Round 2 Combination Mode Alternatives

Initial Alternatives Identification and Evaluation Report

April 2013

APPENDIX G

Summary of Round 2 Combination Mode Evaluation Results

I-290 Phase I Study

Round 2 - Combination Mode Alternatives Purpose and Need Evaluation Measures

February 21, 2013

DRAFT

This is a draft document, and may be updated.

P&N Point		Measure			Higher ↑ or Lower ↓ value of measure desired	2040 No Build + EXP	GP Lane		HOV 2+		HOT 3+		Toll		HOT 3+ & Toll		Base w/ Toll & HCT	
							GP & EXP	GP & EXP & HCT	HOV 2+ & EXP	HOV 2+ & EXP & HCT	HOT 3+ & EXP	HOT 3+ & EXP & HCT	TOLL & EXP	TOLL & EXP & HCT	HOT 3+ & TOLL & EXP	HOT 3+ & TOLL & EXP & HCT	BASE (3GP) W/ VALUE $ & HCT	BASE (2GP) & HOT 3+ & HCT
		Score by Sum Need Point Average Rank->					21.4	28.4	22.9	27.5	22.8	26.8	17.9	19.7	24.4	26.8	23.8	18.2
Regional Travel	All Vehicles	1.3	**I-290 Average Travel Time Changes** (Peak Periods)	All Lanes	%		17.2 min	-5.4%	-7.9%	-11.8%	-10.8%	-12.4%	-11.8%	-12.0%	-8.9%	-34.6%	-34.5%	-40.5%	-4.7%
				HOV/HOT	%		-	-	-	-40.6%	-40.2%	-25.3%	-17.1%	-40.1%	-39.9%	-16.7%	-22.1%	-	-27.8%
		1.4	**Daily Hours of Congestion** (I-290 in Study Area)	GP Lanes	hrs		18.0	-1.00	-0.50	-0.75	-0.75	-0.50	-0.50	-0.25	-0.25	-8.50	-8.25	-3.00	-4.00
				HOV/HOT *	hrs		-	0.0	0.0	-14.5	-14.0	-12.5	-12.5	-12.0	-12.0	-12.0	-11.5	0.0	0.0
		1.5	**Daily Person Throughput** (Daily thru Study Area)		#	↑	423,953	17,482	22,810	28,150	31,895	34,406	38,137	35,463	40,022	26,824	30,592	10,672	22,957
		1.6	**Vehicle Miles of Travel (Daily VMT)**		miles	↓	233,263,703	31,249	68,884	42,619	24,144	105,057	113,918	148,191	155,759	81,709	107,482	122,800	38,192
		1.7	**Vehicle Hours of Travel (Daily VHT)**		hours	↓	10,319,255	-19,415	-28,554	-20,250	-23,232	-8,970	-12,886	-5,795	-1,225	-17,613	-11,715	8,247	9,684
		1.8	**Congested VMT (Daily)**		miles	↓	17,937,393	-56,395	-76,738	-67,995	-59,370	-62,872	-59,812	-62,468	-41,955	-95,328	-88,684	-47,249	23,414
		1.9	**Hours of Delay (Daily)**		hours	↓	5,237,381	-17,454	-26,852	-19,713	-22,163	-8,916	-12,816	-6,897	-2,346	-21,298	-16,115	-831	8,247
	Trucks	1.10	**Truck Miles of Travel (TMT)**		miles	↓	44,488,408	2,528	6,303	-3,358	-2,209	-2,739	-2,980	-5,016	-3,256	-11,082	-10,314	-13,814	-6,480
		1.11	**Truck Hours of Travel (THT)**		hours	↓	1,746,489	-3,636	-4,483	-1,942	-2,395	-893	-1,726	183	934	-4,582	-2,986	29	3,912
		1.12	**Congested TMT**		miles	↓	2,353,496	-9,612	-12,389	-7,894	-7,662	-9,335	-11,809	-5,526	-4,936	-21,456	-18,410	-7,999	5,745
		1.13	**Truck Hours of Delay**		hours	↓	856,318	-3,312	-4,220	-1,851	-2,368	-812	-1,693	195	922	-5,236	-3,646	-1,309	3,503
Local Travel	Arterials	1.16	**Peak Period Speed**	**East-West Arterials**	mph	↑	18.49	0.47	0.47	0.37	0.36	0.21	0.20	0.10	0.09	-0.33	-0.32	-1.25	-0.39
		1.17		**North-South Arterials**	mph	↑	17.20	0.01	0.05	-0.01	0.14	0.01	0.11	0.06	0.01	-0.06	0.03	-0.21	-0.08
		1.18	**Vehicle Miles of Travel (VMT)**		miles	↓	3,381,655	-67,378	-77,451	-36,511	-43,604	-40,146	-43,110	-22,289	-25,257	73,639	74,412	196,323	43,270
		1.19	**Vehicle Hours of Travel (VHT)**		hours	↓	211,807	-6,267	-7,650	-5,271	-6,061	-5,191	-5,548	-3,389	-3,819	2,080	2,256	15,171	2,980
		1.20	**Congested VMT**		miles	↓	239,165	-15,193	-19,481	-15,354	-17,393	-15,935	-16,437	-11,529	-12,346	-3,468	-3,659	30,009	3,599
		1.21	**Hours of Delay**		hours	↓	101,880	-4,014	-5,093	-4,018	-4,581	-3,865	-4,126	-2,647	-2,996	-196	-50	8,827	1,544
Improve Regional And Local Travel				**Need Point Average Rank**				7.5	9.1	7.6	8.5	6.5	7.5	5.3	4.4	7.8	7.1	3.8	3.2
Access to Employment			**# of Jobs Accessible within 60 min.:**																
		2.1	**Auto**		#	↑	5,219,479	-60,229	6,141	-4,371	-4,371	14,167	21,257	13,846	15,603	75,626	90,099	199,772	-18,158
		2.2	**Transit**		#	↑	4,006,033	66,783	55,805	66,783	55,805	66,783	55,805	66,783	55,805	66,783	55,805	55,805	55,805
		2.3	**Transit & Auto**		#	↑	9,225,512	6,554	61,946	62,412	51,434	80,950	77,062	80,629	71,408	142,409	145,904	255,577	37,647
Improve Access to Employment				**Need Point Average Rank**				3.3	3.3	5.3	2.3	8.0	5.7	7.3	5.0	9.3	7.7	8.3	1.7
Safety			**Injuries and Fatality Rates % Change:**																
		3.1	**Arterial**		million vehicle miles/year	↓	0.496	0.07%	-0.09%	0.08%	-0.08%	0.14%	0.06%	0.19%	0.12%	0.31%	0.21%	0.60%	0.14%
		3.2	**Expressway**		million vehicle miles/year	↓	0.206	-9.14%	-8.56%	-10.14%	-9.91%	-8.30%	-8.05%	-8.15%	-7.80%	-12.14%	-11.88%	-16.17%	-12.44%
		3.3	**Overall** (Arterial, Highway, Transit)		million person miles/year	↓	0.247	-5.40%	-5.94%	-7.32%	-8.11%	-6.23%	-6.86%	-5.55%	-6.11%	-5.17%	-5.58%	-1.50%	-4.95%
Improve Safety for All Users				**Need Point Average Rank**				6.3	8.0	9.0	10.0	6.3	7.3	4.0	5.3	5.0	6.0	4.7	6.0
Modal Connections & Opportunities		4.1	**New Transit Trips** (Regional)		#	↑	2,009,178	-178	1,302	-6,080	-2,390	-3,706	-2,400	-5,221	-3,765	-3,125	-2,580	-1,652	-1,478
		4.2.1	**0.5 Mile Transit Access**	**Households**	#	↑	-	0	4,585	0	4,585	0	4,585	0	4,585	0	4,585	4,585	4,585
		4.2.2		**Employment**	#	↑	-	0	19,397	0	19,397	0	19,397	0	19,397	0	19,397	19,397	19,397
		4.3	**Non-motorized Connections**		*(qualitative)*	↑	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		4.4	**Multimodal Opportunities**		*(qualitative)*	↑	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Improve Modal Connections & Opportunities				**Need Point Average Rank**				4.3	8.0	1.0	6.7	2.0	6.3	1.3	5.0	2.3	6.0	7.0	7.3
Facility Condition & Design		5.1	**Address Pavement Age**		*(qualitative)*	↑	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		5.2	**Address Structure Deficiencies**		*(qualitative)*	↑	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		5.3	**Address Geometric Deficiencies**		*(qualitative)*	↑	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		5.4	**Address ADA Deficiencies**		*(qualitative)*	↑	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		5.5	**Address Drainage Deficiencies**		*(qualitative)*	↑	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Improve Facility Condition and Design				**Need Point Average Rank**				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Color Legend:

1st	2nd	3rd	4th	Worsened
Rank 12	Rank 11	Rank 10	Rank 9	

* Provided for information only, not included in scoring.

**For information

Round 2 Combination Mode Alternatives

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APPENDIX H

Travel Forecasting Assumptions

Purpose

The purpose of this summary is to present the travel forecasting assumptions being used by IDOT for the I-290 Environmental Impact Statement (EIS). In addition, a comparison of any differences in assumptions being used by CMAP for the development of their GO TO 2040 Comprehensive Regional Plan and the Cook-DuPage Corridor Study is also included, as well as a discussion of how the GO TO 2040 Plan and forecasts will be considered as part of the I-290 Study. The I-290 Study has previously documented its travel forecasting approach. The "I-290 Travel Model Assumptions Methodology & Validation" report (July 2010) was prepared and is posted on the I-290 project website (www.eisenhowerexpressway.com). Also, a Technical Memorandum, "Planning of Managed Lanes for Reconstruction of a Major Urban Freeway" (June 2012) was prepared that discusses the high occupancy vehicle (HOV) and tolling travel modeling approach for the I-290 Study (see attached). CMAP has prepared "CMAP Travel Demand Model Validation Report" (February 23, 2011), which documents their regional travel forecasting process and is available on their website (www.CMAP.illinois.gov). In summary, a project level forecast is required for the I-290 Study:

- To satisfy the requirements of National Environmental Policy Act (NEPA)
- To provide the appropriate level of engineering and environmental detail
- To account for differing infrastructure assumptions for the no build and build scenarios
- To properly disclose and measure project impacts.
- To provide tolling forecasts that are consistent with national industry standards

Why develop a project level forecast?

GO TO 2040 and NEPA studies are produced for different purposes

As part of the Clean Air Act Amendments and past Federal transportation authorizations up to and including Moving Ahead for Progress in the 21st Century (MAP-21), metropolitan areas over 50,000 in population must develop regional long range transportation plans. These plans are intended to guide public policy with respect to future land use and infrastructure investment for the next 20+ years for the region. GO TO 2040 is intended to identify an overall framework of major capital projects that are tested for air quality conformity and are within an assumed overall fiscally constrained scenario. The projects identified as part of the GO TO 2040 process essentially represent placeholders that are subject to NEPA studies, including a rigorous analysis of alternatives. GO TO 2040 does not, however, satisfy all of NEPA's planning requirements for implementing an infrastructure project.

As required by NEPA, a major infrastructure project such as I-290 is required, at a project level of detail, to undergo:

- An analysis of a "No Build" alternative to define the transportation need. For the I-290 study, the "No Build" is defined as no major improvements in the study area; outside the study area, the major capital improvements contained in GO TO 2040 are assumed to be in place.

- An analysis of a range of reasonable Build alternatives. As documented in the ongoing I-290 study, a broad range of multimodal (highway/transit combinations) alternatives are being evaluated.
- An assessment of the social, economic, and environmental impacts of a proposed action or project. The I-290 study will include an analysis of noise, air quality, energy, threatened & endangered species, natural resources, wetlands, floodplains, water resources, groundwater resources, Section 4(f) properties/parks and recreation, special/hazardous waste, special lands, social and economic impacts including environmental justice, cultural resources, visual resources, indirect and cumulative impacts, and construction impacts.
- Consideration of environmental sequencing: avoidance, minimization and mitigation.
- Stakeholder involvement: coordination and consultation on every aspect of the NEPA process, including the identification of project needs, evaluation methodologies, and alternatives development and evaluation.

NEPA requires preparation of an EIS for major Federal actions that may significantly affect the quality of the human environment. An EIS is a full disclosure document that details the process through which a transportation project was developed, includes consideration of a range of reasonable alternatives, analyzes the potential impacts resulting from the alternatives, and demonstrates compliance with other applicable environmental laws and executive orders. IDOT and FHWA will be preparing an EIS for the I-290 Study.

GO TO 2040 and NEPA studies differ in scale and level of detail

Regional Long Range Transportation Plans – For CMAP, a seven-county northeastern Illinois region is evaluated; the regional transportation network covers 23 counties in three states; this regional modeling platform yields broad measures of performance, such as total auto and transit trips, average travel time, and hours of congestion. To evaluate this project in a regional context using its standard travel demand model, CMAP codes a managed lane as equivalent to 0.33 lane additional capacity. Standard travel models cannot effectively evaluate managed lane operations or congestion pricing.

NEPA / Project Level Studies – Require a greater level of travel modeling detail for use in design, environmental impact evaluation, and financial analysis. NEPA / Project Level Studies typically use a focused area modeling approach where the regional model is detailed in the project study area. This involved developing a finer level of detail for the roadway network in the study area. The I-290 Study also implemented additional modeling enhancements to better analyze the alternatives under consideration, including modeling procedures to estimate auto occupancy in order to evaluate HOV alternatives, tolling procedures to evaluate toll and HOT alternatives, transit model improvements to evaluate transit alternatives, and detailed travel performance measures, such as person throughput, study area expressway and arterial performance, and truck and transit measures. The travel model enhancements developed for the I-290 Study are presented in the attached table.

GO TO 2040 and NEPA studies differ in transportation infrastructure assumptions for "Build and No Build"

During 2008, while GO TO 2040 was in its early development, CMAP used a "Reference Scenario" as a baseline to evaluate over 100 proposed major capital improvements. Because the policy direction of GO TO 2040 had not yet been established, the Reference Scenario assumed continuation of current socioeconomic and land use trends and no additional transportation infrastructure in 2040. In 2010, CMAP officially adopted GO TO 2040 which includes a "Preferred Scenario" that promotes infill and reinvestment as the primary policy driver for future land use planning and transportation investment. The Preferred Scenario integrates socioeconomic and land use assumptions with a fiscally constrained set of transportation improvements intended to support specific planning goals. In the Preferred Scenario, CMAP assumes an I-290 managed lane from Mannheim to Cicero, but no CTA Blue Line extension, in the list of fiscally constrained transportation projects. The I-290 NEPA study tests and refines the original project specification to achieve better performance and recognize specific construction and operational constraints.

As prescribed by NEPA, IDOT excludes all major capital projects in the study area to determine "No Build" conditions. The No Build alternative serves as a benchmark against which the transportation needs are defined and the Build Alternatives are compared. For the I-290 study, the No Build alternative includes all of the major capital projects included in fiscally constrained GO TO 2040 Plan *except* the proposed I-290 Multimodal Corridor project. The I-290 project also employs an updated version of the Reference Scenario by assuming that socioeconomic and land use patterns are the product of market-driven trends rather than the policy driven integrated land use and transportation scenario found in the GO TO 2040.

The Build alternatives for the I-290 Study are combinations of highway and transit improvements, including managed lanes, the Blue Line Extension, and other transit, highway, and non-motorized improvements. As such, the Build alternatives that advance to the Draft Environmental Impact Statement (DEIS) will each require a Build socioeconomic forecast. Further coordination with FHWA and CMAP is necessary to address the need to develop multiple build forecasts and the role of the GO TO 2040 preferred scenario forecast.

What are the specific differences between GO TO 2040 and I-290 forecasting approaches?

2040 Population and Employment Forecasts

As part of the GO TO 2040 Comprehensive Regional Plan process, CMAP developed population and employment forecasts that reflect the desired outcome of the plan. As part of CMAP's mandate to integrate land use and transportation planning, the method used to develop the 2040 population and employment forecasts is a radical departure from previous practices in the region. Prior to GO TO 2040, regional planning practice in northeastern Illinois was based on municipal and county consultation, historic trends, local land use policies, local development proposals, available land for development, and county level control totals. This socioeconomic and land use forecast was adopted as the planning

baseline for major project development under the separately developed Regional Transportation Plan (RTP).

CMAP's approach for the GO TO 2040 Plan was to integrate land use and transportation policy using a scenario-driven 2040 population and employment forecasting technique systematically responsive to major investments and high-level choices that shape the region. The scenario-driven forecasts reflect the plan's desired scenario outcome (i.e. the Preferred Scenario) and assume that the recommended policies will be in place by 2040 in order to achieve these.

Since the late 1990's, a court ruling (Sierra Club, et al v. U.S. Department of Transportation, et al, January 16, 1997, No. 96 C 4768) has required inclusion of No Build and Build Scenario evaluations for major project development. IDOT has coordinated with CMAP on performing No Build and Build analyses that forecast alternative development patterns and travel behavior that might result from a major new transportation project. It is instructive to recognize that actual socioeconomic and land use outcomes are a combination of policy- and market-driven economic forces. In reality, public policy only redirects market-driven land development. A market-based economic forecast alternative can also aid detailed NEPA level project development in determining the sensitivity of proposed highway and transit facility performance and environmental impacts under different background assumptions. Also, any potential toll and revenue evaluations needed to finance a project will require that an investment-grade forecast be prepared. Lenders and bonding agencies are typically reluctant to assume that goal-based policy-driven recommendations will be entirely effective in the face of *laissez-faire* market economics. Tolling options are being considered as part of the I-290 Study, and similar market-based economic forecasts are also being used by the Illinois Tollway for their major project development studies. Similarly, the Federal Transit Administration now places more emphasis on models that replicate current year demand and existing land use as the basis for forecasting eligibility for New Starts funding.

IDOT has developed a market-based economic forecast for this study. This No Build market-based economic forecast does not assume the implementation of the I-290 Multimodal Corridor project, but includes implementation of the fiscally constrained projects outside of the study area. The I-290 Study No Build forecasts maintain the same control totals for the region as GO TO 2040, but have a different distribution of population and employment within the region that more closely resembles the Reference Scenario.

CMAP anticipated and supports the need for alternative socioeconomic forecasts to evaluate major projects as outlined in CMAP's Forecasting Principles (also attached). IDOT consultants have closely coordinated with CMAP staff on development of the I-290 market-based economic forecasts, consistent with the CMAP forecasting principles, and CMAP staff concurs on the method used to develop them.

The I-290 Study is using market-based economic forecasts for the No Build scenario 2040 population and employment forecasts. The I-290 Study population and employment forecasts are based on historic trends, 2010 Census data, land availability, local land use policies, and independent Woods & Poole county level economic forecasts. Note that the resulting population and employment forecasts for the I-

290 Study are based on different forecasting assumptions than GO TO 2040 Plan, which were scenario derived, policy-based forecasts. The I-290 Study No Build market-based population and employment forecasts do not contain the same policy assumptions as the CMAP forecast, and are more consistent with the detail and assumptions typically used to initiate project level design, environmental, and financial evaluations.

A comparison of the existing 2010, CMAP GO TO 2040 Plan, and I-290 Study 2040 No Build population forecasts for Cook and DuPage Counties is presented in the following table. The difference between the 2040 population forecasts from the I-290 Study and the CMAP GO TO 2040 Plan reflects the level of policy and directed investment assumed in the GO TO 2040 Plan policy goals. For Cook County, there is an 8% difference between the 2040 GO TO 2040 population total and the I-290 Study. For DuPage County, there is a 13% difference between the 2040 CMAP GO TO 2040 population and the I-290 Study. This is largely the result of accommodating new growth within existing communities instead of converting vacant or agricultural land at the region's fringe to urban use.

Population Forecast Comparison

County	2010 Population (Census)	2040 CMAP GO TO 2040 Population Forecast	2040 I-290 Study No Build Population Forecast
Chicago	2,695,598	3,264,099	2,942,489
Suburban Cook	2,499,077	2,918,388	2,749,578
Total Cook	5,194,675	6,182,487	5,692,066
DuPage	916,924	1,151,007	1,005,292

The I-290 Study will also develop 2040 Build population and employment forecasts that will be used to test the final Build alternatives being evaluated in the DEIS. The I-290 2040 Build population and employment forecasts will use the 2040 I-290 No Build population and employment forecasts as a starting point and then revise the forecasts based on the increased accessibility provided by the transportation improvements included in the Build alternatives. Given the need to develop multiple build forecasts for the Draft EIS alternatives, further coordination is required with FHWA and CMAP to develop a methodology for producing them and determining the role of the GO TO 2040 forecast in that process.

Highway and Transit Network Assumptions

The I-290 Study utilized the CMAP GO TO 2040 Plan highway and transit networks as a starting point to develop the No Build scenario transportation networks. Thus, major capital projects contained in the fiscally constrained GO TO 2040 Plan were included in the networks, with the exception of the I-290 Multimodal Corridor project. In addition, the background transit service enhancements included in the fiscally constrained GO TO 2040 Plan, such as implementation of arterial rapid transit, and other bus enhancements were included in the I-290 Study transit network. Thus, these background transit improvements contained in the GO TO 2040 Plan, such as the Cermak Road arterial rapid transit (bus rapid transit) service, are included in the 2040 I-290 transit network for all alternatives tested.

For the development and testing of transit alternatives in the I-290 Study, the CTA Blue Line extension, bus rapid transit, and express bus alternatives were coded on top of the background transit network. The I-290 transit alternatives included the addition of new terminal and intermediate stations for the Blue Line extension and bus rapid transit alternatives, the availability of park-and-ride at outlying stations (Mannheim Road and stations to the west), feeder bus connections for existing bus routes, and additional new (or restored) feeder bus service. The attached map depicts the transit network improvements for the testing of the Blue Line extension to Oak Brook via I-290 as part of the Single Mode testing.

For the I-290 Study, additional detail was also included in the study area for the coding of I-290 in order to better reflect actual movements. The use of auto occupancy and toll modeling procedures also required more detailed coding of I-290. On the transit side, minor revisions were made to the transit network and processing of the network to better replicate existing transit travel patterns in and near the study area. This included improving the split between forecasted Metra and CTA rail ridership.

Travel Model Enhancements

Throughout the I-290 Study, the travel demand forecasting approach and implementation has included continuous coordination and cooperation with CMAP. When the I-290 Study was initiated in 2009, the CMAP regional travel model and the 2030 Regional Transportation Plan assumptions were used as the starting point. With the adoption of CMAP's GO TO 2040 Comprehensive Regional Plan in October 2010, the travel modeling for the I-290 Phase I Study transitioned to using CMAP's GO TO 2040 forecasts.

Over the course of the I-290 Study, IDOT's consultant has implemented a number of enhancements to the CMAP regional travel model, which have in turn been adopted by CMAP. There were three major reasons for developing and implementing these CMAP regional travel model enhancements:

- To update the CMAP regional travel models using data from the 2007 CMAP Travel Tracker Survey, the American Community Survey (ACS) and the 2010 Census.
- To develop and implement more detailed travel forecasting procedures and inputs for use in the development of design-level traffic forecasts for major project development, and
- To develop enhanced travel forecasting procedures to provide improved sensitivity to the alternatives being tested.

IDOT's consultant has coordinated closely with CMAP staff as part of implementing these model improvements. The I-290 Study travel model improvements were developed by Parsons Brinckerhoff staff with extensive experience working directly with the CMAP regional travel model.

The attached table summarizes the regional travel model enhancements implemented for the I-290 Study. As seen in this table, there have been a long series of travel model enhancements made for the I-290 Study as additional needs arise. Many of these travel model enhancements have since been

integrated into the CMAP regional travel forecasting process.

Can you compare CMAP's results for I-290 and the Blue Line extension in GO TO 2040 with IDOT's current I-290 study?

I-290 Results

The modeling results for an I-290 managed lane improvement are not comparable. GO TO 2040 did not use any auto occupancy or tolling procedures in their regional modeling. The I-290 managed lane project was represented by increasing capacity on I-290 by an additional third of a lane in each direction to approximate the additional traffic that would use the managed lane. Therefore, this added capacity which is supposed to act as an HOV/HOT lane, is essentially represented by an increase in capacity of the general purpose lanes. The additional one-third of a lane capacity is intended to represent the magnitude of the additional HOV/HOT vehicles that would be using the managed lane. For the purposes of regional long range transportation plan project analysis and regional air quality conformity analysis, this is an acceptable approach.

The I-290 Study, since it is a NEPA/project level analysis, is using auto occupancy and tolling procedures to provide a more causal representation of travel behavior associated with managed lanes. Thus, the model estimates single occupant, 2-person, and 3+ person auto vehicle trips, as well as reflecting the impact of tolls, including mode shifts from auto to transit as a result of tolling. This additional level of analysis detail is required for development of project level design, environmental, and financial measures.

Blue Line/HCT Extension Results

The modeling results for a transit extension of the Blue Line to Oak Brook are more comparable, since CMAP regional transit modeling procedures were used for GO TO 2040 and the I-290 Study. The "GO TO 2040 Major Capital Projects" (originally drafted February 2010; updated October 2010) shows a Blue Line extension resulting in +4,000 transit trips and -3,000 auto trips. In the Round One Single Mode Screening analysis in the I-290 Study, the Blue Line Extension to Oak Brook resulted in +8,400 transit and -8,400 auto trips. Thus, even using a 2040 No Build market-based population and employment forecast in the I-290 Study, the Blue Line extension resulted in double the auto diversion, and higher ridership than in GO TO 2040.

Role of GO TO 2040 Comprehensive Regional Plan goals in the I-290 NEPA study

The GO TO 2040 Plan identified improvements in the I-290 corridor that met the broad goals of GO TO 2040, including conformity with regional air quality standards. For the purposes of the I-290 NEPA study, our purpose and need has and will continue to be related to those goals, including:

- Improve regional and local mobility – Directly related to GO TO 2040 congestion evaluation measures, including speeds, travel times and hours of congestion

- Improve accessibility to employment – Directly related to GO TO 2040 jobs-housing access evaluation measure
- Improve safety for all users – Safety is a paramount goal for any transportation project
- Improve modal connections and opportunities – Directly related to GO TO 2040 mode share evaluation measure
- Improve facility deficiencies – Directly related to GO TO 2040 facility condition evaluation measure

Furthermore, the I-290 DEIS will address in a much greater level of detail the socio-economic and environmental impacts/benefits of the finalist build alternatives.

In addition, a comparison between the GO TO 2040 Preferred Scenario and the I-290 NEPA study forecasts will be included in the Draft EIS. The eventual preferred alternative, which will be identified in the Final EIS, will include a discussion of how it is consistent with the GO TO 2040 Plan.

Summary

A project level forecast is needed in order to provide a sufficient level of engineering and environmental detail, to account for differences in infrastructure assumptions, and in doing so, satisfy NEPA requirements. CMAP has anticipated the need for alternative forecasts for project level development by issuing their "CMAP Forecast Principles for Data Users and Forecast Developers," and IDOT has coordinated with CMAP in developing I-290 market-based economic forecasts, for which CMAP has concurred with the methodology used to develop these forecasts.

The requirement for more detailed NEPA project level forecasts for the I-290 Study also led to more detailed highway and transit networks and processing in the study area. Furthermore, additional travel model enhancements were made for the I-290 Study to better model managed lane alternatives and to better replicated study area travel patterns. The model enhancements made by IDOT have been/will be incorporated back into CMAP's regional model.

The overall results in testing of the I-290 managed lane in GO TO 2040 versus the I-290 Study are not comparable, since GO TO 2040 did not use auto occupancy or tolling procedures to model the I-290 improvements. With regards to the Blue Line extension, the I-290 Study resulted in double the auto diversion and higher ridership than GO TO 2040.

Attachments:
Planning of Managed Lanes for Reconstruction of a Major Urban Freeway Technical Memorandum
Travel Forecasting Comparison Table
I-290 Transit Network Assumptions
CMAP Forecast Principles

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CMAP Forecast Principles

For data users and forecast developers

April 2011

Background

A significant new feature of GO TO 2040 is a wholesale shift to scenario-based evaluation and its intentional reliance on forecasts that reflect implementation of preferred regional planning strategies. This is a radical departure from previous long-range planning forecasts in the Chicago region that were based primarily on trends and an inventory of local development patterns.

CMAP'S mandate to integrate transportation and land use planning made necessary a forecasting process that would quantify actual planning outcomes rather than the historical practice of selecting planning strategies to address inevitable trends.

What are CMAP forecasts?

The CMAP forecasts are quantified values of population and employment listed at a small geographic scale called "subzones". Subzones generally correspond to a grid of ¼ square mile land sections originally developed for purposes of surveying and property descriptions. A regional forecast is the sum of all values for the entire region defined by a specific future year and assumed policy scenario. For example, the current official CMAP forecasts are for the year

2040 and reflect the expected outcome of the preferred regional scenario adopted by the CMAP Board.

How are the forecasts calculated?

Population and employment forecasts begin with currently observed counts recorded at a small geography. An overall growth rate resulting from a regional economic model provides a reference total for a future year. The effects of policy strategies that define the scenario under study are quantified and coded into mathematical expressions. Statistical modeling procedures equilibrate the compound effects of the policy strategies on supply, demand and accessibility. The resulting effects are used to adjust the reference values to represent the scenario forecast.

How are the forecasts used?

Scenario forecasts quantify the combined outcomes of distinct planning scenarios. Once a scenario is officially adopted as the basis for a regional plan, the associated forecasts are henceforth labeled "current planning assumptions" (i.e. the assumed outcome of the plan). The use of this official scenario is codified into numerous transportation planning regulations including Air Quality Conformity, Environmental Impact and New Starts. Other regional planning evaluations often rely upon scenario forecasts including transportation project, economic development and environmental studies.

Principles for CMAP forecast users

In addition to consistently and properly attributing the forecasts as the outcome of GO TO 2040's preferred regional scenario, forecast users should subscribe to several principles regarding the forecast's purpose and application:

Respect the regional planning process

GO TO 2040 reflects a collectively preferred future that is the product of a broad-based consensus-building effort. It is rare that any individual will view the plan or forecasts as entirely reflective of their unique self-interest. The preferred scenario represents the regional resolution of both competing and complementary local desires. As such, the forecasts are a tangible manifestation of the compromise required to achieve a regional whole that is more desirable than the sum of its parts.

The forecasts are not local land use plans

The forecasts are derived from mathematical equations that balance a location's land development potential and its transportation accessibility. To accomplish this, socioeconomic measures are listed at the subzone level so that their effects on each other can be continuously estimated over space and time. When mapped, this gives the impression of a prescribed land

use pattern. This is not their purpose; authority over local land use resides with local government.

The forecast values must be aggregated

Each value in the forecast is the product of mathematical operations that include statistical error. As individual values are combined, individual error terms cancel each other and the statistical reliability of the forecast is improved. The level of aggregation needed varies with geographic context, but is usually defended based on external validation of the result against existing conditions or desired outcomes.

Principles for forecast developers

CMAP encourages the use of the preferred scenario forecasts for all regional planning evaluations. CMAP recognizes that many evaluations are based on the systematic comparison of two or more sets of input assumptions; i.e., the value of a single project, program or strategy is best articulated by comparing it with the regional outcome in its absence. It is important that the method used to quantify alternative assumptions is consistent with that used for the preferred scenario. The steps to accomplish this include:

Articulate alternative assumptions

Prepare a narrative describing the alternative scenario and the set of conditions (or absence thereof) that produce the alternate outcome. This should include the argument for why examining the alternative is necessary to demonstrating the value of the project, program or strategy under study.

Show the math

All mathematical operations should be intuitive and include quantitative worked examples. CMAP understands that many outcomes cannot be rigorously calibrated or validated and will require some analyst judgment. For uncertain outcomes (e.g. land use density and mix) CMAP encourages conservative use of stochastic (i.e. probabilistic) parameters that will produce plausible and intuitive outcomes while incorporating random variability.

Produce standard outputs

CMAP will handle alternative forecasts only when they are delivered in a format that permits analysis within our regional travel demand models. In general, this requires adhering to CMAP's system for indexing geographic locations and providing household and employment quantities according to the definitions upon which the models were originally calibrated.

Principles for CMAP policy concurrence

For any project, program or strategy evaluation requiring CMAP approval, inclusion of the preferred scenario is required. Results of alternative forecasts may be presented as evidence intended to support or refine a project, program or strategy already included in GO TO 2040. Alternative forecasts, however, may not be substituted for preferred scenario forecasts with the intent of enhancing or diminishing a particular outcome. Alternative forecasts that contradict or undermine the outcome of the preferred regional scenario will not be considered.

Concur on methodological validity

If an alternative forecast is included as part of an evaluation of a particular project, program or strategy, CMAP will consider concurrence **only** on the validity of the method used to prepare the forecast data; i.e. CMAP will not offer concurrence on the quantitative results.

Collaborate on improved methods and outcomes

CMAP recognizes and applauds all cooperative efforts to improve the quality, reliability and usefulness of our regional planning forecasts. In the course of continued work, it is likely that we will arrive at superior methods, discover systematic flaws and uncover mistakes that contributed to the current preferred regional forecast. In these cases, we invite collaboration in improving CMAP's forecasting methods going forward. The next release of CMAP forecasts is anticipated to coincide with the scheduled update of GO TO 2040 in 2014.

Appendix A: Preferred Scenario Modeled Forecast Assumptions

The GO TO 2040 preferred scenario forecasts were developed by mathematically estimating the effects of selected transportation and land development strategies using the "access product" method outlined in the report: Socioeconomic Inventory Validation and Forecasting Method. During early GO TO 2040 strategy analysis, a unique access product equation was developed and applied to the initial reference activity distribution; defined as the sum of households and jobs in each subzone. The set of planning strategies found plausible, reasonable and achievable mirrors the set of access product equations that resulted in the GO TO 2040 preferred scenario forecast. In many cases, these equations include an "uncalibrated parameter" that was estimated either from secondary research in another context or as an intuitively conservative constraint on the outcome.

Compound Access Product

Access Product = Land Value Index(p) * Accessibility (p,q)

Where: Land Value Index is the average assessed value of land in a subzone (p), standardized across counties and normalized across the region.

Accessibility is the inverse logsum of highway and transit network generalized travel cost between each zone pair (p,q).

Land Use Strategies

Land use strategies operate exclusively on the Land Value Index term of the Access Product equation. An increased Land Value Index contributes to an increased Access Product when combined with high transportation accessibility. A higher Access Product results in higher activity levels.

Open space preservation

Strategy Land Value Index = Land Value Index(p) * (1 – percent protected land(p))

Where: Percent protected land is the proportion of a subzone with a natural resource score that falls within 225,000 acres of the top ranked scores region-wide.

Brownfield reinvestment

Strategy Land Value Index = Land Value Index(p) + (10% per subsidized brownfield(p))

Where: A brownfield is identified as such by Illinois EPA. Subsidies restricted to subzones with a Land Value Index less than +0.024. The 10% increment is an uncalibrated parameter.

Transit oriented development

Strategy Land Value Index=Land Value Index(p) + (10% per transit subzone(p))

Where: Transit is identified with subzone (p). The 10% increment is an uncalibrated parameter.

Urban design

Strategy Land Value Index = Land Value Index(p) + (10% per unit of improved pedestrian environment (p))

Where: Land value was increased for subzone (p) within existing municipal boundaries. Pedestrian environment was increased when the subzone was in a growing area or near planned bike facilities. The 10% increment is an uncalibrated parameter.

Transportation Strategies

Transportation strategies operate exclusively on the Accessibility term of the Access Product equation. Increased Accessibility contributes to an increased Access Product when combined with high land values. A higher Access Product results in higher activity levels.

Transit Wait Time Reductions

Strategy Accessibility(p,q) = Accessibility(p,q) with Transit Wait Time (p,q) * 0.5

Where: Transit Wait Time is the accumulated minutes assumed waiting for a transit vehicle when traveling between zones p and q. 0.5 is an uncalibrated parameter.

Variable Pricing on Expressways

Strategy Accessibility(p,q) = Accessibility(p,q) with Expressway Auto Generalized Cost (p,q) * 2.5

Where: Expressway auto generalized cost is a compound measure of congested time, distance and operating costs. The 2.5 shadow price was calibrated to achieve an overall volume/capacity ratio on expressways of less than 1.0.

Additional Bus Routes

Strategy Accessibility(p,q) = Accessibility(p,q) with additional bus network

Where: Additional bus lines were added in a comprehensive grid covering the CTA and Pace service areas based on the Strategic Regional Transit System included in the 2030 RTP.

Increase Transit Speeds

Strategy Accessibility(p,q) = Accessibility(p,q) with lower rail segment times

Where: Individual segment times on existing rail transit facilities were lowered to meet the average time for the entire line.

Transit Signal Priority and Arterial Rapid Transit

Strategy Accessibility(p,q) = Accessibility(p,q) with selected uncongested bus segment times

Where: Individual segment times on selected segments of the existing CTA and Pace bus system were permitted to run according to schedule rather than being subjected to congestion delays.

Advanced arterial signal systems on TSP/ART segments

Strategy Accessibility(p,q) = Accessibility(p,q) with Arterial Intersection Auto Generalized Cost (p,q) * 0.1

Where: Arterial Intersection auto generalized cost is a compound measure of intersection geometry and signal characteristics. The 0.1 cost savings is an uncalibrated parameter.

Parking charges

Strategy Accessibility(p,q) = Accessibility(p,q) with Auto Generalized Cost (q) * 1.1

Where: Auto generalized cost(q) is a compound measure of time, distance and operating cost at the destination zone of an auto trip. The 1.1 cost burden is an uncalibrated parameter.

Transportation demand management

Strategy Accessibility(p,q) = Accessibility(p,q) with Transit Fare (q) * (0.95-(0.15 * dense(q)))

Where: Transit Fare is the accumulated out-of-pocket cost incurred when traveling by transit between zones p and q. Dense is arbitrary and the parameters are uncalibrated.

Access product resolution

The individual strategy LVI and Accessibility values are combined into a single zonal factor that is applied to the logsum generalized cost metric that is the basis for trip distribution and mode choice in the travel demand model. The difference in logsums for two scenarios, with and without the strategies, are taken and exponentiated to produce the probability that a zone's activity level will change in response to the set of strategies being tested.

Probability (p1/p2)=(0+(10*(0.2*(1-exp(-10*("logsum difference"*0.1)^2)))))*32.30978

Where: this is a standard probability formulation. In the absence of any calibration data, all of the parameters are simple and intuitive bounds constraining the probability of change to within 10 percent of the original value. The final parameter scales the probability to the match the range of generalized cost values in the travel demand model.

Appendix B: "No Plan 2040" Socioeconomic Forecast

Some regional analyses being conducted for implementation of GO TO 2040 require comparison with forecasts that conspicuously ignore current regional planning recommendations. Under past regional plans, these were variously referred to as no-build, no-action, or baseline scenarios and were limited to the distributional effects of major transportation projects on otherwise fixed development patterns.

The GO TO 2040 forecasts reflect numerous policy and system influences articulated as planning strategies in the preferred regional scenario. This suggests that the most extreme comparison would come from a scenario forecast that ignores these planning strategies as well the major transportation projects recommended in GO TO 2040. To accomplish this, CMAP collaborated with transportation project sponsors to prepare a "No Plan" forecast for use in studying the comparative effects of GO TO 2040 recommendations.

Method

The most conservative assumption we can make regarding the efficacy of government planning is that it will have no effect on development patterns; that the future is entirely *laissez-faire*. No practical examination of historical development in our region suggests that this is entirely the case, but our highly fragmented local governmental structure resembles the marketplace of anonymous and uncoordinated decision-makers economists describe as the agents of the "invisible hand". As such, it is possible to predict future development patterns using some basic trend and resource availability information.

The "No Plan" forecast relies on four basic premises:

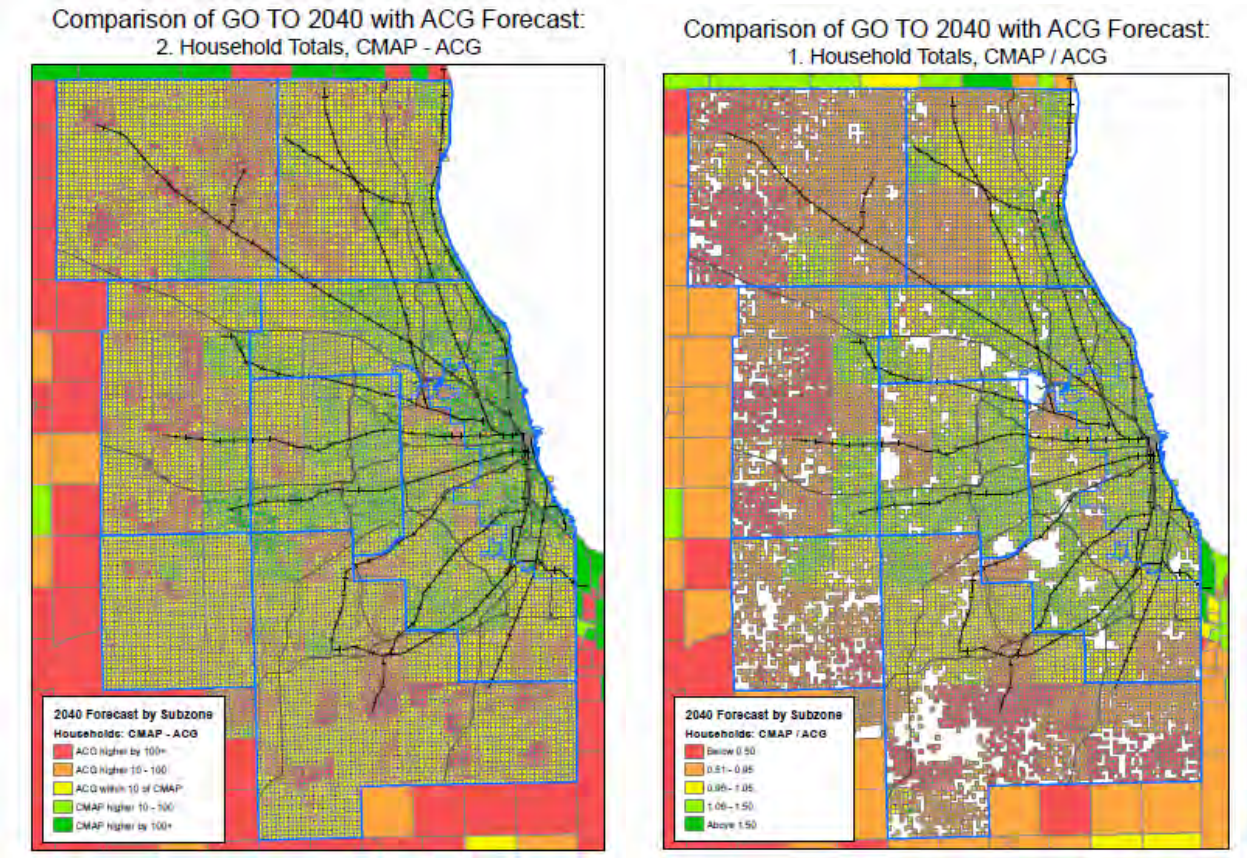
- Vacant land is easier to develop[i]
- Existing communities are governed by local preferences[ii]
- Proximity to each other is a primary concern of workers and employers[iii], and
- Transportation quality affects housing and job location decisions.

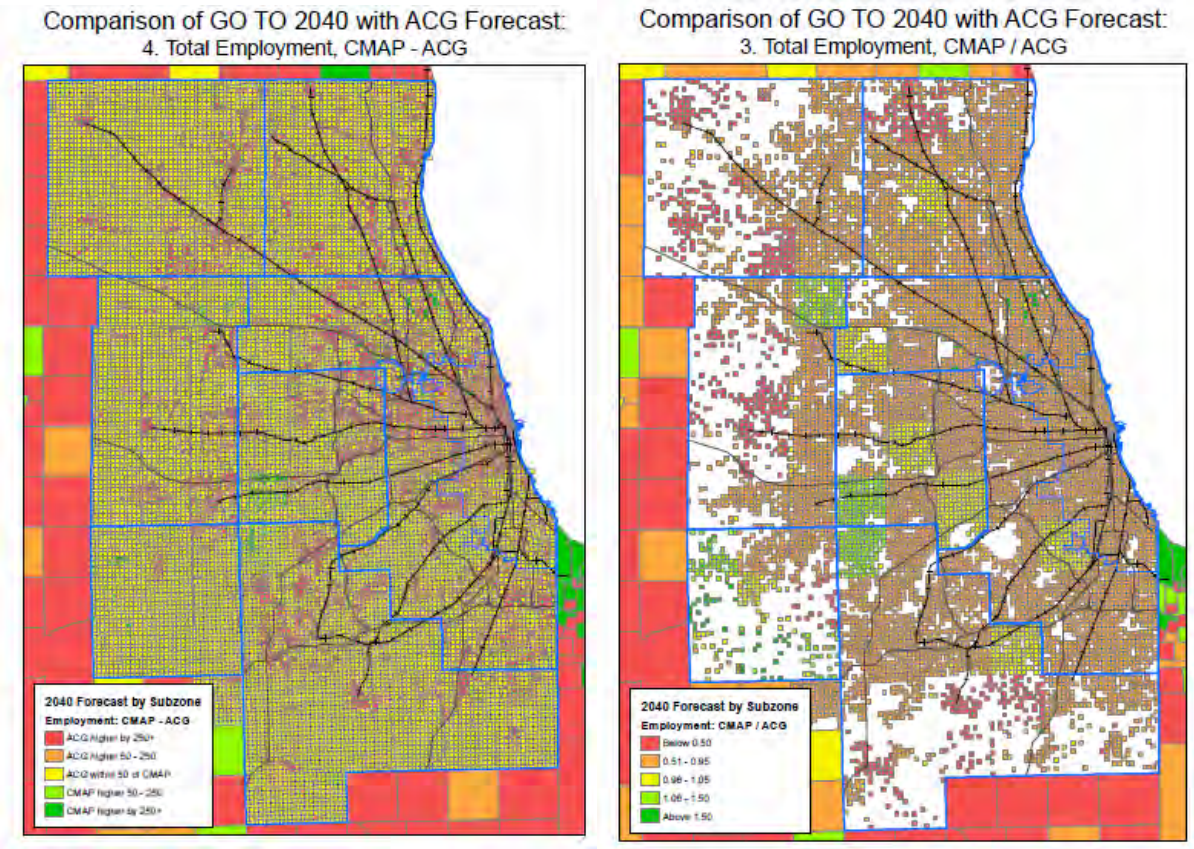
This means that the "No Plan" scenario should reflect historical trends that are tempered by the region's overall size and prevailing transportation system performance absent any specific public policy intervention including the addition of transportation infrastructure to accommodate growth in demand.

Step 1: Estimate an initial No Plan socioeconomic distribution

To assist their implementation studies, project sponsors for major transportation projects desired a regional socioeconomic forecast independent of the implementation of strategies outlined in GO TO 2040. A consultant prepared an initial distribution of households and jobs based on the first two assumptions stated above: 1) a greater propensity for new development beyond the region's current urban boundary and 2) maintenance of prevailing area densities in established communities and perpetuation of these densities in adjacent new development.

Figure 1: Comparison of initial No Plan (ACG) with GO TO 2040 household and employment

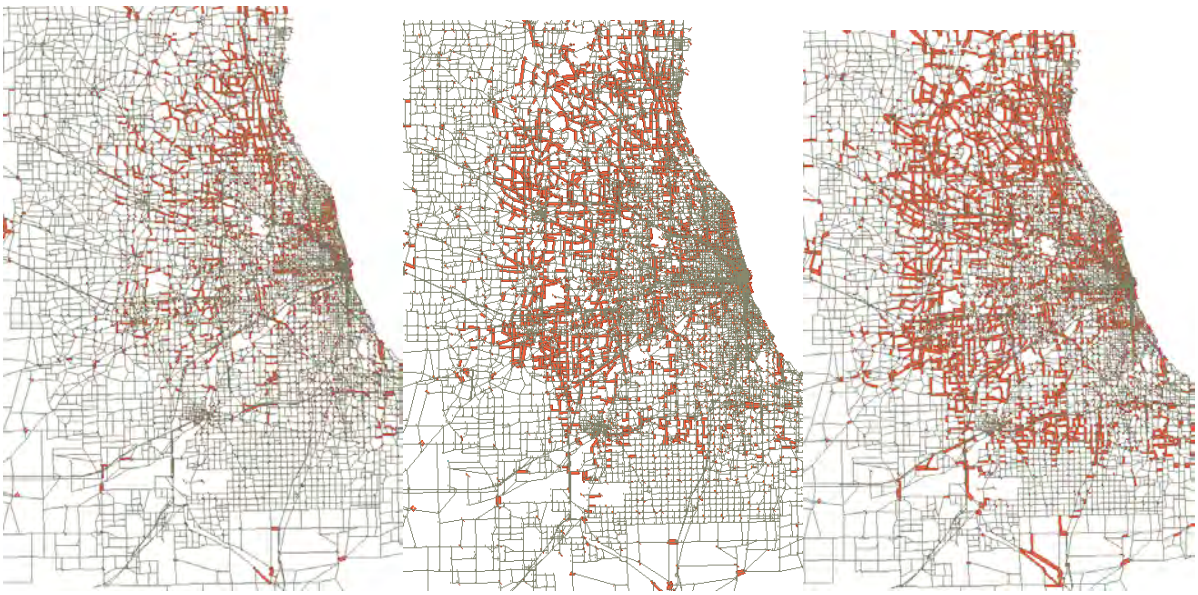




Step 2: Calculate initial travel demand

The initial No Plan forecasts were used as trip generation input to an initial travel demand run. To complement the absence of regional development directives, this demand analysis also assumed that no further improvements would be made to the transportation system between now and 2040. The anticipated outcome is that the initial No Plan socioeconomic distribution will place excessive demand on the existing transportation capacity in areas that are rural today.

Figure 2: 2010, Go To 2040, Initial No Plan V/C > 1 during a.m. peak



In addition, it is anticipate that the initial No Plan scenario will increase overall travel times and delay due to greater geographical separation of jobs and households.

Figure 3: 2010, GO TO 2040, initial no plan average commute times during a.m. peak

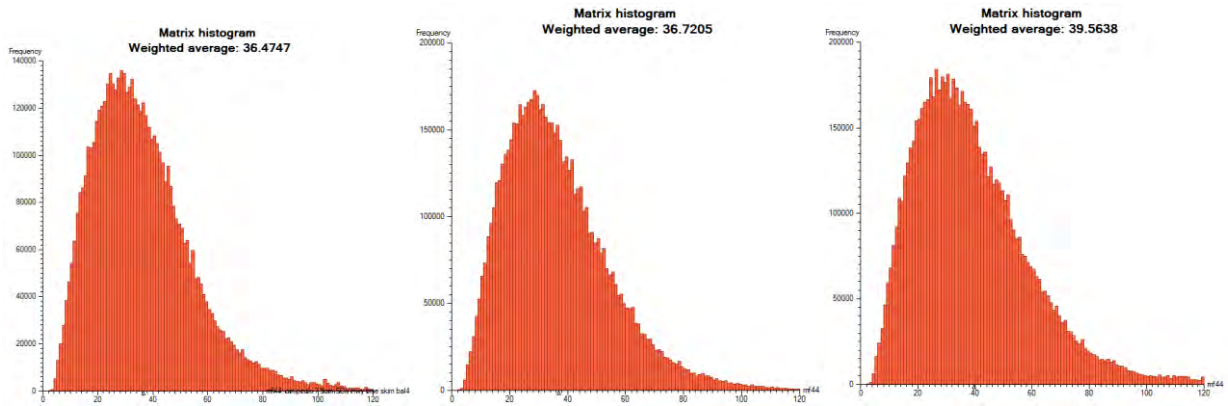


Figure 4: 2010, GO TO 2040, initial No Plan Congestion daily

Mainline VMT	Total	Congested	% congested
Daily Auto	107,526,897	12,357,624	11%
Daily Truck	29,568,239	3,628,241	12%
	137,095,137	15,985,864	12%
Daily Arterial	86,204,676	8,100,861	9%
Daily Expressway	50,890,467	7,885,004	15%
	137,095,144	15,985,864	12%

Mainline VHT	Total	Congested	% congested
Daily Auto	3,791,997	783,743	21%
Daily Truck	950,205	210,778	22%
	4,742,201	994,521	21%
Daily Arterial	3,591,291	691,938	19%
Daily Expressway	1,150,917	302,583	26%
	4,742,208	994,521	21%

Mainline VMT	Total	Congested	% congested
Daily Auto	131,498,353	19,831,839	15%
Daily Truck	40,334,625	6,792,354	17%
	171,832,978	26,624,193	15%
Daily Arterial	110,257,636	15,400,465	14%
Daily Expressway	61,575,350	11,223,728	18%
	171,832,985	26,624,193	15%

Mainline VHT	Total	Congested	% congested
Daily Auto	4,773,477	1,249,171	26%
Daily Truck	1,337,827	374,161	28%
	6,111,304	1,623,332	27%
Daily Arterial	4,660,671	1,185,510	25%
Daily Expressway	1,450,640	437,822	30%
	6,111,311	1,623,332	27%

Mainline VMT	Total	Congested	% congested
Daily Auto	132,937,852	24,585,077	18%
Daily Truck	38,384,628	7,527,757	20%
	171,322,479	32,112,834	19%
Daily Arterial	116,306,115	21,035,331	18%
Daily Expressway	55,016,371	11,077,502	20%
	171,322,486	32,112,834	19%

Mainline VHT	Total	Congested	% congested
Daily Auto	5,135,290	1,663,280	32%
Daily Truck	1,347,651	447,159	33%
	6,482,941	2,110,438	33%
Daily Arterial	5,147,291	1,660,598	32%
Daily Expressway	1,335,657	449,840	34%
	6,482,948	2,110,438	33%

Step 3: Reallocate initial No Plan socioeconomic distribution

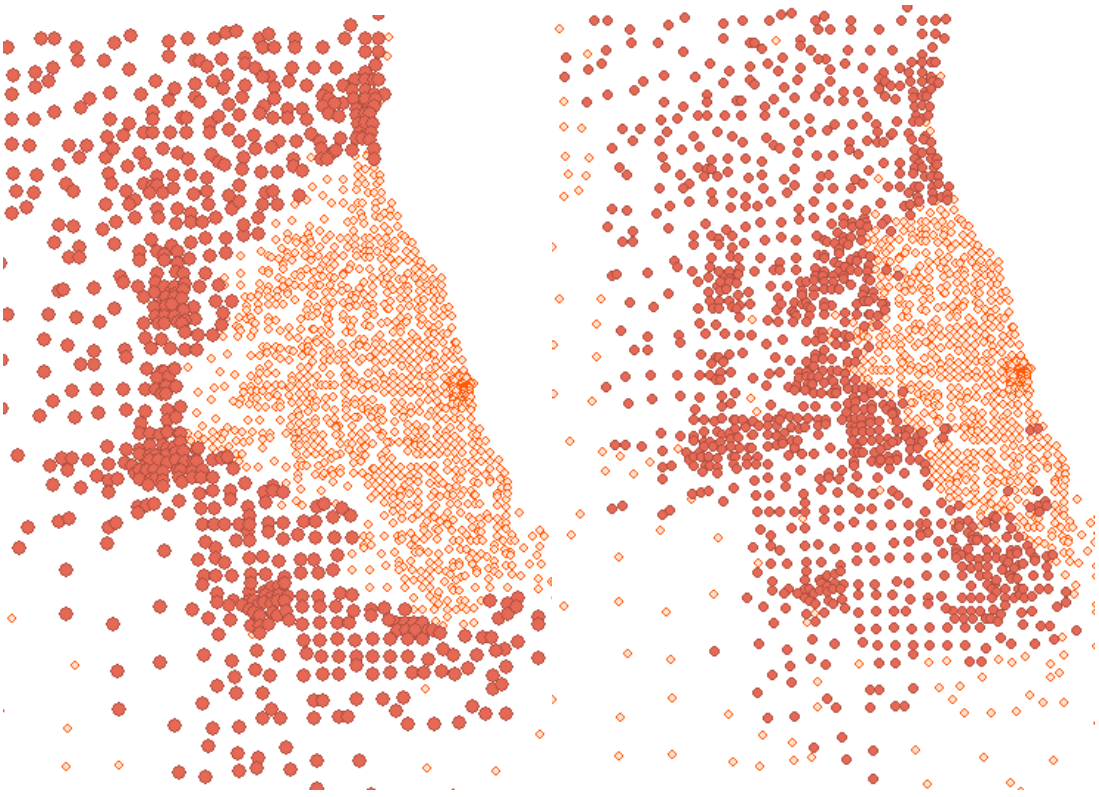
We assume, all other things being equal, that increased travel costs erode the region's economic growth potential. Another way of looking at this is to recognize that the region's overall size is a function of its overall transportation capacity. Scenarios offering lower transportation system performance will ultimately accommodate less economic activity.

In this case, changes in travel accessibility between 2010 and the initial No Plan allocation of households and jobs are used to dampen the estimated growth at zone pairs experiencing significant increases in travel cost. The factor by which accessibility changes for each zone pair produces a new No Plan allocation.

The above results indicate a 6% increase in regional delay between 2010 and the GO TO 2040 results. The No Plan alternative adds an additional 6% to the GO TO 2040 estimate. Therefore, we are assuming the congestion relief benefit associated with full GO TO 2040 implementation to be about 6%.

There is no data by which to calibrate this effect, so we assume that the diminished activity resulting from poorer accessibility is not insignificant (i.e. not zero) but that it does not exceed the proportion by which accessibility is degraded (6%). The following results reduce activity by an average of 6.7%.

Figure 5: initial No Plan allocation exceeds decline in accessibility by 6%: Household end, Job End



input No Plan households	output No Plan households	change in households
4,989,880	4,656,953	-332,927

input No Plan jobs	output No Plan jobs	change in jobs
7,957,306	7,413,917	-543,389

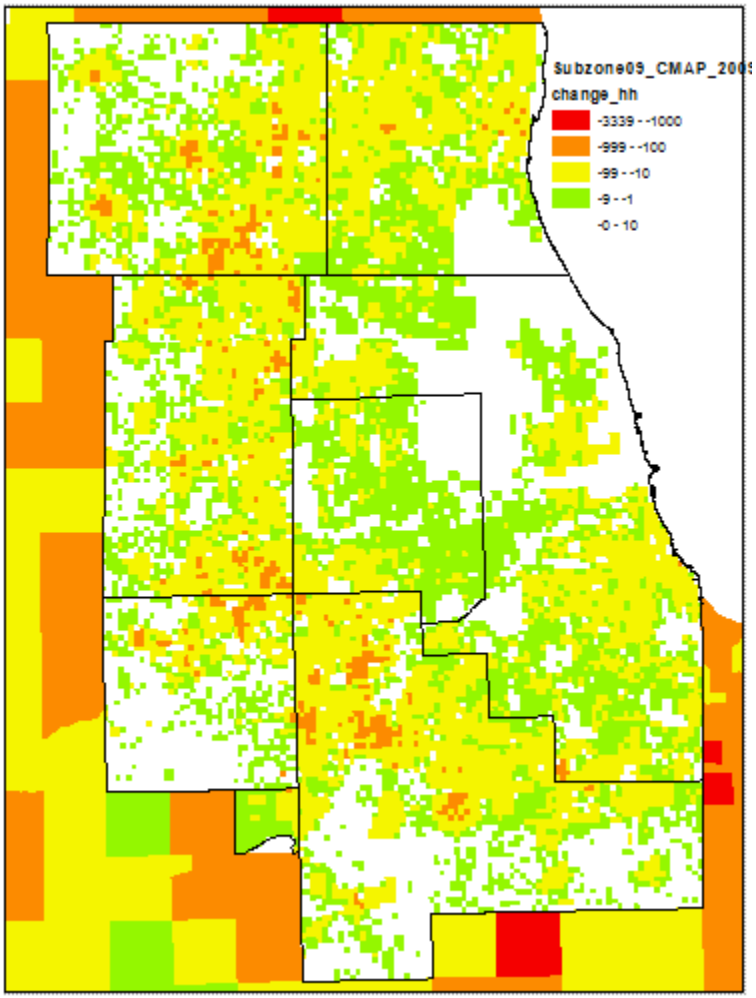


Figure 6: Change in Households: Initial No Plan, Dampened No Plan

[i] Land assembly costs associated with developing unused land is less than assembling pre-developed parcels for redevelopment

[ii] There is typically suburban resistance to proposals for increased overall density.

[iii] This is the urban economic reason for the region's existence.

Travel Forecasting Comparison Table

Attributes or Assumptions	CMAP GO TO 2040 2008 Evaluation	IDOT I-290 EIS Model 2012 Evaluation	Comments
2040 Base Line Projects Assumed in Transportation Networks	CMAP 2040 fiscally constrained major projects and background bus and arterial projects included.	Starting point is the same 2040 CMAP transportation network minus the I-290 Multimodal Corridor Managed Lane Project.	To create 2040 I-290 "No-Build" alternative scenario used for comparison of conditions with and without an improvement. Required practice for EIS and accepted by CMAP.
2040 Socioeconomic Forecasts	Based upon CMAP GO TO 2040 Preferred Regional Scenario (developed prior to 2010 Census results).	2040 No-Build forecast developed by Consultant Team (developed after 2010 Census results) based on CMAP regional control totals. 2040 Build forecast to be developed by Consultant Team for use in DEIS.	CMAP developed only 2040 Preferred Regional Scenario. Preferred Regional Scenario developed as a scenario-driven policy-based 2040 forecast for addressing major investments and high-level choices that shape the region. The forecast reflects the desired plan scenario outcome and assumes that the recommended policies will be in place by 2040. The I-290 2040 No Build forecast were based on historic trends, land availability, and independent Woods & Poole county level forecasts and match the population totals used for GO TO 2040. Market based forecast approach is typical practice for design and financial analysis purposes for major project development. 2040 Build forecast to reflect any accessibility changes based on implementation of the build project.

Attributes or Assumptions	CMAP GO TO 2040 2008 Evaluation	IDOT I-290 EIS Model 2012 Evaluation	Comments
Specific Regional Travel Model Improvements			
1. Trip Generation Model (2009-2010)	Previous trip generation model calibration data based on information from1989-1991 Household Survey and 2000 Census Journey to Work data.	Updated CMAP regional trip generation rates based on more recent 2007-2008 CMAP Travel Tracker Survey and U.S. Census Bureau American Community Survey data. This included an update of trip generation rates for persons residing in households, stratification by income level for home-based work trips, and updates of the household vehicle ownership, trip attraction allocation, external trips, and non-motorized sub-models	I-290 improvements implemented by CMAP
2. Trip Distribution Model (2009-2010)	Previous trip distribution model calibration data based on information from 1989-1991 Household Survey and 2000 Census Journey to Work data.	Re-calibrated CMAP regional trip distribution models to more recent CMAP Travel Tracker Survey and Census journey to work trip length data. Updated the input files for estimating the costs of transit and highway travel, and stratified home based work trips by income level.	I-290 improvements implemented by CMAP
3. Mode Choice Model (2009-2010)	Previous mode choice model calibration data based on information from 1989-1991	Updated CMAP regional mode choice model, including re-calibration of the model	I-290 improvements implemented by CMAP

	Household Survey and 2000 Census Journey to Work data.	based upon more recent CMAP Travel Tracker Survey mode shares, update of travel costs to reflect current conditions, adjustment of model coefficients for current dollars in the primary auto-transit choice model and the auto occupancy sub-model, and model code revisions to account for the stratification of home-based trips by income level (for example, this stratification improves transit mode choice modeling for commuter rail and other longer distance commuting trips).	
4. Highway Assignment (2009-2010)	Previous highway assignment time-of-day model calibration data based on information from 1989-1991 Household Survey and 2000 Census Journey to Work data. Highway assignment by auto occupancy level not performed in regional CMAP model runs.	Updated CMAP regional highway trip assignment model, including updates to more current time-of-day factors based on the more recent CMAP Travel Tracker Survey, and revisions to the traffic assignment macros to include the assignment of the additional managed lane trip types.	I-290 improvements implemented by CMAP
5. Sub-Area Highway Network (2009-2010)	N/A	Added highway network detail in CMAP regional highway network for the I-290 study area to allow the development of more detailed project level traffic forecasts required for design purposes.	I-290 project specific model improvement

6. Sub-Area Zone System (2009-2010)	N/A	Added detail to transportation analysis zones in CMAP regional model for the I-290 study area to allow the development of more detailed project level traffic forecasts for design purposes.	I-290 project specific model improvement
7. Evaluation Measure Summaries (2009-2012)	N/A	Developed processes to summarize regional model data into transportation system performance evaluation measures. The summaries allowed IDOT to prepare the evaluation results of alternatives in a tabular format for use in comparing the transportation performance of different alternatives.	I-290 project specific model improvement
8. Highway Assignment (2011)	Equilibrium traffic assignment	Incorporated advanced path-based traffic assignment resulting in improved model convergence, faster computer run times, and the ability to analyze path-based results that are required for the development of travel performance summaries.	Implemented by CMAP
9. Trip Distribution/Mode Choice Models (2011)	Previous trip distribution/mode choice model cost data based on updates during mid-2000s	Revised CMAP procedure for estimating transit cost and time inputs for trip distribution and mode choice, including updating the fare calculations to current levels. These revisions were made to better reflect current transit	Implemented by CMAP

		conditions to provide faster computer run times.	
10. Transit Assignment (2011)	CMAP uses a variant of this transit assignment procedure	Implemented transit assignment procedure that does not require coding of auto access links and allows riders to consider multiple rail stations and bus stops. This results in improved sensitivity of the transit modeling through better transit access representation.	
11. Highway Assignment (2012)	Toll links contained in CMAP network	Updated tolling procedures in regional highway assignment through network coding, updated link volume-delay functions and revised assignment macros. This update improved the sensitivity of the model to tolling characteristics contained in the managed lane alternatives.	CMAP Implementation planned in 2013
12. Mode Choice Model (2012)	Tolls not included in CMAP Mode Choice Model	Developed a post-processing procedure that estimates the effect upon mode choice of alternate tolling and pricing scenarios. This results in the mode choice model being sensitive to tolling, so its impacts can now be reflected in the transit mode share.	CMAP Implementation planned in 2013