



FTA NEW STARTS ECONOMIC DEVELOPMENT CRITERIA

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I. Why Economic Development Criteria for New Starts

When Congress passed SAFTEA – LU in 2005, the legislation included, for the first time, a requirement that economic development criteria be incorporated into the process for evaluating proposed transit systems under consideration for FTA New Starts Funding. While policy makers, transit operators, and the development community have agreed for years that land use criteria must be considered in evaluating new transit systems, the idea that broader economic development objectives should also be considered is a new concept and there is no clear consensus on how to implement this mandate from SAFTEA - LU. Part of the problem is that many people do not see a clear distinction between land use and economic development criteria, nor is there a simple measure of economic development that can be attributed to transit beyond the cost effectiveness measures already in place. However, transit advocates and others concerned with transit efficiency recognize that economic development, including economic growth and sustainability at the regional level, is of great concern to the U.S. and should be a goal that is fostered by all major federal investments, including those in transit. Therefore, it makes sense to include some type of economic development screen in the New Starts evaluation process. The challenge is then to define these criteria in a manner that is relatively simple to apply, does not overlap with the land use criteria, and can fit easily within the existing New Starts evaluation process.

This paper provides some initial ideas on approaches to economic development criteria based on a definition of economic development typically used by planners at the local metropolitan and state levels focusing on job, industry, and occupational growth, and direct investment in buildings, infrastructure, and human capital rather than on a definition used by economists focused on costs, expenditures, revenue flows and measures of output and productivity.

The following discussion is divided into two main sections. Section II, which follows this introduction, lays out the arguments for linking transit to economic development. Section III proposes some specific approaches for including economic development criteria in the New Starts evaluation process.

II. MAKING THE CASE FOR LINKING TRANSIT AND ECONOMIC DEVELOPMENT

Understanding Local Economic Development

As the U. S. economy has shifted away from a manufacturing/production base towards more services and high technology, fewer and fewer people are working in the community where they live. In 1990, 53 percent of workers worked outside of their place of residence¹. In 2000, this number increased by nearly 8.5 million workers to 57 percent of all workers². For many workers, this economic “metropolitanization” means that commuting is a fact of life and that long commutes have become the norm; even though these commutes can be expensive, disruptive to family life, and sometimes lead to higher absenteeism or lower worker retention rates. For local government, this shift has weakened municipal tax bases by creating underutilized buildings or even entire districts, and has left some community residents stranded without local jobs or a way to get to the “new economy” jobs located in distant suburbs. Employers too are facing new challenges related workforce attraction and retention from this same economic transition.

This transition has forced governmental agencies and the private sector to rethink their relationship with respect to economic development. While a few communities have grabbed headlines with spectacular job attraction strategies, like providing huge incentives to car manufacturer to build new plants, or constructing baseball stadiums to revitalize old inner city neighborhoods, these kinds of activities account for a relatively small part of the job growth that fuels economic expansion in most regions, or even local communities. In fact 78 percent of gross quarterly private job growth is from expansion by existing firms rather than by openings of new businesses³. As a result, *the most effective economic development strategies typically include public/private partnerships focused on retaining and helping to grow local firms and strengthening business clusters that comprise larger industry groups*. These efforts are then combined with other activities aimed at building the regional work force as well as fostering institutions that support research and development. Attracting new businesses can also figure into the equation, but only as part of a larger strategy.

Economic Resiliency and Competitiveness

Old models of economic development concentrated on businesses being able to find the last expensive land, labor, and capital. However, in today’s economy, where even traditional “old economy” industries rely heavily on high technology, a skilled and highly flexible workforce, along with other kinds of civic and institutional infrastructure, are becoming critical keys to an economy with lasting resilience and the ability to maintain a competitive position within the increasingly global trading system. But, while it may appear that knowledge based industries only rely on higher trained workers, in fact, these businesses cannot survive without a range of supporting industries that often employ lower skilled workers, although not always at low wages. Nor can workers get along without the retail and service sectors necessary to support their households. Thus, economies are complex systems that require diversity as well as flexibility to be successful. And, since economies are being more regional and less local, *connecting all workers at all skill levels to their jobs is absolutely essential to any region’s economic success*.

¹ US Census Bureau, 1990, Strategic Economics.

² US Census Bureau, 2000, Strategic Economics.

³ Bureau of Labor Statistics Employment Dynamics, Strategic Economics. This figure does not include job losses and is calculated as the average quarterly percentage of job growth from 1996-2006



High Quality, Well-Positioned Transit Benefits Employers and Employees Alike

Studies on the impacts of transit to employers demonstrate that a reliable, high-quality system mitigates worker absenteeism and tardiness. *Employers in these studies reported gains in worker productivity as a result of their employees riding transit.* Transit systems with extended reach within the region can give employers a competitive advantage in the search for high-quality employees since employees within a larger catchment area can reach the office within a reasonable commute time.

Employees also benefit from reduced commute times riding transit and an increase in the productivity of their commute time since they are not forced to concentrate on navigating automobile traffic and can instead use the time for other discretionary activities.

Another important benefit of transit access to employees is the financial savings achieved when available transit allows them to forgo the automobile-related expenses of a long distance commute. The CTOD's Affordability Index has expanded upon this financial savings to demonstrate that automobile savings achieved by transit can help employees afford more expensive housing by offsetting commute costs.

And, to the extent that commuter ridership provides a stable base of riders for any transit system, it seems clear that transit system operators stand to gain considerable financial benefits from emphasizing lines that get workers to their jobs. These commuters increase the level of fare box recovery, create operating efficiencies within the transit system; and, good TOD can lower the cost of riders accessing stations by decreasing the need for parking or feeder bus service.

Economic Connectivity and Continued Investment in Local Places

Much of the post war economic expansion in the U. S. took place in "greenfield" locations where new factories were being built in conjunction with new residential neighborhoods that could house the necessary work force. After 50 years, many of these factories have closed down, but the residential neighborhoods remain. Without the strong partnership between these jobs and the housing, many communities have begun to experience significant amounts of economic disinvestment and other forms of social decline. However, research shows that those *communities who have had the greatest success at stemming this downward spiral have done so, in part, by giving their residents better access to the broader metropolitan economy.* A second important strategy has been for these communities to reinvigorate themselves physically, adding new housing types, new retail stores, and better place making amenities, like parks, trails, or community facilities.

Connecting Transit Planning to Economic Development Has Benefits at Multiple Scales

Development and investment patterns throughout history demonstrate that transportation is a critical factor in determining where investment is made and where jobs are created. *The consideration of new transit lines offers local and regional jurisdictions the unusual opportunity to consider the most appropriate means of connecting the workforce to jobs.* Furthermore, it allows planners to consider transit's role in the jobs-housing balance of the entire region. Transit can effectively connect residential parts of the region with major job centers and mitigate disparities at a local level through access to regional transit systems. Additionally, the prevalence of transit within the region allows workers greater access to jobs within the entirety of the region. On the flip side, it also offers employers enhanced access to the best employees within the entire region.



The regional nature of transit affords economic development practitioners a significant (and rare) tool because it gives them the opportunity to plan for local economic development and growth on a regional level. This opportunity is especially valuable in the twenty-first century as economies are becoming more metropolitan and regional in nature. For example, it is nearly impossible to consider the fate of the corner grocery without also contemplating chain superstores on the urban fringe. Despite this prevalent change in the economic structure of cities, governments, by-and-large, remain local. For this reason, transit is a logical method of connecting local and regional interests within a broader system.

Fixed Guideway Transit Serves a Very Diverse Range of Riders by Wage and Occupation

A preliminary analysis of transit ridership by industry and occupation in Portland, Oregon indicates that fixed guideway transit connects to more diverse employment opportunities than local bus. An Entropy Index was used to measure the diversity of incomes for occupations in industries with the highest percentage of transit ridership in the region. Entropy index scores are stated as a decimal and the lower the number, the more concentrated the occupational and income mix within that industry. As Table 1 shows, industries with high percentages of bus ridership also tend to have low Entropy Index scores for an overall average of 0.54. For the most part, these were industries with a high percentage of low wage jobs. However, industries where workers use fixed guideway transit and/or bus and fixed guideway transit to get to work had a much greater diversity income diversity with an average index score of 0.89. ***This analysis demonstrates that fixed-guideway transit provides connectivity to jobs with different income opportunities, and possibly greater opportunities for advancement***, while bus provides the best connectivity for workers in predominantly low-income industries with little opportunity for advancement.

**Table 1: Income Diversity of Industries with Highest Ridership, by Transit Mode
Portland, OR**

	Income Diversity Index
Top Jobs in Bus Only	0.54
Top Jobs in Fixed-Guideway Only	0.88
Top Jobs in both Bus and Fixed-Guideway	0.90

**As the Income Diversity approaches 1, the industry offers jobs with a broader mix of incomes. As it approaches 0, incomes are less mixed and more concentrated at a given income level.*



III. AN APPROACH TO ECONOMIC DEVELOPMENT CRITERIA FOR THE NEW STARTS PROCESS

The following four steps lay out a proposed process for applying economic development criteria within the framework of the New Starts process. Because this approach makes assumptions about the importance of connecting either existing or planned employment centers, it must be completed at the very initial stages of the transit corridor planning when various alternatives are under consideration.

STEP 1: PLACING TRANSIT PLANNING IN A REGIONAL CONTEXT

Given that one of the most important functions fixed guideway transit can perform is to connect the greatest number of workers with the widest range of job opportunities, it seems critical that all transit investment decisions be considered within the context of regional employment centers and the ways in which any given corridor or transit line may contribute to better connectivity not only between workers' jobs and their homes, but also between multiple job centers. However, in looking at this regional picture, it is also important to consider that not all jobs are equally "transit friendly." An important finding of recent research efforts is that some industries are more likely to have employees that ride transit to work than others. People who ride fixed-guideway transit are likely to work in Professional, Insurance, Executive, Telecommunications, Banking, and Information Services, as well as in certain Clothing and Retail sectors. See Appendix A for a more complete list. These findings suggest that when evaluating proposed transit corridors, it is not enough just to analyze job centers or the total number of employees. *The sectoral mix of the job center and whether it contains the type of sectors that have a demonstrated transit ridership should also be considered before a new transit line is proposed.*

Figure 2 below shows the largest employment concentrations or "centers" in the Twin Cities region. Although these centers do not include every job in the region, they comprise the most significant destinations to which the greatest number of commuters travel each day. Given that transit riders tend to cluster in industries that are more like to locate in office buildings, the most important employment centers on this map, from a transit perspective, are those with office, or other types of relatively dense employment. This excludes warehouse and manufacturing locations.

Just by mapping regional employment, which is a relatively simple exercise using data from the Census' Transportation Planning Package, a new framework emerges for considering where transit lines should be located. The standard cost effectiveness measure favors transit corridors that run along existing rail lines, or within highway rights-of-way. This approach typically results in creating a "hub and spoke" transit system which is, at least in part, a vestige of the 19th century railroad patterns when virtually all employment in a region was located in one area in and around the central city "downtown." But with creation of the highway system, first housing and then jobs, moved to many suburban, and even exurban locations, creating the multi-centered employment pattern we see in regions today. By mapping these centers, and looking for ways in which transit can provide an alternative, and to some extent redundant alternative to the highway system, corridor alignments may emerge that would not have been considered based on the standard cost effectiveness measures, but that may in the long run, generate much more ridership than corridors that might otherwise score well based solely on cost effectiveness.

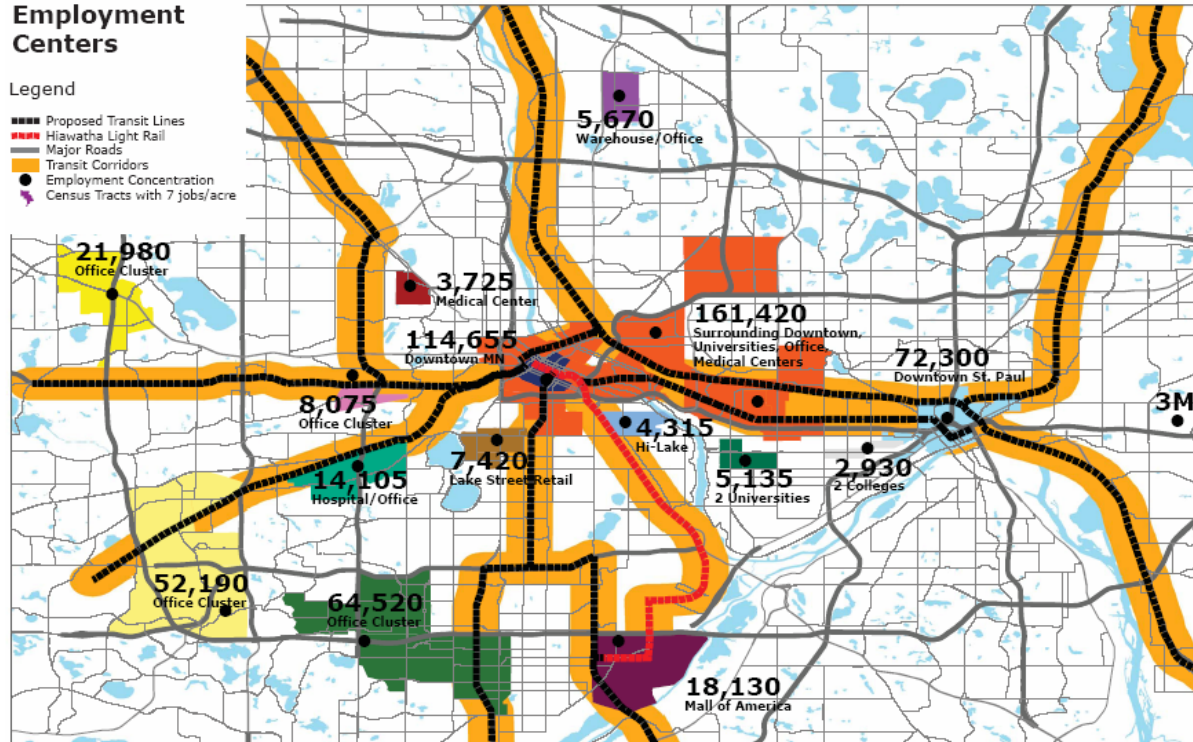
Figure 2: Employment Centers in the Twin Cities Region



Employment Centers

Legend

- Proposed Transit Lines
- Hiawatha Light Rail
- Major Roads
- Transit Corridors
- Employment Concentration
- Census Tracts with 7 jobs/acre



STEP 2: DEFINING THE CORRIDOR TYPE

Regional transit systems are made up of numerous corridors; indeed, transit systems are built corridor-by-corridor, gradually completing a long-range regional network. To date, however, very little research has been done to distinguish the different purposes of individual transit corridors and the role they play in linking regional destinations, providing circulation and stimulating transit oriented development. But from a “user perspective”, transit corridors function very differently depending on the types of activities that are located at various stops along the line. For example, as people begin to use transit more frequently they take trips along the corridor for regular everyday activities such as going shopping, going to a library or to a park and they connect to a region as a whole from their home or place of work. Or, a transit line that only provides service in the morning and evening peak hours can only provide utility to the commuter, not those seeking a full range of transportation options. Recent work completed by the CTOD has identified four different corridor types, each of which can play a critical role within a regional transit network. The four types are as described below in Table 3.



Corridor Type	Function	Frequency	Technology
Urban Commuter Corridor	Serve workers traveling from neighborhoods within the urbanized areas of a region to downtown jobs	Frequent Service at Commute hours only	Diesel commuter cars, electrified commuter cars and/or express bus
District Circulator	Provides additional mobility from business districts to areas that might be just beyond a reasonable walking distance or to stimulate revitalization of underutilized areas near downtowns	High frequency	Streetcar
Planned Growth Corridor	Promotes economic development and provides congestion mitigation where alignment typically runs through areas with substantial amounts of outdated industrial or commercial uses on either side of the line that can be redeveloped with more intensive uses	Depends on technology	Diesel commuter cars, electrified commuter cars, LRT
Destination Connection Corridor	Creates connectivity among a mix of job centers and other high-ridership destinations including universities, medical centers, major cultural/entertainment venues, etc	High frequency	Light and heavy rail, as well as BRT

Each of the four corridor types has different land use characteristics and therefore, in a traditional ridership modeling process, different projected ridership levels. However, many recently opened systems that are Destination Connection Corridors, where major job centers are connected with a single transit line, actual ridership levels have far exceed projections, as shown in Table 4. In some of these communities, ridership is far exceeding projections, for example: actual ridership exceeded projected ridership by 200 percent for the Portland Streetcar and over 71 percent in San Diego. Additionally, the ability to meet and exceed ridership projections far ahead of the estimated time is stunning. The Hiawatha LRT line in Minneapolis exceeded its 2020 projection by 25 percent only two years after opening, and Salt Lake Trax exceeded ridership projections by 59 percent in a similar timeframe. A more detailed discussion of each corridor and the nature of the destinations being connected is included in Appendix B.



TABLE 3: ACCELERATED RIDERSHIP COUNTS ON SELECTED TRANSIT LINES

System	Estimate	Estimated Year	Most Recent	Date
Minneapolis Hiawatha	24,800	2020	31,000	Aug-06
Houston Metrorail	40,000	2020	40,000	Sep-06
Salt Lake City Trax	34,600	2020	55,000	Oct-06
Portland Streetcar	3,000	2001	8,800	Oct-06
San Diego Green Line	10,800	2015	18,455	Dec-05
St. Louis St. Clair Ext	13,502	2010	14,083	Nov-03
Tacoma Link	2,000	2010	2,880	Q1 2006
Portland Westside Max	27,100	2005	32,700	Oct-05

Estimates based on FTA New Starts and transit agency data
Source: CTOD, November, 2006

Assessing the corridor type allows transit planners to have a better understanding of how the proposed corridor will perform in terms of making critical regional connections between workers and their jobs. However, no matter the type of corridor under consideration, it is critical to determine whether the proposed alignment will serve the appropriate type of jobs and/or households that are likely to ride transit. Although the selected transit lines profiled in Table 4 above are all Destination Connection Corridors, other corridors, such as the Rosslyn-Ballston line in northern Virginia, which started a Planned Growth Corridor, but has evolved into a Destination Corridor due, part to good planning, have also had tremendous ridership success, again because the planning that took place for the line focused on appropriate building types for both jobs and housing that were responsive to market demand, but also captured those specific niches within the market that also tend to be transit oriented. In the case of proposed Commuter Corridors, it is important to consider who lives along that corridor and how they relate to the regional labor force. This could include assessing how many total workers live, or could live along the line relative to the regional labor pool so that corridors with a greater concentration of workers or households (or potential workers) would receive a higher ranking than a corridor with fewer workers. Additional factors that should be considered also include the potential to link households that currently have only limited access to the regional economy as well as the potential match between the industries in the occupational mix of current (or potential) workers who live along the line.

By taking into account the corridor type and how the proposed line will connect workers to jobs, the New Starts evaluation process will also begin to move away from a ranking system that has an implicit bias toward lines that serve residential areas, or planned residential growth and does not necessarily deliver a balanced transportation network as a regional transit system gets built out over time. Clearly, transit riders must start their trip somewhere, generally at the place where they live, but without understanding the more holistic picture of how these origins link to appropriate destinations, there is a much greater likelihood that transit lines will be funded that can never perform well enough to justify their construction cost.



STEP 3: SELECTING THE ALIGNMENT

As it exists today, the process for deciding where any given transit line will actually be located is based on a series of steps that goes from evaluating general “corridors” which are relatively wide swaths of area, down to picking the specific alignment where the transit vehicles will actually operate. Because cost effectiveness plays such a big role in evaluating both the corridors and the alignments, there is a tendency to end up running the new lines in existing rail corridors, or putting the lines in freeway medians. While from a modeling perspective, this may seem like the most efficient way to evaluate line alternatives, it may, in reality, steer decisions about selecting both corridors and alignments away from areas that would present a significant opportunity to better connect regional job centers and to provide great regional accessibility for all segments of the labor force.

The Twin Cities region provides a good example of how both corridor decisions and specific alignment choices might be different if economic development criteria were given more weight in the New Starts process. As Figure 2 shows, the proposed Southeast Corridor connects several regional job centers to Downtown Minneapolis. However, the current alignment is in an existing rail corridor. As a result any future transit vehicles would serve the edges of these employment centers, not the core areas, nor the areas with the greatest potential for future intensification. Areas with the greatest potential for intensification are sites that are currently “underutilized” based on the assessed value of the land relative to the improvements on the same parcel (see Figure 3).

If economic development criteria were used to evaluate proposed transit corridors including measures such as how many job centers would be connected by the proposed line; how many jobs by sector and occupational mix are in these centers; and how many workers lived along the corridor, the Southeast corridor would probably still receive a high ranking, but the actual alignment might have been located to the south where it could better serve the core of the employment centers it connects.

Further, in looking at the location of every employment center in the Minneapolis-St. Paul region, and how they are connected with current and proposed transit lines, it appears that a line connecting the existing Hiawatha LRT line with the proposed Southeast line—even along its current alignment—might provide much better regional connectivity and foster greater levels of transit ridership than would be achieved with the current proposed transit line extensions, especially those to the east and northwest which appear to serve relatively low density residential corridors (See Figure 2).



Figure 2: Proposed Southeast Corridor

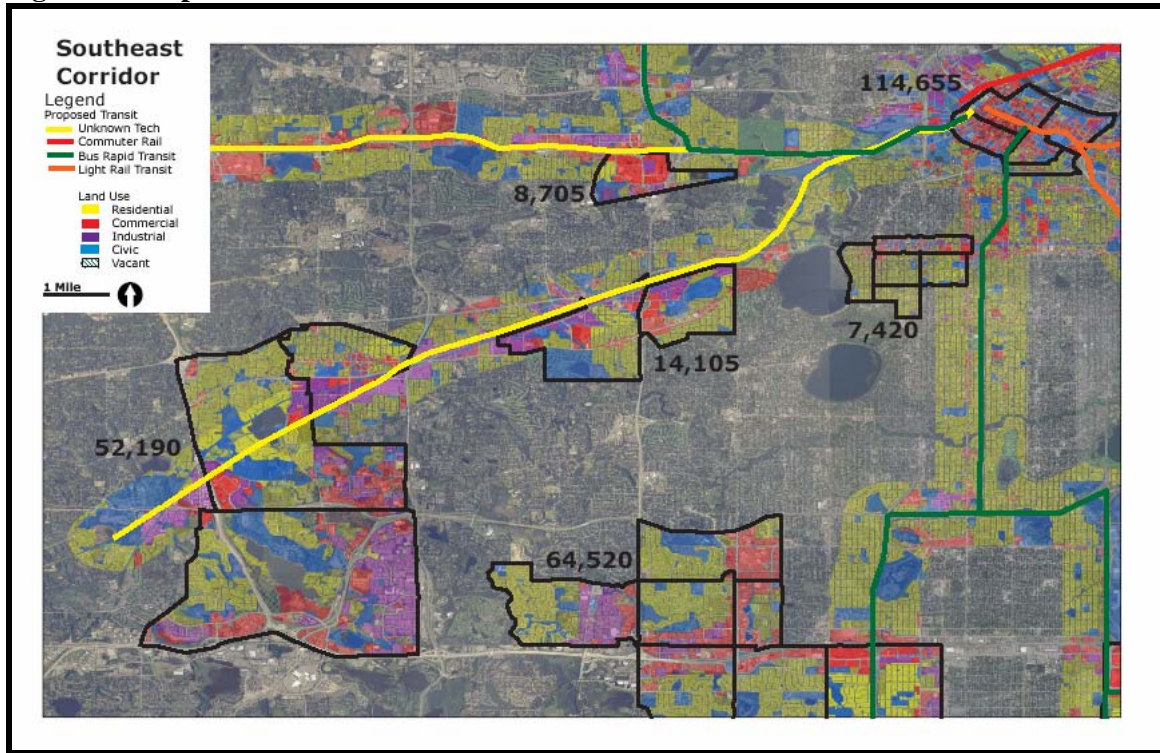
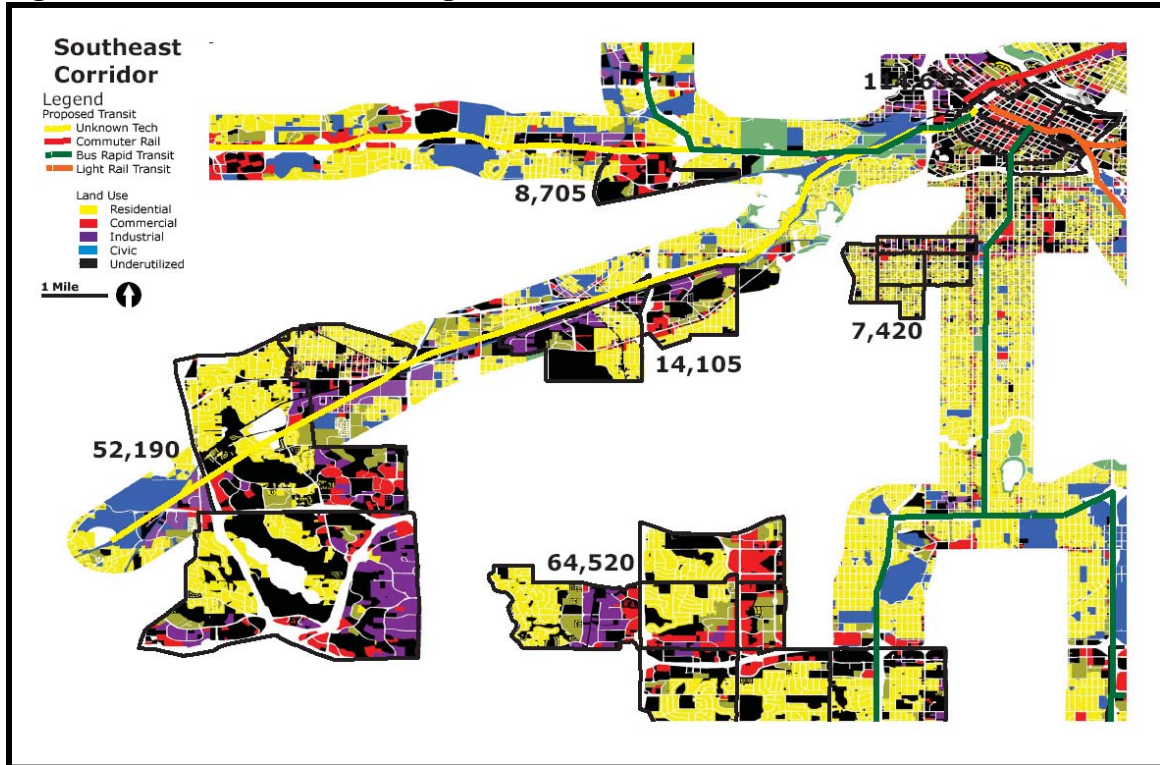


Figure 3: Underutilized Sites Along the Southeast Corridor



STEP 4: MAKING THE CASE — PULLING TOGETHER THE DATA

The fourth and final step in incorporating economic development criteria into the New Starts evaluation process will be to write a narrative and provide supporting data and maps showing how the corridor under consideration will contribute to better connectivity among regional employment centers and the regional labor pool. Although the specific details to be include in this narrative need to be better defined, topics to be covered should include:

- Identification of the corridor “type” and an explanation of how the corridor would serve greater regional connectivity between jobs and the labor force.
- The number of jobs in existing job centers by sector and occupational mix that would be connected and what percentage of total regional jobs these jobs represent.
- The number of potential jobs that could be added to the corridor through future development with a market rationale showing that that the corridor is an appropriate and desirable location for these jobs with or without transit.
- The number of workers who would gain greater access to employment with an analysis of the sector of employment, occupation, and level of educational attainment of these resident workers with a comparison to the regional averages.
- A discussion of how this line would contribute to greater regional mobility for low-income workers.
- A discussion of how future residential growth along the corridor will accommodate a wide range of incomes so as to foster greater diversity among the work force that will also be gaining greater regional connectivity.



IV. FITTING THE ECONOMIC DEVELOPMENT CRITERIA INTO THE NEW STARTS PROCESS

This paper makes the case for including economic development criteria within the FTA New Starts process that are based on considerations of the spatial location of employment centers within a region, and on the assertion that transit plays a key role in regional economic vitality by ensuring that jobs and housing are easily accessible to each other through a rational multimodal transportation system. The analytic framework outlined above necessitates that these particular economic development criteria be applied at the very early stages of the transit planning process that regional transportation planners must establish a solid basis for planning their transit network based on a holistic understanding of a region's economic structure, not just its population base or rapidly growing population centers. However, these are not necessarily the only economic development criteria that could or should be applied in the New Starts process. Other measures of economic efficiency and overall cost benefit will also play an important role in determining how to weigh the various alternative choices for transit funding within the context of supporting long term regional economic competitiveness and sustainability for every region seeking support from the Federal Transit Administration.



APPENDIX A:
SECTORS WITH HIGH TRANSIT RIDERSHIP



APPENDIX A – SECTORS WITH HIGH TRANSIT RIDERSHIP

Several major assumptions are employed in Table 1 to determine the income diversity of transit riders. The first is to measure who rides transit by industry. To do this, the following methods were followed:

By using 2000 Census Public Use Microdata (PUMS), the number of employed residents commuting to work on fixed-guideway transit was broken down by the industry in which the residents worked. Two measures were used to rank the extent to which the resulting industry categories were located near transit, and would thus have a future potential demand for transit-oriented space:

1. The share of employees in a given industry who commuted to work on fixed guideway transit, and;
2. The total share of fixed-guideway commuters in each given industry.

Each industry was ranked from highest to lowest for both factors. The industries were then grouped based on the quartiles for the two factors above, as shown in **Table A-1**.

Table A-1: Industry Ranking Based on Transit Ridership Factors, CTOD Employment Demand Methodology

<i>Demand:</i>	<i>Very Strong</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Moderate</i>	<i>Low</i>	<i>None</i>
Factor 1 or Factor 2	Top quartile	Top quartile	Top quartile	Second Quartile	Second Quartile	Below Second Quartile
Factor 2 or Factor 1	Top quartile	Second quartile	Below second quartile	Second Quartile	Below Second Quartile	Below Second Quartile

After several bridges from one industry category to another, these are the industries with a very strong tendency to locate near transit, as shown in **Tables A-2 and A-3**.

Table A-2: Top Industries by Employee Fixed-Guideway Ridership, Portland-Salem MSA



NAICS ⁴	Total Employees Using Fixed Guideway Transit	Total Employees Recorded in Industry	Share Fixed-Guideway Employees per Industry	Share of All Fixed-Guideway Employees	Indexed to Region	Description of Industry
519	185	3,889	4.8%	2.2%	6.7	Other Information Services
221	348	8,810	4.0%	4.2%	5.6	Utilities
448	183	8,421	2.2%	2.2%	3.1	Clothing and Clothing Accessories Stores
524	468	23,431	2.0%	5.6%	2.8	Insurance Carriers and Related Activities
541	1,375	71,569	1.9%	16.5%	2.7	Professional, Scientific, and Technical Services
921	255	13,788	1.8%	3.1%	2.6	Executive, Legislative, and Other General Government Support
517	239	13,419	1.8%	2.9%	2.5	Telecommunications
522	131	9,238	1.4%	1.6%	2.0	Credit Intermediation and Related Activities
521	209	15,027	1.4%	2.5%	2.0	Monetary Authorities - Central Bank
922	238	18,147	1.3%	2.9%	1.9	Justice, Public Order, and Safety Activities
453	132	12,946	1.0%	1.6%	1.4	Miscellaneous Store Retailers

Source: 2000 Census Public Use Microdata (PUMS), *Strategic Economics*

Table A-3: Top Industries by Employee Bus Ridership, Portland-Salem MSA

NAICS	Total Employees Using Bus Transit	Total Employees Recorded in Industry	Share Bus Employees per Industry	Share of All Bus Employees	Indexed to Region	Description of Industry
721	1,510	10,899	13.9%	3.1%	3.3	Accommodation
451	615	5,151	11.9%	1.3%	2.9	Sporting Goods, Hobby, Book, and Music Stores
921	1,266	13,788	9.2%	2.6%	2.2	Executive, Legislative, and Other General Government Support
521	1,241	15,027	8.3%	2.5%	2.0	Monetary Authorities - Central Bank
722	5,072	67,151	7.6%	10.4%	1.8	Food Services and Drinking Places
517	926	13,419	6.9%	1.9%	1.7	Telecommunications
453	885	12,946	6.8%	1.8%	1.7	Miscellaneous Store Retailers
541	4,679	71,569	6.5%	9.6%	1.6	Professional, Scientific, and Technical Services
524	1,527	23,431	6.5%	3.1%	1.6	Insurance Carriers and Related Activities
452	1,468	23,147	6.3%	3.0%	1.5	General Merchandise Stores
561	2,622	47,780	5.5%	5.4%	1.3	Administrative and Support Services
624	1,450	27,630	5.2%	3.0%	1.3	Social Assistance
813	969	19,166	5.1%	2.0%	1.2	Religious, Grantmaking, Civic, Professional, and Similar Organizations

Source: 2000 Census Public Use Microdata (PUMS), *Strategic Economics*

After calculating the top industries for Bus and Fixed-Guideway Ridership in the Portland-Salem MSA, the 1999 Average Wage/Income data PUMS data was collected for all the jobs within those industries (see Tables A-2 and A-3). These jobs were then categorized into the five following income categories.

⁴ NAICS stands for the North American Industry Classification System, which designates code numbers for industries, business groups and subsectors in Canada, Mexico and the United States. The codes aid in the classification of industry types and allow experts and policymakers to measure economic activity in a standardized manner.



We chose the income categories because they represent, roughly, quintiles of national household income — i.e., each category contains nearly 20 % of U.S. households.

Income Range
<\$20,000
\$20,000 - \$34,999
\$35,000 - \$49,999
\$50,000 - \$74,999
\$75,000+

After categorizing the jobs into each income category, an Income Diversity (Entropy Index) score was calculated for each industry and for each commute mode (bus & fixed-guideway) in order to determine the diversity of incomes within each industry and commute mode. The Income Diversity scores range from 0 to 1, where a value of 0 is homogeneous and a value of 1 is completely heterogeneous.⁵ Complete heterogeneity means that all categories measured are equally represented; for example, an industry that has 20% of jobs in the <\$20,000 category, 20% of jobs earning between \$20,000 and \$34,999, 20% of jobs earning between \$35,000 and \$49,999, 20% of jobs earning between \$50,000 and \$74,999, and 20% of jobs earning \$75,000 and above would have an Income Diversity score of 1.

The Income Diversity scores each of the top quintile industries are shown in Table A-4.

Table A-4: Income Diversity for Top Transit Industries

NAICS code	Industry Type	Entropy Index by SOC	Commute Mode
722	Food Services and Drinking Places	0.31	Bus
451	Sporting Goods, Hobby, Book, and Music Stores	0.46	
721	Accommodation	0.47	
452	General Merchandise Stores	0.49	
624	Social Assistance	0.59	
813	Religious, Grantmaking, Civic, Professional, and Similar Organizations	0.76	
561	Administrative and Support Services	0.62	
448	Clothing and Clothing Accessories Stores	0.57	Fixed Guideway
221	Utilities	0.86	
519	Other Information Services	0.86	
922	Justice, public order, and safety activities	0.87	

⁵ As often used, the Entropy Index ranges from a value of 0 to $\ln(n)$ where n is the number of categories studied. We normalized our index to allow a range of 0 to 1 for clarity. The equation we have used is the following: Entropy Index = $-1 \sum (p_i \cdot \ln(p_i)) / \ln(n)$ Where p_i is the percentage of population in each category and n is the number of categories.



522	Credit Intermediation and Related Activities	0.88	Bus & Fixed Guideway
453	Miscellaneous Store Retailers	0.53	
524	Insurance Carriers and Related Activities	0.82	
521	Monetary Authorities - Central Bank	0.84	
517	Telecommunications	0.84	
921	Executive, Legislative, and Other General Government Support	0.87	
541	Professional, Scientific, and Technical Services	0.9	



APPENDIX B:
HIGH RIDERSHIP CORRRIDORS



APPENDIX B - HIGH RIDERSHIP CORRIDORS DISCUSSION

Minneapolis

The Hiawatha Line has been a resounding success; so much so that recently city representatives have been second guessing their decisions to go with bus rapid transit on other corridors. The line has several attractors, which might have been overlooked when preparing ridership estimates. One of which is the number of transit-oriented job centers located along the line including; the Mall of America, the VA Hospital, The Airport and a university campus. Another factor might be that in the harsher northern climate, the rail lines can be much more dependable than highway traffic allowing people to plan their commutes to downtown much easier than before.

Houston Metrorail

The new Houston rail line is a powerful example of how connecting up job-based activity centers can lead to increased ridership. Located along the line are large medical complexes, the Downtown office core, two major university campuses (Rice and University of Houston), a large museum and theater district, and several sports stadiums. Anecdotal evidence states that people will park anywhere along the line and ride it into their destination, as opposed to parking at their destination which might be congested and under parked.

Salt Lake City Trax

Hailed as the savior of the 2002 Winter Olympics, the Salt Lake City Trax line actually serves the University of Utah and the Downtown, allowing riders to avoid the traffic and get to their destinations on time. In an area hemmed in by mountains, the north south parallel to the I-15 freeway carries 20,000 more people a day than projected by 2020.

Portland Streetcar

This is not a commuter line but rather a pedestrian accelerator and local circulator. As more and more people find the line convenient to go to the store and shopping, it will continue to act as a circulator. The line connects a major hospital, a newly created urban residential district, Portland State University, the Downtown and when the South Waterfront Gondola is complete, Oregon Health Sciences University. Ultimately this line is a way to connect destinations a little too far from light rail together within a real comfortable ride and walk distance.

San Diego Green Line

This line creates a loop that hooks up San Diego State University with the Downtown. The new green line connection makes it easier to get to school or downtown from both directions showing us that connecting major destinations from multiple access points has huge ridership benefits.

St. Louis St. Claire Extension

The extension of the St. Louis Metro Rail allowed commuters to get off the I-65 freeway that runs into St. Louis and connect to a number of new destinations including Belleville, Memorial Hospital and destinations on the existing line including the stadium where the Cardinals play. Light rail in St. Louis has also revitalized overall transit ridership reversing a downward trend that ended in 1993 and shot up after completion of the first line in 2004. The extension is just another link in the chain of success.

Tacoma Link

The Tacoma Link is the city's downtown streetcar. It links up to the commuter rail line that links to Seattle and offers connections to major downtown destinations. The line has been so successful that the city is looking into expanding the line into other sections of the city.

Portland Westside Max



The Westside Max was built as a connection between Hillsborough, Beaverton and Downtown Portland, the region's high tech job corridor. It also created an east-west transit linkage for the region.

