

*TIENKEN ROAD CORRIDOR STUDY*

*CITY OF ROCHESTER HILLS*

*Volume 1 of 4*



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# Chapter 1 – Data Collection

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## 1.1 Existing Condition

The existing Tienken Road corridor, Livernois Road to Washington Road, consists mainly of a two-lane bituminous roadway with widenings at its intersections with Rochester Road and Livernois Road to accommodate left and right traffic turning movements. Additional deceleration/acceleration lanes and passing lanes have been added over the years as site developments have evolved.

The existing horizontal alignment for Tienken Road is straight with the exception of a tight S-curve at the Tienken Road and Sheldon Road intersection. The curve at this location does not meet warrants for 30 miles per hour.

The existing vertical alignment has prominent vertical relief throughout the project corridor. There is one location, between Livernois Road and Rochester Road that barely meets criteria for 35 miles per hour. Drainage along the corridor is conveyed through ditches and swales and at places along the shoulder point.

Sheldon Road is an existing straight gravel road, also with vertical relief. This road is very rural in nature with large trees within close proximity to the roadway. There is no real system to convey roadway drainage other than the road edge and periodic ditches.

## 1.2 1996 Master Thoroughfare Plan

HRC reviewed the 1996 Master Thoroughfare Plan Update, prepared by BRW, Inc. and adopted by the Rochester Hills Planning Commission on June 2, 1998. This document examined existing transportation trends and problems in order to identify future transportation facility needs and to recommend a transportation improvement program. The Tienken Road Corridor Study wanted to coordinate any proposed improvements with the goals and established criteria of the Plan.

The Master Thoroughfare Plan Update designates Tienken Road a minor arterial; its function is to provide mobility within and between neighborhoods and to accommodate trips of moderate length. The Plan indicates a need for a major arterial in the northern third of the city. Although, Tienken Road is a heavily used corridor, it did not meet the criteria for a major arterial classification because it is neither continuous through the city nor is it linked to the regional roadway system.

The Master Thoroughfare Plan Update does not recommend a future roadway geometric for Tienken Road. However, the Plan recommends establishing a Right-of-Way width of 120 feet for the whole length of the road. This ROW width will accommodate a typical minor arterial with a 3 lane cross section up to a typical major arterial designed as a 4 lane residential boulevard.

The Master Thoroughfare Plan Update does recommend that Sheldon Road between Tienken and Mead be classified as a Minor Arterial and improved to a 3 lane roadway in order to accommodate 2015 roadway conditions.

### 1.3 Traffic Studies

The traffic studies were conducted by Hubbell, Roth, & Clark (HRC) during June 1999. The complete results by location and study can be found in Appendix A.

#### 1.3.1 Speed

The speed data based on weekday 24-hour counts is summarized in Table 1-1. Data was collected at seven locations in the study area.

The primary basis for establishing a proper, realistic speed limit is the nationally recognized method of using the 85<sup>th</sup> percentile speed. This is the speed at or below which 85% of the traffic moves. For example, if 85 of each 100 motor vehicles were recorded at 45 mph or under, then 45 mph is the 85<sup>th</sup> percentile speed.

Historically, before and after, traffic engineering studies have shown that changing the posted speed limit does not significantly affect the 85<sup>th</sup> percentile speed. The driving environment, which includes other traffic on the road and roadway conditions, is the primary factor, which influences the prevailing speed.

The driving environment is reflected by the 85<sup>th</sup> percentile speed. The majority of drivers, consciously or unconsciously, consider the factors in the driving environment and travel at a speed that is safe and comfortable regardless of the posted speed limit.

Table 1-1 shows that the 85<sup>th</sup> percentile and the average speeds are higher than the current posted speed limit of 40 mph on Tienken and 25 mph on Mead and Sheldon.

The speed study indicated that the 24-hour weekday traffic speeds were similar on specific segments of the corridor. On Tienken, from Brewster to Rochester Road, the 85<sup>th</sup> percentile ranges from 43 – 45 mph. On Tienken, from Rochester to the old Washington/Runyon intersection, the 85<sup>th</sup> percentile ranges from 49 – 54 mph. Speeds are potentially a problem along these segments of Tienken. In addition, speed data was collected on Sheldon and Mead, which had an 85<sup>th</sup> percentile of 38.75 mph and 34.67 mph, respectively.

# Chapter 3 – Corridor Improvement Alternatives

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## 3.1 Approach

The process of developing an improvement program for the Tienken Road Corridor was driven by an analysis of separate areas along the corridor, requiring special attention. The first of these areas was the intersection of Letica Drive and Tienken Road. Letica is a proposed connection from the City of Rochester to form a T-intersection with Tienken Road in Rochester Hills. Challenging topography and sensitive land uses to the south side of Tienken Road limits the areas where this connection can be made. In consultation with the City of Rochester, the HRC team determined that the intersection of Letica Drive with Tienken Road could be made between the proposed high school driveway with Tienken Road and Clear Creek.

The next area of concern was the design for the Tienken/Sheldon intersection. We concluded that this intersection could operate as a conventional T-intersection or as a modern roundabout. A detailed analysis of the feasibility of a modern roundabout at this intersection was conducted separately.

A third area of concern was the paving of Sheldon Road, North of Tienken. The HRC team developed a cost estimate for constructing Sheldon Road as a three-lane cross section from Tienken to a point approximately 3,400 feet north of Tienken. The school district and the City of Rochester Hills apparently have reached an agreement that this is the appropriate cross section for this portion of Sheldon Road, and our analysis confirms that this cross section will provide adequate capacity for the expected traffic on this portion of Sheldon Road. The balance of Sheldon Road to Mead can be a two-lane cross section.

Our capacity analysis of the intersections in the corridor revealed serious capacity deficiencies at the Tienken/Rochester and Tienken/Livernois intersections. We explored several alternatives for providing additional capacity to the Tienken/Livernois intersection, and we are recommending additional turn lanes at this intersection to provide an acceptable Level of Service.

The analysis of the capacity deficiencies at the Tienken/Rochester intersection was more involved. The need to provide capacity for a left turn movement at this intersection during the PM peak hour leads to

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geometric designs which provide significantly more lanes at the intersection than currently exist. Capacity analysis suggests that two through lanes in each direction are required on Rochester Road and two through lanes are required in each direction on Tienken Road at this intersection. In addition, significant left turn capacity is required, and this can be provided through double left turn lanes or through a boulevard cross section on both Rochester Road and Tienken Road. The boulevard design provides a more aesthetic treatment to the intersection and a safer operation for turning movements. This design also conforms with the recommendation from the Master Thoroughfare Plan Update for Rochester Road to be a boulevard. A boulevard has the added benefit of giving motorists two options for making a left turn.

Our analysis of the corridor outside of the major intersections indicated that a pattern of rear-end accidents could be addressed with a center lane for left turns. The center lane for left turns is proposed for those areas not involved in intersection improvement, except that the portion of Tienken Road near the Stoney Creek bridge at the east end of the corridor can be accommodated with a two-lane section. This two-lane section will allow the bridge in the historic district to remain at two-lanes in width. For the other portions of Tienken Road, currently two lanes in width, the HRC team recommends a three-lane cross section.

Thus, our evaluation of alternatives occurred in a segment by segment and intersection by intersection basis, rather than alternative alignments and/or cross sections for the entire corridor. The resulting recommended alternative is a mixture of cross sections customized to the location along the corridor. The critical capacity deficiencies are now which occurred at major intersections, are addressed for this alternative. The historic area at the east end of the corridor is not significantly changed, and traffic flow in and out of the new high school and Tienken/Sheldon is accommodated.

### 3.2 Alternatives for Vehicular Traffic

#### 3.2.1 Letica Connection

The HRC team explored options for creating a connection from the City of Rochester north to Tienken Road. The option of extending Sheldon Road to the south has been precluded by conflicts with cemetery property in this area. The City of Rochester has new restricted developments under construction on the south side of Tienken, east of Sheldon. A location for a connector to the south adjacent to these