ITEM 10 - Information
June 18, 2008

Briefing on a Cost-Benefit Analysis Framework for Assessing Transit Investments, and Possible Implications for Transportation Planning in the Washington Region

Staff Recommendation: Receive briefing on a cost-benefit analysis framework which provides a comprehensive approach for assessing transit investments, and possible implications for transportation planning in the Washington region.

Issues: None

Background: In May 2007, Dr. David Lewis testified on the Federal Transit Administration (FTA) New Starts Program before the Subcommittee on Highways and Transit of the House Committee on Transportation and Infrastructure. He concluded that in not recognizing the full economic value of transit projects, the New Starts process creates a risk of underinvestment in transit in American urban development.

Dr. Lewis has provided the attached paper for the TPB to provide general guidance on (1) a comprehensive analysis framework that ensures that all economic values are considered when assessing transit investments, and (2) possible implications for transportation planning in the Washington region

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A Comprehensive Cost-Benefit Analysis Framework for Assessing Transit Investments, and Possible Implications for Transportation Planning in the Washington Region

Prepared for the
National Capital Region Transportation Planning Board

June 12, 2008

HDR | HLB Decision Economics Inc.

Risk Analysis • Investment and Finance
Economics and Policy

1.0 INTRODUCTION

Practices and procedures of Cost-Benefit Analysis are firmly in place for virtually all types of public infrastructure, including airports, seaports, levees, canals, locks and dams, and water and wastewater facilities. Congress has required the use of Cost-Benefit Analysis by the Corps of Engineers, for example, since the 1930s.

In contrast to most other types of public infrastructure, transit projects in the United States are most often assessed and presented to decision makers in terms of cost-per-rider or related indices. It is not the case, however, that the policy objectives and economic benefits of transit are fully reflected in, or proportional to, the level of ridership it serves. While ridership can help identify transit's effect on the mass movement of people, it is not an index of congestion relief, community economic development, the provision of low-income mobility, the promotion of economic "location efficiency" (high density urban communities), or other prospective objectives and effects of transit investment.

2.0 THE STOCK APPROACH: THE FEDERAL GOVERNMENT'S NEW STARTS PROCESS

Why then are transit projects evaluated differently from other kinds of infrastructure investment? The practice stems from an analysis procedure established by Congress and implemented by the Federal Transit Administration (FTA) called the New Starts process. The statutorily defined New Starts process is the means by which the agency evaluates and rates applicant projects for access to a pool of federal funds designated for transit investment. Applicant projects are evaluated and rated on a defined set of measures, though most weight in the current FTA funding decision process is attributed to the measure of "cost-effectiveness" FTA applies a ratio of "incremental cost per hour of transportation system user benefit" as the measure of cost effectiveness.

The transportation system user benefit is an output of the travel demand forecasting model related to estimated transit ridership and model outputs of estimated travel time savings. User benefits actually represent the forecasted difference in travel time savings forecasted for the proposed project compared to the baseline alternative (representing the "best that can be done" to provide comparable levels of transit service without the fixed guideway investment). The intent of the FTA New Starts project evaluation and rating process is to provide information for Federal decision-makers to fairly and objectively distinguish between applicant projects nationwide. The Federal process is not intended to lead to the local investment decision and selection of preferred alternative, nor to compare the viability of the proposed transit investment against other transportation modes or technological proposals.

As a result, FTA officials have not seen the need to employ more comprehensive methodologies, such as Cost-Benefit Analysis, that permit like-with-like comparisons of

economic rates of return among highway and transit alternatives. As well, FTA officials see ridership and related travel time savings as more readily amenable to accurate forecasting than other sources of transit value and focus the procedure for ranking applicant projects accordingly. While the New Starts process does permit the qualitative expression of non-ridership benefits as part of the application process (land use effects, for example), ridership and related travel time savings are the driving factors in the ranking procedure.

Localities must employ the FTA New Starts process in order to be eligible for federal New Starts funding for major transit projects. Although localities are certainly free to employ other methods of measuring the value of transit projects for local planning and decision-making, most do not. One reason is the reality that the FTA process is expensive and time-consuming. A related reason is that findings from other approaches do not help improve a project's FTA ranking for access to federal funds. A more fundamental reason, however, is that the FTA New Starts process has, of its own volition, become the stock means of ascertaining transit value. Transit planners and consulting firms that specialize in the provision of transit planning services invest heavily in its application. Most do not even consider that that another, more comprehensive approach could be applied for local decision-making.

Notwithstanding the situation outlined above, internationally the Cost-Benefit Analysis of transit investments lays claim to a long and distinguished track record. In 1965, the government of the United Kingdom commissioned a major Cost-Benefit Analysis to ascertain the merits of building a new underground subway line (the Victoria Line).[2] A subsequent analysis was conducted for the Piccadilly Line extension to Heathrow Airport. Today, the Canadian federal government requires all funding applicants to apply the comprehensive Cost-Benefit Analysis framework.

The risks for local and regional planning inherent in not using a comprehensive approach are discussed next.

3.0 RISKS IN THE CURRENT APPROACH

Exclusive use of the New Starts process for project evaluation poses a number of risks, many of which rest at the local level.

Since the current FTA cost-effectiveness measure gives quantitative standing to some transit policy objectives (such as ridership and mass movement) and not others (such as congestion management, environmental sustainability, economic development and affordable mobility), there is a risk that localities, in order to obtain federal funds, will not shape projects to serve local policy objectives but rather to satisfy federal criteria. For example, if economic development and location efficiency represents the principal local goal for a transit project, a circuitous bus rapid transit (or streetcar or LRT) alignment

[2] C.D. Foster and M.E. Beesley, Estimating the Social Benefit of Constructing an Underground Railway in London, Journal of the Royal Statistical Society, vol. 126 (1965)

linking local suburban clusters might be the benefit-maximizing design. Yet planners seeking to maximize the likelihood of obtaining federal funds might select a more direct or arterial-oriented routing in order to maximize ridership, driving a wedge between project design and local public policy preferences and values.

Even where the design process itself is not distorted, exclusive use of the New Starts evaluation process creates a risk of failure to fully recognize certain value-creation benefits of transit. For example, restricting the analysis of a project's outcomes to its ridership and travel time savings potential means failure to quantify its potential economic development effects. In some cases, this could mean that effects of importance in the search for local public understanding and consensus regarding the project go unnoticed and are not considered in planning and project decision-making. Indeed, there is the risk that a project which succeeds in satisfying the needs of the FTA New Starts process, (based primarily on ridership and travel time savings), and stands a good chance of obtaining federal funds accordingly, would fail to obtain local consensus and approval because either the design has veered from local policy objectives, or the analysis has failed to identify outcomes of local importance. In addition, proposed projects founded primarily on local goals of land use and economic development, will face significant challenge in meeting the current FTA New Starts criteria.

Design distortions and measurement omissions create an additional risk, that of failure to recognize possible financing opportunities other than federal funding. For example, transit-generated economic development creates the potential for value capture taxation strategies and public-private partnerships. To the extent that ridership-focused alignments and project choices diminish economic development opportunities, such financing methods are diminished accordingly.

Even without design distortion, failure to recognize and measure economic development value itself creates the risk of "leaving money on the table" – that is, overlooking potential non-federal funding opportunities. There is anecdotal evidence of local transit agencies favoring one kind of project over another in order to maximize access to federal funds rather than maximize the achievement of economic value and local objectives which might be financeable in other ways. For example, a transit agency might favor capacity expansion projects (such as new stations) over improvements to existing stations (and the associated development potential) because new stations are ridership-focused and thus stand a greater opportunity of drawing federal funds. It is quite possible, however, that improving an existing station would (i) generate a stronger economic rate of return (based on the creation of economic development benefits) than would the new station; and (ii) create value-capture of public-private partnering based on financing opportunities.

The point to be drawn from the above is not that one kind of alignment or project is intrinsically better than another. Rather, it is that a ridership-bias in the current New Starts evaluation process inhibits the realization of projects that best serve local objectives; and inhibits the identification of alternative financing arrangements.

Another significant risk inherent in exclusive use of the New Starts evaluation process is that it provides no basis for comparing the economic rate of return of transit projects with highway alternatives, or indeed with non-transportation options for the use of limited capital resources (such as convention centers, stadiums and other infrastructure projects). As in business, "rate of return" in the public sector provides a common measurement yardstick with which to compare the merits of alternative uses of funds. Because the current cost-effectiveness measure and New Starts evaluation framework is meaningful in the transit context alone, it provides no information for decision makers about the comparative investment value of their choices.

A further risk inherent in the current cost-effectiveness methodology ranks among the most serious – that *of mistakenly rejecting good projects*. A recent analysis of a prospective streetcar investment in Cincinnati, for example, finds that whereas ridership-oriented benefits are insufficient to justify the project's capital and operating costs, economic development benefits would exceed such costs and more than justify the investment. Ignoring economic development benefits and focusing on ridership alone thus creates the risk of rejecting a worthwhile project. This is a risk for both local and federal governments. At the local level, worthwhile projects might be overlooked or mistakenly deemed unworthy. Or design modifications designed to increase ridership might diminish other values, such as economic development benefits, and diminish the overall value of the project in so doing. At the federal level, some analysts suggest that the risk of overlooking good projects helps explain the decline in the number of transit investment applications coming into the FTA New Starts pipeline.[3] Indeed, the Secretary of Transportation called recently for greater use of comprehensive Cost-Benefit Analysis throughout the nation, both federally and locally.[4]

4.0 THE ALTERNATIVE APPROACH: AN OVERVIEW OF THE COST-BENEFIT ANALYSIS FRAMEWORK FOR TRANSIT

FTA officials view ridership and related travel time savings as more readily amenable than other sources of transit value to accurate forecasting with traditional transportation planning methods. The agency thus focuses the New Starts evaluation procedure -- which rests exclusively on traditional transportation planning methods -- on forecasts of ridership and related travel time savings.. Cost-Benefit Analysis, on the other hand, recognizes all sources of transit value, including those that indeed are not amenable to forecasting with traditional transportation planning methods. Non-ridership sources of value can, however, be ascertained using conventional tools from other related disciplines, including micro-economics and probabilistic risk analysis. While the Cost-Benefit Analysis approach is an internally consistent and disciplined process, it employs

[3] See, Statement of Dr. David Lewis, Before the Committee on Transportation and Infrastructure, Sub-Committee on Highways and Transit, Implementation of New Starts and Small Starts Program, May 10, 2007. The testimony concludes that in not recognizing the full economic value of transit projects, the federal New Starts process creates a risk of underinvestment in transit and the marginalization of public transportation investment in American urban development.

[4] Statement of Mary E. Peters before the National Governors Association, Towards a New Surface Transportation Economic Model, February 25, 2008.

a mix of analysis and forecasting methods with which to ascertain the various effects, values and benefits of investment alternatives.

Additionally, the Cost-Benefit Analysis approach can be applied as both a "study" of investment value, and as a deliberative public process that helps bring communities to consensus on the nature of economically and socially appropriate transportation investments. Protocols, such as the Risk Analysis Process (RAP), have been developed through which the Cost-Benefit Analysis process is used to help promote public understanding, engagement and consensus. Facilitated public sessions enable stakeholders to participate in and inform the analysis. Those whose values we seek to quantify, the public, are the very "experts" engaged in the process of scrutinizing and helping shape the evidence. In short, RAP is an operational means by which Cost-Benefit Analysis is recast from a "study" into a procedural framework for reasoned local deliberation and decision by discussion.

Treatment of Costs in the Cost-Benefit Analysis Approach

As in private business, Cost-Benefit Analysis in the public sector examines project costs on a life-cycle basis. The economic costs of transit include one-time capital expenditures on land, vehicles, facilities and equipment; annual outlays for maintenance and repairs; and the opportunity cost of capital employed.

Treatment of Benefits in the Cost-Benefit Analysis Approach

Cost-Benefit Analysis recognizes three sources of transit value:

- Mobility;
- Congestion management; and,
- Economic development.

Although some believe that construction and operating employment should also be included as a benefit, doing so is only legitimate where projects would reduce structural unemployment or underemployment in the locality's urban labor markets. The reverse is actually possible wherein large-scale construction projects fuel inflation (by bidding up wage rates) during times of economic expansion. In short, construction and operating labor are *costs*, not benefits, unless unemployment in the area would be reduced by virtue of the project.

Mobility Benefits

Mobility benefits arise from:

- Time savings to transit users;
- Cash savings to low income households for reallocation to higher valued effects, such as nutrition, child care and shelter; and,

- Cross-sectoral reductions in the financial burden on social services such as employment support and home-based nutrition and medical services (such as home-based dialysis).

The FTA New Starts process recognizes the first item in the list above, though not the subsequent two.

People benefit from the time savings that attract them to make transit trips. Such time savings have economic value. Additional benefit is occasioned by low income groups. Although the use of transit by people from low income households is typically viewed as an equity benefit rather than an economic one, real resource gains do arise from transit's availability to the poor. Assessments of the demand for transit for low income travelers indicates that the cost of the "next cheapest" modal alternative creates much of their willingness to pay for bus or rail service. The alternative is often taxi, which tends to consume three to four times more of the household budget among poorer households as compared with higher income families.

Congestion Management Benefits

Congestion management benefits arise from:

- Reduced delay and resultant savings in time and vehicle operating costs for auto users and trucks;
- Improved reliability, predictability and productivity for auto users and trucks;
- Reduced environmental emissions and greenhouse gas emissions; and,
- Improved road safety and corresponding reductions in the loss of life, in injuries and in property damage.

Although the current cost-effectiveness measure does not recognize congestion management benefits, time savings and improvements in travel time reliability for autos and trucks resulting from transit investments carry economic value. The existence of economic value in relation to time savings is widely recognized by transportation economists (and treated as a legitimate benefit by the federal Office of Management and Budget in its guidelines on the conduct of Cost-Benefit Analysis[5]). Improved travel time *reliability* – the degree to which roadway users can count on predictable travel times, is known to convey even greater economic value than improvements in the "average" travel time performance. Shippers of freight, for example, rely on predictable deliveries in order to maintain low inventory costs and obtain value from their investments in just-in-time technologies and business processes. Trucking firms, which incur financial penalties for late deliveries, cushion against the risk of such penalties by leaving earlier than they would under reliable and predictable travel time conditions, thereby reducing their productivity. Workers lose productivity due to unreliable traffic conditions as well.

[5] Federal Office of Management and Budget, Circular A4

Many place cushions in the time they allow for travel to meetings in order to guard against the risk of being late, time that would otherwise be used for productive work. Householders too are disadvantaged by unreliable travel times. Some leave work earlier in order to ensure timely arrival at day-care centers. Economists also recognize the economic value of lost family time when people place cushions in the time they allow for the journey to work in order guard against late arrival.[6]

Not included in the FTA cost-effectiveness measure, environmental, greenhouse gas and safety benefits are known to carry real and quantifiable economic value. Here again the legitimacy of such quantitative estimates is validated by virtue of their recognition by the federal Office of Management and Budget.

Economic Development Benefits

The economic development value of neighborhoods and communities can be enhanced by certain kinds of transit facilities. Such value arises from several sources, including:

- Increased economic value of existing residential and commercial properties due to peoples' willingness to pay a premium for access to a wider range of destinations;
- Agglomeration economies (business efficiencies) due to higher density retail and commercial activities; and,
- Reduced requirements for auto-ownership and use due to higher density urban form.

For measurement purposes, economic development benefits can be identified through their influence on the value of land and property. Using sophisticated statistical techniques to separate different sources of land value, one study finds that station facilities yield in the region of $16.00/square foot more residential equity value for each foot closer the property is to the transit station. Findings in San Francisco indicate that the average home carries $15,000.00 more value for each 1,000 feet closer it is to a BART station. Similar findings have been reported in relation to the impact of commercial properties.[7]

Increased land values due to transit reflect two distinct effects, (i) the capitalization of transportation benefits (i.e., the reflection of better travel times in the value of land near stations); and, (ii) non-transportation related benefits of transit due to peoples' willingness to pay for improved neighborhood form, agglomeration economies, amenity and general livability. Studies find that transit-induced enhancements in land value can exceed the capitalized value of time savings. This indicates that transportation ridership is not the only source of transit's impact on economic development. That people and firms choose to locate in transit-oriented residential locations without the intention of

[6] HDR|HLB Decision Economics Inc., The Value of Travel Time Reliability in Highway User Cost Estimation, National Cooperative Highway Research Program, Report 431, September, 1999

[7] David Lewis and Fred Laurence Williams, Policy and Planning as Public Choice: Mass Transit in the United States, Ashgate, 1999

actually using the transit service is evidence of the non-transportation economic value of transit-oriented development.

In Cost-Benefit Analysis it is wrong to add that portion of increased economic development value arising from the capitalization of time savings to the value associated with mobility value. To do so would be to "double-count" the benefits of a project. It is important to note however that, whatever may be the division of increased economic development value between transportation (ridership) and non-ridership effects, it is always the entire increase in land value that is relevant to quantifying the taxation and other financial leveraging opportunities (such as public-private partnering) that might arise from the transit project's creation of development value.

5.0 EXAMPLES OF THE COST-BENEFIT ANALYSIS APPROACH IN APPLICATION

The Cost-Benefit Analysis framework outlined above has been applied in only a handful of urban areas in the United States, but enough to demonstrate its ready applicability and to indicate the value proposition for different kinds of transit investment.

The evidence from such studies indicates that:

1. Projects can generate significant benefits in all three categories of transit value creation, not just those categories relating directly to ridership *(see examples for Austin, Texas in Table 1)*;

2. Projects can generate substantially greater economic benefits than the life-cycle costs of construction, operations and maintenance – in other words, projects can be economically well worthwhile *(see examples for Austin and Cincinnati in Tables 1 and 2)*;

3. Not all major transit investments generate more benefits than costs (*see the example of the Orange Line in Austin, Texas -- Table 1*);

4. Bus investments can outperform rail alternatives in terms of rate of return, but rail investment can generate significantly greater absolute levels of economic benefit and net benefit *(see example for Cincinnati, Ohio in Table 2)*;

5. Transit investment can sharply outperform highway investment alternatives in terms of economic return *(see example for Cincinnati in Table 2)* and

6. Focusing on ridership-related benefits alone can lead to the mistaken conclusion that a project is not economically worthwhile.

Table 1: Cost-Benefit Analysis of Two Prospective Light Rail Lines in Austin, Texas (in present value of millions of year-2000 dollars, over 30 years)

Category of Benefits	Green Line	Orange Line
Total Benefits (Million U.S. dollars)	$1,369.9	$233.6
Congestion Management	$852.5	$106.5
Affordable Mobility	$224.0	$32.5
Community Economic Development	$293.5	$94.6
Total Cost (Million U.S. dollars)	**$1,035.4**	**$410.0**
Net Present Value (Million U.S. dollars)	**$334.5**	**($176.4)**

Source, HLB Decision Economics, *Light Rail Transit in the Austin Urbanized Area: A Cost-Benefit Analysis*, prepared for Austin Transit Authority, March, 2000.

Table 2: Cost-Benefit Analysis of Bus, Light Rail and Highway Capacity Investments in Cincinnati, Ohio (in present value of millions of year-2000 dollars, over 30 years)

	Bus Improvement, Region-wide	Light Rail Region-wide	New Highway Capacity
Total Cost	$522	$6,218	$1,209.1
Total Benefits	$1,141	$10,784	$1,365.2
Net Benefits	$619	$4,566	$156.1
Internal Rate of Return	27.1%	8.7%	4.9%

Source: HLB Decision Economics, *The Economic and Community Benefits of Transportation Options for Greater Cincinnati*, February, 2001, prepared for Ohio-Kentucky-Indiana Metropolitan Planning Organization.

Conclusion 6 above is evident in the Cost-Benefit Analysis of a prospective streetcar project in Cincinnati. As shown in Table 3, all benefits other than those associated with local economic development (namely mobility and congestion benefits, which sum to $52.7 million) are found to be insufficient to cover the estimated total life cycle costs of $115.8 million. Non-ridership related economic development benefits, on the other hand are estimated to total $378.9 million, more than enough to justify total costs. And even though the project is economically worthwhile, there is a risk that it would not rank

highly under the cost-per-rider index which reflects largely the mobility category of benefit.

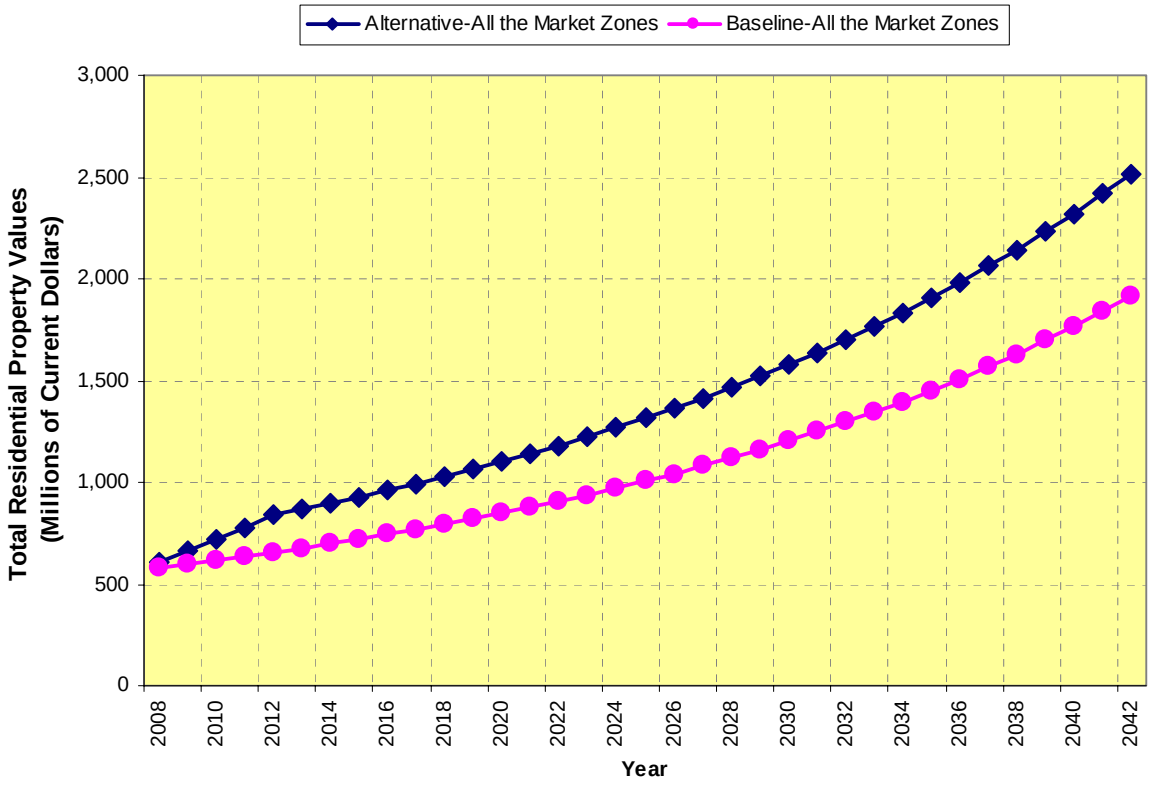
The Cincinnati streetcar study found that the proposed system could generate substantial economic development benefits for both the residential and commercial sectors in downtown Cincinnati. Figure 1 depicts the projected incremental growth in property values in the Base Case (without a Streetcar System) and Alternative (with a Streetcar System) over the period 2008-2042. The Alternative case accounts for growth in economic value resulting from the streetcar investment only and not from other additional or complementary policy initiatives.

Table 3: Cost-Benefit Analysis of Prospective Streetcar System, Cincinnati (in present value, millions of 2007 dollars over the period 2008-2042)

	Mean	90% Probability of Exceeding	10% Probability of Exceeding
Congestion Management Benefits			
Time and Vehicle Operating Cost Savings	$13.0	$10.4	$16.5
Emission Savings	$0.4	$0.1	$0.6
Accident Cost Savings	$3.0	$0.8	$5.8
Total Congestion Management Benefits	**$16.4**	**$12.3**	**$21.0**
Mobility Benefits			
Trip Cost Savings	**$35.2**	**$23.9**	**$47.4**
Cross Sector Benefits			
Welfare Cost Savings	$0.7	$0.5	$1.0
Home Care Cost Savings	$0.3	$0.2	$0.4
Total Cross Sector Benefits	**$1.1**	**$0.7**	**$1.4**
Economic Development Benefits			
Residential	$106.9	$70.8	$143.0
Commercial	$272.0	$148.5	$398.3
Total Economic Development Benefits	**$378.9**	**$249.5**	**$509.1**
Grand Total Benefits	**$431.6**	**$303.0**	**$565.7**
Project Costs			
Capital Expenditures	$75.7	$73.7	$77.7
Incremental O&M + Disruption Costs	$40.1	$39.7	$40.5
Total Costs	**$115.8**	**$113.8**	**$117.9**
Net Present Value	**$315.8**	**$186.8**	**$450.4**
Benefit-Cost Ratio	**2.7**	**1.6**	**3.9**

Source: HDR Corporation, 2007

Figure 1: Projected Total Property Values (2008-2042): Cincinnati Streetcar



Other Evidence

The evidence cited above indicates that light rail, bus and streetcar investments can generate strong net benefits and economic rates of return that exceed the opportunity cost of capital employed. While such a result is by no means guaranteed, the evidence thus bodes well for similar local projects.

A recent, unpublished[8] Cost-Benefit Analysis of Toronto's $2 billion "Spadina Extension" indicates a positive economic real rate of return of about 7 percent, well above the opportunity cost of capital. Projected net benefits (benefits minus costs) approached half a billion dollars.

Evidence is also available from major subway extensions abroad. Opened in 1986, the Hounslow branch of London's Piccadilly subway line was extended to Heathrow Airport in a loop to serve the (then) new Terminal 4. Prior to construction, Cost-Benefit Analysis lead to the conclusion that these investments would generate positive net economic benefits. Going back to the 1960s, a Cost-Benefit Analysis of London's then prospective Victoria Line by Professors Michael Beesley and Christopher Foster[9] found the

[8] HDR|HLB Decision Economics, 2007 (unpublished)
[9] C.D. Foster and M.E. Beesley, Estimating the Social Benefit of Constructing an Underground Railway in London, Journal of the Royal Statistical Society, vol. 126 (1965)

investment's economic benefits to exceed its total life-cycle costs. The Victoria Line was opened in 1968.

6.0 POSSIBLE IMPLICATIONS FOR TRANSPORTATION PLANNING IN THE WASHINGTON REGION

What implications can be drawn from the previous sections for transportation planning in the Washington region? Perhaps the most significant message is that proven methods are available with which to compare, quantitatively and comprehensively, the net economic benefits to the region of alternative policies for allocating scarce budgetary dollars among alternative portfolios of transportation investment, including transit, highway, and "non-structural" approaches (such as congestion pricing, parking policies and technology-based investments). The cost-benefit (value for money) approach is certainly not the only criterion of interest to policy makers, but it can help decision makers (and the general public) understand the alternatives in relation to their implications for the rate and shape of regional economic growth and development.

One application of the cost-benefit approach might be to employ it to support the work of the TPB Scenario Study Task Force. The Task Force is providing policy-level stewardship for the on-going Scenario Study and related TPB activities, including consideration of opportunities for integration of study findings into TPB planning processes and initiatives.

The comprehensive value assessment methodology discussed in this paper could be used to compare the economic rate of return on scenarios under consideration by the TPB Scenario Task Force, in terms of their costs and benefits. Benefits would be expressed in terms of mobility; congestion management (including delay, productivity, safety and environmental effects); and economic development (See Table 4 below). It is the costs and the relative size of the benefits in each category that would differ from scenario to scenario as would, therefore, the relative value for money (return on investment, or "bang for the buck") the region could expect to realize from each one.

By examining the costs, benefits and value for money of different scenarios, the comprehensive value assessment method could be used to help search for the mix of investments most likely to deliver maximum economic value for money to the region. As stated above, the comprehensive cost-benefit approach is certainly not the only criterion of interest to policy makers, but it could help place the alternatives in their broad economic context.

Table 4: Qualitative Assessment of Benefits Associated with Alternative Transportation Scenarios

TRANSPORTATION SCENARIO	QUALITATIVE ASSESSMENT		
	MOBILITY	**CONGESTION MANAGEMENT**	**ECONOMIC DEVELOPMENT**
SCENARIO A, B …..n	*Improvements in general mobility and low income mobility can be expected due to the increase in accessibility between communities. The degree of mobility improvement is scenario dependent*	*A degree of diversion from auto to transit can be expected to the extent that transit travel times are competitive; to the extent that that higher density development diminishes auto ownership; and to the extent of diversion due to pricing. Relative effects are scenario dependent*	*Scenarios that improve fixed transit facilities in communities and neighborhoods would diminish the risk of sprawl, generate local economic value, and create private financing potential. Relative effects are scenario dependent*