Kane County Transportation Planning Area Study

Sugar Grove, Aurora, Montgomery Planning Area Transportation Improvement Plan

CH2MHILL

April 2004

Report

Sugar Grove, Aurora, Montgomery Planning Area Transportation Improvement Plan

Submitted to:

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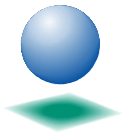

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Introduction

Background

In October 2000, the Kane County Division of Transportation and CH2M HILL began a transportation planning study to develop a recommended plan of transportation improvements for areas within the County. The project consists of two phases; first, a countywide assessment of existing and future travel conditions, and then a more detailed study of transportation issues within each designated planning area. The Kane County travel demand model1 was used to evaluate existing and future travel conditions. Traffic performance was aggregated by Planning Partnership Area (PPA) to identify areas having the highest concentration of performance issues. These locations were used as a guide in the delineation and prioritization of planning areas. This report describes the results of the planning area process and presents a recommended plan for the Sugar Grove, Aurora, Montgomery (SAM) Area. The plan consists of a toolbox of solutions including new collector roads, arterial improvements, transit enhancements, bike/pedestrian trails, regional connections, and access control guidelines.

Analysis of Existing and Future Conditions

Existing transportation facilities in Kane County are comprised of highways, public transportation routes and facilities, and accommodations for non-motorized modes. There are approximately 550 miles of highway in the county including two interstate highways, three U.S. highways, 11 state highways, and about 310 route miles of county highway. Kane County is also served by Metra commuter rail and Pace buses, as well as, by a network of bike/pedestrian trails.

Performance of the existing street and highway transportation system was evaluated in three categories: (1) traffic service, (2) congestion, and (3) safety. Measures of performance in terms of traffic service include Vehicle Miles of Travel (VMT), Vehicle Hours of Travel (VHT), and Vehicle Hours of Delay (VHD). In examining the traffic performance of all highways in the county, principal arterials, which account for approximately one-quarter of the lane miles, were found to carry the bulk of traffic (approximately 50 percent) and account for an even larger proportion of delay (approximately 55 percent). The primary performance measure for congestion is Level of Service (LOS).[2] Under existing conditions, 14 percent of the route-miles in Kane County were found to be operating at LOS D, E, or F and consequently were judged to be congested. Existing traffic safety performance was measured using predictive crash frequency models. Fifteen intersections and fifteen route miles of county roads were classified in the highest priority category for safety.

The next step in the countywide analysis was a forecast of future travel demand based on projected growth of population and employment. Population of Kane County is expected to grow from 317,000 in 1990 to 552,000 in 2020 and employment is expected to increase from 174,000 to 211,000 during the same period. Future travel demand was determined by incorporating increased population and employment by traffic analysis zone (TAZ) into the

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[1] *Development and Calibration of Kane County Transportation Systems Planning Model*, CH2M HILL (May 2000)

[2] See page 16 of *Existing Transportation Conditions and Forecasts of Future Travel Demand*, CH2M HILL (May 2001) for an explanation of LOS.

travel demand model. Growth factors were calculated for each highway segment using a comparison of modeled volumes for the base year and 2020. These growth factors were then applied to 1997 counts to predict 2020 average daily traffic (ADT). Areas with the largest anticipated traffic growth would be Sugar Grove, West Geneva/West Batavia, Elgin, and West Upper Fox.

The 2020 trip table was then assigned to a network including both existing highways and committed projects. Future traffic service and congestion measures were calculated and compared to existing performance. Between 1997 and 2020, VMT within the county is expected to grow by 93 percent, VHT by 105 percent, and VHD by 750 percent. Also, by 2020, it is anticipated that, without improvements, 56 percent of the lane miles of highway within the county will be congested compared with just 14 percent in 1997.

The final step in the analysis of the existing and future transportation conditions was the aggregation of performance measures by Planning Partnership Area (PPA). The five measures analyzed for each PPA were:

- VMT per lane mile,
- VHT per lane mile,
- VHD per lane mile,
- Change in speed, and
- Percent-congested lane miles.

Each PPA was classified into one of three priority categories for each performance measure: immediate need, near-term need, or long-term need. See Figure 1. The Greater Elgin PPA was the only area exhibiting the highest priority, immediate need, for all categories of performance. Part of the Sugar Grove, Aurora, Montgomery area fell into the immediate need or near-term need categories for four of the five performance measures. For more information regarding the analysis of existing and future transportation conditions in Kane County, refer to the *Existing Transportation Conditions and Forecast of Future Travel Demand* (May 2001) report.

Product of Delineation and Prioritization Process

The delineation and prioritization of planning areas in Kane County was accomplished using a five-step process.

1. Analysis of Planning Partnership Areas
2. Layering of performance measures
3. Delineation of transportation planning districts
4. Prioritization of districts
5. Selection of planning areas for further study

At the county level, the relative priority of transportation need in each PPA was evaluated by performance. This assessment served as a guide in identifying locations of concern, but was not sufficient in itself to delineate and prioritize the planning areas. Therefore, a more detailed study was conducted by bounding the areas of influence of the individual performance issues. Clusters of performance problems were delineated to define the planning areas and then compared to one another to prioritize the order of study. Those areas classified as having immediate or near-term needs would be studied first and those

areas designated to have longer-term needs would be studied at a later date. Figure 2 illustrates the areas with a clustering of performance problems and the areas identified as having immediate or near-term need. A number of areas have been designated for further study. The West Upper Fox Area served as a prototype for the planning area process. The Sugar Grove, Aurora, Montgomery planning area, which is the subject of the remainder of this report, has also been selected for further study and will follow the West Upper Fox planning model. For more information regarding the delineation and prioritization of planning areas refer to the report, *Delineation and Prioritization of Planning Areas* (July 2001).

Sugar Grove, Aurora, Montgomery Planning Area

Development Trends

Currently, there is a large quantity of developable land in the Sugar Grove, Aurora, Montgomery (SAM) planning area. During the next 20 years, significant development (mostly residential) of varying density is projected to occur. Commercial development is proposed for the areas around IL 47 between U.S. 30 and Bliss Road, at IL 47 and U.S. 30, along Orchard Road and Deerpath Road from I-88 to north of Oak Street, and along Orchard Road from U.S. 30 to Jericho Road. Information was gathered regarding a number of planned developments. Plans of residential and commercial developments under construction, in the permitting process, or in the planning phase were provided by local communities or identified during a field review. These data varied in level of detail depending on the stage of implementation of each project.

A comparison was made between the socioeconomic forecast provided by the Northeastern Illinois Planning Commission (NIPC) and projected development trends. The number of dwelling units to be provided in each planned residential development was determined and compared to the NIPC 2020 forecast by traffic analysis zone (TAZ). Where data pertaining to planned development did not contain detailed information on the exact number of households, assumptions were made regarding densities. Average densities were calculated for different types of existing development. The assumed densities used were 1.5 units per acre for low-density residential developments, and 2.3 for medium-density residential developments. Using the Geographic Information System (GIS) to calculate acreage of each development (if not provided), and given an assumed density, the number of units could be calculated for each prospective development.

Commercial and industrial development assumptions were used to convert gross acreage to leasable/usable square footage. For commercial development leasable square footage has been assumed to be equivalent to 0.25 times the gross square footage. For industrial development the gross square footage would be multiplied by 0.75 to obtain net square footage. This value would then be multiplied by 0.4 to determine the leasable area.

In comparing the socioeconomic forecast derived from planned development in the SAM planning area to the NIPC forecast it was found that some of the developments were completely accounted for, but others were not entirely included. In some cases, developments were assigned to neighboring TAZs. Areas wherein adjustments were made to the NIPC population and employment data are shown in Figure 3.

For input to the travel demand model, residential occupancy was estimated at 2.77 persons per household. A total of 9,660 household were added in the SAM area, creating an increase in population of approximately 26,800 more than the prior forecast. In addition, the prior employment forecast was increased by 480 workers. For details regarding the population and employment data comparisons and adjustments refer to Appendix A.

To more accurately represent the network for the SAM area, three large TAZs were split into twelve TAZs. This allows the trips originating or destined to each TAZ to access the network at multiple locations via centroid connectors. Each four square mile TAZ was split into four equal TAZs, each 1 mile square. The socioeconomic forecast for the larger TAZ was then equally distributed to the four smaller TAZs.

Another adjustment to the model for the SAM planning area was the calculation of additional attractions related to special generators, or large trip attraction centers. Two special generators in the SAM planning area are the Aurora Municipal Airport and Waubonsee Community College. Trip generation was computed using the Sixth Edition of *Trip Generation* by the Institute of Traffic Engineers. The trip generation rate for the airport was based on forecast average number of flights per day while the community college forecast trips were based on the forecast enrollment. The number of trips determined in this manner were incorporated into the attractions portion of the gravity model.

Development occurring south of the county line would also have an impact on travel demand within Kane County. For this reason, anticipated growth in the northern sections of Kendall County was also investigated. The major sources of data included Kendall County, Village of Montgomery, Village of Oswego, and United City of Yorkville. The area outside of Kane County is considered external to the travel demand model and adjustments were completed with a different procedure than described above. Socioeconomic data were not provided for comparison for external zones, only the number of trips was available. To compare similar quantities, the number of expected trips based on total existing and proposed development, was determined for the northern townships in Kendall County. The number of trips per zone was then updated to account for additional development. Areas east of the Fox River were found to be adequately represented with regard to anticipated growth. There was an increase, however, in the number of trips per zone for areas west of the Fox River (See Figure 4).

Growth of Travel Demand

Figure 5 shows forecast travel growth between 1997 and 2020 in the SAM area. The largest increases would occur on the Illinois Tollway (I-88), particularly the section east of the merge with IL 56. Other highways experiencing appreciable traffic growth would be Orchard Road north of I-88, Randall Road, IL 56 between U.S. 30 and I-88, and to a lesser degree IL 47/U.S. 30, Orchard Road south of I-88, and IL 47 on either side of the interchange with I-88.

Future System Performance

Performance of transportation facilities in the SAM area under future (2020) conditions was measured to identify roadways that would operate poorly. System performance was evaluated for conditions including the interstate highways (tollways). Arterials comprise a

large percentage of the lane miles in the area (45 percent) and account for much of the area's VMT (52 percent), and VHD (68 percent). Collector roads in the SAM area account for 37 percent of the lane miles but only 15 percent of the VMT and 16 percent of the VHD. The weighted percentage of congested lane miles operating at LOS D or worse would be 74 percent considering all roadways. The average speed on the roadway network would be 41 mph with all facilities included in the summary. Figure 6 shows roadways operating at LOS F (severe congestion).

Sugar Grove, Aurora, Montgomery Planning Area Transportation Improvement Plan

Objectives and Constraints

A planning framework was established to assist in development and evaluation of a transportation improvement plan for the SAM area. The two primary components of the framework would be determination of planning objectives and identification of area constraints.

Objectives were established to determine the relative effectiveness of a specific transportation improvement. Techniques were also developed to measure conformance of the planned improvement with each objective. In evaluating conformance, however, each objective was considered individually and was not weighted or prioritized in comparison with the others.

Five objectives, as follows, were established for development of a transportation improvement plan in the SAM area:

- **Enhance connectivity** to the rest of the county and surrounding areas.
- **Reduce delay** as measured by vehicle hours of delay (VHD) per lane mile. The VHD would be normalized using lane-miles because the quantity of lane-miles varies from one alternative to another.
- **Reduce congestion** by lessening the percentage of congested lane-miles.
- **Be proactive towards development related to infrastructure improvements.** It would be desirable to plan for infrastructure improvements prior to development occurring, rather than reacting after the development is complete. This measure also would aid in prioritizing improvements according to the projected timing of developments.
- **Distribute trips to appropriate facility types.** The intent of this objective would be to encourage local trips to use the collector network and longer distance trips to utilize major arterials for regional travel. This measure would quantify the percentage of local trips on various facility types.

Two primary categories of constraints or sensitive areas would influence the type and location of transportation improvements proposed in the SAM area: environmental and socioeconomic. Environmental constraints in this area would include wetlands, forest preserves, parks, open space, and flood zones. Sensitive land uses would include churches, cemeteries, schools, and residential neighborhoods. These constraints should be considered

and potential impacts avoided or mitigated related to the recommended transportation projects. Locations of constraints in the SAM planning area are shown in Figure 7.

An important element of the planning process for the County has been the establishment of boundary agreements between adjacent municipalities. Figure 8 shows the adopted boundary line agreements and time of those agreements within the SAM Area. Boundary agreements assist the municipalities with defining their respective jurisdictions for land use and development planning. In the context of this area planning study, the boundary line agreements assist the County in coordinating recommended improvements with the municipalities.

Planned Transportation Improvements

Roadways

The type and location of planned roadway improvements in the SAM area, in addition to those already committed and included in the base network, were obtained from the following sources.

- Kane County 2020 Transportation Plan
- Chicago Area Transportation Study (CATS) 2020 Regional Transportation Plan (RTP), Appendix A
- Shared Path 2030 – Chicago Area Transportation 2030 Regional Transportation Plan
- Village of Montgomery 2002 Comprehensive Transportation and Access Plan
- 1984 Aurora Comprehensive Plan Update
- Aurora Countryside Vision Plan
- Village of Sugar Grove Comprehensive Transportation Plan
- Sugar Grove Village Center
- Interchange Feasibility Report – Illinois Route 56 at Hankes Road

The various documents comprise a mix of major and minor improvements and include widening or reconstruction of existing roadways as well as construction of new roadways. The widening of Orchard Road was considered a committed project and is scheduled for completion in the next 5 years. Major planned roadway improvements in the SAM area are summarized in Table 1.

TABLE 1
Planned Major Roadway Improvements in the SAM Area

Roadway	Improvement	Limits
U.S. 30	Widening to 4 Lanes	IL 47 to IL 31
U.S. 30/IL 47	Widening to 4 Lanes	Base Line Road to current 4-lane section
IL 47	Widening to 4 Lanes	Current 4-lane section to Main Street
Galena Boulevard	Widening to 4 Lanes	IL 47 to Orchard Road
I-88/IL 47 Interchange	Interchange Completion	
IL 56/Hankes Road Interchange	New Partial Interchange	
Gordon Road	New Construction/Widening to 4 Lanes	U.S. 30 to Galena Boulevard

Some of the improvements would be relatively minor such as realigning sections of Prairie Street. Many new roadways, collectors and arterials, have been identified and would connect neighborhoods and provide additional collector service in developing areas. Figure 9 shows the location of previously planned roadway improvements in the SAM area.

Public Transit, Bike and Pedestrian Facilities

Kane County DOT and other agencies have planned improvements to the area's transit, bike, and pedestrian facilities. The Kane County 2020 Transportation Plan identifies a Metra rail extension in the SAM area along the Burlington Northern/Sante Fe Rail Line with new commuter stations at Orchard Road and Sugar Grove. The Kane/Kendall Commuter Rail Extension Feasibility Study, Phase 2 and the CATS 2030 RTP identifies the extension of the Burlington Northern/Sante Fe rail line into Oswego with a station in Montgomery at U.S. 30, named the Avaya Station. Pace bus express routes are proposed on IL 56 and Orchard Road. New bike/pedestrian trails in the SAM area were identified in the Kane County Bicycle and Pedestrian Plan. Figure 10 illustrates the previously planned transit, bike, and pedestrian improvements.

Plan Development Process

The development of a transportation improvement plan for the SAM area was accomplished using a toolbox approach. The basic implements in such a toolbox would be collector roads, arterial improvements, regional connections, transit enhancements, bike and pedestrian paths, and access management strategies.

Measures of Effectiveness

Six performance measures were used to evaluate the effectiveness of the roadway improvements in achieving the objectives previously stated. Four of the measures were quantitative: vehicle hours of delay, weighted percent congested lane miles, percentage of lanes miles operating at LOS F, and distribution of local trips by facility type. Two of the measures were qualitative: connectivity to the roadway system, and the timing of roadway improvements relative to development trends.

Total delay was measured in vehicle hours of delay (VHD) summed for all roadways in the planning area including freeways and normalized using the number of lane miles. Delay is an important indicator of the quality of traffic operations, because it is most apparent to the driver.

The proportion of lane miles operating at LOS F and the weighted percent congested lane miles were used together to measure the level of congestion. The weighted percent congested lane miles measures the number of lane miles operating at LOS D, E, and F with relative weighting factors of 0.87, 1.0, and 1.2, respectively. The percentage of lane-miles operating at LOS F focuses on those roadways at the worst level of congestion. Often, a roadway enhancement may improve operation of a roadway segment from LOS F to LOS E. This change would not significantly affect the weighted percentage of congested lane miles, but a significant difference would be apparent when measuring only the percentage operating at LOS F.

An analysis of trip patterns is used to evaluate the effectiveness of a roadway improvement in redistributing trips onto appropriate facilities. For example, through trips that are typically longer than local trips should use arterial and higher functional class roadways. Shorter trips should use the local and collector roadways. The distribution of trips by facility type was measured using the percentage of VMT by functional classification.

Connectivity is a qualitative measure indicative of the ability of the highway system to efficiently route traffic. Also, since one of the county's objectives is to stay ahead of development, the time when a specific development is expected to occur is considered important in prioritizing highway improvements. The effectiveness of a particular project in reference to the timing of related land use development would be a function of whether the development had already been built, was under construction, or was in the permitting or conceptual phases. It would be most advantageous if the implementation of transportation improvements preceded or accompanied the land use development.

New Roadways

New roadways are identified in the area both through existing plans and determination of system deficiencies. New roads are also identified to enhance connectivity within and across the planning area boundary. A new road could be classified either as a collector road or an arterial, and may include the realignment of existing facilities.

Collector Road Improvements

Collector roads serve a dual function of providing for mobility as well as access to abutting land uses. An efficient and continuous collector road network would benefit the County. The collectors would be effective in removing local traffic from the arterial roads, thereby providing for enhanced mobility on the arterials. Collector roads would provide safe access to abutting residential areas and would help to control access onto the arterials. Also, the collector roads would provide an alternative route should an incident occur. Figure 11 illustrates the role played by various functional classifications of highway.

When modeling a collector-based transportation network, full efficiency was assumed. To ensure that the collector road system operates at the highest level of efficiency, design of the collectors should conform to conventional standards for this type of roadway. The collector roads would provide two through lanes (one in each direction), with turn lanes as required and appropriate access control. It was also assumed that the collector road system would be continuous. A partial collector road network would not have the same impact as one fully developed. If any of these conditions were compromised, traffic diversion from the arterials would diminish. Figure 12 illustrates desirable collector road cross-sections.

Local vs. Regional Trips. Key to developing a collector-based plan is an understanding of the effectiveness of a collector network in diverting trips from the arterial system. To a large extent, diversion would be reliant on the proportion of trips that are captive to the arterial system. Longer regional trips would be unlikely to divert from the arterials, but shorter local trips might find a less congested system of collector streets more attractive than the arterials.

It was assumed certain categories of trips using the arterial highways would not be diverted to a collector road network for the entire length of the trip. For example, trips having an origin or destination outside of the influence area of an arterial would not be expected to

divert to a collector system. These are referred to as "regional" trips and were assumed to be captive to the arterials.

Due to limitations of the travel-demand model, it was not feasible to incorporate all of the closely spaced collector roadways into the traffic assignment network. Instead, a skeleton collector network was incorporated into the model and adjustments were made to centroid connectors as needed to more accurately represent the traffic loading locations. The revised 2020 forecasted trip table was then assigned to the collector-based network and a comparison was made of the assigned volume on each arterial link versus the volume assigned without collectors. This difference was assumed to approximate the volume of travel that might be diverted from the arterials to collector roads.

Collector Performance. The collector-based plan would improve local connectivity by adding an in-fill network to link land uses throughout the area, but the addition of collector roads alone would do little to improve the regional connectivity. Daily system-wide VHD per lane mile would be reduced from 4 VHD/lane mile for the base system to 3 VHD/lane mile for the collector-based system. The weighted percentage of congested lane miles would improve from 74 percent to 36 percent. The proposed collector-based plan would also assist in establishing roads to connect future developments, and may even be partially constructed by the developers. The augmented collector road system would account for 54 percent of the area's lane-miles of roadway. The collectors would carry 20 percent of daily VMT and would experience 17 percent of the daily VHD on the highway system. Estimated cost of implementing the collector-based transportation plan in the SAM area would be approximately $165 million.

Arterial Improvements

Once the collector road network had been established, modeled arterial improvements were added to create a network having sufficient capacity to meet anticipated traffic demand. The steps involved in defining arterial improvements are as follows:

- Identify potential arterial improvements
- Determine effectiveness of each individual improvement project
- Estimate the cost of each improvement project
- Summarize performance of the improvement projects

Identification of Potential Improvements. The base arterial network in the SAM area was assumed to consist of existing highways and those already committed for implementation (Orchard Road). A list of potential additions to this network was developed, beginning with planned but not committed arterial improvement projects (Table 1) and then adding other potential projects that appeared to be warranted based on future traffic demand. The resulting list of potential major improvement projects in the SAM area is shown in Table 2.

TABLE 2
Planned and Potential Major Improvement Projects in the SAM Area

Roadway	Improvement	Limits
Previously Planned Improvements		
U.S. 30	Widening to 4 Lanes	IL 47 to IL 31
U.S. 30/IL 47	Widening to 4 Lanes	Base Line Road to current 4 lane section
IL 47	Widening to 4 Lanes	Current 4 lane section to Main Street
Galena Boulevard	Widening to 4 Lanes	IL 47 to Orchard Road
I-88/IL 47 Interchange	Interchange Completion	
IL 56/Hankes Road Interchange	New Partial Interchange	
Gordon Road*	New Construction 4 Lanes	U.S. 30 to Galena Boulevard
Potential Improvements		
Jericho Road	Widening to 3 Lanes	U.S. 30 to Orchard Road
Bliss Road	Widening to 3 Lanes	IL 47 to Healy Road

* Gordon Road is partially complete

In addition, secondary roadway enhancements were considered including realignment of Prairie Street at various locations, a connection between Dugan Road and Ashe Road, Ashe Road realigned to McCannon Road, Dugan Road realignment around the airport, and an extension of Indian Trail Road to Hankes Road.

The candidate roadway improvements were stratified into categories of major and secondary projects. See Table 3.

TABLE 3
Categories of Candidate Improvement Projects

	Improvement	Limits
Major Projects	U.S. 30	IL 47 to IL 31
	U.S. 30/IL 47	Base Line Road to current 4 lane section
	IL 47	Current 4 lane section to Main Street
	Galena Boulevard	IL 47 to Orchard Road
	IL 47/I 88 Interchange	
	IL 56/Hankes Road Interchange	
	Gordon Road	U.S. 30 to Galena Boulevard
	Jericho Road	U.S. 30 to Orchard Road
	Bliss Road	IL 47 to Healy Road
Secondary Projects	New Connection	Dugan Road to Ashe Road
	New Connection	Ashe Road to McCannon Road
	New Connection	Indian Trail Road to Hankes Road
	New Connection	Prairie Road (various locations)

Cost Estimates. Cost estimates for each of the individual improvements were determined using a cost model similar to the model developed for estimating the cost of Strategic Regional Arterials (SRAs). Costs were also applied to intersection and interchange improvements as well as for right-of-way acquisition. Appendix B presents a detailed explanation of the cost assumptions.

Optimizing Performance-to-Cost. The major improvements were modeled individually to determine the relative impact on the overall system performance. System performance for the alternative was then graphed against the cumulative cost of the alternative to compare the effectiveness of the improvements. The process was repeated by combining the remaining improvements with the one selected previously and completing an independent assessment. The output from the process was graphed by accumulating for the set of the improvements, the change in network performance and the estimate of construction cost.

Finally, secondary projects would be added to the plan and a concluding analysis would be made of the composite improvement plan.

Recommended Plan

The recommended plan for the SAM area would encompass a full range of transportation solutions. Improvements would be made to both the collector and arterial systems to create a complete roadway network. The cost of the improvements would be distributed among the state, county, and municipal agencies as well as to future development, creating a joint effort to improve transportation performance. Transit and pedestrian/bike trail improvements are also planned for the area. Additionally, the recommended plan would incorporate access management. The plan would recognize the importance of regional connectivity by incorporating improvements with a more regional scope. Components of the recommend plan are illustrated in Exhibit 1 found in a pocket at the back of this document.

New Roads

New roads are proposed as part of the SAM Plan. Most of the new roads are collector roadways providing increased access to local land uses. Also included in the new road system would be arterials and realignments of existing roads. The result of the in-fill collector roads would be a completed grid network that would provide access to abutting land uses. The proposed new roads are shown in Figure 13.

Collector Roadway Improvements

The foundation for the recommended plan is the establishment of an in-fill collector road network, which affords several distinct advantages in this area of Kane County. Since the collector network would distribute traffic demand more evenly among the area's roadways, the existing arterial highways would be capable of operating at an acceptable of performance for a longer span of time. The implementation of a collector system would also provide an opportunity to shift some of the financial burden to developers and/or local governing bodies.

In order to maximize the collector road system the collector network would need to be sufficiently complete and built to the recommended cross section so as to afford a continuous and efficient roadway network. Even then, not enough traffic would be diverted to the collectors to preclude the need to widen parts of the arterial system to accommodate the projected growth in traffic. The collector road network might delay the requirement to widen some of the arterial highways, but would not totally prevent this need. Collector highways incorporated in the recommend plan are shown in Figure 14. The proposed roadway alignments in Figure 14 are meant to represent an approximate corridor of the recommended roadway project. The preferred roadway alignment will be determined in the engineering phases of project development.

Arterial Roadway Improvements

In developing the recommended plan, the arterial improvement performance was summarized using the stepwise method described above. The arterial projects to be included are listed in Table 4.

TABLE 4
SAM Roadway Improvements

Roadway	Location	Length (route-miles)	Type
U.S. 30	IL 47 to IL 31	4.7	4 – Lanes
U.S. 30/IL 47	Base Line Road to 4-Lane Section	2.4	4 – Lanes
IL 47	4-Lane Section to Main St.	3.0	4 – Lanes
Galena Boulevard	IL 47 to Orchard Road	3.5	4 – Lanes
Bliss Road	IL 47 to Healy Road	2.7	3 – Lanes
Jericho Road	IL 47 to Orchard Road	1.3	3 – Lanes
Gordon Road & Extension	U.S. 30 to Galena Boulevard	2.7	4 – Lanes
I-88/IL 47			Partial Interchange
IL 56/ Hankes Road			New Partial Interchange
Collectors*		42.9	2 – Lanes
Realignments*		4.7	2 – Lanes

* Only includes alignments within planning area – others are shown to demonstrate connectivity

Gordon Road would be incorporated as a four-lane minor arterial to complete the arterial system. The Gordon Road and Ashe Road Corridors are planned to align with and extend regionally significant corridors planned in Kendall County. Additionally, the partial interchange at IL 56 and Hankes Road is incorporated into the recommended plan. Arterial roadway improvements incorporated in the recommended plan are shown in Figure 14. The proposed roadway alignments in Figure 14 are meant to represent an approximate corridor of the recommended roadway project. The preferred roadway alignment will be determined in the engineering phases of project development.

It is envisioned that along with the major improvements, as listed in Table 4, other enhancements such as intersection capacity improvements would occur in preparation of or in conjunction with the proposed widening of the arterials and collectors. The location of these capacity improvements would be at the discretion of the governing agency.

Regional Connections

The recommended plan also identifies improvements having a more regional need and effect. The proposed Prairie Parkway, a north/south expressway connecting I-80 and I-88 would be another potential regional improvement affecting the SAM area. Currently, the proposed Prairie Parkway is in the environmental review process and the alignment is under study. The Prairie Parkway was not included in this analysis because the final alignment has not been determined and the study emphasis for this planning area is on local improvements. This plan creates a working solution for the SAM area with projects that have a local significance and can be shaped and implemented by local governments in cooperation with the state as needed. When the preferred alignment of the Prairie Parkway has been selected, the SAM transportation plan should be reevaluated to address changes in land use and traffic patterns.

Performance and Cost

The overall recommended plan utilizes the Orchard Road, IL 47, and Gordon Road corridors to distribute north/south traffic, while east/west traffic would be distributed to the U.S. 30 and Galena Boulevard corridors, and, to a lesser extent, the Jericho Road corridor. The collector roads would provide an in-fill network to distribute traffic to local developments.

As arterial widening projects are added to the basic collector highway system, the daily vehicle hours of delay (VHD) per lane-mile would decrease from 4 VHD/lane mile in the base case to 2 VHD/lane mile with full implementation. The percentage of lane-miles operating at LOS F would decrease from 15 percent to 1 percent, almost entirely eliminating any roadway segment operating at failure. The weighted percentage of congested lane miles would decrease to 32 percent from 74 percent. The area roadway system would consist of 47 percent collectors and 41 percent arterials based on lane miles. However, the arterials would carry a large percentage of the daily VMT (46 percent) and would account for 27 percent of daily VHD, compared to 14 percent of VMT and 5 percent of VHD on the collector roads. With the addition of an interchange on Hankes Road at IL 56 and the completion of a full interchange on I-88 at IL 47, travel demand on the freeway would increase from 34 to 40 percent, thereby serving to complement the reduction in travel on the arterial roads. A summary of performance of the recommended plan is presented in Appendix C. Table 5 shows measures of effectiveness of the recommended plan along with comparative values for the future base condition.

After implementation of the recommended plan, much of the remaining system delay would be experienced on the tollway, which the projections indicate would operate at a poor LOS. The widening of I-88 has not been evaluated as part of the recommended plan. As shown in development of the West Upper Fox planning area, improvements to the tollway would not reduce the need for infrastructure improvements to the local roadway

system. Therefore, it was decided, for the purpose of planning, the county and municipalities would concentrate efforts on resolving local transportation issues.

TABLE 5
Comparison of Transportation Performance

Measure of Effectiveness (MOE)	Base Network	Recommended Plan
Vehicle-Hours of Delay (VHD)/Lane Mile	4	2
Percentage of Lane Miles at LOS F	15	1
Weighted Percentage of Lane Miles Congested	74	32
Percentage of VMT on Freeways/Arterials/Collectors	34 / 51 / 15	40 / 46 / 14
Estimated Cost	N/A	$265 – 325 Million*

* Does not include cost outside the planning area boundary such as improvements in North Aurora or the regional connections.

The BNSF railroad line runs east/west through the center of the SAM planning area. Four grade separations exist currently or would be proposed within the planning area. The crossing at Orchard Road is a recently completed grade separation. The crossing at Gordon Road is a proposed grade separation and will be considered a swap for the proposed at-grade crossing with the new collector road west of Gordon Road. The railroad crossing at IL 47 will need to be widened to accommodate a proposed four-lane cross section. The proposed collector road west of IL 47 will be grade separated. The existing railroad crossing at Dugan Road will remain an at-grade crossing.

Estimated total cost of the recommended transportation improvements (construction and right-of-way) in the SAM area would amount to approximately $325 million. This includes $165 million for development of the collector road network. Widening the arterials, as opposed to full reconstruction would reduce construction costs $60 million, for a total construction cost of $265 million. Developers and/or local municipalities are expected to construct or contribute financially to a large share of the collector roads. County road widening would be accomplished utilizing a variety of funding sources including the recently enacted imposition of impact fees. Many of the improvements in the SAM area are on state facilities and would be administered by IDOT through a capital improvement program. The cost estimate pertains to arterial and collector road improvements, and excludes the cost of transit, and bike/pedestrian facilities. The cost stratified by jurisdiction is shown in Table 6.

TABLE 6
Stratified Cost by Jurisdiction

Jurisdiction	Route Miles	Cost (millions)	% of Total
State (IDOT/ISTHA)	13.5	$110	34%
County	4.0	$20	6%
Others (Local/Developers)	50.3	$195	60%
Total	67.8	$325	100%

The access control plan and the right-of-way guidelines would apply to roadway projects along with capacity and safety improvements. The latter encompasses upgrades to signals or the addition of new signals to improve capacity and safety at intersections. Full channelization of improved intersections is also a requirement set forth by KCDOT.

Public Transit, Bicycle, and Pedestrian Facilities

The recommended public transit plan incorporates improvements already planned by Metra and Pace. A south extension of the BNSF line to Oswego is incorporated into the recommended plan as a planned improvement with a station at U.S. 30 in the Village of Montgomery named the Avaya Station. The west extension to Sugar Grove is incorporated into the recommended plan as a suggested improvement with a proposed station at Gordon Road. The station at Orchard Road was removed due to the lack of available space as a result of the construction of the overpass at Orchard Road. The suggested location of the commuter station could be relocated upon further study by Metra.

Park and ride lots are being planned for in Oswego and Montgomery. In Oswego, a park and ride lot has been planned for at the intersection of Orchard Road and Mill Road and is scheduled to be open within the year. In Montgomery, a park and ride lot is being planned for at the proposed Avaya Station located along U.S. 30 southeast of the intersection with IL 31.

Additional express bus service is proposed along IL 56, I-88, and Orchard Road. Other general recommendations for improvements to Pace bus service include bus pullouts and bus prioritization. In addition, on-demand paratransit bus service has been proposed for the SAM area.

Bicycle/pedestrian trail improvements incorporate all previously planned improvements as well as paths along newly developed collector roadways. The proposed bike trails would be consistent with the recommendations of the countywide bicycle and pedestrian plan. For improved safety along the proposed bike trials, bridges or underpasses should be considered at crossing with major roadways in the area. Other safety improvements incorporated in the bicycle/pedestrian trails would include clearly visible crossing with pedestrian buttons and signals incorporated in the intersection control. Bike/pedestrian trails are also proposed in connection with proposed Metra stations to better connect the transportation systems. Figure 15 illustrates proposed public transit, bicycle, and pedestrian improvements.

Access Management Plan

In order to achieve maximum benefit, transportation improvements in Kane County should be accompanied by an access management plan. The Federal Highway Administration (FHWA) defines access management as "the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding system in terms of safety, capacity, and speed." Properly implemented access management will improve traffic operations, increase highway safety, and minimize adverse environmental impacts.

The access management plan would consist of an access control policy and the provision of intersection capacity enhancements at critical locations throughout the study area. Kane

County has an existing access control policy,[3] but the only roadway in the SAM area included under the policy is Orchard Road.

The county's access control regulations specify the techniques and policies of access control to be applied in the following areas:

- Location of Access Points
- Number of Access Points
- Internal Circulation
- Intersection Spacing and Application of Access Control Guidelines
- Turn Lane Improvements
- Intersection Signalization and Street Lighting
- Abutting Land Use and Site Development Characteristics
- Design Requirements

Roadway safety and capacity are adversely affected by uncontrolled or poorly designed turning and cross traffic operations. These operations can be controlled through the development of turning lanes, medians, turning restrictions, traffic signals, and roadway lighting.

The policy also provides that an access point (driveway) or system of access points must be located so as to provide:

- the most favorable vision, grade and alignment conditions for users of the roadway and access point,
- no undue interference with the safe and efficient movement of roadway traffic, and
- maximum safety and convenience for pedestrians, bicyclists and other users of the roadway right-of-ways.

The county has policies regarding the number of access points, the location of access points, and internal circulation within a development. Providing adequate internal circulation within a development aids in the operation of major facilities. Finally, the access policy includes guidelines for development characteristics of abutting property regarding land use, internal circulation, aesthetics, and pedestrians/mass transit. Appendix D provides more detailed information regarding the Kane County Access Control Policy.

As noted, the Kane County access control policy designates Orchard Road from U.S. 30 to Randall Road as a limited access freeway in the SAM area[4]. It is not suggested that arterials within the planning area be redesignated as limited access freeways. What is recommended is that the arterials within the planning area be considered for corridor management. It is also recommended that Kane County work with the Illinois Department of Transportation (DOT) to implement access control on state maintained routes.

Although collector roads in the SAM area are not in the county highway system, a means would be required to extend the access guidelines to cover this classification of roadway as

[3], Division of *Transportation Permit Regulations and Access Control Regulations*, Kane County, January,2004.

[4] The term "freeway" as used in the *Division of Transportation Permit Regulations and Access Control Regulations* does not correspond with the functional classifications described in this report.

well. The recommended transportation improvement plan for this area, which relies heavily on a network of collector roads as well as arterials, will not function efficiently unless access management is imposed throughout the collector roadway system.

Access spacing should recognize that access and mobility are competing functions. Kane County's highways, which are functionally classified as principal arterial, minor arterials, or collectors, evidence this recognition. Highways classified as principal arterials provide mainly for mobility of through traffic. Minor arterials provide both land access and mobility. Two designations are suggested for the collector roads; major collector and minor collector. The major collector roads would serve to collect and distribute traffic between the local roadway system and arterials. The predominant role of minor collector roads would be to provide good access to abutting land uses and provide for inter-neighborhood traffic movement. Each class of roadway would have its own geometric, traffic control, and spacing requirements. Tables 7 and 8 provide an example of driveway spacing requirements as specified in the county access management regulations.

TABLE 7
Minimum Signalized Intersection Spacing

Highway Classification			
Freeway and SRA Residential	**Freeway and SRA Commercial**	**Rural Arterial Collector**	**Urban/Suburban Arterial Collector**
1,760 ft (1/3 mile) to 2,640 ft (1/2 mile)	1,320 ft (1/4 mile) to 1,760 ft (1/3 mile)	2,640 ft (1/2 mile)	1,320 ft (1/4 mile)

Note: All dimensions approximate.

TABLE 8
Separation Between Adjacent Full Access Intersections (ft)

			Access Level 3	
Design Speed	**Access Level 1**	**Access Level 2**	**2 Lanes**	**4 Lanes**
30 mph	Signal Spacing Guidelines Apply as shown in Table 7	490	335	353
35 mph		590	390	412
40 mph		690	445	470
45 mph		800	500	529
50 mph		910	555	588
55 mph		1030	610	647
60 mph		1150	665	706

Right-of-Way Guidelines

Right-of-way guidelines have been defined by functional class to ensure appropriate land acquisition to accommodate future widening of roadways. Also, the right-of-way guidelines, created with County input, establish adequate set backs from the roadways. Acquisition of right-of-way could occur before widening is warranted. This early acquisition allows for land to be set aside before development occurs. Table 9 shows the right-of-way guidelines by functional classification.

TABLE 9
Right-of-Way Guidelines

Functional Classification	Right-of-Way (Minimum)
SRA – Major Arterial	170’
Minor Arterials	120’
Collectors	80’

Constraints

At this stage in the development of roadway improvements a detailed assessment of environmental impacts would not be warranted. It was still deemed important, however, to consider environmental issues at the commensurate level of detail afforded by the available data. To this end, the recommended plan took into account the impact of major environmental factors in the developmental stages of the process. A more detailed assessment of environmental issues in terms of avoidance and mitigation will be required as each of the projects enter into the design phase.

A general environmental appraisal was conducted by comparing the proposed improvements to the environmental features in the study area. Figure 16 highlights the potential impact to sensitive environmental features. The circled areas do not represent a delineation of the potentially impacted area, but merely show the location of critical areas of concern, three of which are highlighted. The first such area is the Indian Trail Road/Hankes Road alignment which clips the southeast corner of the Aurora West Forest Preserve in avoidance of an existing neighborhood. Another area of concern is the IL 56/Hankes Road interchange, which also impacts the Aurora West Forest Preserve in the northeast quadrant. The north/south minor collector road west of IL 56 and north of Galena Boulevard through the proposed village center of Sugar Grove may impact the Prestbury Golf Course and would cross both the Virgil Gilman Trail and Blackberry Creek.

The proposed collectors would have to be evaluated further in order to determine their feasibility and cost. The location of collector roads and realignments, which have been defined to minimize potential impacts, only represent a selected corridor. The actual alignment of each roadway will be finalized during the design phase.

Public Agency Involvement

Numerous meetings have been conducted as part of this planning effort. Initially, both the Technical Advisory Committee (TAC) and the Planning Area Group (PAG) were presented with a conceptual framework of the planning process. Next, meetings were conducted with

the municipalities and townships within and surrounding the study area. These meetings were used to achieve an understanding of future planning activities of each municipality and to discuss the planning process for this project. Meetings were also conducted with municipalities in northern Kendall County to account for growth in this area resulting in additional traffic affecting Kane County Roadways.

Upon completion of a draft of the SAM area plan in October 2003, another series of meetings was conducted to allow the public and agencies to review the plan, ask questions, and provide input. Along with the municipalities and townships, the following groups and organizations were presented with the draft plan.

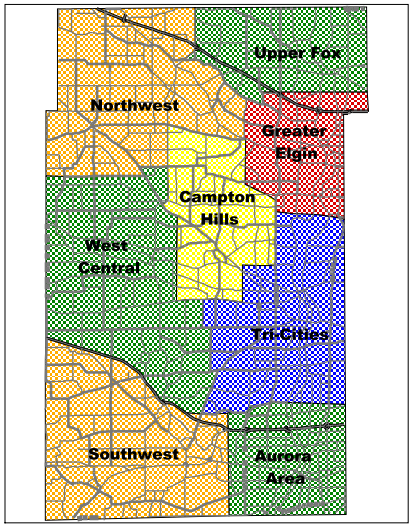
- Technical Advisory Committee
- SAM Planning Area Group
- Kane County Transportation Committee
- Kane County Council of Mayors
- Kane County Regional Planning Commission

All comments received during these meetings were taken into consideration and assisted the project team in the refinement of the recommended plan.

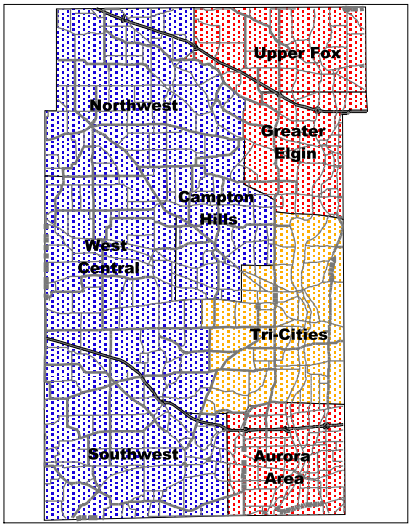
Implementation

The recommended plan has been formulated to evolve in conjunction with land development in the SAM area. The intent of the planning process was to anticipate the amount and location of future developments in order to provide for construction of infrastructure improvements concurrently with development. Given the current travel patterns and existing development pressure in the southern sections of the SAM area, improvements to IL 47 and U.S. 30 should be a priority. The need for roadway improvements will have to be reevaluated if changes in development pattern result in a change in density for certain areas. In such instances, it may be found that some of the planned transportation improvements are not needed. The collector roads that have been described as part of the area plan should be constructed along with development. However, it should be recognized that, in order to fully maximize the use of the collector roadway system, related arterial roadway improvements would also need to be completed. Widening projects should also be accomplished in conjunction with associated development. The entire development program must be flexible enough to adapt to change with the dynamics of how development occurs. Once the recommended plan has been finalized the next objective of the implementation process would be to adopt the recommendations through county and municipal resolutions.

Figures



Planning Area Boundaries

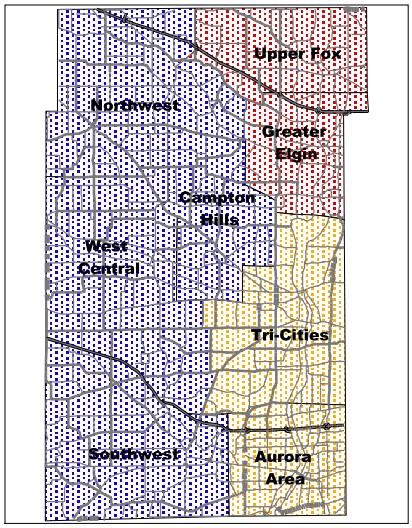


2020 VMT/Lane Mile

Legend

2020 VMT/Lane Miles

- >10,000 VMT/Lane Mile
- >5,000 VMT/Lane Mile
- <5,000 VMT/Lane Mile

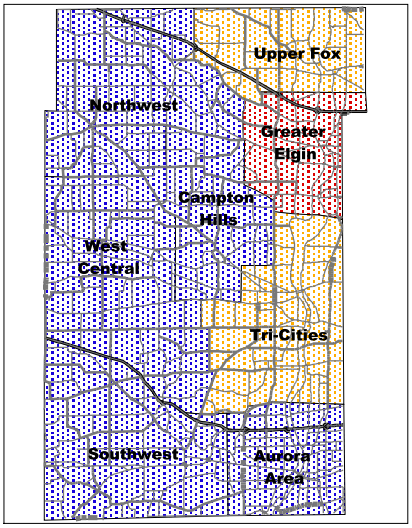


2020 VHT/Lane Mile

Legend

2020 VHT/Lane Miles

- >300 VHT/Lane Mile
- >150 VHT/Lane Mile
- <150 VHT/Lane Mile

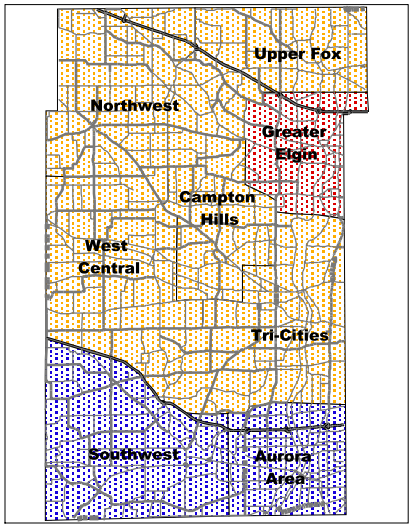


2020 VHD/Lane Mile

Legend

2020 VHD/Lane Miles

- >40 VHD/Lane Mile
- >20 VHD/Lane Mile
- <20 VHD/Lane Mile

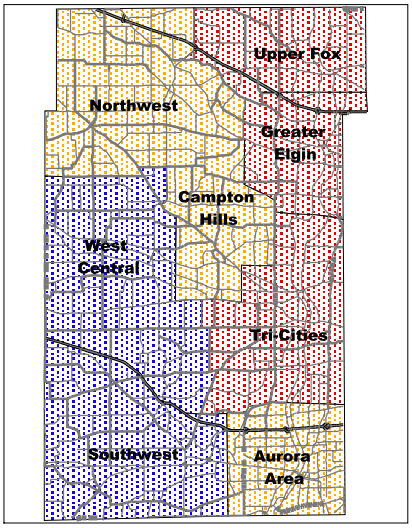


Change in Speed 1996 - 2020

Legend

Percent Change in Speed

- >8% Change in Speed from 1996
- >4% Change in Speed from 1996
- <4% Change in Speed from 1996



2020 Percent Congested by Lane Mile LOS D, E, and F

Legend

% Congested

- >80% LOS D, E, and F
- >40% LOS D, E, and F
- <40% LOS D, E, and F

N

Legend

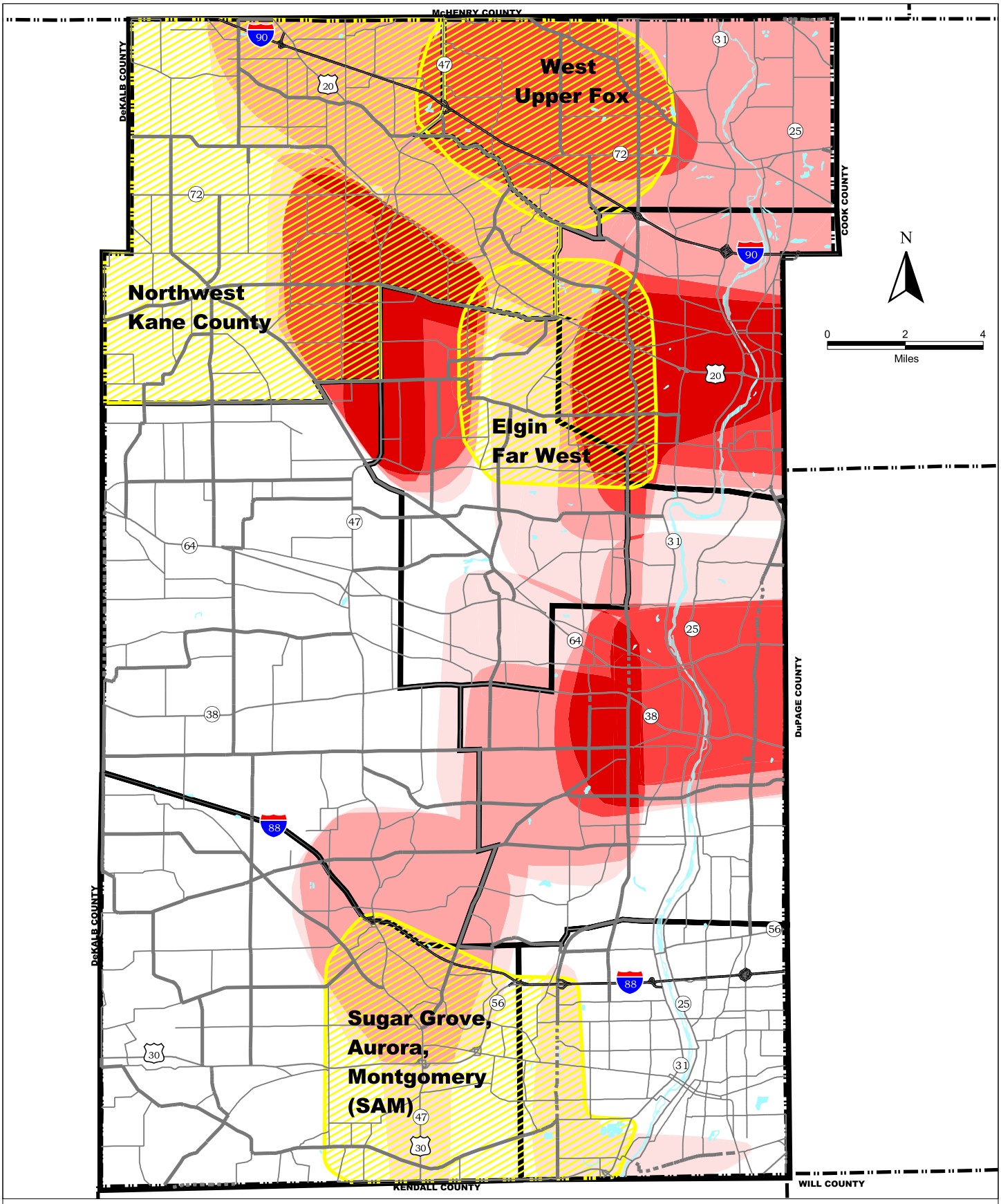
- Immediate Need
- Near-Term Need
- Long-Term Need

Planning Partnership Areas

CH2MHILL

Figure 1

Kane County Transportation Planning Area Study



Legend

Number of Measures of Future Performance Rated Poor

- 1 measure
- 2 measures
- 3 measures
- 4 measures
- PPA Boundary
- Selected Planning Areas

Planning Areas Selected for Further Study

Figure 2

Kane County Transportation Planning Area Study

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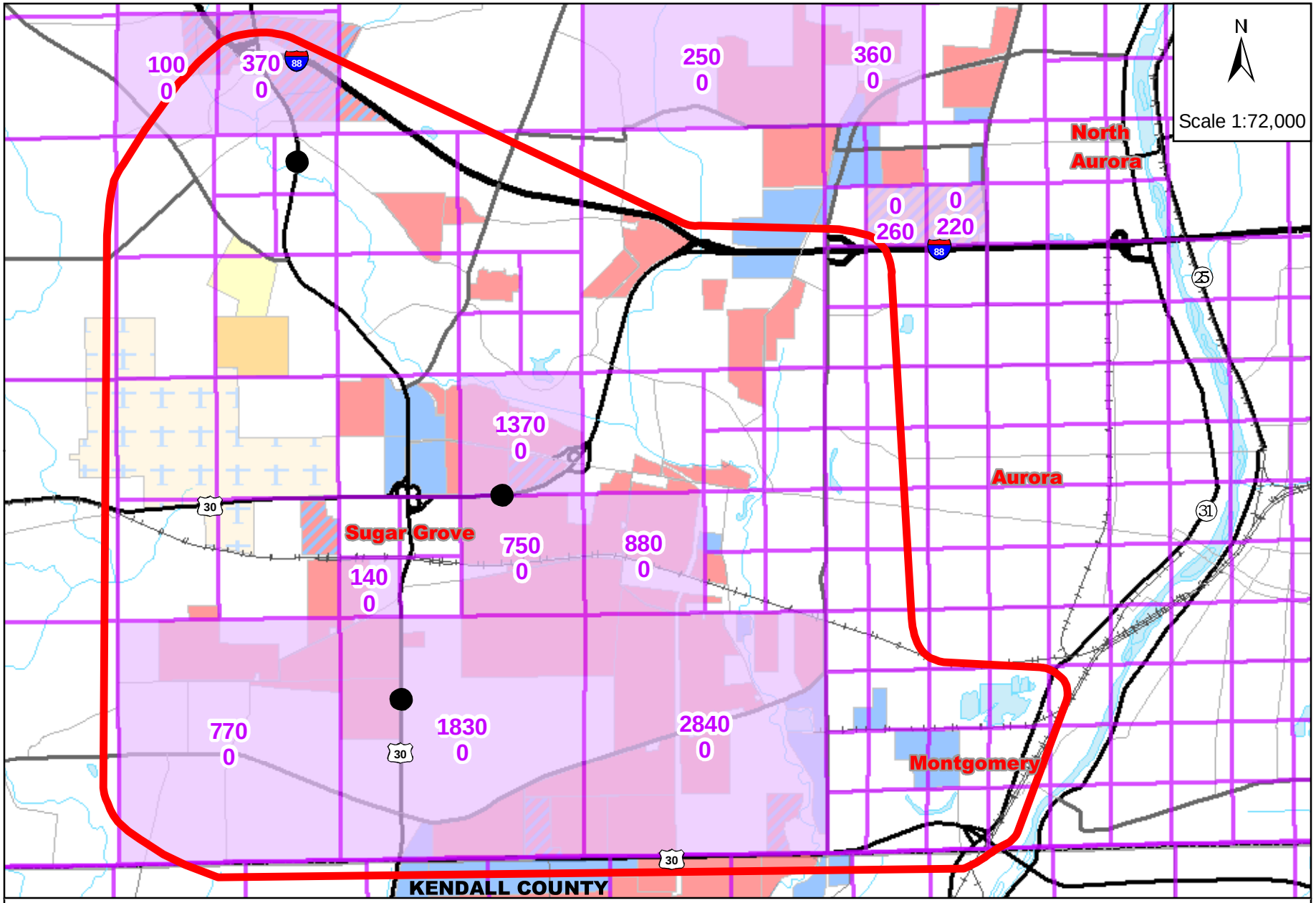

Added Households for 2020
Added Employment for 2020

TAZ
Updated TAZ
SAM Boundary
Airport
Commercial
Commercial/Residential
Industrial
Industrial/Commercial
Residential
School

CH2MHILL

SAM Planning Area
Kane County Planned Development

Figure 3
Kane County Transportation Planning Area Study

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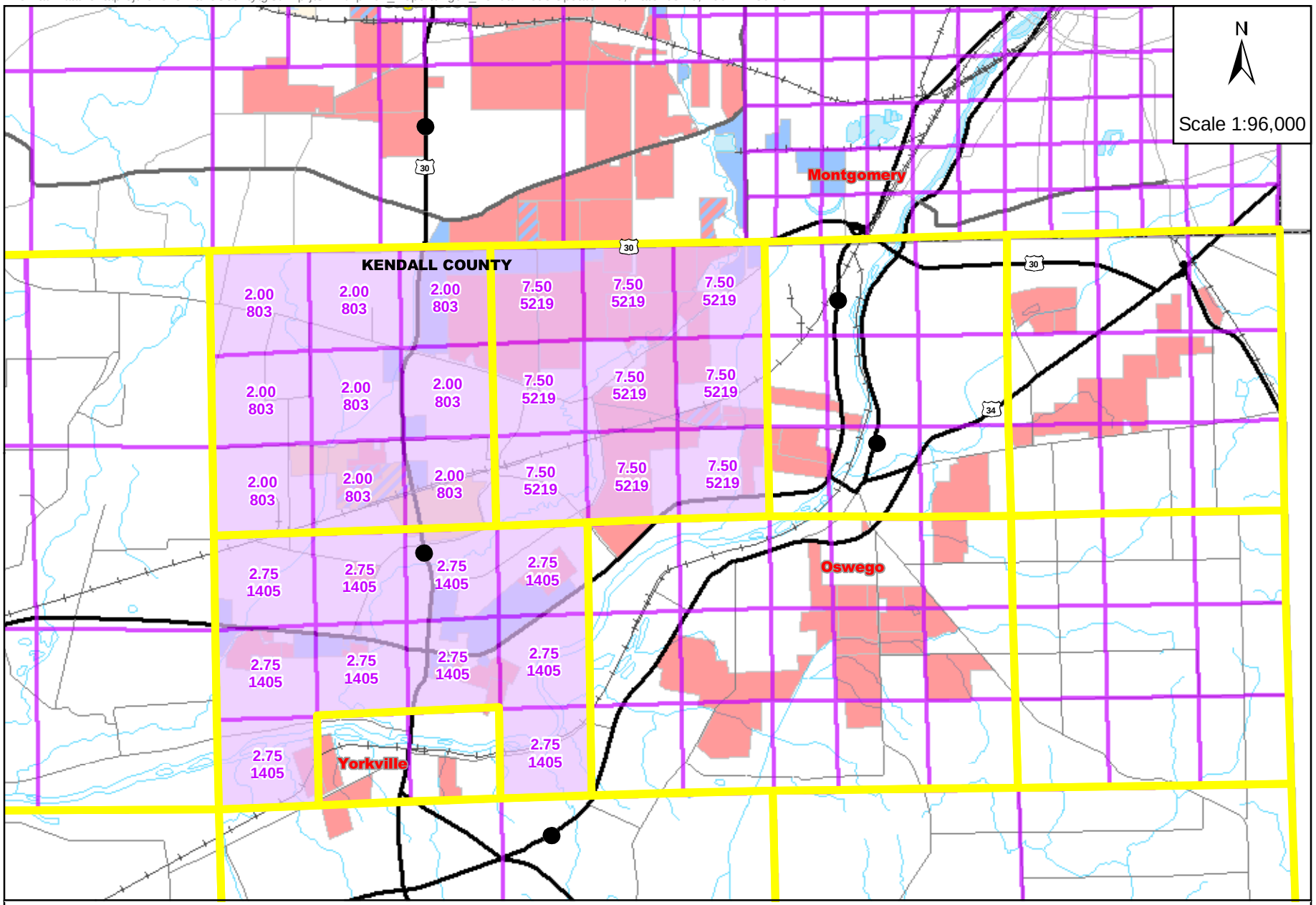

Factor for Updated 2020
Added Trips for Updated 2020

TAZ
Updated TAZ
Grouped TAZs
Airport
Commercial
Commercial/Residential
Industrial
Industrial/Commercial
Residential
School

CH2MHILL

SAM Planning Area
Kendall County Planned Development

Figure 4
Kane County Transportation Planning Area Study

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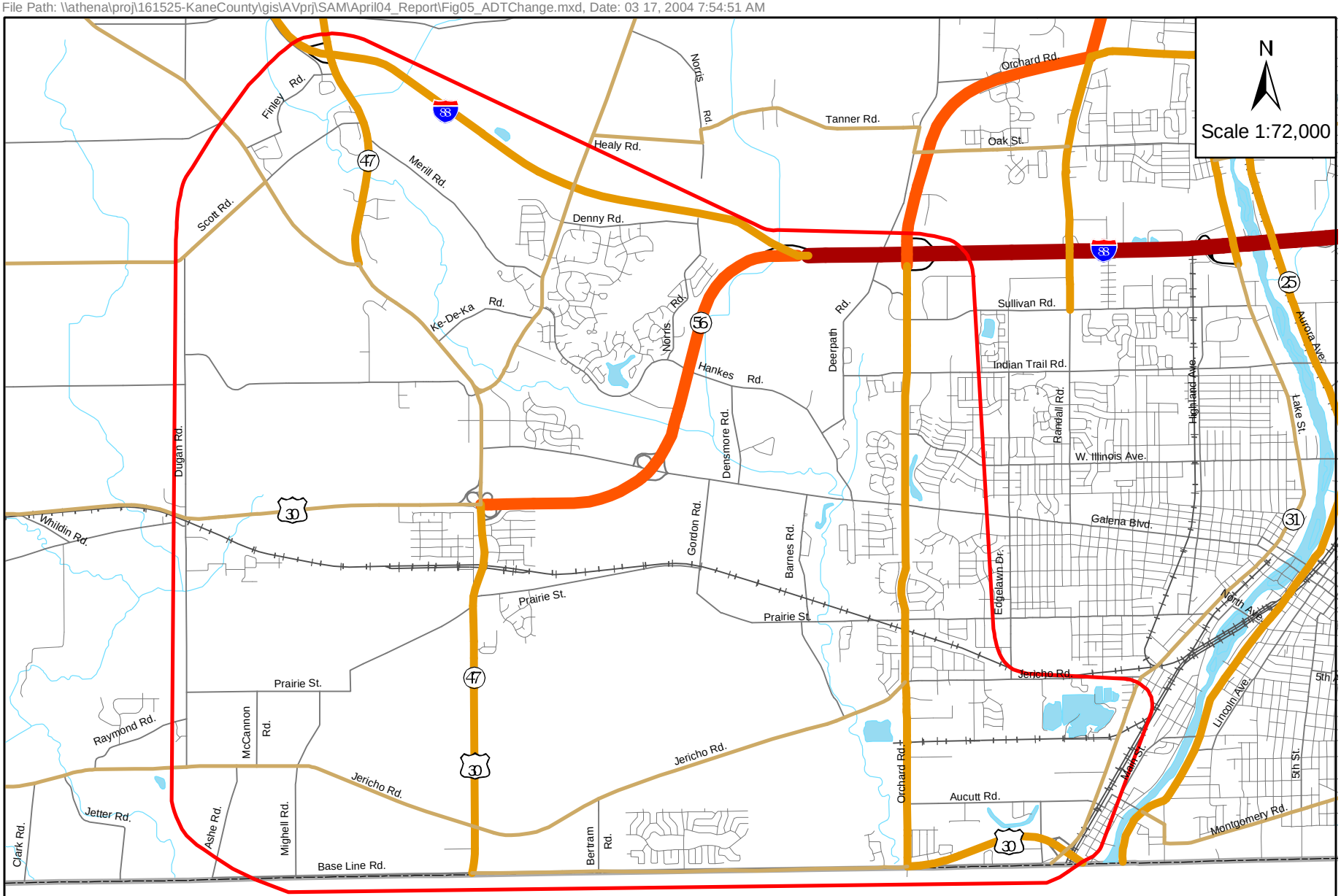

SAM Planning Area
Change in Average Daily Traffic by Segment, 1997-2020

Figure 5

Kane County Transportation Planning Area Study

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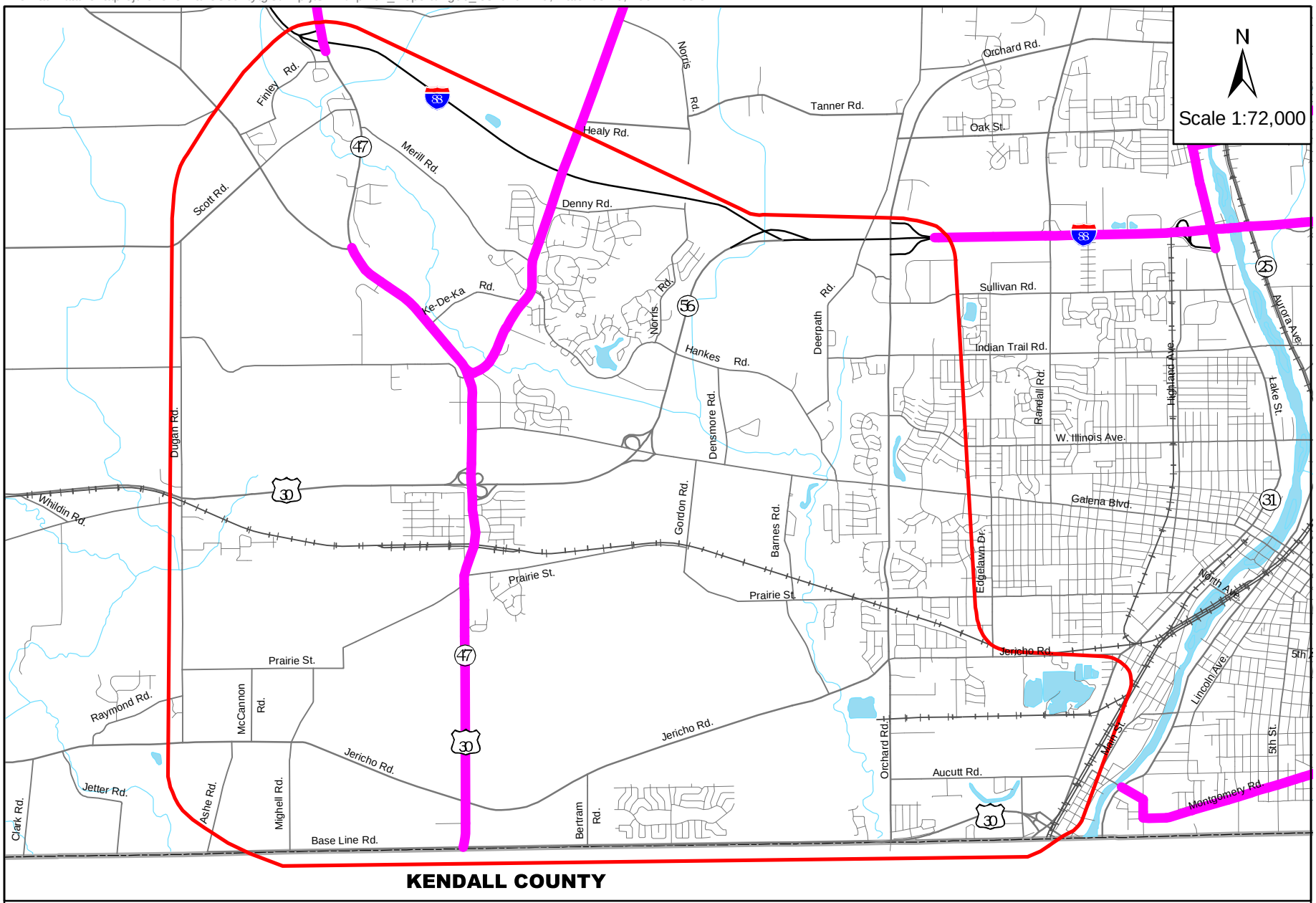

SAM Planning Area
Projected 2020 Congested Roadway Segments

Figure 6

Kane County Transportation Planning Area Study

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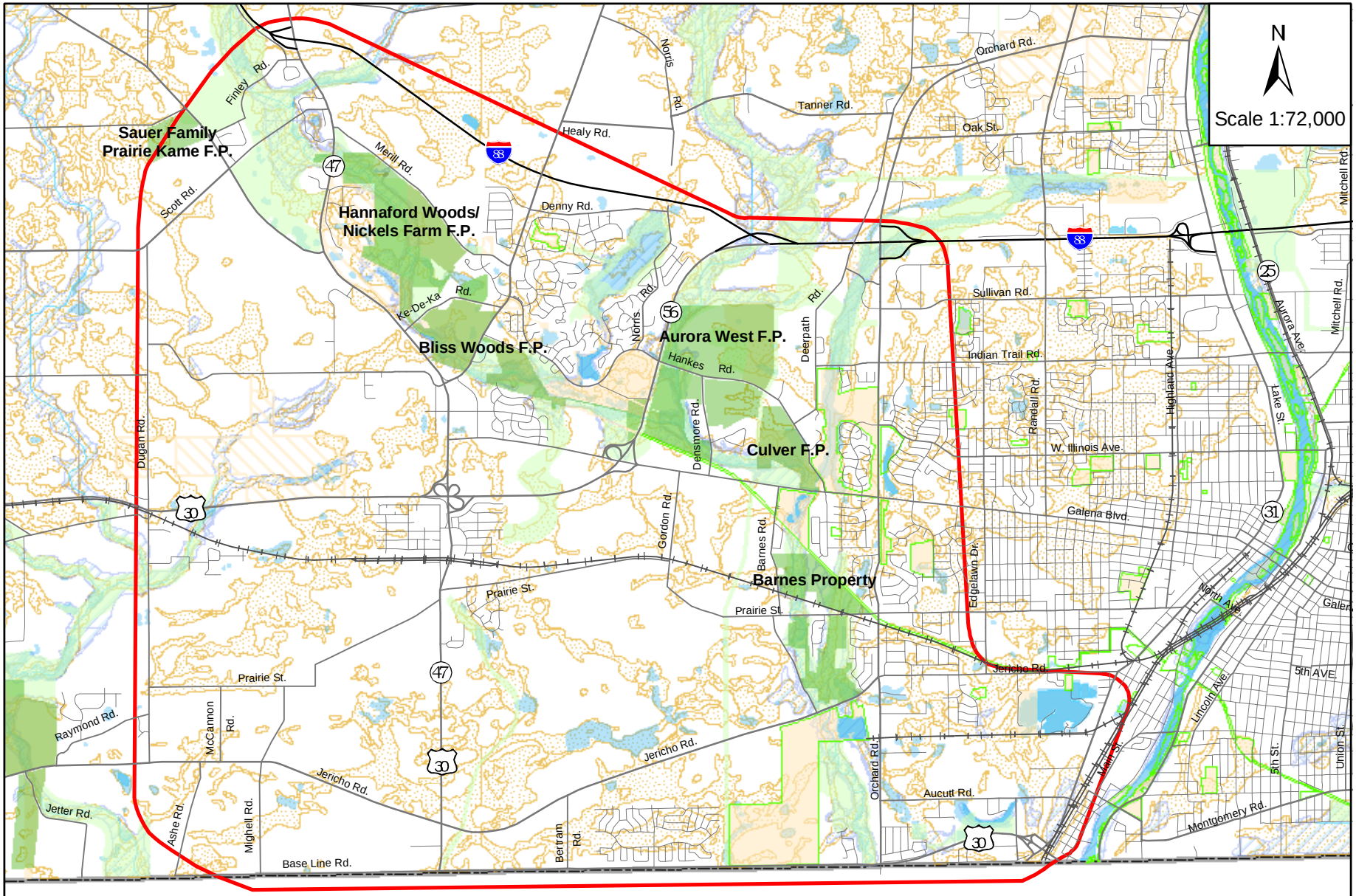

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SAM Planning Area Constraints Map

Figure 7

Kane County Transportation Planning Area Study

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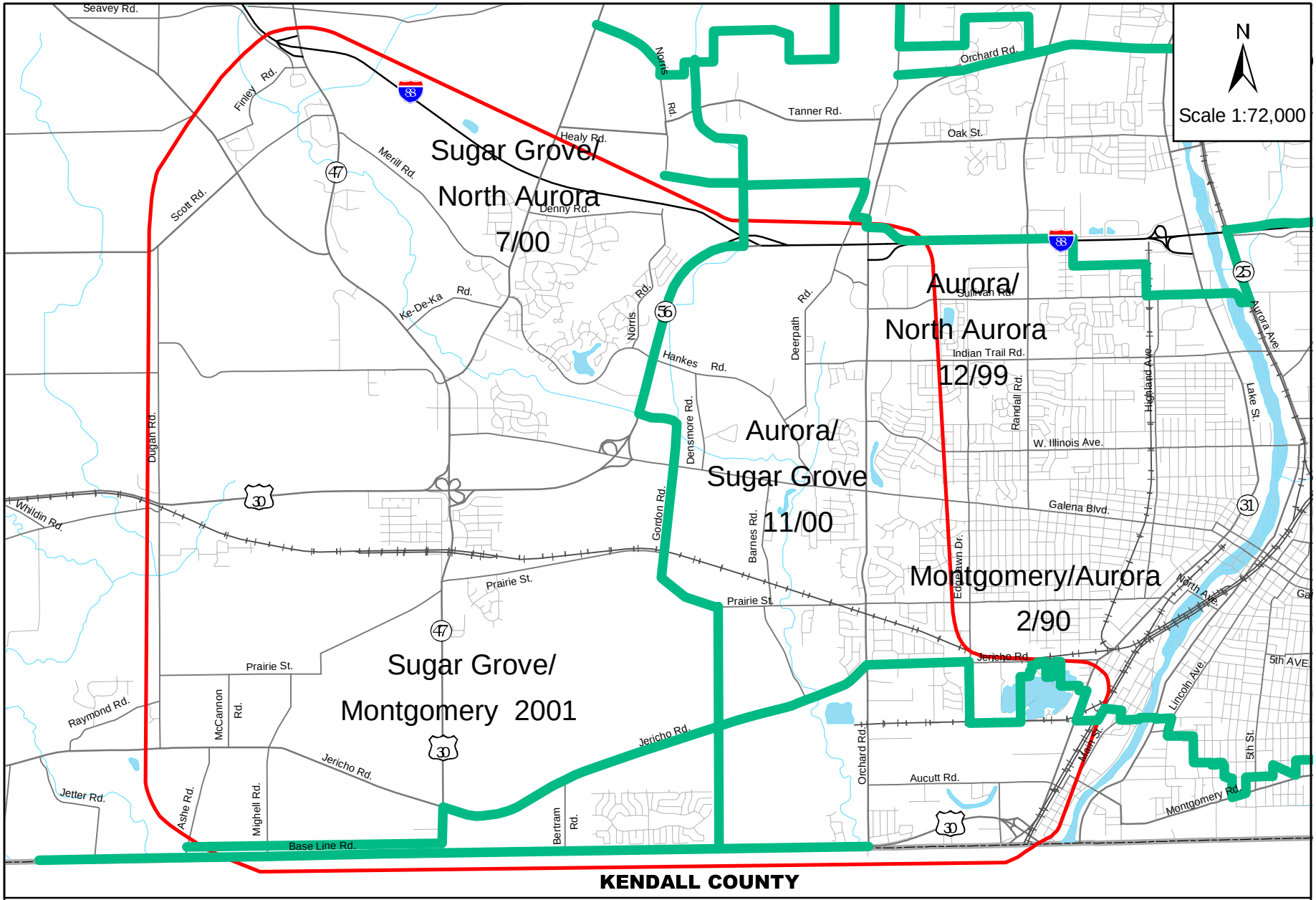

SAM Boundary

Planning Boundary Agreement Lines

SAM Planning Area
Planning Boundary Agreements

Figure 8

Kane County Transportation Planning Area Study

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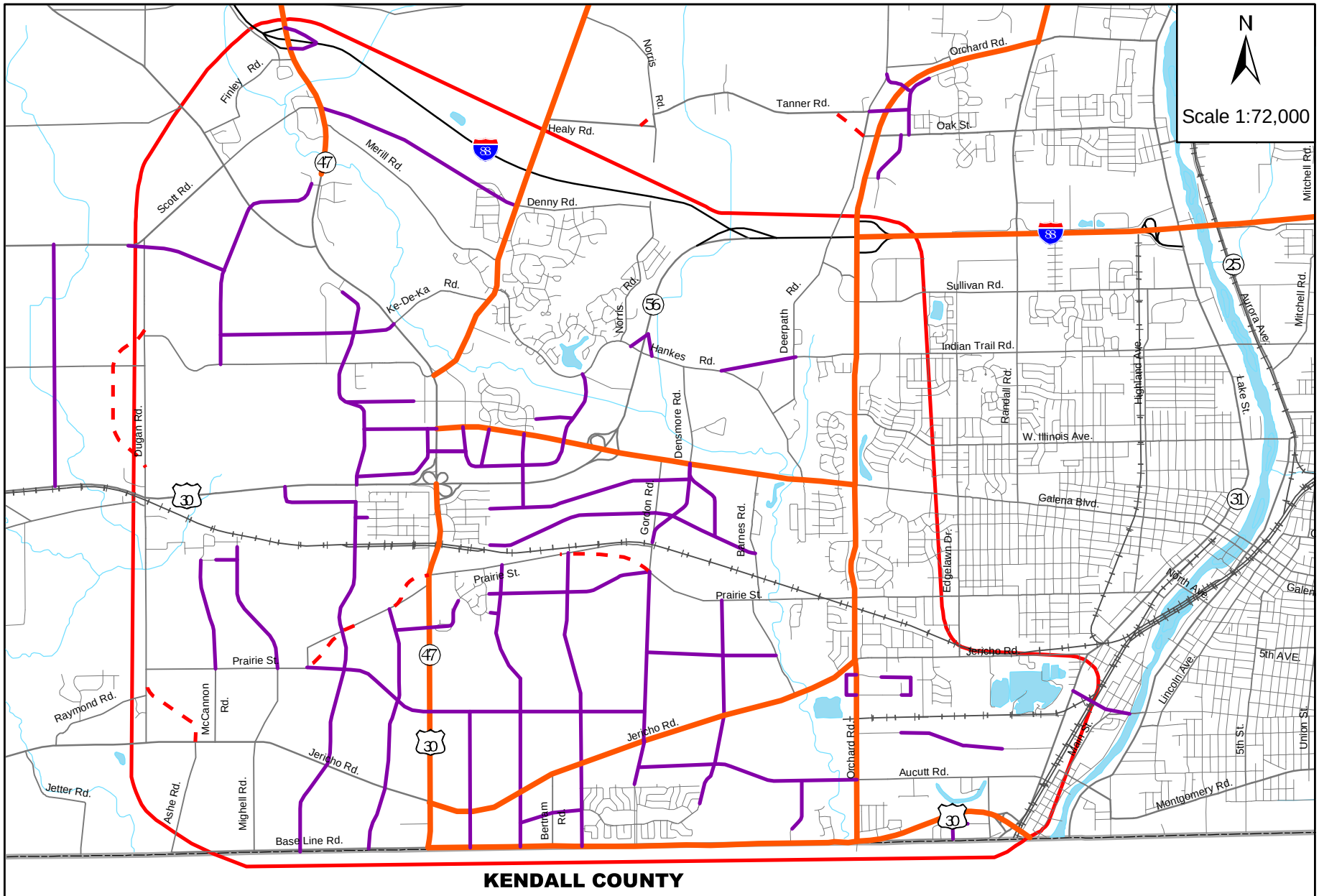

SAM Planning Area
Previously Planned Road Improvements

Figure 9
Kane County Transportation Planning Area Study

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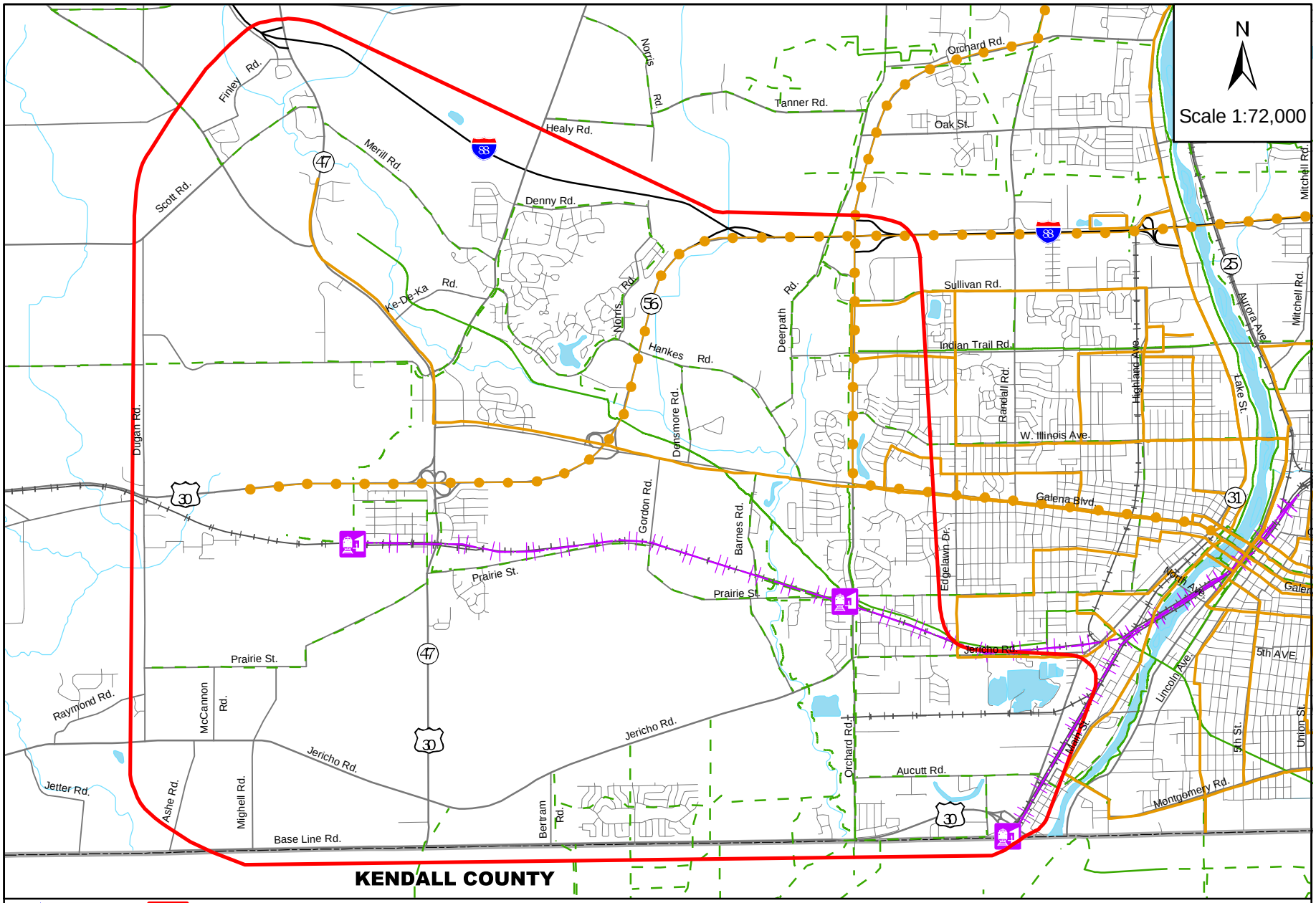
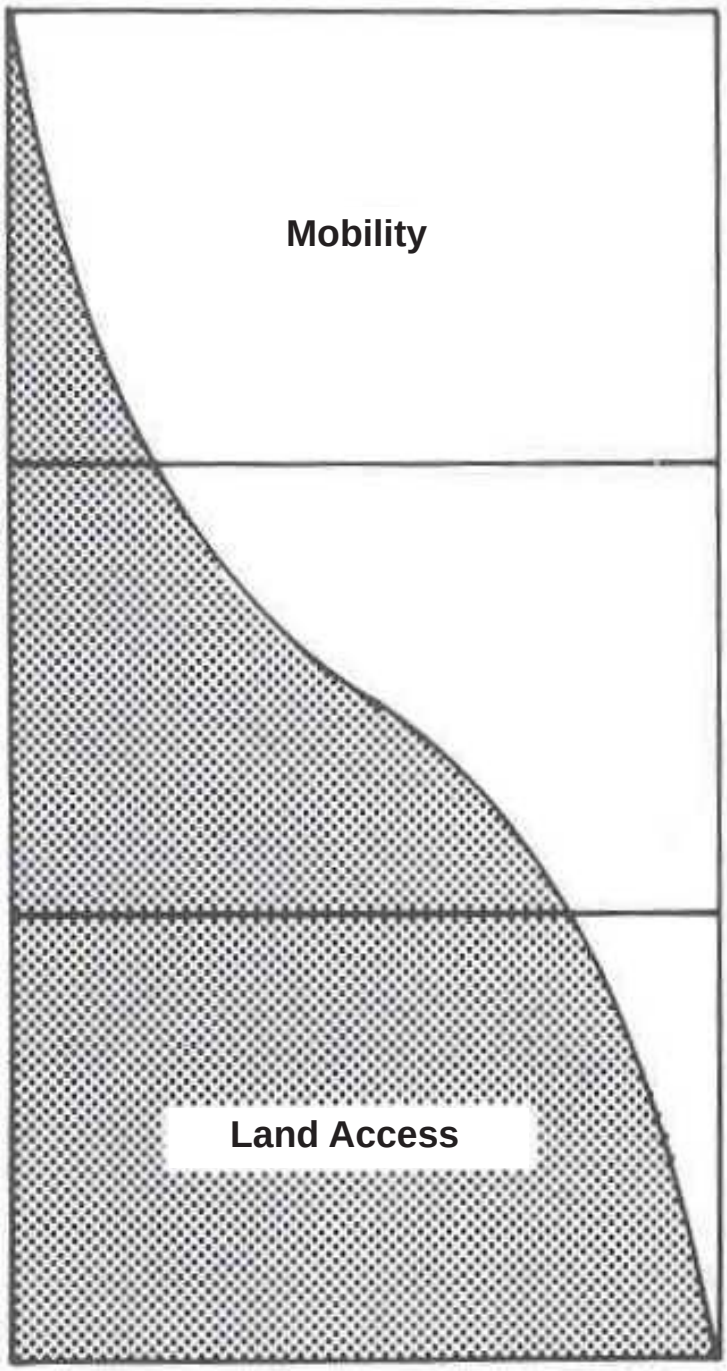


SAM Planning Area
Previously Planned Transit and Bike/Ped Improvements

Figure 10
Kane County Transportation Planning Area Study



Arterials

Collectors

Locals

Source: A Policy on Geometric Design of Highways and Streets 2001

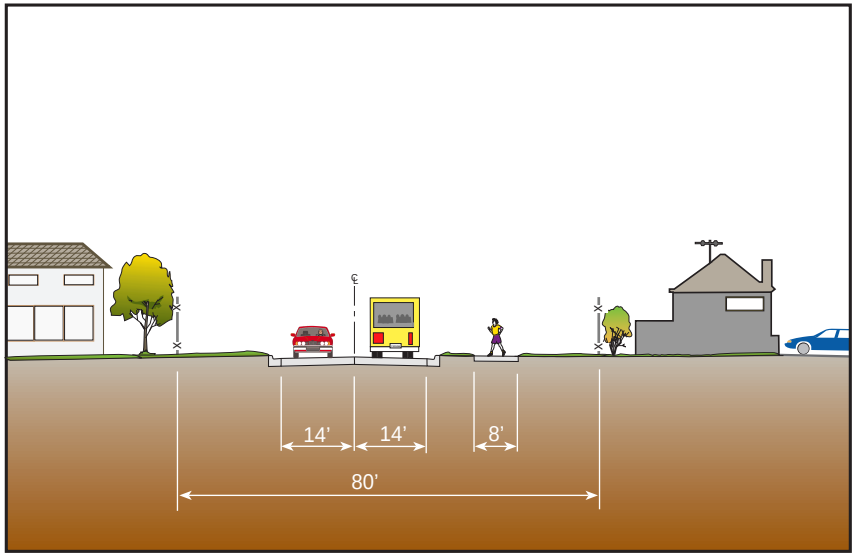
Access and Mobility Function of Highways

Figure 11
Kane County Transportation Planning Area Study

Three-Lane Cross Section

Open Drainage

Closed Drainage - Bike Path



Desirable Collector Road Cross Section

Figure 12
Kane County Transportation Planning Area Study

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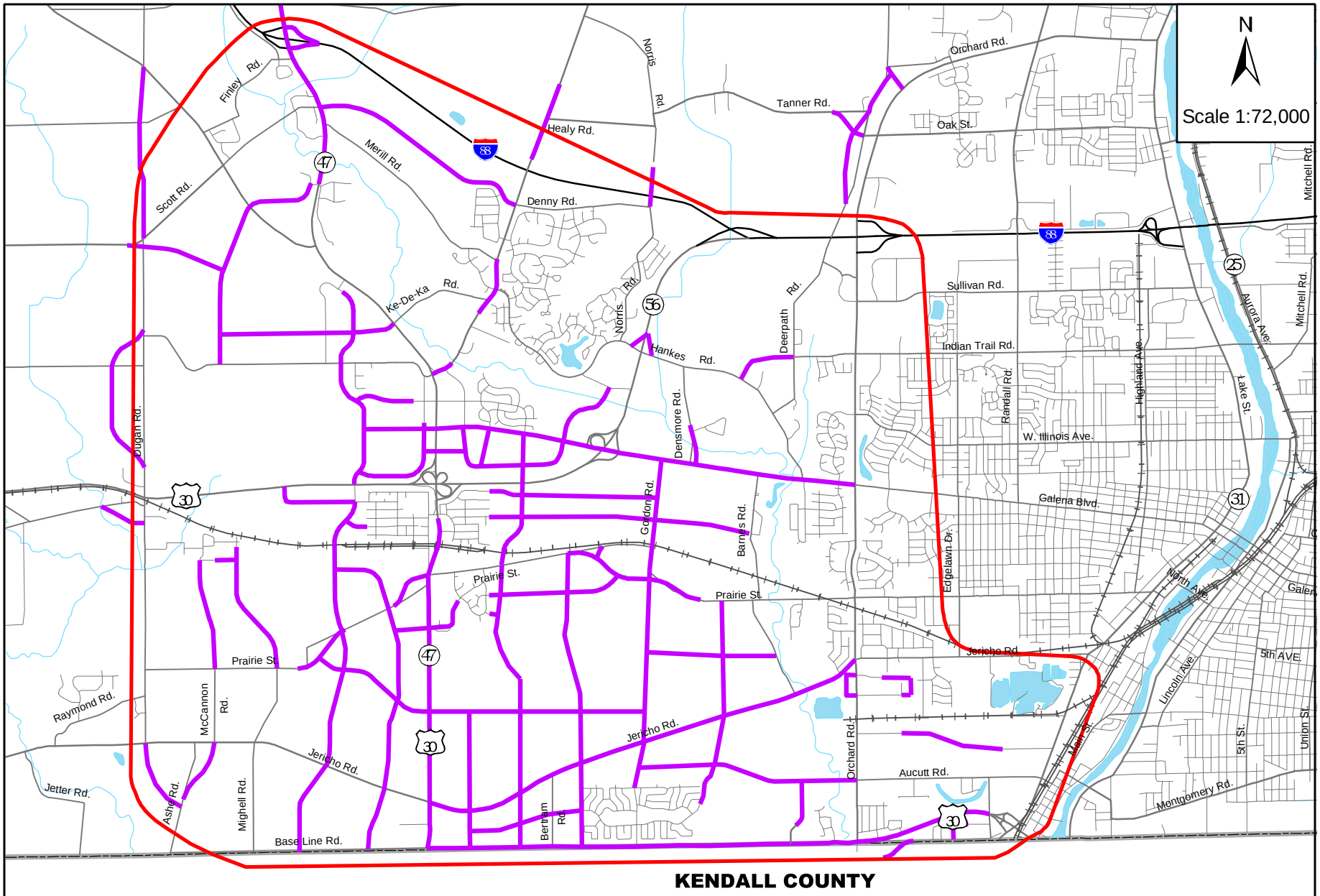

SAM Plannning Area
Proposed New Roads

Figure 13

Kane County Transportation Planning Area Study

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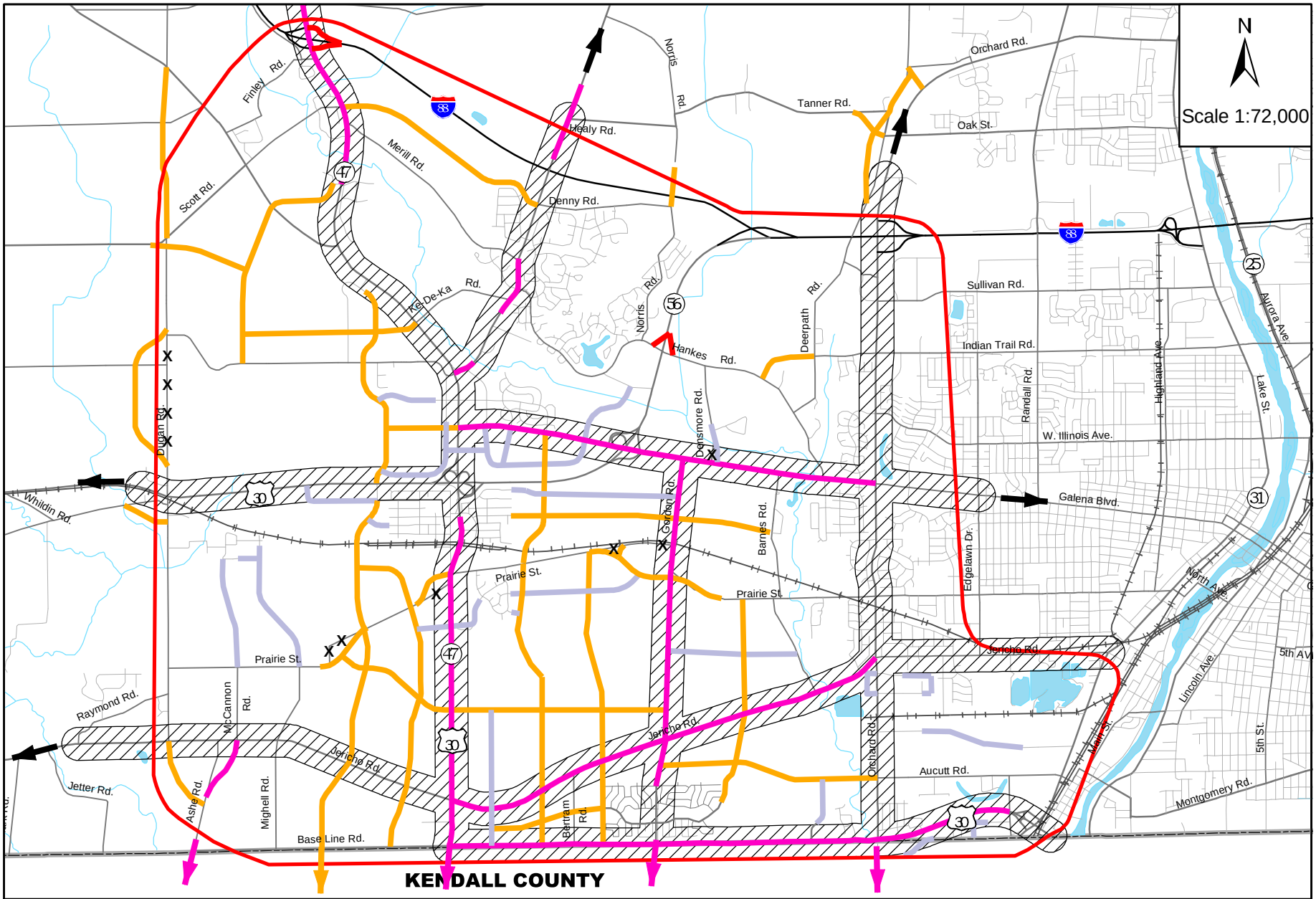

SAM Planning Area
Recommended Roadway Plan

Figure 14
Kane County Transportation Planning Area Study

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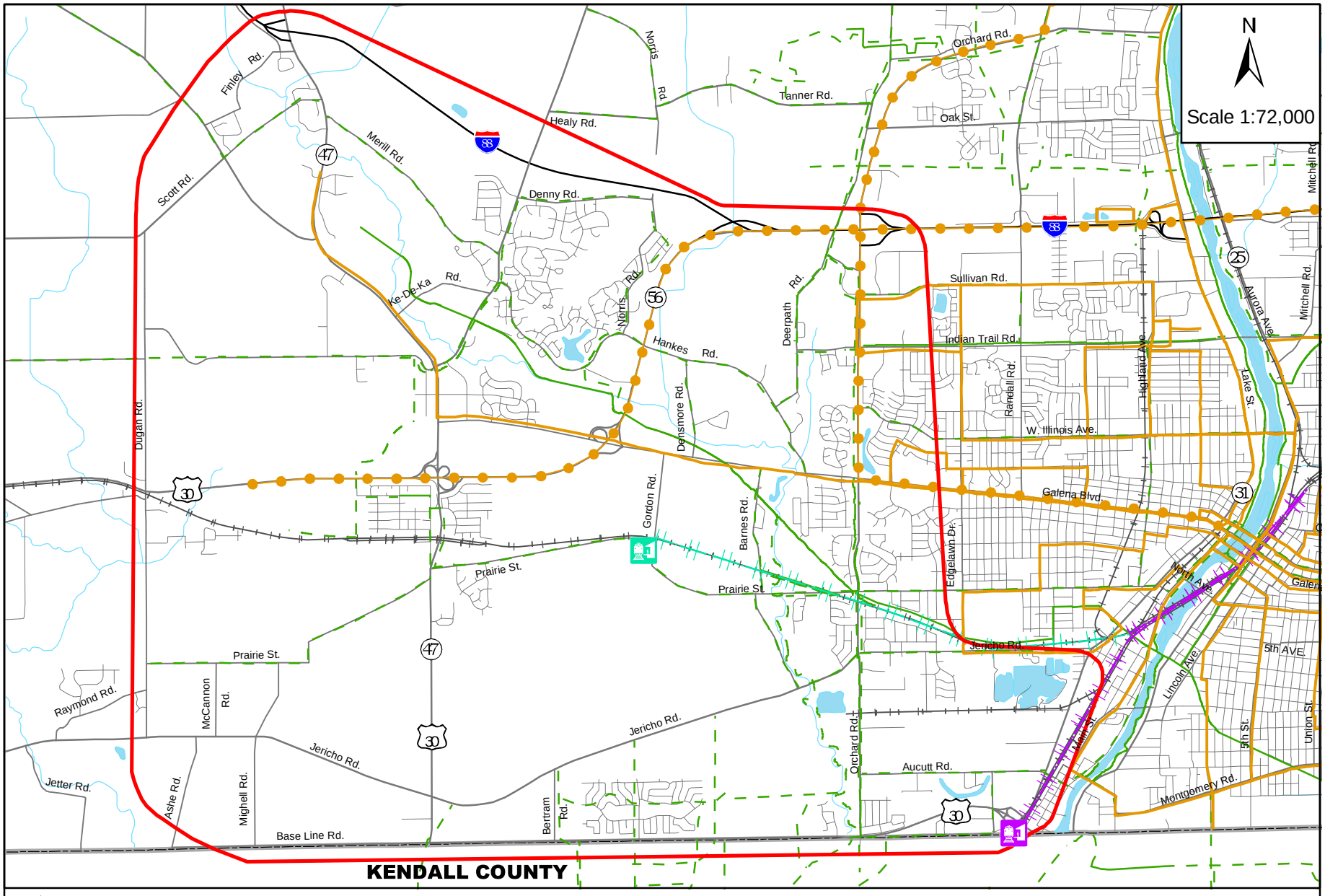

SAM Planning Area
Recommended Transit and Bike/Ped Plan

Figure 15
Kane County Transportation Planning Area Study

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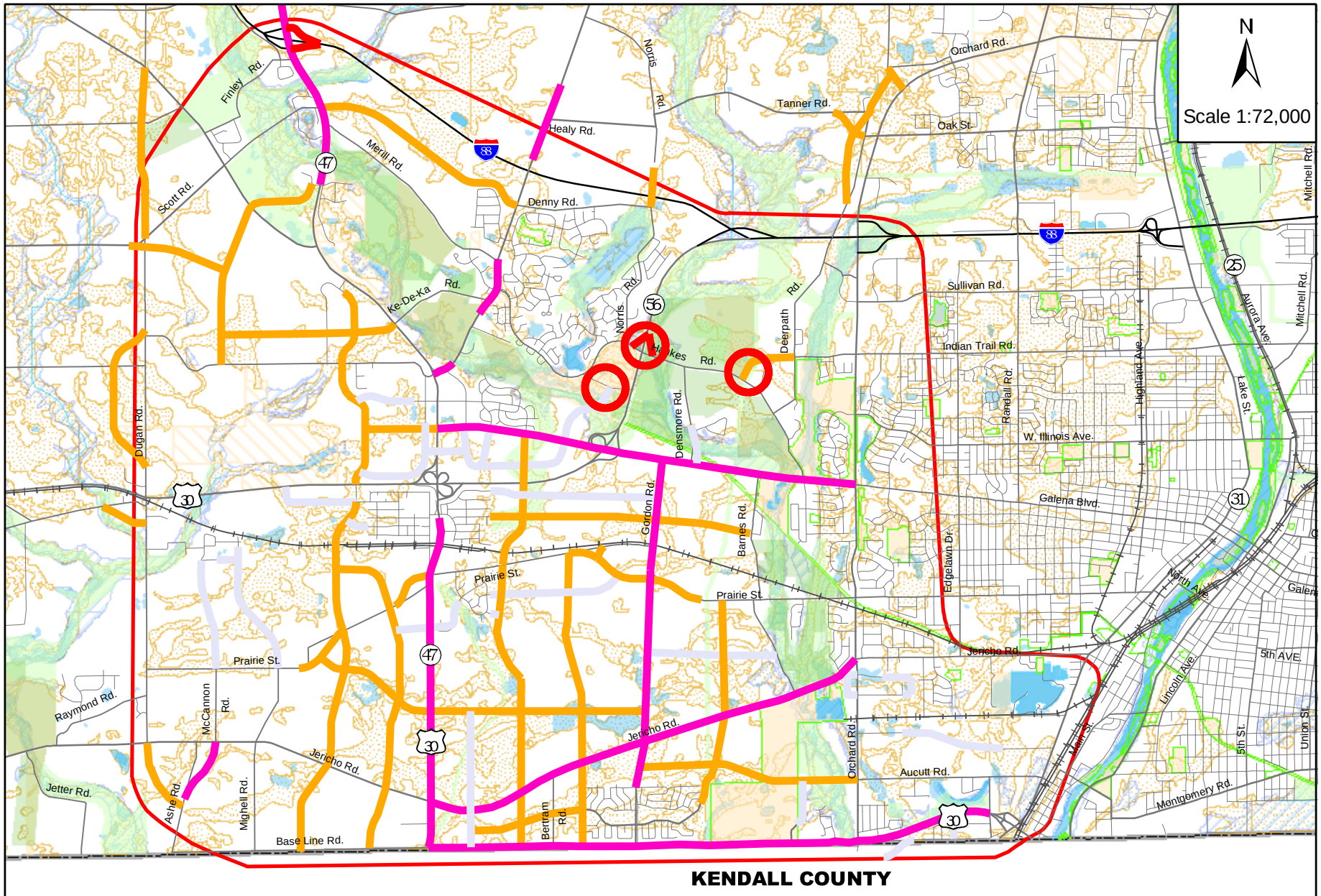

Improved Facilities
Minor Collector
Major Collector
Arterial
Interchange
SAM Boundary
Parks
Forest Preserve
Impacted Areas
Existing Open Space
Institutional Open Space
Proposed Open Space
Wetlands
Flood
Hydric Soils

CH2MHILL

SAM Planning Area
Potentially Impacted Sensitive Areas

Figure 16
Kane County Transportation Planning Area Study

Appendix A
Socioeconomic Data for the SAM Area

APPENDIX A

Socioeconomic Data for the Sugar Grove, Aurora, Montgomery Area

Data gathered from the municipalities was used to evaluate the projections of households and population within the study. The Comprehensive Plans were used to determine how at a local level the affect of projected development compared with regional socioeconomic projections (2020) by the Northern Illinois Planning Commission (NIPC) by TAZ. The first step in the process was to determine which proposed developments would be incorporated into the planning process. Some of the developments were already being considered for approval by the respective municipalities, others were more speculative. Through discussions with the county and municipalities, decisions were made as to which developments were to be included in the development of the area plan. These assumptions were critical, in that, the assumed development would influence the amount of traffic that would generate in the future. Ultimately, the level of development would translate to a measurable impact onto the transportation infrastructure.

Once the set of developments was agreed upon, the next step was to determine the number of households in each development. As mentioned before, some of these developments were already platted so the number of units were provided. In other instances, the only information available was gross developable area and the type of development. For these developments, assumptions were made to determine the number of households. Once all of the information was processed, comparisons were made between the sets of socioeconomic data. For a majority of the study area, the 2020 forecasts of households and population were accounted for by TAZ. At some locations, it appeared that the assumed development exceeded the 2020 regional socioeconomic forecasts and modifications were made to the NIPC data. Table A-1 shows the assumptions used for residential developments in Kane County.

TABLE A-1
Kane County Development Assumptions

Development	Municipality	Density	Households
Hanford Farm	Sugar Grove	*	170
Wiseman Hughes	Sugar Grove	*	251
Town Center	Sugar Grove	*	1006
Kimball Homes	Sugar Grove	*	2200
Neuman Homes	Sugar Grove	*	2000
Diamonte Builders	Sugar Grove	2.3	95
Crown Community	Sugar Grove	2.3	1046
Bliss Woods	Sugar Grove	*	69

TABLE A-1
Kane County Development Assumptions

Development	Municipality	Density	Households
Black Walnut Trails	Sugar Grove	*	408
Walnut Woods	Sugar Grove	*	257
Windsor Pointe	Sugar Grove	*	425
Rolling Oaks	Sugar Grove	*	88
Foxmoor	Montgomery	*	523
Fairfield Way	Montgomery	*	444
Mason Farm	Montgomery	*	390
Montgomery – M1	Montgomery	*	760
Aurora B1	Aurora	1.5	315
Aurora A1	Aurora	1.0	30
Aurora A2	Aurora	1.0	75
Aurora B2	Aurora	1.5	366
Aurora B3	Aurora	1.5	58
Aurora B4	Aurora	1.5	398
Aurora C1	Aurora	2.3	143
Aurora C2	Aurora	2.3	191
Aurora Extra	Aurora	1.5	548
North Aurora A	North Aurora	*	803
North Aurora B	North Aurora	*	410
North Aurora D	North Aurora	*	160
North Aurora E	North Aurora	*	150
North Aurora K	North Aurora	*	328
North Aurora M	North Aurora	*	161
North Aurora N	North Aurora	*	134
North Aurora O	North Aurora	*	329

* Number of Households was provided as part of development plan.

This information was then added to the NIPC data as shown in Table A-2. The table includes the original 2020 household and population forecasts along with what was added to the TAZ as a result of additional development. Figure A-1 shows the TAZ structure for the area.

TABLE A-2
Socioeconomic Assumptions by TAZ

Zone	2020 Forecasts by TAZ			Added		
	Households	Population	Employment	Household	Population	Employment
Socioeconomic Assumptions by TAZ inside the SAM Planning Area						
76	30	81	0	770	2140	
77	243	684	286			
78	1	3	0			
79	22	60	67			
80	54	169	0			
81	379	995	223			
82	97	268	202			
83	2	6	136			
84	8	20	205			
85	28	81	59			
86	3	10	765			
87	51	137	67			
88	202	550	120	1830	5070	
89	10	23	202	140	390	
90	482	1251	0			
91	153	396	86			
92	374	1022	67			
93	385	1027	250			
94	188	490	122			
95	102	255	65			
96	284	726	3	750	2070	
97	64	183	181	1370	3800	
98	249	764	21			
99	274	685	105			
100	288	764	6			
101	71	189	53			
102	698	1819	224			
103	256	698	0	2840	7870	
104	8	22	0	880	2420	
105	135	355	27			
106	1071	2810	257			
107	72	192	0			
108	86	256	53			

TABLE A-2
Socioeconomic Assumptions by TAZ

	2020 Forecasts by TAZ			Added		
Zone	Households	Population	Employment	Household	Population	Employment
109	124	371	5			
110	340	1014	206			
111	29	76	27			
112	87	220	5			
113	781	2052	123			
114	53	140	70			
115	12	39	111	100	280	
124	124	391	251	370	1030	
229	414	976	142			
230	3	9	777			
231	104	279	859			
232	0	0	78			
233	297	696	8			
234	154	378	0			
235	359	917	21			
236	247	649	99			
237	248	770	335			
238	315	1035	518			
239	269	629	310			
240	106	265	1775			
241	503	1121	81			
242	489	1375	47			
243	1479	2881	193			
244	399	1165	288			
245	45	111	689			
246	0	0	350			
247	529	1397	121			
248	1	3	142			
253	20	90	522			
254	0	0	1919			
255	238	564	1550			
256	23	51	595			
257	424	1087	0			
259	136	462	472			

TABLE A-2
Socioeconomic Assumptions by TAZ

Zone	2020 Forecasts by TAZ			Added		
	Households	Population	Employment	Household	Population	Employment
Subtotal	**14724**	**38204**	**16543**	**9050**	**25070**	**0**
Socioeconomic Assumptions by TAZ outside the SAM Planning Area						
136	655	1642	34	250	690	
251	243	616	37			260
273	0	0	85			220
367	224	642	114	360	1000	
Subtotal	**1122**	**2900**	**276**	**610**	**1690**	**480**
Total	**15846**	**41104**	**16813**	**9660**	**26760**	**480**

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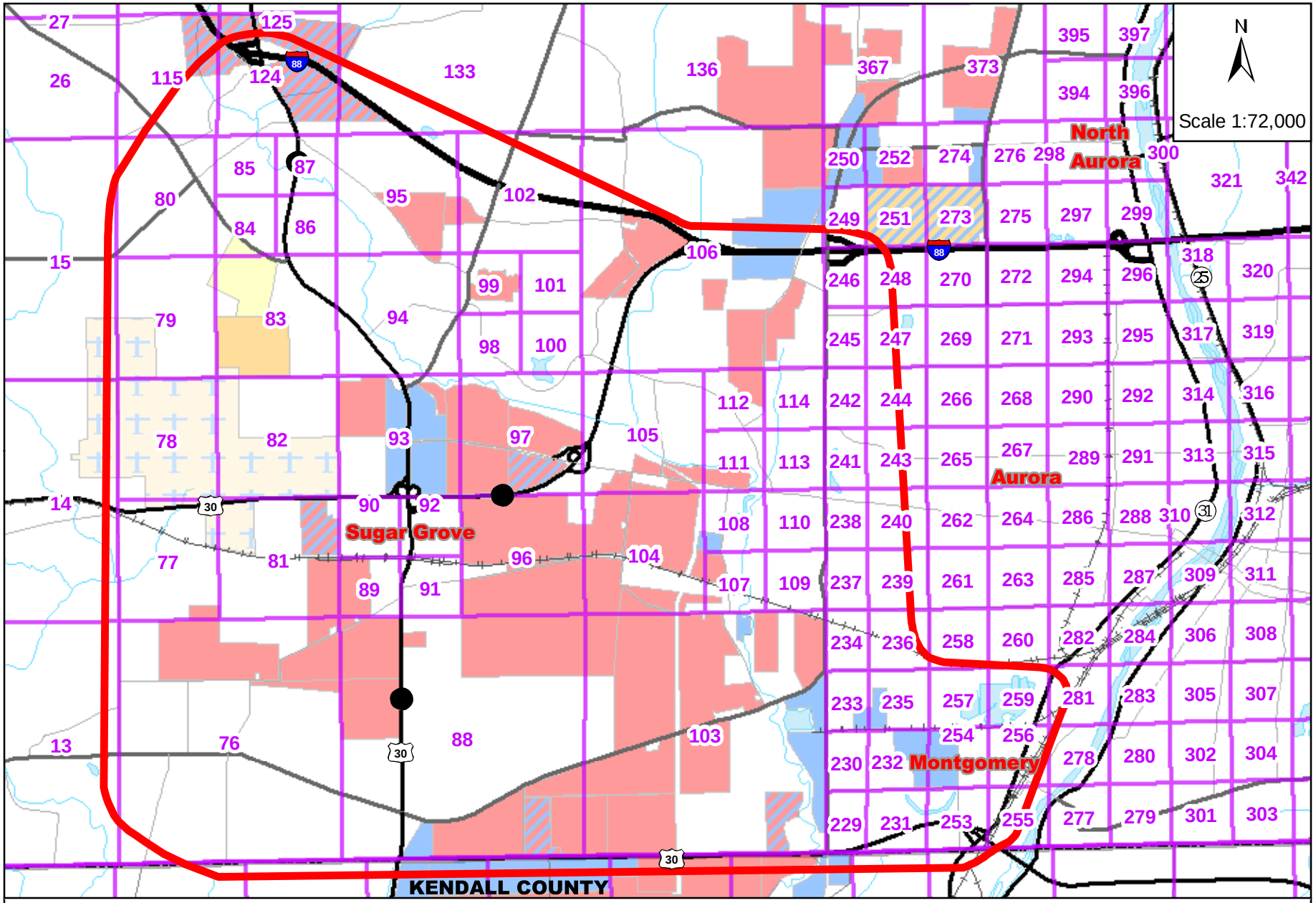

SAM Planning Area
Traffic Analysis Zones

Figure A-1
Kane County Transportation Planning Area Study

Appendix B
Cost Model

APPENDIX B

Cost Model

Introduction

This appendix describes a construction and right-of-way cost estimation methodology developed by CH2M HILL for the study of the Strategic Regional Arterials (SRA) in northeastern Illinois. Note that since the projects being considered in Kane County are pre-Phase 1 type of improvements, the cost estimating methodology need not be as detailed as for preliminary engineering. Costs have been updated to 2001 dollars.

First, the cost items that are to be used are described, and then the methodology, documentation, and quality control procedures are explained.

Construction Costs

The construction cost methodology utilizes the following items: roadway, resurfacing, new structures, structure widening, intersections, railroad grade separations, and interchanges.

Roadway

The roadway cost item is measured in miles. It is meant to include the costs of upgrading the existing roadway to the proposed cross section, and constructing segments on new alignment. The roadway costs include reconstruction of the existing roadway due to the limited service life of the existing pavement, as well as the costs for earthwork, drainage, landscaping, etc. Where an urban arterial is proposed, with a cross section that is identical to that of the existing, resurfacing should be assumed (see next section), rather than reconstruction. In addition, a cost for widening the existing arterials instead of reconstruction was done for comparative purposes. As a general guideline, a unit cost of 0.5 million per lane mile was assumed and confirmed by County staff for widening projects.

The length of roadway to be measured is the centerline length, including through intersections and interchanges, but excluding segments on long bridges (longer than 500 feet).

Table B-1 shows construction costs in millions of dollars per mile based on the number of lanes on the existing road, if any, and the number of lanes and cross section type for the proposed route. Costs for suburban arterials with open drainage (outside shoulders instead of curbs) are also included. The table was developed to be used for the construction of 4-lane and 6-lane turning roadways and cross street realignments. Two-lane roadway costs are shown as being one-half the applicable 4-lane cost.

Structures

Cost of each new or widened structure should be estimated separately, except when part of an interchange. Estimated costs for interchanges will include all associated structures.

TABLE B-1
Cost Estimate for Roadway Construction/Reconstruction on Existing Cross Section

Proposed Cross Section	Cost ($ Millions per mile)		
	0–3 Lanes	4 Lanes	5 Lanes
Rural Arterial			
4 Lane	4.5	3.75	—-
6-Lane	5.25	5.25	4.5
Suburban or Urban Arterial			
4-Lane	5.25	4.5	—-
6-Lane	6.75	6.75	5.25
Suburban Arterial with Open Drainage			
4-Lane	5.0	4.0	—
6-Lane	6.0	6.0	5.0
Two-Lane Roadways			
Rural	2.25	—-	—-
Suburban or Urban	2.5	—-	—-

There may be situations where it appears that an existing structure can remain in use, perhaps with some widening. An example is the situation where one of the roadways can use an existing structure, while a new structure is constructed for the other roadway. However, due to the limited service life of structures, it should be assumed that some of these structures would be replaced. The smaller, more inexpensive structures should nearly always be replaced. Judgement should be used, however, for deciding whether to assume replacement of long, expensive structures whose horizontal and vertical alignments are consistent with the proposed highways.

New Structures

Table B-2 shows the estimated costs of new structures in millions of dollars, based on the number of lanes on the structure and the number of lanes spanned by the structure. If a median is carried by the structure, its width should be converted to an equivalent number of lanes. Similarly, medians that are spanned should be included. Shoulder and sidewalk widths should not be added, however, since they are already assumed to be included in the structure costs.

Railroads that are spanned can be treated as having two equivalent lanes per rail line. The widths of medium-sized rivers can also be converted to equivalent numbers of lanes for cost estimation purposes.

Table B-2 also supplies costs for short structures used for spanning minor water courses. For new structures longer than 200 to 250 feet, the estimated construction cost should be based on the bridge deck area, in square feet, as noted in the table.

TABLE B-2
Cost Estimate for New Roadway Construction/Reconstruction

Equivalent Number of Lanes Under	Cost ($ Millions per mile) Equivalent Number of Lanes Over		
	2–3 Lanes	4–5 Lanes	6–7 Lanes
2 to 5	1.0	2.0	3.0
6 to 7	2.0	3.0	4.0
Structures Over Minor Waterways	1.0	1.0	1.5

Note:
Structures that are part of interchanges are not costed separately. Equivalent lanes refer to travel lanes and medians only. See text. For extra long bridges (over 200 feet), use $75 per square foot of assumed deck

Widened Structures

The costs for widening existing structures is shown in Table B-3, on the basis of the square feet of deck area being added to the bridge. The widths of any medians, shoulders, and sidewalks should be included when determining the area of widening.

TABLE B-3
Cost Estimate for Widening of Structures

Item	Cost ($ per square foot of widening)
Widening of Structure	$150

Intersections

Some at-grade intersections are to have costs attributed to them that are over and above the per-mile roadway costs, which have already, been described. The intersection costs are meant to allow for the costs of signalization and additional turn lanes and/or through lanes.

Only three types of intersections are to have additional costs attributed to them. They are:

- Intersections with another arterial;
- Existing unsignalized intersections at which new signalization is proposed; and
- Newly proposed intersections at which signalization is also proposed, including turning roadway/cross street intersections.

No costs should be added for interchange ramp intersections, however, since those costs are included in the interchange cost estimate.

Costs of intersection improvements that are not listed above are not provided because they are felt not to be attribute to the highway improvement project, but rather to other improvement.

Table B-4 lists the additional construction costs to be attributed to some at-grade intersections based on intersection type.

TABLE B-4
Cost Estimate For At-Grade Intersections

Intersection Type	Additional Cost ($ each)
Cross street is another arterial	
Existing unsignalized intersection which is to be newly signalized, or newly proposed intersection which is to be signalized, where cross street is:	
4 lanes or wider	400,000
3 lanes or narrower	200,000
At an interchange ramp	-0-
Other intersections	-0-

Grade-separated intersections have no applicable additional costs. This is because the costs for the structure, the turning roadway(s), and the cost for any signalization at the turning roadway intersection(s) should be treated as discussed previously.

Grade Separations

New grade separations with railroad tracks are applied a cost of ten million. This unit cost was confirmed by the county based on recently completed projects.

Interchanges

Cost of new or modified interchanges should be estimated based on interchange type. These costs are in addition to the per-mile costs of the roadway through the interchange area, discussed previously. The interchange costs include all associated structures, retaining walls and any signalization of ramp intersections. Table B-5 shows estimated interchange costs by interchange type.

TABLE B-5
Cost Estimate for Interchanges

Interchange Type	Cost ($ Millions, each)
Single Point Diamond	18.0
Typical Diamond or Parclo	12.0

Right-of-Way Costs

As part of the cost estimate, a general cost per acre was assumed for right-of-way acquisition. A value of $100,000 per acre was assumed for developed areas, and a value of $50,000 per acre was assumed for undeveloped areas. Right of way guidelines have been set to ensure that a minimum right of way is provided for each type of facility. The minimum right of way is shown in Table 8.

Appendix C
Recommended Plan Performance Summary

Area Routes Summary

(Summary of links with a route code > 0)

Route		Lane Miles (miles)	Sum of VMT	Sum of VHT	VMT/ VHT	Sum of VHD	LOS
0		3.4	26,101	782	33.4	96	F
4	Perry Rd.	3.5	3,531	101	35.1	0	A
24	Jericho Rd.	12.4	54,666	1,580	34.6	17	D
48	Scott Rd.	1.8	1,823	52	35.1	0	A
78	Bliss Rd	4.7	20,668	520	39.7	3	C
83	Orchard Rd.	20.9	152,232	4,527	33.6	68	D
188	Interstate 88	21.6	362,159	6,536	55.4	425	E
230	US 30	35.6	234,141	5,930	39.5	106	D
347	IL 47	18.6	59,174	1,428	41.4	0	B
356	IL 56	15.4	182,705	2,828	64.6	16	C
801	Prairie St	13.9	25,737	779	33.0	16	D
802	Galena Blvd	17.4	72,476	2,085	34.8	14	C
803	Hankes Rd	6.3	20,201	597	33.9	4	C
804	Sullivan Rd	2.4	4,634	146	31.8	0	B
805	Indian Trail Rd	5.2	13,406	396	33.8	0	B
806	West Illinois Ave	1.7	7,312	210	34.9	0	C
807	Wheeler Rd	4.8	1,207	34	35.0	0	A
808	Dugan Rd	9.4	21,631	622	34.8	5	C
809	Baseline Rd	4.3	12,397	354	35.0	0	C
810	Seavey Rd	2.8	2,816	80	35.1	0	A
811	Ke-De-Ka Rd	1.6	3,898	112	34.9	0	B
812	Merrill Rd	3.6	2,053	59	35.0	0	A
813	Denny Rd	2.2	242	7	35.0	0	A
814	Norris Rd	3.6	3,655	104	35.0	0	A
815	Deerpath Rd	4.8	4,683	134	35.0	0	A
816	Densmore Rd	1.6	2,935	89	32.9	0	B
817	Gordon Rd	3.9	9,382	270	34.8	0	B
818	Barnes Rd	3.8	1,335	38	35.2	0	A
819	Bertram Rd	1.2	903	25	35.5	0	A
820	Mighell Rd	3.1	6,270	182	34.4	3	E
821	Ashe Rd	1.8	8,006	232	34.5	3	D

Route		Lane Miles (miles)	Sum of VMT	Sum of VHT	VMT/ VHT	Sum of VHD	LOS
822	Aucutt Rd	3.0	8,544	286	29.9	1	C
823	Albright Rd	0.6	2,709	92	29.5	2	D
824	Jericho Rd	1.7	4,964	165	30.0	0	C
825		3.2	4,717	157	30.0	0	A
826		3.6	578	16	35.1	0	A
827		2.0	726	21	35.1	0	A
828		2.3	1,398	40	34.8	0	A
829		6.1	3,302	95	34.9	0	A
830		2.2	876	25	35.2	0	A
831		5.4	3,303	95	34.9	0	A
833		2.2	109	3	35.0	0	A
834		3.5	3,924	112	35.0	0	B
835		0.8	49	1	34.7	0	A
836		3.0	507	15	34.7	0	A
837		1.5	353	10	35.1	0	A
838		2.6	1,502	42	35.4	0	A
839		8.8	12,765	364	35.1	0	A
840		2.9	2,652	76	35.0	0	A
841		3.5	2,793	80	34.8	0	B
842		4.0	7,605	217	35.0	0	B
843		9.5	20,853	611	34.1	5	C
844		2.4	4,855	138	35.2	0	B
845		2.0	1,474	42	35.0	0	A
846		1.7	51	1	34.9	0	A
847		3.0	536	15	35.1	0	A
848	Scott Rd	1.9	2,788	80	35.0	0	A
849		3.8	379	11	35.1	0	A
850		3.6	1,107	32	35.0	0	A
851		1.3	3,374	97	35.0	1	C

Summary of Links in Area

Area	Distance (miles)	Approximate Route Miles (miles)	Lane Miles (miles)	Sum of VMT	VMT/ LnMi	Sum of VHT	VHT/ LnMi	Sum of VHD	VHD/ LnMi	VMT/VHT
300	258.0	129.0	329	1,421,172	4,314	33,779	103	784	2	42

Summary of Links in Area (without Interstates)

Area	Distance (miles)	Approximate Route Miles (miles)	Lane Miles (miles)	Sum of VMT	VMT/ LnMi	Sum of VHT	VHT/ LnMi	Sum of VHD	VHD/ LnMi	VMT/VHT
300	247.2	123.6	308	1,059,013	3,440	27,243	89	359	1	39

Area Summary of Lane Miles by LOS

LOS	Lane Miles (miles)	
A	94.73	29%
B	46.62	14%
C	74.74	23%
D	85.28	26%
E	24.72	8%
F	3.38	1%
	329.47	

Area Summary of Lane Miles by LOS (without Interstates)

LOS	Lane Miles (miles)	
A	94.73	31%
B	46.62	15%
C	74.74	24%
D	85.28	28%
E	3.08	1%
F	3.38	1%
	307.83	

Jurisdiction Summary

(Summary of links in Area with Rte Code)

Jurisdiction	Distance (miles)		Approximate Route Miles (miles)		Lane Miles (miles)		Sum of VMT		Sum of VHT		Sum of VHD	
Interstate	10.8	13.4%	5.4	13.4%	22	16.1%	362,159	33.8%	6,536	27.8%	425	66.9%
US Highway	20.1	24.9%	10.1	24.9%	36	26.5%	234,141	21.9%	5,930	25.2%	106	16.7%
State Highway	17.0	21.0%	8.5	21.0%	34	25.3%	241,879	22.6%	4,256	18.1%	16	2.6%
County	32.8	40.6%	16.4	40.6%	43	32.2%	232,920	21.7%	6,781	28.9%	88	13.8%
	80.8		40.4		134.5		1,071,099.1		23,502.3		635.0	

Area Roads Functional Class Summary

(Summary of links in area with Rte Code > 0)

Route	Distance (miles)		Approximate Route Miles (miles)		Lane Miles (miles)		Sum of VMT		Sum of VHT		Sum of VHD	
Collector	155.1	60.1%	77.5	60.1%	155	47.1%	202,721	14.3%	5,947	17.6%	38	4.9%
Expressways and Principal Arterials	51.2	19.8%	25.6	19.8%	98	29.7%	531,430	37.4%	14,366	42.5%	188	24.0%
Freeways and Ramps	21.9	8.5%	11.0	8.5%	40	12.3%	570,966	40.2%	10,146	30.0%	536	68.5%
Minor Arterials	29.8	11.6%	14.9	11.6%	36	11.0%	116,056	8.2%	3,320	9.8%	21	2.7%
	258.0		129.0		329.5		1,421,172.3		33,778.7		783.5	

Appendix D

Kane County Access Control Policy

APPENDIX D

Kane County Access Control Policy

Introduction

On January 14, 2003, the Kane County Board approved comprehensive Transportation Permit regulations. The County subsequently published Permit Regulations and Access Control Regulations on January 1, 2004. The Transportation Permit Regulations replace the Access Control Regulations adopted in March 1989 and include updated policies, detailed procedures, design standards, and quality control checklists for various types of permits.

The guiding philosophy of the Access Control Regulations is to "Provide safe, efficient transportation systems compatible with land use" by controlling access on roadways to minimize curb cuts and local street intersections and maintaining existing roadway capacity. The Regulations provide that the highest degree of access control is to be applied to the County Limited Access Freeways[1] and Major Arterial Roads, with lesser degrees of access control on minor arterial and collector roads.

The degree of access control is based on two basic criteria:

1. The size and nature of the development, which determines the volume and type of traffic generated: and

2. The current and future significance of the highway being accessed.

In all cases, the operational characteristics of the new access point must meet, in the opinion of the County Engineer, traffic engineering criteria for safe traffic operations. In many cases, roadway improvements such as turning lanes, medians, turning restrictions, traffic signals, and roadway lighting must be funded and constructed by the Developer in order to ensure safe traffic operations. In the interest of public safety and general welfare, the county may restrict the location and number of access points.

Location of Access Points

Guidelines were also established regarding the location of access points. The first guideline provides that access points be located so that ingress and egress maneuvers will not severely degrade safe and efficient traffic movements and operations on the County highways. The locations should provide adequate sight distance avoiding placement of access points on a horizontal curve or just below a crest of a vertical curve. If the sight distance is not adequate for specific movements those movements will not be allowed. Whenever possible, access should be provided via existing cross streets in lieu of additional County highway access

[1] The County Highways designated by the County Board as Limited Access Freeways are:
- Fabyan Parkway from Randall Road to DuPage County Line
- Kirk Road from IL 56 (Butterfield Road) to Dunham Road
- Dunham Road from Kirk to IL 25
- Orchard Road from U.S. 30 to Randall Road
- Randall Road from East-West Tollway (I-88) to North County Line

points and will be prohibited when a property abutting a county highway has frontage on one or more roadways and reasonable access can be provided from said roadway. New access locations should be aligned with access points for existing development on the opposing side of the highway. Adjacent access points should be spaced to insure that conflicting movements do not overlap and that safe and efficient traffic movements and operations will be maintained. Adjacent access points should be spaced far enough apart as to provide for full left turn tapers and storage bays for both access points to the county highway. The county may require joint or shared access facilities. Access points in the vicinity of interchanges, interchange ramp terminals, crossroads, frontage roads, and service drive connections shall be restricted to minimize hazardous and congested conditions. Finally, access points shall be located to provide safety and convenience for pedestrians, bicyclists, and other users of the roadway right-of-ways.

Number of Access Points

A set of guidelines is specified for the number of access points to be provided. Each development or property regardless of the number of parcels is limited to one access point. When subdividing existing developed parcels to create new lots, no additional access will be permitted. An additional access point may be permitted if it is demonstrated that the level of service at the primary access point would be substantially improved and the additional access point will not adversely affect traffic safety or operations on the county highway. If the approved access is signalized, no additional full access points are allowed. A right turn only access point may be permitted, provided that the property owner demonstrated the need and complies with all other policies. The access guidelines for abutting property located at the intersection of two county highways provide that the access point shall be permitted on the county highway with lower volumes. For corner lots at an intersection where only one of the abutting roads is a county highway, access should be provided to the other intersecting road rather than the county highway.

Internal Circulation

Providing adequate internal circulation within a development aids in the operation of major facilities. The county recognizes this through a guideline specifying that when property abutting a county highway is to be developed, direct access to the county highway shall not be used in lieu of an adequate internal traffic circulation system. Access will not be permitted if internal traffic patterns are not acceptable based on overall traffic circulation, drive-in reservoir and parking space capacities, internal turning movements, and projected trip/parking generation rates. No access shall be permitted if such access would require backing or turning maneuvers onto a county highway or would result in parking on a county highway or within the right-of-way of a county highway.

Intersection Spacing and Application of Access Control Guidelines

The regulations apply different degrees or levels of access control depending on the type and operational characteristics of the highway in question, in combination with the type and intensity of the proposed land use generating the request for access. Three levels of access control guidelines are specified.

Level 1 – High level of access control based upon conservative parameters of driver behavior, vehicle performance characteristics, and a high margin of safety.

Level 2 – Moderate level of access control based on normal or median parameters for both driver behavior and margin of safety.

Level 3 – Minimum guidelines typically representative of physical or geometric constraints or considerations; not based on driver or vehicle performance criteria.

Guidelines for each level of control are presented for the following situations:

- Signalized Full Access Intersection Spacing
- Unsignalized Full Access Spacing
- Right-in/Right-out and Right-in Only Driveways (Policies, Corner Clearance, Spacing, and Design)

Turn Lane Improvements

As determined by the County Engineer, turning lanes (consisting of an approach widening, turn bay taper, and a full width auxiliary lane) for either right or left turns into an abutting property are required. Generally, most developments requesting access to arterials will be required to construct turning lanes.

Intersection Signalization and Street Lighting

The access control policy provides for installation of traffic signals at crossroads or driveways to facilitate outbound left turn and through traffic movements. The signals shall meet the warrants set forth in the *Manual of Uniform Traffic Control Devices* (MUTCD). Spacing of signalized intersections, use of detectors, and compatibility with arterial progression patterns is addressed. The regulations also specify that whenever traffic signals are required to serve a private development, the entire cost of the installation shall be the responsibility of the property owner.

If warranted by IDOT policy, or as determined by the County, property owners are required to install and maintain lighting at access locations.

Pedestrian/bicycle push button activated signal heads at traffic signal installations are also required when the MUTCD "pedestrian signal warrant" is met, or as otherwise determined by the County Engineer.

Abutting Land Use and Site Development Characteristics

The access policy includes guidelines for development characteristics of abutting property regarding land use, internal circulation, and aesthetics. The following elements are to be reviewed as part of the access permit review process.

- Safety considerations
- Regional impacts to the Highway System
- Internal circulation as it affects ingress or egress to the site
- Aesthetics of the improvements on the county right-of-way

- Right-of-way requirements
- Pedestrian/bicycle/mass transit circulation

Design Requirements

The regulations call for design of access points and accompanying highway improvements complying with the county requirements. The standards and specifications set forth in these regulations are to ensure a safe and efficient highway system for the motoring public. Design features addressed in the regulations are design speed, intersection and driveway sight distance requirements, access design widths and standards, radius return, angle of intersection, islands, medians, driveway profile, culverts, mailbox turnouts, shoulders, curb and gutter, bikepaths, sidewalks, cross-section and materials, traffic control and on-site design elements.