# Service Development Plan for the Midwest Regional Rail System

The Midwest Regional Rail System (MWRRS) has been under development since 1995, when the states of Illinois, Wisconsin, Michigan, Indiana, Ohio, Minnesota, Iowa, Nebraska, and Missouri in partnership with the Federal Railroad Administration and Amtrak, began to evaluate the potential role of High Speed rail in the Midwest. The work of this initiative (MWRRI) has resulted in a well coordinated and integrated 110-mph rail Business Plan that defines the way in which the rail system should be implemented. This Business Plan consists of an Executive Summary, MWRRI Project Notebook, Appendices, and Cost/Benefit Updates (Attachments 1,2,3, and 4)

On July 27, 2009 the Governors of the States of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin and the Mayor of the City of Chicago executed a Memorandum of Understanding for the "Implementation of High- Speed Rail Passenger Service and Connections Involving Corridors Linking Cities in their Respective States" (Attachment 5). This document affirms that "all MOU Participants recognize a priority to establish the Chicago Hub to corridors consisting of Chicago-St. Louis, Chicago to Milwaukee-Madison, and Chicago to Detroit-Pontiac, (MWRRI Phase 1) that would form a high speed hub in the heart of the nation with high-speed and conventional passenger service connections radiating to seven other Midwestern states".

The US Department of Transportation, Federal Railroad Administration's (FRA) High Speed Intercity Passenger Rail Program (HSIPR) provides an opportunity for the MWRRS to implement a number of the corridors identified in MWRRI Business Plan. While the MWRRI recommended these corridors as part of its Phase I Implementation, various financial and development issues have resulted in phasing refinements within the MWRRI Phase 1 and Phase 3 plans and the delay in the implementation of Phase 2. These refinements in the MWRRI Phase 1 plans were necessary due to the complexity of the Chicago Terminal Limits, particularly environmental and capacity issues between Chicago and Rondout on the Chicago-Milwaukee-Madison corridor; Chicago to Dwight on the Chicago – St Louis corridor; and Chicago to Porter on the Chicago to Detroit corridor. The MWRRI States submitted a Track 1B application, Chicago Terminal Limits PE/NEPA (Illinois is the lead state) to resolve these complex issues. Therefore, the MWRRI States have coordinated their Track 2 applications with the intention to "jumpstart" the development of the entire MWRRS in accordance with the long term planning effort that has resulted in this MWRRS Service Development Plan as the "overarching" SDP to the phased implementation of the MWRRS. The refinements in the MWRRI implementation plan focused on assuring that the major corridors emanating from the Chicago Hub are included in the "jumpstart".

The refinements in the implementation plan of the MWRRI Phase I to "jumpstart' the MWRRS are as follows:

MWRRI Phase 1:

- Chicago – Milwaukee – Madison (Wisconsin is the lead state): The original MWRRI Phase 1 has 10 round trip trains per day from Chicago to Milwaukee operating at a maximum speed of 79 mph with 6 trains continuing to Madison operating at a maximum speed of 110 mph. Due to capacity constraints and needed associated environmental clearances within the Chicago Terminal Limits, this corridor has been refined to retain the current 7 round trip trains per day to Milwaukee with 6 continuing to Madison. Speed increases in the Milwaukee to Madison corridor will be consistent with progress on Positive Train Control. The Milwaukee to Madison Corridor Service Development Plan contains the operations and ridership metrics of this service.
- Chicago – St Louis (Illinois is the lead state): The original MWRRI Phase 1 has 8 round trip trains per day from Chicago to St Louis operating at a maximum speed of 110 mph. Due to environmental and capacity issues in the Chicago Terminal Limits and the addition of the Union Pacific Intermodal Facilities south of Joliet, the phasing of this corridor has been refined to complete the initial implementation of 5 round trip trains per day, with 3 trains operating at maximum speed of 110 mph and 2 trains operating at a maximum speed of 79 mph between Chicago and St Louis in accordance with the previous environmental clearances. Concurrently, Chicago-St Louis will be developed to the original MWRRI Phase 1 service resulting in an increase in track capacity needed to permit the operation of 8 round trip trains at a maximum speed of 110 mph with the increased UP freight traffic on shared right of way.. The Chicago to St Louis Corridor Service Development Plans for the two concurrent phases outline the operations and ridership metrics associated with this service.
- Chicago – Detroit / Pontiac (Michigan is the lead state): The original MWRRI Phase 1 has 6 round trip trains per day from Chicago to Detroit/Pontiac operating at a maximum speed of 110 mph. Due to capacity constraints and associated environmental issues within the Chicago Terminal Limits (South of the Lake Corridor), the phasing of this corridor has been refined to maintain the current 3 round trip trains per day between Chicago and Detroit/Pontiac and complete significant improvements within the corridor consistent with associated environmental documentation. These significant improvements consist of a coordinated and comprehensive grouping of projects that eliminate a series of chokepoints between Chicago and Porter and improve track conditions and signals between Porter and Ann Arbor resulting in operations in this segment (Porter to Ann Arbor) at a maximum speed of 110 mph. The Chicago to Detroit/Pontiac Service Development Plan contains detailed operation and ridership metrics associated with this service.

MWRRI Phase 2:

Chicago to Minneapolis/St. Paul (Minnesota is the lead state): This phase was predicated on 6 round trip trains per day to Twin Cities with 4 additional round trip trains per day to Madison and was scheduled for implementation one year after Phase 1. Due to the environmental requirements to determine the exact route between Milwaukee and Minneapolis/St Paul, this phase has been deferred until the route has been selected and environmental requirements for funding completed. Minnesota, as the lead state, has submitted a Track 3 application to fund a study in this corridor

MWRRI Phase 3:

- Chicago – Iowa City (Iowa is the lead state): This phase was based on 5 round trip trains per day from Chicago to Iowa City and was scheduled for implementation two years after Phase 1 operating at maximum speed of 90 mph between Aurora and Wyanet and a maximum speed of 79 mph between Wyanet and Iowa City. Since the announcement of the American Recovery and Reinvestment Act, Iowa, in partnership with Illinois, decided to advance this phase into Year 1 with an initial phase consisting of 2 round trip trains per day to Iowa City operating at a maximum speed of 79 mph. Advancing this corridor to Year 1 meets the goal of the MWRRI States to" jumpstart" all corridors emanating from the Chicago Hub to the states neighboring Illinois and is consistent with the Memorandum of Understanding signed by the Governors.

The selection of the MWRRI Phase 1 corridors for initial implementation was made as a result of a Quality Audit Review and Risk Analsyis (Attachment 6)conducted in 2006 (participants included experts from AECOM, RL Banks, Amtrak, and the MWRRI States). The Quality Audit concluded that the work performed to develop the MWRRS ridership and revenue forecasts, capital cost estimates, and financial plan was sound. Subsequent ridership studies undertaken by MWRRI States as part of their "work in progress" in developing their corridors have confirmed that the MWRRI ridership projections are reasonable.

The Quality Audit Review also determined that the operating cost projections were reasonable although lower than historical Amtrak operating costs. The maintenance and cyclic capital costs were calculated by the MWRRI in coordination with Amtrak using the FRA Technical Report by Zeta Tech. These calculations (Attachment 7)produced an annual maintenance cost of $3.79 per passenger train mile and an annual cyclic capital cost of $3.21 per passenger train mile. Although the FRA Zeta Tech study was based on freight railroad cost metrics, the freight railroads have indicated that the States should pay more than these amounts. The overall operating costs for modern high speed rail equipment and, particularly the maintenance cost component, will continue to be subject of future negotiation with Amtrak and the host freight railroads.

The MWRRI States understand the importance of Risk Management in their decision making process. The Risk Analysis undertaken as part of the Quality Audit identified certain risk factors to the successful implementation of the entire MWRRS. These risk factors were generally associated with operational efficiency and funding. These risk factors were essentially mitigated by phasing the MWRRS to initially build-out the most developed and high density Phase 1 corridors. The addition of the Chicago to Iowa City corridor into Year one meets the criteria established to connect the Chicago Hub to the neighboring states of Illinois and adds minimal risk. The operations and ridership metrics developed for the refinements in the implementation of the MWRRI Phase 1 and Phase 3 have been reviewed and are consistent with the risk mitigation strategy.

In 2007, the MWRRI States developed a Draft Purpose and Need for the MWRRS (Attachment 8), a Scope of Work for undertaking preliminary engineering and environmental studies of the MWRRI Phase

1 corridors (Attachment 9), and a Scope of Work for undertaking a programmatic environmental study of the other MWRRS corridor outside of Phase 1 (Attachment 10).

To meet the HSIPR application requirements, the following provides a Service Development Plan (SDP) for the MWRRS as a whole to support the formulation of a Service Development Plan for each corridor of the MWRRS for which a Track 2 application is submitted. As defined by the FRA, a Service Development Plan is a plan for developing High-Speed Rail/Intercity Passenger Rail Service, either by initiating new service or improving existing service. It is typically focused on distinct phases and /or geographic areas. The SDP includes three general topics:

1. **Rationale**: including purpose and need; a description of the Midwest Regional Rail System (MWRRS) transportation challenges and opportunities based on current and forecasted travel demand and capacity conditions

2. **Service/operating plan and prioritized capital plan:** including the description of the train service to be provided for each phase of new or improved Intercity Passenger Service.

3. **Implementation plan:** including project management approach, stakeholder agreements and financial plan

The MWRRS completed a major planning effort in June 2004, and documented its conclusions in the Project Notebook. This Project Notebook and Appendices addresses all the subject areas required by the SDP, so the Project Notebook can in essence, be considered an SDP for the entire MWRRS network. An Executive Report was issued in September 2004 and the Project Notebook was amended in November 2006 with an update to Chapter 11, Benefit and Cost Analysis. (Refer to Attachments 1,2,3, and 4)

Previous Midwest High Speed Passenger Rail studies supported the development of the project notebook. A total of 49 studies (refer to the list in Attachment 11) have been completed as follows:

| Corridor | Number of Studies |
|---|---|
| Midwest System (as a whole) | 5 |
| Chicago – Detroit/Pontiac | 6 |
| Chicago-Toledo-Cleveland | 7 |
| Chicago-Indianapolis-Cincinnati | 4 |
| Chicago-Carbondale | 3 |
| Chicago-St. Louis | 5 |
| St. Louis – Kansas City | 5 |
| Chicago-Quincy-Des Moines-Omaha | 4 |
| Chicago-Milwaukee-Madison-St Paul | 10 |
| Grand Total MWRRI Studies | 49 |

Since 2004, states have been working individually on development plans for their own corridors. All these efforts can be considered "work in progress" or interim work that is still under development. With respect to the overall MWRRS vision, the most recent update consists of the 2004 Project Notebook. This document continues to guide and direct the efforts of the individual states, as they seek to develop their own respective parts of the system, in a manner consistent with the overall framework and vision that the Project Notebook provides.

In March, 2008, the MWRRI prepared a Draft Purpose and Need Statement for Phase 1 of the MWRRS (Attachment 7). This document stated that the purpose of the MWRRI and the proposed action is to provide a means to help meet future regional travel needs through improvements to the level and quality of regional passenger rail service. The proposed action offers an opportunity to provide reliable and competitive passenger rail service as an attractive alternative transportation choice. To address the purpose of meeting regional travel needs by preserving, improving, and expanding the passenger rail service in the Phase 1 corridors, market research to gauge the feasibility of the MWRRS was conducted. The research concluded that the most important prerequisites for attracting and retaining rail riders are to overcome the current lack of reliability, infrequent service and provide travel times that are equal or better than the auto mode. The needs (principal service attributes) of the MWRRS are:

- Improved travel times and frequencies
- Competitive fares that maximize revenue yields
- Use of modern equipment
- Improved accessibility and reliability
- Upgraded on-board and station amenities

The MWRRS Service Development Plan and the complementary MWRRI Phase 1 and Phase 3 Corridor Service Development Plans are consistent with this Purpose and Need as further explained in the individual Corridor-wide Service NEPA documents.

For the purpose of this submission, the SDP for individual states' Corridor Programs will remain consistent with the Project Notebook. Specific corridor level information has been documented as it currently exists within the Project Notebook, with some selective updates to reflect more recent information, particularly in the area of Capital costs.

While capital costs have been updated, the related ridership, revenue, operational, financial and economic analyses have *not* yet been correspondingly updated. Dollar values need indexing from $2002 up to $2009, but there have also been changes in the transportation market, largely driven by higher fuel prices, but also demographic changes and structural economic shifts. Amtrak and all passenger rail operators have noticed a strong increase in demand since the Project Notebook was completed in 2004. While capital costs may have gone up, so too have ridership, revenue, consumer surpluses and all the social benefits associated with operation of the MWRRS system.

Because of this, the MWRRS Cost Benefit results calculated in 2006 are, if anything, conservative in today's transportation environment, despite the apparent increase in capital costs. The time frame for developing this submission has not permitted recalibration of the ridership models or recalculation of all the financial projections for all corridors.
Because the material in the SDP is largely drawn from the MWRRS Project Notebook, the Project Rationale, Financial, Economic and Implementation Plan will be addressed at the level of the whole network. Some parts of the service/operating plan, such as equipment cycling and train equipment consist standards, also make more sense to address at the network rather than individual corridor level. Crew and timetabling requirements, as well as line capacity simulation and capital investment strategies are presented at the individual corridor level.

***Topic #1: Rationale***

Since 1996, the Midwest Regional Rail System (MWRRS) has advanced from a series of individual corridor service concepts, into a well-defined, integrated vision to create a 21st century regional passenger rail system. This vision reflects a paradigm shift in the manner in which passenger rail service will be provided throughout the Midwest, and forges an enhanced partnership between USDOT, FRA and the Midwestern states for planning and providing passenger rail service. This system would use existing rights-of-way shared with existing freight and commuter services and would connect nine Midwestern states and their growing populations and business centers. System synergies and economies of scale, including higher equipment utilization, more efficient crew and employee utilization, and a cooperative federal and state infrastructure and rolling stock procurement, can be realized by developing an integrated regional rail system.

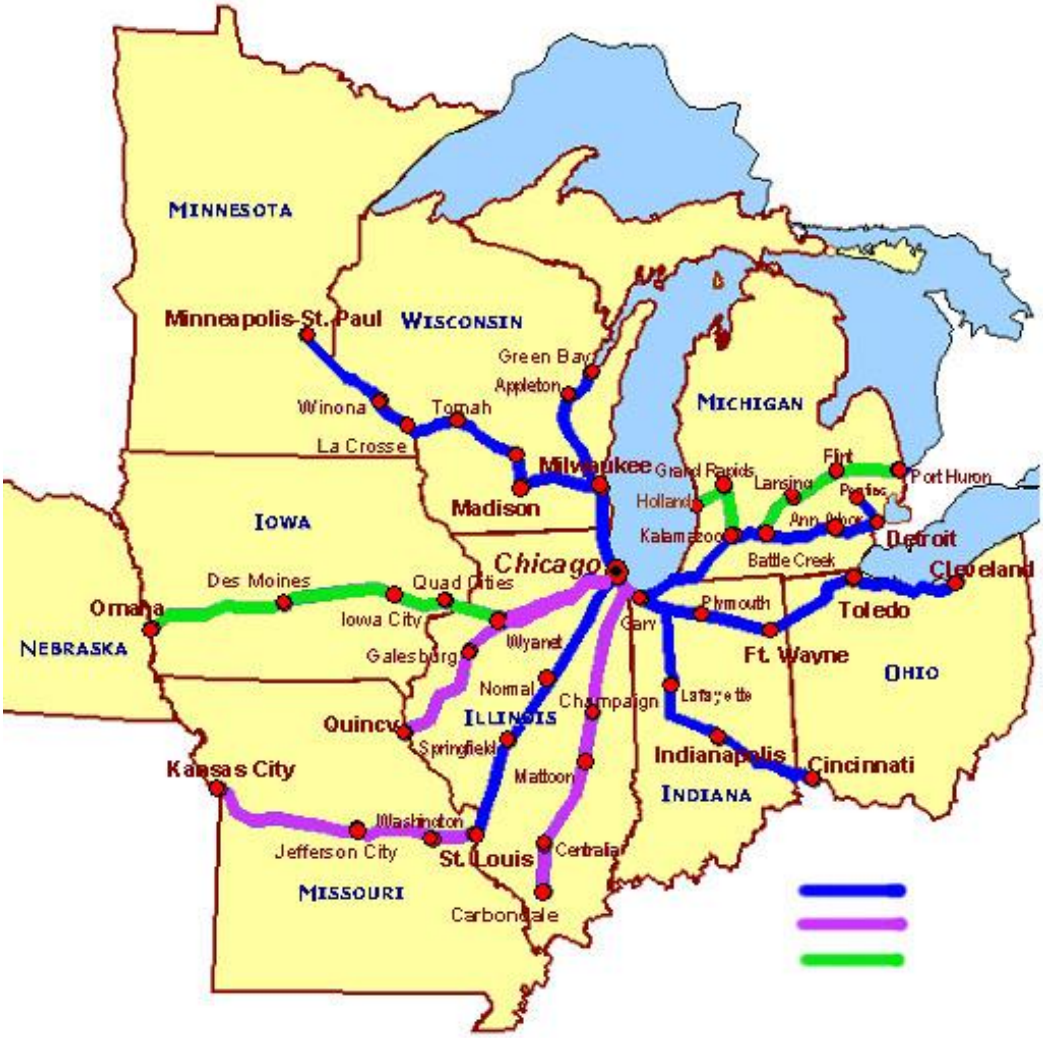
Collectively, the key elements of the MWRRS plan will improve Midwestern travel well beyond currently available train service. These elements include:

- Upgrading existing rail rights-of-way to permit frequent, reliable, high-speed passenger train operations. These generate significant improvements in rail efficiency, reliability and on-time performance.
- Operation of a hub-and-spoke passenger rail system providing through service and connectivity in Chicago, to locations throughout the Midwest region.
- Introduction of modern train equipment with improved amenities operating at speeds up to 110-mph.
- Provision of multimodal connections and feeder bus systems to improve system access.
- Development of a rail service that satisfies FRA's Public/Private partnership requirements, as defined in FRA's document *High-speed Ground Transportation for America* (1997). Accordingly, it has been shown that the MWRRS has the potential to run without operating subsidy and its implementation will generate substantial public benefits, exceeding its cost, for the regional and US economies.

The MWRRS would encompass a rail network of more than 3,000 route miles and serve nine states with a combined population of 60 million people. About 80 percent of the region's population lives within an hour drive of either an MWRRS rail station or a feeder bus station. As a result of the interstate character of the MWRRS network, a strong Federal role is both necessary and appropriate for promoting its development.

The frequent service proposed for the MWRRS (Exhibit 1-1 from the Project Notebook) serves intermediate sized cities on each corridor, such as Jefferson City, Springfield, Des Moines, Indianapolis, Madison and Toledo, as well as their respective larger endpoint cities such as Kansas City, St. Louis, Omaha, Cincinnati, Twin Cities and Cleveland.
Mainline service to destinations such as Detroit and Twin Cities is supplemented by branch line services to Lansing, Grand Rapids and Green Bay.

**Exhibit 1-1**
**Proposed Midwest Regional Rail System**



Implementation of the MWRRS will increase mobility choices and stimulate economic development throughout the region. The system affords the opportunity to:

- Develop attractive public/private partnerships that will enhance both rail and bus travel in the Midwest
- Achieve significant reductions in travel times and improve service reliability
- Introduce passenger rail service to Midwest areas currently not served by passenger rail
- Introduce an alternative to auto travel to many small towns and cities of the Midwest that lack travel choices
- Introduce a regional passenger rail system designed to generate revenues that cover operating costs when it is fully implemented
- Provide major capital investments in rail infrastructure to improve passenger and freight train efficiency, safety and reliability on shared rights-of-way
- Provide impetus for station-area development

The analysis demonstrated that the proposed service, with modern stations and a high level of on-board amenities could attract significant numbers of riders and achieve a respectable modal market share for trips up to 500 miles.

**Intermodal Complementarity**

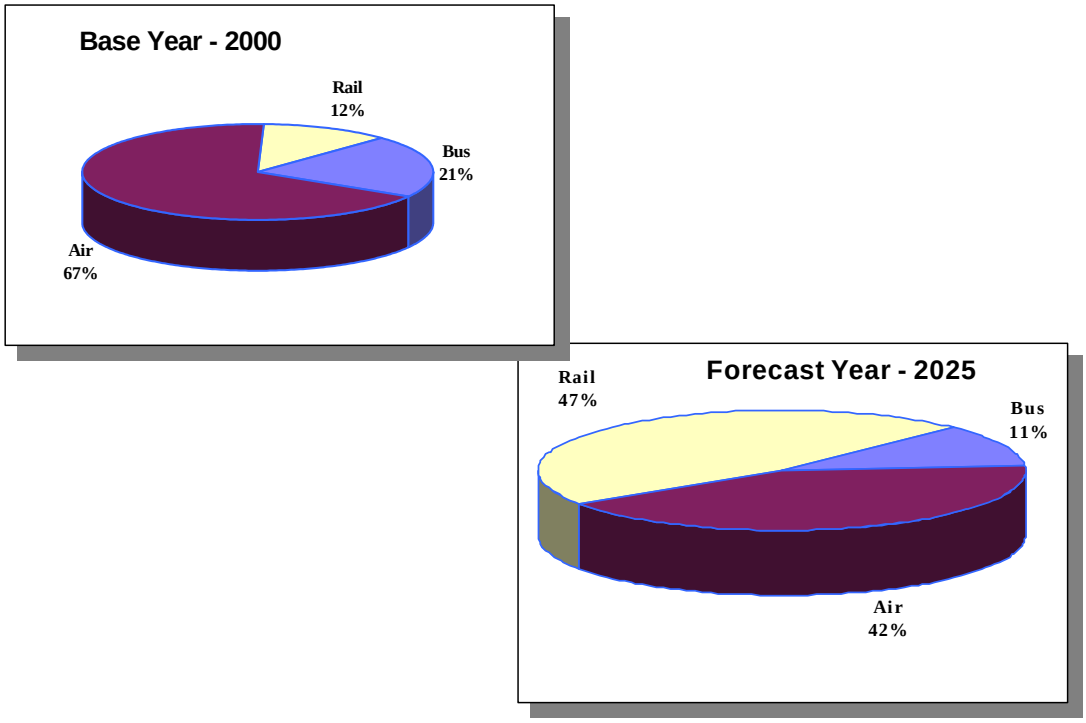
The passenger rail market analysis confirms there is a substantial market for intercity travel between all the cities on the MWRRS network. In many markets, the MWRRS provides a faster and more cost-effective alternative to auto and bus travel. Furthermore, the MWRRS provides a more cost-effective means of travel than air in many of the smaller, urban areas on or near an MWRRS corridor.

In the 2000 base year, 498 million trips within the Midwest region, 98 percent were made by auto; 1.3 percent by air; 0.4 percent by bus and 0.3 percent by rail. Auto trips include a large number of relatively short trips (100 to 150 miles), while the public modes generally include longer trip lengths, typically 150 to 250 miles for bus and rail and 250 to 500 miles for air. In other words, while the market share of the public modes is small (2.0 percent for air, rail and bus), the public modes have a larger share of the total vehicle or passenger miles, and therefore account for a much larger proportion of the person miles traveled. Of the public modes, of the existing market, 67 percent of the trips are made by air, 21 percent by bus and 12 percent by rail.

Of the total rail ridership forecast for 2025, 6 percent is a result of the natural growth of travel demand in the region, 10 percent is due to increased mobility or induced demand, and 84 percent is due to diverted demand. Induced demand is defined as those trips that would not have been made without the introduction of the MWRRS, while diverted demand is the result of travelers changing travel mode. Of

the diverted demand for the MWRRS, 58 percent is from auto, 23 percent from bus and 20 percent from air. (see Exhibits 4-25 and 4-37 in the Project Notebook).

**Exhibit 4-37**
**Base and Forecast Year Market Shares for the Public Modes**




MWRRS implementation would add significant capacity to augment the capacity of the existing highway and air systems. While most of the rail travel diversion would come from automobile, the MWRRS would provide a moderate level of airport congestion relief as well.

Since air service is increasingly focused on trips over 300 miles, the MWRRS tends to complement rather than compete with air service in the Midwest. Even so, the convenience of direct downtown-to-downtown accessibility provided by the system will enable it to divert some short-haul air traffic to rail. Most of the air impact would come from reduction of very short flights that offer marginal profitability to the airlines anyway. Since the MWRRS would be more efficient than air for many of these short trips under 300 miles, this would allow airlines and airports to redeploy assets to more economically productive uses.

There would be some shift of long haul trips from bus to rail as well. However, the overall use of bus service in the Midwest would be likely to grow through development of a feeder bus network, like the one that already exists in California. This would connect the MWRRS rail system to smaller outlying

communities, which would likely result in an increased overall usage of a restructured bus network. Greyhound participated in development of this feeder bus plan and has indicated its support for it.

***Topic #2: Service/Operating Plan and Prioritized Capital Plan***

The operational characteristics of the proposed MWRRS service have been extensively analyzed over the course of a multi-year planning effort. At the network level, the most important operational aspects of the system include the development of a standard, interoperable MWRRS rolling stock configuration/train consist that can freely rotate and operate on all the MWRRS corridors.

In addition the development of standardized maintenance and repair procedures and a network of shop facilities at Pontiac, St. Louis, Kansas City, Madison and St. Paul has been recommended. This provides for major overhaul capabilities as well as progressive maintenance and periodic inspection needs for the equipment. (If St. Louis cannot maintain and repair at least three trains per night, a sixth shop will be needed and has been recommended for Cleveland, OH. See page 7-17 of the Project Notebook.)

The adoption of a standardized train consist, with cycling of equipment between routes allows for a reduction in equipment dwell times, particularly at the downtown Chicago hub, promoting more schedule flexibility, better equipment utilization and a reduced requirement for "protect" equipment, since one spare equipment set could protect the emergency needs for multiple MWRRS routes. High equipment utilization along with shared maintenance facilities are the key components for attaining projected economies of scale associated with implementation of the MWRRS network as a whole.

An additional analysis that was performed for the network or "system" operations relates to the capacity of Chicago Union Station. This section, therefore, will describe the underlying operational analyses related to:

- Rolling stock configuration / train Consists
- Equipment schedules
- Chicago Union Station

**Rolling Stock Configuration/Train Consists**

As described in Section 7.4 of the Project Notebook, the intent of the MWRRS agreement was to develop a standardized train consist assumption for planning purposes, as well as to pursue an integrated train equipment procurement process.

The standardized train consist has generally been referred throughout the Project Notebook as the "Generic Train". This "Generic Train" assumption for the MWRRS evolved over time. The early 1998 MWRRS assessment was based on the Adtranz IC3 DMU, but later in 2000 the "generic" equipment assumption was changed to the Talgo T-21 locomotive-hauled train instead.

Please note that selecting the generic passive tilt technology for planning purposes does not mean that Talgo would necessarily be selected as the equipment manufacturer for the MWRRS. In fact the Talgo was actually higher cost and slightly slower than the DMU on most corridors. This makes the MWRRS ridership, revenue and operating cost forecasts more conservative than if the DMU had been selected.

Therefore the selection of Talgo as the "generic" train technology for analysis purposes does not imply that Talgo was either "recommended" or "optimized" for the system. It was simply used as a representative train for planning purposes. Selection of a locomotive-hauled, passive tilt technology actually increases the MWRRS flexibility for choosing a technology, because multiple manufacturers and technologies will be able to meet the broader performance parameters provided by this more conservative approach.

The MWRRS plan assumes the purchase of 63 trainsets, each with a capacity of 190 to 200 passengers. (The recommended train size was subsequently revised upwards to a 300-seat train.) Subsequent studies and increasing ridership on existing routes has demonstrated that the seating capacity may need to be much greater than 300 on certain corridors The assumed cost was based on information received from the manufacturers; however, manufacturers' price quotes were only preliminary estimates. It is understood that the final cost will be determined by a set of factors to include the degree of competition, delivery dates, level of customization, and number of trainsets ordered. However, these preliminary estimates provided a reasonable basis for the MWRRS analysis. Volume discounts included in the analysis were predicated on the states collectively purchasing the rolling stock on a system-wide basis rather than individually, on a by-corridor basis.

**Equipment Schedule Analysis**

Sections 7.5 and 7.6 of the Project Notebook presents an extensive and detailed analysis whereby the equipment sets were "cycled" through the complete MWRRS train schedules, to ensure that the plan specified the purchase of the correct number of train sets, but even more importantly, to verify that the planned maintenance shops were in the right locations and had sufficient capacity to maintain the train sets. Sections 7.8 and 7.9 provide additional information on maintenance base requirements for supporting MWRRS operations.

The train schedules could be covered with 57 train-sets but the recommendation was to purchase 10% extra trains, for shop counts and protect equipment. A feasible rotation could be developed for any shop-siting plan that offers capacity of at least 16 trains per night. Regarding the development of shops for maintaining the trains, the analysis reached the following conclusions:

- The final choice of shop locations must largely hinge on the availability of reasonably priced real estate in reasonable proximity to the endpoint stations. It was therefore recommended that further study be undertaken to find a better and larger location for the proposed St. Louis shop, and to identify specific sites for the proposed Kansas City and St. Paul shops.
- At this time, only the shops proposed at Pontiac, Cleveland and Madison have adequate sites identified.
- A two-train shop at St. Louis would provide insufficient capacity to meet the needs of the 2014 MWRRS system. A minimum three-train capacity is needed here to increase the system production rate to 16 trains per night.
- The proposed shops in Kansas City and St. Paul have not been sited yet.
- From an operational perspective, Chicago remains a logical location for an MWRRS equipment maintenance facility, if a suitable site could be identified.

**Chicago Union Station**

Section 7.7 of the Project Notebook presents an analysis of Chicago Union Station operations. The key concern was how to accommodate the projected growth of METRA commuter service, along with existing Amtrak long distance service and new MWRRS service at the Chicago Union Station site.

**Exhibit 7- 1**
**CUS Track Occupancy: MWRRS vs. Long Distance**

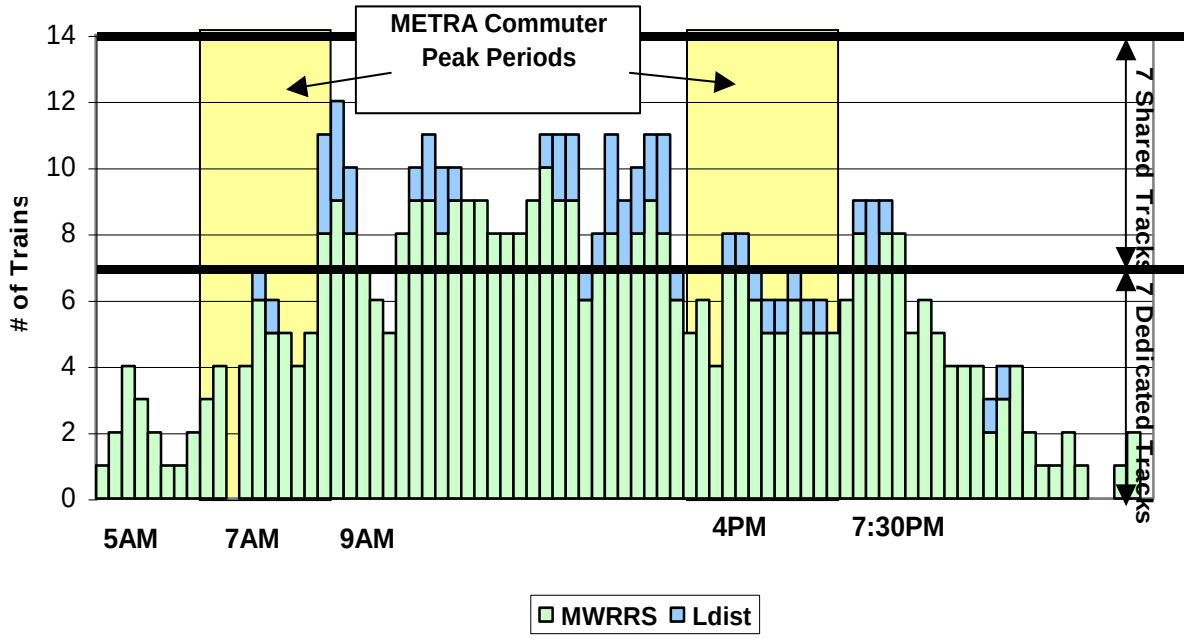
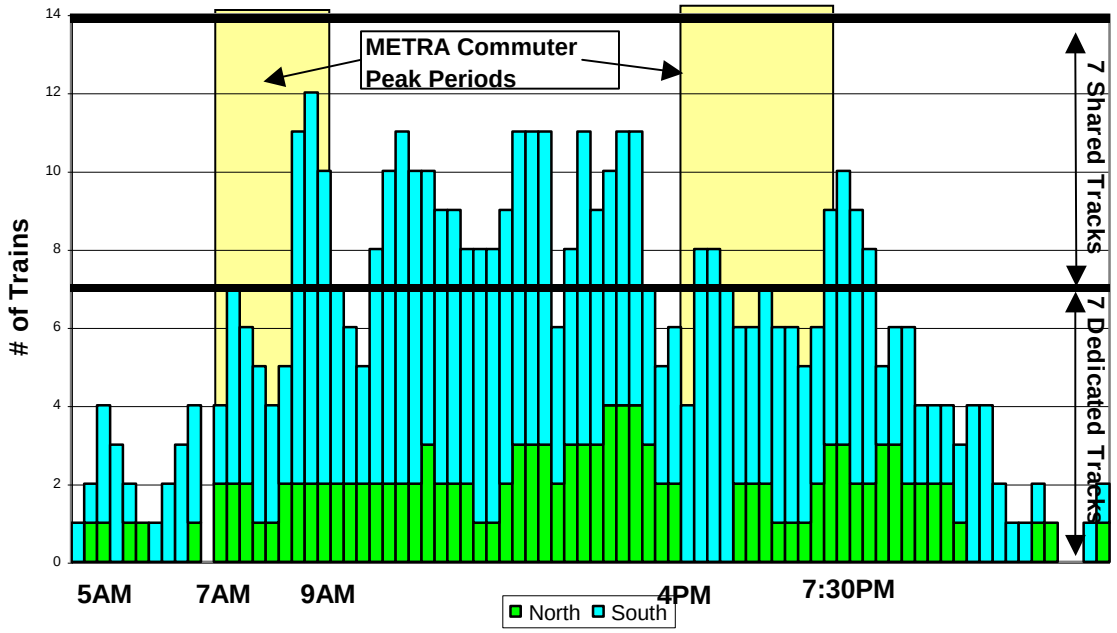



**Exhibit 7- 2**
**CUS Track Occupancy: North vs.South**



Equipment dwell times at CUS were assumed consistent with those developed by the equipment cycling analysis. The key result of this analysis, as shown by Exhibits 7-1 and 7-2 from the Project Notebook, was that MWRRS could operate within Amtrak's current seven-track allocation at CUS. The Capitol Limited that departs at 5:35 PM requires use of one Metra shared track for 30 minutes. At off-peak, MWRRS would use no more than one-half to one-third of the capacity of the Metra shared tracks for mid-day train storage. By shunting four trains to the yard for mid-day storage, the MWRRS could operate within the seven-track constraint during all peak hours except for 30 minutes of the evening rush.

The MWRRI recognizes the inherent problems associated with the capacity of Chicago Union Station. In addition to the analysis described above, the MWRRI has reviewed the Study completed in 2002 by the HDR/CANAC Team and its Findings. The simulation studies undertaken by HDR/CANAC confirmed that CUS is nearing capacity at peak hours. Therefore, the MWRRI, as part of the Chicago Terminal Limits PE/NEPA Project will undertake a further detailed analysis of the CUS, in addition to the one described above, and the impact of future MWRRS trains.

**MWRRI Coordination with the Chicago Region Environmental and Transportation Efficiency Program**

The State of Illinois and the City of Chicago have joined with the passenger and freight railroads serving the Chicago region to establish Program Level Goals as follows:

- Improve the efficiency and reliability of local and national passenger and freight rail service in and through the Chicago region;
- Reduce motorist, passenger rail and freight rail delays to travel in and through the Chicago region;
- Reduce highway and rail traffic congestion in the Chicago region;
- Improve rail-highway grade crossing safety in the Chicago region;
- Provide national, regional and local economic benefits;
- Provide environmental (air quality) benefits;
- Provide national, regional and local energy benefits.

In order to advance these goals, the MWRRI states and the City of Chicago have partnered with the freight railroad's Chicago Planning Group in submitting the Track 1 application for the Chicago Terminal Limits PE/NEPA project in seeking a cooperative agreement with FRA for the purpose of understanding the inherent complex problems within the Chicago region that constrains the operations of the freight and passenger rail network and identifying solutions that ensure efficient passenger rail operations.

**Additional Operations Analysis Provided at the Specific Corridor Level**

The MWRRS Project Notebook developed additional analysis with respect to the specific operations of each corridor. These analyses, which are specific to each individual corridor, show how the proposed Corridor Program makes use of the facilities that would be shared with freight, commuter rail, and other intercity passenger rail services. They show how the proposed Corridor Program protects the quality of those other services through a planning horizon year and under assumptions that were agreed to with the other partners.

The following components of the operating plan are described in the portion of the SDP that are specific to each corridor:

- Service frequency
- Time table (including time-distance "stringline" diagrams as available)
- General station locations
- Intermodal connections
- Railroad operations simulations
- Crew schedule analyses

On an overall basis, the proposed MWRRS operating plan has been designed to optimize the relationship between service levels, estimated ridership and generated revenue. Compared to current regional passenger rail services, the MWRRS operating plan dramatically improves reliability, increases frequency and reduces travel times. Depending upon the corridor, roundtrip frequencies are increased by two and five times compared to existing services, improving opportunities to make connecting trips through Chicago Union Station. Improvements in travel times range from 32 percent between Chicago and the Twin Cities, to 56 percent between Chicago and Cincinnati. Exhibit 7-1 from the Project Notebook compares travel times by mode on selected MWRRS corridors.

**Exhibit 7-1**
**Estimated Travel Times to Chicago by Corridor – 2020**

| *MWRRS Corridors* | *Train Travel Times* | | | |
|---|---|---|---|---|
| | *MWRRS* | *Current Service* | *Reduction in Travel Time* | *Percent Reduction* |
| Chicago-Detroit | 3 hrs 46 mins | 5 hrs 46 min | 2 hrs 00 min | 35.6% |
| Chicago-Cleveland | 4 hrs 23 mins | 7 hrs 16 mins | 2 hrs 53 mins | 39.7% |
| Chicago-Cincinnati | 4 hrs 08 mins | 9 hrs 25 mins | 5 hrs 17 mins | 56.1% |
| Chicago-Carbondale | 4 hrs 22 mins | 5 hrs 30 mins | 1 hr 08 mins | 20.6% |
| Chicago-St. Louis | 3 hrs 50 mins | 5 hrs 30 mins | 1 hr 40 mins | 30.3% |
| St. Louis-Kansas City | 4 hrs 14 mins | 5 hrs 40 mins | 1 hr 26 mins | 25.3% |
| Chicago-Omaha | 7 hrs 02 mins | 8 hrs 37 mins | 1 hr 35 mins | 18.4% |
| Chicago-Twin Cities | 5 hrs 37 mins | 8 hrs 15 mins | 2 hrs 38 mins | 31.9% |
| Chicago-Milwaukee | 1 hr 05 mins | 1hr 29 mins | 0 hr 24 mins | 43.8% |

* Based on Express MWRRS Schedule.

Along almost every corridor, the MWRRS provides more service than is currently operated. MWRRS either replaces Amtrak's short-distance Chicago Hub trains, or adds service to new routes not presently served by Amtrak. Exceptions to this are the Omaha line through Iowa, the Indianapolis-Cincinnati line and direct service to Madison, WI and Ft. Wayne, IN using different routes than those currently utilized by Amtrak. Implementation of the MWRRS will help Amtrak's long-distance trains by improving track speed and covering the costs of many station and yard facilities. An upgraded passenger infrastructure will reduce delays currently incurred by Amtrak on busy freight tracks. Exhibit 7-2 from the Project Notebook compares 2004 Amtrak service to the number of round trips planned for the fully implemented MWRRS.

**Exhibit 7-2**
**Passenger Rail Service Comparison (Roundtrips)**

| *City Pair* | *2004 Amtrak Service* | *Fully Implemented MWRRS* |
|---|---|---|
| **Chicago - Detroit** | 3 | 9 |
| *Chicago-Kalamazoo/Niles* | 4 | 14 |
| *Kalamazoo/Niles-Ann Arbor* | 3 | 10 |
| *Ann Arbor-Detroit* | 3 | 10 |
| *Battle Creek-Port Huron* | 1 | 4 |
| *Kalamazoo-Holland* | 0 | 4 |
| *Detroit-Pontiac* | 3 | 7 |
| **Chicago - Cleveland** | 2* | 8 |
| *Chicago-Toledo* | 2* | 8 |
| *Toledo-Cleveland* | 2* | 9** |
| **Chicago - Cincinnati** | 1* | 5 |
| *Chicago-Indianapolis* | 1* | 6 |
| *Indianapolis-Cincinnati* | 1* | 6** |
| **Chicago - Carbondale** | 2* | 2 |
| *Chicago-Champaign* | 2* | 5 |
| *Chicago-Carbondale* | 2* | 2 |
| **Chicago - St. Louis** | 3* | 8 |
| *Chicago-Joliet* | 3* | 8 |
| *Joliet-Springfield* | 3* | 8 |
| *Springfield-St. Louis* | 3* | 8 |
| **St. Louis - Kansas City** | 2 | 6 |
| *St. Louis-Kansas City* | 2 | 6 |
| **Chicago - Quincy** | 1 | 4 |
| **Chicago - Omaha** | 1 | 4** |
| *Chicago-Naperville* | 3* | 5 |
| *Naperville-Rock Island* | 0 | 5 |
| *Rock Island-Iowa City* | 0 | 5 |
| *Iowa City-Des Moines* | 0 | 5 |
| *Des Moines-Omaha* | 0 | 4 |
| **Chicago – Twin Cities** | 1* | 6 |
| *Chicago-Milwaukee* | 8* | 17 |
| *Milwaukee-Madison* | 0 | 10** |
| *Madison-St. Paul* | 0 | 6 |
| *Milwaukee-Green Bay* | 0 | 7 |

* Includes Amtrak long-distance trains

** MWRRS route differs from current Amtrak service

Compared to the existing service, the MWRRS plan generates operating efficiencies by using new, modern trains, by maintaining equipment to maximize availability, and by running faster to maximize labor and equipment productivity.

The MWRRS will operate as a hub-and-spoke system with seven main corridors plus branch lines, all converging on Chicago Union Station. A hub-and-spoke system facilitates the sharing of trains between routes for better equipment utilization and allows convenient passenger transfers between routes. It offers an array of travel options at the hub, and fosters efficiencies in the use of equipment and deployment of manpower.

The MWRRS plan includes the use of standardized train technology and rolling stock amenities throughout the system. Because of constraints of available land, the MWRRI Steering Committee decided that MWRRS equipment maintenance shops need to be located at route endpoints rather than in Chicago. This requirement to rotate equipment into shop facilities adds complexity to the MWRRS operating plan. Since not every route will have its own shop, standard train consists are essential to facilitate necessary equipment cycling between routes.

**Methodology for MWRRS Train Schedule Development**

MWRRS train schedules were developed using the *TRACKMAN™* and *LOCOMOTION™* software systems[1]. *TRACKMAN™* was used to identify all infrastructure characteristics, while *LOCOMOTION™* monitors train technology capabilities. Information such as acceleration and deceleration rates of different train technologies and maximum allowable speeds on curves by use of various tilt technologies were incorporated into the simulations. Train speed and running time profiles were generated for different combinations of infrastructure and equipment investments.

Three different train technologies were compared and any of the three could perform within the required operational parameters for the MWRRS. A life cycle cost analysis verified that two of the three technologies could operate within the cost parameters of the business plan. It was therefore decided that MWRRS operating and financial plans should adopt a conservative posture based on the higher-cost technology of the two that met the financial criteria – specifically by assuming use of Talgo passive tilt technology as the MWRRS generic train.

Originally, skip-stop service was proposed so some trains could bypass small stations. That concept was abandoned in favor of an express/local service pattern. Local service makes all station stops, while express service runs with limited stops throughout the day.

[1] Both *TRACKMAN™* and *LOCOMOTION™* are proprietary software systems developed by Transportation Economics & Management Systems, Inc.

Extra time, (i.e., recovery time) was added to each train schedule as a contingency, so that some level of delay can be incurred without causing late train arrivals. Train delays can be extremely disruptive since late arrivals not only delay passengers and result in missed connections, but can also upset equipment cycling, crew allocation and terminal operations. Capacity constrained corridors with heavy freight traffic need extra recovery time. Specifically, recovery time was added to schedules as follows:

- Five percent for lines with limited freight activity:
  - Chicago-Detroit and Michigan branch lines
  - Chicago-Cincinnati
  - Chicago-St. Louis
  - Chicago-Toledo (Southern Alignment)
- Eight percent for moderate freight activity:
  - Chicago-Carbondale
  - Chicago-Quincy/Omaha
- Ten percent for very heavy freight activity:
  - Toledo-Cleveland
  - St. Louis-Kansas City
  - Chicago-Twin Cities

Once schedules were developed, they were input to the *COMPASS™* demand forecasting model[2] for estimating ridership and revenue. During MWRRS implementation, a 10 percent contingency for construction travel time was included in revenue forecasts for the implementation period. This extra time will be needed to offset likely train delays during the track construction period.

MWRRS service will operate an equivalent of 312 days per year, reflecting 5-day weekday schedules and half-day service on Saturday (largely morning) and Sunday (largely evening.) Based on the anticipated ridership on each line and by using a target load factor of 65-70 percent (on the peak segment throughout the day) a 300-seat train was determined to be most appropriate for the MWRRS. Exhibit 7-3 from the Project Notebook shows train frequency and average passengers per train by route segment.

[2] *COMPASS™* is proprietary software system developed by Transportation Economics & Management Systems, Inc.

**Exhibit 7-3**


Minneapolis–St. Paul
Green Bay
Madison
Brookfield
Milwaukee
Grand Rapids
Port Huron
Pontiac
Detroit
Holland
Kalamazoo
Battle Creek
Dearborn
Toledo
Cleveland
Fort Wayne
Naperville
Whiting
Joliet
Homewood
Wanatah
Princeton
Rock Island
Des Moines
Omaha
Galesburg
Macomb
Quincy
Springfield
Champaign
Indianapolis
Cincinnati
Kansas City
Jefferson City
St. Louis
Carbondale
217
235
202
A 300-seat train provides adequate capacity on these peak load segments
* Based on a 312-day year
LEGEND
XXX # Riders per Train (avg)
x # Trains per track segment

The need to use a standardized 300-seat train results in slightly higher than desirable loadings on some lines with lower than desirable loadings on other segments. For example, the Cleveland line east of Ft. Wayne[3] and the Omaha line west of Des Moines are lightly used; but the Michigan and St. Louis routes are heavily used, and could support additional train frequency. Nonetheless, planned schedules with 300-seat trains offer enough capacity to accommodate demand through 2020.

**Line Capacity Analysis Methodology**

The results of Line Capacity analysis performed for each segment are summarized in the individual corridor-level SDP's. However, it is important to note that every segment of the MWRRS system did receive some level of capacity assessment in order to develop a mitigation cost estimate. Those segments having light to moderate freight train volumes received an "Ideal Day" assessment, whereas those lines with significant capacity issues due to heavy freight volume received a more detailed "Typical Day" study.

Three segments of the MWRRS system were subjected to this more detailed "Typical Day" analysis based on the full build-out: Chicago to St Paul; Toledo to Cleveland; and St Louis to Kansas City.

The use of the line capacity simulation models was supported by a Mitigation Framework methodology designed to ensure that the freight railroads are "held harmless" by the addition of passenger trains to their corridors, e.g. the assessment of the level of track capacity that would be required to hold freight delays constant in some future target year.

The capacity assessment methodologies are described in detail in Sections 6.1 through 6.6 of the Project Notebook. The results of the Ideal Day capacity analyses are presented in Sections 6.7 through 6.23. The results of the three Typical Day analyses are found in Sections 6.24 through 6.26 of the Project Notebook.

These results of these detailed simulation studies for each corridor, are also included in the individual corridor-level SDP's that form a part of this document.

**Prioritized Capital Plan**

The MWRRS developed a prioritized capital plan in Chapter 8 that addressed corridor and segment implementation phasing. Based on the assumed build-out plan for the MWRRS year-by-year cash flows could be projected, along with their associated funding requirements. This allowed the development of related financing plans, including a statement on Sources and Uses of Funds, with clear definitions of State financial accountabilities for the completion of each segment. This will be addressed in more detail under Topic #3: Implementation Plan.

[3] However, the connectivity provided by the Cleveland Hub System rectifies forecast light ridership on the east end of the Cleveland line. Three additional destinations served by Cleveland Hub – Detroit, Columbus and Pittsburgh – would add significantly to the ridership on the MWRRS Cleveland line. Additional ridership that would result from Cleveland Hub connectivity is not included in the current MWRRS financial forecasts.

**Ridership and Revenue**

The market assessment undertaken in the 2004 Project Notebook represents an analysis of the full social and business market potential for the Midwest Regional Rail System (MWRRS). The study of the passenger rail market opportunities includes an analysis of consumer preferences, market segments, competitive travel modes and the longer-term socioeconomic trends in income, employment and population that affect overall travel levels and consumer choices and mode selection behavior. The process used for conducting the MWRRS market assessment is fully described in Chapter 4 of the Project Notebook.

Data was collected on travel behavior and socioeconomic factors to develop a detailed and comprehensive zone system. These data were later used in the COMPASS™ demand model as the primary source of information for demand and revenue forecasting. Base year socioeconomic data were provided by the U.S. Census Bureau. Socioeconomic growth rates in population, employment and income were provided by Woods & Poole Economics, Inc.

An early step in the development of the forecasting tool for modeling public responses to various levels of service, costs and amenities was the establishment of a zone system that would give a reasonable representation of travel between the origins and destinations in the region. The zone system used is mostly county-based, with urban areas subdivided (Exhibits 4-18 and 4-19 of the Project Notebook). A 385-zone system was developed to represent the Midwest region using the data collected for each zone, integrating the information from the following sources:

- U.S. Census Bureau and Woods & Poole socioeconomic data on population, employment and income
- Network data on all existing travel modes (auto, air, rail, bus)
- Traveler origin and destination data by mode and trip purpose
- Attitudinal data on the preferences and priorities of travelers

Individual state zone maps may be found in Appendix A3 of the Project Notebook. County-based zones provide compatibility with the socioeconomic baseline and forecast data (discussed below) that are derived from the U.S. Census Bureau and Woods & Poole data and are county-based. Zones were defined relative to the rail network, such that small zones are defined for areas close to stations and larger zones for areas farther away. Network links are defined from the centroid of each zone to the nearest MWRRS station representing the cost of system access/egress. Airport-specific zones were introduced to aid in the measurement of MWRRS use for airport access.

**Exhibit 4-18**
**Number of Zones by State**

| *States* | *Number of Zones* | | |
|---|---|---|---|
| | *Statewide Zones* | *Airport Zones* | *Total* |
| Illinois | 57 | 5 | 62 |
| Indiana | 43 | 2 | 45 |
| Iowa | 42 | 2 | 44 |
| Michigan | 48 | 1 | 49 |
| Minnesota | 23 | 1 | 24 |
| Missouri | 45 | 2 | 47 |
| Nebraska | 21 | 1 | 22 |
| Ohio | 36 | 3 | 39 |
| Wisconsin | 47 | 2 | 49 |
| Other | 4 | - | 4 |
| **Total** | **366** | **19** | **385** |

The variables modeled for the MWRRS are shown in Exhibit 4-21 from the Project Notebook. For all four modes of intercity travel (air, auto, bus, and rail), the data for the base year have been assembled into *COMPASS™* databases. The assumptions on the changes in the modes from the base year conditions determine the modal shifts in travel patterns.

**Exhibit 4-21**
**Modal Attributes Used in the *COMPASS™* Demand Model**

| | *Public Modes* | *Auto* |
|---|---|---|
| **Time** | • In-vehicle time<br>• Access/egress times<br>• Number of interchanges<br>• Connection wait times | • Travel time |
| **Cost** | • Fare<br>• Access/egress costs | • Operating cost<br>• Tolls<br>• Parking<br>(all divided by occupancy) |
| **Reliability** | • On-time performance | |
| **Schedule** | • Frequency of service<br>• Convenience of times | |

The ridership results by corridor are provided in Exhibit 4-35 from the Project Notebook.

**Exhibit 4-35**
**Base System Passenger Trips and**
**Passenger Miles for Full MWRRS Operation in 2025**

| *Corridor* | *Passenger Trips* | *Passenger Miles (Millions)* | *Average Trip Length (Miles)* |
|---|---|---|---|
| Michigan | 3,674,940 | 603.14 | 164.1 |
| Cleveland | 1,120,108 | 252.14 | 225.1 |
| Cincinnati | 894,669 | 213.79 | 239.0 |
| Carbondale | 769,911 | 87.08 | 113.1 |
| St. Louis | 1,757,123 | 336.91 | 191.7 |
| Kansas City | 804,498 | 116.28 | 144.5 |
| Quincy – Omaha | 1,440,132 | 238.04 | 165.3 |
| Green Bay – St. Paul | 4,362,404 | 540.23 | 123.8 |
| Cross Chicago | (2,187,778) | -- | -- |
| **Total** | **14,823,786** | **2387.62** | **161.1** |

The ridership and revenue forecasts for the eight principal corridors used in the financial analysis of the MWRRS are given in Exhibit 4-36 from the Project Notebook. It is estimated that, by 2025, the MWRRS will attract an annual ridership of 14.8 million. (Eliminating double-counting of riders who transfer in Chicago, ridership would be 12.6 million.) There are significant differences between the corridors. Not surprisingly, the forecasts show that Chicago-Michigan, Chicago-St. Louis, Chicago-Cincinnati and Chicago-Twin Cities are the corridors with the largest ridership and market shares in rail. Although the corridors with the lowest market shares are Chicago-Cleveland, Chicago-Carbondale and Chicago-Quincy-Omaha, the analysis shows they are still significant components of the MWRRS network.

**Exhibit 4-36**
**2025 Passenger Rail Forecasts and**
**Corridor Market Shares for the Intercity Modes**

| *Corridor* | *Rail Demand* | *Corridor Market Share (%)* | | | |
|---|---|---|---|---|---|
| | | *Air* | *Bus* | *Auto* | *Rail* |
| Michigan | 3,674,940 | 0.94% | 0.34% | 97.29% | 1.43% |
| Cleveland | 1,120,108 | 1.15% | 0.51% | 97.31% | 1.03% |
| Cincinnati | 894,669 | 3.48% | 0.45% | 93.74% | 2.33% |
| Carbondale | 769,911 | 0.48% | 0.42% | 98.10% | 1.00% |
| St. Louis | 1,757,123 | 2.77% | 0.43% | 94.61% | 2.19% |
| Kansas City | 804,498 | 2.95% | 0.22% | 95.35% | 1.48% |
| Quincy – Omaha | 1,440,132 | 1.25% | 0.17% | 97.45% | 1.13% |
| Green Bay – St. Paul | 4,362,404 | 1.07% | 0.29% | 96.97% | 1.67% |
| Cross Chicago | (2,187,778) | 2.75% | 0.58% | 94.36% | 2.31% |
| **Total** | **14,823,786** | **1.15%** | **0.29%** | **96.41%** | **2.15%** |

By 2025, rail's market share will increase to 47 percent of the intercity public modes, making rail travel as popular as air travel (Exhibit 4-37).

**Operating Costs**

Development of a detailed operating cost model is detailed in Section 7.12 of the MWRRS Project Notebook. This cost model includes all the detail breakdowns that are needed for an SDP. Exhibit 7-44 from the Project Notebook shows the unit costs applied (in $2002) and the assumed methodological basis for assigning each cost.

It should be noted that MWRRS costs were developed in conjunction with Amtrak, thus reflect a cost basis that has been accepted as reasonable and achievable in the U.S. Along with anticipated economies of scale, modern technology reduces operating costs when compared to existing Amtrak practice. In development of the earlier 2000 Plan, European costs were measured at 40 percent of Amtrak's costs. However, in the current 2004 study, train operating costs have been significantly increased to a level that is approximately 80 percent of Amtrak's costs today. This is regarded as a conservative assumption for a modern, 63-train system. Costs assumed in the MWRRS Project Notebook are specific to a large operation with economies of scale, and so may not apply to a smaller system. (See Section 3.1.1 of the Project Notebook.)

**Exhibit 7-44**
**Unit Operating Costs Summary (2002 $)**

| *Category* | *Source* | *Allocation Basis* | *Type* | *Unit / Lump Sum Cost* |
|---|---|---|---|---|
| Train Crew | TEMS/Amtrak | Train Miles | Variable | $3.95 |
| OBS | Amtrak/Gate Gourmet | Train Miles plus OBS Rev | Variable | $1.53 (crew and supervision) plus 50% of OBS Revenue |
| Equipment Maintenance | Equipment Manufacturers | Train Miles | Variable | $9.87 |
| Energy/Fuel | Equipment Manufacturers | Train Miles | Variable | $2.32 |
| Track/ROW | Zeta-Tech/HNTB | Train Miles | Both Fixed and Variable Components | Lump Sum (corridor wise - year wise) plus 39.5¢ /TM for Out-of-Pocket Expense such as Dispatching. |
| Station costs | TEMS/Amtrak | Passengers | Fixed | $26,093,119 per year (full operation years) |
| Insurance | TEMS/Amtrak | Passenger Miles | Variable | $0.011 |
| Sales/Marketing | TEMS/Amtrak | Passengers plus Ticket Revenue | Both Fixed and Variable Components | $0.65 (phone support variable), 1.6% (credit card fees), 1% (travel agent fees), $7,339,450 fixed (market media and phone support) |
| Admin | TEMS/Amtrak | Train Miles | Fixed | $28,993,655 |
| Bus Feeder | Greyhound | Bus Miles | Fixed | Lump sum (corridor wise - year wise) |
| Operator's Profit | TEMS/MWRRI | Percentage of Energy-Fuel, Train Crew, Service Admin, Sales-Marketing, Station Cost, Insurance Liability | Variable | 10% |

**Financial Results**

Exhibit 10-1 from the Project Notebook shows MWRRI net revenue, operating expenses, and the resultant cash flows. During the first two years of the implementation period, start-up operating expenses – at the system level – are below operating revenues. By the third year of implementation, net operating revenues (revenues less costs) are positive and continue to accelerate at a faster rate than operating costs. After full implementation of the system, ridership, revenues and costs continue to slowly increase because of the effect of forecast population growth and income changes. With additional ridership, costs increase at a much slower pace since train-mile costs are held essentially fixed. Since operations are held constant after Phase 7, the financial model predicts an improving operating ratio over time.

**Exhibit 10-1**
**Net Operating Revenues and Expenses**

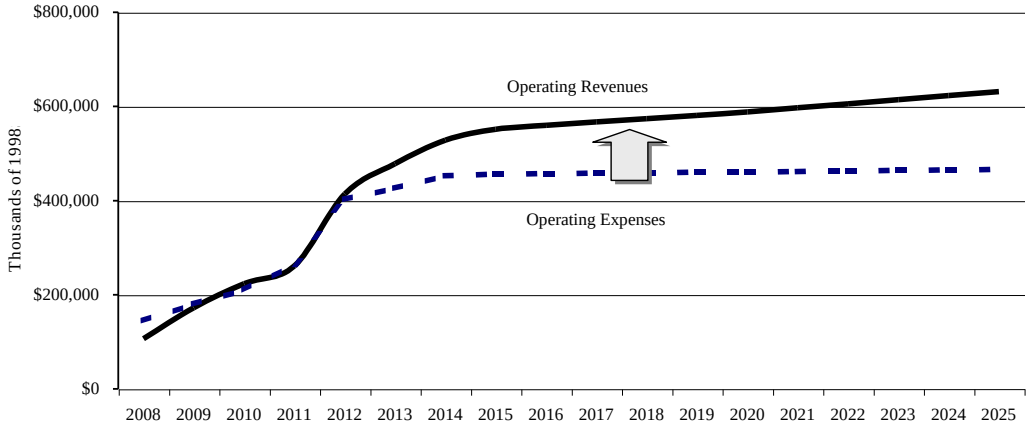



Exhibit 10-2 from the Project Notebook provides a detailed Pro Forma Statement of Operations for the thirty-three year planning period 2008 through 2040.

**Exhibit 10-2**
**Midwest Regional Rail System**
**Statement of Operations, Year 2008 – 2040 (Thousands of 2002$)**

| | Total to 2040 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Revenues** | | | | | | | | | | | | |
| Fare Box Revenue | **$17,584,584** | $98,405 | $158,554 | $205,681 | $240,453 | $380,650 | $438,283 | $483,991 | $505,191 | $512,822 | $519,288 | $525,753 |
| On Board Revenue | **1,395,879** | 7,826 | 12,600 | 16,330 | 19,084 | 30,219 | 34,800 | 38,422 | 40,101 | 40,707 | 41,220 | 41,733 |
| Express Parcel Svc (Net Rev) | **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bus Feeder System | **220,722** | 398 | 1,095 | 1,539 | 1,898 | 3,159 | 5,216 | 5,964 | 6,218 | 6,361 | 6,467 | 6,575 |
| **Total Revenues** | **18,980,463** | 106,628 | 172,249 | 223,550 | 261,435 | 414,028 | 478,299 | 528,377 | 551,511 | 559,890 | 566,975 | 574,061 |
| ***Train Operating Expenses*** | | | | | | | | | | | | |
| Energy and Fuel | **965,994** | 7,827 | 10,026 | 11,625 | 16,204 | 28,172 | 29,773 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 |
| Train Equipment Maintenance | **4,109,638** | 33,300 | 42,652 | 49,458 | 68,938 | 119,851 | 126,663 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 |
| Train Crew | **1,645,551** | 13,334 | 17,078 | 19,803 | 27,603 | 47,990 | 50,718 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 |
| On Board Services Crew | **1,334,461** | 9,071 | 12,906 | 15,825 | 20,219 | 33,673 | 37,018 | 40,257 | 41,097 | 41,399 | 41,656 | 41,913 |
| Service Administration | **942,294** | 20,296 | 23,195 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 |
| Operating Profit | **621,640** | 7,202 | 8,654 | 10,220 | 12,070 | 17,131 | 18,102 | 19,183 | 19,412 | 19,483 | 19,542 | 19,600 |
| **Total Train Operating Expenses** | **9,619,578** | 91,029 | 114,511 | 135,926 | 174,028 | 275,811 | 291,268 | 310,662 | 311,731 | 312,105 | 312,420 | 312,735 |
| ***Other Operating Expenses*** | | | | | | | | | | | | |
| Track & ROW Maintenance | **1,802,585** | 22,942 | 27,403 | 30,143 | 39,790 | 55,557 | 56,272 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 |
| Station Costs | **818,250** | 14,001 | 14,767 | 16,165 | 18,965 | 24,719 | 25,119 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 |
| Sales & Marketing | **987,206** | 11,620 | 13,972 | 15,940 | 17,519 | 23,435 | 25,823 | 27,876 | 28,808 | 29,154 | 29,430 | 29,706 |
| Insurance Liability | **857,110** | 4,943 | 7,503 | 9,676 | 11,415 | 18,004 | 20,596 | 22,523 | 23,880 | 24,243 | 24,553 | 24,863 |
| Bus Feeder | **221,295** | 482 | 2,124 | 2,241 | 2,815 | 5,055 | 7,105 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 |
| **Total Other Operating Expenses** | **4,465,151** | 53,988 | 65,769 | 74,165 | 90,504 | 126,771 | 134,914 | 142,120 | 144,410 | 145,118 | 145,704 | 146,290 |
| **Total Operating Expenses** | **14,084,729** | 145,018 | 180,281 | 210,090 | 264,532 | 402,582 | 426,182 | 452,782 | 456,141 | 457,223 | 458,124 | 459,025 |
| **Cash Flow From Operations** | **4,895,734** | ($38,389) | ($8,031) | $13,459 | ($3,097) | $11,446 | $52,117 | $75,595 | $95,370 | $102,668 | $108,851 | $115,037 |
| **Operating Ratio** | **1.35** | 0.74 | 0.96 | 1.06 | 0.99 | 1.03 | 1.12 | 1.17 | 1.21 | 1.22 | 1.24 | 1.25 |

**Exhibit 10-2 (continued)**
**Midwest Regional Rail System**
**Statement of Operations, Year 2008-2040 (Thousands of 2002$)**

| | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Revenues** | | | | | | | | | | | | |
| Fare Box Revenue | $532,219 | $538,684 | $546,641 | $554,598 | $562,555 | $570,511 | $578,468 | $586,425 | $594,382 | $602,339 | $610,295 | $618,252 |
| On Board Revenue | 42,247 | 42,760 | 43,391 | 44,023 | 44,655 | 45,286 | 45,918 | 46,549 | 47,181 | 47,812 | 48,444 | 49,076 |
| Express Parcel Service (Net Rev) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bus Feeder System | 6,684 | 6,795 | 6,908 | 7,023 | 7,140 | 7,259 | 7,380 | 7,503 | 7,627 | 7,754 | 7,883 | 8,015 |
| **Total Revenues** | 581,149 | 588,239 | 596,941 | 605,644 | 614,349 | 623,056 | 631,766 | 640,477 | 649,190 | 657,905 | 666,623 | 675,342 |
| ***Train Operating Expenses*** | | | | | | | | | | | | |
| Energy and Fuel | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 |
| Train Equipment Maintenance | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 |
| Train Crew | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 |
| On Board Services Crew | 42,169 | 42,426 | 42,742 | 43,057 | 43,373 | 43,689 | 44,005 | 44,321 | 44,636 | 44,952 | 45,268 | 45,584 |
| Service Administration | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 |
| Operating Profit | 19,659 | 19,718 | 19,784 | 19,851 | 19,917 | 19,984 | 20,050 | 20,144 | 20,239 | 20,333 | 20,428 | 20,522 |
| **Total Train Operating Expenses** | 313,050 | 313,365 | 313,748 | 314,130 | 314,512 | 314,895 | 315,277 | 315,687 | 316,097 | 316,507 | 316,918 | 317,328 |
| ***Other Operating Expenses*** | | | | | | | | | | | | |
| Track & ROW Maintenance | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 |
| Station Costs | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 |
| Sales & Marketing | 29,982 | 30,258 | 30,544 | 30,829 | 31,114 | 31,400 | 31,685 | 32,042 | 32,399 | 32,756 | 33,113 | 33,470 |
| Insurance Liability | 25,172 | 25,482 | 25,862 | 26,242 | 26,621 | 27,001 | 27,381 | 27,968 | 28,555 | 29,142 | 29,729 | 30,316 |
| Bus Feeder | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 |
| **Total Other Operating Expenses** | 146,876 | 147,461 | 148,126 | 148,792 | 149,457 | 150,122 | 150,787 | 151,731 | 152,675 | 153,619 | 154,562 | 155,506 |
| **Total Operating Expenses** | 459,926 | 460,827 | 461,874 | 462,921 | 463,969 | 465,016 | 466,064 | 467,418 | 468,772 | 470,126 | 471,480 | 472,834 |
| **Cash Flow From Operations** | $121,224 | $127,412 | $135,067 | $142,723 | $150,380 | $158,040 | $165,702 | $173,059 | $180,418 | $187,779 | $195,143 | $202,508 |
| **Operating Ratio** | 1.26 | 1.28 | 1.29 | 1.31 | 1.32 | 1.34 | 1.36 | 1.37 | 1.38 | 1.40 | 1.41 | 1.43 |

**Exhibit 10-2 (continued)**
**Midwest Regional Rail System**
**Statement of Operations, Year 2008 – 2040 (Thousands of 2002$)**

| | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 |
|---|---|---|---|---|---|---|---|---|---|
| **Revenues** | | | | | | | | | |
| Fare Box Revenue | $634,166 | $642,122 | $650,079 | $658,036 | $665,993 | $673,950 | $681,906 | $689,863 | $697,820 |
| On Board Revenue | 50,339 | 50,970 | 51,602 | 52,234 | 52,865 | 53,497 | 54,128 | 54,760 | 55,392 |
| Express Parcel Service (Net Rev) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bus Feeder System | 8,284 | 8,421 | 8,561 | 8,704 | 8,849 | 8,996 | 9,146 | 9,298 | 9,453 |
| **Total Revenues** | 692,788 | 701,514 | 710,243 | 718,974 | 727,707 | 736,443 | 745,181 | 753,921 | 762,664 |
| ***Train Operating Expenses*** | | | | | | | | | |
| Energy and Fuel | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 | 31,940 |
| Train Equipment Maintenance | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 | 135,881 |
| Train Crew | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 | 54,408 |
| On Board Services Crew | 46,215 | 46,531 | 46,847 | 47,163 | 47,478 | 47,794 | 48,110 | 48,426 | 48,742 |
| Service Administration | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 | 28,994 |
| Operating Profit | 20,711 | 20,805 | 20,900 | 20,994 | 21,088 | 21,183 | 21,277 | 21,372 | 21,466 |
| **Total Train Operating Expenses** | 318,148 | 318,558 | 318,969 | 319,379 | 319,789 | 320,199 | 320,609 | 321,019 | 321,430 |
| ***Other Operating Expenses*** | | | | | | | | | |
| Track & ROW Maintenance | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 | 58,166 |
| Station Costs | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 | 26,093 |
| Sales & Marketing | 34,184 | 34,541 | 34,898 | 35,255 | 35,612 | 35,969 | 36,326 | 36,682 | 37,039 |
| Insurance Liability | 31,490 | 32,077 | 32,664 | 33,251 | 33,838 | 34,425 | 35,012 | 35,599 | 36,185 |
| Bus Feeder | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 | 7,462 |
| **Total Other Operating Expenses** | 157,394 | 158,338 | 159,282 | 160,226 | 161,170 | 162,114 | 163,058 | 164,002 | 164,946 |
| **Total Operating Expenses** | 475,542 | 476,897 | 478,251 | 479,605 | 480,959 | 482,313 | 483,667 | 485,021 | 486,375 |
| **Cash Flow From Operations** | $217,246 | $224,618 | $231,992 | $239,369 | $246,748 | $254,129 | $261,513 | $268,900 | $276,289 |
| **Operating Ratio** | 1.46 | 1.47 | 1.49 | 1.50 | 1.51 | 1.53 | 1.54 | 1.55 | 1.57 |

Operating performance on a corridor basis both *with* and *without* the express parcel service, showing operating revenue, costs and ratios is presented in Exhibit 10-3 and 10-4 respectively. Adding the express parcel service clearly improves the financial performance of the MWRRS, but is not critical to meeting the FRA requirement described in Chapter 9 that each route must show a positive operating ratio after the ramp-up period. O&M costs do not increase with the addition of the express parcel service, since express parcel costs are accounted for here in a separate financial statement. Only the net contribution of the express parcel service is brought forward into the operating ratio calculations of Exhibit 10-5.

**Exhibit 10-3**
**Operating Revenues, Costs and Ratios without the Express Parcel Service**

| *MWRRS Summary Financial Statistics* | *Operating Revenue* | | *O&M Cost* | | *Operating Ratio* | |
|---|---|---|---|---|---|---|
| | *(Millions of 2002$)* | | *(Millions of 2002$)* | | | |
| | *2014* | *2025* | *2014* | *2025* | *2014* | *2025* |
| Chicago-Detroit/Grand Rapids/Port Huron | $113 | $129 | $95 | $97 | 1.18 | 1.32 |
| Chicago-Cleveland | $50 | $66 | $56 | $58 | 0.88 | 1.15 |
| Chicago-Cincinnati | $53 | $61 | $40 | $41 | 1.32 | 1.49 |
| Chicago-Carbondale | $22 | $25 | $22 | $22 | 0.99 | 1.11 |
| Chicago-St. Louis | $61 | $71 | $47 | $49 | 1.30 | 1.46 |
| St Louis-Kansas City | $35 | $47 | $34 | $35 | 1.05 | 1.32 |
| Chicago-Quincy Omaha | $53 | $61 | $59 | $60 | 0.90 | 1.02 |
| Chicago-Minneapolis /Green Bay | $141 | $172 | $99 | $104 | 1.42 | 1.65 |
| **Midwest Regional Rail System Total** | **$528** | **$632** | **$453** | **$466** | **1.17** | **1.36** |

**Exhibit 10-4**
**Operating Revenues, Costs and Ratios with the Express Parcel Service**

| *Corridor* | *Operating Revenue including Express Parcel Service (2002$ Million)* | | *Operating Cost (2002$ Million)* | | *Operating Ratio* | |
|---|---|---|---|---|---|---|
| | *2014* | *2025* | *2014* | *2025* | *2014* | *2025* |
| Chicago-Detroit/Grand Rapids/Port Huron | $118 | $137 | $95 | $97 | 1.24 | 1.40 |
| Chicago-Cleveland | $54 | $73 | $56 | $58 | 0.96 | 1.27 |
| Chicago-Cincinnati | $57 | $66 | $40 | $41 | 1.40 | 1.61 |
| Chicago-Carbondale | $22 | $25 | $22 | $22 | 1.00 | 1.13 |
| Chicago-St. Louis | $64 | $76 | $47 | $49 | 1.36 | 1.55 |
| St Louis-Kansas City | $37 | $49 | $34 | $35 | 1.09 | 1.38 |
| Chicago-Quincy-Omaha | $54 | $62 | $59 | $60 | 0.92 | 1.04 |
| Chicago-Minneapolis /Green Bay | $149 | $185 | $99 | $104 | 1.51 | 1.77 |
| **Midwest Regional Rail System Total** | **$555** | **$672** | **$453** | **$466** | **1.23** | **1.44** |

As shown in Exhibit 10-5, total operating losses during the seven-year implementation period amount to $206.1 million, on a corridor basis. With this approach, each corridor operates independently from the others and there is no cross-subsidy between corridors. However, on a system-wide basis, total operating losses are only $49.5 million, less than one-fourth the amount of the individual corridors. The improved *net* financial performance, when viewed on the system-wide basis, results from the stronger established corridors covering some initial start-up costs of the weaker routes that are not yet fully ramped-up. The financial analysis assumes that TIFIA assistance, rather than a direct state subsidy, will be used to cover the ramp-up operating losses. A system-wide approach dramatically reduces the level of TIFIA assistance needed.

**Exhibit 10-5**
**Net Operating Revenue**
**(Thousands of 2002$)**

| *Cash Flow (Thousands of 2002$)* | | *Implementation Period* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | *Phase 1 2008* | *Phase 2 2009* | *Phase 3 2010* | *Phase 4 2011* | *Phase 5 2012* | *Phase 6 2013* | *Phase 7 2014* |
| *Corridor* | *Total Losses* | | | | | | | |
| Michigan | ($53,395) | ($21,286) | ($13,256) | ($10,836) | ($8,018) | $2,112 | $12,338 | $17,506 |
| Cleveland | ($47,648) | $0 | $0 | $0 | $0 | ($28,478) | ($12,434) | ($6,736) |
| Cincinnati | ($10,243) | $0 | $0 | $0 | $0 | ($10,243) | $7,998 | $12,908 |
| Carbondale | ($11,256) | $0 | $0 | $0 | ($7,884) | ($2,201) | ($947) | ($224) |
| St. Louis | ($11,571) | ($11,571) | $1,038 | $4,986 | $2,555 | $11,859 | $12,711 | $14,234 |
| Kansas City | ($11,164) | $0 | $0 | $0 | ($9,022) | $2,927 | ($2,142) | $1,546 |
| Quincy-Omaha | ($55,299) | $0 | $0 | ($5,199) | ($15,167) | ($13,802) | ($15,430) | ($5,702) |
| Green Bay-St. Paul | ($5,533) | ($5,533) | $4,187 | $24,508 | $34,438 | $49,271 | $50,023 | $42,062 |
| **Total by Corridor** | **($206,109)** | | | | | | | |
| **Total by System** | **($49,518)** | **($38,389)** | **($8,031)** | **$13,459** | **($3,097)** | **$11,446** | **$52,117** | **$75,595** |

Applying the cost assumptions discussed previously in this report, the operational analysis projects that the MWRRS produces an operating surplus – on a system-wide operating basis – in 2012, the fifth year of implementation. By the end of the first four years, the performance of the corridor segments completed in Phase 1 through Phase 4 is strong enough to *carry* projected operating losses through the remainder of the implementation period.

In the operating projections, all operating costs are incurred in the first year of each corridor's operation. However, revenue levels do not achieve full potential until the third year of operations. This assumption allows for a reasonable ramp-up period and takes into account the lag in market responsiveness to this new service. Revenues are projected at 50 percent of full operations in the first year and at 90 percent in the second year. Therefore, even with increases in variable costs resulting from increased ridership levels, the overall operating cost ratio for the system improves from 0.74 in

2008 to 1.06 in 2010 and to 1.17 in 2014. Projected annualized revenues by 2014, the first full year in which all corridor segments are in operation, are expected to exceed $528 million with net operating cash flows of approximately $75 million.

Projected operating revenues and costs are incorporated into each financing alternative and are estimated over a twenty-year period. Net revenues are defined as farebox, onboard, express parcel service revenues, less operating and maintenance costs. The cash flow projections assume that five percent of any positive net cash flow from operations, on a system-wide basis, is diverted to a capital reserve account and used for system expansion, preservation or other purposes. The balance of annual net revenues would be disbursed to the participating states based on an agreed-upon allocation method.

In terms of the objectives set by the MWRRI Steering Committee, the ratio of revenues to operating costs, the *operating cost ratio,* provides the key financial measure of the merits of the MWRRS. Specifically, the operating cost ratio measures whether the system will generate enough revenues to cover its operating costs. Thus, the operating cost ratio measures the MWRRS' ability to be self-supporting, if the capital costs of the system are provided as grants. The operating cost ratio for the MWRRS achieves a ratio above 1.0 (revenues greater than costs) by 2006 and is projected to achieve a ratio of 1.17 by 2014 when the system is fully operational. With the exception of the Chicago-Omaha/Quincy route, each corridor achieves a positive operating cost ratio (greater than 1.0) by 2015, the year after full system implementation. The Chicago-Omaha segment, which is not completed until Phase 6, does not reach self-sufficiency until 2024. Exhibit 10-6 from the Project Notebook presents the forecasted operating cost ratio for each corridor in 2014 and 2025.

**Exhibit 10-6**
**Operating Cost Ratios in 2014 and 2025**

| ***MWRRS*** ***Summary Financial Statistics*** | ***2014*** | ***2025*** |
|---|---|---|
| Chicago Detroit/Grand Rapids/ Port Huron | 1.18 | 1.32 |
| Chicago Cleveland | 0.88 | 1.15 |
| Chicago Cincinnati | 1.32 | 1.49 |
| Chicago Carbondale | 0.99 | 1.11 |
| Chicago St. Louis | 1.30 | 1.46 |
| St Louis Kansas City | 1.05 | 1.32 |
| Chicago Quincy Omaha | 0.90 | 1.02 |
| Chicago Minneapolis /Green Bay | 1.42 | 1.65 |
| **Midwest Regional Rail System Total** | **1.17** | **1.36** |

**Economic Results and Public Benefits**

Chapter 11 of the Project Notebook describes the estimation of the economic results and public benefits associated with development of the MWRRS. This 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 MWRRS Economic 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.

The Consumer Surplus analysis (Section 11.2 of the Project Notebook) uses the same criteria and structure as the 1997 FRA study, *High-Speed Ground Transportation for America*. In that study, costs and benefits were quantified in terms of passenger rail system user benefits, other-mode user benefits, and resources benefits. The result was the development of a Cost/Benefit analysis for the MWRRS based on the FRA methodology.

The Economic Rent analysis (Section 11.3 of the Project Notebook) measures the supply side benefit of the MWRRS resulting from increased productivity of the Midwest economy. The RENTS™ Model shows how consumer surplus user benefits translate into increased jobs, incomes and property values. Accordingly the Economic Rent results are not additive to the consumer surplus benefit, but are simply another way of expressing the same benefit that is identified in the FRA Cost/Benefit analysis.

Finally, the Input-Output analysis (Section 11.4 of the Project Notebook) measures the temporary construction spending impacts of the MWRRS on income, overall economic activity and job creation in the Midwest economy. This analysis was performed using the Bureau of Commerce, BEA, RIMS II economic model.

Summarizing the results of the economic analysis, Exhibit 11.2 of the Project Notebook shows that 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 11.2**
**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 user benefit analysis, estimates that implementation of the MWRRS will generate more than $23 billion in economic benefits to the region. The resulting 1.80 ratio of benefits to costs indicates that the MWRRS is expected to have a positive impact on both the Midwest and National economy.

To estimate job creation as a result of the ongoing productivity and mobility improvement due to the MWRRS, a regression analysis was used to calibrate the MWRRI Economic Rent Model. This established the mathematical relationship between a 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 11.6 through 11.9 in the Project Notebook 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.

**Exhibit 11.6**
**Employment as a Function of Accessibility**

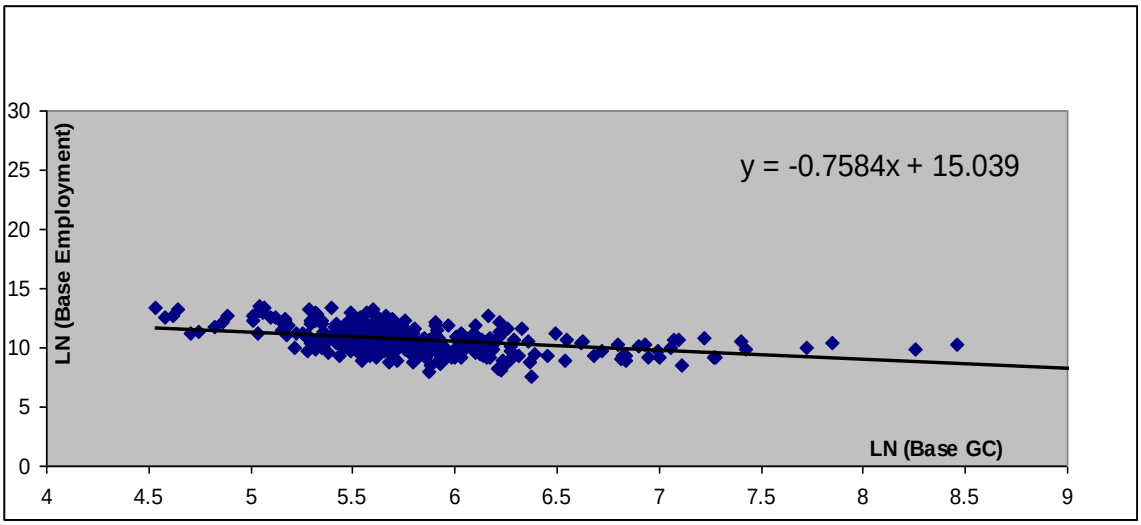



**Exhibit 11.7**
**Average Household Income as a Function of Accessibility**

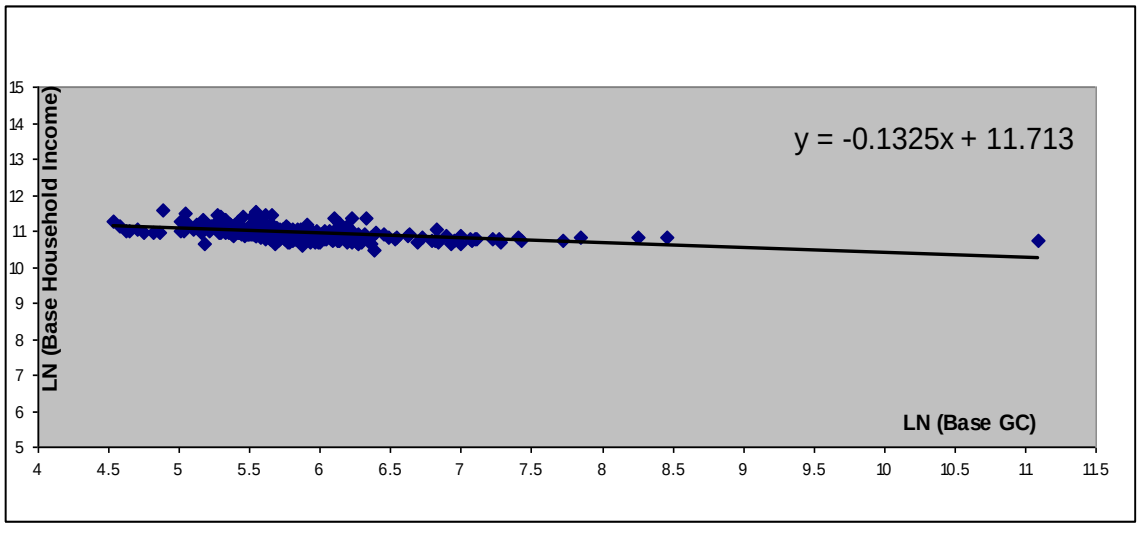



**Exhibit 11.8**

**Average Property Value as a Function of Accessibility**

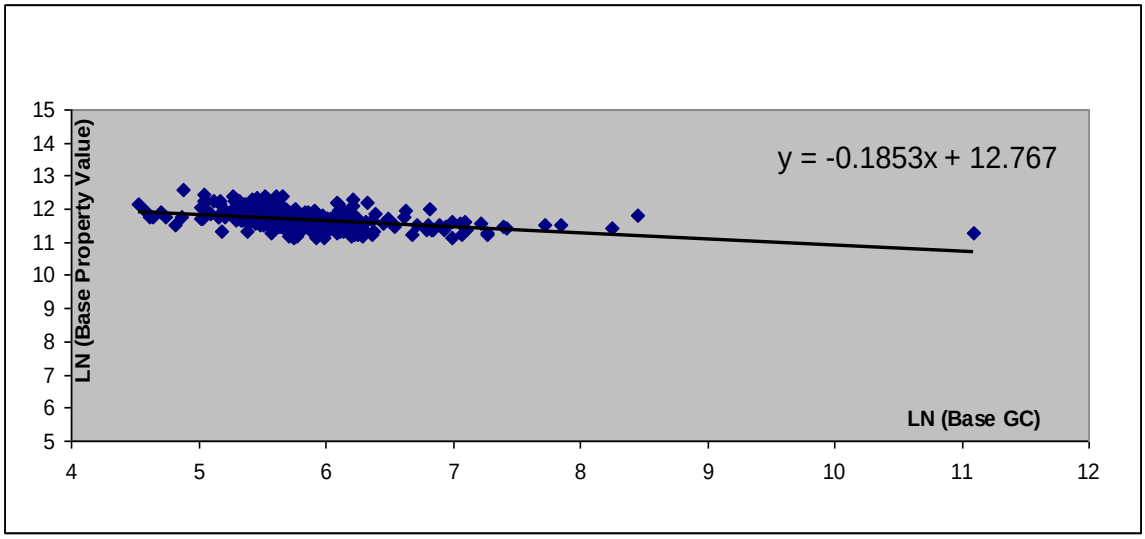



**Exhibit 11.9**
**Economic Rent Coefficients (for employment, average income and property value)**

| Socio-economic Indicators | $\beta_0$ | $\beta_1$ | *T-value for* $\beta_1$ | *T-value for* $\beta_0$ | 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.

The result of the Economic Rent analysis has shown that, for the entire Midwest Region, over 58,260 permanent new jobs will be created; joint development potential is estimated to increase property values by nearly $5 billion; and urban household income is estimated to increase by over $1.0 billion. In addition, the overall results could be disaggregated to the zone level for assessing the benefits at each rail station. These corridor-specific results will be reported as part of the individual corridor-level SDP's that are part of this document.

Finally, an Input-Output analysis has been used to assess the temporary construction related impact on the Midwestern regional economy. This is more fully described in Section 11.4 of the Project Notebook.

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[4]. 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.

As shown in Exhibit 11-29 the construction impact was estimated to create 152,063 person-years of work, or an average of 15,206 jobs for each of the assumed 10-year deployment period for the system.

By comparison it can be seen that the long-term structural impact on the economy by creating 58,260 permanent new jobs is much greater than the 15,026 jobs of temporary construction impact. This shows the high value of the MWRRS investment towards increasing the long-term economic productivity of the Midwestern US economy. This strong supply-side economic impact results directly from the high levels of Consumer Surplus generated by the system, as reflected in the FRA Cost Benefit ratios. It shows how these demand-side Consumer Surplus benefits translate directly into supply-side impacts reflecting job creation, and income and property value effects.

[4] 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.

***Topic #3: Implementation Plan***

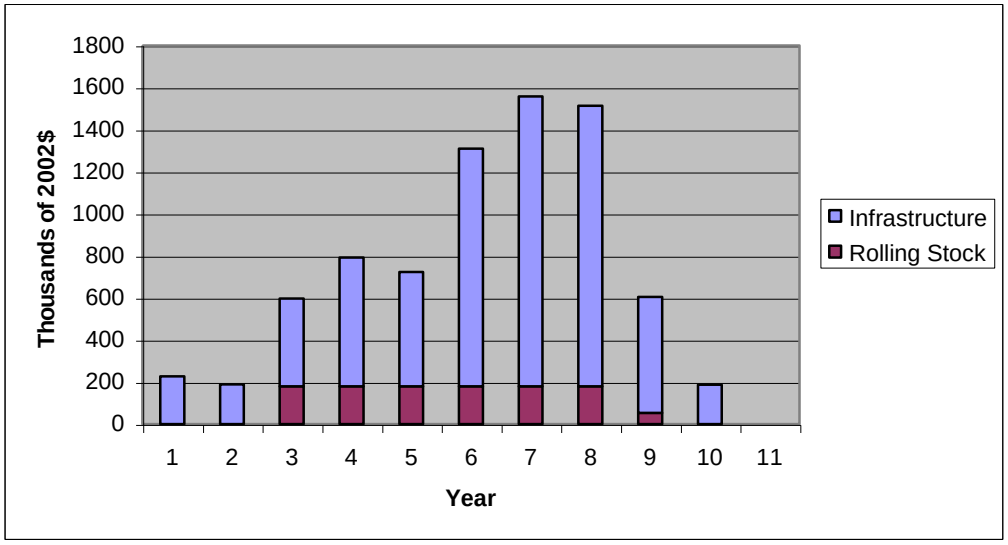
Starting in 2004, the MWRRS developed a detailed Implementation Plan defining a schedule for carrying out each phase of the Corridor Program. Development of this Implementation Plan, along with its related Funding and Financing requirements, is detailed in Chapter 8 of the Project Notebook.

Given the scale of the MWRRS – more than 3,000 route miles through nine states – and the level of capital funding required for the infrastructure improvements and rolling stock, implementation of the MWRRS is planned to occur in a series of six construction phases. The MWRRS will be fully operational by the end of the tenth project year.

This timeframe takes the project through design and manufacture of rolling stock, project development, preliminary engineering, design and final construction of the rail system's infrastructure. Project development includes all environmental reviews and/or the steps necessary under the National Environmental Policy Act, including public involvement and necessary engineering to obtain a record of decision. This incremental approach allows the states to secure funding and to develop the infrastructure in conjunction with the freight railways, and enables the rail operator to assess the impact of various service attributes on ridership and revenue and make any necessary adjustments.

While the MWRRS requires significant capital funding, its $7.7 billion cost (in $2002) is reasonable given the size and population of the Midwest region (60 million people), the lack of previous regional investment in intercity passenger rail and the fact that nine states and the federal government would share these costs. The proposed split of the necessary funding is 80 percent federal and 20 percent state and other sources – a long-established statutory arrangement used for highway, transit and airport funding. As shown in Exhibit 8-1 from the Project Notebook, more than $1.3 billion will be needed in each of three peak years to support construction and equipment purchases.

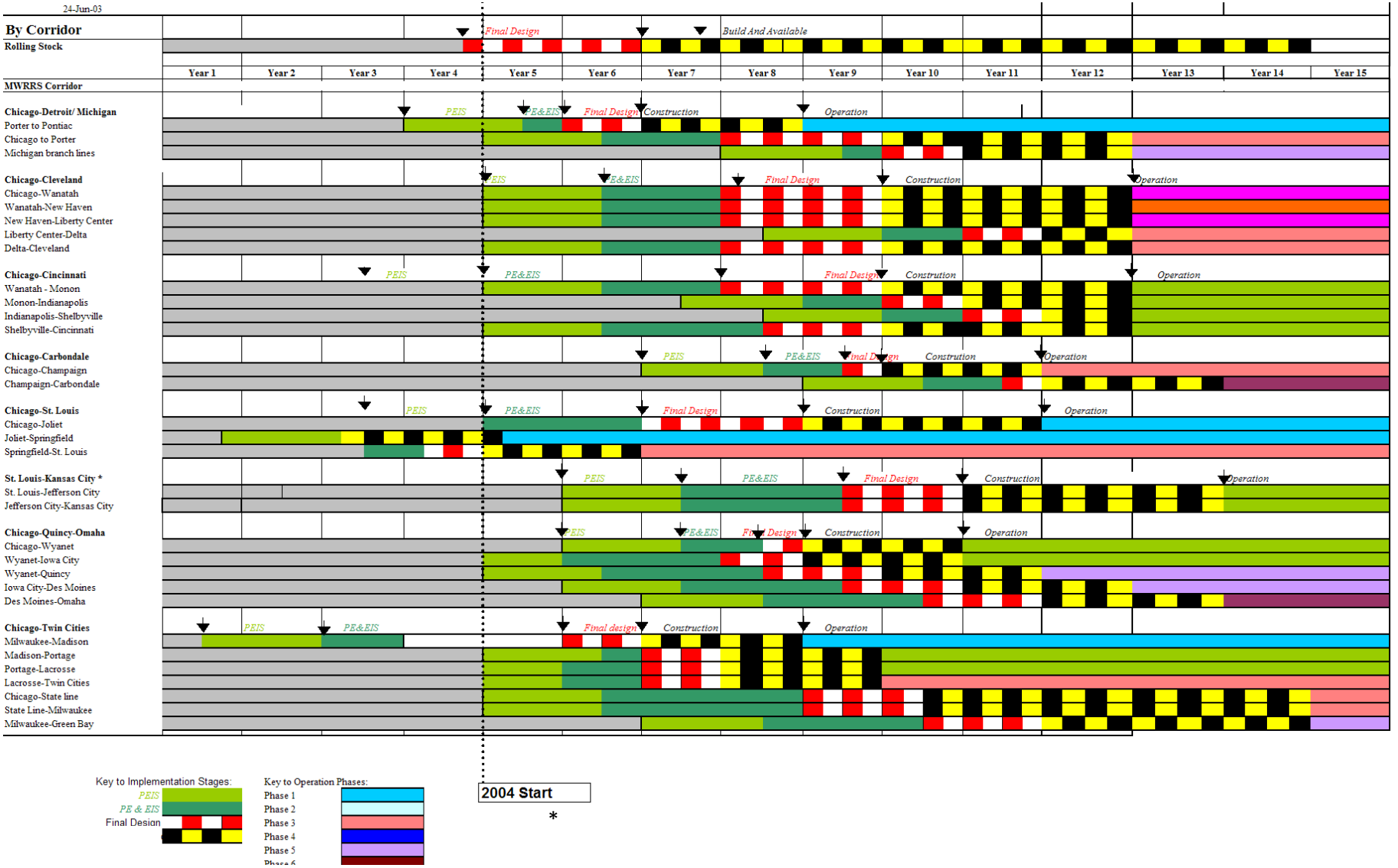
**Exhibit 8-1**
**MWRRS Capital Requirements by Year**




**Implementation Phase Development**

The implementation plan has been refined to ensure positive operating cash flows as early in the implementation schedule as possible. The corridors (routes) have been segmented and re-ordered in such a way as to optimize financial results. Thus, those corridor segments with the highest operating returns are implemented in the earlier phases of the plan. Exhibit 8-2 from the Project Notebook illustrates the full implementation plan by corridor, and provides details on the anticipated ten-year schedule by activity – project development, preliminary engineering design and construction. Exhibits 8-3, 8-4 and 8-5 provide additional information on the development of each corridor and the financial costs to each state.

## Exhibit 8-2
## Midwest Regional Rail System Implementation Plan




* Dates are illustrative for planning purposes and the actual dates will be dependent upon federal funding.

## Exhibit 8-3
## MWRRS Train Schedule Implementation Plan

| *Year* | *Chicago-Detroit* | *Chicago-Cleveland* | *Chicago-Cincinnati* | *Chicago-Carbondale* | *Chicago-St Louis* | *St. Louis-Kansas City* | *Chicago-Quincy / Omaha* | *Chicago–Twin Cities* |
|---|---|---|---|---|---|---|---|---|
| 2008 | 6 Round Trips CHI-PNT, 5:23 running time (Old Phase 2 schedule extended to Pontiac) | | | | 8 round trips with 4:10 running (Old Phase 6 schedules) | | | Six round trips to Madison with 2:43 running time (Old Phase 2 but truncate St Paul back to Madison) |
| 2009 | "Same as above" | | | | "Same as above" | | | Six round trips to Twin Cities at 6:44 running plus 4 to Madison (Old Phase 6 schedules without Green Bay) |
| 2010 | "Same as above" | | | | "Same as above" | | 5 Round Trips to Iowa City service | "Same as above" |
| 2011 | "Same as above" | | | 5 Round Trips CHI to Champaign at 90 mph; two trains continue to Carbondale at 79 mph. | "Same as above" | 4 Round Trips on 5:34 schedule (old Phase 4 schedules) | Iowa City plus 4 Round Trips to Quincy | "Same as above" |
| 2012 | Full schedules with Branch Lines, 5:01 running time CHI-PNT. (Old Phase 6 schedules) | Full schedules with 8 round trips, 4:48 running time (Old Phase 6 schedules) | Full schedules with 5 round trips, 4:25 running time (Old Phase 6 schedules) | "Same as above" | "Same as above" | "Same as above" | Extend service to Des Moines, plus Quincy | "Same as above" |
| 2013 | "Same as above" | "Same as above" | "Same as above" | 5 Round Trips CHI to Champaign at 90 mph; two trains continue to Carbondale at 90 mph. | "Same as above" | 6 Round Trips on 4:42 schedule (old Phase 6 schedules) | Extend service to Omaha, plus Quincy (Old Phase 6 schedules) | "Same as above" |
| 2014 - beyond | "Same as above" | "Same as above" | "Same as above" | "Same as above" | "Same as above" | "Same as above" | "Same as above" | Add Green Bay service; reduce Chicago-Milwaukee by 15 minutes |

**Exhibit 8-4**
**Capital Costs by Phase and Route Segment**
**(Millions of 2002$)**

| *Route* | *Year 1* | *Year 2* | *Year 3* | *Year 4* | *Year 5* | *Year 6* | *Year 7* | *Year 8* | *Year 9* | *Year 10* | *Total* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Michigan | $20 | $24 | $165 | $157 | $15 | $165 | $163 | $163 | $0 | $0 | $873 |
| Cleveland | $0 | $28 | $42 | $23 | $23 | $422 | $316 | $332 | $0 | $0 | $1,187 |
| Cincinnati | $0 | $9 | $15 | $11 | $17 | $166 | $177 | $212 | $0 | $0 | $606 |
| Carbondale | $0 | $0 | $0 | $3 | $8 | $53 | $58 | $55 | $55 | $0 | $232 |
| St. Louis | $188 | $68 | $4 | $4 | $72 | $54 | $54 | $0 | $0 | $0 | $445 |
| St. Louis-Kansas City | $0 | $0 | $16 | $21 | $30 | $21 | $322 | $241 | $241 | $0 | $893 |
| Omaha | $0 | $7 | $12 | $22 | $110 | $179 | $125 | $116 | $66 | $0 | $638 |
| Wisconsin | $15 | $50 | $148 | $354 | $247 | $70 | $163 | $216 | $188 | $188 | $1,638 |
| Chicago Terminal + Pontiac Shop | $4 | $2 | $16 | $16 | $22 | $0 | $0 | $0 | $0 | $0 | $60 |
| Rolling Stock | $0 | $0 | $179 | $179 | $179 | $179 | $179 | $179 | $54 | $0 | $1,128 |
| **TOTAL** | **$227** | **$189** | **$597** | **$791** | **$723** | **$1,310** | **$1,557** | **$1,514** | **$604** | **$188** | **$7,700** |

**Exhibit 8-5**
**Summary of Capital Costs by Corridor**
**(Millions of 2002$)**

| *Corridor* | *Infra-structure* | *Rolling Stock* | *Total* |
|---|---|---|---|
| Michigan | $873 | $234 | $1,106 |
| Cleveland | $1,187 | $152 | $1,338 |
| Cincinnati | $606 | $101 | $707 |
| Carbondale | $232 | $51 | $283 |
| St. Louis | $445 | $115 | $560 |
| St. Louis-Kansas City | $893 | $86 | $980 |
| Omaha | $638 | $167 | $806 |
| Wisconsin | $1,638 | $222 | $1,860 |
| Chicago Terminal + Pontiac Shop | $60 | - | $60 |
| **TOTAL** | **$6,572** | **$1,128** | **$7,700** |

**Attachments as referenced in the MWRRS Service Development Plan:**

1. Business Plan Executive Summary
2. MWRRI Project Notebook
3. MWRRI Project Notebook Appendices
4. Update of Cost Benefit Economic Factors
5. Governor's Memorandum of Understanding
6. MWRRI Quality Audit/Risk Analysis
7. Track Maintenance Cost Report
8. MWRRS Draft Purpose and Need
9. MWRRI Phase 1 EIS Scope of Work
10. MWRRI PEIS Scope of Work
11. MWRRI Comprehensive List of Studies