FINAL ENVIRONMENTAL IMPACT STATEMENT

Buffalo Light Rail Rapid Transit Project

UMTA PROJECT NO. NY-03-0072

U.S. DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION

DECEMBER 1977

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BUFFALO LIGHT RAIL RAPID TRANSIT PROJECT
BUFFALO, NEW YORK

UMTA PROJECT NY-03-0072

This transportation improvement is proposed for funding under an Urban Mass Transportation Administration capital grant.

This statement is submitted pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, Sections 3(d) and 14 of the Urban Mass Transportation Act of 1964, and Section 106 of the National Historic Preservation Act of 1966.

DEC 15 1977

Date

By: John K. Taylor

John K. Taylor
Acting Associate Administrator
for Transit Assistance

PREFACE

This Environmental Impact Statement (EIS) was prepared by the Urban Mass Transportation Administration (UMTA) in cooperation with the Niagara Frontier Transportation Authority (NFTA) to document the environmental impacts of the proposed Buffalo Light Rail Rapid Transit Project. The proposed project has been the subject of extensive discussion and review with public and local officials since 1969.

The draft EIS was circulated to various Federal, State and local agencies and to interested organizations and individuals in accordance with applicable guidelines and regulations. UMTA received comments on this draft for 60 days after the official start of circulation on Friday, June 3. A public hearing was held in Buffalo July 14, 1977. UMTA and the NFTA jointly have addressed all substantive comments on the social, economic, and environmental issues in this final EIS. Changes from the draft EIS are indicated by vertical margin lines in this final text.

Copies of the final Statement may be obtained, as supplies permit, or inspected at:

Urban Mass Transportation Administration
Region II
26 Federal Plaza
New York, New York 10007

Metro Construction Division
Niagara Frontier Transportation Authority
1900 Rand Building
Buffalo, New York 14203

Copies of the final Statement may be inspected at:

<u>New York State Planning and Development Clearinghouse</u>
Division of the Budget
State Capitol Building
Albany, New York 12224

<u>Erie-Niagara Counties Regional Planning Board</u>
Northtown Plaza
3103 Sheridan Drive
Amherst, New York 14216

Public Libraries

Buffalo & Erie County Public Library System

The Statement can be purchased from:

Environmental Law Institute
1346 Connecticut Avenue, N.W.
Washington, D.C. 20036

SUMMARY
FINAL ENVIRONMENTAL IMPACT STATEMENT

DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION

1. Name of Action: Administrative Action

2. Description of Proposed Action:

A. The Niagara Frontier Transportation Authority of New York (NFTA) proposes to construct and equip a 6.4-mile Light Rail Rapid Transit (LRRT) System along Main Street in the Buffalo-Amherst Corridor, New York. The proposed LRRT would run in subway for 5.2 miles between the South Campus of the State University of New York at Buffalo and Tupper Street, and at-grade for 1.2 miles from Tupper Street to Buffalo's Memorial Auditorium. In conjunction with this project, Main Street between Tupper and Church Streets will be developed as an auto-free pedestrian mall. The project includes 3.5 miles of rock tunneling, 1.7 miles of cut-and-cover construction, and 1.2 miles of at-grade construction. Fourteen stations will be constructed, eight underground, and six at-grade. Three locations near the southern terminus of the proposed rail line were considered as service and storage yards, the South, Ellicott, and Terminal sites, with the latter having been selected. Forty-seven Light Rail Vehicles, supplied with power from overhead catenary lines, will be purchased. Existing bus routes will be realigned and supplemented to provide feeder bus service.

B. The project will require capital assistance under the Urban Mass Transportation Act of 1964, as amended. The total project cost is estimated at $336,250,000. The Federal share will be $269,000,000.

C. UMTA Project No. NY-03-0072

3. Summary of Effects

A. Long-Term Beneficial Effects

1. Provision of rail passenger service would increase ease of accessibility to the Central Business District (CBD) and all points along the transit route, particularly for the transit dependent. Mobility would be improved for the elderly and handicapped.

2. The project should stimulate the regional economy and spur development, especially in the Buffalo-Amherst Corridor.

3. The mall and associated reduction in auto travel would enhance the pedestrian and transportation environment in the Central Business District.

4. The project would allow local planners to adopt policies which could reduce automobile use, thereby promoting energy savings and improved regional air quality.

B. Long-Term Adverse Effects

1. As of September 1977, it is estimated that approximately five parcels, four of which are residential, would be taken for stations along Main Street. Many of these properties consist of vacant land or presently unoccupied structures. Four parcels would be acquired for vent shafts in the tunnel area and possibly eight businesses would require relocation. Many of the right-of-way takings under consideration are City owned.

2. If a new spur is constructed to maintain rail service to businesses across South Park Avenue from the Terminal yard site, 8.3 acres of public land encompassing the Delaware, Lackawanna & Western Railroad depot property and 2.6 acres of private land would be taken; three structures would be razed.

3. Mixed-traffic operations may result in increased accidents. However, the trend in numbers of accidents is not certain; the anticipated reduction in vehicular traffic in this section may result in a better rather than worse safety record.

4. The closure of Main Street in conjunction with the downtown auto-free pedestrian mall is expected to cause little additional traffic congestion if the capacity of the streets that must absorb the shifted traffic is increased by eliminating parking, improving service vehicle practices, correcting traffic signal synchronization, etc. If these improvements are not made, traffic congestion from the closure of Main Street is expected to be severe.

5. System operation may increase traffic congestion and aggravate parking problems near stations.

6. The presence of stations and overhead power lines and associated support elements would constitute a visual intrusion along at-grade sections.

C. Short-Term Adverse Effects During Construction

1. Temporary traffic congestion, and pedestrian inconvenience.

2. Increased noise, vibration, and air pollutant emissions would occur, particularly in at-grade and cut-and-cover sections and at station sites.

3. The visual environment would be adversely affected by construction equipment, barriers, torn-up pavement.

4. Possible disruption to business activities may occur wherever normal traffic flow is impeded.

5. Temporary right-of-way easements on approximately ten parcels containing three residences and portions of five others may be required, involving two possible business relocations and temporary disruption to two others.

4. Alternatives Considered

A. Upgrade existing bus service commensurate with population growth to provide the same level of service on a per capita basis. [This is considered inevitable and is therefore equivalent to "No Action."]

B. Advanced Bus-Based Systems--Bus-only traffic lanes, bus priorities, busways

C. Commuter Railroad

D. Heavy Rail Transit--11- and 6.6-mile systems were considered, with various lateral extensions

E. Light Rail Transit--11- and 6.4-mile systems considered, with various lateral extensions

F. Light Rail Rapid Transit--11-mile system and various lateral extensions considered

G. Elevation Alternatives

5. The following is a partial list of those organizations and individuals to whom the Draft Environmental Impact Statement was circulated and who will receive copies of the Final Environmental Impact Statement.

FEDERAL

- U.S. Environmental Protection Agency Washington, D.C.
- U.S. Department of Health, Education and Welfare Washington, D.C.
- U.S. Department of Commerce Washington, D.C.
- U.S. Department of the Interior Washington, D.C.
- U.S. Department of Agriculature, Soil Conservation Service, Syracuse, New York
- Advisory Council on Historic Preservation Washington, D.C.
- U.S. Department of Transportation, Federal Highway Administration, Washington, D.C.
- U.S. Department of Transportation, Federal Railroad Administration, Washington, D.C.

- U.S. Department of Transportation, Acting Assistant Secretary for Environment Safety and Consumer Affairs Washington, D.C.
- Interstate Commerce Commission Washington, D.C.
- Federal Energy Administration Regional Director, Buffalo, New York
- U.S. Army Corps of Engineers District Engineer, Buffalo, New York
- Representative Henry Nowak Washington, D.C.
- Representative Jack Kemp Washington, D.C.
- Representative John LaFalce Washington, D.C.
- U.S. Department of Housing & Urban Development Buffalo, New York
- Environmental Protection Agency, Region II New York, New York

STATE

- New York State Energy Office, Empire State Plaza Albany, New York
- State Clearing House, New York State Office of Planning Services, Albany, New York
- New York State Historic Preservation Officer Deputy Commissioner of Historic Preservation N.Y.S. Parks & Recreation Agency, Albany, New York
- N.Y.S. Department of Transporation Commissioner, Albany, New York
- N.Y.S. Department of Transportation Director, Development Division, Albany, New York
- N.Y.S. Division of Human Rights Buffalo, New York
- N.Y.S. Department of Environmental Conservation Buffalo, New York
- N.Y.S. Office of Parks & Recreation Niagara Reservation, Niagara Falls, New York
- N.Y.S. Department of Commerce Buffalo, New York
- N.Y.S. Education Department Donovan State Office Building, Buffalo, New York
- N.Y.S. Office of General Services Donovan State Office Building, Buffalo, New York
- N.Y.S. Department of Labor Buffalo State Office Building, Buffalo, New York

- N.Y.S. Department of Social Services
  Buffalo, New York
- State University of New York at Buffalo
  President, Buffalo, New York
- State University of New York at Buffalo
  Office of Facilities & Planning, Buffalo, New York
- N.Y.S. Department of Health
  Buffalo, New York
- N.Y.S. Department of Transportation
  Buffalo
- State University Construction Fund
  Williamsville, New York
- N.Y.S. Urban Development Corporation
  Getzville, New York
- N.Y.S. Department of Social Services
  Commission for the Visually Handicapped
  Supervisor for Social Services, Buffalo, New York
- Rachel Carson College, Ellicott Complex
  State University of New York at Buffalo,
  Buffalo, New York
- N.Y.S. Department of Environmental Conservation
  Office of Environmental Analysis, Albany, New York

LOCAL

- Erie & Niagara Counties Regional Planning Board
  Regional Director, Buffalo, New York
- Erie County Executive
  Buffalo, New York
- Erie County Health Department
  Buffalo, New York
- Health Systems Agency, Buffalo, New York
- Erie County Office for the Aged
  Buffalo, New York
- Erie County Department of Environmental Quality
  Buffalo, New York
- Erie County Department of Public Works
  Buffalo, New York
- Erie County Water Authority
  Buffalo, New York
- Erie County Environmental Management Council
  Buffalo, New York
- Erie County Department of Parks & Recreation
  Buffalo, New York
- Erie County Development Coordination Board
  Buffalo, New York
- Erie County Planning Division
  Director, Buffalo, New York
- City of Buffalo Common Council
  Buffalo, New York
- City of Buffalo Department of Community Development
  Buffalo, New York
- City of Buffalo Department of Transportation
  Buffalo, New York

- City of Buffalo Sewer Authority
  Buffalo, New York
- City of Buffalo Police Department
  Buffalo, New York
- City of Buffalo Fire Department
  Buffalo, New York
- Greater Buffalo Development Foundation
  Vice President, Buffalo, New York
- Urban Waterfront Advisory Committee
  Executive Director, Buffalo, New York
- Hon. Stanley Makowski, Mayor
  City of Buffalo, Buffalo, New York
- Department of Community Development
  Buffalo, New York
- Department of Transportation
  Commissioner, Buffalo, New York
- Town of Amherst, Supervisor
  Amherst, New York
- Niagara Frontier Transportation Committee
  Buffalo, New York
- Niagara Group Sierra Club
  Eggertsville, New York
- Environmental Clearinghouse Organization
  Buffalo, New York
- Buffalo Evening News
  Buffalo, New York
- Buffalo Courier Express, City Editor
  Buffalo, New York
- Erie County League of Women Voters
  Buffalo, New York
- Town of Amherst Planning Director
  Williamsville, New York
- Buffalo & Erie County Public Libraries
  - Main Library
  - Crane Branch
  - Fairfield Branch
  - Kensington Branch
  - N. Jefferson Branch
  - Martin Luther King Branch
  - Eggertsville-Snyder Branch
  - Williamsville Branch
- Buffalo General Hospital
  Buffalo, New York
- E. J. Meyer Memorial Hospital
  Buffalo, New York
- Action for Employment
  Buffalo, New York
- Blind Association of Western New York
  Executive Director, Buffalo, New York
- Buffalo Goodwill Industries
  Buffalo, New York

- Building Barriers Committee
  Buffalo, New York
- Children's Rehabilitation Center
  Buffalo, New York
- N.Y.S. Association for Retarded Children
  Erie County Chapter, Buffalo, New York
- Research & Planning Council for Community Services
  Buffalo, New York
- St. Mary's School for the Deaf
  Buffalo, New York
- Erie County Office for the Aged
  Executive Director, Buffalo, New York
- Niagara Frontier Vocational Rehabilitation Center, Inc.
  Executive Director, Buffalo, New York
- Council of Senior Citizen Clubs of Buffalo & Erie County, Inc.
  Chairman, Transporattion Committee, Buffalo, New York
- Forest District Civic Association
  Corresponding Secretary, Buffalo, New York
- United Taxpayer's League of Buffalo & Erie County, Inc.
  President, Buffalo, New York
- Environmental Assessment Coordinator
  Buffalo, New York
- American Automobile Association
  Safety Department, Buffalo, New York
- Walter Faxlanger
  Amherst, New York
- Department of Anthropology, Director, Archeological Survey, State University of N.Y. at Buffalo,
  Buffalo, New York
- John A. Williams, Williams Gold Refining Co., Inc.
  Buffalo, New York

CONSULTANTS

- Day & Zimmermann, Inc.
  Philadelphia, Pennsylvania
- Urban Engineers
  Buffalo, New York
- Corddry, Carpenter, Dietz & Zack
  West Seneca, New York
- Hatch Associates
  Buffalo, New York
- Alan M. Voorhees & Associates
  McLean, Virginia

6. Circulation of the draft Environmental Impact Statement began June 3, 1977 and this Final Environmental Impact Statement is being made available in December 1977.

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BUFFALO'S CENTRAL BUSINESS DISTRICT

SECTION 1

1 - REGIONAL PERSPECTIVE

Buffalo, New York is located at the eastern end of Lake Erie near Niagara Falls and on the International Boundary between Canada and the United States. Figure 1-1 includes an insert vicinity map of New York showing the location of the Buffalo Standard Metropolitan Statistical Area (SMSA). The map of northwestern New York shows the geographic relationship of the project setting to prominent regional features and identifies Erie and Niagara Counties as not only the Buffalo SMSA, but also the Niagara Frontier Transportation District and the regional planning area.

Mass transit studies for the Buffalo area have shown the Buffalo-Amherst and Buffalo-Tonawanda Corridors to be particularly suited to a mass transit system. This report focuses on the primary candidate for initial mass transit improvements, the Metro Corridor (Figure 1-1), a portion of the Buffalo-Amherst Corridor.

Quality of life studies compare the overall well-being of citizens based upon community socioeconomic, environmental, and public service characteristics. Buffalo, with the 27th largest SMSA population (Ref. 1), was ranked "Excellent" in overall quality of life in a 1975 report (Ref. 2). The findings of the referenced study are summarized in Table 1-1. A 1972 quality of life study (Ref. 3) involving 18 large metropolitan areas ranked Buffalo 18th--last--and deteriorating in quality of transportation.

TABLE 1-1

BUFFALO'S QUALITY OF LIFE RATINGS

Category	Rating	Rank Amongst 65 Largest SMSA's
Overall Quality of Life	Excellent	15
Political	Outstanding	1
Social	Excellent	18
Health and Education	Excellent	25
Economic	Good	32
Environmental	Adequate	45

Source: Ref. 2

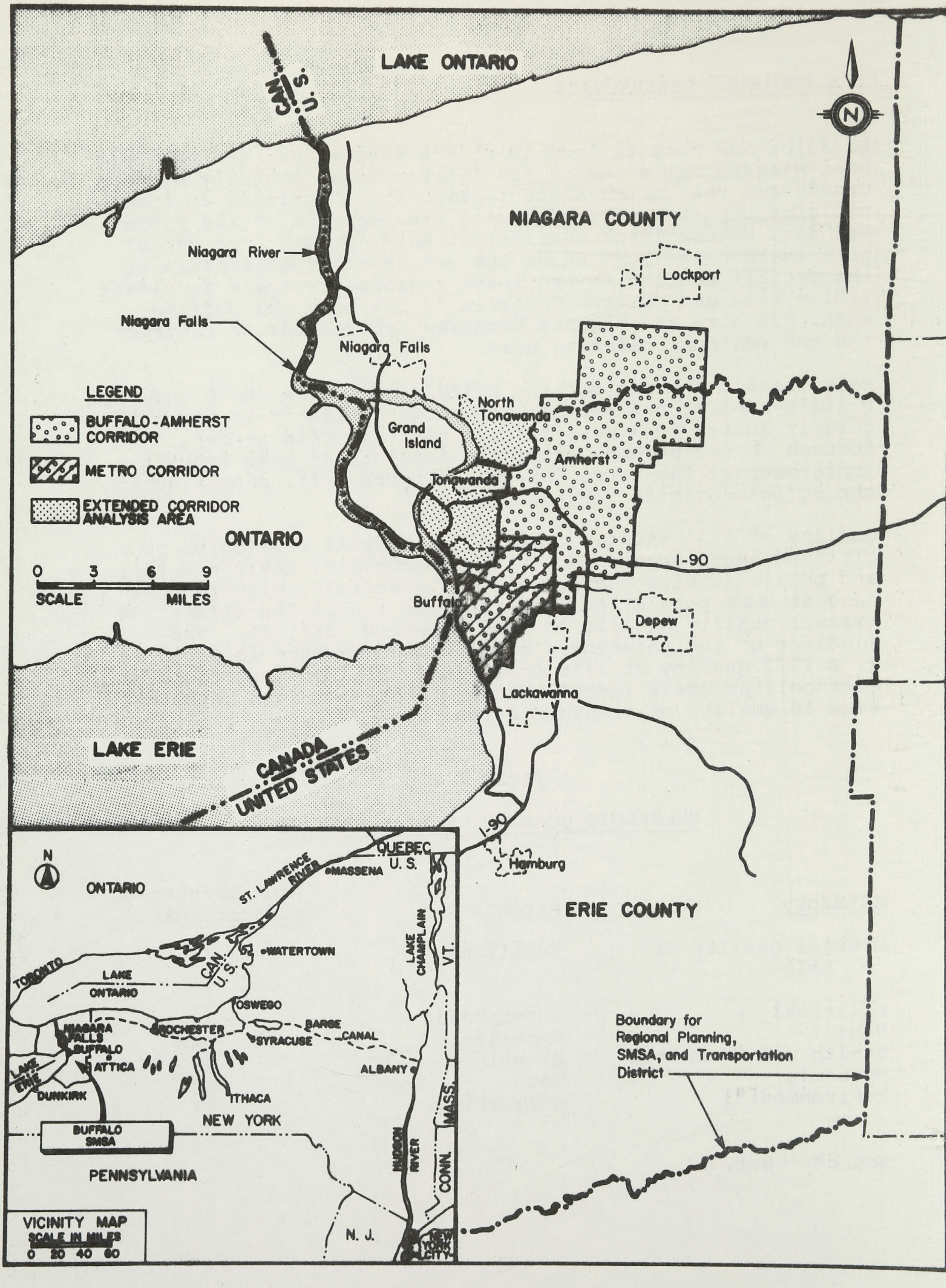


Figure 1-1. Buffalo Study Area Location

Buffalo is located in what is generally defined as the Lake Plains Climatic Area (Ref. 4). Wide swings in temperature, characteristic of the latitude, are moderated somewhat by the proximity of Lakes Erie and Ontario. The City's location adjacent to Lake Erie results in high wind speeds throughout the year (Ref. 5). Buffalo is situated in the "snow belt" in northwestern New York and records the greatest average annual snowfall (almost 7 feet) of any large U.S. city. The winter weather in Buffalo includes occasional periods during which auto and bus travel is inadvisable or even impossible due to poor visibility and drifting snow. This makes reliable mass transit particularly attractive to commuters.

The Buffalo SMSA has had the same experience as many other metropolitan areas in the northeastern U.S.--modest population growth during the 1960's (3 percent in 10 years) and annual declines since 1970 (1.6 percent in the first five years of this decade). Population shifts within the SMSA have been from the central City to the suburbs, with a corresponding shift in economic activity. Implementation of an improved transit system may act as a catalyst to reverse these downward trends and revitalize the City and regional economic picture.

SECTION 2

2 - METRO CORRIDOR SETTING

This section describes the existing environment in the Metro Corridor (i.e., the areas on either side of Main Street between the Buffalo Central Business District (CBD) and the South Campus of the State University of New York at Buffalo (SUNYAB)). This area would be strongly affected by mass transit improvements and is used as a basis for discussion of project impacts in Section 5. Figure 2-1 locates many of the items discussed in this section.

2.1 - Geology

Buffalo is situated in an area of gentle relief. The local topography is dominated by the moraines, interglacial lake-beds, and beach ridges that formed during recent glacial periods. Bedrock consists of limestone and limy shale. Along the southern portion of the Metro Corridor (i.e., south of Delavan Avenue), the rock surface lies from 20 to over 65 feet below the ground surface and is covered by permeable sands containing variable amounts of clay and silt.

Rock is very near the ground surface between Delavan and Bailey Avenues in the northern portion of the Metro Corridor. Thin- to medium-bedded limestone predominates. Horizontal joints (cracks) give the limestones a slabby character. In addition, vertical joints are irregularly spaced along these beds. Most of this rock is hard and shows little sign of weakening from weathering processes.

From the northern portion of the Metro Corridor toward Amherst and Tonawanda, the depth of the rock surface varies from a few feet to over 60 feet. In Amherst, the bedrock is generally a shaly thin-bedded limestone with scattered gypsum seams and solution cavities. In Tonawanda, the bedrock is a mixture of shale and limestone. The overburden in both areas is dominated by glacially deposited rubble and nearly impermeable clayey silts with some sand.

The earthquake history of the Erie-Niagara region is reviewed in detail in Reference 5. Only seven earthquakes within 150 miles of Buffalo have been recorded during the past 300 years, none of them large. The most severe earthquake occurred on August 12, 1929, near Attica, some 40 miles east

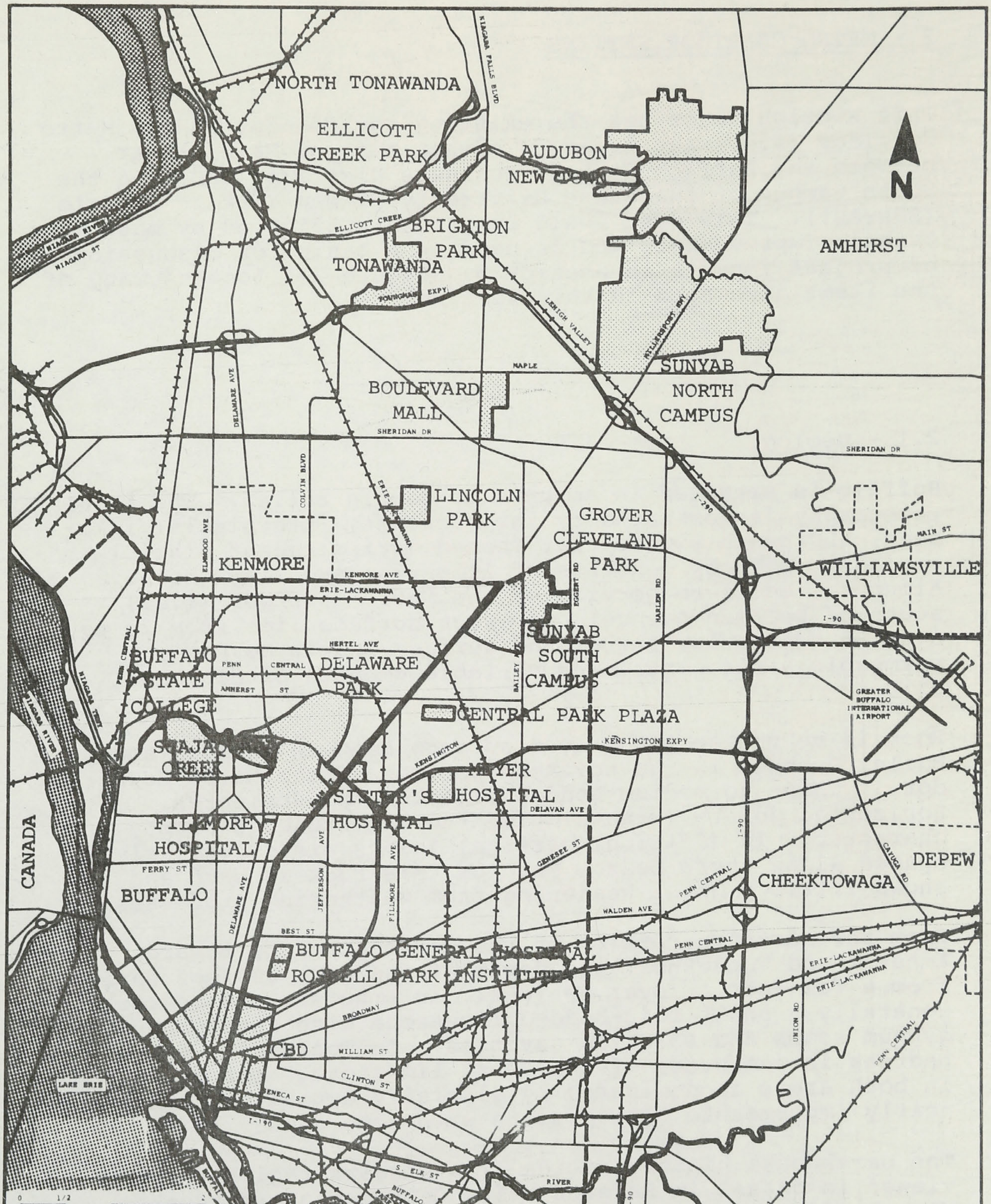


Figure 2-1. Buffalo-Amherst Corridor, Major Features

of Buffalo. Structural damage was minor, confined chiefly to the toppling of a number of brick chimneys in the surrounding area. This temblor is estimated to have measured between 5.5 and 6.1 on the Richter Scale. This earthquake occurred along the Clarendon-Linden fault, which lies some 35 miles east of the Metro Corridor at its nearest point.

As a guideline to the level of structural design needed, the National Oceanographic and Atmospheric Administration and the U.S. Geological Survey divided the continental U.S. into zones designated 0 to 3 in order of increasing earthquake damage risk. Buffalo is included in a Zone 3 area chiefly due to regional structural geology and not earthquake history. Based only upon past earthquakes, Buffalo would be assigned Zone 1 or marginally Zone 2 risk (low damage risk).

A preliminary report and earthquake hazard map prepared by the U.S. Geologic Survey (Ref. 6) indicates that only a 10-percent chance exists that Buffalo will experience a maximum horizontal acceleration greater than 4-9 percent that of gravity at least once every 50 years. For the same percentage chance of occurrence, a maximum acceleration of 9 and 60 percent could be expected for New York and San Francisco, respectively, cities with major rail transit systems.

Reference 5 notes that underground structures tunneled in firm ground would not need any special seismic design. Underground structures tunneled in very soft soil or built by the cut-and-cover method should receive earthquake analyses. Reference 5 recommends a peak ground acceleration of 15 percent that of gravity be adopted as the seismic design criterion.

2.2 - Water Resources

Overburden deposits along the Metro Corridor vary from nearly impermeable silts and clays to well-drained gravelly sands. Although the nonfractured portions of the underlying bedrock are largely water-tight, interconnected joints and fractures may allow sizable water flows through the rock mass. The water table in the southern portion of the Metro Corridor ranges from as little as 10 feet below the ground surface near the Buffalo River to over 30 feet in the vicinity of High Street (about ¼ mile south of Best Street in Figure 2-1). North of High Street, the water table is relatively shallow, rising to within 15 feet of the surface in the overburden deposits as far north as Northland Avenue (about ¼ mile south of Delavan Avenue). Along the northern portion of the Metro Corridor, the water table lies in rock from 15 to 40 feet below ground. Here, joint systems in the rock control groundwater movement.

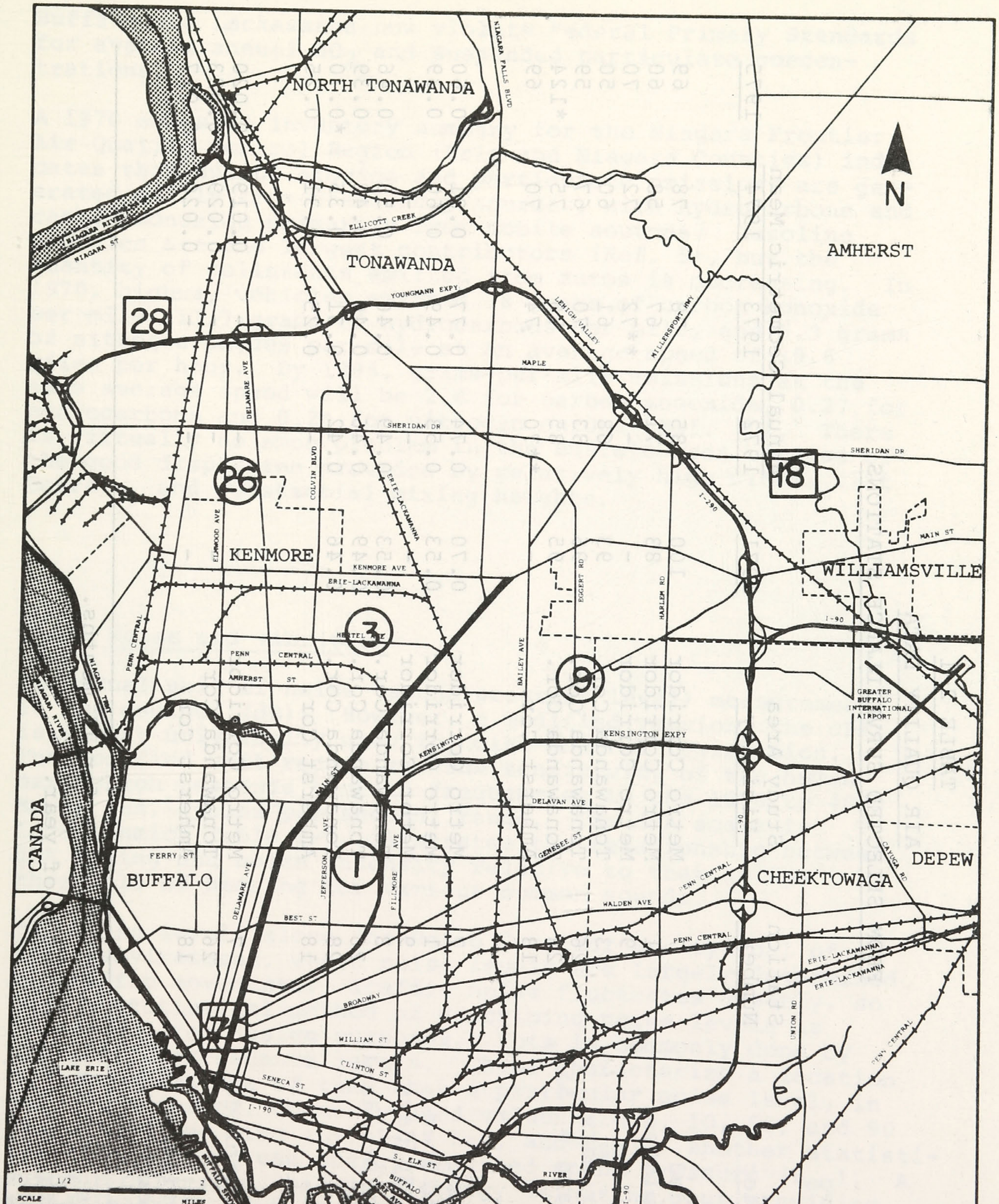
The chemical nature of the groundwater resources found along the Metro Corridor severely limits their use. Typically, the groundwater is very hard, has a high concentration of dissolved solids with a sulfate content that ranges from moderate to objectionably high, and is quite saline. Some groundwater along the route also has a high iron content. Four wells exist along the proposed route, but none is currently in use.

Only one local body of water, Scajaquada Creek, is intersected by the Metro Corridor (Figure 2-1). The creek crosses the proposed rail alignment via an underground conduit just north of Delavan Avenue. Detailed information on Scajaquada Creek and other surface water resources in the Niagara Frontier Transportation District may be found in Reference 5.

2.3 - Air Quality

Extensive air quality data have been compiled since 1970 by the Erie County Department of Environmental Quality (DEQ) Air Quality Division. The DEQ's Air Surveillance Network consists of 28 stations where settleable and suspended particulates, sulfur dioxide, and sulfation rate are analyzed periodically; and 4 Continuous Air Monitors (CAM's) where particulates, sulfur dioxide (SO_2), nitrogen oxides (NO_x), and ozone are monitored. Of these 32 stations, 7 are located within the study area: Stations 1, 7 (CAM), and 9 essentially along the CBD-South Campus Metro Corridor; Stations 3, 26, and 28 (CAM) in the "Tonawanda Corridor" (northwest of the South Campus); and Station 18 (CAM) in the "Amherst Corridor" (northeast of the South Campus) (Figure 2-2).

Table 2-1 presents air quality data for these stations (Ref. 7). Note that at all locations air quality has been steadily improving since 1971, due to stringent controls enacted when the Environmental Protection Agency (EPA) classified Erie County as a high priority area with respect to SO_2 abatement. Reference 7 indicates that Erie County only South



(1) AIR MONITORING STATION

[18] CONTINUOUS AIR MONITORING STATION (CAM)

MAIN STREET IN METRO CORRIDOR

Figure 2-2. Air Quality Surveillance Network

Source: Ref. 7

TABLE 2-1

AIR QUALITY DATA

FROM SELECTED SURVEILLANCE STATIONS

Parameter	Station Number	Study Area Vicinity	1971	Annual Geometric Mean 1972	1973	1974	1975
Suspended Particulates, $\mu g/m^3$	7	Metro Corridor	100	85	78	78	69
	1	Metro Corridor	83	71	67	58	60
	9	Metro Corridor	-	-	**72	72	70
(EPA Primary Standard = 75)	3	Tonawanda Cor.	93	68	61	60	50
	26	Tonawanda Cor.	96	83	70	67	59
	28	Tonawanda Cor.	95	85	76	75	*124
	18	Amherst Cor.	-	**70	74	70	69
Setteable Particulates, $mg/cm^2/30$ days	7	Metro Corridor	0.70	0.74	0.77	0.81	0.60
	1	Metro Corridor	0.53	0.53	0.49	0.60	0.39
	9	Metor Corridor	-	-	-	-	-
(No EPA Standard)	3	Tonawanda Cor.	0.53	0.49	0.46	0.53	0.46
	26	Tonawanda Cor.	0.49	0.46	0.46	0.42	0.39
	28	Tonawanda Cor.	0.46	0.42	0.31	0.35	*0.70
	18	Amherst Cor.	-	-	0.25	0.31	0.25
Sulfur Dioxide, mg/l	7	Metro Corridor	-	-	-	0.019	0.020
	26	Tonawanda Cor.	-	-	-	0.029	0.023
(EPA Primary Standard = 0.03)	18	Amherst Cor.	-	-	-	0.020	0.017

* Construction adjacent to site for 11 months.

** Data for last 6 months of year.

Source: Ref. 7.

Buffalo and Lackawanna now violate Federal Primary Standards for average annual SO_2 and suspended particulate concentrations.

A 1970 emission inventory summary for the Niagara Frontier Air Quality Control Region (Erie and Niagara Counties) indicates that sulfur dioxide and particulate emissions are generated mainly from stationary sources, with hydrocarbons and carbon monoxide primarily from mobile sources. Gasoline vehicles are the largest contributors (Ref. 5), but the quantity of pollutants emitted from autos is decreasing. In 1970, highway vehicles emitted 78 grams of carbon monoxide per mile, 11.7 grams of hydrocarbons per mile, and 5.3 grams of nitrogen oxides per mile at an average speed of 19.6 miles per hour. By 1995, grams-per-mile emissions at the same average speed will be 2.8 for carbon monoxide, 0.27 for hydrocarbons and 0.24 for nitrogen oxides (Ref. 8). There is virtually no smog problem in the Buffalo area because of the good dispersion provided by relatively high winds, flat terrain, and substantial mixing heights.

2.4 - Noise and Vibration

The usual unit of noise (sound pressure level) measurement is the decibel (dB). However, a modified version, the dBA, is almost universally used in noise control legislation. The modified unit recognizes the sensitivity of the human ear, which responds best to frequencies in the 1000 to 4000 Hertz (Hz, cycles per second) range. The dBA scale is logarithmic; Table 2-2 illustrates the relationship between dBA rating and noise intensity relative to that at the threshold of hearing for various common sounds.

The noise levels along the Metro Corridor are typical of an urban environment, where noise levels are largely determined by traffic movements. Traffic noise fluctuates greatly, so that a statistical method of describing noise levels is often used for design purposes. This is commonly done by the use of exceedance levels. These characterize a location by the percentage of time that a particular noise level, in dBA, is exceeded. Commonly used values are 1, 10, 50, and 90 percent of the time (L_1, L_{10}, L_{50}, and L_{90}). Another statistical method is to use energy weighted sound pressure (L_{eq}). A further criterion, based on energy weighting, but providing an additional weighting for fluctuations, is Noise Pollution Level, L_{NP}. Exceedance levels are widely used in highway

TABLE 2-2

COMPARISON OF INTENSITY, SOUND PRESSURE LEVEL, AND COMMON SOUNDS

Source of Sound	Sound Pressure Level dBA	Relative Energy Intensity
Artillery fire	140	100,000,000,000,000
Threshold of pain	130	10,000,000,000,000
Jet aircraft take-off at 200 feet	120	1,000,000,000,000
Riveting machine at 10 feet	110	100,000,000,000
Inside propellor plane	100	10,000,000,000
Full symphony or band	90	1,000,000,000
Inside auto at high speed	80	100,000,000
Vacuum cleaner at 10 feet	70	10,000,000
Conversation, face-to-face	60	1,000,000
Inside general office	50	100,000
Inside private office	40	10,000
Inside bedroom	30	1,000
Inside empty theater	20	100

design work, but energy weighted sound levels are also becoming quite common. Reference 9 discusses the preceding topics in greater depth.

A two-phase noise measuring program was undertaken to determine the existing noise environment along the Metro Corridor (Ref. 5). The noise sampling sites selected were generally located near residences or other noise- or vibration-sensitive buildings that might be expected to be affected by transit system construction or operation. Several structures of special note situated within one block of Main Street and hence within range of possible noise or vibration impacts from a transit system are listed in Table 2-3.

The first phase of the program covered a relatively large number of sites (31) at which peak noise levels (L_{max}) and median (L_{50}) levels were obtained. These are presented in Table 2-4 and Figure 2-3. Of the 31 sites, 29 were surveyed during daytime rush hours and 8 during late night hours. In general, the daytime rush hour measurements were made between 7 and 9 a.m. or 4 and 6 p.m.; the daytime non-rush hour measurements between 9 and 11 a.m. and 1 and 4 p.m.; evening measurements between 7 p.m. and midnight; and the night measurements between midnight and 3 a.m. In the second phase of the program, readings were taken over several days at site No. 24 to develop a 24-hour noise profile (Table 2-5).

Two sets of noise criteria are available to evaluate the noise situation along the Metro Corridor. The Institute for Rapid Transit (IRT, now the American Public Transit Association, APTA) classifies areas according to the ambient (existing background) noise levels at night (Ref. 11). Measurements in Table 2-4 are rated using the APTA criteria in Table 2-6, and the resulting classification is given in Table 2-7.

The second set of criteria is that adopted by the Department of Housing and Urban Development (HUD) for assessing suitability for housing development. In the policy circular that sets out the HUD noise abatement policy, these criteria are expressed in terms of outdoor levels not to be exceeded for more than so many minutes per 8- or 24-hour period. They can also be approximated in a standard statistical format and converted to L_{eq} and L_{NP} (Ref. 9). Table 2-8 compares the detailed measurements at site No. 24 to the HUD criteria.

The results of this noise measuring program indicate that the southern portion of the Metro Corridor is predominantly in a high noise area, while the northern portion comprises quieter, residential areas. Since no significant vibration sources are known along the Corridor, no vibration measurements were taken.

TABLE 2-3

EXAMPLES OF ACOUSTICALLY-SENSITIVE STRUCTURES IN METRO CORRIDOR

Type	Name	Vicinity	Nearest Sample Site
Hospital/ Health Service	Sisters of Charity Hospital	Main & Kensington	#14
	SUNYAB 2211 Main St. (formerly Marine Hospital, now off-campus office and research facility)	Main & Kensington	#14
	Saint Mary's School for the Deaf	Main & Kensington	#14
	St. Francis Hospital	Main near Hertel	2 blks. South of #25
Historical Significance	St. Paul's Episcopal Cathedral	Church & Erie (CBD)	2 blks. South of #7
	Saint Louis Roman Catholic Church	Main & Edward	1 blk. North of #8
	1624 Main St.: 2-story, brick building reputedly blacksmith shop on old Batavia-Buffalo Road	Main & Michigan	1 blk. South of #11

TABLE 2-3 (Concluded)

Type	Name	Vicinity	Nearest Sample Site
Educational	SUNYAB South Campus	Main & Kenmore	#29, 30
	Main-Delavan School	Main & Delavan	1 blk. North of #11
	Canisius College	Main & Jefferson	#13

TABLE 2-4

SOUND LEVELS ALONG METRO CORRIDOR

All values are in dBA, Median (L_{50})/Maximum (L_{max})

Site Number	Location	Neighbor-hood Type*	Measurement Period: Daytime Rush Hour	Daytime Non-Rush Hour	Evening	Night
1	Miami behind P.S. #4	R,S,I	56/59	59/64	52/70	47/60
2	Mackinaw at Tennessee	R	55/60	57/64	50/60	48/51
3	Curb near South Park	R,C	66/75	65/80	58/72	49/77
4	Scott at Main	C,F	64/68	67/74		
5	Marine Dr. behind Aud.	C,F	66/72	65/71		
6	Marine Dr. Apartments	R,F	63/66	64/76	55/62	52/58
7	Lafayette Square	C	67/73	66/73		
8	Main near Studio Arena	C	70/78	68/75		
9	Near Main and High	C	66/77	67/74	64/72	
10	Near Main and Glenwood	C	65/78	62/70	60/66	
11	Masten near Main	R,C	65/70	63/68		
12	Eastwood at Humboldt	R,F	69/72	69/74		
13	Eastwood at Main	R,S	63/68	62/69		
14	Robie at Main	R,H	65/72	63/74		
15	Willow Lawn at Main	R,S,C	63/76	63/67	54/70	
16	Loring at Humboldt	R,F	69/76	69/80	64/71	
17	Glenny Drive	R,F	63/69	64/73	57/62	52/56
18	Burgard Vocational HS	R,C,S,F	65/73	67/70		
19	Warwick near playground	R,F	62/68	64/68		
20	Meyer Mem. Hospital	R,H	61/70	60/69	54/59	
21	North End of Federal	R,I	51/54	56/59	48/56	41/54
22	Curb near 67 Clarence	R,I	51/63	61/65	49/55	
23	Mercer and Manhattan	R,C	57/68	52/60	51/72	
24	Hill and Manhattan	R,C,S	51/64	46/54	46/49	36/42
25	Shoshone Park	R,I	50/55	48/54		
26	Parkside Ct.	R	49/60	46/78	48/57	43/45
27	Near LaSalle & Cordova	R,C		50/57		
28	Minnesota at Main	R,C	65/72	63/70		

TABLE 2-4 (Concluded)

Number	Location	Neighborhood Type	Measurement Period: Daytime Rush Hour	Daytime Non-Rush Hour	Evening	Night
29	Main Circle SUNYAB S.	S	54/68	52/68		
30	Diefendorf Loop SUNYAB S.	S		53/62		
31	Crosby near Crosby Cir.	R,C	56/62	58/63	50/70	

* KEY: R = Residential I = Industrial H = Hospital
C = Commercial S = School F = Freeway

Source: Ref. 10

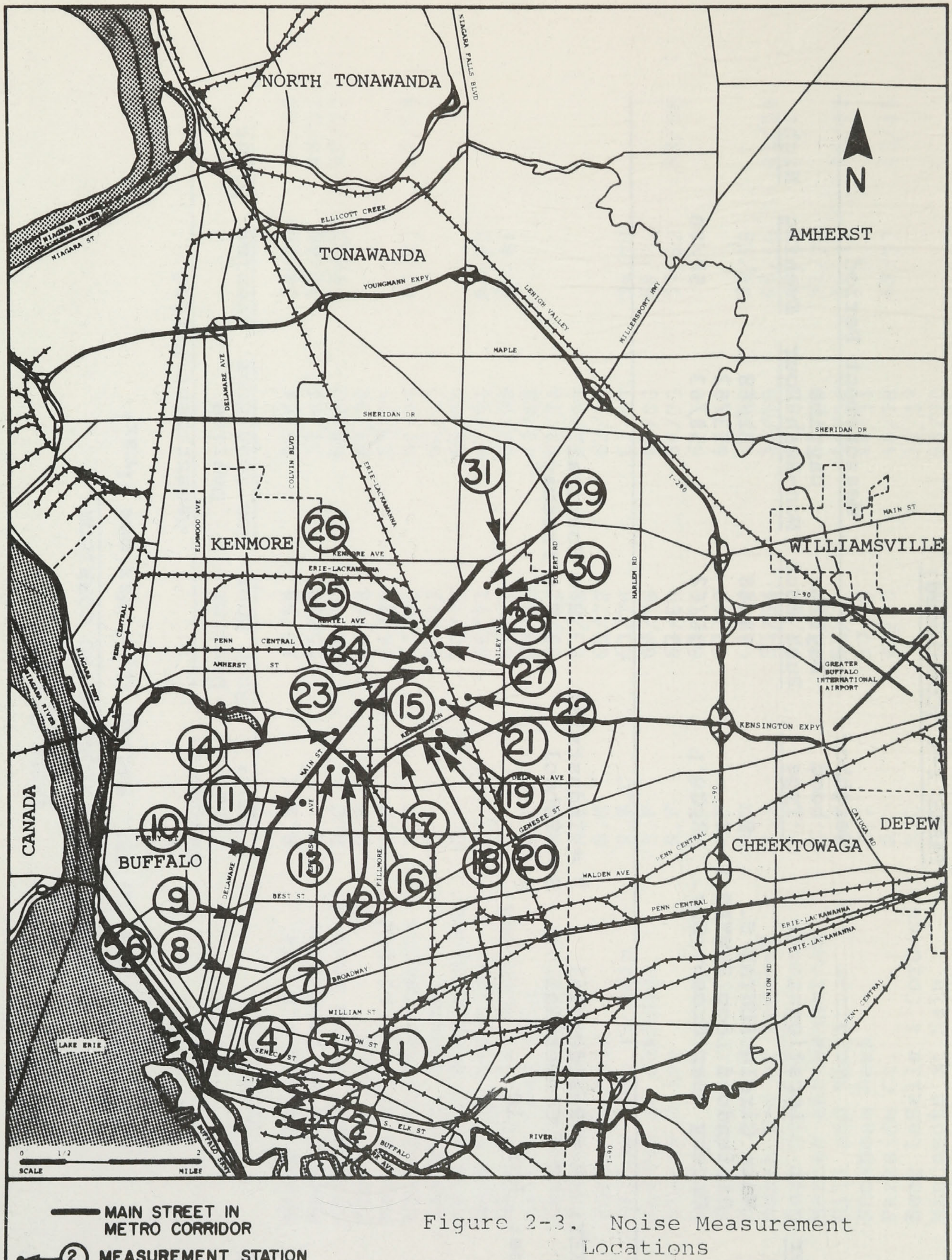


Figure 2-3. Noise Measurement Locations

Source: Ref. 5

TABLE 2-5

DETAILED MEASUREMENTS OF BACKGROUND SOUND LEVELS AT SITE 24 IN METRO CORRIDOR

Exceedance Level	Site No. 24 Measurements, dBA
L_1	60
L_{10}	52
L_{50}	43
L_{90}	37
L_{eq}	50
N_{PL}	66

TABLE 2-6

AMERICAN PUBLIC TRANSIT ASSOCIATION

AREA CLASSIFICATION SYSTEM

Area Category	Area Description	Typical Median (L_{50}) Ambient Noise Levels
1	Low density urban residential, open space park, suburban.	40-50 dBA - day 35-45 dBA - night
2	Average urban residential, quiet apartments and hotels, open space, suburban residential, or occupied outdoor area near busy streets.	45-55 dBA - day 40-50 dBA - night
3	High density urban residential, average semi-residential/commercial areas, parks, museum and non-commercial public building areas.	50-60 dBA - day 45-55 dBA - night
4	Commercial areas with office buildings, retail stores, etc., primarily daytime occupancy. Central business district.	60-70 dBA
5	Industrial areas or freeway and highway corridors.	Over 60 dBA

Source: Ref. 11.

TABLE 2-7

AREA CLASSIFICATION OF METRO CORRIDOR MEASUREMENT SITES

Area Category	Metro Corridor Measurement Sites within Category	Mean Sound Levels for Category, dBA			
		Day Rush	Day Non-rush	Evening	Night
1	24, 25, 26, 27	50	47	47	39
2	21, 23, 29, 30, 31	54	54	50	41
3	1, 2, 3, 11, 13, 14, 15, 20, 22, 28	61	61	53	48
4	4, 5, 6, 7, 8, 9, 10, 12, 16, 17, 18, 19	66	65	61	60

TABLE 2-8

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

NOISE CRITERIA

	Site No. 24 Measurements, dBA	HUD Criteria, dBA			
		Clearly Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable
L_{eq}	50	49	49-62	62-76	76+
L_{NP}	66	62	62-74	74-88	88+

2.5 - Wildlife Habitat and Open Space Resources

The terrestrial habitat in the Buffalo-Amherst Corridor is typical of an urban environment. The Corridor is characterized by intensive residential, industrial, and commercial development with little open space. Wildlife typically consists of urban-adapted forms, mainly squirrels and birds. A Buffalo Ornithological Society bird check list (Ref. 12) contains over 200 bird species, many of which are only occasional visitors.

The largest open space in the Metro Corridor is the Forest Lawn Cemetery-Delaware Park area (Figure 2-1), which is over 750 acres in size. This area boasts numerous mature and young trees, primarily elm, soft maple, and horsechestnut. Wildlife is mainly urban-adapted such as sparrows, numerous other species of birds, and squirrels. Delaware Park is a major bird-watching area because of the large number of transient and seasonal resident bird species. Migratory waterfowl are known to use Delaware Park Lake and adjacent Scajaquada Creek. Duck species consist mainly of puddle-ducks such as mallards, with some diving forms like scaup, redhead, and canvasback.

Along the northern portion of the Metro Corridor, streets are sparsely lined with trees. Trees along Main Street consist primarily of elms with some soft maple, horsechestnut, and European hornbeams. A large Scotch elm is located just east of the Main Street-Winspear Avenue intersection. A "specimen class" Austrian pine is located at the Main Street entrance to the Forest Lawn Cemetery. Wildlife consists of squirrels and urban-tolerant bird species with seasonal and migratory visitants.

The Amherst and Tonawanda Corridors, northeast and northwest of the SUNYAB's South Campus, contain much more open land than the Metro Corridor. At the southern end of these corridors, the primary open area comprises the SUNYAB's South Campus and the adjacent Grover Cleveland Park. The campus consists of lawn, parking lots, and buildings with some scattered trees.

The 112-acre Grover Cleveland Park, a public golf course, is mainly open lawn with trees such as elms, Lombardy poplar, silver maple, and hawthorn. North Bailey Avenue is densely lined with Norway maple, silver maple, and elm between the Main Street and Eggert Road intersections. Lincoln Park, a 65-acre town recreation area between Kenmore Avenue and Sheridan Drive in Tonawanda, contains many mature poplar and maple trees.

To the northeast, some undeveloped areas exist along Ellicott Creek between Niagara Falls Boulevard and Millersport Highway. These areas consist of open and wooded fields containing elms, birch, and maple trees (Ref. 13). Wildlife using these areas consists primarily of birds, with some mammals, such as raccoons, squirrels, rabbits, and voles and an occasional skunk, fox, or deer. Over 20 species of waterfowl may be found along Ellicott Creek during migration periods. In addition, a number of open fields is interspersed among commercial and residential areas along North Bailey Avenue and near the SUNYAB's North Campus.

The largest open space resources in the Tonawanda Corridor are Brighton Park (212 acres) and Ellicott Creek Park (165 acres). Of the two, Ellicott Creek Park offers the greatest wildlife habitat diversity. Within the park are hundreds of fine trees, including hickory, beech, elm, maple, cherry, cottonwood, and ash. The park provides shelter for songbirds, waterfowl, squirrels, and other small birds and mammals.

Two rare and endangered species are known to have been sighted in Western New York--the southern bald eagle (*Haliaeetus leucocephalus*) and the American peregrine falcon (*Falco peregrinus*). However, they are transients known to appear only during migration. Sitings are extremely rare and no local nesting areas have been discovered.

2.6 - Socioeconomic Setting

The socioeconomic setting covers characteristics and trends of population, housing, employment, and business from several perspectives: regional (SMSA), City of Buffalo, and a defined transit corridor study area.

Transit Corridor Study Area

The 1974 Environmental Impact Assessment (EIA) (Ref. 5) for a proposed heavy rail transit line between downtown Buffalo and Amherst defined an urban impact corridor consisting of census tracts on either side of the rail alignment. The transit corridor study area used in this EIS is slightly different. First, the new corridor study area covers only the CBD to South Campus portion of the earlier corridor. Second, the definition of neighborhood areas and census tracts has been revised to include only census tracts wholly or partially within 2000 feet of Main Street. These revisions are in keeping with Main Street's long recognized role as a potential rail transit route and the standard definition wherein "direct patronage" (i.e., people walking to a transit line) is generated from a band three-eighths of a mile on either side of a rail transit line.* Although portions of census tracts frequently extend beyond the 2000 feet used in this definition, the census tract is the smallest unit of measurement for which comparative 1970 and 1975 data is available.

Between the CBD and the Scajaquada Expressway (approximately two-thirds of the distance between the CBD and the South Campus), Main Street marks the boundaries between census tracts and neighborhood planning districts (the latter defined by the Citizens Advisory Committee for the City of Buffalo). North of the expressway, census tract and neighborhood planning district boundaries cross Main Street.

The 1974 EIA grouped census tracts with comparable neighborhood characteristics and assigned a name to each of the sub-areas. With some revisions, the sub-areas used in this study are very similar to those defined in 1974 (Table 2-9, Figure 2-4).

Population Profile and Projections

Population Projections - A number of private firms and public agencies have made population projections for the Buffalo SMSA, the City of Buffalo, and the Towns of Amherst and Tonawanda (Table 2-10). These population estimates are being constantly revised as new information becomes available, with the most recent studies showing a downward revision in population projections from estimates made several years ago. There are fairly substantial differences in the SMSA projections for 1980 and 1985 among the various studies; however, all of the studies predict moderate growth after 1980 to 1995. This growth is expected to occur outside of the City of Buffalo; all the studies predict that population within the City will continue to decline through 1995.

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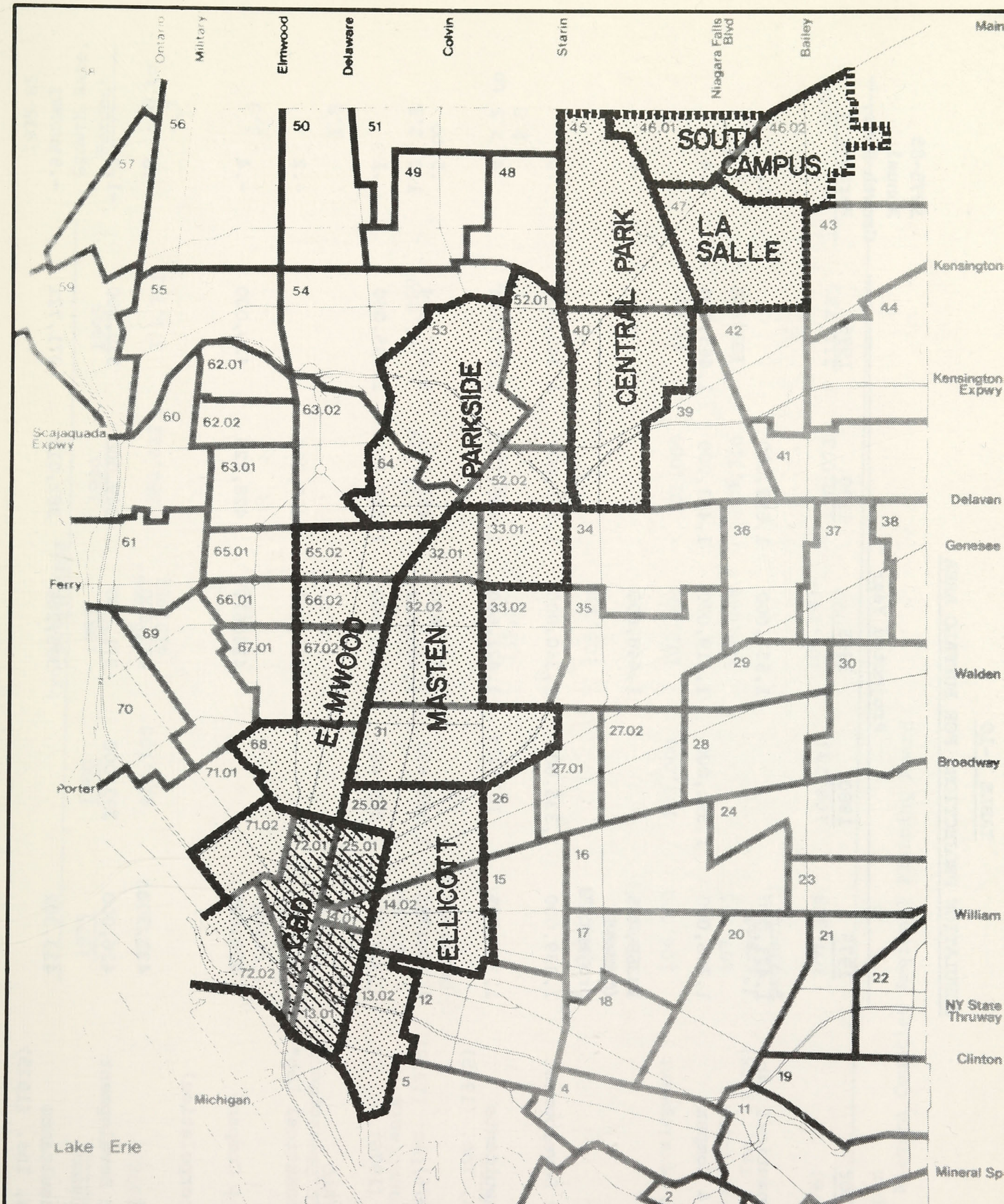
* The transit corridor study area described here should not be confused with the Buffalo-Amherst-Tonawandas "patronage" area, which encompasses the entire territory providing transit users, including areas from which people might drive in "kiss-and-ride" or "park-and ride" situations and areas served by feeder buses conveying passengers to a transit station.

TABLE 2-9

SUB-AREAS OF TRANSIT CORRIDOR STUDY AREA

Sub-area Name	Census Tracts	Major Intersections on Main Street	Neighborhoods*
CBD	13.01, 72.02	Scott/Seneca	CBD
	14.01, 72.01	Church Lafayette Sq.	
	25.01	Huron/Chippewa-Tupper	
	71.02		
Ellicott	13.02	--	Perry
	14.02		Ellicott Park
	25.02		Willert Park
Elmwood	68	Allen	Allen
	67.02	Summer-Best	Bryant
	66.02	Utica	Bryant
	65.02	Utica/Delavan	Cleveland
Masten	31	Allen	Fruit Belt
	32.02	Summer-Best	Masten
	32.01	Utica/Delavan	Cold Spring
	33.01	Utica/Delavan	Hamlin Park
Parkside	64	Delavan	Cleveland
	52.02	Delavan/Humboldt	Hamlin Park
	52.01	Humboldt/Amherst	Parkside
	53	Humboldt	Delaware Park
Central Park	40	Amherst	Leroy
	45	Amherst/LaSalle	Central Park
LaSalle	47	LaSalle	LaSalle
South Campus	46.01	South Campus Entrance	University
	46.02	South Campus Entrance	University

* As defined by the City Planning Department.



CBD definition used in economics discussion

City of Buffalo
State of New York

Figure 2-4. Transit Corridor Study Area

TABLE 2-10

POPULATION PROJECTIONS FOR BUFFALO AREA

Area and Author	Projected Year 1975	1980	1985	1990	1995	1975-85 Annual Growth Rate, Percent
BUFFALO SMSA						
Cornell Aeronautical Lab* (1967)	1,421,000		1,557,000	1,652,000		1.0
Larry Smith & Company (1974)	1,366,000	1,391,000	1,419,000	1,443,000	1,465,000	.4
NFTC (1975)	1,359,785 ("Trend project.")		1,448,600			.6
NYS Economic Development Board (1976)	1,339,000	1,335,000	1,340,000	1,346,000	1,342,000	.0
Economic Consultants Organization, Inc. (1975)	1,359,785		1,421,690	1,455,100	1,477,884	.4
ENCRPB** (1976)	1,359,785	1,385,692	1,421,690-1,498,022	1,455,100	1,477,884	.5 to 1.0
U.S. Census (1976)	1,327,200	1,319,400	1,344,800	1,370,200	1,395,000	.1
CITY OF BUFFALO						
Cornell Aeronautical Lab* (1967)	460,000		451,000	469,000		-.2
Larry Smith & Company (1974) (1970-95 interpolation)	453,876		436,610	428,225	420,000	-.4
NFTC (1975)	433,302		400,000			-.8
NYS Economic Development Board (1976)	426,000	393,000	371,000	349,000	339,000	-1.2
Economic Consultants Organization, Inc. (1975)	433,302		395,266	382,012	371,721	-.9

TABLE 2-10 (Concluded)

Area and Author	Projected Year 1975	1980	1985	1990	1995	1975-85 Annual Growth Rate, Percent
ENCRPB** (1976)	433,302	412,100	395,266-419,981	382,012	371,721	-.8 to -.3
AMHERST						
NFTC (1975)	107,560 ("trend project.")		149,100			3.3
NYS Economic Development Board (1976)	102,000		120,000			1.8
Economic Consultants Organization, Inc. (1975)	107,560 ("trend project.")		138,223	152,990	164,069	2.5
ENCRPB** (1976)	107,307	121,314	134,536-137,203	151,604	162,405	2.5 to 2.8
TONAWANDA						
NFTC (1975)	107,255 ("trend project.")		106,300			-.1
NYS Economic Development Board (1976)	104,000	102,000	102,000	101,000	99,000	-.2
Economic Consultants Organization, Inc. (1975)	107,255 ("trend project.")		108,648	109,310	109,822	.1
ENCRPB** (1976)	107,368	108,233	109,193-112,000	110,073	110,733	.2 to .4

* Now Calspan
** Erie and Niagara Counties Regional Planning Board

Amherst and Tonawanada are expected to continue their growth, with Amherst growing at roughly double the rate of Tonawanda.

In terms of population density, the urbanized portions of the Buffalo SMSA ranked seventh in the nation in 1970 with 5,085 persons per square mile; the City ranked ninth with 11,205 persons per square mile. Trends in density can be expected to follow the population projection trends discussed above.

<u>Population Characteristics</u> - Recent estimates suggest that the SMSA and City populations are getting older. The City's elderly (60 years of age and over) are expected to account for 22 percent of the population in 1980, up from 18 percent in 1970. Those 18 years and under will constitute about 28 percent of the 1980 population, down from 31 percent in 1970. Consequently, the "dependent" population (normally defined as those 18 years and under and 60 years and over) will increase its share of the total population in 1980 by 1 percent.

In a 1975 on-board bus survey prepared for the Niagara Frontier Transportation Committee (NFTC), women accounted for more than 70 percent of the riders, while the dependent population accounted for slightly more than 38 percent (Ref. 14). Since according to the Erie and Niagara Counties Regional Planning Board (ENCRPB), the proportion of women in the City of Buffalo is expected to remain about 53 percent in 1980 (Ref. 15) and the percentage of women in the nation's labor force is expected to continue to increase, the preponderance of women transit users can be expected to continue.

The transit corridor study area's population, like that of the City, has declined since 1970, although the pattern of decline is not uniform throughout the corridor. The heaviest declines have probably occurred in the Ellicott and Masten areas, the closest residential sub-areas to the CBD on the east side of Main Street. Population declines are apparent in housing losses visible in these areas. The four sub-areas east and west of Main Street on the northern end of the corridor also declined in population, but probably at a lower rate than the City. Almost all the corridor sub-areas had between a quarter and a third of their populations in the elderly category in 1970; the average for the corridor study area as a whole was essentially the same as that of the City.

Minority Populations - In 1970, about a fifth of Buffalo's population and less than 10 percent of the SMSA population was black. Persons of Hispanic heritage constituted between 1 and 2 percent of both the City and SMSA population in 1970. The percentage of total population represented by these ethnic groups increased between 1960 and 1970, but there are no reliable estimates available for 1975.

Within the transit corridor study area, blacks accounted for close to half of the total population in 1970, almost two and a half times the proportion in the City as a whole. The proportion of blacks varied from almost 90 percent of the total population in the Ellicott and Masten sub-areas to 5 percent or less in the Elmwood, Campus, and LaSalle sub-areas.

Transit-Dependent Population - The dependent population discussed here is only an indirect measure of the total potentially "transit-dependent" population. The 1974 EIA estimated transit dependency based upon the availability of automobiles and calculated a percentage of transit dependency for each census tract based upon the 1970 U.S. Census. Since detailed information about 1975 automobile ownership is not available on a census tract basis, the 1970 estimates of transit dependency must be used.

The 1970 estimates of transit-dependent population and commuter mode information are shown in Table 2-11 for the SMSA, City, and transit corridor study area. The data indicates that corridor residents are much more highly transit dependent than the population of the SMSA and more likely to use mass transit as a means of getting to work. Corridor residents are also more likely to be auto passengers, suggesting that automobiles are not as available to them as in the SMSA or the City as a whole. It should be noted that these are 1970 figures, reported prior to the transit improvements brought about by NFTA's Metro Bus service. They do give some indication, however, as do the figures on "dependent" population, of the people most likely to be affected by mass transit improvements along the corridor study area.

Other people likely to be affected by transportation improvements are those with handicaps who are able to use properly designed public transit. The NFTA is preparing the Niagara Frontier Elderly and Handicapped Study. Preliminary results indicate that there are at least 30,000 people in the City of Buffalo who are handicapped, but whose conditions are judged "relevant to public transport."

TABLE 2-11

TRANSIT-DEPENDENT POPULATION, COMMUTER MODE

Area	Transit Dependency, Percent of Population 1960	Transit Dependency, Percent of Population 1970	1970 Commuter Mode, Percent of Workers Commuting As Bus Passengers	1970 Commuter Mode, Percent of Workers Commuting As Auto Passengers
SMSA	64.0	42.5	10.1	12.1
Buffalo		64.0	21.4	12.2
Transit Corridor Study Area		NA	22.3	12.7
1. CBD		76.1	29.4	8.6
2. Ellicott		98.4	39.1	16.2
3. Elmwood		60.0	18.6	8.9
4. Masten		71.0	27.9	15.7
5. Parkside		61.0	20.4	10.4
6. Central Park		49.0	15.4	13.8
7. LaSalle		57.0	14.3	10.3
8. South Campus		50.1	10.7	10.0

Sources: Transit Dependency - Ref. 5
Transportation to Work - calculated by Daniel, Mann, Johnson, & Mendenhall from 1970 U.S. Census data

Income Levels - In 1970, the average income for families and unrelated individuals in the City was $7,764, 77 percent of the average income in the SMSA ($10,062). Families with incomes below the Federally defined poverty level in 1969 constituted 11.2 percent for the City and 6.8 percent for the SMSA. This relationship is fairly common between central cities of SMSAs and SMSAs as a whole. A 1975 census for the City (Ref. 16) estimated average household income at $11,102; another study (Ref. 17) estimated the 1975 average household income in the SMSA at $13,900. These figures suggest that average incomes in the City have kept pace with those in the SMSA as a whole.

The sub-areas of the transit corridor study area had a wide range of income levels in 1970. Table 2-12 presents a breakdown by family income as reported in the 1970 U.S. Census. The lowest family income levels were concentrated in the Ellicott and Masten sub-areas where nearly 60 percent and over 40 percent of the families, respectively, had incomes of less than $6,000. Highest family incomes occurred in Elmwood. There is no reliable estimate available for 1975 family income on a corridor or neighborhood basis.

Economic Environment

The economic environment of an area is reflected by the status and trends in such factors as employment, the number of businesses, retail sales activity, industrial construction, and the property tax base.

Commercial Structures and Establishments - As of 1975, the number of commercial structures within the City of Buffalo totaled 8,430, providing 16,910 occupancy units of commercial or industrial space. About 40 percent of the City's commercial structures (3,421) lie within the transit corridor study area, including 11 percent within the CBD, 24 percent in census tracts with frontage on Main Street, and 5 percent in transit corridor census tracts without Main Street frontage. These 3,421 commercial structures house 5,963 businesses: 36 percent of the City's manufacturing establishments, 39 percent of the wholesale establishments, 32 percent of the retail businesses, 66 percent of the financial/insurance/real estate businesses, 52 percent of the professional and service businesses, and 32 percent of all other nonmanufacturing businesses.

The vacancy rate of units in commercial structures is high: 20-22 percent in the City of Buffalo, the CBD, and in census tracts with Main Street frontage; and 32 percent in census

TABLE 2-12

FAMILY INCOMES IN BUFFALO AREA*

Area	Under $6,000 (percent)	$6,000-9,999 (percent)	$10,000-14,999 (percent)	$15,000-24,999 (percent)	$25,000 and over (percent)
SMSA	18.6	28.1	31.9	17.2	4.2
City of Buffalo	28.1	31.0	26.8	11.6	2.5
Total Transit Corridor Study Area	33.8	26.6	23.7	11.5	4.4
Sub-areas					
1. CBD	36.5	35.3	20.8	6.6	0.8
2. Ellicott	58.0	24.6	12.7	3.5	1.2
3. Elmwood	23.8	23.8	21.6	17.7	13.1
4. Masten	42.7	29.1	21.4	6.0	0.8
5. Parkside	23.0	26.0	28.2	18.3	4.5
6. Central Park	22.9	23.8	29.5	15.6	8.2
7. LaSalle	18.7	28.8	34.0	16.1	2.4
8. South Campus	14.8	26.6	34.4	20.2	4.0

* Based on 1969 family incomes.

Source: 1970 U.S. Census

tracts without Main Street frontage. An inventory of commercial occupancy in the CBD, covering Main Street, Pearl Street, and Washington Street between Seneca and Tupper Streets, reveals 72 vacant street-level (essentially storefront) units, 19½ floors of vacant office space, and an additional 189 vacant office rooms or suites.

There was a net loss of 254 commercial structures within the City of Buffalo during 1974-75; 125 commercial structures were constructed, 379 were razed (Ref. 16). During this same year, the City sustained a net loss of 531 firms covering every major category of business and industry: 59 from the manufacturing category and 472 from nonmanufacturing businesses, the latter including 54 wholesalers, 201 retailers, 43 finance/insurance/real estate offices, 147 service or professional businesses, and 27 unclassified. Only one location within the transit corridor study area showed considerable growth in any category of business activity during this period. Census tract 52.02 (bounded by Delavan and Kensington Avenues, Humboldt Parkway, and Main Street) added 32 establishments in the health and medical field.

Employment and the Labor Market - U.S. Department of Commerce figures show the Buffalo SMSA experienced a loss of 33,600 employees in manufacturing industries between 1966 and 1972 (Refs. 18, 19). According to the New York State Department of Labor, employment within the Buffalo SMSA dropped from 507,000 in 1970 to 501,000 in 1975. Between 1973 and 1975, growth occurred in only three employment categories: government, service, and machinery and electrical equipment manufacturing. All other manufacturing and nonmanufacturing categories showed substantial declines. Plant closing in the Buffalo SMSA accounted for an average loss of 2,000 jobs per year between 1970 and 1976. Out of the 14,100 jobs reported affected by plant closings during the seven-year period, 5,562 were in the City of Buffalo. Plant closings in any geographic location tend to reduce employment in other businesses in the local area that supply goods and services to the primary plant and to its employees; thus, plant closings have a multiple adverse effect on the economic base and activity of the area.

Employment within the Buffalo SMSA is projected to increase an average of 2,550 to 2,800 annually between 1980 and 1995, according to the ENCRPB and the U.S. Department of Commerce. The Regional Planning Board estimates that essentially all this growth will occur within Erie County with about one-half of the increase within the City of Buffalo. The major sources of the projected increase in employment between 1980 and 1990 in declining order of importance according to the Department of Commerce will be in the areas of government, business/professional/service, finance/insurance/real estate, transportation/communications/utilities, and wholesale/retail trade. Manufacturing employment is projected to decrease slightly. The ENCRPB projects a different mix of employment increases for the 1980-90 decade: services (including finance/insurance/real estate), trade, government, and transportation/communications/utilities; with manufacturing employment declining. In both sets of projections, the categories accounting for the major increases will be the kinds of businesses predominating within the Buffalo CBD and the transit corridor study area.

The size of the labor force (available potential workers) in the Buffalo SMSA is projected to increase an average of 2,750 annually between 1980 and 1995, according to the ENCRPB. The labor force residing within the City of Buffalo is projected to decline by 1000 persons annually between 1980 and 1995, whereas about half the increase in employment opportunities will be within the City. This means that there will be more workers commuting from suburban areas to the City for daily employment than at present, an increase of over 1100 from Amherst and over 2500 from other suburban portions of Erie County. Transportation access will become an increasingly important economic consideration.

Retail Trade - Retail sales in the Buffalo SMSA in 1972 were at a $2.7 billion annual level; retailing accounted for an annual payroll of $344 million; employment in the retail field totaled 76,800; and there were 10,228 retail establishments. The City of Buffalo, with 33 percent of the SMSA population accounted for a lower share of retail sales volume (30.6 percent), but 34.7 percent of the annual retail employment payroll, 34.4 percent of the retail employees, and 37.8 percent of the retail establishments. The Buffalo CBD accounted for over 15 percent of the City's total retail sales volume, nearly 5 percent of the SMSA's total. Within the CBD there were 395 retail establishments employing 6,736 persons and providing a payroll of $29.4 million annually.

There are 14 major retail areas beside the Buffalo CBD within Erie County (Ref. 20). One of these other major retail areas, which includes the Northtown Plaza, the Boulevard Mall, and businesses along Sheridan Drive and Niagara Falls Boulevard, had a 1972 retail sales volume slightly exceeding that of the CBD. It should be noted that this major retail area is just north of the South Campus and beyond the transit corridor study area. Two other major retail areas are also near the South Campus: the University Plaza and the Main Street/Eggert Road retail areas. The combined retail volume of these two areas totaled slightly more than one-fifth the retail volume of the CBD in 1972. As is common with many metropolitan areas, a share of the retail activity in downtown Buffalo has been lost to suburban shopping areas because of more convenient access. Convenient transportation facilities in conjunction with employment incentives would encourage refurbishing of retail facilities and enhance the total retail environment and, in turn, would stimulate retail activity in the downtown shopping district.

Tax Base - The current property tax rate of $121.09 per $1,000 assessed valuation (AV) in the City of Buffalo is allocated as follows to the four jurisdictions whose operating funds depend on property tax revenues generated within the City: 38.1 percent to the City of Buffalo, 33.8 percent for the Board of Education of the City, 3.8 percent for the Sewer Authority, and 24.4 percent for Erie County. Any reduction in the AV tax base automatically increases the tax rate applicable to properties remaining on the tax roll in order to generate the same amount of needed tax revenue.

The property tax base for the City of Buffalo for fiscal year 1976/77 was $1,019,914,937 in AV. This was $8.2 million less than the previous fiscal year and $12 million less than in 1974/75. These losses in AV have occurred because of the acquisition by the City of Buffalo of some tax delinquent properties, the demolition of some deteriorated structures, the conversion of some private property into Urban Renewal Agency holdings that have not yet been redeveloped, and the lack of reassessments on most properties within the City of Buffalo since 1959. Because of the lack of reassessment, the appreciation in property values has not been accounted for in the AVs. Thus, for those properties not reassessed recently, the relationship between AV and fair market value likely is no longer represented by the City's 0.4267 conversion factor.

The fact that privately-owned property continues to be removed from the tax roll has already created an adverse financial impact on the remaining properties, and any further removal of private property from the tax roll will increase the adverse momentum.

Economic Setting of Existing Transit Operations/Ridership

It is important to establish the existing economic setting of the Niagara Frontier Transit Metro System as a basis for evaluating potential impacts that may result from transit improvements.

In NFTA's fiscal year ending March 1975, revenue from bus fares totaled $12.2 million, whereas operating and maintenance (O&M) expenses totaled $15.1 million. In the year ending March 1976, fare-box revenues increased slightly to $12.3 million, whereas O&M expenses increased substantially to $17.6 million. Despite the poorer showing in 1975/76, Buffalo's Metro System still ranked high in terms of the percentage of operating expenses covered by fare-box revenues. Buffalo was one of only three urbanized areas with populations exceeding 1 million whose transit system revenues covered at least 70 percent of the operating expenses. Among 80 areas with over 50,000 population, Buffalo was one of only five with at least 70-percent coverage. By comparison, some communities covered less than 10 percent of their operating expenses (Ref. 21).

In fiscal years 1974/75 and 1975/76, subsidies were received from the State and Erie and Niagara Counties to cover operating deficits. The ultimate source of such subsidies, of course, is the taxpayer. Public agencies cannot make commitments to cover transit operating deficits in perpetuity, because such agencies are subject to limitations of annual budgets and voted appropriations, debt ceilings, and collectible tax revenues. Therefore, it is important to understand the ramifications of the existing financial base to which a new transit system element might be added.

If operating subsidies had not been available in the 1974/75 and 1975/76 periods, i.e., if the system's O&M costs had had to be covered by fare-box revenues, then fares would have had to be higher. Assuming the same ridership as was experienced in each of those years, the fare would have had to increase from a current 40 cents to 49 or 50 cents in 1975 (about 25 percent) and to 58 or 59 cents in 1976 (nearly 50 percent). (This, of course, assumes that these fare increases would have had no impact on ridership. Realistically, however, a drastic decrease in ridership would likely have resulted from such large fare increases.) Alternatively, O&M expenses could have been met by increases in patronage equivalent to the fare increases, i.e., nearly 25 percent in 1975 and nearly 50 percent in 1976. (This simple example assumes that such increases in patronage would not have added to the 1975 or 1976 operating expenses.)

Any substantial increase in fare-box revenue via the increased patronage alternative would depend primarily on a program to increase the number of regular daily/weekly riders of transit--that is, capturing a larger share of that segment of the population that needs daily transportation to work or to school. This is because in terms of relative ridership volume, daily/weekly riders account for an estimated 95 percent of the transit patronage (Ref. 22). In the 1970 Census, 21.4 percent of the workers living within the City of Buffalo and 22.3 percent of the workers living within the defined transit corridor study area used bus transit to and from work. The nearly 50-percent increase in patronage needed to cover all O&M expenses without subsidies in 1976 would have meant an increase in the share of Buffalo workers using public transit as their mode of transporation to work to nearly 32 percent. Such an increase would mean an all-out campaign to encourage transit patronage, including improved transit facilities (e.g., new vehicles, modes) and auto disincentives (e.g., increased Thruway tolls and downtown parking rates).

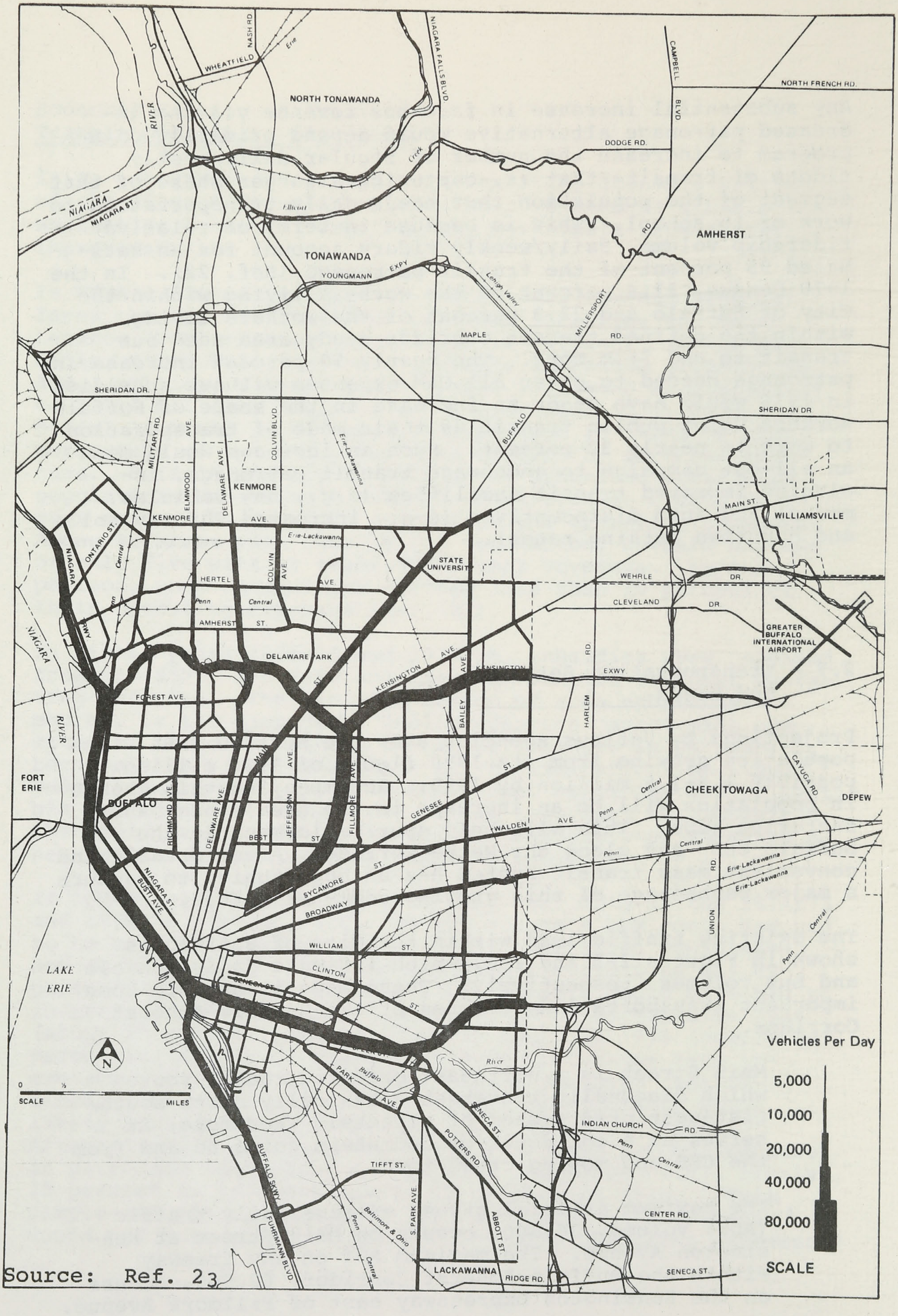
2.7 - Transportation Setting and Needs

Projections by various agencies show the Buffalo SMSA population growing from its 1970 figure of 1.34 million to possibly 1.4-1.5 million by 1995. Accompanying this change in population will be an increase in the area's non-manufacturing jobs. This will help spur employment in the Buffalo CBD and along the Metro Corridor. A comfortable and convenient mass transit system has an opportunity to capture a major percentage of this growing commuter market.

The existing traffic load within the City of Buffalo is shown in Figures 2-5 and 2-6, which indicate daily vehicle and bus volumes, respectively. These maps illustrate some important transportation features of the Buffalo-Amherst Corridor.

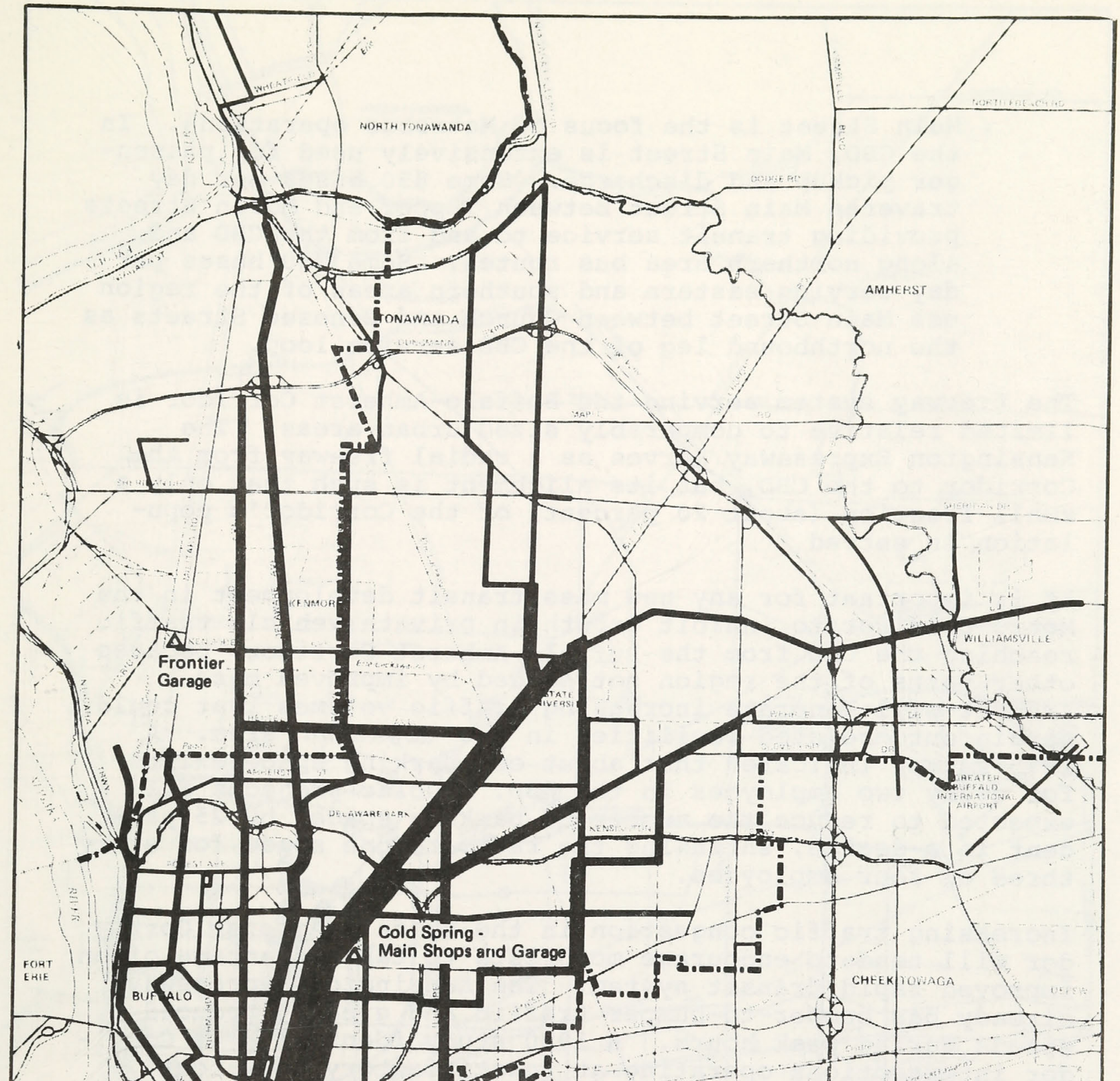
- Main Street is a northeast-oriented radial route which diagonally traverses a basically north-south/east-west grid system of streets. Therefore, it serves as a collector of commuters going to and from the CBD and moving cross-town.

- The maximum arterial street average daily traffic (ADT) volume, 36,500, occurs on Main Street at Kensington Avenue. The maximum ADT on any freeway within the Buffalo-Amherst Corridor, 62,000, occurs on the Kensington Expressway east of Fillmore Avenue.



Source: Ref. 23

Figure 2-5. Daily Traffic Volumes, City of Buffalo



Source: Ref. 23

Figure 2-6. NFT Metrobus Volume

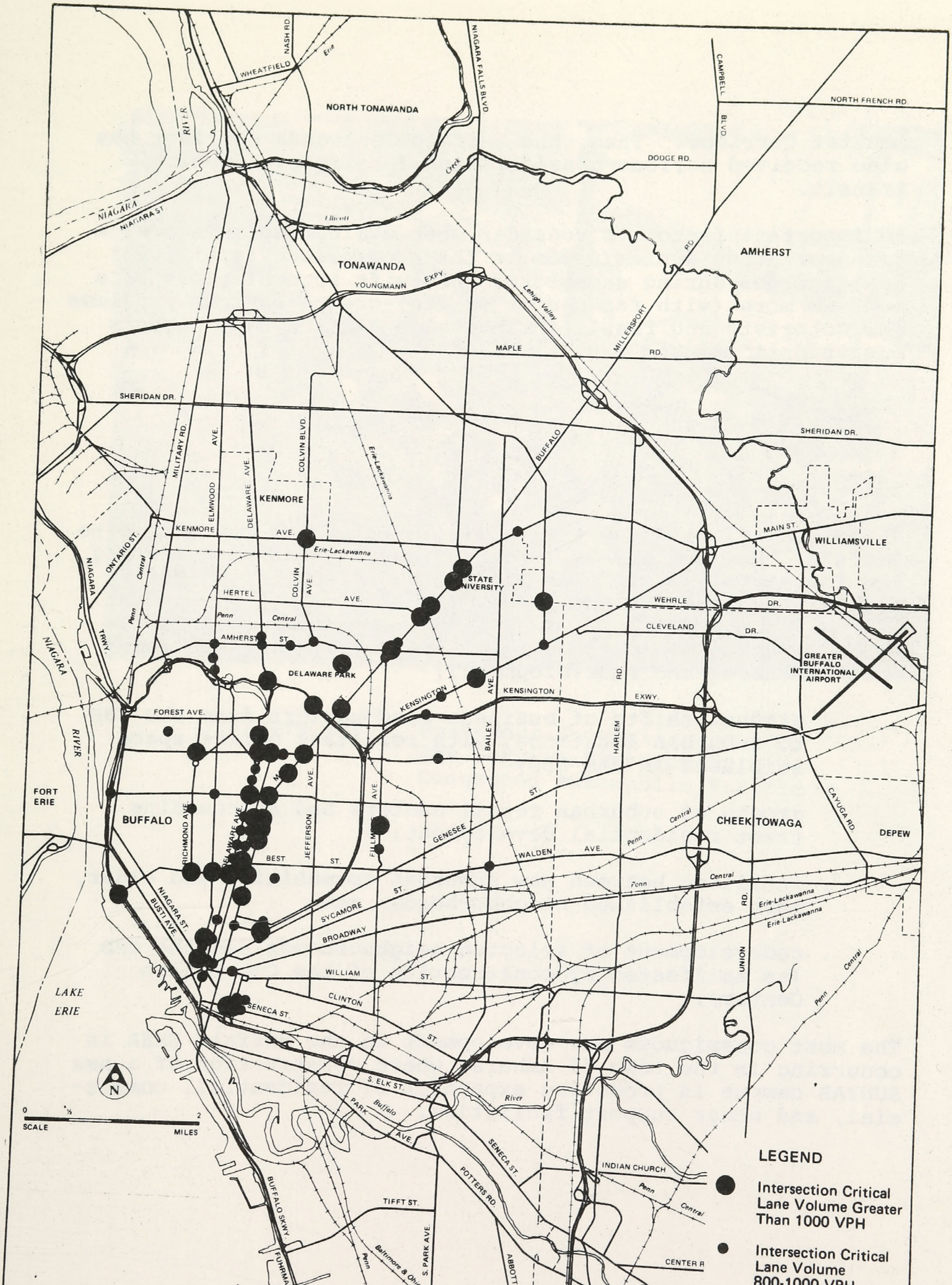
- Main Street is the focus of Metrobus operations. In the CBD, Main Street is extensively used for passenger pickup and discharge. Some 850 buses per day traverse Main Street between Tupper and Huron Streets providing transit service to and from the CBD and along northern area bus routes. Some 380 buses per day serving eastern and southern areas of the region use Main Street between Church and Genesee Streets as the northbound leg of the CBD service loop.

The freeway system serving the Buffalo-Amherst Corridor is limited relative to comparably sized urban areas. The Kensington Expressway serves as a radial freeway from the Corridor to the CBD, but its alignment is such that only a small fraction (about 20 percent) of the Corridor's population is served.

It is important for any new mass transit development in the Metro Corridor to inhibit growth in private vehicle traffic reaching the CBD from the Buffalo-Amherst Corridor, because other parts of the region not served by improved mass transit will generate increasing traffic volumes that could strain auto-related facilities in the downtown area. A 1975 survey indicated that about one parking space exists for every two employees in the CBD. Public projects are expected to reduce the number of parking spaces by 25 percent in a decade, shrinking the ratio to one space for every three or four employees.

Increasing traffic congestion in the Buffalo-Amherst Corridor will tend to encourage motorists to take advantage of an improved rapid transit system. The Kensington Expressway already has bumper-to-bumper traffic and greatly reduced speeds during peak hours. A 1970 study identified 42 Corridor intersections operating at unsatisfactory peak-hour levels (Figure 2-7) and forecast another 13 would reach that condition within five years. Traffic congestion is expected to worsen as Corridor development continues since no major roadway improvements are planned. Growing public awareness of adverse consequences of major highway expansions--serious neighborhood disruptions, unmanaged suburban sprawl with its attendant increase in commuter traffic and energy waste, environmental impacts--has spawned opposition to such action, but fostered support for improved public transit.

The Tonawanda area northwest of the Buffalo-Amherst Corridor is another major contributor of trips to and from the Corridor. The additional individual trips contributed by this area to an expanded Corridor have been estimated to number about 320,000 daily (Ref. 23), a 23-percent increase over the number of trips generated within the basic Buffalo-



Source: Ref. 23

Figure 2-7. Intersection Capacity Deficiencies, City of Buffalo

Amherst Corridor. Thus, the Buffalo-Tonawanda Corridor has also received serious consideration for improved public transit.

An important factor to consider when evaluating this area's transportation system/needs is the snowfall. Visibility restrictions during snowstorms and swift accumulations of a foot or more (with far deeper drifts) create serious problems for motorists and result in severe congestion that hampers bus transit (Figure 2-8).

2.8 - Land Use and Zoning

While general land use trends listed below are not unique to Buffalo, they are likely to figure heavily when considering the long-term impacts of a rapid transit project on Buffalo's urban environment. They include:

- erosion of inner city housing supply (through abandonment and redevelopment);
- gradual shifts of business headquarters from the CBD to suburban locations, with resultant office space surpluses in the CBD;
- growth of suburban retail centers and surrounding tract residential development;
- infilling between new suburban communities and older, more established neighborhoods; and
- redevelopment of selected neighborhoods and the CBD (as manifested by construction of the Convention Center).

The most conspicuous new development in the Buffalo SMSA is occurring in the town of Amherst where construction of a new SUNYAB campus is promoting expansion of residential, commercial, and other support facilities.

Figure 2-8. Rush-Hour Snowfall;
Bus Service Hampered by
Congested Automobile Traffic

Development patterns over most of the Metro Corridor are fairly uniform and adhere to the following guidelines:

- Properties with frontage on Main Street are, with few exceptions, zoned commercial. Exceptions include the SUNYAB's South Campus; health, religious, and educational facilities; recreational and memorial parks; and limited residential development.

- North of Goodell Street (at the edge of the CBD in Figure 2-1), nearly all parcels without frontage on Main Street are devoted to residential uses.

- There is great variation in the quality of housing. Most houses are two- or three-story, pre-1940 structures on small land parcels, making for high average density in residential neighborhoods.

- Urban redevelopment projects launched in the 1960's have accounted for upgrading of the housing stock in some residential neighborhoods and the complete razing of others.

- South of Goodell Street, the study area is zoned almost completely commercial. As one proceeds south, building heights gradually increase, the tallest building in the Buffalo CBD being the recently completed Marine Midland Tower straddling Main Street just north of Interstate 190.

- Construction of new office space in the Buffalo CBD, fairly rapid up to the early 1970's, has ceased due to economic constraints. However, the CBD remains the regional financial and administrative center due to its concentration of private and public offices.

- The study area is replete with individual vacant parcels; however, there are nearly no undeveloped groups of parcels (with the exception of redevelopment areas).

- A significant portion of the land between I-190 and the Buffalo River falls within the proposed Buffalo Coastal Zone. Two potential sites for a service yard for any rapid transit system are located in this area and the impact on the coastal zone must be considered. This aspect of e service yard siting is discussed in Section 5.

2.9 - Current and Planned Redevelopment Projects

The study area encompasses four current redevelopment projects keyed below to Figure 2-9.

1. Oak Street Redevelopment Project: Large-scale clearance of substandard housing, commercial, and industrial structures; new construction envisioned to be primarily residential, with some new commercial establishments along Main Street; coordinated arterial improvement program along Oak and Elm Streets.

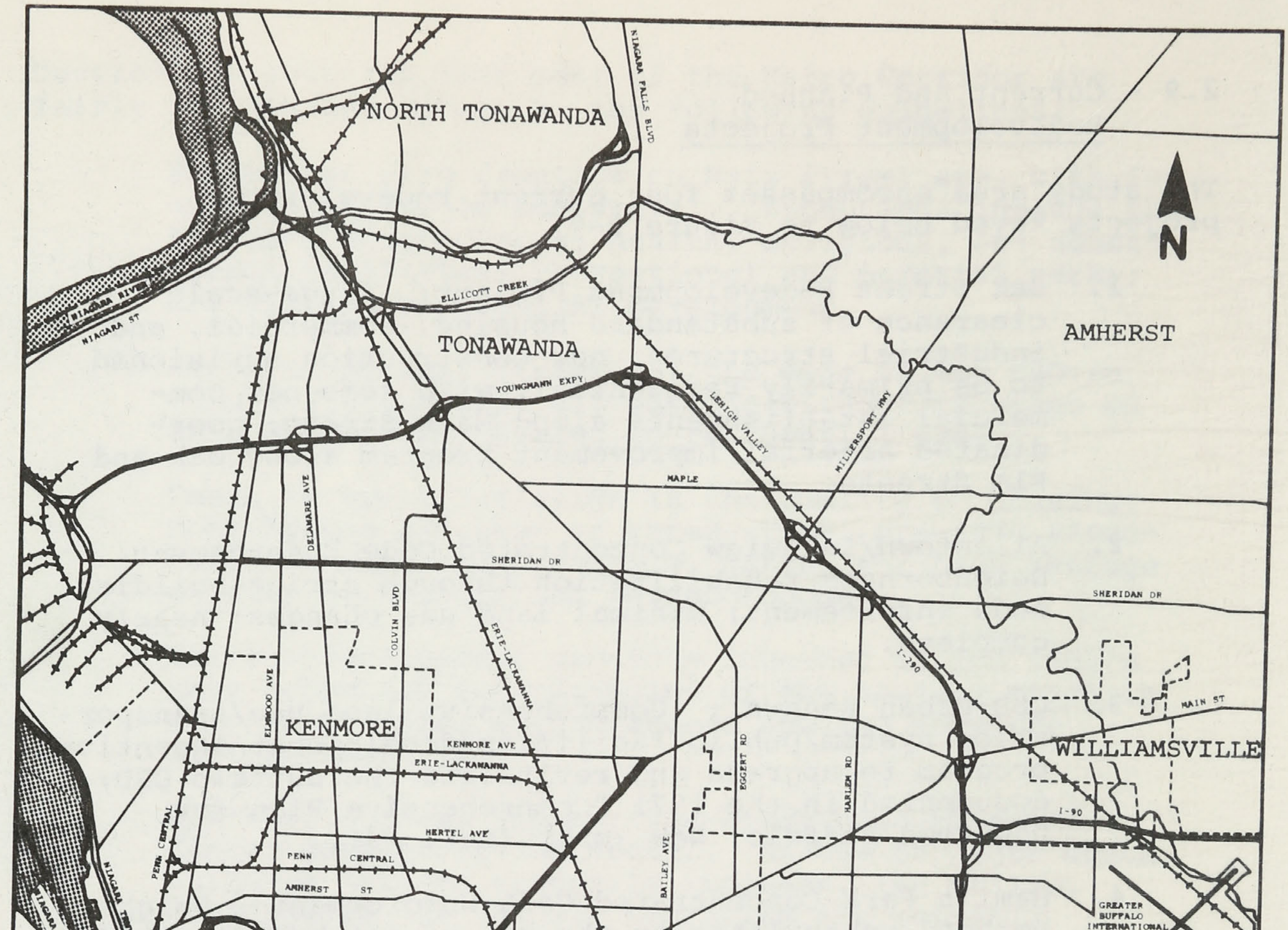
2. Allentown/Lakeview Concentrated Code Enforcement: Neighborhood rehabilitation through strict building code enforcement; minimal land use changes; nearly complete.

3. CBD Urban Renewal: Comprehensive land use/transportation system/public facilities/development incentive program to upgrade and revitalize the Buffalo CBD; documented in the 1971 "Comprehensive Plan for Downtown Buffalo, New York" (Ref. 24).

4. Hamlin Park Concentrated Code Enforcement: Neighborhood rehabilitation through strict building code enforcement; minimal land use changes; nearly complete.

All current and planned redevelopment projects acknowledge concurrent proposals for rapid transit system construction along the Main Street corridor. The CBD Urban Renewal program (3 above) features an auto-free shopping mall along Main Street. This program was adopted as part of the City of Buffalo Master Plan.

Significant urban renewal projects contemplated for the future include the Ellicott and Waterfront Redevelopment Plans. Though these plans may account for major impacts on the Main Street corridor at some point in the future, there has been no construction to date that influences the study area's current setting. However, the Waterfront Redevelopment Plan does include areas suitable for service facilities for a new mass transit system; this is discussed further in Chapters 4 and 5.



MAIN STREET IN METRO CORRIDOR

REDEVELOPMENT PROJECT

Figure 2-9. Redevelopment Projects in Metro Corridor

As development of the new Amherst Campus continues, the SUNYAB plans to convert the South Campus to a Health Sciences Center with other areas of study being moved to the new campus. This plan would greatly reduce the South Campus student population and, correspondingly, parking requirements. The SUNYAB plans to cut the number of available parking spaces in accordance with the anticipated reduction in campus population.

2.10 - Utilities and Public Services

The Main Street corridor is used for the delivery of virtually all utilities and public services, including fuel gas, electricity, telephone, water, storm drainage and sewage, garbage collection, bus transit, police, and fire prevention.

Fuel Gas

National Fuel Gas provides the natural gas service for the City of Buffalo. Within the Main Street right-of-way, the pipeline network forms a major distribution system which extends from the Buffalo CBD to and beyond the SUNYAB's South Campus. The network consists primarily of low-pressure distribution lines which emanate from various regulator stations and generally run under both sides of the street to provide local service and to accommodate lateral tie-ins at every street intersection. The regulator stations are located off the Main Street right-of-way but are fed by high-pressure lines which cross Main Street at a number of places. With few exceptions, high-pressure lines in the corridor generally do not follow the Main Street alignment.

Electricity

The Niagara Mohawk Power Company supplies electricity to the Buffalo area. A 23 kilovolt (kv) mainline conduit system is located beneath Main Street and follows the street north from the CBD into residential service areas. Within the CBD, the roadway also accommodates a subsurface 120-208 volt low-voltage secondary distribution system. North cf Tupper Street, the secondary distribution service becomes a 41.6 kv system for the balance of the Metro Corridor. The specific locations of these underground lines vary, but they are generally confined to one quarter of the street width along one curb or the other. Aerial lines supplement the underground service along some portions of the roadway.

Telephone

New York Telephone provides telephone service throughout New York State. Major telephone trunk lines are located in "subways" below Main Street the length of the study area. These subways are usually located beneath sidewalks or near curbs, rather than near the street median. There are some aerial lines on sidestreets, though most sidestreets are serviced by underground lines.

Water

Water for metropolitan Buffalo is taken from Lake Erie, filtered in a water purification plant east of the Buffalo CBD, and pumped to consumers through a network of water mains. One water main is located below Main Street. Its specific location in relation to the street above varies, but for most of its length it is approximately seven or eight feet from the curb. Though the line along Main Street is not one of the primary water arteries in Buffalo, several key lines cross Main Street below major street intersections.

Storm Drainage/Sewage

The City of Buffalo Department of Public Works is in charge of surface water storm drainage facilities. The Buffalo Sewer Authority owns and operates all underground sewers within the Buffalo City limits as well as the sewage treatment plant located on Bird Island. Sanitary and storm waters are handled by combined sewers. Along most of the Main Street corridor, these sewers are located on both sides of the street. At the intersection of Main Street and Delavan Avenue, Scajaquada Creek crosses Main Street via a large culvert (14 feet by 23 feet in cross section) buried under 20 to 25 feet of cover. The Sewer Authority plans to route a major new sewer line (the Scajaquada interceptor) across Main Street in the vicinity of Delavan Avenue.

Garbage Collection

The City of Buffalo provides garbage collection service once a week to all residences and businesses. Many businesses in the CBD opt for more frequent private service, up to five times per week. Along most of the Main Street corridor north of Tupper Street, collection is curbside. South of Tupper Street, curbside collection on Main Street occurs only where establishments do not have frontage on adjacent streets paralleling Main Street (Pearl Street to the west and Washington Street to the east). Thus, nearly all small commercial establishments use Main Street sidewalks for refuse storage on collection nights, while most larger establishments have access to Pearl Street or Washington Street.

Bus Transit

The Niagara Frontier Transportation Authority (NFTA) handles public transit in the Buffalo Metropolitan area. The Regional Transportation Center is nearing completion in the Buffalo CBD, east of Main Street. Regional buses and transit buses will use this facility, which also will serve as headquarters for NFTA administration. The Main Street corridor is a heavily-used transit artery. In the CBD, buses from points north, east, and south distribute passengers along Main Street. Buses serving areas to the north use Main Street for long distance routes as well. Buses serving points west use Pearl and Franklin Streets for distribution and, in general, Delaware Avenue for express portions of their routes.

Police and Fire Prevention

Police and fire prevention activities are dispatched from several locations. Main Street is among the primary arteries used by police and fire-fighting vehicles.

2.11 - Visual Setting

The outer five miles of the Metro Corridor are characterized by low silhouette "strip" commercial development, flanked by high density residential neighborhoods. Main Street passes through several types of neighborhoods, with park-like settings in some cases, congested commercial developments in others. People likely to be affected visually by a mass transit project traversing this area are those moving along Main Street, e.g., walkers and vehicle occupants. Their impressions tend to subordinate visual extremes (e.g., heavy industry and parks) and emphasize the following features:

- one- and two-story commercial establishments with few distinquishing features save a variety of garish signs;
- scattered vacant lots interrupting otherwise continuous development;
- arching streetlights of a relatively modern style;
- overhead wires at intersections and traffic control points;
- little planting or vegetation;
- slow-moving or stopped traffic, even in off-peak hours.

Main Street has two driving lanes in each direction, but flow is impaired by left-turn maneuvers and poor parking conditions. In winter, snowbanks intrude into the parking lane, forcing cars to park partially in driving lanes.

Architecture is generally uninspired. Few buildings were designed for their sites; rather, most are structures common to "strip" developments nationwide, particularly those developed in the first half of the century. Structures of note include a Romanesque church, a warehouse building used as the SUNYAB's architecture school, a contemporary gymnasium facility, and the like. Occasional rows of contiguous storefronts with offices above may have restoration potential (though suffering from previous "modernizations"); but such structures are not common. The rule is box-shaped buildings of nondescript design origin. Predominant colors are red-brown brick and grey.

Sidestreet visual atmosphere is even more uniform than Main Street's. With the exception of major arterials, most sidestreets are narrow lanes lined with parked cars and compact, two- or three-story woodframe houses built prior to 1940. House styles are "pattern book," i.e., developer-built from syndicated plans with few embellishments. Though incomes vary throughout the corridor, most houses are well maintained.

The following discussion notes unique characteristics and sensory impressions at several points along the Metro Corridor outside the CBD:

- SUNYAB's South Campus: Parking lots in the center of a vast, sloping lawn; neoclassical and Georgian university buildings several hundred feet to the east; university-related "strip" commercial development on west side of Main Street; minimal discordance between commercial and university buildings because of space between them; rows of formally arranged trees; feeling of parklike spaciousness somewhat offset by presence of parking lot, though winter snowbanks render lots nearly invisible from Main Street and university buildings.

- Main Street-LaSalle Street area (just north of Erie-Lackawanna Railroad): Commercial "strip" development north along Main Street; vacant lot and Erie-Lackawanna Railroad overpass to the south, with Main Street dipping beneath; narrowness of Main Street underpass discourages walking; heavy industrial traffic on LaSalle Street out of keeping with its residential nature; noisy; no trees in immediate vicinity; overhead wires, billboards, and signs create cluttered visual image.

- Main Street-Amherst Street area: Commercial "strip" development interfacing with two-story brick industrial structures; sidestreet woodframe houses unusually conspicuous due to diagonal juxtaposition of roads; some mature trees visible behind commercial buildings.

- Main Street-Humboldt Parkway area: Institutional buildings on both sides of Main Street--Mount St. Joseph Academy (red brick structures) set well back from Main Street to west, stone Romanesque church and related school to east; high-rise brick and concrete residential structure visible to the northwest; many mature trees lining west side of Main Street.

- Main Street-Delavan Avenue area: Visual image to east dominated by contemporary concrete/brick, low-silhouette athletic facility and retaining wall mural; otherwise, complete dearth of visual stimuli to east; west side of Main Street features odd juxtaposition of industrial structures (set back from street) and "vest-pocket" park; several trees to west.

- Main Street-Utica Street area: Two-story commercial/office structures on three corners; mixed architectural styles; most buildings pre-1930's, modified by extensive remodeling and insensitive superimposed sign treatments; two such structures possibly warrant preservation/restoration--brick turn-of-the-century commercial building of possible iron-front construction and round-cornered concrete storefront row on the opposite corner.

- Main Street-Best Street area: Discordant mix of pre-1940's box-shaped and 1960's "strip" commercial structures, with inconsistent cornice lines and setbacks; no visual anchors, with possible exception of church tower to south; unusually cluttered array of signs, especially to south; realignment of Best Street creates unexpected panorama through new vacant lot (formerly Best Street right-of-way).

- Main Street-Allen Street area (west of Buffalo General Hospital): Another discordant mix of architectural styles and building types--high-rise medical facilities spanning 30 years in construction dates, "fast-food" franchises, 1960's motels, and an unusual five-story brick office structure; Main Street is significantly wider than at sites discussed above with resultant lower congestion level; Buffalo CBD skyscrapers visible to south; sense of low-density development associated with suburban areas despite tall buildings in immediate vicinity; rhythm of buildings reflects auto, rather than pedestrian orientation.

The CBD portion of the Metro Corridor is developed more intensively than the "outer" portion, with larger buildings and an atmosphere of urban activity typical of downtowns in the eastern U.S. South of Tupper Street, Main Street frontage becomes more consistently in-filled with commercial buildings. Building setbacks, random and interposed with parking lots north of Tupper Street, uniformly abut sidewalks south of Tupper Street. Parking lots abutting Main Street are rare south of Tupper Street.

This area gives the impression of being urban and orderly. Though buildings are only one or two stories near the north end of the CBD, they are usually contiguous. Roof and cornice lines often match despite different builders and this lends heavily to a sense of visual cohesion. Street lights become less prominent as building heights increase. There are no overhead wires except at traffic control points. Adding to the uncluttered image is generally sensitive sign treatment.

Building heights rise gradually as one travels south. The tallest building in Buffalo, the Marine Midland Tower, spans Main Street and creates a visual enclosure of the Corridor on the south. Main Street is broad and vehicular traffic flows fairly smoothly, particularly in non-peak hours. This, coupled with the more prominent visual characteristics of taller buildings, makes traffic visually subordinate to the built environment in this area.

Views of this area are most likely to be from sidewalks and motor vehicles. Views from upper floor windows are generally directly across the street and above, as most buildings feature sill heights of at least three feet. Thus, street-level activities go relatively unnoticed in upper floor offices. At street level, the rhythm of storefronts encourages walkers to "window shop" despite frequent storefront vacancies.

Buffalo's theater district, the two blocks south of Tupper Street, somewhat belies the above description. Most structures date to the 1920's; while none show first-run movies, most theaters are, nevertheless, in use. Restoration efforts, stemming primarily from private sector donations, are hoped to spark a resurgence of legitimate entertainment in an area used increasingly for "underground" productions.

The theater district is characterized by flamboyant architectural styles and marquees vying for visual attention. Significant buildings include the Greyhound Bus Depot and the recently restored Shea's Buffalo Theater, both of which are good examples of notable architectural styles ("streamlined moderne" and "art-deco," respectively) popular earlier this century. Street parking resumes in the theater district, adding to the level of street activity.

South of the theater district is the core of Buffalo's CBD, with high-rise headquarters for major department stores and for administrative, financial, and government agencies. Lafayette Square and Cathedral Park at Church Street provide relief from the "tunnel" effect created by office buildings.

Architectural styles are widely divergent, but complement each other in their urban context. The most common building material is concrete; the primary color is grey. Framework superstructures for rooftop signs clash with the solidarity of other structures, particularly at the Huron Street intersection.

Curtain wall office buildings and other major new structures are confined to Lafayette Square and points south. Main Place Mall, an enclosed shopping center, makes up the west flank of Main Street just south of Lafayette Square.

Financial concerns predominate south of Church Street. In this area one is constantly aware of the trough-effect created by the Marine Midland Tower which concludes the Main Street corridor much as does the Pan American Building on Park Avenue in New York. One impact is limited sunlight in this part of Main Street, particularly in winter months when the sun lies closer to the southern horizon.

Development south of the Marine Midland Tower is significantly different from other parts of the corridor. Industrial developments (e.g., warehouses, trucking) abound. The major organizing elements and most prominent visual elements are the Buffalo Skyway and New York State Thruway, expressways to the south and east, respectively. Views of the Buffalo CBD from the south are dramatic, heightened by the axial relationship of Main Street high-rise structures to the expressway (particularly the Buffalo Skyway). The former Delaware Lackawanna, & Western Railroad terminal, now in ruins, is located at the Main Street-South Park Avenue intersection.

SECTION 3

3 - IDENTIFICATION AND DESCRIPTION OF PROJECT ALTERNATIVES

In this section, the development of the current mass transit program for the Niagara Frontier is discussed, including the program's comprehensive public participation efforts. The primary goals for a mass transit system that have emerged during the program's evolution are identified. Mass transit alternatives which have been accorded detailed analysis are described. (No attempt is made to cover the entire array of combinations and permutations of transit modes and routes considered at one time or another by NFTA planners.) Modes and routes with obvious inadequacies or adverse consequences are eliminated early in the discussion to focus on viable alternatives. In some cases, systems that appeared best at one time have become unsatisfactory due to changes in public attitudes, in local and national priorities, in availability of funding assistance, and in relative costs; shifts in the direction of urban growth and decay; and development of new technologies. In other cases, inadequate level of service or revenues, excessive costs, or unacceptable impacts result in an alternative being dropped from consideration.

3.1 - Mass Transit Program Development

The development of the present mass transit program for the Niagara Frontier culminates years of study and planning effort. For instance, the Buffalo-Amherst and Buffalo-Tonawanda Corridors were identified as having high transit potential in work completed as early as 1965 by the Niagara Frontier Transportation Study (NFTS).

In 1967, the NFTA was created by the legislature of New York State. Its mission was to strengthen and improve the transportation services available to residents within the Niagara Frontier Transportation District (Erie and Niagara Counties). Its particular responsibility was to develop and implement a unified mass transportation policy for the two-county region.

In March 1969, the New York State Office of Planning Coordination (OPC) completed the Buffalo-Amherst Corridor Urban Impact Study. In assessing the impact of the new Amherst Campus (North Campus) of the SUNYAB and the Audubon planned community development in Amherst (Figure 2-1), the OPC concluded that significant transportation improvements would be needed in the heavily traveled Corridor between downtown

Buffalo and the new campus. This conclusion is still valid despite short-term financing and economic concerns that will likely delay completion of the North Campus and Audubon from the mid-1980's to the 1990's. This delay will not necessarily affect 1995 projections because regional policies continue to encourage and anticipate a major share of the growth to take place in this Corridor. Also, other developments adjacent to Main Street are planned or under way or have already occurred on the assumption that a mass transit system will be constructed along this alignment.

In response to the OPC recommendations, the NFTA contracted with consultants to conduct the Niagara Frontier Mass Transit Study (NFMTS) which:

- examined the bus transit problems of the Niagara Frontier Region; and

- investigated the feasibility of an exclusive right-of-way transit facility in the Buffalo-Amherst Corridor.

The study determined that the current and projected motor bus transportation system faced increasing costs and declining revenues, despite an almost twofold increase in total travel in the Corridor by 1995. The report, (Ref. 25) completed in September 1971, concluded that a publicly-owned regional transit network combining motor bus and rail rapid transit was critically needed to reverse the trend of declining patronage and increasing costs and to enhance the economic potential of the Buffalo CBD and Buffalo-Amherst Corridor. The report recommended that the NFTA acquire area bus companies and design, construct, and operate a rail transit line in the Buffalo-Amherst Corridor.

The NFMTS recommendations were reiterated by the Transit Development Program (TDP), completed in November 1971, which described regional short- and long-term transit goals and led to designation of the Buffalo-Amherst Corridor as the first priority location for a rapid transit line. The TDP comprised three phases. Phase I provided for the NFTA to:

- acquire existing bus firms, purchase new equipment, and generally upgrade the facilities, services, and management of a unified regional service;

- construct a downtown Buffalo local and intercity bus terminal, the Metropolitan Transportation Center; and

- construct a rail rapid transit line in the Buffalo-Amherst Corridor.

The recommended program for Phase II included further bus improvements, construction of an International Transportation Center, and additional Buffalo-Amherst rapid transit extensions. Proposed activities for Phase III were not outlined in detail.

In 1971, the New York State Legislature authorized the NFTA to proceed with creation of a regional bus network and the design and construction of a rail transit line in the Buffalo-Amherst Corridor; $86 million was appropriated for these activities; a separate appropriation of $7.8 million was made for the Transportation Center. Urban Mass Transportation Administration grants toward the bus network totaled $7.7 million. In July 1975, the State allocated an additional $16 million for the rail transit system.

In accordance with the requirements for Federal funding at that time, the NFTA prepared a draft Environmental Impact Assessment (Ref. 26) in November 1971. After local agency review and consequent revisions, the draft EIA and the findings of the TDP and NFMTS were the subjects of public hearings in April 1972.

Community opposition to certain portions of the proposed alignment and significant lengths of aerial structure necessitated a re-evaluation of the project. In November 1972, UMTA awarded the NFTA a grant for preliminary engineering design activity, during which the Authority and its consultants met with the community and revised the alignment. As a part of this phase of work, a new EIA was prepared. This document (Ref. 5), published in June 1974, recommended an 11-mile long, fully grade-separated heavy rail transit (HRT) system with more of the line placed in subway.

Another Public Hearing was held in July 1974, at which nearly all comment was favorable. However, escalating construction cost estimates on the project prompted a reanalysis of mass transit alternatives to compare the recommended 11-mile HRT system with bus and light rail transit (LRT) to ensure that the most cost-effective project was being pursued.

The "Metro for Buffalo" report (Ref. 23) on the findings of this reanalysis was completed in June 1976 and concluded that a "reduced" rail transit system serving the downtown Buffalo-SUNYAB South Campus portion of the Corridor was more feasible in light of existing funding limitations and the desire to provide flexibility for future extensions.

A "Staff Conclusions and Recommendations" report (Ref. 27) compiled and reassessed the results of all previous studies, including the "Metro for Buffalo" study. The report recommended adoption of a reduced rail transit system partially at grade, partially underground, combining the best features of both heavy and light rail systems.

Following an UMTA "commitment in principle" to support a Metrorail System for Buffalo contingent on successful preparation and acceptance of this Environmental Impact Statement (EIS), the NFTA, in July 1976, submitted an application to UMTA (Ref. 28) for a mass transportation capital improvement grant under the Urban Mass Transportation Act of 1964, as amended. The application requested $8 million as the Federal share of a $10 million budget for costs incurred during the preliminary design phase of the $336,250,000 Metrorail Project. This budget covers General Architecture and Engineering and NFTA administrative expenses for Project Management during this phase. The NFTA Federal grant application for the preliminary design phase was approved by UMTA in October 1976.

3.2 - Community Participation Program

A Community Participation Program, with continuous evaluation of environmental impacts and public concerns, has been an integral part of the Buffalo Metrorail planning process. The program was designed to inform the public of planning considerations before final decisions were made, thereby permitting citizen participation in the decision-making process. Public involvement in the studies included, but was not limited to, suggestions on routes, station locations, system design, and construction methods.

The public has been involved in planning activities via the following channels: community forums, community workshops, individual participation, and Mass Transit Advisory Committee* meetings. The number of and attendance at these various functions through October 1976 is tabulated below.

Meetings	Number	Attendance
Community Forums and Public Hearings	18	2,120
Community Workshops	58	890
Citizen/Professional Group Meetings	184	8,094
Mass Transit Advisory Committee	22	826
Local Governmental Agencies	81	1,656
Radio and Television Appearances	64	--
	427	13,586

Source: Ref. 23

* An advisory group consisting of Federal, State, and local governmental representatives and concerned citizens appointed by the NFTA's Chairman.

In May 1975, at the request of the Erie County Executive and the Mayor of the City of Buffalo, the Joint Executive Committee for Rapid Transit was formed. It was composed of the chairmen of the Mass Transit Advisory Committee, the Area Committee for Transit (ACT), and the No Overhead Transit (NOT) organization (the latter two being special interest community groups). The Joint Committee was designed to unite these groups in a demonstration of community support for rapid transit.

In July 1975, the New York State Transportation Commissioner appointed a 50-member citizen's committee to support local efforts directed toward a favorable decision on the Buffalo-Amherst rail rapid transit project. Designated the Committee for Federal Action, the membership comprised a cross section of the area's business, civic, labor, and community leaders.

In February 1976, the entire State of New York Congressional delegation united to press for approval of the Buffalo project.

The NFTA held a public hearing on its capital grant application in August 1976; citizen response was favorable to the revised rail transit system plans.

During the preparation of this draft EIS, the NFTA has been available for public meetings to discuss the impacts of the proposed project and solicit public reaction. A formal public hearing will be held in June 1977 after completion of the draft EIS. Revisions in the document will be made in response to the citizens' comments at these various public forums.

3.3 - Criteria for Evaluating Transit Alternatives

Following completion of the June 1974 EIA and the public hearings of July 1974, a number of factors pointed to the need for a total reappraisal of the mass transit picture in the Buffalo-Amherst Corridor. These factors included:

- insufficient Federal funds for the anticipated number of transit proposals from various cities;
- sharply escalating costs for the 11-mile HRT system recommended at that time;

- declining public transit use;

- changes in funding assistance--an increased ratio of Federal matching monies for capital improvements and New York State's Transit Operating Assistance Funds;

- new Corridor development with altered baseline and projected demographics and socioeconomic data; and

- new transit developments, research, and demonstration programs examining the feasibility of low capital cost transit sytems.

Two areas of primary concern for a Buffalo-Amherst Corridor mass transit system were identified:

- costs--both capital and operating; and

- level of service--coverage of possible origins and destinations, frequency of service, travel time, and accessibility of given destinations from various origins.

These areas of primary concern evolved into the major objectives of the mass transit reappraisal, namely to determine:

- if staged construction of the 11-mile HRT line would result in cost savings such that the rail system's cost-effectiveness would be improved;

- if adding branches or extensions to the basic 11-mile HRT line would improve the system's cost effectiveness; and

- if another transit mode could provide equivalent service at lower cost, better service at equivalent cost, or lower service with more than commensurate cost savings such that overall cost-effectiveness would be improved.

These objectives were the basis of two reports, the "Metro for Buffalo" report (Ref. 23), published in June 1976, and the "Staff Conclusions and Recommendations" report (Ref. 27), released in February 1976. In these two reports, a number of criteria were adopted for the evaluation of alternative mass transit systems. These criteria are shown in Table 3-1. Both reports used an improved version of the existing bus system and the 11-mile HRT system as benchmarks with which other transit alternatives were compared.

TABLE 3-1

EVALUATION CRITERIA FOR
MASS TRANSIT ALTERNATIVES

Category	Evaluation Factor	Typical Component Measures
Costs	System Costs and Revenues	Capital costs; operating costs; system revenues; cost performance
Level of Service	System Usage	Patronage; average vehicle loading
	Quality of Transportation Service	Accessibility; safety; comfort; reliability
Community Impacts	Economic Effects	Transportation benefits; community benefits; energy savings
	Effects upon surrounding Community/Environment	Displacements; visual quality; nonuser safety
	Levels of Environmental Pollutants	Air pollution; noise/vibration
	Patterns of Urbanization and growth	Distribution of land use; growth stimulus
Other	Implementation Issues	Uncertainties; financing potential

Certain of the component measures listed need definition:

- Accessibility--Reflects the total number of people, low-income households, elderly persons, and educational and medical centers with easy access to transit service directly or via feeder buses.

- Transportation benefits--Comprises direct cost savings due to reduced auto operation, parking, auto insurance needs, auto ownership requirements, accident incidence, and travel time savings.

- Community benefits--Comprises indirect benefits from income generated by transit system construction/ operation; residential capital/maintenance savings; retail sales, retail sales taxes, retail income, office/clerical income, and market value increases in retail/office space stimulated by presence of the transit system.

- Displacements--Removal and relocation of residents, businesses, and other community facilities.

- Uncertainties--A measure of the reliability of the projections and estimates an alternative is based upon which, in turn, reflects dependence on changeable government policies and economic, demographic, and urban development trends.

- Financing potential--Reflects the current position and likely prospects for Federal, State, and local assistance for operating expenses and capital costs.

3.4 - Non-Rail-Based Alternatives Evaluated

Highway Improvements

The Niagara Frontier Transportation Study, the results of which were published in 1965, developed an extensive freeway plan, less than 15 percent of which has been completed. The reason: public and governmental recognition of the adverse impacts of further highway expansion. These include serious neighborhood disruptions, increased noise and air pollution, encouragement of energy consumption, increased property taxes due to taking of taxable properties, added burdens on limited CBD parking facilities, and no resolution of mobility problems for transit-dependent persons. Thus, major highway developments are no longer a viable alternative. The only significant highway improvement likely to be completed in the near future is the Elm-Oak Arterial through the eastern part of the CBD to connect the Kensington Expressway and I-190.

Bus-Based Transit

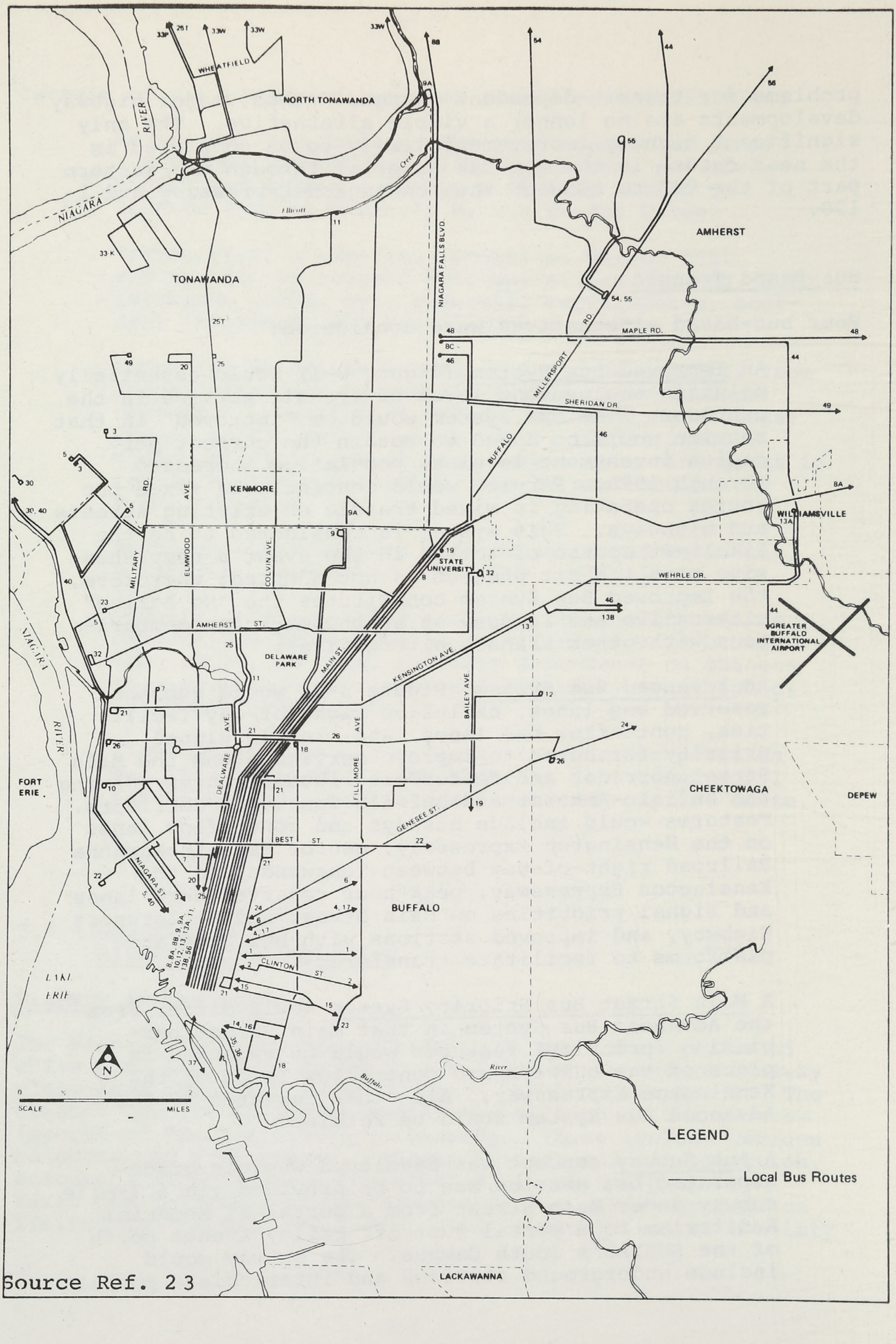
Four bus-based alternatives were considered:

- An Improved Bus System (Figure 3-1) would essentially maintain the present level of transit service in the corridor. The bus system would be "improved" in that service would be added to retain the current per capita investment level as population increased through 1995. Service would continue via fixed bus routes operating in mixed traffic on existing streets and highways. This system is considered to be the likeliest course of action in the event a comprehensive mass transit project is not adopted; therefore, the Improved Bus System constitutes the "No Action" alternative and is used as a benchmark for comparisons with other transit alternatives.

- An Advanced Bus System (Figure 3-2) would combine reserved bus lanes, exclusive right-of-way facilities, contraflow bus lanes, and traffic signal priority for buses to improve service along the Main Street corridor and feeder/distributor routes serving the Buffalo-Amherst and Buffalo-Tonawanda Corridors. Features would include busways and contraflow lanes on the Kensington Expressway, use of Erie-Lackawanna Railroad right-of-way between Tonawanda and the Kensington Expressway, peak-hour reserved curb lanes and signal priorities on Main Street and Millersport Highway, and improved stations with bus bays and platforms to facilitate transfers.

- A Main Street Bus Priority System would differ from the Advanced Bus System in that Main Street bus-biasing (priority) features would be expanded in place of the busways and contraflow lanes on the Kensington Expressway. All other features of the Advanced Bus System would be retained.

- A Bus Subway concept was developed wherein grade-separated bus service was to be provided via a 7-mile subway under Main Street from a portal at Memorial Auditorium to a portal just off Bailey Avenue north of the SUNYAB's South Campus. The subway would include underground stations and intermediate portals



Source Ref. 23

Figure 3-1. Improved Bus System

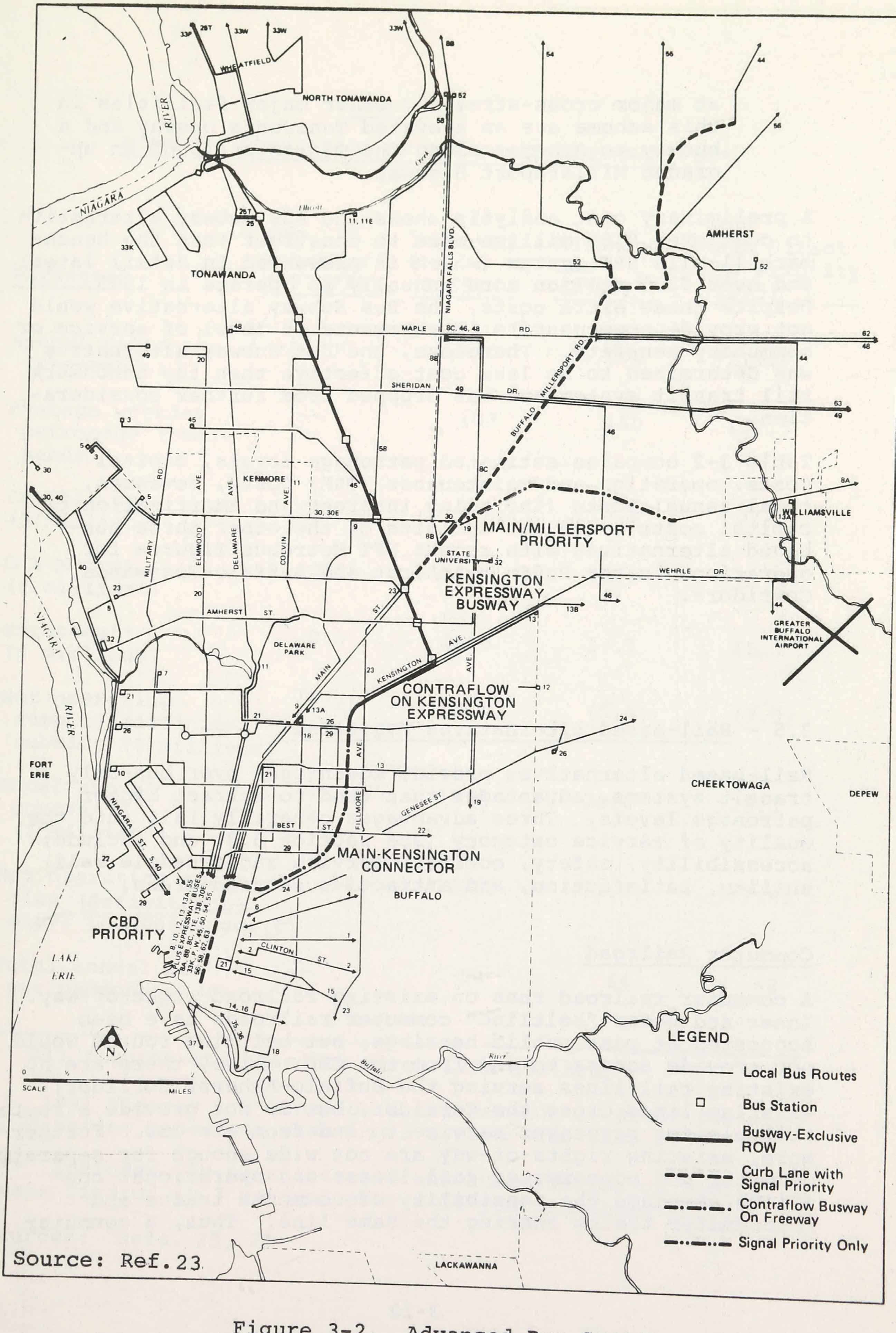


Figure 3-2. Advanced Bus System

at major cross-streets. Other major facilities in this scheme are an elevated Tonawanda busway and a busway to Amherst along the median strip of an upgraded Millersport Highway.

A preliminary cost analysis shows the Bus Subway alternative to cost over $180 million more to construct than the benchmark 11-mile HRT system (which is presented in detail later) and over $2.5 million more annually to operate in 1995. Despite these extra costs, the Bus Subway alternative would not provide commensurate improvements in level of service or community benefits. Therefore, the Bus Subway alternative was determined to be less cost-effective than the benchmark rail transit system and was dropped from further consideration.

Table 3-2 compares estimated patronage levels, capital costs, operation and maintenance (O&M) costs, revenues, total annual costs (including interest and amortization of capital costs), and net deficits of the other three bus-based alternatives with recent NFT Metrobus figures for operations in the Buffalo-Amherst and Buffalo-Tonawanda Corridors.

3.5 - Rail-Based Alternatives Evaluated

Rail-based alternatives provide advantages over bus-only transit systems, advantages that tend to attract higher patronage levels. Three advantages generally fall into the quality of service category (see Section 3.3) and include: accessibility, safety, comfort, service and schedule reliability, satisfaction, and attractive station areas.

Commuter Railroad

A commuter railroad runs on existing railroad right-of-way. Inner and outer "beltline" commuter railroads have been suggested at past public hearings, but beltline routes would not provide access to and from the CBD. Also, there are no existing rail lines serving the Buffalo-Amherst Corridor; existing lines cross the Corridor, but do not provide a route suitable for passenger service to and from the CBD. Furthermore, existing rights-of-way are not wide enough for separate commuter and noncommuter rail lines; and operational conflicts preclude the possibility of commuter trains and noncommuter trains sharing the same line. Thus, a commuter

TABLE 3-2

ECONOMIC COMPARISON OF BUS-BASED ALTERNATIVES*

Parameter	NFT Metrobus (1974/75)	Improved Bus (1995)	Advanced Bus (1995)	Main Street Bus Priority (1995)
Annual patronage (thousands)	18,900	30,900	45,000	41,300
Average weekday patronage (thousands)	--	103	150	137.5
Capital cost ($ millions)	--	5.8	75.2	57.0
O & M costs ($ millions)	10.2	14.9	22.3	22.9
Revenues** ($ millions)	8.0	11.8	17.1	15.7
Net operating surplus (deficit/subsidy) ($ millions)	(2.2)	(3.1)	(5.2)	(7.2)
Total annual cost*** ($ millions)	--	15.5	28.8	28.1
Net operating surplus (deficit/subsidy) per passenger (¢)	(11.6)	(10.0)	(11.6)	(17.4)
Total annual cost per passenger (¢)	--	50	64	68

* All figures are based on March 1974 dollars.

** 1995 Figures are based on a net revenue of $0.38 for each originating passenger assuming a system-wide fare of $0.40.

*** Includes O&M plus interest and amortization on capital costs figured at 7 percent over a 50-year economic life.

Sources: Refs. 23, 27

railroad would not provide a solution to the transit needs of the Corridor.

Rail Rapid Transit

Three types of rail rapid transit systems were examined: Heavy Rail Transit (HRT), Light Rail Transit (LRT), and Light Rail Rapid Transit (LRRT) (a "composite" of the other two systems). Differences between HRT and LRT are not always clear. Generally, however, HRT is characterized by its ability to transport large volumes of people (on the order of 40,000 passengers/hour). To accomplish this, it is necessary to have the system on exclusive right-of-way to avoid interference from other modes of travel.

A grade-separated (subway or elevated) right-of-way is commonly used which, in turn, permits use of a "hot" third rail for power supply. Other inherent HRT features favoring a high passenger volume include the multi-car train (two to twelve cars), raised platforms for floor-level rather than step-up boarding, and in-station rather than on-board fare collection.

LRT systems generally peak at about 20,000 passengers/hour, a level of service between the 40,000 passengers/hour for HRT and the 5,000-7,000 passengers/hour typical of bus transit. LRT systems are flexible in that they may operate at grade in mixed-traffic situations where the cost to provide exclusive right-of-way is not justified. Mixed-traffic operation requires use of overhead power pickup to avoid exposing the public to a potentially hazardous third rail. LRT trains frequently have fewer cars (one to four) than used with HRT; LRT systems generally have low platform (step-up) boarding and on-board fare collection.

The greater passenger-carrying capacity of the HRT system, a function of its exclusive right-of-way and more efficient loading and fare collection features, is gained at the expense of higher capital costs. A LRT system is generally less capital-intensive than a HRT system, but more labor-intensive, hence costlier to operate.

The LRRT concept utilizes the best features of both HRT and LRT. Rail vehicles with the capability for overhead power pickup are used to permit mixed-traffic operation wherever appropriate to reduce capital costs and to retain maximum flexibility for later inexpensive expansion of service to other areas. However, a LRRT system has the option of using exclusive right-of-way in areas where it is preferable to avoid mixed traffic congestion to reduce travel times.

Floor-level loading (via raised platforms) and in-station (rather than on-board) fare collection is adopted to reduce operating costs and speed passenger on- and off-loading.

Eight HRT systems were analyzed, the benchmark 11-mile HRT System, a "Reduced" HRT System, and six Modified HRT Systems. These are discussed in the following paragraphs:

- The benchmark 11-mile HRT System was developed in detail in the studies culminating in the 1974 EIA (Ref. 5) and the "Preliminary Design Report" (Ref. 29) both dated June 1974, and was refined further in the "Metro for Buffalo" study (Ref. 23).

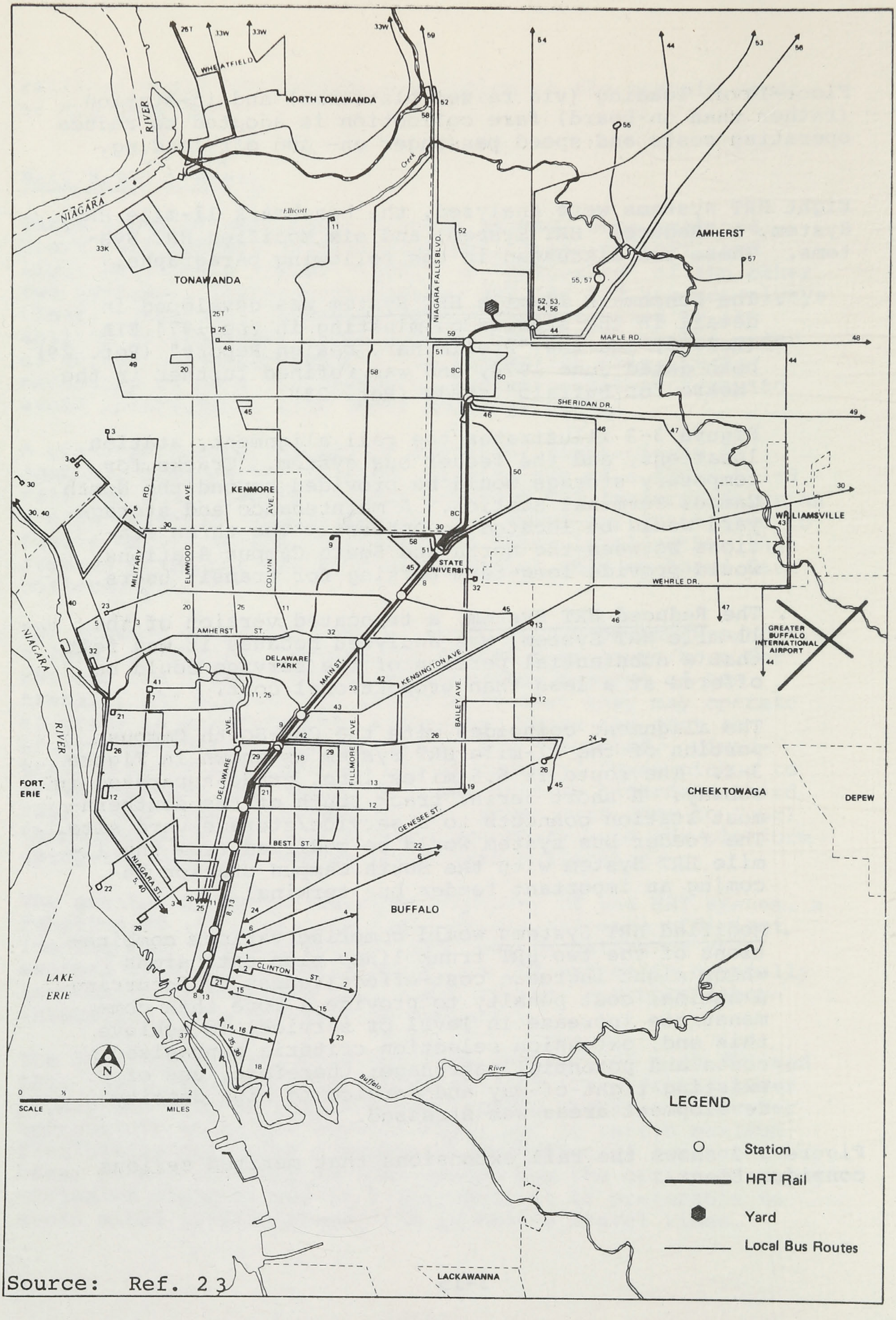
  Figure 3-3 illustrates the rail alignment, station locations, and the feeder bus system. Tracks for temporary storage would be provided beyond the North Campus Terminal Station. A maintenance and storage yard would be located in Amherst. The three stations between the North and South Campus Stations, would provide long-term parking for transit users.

- The Reduced HRT System, a truncated version of the 11-mile HRT System, was analyzed because it was felt that a substantial portion of the service could be offered at a less than proportional cost.

  The alignment coincides with the CBD-South Campus portion of the 11-mile HRT System as shown in Figure 3-4. The route is 6.6 miles long, grade-separated in subway. A short aerial track south of the southernmost station connects to a service/storage yard site. The feeder bus system would be modified from the 11-mile HRT System with the South Campus Station becoming an important feeder bus terminal.

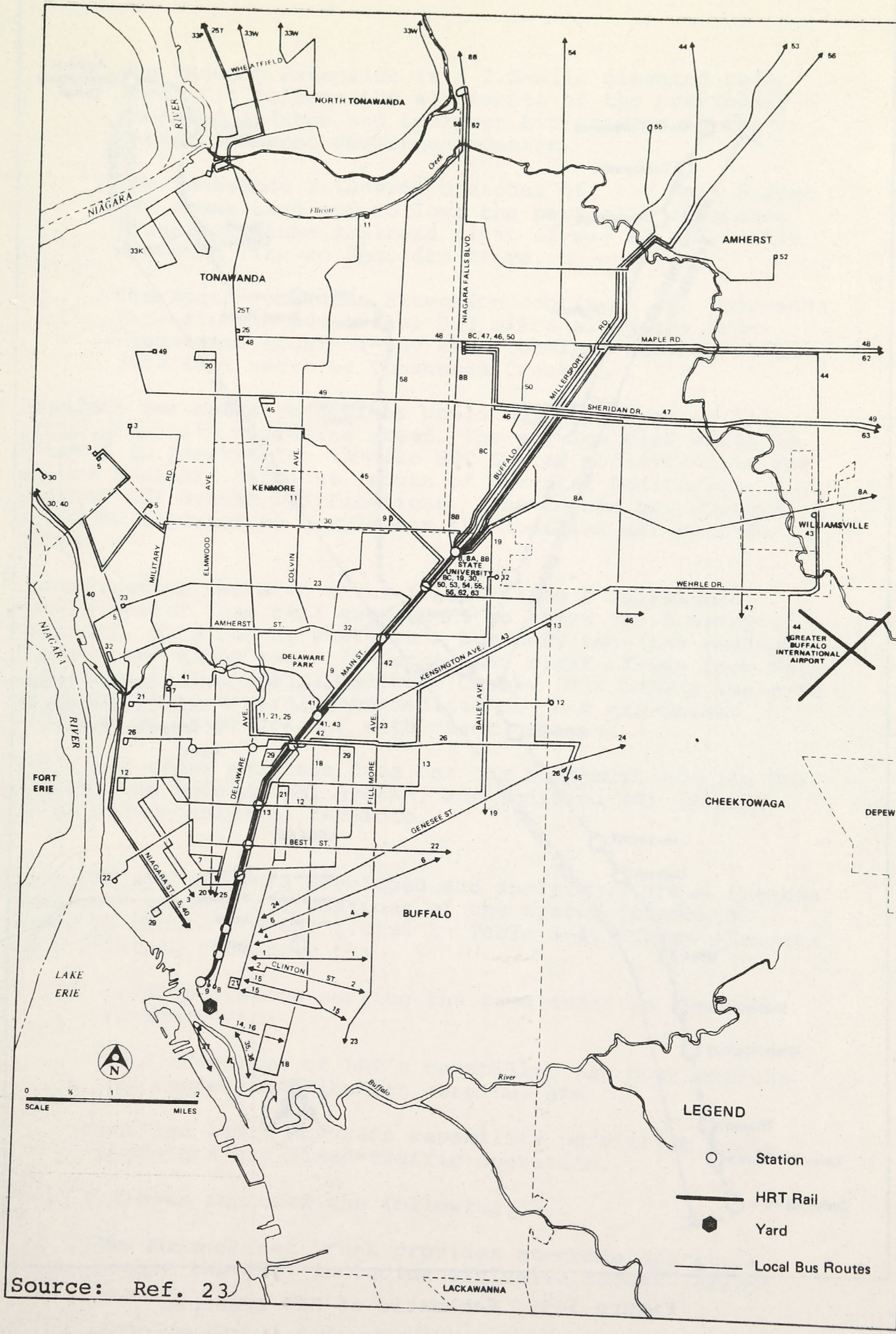
- Modified HRT Systems would comprise various combinations of the two HRT trunk lines plus extensions which might increase cost-effectiveness by incurring a nominal cost penalty to provide a more than commensurate increase in level of service. To achieve this end, extension selection criteria emphasized costs and potential patronage; therefore, use of existing right-of-way and service to high density development areas was stressed.

Figure 3-5 shows the rail extensions that merited serious consideration:



Source: Ref. 23

Figure 3-3. 11-Mile HRT System



Source: Ref. 23

Figure 3-4. Reduced HRT System

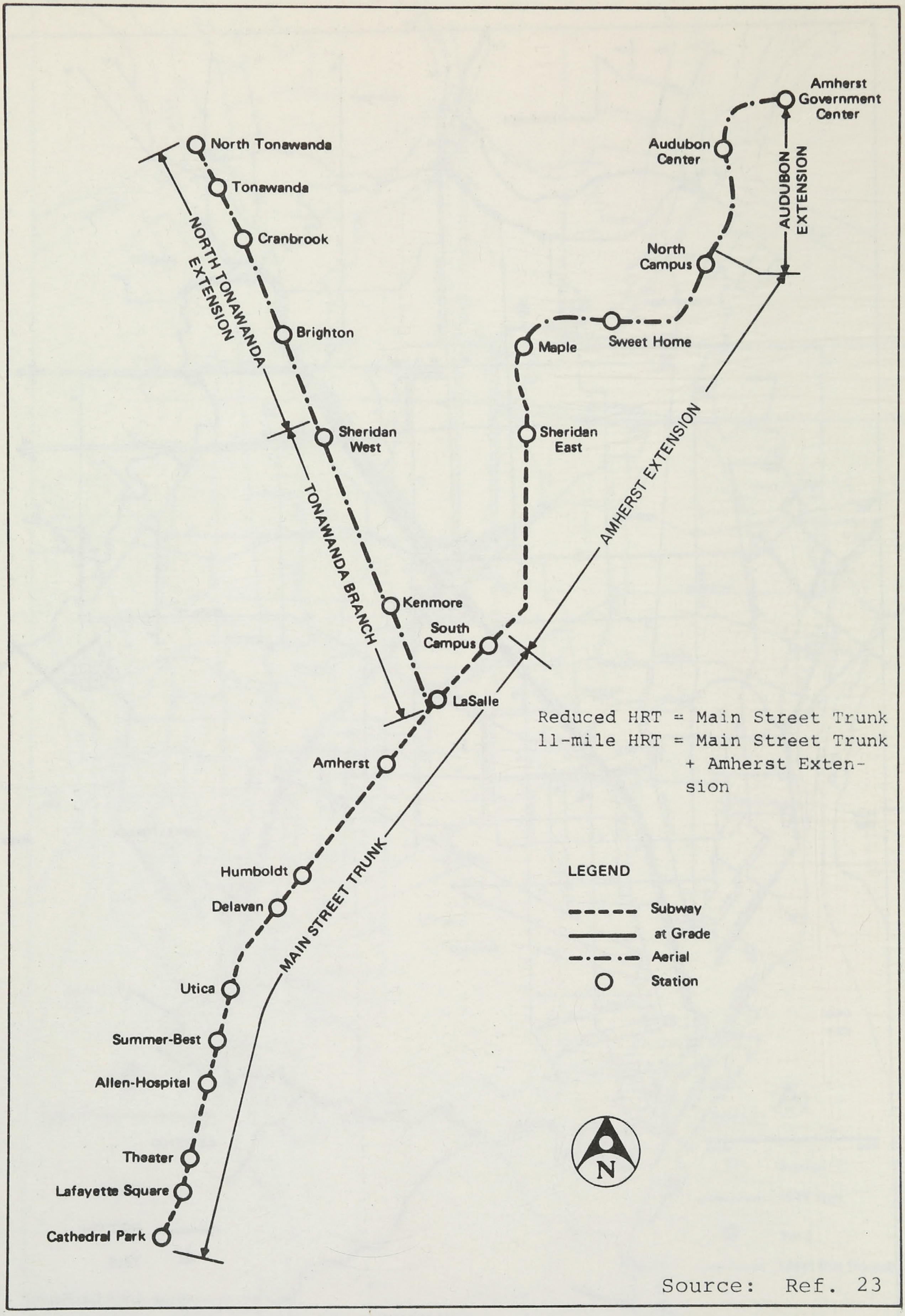


Figure 3-5. Schematic of HRT Branches

- The Audubon Extension is a 2.5-mile elevated rail line. It follows the alignments of the previously proposed Audubon and Lockport Expressways to the planned Amherst Government Center.

- The Tonawanda Extension branches off the Main Street HRT trunk line and follows the partially abandoned Erie-Lackawanna Railroad right-of-way as a 2.8-mile elevated line to Sheridan Drive.

- The North Tonawanda Extension continues the Tonawanda Extension an additional 3.3 miles along the Erie-Lackawanna right-of-way to a terminal station about 3000 feet north of Tonawanda Creek.

Stations for these extensions would be on covered aerial structures with mezzanine areas. The service yard would be located in Amherst for 11-mile HRT System modifications and at the southern terminus, south of Memorial Auditorium, for Reduced HRT System modifications. The feeder bus systems would be adjusted to complement the modified HRT alternatives.

Consideration was also given to utilizing a Tonawandas Busway rather than rail extensions to serve the Tonawanda Corridor. This busway would be a bus-only two-lane roadway constructed along the Erie-Lackawanna right-of-way from Main Street to just south of Ellicott Creek. The busway would be at grade, with several intermediate on- and off-points provided at intersections with major streets.

Table 3-3 shows economic data for the benchmark 11-mile HRT System, the Reduced HRT System, and Modified HRT Systems which were considered feasible.

Nine LRT systems were developed and analyzed. These systems comprised various combinations of the system "elements" shown in Figure 3-6 and listed in Table 3-4. These elements were selected primarily to:

- develop systems serving the same areas as the HRT alternatives;

- take advantage of LRT's capability for both express and feeder/distribution service; and

- utilize LRT's at-grade capability permitting grade crossings and mixed-traffic operation.

These elements included the following:

- The Main Street Trunk provides at-grade operation within the CBD, including exclusive access (except

TABLE 3-3

ECONOMIC COMPARISON OF HRT ALTERNATIVES*

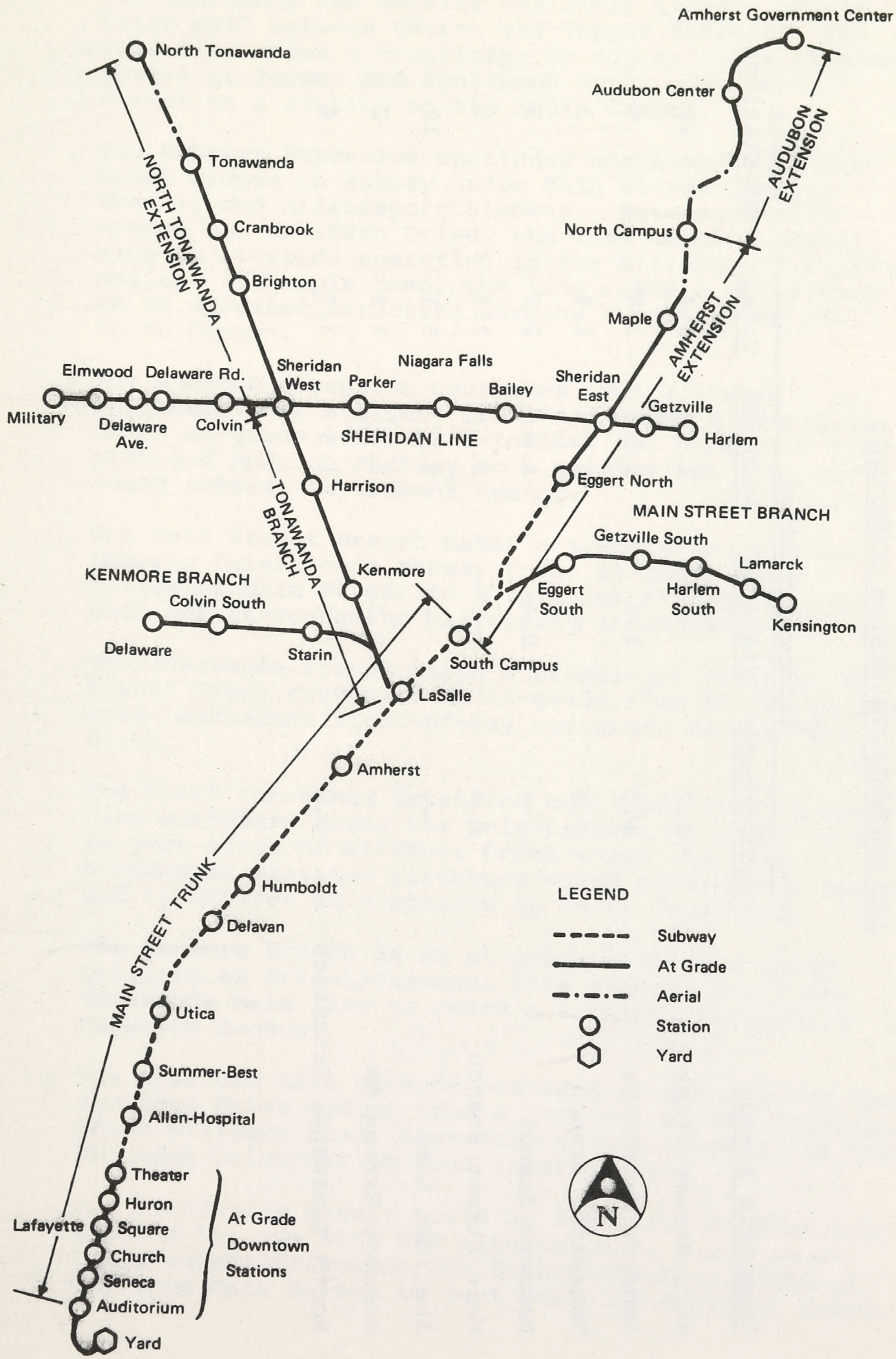
Parameter	11-mile HRT System +				Reduced HRT System +			
	Alone (Benchmark)	A	T+NT	A+T+NT (Maximum)	Alone	T	T+NT	TB
Annual patronage (thousands)	63,600	64,200	66,600	67,200	55,200	56,700	58,200	57,600
Average weekday patronage (thousands)	212	214	222	224	184	189	194	192
Capital costs ($ millions)	373	420	479	518	261	310	363	282
O&M costs ($ millions)	23.6	23.8	25.2	25.3	24.4	25.9	26.0	24.4
Revenues** ($ millions)	24.2	24.4	25.3	25.6	21.0	21.4	22.1	21.9
Net operating surplus (deficit) ($ millions)	0.6	0.6	0.1	0.3	(3.4)	(4.5)	(3.9)	(2.5)
Total annual cost*** ($ millions)	51.5	55.2	61.3	63.8	44.2	49.3	53.5	46.1
Net operating surplus (deficit) per passenger (¢)	0.9	0.9	0.2	0.4	(6.2)	(7.9)	(6.7)	(4.3)
Total annual cost per passenger (¢)	81	86	92	95	80	87	92	80

* All figures except capital cost are based on 1995 projections and March 1974 dollars.

** Figures are based on a net revenue of $0.38 for each originating passenger assuming a system-wide fare of $0.40.

*** Includes O&M plus interest and amortization on capital costs figured at 7 percent over a 50-year economic life.

A = Audubon Extension
T = Tonawanda Extension
NT = North Tonawanda Extension
TB = Tonawandas Busway



Source: Ref. 23

Figure 3-6. Schematic of LRT System Elements

TABLE 3-4

LRT ALTERNATIVE SYSTEM COMPONENTS

Component Branch	Guideway Mileage: Underground	Elevated	At Grade	Total	Number Of Stations
Main Street Trunk	5.2	--	1.2	6.4	14
Amherst Extension	1.5	1.0	1.3	3.8	4
Tonawanda Branch	0.6	--	2.2	2.8	3
Kenmore Branch	--	0.4	1.8	2.2	3
Main Street Branch	0.4	--	2.1	2.5	5
Sheridan Line	--	--	5.1	5.1	12
Audubon Extension	--	0.5	2.4	2.9	2
North Tonawanda Extension	0.2	1.6	1.5	3.3	4

for emergency and service vehicles) along a pedestrian mall between Church and Tupper Streets. The rail line makes a transition to subway via a ramp and portal at Tupper and continues north under Main Street to a station on the South Campus.

- The Amherst Extension continues northward from the South Campus in subway under Main Street, Bailey Avenue, and Millersport Highway. Between Bailey Avenue and Sheridan Drive, the line makes a transition to at-grade operation in the Millersport Highway median. At Maple Road, the line makes a transition to an elevated structure serving a station on the North Campus.
- The Audubon Extension continues this elevated line northward over Ellicott Creek and makes a transition to an at-grade line which follows the median of the proposed Audubon Parkway to a terminal at the proposed Amherst Government Center.
- The Main Street Branch makes a transition from the Amherst Extension's subway to an at-grade line following Main Street to a terminal station at the Main Street-Youngmann Expressway intersection.
- The Tonawanda Branch makes a transition from the Main Street Trunk subway to an at-grade line following the Erie-Lackawanna right-of-way northward to Sheridan Drive.
- The North Tonawanda Extension continues this at-grade line northward along the Erie-Lackawanna right-of-way to just south of Ellicott Creek where the line becomes an elevated structure which crosses the creek and terminates at a station in North Tonawanda.
- The Kenmore Branch is an at-grade extension which utilizes an Erie-Lackawanna line branching off the Tonawanda main line to reach a terminal station at Delaware Avenue.
- The Sheridan Line extends eastward at grade along the Sheridan Drive median from a terminal at the Sheridan Drive-Military Road intersection to a terminal at the Sheridan Drive-Harlem Road intersection.
- The Tonawandas Busway would be identical to that considered for use with HRT alternatives, i.e., an at-grade busway following the Erie-Lackawanna right-of-way from Main Street to just south of Ellicott Creek.

Stations for these elements would provide a variety of services, from step-up loading to floor-level loading via raised platforms, from in-station to on-board fare collection, and from 0 to 2000 parking spaces for transit users. Table 3-5 lists the features of the stations. The service yard in all LRT systems would be located at the southern terminus of the line. As with the HRT alternatives, bus routes would be modified to provide feeder service to the rail line.

The nine LRT alternatives analyzed in detail include maximum, intermediate, and minimum systems plus six other variations:

- The Maximum LRT System would include all the elements (except the Tonawandas Busway), a total of 29.0 miles of rail line. Figure 3-7 shows this system and the corresponding feeder bus routes.

- The Intermediate LRT System would include the Main Street Trunk, the Tonawanda Branch, and the Amherst Extension, a total of 13.0 miles (Figure 3-8).

- The Minimum LRT System consists only of the 6.4-mile Main Street Trunk (Figure 3-9).

Table 3-6 presents economic data for all nine systems and the benchmark 11-mile HRT System.

Five LRRT systems were analyzed:

- The Minimum LRRT System follows the same alignment used by the Minimum LRT System (Figure 3-9). Within the CBD, the rail line would be at-grade for 1.2 miles, including the Church-Tupper Streets pedestrian mall segment. A transition to subway would be made at Tupper Street and the subway would terminate at the South Campus Station.

- The 11-mile LRRT System that was analyzed would essentially add the HRT Amherst Extension alignment to the Minimum LRRT System. The subway would proceed north from the South Campus under Main Street and Bailey Avenue to a point between Sheridan Drive and Maple Road where the line would make a transition to an elevated structure which would terminate at a station on the North Campus.

- The Extended LRRT System would add the LRT Tonawanda Branch and North Tonawanda Extension to the 11-mile LRRT System, i.e., the rail line serving the Tonawanda Corridor would branch off the Main Street subway with a transition to an at-grade line along

TABLE 3-5

DESCRIPTION OF LRT STATIONS

Station	Construction	Platform Type	Platform Length (ft.)	Fare Collection	Parking Spaces
Main Street Trunk					
1. Auditorium	On Street	Low, Side	300	On Street (1)	None
2. Seneca	On Street	Low, Side	150 (2)	On Vehicle	None
3. Church	On Street	Low, Side	150 (2)	On Vehicle	None
4. Lafayette Sq.	On Street	Low, Side	150 (2)	On Vehicle	None
5. Huron	On Street	Low, Side	150 (2)	On Vehicle	None
6. Theater	On Street	Low, Side	150 (2)	On Vehicle	None
7. Allen/Hospital	Cut & Cover	High, Side	300	In Station (3)	None
8. Summer/Best	Cut & Cover	High, Side	300	In Station (3)	None
9. Utica	Cut & Cover	High, Side	300	In Station (3)	None
10. Delavan	Tunnel	High, Center	300	In Station (3)	None
11. Humboldt	Tunnel	High, Center	300	In Station (4)	None
12. Amherst	Tunnel	High, Center	300	In Station (3)	None
13. LaSalle	Tunnel	High, Center	300	In Station (4)	None
14. S. Campus	Tunnel	High, Center	300	In Station (3)	None
Amherst Extension					
1. Eggert	On Street	Low, Side	150	On Vehicle	None
2. Sheridan East	On Street	Low, Side	150	On Vehicle	300
3. Maple	At Grade	High, Side	150	On Vehicle	750
4. N. Campus	Hwy. Median Aerial	High, Side	300	In Station (4)	None
Audubon Extension					
1. Audubon Center	At Grade	Low, Side	150	On Vehicle (4)	300
2. Amherst Government Center	At Grade	Low, Side	150	On Vehicle	200
Tonawanda Branch					
1. Kenmore	At Grade	Low, Side	150	On Vehicle	200
2. Harrison	At Grade	Low, Side	150	On Vehicle	200
3. Sheridan West	At Grade	Low, Side	150	On Vehicle	300
N. Tonawanda Ext.					
1. Brighton	At Grade	Low, Side	150	On Vehicle	650
2. Canton	At Grade	Low, Side	150	On Vehicle	550
3. Tonawanda	Aerial	High, Side	300	In Station (4)	200
4. N. Tonawanda	Aerial	High, Side	300	In Station (3)	150
Kenmore					
1. Starin	At Grade	Low, Side	150	On Vehicle	None
2. Colvin South	At Grade	Low, Side	150	On Vehicle	None
3. Delaware	At Grade	Low, Side	150	On Vehicle	None
Main St. Branch					
1. Eggert South	On Street	Low, Side	150	On Vehicle	None
2. Getzville South	On Street	Low, Side	150	On Vehicle	None
3. Harlem South	On Street	Low, Side	150	On Vehicle	None
4. Lamarck	On Street	Low, Side	150	On Vehicle	None
5. Kensington	On Street	Low, Side	150	On Vehicle	None
Sheridan					
1. Military	On Street	Low, Side	150	On Vehicle	
2. Elmwood	On Street	Low, Side	150	On Vehicle	None
3. Delaware Ave. N.	On Street	Low, Side	150	On Vehicle	None
4. Delaware Rd.	On Street	Low, Side	150	On Vehicle	100
5. Colvin North	On Street	Low, Side	150	On Vehicle	None
6. Sheridan West	On Street	Low, Side	150	On Vehicle	-
7. Parker	On Street	Low, Side	150	On Vehicle	None
8. Niagara Falls	On Street	Low, Side	150	On Vehicle	200
9. Bailey	On Street	Low, Side	150	On Vehicle	2,000
10. Sheridan East	On Street	Low, Side	150	On Vehicle	None
11. Getzville	On Street	Low, Side	150	On Vehicle	None
12. Harlem North	On Street	Low, Side	150	On Vehicle	100

NOTES: (1) Facilities to be provided to allow prepayment of fares before boarding vehicles during Auditorium special event.

(2) All platforms 150 ft. in length will be located to facilitate extension to 300 ft. in future.

(3) Station attendant to be provided during entire 18 hr. operating day.

(4) Station attendant to be provided during rush hours only.

Source: Ref. 23

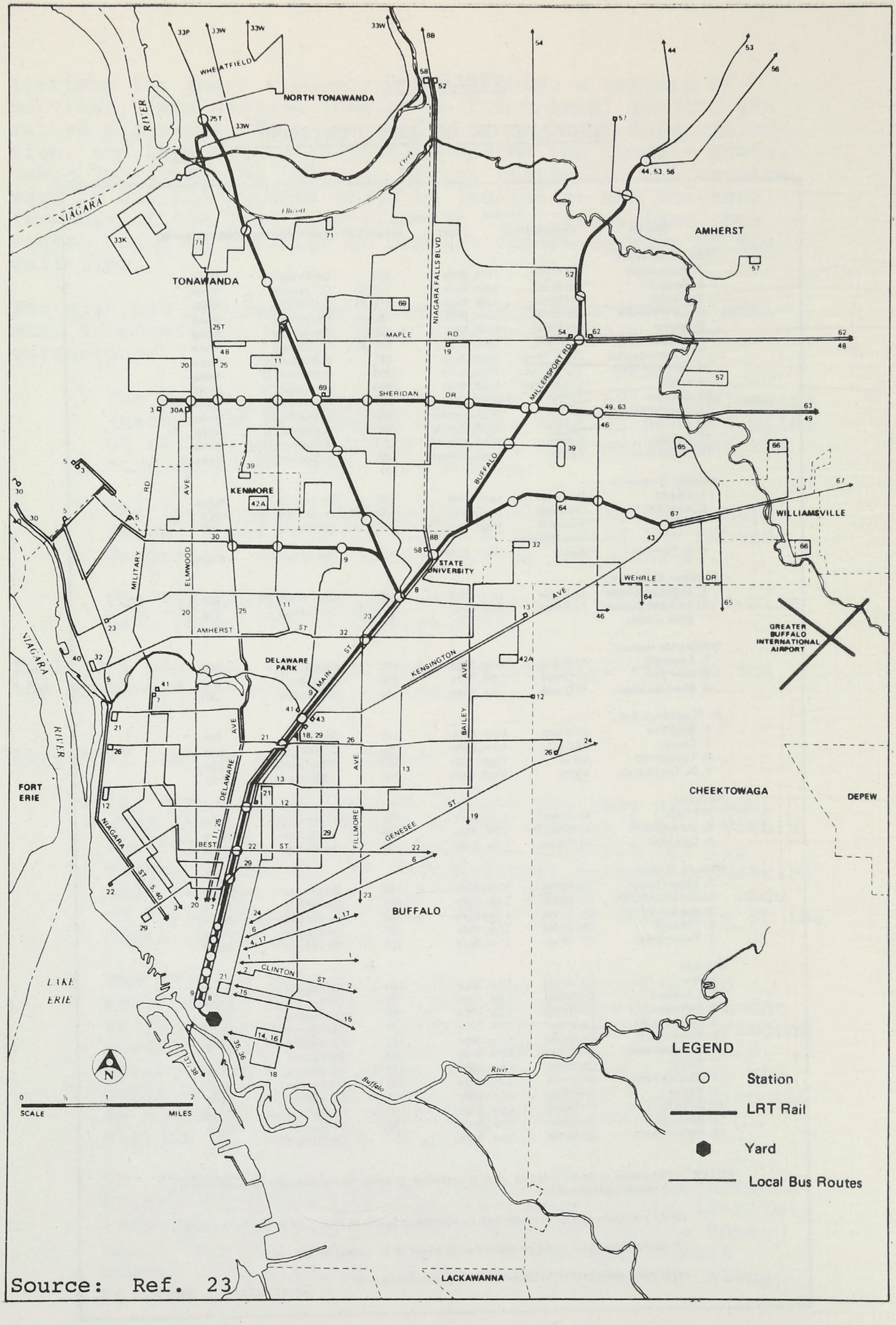


Figure 3-7. Maximum LRT System

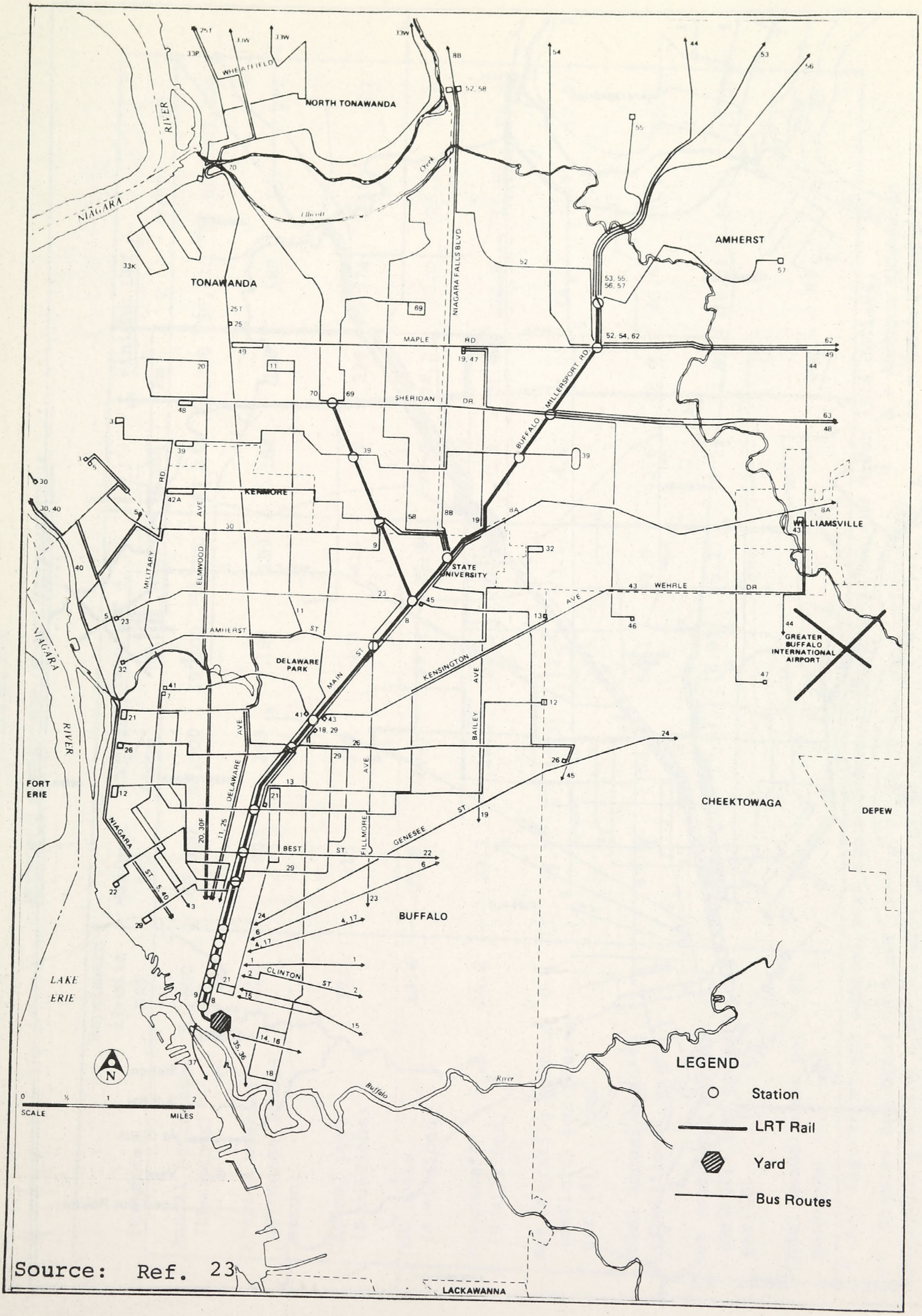


Figure 3-8. Intermediate LRT System

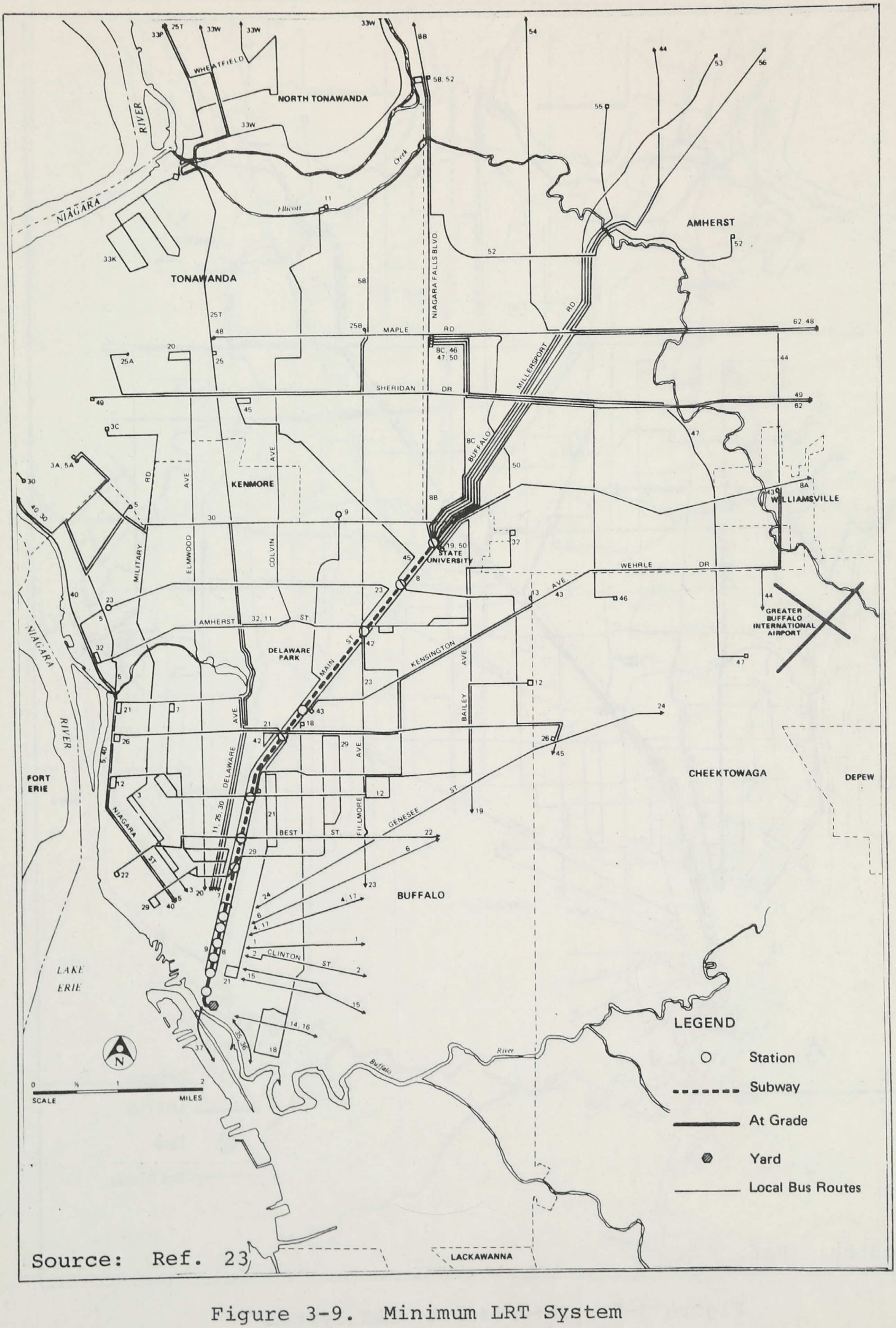


Figure 3-9. Minimum LRT System

TABLE 3-6

ECONOMIC COMPARISON OF LRT ALTERNATIVES*

Parameter	Benchmark 11-mile HRT	Maximum LRT	Intermediate LRT + Alone	Intermediate LRT + NT	Intermediate LRT + A+NT	Minimum LRT + Alone	Minimum LRT + Am	Minimum LRT + T	Minimum LRT + T+NT	Minimum LRT + TB
Annual patronage (thousands)	63,600	60,900	57,900	59,100	59,700	55,200	56,700	56,400	57,600	57,600
Average weekday patronage (thousands)	212	203	193	197	199	184	189	188	192	192
Capital cost ($ millions)	373	515	357	403	425	246	328	274	321	267
O&M costs ($ millions)	23.6	27.8	26.3	25.4	25.8	24.9	24.2	26.0	26.2	24.8
Revenues** ($ millions)	24.2	23.1	22.0	22.5	22.7	20.9	21.6	21.5	21.8	21.9
Net operating surplus (deficit) per passenger (¢)	0.6	(4.7)	(4.3)	(2.9)	(3.1)	(4.0)	(2.6)	(4.5)	(4.4)	(2.9)
Total annual cost*** ($ millions)	51.5	67.0	53.3	56.1	57.9	43.6	48.8	46.8	50.7	45.5
Net operating surplus (deficit) per passenger (¢)	0.9	(7.7)	(7.4)	(4.9)	(5.2)	(7.2)	(4.6)	(8.0)	(7.6)	(5.0)
Total annual cost per passenger (¢)	81	110	92	95	97	79	86	83	88	79

* All figures except capital cost are based on 1995 projections and March 1974 dollars.

** Figures are based on a net revenue of $0.38 for each originating passenger assuming a system-wide fare of $0.40.

*** Includes O&M plus interest and amortization on capital costs figured at 7 percent over a 50-year economic life.

A = Audubon Extension
Am = Amherst Extension
T = Tonawanda Branch
NT = North Tonawanda Extension
TB = Tonawandas Busway

the Erie-Lackawanna right-of-way. This line would be elevated from a point just south of Ellicott Creek to the terminal station in North Tonawanda.

- The Minimum LRRT System + Tonawandas Busway would add an at-grade busway running along the Erie-Lackawanna right-of-way from Main Street to just south of Ellicott Creek.

- The 11-mile LRRT System + Tonawandas Busway would exchange the busway for the rail extensions of the Extended LRRT System to see which modification to the 11-mile LRRT System is more cost-effective.

Stations for LRRT alternatives match those on the corresponding LRT routes, except for the Amherst portion of the 11-mile LRRT system which follows the HRT alignment and station locations. All stations, however, would be of the HRT type, i.e., raised platforms for floor-level on- and off-loading plus in-station rather than on-board fare collection. The service yard for LRRT alternatives would be located at the southern terminus of the line as in the LRT alternatives. Also, bus routes would be modified to provide feeder service to the rail line.

Table 3-7 summarizes economic data for these five LRRT systems relative to the benchmark 11-mile HRT System.

3.6 - Evaluation of Preferred Alternatives

The ultimate purpose of alternative evaluation is to provide decision-makers with a basis for selecting that alternative which is most desirable. This is a particularly complex procedure in urban transportation development since a variety of concerns enters into the decision-making process, ranging from what is desirable at a policy level to conflicting distributions of costs and benefits among the members of the community at large to what is realistic to pursue in light of funding constraints. In most cases, some degree of compromise is necessary to reach a consensus enabling the project to proceed. For example, a small cost penalty might be incurred to minimize or mitigate adverse environmental impacts. Or, it might be necessary to accept a reduced project scope despite less favorable economic indicators to stay within given budgetary constraints.

All the bus- and rail-based alternatives presented in Sections 3.4 and 3.5 respectively, with the exceptions of the Bus Subway and the Commuter Railroad, are feasible from a

TABLE 3-7

ECONOMIC COMPARISON OF LRRT ALTERNATIVES*

Parameter	Benchmark 11-mile HRT	Minimum LRRT	Minimum LRRT + TB	11-mile LRRT	11-mile LRRT + TB	Extended LRRT
Annual patronage (thousands)	63,600	55,200	57,600	63,600	66,000	66,200
Average weekday patronage (thousands)	212	184	192	212	220	221
Capital cost ($ millions)	373	245	266	371	392	447
O&M costs ($ millions)	23.6	24.4	24.6	23.6	23.8	25.0
Revenues** ($ millions)	24.2	21.0	21.9	24.2	25.1	25.2
Net operating surplus (deficit) ($ millions)	0.6	(3.4)	(2.7)	0.6	1.3	0.2
Total annual cost*** ($ millions)	51.5	43.0	44.5	51.5	53.0	57.0
Net operating surplus (deficit) per passenger (¢)	0.9	(6.2)	(4.7)	1.0	2.0	0.3
Total annual cost per passenger (¢)	81	78	77	81	80	86

* All figures except capital cost are based on 1995 projections based on March 1974 dollars.

** Figures are based on a net revenue of $0.38 for each originating passenger assuming a system-wide fare of $0.40.

TB = Tonawanda Busway

*** Includes O&M plus interest and amortization on capital costs figured at 7 percent interest and a 50-year economic life.

technical standpoint and are reasonable in scope. So it now becomes necessary to use the evaluation criteria discussed in Section 3.3 to screen out poorer alternatives and focus attention on the more promising candidates. A two-stage screening process is used--the first stage being primarily economic in nature, the second stage accounting for other important factors, e.g., level of service and social and environmental impacts. Bus- and rail-based alternatives are evaluated separately; the best bus system and best rail system thus identified are then compared with one another and with the "No Action" Improved Bus System to select the best mass transit project for the Buffalo area.

The first screening phase can be conducted using the data in Tables 3-2, 3-3, 3-6, and 3-7. Economic indicators of particular note include:

- Capital cost--Because Federal mass transit funding assistance is being sought by so many cities, alternatives with capital costs approaching or exceeding those of the benchmark 11-mile HRT System are judged to be extremely poor candidates for implementation. It was considered to be in the Buffalo area's best interest to focus on less expensive alternatives which were more promising from a financial assistance standpoint than to try to promote more extensive, more costly alternatives with little chance of being funded.

- Net operating surplus (deficit)--A deficit figure represents an operating subsidy need. Presently, the operating deficit of the NFT Metrobus system ($2.2 million in 1974/75) is covered by Federal, State, and Erie and Niagara County funds. However, subsidy policies of any of these sources could change in time. Therefore, it was felt prudent to reject alternatives with especially high operating deficits.

- Total annual cost per passenger--This figure reflects both capital and O&M costs plus patronage, i.e., a combination of economic and level-of-service measures. A high total annual cost per passenger figure indicates that the patronage for this alternative is not commensurate with the costs incurred; it costs more per passenger to construct and/or operate this alternative, i.e., this alternative is less cost-effective. Adopting the total annual cost per passenger of the benchmark 11-mile HRT System as a baseline, alternatives whose figures exceeded this baseline value were downgraded.

- Net operating surplus (deficit) per passenger--This factor also combines economic and level-of-service measures. A higher deficit per passenger value indicates less than commensurate patronage for the O&M expenses incurred by the alternative. Alternatives with especially high values were downgraded.

Table 3-8 shows the results of the screening process. To reiterate: alternatives with high capital costs or high operating deficits were immediately dropped from contention; alternatives with high total annual cost per passenger or high net operating deficit per passenger were downgraded.

The second screening phase is predicated on ranking the alternatives that passed the first screening using the economic indicators plus the several factors discussed in Section 3.3 and listed in Table 3-1. Since the Advanced Bus System is the only bus-based alternative (other than the "No Action" Improved Bus System) to survive the first screening, this alternative is not subjected to the second screening phase. Instead, the Advanced Bus System is retained for the final selection phase wherein it is compared to the best rail-based alternative and the "No Action" alternative.

Table 3-9 shows the results of ranking the viable rail-based alternatives. Ratings and other figures in the table are derived primarily from the "Metro for Buffalo" report (Ref. 23) and the "Staff Conclusions & Recommendations" report (Ref. 27). The six alternatives are ranked for each individual factor on a scale of 1 (best) to 6 (poorest). Then individual rankings are summed up to determine overall ranking. Based on this evaluation procedure, the Minimum LRRT System is ranked first.

The final selection step is illustrated by Table 3-10, which compares the "No Action" Improved Bus System, the Advanced Bus System, and the Minimum LRRT System using the same criteria and procedure as in Table 3-9. The "No Action" Improved Bus System has a cost advantage because of its low capital investment and low operating costs (by reason of its poorer quality of service). However, the Minimum LRRT System is so superior in socioeconomic terms--community and transportation benefits, quality of service, and achieving desirable regional development goals--as to be the best overall of the three systems shown. (Actually, if all eight viable alternatives, two bus-based and six rail-based, are ranked at the same time, the Minimum LRRT System ranks first and the Improved Bus System and Advanced Bus System rank seventh and eighth, respectively.)

TABLE 3-8

ECONOMIC SCREENING OF ALTERNATIVE BUS- AND RAIL-BASED MASS TRANSIT SYSTEMS

Alternative	Rejection Factors: Capital Cost	Rejection Factors: Net Operating Surplus (Deficit)	Downgrading Factors: Total Annual Cost per Passenger	Downgrading Factors: Net Operating Surplus (Deficit) per Passenger	Overall Status of Alternatives*
Bus					
Improved Bus (Benchmark)				-	-
Advanced Bus				-	-
Main Street Bus Priority		X		-	X
HRT					
11-mile HRT +					
Alone (Benchmark)	X				X
A	X		-		X
T+NT	X		-		X
A+T+NT	X		-		X
Reduced HRT +					
Alone				-	-
T		X	-	-	X
T+NT	X		-	-	X
TB					0
LRT					
Maximum LRT	X	X	-	-	X
Intermediate LRT +					
Alone	X	X	-	-	X
NT	X		-		X
A+NT	X		-		X
Minimum LRT +					
Alone				-	-
Am	X		-		X
T		X	-	-	X
T+NT	X	X	-	-	X
TB					0
LRRT					
Minimum LRRT				-	-
Minimum LRRT + TB					0
11-mile LRRT	X				X
11-mile LRRT + TB	X				X
Extended LRRT	X		-		X

* X = Rejected
- = Downgraded,
0 = No unacceptable or particularly poor indicators

A = Audubon Extension
Am = Amherst Extension
T = Tonawanda Branch
NT = North Tonawanda Extension
TB = Tonawandas Busway

TABLE 3-9

OVERALL EVALUATION OF VIABLE RAIL-BASED MASS TRANSIT SYSTEMS*

Parameter	Reduced HRT		Reduced HRT + TB		Minimum LRT		Minimum LRT + TB		Minimum LRRT		Minimum LRRT + TB	
Economic Indicators												
Capital cost ($ millions)	261		282		246		267		245		266	
Ranking		3		6		2		5		1		4
Net operating surplus (deficit) ($ millions)	(3.4)		(2.5)		(4.0)		(2.9)		(3.4)		(2.7)	
Ranking		4		1		6		3		4		2
Total annual cost per passenger (¢)	80		80		79		79		78		77	
Ranking		5		5		3		3		2		1
Net operating surplus (deficit) per passenger (¢)	(6.2)		(4.3)		(7.2)		(5.0)		(6.2)		(4.7)	
Ranking		4		1		6		3		4		2
TOTAL OF ECONOMIC INDICATOR RANKINGS		16		13		17		14		11		9
Quality of Service												
Overall rating	High		High		High		High		High		High	
Ranking		1		1		1		1		1		1

TABLE 3-9 (Continued)

Parameter	Reduced HRT	Reduced HRT + TB	Minimum LRT	Minimum LRT + TB	Minimum LRRT	Minimum LRRT + TB
Economic Effects						
Direct (transportation) benefits ($ millions)**	19.2	24.3	19.2	24.3	19.2	24.3
Ranking	4	1	4	1	4	1
Indirect (community) benefits (% of maximum)	57	64	57	64	57	64
Ranking	4	1	4	1	4	1
Effects on Surrounding Community/Environment						
Properties taken	52	52	45	45	45	45
Ranking	5	5	1	1	1	1
Operational impacts	No major adverse	No major adverse	No major adverse	No major adverse	No major adverse	No major adverse
Ranking	1	1	1	1	1	1
Air quality (operation phase)	Min. adv. to positive	Min. adv. to positive	Min. adv. to positive	Min. adv. to positive	Min. adv. to positive	Min. adv. to positive
Ranking	1	1	1	1	1	1
Noise/vibration (operation phase)	Minimum adverse	Min. to mod. adv.	Min. to mod. adv.	Min. to mod. adv.	Min. to mod. adv.	Min. to mod. adv.
Ranking	1	2	2	2	2	2
Patterns of urbanization and growth (summary rating)	High	Neutral	High	Neutral	High	Neutral
Ranking	1	4	1	4	1	4

TABLE 3-9 (Concluded)

Parameter	Reduced HRT	Reduced HRT + TB	Minimum LRT	Minimum LRT + TB	Minimum LRRT	Minimum LRRT + TB
Implementation Issues						
Reliability of estimates	High	High	High	High	High	High
Ranking	1	1	1	1	1	1
Staging and coordination	Neutral	Low	Very high	Low	Very high	Low
Ranking	3	4	1	4	1	4
Goals achievement	High	Low	High	Low	High	Low
Ranking	1	4	1	4	1	4
Financial potential	High	Low-neutral	Very high	High	Very high	High
Ranking	3	6	1	3	1	3
TOTAL OF RANKINGS FOR OTHER FACTORS	26	31	19	24	19	24
TOTAL OF ALL RANKINGS	42	44	36	38	30	33
OVERALL RANK	5	6	2	4	1	2

* Economic figures except capital cost are based on 1995 projections and March 1974 dollars.

** Using the benchmark Improved Bus System as a baseline.

TB = Tonawandas Busway

TABLE 3-10

COMPARISON OF "NO ACTION" ALTERNATIVE AND BEST BUS- AND RAIL-BASED ALTERNATIVES*

Parameter	"No Action" Alternative/ Improved Bus System	Advanced Bus System	Minimum LRRT System
Economic Indicators			
Capital cost ($ millions)	5.8	75.2	246
Ranking	1	2	3
Net operating surplus (deficit) ($ millions)	(3.1)	(5.2)	(3.4)
Ranking	1	3	2
Total annual cost per passenger (¢)	50	64	78
Ranking	1	2	3
Net operating surplus (deficit) per passenger(¢)	(10.0)	(11.6)	(6.2)
Ranking	2	3	1
TOTAL OF ECONOMIC INDICATOR RANKINGS	5	10	9
Quality of Service			
Overall rating	Low	Neutral	High
Ranking	3	2	1
Economic Effects			
Direct (transportation) benefits ($ millions)**	[Baseline]	4.0	19.2
Ranking	3	2	1
Indirect (community) benefits (% of maximum)	[Baseline]	23	57
Ranking	3	2	1
Effects on Surrounding Community/Environment			
Properties taken	0	0	45
Ranking	1	1	3
Operational impacts	No significant change	No major adverse	No major adverse
Ranking	1	2	2

TABLE 3-10 (Concluded)

Parameter	"No Action" Alternative/ Improved Bus System	Advanced Bus System	Minimum LRRT System
Air quality (operation phase)	No change	Min. adv. to positive	Min. adv. to positive
Ranking	**	**	**
Noise/vibration (operation phase)	No change	Min. to mod. adv.	Min. to mod. adv.
Ranking	1	2	2
Patterns of urbanization and growth (summary rating)	Very low	Low	High
Ranking	3	2	1
Implementation Issues			
Reliability of estimates	Neutral	Neutral	High
Ranking	2	2	1
Staging and coordination	High	High	Very high
Ranking	2	2	1
Goals achievement	Very low	Very low	High
Ranking	2	2	1
Financial potential	High	High	Very high
Ranking	2	2	1
TOTAL OF RANKINGS FOR OTHER FACTORS	21	21	15
TOTAL OF ALL RANKINGS	26	31	24
OVERALL RANK	2	3	1

* Economic figures except capital cost are based on 1995 projections and March 1974 dollars.

** Ranking impossible because of uncertainty whether slight beneficial or adverse effects will result.

NOTE: Information in Table 3-10 is taken from Ref. 23 (pp. 119-121).

Future Extensions

In the future, consideration will be given to expanding rapid mass transit service to the Tonawandas and Amherst. For service to the Tonawandas, the relative feasibility of constructing an LRRT branch line versus using a busway will be determined. A Minimum LRRT + Tonawanda Branch + North Tonawanda Extension System was not evaluated in Table 3-7; however, this alternative would be basically similar to the Minimum LRT + Tonawanda Branch + North Tonawanda Extension shown in Table 3-6. The comparative capital cost and cost-effectiveness data for the rail and bus lines to the Tonawandas may be misleading. Rights-of-way limitations between Tonawanda and North Tonawanda parallel to the Erie and Lackawanna railroad tracks are quite restrictive. To avoid 1.2 miles of aerial structure, the busway alternative was terminated in Tonawanda, whereas the LRT line was extended, providing direct rail access to North Tonawanda. This raises the capital costs of the rail alternative considerably and reduces its comparative cost effectiveness. Also, although the general level of ridership in this corridor has been predicted within reasonable bounds, future planning studies are necessary to more accurately compare the two alternatives. Furthermore, the socioeconomic and environmental impacts of these basically different transit modes should be researched more thoroughly before selecting either of the alternatives for corridor access.

Expansion of LRRT service up the Amherst Corridor (via the HRT alignment up North Bailey Avenue and an elevated structure to the North Campus) was attractive in every respect except for high capital costs, which were considered unsatisfactory at this stage of the project. In Table 3-7, the 11-mile LRRT System shows a satisfactory total annual cost per passenger and an operating surplus. Although this projected operating surplus might not materialize if the assumptions in the analyses do not prove correct, the Amherst Extension would substantially reduce operating deficits.

3.7 - Elevation Alternatives

Three variations on the proposed LRRT system need special mention--an all at-grade line, an all elevated line, and an all subway line. The advantages of an underground LRRT in the CBD would include the elimination of traffic problems associated with street closures and the provision of a service operable in all weather conditions. The all at-grade line was considered and rejected early for a number of reasons:

- The track right-of-way width would reduce Main Street to four lanes. The high volume of auto traffic on Main Street would experience severe flow constrictions.

- The large amount of retail activity on Main Street requires a number of loading zones which could not be eliminated without severe inconvenience to the affected shops. The use of two of the remaining four lanes for loading zones would reduce Main Street's capacity still further.

- A similar problem would occur at transit stations (located in mid-street) which would also reduce Main Street to one lane each way unless local street widening was used to restore Main Street to two lanes each way.

- In the interests of safety, the at-grade LRVs would have to respect traffic signals. This would seriously reduce the speed of the rail vehicles to essentially that which could be achieved by buses following the same route. Also, traffic tie-ups could encroach onto the rail right-of-way, particularly at cross-streets, further impairing service. Thus, a major advantage of rail transit would be lost; the "rapid" in LRRT would be a misnomer.

The concept of a fully elevated LRV system is also unacceptable. This conclusion is based on the extensive preliminary engineering work and other studies conducted for the HRT alternatives. These studies found that citizen rejection and cost disadvantages eliminated the concept of aerial construction along Main Street.

A fully underground LRRT system is technically feasible and would be socially and environmentally acceptable. Although use of a third rail would be possible with the fully underground line, plans for future LRRT system expansion to serve Amherst and the Tonawandas are based on use of at-grade sections where overhead power pick-up is necessary. Thus, the LRVs would be equipped with pantographs, even for the first phase all-subway section, rather than having a dual pick-up capability (both third rail and pantograph). The alignment and stations for an LRRT subway section in the CBD would match those of the Reduced HRT system (Figure 3-4).

This route, which deviates from Main Street at Church Street, was shown in prior studies to avoid costly problems that would be encountered should the line continue underground down Main Street (e.g., a high water table, soft ground tunneling, extensive utility relocations, and underpinning the Marine Midland Tower). The cost for this fully underground LRRT system (including feeder buses) is estimated at $278 million compared to $245 million for the proposed LRRT system, a $33 million 13-percent) increase.

SECTION 4

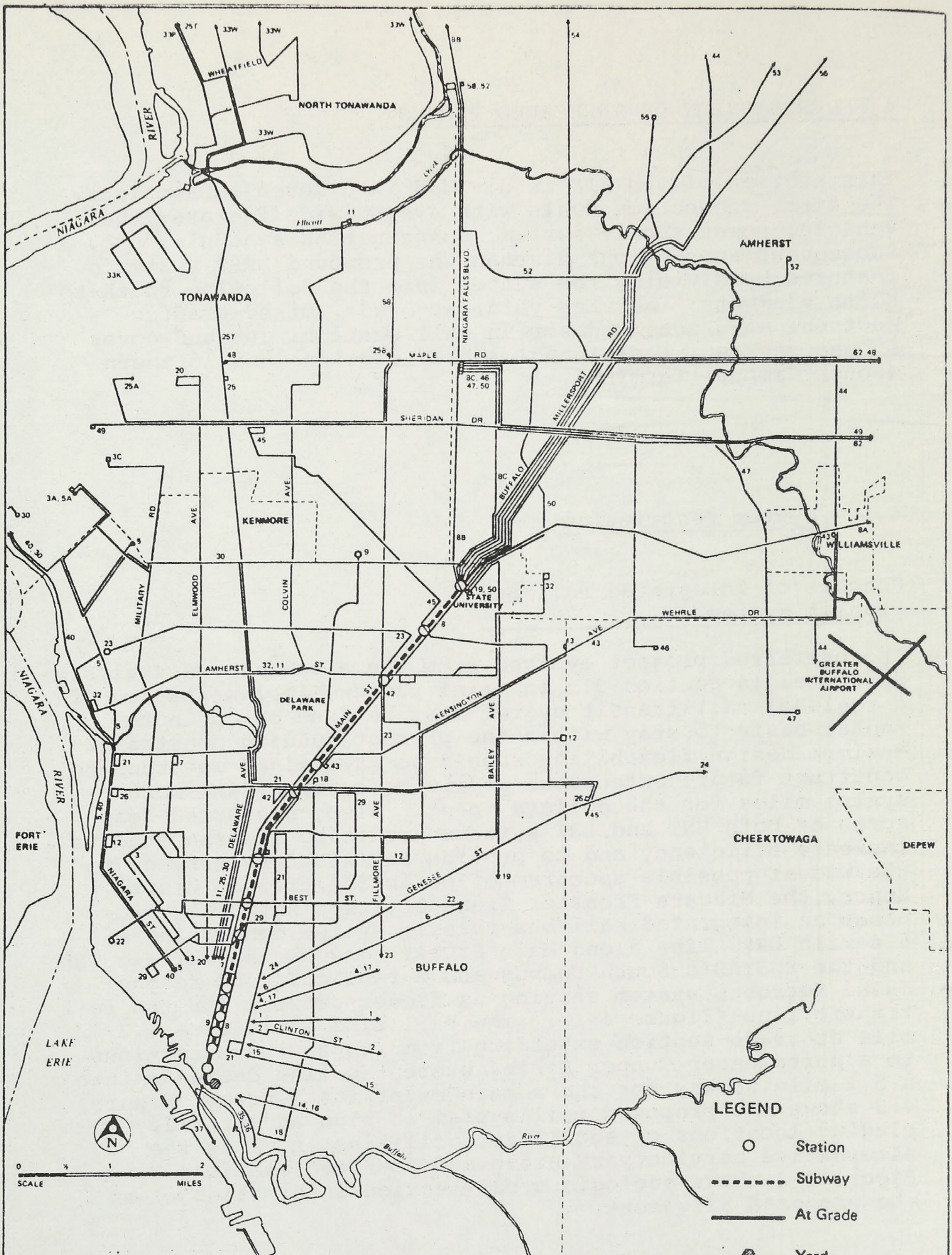
4 - DESCRIPTION OF PREFERRED PROJECT

This section of the EIS is divided into seven subsections. The first subsection deals with system-wide factors--the vehicle, power supply system, construction schedule, etc. Subsequent subsections discuss the proposed LRRT system's features by dividing the system into the following south-to-north elements: service yard; at-grade, mixed-traffic section; at-grade, pedestrian mall section; cut-and-cover subway section; rock tunnel subway section; and northern (South Campus) terminal.

4.1 - System Description

Concept of Integrated Rail/Bus Transit System

The preferred project evolved from the alternatives analysis described in Section 3. In brief review, implementation of a regional rail transit system must be done on an incremental basis to stay within the present funding constraints. Maximum design flexibility should be maintained in order to construct future extensions at low cost, providing more system miles for the dollars spent. Also, preferred features of both HRT and LRT systems are to be incorporated to increase efficiency and to provide satisfactory service to the widest possible spectrum of potential transit users. Hence, the Niagara Frontier Transportation Authority proposes an integrated rail/bus transit system comprising a 6.4-mile LRRT line along Main Street between the Buffalo CBD and the SUNYAB's South Campus and a realigned and rescheduled Metrobus system serving as feeder network for the rail transit line (Figure 4-1). The rail line includes a 1.2-mile at-grade section extending from its southern terminus to a portal near Tupper Street where the line descends into a 5.2-mile subway for the remainder of its length. Figure 4-2 shows the proposed rail system in plan and profile, including locations of ancillary facilities, such as the alternative service yard sites and fourteen stations. Figure 4-3 shows geologic cross-section information along the proposed alignment.



Source: Ref. 23

Figure 4-1. Proposed Metrorail Alignment and Integrated Feeder Bus System

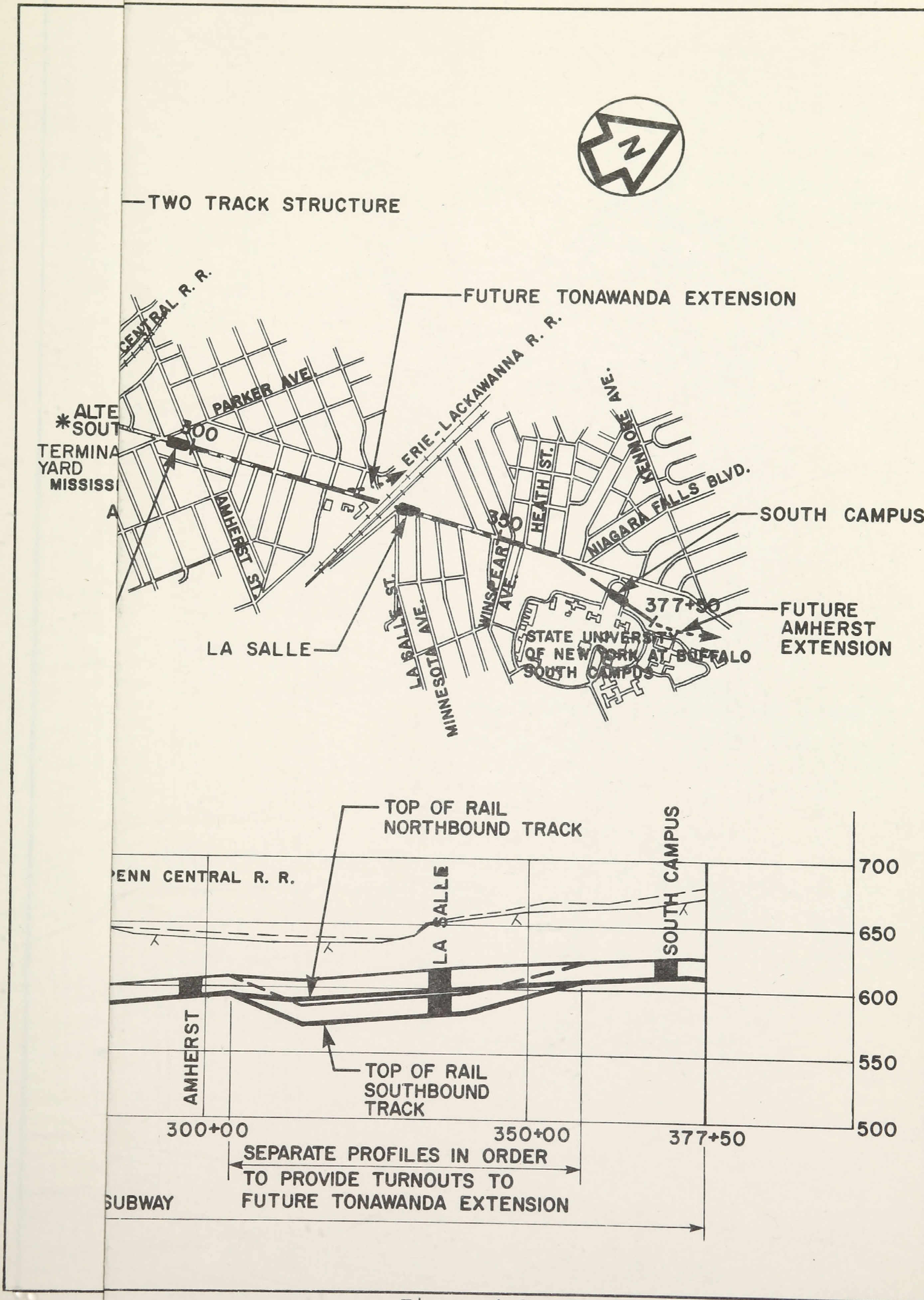


Figure 4-2. Preferred Project Plan and Profile

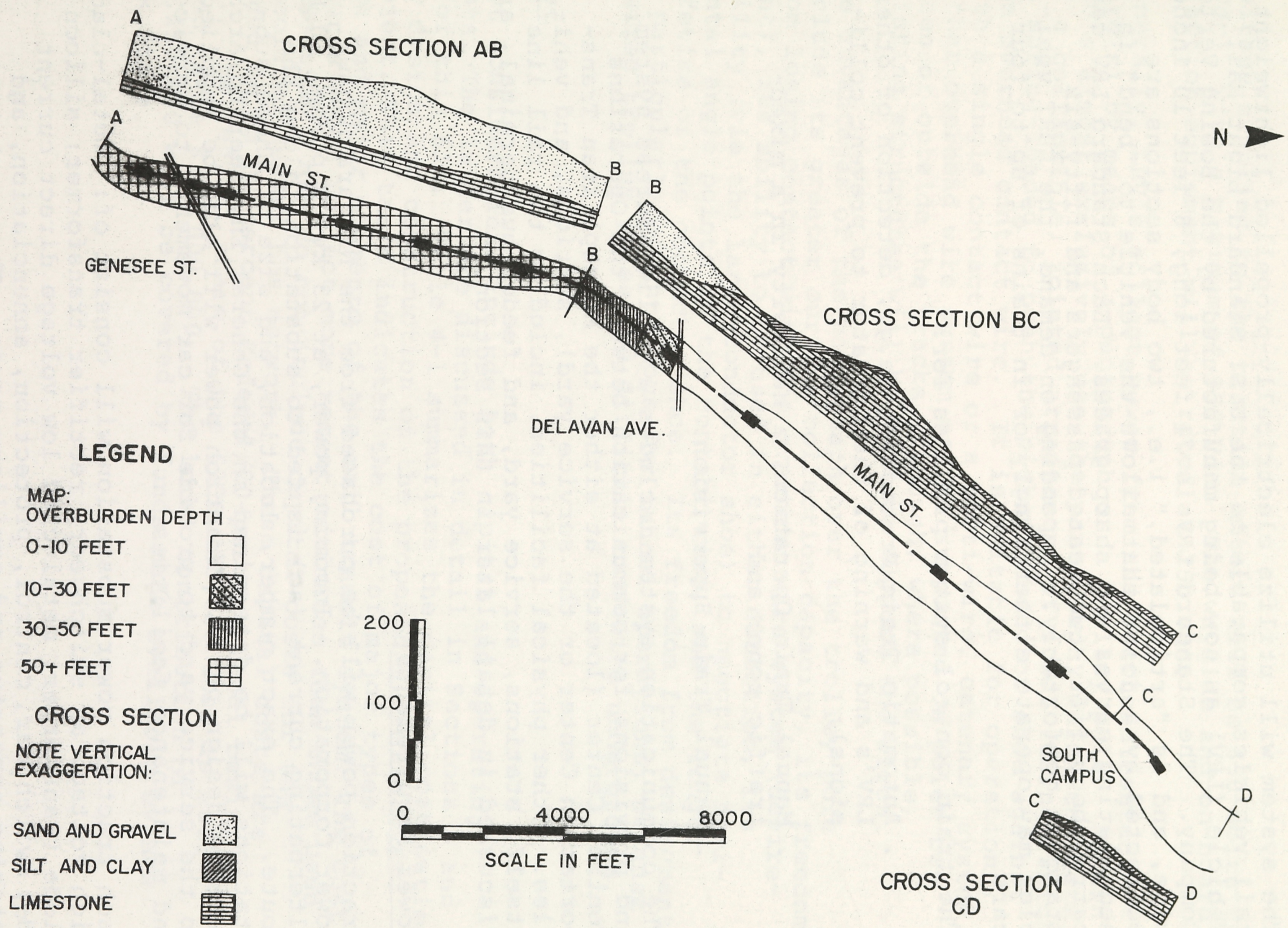


Figure 4-3. General Geologic Cross Section Along Preferred Project Alignment

System Components

The system will utilize electrically-propelled lightweight rail vehicles comparable to the U.S. Standard Light Rail Vehicle (LRV) as now being manufactured by the Boeing Vertol Company. The Standard LRV is 71 feet long, 8 feet 10 inches wide, and is "articulated," i.e., two body sections are connected by a joint that allows the vehicle to "bend" in negotiating curves and sharp grades. Each Standard LRV can carry about fifty-two seated passengers and fifty-six standees comfortably. Depending on demand, the LRRT vehicles may operate either singly or in trains of up to four cars.

The train control system provides for:

- Automatic Train Protection (e.g., detection of other LRV's and warning of the operator to prevent collisions);

- Manual Train Operation, a necessity in a mixed-traffic zone; and

- Manual Train Supervision.

The communication system includes a public address system and provisions for communication between the Operations Control Center (located at either the Metropolitan Transportation Center or the service yard), stations, and vehicles. Other physical facilities, including the rail line itself, stations, service yard, and feeder bus terminal, are discussed in detail later in this section.

Power Requirements

Traction power will be purchased from the Niagara Mohawk Power Corporation. Incoming power, at 23 kv, 3 phase, 60 Hz alternating current (ac) is fed to substations along the route. The exact number, location, and size of these substations will be determined in the General Engineering/Architecture design phase. Traction power will also be supplied to the service yard to provide for car movements to service and maintenance facilities.

Each traction power substation will consist of: metal-clad high voltage ac switchgear, rectifier transformer; silicon diode transformer; metal-clad low voltage direct current (dc) switchgear, control, protection, annunciation, and metering apparatus and auxiliary power. These substations convert incoming power from ac to dc and reduce the voltage to the proper value for the rail vehicle's dc motor. Normal voltage supplied to the traction motors will be 650 volts dc (Vdc), with a minimum of 350 Vdc. The wayside and on-board traction equipment will be rated at 750 Vdc.

Generally, LRV's collect power from the overhead contact wire(s) by means of a pantograph or a trolley pole. Modern LRV's almost exclusively use the pantograph, which consists of a collapsible, jointed arrangement of steel tubing, which is spring-loaded to push the pickup conductor shoe against the overhead contact wire. It is suitable for operation with a single contact wire or a multi-wire, catenary system. Either overhead wire system may be supported on poles between or outside the tracks although, where possible, existing structures will be used to support the wires.

The advantages of the pantograph over the trolley pole include its greater current collection capacity, its freedom from losing contact with the overhead wire system (dewirement), its ability to be used in either direction, its ability (via the large conductor shoe) to negotiate horizontal angle points in the contact wire, and the longer lifetime of the conductor shoe. Its freedom from dewirement is particularly advantageous for tunnel operations, because dewired trolley poles are difficult to rewire underground.

Cost

Cost considerations include both capital and operating costs. The latter are discussed in detail in Sections 5 and 10 of this EIS. Table 4-1 summarizes the capital cost estimate for design and construction of the proposed 6.4-mile LRRT project. This table indicates the cost of major types of work and major elements of the rail transit system. The cost figures shown reflect more recent estimates than those used in Section 3 and do not include capital costs for the associated feeder bus network. These capital costs are funded on an 80-percent Federal/20-percent Local basis, i.e., the Federal share of the $336,250,000 cost is estimated to be $269,000,000. The local contribution of $67,250,000 will be covered by funds made available by New York State.

TABLE 4-1

PROJECT COST ESTIMATE*

Construction and Rights-of-Way	
Basic Construction	$ 73,578,000
Finish Construction	5,232,000
Combined Basic and Finish Construction	48,101,000
Trackwork	7,266,000
Train Control and Communications	6,300,000
Electrification	5,400,000
Yards, Shops, and Equipment	6,096,000
Elevators and Escalators	3,563,000
Fare Collection	550,000
Rights-of-Way	4,437,000
Total	$160,523,000
Total System	
Construction and Rights-of-Way	160,523,000
Rapid Transit Cars (47 Vehicles)	18,800,000
Design and Construction Management	24,383,000
Construction Insurance	2,341,000
Contingencies	7,891,000
Total	$213,534,000
Escalation Allowance**	$122,716,000
Estimated Gross Project Cost:	$336,250,000

* Estimates are based on first quarter 1974 labor and material prices.

** The 1974 construction costs are projected on the basis of an average inflation rate of 9 percent, compounded annually, applied to construction expenditures for the first 2 years and 7 percent, compounded annually, for the remainder of the construction schedule.

Source: Ref. 28

Construction Schedule

The Metrorail design is divided into three phases: Phase 1 - General Architecture/Engineering and Conceptual Design; Phase 2 - General Architecture/ Engineering and Definitive Design; and Phase 3 - Final Design and construction.

Design work in Phase 2 cannot commence until this EIS is circulated and approved. Final design and construction (Phase 3) must await UMTA's approval of another capital assistance request, which also is dependent upon acceptance of this EIS and other conditions.

Construction is generally divided into four basic types of contracts:

- Structural Contracts--This includes the construction of at-grade sections of the line, cut-and-cover and tunnel subway sections, and station shells. Other activities include utilities' maintenance and relocation, drainage, traffic control, street restoration and underpinning, and floating slab structures to minimize operational noise and vibration.

- Finish Contracts--This includes the finishing work of principal at-grade structures, i.e., architectural finishing of floors, walls, and ceilings; paving and landscaping; electrical and mechanical systems, lighting, service power, water supply, plumbing, and fire protection.

- Combined Contracts--Contracts for selected work which combine the structural and finish elements of construction indicated above.

- Systems Contracts--These include items of work or equipment common throughout the system, including such system components as trackwork, elevators, escalators, traction power, train control and communications, revenue vehicles, shop equipment, and fare collection.

Figure 4-4 provides a tentative schedule for the design, construction, and implementation of the major elements of the project.

4.2 - Service Yard

There will be an initial requirement to store and service 60 LRV's at the selected service yard; ultimately, the system will use 120 LRV's. Three sites just south of the CBD were compared for suitability as a service yard for the proposed LRRT system. The first site, designated the South Yard, is bounded by Main, Perry, and Mississippi Streets, and South Park Avenue. The second, the Ellicott Yard, is enclosed by Michigan Avenue, Carroll and Louisiana Streets and the Main Line railroad tracks. The third, the Terminal Yard, utilizes the abandoned Delaware, Lackawanna & Western Railroad depot and is bounded by the Skyway, South Park Avenue, Michigan Avenue, and the Buffalo River.

South Yard

Approximately 500 feet of track located along the center of Main Street connect the South Yard to the southernmost terminal, the Auditorium Station. With this track arrangement, the section of Main Street south of Perry Street is open only to southbound traffic in order to avoid interference with yard operations. Northbound traffic can be rerouted along Mississippi or Baltimore and Perry streets.

Figure 4-5 is a view of the South Yard site from the Marine Midland Tower. Figure 4-6 illustrates a conceptual layout of the service yard, which incorporates facilities for storage and maintenance of 120 LRV's of a size similar to the Standard LRV. Yard dimensions to handle the initial requirement of 60 cars are also indicated. The area south of the yard, bounded by Mississippi Street and South Park Avenue may be incorporated into the yard and used for equipment storage as necessary.

4/7/77

NIAGARA FRONTIER TRANSPORTATION AUTHORITY

BUFFALO METRORAIL PROJECT

PROJECT SCHEDULE

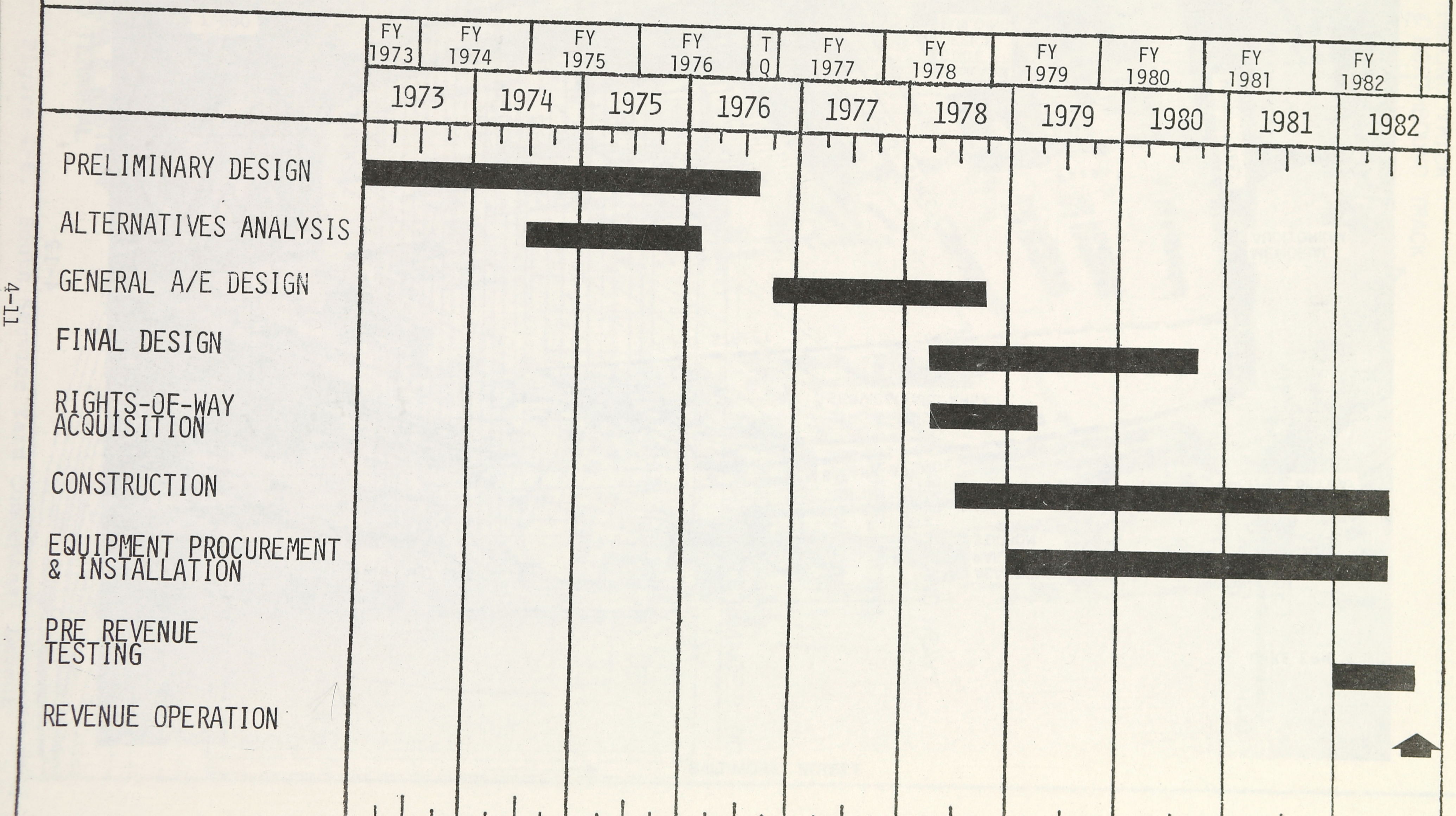


Figure 4-5. View Looking South on Main Street to Area of South Service Yard

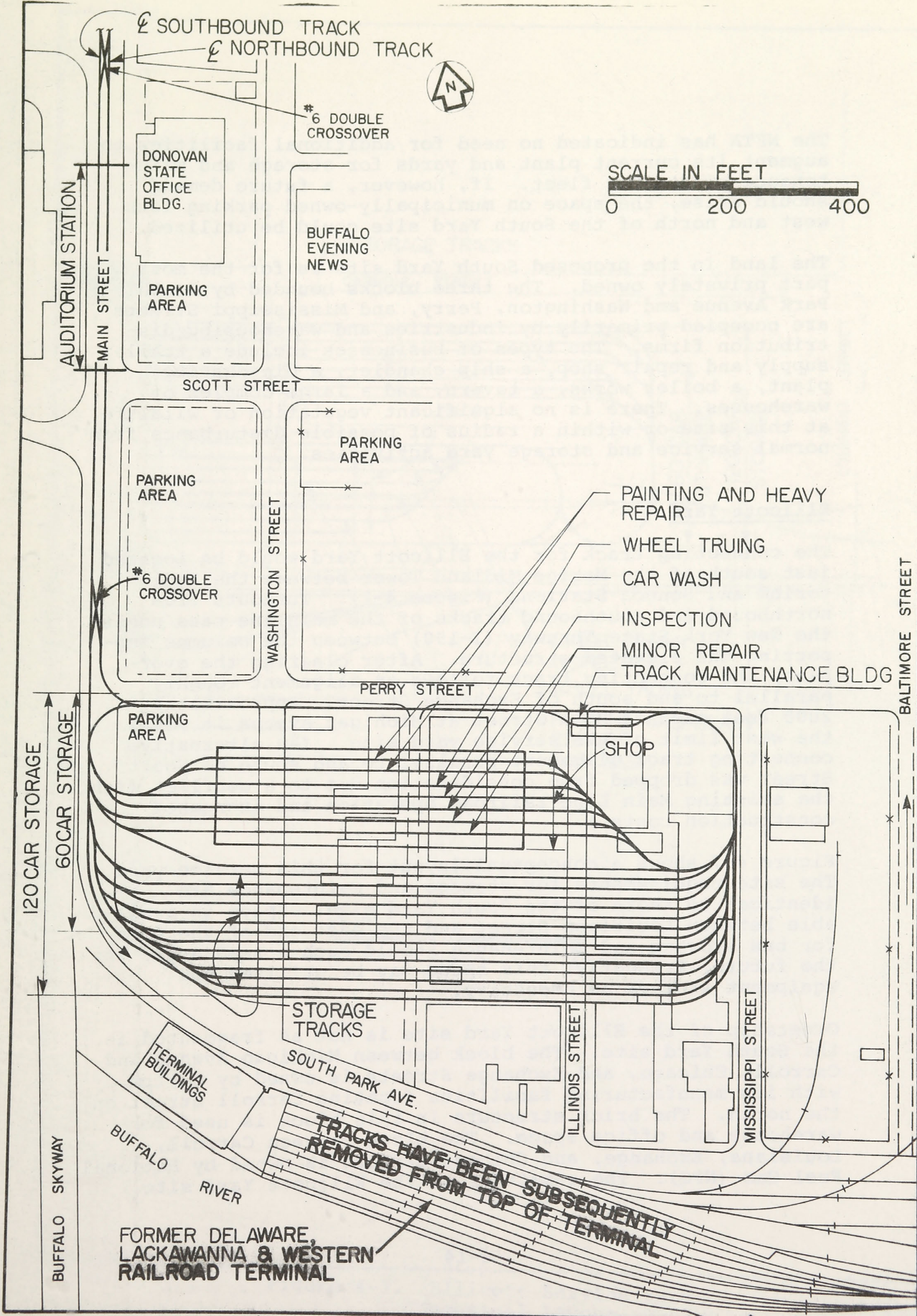


Figure 4-6. South Service Yard Conceptual Layout

The NFTA has indicated no need for additional facilities to augment its current plant and yards for storage and maintenance of its bus fleet. If, however, a future demand should arise, the space on municipally-owned parking lots west and north of the South Yard site could be utilized.

The land in the proposed South Yard site is for the most part privately owned. The three blocks bounded by South Park Avenue and Washington, Perry, and Mississippi Streets are occupied primarily by industries and warehousing/distribution firms. The types of businesses include a trailer supply and repair shop, a ship chandler, a die-casting plant, a boiler works, a tavern, and a large complex of warehouses. There is no significant vegetation or wildlife at this site or within a radius of possible disturbance from normal service and storage yard activities.

Ellicott Yard

The connecting track for the Ellicott Yard would be located just south of the Marine Midland Tower between the Auditorium and Seneca Stations (Figure 4-7). Turnouts from northbound and southbound tracks of the mainline pass under the New York State Thruway (I-190) between the columns supporting the elevated structure. After clearing the overpass, the connecting track follows an alignment roughly parallel to and south of Exchange Street. Approximately 2000 feet east of Main Street at Michigan Avenue it meets the west limit of the service yard site. (An alternative connecting track alignment parallel to and south of Scott Street was dropped from consideration due to a conflict with the existing Main Line railroad operation and increased construction costs.)

Figure 4-7 shows a conceptual layout for this service yard. The site requirements for storage and maintenance are identical to those of the South Yard site. Space is available between Louisiana Street and the east end of the yard for bus storage and maintenance should such a need arise in the future. Presently, this space may be utilized for equipment storage as necessary.

Ownership of the Ellicott Yard site is not as fragmented as the South Yard site. The block between Michigan Avenue and Carroll, Chicago, and Exchange Streets is owned by a firm with its manufacturing facilities fronting Carroll Street on the north. The brick structure in this block is used for warehouse and office space. The block between Carroll, Louisiana, Exchange, and Chicago Streets is owned by National Fuel Gas (NFG). The remainder of the Ellicott Yard site,

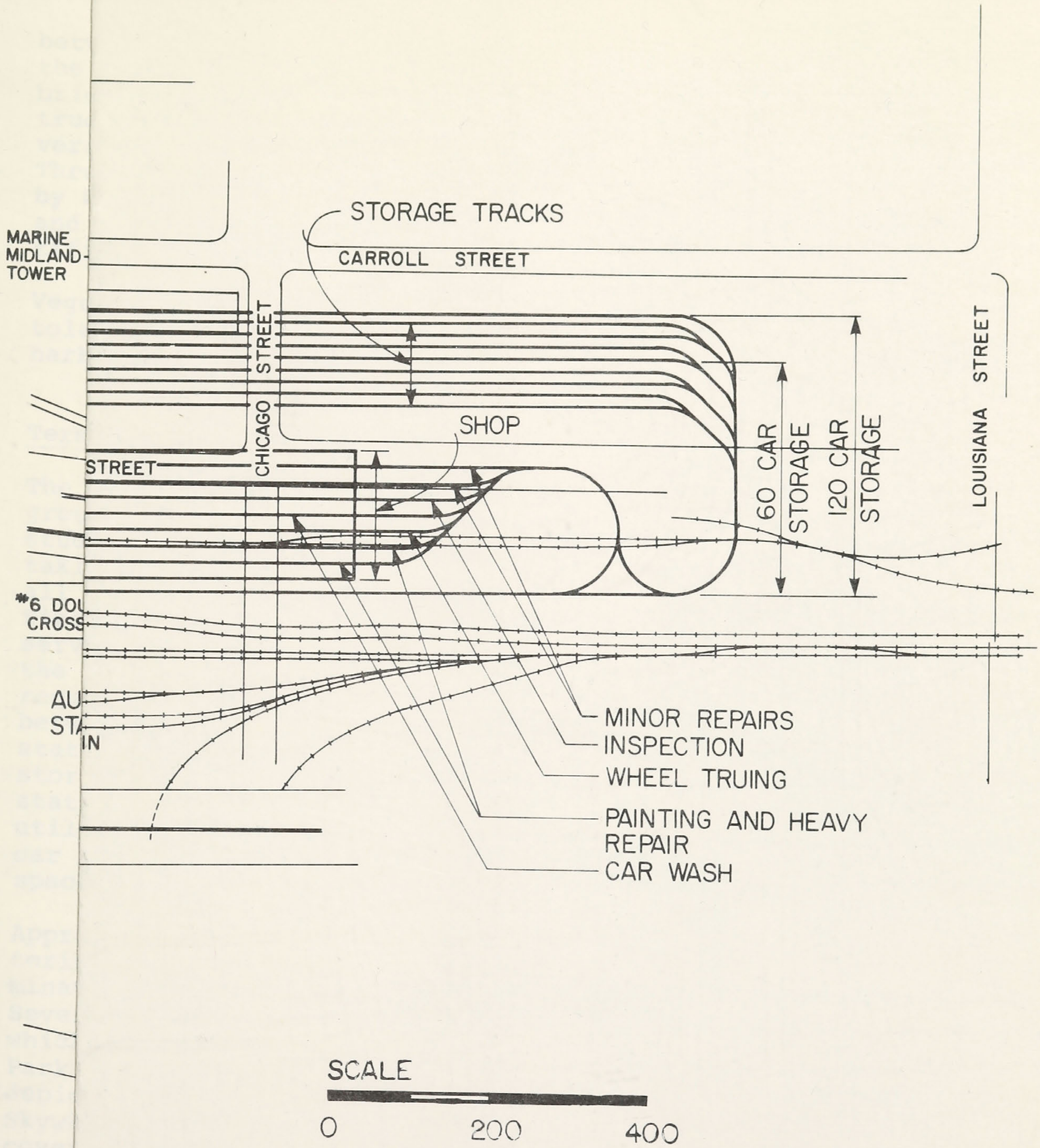


Figure 4-7. Ellicott Service Yard Conceptual Layout

between Michigan Avenue, Louisiana and Exchange Streets, and the Main Line railroad tracks is owned by ConRail. A large brick building on the ConRail property has been leased to a trucking firm. Right-of-way for the connecting track traverses land owned for the most part by the New York State Thruway Authority. The City of Buffalo owns a parcel bounded by Washington and Exchange Streets, the Oak Street on-ramp, and the Main Line tracks. This parcel is tentatively identified with a prospective Waterfront Redevelopment Project.

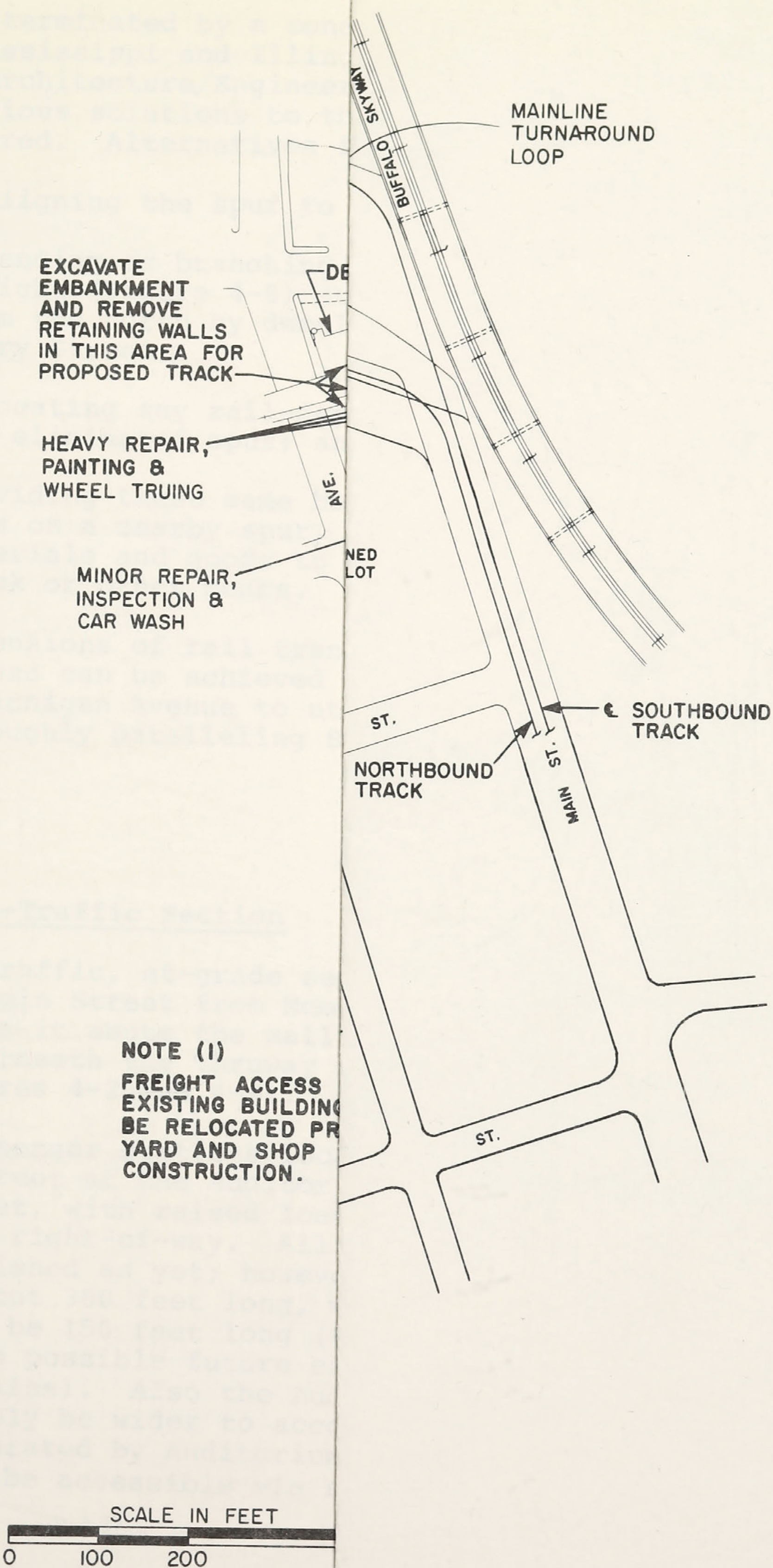
Vegetation and wildlife at this site are limited; urban-tolerant birds are not uncommon; and unkempt weedy areas harbor rodents and an occasional pheasant.

<u>Terminal Yard</u> (Selected)

The abandoned Delaware, Lackawanna & Western terminal (background, Figure 4-5) now owned by the City of Buffalo was studied because it was felt that costly private property takings and relocations could be avoided, resulting in overall cost savings and minimizing the loss of taxable properties. Figure 4-8 illustrates a conceptual layout of the service yard. Two station buildings between the Skyway and the station would be razed. The initial 60-car storage requirement can be achieved in the ancillary room spaces between the columns which support the abandoned railroad station above. (The conceptual layout actually provides storage for more than 60 cars.) The abandoned railroad station area above, which is accessible by a ramp, would be utilized initially for equipment storage. The ultimate 120-car storage capability may be realized by converting this space for additional car storage in the future.

Approximately 700 feet of track running south from the Auditorium Station along the center of Main Street would terminate in a turnaround loop adjacent to the Terminal Yard. Several turnaround loop layout possibilities exist, all of which necessitate the relocation of the western end of South Park Avenue. The conceptual layout shown in Figure 4-8 depicts the turnaround loop on the east side of the Buffalo Skyway. With this layout, the South Park Avenue relocation covers the two blocks between Main and indiana Streets. In addition, the westbound yard track paralleling South Park Avenue requires the street to be shifted approximately 5 feet to the north between Indiana and Illinois Streets.

The shop and maintenance facility occupies land owned by the Erie-Lackawanna Railroad and eliminates the turnaround freight train movement from the spur serving Merchant Refrigerating Company and Higgins to another spur which is



rminal Service Yard Conceptual Layout
50-Car Storage Requirement

presently terminated by a concrete wall at Perry Street between Mississippi and Illinois Streets. During the Preliminary Architecture/Engineering and Conceptual Design Phase, various solutions to this loss of rail service will be considered. Alternatives include but are not limited to:

- realigning the spur to parallel South Park Avenue;
- extending or branching off the spur serving Republic Freight (Figure 4-8) and joining the existing spur from the north by demolishing the concrete wall at Perry Street;
- relocating any rail-dependent businesses served by the eliminated spur; and
- providing these same businesses with loading facilities on a nearby spur, with short-haul transport of materials and goods to and from their buildings via truck or other means.

Future extensions of rail transit service to areas eastward and southward can be achieved by bridging the service yard loop and Michigan Avenue to utilize the abandoned rail embankment roughly paralleling South Park Avenue.

4.3 - Mixed-Traffic Section

The mixed-traffic, at-grade section would run along the center of Main Street from Memorial Auditorium to Church Street where it abuts the mall section. This alignment passes underneath the Thruway (I-190) and Marine Midland Tower (Figures 4-2 and 4-9).

Covered passenger stations located in the middle of Main would be Street at the Auditorium (Figure 4-10) and near Seneca Street, with raised loading platforms on both sides of the rail right-of-way. All station dimensions have not been established as yet; however, the Auditorium Station would be about 300 feet long, whereas other at-grade stations would be 150 feet long (the length of a two-car LRRT train), with possible future expansion to 300 feet (to serve four-car trains). Also the Auditorium Station's platforms would probably be wider to accommodate the larger passenger volumes generated by Auditorium events. The raised platforms would be accessible via steps and ramps to provide

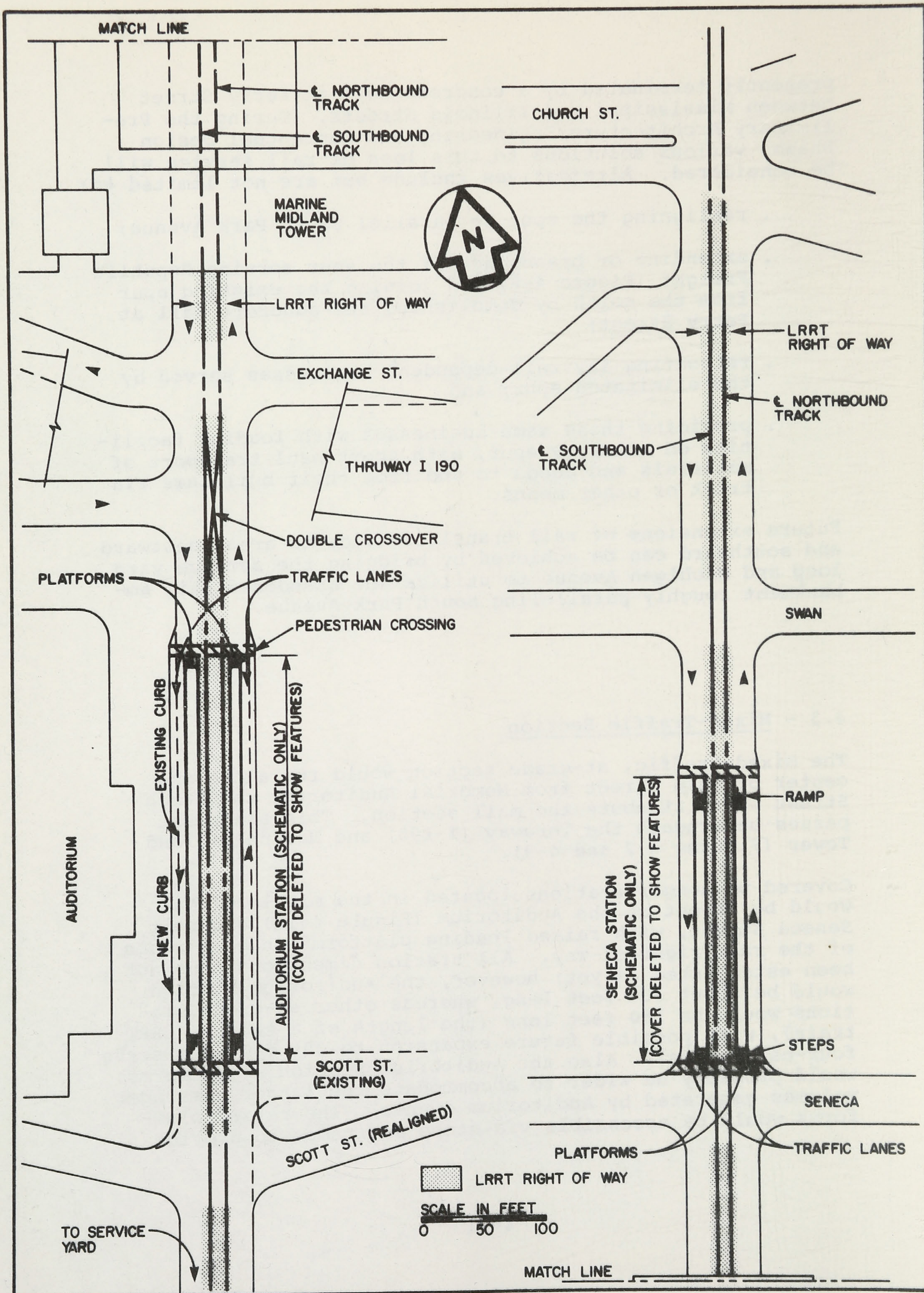
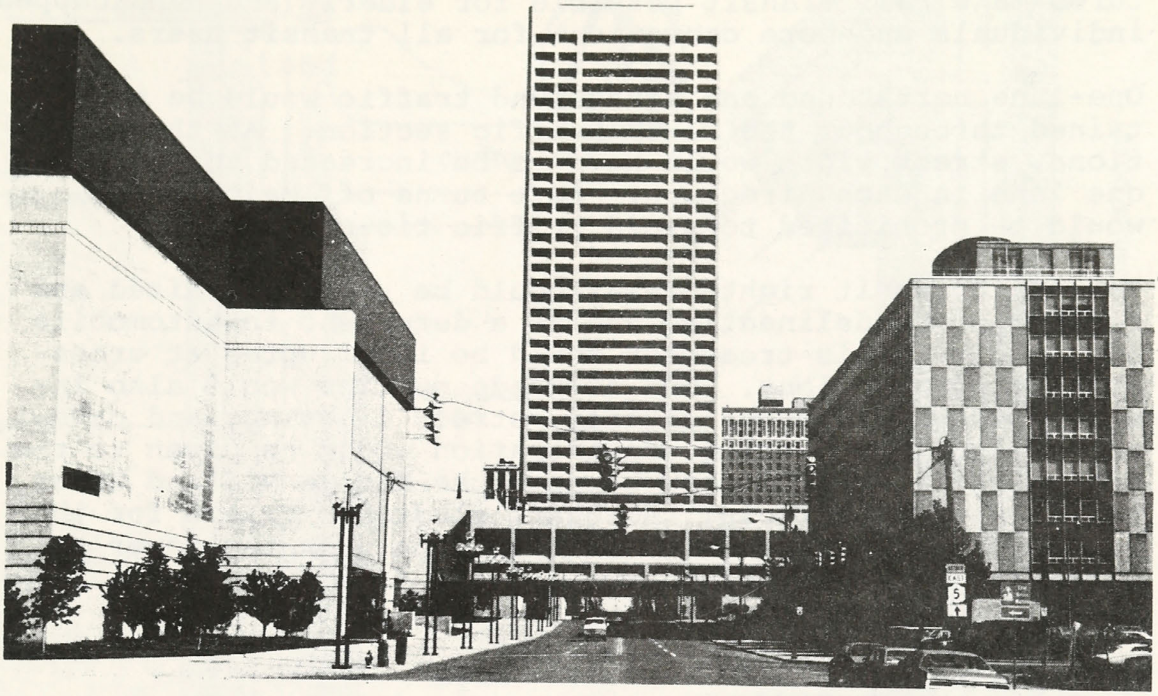


Figure 4-9. Mixed Traffic Section: Memorial Auditorium to Church Street



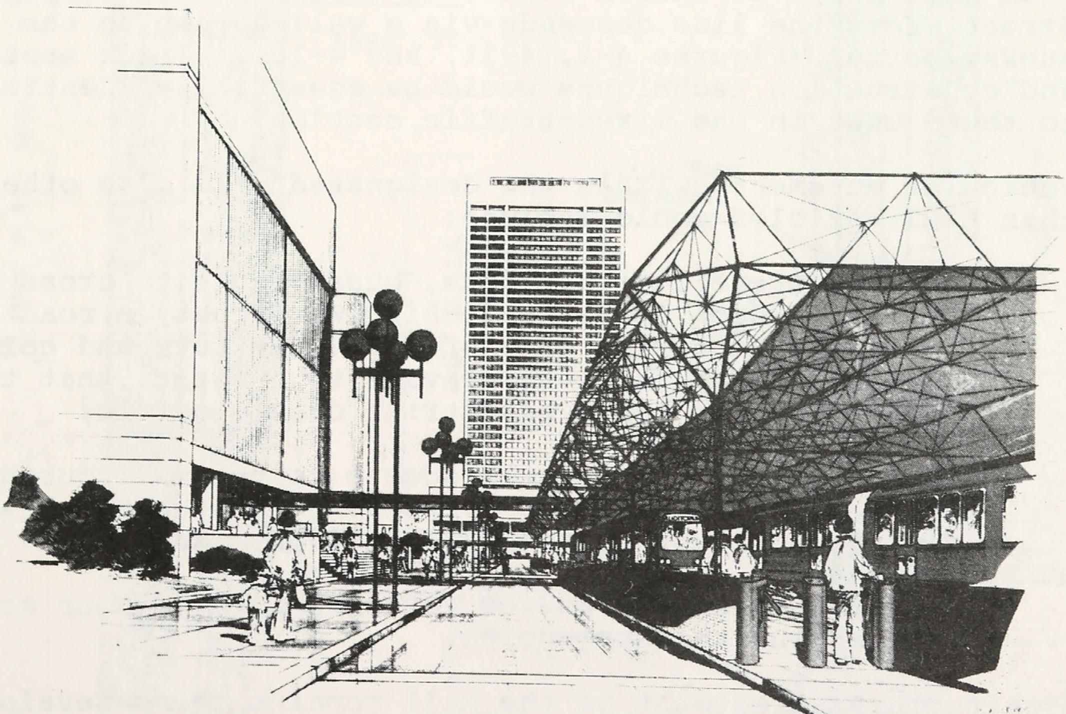


Figure 4-10. Top: View Looking North on Main Street at Site of Auditorium Station.

Bottom: Rendering of Same View with At-Grade Station.

floor-level entry and exit from rail vehicles; these features make rail transit possible for elderly and handicapped individuals and more convenient for all transit users.

One-lane northbound and southbound traffic would be maintained throughout the mixed-traffic section. At the stations, street width would have to be increased to provide one lane in each direction. Left turns off Main Street would be prohibited to avoid traffic tie-ups.

The rail transit right-of-way could be slightly raised and roughened for delineation and as a deterrent to automobile incursions. This treatment could be interrupted at cross-street intersections. The at-grade portion would also include pedestrian cross signals, street lighting, and catenary supports. Special consideration would be given to the design of the rail system beneath the Marine Midland Tower to minimize vibrations. Adequate clearance exists for the catenary power system with no intrusion upon the tower's underground facilities.

4.4 - Mall Section

Proceeding north on Main Street, the at-grade rail line would traverse the length of the proposed pedestrian mall from just north of Church Street to just south of Tupper Street where the line descends via a walled ramp to the subway portal (Figures 4-2, 4-11, and 4-12). Track section and construction techniques would be essentially identical to those used in the mixed-traffic section.

Vehicular movements within the designated mall area other than LRRT vehicles would include:

- street traffic (i.e., cars, buses) able to cross the mall on Huron Street and Chippewa Street; a road surfacing material of distinctive texture and color could be used to alert drivers to the fact that they may encounter heavy pedestrian cross-traffic;

- service vehicles allowed access to the mall during specified non-business hours for such functions as garbage collection and mail delivery; and

- fire fighting and police vehicles with 24-hour access to respond to emergencies.

Architectural treatment of the mall remains to be developed; therefore, a description of the mall's visual characteristics must be general:

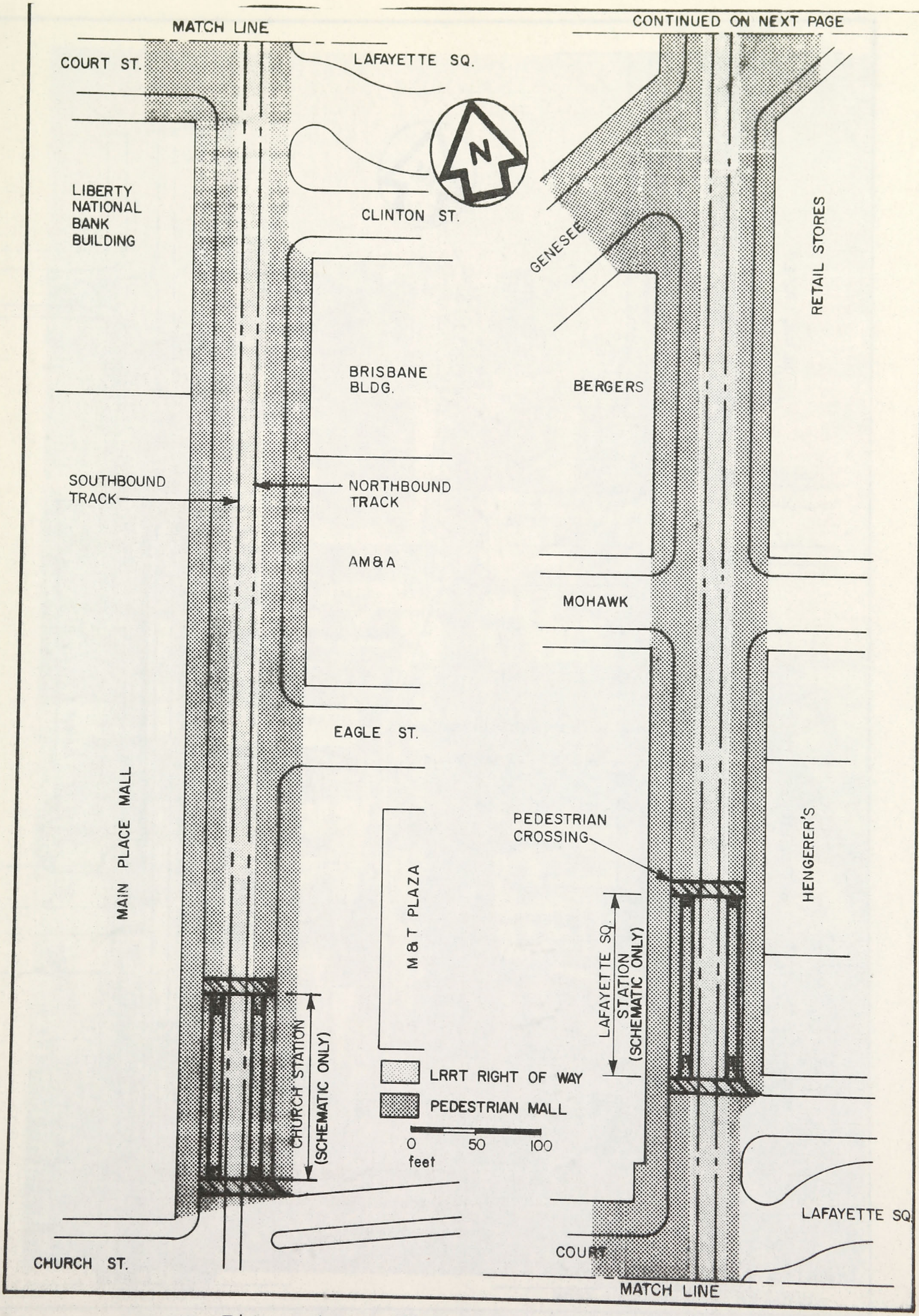


Figure 4-11. Mall Section: Church Street to Tupper Street

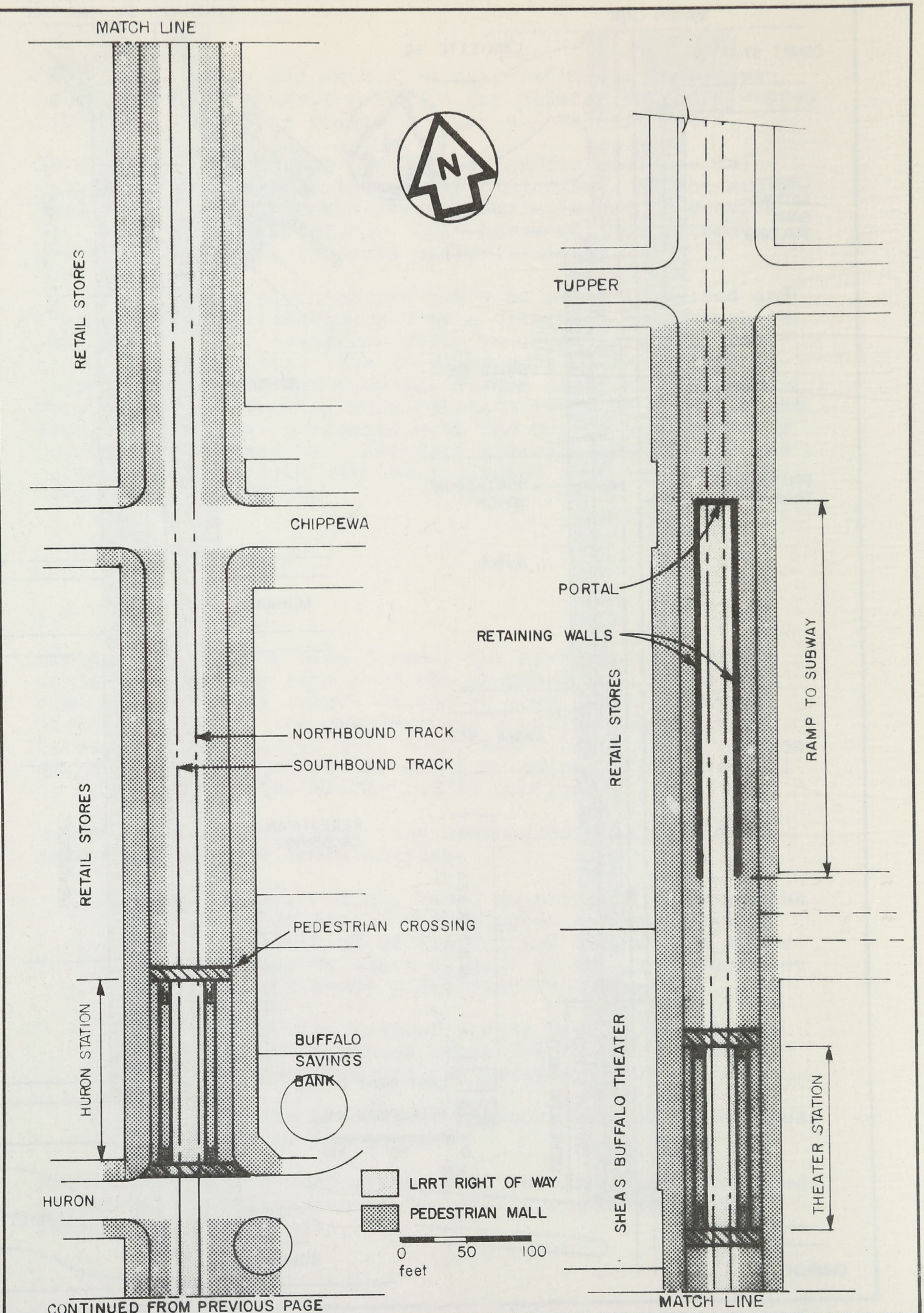


Figure 4-11. (Concluded)

Figure 4-12. View of Main Street Looking North from Marine Midland Tower to Mall Area

- The approximate proportions of the mall would be 3,080 feet (the distance between Tupper and Church Streets) by 100 feet (the nominal right-of-way width of Main Street, including sidewalks).

- Tracks would consist of girder rail set into the street bed with textural delineation to warn pedestrians that they are within the rail vehicle's path.

- Bus shelters, serving also as transit interface points, would be provided at Church Street (the mall's southern terminus), Lafayette Square, and Huron Street.

- Overhead catenary lines supplying electrical power to LRRT vehicles would run the length of the mall about 14 feet above grade. Integration of the catenary lines with other aerial elements (e.g., street lights) to improve esthetics would be given primary consideration.

- Stations would be provided in the mall area at Church Street, Lafayette Square, Huron Street, and the Theater section (between Chippewa and Tupper Streets). These stations would be identical in concept to the Seneca Station in the mixed-traffic section: covered; with two raised platforms 150 feet long (with provision for expansion to 300 feet) separated by about 23½ feet for the tracks.

- Special grading and planting areas as well as surface materials would be used to enhance drainage and snow removal.

(See 10.2.10, page 10-19.)

4.5 - Cut-and-Cover Section

From the portal, the rail line would continue north under Main Street in a relatively shallow cut-and-cover double box concrete structure to the Allen-Hospital Station (Figure 4-2). From the Allen-Hospital Station, the route would continue north with stations at the Summer-Best and Utica locations.

At Ferry Street, the proposed route curves to the northeast (still following Main Street's right-of-way) and enters a transition zone between the cut-and-cover and rock tunnel sections. In this transition, the double box concrete structure would be altered to two single box concrete structures which then would merge with the two circular concrete-lined rock tunnels.

A double crossover would be provided south of the Utica Station for emergency rerouting, e.g., in the event of a stalled train on one line. A double crossover could also be located between Tupper Street and the Allen-Hospital Station to permit rerouting trains to avoid delays in either the underground or at-grade sections of the transit system. This latter crossover might be particularly useful when surface travel becomes inadvisable or impossible due to blizzard conditions; transit supervisors would then have the option of maintaining service between the South Campus terminal and the Allen-Hospital Station.

The stations in the cut-and-cover section are of the type shown in Figure 4-13. Passengers reach the loading platforms from street level via stairway, escalator, or elevator (for handicapped individuals). If they wish to board a train on the opposite track, they descend to a pedestrian crossover beneath the rail line. Platforms are 300 feet long.

4.6 - Rock Tunnel Section

North of Ferry Street, the rock strata approach the ground surface (Figure 4-3) and the route would change from a shallow depth, cut-and-cover subway to a rock-tunneled subway via the transition described in Section 4.5. The route would then continue in twin rock tunnels to the Delavan Station, Humboldt Station, Amherst Station, and LaSalle Station (Figures 4-2 and 4-14). In this portion, the profile would be relatively deep because of the need to pass under such obstacles as the Scajaquada Creek arch culvert under Main Street; the Humboldt Parkway, set in an open cut; and the Penn Central Railroad belt line, also in open cut. South of the Amherst Station, an emergency storage and turnaround track would be provided; south of the LaSalle Station, the vertical alignments of the rock tunnels would be on separate profiles for easy tie-in with a future extension to the Tonawanda Corridor. North of the LaSalle Station, the two rock tunnels would regain the same profile. In the vicinity of Heath Street, the route would curve off Main Street onto the grounds of the SUNYAB's South Campus, where a subway station and terminal facility would be located (Section 4.7). The northern physical limit of the subway would extend some 400 feet past the station in order

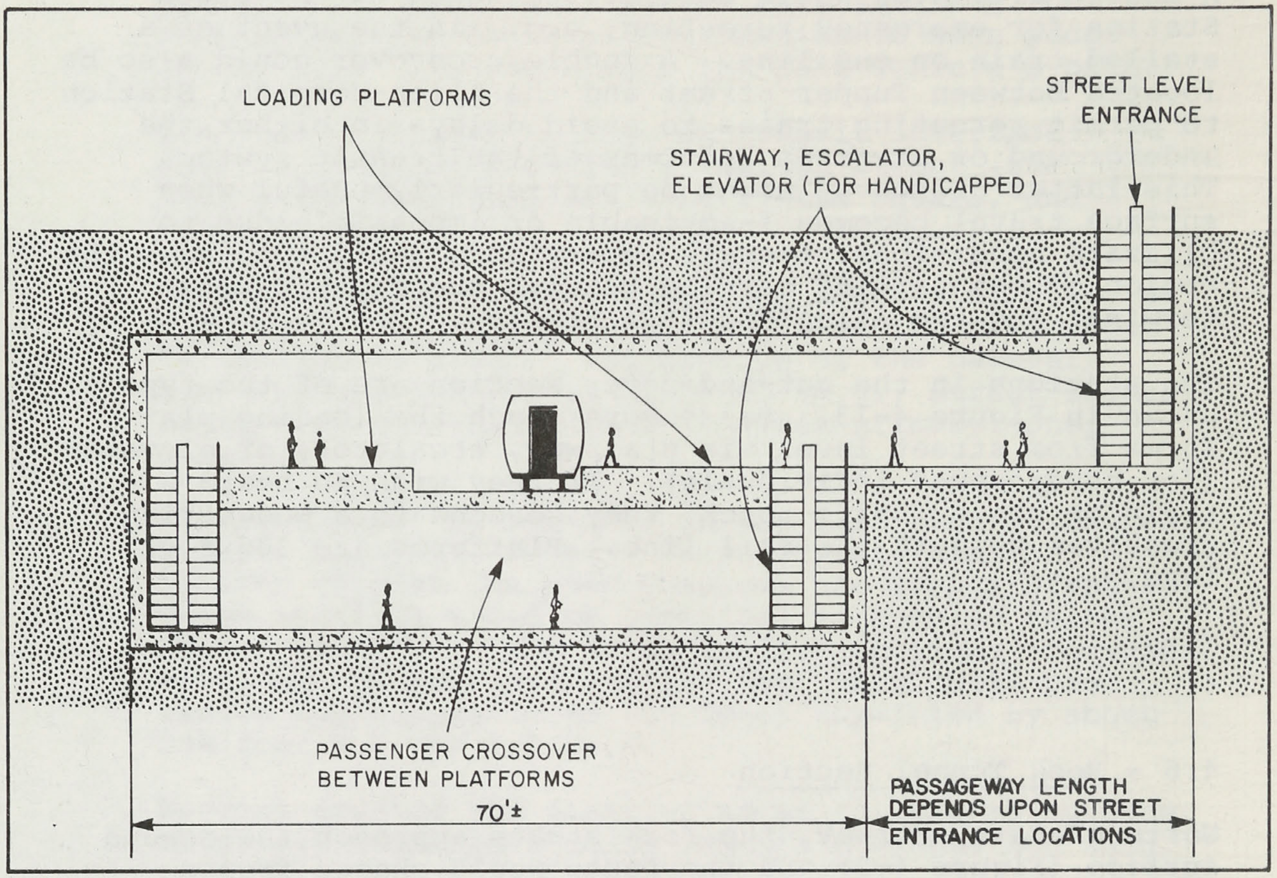


Figure 4-13. Typical Cut-and-Cover Section Station

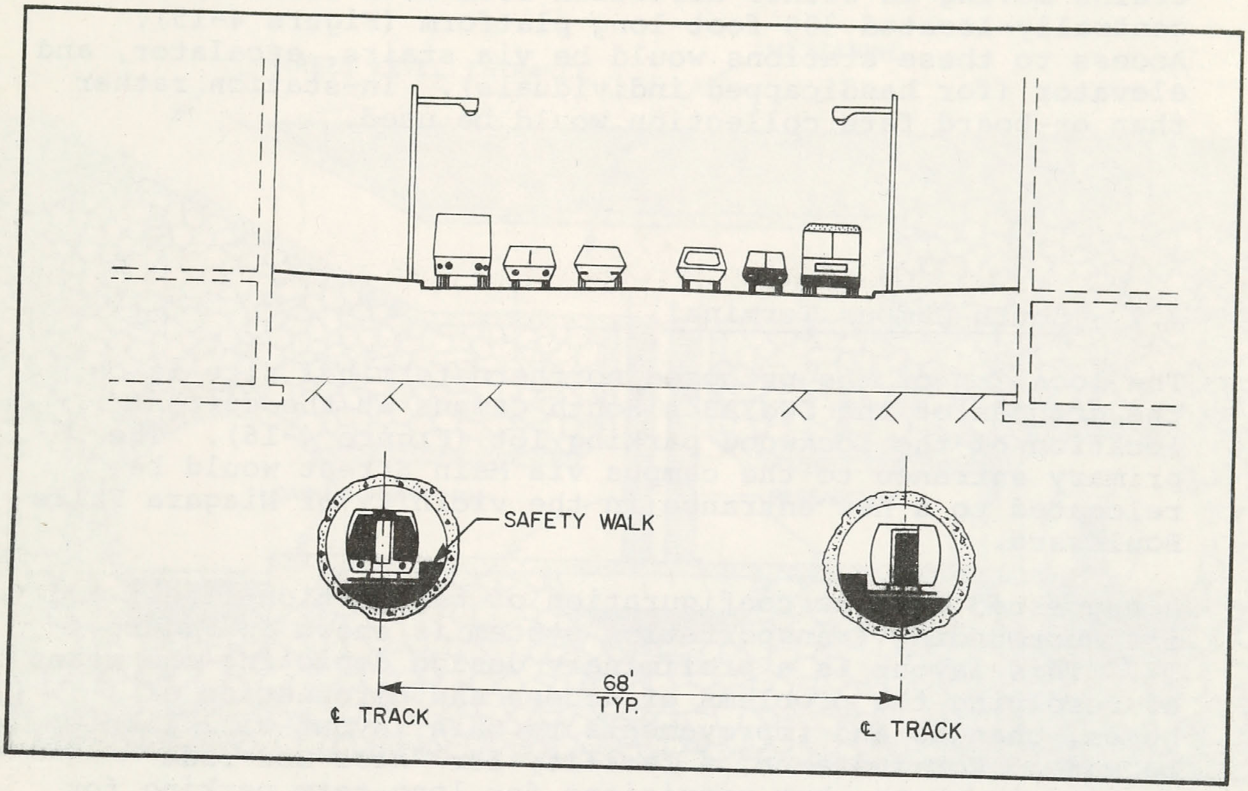


Figure 4-14. Rock Tunnel Section Configuration

to provide tail track space beyond the South Campus Station. A double crossover would be provided at this station so that trains could switch from the north-bound track to the south-bound track.

The stations in this section would provide for loading of trains moving in either direction from both sides of a centrally-located 300-foot long platform (Figure 4-15). Access to these stations would be via stairs, escalator, and elevator (for handicapped individuals). In-station rather than on-board fare collection would be used.

4.7 - South Campus Terminal

The location of the proposed northern terminal site is on the grounds of the SUNYAB's South Campus at the current location of the Lockwood parking lot (Figure 4-16). The primary entrance to the campus via Main Street would be relocated to a new entrance in the vicinity of Niagara Falls Boulevard.

A suggested surface configuration of the station itself and its surrounding transportation system is shown in Figure 4-17. This layout is a preliminary design depicting one means of resolving the problems of access and circulation of buses, changes and improvements to this layout will likely be made. For instance, a facility for "kiss-and-ride" parking is shown, but provisions for long-term parking for transit users are not shown. Changes such as the inclusion of long-term parking facilities are not anticipated to substantially affect traffic and circulation patterns from the basic patterns shown on this figure.

The major element of the preliminary design concept is the station itself. The basic layout and location were previously developed in Ref. 29. The original design was altered slightly to a squarer layout to permit more efficient allocation of bus bays along the periphery of the station.

Feeder Bus Access and Circulation

The station would be encircled by a bus-only roadway for discharge and pickup of passengers at any one of ten bus bays. Bus circulation in this loop would be in two lanes, both of which operate in the clockwise direction. The inner lane would be reserved for buses picking up or dropping off

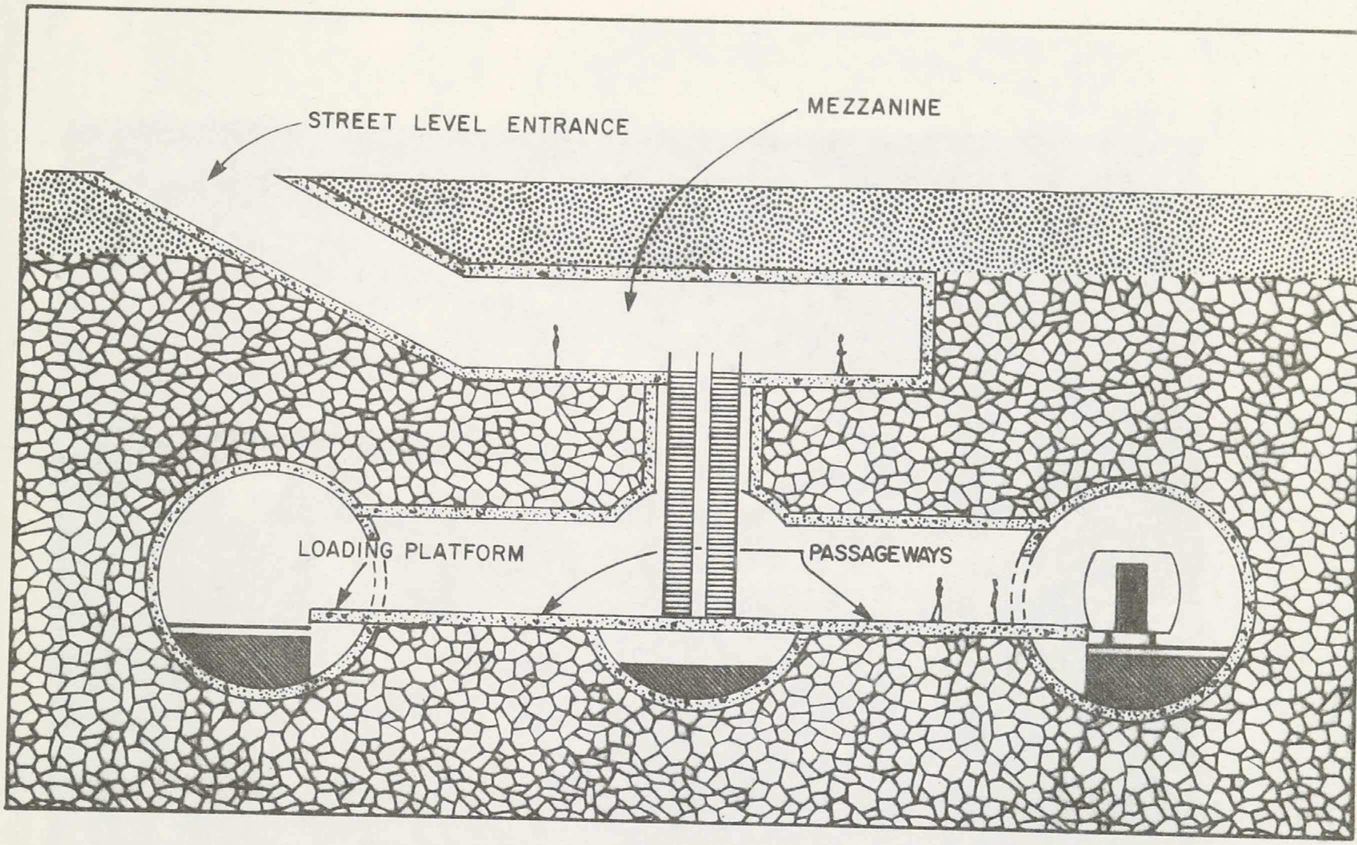


Figure 4-15. Typical Rock Tunnel Section Station

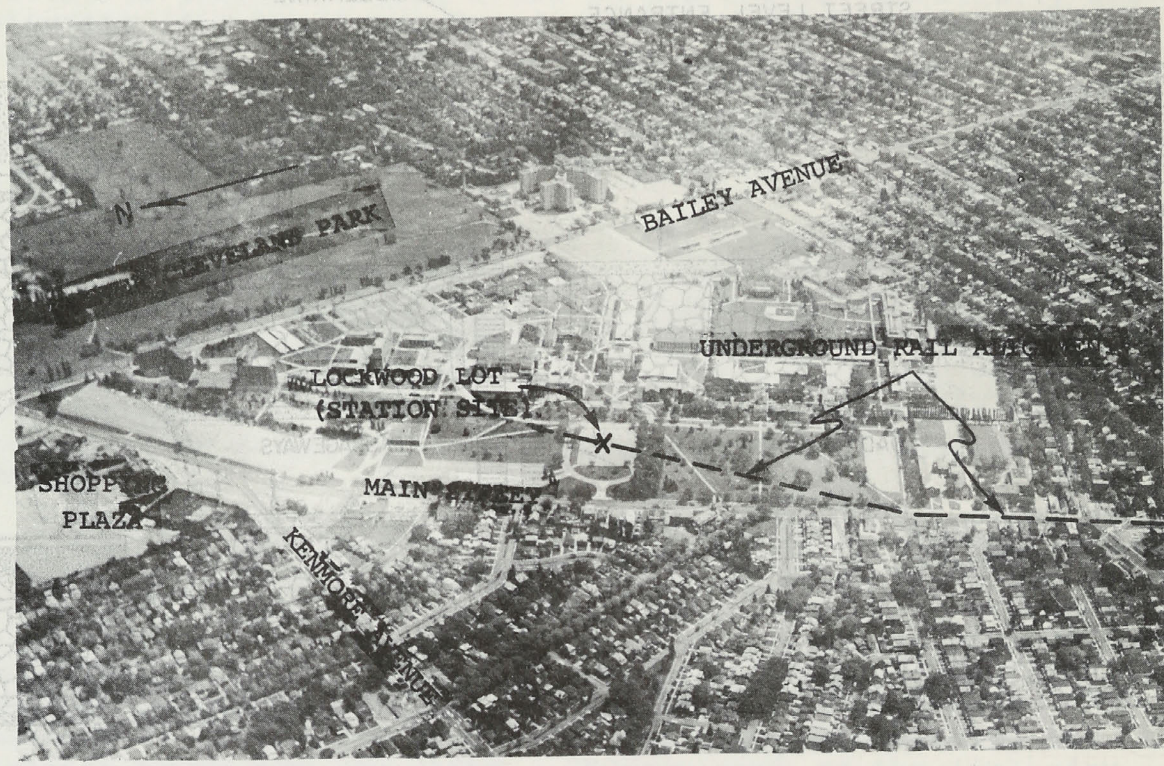


Figure 4-16. South Campus of the State University of New York at Buffalo; Site of Northern Terminus of Proposed Rail Transit Alignment

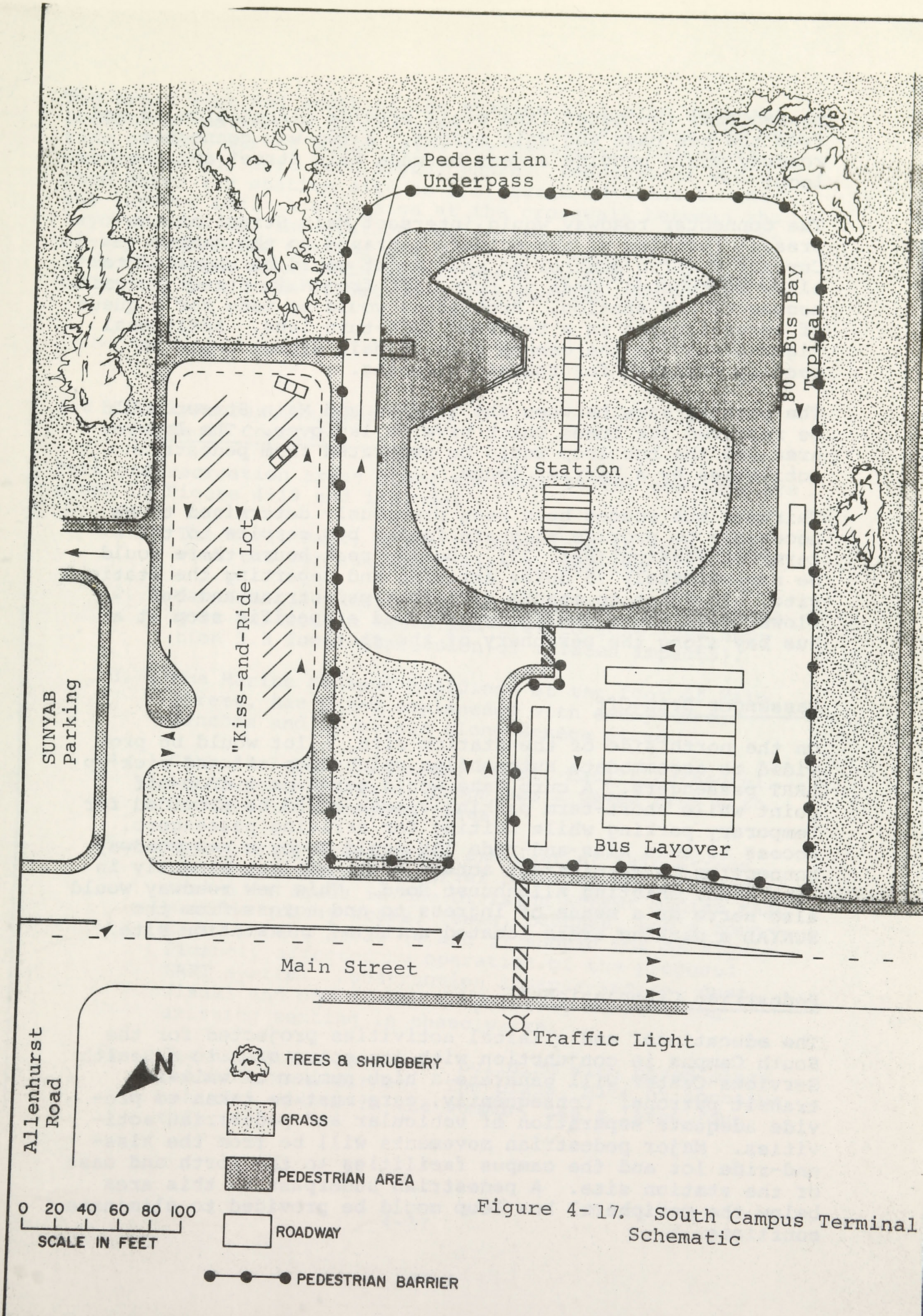


Figure 4-17. South Campus Terminal Schematic

passengers; the outer lane would provide circulation to and from the bus bays and Main Street. A two-way connecter roadway would provide access between Main Street and the bus loop.

The connecter roadway would intersect Main Street at the present location of the primary entrance to the campus. Current traffic control at that point would be upgraded to allow southbound buses to turn left from Main Street to gain access to the station. Provisions would be made for a queue of several buses in a reserved left-turn lane. Additional right-of-way on the campus side of Main Street could be readily obtained for roadway widening.

The parking area between the station and Main Street would be reserved for buses which have to lay over. The layover area and the bus loop would be separated from pedestrian activities by a barrier fence.

Thirteen bus routes have been previously determined to be necessary to provide adequate feeder bus service to the terminal station (Ref. 23). During peak hours there would be approximately 75 buses arriving and departing the station site. In order to ensure efficient pedestrian and bus flows, each route should be assigned a specific stop at a bus bay along the periphery of the station.

Passenger Drop-Off

On the north side of the station site, a lot would be provided to accommodate automobiles which drop off and pick up LRRT passengers. A curb lane would serve as a drop-off point while short-term parking spaces could be provided for temporary parking while waiting for arriving passengers. Access to this kiss-and-ride lot would be by a new roadway connecting to Main Street across from, but not directly in line with, existing Allenhurst Road. This new roadway would also serve as a means of ingress to and egress from the SUNYAB's parking areas located north of the station site.

Pedestrian Circulation

The educational and clinical activities projected for the South Campus in conjunction with its conversion to a Health Services Center will generate a high number of walk-in transit patrons. Consequently, care must be taken to provide adequate separation of vehicular and pedestrian activities. Major pedestrian movements will be from the kiss-and-ride lot and the campus facilities to the north and east of the station site. A pedestrian underpass in this area below the peripheral bus loop could be provided to eliminate conflicts.

The areas west and south of the station will also generate pedestrian movements to the site. A crosswalk from the west side of Main Street would allow for pedestrian movements during the bus left turn signal phase. Pedestrians would then enter the station site on a sidewalk adjacent to the bus layover lot. A stop sign at the crosswalk between the layover area and the station would give pedestrians right-of-way over buses exiting the bus loop. Pedestrian access from the north along Main Street would be along a sidewalk extending from Main Street to the pedestrian underpass.

4.8 - Park/Recreation/Open Space Lands in Corridor

Park and recreation areas along the Main Street corridor are shown in Figure 4-18 and include:

1. The Naval Park, which is described in connection with the Terminal Yard Site in Section 5.

2. War Memorial Auditorium adjacent to the southernmost station in the mixed-traffic zone (see Section 5.3 for a discussion of related impacts).

3. The Marine Midland Building, at the foot of Main Street, has paved esplanades with sculptures, benches and plantings along Seneca Street.

4. Cathedral Park, adjacent to St. Paul's Cathedral in downtown Buffalo, comprises a paved area with benches and numerous trees.

5. Opposite Cathedral Park and east of Main Street, the Church Street arterial consists of two larger park-like areas in the Division Street median that provide grassy areas, trees, benches, and a fountain. These areas (4 and 5) should not be significantly affected by operation of the proposed LRRT system. Construction impacts--noise, dust, visual and odors--may temporarily disrupt the existing setting in these parks.

6. The M&T Plaza is a bank building with paved plaza fronting Main Street. The plaza, site of noontime cultural events in the summer, has a large fountain.

7. Lafayette Square is located between Main and Washington Streets at the intersection of Main and Court Streets. This park includes the Soldiers and Sailors Monument, benches, trees, and grassed areas, but is transected by very active roadways which reduce its attractiveness to passersby. The pedestrian mall proposed in conjunction with the at-grade section of the LRRT line will close Main Street to cross-traffic at this point. Consequently, the utility and appearance of Lafayette Square could be greatly enhanced by replacing roadways with additional lawn, plantings, benches, tables, etc.

8. Genesee Street west of Main Street has already been closed to through traffic due to construction of the convention center. The two blocks on either side of Main Street are being considered for vehicular removal and park-type landscaping as has been done in Cathedral Park. No definite plans have been developed.

9. A "pocket" park on the northwest corner of Main Street at Chippewa. This cleared lot, seeded and planted with small shrubs, is owned and maintained by the Buffalo Savings Bank.

10. Bishop Fallon, a now vacant school, has a cinder track bordered grass athletic field adjoining its structure on the west side of Main Street facing the city campus of Erie Community College.

11. Northland/Masten/Main Streets come together at a small triangle of open land which has grass and bushes.

12, 13 & 14. The area west of Main Street between Delavan Avenue and Humboldt Parkway includes (13) Forest Lawn Cemetery and the grounds of (14) Mount St. Joseph Academy, both rich in trees, grassy areas, and urban-adapted wildlife. This area is located along the tunnel portion of the LRRT line and will not experience significant impacts from either construction or operation of the line. Localized impacts might result, however, from the Delavan and Humboldt Stations.

The tentative location of the Delavan Station is on city-owned land adjacent to Public School No. 17 on the southwest corner of the Delavan Avenue-Main Street intersection. The small park here was intended to be temporary until construction of the Metrorail. A possible alternative location is on the northeast corner of this intersection. Both locations are across the street from Forest Lawn Cemetery, which would not be affected by the presence of the station.

The tentative location of the Humboldt Station is about one block south of Humboldt Parkway. The types of impacts projected for the Delavan Station could also be expected here, particularly since one entrance to the Humboldt Station is envisaged on the west side of Main Street, immediately adjacent to the Academy's grounds.

15. Sisters Hospital, SUNY Medical School and St. Mary's School for the Deaf, all north of Humboldt Parkway on the east side of Main Street, have fairly sizeable lawns with trees.

16. Two other possible locations for the Humboldt Station are three and four blocks north of Humboldt Parkway, respectively. The city-owned land associated with Public School No. 54 is adjacent to the northernmost of these alternatives. Should the station entrance be located on the west side of Main Street, and if the sidewalk area is not adequate for this entrance, then a small corner of the parking lot serving the school and its athletic field might be taken.

17. Vernon Place at Main Street-small area of street being reclaimed by the City for a grassy triangle at intersection. This project will include trees, shrubs and benches.

18. Bennett High School has some large trees and a good sized lawn on the west side of Main Street just south of Hertel Avenue.

19. Minnesota Linear Park is in an area west of Main Street along the Erie-Lackawanna Railroad right-of-way. Community Development Block grant funds have been used for improvements in this strip, which does not touch Main Street.

20. University Avenue & Niagara Falls Boulevard is an attractively landscaped intersection facing the South Campus of SUNY.

21. The grounds of the South Campus of the SUNYAB are described and discussed thoroughly in Sections 2 and 5 of this EIS.

(See 10.3.5, pages 10-29, 30.)

Figure 4-18. Park/Recreation/Open Space Lands in Corridor

SECTION 5

5 - ENVIRONMENTAL IMPACTS AND IMPACT-MITIGATIVE MEASURES ASSOCIATED WITH THE PREFERRED ALTERNATIVE

This chapter examines the beneficial and adverse consequences that may result if the proposed LRRT system is adopted over the "No Action" Improved Bus plan. For discussion purposes, these impacts have been categorized as follows:

- System-wide Impacts, including those common to all sections of the proposed LRRT route and those which affect in the long run the overall environmental quality and socioeconomic character of the Niagara Frontier and specifically the Buffalo-Amherst Corridor.

- Local Impacts, which are associated with the individual project elements identified in Section 4. Included here are temporary construction-related effects and long-term operational effects on neighborhoods and the CBD.

An attempt has been made to quantify project-induced effects and assess their significance on regional, Corridor, and local bases. Wherever feasible, mitigative measures have been recommended to reduce adverse impact.

5.1 - System-wide Impacts

Energy Consumption

Recent fuel shortages have demonstrated that our reserves of fossil fuels (particularly petroleum) are limited and must be conserved. Such measures are especially appropriate in the transportation sector, which accounts for 55 percent of the total domestic petroleum demand, much of this consumed relatively inefficiently by private automobiles (Ref. 31).

This section presents an estimate of energy consumption for transportation in the Buffalo-Amherst Corridor based on standard computational methods and data presented in References 5, 23, 25, 30-33. The 1995 total energy demand of the proposed LRRT system is compared to the Improved Bus System (the benchmark "No-Action" alternative). No auto disincentives are assumed in the calculations, although their potential impact will be discussed. In the analysis, total energy demand consists of direct and indirect components. Direct demand is energy used to operate the trains, buses, and cars involved in Corridor transit. Indirect demand includes energy used for operating transportation system components other than vehicles, for system maintenance and construction, and for manufacture of system components, all annualized over a 50-year project life. The following criteria have been defined for purposes of comparison:

- Transit Efficiency - the average number of miles that a person can be carried by the overall transit system as it consumes the energy equivalent of one gallon of gasoline. Separate efficiencies were also calculated for auto, bus, and rail travel to compare the efficiencies of the individual modes.

- Direct Energy Savings in Corridor - the amount of gasoline saved locally due to potential auto trips diverted to the bus and rail components of the LRRT system. This is a measure of the conservation of a scarce resource (petroleum) at the expense of a relatively abundant one (coal used to generate electricity for the LRRT), expressed as gallons of gasoline and as a percentage of direct demand of the benchmark system.

- Net Energy Savings in Corridor - the savings realized after consideration of all direct and indirect energy demands, expressed as equivalent gallons of gasoline and as a percentage of total demand of the benchmark system.

The energy demand/benefit analysis for 1995 is summarized in Table 5-1. Note that regardless of the availability of mass transit, transit in the Buffalo-Amherst Corridor is dominated by auto travel. Even with the LRRT system, auto traffic would account for nearly 90 percent of the passenger-miles in 1995.* However, because rail and bus travel are respectively 2.0 and 1.5 times as efficient as auto travel, projected direct energy savings amount to 4.7 percent of the annual demand that would exist with the benchmark system; net energy savings are on the order of 2 percent.

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* This assumes that there is no drastic change in the availability of gasoline for use by private passenger cars in 1995 (see Page 5-4).

TABLE 5-1

1995 ANNUAL ENERGY DEMAND COMPARISON BETWEEN LRRT AND NO ACTION ALTERNATIVE

Item	Improved Bus (No Action)			Proposed LRRT			
	Auto	Bus	Corridor Totals	Auto	Bus	Rail	Corridor Totals
Annual Travel, million passenger-miles[1]	1570	80.3	1650.3	1467.0	125.3	88.3	1680.6
Direct Energy Demand, million gallons of gasoline[2]	46.7	1.9	48.6	43.6	2.7	1.2	47.5
(Total Energy/Direct Energy) Factor[3]	1.62	1.55	--	1.62	1.55	1.5-2.0	--
Total Energy Demand, million gallons of gasoline	75.7	2.9	78.6	70.6	4.2	1.8-2.4	76.6-77.2
Transit Efficiency, passenger-miles per gallon	20.7	27.7	21.0	20.7	29.8	36.8-49.0	21.8-41.9
Direct Energy Savings in Corridor: Million gallons of gasoline		--				2.3	
Direct Energy Savings in Corridor: Percent savings over benchmark system demand		--				4.7	
Net Energy Savings in Corridor: Million gallons of gasoline		--				1.4 - 2.0	
Net Energy Savings in Corridor: Percent savings over benchmark system demand		--				1.8 - 2.5	

1. Automobile data from Ref. 25, bus and rail data from Ref. 23 and 30.
2. Automobile consumption at 20 miles/gallon average efficiency, bus and rail data from Ref. 23 and 30.
3. Ref. 32; bus factor estimated.

Note that because rail demand is little more than 2 percent of total energy demand in the Corridor, total demand is relatively insensitive to improvements in rail energy efficiency or use of alternative energy sources, e.g., wind power, solar collectors, etc. Furthermore, on a regional scale, the impact of the LRRT system on energy demand is even more modest. Nevertheless, there is a savings in precious energy resources predicted. Therefore, energy conserving measures must be adopted wherever proven cost-effective within the context of the system under construction. For example, installation of regenerative braking systems on LRRT cars may reduce annual rail energy demand 30-40 percent (Ref. 34). If this benefit outweighs the cost to purchase, install, and maintain the braking systems, they should be considered in the final design even though the savings are very modest on a regional scale.

In summation, this analysis clearly indicates that the key to regional energy conservation in the transportation sector is to reduce auto use. The LRRT is not expected to divert sufficient auto commuters to effect major energy savings. The mere availability of mass transit does not guarantee its widespread use. However, gasoline shortage or auto disincentives (discussed in Section 4.1) could substantially reduce auto use and thereby increase LRRT ridership, greatly amplifying its beneficial impact.

Two assumptions inherent in the preceding analysis deserve further discussion. The 20 mpg auto mileage rating is considered a reasonable guess because:

- present EPA policy mandates that by 1985 the "average" new car must attain 27.5 mpg highway and 18 mpg urban; and

- most, but not all, of the auto miles diverted represent urban (basically "stop and go") driving.

While the validity of this estimate may be argued, the conclusion arrived at is not materially affected by adopting reasonable alternative estimates. For instance, at 17 mpg, the energy savings range from 2.2 to 2.8 percent versus 1.8 to 2.5 percent at 20 mpg.

The second assumption is more critical and far less certain: that in 1995 gasoline will be available in sufficient supply to satisfy the projected auto demand, and that commuters will be willing to pay the going price for it. If this assumption is incorrect (it may well be unrealistic), then the LRRT system could have a major impact on transit energy use in the Niagara Frontier Transportation District.

Air Quality

System-wide air quality impacts are considered here from two viewpoints:

- localized impacts on air quality in the Buffalo-Amherst Corridor due to a shift from automobile to bus and rail vehicles of the LRRT system; and
- regional impact of pollutants emitted by power plants while generating electrical energy to operate the LRRT system.

In this discussion, all air quality impacts are measured as changes in projected 1995 emissions using the benchmark Improved Bus System as a baseline. As in the energy analysis, no auto disincentives are assumed. Parameters include carbon monoxide, hydrocarbons, nitrogen oxides, sulfur oxides, and particulates. References 23, 30, and 33 supplied data needed to estimate auto and bus emissions using EPA methods given in Reference 8. (Consideration was given to moving vehicles only; emissions from idling and parked vehicles were not computed.) Reference 23 supplied data needed to estimate power plant emissions based upon loading factors given in Reference 35 for a completely controlled (low-polluting) coal-fired plant.*

A comparison of transit air pollutant emissions between the LRRT System (including feeder buses) and the benchwork Improved Bus System is presented in Table 5-2. Note that, with or without the LRRT System, autos are responsible for the bulk of those emissions attributable to Corridor transit, with buses contributing significantly only to nitrogen oxide and sulfur oxide emissions. Regarding the impact of the proposed LRRT System on air quality, the analysis suggests the following:

- Modest decreases in Corridor emissions of carbon monoxide, hydrocarbons, and particulates (due to auto trips diverted to mass transit) are accompanied by a modest increase in nitrogen oxide emissions and a minor increase in sulfur oxide emissions (due to the greater number of feeder buses).

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* A completely controlled plant does not now exist in the region. However, it is reasonable to assume that such plants will be operational by 1995.

TABLE 5-2

COMPARISON OF 1995 ANNUAL TRANSPORTATION-RELATED AIR POLLUTION EMISSIONS BETWEEN LRRT AND IMPROVED BUS SYSTEMS

Pollutant	Improved Bus System (No Action)			Proposed LRRT System				
	Annual Corridor Emissions, Tons[1]	% Due To Autos	% Due To Buses	Annual Corridor Emissions, Tons[1,4]	% Due To Autos	% Due To Buses	Annual Power Plant Emissions Due to LRRT, Tons[2]	Total Annual Power Plant Emissions, Tons [2,3]
Carbon Monoxide	61,652	99.5	0.5	57,749	99.3	0.7	3.1	1,230
Hydrocarbons	992	95.1	4.9	951	92.7	7.3	0.9	369
Nitrogen Oxides	529	75.9	24.1	557	67.4	32.6	55.4	22,140
Sulfur Oxides	157	83.3	16.7	159	76.7	23.3	30.3	1,818
Particulates	274	95.6	4.4	262	93.4	6.6	3.1	185

Pollutant	Total Transit Emissions Within Corridor Without LRRT System, Tons	Total Transit Emissions Within Corridor With LRRT System, Tons	Corridor Emissions Avoided Due To LRRT System, Tons	Percent Emissions Avoided in Corridor Due to LRRT System
Carbon Monoxide	61,652	57,749	3,903	6.3
Hydrocarbons	992	951	41	4.1
Nitrogen Oxides	529	557	-28	-5.3
Sulfur Oxides	157	159	-2	-1.3
Particulates	274	262	12	4.4

1 Calculated from data in Ref. 23, 30, and 33 by EPA methods in Ref. 8. (No indirect sources included.)

2 Calculated from data in Ref. 35 for completely controlled (very-low polluting) conventional coal-fired plants.

3 Assuming a 1000-MW plant operated at a 75-percent load factor (capacity), which would require 60×10^{12} BTU's of energy.

4 Does not include power plant emissions due to LRRT, since power plant would lie outside of Buffalo-Amherst Corridor.

- Pollutants emitted during the generation of LRRT energy by a contemporary 1995 coal-fired power plant amount to a negligible 1/4 percent of annual plant emissions. Hence, increasing the energy efficiency of rail transit or otherwise reducing the energy required to operate the rail system (e.g., by increasing power plant efficiency or using wind or solar power) would have a nearly insignificant impact on regional air quality.

- If the hypothetical power plant is considered a major contributor to regional emissions in 1995, then corridor transit must be considered a major contributor to regional carbon monoxide, hydrocarbon, and particulate emissions with or without the LRRT (compare annual power plant emissions to annual transit emissions in the table).

- Factors such as auto disincentives or gasoline shortages that substantially decrease the annual mileage attributable to auto travel would spur considerable improvement in air quality.

The relative differences in regional or Corridor air quality between alternative transit systems are not great enough to warrant a detaile analysis for each of the myriad systems considered and an expansion of the air quality analysis of sufficient magnitude to include data suggested in governmental review comments would be subject to serious uncertainties since hard estimates of the LRRT system operation exist only for the year 1995.

Similarly, microscale air quality analyses were not performed because local air quality monitoring is not done for street level pollutant concentrations. In this industrial area, vehicular emissions are considered to be of secondary concern to the regional air pollution picture.

(See 10.3.3, pages 10-27, 28.)

Spoil Disposal

As estimated 910,000 cubic yards must be excavated from the cut-and-cover and tunnel sections. This material breaks down roughly into the following categories: rock--62 percent, sand and gravel--35 percent, silt and clay--3 percent. There will also be a smaller amount of spoil, including asphalt pavement, concrete, reinforcing steel, other scrap metal, lumber, and brick, generated by demolitions and street excavation. Some of the excavated material may be of saleable quality as clean fill or aggregate and could provide a small financial return. However, it is anticipated that most of the material will be hauled to disposal sites.

The NFTA has designated two areas that it owns as potential spoil disposal areas. These areas have a capacity of over 5 million cubic yards of spoil. Figure 5-1 shows one area with two potential spoil disposal sites (Numbers 1 and 2) at the Greater Buffalo International Airport. Site Number 1 is immediately adjacent to the Lehigh Valley Railroad and formerly served as a source of material for previous airport construction activities. Site Number 2 is located at the end of the main runway near the New York State Thruway. This area presently serves as a floodplain for Ellicott Creek. Due to the proximity of the airport and its attendant noise and construction activities, neither of these sites supports a significant wildlife population.

Figure 5-2 shows a potential spoil disposal site at the Port of Buffalo, near the small boat harbor, in an area where dredging and fill have already changed the original character of the environment. This site is located within a mile of two areas recognized as valuable wildlife habitat: the Times Beach diked containment area for dredged material and the Tifft Farm Nature Preserve (Ref. 36). Migratory waterfowl attracted to these areas may also use the proposed spoil disposal site. This site could be developed as a recreational resource. An existing inlet and boat ramp could be upgraded to expand the harbor's marina facilities after the disposal site is filled.

Spoil disposal will be conducted in compliance with Part 19 of the New York State Sanitary Code and Part 360 of the New York State Environmental Law pertaining to sanitary landfill sites. Assuming the "worst case," i.e., that the entire 910,000 cubic yards must be disposed of, and assuming the spoil is equally divided between the disposal sites and spread evenly over the available area, the land surface would be raised approximately 6 feet at each site. Care would be taken to ensure that spoil at the airport would not intrude into the Ellicott Creek floodplain to the degree where its flow capacity is reduced and localized flooding results. Also, possible leachate problems would be considered in providing for drainage at the airport and harbor sites.

An adverse impact associated with spoil disposal will be the truck traffic between the Main Street construction zone and the disposal sites. The NFTA will coordinate with City traffic personnel to select routes that will minimize problems with neighborhood air quality, noise, traffic, and roadway damage.

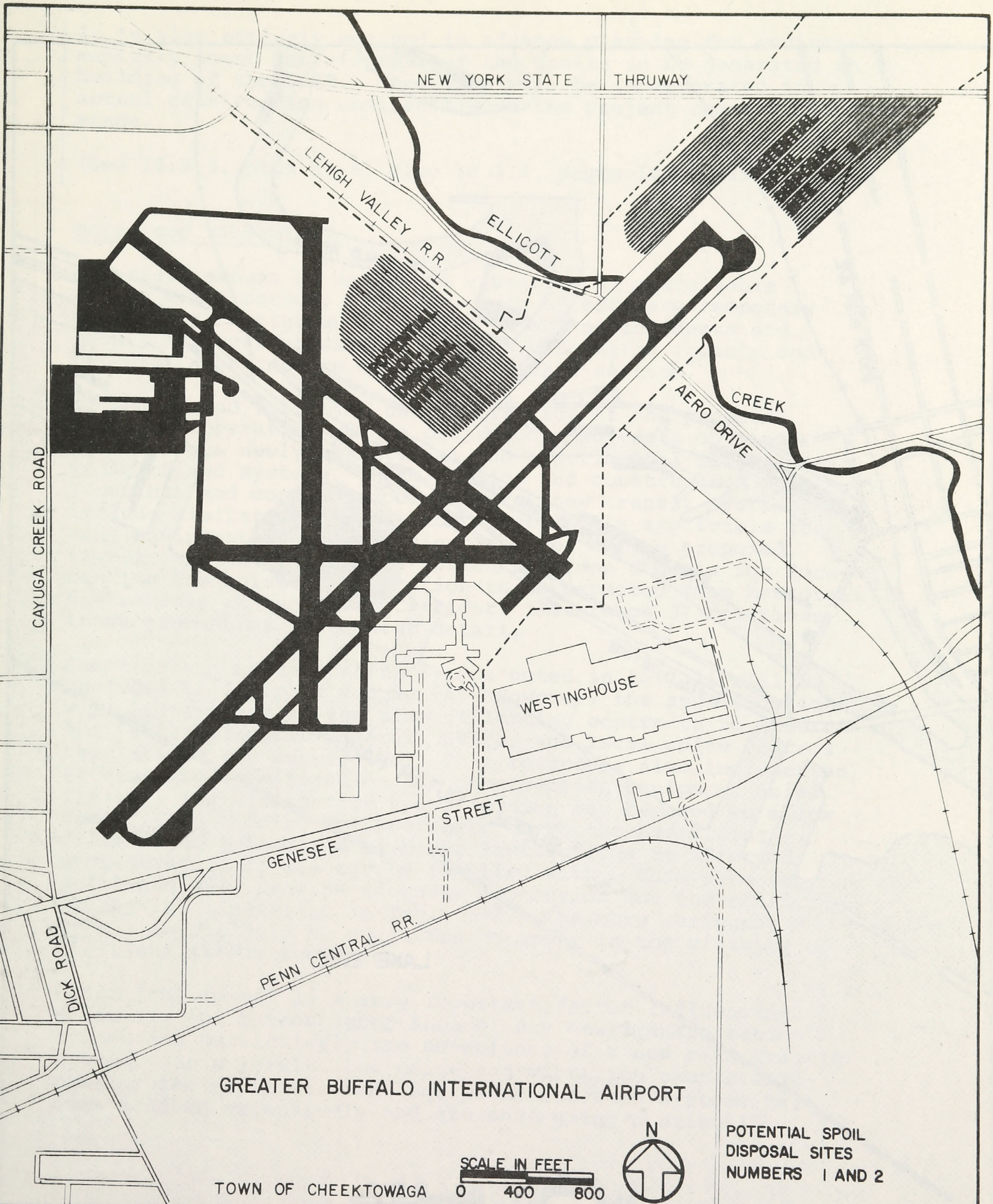


Figure 5-1. NFTA Spoil Disposal Sites at Greater Buffalo International Airport

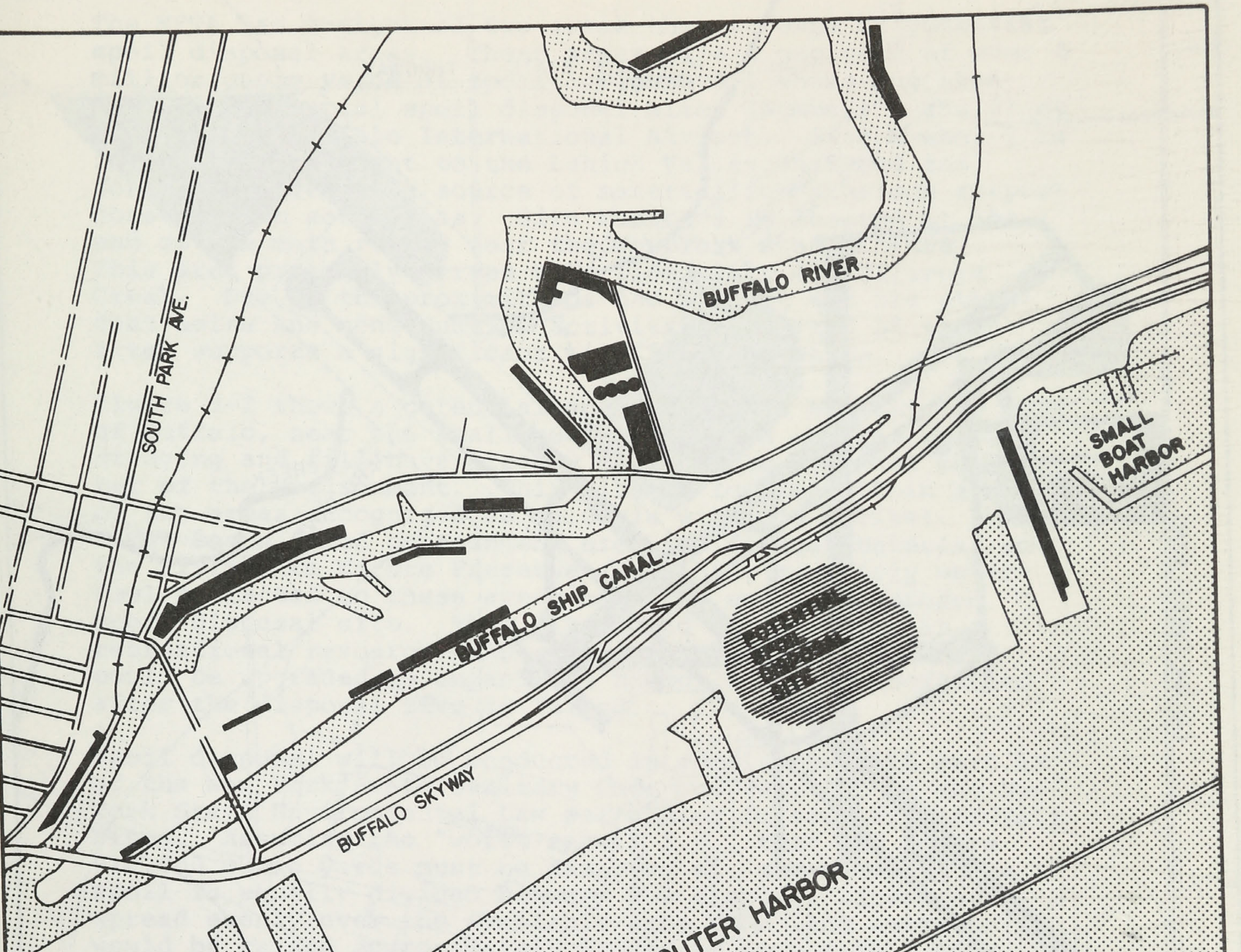


Figure 5-2. NFTA Spoil Disposal Site at Buffalo Harbor

It is also actively engaged in advance planning for environmentally sound use/disposal of the spoils to be generated in building of the LRRT. Specifics will be incorporated in actual construction contracts when the project reaches that stage.

(See 10.2.3, page 10-6; also 10.3.4, pages 10-28, 29.)

Noise and Vibration

A certain amount of noise and vibration is unavoidable during construction. However, such effects are temporary and will be mitigated to lessen impact on residents and properties near construction sites. Specific impacts and remedial measures are discussed in this section.

The noise and vibration characteristics of the proposed system in operation can be projected using data obtained from various newly operational and experimental rail transit vehicles and systems. Also, design and construction specifications and contract documents for new transit systems include limitations on maximum noise levels applicable to many equipment items or design features of the proposed transit system. This information provides a basis for forecasting the noise and vibration to be expected from Metrorail opwerations in the Metro Corridor. Reference 37 describes these procedures in greater detail.

Construction noise specifications noted in Ref. 11 will be included in contract documents. However, the specifications will be reviewed at the time of letting contracts to ensure that all applicable Federal, State, and local noise control regulations are adhered to. This reference also includes an alternative specification for construction equipment noise limits. The alternative specification may be used to allow competitive bidding for contracts where the overriding criteria of subsection B, Noise Restrictions at Affected Structures (Ref. 11) can be complied with. This same subsection B will provide adequate protection for the sensitive structures identified in Table 2-3. The more stringent Type 1 levels will be specified to apply in the vicinity of the identified structures.

Acoustical impact is a very important factor influencing community and patron acceptance of any new transportation system and particularly the acceptance of a new rail transit system. As a result, the noise and vibration characteristics of the facilities and equipment for such systems have been studied extensively and are undergoing continual development to produce lower noise and vibration. There are two basic purposes in controlling or reducing the noise and vibration created by transit system operations:

. minimizing the transmission of noise and vibration to adjacent neighborhoods, buildings, or structures, i.e., minimizing the impact of system operations on the community; and

. maintenance of noise levels within the transit vehicles, stations, and other facilities at low, acceptable limits to provide system patrons with an acoustically comfortable environment.

The Buffalo Metrorail system will draw upon the experience gained with the San Francisco Bay Area Rapid Transit System (BART), the Washington Metropolitan Area Transit Authority (WMATA) Metro System, the Metropolitan Atlanta Rapid Transit Authority (MARTA) Metro System, and other recently designed rapid transit systems.

To provide a basis for evaluating the expected acoustic impact of Metrorail operations, levels of the expected wayside noise and vibration from the trains have been determined. The background information providing the basis for the expected performance includes noise and vibration level data obtained at the BART Test Track, at the Toronto Transit Commission facilities, at the Port Authority Transit Corporation Lindenwold Line facilities, with BART revenue trains operating on the BART facilities, and with other rapid transit systems under final design and construction. The predictions, therefore, are based on information available from the latest advances in technology, from data obtained from the newest systems, and available information from research studies on wheel/rail noise. These predictions have been adjusted to account for the lower operating speeds of the Buffalo Metrorail System (55 mph maximum as compared with 70-80 mph for other systems).

The LRV equipment will be purchased using specifications that will ensure that the Metrorail system will be at least as quiet as these earlier systems. In addition, the Metrorail system will operate at lower speeds. Table 5-3 compares the Standard LRV with the HRT vehicle proposed in the 1974 EIA. The two vehicles are similar enough that noise studies done previously for HRT are also valid for LRRT.

TABLE 5-3

RAIL VEHICLE SPECIFICATIONS

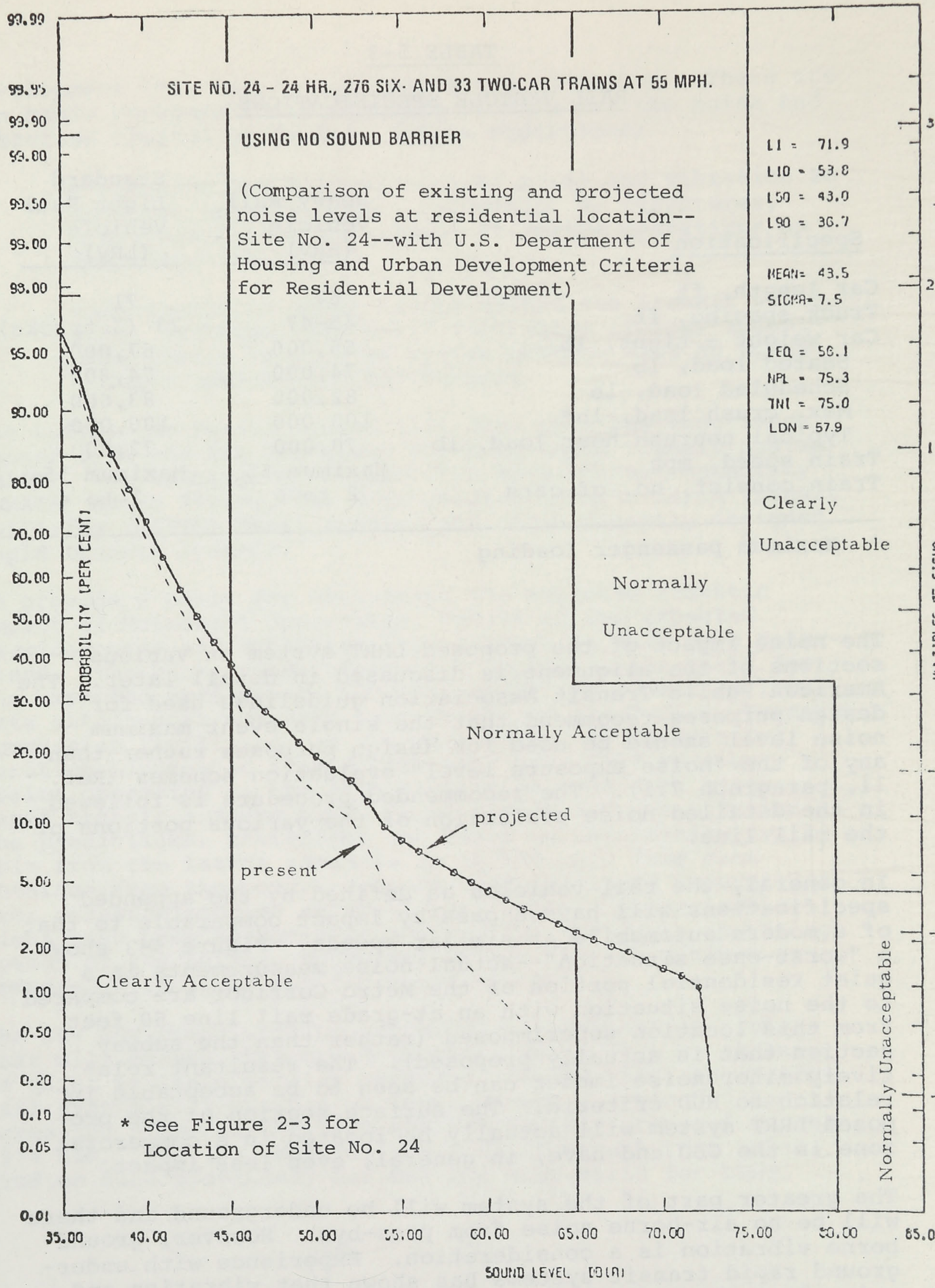
Specification	Heavy Rail Vehicle (HRV)	Standard Light Rail Vehicle (LRV)
Car length, ft	67	71
Truck spacing, ft	45-47	23 (3 trucks)
Car weight - Light, lb	65,000	67,000
Seated load, lb	74,000	74,800
Scheduled load, lb	82,000	83,000
Max. crush load, lb*	100,000	100,000
Typical nonrush hour load, lb	70,000	72,000
Train speed, mph	Maximum 55	Maximum 55
Train consist, no. of cars	2 to 6	1 to 4

* Maximum passenger loading

The noise impact of the proposed LRRT system on various sections of the alignment is discussed in detail later. The American Public Transit Association guidelines used for design purposes recommend that the single event maximum noise level should be used for design purposes rather than any of the "noise exposure level" evaluation schemes (Ref. 11, paragraph 7.1). The recommended procedure is followed in the detailed noise evaluation of the various portions of the rail line.

In general, the rail vehicles as defined by the appended specifications will have a pass-by impact comparable to that of a modern automobile at similar speeds. Figure 5-3 shows a "worst-case situation"--actual noise measurements in a quiet residential portion of the Metro Corridor are compared to the noise situation with an at-grade rail line 50 feet from this location superimposed (rather than the subway section that is actually proposed). The resultant relatively minor noise impact can be seen to be acceptable in relation to HUD criteria. The surface section of the proposed LRRT system will actually be located in a commercial zone in the CBD and have, in general, even less impact.

The greater part of the system will be underground and there will be no air-borne noise from pass-bys. However, ground-borne vibration is a consideration. Experience with underground rapid transit systems has shown that vibration and noise from the trains can intrude in buildings near the



Source: Ref. 10

Figure 5-3. Projected Exceedance Probability Vs A-Weighted Sound Level for 24-hour Period at Site No. 24 Assuming No Sound Barrier* underground facilities and that mitigating measures are appropriate. The two main sources of noise intrusion from the underground operations are:

- vibration that originates where the wheel and rail meet is transitted as ground-borne vibration to nearby buildings and perceived as a low frequency rumbling noise audible inside buildings; and

- air-borne noise from fan and vent shafts which is perceptible in open areas and sometimes can create annoyance in buildings near the shaft openings.

Prediction of the expected sound level in buildings adjacent to the subway portions of a transit system cannot be done with the precision or confidence associated with the prediction of noise from surface operations. There is, however, a considerable amount of background information available that permits prediction of expected noise level with reasonable confidence. The predictions apply to ground-borne vibration modern design features, including continuous welded rail, resilient rail fasteners, resiliently supported ties, and floating slab trackbeds.

The ground-borne vibration from transit trains passing by is perceived as a low-pitched rumbling noise radiated inside nearby buildings due to building structure vibration. In all cases, except possibly for a building directly attached to an earth-founded subway, the vibration levels created by modern subway train operations are below the threshold of perception of mechanical motion; i.e., for persons seated or standing, there is no sensation of vibration or motion. Factors affecting the noise level include such items as the type of subway structure, the type of material in which the subway is constructed, the type of material between the subway and the building, the type of building, and the type of building foundation. Detailed estimates of ground-borne noise levels are made in Sections 5-5 and 5-6). In all cases, suitable measures can be taken to reduce the regenerated rumbling noise to levels meeting the APTA guidelines noted in Ref. 11.

There will be no adverse impact pertaining to electromagnetic interference with sensitive equipment in St. Mary's School for the Deaf and Sister's Hospital during the operational phase of this project. First, the rail system is located 75 feet below and 110 feet away from these facilities. Second, various mitigation measures (e.g., resilient ties) are available to control any potential noise or vibration problem. (See Section 5-5 for a discussion of cut-and-cover section noise levels with various track treatments.)

Vibration from the LRRT system will not pose a threat to any of the acoustically-sensitive buildings listed in Table 2-3 in terms of structural damage. The noise criteria presented in Ref. 11 will be adhered to to ensure there will be no annoying noise effects. Furthermore, the absence of bus traffic and a decrease in auto traffic along Main Street will reduce ambient noise levels compared to conditions that would exist with the "No Action" Improved Bus System.

Feeder Bus Routes - Noise increases will be associated with bus traffic along routes where there would be fewer or no buses with the Improved Bus plan. The impact will be less than that due to buses presently operating in Buffalo, however, since newer, quieter buses will be used on these systems. It is anticipated that buses built after 1980 will be at least 8 dBA quieter than buses currently in operation.

As an example of the trend to quieter buses, the City of Chicago has a noise ordinance that controls the sale of new vehicles. The heavy vehicle category applying to buses allows 84 dBA as of January 1975, with a reduction to 75 dBA by January 1980. The relationship between noise and frequency of bus movements is a relatively insignificant 3 dBA increase per doubling of frequency. The net effect will be a reduction in noise levels.

Yard and Station Areas - Secondary acoustic impact can be experienced in neighborhoods due to noises from stations and storage and maintenance yard areas. At stations, the main impact of noise will be due to automobile traffic from transit patrons. The South Campus Station will also generate noise from feeder bus traffic discharging and picking up transit patrons. Surface stations will be subject to sounds associated directly with transit system operations: the noise of trains entering, standing in, and leaving the station area, and the sound from station public address systems. For subway stations, the only noises perceptible to persons in the vicinity besides those due to automobile traffic from transit patrons will possibly be noises from fan and vent shaft. These noise sources will be held to levels defined in Table G. Guidelines for Noise from Transit System Ancillary Facilities, Ref. 11.

Noise from train operations in surface station areas will be similar to wayside noise along mainline track, except that train speeds will be less. With a modern system, there is no difference in the wayside noise whether the trains are braking, coasting, or accelerating. The noise depends only on the speed of the train and is independent of operating conditions. The exterior noise level is controlled by the guidelines in Ref. 11 to 80-85 dBA at 60 mph. At slower speeds typical of the at-grade sections of the line, noise will be in the 70-75 dBA range. (This range of noise indicates levels anticipated for resilient rail mounting or rigid imbedment.) For comparison, the State of California limits automobiles to a maximum of 82 dBA under any conditions. When the trains are stationary, the noise radiated is that due to operation of the auxiliary equipment. Anticipated noise levels, by the guidelines in Ref. 11 are 60 dBA.

Ancillary Facilities - Ancillary facilities associated with a transit system can be a source of secondary acoustic impact. These facilities include substations, fan and vent shafts, and station heating and ventilating equipment. However, technology is available for controlling noise from these facilities using principles for noise control at substations, mechanical equipment, and shafts common to any industrial, municipal, public agency, or private project. Further details may be found in Ref. 11.

Construction of a rapid transit system in the Buffalo Metro Corridor will produce changes in traffic patterns in the area that will, in turn, result in changes to the present noise climate. Such changes are difficult to predict quantitatively because of the multiplicity of uncertain factors that enter into the problem. Changes in the noise climate depend not only on changes in traffic density, but also on changes in the ratio of trucks and buses, the rate at which the transportation industry adopts noise reduction measures for all vehicles, and the rate at which newer, quieter vehicles replace older, noisier vehicles.

Several methods will be employed to minimize the acoustic impact of rail operation and noise exposure of the system patrons. The LRRT vehicle will be designed to meet specific interior and exterior noise and vibration guidelines as outlined in Ref 11, Table A. Noise and vibration abatement techniques will be used, including sound absorption treatment in subway stations and tunnels. Other vehicle and equipment design features or concepts which will be used if required to meet applicable noise and vibration guidelines include:

- continuous welded rail;
- resilient rail fastenings;
- lightweight trucks with minimized unsprung weight and with rubber mounts and inserts for vibration isolation;

. low noise nonskid braking systems;

. car side skirts;

. car body sound insulation and vibration level performance requirements;

. noise limits in the specifications for the vehicle propulsion systems and auxiliary equipment;

. wheel and rail grinders for maintaining the wheels and rails in a smooth condition;

. resilient wheels;

. sound absorption treatment on the bottom of the car floor and inside face of car skirts.

Special design features which will be included for further noise and vibration reduction and which can be applied in special or critical areas include:

. resilient ties in lieu of resilient rail fasteners in subways; and

. resiliently supported or "floating slab" trackbeds in subways.

For a more detailed description of the acoustic design features, see Ref. 11.

Noise impacts on a section-by-section basis are discussed in Sections 5.2-5.7.

Sociological Impacts

Route alignment and the tentative station locations have been carefully selected to minimize the number of people affected by construction--only one residential structure with four units need be acquired along the LRRT route. However, temporary disruption of normal transportation patterns along Main Street during construction will force people to make adjustments in their daily activities: journeys to work, to school, for shopping, and use of community facilities. The effects of these changes are expected to be minor and temporary if the following mitigating measures are incorporated in the project:

- construction is carefully staged to minimize the period of time streets are wholly or partially closed;

- pedestrian safety, particularly for school-bound children, the elderly, and handicapped, is maintained at construction sites;

- access to businesses and to community facilities along the route is carefully maintained (e.g., schools on weekdays, churches and community meeting areas on weeknights and weekends, hospitals all the time); and

- temporary rerouting of bus lines is carefully planned to maintain normal neighborhood patterns and widely publicized so that people will not permanently change their shopping, business, and socializing patterns, e.g., away from Main Street retail stores with temporary access problems during construction.

In terms of operational impacts, the primary benefit of the proposed transit system would be improved access. Benefits would accrue particularly to the "dependent" population (those under 18 or over 60 years), the "transit-dependent" population (those with no or very limited access to automobiles), and the handicapped. The proposed transit line traverses neighborhoods with a wide range of income levels, from Ellicott where almost 60 percent of the families had incomes of less than $6000 in 1970 to Elmwood where almost a third of the families had incomes greater than $15,000 in the same year. Transportation savings would accrue to all income levels for transit users and nonusers; however, benefits would be proportionately higher for people of lower income levels who are more likely to need convenient, relatively inexpensive transit service.

Because Main Street is an important neighborhood boundary, placing the transit line along Main Street both reinforces and minimizes its boundary role. Using Main Street for the rail right-of-way would not cause the type of neighborhood disruption that would occur if the rail line were east or west of Main Street; nor would it force people to cross the perceived Main Street boundary. At the same time, however, Main Street would become a meeting ground, or neutral territory, where people from disparate neighborhoods would come to use the line. Also, the rail line could spur commercial and residential development adjacent to Main Street that would reinforce this function as a meeting ground. Residential development could reverse demographic trends in neighborhoods like Ellicott and Masten where population and housing losses have been severe. New commercial development along Main Street could provide goods and services to adjacent neighborhoods that would make them more attractive communities to existing and potential residents.

However, the Main Street transit line would be attractive to residents on either side of the line only under the following conditions:

- Security of commuters and their property is perceived as adequate. In 1975, crimes against persons in the CBD and Ellicott sub-areas were 3-7 times that of the City mean; they were 1.5 to 3 times the City mean in the Masten and Elmwood sub-areas (Ref. 15). The 1974 EIA stated that a security force would be on duty at transit stations and that station design features would discourage vandalism and criminal activity (Ref. 5). In addition to those measures, it is recommended that the City of Buffalo Police and Public Work Departments insure that adjacent streets are well-lighted and patrolled, and that criminal activity is discouraged by concentrated enforcement programs in the early years of operation to ensure that the transit line acquires an early reputation for security.

- An automated fire detection/protection system is being designed for the LRRT. Work on this aspect of the Metrorail project has only recently begun, so specific information is not yet available, but it will remain a major concern that will be thoroughly dealt with by the NFTA and its consultants.

  (See 10.2.11, page 10-20.)

- Developments that are attractive and accessible to residents and transit patrons should be encouraged in areas adjacent to the line. This would assist the property tax situation and create a positive aura of private as well as public confidence in these neighborhoods. It is disadvantageous for adjacent parcels of land to be held for lengthy periods of time for speculative purposes.

- Possible adverse impacts on surrounding neighborhoods must be minimized. Street parking and traffic congestion generated by stations in residential neighborhoods could disrupt local businesses and may create the impression that the neighborhood is deteriorating. Residents will be concerned about pedestrian safety, especially for children, the elderly, and the handicapped. The City's Department of Transportation could adopt traffic regulations for station areas to minimize this adverse impact.

The problems of project-related street closures will be the subject of a study to be undertaken in cooperation with the Departments of Transportation of the City of Buffalo and the State of New York. The North/South and East/West traffic flows are influenced both by the proposed mall and the Elm/Oak Arterial to Delaware Avenue CBD Improvements project. This latter study, scheduled to begin late in 1977, will address problems of restrictions in existing traffic corridors and will recommend improvements to allow for the orderly movement of vehicular and pedestrian traffic.

Alternative feeder bus networks are also the subject of a study, Ridership and Operations, begun in early fall 1977 by consultants to the NFTA. This study will identify new bus routes which, together with existing routes, will be analyzed in order to maximize service to potential transit patrons while consideraing the environmental and capital costs involved for various alternatives.

(See 10.2.6, page 10-10.)

Financial and Economic Impacts

The proposed transit service improvements should be especially beneficial to employers in nonmunufacturing businsses projected to increase employment between 1980 and 1990. These types of establishments (government and finance/insurance/real estate) tend to concentrate in the CBD and transit corridor study area, where increased convenience of access should widen the labor market open to them.

Improved transit services will offer a rental and sale advantage to owners of properties available for retail, office, and manufacturing use in the transit corridor. Typically, land values of property adjoining or near new transit station areas or along the route within prime commercial areas, such as the CBD, have increased up to 45 percent over a 10-year period in other cities where convenient transit systems have been implemented. Obviously, increases in land values due to demand and appropriate zoning changes to satisfy such demand would produce a beneficial impact on tax rolls and the assessed valuation base of the City of Buffalo. Reference 38 estimated a 20-percent increase in assessed valuations of property along the transit corridor by 1995. However, this estimate assumed demand that would be generated by a larger population base than is currently being projected, and it also assumed the implementation of an enclosed Main Street mall. Consequently, the beneficial impact on assessed valuations within the corridor attributable to the proposed LRRT system and open mall may be less than 20 percent by 1995. Additional increases in assessed valuations may be generated by coordinated action of public and private investors and effort in support not only of transit, but also of economic development programs.

The City of Buffalo may take advantage of the generally positive impact on values of properties adjacent to the transit stations by marketing publicly-owned properties in these areas to private developers, and by rezoning as appropriate to ensure upgraded uses of such property. To fully realize this benefit, the various public agencies that might be involved should coordinate planning efforts as early and as fully as possible.

Transit service itself will have no direct beneficial or adverse impact on reversing the City's population emigration trend unless all interrelated conditions necessary for promoting business development and employment in the area are attractive to existing and potential new businesses.

When the proposed transit system project, including feeder bus lines, is implemented and operating, employment at the NFTA is projected to increase by an estimated 535 persons, a beneficial impact in a depressed employment market. These additional jobs are assumed to be primarily in the operating and maintenance work areas. The projected increase in terms of dollars added to the annual NFTA payroll is $7 million.

Public transportation in North America has ceased to be a money-making venture. It is generally supported by public money allocated by various levels of government. This need for financial assistance is a potential impact which must be understood by the community. There are many factors influencing operating costs which are outside the control of local transit system operators. These include, among others:

- Energy, supply and price

- Inflation, both labor and materials

- Public policy, on parking supply and costs, insurance costs and air quality.

However, the level of service provided by the system each year will be directly related to the amount of revenue raised from both fare box and other sources. This is the same situation faced by all cities operating transit service in this country. Unlike some other cities, where a much more extensive rail element has been provided initially, the 6.4-mile LRRT line accounts for about 20 percent of the total cost of operating transit service in the Buffalo-Amherst-Tonawandas corridor. Thus, the level of service in the corridor can be effectively "tailored" to the amount of subsidy available to meet operating deficits each year. If sufficient subsidy cannot be provided by all levels of government involved, service in the corridor can be reduced, or system fares raised to make up the difference.

Buffalo's transit system has a long history of sound fiscally conservative management. In a 10-year period (1965-1975), operating expenses for the public transportation system serving the Niagara Frontier increased by 22 percent. Nationwide, during the same period, transit operating expenses increased by an amount seven times greater. Experience of the NFT Metro Bus System in the most recent 5 years is shown in Table 5-4.

TABLE 5-4

NFT METROBUS SYSTEM ANNUAL FINANCIAL SUMMARY

	1973[1] ($000)	1974[2] ($000)	1975[3] ($000)	1976[3] ($000)	1977[3,4] ($000)
Operating Expense	$13,832	$15,242	$17,669	$19,264	$20,728
Fare-Box Revenue	13,520	12,412	12,482	12,301	12,474
Operating Assistance	--	3,245	4,593	6,931	8,280

1) Calendar, 1973
2) Fiscal year beginning April 1, 1974
3) Fiscal years
4) Estimated

This represents an increase in operating expenses of 50 percent or 10.6 percent compounded annually.

Present estimates show that a combined bus/rail transit system would produce revenue shortfalls of the same general order of magnitude as an all-bus system. However, potential deficits per rider are projected to be less for the combined system. The LRRT system would carry almost 80 percent more annual riders in 1995, and therefore, the operating deficit

TABLE 5-5

COMPARISON OF OPERATING COSTS AND REVENUES: 1982-1995*

Year	Estimated Annual Ridership	Annual Fare-Box Revenue	Annual Costs	Operating Assistance
1982	37,500	$14,250	$18,516	$4,266
1983	45,000	17,100	21,001	3,901
1984	48,000	18,240	21,994	3,754
1985	50,400	19,152	22,789	3,637
1986	51,000	19,380	22,988	3,608
1987	51,600	19,608	23,187	3,579
1988	51,900	19,722	23,286	3,564
1989	52,500	19,950	23,485	3,535
1990	53,100	20,178	23,683	3,505
1991	53,400	20,929	23,783	3,591
1992	53,700	20,406	23,882	3,476
1993	54,300	20,634	24,081	3,447
1994	54,600	20,748	24,180	3,432
1995	55,200	20,976	24,379	3,403

* All statistics in thousands.

All figures are in constant 1974 dollars. No provision for inflation is included.

Source: Ref. 23.

per passenger is thus reduced almost 40 percent below that forecast for the improved bus system. Estimates in constant 1974 dollars are that this rail/bus sytem will have revenues, costs, and operating assistance needs as shown in Table 5-5.

Current LRRT forecasts do not assume any major changes in the economy or public policy which would drastically influence a change in level of automobile use. Energy shortages, energy costs and national policies relative to energy and air quality could cause reduced automobile and higher transit use in the future. If such changes fully materialize, then Buffalo's estimates of ridership would be expected to be conservative and its projected operating assistance reduced accordingly.

It is also possible that transit ridership might have been overestimated. If public policy were to dictate that service not be decreased, in spite of reduced ridership, and that fares not be increased, the transit revenue which would be required in 1995 from other public sources is shown in 1974 dollars in Table 5-6 for ridership levels of 10, 20, and 50 percent below that projected.

TABLE 5-6

1995 PROJECTED OPERATING ASSISTANCE FOR REDUCED RIDERSHIP, CONSTANT FARES, CONSTANT SERVICE

Ridership Reduction	Annual Ridership (000)	Annual Revenue ($000)	Annual Cost 1/ ($000)	Operating Assistance 1/ ($000)
-10%	49,680	$18,878	$24,379	$ 5,501
-20%	44,160	16,781	24,379	7,598
-50%	27,600	10,488	24,379	13,891

1/ 1974 Dollars.

Source: Derived from Ref. 23.

Future public tax support required for public transporation will depend heavily on inflation. The effect of inflation on the costs shown on Table 5-5 is shown in Table 5-7 for various annual rates of inflation.

This hypothesis, with a 7 percent inflation rate, would result in 20 percent of transit costs being funded from farebox revenue by 1995 as compared with 60 percent today. It

TABLE 5-7

EFFECT OF INFLATION IN ANNUAL OPERATING COSTS ON OPERATING ASSISTANCE

FARE AND SERVICE LEVELS ASSUMED CONSTANT

Year	Annual Fare Box Revenue (000)	3% Inflation: Annual Cost (000)	3% Inflation: Annual Operating Assistance (000)	5% Inflation: Annual Cost (000)	5% Inflation: Annual Operating Assistance (000)	7% Inflation: Annual Cost (000)	7% Inflation: Annual Operating Assistance (000)
1982	$14,250	$23,456	$ 9,206	$27,357	$13,107	$31,814	$17,564
1988	19,722	35,222	15,500	46,106	26,384	60,043	40,321
1995	20,976	45,352	24,376	67,920	46,944	100,944	79,968

Source: Derived from Ref. 23

should be noted that today, transit sytems in U.S. cities recover 8 to 80 percent of operating expenses from their fare-box revenues, depending largely on the availability of operating assistance from other sources.

In the unlikely combination of events where fares were not increased, and service was not reduced, while ridership was only half that projected, and costs experienced an inflation rate of 7 percent, operating assistance requirements would increase to about $90 million annually by 1995. This could only result from conscious public-policy decisions, by Federal, State and/or local government, to maintain fares and service levels in spite of drastically reduced ridership.

The exact amount of government subsidy required to support public transportation in the future is difficult to estimate. Through a current Ridership and Operations Analysis study, the NFTA is attempting to provide the best possible projections of, not only future costs, but alternative strategies for meeting them. The results of this study will be made available to the public upon its completion.

Such socially and politically unpopular means as increasing transit fares, reducing bus service and/or increasing public assistance to transit will become necessary at some future point. One of the traditional sources of transit revenue, and one which would certainly be used if other sources were not available from Federal, State and local government, is increased fares. For example, if transit costs experienced a 7-percent annual inflation rate and fares were increased at the same rate, then the basic transit fare would be 70¢ by 1983, and $1.50 by 1995. Such fare increases would not affect projected ridership since wages and other costs would be expected to rise at about the same rate. However, unless transit fares were increased at a rate faster than inflation, future public tax support would also have to increase. This is shown in Table 5-8 for different sample inflation rates. The operating assistance per passenger required for the LRRT/ Bus alternative is projected to be lower than that required for an all-bus alternative.

The Federal government formula assistance, known as UMTA Section 5 funds, was first made available under legislation passed by Congress in 1975. These funds can be utilized for either capital or operating assistance. The Buffalo Urbanized Area's share of the apportionments is shown in Table 5-9 by year as printed in the Federal Register of January 13, 1975. State and local governments must contribute a non-fare box amount at least equal to that used for operating assistance.

TABLE 5-8

EFFECT OF INFLATION IN BOTH FARES AND ANNUAL OPERATING COSTS ON OPERATING ASSISTANCE

Year	3% Inflation Rate			5% Inflation Rate			7% Inflation Rate		
	Fare Box Revenue (000)	Annual Cost (000)	Operating Assistance (000)	Fare Box Revenue (000)	Annual Cost (000)	Operating Assistance (000)	Fare Box Revenue (000)	Annual Cost (000)	Operating Assistance (000)
1982	$18,052	$23,456	$5,404	$21,054	$27,357	$6,303	$24,484	$31,814	$7,330
1988	29,831	35,222	5,391	39,050	46,106	7,056	50,853	60,043	9,190
1995	39,022	43,352	6,330	58,439	67,920	9,481	86,853	100,944	14,091

Source: Derived from Ref. 23

TABLE 5-9

PROJECTED SECTION 5 APPORTIONMENTS
TO BUFFALO URBANIZED AREA

Federal Fiscal Year	Section 5 Program (000)
1975	3,042
1976	5,070
1977	6,591
1978	7,858
1979	8,619
1980	9,126

NOTE: These amounts available to the Buffalo Urbanized Area have been updated by the Federal Register of October 4, 1977, but the amounts remain substantially the same.

Continuation of this program and its level of funding are currently being discussed by the Executive Branch and the Congress. If it became necessary to use the full amount of the Federal apportionment for operating assistance, State and local contributions would have to increase. New York State has had an operating assistance program since 1975. This program has provided the following amounts for the New York State fiscal years shown.

Year	Amount ($000)
1975	1,623
1976	1,770
1977	1,770
1978	1,770

State law mandates that an equal amount be contributed by counties. Counties which fail to budget transit operating assistance have the mandated amounts deducted from State Aid which the counties would otherwise receive. The amounts are computed from estimates made by each State transit authority. It is conceivable that NFTA could obtain more funds from this program if necessary. The State Department of Transportation is required to evaluate this program annually.

In a recent report, NYSDOT considered a variety of tax sources and their potential statewide yields in 1975 dollars as shown in Table 5-10. The NFTA Transit District (Erie and Niagara Counties) represents 7 percent of New York State on a per capital basis.

TABLE 5-10

FUNDING SOURCES AND THEIR POTENTIAL STATEWIDE YIELDS (1975)

Source	Assessment Level	Annual Yield
Personal Income Tax	1% Surcharge	$ 36.14 million
Payroll Tax	1% of Gross Payroll	760.55 million
Property Tax	10¢/$1,000 Full Valuation	18.01 million
Sales Tax	1% on Retail Sales	525.00 million
Passenger Car Registration	$10 per Automobile	67.25 million
Gasoline Tax	1¢/gallon	61.40 million

Source: Ref. 46.

In future years, the community will have the opportunity to assess the need for and worth of public transportation on the Niagara Frontier. Decisions will have to be made at all levels of government as to the specific size of the annual subsidy each can support.

A number of transit agencies have been granted direct taxing authority, or have had tax revenues earmarked for their use. Such taxes in use by transit districts include property taxes, personal property taxes, household taxes, employee taxes, payroll taxes, motor vehicle excise taxes, business taxes, sales taxes and cigarette taxes.

Still another means of reducing operating assistance requirements is to reduce operating costs by reducing service. Buffalo's LRRT will be built in a densely populated corridor which has traditionally generated high transit usage. Because of its location, the rail system would be the last affected by service cuts necessitated by budget constraints. The level of service in the system can be effectively tailored to the funds available to meet annual expenses. If sufficient non-fare box revenue is not provided by the various levels of government, then service can be reduced and/or fares raised to make up the difference.

Citizens of Buffalo and Erie County have traditionally supported public transporation as evidenced by their strong affirmative votes on several statewide transportation bond issues, including the successful one of 1967. It is unlikely that they would permit transit service to deteriorate to the point where Main Street bus service or LRRT service would be affected. Public transportation, like fire and police protection, water and other utilities, is an essential public service. Operating assistance is required by all existing public transit systems in North America. However, since an efficient mass transit system benefits all segments of the population, not just transit users, its costs are expected to be borne by all.

(See 10.2.8, pages 10-13 through 10-17.)

Station and Feeder Buses

The level of activity at stations and the routes and frequency of feeder buses will affect the severity of impacts in the vicinity of stations and long bus lines. For instance, commuters choosing to drive to a station and park on the street can degrade the normal neighborhood atmosphere and reduce parking availability for residents or for customers of local businesses. The availability of feeder bus service will determine whether transit patrons feel the need to drive to the stations and thereby increase traffic congestion and parking problems. Beyond a point, however, increasing feeder bus service is not economical; the additional ridership generated is not commensurate with the added costs. Also, excessive bus traffic can be objectionable to neighborhoods due to what residents might feel to be unnecessary noise, odor, traffic, and pedestrian safety problems. The NFTA, in cooperation with the appropriate traffic departments in the various communities, will continue to review its bus routes.

Table 5-11 lists the stations in each section of the LRRT System, the projected numbers of transit riders at each station, the arrival mode for these riders, the feeder bus routes serving these stations, and the peakhour feeder bus frequency.

In addition to those feeder buses shown in the table, a bus route (No. 8, with peak-hour headway of 10 minutes) will be provided along Main Street. This route is needed because of the relatively large spacing between LRRT stations (average 0.65 miles) in the subway section. To ensure transit-dependent individuals adequate access to these stations, bus stops would be located at frequent intervals along Main Street. The economics in this EIS assume a basic fare of $0.40 and no transfer charge for a patron using feeder bus service.

The location of the Humboldt-Park-Area station has been a matter of considerable debate for many years, on the previously proposed Heavy Rail system as well as on the present LRRT project.

The NFTA continues to work with the organizations and institutions involved in order that a final decision on the location of this station will be as nearly satisfactory as possible to all interested parties. This decision will also be based on findings of a Ridership and Operations study being made for the LRRT project.

(See 10.2.4, page 10-6.)

5.2 - Service Yards

Because of the existing urban environment at the proposed yard sites, major impacts are essentially confined to the economic sector; impacts related to property takings outweigh operational impacts in significance.

Construction-Related Impacts

Each of the alternative service yard sites will require acquisition, relocation of existing businesses, demolition of existing structures, and preparation of the site before actual construction commences. Because a final choice of yard site has not yet been made, all three sites are discussed in the following section. Cost estimates for property acquisition, business relocations, and yard construction are shown in Table 5-12.

TABLE 5-11

STATIONS AND FEEDER BUS ROUTES

Section	Stations	Average Weekday Ridership Originating at Station	Mode of Arrival			Feeder Bus Routes**			
						Existing Routes Retained		New Routes Added	
			Walk	Auto*	Bus	Route Nos.	Peak-Hour Headway, minutes	Route Nos.	Peak-Hour Headway, minutes
Mixed-Traffic	Auditorium	10,700	6,370	650	3,680	14	15	--	--
						16	15		
						35	20		
						36	20		
						37	60		
	Seneca	11,300	6,730	680	3,890	15	10	--	--
Mall	Church	12,500	7,500	760	4,240	3	10	--	--
						5	10		
						11	15		
						25	10		
	Lafayette Square	13,500	11,900	0	1,600	1	15	--	--
						2	15		
						4	10		
						17	30		
	Huron	9,000	6,360	320	2,320	6	15	--	--
						24	10		
	Theater	8,500	6,060	300	2,140	--	--	--	--
Cut-and-Cover	Allen-Hospital	12,700	9,000	500	3,200	7	10	--	--
						29	10		
	Summer-Best	11,500	4,730	820	5,950	22	8	--	--
	Utica	10,700	5,590	870	4,240	--	--	12	10

TABLE 5-11 (Concluded)

Section	Stations	Average Weekday Ridership Originating at Station	Mode of Arrival: Walk	Mode of Arrival: Auto*	Mode of Arrival: Bus	Feeder Bus Routes** Existing Routes Retained: Route Nos.	Existing Routes Retained: Peak-Hour Headway, minutes	New Rotes Added: Route Nos.	New Rotes Added: Peak-Hour Headway, minutes
Tunnel	Delavan	18,100	5,130	1,640	11,330	21	10	42	10
						26	8		
	Humboldt	7,400	4,810	820	1,770	13	6	18	8
								43	10
	Amherst	11,100	5,260	2,020	3,820	23	8	42	10
						32	10		
	LaSalle	8,300	6,710	670	920	--	--	45	8
	South Campus	38,700	12,660	5,610	20,430	8A	6	50	15
						8B	6	53	20
						8C	15	55	15
						19	10	56	20
						30	10	62	15

* Includes both "kiss-and-ride" and "park-and-ride."

** See Figure 4-1 for schematic of bus routes.

Note: Bus frequency data from Reference 30.

TABLE 5-12

SUMMARY OF SERVICE YARD CAPITAL COSTS

Yard	Private Property Acquisition*	Business Relocations	Construction	Total Cost
South	1,516,000	528,000	7,022,000	9,066,000
Ellicott	355,000	43,000	8,513,000	8,911,000
Terminal	95,000	0	7,063,000	7,158,000

* It is assumed that public properties could be obtained at no cost.

Note: all costs in 1974 dollars.

Note: a 20-percent contingency factor is added to construction and relocation cost items.

The service yards as well as connecting track and tailtrack will be constructed at grade. Because of the ability to work near ground surface level, at-grade construction is relatively simple. After utilities are exposed and relocated where interference occurs, excavation equipment removes unsatisfactory foundation materials. Acceptable materials may then be placed and compacted as required. The area is graded to conform to the required elevations and cross sections. Permanent facilities such as track bed materials or structural concrete are placed on the prepared foundation. Included in the at-grade construction are pedestrian cross signals, street lighting, and catenary supports.

Prior to at-grade construction of the tracks, the service yard areas will require significant building demolition, site clearing (including concrete pavement), and removal of existing railroad track. The areas will be fenced in to preclude pedestrian access in the interests of safety and to prevent vandalism and thefts. Buildings will be demolished in accordance with the applicable codes for the City of Buffalo. A number of specific requirements will be included in the construction specifications to minimize dirt, dust, and air pollution during construction. Utility service will be maintained and protected from damage. In any construction activity, contractors are usually made responsible for proper "housekeeping" of the construction site. This includes periodic sweeping and watering of the streets used for haulage and other precautionary means of minimizing undue tracking of dirt along streets. The areas will be graded so that storm water runoff is diverted to existing sewers or, where necessary, additional catch basins will be installed. In addition to any City or State noise ordinances or standards, the construction contracts will include a section on noise limits as discussed in Section 5.1.

South Yard - Acquisitions and structures needing demolition should the South Yard be selected are enumerated in Tables 5-13 and 9-1. The lands and improvements in private ownership have a current assessed valuation of $605,980 and an estimated market value of $1,500,000 (in 1974 dollars). If these businesses relocate outside of the City of Buffalo or go out of business, the City will suffer a loss in property tax revenues. However, in the opinion of relocation specialists at the New York State Department of Transportation, there are enough vacant industrially-zoned parcels within the City to accommodate all of these businesses that wish to remain in Buffalo.

TABLE 5-13

ACQUISITIONS/DEMOLITIONS AT ALTERNATIVE SERVICE YARD SITES

Type of Structure	South Yard	Ellicott Yard	Terminal Yard
Brick			
1 story	9	0	0
2 story	13	0	1
3 story	4	0	1
4+ story	3	0	1
Concrete block			
1 story	2	0	0
2 story	2	0	0
Wood frame			
1 story	2	0	0
2 story	3	0	0
Other undifferentiated Structures	Cinder block warehouse 1 sty. asbestos tile fireproof warehouse 2 sty. metal shed Concrete fireproof warehouse	Steel frame warehouse Brick warehouse	None
Vacant Parcels (or portions thereof)	8	2	0

There would be short-term disruption of revenues to relocated businesses during the period of relocation. The amount of time required for relocation would vary depending upon individual circumstances; however, it is expected that all relocations could be completed within 2½ years. Relocation costs, paid by the Federal government under the Uniform Relocation Assistance Act, have been estimated at $528,000 for all of the private businesses affected. The number of employees that would be affected by business relocations has been estimated to be less than 100.

In addition to the private ownerships in the South Yard area, the block bounded by Main, Perry, and Washington Streets and South Park Avenue is owned by the City of Buffalo and the Buffalo Urban Renewal Agency. This block has been identified as part of the Waterfront Redevelopment Project. If this block is used for the South Yard, the City would lose the opportunity to develop it for other purposes. The NFTA will continue to coordinate with the City and the Urban Renewal Agency in evaluating the impacts of these possible takings.

The 1972 Coastal Zone Management (CZM) Act requires states to develop CZM programs. The proposed coastal zone within the City of Buffalo encompasses the South Yard site. The site lies within an area recognized as being under-utilized (Ref. 39) (witness the abandoned Delaware, Lackawanna & Western Railroad depot and the cleared blocks in the vicinity shown in Figure 4-5). Thus, location of the service yard in this area is in keeping with local goals of the CZM program in that the area will be more fully utilized. These goals would be subverted to an extent, however, by the possible loss of the variety of businesses which would be displaced by the South Yard, unless the businesses were to relocate in the same general area. The NFTA will continue to coordinate with the City's CZM Director.

The service yard construction impacts on traffic would include those due to the street closures within the site and in this respect would be equivalent to those of the full LRRT operation (discussed below). The short-term traffic impacts from temporary street closings required for placement of trackage for the service yard access routes would be similar to those for yard construction. The South Yard access trackage down Main Street would require temporary cross-traffic closures at the Main Street/Scott Street and Main Street/Perry Street intersections. Some rerouting inconvenience would undoubtedly result; however, the streets paralleling Main Street would remain unaffected and would provide the lateral movement capabilities required.

Ellicott Yard - Takings for the Ellicott Yard are summarized in Tables 5-13 and 9-1. There are only two structures in private ownership in the proposed Ellicott Yard; both are warehouses. The two other parcels in the proposed area are vacant.

Several recommendations were made in public hearing testimony on the draft EIS favoring the Ellicott Yard site on environmental grounds. These were counterbalanced by testimony indicating potentially severe socio-economic impacts on the warehouses noted above, which contain a large manufacturing firm. The W & F Company, a locally owned firm which has operated at this site for nearly 40 years, employs over 400 people, 43 percent of whom are minorities. Of these workers, 65 percent are residents of urban areas which suffer from high unemployment. The success of this environmentally attractive industry which generates no air or water pollution is heavily dependent on the transportation advantages of its present location as well as its capability to expand on that site in the near future. A company official has indicated to the NFTA that this business, which has been encouraged by city officials to stay at its present location as part of a developing industrial park, would not relocate in the city or possibly even in Western New York should the Ellicott Yard Site be utilized.

(See 10.2.1, page 10-2.)

In addition to the private properties, right-of-way south of Exchange Street would be required between Washington Street and Michigan Avenue. This land is in public ownership; most of it is owned by the New York State Thruway Authority and some (between Washington Street and the Oak Street on-ramp) is owned by the City of Buffalo and used as a parking lot. Acquisition of this right-of-way has been assumed possible at no cost, although the City would lose parking lot revenues if this property is taken. In addition, this site is identified as part of the Waterfront Redevelopment Project. If that parcel is used for trackage, the City would lose the opportunity to develop it for other purposes.

The installation of access trackage to the Ellicott Yard would require closures of Washington Street and northbound Main Street at some point. With careful planning, the simultaneous closings of Main and Washington Streets could probably be avoided.

A potentially severe impact concerns the routing of LRRT vehicles between support columns of the New York State Thruway. More detailed engineering design work is necessary before the possible need to relocate any of the support columns can be firmly established. Removal and relocation of columns would involve costly underpinning operations.

Terminal Yard - Acquisitions for the yard and service facilities (Table 5-13 and 9-1) would include the Delaware, Lackawanna & Western Railroad depot (presently City-owned), a portion of the City-owned block bounded by South Park Avenue and Main, Perry, and Washington Streets, portions of the privately-owned blocks bounded by South Park Avenue and Washington, Perry, and Illinois Streets, and the land between the depot and South Park Avenue (owned by the Erie-Lackawanna Railroad) (see Figure 4-8).

The costs shown in Table 5-12 for the Terminal Yard are based on solving the problem of loss of rail service to businesses in the block bounded by South Park Avenue and Illinois, Perry, and Mississippi Streets by branching off the abandoned spur serving the Republic Freight buildings and tying into the other spur from the north. This alternative represents possibly the "worst-case" practicable solution in terms of capital cost and parcel takings. As stated in Section 4.2, a number of alternative solutions will be evaluated in the General Architecture/ Engineering and Conceptual Design Phase.

The figures in Table 5-12 assume that publically-owned lands could be acquired without charge. The privately-owned parcels have a total assessed valuation of $51,000 and an estimated fair market value of about $95,000. No dislocations of businesses would be necessary with the spur tie-in plan, although there might be short periods of access inconvenience during construction.

The Delaware, Lackawanna & Western depot is located in Buffalo's proposed coastal zone. The latest recommendations for this specific area of the coastal zone (Ref. 40) are for:

- creation of park and recreation areas in vacant land along the Buffalo River,
- elimination of excess railroad trackage--use as linear open space corridors, and
- phasing out of non-water industry.

The depot is not considered a viable candidate for park or recreation development. The areas immediately north and east and across the Buffalo River to the south are industrial/commercial in nature and do not provide the type of atmosphere conducive to active or passive recreation. However, immediately west of the depot is the area designated for the proposed Naval Park which will include a display of decommissioned warships. The depot's deteriorated condition would degrade this park's visual setting and present a safety hazard to park visitors and others who might be tempted to "explore" (the depot is not fenced off to prevent entry). Demolition of the westernmost depot structures and rehabilitation of the remainder in conjunction with the rail transit project could only improve this situation. Rail traffic to and from the service yard might reduce the visual improvement to a degree; noise from LRV movements will largely be masked by noise from traffic on the elevated Skyway, from blowers at the Pillsbury grain facility across the Buffalo River, and from water-borne commerce on the river.

At present, there are no firm plans to raze the depot either in conjunction with development of the Naval Park or just to remove the public safety hazard. Nor are there alternative plans to rehabilitate the depot. Furthermore, the costs for either razing or rehabilitation are considered prohibitive for the City and most private businesses. Thus, the depot will likely remain in its present condition for many years if not used by the rail transit project.

From an environmental standpoint, any change to this site would be an improvement as it is presently and has long been both an eyesore and a public hazard. The NFTA would combine its purposes with preservation of a large section of the old structure, acceptable landscaping and development of a pedestrian/bicycle path along the river, as recommended in public hearing testimony by several organizations.

(See 10.2.1, page 10-2.)

There is currently no incentive for railroads or the City to remove excess trackage from private and public lands in this area; thus, significant progress toward meeting the second CZM goal is unlikely in the near future. However, during construction of the proposed service yard, existing excess trackage in the area between the depot and South Park Avenue would be replaced with active trackage. The only currently active trackage in this area is on the spur providing a movement from the mainline tracks (near the Thruway), southward across South Park Avenue, and back northward to serve businesses in the block bounded by South Park Avenue and Illinois, Perry, and Mississippi Streets. The shop and maintenance building and trackage of the proposed service yard would prevent this movement; consequently, equivalent access would have to be provided for the rail-dependent businesses or these businesses would have to be relocated.

Construction of the Terminal Yard would involve temporary traffic disruptions at several locations. The access trackage between the Auditorium Station and the turnaround loop (Figure 4-8) would require temporary cross-traffic closures at the Main Street/Scott Street and Main Street/Perry Street intersections. Loop construction would necessitate relocating the Main Street/South Park Avenue intersection into the blocks bounded by these same two streets and Perry and Indiana Streets. Staged construction--relocated street first, then loop construction--would minimize the disruption to traffic utilizing the South Park Avenue-Main Street route to and from the CBD. If necessary, traffic could be detoured around the construction via Perry and Illinois Streets. Construction of a new spur track to serve the businesses in the block bounded by South Park Avenue and Illinois, Perry, and Mississippi Streets would involve short-term traffic interruptions for track-laying across streets.

Operational Impacts

In terms of impact on system operation, the Terminal and South Yards have significant advantages over the Ellicott Yard. The Terminal and South Yards require only 700 and 500 feet of connecting track, respectively, compared to 2000 feet for the Ellicott Yard. Access to the Terminal and South Yards is south of the Auditorium Station, outside the limits of revenue operation, thereby eliminating conflicts with and delays of in-service vehicles. In contrast, vehicles entering or exiting the Ellicott Yard cross the paths of vehicles in revenue service. The poorer ingress/egress situation of the Ellicott Yard would result in an additional $80,000 in annual operating costs that would not be incurred by the other two yards. Operational safety of these movements must also be considered. The limited distance between the Auditorium Station and the turnouts to the Ellicott Yard, as well as space requirements for a double crossover just north of the Auditorium Station impose a constraint on the flexibility of the Auditorium Station location.

There will be a small number of jobs generated by a service yard facility. Otherwise, there are no social impacts associated with the service yard sites other than the major impact upon W&F Manufacturing in the Ellicott site. In terms of visual impact, the overhead wires serving the storage tracks would be an adverse visual impact at any site. In the context of a service yard setting, the overhead wires would not constitute an anomalous visual intrusion. However, if passers-by find the sight objectionable, visual barriers could be installed, e.g., a landscaped berm with plantings to screen the yard and its overhead wires from street-level view.

Noise - The alternative service facility sites are located in commercial areas. Section 2.5 confirms that existing noise levels are correspondingly high. The Terminal Yard is bounded on the west by the elevated Skyway, on the north and east and across the river to the south by commercial/industrial developments. The South Yard is bounded directly to the south by an abandoned railway yard; on the west and north by elevated highways carrying heavy traffic within 1000 feet; and on the east by a contractor's equipment yard. The Ellicott Yard is bounded to the south by a mainline railroad and marshalling area, and by the elevated I-190 highway. On the other boundaries, commercial development is prevalent.

All three yards would be classified Category 4 by the APTA Design Guidelines, with no structures of special significance in the immediate vicinity. Under Category 4, peak noise levels of 85 dBA (though not anticipated at the yard perimeter) would be acceptable and there would be no restriction on ground-borne noise levels because none of the adjacent buildings contain sleeping accommodations.

A minimum curve radius of 75 feet has tentatively been selected within the yards to control wheel squeal. Experience on the MBTA system suggests that squeal noise will not be excessive at this radius, particularly since the likely vehicle (similar to the Boeing Standard LRV) is normally fitted with resilient wheels. If objectionable squeal occurs, noise barriers could be installed to minimize off-site perception.

Traffic - The South Yard service facility location would involve several significant changes in the current traffic operations. Closure of Washington Street (see Figure 4-6) would eliminate a CBD egress alternative currently provided to South Park Avenue. Southbound Metro buses currently utilize this route. However, buses and other traffic could be readily accommodated on other streets. Closure of Indiana and Illinois Streets would have little significance since their primary function is to handle local service needs which would be eliminated when the businesses served are displaced by the South Yard. Main Street would continue to accommodate two-way traffic flow as far south as the intersection with Perry Street. Below Perry Street, however, the northbound traffic lanes would be eliminated and Main Street/South Park Avenue would become a one-way outbound operation to the intersection with Mississippi Street where two-way service would resume. Northbound traffic on South Park Avenue would be rerouted on Mississippi and Scott Streets to rejoin Main Street. The traffic plan suggests the possibility that Mississippi Street might be designated one-way northbound to most readily accommodate the projected traffic flow without street widening. Two-way operations could continue on both Scott and Perry Streets; however, some traffic control changes would undoubtedly be found desirable. The rail-street traffic conflicts introduced by LRRT ingress and egress at the South Yard are limited primarily to those associated with left-turns at Scott and Perry Streets. In neither case would these traffic movements be expected to be critical with respect to volume or timing.

The Ellicott Yard would necessitate no major changes in vehicular traffic operations. The site would occupy and require closure of Exchange Street between Michigan Avenue and Louisiana Street and possible rerouting of traffic to Carroll Street north of the yard. However, current traffic utilization is reportedly quite low and no special considerations would be required with respect to traffic rerouting. Train access to the Ellicott Yard would create conflicts with street traffic since trains entering or leaving the yard would have to cross both Washington Street and the northbound traffic lanes of Main Street. The most severe case would occur in the morning rush-hour period (7:30 - 9 a.m.) when LRVs with an average 2-minute headway must enter the traffic stream, estimated at 1200 vehicles per hour in a 1975 City traffic count. The evening peak traffic count at this location occurs between 3 and 4 p.m., before the LRV peak egress period to handle homebound commuters; thus, the evening rush hour is less a problem than the morning rush hour. To minimize these problems, traffic signals would be installed at these points in the interests of safety and to ensure the LRVs' ingress and egress during peak-hour traffic.

The Terminal Yard does not necessitate any permanent street closures. The only significant traffic impacts will occur during rail vehicle movements entering or leaving Main Street via the turnaround loop just west of the service yard. Signals to ensure safe crossing of traffic lanes, particularly during peak-hour traffic will be studied during the Final Design Phase. Alternatively, consideration might be given making Main Street/South Park Avenue one-way inbound between Perry and Indiana Streets to avoid possible rail vehicle-auto conflicts.

Selection

In weighing the advantages and disadvantages of the three alternative yard sites, the NFTA staff gave careful consideration to all economic, environmental and urban development factors as well as those relating to LRRT construction and operation.

The South Yard location, while very desirable from an operational standpoint would conflict with City of Buffalo wishes, as well as removing a number of businesses from the City's tax rolls. It was therefore, discussed as an alternative.

The same socioeconomic drawbacks in even greater magnitude, have been found to exist for the Ellicott Yard site, due to the existance of the W & F Company, as explained in detail on page 5-39. The severity of impacts involved has led the NFTA staff to drop this site from consideration too.

It has been concluded that the DL&W Terminal site presents the least possibility of adverse impact of any kind on the community and is therefore selected as the yard site for LRRT operations.

(See also 10.2.1.)

5.3 - Mixed-Traffic Section

Construction-Related Impacts

The at-grade construction in the mixed-traffic section will follow the same basic steps as that for the service yard (see Section 5.2). Construction would result in a modest disruption of surface activities. Traffic could be rerouted on a block-by-block basis to minimize inconvenience to bus patrons, service vehicles, etc. Alternatively, through traffic could be maintained during construction, although traffic flow would frequently be disrupted by construction vehicles. Businesses relying on auto traffic for trade could suffer temporary revenue losses.

At-grade LRRT construction in both the mixed-traffic and mall sections is likely to produce severe, but relatively short-term visual impacts from the construction equipment itself, the excavation in the middle of the street, the fenced-off construction area, traffic barricades, etc. In some respects, construction activities can be considered a sensory plus, as exemplified by the numbers of "sidewalk superintendents" typically in attendance at construction sites. Construction will cause adverse impacts due to odors (from exhaust fumes, asphalt), noise, fugitive dust, and dirt escaping the construction zone on tires, etc.

Operational Impacts

Traffic - Closure of Main Street north of Church Street in conjunction with the pedestrian mall is expected to result in a shift of vehicles onto one-way couples paralleling Main Street, thereby reducing the number of vehicles in the mixed-traffic section. Thus, normal traffic demand on Main Street south of Church Street is expected to require no more than minimum roadway service provisions. Under normal traffic conditions, Main Street should not experience significant tie-ups and conflicts despite the proposed midstreet rail and station configuration which would limit Main Street auto traffic to one through lane in each direction of travel (Figure 4-9); i.e., Main Street should perform at level of service "C," as defined by the Highway Capacity Manual prepared by the Federal Highway Administration. This presupposes that potential sources of traffic problems are averted and traffic flow is smooth. For instance, assuming traffic incursion onto the LRRT right-of-way is not allowed, then:

- left turns from Main Street could be prohibited;
- service vehicles would not be permitted to stop along the mixed-traffic zone; and
- consideration would be given to relocating bus stops off Main Street or to permitting buses only in the mixed-traffic zone to avoid conflicts between through traffic and stop-and-go bus activities.*

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* The proposed mixed-traffic section of Main Street presently provides northbound access to the CBD for about 150 buses per day serving areas to the south and east.

Alternatively, the street widening at the stations could be extended throughout the mixed-traffic zone to provide for two lanes northbound and southbound other than at the station sections. The curbside lane could be reserved for right-turning vehicles, service vehicles, and bus loading; the inside lane could be designated for through traffic. The loss of sidewalk width with this scheme (5-6 feet) would not significantly impair pedestrian traffic since 14-15 feet would remain. The NFTA will continue to coordinate closely with the City's Commissioner of Transportation and the NFTC during the General Engineering and Architectural Phase to discuss means of best meeting the traffic needs of this area.

Regardless of the scheme, the curbside areas of the mixed-traffic zone assume a new measure of importance. Winter snow removal operations must keep these areas clear, particularly in the vicinity of the stations. Snow removal crews will not have the option of plowing the snow to the side of the street where it might block a portion of the lane.

The most serious traffic impacts are likely to develop with either of two special circumstances. When inclement weather closes the Skyway, South Park Avenue and the southern portion of Main Street absorb a larger than usual share of the peak-hour traffic. Main Street apparently experiences nearly a three-fold increase in traffic movements. This excess traffic would have to be diverted off Main Street and distributed among adjacent streets to avert major tie-ups.

The other special circumstance involves traffic generated by events at the Memorial Auditorium. Traffic congestion from conflicts between vehicles traversing this part of Main Street and pedestrians going to and from the LRRT station and nearby parking lots may warrant temporarily rerouting through traffic around the Auditorium area during major events. Detailed plans for traffic rerouting will be worked out between the NFTA and City transportation planners depending on which service yard is ultimately selected (the Ellicott Yard poses special problems because the LRVs enter and leave Main Street just north of the Auditorium).

Operation of LRRT vehicles in mixed traffic is likely to have some effect on auto and pedestrian safety, but it is difficult to predict what that effect might be. Certainly the potential for auto and pedestrian accidents exists, especially near stations and street crossings where pedestrians will tend to congregate. However, the trains will be traveling quite slowly here and will be highly visible. Also, the LRV's will be under manual control and will be required to obey all traffic signals. Furthermore, bus and auto traffic should decline with the system in operation, reducing traffic hazards from these sources.

Noise - The noise climate is established by the I-190 and Buffalo Skyway. The APTA classification system (Ref. 11, Table A) puts most of the area into Class 5, which allows 85 dBA pass-by air-borne noise (Ref. 11, Table C). There is some parkland or open space in the vicinity of St. Paul's Cathedral in the CBD that should have no more than 70 dBA pass-by air-borne noise. (The APTA does not give a guideline for this land use,but the U.S. Department of Transportation, Federal Highway Administration's Standard PPM 90-2 recommends that L_{10} values not exceed 70 dBA.) The APTA ground-borne noise guideline of 30 dBA is appropriate for the War Memorial Auditorium and St. Paul's Cathedral. For the remaining facilities, the APTA guideline of 35-45 dBA for application to office interiors is appropriate. The APTA guidelines are given in Ref. 11, Table F.

All of the line, with the exception of the last section before the pedestrian mall, is acceptable without a resilient rail imbedment. The resulting noise situation at the Auditorium will be marginal, but since it is a large building with most parts at a considerable distance from the rail line and is used for sports events and popular music concerts (as opposed to orchestral music, drama, or similar uses where maximum audibility is required), resilient rail imbedment will not be needed.

The section of track opposite St. Paul's Cathedral is again likely to be marginal. However, the Cathedral interior, on the average, is located closer to the track than is the Auditorium. Also, the Cathedral is in daily use and good speech conditions are required. Resilient mounting to isolate the rails from the pavement will probably be required to reduce the impact to acceptable levels. Design of the resilient rail mounting system will be completed in the detailed engineering stage. This kind of construction has not been used in North America, but there is a precedent in some European light rail installations. A qualified acoustical consultant will review the situation and make recommendations.

Visual - The most obvious visual symbol of the LRRT System (other than the LRV's themselves) will be the stations. The raised platform of the at-grade stations will be barricaded to prevent entry to the LRV's except through fare-collection booths. The tracks and platforms will be protected by a roof structure (see Figure 4-10), the cover of which could be colored, anodized aluminum panels or a Fiberglas-type material. Lighting, catenary supports, drainage facilities, and graphics can be integrated to emphasize the attractive features of the design and to camouflage unattractive aspects.

5.4 - Mall Section

Construction-Related Impacts

Rail line construction in the mall section would follow the same basic steps outlined for at-grade construction in the service yard (Section 5.2). The NFTA and the City of Buffalo could phase street closures during construction in a number of ways. For instance, traffic could be temporarily rerouted on a block-by-block basis as per the mixed-traffic section, with total, permanent cutoff of traffic deferred to a future date when other mall improvements (resurfacing, plantings, lighting, benches, etc.) are made. Alternatively, traffic could be cut off and rerouted permanently at the time the rail line is installed, independent of mall improvements. In this latter case, access for emergency and service vehicles would be maintained.

The closing of Genesee and Mohawk Streets crossing Main Street could be accomplished with little added inconvenience. For all practical purposes, the cross-town utility of these streets has already been eliminated by the Convention Center's construction between Pearl and Franklin Streets. The closure of the Court Street/Broadway cross-street would further affect traffic now being rerouted away from Genesee and Mohawk Streets and would result in a partial load transfer to the northern CBD cross-town routes (e.g., Goodell Street) which are already traffic constrained.

Total Main Street closure during construction would cause traffic problems unless traffic distribution difficulties in the northern part of the CBD (see Operational Impacts) can be resolved. However, a partial closure of Main Street, possibly south of Huron Street, would decrease the north CBD traffic impacts somewhat by allowing Huron and Chippewa Streets to help dissipate Main Street traffic flows.

A Main Street construction closure could also adversely affect the existing public bus transportation. Some 850 buses per day currently traverse Main Street between Tupper and Huron Streets providing transit services to and from the CBD area and along the northern area bus routes. Any rerouting required during construction might inconvenience transit patrons to the point where they would be inclined to commute in another way. It is important to avoid establishing new riding habits with current transit users. (This consideration applies also to the cut-and-cover section where rerouted Metrobuses must continue to provide convenient service until such time as the rail transit service can be placed in operation.)

The visual, noise, and air pollution impacts from construction in the mall section are the same as in the mixed-traffic section (Section 5.3).

Operational Impacts

Socioeconomic - Environmental quality in the CBD will benefit from LRRT operations. The LRRT and the pedestrian mall will provide improved amenities for daily commuters and casual shoppers alike. Hence, the CBD will be better able to compete with suburban shopping malls and industrial complexes for retail trade and business development. Increased retail and business activities will generate badly needed tax revenues, and may stimulate store owners to upgrade their properties to boost sales. In conjunction with a 1971 proposal for a covered Main Street mall with a subway rail transit line (Ref. 24), the Greater Buffalo Development Foundation identified 55 businesses that would be "landlocked" by closing the mall to service vehicles, i.e., these businesses require access via Main Street for deliveries, refuse pickup, etc. Thus, it would be necessary to permit service vehicle movements on the mall during non-business hours, e.g., early in the morning or late at night. Alternatively, truck loading areas would be provided in each block where goods or wastes could be transferred to and from electric- or gasoline-powered carts for mall operation. Improving access to governmental agencies located downtown should benefit those people most dependent on those agencies for assistance--e.g., welfare and other forms of public assistance--and most likely to be transit dependent.

Traffic - The impact of the closure of Main Street between Tupper and Church Streets, with just Huron and Chippewa Streets as cross-streets, must be viewed in light of current traffic conditions in the CBD. Prior studies suggest that from a theoretical standpoint none of the streets and intersections in the CBD area actually experience volumes of traffic which should result in a peak-hour level of service worse than C. However, several factors are contributing to what appear to be capacity problems and are causing level of service D (minor traffic congestion). These factors include:

street discontinuities,* poor signal timing, lack of signal control flexibility, illegal and unsound parking and loading practices, and blocked intersections due to east-west traffic not clearing the cross-street.

The traffic impact on north-south streets from the closure of Main Street will be felt primarily by the parallel one-way streets on either side of Main Street--Pearl and Washington Streets southbound and Franklin and Ellicott Streets northbound. Although these streets currently operate at peak-hour levels of service C and D, their theoretical capacities are not currently being fully utilized. One reason is at the northern terminus of the streets. Pearl Street, for example, is fed on the north only by Tupper Street, which has very limited capacity itself. This situation could be improved by extending Pearl Street northward from Tupper Street to Edward Street to provide southbound Main Street traffic on optional lateral movement onto Pearl Street. Essentially similar situations limit the potential of Washington and Ellicott Streets. What is needed is better lateral movement to and from the north-south parallels. Upgrading the role of the parallel streets will also require a solution to the problems of business service and supply on Pearl, Main, and Washington Streets. While loading restrictions on Washington and Pearl Streets would help solve the traffic problems, other more extensive and expensive solutions may be required to meet the service needs of the merchants.

The major effect of closing streets crossing Main Street will be absorbed by those streets immediately north and south of the closures. On the south, the combination of the new six-lane divided Church Street and the Seneca Street-Swan Street one-way pair (all of which currently operate at level of service C) is expected to adequately accommodate east-west movements given traffic-responsive signals. North of the closures no new facilities are currently being proposed. The Chippewa Street-Huron Street one-way pair comprises the only streets crossing the mall. Given other supportive east-west facility development, these one-way streets are expected to adequately accommodate local demand by requiring only the elimination of peak-hour curb parking

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* For example, Clinton Street, an important route for buses serving areas east and southeast of the CBD, has a 3-block discontinuity starting five blocks east of Main Street. Pearl Street, an important one-way, inbound route from the north, has a 2-block dicontinuity north of Tupper Street.

to add an additional traffic lane. During peak hours, rail vehicle headways will be approximately two minutes which should cause no interference with east-west movements on Chippewa and Huron Streets.

Further north in the CBD, Tupper Street serves as an important feeder of the Kensington Expressway. East of Main Street, Tupper Street is a narrow one-way (eastbound) street with sufficient traffic demand to fully utilize the street's total pavement width. At the present time, this is not possible, however, because of Main Street-Pearl Street traffic flow needs and right-of-way constraints which limit the potential of the Goodell Street-Edward Street route to accommodate westbound demand.

The traffic impacts on Tupper Street, Goodell Street-Edward Street, and related Main Street intersections which would result from the closure of Main Street under present conditions are considered to be extremely serious, probably peak-hour level of service E. Various proposals for solving the roadway problems in this area have been considered in the past, but alternative analyses ceased when the West Side Arterial project* was dropped from further consideration. It is imperative that a solution be found to the present roadway conditions north of the CBD in advance of Main Street closures or at-grade LRRT service. The NFTA will continue working closely with City transportation planners to resolve these issues.

Visual - The mall section of the line is the single most important visual impact sector of the project. Concepts presented in a 1971 proposal for a covered Main Street mall with a subway rail transit line (Ref. 24) must be revised in keeping with the precepts of the preferred LRRT system, i.e., an open, auto-free mall with an at-grade rail line. Specific mall concepts will be developed in the General Architectural/Engineering and Conceptual Design Phase of the project.

A significant impact involves the elimination of all but LRRT vehicles in the mall. The lack of constant vehicular activity and the dispersion of pedestrian traffic over the entire Main Street right-of-way may result in a deserted atmosphere. This effect could be mitigated through coordinated plans to upgrade Main Street amenities to "plaza"

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* The West Side Arterial would have provided direct service between the Kensington Expressway and New York State Thruway roughly paralleling Goodell and Virginia Streets to the north and west of the CBD, respectively.

standards. While these standards vary from city to city, they generally encompass modifications in grading (eliminating curbs and traditional street crowning), replacement of asphalt with aggregated materials (often patterned) or masonry, human-scaled street lighting, landscaping, and weather protection devices. Any supplementary mall design program must acknowledge needs for fire, police, and service vehicle access.

Overhead catenary lines for LRRT vehicle power would tend to intrude on the present relatively unobstructed upward view. This is particularly significant in light of Main Street's ascending skyline to the south. Possible mitigative measures include extending canopies between stations or semi-enclosure of the entire mall area. Somewhat less effective would be the incorporation of suspended aerial banners in mall design. Some people might object to these mitigative measures since they would obscure pedestrians' views of the skyline as well as of the catenary lines.

Prototypical mall stations have not yet been designed, though their basic configuration has been established as described in Section 5.3 for the mixed-traffic section (see also Figure 5-4). Inasmuch as the transit line is to occupy the center of Main Street, variations in lateral mall proportions are not possible; this inhibits the pedestrian's range of spatial sensations. Specialized plaza treatments might be adopted (e.g., sidewalk cafes of varying proportions, children's play areas) to diversify an otherwise unvaried streetscape. Awnings to span between station platform covers and weather screens above storefronts might provide another integrating theme while increasing mall utility in inclement weather.

Design schemes should be predicated on studies of existing street closure/transit mall arrangements in the United States and Europe. In St. Louis, all normal traffic is banned from one downtown artery during afternoon peak hours, leaving the street to transit buses and pedestrians. Several permanent transit malls have been planned or built in the United States, though all feature conventional bus technology. Study of existing transit malls in Philadelphia and Minneapolis and a planned transit mall in Portland is recommended. Europe offers precedents of transit malls that feature LRT technology; in Germany, Bremen and Mannheim (Figure 5-5) are examples.

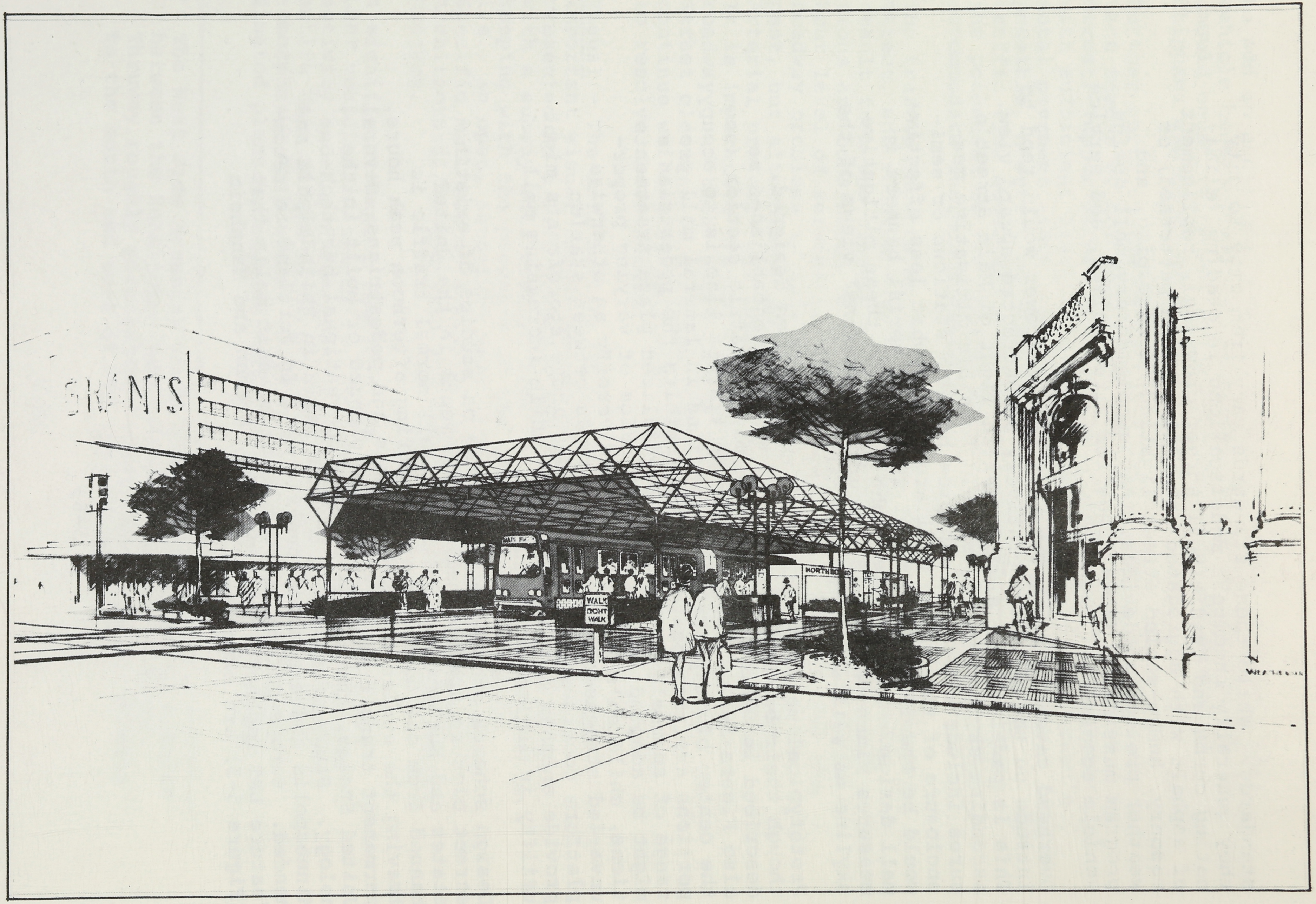


Figure 5-4. Artist's Rendition of Possible Huron Street Station

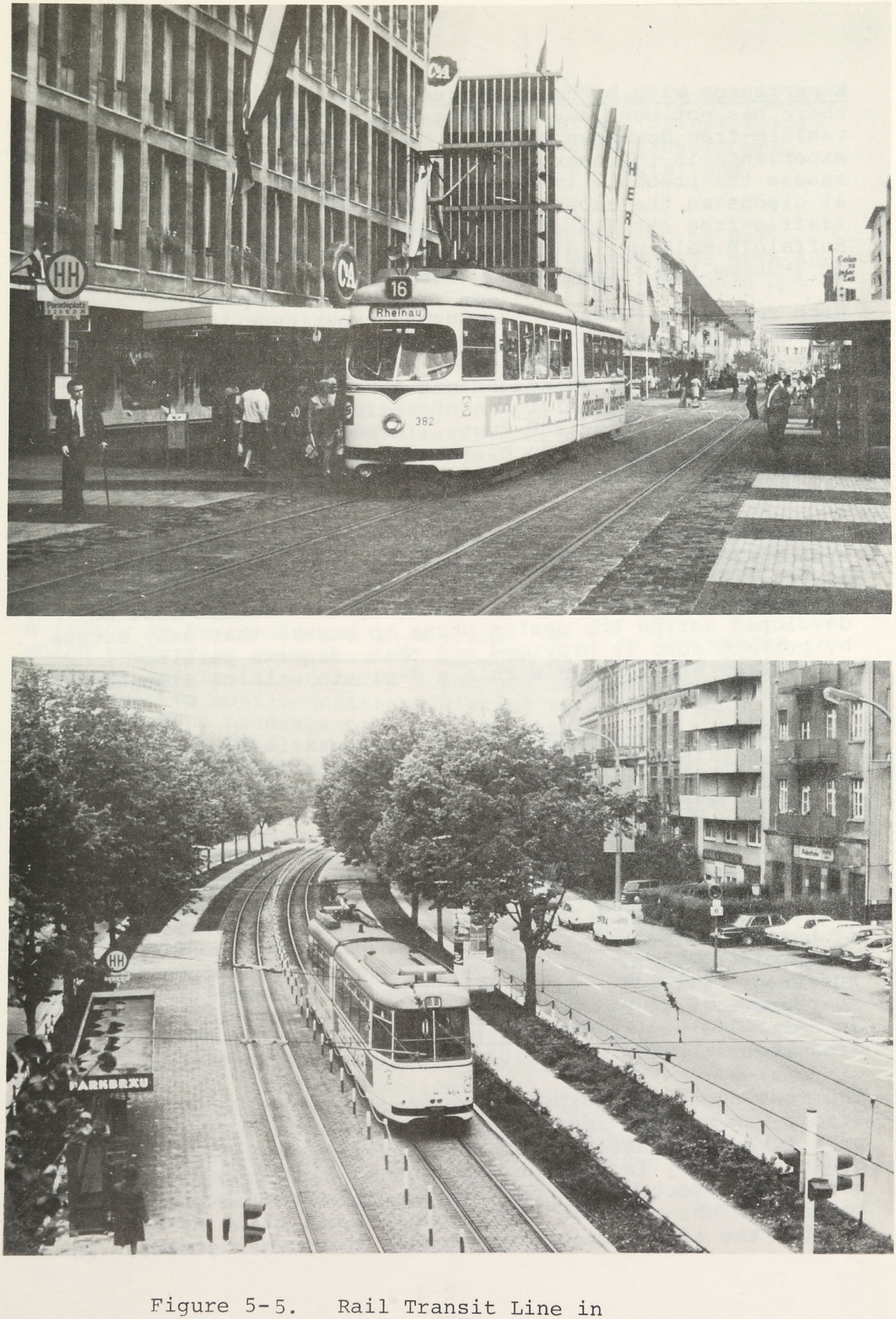


Figure 5-5. Rail Transit Line in Mannheim, Germany

Experiences with Automobile-Free Malls in Other Cities - As there has not been any large-scale experimentation with vehicle-free downtown malls in North America, European experience is the best guide to use for the design and to assess the probable impacts of the proposed mall. Reference 41 discusses the experience of European cities in which traffic-free streets or areas have been established. Buffalo's mall will differ only in that LRRT vehicles will be sharing the street with pedestrians.

With respect to access, the German experience is the most extensive and best documented. Traffic banned from traffic-free streets is accommodated on ring roads which provide direct access to parking garages strategically located within easy walking distance of the pedestrian area, preferably within 1000-1200 feet. In addition, in nearly all areas, convenient access by transit is available. In Hamburg and Munich, access is provided by centrally located subway stations.

In the Buffalo case, the LRRT system will provide adequate transit access. However, convenient access by private car is still an important ingredient for the success of retail shopping in the CBD. A traffic management scheme must be developed during the design phase to ensure that easy access by private auto is provided and that adequate parking facilities are located within a 5-minute walking distance of retail stores.

Almost without exception, the experiments in Europe were successful--pedestrian counts showed great increases, as much as 50 percent on the Strojet in Copenhagen and London Street in Norwich, England. Pedestrians, questioned after the traffic-free areas were opened, expressed high satisfaction, favorable comments running in the range of 90 percent. Among retailers, traffic-free shopping was regarded as successful, though very commonly they had been skeptical or opposed before the change was made. Some types of businesses, such as furriers and exclusive jewellers, whose clientele expect to come to the door by automobile, suffered. Overall, retail business improved in the range of 10 percent, well below the 50 percent increase in traffic. In several areas, merchants not included in the original area requested its extension to include their frontage.

The most successful experiments were those where a conscious effort was made to improve the environment by providing a park-like atmosphere and opportunities for shoppers and others to enjoy in a leisurely manner refreshment and sometimes entertainment as well. A feature that proved helpful in one case was the removal of all curbs by extending the sidewalk entirely across the former street. In

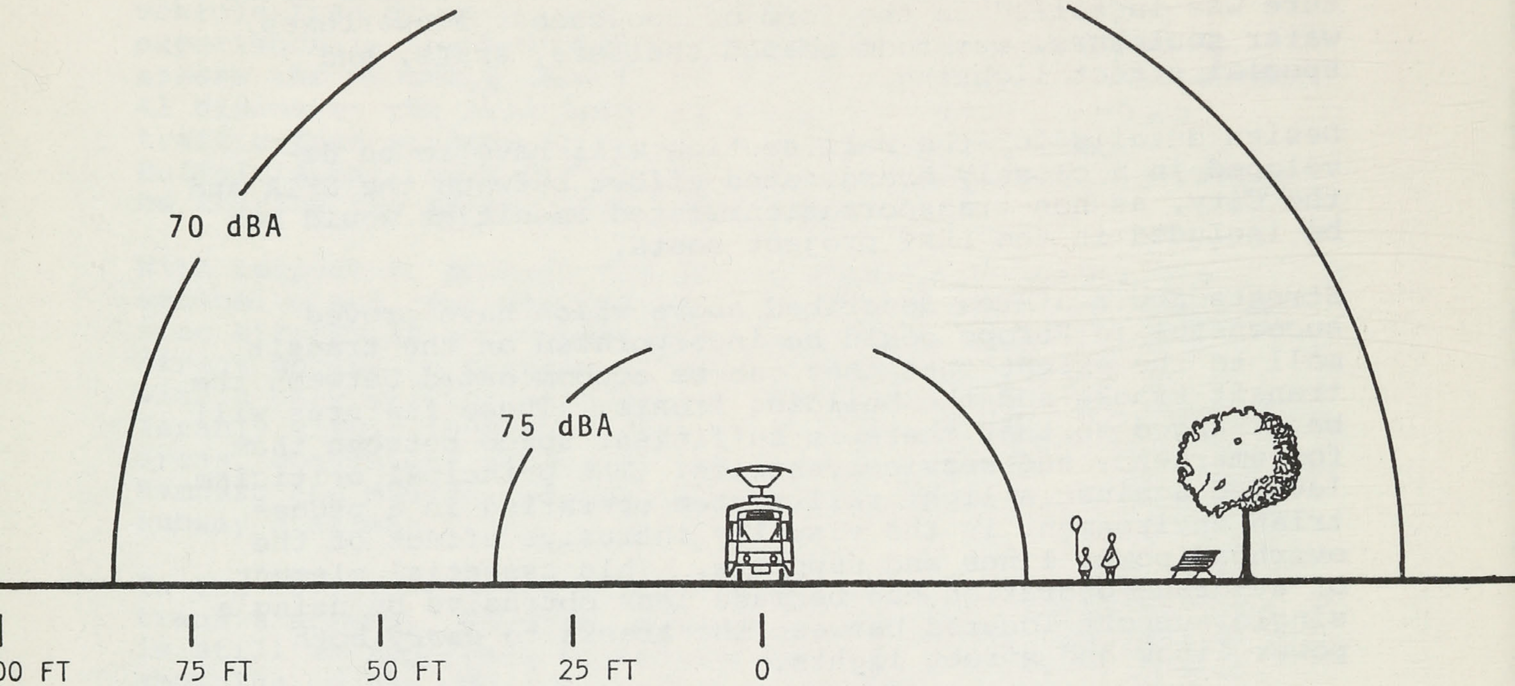
Essen, streets were paved with different types of non-slip paving slabs arranged in different patterns. Street furniture was installed in the form of showcases, flowerboxes, water sculpture, mushroom-shaped shelters, seats, and special street lighting.

Design details for the Mall section will have to be developed in a closely coordinated effort between the NFTA and the City, as non-transportationrelated amenities would not be included in the LRRT project costs.

Streetscape features described above which have proved successful in Europe could be incorporated on the transit mall to the extent that they can be accommodated between the transit tracks and the building fronts. These features will be arranged so that there is sufficient space between them for emergency and service vehicles. The principal criticism leveled against a light rail system operating in a pedestrian environment is the visually intrusive effect of the overhead power lines and supports. This essential element of at-grade operation can be made less obtrusive by using a single support located between the tracks to carry both power lines and street lights.

A factor to be considered in a transit mall is the degree to which pedestrian movements are impeded by transit vehicles. A gap in the traffic of 4 to 5 seconds is considered to be acceptable to most pedestrians wishing to cross a road. With peak-hour headways of 2 minutes, the transit vehicles will have a minimal effect on the freedom of pedestrian movement. It is estimated that the transit vehicles on the mall will be operating at an average speed of 10 to 15 mph, a level compatible with random pedestrian crossings.

<u>Noise</u> - This section is exclusively commercial and, by the APTA classification, falls into Category 3, which allows single pass noise levels of 80 dBA. Anticipated noise levels at a speed of 20 mph range from 70 to 75 dBA (the lower value would apply to a resilient rail mounting or tie and ballast track). The guidelines will be satisfied even if the track is rigidly imbedded in the pavement. However, the vehicles will be running closer to pedestrians than the 50 feet usually assumed when noise levels are quoted. Also, there will be no masking noise from other vehicular traffic in the mall. The quieter resilient rail mounting will make the system more acceptable and should be given serious consideration at the final design stage. A qualified acoustical consultant will review track mounting details at this stage. Ground-borne noise criteria in Ref. 11, Table F are 45-55 dBA for commerical building interiors. The anticipated



The Noise Level Contours indicated are for a typical candidate LRRT vehicle such as the Boeing LRV or DuWag LRTV Type B. The contours shown are for 2-car trains operating at 30 mph on the surface with imbedded rails and paved area along each side of the tracks. Noise levels are not expected to vary more than ±2 dBA for other likely operating conditions or vehicles.

Figure 5-6. Noise Level Contours for Maximum Noise Produced by a 2-Car LRRT Train at 30 mph ground-borne noise levels from the proposed LRRT System are more than 10 dBA below this, even if the track is rigidly imbedded in the pavement.

5.5 - Cut-and-Cover Section

Construction-Related Impacts

The cut-and-cover section covers approximately 1.7 miles of subway and three stations (see Figure 4-2). The construction process for this section generally follows the steps outlined below for construction within city streets (see Figure 5-7):

- Shallow trenches are dug to expose utilities.
- Ground and water conditions dictate the type of temporary earth support system to be installed. Available information indicates that soldier piles and lagging (steel H-piles with timbers spanning between the piles) might be used. To minimize noise and vibration during construction, impact pile driving will not be used. Buildings or any other structures within the zone of influence (zone of possible earth settlement) will be underpinned as necessary, utilizing standard methods.
- Working on a block-to-block basis or less, street traffic could be temporarily rerouted, pavement is removed and the street sufficiently excavated to place steel deck beams between the soldier piles.
- Manual excavation proceeds around utilities that are then either supported from the deck beams or relocated, maintaining utility service during construction.
- Excavation continues to a depth of about 8 to 10 feet below the surface and timber or concrete decking is installed on the deck beams.
- Traffic is returned to the street and travels on the decking.
- Mechanical excavation continues to the bottom of the proposed structure.

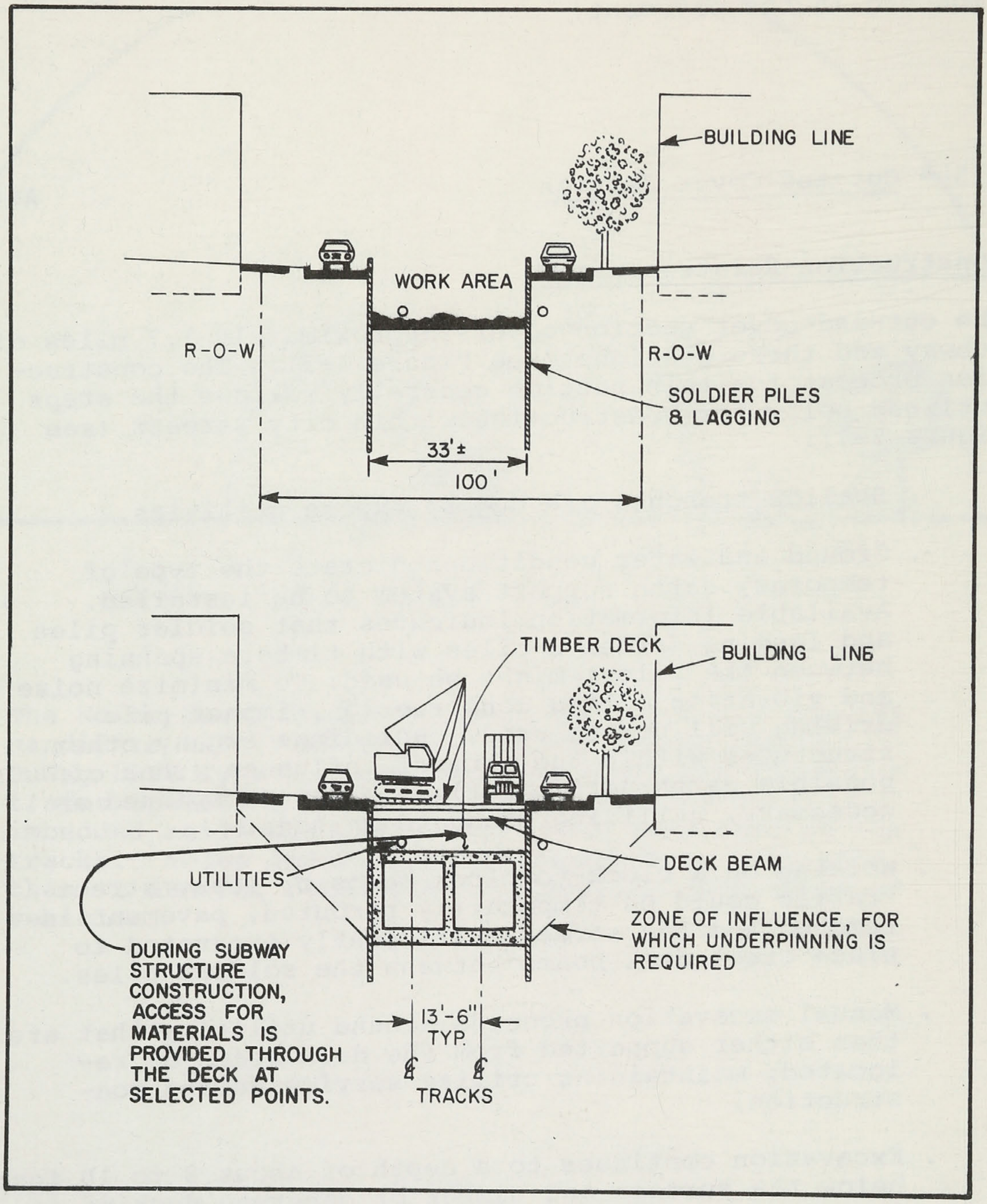


Figure 5-7. Cut-and-Cover Construction

- Where the groundwater level is close to the surface, for instance, less than 10 feet below the surface near Ferry street, some dewatering will be required which may be accomplished by the installation of a deep well system.

- On completion of excavation, formwork is installed, reinforcing steel is positioned, and concrete delivered to the site and placed.

- When the concrete has gained sufficient strength, forms are removed and backfilling begins over the completed structure. Temporary earth support struts are sequentially removed.

- Surface traffic is diverted as backfilling nears the surface. Decking and beams are removed. Backfilling is then completed to the surface.

- Pavement is restored, the area cleaned up, and traffic permanently moved back onto the street.

During the preliminary design, each station area, including its entrance and passageway configurations, will have to be studied separately in order to assess the proper construction procedure. Since the stations constitute only 300-foot long construction segments, no difficulty is anticipated with easing property accessibility problems and providing access for emergency vehicles. Deck beams could be placed and partial decking accomplished during off-peak hours by rerouting traffic around the area. A portion of the sidewalk areas could be utilized for a temporary roadway so long as pedestrian access is not impeded. In this manner, the traffic impact during peak hours could be minimized. Alternatively, the decking procedure may be staged, i.e., deck half the street excavation while maintaining traffic on the other half. Then, while the other half is being decked, traffic is rerouted to the decked portion. Backfilling and street restoration may be handled in a similar manner.

Cut-and-cover construction is highly disruptive for short periods of time despite mitigative measures. Traffic flow in this section is bound to be impeded by construction, especially during peak hours when car and bus traffic is heavy. During the periods when rerouting of traffic is unavoidable, the absence of streets parallel to Main Street will make short-segment traffic detours virtually impossible. Michigan Avenue, Masten Avenue, and Jefferson Avenue could be expected to provide some measure of detour-relief for CBD-related traffic. These streets would also serve reasonably well for express busses; however, local bus service in the cut-and-cover section would be severely displaced and might suffer losses of current transit riders.

Construction scheduling and traffic maintenance plans must be carefully coordinated to minimize adverse impacts. For example, businesses may suffer temporary revenue losses if customers shop elsewhere to avoid the inconveniences caused by construction detours. The visual environment will be disrupted and street-level noise and air pollution increased. Dust and debris would be controlled in a fashion similar to that used for at-grade construction (see Section 5.2).

Operational Impacts

Traffic - Because the LRRT system will operate in subway in this section, it will have little adverse impact. Those who live near stations may be inconvenienced by increased auto and bus traffic and parking shortages. (Table 5-11 shows the relative numbers of transit patrons arriving by car and feeder bus.) This problem should be offset, however, by a decrease in commuting autos and transit buses on Main Street, which will ease rush hour congestion and decrease noise levels. Also, parking regulations could be adopted in the vicinity of stations to prohibit parking by nonresidents. Residents could be issued windshield stickers for identification. Persons ignoring posted warnings against nonresident parking could have their cars towed and could be subject to fines. A possible negative impact is increased cross-town traffic in the area just north of the CBD due to vehicles diverted from the auto-free mall.

Visual - Stations have not yet been designed, and decisions regarding scale, treatment, and uniformity of station entrances have not been made. Station design can reinforce or contrast with existing architectural and landscape features through scale, uniformity, materials, colors, architectural and graphic embellishments, and integration with existing structures' features (e.g., cornice lines, setbacks).

Socioeconomic - The underground sections of the proposed line will traverse a variety of neighborhoods and sub-areas. The presence of a rail line in this corridor could spur welcome development in the vicinity of the stations. Benefits of improved accessibility along the transit corridor study area are highlighted below.

The Ellicott and Masten sub-areas are the closest residential neighborhoods to the CBD on the east side of Main Street. In 1970, they had the lowest incomes in the City, the highest rate of transit dependency (98 percent of the population was without cars according to Ref. 5), the highest proportion of the population under 18 years, and the highest unemployment rates in the City in 1975 (greater than

35 percent according to Ref. 15). The advantages of improved accessibility to schools, jobs, and community facilities should be of particular benefit to people in these neighborhoods. These are also the neighborhoods with the highest housing vacancy rates and the highest rates of demolition (almost a third of the total number of housing units was razed between 1970 and 1975). The improved transit accessibility in combination with large areas of cleared land, e.g., unfinished portions of the Oak Street and Ellicott Redevelopment Projects, may make these sub-areas particularly attractive to developers. Two very important community facilities, Buffalo General Hospital and Roswell Park Memorial Institute, are located in the Masten sub-area about 1500 feet east of the rail line. Users of these facilities will benefit from improved access to them.

The Elmwood sub-area is one of the closest residential areas to the CBD on the west side of Main Street. This sub-area is characterized by a high proportion of elderly among its population (in 1970, more than a third were over 60 years of age). Elderly and retired persons are often on fixed incomes and have less access to automobiles. They are also often dependent on specialized community services, particularly health services. Improving transit services should be of particular benefit to these people. The Allentown area of Elmwood has been the site of housing and commercial rehabilitation efforts for several years. Although much of this type of activity has occurred in the western portions of the Elmwood sub-area, possible developments along Main Street on the eastern side spurred by the presence of the LRRT system could reinforce these efforts throughout the sub-area. Elmwood has a high proportion of single person households, suggesting the presence both of elderly (discussed previously) and of young singles. Rehabilitated or new housing in this sub-area could be particularly attractive to single persons seeking housing close to the CBD. Access to improved public transportation could enhance this attraction and further encourage improvement efforts already under way in this area.

<u>Noise</u> - Most of the cut-and-cover section passes through neighborhoods that would rate as semi-residentail/commerical, allowing relatively high levels of ground-borne noise according to the Category 3 noise criterion Ref. 11, Table E). The allowable levels become 35 and 40 dBA (NC-30 and NC-35) for single family and multi-family dwellings, respectively. The levels shown in Table 5-14 are typical for the cut-and-cover section and indicate that resilient direct fixation (DF) fasteners will provide adequate isolation of ground-borne noise. Table 5-14 illustrates that additional isolation (floating slab construction) will be required close to the WKBW-TV studio. The criterion for the TV studio is taken from Ref. 11, Table F.

TABLE 5-14

CUT-AND-COVER SECTION, GROUND-BORNE NOISE

Location**	Type of Structure	Noise Criteria, NC, of Ground-borne Noise* DF Fasteners	Resilient Ties	Floating Slab
171+00 to 174+00	WKBW-TV Studio (close to proposed Utica Station)	30-32	21-23	<20

* Add 5 for approximate conversion to dBA. These noise levels are predicted based on an acoustical study of the site.

** See Figure 4-2.

Note: For this busy, urban commercial/residential area, the APTA guidelines for maximum levels of noise from ground-borne sources would be NC-30 to NC-35 (35 to 40 dBA). This criterion can be met using the standard resilient track fasteners with no special ties or floating slabs. For the short distance past the TV studio, however, NC-20 (25 dBA) is called for in the APTA guidelines. Floating slab construction is required at this location.

5.6 - Tunnel Section

Construction-Related Impacts

Rock tunnel construction is the least disruptive of any of the construction techniques to be used on this project because surface disturbance is required only where construction portals, station access, or ventilation is necessary. Rock tunnel procedures vary according to the nature of the materials encountered and the economy of various types of construction.

The twin tunnels for the LRRT may be bored by a mechanical mole (a mobile machine fitted with a circular cutterhead) or by Alpine-miner type equipment (which consists of a crawler-mounted, articulated boom carrying a ripper-type cutterhead). The tunnel produced will be grouted and lined to control ground settlement and water inflow. In station areas, where sharp maneuvers and non-circular cross sections are required, the Alpine-miner type equipment must be used. All studies to date indicate that the mole and Alpine-type equipment should be able to handle most rock excavation along the proposed alignment. Drilling and blasting will be avoided wherever possible. However, vent shafts, station access points, and reaches with unusual conditions will require blasting, which it will be done judiciously and in accordance with construction industry standards.

Tunneling via the mechanical mole and Alpine-type equipment will not produce significant vibration levels. When localized blasting is required (e.g., for vent shafts), vibration will be controlled via time delay charges to a specified maximum level (2 inches per second peak particle velocity is the normal maximum according to Reference 42) so that adjacent structures are protected.

The impact of tunnel and station construction on utilities was considered in Reference 29, published in 1974, which noted that utility users would be little affected by construction. However, since the date of that report, the Buffalo Sewer Authority has initiated the design of the Scajaquada interceptor, a major new trunk sewer facility, which would cross the transit corridor near Delavan Avenue. As designed, the line intersects the proposed LRRT transit tunnels. This potential conflict has been recognized and negotiations are currently under way between the NFTA and the Sewer Authority and their design consultants to resolve the problem through a change in the planned alignment of the proposed transit tunnel.

Operational Impacts

Traffic - Because station parking for transit users is not provided along this section, minor tie-ups and parking shortages may be induced along sidestreets near stations. This problem could be handled in the same way as proposed for the cut-and-cover section, i.e., by a ban on nonresident parking.

Visual - Visual impacts in the tunnel section, like those in the cut-and-cover section, are confined to the station areas (see Section 5.5).

Socioeconomic - The Parkside sub-area is a transition area between inner-city neighborhoods to the south and more suburban areas to the north. This sub-area probably had less population loss since 1970 than areas to the south and the City as a whole, but more than areas to the north. Also, Parkside was the only sub-area in the transit corridor that increased in number of housing units in the 1970-1975 period. Increased accessibility to and from either end of the corridor should benefit Parkside residents. For instance, improved transportation services could reinforce the positive housing trends. Furthermore, Parkside is an important institutional center, with Canisius College, Medaille College, Sisters Hospital, and Mount St. Joseph Academy located close to the proposed Delavan and Humboldt Stations. Improved accessibility to these facilities would be of benefit to facility patrons. The Central Park and LaSalle sub-areas are basically residential neighborhoods, with a fairly stable housing stock and low vacancy rates. Most of the benefits that would accrue from the transit line in this area would be to residents commuting to work and to community facilities elsewhere in the transit corridor.

Noise - The rock tunnel section passes predominantly through residential areas where APTA Category 2 guidelines must be applied (Ref. 11, Table E) to determine if special track mounting features are needed. Table 5-15 lists noise sensitive locations in this section and predicts the ground-borne noise levels anticipated in these structures. The predicted levels will be typical for other structures along the route.

The following criteria are extracted from Tables E and F of Ref. 11:

Schools	40 dBA	NC-35
Hospital-sleeping rooms	35 dBA	NC-30
Single family dwellings	35 dBA	NC-30
Multi-family dwellings	40 dBA	NC-35
Hotels/motels	45 dBA	NC-40
Theaters (Music Hall)	35 dBA	NC-30

These are applied to Table 5-15 and the appropriate sound isolation measures identified for the principal features along the route. For the remainder of the route, resilient DF fasteners are appropriate.

5.7 - South Campus Terminal

Construction-Related Impacts

Construction at the South Campus will have less adverse impact than at other sites because the station is to be located well off the Main Street right-of-way and some 200 feet from the nearest building on the SUNYAB's campus. Hence, local traffic will be little affected by construction, and the associated noise, vibration, exhaust fumes, and dust should have minimal impact on campus activities. Social impacts of construction are expected to be secondary and minor.

The proposed terminal and kiss-and-ride parking facilities would occupy approximately 3.5 acres of campus property, including 1.6 acres of the existing Lockwood parking lot and roadways and 1.9 acres of landscaped lawn areas. Acquisition of this land will neither constitute a cost to NFTA nor remove land from the tax rolls, because the property is already owned by the State of New York. Furthermore, the loss of the Lockwood lot will have no adverse effect on campus parking--the Lockwood lot is one of a number of lots scheduled for removal in conjunction with conversion of the South Campus into a Health Sciences Center serving far fewer students (Ref. 43).

It is possible that construction will involve the removal of a few small trees, the exact number of which will be determined during final project design. The impact of their loss will be mitigated somewhat by attractive landscaping of remaining open space near the station, including planting of small trees and shrubbery where appropriate.

Operational Impacts

Traffic - Table 5-11 shows the number of transit users arriving at the South Campus Station by walking, auto, and feeder bus. As currently envisioned, the South Campus Station would provide auto parking only for drivers dropping off or

TABLE 15

TUNNEL SECTION, GROUND-BORNE NOISE

Location**	Type of Structure	Noise Criteria, NC of Ground-borne Noise* DF Fasteners	Resilient Ties	Floating Slab
231+00 to 278+00	School (St. Mary's School for the Deaf), Sister's Hospital, Residences	36-39	27-30	21-24
284+00 to 292+00	Residences, Motel	36-39	27-30	21-24
302+00 to 325+00	Residences	36-39	27-30	21-24
325+00 to 330+00	Residences (Special Trackwork)	48-51	39-42	33-36
341+00 to 360+00	Residences, Church	35-38	26-29	20-23

* Add 5 for approximate conversion to dBA.

** See Figure 4-2.

Note: underlined values indicate appropriate sound isolation measures to satisfy APTA guidelines (Ref. 11, Tables E and F).

picking up LRRT passengers. Therefore, it is likely that many commuters will seek all-day parking on adjacent neighborhood streets or (illegally) on campus. This will inconvenience students and local residents and promote rush hour congestion on nearby sidestreets. Furthermore, without all-day parking, drop-off demand will be very high, possibly forcing "kiss-and-ride" traffic to overflow onto Main Street during rush hours, causing major tie-ups. Such problems can best be averted by providing all-day parking near the station. This appears feasible given the decrease in student population expected at the South Campus upon its conversion to a Health Sciences Center. SUNYAB plans show a 1980 need for about half the parking spaces now available. NFTA plans to continue discussions with SUNYAB officials about the possibility of converting an existing lot for transit patron use.

The need for and impact of Park and Ride facilities, particularly at the SUNYAB campus and northernmost LRRT stations, was a subject of some concern in public hearing testimony.

Resolution of the problems created by unauthorized and illegal parking is and will be dependent upon firm enforcement of traffic ordinances. The NFTA will work closely with the City of Buffalo Department of Transportation in identifying areas of impact and suggesting new ordances which, when properly enforced, should alleviate the illegal parking problem.

Past experience in other areas has consistently shown that parking demand, particularly near any kind of rail transit station, increases to available capacity, regarless of how great that capacity may be. The need for a good mass transportation system would not be met efficiently by paving over large areas for parking around transit stations and such action would be disruptive to the surrounding community. With this in mind, the NFTA has planned an extensive feeder bus network to provide transit patrons with a means of quick and safe access to the Metrorail line. "Kiss-and-ride" facilities for passengers being dropped off by automobile will increase access to the South Campus station and talks are continuing with University officials to identify possible parking areas at this site. Existing parking places near the transit line might be used by LRRT patrons, subject to the constraints of the traffic regulations previously mentioned.

(See 10.2.5, page 10-8, 9.)

Seventy-five feeder buses will serve the station during rush hours, adding to noise and pollutant burdens at the station. Using the EPA methods in Reference 8, it is estimated that feeder bus and "kiss-and-ride" auto traffic will generate 2000 grams of CO at the station site during the peak hour. Insufficient information is available on CO generation and dispersion to reliably predict CO concentrations; however, due to prevailing winds, CO will not pose a health hazard to persons at or in the vicinity of the station. Dispersion calculations (Refs. 44 and 45) reveal that at an average wind speed of only 2 mph (considered extremely unusual for this location), the increase in CO concentration during peak hours would be undetectable (< 0.001 ppm) within 200 feet of the station. A traffic signal at the Main Street entrance will allow buses to make left turns into the station. To avoid congestion and facilitate bus operations, it is suggested that this signal be controlled either from the buses or from the station.

Visual - The station as now conceived (Figure 4-17) could enhance the visual environment at the SUNYAB's South Campus. The station will be camouflaged by a low grass-covered berm and attractive stone-paved walkways will be lined with trees and shrubbery. This will be an esthetic improvement over the existing parking lot.

Socioeconomic - Because the South Campus Terminal will be an important intermodal connection between the rail line and the feeder bus network, pressures can be expected for both residential and commercial development. Both beneficial and adverse impacts could result from such development. Beneficial impacts will require the City to adopt controls on development so that the character of existing neighborhoods is enhanced.

Noise: The noise survey data in Section 2 indicates that the terminal area is Category 2 (APTA guidelines, Ref. 11, Table B). The noise climate will be controlled by the impact of the terminal on local traffic movements. Traffic noise will increase by 3 dB for every doubling of traffic flow. Such a noise increase is likely to be self-limiting because doubling and redoubling "kiss-and-ride" and "park-and-ride" traffic will quickly result in congested flows and transfer of patronage to the feeder bus service. Legislation is anticipated to bring the noise levels of buses down to a level comparable to automobiles. The net effect will be that the area should not change from the existing Category 2 noise levels.

5.8 - Transportation Benefits

The proposed LRRT system would introduce direct transit service between outlying communities and the Buffalo CBD and is expected to result in the following transportation benefits:

- monetary savings to users in terms of a reduction in travel time and in trip, auto maintenance, and parking costs;
- provision of more convenient access, especially for transit corridor residents of limited mobility;
- reductions in traffic congestion along the transit route and especially in the CBD due to decreased auto use and realigned bus schedules;
- monetary savings to the NFTA in terms of lower long-term operating costs and more efficient use of the bus fleet; and
- expansion of policy options available to transportation/urban planners.

Monetary Savings - Transportation benefits include:

- direct savings due to reduced costs for auto operation, parking, insurance, and accidents and a lower auto operating requirement; and
- indirect savings due to shorter travel times for transit users because of improved mass transit efficiency and for other motorists because of reduced traffic congestion.

Based on LRRT ridership estimates (Ref. 27, pages 24 and 34), an average daily auto parking fee of $1.27 (Ref. 30, page C-7), and a $0.40 transit fare, direct savings to users diverted from automobiles would amount to $14.3 million in 1974 dollars in 1995. Indirect savings would be over $4 million, based on an estimated 1.3 million hours of travel time saved in 1995 and a time value of $7.40 for truckers and $2.37 for individual travelers.

Provision of Convenient Access - The LRRT System would reduce transit travel time from outlying communities to downtown Buffalo, increasing user convenience and making transit more competitive with the automobile. The approximate peak-hour travel times for auto, bus, and LRRT commuters traveling between the terminal station at the South

Campus and the Auditorium Station in the CBD are given in the following table. The time savings of the LRRT system are partly due to the high speeds attained in the exclusive right-of-way provided by the subway section. Also, a significant portion of the time saved is attributable to higher frequency of service (reduced headway), which cuts waiting time substantially. Travel times to the South Campus from outlying areas by car or feeder bus are not included in the figures shown.

TABLE 16

COMPARATIVE PEAK-HOUR TRAVEL TIMES BETWEEN THE SOUTH CAMPUS AND AUDITORIUM STATIONS

Mode	Travel Time (minutes)	Time Savings by LRRT (minutes)
Automobile	29	11
Bus	37	19
LRRT	18	--

The LRRT would also benefit "reverse" commuters, those who travel away from the CBD in the morning and return at night. Traffic controls favor inbound morning and outbound evening traffic, so that buses running in opposite directions are hampered. The LRRT vehicles, operating primarily in exclusive right-of-way, would not be affected by such traffic control strategies; hence, service to reverse commuters would improve substantially.

The LRRT will be particularly attractive in the wintertime, when heavy snows often cripple vehicular traffic and parking downtown in the cheaper open lots becomes undesirable. Even if feeder bus service is disrupted, many commuters will choose to be dropped off at an LRRT station rather than drive all the way to their destination.

Finally, the LRRT would provide increased travel opportunities to those transit corridor residents who do not own and cannot afford cars or those who cannot drive due to age or infirmity.

Reductions in Traffic Congestion - Based on diverted trip estimates given in Reference 30, with the LRRT system, an estimated 2500 fewer autos would be driven into the CBD each day in 1995 than with the Improved Bus plan; a reduction of about 15 percent from existing traffic counts (Ref. 23), assuming an average trip length of 10 miles. This should reduce traffic congestion, allowing more efficient use of Main Street north and south of the CBD pedestrian mall and reducing the impacts of mall-related street closures. The elimination of major bus movements on Main Street should also greatly benefit traffic flow. Note, however, that these potential improvements cannot be realized unless measures are adopted to distribute incoming/ outgoing and cross-town traffic around the pedestrian mall without conflict. This problem is discussed in Section 5.4.

Policy Alternatives Made Feasible by the LRRT System - Adoption of the LRRT system would allow the NFTA and other agencies responsible for urban planning greater flexibility in their efforts to stimulate controlled economic development and improve the human environment in the Buffalo SMSA. An obvious benefit of this flexibility is manifested in the CBD, where the LRRT system makes the concept of the pedestrian mall viable. Also, the LRRT system gives regional planners a powerful tool to check urban sprawl, improve air quality, and decrease energy use in the transportation sector.

The proposed LRRT system would enable local planners to adopt policies that actively discourage auto trips in the corridor. Such auto disincentives could include:

- Increased parking fees - The 1974 average daily cost of parking in the CBD has been estimated at $1.27, a "bargain" among major U.S. cities, and a level unlikely to deter many habitual auto commuters.

- Reduced parking space in the CBD.

- Expansion of the auto-free zones beyond the proposed pedestrian mall - This would make driving a less convenient mode of access to destinations in the zones, especially if peripheral parking is restricted.

Note that planners must carefully consider the indirect consequences of such policies before enacting them. Total passenger capacity of Corridor transit should not be allowed to decline. Hence, the rail system must be able to accommodate the expanded ridership resulting from auto disincentives.

SECTION 6

6 - HISTORICAL AND ARCHEOLOGICAL PRESERVATION: SECTION 106 and 4(f) ANALYSIS

This detailed discussion of historical and archeological sites within the project impact area is mandated by Section 106 of the National Historic Preservation Act of 1966 and Section 4(f) of the Department of Transportation Act of 1966 (P.L. 90-495). Because the proposed alignment runs up the middle of Main Street the pertinent impact area is considered to include only properties abutting Main Street and those located in the proposed station and service yard areas.

6.1 - Historic Sites

The Buffalo Historical Society (under the direction of Dr. Walter S. Dunn, Jr.) and the Landmark Society of the Niagara Frontier (represented by Mr. Olaf Shelgren, Jr., Chairman) compiled a list of historic structures located along the proposed rail alignment. The name and initial construction date for each of these sites is given in Table 6-1, along with a map reference keyed to Figure 6-1. Three structures are included in the National Register of Historic Places: Shea's Bufflo Theater, the Prudential Building, and St. Paul's Cathedral. Six other sites identified in the table are considered by the Landmark Society to meet the criteria for inclusion in the Register. No sites of historic value are located in the proposed service yard areas.

Neither construction nor operation of the proposed transit system should have an on any of the structures listed. The Buffalo Landmark and Preservation Board reviewed the list of sites and found no problems with the proposed rail transit project. It was noted that the visual impact of the at-grade section will be reminiscent of that with the trolley service along Main Street prior to World War II. The New York State Historic Preservation Officer has confirmed in a May 4, 1977 letter to UMTA, that the project will have no effect upon structures included in or eligible for inclusion in the National Register of Historic Places.

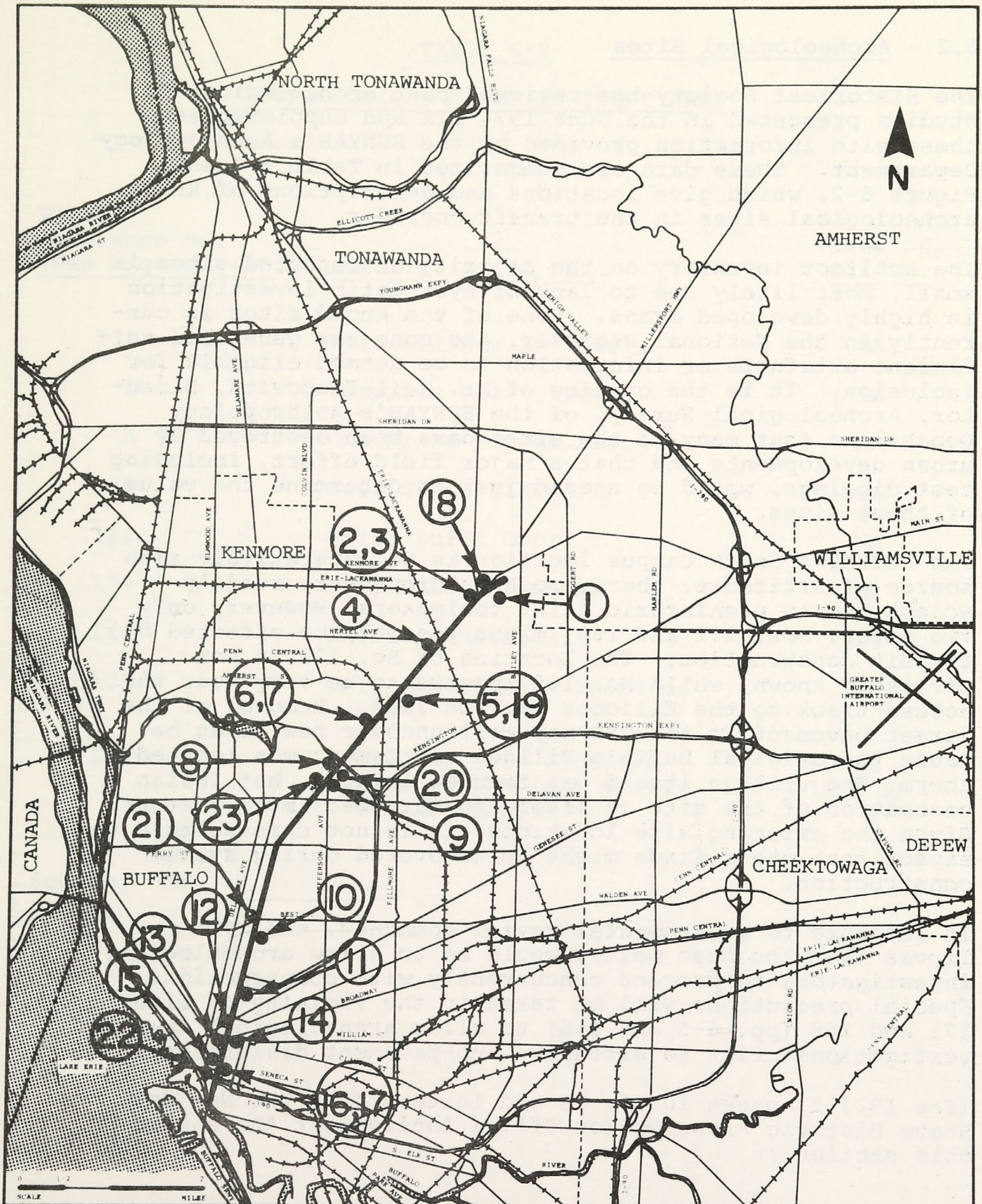
TABLE 6-1

STRUCTURES OF HISTORIC INTEREST ALONG PROPOSED RAIL ALIGNMENT

Map Reference (See Figure 6-1)	Name	Date Construction Began
1**	Hayes Hall at SUNYAB South Campus	ca. 1860
2	St. Joseph's Roman Catholic Church	1926
3	St. Andrews Episcopal Church	1922
4	Williams Gold Refining Co.	ca. 1850
5	McKendry-Dengler Funeral Home	1841 (old wing)
6**	Pierce-Arrow Showroom (now Tinney Cadillac)	1928
7	Central Presbyterian Church	1910
8	Providence Retreat at Sister's Hospital	1861
9	Old Main Hall at Canisius College	1912
10**	St. Louis Roman Catholic Church	1829
11*	Shea's Buffalo Theater	1926
12**	Buffalo Savings Bank	1899
13	Soldiers and Sailors Monument	1884
14	Brisbane Building	1894
15*	Prudential Building	1895
16*	St. Paul's Cathedral	1850
17**	Ellicott Square Building	1896
18	University Presbyterian Church	ca. 1925
19	St. Mary's School for the Deaf	ca. 1900
20	St. Vincent-DePaul Church	ca. 1920
21	Holy Trinity Lutheran Church	ca. 1910
22	302 Main Street	ca. 1855
23**	Forest Lawn Cemetery	ca. 1850

* Included in National Register of Historic Places.

** Considered eligible.



PROPOSED RAIL TRANSIT ALIGNMENT

HISTORICAL SITE

Figure 6-1. Historical Sites Along Metro Corridor

6.2 - Archeological Sites

The Historical Society has reviewed past archeological studies presented in the June 1974 EIA and supplemented these with information provided by the SUNYAB's Anthropology Department. These data are summarized in Table 6-2 and Figure 6-2, which give locations and descriptions of known archeological sites in the transit corridor.

The artifact inventory on the majority of reported sites is small, most likely due to lack of systematic investigation in highly developed areas. None of the known sites is currently in the National Register, and none has generated sufficient artifacts or information to be deemed eligible for inclusion. It is the opinion of Mr. Neil Trubowitz, Director, Archeological Survey, of the SUNYAB's Anthropology Department that many of the sites have been destroyed by urban developments and that a major field effort, including test diggings, would be needed just to determine the value of these sites.

The SUNYAB's South Campus location is a comparatively rich source of artifacts; there, rock outcrops were readily accessible to prehistoric flint toolmakers. However, only two sites, Nos. 171 and 168, might possibly be affected by transit construction. The location of No. 171 is not precisely known, while No. 168 appears to be very near the access track to the Ellicott Service Yard. Removal of the street pavement in the CBD may well uncover new finds because the original Buffalo Village settlement was located there. The village itself was founded in 1803, but Indian occupation of the site is likely to date back much further. Given the existing site locations, it is not unreasonable to expect that other finds might be uncovered during system construction.

In response to governmental review comments, the NFTA believes that the best policy would be to allow archeological investigators to proceed concurrently with construction. Special precautions will be taken in the vicinity of sites 171 and 168 (pp. 6-5 and 6-6) to allow archeological investigations prior to extensive sub-pavement disturbance.

(See 10.3.2, pages 10-25, 26 and letters from the New York State Historic Preservation Office included at the end of this section.)

Contract specifications will provide that if any artifacts are found, construction at that particular site will be delayed until the find is fully evaluated by qualified

TABLE 6-2

ARCHEOLOGICAL SITES IN STUDY AREA

SUNYAB Reference No. (See Figure 6-2)	Description of Find	Date of Origin
233	Flint Flakes and Tools	NA
L	Possible Flint Tools	NA
A	One Brass-Tipped Arrow	NA
177	Four Stone Blades	NA
182	[Site Built Over]	NA
173	Only Location Known	NA
166	Iroquois Materials	1200 AD
171	Only Approximate Location Known	NA
168	Early and Late Woodland Material, Mainly Spear- and Arrowheads	500 BC - 1200 AD

Source: Ref. 2

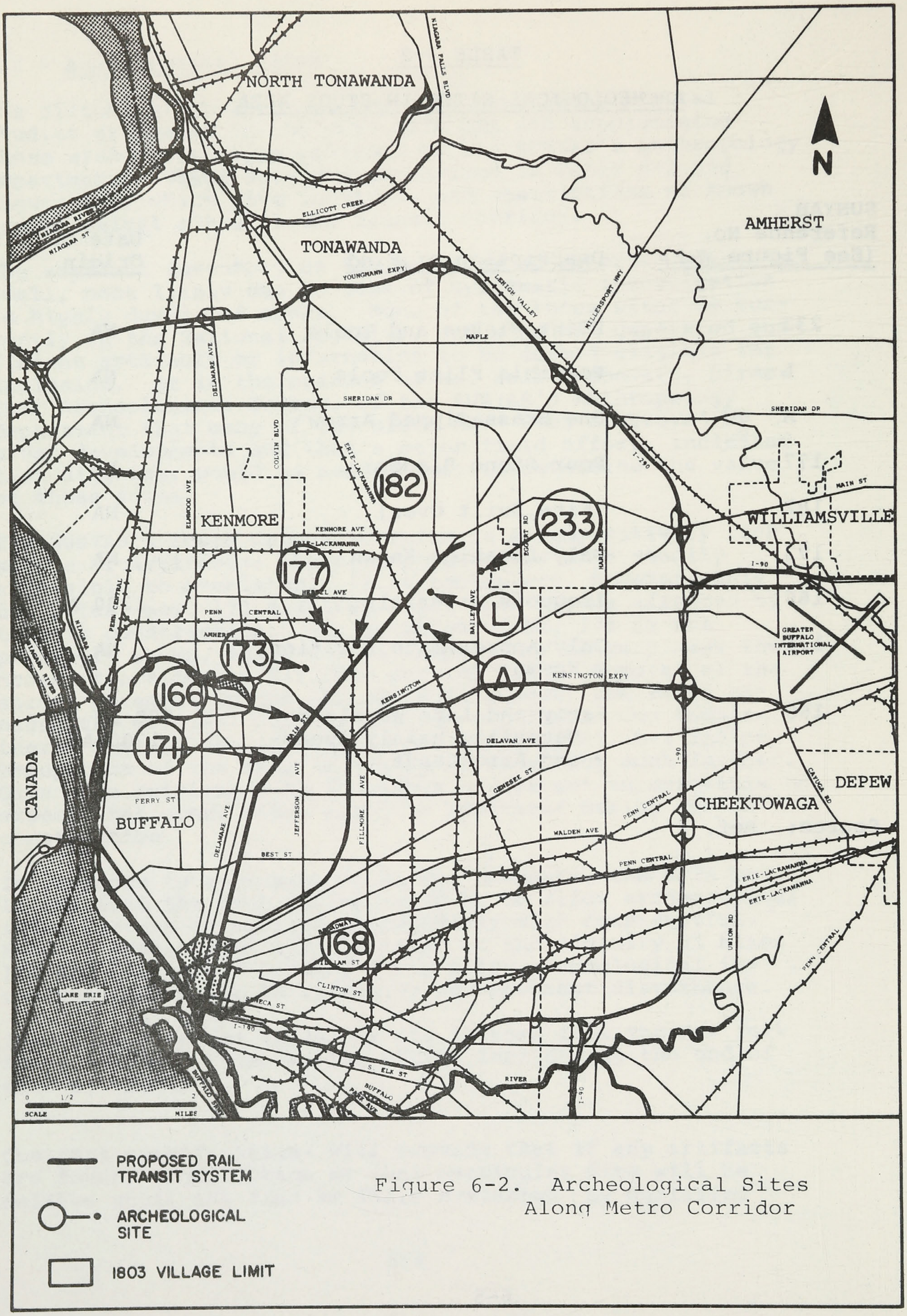


Figure 6-2. Archeological Sites Along Metro Corridor

archeologists and any discoveries are salvaged. These precautions should prevent adverse impacts during construction. Operation and maintenance of the line will not affect any archeological resource in the Buffalo area.

NEW YORK STATE PARKS & RECREATION Agency Building [illegible] Plaza Albany New York [illegible] Information [illegible] XXX

Orin Lehman, Commissioner

3176

May 4, 1977

Mr. Kenneth E. Vought
Director
Urban Mass Transportation
Administration
26 Federal Plaza
New York, N.Y. 10007

Re: NY-03-0072
Niagara Frontier Transportation Authority
Metro Rail
Buffalo, Erie County

Dear Mr. Vought:

The State Historic Preservation Officer has reviewed the above project in accordance with the Advisory Council's "Procedures for the Protection of Historic and Cultural Properties," 36 CFR 800.

Based upon this review, it is the opinion of the State Historic Preservation Officer that the project will have no effect upon structures included in or eligible for inclusion in the National Register of Historic Places.

With regard to archeological resources, the State Historic Preservation Officer finds that the proposed Section 106 and 4(f) analysis narrative does not adhere to the Advisory Council's procedures. Section 800.4(a) of the procedures states that "as early as possible and in all cases prior to agency decision concerning an undertaking, the Agency Official shall identify properties located within the area of the undertaking's potential environmental impact that are included in or eligible for inclusion in the National Register." There is no indication that the National Register criteria have been applied to sites which have already been identified, or that any investigation has been undertaken to identify sites which may very well be located within the project area.

It is our recommendation that your agency review the Advisory Council's procedures and determine whether or not any further steps need be taken at this time.

Should you have any questions, please contact the project review staff at 518-474-3176.

Sincerely,

F.L. Rath, Jr.
Deputy Commissioner for
Historic Preservation

LRK:mr

cc: Kenneth Knight
General Manager
Metro Construction Division
Niagara Frontier Transportation
Authority
Rand Building
14 Lafayette Square
Buffalo, N.Y. 14203

John W. Hayden
Head, Water Resources/Environmental
Department
Acres American Incorporated
Consulting Engineers
Liberty Bank Building, Main at Court
Buffalo, New York 14202

NEW YORK STATE PARKS & RECREATION Agency Building 1, Empire State Plaza, Albany, New York 12238 Information 518 474 0XXX
Orin Lehman, Commissioner

0479

October 11, 1977

Mr. Edward Fleischman
Urban Mass Transportation
Administration
400 7th Street, S.W.
Washington, D.C. 20590

Re: NY-03-0072
Metro Rail
Buffalo, Erie County

Dear Mr. Fleischman:

Subsequent to our letter to UMTA dated May 4, 1977 (copy attached), the State Historic Preservation Officer (SHPO) has received supplemental documentation concerning the above project.

Based upon the additional data, it appears that pre-construction reconnaissance is infeasible. Therefore, the SHPO is in concurrence with UMTA's plans to conduct an archeological investigation immediately prior to major construction activities. It is the understanding of the SHPO that the consulting archeologist will examine the project area once pavement has been removed for construction purposes.

The SHPO would be pleased to consult with you further should any resources be identified.

Should you have any questions, please contact the project review staff at 518 474-3176.

Sincerely,

Orin Lehman
State Historic Preservation Officer

LRK/cb
cc: Joan P. Schmidt ✓
Kenneth E. Vought

SECTION 7

7 - ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

7.1 - Property Takings

Project implementation will involve the following takings:

- 3.5 acres of public land, including the Lockwood parking lot and nearby lawn areas on the SUNYAB's South Campus, will be cleared for construction of the South Campus terminal station. A few small trees may have to be removed.
- If a new spur is constructed to maintain rail service to businesses across South Park Avenue from the selected terminal yard site, 8.3 acres of public land and 2.6 acres of private land would be required, and three buildings razed.
- Seven businesses (one on public property), one residence (with four family units), and all or parts of 13 vacant parcels (five privately owned) would be taken along the trunk line of the LRRT system.
- The City and other government bodies dependent on property taxes stand to lose some annual revenues as a result of the private (taxable) property takings. The loss can be mitigated by encouraging displaced businesses and residents to relocate within the City, perhaps by purchasing and rebuilding on land that is now publically owned.

7.2 - Operational Impacts

System operation may increase traffic congestion and aggravate parking problems near stations (particularly the South Campus terminal station) due to feeder bus activities and transit patrons arriving by auto in "kiss-and-ride" and "park-and-ride" situations. If so, nearby neighborhoods would be subjected to higher levels of ambient noise and air pollution and residents would experience local difficulties with driving and parking.

Diversion of traffic around the auto-free pedestrian mall may cause serious congestion on sidestreets in the CBD, particularly if the traffic ingress/egress situation north of the CBD isn't resolved first (see Section 5.4). The at-grade sections of the rail line in the CBD, particularly the mixed-traffic section, may compile a worse safety record due to conflicts between auto and rail traffic and large numbers of transit riders congregating near stations. However, the trend in number of accidents is not certain. The anticipated reduction in vehicular traffic in these sections may result in a better, rather than worse safety record.

The visual environment in the CBD will be adversely affected by the presence of overhead lines and associated support elements which provide power to the LRVs. This equipment will intrude upon upward views along Main Street, and attempts to camouflage these structures or render them esthetically pleasing may increase the intrusion in some viewers' tastes. In the service yard area, relatively few passers-by will experience the severe visual disruption that power lines and equipment produce; hence, this impact is considered minor.

7.3 - Construction-Related Impacts

The local environment around construction sites will be temporarily degraded by fugitive dust, exhaust emissions, dirt escaping the site, and by noise associated with construction itself and the unavoidable traffic congestion it causes. Some sidewalk width may be taken near stations. Main Street businesses may experience temporary sales losses where at-grade and cut-and-cover construction causes serious, but short-term traffic disruptions.

SECTION 8

8 - THE RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

In this discussion, the proposed project itself is considered a short-term use of man's environment. The concern of this section of the EIS is whether the decision to implement the proposed project will affect land use and resource productivity beyond the project's useful life.

Clearly, any successful mass transit system--one that converts a significant number of motorists to transit patrons--is likely to have far-reaching impacts on urban development and regional environmental quality. The presence of such a system places a premium upon land within its service area--this area becomes a more desirable place in which to live and conduct business and grows at the expense of suburbs beyond the service area. Two positive effects result:

- growth is centralized along transit routes, which allows more efficient provision of goods and services to residents and retards suburban sprawl; and

- energy consumption and air pollution are reduced because of this centralization and the resulting decrease in travel.

The proposed LRRT could well be a critical element of such a mass transit system. Its presence should spur more intensive land use along the transit corridor and encourage recycling of formerly undesirable land parcels within the City of Buffalo. The transit system, in combination with auto disincentives, should markedly reduce auto dependency in the region; this should further land use goals and reduce both energy consumption and air pollution.

There may be trade-offs inherent in the centralized urban structure that result. Former exurbanites may have the opportunity to adapt to a more urban environment. Also, if the LRRT system spurs regional growth, environmental quality may be degraded rather than improved to the extent that net energy consumption increases.

SECTION 9

9 - IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES THAT WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

The preferred project will affect the following three areas of natural resources:

- the committed land resources within the proposed right-of-way corridor;
- the raw materials used to construct the Metrorail system; and
- the amount of human labor used during construction and operation.

The preferred project will affect the following three areas of manmade resources:

- the irreversible loss of the remaining useful life of the structures acquired and razed to satisfy project land needs;
- the irreversible loss of annual tax revenues generated by the lands in private ownership acquired to satisfy project needs if land taken for this project is not replaced by land now in public ownership and put back on the tax rolls as sites for relocated businesses; and
- An irreversible 7-9 percent annual increase in the cost of the project for no added value with any delay in project approval and construction scheduling (Ref. 27).

The breakdown of the resources required for the project is presented in Tables 9-1, 9-2, and 9-3.

TABLE 9-1

RIGHT-OF-WAY SUMMARY

	Privately-Owned		Publicly-Owned	
	Acreage	Structures	Acreage	Structures
Service Yard				
Terminal	2.6	0	8.3	3
Line				
Stations	NA (12 parcels, 5 of which are vacant)	7	NA (9 parcels, 8 of which are vacant)	1
Terminal Station	0	0	3.5	0

TABLE 9-2

MATERIALS INVOLVED IN CONSTRUCTION OF THE METRORAIL SYSTEM

Configuration	Steel, pounds	Concrete, cubic yards
Subway - tunnel	4,378,000	88,000
Subway - cut-and-cover	42,134,000	145,000
	46,512,000	233,000

These materials quantities are approximations. The at-grade portion is excluded since the six surface stations have not been developed in sufficient detail for a quantity estimate. Conceptual station layouts will be developed during the General Architectural and Engineering design phase.

TABLE 9-3

HUMAN RESOURCES INVOLVED IN CONSTRUCTION AND OPERATION OF THE METRORAIL SYSTEM

Activity	Labor Force	Duration
Construction	1600	4 years
Operation and Maintenance	260	Life of Project

Economic resources that will be committed with the implementation of the preferred project include the total capital cost of approximately $336,250,000. The capital cost estimate for design and construction of the proposed 6.4-mile LRRT project is summarized in Section 4. The capital cost includes construction, right-of-way, vehicles, station hardware, and an escalation allowance.

SECTION 10

10 - DRAFT EIS REVISIONS

10.1 - Introduction

Review of the draft EIS commenced June 3, 1977, for a 60-day period. Comments received from Federal and State Agencies and responses to them are contained in 10.3, with copies of the review letters following.

The official Public Hearing was held in two sessions on July 14, 1977, to permit parties with social, economic or environmental interests an adequate opportunity to present their views on the proposed project publicly. During the Hearing sessions, which were presided over by Commissioners of the NFTA, a total of twenty-five (25) speakers presented oral testimony. Of these, two persons expressed substantial opposition while the remainder were supportive of the project with various suggestions for additions or improvements to the proposed system. Written testimony was received from 17 sources. Of these, 13 duplicated testimony presented at the hearing; 2 submitted additional material and 2 were not represented at the hearing. The Public Hearing Record may be inspected at NFTA headquarters and responses to all comments are contained in 10.2.

10.2 - Response to Community Concerns

This section deals with substantive points raised by individuals and/or organizations either at the public hearing sessions or in written testimony received within a thirty-day period following the hearings. Issues arising have been consolidated into the following twelve points:

1. Selection of DL & W or Ellicott Site for Service Yard

2. Access to Waterfront at DL & W Site and Bicycle Facilities

3. Transportation and Disposal of Construction Spoils

4. Station(s) Location; Humboldt Park Area

5. Park and Ride Impacts on Northern Station Areas

6. Project-Related Street Closures and Feeder Bus Routes

7. Convenience of System and Its Competition with the Automobile

8. Transit System Deficit and Construction Cost Overruns

9. Affirmative Action, Employment of Handicapped and Increased Accessibility for Elderly and Handicapped

10. Snow Removal in Mall Area

11. Police and Fire Protection

12. Coordination with the City of Buffalo

For the convenience of the reader, after each of these points, specific Comments are detailed in italics, with Responses following.

10.2.1 - Selection of DL & W or Ellicott Site for Service Yard

Six references are made to the selection of a Service Yard Site. Three of these recommend use of the DL & W Terminal Site (Erie County Planning Division, Erie County Environmental Management Council, Richard May) with the first two urging that access to and along the waterfront for pedestrians and/or bicycles be maintained. Concern was also expressed that any yard site avoid infringing on the planned adjacent Naval Park.

The Ellicott Yard Site is recommended as a feasible alternative by the Urban Waterfront Advisory Committee which also asks for riverfront access if the DL & W is used. The Sierra Club states a preference for the Ellicott site but makes no specific recommendation in that area. The W & F Manufacturing Company, a light industry partially located on the proposed Ellicott site, objects to use of the site by the NFTA.

Comment

Selection of the DL & W Site for a Service Yard conflicts with the possibility of residential development along west bank of Buffalo River.

Response

Sources on the City of Buffalo Planning Board and the Buffalo Housing Committee have stated that there are no current plans for publicly supported residential development in the Terminal yard vicinity. Further, these sources deem it most unlikely that such a site would be considered for municipal housing when numerous already cleared sites exist within the city.

No private development plans exist for the Terminal, which has remained in its present abandoned state for over a decade to the best knowledge of the NFTA and planning agencies consulted by the Authority's staff. Any future residential development at this site would be unlikely due to the industrial nature of the area and its present M-1, manufacturing, industrial classification zoning.

Comment

Ellicott Yard Site Acquisition involves fewer ownerships than DL & W Area.

Response

The contention that fewer ownerships would be involved in obtaining the Ellicott Yard Site is incorrect. The DL & W site belongs to the City of Buffalo, having been acquired for tax delinquency. A portion of the site belongs to Conrail.

The Ellicott Yard Site is owned by the W & F Manufacturing Company, National Fuel Gas, and Conrail, all of which contribute to the City of Buffalo tax rolls. The Terminal Yard Site would displace no one. By contrast, the South Yard Site involves over a dozen businesses.

Comment

No room at DL & W site to branch out from first increment of line toward South and Tonawandas, making extensions difficult.

Response

Engineering studies presently taking place indicate that no problem exists for expanding the initial line South or Eastward on an existing railroad embankment. Any future expansion to the Tonawandas will probably be considered, as in the 1976 Metro for Buffalo Report (Ref. 23), along unused Erie/Lackawanna Railroad track located toward the northern end of the LRRT line.

Comment

Selection of DL & W Site would involve adverse Environmental Impacts.

Response

From an environmental standpoint, any change to this site would be an improvement as it is presently and has long been both an eyesore and a public hazard. To our knowledge, no proposals other than the NFTA's for the renovation and preservation of the DL & W have been made by any organization. The NFTA plans to combine its purposes with preservation of a large section of the old structure, acceptable landscaping and development of a pedestrian/bicycle path along the river.

Comment

Terminal Site is prime development parcel "located in the path of community growth as evidenced by recent development patterns".

Response

There is also little evidence that "community growth as evidenced by recent development patterns" will occur beyond a small attractive area on Lake Erie, north of the proposed Naval Park, long planned and eminently suited for development. Even in this area, most development remains in long-range planning stages.

Comment

Selection of DL & W Site would not be in accordance with non-water related activities policy of the Coastal Zone Management Act of 1972.

Response

Coordination with these organizations working on Coastal Zone Management planning has been and will continue to be maintained by the NFTA, as stated in the third paragraph on page 5-38.

While a passenger rail system Service Yard is obviously not a water-related activity, it is in conformity with both zoning and long-time previous use where the DL & W site is concerned. The Terminal Site would be a logical choice for a service yard in light of its possibilities for covered rail storage, and its location just beyond the southern terminus of the proposed transit line, particularly in view of area weather conditions.

The Ellicott Yard Site may be both technically and economically possible, but, as noted in the EIS on page 5-42, it would present operational safety hazards and added costs, both major considerations in the development of an efficient mass transit system being financed by public money.

In addition, it should not be considered a feasible alternative, as suggested by the Waterfront Committee, due to potentially severe socio-economic impacts. The W & F Company, a locally-owned firm which has operated at this site for nearly 40 years, employs over 400 people, 43 percent of whom are minorities. Of these workers, 65 percent are residents of urban areas which suffer from high unemployment. The success of this environmentally attractive industry which generates no air or water pollution is heavily dependent on the transportation advantages of its present location as well as its capability to expand on that site in the near future. A company official has indicated to the NFTA that this business, which has been encouraged by city officials to stay at its present location as part of a developing industrial park, would not relocate in the city or possibly even in Western New York should the Ellicott Yard Site be utilized.

10.2.2 - Waterfront Access and Bicycle Facilities

Four requests were made to maintain access to the Buffalo River should the DL & W Terminal site be selected for an LRRT Service Yard (Erie County Division of Planning, Environmental Management Council, Urban Waterfront Committee, Sierra Club). Bicycles were mentioned by the Planning Division and the Niagara Frontier Bicycle Club.

Comment

Maintain adequate right-of-way between yard site and the Buffalo River for pedestrian/bicycle circulation, extensions of the Riverwalk Trail, and potential future water access.

Response

The NFTA has already expressed its willingness to provide a waterfront pathway to representatives of several of the above groups. A working relationship to plan the form this right-of-way should take will be maintained with interested organizations.

Comment

Provide for adequate, safe bicycle storage at each LRRT station and possibly facilities for carrying cycles on trains. Provide surface trails along right-of-way.

Response

Bicycle storage at stations should be an integral part of the design work in the Metrorail project, when the more specific phases of architecture/engineering are reached. The possibility of trains carrying passengers with their cycles will be investigated as will the provision of bicycle paths. The latter, while not within the NFTA's responsibility or budget possibilities, is a concept the Authority supports.

10.2.3 - Transportation and Disposal of Construction Spoils (See also 10.3.4)

Both the Erie County Environmental Management Council and the Niagara Group of the Sierra Club expressed concern over the method of transporting project construction spoils to the two disposal sites mentioned in the EIS and the environmental impact of such disposal.

Comment

(*The*) "*Question of leachate at both of the proposed sites* (*should*) *be carefully studied to minimize runoff into area waters..... Acceptable landfill procedures* (*should*) *be used with no off-shore dumping or diked disposal allowed at the harbor location.*"

Response

Protection against any harmful leaching into the Ellicott Creek floodplain is explained in Section 10.3.4 as is the transportation of project spoils. The bulkhead along the waterfront indicated in some previous reports refers to a U.S. Corps of Engineers project which has neither approval nor funding at this time and which is not under consideration in conjunction with planning for disposal of the Metrorail construction spoils. No off-shore dumping will be done.

The NFTA is actively engaged in advance planning for environmentally sound use/disposal of the spoils to be generated in building of the LRRT. Specifics will be incorporated in actual construction contracts when the project reaches that stage.

10.2.4 - Station(s) Location; Humboldt Park Area

The location of this particular station has been a matter of considerable debate for many years, on the previously proposed Heavy Rail system as well as on the present LRRT project. It was referred to by speakers from the Niagara Frontier Vocational Rehabilitation Center/United Cerebral Palsy Association of Western New York; the endorsed Democratic candidate for University District Councilman; Leroy Avenue Block Club/New York Public Interest Research Group and Jerome Johnson.

Comment

"In the schematic of LRRT branches on the Main Street trunk line, the indication is that the greatest distance between two stations of the LRRT will be between the Amherst Station and the Humboldt Avenue Station. This is the area served by the Niagara Frontier Vocational Rehabilitation Center, the United Cerebral Palsy Association of Western New York, St. Mary's School for the Deaf and a Well Baby Clinic conducted at 2211 Main Street by the State University of New York at Buffalo School of Medicine. All of these facilities have individuals who use public transportation and could benefit from a station that was placed midway between the Amherst and Humboldt proposed stations or if the Humboldt Station, which is very close to the Delavan Station, could be moved further east and placed in a convenient position to the above-mentioned facilities. The consideration by the Board of Commissioners of this proposal will be gratifying to all the facilities involved."

".....the need for a station in the vicinity of Leroy Avenue. This densely populated neighborhood will not be adequately served by the transit line as presently planned. Again I ask that there be an open and objective analysis of the potential for a station in this area. Consideration should be given to the fact that NFTA has made a commitment to provide shuttle service between the transit line and Meyer Memorial Hospital.

Leroy Avenue provides the shortest most direct route between the transit line and Hospital and would simultaneously give better transit service to residential commercial and industrial development. In addition, the area has available space for a feeder bus facility and opportunities for economic development.

I would like to see a professional analysis of ridership for a new Leroy Avenue Station and a relocated Humboldt Station. Such analysis should consider transit ridership estimates, station costs and shuttle bus operating expenses. It should not subject the decision relative to a Leroy Station to any test not equally applied to all of the stations on the transit line."

".....as regards the Humboldt Station. The design here intends a tunnel station would be south of the Humboldt Expressway on the properties of Mount Saint Joseph and another entrance on the east side across from Canisius College. I have argued for over a year and a half now--and I think successfully to most of the people in the Fillmore-Leroy-Parkside Community--that the ride and ridership and the patronage would be I think at least in my estimation of 25 to 50 percent if we had a station located to the north of Humboldt Expressway."

Response

Although no position was stated in the hearing process opposing the foregoing suggestions, such opposition or support for the previously planned location of this station, is known to exist. The NFTA continues to work with the organizations and institutions involved in order that a final decision on the location of this station will be as nearly satisfactory as possible to all interested parties. This decision will also be based on findings of a Ridership and Operations study just getting underway for the LRRT project.

10.2.5 - Park and Ride Impacts on Northern Station Areas

The need for and impact of Park and Ride facilities, particularly at the SUNYAB campus and northernmost LRRT stations, was mentioned by four speakers, the endorsed Democratic candidate for University District Councilman; Richard May; the Leroy Avenue Block Club/New York Public Interest Research Group and Martin Gugino.

Comment

"The neighborhoods immediately surrounding the University have long been plagued by cars left in whatever space will accommodate them even on the grass in front yards and even blocking driveways. This location, the end of the line (we hope only temporarily), will obviously attract suburban residents who like the students will park their cars wherever the cars will fit.

The neighborhoods surrounding the South Campus and LaSalle Stations will be most heavily impacted by park-and-ride transit patrons. The EIS treats this problem not by quantitatively estimating the demand for such parking and planning to provide it but by saying that one state agency, NFTA, will continue to discuss provision of additional transit parking with another state agency, SUNYAB.....I will not find that this problem has been adequately addressed until the demand for park-and-ride spaces has been professionally estimated and until that number of spaces has been negotiated by NFTA from the State University."

"It is obvious that there is a need for park-and-ride facilities, and that this need will increase at each station as you get further away from downtown; peaking at the South Campus Terminal.

I would recommend the provision of parking lots or ramps at least near the South Campus, LaSalle, and Amherst stations. Parking facilities could possibly be provided on the Main Campus of the State University since the number of students and faculty concentrated there has decreased, due to the conversion of the Main Street Campus to solely health sciences. I further recommend the purchase or leasing of the perennially empty parking lot behind the University Plaza. LaSalle Station parking facilities could be constructed in the proximity of the Erie/Lackawanna Railroad viaduct (the site of the future Tonawanda extension). The Amherst Parking Lot or ramp could be constructed somewhere between Amherst and Fillmore, East of Main Street."

"Now, as regards the parking situation on the line, I am greatly concerned about the environmental impact of all those cars that are going to drive in and what the impact will be on the neighborhoods. I think to back up to some earlier testimony, there are some aspects of Central Park Plaza and the old quarry there for parking facilities. At the LaSalle Station there's a lot of land along the railroad tracks. You can even think way down as far as Delavan. Sears doesn't use half the parking up on the top. I don't know what you would find. I don't think you would find anything at the Humboldt Station area; but as far down as Sears, you could develop parking in that area as well. I think the study really should give more attention to really plan for parking."

"Another point is the current planning for the station at university is to place the station in the center of the parking ramp with a parking area right in front of Lockwood Library. There is a central road parking lot. Since this is the northern terminal of the station, it probably will attract many riders from the suburbs, and the present plan for what is called the "kiss-and-ride" stop will probably have to be developed into a fullfledged parking lot stop and in my opinion put pressure on the transit system and the university to replace a lot of land there with parking area...."

Response

Resolution of the problems created by unauthorized and illegal parking is and will be dependent upon firm enforcement of traffic ordinances. The NFTA will work closely with the City of Buffalo Department of Transportation in identifying areas of impact and suggesting new ordinances which, when properly enforced, should alleviate the illegal parking problem.

Past experience in other areas has consistently shown that parking demand, particularly near any kind of rail transit station, increases to available capacity, regardless of how great that capacity may be. The need for a good mass transportation system would not be met efficiently by paving over large areas for parking around transit stations and such action would be disruptive to the surrounding community.

With this in mind, the NFTA has planned an extensive feeder bus network to provide transit patrons with a means of quick and safe access to the Metrorail line. "Kiss-and-ride" facilities for passengers being dropped off by automobile will increase access to the South Campus station and talks are continuing with University officials to identify possible parking areas at this site. Existing parking places near the transit line might be used by LRRT patrons, subject to the constraints of the traffic regulations previously mentioned.

10.2.6 - Project-Related Street Closures and Feeder Bus Routes

Four references were made to potential problems related to street closures and feeder buses. The speakers were the endorsed Democratic candidate for University District Councilman; Mr. Herbert Hough; the Erie County Division of Planning and Donald Kratz.

Comment

"The Division of Planning is concerned about the potential impact of increased traffic generated on streets to the west of the pedestrian mall as a result of closure of Main Street. Such traffic increases may present a significant adverse effect on federal, state, county, and city governmental facilities."

"The main problem is that the CBD developed in linear fashion with its large retail establishments all on Main Street, with the adjacent streets Washington and Pearl heavily used by trucks for unloading (at the rear of the stores) and supply. There is no way these streets can be turned into trunk thoroughfares without "extensive and expensive" changes--probably nothing short of providing underground loading facilities-which would be a huge project in itself....

....The severe cross-town traffic problem caused by closing of all but two E-W streets for the Mall (and cost of suggested street changes....None of these would be a problem if this 1.2-mile section were put underground. (As the EIS points out) And with just a modest additional cost (a little over 10 percent) I think it should really be given serious consideration."

...."One thing that I think ought to be included in the Environmental Impact Statement would be the relocation or reassignment of the regular buses....

....I think we would like to see how the bus system will tie in, how this will tie into the rapid rail system."

"I would also like to express my concerns about the proposed feeder bus routes for the LaSalle station. Some of the routes proposed are over streets which are not presently bus routes, are residential in character, and are not sufficiently wide for normal traffic much less buses.

The environmental impact of feeder bus routes does not appear to have been examined."

Response

The problems of project-related street closures will be the subject of a study to be undertaken in cooperation with the Departments of Transportation of the City of Buffalo and the State of New York.

The North/South and East/West traffic flows are influenced both by the proposed mall and the Elm/Oak Arterial to Delaware Avenue CBD Improvements project. This latter study, scheduled to begin shortly, will address problems of restrictions in existing traffic corridors and will recommend improvements to allow for the orderly movement of vehicular and pedestrian traffic.

As for the suggestion that the proposed at-grade section of the LRRT project be built underground, it should be noted that this above-ground portion was developed in conjunction with the City of Buffalo's plans for a downtown mall and the need to develop a more cost-effective system than the 1974 heavy rail, underground proposal. The latter, incidentally, also involved some problems with regard to historic structures. These difficulties were eliminated by use of the LRRT alignment. As for cost, the "modest additional cost of a little over 10 percent" suggested by Mr. Hough for burying the 1.2 mile at-grade section comes to approximately $33 million.

Alternative feeder bus networks are also the subject of a current study, Ridership and Operations, being done by consultants to the NFTA. This study will identify new bus routes which, together with existing routes, will be analyzed in order to maximize service to potential transit patrons while considering the environmental and capital costs involved for various alternatives.

10.2.7 - Convenience of System and its Competition with the Automobile (See also 10.2.8)

Objection to the the LRRT proposal was expressed, both at the hearing and in written testimony submitted after close of the official 30-day period for receiving testimony, by Mr. Walter Faxlanger. In essence, Mr. Faxlanger, who has submitted extensive testimony and correspondence to the NFTA over a period of many years, objects to a single rail line for Buffalo and has submitted his own "Surplus Rail Rights-of-Way" plan as an alternative.

Comment

"I firmly believe that mass transit can be revived unless we foolishly squander the federal and state grant money meant to revive it. The proposal here by the NFTA is in the worst possible location."

"The alternate plan that I propose is that we use the old New York Central-Lackawanna belt line to connect with all of the radials crossing it so that we have a complete transit service throughout the whole city in conjunction with the city's bus lines that touches downtown in a better way than the rapid transit going straight through Main Street which will close that important artery."

"I believe that when the New York Central Railway put its belt line route through which crossed not Main Street alone or not Delaware alone or not Broadway alone but encompassed every one of those streets in its trip around the city so the people could crosscut as they do now in the automobile expressways. Then, if we can establish on the abandoned railroad properties, railroad rights-of-way, if we could establish on that a belt line rapid transit where the wives could bring the husbands and hitch a ride, they wouldn't need as big a parking lot."

"I think I have given you somewhat of an idea of what is the possibility within this town. I have run into some terrible-not opposition--but a conspiracy really to continue me as the silent advocate here because I can't reach the people who could make it more than a one man show; but I've got the materials, and finally, the NFTC allowed me to present it to about twenty people who are business leaders in this town. It was a five-year battle to present that, but the date line to the thing was too close to the time of decision, and I will not bore you with all of the roadblocks that were thrown in the way. You haven't seen it in the press--not because the press has not been provided with the material but because the press threw the material into the wastebasket."

Response

As for Mr. Faxlanger's doubts concerning convenience of the proposed LRRT system and its competition with the automobile, great effort has been expended to ensure that the LRRT is attractive to "habitual" auto commuters. The cars will be modern and comfortable and the trains will run frequently, transporting passengers quickly along the corridor. Feeder bus service will provide convenient access to the line from a wide service area. The LRRT will provide the most economical means of travel from the CBD, especially if gasoline prices and parking fees continue to increase.

The Buffalo/Amherst Corridor location, contrary to Mr. Faxlanger's opinion, has long been shown, through previous studies on patronage, to have the highest potential in the region for public transportation trips. Three of the lines mentioned by Mr. Faxlanger have indeed been studied, with a Kenmore Branch having been considered infeasible for cost reasons. The abandoned Erie-Lackawanna right-of-way, on the other hand, is a definite consideration for future extension of the LRRT system to the Tonawandas.

While the theory of reviving unused rail lines is intriguing and seems on the surface to have merit, it must be pointed out that no purpose would be served by acquiring abandoned rail segments, however cheaply, if patronage does not exist for the areas served by those lines. In order to be successful, a public transit line must take passengers where they want to go.

Mr. Faxlanger clearly believes that his testimony and ideas on various NFTA proposals prior to and including the present LRRT project have fallen on deaf ears. It should be stressed that this simply is not true. Mr. Faxlanger has been duly heard, often at far greater length than other public hearing speakers. All of his comments and proposals have been conscientiously reviewed and considered by various NFTA staff members, despite the voluminous and frequently handwritten nature of the material submitted.

It is not deemed appropriate for the NFTA to reply to comments made by Mr. Faxlanger regarding various newspaper articles, for whose content the Authority is not responsible. Nor is it considered within the scope of this EIS to reply to the extensive materials on previously proposed systems submitted by Mr. Faxlanger.

Finally, it is regrettable that Mr. Faxlanger was unaware of the extensive publicity advising that the draft EIS was available to the public at numerous locations, including two NFTA offices, as of June 3rd. Being aware of his past interest in the project, NFTA staff would gladly have been available to meet with Mr. Faxlanger. However, no contact with the Metro Construction Division staff was sought by him prior to the July hearing.

10.2.8 - Transit System Deficit/Construction Cost Overruns

Concerns regarding possible Transit System deficits/subsidies and construction cost overruns were stated by the Forest District Civic Association Incorporated, both verbally and in written testimony submitted after the public hearing, and by Herbert Mellan, whose comment is the 2nd paragraph under "Construction Cost Overrun".

Comment

"What we are concerned about, and will probably indicate in our formal statement to be issued within the next thirty days, is the negative economic impact that the project may have upon the financial operations of the City of Buffalo and the County of Erie. Both the city and county are in financial binds and the maintenance of essential governmental operations has been curtailed.

The Draft Environmental Statement indicates an anticipated deficit of $4,266,000 for the integrated system in 1982. This will require a subsidy.

So far, we have yet to learn just what percentage of this deficit will be picked by the local governments.

UMTA has indicated in the past that some assurance will be required for the assumption of cost overruns on construction and operating deficits.

We feel that these items should be addressed in the Final Environmental Impact Statement that is scheduled to be issued in December."

"At this juncture neither the city or county can afford to subsidize any operation that is not essential to the protection of life and property and the welfare of all the residents in the area."

"OPERATING SUBSIDY

The Draft Environmental Statement indicates there will be an operating deficit for the system in 1982 of $4,266,000. There appears to be nothing in the EDIS to indicate which agencies will cover this."

"CONSTRUCTION COST OVERRUN

Although the Federal government has indicated that it will not pick up any charges for construction cost overruns, there appears to be nothing in the report to indicate just which agencies at the state, county or city level will assume any cost overruns."

"In earlier actions, the NFTA promised Secretary Coleman, that no overruns in cost would be assessed against the federal government. Well, Secretary Coleman is gone and maybe that promise is gone too. Rep. Henry J. Nowak stated in a recent report, April 9, 1977, "Of course, our long range goal must be to insure adequate funding is available in the future to support the proposed extensions of our mass transit line to Amherst and the Tonawandas." In his statement, he indicated other sources of funding. (And should this proposal ever reach reality, the potential riders will have an opportunity to increase their giving even as the New York City subway riders found in 1975, when 45 of them were arrested, and more than 300 extra Transit Authority policemen tried to contain the situation which developed.") (sic)

Response

Public transportation in North America has ceased to be a money-making venture. It is generally supported by public money allocated by various levels of government. This need for financial assistance is a potential impact which must be understood by the community. There are many factors influencing operating costs which are outside the control of local transit system operators. These include, among others:

- Energy, supply and price

- Inflation, both labor and materials

- Public policy, on parking supply and costs, insurance costs and air quality.

However, the level of service provided by the system each year will be directly related to the amount of revenue raised from both fare box and other sources. This is the same situation faced by all cities operating transit service in this country. Unlike some other cities, where a much more extensive rail element has been provided initially, the 6.4-mile LRRT line accounts for about 20 percent of the total cost of operating transit service in the Buffalo-Amherst-Tonawandas corridor. Thus, the level of service in the corridor can be effectively "tailored" to the amount of subsidy available to meet operating deficits each year. If sufficient subsidy cannot be provided by all levels of government involved, service in the corridor can be reduced, or system fares raised to make up the difference.

Buffalo's transit system has a long history of sound fiscally conservative management. In a 10-year period (1965-1975), operating expenses for the public transportation system serving the Niagara Frontier increased by 22 percent. Nationwide, during the same period, transit operating expenses increased by an amount seven times greater. Experience of the NFT Metro Bus System in the most recent 5 years is shown in Table 5-4.

This represents an increase in operating expenses of 50 percent or 10.6 percent compounded annually.

Present estimates show that a combined bus/rail transit system would produce revenue shortfalls of the same general order of magnitude as an all-bus system. However, potential deficits per rider are projected to be less for the combined system. The LRRT system would carry almost 80 percent more annual riders in 1995, and therefore, the operating deficit per passenger is thus reduced almost 40 percent below that forecast for the improved bus system. Estimates in constant 1974 dollars are that this rail/bus sytem will have revenues, costs, and operating assistance needs as shown in Table 5-5.

Current LRRT forecasts do not assume any major changes in the economy or public policy which would drastically influence a change in level of automobile use. Energy shortages, energy costs and national policies relative to energy and air quality could cause reduced automobile and higher transit use in the future. If such changes fully materialize, then Buffalo's estimates of ridership would be expected to be conservative and its projected operating assistance reduced accordingly.

It is also possible that transit ridership might have been overestimated. If public policy were to dictate that service not be decreased, in spite of reduced ridership, and that fares not be increased, the transit revenue which would be required in 1995 from other public sources is shown in 1974 dollars in Table 5-6 for ridership levels of 10, 20, and 50 percent below that projected.

Future public tax support required for public transportation will depend heavily on inflation. The effect of inflation on the costs shown on Table 5-5 is shown in Table 5-7 for various annual rates of inflation.

This hypothesis, with a 7 percent inflation rate, would result in 20 percent of transit costs being funded from fare-box revenue by 1995 as compared with 60 percent today. It should be noted that today, transit sytems in U.S. cities recover 8 to 80 percent of operating expenses from their fare-box revenues, depending largely on the availability of operating assistance from other sources.

In the unlikely combination of events where fares were not increased, and service was not reduced, while ridership was only half that projected, and costs experienced an inflation rate of 7 percent, operating assistance requirements would increase to about $90 million annually by 1995. This could only result from conscious public-policy decisions, by Federal, State and/or local government, to maintain fares and service levels in spite of drastically reduced ridership.

The exact amount of government subsidy required to support public transportation in the future is difficult to estimate. Through a current Ridership and Operations Analysis study, the NFTA is attempting to provide the best possible projections of, not only future costs, but alternative strategies for meeting them. The results of this study will be made available to the public upon its completion.

Such socially and politically unpopular means as increasing transit fares, reducing bus service and/or increasing public assistance to transit will become necessary at some future point. One of the traditional sources of transit revenue, and one which would certainly be used if other sources were not available from Federal, State and local government, is increased fares. For example, if transit costs experienced a 7-percent annual inflation rate and fares were increased at the same rate, then the basic transit fare would be 70¢ by 1983, and $1.50 by 1995. Such fare increases would not affect projected ridership since wages and other costs would be expected to rise at about the same rate. However, unless transit fares were increased at a rate faster than inflation, future public tax support would also have to increase. This is shown in Table 5-8 for different sample inflation rates. The operating assistance per passenger required for the LRRT/ Bus alternative is projected to be lower than that required for an all-bus alternative.

The Federal government formula assistance, known as UMTA Section 5 funds, was first made available under legislation passed by Congress in 1975. These funds can be utilized for either capital or operating assistance. The Buffalo Urbanized Area's share of the apportionments is shown in Table 5-9 by year as printed in the Federal Register of January 13, 1975. State and local governments must contribute a non-fare box amount at least equal to that used for operating assistance.

Continuation of this program and its level of funding are currently being discussed by the Executive Branch and the Congress. If it became necessary to use the full amount of the Federal apportionment for operating assistance, State and local contributions would have to increase. New York State has had an operating assistance program since 1975. This program has provided the following amounts for the New York State fiscal years shown.

Year	Amount($000)
1975	1,623
1976	1,770
1977	1,770
1978	1,770

State law mandates that an equal amount be contributed by counties. Counties which fail to budget transit operating assistance have the mandated amounts deducted from State Aid which the counties would otherwise receive. The amounts are computed from estimates made by each State transit authority. It is conceivable that NFTA could obtain more funds from this program if necessary. The State Department of Transportation is required to evaluate this program annually.

In a recent report, NYSDOT considered a variety of tax sources and their potential statewide yields in 1975 dollars as shown in Table 5-10. The NFTA Transit District (Erie and Niagara Counties) represents 7 percent of New York State on a per capital basis.

In future years, the community will have the opportunity to assess the need for and worth of public transportation on the Niagara Frontier. Decisions will have to be made at all levels of government as to the specific size of the annual subsidy each can support.

A number of transit agencies have been granted direct taxing authority, or have had tax revenues earmarked for their use. Such taxes in use by transit districts include property taxes, personal property taxes, household taxes, employee taxes, payroll taxes, motor vehicle excise taxes, business taxes, sales taxes and cigarette taxes.

Still another means of reducing operating assistance requirements is to reduce operating costs by reducing service. Buffalo's LRRT will be built in a densely populated corridor which has traditionally generated high transit usage. Because of its location, the rail system would be the last affected by service cuts necessitated by budget constraints. The level of service in the system can be effectively tailored to the funds available to meet annual expenses. If sufficient non-fare box revenue is not provided by the various levels of government, then service can be reduced and/or fares raised to make up the difference.

Citizens of Buffalo and Erie County have traditionally supported public transporation as evidenced by their strong affirmative votes on several statewide transportation bond issues, including the successful one of 1967. It is unlikely that they would permit transit service to deteriorate to the point where Main Street bus service or LRRT service would be affected. Public transportation, like fire and police protection, water and other utilities, is an essential public service. Operating assistance is required by all existing public transit systems in North America. However, since an efficient mass transit system benefits all segments of the population, not just transit users, its costs are expected to be borne by all.

(See page 5-22.)

10.2.9 - Affirmative Action, Employment of Handicapped and Increased Accessibility for Elderly (Handicapped) (see also 10.3.7)

Reference to employment opportunities for the handicapped and minorities and accessibility of the system for both handicapped and elderly people was made by Richard May; the Niagara Frontier Vocational Rehabilitation Center/United Cerebral Palsy Association; Hamlin Park Taxpayers and Community Association and Jerome Johnson.

Comment

"The impact statement insinuates that the rapid transit will provide greater accessibility for the City's 30,000 handicapped persons who are able to use public transit, but the statement does not specify what design provisions have been made for handicapped riders. How are the handicapped suppose to get to the station? Are there plans for a dial-a-bus system? Will people in wheel-chairs, or those who use walkers or canes, be able to use the rapid? Will there be elevators, as well as escalators in the stations? Will ramps be provided and obstacles like curbs be removed? Will the handicapped and elderly be frightened by fast closing doors or find that they are forced to stand on the rapid."

"At this time, I would like to request that the Chairman and the Board of Commissioners give strong consideration of the employment of the handicapped in all facets of the transit system's operation. Programs can be arranged for the specific and direct training of handicapped individuals for employment in the repair yards, the offices, the operational units and the toll collection of the entire Light Rail Rapid Transit system. Experience has indicated that a trained handicapped individual makes a good employee."

"The impact statement should indicate, strongly, the need minority business development and affirmative action as a necessary factor of the social-economic impact study. Environments are conditions under which people live. Therefore, regardless of the majestic marble elegant structures and skyscrapers, what we are envisioning is if there is denial of people on the lowest social-economic levels to gain meaningful employment, then your study is not complete."

"I would like to speak to the affirmative action plan. Having looked over the proposal, the best I can say is at best the affirmative action plan is minimal. I would like to make these recommendations that the affirmative action plan stipulate specific goals and objectives towards hiring minorities and women at all levels of employment but particularly in the middle and upper management levels and that the affirmative action plan have specific goals and objectives for the numbers of minorities that would be hired in each of the levels of employment so that the total number of minorities and women employed in the project, in the total project, would equal and make up the unemployment deray (sic) in the City of Buffalo.

I think that furthermore the affirmative action plan should mandate that the goals and objectives that are set, the specific goals and objectives that are set are met within specified time frames because if minorities and women cannot be found who are qualified for the positions, I think the affirmative action plan should mandate specific job opportunity training programs designed to train minorities and women for those jobs for which they may not qualify."

Response

The NFTA, through its Office of Equal Employment Opportunity, is currently working in conjunction with the Western New York Manpower Consortium, an organization representing twelve (12) Buffalo-based Civil Rights and Affirmative Action groups. The purpose of this interaction is to define specific needs the NFTA may have to establish Affirmative Action plans for the LRRT project in addition to those currently in operation throughout the Authority. The present NFTA document covering this area has been approved by the NFTA Board of Commissioners and is under continuous review by the Division of Civil Rights, Urban Mass Transportation Administration.

Liaison will be maintained with numerous area organizations serving the handicapped to permit maximum consideration of the employment needs of that part of the population. Accessibility to the completed Metrorail for handicapped and elderly persons will be a prerequisite from basic planning through final construction and operation stages, as noted in 10.3.7.

10.2.10 - Snow Removal in Mall Area

This question was posed by the Forest District Civic Association.

Comment

"In the Mall area snow will be pushed off the tracks by the Authority's plows but who will pay for the cost of removing the snow from the service lanes that must be kept open at all times on both sides of the tracks? This problem should be addressed at this time."

Response

Standard snow removal equipment such as blowers and/or plows will be an integral part of LRRT track maintenance on trains in the at-grade section. Snow removal in the Mall itself will be a municipal, rather than an NFTA responsibility.

10.2.11 - Police and Fire Protection

This was also brought up by the Forest District Civic Association.

Comment

"There are many other problems that affect the City of Buffalo such as fire protection for the stations and subway."

"When the system is placed in operation, sophisticated fire fighting and rescue equipment will be needed especially in the deep tunnel sections. Evacuation of passengers will pose problems in the event of a power failure or accident.

Movement of fire equipment in the Central Business District may be restricted because of the closing of several cross-town streets. Deployment of aerial ladders in the Main Street area between Tupper and the southern terminus of the line may be hazardous because of overhead trolley wires."

Response

Consultants under contract to NFTA are now designing an automated fire detection/protection system for the LRRT. Work on this aspect of the Metrorail project has only recently begun, so specific information is not yet available, but it will remain a major concern that will be thoroughly dealt with by the NFTA.

10.2.12 - Coordination With the City of Buffalo

Finally, from the Forest District Civic Association.

Comment

"It is quite apparent that the City of Buffalo will have a considerable involvement in the project both during construction and operation of the system. To expedite solutions of the problems and to expedite construction, we suggest that qualified representatives be appointed by the City to closely work with the designers. These representatives should preferably be, where feasible, career civil service employees who are intimately acquainted with the operations of the departments they will represent.

These agencies should have representatives:

- *City Engineer*
- *Division of Water*
- *Buffalo Sewer Authority*
- *Buffalo Fire Department*
- *Buffalo Police Department*
- *Department of Transportation*
- *Department of Finance & Administration*
- *Corporation Counsel*
- *City Comptroller*
- *Buffalo Common Council*
- *Mayor's Office*
- *Buffalo Planning Board"*

Response

With the hiring of major consultants to begin general architecture/engineering design work on the LRRT project, and an increase in its own staff, the NFTA is now in an excellent position to set up and maintain the necessary liaisons referred to above and this is presently being done. Project personnel will continue to work with appropriate departments of both City and County government, as well as with interested organizations and individuals in the community.

10.3 - Governmental Agency Review

Comments on the draft EIS were received from seven governmental agencies, six Federal and one State. Maintaining the same format used in 10.2, issues raised by more than one source have been consolidated and responses follow each. Principal points of concern were as follows:

1. Noise and Acoustical Considerations
2. Archeological Resources
3. Air Pollution
4. Floodplain Protection
5. Park/Recreation/Open Space Lands, Plans and Growth in Corridor
6. Construction Impacts
7. Accessibility for Handicapped Persons
8. Visual Impacts of Overhead Wires and Mitigating Measures
9. Thruway Authority Parking Lot Revenues
10. Costs of Improved Bus Service, Traffic Improvements
11. NFTC Bus Priority System

10.3.1 - Noise and Acoustical Considerations

Wilson, Ihrig and Associates, Incorporated, headed by Dr. George Wilson, has been retained by consultants to the NFTA to provide acoustical consulting services on the LRRT project. Responses to all comments on noise have been discussed in detail with Mr. Wilson and checked for accuracy.

Comment

Improve ambient noise data--use L_{eq} descriptor or a combination of L_{10}, L_{50}, L_{90} levels. Describe noise measuring equipment and methodology, i.e., why was Site 24 particularly selected for 24-hour monitoring? Consider duration of exposure to construction noise for a given section of the corridor.
(Environmental Protection Agency)

Response

Ambient Noise - With regard to ambient noise data, where traffic noise dominates the background, the relationship between L_{eq} and L_{50} is generally constant. There being nothing unusual in Buffalo's noise environment, the statistical analysis performed in local studies (Ref. 10) was similar to that for other urban areas. For the 24-hour monitoring, three sites were chosen for study because they were good examples of the most noise-sensitive residential areas and all three formed part of the overall ambient noise evaluation study. While only one of these, Site 24, falls within the area pertinent to the proposed LRRT project, all three are shown in Figure 4-5 of Ref. 5.

Equipment and Methodology - Noise measuring equipment consisted of sound level meters meeting ANSI Standard S1.4-1971 for Type 2 instruments. Measurements were taken by two-man teams during the period 20 November-12 December 1973. The teams verified meter calibration periodically during the measurement period.

During the general measurement program involving all 31 stations listed in Table 2-4, a slow root mean square (rms) meter response was used in recording median (L_{50}) A-weighted sound levels at 15-second intervals for 5-minute periods during the times of day selected for sampling. In addition, peak (L_{max}) noise levels representing singularly loud noise events were recorded at these same sites. These data do not form a basis for determining L_{eq}.

During the detailed measurement program at Station 24 and the other two sites, sound levels were recorded continuously over selected 10-minute periods of the 24-hour day. The unweighted signals and calibration tones were taped in the field for later analysis in the laboratory, the signals were A-weighted, fed into an rms averaging circuit, and stored in digital form on magnetic tape. These data were then statistically analyzed via computer for exceedance probability to determine L_1, L_{10}, L_{50}, L_{90}, and L_{eq}.

Construction Noise Exposure - Section (b) of Ref. 11 includes construction noise specifications which detail duration limits at various sound levels as established by OSHA for protection of both the general public and workmen. In addition, noise limitations for various times of day and types of working environment--e.g., residential or commercial--are spelled out in Ref. 11 and their applicability to various sections of the proposed LRRT line is described in Section 5. More stringent limitations as defined by Federal, State, or local regulations may supercede those referenced in Ref. 11--this will be determined at the time construction specifications are actually prepared.

Specific details on the duration of construction noise and/or vibration cannot be addressed in the EIS as the procedures, machinery and schedules to be employed by the contractor are not known at this time. These matters are and must remain contractor options, subject to governmental regulations and NFTA control.

The NFTA has insured reasonable, site compatible noise levels by specifying limits that will result in lower levels than are traditionally associated with heavy construction activities. There are no project areas where noise levels will exceed the APTA guidelines which will constitute LRRT design parameters. The application of these noise limits will result in construction and operating noise levels being considerably less than that experienced in the building of other heavy construction projects.

Comment

Include acoustical consultant recommendations and steps that will be taken to implement them in resilient rail mounting opposite St. Paul's Cathedral.
(Acting Assistant Secretary for Environment, Safety and Consumer Affairs, U.S. Department of Transportation)

More complete information documenting the vibrary impact on (historic) properties during and after construction should be included.
(Advisory Council on Historic Preservation)

Response

Specifics for acoustical work relating to the area near St. Paul's Cathedral will be developed during the final design phase. The necessity for a vibration-isolated or floating track slab designed specifically for this part of the transit line has already been recognized. There will be no vibration impact on any other historic or potential historic structure in the transit corridor.

Comment

Provide comprehensive listing of potential noise-sensitive receptors such as schools, churches, hospitals, etc.
(New York State Department of Environmental Conservation)

Response

This listing appears on pages 2-10 and 2-11 of the EIS and is based on material contained in Ref. 10.

Comment

Explain HUD criteria in terms of L_{eq}.
(New York State Department of Environmental Conservation)

Response

The HUD criterion in terms of L_{eq} is approximately 75 dBA for the boundary between normally acceptable and normally unacceptable noise environments.

Comment

"Consideration should be given to the additional noise generated in the vicinity of the tunnel portal and the vent outlets. Acoustic treatment is usually required several hundred feet in the case of tunnel portals."
(New York State Department of Environmental Conservation)

Response

Contrary to the above, no additional noise is generated at a tunnel portal by trains beyond normal running noise. The NFTA has determined that no acoustic treatment at portals has been either re-equired or used on other transit systems because there is no special noise problem at such locations. Acoustical design criteria prepared for APTA will be used in the design of acoustical protection at all ventilation shaft outlets. Design will take into account the operating characteristics of the trains, ventilation equipment and the character of the neighborhood at each shaft location.

Comment

Consider noise generated by auto and bus traffic generated at South Campus Terminal.
(New York State Department of Environmental Conservation)

Response

Present estimates show that traffic at the station in question would have to double in order to increase that area's noise level by 3 dBA, meaning levels would remain within acceptable limits, with a negligible perceptible increase in noise levels. Specific attention will be paid to the acoustical design of this terminal station to mitigate any adverse acoustical effects of bus traffic on the University.

Comment

"Consideration should be given to landscaped berms and/or other methods to reduce noise and visual impacts associated with yard facilities."
(New York State Department of Environmental Conservation)

Response

With selection of the abandoned D,L&W terminal as a yard site for the proposed project, this consideration becomes moot, as the entire site will, in effect, be enclosed in a presently existing structure which will be rehabilitated. Therefore any visual impacts will be positive and noise will be considerably less than in an open site with berms.

10.3.2 - Archeological and Historic Resources

Comment

"...the DEIS contains insufficient documentation on pages 6-4 to 6-6 to identify both prehistoric and historical archeological sites

in the project area that may be eligible for inclusion in the National Register of Historic Places"..."A letter dated May 4, 1977, from the State Historic Preservation Officer to Mr. Kenneth E. Vought, Director, UMTA Field Office, Region 2, has come to our attention and is in complete accordance with that view."
(Advisory Council on Historic Preservation)

"A copy of the May 4...letter...should be appended to the final EIS".
(Acting Assistant Secretary for Environment, Safety and Consumer Affairs, U.S. Department of Transportation)

"...the final environmental statement...should show that the Urban Mass Transporation Administration, Department of Transportation has fulfilled the requirements of 36 CFR800 in its determination of impacts on historic sites."

"We note by reference to the work of Mr. Trubowitz that potentially significant archeological sites and resources yet to be identified are subject to serious adverse effects by this project. We urgently support the recommendation of Mr. Trubowitz for a major effort of test diggings to minimize and possibly avoid inadvertent damage or loss to archeological values. It may prove to be too late or ineffective to relegate serious protective considerations to mitigative measures of recovery during construction. Careful study now, dealing with the knowledge of original ground disturbance by installation of existing streets and adjacent buildings, would be most helpful to provide firmer data to assist final design work and provide anticipatory information for construction operations. As much of these further archeological investigations should be completed prior to finishing the final environmental statement so as much conclusory outlook as possible can be presented therein." (sic)
(U.S. Department of the Interior, Northeast Region)

Response

A copy of the May 4, 1977, letter from the New York State Historic Preservation Officer (SHPO) appears at the end of Section 6, together with an October 11, 1977 letter of concurrence with NFTA's plans for the proposed project. As stated on page 6-4, the NFTA plans to specify in its construction contracts that work at any site yielding historic artifacts will be delayed pending evaluation of the find by qualified archeologists.

Recognizing that the project area is part of an urban corridor which has undergone extensive sub-surface disturbance over a period of many years, Professor Neal Trubowitz, in his letter of May 20, 1977, to Acres American Incorporated, notes that the few sites which might be in the area of the LRRT construction have not been adequately located in the past.

The NFTA believes that the best policy would be to allow archeological investigators to proceed concurrently with construction. Special precautions will be taken in the vicinity of Sites 171 and 168 (pages 6-5 and 6-6) to allow archeological investigations prior to extensive sub-pavement disturbance.

10.3.3 - Air Pollution

Comment

Expand and clarify projected air pollutants (Table 5-2), comparing those for main alternatives to regional pollution totals. (U.S. Department of Health, Education and Welfare)

Response

Section 5.1 notes that the proposed LRRT system will have only a modest impact on air quality in the Buffalo-Amherst Corridor (Table 5-2), with 4- to 6-percent reductions in carbon monoxide, hydrocarbons, and particulates partially offset by 1- to 5-percent increases in nitrogen oxides and sulfur oxides. The relative differences in regional or Corridor air quality between alternative transit systems are not great enough to warrant a detailed analysis for each of the myriad systems considered. A greater impact on air quality would result from implementation of auto disincentives in conjunction with any of the alternatives to encourage widespread use of public transit.

A few generalizations on air quality are evident: the various transit alternatives would improve air quality roughly in proportion to their ability to convert auto users to public transit. Thus, the patronage figures shown in Section 3 provide a crude measure of effectiveness. The figures show that busbased alternatives are less successful in attracting patrons. Also, buses emit more nitrogen oxides and sulfur oxides. Rail-based alternatives have an inherent advantage over bus-based systems in that the former are more attractive to commuters. Studies have shown that a rail commuter is willing to walk up to 1600 feet to the station, whereas bus patrons generally are unwilling to hike over 800 feet. It is apparent from patronage figures that the more extensive rail systems would be better in terms of air quality. First, a rail extension would convert more auto users to public transit than feeder buses serving the same area; second, the rail extension would have fewer emissions than the feeder buses it would replace. Thus, in terms of air quality, the proposed LRRT system would be notably superior to the "No Action" and bus-based alternatives, but less efficient than rail systems reaching beyond the Main Street corridor, say to Amherst and the Tonawandas as well.

Comment

Provide analysis of air pollution emissions at present, on completion of project and in future to identify year of maximum emissions for area affected by project and power plant supplying it.
(New York State Department of Environmental Conservation)

Response

An expansion of the air quality analysis of sufficient magnitude to include the data suggested would be subject to serious uncertainties since hard estimates of the LRRT system operation exist only for the year 1995.

Comment

"There was no microscale air quality analysis performed. If present concentrations of transporation-related pollutants were provided, an analysis of the effects the proposed project would have on these pollutants could then be performed. These effects could be addressed for the feeder bus system, auto trips to park-and-ride lots or to local street parking, and the diversion of auto trips to transit."
(New York State Department of Environmental Conservation)

Response

Microscale air quality analyses were not performed because local air quality monitoring is not done for street level pollutant concentrations. In this industrial area, vehicular emissions are considered to be of secondary concern to the regional air pollution picture.

10.3.4 - Floodplain Protection (See also 10.2.3)

Comment

"The final EIS should describe the measures which will be taken to protect the Ellicott Creek Floodplain, as required by Executive Orders 11988.... and 11990.... issued by the President on May 24, 1977."
(Acting Assistant Secretary for Environment, Safety and Consumer Affairs, U.S. Department of Transportation)

Response

Alternatives to the airport and harbor disposal sites will continue to be investigated prior to construction to determine if there are optional uses or means of disposal for the spoil material. Should either or both of the NFTA-owned sites be selected in the final analysis, studies will be undertaken to ensure that disposal is in accordance with applicable Federal, State, and local regulations.

The comment specifically cites Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands). With regard to the former, Section 5 of this EIS already states that care will be taken to ensure that spoil does not intrude into the floodplain to the extent that flow capacity is reduced and local flooding results. Also, although spoil is not "flood-susceptible" in the sense of a structural improvement, careful placement and post-disposal protection (via vegetative or rock cover) will prevent erosion which might result in water quality degradation or downstream disposition of the eroded material. All necessary permits for floodplain disposal activities will be obtained from the appropriate agencies, e.g., the U.S. Army Corps of Engineers.

Section 8 of Executive Order 11990 precludes its applying to the Buffalo Metrorail project or any other project for which a draft or final EIS is filed prior to October 1977. Nevertheless, existing regulations provide a strong basis for protection of wetlands. Accordingly, final design and construction specifications will fully consider possible adverse impacts on wetlands adjoining Ellicott Creek and the harbor disposal site as well as preventive or mitigative measures. For the most part, modern construction and waste disposal practices will suffice. For example, ecologists can evaluate the existing flora and fauna and suggest relatively insensitive areas where disposal would be ill-advised. Settling basins can be used to trap sediment which might otherwise be carried off by rainfall or snowmelt runoff in the period before a protective vegetative cover becomes established. Materials presenting a potential contaminated leachate problem could be placed in a lined basin with a subdrainage system to collect the leachate for treatment. If deemed necessary any or all of the foregoing measures will be implemented. All possible care will be taken to comply with the intent of E.O. 11990.

10.3.5 - Park/Recreation/Open Space Lands, Plans and Growth in Corridor

Comment

"Additional information should be provided on the city, town, county and regional land use plans. With this information, the alternatives could then be discussed as to whether they are compatible or not with the existing land use plans."
(New York State Department of Environmental Conservation)

Response

Within the Metrorail service corridor, all plans reference a rail rapid transit system. Because the initial increment of the system will be located wholely within the City of Buffalo, Buffalo's plans have received the greatest emphasis. The proposed LRRT project is compatible with all existing area plans for land use, transportation, economic development, etc.

Comment

"Include additional information regarding project effects, if any, on open space, parks and recreation, existing or proposed, with accompanying map."
(U.S. Department of the Interior, New York State Department of Environmental Conservation)

Response

Construction of the LRRT will not take any 4(f) land and will have no environmental impacts on any of these areas, which are listed on pages 4-39 through 4-43.

Comment

"Page 8-1 states that growth will be centralized along the transit route. The effect of this growth upon existing schools and health facilities, or the possible need for new facilities are not discussed in the draft but should be addressed in the final EIS."
(U.S. Department of Health, Education and Welfare)

Response

First, it is to be noted that a massive population influx necessitating possible expansion of existing school/health facilities is not projected in response to the proposed LRRT system. However, the presence of the LRRT system might help to reverse the central city population loss that has been occurring in recent years. Also, improved public transit will make existing inner city health facilities more accessible to patients residing in outlying areas. Better utilization of existing schools and health facilities should result in improved efficiency.

10.3.6 - Construction Impact

Comment

"The final EIS should include some elaboration as to the steps that will be taken to mitigate the adverse impacts of construction upon businesses located along the Main Street corridor"
(Acting Assistant Secretary for Environment, Safety and Consumer Affairs, U.S. Department of Transportation)

Response

All area merchants have been publicly assured by the NFTA and its consultants that construction will be carefully staged, possibly on a block-by-block basis and pedestrian access maintained so as to cause the least possible disruption to both businesses and residences along the route.

Comment

The short-term impact of construction generated fugitive dust needs to be more fully addressed. Air quality monitors in the vicinity of this project show suspended particulate concentration levels close to national standards--particularly in areas where at-grade construction will be employed. We recommend that the statement be amended to include a discussion of the use of dust control techniques at construction sites.
(*New York State Department of Environmental Conservation*)

Response

Historically, dust at construction sites has been controlled with water, oil or calcium chloride. Tarpaulins have been used on trucks to contain fill or spoils being transported to and from project sites. Section 380A of the New York State Vehicle and Traffic Law now provides that trucks carrying construction spoils must have sides higher than the load they carry and the load must be covered. Specific measures to control fugitive dust will be written into project construction contracts and the efficacy of these measures will be closely monitored by NFTA staff.

The recently-announced closing of several of Bethlehem Steel Company's coke ovens, which will occur before construction on the Metrorail begins, is estimated to reduce air pollution in the project area considerably, so the ambient air quality should be much less marginal in terms of national particulate standards. Every effort will be made to minimize this source of contamination on the LRRT project.

10.3.7 - Accessibility for Handicapped Persons

Comment

"We are especially concerned that this project be designed for full accessibility by the handicapped. We note projections that 22 percent of the population will be 60 years older by 1980. Although statements have been made that the project will be accessible to the handicapped, there is no elaboration as to what standards are to be followed. We suggest that the American National Standard A117.1-1961 (Reaffirmed 1971), "Specifications for Making Buildings and Facilities Accessible to and Usable by the Physically Handicapped" be used as a guide in developing plans for the stations and ancillary facilities."
(*U.S. Department of Health, Education and Welfare*)

Response

(See also 10.2.9.)

The NFTA is familiar with the more widely used handicapped building standards for handicapped persons. In addition, staff is soliciting the participation and advice of individuals and organizations serving the handicapped to benefit from their years of first-hand experience in coping with transit facilities throughout the world. The NFTA hopes in this way to be made aware of possible shortcomings in existing building standards and new ideas that might be advantageous to the handicapped. The standards referred to by HEW will be given every consideration, as will other well-known guides, in design stages of the project.

10.3.8 - Visual Impacts of Overhead Wires and Mitigating Measures

Comment

Further discussion of the visual intrusion of the overhead wires should be presented since the City of Buffalo, in the TOPICS project, has preferred a mastarm instead of a span wire installation.
(New York State Department of Environmental Conservation)

Response

This topic was addressed on pages 5-52 and 53 of the EIS. The choice of catenary support system will be made in the final design stage of the project based on engineering feasibility, cost and aesthetics. Regardless of the system adopted, catenary lines will present a visual intrusion in the areas between the six stations of the at-grade portion of the line on Main Street. This can be mitigated through innovative design in the mall area, a challenge which has been successfully met in other cities with similar transit lines.

10.3.9 - Thruway Authority Parking Lot Revenues

Comment

At the corners of Main and Exchange Streets, and Washington and Exchange Streets, are parking lots from which the New York State Thruway Authority receives revenue (approximately $20,000 annually) through a rental agreement with the Office of General Services. The FEIS should discuss the impact(s) the proposed project will have on those lots and, in addition, should consider compensation measures if in fact those lots will be destroyed.
(New York State Department of Environmental Conservation)

Response

The fate of these lots depends upon the choice of yard site. However, their loss must be considered a minor impact, considering the revenues received yearly by the Thruway Authority.

10.3.10 - Costs of Improved Bus Service, Traffic Improvements (See also 10.2.6)

Comment

Identify costs of improved bus service to feed LRRT and costs of required traffic improvements.
(New York State Department of Environmental Conservation)

Response

The $22,680,000 estimated cost of the improvements necessary to complete an adequate feeder bus network to compliment the LRRT is included in Metrorail project costs, which are given in 1974 dollars (Ref. 28).

The main traffic improvement scheduled to take place in the transit corridor is the Elm/Oak Arterial. Construction on this project should begin before the end of 1977.

The Elm Oak Arterial to Delaware Avenue, Phase I CBD Improvement and Pearl Street Connector, will be designed by New York State for the City of Buffalo. This $4.4 million dollar project is proposed to begin design in fiscal year 1978 and construction in fiscal year 1980.

Minor adjustments to existing traffic signals in timing and placement of signal heads will be necessary in adjacent traffic corridors. These adjustments will be made under the authority of the City of Buffalo Department of Transportation.

10.3.11 - NFTA Bus Priority System

Comment

The proposed bus priority system on Main Street and/or Delaware Avenue currently being developed by the Niagara Frontier Transportation Committee should be described."
(New York State Department of Environmental Conservation)

Response

The proposed Main Street bus-biasing FAUS project was originally intended as an interim measure to build public transit patronage prior to construction of a rail line. The project is dormat and has been for some time. It is therefore not germane to this EIS, nor is the Delaware Avenue project which has just been approved for study design only.

10.4 - Governmental Agency Review Letters

1. Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

2. Acting Assistant Secretary for Environment
Safety and Consumer Affairs
U.S. Department of Transportation
Washington, D.C. 20590

3. Department of Health, Education, and Welfare
Office of the Secretary
Washington, D.C. 20201

4. United States Department of the Interior
Office of the Secretary, Northeast Region
150 Causeway Street, Room 1304
Boston, Massachusetts 02114

5. U.S. Environmental Protection Agency
Region II, 26 Federal Plaza
New York, New York 10007

6. Advisory Council on Historic Preservation
1522 K Street, N.W.
Washington, D.C. 20005

7. New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

NOTE: Two other agencies, the New York State Department of Transportation and the Erie County Planning Division, presented their comments at the July 14th public hearing and are therefore included in Section 10.2 rather than 10.3.

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

22 June 1977

Peter Benjamin, Director
Office of Program Analysis
Urban Mass Transportation Administration
Washington, DC 20590

Dear Mr. Benjamin:

Thank you for providing the District with a copy of your Draft Environmental Impact Statement on the Buffalo Light Rail Rapid Transit Project (UMTA Project No. NY-03-0072) received 15 June 1977.

My Environmental staff has reviewed the Statement and find the Report complete in its overall assessment of the proposed Project. The basic format follows acceptable guidelines and requirements for such a Statement. Content is very specific and informative as to alternatives, scope and impacts both adverse as well as beneficial. Accordingly, I see no problem with the Statement as presented.

The treatment of Cultural Resources is fairly complete and it appears that potential impacts were seriously considered during the planning process. Only two comments appear warranted after a quick review of the document.

a. In the vicinity of historic structures, especially those on the National Register of Historic Places or eligible for inclusion, an attempt should be made to insure that station design blends aesthetically with the existing structures.

b. On page 6-4, it is stated that two prehistoric sites and portions of the original Buffalo Village settlement may be affected by construction. I would suggest in areas of potential sensitivity such as this that rather then relying on construction crews to recognize artifacts and stopping construction an archaeologist should be hired to monitor construction in the sensitive area.

I hope these comments are constructive to the project and appreciate the opportunity to review the Draft Statement.

Sincerely yours,

Daniel D. Ludwig

DANIEL D. LUDWIG
Colonel, Corps of Engineers
District Engineer

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UPA-30

Form DOT F 1320.1 (1-67)

UNITED STATES GOVERNMENT

DEPARTMENT OF TRANSPORTATION

OFFICE OF THE SECRETARY

Memorandum

DATE: JUN 30 1977

SUBJECT: New York, UMTA Draft Environmental Impact Statement, Buffalo Light Rail Rapid Transit, NY-03-0072

In reply refer to:

RECEIVED

JUL 6 - 1977

UTA-30

FROM : Acting Assistant Secretary for Environment, Safety, and Consumer Affairs

TO : Director, Office of Program Analysis

The subject draft EIS has been reviewed by this office and the following comments are offered for your consideration:

1. If either of the two potential spoil disposal sites located at the Greater Buffalo International Airport is ultimately selected, the final EIS should describe the measures which will be taken to protect the Ellicott Creek Floodplain, as required by Executive Orders 11988 ("Floodplain Management") and 11990 ("Protection of Wetlands"), issued by the President on May 24, 1977.

2. In regard to the need for a resilient rail mounting system for the section of track opposite St. Paul's Cathedral, the final EIS should include the recommendations made by the acoustical consultant and should indicate the steps that will be taken to implement those recommendations.

3. The final EIS should include some elaboration as to the steps that will be taken to mitigate the adverse impacts of construction upon businesses located along the Main Street corridor.

4. A copy of the May 4, 1977, letter to UMTA, in which the New York State Historic Preservation Officer (SHPO) confirmed that the project will have no effect upon structures included in or eligible for inclusion in the National Register, should be appended to the final EIS.

5. The final EIS should include verification by the New York SHPO to the effect that no archaeological sites will be adversely affected by construction of the project.

We appreciate the opportunity to review and comment on this proposed project and look forward to receiving the final EIS.

M Convisser

Martin Convisser

JUL 11

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20201

RECD

JUL 1 3 1977

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Mr. Peter Benjamin
Director
Office of Program Analysis
Department of Transportation
Urban Mass Transportation Administration
Washington, D.C. 20590

UTA-30

Dear Sir:

Thank you for the opportunity to review the draft Environmental Impact Statement on the Buffalo Light Rail Rapid Transit Project.

We are especially concerned that this project be designed for full accessibility by the handicapped. We note projections that 22% of the population will be 60 years older by 1980. Although statements have been made that the project will be accessible to the handicapped, there is no elaboration as to what standards are to be followed. We suggest that the American National Standard A117.1 - 1961 (Reaffirmed 1971), "Specifications for Making Buildings and Facilities Accessible to and Usable by the Physically Handicapped" be used as a guide in developing plans for the stations and ancillary facilities.

Page 8-1 states that growth will be centralized along the transit route. The effect of this growth upon existing schools and health facilities, or the possible need for new facilities are not discussed in the draft but should be addressed in the final EIS.

Finally the statement may be improved by expansion and clarification of the projected air pollutants in table 5-2. Air pollutants for the main alternatives should also be compared to the regional pollution totals. Simple displacement of pollutants outside the corridor may have unwanted secondary effects.

Sincerely,

Charles Custard

Charles Custard
Director
Office of Environmental Affairs

United States Department of the Interior

OFFICE OF THE SECRETARY
NORTHEAST REGION
150 Causeway Street, Room 1304
Boston, Massachusetts 02114

ER-77/545

July 20, 1977

Dear Mr. Benjamin:

This is in response to a request for the Department of the Interior's comments on the draft environmental statement for the Buffalo Light Rail Rapid Transit System, Buffalo, Erie County, New York.

It would seem that adequate consideration for the protection of historic sites has been given serious treatment by the showing of numerous site identifications and reference to a letter of comment by the State Historic Preservation Officer. This should all be clarified in the final environmental statement by display of the State Historic Preservation Officer's comments. Both the final environmental statement and the section 4(f) statement should show that the Urban Mass Transportation Administration, Department of Transportation has fulfilled the requirements of 36 CFR 800 in its determination of impacts on historic sites. If there are any sites in question as to eligibility for listing on the National Register of Historic Places, the Chief, Office of Archeology and Historic Preservation, National Park Service, Washington, D.C. 20240 will, upon request, provide a determination of eligibility.

We note by reference to the work of Mr. Trubowitz that potentially significant archeological sites and resources yet to be identified are subject to serious adverse effects by this project. We urgently support the recommendation of Mr. Trubowitz for a major effort of test diggings to minimize and possibly avoid inadvertent damage or loss to archeological values. It may prove to be too late or ineffective to relegate serious protective considerations to mitigative measures of recovery during construction. Careful study now, dealing with the knowledge of original ground disturbance by installation of existing streets and adjacent buildings, would be most helpful to provide firmer data to assist final design work and provide anticipatory information for construction operations. As much of these further archeological investigations should be completed prior to finishing the final environmental statement so as much conclusory outlook as possible can be presented therein.

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

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JUL 27 1977
UMA-30

Mr. Peter Benjamin, Washington, D.C. 20590

Also, we believe the statement could be strengthened if additional information were included regarding the project and its effects, if any, on parks and recreation. Although the 750 acre Forest Lawn Cemetery - Delaware Park area and the 112 acre Grover Cleveland Park are specifically mentioned, it is unclear whether any smaller recreation areas or parks are involved. A map illustrating the proposed right-of-way and those recreation areas existing or proposed should be included in the final statement. We would suggest also that thought be given to providing bicycle racks or other storage facilities at those stations at which such facilities might be warranted, and perhaps even on the cars themselves.

Sincerely yours,

William Patterson

William Patterson
Regional Environmental
Officer

Mr. Peter Benjamin
Director
Office of Program Analysis
Department of Transportation
Urban Mass Transportation Administration
Washington, D.C. 20590

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

Class. LO-2

20 JUL 1977

Mr. Peter Benjamin, Director
Office of Program Analysis
Department of Transportation
Urban Mass Transportation Administration
Washington, D.C. 20590

Dear Mr. Benjamin:

We have reviewed the draft environmental impact statement (EIS) issued by your office in connection with an application for federal capital grant assistance to construct and equip a 6.4-mile Light Rail Rapid Transit System in the Buffalo-Amherst corridor, Erie County, New York. The following comments are offered for your consideration in preparing the final EIS for the project.

The EPA has rated this EIS "LO-2" because we lack objection to the proposal (LO) and request additional information to complete our review (2).

The beneficial impacts of this proposal on air quality, transportation efficiency and energy conservation compel us to strongly recommend construction of the project. To encourage use of the system, CBD restrictions discussed in the draft EIS should be implemented.

Ambient noise data should be improved. The draft EIS presents data only in terms of L_{50} and L_{max}. L_{50} is not sensitive to intrusive noise events; L_{max} indicates only the single loudest event in the measuring period and is, therefore, of little statistical value. We suggest use of the more meaningful L_{eq} descriptor, or a combination of L_{10}, L_{50} and L_{90} levels.

The noise measuring equipment and methodology should be described. For instance, why was Site 24 selected for 24-hour monitoring? Consideration should also be given to the duration of exposure to construction noise for a given section of the proposed corridor.

We hope these comments assist you in describing the environmental impacts of this worthwhile project. One copy of the final EIS is requested for EPA review.

Sincerely yours,

Barbara M. Metzger

Barbara M. Metzger
Chief
Environmenal Impacts Branch

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

July 22, 1977

Mr. Peter Benjamin
Director
Office of Program Analysis
Urban Mass Transportation Administration
Department of Transportation
Washington, D. C. 20590

Dear Mr. Benjamin:

Thank you for your request of June 1977, for comments on the environmental statement for the Buffalo Light Rail Rapid Transit Project. Pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969 and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), we have determined that your draft environmental statement does not contain sufficient information concerning historic and cultural resources for review purposes. Please furnish the following data indicating:

Compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320).

The final environmental impact statement must demonstrate that either of the following conditions exists:

1. No properties that may be eligible for inclusion in the National Register of Historic Places are located within the area of environmental impact, and the undertaking will not affect any such property.

Our review finds that the DEIS contains insufficient documentation on pp. 6-4 to 6-6 to identify both prehistoric and historical archeological sites in the project area that may be eligible for inclusion in the National Register of Historic Places.

A letter dated May 4, 1977, from the State Historic Preservation Officer to Mr. Kenneth E. Vought, Director, UMTA Field Office, Region 2, has come to our attention and is in complete accordance with that view. A copy of that letter is enclosed. The complete comments of the State Historic Preservation Officer should be included in the final environmental impact statement.

New York Environmental Impact Statement

2. Properties included in or that may be eligible for inclusion in the National Register of Historic Places are located within the area of environmental impact, and the undertaking will or will not affect any such property. More complete information documenting the vibrary impact on such properties during and after construction should be included. In cases where there will be an effect, the final environmental impact statement should contain evidence of compliance with Section 106 of the National Historic Preservation Act through the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800).

Should you have any questions, please call Amy Schlagel at 202-254-3380.

Sincerely yours,

Myra F. Harrison

Myra F. Harrison
Acting Director
Office of Review
and Compliance

Enclosure

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Peter A. A. Berle,
Commissioner

August 11, 1977

Mr. Peter Benjamin, Director
Office of Program Analysis
Department of Transportation
Urban Mass Transportation
Administration
Washington, D. C. 20590

Dear Mr. Benjamin:

RE: Draft Environmental Impact Statement
Buffalo Light Rail Rapid Transit Project
DEC Project No. 915-01

The above noted document has been reviewed by appropriate State agencies. As coordinator of environmental review of impact statements, the attached comments reflect the results of that review.

While the subject report is generally adequate, the attached comments are offered for your consideration in preparing the final environmental impact statement.

Thank you for the opportunity to review this document.

Sincerely,

Louis M. Concra, Jr

FOR Terence P. Curran, Director
Office of Environmental Analysis

Attachment

DEPARTMENT OF ENVIRONMENTAL CONSERVATION COMMENTS ON
BUFFALO LIGHT RAIL RAPID TRANSIT DEIS

1. The technique used to compute the ranking of alternatives (Tables 3-9 and 3-10) involves the summation of rankings for all criteria, therefore implying an equal weighing of all criteria. It would be helpful to discuss the relationship of these criteria to the goals and objectives of the community.

2. Additional information should be provided on the city, town, county, and regional land use plans. With this information, the alternatives could then be discussed as to whether they are compatible or not with the existing land use plans.

3. The draft environmental impact statement's discussion of open space resources should be expanded to include the developing Buffalo Waterfront Naval and Serviceman's Park located south of Memorial Auditorium and west of Main Street. (para 2.5 page 2-20)

4. In Table 3-10 (Comparison of Alternatives), each of the factors identified under "Implementation Issues" should be clearly defined with explanations as to how the differentials in ranking were obtained.

5. On page 5-20 (Financial and Economic Impacts) the potential for increased land values in the corridor is discussed. Consideration should be given to those marginal businesses that could not survive an increase in property taxes. If such cases were expected, mitigative measures should be explored.

6. The mesoscale air quality analysis evaluated only the 1995 emissions, and did not consider the present condition, the expected completion date, or any other future year's emissions. By providing an analysis for these different time periods, perhaps over a wider area to include the effects of the power plant emissions, a discussion of pollution trends could then be made allowing an identification of the critical year (year of maximum emissions).

7. There was no microscale air quality analysis performed. If present concentrations of transportation related pollutants were provided, an analysis of the effects of the proposed project would have on these pollutants could then be performed. These effects could be addressed for the feeder bus system, auto trips to park-and-ride lots or to local street parking, and the diversion of auto trips to transit.

8. The short-term impact of construction generated fugitive dust needs to be more fully addressed. Air quality monitors in the vicinity of this project show suspended particulate concentration levels close to national standards - particularly in areas where at-grade construction will be employed. We recommend that the statement be amended to include a discussion of the use of dust control techniques at construction sites.

9. Long-term impact of the project on local air quality should be favorable, particularly if recommended traffic flow improvements are implemented.

10. In accordance with 6NYCRR 203.3 the proposed modification of parking facilities for the South Campus Terminal may require a departmental permit for construction of an indirect source of air contamination, since the modification appears to involve a total urban parking capacity of 500 vehicles or more. The Niagara Frontier Transportation Authority should contact Mr. Robert Armbrust (NYS Department of Environmental Conservation, 584 Delaware Avenue, Buffalo, New York 14202 telephone: 842-5826) for verification of permit requirements. (table 5-4 page 5-24)

11. It would be beneficial to have a comprehensive listing of potential noise sensitive receptors such as schools, churches, hospitals, libraries, etc.

12. An explanation of the HUD criteria in terms of L_{eq}. would be beneficial.

13. Consideration should be given to the additional noise generated in the vicinity of the tunnel portal and the vent outlets. Acoustic treatment is usually required several hundred feet in the case of tunnel portals.

14. At the South Campus Terminal, some consideration should be given to the generated noise from the auto and bus traffic in the area.

15. The proposed bus priority system on Main Street and/or Delaware Avenue currently being developed by the Niagara Frontier Transportation Committee should be described.

16. Table 4-1 (Project Cost Estimate) on page 4-8 does not identify the cost of improved bus service to feed the project corridor, costs of required traffic improvements, and the cost of providing truck unloading bays due to the elimination of Main Street unloading in the CBD.

17. Further discussion of the visual intrusion of the overhead wires should be presented since the City of Buffalo, in the TOPICS projects, has preferred a mastarm instead of a span wire installation.

18. Consideration should be given to landscaped berms and/or other methods to reduce noise and visual impacts associated with yard facilities. (Para 5.2 page 5-25

19. At this time, solutions to the roadway conditions north of the CBD resulting from Main Street closures or at-grade LRRT service should be presented.

20. On page 6-4, Archeological Sites, sub-surface testing techniques should be identified along with any mitigation plans for an archelogical site survey in the area.

21. At the corners of Main and Exchange Sts., and Washington and Exchange Sts., are parking lots from which the New York State Thruway Authority receives revenue (approximately $20,000 annually) through a rental agreement with the Office of General Services. The FEIS should discuss the impact(s) the proposed project will have on those lots and, in addition, should consider compensation measures if in fact those lots will be destroyed.

REFERENCES

REFERENCES

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2. Liu, Dr. Ben-Chieh, Quality of Life Indicators in the U.S. Metropolitan Areas, 1970 (Summary), Midwest Research Institute Report, 1975.

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8. U.S. Environmental Protection Agency, Supplement No. 5 for Compilation of Air Pollution Emission Factors, 2nd Edition, 1975.

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10. Calspan Corporation, Acoustic Studies of the Buffalo-Amherst Corridor Rail Transit System, Report NB-5423-L-1, Volumes I and II, Mar 1974.

11. American Public Transit Association, Guidelines and Principles for Design of Rapid Transit Facilities, Acoustics, 1976.

12. Buffalo Ornithological Society; "Field Check List," Buffalo Museum of Science.

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20. U.S. Department of Commerce, Bureau of Census, 1972 Census of Business.

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