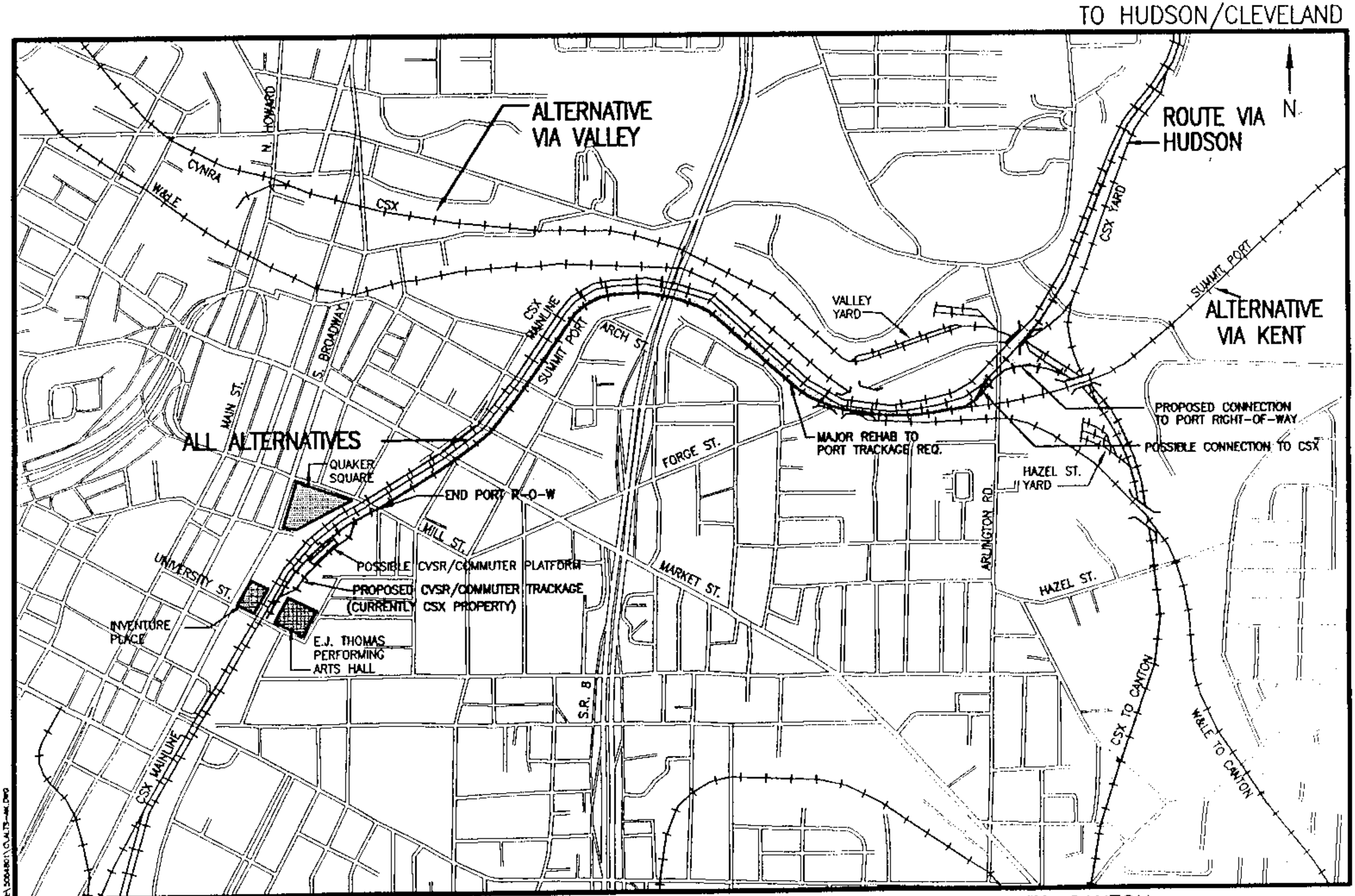
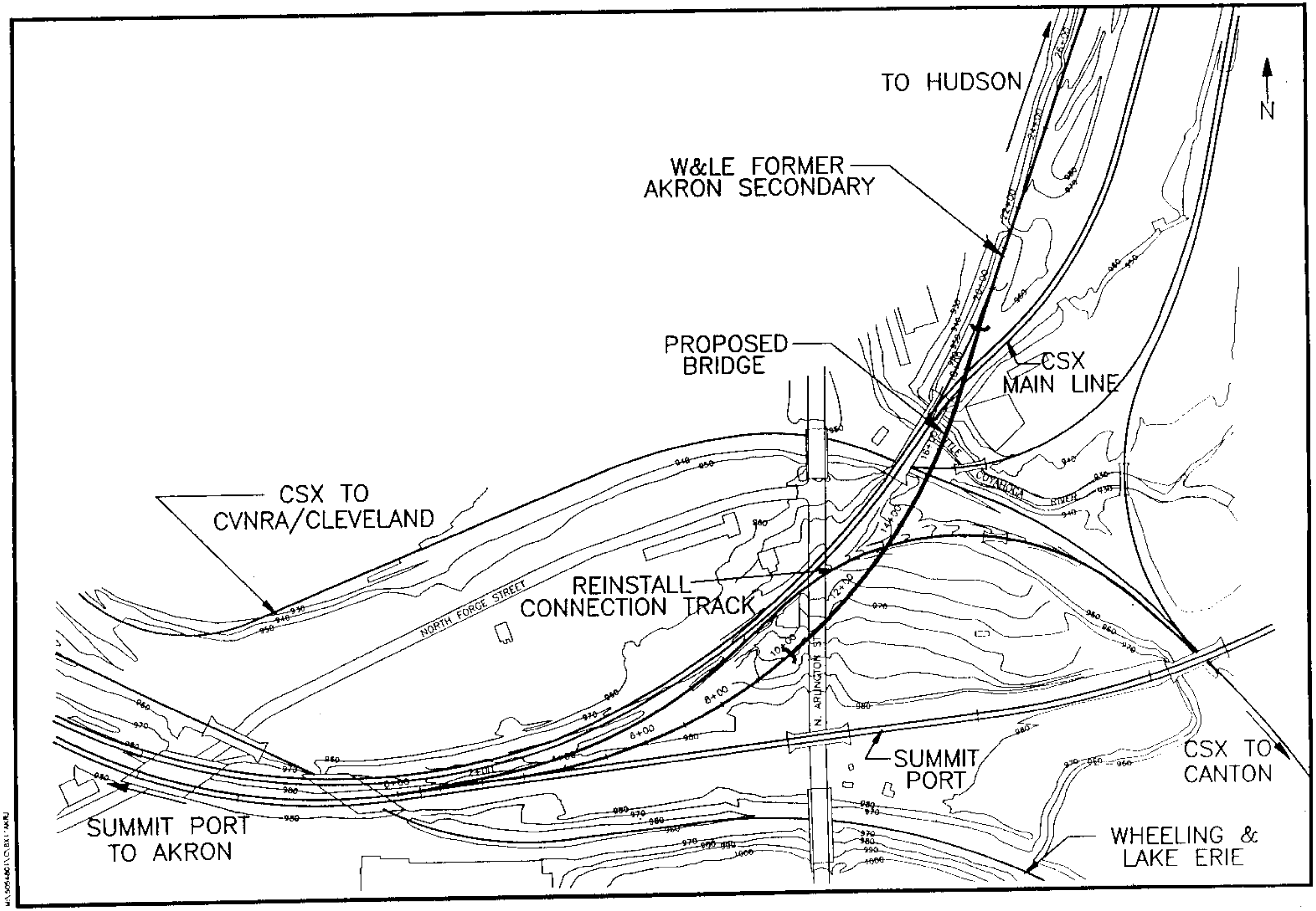


URS CONSULTANTS
SCALE 1" = 800'

AKRON VICINITY

FIGURE 3



URS CONSULTANTS
SCALE 1" = 300'

AKRON JUNCTION DETAIL

FIGURE 4

Ridership Conclusions

For initial service planning purposes, a daily ridership of about 3086 CBD-oriented work-trip boardings appears achievable. The additional potential impact of University of Akron student trips is large, however, and ridership could be supplemented by several hundred or more trips by this market.

While indicative of general opportunities and orders of magnitude, the data presented here is not sufficient to size the service. As implementation plans proceed, a more detailed estimate of reasonable and achievable ridership should be developed. This is likely best accomplished by a multi-faceted strategy which could include further analysis of work trip data from the census and other sources as well as other data gathering techniques such as survey work, focus groups, and other direct contact with potential riders and/or employers. Opportunities also exist to combine this task with public involvement, information, and educational efforts. In any case, based on experience in other North American commuter rail systems, ridership on a well designed and operated commuter system is likely to grow, and provisions for expansion should be considered and incorporated where possible and cost-effective.

The development of a ridership estimate for the project is affected by several policy issues and project goals. For example, initial ridership is likely to be traditional in nature, with CBD-oriented trips made by auto-owning suburbanites who choose the service for travel time, comfort, and efficiency reasons in corridors with traffic congestion and relatively costly and limited parking. The reverse-oriented trips, which can provide access to suburban jobs for transit-dependent riders, can ultimately provide ridership and stimulate economic growth. However, this will require the development of coordinated feeder bus networks (at additional cost) to access low density suburban development. In addition to requiring suitable schedules and frequencies, coordination regarding transfer fares and other simplified ticketing will be important for success. These are challenging requirements, which often take time to develop and implement. Ridership growth may lag behind the introduction of rail service and the accompanying operating costs.

Operating Costs

Operating costs include labor costs, fuel, insurance, administration, trackage rights fees, basic equipment and track maintenance allocations, legal fees, and all other operational costs. Since physical and institutional arrangements, cost structure, and socioeconomic factors for different existing commuter systems can be vary widely, a comparison of operating costs based on experience elsewhere should be considered conceptual only.

And, trade-offs exist between capital costs, operating costs, and service plan. One example involves equipment utilization and fleet size. A smaller fleet with careful schedule coordination (high utilization) increases maintenance costs, but decreases capital costs and can decrease labor costs. Wide variations exist in the industry, such as the case of Tri-Rail serving more than twice as many passengers on twice as many car-miles as does VRE, yet Tri-Rail's active fleet of cars (at the time) was only about one-third as large. Another obvious issue for consideration involves operations on segments with low ridership, which will increase the shortfall between revenues and operating costs.

As with any enterprise, operating costs in the first year of service are likely to be higher than for subsequent years, and higher in comparison to other similar systems. Subsequent years will show lower costs as efficiency improves, and particularly as service levels increase and fixed costs can be allocated over a larger system. This has a significant impact on insurance and risk management costs. These costs have a variable component, and according to one broker, at these low levels of service, payroll size may be the dominant factor rather than number of trains.

For estimating purposes, the provision of $200 million in insurance coverage should be expected to cost about $2 million per year, depending on the specific arrangements. This level of coverage is specified by the state of Ohio in HB 250, and is also required for operations over CSX-owned trackage. An important complication is the requirement by both Conrail and CSX that they be fully protected and held harmless for any passenger-related claims regardless of fault. The structuring of this coverage typically includes a level of self-insurance, a level of commercially available insurance (at relatively competitive prices), and a level of coverage from a specialized carrier, though other alternatives exist. If Amtrak becomes the designated operator, it could provide certain portions of this coverage, likely at lower cost, depending on certain other details of coverage.

Several indicators can be used to develop operating cost and revenue forecasts. One method uses revenue train-miles. An appropriate range for a system somewhat larger than this project is between $31 and $50 per train-mile. As example, SCRRA's (Metrolink in Los Angeles) cost in its first year was about $48 per train-mile. Another measure is cost per train hour, with $1,200 per hour to $1,800 per hour generally considered to be reasonable. Estimates for three proposed Atlanta routes are about $1,400 per hour.

An indicator frequently used is cost per revenue car mile, which takes into account the train length. A comparison of these costs was made based on data reported to the American Public Transit Association by system operators nationwide. While the Canton-Akron-Cleveland project is similar in size to the start-up configuration of other systems such as Tri-Rail in Florida and VRE in Virginia, these organizations are now operating larger systems than the proposed service. This skews average costs, especially because of insurance and liability costs. However, based on a comparison with smaller systems including Tri-Rail, VRE, Metrolink, Cal-Train Peninsula Service (California), MARC (Washington-Baltimore), Connecticut DOT (Shore East), as well as using planning results from Atlanta, a cost of $11 per revenue car-mile is considered reasonable.

For the planned Atlanta system, fixed costs comprise about 20% of the total unit cost. These are not variable with route length or number of trains. Assuming this is largely comprised of insurance costs, a more conservative estimate uses variable costs of $10 per car-mile plus a relatively fixed annual cost of $2 million for insurance. An average of these two car-mile based approaches suggests that, for planning purposes, an operating cost of about $7.5 million is reasonable for this Canton-Akron-Cleveland project. This cost assumes that equipment is purchased and included in capital costs; if equipment is leased, capital costs will decrease and operating costs will increase.

The gap between revenues and operating costs, or operating shortfall, is dependent on many inter-related factors including ridership, fare levels, service quality, and capital funding alternatives. A detailed analysis of these relationships is beyond the scope of this document. However, the ratio of operating revenue to operating costs is a standard tool that can provide an indication of ranges of behavior. In North America, in 1993, this ratio varied from 10% to slightly more than 50%. The higher range generally represents well-established networks in densely populated, transit-oriented areas such as New York, New Jersey, and Chicago. The lower range that year included a new start connecting service in Connecticut, and a growing period in Los Angeles that included some relatively costly off-peak service. Ratios for recently established systems generally range from 20% to 45%.

For this consideration, a conservative range of 20% to 30% is suggested until additional justifications and analyses can be performed. As Table 8 shows, this suggests a potential annual shortfall of $5 million to $6 million for the project. Based on the ridership levels identified previously, this reflects an average one-way fare of $1.80 to about $2.80. The establishment of a fare structure is an important operating and policy decision which should be made based on the project's goals and objectives, but this range is not unreasonable.

TABLE 8
COMMUTER RAIL DEMONSTRATION PROJECT
IMPLEMENTATION REPORT
CANTON – AKRON – CLEVELAND VIA HUDSON
PROJECTED OPERATING COSTS

ANNUAL OPERATING COSTS:

ASSUMPTIONS:

INCLUDES LABOR, ADMINISTRATION, FUEL, INSURANCE, SUPPLIES, MARKETING, AN ALLOWANCE FOR PARTIAL DEPRECIATION, AND OTHER ANNUAL COSTS TO OPERATE FOUR PEAK HOUR 5 CAR TRAINS AS DESCRIBED IN THIS OPERATING PLAN. OPERATING YEAR ASSUMED TO BE 250 WORKING DAYS.

	OPERATING COST PER CAR–MI	INSURANCE	OPERATING COST PER CAR–MI	TOTAL COST	EQUIVALENT COST PER TRAIN–MI
620,000 CAR–MILES/YEAR	$11	INCLUDED	N/A	$6,820,000	$55
620,000 CAR–MILES/YEAR	N/A	$2,000,000	$10	$8,200,000	$66

ASSUMED ANNUAL COST(AVERAGE OF TWO METHODS): $7,510,000

AVERAGE OPERATING COST PER PASSENGER: $9.73

ANNUAL REVENUES:

ASSUMPTIONS:

ASSUMES 3086 DAILY WORK TRIPS ON 250 DAYS PER YEAR. DOES NOT INCLUDE WORK TRIPS TO NON–CBD AREAS, STUDENT TRIPS, OR OTHER NON–WORK TRIPS. THIS REPORT DOES NOT INCLUDE AN ANALYSIS OF FARE LEVELS, POLICIES, AND SENSITIVITIES, BUT REFLECTS TYPICAL ONE WAY FARES OF ABOUT $2 TO $3. THIS ESTIMATION IS BASED ON A COMPARISON OF OPERATING RATIOS (REVENUES/OP. COSTS) FOR SIMILAR SERVICES. FUTURE CONSIDERATION OF THE PROJECT SHOULD INCLUDE ITEMIZED COST ANALYSIS.

	REVENUES AS A PERCENT OF OPERATING COSTS		
	20% COST	30% COST	40% COST
AVERAGE OPERATING COST	$7,510,000	$7,510,000	$7,510,000
REVENUES	$1,502,000	$2,253,000	$3,004,000
ANNUAL OPERATING SHORTFALL:	$6,008,000	$5,257,000	$4,506,000

M:\5054801\OP–COSTS

Equipment Plan

Single level or bi-level passenger cars could be used for the service. The route via Hudson has sufficient vertical clearances to allow the operation of bi-level passenger equipment if desired, since typical bi-level passenger equipment can be between 14' 6" and slightly more than 16 feet in height. Vertical clearances on the Conrail and CSX main lines are about 21 feet, on the Akron Secondary 20 feet, on the Summit Port right-of-way about 19 feet depending on the specifics of trackage re-installation, and on the Akron-Canton segment about 17 feet 6 inches.

The implementation of the service described in this plan requires three train sets, each consisting of a locomotive, four passenger cars, and a cab control car. The cab control car is required to permit trains to reverse direction without turning. To permit scheduled and unscheduled maintenance, the fleet should also include a spare locomotive, a spare cab control car, and a spare standard car. Schedules such as the one shown utilize equipment from the first peak Cleveland-oriented train to turn and become the southbound Akron/Canton-oriented train. This eliminates the need for additional equipment, and increases equipment utilization, but it restricts scheduling flexibility, reliability, and limits capacity for future growth. At car capacities of 120 to 175 passengers per car, the total capacity of each train would be 600 to 875, or 2400 to 3500 seats per peak period. The operation of the spare cars could increase total capacity, subject to their availability.

At purchase prices of about $1 million or more per rehabilitated diesel locomotive, $1 million to $1.5 million per car (depending on whether new or rehabilitated), and $1.5 million to $2 million per cab car, the total equipment costs range between $23 million and $34 million. Assuming that the project is planned as a demonstration service, creative leasing or other arrangements should also be explored, depending on funding sources. Annual lease costs (in lieu of the purchase of cars and locomotives) for a fleet of this size could range from $1.7 million to $2.6 million, but this is highly dependent on equipment availability. It is very common for other passenger systems and sometimes manufacturers to lease new, excess, or retired equipment, but the sources of supply in the equipment market are relatively small in number.

These potential alternative equipment acquisition arrangements should be considered and explored, with several caveats. The equipment must be reliable and dependable, since the operating "windows" of time will be very limited to avoid conflict with freight as well as other rail traffic. Common mechanical delays and poor operating performance will ensure the failure of the demonstration service from the perspectives of both riders and the contracting freight railroads. And, as a demonstration service, the equipment must also be clean, modern, and attractive to allow riders to make a fair evaluation of the service.

Infrastructure Plan / Capital Costs

Infrastructure costs will include extensive track rehabilitation, new trackage at major stations and to add capacity, signal upgrading and installation, and structural and station work. It is recommended that the grade separation over the North Arlington Street area be strongly considered to eliminate impacts on CSX main line traffic. The estimated total capital cost for the Canton-Akron-Cleveland demonstration project as outlined in this report totals $100 million, as summarized in Table 9. Without the proposed bridge at North Arlington Street, costs could be about $83 million.

TABLE 9

COMMUTER RAIL DEMONSTRATION PROJECT IMPLEMENTATION REPORT
CANTON – AKRON – CLEVELAND VIA HUDSON
CAPITAL COST SUMMARY

RECOMMENDED ALTERNATIVE INCLUDING ARLINGTON BRIDGE

	Conrail Cleveland Line	Conrail Akron Secondary	Arlington Bridge Option (Akron)	CSX CT&V Akron–Canton	Station Areas Akron/Cleveland	Total Cost with Arlington Bridge
Track	$686,250	$5,792,365	$3,980,407	$14,299,163	$2,657,160	$27,415,345
Signals	$5,929,200	$4,422,500	$921,100	$10,296,800	$1,759,850	$23,329,450
Structures/Stations	$2,440,000	$2,440,000	$14,640,000	$4,270,000	$2,806,000	$26,596,000
Equipment	N/A	N/A	N/A	N/A	N/A	$23,000,000
Total	$9,055,450	$12,654,865	$19,541,507	$28,865,963	$7,223,010	**$100,340,795**

ALTERNATIVE USING CSX IN AKRON AREA

	Conrail Cleveland Line	Conrail Akron Secondary	CSX Akron Area	CSX CT&V Akron–Canton	Station Areas Akron/Cleveland	Total Cost using CSX in Akron Area
Track	$686,250	$5,792,365	$700,280	$14,299,163	$2,657,160	$24,135,217
Signals	$5,929,200	$4,422,500	$2,153,300	$10,296,800	$1,759,850	$24,561,650
Structures/Stations	$2,440,000	$2,440,000	$0	$4,270,000	$2,806,000	$11,956,000
Equipment	N/A	N/A	N/A	N/A	N/A	$23,000,000
Total	$9,055,450	$12,654,865	$2,853,580	$28,865,963	$7,223,010	**$83,652,867**

ALTERNATIVE INCLUDING ARLINGTON BRIDGE, EXTENSIVE CONRAIL THIRD TRACK, AND OTHER IMPROVEMENTS

	Conrail Cleveland Line	Conrail Akron Secondary	Arlington Bridge Option (Akron)	CSX CT&V Akron–Canton	Station Areas Akron/Cleveland	Total Cost with Arlington Bridge
Track	$3,294,000	$6,525,536	$4,945,984	$17,246,927	$3,335,480	$35,347,926
Signals	$9,589,200	$6,862,500	$921,100	$12,736,800	$2,979,850	$33,089,450
Structures/Stations	$3,050,000	$2,745,000	$14,640,000	$5,032,500	$2,806,000	$28,273,500
Third Track (all costs)	$70,272,000	$0	$0	$0	$0	$70,272,000
Equipment	N/A	N/A	N/A	N/A	N/A	$23,000,000
Total	$86,205,200	$16,133,036	$20,507,084	$35,016,227	$9,121,330	**$189,982,876**

NOTE 1: Akron station includes new platforms and vertical access to pedestrian walkway. Walkway and station by others. Cleveland station includes platforms and vertical/horizontal access to Amtrak and/or Waterfront Transit station. Other stations include platform, small shelter, lighting, parking for about 200 cars, etc.

NOTE 2: Assumes TCS installation or upgrade over all track not now equipped.

NOTE 3: Equipment could be leased instead of purchased. Typical annual leasing costs for the specified fleet could be $2 to 3 million per year, subject to availability.

NOTE 4: Includes 15% contingency and 7% engineering costs. Does not include legal, property acquisition, or other costs. m:\5054800\tables\cap-sum.wk3

It should be noted that these figures include estimated equipment capital costs of $23,000,000. As discussed previously, this cost could be eliminated in favor of annual equipment lease costs, especially if sufficient funding is not immediately available for the entire project. Additionally, some system segments could be implemented in a phased approach, decreasing the necessary start-up capital well below that required for the total system. These figures are highly dependent on the specific goals and objectives of the project, on further operating analyses, on specific frequency and scheduling preferences, and on negotiation with the affected railroads.

Costs for property acquisition, if necessary, are not included. It is assumed that conditions on the main line segments of the route are sufficient to support the current maximum authorized speeds of about 50 mph. It is also assumed that all lines south of Hudson, including the Akron Secondary and CSX CT&V, receive heavy rehabilitation including replacement rail, new ties, highway crossings, turnouts, and resurfacing. New trackage and turnout connections are included at Cleveland and Canton and on the Summit Port right-of-way into downtown Akron.

The project is assumed to include automatic protection devices including flashing lights and gates at all at-grade highway crossings. This involves both new systems and upgrades to existing systems. For train control, the upgrading of the existing Conrail signal system between Hudson and CP White (and on CSX for two miles in Cuyahoga Falls) to a centralized and automatic Traffic Control System is assumed. Installation of a new signalling system is also included for the remainder of the route. This system could be a standard TCS system, or perhaps a newer technology incorporating local radio communications and global positioning systems currently under development. Federal Railroad Administration technology program grants may be available for the testing of such a system. Costs for a possible new central control location are not included.

A generic allowance for bridge rehabilitation costs is included, but the scope of this analysis does not permit a structural investigation. Station costs generally include basic facilities such as a partially sheltered concrete platform with parking (typically 200 or more cars at each intermediate station) and local roadway access. The construction of a new equipment maintenance facility is not included. No costs are included for the acquisition of trackage.

These estimates are for total costs only, and do not assume any allocation of costs among other users. Conrail, CSX, Amtrak, the State of Ohio, and others may share the benefits of these proposed improvements, so grounds exist to allocate some costs among these other beneficiaries. However, a firm position against such an allocation should be expected from the freight railroads, who view the costs of any passenger-related improvements to be the responsibility of the passenger operator.

As described previously, even with the significant level of investment as identified, the assumed track and signal improvements may only modestly increase the capacity of these main line segments. Further analysis is required not only to evaluate the need for the improvements identified here, but also to ensure that the line can handle the expected freight and passenger traffic volumes in the future.

The possible need for 16 miles of additional third main track parallel to Conrail from Hudson to CP White in Garfield Heights, extended passing sidings, and more extensive track and signal rehabilitation was also considered. If these additional improvements are required, capital costs could reach $190 million, as indicated in the table, depending on the resolution of operating issues, liability, and service alternatives. This scenario also includes additional surfacing and realigning, which could also allow slightly increased speeds in some locations. In lieu of the full third track, the cost of additional trackage only in the congested Motor Yard area between Alexander Road and Highland Road would fall somewhere within the $100 million to $190 million range.

The costs for the third main track are conceptual, and are based on a current project north of Cincinnati. This project involves Norfolk Southern and State of Ohio funding to add another main track parallel to CSX over a distance of about 3.5 miles, thereby increasing capacity and decreasing freight traffic delays. It includes earthwork, grading, trackwork, TCS signalling, bridgework, and other items required to build and integrate this new track into the existing trackage with crossovers, shared bridges, etc. Preliminary discussions with Conrail regarding the Hudson to Cleveland route suggest that they may prefer a separate, independent track including major bridge structures to grade separate it from the existing trackage. Additional costs would be incurred in this case, depending on detailed design.

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