KANE COUNTY
LONG RANGE TRANSIT PLAN

APPENDIX E: NEEDS ASSESSMENT

TECHNICAL MEMORANDUM #3

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Transit Needs Assessment

Introduction

This memorandum summarizes the key unmet transit needs that were identified in the initial elements of this study. The needs assessment is based on information gathered as part of:

- A review of existing services and supporting infrastructure (presented in Technical Memorandum 1 – Appendix C)
- Demographic analysis and projections (Technical Memorandum 2 – Appendix D)
- A transit market analysis (Technical Memorandum 2 – Appendix E)
- Stakeholder interviews (Technical Memorandum 2 – Appendix E)
- Transit Committee feedback (Appendix G)

These needs are primarily the results of a gap analysis examining disparities between community public transportation travel requirements and available transit services. The individual needs can be characterized as:

- Gaps between existing transit services and requirements for time-sensitive travel such as work or school commutes
- Insufficient levels of transit service making public transportation inconvenient relative to automobile travel
- Missing connections in the public transit network between population centers and major retail/employment centers
- Desired transit connections as identified by stakeholders

This assessment does not prioritize or exclude needs based on their feasibility (i.e. their likelihood of being implemented or funded). The needs identified in this assessment will be available for public review and validation at the project's initial public meeting and associated outreach. Specific strategies to address the gaps and needs presented in this assessment will be provided in the next phase of this study. These strategies will be prioritized and identified with a specific planning horizon (short, intermediate, or long-term) based on community goals and likelihood of available funding.

Framework for Assessing Needs

This assessment presents the resulting needs sorted into the broad categories based on when the gaps are most relevant.

Current Needs: Needs that exist today, or will soon be realized, based on existing gaps in service or supporting investments, and constrained by current travel behavior and existing regulatory environments.

Future Needs: Needs that will be realized in future years. These are needs that will result from: expected growth in population and employment along with increases in traffic congestion; the aging of the population; and prospects for major land use developments – all unconstrained by current behavior and policies.

Note that strategies developed to address future needs will be prioritized into the intermediate-term (5 to 15 years) and long-term (15 to 30 years) planning horizons based on the feasibility of implementation.

For discussion purposes, the needs are presented in three main categories for each time frame.

Connections: Gaps between where Kane County residents need to travel by public transportation and where transit services are available.

Level of service: Gaps between when / how often individuals require transportation and the hours of operation along with the frequency of service for available transit services.

Transit supportive investments and policies: Needs identified in terms of the requisite funding, supporting infrastructure, land use and transportation policies or programs that are missing (and are achievable in the specified timeframe) to make transit work. These investments and policies are essential to make it feasible to meet the identified connection needs with transit service that is convenient, attractive and cost-effective.

The three elements of this framework are closely interrelated with one another and all are necessary to make transit an attractive mode of travel to destinations and to realize the benefits of transit desired by Kane County – increased travel choices, community livability, and congestion relief through reduced vehicle trips.

Current Needs

Connections

This category of transit needs identifies gaps between where Kane County residents need to travel by public transportation and the ability to use existing transit services for those potential trips. The needs include connections both within Kane County and to/from neighboring counties. The current needs for connections within Kane County are illustrated graphically in Figure 4 at the end of this memorandum, while Figure 5 shows the needs for out-of-county connections.

East-West Connections within Kane County: Existing Pace service provides east-west connections in Elgin, Geneva/St. Charles, and Aurora, but does not serve a number of east-west corridors within Kane County. Significant employment centers generate a need for transit service along corridors such as IL 72 between I-90 and Randall Road (in Gilberts, West and East Dundee, and Carpentersville) and along Fabyan Parkway in Batavia (east of IL 25 in the vicinity of Kirk Road). Transit service along the IL 72 corridor would meet the Village of Carpentersville's expressed need for east-west transit connectivity to Randall Road and the new Sherman Hospital facility. Although east-west service is generally good in Elgin, there may be a need to extend east-west service from the Big Timber Metra station to the west along the Big Timber Road corridor towards Gilberts.

North-South Connections within Kane County: Existing Pace service provides the most frequent north-south access within the Elgin and Aurora areas. Existing Pace service is less frequent between Aurora and Geneva along Randall Road and between Elgin and Geneva along IL 25/IL 31. Kane County's travel demand model for 2009 confirms that current demand for north-south travel from Aurora to Elgin is less significant than other travel patterns. Several specific examples of gaps in north-south service are:

- Along Kirk Road on the east side of the Fox River through Batavia, between Il 38 and IL 56 especially to a concentration of employment areas south of Fabyan Parkway, and Fermi Lab east of Kirk Road. The City of Batavia and several other stakeholders expressed a need for service along Kirk Road. The Kane County travel demand model shows high employment densities and significant general travel demand along the Kirk Road corridor between IL 38 and I-88. By 2040, moderate-to-high residential and combined residential/employment densities are projected to develop along the corridor, particularly north of IL 38.
- In the Aurora area, the community of Montgomery expressed a desire for service along Orchard Road. Parts of the corridor currently have high employment density and moderate residential or combined residential/employment density, with intensified densities projected by 2040. Although there are two areas along the corridor with east-west transit service from central Aurora, there is no direct service from Montgomery along Aucutt Road or U.S. 30 and along Orchard Road.

Local Service Extensions to Growing Population and Employment Centers within Kane County: In the Fox Valley, population and employment centers have grown or increased in density outside of the core areas currently served by the Pace bus routes, creating a need to expand service to these adjacent areas. Several communities have expressed a need for local service connecting to the regional system. Specific examples are:

- Carpentersville, where employment centers such as the Old Town area lack service
- South Elgin, where relatively high densities are developing south of where current transit service ends on Randall Road, Maclean Boulevard, and IL 31
- St. Charles, which has grown beyond the IL 25 and IL 64 corridors served by Pace and where the ongoing Circulator Study demonstrates interest in enhanced local connectivity
- Montgomery, which has no transit service in the far western part of the community where most of its population resides and lacks service to industrial areas in the middle of the community

East-West Intercounty Connections: Existing Metra service addresses travel needs between Kane County and Cook and DuPage Counties along three east-west rail corridors. In addition, Pace service provides the following connections:

- Elgin to Woodfield Mall and the Pace Northwest Transportation Hub in Schaumburg (Route 554, peak with limited midday service)
- Aurora to Naperville (Route 530, 30 minute headways including on Saturdays).

The major general intercounty travel patterns identified from the Kane County travel demand model, and illustrated later in Figure 5, include: [1]

- From the Elgin area to south-outer Cook County

[1] Detailed intercounty travel demand model projections are illustrated in Figures 44-47 in Technical Memorandum 2.

- From Elgin and Carpentersville to the Schaumburg area
- From the Geneva/St. Charles area to north-western/central DuPage County
- From the Aurora area to southwestern DuPage County (Naperville area) and along the I-88 corridor in western DuPage County

Specific needs were also identified by the communities for bus service to employment areas in western Bartlett and from the Elgin area to the Prairie Stone employment area in Hoffman Estates, near IL 72.

North-South Intercounty Connections: The major north-south travel demand patterns identified from the Kane County travel demand model include:

- From the Elgin and Carpentersville areas to southeastern McHenry County
- From the Aurora area to northeastern Kendall and northwestern Will Counties

The existing transit service and identified needs between Kane County and each of these counties are as follows:

- McHenry County: There is no Pace bus service from Kane County to McHenry County. The Metra UP-NW line serves McHenry County from Cook County and there is Pace bus service in McHenry County along and north of the UP-NW line but not between the UP-NW line and Kane County. Based on stakeholder input, Algonquin residents currently use the Metra UP-NW line in Cary or Barrington.

- Kendall County: There is limited Pace bus service between Kane and Kendall Counties – the Oswego-Aurora Metra Shuttle operating at peak hours only. Kendall County is not part of the RTA service area and there is limited public transportation service available. The Village of Montgomery expressed a need for some service to Kendall County.

- Will County: There is only limited connecting service to Will County – Pace route 834 from the Downers Grove station on the BNSF Metra line in DuPage County. The trip is indirect and not time-competitive with driving. (For example, the minimum transit travel time from the Aurora Transportation Center to Union Station in Joliet is about 1 hour 35 minutes, not including about a 30-minute transfer time.) Stakeholders did not specifically identify a need for public transportation to Will County.

Metra Feeder Service: Metra service to Elgin, Elburn/Geneva, and Aurora provides a significant link to employment centers in downtown Chicago and Cook and DuPage Counties. Pace provides some existing local feeder service and coordinates a station vanpool program used by Elgin residents. However there is a greater demand for efficient, reliable feeder transit to and from Metra stations in Kane County. The need is bidirectional, required both to/from residential areas without transit service and to/from employment sites. Communities with existing transit service to Metra stations have expressed concerns about using Pace to connect to Metra due to the low frequency and a perceived poor reliability (in terms of schedule adherence) of bus service. Communities with no existing feeder service currently rely on park-and-ride access to Metra (which has capacity constraints discussed under Transit Supportive Investments). Based on current travel demand for home-based work trips from the Kane County Travel Demand Model, in

parts of the County not currently served by transit is the strongest current potential for feeder service is between Huntley and Elgin. The model also identifies a demand between Hampshire and Elgin and between Sugar Grove and Aurora, but at lower levels.

Connections to Regional Activity Centers: Communities in the central and western parts of the County lack fixed-route bus service and are more distant from the existing service network, but have non-commute needs for access to services, such as shopping and medical appointments. These needs are supported by the Kane County Travel Demand Model and specific examples include:

- Service from Elburn to Randall Road
- Service between Sugar Grove and the Aurora area
- Service between Huntley and Carpentersville/Elgin

Level of Service

This category of needs includes improvements to the service hours, frequency, and/or reliability of existing Metra and Pace bus service. These needs are directly related to the ability of transit to attract riders, particularly "choice" riders, by increasing the convenience of taking transit.

Metra

Improve Frequency and Reliability: Metra is perceived as offering good service and providing a reasonable alternative to driving. However, there is a need to enhance the frequency, speed, as well as reliability of Metra service, such as the proposed UP-W Upgrade New Starts Project and the UP-W Public Private Partnership (PPP), which is currently in progress.

Pace

In order for bus service to be perceived as a reasonable means of travel for "choice" riders and commuters, Pace would need to improve its service within these areas, which stakeholders expressed as deficiencies in current service. As will be discussed in more detail in the next section, these attributes are necessary to attract riders, but the ability to provide high-quality service is also related to implementation of transit-supportive land use and policies that promote residential and employment density, diversity or mix of uses, urban design (connectivity/walkability), and access to regional activity centers.

Hours of Service (Night): Existing Pace bus service ends as early as 6:00 pm and as late as 9:30 pm, depending on the route. Stakeholders including colleges and retailers on Randall Road expressed a need for later hours of operation at night on specific routes to accommodate late classes or work schedules.

Frequency of Service: The most frequent existing Pace bus routes serving Kane County operate every 30 minutes. Service operating at least every 15 minutes is often seen as a well-established threshold wherein the psychology of transit use changes. At this frequency or above, passengers can go to a stop and expect that a bus will arrive soon. This frequency also permits a more spontaneous connectivity between lines without the need for timed connections. Infrequent service creates a challenge for "chaining" trips, such as child care, school, and work.

Reliability of Service: Stakeholders perceive existing service to be insufficiently reliable. Reliability – how well transit adheres to its schedule – is a key factor in attracting and retaining riders. As previously discussed, stakeholders believe that perceived reliability problems, whether due to Pace operations or buses delayed in traffic, have dissuaded potential riders from using Metra feeder service when they otherwise would.

Off-Peak/Weekend Service: Some Pace routes run at lower frequencies in the middle of the day and night; existing bus service is limited on Saturday and does not operate on Sundays. Stakeholders expressed a need for improved service at off-peak times, including midday and at night. Although not specifically articulated and likely a secondary concern, the need for off-peak service may include improved weekend service, including service on Sundays.

Transit Supportive Investments and Policies

This category of needs identifies gaps in funding, supporting infrastructure, land use and transportation policies or programs that need to be bridged to support and realize the benefits of improving transit connections and service quality.

Pedestrian Access and Amenities: The pedestrian environment along and near some of the current Pace routes is in need of improvement. This is especially true along Randall Road where riders board along the unimproved and often impassable shoulders, safe pedestrian crosswalks are infrequent and sidewalk connections from adjacent neighborhoods and commercial areas are limited. Pedestrian access to Randall Road often requires lengthy travel through parking lots or along driveways. And accessing buses on Randall Road often requires cutting across unimproved and uneven shoulders. Many of the boarding areas, including the signed flag stops, along Randall Road, IL 31 and IL 25 lack passenger amenities (shelters, benches, etc.). Downtown Elgin, St. Charles, Geneva and Aurora have good pedestrian access and provide a higher level of amenities at bus stops. The downtown Metra stations have a strong local sidewalk network. Other stations like Big Timber and Elburn are focused on park-and-ride or passenger drop-off access (although pedestrian connectivity/walkability would be necessary to support future plans for transit-oriented development).

Funding for Transit: Funding for transit operations and capital improvements is currently limited and being further reduced as a result of the recent economic downturn. Sustaining current service levels is becoming difficult under these conditions and expansion of service is not likely in the near future. Sustaining the Ride in Kane program in the short term presents additional challenges. The Federal Transit Administration New Freedom funding that was used to seed the program is intended to initiate new services to provide mobility options for people with disabilities beyond those required by the American with Disabilities Act (i.e. Pace paratransit service) and not for ongoing operations support. In addition, many of the local communities are having difficulty securing adequate funding in order to participate or remain as a program sponsor.

Park-and-Ride Facilities: Regionally, improvements at and expansion of Pace and Metra park-and-ride facilities were identified as a current capital funding need.[2] Parking facilities at the Elgin (Chicago Street) Metra station and Aurora Transportation Center as well as those at the Geneva Metra Station, have current capacity constraints. There is a near-

[2] Regional Transportation Authority, *Regional Transportation Strategic Plan*, February 2007

term need to reduce the demand for parking (e.g. additional feeder service or vanpools, changes in management/pricing policies, etc.) or to increase the supply of parking without conflicting with communities' longer-term development plans.

Fleet Replacement and Expansion: The RTA's Regional Transportation Strategic Plan also identified the need to replace aging suburban bus and ADA paratransit vehicles. The continued upgrading of Pace's rolling stock likely remains a need over the next five years. Assuming operating funding remains in place, the growth in demand for Ride in Kane services will likely continue, especially as the region continues to age and more residents learn about the program. This may result in the need for additional vans to meet the increased demand.

Transit-supportive Land Use Planning: As detailed in the Future Needs section, there will be the need to coordinate future transit-oriented development with increased transit service. Addressing these longer-term needs will require shorter-term actions to assure that future development meets the desired outcomes. The need for supportive local land use policies, zoning codes and development incentives exists today if future goals are to be realized.

Future Needs

Connections

East-West Extension of Transit Service to Growing Population and Employment Centers: Growing population and employment centers in northern and southern Kane County lack transit service and communities in these parts of the County have expressed a desire for local service connecting to the regional system. However, service may not be feasible given current residential and employment densities or funding levels. If combined densities increase to transit-supportive levels (see Appendix E.1), these communities may be better able to support fixed-route service. Examples from stakeholder input, which are also supported by Kane County's 2040 travel demand model data, are shown in Figure 4 and include:

- Increased travel between Huntley/Hampshire/Pingree Grove to Elgin, as well as developing travel patterns from Burlington to the east and northeast
- Increased travel within the general Hampshire/Huntley area
- More pronounced travel patterns from Sugar Grove to the Aurora area as well as from far southwestern Kane County to the Aurora area
- Developing travel from central-western part of Kane County to the east (not shown)

East-west Transit Connections across the Fox River: Several new planned bridges will increase roadway connectivity across the Fox River. Figure 4 illustrates a likely increase in demand for east-west transit connections over new bridges in the Carpentersville area and in central Kane County, including to employment areas along Stearns Road near IL 25.

Intercounty Connections: The 2040 travel demand model indicates the following intercounty travel patterns:

- Increased travel from the Elgin/Huntley/Hampshire area to southeastern McHenry County and Cook County
- Developing travel from the Hampshire/Huntley area to southwestern McHenry County
- Increased travel from the entire Fox Valley to northeastern DuPage County
- Increased travel from the southern half of the Fox Valley to southeastern DuPage County
- Increased travel from far southern Kane County to northern Kendall County and northwestern Will County

Connections to New Metra Stations: Communities such as Montgomery, Sugar Grove, Hampshire, Big Rock, Pingree Grove, and Maple Park have expressed a desire for future Metra service and many are undertaking preliminary planning efforts and/or preserving land for future station locations. It will be necessary to analyze the need for connecting transit service if these lines are expanded and/or new stations are developed.

Connections to STAR Line: There is an expressed need to provide connections to the planned STAR Line, running north-south in Cook and DuPage Counties and linking to an east-west line along the I-90 corridor to O'Hare International Airport. Some communities (such as Hoffman Estates and Bartlett that span both Kane County and Cook/DuPage Counties and Elburn to the west in Kane County) see the STAR Line as an opportunity to meet a need for north-south connections. It will be necessary to analyze the need for connecting transit service to/from Kane County.

Potential North-South Service on IL 47: Communities such as Sugar Grove and Elburn have expressed a need for north-south transit connections and see the potential for fixed-route bus service along IL 47. Data from the Kane County Travel Demand Model does not support corridor-wide travel demand, however it shows demand along the north and south parts of the corridor. Demand is strongest in the northern part of the County, and indicates potential for service along IL 47 between Huntley and Pingree Grove. Growth in demand is not projected to be as strong in the southern part of the County, however there may also be potential for service between Elburn and Sugar Grove, which would serve the Elburn Metra station and Waubonsee Community College. These connections are illustrated later in Figure 4.

Level of Service

Local Service to Meet Increased Demand: If downtowns in the Fox Valley continue to develop with transit supportive densities and urban forms, there will be a need to enhance local transit service to meet increased demand for transit. These developments, and their associated residential and employment activities, will have the ability to support a higher level of service and coverage. The County Travel Demand Model shows strong growth in all trip types both within zones and between adjacent zones, i.e. shorter-distance local trips, supporting the need for increased service levels not only a peak times but in midday periods when a number of bus routes do not operate. As discussed below, increased local service levels will be necessary to attract riders to transit and realize congestion relief benefits.

High Capacity/High Quality North-South Level of Service: Projected travel patterns indicate an increased demand for north-south travel in the County. If transit-supportive residential and employment densities (see Appendix E.1) develop along north-south corridors, such as Randall Road, there may be a future need (and the ability to support) high capacity/high quality transit. Pace has identified Randall Road as a potential Arterial Rapid Transit (ART, a form of Bus Rapid Transit or BRT) corridor in its long-range planning.[3] Transit along a concentrated corridor could operate at high enough frequencies to facilitate more convenient transfers between routes. The implementation of high-capacity ART service will also require connections to high-quality local service (or community-based feeder/circulator services) at key stops and route anchors.

Ensure Reliability as Congestion Increases: If roadway congestion increases as projected (roadway delay by about 50% and the number of congested lane miles by about 10% by 2030 relative to 2003 values), there will be a need to take measures that minimize the impact on transit.[4] These measures will be needed to maintain time-competitiveness with the automobile and to mitigate the effects on operating costs (i.e. the need to run more buses to maintain desired headways). Potential techniques include queue jump lanes and transit signal priority (TSP), which allow buses to bypass congestion at intersections and minimize delay at traffic signals.[5]

Transit Supportive Investments and Policies

Congestion Relief: Traffic congestion is expected to worsen over the next 30 years and there will be a need to lessen the demand for single-occupant vehicle (SOV) travel. Transportation Demand Management (TDM) strategies encourage drivers and potential transit users to take advantage of transportation options to reduce SOV trips or shift them away from peak travel times.[6] For TDM strategies to be effective, a range of transportation options must be available and comparable in convenience to automobile travel. Numerous

[3] Pace Vision 2020 defines ART as a form of Bus Rapid Transit (BRT) consisting of elements including Transit Signal Priority (TSP), queue jump lanes and Intelligent Bus Systems (IBS) along arterial streets. See http://www.pacebus.com/sub/vision2020/arterial_brt.asp and Pace Arterial Rapid Transit Study.
[4] Congestion projections from the Kane County 2030 Transportation Plan
[5] Transit signal priority (TSP) gives a bus that is behind schedule additional priority at select traffic signals, e.g. allowing a bus to request an extended a green light to allow it pass through an intersection before the light turns red. Queue jumps allow buses to bypass traffic at an intersection, such as by providing a short bus-only lane or allowing buses to use a right-turn lane. See http://www.pacebus.com/sub/vision2020/arterial_brt.asp for additional details.
[6] Specific TDM strategies may be proposed in the next phase of this project; however, Appendix E provides a discussion of various strategies and their effectiveness in reducing vehicle trips.

stakeholders stated that for transit to be seen as a viable commute option for residents who currently drive, future service will need to have high levels of service and meet the travel needs of Kane County residents. Incentives, typically provided through employers or educational institutions, are among the most effective TDM strategies. These strategies include tax benefits for transit users (currently available on federal taxes), drivers realizing the costs of parking (or savings from not parking) and/or free or reduced transit passes.[7] Fostering employer/institutional participation will require continued support from Pace and Metra to promote alternative modes of travel, but may also require trip reduction mandates (typically seen at the state level for large employers) or other inducements.

Transit-Supportive Development: A number of Kane County communities are creating Transit Oriented Development (TOD) plans. These transit-supportive development initiatives promote downtown redevelopment, improve community livability and contribute to congestion relief, but their success depends on the presence of high-quality transit service. Current TOD plans in downtown Aurora and Elgin and recent Metra station area development in Geneva are examples of transit-supportive development.

As the County grows, similar developments will be needed to house 70% of total Kane County residents, and 50% of population growth, in the Urban Corridor by 2030.[8] A significant increase in the level of transit service will be required for TODs to realize their maximum potential. Seven-day-week, frequent service throughout the Fox Valley will be needed to reduce reliance on automobile travel. But for transit to work, there needs to be a critical mass of such development. Where applicable, local jurisdictions will need to support these efforts in their comprehensive plans and associated zoning codes by restricting non-transit supportive land use patterns (i.e. low-density, single-use) and requiring transit-supportive development and urban design practices (e.g. connected street grid, locating parking behind buildings, etc). Additionally, local jurisdictions may benefit from providing developers with incentives, such as increased development rights (e.g. higher allowed density or floor area ratio) or relief from other mandates, in return for transit-supportive projects.

Increasing Transit Ridership: There will be the need to attract "choice" riders or those currently reliant on automobile travel. Increasing transit's mode share will help achieve the previously mentioned congestion relief and community livability goals. And as previously discussed, a high level of transit service will be required to appeal to those who are not dependent on transit for their travel needs. As highlighted by stakeholder opinion, there is underlying support for transit in the County, but most residents do not see themselves riding a bus. Therefore, there is a need to market transit service to this audience. The *Regional Transportation Strategic Plan* highlights strategies to increase ridership, including improved transit traveler information such as trip planning tools and bus arrival notifications. But converting non-riders will also require additional social marketing to change behavior (as employed in smoking cessation and recycling promotion campaigns).

Park-and-Ride Facilities: New parking facilities will be needed to support regional, commuter-oriented services. New Metra stations have been suggested on the MD-W, UP-W (per Maple Park's vision), and BNSF lines. Additionally, express bus service has been proposed along I-90 and I-88. Similarly, implementation of a Randall Road ART service

[7] Parking cash-out programs and other regional parking strategies to reduce the demand of SOV travel are presented in the CMAP GO TO 2040 strategy paper *Parking Management Strategies* (2010)
[8] Kane County 2030 Land Resource Management Plan

may include a park-and-ride strategy. The nature of these new services would require park-and-ride facilities if access cannot be provided by local/feeder bus service or by non-motorized modes for those living or working close to the stations / stops. Capacity at current Metra parking facilities must be expanded to meet traveler demand if parking management strategies cannot reduce this demand. If transit-oriented development occurs around current Metra stations oriented toward park-and-ride access, such as Elburn and Big Timber, there also will be a need to improve pedestrian facilities and access at and around those stations.

Fleet Replacement and Expansion: Ongoing vehicle replacement will continue be a need as older buses and vans are retired. Any significant increases in the level of service necessitated to address the previously discussed needs will likely create the demand for suburban bus fleet expansion, especially if new peak service is added. The suburban paratransit fleet may not be impacted to the same degree if the paratransit service area is not expanded.

Passenger Amenities: With any expansion in the fixed-route system, additional passenger amenities will be required. Any policy changes reducing the use of flag stops in the next 30 years will also create the need to identify stops requiring amenities. These amenities (including shelters, waiting pad, signage, lighting, rider information, trash receptacles, etc.) will be required to attract choice riders to the system. Metra stations already have the essential amenities in terms of waiting areas, lighting, etc. Wi-Fi internet access is becoming a popular passenger amenity and there may be a need to provide this on commuter and long-distance bus routes to attract more choice riders.

Funding for Transit: Many of the previously discussed needs require greater levels and quality of transit service. To address these needs, substantial increases to both operating and capital funding will be required.

Summary of Needs

The table below summarizes the current and future transit needs identified for Kane County. The needs for connections within Kane County are illustrated graphically in Figure 4, while Figure 5 shows the needs for out-of-county connections.

Figure 1 Transit Needs Summary

	Current	Future
Connections	• East-west and north-south transit connections within Kane County • Local service extension to growing population and employment centers. • East-west and north-south intercounty transit connections • Feeder service to Metra stations • Connections to regional activity centers	• East-west connections to growing population and employment centers in central-west parts of the county • East-west connections across the Fox River • Increased intercounty connections • Connections to new Metra stations as possible expansion occurs • Connections to STAR Line (linking to east-west line to O'Hare Airport) • Potential north-south service on IL 47
Level of Service	• Metra: frequency/reliability • Pace bus service: - Hours of service (nights) - Frequency of service - Reliability (schedule adherence) - Off-peak/weekend service	• Local service to meet increased demand • High capacity/quality north-south level of service • Ensure reliability as congestion increases
Transit-supportive Investments and Policies	• Pedestrian access and amenities • Funding for transit • Park-and-ride facilities • Fleet replacement and expansion • Transit-supportive land use planning	• Congestion relief • Transit-supportive development • Increasing transit ridership (marketing) • Park-and-ride facilities • Fleet replacement and expansion • Passenger amenities • Funding for transit

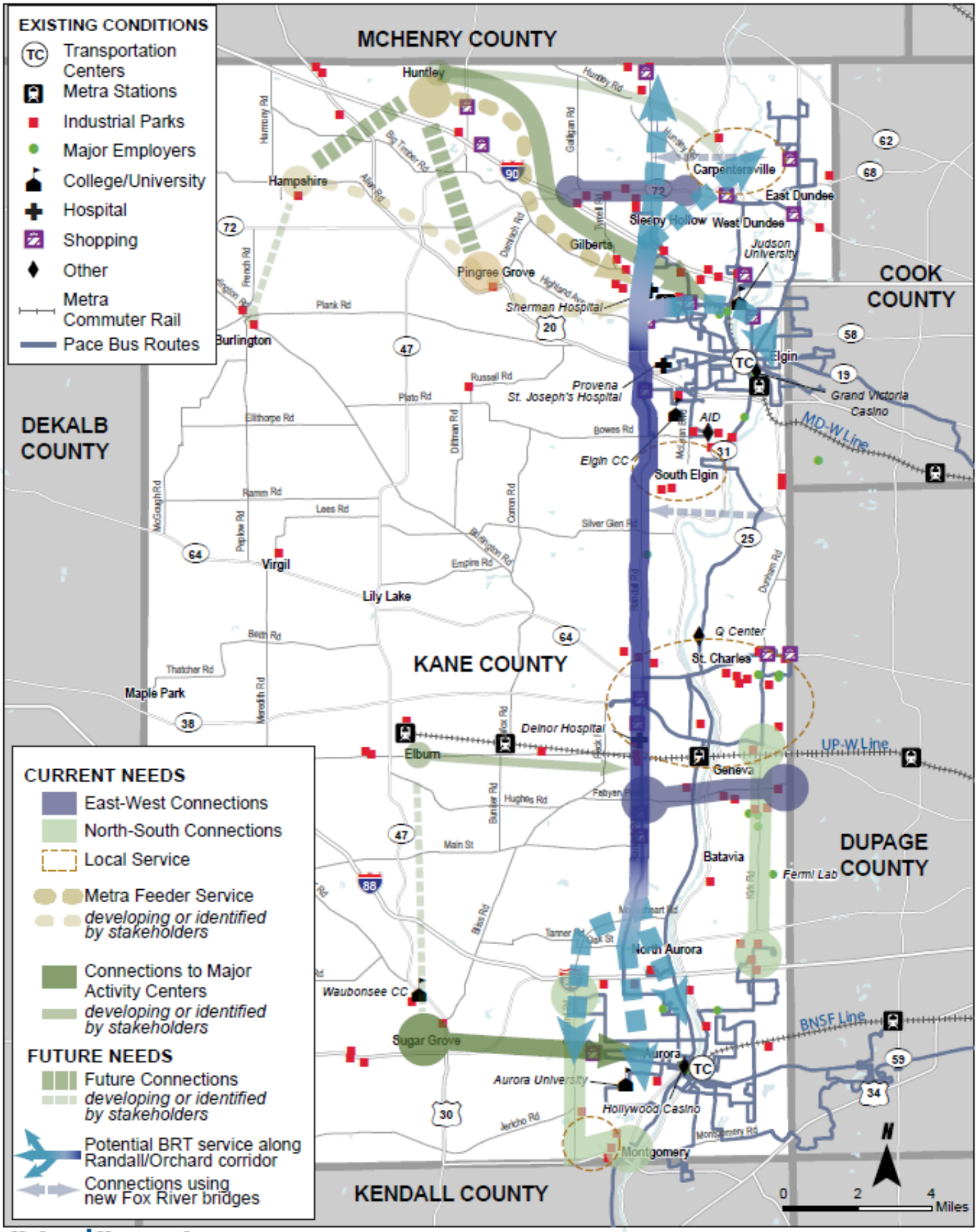
Figure 2 Sources of Specific Transit Needs within Kane County - Connections

Type of Transit Need	Specific Needs Identified	Need identified by:	
		Kane County Travel Demand Model	Stakeholder Input
Current			
East-west transit connections within Kane County	IL 72	X	X
	Fabyan Parkway	X	X
North-south transit connections within Kane County	Kirk Road	X	X
	Orchard Road	X	X
Local service extension to growing population and employment centers.	Carpentersville	X	X
	South Elgin	X	
	St. Charles/Geneva	X	
	Montgomery	X	X
Feeder service to Metra stations	Huntley to Elgin	X	X
	Hampshire/Pingree Grove to Elgin		X
	McHenry County	X	X
Connections to regional activity centers	Huntley to Elgin & Carpentersville	Huntley to Elgin	X
	Elburn to Randall Road		X
	Sugar Grove to Aurora	X	X
Future			
East-west connections to growing population and employment centers in central-west parts of the county	Burlington – Hampshire		X
	Hampshire – Huntley	X	X
East-west connections across the Fox River	Using planned new Fox River bridges	X	X
Connections to new Metra stations as possible expansion occurs	e.g. Montgomery, Sugar Grove, Hampshire, Big Rock, Pingree Grove, Maple Park	Based on overall needs	X
Potential rapid bus service (e.g., BRT) along the Randall Road / Orchard Road corridor	Short to medium-length trips along corridor and from Fox Valley and western County to activity centers along the corridor	X	X
Potential north-south service on IL 47	North County (Huntley - Pingree Grove)	X	X
	South County (Sugar Grove – Elburn)	Developing	

Figure 3 Sources of Specific Transit Needs for Out-of-County Travel

Type of Transit Need	Specific Needs Identified	Need identified by:	
		Kane County Travel Demand Model	Stakeholder Input
Current			
East-west intercounty transit connections	Limited connections to Cook & DuPage Counties	X (growing by 2040)	X
	No direct service to NW Will County	X (growing by 2040)	
	No/limited connecting service to Central Will County	X	
North-south intercounty transit connections	No/limited connecting service to McHenry County	X (Most significant growth by 2040)	X
	No direct service to Kendall County	X (growing by 2040)	X
Future			
Intensified intercounty connections	All current needs except those to central Will County projected to increase	X	
North-south intercounty transit connections	From west of Fox Valley to McHenry/Kendall Counties	X	
Connections to STAR Line to access Will/ DuPage/ Cook Counties and O'Hare Airport	From Fox Valley and Elburn	X	X

Figure 4 Transit Needs Within Kane County



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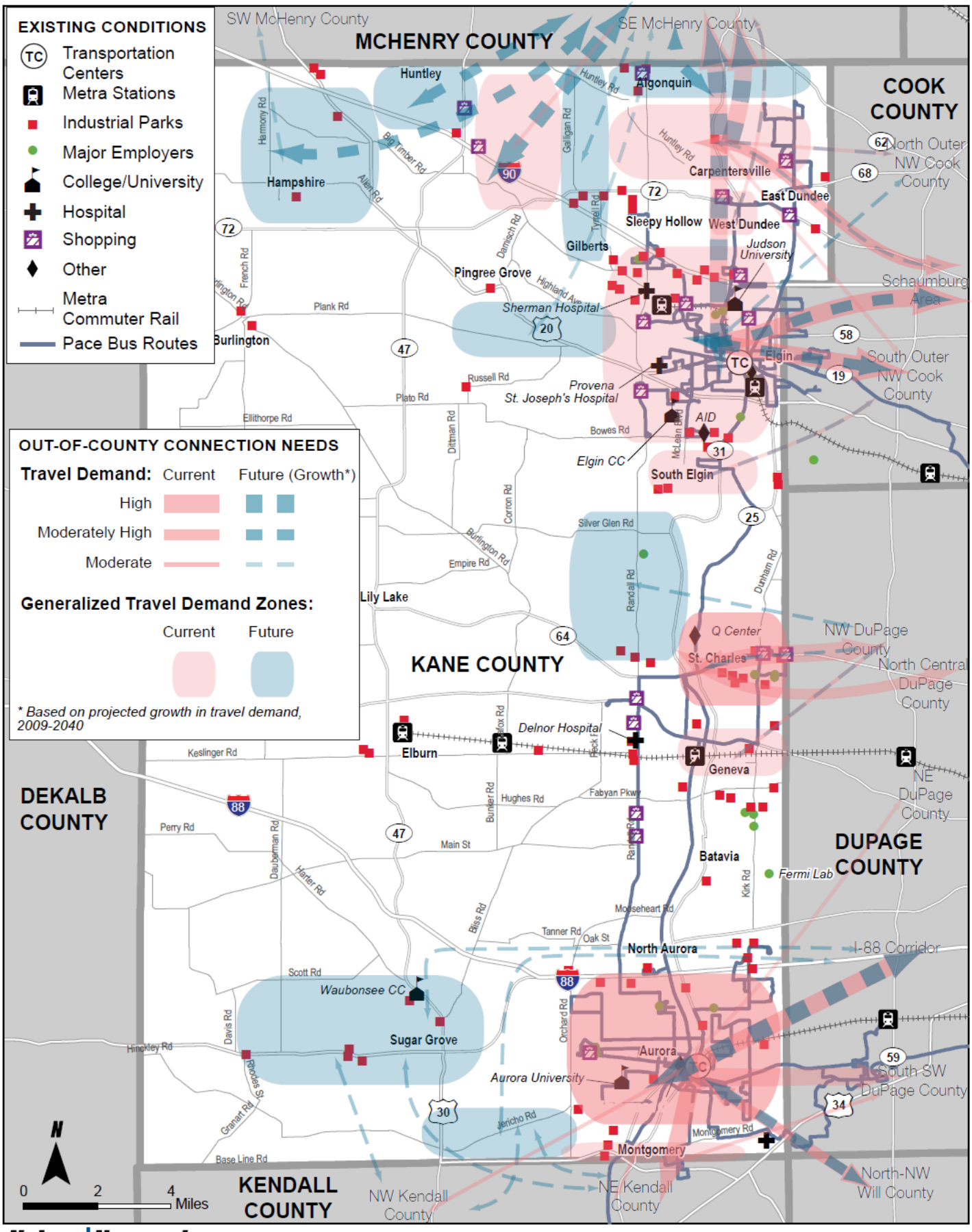
Assessment based on Stakeholder and Transit Committee input and Kane County Travel Demand Model
GIS Data Sources: Kane County, ESRI, 2000 U.S. Census

Figure 5 Major Out-of-County Transit Needs



Nelson|Nygaard consulting associates

Assessment based on Stakeholder and Transit Committee input and Kane County Travel Demand Model
GIS Data Sources: Kane County, Kane County Economic Development Advisory Board, ESRI, 2000 U.S. Census

APPENDICES

Appendix E.1: Land Use and Transit Demand

Although there is no single answer to the question, "What is transit-supportive density?" as a general rule the minimum density to support high-performing local bus transit service is 5 to 7 households per acre and transit use increases most significantly when density increases from 6 to 12 households per acre. This appendix provides a more complete overview of the research linking land use/development factors to transit ridership.

For the purpose of comparison, the following conversions and assumptions are used:

- 1 dwelling unit/acre = 640 dwelling units/square mile
- 1 dwelling unit/acre = 2.5 persons/acre = 1600 persons/square mile

Density

Several studies point to a strong connection between density and transit ridership. In *Transit Metropolis*, Robert Cervero states, "It is widely agreed that higher urban densities will do more than any single change to our cityscapes in attracting people to trains and buses."

A general conclusion, aggregating a number of density studies, is that every 10 percent increase in population and employment densities yields anywhere between a 5 and 8 percent increase in transit ridership, controlling for other factors (such as lower incomes, restricted parking, and better transit services generally associated with more compact settings). Other studies listed below refine this conclusion.

- A well recognized analysis highlights the relationship between residential densities and different types of transit services these developments can support.[9] The authors conclude that at least 4 dwelling units per residential acre are required to support hourly local bus service. Densities of 7 dwelling units per residential acre are needed for 30-minute service. These thresholds are also promoted by the Institute of Transportation Engineers (ITE) which recommends a series of minimum levels of service for transit corresponding to several levels of residential density and employment center size. [10] ITE defines the threshold for hourly service at 4 to 6 dwelling units per residential acre, or 5 to 8 million sq. ft. of active commercial/office space. This resource specifies the threshold for 30-minute service at 7 to 8 dwelling units per residential acre or 8 to 20 million sq. ft. of active commercial/office space.

Two studies cited a level of residential density at which point transit ridership per person or household levels out (at about 1.5 transit trips per household per day):

- A study by Spillar and Rutherford (1998) states, "Transit use per person grows with increasing density up to a ceiling at somewhere between 20 and 30 people per acre (about 19,000 people per square mile or 12 dwelling units/acre). In terms of income, in higher income neighborhoods (those with less than 18 percent low-income families)

[9] Pushkarev, B. S. and J. M. Zupan. "Where Transit works: Urban Densities for Public Transportation." in *Urban Transportation: Perspectives and Prospects*, ed. by H. S. Levinson and R. A. Weant, Westport, CT, Eno Foundation (1982).
[10] ITE. *A Toolbox for Alleviating Traffic Congestion*. Washington, DC(1989).

density has less of an effect on transit use than in low-income areas, but this could be due to the relatively small number of samples available."[11]

- Similarly, the San Francisco Bay Area region's Metropolitan Transportation Commission surveyed over 10,000 households throughout the metropolitan region in its 1990 Household Travel Survey, and showed that transit trip ridership per household flattens out at a density of about 30 households per acre, or roughly 48,000 people per square mile. (See Figure 6, below). The study also shows that transit needs a base of at least 5 households per acre (8,000 people/square mile) before ridership will grow, increasing noticeably at about 10 households per acre (16,000 people per square mile) and up.

Figure 6 Average Daily Trips per Household vs. Density

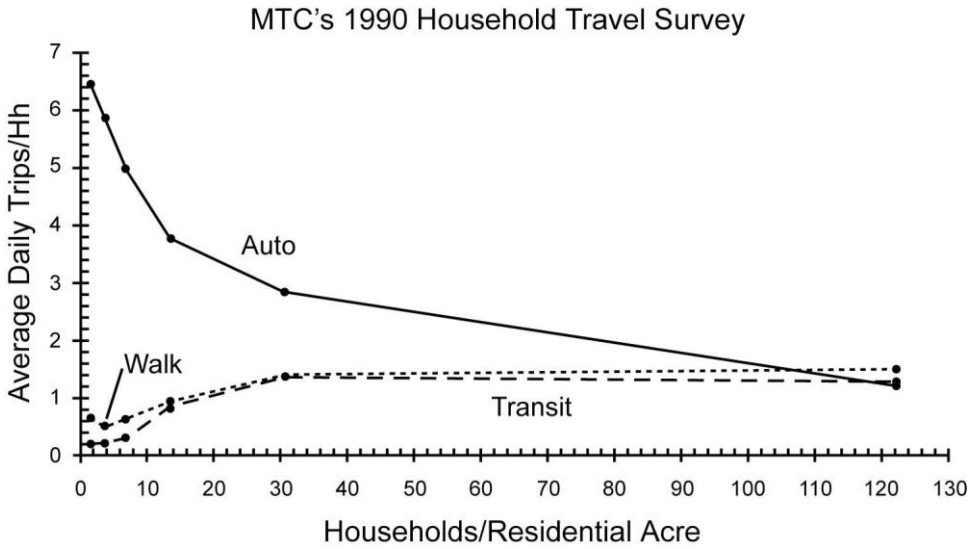


Figure 6 shows that when neighborhoods are more compact, trip lengths are shorter. Many destinations are close at hand. As a result, auto trips fall sharply, while more trips are taken by walking and transit. A crucial point is that up to about 12 households/acre, the relationship between density and transit use is parabolic – transit ridership/household rises faster than density. Transit ridership/acre (the real determinant of the market for a given transit service) thus rises extremely steeply against density up to this threshold, then gradually falls back to a linear relationship in which every new increment in population (and hence density) added to a fixed area generates new ridership at the same rate.

- Newman and Kenworthy (1989) found that that at densities below 12 persons per acre (7,500 persons per square mile) the bus service becomes poor. They therefore recommend densities above 5 to 6.5 dwelling units/ acre (7,500 to 10,000 persons per square mile) for public transit-oriented urban areas.[12]

[11] Spillar, Robert J., and G. Scott Rutherford. 1998. "The Effects of Population Density and Income on Per Capita Transit Ridership in Western American Cities." *Institute of Transportation Engineers' Compendium of Technical Papers*: 60th Annual Meeting. August 5-8, 1998. Pp. 327-331.

[12] Newman, P. and J. Kenworthy. Cities and Automobile Dependence: An International Sourcebook. Aldershot, Avebury Technical (1989).

- Levinson and Kumar (1994) conclude that relationships between density and mode choice "are found only in densities greater than 10,000 persons per square mile," (6 dwelling units/acre) using data from the 1990/91 Nationwide Personal Transportation Survey (NPTS). The lower limit of 7,500 persons per square mile (4.5 dwelling units/acre) is also used in other sections of the paper.[13]

- For employment density, a study of travel behavior in the Seattle metropolitan area, Frank and Pivo (1994) concluded that a threshold exists at which transit work trips showed a significant increase, of 50 to 75 employees per acre, and nine to 13 persons per gross acre (5500 to 8500 persons per square mile). They found that there are thresholds of 75 employees per acre and over 18 persons per gross acre (11,500 persons per square mile) for the same phenomenon to occur for shopping trips.[14] Note: a more in-depth account of the Frank and Pivo study will be provided in the final report.

- The 1996 TCRP paper, *Transit and Urban Form*, reviewed several studies that all pointed to a correlation between density and transit trip generation.[15]

- In an analysis of transit demand in Portland, Oregon, Nelson\Nygaard (1995) found that "of 40 land use and demographic variables studied, the most significant for determining transit demand are the overall housing density per acre and the overall employment density per acre. These two variables alone predict 93 percent of the variance in transit demand among different parts of the region."[16]

- An unpublished TCRP analysis of travel behavior in 11 metropolitan areas surveyed in the 1985 Housing Survey suggests that both land use mix and residential densities contribute to transit mode choice decisions. It determines that the probability of choosing transit is better explained by the overall levels of density rather than by measures of land use.[17]

- Research conducted to establish the Location Efficient Mortgage program shows an indirect correlation between density and transit ridership, by illustrating an inverse impact on vehicle trips and miles traveled. The research included every neighborhood in the Los Angeles, San Francisco and Chicago metropolitan areas, and controlled for other potential explanatory variables such as household income and household size. As shown in Figure 7, in each of the three metropolitan areas, the compactness of the neighborhood was found to be the most important explanatory variable. As residential density in a neighborhood rises, the number of nearby destinations (such as shops, restaurants and other services) increases, and as a result, driving rapidly decreases.

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[13] Levinson, D. and A. Kumar. "The Rational Locator: Why Travel Times Have Remained Stable." *Journal of the American Planning Association*, 60, 3 (1994) pp. 319–332.

[14] Frank, L. D. and Gary Pivo. *Relationship Between Land Use And Travel Behavior in the Puget Sound Region*. Olympia, WA: Washington State Department of Transportation, WA-RD 351.1 (1994).

[15] Source: (http://transweb.sjsu.edu/publications/transitridership2/TransitRidership_7_16.pdf), The Mineta Transportation Institute College of Business, 2002

[16] Nelson/Nygaard Consulting Associates. "Land use and Transit Demand: The Transit Orientation Index," Chapter 3 of *Community Transit Network Study* (Draft). Portland, OR: Tri-Met (1995).

[17] Transit Cooperative Research Program. 1996. Transit and Urban Form. Washington, D.C.: National Academy Press. TCRP Report 16(1): 1-25. Unpublished paper entitled, *Influence of Land Use Mix and Neighborhood Design on Transit Demand.*

Figure 7 Driving vs. Residential Density

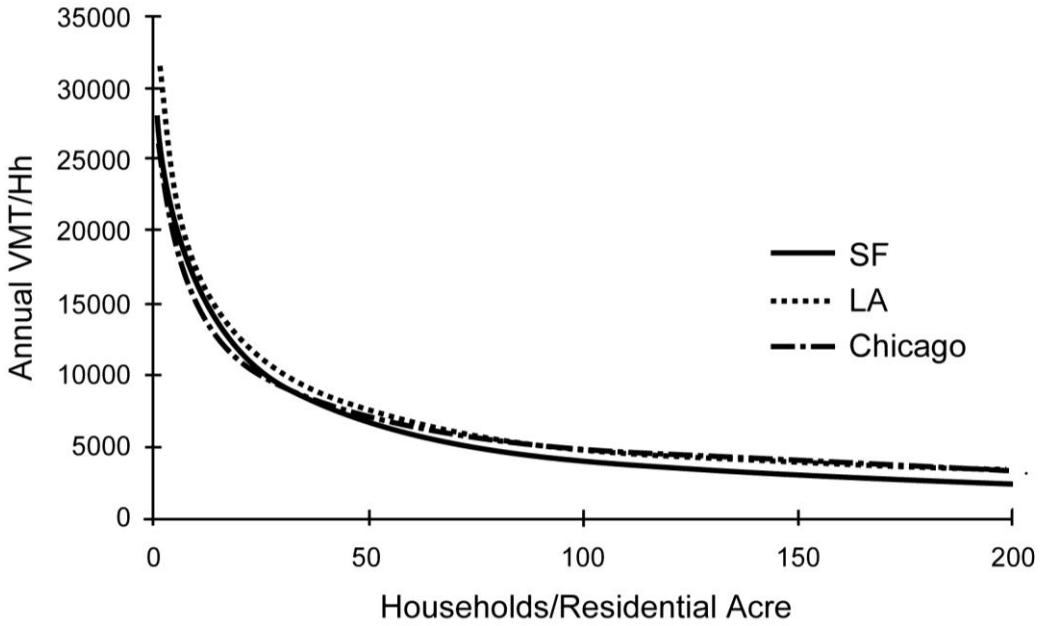

Figure 7 shows the reduction in vehicle miles traveled per household as residential density increases. In Los Angeles neighborhoods with a density of two households per acre, the average household drives nearly 25,000 miles per year. At 40 households per acre (the density of the Mission Meridian Station project), the average Los Angeles household drives approximately 8,000 miles per year. Note that the parabolic part of the transit ridership curve in Figure 6 corresponds to the steepest part of the curve in this figure, beginning to flatten at about 12 du/acre.

Appendix E.2: Effects of TDM Programs

Transportation Demand Management, or TDM, refers to strategies that manage or influence how residents and employees use the transportation system in order to increase overall system efficiency. TDM strategies aim to shift single-occupant vehicle (SOV) trips to other modes of travel such as transit, carpooling or bicycling, or out of peak travel periods when roads are most congested. Figure 8 provides a brief overview of the effectiveness of various transportation demand management strategies, which are often quantified in terms of the reduction in vehicle trips. Reducing the number of vehicle trips has benefits such as reduced congestion and can translate into increased use of alternative forms of transportation, including transit.

The first section of this appendix summarizes research into the effect of different types of TDM strategies. The second section provides several packages of TDM strategies and ranges of trip reduction benefits.

Figure 8 Impact of Selected Employer-Based TDM Strategies

Strategy	Details	Employee Vehicle Trip Reduction Impact
Parking Charges[1]	Previously Free Parking	20-30%
Information Alone[2]	Information on Available SOV- Alternatives	1.4%
Services Alone[3]	Ridematching, Shuttles, Guaranteed Ride Home	8.50%
Monetary Incentives Alone[4]	Subsidies for carpool, vanpool, transit	8-18%
Services + Monetary Incentives[5]	Example: Transit vouchers and Guaranteed Ride Home	24.5%
Cash Out[6]	Cash benefit offered in lieu of accepting free parking	17%

1 Based on research conducted by Washington State Department of Transportation.
2,3, 5 Schreffler, Eric. "TDM Without the Tedium," Presentation to the Northern California Chapter of the Association for Commuter Transportation, March 20, 1996.

4 Washington State Department of Transportation

6 Donald Shoup (1997), "Evaluating the Effects of California's Parking Cash-out Law: Eight Case Studies," Transport Policy, Vol. 4, No. 4, 1997, pp. 201-216. http://www.commuterchallenge.org (accessed November 2, 2007)

Parking Management

TDM programs have been shown to reduce employee vehicle trips by up to 38%, with the largest reductions achieved through parking pricing.[18] Observed reductions range from 15% to 38% (Shoup & Willson, 1990; Comsis, 1993; Pratt, 2000). Parking cash-out programs tend to have significantly lower impacts (Pratt, 2000). Donald Shoup finds that single occupancy vehicle trips declined by 17% and other modes increased significantly (carpooling by 64%, transit by 50%, and walking/biking by 33%) after a parking cash-out program was introduced at various urban and

[18] Shoup & Willson (1980); Comsis (1993); Valk & Wasch (1998); Pratt (2000).

suburban worksites with varying levels of transit service.[19] Another study of City of Pleasanton (CA) employees saw a doubling of participation between 1993 and 2004 and an annualized reduction of 20,625 commuter vehicle trips.[20]

Parking supply is another key indicator of trip generation. Research shows that there is an indirect link between reduced minimum parking requirements and a decline in vehicle trips. Setting minimum parking requirements often results in lower parking prices, as the supply of parking exceeds demand, which in turn increases vehicle ownership and the propensity to use a vehicle for work trips. Studies reveal that the elasticity of vehicle ownership with respect to price is typically -0.4 to -1.0, hence a 10% increase in total vehicle costs reduces vehicle ownership 4-10%.[21]

Average income households spend an average of $3,800 annually per vehicle.[22] Assuming that residential parking spaces have an annualized cost of $800 per year, parking costs add 21% to vehicle costs for an average income household. Assuming a vehicle price elasticity of –0.7 (Figure 9), minimum parking requirements that exceed the actual demand for parking increase vehicle ownership about 15%. The resulting increase in vehicle ownership produces more vehicle trips. Conversely, decreasing or eliminating requirements would result in a proportionate reduction in residential vehicle trips.[23]

Figure 9 Vehicle Ownership Reductions from Residential Parking Pricing

Annual (Monthly) Fee	-0.4 Elasticity	-0.7 Elasticity	-1.0 Elasticity
$300 ($25)	4%	6%	8%
$600 ($50)	8%	11%	15%
$900 ($75)	11%	17%	23%
$1,200 ($100)	15%	23%	30%
$1,500 ($125)	19%	28%	38%

Source: Nelson\Nygaard (2010), Santa Monica LUCE Trip Reduction Impacts Analysis

Subsidized Transit Passes

Free transit pass programs have been shown to increase transit ridership by 50-79% (City of Boulder, undated; Caltrans, 2002), and reduce vehicle trips by 19% (Shoup, 1999). Todd Litman of the Victoria Transport Policy Institute confirms the trip reduction benefits of transit subsidies by workplace setting. Figure 10 below depicts the potential impacts of a transit pass program for different land use environments.

[19] Donald C. Shoup, *Evaluating the Effects of Cashing Out Employer-Paid Parking: Eight Case Studies*, http://www.arb.ca.gov/research/apr/past/93-308a.pdf.
[20] U.S. Environmental Protection Agency (2005), *Parking Cash Out: Implementing Commuter Benefits as One of the Nation's Best Workplaces for Commuters,* http://www.bestworkplaces.org/pdf/ParkingCashout_07.pdf
[21] Victoria Transport Policy Institute (2009), Transportation Elasticities, http://www.vtpi.org/tdm/tdm11.htm
[22] Bureau of Labor Statistics (2003), Consumer Expenditure Survey, 2002, www.bls.gov.
[23] From Nelson\Nygaard (2010) Santa Monica LUCE Trip Reduction Impacts Analysis.

Figure 10 Vehicle Trip Reduction by Workplace Setting and Daily Transit Subsidy

	Daily Transit Subsidy			
Worksite Setting	**$0.75**	**$1.49**	**$2.98**	**$5.96**
Low density suburb, rideshare oriented	0.1%	0.2%	0.6%	1.9%
Low density suburb, mode neutral	1.5%	3.3%	7.9%	21.7%
Low density suburb, transit oriented	2.0%	4.2%	9.9%	23.2%
Activity center, rideshare oriented	1.1%	2.4%	5.8%	16.5%
Activity center, mode neutral	3.4%	7.3%	16.4%	38.7%
Activity center, transit oriented	5.2%	10.9%	23.5%	49.7%
Regional CBD/Corridor, rideshare oriented	2.2%	4.7%	10.9%	28.3%
Regional CBD/Corridor, mode neutral	6.2%	12.9%	26.9%	54.3%
Regional CBD/Corridor, transit oriented	9.1%	18.1%	35.5%	64.0%

Source: Victoria Transport Policy Institute (2008), *Transportation Elasticities*, http://www.vtpi.org/elasticities.pdf

Carpooling and Rideshare

Research indicates that ridesharing programs typically attract 5-15% of commute trips if they offer only information and encouragement, and 10-30% if they also offer financial incentives such as parking cash out or vanpool subsidies.[24] Rideshare programs that include incentives such as HOV priority and parking cash-out often reduce affected commute trips by 10-30%.[25] If implemented without such incentives travel impacts are usually smaller. A study conducted by Reid Ewing concluded that ridesharing programs can reduce daily vehicle commute trips to specific worksites by 5-15%, and up to 20% or more if implemented with parking pricing.[26]

Carsharing

The trip reduction benefits of carsharing are increasingly backed by research findings. According to TCRP Report 108, each car-sharing vehicle takes nearly 15 private cars off the road – a net reduction of almost 14 vehicles.[27] A UC Berkeley study of San Francisco's City CarShare found that members drive nearly 50% less after joining. The research also indicates that nearly three-quarters of the vehicle trips made by members were for running errands, visiting friends and other social activities, meaning that only roughly one-quarter of trips were for commuting to work.

Alternative Work Schedules

Compressed work weeks and telecommuting are TDM strategies that eliminate vehicle trips by decreasing the number of work days while maintaining the level of work hours (i.e. working four 10-hour days per week) and shifting the worksite to an employee's home, respectively. :Research by Apogee (1994) demonstrated that compressed work weeks can reduce VMT by up to 0.6% and vehicle trips by up to 0.5% in a region. However, two other studies showed that compressed work weeks may provide more modest reductions in total vehicle travel, in part because

[24] Bryon York and David Fabricatore (2001), *Puget Sound Vanpool Market Assessment*, www.wsdot.wa.gov.
[25] Philip Winters and Daniel Rudge (1995), *Commute Alternatives Educational Outreach*, www.cutr.eng.usf.edu.
[26] Reid Ewing (1993), *TDM, Growth Management, and the Other Four Out of Five Trips.*
[27] Transportation Research Board (2005), *Car-Sharing: Where and How it Succeeds*, Transit Cooperative Research Program Report 108. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_rpt_108.pdf

participants make additional trips during their non-work days.[28] Compressed work weeks may also encourage some employees to move further from worksites or to drive rather than rideshare, effects not accounted for in any of the tools.

Telecommuting generates even smaller trip reductions. Recent research concludes that only one in ten employees that are in a telecommuting suitable environment either have employers that would host such a program, or would in fact telecommute if given the chance.[29]

Potential Results from Packages of TDM Strategies

Figure 11 presents nine different packages of TDM programs and the employee vehicle trip reduction impact that can be expected from each. The impact of these programs is measured as the percentage of employee vehicle trips reduced from the existing baseline and is based on documented program results from a number of studies and reports. The impacts are measured at the site level. The TDM program impacts are presented as ranges, since no two situations are the same and different sites offering the very same programs will have different results based on:

- Level of ongoing support for the TDM program including the presence of dedicated staff to administer and coordinate TDM efforts
- Level of public transportation serving the site
- Typical length of commutes
- Price of gasoline
- The urban / suburban / rural nature of the site including proximity to nearby attractions (other work sites, personal errand and restaurant locations etc)
- External transportation factors (e.g. HOV lanes, bus service, traffic conditions)
- Nature of workforce (work schedule reliability, skill levels, salary levels)
- The synergy of the elements in the TDM package and how they work for that particular site (e.g. use of Guaranteed Ride Home to alleviate concerns about carpooling and possibly needing to go home early to take care of family members)

The nine packages are organized from least to most aggressive. The first six show potential program impacts of TDM programs when parking is free. The last three show potential program impacts when parking is not free. The program packages vary in their combinations and intensity of each of the following five elements:

- Information (e.g. educating employees about options, potential cost savings, tax impacts)
- Services (e.g. preferential parking; Guaranteed Ride Home programs, shuttles)
- Financial Incentives (e.g. reward for participation, partial to full subsidy of alternate mode travel costs)
- Financial Disincentives (e.g. charging for employee parking)
- Site Design (e.g. land use development that encourages use of alternate modes)

[28] See Ho and Stewart (1992) and Giuliano (1995)
[29] See Joanne H. Pratt and Associates (1999); LDA Consulting (2004); Mokhtarian, P. et al. (1996)

Figure 11 TDM Strategies and Potential Impacts

A	**Information Only Programs**
Trip Reduction[30]	1% to 3%
Elements	• New employee orientation • Brochures • Information kiosk • Newsletter articles • Preferential carpool parking with no staff support or enforcement • Advertise carpool information phone number • Annual promotional events

B	**Information + Modest Services/Incentives**
Trip Reduction	3% to 9%
Elements	• Information: see above • Preferential carpool parking with enforcement and promotion • Carpool and vanpool database / formation • Promotional financial incentive (e.g. one-time vanpool subsidy or chances to win prizes) • Commuter Club that offers discounts at stores/restaurants, mugs, monthly give-aways of small items, etc. • On-site amenities – cafeteria, bank machine

[30] Trip reduction refers to estimated range of employee vehicle trip reduction based on review of TDM program results.

C	**Information + Moderate Services & Moderate Financial Incentives**
Trip Reduction	7% to 15%
Elements	● Information services described above ● Bicycle lockers, showers ● Guaranteed Ride Home program ● Full-time TDM program coordinator/manager ● Lower frequency shuttles, as applicable and/or a mid-day shopper shuttle ● On-site circulator shuttle or golf-carts and/or campus bicycles ● On-site amenities - dry cleaning, café/restaurant, convenience retail ● Vanpool support – e.g. empty seat subsidies, formation meetings ● Moderate financial incentives – e.g. 30% coverage of vanpool costs, monthly gift certificates or drawings for substantial prizes ($100+ value) ● Fleet vehicles for mid-day trips (useful if employees drive in order to make midday errands) ● On-site transit ticket sales, if applicable ● Allow employees to work alternative work schedules or telecommute

D	**Information and Aggressive Services**
Trip Reduction	12% to 25%
Elements	• Information services described above, plus • Subscription buses • Employer-owned/sponsored vanpools • Aggressive carpool formation and HOV parking program • Frequent shuttle service up to all-day service • Extensive shuttle program – e.g. on-site, mid-day downtown connector, local residential shuttles • Aggressive alternative work hours program (e.g. require some departments to work 9/80 or 3/36 unless an exception is made) • Aggressive telecommuting program (e.g. employer pays for home office set-up) • On-site amenities – child care, fitness center (useful if employees drive in order to make midday errands or trip chain to/from work) • Bicycle Commuter Club/Promotion, • Bike parking (variety of options), showers

E	**Information and Aggressive Financial Incentives**
Trip Reduction	12% to 25%
Elements	• On-going transit subsidies covering at least 50% of transit costs • Vanpool subsidies • Eco-Pass (free transit for everyone) • Transportation allowance received by all users of alternatives

F	**Information + Aggressive Services and Financial Incentives**
Trip Reduction	17% to 33%
Elements	• Services listed in D • Financial incentives listed in E

G	**Institute Parking Charges where Previously Free**
Trip Reduction	18% to 35%
Elements	Maintain existing conditions, but begin charging up to market rates for parking

H	**Information + Aggressive Services and Financial Incentives + Parking Charges**
Trip Reduction	22% to 40%
Elements	Package F + Parking Charges or Parking Cash-Out (instead of charging for parking, Cash-Out programs rebate the cost of parking to employees who do not drive – creating the financial incentive not to drive alone and park)

I	**Information + Aggressive Services and Financial Incentives + Parking Charges + Site Designed to Limit Trips**
Trip Reduction	25% to 65%
Elements	Package H + ● On-site housing ● Wide sidewalks ● Street-level, pedestrian facing retail ● Building design to embrace pedestrian ● Extensive bicycle network and parking ● Shared parking or 3rd party-provided parking ● Satellite/peripheral/remote ● Proximity to transit node ● Green spaces that promote picnicking ● Mixed-use facility or located within urban core