I-290

Environmental Impact Statement

West of Mannheim Road to East of Cicero Avenue

Alternatives Identification and Evaluation

November 2011

Draft Interim Report:
Initial Alternatives Identification and Round 1 Evaluation

Version 1.0

Note:
This is a draft version of the report which will be updated as the Alternatives Identification and Evaluation process advances towards the identification of the alternatives to be carried forward into the DEIS

Illinois Department of Transportation

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(subsequent sections to be added when additional evaluation is completed)

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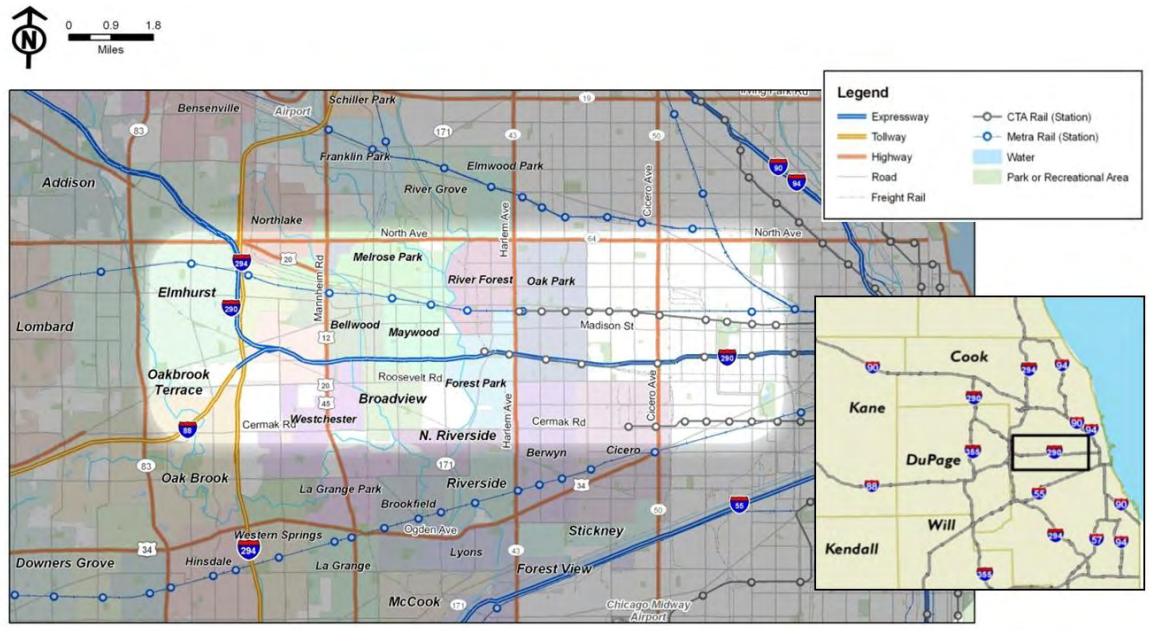
1 Executive Summary

The I-290 Preliminary Engineering and Environmental (Phase I) Study is being undertaken consistent with the National Environmental Policy Act (NEPA) and federal and state policy to prepare an Environmental Impact Statement (EIS) for the reconstruction of I-290 from west of Mannheim Road to east of Cicero Avenue (seeFigure 1-1. Study Area Map).

Figure 1-1. Study Area Map



The NEPA process guidespotential federal actions to consider impacts to the environment, and requires IDOT to evaluate alternative ways of accomplishing study goals and meeting study needs. The NEPA process establishes three primary steps in project development for an EIS: Establish the Purpose and Need, Alternatives Development and Evaluation, and identification of the Preferred Alternative.

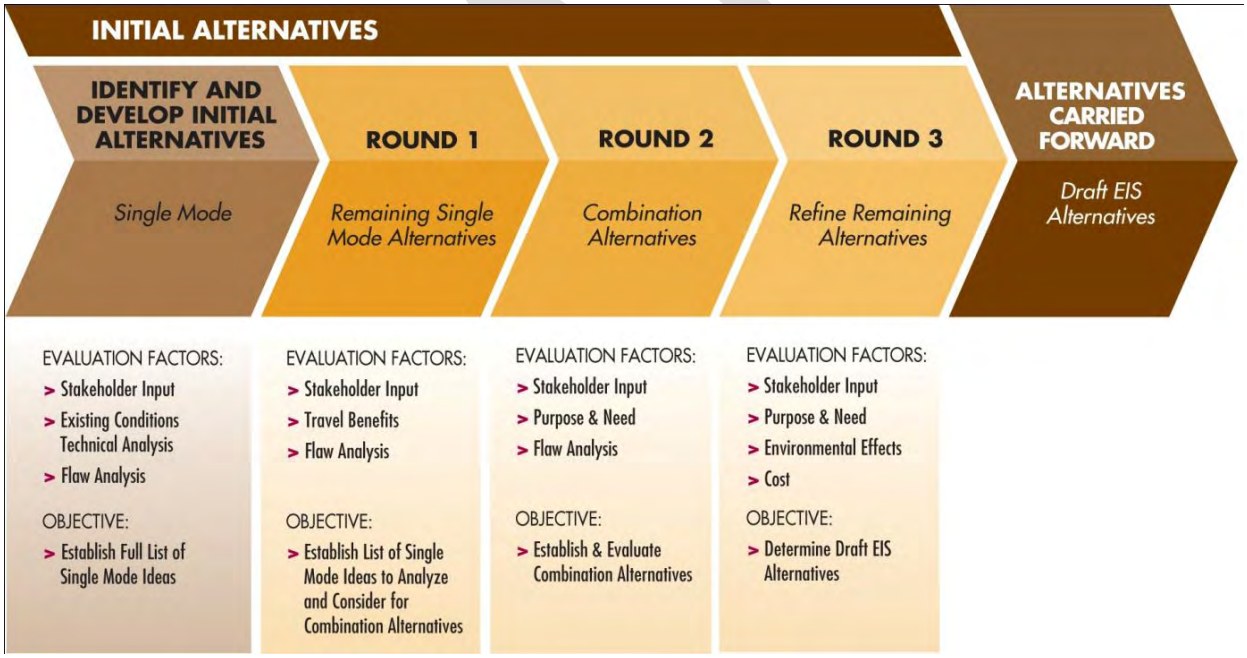
Figure 1-2. Environmental Impact Statement Planning Process

This document, which will be updated as the planning process advances, describes the alternative development and evaluation process used. This process, as illustrated in Figure 1-3, will include:

- Round 1 - The identification and evaluation of single mode alternatives, which are alternatives that consider changes to or improvements of only one mode of transportation, to understand the effectiveness and characteristics of each individual mode.
- Round 2 - The evaluation of an initial set of combination mode alternatives assembled based on the findings from the Round 1 single mode evaluation. Combination mode alternatives include improvements to or additions of more than one mode of transportation (e.g. transit and expressway improvements).
- Round 3 - The revision of the combination alternatives based on the initial results and further development and evaluation.

The goal of this process is to identify the alternatives to be carried forward for evaluation in the Draft EIS. The process also provides the opportunity to examine all modes of travel within the transportation system, which can provide the basis for future planning efforts by other area transportation agencies (i.e. RTA, CTA, etc).

Figure 1-3. Initial Alternatives Development and Evaluation Process



Prior to the initial alternatives identification process, the Illinois Department of Transportation (IDOT) initiated a project context audit to identify key features of the project area, characteristics of key transportation facilities, and conditions that should be addressed in the scope of the study. With this information, IDOT and the Corridor Advisory Group (CAG) prepared a project problem statement (February 2010). With stakeholder and transportation agency input, the study team evaluated the condition and performance of the existing transportation system. This activity focused on the identification of transportation needs of the study area, and was documented in the Existing Transportation Systems Performance Report

(ETSP), August 2010. Based on the findings from the ETSP and with stakeholder input, the Purpose and Need for the project was developed between July 2010 and December 2011 beginning with a basic outline that was gradually expanded and discussed with the CAG and other stakeholders over the course of 5 CAG meetings and a public meeting in May of 2011. The five needs identified for the I-290 study area are:

1. Improve regional and local travel
2. Improve access to employment
3. Improve safety for all users
4. Improve modal connections and opportunities
5. Improve facility deficiencies

A travel demand model was used as the evaluation tool for testing the transportation performance of alternatives. The travel demand model is based upon decades of research and calibration to appropriately portray existing conditions. To evaluate alternatives, the project ÌÚÛÈÉÓÐÚÏÌËɯÈɯÉÈÚÌÓÐÕÌ the Chicago Metropolitan Agency for Planning (CMAP) 2040 data to forecast future travel conditions throughout the study area, and assuming no improvements to I-290 in the study area. As the accepted plan for the regional transportation system for the year 2040, this model ÌÚÛÈÉÓÐÚÏÚɯÛÏÙÙBuild ×ÙÖÑÌÊ alternative, which ÐÚɯşÈÓÛÌÙÕÈÛÐÝÌ the baseline condition against which the transportation performance of alternatives are evaluated. The evaluation process includes a relative comparison between alternatives and comparison of each alternative to the No Build alternative. Specific population and employment forecasts will be developed for the evaluation of the alternatives in the Draft Environmental Impact Statement (DEIS).

Alternatives were initially evaluated for fatal flaws throughout the process. A fatal flaw is defined as a characteristic or component of an alternative that would render it infeasible or impractical in the context of this study. Flaws could include substantial direct impacts to residences, businesses, environmental resources, or community facilities. A fatal flaw could also result from the improvement being beyond the context of the I-290 Phase I Study Area or needs. Alternatives that have costs that are not reasonable and prudent can also be removed from consideration.

1.1 Initial Alternatives Identification Summary

The initial alternatives for the Round 1 evaluation were identified through a pre-screening process that considered approximately 460 alternative suggestions submitted by project stakeholders on how to address the purpose and need of the I-290 project. These suggestions were sorted into three main groups: roadway improvements, transit improvements, and related improvements that could be combined with other concepts. Each of the three groups was subdivided into concept categories based on the stakeholder suggestions provided (example: add general purpose lanes to I-290). As discussed further in Section 4 and Appendix A of this document, 33 concept categories emerged to which each suggestion was assigned.

The 33 concept categories were pre-screened by IDOT to identify which concepts would be either carried forward into Round 1, not carried forward, or deferred to a future round of evaluation. The pre-screening resulted in 11 of the 33 original categories carried forward into

the Round 1 evaluation. In addition to these single mode alternatives, 11 other categories of related improvements were deferred for consideration in future screening rounds.

1.2 Round 1 (Single Mode Evaluation) Summary

The purpose of the single mode evaluation was to understand the effectiveness and characteristics of each individual mode. A Travel Demand model was used to test the alternatives, and is based upon decades of research and calibration to appropriately portray existing conditions; the CMAP 2040 plan was used as a base for forecasting future conditions. The model seeks the most efficient mode of travel based upon travel costs, trip lengths and trip purposes.

21 single mode alternative concepts, that are derivative of the 11 single mode concept categories carried forward from the pre-screening, were developed by the study team and Corridor Advisory Group for evaluation in Round 1 that are derived The 21 single mode alternatives are summarized in Table 1-1, and a set of maps representing these alternatives is provided in Appendix C. Some of the concept categories resulted in multiple single mode alternatives. For example, three versions of the CTA Blue Line extension concept were carried forward as single mode alternatives with different project termini.

Table 1-1. List of Single Mode Alternatives Evaluated in Round 1

Transit Mode Alternatives (9 total)

Blue Line Extension (Heavy Rail Transit - HRT)	[HRT 1] From Forest Park To Oak Brook via IL Prairie Path and Butterfield Road
	[HRT 2] From Forest Park To Oak Brook via IL I-290 and I-88
	[HRT 3] From Forest Park To Mannheim via I-290
Express Bus	[EXP] Various service from DuPage and Northwest Cook Counties to Forest Park CTA terminal
Bus Rapid Transit (BRT)	[BRT 1] Oak Brook to Forest Park - via Butterfield Road and IL Prairie Path
	[BRT 2] Oak Brook to Forest Park - via I-88 and I-290
	[BRT 3] Oak Brook to Cicero Avenue - via I-88 and I-290
	[BRT 4] Oak Brook to Ashland Ave - via I-88 and I-290 + CTA Blue Line conversion
	[BRT 5] Lombard to Forest Park - via I-88 and I-290

Expressway Mode Alternatives (11 total)

General Purpose (GP) Add Lane			[GP LANE] General Purpose Add Lane from I-88 to Central Avenue
Managed Lanes	High Occupancy Vehicle (HOV) Lanes	2+ Riders 	[HOV 2LL] Oak Brook to Racine Avenue
			[HOV 2L] I-88 to Racine Avenue
			[HOV 2W] Oak Brook to Central Avenue
		3+ Riders 	[HOV 3LL] Oak Brook to Racine Avenue
			[HOV 3L] I-88 to Racine Avenue
			[HOV 3W] Oak Brook to Central Avenue
	High Occupancy Toll (HOT) Lanes		[HOT 1] Oak Brook to Central Avenue, 3+ Vehicles Free
			[HOT 2] Oak Brook to Racine, 3+ Vehicles Free
	Toll Lanes		[TOLL 1] Toll Existing I-290 Lanes, I-88 to Cicero Avenue
			[TOLL 2] Toll I-290 with Add Lanes, I-88 to Cicero Avenue

Arterial Mode Alternatives (1 alternative with two variations)

Arterial Widening	With Parking	[ART 1 & 2] Widening of Roosevelt Road and Madison Avenue to 4 continuous lanes (2 lanes each direction). ¶ Roosevelt Road from I-294 to Cicero Avenue ¶ Madison Avenue from 25th Avenue to Cicero Avenue
	Without Parking	

Round 1 single mode travel benefit evaluation results were presented to, and reviewed by the CAG and Technical Force (TF), in July 2011 and September 2011. Further discussion on the single mode evaluation results continued at subsequent CAG meetings. Based on the Round 1 evaluation findings and stakeholder and transportation agency input, an initial set of combination mode alternatives were identified for evaluation in Round 2 in September 2011, and will be further refined at the December 2011 CAG/TF Combination Alternatives Workshop.

The following is a summary of the single mode evaluation results:

Transit Modes:

The Blue Line extension and BRT single mode alternatives were the best performing transit alternatives with similar results and the express bus alternative resulted in local travel and job accessibility improvements. However, no single mode transit alternative showed improvement to I-290 travel performance due to the already well-established and utilized study area transit network, with new service drawing insufficient auto-trip diversions to offset auto demand for I-290, and a smaller narrower transit market as compared to I-290. Given the extent of the existing transit market in the study area, ridership gains on new transit services are limited, and

any ridership on new transit services would be comprised primarily from riders diverting from existing service. For example, the Blue Line extension to Oak Brook alternative [HRT 2] attracts 24,550 riders; 13,260 (54 percent) of these riders are diverted from existing transit services (PACE, Metra), and 8,350 (34 percent) are diversions from auto.

Highway Modes:

The single mode expressway alternatives resulted in the highest travel performance improvements to the I-290 Expressway, as well as the best improvement of regional and local (study area) travel performance. This is due to improving travel for the large market served by I-290, for both the traditional and reverse commute patterns. Managed lane expressway alternatives (HOV and HOT) provide some of the best performance benefits because they add capacity to address the underserved demand in this corridor, and manage its use effectively.

Arterial Widening:

An initial fatal flaw footprint impact evaluation found that arterial widening for Roosevelt Road (IL 38) from I-294 to Cicero Avenue and Madison Ave from 25th Avenue to Cicero Avenue (with and without parking) resulted in a large number of displacements and, therefore, arterial widening was determined to be fatally flawed and not carried forward for performance evaluations. Arterial improvements will be further considered in conjunction with other modes as the evaluation process advances.

Overall:

While single mode transit alternatives offer some travel benefits, they do not show any improvement to I-290 performance. Overall, expressway modes provide the best travel improvements locally and regionally. Combinations of transit and expressway alternatives will be assembled and evaluated to identify any transportation performance synergies to be gained by various combinations.

The following single modes were dropped from further consideration as part of the I-290 Study, for the following reasons:

Blue Line Conversion to Bus Rapid Transit (BRT 4): The BRT 4 Alternative from Oak Brook to Ashland Avenue was evaluated as a conversion of the existing CTA Blue Line to a Bus Rapid Transit facility between Ashland Avenue and the Forest Park terminal. This alternative indicated generally similar and some improved performance as compared to an HRT Blue Line extension to Oak Brook (HRT 2), however, due to the similarity in performance and ROW requirements for these two fixed guideway transit facilities, the HRT extension of the Blue Line will be the representative mode that will be modeled and evaluated in the combination alternatives.

Blue Line Extension and BRT Alternatives along the Prairie Path (HRT 1 and BRT 1): The Blue Line extension and BRT alternatives along the Prairie Path and along I-290 (HRT 2) perform very similarly. However the Prairie Path alignment has greater service overlap/duplication with the existing Metra service, diverting more riders from the UP-West line than the alignment along I-290. There are also potential conflicts with the recreational functions of the Illinois Prairie Path corridor and Section 4(f) of the US Department of Transportation Act of 1966. Therefore, the alternatives using the Prairie Path alignment are not being carried forward for evaluation in Round 2

Identification of Combination Modes:

The results from the single mode evaluation were used to establish the set of combination mode alternatives for evaluation in Round 2 .

(This section will be updated when the initial list of combination modes is finalized)

1.3 Round 2 Summary

(This section will be updated at the completion of Round 2)

1.4 Round 3 Summary

(This section will be updated at the completion of Round 3)

1.5 Conclusion

(This section will be updated when the Initial Alternatives Identification and Evaluation is complete)

2 Alternatives Identification and Evaluation Process

After the project needs were identified, alternatives were formally sought to address those needs. The process for developing alternatives and evaluating those alternatives consisted of four iterative steps, which are described below:

1. Identify and Develop Initial Alternatives
2. Round 1 ‑ Single mode evaluation
3. Round 2 ‑ Initial combination mode evaluation
4. Round 3 ‑ Identification of DEIS alternatives

These four steps will be used to screen a large range of concepts to the alternatives to be carried forward into the DEIS for detailed development and evaluation. Alternatives will be evaluated relative to each other and to the baseline or No Build Alternative. A range of factors were considered in the evaluation process, including: transportation performance, stakeholder input, logical termini, fatal flaws, impacts, and cost.

The goal of this process is to identify the alternatives to be carried forward for evaluation in the Draft EIS. The process also provides the opportunity to examine all modes of travel within the transportation system, which can provide the basis for future planning efforts by other area transportation agencies (i.e. RTA, CTA, etc).

A travel demand model was used as the evaluation tool for testing the transportation performance of alternatives in Rounds 1, 2, and 3. The travel demand model is based upon decades of research and calibration to appropriately portray existing conditions. To evaluate alternatives, the ×ÙÖÑÌÊÛɯÌÚÛÈÉÓÐÚÏÌËɯÈɯÉ the Chicago Metropolitan ?-Öɯ!ÜÐ Agency for Planning (CMAP) 2040 data to forecast future travel conditions throughout the study area, and assuming no improvements to I-290 in the study area. As the accepted plan for the regional transportation system for the year 2040, this model ÌÚÛÈÉÓÐÚÏÌÚɯÛÏÌɯ×ÙÖ Build alternative, which ÐÚɯçÈÓÛÌÙÕÈÛÐÝÌ and is the baseline condition against which the transportation performance of alternatives are evaluated. The evaluation process includes a relative comparison between alternatives and comparison of each alternative to the No Build alternative. Specific population and employment forecasts will be developed for the evaluation of the alternatives in the DEIS.

2.1 Initial Alternatives Identification

Alternatives suggestions for the I-290 Study were solicited from project stakeholders and the public through public meetings, CAG/TF meetings, via comments submitted to the project website or by other means. Initially, single mode alternatives were sought for evaluation; single mode alternatives are those that involve one mode of transportation (commuter rail, bus rapid transit, subway, HOV lanes, etc.) for the modification of, or addition to, the study area. The purpose of evaluating the single modes was to understand the effectiveness and characteristics of each individual mode. The submitted alternatives were categorized, reviewed, and screened

to identify an initial set of single mode alternative concept categories that fit within the context of the study for initial evaluation in Round 1. These are those alternatives that include the general location, configuration, and mode type of a potential solution. This list was developed, coordinated, and refined with project stakeholder input.

2.2 Round 1 – Single Mode Evaluation

A total of 21 single mode alternatives were identified for evaluation in Round 1, including 9 transit, 11 expressway, and one arterial widening alternative. A summary of the evaluation that led to the selection of these single mode alternatives is provided in Section 4.

The initial set of identified single mode alternatives were reviewed for possible fatal flaw impacts, and those not identified as fatally flawed were evaluated with the travel demand model to compare relative transportation performance. Using the results of the Round 1 evaluation, and stakeholder and transportation agency input, various single mode expressway and transit alternatives were reviewed for consideration in combination mode alternatives for further evaluation in Round 2. A summary of the Round 1 evaluation, findings, and list of initial combination mode alternatives is provided in Section 5 of this report.

2.3 Round 2 – Combination Mode Evaluation

Using the results of the Round 1 evaluation, and stakeholder and transportation agency input, a set of combination mode alternatives were assembled for evaluation in Round 2. Combination mode alternatives are those that include two or more single modes as part of an overall corridor level alternative. In Round 2, the initial corridor level combination mode alternatives will undergo an additional fatal flaw footprint impact screening, and those carried forward will be evaluated with the travel demand model to assess how well they meet the purpose and need and to compare relative transportation performance. The results of the Round 2 evaluation will be reviewed with the stakeholders and transportation agencies, and those initial combination mode alternatives that perform well and are not fatally flawed will be considered and/or revised for further evaluation in Round 3.

(This section and Section 6 will be updated at the completion of the Round 2 Evaluation)

2.4 Round 3 – Refinement of Remaining Alternatives

In Round 3, with additional stakeholder input, the alternatives and features are further refined based on the findings from Round 2 evaluation. Alternative refinements will undergo additional travel modeling and traffic analysis, impact evaluation (geographic information system (GIS) level footprint, environmental and social impacts), and cost considerations. Interchanges, access, cross-streets, frontage roads, transit access, non-motorized, and other transportation features will also be developed and evaluated.

The objective at the end of Round 3 is to identify the primary modes, alignment(s), and features of the alternative(s) to be carried forward for evaluation in the DEIS.

(This section and Section 7 will be updated at the completion of the Round 3 Evaluation)

3 Evaluation Measures

Measures of transportation performance were developed to evaluate the respective benefits of each alternative. The measures which follow represent the initial evaluation list which is expected to be refined as the alternatives screening process proceeds into subsequent rounds of evaluation. This will also account for more detailed level of design, the refinement of the alternative concepts, and the outcomes of those evaluations.

3.1 Footprint/Fatal Flaw Screening ï GIS Level Analysis

Screening was initiated to evaluate the physical impacts of an alternative, or footprint, within the study area based on right-of-way requirements. A geographic information system (GIS) level of analysis was used for the initial screening to assess impacts based on information currently available. The most detailed environmental and socioeconomic analysis, field studies, and documentation will be completed for the DEIS alternatives. Table 3-1 lists the measures of physical impacts of an alternative to be evaluated in Rounds 1, 2, and 3:

Table 3-1. Footprint Screening Measures

Footprint Screening	Unit	Rnd 1	Rnd 2	Rnd 3
Additional right-of-way required/footprint	acres	¸	o	o
Displacements (direct impact to residences and businesses)	#	¸	o	o
Parkland Impacts	acres	¸	o	o
Historic Property Impacts	#	¸	o	o
¸ Completed as of this version of the report o Yet to be completed as of this version of the report				

Alternatives that would result in impacts or displacements may be determined to be fatally flawed and dropped from further consideration.

3.2 Performance & Purpose and Need Screening

The following measures were selected in each need category based on their linkage to addressing the needs outlined in the I-290 Draft Purpose and Need Statement. The following presents the measures to be used in Rounds 1, 2, and 3 evaluations. In Round 1, the performance based measures will be used for the single mode evaluation. Further evaluation with respect to the Purpose and Need will be added in Rounds 2 and 3 as the combination mode alternatives are identified and further defined.

3.2.1 Improve Regional and Local Travel

Measures for improving regional travel listed in Table 3-2 are intended to evaluate the relative potential of an alternative to improve travel conditions through the corridor relative to the 2040 Baseline (No Build) Alternative.

Table 3-2. Study Area and Regional Measures

Improve Regional Travel		Unit	Rnd 1	Rnd 2	Rnd 3
Study Area Measures	I-290 Volume to Capacity (v/c)	ratio	¸	o	o
	I-290 Speeds	mph	¸	o	o
	I-290 Hours of Congestion	hours/day	¸	o	o
	Person Throughput	persons/day	¸	o	o
	Vehicle Miles of Travel (VMT)	hours/day	¸	o	o
Regional Measures	Congested Vehicle Miles of Travel (CVMT)	miles/day	¸	o	o
	Vehicle hours of Travel (VHT)	hours/day	¸	o	o
	Hours of Delay	hours/day	¸	o	o

I-290 Volume to Capacity Ratio (v/c) ł Study Area: Congestion along I-290 affects the ability of this facility to serve regional travel; this measure provides an indication of congestion by relating the actual volume of a facility to its theoretical maximum capacity for acceptable operations. This is expressed as a ratio with values greater than 0.85 indicating potential for congestion, and because the maximum capacity is theoretical, values greater than 1 are possible for this measure. The travel demand model will be used to calculate the AM and PM peak period volume to capacity ratios for each alternative. Lower v/c ratios are desired but this ratio is used as a relative comparison, not an absolute measure

I-290 Speeds ł Study Area: Speeds along I-290 in the study area affect the ability of the expressway to serve regional travel. Average travel speeds along I-290 in the study area for the AM and PM peak periods will be calculated by the travel demand model. Faster travel speeds are desired.

I-290 Hours of Congestion ł Study Area: Congestion along I-290 affects the ability of this facility to serve regional travel. This measure will estimate how many hours of congestion are anticipated per day on I-290 in the study area for each alternative. Congestion is defined as a level of service D or worse on the expressway. The CMAP travel model and/or VISSIM will be used to estimate the volumes on the facility throughout the day and the LOS will be calculated using the Highway Capacity Manual (2000/2010[1]). Fewer hours of congestion per day are desired.

Person Throughput ł Study Area: The travel demand model for I-290 will be used to calculate the study area person throughput for each È Ó Û Ì Ù Õ È Û Ð Ý Ì ш È Û ш Ö Õ Ì ш Ö Ù ш Ô Ö Ù Ì ш ş Ú

[1] Based on the availability of the current accepted version at the time of evaluation.

the study area. Screen lines capture person throughput across specific locations along I-290 and the east-west arterials in the study area. Person throughput for both auto and transit will be evaluated. Higher overall person throughput is desired.

Vehicle Miles of Travel (VMT) – Regional system and Study Area: This measure indicates the distance travelled (in miles) by all the vehicles at the regional and study area levels. The regional travel demand model will be used to calculate this measure.

Congested Vehicle Miles of Travel (CVMT) – Regional system and Study Area: This measure indicates the vehicle miles traveled in congestion per day, and is calculated and compared at the regional and study area levels for each alternative. The regional travel demand model will be used to calculate this measure. Fewer miles traveled in congestion are desired.

Vehicle Hours of Travel (VHT) – Regional system and Study Area: This measure indicates how many hours are traveled each day by vehicles in the region and study area. The travel demand model for I-290 will be used to calculate this measure for each alternative. Fewer vehicle hours of travel are desired.

Hours of Delay – Regional system and Study Area: This measure indicates how many hours of delay vehicular traffic is experiencing in the region and study area each day. The regional travel demand model will be used to calculate this measure for each alternative. Fewer hours of delay are desired.

Commercial Truck needs have regional importance in this corridor because of the lost time and economic loss due to inefficient truck movements resulting from congestion. Regional measures related to truck movements will be evaluated for each alternative. The measures shown in Table 3-3 are the same as the measures above, but limited to trucks.

Table 3-3. Regional Measures - Truck Travel

Improve Regional Travel	Unit	Rnd 1	Rnd 2	Rnd 3
Truck Miles of Travel (TMT)	miles/day	,	o	o
Truck Hours of Travel (THT)	hours/day	,	o	o
Congested TMT	miles/day	,	o	o
Truck Hours of Delay	hours/day	,	o	o

Measures for improving local travel are intended to evaluate the relative potential of an alternative to improve local study area travel conditions. The local travel measures related to the performance of the local arterial network in the I-290 study area are shown in Table 3-4.

Table 3-4. Local Travel Measures

Improve Local Travel – Study Area	Unit	Rnd 1	Rnd 2	Rnd 3
Arterial Volume to Capacity (v/c)	Ratio	,	o	o
Arterial Speeds	Mph	,	o	o
Arterial Vehicle Miles Traveled	miles/day	,	o	o
Arterial Vehicle Hours of Delay	hours/day	,	o	o

Arterial Congestion VMT	miles/day	¸	o	o
Interchange Level of Service (LOS)	LOS	-	o	o

Arterial volume to capacity (v/c), speeds, vehicle miles traveled (VMT), and vehicle hours of delay are the same measures used regionally, but are evaluated on the study area arterials only. The study area arterials include the north-south streets of Mannheim Road, 1st Avenue, Harlem Avenue, Cicero Avenue, bounded by North Avenue and Cermak Road. The east-west study area arterials are Cermak Road, Roosevelt Road, Madison Street, Lake Street, and North Avenue, bounded by Wolf Road in the west and Cicero Avenue in the east.

When appropriate, interchange levels of service (LOS) will also be evaluated; interchanges will be evaluated in Round 3.

3.2.2 Improve Access to Employment

Measures for improving access to employment are intended to evaluate the relative potential of a corridor alternative to improve the accessibility to jobs by number of regional jobs accessible from the study area within 60 minutes. For Round 1, the number of jobs from a single location in the study area was estimated and used to make relative comparisons. In subsequent rounds, the number of jobs accessible fromadditional locations will be considered. Sixty (60) minutes is used as it able to cast a wider net for jobs accessible by the transit system in the Chicago area. This information is extracted from the regional transportation model based on 2040 baseline population and employment for each alternative modeled as shown in Table 3-5.

Table 3-5. Access to Employment Measures

Improve Access to Employment	Unit	Rnd 1	Rnd 2	Rnd 3
Accessibility to Jobs by Auto	# of jobs/time	¸	o	o
Accessibility to Jobs by Transit	# of jobs/time	¸	o	o
Total Accessibility to Jobs (Transit + Auto)	# of jobs/time	¸	o	o

3.2.3 Improve Safety for All Users

The measure for addressing pedestrian-vehicle conflicts in the each of the evaluation rounds is shown in Table 3-6.

Table 3-6. Safety Measures - Pedestrian-Vehicular Safety

Address Pedestrian-Vehicle Conflicts	Unit	Rnd 1	Rnd 2	Rnd 3
Number of Conflict/ crossing Locations at each Interchange	High/Med/Low	-	o	o

Number of Conflict/crossing Locations at each Interchange: This measure is evaluated in Rounds 2 and 3 when initial interchange concepts are further developed and refined. The number of existing and proposed interchange conflict points/crossing locations will be counted and compared against existing conditions.

Measures for addressing the high comparative crash rates and high frequency of crashes on I-290 are shown in Table 3-7 and are intended to evaluate the relative potential for an alternative to improve overall safety along I-290 and in the study area.

Table 3-7. Safety Measures - Crash Rates

Address High Comparative Crash Rates and High Frequency of Crashes on I-290	Unit	Rnd 1	Rnd 2	Rnd 3
Arterial Safety – Study Area	injury and fatal (K) crashes per million vehicle miles traveled per year (MVMY)	,	o	o
I-290 Safety – Study Area	injury and fatal (K) crashes per million vehicle miles traveled per year (MVMY)	,	o	o
Overall Transportation System Safety – Study Area	injury and fatal (K) crashes per million person miles traveled per year (MPMY)	,	o	o

Arterial Safety – Study Area: This measure was evaluated for the major east-west and north-south arterials within the I-290 Study area using methods established in the AASHTO Highway Safety Manual, 1st Edition (date?). Existing characteristics of each route were coded, and travel model traffic volumes of each arterial segment were used to calculate injury and fatality rates for each alternative using the HSM method. This measure is expressed in injuries and fatalities per million vehicle miles traveled per year. Lower injury and fatality rates are desired.

I-290 Safety – Study Area: This measure was evaluated in the I-290 Study area using methods described in the Texas Roadway Safety Manual for highways that will be incorporated in a future edition of AASHTO Highway Safety Manual. Geometric characteristics of the existing facility, and proposed conditions (including shoulder widths, lane widths, number of lanes, etc.) each were coded, and travel model traffic volumes of each arterial segment were then applied to calculate injury and fatality rates for each alternative using the Texas Roadway Safety Manual methods. The measure is expressed in injuries and fatalities per million vehicle miles traveled per year. Lower injury and fatality rates are desired.

Overall Transportation System Safety – Study Area: This measure is used to evaluate the overall safety performance of the alternatives and factors in expressway, arterials, and transit safety performance. The unit for this measure is expressed in injuries and fatalities per million person miles traveled. ş / Ì Ù Ú Ö Õ ш Ô Ð Ó Ì Ú ç ш Ð Ú ш Ü Ú Ì Ë ш Í Ö Ù ш Û Ï Ð Ú ш common denominator between both individual vehicular and transit-based travel. Person miles traveled for each facility is calculated from the travel demand model. For expressway and arterials, the injury and fatality rates were calculated by dividing the results of the arterial and highway safety evaluations by the total number of annual person miles traveled on each facility. For this evaluation, it was assumed that there were no injuries or fatalities for users of transit, regardless of mode (bus or train). The rates of all three facilities were then combined to compare the for the overall safety performance of each alternative. Lower injury and fatality rates are desired.

3.2.4 Improve Modal Connections and Opportunities

Measures for improving access to transit, non-motorized connections, and multimodal Ö × × Ö Ù Û Ü Õ Ð Û Ð Ì Ú ш È Ù Ì ш Ð Õ Û Ì Õ Ë Ì Ë ш Û Ö ш Ì Ý È Ó Ü È Û Ì ш Û Ï Ì ш Ù Ì Ó È Û Ð better connections between travel modes, as shown in Table 3-8. Since the last three evaluation metrics listed in Table 3-8 were assumed to be satisfied for all single mode alternatives, they were not used for evaluation in Round 1.

Table 3-8. Modal Connections Measures

Improve Modal Connections and Opportunities	Unit	Rnd 1	Rnd 2	Rnd 3
New Transit Trips ł Region	#	¸	o	o
Improve Transit Access ł Study Area (qualitative)	V	-	o	o
Improve Non -Motorized Connections ł Study Area (qualitative)	V	-	o	o
Improve Multi -Modal opportunities ł Study Area (qualitative)	V	-	o	o

New Transit Trips ł Region: This measure is used as an indicator of an alternative¢s ability to improve access to transit. New transit trips are defined as the number of regional transit trips generated by an alternative that exceed the number of regional transit trips of the 2040 no-build scenario. More transit trips are desired.

Transit Access ł Study Area: For this qualitative evaluation it is assumed that alternatives recommending reconstruction of existing facilities in the study area will include improvements to existing pedestrian, bicycle, and bus transfer connections in the study area. If an alternative is determined to have the ability to improve transit access, a V is assigned. This measure was not used in Round 1.

Improving Non -Motorized Connections ł Study Area: For this qualitative evaluation, it is assumed that any alternative recommending the reconstruction of existing facilities in the study area will include improvemen ts to non-motorized connections across the I-290 corridor. If an alternative is determined to have the ability to improve non -motorized connections, a V is assigned. This measure will require more definition in future evaluation rounds.

Improving Multi -Modal Opportunities ł Study Area: For this qualitative evaluation, it is assumed that any alternative that involves coordination with transit providers and stakeholders regarding transit opportunities has the potential to improve multi -modal connections. If an alternative is determined to have the ability to improve multi -modal opportunities, a V is assigned. This measure will require more definition in future evaluation rounds.

3.2.5 Improve Facility Deficiencies

Measures for improving facility deficiencies are intended to evaluate an alternative's potential to address existing design deficiencies, as shown in Table 3-9. For alternatives that require the reconstruction of the mainline, cross-roads, and interchanges will assume that geometric and Americans with Disabilities Act (ADA) ramp deficiencies will be addressed. These evaluation metrics are not used in Round 1 single mode evaluation.

Table 3-9. Facility Deficiencies Measures

Improve Facility Deficiencies	Unit	Rnd 1	Rnd 2	Rnd 3
Pavement Age	yes/no	-	o	o
Structure Deficiencies	yes/no	-	o	o
Geometric Deficiencies	yes/no	-	o	o
ADA ramp and Sidewalk Deficiencies	yes/no	-	o	o
Drainage Deficiencies	yes/no	-	o	o

3.3 Cost Estimates

Conceptual capital cost screening level estimates will be developed based on recent local and or national experience. These cost estimates will typically be based on per mile unit costs and contain an appropriate contingency factor to account for uncertainties in the early screening steps. Cost estimates are considered in Rounds 3 and beyond.

4 Initial Alternatives Identification Findings

This section describes the process that was used to identify the alternatives evaluated in Round 1. Section 4.1 presents the range of stakeholder suggestions and Section 4.2 describes the pre screening process that was used to identify the list of alternatives for the Round 1 screening process.

4.1 Initial Range of Stakeholder Suggestions

Approximately 170 alternatives suggestions were submitted at the first public meeting (November 2009) and at the Corridor Advisory Group/Task Force Alternatives Workshop in December 2010. Over 400 additional comments suggesting alternatives were submitted via the I-290 Study Website, subsequent CAG/TF meetings, and during the comment period for the second Public Meeting in May 2011. At this time over 580 suggestions have been submitted regarding alternatives. A comprehensive listing of the alternative suggestions is provided in Appendix A.

The suggestions were sorted into three main groups: roadway improvements, transit improvements, and related improvements that could be combined with other concepts. Based on the stakeholder suggestions, each of the three groups was subdivided into 33 distinct concept sub-categories (example: add general purpose lanes to I-290) to which each suggestion or comment was assigned. A functional description of each concept category can be found in Appendix A. A summary of the various concepts by mode are provided in map form in Appendix B. Section 4.2 describes the pre-screening results of the 33 concept categories.

4.2 Single Mode Alternatives Concept Screening

The 33 concept categories were pre-screened to identify the single mode alternative concepts to be carried forward for evaluation in Round 1. Each concept was either: (1) carried forward into Round 1, (2) not carried forward into Round 1, or (3) deferred to a later round of evaluation. An important factor in the pre-screening process was the potential to serve the two largest travel markets in the I-290 study area. The two largest travel markets, as identified by the RTA Cook DuPage Corridor Study Travel Market Analysis (December 2005), are the traditional and reverse commute markets, which serve the highest density of work trip origins and destinations concentrated in the city of Chicago, the near west suburbs centered along the I-290 Study area, and in eastern DuPage County to the west. Concepts that had large right-of-way impacts on adjacent communities were not carried forward for further study. Other related improvements were deferred to future screening rounds.

Table 4-1 summarizes the results of the concept category pre-screening process. A functional description and a detailed disposition for each concept category are provided in Appendix A.

Table 4-1. Summary of Pre-Screening Findings

Concept Categories	Concept Disposition		
	Carried Forward	Not Carried Forward	Deferred to subsequent rounds
Roadway Improvements			
A1. Add general purpose lanes to I-290	**P**		
A2. Add high-occupancy vehicle (HOV) lanes to I-290	**P**		
A3. Add high-occupancy toll (HOT) lanes in each direction	**P**		
A4. Toll I-290 lanes	**P**		
A5. Arterial Widening	**P**		
Transit Improvements			
B1. $ ß Û Ì Õ Ë ш " 3 ш ! Ó Ü Ì ш + Ð Õ Ì ш Û Ö ш . ʒ		**P**	
B2. Extend CTA Blue Line west	**P**		
B3. Extend CTA Blue Line west via Illinois Prairie Path	**P**		
B4. Add CTA Blue Line express service			**P**
B5. Extend CTA Green Line to Maywood		**P**	
B6. Add BRT via Prairie Path	**P**		
B7. Add BRT along I-290	**P**		
B8. Add BRT along east-west arterials		**P**	
B9. Improve existing commuter rail		**P**	
B10. New commuter rail service		**P**	
B11. Convert the existing CTA Blue Line to BRT	**P**		
B12. Remove the existing CTA Blue Line		**P**	
B13. Add High Speed Rail		**P**	
B14. Add Inner Circumferential Commuter Rail		**P**	
B15. Express Bus	**P**		
B16. Add Automated Guideway Transit		**P**	
B17. Add Light Rail Transit		**P**	
Related Improvements (that can be combined with other concepts)			
C1. Add express bus service within the project area			**P**
C2. Interchange improvements and design			**P**
C3. Improve non-motorized facilities			**P**
C4. Improve transit stations			**P**
C5. Improve transit operations/connections			**P**
C6. Add Transportation System Management /Active Traffic Management/Intelligent Transportation Systems			**P**
C7. Add a cap over the expressway			**P**
C8. Double-deck I-290		**P**	
C9. CTA Blue Line in Subway/Tunnel or Elevated			**P**

Concept Categories	Concept Disposition		
	Carried Forward	Not Carried Forward	Deferred to subsequent rounds
C10. Arterial Improvements			**P**
C11. Other			**P**
Category Totals	11	11	11

Of the 33 original categories, 11 concept categories were carried forward for consideration in Round 1 evaluation. 11 concept categories of related improvements, as identified Table 4-1, were deferred for consideration in subsequent evaluation steps (i.e Rounds 2, 3, or DEIS). The rationale for carrying forward, not c arrying forward, or deferring concept categories to subsequent evaluation is provided in Appendix A.

5 Round 1 Evaluation Findings

The results of the Round 1 screening evaluation are presented below. Section 5.1 presents the list of initial single mode alternatives indentified for Round 1 evaluation, Section 5.2 presents the footprint and flaw analysis results, Section 5.3 presents the results of the travel benefit evaluation, and Section 5.4 summarizes the findings and overall conclusions of the Round 1 evaluation.

5.1 Initial Single Mode Alternatives

21 single mode alternative concepts, that are derivative of the 11 single modeconcept categories carried forward from the pre-screening (see Appendix A), were developed by the study team and Corridor Advisory Group for evaluation in Round 1 that are derived The 21 single mode alternatives are summarized in Tables 5-1 through 5-3. Some of the concept categories resulted in multiple single mode alternatives. For example, three versions of the CTA Blue Line extension concept were carried forward as single mode alternatives with different project termini.

Table 5-1. Transit Modes Evaluated in Round 1

Mode	ID	Description
Blue Line Extension (Heavy Rail Transit - HRT) 	HRT 1	From Forest Park CTA Terminal to Oak Brook via IL Prairie Path, Butterfield Road, and 22nd Street (elevated) from Forest Park CTA
	HRT 2	Terminal to Oak Brook via I-290 median (at-grade) and parallel to I-88 (elevated)
	HRT 3	From Forest Park CTA Terminal to Mannheim via I-290 median (at-grade)
Express Bus 	EXP	Various service from DuPage and northwest Cook counties to Forest Park CTA terminal
Bus Rapid Transit (BRT) 	BRT 1	Oak Brook to Forest Park CTA Terminal - via Butterfield Road and IL Prairie Path
	BRT 2	Oak Brook to Forest Park CTA Terminal ŧ parallel to I-88 (elevated) and I-290 median (at-grade)
	BRT 3	Oak Brook to Cicero Avenue ŧ Parallel to I-88 (elevated) and I-290 median (at-grade)
	BRT 4	Oak Brook to Ashland Ave ŧ parallel to I-88 and along I-290 median (at-grade) ŧ CTA Blue Line conversion to BRT from Forest Park CTA terminal to Ashland Avenue
	BRT 5	Lombard to Forest Park CTA Terminal ŧ parallel to I-88 (elevated) and along I-290 median (at-grade)

Table 5-2. Expressway Modes Evaluated in Round 1

General Purpose (GP) Add Lane			GP LANE	General Purpose Add Lane from I-88 to Central Avenue
Managed Lanes	HOV Lanes	2+ Riders	HOV 2LL	Oak Brook to Racine Avenue
			HOV 2L	I-88 to Racine Avenue
			HOV 2W	Oak Brook to Central Avenue
		3+ Riders	HOV 3LL	Oak Brook to Racine Avenue
			HOV 3L	I-88 to Racine Avenue
			HOV 3W	Oak Brook to Central Avenue
	HOT Lanes		HOT 1	Oak Brook to Central Avenue, 3+ Vehicles Free
			HOT 2	Oak Brook to Racine, 3+ Vehicles Free
	Toll Lanes		TOLL 1	Toll Existing I-290 Lanes, I-88 to Cicero Avenue
			TOLL 2	Toll I-290 with Add Lanes , I-88 to Cicero Avenue

Both the HOV and HOT alternatives assume that two existing general purpose lanes (one in each direction) would be converted to HOV/HOT lane along I-88, and along I-290 from Central Avenue to Racine Avenue. Along I-290 from the I-88/290 split to Central Avenue, two new HOT/HOV lanes (one in each direction) would be added to the existing lanes. Appendix C presents a set of maps representing the single mode alternatives listed above.

Table 5-3. Arterial Improvements Evaluated in Round 1

Arterial Widening	With Parking	ART 1	Widening of Roosevelt Road and Madison Avenue to 4 continuous lanes (2 lanes each direction). Roosevelt Road from I-294 to Cicero Avenue Madison Avenue from 25th Avenue to Cicero Avenue
	Without Parking	ART 2	

5.2 Footprint and Fatal Flaw Screening Results

Corridor level right of way footprints were evaluated and assessed to determine if there were any significant potential impacts that would result in that alternative being fatally flawed due to impacts or displacements. Corridor level footprints included only the main trunk of the alternative, and did not include interchanges , intersection improvements or other localized components, such as park-and-ride lots that will be determined in subsequent rounds of development. The footprint, or width of the alternative, was based on common design standards for each mode.

Corridor level footprint impacts were e valuated along any portion of an alignment that extended west of the DesPlaines River. West of the river, alternatives alignment locations were

relatively straightforward with few constraint variables affecting their locations. East of the DesPlaines River, all the alternative alignments generally follow along the existing I-290 corridor, with the exception of arterial improvements. In this section, two important constraint variables that could directly affect the footprint location are still unresolved at this time, the availability of CSX right-of-way on the south side of I-290. Because these this variable could affect how an alternative may be physically accommodated in this area, none of the expressway alternatives were fatally flawed in Round 1 due to footprint impacts.

The results of Round 1 footprint screening indicated that the arterial widening alternatives were fatally flawed because of the number of displacements Due to the very mature and dense urban environment along Roosevelt Road and Madison Avenue, arterial improvements along these routes would involve widening (from two to four lanes where a two-lane section exists) between Mannheim Road and Cicero Avenue. This would result in between 356 to 583 direct impacts to buildings (for widening without and with parallel parking, respectively). For this reason, arterial widening was dropped for further consideration in the alternatives evaluation. Other arterial suggestions may emerge in subsequent rounds and will be considered as appropriate. The summary table of these results and supporting evaluation exhibits maps can be found in Appendix E.

5.3 Travel Benefit Evaluation

Round 1 is intended to evaluate the transportation performance characteristics of each single mode prior to assembling combination mode alternatives in Round 2. Although Round 1 is not intended to be purpose and need test, to be consistent with purpose and need, the performance based criteria presented in Section 3.2 were used to evaluate the single mode alternatives performance relative to the 2040 baseline condition. For further detail, please refer to the full results summary matrix for the single mode alternatives in Appendix D. For each evaluation measure, the four single mode alternatives that resulted in the best performance relative to the baseline condition are indicated. This evaluation is intended to be used as a tool for the presentation and assistance in the interpretation of the Round 1 performance evaluation results. The ratings shown are not considered to be an absolute measure for determining which alternatives are eliminated or carried forward but are best used in a comparative analysis between alternatives of similar mode. In addition, many factors are considered when evaluating alternatives, including stakeholder and transportation agency input, costs, impacts, and more.

5.3.1 Improve Regional and Local Travel

The results of the regional and local travel performance evaluation of the single mode alternatives are presented below. In Round 1, 17 transportation performance measures were evaluated, 13 related to regional travel, and 4 related to Local Travel.

5.3.1.1 Improve Regional Travel

Table 5-4 presents the alternatives that resulted in the best improvements in the I-290 performance measures relative to the 2040 baseline condition. The performance measures are specific to the I-290 Expressway.

Table 5-4. I-290 Expressway Travel Ratings

I-290 Expressway Travel Performance Measures	Top 4 Performing Alternatives Overall			
	1st	2nd	3rd	4th
I-290 Volume to Capacity (all lanes, peak periods)	TOLL 2	TOLL 1	HOV 3LL	HOV 3W
% change relative to baseline	-7.85%	-5.98%	-5.95%	-5.69%
I-290 Average Speeds (all lanes, peak periods)	TOLL 2	TOLL 1	HOV 2LL	HOV 2W
% change relative to baseline	+35.45%	+28.12%	+15.30%	+14.94%
I-290 Average Travel Time Changes (all lanes, peak periods)	TOLL 2	TOLL 1	HOV 2LL	HOV 2W
% change relative to baseline	-26.17%	-21.95%	-13.27%	-13.00%
Daily Hours of Congestion Reduction (I-290 in Study Area)	TOLL 2	HOV 2W	HOV 2L	HOV 2LL
% change relative to baseline	-22.22%	-5.56%	-5.56%	-5.56%

All the expressway single-mode alternatives resulted in an improvement of the I-290 performance travel measures relative to the 2040 baseline conditions. Tolling alternatives experience the highest expressway performance increases because tolls increase user costs, discouraging some users from the expressway and reducing overall traffic on I-290, however local arterial performance decreases due to diversions from the expressway HOV alternatives also perform well because they manage the demand for the added capacity, providing travel time reductions over 40 percent in the HOV lanes and over 10 percent increase in the 3 general purpose lanes through the study area compared to the travel times for the existing 3 general purpose lanes[2]. The transit alternatives resulted in no performance improvements on I-290 relative to the 2040 baseline condition in all of the above categories because any auto diversions to transit was replaced by unmet vehicle demand for the I-290 expressway.

The tolling alternatives provided the best overall improvement (all lanes) in V/C, speed, and travel time during the peak periods, but the HOV alternatives provided the most improvement in travel times and speeds, with speeds in the HOV lanes showing improvements ranging from 40 percent to 55 percent over the 2040 baseline condition. The HOT alternatives also showed good improvement in peak period travel times and speeds in the HOT lanes. The volumes in the general purpose lanes also decrease between 7 and 10 percent when a managed lane is added to the corridor.

All of the expressway alternatives, which add capacity on I-290 (between Mannheim Road and Central Avenue) as either General Purpose, HOV, HOT, or toll lanes, resulted in improved travel performance on I-290. All of the transit alternatives resulted in no improvements travel

[2] See Appendix D – Summary of Single mode Evaluation Results: Measure 1.3 – I-290 Average Travel Time Changes (peak periods)

performance on I-290, since they provide for no capacity improvement on I-290, nor generate enough diversions to transit to offset the unmet vehicle demand for the facility.

Table 5-5 presents the alternatives that resulted in the best improvements in Daily Person Throughput (through the study area) relative to the 2040 baseline condition. Daily Person Throughput measures the number of persons in autos and transit vehicles (including both bus and rail vehicles) moving through the study area in an east-west direction.

Table 5-5. Daily Person Throughput Ratings

I-290 Study Area East-West Person Throughput	Top 4 Performing Alternatives Overall			
	1st	2nd	3rd	4th
Daily Person Throughput (through study area)	 HOV 3LL	 HOT 1	 HOV 3L	 HOT 2
% change relative to baseline	+7.31%	+7.11%	+6.87%	+6.82%

HOV/HOT alternatives provide the best overall improvement in person throughput. BRT, HRT, General Purpose and Toll 1 provided some improvement, while Toll 2 provided the least improvement in daily throughput.

Added capacity on I-290 in the form of managed lanes that give preferential treatment to carpools (HOV/HOT) were the alternatives that carried the most people through the study area in an east-west direction. This is due to both the increased I-290 capacity due to the additional HOV/HOT lane, and more efficient throughput of vehicles carrying multiple occupants. Transit alternatives increase the capacity of transit in the study area, which results in some new riders that have diverted from auto. However, transit alternatives also result in a more significant diversion of passengers from existing parallel bus services, limiting the overall increase in person throughput. Adding capacity on I-290 in the form of general purpose or toll lanes improves person throughput, but not to the extent of HOV/HOT because there are no incentives for auto vehicles to carry more occupants.

Table 5-6 presents the alternatives that resulted in the best overall improvements in overall regional performance measures. These evaluation measures are for all roadways in the CMAP region.

Table 5-6. Regional Travel Ratings

Regional Travel Performance Measures	Top 4 Performing Alternatives Overall			
	1st	2nd	3rd	4th
Vehicle Miles of Travel (VMT) (daily, regional)	HOV 3LL	HOV 3L	HOV 3W	HRT 1
% change relative to baseline	-0.07%	-0.07%	-0.06%	-0.03%
Vehicle Hours of Travel (VHT) (daily, regional)	HOV 3W	HOV 3LL	HOV 3L	HOV 2W
% change relative to baseline	-0.24%	-0.22%	-0.22%	-0.18%
Congested VMT (daily, regional)	TOLL 2	HOV 3W	HOV 3LL	HOV 3L
% change relative to baseline	-0.47%	-0.46%	-0.45%	-0.42%
Hours of Delay (daily, regional)	HOV 3W	HOV 3L	HOV 3LL	TOLL 2
% change relative to baseline	-0.40%	-0.37%	-0.37%	-0.35%

Daily Vehicle Miles of Travel (VMT) represents the total distance per day traveled by all vehicles in the CMAP region. Daily VMT declines versus the 2040 baseline condition for HOV 3+ and the transit alternatives. HOT, General Purpose, and Toll alternatives resulted in increased VMT. The efficient use of auto in the form of a 3-person (or more) carpool more than offsets the increase in VMT by generally using a slightly longer, but faster route provided by the HOV lane. The HOT, General Purpose, and Toll alternatives result in increased VMT because the auto trips are overall slightly longer to use the additional expressway capacity provided on I-290, but are overall faster trips. Transit alternatives resulted in persons diverting from autos, resulting in less VMT.

Daily Vehicle Hours Traveled (VHT) is the total time spent traveling by all vehicles in the CMAP region, and is an important measure because travel time savings result in economic benefits. Compared to the 2040 baseline condition, HOV 3+ resulted in the largest reduction in VHT, followed by the other expressway alternatives. The transit alternatives showed some reduction in VHT, however the reductions were approximately a third of that provided by the expressway alternatives on average. For the expressway alternatives, VHT savings ranged from 12,000 to 24,000 hours per day. Using an average of 18,000 vehicle hours of travel saved, times 365 days per year, times an average of $20/hour for the value of time [3], results in $131 million dollars of travel time savings a year.

Congested VMT and Hours of Delay are considered measures of congestion for the CMAP region. HOV 3+ and Toll 2 resulted in the most improvement in Congested VMT and Hours of Delay, followed by the other expressway alternatives. The transit alternatives showed some

[3] NCHRP Report 456, Guidebook for Assessing the Social and Economic Impacts of Transportation Projects, adjusted to current dollars based on the Consumer Price Index for All Urban Consumers, Chicago-Gary-Kenosha

reduction in these congested measures, but were generally one-fourth of the reduction provided by the expressway alternatives.

Table 5-7 presents the alternatives that resulted in the best improvements in the regional truck travel performance measures relative to the 2040 baseline condition. Travel time is an important measure for trucks, as the value of time is typically higher for trucks than autos, reflecting the value of goods being transported. Regional truck travel time performance measures include truck hours of travel (THT) and truck hours of delay.

Table 5-7. Regional Truck Travel Ratings

Regional Truck Travel Performance Measures	Top 4 Performing Alternatives Overall			
	1st	2nd	3rd	4th
Truck Miles of Travel (TMT) (daily, regional)	HOV 3LL	HOV 3L	BRT 4	TOLL 1
% change relative to baseline	-0.02%	-0.01%	-0.01%	-0.01%
Truck Hours of Travel (THT) (daily, regional)	TOLL 2	TOLL 1	GP LANE	HOT 2
% change relative to baseline	-0.66%	-0.50%	-0.16%	-0.14%
Congested TMT (daily, regional)	TOLL 2	HOT 2	HOT 1	TOLL 1
% change relative to baseline	-0.70%	-0.57%	-0.47%	-0.37%
Truck Hours of Delay (daily, regional)	TOLL 2	GP LANE	HOT 2	HOT 1
% change relative to baseline	-0.51%	-0.29%	-0.26%	-0.24%

Overall, the Toll, HOT, and General Purpose alternatives showed the most improvement in THT, Congested TMT, and Truck Hours of Delay. HOV and transit also showed improvement in these regional measures for trucks.

5.3.1.2 Improve Local Travel

Table 5-8 presents the alternatives that resulted in the best improvements in the Arterial travel performance measures relative to the 2040 baseline condition in the study area. Arterial Volume to Capacity represents how many vehicles are traveling on an arterial as compared to how many vehicles the arterial can accommodate. At volume to capacity approaching one, the arterials are very congested.

Table 5-8. Arterial Travel Ratings

Study Area Arterial Travel Performance Measures		Top 4 Performing Alternatives Overall			
		1st	2nd	3rd	4th
Arterial Peak Period Volume To Capacity	East-West Arterials	GP LANE	HOV 2LL	HOV 2W	HOT 2
	% change relative to baseline	-4.57%	-3.90%	-3.78%	-3.48%
	North -South Arterials	GP LANE	HOV 2LL	HOV 2W	HOT 2
	% change relative to baseline	-4.50%	-4.01%	-3.87%	-3.86%
Arterial Peak Period Speeds	East-West Arterials	GP LANE	HOV 2LL	HOV 2W	HOV 2L
	% change relative to baseline	+2.52%	+2.45%	+2.34%	+2.28%
	North -South Arterials	HOV 3L	HOV 3LL	BRT 4	HRT 1
	% change relative to baseline	+0.39%	+0.38%	+0.35%	+0.30%

The General Purpose, HOV 2+, and HOT alternatives were the best performing with regards to improving study area arterial travel performance by lowering arterial peak period V olume to Capacity and improving east-west arterial peak period speeds in the study area. The transit alternatives resulted in slightly worse arterial travel performance in the east -west direction.

General Purpose, HOV, BRT, and the transit alternatives showed the most improvements for study area north-south arterials as compared to the 2040 baseline condition.

Generally, east-west arterial travel improvements are seen when capacity improvement s are included along I-290, however there is a correlation between the east-west arterial improvements and how the added capacity of the expressway alternative is managed. The less the added capacity to I-290 is managed (General Purpose lanes, with no usage restrictions), the better the performance of the parallel east-west arterials. This is because longer distance trips that were previously using the east-west arterial streets are now using the added capacity on the I-290 Expressway. Since the General Purpose lanes had no requirements for using this added capacity on I-290, it attracted the most longer-distance trips off of the east-west arterials, with more than a 62,000 vehicle miles of travel decrease on study area arterial streets

Table 5-9 presents the alternatives that resulted in the best improvements in the Local Travel performance measures relative to the 2040 baseline condition. These travel performance measures show which alternatives provide the most travel performance improvement to the study area only.

Table 5-9. Study Area Travel Ratings

Study Area Travel Performance Measures	Top 4 Performing Alternatives Overall			
	1st	2nd	3rd	4th
Arterial Vehicle Miles of Travel (VMT)	GP LANE	HOT 2	HOV 2W	HOT 1
% changerelative to baseline	-1.85%	-1.73%	-1.26%	-1.24%
Arterial Vehicle Hours of Travel (VHT) (daily, regional)	HOT 2	GP LANE	HOV 3LL	HOV 2LL
% change relative to baseline	-3.16%	-2.76%	-2.71%	-2.58%
Arterial Congested VMT (daily, regional)	HOT 2	HOV 3LL	HOV 2LL	HOV 3L
% change relative to baseline	-8.10%	-7.45%	-7.13%	-7.11%
Arterial Hours of Delay (daily, regional)	HOT 2	HOV 3LL	HOV 3L	HOV 2L L
% change relative to baseline	-4.69%	-4.48%	-4.34%	-4.02%

The HOT, General Purpose and HOV alternatives result in the most improvement to study area travel performance. The transit alternatives provide some improvement, while the Toll alternatives result in worsening of ar terial travel performance in the study area without additional capacity being added .

A comparison of the Study Area Travel Performance Measures table with the Regional Travel Performance Measures table shows that the General Purpose and HOT alternatives provide more benefit to the study area, but overall at the regional level, HOV provides the most benefit.

5.3.2 Improve Accessibility to Employment

Table 5-10 presents the alternatives that resulted in the best improvements in the Access to Employment performance measures relative to the 2040baseline condition. Changes to the number of jobs accessible by automobile and transit reflect the changes in travel times due to the transportation performance effects of the single mode alternative being evaluated; the faster the travel time , the more jobs accessiblewithin a given time frame .

Table 5-10. Jobs Accessibility Ratings

# of Jobs Accessible within 60 Minutes	Top 4 Performing Alternatives Overall			
	1st	2nd	3rd	4th
By Auto	TOLL 2	HOT 2	TOLL 1	HOV 3LL
% change relative to baseline	+10.75%	+9.28%	+6.95%	+5.41%
By Transit	BRT 4	BRT 5	BRT 2	BRT 3
% change relative to baseline	+13.44%	+8.45%	+7.81%	+7.11%
By Auto & Transit	TOLL 2	HOT 2	BRT 4	TOLL 1
% change relative to baseline	+6.31%	+5.44%	+5.31%	+4.08%

The number of jobs accessible within 60 minutes from a point in the center of the study area by auto, transit, and combined were calculated for each alternative. The expressway modes show the best improvements in job access by auto, and transit had the best improvements in job access by transit. However the single mode transit alternatives generally worsened the number of jobs accessible by auto, which correlates to decreases in I-290 performance exhibited by the transit alternatives.

When considering the total number of jobs accessible by auto and transit for each single mode alternative, Toll and HOT provide the best access, followed by the BRT. Access to jobs would likely increase with combination expressway and transit alternatives, which will be identified and evaluated in the next screening step.

5.3.3 Improve Safety for All Users

The initial single mode alternatives were compared relative to the 2040 baseline condition for the third need point, improve safety for all users, of the Purpose and Need. Injury and fatal crashes per million vehicle miles traveled (per year) for arterials and expressways were calculated using the Highway Safety Manual (HSM) and the Texas Roadway Safety Manual methodologies, respectively. Injury and fatal crashes per million person miles traveled (per year) on arterial, expressways, and transit were estimated for each alternative. The overall measure accounts for transit safety by assuming no injuries or fatalities for transit person miles. The percent change in injury and fatality rates relative to the 2040 baseline condition were then compared. An expanded summary table for the Round 1 safety evaluation can be found in Appendix D. The top four performing single mode alternatives for improving arterial, I-290, and overall safety are shown in Table 5-11.

Table 5-11. Safety Improvement Ratings

Reductions in Injuries and Fatalities % Rates of Change	Top 4 Performing Alternatives Overall			
	1st	2nd	3rd	4th
Arterials	 BRT 4	 GP LANE	 HRT 2	 BRT 5
% change relative to baseline	-0.13%	-0.10%	-0.10%	-0.09%
Expressway (I-290)	 TOLL 2	 HOV 3L	 HOV 3LL	 HOV 3W
% change relative to baseline	-14.36%	-14.21%	-14.19%	-13.58%
Overall (Arterials, Expressways, Transit)	 HOV 3LL	 HOV 3L	 HOV 3W	 HOV 2L
% change relative to baseline	-11.51%	-11.06%	-9.58%	-8.66%

For arterials, the HSM evaluation indicates there is a relatively stable total number of injury and fatal crashes per year across the alternatives ranging from between -3 percent decrease (GP LANE) and 1 percent increase (TOLL 2), compared to the total number of injuries and fatalities of the 2040 baseline condition (263.9). With the exception of the TOLL 2 alternative, all the expressway alternatives showed overall reductions in total injury crashes. For transit alternatives, the analysis indicated slight increases in these types of crashes, with the exception of HRT 3. However, when expressed as a rate of crashes per million vehicle miles traveled, the transit options indicate some reduction in crashes. This is due to a higher increase in vehicle miles traveled compared to a relatively similar total number of crashes. Although the GP LANE alternative ranks 2nd, it had the lowest total number of crashes overall coupled with the lowest number of vehicle miles traveled on the Arterials.

Regarding the safety of I-290, the HOV and TOLL alternatives showed reductions in total number of annual injury and fatal crashes (between -1.1 percent and -14.1 percent) as compared to the 2040 base condition. When expressed as a rate of crashes per million vehicle miles traveled (per year), all the expressway alternatives indicate good safety improvements with crash reductions ranging from -9.6 percent (HOT 2) to -14.4 percent (TOLL 2). All the transit alternatives indicated an increase in total number of crashes and related increases in crash rates.

Overall safety factors in all the projected annual injury and fatal crashes on arterials, expressways, and transit, and divides by the total number of person miles traveled on these facilities in the study area.

Comparing the overall safety performance of the arterials, expressways, and transit in the study area, all the alternatives demonstrated an improvement in safety using person miles traveled as a basis. With the exception of TOLL 1, all the expressway alternatives indicate the highest overall safety improvements, ranging between -5.2 percent (GP LANE) and -11.5 percent (HOV3 LL) reductions in crash rates. These higher crash rate reductions experienced by the

expressway alternatives are due to higher person throughput, combined with overall reductions in these crash types.

5.3.4 Improve Modal Connections and Opportunities

The initial single mode alternatives were compared relative to the 2040 baseline condition for their ability to attract new transit trips, and the top four performing single mode alternatives are shown in Table 5-12. New transit trips represent the number of persons that previously used automobiles and have now switched to transit because of the transit improvement.

For the Round 1 Screening, measures of improving transit access, non-motorized connections and multimodal opportunities were not evaluated. As the alternatives are detailed and refined in later screening rounds, a more robust assessment will be made of these evaluation criteria.

Table 5-12. Modal Connections Ratings

Improve Modal Connections and Opportunities	Top 4 Performing Alternatives Overall			
	1st	2nd	3rd	4th
New Transit Trips (Regional)	BRT 3	BRT 5	BRT 4	BRT 2
Transit Access (qualitative)	*Not used*			
Non-Motorized Connections (qualitative)	*Not used*			
Multi-Modal Opportunities (qualitative)	*Not used*			

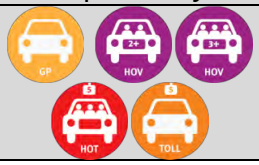
The BRT alternatives are the best performing alternatives for attracting new transit trips, followed closely by the Blue Line extensions. This level of new transit trips is within the bounds of other proposed transit extensions in the region.

It is also informative to examine the diversion of transit riders to auto that result with the expressway alternatives. With the expressway capacity improvements, there are some transit riders that are switching to auto. In general, the HOV and HOT single mode alternatives indicated some transit riders switching to auto (up to 6,800, and 3,200 transit diversions, respectively). The General Purpose and Toll alternatives had relatively no impact on transit.

5.3.5 Improve Facility Deficiencies

The initial single mode alternatives were compared relative to the 2040 baseline condition for the fifth need point of the Purpose and Need, improve facility deficiencies. For the Round 1 Screening, facility deficiencies measures were not used for screening as shown in Table 5-13. As the alternatives are detailed and refined in later screening rounds, a more robust assessment will be made of these evaluation criteria.

Table 5-13. Facility Improvement Ratings

Improve I-290 Facility Condition and Design	Transit	Expressway
		
Pavement Age	*Not used*	
Structure Deficiencies	*Not used*	
ADA Deficiencies	*Not used*	
Drainage Deficiencies	*Not used*	

Since the expressway alternatives require the complete reconstruction and renewal of the expressway, interchanges, and overpasses, these alternatives would address the identified needs for improving the facility condition and design. As standalone improvements, the single mode transit alternatives would not address these needs as they would not require the reconstruction and renewal of the expressway throughout the entire study area.

5.4 Summary of Findings

Twenty-one single mode alternatives were identified for evaluation in Round 1: 9-transit, 11-expressway, and 1 arterial.

5.4.1 Transit Mode Findings

Overall, the single mode transit alternatives provide some improvement in regional congestion and safety, although less than the single mode expressway alternatives. They improve transit access to jobs because of improved transit travel times and improved reverse commute options. The transit alternatives also result in up to 11,600 daily auto person trip diversions, but up to 13,000 diversions from other transit services.

The Blue Line extension and BRT alternatives had similar results and had the best travel performance of the single mode transit alternatives. Each showed some improvement in regional and local travel performance measures, the highest increases in access to jobs by transit and the highest number of new transit trips.

When comparing the effectiveness of the length of transit improvements, it was found that of the three Blue Line Extension alternatives evaluated, the results indicated that the majority of the performance improvements were achieved by a Blue line Extension to Mannheim Road as compared to an extension further west to Oak Brook at less than half the length (3.5 miles vs. 8 miles). Table 5-14 illustrates this comparison for several of the measures evaluated in Round 1.

For example, a Blue Line Extension to Mannheim Road (HRT 3) provides 71 percent of the new jobs accessible, 89 percent of new regional transit trips vs. an extension to Oak Brook. Also, an

HRT terminal at Mannheim may serve as the starting point for a further westward extension of the HRT line.

Table 5-14. Performance Comparison of Blue Line Extensions

Performance Comparison* of Blue Line Extensions to:	Alignment Length (miles)	Daily Person Throughput	Regional Vehicle Miles Traveled	Regional Hours of Delay (Daily)	# of Jobs Accessible Increase	Overall Safety Improvements (Injury crash reductions)	New Transit Trips (Regional)
	Miles	# persons	Miles	Hours	# Jobs	Crash Rate	# trips
Oak Brook (HRT 2)	8	13,812	-37,362	-3,055	128,032	-3.37%	8,353
Mannheim Rd (HRT 3)	3.5	9,552	-35,438	-4,371	91,328	-2.25%	7,456
HRT 3 as % of HRT 2	44%	69%	95%	143%	71%	67%	89%

* from Round 1 single mode evaluation results

Although not fatally flawed due to impacts, the Blue Line Extension and BRT Alternative along the Prairie Path (HRT 1 and BRT 1) are not being carried forward into Round 2 for further evaluation. The Blue Line extension and BRT alternatives along the Prairie Path and along I-290 (HRT 2) perform very similarly. However the Prairie Path alignment has greater service overlap/duplication with the existing Metra service, diverting more riders from the UP-West line than the alignment along I-290. There are also potential conflicts with the recreational functions of the Illinois Prairie Path corridor. Therefore, the alternatives using the Prairie Path alignment are not being carried forward for evaluation in Round 2.

The BRT 4 Alternative from Oak Brook to Ashland Avenue was evaluated as a conversion of the existing CTA Blue Line to a Bus Rapid Transit facility between Ashland Avenue and the Forest Park terminal. This alternative indicated generally similar and some improved performance as compared to an HRT Blue Line extension to Oak Brook (HRT 2), however, due to the similarity in performance and ROW requirements for these two fixed guideway transit facilities, the HRT extension of the Blue Line will be the representative mode that will be modeled and evaluated in the combination alternatives.

Overall, the single mode transit alternatives do not improve I-290 travel performance as compared to the 2040 baseline conditions, providing no improvements to volume-to-capacity ratios, speeds and travel times, and hours of congestion. This is due to an already well-established and utilized study area transit network, with new service drawing insufficient auto-trip diversions to offset auto demand for I-290, and a smaller narrower transit market as compared to I-290.

Figure 5-1 and Figure 5-2 illustrate differences between the transit and expressway travel markets. As seen in Figure 5-1, the travel market for traditional commute (home-to-work) trips is much smaller and confined to the area immediately around the Blue Line extension as compared to using the I-290 Expressway, which has a much broader, more extensive draw of users that extends throughout DuPage County, and into Kane County and northwest Cook County. In the reverse commute direction, shown in Figure 5-2, the travel market for the Blue

Line extension is broader, due to the extensive existing CTA network in the city of Chicago. However, the transit reverse commute travel market is much smaller than the I -290 Expressway at less than a tenth of the size.

Figure 5-1. Traditional Commute Travel Origins

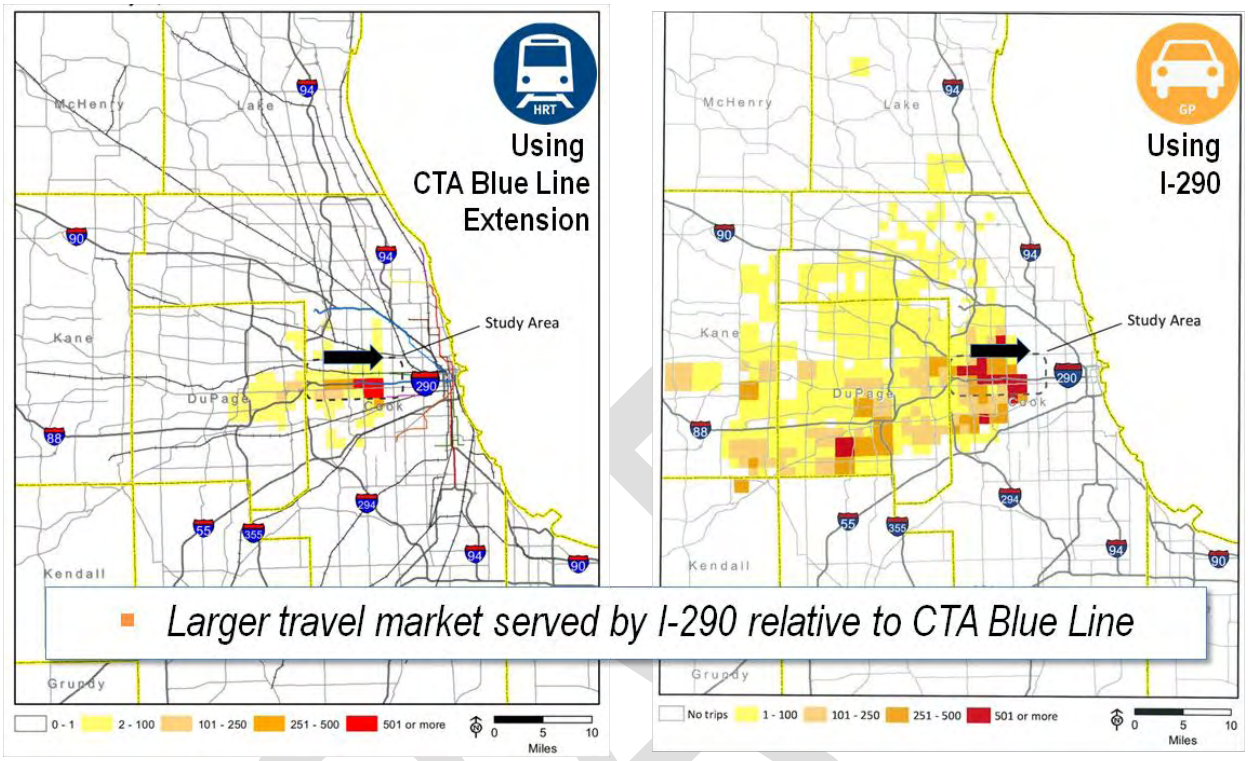


Figure 5-2. Reverse Commute Travel Origin s