

**Falcon Heights Council Workshop Minutes**  
**November 6, 2013**  
**6:30 p.m.**

**Members present:** Mayor Lindstrom, Council Members Mercer-Taylor, Harris, Long and Gosline

**Members absent:**

**City Staff present:** City Administrator Bart Fischer  
Assistant to the Administrator Michelle Tesser

- 1) **Continued Discussion regarding the On-Sale Liquor License Sec 6-24**  
Councilmember Harris recused herself from the conversation.  
Staff presented options relating to allowing wine and beer sales at a local establishment without the sale of food. Council discussed the options and directed staff not to make any significant changes to the liquor ordinance and to provide the business owner with the options already available in the current ordinance.
- 2) **Update from Ady Wickstrom on Ramsey County Public Transportation**  
Shoreview City Councilmember Ady Wickstrom, Ramsey County Commissioner Jim McDonough and Jonathan Weinhagen from the St. Paul Area Chamber of Commerce presented the attached information on future public transportation projects in Ramsey County and expressed the need for the east Metro to come together to support these projects to make the region more competitive. The Council and these representatives discussed various points relating to public transportation.
- 3) **Discuss Amending the Tobacco Ordinance**  
Katie Engman and Alisha Weisenger from the Ramsey County Tobacco Coalition presented information (see attached) relating to E-cigarettes and how the City's ordinance could be changed relating to the sale of E-cigarettes. They also presented information on other tobacco products that appear to be targeting young people. Council directed staff to immediately begin work on bringing changes to the Tobacco Ordinance relating to E-cigarettes to an upcoming Council meeting for approval. They also directed staff to look into options relating to changing the ordinance as it relates to tobacco products aimed at young people.

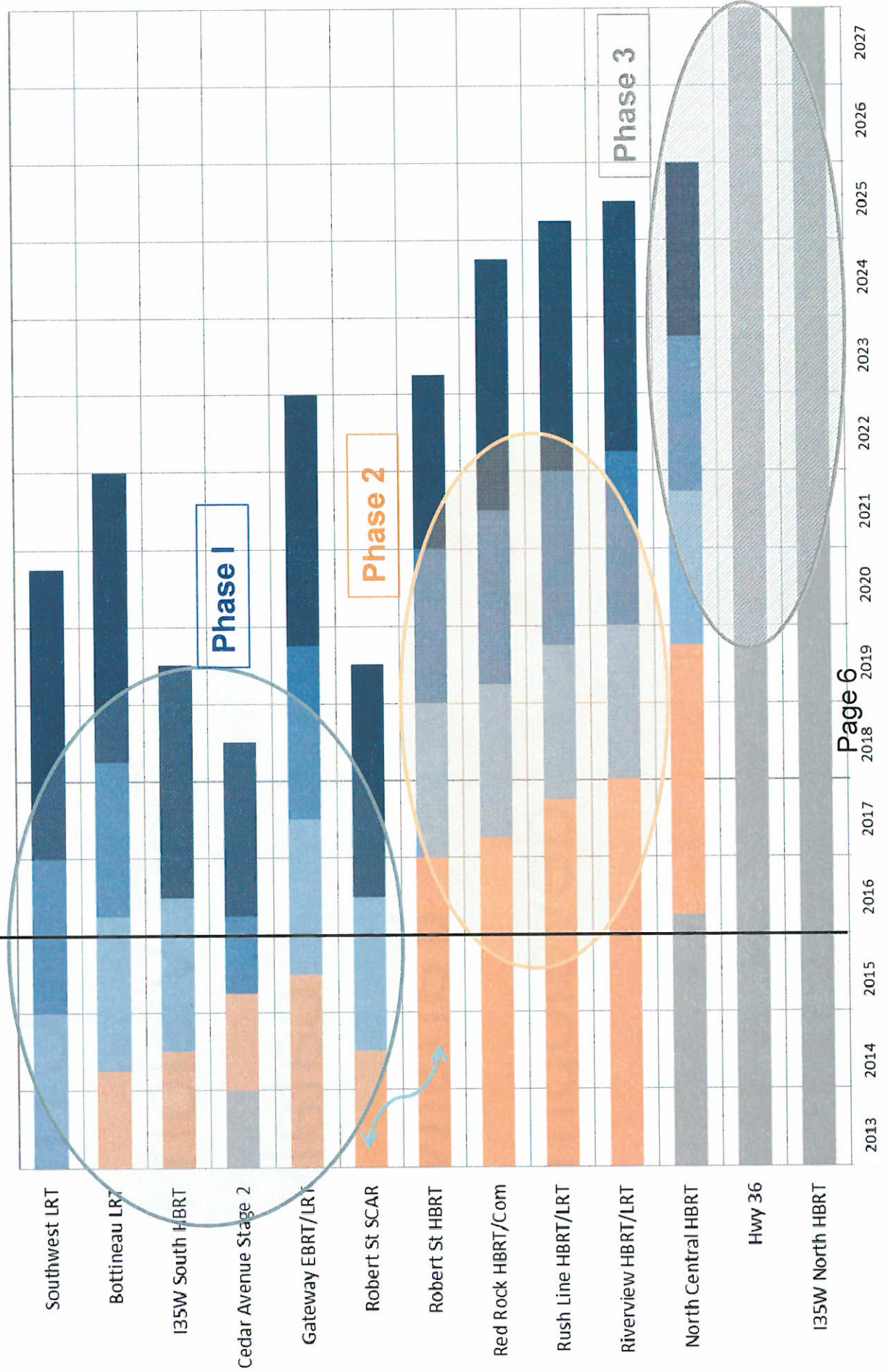
The workshop concluded at 8:54 p.m.

Respectfully submitted,  
Bart Fischer  
City Administrator



# CTIB Program of Projects (Standardized Readiness)

■ Pre-Transit Corridor Planning  
 ■ Transit Corridor Planning  
 ■ Project Development  
 ■ Engineering  
 ■ Construction/Testing



# 2030

## TRANSPORTATION *Policy Plan Summary*



## The Transit Vision



Transit plays an important role in the regional economy. It connects people to economic and educational opportunities, provides an alternative to driving on congested highways, improves air quality, reduces energy consumption and enhances mobility for everyone.

This plan renews the Council's goal of doubling transit ridership – from a 2003 base of 73 million annual rides – to 145-150 million rides by 2030. Strategies for achieving this goal include:



- Expanding the bus system by improving coverage and frequency; adding express routes, transit centers and park-and-ride facilities; and making technological improvements such as web-based trip planning tools and real-time service information.
- Utilizing highway improvements – such as HOT and HOV lanes, bus-only shoulder lanes, ramp meter bypasses and other improvements – that give transit a travel-time advantage over the single-occupant car.
- Developing a network of bus and rail “transitways,” including light-rail transit (LRT), bus rapid transit (BRT), commuter rail and express buses with transit advantages.

Providing transit advantages and developing a network of transitways will allow travel that avoids congested highways, connects regional employment centers, improves the reliability of riders' trips and boosts the potential for transit-oriented development.



## A Network of Transitways



The region now has two transitways – Hiawatha LRT and the I-394 HOT lane. Four more are in construction, final design or preliminary engineering – the Northstar commuter rail line, the I-35W and Cedar Avenue BRT projects, and the Central Corridor LRT line.



Eight additional corridors are recommended as potential transitways by 2030. Planning and development studies, conducted and funded in cooperation with county regional railroad authorities and Mn/DOT, will determine the specific alignment, mode and schedule for each corridor. The status of these corridor studies are:

- Southwest: Alternatives Analysis completed and Draft Environmental Impact Statement for three LRT options underway.
- Bottineau Boulevard: Alternatives Analysis underway.
- Rush Line: Alternatives Analysis underway.
- I-35W North, Highway 65/BNSF, Highway 36 and I-94 East: Preferred mode and alignment to be determined through alternatives analyses over the next three years.
- Red Rock: Alternatives Analysis completed recommending a phased approach. Studies for improved bus service are now underway, and commuter rail could be implemented if high speed rail is developed in the corridor.



The cost estimates in this plan assume the transitways will be implemented as follows:

- Three corridors will be built as LRT or dedicated busways – one to be completed by 2020, one begun before 2020 and completed soon after, and a third completed by 2030.
- Four BRT corridors will be built on highway alignments – two will be built by 2020 and two additional BRT corridors on highway alignment will be built by 2030.
- One additional commuter rail corridor will be built by 2030.

Nine arterial streets are recommended for a form of BRT featuring limited-stop service and technology improvements to provide a faster trip. This plan assumes six of these corridors could be implemented by 2020, and three more by 2030:

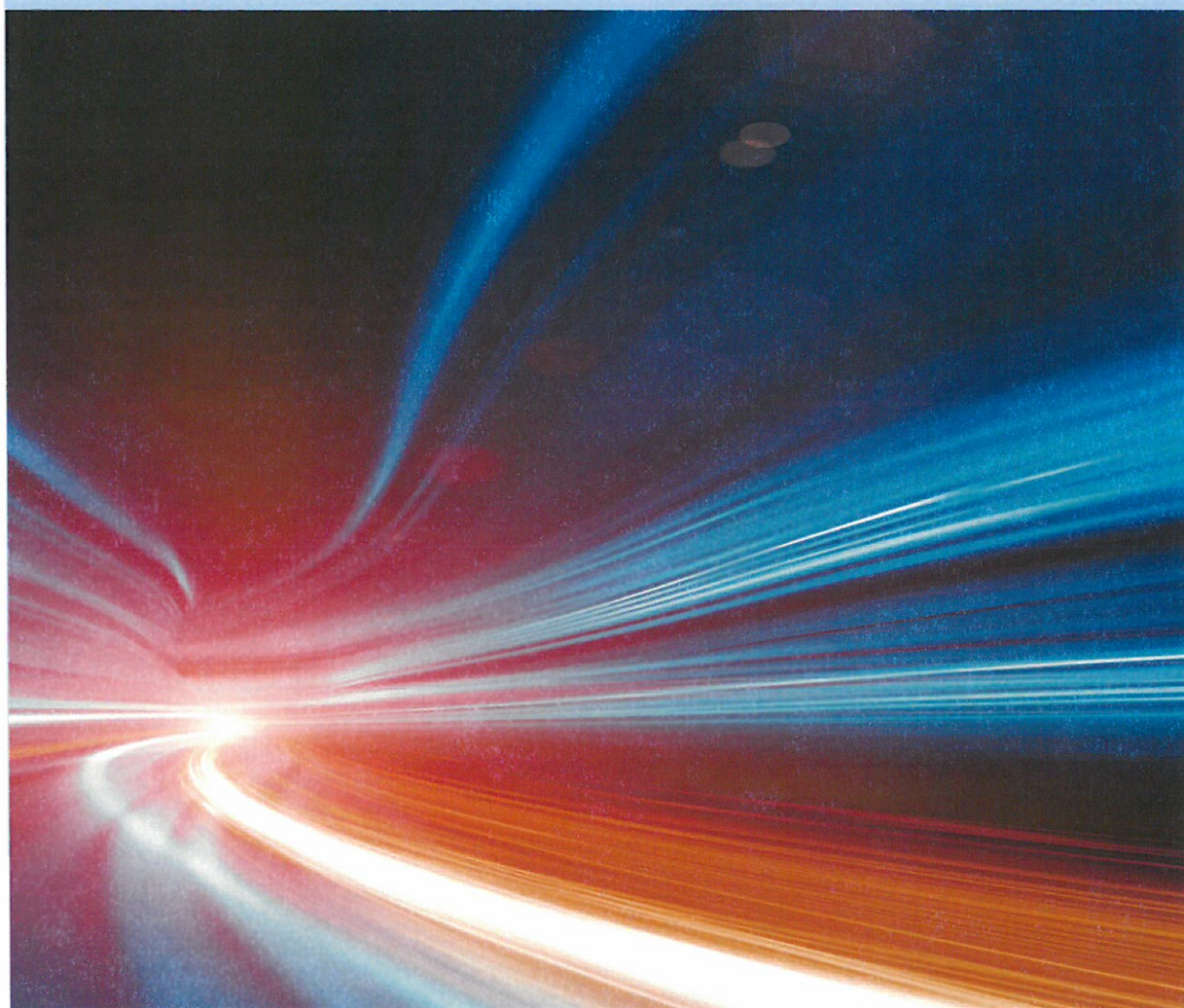
- |                   |                       |                       |
|-------------------|-----------------------|-----------------------|
| • Central Avenue  | • Nicollet Avenue     | • Robert Street       |
| • Snelling Avenue | • Chicago Avenue      | • West Seventh Street |
| • West Broadway   | • East Seventh Street | • American Boulevard  |

Express bus routes with transit advantages provide another alternative to congestion. Transit advantages include bus-only shoulder lanes, HOT or HOV lanes, and ramp meter bypasses. Express routes typically operate non-stop between a park-and-ride facility and their destination. The region will need to double express bus service to remain on track to increase transit ridership 50% by 2020 and double it by 2030.



# ITASCAproject

**Regional Transit System**  
Return on Investment Assessment  
November 30, 2012





## EXECUTIVE SUMMARY

The Itasca Project has a key goal to advance a comprehensive and aligned transportation system. As a stakeholder in regional discussions around proposals for transit investment, Itasca's transportation task force sought to understand "what is the expected economic return on regional transit investments?"

Itasca commissioned Cambridge Systematics to assess the expected return from the region's proposed transit system. Working with a technical advisory committee of regional experts, the project team quantified and monetized how the regional transit build-out would impact travel times, travel time reliability, vehicle operating cost, safety, emissions, shippers and logistics costs, and road pavement condition.

Itasca's transportation task force posed three questions:

- 1) A built-out regional transit system would require substantial investment. *What would be the return on that investment?*  
Answer: Between \$6.6 and \$10.1 billion in total direct benefits, on a \$4.4 billion investment (benefits accrued 2030 – 2045).
- 2) Investments can be made more or less quickly. *Would accelerating the build-out change the return on investment?*  
Answer: The total direct benefits would increase to between \$10.8 – 16.5 billion, on a \$5.3 billion investment (benefits accrued 2023 – 2045).
- 3) Many communities with developing transit systems experience more growth near transit stations. *Would such expectations for regional growth change the return on investment?*  
Answer: More community growth near transit stations would increase net benefits by another \$2 – 4 billion (2030 - 2045).

In addition to quantified and monetized impacts, the analysis quantified but did not monetize other regional impacts, such as regional accessibility to jobs. The analysis found that a regional transit system would enable local employers to access an additional 500,000 employees.

Finally, the project team sought the views of human resources and facilities executives at regional employers, with respect to the role of a built-out transit system in accessing and attracting employees.

Together, the results show that investment in a built-out regional transit system would create substantial value for the region.

## BACKGROUND

The Itasca Project is a CEO-led alliance drawn together by an interest in new and better ways to address regional issues that impact our economic competitiveness and quality of life. Its 50-plus participants are primarily private-sector business leaders, the heads of major Minneapolis/St. Paul-based foundations, and key public sector leaders.

Itasca's participants understand that our regional transportation system helps determine regional prosperity and quality of life. One of Itasca project's three priorities is to "Advance a Comprehensive and Aligned Transportation System". This vision includes roads and bridges, as well as a connected transit system.

As a stakeholder in regional discussions around proposals for transit investment, the Itasca Project sought its own understanding of current transportation visions, including that of a built-out regional transit system. Specifically, Itasca's transportation task force sought to understand "what is the expected return on such transit investments?"

The Itasca Project commissioned Cambridge Systematics to assess the proposed transit system.

## KEY QUESTIONS

The Itasca Project transportation task force posed three questions:

- 1) A built-out regional transit system would require substantial investment. *What would be the return on that investment?*
- 2) Investments can be made more or less quickly. *Would accelerating the build-out change the return on investment?*
- 3) Many communities with developing transit systems experience more growth near transit stations. *Would such expectations for regional growth change the return on investment?*

To answer these questions, Cambridge Systematics, with support from an advisory committee of regional experts, modeled the costs and benefits of three future regional transit scenarios and compared them with a base case scenario that incorporates only existing and committed transit investments (including Central Corridor):

- *Scenario 1: 2030 Regional Plan.* This scenario assumes the Metropolitan Council 2030 plan is executed and that the region-wide transit investment includes the addition of three LRTs, two BRT extensions, two new BRTs, and nine arterial BRTs.

- *Scenario 2: Accelerated Regional Plan.* This scenario assumes the same build-out as Scenario 1, completed seven years earlier in 2023.
- *Scenario 3: 2030 Plan with Growth Near Stations.* This scenario assumes the same build-out and timing as in Scenario 1, but focuses more of the expected regional growth near stations. This scenario does not suppose accelerated or additional growth for the region but simply reallocates 25% of projected development and community growth in served communities to be nearer to station areas.

The analysis looked at the costs and benefits of a regional transit system from its completion date through 2045. Scenarios one and three assesses the costs and benefits from the system completion date of 2030 through 2045. Scenario two proposes the system is complete by 2023 and, hence, assesses costs and benefits from 2023 through 2045.

In addition to the technical analysis, the project also conducted qualitative research to understand the perspective of regional businesses and assessed impacts of transit build-outs in other regions.

## SUMMARY OF DIRECT IMPACTS

A built-out transit system brings enhanced mobility to the region, which has benefits for both highway and transit users. For this analysis, we considered six types of direct impacts:

- Vehicle operating costs
- Travel times and reliability
- Shippers and logistics costs
- Emissions
- Safety costs
- Road pavement conditions

Figure 1 compares the quantified direct impacts with the cost of the regional transit system build-out. Note that the analysis considered *net* benefits. To the extent any of these factors were negatively impacted by the transit system build-out (e.g., increase in travel times), that was accounted for. Both capital costs and operating and maintenance costs are included.

The analysis finds that expected direct benefits range from \$6.6 billion up to \$13.9 billion.

**Figure 1: Benefits and costs of the regional transit system from completion of build-out to 2045, compared to base case (2010\$ Millions)**

Scenario	Compared to Base Case Scenario			
	Investment cost	Total direct impacts		IRR
		Low	High	
<b>1: 2030 Regional Plan</b> <i>(Benefits/costs accrue 2030–2045)</i>	\$4,361	\$6,571	\$10,083	7.8 - 14.8%
<b>2: Accelerated Regional Plan</b> <i>(Benefits/costs accrue 2023–2045)</i>	\$5,289	\$10,762	\$16,516	11.2 - 18.0%
<b>3: 2030 plan with more growth near stations</b> <i>(Benefits/costs accrue 2030–2045)</i>	\$4,361	\$9,082	\$13,927	13.0 - 20.9%

Source: Cambridge Systematics analysis based on MetCouncil TDM output

As shown in Figure 1, the benefits and costs were also used to calculate an internal rate of return (IRR)<sup>1</sup>: between 7.8% and 20.9% for the project.

The range of direct user impacts by category are:

- Travel time savings: \$4.6 to \$11.4 billion
- Vehicle operating cost savings: \$1.5 to \$4.7 billion
- Shipper and logistics cost savings: \$185 to \$270 million
- Reduction in emissions: \$185 to \$395 million
- Safety benefits: \$53 to \$88 million
- Pavement maintenance savings: \$26 to \$54 million

Because the analysis period is relatively short (only 15 years for the base build-out and focused growth scenarios, when the system will likely provide benefits beyond) and because of the conservative assumptions regarding future land use changes and energy costs in the travel demand model, the resulting benefits represent a conservative estimate of the potential impact.

<sup>1</sup> Internal Rate of Return (IRR) is the discount rate often used in capital budgeting that makes the net present value of all cash flows from a particular project equal to zero.

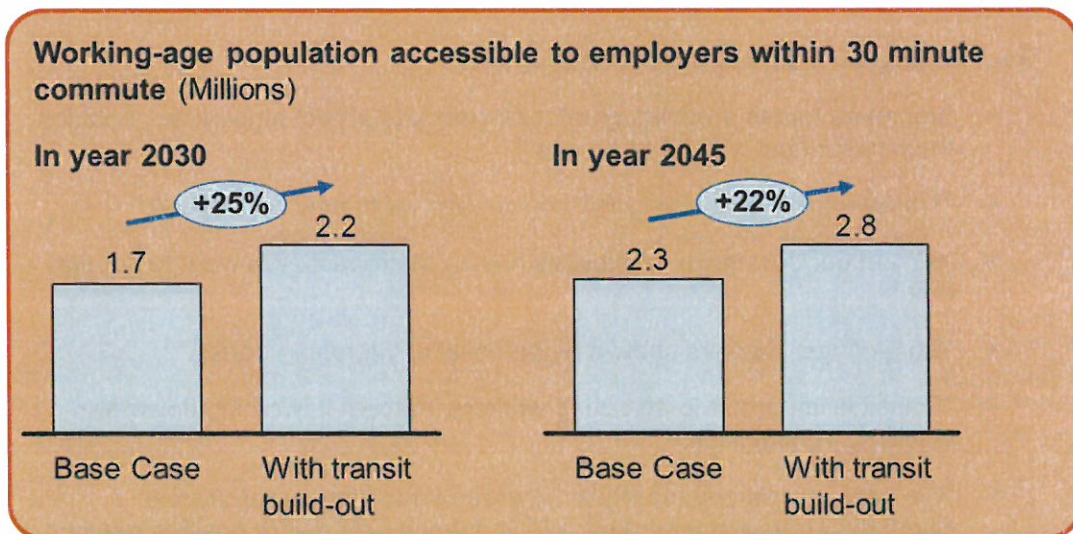
## SUMMARY OF WIDER ECONOMIC IMPACTS

In addition to the direct benefits assessed, the project considered a select number of wider economic impacts that research suggests will accrue as a result of transit investments.

### Impact on access to labor shed

The regional travel model shows that transit improvements are expected to decrease average travel times on the transportation network. This increases work opportunities available to residents and the labor shed available to employers. The analysis indicates that, compared to base no-build scenario, an additional 500,000 working-age residents will be accessible within a 30 minute trip time under the 2030 plan and up to 520,000 working age residents under the 2030 plan with more growth near stations. As shown in Figure 2, this represents a 22 – 25% increase.

**Figure 2:** Change in regional labor shed due to transit build-out (assumes build-out of 2030 regional plan)



### Construction impacts

In addition to the long-term economic benefits, the construction activity associated with the 2030 transit build-out scenario is projected to support more than 30,000 full-time equivalent jobs and \$4.3 billion in Gross Regional Product over the course of the construction period.

## Induced economic development

The direct user benefits associated with a regional transit build-out are expected to drive long-term economic impacts in terms of business attraction and retention, leading to economic and employment expansion. The analysis relied on the economic modeling tool TREDIS to assess potential economic value creation. Transit investment is expected to support an additional 3,500 to 8,495 jobs by 2045. Transit investments and resulting transportation efficiencies will lead to an additional expansion of the regional economy up to \$1.4 billion.

## BUSINESS PERSPECTIVE

In addition to the quantitative analysis, qualitative research was conducted with leaders from several of the region's leading companies to assess their viewpoints on the benefits of a regional transit system. The project team spoke with Human Resources and Facilities leaders from companies including Target, UnitedHealth, US Bancorp, DLR Group, Xcel Energy, and Plymouth/Center National Bank.

Key themes and representative quotes from these discussions are highlighted below.

### Transit helps access and attract employees.

- "Improved transit provides greater efficiency to attract employees, enables them to connect with labor groups."
- "Transit comes up in every HR conversation with new employees."
- "60% of our downtown employees have a Metropass. We want to support that."
- "Our younger workers show a higher level of interest in transit."
- "Transit is important to attracting workers. Without it, working downtown would be very difficult."
- "We have a company priority to be green and socially-responsible. Supporting transit is important. We find that it gets a very positive reaction within our younger employees."
- "We worry about future commuting costs, as gas could be significantly more expensive."

### Transit enables higher density development and greater customer access.

- "Improved transit would allow higher densities and greater customer access."
- "Higher densities encourage entrepreneurial activities."

### **Transit must be connected to and aligned with destinations and other modes of transit.**

- “Pedestrian access is important to support transit, complete last mile connections.”
- “Want to see more suburb-to-suburb connections.”
- “I appreciate the LRT connection to the airport but there are limited door-to-door mass transit options”
- “Must be reliable.”

## **CONCLUSION**

This analysis provides the business community and partners information it requested to understand the benefits of a regional transit system. The study answered three key questions:

- 1) A built-out regional transit system would require substantial investment. *What would be the return on that investment?*  
Answer: Between \$6.6 and \$10.1 billion in total direct benefits, on a \$4.4 billion investment (benefits accrued 2030 – 2045).
- 2) Investments can be made more or less quickly. *Would accelerating the build-out change the return on investment?*  
Answer: The total direct benefits would increase to between \$10.8 – 16.5 billion, on a \$5.3 billion investment (benefits accrued 2023 – 2045).
- 3) Many communities with developing transit systems experience more growth near transit stations. *Would such expectations for regional growth change the return on investment?*  
Answer: More community growth near transit stations would increase net benefits by another \$2 – 4 billion (2030 - 2045).

These results support advancing transit investments (including LRT, BRT, and arterial bus) in the Minneapolis Saint Paul Metro area. There are of course many other questions that will be considered as the region assesses how to advance its transit investment, including funding sources.

## ABOUT THIS REPORT

### Methodology

The Return on Investment (ROI) evaluation quantifies and monetizes the future impacts arising from building a regional transportation system.

To estimate the transportation benefits associated with the transit build-out, the study utilizes output from Metropolitan Council's regional travel demand model. The study team interpolates the 2030 and 2045 travel data provided by the Metropolitan Council to estimate annual travel data, which forms the basis for the 15-year impact analysis, from 2030 to 2045 (2023 – 2045 for accelerated scenario).

To estimate economic impact, the team used the TREDIS model which is an economic model developed specifically to evaluate the impact of multimodal transportation investments. The model is customized for the Twin Cities region and it evaluates the impact of investments across modes and users, including passengers and freight. More information on the TREDIS model is available at [www.tredis.com](http://www.tredis.com).

### Key assumptions

The Technical Advisory Group worked with Cambridge Systematics to define key input assumptions for the model, which are highlighted here.

All findings will be reported in 2010 dollars.

A discount rate of 2.8 percent is employed for this analysis as recommended by MnDOT.

For the regional assessment, all corridors are assumed to be operational in 2030 and the impacts from 2030-2045 are estimated and reported. For the accelerated assessment, all corridors are assumed to be operational in 2023 and the impacts from 2023-2045 are estimated and reported.

The focused growth scenario assumes that 25 percent of all projected development in the transitway-served communities occurs within a 1/3 of a mile of new and existing transit station areas. The reallocation of growth assumes that communities anticipating a transitway have focused growth in station areas to some degree as part of their regular long-range and land use planning processes. This assumption is made within the travel demand model, thus allowing the changing development patterns to impact ridership and travel behaviors. Induced development above and beyond baseline projections arising from improved mobility is captured in the analysis of wider economic benefits.

The price of fuel used in the travel demand and mode choice models is \$3.41 per gallon (\$2.59 in 2000\$ based on the CPI) to reflect the average cost of fuel in the region on October 26, 2011. Gas prices are an important input to the model



because they are a major driver of transit ridership, which impacts other benefits. When possible, sensitivity analysis was conducted.

Value of travel time varies by trip purpose and it is equivalent to the opportunity cost travelers' time for non-work trips and commute trips and to the out-of-pocket costs for work or business trips. Generally, value of travel time is a function of travel time, trip purpose and wage rate. For commute, the study team utilized 50 percent of travel time saved for analysis in accordance with U.S. Department of Transportation recommendation. Also, non-work related trips (including leisure) will be used to estimate efficiency benefits but not as input into the economic impact analysis since they do not represent out-of-pocket cost.

## ABOUT THE ITASCA PROJECT

The Itasca Project is an employer-led alliance drawn together by an interest in new and better ways to address regional issues that impact our future economic competitiveness and quality of life in the Twin Cities area. Its 50-plus participants are primarily private-sector CEOs, public-sector leaders, and the leaders of major Minneapolis/St. Paul-based foundations.

### Leadership

Chairperson	Mary Brainerd, President and CEO, HealthPartners
Vice-Chairperson	Richard Davis, Chairman, President and CEO, US Bancorp
Director	Allison Barmann, McKinsey & Co.

### Transportation task force leadership

Co-chair	Jay Cowles, President, Unity Avenue Associates
Co-chair	Charlie Zelle, CEO, Jefferson Lines

## ABOUT CAMBRIDGE SYSTEMATICS

Cambridge Systematics (CS) is a national transportation planning consulting firm with 40 years of experience providing regional, state, and federal transportation planning and policy services. CS offers demonstrated expertise in regional transportation planning, transit planning, air quality analysis, travel demand forecasting, economic analysis, and state and Federal transportation policy. We develop innovative solutions to complex problems using quantitative tools and qualitative analysis.

## TECHNICAL ADVISORY GROUP

The Itasca Project would like to thank the Technical Advisory Committee who provided local expertise and guidance to the analysis.

Mary Richardson	CTIB
Mary Kay Baily	Corridors of Opportunity
Katie Walker	Hennepin County
David Lawless	Hennepin County
Arlene McCarthy	Metropolitan Council
Guy Peterson	Metropolitan Council
Mark Filipi	Metropolitan Council
John Kari	Metropolitan Council
Will Schroeer	Minneapolis Regional Chamber of Commerce and Saint Paul Area Chamber of Commerce
Lee Sheehy	The McKnight Foundation
Eric Muschler	The McKnight Foundation
Jim Erkel	Minnesota Center for Environmental Advocacy
Kate Johansen	Minnesota Chamber of Commerce
David Levinson	University of Minnesota
Laurie McGinnis	University of Minnesota
Caren Dewar	ULI MN and Regional Council of Mayors
Ted Schnoenecker	Washington County



One example of a rechargeable e-cigarette model



“blu” is a brand of electronic cigarettes manufactured by Lorillard, the company that makes Newport cigarettes. It is purposefully designed to look difference than a cigarette for use by consumers in places with smoke-free policies.



This disposable electronic cigarette produced by NJOY costs about \$7. NJOY is the number one selling brand of electronic cigarettes.

## WHAT IS AN ELECTRONIC CIGARETTE?

Electronic cigarettes, also called e-cigarettes, are battery operated nicotine vaporizers that are produced primarily in China.<sup>1</sup> E-cigarettes often look like a traditional cigarette but do not produce smoke. The use of e-cigarettes is referred to as “vaping” rather than “smoking.”

E-cigarette users purchase cartridges filled with liquid nicotine and other substances, attach the cartridge onto the e-cigarette battery, and breathe in nicotine vapor produced by a small heating element.

The cartridges are sold in many flavors such as cherry, bubblegum, vanilla, and fruit punch, making them appealing to youth.<sup>2</sup> Disposable e-cigarettes sell for about \$5 and rechargeable e-cigarettes cost up to \$120. E-cigarettes are often advertised as a safer alternative to tobacco cigarettes; however, the potential health risks associated with these products is not known.

Liquid nicotine found in e-cigarettes is derived from tobacco; however, most of the devices do not contain any tobacco. Similar to tobacco cigarettes, heavy metals, carcinogens, silicate, and nanoparticles (which can go deep into the lungs) have been found in e-cigarette vapor.<sup>3</sup>

## ARE ELECTRONIC CIGARETTES REGULATED?

The production and manufacturing of e-cigarettes is poorly regulated.<sup>4,5</sup> The Food and Drug Administration (FDA) has noted that “quality control processes used to manufacture these products are inconsistent or nonexistent.” For example, three different e-cigarette cartridges with the same label were tested and each cartridge released a substantially different amount of nicotine with each puff.<sup>6</sup>

## WHAT ARE THE HEALTH EFFECTS OF ELECTRONIC CIGARETTE USE?

Because these products are so new, little is known about their long term health effects. There is a significant amount of research showing the harmful effects of nicotine: a highly addictive stimulant that increases blood pressure and heart rate.<sup>3</sup> E-cigarettes are designed to deliver high amounts of nicotine to the user. Often, e-cigarettes deliver more than two times the amount of nicotine approved by the FDA for smoking cessation aids.<sup>1</sup> Many of the ingredients found in e-cigarettes are known to be dangerous to human health. These ingredients can cause: lung and cardiac inflammation, cancer, and cell damage.



Many e-cigarettes are advertised as a smoke-free alternative, especially as a New Year's resolution. Source: Rolling Stone (January 17, 2013). Retrieved from [www.trinketsandtrash.org](http://www.trinketsandtrash.org)



Source: Ok! Magazine (October 3, 2011). Retrieved from [www.trinketsandtrash.org](http://www.trinketsandtrash.org)

This publication has been made possible by funding from the Minnesota Department of Health's Tobacco-Free Communities grant program.

Ramsey Tobacco Coalition is a program of the Association for Nonsmokers-Minnesota.



## WHO USES ELECTRONIC CIGARETTES?

As a result of widespread availability, sales of e-cigarettes are increasing rapidly. Some predict that electronic cigarette sales could overtake traditional cigarette sales in the next decade. Electronic cigarettes are popular among people who are looking for an alternative to traditional cigarettes. These people are often looking for a “safer” alternative and the ability to smoke in places where cigarette smoking is prohibited.

## WHAT CAN I DO TO HELP PREVENT YOUTH ELECTRONIC CIGARETTE USE?

It is critical that local municipalities regulate e-cigarettes. All e-cigarette vendors should be licensed and subject to the same provisions as traditional tobacco retailers to ensure youth do not have access to these products. Minnesota state law currently regulates the sale of e-cigarettes by prohibiting sale to minors. Local ordinances should be updated at the county and city level to ensure that e-cigarettes are not sold to those under 18 years of age.

### Sources:

1. Dooley, E. (2009). E-cigarettes: Not quite healthy. *Environmental Health Perspectives*, 117(9), A392.
2. Kuehn, B. M. (2009). FDA: Electronic cigarettes may be risky. *JAMA* 302(9), 937.
3. Williams, M., Villarreal A., Bozhilov K., Lin S., & Talbot, P. (2013). Metal and silicate particles including nanoparticles are present in electronic cigarette cartomizer fluid and aerosol. *PLoS ONE* 8(3), e57987.
4. Wollscheid, K. A. & Kremzner, M. E. (2009). Electronic cigarettes: Safety concerns and regulatory issues. *American Journal of Health-System Pharmacy*, 66(19), 1740.
5. Williams, M. & Talbot, P. (2011). Variability among electronic cigarettes in the pressure drop, airflow rate, and aerosol production. *Nicotine & Tobacco Research* 13 (12), 1276-1283.
6. FDA (July 2009). Summary of results: Laboratory analysis of electronic cigarettes conducted by FDA. Available from <http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm173146.htm>
7. Trehy, M. L., Ye, W., Hadwiger, M. E., Moore, T. W., Allgire, J. F., Woodruff, J. T., Ahadi, S. S., Black, J. C., & Westenberger, B. J. (2011). Analysis of electronic cigarette cartridges, refill solutions, and smoke for nicotine and nicotine related impurities. *Journal of Liquid Chromatography & Related Technologies*, 34(14), 1442-1458.