WADSWORTH EXTENSION COMMUTER RAIL FEASIBILITY STUDY

FINAL REPORT

Prepared for:

Metra

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T·Y·LIN INTERNATIONAL

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FOREWORD

It is very important that the reader recognize from the outset that all of the discussions, assessments and conclusions contained in this feasibility study report are based on the best information available prior to publication. This is particularly true of the capital cost estimates for railroad infrastructure improvement needs. These cost estimates are broad order-of-magnitude estimates of the highest level, with very little actual engineering data upon which to make more detailed estimates. All of these estimates have been created by utilizing unit costs for materials and equipment in 2001 dollars, i.e., unit costs that were current when the cost-estimating work for this study was done.

More precise capital cost estimates will come after the process advances to engineering and design. In fact, the costs are likely to be re-estimated several times before reaching the stage where the decision to pursue implementation could be made. Even computing probable cost increases based on current rates of inflation would be futile, given the potential for changes to the economy of the railroad industry and the lack of predictability for exactly when (presuming further feasibility studies continue to show viability) implementation of this commuter rail service might be pursued by Metra. At least two factors can impact the capital cost estimates in the future:

- Freight railroad operations and traffic volumes are subject to change at any time on any existing freight railroad. Growth of the national economy, improved competitive costs produced by the railroads, or future railroad mergers could all have a major influence on the potential cost of implementing commuter service.

- New track-protection regulations, developed to augment existing safety procedures, could affect the productivity of contractors implementing the necessary improvements. These regulations, combined with the potential for increasing freight traffic, could limit the amount of time available for construction work, which could also significantly impact potential costs.

Therefore, while the capital cost estimates reported herein are a good relative measure for this first phase of the overall study, on an absolute scale they should be considered only as an order-of-magnitude indication of potential investment requirements. Further refinement of these values will be needed during succeeding phases of the project.

A costly but vital line capacity analysis must be performed in the Phase II Studies, in order to determine if the suggested railroad improvements are sufficient to run commuter trains efficiently (i.e., on time), or whether additional improvements (e.g., additional tracks, signals, bridges, etc.) must be provided in order to avoid potential delays from freight traffic. This computerized depiction inputs all current freight train schedules and mixes them with potential commuter train schedules in order to simulate actual running experience, and determine whether the suggested additional infrastructure is adequate to handle all of the train movements.

At this point in time, the potential station locations indicate only that communities have suggested potential sites that fit with their future plans. These locations become place holders that will be carefully examined and evaluated as to site acceptability. There have been no detailed examinations of the environmental aspects of potential station sites that were suggested by the communities. Therefore, specific station-related costs (including land acquisition) are indeterminable at this time. Site-specific cost estimates for land and station/parking facilities will be examined in the Phase II Feasibility Study. However, in order to provide complete capital-cost estimates, a conservative estimate of potential total station costs is included. At this juncture, it is particularly important to remember that all future park-and-ride station-related costs, including land acquisition and depot/parking facility construction, will be the responsibility of and must be borne by the host community.

Metra Staff

EXECUTIVE SUMMARY

1.0 INTRODUCTION

Metra, the Commuter Rail Division of the Regional Transportation Authority (RTA), initiated this Feasibility Study in Lake County to evaluate the viability of commuter service along a proposed branch of the Milwaukee District-North Line (MD-N Line) that would continue north of Rondout. Service would be operated along Canadian Pacific Railway (CP) Main Line (C&M Subdivision) trackage and right-of-way. The proposed Metra Wadsworth Extension would run between Rondout and the Illinois – Wisconsin border, a total distance of 12 to 15 miles. The extension would pass through Green Oaks, Waukegan, Gurnee and Wadsworth, as well as unincorporated portions of Lake County. The 2.5 route-miles south of the state line would include the northernmost potential station and an overnight-storage coach yard. The new service would overlay Metra commuter service on CP freight and Amtrak passenger train schedules.

The purpose of this Study is to evaluate the physical and operational feasibility of commuter service along the CP Main Line. Through assessment of potential ridership and order-of-magnitude costs, the Study has sought to determine if the proposed service would be a desirable element of an expanded Metra system. It is expected that this proposed extension would likely provide better access to Metra service for this area's residents.

This Study includes:

- examination of existing conditions, including land use, railroad physical plant, and environmental features;
- assessment of future plans and conditions for both the railroad and communities;
- identification of physical improvements necessary to provide safe and efficient commuter rail service;
- financial analysis of the necessary upgrades to the physical plant;
- assessment of potential connections with other transit services (other Metra lines, Pace bus service, and shuttle-bus services); and,
- evaluation of ridership potential.

The Northeastern Illinois Planning Commission (NIPC) forecasts continuing high levels of growth for the entire Northeastern Illinois suburban region. As a result of this growth, Metra has identified the need to enhance its current commuter system to meet the changing transportation demands of the metropolitan region. The proposed extension to an existing commuter rail line seems logical to consider for serving the commuting population in northern Lake County. Coordination meetings with the communities along the rail line and the CP were held in order to determine interest in commuter service along the CP Main Line. A determination of the general feasibility of providing commuter service is provided in the form of final recommendations.

2.0 EXISTING CONDITIONS

Existing physical and operating characteristics of the route were evaluated to identify what new facilities might be required to operate commuter rail service. The inventory of existing railroad

conditions was based on documentation from Metra and the CP, published maps and aerials, and a field review of the rail line. Freight operations, public transportation, and environmental features were assessed.

Metra sought direct input from each municipality and several major employers in the study area regarding interest in sponsoring a station. Based on Metra's initial discussions with local officials, support for commuter service is favorable throughout the corridor. Station-site selection is a dynamic process that will continue to evolve throughout the series of rail corridor evaluation studies. The communities in the study area have a vested interest in selecting potential station sites, given that Metra requires both land dedication and commitment for funding the construction of station and parking facilities by these host communities. As part of the planning for the potential station sites, provision for 20 acres of surface parking (or a smaller area if structured parking is feasible and desired) must be accommodated. Adequate land areas for potential station facilities generally appear to be available along the corridor to support the appropriate level of service that could be provided along this line.

The CP C&M Subdivision is operated directionally (by timetable) as an east-west route, with trains running east toward Chicago and west toward Milwaukee, even though the tracks run essentially north and south in this segment. (Nearby Interstate Highway signs for I-94 are analogous.) The entire line is double-tracked, and several operational sidings are used to maintain scheduled freight and Amtrak traffic. The track, structures, and signal system currently meet FRA Class 4 requirements, allowing 79 mph passenger operations on the C&M Subdivision west of Rondout. The CP owns the right-of-way and the physical plant, from just north (west via timetable) of the J-Line connection. The J-Line is the Metra-owned segment of the MD-N Line between Rondout and Fox Lake, also known as the CP Fox Lake Subdivision.

There are no "fatal flaws" identified related to the existing physical plant that would preclude a potential service extension along the CP Main Line. Several upgrades to the existing physical plant (i.e., track, ties, turnouts, signals, sidings, and structures) would be recommended in order to provide for safe and efficient commuter rail service. At this point in time, none of the information that was generously supplied by the CP should be taken to imply sponsorship or support of the Wadsworth Extension by the Canadian Pacific Railway. Also, the critiques provided in this section are not intended to portray or imply that the current CP physical plant and infrastructure is in substandard condition for operating their freight service or Amtrak service.

3.0 FUTURE PLANS

The communities provided input regarding future development plans and concepts. Projected demographic and sociodemographic characteristics were also compiled, as obtained from the Northeastern Illinois Planning Commission (NIPC) and the municipalities. CP personnel provided input on maintenance and their plans for the future.

Growth in population, households, and employment in the corridor is expected to be moderate to very high, depending on the townships considered. IDOT and LCDOT have identified many

proposed and future projects that are near the proposed Wadsworth Extension. Some of these projects involve capacity increases through lane additions, intersection modifications, and signal improvements, and could positively influence access to potential station sites. Finally, based on the findings of a joint study by IDOT and WisDOT, implementation of High-Speed Rail (HSR) service along the CP Line has previously been found to be feasible.

No opposition to the Wadsworth Extension was expressed during the coordination process with the communities. All four communities not only expressed support for the project, they also formed an ad hoc committee to coordinate with local businesses to vigorously pursue this project. Based on the data currently available regarding future plans, as well as the level of local support, it would appear that there is solid potential for commuter service to be viable within this corridor.

4.0 POTENTIAL OPERATIONS

In order to estimate potential capital costs, it was necessary to make some assumptions in general terms about how a new service would operate. Assumed operating parameters are summarized below:

- The operation of commuter service was assumed to be similar to established Metra commuter service operations on the MD-N Line.
- Initially, the potential service would operate on weekdays only, leaving the proposed IL 173 station inbound between 4:30 a.m. and 7:00 p.m., and arriving at the IL 173 station outbound between 7:00 a.m. and 1:00 a.m. the next day.
- In the peak periods, peak-direction trains would operate on 30- to 45-minute headways.
- Additional mid-day, reverse-commute, and evening trains would also be provided, for a total of 24 trains per day.
- Commuter service would utilize conventional rolling stock (diesel locomotives with passenger coaches), with the number of train sets dependent upon the level of service proposed for start-up implementation.

Potential commuter rail station and yard sites were identified, based on local coordination as well as operating requirements and provision of adequately spaced service along the line. Four potential station sites have been identified as part of this project. Each of these potential stations would have parking available for commuters. Metra requires assurances from each of the potential host communities that at least 20 acres would be available for future parking expansion. Metra has received commitments from two of the municipalities that multi-level parking structures at the recommended locations would be a conforming use in local zoning ordinances. Potential commuter station sites (including station buildings, parking lots, and other associated site improvements) would be funded, constructed, maintained, and operated by the host communities.

Commuter service would be operated through a trackage-rights agreement, similar to the agreement that Canadian Pacific currently has for operating their freight trains on Metra's tracks east of Rondout. Trackage-rights would generally entail a fixed-fee for Metra to operate over tracks maintained by the CP, plus possible performance incentives for efficient dispatching and

on-time performance. The exact nature of any service agreement would be subject to negotiation and agreement between Metra and the CP.

In order to accommodate the expanded service via the CP Main Line, three train sets would be relocated from Fox Lake service to the Wadsworth Extension and three new train sets would be purchased. The construction of a new layover facility (overnight coach storage yard) south of Russell Road and north of the proposed IL 173 station is proposed for the additional equipment required for this extended Metra service.

This Study examined the need for additional and/or improved sidings along the CP Main Line. The purpose of these sidings is to provide ample room for freight trains to 'pull over', without separating their trains, during Metra's curfew period. While there are three such sidings in place today, as many as three new sidings may be required. In addition, the existing sidings would require upgrading and at least one would be shifted a half-mile.

In the preliminary draft schedule developed for the sake of ridership estimation, three inbound and three outbound trains were removed from the schedule on the J-Line portion of the MD-N. The effects of such a change would be minimized by relocating only those trains that currently run express inbound from Fox Lake to Libertyville. The potential operational impacts of adding a net 18 trains per day as part of the extension service will need to be analyzed in detail in future Phase II Studies. In particular, the potential effect of the additional trains between Rondout and Tower A-20 may be equally significant to operational congestion as it would be between Rondout and Wadsworth

One additional feature would be added to this project. Peak-period trains traveling outbound cannot enter the J-Line because of the frequent flow of inbound trains on the single main track. A new siding at the Green Oaks/Abbott Labs site would provide a location off of the CP/Metra Main Line to turn trains (change ends) without occupying the Main Line track, as is the case today in Deerfield. The result would be additional reverse-peak service to the Lake Forest and Green Oaks/Abbott Labs stations, whereby shuttle buses could take employees to nearby job sites as is done at the Lake-Cook Road station.

5.0 CAPITAL IMPROVEMENTS

To support the potential Metra commuter rail operations described in the previous section, capital improvements would be required. These improvements include CP Main Line track and signals; the addition of new sidings; and adjacent roadway improvements. Improvements are recommended based on the need for added flexibility upon implementation of commuter service. The estimated order-of-magnitude costs for the Wadsworth Extension total $128.4 million. Three train sets are included, each consisting of one locomotive and six passenger coaches. The three additional required trains would be transferred from the MD-N Line. An overnight coach yard near Russell is also included. Land acquisition costs and operating costs are not included.

A major portion of the track improvement costs can be attributed to the six siding improvements that have been identified. New turnouts would be needed to serve the new and reconstructed

sidings. The total traffic on the line is expected to be 30 freights, 14 Amtrak trains and 24 Metra trains. Based on this level of traffic, an assumption has been made that substantial flexibility will be required and would be provided by the six sidings. The addition of a third main track is precluded by modifications that would be required to the existing bridges and overpasses, representing significant capital costs.

Also included are the potential commuter station costs, which are based on assumed parking needs, depot sizes, platform lengths, and other commuter service related items. Passenger stations are assumed at Green Oaks/Abbott Labs, Waukegan, Gurnee, and IL 173. In Green Oaks, Gurnee, and Russell (coach yard) there may be significant wetland and floodway issues that could increase the costs for mitigation.

The table below depicts the estimated capital costs for full-build, including a new MD-N Line Green Oaks/Abbott Labs Station in Alternative 2. The full-build Wadsworth Extension only is Alternative 3 (without a new MD-N Line station at Green Oaks/Abbott Labs), while Alternative 4 is for the interim or Phase I implementation, with only the MD-N Line Green Oaks/Abbott Labs station as a first step.

Potential Operating Scenario	Estimated Capital Costs
Alternative 1 – Do Nothing	$ 0
Alternative 2 – Full-Build (Including a New MD-N Line Green Oaks/Abbott Labs Station)	$128.4 million
Alternative 3 – Full-Build (without a new MD-N Line Green Oaks/Abbott Labs Station)	$124.0 million
Alternative 4 – Phase I Development (No Wadsworth Extension – Only a New MD-N Line Green Oaks/Abbott Labs Station)	$ 17.1 million

6.0 POTENTIAL RIDERSHIP

Growth in population and employment in the vicinity of the proposed extension is expected to exceed growth rates for the Northeastern Illinois region as well as for Lake County. In addition, many of the areas in Lake County that are served by existing commuter rail are forecasted to continue their growth. This growth will produce a commensurate increase in Metra rail ridership.

The forecast methodology employed in this analysis is a three-step process; these steps include:

- A trip generation/distribution component which forecasts the number of home-based work trips generated by each planning zone in Lake County with a destination in the Chicago Central Area (CCA). This step forecasts all work trips regardless of mode of travel to the Chicago Central Area.
- A modal-split model, applied to the data generated in step one, to forecast: first, total commuter rail trips for each planning zone to the Chicago Central Area; and second, to identify the boarding station.

- Based on relationships derived from the 1999 Metra boarding statistics for stations of similar characteristics to those proposed, the a.m. peak inbound alightings are forecast first; and, then, the a.m. peak outbound boardings and alightings at all Lake County stations. Finally, midday and return boardings are forecasted and totaled to generate all-day boardings and alightings.

The forecast methodology was applied to four service development scenarios:

- Alternative 1 - Do Nothing: No Wadsworth Extension and no additional station on existing Milwaukee District-North Line.
- Alternative 2 - Full Build Including a New MD-N Line Green Oaks/Abbott Labs Station: Wadsworth Extension with four stations; the Green Oaks/Abbott Labs Station having two sets of platforms (one on the Extension; the other on the existing MD-N Line).
- Alternative 3 - Full Build: Wadsworth Extension with four stations; however, the Green Oaks/Abbott Labs Station has one set of platforms only (on the Extension).
- Alternative 4 - Phase I Development: No Wadsworth Extension, but a Green Oaks/Abbott Labs Station added with one set of platforms located on the existing Milwaukee District-North Line.

These procedures allow for comparing the growth that would occur assuming no new stations. Through such comparisons, conclusions can be drawn as to whether the existing system has the capacity to accommodate the forecasted growth in rail ridership which would occur due to the population growth and increased highway congestion. It should be noted that all forecasts assume no capacity constraints (including parking) at any of the stations or on any of the trains.

The year 2020 a.m. work trips to the Chicago Central Area (CCA) for all modes were generated for Lake County, the planning zones in the Extension Corridor, and comparable zones along the Milwaukee District-North Line (Libertyville to Fox Lake). The population growth in Lake County between 1999 and 2020 would result in an increase of approximately 7,300 daily commuters to the Chicago Central Area. If Alternative 2 (Wadsworth Extension with a new station at Green Oaks/Abbott Labs on the MD-N Line) were to be built, at least 1,200 workers would commute to the Chicago Central Area.

The boardings and alightings at the proposed stations of the Wadsworth Extension were developed. Under Alternative 2 (Full-Build including a new MD-N Line Green Oaks/Abbott Labs Station), the four stations of the Wadsworth Extension would attract approximately 1,450 a.m. peak inbound boardings and 625 a.m. peak outbound alightings. This alternative would attract around 2,500 total daily boardings.

Some of the boardings that were modeled represent diversions from existing stations in Lake County. However, almost all the diversions would be from stations and/or lines which would be operating at or above capacity if the Wadsworth Extension is not built. As a result, projected growth at existing stations would likely not be realized without the extension stations.

Summary of AM Peak Boarding and Alighting Statistics - Proposed Stations Only

2020 Forecast Summary	AM Peak Inbound Boardings	AM Peak Outbound Alightings
1999 Boardings	0	0
Alternative 1	0	0
Alternative 2	1,450	625
Alternative 3	1,195	615
Alternative 4	530	330

7.0 RECOMMENDATIONS

This report has shown that potential commuter service along the Wadsworth Extension appears to be physically feasible. In addition, local support from the communities and the business sector is substantial. However, there are significant capital costs involved, particularly when passing sidings would be necessary to avoid conflicts with freight trains. Based on the results of this Study, further analysis of the Wadsworth Extension as a potential extension of the MD-N Line is recommended.

It should be understood that this conclusion and recommendation is qualified based on the findings in this Study phase alone, and does not account for any "unknowns" that may emerge from more detailed studies. Furthermore, at the present time the results of this Study phase cannot and should not be construed as indicating that the Wadsworth Extension will be considered operationally viable or even desirable at the completion of the remaining Study phases.

At this point in time, it appears that four areas of investigation in particular would lead off Phase II Studies of the potential Wadsworth Extension, with other possible factors to be determined later. Specific areas for further study are summarized below.

Line Capacity Analysis: A line capacity analysis would evaluate passenger (Metra and Amtrak in this case) and freight train operational scenarios on the CP Main Line alignment. A computerized simulation model would be developed to perform capacity simulations along the proposed route, using different combinations of operating conditions. This task will simulate the existing and proposed freight traffic combined with the proposed passenger service, in order to determine what physical modifications of the current plant would be required. In this particular circumstance, in addition to enabling both the additional and existing trains to operate unfettered over the CP Main Line, the meshing of all the trains at Rondout with the Fox Lake trains will require close scrutiny.

Refined Cost Estimates: The order-of-magnitude cost estimates performed in the Phase I Study made extensive use of standard unit costs for many categories. This task would examine such unit costs to determine where refinements are needed to ensure a reliable project cost estimate for both capital and operating costs (the latter was not a part of Phase I). The order-of-magnitude capital costs for track, signals, bridges, etc., from the Phase I Feasibility Study would be refined, based on the results of these evaluations. Location-specific studies would evaluate existing and proposed railroad infrastructure such as crossovers, turnouts, passing sidings, interlockings and CTC signal systems, at-grade highway crossings, and rail-from-highway grade separations. Refined cost estimates would include more-detailed and location-sensitive capital cost estimates, as well as identification of costs that are subject to change as a result of updated design and engineering specifications.

Environmental Impacts: For this project, there would be a necessary focus on the many wetlands, floodplains, and floodways that are traversed by this route, and in several cases where they could be utilized for station facilities. The screening of environmental impacts would begin with an identification of baseline conditions. The environmental tasks would be performed in parallel with the Phase II engineering activities, and would serve as the primary input to the identification of key mitigation strategies. Issue identifications, baseline establishments, and impact analyses would be prepared in full accordance with the planning procedures and methods of the National Environmental Policy Act (NEPA) and the Federal Transit Administration (FTA). Environmental documentation would address both beneficial and adverse impacts for existing and future conditions. The consequences of construction activities and operations would be considered. Impacts would be classified, and their significance addressed on the basis of short- and long-term consequences. The potential impacts of structures and construction activities would be identified, and the requirement for and extent of necessary mitigation actions would be described.

Station Facility Parameters: Site-specific station-facility and coach-yard cost refinement would include examinations of the overall layout, acreage, and access routes for the facilities separate from the influence of the line capacity analysis. Although parameters for the station cost estimates would be influenced somewhat by the ridership forecasts, environmental-impact evaluations could be a more-significant determinant. As noted earlier, three of the five sites face potential mitigation and avoidance issues concerning wetlands and flood plains. These will be part of the environmental review, and in turn be influenced by the findings.

Design layouts for each site will be created in greater detail than this Phase I Study has done. The best utilization of the proposed sites must be ascertained, access routes and traffic control must be examined, and parking lots must be designed for start-up ridership with space reserved for likely expansion needs. Additional meetings will be held with each of the communities to continue discussions and monitor new circumstances.

1.0 INTRODUCTION

1.1 STUDY-AREA DESCRIPTION

The corridor study area encompasses the Canadian Pacific Railway (CP) Main Line (C&M Subdivision) and its immediate surroundings. The corridor is approximately 15 miles long and two miles wide, centered along the rail line. [A project location map can be found on page 3 (Figure 1.1-1) and in Appendix A.] The rail line passes through the communities of Green Oaks, Waukegan, Gurnee, and Wadsworth. Within one mile, it also passes portions of North Chicago, Park City, and various unincorporated areas of Lake County.

Land uses within the corridor study area include residential, industrial, commercial, office, agricultural, and green space. Communities along the corridor have land uses ranging from largely residential to a mix of residential, commercial and office uses. The three villages and one city also have existing (and more planned) industrial or office parks, concentrating numerous businesses in particular areas of their communities. The concentrated residential densities, particularly in Gurnee and Waukegan, could provide a pool of potential passengers for Metra commuter rail service on the CP Main Line to serve both suburb-to-suburb and Chicago-to-suburb markets. Major employers such as Abbott Laboratories and Allegiance Health Care Corporation are also located close to this line. The possibility of significant reverse-commute travel is an element of this Study.

1.2 PURPOSE OF THE STUDY

The purpose of the Wadsworth Extension Feasibility Study is to evaluate the physical and operational feasibility of commuter rail service on the CP Main Line between Rondout and the Illinois-Wisconsin State Line. The potential Metra service would operate as a separate branch of the existing Metra Milwaukee District-North Line (MD-N) service, diverging at Rondout. Through assessment of potential ridership and order-of-magnitude costs, this Study ultimately recommends whether or not this potential extension of service could be a desirable element of an expanded Metra system, and therefore should continue with pertinent elements of Phase II Studies.

This Study intends to provide a broad-brush analysis of the potential for providing commuter service along the defined rail corridor. The review of the line's physical feasibility includes an examination of existing conditions:

- the CP physical plant (rail, signal systems, capacity);
- land uses and development (existing and proposed) adjacent to the rail line and within the corridor;
- potential environmental concerns;
- at-grade crossings and possible new grade separations;
- existing and proposed roadway networks and/or planned improvements to the roadways, including potential new roadway segments; and
- interfacing with the existing Metra MD-N Line at Rondout.

Population and employment trends of the study area have been compiled. Order-of-magnitude cost estimates have been prepared to provide a basis for financial evaluation of the proposed corridor service. A brief look at operational feasibility has examined freight movements along the CP Main Line, as well as Metra commuter train movements east of Rondout along the MD-N Line. Finally, the Study has determined community interest in potential Metra service on the CP Main Line, as well as potential station locations. In the final chapter of this report, recommendations have been made regarding further studies of the CP Main Line and this proposed extension. These further studies may include:

- Phase II Feasibility Study, examining up to 12 distinct elements to determine and/or evaluate such items as ridership demand estimates, environmental impacts, site studies, refined cost estimates and line capacity analyses.
- Preparation of an Environmental Assessment to determine and plan mitigation for corridor-wide and site-specific impacts.
- Pre-Implementation Studies to review financial feasibility, funding availability, host railroad support, and formalization of local community support.

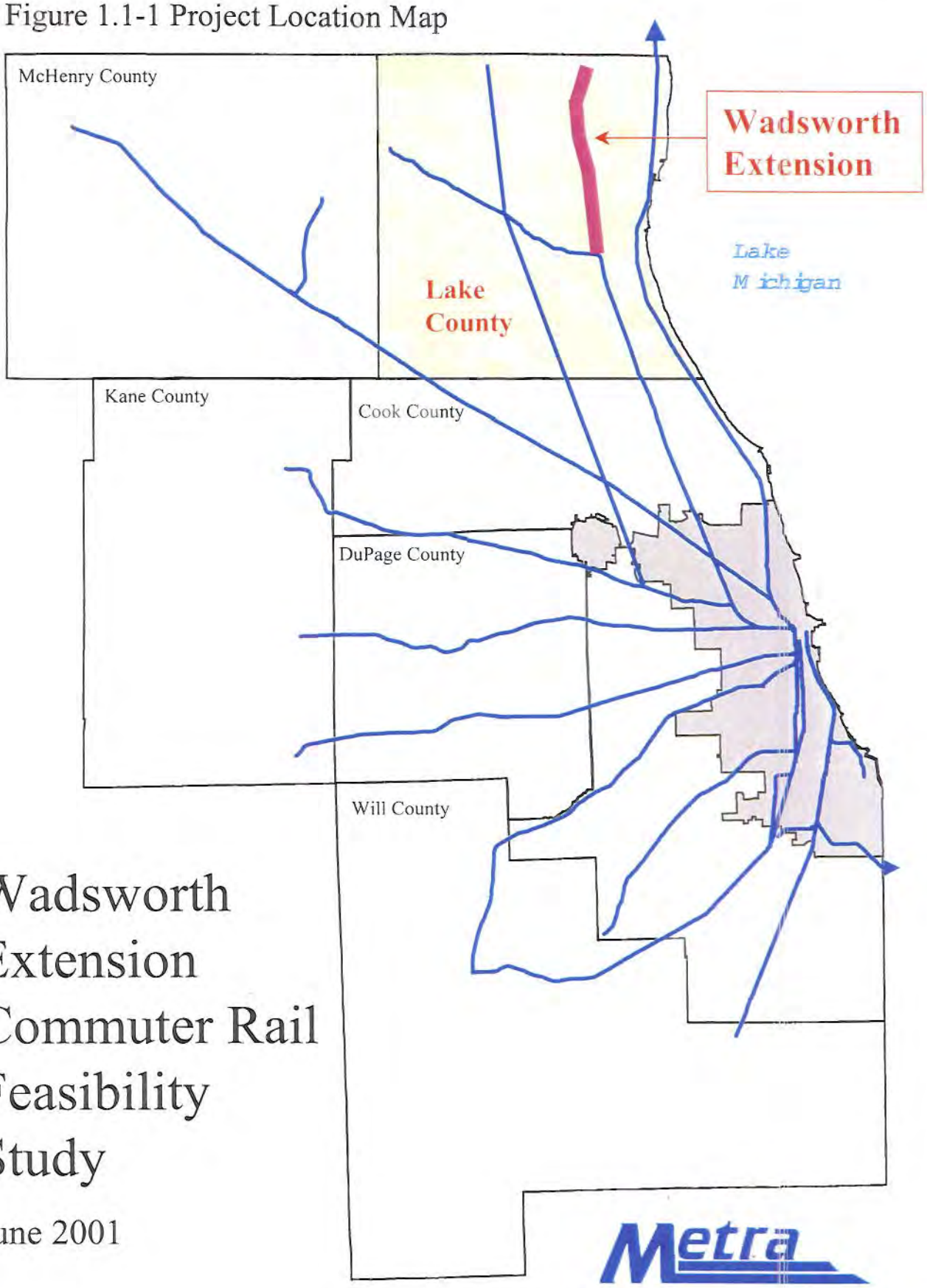
1.3 PROJECT BACKGROUND

The transportation patterns of the Chicago metropolitan area have evolved from a system that originally focused on commuting to jobs located within the central city core, into increasing numbers of so-called "reverse-commutes" (from the city to suburban job sites) and ever-growing suburb-to-suburb (home-to-work) commutes. This has resulted from the development of an extensive highway system which in turn allowed reduced-density living patterns, an increasing percentage of multi-car families, and relocation of many employers from the City to suburban areas. However, even as these changes have evolved, the commute from the suburbs into downtown Chicago has remained strong, and today is higher than ever.

The Northeastern Illinois Planning Commission (NIPC) forecasts continuing high levels of growth for the entire Northeastern Illinois suburban region. As a result of this growth, Metra has identified the need to enhance its current commuter system to meet the changing transportation demands of the metropolitan region. The proposed extension to an existing commuter rail line seems logical to consider for serving the commuting population in northern Lake County. Funding for this Study was obtained by Lake County Division of Transportation (LCDOT) through the Unified Work Program (UWP), a distribution of Federal planning funds, and subsequently given to Metra to conduct the Study. The UWP is administered by the Chicago Area Transportation Study (CATS).

In April 1992, Metra and Pace published the Future Agenda for Suburban Transportation (FAST) in which they offered an aggressive public transportation package for suburban residents. Metra's portion of that document, i.e., the Extended Transportation Agenda (EXTRA), included discussions of potential upgrades to existing Metra lines and potential extensions of many of these same existing commuter lines, including this route to Wadsworth via the CP Main Line.

Figure 1.1-1 Project Location Map



Wadsworth Extension Commuter Rail Feasibility Study

June 2001

Metra

2.0 EXISTING CONDITIONS

This chapter of the report discusses the physical and operating characteristics of the CP Main Line, which are critical in determining how and whether to institute commuter rail service. It provides an early indication of how adaptable this line is and what additional facilities might be required.

The inventory of existing conditions has relied upon available resources from Metra, the Canadian Pacific Railway, communities along the rail line, a hi-rail inspection of the line, published maps, and discussions with CP operating personnel. Eventual implementation of the new service would be subject to negotiations for trackage rights with the CP, and this would only be sought after positive recommendations from this and any subsequent studies by Metra. At this point in time, none of the information that was generously supplied by the CP should be taken to imply sponsorship or support of the Wadsworth Extension concept by the Canadian Pacific Railway. Also, the critiques provided in this section are not intended to portray or imply in any way that the current CP physical plant and railroad infrastructure is in substandard condition for operating their freight service or Amtrak service. Statements regarding the physical condition of the existing infrastructure are professional engineering opinions of the authors on behalf of Metra, with which CP personnel might not necessarily concur.

The following physical and operational features have been investigated:

- Main Line tracks and sidings, including condition of track bed, ties and rail;
- signal systems and interlockings;
- structures – type, condition, and horizontal and vertical clearances;
- grade crossings – condition and level of protection;
- operating characteristics and service levels, including specific operational interfaces among existing freight, Amtrak, and Metra services;
- land uses adjacent to the line and general accessibility for potential Metra commuters;
- general topography, wetland locations, and floodplain conditions; and
- information regarding general locations and candidate sites for potential Metra passenger stations, as identified by the local communities.

2.1 PHYSICAL PLANT

The entire line is double-tracked, and several operational sidings are used to maintain scheduled freight and Amtrak traffic. The CP has an ongoing capital improvement program to update and maintain its facilities. The annual program typically includes rail and tie replacement, track surfacing, rehabilitation or replacement of structures, signal and communications improvements, and overall maintenance of the railroad in its current form. This Study is concerned primarily with those changes that could affect potential commuter rail operations on the railroad. At present, the CP has no plans for any major changes to its physical plant.

The CP C&M Subdivision is operated directionally (by timetable) as an east-west route, with trains running east toward Chicago and west toward Milwaukee, even though the tracks run essentially north and south in this segment. (Nearby Interstate Highway signs for I-94 are

analogous.) The track, structures, and signal system currently meet FRA Class 4 requirements, allowing 79 mph passenger operations on the C&M Subdivision west of Rondout. The CP owns the right-of-way and the physical plant, from just north (west via timetable) of the J-Line connection. The J-Line is the Metra-owned segment of the MD-N Line between Rondout and Fox Lake, also known as the CP Fox Lake Subdivision.

2.1.1 Trackbed; Line and Grade

The CP Main Line track bed is relatively flat, and does not include any sharp horizontal curves or steep vertical grades. Generally, the tracks closely follow surrounding ground elevations, being raised on low ballasted embankments several feet above the surrounding ground. The subgrade is generally in good condition; however, at various locations along the line, the ditches have partially filled in with sediment, and there is potential for high water levels immediately adjacent to the tracks. Maintaining good drainage of the track bed is an ongoing maintenance issue in many areas.

The maximum horizontal curvature on this line is one degree. This curvature is located at three locations:

1) MP 41.4 to MP 41.9 (east of the Wadsworth Road grade crossing);
2) MP 45.3 to MP 45.9 (west of the IL 173 grade crossing); and
3) MP 47.2 to MP 47.8 (west of the Russell Road grade crossing).

These curves are superelevated at two inches, based on the need to provide comfortable operations to Amtrak passengers at the 79 mph operating speed. Several other, more moderate curves exist along the alignment, but most are of relatively short length. The maximum vertical grade of 0.57% exists between MP 35.3 and MP 35.6, west of the IL 137 highway overpass and ascending to the west. All other grades along the line are 0.5 percent or less, with the vast majority of the line having flat grades below 0.2 percent.

The ballast is primarily granite (Ortonville) but includes other mixed types throughout the route. Typically, track pumping occurs due to poor roadbed conditions, when the track moves vertically under wheel loads and causes subgrade particles to travel up into the ballast. Very little track pumping appeared to be taking place when observed during the hi-rail inspection. Although water levels are fairly high along much of the route, the trackbed and subgrade appear to be in good condition due to a continuing high level of maintenance along the line.

CP runs a geometry car on the line three to four times per year to determine locations where ballast undercutting, track surfacing, and other related work might be required. Line and grade are closely maintained, which is particularly important for the CP to accommodate higher-speed Amtrak operations.

2.1.2 Ties

The existing ties are generally in good condition. Inspection of ties along this rail line indicates that approximately 15 to 20 percent of the ties are in "fair" condition and should be replaced if

Metra implements commuter service on this route. It appears that the main cause of the limited tie failure observed is age rather than mechanical failure.

2.1.3 Rail and Turnouts

The CP Main Line rail is in good condition throughout the length of the line, with very few noticeable defects. The rail is generally 132-pound (per linear yard) section, and has been laid at intervals over the past 25 years. Rail anchors are the drive-on type. Most of the rail is box-anchored on every other tie. The existing tie plates are 14" in length and are on all of the ties. Most of the plates are rail-spiked.

The eastern Main Line track (#1 Main) consists of continuous welded rail (CWR) from Rondout to the IL 137 overpass (MP 34.4), jointed rail from there to a point east of Wadsworth Road (MP 42.3), then CWR to the Wisconsin State Line. Some of the joints on #1 Main are noticeably battered, but most are in good condition. The western Main Line track (#2 Main) has CWR over this entire segment of the C&M Subdivision. In the vicinity of the one-degree curve west of IL 173, #2 Main has substantial rail wear. No other areas of substantial rail wear were noted in the field. The CP inspects the Main Line rail several times per year, and has identified no consistent rail defects.

The turnout standard for the CP Main Line is No. 16 turnouts with 30'-0" straight switch points and rail-bound manganese (RBM) frogs. These turnouts permit maximum speeds of 25 mph (freight) and 30 mph (passenger) along the turnout movements. CP has two Main Line crossovers west of Wadsworth Road (near MP 43) and two more at Rondout (near MP 32). The turnouts for existing sidings are controlled by either the Control Operator at Rondout or the CP Dispatcher, depending upon their location, and are generally in good condition.

2.1.4 Sidings

Three sidings currently exist in the subject area:

- Siding #1 – passing track off #1 Main, extending from west of IL 176 (MP 32.3) to east of IL 137 (MP 34.3), a distance of 2.0 miles. This siding is in good condition.
- Siding #2 – passing track off #2 Main, extending from west of IL 176 (MP 32.4) to east of IL 137 (MP 33.8), a distance of 1.4 miles. This siding is in fair condition. It would probably require replacement if usage levels were to increase.
- Siding #3 - passing track off #1 Main, extending from west of Wadsworth Road (MP 43.0) to east of IL 173 (MP 44.6), a distance of 1.6 miles. This siding is in fair condition. It would probably require replacement if usage levels were to increase.

Both sidings west of Rondout (#1 and #2) are used for staging freight trains to enter Metra territory. Such trains are primarily headed for Tower A-20 near Techny Road (east of the Northbrook Metra Station), where they connect with the Union Pacific (UP) Milwaukee Subdivision at Shermer, destined for Bensenville Yard.

A short stub track east of IL 137 (off Siding #2) is not currently in use and has been partially removed (CP has stated that this siding could be removed completely). Abbott operates a

double-ended secondary siding (off Siding #1) at approximately MP 34, east of the IL 137 overpass. The Abbott Lab facilities are coal-powered, and coal delivery is the primary use of this siding.

2.2 SIGNALS AND INTERLOCKINGS

There is one major interlocking at the eastern end of the route under study. The single-tracked Elgin, Joliet, and Eastern Railway (EJ&E) crosses the double-tracked Milwaukee District-North Line (MD-N) at Rondout, with the diamonds maintained by the EJ&E. They are reversible manganese diamonds with four identical insert frogs. EJ&E trains operate at 20 mph through the crossing. Amtrak trains operate at 79 mph, while CP freight trains operate at 50 mph through the crossing. Currently, Metra trains operate at a slower speed because of the turnout movements and curvature of the MD-N line, as the trains enter the J-Line/Fox Lake Subdivision west of the EJ&E crossing.

The CP Main Line is operated under Centralized Traffic Control (CTC), with operations controlled by the CP Dispatcher in Minneapolis. The CP Control Operator at Rondout runs the interlockings with the EJ&E and the MD-N Main Line (J-Line). The tower also controls the crossovers at Rondout and both ends of Sidings #1 and #2.

2.3 STRUCTURES AND CLEARANCES

Two roadways pass above the CP Main Line. These are three-span structures with concrete abutments and piers, and steel beams. Both existing bridges have sufficient clearance for two tracks, but could not accommodate a third track without substantial modification (lengthening) of the structures. Clearances above the tracks are sufficient for both freight and commuter operations. The two locations:

- IL 137 (MP 34.43) – two 3-span structures
- IL 120 (MP 36.90) – four 3-span structures for IL 120 and two adjacent on/off ramps

Four roadways pass below the CP Main Line. Each of the structures carries the two Main Line tracks, and would require major modifications (widening) if a third main track or siding track were added. The four structures have ballasted decks. The four locations:

- Washington Street (MP 37.84) – four roadway lanes
- IL 132/Grand Avenue (MP 38.50) – four roadway lanes
- Old Grand Avenue (MP 38.59) – two roadway lanes
- US 41 (MP 39.13) – four roadway lanes

The remaining structures along the CP Main Line consist of box and pipe culverts for stream crossings and local drainage under the tracks. The majority of these structures are constructed of reinforced concrete (box culverts) or cast iron pipe. Most appear to have been built in the early- to mid-1900s, but they are in good condition with occasional concrete spalling (the breaking away of surface concrete). All of the existing pipes and culverts appear to be able to serve their intended function. There are about 40 culverts of various sizes in this territory.

2.4 AT-GRADE ROADWAY CROSSINGS

There are five at-grade public roadway crossings of the CP Main Line between Rondout and the Wisconsin State Line. One private access road also crosses at-grade. The six at-grade crossings, existing crossing protection, and their condition:

- IL 176 (MP 32.25) – crossbucks, flashers, bells and gates; good condition
- Atkinson Road (MP 33.02) – crossbucks, flashers, bells and gates; good condition
- An Abbott private roadway crossing west of Atkinson Road (approximate MP 33.7) – no protection, seldom used, fair condition.
- Wadsworth Road (MP 42.75)– crossbucks, flashers, bells and gates; good condition
- IL 173 (MP 45.25)– crossbucks, flashers, bells and gates; good condition
- Russell Road (MP 47.10)– crossbucks, flashers, bells and gates; good condition

The crossings immediately abutting the flangeways are typically constructed of rubber. Such crossing systems are found on all of these roads, which have moderate to heavy levels of traffic. Several have been recently reconstructed, and all are in good to excellent condition. The private crossing is constructed of timber.

All grade-crossing signals operate on coded track circuits, with the trains shunting the circuit which runs through the rails, activating the crossing protection (gates, lights, and bells). These signals operate when the train is at a specified distance from the crossing and are designed for Amtrak operations, i.e., their timing is based on the maximum allowable operating speed of 79 mph.

2.5 FREIGHT AND AMTRAK OPERATIONS

In Spring 2001, 30 freight trains and 14 Amtrak trains operated each weekday on the CP Main Line. [Amtrak trains include 12 Chicago-to-Milwaukee *Hiawathas* (six each way) and two Chicago-to-Portland/Seattle *Empire Builders* (one each way). Note that the *Lake Country Limited* to/from Janesville no longer operated weekdays.] The lengths of these trains vary depending on many factors. Freight trains are generally longer during the fall harvest season than at other times. The general trend over the past several years has been that trains are getting longer and more materials are being hauled. The total number of freight trains per day has remained constant at 30 in recent years. Commodities commonly transported by the CP include intermodal trailers (TOFC), grain, potash, lumber, autos and coal. Hazardous materials are transported on a regular basis. Speed limits on the line are 79 mph for Amtrak, 60 mph and 50 mph for freight trains, and 40 mph for unit trains (coal or grain).

Trains operate throughout the day, but Metra has freight curfews on the MD-N. During these curfews, CP freight trains often back up along the CP Main Line north of Rondout, waiting to move onto the MD-N. Table 2.5-1 provides a summary.

Table 2.5-1 Summary of Freight Curfews on the Milwaukee District

Track Segment	Direction	Morning Period	Evening Period
CUS - Tower A-20	Westbound	6:25 a.m. to 8:45 a.m.	4:15 p.m. to 6:10 p.m.
	Eastbound	6:00 a.m. to 7:50 a.m.	4:20 p.m. to 6:00 p.m.
Tower A-20 - Rondout	Westbound	7:00 a.m. to 8:15 a.m.	4:30 p.m. to 6:20 p.m.
	Eastbound	6:00 a.m. to 7:50 a.m.	4:20 p.m. to 6:00 p.m.
Rondout - Fox Lake	Westbound	No Reverse-Peak Trains	4:30 p.m. to 6:45 p.m.
	Eastbound	5:00 a.m. to 8:30 a.m.	No Reverse-Peak Trains

Sidings #1 and #2 (between IL 176 and IL 137) are used primarily as passing sidings, with only occasional long-term storage of train sets. Siding #1 is used more frequently than Siding #2. Use of the sidings is complicated by the at-grade crossing at Atkinson Road, located about 0.6 miles west of the eastern end of the sidings. Parked freight trains must be split at Atkinson Road so that the crossing is not blocked for long periods.

Siding #3 (west of Wadsworth Road) is used primarily as a passing siding. This is a 30 mph siding. Amtrak trains typically pass each other in the vicinity of this siding west of Wadsworth Road. The siding is generally used to route freight trains off of the Main Line to allow Amtrak trains to pass.

Amtrak operates under a trackage-rights agreement with CP. The CP has no trackage-rights agreements with other railroads in this segment, and there are no planned changes in the agreement with Amtrak. There are no way-freights servicing customers along the line, except coal deliveries to Abbott, and no new spur or industrial tracks are planned.

Metra service on the MD-N through Rondout (Timetable 14-N dated January 7, 2001) included the following (times shown are 'by' the tower):

- 23 weekday inbound trains between 5:15 a.m. and 10:30 p.m.
- 23 weekday outbound trains between 8:05 a.m. and 1:25 a.m.
- Nine trains in each direction on both Saturdays and Sundays

Weekday outbound Metra trains cannot operate through Rondout before 8:00 a.m., due to the constant flow of inbound commuter trains on the single-track MD-N west of Rondout. Weekday Metra inbound trains are similarly limited in the evening peak period. No inbound trains are scheduled between 4:42 and 7:48 p.m. Freight traffic on the MD-N west of Rondout is generally limited to nighttime hours that are outside of the schedules of regular commuter service. This affects Wisconsin & Southern trains primarily, with one through-freight in each direction destined for Janesville, although CP way-freights have been observed on the Fox Lake Subdivision in daytime hours.

2.6 SURROUNDING LAND USE AND UTILITIES

A general summary of land uses immediately adjacent to the right-of-way is as follows:

- Abbott Labs property (developed or undeveloped), IL 176 to IL 137, about two miles
- Undeveloped with wooded wetlands from IL 137 west for about one mile

- Commercial development on the eastern side (Allegiance, Lakehurst) and residential development with wetlands on the western side from IL 120 east for about 1.5 miles
- Intensive development (mostly residential) within Gurnee between IL 120 and US 41, about 2.5 miles
- Primarily open space, wetlands and Lake County Forest Preserve, with occasional residential development, from US 41 to the State Line, about eight miles

Development patterns generally do not preclude the addition of sidings, especially west of the US 41 bridge. Utility pole lines are located continuously on the eastern side and intermittently on the western side of the right-of-way. Buried fiber optic lines are located along both the eastern (MCI) and western (Sprint Canada) sides of the right-of-way. Possible impacts to fiber optic lines would be a key issue for constructing new sidings.

Vegetated ditches exist along both sides of the right-of-way throughout most of the corridor. Recent ditch maintenance has been performed along the western side of the CP Main Line east of Atkinson Road to improve local drainage conditions. Both wetlands and floodplains are located in this area.

Just west of Wadsworth Road there is a wider area on the eastern side that appears to previously have been part of the railroad right-of-way. The CP indicated that this land is now privately owned. Its relatively small size would make it difficult to utilize for a potential station or coach yard, as was first considered, with expansion of the site impossible since it is adjacent to Lake County Forest Preserve property.

Major employers and destination sites along the CP Main Line include Abbott Labs, Allegiance Health Care, Six Flags Great America, and the Gurnee Mills Mall. Numerous smaller companies exist in several industrial parks. Appendix E provides an illustration of the major employers (175 employees or larger) within about one mile of the Wadsworth Extension.

2.7 ENVIRONMENTAL FEATURES

If and when commuter rail service would approach implementation on this route, some form of review of the project's impacts on the environment would be required. Although any form of comprehensive environmental analysis is beyond the scope of this Feasibility Study, a brief review of the areas that would require investigation in later stages of project development are included below. This review is based on experience with the implementation of the North Central Service and on other Metra projects.

2.7.1 Waterways/Floodways/Floodplains

The CP Main Line crosses five significant waterways:

- Des Plaines River Tributary, 1,800 feet east of Russell Road (MP 46.78)
- Suburban Country Club Tributary (to Des Plaines River), 1,900 feet west of US 41 (MP 39.50), and again at MP 40.11 and MP 40.37
- North Gurnee Tributary (to Des Plaines River), 100 feet west of US 41 (MP 39.20)
- The Gurnee Tributary (to Des Plaines River), 100 feet west of IL 132 (MP 38.52)

- The Middle Fork of the North Branch of the Chicago River, 3,700 feet west of IL 137 (MP 35.15). [Along a 12,500-foot distance immediately west of Rondout, this tributary runs parallel to the CP Main Line.]

Maps from the National Flood Insurance Program portray the presence of both floodways and floodplains at these locations. Additional floodplains located adjacent to or within the railroad right-of-way are apparent at five other locations on the maps. Floodways and floodplains could affect the locations of sidings as well as the design of some potential commuter station sites.

2.7.2 Wetlands

Based on review of the Lake County Wetland Inventory maps, the CP Main Line crosses many wetlands within the project corridor. Many of them lie either immediately adjacent to the tracks or at the base of some of the fill sections along the line. The addition of sidings and/or a third main track within these areas might be difficult, based on the potential impacts that could result to the wetlands.

Appendix B lists and provides an illustration of all wetlands identified on the Lake County Wetland Inventory Maps along the Wadsworth Extension. Of special note are those wetlands that have been identified as high-quality Advanced Identification (ADID) wetlands as part of a county-wide study directed by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers. ADID wetland complexes are noted at the following two locations:

- From 4,000 feet west of Atkinson Road to 2,000 feet east of IL 120, a distance of about 14,800 feet (MP 33.8 to 36.6). ADID wetlands are mapped along both sides of the CP Main Line between MP 34.2 and 35.6, and primarily along the western side in other areas.
- From Wadsworth Road to the west for a distance of 7,400 feet, on both sides of the CP Main Line, as part of a major Des Plaines River wetland complex (MP 43.1 to 44.1)

Other non-ADID wetlands are also shown along the CP Main Line within much of the project area. Wetlands and high standing water along much of the line west of US 41 could limit siding opportunities. Standing water occasionally reaches the level of Siding #3 (between Wadsworth Road and IL 173), which is constructed lower than the adjacent CP Main Line. Wetlands encroach upon the existing right-of-way in many places.

2.7.3 Public Land

Lake County preserved lands adjoin the CP right-of-way at the following locations:

- Western side from MP 33.1 to MP 33.6 (Atkinson Road to IL 137)
- Western side from MP 38.6 to MP 39.0 (Viking Park in Gurnee)
- Western side from MP 39.2 to MP 42.8 (US 41 to 21st Street)
- Western and eastern sides from MP 43 to MP 44.8 (Wadsworth Road to 21st Street)
- Western side from MP 45.3 to 46.9 (IL I73 to Russell Road)

Altogether, Lake County Forest Preserve parcels are present immediately adjacent to the right-of-way over a distance of 7.5 miles along the western side (along the Des Plaines River) and 1.9

miles along the eastern side. CP personnel noted that controlled burns of several adjacent Forest Preserve wetlands and/or prairie areas have taken place regularly over the past several years.

Viking Park, under the ownership and jurisdiction of the Gurnee Park District, lies along the western side of the right-of-way just west of Old Grand Avenue in Gurnee for a distance of 0.4 miles.

2.8 POTENTIAL STATION LOCATIONS

This Phase I Study has sought direct input from each municipality through which the CP Main Line directly passes, particularly regarding their interest in sponsoring a potential station, and they have been given the opportunity to review, evaluate and offer comments on this Phase I report. The communities in the study area have a vested interest in selecting potential station sites. Metra requires both land dedication and commitment for funding the construction of station and parking facilities by the host communities. A sample of the standard Metra Station Operating and Management agreement can be found in Appendix K. In addition, as part of the planning for the potential station sites, provision for 20 acres of surface parking (or a smaller area if structured parking is feasible and desired) must be accommodated.

Station-site selection is a dynamic process that will continue to evolve through future phases of corridor evaluation. Potential station locations will be evaluated in more detail during later Study phases. All locations are subject to change, resulting from altered preferences expressed by the communities, CP, or Metra. The current list of potential station locations shown in Table 2.8-1 and Figure 2.8-1 have been developed through the expressed interest of local communities and Abbott Labs. General locations are portrayed in Appendix F.

Village of Green Oaks / Abbott Labs Combined Facility site: Abbott and the Village have agreed to work together on a single, mutually beneficial concept plan. Their preferred joint station site is located west of the CP Main Line and south of Atkinson Road, along the north side of the MD-N Line. It is approximately 30 acres in size, extending to the Tri-State Tollway, and borders both the CP Main Line and the MD-N main track (J-Line a.k.a. CP Fox Lake Subdivision). There is also a little-used Metra storage siding on the northern side of the J-Line track. There are non-ADID wetlands mapped within this potential station site, including a large open-water area about 10 acres in size. Green Oaks officials believe this to be a "borrow pit" from the Tri-State Tollway construction in the early 1960s.

Several larger employers are located to the south along Bradley Road, including Oneac Corporation with 200 employees. According to the Village and Lake County Partners, the area around IL 176 and Bradley Road will likely experience growth. Property in both directions along IL 176 is zoned for business and industrial uses.

City of Waukegan site: A future Metra train station was proposed as part of the "University Station" concept plans near the northwest corner of the development site along IL 120. Until recently, University Station was a planned redevelopment of the defunct Lakehurst Shopping Center, with uses to include course offerings from several universities, commercial/retail and office space, and residential areas. The plan was structured for implementation in four phases

over an eight-year period, but the time allotted to have a plan with full financial backing in place has recently expired. The entire Lakehurst property encompasses approximately 150 acres immediately to the east of the CP Main Line.

A Tax Increment Financing (TIF) District has been set up for the core of the new development, including the existing Lakehurst Mall buildings and other areas on either side of the existing ring road. The altered situation must be assessed, but the City still believes that a potential Lakehurst site redevelopment could become a major location that would result in both peak-direction trips and reverse commuting on Metra. As part of the planning for the site, provision for 20 acres of surface parking or a smaller area of structured parking must be accommodated. It should be understood that Metra would require land dedication and a commitment for funding the construction of the parking facilities. There are no wetlands mapped in the immediate vicinity of the potential station site.

Village of Gurnee site: The proposed station site identified by the Village of Gurnee is located immediately south of US 41, east of Kilbourne Road. According to plans developed by the village, the proposed station would be located immediately north of new buildings recently completed in a Public Works facility expansion. The size of the immediate station site has been reduced by the Public Works expansion, leaving only about three acres remaining for construction of a potential Metra station. A location for limited supplemental parking along the western side of Depot Street, immediately adjacent to the tracks, might be considered. Available land is limited here, but there may be sufficient space for one row of perpendicular parking. There are no wetlands mapped in the immediate vicinity of this site, either north or south of US 41.

The relatively small size of the site available for a potential Metra station south of US 41 results in a need for substantial additional parking capacity in adjacent areas. The village has suggested a potential purchase of a five-acre parcel north of US 41 that is connected to the site via a bicycle bridge for the Forest Preserve trail over US 41. (Part of this parcel is in the 100-year floodplain of the Des Plaines River. See Appendix F.) The Village believes that structured parking would be possible on this site, which is bordered by Lake County Forest Preserve land and US 41. Access to both the northern and southern sites would be from US 41, a situation, which is itself problematic. Again, Metra will require the community to fund all land and parking facility construction costs, up to the equivalent of 20 acres of surface parking (i.e., approximately 2,000 spaces).

There are several major employers within 1.5 miles of the potential station location. Many of these are located in the Delany Road industrial corridor north of US 41, including Cherry Corp. with 1,550 employees, Domino Amjet with 290 employees, and BASF Corp. with 200 employees. The immediate station area might be best-suited for interfacing with shuttle buses going to and from nearby employment sites, as well as taking both workers and customers to Gurnee Mills or Great America. Shuttle buses to the shopping center and amusement park would use Kilbourne Road southward.

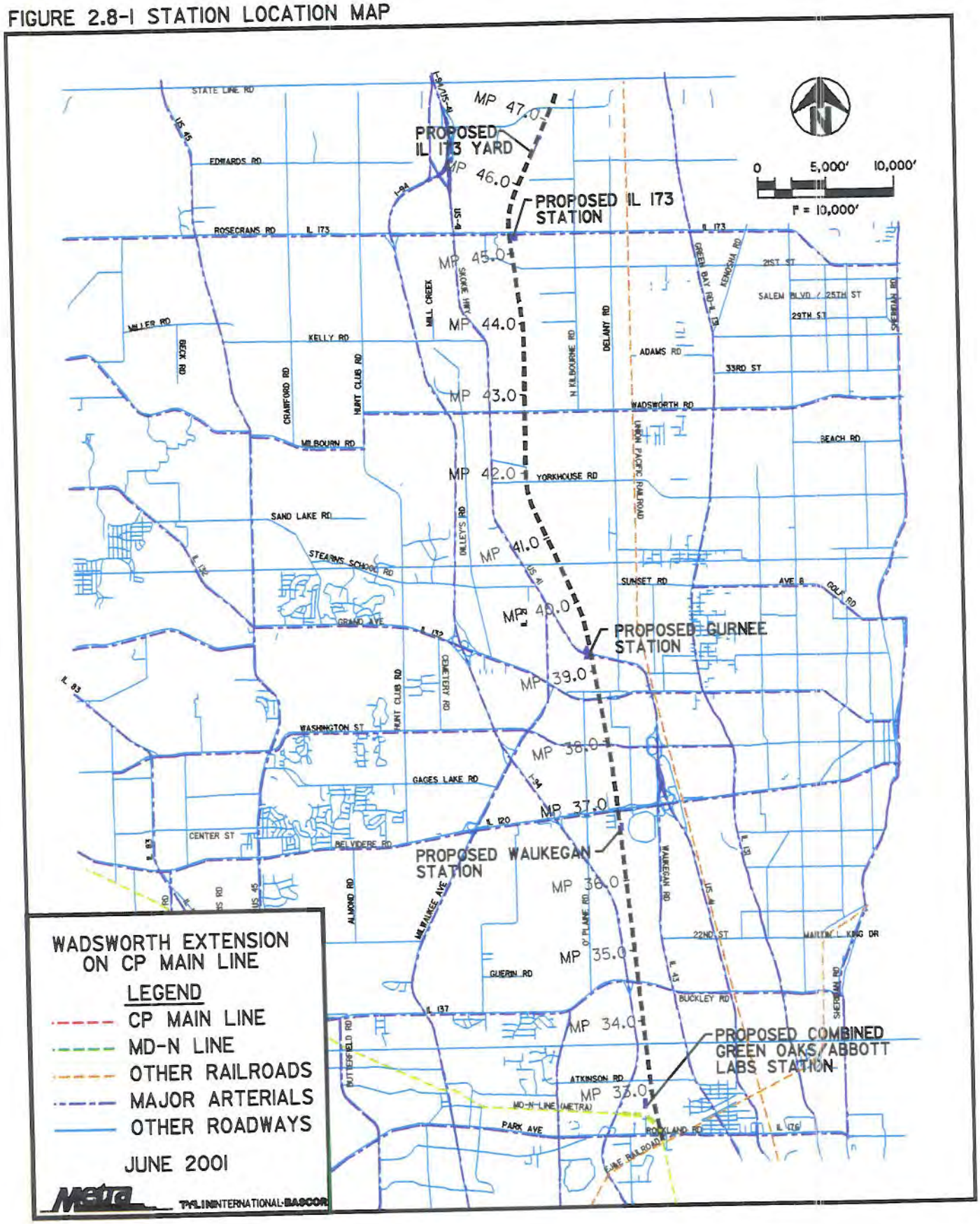
Village of Wadsworth site: The proposed station site for the Wadsworth station is in a presently unincorporated area on the north side of the Village. A 20-acre agricultural site along the eastern

side of the right-of-way and south of IL 173 could be considered for a potential station. Adjacent uses include an equestrian center west of the tracks and south (timetable east) of IL 173. Residential uses on larger lots lie to the north and east of this site, while remaining areas are Lake County Forest Preserve property. A coach yard would need to be located nearby but beyond (further west along the railroad) this northernmost station. There are no wetlands mapped in the immediate vicinity of this site, and the Village has no major development plans for this area.

Table 2.8-1 Summary of Potential Station Locations

Village or Corporation Suggested Location	Description of Location	General Size
Village of Green Oaks & Abbott Laboratories Combined Facility	Along the northern side of the MD-N Line and western side of the CP Main Line. Access from south via an extended Bradley Road north from IL 176, and from the north via Atkinson Road.	30 acres
City of Waukegan (Lakehurst Site)	On eastern side of the CP Main Line, south of IL 120. Placeholder at northwest corner of the Lakehurst Shopping Center redevelopment site. Until recently planned development was called University Station. Possible structured parking.	To be determined
Village of Gurnee	On western side of CP Main Line. Adjacent to US 41 off Kilbourne Road, immediately north of Village's Public Works facility. Five-acre parcel north of US 41 (same side r-o-w) could be acquired for possible structured parking.	3-8 acre footprint with structures
Village of Wadsworth	On eastern side of CP Main Line, south of IL 173 (presently unincorporated).	20 acres

FIGURE 2.8-I STATION LOCATION MAP



3.0 FUTURE PLANS

This section explores how demographic forecasts and future railroad, highway, and municipal plans might impact potential commuter rail service along the Wadsworth Extension. Data gathered for this section comes from a variety of sources. During a hi-rail tour of the Main Line, CP personnel described their maintenance programs and plans for the future in this area. At other information-gathering meetings, communities and major businesses along this line expressed whether they wanted commuter rail service, and provided information on future development plans that would help Metra estimate how much demand already existed for the service.

Metra's Office of Planning & Analysis had population and household forecasts previously furnished by the Northeastern Illinois Planning Commission (NIPC) and employment and other socioeconomic data from the 1990 U.S. Census. Lake County DOT and IDOT provided Metra with information about their highway improvement programs. A previous IDOT/WisDOT report described scenarios for potential High Speed Rail (HSR) service on the CP Main Line.[1]

3.1 PROJECTED FREIGHT/PASSENGER OPERATIONAL IMPROVEMENTS

The CP Railway does not expect any significant changes to their level of service in the near future. They expect to continue operating about 30 freight trains per day through this area, and continue coal deliveries to Abbott Laboratories. The CP does not anticipate any new local customers and has not planned for any new spur or industrial tracks. They do, however, expect Amtrak to maintain its existing level of service and continue operating under the current trackage-rights agreement. Curfews on the MD-N east of Rondout during Metra's peak operating periods are also expected to remain unchanged. CP trains are expected to operate around the curfews. As noted earlier, the cooperation of the railroad in providing information does not necessarily indicate, and is not meant to imply, their support for or endorsement of a potential Wadsworth Extension.

Based on the findings of a joint study by IDOT and WisDOT, implementation of High Speed Rail (HSR) service along the line was found to be feasible. Two possible operating plans have been identified, both of which would require substantial upgrading of existing railroad infrastructure. An entirely new signal control system would be necessary. This system would comply with the safe-braking requirements of high-speed trains, while also being compatible with Metra and Amtrak operations. All five existing grade crossings on the Wadsworth Branch would be upgraded with Class B protection which would include flashers, bells, four-quadrant gates, and trapped vehicle detection. These crossings are located at IL 176, Atkinson Road, Wadsworth Road, IL 173, and Russell Road. Other identified improvements would include partial tie replacement, track surfacing, curve-elevation increases, elastic fastening systems, and special track work replacements and additions.

The HSR "Implementation Scenario" would allow for 110-mph service that would include 12 daily round trips between Chicago and Milwaukee. The "Incremental Scenario" would allow for 125-mph operations and include 16 daily round trips. Although CP and Metra were active

[1] Chicago to Milwaukee Rail Corridor Study, Capital Cost Estimates, Phase II Task 5, Volume 1; Envirodyne Engineers, Inc.; May, 1995.

participants and contributors to the HSR Study, the recommendations of the 1995 study and the Wadsworth Extension Study are presently independent of each other.

3.2 DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS

For purposes of this particular analysis, this section focuses on a six-mile-wide corridor that stretches from IL 60 in the City of Lake Forest north to the Illinois-Wisconsin State Line. The tables on the following page summarize population, household, and employment data for the study corridor according to geographic townships. [NIPC compiles demographic and socioeconomic data by township (36 sections or square-miles) and quarter-section (9 sections or ¼-square miles).] In Tables 3.2-1, 3.2-2, and 3.2-3, data is divided by groups of townships. Segments of the Wadsworth Extension are thereby represented from north to south (compass direction). Appendix D illustrates this data graphically, using color shading for each quarter-section within the study corridor.

The summarized demographic and socioeconomic data have been taken from the 1990 U.S. Census and the 1996 NIPC population, household, and employment forecasts. NIPC developed forecasts as part of the 2020 Regional Transportation Plan (RTP) process, using two distinct future land-use scenarios for the region, based on potential airport development. One involves upgrading O'Hare and Midway Airports, identified as "Existing Airport Investments" (EAI), while the other assumes construction of a new "South Suburban Airport" (SSA). Both scenarios share the same total regional forecasts for population, households, and employment, but have separate regional distributions of each. (The basic premise is that a new SSA would be expected to divert more new development to the South Suburbs.) Each of the two scenarios is portrayed here.

3.2.1 Population

According to the 1990 U.S. Census, approximately 135,000 people lived within the corridor, with 5% of those living in the northern tier of townships, 53% in the middle tier, and 42% in the southern tier. Between 1990 and 1996, population in the northern and middle tiers grew by 10%, while growth in the southern tier was only 2%. County-wide population growth in this period was 14%.

Between 1990 and 2020, population in the corridor is expected to grow by approximately 49% under the EAI scenario and 41% under the SSA scenario. The largest percentage change is expected to occur in the northern tier of townships, with either a 134% (EAI) or 101% (SSA) increase. However, this northern tier currently has far less population than the middle or southern tier townships. The proportion of corridor population in the northern tier is expected to increase from 5% in 1990 to about 8% in 2020 (SSA or EAI).

During this same period, overall population in Lake County is expected to grow from 516,400 to 806,800 with the EAI assumptions, or to 782,500 under the SSA assumptions, an increase of 56% or 52%, respectively.

Table 3.2-1 Population in the Study Corridor

Township	1990	1996	2020 EAI	2020 SSA	% Change 1990-1996	% Change 1990-2020 EAI	% Change 1990-2020 SSA
Newport & Benton	7,302	8,055	17,099	14,650	10.3%	134.2%	100.6%
Warren & Waukegan	71,519	78,548	100,121	99,450	9.8%	40.0%	39.1%
*Libertyville & Shields	55,817	57,139	83,043	76,017	2.4%	48.8%	36.2%
TOTAL	13,638.00	143,742.00	200,263.00	190,117.00			
Newport & Benton	5.4%	5.6%	8.5%	7.7%			
Warren & Waukegan	53.1%	54.6%	50.0%	52.3%			
*Libertyville & Shields	41.5%	39.8%	41.5%	40.0%			
TOTAL	100.0%	100.0%	100.0%	100.0%			

* Includes several quarter sections in Vernon & West Deerfield Townships

Table 3.2-2 Households in the Study Corridor

Township	1990	1996	2020 EAI	2020 SSA	% Change 1990-1996	% Change 1990-2020 EAI	% Change 1990-2020 SSA
Newport & Benton	2,336	2,558	6,068	5,187	9.5%	159.8%	122.0%
Warren & Waukegan	26,207	28,908	39,227	38,925	10.3%	49.7%	48.5%
*Libertyville & Shields	14,867	15,564	21,931	19,681	4.7%	47.5%	32.4%
TOTAL	43,410.00	47,030.00	67,226.00	63,793.00			
Newport & Benton	5.4%	5.4%	9.0%	8.1%			
Warren & Waukegan	60.4%	61.5%	58.4%	61.0%			
*Libertyville & Shields	34.2%	33.1%	32.6%	30.9%			
TOTAL	100.0%	100.0%	100.0%	100.0%			

* Includes several quarter sections in Vernon & West Deerfield Townships

Table 3.2-3 Employment in the Study Corridor

Township	1990	1996	2020 EAI	2020 SSA	% Change 1990-1996	% Change 1990-2020 EAI	% Change 1990-2020 SSA
Newport & Benton	1,473	1,510	4,993	4,251	2.5%	239.0%	188.6%
Warren & Waukegan	35,408	40,245	59,215	57,372	13.7%	67.2%	62.0%
*Libertyville & Shields	43,865	45,987	58,464	52,558	4.8%	33.3%	19.8%
TOTAL	80,746.00	87,742.00	122,672.00	114,181.00			
Newport & Benton	1.8%	1.7%	4.1%	3.7%			
Warren & Waukegan	43.9%	45.9%	48.3%	50.2%			
*Libertyville & Shields	54.3%	52.4%	47.7%	46.0%			
TOTAL	100.0%	100.0%	100.0%	100.0%			

* Includes several quarter sections in Vernon & West Deerfield Townships

3.2.2 Households

Historically, Metra ridership correlates more directly to the number of households (i.e., a single occupied housing unit of any type) than to population. According to the 1990 U.S. Census, there were 2.6 million households in the six-county region of northeastern Illinois, with 43,400 households within the defined corridor. Between 1990 and 1996, the number of corridor households increased by 3,600 (8%). By 2020, the number of households will likely grow to either 67,200 (EAI) or 63,800 households (SSA), an increase of 55% or 47%, respectively.

Within the corridor, the largest percentage change is expected to occur in the northern tier of townships, with either a 160% (EAI) or 122% (SSA) increase. The 2020 proportion of corridor households in the northern tier is expected to increase similarly to the overall population proportion, with either 9% (EAI) or 8% (SSA) of the corridor households being located there, compared with 5% in 1990.

3.2.3 Employment

According to the 1990 U.S. Census, more than 3.6 million people worked in the six-county region of northeastern Illinois. About 80,700 worked in the defined corridor. The middle tier of townships comprised about 44% of the jobs, and the southern tier of townships about 54%. Between 1990 and 1996, employment growth was fastest in the middle tier of townships, with a 14% increase in the number of jobs. County-wide employment growth was 22% in this period.

Between 1990 and 2020, overall employment in Lake County is expected to grow from 228,600 to 426,200 under the EAI scenario, or to 387,700 under the SSA scenario, an increase of 86% or 70%, respectively. During the same period, employment in the corridor is expected to grow almost 52% under the EAI scenario and about 41% under the SSA scenario. Within the corridor, the largest percentage change is expected to occur in the northern tier of townships, with either a 239% (EAI) or 189% (SSA) increase. The proportion of corridor employment in the northern tier is expected to increase from 2% in 1990 to about 4% in 2020 (SSA or EAI).

3.3 ROADWAY IMPROVEMENTS

IDOT and LCDOT have identified many proposed and future projects that are near the proposed Wadsworth Extension. Most of these projects consist of ongoing maintenance such as resurfacing, channelization, and bridge rehabilitation projects, while others involve capacity increases through lane additions, intersection modifications, and signal improvements. The projects are listed individually in Appendix C, while those that could positively influence access to potential station sites are summarized below.

- Improvements to I-94 (completion of a full interchange at IL 176), Bradley Road (extension from IL 176 to IL 43), and IL 176 (surface improvements from St. Mary's Road to U.S. Route 41) would ease traffic flow near the potential station at Green Oaks/Abbott Labs.

- Improvements to 14th Street (between IL 43 and IL 131) and the westward extension of 14th Street from IL 43 to O'Plaine Road would better serve the potential station at Lakehurst in Waukegan.

- Roadway improvements to segments of the following projects that are near the station area, or are well-traveled access roads leading to it, would ease traffic going into and out of the potential station at Gurnee. These include Delany Road (Sunset Avenue to US 41), US 41 (Delany Road to Lake-Cook Road), Washington Street (US 45 to IL 21), and IL 132/Grand Avenue (IL 21 to IL 131).

- Roadway improvements to IL 173 (from I-94 to Lewis Avenue) would ease possible congestion around a potential IL 173 Station.

LCDOT noted that an extension of Bradley Road between IL 176 and Atkinson Road is listed in their long-range plans, but a time period for study and implementation has not been determined. As originally envisioned by LCDOT, the proposed Bradley Road extension would cross the MD-N Line at-grade, and would intersect with Atkinson Road near the CP Main Line grade crossing. The property north and west of the two sets of railroad tracks is owned by Abbott Laboratories, and is within the corporate limits of the Village of Green Oaks.

A Bradley Road extension would directly serve a potential Green Oaks/Abbott Labs Station located in the "wedge" between the two rail lines. A grade separation might be in the best interests of all parties, particularly since a bridge over the retention pond north of the tracks would be required. The Bradley Road overpass could cross both the water and railroad via the same bridge. Potential use of an upgraded existing storage siding to flip some peak-period trains would also suggest the utility of an overpass.

From the other side, a grade separation at Atkinson Road would also be the best option. CP could better utilize the siding on the eastern side of the right-of-way, where any parked trains presently have to be split to keep the road open. The new access road to the potential station and the cut-off western portion of Atkinson Road would intersect the new road between the roadway overpasses at a signalized intersection.

3.4 MUNICIPAL DEVELOPMENT PLANS

The municipalities have provided information on current zoning that was used to examine whether future development might positively affect commuter service on the Wadsworth Extension. In addition, discussions of the project and its potential station sites were undertaken in order to establish existing levels of local support for the line and for specific station locations.

3.4.1 Village of Green Oaks

The Village has expressed strong support for the new service. After reviewing several options, they have joined with Abbott Laboratories to locate two connected potential stations serving the CP Main Line and the MD-N Line. The Village believes that implementation of shuttle services for Metra riders to employment sites could beneficially reduce existing traffic volumes, particularly on Atkinson Road.

Access from the south would be via a northern extension of Bradley Road that would be grade-separated from the MD-N tracks and the borrow pit via a roadway overpass. Such access directly from IL 176 would address a concern of the Village of Green Oaks that traffic demand along

Atkinson Road to and from the west not be further increased. Abbott would utilize the access road from the new roadway for their company shuttles.

The Village and Abbott are very interested in pursuing development of their station as an interim step in the Wadsworth Extension implementation process. They believe that a market already exists for a Metra station at this location, including reverse-commuters to Abbott Labs and other nearby businesses. In addition, the Libertyville Fire Protection District (LFPD) has expressed a strong interest in the potential benefits of the proposed new Bradley/Atkinson roadway with overpasses above the two sets of railroad tracks. They have offered to participate in the planning and potential funding of the project. The LFPD has a fire station on Atkinson Road east of the CP Main Line that was built to serve Abbott in particular. However, since their territory extends south to IL 60, they view the new road as very important in reducing emergency travel times to serve recent commercial office developments at IL 60 and Bradley Road.

It is important to note that a Green Oaks MD-N station could be implemented independently. A new station project on the existing line could be completed sooner than the extension, which includes four new stations, higher capital costs, and currently no agreements in place with the potential host railroad. A potential station in Green Oaks was cited in Metra's EXTRA section of FAST.

3.4.2 City of Waukegan

The City of Waukegan supports the new service, and had identified the aforementioned "University Station" redevelopment of the Lakehurst property as the most appropriate location for a new commuter train station. However, the time frame for the developer of the University Station project to move forward has expired. The potential Wadsworth Extension station was shown on the western edge of the overall site on the concept plans.

University Station plans included the introduction of several universities and colleges to a shared academic facility, including IIT and National-Louis University. Other planned aspects of the development included a library, museums, retail shops, offices, a hotel, a wellness center, churches, YMCA, and open space. Arthur Andersen used NIPC forecasts to develop an Economic Impact Analysis for the University Station project.[2] They estimated that, once the project was complete, 9,000 additional full-time equivalent jobs would be created. The development was to include 1,500 housing units, residents of which could walk to the proposed train station.

The pursuit of other redevelopment concepts with similar elements is expected from the City. The potential station site as presently depicted in the northwest corner of the overall Lakehurst site is considered a placeholder that awaits a new redevelopment plan, about which the City is very serious. Access would be off the Lakehurst ring road from either IL 120 or IL 43. New train service and improved bus service still are considered by the City to be critical aspects of the overall project. The City and the developer also had expressed hope that Amtrak *Hiawathas* (Chicago-to-Milwaukee trains) would stop at the proposed Metra station.

[2] Economic Impact Analysis – University Station, Arthur Andersen, March 23, 2000.

3.4.3 Village of Gurnee

Village officials stated their support for the new service and for a potential station location just south of US 41 with access from Kilbourne Road. They chose this site because it is adjacent to the Village Center located near Kilbourne Road and Old Grand Avenue. They noted that safety would be a concern along US 41, and would expect to see a traffic signal installed at Kilbourne Road and US 41 for the station.

The Village expressed concern about additional auto traffic associated with a potential Metra station, and believes that implementation of shuttle services for Metra riders would be an important element of the project. The Village noted that if excess parking capacity were identified at some Village locations, such as Gurnee Mills, shuttle services could provide access to the potential Metra station. (Gurnee Mills is about three miles and Great America about two miles from the potential station site.) Conversely, the shuttles could service Gurnee Mills and Great America as destinations from the Metra station. The Village also noted that Great America has purchased 135 acres of land immediately west of I-94 and north of Washington Street for possible expansion as an entertainment complex and water park. The Tri-State business park is located just north of this site, and might be expanded south if Great America does not move forward with their plans.

The lack of provision of substantial commuter parking could be an issue because the land area to be set aside is substantially below Metra's general requirement of 20 acres. While the Public Works site can be considered to be their first choice, the Village has expressed an interest and willingness to work jointly with the City of Waukegan on a Lakehurst station if the Public Works site proves infeasible. It is possible that the primary location could be implemented as a destination-only station served by shuttle buses, with access also available to drop-offs and pedestrians (e.g., walking access from nearby homes). The Lakehurst location, with substantial ground acreage and probable compatibility with a parking structure, would become a major regional park-and-ride station. Such questions and options will be addressed in future Phase II studies.

3.4.4 Village of Wadsworth

The Village's comprehensive plan anticipates a potential Wadsworth Extension station at IL 173. A 1997 Village survey found that the majority of residents support the new service. The Village has no major employers, industries, or retail centers within the CP Main Line corridor, and there are no specific plans for such development. No van pools or shuttle services exist within the Village, and none would be anticipated with the new service. The Village would agree to a site in the southeast quadrant of the IL 173 grade crossing, but has not committed to future financial support.

The western and southern portions of Kenosha County are growing rapidly, particularly in the Village of Pleasant Prairie. This IL 173 location would have the advantage of I-94 (via Russell Road) and US 41 access to and from the north. Another agricultural site off of North Kilbourne Road, south of Russell Road and north of IL 173, has sufficient size to be considered for a potential station alongside the coach yard, should the preferred site not work out.

4.0 POTENTIAL OPERATIONS

The following operational assumptions were made for the Milwaukee District-North Line (MD-N) Wadsworth Extension (actually a branch of the existing commuter rail service), west from Rondout along the Canadian Pacific Railway's C&M Subdivision.

Train Routing and Schedules

- The new commuter service would utilize the existing MD-N Line from Union Station in Chicago to Rondout. At that point, instead of entering the J-Line toward Fox Lake, some MD-N trains would stay on the CP Main Line alignment and provide passenger service to four proposed station locations. After serving the stations, trains would continue into the coach yard (further north/timetable west) where they would prepare for the next inbound trip. The layover would take place off of the CP Main Line because of existing levels of activity along the CP Main Line that is used by both CP freight trains and Amtrak passenger trains.
- For scheduling purposes, dwell times at potential stations were estimated to be two minutes. Turnaround time at terminal points (time to "change ends," i.e., reverse the train's direction) was estimated to be a minimum of 12 minutes.
- Existing train speed limits were taken from the most recent Canadian Pacific and Metra timetables. Operating speeds for Amtrak and Metra (up to 79 mph) would be the same throughout the length of the extension.
- A preliminary draft train schedule was developed for use in the assessment of both ridership and cost estimations. Metra commuter service would consist of 24 trains (12 in each direction), provided on weekdays between 4:30 a.m. and 1:00 a.m. Trains would run approximately every 30 to 45 minutes in the peak direction during morning (inbound) and evening (outbound) peak periods. Service with greater headways would be provided at other times, as would limited service for reverse-commuters during the peak periods. [The latter does not include potential reverse-peak trains on the J-Line (see Section 5.5) at the Green Oaks/Abbott Labs Station.]
- Twenty-four trains per weekday were assumed, and no weekend service would initially be provided. Improvements necessary to safely and efficiently support commuter rail service were identified, based on this assumed service level.

Rolling Stock

- The Wadsworth Extension would utilize conventional rolling stock similar to those in use today on the Metra system (i.e., diesel locomotives with passenger coaches). The number of required new train sets would be dependent upon the final level of service proposed for start-up implementation. Interim assumptions on the number of trains required were made, based on the preliminary draft schedule.

Stations and Yard

- Potential station sites were identified through meetings and discussions with officials from each community, the Lake County Division of Transportation, and Abbott Laboratories.

Preliminary site plans were then developed. Both site layouts and site locations are subject to change in future Study phases.

- Potential commuter station sites (including station buildings, parking lots, and other associated site improvements) would be funded, constructed, maintained, and operated by the host communities, and would be subject to Metra standards and supervision. All sites would be designed to meet applicable guidelines to facilitate shuttle, feeder, and/or fixed-route bus access. Land acquisition costs for the potential station sites have not been determined, and are not included in the cost estimates.
- In order to permit overnight storage of trains and proper positioning of train sets to allow 30 to 45-minute service levels during the morning peak period, a coach storage yard would need to be constructed near the northern end of the Wadsworth Extension. The storage yard would consist of several yard tracks to allow overnight storage of trains, a welfare building for train crews, and a parking lot for the train crew's vehicles. No heavy maintenance would occur at the yard location, only the interior cleaning of the trains. The required size of the overnight coach storage facility would be dependent upon the eventual level of service to be provided. Size requirements were estimated for initial assessment, based on the preliminary draft train schedule.
- It was assumed that heavy maintenance of the train equipment would occur at the Milwaukee District maintenance facility at Western Avenue in Chicago. Capacity may need to be added at the Western Avenue yard facility for daytime storage and heavy maintenance. Any additional facilities that might be necessary to accommodate the additional trains are not included in the cost estimates.

Operating Agreement

- Metra could operate commuter service through a trackage-rights agreement, which would entail a fixed fee for Metra to operate over tracks that CP owns and maintains, and could also include performance incentives for efficient dispatching and on-time performance. The CP currently operates over Metra MD-N tracks south of Rondout through a fixed-fee agreement. The exact nature and costs of any service agreement would be subject to negotiation and agreement between Metra and the Canadian Pacific Railway.

4.1 STATION AND YARD LOCATIONS

Potential commuter rail station and yard sites were identified, based on local coordination as well as operating requirements and provision of adequately spaced service along the line. Locations, as described in Section 2.8, are summarized in the following section.

4.1.1 Station Locations

Four potential station sites have been identified as part of this project. One of the potential stations (Green Oaks/Abbott Labs) is also adjacent to the MD-N (J-Line), and potentially could be implemented separately while the entire Wadsworth Extension proceeds through additional Phase II Studies.

Each of these potential stations would have parking available for commuters. Metra requires assurances from each of the potential host communities that at least 20 acres would be available for future parking expansion. In Gurnee, 20 acres of land is not readily available, while at Lakehurst in Waukegan, land may be at a premium depending upon future redevelopment plans. Metra has received commitments from the respective municipalities that multi-level parking structures at the recommended locations would be a conforming use in local zoning ordinances. In addition, the municipalities understand that they would be responsible for funding the facilities.

Information on each of the potential station sites is provided in Appendix F, including general station information, location maps, wetland and floodplain maps, and preliminary station layouts. The station site plans tentatively reflect the inclusion of four to six acres for parking facilities at the potential start-up date. The proposed fare structure would be as follows, based on Metra's current criteria:

Table 4.1-1 Station Fare Zones

Mile Post	Fare Zone	Station
32.8	G	Green Oaks/Abbott Labs
36.8	H	Waukegan (Lakehurst)
39.1	H	Gurnee (Public Works)
45.1	J	IL 173 (southeast quadrant)

4.1.2 Coach Yard Location

A coach yard would be located west of the northern terminus in order to avoid turning back trains while standing on the CP Main Line tracks. The distance required for "deadheading" of trains between the potential northernmost station and the yard would be similar to the distance between the Antioch Yard and the Antioch Station on the Wisconsin Central for the Metra North Central Service, which has proven to be quite workable.

Operational considerations for the yard include the need for two access points between the yard and the CP Main Line (a "double-ended yard"), and the need for access to both Main Line tracks in the immediate vicinity of the yard. A crossover on the CP Main Line just east of the yard lead would be required, as would related signal-system modifications (i.e., an interlocking or control point). Per the CP, mainline turnouts entering a yard facility should not be located on a curve; hence the location is west of the existing curve. There is a concern that locating a yard within 2,000 feet of residences could create the potential for noise impacts due to operations in the yard; appropriate mitigation would be provided. Floodplain and wetland locations were also considered in the location and conceptual layout of the yard.

Information on the potential yard site is provided in Appendix G, including a general site description, a basic layout, and wetland and floodplain maps. Operationally, the site east of North Kilbourne Road in unincorporated Lake County near Russell allows a double-ended yard, which is required by Metra's Transportation and Engineering Departments.

4.2 OPERATIONS, SCHEDULES, AND INTERFACES

Operational considerations are pertinent both west and east of Rondout because of the increased train activity. Metra commuter train schedules would have to be meshed with existing or modified schedules for Amtrak trains and CP freight trains.

4.2.1 Rail Operations West of Rondout

The preliminary draft schedule would provide inbound trains leaving the proposed IL 173 station at 4:30, 5:10, 5:40, 6:09, 6:55, 7:35, 8:30, and 11:48 a.m., and at 3:49, 5:10, 6:00, and 6:55 p.m. Outbound trains would arrive at the proposed IL 173 station at 7:20, 7:53, and 10:56 a.m., and at 2:56, 4:57, 5:48, 6:07, 6:39, 7:05, 8:33, 11:00 p.m., and 12:56 a.m. The schedule accommodates continued Amtrak service along the line, according to its current schedule of seven trains per day in each direction.

Approximately 30 freight trains per day would also continue to operate, but might require some schedule adjustments to avoid interference with passenger service. During peak commuter service periods (see Table 2.5-1), freight movements would be highly restricted. Eastbound freight trains would continue to be held west of Rondout during Metra curfew periods on the existing MD-N, and provisions have been made to provide additional parking space for the freight trains. Freight train operations during other periods would require more frequent use of the passing sidings (including new ones) so that passenger train schedules could be maintained. Specific locations for additional sidings are recommended in Chapter 5 as part of this project.

The possibility of turning back trains at intermediate locations along the Wadsworth Extension, such as at Lakehurst or Gurnee, was considered briefly. Such circumstances would require the addition of intermediate crossovers and signal modifications that do not appear to be warranted for start-up operations along the line. However, there may be a good opportunity to extend some Deerfield "flips" to Green Oaks. ("Flips" are railroad jargon for trains that end their runs prior to reaching the outer terminal, returning in the opposite direction to serve the busier stations during the peak period.) Peak-period trains traveling outbound cannot enter the J-Line because of the frequent flow of inbound trains on the single main track. This would provide a location off of the CP/Metra Main Line to change ends (the engineer moves to the other end of the train) without occupying the Main Line track, as is the case today in Deerfield. The result would be additional reverse-peak service to the Lake Forest and Green Oaks/Abbott Labs stations, whereby shuttle buses could take employees to nearby job sites as is done at the Lake-Cook Road station.

4.2.2 Rail Operations East of Rondout

In order to accommodate the added service via the CP Main Line, three train sets would be relocated from Fox Lake service to the Wadsworth Extension (three new train sets would also be purchased). In the preliminary draft schedule developed for the sake of ridership estimation, three inbound and three outbound trains were removed from the schedule on the J-Line portion of the MD-N. The effects of such a change would be minimized by relocating only those trains that currently run express inbound from Fox Lake to Libertyville. (These trains have close

headways to the others, and are in Fox Lake primarily because it is the only coach yard on the MD-N.) This shifting of train sets would not have a substantial negative impact on overall service on the MD-N, since the affected trains would continue to serve the higher-use stations east of Rondout, except that they would originate and terminate at the Russell Yard.

The potential operational impacts of adding a net 18 trains per day as part of the extension service will need to be analyzed in detail in future Phase II Studies. In particular, the potential effect of the additional trains between Rondout and Tower A-20 may be equally significant to operational congestion as it would be between Rondout and Wadsworth. This 12-mile double-track segment east of Rondout could also require additional infrastructure. Closer to downtown Chicago, trains from two other Metra lines (Milwaukee District-West Line and North Central Service) and Amtrak currently use the three Main Line tracks between Tower A-5 and Union Station.

4.2.3 High Speed Rail Operations

Implementation of High Speed Rail (HSR) along the CP Main Line previously has been determined to be feasible, based on the findings of a joint study by IDOT and WisDOT. However, that study identified the need to divert nearly all of the current freight activity on the CP Main Line to the parallel Union Pacific Milwaukee Subdivision to the east. Note that such circumstances are not considered in this Study. The Wadsworth Extension preliminary operating plan assumes that existing CP freight trains (and Amtrak) would remain on CP Main Line tracks, with the resultant need to provide sufficient capacity for them along with the additional Metra trains.

The preliminary draft train schedule for the Wadsworth Extension would not necessarily preclude implementation of HSR. Adequate gaps might exist in service between Wadsworth and Rondout even in peak periods (30 to 45 minute headways), especially since the 12 Amtrak *Hiawathas* would become part of the High-Speed Rail program. East of Rondout, Metra service levels would increase, but the changes would not place substantial additional limitations on HSR operations beyond those already recognized in the HSR Study. Note that the 1995 HRS Study specifically included triple-tracking of the MD-N Line from Rondout to Tower A-5.

4.2.4 Pace Bus Service

This section covers the potential for provision of RTA/Pace bus service for interface with the Wadsworth Extension. Several Pace bus routes cross or have stops located within the immediate vicinity of the potential stations. Provision of bus service at stations will be important toward integrating the rail route into the overall Lake County transportation system. Some relatively minor modifications to existing bus routes appear to be possible in order to provide service directly to the potential Metra stations. Opportunities for independent shuttle services to specific locations would be examined as part of the Phase II Studies. A map detailing existing Pace Bus Service can be found in Appendix I.

Combined Green Oaks/Abbott Labs Station

There are no Pace routes within two miles of the potential station location. Abbott Laboratories will likely provide shuttle services for their employees. Abbott's facilities are located about one mile to the north of the site. Pace bus service along IL 176 could be investigated, potentially serving the UP-North Line (Lake Bluff station) about three miles to the east and the NCS (Mundelein station) about four miles to the west.

Waukegan (Lakehurst) Station

Three Pace bus routes currently serve the Lakehurst Mall and Lakehurst Apartments. Route 567 runs between the Gurnee Mills Mall and the Great Lakes Naval Base in North Chicago. Routes 564 (along 14th Street) and 568 (along IL 120) both run from the Lakehurst Mall to downtown Waukegan. All of these services could be continued or supplemented with the Wadsworth Extension, with service directly to the proposed Metra station and to other points within a new Lakehurst development.

Gurnee Station

Pace Route 565 runs along Grand Avenue between the Gurnee Mills Mall and downtown Waukegan, passing about one-half mile south of the potential station location. Route 562 serves the Gurnee Center for Commerce and Industry (immediately east of the potential station and north of U.S. 41), with service to downtown Waukegan and the Metra UP-North Line Waukegan station. Adaptation of either of these routes to serve the potential station would likely be possible. The Center for Commerce and Industry is within one half-mile of the potential station and would be easily accessible by walking if a better pedestrian route were established. Direct service by either (or both) bus routes would be an important element of an overall transportation plan.

IL 173 Station

The Pace service nearest to the potential station location is within Zion, about four miles to the east along IL 173 (Route 571), and is primarily a north-south route between Zion and Waukegan. Whether a new Pace service to the potential station is warranted would require further analysis of potential bus ridership.

5.0 CAPITAL IMPROVEMENTS

This chapter identifies the upgrades required to accommodate Metra commuter rail service along the subject 15-mile portion of the Canadian Pacific Railway (CP) C&M Subdivision in northern Lake County. In order to support operations on the proposed Wadsworth Extension, limited improvements to track, ballast and subgrade, sidings, bridges, interlockings, and at-grade street crossings are recommended. Additional (new) sidings are also recommended, and new rolling stock would be purchased. As described in the previous chapter, new passenger stations (including station buildings, parking lots and other associated site improvements) and a new overnight coach yard would also be required. Physical-plant upgrades are based on assumed levels of commuter rail service, as previously described.

Local land acquisition, i.e., purchase of station sites by the host communities, would be necessary for park-and-ride stations. Metra would acquire property for the proposed coach yard, and potentially could require some limited right-of-way along the alignment for sidings. Determination of specific land acquisition locations and costs would be part of Phase II Studies.

A cost estimate, including breakdowns of quantities, has been prepared and is included in Section 5.4. The required improvements presented in this chapter are considered necessary to operate commuter trains efficiently, and are not intended to portray or imply that the current CP physical plant and infrastructure is in substandard condition for operating their freight service or Amtrak service. A line capacity analysis would be completed as an initial step of Phase II Studies, which could revise (and possibly substantially alter) the list of final improvements that would be necessary.

5.1 IMPROVEMENTS TO PHYSICAL PLANT

This section identifies the physical plant items requiring upgrading in order to accommodate Metra commuter rail service. These improvements include CP Main Line track, signal and siding improvements; the addition of new sidings; and adjacent roadway improvements. Improvements are recommended based on the need for added flexibility upon implementation of commuter service. A regular schedule of replacement of worn rail and other track materials after the proposed implementation of Metra service is assumed to be necessary. The related costs of such maintenance are not included as part of the capital cost estimates provided in this report.

5.1.1 Rail

The CP plans to replace the existing jointed rail from the IL 137 overpass to the State Line, and the worn rail through the one-degree curve north of IL 173. Therefore, 132-pound continuous welded rail, in good condition, should be in place along the entire line prior to any Metra service. No new running rail on the Main Line is included in the cost estimates.

5.1.2 Ties

Approximately 10% of existing ties are assumed to be replaced as part of Metra service implementation, based on a survey of tie counts along the main line. Most of these ties would be replaced due to aging rather than mechanical wear.

5.1.3 Roadbed

Minor problems were identified with the existing roadbed, which would be alleviated by undercutting the ballast and/or adding new ballast. In addition, the ditch line should be re-cut and/or cleaned out for the entire length of this segment, in order to maintain proper drainage adjacent to the tracks. This is especially important due to the high water levels and encroaching floodplains along much of the alignment. In limited areas, the fill has narrowed, resulting in the lack of a ballast shoulder next to the rail. Additional fill would be placed to restore proper side slopes and ballast shoulders to the roadbed.

5.1.4 Other Track Material (OTM)

Box anchoring on every other tie along each segment would be necessary. This treatment is present along most of the line, but an allowance for additional anchoring is included.

5.1.5 Turnouts and Crossovers

In order to permit higher-speed commuter operations, new No. 20 turnouts with rail-bound manganese frogs and guardrails would be needed for the passing sidings, the coach yard, and between the CP Main Line tracks. The existing No. 16 turnouts along the line would also be replaced. Turnouts to industrial leads not accessed by commuter rail would not require upgrading. A new crossover between #1 Main and #2 Main would be required on the CP Main Line east of the coach-yard lead track.

5.1.6 Sidings

With the added commuter service, freight trains must be able to clear the CP Main Line tracks near both the eastern and western ends of the route, and from either #1 Main or #2 Main. The construction of a minimum of one new siding along #2 Main would minimize the potential for freight interference with Metra's proposed operations. Two additional sidings are also suggested, one on either side of the CP Main Line. The necessity of these additional sidings would be determined in future Phase II Studies. Appendix H provides wetland maps and floodway maps for proposed new passing siding locations.

Recommendations for reconstruction of existing sidings and for new sidings, to provide either two or (suggested) three sidings on each side, are listed below. Their final length and locations would be dependent on more detailed assessment of train information from the CP and, in particular, by the line capacity analyses to be scheduled early in Phase II.

- Reconstructed Siding #1 (off #1 Main) - reconstruct from west of IL 176 (MP 32.3) to east of IL 137 (MP 34.3), a distance of 2.0 miles.

- Relocated Siding #2 (off #2 Main) - reconstruct from west of IL 176 (MP 33.0) to east of IL 137 (MP 34.4), a distance of 1.4 miles.
- Reconstructed Siding #3 (off #1 Main) – reconstruct from west of Wadsworth Road (MP 43.0) to east of IL 173 (MP 44.6), a distance of 1.6 miles.
- Required New Siding #4 (off #2 Main) – construct from 1.4 miles west of US 41 (MP 40.5) to 0.2 miles east of Wadsworth Road (MP 42.5), a distance of 2.0 miles. A siding was previously located along most of this distance but has been removed. Most of the required subgrade is in place, so construction costs would be reduced and the potential for environmental impacts would be minimal.
- Optional New Siding #5 (off #1 Main) – a potential location for a third westbound siding is east of Wadsworth Road, from MP 40.5 to MP 42.5, a distance of 2.0 miles.
- Optional New Siding #6 (off #2 Main) – a potential location for a third eastbound siding is west of Wadsworth Road, from MP 43.0 to MP 45.0, a distance of 2.0 miles.

Limitations to placing new continuous sidings or a third main track at other locations result from various obstacles. These include existing bridges at IL 137, IL 120, Washington Street, IL 132, Old Grand Avenue, and US 41; and major wetlands and floodplains between MP 33.8 and MP 36.6 and between MP 43.1 and MP 44.1. These circumstances also preclude adding a continuous third main track to this segment without significant capital costs.

Sidings #3 through #6 would provide efficient layover facilities for freight trains by allowing trains to remain intact. The east-end sidings (#1 and #2), given the current roadway network, would be more limited in that longer trains would need to be split at Atkinson Road so that the at-grade crossing is not blocked. However, the recommended proposal to construct a new grade separation at Atkinson Road would eliminate this problem. In future Study phases, capacity and operations would be computer-simulated for freight and commuter operations. At this point in time, the precise location of future passing sidings is less important than having a general number and length of sidings to contribute to the development of order-of-magnitude capital cost estimates.

Near Sidings #1 and #2, platforms are proposed on the outside of both CP Main Line tracks, which would conflict with the current sidings that are located between MP 32.3 and MP 34.3 (off #1 Main) and between MP 32.4 and 33.8 (off #2 Main). Using the sidings for the station stops is not an option, since the storage function of the sidings would be lost.

For Siding #1 it is possible to relocate the siding further east to provide an offset from the Main Line of 26 feet (minimum). The east siding could therefore be shifted east (by 12 to 15 feet) between IL 176 and Atkinson Road to accommodate the westbound Metra platform. The siding further west (where Abbott receives coal deliveries) would be unaffected by this change. Siding #2 must be relocated 0.6 miles west in order to accommodate access for the eastbound Metra platform. The siding is currently 1.4 miles in length, and sufficient space is available east of the IL 137 bridge to shift the siding north by 0.6 miles. This shift would place the siding completely to the west of the proposed station and eliminate any conflict. A concern is that ADID wetlands are mapped adjacent to the tracks in the area within 0.6 miles of IL 137. A field review of the area would need to be undertaken in Phase II to determine whether any wetlands might be affected by the addition of a siding in this area.

5.1.7 Structures, Grade Separations and Roadway Improvements

No rehabilitation or widening of existing railroad structures appears to be necessary for the proposed service. There are no other locations along the eastern portion of the Wadsworth Extension where new sidings could be installed without major bridge reconstruction. Because increased usage levels for the east-end sidings would be expected, the construction of an overpass for Atkinson Road would provide substantial operational advantages and should be considered further. The 1996 average daily traffic along Atkinson Road was 1,850 vehicles. Traffic volumes at other at-grade crossings are higher: 11,600 at Wadsworth Road, 9,600 at IL 173, and 3,000 at Russell Road. However, grade separations at these locations do not appear to be warranted as part of project implementation, since delays to roadway traffic would be minimal over the course of each day.

5.1.8 At-Grade Crossings

All existing roadway crossings have crossbucks, bells, flashing lights, and gates. Rehabilitation of the crossings may be performed. At-grade crossing improvements would be to the signal system and/or roadway only. None of the proposed new passing sidings would cross a roadway, so the at-grade crossings would still have only two tracks.

5.1.9 Signals

Because Amtrak currently operates passenger service on the line and CTC is present throughout, extensive signal system improvements should not be necessary. It is assumed that the control points and intermediate signals are in good working order and are sufficient to accommodate the increased service levels. Included as part of the CTC are switch machines, circuit microprocessor controls, radio-controlled data systems, electrically coded track circuits, underground cable, control signals, signal relays, and signal instrument housings. The following items are included in the cost estimates:

- New CTC control points for new sidings, Main Line crossovers, and the coach yard
- Modification of existing signalized sidings to CTC control points

5.2 ROLLING STOCK

Six train sets, consisting of six diesel locomotives and 36 bi-level coaches, would be required to operate the Wadsworth Extension service. This need is based on the preliminary draft train schedule and includes provision for a spare train set. However, three of the necessary trains would be those that are currently stored at the rail yard in Fox Lake, which could effectively be relocated onto the extension while serving the same MD-N stations east of Rondout. New rolling stock requirements would therefore be limited to only half of the equipment necessary to run the operation.

Conventional rolling stock, with diesel locomotives and gallery cars like those that Metra presently uses, would be utilized. All new passenger coaches are designed to be ADA-compatible. Each gallery car can accommodate 140 to 144 passengers. New passenger coaches,

including cab cars, have an average cost of about $2 million per car. The approximate cost of a new diesel-powered locomotive is $2.4 million.

5.3 ENVIRONMENTAL IMPACTS

5.3.1 Wetlands

A preliminary assessment of potential wetland impacts was performed by reviewing Lake County Wetland Inventory (LCWI) maps. Appendix B lists and illustrates all wetlands included in the LCWI along the proposed Wadsworth Extension. At this point of the Study, exact impacts to any wetlands identified on the LCWI maps cannot be determined, since the station and yard locations and passing siding locations shown (as well as their respective lengths and sizes) are very preliminary in nature. Also, there could be additional wetlands beyond those shown on the LCWI maps. Appendix F includes the wetland inventory maps for each potential station site, Appendix G includes the wetland maps for the potential coach yard site, and Appendix H includes the wetland maps for the potential new passing track siding locations.

During later phases of this project, after specific locations of stations, sidings, and any other improvements are finalized, field review and delineation of any wetlands at or near these locations would be performed. Any proposed improvements that lie within a wetland area would be evaluated by first trying to relocate the improvement to avoid impacts to the wetland, secondly by attempting to minimize any impact, and lastly by mitigating any impacts to wetlands.

5.3.2 Floodways/Floodplains

As with wetlands, a very preliminary assessment of potential floodway and/or floodplain impacts was performed based on review of the Floodway maps and the Flood Insurance Rate Maps (FIRM). Appendix F includes floodway/floodplain maps for each of the potential station sites, Appendix G includes these maps for the potential coach yard site, and Appendix H includes these maps for the potential new passing siding locations. As with the wetlands in this Phase I Study, exact impacts to any floodways/floodplains identified on the Floodway or FIRM maps cannot be determined, since the potential station and yard locations and sizes, as well as passing siding locations, are very preliminary in nature.

During later phases of this project, after specific locations of potential stations, sidings, and any other improvements are identified, determination of floodway/floodplain elevations at or near these locations would be performed to determine any potential encroachments into the floodway/floodplain. Any proposed improvements that lie within a floodway/floodplain area would be evaluated by first trying to relocate the improvement to avoid impacts, secondly by attempting to minimize any impact, and lastly by mitigating any impacts to the floodway/floodplain.

5.3.3 Other Environmental Issues

As mentioned previously, a consideration in the final location of the coach yard site would be the possibility of noise impacts for residences within 2,000 feet of the yard. No other environmental

issues were identified during the cursory review of maps or during site visits. A full examination of all environmental issues would be performed as part of future Phase II Studies.

5.3.4 Station and Yard Location Potential Impacts

The following key issues have been noted relating to the development of the identified potential station sites and yard location:

- The Green Oaks/Abbott Labs site has potential floodplain, floodway, and wetland involvement, primarily due to the presence of the Middle Fork of the North Branch of the Chicago River running through the site.
- The City of Waukegan (Lakehurst) site has no identified issues.
- The Village of Gurnee site has potential wetland and floodplain involvement, primarily north of US 41, due to the presence of the Des Plaines River floodplain.
- The IL 173 site has no identified issues.
- The coach yard site north of IL 173 near Russell has possible wetland and floodplain involvement, which may be avoided by its design, due to the presence of the Des Plaines River Tributary at the western end. There is also a potential noise issue for nearby homes.

5.4 CAPITAL COST ESTIMATES

The estimated order-of-magnitude cost for the Wadsworth Extension is $128.4 million, as detailed in Table 5.4-1. Land acquisition costs are not included. Potential costs for operating and maintaining the new extension are also not included. In addition, there has been no capital cost estimate for potential required improvements to the physical plant east of Rondout. This would be a topic for further Phase II Studies. Some of the important assumptions that have been incorporated into the capital cost estimates are described below.

Sidings. All of the sidings discussed in Chapter 5 are included in the cost estimate, including those that are identified as "optional". (Relocation of Siding #2, to the north between Atkinson Road and IL 137, is also included.) A major portion of the track improvement costs can be attributed to the siding improvements.

Turnouts and Crossovers. New turnouts allowing for faster speeds when diverging would be needed to serve the new and reconstructed sidings. The total traffic on the line is expected to be 30 freight trains, 16 Amtrak trains and 24 Metra trains. Based on this level of traffic, the assumption has been made that substantial flexibility will be required.

Signals. The new track signals and signal modifications identified in the estimate are necessary to accommodate the new and relocated sidings and yard. A total of eight new single-directional signal and modifications to nine existing signals are identified.

Commuter Stations. Stations are assumed at Green Oaks/Abbott Labs, Waukegan, Gurnee, and IL 173. All stations are assumed to include a large station building of about 1,100 square feet and a pedestrian underpass for access between platforms, as well as an access drive and a parking lot to accommodate approximately 500 cars (about 5 acres at start-up).

Green Oaks/Abbott Labs MD-N Reverse-Peak Service. This station could have platforms on both the CP Main Line and the J-Line (Wadsworth Extension and the MD-N Line). Some MD-N Line trains that presently turn back ("flip") at Deerfield in the a.m. could be extended to the new station on the J-Line by installing a second main track west of Rondout. The estimated cost for installing the second track off the J-Line at the eastern end and extending west to a point east of I-94 are described separately in the cost table. (Note the track bed already exists at this location and is presently occupied by a storage track.) Both ends would require remote-controlled turnouts, with interlocked signalization. The cost estimate assumes that the existing single-track connection to the J-Line would remain as is, with the turnout to the new siding occurring just west of the connection. Metra's Transportation and Engineering Departments have strongly suggested that a new double-track connection would be required for more efficient operation of the new facility. The additional cost for track and signal for a double-track connection is not included, as it was not anticipated until very late in the Study.

Roadway Improvements and Structures. In order to provide adequate access to the combined Green Oaks/Abbott Labs station, Bradley Road would be extended from IL 176 to Atkinson Road. Grade separations for the two-lane Bradley Road extension, over both the MD-N Line and the CP Main Line are included. Access to the station would therefore be provided from both Atkinson Road and Bradley Road. Because clearance over the railroad track would be approximately 23 feet between top of rail and bottom of structural beam, a high embankment will be required along most of the length of the Bradley Road extension, increasing the construction costs. New traffic signals are included at the relocated Atkinson Road intersection with Bradley Road extended, which would be directly across from the station access road.

Coach Storage Facility. An overnight storage yard for train equipment would be constructed near Russell. The crew welfare building would be about 11,000 square feet in size. Only light maintenance (car cleaning) would be performed at the yard location. The yard could potentially accommodate up to seven train sets, each consisting of a single locomotive and six passenger coaches.

Rolling Stock. Three new train sets are included, each consisting of one locomotive and six passenger coaches. The three additional required trains would be relocated from the MD-N Line yard in Fox Lake.

Contingencies. The estimate includes a 30 percent general contingency, since no facilities have been designed or engineered, even conceptually. The estimate also includes a standard 12 percent allowance for management of the project's design, engineering, and construction. The contingencies apply to all items other than rolling stock. Costs are in year 2001 dollars.

TABLE 5.4.1
Capital Cost Estimates for CP Main Line Wadsworth Extension

Item	Unit	Unit Cost	Quantity	Cost
TRACK WORK FOR 6 SIDINGS (S) AND MAIN LINE (M)				
Upgrade Existing Track/New Track Installation				
Track removal (S)	lf	$30	14,400	$432,000
Install subballast, ballast, ties, 132# CWR, and OTM (S)	lf	$180	35,400	$6,372,000
Install 132# CWR and OTM (S)	lf	$95	13,800	$1,311,000
Install #20 turnout (S)	ea	$150,000	8	$1,200,000
Remove existing turnout (S)	ea	$20,000	4	$80,000
Tie replacement/installation (M & S)	ea	$80	16,500	$1,320,000
Track surfacing (ballast placement) (M & S)	lf	$3.50	29,500	$103,300
Ballast undercutting (M & S)	lf	$50	29,500	$1,475,000
Track salvage value (80% of track removed) (S)	lf	$10.50	11,500	($120,800)
Track scrap value (20% of track removed) (S)	lf	$0.50	2,900	($1,500)
Turnout Scrap (S)	ea	$500	4	($2,000)
OTM scrap value (S)	lf	$0.05	14,400	($700)
Fill (S)	cy	$15	46,900	$703,500
Ditch cutting/cleaning (M)	lf	$1.50	141,500	$212,300
Subtotal, Track Work for 6 Sidings and Mainline =				**$13,084,100**
SIGNALS FOR 6 SIDINGS				
Signal System				
Interlocking installation	ea	$1,500,000	8	$12,000,000
Modify existing signals	ea	$100,000	9	$900,000
Subtotal, Signals for 6 Sidings and Mainline =				**$12,900,000**
TRACK WORK FOR MD-N TURNBACK				
Upgrade Existing Track/New Track Installation				
Track removal	lf	$30	1,400	$42,000
Install 132# CWR and OTM	lf	$95	1,400	$133,000
Install #20 turnout	ea	$150,000	2	$300,000
Remove existing turnout	ea	$20,000	1	$20,000
Tie replacement/installation	ea	$80	800	$64,000
Track surfacing (ballast placement)	lf	$3.50	1,400	$4,900
Ballast undercutting	lf	$50	1,400	$70,000
Track salvage value (80% of track removed)	lf	$10.50	1,100	($11,600)
Track scrap value (20% of track removed)	lf	$0.50	300	($200)
Turnout Scrap	ea	$500	1	($500)
OTM scrap value	lf	$0.05	1,400	($100)
Ditch cutting/cleaning	lf	$1.50	2,900	$4,400
Subtotal, Track Work for MD-N Turnback =				**$625,900**
SIGNALS FOR MD-N TURNBACK				
Signal System				
Signal installation, single-directional	ea	$150,000	2	$300,000
Modify existing signals	ea	$100,000	2	$200,000
Subtotal, Signals for MD-N Turnback =				**$500,000**

TABLE 5.4.1
Capital Cost Estimates for CP Main Line Wadsworth Extension

Item	Unit	Unit Cost	Quantity	Cost
COMMUTER STATION FACILITIES[1]				
Commuter stations with park-and-ride[2]	ls	$18,774,000	4	$18,774,000
Grade separation of Atkinson Rd at CP Main Line	ls	$829,000	1	$829,000
Grade separation of Bradley Rd extension at MD-N Line	ls	$480,000	1	$4,800,000
Bradley Road extension	ls	$3,441,500	1	$3,441,500
Signalization of Atkinson Rd/Bradley Rd extension	ea	$120,000	1	$120,000
Signalization of Skokie Highway (US 41) and Kilbourne Rd	ea	$120,000	1	$120,000
Subtotal, Commuter Station Facilities=				**$28,084,500**
STORAGE AND MAINTENANCE FACILITIES				
Rail Facilities				
Russell Yard (layover facility)	ls	$4,784,600	1	$4,784,600
Subtotal, Storage and Maintenance Facilities =				**$4,784,600**
ROLLING STOCK				
Conventional Train Sets[3]				
Locomotive	ea	$2,400,000	3	$7,200,000
Passenger coach	ea	$2,000,000	18	$36,000,000
Subtotal, Conventional Rolling Stock =				**$43,200,000**
Capital Improvements Subtotal =				$103,179,100
30% Contingency[4] =				$17,993,700
12% Preliminary Engineering, Design, & Construction Management[4] =				$7,197,500
Capital Improvements Total Cost[5] =				**$128,400,000**

NOTES :

1. Costs do not include land acquisition
2. Estimated costs were based on stations built for Metra's NCS. Estimated costs include paved parking lots (parking spaces, drive aisles, access road, parking lot striping, signage, curb and gutter, lighting, and drainage), depot facilities, boarding platforms, and pedestrian underpasses (as necessary). In general, in assessing the estimated costs for the station sites, a station was assumed to consist of 500 parking spaces, a 1,100 sf depot, two 635 lf platforms, and a pedestrian underpass. Site specific factors will be considered in future study phases.
3. For this study, a traditional train set is assumed to consist of one locomotive, five passenger coaches, and one cab car.
4. Not applied to rolling stock.
5. These costs are estimates only based on existing and projected future conditions. Actual freight traffic and operations at the time of design may affect these estimates.

5.5 GREEN OAKS/ABBOTT LABS INTERIM STATION

Earlier discussions talked about implementing a new station on the Milwaukee District-North Line as an interim step while studies of the entire proposed Wadsworth Extension are pursued. (Such a station in Green Oaks was listed in FAST.) Access to the Green Oaks/Abbott Labs site south of Atkinson Road and north of the MD-N junction (compass direction) presents unique issues. From the outset, there were several basic options to consider as described in the following paragraphs. Options available for the Abbott station site access include:

1. Providing access only from IL 176 with an at-grade crossing of the MD-N Line.
2. Providing access only from Atkinson Road.
3. Providing access from both IL 176 and Atkinson Road with grade separations over both the MD-N Line and the CP Main Line.

Option 1. Green Oaks has requested that access be provided from IL 176, preferably along an extension of Bradley Road, in order to avoid traffic volume increases along Atkinson Road. The least-cost design for Bradley Road access from IL 176 involves an additional at-grade crossing of the MD-N Line and a long access drive (approximately 0.7 miles long from IL 176 to the parking lot). This would avoid the need for bridges by routing the access road to avoid the 10-acre pond. However, the provision of a new at-grade crossing at this location could conflict with opportunities to flip some peak-period trains, and would also present new safety concerns.

Option 2. Providing access only from Atkinson Road would allow for minimization of floodplain impacts and would not require any structures or a new crossing of the MD-N Line. Traffic levels would increase along Atkinson Road adjacent to the station. The related recommendation for an Atkinson Road grade separation becomes more attractive with full access to the station from the north. [As originally envisioned by LCDOT, a proposed Bradley Road extension would cross the MD-N Line at-grade, cross the pond, and intersect with Atkinson Road near the CP Main Line grade crossing. If that Bradley Road extension to Atkinson Road were pursued, access to the station would necessarily be from both Atkinson Road and IL 176, rather than only from IL 176.]

Option 3. Grade separations of both the MD-N Line and the CP Main Line and a connecting Bradley Road Extension would provide substantial operational advantages. The upgraded existing storage siding could be utilized to flip some peak-period trains. The higher cost of providing the MD-N Line grade separation comes from spanning both the tracks and the pond for the through road, not just for station access alone. Some floodplain and wetland impacts would be unavoidable. If grade separation is provided with a connection to Atkinson Road, traffic volumes along the extended Bradley Road and Atkinson Road could be expected to be substantial, since a new route connecting IL 176 and IL 43 would be created. This new situation would also benefit public safety and specifically the Libertyville Fire Protection District, who view this new roadway as a way to reduce emergency travel times to the office developments at IL 60 and Bradley Road. This option is identified as preferred.

The estimated cost for a Green Oaks/Abbott Labs station, as a stand-alone station, on the MD-N Line is $17.1 million. This cost includes:

- Track and signal improvements on and into the current storage-track location, including interlocked turnouts at both ends
- Commuter station facilities, including access road, parking lot, sidewalk, depot, platforms, and pedestrian underpass on the MD-N Line
- Bradley Road extension north from IL 176 to connect with Atkinson Road, grade separations at Bradley Road/MD-N and Atkinson Road/CP Main Line, and traffic signals at new intersection with Atkinson road going west

Items not included: sidewalk, depot, platforms, and pedestrian underpass on the CP Main Line, land acquisition costs, and operating costs. Early stages of Phase II Studies would determine if any additions to Metra's existing physical plant east of Rondout would be required. The existing infrastructure of the MD-N Line would be as much a part of the further studies as the proposed extension, since the additional trains will have a significant effect on current schedules and operations. Also, the utility or necessity of a double-track connection to the J-Line would be reviewed, including a tentative design and order-of-magnitude capital cost estimate. Any new requirements could increase the cost estimate for this interim station and would be further refined in the site-specific studies in Phase II.

6.0 POTENTIAL RIDERSHIP

The Northeastern Illinois Region in general and the collar counties in particular are experiencing significant growth in population and employment. The population of the six-county Region grew by 11.4 percent during the 1990s, while employment increased by 15.5 percent. The corresponding growth of population and employment in Lake County were 24.8 percent and 43.7 percent, respectively. The growth rates were even higher in the outer sections of Lake County. Exhibits showing the change in population and employment for Lake County and its adjacent areas as well as population and employment forecasts generated by the Northeastern Illinois Planning Commission (NIPC) by quarter-section (quarter square miles) can be found in Appendix J.

The Metra feasibility study of the Wadsworth Extension reflects the magnitude and robustness of this growth. Considerable growth has occurred and is forecasted to continue in the vicinity of the proposed extension. In addition, many of the areas in Lake County that already are served by existing commuter rail are forecasted to continue their growth. This growth will produce a commensurate increase in Metra rail ridership.

The basic questions and issues addressed by this Chapter are:

- Determine the number of riders who would be attracted to the Wadsworth Extension;
- Decide whether or not the existing rail lines could accommodate the increased ridership; and
- Describe the interrelationship between the existing rail line and the proposed extension.

Answering the first of these three questions establishes the feasibility of the rail extension. Addressing the other two concerns is intended to measure the negative impact, if any, of the proposed extension on Metra's existing service and its approved planned improvements.

6.1 HISTORICAL PERSPECTIVE

Traditionally, commuter rail serves long work trips to highly concentrated job centers. The longer the work trip, the greater the probability that the trip will use rail instead of car as its primary mode. Commuters boarding in the a.m. access stations by walking, by car or by feeder bus. The number of housing units within walking distance of stations and the number of commuter parking spaces at the stations are major determinants of a.m. boardings. At the a.m. alighting end of the trip, a high job-density center accessible by walking or feeder transit is an important factor in attracting commuter ridership. Accordingly, the majority of Metra rail riders traditionally have been suburban commuters to the Chicago Central Area (CCA).

The emergence of dense suburban job centers in northeastern Cook and eastern Lake Counties has attracted non-CCA Metra commuters. Stations with good reverse feeder transit or employment centers within walking distance, such as Lake-Cook Road and Evanston-Davis Street, are very successful examples of such centers. These stations are attracting both inbound and outbound commuters who are alighting during the a.m. peak period. However, a.m. peak work trips to the Chicago CCA (and the corresponding p.m. peak return trip) remain the largest component of rail ridership. System-wide, approximately nine percent of Metra's ridership is

non-CCA-work oriented. The balance, almost 91 percent, constitute work trips to the CCA. However, both the UP-North and the Milwaukee District-North Lines have much higher non-CCA-work trips (20.0 percent and 20.5 percent, respectively). The percentage of non-CCA-work trips on all Metra lines is shown on Table 6.1-1.

Table 6.1-1 Percentage of Non-CCA-Work Trips

Metra Line	Percent
Milwaukee District – North	20.5%
Union Pacific-North	20.0%
North Central Service	12.4%
Union Pacific – Northwest	13.2%
Milwaukee District – West	11.9%
Union Pacific – West	5.9%
Burlington Northern Santa Fe	4.0%
Heritage Corridor Service	0.1%
SouthWest Service	0.5%
Rock Island District	1.2%
Metra Electric District	7.1%
South Shore	8.9%

Another factor influencing boardings and alightings during the a.m. peak period is the household/job relationship (ratios) in the general vicinity of stations. The areas with job deficits usually generate more boardings toward the CCA or other job centers. Areas with excess jobs (labor deficit) tend to generate fewer boardings toward the CCA and other job centers and more alightings destined to the nearby jobs. Appendix J contains maps depicting the a.m. peak inbound and outbound boardings and alightings at Metra stations superimposed on 1995 job/household balance.

6.2 FORECAST METHODOLOGY

The forecast methodology employed in this analysis is a three-step process; these steps include:

- A trip generation/distribution component which forecasts the number of home-based work trips generated by each planning zone in Lake County with a destination in the Chicago Central Area. This step forecasts all work trips regardless of mode of travel to the Chicago Central Area.
- A modal-split model, applied to the data generated in step 1, to forecast: first, total commuter rail trips for each planning zone to the Chicago Central Area; and second, to identify the boarding station.
- Based on relationships derived from the 1999 Metra boarding statistics for stations of similar characteristics to those proposed, the a.m. peak inbound alightings are forecast first; and then, the a.m. peak outbound boardings and alightings at all Lake County stations. Finally, midday and return boardings are forecasted and totaled to generate all-day boardings and alightings.

6.2.1 Trip Generation/Distribution Model: Work Trips to Chicago Central Area

Work trips from suburban areas to the Chicago Central Area represent a special set of work trips influenced, significantly, by the availability and frequency of commuter rail. Research for other commuter rail corridors has confirmed this hypothesis. The first step in the forecasting process for the Wadsworth Extension was to test the various variables which may influence the number of work trips originating from each planning zone in Lake County with a Chicago Central Area destination. The variables examined included:

- Total work trips generated by the planning zone
- Auto travel time to the CCA
- Metra rail time to the CCA
- Access time to the nearest station
- Number of Metra stations in the Planning Zone
- Number of a.m. trains to the CCA
- Total employment within the planning zone
- Excess jobs within the planning zone.

The planning zones selected for analysis were those used by the Northeastern Illinois Planning Commission (NIPC) for its socio-economic forecasting model. There are 42 such zones in Lake County; with few exceptions, each of these zones encompasses a nine-square-mile area. The use of smaller zones might have necessitated aggregating employment or excess jobs data in surrounding zones; larger zones would have obscured the differentiation between zones with rail service and those without.

The above-listed variables were tested against the 1999 work trips to the Chicago Central Area as estimated by the Chicago Area Transportation Study. Each variable was tested individually, in a group, and through a step-wise regression process. Based on this analysis, the following variables and equations were selected:

Work Trips to Chicago Central Area =
Constant (= 2,048)
+ .11762 x total work trips generated within the zone
+ 98.3 x number of a.m. peak trains to CCA
- 24.1 x auto travel time to CCA in minutes
- .03625 x employment within the zone

The R-square for the above equation is .84, implying that the equation explains 84 percent of the 1999 observed conditions. The statistical "P" tests for the first three variables were less than .002 and for the last variable (employment within the zone) was .08, implying that the statistical relationships are neither accidental nor random. Finally, the signs (+ or -) are reasonable: more originating work trips and more trains would generate more trips to the Chicago Central Area, whereas longer travel time by auto and more employment opportunities nearby would generate fewer trips.

The above equation was applied to four service development scenarios:

- Alternative 1 - Do Nothing: No Wadsworth Extension and no additional station on existing Milwaukee District-North Line.
- Alternative 2 - Full Build Including a New MD-N Line Green Oaks/Abbott Labs Station: Wadsworth Extension with four stations; the Green Oaks/Abbott Labs Station having two sets of platforms (one on the Extension; the other on the existing line).
- Alternative 3 - Full Build: Wadsworth Extension with four stations; however, the Green Oaks/Abbott Labs Station has one set of platforms only (on the Extension).
- Alternative 4 - Phase I Development: No Wadsworth Extension, but a Green Oaks/Abbott Labs Station added with one set of platforms located on the existing Milwaukee District-North Line.

The number of total work trips generated by each planning zone are from the Chicago Area Transportation Study (CATS) 2020 Regional Transportation Plan (RTP). The auto travel times are those generated by the Lake County Transportation Improvement Plan, assuming full implementation of the 2020 RTP (including construction of the Illinois 53 Extension).

Tables 6.2.1-1 through 6.2.1-4 present the total number of trips generated by each of the 42 planning zones in Lake County. Figure 6.2.1-1 shows the planning zones. This exhibit highlights the four zones significantly impacted by the Wadsworth Extension, as well as four comparable zones on the existing Milwaukee District-North Line selected for comparative analysis.

6.2.2 Modal Split of Work Trips to Chicago Central Area (AM Peak Inbound Boardings)

The modal-split model used to disaggregate the forecasts presented in the preceding Tables 6.2.1-1 through 6.2.1-4 is that used by the Chicago Area Transportation Study for its 2020 Regional Transportation Plan. The model was used twice: first, to disaggregate rail trips from auto trips; second, to assign commuter rail trips to specific stations. The two-step modal split was first applied to 1999 conditions to ensure that its results closely matched Metra's boarding statistics by station. Minor adjustments were incorporated into the model as a result of this comparison.

The use of the two-step approach allows for determining the magnitude of shifts in boardings from existing stations to the new proposed stations. These procedures also allow for comparing the growth that would occur assuming no rail extension or new stations. Through such comparisons, conclusions can be drawn as to whether the existing system does have the capacity to accommodate the forecasted growth in rail ridership which would occur due to the population growth and increased highway congestion. It should be noted that all forecasts assume no capacity constraints (including parking) at any of the stations or trains.

Table 6.2.1-1 2020 All Work Trips to Chicago Central Area
Alternative 1 – Do Nothing

From DEZ		1999 AM Work Trips All Destinations	1999 AM Work Trips Chicago Central Area	2020 AM Work Trips All Destinations	2020 AM Work Trips Chicago Central Area
401		4,039	71	5,929	94
402		564	1	2,035	1
403		3,847	13	8,415	354
404		3,792	33	7,479	49
405		2,698	34	6,460	155
406	*	1,918	1	3,634	1
407		7,110	221	11,353	304
408		8,871	229	11,228	277
409	**	12,166	1,121	13,957	1,264
410		6,609	133	10,475	420
411		7,183	203	11,274	300
412	**	7,119	768	16,587	1,735
413	**	9,703	943	14,093	1,288
414	*	6,120	17	8,485	22
415		3,923	12	7,029	17
416	*	6,190	137	11,011	546
417		6,845	130	10,835	407
418		14,089	367	17,080	431
419		18,702	2,150	19,635	2,252
420		7,890	59	12,719	141
421		2,504	10	6,566	571
422		778	4	3,314	7
423		6,639	183	11,432	610
424		895	6	2,625	11
425	*	2,311	53	7,193	327
426	**	6,575	1,739	7,105	1,868
427		2,346	57	3,989	80
428		11,138	538	17,268	1,381
429		27,528	3,888	28,876	4,066
430		7,211	1,499	7,563	1,569
431		6,748	118	8,358	141
432		2,771	9	3,773	12
433		4,232	11	5,635	14
434		3,160	29	4,184	45
435		5,956	50	7,320	59
436		2,989	333	5,001	466
437		7,925	590	10,377	897
438		6,950	435	8,884	579
439		9,800	384	11,823	546
440		10,116	1,547	12,167	1,808
441		11,480	2,187	12,525	2,369
442		9,514	762	11,222	878
Lake County		288,939	21,071	406,906	28,363
Extension Zones *		16,539	208	30,322	896
Comparable Zones **		35,563	4,571	51,742	6,156

Table 6.2.1-2 2020 All Work Trips to Chicago Central Area Alternative 2 – Full-Build (Including a New MD-N Line Green Oaks/Abbott Labs Station)

From DEZ		1999 AM Work Trips All Destinations	1999 AM Work Trips Chicago Central Area	2020 AM Work Trips All Destinations	2020 AM Work Trips Chicago Central Area
401		4,039	71	5,929	94
402		564	1	2,035	1
403		3,847	13	8,415	354
404		3,792	33	7,479	49
405		2,698	34	6,460	155
406	*	1,918	1	3,634	38
407		7,110	221	11,353	304
408		8,871	229	11,228	277
409	**	12,166	1,121	13,957	1,264
410		6,609	133	10,475	420
411		7,183	203	11,274	300
412	**	7,119	768	16,587	1,735
413	**	9,703	943	14,093	1,288
414	*	6,120	17	8,485	221
415		3,923	12	7,029	17
416	*	6,190	137	11,011	841
417		6,845	130	10,835	407
418		14,089	367	17,080	431
419		18,702	2,150	19,635	2,252
420		7,890	59	12,719	141
421		2,504	10	6,566	571
422		778	4	3,314	7
423		6,639	183	11,432	610
424		895	6	2,625	11
425	*	2,311	53	7,193	1,015
426	**	6,575	1,739	7,105	1,868
427		2,346	57	3,989	80
428		11,138	538	17,268	1,381
429		27,528	3,888	28,876	4,066
430		7,211	1,499	7,563	1,569
431		6,748	118	8,358	141
432		2,771	9	3,773	12
433		4,232	11	5,635	14
434		3,160	29	4,184	45
435		5,956	50	7,320	59
436		2,989	333	5,001	466
437		7,925	590	10,377	897
438		6,950	435	8,884	579
439		9,800	384	11,823	546
440		10,116	1,547	12,167	1,808
441		11,480	2,187	12,525	2,369
442		9,514	762	11,222	878
Lake County		288,939	21,071	406,906	29,581
Extension Zones *		16,539	208	30,322	2,114
Comparable Zones **		35,563	4,571	51,742	6,156

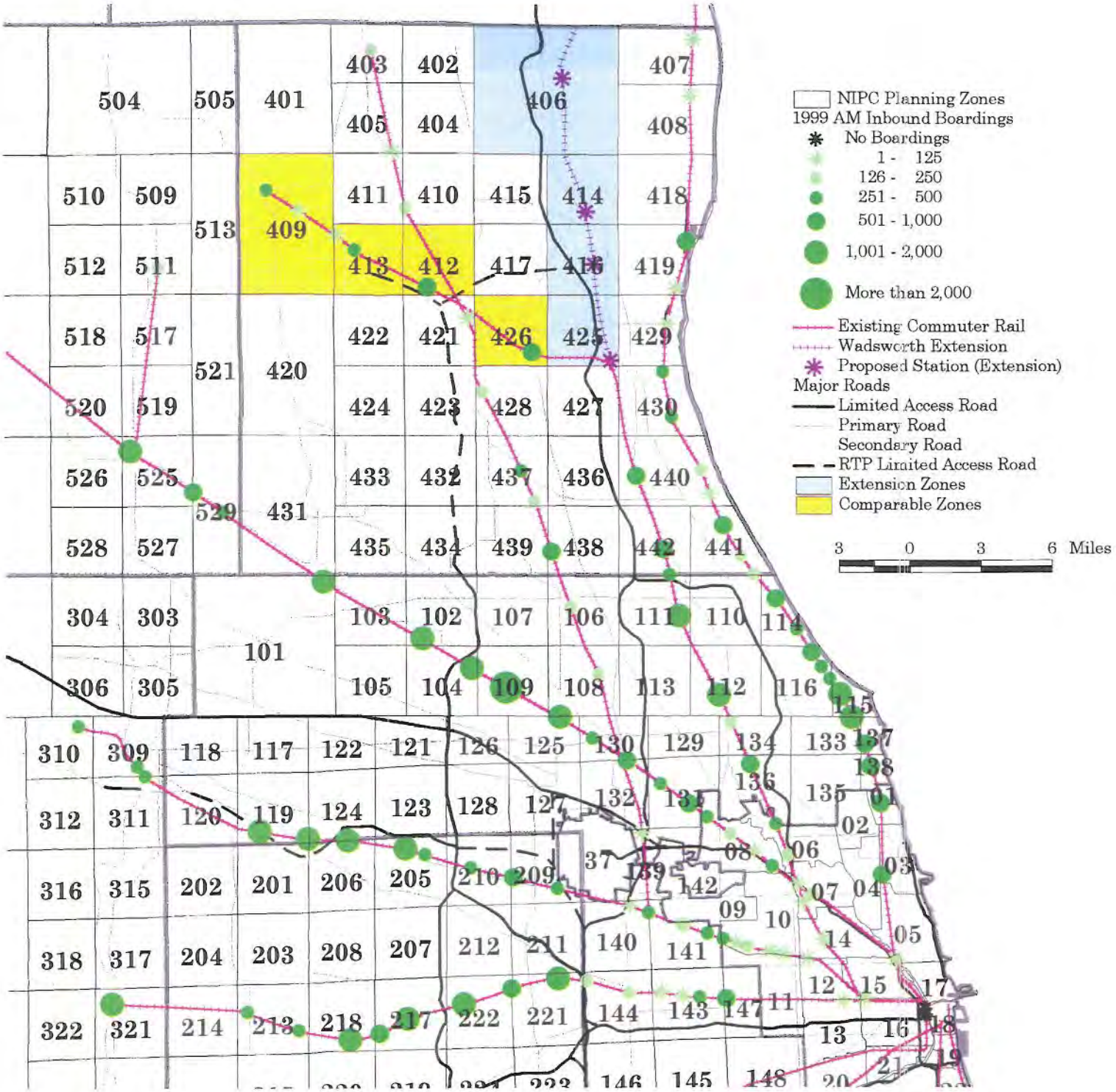
Table 6.2.1-3 2020 All Work Trips to Chicago Central Area Alternative 3 – Full-Build (without a new MD-N Line Green Oaks/Abbott Labs Station)

From DEZ		1999 AM Work Trips All Destinations	1999 AM Work Trips Chicago Central Area	2020 AM Work Trips All Destinations	2020 AM Work Trips Chicago Central Area
401		4,039	71	5,929	94
402		564	1	2,035	1
403		3,847	13	8,415	354
404		3,792	33	7,479	49
405		2,698	34	6,460	155
406	*	1,918	1	3,634	38
407		7,110	221	11,353	304
408		8,871	229	11,228	277
409	**	12,166	1,121	13,957	1,264
410		6,609	133	10,475	420
411		7,183	203	11,274	300
412	**	7,119	768	16,587	1,735
413	**	9,703	943	14,093	1,288
414	*	6,120	17	8,485	221
415		3,923	12	7,029	17
416	*	6,190	137	11,011	841
417		6,845	130	10,835	407
418		14,089	367	17,080	431
419		18,702	2,150	19,635	2,252
420		7,890	59	12,719	141
421		2,504	10	6,566	571
422		778	4	3,314	7
423		6,639	183	11,432	610
424		895	6	2,625	11
425	*	2,311	53	7,193	622
426	**	6,575	1,739	7,105	1,868
427		2,346	57	3,989	80
428		11,138	538	17,268	1,381
429		27,528	3,888	28,876	4,066
430		7,211	1,499	7,563	1,569
431		6,748	118	8,358	141
432		2,771	9	3,773	12
433		4,232	11	5,635	14
434		3,160	29	4,184	45
435		5,956	50	7,320	59
436		2,989	333	5,001	466
437		7,925	590	10,377	897
438		6,950	435	8,884	579
439		9,800	384	11,823	546
440		10,116	1,547	12,167	1,808
441		11,480	2,187	12,525	2,369
442		9,514	762	11,222	878
Lake County		288,939	21,071	406,906	29,188
Extension Zones *		16,539	208	30,322	1,721
Comparable Zones **		35,563	4,571	51,742	6,156

Table 6.2.1-4 2020 All Work Trips to Chicago Central Area
Alternative 4 – Phase I Development (No Wadsworth Extension - Only a New MD-N Line Green Oaks/Abbott Labs Station)

From DEZ		1999 AM Work Trips All Destinations	1999 AM Work Trips Chicago Central Area	2020 AM Work Trips All Destinations	2020 AM Work Trips Chicago Central Area
401		4,039	71	5,929	94
402		564	1	2,035	1
403		3,847	13	8,415	354
404		3,792	33	7,479	49
405		2,698	34	6,460	155
406	*	1,918	1	3,634	1
407		7,110	221	11,353	304
408		8,871	229	11,228	277
409	**	12,166	1,121	13,957	1,264
410		6,609	133	10,475	420
411		7,183	203	11,274	300
412	**	7,119	768	16,587	1,735
413	**	9,703	943	14,093	1,288
414	*	6,120	17	8,485	22
415		3,923	12	7,029	17
416	*	6,190	137	11,011	546
417		6,845	130	10,835	407
418		14,089	367	17,080	431
419		18,702	2,150	19,635	2,252
420		7,890	59	12,719	141
421		2,504	10	6,566	571
422		778	4	3,314	7
423		6,639	183	11,432	610
424		895	6	2,625	11
425	*	2,311	53	7,193	868
426	**	6,575	1,739	7,105	1,868
427		2,346	57	3,989	80
428		11,138	538	17,268	1,381
429		27,528	3,888	21,348	4,066
430		7,211	1,499	7,563	1,569
431		6,748	118	8,358	141
432		2,771	9	3,773	12
433		4,232	11	5,635	14
434		3,160	29	4,184	45
435		5,956	50	7,320	59
436		2,989	333	5,001	466
437		7,925	590	10,377	897
438		6,950	435	8,884	579
439		9,800	384	11,823	546
440		10,116	1,547	12,167	1,808
441		11,480	2,187	12,525	2,369
442		9,514	762	11,222	878
Lake County		288,939	21,071	399,378	28,904
Extension Zones *		16,539	208	30,322	1,437
Comparable Zones **		35,563	4,571	51,742	6,156

FIGURE 6.2.1-1


NIPC Planning Zones
1999 AM Inbound Boardings
No Boardings
1 - 125
126 - 250
251 - 500
501 - 1,000
1,001 - 2,000
More than 2,000
Existing Commuter Rail
Wadsworth Extension
Proposed Station (Extension)
Major Roads
Limited Access Road
Primary Road
Secondary Road
RTP Limited Access Road
Extension Zones
Comparable Zones
3 0 3 6 Miles

6.2.3 Forecasting Other Boardings (Other than AM Peak Inbound)

As noted earlier, the Milwaukee District-North and the UP-North Lines have a high rate of a.m. peak non-Chicago Central Area (CCA) inbound alightings, as well as high outbound boardings and alightings. Lake-Cook Road and Evanston-Davis Street Stations on these two lines, respectively, have heavy non-CCA work-oriented activities. It should be noted that key characteristic of these two stations is an area of dense job concentration with either connecting reverse feeder bus service or within walking distance of the station. These same characteristics are also present or could be made present for at least two of the proposed stations on the Wadsworth Extension and to a lesser extent at a third station. Using the above-observed relationships between job concentrations and non-CCA-oriented trips, a.m. peak-hour alightings and outbound boardings and alightings were forecasted. With these forecasts, total a.m. peak statistics are complete.

The a.m. peak-period station activities are balanced by return statistics. However, the return trips are usually spread over a longer period, accounting for some midday and evening activities. The balance of the midday and evening activities is forecasted again on the basis of ratios derived from the comparable stations along the Milwaukee District-North and the UP-North and Northwest Lines.

Table 6.2.3-1 presents the a.m. peak, as well as the total daily, inbound and outbound boardings and alightings. Tables 6.2.3-2 through 6.2.3-5 present the 2020 forecasts from each of the four tested alternatives.

6.2.4 Impact of Alternative Airport Scenario on Ridership Forecast

The Regional Transportation Plan, as officially adopted in the Fall of 2000, includes two airport development scenarios with two separate socio-economic forecasts. They are:

- Existing Airport Investment Scenario (EAI):
  Accommodating all 2020 aviation activities at the existing airports, O'Hare and Midway

- South Suburban Airport Scenario (SSA):
  Developing the South Suburban Airport to accommodate aviation activities that cannot be accommodated, given the current runway capacities of O'Hare and Midway

The ridership forecasts employed in the chapter are based on the socio-economic forecasts of the Existing Airport Investment Scenario (EAI). This scenario was selected because it generates fewer riders on Metra rails from Lake County to the Chicago Central Area. Accordingly, if a rail extension can be justified using the lower ridership forecast, it can be justified under higher ridership.

There are two reasons why the South Suburban Airport Scenario would generate higher transit ridership from Lake County to the Chicago Central Area:

- There would be fewer job opportunities in Lake County. The NIPC socio-economic forecasts show that the South Suburban Airport Scenario would generate 9,285 fewer households and 38,524 fewer jobs in Lake County by 2020. These changes would cause the jobs deficit in Lake County to increase from 30,000 to 55,000. This change, alone, would increase work trips from Lake County to the Chicago Central Area by approximately four percent. The change in the socio-economic forecast does not cause changes in the modal shift percentages. Accordingly, the ridership forecasts would increase by the same four percent.

- There would be a better balance between jobs and households throughout the region. The South Suburban Airport Scenario would increase both the 2020 household and employment forecasts in the southern part of the region. However, the changes in jobs would be higher than the changes in households, causing the jobs deficit south of I-55 to decline from 45,000 in 1995 to 375,000 in 2020 (with the Existing Airport Investment Scenario, this jobs deficit would increase to 525,000). This decline in jobs deficit would reduce the pressure on jobs in the Chicago Central Area, increasing the job opportunities there for residents of the northern parts of the region.

It is not possible to estimate the impact of restructuring the region into a more balanced state on trips from Lake County to the CCA using sub-regional models used for this Study. Such impacts can be estimated only through the use of the CATS regional transportation model. Analysis of the CATS model results reveals that regional restructuring, resulting from the building of the South Suburban Airport, could increase work trips from Lake County to the CCA by as much as 28 percent or more. This high level of impact would occur if all jobs and occupation skills were uniform throughout the region. However, such uniformity does not exist and the occupation skills in Lake County are quite different than those in the southern part of the region.

In conclusion, the South Suburban Airport Scenario would generate a minimum of four percent additional Metra ridership from Lake County, based on job and population shifts in Lake County, and the maximum of 28 percent more than the O'Hare Scenario, based on regional balance issues. The most likely difference between these two scenarios would be 15-20 percent more under the South Suburban Scenario.

Table 6.2.3-1 Boarding and Alighting By Station - AM Peak and Total Daily Base Year (1999) Data

	1999 AM Peak				1999 Total Daily			
	Inbound		Outbound		Inbound		Outbound	
	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Wadsworth Branch Extension								
Wadsworth								
Gurnee								
Waukegan/Lakehurst								
Green Oaks/Abbott Labs								
Sub-Total								
Milwaukee District-North Line (Lake County Stations)								
Fox Lake	469	0	0	13	547	0	0	564
Ingleside	62	0	0	3	74	0	1	71
Long Lake	79	0	0	1	83	0	0	83
Round Lake	482	3	0	11	530	4	4	513
Grayslake	733	2	0	5	824	6	3	838
Libertyville	857	53	3	61	1,063	67	55	1,063
Green Oaks/Abbott Labs								
Lake Forest	574	19	2	74	697	27	20	726
Deerfield	890	44	3	154	1,178	47	101	1,164
Lake-Cook Road	462	195	1	314	906	215	222	934
Sub-Total	4,608	316	9	636	5,902	366	406	5,956
Total – MD-N (Lake Co.)	**4,608**	**316**	**9**	**636**	**5,902**	**366**	**406**	**5,956**

Table 6.2.3-2 Boarding and Alighting Forecasts By Station - AM Peak and Total Daily Alternative 1 - Do Nothing

	2020 AM Peak				2020 Total Daily			
	Inbound		Outbound		Inbound		Outbound	
	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Wadsworth Branch Extension								
Wadsworth	0	0	0	0	0	0	0	0
Gurnee	0	0	0	0	0	0	0	0
Waukegan/Lakehurst	0	0	0	0	0	0	0	0
Green Oaks/Abbott Labs	0	0	0	0	0	0	0	0
Sub-Total	0	0	0	0	0	0	0	0
Milwaukee District-North Line (Lake County Stations)								
Fox Lake	670	0	0	18	781	0	0	805
Ingleside	84	0	0	4	100	0	0	96
Long Lake	151	0	0	2	159	0	0	159
Round Lake	853	4	0	19	937	5	5	907
Grayslake	1,133	3	0	6	1,272	9	5	1,293
Libertyville	1,256	129	4	97	1,567	159	131	1,567
Lake Forest	762	37	3	99	926	51	38	965
Deerfield	1,020	80	4	279	1,466	84	181	1,448
Lake-Cook Road	462	326	2	393	998	360	372	1,029
Sub-Total	6,391	579	13	917	8,206	668	732	8,269
Total – MD-N (Lake Co.)	**6,391**	**579**	**13**	**917**	**8,206**	**668**	**732**	**8,269**

Table 6.2.3-3 Boarding and Alighting Forecasts By Station – AM Peak and Total Daily Alternative 2 – Full-Build (Including a New MD-N Line Green Oaks/Abbott Labs Station)

	2020 AM Peak				2020 Total Daily			
	Inbound		Outbound		Inbound		Outbound	
	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Wadsworth Branch Extension								
Wadsworth	79	0	0	9	100	0	0	103
Gurnee	180	0	0	160	397	0	0	409
Waukegan/Lakehurst	551	1	0	131	796	1	1	821
Green Oaks/Abbott Labs*	640	107	4	324	1,116	133	109	1,116
Sub-Total	1,450	108	4	624	2,409	134	110	2,449
Milwaukee District-North Line (Lake County Stations)								
Fox Lake	670	0	0	16	779	0	0	803
Ingleside	84	0	0	4	100	0	0	96
Long Lake	151	0	0	2	159	0	0	159
Round Lake	853	4	0	19	937	5	5	907
Grayslake	1,067	3	0	6	1,198	9	5	1,218
Libertyville	1,020	93	3	79	1,273	115	94	1,273
Lake Forest	753	37	3	99	916	51	38	955
Deerfield	1,013	80	4	279	1,458	84	181	1,441
Lake-Cook Road	462	326	2	393	998	360	372	1,029
Sub-Total	6,073	543	12	897	7,818	624	695	7,881
Total – MD-N (Lake Co.)	**7,523**	**651**	**16**	**1,521**	**10,227**	**758**	**805**	**10,330**

Table 6.2.3-4 Boarding and Alighting Forecasts By Station - AM Peak and Total Daily Alternative 3 – Full-Build (without a new MD-N Line Green Oaks/Abbott Labs Station)

	2020 AM Peak				2020 Total Daily			
	Inbound		Outbound		Inbound		Outbound	
	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Wadsworth Branch Extension								
Wadsworth	79	0	0	9	100	0	0	103
Gurnee	180	0	0	160	397	0	0	409
Waukegan/Lakehurst	551	1	0	131	796	1	1	821
Green Oaks/Abbott Labs	384	83	3	316	811	103	84	811
Sub-Total	1,194	84	3	616	2,104	104	85	2,144
Milwaukee District-North Line (Lake County Stations)								
Fox Lake	670	0	0	16	779	0	0	803
Ingleside	84	0	0	4	100	0	0	96
Long Lake	151	0	0	2	159	0	0	159
Round Lake	853	4	0	19	937	5	5	907
Grayslake	1,067	3	0	6	1,198	9	5	1,218
Libertyville	1,134	117	4	88	1,415	145	119	1,415
Lake Forest	762	37	3	99	926	51	38	965
Deerfield	1,020	80	4	279	1,466	84	181	1,448
Lake-Cook Road	462	326	2	393	998	360	372	1,029
Sub-Total	6,203	567	13	906	7,978	654	720	8,040
Total – MD-N (Lake Co.)	**7,397**	**651**	**16**	**1,522**	**10,082**	**758**	**805**	**10,184**

Table 6.2.3-5 Boarding and Alighting Forecasts By Station - AM Peak and Total Daily Alternative 4 – Phase I Development (No Wadsworth Extension - Only a New MD-N Line Green Oaks/Abbott Labs Station)

	2020 AM Peak				2020 Total Daily			
	Inbound		Outbound		Inbound		Outbound	
	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Wadsworth Branch Extension								
Wadsworth	0	0	0	0	0	0	0	0
Gurnee	0	0	0	0	0	0	0	0
Waukegan/Lakehurst	0	0	0	0	0	0	0	0
Green Oaks/Abbott Labs	531	23	2	332	999	30	25	999
Sub-Total	531	23	2	332	999	30	25	999
Milwaukee District-North Line (Lake County Stations)								
Fox Lake	670	0	0	16	779	0	0	803
Ingleside	84	0	0	4	100	0	0	96
Long Lake	151	0	0	2	159	0	0	159
Round Lake	853	4	0	19	937	5	5	907
Grayslake	1,230	3	0	6	1,380	9	5	1,403
Libertyville	1,077	93	3	71	1,329	115	94	1,329
Lake Forest	753	37	3	99	916	51	38	955
Deerfield	1,013	80	4	279	1,458	84	181	1,441
Lake-Cook Road	462	326	2	393	998	360	372	1,029
Sub-Total	6,293	543	12	889	8,056	624	695	8,122
Total – MD-N (Lake Co.)	6,824	566	14	1,221	9,055	654	720	9,121

6.3 SUMMARY OF FINDINGS AND CONCLUSIONS

Table 6.3-1 shows the number of work trips to the Chicago Central Area generated by Lake County, the planning zones in the Extension Corridor, and comparable zones along the Milwaukee District-North Line (Libertyville to Fox Lake) for each of the four studied alternatives. The planning zones, various rail corridors and railroads stations are shown in the previously referenced Figure 6.2.1-1. This table also shows the number of additional commuters to the Chicago Central Area as a result of each of the three build alternatives.

The population growth in Lake County between 1999 and 2020 would result in an increase of 7,292 daily commuters to the Chicago Central Area. This number would have been larger if highway congestion and employment opportunities in Lake County were not increasing at rates faster than its population growth. If the Wadsworth Extension were to be built with an new station at Green Oaks/Abbott Labs on the MD-N Line (Alternative 2), an additional 1,218 workers would commute to the Chicago Central Area. It should be noted, however, that not all these transit-induced work trips would be undertaken via transit. Some of these workers, attracted to Lake County by the introduction of new transit service, would commute to the CCA either very frequently or occasionally by auto. The reverse also is true; new highways attract residents, some of whom would commute to work via transit. In addition, some CCA trips generated in the zones adjacent to the Wadsworth Extension Zone would use the proposed stations.

Table 6.3-1 AM Work Trips to Chicago Central Area All Modes - Forecast Summary

	Lake County	Extension Zones	Comparable Zones
Actual 1999 CATS Data	21,071	208	4,571
# 1 2020 Alternative 1 - Do Nothing	28,363	896	6,156
# 2 2020 Alternative 2 – Full-Build (Including a New MD-N Line Green Oaks/Abbott Labs Station)	29,581	2,114	6,156
# 3 2020 Alternative 3 – Full-Build (without a new MD-N Line Green Oaks/Abbott Labs Station)	29,188	1,721	6,156
# 4 2020 Alternative 4 – Phase I Development (No Wadsworth Extension – Only a New MD-N Line Green Oaks/Abbott Labs Station)	28,904	1,437	6,156
Growth Without Any Improvements (#1 – Actual)	7,292	688	1,585
2020 Trips Due to Alternative 2 (#2 - #1)	1,218	1,218	0
2020 Trips Due to Alternative 3 (#3 - #1)	825	825	0
2020 Trips Due to Alternative 4 (#4 - #1)	541	541	0

Table 6.3-2 summarizes the boardings and alightings at the proposed stations of the Wadsworth Extension. This data is derived from prior Tables 6.2.3-1 through 6.2.3-5. Under Alternative 2 (Full-Build including a new MD-N Line Green Oaks/Abbott Labs Station), the four stations of the Wadsworth Extension would attract 1,450 a.m. peak inbound boardings and a total of 624 a.m. peak outbound alightings. This alternative would attract 2,500 total daily boardings.

Table 6.3-2 Summary of AM Peak Boarding and Alighting Statistics Proposed Stations Only

2020 Forecast Summary	AM Peak Inbound Boardings	AM Peak Outbound Alightings
1999 Boardings	0	0
2020 Alternative 1 (Do Nothing)	0	0
2020 Alternative 2 (Full Build - w/ new MD-N Line Station)	1,450	625
2020 Alternative 3 (Full Build – No new MD-N Line Station)	1,195	615
2020 Alternative 4 (Phase I Development – only a new MD-N Line Green Oaks/Abbott Labs Station)	530	330

Some of the boardings presented in the above table are diversions from existing stations in Lake County. However, almost all the diversions would be from stations and/or lines which would be operating above or at capacity if the Wadsworth Extension is not implemented. Table 6.3-3 shows the impact of the Wadsworth Extension on boardings at the Libertyville Station, which would be (by far) the existing station most-impacted by such diversions.

As can be seen from the Table 6.3-3, each of the three build alternatives would cause diversion of boardings from the Libertyville Station to the new Green Oaks/Abbott Labs Station. The highest level of diversion occurs under Alternative 2 - Full Build including a new MD-N Line Green Oaks/Abbott Labs Station. The magnitude of the diversion in 2020 is 236 a.m. peak inbound boardings and 294 total daily inbound boardings. The other two Alternatives - 3 and 4 - would result in fewer a.m. peak diversions, 122 and 179 respectively. However, it should be noted that Libertyville, even under Alternative 2, would be experiencing a 19 percent growth between 1999 and 2020. The Libertyville Station cannot handle this growth, particularly since it has lost a significant portion of parking spaces in the past few years. Without the Wadsworth Extension (Alternatives 2 & 3), or at least the addition of the Green Oaks/Abbott Labs Station on the Milwaukee District-North Line (Alternative 4), the growth potential of Libertyville would be 47 percent.

Table 6.3-3 Impact of Boardings at the Existing Libertyville Station

	AM Peak Inbound	Total Daily Inbound
1999 Boardings	857	1,063
2020 Alternative 1 (Do Nothing)	1,256	1,567
2020 Alternative 2 (Full Build - w/ new MD-N Line Station)	1,020	1,273
2020 Alternative 3 (Full Build – No new MD-N Line Station)	1,134	1,415
2020 Alternative 4 (Phase I Development – only a new MD-N Line Green Oaks/Abbott Labs Station)	1,077	1,329

Diversions from the North Central Service (all Lake County Stations) are estimated at 77 a.m. peak inbound boardings in 2020. Diversions from the UP-North Line (all Lake County Stations) are estimated at 113 a.m. peak inbound boardings. These diversions are minimal compared to the growth forecasted for the period 1999-2020, which is estimated to more than double, assuming no capacity constraints.

7.0 RECOMMENDATIONS

This Phase I Feasibility Study has examined the proposed route for providing new commuter rail service in the Wadsworth Extension corridor, in order to determine whether it might be physically and financially feasible. The Study has also determined the level of community support, i.e., which cities or villages would agree to sponsor and fund potential stations and parking facilities, should the proposed project reach the implementation stage. The intent was either to recommend the route for more detailed studies or to decide that no further studies should be pursued if it were deemed physically or financially infeasible and/or where little local support was evident.

This report has shown that potential commuter service along the Wadsworth Extension appears to be physically feasible. In addition, local support from the communities and the business sector is substantial. However, there are significant capital costs involved, particularly when passing sidings would be necessary to avoid conflicts with freight trains. Based on the evaluations in this report, this Study recommends that the potential Wadsworth Extension of the existing Milwaukee District-North Line service be studied further. It should be understood that this conclusion and recommendation is qualified based on the findings in this Study phase alone, and does not account for any "unknowns" that may emerge from more detailed studies. Furthermore, at the present time the results of this Study phase cannot and should not be construed as indicating that the Wadsworth Extension will be considered operationally viable or even desirable at the completion of the remaining Study phases.

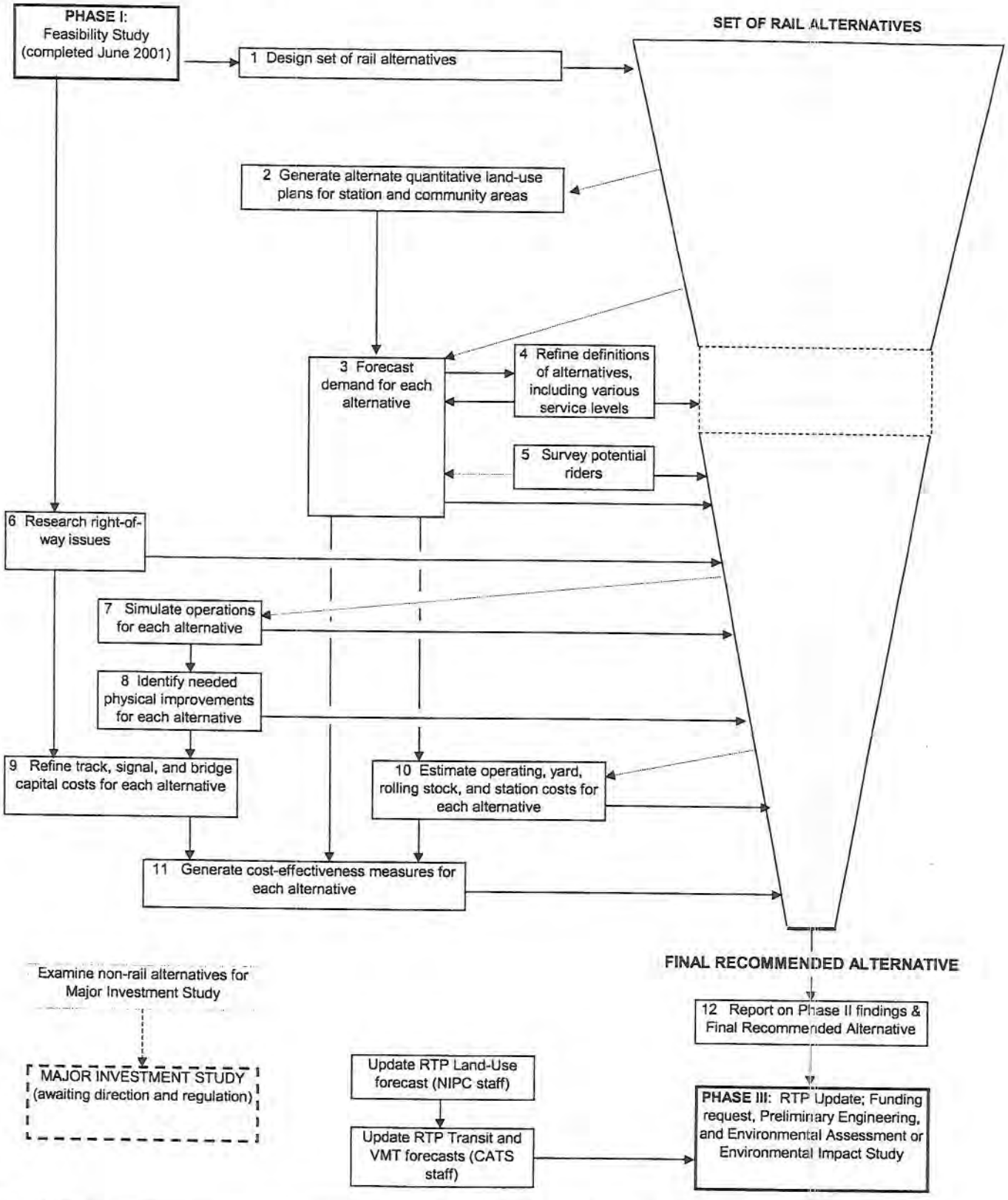
7.1 PROGRAM FOR FURTHER STUDY

Metra has defined a Typical Overall Rail Corridor Evaluation Process as a phased plan for the study of new commuter rail service in a corridor. The intent of phasing the studies is to limit the investment in the Study effort to increments of progressively justified and more-detailed work. Specifically, the progressive investment before starting Phase II is to ensure that the planning and engineering concepts behind the service and the alignment are sound before investing in more-costly items such as capacity simulations and site-specific/environmental studies of the rail alignment and the station-facility/coach-yard sites.

A Phase II Feasibility Study is designed to evaluate the Phase I recommendation within a more in-depth and expanded scope. This also allows for a more effective use of financial resources and the sufficient time to properly assess the elements that make up the Phase II Studies (see Figure 7.1-1). The whole gamut of 12 Elements is usually necessary for completing feasibility studies of entirely new commuter rail lines, such as the now-operational North Central Service (NCS) in Lake County, or the proposed Outer Circumferential Service (OCS), which might utilize the Elgin, Joliet & Eastern (EJ&E) Railway corridor through as many as four counties. Not all of the elements are applicable in cases of extending the terminal points of (or branching off from) existing Metra lines. The Wadsworth Extension Phase I Feasibility Study has concluded that the segment of the CP Main Line between Rondout and the State Line should be studied further as a commuter rail option. At this point in time, it appears that three areas of

FIGURE 7.1-1

SUMMARY OF PHASE II ELEMENTS AND SEQUENCING



investigation in particular would lead off Phase II Studies of the potential Wadsworth Extension, with other possible factors to be determined later.

7.1.1 Line Capacity Analysis

A line capacity analysis would evaluate passenger (Metra and Amtrak in this case) and freight train operational scenarios on the CP Main Line alignment. A computerized simulation model would be developed to perform capacity simulations along the proposed route, using different combinations of operating conditions. The conditions would include:

- Current and projected freight train traffic densities and proposed commuter train schedules
- Operating rules and other operating considerations as defined by Metra and Canadian Pacific
- Speed and signaling restrictions from current conditions and projected future improvements
- Existing dispatcher prioritizations and potential changes with improvements to physical plant

Each simulation would cover at least the time frames that commuter trains are proposed to be operating, and perhaps go further to ascertain limits of expanded Metra service on the foreseen physical plant. The simulations would be designed so that all commuter train operations would have a 100% on-time performance each day of operation. Since all commuter trains must operate on clear signals for maximum efficiency, except where a less-favorable signal indication is required by a diverging route, the train speeds and meeting points must reflect and agree with the specific sets of potential improvements to the physical plant which have been recommended. The simulations and analyses would meld the scheduled movements of potential Wadsworth Extension commuter trains, Amtrak inter-city passenger trains, and CP freight trains.

This task will simulate the existing and proposed freight traffic combined with the proposed passenger service, in order to determine what physical modifications of the current plant would be required. As the Phase I report indicates, the operational interface between proposed Metra service and freight traffic is still an open issue. The CP will be involved in developing the simulations, using their information and projections of freight traffic. The analysts performing the operations simulations will need to be mindful that the simulation, capital and operating cost, and demand-estimation processes must each be using the same definitions.

In this particular circumstance, in addition to enabling both the additional and existing trains to operate unfettered over the CP Main Line, the meshing of all the trains at Rondout with the Fox Lake trains will require close scrutiny. The later would include examining the already congested MD-N segment between Rondout and Tower A-20. Finally, projected improvements to the J-Line can be tested as alternatives for additional capacity needs that would now include a Green Oaks/Abbott Labs Station. Metra's Transportation and Engineering Departments have itemized the double-track connection at Rondout, additional double-tracking of the line to Grayslake, and installing CTC to the entire route west of Rondout as priorities.

7.1.2 Refined Cost Estimates

The order-of-magnitude cost estimates performed in the Phase I Study made extensive use of standard unit costs for many categories. For example, to estimate track installation costs, a per-

linear-foot unit cost was assumed. This task would examine such unit costs to determine where refinements are needed to ensure a reliable project cost estimate for both capital and operating costs (the latter was not a part of Phase I).

Location-specific studies would evaluate existing and proposed railroad infrastructure such as crossovers, turnouts, passing sidings, interlockings and CTC signal systems, at-grade highway crossings, and rail-from-highway grade separations. Refined cost estimates would include more-detailed and location-sensitive capital cost estimates, as well as identification of costs that are subject to change as a result of updated design and engineering specifications. In particular, the revised cost estimates would take into account additional infrastructure needs identified by the line capacity analysis. The order-of-magnitude capital costs for track, signals, bridges, etc., from the Phase I Feasibility Study would be revised, based on the results of these evaluations. New capital costs may also be identified on the existing MD-N Line east of Rondout (not covered in this Study). Finally, the refined cost estimates will include necessary improvements to the eastern end of the J-Line to facilitate a smooth and efficient junction with the extension of service.

7.1.3 Environmental Impacts

A review of potential environmental impacts would precede a formal Environmental Assessment, which would be required before implementation. The review would focus upon construction impacts, water systems and wetlands, air-quality issues, noise and vibration, living species, historical issues and other actions which could require recommended mitigation strategies. For this project, there would be a necessary focus on the many wetlands, floodplains, and floodways that are traversed by this route, and in several cases where they could be utilized for station facilities. [How to construct (and then keep the water out of) pedestrian underpasses to the platforms illustrates one of several potential environmental obstacles that must be addressed.] The environmental tasks would address important concerns relating to the physical and natural environment by focusing on three objectives prior to preparing a complete documentation of findings:

- Description of the environmental conditions within the study area
- Identification and evaluation of the short- and long-term impacts of each site or location on the environment, determining potential concerns and liabilities
- Identification and recommendation of mitigation measures to be incorporated in design and/or operating plans for each site or location and their components

The screening of environmental impacts would begin with an identification of baseline conditions. An inventory of existing environmental conditions would be developed by reviewing and building upon the previous Phase I work. The environmental tasks would be performed in parallel with the Phase II engineering activities, and would serve as the primary input to the identification of key mitigation strategies. Environmental documentation would address both beneficial and adverse impacts for existing and future conditions. The consequences of construction activities and operations would be considered. Impacts would be classified, and their significance addressed on the basis of short- and long-term consequences. The potential

impacts of structures and construction activities would be identified, and the requirement for and extent of necessary mitigation actions would be described.

7.1.4 Station Facility Parameters

Site-specific station-facility and coach-yard cost refinement would include examinations of the overall layout, acreage, and access routes for the facilities separate from the influence of the line capacity analysis. Although parameters for the station cost estimates would be influenced somewhat by the ridership forecasts, environmental-impact evaluations could be a more-significant determinant. As noted earlier, three of the five sites face potential mitigation and avoidance issues concerning wetlands and flood plains. These will be part of the environmental review, and in turn be influenced by the findings.

Design layouts for each site will be created in greater detail than this Phase I Study has done. The best utilization of the proposed sites must be ascertained, access routes and traffic control must be examined, and parking lots must be designed for start-up ridership with space reserved for likely expansion needs. Additional meetings will be held with each of the communities to continue discussions and monitor new circumstances. Other issues such as what will happen at Lakehurst Shopping Center in Waukegan, how will the proposed station in Gurnee be developed and utilized, and whether Wadsworth will commit to funding the proposed IL173 station facility will also need to be addressed.

7.2 SUB-REGIONAL BENEFITS

A variety of tangible benefits that might be expected from the proposed new service could cover a wide range, such as opportunities that communities and businesses (i.e., residents, employees, and employers) in the study area can derive from the local response to the inception of commuter rail service. Broader benefits, such as congestion mitigation and improvements to air quality, could extend the positive influence beyond the immediate sub-regional study area. Possibilities include:

- Increased modal choices and enhanced intermodal options
- Reduced auto emissions and roadway congestion levels
- Improved access to employment centers and greater employment mobility for the economic health of both the study area and the overall region
- Opportunities to enhance comprehensive and development plans of individual communities
- Infrastructure enhancements such as commuter rail stations which could serve as community focal points for transit-oriented developments

The key sub-regional benefits are associated with the population and employment market to be supported by commuter rail, additional mode choice and increased accessibility arising from new service, and the potential local development initiated by this transportation investment. This task will bring community and business desires together with cost-effectiveness measures to decide upon the final operating scenario to recommend for implementation. A final Phase II Feasibility Study report will summarize all of the Phase II analyses that led to the recommendation.

APPENDICES