

- STD 26.07

**Traffic Engineering  
and  
Transportation Planning Assistance Project**

**U.S. ROUTE 7  
Town of Milton**

**Chittenden County  
Regional Planning Commission**

**Prepared by  
JHK & Associates**

**November 22, 1989**

## Traffic Engineering-Transportation Planning Assistance Project

### U.S. ROUTE 7 - TOWN OF MILTON

The Traffic Engineering-Transportation Planning Assistance Project was conducted to address a series of transportation issues in the Chittenden County area in a systematic fashion. The project encompassed twelve locations in seven jurisdictions within the County. In general terms, the studies shared the common aspects of a short term focus on resolving immediate concerns through relatively low-cost, readily implementable actions.

This memorandum summarizes the findings and recommendations for the examination of locations along U.S. Route 7 in the Town of Milton. This document reflects comments received from the Town and the client, the Chittenden County Regional Planning Commission (CCRPC), at a preliminary briefing. This memorandum is accompanied by four scaled aerial photograph plan sheets depicting the recommendations.

This study would not have been possible without the cooperation of a number of agencies. The support provided by the staff of the CCRPC was exemplary. Most notable was the provision of all required traffic volume data for the study. Thanks also go to the staff of the Town of Milton, for providing their time and input, and the Vermont Agency of Transportation. In spite of their aid, JHK & Associates remains fully responsible for the information and opinions presented herein.

The memorandum is organized by the four locations examined along U.S. Route 7; intersections with:

- Lake Road,
- Main Street,
- Middle Road/Railroad Street Extension, and
- West Milton Road/Racine Road.

Each of the locations is discussed below beginning with a description of existing conditions and observed problems. Projected conditions for 1995 are then assessed. Each section concludes with recommendations for immediate, short term and intermediate/long term actions.

#### OVERVIEW

U.S. Route 7 is a two-lane roadway in the Town of Milton. The speed limit varies between 25 miles per hour within the Village to 50 miles per hour at the northern and southern portions. Between Checkerberry Village and Lake Road, the only location with a left turn lane is between Middle Road and the Milton Square shopping center where short back-to-back turn lanes are provided. In general, access control is fair to poor with numerous poorly defined residential and commercial driveways along the roadway. Route 7 generally parallels I-89 through the Town and although there are no interchanges within the Town, interchanges are located just beyond the Town's borders. To the south in Colchester, an interchange with U.S. Route 2 is less than one-half mile from Route 7. To the north, Route 7 intersects I-89 in Georgia. Therefore, most of the longer distance through traffic uses I-89. This fact combined with modest amounts of development results in relatively moderate traffic volumes on Route 7 in the Town. Over time, however, the amount of local development will increase placing greater demands on the existing roadway.

Traffic forecasts were developed for 1995 based on land use projections provided by the Town staff. These projections were largely based on existing approved and

pending development proposals. The forecast volumes reflect additional development in the Town by 1995 of:

- 116 residential dwelling units served via Lake Road plus 39 dwelling units in the Overlake development southwest of the Route 7/Lake Road intersection,
- 81 residential dwelling units east of Arrowhead Mountain Lake and north of Main Street/Westford Road,
- 9 residential dwelling units in the Moss End development on Barnum Street,
- 25 residential dwelling units off of McMullen Road, and
- 350,000 square feet of light industrial, 175,000 square feet of service-type retail and 13 residential dwelling units accessing Route 7 between Middle Road and Checkerberry Village.

In addition, background traffic on Route 7 was assumed to increase three percent annually to account for development outside the study area. A two percent annual growth rate for background traffic on Middle Road was assumed since it serves longer distance trips as well. The effects of the resulting traffic increases are discussed for each location under Future Conditions sections.

## **U.S. ROUTE 7 AND LAKE ROAD**

### **Existing Conditions**

The intersection of U.S. Route 7 and Lake Road is slightly less than one mile north of the bridge over the Lamoille River. In the vicinity of the intersection, Route 7 is oriented in a north-south direction with Lake Road approaching at a 45 degree angle from the northwest. Lake Road provides access to Route 7 for a large area of northwest Milton which is predominately low density residential and open space/agricultural. The existing peak hour traffic volumes are shown in Figure 1-1.

The key features of the existing intersection and its operation are described below.

- The intersection has a small island on the Lake Road leg of the intersection which has two-way traffic flow on both sides. This is unusual and creates a secondary point of conflict on Lake Road northwest of the Route 7 intersection.
- The configuration of the intersection accommodates the right turn movements from Lake Road at a 30 degree angle creating some sight line difficulties for drivers since they must look back over their shoulders.
- The sight distance to the north is restricted by a slight hillcrest. For vehicles turning right from Lake Road the available sight distance is approximately 470 feet. For left turning vehicles from Lake Road the sight distance is about 525 feet. Both of these values are less than the recommended values in AASHTO<sup>1</sup> (680 and 1030 feet respectively) for these

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<sup>1</sup>American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, 1984.

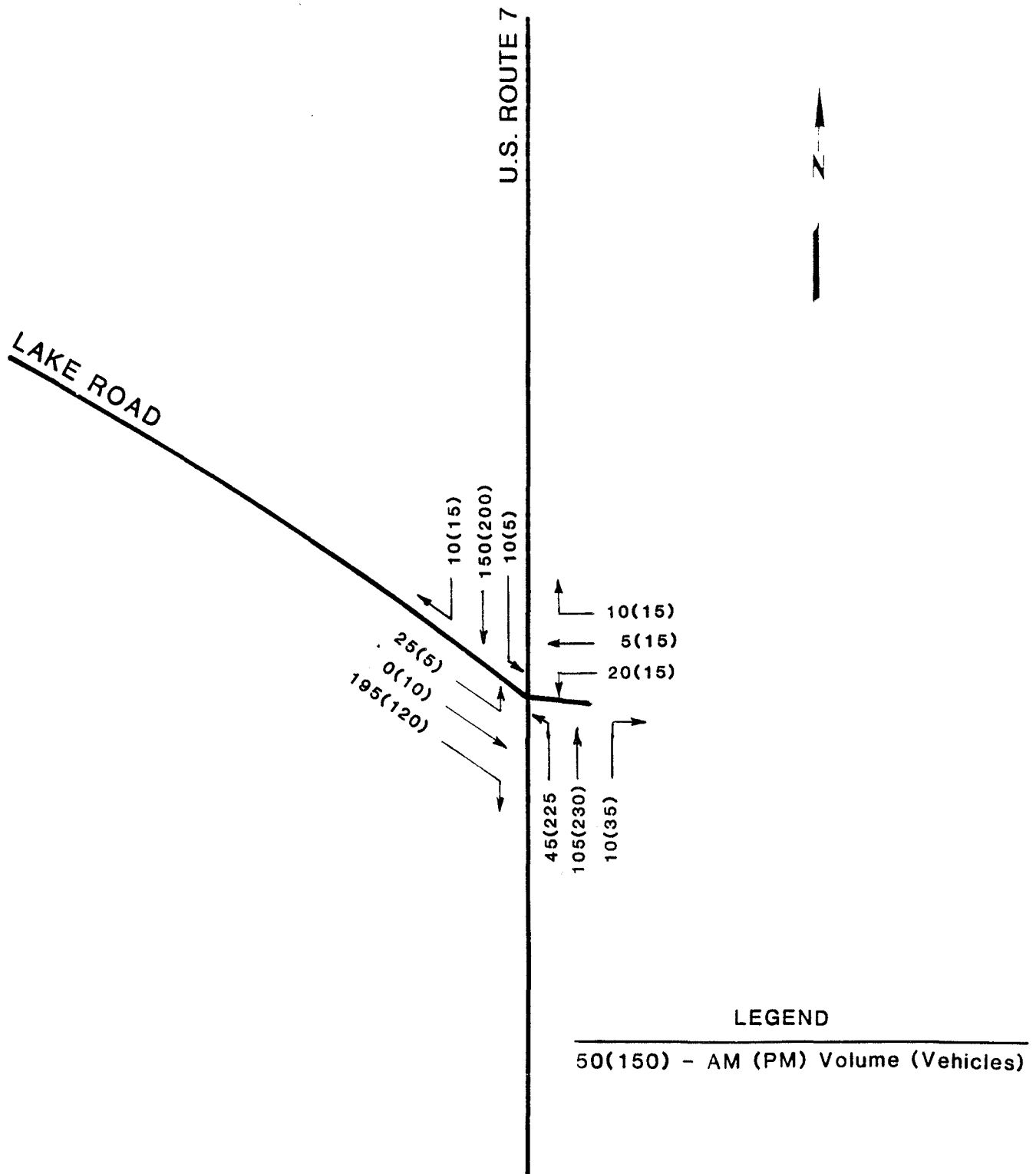


Figure 1-1 U.S. ROUTE 7 and LAKE ROAD -  
1989 PEAK HOUR TRAFFIC VOLUMES

turning movements. The available sight distance is greater than the stopping sight distance. No significant accident trend was observed to be related to these sight distances. Thus, vehicles turning from Lake Road may cause some slowdowns of vehicles on Route 7, however the adequate stopping sight distance helps to minimize adverse safety impacts.

- A single STOP sign for Lake Road is located in the island. Its placement is such that it is unclear if it controls both the right and left turns.
- The lack of a northbound left turn lane results in vehicles using the paved shoulder in front of the Arrowhead Variety Shop to bypass left turning vehicles. Portions of the shoulder pavement have deteriorated from the traffic.
- The driveways to the parking lot of the Arrowhead Variety Shop are too wide to properly channelize traffic.
- Observations of traffic conditions at the intersection indicate no significant capacity problems or delays.
- The VAOT data showed four accidents over five years which does not indicate any significant problems. It is interesting to note that three of the accidents are related to driveways on the east side of Route 7.

### Future Conditions

The traffic volume levels at the intersection will be mainly affected by development in the northwest portion of the Town and growth in through traffic on Route 7. The projected traffic volumes for 1995 are shown in Figure 1-2. The implications of these volumes are described below.

- The traffic forecasts for 1995 show moderate traffic increases on all legs of the intersection. The through movements on Route 7 and the turning movements between Lake Road and Route 7 to the south are primarily affected.
- The approach volumes for 1995 satisfy the Manual on Uniform Traffic Control Devices (MUTCD)<sup>2</sup> peak hour traffic signal warrant. The pattern of turning movements to and from the side street, however, indicate that a traffic signal will not be needed. On Lake Road, at least 85 percent of the approaching volume turns right. Typically, side street left turns and crossing movements are what requires a signal because they require longer times to execute the movement and need gaps in both directions. Right turns require less time and gaps in one direction. At this intersection, right turns conflict with low to moderate volumes southbound on Route 7. A signal should not be installed until both signal warrants described in the MUTCD are met and observations confirm the need for a signal. The peak hour delay warrant is particularly useful for evaluating need in a single hour. The criteria, five vehicle hours of total delay for one hour, is equivalent to an average queue length of five vehicles throughout an entire hour.

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<sup>2</sup>Federal Highway Administration, Manual on Uniform Traffic Control Devices for Streets and Highways, Revision No. 4, March, 1986.

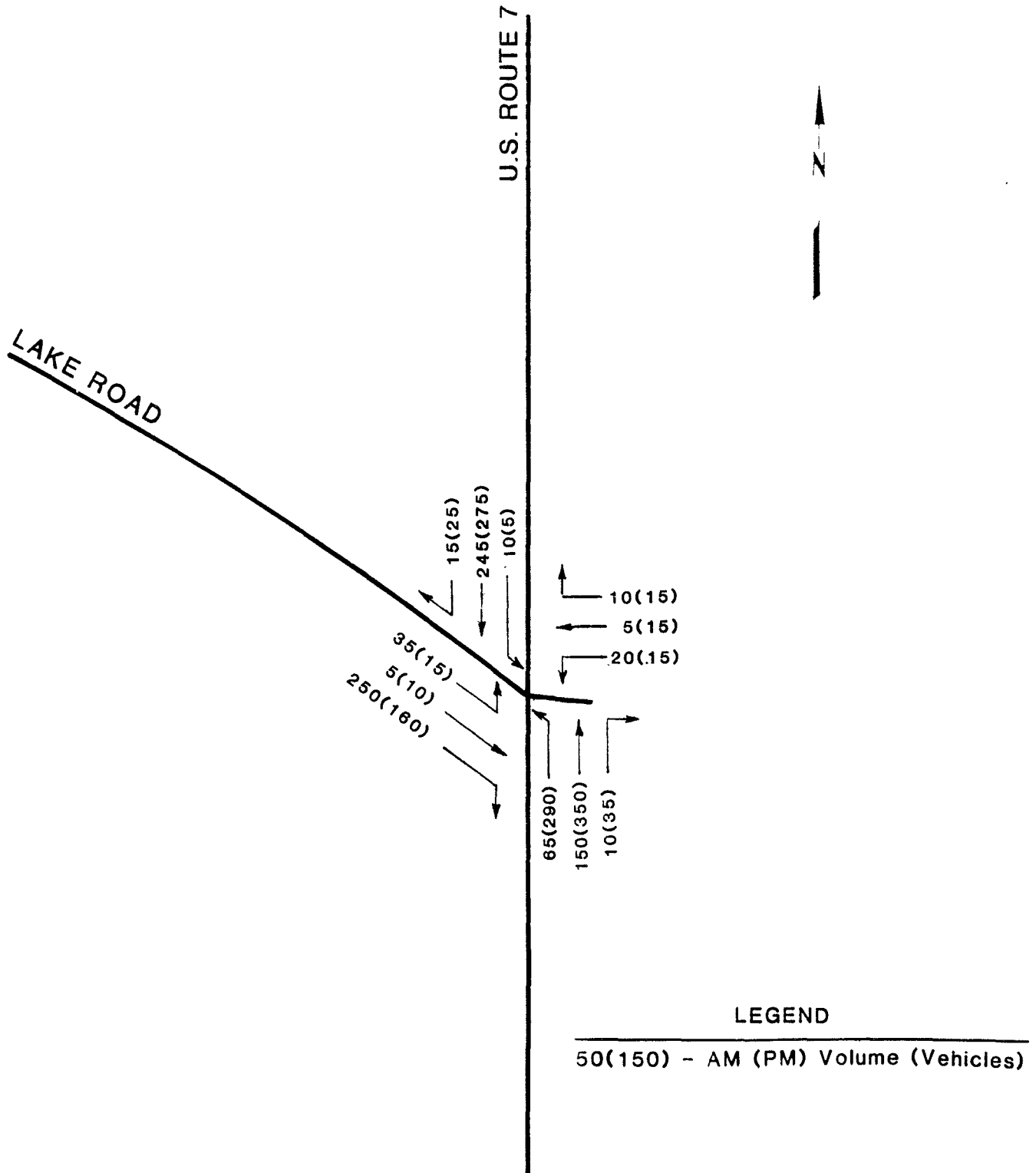


Figure 1-2. U.S. ROUTE 7 and LAKE ROAD - 1995 PEAK HOUR TRAFFIC VOLUMES

- Unsignalized capacity analyses indicate that left turns and crossing movements from Lake Road and the Variety Shop will operate near capacity and experience long, but tolerable, delays. Right turns from Lake Road will operate with minor delays. The northbound left turns will also have sufficient gaps in traffic for good operations. The amount of northbound left turns however, will block the northbound through lane much of the time during the P.M. peak without a separate left turn lane.

### **Alternative Improvements**

To accommodate the projected traffic volumes, three primary problems must be resolved: 1) the skewed angle of intersection, 2) the unusual intersection configuration with two way traffic flow on both sides of the island, and 3) the lack of a left turn lane on northbound Route 7. The implementation of a left turn lane is relatively straight forward. A significant consideration for this improvement is coordination with the proposed left turn lane for the Overlake development entrance. This new intersection is to be approximately 530 feet south of the existing Lake Road intersection. The new left turn lane should be sufficient in length to accommodate the deceleration and storage of vehicles.

The problems related to the angle and configuration of the intersection can be resolved by creating a standard Tee intersection in which Lake Road connects to Route 7 at an angle close to 90 degrees. To minimize the sharpness of the curvature on Lake Road, it would be desirable to move the intersection to a location as far to the north as possible which provides adequate sight distance. A new intersection at the hillcrest north of the existing intersection would be most desirable. However the presence of homes precludes this option as a short or intermediate term improvement. Thus, the best improvement would be a Tee intersection approximately at the existing location. This provides a standard intersection configuration and a left turn lane of adequate length. This improvement is depicted on plan sheet 1 of 4.

### **Recommendations**

#### **Immediate Actions**

- Modify the placement of the existing STOP sign for the Lake Road approach. Relocate the sign in the island to a location near the point left turning vehicles stop. Install a STOP AHEAD warning sign and an additional STOP sign to the right of the Lake Road right turn lane.
- Adopt the recommended improvements so that any development activity which significantly impacts the intersection can participate in the funding of the design and construction of the improvements.

#### **Short Term Actions**

- Construct intersection improvements described above and depicted on the plan sheet (Sheet 1 of 4). These improvements will increase safety and provide sufficient capacity to accommodate traffic growth through 1995.
- The left turn lane design should be coordinated with that being constructed for the Overlake development. A short (100 foot storage, 100 foot taper) southbound left turn lane into the Arrowhead Variety Shop should be incorporated because of the small incremental cost.

- Access control in the vicinity of the improvements should be improved by better defining and consolidating driveways.
- Channelizing islands should be incorporated into the design on the Lake Road approach. A raised median which extends back to the beginning of the new curve on Lake Road should be provided to separate opposing flows of traffic and guide vehicles along the curve. A right turn island is necessary to accommodate this movement while still providing an improved angle of approach. The design of the islands should specifically consider the accommodation of vehicular turning movements to and from Lake Road.
- A traffic signal should only be installed at the intersection when needed. Significant vehicle delays and problems correctable with a traffic signal should be observed at various times during the day and the MUTCD signal warrants should be met. It does not appear a signal will be required by 1995.

### **Intermediate/Long Term Actions**

- Access to/from the northwest portion of the Town of Milton should be improved by providing improved and/or additional connections to the regional roadway network to minimize the extent Lake Road becomes a bottleneck.
- To improve sight distance for vehicles turning from Lake Road, the feasibility of lowering the hillcrest just north of the intersection should be examined as a longer term improvement.

### **Cost Estimate**

The immediate action improvements could be implemented for about \$500. The short term improvements for the U.S. Route 7/Lake Road intersection recommended herein will cost approximately \$400,000 to \$450,000. This cost includes engineering, management, and a 10 percent contingency. In addition, approximately 2,500 square feet of right-of-way will be required in the northwest quadrant and along Lake Road.

## **U.S. ROUTE 7 AND MAIN STREET**

### **Existing Conditions**

The intersection of U.S. Route 7 and Main Street is just south of the bridge over the Lamoille River. It is a three legged intersection with Route 7 oriented in a north-south direction and Main Street approaching from the east. To the east, Main Street becomes Westford Road and leads into the Town of Westford. The most distinctive feature of the intersection is the presence of a Union soldier monument in the middle of the Main Street approach just off of Route 7. The added features of a flashing beacon and the narrow, truss bridge distinguish this as a landmark location. The existing peak hour traffic volumes are shown in Figure 2-1.

The key aspects of the operation of the existing intersection are described below.

- The monument functions as a small island on the Main Street leg of the intersection and has two-way traffic flow on both sides similar to the existing Lake Road intersection. This is unusual and creates a secondary point of

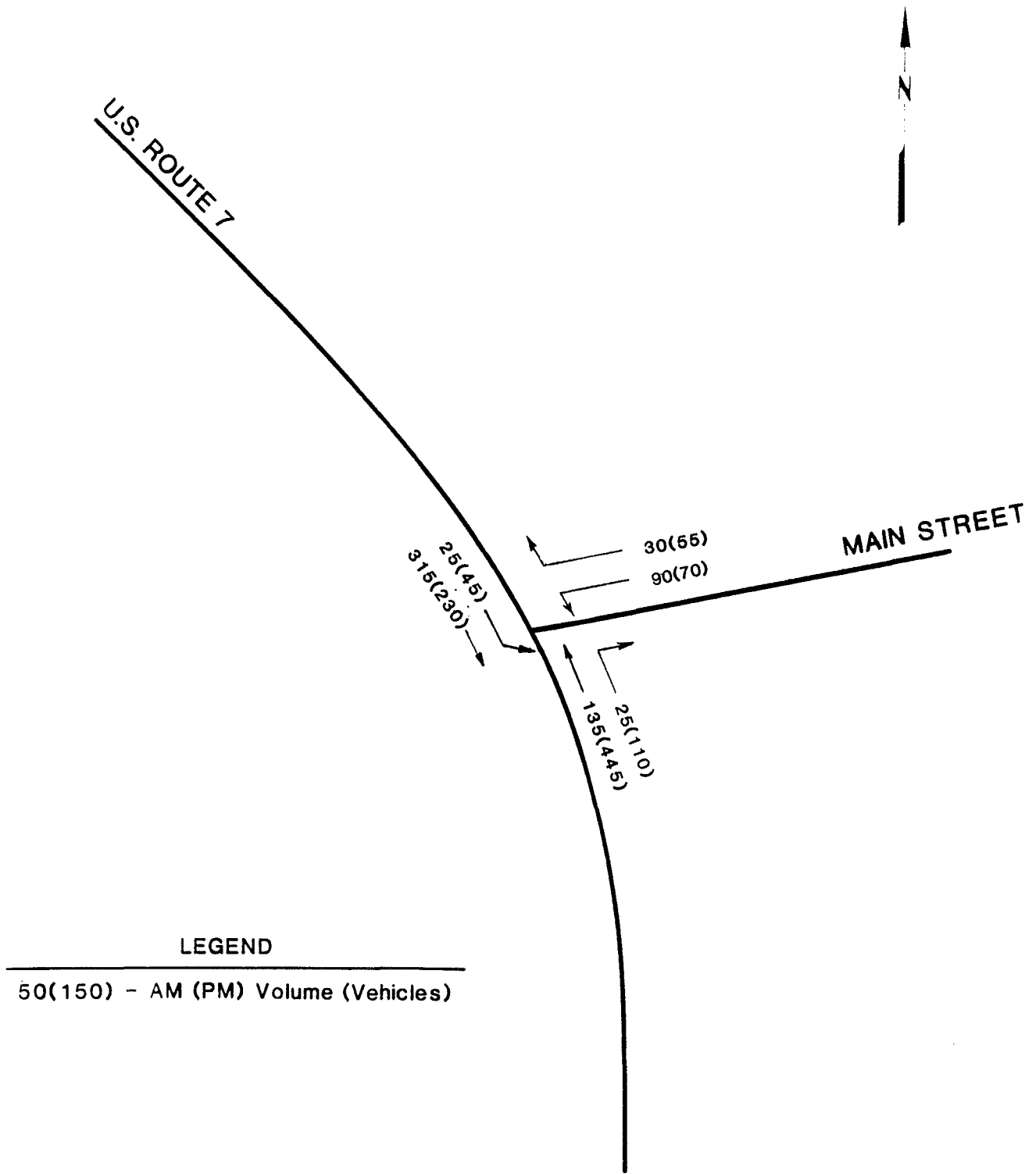


Figure 2-1 U.S. ROUTE 7 and MAIN STREET - 1989 PEAK HOUR TRAFFIC VOLUMES

conflict on Main Street east of the Route 7 intersection. The monument disrupts sight lines at the intersection and represents a potential hazard given its proximity to the Route 7 travelled way. The base of the monument shows evidence that it has been struck by vehicles on several occasions.

- Main Street approaches Route 7 on a significant downgrade of approximately six percent. This can cause difficulties for vehicles stopping particularly during inclement weather.
- Buildings on the west side of Route 7 (gift shop) and in the northeast corner (bar) are also located close to the pavement edges. Parking for both structures occurs on and adjacent to the shoulders of Route 7.
- The sight distance from Main Street to the north is restricted by the bridge structure due to a curve. This sight distance is limited to approximately 280 feet. This provides stopping sight distance for a safe operating speed of about 36 miles per hour. For vehicles turning left from Main Street the recommended AASHTO sight distance is 530 feet for 35 miles per hour. No significant accident trend was observed to be related to this sight distance. Thus, vehicles turning from Main Street may cause some slowdowns of vehicles on Route 7, however the adequate stopping sight distance helps to minimize adverse safety impacts. In addition, the narrow bridge forces vehicles on Route 7 to slow down considerably.
- A single STOP sign for Main Street is located in front of the monument. It is unclear if it controls both the right and left turns movements.
- The driveways in the vicinity of the intersection are ill defined and too wide to properly channelize traffic.
- Observations of traffic conditions at the intersection indicate no significant capacity problems or delays.

### **Future Conditions**

The traffic volume levels at the intersection will be affected by development along Route 7 and elsewhere in the Town. Traffic on Main Street will primarily be affected by development north of Main Street and east of the Lake. The projected traffic volumes for 1995 are shown in Figure 2-2. The implications of these volumes are described below.

- The traffic forecasts for 1995 show moderate traffic increases on the Main Street leg intersection. Traffic on Route 7 will increase more substantially due to development elsewhere in the Town and growth in through traffic.
- The approach volumes for 1995 do not satisfy the MUTCD peak hour traffic signal warrant which indicates it is not likely a signal will be needed by 1995.
- Unsignalized capacity analyses indicate that left turns from Main Street will operate near capacity and experience long, but tolerable, delays. Right turns from Main Street will operate with only minor delays if not inhibited by left turning vehicles. The southbound left turns will also have sufficient gaps in

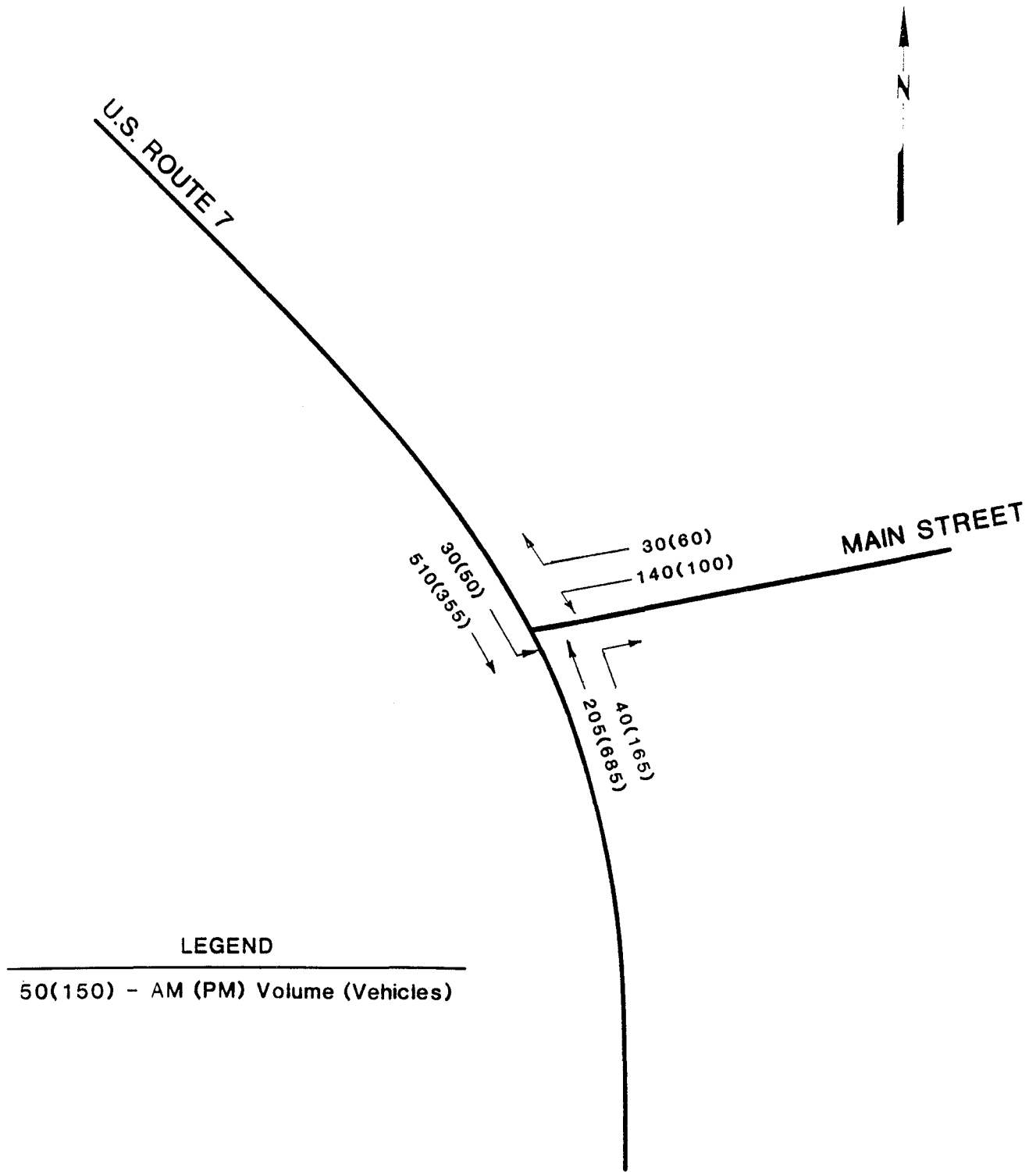


Figure 2-2. U.S. ROUTE 7 and MAIN STREET - 1995 PEAK HOUR TRAFFIC VOLUMES

traffic for good operations but will cause some moderate delays to south-bound through vehicles.

### **Alternative Improvements**

Currently, the primary problem at the intersection is the presence of the monument and the unusual traffic patterns around it. Any significant improvement must involve relocation of the monument from the intersection. It could be moved to the lawn of the library/Town Hall, or to a suitable place of honor within a park. To keep its association with Route 7, it could be relocated to a spot on or near the new/rehabilitated bridge over the Lamoille River if safely incorporated into the design.

In conjunction with the monument relocation, the intersection should be converted to a standard Tee intersection. To minimize delay on the Main Street approach, separate right and left turn lanes should be provided. This configuration is shown on plan sheet 2 of 4.

The increasing traffic volumes on Route 7 indicate that a southbound left turn lane will be warranted in the future. Due to the proximity of the buildings on both sides of the roadway however, the costs would exceed the benefits as a short term improvement. This improvement should be made in conjunction with the bridge improvement at which time the incremental cost would be effective.

### **Recommendations**

#### **Immediate Actions**

- Install a second STOP sign to the right of the existing right turn lane.
- Adopt the recommended improvements so that any development activity which significantly impacts the intersection can participate in the funding of the design and construction of the improvements.
- Identify the site for the monument relocation.
- Proceed with the design of the improvements.

#### **Short Term Actions**

- Relocate monument and construct intersection improvements described above and depicted on the plan sheet (Sheet 2 of 4). These improvements will increase safety and provide sufficient capacity to accommodate traffic growth through 1995.
- A raised median on Main Street should be incorporated into the design. This median is desirable to properly accommodate vehicular turning movements, separate opposing flows of traffic and provide a good location for STOP sign placement. This island should be extended beyond the beginning of the hill to provide adequate sight distance and prohibit left turns into the western Town Hall driveway
- Access control in the vicinity of the improvements should be improved by better defining and consolidating driveways.

**Intermediate/Long Term Actions**

- Construct a southbound left turn lane on Route 7 in conjunction with improvements to the bridge over the Lamoille River.
- The bridge improvement should specifically consider improving the sight distance from Main Street to the north.

**Cost Estimate**

The immediate action improvements described above can be implemented for approximately \$250. The short term improvements recommended for the U.S. Route 7/Main Street intersection will cost approximately \$80,000 to \$105,000. This cost includes engineering, management, and a 10 percent contingency. This improvement can be constructed within existing right-of-way.

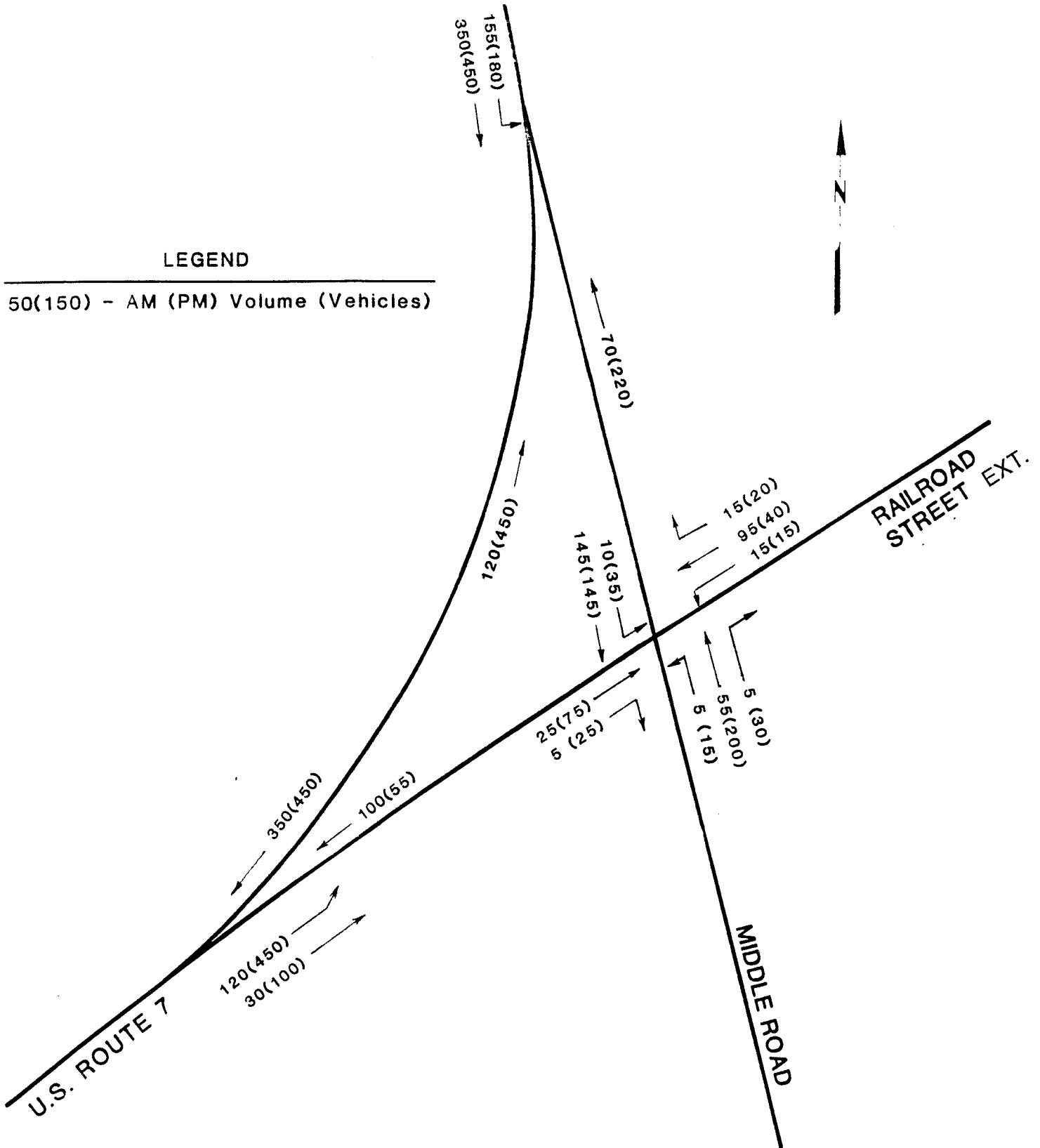
**U.S. ROUTE 7 AND MIDDLE ROAD/RAILROAD STREET EXTENSION**

**Existing Conditions**

The intersections of U.S. Route 7 and Middle Road/Railroad Street Extension is located just south of the recently signalized Milton Square shopping center entrance. Due to their proximity, the Route 7/Middle Road/Railroad Street intersections function as an intersection complex with three points of conflict: Route 7 and Middle Road, Route 7 and Railroad Street, and Middle Road and Railroad Street. Middle Road traverses to the southeast providing connections to Route 2A in Colchester. The Railroad Street Extension traverses to the northeast to the eastern portion of the village. The existing peak hour traffic volumes are shown in Figure 3-1.

The key features of the existing intersection complex and its operation are described below.

- Route 7 is on a curve with a degree of curvature approximately six degrees. Superelevation is provided through the curve and thus safe conditions exist for the operating speeds observed. The side streets are tangent to the curve which reduces the amount of positive guidance provided to vehicles travelling on Route 7 along the curve.
- The configuration of the intersection accommodates turning movements to and from Route 7 at very flat angles. This creates sight line difficulties for drivers turning from the side streets since they must look back over their shoulders.
- The back-to-back left turn lanes on Route 7 between Middle Road and the Milton Square entrance are relatively short (75 feet of storage) but still enhance the operation of the existing intersections.
- The intersection of Middle Road and Railroad Street is an unusual secondary point of conflict. All approaches, except the southbound Middle Road approach, are controlled by STOP signs. Considering the existing traffic patterns and configuration this is the appropriate treatment.



**Figure 3-1. U.S. ROUTE 7 and MIDDLE ROAD/  
RAILROAD STREET EXTENSION -  
1989 PEAK HOUR TRAFFIC VOLUMES**

- The sight distance is adequate from the side streets because they are on the outside of the curve.
- Parking for the China House Restaurant in the southeastern quadrant of the intersection occurs on and adjacent to the shoulder of the Railroad Street Extension.
- Observations of traffic conditions at the intersection indicate no significant capacity problems or delays. If the Middle Road and Railroad Street intersections with Route 7 are considered as a single location, the existing traffic volumes meet several MUTCD signal warrants.

### Future Conditions

The traffic volume levels and patterns at this location will be primarily affected by the development along Route 7 between Checkerberry Village and Middle Road. The projected traffic volumes for 1995 are shown in Figure 3-2. The implications of these volumes are described below.

- The traffic forecasts for 1995 show moderate traffic increases on Middle Road and Railroad Street. The through movements on Route 7 will increase more substantially.
- If the Middle Road and Railroad Street intersections with Route 7 are considered as a single location, unsignalized capacity analyses indicate that the moderate volume of left turns will have difficulty turning onto Route 7 during the P.M. peak hour. The adjacent traffic signal may help provide additional gaps in traffic but would probably not solve the problem. The projected 1995 traffic volumes meet the MUTCD peak hour signal warrant. Thus, a traffic signal would likely be required to accommodate the projected volumes.
- Considered as separate intersections as in the existing configuration, the Railroad Street approach volumes do not meet the peak hour warrant while the Middle Road volumes do meet the peak hour warrant. The pattern of turning movements associated with Middle Road (right turns from and left turns onto) indicate that a traffic signal would not be needed.

### Alternative Improvements

Currently the existing arrangement of the intersection complex provides an unusual configuration with undesirable low angle intersections. The separation of the Middle Road and Railroad intersections with Route 7 does provide the subtle benefits of physical separation of conflict points. This latter benefit does not offset the configuration problems especially in terms of safety. In addition, the proximity of the existing Middle Road intersection to the Milton Square entrance will create increasing problems.

To improve the intersection complex, several alternatives were examined and are schematically illustrated and described below.

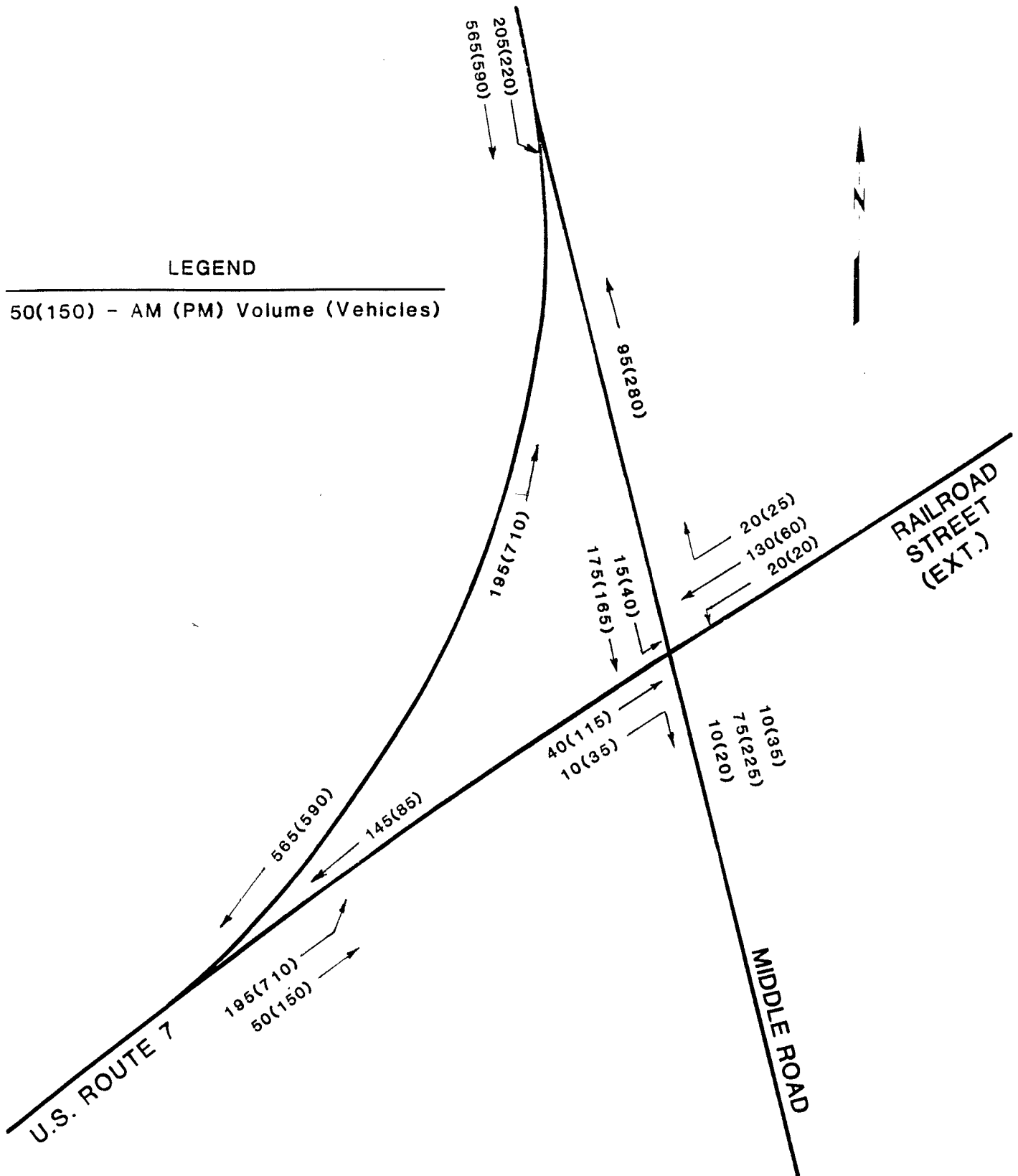
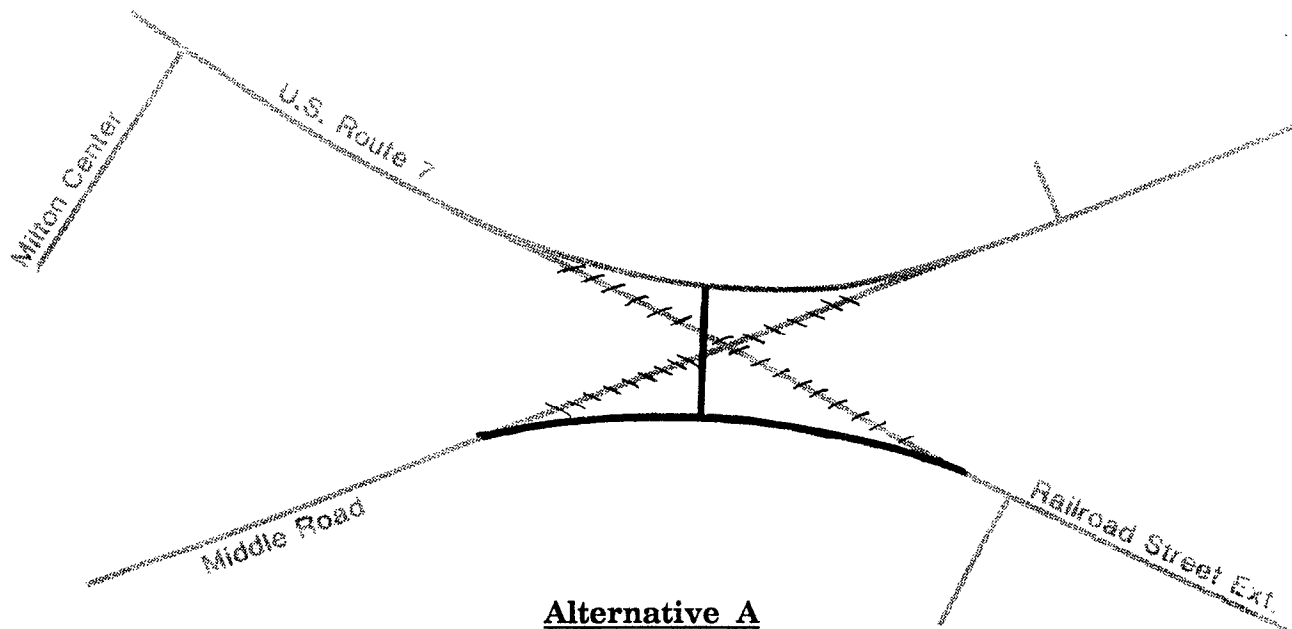
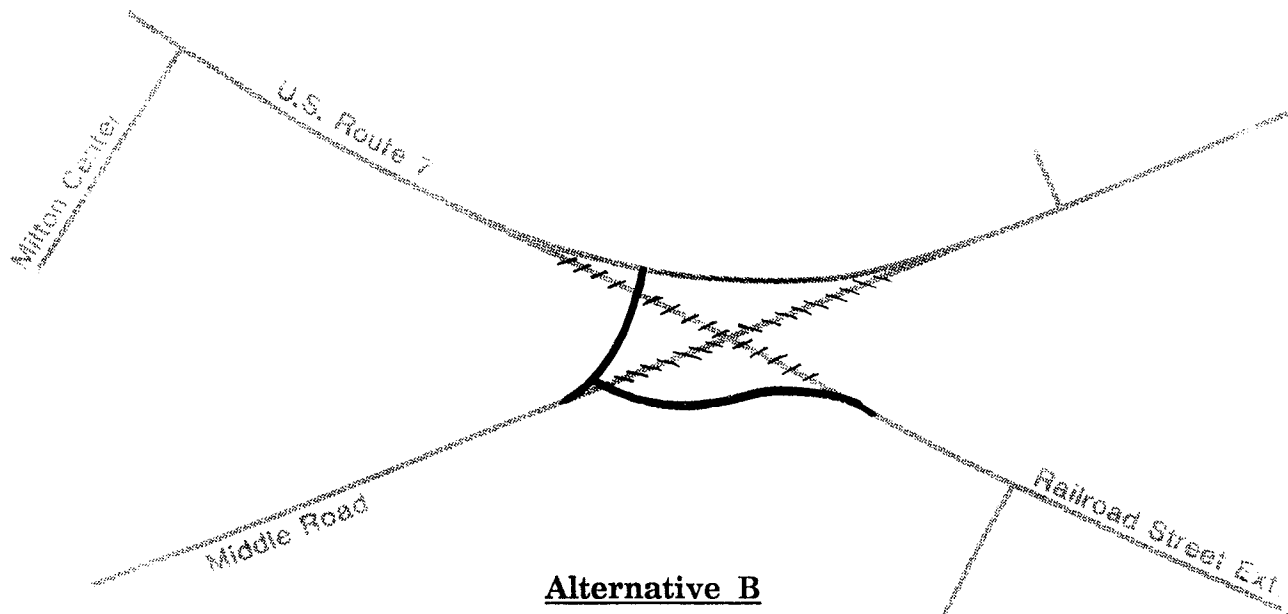


Figure 3-2. U.S. ROUTE 7 and MIDDLE ROAD/  
RAILROAD STREET EXTENSION -  
1995 PEAK HOUR TRAFFIC VOLUMES



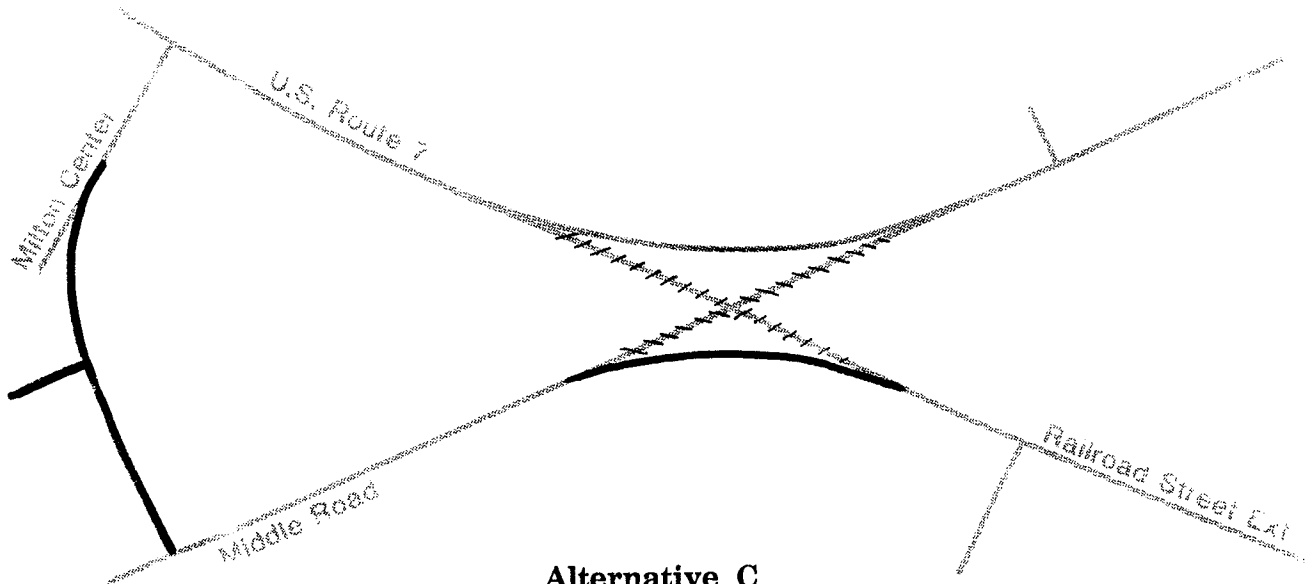
**Alternative A**

- Creates standard Tee intersection configurations.
- Increases separation of intersection from Milton Square entrance.
- Insufficient storage between Middle Road/Railroad Street and Route 7.



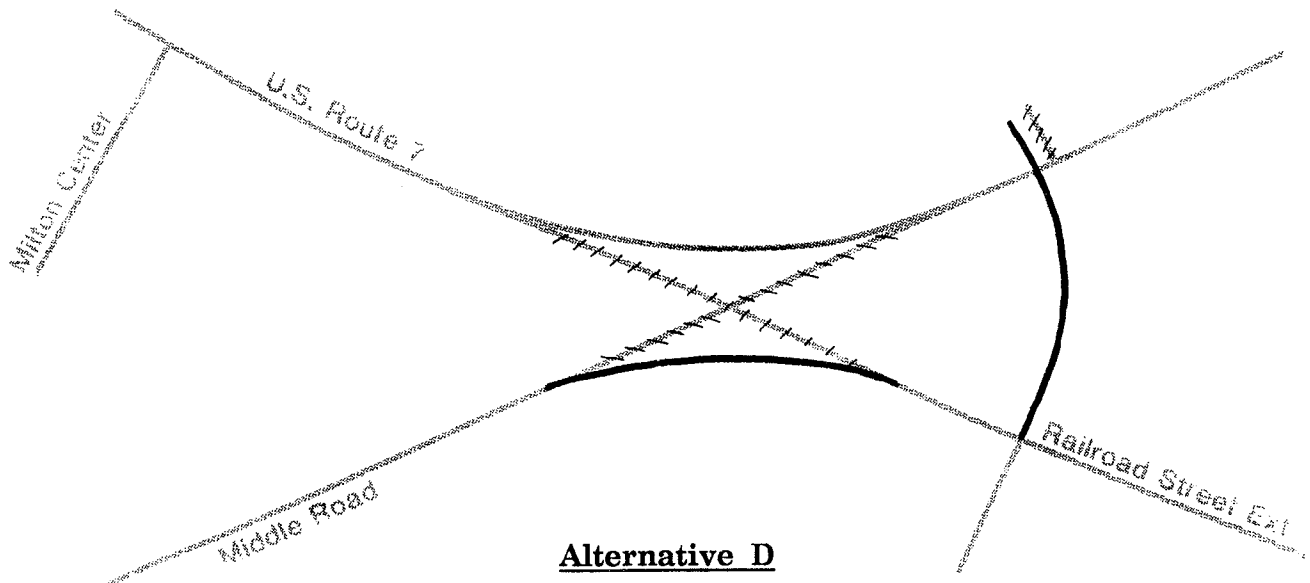
**Alternative B**

- Creates standard Tee intersection configurations.
- Increases separation of intersection from Milton Square entrance.
- Limited storage on realigned Middle Road between Railroad Street and Route 7.



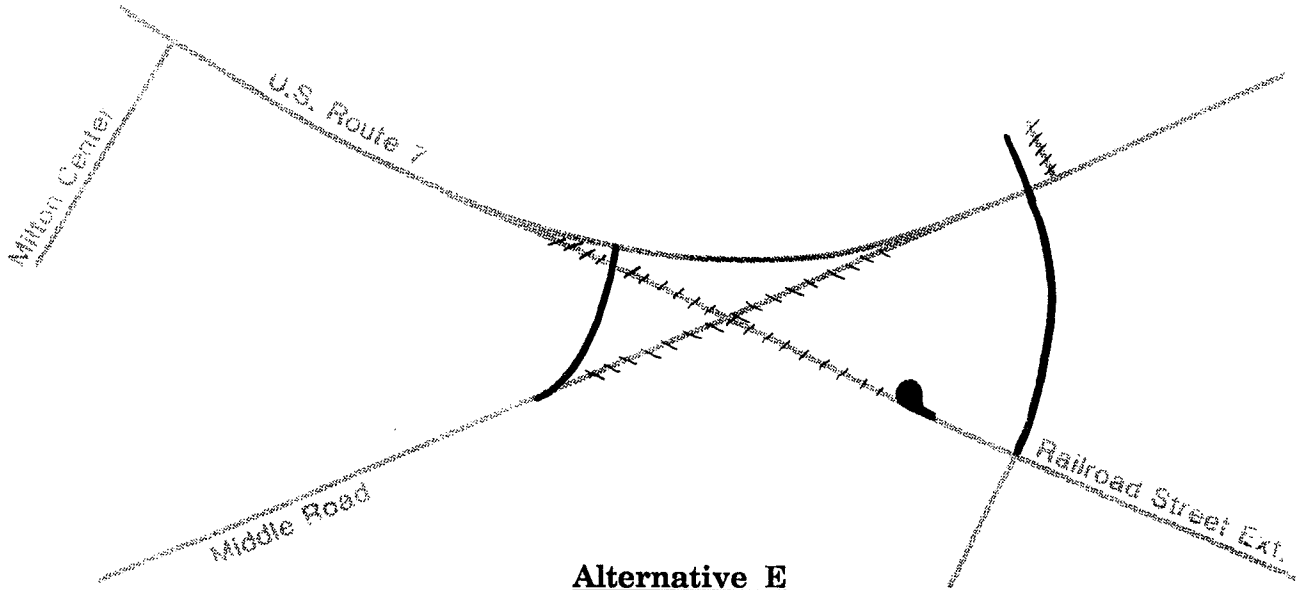
**Alternative C**

- Maximum separation of intersections.
- Requires reconfiguration of Milton Center development.
- Lack of connections between Route 7 and Middle Road/Railroad Street undesirable for efficient travel patterns.



**Alternative D**

- Consolidates intersections to eliminate offset.
- Concentrates turning movements at a single location creating a potential congestion point.
- Forces traffic traveling between Middle Road and Route 7 on a circuitous path with extra turns.



**Alternative E**

- Provides standard Tee intersection configuration.
- Increases separation of intersections on Route 7.
- Separates turning movements and places left turns from Railroad Street to Route 7 at existing signal.
- Does not provide direct connection between Railroad Street and Middle Road.

All of the alternatives eliminate the unusual existing configuration and most relocate a single intersection further to the south. This relocation attempts to maximize the spacing for left turn storage on Route 7. To provide adequate spacing the China House Restaurant should be taken. Two of the alternatives are not realistically feasible. Alternative A is not sufficient because of the limited storage distance between Route 7 and Middle Road/Railroad Street. Alternative C is not practical because of its impacts on Milton Center.

The remaining three alternatives differ mainly in their operational characteristics. Alternative D would create a congestion point on Route 7 by concentrating most of the highest turning movements in the Town at a single location and thus is not desirable. Alternative B maintains a connection between Middle Road and Railroad Street, but the proximity of the Route 7/Middle Road and Middle Road/Railroad Street intersections will create operational difficulties. Alternative E eliminates the connection, but also eliminates operational problems along Middle Road. The tradeoff then is the operational superiority of Alternative E against the slightly lower cost Alternative B which maintains the connection between Middle Road and Railroad Street. Considering the relatively low existing and projected turning movement volumes between Railroad Street and Middle Road, Alternative E is preferred. The cost difference of 10 to 15 percent is offset by the operational improvements. In addition, a new traffic signal may not be needed for Alternative E while Alternative B would likely require one by 1995. The preferred alternative is shown on plan sheet 3 of 4.

## Recommendations

### Immediate Actions

- Adopt the preferred configuration so that any development activity in the vicinity can incorporate the required land donations into the development plan and participate in its implementation.
- Proceed with design of the recommended improvements.

### Short Term Actions

- Construct intersection improvements described above and depicted on the plan sheet (Sheet 3 of 4) commensurate with development. These improvements will increase safety and provide sufficient capacity to accommodate projected traffic growth through 1995.
- The plan depicts the minimum amount of storage for the left turns on Route 7. A short (100 foot storage, 100 foot taper) southbound left turn lane into the Railroad Street connector should be incorporated because of the small incremental cost.
- To align with the new connector, the entrance to the Milton Square shopping center should be relocated about 45 feet to the south. The parking lot layout should be reconfigured to accommodate the relocation. The resulting circulation scheme is better than that which exists today.
- A northbound right turn lane at the new four-way intersection is warranted to maximize the effectiveness of the single northbound thru lane.
- The existing Railroad Street extension should be closed south of the connector with a cul-de-sac. Access should be provided via the cul-de-sac rather than Route 7.
- Channelizing islands should be incorporated into the design on the Middle Road approach. A raised median which extends back to the beginning of the new curve on Middle Road should be provided to separate opposing flows of traffic and guide vehicles along the curve. Right turn islands are also necessary to accommodate these movements. The design of the islands should specifically consider the accommodation of vehicular turning movements to and from Middle Road.
- A traffic signal should only be installed at the intersection when needed. Significant vehicle delays and problems correctable with a traffic signal should be observed at various times during the day and the MUTCD signal warrants should be met. The pattern of turning movements indicates a signal may not be required by 1995.
- Sight distance easements along the insides of the curves on Middle Road and the new connector should be incorporated into the improvements.

**Intermediate/Long Term Actions**

- The long term needs for Route 7 in this area should be addressed in a comprehensive study. The majority of potential development in the Town will occur beyond the short term horizon. Planning needs to be done now to establish the needs and place the short term improvements in context.

**Cost Estimate**

The improvements for the U.S. Route 7/Middle Road/Railroad Street Extension intersection recommended herein will cost approximately \$1,100,000 to \$1,200,000. This cost includes engineering, management, and a 10 percent contingency. In addition, approximately one acre of right-of-way will be required.

**U.S. ROUTE 7 - WEST MILTON ROAD TO BOMBARDIER ROAD**

**Existing Conditions**

This examination focuses on the triangle of roadways in Checkerberry Village and generally addresses the remaining portion of Route 7 in the study area. In Checkerberry Village, West Milton Road's connections to Route 7 form two sides of a large triangle with a curving Route 7 completing the figure. The intersection of Route 7 and Racine Road is at the center of the Route 7 side of the triangle. West Milton Road traverses to the west providing connections to the southwestern portion of the Town. It crosses I-89 approximately one quarter of a mile west of Route 7. The existing peak hour traffic volumes are shown in Figure 4-1.

The key features of the existing intersections and their operation are described below.

- Route 7 follows a broken back curve alignment with a 300 foot tangent between the curves. The southern and northern curves have degrees of curvature of approximately 7° and 8°30', respectively. Superelevation is provided through the curves and thus safe conditions exist for the posted speed of 35 miles per hour. The West Milton Road connections are tangent to the curves which reduces the amount of positive guidance provided to vehicles travelling on Route 7 along the curve.
- The configuration of the intersections accommodates turning movements between West Milton Road and Route 7 at very flat angles. This creates sight line difficulties for drivers turning from the side streets since they must look back over their shoulders.
- The lack of left turn lanes on Route 7 causes some unexpected slowdowns on Route 7. Signs warning "WATCH FOR TURNING VEHICLES" exist at both ends of the curve.
- Driveways serving the land uses along Route 7 are poorly defined and too wide to properly channelize traffic.
- The sight distance is adequate from the side streets especially for those on the outside of the curve. This is mostly due to the flatness of the terrain and the lack of development on the center of the curve.

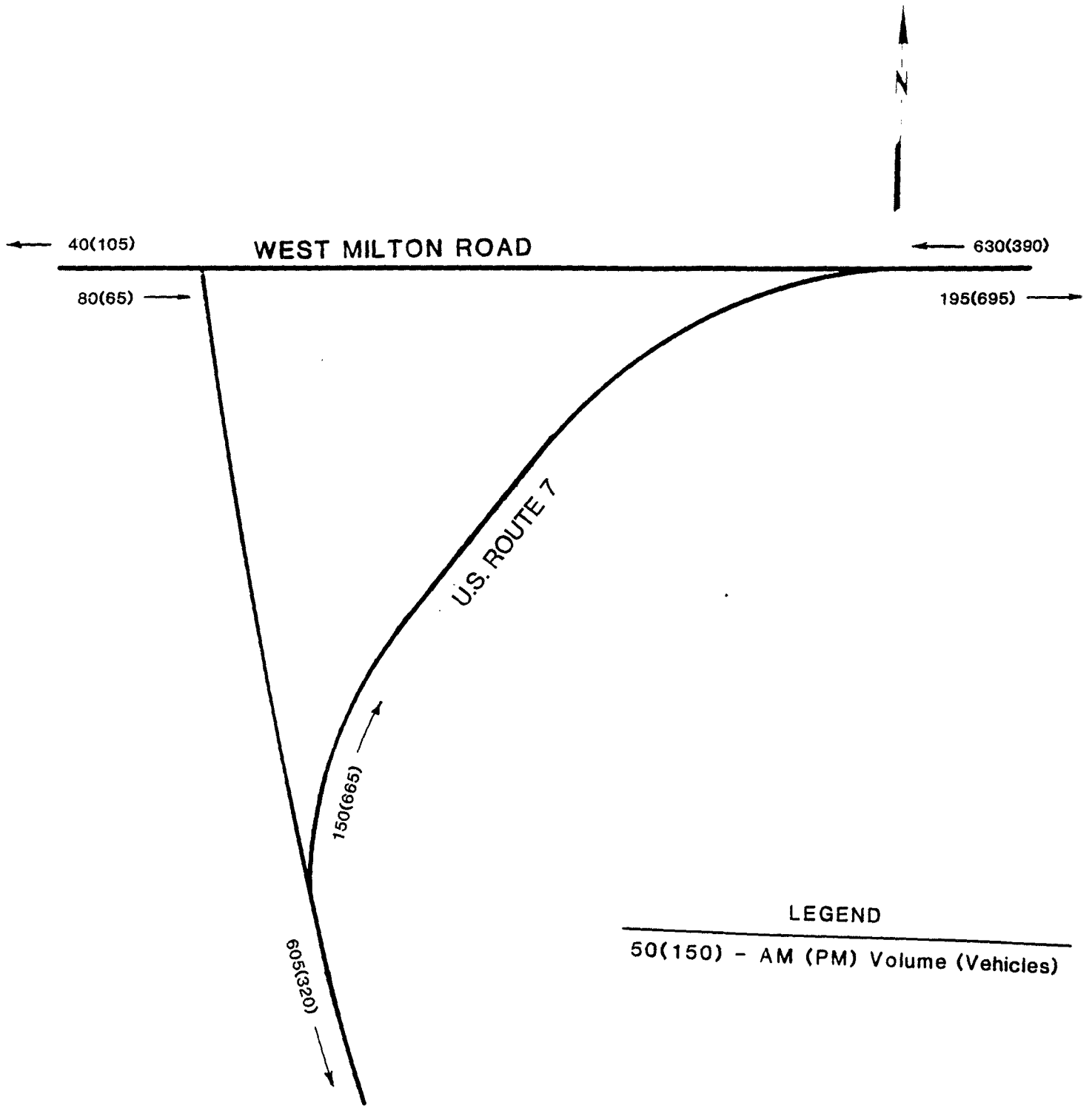


Figure 4-1 U.S. ROUTE 7 and WEST MILTON ROAD - 1989 PEAK HOUR TRAFFIC VOLUMES

- Observations of traffic conditions at the intersection indicate no significant capacity problems or delays.
- Wetland areas are present on both sides of Route 7. These areas exist not only surrounding the ponds on either side of Route 7, but also within the triangle on both sides of Racine Road near the American Legion hall and the natural gas check station.

The stretch of Route 7 between West Milton Road and Bombardier Road passes through mixed residential and commercial development. For the most part the development is continual although the land uses are not particularly intense in terms of density or traffic generation. Route 7 is a two lane roadway throughout with gravel shoulders which vary in width from two to six feet. Presently, no left turn lanes exist. Access control is generally fair to poor with numerous poorly defined driveways along the roadway.

### **Future Conditions**

The traffic volume levels and patterns in this area will be primarily affected in the short term by the development along Route 7 between Checkerberry Village and Middle Road. The projected traffic volumes for 1995 are shown in Figure 4-2. The implications of these volumes are described below.

- The traffic forecasts for 1995 show significant traffic increases on Route 7. Lack of projected development in southwestern Milton in the short term results in basically stable traffic volumes on West Milton Road. Longer term changes such as the potential for a new interchange with I-89 at West Milton Road will have substantial impacts on traffic patterns and levels on this roadway.
- The 1995 traffic volumes do not meet the peak hour traffic signal warrant even if the West Milton Road connections to Route 7 are considered as a single location.
- Along Route 7, the several proposed developments (Milton Centre, Haydenberry Park, New England Commercial Park, and Checkerberry Commercial Park) will each have one or two access points onto Route 7. Some of these access points will incorporate left turn lanes on Route 7. The increasing volumes on Route 7 and the new turning volumes indicate that all these points should have left turn lanes in the short term.

### **Alternative Improvements**

With respect to the other locations examined along Route 7, Checkerberry Village has the least pressing problems. The basic configuration of the West Milton Road connections to Route 7 are undesirable. The flat angle of the intersections causes operational and sight line difficulties. Standard intersection configurations are required. In addition, at least one of the remaining connections to Route 7 from the northwest side should be closed. Along Route 7, a left turn would be desirable to remove some stopped vehicles from the through lanes on Route 7.

The simplest solution is to just bend the side street leg around to a 90 degree Tee intersection. This is precluded at the southern intersection by a new leach field. At the northern location, this type of improvement is possible, but the realigned

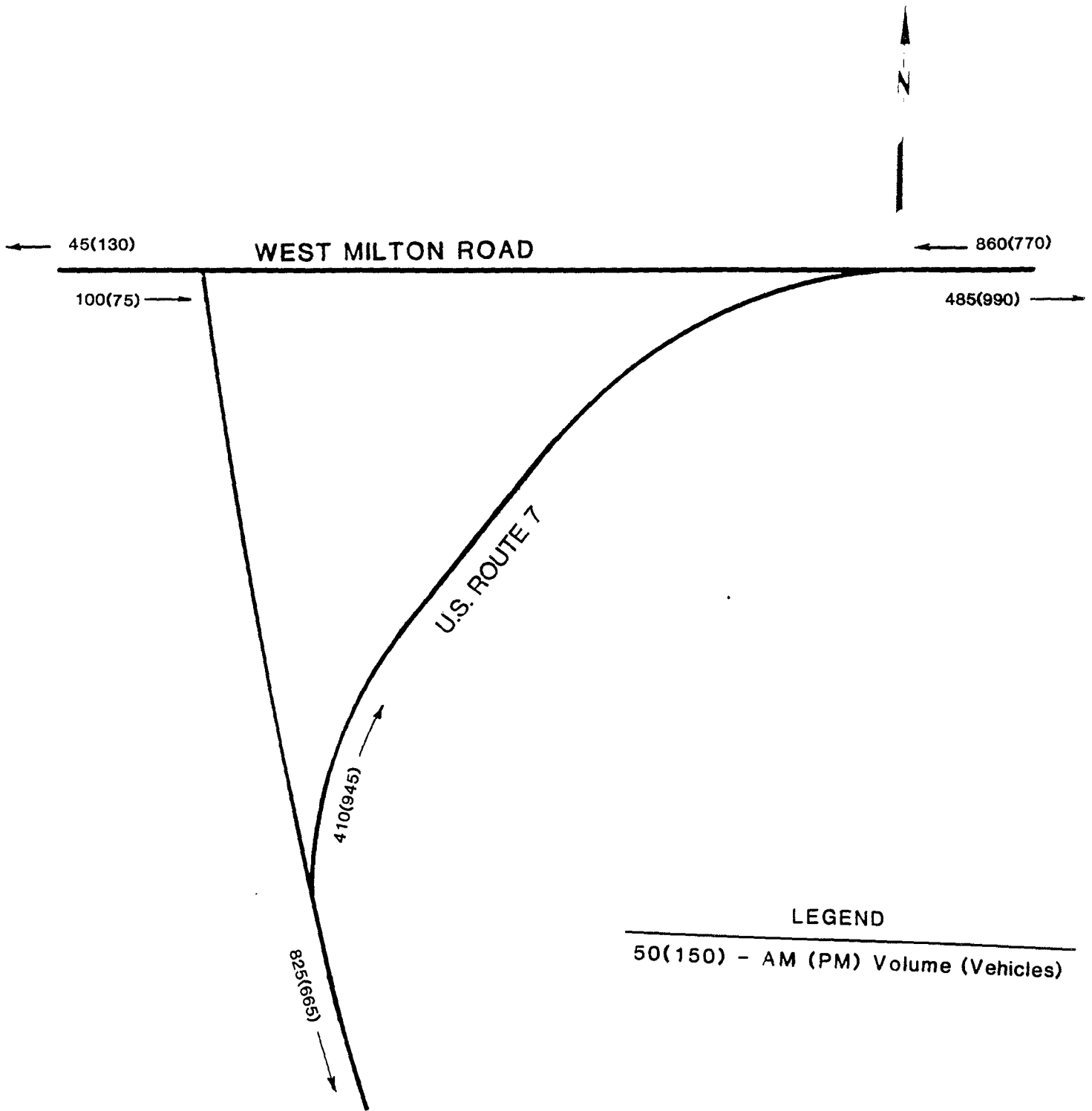


Figure 4-2 U.S. ROUTE 7 and WEST MILTON ROAD - 1995 PEAK HOUR TRAFFIC VOLUMES

roadway would have a curve with a 150 foot radius approaching the intersection. A curve of this radius is adequate for a speed of 23 miles per hour. A larger curve radius could be achieved if the house in the northeast corner of the triangle was taken, but this goes beyond a short term improvement. With this improvement, Racine Road and the southern connector should be closed on the northwest side of Route 7. Thus, traffic desiring to travel to properties along the closed roadways would turn at the new Tee intersection and access them via connections to West Milton Road.

An alternative solution would involve the relocation of the West Milton Road connection so that larger radii could be used. Such an alignment would have radii of approximately 500 feet (40 mph) but has some constraints. The new connection would partially follow the existing alignment of Racine Road past the American Legion Hall and the natural gas check station and across the wetlands. Once across the wetlands, the new roadway would curve to smoothly tie into existing West Milton Road at the existing apex of the triangle. This alignment is necessary to minimize impacts on the wetlands and avoid structures. As with the first option, the remaining two legs would be closed northwest of Route 7.

Both alternatives would be adequate in the short term with the preferred alternative being the relocation of West Milton Road to near Racine Road, assuming the wetland issues can be overcome. The preferred alternative has the advantages of better geometrics and a better local roadway network which will provide improved service into the long term. The tradeoff is one of cost. Since the improvements are currently a low priority, the better long term option is depicted in plan sheet 4 of 4.

Along Route 7, the cumulative effects of development will begin to strain the two lane roadway in the short term. Appropriate improvements are the construction of left turn lanes at each public street and significant development entrance. Right turn lanes should also be constructed to accommodate moderate turning movements and should be especially emphasized at signalized intersections. Interparcel access and other new roadways between developments parallel to Route 7 should also be encouraged to reduce volumes on Route 7.

Turning movements to development fronting Route 7 are more difficult to accommodate in the short term. Without improvements, delays to through traffic will increase somewhat but the signalized intersections will still be the critical points along the roadway in terms of capacity. To better accommodate the movements, options include the provision of full width paved shoulders or the construction of a center two-way left turning lane (TWLTL). Neither option is an ideal solution and does not appear to be warranted. The intensity of development along Route 7 does not generate moderate or high volumes of left turn vehicles. Threshold volumes for considering this type of treatment are 70 midblock left turns per 1000 feet and/or a left turn volume of greater than 20 percent of total volume<sup>3</sup>.

## **Recommendations**

### **Immediate Actions**

- Adopt the preferred configuration for improvements in Checkerberry Village so that any development activity which significantly impacts the intersection can participate in the funding of the design and construction of the improvements.

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<sup>3</sup>Transportation Research Board, NCHRP Report 279 - Intersection Channelization Design Guide, (Washington, D.C., 1985), pg. 57.

- Adopt a policy statement regarding the importance of turn lanes on Route 7 at significant intersections.

### **Short Term Actions**

- Proceed with design of the recommended improvements in Checkerberry Village.
- Construct intersection improvements described above and depicted on the plan sheet (Sheet 4 of 4) commensurate with development. These improvements will increase safety and provide sufficient capacity to accommodate projected traffic growth through 1995.
- As shown, the relocated West Milton Road should intersect Route 7 at about 90 degrees. This provides adequate setback from the American Legion Hall and requires relocation of Racine Road south of Route 7.
- Left turn lanes on Route 7 should be provided at the new intersection with West Milton Road. The length of the left turn lane for vehicles turning from Route 7 to West Milton Road is shown as constrained by the culvert between the two ponds. To avoid the requirement of lengthening the culvert, a minimum length of transition, taper and storage is depicted.
- The existing West Milton Road connections to Route 7 should be closed with cul-de-sacs. Access to the properties within the existing triangle should not be from Route 7. Trees and shrubs should be planted in the abandoned roadbeds to provide positive visual guidance for drivers on Route 7.
- Access control along Route 7 should be improved by better defining and consolidating driveways. Whenever possible access to parcels should be provided from side streets rather than directly from Route 7. Interparcel access should also be encouraged as part of the access control plan.

### **Intermediate/Long Term Actions**

- In Checkerberry Village, when the field northeast of West Milton Road develops, a roadway should connect the relocated West Milton Road with Checkerberry Commercial Park's Lamell Drive.
- The long term needs for Route 7 in this area should be addressed in a comprehensive study. The majority of potential development in the Town will occur beyond the short term horizon. Planning needs to be done now to establish the needs and place the short term improvements in context.

### **Cost Estimate**

The improvements for the Checkerberry Village improvements recommended herein will cost approximately \$700,000 to \$800,000. This cost includes engineering, management, and a 10 percent contingency. In addition, approximately one acre of right-of-way will be required.