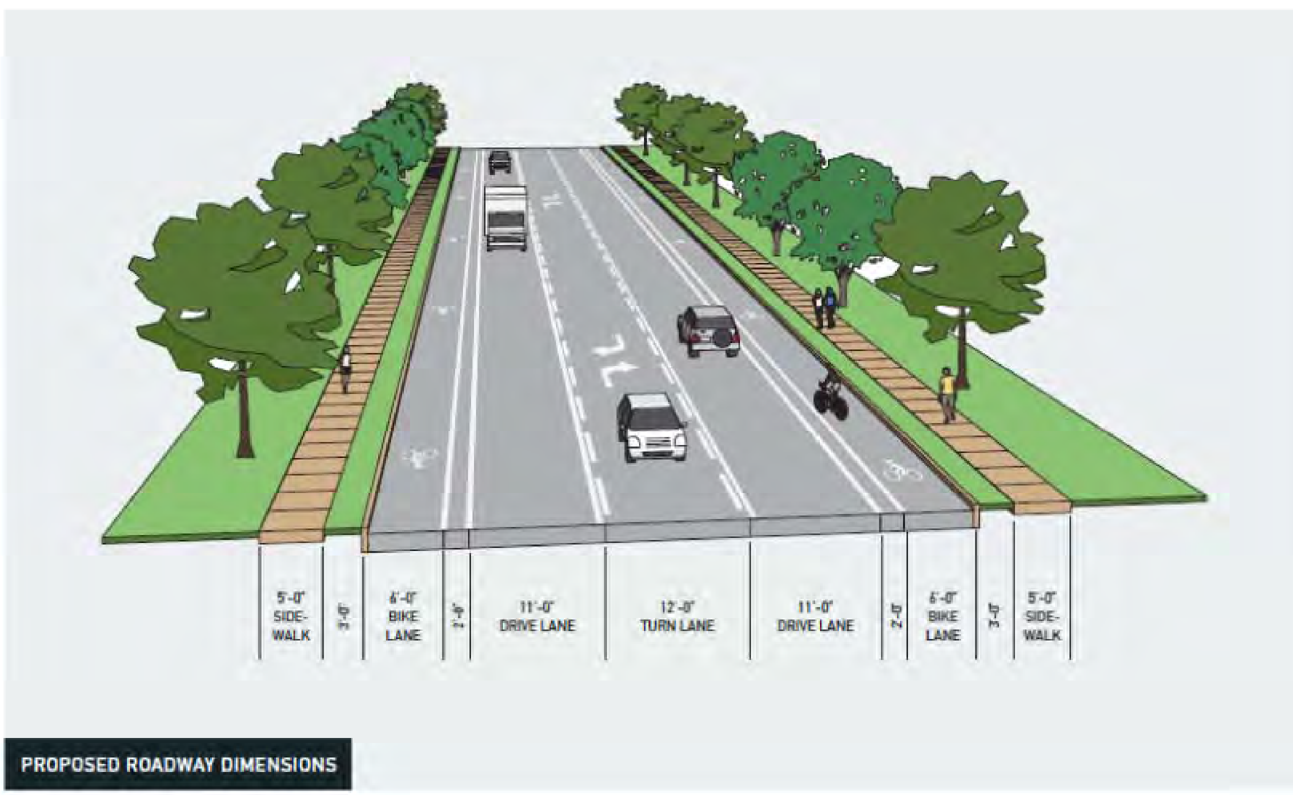


Figure 13: Arlington Heights Road & Fairview Street – Complete Street Design Concept

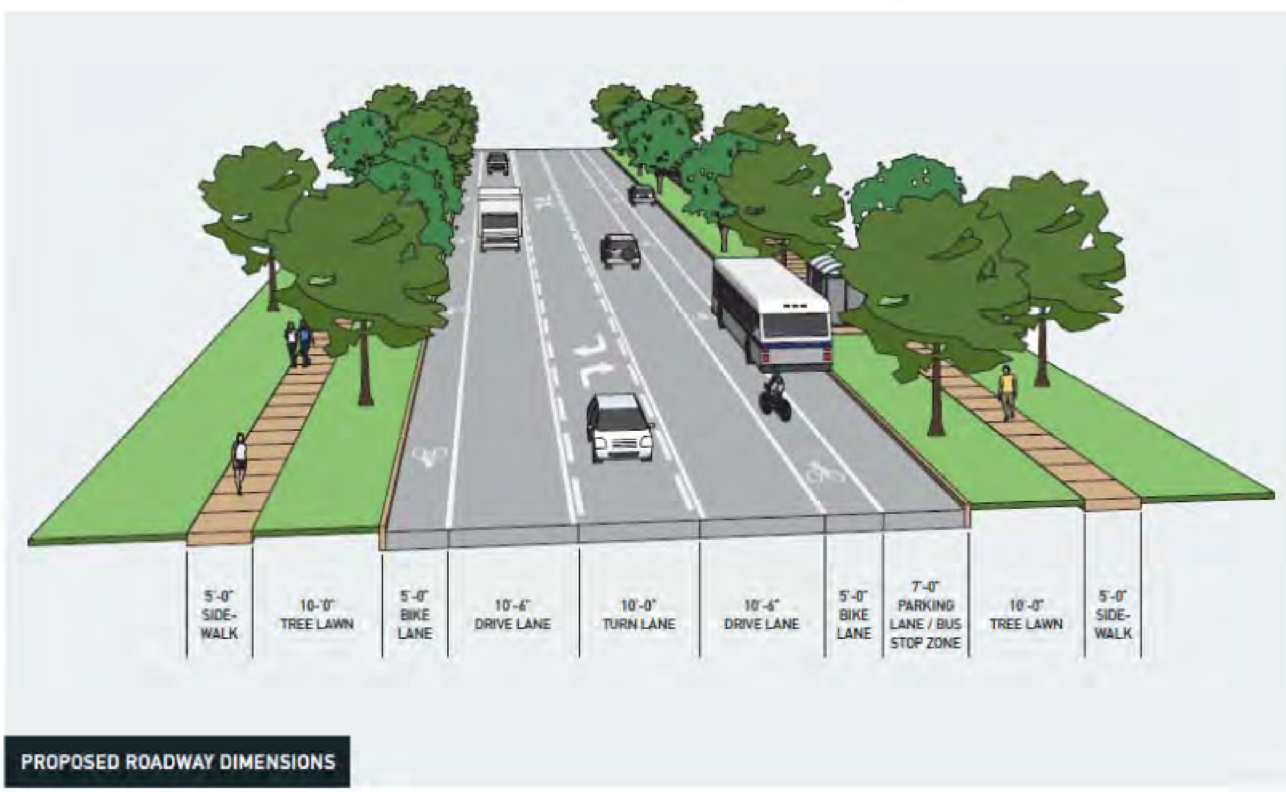
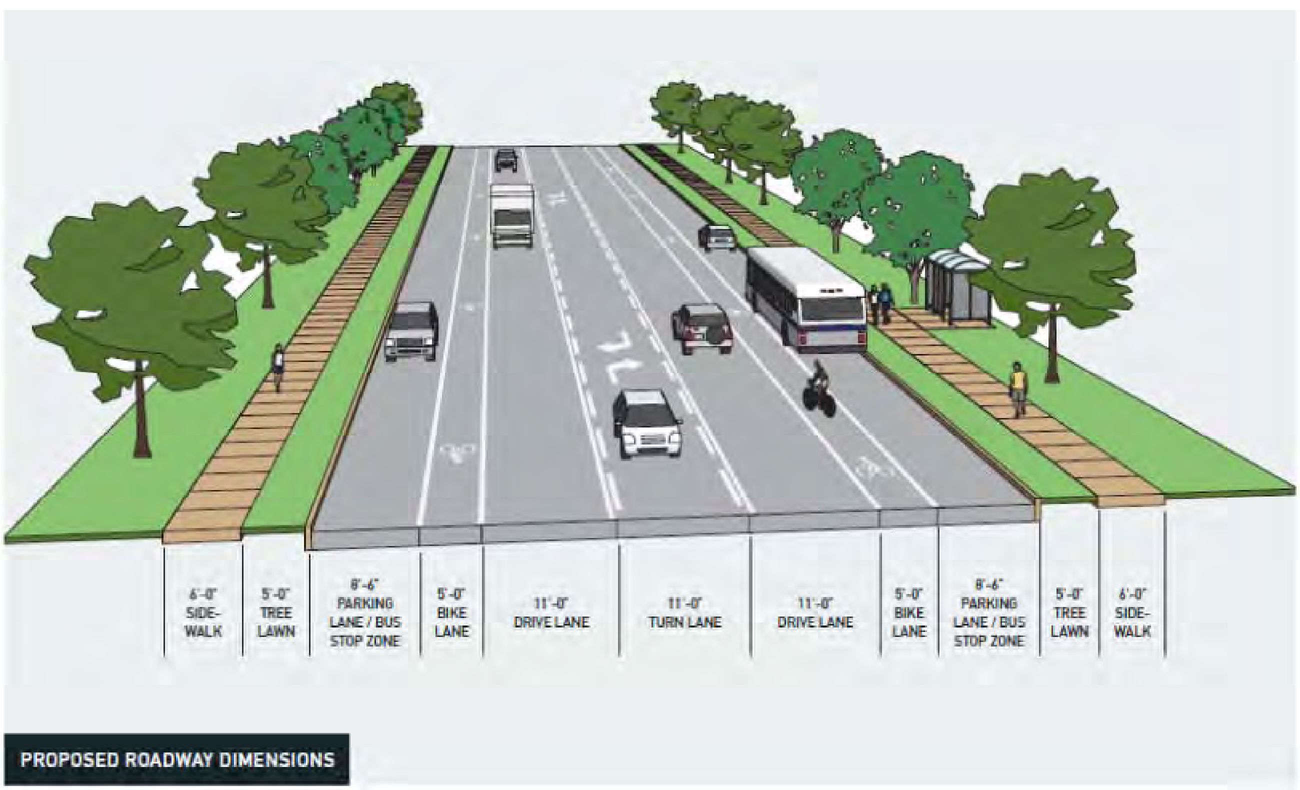


Figure 14: Fairview Avenue & Ogden Avenue – Complete Street Design Concept



Corridor Development Strategies

A number of municipalities and transit agencies around the country, such as Boulder, Colorado and Community Transit (Snohomish County, Washington), have identified multimodal corridors or transit emphasis corridors in their communities as places where to focus investment in walking, bicycling, and transit, as well as attracting new Transit Oriented Development. This section defines multimodal corridors and describes how Pace could work with the municipalities and counties in its service area to invest in existing and future transit corridors, improve operating conditions, and grow the transit market base to support increased levels of service that match travel demand.

Multimodal Corridor Strategy

Recognizing the strong linkage between land use and transit, and the role jurisdictions play in guiding urban development, multimodal corridors are a zoning designation intended to focus new development into corridors to increase densities and create transit, pedestrian and bike-oriented development, while providing appropriate transportation demand management strategies and roadway improvements that favor person capacity over vehicle capacity.

Multimodal corridors are inherently a development goal for major streets that includes a mixture of commercial, industrial, and residential land uses. Important attributes of these corridors include high-densities of housing and jobs in proximity with one another, pedestrian and bicycle-friendly scale and design, connection to major population and employment centers, and roadway features that facilitate transit service. Transit, pedestrian, bicycle, and automobile modes are all accommodated on multimodal corridors.

The identification and implementation of multimodal corridors requires the cooperation of counties and local municipalities. A county or municipality could choose to designate a corridor using a *multimodal overlay*, which is a planning tool used to guide the types of zoning codes and capital investments made along a corridor. The intention would be for population and employment densities along the corridor to increase while investments are made in pedestrian, bicycle, and transit infrastructure. In turn, the local transit agency (e.g. Pace) would emphasize and increase transit service along the corridor.

Multimodal corridors make sense from a long-term transit market development perspective, connecting urban centers, providing network coverage, and exhibiting current or future population and employment density designs that are supportive of transit use. The corridors must reflect the common efforts of both local transit operators and municipalities. For that to happen, local planners and traffic engineers must work with transit service planners to identify corridors that have the potential to support future investments in multimodal infrastructure and transit-oriented developments.

The multimodal corridor idea is supported by GO TO 2040, the regional comprehensive plan produced by CMAP. Chapter 11, titled "Increase Commitment to Public Transportation," includes a number of implementation action areas. The fourth action area, "Conduct Supportive Land Use Planning," lists a number of actions related to transit and land use, including the following:

> ***Action:*** *Use livability principles to plan for land use in development near transit*
> ***Lead Implementers:*** *Counties, municipalities*
> ***Description:*** *Counties and municipalities should pursue opportunities for more dense development which mixes uses and housing types within "location efficient" areas near transit services. Counties and municipalities can increase density by providing density bonuses (in*

exchange for affordable units), creating transit overlay districts, or using form-based codes to address community fit. This can occur both for existing transit services and areas where transit expansion is planned, and applies to both rail and bus service.

Action: *Require supportive land use planning before new transit investment is made*
Lead Implementers: *RTA, CTA, Metra, Pace*
Description: *Consider supportive land use when making investment and programming decisions. The service boards should prioritize investments (new service in particular) in areas that have or are planning for land use and local infrastructure that supports transit.*

These two actions represent how counties/municipalities and Pace can collaborate to create multimodal corridors. Pace can justify service expansion and investment in areas along corridors where dense and diverse development and transit-supportive infrastructure have been or will be emphasized.

Components of Multimodal Corridors

The components of multimodal corridors can be divided into two groups: land use and transportation. In any community, transportation and land use patterns interact, each shaping the other's ability to function effectively. Both are essential for effective multimodal corridors.

Land Use Components

Density	Relatively high population and employment densities are required to support frequent transit service. Research has shown that transit demand tends to increase most dramatically between about 7 and 15 dwelling units per acre. Below 7 dwelling units per acre, it is usually difficult to operate productive transit services.[9] Density also leads to increased bicycling and walking, as the destinations that people need to travel tend to be closer to one another.
Diversity of land uses	A mix of development types reduces the need for longer-distance trips. When shopping, schools, and community centers are located close to residents' homes, cars become less necessary than when residential subdivisions are built in isolation away from other land use types, and alternative modes become more competitive.
Accessible design	Design matters, because even at high densities, people will not use transit if it is uncomfortable, difficult, or dangerous to access a bus stop. Many streets in the Pace service area have the combination of high densities of jobs or housing but poor pedestrian connectivity. In many cases, it is impossible to access buildings on foot without crossing large parking lots. This combination leads to 'inaccessible density,' where there is enough density to support transit, but the density is difficult to access by walking, bicycling, or riding transit.

[9] Boris S. Pushkarev and Jeffrey M. Zupan. Public Transportation and Land Use Policy. Indiana University Press, Bloomington, IN, USA, 1977. At an average size of 2.5 persons per household or dwelling unit, 7 to 15 dwelling units per acre would be equivalent to 17.5 to 37.5 persons per acre.

Transportation Components

Transit service	When there is appropriate density and accessible design, multimodal corridors should be served by frequent transit service. A common minimum service frequency threshold is 15 minutes in the AM and PM peaks and 30 minutes at other times of the day.
Transit priority features	Features such as curb bulb outs, traffic signal queue jumps, business access and transit (BAT) lanes, transit only lanes, and transit signal priority allow buses to operate more quickly, making them more time-competitive with automobiles.
Pedestrian facilities	This includes continuous sidewalks, absence of barriers, direct connections with bus stops, direct connections with destinations (or direct path to building entrance from sidewalk), safe crosswalks, frequent street crossings (e.g. every 0.25 mile), low vehicular speeds, pedestrian refuges when crossing multi-lane streets, and appropriate scale aesthetics.
Bicycle facilities	On some corridors, right-of-way space may be present for bike lanes or bike paths. On others, sharrows can be used to remind drivers that cyclists are present on the street and to make cyclists more comfortable. Wayfinding signage identifying bicycle facility connections makes traveling by bicycle easier. Also, bike racks or parking in commercial areas or other large buildings make cycling a convenient option.
Parking fees or restrictions such as max requirements	Nothing encourages the use of alternative modes more than reducing parking supply through zoning regulation and charging a fee for auto parking. This is mostly applicable to downtown or commercial district areas, such as those in Wheaton, Downers Grove, and Elmhurst. But it is also a tool to make residential developments and neighborhood retail developments more attractive by reducing parking requirements and allowing developers to build more residential units and more square footage.
Traffic calming features	Some traffic calming features are appropriate on multimodal corridors to reduce traffic speeds and create a more pedestrian and bicycle friendly environment while still allowing for good bus operating conditions. These can include lower speed limits, medians, pedestrian refuge islands, and raised intersections. These features are appropriate in areas where transit speed is a lesser concern.

Identifying Multimodal Corridors

The identification of multimodal corridors should be a collaborative effort between Pace and counties/municipalities. The methodology used to identify and evaluate corridors in Tech Memos #3 and #4 of this study could be replicated throughout the Pace service area to identify candidate corridors. This methodology was composed of three major components:

1. Identification of significant travel demand connections and corridors using data from CMAP's regional travel demand model.
2. Evaluation of corridors based on transit demand potential, population and employment market reach, and transit network integration.
3. Assessment of corridors built environment and pedestrian realm conditions, utilizing a physical design multi criteria evaluation (such as the one utilized in Tech Memo #4) that includes evaluation of roadway design, sidewalk design, and urban form conditions.

Using a methodology such as this provides an objective way to identify corridors with potential for strong transit ridership. Our analyses showed that three corridors, the Wood Dale Metra – Downers Grove, Dundee Road – Arlington Heights, and Elmhurst Metra – Downers Grove (Fairview Metra) corridors, are potential candidates for a multimodal corridor designation, as they scored highly in this study's evaluation with Dundee Road – Arlington Heights Road coming at top. In some cases, the evaluation of corridors should consider other factors as well. If a corridor already has existing transit service, the productivity of that service should also be considered.

The most important aspect of identifying multimodal corridors is getting the buy-in of cooperating counties/municipalities. Throughout the process, municipal staff and elected officials should be consulted to get ideas and feedback about potential corridors and the evaluation process. One consideration that should be discussed is the redevelopment potential of corridors, as increasing population and employment density would make a corridor a better candidate. The final decision to implement a multimodal corridor should be made jointly by Pace and the municipality/county, as buy-in by all parties involved is absolutely necessary for the development of a successful transportation corridor in the future.

Transit Level of Service Standards

The multimodal corridors policy is based on a number of urban design, economic development, community building, and transportation management goals. From a transit planning perspective, multimodal corridors provide a vision for sustainable transit operations. It is assumed that corridor re-development and densification together with complete street design approaches will result in more residents and economic activities (jobs) locating within the corridor, and increased travel needs. Multimodal corridors also allow travel demand to increase in size and mobility choices, thus growing the market for transit. This means that as physical conditions along multimodal corridors improve, transit demand will improve and Pace will need to evaluate levels of service along the corridor. At the same time, when counties or municipalities invest in corridors, attracting new development or in capital projects, they will expect a commitment from Pace to increase service as conditions improve and mobility demand increases. This section focuses on establishing a framework to analyze corridors and developing level of service standards that can be applied to corridors as demand and investments increase.

Corridor Service Types

Recognizing that multimodal transit corridors will probably not contain every one of the design features identified in the previous section at the outset and that these will be developed over time, future transit services will need to be tailored to local needs and conditions. At least six different types of service can be established along multimodal corridors in the Pace Bus service area; these are listed in Table 15 below.

High Capacity Transit service such as light rail (LRT) or bus rapid transit (BRT) will be the highest, serving fully developed corridors; balancing the mobility needs of various user groups and containing high levels of residential and employment density (this service type does not exist in the I-355 corridor study area today, but may exist in the future). Ridesharing and demand response service will be the lowest, serving corridors that are incomplete in their development, containing low density development and not providing an adequate environment for alternative modes of travel (this service type exists today in the study area and it may be perpetuated in the future, unless there is a radical shift in urban development policy). Table 15 below summarizes the breadth of transit service types that can be tailored to local conditions.

Table 15: Corridor Service Types and Supportive Densities

Class	Corridor Service Type	Key Service Features	Density Threshold (persons + jobs per acre)
A+	High Capacity Transit	Local bus and LRT/BRT operation at high service level. 5 minutes peak, 10 minutes off-peak combined frequency minimum.	60 or more
A	Rapid Transit	Local bus and limited-stop operations at high service level. 10 minutes peak, 15 minutes off-peak combined frequency minimum.	40 to 60
B	Arterial Transit	Local bus operations at enhanced service level. 15 minutes peak, 30 minutes off-peak minimums.	20 to 40
C	Local Transit	Local bus and shuttle operations at baseline levels. 30 minutes peak, 60 minutes off-peak minimums.	10 to 20
D	Shuttle Transit	Employee shuttles and commuter bus services. Circulators and flex-route operations.	5 to 10
E	Demand Response	Ridesharing (carpool, vanpool, bus pool or van share). Demand response services.	5 or less

Level of service standards and density thresholds have been developed by Nelson\Nygaard based on a combination of empirical data (our own work in other places and transit systems e.g. Pittsburgh, Kansas City, Honolulu, Los Angeles) and industry research.[10]

Corridor classes and level of service types are provided as a conceptual guidance to better understand the relationship between urban form and land use generating travel demand and the type of transit service that can cost-efficiently handle respective levels of demand. The point of the table is to illustrate typical transit service applications and the type of environment in which they are most cost-effective, and use this information to characterize the potential transit corridors we find in the study area. Density thresholds are by no means a hard line. In reality there will be overlapping of service types across them as the system is developed and implemented.

[10] Most notably: Boris S. Pushkarev and Jeffrey M. Zupan. Public Transportation and Land Use Policy. Indiana University Press, Bloomington, IN, USA, 1977.

Transit Supportive Densities

Planners often talk about "transit-supportive density" or "transportation-efficient land uses." There is a strong correlation between land use density (mostly residential and employment density) and transit demand. However, this relationship is not linear and transit demand tends to increase most dramatically at more than 7 households per residential acre (or beyond 15-20 persons per acre on average).

In most metropolitan areas, population and employment density are the factors which tend to have the greatest influence on transit demand. The density of residential, retail and commercial development determines the number of people and/or activities that are in close proximity to transit services. Furthermore, as the density of development increases, so do the incentives that people may have for using transit. As density increases, factors such as traffic congestion, parking fees, and parking congestion tend to increase and encourage increased transit usage. Even more than income or age, density determines the potential market for transit. Other factors, such as the proximity of a large university or employment center, work in combination with underlying density to increase transit's market.

Note that the density breaks shown in Table 15 is the sum of both, population and employment density. There is not enough data and research to support separated thresholds for each population and employment. Also the mix of persons and jobs per acre that fit into any corridor LOS can range greatly. For example: a Class B corridor can have 30 persons per acre but only 5 jobs per acre or quite the opposite or any combination in between. Transit service types will most likely look the same under any of these density conditions.

Transit Supportive Urban Design

The service design and operating features outlined in Table 15 above also include transit supportive density thresholds. These density thresholds suggest the types of community, street design and urban form that are needed to support each category of transit service. While urban form, street design and community development are beyond Pace's responsibility, much of the transit system's ultimate success will depend upon whether transit supportive development practices are conscientiously followed by local jurisdictions. If they are, a vibrant network of corridors will be able to support high quality and productive public transportation services. Without such corridors, the operation of productive transit services will prove impossible.

The summary tables in the following pages provide a visual example of the transit supportive densities, transit supportive urban design and recommended transit service types included in Table 15 above. Examples include corridor segments found within the I-355 corridor study area, Pace Bus service area, as well as CTA service area. They are specifically intended to assist local jurisdictions as they evaluate their land use and transportation regulations and help them determine whether they are ready for transit service and if so, what type of transit service. In that regard, they help both Pace and local jurisdictions identify common ground to devise a concerted strategy to implement transit service and grow market demand along major arterial corridors.

While land use regulation is the responsibility of local cities, towns, and the county, most transit corridors serve more than one jurisdiction. As with the underlying street facilities they operate on, the successful implementation of multimodal corridor policies will require careful coordination between each of the communities being served.

In addition, these corridor segment examples represent just one segment. In most cases, the corridors showing potential for a transit service implementation in the I-355 study area are comprised of many different segments of varying density, form and land use mix. As it was discussed in Tech Memo#4, there are many urban form typologies in the study area, and many corridors exhibit several urban form typologies. Therefore, implementation of transit service and investments of transit service along corridors need to take into account variability in transit supportive density and urban design. Corridors are not homogeneously developed today and they will not grow homogeneously in the future. New retail and residential development will most likely be concentrated at major nodes of accessibility such as around a Metra station or downtown or close to a major arterial intersection.

In the next section, Implementation Recommendations, we discuss strategies for implementing candidate corridors and increasing market demand.

A+ High Capacity Transit

Corridor Description

This type of development is primarily found in urban areas inside the City of Chicago. A High Capacity Transit corridor includes high density residential, primarily multifamily housing (3 stories or higher), high density commercial development and office space with buildings in close proximity to the street. There is a mix of uses and accessible design along the corridor. Street characteristics include a traditional street grid, continuous sidewalks and marked crosswalks at every intersection, and buildings facing the street with direct access from the sidewalk.

Appropriate Service Level

A corridor of this type can support two layers of service. The first could be a high frequency bus rapid transit service with wide station spacing, segregated or exclusive lanes, transit signal priority, and stations with shelters and other amenities. The second layer of service would be a high frequency local bus making frequent stops and providing service to local trips.

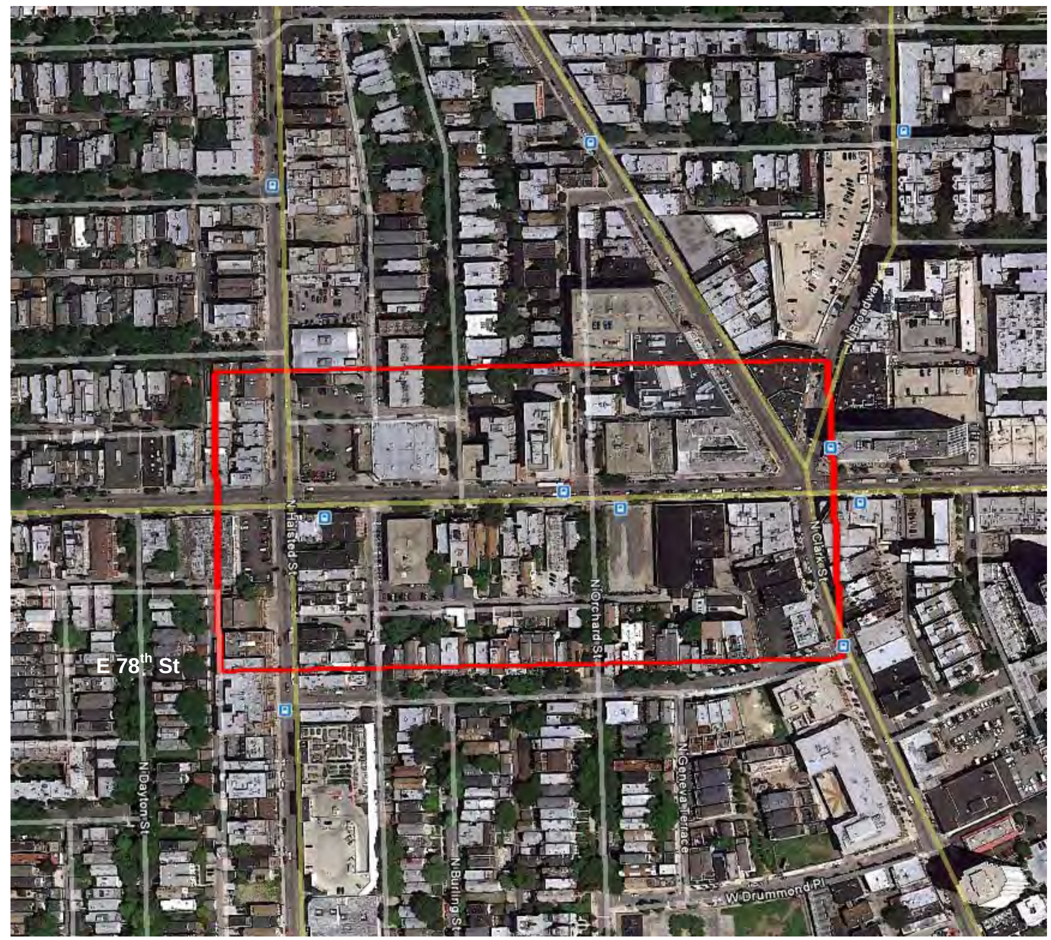
Supportive Density Thresholds

Population and employment density along a high-capacity transit corridor requires a minimum threshold of 60 persons and/or jobs per acre in order to generate ridership demand that supports high levels of service.

Supportive Design Improvements

Safe pedestrian crossings, buffering of sidewalks from traffic lanes, pedestrian friendly landscaping, lighting, and urban furniture.

Example: W Diversey Parkway (Chicago)



A Rapid Transit

Corridor Description

This type of development is primarily found in urban areas inside Chicago or in first-ring suburban areas outside Chicago. A Rapid Transit corridor includes medium to high density residential, including single family and multifamily, and medium to high density of commercial and office space development which faces the street. Buildings are generally easily accessible, but there are some parking lots present between the street and buildings. Street conditions include a traditional street grid, continuous sidewalks along the corridor, and pedestrian signals and marked crosswalks at signalized intersections.

Appropriate Service Level

This corridor type can support two layers of service, including a rapid bus service with wide station spacing and transit priority features. The second layer would be a local bus that provides frequent service with shorter stop spacing.

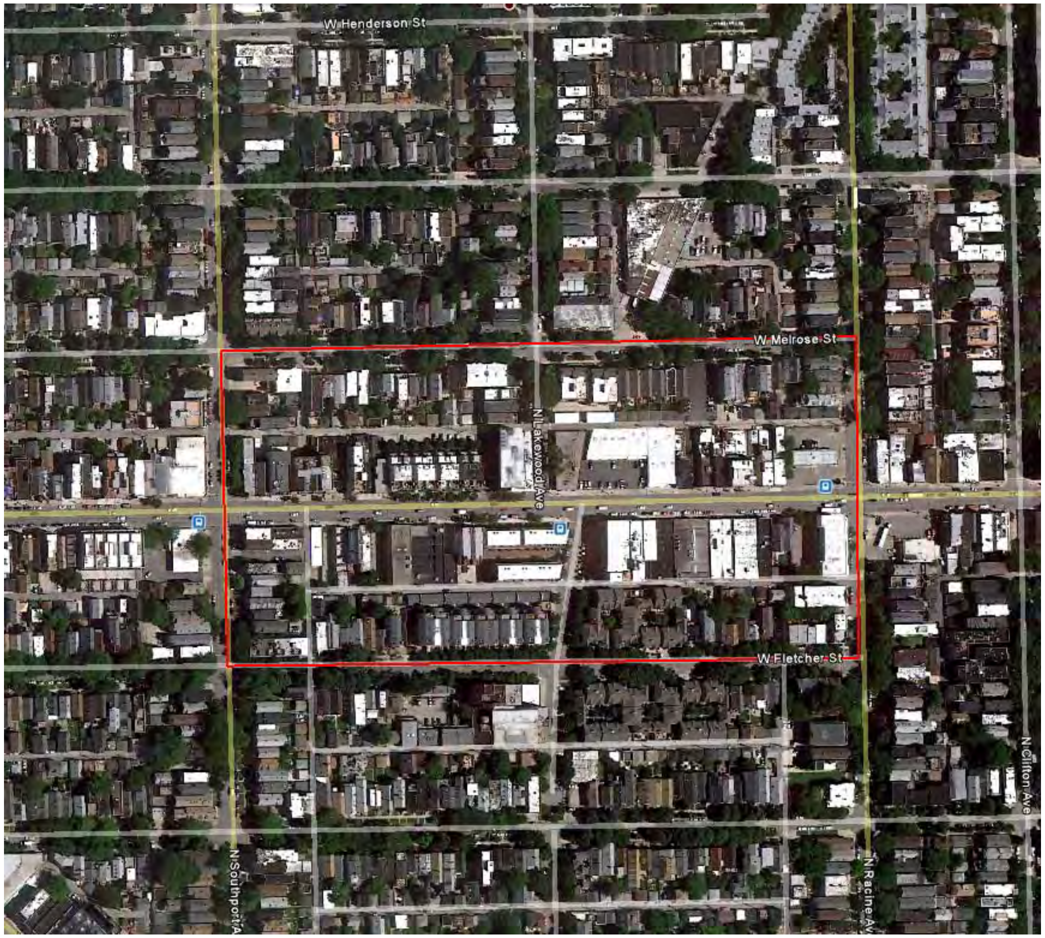
Supportive Density Thresholds

Population and employment density along a rapid transit corridor requires a range of 40 to 60 persons and/or jobs per acre in order to generate ridership demand that supports local and rapid/limited stop service.

Supportive Design Improvements

Safe and frequent pedestrian crossings, buffering of sidewalks from traffic lanes, and pedestrian friendly landscaping, lighting, and furniture.

Example: Belmont Avenue (Chicago)



B Arterial Transit

Corridor Description

This type of development is generally found in first-ring suburban areas. An Arterial Transit corridor is characterized by medium density residential, including single family and multifamily, and also by medium density commercial and office buildings which are primarily oriented to the street. Buildings are generally accessible from the sidewalk, although setbacks and parking lots are present. Street conditions include a traditional street grid, continuous sidewalks along the corridor, and pedestrian signals and marked crosswalks at signalized intersections.

Appropriate Service Level

Arterial transit corridors can support local bus with frequent enough service (at least every 15 minutes) that riders don't need to look at a schedule before they go to a bus stop.

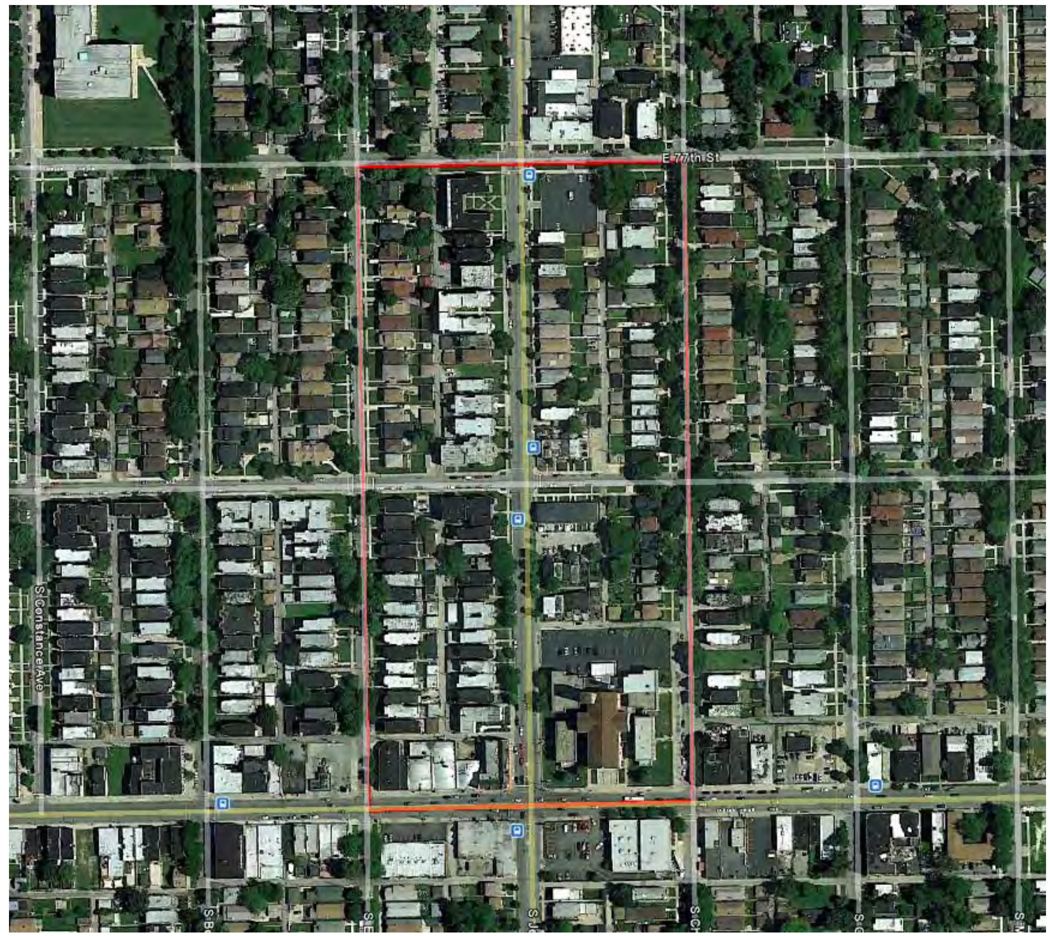
Supportive Density Thresholds

Population and employment density along an arterial transit corridor requires a range of 20 to 40 persons and/or jobs per acre in order to generate ridership demand that supports frequent local service.

Supportive Design Improvements

Safe and frequent pedestrian crossings, buffering of sidewalks from traffic lanes, and pedestrian friendly landscaping, lighting, and furniture.

Example: Jeffery Boulevard (Chicago)



C Local Transit

Corridor Description

This type of development is generally found in first and second-ring suburban areas such as those around the I-355 corridor. A Local Transit corridor includes a mixture of low to medium density single family and multifamily residential and suburban commercial frontage development. There may be suburban commercial development over large blocks present along parts of the corridor. Street conditions include a modified street grid made of larger blocks and often curvilinear streets. Continuous sidewalks are present along most of the corridor. In general, streets are wider and intersections are less frequent. Most intersections have pedestrian signals and marked crosswalks.

Appropriate Service Level

This corridor type is considered to have the "baseline" conditions needed for arterial bus service. Appropriate service frequency would be a minimum of every 30 minutes, which provides basic mobility for riders along the corridor.

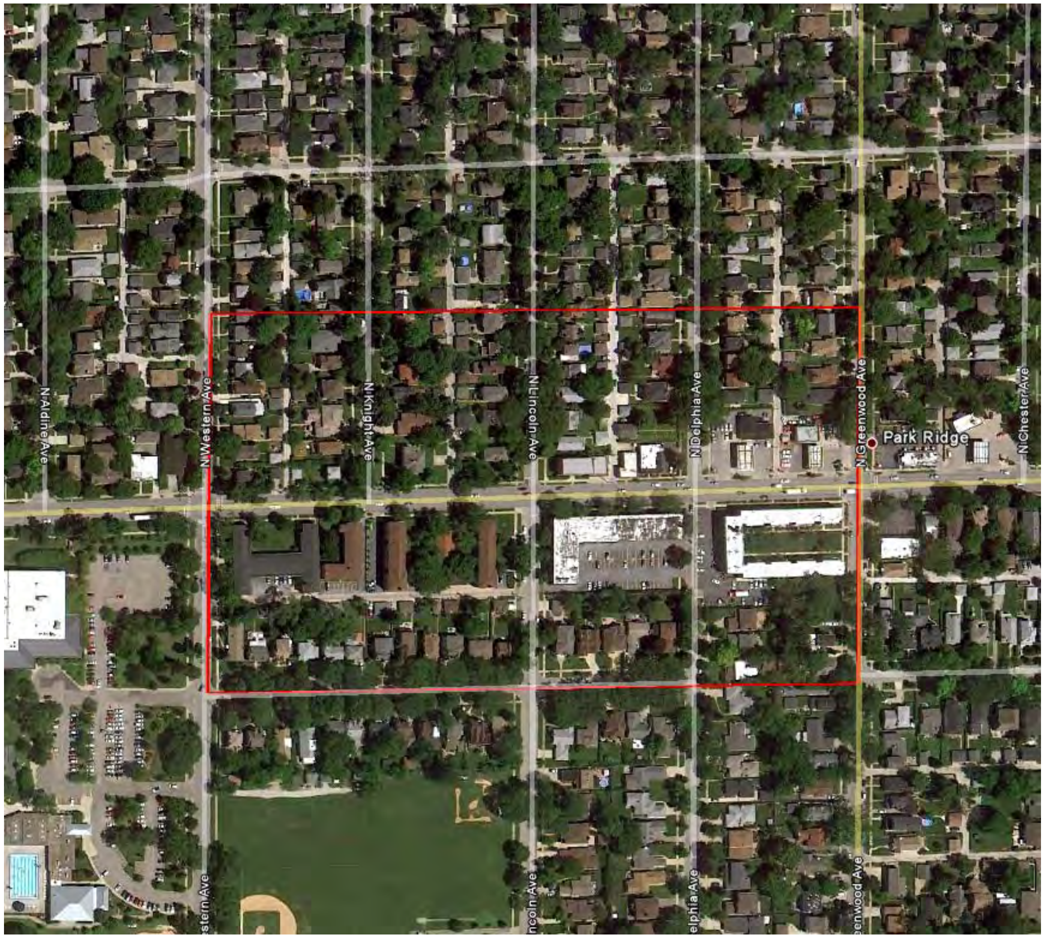
Supportive Density Thresholds

Population and employment density along a local transit corridor requires a range of 10 to 20 persons and/or jobs per acre to generate ridership demand that supports local service.

Supportive Design Improvements

Safer, more frequent and complete pedestrian crossings, complete sidewalks, buffering from traffic lanes, and clear and direct pedestrian connections to buildings.

Example: Touhy Avenue (Park Ridge)



D Shuttle Transit

Corridor Description

This type of development is generally found in suburban areas. A Shuttle Transit corridor includes a mixture of low density single family residential, suburban commercial frontage, or suburban commercial megablock development. Street conditions include a disconnected street grid in residential areas, and large parking lots between the street and buildings in commercial areas. The sidewalk network is typically discontinuous, and there are pedestrian signals and marked crosswalks at some signalized intersections.

Appropriate Service Level

There may be demand for regular, fixed-route service on this corridor, but poor pedestrian connectivity will likely lead to poor productivity. Flexible-route services, ridesharing, commuter shuttles, and employment “tripper” services could provide beneficial service to certain markets.

Supportive Density Thresholds

Population and employment density along a shuttle transit corridor typically ranges between 5 to 10 persons and/or jobs per acre. This environment generates insufficient ridership demand for a fixed-route bus at minimum level of service.

Supportive Design Improvements

More frequent and complete pedestrian crossings, complete sidewalks, narrower streets, buffering from traffic lanes, and direct pedestrian connections to buildings.

Example: Olesen Drive (Naperville)

E Demand Response

Corridor Description

This type of development is generally found in suburban areas. A Demand Response corridor includes single-family residential uses in large lots or in cul-de-sacs with very few connections to the main corridor. It also features retail developments in a mega block setting. The sidewalk network is disconnected, and many intersections are difficult to cross because of wide street cross sections and a lack of marked crosswalks and pedestrian signals.

Appropriate Service Level

There may be demand for regular, fixed-route service on this corridor, but poor pedestrian infrastructure and inaccessible buildings will likely lead to poor productivity. Pedestrian conditions should be improved and the corridor densified before starting any fixed route service. Ridesharing and demand response could provide beneficial service to certain markets.

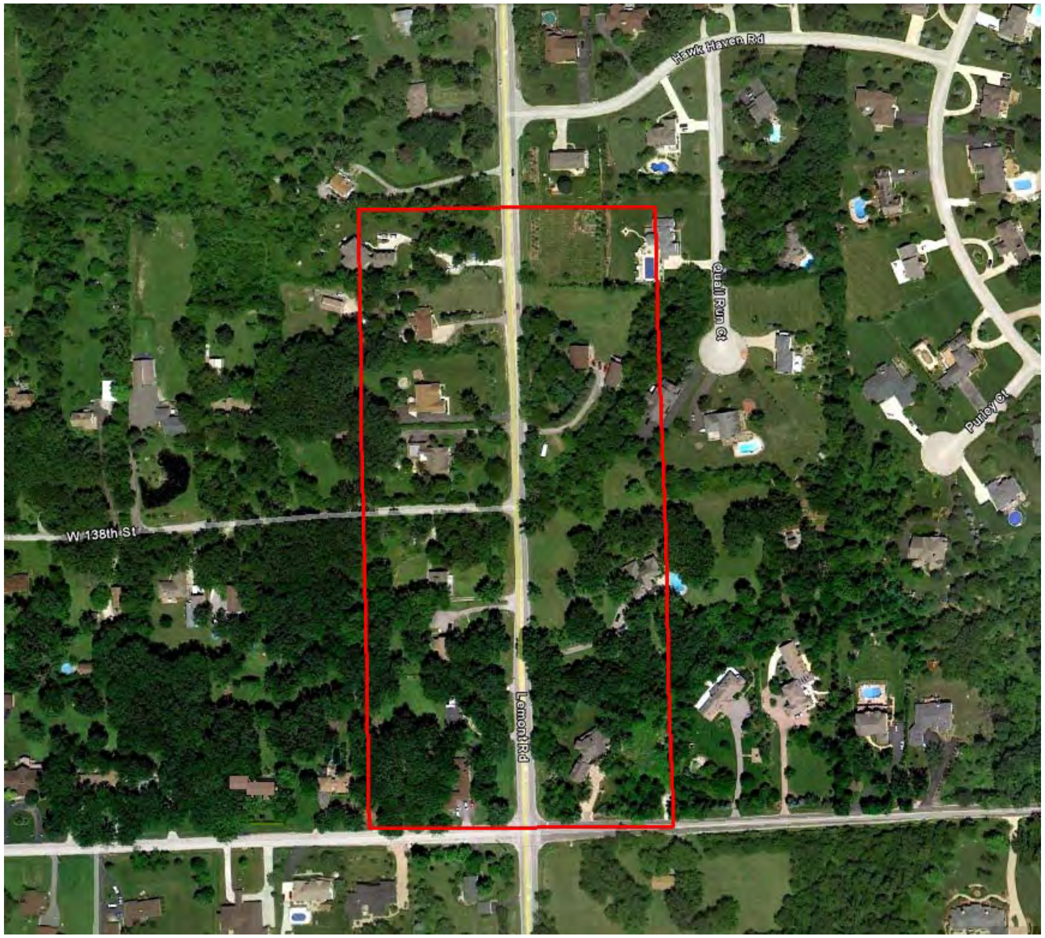
Supportive Density Thresholds

Population and employment density along a demand response corridor does not meet a minimum threshold of 5 persons and/or jobs per acre, and it does not generate sufficient ridership demand for a fixed or flex-route bus at minimum levels of service.

Supportive Design Improvements

More frequent and complete pedestrian crossings, complete sidewalks, narrower streets, buffering from traffic lanes, and direct pedestrian connections to buildings.

Example: Lemont Road (Lemont)



Implementation Recommendations

The analysis of potential transit markets and physical design of corridors identified a group of selected corridors for which field observations and a service and capital plan was developed. Of the six corridors selected for analysis, one arterial corridor (Dundee Road – Arlington Heights Road) presented the best market opportunity conditions for a transit service implementation.

No highway based corridors were found to provide sufficient market demand opportunities except for Route 53 between Dundee Road and the Schaumburg NWTC, which was identified as a potential candidate for an express bus service operation. However, some minimal infrastructure and pedestrian accessibility conditions would need to take place before transit service implementation is recommended along this corridor. The following paragraphs provide recommendations on how transit service could be implemented in these two corridors, and how corridors can be improved over time to grow their travel market base and improve their physical design conditions to support transit service and increased levels of service.

Arterial Corridor Implementation

The Dundee Road – Arlington Heights Road corridor was identified as the best candidate for transit service implementation due to its potential transit market conditions, physical design conditions, and estimated ridership and service performance indicators. Figure 15 below shows the suggested route alignment for implementation. A one-half mile buffer has been drawn around the corridor and the gross population and employment density (i.e. population and employment projections at the TAZ level by land use polygon) that is accessible to the corridor is shown within the buffer.

The map shows that the alignment will provide connections to residential areas and employment areas of varying density ranging from 10 to 20 persons per acre for residential uses, and from 5 to 30 jobs per acre for retail, services, educational and industrial activities. Five major transportation accessibility nodes have been identified along the alignment. These nodes concentrate most destinations and density and also provide most opportunities for corridor development in the short term in the form of TOD and transit supportive urban design improvements.

According to Table 15, the Dundee Road – Arlington Heights Road corridor is comprised mostly of Class C: Local Transit segments plus some Class B: Arterial Transit segments, and one or two pockets of Class D: Shuttle Transit segments. Therefore, an appropriate strategy seems to be starting operation of transit service at baseline levels, or every 30 minutes during peak hours, and every 60 minutes during off-peak hours. The goal then is to set in motion a ‘virtuous cycle’ that will help growing ridership in the corridor and increase transit service investment over time. This virtuous cycle could work like this.

> *Once improvements to the pedestrian realm have been made to make existing destinations more accessible to potential transit users, transit service should become more appealing as an alternative and bring new riders. Once more people start riding the service, transit service levels can be improved making service more convenient overall. Then, land use and zoning regulations such as a multimodal corridor overlay or reductions in parking requirements can be implemented that will attract new transit oriented development to the corridor, which in turn will help growing the corridor market base, the trips that are made and the usage of transit.*

Table 16 below summarizes recommended strategies to develop the corridor and build market demand. Strategies have been organized in short-term and long-term recommendations, and interim planning thresholds have been suggested where possible.

The table is provided as a sample roadmap for market development and improvement of mobility conditions along the corridor. Transit level of service investments are tied to mobility improvement strategies and market development strategies that would need to be in place for Pace to make further investments in service levels and satisfy likely increases in demand. The suggested timeline is an optimistic timeline that will vary on a corridor by corridor basis.

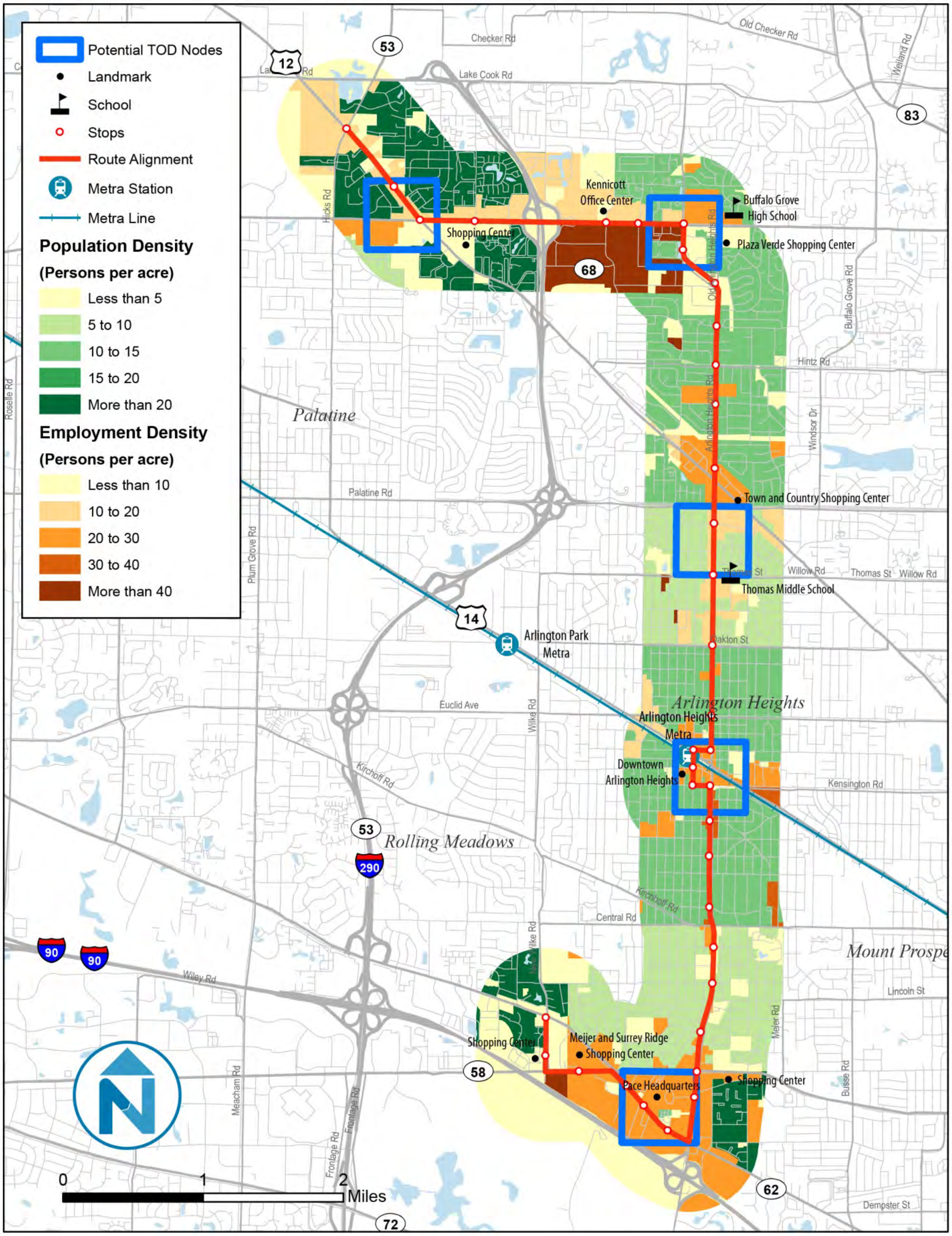
The point of the table is to show how transit corridors could be improved and developed in close coordination with investments from local jurisdictions. If anticipated increases in development do not occur due to uncertain economic conditions or local jurisdictions chose not to improve physical conditions in the corridor to encourage alternative mobility options, then transit service investments will not occur either.

This strategic approach to development of corridors and making transit a viable mobility option is supported by GO TO 2040 principles, as quoted below. [11]

> ***Supportive Land Use, Infrastructure Investments, and Other Local Support***
>
> *For transit to be successful, it requires supportive land use planning and infrastructure investments. A new transit service in an area that is low density and not walkable is unlikely to succeed. Therefore, transit expansion efforts should be accompanied by land use planning, local infrastructure investments, and other local actions that seek to create a transit-friendly environment, and transit investments should be prioritized in places where such planning is occurring. As previously noted, a significant challenge in providing transit service in much of the region involves the "last mile" problem; local support for transit is necessary to overcome this.*
>
> *The principles that make up livable communities cover many of the elements that make up transit-supportive land use. Some elements are particularly important, such as development density. Rules of thumb among transit researchers are that six to eight housing units per acre (or 25 employees per acre) are needed to support basic bus service, and more than twice this density is needed for more frequent bus or rail service, though this can vary.*
>
> *One important precondition for successful transit service is an extensive pedestrian and bicycle infrastructure that makes direct connections from transit stops to nearby destinations. This goes beyond sidewalks and bicycle facilities to include roadway design, pedestrian treatments at signalized road crossings, safety islands, or other improvements that provide safe ways to cross busy streets. Other infrastructure improvements can be made locally to support transit, such as bicycle racks at train stations and bus stops, attractive bus shelters, and improvements that allow accessibility by disabled people. Typically, these improvements fall under the jurisdiction of municipalities or counties, and an active local role is needed to create a supportive pedestrian and bicycle environment.*

[11] GO TO 2040 (page 298), CMAP.

Figure 15: Dundee Road – Arlington Heights Road Density and TOD Nodes



Data Sources: CMAP, Pace, ESRI, State of Illinois

Table 16: Developing the Market on Arterial Corridors: Dundee Road – Arlington Heights Road

Implementation Period	**Transit Improvement Strategies** (Local Jurisdictions)	**Market Development Strategies** (Local Jurisdictions)	**Transit Level of Service Investment** (Pace Bus)
1 – 2 years	Complete a bus stop implementation plan that builds a full set of bus stops including a sidewalk landing pad, shelters, benches and signage.	Working in consultation with local jurisdictions, develop a long-range transit plan for Pace's service area that establishes a multimodal designation on the corridor.	Start operation of transit service at baseline level, Class C – Local Transit corridor service, every 30 minutes peak, 60 minutes off-peak, 14 hours per day (from 6:00 am to 8:00 pm).
2 – 5 years	Develop and execute a sidewalk improvement plan that includes sidewalk completion, striping of crosswalks, and pedestrian improvements at major intersections (i.e. full set of crosswalks and signals). See Figures 23 through 25 in Appendix 1.	Identify opportunities for redevelopment (i.e. vacant properties, blighted properties, undeveloped parcels and major TOD nodes), and develop a land use plan and TOD master plan that includes a real estate market analysis, an economic development plan.	Increase weekday service frequency on the midday period, from every 60 minutes to every 30 minutes. Extend weekday service hours from 14 hours to 18 hours (from 5:00 am to 11:00 pm).
5 – 7 years	Develop and execute a Complete Streets design that includes restriping of roadway, reduction of traffic lanes, creating curb bulb-outs and safer pedestrian crossings, new bicycle lanes on both sides of the roadway, and bus stop concrete pads.	Develop a specific zoning plan (potentially a form-based code) for the corridor that increases residential and employment density, aims for mixed-use developments, parking requirements reductions (or maximums), and promotes a walkable urban design.	Start weekend service at a frequency of every 60 minutes, for at least 12 hours (from 7:00 am to 7:00 pm). Upgrade weekday service to Class B – Arterial Transit corridor, increasing service frequency on the peak period to every 15 minutes.
7 – 10 years	Develop and execute a pedestrian improvement plan that provides direct connections between bus stops and major destinations (or buildings' front doors) and completes network of sidewalks providing access to/from adjacent neighborhoods.	Break ground with new TOD or infill developments at major transportation and accessibility nodes. Achieve a minimum average density of 30 persons/jobs per acre at TOD nodes and 15 persons/jobs per acre in the corridor overall.	Increase weekend service frequency to operate every 30 minutes. Increase weekday service frequency on the midday period to operate every 15 minutes. Extend weekend service hours from 12 hours to 16 hours (from 6:00 am to 10:00 pm).
10 – 15 years		Achieve a minimum average density of 40 persons/jobs per acre at TOD nodes and 20 persons/jobs per acre in the corridor overall.	Upgrade weekday service to Class A – Rapid Transit corridor, adding a limited-stop service during peak periods, operating every 15 or 20 minutes, for a combined 7 to 10 minutes frequency in the corridor. Extend weekday service hours from 18 hours to 20 hours (from 4:00 am to 12:00 am).

Highway Corridor Implementation

The Wheeling Metra – Schaumburg NWTC corridor was identified as a potential candidate for express bus service implementation due to its strong origin-destination travel market between residential areas in Palatine and Buffalo Grove and the Schaumburg employment center. Figure 16 below shows the suggested route alignment. A one-half mile buffer has been drawn around the corridor south end, in Schaumburg, where it distributes passengers to their final destination. A three-quarter of a mile buffer has been drawn at Northwest Highway where a freeway station is proposed with direct pedestrian access from Northwest Highway. The route is proposed to start in the north end at a new park-and-ride facility in the southwest quadrant of the interchange between Route 53 and Dundee Road.

The gross population and employment density (i.e. population and employment projections at the TAZ level by land use polygon) that is accessible to the corridor is shown within the buffer. The map shows that the alignment will provide connections to residential areas and employment areas of varying density ranging from 5 to 15 persons per acre for residential uses (around Northwest Highway), and from 10 to 40 jobs per acre for retail, services, financial and industrial activities (in Schaumburg). Two major employment accessibility nodes have been identified along the alignment. These nodes concentrate major destinations and employment density in the Schaumburg area such as Motorola, the Convention Center, and corporate towers along Meacham Road. The nodes represent locations where major barriers exist today for pedestrians to access destinations, and also locations where most opportunities exist for transit supportive urban design improvements in the future.

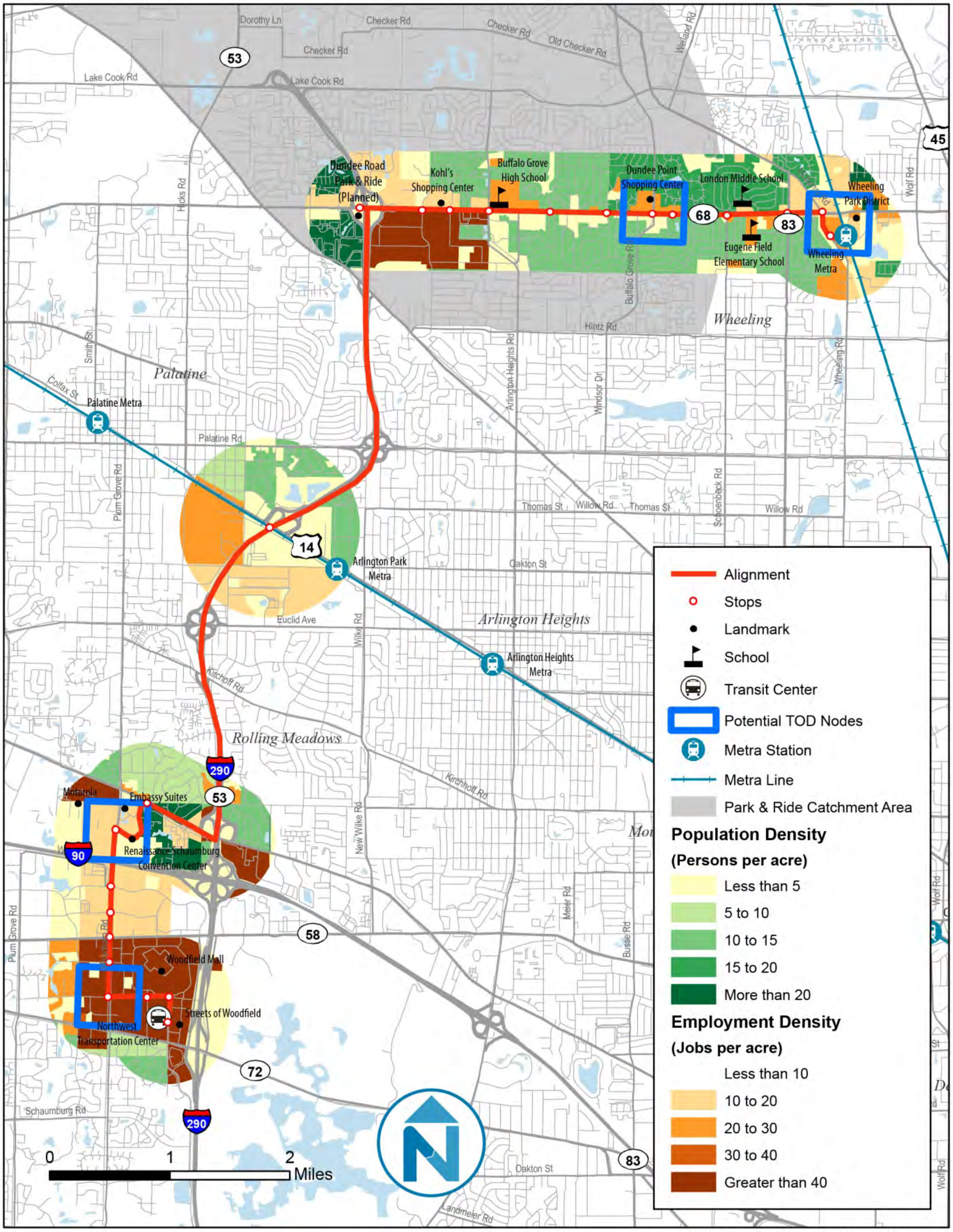
According to Table 15: Corridor Service Types and Supportive Densities, the Wheeling Metra – Schaumburg NWTC is comprised mostly of Class D: Shuttle Transit segments in the northern end, Class C: Local Transit segments in Northwest Highway and along Algonquin Road, and Class B: Arterial Transit segments in the south end along Meacham Road. No transit service start-up is recommended for the corridor unless some minimum infrastructure improvements are made to pedestrian access in the Schaumburg area (e.g. the improvements in Figure 31: Meacham Road & Woodfield Road on page 120), and once the new park-and-ride facility on Dundee Road and Route 53 is built. Once these improvements are in place, an express bus transit operation providing service during weekday peak hours is recommended, with a service frequency of every 30 minutes and a span of service of at least 6 hours in the day (6:00 – 9:00 a.m. and 3:30 – 6:30 p.m.).

The implementation plan for this particular corridor and for any other highway-based express bus service should include at least the following design and partnering requirements:

- No mid-route deviations off the highway, but direct service with freeway stations providing access to arterials streets and transfers to local bus service.
- Reduce circulation at route end to distribute passengers and instead develop an extensive network of sidewalks and dedicated pedestrian connections with destinations.
- Partnering with major employers or a transportation management association (TMA) at destinations to develop direct marketing to potential users, a comprehensive TDM program and offer incentives to leave the car at home and use transit such as discounted bus passes and/or a parking cash-out program.

Table 17 below summarizes recommended strategies to develop the corridor and build market demand. Strategies have been organized in short-term and long-term recommendations, and interim planning thresholds have been identified where possible.

Figure 16: Wheeling Metra – Schaumburg NWTC Density and TOD Nodes



Data Sources: CMAP, Pace, ESRI, State of Illinois

Table 17: Developing the Market on Highway Corridors: Wheeling Metra – Schaumburg NWTC

Implementation Period	**Transit Improvement Strategies** (Local Jurisdictions)	**Market Development Strategies** (Local Jurisdictions)	**Transit Level of Service Investment** (Pace Bus)
1 – 2 years	Design and complete pedestrian improvements (such as new sidewalks, pedestrian signals and crosswalks) at key destinations to provide direct access to major employment centers (i.e. Motorola and Meacham corporate towers).	Partner with major employers in Schaumburg or the Business Association to develop direct marketing to potential users.	Build new park-and-ride facility at Dundee Road.
2 – 5 years	Break large blocks with mid-block pedestrian crossings (at grade or above grade), and serve them with mid-block bus stops, to more easily access destinations. Integrate stops with an extensive network of sidewalks and pedestrian connections penetrating large blocks and accessing destinations.	Develop a comprehensive TDM program with Schaumburg employers, offering incentives to leave the car at home and use transit such as discounted bus passes and/or a parking cash-out program.	Start operation of transit service at baseline level, every 30 minutes, in the peak-commute direction only, 6 hours per day (between 6:00 – 9:00 am and 3:30 - 6:30 pm).
5 – 7 years	Develop on-ramp bus stops at highway interchanges to minimize bus deviations, and complete pedestrian connections between on-ramp stops and adjacent neighborhoods/destinations.	Form a transportation management association (TMA) in the area to promote transit use, strengthen TDM programs (i.e. ridesharing and car sharing), and reduce vehicle trips.	Extend weekday service hours from 6 hours to 8 hours (between 5:30 – 9:30 am 3:00 to 7:00 pm).
7 – 10 years	Implement a complete streets design in Meacham Road, including facilities for other modes (i.e. bike, walk), and transit service priority infrastructure (i.e. lanes, queue jumpers, signal priority, etc.).	Develop a TOD densification and rehabilitation plan around the transit center that uses unutilized land currently dedicated to parking and converts it into residential and commercial uses facing the street.	Add midday service increasing weekday service from 6 to 14 hours, operating every 30 minutes from 5:30 am to 7:30 pm.
10 – 15 years	Implement transit service on arterial streets crossing highway corridor and feeding the park-and-ride. Develop freeway stations to replace on-ramp stops and providing direct access to arterials streets and transfers to local bus service.	Break ground on catalyst developments that set the TOD plan in motion.	Increase weekday service frequency on the peak period to operate every 15 minutes. Class B – Arterial Transit Corridor. Start weekend service at a frequency of every 60 minutes, for at least 12 hours (from 7:00 am to 7:00 pm).

Implementing Multimodal Corridors

The following tables provide a summary of recommendations and implementation actions that Pace and local jurisdictions can take together in the future to designate multimodal corridors, strengthen the market base along corridors and improve multimodal travel conditions, especially for transit service and pedestrians.

Corridor Designation

Lead Implementer	**Action**	**Timeframe**
Pace	Develop methods to identify candidates for multimodal corridor designation.	1-2 Years
Pace	Develop list of potential multimodal corridors.	1-2 Years
Pace, counties/municipalities	Pace should start discussions with counties and municipalities about the multimodal corridor idea. Pace should present its list of potential corridors, ask for feedback, and ask counties and municipalities for their ideas about potential multimodal corridors.	1-2 Years
Pace, counties/municipalities	Develop final list of multimodal corridors for short, medium, and long-range implementation.	1-2 Years
Pace, counties/municipalities	Every two years, Pace should reevaluate its list of multimodal corridors and, along with the appropriate counties/municipalities, determine if corridors should be dropped or added.	Ongoing

Corridor Development

Lead Implementer	**Action**	**Timeframe**
Counties/municipalities	Counties/municipalities should mandate that pedestrian-oriented design is considered along multimodal corridors. This mandate should be enforced during the development review process.	1-5 Years
Counties/municipalities	Zoned maximum densities along the corridor should be reviewed to determine whether they are adequate to support frequent service that operates seven days per week.	1-10 Years
Counties/municipalities	Parking minimums perpetuate auto-oriented land uses, and the area required for surface parking makes it difficult to create walkable, transit-oriented neighborhoods. They should be reduced, capped or eliminated along multimodal corridors.	1-10 Years

Counties/municipalities	Counties/municipalities should consider developing an overlay zone one-quarter to one-half of a mile on either side of the multimodal corridor that includes incentives or exceptions designed to encourage developers to deliver denser, mixed use buildings and high quality pedestrian and bicycle facilities in exchange for incentives to develop. Infrastructure investment can be focused in areas that have a multimodal overlay.	1-10 Years

Traffic and Street Operations

Lead Implementer	**Action**	**Timeframe**
Pace, counties/municipalities	Pace should work closely with counties/municipalities on street projects along the corridor. These efforts would provide an opportunity to ensure that transit stops/stations are developed at a higher level of design quality.	Ongoing
Counties/municipalities, Pace	Any time a road improvement project is undertaken along a multimodal corridor, the local agency should work with Pace to provide appropriate transit priority measures in the design.	Ongoing
Counties/municipalities, Pace	Partnerships should be developed to optimize traffic operations along multimodal corridors. The common goal should be to provide high occupancy modes an advantage over SOVs. This includes the adoption of traffic evaluation standards that consider person delay over the design life of the facility, as opposed to vehicle delay.	1-5 Years
Counties/municipalities	Transit priority treatments, such as bulb-outs for in-lane transit stops, can increase ease of boarding and speed operations on transit routes.	1-5 Years
Counties/municipalities	Throughout the Pace service area there are gaps in the sidewalk network along and leading to transit routes, particularly on major auto-oriented streets. These gaps can impair basic access to the system, and programs should be developed in each jurisdiction to prioritize and eliminate missing sidewalk links along and near multimodal corridors.	1-5 Years
Counties/municipalities	Municipalities and counties should match bicycle and pedestrian plan priorities with multimodal corridors.	1-5 Years

Transit Service

Lead Implementer	**Action**	**Timeframe**
Pace	Pace will implement transit service on the multimodal corridor.	1 – 2 Years
Pace	After one year, Pace will evaluate route performance and adjust service levels if necessary.	2 – 6 Years
Pace	As resources permit, Pace should improve the frequency of services operating along multimodal corridors and, when possible, reroute services to more closely conform to their long term alignment.	1-10 Years
Pace	While implementation of individual projects will be extended over a period of ten years, Pace should carefully consider both the near term and long term impacts of each change. Whenever possible, service adjustments should be implemented in packages that preserve mobility even before follow-on stages are implemented. This planning needs to begin immediately and continue through final implementation.	1-10 Years

TECHNICAL APPENDIX 1:

Individual Corridor Analysis Summaries

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Individual Corridor Analysis Summaries

1. Wood Dale Metra – Downers Grove

A transit service implementation evaluation was conducted on the Wood Dale Metra – Downers Grove corridor, which included a definition of its route alignment and stops, overview of market characteristics, a field review, and a draft transit service operations and capital plan.

Route Alignment

The selected route begins at the Wood Dale Metra station in the vicinity of E Irving Park Road and N Wood Dale Road. From this location, it continues west on Irving Park and then turns south on Addison Road. It travels on S Addison Road for about 3.5 miles to North Avenue, penetrating the industrial park subdivision at the intersection of Addison and North – via Factory Road and Westwood Avenue, before turning on North Avenue. Once at E North Avenue, the route continues west for about a mile and turns south on S Main Street. It continues on S Main Street for 3 miles and then shifts east to Highland Avenue at E Roosevelt Road, from there it continues on Highland Avenue and Main Street for about 5 miles to Downers Grove Metra Main Street, ending at Main Street and Maple Avenue. The total length of the route is 14.5 miles. See Figure 17 below.

Market Characteristics

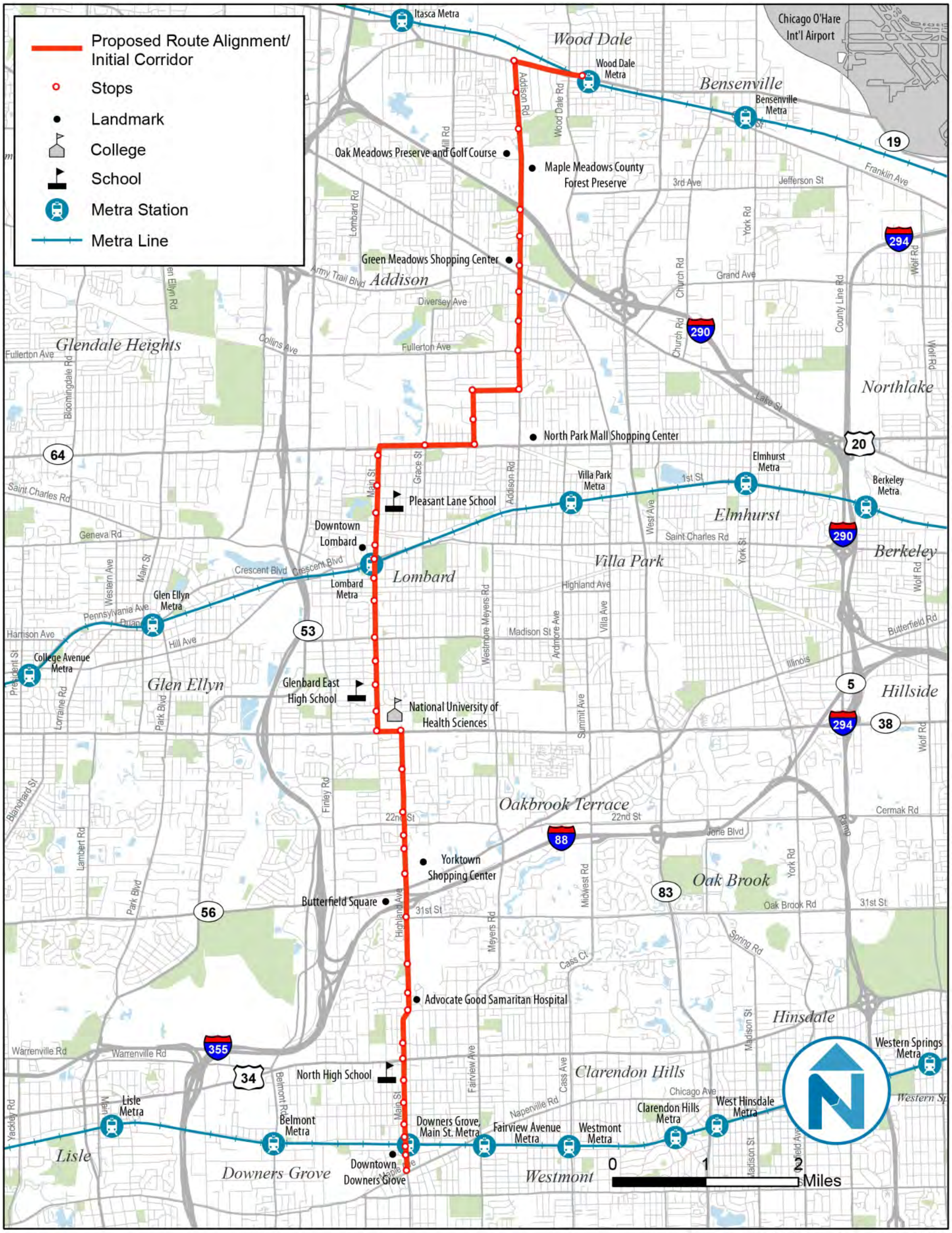
Corridor evaluation analysis conducted Tech Memos # 3 and 4, show that major characteristics of the transit market along this route include:

- A potential accessibility to about 83,000 residents and jobs within one-half mile around the route.
- An effective market reach of 96 percent (close to 80,000 persons and jobs with direct accessibility to/from the corridor, on a 10-minute walk via the street network).
- An average population and employment density of 11.1 persons/jobs per acre within the potential market area.
- A Transit Orientation Index (TOI) of 17.2, which ranks in the 95th percentile of all corridors evaluated (a total of 43 corridors).
- North-south travel connections and service to eight different analysis micro-zones, generating a potential market of almost 10,000 daily person trips per mile of corridor, and comprising 42 percent of daily person traffic in the corridor.

Transit Network Duplication or Integration

In addition, implementing transit service in this route will open up a new corridor and market area for Pace, reaching local destinations along Addison Road and connecting with new Metra stations in Wood Dale Metra, thus increasing the overall coverage of Pace’s network. A potential transit service on the corridor would duplicate Route 834 on Highland Avenue.

Figure 17: Wood Dale Metra – Downers Grove Corridor Alignment



Data Sources: CMAP, Pace, ESRI, State of Illinois

Field Observations

Field observations and run time checks were conducted between Wednesday April 27th and Friday, April 29th, 2011, completing two one-way trips during the morning rush hour (between 7:30 and 9:15 a.m.), and two one-way trips in the afternoon (between 4:30 and 6:30 p.m.). The paragraphs below summarize observations and notes about the corridor with regards to signal wait times, areas of back-ups, areas of faster traffic, crosswalk locations, heavy pedestrian activity, major turning movements, potential bus stops and major vehicle and pedestrian destinations.

General Observations

Generally, the traffic within this route flowed without major backups. A major exception, particularly in the afternoon, was Main Street through downtown Downers Grove, between the Metra Station and Maple Avenue. Traffic became heavily congested in this area, particularly at mid-block pedestrian crossings, and at the train station with deboarding passengers at the at-grade rail crossing.

Drivers generally obeyed the speed limit along the route, with a few areas experiencing higher speeds. Observed backups occurred along North Avenue, in particular at Grace Street where a signalized intersection caused a large amount of vehicle stacking. Additionally, at the Addison Road intersection, vehicles were waiting to make left turns northbound onto Addison Road.

Vehicle Traffic Observations

Traffic Speeds

In most cases, traffic moved at the speed limit, or within 5 mph. The locations in which vehicles were traveling above the speed limit included the following:

- Highland Avenue, from Ogden Avenue to 31st Street. In this stretch, the speed limit varies between 35 mph and 40 mph, with the majority of vehicles traveling at the limit or within 5 mph over.
- Eastbound North Avenue, between Main and Addison Road. The speed limit is 45 mph in this zone, but many cars were moving faster as the roadway is 3 lanes wide in each direction and has limited traffic controlled intersections. Movement from the outside to the inside lane was difficult due to the heavy flow of traffic and speeds experienced. In order to complete the northbound turn at Addison Road, this movement should be completed soon after making the right turn off of Main Street.
- Addison Road, between Byron Avenue and Elizabeth Drive. This stretch of Addison is surrounded by the Oak and Maple Meadows County Forest Preserve and has limited signal controlled intersections. The speed limit is 45 mph, but most vehicles were traveling between 50 and 55 mph.

Major Intersections

Based on field observations, it appeared that the east-west corridors of North Avenue, Roosevelt Road, St. Charles Road, Lake Street and Irving Park Road are the major arterial corridors crossing the route and have higher traffic volumes in comparison to Main Street, Highland Avenue and Addison Road. Table 18 provides a summary of the characteristics of intersections along the route, including presence of a signalized or stop controlled intersection, and the location of pedestrian crosswalks.

Table 18: Traffic Signal and Crosswalk Locations, Wood Dale Metra – Downers Grove

	Traffic Signals		Crosswalks			
List of Intersections (from north to south)	Traffic Lights	Stop Sign Control	North	East	South	West
Wood Dale/Irving Park Road	X		X	X	X	X
Addison/Irving Park Road	X				X	X
Potter Street	X				X	X
Elizabeth Drive	X		X	X	X	X
Green Meadow Drive	X		X			X
Lake Street	X		X	X	X	X
Moreland	X			X		
S. Lincoln Avenue	X					X
W. Fullerton Avenue	X		X	X		
Factory Road	X			X		X
Addison Road/North Avenue	X		X	X	X	X
S. Westwood Avenue	X		X	X	X	X
N. Grace Street	X			X	X	
North Avenue/Main Street	X				X	X
Crystal Avenue	X					
E. St. Charles Road	X		X	X	X	X
E. Parkside Avenue	X		X	X		X
E. Maple Street	X		X	X	X	X
Madison Street	X		X	X	X	X
Wilson Avenue	X		X	X	X	X
Morris Avenue	X		X	X	X	X
Roosevelt Road/Main St.	X		X	X	X	X
Roosevelt Road/Highland Ave	X		X	X	X	X
Eastgate Road	X		X	X	X	
22nd Street	X		X	X	X	X
Majestic Drive	X			X		
Yorktown Mall Drive (South)	X					X
Butterfield Road	X					
31st Street	X		X	X	X	X
Advocate/Samaritan Hospital Entrance	X		X	X		
39th Street	X		X	X	X	X
41st Street	X					
Ogden Avenue	X		X	X	X	X
Lincoln Street	X			X		X
Prairie Avenue	X		X	X	X	X
Franklin Street	X		X	X	X	X
Metra Train Crossing/Burlington	X					
Curtiss Street	X		X	X	X	X
Maple Avenue	X		X	X	X	X

Major Turning Movements

- Southbound Addison Road – Left turn onto Lake Street
- Southbound Highland Avenue – Left turn onto 31st Street
- Southbound Main Street – Left turn onto Ogden Avenue
- Northbound Main Street – Left turn onto Ogden Avenue
- Northbound Addison Road – Right turn onto Lake Street
- Northbound Addison Road – Left turn onto Irving Park Road
- Northbound Highland Avenue – Left turn onto Roosevelt Road
- Westbound North Avenue – Left turn onto Main Street

Pedestrian Traffic Observations

Very few, if any, pedestrians were observed throughout this route, although most of the route has sidewalks. An exception to this occurred during the afternoon when a large influx of pedestrians, within downtown Downers Grove, appeared after a Metra train disembarked and its passengers moved about.

Along the route, there are three major bike/pedestrian trails (Illinois Prairie Path-Main Stem, Great Western Trail DuPage County Segment, and Salt Creek Greenway Trail) that intersect the roadway in an east-west orientation. No pedestrians or users were observed along these trails during morning and afternoon rush hours.

Land Use Observations

The majority of the route is abutted by commercial, office, residential and institutional land uses, including business parks/centers and a regional retail center. The major destinations that could potentially benefit from a bus route include:

- Downers Grove Metra Station
- Downtown Downers Grove
- Yorktown Shopping Center (Von Maur, Sports Authority, Target, Lands End)
- Advocate Good Samaritan Hospital
- Butterfield Square (Butterfield Ave./Highland Ave.)
- National University of Health Sciences
- Elmhurst Memorial Hospital – Lombard Center
- Lombard Metra Station
- Downtown Lombard
- Shopping Centers along North Avenue and Addison Roads
- North Park Mall Shopping Center (North and Addison Road Intersection)
- Green Meadows Shopping Center, including Jewel Grocery Store (Addison Road)
- Shopping Centers along Irving Park Road (between Addison and Wood Dale)
- Oak Meadows Preserve and Golf Course and Maple Meadows County Forest Preserve
- Pleasant Lane School
- Glenbard East High School

- North High School

Running Time Observations

As part of the field observations, we also conducted run time checks on the selected transit route in order to develop runtime estimates for transit service implementation. Based on roadway section characteristics, urban form, development density, street network grid, and land uses, the route can be divided into five discrete segments for its operation performance. These are indicated in Table 19 below, along with runtime observations and average speed.

Table 19: Observed Running Times by Segment, Wood Dale Metra – Downers Grove

Wood Dale to Downers Grove SB				
Segment		*Time*	*Miles*	*MPH*
1	Irving Park & Wood Dale to Addison & Fullerton	09:38	3.72	23.13
2	Addison & Fullerton to Lombard Metra	08:39	3.72	25.83
3	Lombard Metra to Roosevelt & Highland	06:49	2.12	18.65
4	Roosevelt & Highland to Highland & 39th	08:15	2.98	21.65
5	Highland & 39th to Main & Maple	09:07	1.78	11.72
	Subtotal	42:29	14.32	20.23
	45 stops @ 15 seconds each	11:15		
	One-way runtime	0:53:44		

Wood Dale to Downers Grove NB				
Segment		*Time*	*Miles*	*MPH*
1	Main & Maple to Highland & 39th	07:27	1.74	14.04
2	Highland & 39th to Roosevelt & Highland	08:41	2.98	20.62
3	Roosevelt & Highland to Lombard Metra	06:30	2.12	19.59
4	Lombard Metra to Addison & Fullerton	10:19	3.73	21.68
5	Addison & Fullerton to Irving Park & Wood Dale	09:11	3.70	24.16
	Subtotal	42:09	14.28	20.33
	45 stops @ 15 seconds each	11:15		
	One-way runtime	0:53:24		

Route Total	*Time*	*Miles*	*MPH*
Roundtrip time	1:47:07	28.60	14.56
Layover @ 15%	0:10:43		
Cycle time	1:57:50		

Table 19 also includes an estimate of delay for serving bus stops and a layover/recovery time estimate to better reflect a potential revenue service operation along the corridor. An average of 15 seconds per stop was assumed for estimating delay. This was based on our own experience measuring running time delays at stops in suburban environments similar to the I-355 corridor study area (e.g. arterial corridors such as Foothill Boulevard in San Bernardino County in California).

Transit Service Plan

In addition to bus stop delay, we added a 15 percent layover/recovery time to the observed running time to calculate the potential roundtrip cycle time for the route. The Wood Dale Metra – Downers Grove route came at just under two hours or 120 minutes. This cycle time can be efficiently served with 15, 30, or 60 minute headways. The proposed alignment is shown in Figure 17 on page 62.

Potential stops have been proposed in 46 locations, typically at intersections that offer good access to penetrate residential neighborhoods and convenient access to major destinations, carefully balancing the number of pedestrian access opportunities with operational issues (i.e. transit speed and travel time). Selected stops and adjacent land uses are listed below in Table 20. The proposed route alignment is 14.5 miles long, with a resulting distance between stops of 0.32 miles on average.

Table 20: Stop Locations, Wood Dale Metra – Downers Grove

Stop #	Stop Location	Land Use Access
1	Wood Dale Metra Station	Retail frontage; single and multi family residential
2	Irving Park Rd & Addison Rd	Big box retail; single family residential
3	Addison Rd & Potter St	Single family residential
4	Addison Rd & Forest Preserve Dr	Single family residential
5	Addison Rd & Byron Ave	Single family residential
6	Addison Rd & Michael Ln	Single and multifamily residential
7	Addison Rd & Oak St (Lake St)	Big box and frontage retail; single family residential
8	Addison Rd & Moreland Ave	Frontage retail, business park and single family residential
9	Addison Rd & Lincoln Ave	Single family residential; industrial parks
10	Addison Rd & Fullerton Ave	Industrial park; frontage retail; single and multi family res.
11	Addison Rd & Factory Rd	Industrial park; single family residential
12	Factory Rd & Westwood Ave	Industrial park
13	Westwood Ave & Gerri Ln	Industrial park
14	North Ave & Westwood Ave	Industrial park; frontage retail; single and multi family res.
15	North Ave & Grace St	Retail frontage; single family residential
16	Main St & Le Moyne Ave (North & Main)	Single family residential; industrial parks
17	Main St & Berkshire Ave	Single family residential; schools
18	Main St & View St	Single family residential
19	Main St & Groove St	Single and multi family residential; Lombard town center
20	Lombard Metra Station (Main St & St. Charles Rd)	Town center; office, retail and businesses
21	Main St & Maple St	Single family; churches, schools, services
22	Main St & Hickory St	Single and multi family; retail and services
23	Main St & Madison St	Single family, schools, retail
24	Main St & Harrison Rd	Single family, retail and services
25	Main St & Wilson Ave	Single family, schools, retail

Stop #	Stop Location	Land Use Access
26	Main St & Edward St	Single family, frontage and big box retail
27	Main St & Roosevelt Rd	Big box retail and business parks
28	Roosevelt Rd & Highland Ave	Business parks (medical, educational)
29	Highland Ave & 15th St	Single family residential, schools
30	Highland Ave & 20th St	Multifamily residential; business parks
31	Highland Ave & Janata Blvd	Multifamily residential; business parks
32	Highland Ave & Majestic Dr	Multifamily residential; suburban mall
33	Highland Ave & Yorktown Mall	Business parks; suburban mall
34	Highland Ave & 31st St	Corporate towers
35	Highland Ave & 35th St	Low density single family residential
36	Highland Ave & Black Oak Dr	Single family residential; hospital
37	Highland Ave & 39th St	Single family residential; schools
38	Main St & 41st St	Single and multifamily residential
39	Main St & Ogden Ave	Frontage retail, business park and services
40	Main St & Grant St	Single family, schools, medical
41	Main St & Chicago Ave	Single family residential
42	Main St & Franklin St	Single family residential, services
43	Main St & Rogers St	Single family; Downers Grove business district
44	Downers Grove Metra Station (Main & Burlington)	Downtown Downers Grove; multi family residential
45	Main St & Curtiss St	Downtown Downers Grove
46	Main St & Maple Ave	Single and multifamily residential; services

Service Frequency Scenarios

We estimated costs and projected potential ridership for three frequency scenarios. The three scenarios have varying service frequencies, as follows:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively
- Scenario 2 – peak and off-peak frequency of 30 minutes
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively

The route's service hour span is proposed from 6:00 a.m. to 8:00 p.m., for a period of 14 hours. Service is proposed to operate on weekdays only and for 255 days in a year. Resulting operating cost estimates for each service frequency scenario are presented in Table 21 below.

Based on an average cost per revenue hour of $100.91 (as indicated in PACE's 2009 NTD report for bus operations expenses), the cost of operating the Wood Dale Metra – Downers Grove route would range between $1 million for Scenario 3 – 30/60 frequency, and $2 million for Scenario 1 – 15/30 frequency. Costs are subject to change pending final design details, and before any service could be considered for future implementation, a funding source would need to be identified.

Table 21: Service Operation Scenarios and Costs, Wood Dale Metra – Downers Grove

Service Operations Plan	Scenario 1	Scenario 2	Scenario 3
Suggested cycle time	120	120	120
Peak Frequency	15	30	30
Off Peak Frequency	30	30	60
Peak Buses	8	4	4
Off Peak Buses	4	4	2

Service Parameters	Scenario 1	Scenario 2	Scenario 3
Service Hour Span (from 6:00 am to 8:00 pm)	14	14	14
Peak Hours (6:00-9:00 am & 4:00 - 7:00 pm)	6	6	6
Off Peak Hours (9:00 am - 4:00 pm; 7:00 - 8:00 pm)	8	8	8
Peak Revenue Hours	48	24	24
Off Peak Revenue Hours	32	32	16
Daily Revenue Hours	80	56	40
Daily One-way trips	80	56	40
Peak Revenue Miles	686	343	343
Off Peak Revenue Miles	458	458	229
Daily Revenue Miles	1,144	801	572
Days of Service Annually	255	255	255
Annual Hours	20,400	14,280	10,200
Annual Miles	291,682	204,177	145,841
Cost per Hour	$100.91	$100.91	$100.91
Annual Cost	$2,058,564	$1,440,995	$1,029,282

Note: Cost per Hour is based on Pace's 2009 NTD profile for bus operations (operating expense per vehicle revenue hours).

Service Performance

Building upon ridership forecasts developed in Tech Memo #4 for all Tier 1 corridors, we refined estimates for the Wood Dale Metra – Downers Grove corridor to better account for proposed levels of service (i.e. frequency and number of trips), and physical characteristics of the corridor (mainly pedestrian accessibility conditions along the route). Table 22 below shows estimated route ridership for each service scenario and potential service performance, summarized in four common performance indicators – cost per boarding, boardings per hour, boardings per mile, and farebox recovery.

Table 22: Estimated Route Performance, Wood Dale Metra – Downers Grove

Estimated Performance	Scenario 1	Scenario 2	Scenario 3
Estimated Daily Boardings	888	736	634
Cost per Boarding	$9.09	$7.68	$6.36
Boardings per Hour	11.1	13.1	15.9
Boardings per Mile	0.78	0.92	1.11
Farebox Recovery Ratio	12.9%	15.2%	18.4%

Table 22 shows that the best performance indicators would be achieved under Scenario 3 – 30/60 service frequencies, with a ridership projection of over 600 daily boardings and a service productivity of about 16 passengers per revenue hour. The highest potential ridership would be achieved under Scenario 1 – 15/30 service frequency, with close to 900 daily boardings. However, productivity indicators will be much lower at 11 passengers per revenue hour only. The reason for this difference is that Scenario 1 would generate 250 additional boardings or a 40 percent increase in ridership, while levels of service will be duplicated, for a 100 percent increase in operating costs. Increases in cost will also translate into significant changes in cost per boarding (and subsidy per boarding), from $6.36 in Scenario 3 to $9.09 in Scenario 1, or an increase of $2.73 per boarding.

In summary, these figures tell us that there is not sufficient demand in the corridor today to justify levels of service above 30 minute frequency in the peak hours, and 60 minute frequency during off-peak hours. Or in other words, significant increases in market size and demand will need to occur to justify more frequent service in the corridor.

Transit Capital Plan

A draft capital improvement plan was also prepared for this route which includes improvements to stops, vehicles and sidewalks to connect with the market area around each stop. The goal is for transit service to have a strong physical presence in the community and along the route by placing fully developed stops, including posts, signs, schedules, landings pads and shelters.

Table 23 below provides capital cost estimates for installing fully developed stops at all 46 stop locations on both sides of the street. The estimates are based on unit costs from a recent implementation in Pace's service area.

Table 23: Stop Improvement Costs, Wood Dale Metra – Downers Grove

Stop Improvements	Material/ Labor Cost	Quantity	Projected Total Cost
Flag/Post/Schedule Holder	$50	92	$4,600
ADA 5' x 8' Pad	$5,000	92	$460,000
Shelter Pad	$10,750	92	$989,000
Shelter (8')	$6,000	92	$552,000
Subtotal			$2,005,600

In addition to stops, the operation of the Wood Dale Metra – Downers Grove route will require buses for daily operation as well as spare vehicles. It has been assumed that Pace would buy these buses. Table 24 below shows non-annualized costs of vehicles for each service scenario. Scenario 1 would require $1.4 million more in capital costs than Scenarios 2 and 3 due to the need for more buses during the peak hours.

Table 24: Vehicle Costs by Service Scenario, Wood Dale Metra – Downers Grove

Vehicle Purchase Costs	Scenario 1	Scenario 2	Scenario 3
40 foot low-floor diesel buses @ $350,000 each (incl. spares)	$3,150,000	$1,750,000	$1,750,000

Table 25 below shows the cumulative cost of operating the route over a period of 12 years (the typical lifetime of a transit vehicle); Scenario 1 would cost about $30 million in operating and capital costs, compared to $21 million for Scenario 2 and $16 million for Scenario 3.

Table 25: Total 12-Year Operating and Capital Costs, Wood Dale Metra – Downers Grove

Total 12-Year Costs	Scenario 1	Scenario 2	Scenario 3
Operating Costs	$24,702,768	$17,291,938	$12,351,384
Stop Improvements Costs	$2,005,600	$2,005,600	$2,005,600
Vehicle Purchase Costs	$3,150,000	$1,750,000	$1,750,000
Total Costs	$29,858,368	$21,047,538	$16,106,984
Annualized Costs	$2,488,197	$1,753,961	$1,342,249

Pedestrian Connection Improvements

As shown in the capital and operations plan above, it is a significant investment and a major financial commitment for Pace to start a new route. Therefore, minimum levels of market demand, operational conditions and pedestrian accessibility appear to be needed before making such a commitment. A first step towards meeting a minimum level of pedestrian accessibility is to develop a pedestrian improvement plan that fills in gaps in the pedestrian network around potential bus stops, provides direct connections with destinations and building front doors, and the ability to safely cross the street to access bus stops.

Based on field observations and analysis, we are recommending that Pace work with jurisdictions along the route in the improvement of sidewalks, crosswalks and pedestrian connections with destinations. Complete sidewalks, street crosswalks, and effective pedestrian connections will be a major incentive and enabler for people to use transit. Current conditions show that even corridors with significant transit market potential such as Wood Dale Metra – Downers Grove have considerable gaps in pedestrian accessibility and connectivity that will negatively impact potential transit usage.

Four potential stops were selected along this corridor to develop a conceptual design of what improvements could look like. Conceptual designs are shown in Figures 18 through 21. Locations were selected to represent different land use and street configuration conditions, as specified below:

- A single-family residential environment – N Addison Road & W Michael Lane
- A corporate park/office building environment – Highland Avenue & 31st Street
- A shopping mall and big box retail environment – Yorktown Mall on Highland Avenue
- A heavy industrial/warehouse environment – S Addison Road & Factory Road

Conceptual designs at these locations generally include small interventions such as building sidewalks, marking crosswalks and creating safe corridor crossing for pedestrians. However, they show that with even small interventions, conditions for pedestrians and transit users could be improved significantly. Transit-related interventions are also included in these designs, particularly bus shelters and stop zones.

Capital costs for pedestrian interventions at each of these locations have not been estimated. A comprehensive plan including all stops in the route is recommended to identify costs and mechanisms for implementation.

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Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

0' 50' 100'

Addison Road & Michael Lane

August 3, 2011

Pace Bus

I-355 Corridor Service Study

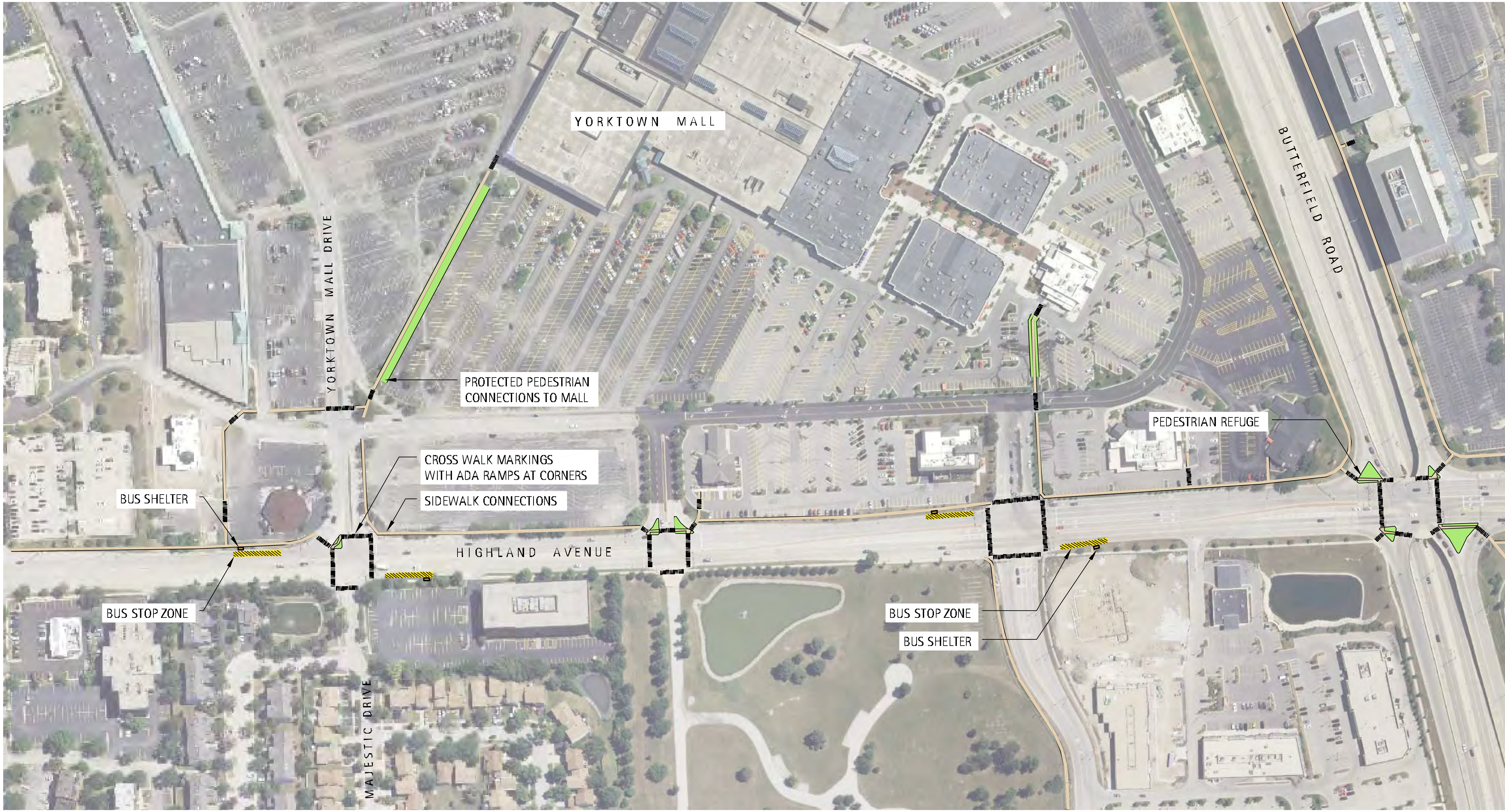
Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

0' 50' 100'

Highland Avenue & 31st Street

August 3, 2011



Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

0' 100' 200'

Highland Avenue at Yorktown Mall

August 3, 2011

Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

0' 50' 100'

Addison Road & Factory Road

August 3, 2011

2. Dundee Road - Arlington Heights

A transit service implementation evaluation was conducted on the Dundee Road – Arlington Heights corridor, which included a definition of its route alignment and stops, overview of market characteristics, a field review, and a draft transit service operations and capital plan.

Route Alignment

The selected route begins at N Rand Road and N Hicks Road in Palatine. From there it continues southeast on Rand Road toward E Dundee Road, then east on Dundee Road for about 2 miles toward Arlington Heights Road. It turns south on Arlington Heights Road and continues for about 7 miles toward E Algonquin Road. At that point it turns west and continues on Algonquin Road until Golf Road, distributing around the corporate parks and office towers near the intersection of Golf Road and Algonquin Road, via Golf Road and New Wilke Road. The total length of the route is 11 miles long. See Figure 22 below.

This corridor, overlaps the discontinued Route 690 for about one-third of its length between Dundee Road and the Metra Station. Based on market conditions characteristics, origin-destination patterns, and network assignments the corridor has been designed to connect major employment, shopping and residential areas that lay outside the alignment of former Route 690, and it provides transit connections and service for trips that occur throughout the entire day and not only during rush hour periods. The Dundee – Arlington Heights corridor increases service hours to cover the full day, and connects with major employment and destination centers, thus providing a more convenient option in this part of the service area, and attracting a mix of trips of different length and purpose.

Market Characteristics

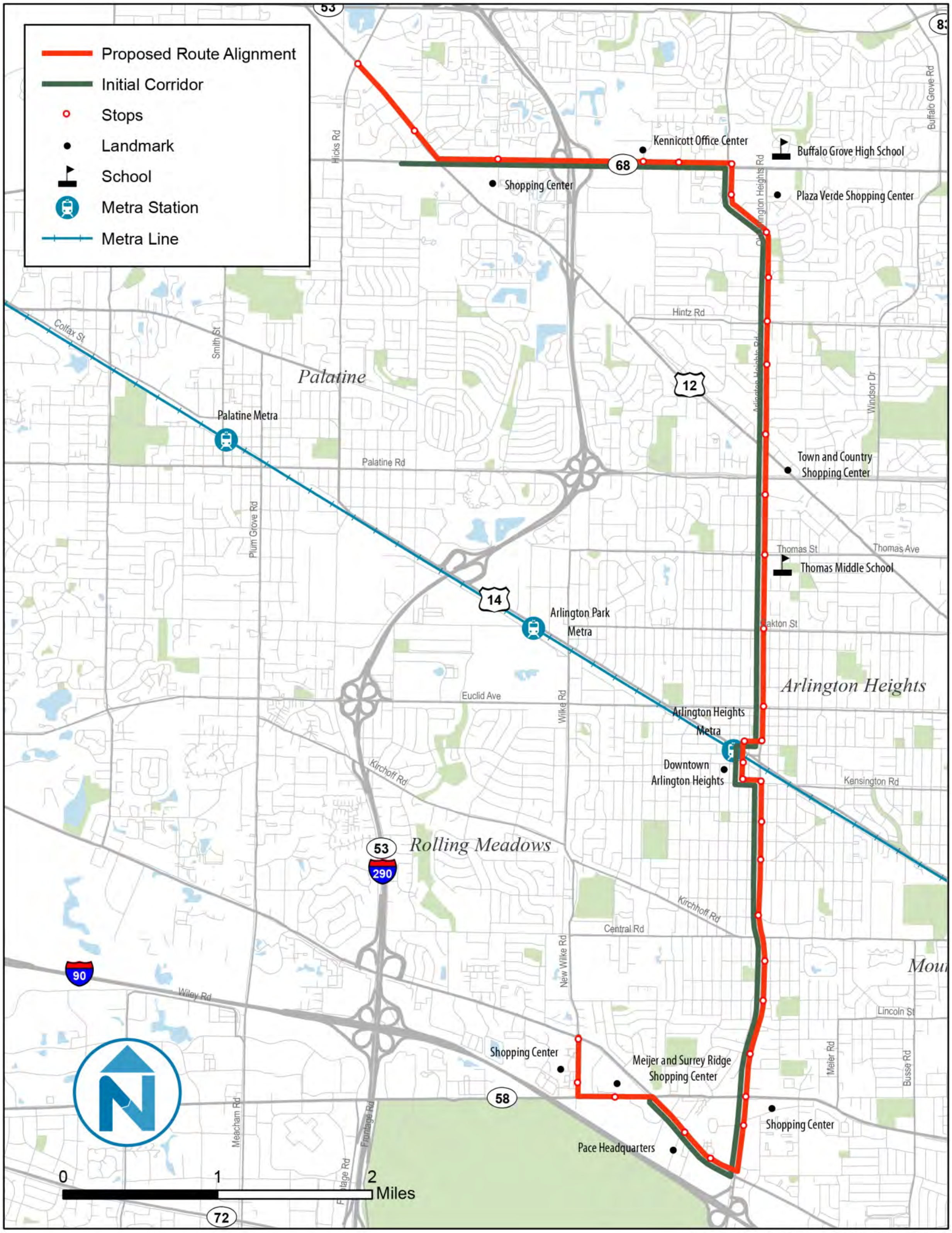
Corridor evaluation analysis conducted Tech Memos # 3 and 4, show that major characteristics of the transit market along this route include:

- A potential accessibility to over 80,000 residents and jobs within one-half mile of the route.
- An effective market reach of 79 percent (close to 64,000 persons and jobs with direct accessibility to/from the corridor, on a 10-minute walk via the street network).
- An average population and employment density of 14 persons/jobs per acre within the potential market area.
- A Transit Orientation Index (TOI) of 17.9, which ranks in the 99.3th percentile of all corridors evaluated (a total of 43 corridors).
- North-south travel connections and service to five different analysis micro-zones, generating a potential market of about 7,500 daily person trips per mile of corridor, and comprising 23 percent of daily person traffic in the corridor.

Transit Network Duplication or Integration

In addition, implementing transit service in this route will open up a completely new corridor and market for Pace, reaching new destinations such as downtown Arlington Heights and Metra station, retail and office park destinations in Dundee and Rand Roads, and major employment destinations in South Arlington Heights (around the intersection of Golf and Algonquin Roads). This route will increase the coverage of Pace’s network and not duplicate existing services, except for a short segment along Golf and Algonquin Roads.

Figure 22: Dundee Road – Arlington Heights Road Alignment



Data Sources: CMAP, Pace, ESRI, State of Illinois

Field Observations

Field observations and run time checks were conducted on Thursday April 28th, 2011, completing three one-way trips during the morning rush hour (between 7:00 and 9:00 a.m.), and three one-way trips in the afternoon (between 4:30 and 6:30 p.m.). The paragraphs below summarize observations and notes about the corridor with regards to signal wait times, areas of back-ups, areas of faster traffic, crosswalk locations, heavy pedestrian activity, major turning movements, potential bus stops and major vehicle and pedestrian destinations.

General Observations

Generally, vehicle traffic within this route flowed without major backups. A big exception, which was particularly exacerbated in the afternoon, was Arlington Heights Road just south of the Dundee Road intersection. Due to roadway reconstruction, only one lane moving in each direction was open from University Drive & Old Arlington Heights Road to Dundee Road. This created very long backups moving north on Arlington Heights Road during the afternoon.

Most traffic moved at the speed limit, with only a few exceptions. A few backups were observed at locations where the distance between lights is short, such as on Arlington Heights Road where there are signals at Lillian Avenue, Palatine Road, Rand Road and a commercial access point north of Rand. Other observed backups occurred in areas of Arlington Heights Road where vehicles were waiting to make left turns, where a separate left turn lane is not provided. This occurred on Arlington Heights Road (southbound) south of Lillian Avenue, as a vehicle was waiting to turn into a residential area, as well as northbound on Arlington Heights with left turns onto Euclid Avenue.

The route had noticeably higher traffic volumes during the afternoon period, which increased observed travel times by 5 minutes per trip (25.33 minutes in the morning; 30.66 minutes in the afternoon). This was also due to the aforementioned road construction in Arlington Heights Road.

Vehicle Traffic Observations

Traffic Speeds

In most cases, traffic moved at the speed limit, or within 5 mph of the speed limit. The locations in which vehicles were traveling above the speed limit include the following:

- Southbound Arlington Heights, from Sigwalt to Central. In this stretch, the speed limit is 30 mph, but many cars were traveling between 35 mph and 40 mph.
- Southbound and Northbound Arlington Heights, between Golf Road and Algonquin Road. The speed limit is 35 mph in this zone, but many cars were moving faster, either in anticipation of entering the Toll Road (I-90) or having just exited from the Toll Road, which is just south of the Algonquin Road/Arlington Heights Road intersection.
- Northbound Arlington Heights, between Euclid Avenue and Thomas Street (afternoon). Along this stretch there is a middle school and fire department facility, as well as primarily residential neighborhoods. In the morning, vehicles consistently moved at the speed limit presumably due to the school zone. However, in the afternoon many cars were traveling at higher speeds (approximately 5 mph over the 30 mph speed limit).
- Eastbound Dundee Road, between Rand and Route 53 (afternoon). Due to the number of stop lights along Dundee Road, most vehicles appeared to be driving the speed limit

throughout the day with little time to accelerate. In the afternoon, more vehicles were observed traveling at higher speeds as they approached the on-ramp to Route 53.

Major Intersections

Based on field observations, it appeared that the major east-west arterial corridors had higher traffic volumes than Arlington Heights Road for most segments (the segment of Arlington Heights Road between Golf Road and Algonquin Road was the exception). These primary streets include Algonquin Road, Golf Road, Northwest Highway, Palatine Road, Rand Road and Dundee Road. Table 26 provides a summary of the characteristics of intersections along this corridor, including presence of a signalized or stop controlled intersection, and the location of pedestrian crosswalks.

Table 26: Traffic Signal and Crosswalk Locations, Dundee Road – Arlington Heights Road

	Traffic Signals		Crosswalks			
List of Intersections (from north to south)	Traffic Lights	Stop Sign Control	North	East	South	West
Baldwin Road	X		X		X	
Kennedy Dr/N Frontage Rd	X					
53 south exit ramp	X					
53 north exit ramp	X					
Wilke Road	X					
Kennicott Ave	X		X		X	
Ridge Ave	X		X		X	
Arlington Heights Rd/Dundee	X		X	X	X	X
University Dr/Old Arl. Hts. Rd	X			X	X	X
Hintz Rd	X			X	X	X
Parking access @ retail	X		X			
Rand Road	X		X	X	X	X
Palatine Road	X					X
Lillian Ave	X			X	X	X
Thomas St	X		X	X	X	X
Olive St	X		X	X	X	X
Oakton St	X		X	X	X	X
Self Actuated Ped. Timer	X			X		X
Euclid Ave	X		X	X	X	X
Miner St/Arl. Hts. Rd	X		X	X	X	X
Evergreen Ave/Miner St		4-way stop				
Dunton Ave/Miner St		stop sign*				
Northwest Highway	X		X	X	X	X
Campbell St/Dunton Ave		4-way stop				
Dunton Ave/Sigwalt St		4-way stop				
Evergreen Ave/Sigwalt St		4-way stop				

	Traffic Signals		Crosswalks			
List of Intersections (from north to south)	Traffic Lights	Stop Sign Control	North	East	South	West
Arlington Heights Rd/Sigwalt	X		X	X	X	X
Park St	X		X	X	X	X
Central Rd	X		X	X	X	X
White Oak St	X		X	X	X	X
Golf Rd	X		X	X	X	X

*North-south traffic does not stop

Major Turning Movements

Major turning movements were observed at:

- Northbound Arlington Heights Road – Left turn onto Palatine Road
- Northbound Arlington Heights Road – Right turn onto Hintz Road
- Southbound Arlington Heights Road – Left turn onto Euclid Avenue
- Northbound Arlington Heights Road – Left turn onto Central Road
- Turning movements out of St. Edna's Catholic Church onto Arlington Heights Road
- Turning movements out of Kennicott Office Center (afternoon) onto Dundee Road
- Left turns on to Arlington Heights Road (southbound) from Central Road (from the east)

Pedestrian Traffic Observations

Very few pedestrians were observed throughout this route, although most of the route has sidewalks. One large gap that does not have sidewalks is found between Baldwin Road and Wilke Road on Dundee Road. On the arterial streets in the morning, only a few runners were observed along the route and a student was seen crossing Arlington Heights Road at Thomas Street; there was a crossing guard in this location. In the afternoon, there were more pedestrians, although no particular destination was evident. It should be noted that it was raining in the afternoon, which may have impacted the number of people walking.

Additionally, more than one instance of jaywalking was observed along Dundee Road, probably due to a general lack of pedestrian amenities at signalized intersections (marked crosswalks and countdown timers), as well as the general auto-oriented character of the street itself. Dundee essentially has a 7 lane cross-section, with 2 travel lanes in each direction, a bi-direction turn lane and a wide asphalt shoulder on each side.

Many more pedestrians were observed in downtown Arlington Heights (along Miner, Dunton and Sigwalt), particularly around the train station. In the morning, there were approximately 50 people crossing Dunton near the train station. In the afternoon, trains unload hundreds of pedestrians that cross in all directions in the vicinity. Due to jaywalking and a lack of clear signage for vehicles (where to stop when crowds are crossing at mid-block), it creates confusion as to who has the right-of-way. This caused a several minute delay for vehicles getting through the area.

Land Use Observations

The majority of the route is abutted by commercial and office land uses, including office parks/centers and big box stores. The major destinations that could benefit from a bus route include:

- The Arlington Heights train station
- Downtown Arlington Heights
- Meijer and Surrey Ridge Shopping Center (off Algonquin Road)
- Pace Headquarters (Algonquin Road)
- Shopping Centers around Golf Road & Arlington Heights Road intersection, including Jewel
- Thomas Middle School (Thomas & Arlington Heights Road)
- Town and Country Shopping Center (Palatine Road & Arlington Heights Road)
- Northpoint Shopping Center & Arlington Heights Promenade (Palatine Road/Rand Road/ Arlington Heights Road)
- Plaza Verde Shopping Center (Dundee Road & Arlington Heights Road)
- Buffalo Grove High School (Dundee Road & Arlington Heights Road)
- Kennicott Office Center (Dundee Road)
- Large shopping center with a Whole Foods (Dundee Road & Rand Road intersection)

Additionally, Dundee Road and Arlington Heights Road have continuous “strip” commercial zones for large stretches that would be well served with bus service.

Running Time Observations

As part of the field observations, we also conducted run time checks on the selected transit route in order to develop runtime estimates for transit service implementation. Based on roadway section characteristics, urban form, development density, street network shape, and land uses, the route can be divided into five discrete segments for its operation performance. These are indicated in Table 27 below, along with runtime observations and average speed.

Table 27 also includes an estimate of delay for serving bus stops and a layover/recovery time estimate to better reflect a potential revenue service operation along the corridor. An average of 15 seconds per stop was assumed for estimating delay. This was based on our own experience measuring running time delays at stops in suburban environments similar to the I-355 corridor study area (e.g. arterial corridors such as Foothill Boulevard in San Bernardino County in California).

Table 27: Observed Running Times by Segment, Dundee Road – Arlington Heights Road

Dundee Rd SB

Segment		*Time*	*Miles*	*MPH*
1	Dundee & Rand to Dundee & Arlington Heights	04:05	1.83	26.94
2	Dundee & Arlington Heights to Arlington Heights & Rand	04:09	1.85	26.81
3	Arlington Heights & Rand to Arlington Heights & Sigwalt	08:24	2.51	17.91
4	Arlington Heights & Sigwalt to Arlington Heights & White Oak	03:06	1.41	27.30
5	Arlington Heights & White Oak to Pace Headquarters	03:20	1.53	27.41
	Subtotal	23:04	9.13	23.75
	29 stops @ 15 seconds each	07:15		
	One-way runtime	30:19		

Dundee Rd NB

Segment		*Time*	*Miles*	*MPH*
1	Pace Headquarters to Arlington Heights & White Oak	04:50	1.58	19.56
2	Arlington Heights & White Oak to Arlington Heights & Sigwalt	03:50	1.42	22.15
3	Arlington Heights & Sigwalt to Arlington Heights & Rand	09:10	2.54	16.65
4	Arlington Heights & Rand to Dundee & Arlington Heights	07:12	1.86	15.54
5	Dundee & Arlington Heights to Dundee & Rand	04:49	1.87	23.27
	Subtotal	29:51	9.27	18.63
	29 stops @ 15 seconds each	07:15		
	One-way runtime	37:06		

Route Total		*Time*	*Miles*	*MPH*
	Roundtrip time	1:07:25	18.40	14.24
	Layover @ 15%	0:10:07		
	Cycle time	1:17:32		

Transit Service Plan

In addition to bus stop delay, we added a 15 percent layover/recovery time to the observed running time to calculate the potential roundtrip cycle time for the route. The Dundee Road – Arlington Heights Road route came at 1 hour and 17 minutes or 77 minutes. In order to serve this route efficiently – with a clockface headway of 15 or 30 minutes, we propose a 2-mile extension of the route, at the northern and southern termini, to get closer to a 90 minute cycle time. The proposed alignment would start at the intersection of Rand Road and Hicks Road, and end at S New Wilke Road and W Algonquin Road. Figure 22 on page 78 shows the initial corridor alignment as well as the new proposed route alignment.

Potential stops have been proposed in 36 locations, typically at intersections that offer good access to penetrate residential neighborhoods and convenient access to major destinations, carefully balancing the number of pedestrian access opportunities with operational issues (i.e. transit speed and travel time). Selected stops and adjacent land uses are listed below in Table 28. Given that the proposed route alignment is 11.3 miles long, this results in an average distance between stops of 0.31 miles.

Table 28: Stop Locations, Dundee Road – Arlington Heights Road

Stop #	Stop Location	Land Use Access
1	N Rand Rd & N Hicks Rd	Low density commercial
2	N Rand Rd & Old Hicks Rd	Big box and frontage retail
3	E Dundee Rd & N Rand Rd	Big box and frontage retail; multi family residential
4	E Dundee Rd & Baldwin Rd	Big box and frontage retail; single and multi family residential
5	W Dundee Rd & N Kennicott Ave	Big box and frontage retail; office parks
6	W Dundee Rd & N Ridge Ave	Big box and frontage retail; multi family residential
7	W Dundee Rd & N Arlington Heights Rd	High school; retail frontage
8	N Arlington Heights Rd & Villa Verde Dr	Business parks (medical); multi family residential
9	N Arlington Heights Rd & University Dr	Industrial and offices; park; single and multi family residential
10	N Arlington Heights Rd & E Burr Oak Dr	Single family residential
11	N Arlington Heights Rd & W Hintz Rd	Single family residential; churches
12	N Arlington Heights Rd & W Waverly Rd	Schools; churches; single family residential
13	N Arlington Heights Rd & Parking access @ retail north of W Rand Rd	Big box and frontage retail; single family residential
14	N Arlington Heights Rd & E Lillian Ave	Offices (medical); big box and frontage retail; single family residential
15	N Arlington Heights Rd & E Thomas St	Offices (medical) and services ; middle school; single family residential
16	N Arlington Heights Rd & W Oakton St	Offices (medical); school; single family residential
17	N Arlington Heights Rd & E Euclid Ave	Single family housing; library
18	N Arlington Heights Rd & E Miner St	Downtown Arlington Heights; retail and services; single family housing
19	E Miner Ave & N Dunton Ave	Downtown Arlington Heights; retail and services; single family housing; Metra station
20	S Dunton Ave & E Campbell St	Downtown Arlington Heights; retail and services
21	S Dunton Ave & W Sigwalt St	Single and multi family housing; retail and services
22	W Sigwalt St & S Arlington Heights Rd	Single and multi family housing; retail and services
23	S Arlington Heights Rd & E Grove St	Frontage retail; single family housing
24	S Arlington Heights Rd & W Fairview St	Single family housing
25	S Arlington Heights Rd & W Orchard St	Single family housing
26	S Arlington Heights Rd & E Magnolia St	Frontage retail; single and multi family housing
27	S Arlington Heights Rd & E White Oak St	Park; school; single family housing
28	S Arlington Heights Rd & W Pickwick Rd	Single family housing
29	S Arlington Heights Rd & Golf Rd	Big box and frontage retail; multi family residential
30	S Arlington Heights Rd & W Seegers Rd	Office parks
31	W Algonquin Rd & S Reserve Dr	Office parks and services (hotels)
32	W Algonquin Rd & entrance to PACE headquarters	Office parks and services
33	W Algonquin Rd & Meijer Dr	Office parks and big box retail
34	Golf Rd & entrance to Walmart	Office parks; big box and frontage retail

Stop #	Stop Location	Land Use Access
35	S New Wilke Rd & entrance to office park	Office parks
36	S New Wilke Rd & W Algonquin Rd	Frontage retail, multi family residential

Service Frequency Scenarios

We estimated costs and projected potential ridership for three frequency scenarios. The three scenarios have varying service frequencies, as follows:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively
- Scenario 2 – peak and off-peak frequency of 30 minutes
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively

The service hour span is proposed from 6:00 a.m. to 8:00 p.m., for a period of 14 hours. Service is proposed to operate on weekdays only and for 255 days in a year. Operating cost estimates for each scenario are presented in Table 29 below.

Table 29: Service Operation Scenarios and Costs, Dundee Road – Arlington Heights Road

Service Operations Plan	Scenario 1	Scenario 2	Scenario 3
Suggested cycle time	90	90	90
Peak Frequency	15	30	30
Off Peak Frequency	30	30	60
Peak Buses	6	3	3
Off Peak Buses	3	3	2

Service Parameters	Scenario 1	Scenario 2	Scenario 3
Service Hour Span (from 6:00 am to 8:00 pm)	14	14	14
Peak Hours (6:00-9:00 am & 4:00 - 7:00 pm)	6	6	6
Off Peak Hours (9:00 am - 4:00 pm; 7:00 - 8:00 pm)	8	8	8
Peak Revenue Hours	36	18	18
Off Peak Revenue Hours	24	24	16
Daily Revenue Hours	60	42	34
Daily One-way trips	80	56	40
Peak Revenue Miles	442	221	221
Off Peak Revenue Miles	294	294	147
Daily Revenue Miles	736	515	368
Days of Service Annually	255	255	255
Annual Hours	15,300	10,710	8,670
Annual Miles	187,642	131,349	93,821
Cost per Hour	$100.91	$100.91	$100.91
Annual Cost	$1,543,923	$1,080,746	$874,890

Note: Cost per Hour is based on Pace's 2009 NTD profile for bus operations (operating expense per vehicle revenue hours).

Based on an average cost per revenue hour of $100.91 (as indicated in PACE's 2009 NTD report for bus operations expenses), the cost of operating the Dundee Road – Arlington Heights Road route would range between $875,000 for Scenario 3 and $1.5 million for Scenario 1. Costs are subject to change pending final design details, and before any service could be considered for future implementation, a funding source would need to be identified.

Table 30: Estimated Route Performance, Dundee Road – Arlington Heights Road

Estimated Performance	Scenario 1	Scenario 2	Scenario 3
Estimated Daily Boardings	1,132	938	808
Cost per Boarding	$5.35	$4.52	$4.24
Boardings per Hour	18.9	22.3	23.8
Boardings per Mile	1.54	1.82	2.20
Farebox Recovery Ratio	21.9%	25.9%	27.6%

Service Performance

Building upon ridership forecasts developed in Tech Memo #4 for all Tier 1 corridors, we refined estimates for the Dundee Road – Arlington Heights Road corridor to better account for proposed levels of service (i.e. frequency and number of trips), and physical characteristics of the corridor (mainly pedestrian accessibility conditions along the route).

Table 30 above shows estimated route ridership for each service scenario and potential service performance, summarized in four common performance indicators – cost per boarding, boardings per hour, boardings per mile, and farebox recovery.

All in all, Table 30 shows that the highest potential ridership would be achieved under Scenario 1 (15/30 service frequency) with over 1,100 daily boardings, while the highest productivity will be achieved with Scenario 3 (30/60 service frequency) with close to 24 passengers per revenue hour. However, the route's 90-minute cycle time will not work well with 60-minute frequencies during off-peak hours in Scenario 3, and will produce a very inefficient waste of revenue hours. In this regard, Scenario 2 makes more efficient use of service hours, at 30-minute frequency throughout the day, and also it achieves similar productivity and efficiency indicators as Scenario 3, with a potential productivity of 22 passengers per revenue hour and a cost of $4.52 per boarding. At estimated 938 daily boardings, Scenario 2 is the preferred scenario for service implementation.

In addition, and as opposed to the Wood Dale Metra – Downers Grove corridor, ridership and productivity figures for Scenario 1 are only marginally lower than Scenario 2, showing the strength of the corridor from a market size and latent demand perspective, and the potential for more ridership in the future if street design and land use conditions are improved.

Transit Capital Plan

A draft capital improvement plan was also prepared for this route which includes improvements to stops, vehicles and sidewalks to connect with the market area around each stop. The goal is for transit service to have a strong physical presence in the community and along the corridor by placing fully developed stops, including posts, signs, schedules, landings pads and shelters.

Table 31 below provides capital cost estimates for installing fully developed stops at all 36 stop locations (both sides of street). Estimates have been based on unit costs from a recent implementation in Pace's service area.

Table 31: Stop Improvement Costs, Dundee Road – Arlington Heights Road

Stop Improvements	Material/ Labor Cost	Quantity	Projected Total Cost
Flag/Post/Schedule Holder	$50	72	$3,600
ADA 5' x 8' Pad	$5,000	72	$360,000
Shelter Pad	$10,750	72	$774,000
Shelter (8')	$6,000	72	$432,000
Subtotal			$1,569,600

In addition to stops, the operation of Dundee Road – Arlington Heights Road route will require buses for daily operation as well as spare vehicles. It has been assumed that Pace would buy these buses. Table 32 below shows non-annualized costs of vehicles for each service scenario. Scenario 1 would require capital costs of $1 million more than Scenarios 2 and 3 due to the need for more buses during the peak hours.

Table 32: Vehicle Costs by Service Scenario, Dundee Rd – Arlington Heights Rd

Vehicle Purchase Costs	Scenario 1	Scenario 2	Scenario 3
40 foot low-floor diesel buses @ $350,000 each (incl. spares)	$2,450,000	$1,400,000	$1,400,000

Table 33 below shows the cumulative cost of operating the route over a period of 12 years (the typical lifetime of a transit vehicle); Scenario 1 would cost about $22 million in operating and capital costs, compared to $15 million for Scenario 2 and $13 million for Scenario 3.

Table 33: Total 12-Year Costs, Dundee Rd – Arlington Heights Rd

Total 12-Year Costs	Scenario 1	Scenario 2	Scenario 3
Operating Costs	$18,527,076	$12,968,953	$10,498,676
Stop Improvements Costs	$1,569,600	$1,569,600	$1,569,600
Vehicle Purchase Costs	$2,450,000	$1,400,000	$1,400,000
Total	$22,546,676	$15,938,553	$13,468,276
Annualized Costs	$1,878,890	$1,328,213	$1,122,356

Pedestrian Connection Improvements

As shown in the capital and operations plan above, it is a significant investment and a major financial commitment for Pace to start a new route. Therefore, minimum levels of market demand, operational conditions and pedestrian accessibility are needed before making such a commitment. A first step towards meeting a minimum level of pedestrian accessibility is to develop a pedestrian improvement plan that fills in gaps in the pedestrian network around potential bus stops, provides direct connections with destinations and building front doors, and the ability to safely cross the street to access bus stops.

Based on field observations and analysis, we are recommending that Pace work with jurisdictions along the route in the improvement of sidewalks, crosswalks and pedestrian connections with destinations. Complete sidewalks, street crosswalks, and effective pedestrian connections will be a major incentive and enabler for people to use transit. Current conditions show that even corridors with significant transit market potential such as Dundee Road – Arlington Heights Road have considerable gaps in pedestrian accessibility and connectivity that will negatively impact potential transit usage.

Three potential stops were selected along this corridor to develop a conceptual design of what improvements could look like. Conceptual designs are shown in Figures 23 through 25. Locations were selected to represent different land use and street configuration conditions, as specified below:

- A shopping mall and big box retail environment – Arlington Heights & Rand Road
- A single-family residential environment – Arlington Heights & Fairview Street
- A retail and office/business park environment – Arlington Heights between Golf and Algonquin Roads.

Conceptual designs at these locations generally include small interventions such as building sidewalks, marking crosswalks and creating safe corridor crossing for pedestrians. However, they show that with even small interventions, conditions for pedestrians and transit users could be improved significantly. Transit-related interventions are also included in these designs, particularly bus shelters and stop zones.

Capital costs for pedestrian interventions at each of these locations have not been estimated. A comprehensive plan including all stops in the route is recommended to identify costs and mechanisms for implementation.

Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

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Arlington Heights Road & Rand Road

August 3, 2011

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Arlington Heights Road & Fairview Street

August 3, 2011

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I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

Arlington Heights Road & Seegers Road

August 3, 2011

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3. Elmhurst Metra – Downers Grove/Fairview Metra

A transit service implementation evaluation was conducted on the Elmhurst Metra – Downers Grove/Fairview Metra corridor, which included a definition of its route alignment and stops, overview of market characteristics, a field review, and a draft transit service operations and capital plan.

Route Alignment

The selected route begins north of the Elmhurst Metra station at N York Street and W Fremont Avenue. From there it travels south on N York Street through downtown Elmhurst and the Metra station to St. Charles Road. It turns west on St. Charles and travels east for about 3 miles to S Westmore Avenue. The route turns south in Westmore Avenue and continues south for about 6.5 miles onto Westmore-Meyers Road, then onto Meyers Road, and onto Fairview Avenue (south of Ogden Avenue) toward the Downers Grove Fairview Metra station. From the Fairview Metra station, the route continues west to downtown Downers Grove via Burlington Avenue, Maple Avenue, and Curtiss Street (see Figure 26 below). This route is 11.8 miles long.

Market Characteristics

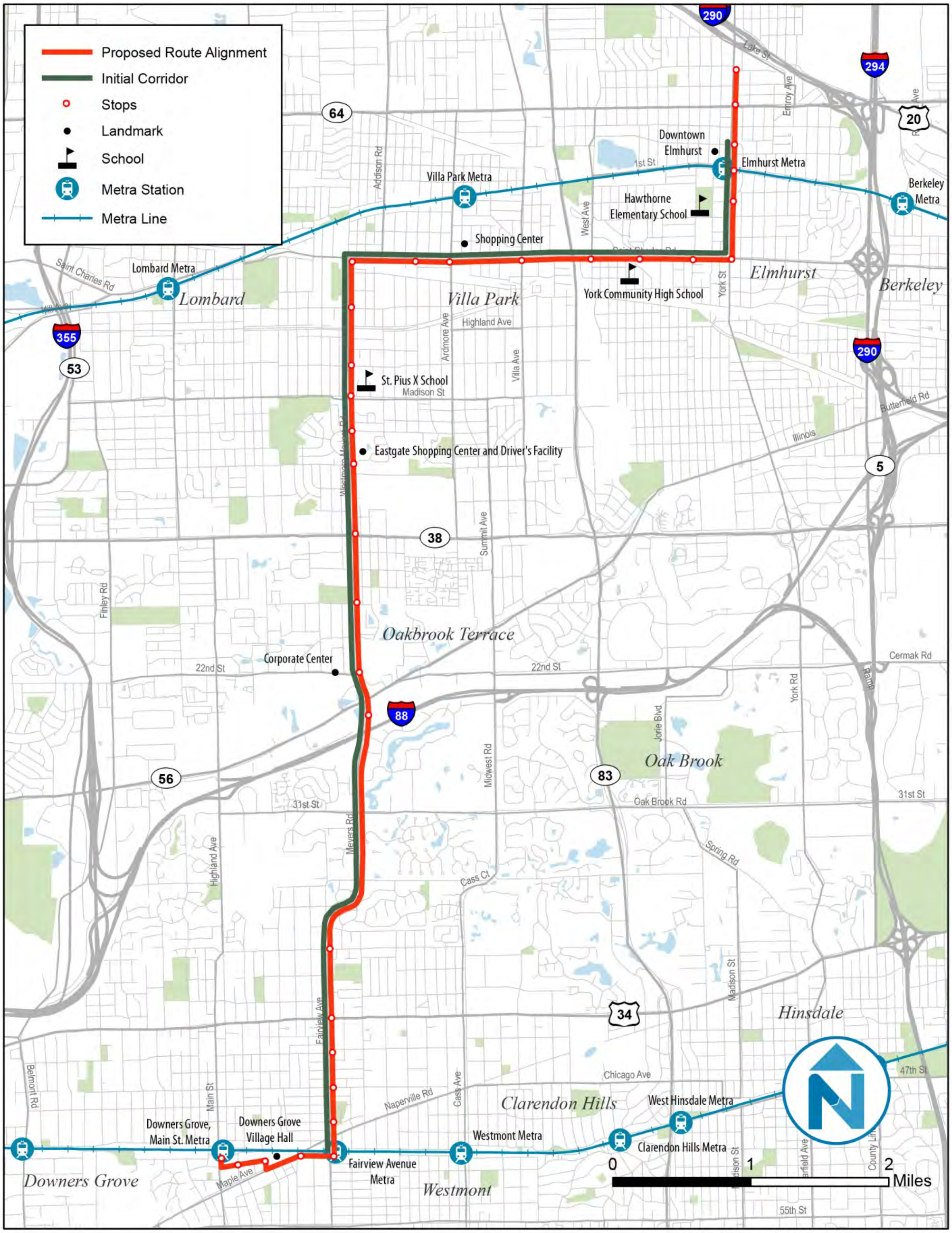
Corridor evaluation analysis conducted Tech Memos # 3 and 4, show that major characteristics of the transit market along this route include:

- A potential accessibility to over 72,000 residents and jobs within a one-half mile of the corridor.
- An effective market reach of 82 percent (over 59,000 persons and jobs with direct accessibility to/from the corridor, on a 10-minute walk via the street network).
- An average population and employment density of 10.3 persons/jobs per acre within the potential market area.
- A Transit Orientation Index (TOI) of 16.8, which ranks as the 93.2th percentile of all corridors evaluated (out of 43 total corridors).
- North-south travel connections and service to seven different analysis micro-zones, generating a potential market of about 7,200 daily person trips per mile of corridor, and comprising 31 percent of daily person traffic in the corridor.

Transit Network Duplication or Integration

In addition, implementing transit service in this corridor will open up an entire new corridor and market for Pace – along Westmore, Westmore/Meyers, Meyers, and Fairview, reaching new destinations such as the Fairview Metra station and retail destinations in St. Charles Road and Fairview Avenue, thus increasing the coverage of Pace's network. Transit service on York Street would however duplicate a portion of Route 322, and a portion of Route 313 along St. Charles Road between York Street and Villa Avenue.

Figure 26: Elmhurst Metra – Downers Grove/ Fairview Metra Alignment



Data Sources: CMAP, Pace, ESRI, State of Illinois

Field Observations

Field observations and run time checks were conducted on Wednesday March 30th, 2011, completing four one-way trips during the morning rush hour (between 7:00 and 9:00 a.m.), and three one-way trips in the afternoon (between 4:30 and 6:30 p.m.). The paragraphs below summarize observations and notes about the corridor with regards to signal wait times, areas of back-ups, areas of faster traffic, crosswalk locations, heavy pedestrian activity, major turning movements, and major vehicle and pedestrian destinations.

General Observations

Generally, vehicle traffic on the corridor moved smoothly. The majority of the time there was no congestion and traffic flowed at speeds near the posted speed limit. In the afternoon, there were some areas of congestion that made traffic move slower and below the speed limit, especially on St. Charles between Berkley Avenue and York Street.

The corridor had noticeably more traffic during the afternoon period. Again, with the exception of St. Charles, this did not seem to affect travel speeds, but the overall travel time of the corridor increased slightly. In the afternoon period, we observed more vehicle backups and experienced delays at multiple intersections with traffic signals, especially at St. Charles Road & Ardmore Avenue, and at Meyers Road & Butterfield Road, where it took two signal cycles to get through the intersection. In those cases, the right lane (or transit lane) was more backed up than the other lanes, and was the only lane experiencing the two signal cycle wait.

The higher traffic volumes during the afternoon period contributed to a slightly longer observed travel time, which increased observed travel times by 3 minutes per trip in the northbound direction and 2 minutes per trip in the southbound direction. Table 35 below discusses observed runtimes further.

Vehicle Traffic Observations

Traffic Speeds

In most cases, traffic moved slightly above the speed limit. There were several areas where traffic moved even faster (approximately 5 to 10 mph over speed limit), specifically in:

- Northbound Westmore, from Madison to St. Charles. In this case, the speed changes from 35 mph down to 30 mph, but traffic appeared to continue at 35 mph or above.
- Northbound Meyers, from 22nd Ave to Roosevelt. Again, this may be due to a change in posted speed limits from 40 to 35 mph. Most traffic continued to the light at Roosevelt at a higher speed.
- Northbound Fairview, from Ogden to 39th Avenue. Traffic moved at high speeds exiting the Ogden/Fairview intersection, possibly in part due to an increase in speed limit, from 35 to 40 mph that occurs at 39thAvenue.
- Southbound Fairview, from 39th Avenue to Ogden. Similarly, as the speed limit changes from 40 to 35 mph, much of the traffic continues to Ogden at 40 mph or faster.

Major Intersections

Table 34 provides a summary of the characteristics of intersections along this corridor, including presence of a signalized or stop controlled intersection, and the location of pedestrian crosswalks.

Table 34: Signal & Crosswalk Locations, Elmhurst Metra – Downers Grove/ Fairview Metra

	Traffic Signals		Crosswalks			
List of Intersections (from north to south)	Traffic Lights	Stop Sign Control	North	East	South	West
N. Palmer Drive	X		X	X	X	X
Schiller St/York St	X		X	X	X	
Schiller St/Palmer Dr	X		X	X	X	X
1st St/York St		X	X	X		X
1st St/ Palmer	N/A	N/A				
Park Ave/York St		X		X	X	X
Park Ave/ Palmer Dr	N/A	N/A				
Adelaide St/ York St		X	X	X	X	X
S. Palmer Drive	X		X	X	X	
Arthur St		X			X	X
St. Charles Rd/York St	X		X	X	X	X
Cottage Hill Ave	X*		X	X	X	X
Hagans Ave	X		X	X	X	X
N. Berkley Ave	X		X	X		
S. Berkley Ave						X
S. West Ave	X		X	X	X	X
Kingery Hwy (Route 83)	X		X			
Salt Creek Trail			X			
Villa Ave	X		X	X	X	X
Ardmore Ave	X		X	X	X	X
Addison Rd	X		X	X		X
Westmore Ave/St. Charles Rd	X		X	X	X	X
Great Western Trail	X (Flashing					
E. Maple St	Y		X	X	X	X
Illinois Prairie Path	X (Flashing					
Washington Blvd	X		X	X	X	X
Madison St	X		X	X	X	X
Jackson St/Lombard Cir	X		X	X	X	X
Wilson Rd	X		X	X	X	X
Highridge Rd	X		X	X	X	
Roosevelt Rd	X		X	X	X	X
14th St	X		X	X	X	X
16th St	X		X			X
Corporate Campus Entrance	X					
22nd St	X		X	X	X	X
Butterfield Rd	X					
31st	X			X		
35th	X			X	X	
39th	X					

	Traffic Signals		Crosswalks			
List of Intersections (from north to south)	Traffic Lights	Stop Sign Control	North	East	South	West
Ogden Ave	X				X	X
Lincoln Ave	X			X	X	X
Prairie Ave	X		X		X	X
Maple Ave	X		X	X	X	X
2nd St	X			X	X	
Train Tracks						

*Signal only used during school hours

Major Turning Movements

Based on field observations, it appeared that the amount of traffic turning off of the study corridor onto cross streets was equal to or greater than the through traffic movements, particularly at Kingery Highway, Roosevelt Road, 22nd Street, Butterfield Road, 31st Street, and Ogden Avenue. In many cases, the number of vehicles queued up to turn exceeded the turning lane length and backed up into through travel lanes. This was particularly problematic at the following intersections:

- Northbound Meyers – Left turn onto 22nd Avenue, in the afternoon
- Northbound Meyers – Right turn onto Roosevelt, in the afternoon
- Westbound St. Charles – Left turn onto Spring Road, in the afternoon
- Westbound St. Charles – Left turn onto Westmore
- Southbound Westmore – Left turn onto Roosevelt
- Northbound Meyers – Right turn onto Roosevelt
- Northbound Fairview – Left turn onto Ogden

Pedestrian Traffic Observations

There was little pedestrian traffic on the corridor, although the majority of the corridor has sidewalks. In the morning there were virtually no pedestrians, with the exception of the areas around the Elmhurst and Fairview Metra stations. In the afternoon, there was a noticeable increase in pedestrian activity, particularly in the following locations:

- St. Charles between Ardmore and Salt Creek – Along the commercial shopping corridor were numerous fast food options, with many teens and preteens on bicycles. Several jaywalking and bicycle crossings were observed, including at Admore, Harvard and Euclid.
- Fairview between Maple and Prairie – Adjacent Hummer Park was very heavily used. There was one jaywalking instance observed.

Land Use Observations

There are several major activity destinations directly on the corridor, which seem to contribute to the high volume of turning movements. The largest were the two train stations, around downtown Elmhurst, and the Jewel grocery store at St. Charles Road & Ardmore Avenue. Other major destinations include a collection of government and public facilities in the shopping center at the southeast corner of Westmore and Jackson, including the DuPage Health Center, a Driver's Licensing Facility, and an Illinois Employment Center.

Another major vehicular destination along the corridor is a corporate center at the northeast corner of Meyers and 22nd Avenue. The flow of cars into the campus was consistent throughout the morning rush and the parking lot was mostly full.

One major caveat is that as these observations were made during Spring Break, the impact of schools on traffic conditions was not observed. The following are locations where traffic may increase when school is in session:

- York Street at Arthur Street – Adjacent Hawthorne Elementary School with School Zone marked on York Street.
- St. Charles at Cottage Hill – Additional signal that may be used for pedestrians or buses coming to/from Hawthorne Elementary.
- St. Charles at Berkley – Adjacent to York High School.
- St. Charles at Wisconsin Avenue – Adjacent to school bus yard.
- Westmore at Madison – Adjacent to St. Pius School with School Zone marked on Westmore Avenue.

Table 35: Observed Running Times, Elmhurst Metra – Downers Grove/Fairview Metra

Elmhurst to Downers Grove SB

Segment		*Time*	*Miles*	*MPH*
1	York & 2nd to St Charles & Westmore	11:13	3.68	19.67
2	St Charles & Westmore to Meyers & Butterfield	09:08	3.40	22.34
3	Meyers & Butterfield to Fairview Ave Metra	07:51	3.31	25.34
	Subtotal	28:13	10.40	22.11
	27 stops @ 15 seconds each	0:06:45		
	One-way runtime	34:58		

Downers Grove to Elmhurst NB

Segment		*Time*	*Miles*	*MPH*
1	Fairview Ave Metra to Meyers & Butterfield	07:05	3.19	27.09
2	Meyers & Butterfield to St Charles & Westmore	09:50	3.37	20.55
3	St Charles & Westmore to York & 2nd	11:11	3.53	18.90
	Subtotal	28:06	10.09	21.54
	27 stops @ 15 seconds each	0:06:45		
	One-way runtime	34:51		

Route Total	*Time*	*Miles*	*MPH*
Roundtrip time	1:09:48	20.48	15.31
Layover @ 15%	0:10:28		
Cycle time	1:20:17		

Running Time Observations

As part of the field observations, we also conducted run time checks on the selected transit route in order to develop runtime estimates for transit service implementation. Based on roadway section characteristics, urban form, development density, street network grid, and land uses, the route can be divided into five discrete segments for its operation performance. These are indicated in Table 35 above, along with runtime observations and average speed.

In addition, Table 35 includes an estimate of delay for serving bus stops and a layover/recovery time estimate to better reflect a potential revenue service operation along the corridor. An average of 15 seconds per stop was assumed for estimating delay. This was based on our own experience measuring running time delays at stops in suburban environments similar to the I-355 corridor study area (e.g. arterial corridors such as Foothill Boulevard in San Bernardino County in California).

Transit Service Plan

In addition to bus stop delay, we added a 15 percent layover/recovery time to the observed running time to calculate the potential roundtrip cycle time for the route. The Elmhurst Metra – Downers Grove/Fairview Metra route came at 1 hour and 20 minutes or 80 minutes. In order to serve this route efficiently – with a clockface headway of 15 or 30 minutes, we propose a 2-mile extension of the route, in the southern terminus toward downtown Downers Grove, to get closer to a 90 minute cycle time. The route would proceed from the Fairview Avenue station to Downers Grove along Burlington Ave., Maple Ave., Mackie Pl., Curtiss St., and Washington St.   Figure 26 on page 94 shows the initial corridor alignment as well as the new proposed route alignment.

Potential stops have been proposed in 32 locations, typically at intersections that offer good access to penetrate residential neighborhoods and convenient access to major destinations, carefully balancing the number of pedestrian access opportunities with operational issues (i.e. transit speed and travel time). Selected stops and adjacent land uses are listed below in Table 36. Given that the proposed route alignment is 11.9 miles long, this results in an average distance between stops of 0.37 miles.

Table 36: Stop Locations, Elmhurst Metra – Downers Grove/ Fairview Metra

Stop #	Stop Location	Land Use Access
1	N York St & W Fremont Ave	Retail frontage; single family residential
2	N York St & North Ave	Retail frontage; single family residential
3	N York St & W 2nd St	Town center; office, retail and businesses; single family residential
4	S York St & Park Ave	Downtown Elmhurst; Metra station, retail and businesses
5	S York St & Arthur St	Wilder park, elementary school, office and retail, single family residential
6	S York St & St Charles Rd	Single family residential; church
7	W St Charles Rd & S Prospect Ave	Single family residential
8	W St Charles Rd & Berkley Ave	High school; single and multi family residential
9	E St Charles Rd & S West Ave	Big box retail; single and multi family residential
10	E St Charles Rd & N Villa Ave	Frontage retail; single and multi family residential
11	E St Charles Rd & S Ardmore Ave	Frontage retail; single family residential
12	W St Charles Rd & Harvard Ave	Frontage retail; single family residential

Stop #	Stop Location	Land Use Access
13	W St Charles Rd & S Westmore Rd	Frontage retail; single family residential
14	S Westmore Ave & E Maple St	Offices; single family residential
15	S Westmore Ave & E Washington Blvd	Churches; single family residential
16	S Westmore Ave & W Madison St	Churches; single family residential
17	S Westmore-Meyers Rd & Jackson St	Services; single family residential
18	S Westmore-Meyers Rd & E Wilson Rd	Single and multi family residential
19	S Meyers Rd & Roosevelt Rd	Frontage retail and single family residential
20	S Meyers Rd & 16th St	Knolls park; single family residential
21	S Meyers Rd & 22nd St	Office parks; Frontage retail; single family residential
22	S Meyers Rd & Butterfield Rd	Office parks
23	Fairview Ave & 39th St	Whitlock park; single family residential
24	Fairview Ave & Ogden Ave	Frontage retail; single and multi family residential
25	Fairview Ave & Grant St	Single family residential; elementary school
26	Fairview Ave & W Chicago Ave	Single family residential
27	Fairview Ave & Franklin St	Hummer park; single family residential
28	Fairview Ave & Burlington Ave	Fairview Metra; office and retail; light industrial; single family residential
29	Burlington Ave & Maple Ave	Single family and multi family residential
30	Mackie Pl & Curtiss St	Single family residential, village hall
31	Curtiss St & Washington St	Multi family residential; office and retail
32	Main St & Burlington Ave	Main St Metra; office and retail

Service Frequency Scenarios

We estimated costs and projected potential ridership for three frequency scenarios. The three scenarios have varying service frequencies, as follows:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively
- Scenario 2 – peak and off-peak frequency of 30 minutes
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively

The service hour span is proposed from 6:00 a.m. to 8:00 p.m., for a period of 14 hours. Service is proposed to operate on weekdays only and for 255 days in a year. Operating cost estimates for each scenario are presented in Table 37 below.

Based on an average cost per revenue hour of $100.91 (as indicated in PACE's 2009 NTD report for bus operations expenses), the cost of operating the Elmhurst Metra – Downers Grove/Fairview Metra route would range between $875,000 for Scenario 3 and $1.5 million for Scenario 1. Costs are subject to change pending final design details, and before any service could be considered for future implementation, a funding source would need to be identified.

Table 37: Service Operation Scenarios, Elmhurst Metra – Downers Grove/Fairview Metra

Service Operations Plan	Scenario 1	Scenario 2	Scenario 3
Suggested cycle time	90	90	90
Peak Frequency	15	30	30
Off Peak Frequency	30	30	60
Peak Buses	6	3	3
Off Peak Buses	3	3	2

Service Parameters	Scenario 1	Scenario 2	Scenario 3
Service Hour Span (from 6:00 am to 8:00 pm)	14	14	14
Peak Hours (6:00-9:00 am & 4:00 - 7:00 pm)	6	6	6
Off Peak Hours (9:00 am - 4:00 pm; 7:00 - 8:00 pm)	8	8	8
Peak Revenue Hours	36	18	18
Off Peak Revenue Hours	24	24	16
Daily Revenue Hours	60	42	34
Daily One-way trips	80	56	40
Peak Revenue Miles	492	246	246
Off Peak Revenue Miles	328	328	164
Daily Revenue Miles	819	574	410
Days of Service Annually	255	255	255
Annual Hours	15,300	10,710	8,670
Annual Miles	208,923	146,246	104,461
Cost per Hour	$100.91	$100.91	$100.91
Annual Cost	$1,543,923	$1,080,746	$874,890

Note: Cost per Hour is based on Pace's 2009 NTD profile for bus operations (operating expense per vehicle revenue hours).

Service Performance

Building upon ridership forecasts developed in Tech Memo #4 for all Tier 1 corridors, we refined estimates for the Elmhurst Metra – Downers Grove/Fairview Metra route to better account for proposed levels of service (i.e. frequency and number of trips), and physical characteristics of the corridor (mainly pedestrian accessibility conditions along the route). Table 38 below, shows estimated route ridership for each service scenario and potential service performance, summarized in four common performance indicators – cost per boarding, boardings per hour, boardings per mile, and farebox recovery.

Table 38 shows that the highest potential ridership would be achieved under Scenario 1 (15/30 service frequency) with 677 daily boardings, while the highest productivity will be achieved with Scenario 3 (30/60 service frequency) with over 14 passengers per revenue hour. However, the route's 90-minute cycle time will not work well with 60-minute frequencies during off-peak hours in Scenario 3, and will produce a very inefficient waste of revenue hours. In this regard, Scenario 2 makes more efficient use of service hours, at 30-minute frequency throughout the day, and also it achieves similar productivity and efficiency indicators as Scenario 3, with a potential productivity of over 13 passengers per revenue hour and a cost of $7.56 per boarding. At estimated 561 daily boardings, Scenario 2 is the preferred option for a potential service implementation.

Table 38: Estimated Route Performance, Elmhurst Metra – Downers Grove/Fairview Metra

Estimated Performance	Scenario 1	Scenario 2	Scenario 3
Estimated Daily Boardings	677	561	483
Cost per Boarding	$8.95	$7.56	$7.10
Boardings per Hour	11.3	13.3	14.2
Boardings per Mile	0.83	0.98	1.18
Farebox Recovery Ratio	13.1%	15.5%	16.5%

Productivity and efficiency figures in Scenario 1 are much lower than in Scenario 2, despite gains in ridership. The reason for this is that Scenario 1 would attract 116 additional riders (a 21% increase) while operating costs will increase by close to $0.5 million (a 43% increase). In other words additional riders will come at a much higher marginal cost than in Scenario 2. These figures tell us that there is not sufficient demand in the corridor today to justify levels of service above 30 minute frequency in the peak hours. They show the weakness of the market along the corridor, therefore significant increases in market size and demand will need to occur in the future to justify more frequent service in the corridor.

Transit Capital Plan

A draft capital improvement plan was also prepared for this route which includes improvements to stops, vehicles and sidewalks to connect with the market area around each stop. The goal is for transit service to have a strong physical presence in the community and along the corridor by placing fully developed stops, including posts, signs, schedules, landings pads and shelters. Table 39 below provides capital cost estimates for installing fully developed stops at all 32 stop locations (both sides of street). Estimates have been based on unit costs from a recent implementation in Pace's service area.

Table 39: Stop Improvement Costs, Elmhurst Metra – Downers Grove/ Fairview Metra

Stop Improvements	Material/ Labor Cost	Quantity	Projected Total Cost
Flag/Post/Schedule Holder	$50	64	$3,200
ADA 5' x 8' Pad	$5,000	64	$320,000
Shelter Pad	$10,750	64	$688,000
Shelter (8')	$6,000	64	$384,000
Subtotal			$1,395,200

In addition to stops, the operation of Elmhurst Metra – Downers Grove/Fairview Metra route will require buses for daily operation as well as spare vehicles. It has been assumed that Pace would buy these buses. Table 40 below shows non-annualized costs of vehicles for each service scenario. Scenario 1 would require capital costs of $1 million more than Scenario 2 to implement, due to the need for more vehicles during peak hours.

Table 40: Vehicle Costs, Elmhurst Metra – Downers Grove/ Fairview Metra

Vehicle Purchase Costs	Scenario 1	Scenario 2	Scenario 3
40 foot low-floor diesel buses @ $350,000 each (inc	$2,450,000	$1,400,000	$1,400,000

Table 41 below shows the cumulative cost of operating the route over a period of 12 years (the typical lifetime of a transit vehicle), Scenario 1 would cost $22 million in operating and capital costs, compared to $16 million for Scenario 2 and $13 million for Scenario 3. This translates into an annual cost of $1.8 million for Scenario 1, and $1.3 million and $1 million for Scenarios 2 and 3.

Table 41: Total 12-Year Costs, Elmhurst Metra – Downers Grove/ Fairview Metra

Total 12-Year Costs	Scenario 1	Scenario 2	Scenario 3
Operating Costs	$18,527,076	$12,968,953	$10,498,676
Stop Improvements Costs	$1,395,200	$1,395,200	$1,395,200
Vehicle Purchase Costs	$2,450,000	$1,400,000	$1,400,000
Total	$22,372,276	$15,764,153	$13,293,876
Annualized Costs	$1,864,356	$1,313,679	$1,107,823

Pedestrian Connection Improvements

As shown in the capital and operations plan above, it is a significant investment and a major financial commitment for Pace to start a new route. Therefore, minimum levels of market demand, operational conditions and pedestrian accessibility are needed before making such a commitment. A first step towards meeting a minimum level of pedestrian accessibility is to develop a pedestrian improvement plan that fills in gaps in the pedestrian network around potential bus stops, provides direct connections with destinations and building front doors, and the ability to safely cross the street to access bus stops.

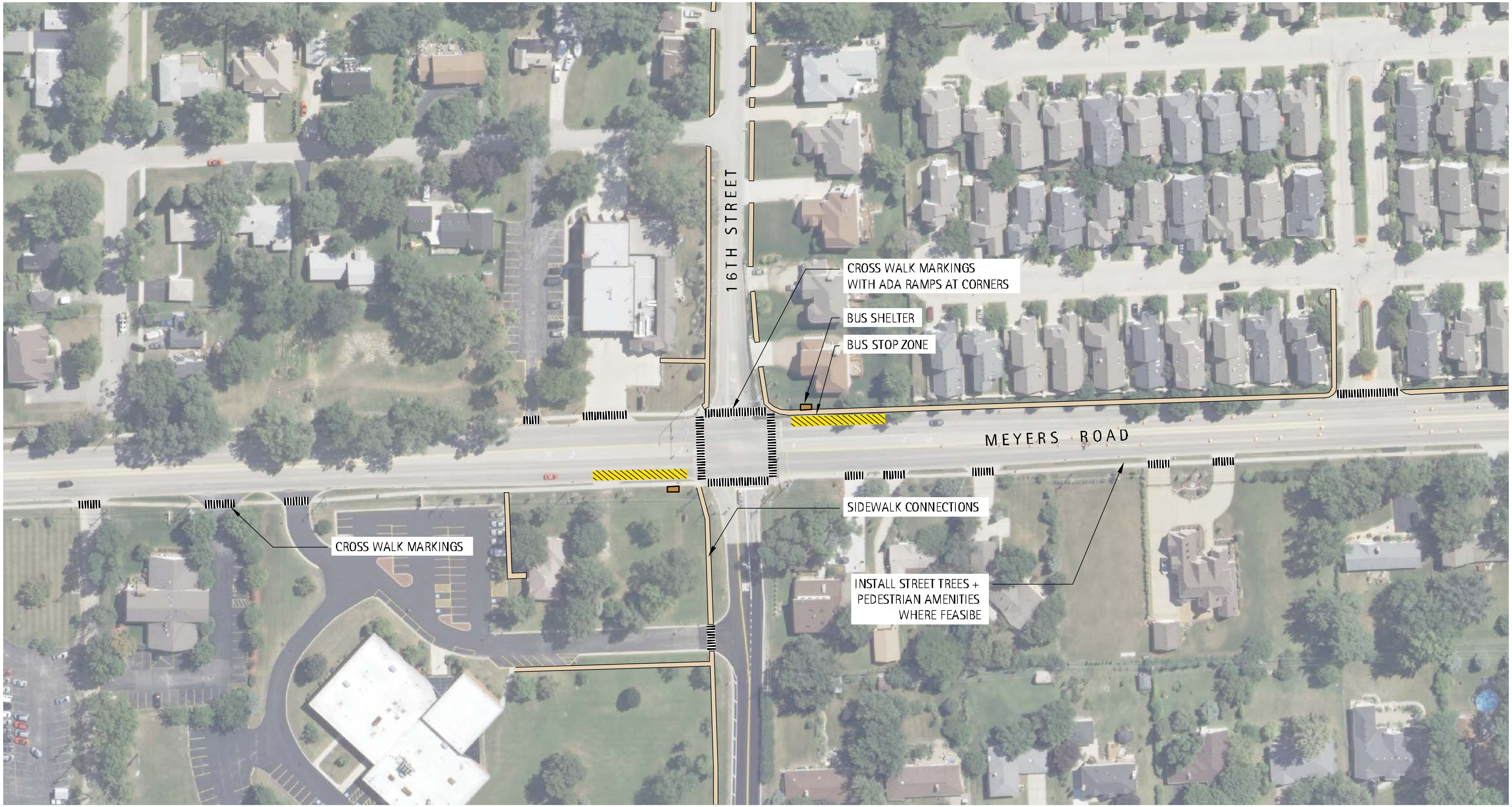
Based on field observations and analysis, we are recommending that Pace work with jurisdictions in the improvement of sidewalks, crosswalks and pedestrian connections with market areas and destinations along the route. Complete sidewalks, street crosswalks, and effective pedestrian connections will be a major incentive and enabler for people to use transit. Current conditions in the corridor show that there are many gaps in pedestrian connectivity and street design that will preclude potential users from using transit.

Two potential stops were selected along this corridor to develop a conceptual design of what improvements could look like. Conceptual designs are included in Figures 27 and 28. Locations were selected to represent different land use and street configuration conditions, as specified below:

- A low density single-family residential and multifamily residential environment – S Meyers Rd & 16th Street.
- A retail and light industrial environment with potential for infill development – Ogden Ave & Fairview Ave.

Conceptual designs at these locations generally include small interventions such as building sidewalks, marking crosswalks and creating safe corridor crossing for pedestrians. However, they show that with even small interventions, conditions for pedestrians and transit users could be improved significantly. The intervention at Ogden Ave and Fairview Ave includes a scenario where a key site is developed to improve the pedestrian environment.

Capital costs for pedestrian interventions at each of these locations have not been estimated. A comprehensive plan including all stops in the route is recommended to identify costs and mechanisms for implementation



Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

Meyers Road & 16th Street

August 3, 2011

Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

0' 50' 100'

Fairview Avenue & Ogden Avenue

August 3, 2011

4. Wheeling Metra – Schaumburg NWTC Corridor

A transit service implementation evaluation was also conducted on the Wheeling Metra – Schaumburg NWTC corridor, which included a definition of its route alignment and stops, overview of market characteristics, a field review, and a draft transit service operations and capital plan.

Route Alignment

We evaluated a transit corridor between the Wheeling Metra station and the Northwest Transportation Center in Schaumburg, that travels along Dundee Road, from the Metra station to IL-53, and then proceeds south on IL-53 toward Schaumburg. A future park-and-ride facility is planned in the southwest section of the interchange between Dundee Road & IL-53. The route would serve this facility and continue south on IL-53 before exiting at Algonquin Road, and serving the Schaumburg area along Thoreau Drive, Meacham Road, and Woodfield Road, ending at the Schaumburg Northwest Transportation Center (see Figure 29). The route alignment is 13.5 miles long.

Market Characteristics

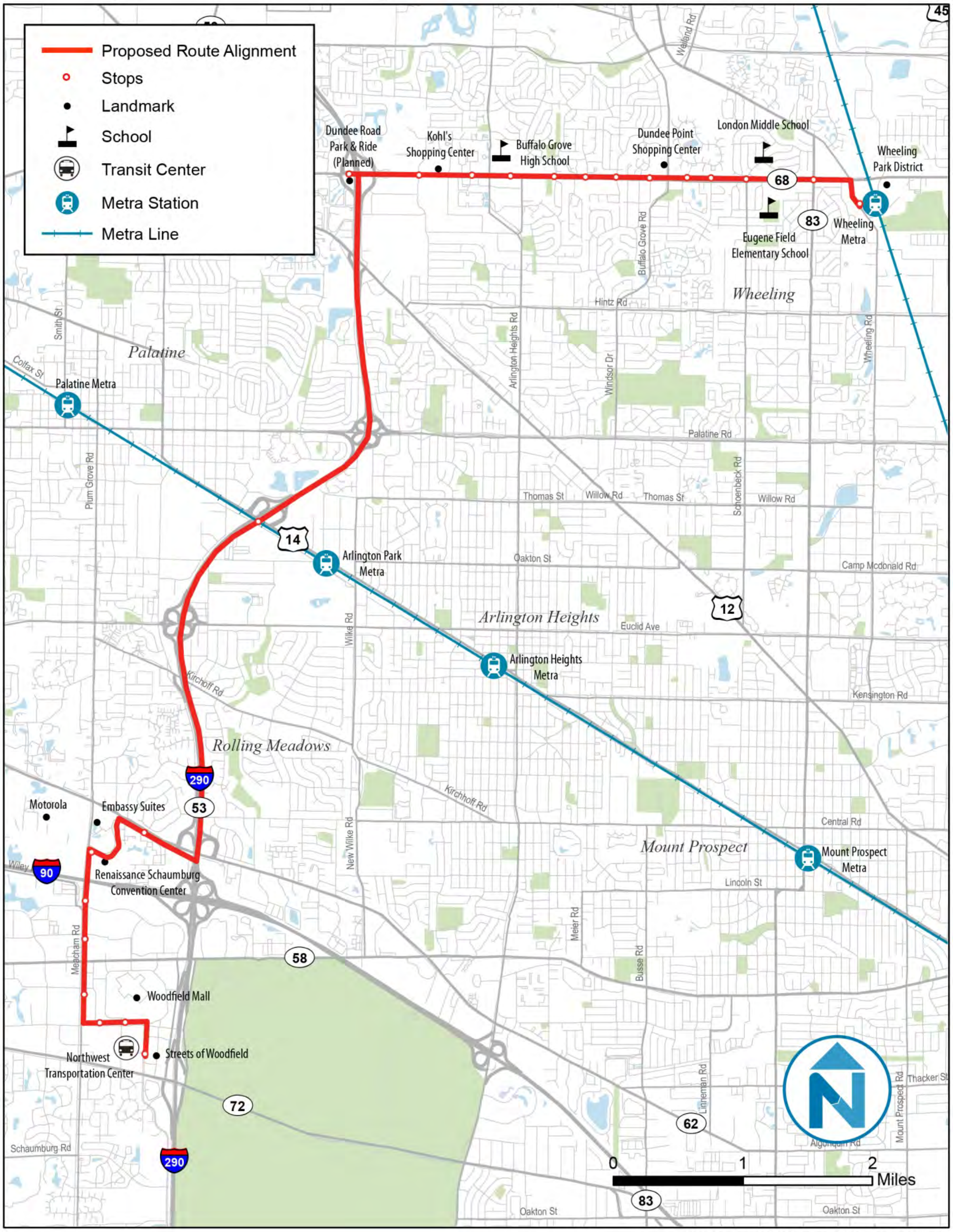
Corridor evaluation analysis conducted in Tech Memos # 3 and 4, show that major characteristics of the transit market along this route include:

- A potential accessibility to about 80,000 residents and jobs within a one-half mile of the corridor.
- An effective market reach of 58 percent (about 47,500 persons and jobs with direct accessibility to/from the corridor, on a 10-minute drive in the north end, and a 10-minute walk in the south end, via the existing street network).
- An average population and employment density of 14.1 persons/jobs per acre within the potential market area.
- A Transit Orientation Index (TOI) of 15.5, which ranks as the 86.2th percentile of all corridors evaluated (out of 43 corridors total).
- North-south travel connections and service to seven different analysis micro-zones, which generate a potential market of about 14,414 daily person trips per mile of corridor, and comprising 12 percent of daily person traffic in the corridor.

Transit Network Duplication or Integration

Implementing transit service in the north end of the I-355 corridor (IL-53) would open up a new market connection for Pace, reaching new residential destinations in Palatine and Buffalo Grove, and connecting them with employment and retail centers in Schaumburg. Thus increasing the coverage of Pace's network. The segment from Dundee Road to I-90, along IL-53, was previously served by Route 556 connecting the UPS Facility in Palatine with Elgin.

Figure 29: Wheeling Metra – Schaumburg NWTC Alignment



Data Sources: CMAP, Pace, ESRI, State of Illinois

Field Observations

Field observations and run time checks were conducted on Thursday, May 5, 2011, completing four one-way trips during the morning rush hour (between 7:00 and 9:00 a.m.), and four one-way trips in the afternoon (between 4:00 and 6:30 p.m.). The paragraphs below summarize observations and notes about the corridor with regards to signal wait times, areas of back-ups, areas of faster traffic, crosswalk locations, heavy pedestrian activity, major turning movements, and major vehicle and pedestrian destinations.

General Observations

Generally, the traffic within this route flowed without major backups. The one exception was Dundee Road, which encounters significant back-ups around the Wheeling Train Station when the roadway is blocked by railroad crossing signals. This was experienced during the second morning trip, and it created back-ups that extended past Elmhurst Road. On the third morning trip, these back-ups had extended almost to Buffalo Grove Road. A similar condition was noted at the beginning of the first afternoon trip, where traffic backed-up up past Northgate Parkway. This created difficult turning movements onto Dundee Road as traffic was still stuck in the intersection when the green light was given to Northgate traffic.

The next section of the route on Dundee Road moved freely. Most of the traffic moved at 40 mph, even though the posted speed limit is 35 mph. However, the signal timing appeared to be well synchronized with the speed limit and speeding vehicles often-encountered red lights, where traffic moving the speed limit was not delayed. This can be seen in the second afternoon trip where virtually no red lights were encountered between IL-53 and Northgate.

The Route 53 section moves as an expressway and experienced no delays. The posted speed limit is 55 mph, while most traffic moved 60-65 mph. During the southbound afternoon drives, there was some traffic backing up from the exits onto I-90, and the back-ups blocked the exit to Algonquin Road, creating a slight delay. This was observed during the first afternoon drive (at about 4:20 p.m.) and was clearing out by the third afternoon drive (at about 5:30 p.m.).

The Schaumburg section, including Algonquin Road, Meacham Road and Woodfield Drive, moved consistently. While more red lights were encountered in this segment, none of the delays were very long. Some differences were noted during the afternoon trips. The signal timing appeared to have changed, most likely to allow traffic to flush out of the larger corporate centers, causing more consistent and slightly longer delays at red lights, especially at Plaza Drive, American Lane, Thoreau Drive and Drummer Drive.

The higher traffic volumes during the afternoon period contributed to a slightly longer observed travel time in the southbound direction, which increased observed travel times by 5 minutes per trip. The afternoon trip in the northbound direction was on average 3 minutes longer than the morning trip. Table 43 below discusses observed travel times further.

Vehicle Traffic Observations

Traffic Speeds

In most locations, traffic moved at the speed limit, or within 5 mph of the speed limit. The only location in which vehicles were traveling dramatically above the speed limit was on IL-53 where traffic moved 5-10 mph over the speed limit.

Major Intersections

Based on field observations, Dundee Road appeared to carry significant traffic, and much of the cross-traffic seemed secondary to the through movements. In the Schaumburg section of the drive, where there are employment centers and shopping destinations distributed around the area, there did not appear to be one overriding direction of movement. However, Golf Road was by far the busiest roadway crossed. Table 42 provides a summary of the characteristics of intersections along this corridor, including presence of a signalized or stop controlled intersection, and the location of pedestrian crosswalks.

Table 42: Traffic Signal and Crosswalk Locations, Wheeling Metra – Schaumburg NWTC

	Traffic Signals		Crosswalks			
List of Intersections (from north to south)	Traffic Signals	Stop Sign Control	North	East	South	West
Dundee Road & Northgate Parkway	X		X	X	X	X
Dundee Road & Rail Crossing						
Dundee Rd & McHenry/Wheeling Rds	X			X	X	
Dundee Rd & Elmhurst Rd	X		X	X	X	X
Dundee Rd & Schoenbeck Rd/Armand Ln	X		X	X	X	X
Dundee Rd & Huntington Ln	X		X	X	X	
Dundee Rd & Buffalo Grove Rd	X		X	X	X	X
Dundee Rd & Golfview Terrace	X					
Dundee Rd & Weidner Rd	X		X	X	X	X
Dundee Rd & Buffalo Grove High School Entrance	X		X		X	X
Dundee Rd & Arlington Heights Rd	X		X	X	X	X
Dundee Rd & Ridge Ave	X		X		X	
Dundee Rd & Kennicott Ave	X		X		X	
Dundee Rd & Wilke Rd	X					
Dundee Rd & 53 Ramp (East)	X					
Algonquin Rd & 53 Ramp (East)	X					
Algonquin Rd & 53 Ramp (West)	X					
Algonquin Rd & Frontage Rd	X					
Algonquin Rd & Thorntree Ln/Thoreau Dr	X		X	X		
Algonquin Rd & Meacham Rd	X				X	
Meacham Rd & Drummer Dr/Motorola North	X			X	X	X
Meacham Rd & Thoreau Dr/Motorola South	X		X	X		
Meacham Rd & Tower Rd	X			X	X	
Meacham Rd & Remington Rd	X		X	X	X	X
Meacham Rd & Golf Rd	X		X	X	X	X
Meacham Rd & American Ln	X		X	X	X	X
Meacham Rd & Woodfield Rd	X		X	X	X	X
Woodfield Rd & Plaza Dr	X		X	X	X	X
Woodfield Rd & Mall Dr	X		X	X	X	X
Mall Dr & Kimberly Dr		X		X		X

Major Turning Movements

- Westbound Algonquin Road – Left turns onto Meacham Road
- Northbound Route 53 – Significant exits onto Dundee Road with the majority turning right at the signal at Dundee and the Route 53 ramp.
- Southbound Meacham Road – Right turns onto Tower Road, especially in the morning, presumably to access offices/businesses to the west.
- Northbound Meacham Road – Left turns onto Algonquin Road in the afternoon.
- Eastbound Dundee Road – Left turns onto Buffalo Grove Road in the afternoon.
- Northbound and Southbound Meacham Road – Both Left and Right turns onto Golf Road

Pedestrian Traffic Observations

There were very few pedestrians noted along this route. Some occasional bicyclists and pedestrians were observed along Dundee Road and Meacham Road. Generally there are sidewalks along the route, with the obvious exception of IL-53. There were some jaywalking incidents noted on Dundee Road, potentially due to the lack of marked crosswalks at several of the intersections. It was also observed that the crosswalk markings on Dundee are worn and faded and are hard to see in some locations.

Land Use Observations

The land uses vary greatly along the route, but there are several destinations of note that may benefit from additional bus access:

- Wheeling Metra Train Station
- Wheeling Park District and Aquatic Center
- London Middle School in Wheeling
- Eugene Field Elementary School
- Large shopping center at the northwest corner of Dundee and Buffalo Grove Roads
- Buffalo Grove High School
- Kohl's Shopping Center at the northeast corner of Dundee Road and Ridge Avenue
- New business park (currently vacant) at the northeast corner of Dundee and Wilke Roads
- Motorola Campus off Meacham Road
- Office and Hotel Campus at Meacham Road and Drummer Drive
- Renaissance Schaumburg Convention Center
- Shopping and employment centers throughout Schaumburg, particularly at:
  - Meacham and Tower Roads
  - Meacham and Golf Roads
  - Meacham Road and American Lane
  - Woodfield Road and Plaza Drive
- Woodfield Mall

Running Time Observations

Field observations also included run time checks on the selected transit route in order to develop runtime estimates for a potential transit service implementation. Based on roadway section characteristics, urban form, development density, street network grid, and land uses, the route can be divided into three discrete segments for its operation performance. These are indicated in Table 43 below, along with runtime observations and average speed.

Table 43: Observed Running Times by Segment, Wheeling Metra – Schaumburg NWTC

Wheeling to Schaumburg SB

Segment		*Time*	*Miles*	*MPH*
1	Wheeling Metra to Dundee & Kennicott	10:36	3.71	20.98
2	Dundee & Kennicott to Radisson Hotel Schaumburg	09:45	7.08	43.53
3	Radisson Hotel Schaumburg to NWTC	08:36	2.83	19.74
	Subtotal	28:57	13.61	28.21
	19 stops @ 15 seconds each	0:04:45		
	One-way runtime	33:42		

Schaumburg to Wheeling NB

Segment		*Time*	*Miles*	*MPH*
1	NWTC to Radisson Hotel Schaumburg	08:16	2.76	20.05
2	Radisson Hotel Schaumburg to Dundee & Kennicott	10:27	7.02	40.36
3	Dundee & Kennicott to Wheeling Metra	10:16	3.70	21.60
	Subtotal	28:58	13.48	27.92
	19 stops @ 15 seconds each	0:04:45		
	One-way runtime	33:43		

Route Total	*Time*	*Miles*	*MPH*
Roundtrip time	1:07:26	27.10	20.97
Layover @ 15%	0:10:07		
Cycle time	1:17:32		

Table 43 also includes an estimate of delay for serving bus stops and a layover/recovery time estimate to better reflect a potential revenue service operation along the corridor. An average of 15 seconds per stop was assumed for estimating delay. This was based on our own experience measuring running time delays at stops in suburban environments similar to the I-355 corridor study area (e.g. arterial corridors such as Foothill Boulevard in San Bernardino County in California).

Transit Service Plan

In addition to bus stop delay, we added a 15 percent layover/recovery time to the observed running time to calculate the potential roundtrip cycle time for the route. The estimated time for the Wheeling Metra to Schaumburg NWTC trip would be approximately 1 hour and 17 minutes, including layover time.

In order to serve this route efficiently with a clockface headway, we propose a 90-minute cycle time. Figure 29 on page 108 shows the proposed route alignment along with the initial corridor. Potential stops have been proposed in 21 locations, typically at intersections that offer good access to penetrate residential neighborhoods and convenient access to major destinations, carefully balancing the number of pedestrian access opportunities with operational issues (i.e. transit speed and travel time). Selected stops and adjacent land uses are listed below in Table 44. Given that the proposed route alignment is 13.5 miles long, this results in an average distance between stops of 0.69 miles.

Table 44: Stop Locations, Wheeling Metra – Schaumburg NWTC

Stop #	Stop Location	Land Use Access
1	Dundee Rd & Northgate Parkway (Wheeling Metra)	Frontage retail, business park and services
2	Dundee Rd & Elmurst Rd	Frontage retail; single and multi family residential
3	Dundee Rd & N Schoenbeck Rd	Single family residential; schools; frontage
4	Dundee Rd & Cambridge Dr	Single family residential; frontage
5	Dundee Rd & Huntington Ln	Multi family, frontage and big box retail
6	Dundee Rd & Old Buffalo Grove Rd	Big box and frontage retail; multi and single family residential
7	Dundee Rd & Golf View Terrace	Big box and frontage retail; multi and single family residential
8	Dundee Rd & Vernon Ln	Frontage retail; single and multi family residential
9	Dundee Rd & Weidner Rd	Frontage retail; single and multi family residential; Bison Park
10	Dundee Rd & Buffalo Grove High School	School; frontage and big box retail; multi and single family res
11	Dundee Rd & Grove Dr	Big box retail and mutlifamily residential
12	Dundee Rd & N Kennicott Ave	Big box retail and business parks
13	Dundee Rd & IL-53 Park & Ride	Planned park & ride
14	E Algonquin Rd & Radisson Hotel Schaumburg	Frontage retail, business park and single family residential
15	N Meacham Rd & Drummer Dr	Business parks (Motorola)
16	N Meacham Rd & Tower Rd	Frontage retail; big box retail; business parks
17	N Meacham Rd & Remington Rd	Big box retail; business parks
18	N Meacham Rd & American Ln	Big box retail; business parks
19	E Woodfield Rd & Plaza Dr	Business parks
20	E Woodfield Rd & Mall Dr	Business parks and Woodfield Mall
21	Kimberly Dr & Schaumburg NWTC	Business parks, frontage retail, big box retail

Service Frequency Scenarios

We estimated costs and projected potential ridership for three standard service scenarios. The three scenarios have varying service frequencies, as follows:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively
- Scenario 2 – peak and off-peak frequency of 30 minutes
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively

The service hour span is proposed from 6:00 a.m. to 8:00 p.m., for a period of 14 hours. Service is proposed to operate on weekdays only and for 255 days in a year. Operating cost estimates for each scenario are presented in Table 45 below.

Based on an average cost per revenue hour of $100.91 (as indicated in PACE's 2009 NTD report for bus operations expenses), the cost of operating the Wheeling Metra – Schaumburg NWTC route would range between $1.5 million for Scenario 1 and $875,000 for Scenario 3. Costs are subject to change pending final design details, and before any service could be considered for future implementation, a funding source would need to be identified.

Table 45: Service Operation Scenarios and Costs, Wheeling Metra – Schaumburg NWTC

Service Operations Plan	Scenario 1	Scenario 2	Scenario 3
Suggested cycle time	90	90	90
Peak Frequency	15	30	30
Off Peak Frequency	30	30	60
Peak Buses	6	3	3
Off Peak Buses	3	3	2

Service Parameters	Scenario 1	Scenario 2	Scenario 3
Service Hour Span (from 6:00 am to 8:00 pm)	14	14	14
Peak Hours (6:00-9:00 am & 4:00 - 7:00 pm)	6	6	6
Off Peak Hours (9:00 am - 4:00 pm; 7:00 - 8:00 pm)	8	8	8
Peak Revenue Hours	36	18	18
Off Peak Revenue Hours	24	24	16
Daily Revenue Hours	60	42	34
Daily One-way trips	80	56	40
Peak Revenue Miles	650	325	325
Off Peak Revenue Miles	434	434	217
Daily Revenue Miles	1,084	759	542
Days of Service Annually	255	255	255
Annual Hours	15,300	10,710	8,670
Annual Miles	276,373	193,461	138,187
Cost per Hour	$100.91	$100.91	$100.91
Annual Cost	$1,543,923	$1,080,746	$874,890

Note: Cost per Hour is based on Pace's 2009 NTD profile for bus operations (operating expense per vehicle revenue hours).

Service Performance

Building upon ridership forecasts developed in Tech Memo #4 for all Tier 1 corridors, we refined estimates for the Wheeling Metra – Schaumburg NWTC corridor to better account for proposed levels of service (i.e. frequency and number of trips), and physical characteristics of the corridor (mainly pedestrian accessibility conditions along the route). Table 46 below shows estimated route ridership for each service scenario and potential service performance, summarized in four common performance indicators – cost per boarding, boardings per hour, boardings per mile, and farebox recovery.

Table 46: Estimated Route Performance, Wheeling Metra – Schaumburg NWTC

Estimated Performance	Scenario 1	Scenario 2	Scenario 3
Estimated Daily Boardings	570	472	407
Cost per Boarding	$10.62	$8.97	$8.42
Boardings per Hour	9.5	11.2	12.0
Boardings per Mile	0.53	0.62	0.75
Farebox Recovery Ratio	11.0%	13.0%	13.9%

Table 46 shows that the highest potential ridership would be achieved under Scenario 1 (15-minute frequency) with 570 daily boardings, while the highest productivity will be achieved with Scenario 3 (30-minute frequency) with over 12 passengers per revenue hour. However, the route's 90-minute cycle time will not work well with 60-minute frequencies during off-peak hours in Scenario 3, and will produce a very inefficient waste of revenue hours. In this regard, Scenario 2 makes more efficient use of service hours, at 30-minute frequency throughout the day, and it also achieves similar productivity and efficiency indicators as Scenario 3, with a potential productivity of 11 passengers per revenue hour and a cost of $8.97 per boarding (compared to $8.42 in Scenario 3). At estimated 472 daily boardings, Scenario 2 is the preferred option for a potential service implementation.

Productivity and efficiency figures in Scenario 1 are much lower than in Scenario 3, despite gains in ridership. The reason for this is that Scenario 1 would attract 160 additional riders (a 40% increase) while operating costs will duplicate and increase by 100 percent. In other words additional riders in Scenario 1 will come at a much higher marginal cost than in Scenario 2. These figures suggest that there is not sufficient demand in the corridor today to justify levels of service above 30 minute frequency throughout the day.

Transit Capital Plan

A draft capital improvement plan was also prepared for this route which includes improvements to stops, vehicles and sidewalks to connect with the market area around each stop. The goal is for transit service to have a strong physical presence in the community and along the corridor by placing fully developed stops, including posts, signs, schedules, landings pads and shelters.

Table 47 below provides capital cost estimates for installing fully developed stops at all 21 stop locations (both sides of street). Estimates have been based on unit costs from a recent implementation in Pace's service area.

Table 47: Stop Improvement Costs, Wheeling Metra – Schaumburg NWTC

Stop Improvements	Material/ Labor Cost	Quantity	Projected Total Cost
Flag/Post/Schedule Holder	$50	42	$2,100
ADA 5' x 8' Pad	$5,000	42	$210,000
Shelter Pad	$10,750	42	$451,500
Shelter (8')	$6,000	42	$252,000
Subtotal			$915,600

In addition to stops, the operation of the Wheeling Metra – Schaumburg NWTC route will require buses for daily operation and as well as spare vehicles. It has been assumed that Pace would buy these buses. Table 48 below shows non-annualized costs of vehicles for each service scenario.

Scenario 1 would require capital costs of $1 million more than Scenario 3 to implement, because of the higher number of vehicles required during the peak period.

Table 48: Vehicle Costs by Service Scenario, Wheeling Metra – Schaumburg NWTC

Vehicle Purchase Costs	Scenario 1	Scenario 2	Scenario 3
40 foot low-floor diesel buses @ $350,000 each (incl. spares	$2,450,000	$1,400,000	$1,400,000

Table 49 below shows the cumulative cost of operating the route over a period of 12 years (the typical lifetime of a transit vehicle). Scenario 1 would cost $22 million in operating and capital costs, compared to $13 million for Scenario 3, a difference of about $800,000 annually.

Table 49: Total 12-Year Operating and Capital Costs, Wheeling Metra – Schaumburg NWTC

Total 12-Year Costs	Scenario 1	Scenario 2	Scenario 3
Operating Costs	$18,527,076	$12,968,953	$10,498,676
Stop Improvements Costs	$915,600	$915,600	$915,600
Vehicle Purchase Costs	$2,450,000	$1,400,000	$1,400,000
Total	$21,892,676	$15,284,553	$12,814,276
Annualized Costs	$1,824,390	$1,273,713	$1,067,856

Pedestrian Connection Improvements

It is a significant investment and a major financial commitment for Pace to start a new route. Therefore, minimum levels of market demand, operational conditions and pedestrian accessibility are needed before making such a commitment. A first step towards meeting a minimum level of pedestrian accessibility is to develop a pedestrian improvement plan that fills in gaps in the pedestrian network around potential bus stops, provides direct connections with destinations and building front doors, and the ability to safely cross the street to access bus stops. For these reasons, we are recommending that Pace work with jurisdictions in the improvement of sidewalks, crosswalks and pedestrian connections with market areas and destinations along the route. Current conditions in the corridor show that there are many gaps in pedestrian connectivity and street design that will preclude potential users from using transit.

Three potential stops were selected along this corridor to develop a conceptual design of what improvements could look like. Conceptual designs are shown in Figures 30 through 32. Locations were selected to represent different land use and street configuration conditions, as specified below:

- A corporate/office park environment with moderate connectivity – N Meacham Rd & Drummer Drive.
- A corporate/office park environment with a challenging mid-block crossing on a major road – N Meacham Rd & American Lane.
- An expressway station prototype that provides direct accessibility to express service on the expressway from a major arterial road – IL-53 & W Northwest Highway.

Conceptual designs at these locations include small interventions such as building sidewalks, marking crosswalks and creating safe corridor crossing for pedestrians. However, they show that with even small interventions, conditions for pedestrians and transit users could be improved significantly.

Capital costs for pedestrian interventions at each of these locations have not been estimated. A comprehensive plan including all stops in the route is recommended to identify costs and mechanisms for implementation.

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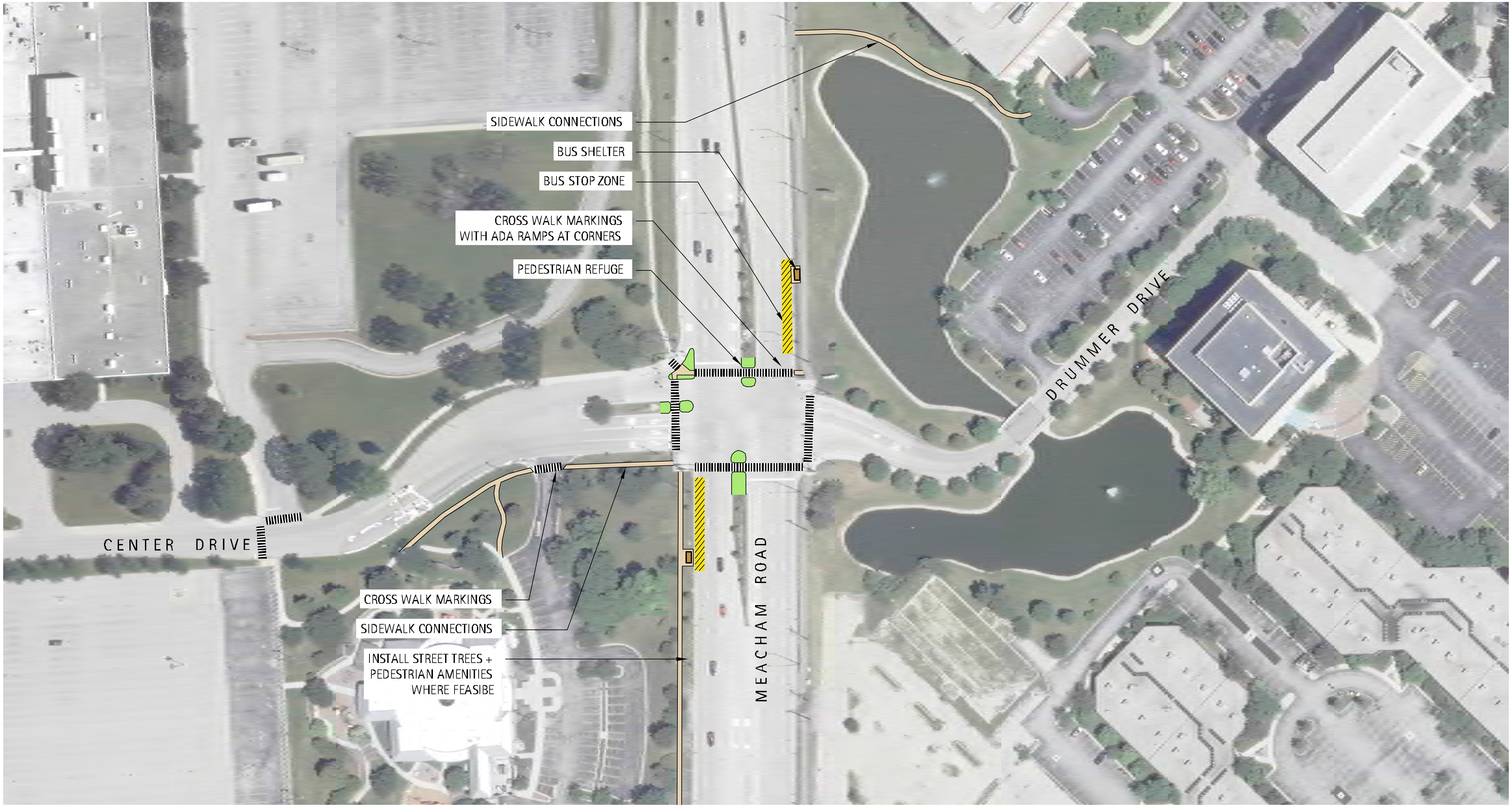

Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

Meacham Road & Center Drive

August 3, 2011

Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
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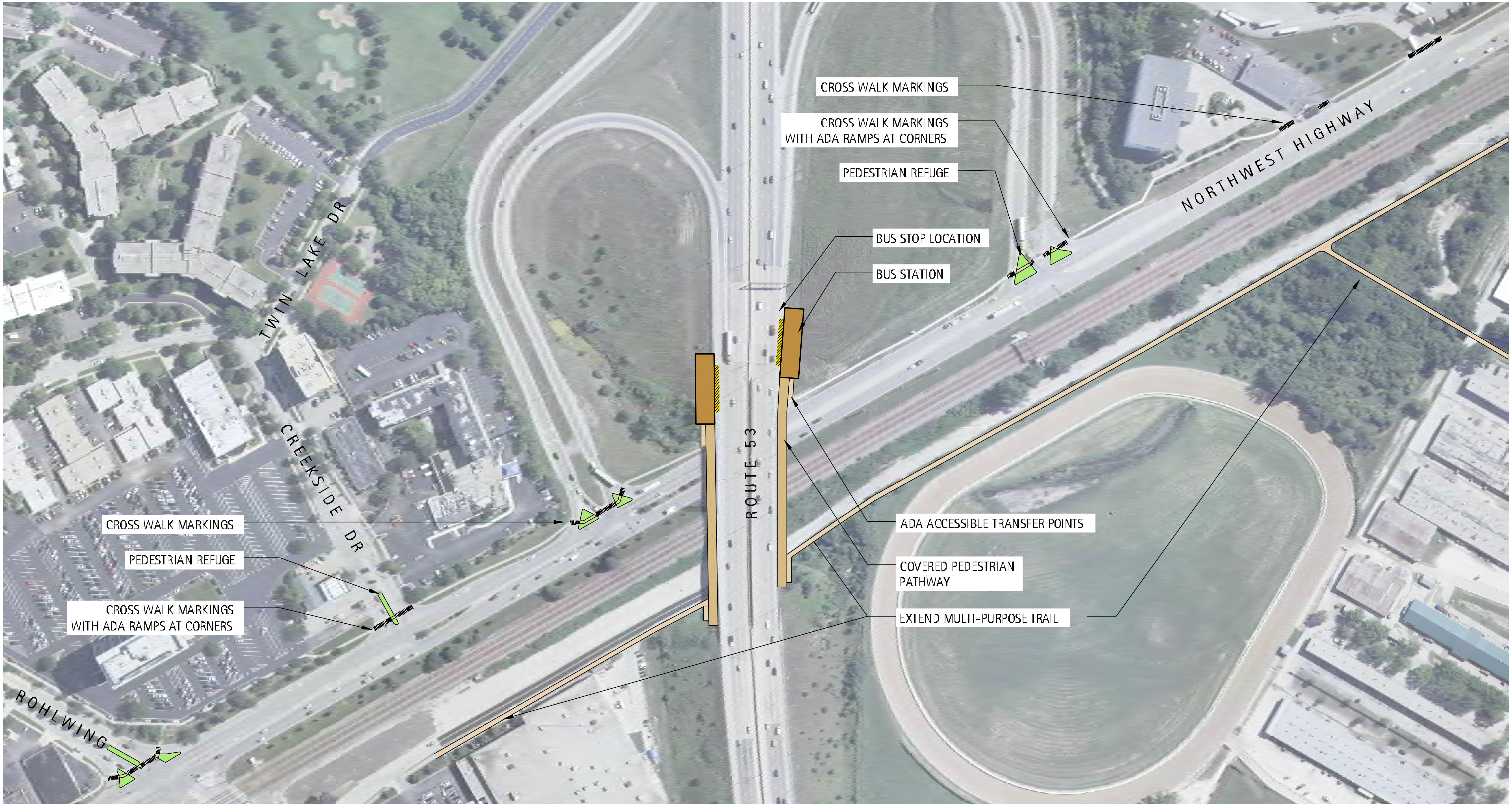
Meacham Road & Woodfield Road

August 3, 2011



Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

0' 100' 200'

Route 53 & Northwest Highway

August 3, 2011

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5. Roselle Metra – Wheaton Metra

A transit service implementation evaluation was conducted on the Roselle Metra – Wheaton Metra corridor, which included a definition of its route alignment and stops, overview of market characteristics, a field review, and a draft transit service operations and capital plan.

Route Alignment

The selected route begins at the Roselle Metra station on E Irving Park Road and E Maple Avenue. From there it travels west on Maple Avenue towards N Bloomingdale Road. It turns south on Bloomingdale Road and continues for about 6.5 miles until Geneva Road, crossing major east-west corridors on its way, such as Lake Street, Army Trail Road, North Avenue, and St. Charles. The route turns west on Geneva Road and continues for 2 miles toward Gary Avenue. It turns south on Gary Avenue and continues toward downtown Wheaton and the Wheaton Metra station via Gary, Harrison Avenue, and West Street. From downtown Wheaton the route continues south on West Street, turning west on Roosevelt Road, and then north on County Farm Road ending at Du Page County's Judicial Center (see Figure 33). The total length of this route alignment is 13.6 miles.

Market Characteristics

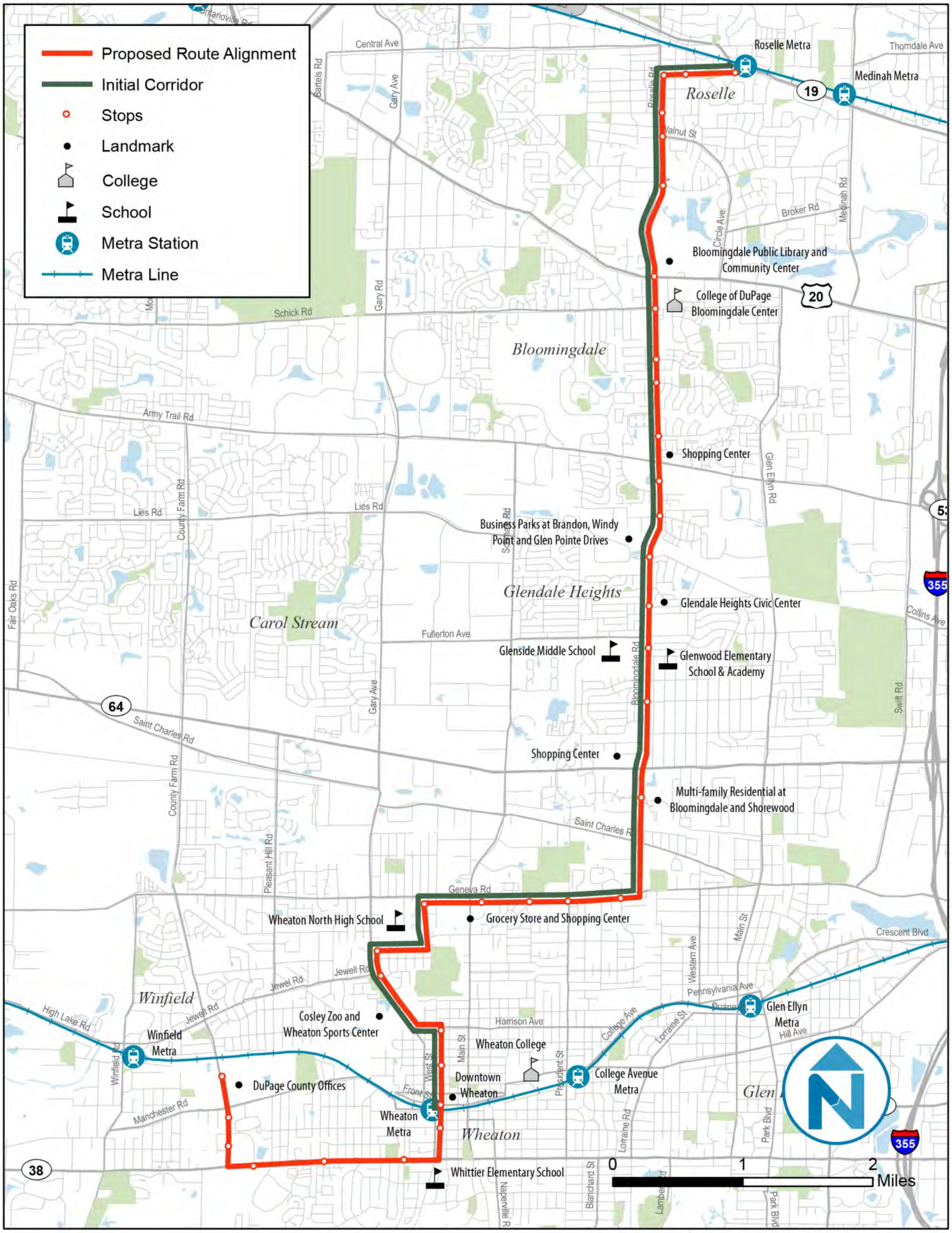
Corridor evaluation analysis conducted Tech Memos # 3 and 4, show that major characteristics of the transit market along this route include:

- A potential accessibility to about 71,500 residents and jobs within a one-half mile of the corridor.
- An effective market reach of 79 percent (over 55,000 persons and jobs with direct accessibility to/from the corridor, on a 10-minute walk via the street network).
- An average population and employment density of 9.7 persons/jobs per acre within the potential market area.
- A Transit Orientation Index (TOI) of 16.2, which ranks as the 90.1th percentile of all corridors evaluated (out of 43 corridors total).
- North-south travel connections and service to three different analysis micro-zones, which generate a potential market of about 5,900 daily person trips per mile of corridor, and comprising 23 percent of daily person traffic in the corridor.

Transit Network Duplication or Integration

In addition, implementing transit service in this corridor will open up a new corridor and market for Pace, reaching new destinations such as the Roselle Metra station and new corridors on Bloomingdale Road and Geneva Road, thus increasing the coverage of Pace's network. The segment from Wheaton Metra to Du Page County's Judicial Center would duplicate service on Route 711 along Roosevelt Road.

Figure 33: Roselle Metra – Wheaton Metra Alignment



Data Sources: CMAP, Pace, ESRI, State of Illinois

Field Observations

Field observations and run time checks were conducted on Thursday, April 28, 2011 and Tuesday, May 2, 2011, completing four one-way trips during the morning rush hour (between 7:00 and 9:00 a.m.), and four one-way trips in the afternoon (between 4:30 and 6:30 p.m.). The paragraphs below summarize observations and notes about the corridor with regards to signal wait times, areas of back-ups, areas of faster traffic, crosswalk locations, heavy pedestrian activity, major turning movements, and major vehicle and pedestrian destinations.

General Observations

Generally, the traffic within this route flowed very well without major backups. Similar to the Elmhurst to Downers Grove route, this route uses mostly north/south corridors that were not congested during the observation, but crosses busier east/west corridors. There were only a few areas of traffic congestion, as noted below.

Traffic slowed slightly on Bloomingdale Road between North and Fullerton Avenues in the morning. There are two school zones in this area and right turns into the schools generated an impact on traffic flow speeds. Additionally, on Bloomingdale Road between Lake Street and Fairfield Way, some congestion was noted in the afternoon. There are several activity generators between Schick Road and Fairfield Way, especially on the east side of the street. Those destinations, combined with the relatively close signal spacing between Schick and Lake, created some congestion.

Another area of slight congestion was southbound on Gary Avenue approaching Prairie Avenue. The Wheaton Sports Center is accessible from Prairie and seems to draw vehicles both in the morning and afternoon. However, the afternoon traffic appeared heavier during the observation, with right-turning vehicles causing slowdowns for southbound traffic all the way to Jewell Road. Additionally, vehicles waiting to make a left-hand turn from Prairie onto northbound Gary were observed stacked up and waiting at the unsignalized intersection.

The higher traffic volumes during the afternoon period contributed to a slightly longer observed travel time during the afternoon period in the northbound direction by 2½ minutes, and yet a shorter travel time in the afternoon in the southbound direction (by 4½ minutes). Table 51 below discusses travel time observations further.

Vehicle Traffic Observations

Traffic Speeds

In most cases, traffic moved at the speed limit, or within 5 mph of the speed limit. A few locations were noted where traffic consistently moved faster than the speed limit:

- Bloomingdale Road, between Bryn Mawr Avenue and Lake Street. The speed limit on this section of road is 35 mph but much of the traffic, especially northbound traffic coming out of a 40 mph zone, moves noticeably faster than the posted speed limit.
- Similarly on Geneva Road from Bloomingdale Road to just west of President Street, the speed limit is 35 mph, but increases to 40 mph to the west. Much of the eastbound traffic and some of the westbound moved at 40 mph or faster.

Table 50: Traffic Signal and Crosswalk Locations, Roselle Metra – Wheaton Metra

	Traffic Signals		Crosswalks			
List of Intersections (from north to south)	Traffic Signals	Stop Sign Control	North	East	South	West
Irving Park Rd & Maple Ave	X			X		X
Maple Ave & Roselle Rd	X		X	X	X	X
Roselle Rd & Bryn Mawr Ave	X				X	X
Bloomingdale Rd & Lake St	X		X	X	X	X
Bloomingdale Rd & Schick Rd	X		X	X	X	X
Bloomingdale Rd & Fairfield Way/Founders Pointe Dr	X		X	X	X	X
Bloomingdale Rd & Edgewater Dr	X			X	X	
Bloomingdale Rd & Greenway Dr	X		X	X	X	X
Bloomingdale Rd & Army Trail Rd	X		X	X	X	X
Bloomingdale Rd & Brandon Dr	X					
Bloomingdale Rd & Windy Point Dr/Glen Pointe Dr	X			X		X
Bloomingdale Rd & Stevenson Dr	X					
Bloomingdale Rd & Fullerton Ave	X			X		X
Bloomingdale Rd & Park Entrance	X					
Bloomingdale Rd & Armitage Ave	X					X
Bloomingdale Rd & Sidney Ave	X					
Bloomingdale Rd & North Ave	X					
Bloomingdale Rd & Shorewood Dr	X		X	X	X	X
Bloomingdale Rd & St. Charles Rd	X		X	X	X	X
Bloomingdale Rd & Geneva Rd	X		X			
Geneva Rd & President St	X		X		X	X
Geneva Rd & Main St	X		X	X	X	X
Geneva Rd & Geneva Plaza Entrance	X					X
Geneva Rd & Morse St	X		X	X	X	X
Geneva Rd & Gary Ave	X					
Gary Ave & Thomas Rd	X				X	
Gary Ave & Jewell Rd	X		X		X	X
Gary Ave & Harrison Ave & Ellis Ave		X				
Harrison Ave & West St		X				
West St & Union Ave		X	X	X	X	X
West St & Wesley St		X	X	X	X	X
West St & Front St	X		X	X	X	X
West St & Railroad Crossing						
West St & Liberty Dr				X	X	X

Major Intersections

As noted previously, the route taken seemed to follow secondary north/south roads that crossed primary east/west roads such as Lake Street, Army Trail Road and North Avenue. Table 50 above provides a summary of the characteristics of intersections along this corridor, including presence of a signalized or stop controlled intersection, and the location of pedestrian crosswalks.

Major Turning Movements

- Southbound Bloomingdale – Heavy left turns onto eastbound Lake Street at both times of day. In the morning, left turns created back-ups past the length of the dedicated turn lane.
- Southbound Bloomingdale – Left and right turns onto Army Trail Road in the morning.
- Southbound Bloomingdale – Heavy left turns onto eastbound North Avenue in the morning, creating back-ups past the length of the dedicated left-hand turn lane.
- Southbound Bloomingdale – More left than right turns onto Geneva Road.
- Northbound Bloomingdale – Right turns onto eastbound North Avenue in the morning and afternoon.
- Northbound Bloomingdale – Heavy right and many left turns onto Lake in the morning. In the afternoon, both turning movements were significant, but there were more left turns.
- Northbound Bloomingdale – Heavy left turns onto Schick in the afternoon, creating back-ups past the length of the dedicated turn lane.
- Westbound Geneva – Many right turns onto northbound Main Street in the morning.
- Westbound Geneva – Many left turns onto southbound President Street in the morning.
- Eastbound Geneva – Several right turns into the Jewel Grocery parking lot

Pedestrian Traffic Observations

There were some pedestrians noted along this route. While very few pedestrians were observed around the Roselle Metra, there were pedestrians visible at both times of day around the Wheaton Metra station. Generally along the route, pedestrian traffic was much higher in the afternoon. People were seen crossing Bloomingdale several times at Fullerton. This may be attributed to the many civic and recreational uses in the area, including the Glendale Heights Park & Recreation Center just to the east of the intersection, the Glenside Library and a large park just to the west of the intersection.

As mentioned previously, there is another collection of activity generators on Bloomingdale between Schick and Fairfield. This includes the Bloomingdale Public Library, the Bloomingdale Community Center and the College of DuPage Regional Center. Some pedestrian activity was noted in the afternoon in this area. During the afternoon, the sports fields of Wheaton North High School, on the south side of Geneva Road just east of Gary, were busy with team practices. While there were no pedestrians noted along the road while the practices were in session, it could be assumed that before or after practices, there are pedestrians using the corridor. Also during the afternoon, there were active uses observed in Pine Park on Maple Avenue in Roselle, with some pedestrians and bicyclists in the area.

Sidewalks were noted throughout the corridor, with two notable areas lacking adequate pedestrian facilities. At the intersection of Bloomingdale Road and E North Ave there are no crosswalks despite a busy road intersection. At Gary Avenue sidewalks are inconsistent despite the presence of the

Cosley Zoo and the Wheaton Sports Center. Along Gary Avenue, there are inconsistent sidewalks between Geneva Road and Jewell, and virtually no sidewalks from Jewell to Harrison.

Off the corridor, it should be noted that poor sidewalk connections were observed from Bloomingdale Road to the business parks at Brandon, Windy Point and Glen Pointe Drives. This cluster of employment centers appeared to be in a good location to capitalize on bus service along the corridor, but lacked connections to make it function successfully. It should also be noted that many of the crosswalk markings are worn or faded, especially on Bloomingdale Road between North Avenue and Lake Street.

Land Use Observations

The land uses vary greatly along the route, but there are several destinations of note that may benefit from additional bus access:

- Roselle Metra Station
- Pine Park in Roselle
- College of DuPage Regional Center
- Bloomingdale Public Library and Community Center
- Shopping Centers at the Bloomingdale and Army Trail intersection
- Business Parks at Brandon, Windy Point and Glen Pointe Drives
- Glendale Heights Parks and Recreation at Bloomingdale and Fullerton
- Glenwood Elementary School & Academy
- Shopping Center at southwest corner of Bloomingdale and North
- Medium density residential at the intersection of Bloomingdale and Shorewood
- Dominicks and Jewel grocery stores around the intersection of Geneva and Main
- Wheaton North High School near the southeast corner of Geneva and Gary
- The Cosley Zoo on Gary
- The Wheaton Sports Center on Prairie, just east of Gary
- Downtown Wheaton
- Wheaton Metra Station

Running Time Observations

As part of the field observations, we also conducted run time checks on the selected transit route in order to develop runtime estimates for transit service implementation. Based on roadway section characteristics, urban form, development density, street network grid, and land uses, the route can be divided into three discrete segments for its operation performance. These are indicated in Table 51 below, along with runtime observations and average speed.

Table 51 also includes an estimate of delay for serving bus stops and a layover/recovery time estimate to better reflect a potential revenue service operation along the corridor. An average of 15 seconds per stop was assumed for estimating delay. This was based on our own experience measuring running time delays at stops in suburban environments similar to the I-355 corridor study area (e.g. arterial corridors such as Foothill Boulevard in San Bernardino County in California).

Table 51: Observed Running Times by Segment, Roselle Metra – Wheaton Metra

		Time	Miles	MPH
Wheaton to Roselle NB				
Segment		*Time*	*Miles*	*MPH*
1	Wheaton Metra to Geneva & Glencoe	08:43	3.80	26.16
2	Geneva & Glencoe to The Home Depot	07:21	3.31	27.07
3	The Home Depot to Roselle Metra	09:45	3.76	23.15
	Subtotal	25:49	10.88	25.28
	27 stops @ 15 seconds each	0:06:45		
	One-way runtime	32:34		
Roselle to Wheaton SB				
Segment		*Time*	*Miles*	*MPH*
1	Roselle Metra to The Home Depot	09:46	3.75	23.02
2	The Home Depot to Geneva & Glencoe	06:54	3.28	28.53
3	Geneva & Glencoe to Wheaton Metra	10:19	3.81	22.15
	Subtotal	27:00	10.84	24.09
	27 stops @ 15 seconds each	0:06:45		
	One-way runtime	33:45		
Route Total		*Time*	*Miles*	*MPH*
	Roundtrip time	1:06:18	21.72	17.09
	Layover @ 15%	0:09:57		
	Cycle time	1:16:15		

Transit Service Plan

In addition to bus stop delay, we added a 15 percent layover/recovery time to the observed running time to calculate the potential roundtrip cycle time for the route. The Roselle Metra – Wheaton Metra route came at 1 hour and 16 minutes or 76 minutes. In order to serve this route efficiently with a clockface headway, we propose extending the southern end of the corridor to get closer to a 90 minute cycle time. The extended alignment is proposed to travel from the Wheaton Metra station to the DuPage County offices via West Street, Roosevelt Road, and County Farm Road. Figure 33 on page 124 shows the initial corridor alignment as well as the new proposed route alignment. The 2.8 mile extension would allow service to efficiently operate headways of 15 or 30 minutes.

Potential stops have been proposed in 35 locations, typically at intersections that offer good access to penetrate residential neighborhoods and convenient access to major destinations, carefully balancing the number of pedestrian access opportunities with operational issues (i.e. transit speed and travel time). Selected stops and adjacent land uses are listed below in

Table 52. Given that the proposed route alignment is 13.6 miles long, this results in an average distance between stops of 0.39 miles.

Table 52: Stop Locations, Roselle Metra – Wheaton Metra

Stop #	Stop Location	Land Use Access
1	E Irving Park Rd & E Ardmore Ave	Roselle Metra; frontage retail and services; single family residential
2	E Maple Ave & S Park St	Library and shopping; school; park; single family residential
3	E Maple Ave & Co Rd 4	Single family residential
4	Co Rd 4 & W Bryn Mawr Ave	Single family residential; community center
5	Co Rd 4 & E Walnut St	Single family residential
6	N Bloomingdale Rd & Foster Ave	Low density single family residential; forest preserve
7	N Bloomingdale Rd & W Lake St	Downtown Bloomingdale; frontage retail and services; single family residential
8	S Bloomingdale Rd & Schick Rd	Frontage retail; single and multi family residential
9	S Bloomingdale Rd & E Fairfield Way	Frontage retail; single family residential; library
10	S Bloomingdale Rd & Edgewater Dr	Single family residential
11	S Bloomingdale Rd & Greenway Dr	Big box and frontage retail; multi family residential
12	Bloomingdale Rd & Home Depot parking access	Big box and frontage retail; multi family residential
13	Bloomingdale Rd & N Brandon Dr	Light industrial; retail frontage; single family residential
14	Bloomingdale Rd & Windy Point Dr	Warehouse industrial; single family residential
15	Bloomingdale Rd & E Wrightwood Ave	Single family residential; frontage retail
16	Bloomingdale Rd & Marilyn Ave	Schools; single family residential
17	Bloomingdale Rd & Armitage Ave	Single family residential
18	Bloomingdale Rd & Shorewood Dr	Multi family residential; big box and frontage retail
19	Geneva Rd & Glencoe St	Multi family residential
20	Geneva Rd & S President St	Multi family residential; frontage retail
21	E Geneva Rd & Driving Park Rd	Single family residential; churches
22	E Geneva Rd & retail parking access east of N Main St	Big box and frontage retail; multi family residential
23	W Geneva Rd & Papworth St	Schools; single family residential
24	Thomas Rd & Farwell St	High school; single family residential
25	N Gary Ave & Jewell Rd	Single and multi family residential
26	W Harrison Ave & N West St	Single family residential
27	N West St & W Franklin Ave	Single family residential; elementary school
28	S West St & W Front St	Downtown Wheaton; services and retail; Metra station
29	S West St & W Illinois St	Church; single family and multi family housing
30	W Roosevelt Rd & S Carlton Ave	Frontage retail; multi family housing
31	W Roosevelt Rd & Timber Trail	Single family residential
32	W Roosevelt Rd & entrance to Target	Big box and frontage retail; multi family residential
33	S County Farm Rd & entrance to Kohl's	Office; medical center
34	S County Farm Rd & entrance to Wynscape	
35	N County Farm Rd & entrance to DuPage County Campus	Government offices

Service Frequency Scenarios

We estimated costs and projected potential ridership for three frequency scenarios. The three scenarios have varying service frequencies, as follows:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively
- Scenario 2 – peak and off-peak frequency of 30 minutes
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively

The route's service hour span is proposed from 6:00 a.m. to 8:00 p.m., for a period of 14 hours. Service is proposed to operate on weekdays only and for 255 days in a year. Resulting operating cost estimates for each service frequency scenario are presented in Table 53 below.

Table 53: Service Operation Scenarios and Costs, Roselle Metra – Wheaton Metra

Service Operations Plan	Scenario 1	Scenario 2	Scenario 3
Suggested cycle time	90	90	90
Peak Frequency	15	30	30
Off Peak Frequency	30	30	60
Peak Buses	6	3	3
Off Peak Buses	3	3	2

Service Parameters	Scenario 1	Scenario 2	Scenario 3
Service Hour Span (from 6:00 am to 8:00 pm)	14	14	14
Peak Hours (6:00-9:00 am & 4:00 - 7:00 pm)	6	6	6
Off Peak Hours (9:00 am - 4:00 pm; 7:00 - 8:0	8	8	8
Peak Revenue Hours	36	18	18
Off Peak Revenue Hours	24	24	16
Daily Revenue Hours	60	42	34
Daily One-way trips	80	56	40
Peak Revenue Miles	521	261	261
Off Peak Revenue Miles	347	347	174
Daily Revenue Miles	869	608	434
Days of Service Annually	255	255	255
Annual Hours	15,300	10,710	8,670
Annual Miles	221,514	155,060	110,757
Cost per Hour	$100.91	$100.91	$100.91
Annual Cost	$1,543,923	$1,080,746	$874,890

Note: Cost per Hour is based on Pace's 2009 NTD profile for bus operations (operating expense per vehicle revenue hours).

Based on an average cost per revenue hour of $100.91 (as indicated in PACE's 2009 NTD report for bus operations expenses), the cost of operating the Roselle Metra – Wheaton Metra route would range between $875,000 for Scenario 3, $1 million for Scenario 2 and $1.5 million for Scenario 1. Costs are subject to change pending final design details, and before any service could be considered for future implementation, a funding source would need to be identified.

Service Performance

Building upon ridership forecasts developed in Tech Memo #4 for all Tier 1 corridors, we refined estimates for the Roselle Metra – Wheaton Metra corridor to better account for proposed levels of service (i.e. frequency and number of trips), and physical characteristics of the corridor (mainly pedestrian accessibility conditions along the route). Table 54 below shows estimated route ridership for each service scenario and potential service performance, summarized in four common performance indicators – cost per boarding, boardings per hour, boardings per mile, and farebox recovery.

Table 54: Estimated Route Performance, Roselle Metra – Wheaton Metra

Estimated Performance	Scenario 1	Scenario 2	Scenario 3
Estimated Daily Boardings	695	576	497
Cost per Boarding	$8.71	$7.36	$6.91
Boardings per Hour	11.6	13.7	14.6
Boardings per Mile	0.80	0.95	1.14
Farebox Recovery Ratio	13.4%	15.9%	16.9%

Table 54 shows that the highest potential ridership would be achieved under Scenario 1 (15/30 service frequency) with close to 700 daily boardings, while the highest productivity will be achieved with Scenario 3 (30/60 service frequency) with close to 15 passengers per revenue hour. However, the route's 90-minute cycle time will not work well with 60-minute frequencies during off-peak hours in Scenario 3, and will produce a very inefficient waste of revenue hours. In this regard, Scenario 2 makes more efficient use of service hours, at 30-minute frequency throughout the day, and also it achieves similar productivity and efficiency indicators as Scenario 3, with a potential productivity close to 14 passengers per revenue hour and a cost of $7.36 per boarding (an additional cost per boarding of only $0.45). At estimated 576 daily boardings, Scenario 2 is the preferred scenario for service implementation.

Productivity and efficiency figures in Scenario 1 are much lower than in Scenario 2, despite gains in ridership. The reason for this is that Scenario 1 would attract 119 additional riders (a 21% increase) while operating costs will increase by close to $0.5 million (a 43% increase). In other words additional riders will come at a much higher marginal cost than in Scenario 2. These figures show that there is not sufficient demand in the corridor today to justify levels of service above 30 minute frequency in the peak hours. They show the weakness of the market along the corridor, therefore significant increases in market size and demand will need to occur in the future to justify more frequent service in the corridor.

Transit Capital Plan

A draft capital improvement plan was also prepared for this route which includes improvements to stops, vehicles and sidewalks to connect with the market area around each stop. The goal is for transit service to have a strong physical presence in the community and along the corridor by placing fully developed stops, including posts, signs, schedules, landings pads and shelters.

Table 55 below provides capital cost estimates for installing fully developed stops at all 35 stop locations (both sides of street). Estimates have been based on unit costs from a recent implementation in Pace's service area.

Table 55: Stop Improvement Costs, Roselle Metra – Wheaton Metra

Stop Improvements	Material/ Labor Cost	Quantity	Projected Total Cost
Flag/Post/Schedule Holder	$50	70	$3,500
ADA 5' x 8' Pad	$5,000	70	$350,000
Shelter Pad	$10,750	70	$752,500
Shelter (8')	$6,000	70	$420,000
Subtotal			$1,526,000

In addition to stops, the operation of the Roselle Metra – Wheaton Metra route will require buses for daily operation as well as spare vehicles. It has been assumed that Pace would buy these buses. Table 56 below shows non-annualized costs of vehicles for each service scenario. Scenario 1 would require capital costs of about $1 million more than Scenario 2 to implement, due to the need to duplicate vehicles in service during the peak period.

Table 56: Vehicle Costs by Service Scenario, Roselle Metra – Wheaton Metra

Vehicle Purchase Costs	Scenario 1	Scenario 2	Scenario 3
40 foot low-floor diesel buses @ $350,000 ea	$2,450,000	$1,400,000	$1,400,000

Table 57 shows the cumulative cost of operating the route over a period of 12 years (the typical lifetime of a transit vehicle). Scenario 1 would be about $22.5 million, compared to $15.9 million for Scenario 2 and $13.4 million for Scenario 3. On an annual basis, this translates into a cost of $1.8 million for Scenario 1 or $750,000 more than Scenario 2.

Table 57: Total 12-Year Costs, Roselle Metra – Wheaton Metra

Total 12-Year Costs	Scenario 1	Scenario 2	Scenario 3
Operating Costs	$18,527,076	$12,968,953	$10,498,676
Stop Improvements Costs	$1,526,000	$1,526,000	$1,526,000
Vehicle Purchase Costs	$2,450,000	$1,400,000	$1,400,000
Total	$22,503,076	$15,894,953	$13,424,676
Annualized Costs	$1,875,256	$1,324,579	$1,118,723

Pedestrian Connection Improvements

As shown in the capital and operations plan above, it is a significant investment and a major financial commitment for Pace to start a new route. Therefore, minimum levels of market demand, operational conditions and pedestrian accessibility are needed before making such a commitment. A first step towards meeting a minimum level of pedestrian accessibility is to develop a pedestrian improvement plan that fills in gaps in the pedestrian network around potential bus stops, provides direct connections with destinations and building front doors, and the ability to safely cross the street to access bus stops. For these reasons, we are recommending that Pace work with jurisdictions in the improvement of sidewalks, crosswalks and pedestrian connections with market areas and destinations along the route. Current conditions in the corridor show that there are many gaps in pedestrian connectivity and street design that will preclude potential users from using transit.

6. Hoffman Estates – Elk Grove Village

A transit service implementation evaluation was conducted on the Hoffman Estates – Elk Grove Village corridor, which included a definition of its route alignment and stops, overview of market characteristics, a field review, and a draft transit service operations and capital plan.

Route Alignment

Originally, we evaluated a transit corridor alignment that follows W Higgins Road, going through the Busse Woods, and then Busse Road, starting at Hoffman Estates and ending in Elk Grove Village (see Figure 28). The analyses of potential transit routes along this corridor lead us to modifying it to avoid the Busse Woods and instead follow a route via the I-355 Corridor and Biesterfield Road, to connect employment and retail destinations in Schaumburg with residential areas in Elk Grove Village. The proposed alignment is shown in Figure 28 below, and has a length of 14 miles.

Market Characteristics

Corridor evaluation analysis conducted in Tech Memos # 3 and 4, show that major characteristics of the transit market along this route include:

- A potential accessibility to 90,000 residents and jobs within one-half mile of the corridor.
- An effective market reach of 80 percent (resulting in over 71,500 persons and jobs with direct accessibility to/from the corridor, on a 10-minute walk via the street network).
- An average population and employment density of 11.1 persons/jobs per acre within the potential market area.
- A Transit Orientation Index (TOI) of 14.9, which ranks in the 83rd percentile of all corridors evaluated.
- East-west travel connections within the study area, and service to five different analysis micro-zones, which generate a potential market of about 11,400 daily person trips per mile of corridor, comprising 56 percent of daily person traffic in the corridor.

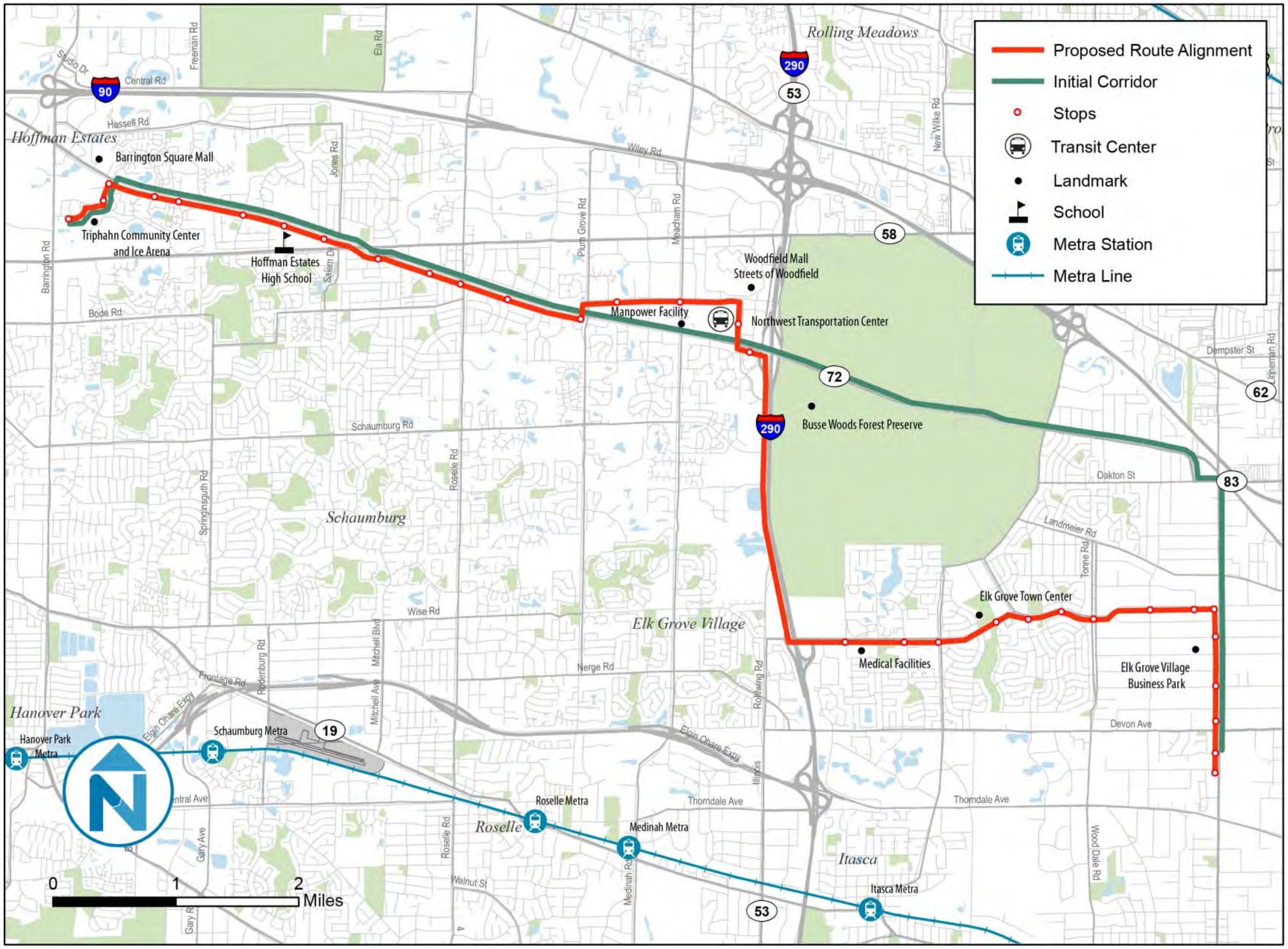
Transit Network Duplication or Integration

Implementing transit service in this corridor would open up a new corridor and market for Pace, reaching destinations such as the Alexian Brothers Hospital in Hoffman Estates, and industrial park subdivisions in Elk Grove Village, thus increasing the coverage of Pace's network. The route alignment would duplicate a small portion of Route 757 on Busse Road.

Field Observations

Field observations and run time checks were conducted on Thursday, May 5, 2011 and Tuesday, May 9, 2011, completing two one-way trips during the morning rush hour (between 7:00 and 9:00 a.m.), and three one-way trips in the afternoon (between 4:30 and 6:30 p.m.). The paragraphs below summarize observations and notes about the corridor with regards to signal wait times, areas of back-ups, areas of faster traffic, crosswalk locations, heavy pedestrian activity, major turning movements, and major vehicle and pedestrian destinations.

Figure 34: Hoffman Estates – Elk Grove Village Alignment



Data Sources: CMAP, Pace, ESRI, State of Illinois

General Observations

While the majority of the route had unimpeded traffic flow, some areas showed heavy congestion or back-ups. Higgins Road around the interchange for Interstate 290 (I-355 Corridor) and the entrances to the Woodfield Shopping Center was heavily congested, particularly during the evening rush hour. There are multiple signalized intersections between E Frontage Road and Meacham Road, along with heavy turning movements onto Interstate 290, which seems to generate traffic congestion. Westbound Higgins Road, at the Moon Lake Boulevard intersection, was also observed to experience heavy congestion during the evening rush hour, particularly in the left turn lane onto Moon Lake Boulevard.

The higher traffic volumes during the afternoon period contributed to a slightly longer observed travel time, which increased observed travel times by 2 minutes per trip in the eastbound and westbound direction. Table 59 below presents observed running times in more detail.

Vehicle Traffic Observations

Traffic Speeds

In most cases, traffic moved at the speed limit, or within 5 mph. Vehicles were travelling significantly above the speed limit along Higgins Road, from Arlington Heights Road to East Frontage Road. In this stretch, the speed limit is 45 mph, with the majority of vehicles traveling at 5-10 mph over. This area has no signalized intersections and minimal cross-streets due to the Busse Woods Forest Preserve flanking the roadway on the north and south.

Along Higgins Road between Salem Drive and Moon Lake Blvd vehicles were slowed due to variable speed limits and turning movements. The speed limit varies between 35 and 50 mph in this zone, but many cars were observed moving slower in the right lane, as the roadway has multiple connections to residential neighborhoods. Many vehicles along this stretch were making right turn movements onto cross-streets at non-signalized intersections, particularly during the evening rush hour.

Major Intersections

Based on field observations, it appeared that the east-west corridors of Devon Avenue, Oakton Street, and Golf Road were the major arterial corridors along the route. The major north-south corridors included: Interstate 290, Arlington Heights Road, Meacham Road, Roselle and Golf Roads. Table 58 provides a summary of the characteristics of intersections along this corridor, including presence of a signalized or stop controlled intersection, and the location of pedestrian crosswalks.

Table 58: Traffic Signal and Crosswalk Locations, Hoffman Estates – Elk Grove Village

	Traffic Signals		Crosswalks			
List of Intersections (from north to south)	Traffic Signals	Stop Sign Control	North	East	South	West
Devon Ave/Busse Road	X			X		X
Pratt Blvd	X					
Greenleaf Avenue	X					X
Landmeier Road	X		X	X	X	X
Oakton St/Busse Road	X		X			X
OaktonSt/Higgins Road	X					
Lively Blvd/Higgins Road	X		X			X
Stanley Road-King Street			X			
Arlington Heights Road	X			X	X	
East Frontage Road	X			X		
West Frontage Road	X					
Martingale Road	X		X	X		
Mall Drive	X		X			
Meacham Road	X		X		X	
National Parkway	X					
Plum Grove Road	X				X	X
Ash Road	X					
Roselle Road	X		X	X	X	
Grand Canyon Parkway	X			X	X	X
Spring Mill Drive	X		X	X	X	X
Golf Road	X		X	X	X	X
Salem Drive	X		X	X	X	X
Gannon Court	X			X	X	X
Huntington Blvd	X		X		X	X
Moon Lake Blvd - Governors Lane/Higgins Road	X		X	X	X	X
Moon Lake Blvd/ AB Campus Drive		X (Exiting)				
AB Campus Intersection 1		X				

Major Turning Movements

- Northbound Busse Road: Left turn onto Oakton Street
- Southbound Busse Road: Left turn onto Landmeier Road
- Southbound Busse Road: Left and Right turns onto Devon Avenue
- Eastbound Higgins Road: Left turn onto Golf Road
- Westbound Golf Road: Left turn onto Higgins Road
- Westbound Higgins Road: Left turn onto Meacham Road

Pedestrian Traffic Observations

Few pedestrians were observed throughout this route. However, there was an increased amount of pedestrians observed along the Busse Woods corridor due to the amount of walking and biking trails available at that facility. Several users, on foot and bike, were observed at the E Frontage Road intersection using the crosswalks to move from the north to south. The following pedestrian issues were observed along the route:

- Sidewalks are present along Busse Road on both the east and west sides, but gaps are present.
- The north side of Higgins Road from Oakton Street to Arlington Heights Road has fairly consistent sidewalk connections, while the south side has limited or no sidewalks.
- Busse Woods Forest Preserve has no perimeter sidewalk network alongside Higgins Road.
- West Frontage Road to Roselle Road – North side of Higgins has a fairly consistent sidewalk network in particular around the Woodfield Shopping Center area, while the south side has limited or broken connections. In areas further west, towards Roselle Road, residential neighborhoods back up to Higgins Road and have very deep setbacks, but no sidewalks are present on either side of the roadway.
- Roselle Road to Moon Lake Boulevard has a fairly consistent sidewalk network, with limited gaps on the north side. The south side of Higgins has more noticeable gaps adjacent to the residential areas. Connections into commercial centers are present, but the setbacks off of Higgins are deep and cause the centers to appear disconnected from the roadway.

Land Use Observations

The majority of the route is abutted by commercial, office, industrial parks; residential (single-multi-family) and institutional land uses, including a regional retail center. The major destinations that could benefit from a linked bus route include:

- Woodfield Shopping Center/Streets of Woodfield
- East Woodfield Square
- One Schaumburg Place Shopping Center
- Barrington Square Mall Shopping Center
- Manpower Facility at Meacham/Higgins Road
- Strip shopping centers at Higgins/Arlington Heights Road
- Strip shopping centers along Higgins (west of Meacham Road)
- Hoffman Estates High School
- Alexian Brothers Behavioral Health Hospital and adjacent health care facilities
- Busse Woods Forest Preserve
- Hoffman Estates Community Center and Ice Arena
- Industrial businesses along Busse Road
- Business parks along Higgins Road (east of Arlington Heights Road)
- Commercial center between Golf and Roselle along Higgins Road
- Residential neighborhoods along Higgins

Running Time Observations

As part of the field observations, we also conducted run time checks on the selected transit route in order to develop runtime estimates for transit service implementation. Based on roadway section characteristics, urban form, development density, street network grid, and land uses, the route can be divided into five discrete segments for its operation performance. These are indicated in Table 59 above, along with runtime observations and average speed.

Also, Table 59 includes an estimate of delay for serving bus stops and a layover/recovery time estimate to better reflect a potential revenue service operation along the corridor. An average of 15 seconds per stop was assumed for estimating delay. This was based on our own experience measuring running time delays at stops in suburban environments similar to the I-355 corridor study area (e.g. arterial corridors such as Foothill Boulevard in San Bernardino County in California).

Table 59: Observed Running Times by Segment, Hoffman Estates – Elk Grove Village

		Time	Miles	MPH
Hoffman Estates to Elk Grove Village EB				
Segment		*Time*	*Miles*	*MPH*
1	St. Alexius Medical Center to Higgins & Valley	07:44	2.62	20.35
2	Higgins & Valley to Higgins & Streets of Woodfield Ent	08:55	3.11	20.90
3	Higgins & Streets of Woodfield Ent to Higgins & Ridgewood	03:57	2.71	41.08
4	Higgins & Ridgewood to Oakton & Busse	03:08	1.41	26.96
5	Oakton & Busse to Busse & Indian Hill	04:50	2.22	27.52
	Subtotal	28:34	12.06	25.33
	28 stops @ 15 seconds each	07:00		
	One-way runtime	35:34		
Elk Grove Village to Hoffman Estates WB				
Segment		*Time*	*Miles*	*MPH*
1	Busse & Indian Hill to Oakton & Busse	05:26	2.23	24.57
2	Oakton & Busse to Higgins & Ridgewood	02:46	1.35	29.40
3	Higgins & Ridgewood to Higgins & Streets of Woodfield Ent	05:50	2.73	28.04
4	Higgins & Streets of Woodfield Ent to Higgins & Valley	06:49	3.14	27.61
5	Higgins & Valley to St. Alexius Medical Center	07:02	2.66	22.72
	Subtotal	27:53	12.11	26.36
	28 stops @ 15 seconds each	07:00		
	One-way runtime	34:53		
Route Total		*Time*	*Miles*	*MPH*
	Roundtrip time	1:10:27	24.17	17.90
	Layover @ 15%	0:10:34		
	Cycle time	1:21:01		

Transit Service Plan

In addition to bus stop delay, we added a 15 percent layover/recovery time to the observed running time to calculate the potential roundtrip cycle time for the route. The Hoffman Estates – Elk Grove Village route came at 1 hour and 21 minutes or 81 minutes. In order to serve this route efficiently with a clockface headway and to run the route on more transit-friendly streets, we proposed a significant modification to the original route alignment. Like the initial corridor, the proposed route alignment would start in Hoffman Estates and travel east on Higgins Road. However, at Plum Grove Road it would deviate north to serve businesses and services along Woodfield Road and the Northwest Transportation Center. Instead of crossing the Busse Woods on Higgins Road, the route would travel south on I-290, exit at Biesterfield Road, and travel east via Elk Grove Boulevard until the intersection of Touhy Avenue and Busse Road – in Elk Grove Village, then travel south on Busse Road until Indian Hill Drive. Figure 34 on page 136 shows the proposed route alignment.

This 1 mile extension would allow service on headways of 15 or 30 minutes to operate more efficiently with a 90-minute cycle time. The proposed transit route alignment is 13.2 miles long. Potential stops have been proposed in 31 locations for an average distance between stops of 0.43 miles. Stops have been proposed at intersections that offer good access to penetrate residential neighborhoods and convenient access to major destinations, carefully balancing the number of pedestrian access opportunities with operational issues (i.e. transit speed and travel time). Selected stops and adjacent land uses are listed below in Table 60.

Table 60: Stop Locations, Hoffman Estates – Elk Grove Village

Stop #	Stop Location	Land Use Access
1	Alexian Brothers Campus Intersection	Medical center
2	Alexian Brothers Campus Drive & Moon Lake Blvd	Office park, medical offices
3	Moon Lake Blvd & W Higgins Rd	Frontage retail; single and multi-family residential
4	W Higgins Rd & Governors Lane	Single and multi family residential
5	W Higgins Rd & Manchester Dr	Office park; single and multi family residential
6	W Higgins Rd & Kingsdale Rd	Single family residential
7	W Higgins Rd & Gannon Dr	Single and multi family residential; office park; high school
8	W Higgins Rd & Churchill Rd	Frontage retail; single family residential
9	W Higgins Rd & Valley Ln	Frontage retail; multi family residential
10	W Higgins Rd & Grand Canyon Pkwy	Frontage retail; multi family residential
11	Higgins Rd & N Roselle Rd	Single family residential; big box retail
12	E Higgins Rd & Ash Rd	Single family residential
13	E Higgins Rd & Plum Grove Rd	Big box and frontage retail; multi and single family residential
14	E Woodfield Rd & entrance to Root Studios	Office parks
15	E Woodfield Rd & N Meacham Rd	Office parks, hotel
16	N Martingale Rd & Kimberly Dr	NWTC; mall retail and hotel
17	E Higgins Rd & N Martingale Rd	Big box retail; office park; single family housing
18	Biesterfield Rd & Beisner Rd	Hospital and medical offices; open space

Stop #	Stop Location	Land Use Access
19	Biesterfield Rd & Wellington Ave	Big box and frontage retail; office; multi family residential
20	Biesterfield Rd & S Arlington Heights Rd	Frontage retail; single family residential
21	Rev Morrison Blvd & Cypress Ln	Park; church; single family and multi family residential
22	E Elk Grove Blvd & Ridge Ave	Park; school; multi family residential
23	E Elk Grove Blvd & Crest Ave	Single family residential
24	Touhy Ave & Tonne Rd	Single family residential; church; light industrial
25	Touhy Ave & Lively Blvd	Industrial and warehousing
26	Touhy Ave & Chase Ave	Industrial and warehousing
27	Busse Rd & Touhy Ave	Heavy industrial; auto service frontage
28	Busse Rd & Greenleaf Ave	Heavy industrial; retail frontage
29	Busse Rd & Pratt Blvd	Heavy industrial/warehousing
30	Busse Rd & Devon Ave	Heavy and light industrial warehousing
31	Busse Rd & W Indian Hill	Heavy industry/warehousing; single family housing

Service Frequency Scenarios

We estimated costs and projected potential ridership for three standard service scenarios. The three scenarios have varying service frequencies, as follows:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively
- Scenario 2 – peak and off-peak frequency of 30 minutes
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively

The service hour span is proposed from 6:00 a.m. to 8:00 p.m., for a period of 14 hours. Service is proposed to operate on weekdays only and for 255 days in a year. Operating cost estimates for each scenario are presented in Table 61 below.

Based on an average cost per revenue hour of $100.91 (as indicated in PACE's 2009 NTD report for bus operations expenses), the cost of operating the Hoffman Estate – Elk Grove Village route would range between $875,000 for Scenario 3 and $1.5 million for Scenario 1. Costs are subject to change pending final design details, and before any service could be considered for future implementation, a funding source would need to be identified.

Table 61: Service Operation Scenarios and Costs, Hoffman Estates – Elk Grove Village

Service Operations Plan	Scenario 1	Scenario 2	Scenario 3
Suggested cycle time	90	90	90
Peak Frequency	15	30	30
Off Peak Frequency	30	30	60
Peak Buses	6	3	3
Off Peak Buses	3	3	2

Service Parameters	Scenario 1	Scenario 2	Scenario 3
Service Hour Span (from 6:00 am to 8:00 pm)	14	14	14
Peak Hours (6:00-9:00 am & 4:00 - 7:00 pm)	6	6	6
Off Peak Hours (9:00 am - 4:00 pm; 7:00 - 8:00 pm)	8	8	8
Peak Revenue Hours	36	18	18
Off Peak Revenue Hours	24	24	16
Daily Revenue Hours	60	42	34
Daily One-way trips	80	56	40
Peak Revenue Miles	580	290	290
Off Peak Revenue Miles	387	387	193
Daily Revenue Miles	967	677	483
Days of Service Annually	255	255	255
Annual Hours	15,300	10,710	8,670
Annual Miles	246,521	172,564	123,260
Cost per Hour	$100.91	$100.91	$100.91
Annual Cost	$1,543,923	$1,080,746	$874,890

Note: Cost per Hour is based on Pace's 2009 NTD profile for bus operations (operating expense per vehicle revenue hours).

Service Performance

Building upon ridership forecasts developed in Tech Memo #4 for all Tier 1 corridors, we refined estimates for the Hoffman Estate – Elk Grove Village route to better account for proposed levels of service (i.e. frequency and number of trips), and physical characteristics of the corridor (mainly pedestrian accessibility conditions along the route). Table 62 below shows estimated route ridership for each service scenario and potential service performance, summarized in four common performance indicators – cost per boarding, boardings per hour, boardings per mile, and farebox recovery.

Table 62 shows that the highest potential ridership would be achieved under Scenario 1 (15/30 service frequency) with 513 daily boardings, while the highest productivity will be achieved with Scenario 3 (30/60 service frequency) with close to 11 passengers per revenue hour. However, the route's 90-minute cycle time will not work well with 60-minute frequencies during off-peak hours in Scenario 3, and will produce a very inefficient waste of revenue hours. In this regard, Scenario 2 makes more efficient use of service hours, at 30-minute frequency throughout the day, and also it achieves similar productivity and efficiency indicators as Scenario 3, with a potential productivity of 10 passengers per revenue hour and a cost of $9.97 per boarding (compared to $9.36 in Scenario 3). At estimated 425 daily boardings, Scenario 2 is the preferred option for a potential service implementation.

Table 62: Estimated Route Performance, Hoffman Estates – Elk Grove Village

Estimated Performance	Scenario 1	Scenario 2	Scenario 3
Estimated Daily Boardings	513	425	366
Cost per Boarding	$11.80	$9.97	$9.36
Boardings per Hour	8.5	10.1	10.8
Boardings per Mile	0.53	0.63	0.76
Farebox Recovery Ratio	9.9%	11.7%	12.5%

Table 62 also shows that productivity and efficiency figures in Scenario 1 are much lower than in Scenario 2, despite gains in ridership. The reason for this is that Scenario 1 would attract 88 additional riders only, while operating costs will increase by close to $0.5 million. In other words additional riders will come at a much higher marginal cost than in Scenario 2. Ridership projection figures and estimated performance indicators show that, although sufficient demand and employment density exists around the corridor today, pedestrian facilities along the corridor are so discontinuous, removed from the main road and disconnected from buildings front doors, that destinations and density remain inaccessible to pedestrians. The corridor's potential transit demand is significantly reduced, because of wide gaps in pedestrian infrastructure. As a result, transit demand is weak and it will remain weak unless significant increases in market size or changes in physical design are introduced in the corridor to justify minimum levels of service in the future.

Transit Capital Plan

A draft capital improvement plan was also prepared for this route which includes improvements to stops, vehicles and sidewalks to connect with the market area around each stop. The goal is for transit service to have a strong physical presence in the community and along the corridor by placing fully developed stops, including posts, signs, schedules, landings pads and shelters.

Table 63 below provides capital cost estimates for installing fully developed stops at all 31 stop locations (both sides of street). Estimates have been based on unit costs from a recent implementation in Pace's service area.

Table 63: Stop Improvement Costs, Hoffman Estates – Elk Grove Village

Stop Improvements	Material/ Labor Cost	Quantity	Projected Total Cost
Flag/Post/Schedule Holder	$50	62	$3,100
ADA 5' x 8' Pad	$5,000	62	$310,000
Shelter Pad	$10,750	62	$666,500
Shelter (8')	$6,000	62	$372,000
Subtotal			$1,351,600

In addition to stops, the operation of the Hoffman Estates – Elk Grove Village route will require buses for daily operation as well as spare vehicles. It has been assumed that Pace would buy these buses. Table 64 below shows non-annualized costs of vehicles for each service scenario. Scenario 1 would require capital costs of $1 million more than Scenario 2 to implement, due to the need to operate more revenue service vehicles in the peak period.

Table 64: Vehicle Costs by Service Scenario, Hoffman Estates – Elk Grove Village

Vehicle Purchase Costs	Scenario 1	Scenario 2	Scenario 3
40 foot low-floor diesel buses @ $350,000 each (incl. spares)	$2,450,000	$1,400,000	$1,400,000

Table 65 below shows the cumulative cost of operating the route over a period of 12 years (the typical lifetime of a transit vehicle). Total costs for Scenario 1 would be $22.3 million, compared to $15.7 million for Scenario 2 and $13.2 million for Scenario 3.

Table 65: Total 12-Year Costs, Hoffman Estates – Elk Grove Village

Total 12-Year Costs	Scenario 1	Scenario 2	Scenario 3
Operating Costs	$18,527,076	$12,968,953	$10,498,676
Stop Improvements Costs	$1,351,600	$1,351,600	$1,351,600
Vehicle Purchase Costs	$2,450,000	$1,400,000	$1,400,000
Total	$22,328,676	$15,720,553	$13,250,276
Annualized Costs	$1,860,723	$1,310,046	$1,104,190

Pedestrian Connection Improvements

As shown in the capital and operations plan above, it is a significant investment and a major financial commitment for Pace to start a new route. Therefore, minimum levels of market demand, operational conditions and pedestrian accessibility are needed before making such a commitment. A first step towards meeting a minimum level of pedestrian accessibility is to develop a pedestrian improvement plan that fills in gaps in the pedestrian network around potential bus stops, provides direct connections with destinations and building front doors, and the ability to safely cross the street to access bus stops. Based on field observations and analysis, we recommend that Pace work with jurisdictions in the improvement of sidewalks, crosswalks and pedestrian connections with market areas and destinations along the route. Current conditions in the Higgins Road and Busse Road corridors show significant and serious gaps in pedestrian connectivity and street design that will preclude potential riders from using transit.

Two potential stops were selected along this corridor to develop a conceptual design of what improvements could look like. Conceptual designs are shown in Figures 35 and 36. Locations were selected to represent different land use and street configuration conditions, as specified below:

- A low density single-family residential environment with no sidewalks or crossings – E Higgins Road & Ash Road.
- A heavy industrial and warehousing environment with potential for neighborhood accessibility – Pratt Boulevard & Busse Road.

Conceptual designs at these locations include small interventions such as building sidewalks, marking crosswalks and creating safe corridor crossing for pedestrians. However, they show that with even small interventions, conditions for pedestrians and transit users could be improved significantly.

Capital costs for pedestrian interventions at each of these locations have not been estimated. A comprehensive plan including all stops in the route is recommended to identify costs and mechanisms for implementation.

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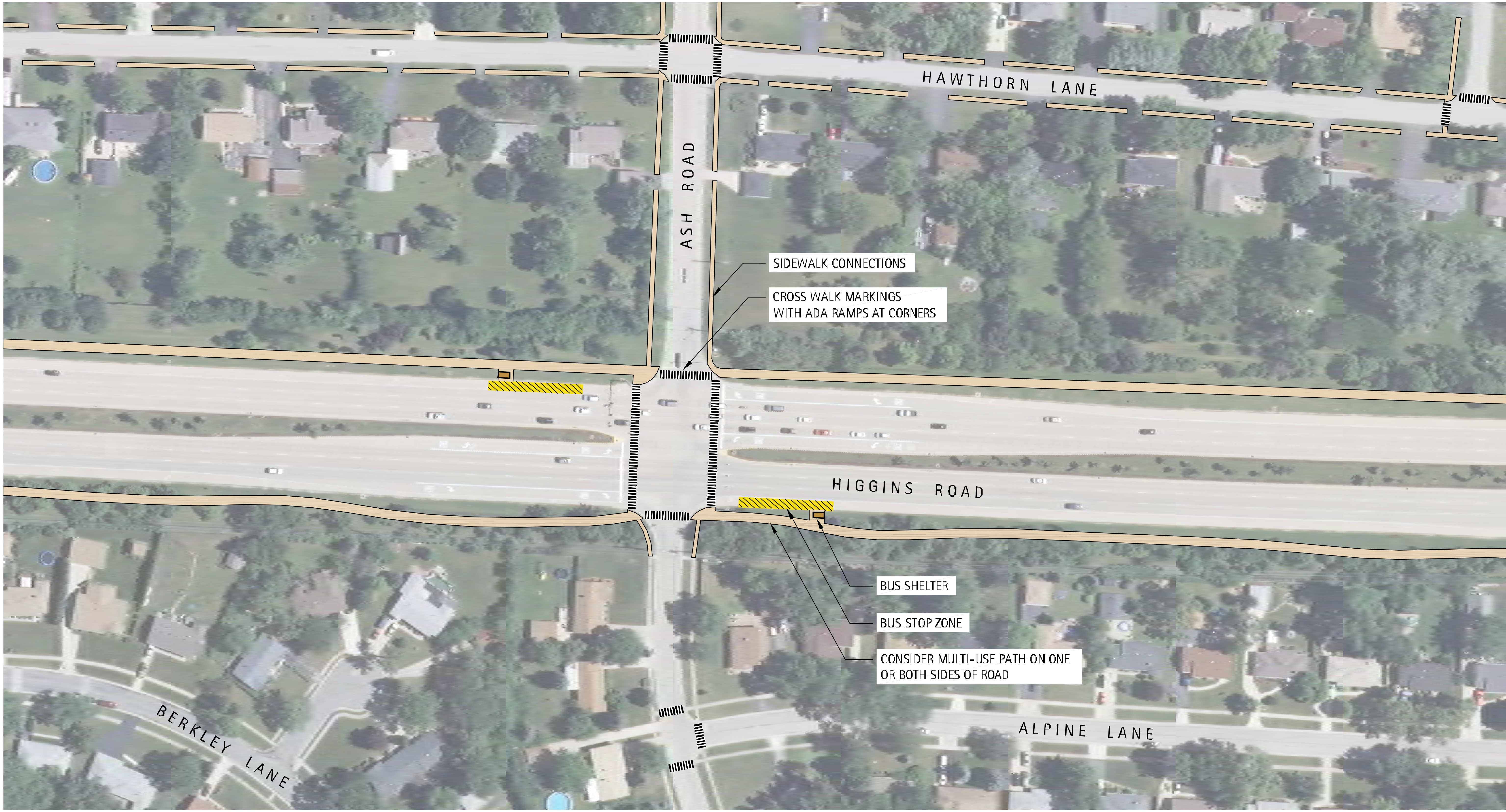

Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

Higgins Road & Ash Road

LAKOTA
THE LAKOTA GROUP INC

0' 50' 100'

August 3, 2011

Pace Bus

I-355 Corridor Service Study

Chicago Region, Illinois

LAKOTA
THE LAKOTA GROUP INC

0' 50' 100'

Busse Road (Route 83) & Pratt Boulevard

August 3, 2011

TECHNICAL APPENDIX 2:

Ridership Projection Refinement

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Ridership Projection Refinement

Ridership projections were developed for the Tier 1 and 2 corridors in Tech Memo #4. These projections were based on regression analysis of demographic and density variables as well as level of service variables, such as number of daily vehicle trips. In this report, we revisited and refined the ridership projections for the corridors that were selected for a draft service operations and capital plan to account for other factors that affect bus ridership. These factors include physical design characteristics of the roadway and the actual service frequency specified for the corridor, as described below.

Physical Characteristics Adjustment

The physical characteristics of a street can greatly impact the ease of use of transit running along that street. There are numerous arterial streets in the I-355 corridor study area that have been designed with only the automobile in mind. With almost no exception, they pose major barriers for pedestrians and potential transit riders to use because of deficient accessibility and connectivity characteristics. These can include a lack of sidewalks along the street, lack of marked crosswalks, long distances between signalized intersections, large roadway widths, and lack of pedestrian only connections from street to building front doors.

The ridership projections in Tech Memo #4 did not account for these characteristics because they are difficult to quantify without extensive field survey work. To improve our ridership projections and account for corridor physical characteristics and pedestrian accessibility conditions, we developed 'adjustment factors' based on the six physical characteristics listed below. These characteristics were evaluated qualitatively (using Google Earth aerial imagery) on a scale from 1 to 5, with 1 meaning poor and 5 meaning excellent:

1. Number of travel lanes (or roadway section that needs to be crossed)
2. Signalized intersections (or distance between traffic controlled intersections)
3. Crosswalk completion (or availability of clear crossing markings)
4. Parking/landscape buffer (or sidewalk relationship with the street)
5. Sidewalk availability/extent (or continuity/gaps on both sides of corridor)
6. Pedestrian access to destinations from sidewalks (or availability of safe pedestrian paths/connections with buildings).

For each physical characteristic an individual score was given, and corridor ridership was adjusted up or down. Ridership was adjusted downward by 10 % for a score of 1 but upward by 10% for a score of 5. Intermediate scores of 2, 3, and 4 led to adjustments of -5%, 0, and +5%, respectively. These scorings and adjustment factors are presented in Table 66.

The evaluation produced six individual scores that were then summed up to calculate an overall "ridership adjustment factor." The score sum and adjustment factors for each corridor are summarized in Table 67.

Table 66: Physical Characteristic Adjustment Factors

Evaluation Score	Adjustment Factor
1	-10%
2	-5%
3	0%
4	+5%
5	+10%

The physical characteristics evaluation was not included in the regression analysis model. The physical evaluation was made on a corridor-by-corridor basis, with a scoring system that range from 1 – poor condition to 5 – excellent conditions. A scoring of 3 was determined to be the average for Tier 1 corridors in the service area. The “ridership adjustment factor” is calculated taking this average value into account and so scoring values below 3 are discounting factors while scoring values over 3 are additive factors. Each corridor is evaluated on six different conditions or adjustment factors. The impact of individual factors on final ridership projections is diminished when adding all six factors together.

Table 67: Overall Ridership Adjustment Factors

		Evaluation Rating						Adjustment Factor						
ID	Corridor	Travel Lanes	Signalized Intersections	Crosswalk Completion	Sidewalk Buffer	Sidewalk Availability	Pedestrian Access	Travel Lanes	Signalized Intersections	Crosswalk Completion	Sidewalk Buffer	Sidewalk Availability	Pedestrian Access	Overall Ridership Adjustment Factor
45	Wood Dale Metra - Downers Grove	4	3	4	5	4	5	5%	0%	5%	10%	5%	10%	35%
32	Elmhurst Metra - Downers Grove / Fairview	5	3	4	4	3	3	10%	0%	5%	5%	0%	0%	20%
8	Hoffman Estates - Elk Grove Village	2	1	2	2	3	2	-5%	-10%	-5%	-5%	0%	-5%	-30%
3	Dundee Road - Arlington Heights	4	3	5	4	5	4	5%	0%	10%	5%	10%	5%	35%
23	Roselle Metra - Wheaton Metra	5	2	3	4	5	2	10%	-5%	0%	5%	10%	-5%	15%
8	Wheeling Metra - Schaumburg NWTC	3	3	4	3	4	3	0%	0%	5%	0%	5%	0%	10%

Service Frequency Adjustment

After adjusting for physical characteristics, additional adjustments were made for different service operation scenarios to account for the frequency of service proposed in each corridor. Three service frequency scenarios are analyzed in the following section that matches proposed transit service plans in the selected corridors:

- Scenario 1 – peak and off peak frequency of 15 and 30 minutes respectively (80 trips daily)
- Scenario 2 – peak and off-peak frequency of 30 minutes (56 trips daily)
- Scenario 3 – peak and off-peak frequency of 30 and 60 minutes respectively (40 trips daily)

The supply of transit service (usually measured as the daily number of trips or service hours) affects ridership demand, but demand also affects the levels of transit service. Pace provides high levels of service where there is high demand for transit and low levels of service where there is low demand. The simultaneity of the two variables can lead to biased and inconsistent estimates of the coefficients in ordinary least squares models,[12] such as the one we used for our projections the first time around, so we elected to exclude the level of service as an explanatory variable in that model to explain demand based only on demographic and density variables. However, the service operation scenarios discussed in the corridor-by-corridor summaries include levels of service that are significantly greater than those used on the average Pace route, so it became clear that this must be accounted for in some way.

The general consensus in the literature is that the elasticity of demand for transit with respect to service levels is between 0.3 and 0.5,[13] meaning that for every 1% increase in service, ridership increases by 0.3% to 0.5%. We used the midpoint of 0.4 and assumed that for every 1% increase in service, ridership would increase by 0.4%. The Pace routes used to develop the ridership forecast model in Tech Memo #4 have an average of 39.9 trips daily, so we used 40 trips as the baseline for the model. Under Scenario 3 the proposed route alignments have 40 trips daily, so no adjustment was made. Scenarios 1 and 2 have 80 and 56 trips daily, respectively, and their ridership figures were adjusted upwards.

Again these adjustments were made outside the regression analysis model. Table 68 presents the final ridership projections. The “Model Projection” column includes the projections from the initial regression model and the “Physical Adjustment” column contains the projections after the physical characteristics adjustment. The 85% interval columns illustrate the probability range of ridership estimates for each corridor.

Table 69 includes the final projections for each service scenario after the service quantity adjustments were made. As indicated in the 85% probability interval column in Table 68, figures can be lower or higher. The figures used to calculate performance indicators at the route level are based on a middle point projection. Performance results can be found in the corridor-by-corridor summaries section (Technical Appendix #1).

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[12] Brian D. Taylor, Douglas Miller, Hiroyuki Iseki, and Camille Fink, “Nature and/or Nurture? Analyzing the Determinants of Transit Ridership Across US Urbanized Areas,” Transportation Research Part A 43 (2009): 60-77.

[13] Graham Currie and Chris Loader, “High Ridership Growth from Extended Transit Service Hours: An Exploration of the Causes,” Transportation Research Record 2110 (2009): 120-127.

Table 68: Ridership Predictions Adjustment

Corridor	Model Projection	Physical Adjustment	85% Interval Prediction: Lower Bound	85% Interval Prediction: Upper Bound
Wood Dale Metra - Downers Grove	470	634	204	1,064
Elmhurst Metra - Downers Grove / Fairview	403	483	150	816
Hoffman Estates - Elk Grove Village	523	366	171	561
Dundee Road - Arlington Heights	599	808	477	1,142
Roselle Metra - Wheaton Metra	432	497	160	833
Wheeling Metra - Schaumburg NWTC	343	407	204	611

Table 69: Ridership Projections by Service Scenario

Corridor	Adj. Midpoint Prediction	Service Quantity Adjustment (Final Ridership Projection): Scenario 1	Scenario 2	Scenario 3
Wood Dale Metra - Downers Grove	634	888	736	634
Elmhurst Metra - Downers Grove / Fairview	483	677	561	483
Hoffman Estates - Elk Grove Village	366	513	425	366
Dundee Road - Arlington Heights	808	1,132	938	808
Roselle Metra - Wheaton Metra	497	695	576	497
Wheeling Metra - Schaumburg NWTC	407	570	472	407

Ridership projections are based on existing market size and physical condition. Implementation of any market development strategies and/or accessibility improvements will result in ridership increases.