Midwest Regional Rail Initiative
Benefit Cost & Economic Analysis

PREPARED FOR

Illinois Department of Transportation
Indiana Department of Transportation
Iowa Department of Transportation
Michigan Department of Transportation
Minnesota Department of Transportation
Missouri Department of Transportation
Nebraska Department of Roads
Ohio Rail Development Commission
Wisconsin Department of Transportation
Amtrak

MWRRI

PREPARED BY

Transportation Economics & Management Systems, Inc.

IN ASSOCIATION WITH
HNTB

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1 Introduction

The MWRRS will provide a wide range of benefits that contribute to economic growth and strengthen the region's manufacturing, service, and tourism industries. It will improve mobility and connectivity between regional centers and smaller urban areas, and create a new passenger travel alternative. The train stations will incorporate multimodal systems, connecting bus and rail networks to the MWRRS and make public transportation services accessible to approximately 80 percent of the region's 65 million residents.

The expected economic benefits to be derived from the MWRRS were updated using the TEMS *RENTS*™ Model and the Department of Commerce, BEA, RIMS II Model. As a result, the analysis includes three distinct assessments -

- A consumer surplus analysis of user benefits as required by the FRA to obtain Federal financing of intercity rail projects.
- An Economic Rent analysis to measure how user benefits are translated into supply side benefits such as increased employment and income.
- An Input-Output analysis to identify the transfer payment benefits of a major investment like the MWRRI (cost $7.7 billion in 2002 dollars) on the economy in terms of temporary construction and permanent operating jobs.

1.1 Consumer Surplus

This analysis uses the same criteria and structure as the 1997 Federal Railroad Administration/U.S. Department of Transportation (FRA/USDOT) study, High-Speed Ground Transportation for America[1]. In that study, costs and benefits were quantified in terms of passenger rail system user benefits, other-mode user benefits, and resources benefits. As a result, this analysis is merely an update of the earlier analysis carried out in the "2000 Plan" Phase of the MWRRI work program.

1.2 Economic Rent

The supply side benefit of the MWRRS is measured by the increased productivity of the Midwest economy. Increased productivity comes from the improved connectivity and regional mobility provided by the MWRRS and correlates to the level of consumer surplus identified in the FRA Cost/Benefit analysis. The improved accessibility benefits measured by consumer surplus can also be expressed in terms of direct economic benefits to communities; it shows in what manner the improved accessibility provided by the MWRRS will eventually be realized in terms of supply side benefits to communities. The RENTS™ Model measures these supply side benefits and demonstrates how each dollar of consumer surplus user benefits translates into increased jobs, incomes and property values. Note that the Economic Rent analysis simply shows how the MWRRS user benefits will be expressed on the supply side of the economy. Accordingly the Economic Rent results are not additive to the consumer surplus benefit, but are simply another way of expressing the same consumer surplus benefit that was identified in the FRA Cost/Benefit analysis

[1] The report is available online on www.fra.dot.gov/Downloads/RRDev/cfs0997all.pdf

1.3 Input/Output

The construction impacts of the MWRRS will constitute a significant investment in the Midwest by the Federal government, if the currently anticipated 80/20 funding split is maintained through the construction phase of the project. This Federal investment would comprise a major transfer payment to the Midwest that would significantly increase total spending within the Midwest economy. While the spending of federal dollars cannot be expressed as a benefit to the U.S. economy, the investment might well have been made elsewhere rather than in the Midwest. However, it is clear that such an investment choice on the part of the Federal government will have a significant economic impact on the local Midwest economy. To estimate the economic impact of the additional federal construction spending in the Midwest, an analysis was performed using the Bureau of Commerce, BEA, RIMS II economic model.

2 User Benefits

The expected user benefits will be derived from several sources. These include the following:

- MWRRS User Benefits: The reduction in travel times that users of the MWRRS receive
- Benefits to Users of Other Modes: The reduction in travel times and costs that users of other modes receive as a result of lower congestion levels
- Resource Benefits: Savings in other mode costs and reductions (savings) in emissions as a result of travelers being diverted from air, bus and auto to the MWRRS

2.1 MWRRS User Benefits

The analysis of user benefits for the MWRRS is based on a measurement of the improvements in generalized cost of travel, which includes both time and money provided by the MWRRS. Time is converted into equivalent monetary values by the use of Values of Time. The Values of Time (VOT) used in this study were derived from stated preference surveys conducted in this and previous study phases, and used in the *COMPASS*™ Multimodal Demand Model for development of the ridership and revenue forecasts. These VOTs are consistent with previous academic and empirical research and with other transportation studies conducted by TEMS.

Benefits to users of the MWRRS are measured as the sum of system revenues and consumer surplus, which is the additional benefit, or *surplus* individuals receive when they purchase a commodity or service. Consumer surplus is used to measure the demand side impact of a transportation improvement on users of the service. It is defined as the additional benefit consumers receive from the purchase of a commodity or service (travel), above the price actually paid for that commodity or service. Consumer surpluses exist because there are always consumers who are willing to pay a higher price than that actually charged for the commodity or service, *i.e.*, these consumers receive more benefit than is reflected by the system revenues alone.

Revenues are included in the measure of consumer surplus as a proxy measure for the consumer surplus foregone, because the price of rail service is not zero. This is an equity decision made by the FRA to compensate for the fact that highway users don't have to pay for use of the road system (the only exception being the use of toll roads). FRA's decision recognizes that operating revenues are in fact a portion of consumer surplus benefits that have been transferred from the rail user to the rail operator. The benefits apply to existing rail travelers as well as new travelers who are induced (those who previously did not make a trip) or diverted (those who previously used a different mode) to the new passenger rail system.

The *COMPASS*™ Demand Model estimates consumer surplus by calculating the increase in regional mobility, traffic diverted to rail, and the reduction in travel cost measured in terms of generalized cost for existing rail users. The term generalized cost refers to the combination of time and fares paid by users to make a trip. A reduction in generalized cost generates an increase in the passenger rail user benefits. A transportation improvement that leads to improved mobility reduces the generalized cost of travel, which in turn leads to an increase in consumer surplus.

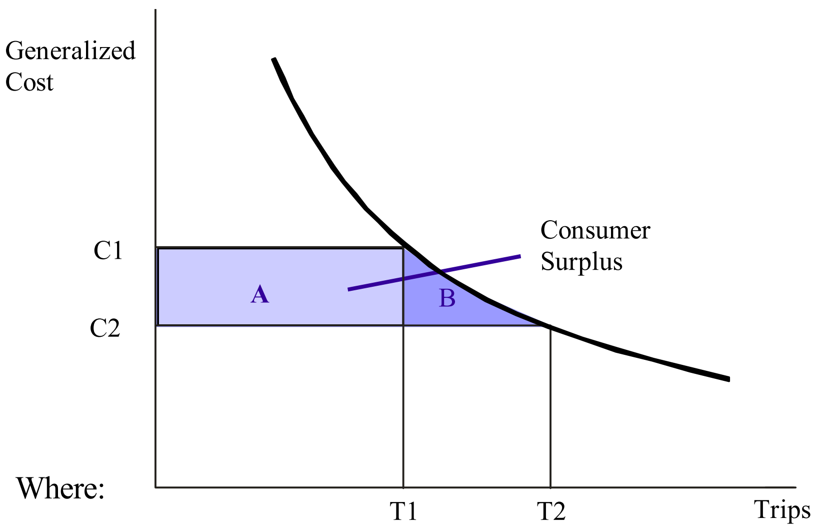
It should be noted that passenger rail fares used in this analysis are those used for development of the MWRRS financial projections and operating ratios. As a rule, these fares are slightly lower than the average optimal fares derived from the revenue-maximization analysis that was performed for each MWRRS corridor. Charging slightly less than the revenue-maximizing fare greatly increases the ridership and consumer surplus associated with the system without reducing the revenues by very much. User benefits incorporate both the measured consumer surplus ($8.9 billion) and the system revenues ($8.3 billion)*.

Exhibit 1 presents a typical demand curve in which Area A represents the improvement in consumer surplus resulting from generalized cost savings for existing rail users, while Area B represents the consumer surplus resulting from induced traffic and trips diverted to rail.

Exhibit 1
Consumer Surplus Concept

The formula for consumer surplus is as follows:

Consumer Surplus = $(C_1 - C_2)*T_1 + ((C_1 - C_2)*(T_2 - T_1))/2$



Where:

C_1	=	Generalized Cost users incur before the implementation of the system
C_2	=	Generalized Cost users incur after the implementation of the system
T_1	=	Number of trips before operation of the system
T_2	=	Number of trips during operation of the system

2.2 Other Mode Benefits

In addition to rail-user benefits, travelers by auto or air will also benefit from the MWRRS as the system will contribute at the margin to highway congestion relief and reduced travel times for users of these other modes. For purposes of this analysis, these benefits were measured by identifying the estimated number of air and auto passenger trips diverted to rail and

* Calculated, 40-year NPV at 3.9%.

multiplying each by the benefit levels used in the FRA/USDOT study, *High-Speed Ground Transportation in America*. Note that the FRA study covered only five Midwest states (Illinois, Indiana, Missouri, Michigan and Wisconsin) while the MWRRI study covers nine states (adding Iowa, Minnesota, Nebraska, and Ohio).

Airport Congestion

Using projections from the *COMPASS*™ Model, benefits to air travelers resulting from reduced air congestion were identified by estimating the number of passenger air trips diverted to rail in 2020 (the comparable year for the FRA study). The air-connect model, developed specifically for this study, estimates that 1.3 million air trips will be diverted to the MWRRS, slightly higher than the 1.23 million trips projected in the "1998 Plan" MWRRI Study. This compares to the FRA estimate of 2 million diverted air trips expected to result from the availability of 110-mph rail service. The larger number of diverted air trips in the FRA study reflects the inclusion of a rail extension to O'Hare Airport, which is not proposed for the MWRRS.

The FRA estimated travel time saved by air passengers (those not diverted to rail) due to reduced congestion, deviations from scheduled flight arrival and departure times, and additional time spent on the taxiway or en route. For each major airport, average delays were capped at 15 minutes per operation. The FRA calculated the Net Present Value (NPV) of this benefit for diverted air trips throughout the study period at $1.16 billion for its 110-mph scenario, or with inflation to $2002, the equivalent of $52.28 per diverted passenger air trip. This value, multiplied by the estimated 1.3 million air trips diverted to the MWRRS, yields a 40-year discounted benefit of $1.6 billion.

Highway Congestion

There will be reduced congestion and delays on highways due to auto travelers diverting to the MWRRS. It is estimated that 5.1 million auto trips will be diverted, up from the 4.1 million projected in the "1998 Plan" MWRRI Study. The FRA projected 2.65 million diverted auto trips in its five-state study. The increased level of diverted auto trips in the MWRRI study can be explained by the larger MWRRI rail network used by TEMS as compared to the FRA.

The FRA calculated the travel time saved when traffic volumes are reduced on major highways between city pairs. The NPV of the benefit of all diverted auto trips throughout the study period was estimated at $692 million with an annual average value of $23.43 per diverted passenger auto trip. This average value reflects increased highway congestion particularly in the latter years of the project when congestion increases significantly. This value, multiplied by the estimated 5.1 million auto trips diverted by the MWRRS and discounted over a 40-year period, yields a benefit of $2.7 billion.

2.3 Resources Benefits

The implementation of any transportation project has an impact on the resources used by travelers. MWRRS service and the consequent reduction in airport congestion will result in resource savings to airline operators and reduced emissions of air pollutants for all non-rail modes.

Air-Carrier Operating Costs

Benefits to air carriers in terms of operating costs savings resulting from reduced congestion at airports are calculated in much the same way as the time savings benefits to air travelers. For its study corridors, the FRA study estimated the benefits to air carriers by multiplying the projected reduction in the number of aircraft hours of delay by the average cost to the airlines for each hour of delay. As noted above, average delays were capped at 15 minutes per operation. The NPV of air carrier benefits was estimated at $623 million for the 110-mph scenario, or the equivalent of $28.13 per diverted passenger air trip. This value, multiplied by the 1.3 million air trips diverted to the MWRRS, yielded a discounted 40-year benefit of approximately $0.9 billion.

Emissions

The diversion of travelers to rail from the auto and air modes generates emissions savings. The FRA calculated emissions savings based on changes in energy use with and without the proposed rail service. Their methodology took into account the region of the country, air quality regulation compliance of the counties served by the proposed rail service, the projection year, and the modes of travel used for access/egress as well as the line-haul portion of the trip. For the MWRRS, it was assumed that emissions savings would be proportional to the number of diverted auto vehicle miles. For both the FRA and MWRRI analyses, the number of vehicle-miles saved was calculated by multiplying the number of diverted auto trips times and the average trip length divided by an average vehicle occupancy factor. The resulting auto vehicle miles saved was divided by the estimate of emissions benefit, yielding a FRA estimated benefit of $0.02 per vehicle mile. This value, multiplied by the number of vehicle miles saved by implementation of the MWRRS, yields a benefit of $0.6 billion.

2.4 Costs

In the economic analysis, costs were separated into three primary components - infrastructure and rolling stock capital costs, capital track maintenance costs associated with the long-term infrastructure replacement and operating and maintenance costs. An additional cost of equipment replacement is considered; however, because of the uncertainty of the actual implementation year, this cost was not included in the economic analysis.

Capital Costs

Capital costs were based on infrastructure improvements and the rolling stock required for the proposed MWRRS implementation plan. It was assumed that 80 percent of the capital costs would be funded by the federal government (GANs or GARVEE bonds would be used to address any temporary funding shortfalls due to the annual Federal funding budget cap.) Capital funds would be used on an as-needed basis in accordance with the implementation schedule. The NPV of the total infrastructure and rolling stock capital costs for the MWRRS are calculated to be approximately $6.1 billion.

Capital Track Maintenance Costs

Capital track maintenance costs were not included in the operation ratio calculation, but they do enter into the costs benefit ratio. In our study the total capital track maintenance costs for the MWRRS were calculated as $0.3 billion. As compared to the ongoing operating costs for the system, the capital track maintenance costs are quite small.

Operating Costs

Operating costs were compiled for the years 2008 through 2040. They include train operating and maintenance costs for trains and tracks and consider the effect of the implementation period 2008-2011. The NPV of the operating costs over the 40 years lifespan of the project is estimated to be $6.5 billion, at a 3.9 percent discount rate.

Discount Rates

A Benefit Cost analysis requires that a discount rate is selected in order to identify the real cost of money for a project. In Investment Grade studies for Wall Street, TEMS would use a 3.9 percent real discount rate that reflects the cost of long-term government bonds. This rate reflects the real cost of money for a project like the MWRRI and as such shows the real value of the project. The FRA however, for its own evaluation purpose mandates the use of a seven percent real discount rate. This level of discount rate is in fact a "rationing" rate that sets the cost of money well above its real cost. This understates the value of a project like the MWRRI. To ensure that this analysis provides both a full understanding of the MWRRI project and provides the FRA with its mandated evaluation, both sets of calculations are included. However, TEMS' reports the value of a project in terms of the Investment Grade discount rate as this reflects the real value of the MWRRI project.

2.5 Total User Benefits

As shown in Exhibit 2, the total user benefits generated by the MWRRS, including rail user benefits, other mode user benefits, and resources benefits are $23.1 billion. At 3.9%, the ratio of the total user benefits to total costs is 1.8. At 7.0% the benefit cost ratio is 1.46.

Exhibit 2
Midwest Regional Rail System
User Benefits and Costs to 2040 (Billions of 2002$)

Benefit Cost Parameters	**40-Year Net Present Value**	
	@3.9%	**@7.0%**
Benefits		
MWRRS User Benefits		
Consumer Surplus	$ 8.9	$5.0
System Revenues	8.3	4.7
Other Mode User Benefits		
Airport Congestion	1.6	1.0
Highway Congestion	2.7	1.6
Resources Benefits		
Airlines	0.9	0.5
Emissions	0.6	0.4
Total Benefits	**$ 23.1**	**$13.2**
Costs		
Capital	$ 6.1	$5.1
Capital Track Maintenance	0.3	0.2
Operating	6.5	3.8
Total Costs	**$ 12.9**	**$9.1**
Ratio of Benefits to Costs	**1.80**	**1.46**

The 1.80 ratio of benefits to costs indicates that the MWRRS is expected to have a positive impact on the Midwest economy. The user benefit analysis, estimates that implementation of the MWRRS will generate more than $23 billion in economic benefits to the region.

2.6 Other Benefits

As noted in the FRA study, implementation of the rail system will bring other kinds of environmental benefits that are not quantifiable without a full environmental impact study (EIS) analysis. These include additional benefits to commuter and long-distance passenger rail services, environmental benefits, and freight rail transportation safety and productivity improvements.

Commuter and Long-distance Passenger Rail Benefits

MWRRS infrastructure improvements will enable both commuter rail and Amtrak long-distance passenger rail services in the Midwest region to achieve faster trip times where track is shared with the MWRRS. This will generate time saving for existing passengers and it is expected to attract new passengers to these services.

Environmental Benefits

The use of the MWRRS instead of auto and air, currently the dominant travel modes in the Midwest region, will promote a number of environmental benefits in addition to those previously mentioned, including the following:

- Encourage more efficient land use and compact development patterns
- Less noise pollution
- Minimal alterations to hydrological characteristics
- Minimal visual intrusion on the landscape
- Minimal disturbances to natural flora and fauna

Rail Transportation Safety and Productivity Improvements

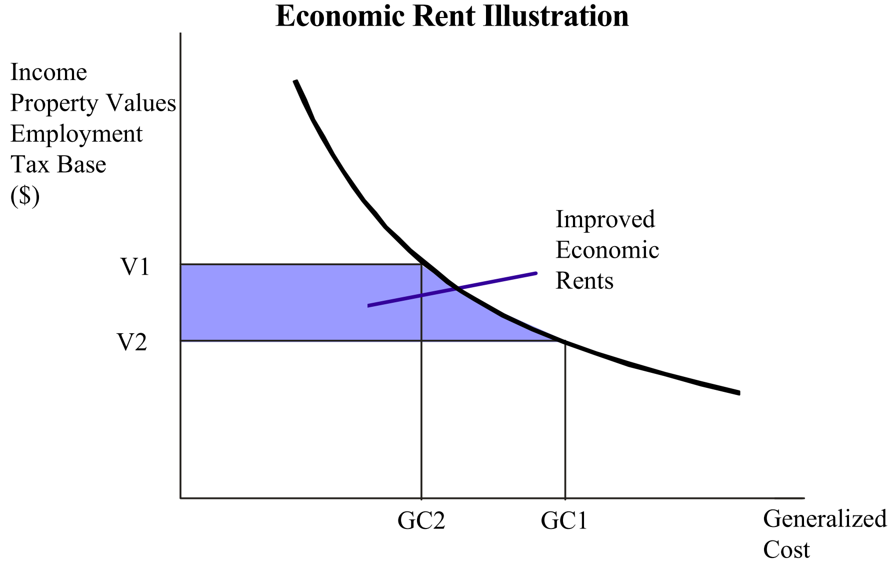
MWRRS infrastructure improvements are expected to increase rail safety and productivity, both for its operations and for commuter, long-distance, and freight rail services in the region. In addition, the provision of improved railway crossings and signaling equipment should result in increased highway safety. Under the MWRRI implementation plan, three to five percent of the grade crossings on rights-of-way used by the MWRRS are anticipated to be closed annually to increase safety.

3 *Economic Rents Analysis*

Economic rent is generated as a result of a transportation investment that improves the level of accessibility to a market or resource base. This improvement generates a benefit in terms of increased economic value as goods and services are more easily or cheaply traded. In some locations (*e.g.*, agriculture areas), improved accessibility has been shown to have minimal impact because of the volumes of traffic involved are small, even if it provides a very large impact for a particular producer. In urban areas, however, businesses and developers have typically been interested in locating new development in accessible areas. A high level of accessibility makes the property more desirable and allows the developer to charge higher rents. Accessibility also increases income potentials and job opportunities as transport costs are reduced. The impact of a new transportation investment can be measured by identifying changes in accessibility that increase the long-term demand for goods and services, and create new business and commercial development opportunities. The resulting increase in employment, household income and property value can be depicted in an economic rent curve, shown in Exhibit 3.

An economic rent curve can be generated for each location using population, employment, household income, and property value data as correlated to an accessibility measure by generalized cost. For the MWRRS, this analysis focused on station locations and their surrounding communities. The economic rent concept is illustrated in Exhibit 3.

Exhibit 3
Economic Rent Illustration



3.1 *MWRRS Community Benefits*

It should be noted that the shape of the economic rent curve reflects the economic impact of an improvement in accessibility. Large cities typically have very steep curves, which indicate more significant economic impacts due to a transportation improvement; smaller communities have less steep curves, and rural areas have very flat curves which indicate minor economic impacts.

Using a socioeconomic proxy (SE_i) for economic rent measures of economic welfare and generalized cost (GC_i) as a specific metric for transportation efficiency measured in terms of time and cost. The Economic Rent equation can be expressed as:

$$SE_i = \beta_o GC_i^{\beta_1}$$

Where:

SE_i - Socioeconomic measures such as employment, income, property value

GC_i - Weighted generalized cost of travel from (to) zone *i* to (from) other zones by all modes and for all purposes

β_o and β_1 = Calibration parameters

In Midwest network we have four modes *m* (auto, bus, rail and air) and two trip purposes *p* (business and non-business).

$$GC_i = \sum_p \sum_m \sum_j GC_{ij}^{mp} * T_{ij}^{mp}$$

Where:

GC_{ij}^{mp} - generalized cost of travel from zone *i* to zone *j* by mode *m* for purpose *p;*

T_{ij}^{mp} - number of trips from zone *i* to zone *j* by mode *m* for purpose *p;*

N – number of transportation zones in network.

The Economic Rent function can be transformed into a linear function:

$$\text{Ln}\,(SE_i) = \beta_o + \beta_1\, \text{Ln}\,(GC_i)$$

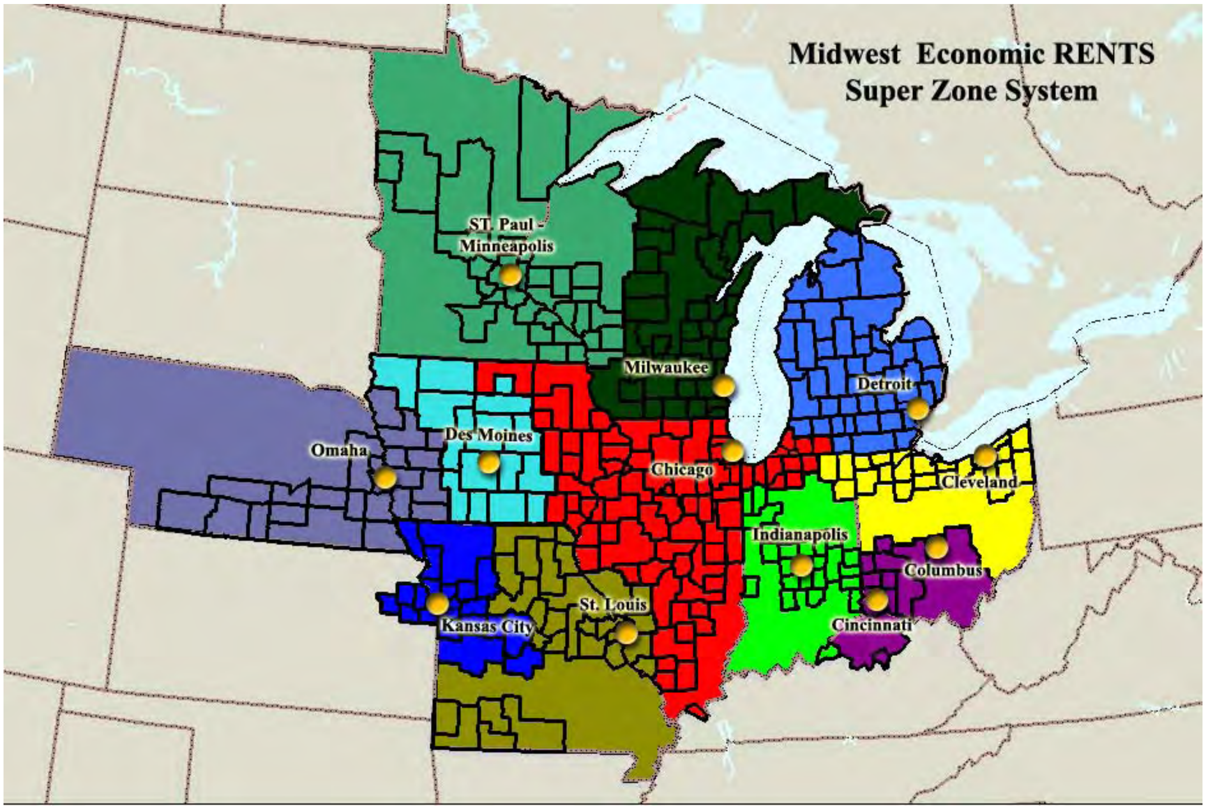
In order to measure the effect of MWRRS project on the Midwest economy we use three socioeconomic indicators: employment, average household income and average property value.[2]

A critical element of an Economic Rent Model is an understanding of the local economy and the interdependence of cities, towns and urban areas along the rail corridor right-of-way. As part of the analysis, the Midwest was partitioned into 11 super zone regions, as shown in Exhibit 4. Super zones show the area of primary influence of specific cities and do not necessarily conform to state boundaries. For example, Gary and a large part of Northwest Indiana are clearly part of the Chicago regional metroplex. Major cities in the center of states like Minneapolis/St. Paul and Indianapolis can easily be seen to dominate much of their state. However, it is not so clear whether areas like south east Wisconsin belong to Chicago or Milwaukee or whether Toledo and Fort Wayne are more a part of Detroit or of Cleveland, or whether in fact all three cities really comprise a single Metroplex. In these circumstances, the zone boundaries must be somewhat arbitrary and for analysis purposes we have used an

[2] Due to the limited availability of property value data, for each zone we use average value of all owner-occupied housing units, and then factored this value to include commercial property.

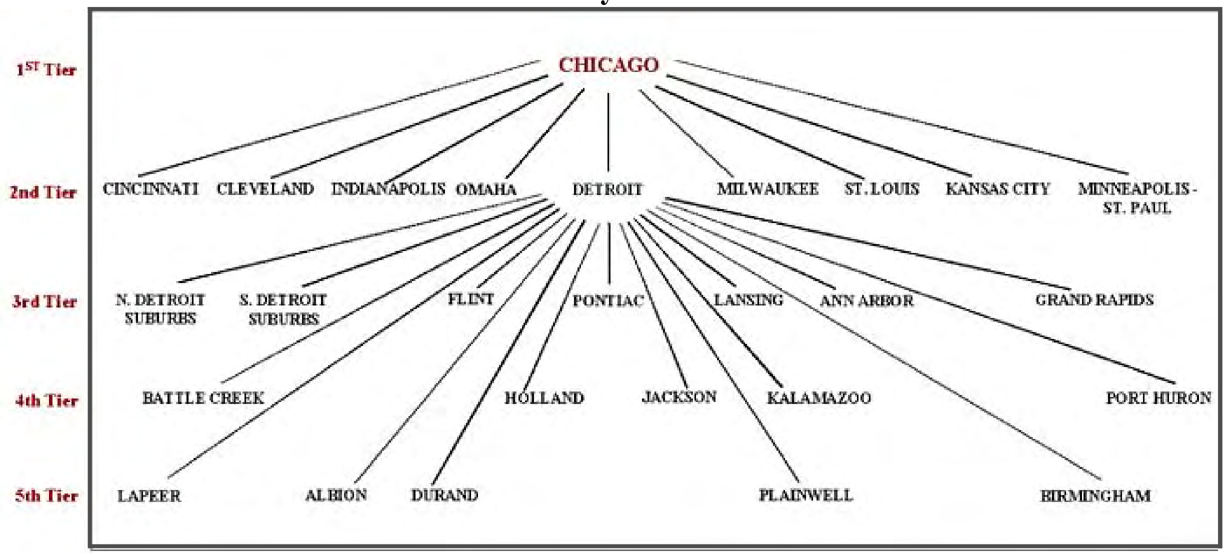
allocation that gives the most conservative result. For such cases, state boundaries have been used as a dividing line mainly for convenience sake. It is likely that the economic rent assessment is low for these areas.

Exhibit 4
Super Zone system



In addition, each super zone is broken down into a hierarchy of cities that reflect their relative interaction with each other and with the principal city of the Super Zone. For example, in the Detroit Super Zone, Lansing is a second level city as are Ann Arbor, Grand Rapids, Flint and Detroit Suburbs. The hierarchy has four levels underneath of Chicago and the economic rent analysis is calculated separately for each level. Each zone was categorized within the hierarchy based on its socio-economic characteristics and its connectivity in the transportation system. Exhibit 5 shows the levels for the principal cities of the Detroit Super Zone.

Exhibit 5
Midwest Hierarchy of Urban Settlement



3.2 Model Calibration

Regression analysis was used to develop the MWRRI Economic Rent Model. In this process we established the mathematical relationship between the measure of accessibility (generalized cost of travel) and the Economic Rent socio-economic variables (employment, average household income and average property value) for each transportation zone. Exhibits 6 through 9 show the observed values for employment, income, and property value versus generalized cost of travel. The regression line reflects the relationship between socio-economic indicators in each transportation zone and corresponding generalized costs. By the tight clustering of data points around the regression line, it can be seen in each case that a very strong relationship was identified.

Economic Rent coefficients (values of calibration parameters) for each of the three socio-economic indicators used in the model together with statistical measures of confidence are presented in Exhibit 9.

Exhibit 6
Employment as a Function of Accessibility

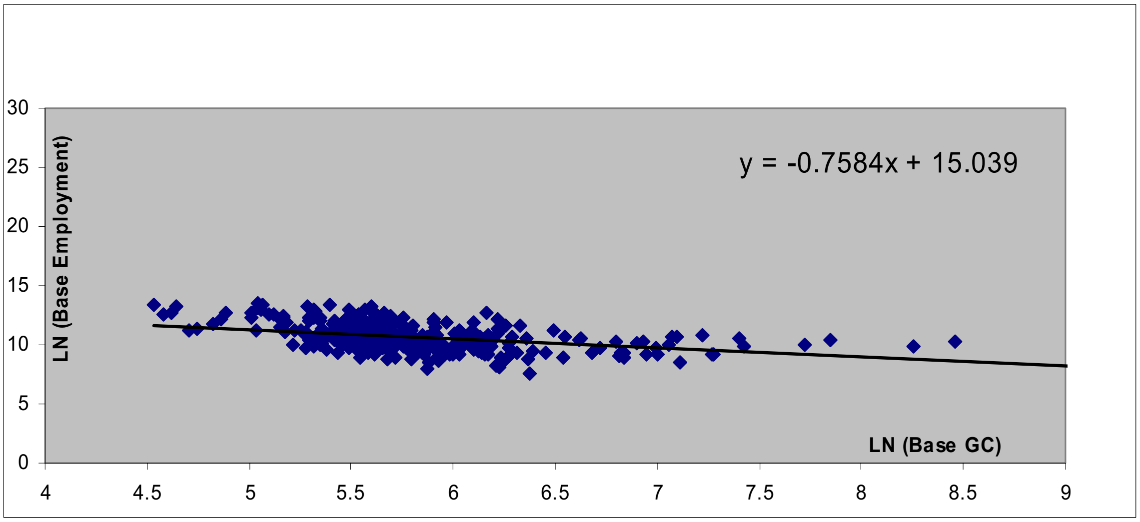


Exhibit 7
Average Household Income as a Function of Accessibility

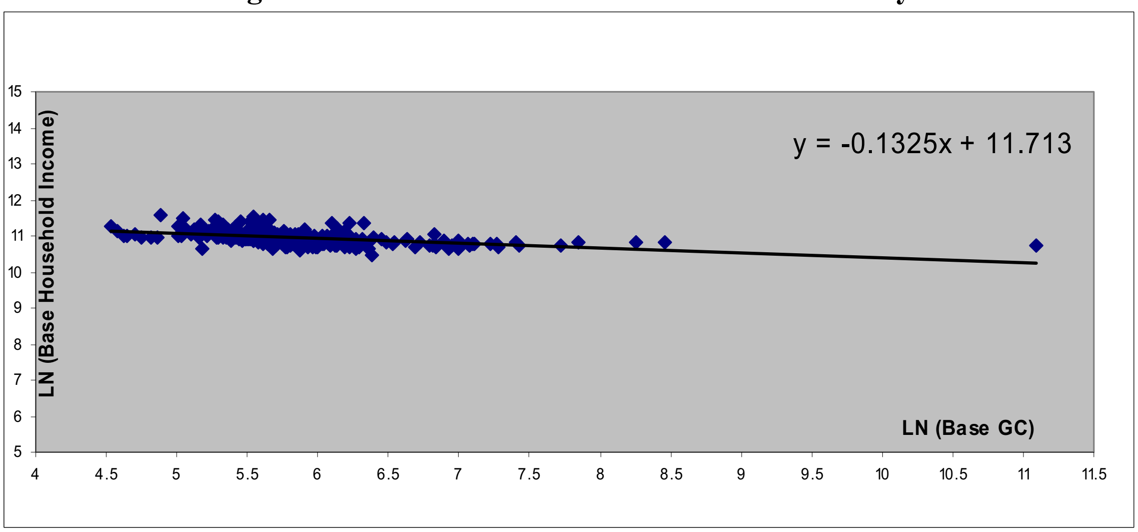


Exhibit 8
Average Property Value as a Function of Accessibility

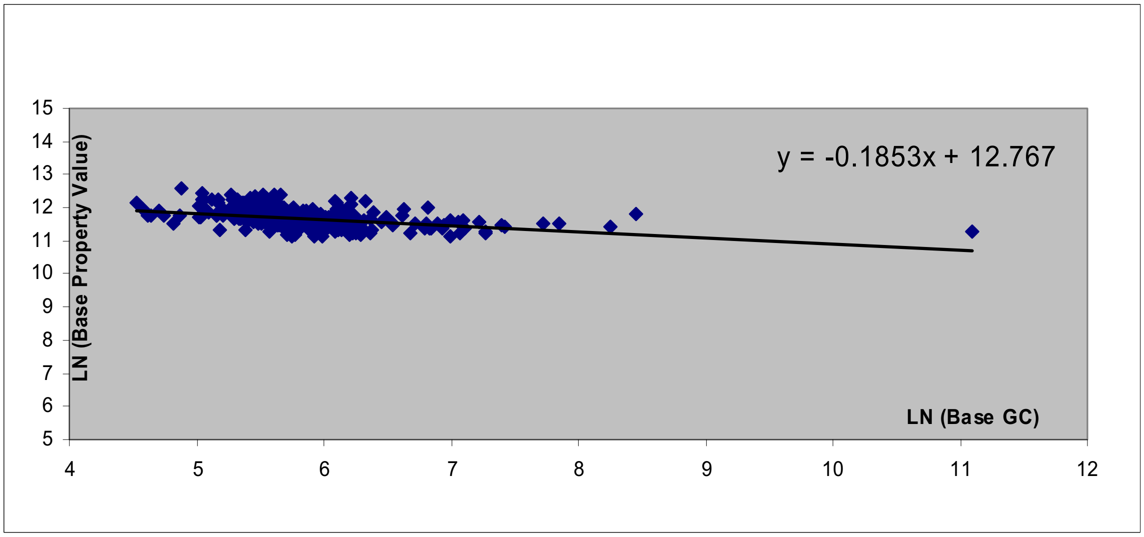


Exhibit 9
Economic Rent Coefficients (for employment, average income and property value)

Socio-economic Indicators	β_0	β_1	*T-value for* β_1	*T-value for* β_0	**Multiple R**
Employment	15.039	-0.758	-8.431	28.530	0.413
Average Household Income	11.713	-0.133	-9.669	145.826	0.462
Average Property Value	12.767	-0.185	-8.511	100.052	0.417

Each equation has highly significant 't' values and Multiple 'R' values. This reflects the strength of the relationship and given the fact that there is a strong basis for the relationship shows firstly that the socioeconomic variables selected provide a reasonable representation or economic rent, and secondly that generalized cost is an effective measure of market accessibility.

Given the performance of the models the next step in developing the Economic Rent Model is to determine the change in socio-economic indicators as a result of accessibility improvement. In order to calculate elasticities we differentiate the Economic Rent function with respect to GC. As a result we obtain:

$$\Delta Emp_i = \frac{\partial Emp_i}{Emp_i} \quad \beta_1^E \frac{\partial GC_i}{GC_i}$$

$$\Delta Inc_i = \frac{\partial Inc_i}{Inc_i} \quad \beta_1^I \frac{\partial GC_i}{GC_i}$$

$$\Delta Pv_i = \frac{\partial PV_i}{PV_i} \quad \beta_1^{pv} \frac{\partial GC_i}{GC_i}$$

Where:

GC_i - Generalized cost of zone i,

$Emp_{i,}$ - Employment of zone i

Inc_i - Average Household income of zone i

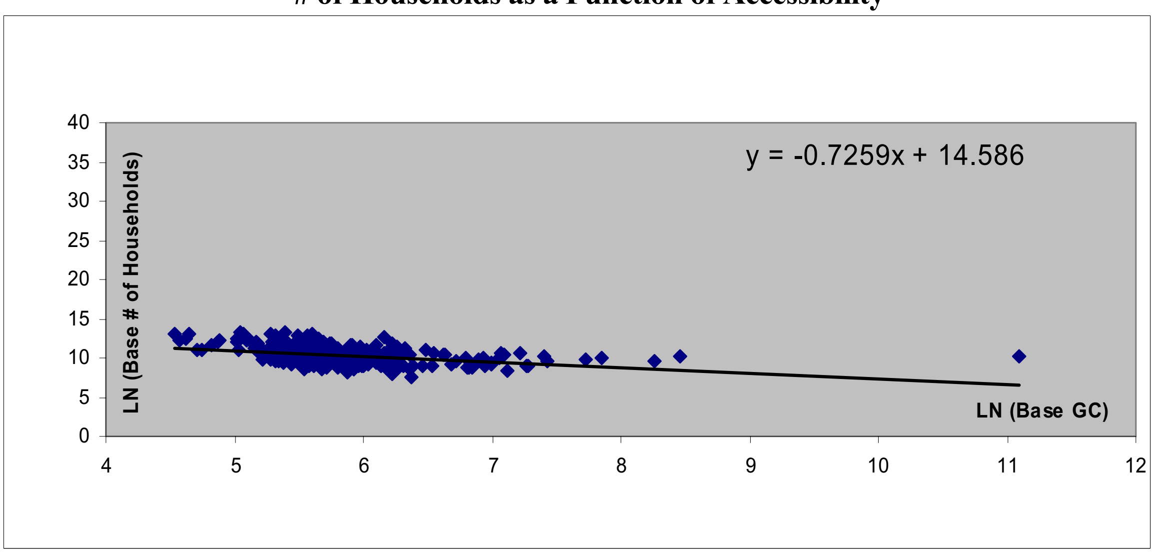
PV_i - Average Property value of zone i

β_1^E β_1^I β_1^{pv} - Calibration parameters.

The change in employment (ΔEmp_i), average household income (ΔInc_i) and average property value (ΔPv_i) for each particular zone i equals the change in generalized cost multiplied by elasticity $\beta^E_{1,}$ β^I_1 or β^{PV}_1 respectively. The value for each β_1 is obtained from the corresponding regression equation.

In order to calculate the impact of accessibility improvement on aggregate household income and aggregate property value, we also had to determine how the improvement in accessibility influences the number of households (housing units) that are supported by any given area. To do this we use Economic Rent Model to predict the number of households (the number of housing units) that are supported by any given level of market access. The results of regression analysis are shown on Exhibits 10 and 11 and economic rent coefficients are given in Exhibit 12. Again it can be seen that good statistical relationships were derived with strong 't' values and Multiple R.

Exhibit 10
# of Households as a Function of Accessibility



# of Housing Units as a Function of Accessibility

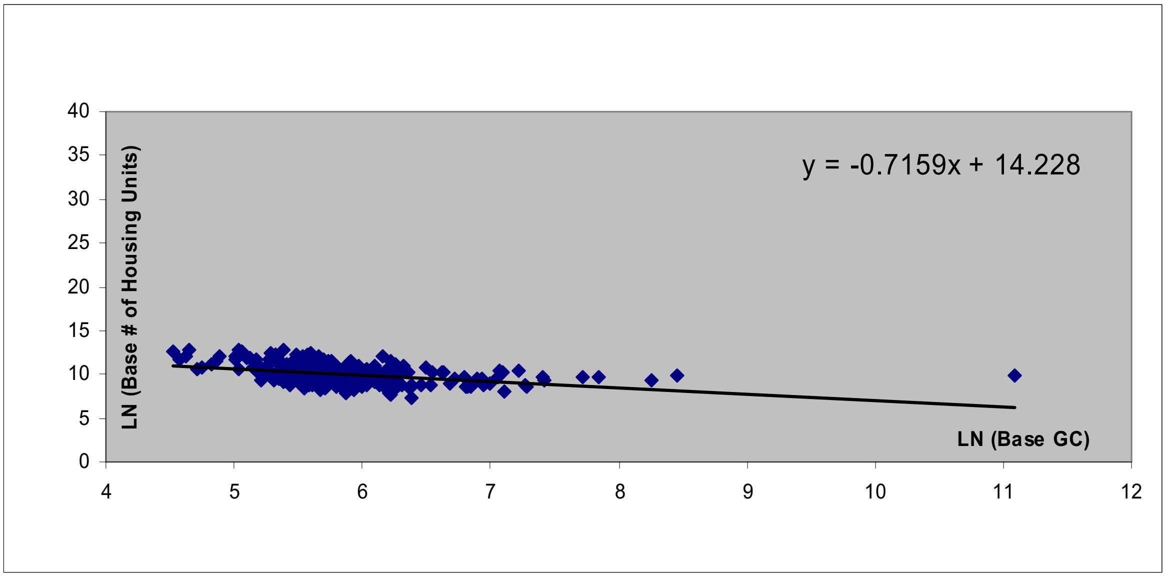


Exhibit 12
Economic Rent Coefficients (for ## of households and housing units)

Socio-economic Indicators	β_0	β_1	T-value for β_1	T-value for β_0	Multiple R
Number of Households	14.586	-0.726	-8.163	27.992	0.402
Number of Housing Units	14.228	-0.716	-8.386	28.446	0.412

● Change in aggregate household income (ΔAgI_i) in zone *i* was calculated as follows -

$$\Delta AgI_i \quad \frac{\partial Inc_i}{Inc_i}(Hh_i + \Delta Hh_i) \quad \frac{\partial Inc_i}{Inc_i}(Hh_i + \frac{\partial Hh_i}{Hh_i}) \quad \frac{\partial Inc_i}{Inc_i}(Hh_i + \beta_1^{hh}\frac{\partial GC_i}{GC_i}),$$

● Change in aggregate residential property value ($\Delta AgPv_i$) in zone *i* was calculated as follows -

$$\Delta AgPv_i \quad \frac{\partial Pv_i}{Pv_i}(Hu_i + \Delta Hu_i) \quad \frac{\partial Pv_i}{Pv_i}(Hu_i + \frac{\partial Hu_i}{Hu_i}) \quad \frac{\partial Pv_i}{Pv_i}(Hu_i + \beta_1^{hu}\frac{\partial GC_i}{GC_i})$$

where:

$\Delta Inc_i \quad \frac{\partial Inc_i}{Inc_i}$ - the change in the average household income in zone *i*

$\Delta Pv_i \quad \frac{\partial PV_i}{Pv_i}$ - the change in average property value in zone *i*;

Hh_i / Hu_i - the base number of households / owner-occupied housing units in zone *i;*

ΔHh_i / ΔHu_i - increased number of households/ owner-occupied housing units in zone *i*

Property Value Adjustment

Given that only residential property value data was available to the study, an adjustment was made to include business property. Business property includes commercial, industrial and agricultural property. According to our detailed analysis, the value of these types of property in Midwest approximately equals the value of owner-occupied private property. For example, residential property is 53 percent of the Indiana assessed value while business property is 47 percent.

Economic RENT™ Results

For the entire Midwest Region, over 58,260 jobs will be created; joint development potential is estimated to increase property values by nearly $5 billion; urban household income is estimated to increase by over $1.0 billion. To obtain state results, the overall results were disaggregated to the zone level and then state totals were estimated by summarizing the zones in each state. Exhibit 13 shows economic rent analysis results by state.

Exhibit 13
Economic Rent Analysis by MWRRI state*

State	Employment Value (# of Jobs)	Household Income ($ in Millions)	Joint Development Potential ($ in Millions)
Iowa	1,000	17	67
Illinois	24,200	480	2,227
Indiana	4,540	86	350
Michigan	6,970	138	680
Minnesota	1,570	31	145
Missouri	5,600	109	480
Nebraska	480	7	27
Ohio	3,520	55	231
Wisconsin	9,570	173	704
Total	**57,450**	**$1,096**	**$4,911**

*Excludes benefits in Kentucky and Kansas

The states in the MWRRS experience different levels of community benefits. The difference depends on the proportion of MWRRS within a state and population size of each state. Overall, Illinois as the hub of the system will experience the largest community benefit from implementation of the MWRRS, while Nebraska with the fewest miles and stations obtains the least community benefit. Exhibit 14 shows the results by Super Zone.

Exhibit 14
Economic Rent Analysis by Super Zone

"Super Zone"* Center	Employment Value (# of Jobs)	Household Income ($ in Millions)	Joint Development Potential ($ in Millions)
Chicago	24,790	490	2,327
Detroit	6,790	134	607
Cleveland	2,490	45	183
Cincinnati	2,410	36	149
St. Louis	4,770	95	416
Des Moines	200	4	14
Milwaukee	9,100	165	673.5
Indianapolis	3,120	60	250
Kansas City	2,040	36	146.5
Minneapolis-St. Paul	2,050	39	176
Omaha	500	8	28
Total for Midwest:	**58,260**	**$1,112**	**$4,970**

*The Super Zone system includes areas outside the nine state MWRRI region.

The size of the economic impact of the MWRRI is considerable. The development of the system integrates so many communities, and provides such a wide reaching impact that it will generate on its own a 0.1 percent growth to the region's economy. It will offer opportunities to fundamentally change the character of business in the nine state regions. In the over one hundred communities linked to the system, the project will create a new business environment that will be attractive to "New Economy" businesses. It will support existing manufacturing and service industries and will foster the growth of new small businesses across the Midwest because of the improved access between communities. It will encourage large businesses to distribute their operations more widely across the Midwest and reap the benefit of providing more efficient "back shop" operations in the highly accessible smaller communities. These communities provide a high quality of life for residents in terms of lower cost housing, good schools, friendly secure neighborhoods, and less congested highway systems.

In an environment of rising oil prices, the MWRRI will offer an energy efficient and cost effective alternative to air and automobile travel that businesses and individuals will be able to use to connect with all of the cities and towns of the Midwest. Since the rail trip will be highly competitive with air and auto in travel time and provide a level of interaction with all the regions communities, the MWRRI system provides a level of service that will be critical to attracting and developing "New Economy" businesses.

3.3 Station Development

An important feature of the development of the MWRRI is the role of MWRRI stations. MWRRI stations will be the gateway to communities and provide the "front door" to the MWRRI system. At this "gateway" or "front door", considerable joint development potential will exist. Increased train operations will encourage service industry to locate at the station, and its immediate surrounds. Such activity will generate both commercial and residential development. Industries looking for a home along the MWRRI system will see it as a good "seeding" ground for business.

As a result, a key output of the community analysis is the increase in property values that can be expected at station locations throughout the MWRRS. These can be equated to the joint development opportunities, which will exist in and around the stations for public-private partnerships. Of the estimated $5.0 billion in joint development, it is anticipated that approximately one half of this total will come from private sector investments, one quarter from state, county and municipal sources, and the final quarter from the Federal government.

There are 102 stations serving the MWRRS and Exhibit 15 shows the profile of each of these stations. Over 80 MWRRS stations and communities have been visited to evaluate the potential of each community to maximize the economic development potential from the MWRRS. This evaluation was conducted using the methodology shown in Exhibit 16.

Exhibit 15
MWRRS Station Profile: Location

			General Characteristics			
	Station Names [1]	***State***	***County***	***Address*** [2]	***Zip Code***	***Feeder Bus***
1	Alton	Illinois	Madison	3400 College Ave.	62002	n
2	Bloomington-Normal	Illinois	Mclean	100 East Parkinson St.,	61761	y
3	Carbondale	Illinois	Jackson	401 South Illinois St.	62901	y
4	Carlinville	Illinois	Macoupin	128 Alton Rd	62626	n
5	Centralia	Illinois	Marion	103 East Broadway St.	62801	n
6	Champaign-Urbana	Illinois	Champaign	45 East University Ave.	61820	y
7	Chicago Union	Illinois	Cook	225 South Canal St.	60661	n
8	Davenport-Rock Island[3]	Illinois	Rock Island		61201	n
9	Du Quoin	Illinois	Perry	20 North Chestnut St.	62832	n
10	Dwight	Illinois	Livingston	119 West Main St.	60420	n
11	Effingham	Illinois	Effingham	401 West National Ave.	62401	n
12	Galesburg	Illinois	Knox	225 South Seminary St.	61401	y
13	Inner West Chicago Suborbs (La Grange Road)	Illinois	Cook	25 West Burlington St.	60525	n
14	Joliet	Illinois	Will	50 East Jefferson St	60431	n
15	Kankakee	Illinois	Kankakee	199 South East Ave.	60901	n
16	Kewanee	Illinois	Henry	West 3rd & Loomis Sts.	61443	n
17	Lincoln	Illinois	Logan	Broadway and North Chicago Sts.	62656	n
18	Macomb	Illinois	Mcdonough	120 East Calhoun St.	61455	n
19	Mattoon	Illinois	Coles	1718 Broadway Ave.	61938	y
20	Mendota	Illinois	La Salle	8th St. & 6th Ave.	61342	n
21	North Chicago Suburbs (Glenview)	Illinois	Cook	1116 Depot St.	60025	n
22	Outer West Chicago Suburbs (Naperville)	Illinois	Du Page	105 East 4th Ave.	60540	n
23	Plano	Illinois	Kendall	West Main & South Center Sts.	60545	n
24	Pontiac	Illinois	Livingston	721 West Washington St.	61764	n
25	Princeton	Illinois	Bureau	107 Bicentennial Dr.	61356	n
26	Quincy	Illinois	Adams	North 30th St. & Wisman Lane	62301	y
27	Rantoul	Illinois	Champaign	East Grove & North Kentucky Aves.	61866	n
28	South Chicago Suburbs (Homewood)	Illinois	Cook	18015 Park Ave.	60430	n
29	Springfield	Illinois	Sangamon	East Washington & North 3d Sts.	62701	y
30	Ft Wayne	Indiana	Allen		46802	y
31	Gary, Airport	Indiana	Lake		46406	n
32	Greensburg[4]	Indiana	Decatur		47240	n
33	Hammond-Whiting	Indiana	Lake	1135 South Calumet Ave.	46320	n
34	Indianapolis	Indiana	Marion	350 South Illinois St.	46225	y
35	Indianapolis, International Airport	Indiana	Marion		46241	n
36	Lafayette	Indiana	Tippecanoe	200 North 2nd St.	47901	n
37	Michigan City	Indiana	LaPorte	100 Washington Street	46360	n
38	Plymouth	Indiana	Marshall		46563	y
39	Shelbyville	Indiana	Shelby		46176	n
40	Warsaw	Indiana	Kosciusko		46580	n
41	Atlantic	Iowa	Cass		50022	y
42	Des Moines	Iowa	Polk		50213	y
43	Iowa City	Iowa	Johnson		52240	y
44	Newton	Iowa	Jasper		50208	n
45	Albion	Michigan	Calhoun	300 North Eaton St.	49224	n
46	Ann Arbor	Michigan	Washtenaw	325 Depot St.	48104	y
47	Battle Creek	Michigan	Calhoun	104 Capital Ave. S.W.	49017	n
48	Birmingham[4]	Michigan	Oakland	449 South Eton St.	48009	n
49	Detroit	Michigan	Wayne	11 West Baltimore Ave.	48202	y
50	Dowagiac	Michigan	Cass	100 East Railroad St.	49047	n
51	Durand	Michigan	Shiawassee	200 South Railroad St.	48429	n
52	Flint	Michigan	Genesee	1407 South Dort Highway	48503	n
53	Grand Rapids	Michigan	Kent	431 Wealthy St. SW	49503	y
54	Holland	Michigan	Allegan	171 Lincoln Ave.	49423	n

Exhibit 15
MWRRS Station Profile: Location -continued

55	Jackson	Michigan	Jackson	501 East Michigan Ave.	49201	n
56	Kalamazoo	Michigan	Kalamazoo	459 North Burdick St.	49007	n
57	Lansing (East Lansing)	Michigan	Ingham	1240 South Harrison Road	48823	n
58	Lapeer	Michigan	Lapeer	73 Howard St.	48446	n
59	Niles	Michigan	Berrien	598 Dey St.	49120	n
60	North Detroit Suburbs (Royal Oak)	Michigan	Oakland	201 South Sherman Ave.	48069	n
61	Plainwell[4]	Michigan	Allegan		49080	n
62	Pontiac	Michigan	Oakland	1600 Wide Track Circle	48342	n
63	Port Huron	Michigan	St. Claire	2223 16th St.	48060	n
64	South Detroit Suburbs (Dearborn)	Michigan	Wayne	16121 Michigan Ave.	48126	n
65	Red Wing	Minnesota	Goodhue	420 Levee Street	55066	n
66	St. Paul-Minneapolis	Minnesota	Ramsy/Hennepin	730 Transfer Road	55114	y
67	Winona	Minnesota	Winona	65 East Mark St.	55987	n
68	Hermann	Missouri	Gasconade	Wharf & Gutenburg Sts.	65041	n
69	Jefferson City	Missouri	Cole	101 Jefferson St.	65101	y
70	Kansas City	Missouri	Clay	30 West Pershing Road	64108	y
71	Kansas City North-East Suburbs (Independence)	Missouri	Jackson	600 South Grand Ave.	64050	n
72	Kansas City South-East Suburbs (Lee's Summit)	Missouri	Jackson	220 SW Main St.	64063	n
73	Sedalia	Missouri	Pettis	Pacific St. & North Osage Ave.	65301	n
74	St. Louis	Missouri	St. Louis City	551 South 16th St.	63103	n
75	St. Louis Suburbs (Kirkwood)	Missouri	St. Louis	110 West Argonne Drive	63122	n
76	Washington	Missouri	Franklin	301 West Front St.	63090	y
77	Warrensburg	Missouri	Johnson	100 South Holden St.	64093	n
78	Omaha	Nebraska	Douglas	1003 South 9th St.	68108	y
79	Cincinnati	Ohio	Hamilton	1301 Western Ave.	45203	y
80	Cleveland	Ohio	Cuyahoga	200 Cleveland Memorial Shoreway	44114	y
81	Defiance	Ohio	Williams		43512	n
82	Elyria	Ohio	Lorain	410 East River Road	44035	n
83	Sandusky	Ohio	Erie	12 North Depot St. at Shelby St.	44870	n
84	Toledo	Ohio	Lucas	415 Emerald Avenue	43602	y
85	Appleton	Wisconsin	Outagamie		54911	y
86	Brookfield-Waukesha	Wisconsin	Waukesha		53005	n
87	Fond Du Lac	Wisconsin	Fond Du Lac		54935	n
88	Green Bay	Wisconsin	Brown		54301	y
89	La Crosse	Wisconsin	La Cross	601 St Andrew St.	54601	y
90	Madison, Dane County Regional Airport	Wisconsin	Dane	4000 International Lane	53704	n
91	Menomonee Falls[4]	Wisconsin	Waukesha		53051	n
92	Milwaukee Union	Wisconsin	Milwaukee	433 West St. Paul Ave.	53203	y
93	Milwaukee, Airport[4]	Wisconsin	Milwaukee	5601 South 6th St.	53221	n
94	Neenah[4]	Wisconsin	Winnebago		54596	n
95	Oconomowoc	Wisconsin	Waukesha		53066	n
96	Oshkosh	Wisconsin	Winnebago	525 West 20th St.	54902	n
97	Portage	Wisconsin	Columbia	400 West Oneida St.	53901	n
98	Sturtevant	Wisconsin	Racine	2984 Wisconsin St.	53177	n
99	Tomah	Wisconsin	Monroe	N. Superior Ave. & Washington St.	54660	y
100	Watertown	Wisconsin	Jefferson		53094	n
101	West Bend	Wisconsin	Washington		53095	n
102	Wisconsin Dells	Wisconsin	Columbia	Superior & La Crosse Sts.	53965	n

Notes:

[1]Station name given in parentheses shows the name of the existing Amtrak station that has the same location as the new station, named by TEMS.

[2]The address of the station (when it is available) reflects the address of the corresponding Amtrak station.

[3]The station location is undecided and it could be located either in Illinois or in Iowa depending on discussion between Illinois and Iowa DOT and the local community

[4]This station is in the same zone as another station. The model assigns riders to a single station in a transportation zone. There is no zone that is directly connected to this station.

Exhibit 15
MWRRS Station Profile: Trip Volumes

			Volume of Trips [2]		
	Station Names [1]	***State***	***Year 2004***	***Year 2020***	***Year 2040***
1	Alton	Illinois	30,221	168,814	218,626
2	Bloomington-Normal	Illinois	82,905	264,163	340,837
3	Carbondale	Illinois	67,664	79,005	102,753
4	Carlinville	Illinois	5,177	27,686	35,969
5	Centralia	Illinois	9,666	13,948	18,147
6	Champaign-Urbana	Illinois	76,633	163,115	210,844
7	Chicago Union	Illinois	2,346,748	5,189,860	6,684,529
8	Davenport-Rock Island	Illinois	0	233,067	299,051
9	Du Quoin	Illinois	4,442	9,385	12,104
10	Dwight	Illinois	4,610	38,458	49,262
11	Effingham	Illinois	9,297	29,656	38,631
12	Galesburg	Illinois	63,826	77,705	100,609
13	Inner West Chicago Suborbs (La Grange Road)	Illinois	6,679	62,752	80,699
14	Joliet	Illinois	22,466	231,185	301,454
15	Kankakee	Illinois	8,897	95,864	123,857
16	Kewanee	Illinois	6,345	17,516	22,634
17	Lincoln	Illinois	13,871	31,898	41,235
18	Macomb	Illinois	36,630	68,341	88,420
19	Mattoon	Illinois	14,249	26,630	34,276
20	Mendota	Illinois	11,997	45,933	58,880
21	North Chicago Suburbs (Glenview)	Illinois	32,708	110,895	144,667
22	Outer West Chicago Suburbs (Naperville)	Illinois	30,845	423,676	553,232
23	Plano	Illinois	1,921	32,802	42,265
24	Pontiac	Illinois	7,462	23,291	30,143
25	Princeton	Illinois	16,648	65,512	83,779
26	Quincy	Illinois	28,843	57,863	75,598
27	Rantoul	Illinois	965	30,623	39,929
28	South Chicago Suburbs (Homewood)	Illinois	21,217	290,466	372,294
29	Springfield	Illinois	98,623	286,495	371,159
30	Ft Wayne	Indiana	0	677,466	882,565
31	Gary, Airport	Indiana	0	79,649	103,260
32	Greensburg[3]	Indiana	0	0	0
33	Hammond-Whiting	Indiana	11,687	72,620	95,269
34	Indianapolis	Indiana	23,612	287,317	376,367
35	Indianapolis, Airport	Indiana	0	16,416	21,651
36	Lafayette	Indiana	11,141	95,372	124,304
37	Michigan City	Indiana	2,085	55,501	71,697
38	Plymouth	Indiana	0	96,743	125,863
39	Shelbyville	Indiana	0	15,122	19,809
40	Warsaw	Indiana	0	45,158	58,717
41	Atlantic	Iowa	0	577	734
42	Des Moines	Iowa	0	56,629	72,786
43	Iowa City	Iowa	0	63,579	81,567
44	Newton	Iowa	0	21,330	27,542
45	Albion	Michigan	1,021	23,455	30,278
46	Ann Arbor	Michigan	108,498	347,623	448,704
47	Battle Creek	Michigan	43,847	219,851	283,117
48	Birmingham[3]	Michigan	16,112	29,202	38,038
49	Detroit	Michigan	53,729	281,062	359,959
50	Dowagiac	Michigan	1,944	26,806	34,399
51	Durand	Michigan	4,522	22,838	29,312
52	Flint	Michigan	15,540	246,844	318,578
53	Grand Rapids	Michigan	47,026	237,018	307,721
54	Holland	Michigan	31,902	93,341	121,998

Exhibit 15
MWRRS Station Profile: Trip Volumes - continued

55	Jackson	Michigan	22,752	106,793	138,059
56	Kalamazoo	Michigan	75,345	309,993	398,538
57	Lansing (East Lansing)	Michigan	30,737	242,539	313,567
58	Lapeer	Michigan	5,401	37,608	48,465
59	Niles	Michigan	16,600	40,522	51,899
60	North Detroit Suburbs (Royal Oak)	Michigan	17,575	141,257	183,816
61	Plainwell[3]	Michigan	0	0	0
62	Pontiac	Michigan	12,802	121,568	158,527
63	Port Huron	Michigan	8,359	54,160	70,330
64	South Detroit Suburbs (Dearborn)	Michigan	65,509	296,024	378,668
65	Red Wing	Minnesota	9,584	40,216	52,609
66	St. Paul-Minneapolis	Minnesota	127,333	464,605	607,155
67	Winona	Minnesota	17,808	39,822	51,942
68	Hermann	Missouri	11,459	30,440	39,648
69	Jefferson City	Missouri	40,014	175,902	227,362
70	Kansas City	Missouri	109,597	232,447	302,348
71	Kansas City North-East Suburbs (Independence)	Missouri	5,570	31,080	40,659
72	Kansas City South-East Suburbs (Lees Summit)	Missouri	17,605	82,813	108,121
73	Sedalia	Missouri	8,177	23,897	31,115
74	St. Louis	Missouri	160,093	678,838	881,533
75	St. Louis Suburbs (Kirkwood)	Missouri	40,132	226,357	294,906
76	Warrensburg	Missouri	8,604	31,649	41,382
77	Washington	Missouri	10,789	46,867	61,176
78	Omaha	Nebraska	23,007	57,713	74,736
79	Cincinnati	Ohio	11,632	296,936	383,823
80	Cleveland	Ohio	35,394	233,834	300,587
81	Defiance	Ohio	0	23,321	30,211
82	Elyria	Ohio	2,651	43,459	56,102
83	Sandusky	Ohio	4,098	25,557	32,995
84	Toledo	Ohio	59,661	162,808	210,452
85	Appleton	Wisconsin	0	142,972	187,075
86	Brookfield-Waukesha	Wisconsin	0	333,141	435,523
87	Fond Du Lac	Wisconsin	0	96,897	126,023
88	Green Bay	Wisconsin	0	131,974	172,871
89	La Crosse	Wisconsin	24,160	70,656	93,529
90	Madison, Dane County Regional Airport	Wisconsin	0	309,199	403,711
91	Menomonee Falls[3]	Wisconsin	0	0	0
92	Milwaukee Union	Wisconsin	438,891	1,127,069	1,392,736
93	Milwaukee, Airport[3]	Wisconsin	0	71,941	88,898
94	Neenah[3]	Wisconsin	0	0	0
95	Oconomowoc	Wisconsin	0	45,863	59,589
96	Oshkosh	Wisconsin	0	143,677	187,404
97	Portage	Wisconsin	5,176	29,756	39,074
98	Sturtevant	Wisconsin	48,451	193,399	254,996
99	Tomah	Wisconsin	7,794	23,793	31,324
100	Watertown	Wisconsin	0	31,790	41,370
101	West Bend	Wisconsin	0	96,910	127,197
102	Wisconsin Dells	Wisconsin	10,480	35,770	47,245

Notes:

[1]Station name given in parentheses shows the name of the existing Amtrak station that has the same location as the new station, named by TEMS.

[2]Volume of trips information for the year 2004 is provided by Amtrak (see: www.amtrak.com).

[3]This station is in the same zone as another station. The model assigns riders to a single station in a transportation zone. There is no zone that is directly connected to this station.

Exhibit 15
MWRRS Station Profile: Socio Economics

			2002 Socio-economic Characteristics (zones)[2]			
	Station Names [1]	***State***	***Population***	***Employment***	***Average Household Income (2002 $)***	***Average Residential Property Value (2002 $)***
1	Alton	Illinois	282,752	136,298	$58,002	$100,881
2	Bloomington-Normal	Illinois	467,654	236,441	$61,688	$119,315
3	Carbondale	Illinois	176,770	80,907	$44,080	$77,866
4	Carlinville	Illinois	133,603	60,747	$48,978	$81,840
5	Centralia	Illinois	133,989	63,322	$51,058	$83,861
6	Champaign-Urbana	Illinois	296,141	143,683	$52,667	$94,681
7	Chicago Union	Illinois	4,168,445	1,900,442	$71,059	$211,452
8	Davenport-Rock Island	Illinois	396,932	197,764	$56,230	$107,368
9	Du Quoin	Illinois	23,275	9,280	$44,335	$68,652
10	Dwight	Illinois	54,220	26,438	$62,630	$135,884
11	Effingham	Illinois	105,416	50,175	$48,531	$88,160
12	Galesburg	Illinois	374,998	182,375	$49,347	$86,064
13	Inner West Chicago Suborbs (La Grange Road)	Illinois	510,164	241,497	$71,059	$211,452
14	Joliet	Illinois	466,464	234,127	$81,867	$189,355
15	Kankakee	Illinois	136,076	65,607	$55,985	$114,807
16	Kewanee	Illinois	57,493	27,873	$52,405	$98,680
17	Lincoln	Illinois	48,095	22,560	$53,766	$95,168
18	Macomb	Illinois	53,049	26,754	$47,427	$114,807
19	Mattoon	Illinois	210,373	101,350	$50,625	$95,273
20	Mendota	Illinois	200,163	94,584	$56,330	$117,056
21	North Chicago Suburbs (Glenview)	Illinois	809,805	396,810	$99,396	$274,939
22	Outer West Chicago Suburbs (Naperville)	Illinois	1,702,311	891,154	$89,171	$228,501
23	Plano	Illinois	55,963	29,800	$80,926	$191,823
24	Pontiac	Illinois	23,907	11,293	$54,594	$96,763
25	Princeton	Illinois	145,243	71,447	$57,620	$106,763
26	Quincy	Illinois	107,425	52,274	$48,653	$92,619
27	Rantoul	Illinois	39,749	20,359	$53,592	$101,831
28	South Chicago Suburbs (Homewood)	Illinois	605,832	268,940	$71,893	$209,050
29	Springfield	Illinois	284,360	143,675	$59,761	$107,310
30	Ft Wayne	Indiana	493,920	251,603	$60,044	$119,637
31	Gary, Airport	Indiana	716,607	334,823	$61,198	$129,456
32	Greensburg[3]	Indiana	N/A	N/A	N/A	N/A
33	Hammond-Whiting	Indiana	103,781	51,298	$56,654	$127,495
34	Indianapolis	Indiana	2,520,580	1,267,610	$62,135	$136,442
35	Indianapolis, Airport	Indiana	109,679	57,577	$70,069	$155,869
36	Lafayette	Indiana	237,767	120,162	$58,616	$146,587
37	Michigan City	Indiana	133,703	64,426	$56,407	$121,537
38	Plymouth	Indiana	313,024	152,834	$57,773	$113,988
39	Shelbyville	Indiana	144,758	70,293	$53,688	$114,451
40	Warsaw	Indiana	185,491	95,618	$61,704	$123,037
41	Atlantic	Iowa	76,126	38,362	$49,111	$91,400
42	Des Moines	Iowa	680,316	364,967	$61,560	$122,356
43	Iowa City	Iowa	518,071	301,703	$59,001	$121,588
44	Newton	Iowa	139,683	70,039	$52,525	$101,659
45	Albion	Michigan	36,688	17,180	$54,106	$105,512
46	Ann Arbor	Michigan	489,468	262,016	$80,447	$220,043
47	Battle Creek	Michigan	205,886	97,253	$55,746	$117,341
48	Birmingham[3]	Michigan	N/A	N/A	N/A	N/A
49	Detroit	Michigan	2,124,240	946,162	$63,579	$142,509
50	Dowagiac	Michigan	106,950	52,752	$54,631	$115,646
51	Durand	Michigan	72,479	35,150	$57,028	$120,273
52	Flint	Michigan	900,255	406,428	$58,740	$112,169
53	Grand Rapids	Michigan	1,255,798	601,901	$58,034	$131,004
54	Holland	Michigan	432,431	220,292	$63,841	$148,516

Exhibit 15
MWRRS Station Profile: Socio Economics - continued

55	Jackson	Michigan	306,563	143,904	$58,788	$127,377
56	Kalamazoo	Michigan	241,055	122,658	$61,142	$135,500
57	Lansing (East Lansing)	Michigan	591,672	297,687	$59,421	$125,100
58	Lapeer	Michigan	135,552	62,588	$61,358	$154,847
59	Niles	Michigan	43,648	17,395	$56,485	$126,865
60	North Detroit Suburbs (Royal Oak)	Michigan	621,062	331,694	$93,017	$236,346
61	Plainwell[3]	Michigan	N/A	N/A	N/A	N/A
62	Pontiac	Michigan	595,748	310,537	$93,017	$236,346
63	Port Huron	Michigan	167,117	80,301	$62,636	$151,364
64	South Detroit Suburbs (Dearborn)	Michigan	719,734	307,546	$60,019	$129,360
65	Red Wing	Minnesota	583,658	327,283	$77,368	$175,922
66	St. Paul-Minneapolis	Minnesota	3,246,669	1,743,514	$70,207	$161,994
67	Winona	Minnesota	105,181	56,089	$52,184	$123,589
68	Hermann	Missouri	147,570	68,985	$49,672	$111,445
69	Jefferson City	Missouri	330,789	168,915	$54,528	$127,714
70	Kansas City	Missouri	2,017,937	1,012,240	$63,109	$133,419
71	Kansas City North-East Suburbs (Independence)	Missouri	215,652	110,637	$56,197	$122,833
72	Kansas City South-East Suburbs (Lee's Summit)	Missouri	145,679	76,039	$60,887	$131,121
73	Sedalia	Missouri	150,017	69,391	$45,472	$93,827
74	St. Louis	Missouri	1,283,622	596,936	$60,823	$126,391
75	St. Louis Suburbs (Kirkwood)	Missouri	862,828	451,525	$76,696	$163,169
76	Warrensburg	Missouri	49,026	22,331	$47,992	$112,117
77	Washington	Missouri	820,851	394,896	$49,006	$110,142
78	Omaha	Nebraska	1,555,974	814,567	$58,226	$118,955
79	Cincinnati	Ohio	4,388,138	2,207,698	$63,254	$144,770
80	Cleveland	Ohio	3,372,741	1,620,478	$60,578	$140,566
81	Defiance	Ohio	128,885	64,776	$54,553	$102,212
82	Elyria	Ohio	441,908	221,041	$66,486	$159,054
83	Sandusky	Ohio	198,970	97,121	$54,997	$122,400
84	Toledo	Ohio	941,726	461,020	$59,670	$127,841
85	Appleton	Wisconsin	489,427	256,073	$59,660	$118,814
86	Brookfield-Waukesha	Wisconsin	371,259	203,995	$86,786	$217,094
87	Fond Du Lac	Wisconsin	98,277	52,416	$57,550	$127,156
88	Green Bay	Wisconsin	434,417	218,527	$54,991	$122,376
89	La Crosse	Wisconsin	393,586	215,042	$60,646	$129,624
90	Madison, Dane County Regional Airport	Wisconsin	592,584	331,242	$65,982	$166,232
91	Menomonee Falls[3]	Wisconsin	N/A	N/A	N/A	N/A
92	Milwaukee Union	Wisconsin	1,134,011	544,847	$55,914	$125,813
93	Milwaukee, Airport[3]	Wisconsin	N/A	N/A	N/A	N/A
94	Neenah[3]	Wisconsin	N/A	N/A	N/A	N/A
95	Oconomowoc	Wisconsin	74,595	40,604	$61,420	$151,834
96	Oshkosh	Wisconsin	159,482	85,318	$60,327	$128,954
97	Portage	Wisconsin	69,864	36,697	$56,417	$140,253
98	Sturtevant	Wisconsin	439,924	219,213	$63,265	$147,880
99	Tomah	Wisconsin	277,671	142,372	$52,533	$112,523
100	Watertown	Wisconsin	87,462	44,645	$57,384	$136,353
101	West Bend	Wisconsin	205,435	114,260	$81,601	$209,800
102	Wisconsin Dells	Wisconsin	76,204	38,317	$53,467	$126,318

Notes:

[1]Station name given in parentheses shows the name of the existing Amtrak station that has the same location as the new station, named by TEMS.

[2] Socio-economic data for the year 2000 was provided by U.S. Census Bureau of the Bureau of Economic Analysis. Projects for the year 2002 were made using the forecasts prepared by Woods & Poole, Inc. After the socio-economic database for the Midwest transportation zoning system had been developed by TEMS (for the base year 2002).

Data on population / employment shown in this table for each particular station reflects the total population / employment of the zones represent the weighted average of corresponding data for all zones that "feed" this station.

[3]This station is in the same zone as another station. The model assigns riders to a single station in a transportation zone. There is no zone that is directly connected to this station.

Exhibit 15
MWRRS Station Profile: Socio Economics - continued

	2000 Socio-economic Characteristics (city)[2]					
	Station Names [1]	***State***	***City Population***	***City Population Size***	***Population Density***	***Density Category***
1	Alton	Illinois	30,496	Small	1,955	Low
2	Bloomington-Normal	Illinois	110,194	Small	3,284	High
3	Carbondale	Illinois	20,681	Small	1,738	Low
4	Carlinville	Illinois	5,685	Small	2,369	Medium
5	Centralia	Illinois	14,136	Small	1,885	Low
6	Champaign-Urbana	Illinois	103,913	Small	3,779	High
7	Chicago Union	Illinois	2,896,016	Large	12,752	High
8	Davenport-Rock Island	Illinois	138,043	Small	1,754	Low
9	Du Quoin	Illinois	6,448	Small	934	Low
10	Dwight	Illinois	4,363	Small	1,678	Low
11	Effingham	Illinois	12,384	Small	1,423	Low
12	Galesburg	Illinois	33,706	Small	1,994	Low
13	Inner West Chicago Suborbs (La Grange Road)	Illinois	15,608	Small	6,243	High
14	Joliet	Illinois	106,221	Small	2,788	Medium
15	Kankakee	Illinois	27,491	Small	2,235	Medium
16	Kewanee	Illinois	12,944	Small	2,055	Medium
17	Lincoln	Illinois	15,369	Small	2,605	Medium
18	Macomb	Illinois	18,558	Small	1,894	Low
19	Mattoon	Illinois	18,291	Small	1,967	Low
20	Mendota	Illinois	7,272	Small	1,914	Low
21	North Chicago Suburbs (Glenview)	Illinois	41,847	Small	3,100	High
22	Outer West Chicago Suburbs (Naperville)	Illinois	128,358	Small	3,626	High
23	Plano	Illinois	5,633	Small	1,609	Low
24	Pontiac	Illinois	11,864	Small	2,282	Medium
25	Princeton	Illinois	7,501	Small	1,120	Low
26	Quincy	Illinois	40,366	Small	2,765	Medium
27	Rantoul	Illinois	12,857	Small	1,786	Low
28	South Chicago Suburbs (Homewood)	Illinois	19,543	Small	3,758	High
29	Springfield	Illinois	111,454	Small	2,064	Medium
30	Ft Wayne	Indiana	205,727	Small	2,604	Medium
31	Gary, Airport	Indiana	102,746	Small	2,047	Medium
32	Greensburg[3]	Indiana	10,260	Small	2,138	Medium
33	Hammond-Whiting	Indiana	83,048	Small	3,627	High
34	Indianapolis	Indiana	781,870	Medium	2,163	Medium
35	Indianapolis, Airport	Indiana	N/A	N/A	N/A	N/A
36	Lafayette	Indiana	56,397	Small	2,806	Medium
37	Michigan City	Indiana	32,900	Small	1,679	Low
38	Plymouth	Indiana	9,840	Small	1,406	Low
39	Shelbyville	Indiana	17,951	Small	2,017	Medium
40	Warsaw	Indiana	12,415	Small	1,182	Low
41	Atlantic	Iowa	7,257	Small	896	Low
42	Des Moines	Iowa	198,682	Small	2,621	Medium
43	Iowa City	Iowa	62,220	Small	2,571	Medium
44	Newton	Iowa	15,579	Small	1,513	Low
45	Albion	Michigan	9,144	Small	2,032	Medium
46	Ann Arbor	Michigan	114,024	Small	4,223	High
47	Battle Creek	Michigan	53,364	Small	1,247	Low
48	Birmingham[3]	Michigan	19,291	Small	4,019	High
49	Detroit	Michigan	951,270	Medium	6,854	High
50	Dowagiac	Michigan	6,147	Small	1,537	Low
51	Durand	Michigan	3,933	Small	1,967	Low
52	Flint	Michigan	124,943	Small	3,719	High
53	Grand Rapids	Michigan	197,800	Small	4,435	High
54	Holland	Michigan	35,048	Small	2,111	Medium

Exhibit 15
MWRRS Station Profile: Socio Economics - continued

55	Jackson	Michigan	36,316	Small	3,272	High
56	Kalamazoo	Michigan	77,145	Small	3,123	High
57	Lansing (East Lansing)	Michigan	119,128	Small	3,404	High
58	Lapeer	Michigan	9,072	Small	1,649	Low
59	Niles	Michigan	12,204	Small	2,104	Medium
60	North Detroit Suburbs (Royal Oak)	Michigan	60,062	Small	5,090	High
61	Plainwell[3]	Michigan	3,933	Small	1,873	Low
62	Pontiac	Michigan	66,337	Small	3,317	High
63	Port Huron	Michigan	32,338	Small	3,992	High
64	South Detroit Suburbs (Dearborn)	Michigan	97,775	Small	4,007	High
65	Red Wing	Minnesota	16,116	Small	455	Low
66	St. Paul-Minneapolis	Minnesota	669,769	Medium	6,219	High
67	Winona	Minnesota	27,069	Small	1,487	Low
68	Hermann	Missouri	2,674	Small	1,163	Low
69	Jefferson City	Missouri	39,636	Small	1,452	Low
70	Kansas City	Missouri	441,545	Medium	1,408	Low
71	Kansas City North-East Suburbs (Independence)	Missouri	113,288	Small	1,447	Low
72	Kansas City South-East Suburbs (Lee's Summit)	Missouri	70,700	Small	1,188	Low
73	Sedalia	Missouri	20,339	Small	1,695	Low
74	St. Louis	Missouri	348,189	Medium	5,625	High
75	St. Louis Suburbs (Kirkwood)	Missouri	27,324	Small	2,970	Medium
76	Warrensburg	Missouri	16,340	Small	1,945	Low
77	Washington	Missouri	13,243	Small	1,558	Low
78	Omaha	Nebraska	390,007	Medium	3,371	High
79	Cincinnati	Ohio	331,285	Medium	4,247	High
80	Cleveland	Ohio	478,403	Medium	6,165	High
81	Defiance	Ohio	16,465	Small	1,568	Low
82	Elyria	Ohio	55,953	Small	2,812	Medium
83	Sandusky	Ohio	27,844	Small	2,784	Medium
84	Toledo	Ohio	313,619	Medium	3,891	High
85	Appleton	Wisconsin	70,087	Small	3,353	High
86	Brookfield-Waukesha	Wisconsin	103,474	Small	2,120	Medium
87	Fond Du Lac	Wisconsin	42,203	Small	2,497	Medium
88	Green Bay	Wisconsin	102,313	Small	2,331	Medium
89	La Crosse	Wisconsin	51,818	Small	2,578	Medium
90	Madison, Dane County Regional Airport	Wisconsin	208,054	Small	3,028	High
91	Menomonee Falls[3]	Wisconsin	32,647	Small	980	Low
92	Milwaukee Union	Wisconsin	596,974	Medium	6,212	High
93	Milwaukee, Airport[3]	Wisconsin	NA	NA	NA	NA
94	Neenah[3]	Wisconsin	24,507	Small	2,989	Medium
95	Oconomowoc	Wisconsin	12,382	Small	1,848	Low
96	Oshkosh	Wisconsin	62,916	Small	2,666	Medium
97	Portage	Wisconsin	9,728	Small	1,172	Low
98	Sturtevant	Wisconsin	5,287	Small	1,705	Low
99	Tomah	Wisconsin	8,419	Small	1,153	Low
100	Watertown	Wisconsin	21,598	Small	1,981	Low
101	West Bend	Wisconsin	28,152	Small	798	Low
102	Wisconsin Dells	Wisconsin	2,418	Small	590	Low

Notes:

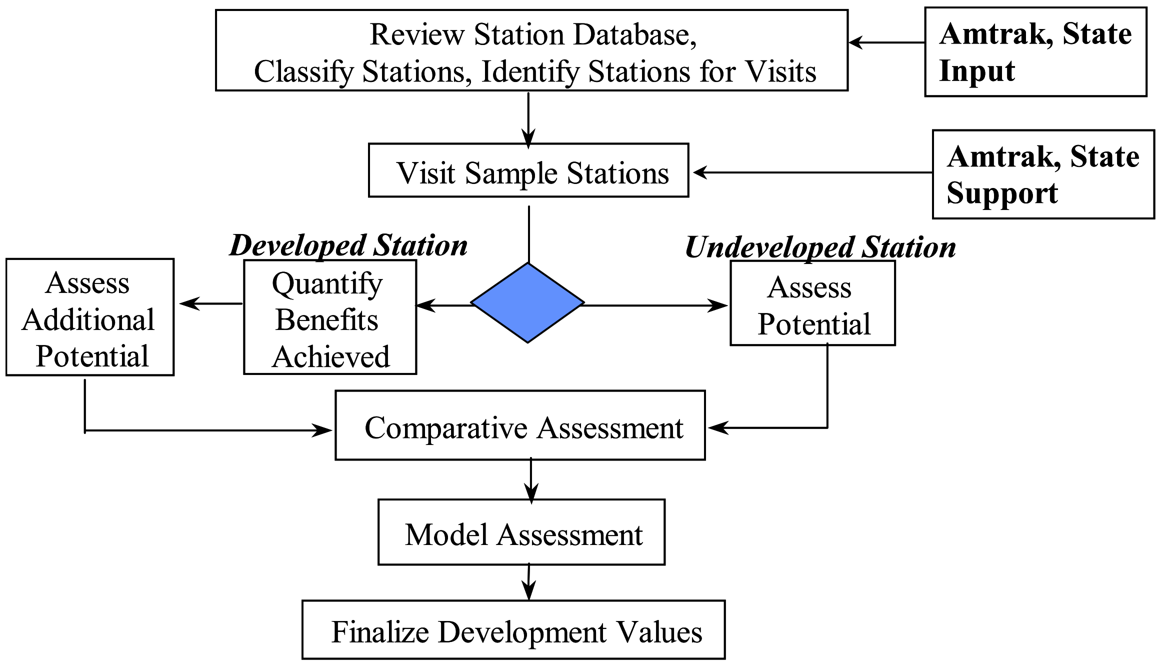
[1]Station name given in parentheses shows the name of the existing Amtrak station that has the same location as the new station, named by TEMS.

[2] Socio-economic characteristics for each city were not used directly in calculations in the Economic Rent Model. They played significant role in the qualitative Economic Rent analysis, i.e., in the developing hierarchy system of the transportation zones. That is why TEMS could use city data for the year 2000 (latest available) without adjusting them for the year 2002 (base year of the study).

Data on city population was obtained from: www.city-data.com/. Data on the population density for each city was calculated by TEMS on the base of the data from the same source.

[3]This station is in the same zone as another station. The model assigns riders to a single station in a transportation zone. There is no zone that is directly connected to this station.

Exhibit 16
Joint Development Methodology



The main factors impacting the development potential included station location, land availability around the station for development, and community commitment to the station and urban development. The ability of a location to achieve its highest potential is affected by the following factors:

- Level of modal integration at station
- Frequency of existing rail and bus services
- Accessibility of the station to the community
- Existing level of connectivity to regional modal networks
- Level of existing economic development

In assessing stations and communities, factors such as community size, proximity of station to major economic markets, current economic base, and density along the corridor were taken into account. Then the potential for each community to realize economic benefits from the MWRRS was determined within the context of the economic rent analysis.

11.3.5 Multimodal Connectivity

MWRRS station development will bring together many modes of travel–trains, planes, taxis, private automobiles, and regional, inter-city, and airport buses–at a single location in order to maximize benefits and efficiencies. Savings in time and increased economic activity will assure the highest output in economic rent, along with an increase in property values and joint development potential. The multimodal transportation centers will be well located to encourage other joint-use occupancies and help create "smart growth" areas in urban centers.

In the same way that large department stores anchor a shopping center and create trips that stimulate activity in nearby shops, a multimodal transportation center has the potential to stimulate retail, office, and residential development in an urban center. Without the synergies achieved by bringing all modes of transportation together in one location, there are significant negative impacts on the economic development potential. The MWRRI analysis and the experiences of other transportation centers indicate that the potential property value increase and joint development potential declines by 30 to 50 percent when the station is a single or limited transportation center. Thus, connectivity is critical to success in the station development effort.

Station Area Joint Development Potential

An intercity high speed rail system provides considerable joint development potential at stations. High speed rail systems developed in Europe and Japan have resulted in very significant joint development projects that have completely changed the character of the urban environment around the station. In France, examples exist in Paris, Lyon and Nantes while in the UK the redevelopment of Liverpool Street Station, Cannon Street Station and plans for Kings Cross Station in London shows the scale of redevelopment possible. At Liverpool Street Station, the project completely changed the character of the surrounding urban environment including massive redevelopment for offices (UBS-PaineWebber headquarters building) housing, and commercial businesses. See Exhibit 17. At Kings Cross an eight billion dollar project is underway on the existing railway lands as a result of the development of 150-mph East coast rail service from London to Edinburgh. See Exhibit 18.

In the U.S. the redevelopment of Washington Union Station and the surrounding area is a clear example of the opportunity that high speed rail can offer for creating a terminal station development. See Exhibit 19. Indeed all along the Northeast corridor, station –area redevelopment is showing the ability of high rail service to provide increased business activity. The Northeast corridor contrasts strongly with the Midwest where despite attempts to redevelop stations, the low level of rail activity is such that only Chicago Union Station and some smaller community stations have been able to realize much of an impact. In extreme cases, some former rail stations have been abandoned or turned into museums or restaurants. See Exhibit 20 and 21. TEMS has assessed this situation for the Great American Station Foundation and advised on the level of potential associated with existing rail service.

Exhibit 17
Liverpool Street Station, London

Exhibit 18
Kings Cross Station, London

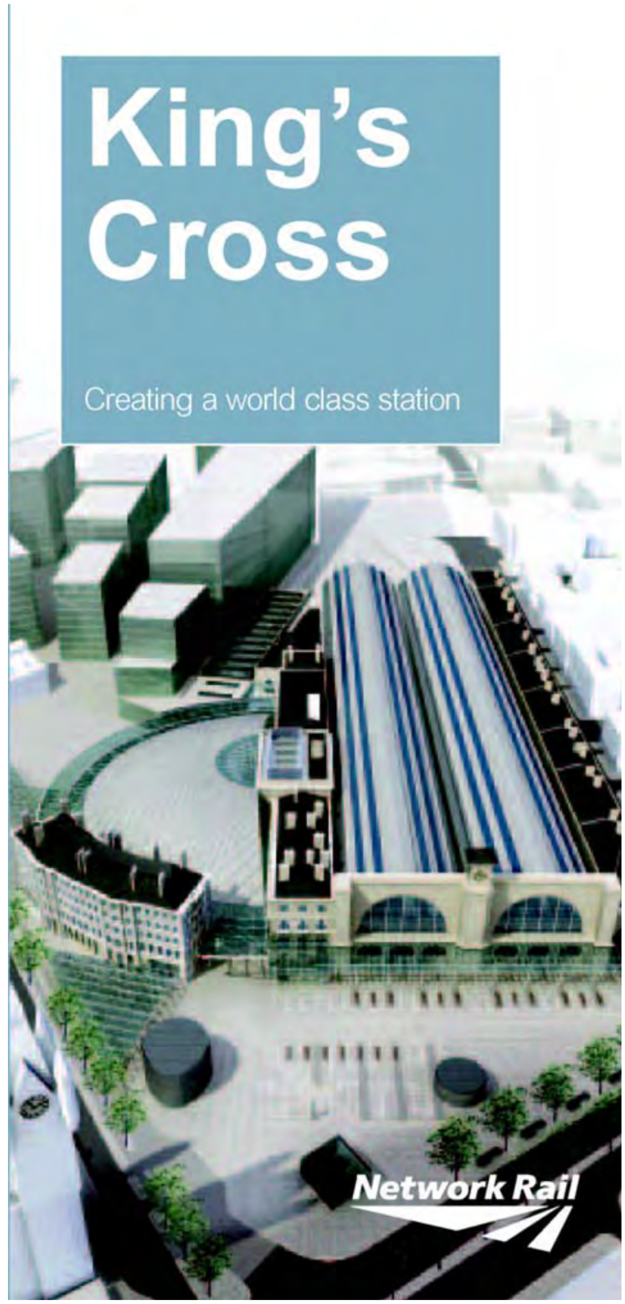
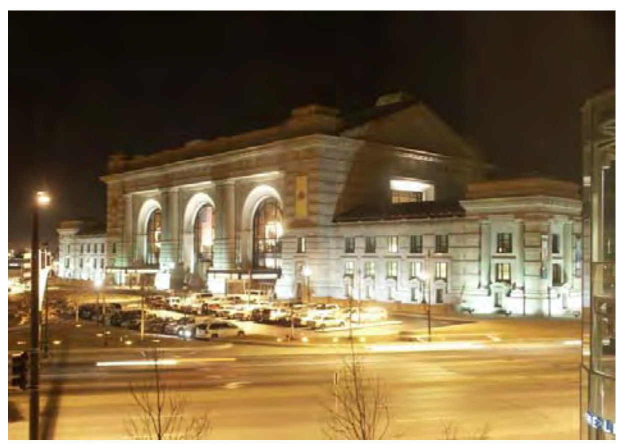


Exhibit 19
Washington Union Station
(a typical major station)

Exhibit 20
Ann Arbor Station (Restaurant)

Exhibit 21
Kansas City Union Station (Museum)



The result of the RENTS™ analysis for each of the MWRRI stations is shown in Exhibit 22 and 23. In Exhibit 22, the property value development is summarized by level of station in the hierarchy. It can be seen that the ten major terminals can expect development in the order of at least $150-250 million. Medium stations can expect $100-150 million, while small station on major 110-mph corridors like at Normal, Illinois can expect $50-100 million for Joint Development. The smallest stations on branchline operations such as the Carbondale line, Illinois, Holland line in Michigan, or the Greenbay line in Wisconsin can expect $10-20 million of Joint Development. The property value development for each individual station is given in Exhibit 23.

Exhibit 22
Joint Development Potential (Tier Summary)

Tier #	# of Stations:	Joint Development Potential ($ in Millions)
Tier 1 Stations:	1	1,437
Tier 2 Stations:	9	1,127
Tier 3 Stations:	23	1,142
Tier 4 Stations:	29	918
Tier 5 Stations:	40	346
Total:	102	4,970

Exhibit 23
Economic Benefits at each Station

			Economic Rent Results		
#	***Station Names***	***State***	***Increase in Employment (# of people)***	***Increase in Household Income (ml of 2002 $)***	***Increase in Property Value (ml of 2002 $)***
1	Alton	Illinois	475-715	9.5-14	41-62
2	Bloomington-Normal	Illinois	625-935	12-18	59-88
3	Carbondale	Illinois	185-280	3.5-5.5	18-26
4	Carlinville	Illinois	80-115	1.5-2.3	7-10
5	Centralia	Illinois	35-50	0.7-1.0	3-5
6	Champaign-Urbana	Illinois	385-580	7.5-11	36-54
7	Chicago Union	Illinois	12,250-18,375	242-363	1,150-1,725
8	Davenport-Rock Island	Illinois	550-825	11-16	52-77
9	Du Quoin	Illinois	20-35	0.4-0.7	2-3
10	Dwight	Illinois	90-135	1.8-2.7	9-13
11	Effingham	Illinois	70-105	1.4-2.1	6-9
12	Galesburg	Illinois	185-275	3.5-5.5	17-26
13	Inner West Chicago Suburbs (La Grange Road)	Illinois	150-220	3-4.5	14-21
14	Joliet	Illinois	545-820	11-16	51-77
15	Kankakee	Illinois	225-340	4.5-6.5	21-32
16	Kewanee	Illinois	40-60	0.8-1.2	4-6
17	Lincoln	Illinois	75-115	1.5-2.2	7-11
18	Macomb	Illinois	160-240	3.2-4.8	15-23
19	Mattoon	Illinois	65-95	1.2-1.9	6-9
20	Mendota	Illinois	110-165	2.1-3.2	10-15
21	North Chicago Suburbs (Glenview)	Illinois	260-395	5-8	25-37
22	Outer West Chicago Suburbs (Naperville)	Illinois	1,000-1500	20-30	94-141
23	Plano	Illinois	75-115	1.5-2.3	7-11
24	Pontiac	Illinois	55-80	1.1-1.6	5-8
25	Princeton	Illinois	155-230	3.1-4.6	15-22
26	Quincy	Illinois	135-205	2.5-4	13-19
27	Rantoul	Illinois	70-110	1.4-2.1	7-10
28	South Chicago Suburbs (Homewood)	Illinois	685-1,030	14-20	64-97
29	Springfield	Illinois	675-1,015	13-20	63-95
30	Ft Wayne	Indiana	345-520	6-9	26-38
31	Gary, Airport	Indiana	400-605	8-12	32-48
32	Greensburg *	Indiana	4-6	0.07-0.1	0.3-0.5
33	Hammond-Whiting	Indiana	175-265	3.5-5	16-25
34	Indianapolis	Indiana	1,510-2,265	29-44	121-182
35	Indianapolis, International Airport	Indiana	85-125	1.6-2.4	7-10
36	Lafayette	Indiana	480-720	9.5-14	39-58
37	Michigan City	Indiana	130-195	2.6-3.9	12-18
38	Plymouth	Indiana	230-345	4.5-6.8	21-32
39	Shelbyville	Indiana	10-15	0.2-0.3	0.9-1.4
40	Warsaw	Indiana	105-160	2.1-3.2	10-15
41	Atlantic	Iowa	4-6	0.06-0.09	0.2-0.3
42	Des Moines	Iowa	115-175	2-3	8-12
43	Iowa City	Iowa	150-225	3-4.5	14-21
44	Newton	Iowa	45-65	0.7-1.2	3-5
45	Albion	Michigan	45-70	0.9-1.3	4-6
46	Ann Arbor	Michigan	535-805	11-16	48-72
47	Battle Creek	Michigan	425-635	8.5-13	40-57
48	Birmingham *	Michigan	3-4	0.06-0.08	0.3-0.4
49	Detroit	Michigan	850-1,275	17-25	76-114
50	Dowagiac	Michigan	65-95	1.2-1.9	6-9
51	Durand	Michigan	45-65	0.9-1.3	4-6

Exhibit 23
Economic Benefits at each Station - continued

52	Flint	Michigan	475-715	9-14	43-64
53	Grand Rapids	Michigan	460-685	9-14	41-61
54	Holland	Michigan	180-270	3.5-5.5	16-24
55	Jackson	Michigan	205-310	4-6	18-28
56	Kalamazoo	Michigan	595-890	12-18	53-80
57	Lansing	Michigan	470-705	9-14	42-63
58	Lapeer	Michigan	75-110	1.4-2.2	6-10
59	Niles	Michigan	95-145	1.9-2.8	9-13
60	North Detroit Suburbs (Royal Oak)	Michigan	300-455	6-9	27-40
61	Plainwell *	Michigan	5-10	0.1-0.2	0.5-0.8
62	Pontiac	Michigan	260-390	5-8	23-35
63	Port Huron	Michigan	105-155	2-3	9-14
64	South Detroit Suburbs (Deaborn)	Michigan	400-600	8-12	36-54
65	Red Wing	Minnesota	105-155	2.0-2.9	9-14
66	St. Paul-Minneapolis	Minnesota	1,190-1,785	23-34	102-153
67	Winona	Minnesota	100-155	2-3	9-13
68	Hermann	Missouri	85-130	1.7-2.6	7-11
69	Jefferson City	Missouri	495-745	10-15	43-65
70	Kansas City	Missouri	940-1,415	17-25	68-102
71	Kansas City North-East Suburbs (Independence)	Missouri	125-190	2-3.5	9-14
72	Kansas City South-East Suburbs (Lee's Summit)	Missouri	335-505	6-9	24-36
73	Sedalia	Missouri	95-145	1.5-2.5	7-10
74	St. Louis	Missouri	1,915-2,870	38-57	167-250
75	St. Louis Suburbs (Kirkwood)	Missouri	640-955	13-19	56-83
76	Warrensburg	Missouri	130-190	2.3-3.4	9-14
77	Washington	Missouri	130-200	2.5-4	12-17
78	Omaha	Nebraska	400-600	6-9	23-34
79	Cincinnati	Ohio	1,925-2,890	29-44	119-179
80	Cleveland	Ohio	1,005-1,510	18-27	74-111
81	Defiance	Ohio	40-60	0.7-1.1	2.9-4.4
82	Elyria	Ohio	75-110	1.5-2	5-8
83	Sandusky	Ohio	45-65	0.8-1.2	3-5
84	Toledo	Ohio	480-720	9-13	35-53
85	Appleton	Wisconsin	625-935	11-17	46-69
86	Brookfield-Waukesha	Wisconsin	930-1,395	17-25	69-103
87	Fond Du Lac	Wisconsin	425-635	7.5-12	31-47
88	Green Bay	Wisconsin	575-865	10-16	43-64
89	La Crosse	Wisconsin	180-270	3.5-5	16-23
90	Madison, Airport	Wisconsin	875-1,315	16-24	65-97
91	Menomonee Falls*	Wisconsin	15-20	0.3-0.4	1.1-1.6
92	Milwaukee Union	Wisconsin	2,050-3,075	37-56	152-227
93	Milwaukee, Airport (General Mitchell Field)*	Wisconsin	5-10	0.1-0.2	0.4-0.7
94	Neenah *	Wisconsin	5-10	0.1-0.2	0.5-0.7
95	Oconomowoc	Wisconsin	200-300	3.6-5.5	15-22
96	Oshkosh	Wisconsin	620-930	11-17	46-69
97	Portage	Wisconsin	130-195	2.4-3.5	10-14
98	Sturtevant	Wisconsin	110-170	2.0-3.1	8-12
99	Tomah	Wisconsin	60-90	1.2-1.7	5-8
100	Watertown	Wisconsin	140-210	2.5-3.8	10-15
101	West Bend	Wisconsin	425-635	7.5-12	31-47
102	Wisconsin Dells	Wisconsin	155-235	2.8-4.3	12-17

* Note that these stations are in the same zone as another station. The model assigns riders to a single station in a zone. There is no transportation zone that is directly connected to the stations marked with (*). The distribution of appropriate riders and distribution of economic benefits was made for Phase 7 in the frame of Economic Rent model.

Comparison of these results with actual urban development opportunities suggest that in most cases these impacts can be doubled if the proposals are integrated with other urban redevelopment proposals.

For example, in the MWRRI case study of Normal, Illinois station (see Exhibit 24), it was shown that small communities such as Normal, Illinois can expect the MWRRI to generate a property value joint development of $50-100 million, much larger than that suggested by the RENTS™ results. This is because the city has supported the station development project and integrated it into its downtown renewal plan. Equally, a second case study of the Crosset site in Cincinnati showed a joint development potential of $350-500 million. See Exhibit 25. This increase is twice the value suggested by the MWRRI RENTS™ Model. Again, this result is due to the integration of the proposed station with Cincinnati downtown, bus and rail links, and office development potential. Chicago Union Station is already seeing some activity based on Amtrak's current proposal to site condominium housing units near the station complex. Given the size and scale of the MWRRI operation, it is likely that Chicago Union Station would have a minimum joint development potential in the range of $2-3 billion, far higher than suggested by the MWRRI RENTS™ Model.

Exhibit 24
Bloomington Normal, Illinois Station

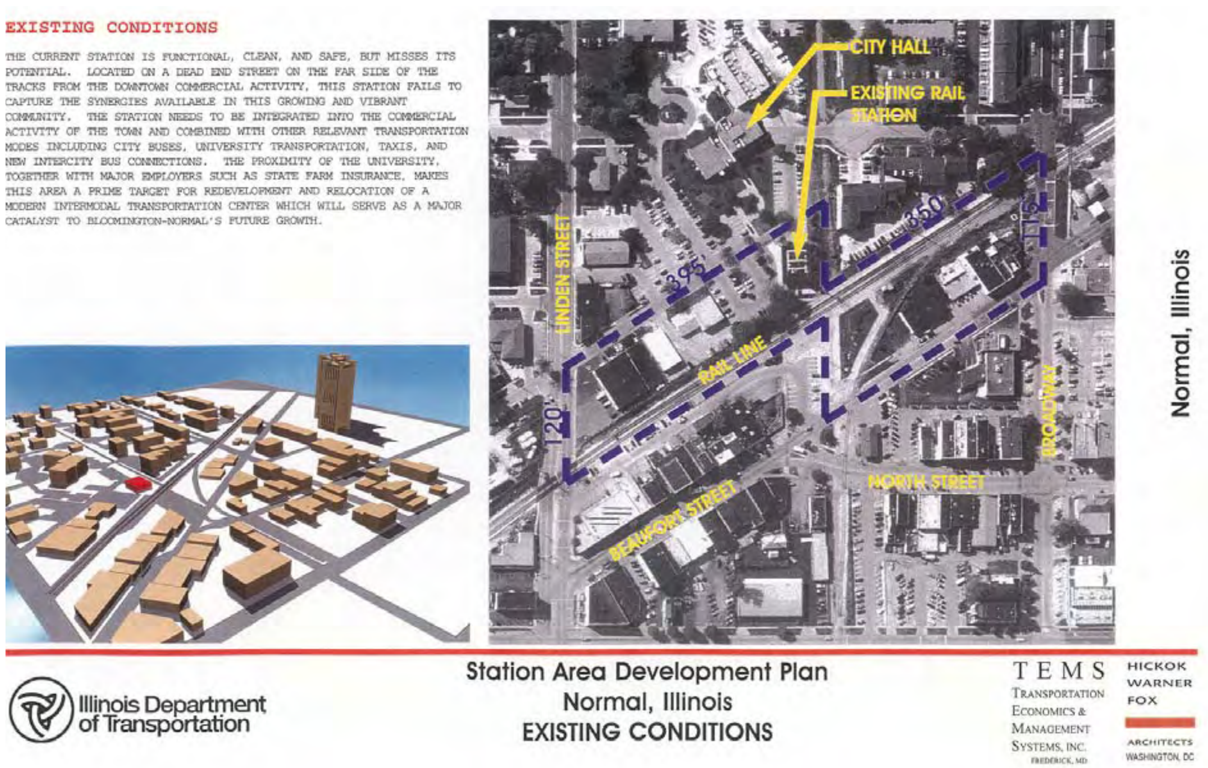
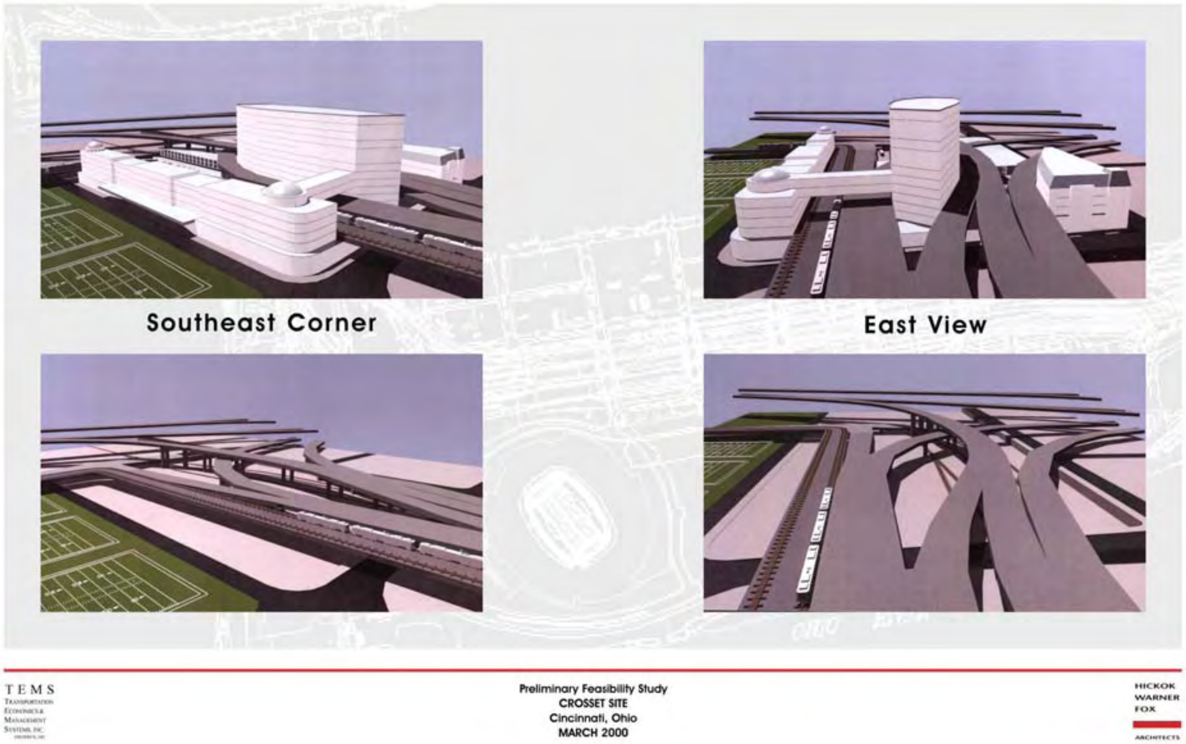


Exhibit 25
Cincinnati, Crosset Station



4 Input/Output Analysis: Construction and Operation of MWRRI

From a regional, state and local perspective, the MWRRI construction program will have significant economic and financial impact in terms of short term job creation, income and output. Regional input-output (I-O) multipliers, which account for inter-industry relationships within specific regions, have proven to be a very potent and useful tool for evaluating economic stimulus of construction expenditures in a region.

4.1 Scope of Evaluation

In order to understand the economic impact of MWRRI project construction on the whole Midwest region, an analysis was made of the supply-side benefits that are derived by the analyzed region. This includes an assessment of both the temporary direct and indirect jobs created by construction of the project, as well as income and economic output.

An input-output methodology was used to identify the number of temporary jobs, both direct and indirect, that will be created in Midwest region during each of 10 years of construction of the project. The input-output analysis measures the short-term economic stimuli that are created in Midwest as a result of the additional construction spending on the project. In our study we assume that Federal government will fund 80% of the capital costs of the project. As a result we will measure the influence of this part (80%) of construction spending on output, job creation and correspondent earnings. Although an FHWA cost-benefit analysis treats the capital investment as a cost rather than as a benefit of the project, according to BEA methodology the construction cost creates job and income benefits to Midwest region, because the money is spent in its states rather than elsewhere.

4.2 Input-Output Methodology

In the 1970's, the Bureau of Economic Analysis (BEA) developed a method for estimating regional I-O multipliers known as Regional Industrial Multiplier System (RIMS) In the 1980's, BEA completed an enhancement of RIMS, known as RIMS II, the Regional Input-Output Modeling System[3]. A second edition of the RIMS II handbook based on more recent data and an improved methodology was issued in 1992. A third edition was made available in 1997.

The main underpinning of the RIMS II methodology is an accounting framework known as an I-O matrix, which is discussed in detail in the Appendix. The I-O matrix is an exhibit that shows the distribution of inputs purchased and outputs sold for each industry. There are two main data sources for the I-O matrix in RIMS II. First is the BEA's national I-O exhibit, which provides the input and output structure of nearly 500 detailed US industries (in accordance with NAICS codes) and of 20 aggregated industries. Second, is represented by BEA's regional economic accounts, used to adjust the national I-O exhibit in order to reflect a region's industrial composition and trading patterns.

[3] For a detailed discussion on the data sources and methods underlying the use of RIMS II, the Reader is referred to the technical Appendix B of the MWRRI Project Notebook (2004).

The fundamental idea behind the input-output model is that of the multiplier effect, whereby new money entering the economy has a ripple effect with spillover benefits for the entire community through direct and indirect impacts. To cite an example, when the government buys $10 billion worth of goods from a major industry, the purchase (notwithstanding the immediate effect of raising employment and profits in that industry) has repercussions leading to higher overall incomes, which in turn lead to even higher demand, thereby triggering a positive feedback loop. The total impact on the quantity of goods and services demanded is much larger than the initial impulse felt from higher government spending. The factor by which the initial impulse is multiplied will be determined by the individuals' marginal propensity to consume: the fraction of extra income that a household consumes rather than saves.

Exhibits 26, 27 and 28 illustrate how a single dollar of additional spending on auto production, for example, benefits the plastics, electricity, instruments and rubber industries, among others[4]. As shown in the first Exhibit, a single dollar spent on auto production translates into 14 cents spent on plastics, 5 cents on electricity, 11 cents on instruments, 7 cents on rubber, 21 cents on local industries, 17 cents in earnings for local employees and 25 cents leakage. In the second ripple, the 14 cents earned by the plastics industry feeds 9 cents to the chemicals industry, 2 cents earnings for local employees and 3 cents of leakage. Similarly, in the third Exhibit, 21 cents spent on other local industries re-enters the economy in the form of 1 cent for utilities, 5 cents on autos, 4 cents for other local industries, and 4 cents income for local employees and 7 cents leakage.

It should be noted that depending upon the type of project and its location, the multiplier effects from the additional investment, jobs, income and workers' spending decisions would differ. This is because the characteristics of the local economy (i.e., the types of industry present) determines exactly how much extra impact an investment will generate in that region.

4.3 Application of Regional Input-Output Modeling System

The main advantage of RIMS II is that multipliers can be estimated for any region composed of one or more counties, and for any industry or group of industries in the national I-O exhibit. In order to obtain multipliers especially for the MWRRI region a description of the region was provided to BEA. The RIMS II multipliers were then calculated for Midwest region.

A systematic analysis of the regional economic benefits that will be accrued from a new MWRRI transportation project calls for detailed information about inter-industry relationships not only at the level of Midwest Region in general, but in the different parts of the region. Using data from Chapter 8, Exhibit 8-4 (MWRRI Project Notebook-2004) we calculate the economic impact of construction spending on output, earnings and job creations in different parts of MWRRI corridor. Because the analysis is based on cash flows, we can identify only the employment generated during project construction.

[4] The given example illustrates the methodology of RIMS II multiplier calculations made by BEA and does not relate to Midwest region.

Exhibit 26
Multiplier Mechanism 1

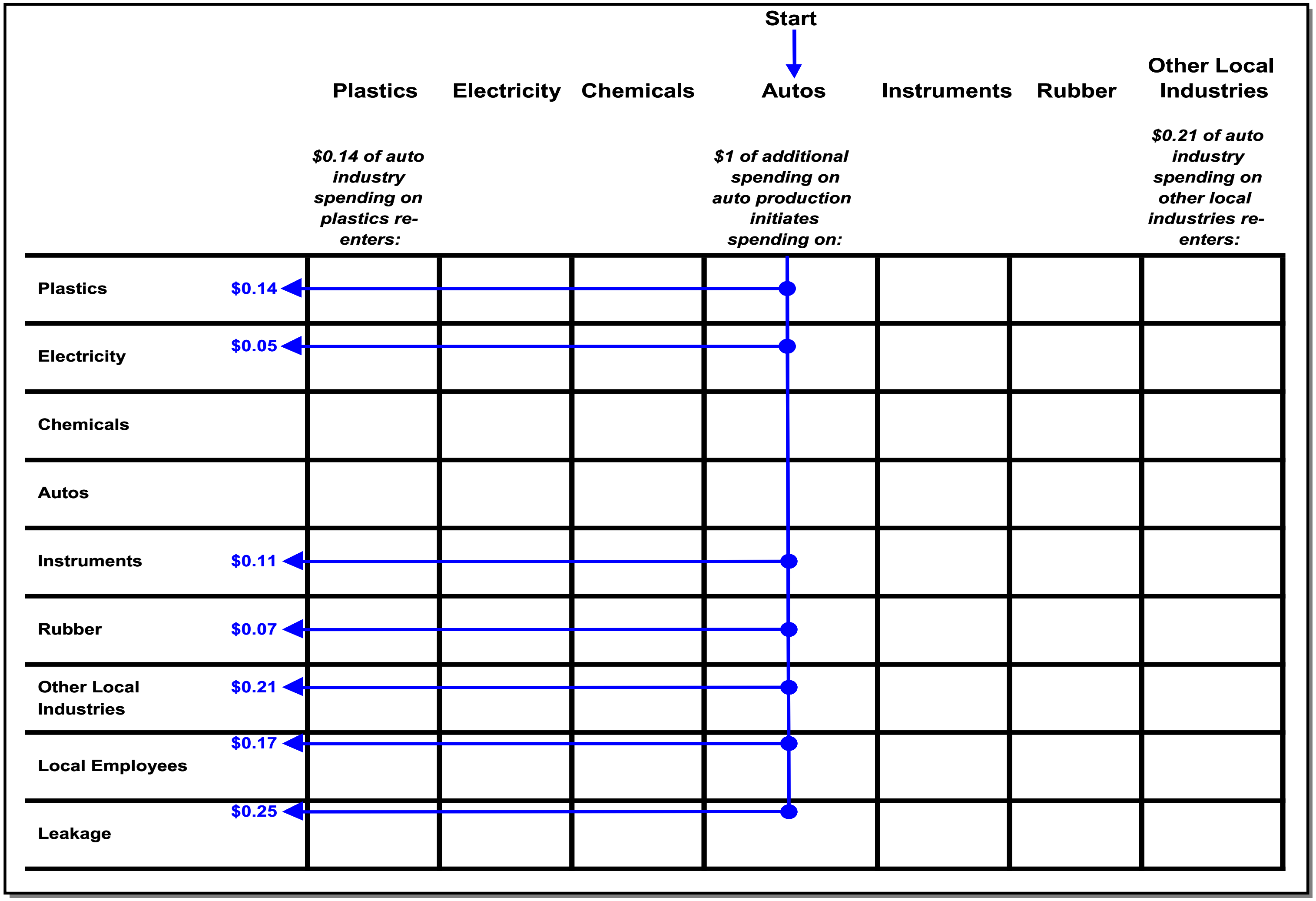


Exhibit 27
Multiplier Mechanism 2

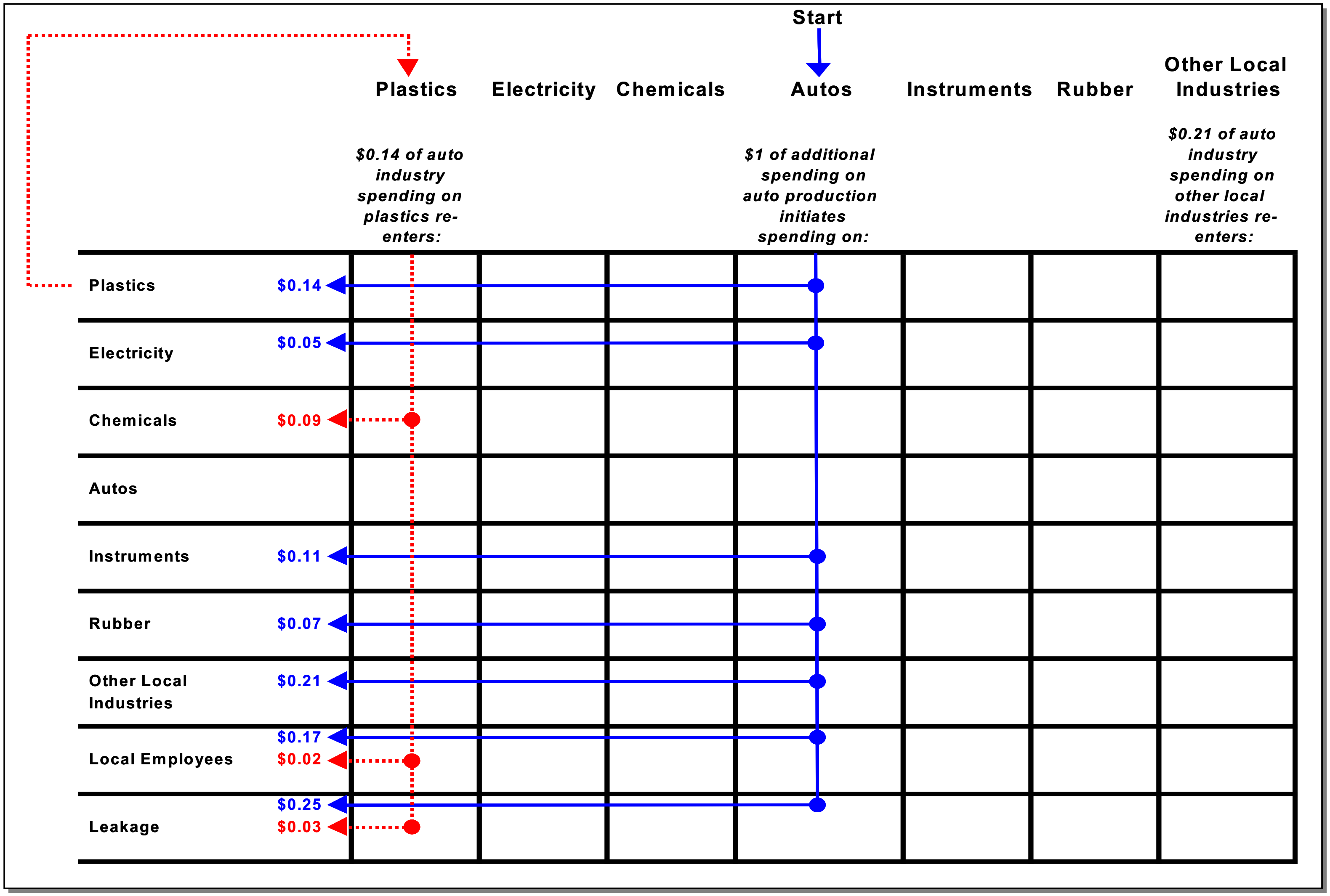
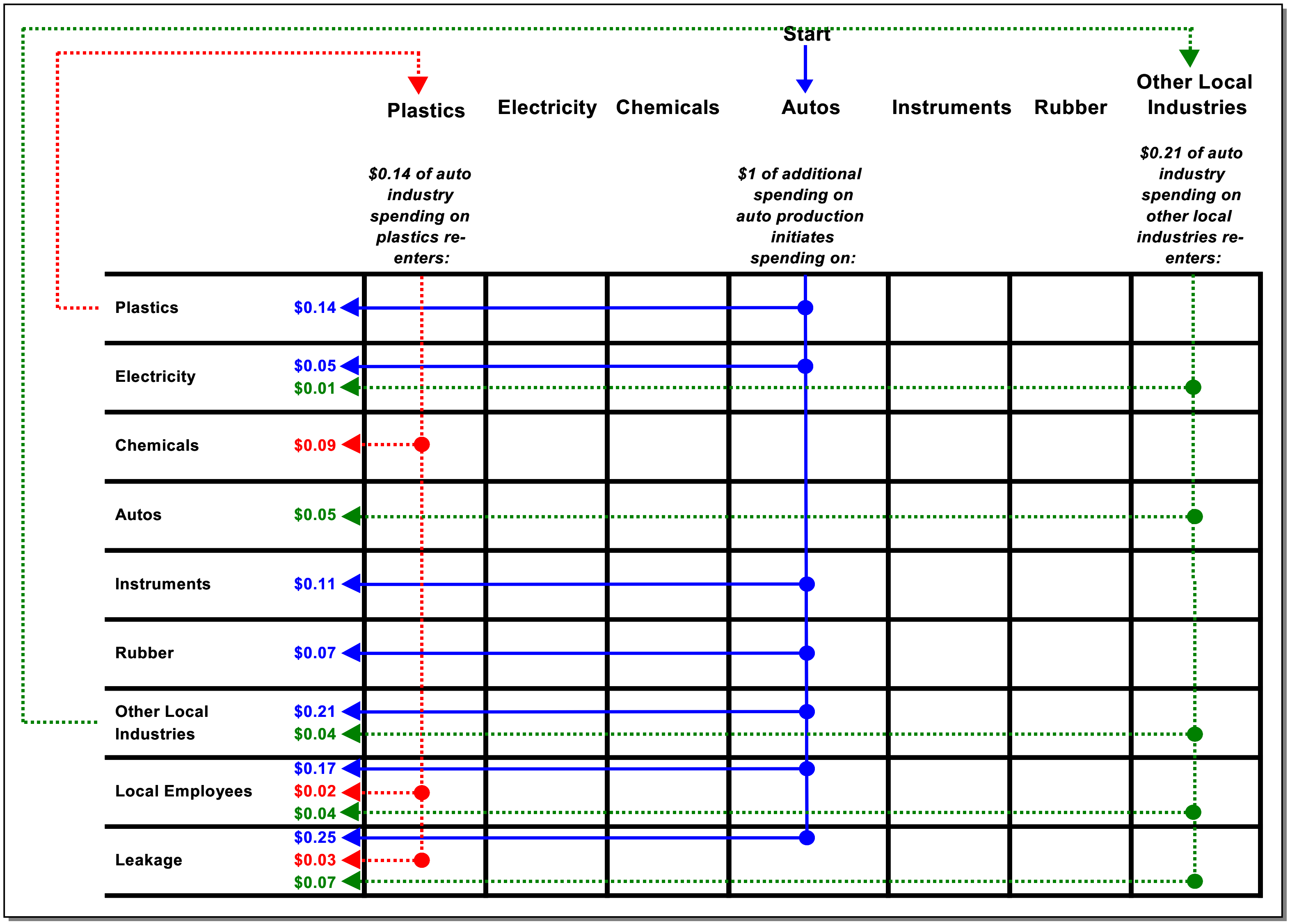


Exhibit 28
Multiplier Mechanism 3



11.4.4 Results

Using RIMS II output and employment multipliers for annual capital infusion in the construction industry over 10-year construction period we estimate how different industries are expected to benefit from MWRRI in terms of output and jobs creation. As was shown in Chapter 8, Exhibit 8-4 of the MWRRI Project Notebook (2004), in the ten-year period of construction there will be additional construction spending in the region – it will vary between $189 million in year 2 and $1,557 million in the year 7 in year 2002 dollars.

Following the methodology developed by BEA for RIMS II we calculate economic impacts on output, earnings and job creation for each stage (year) of construction period. As we can see from Exhibit 29 through 30, construction industry itself will benefit from project implementation more than other industries. It will obtain 40% of temporary jobs and 37% of output created in Midwest Region. Besides construction, noteworthy employment gains will be mainly in retail trade (10% of new temporary jobs), manufacturing (8%), health care and social assistance (7%), accommodation and food services (6%). Among the industries that are estimated to receive significant share of output, we can point out on manufacturing (18%), real estate and rental and leasing (6%), retail trade (5%), finance and insurance (5%).

The Input-Output analysis shows that the MWRRI Project will have a general sizeable impact on the economies of Midwest region. The results are summarized in Exhibits 29 through 32. Since contractors on the project will buy a lot of their materials and services from other Midwest region businesses, the RIMS II analysis predicts a multiplier effect on the initial capital expenditure of $7.7 billion. In making this calculation, RIMS II takes account of leakages to other parts of the U.S. However, all Midwest Region industries are expected to benefit by approximately USD $ 17 billion and over 152 thousand person-years of work during the construction period. The multiplier more than doubles the impact of this expenditure, so the aggregate increase in output comes to $16.934 billion. Over a ten-year construction period, this would be equivalent to adding approximately 15,624 temporary jobs annually in Midwest Region, occurring as a direct result of the construction expenditures alone.

It should be noted that depending upon the type of project and its location, the multiplier effects from the additional investment, jobs, income and workers' spending decisions would differ. This is because the characteristics of the local economy determines exactly how much extra impact an investment will generate.

Exhibit 29
Economic Impact by Industry Grouping - Temporary Job Creation

NAICS	Descriptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average # of jobs	Total Person years of work
23	Construction	1,779	1,480	4,684	6,202	5,673	10,274	12,213	11,876	4,738	1,472	6,039.10	60,391
4A	Retail trade	452	376	1,190	1,576	1,441	2,610	3,102	3,017	1,204	374	1,534.20	15,342
31-33	Manufacturing	366	305	965	1,278	1,169	2,116	2,516	2,446	976	303	1,244.00	12,440
62	Health care and social assistance	308	256	811	1,074	982	1,779	2,115	2,057	821	255	1,045.80	10,458
72	Accommodation and food services	268	223	707	936	856	1,550	1,843	1,792	715	222	911.20	9,112
54	Professional, scientific, and technical services	200	167	527	698	639	1,157	1,375	1,337	534	166	680.00	6,800
56	Administrative and waste management services	175	145	460	609	557	1,009	1,199	1,166	465	145	593.00	5,930
81, S0	Other services*	161	134	424	562	514	930	1,106	1,075	429	133	546.80	5,468
52	Finance and insurance	135	112	354	469	429	777	924	898	358	111	456.70	4,567
42	Wholesale trade	126	104	331	438	400	725	862	838	334	104	426.20	4,262
48-49	Transportation and warehousing*	122	102	322	426	390	706	839	816	326	101	415.00	4,150
61	Educational services	66	55	174	230	211	381	453	441	176	55	224.20	2,242
53	Real estate and rental and leasing	62	51	162	215	196	356	423	411	164	51	209.10	2,091
71	Arts, entertainment, and recreation	60	50	157	208	190	344	409	398	159	49	202.40	2,024
51	Information	56	47	147	195	179	323	384	374	149	46	190.00	1,900
55	Management of companies and enterprises	54	45	142	187	171	310	369	359	143	44	182.40	1,824
11	Agriculture, forestry, fishing, and hunting	33	28	88	117	107	193	230	224	89	28	113.70	1,137
H0	Households	30	25	78	104	95	172	204	199	79	25	101.10	1,011
22	Utilities*	17	14	45	60	55	99	117	114	46	14	58.10	581
21	Mining	10	8	26	34	31	57	67	66	26	8	33.30	333
TOTAL		4,480	3,727	11,794	15,618	14,285	25,868	30,750	29,904	11,931	3,706	15,206	152,063

*Includes Federal Government Enterprises.

Exhibit 30
Economic Impact by Industry Grouping - Output (Millions of 2002$)

NAICS	Descriptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Output Total
23	Construction	$183	$152	$482	$638	$584	$1,057	$1,257	$1,222	$488	$151	$6,214
H0	Households	$156	$130	$410	$543	$497	$899	$1,069	$1,040	$415	$129	$5,286
31-33	Manufacturing	$91	$76	$240	$318	$291	$527	$626	$609	$243	$76	$3,098
53	Real estate and rental and leasing	$29	$24	$76	$101	$92	$167	$199	$194	$77	$24	$984
4A	Retail trade	$27	$22	$71	$94	$86	$156	$185	$180	$72	$22	$917
52	Finance and insurance	$25	$21	$66	$88	$80	$145	$173	$168	$67	$21	$855
54	Professional, scientific, and technical services	$22	$19	$59	$78	$71	$129	$153	$149	$59	$18	$758
62	Health care and social assistance	$21	$18	$56	$75	$68	$124	$147	$143	$57	$18	$727
42	Wholesale trade	$20	$16	$52	$69	$63	$114	$135	$132	$53	$16	$670
48-49	Transportation and warehousing*	$15	$12	$39	$51	$47	$85	$101	$98	$39	$12	$497
51	Information	$10	$9	$27	$36	$33	$59	$71	$69	$27	$9	$349
81, S0	Other services*	$10	$9	$27	$36	$33	$59	$70	$68	$27	$8	$347
56	Administrative and waste management services	$9	$7	$24	$31	$29	$52	$62	$60	$24	$7	$304
72	Accommodation and food services	$9	$7	$23	$30	$27	$50	$59	$57	$23	$7	$292
55	Management of companies and enterprises	$8	$6	$20	$27	$25	$45	$53	$52	$21	$6	$264
22	Utilities*	$7	$6	$19	$26	$24	$43	$51	$49	$20	$6	$251
11	Agriculture, forestry, fishing, and hunting	$4	$3	$10	$13	$12	$22	$26	$25	$10	$3	$129
61	Educational services	$3	$3	$8	$11	$10	$18	$22	$21	$9	$3	$108
71	Arts, entertainment, and recreation	$3	$2	$7	$9	$8	$15	$18	$18	$7	$2	$89
21	Mining	$2	$2	$6	$8	$7	$13	$16	$15	$6	$2	$78
TOTAL**		**$499**	**$415**	**$1,314**	**$1,739**	**$1,591**	**$2,881**	**$3,425**	**$3,330**	**$1,329**	**$413**	**$ 16,934**

* Includes Federal Government Enterprises.

** In accordance with BEA methodology while calculating the total impact on regional output, the household raw was excluded to avoid double counting. (For more details reader is referred to Appendix B)

Exhibit 31
Average Wages of Temporary Employed by Industry Grouping (2002$)

NAICS	Descriptions	Average Wages
55	Utilities*	77,397
51	Management of companies and enterprises	69,907
21	Mining	55,495
56	Professional, scientific, and technical services	50,276
52	Wholesale trade	49,719
48-49	Information	48,631
54	Finance and insurance	48,152
31-33	Manufacturing	45,853
23	Construction	38,515
42	Transportation and warehousing*	37,108
81, S0	Health care and social assistance	33,751
62	Real estate and rental and leasing	25,630
61	Other services*	21,630
H0	Educational services	21,431
53	Administrative and waste management services	21,087
72	Retail trade	20,035
22	Arts, entertainment, and recreation	17,956
11	Agriculture, forestry, fishing, and hunting	13,544
71	Accommodation and food services	12,304

*Includes Federal Government Enterprises.

Exhibit 32
Economic Impact by Industry Grouping - Earnings (Millions of 2002$)

NAICS	Descriptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Average Earnings	Earnings Total
23	Construction	68.51	56.99	180.42	238.89	218.51	395.69	470.39	457.40	182.49	56.70	232.60	2325.99
31-33	Manufacturing	16.80	13.98	44.25	58.58	53.59	97.04	115.36	112.17	44.75	13.90	57.04	570.41
62	Health care and social assistance	10.40	8.65	27.38	36.25	33.16	60.04	71.38	69.41	27.69	8.60	35.30	352.96
54	Professional, scientific, and technical services	10.07	8.38	26.52	35.11	32.12	58.16	69.14	67.23	26.82	8.33	34.19	341.88
4A	Retail trade	9.05	7.53	23.84	31.57	28.88	52.29	62.16	60.45	24.12	7.49	30.74	307.38
52	Finance and insurance	6.48	5.39	17.06	22.59	20.66	37.41	44.47	43.24	17.25	5.36	21.99	219.91
42	Wholesale trade	6.24	5.19	16.44	21.76	19.91	36.05	42.85	41.67	16.62	5.17	21.19	211.90
48-49	Transportation and warehousing*	4.54	3.77	11.95	15.82	14.47	26.20	31.14	30.28	12.08	3.75	15.40	154.00
55	Management of companies and enterprises	3.76	3.12	9.89	13.10	11.98	21.69	25.79	25.07	10.00	3.11	12.75	127.51
56	Administrative and waste management services	3.68	3.06	9.70	12.84	11.75	21.27	25.29	24.59	9.81	3.05	12.50	125.05
81, S0	Other services*	3.48	2.90	9.17	12.15	11.11	20.12	23.92	23.26	9.28	2.88	11.83	118.27
72	Accommodation and food services	3.30	2.75	8.70	11.51	10.53	19.07	22.67	22.05	8.80	2.73	11.21	112.11
51	Information	2.72	2.26	7.17	9.49	8.68	15.72	18.69	18.17	7.25	2.25	9.24	92.40
53	Real estate and rental and leasing	1.58	1.31	4.16	5.50	5.03	9.12	10.84	10.54	4.20	1.31	5.36	53.59
61	Educational services	1.42	1.18	3.73	4.93	4.51	8.17	9.72	9.45	3.77	1.17	4.80	48.05
22	Utilities*	1.32	1.10	3.49	4.62	4.22	7.65	9.09	8.84	3.53	1.10	4.50	44.97
71	Arts, entertainment, and recreation	1.07	0.89	2.82	3.73	3.41	6.18	7.35	7.15	2.85	0.89	3.63	36.34
21	Mining	0.54	0.45	1.43	1.90	1.74	3.14	3.74	3.63	1.45	0.45	1.85	18.48
11	Agriculture, forestry, fishing, and hunting	0.45	0.38	1.19	1.58	1.45	2.62	3.11	3.03	1.21	0.38	1.54	15.40
H0	Households	0.27	0.23	0.72	0.95	0.87	1.57	1.87	1.82	0.72	0.23	0.92	9.24
TOTAL		155.68	129.51	410.01	542.88	496.57	899.20	1068.98	1039.45	414.71	128.84	528.58	5285.83

*Includes Federal Government Enterprises.

5 *Conclusion*

The development of the MWRRI will result in a significant economic impact in the Midwest, providing both transport users as well as communities substantial benefits.

The traditional benefit cost methods developed by the USDOT FRA shows $23 billion economic impact as a result of building the system. The benefit cost ratio is a substantial 1.8 reflecting the fact that the Midwest is one of the best candidate regions in the U.S. for developing a regional rail system.

- Given that the demand side benefits generated by the MWRRI are so large, it is not surprising that the long-term supply side benefits are also substantial. The Economic Rent analysis shows supply side benefits of –
    - Nearly 58,000 long-term jobs across the nine state regions', which is equivalent to 1.7 million person years of work over 30 years.
    - The project will raise the nine state region's income by 0.1 percent or by over 1 billion dollars per year over the life of the project.
    - The Joint Development potential assuming full advantage is taken of the opportunity offered by the MWRRI is at least 4.5 billion dollars, and may be higher with effective planning and urban renewal.

  The regional use of federal construction dollars to build the system will generate a substantial economic impact in the region. During the construction period it will –
    - Create 152,000 person years of work or the equivalent of 15,200 full-time jobs annually during the 10-year construction period (construction plus other industry jobs).
    - Increase earnings in the nine state regions by $5.3 billion
    - Increase regional output by $16.9 billion

  Another transfer payment of the MWRRI system are the tax benefits generated by the extra income, sales and property value. Both state income and sales tax increases will amount to at least 5 percent of the project income impacts ($15 billion) or over 750 million over the life of the project.

- The distribution of benefits will be across the whole nine state region; however, the benefits are expected to be distributed in the following way between states.
    - Illinois: 30-40 percent
    - Wisconsin: 15-20 percent
    - Michigan: 10-15 percent
    - Indiana: 10-15 percent
    - Minnesota: 5-10 percent
    - Missouri: 5-10 percent
    - Ohio: 5-10 percent
    - Iowa: 2-3 percent
    - Nebraska: 1-2 percent