



## CITY of NOVI CITY COUNCIL

**Agenda Item B**  
**October 11, 2010**

**SUBJECT:** Approval of Traffic Control Order 10-37 for the implementation of a 45 mph speed limit on Novi Road between 12 Mile Road and 14 Mile Road and Traffic Control Order 10-38 for the implementation of a 30 mph school speed limit on Novi Road from 300 feet north of the north driveway to Hickory Woods Elementary School to 300 feet south of the south driveway of Hickory Woods Elementary School on school days only during the periods of 8:27 AM to 8:57 AM and 3:45 PM to 4:30 PM.

**SUBMITTING DEPARTMENT:** Department of Public Services, Engineering Division *BIC*

**CITY MANAGER APPROVAL:** *[Signature]* *RH*

**BACKGROUND INFORMATION:**

A recommendation to revise the speed limit on Novi Road from 12 Mile Road to 14 Mile Road was discussed at the August 23, 2010 City Council meeting and was postponed so that additional information regarding pedestrians could be provided. Additional study of pedestrian safety as it relates to the proposed increase in the posted speed limits was conducted by the City's traffic consultants, Birchler Arroyo. The report (see Birchler's September 20, 2010 report, attached) confirms the original recommendation to increase the posted speed limit.

As discussed in the attached September 29, 2010 memo, the majority of the pedestrians along Novi Road are students that are walking to and from school. There is a traffic signal at Hickory Woods Elementary and Novi Road that operates between 6 AM and 9 PM every day to assist pedestrian with crossing Novi Road and a crossing guard is present during school arrival and dismissal times. There is no current school speed zone posted for Hickory Woods Elementary, which is located on Novi Road south of 14 Mile Road. The establishment of a school zone was included in the speed study and the report recommends a 30 mph zone adjacent to the school. State law (MCL 257.627a, attached) allows the speed limit to be decreased by 15 mph from the posted speed (but set at not less than 25 mph) in a school zone for a period of 30 minutes to one hour before school and 30 minutes to one hour after school, when requested by the school superintendent. Staff has discussed the proposed school speed zones with Walled Lake Schools and the Superintendent has provided the enclosed August 16, 2010 letter.

The review of the speed limit was initiated when a recent audit of the City's traffic control sign inventory identified a number of posted speed limits that lack traffic control orders for enforcement of the speed. The Uniform Traffic Code requires that traffic control orders, as issued by the traffic engineer and approved by the City Council, be on file for the enforcement of traffic control signs. As such, an engineering study was performed to establish a legal speed limit as required by the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) (see Birchler Arroyo study dated May 13, 2010). Speed limits are generally set using the 85th percentile speed, which is the speed at or below which 85 percent of the motorists drive on a given road when unaffected by slower traffic or poor weather.

The posted speed limit on Novi Road between 12 Mile Road and 14 Mile Road is currently 40 mph, except an area between Old Novi Road and 13 Mile Road that is posted 35 mph. There is not a traffic control order on file for the posted speeds on Novi Road between 12 Mile Road and 14 Mile Road. A speed limit of 45 mph is proposed to represent existing driver behavior on this segment as demonstrated by the observed 85<sup>th</sup> percentile speeds and shown in the following table.

Segment	Current Posted Speed Limit	Observed 85 <sup>th</sup> Percentile Speed	Recommended Posted Speed Limit
12 Mile to 1,640 feet south of 13 Mile	40	47	45
1,640 feet south of 13 Mile to 13 Mile	35	45	45
13 Mile Road to 14 Mile Road	40	48	45

A key underlying principle in the establishment of a speed limit is that motorists will tend to drive at the speeds they feel comfortable regardless of the posted speed limit. The most effective way to decrease the observed speeds is to change the physical characteristics of the road (i.e. lane width, geometry, design speed, road side environment, traffic calming measures, etc.) to prompt a change in driver behavior. The collected data indicates that drivers on this section of Novi Road feel comfortable driving at 45 mph based on the design of the road.

As discussed in the attached August 10, 2010 memo and the September 29, 2010 memo regarding the proposed speed limit changes, an increase in the posted speed to match the 85<sup>th</sup> percentile speed does not significantly increase the 85<sup>th</sup> percentile speed when the posted speed limit is increased. In reviewing the segments on which the speed limits were increased in 2009, the 85<sup>th</sup> percentile speed increased an average of 0.8 mph. In accordance with Department of Public Service's standard procedures, within one year after implementation of new speed limits, staff will collect speed samples to verify that the new posted speed limit continues to reflect the 85<sup>th</sup> percentile speed.

The new speed limit signs would meet the federal retroreflectivity requirements and would be funded by the Traffic Control Sign Replacement Program as approved in the FY2010-11 budget.

**RECOMMENDED ACTION:** Approval of Traffic Control Order 10-37 for the implementation of a 45 mph speed limit on Novi Road between 12 Mile Road and 14 Mile Road and Traffic Control Order 10-38 for the implementation of a 30 mph school speed limit on Novi Road from 300 feet north of the north driveway to Hickory Woods Elementary School to 300 feet south of the south driveway of Hickory Woods Elementary School on school days only during the periods of 8:27 AM to 8:57 AM and 3:45 PM to 4:30 PM.

	1	2	Y	N
Mayor Landry				
Mayor Pro Tem Gatt				
Council Member Crawford				
Council Member Fischer				

	1	2	Y	N
Council Member Margolis				
Council Member Mutch				
Council Member Staudt				

**CITY OF NOVI  
TRAFFIC CONTROL ORDER**

  X   SPEED  
       PARKING  
       OTHER

DATE OF ORDER: October 4, 2010  
CONTROL NUMBER: 10-37

PURSUANT TO CHAPTER NO. 33 OF THE CODE OF ORDINANCES OF THE CITY OF NOVI, MICHIGAN, SAME BEING THE UNIFORM TRAFFIC CODE FOR CITIES, TOWNSHIPS AND VILLAGES OF MICHIGAN AND IN THE INTEREST OF PUBLIC SAFETY AND CONVENIENCE THE FOLLOWING TRAFFIC CONTROL ORDER IS HEREBY ISSUED BY BRIAN COBURN, SENIOR CIVIL ENGINEER, DULY AUTHORIZED AS TRAFFIC ENGINEER, BY SEC. 33.141 OF THE AFORESAID CHAPTER.

ISSUANCE OF THIS TRAFFIC CONTROL ORDER WAS PRECEDED BY STUDY AND INVESTIGATION OF TRAFFIC CONDITIONS ON THE FOLLOWING PUBLIC ROAD OR ROADS IN THE CITY OF NOVI, MICHIGAN.

**NOVI ROAD**

AND AFTER SAID INVESTIGATION, IT IS HEREBY ORDERED AND DIRECTED THAT THE DEPARTMENT OF PUBLIC SERVICES ERECT AND MAINTAIN THE SPEED LIMIT SIGN (S) IN ACCORDANCE WITH THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AS REQUIRED BY SEC. 33.217 OF THE AFORESAID CHAPTER, SAID SIGNS TO GIVE NOTICE OF THE FOLLOWING DETERMINATION:

**SPEED LIMIT FOR NOVI ROAD BETWEEN 12 MILE ROAD AND 14 MILE ROAD TO BE 45 MPH EXCEPT FOR THE SCHOOL SPEED ZONE AS ESTABLISHED BY TCO 10-38.**



\_\_\_\_\_  
Brian Coburn, P.E. - Traffic Engineer

Dated: October 4, 2010

**APPROVED BY CITY COUNCIL**

TRAFFIC CONTROL ORDER NUMBER 10-37 HAVING BEEN PRESENTED TO THE COUNCIL OF THE CITY OF NOVI, MICHIGAN FOR STUDY AND APPROVAL, IS HEREBY APPROVED AND IT IS HEREBY ORDERED AND DIRECTED THAT THIS ORDER BE FILED IN THE OFFICE OF THE CITY CLERK AND A COPY THEREOF IN THE OFFICE OF THE CHIEF OF POLICE OF SAID CITY.

IT IS FURTHER ORDERED AND DIRECTED THAT THIS ORDER SHALL BECOME EFFECTIVE UPON BEING FILED WITH THE CLERK AND UPON ERECTION OF ADEQUATE SIGNS GIVING NOTICE OF THE EXISTENCE OF AFORESAID,

**SPEED LIMIT FOR NOVI ROAD BETWEEN 12 MILE ROAD AND 14 MILE ROAD TO BE 45 MPH EXCEPT FOR THE SCHOOL SPEED ZONE AS ESTABLISHED BY TCO 10-38.**

ADOPTED AT THE REGULAR MEETING OF  
CITY COUNCIL ON October 11, 2010.

By: \_\_\_\_\_  
David Landry, Mayor

By: \_\_\_\_\_  
Maryanne Cornelius, Clerk

**CITY OF NOVI  
TRAFFIC CONTROL ORDER**

  X   SPEED  
      PARKING  
      OTHER

DATE OF ORDER: October 4, 2010

CONTROL NUMBER: 10-38

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**SCHOOL SPEED LIMIT ON NOVI ROAD FROM 300 FEET NORTH OF THE NORTH HICKORY WOODS ELEMENTARY SCHOOL DRIVEWAY TO 300 FEET SOUTH OF SOUTH SCHOOL DRIVEWAY ON SCHOOL DAYS ONLY DURING THE PERIOD OF 8:27 AM TO 8:57 PM AND 3:45 PM TO 4:30 PM.**



\_\_\_\_\_  
Brian Coburn, P.E. - Traffic Engineer  
Dated: October 4, 2010

**APPROVED BY CITY COUNCIL**

TRAFFIC CONTROL ORDER NUMBER 10-38 HAVING BEEN PRESENTED TO THE COUNCIL OF THE CITY OF NOVI, MICHIGAN FOR STUDY AND APPROVAL, IS HEREBY APPROVED AND IT IS HEREBY ORDERED AND DIRECTED THAT THIS ORDER BE FILED IN THE OFFICE OF THE CITY CLERK AND A COPY THEREOF IN THE OFFICE OF THE CHIEF OF POLICE OF SAID CITY.

IT IS FURTHER ORDERED AND DIRECTED THAT THIS ORDER SHALL BECOME EFFECTIVE UPON BEING FILED WITH THE CLERK AND UPON ERECTION OF ADEQUATE SIGNS GIVING NOTICE OF THE EXISTENCE OF AFORESAID,

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ADOPTED AT THE REGULAR MEETING OF  
CITY COUNCIL ON October 11, 2010.

By: \_\_\_\_\_  
David Landry, Mayor

By: \_\_\_\_\_  
Maryanne Cornelius, Clerk



## Walled Lake Consolidated Schools

William A. Hamilton, Ed.D.  
Superintendent of Schools

Educational Services Center  
850 Ladd Road, Building D  
Walled Lake, MI 48390  
Phone: 248/956-2000  
Fax: 248/956-2123

August 16, 2010

Brian T. Coburn, P.E.  
Engineering Division, Department of Public Services  
City of Novi  
26300 Delwal Drive  
Novi, MI 48375  
[bcoburn@cityofnovi.org](mailto:bcoburn@cityofnovi.org)

**Subject: School Speed Zone on Novi Road, 13 Mile Road to 14 Mile Road**

Dear Mr. Coburn,

We have been advised of the proposed speed limit changes on Novi Road between 12 and 14 Mile Roads, which includes the portion of roadway in front of Hickory Woods Elementary School.

We request a 30 mph school speed zone be designated on that portion of roadway in front of Hickory Woods Elementary School and that signage be installed to properly designate this school speed zone.

Thank you for your assistance and please contact me with any additional questions.

Sincerely,

A handwritten signature in cursive script that reads 'William A. Hamilton'.

William A. Hamilton, Ed.D.  
Superintendent of Schools

# City Of Novi

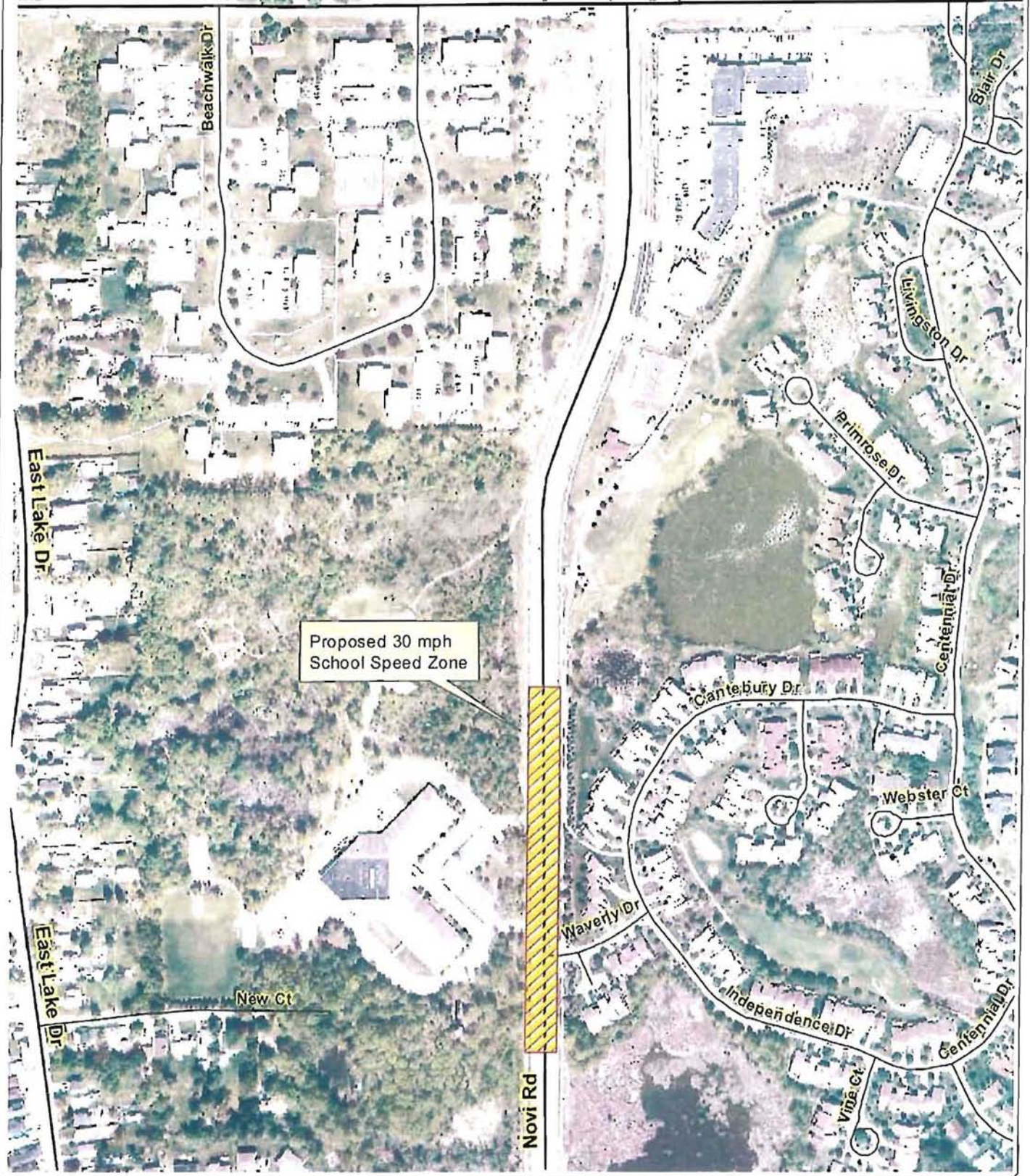


## MAP INTERPRETATION NOTICE

Map information depicted is intended to reduce or substitute for any official or primary source. This map was created to meet National Map Accuracy Standards and use the most recent accurate sources available to the people of the City of Novi. Boundary measurements and area calculations are approximate and should not be construed as survey measurements performed by a licensed Michigan Surveyor as defined in Michigan Public Act 132 of 1970 as amended. Please contact the City GIS Manager to confirm source and accuracy information related to this map.

## Hickory Woods School Speed Zone

Fourteen Mile Rd



Proposed 30 mph School Speed Zone

Novi Rd

MICHIGAN VEHICLE CODE (EXCERPT)  
Act 300 of 1949

257.627a "Regularly scheduled school session," "school," and "school zone" defined; prima facie speed limit in school zone; signs; applicability of section to walkway; location of school; school in session year-round.

Sec. 627a. (1) As used in this section and section 629:

(a) "Regularly scheduled school session" means that part of a day of student instruction that is followed by a break for lunch or by a final dismissal of the student body for that day.

(b) "School" means an educational institution operated by a local school district or by a private, denominational, or parochial organization. School does not include an educational institution that the department of education determines has its entire student population in residence at the institution.

(c) "School zone" means school property on which a school building is located and the area adjacent to the school property that is designated by the signs required under subsection (2). Except as otherwise provided in subsection (5), the school zone extends not more than 1,000 feet from the property line of the school in each direction.

(2) Except as provided in subsection (4), the prima facie speed limit in a school zone, which shall be in force not less than 30 minutes but not more than 1 hour before the first regularly scheduled school session until school commences and from dismissal until not less than 30 minutes but not more than 1 hour after the last regularly scheduled school session, and during a lunch period when students are permitted to leave the school, shall be 25 miles an hour, if permanent signs designating the school zone and the speed limit in the school zone are posted at the request of the school superintendent. The signs shall conform to the Michigan manual of uniform traffic control devices.

(3) This section does not apply to a limited access highway or to that portion of a street or highway over which a pedestrian overhead walkway is erected, if the walkway is adjacent to school property and is designed and located so as to be used, and is being used, as the principal means by which students of a school that has property adjacent to the walkway travel to and from the school.

(4) Local authorities may increase or decrease the prima facie speed limit within a school zone under their jurisdiction pursuant to section 629.

(5) Notwithstanding the requirements for a school zone as defined in subsection (1)(c), if a school is located in an area that requires school children to cross a state trunk line highway or county highway that has a speed limit of 35 miles per hour or more to attend that school, the school superintendent may submit a request to the state transportation commission, county road commission, or local authority having jurisdiction over the roadway, as applicable, for a school crossing as permitted under section 613a. If, based on the traffic engineering studies, the road authority determines the need for a lower speed limit, the road authority may designate the crossing as a school zone. Before submitting a request, the school superintendent shall have completed a school route plan as prescribed by section 7A-1 of the Michigan manual of uniform traffic control devices.

(6) Notwithstanding the 25-mile-per-hour prima facie speed limit established by subsection (2), the prima facie speed limit for any street in a school zone that has sidewalks along at least 1 side of the street, which shall be in force during the same periods that a 25-mile-per-hour speed limit provided by subsection (2) would otherwise be effective, shall be set at the limit requested by the superintendent of schools with jurisdiction over the school within the school zone, but this limit shall neither be more than 15 miles per hour below the regularly posted speed limit for that street nor less than 25 miles per hour. Permanent signs designating the school zone and the speed limit in the school zone shall be posted. These signs shall conform to the Michigan manual of uniform traffic control devices.

(7) If appropriate, the school superintendent may request that a sign be erected in the school zone indicating that a school is in session year-round. A sign erected under this subsection shall be posted on the same signpost as the school zone sign and immediately below the school zone sign. The sign shall read "Year-Round School" and shall conform to the Michigan manual of uniform traffic control devices.

*History:* Add. 1978, Act 42, Imd. Eff. Mar. 7, 1978;—Am. 1979, Act 21, Eff. Mar. 27, 1980;—Am. 1980, Act 222, Imd. Eff. July 18, 1980;—Am. 1996, Act 574, Imd. Eff. Jan. 16, 1997;—Am. 2000, Act 110, Imd. Eff. May 22, 2000;—Am. 2005, Act 88, Imd. Eff. July 20, 2005.

MEMORANDUM



TO: ROB HAYES, P.E.; DIRECTOR OF PUBLIC SERVICES  
FROM: BRIAN COBURN, P.E.; ENGINEERING MANAGER  
SUBJECT: PROPOSED SPEED LIMIT CHANGES  
MEADOWBROOK ROAD AND NOVI ROAD NEAR SCHOOLS  
DATE: SEPTEMBER 29, 2010

9/30/10  
To Hayes  
Brian Coburn

File  
*[Signature]*

This memo is to provide additional information regarding the proposed speed limits for Novi Road between 12 Mile Road and 14 Mile Road and Meadowbrook Road between 12 Mile Road and 13 Mile Road. The proposed speed limits for these segments were discussed during the August 23, 2010 City Council meeting and additional information was requested regarding pedestrians in these areas. Specifically, we requested that our traffic consultant, Birchler Arroyo, review pedestrian safety as it relates to an increase in the posted speed limits. The enclosed report, dated September 20, 2010, provides additional detail.

The enclosed report confirms the original recommendation to increase the posted speed limit to meet the observed 85<sup>th</sup> percentile speed (i.e. the speed at which or below 85 percent of the vehicles are currently traveling). The original report recommended that the school speed zone be in effect between 8:27 AM and 8:57 AM for arrival and 4:00 PM and 4:30 PM for dismissal. The enclosed report recommends a modification in the school speed zone times to account for the early dismissal of walking students at 3:45 PM and recommends that the school speed zone being effect between the hours of 3:45 PM and 4:15 PM for dismissal.

Some highlights from the additional study are as follows:

- The American Association of State Highway and Transportation Officials (AASHTO) in its 2004 publication titled, *Guide for the Planning, Design, and Operation of Pedestrian Facilities* states that "motorists will tend to drive at the speeds they feel comfortable...regardless of the posted speed limit." The most effective way to decrease the observed speed is to change the physical characteristics of the road (i.e. lane width, geometry, design speed, roadside environment, traffic calming, etc.) to prompt a change in driver behavior that makes them drive at slower speeds.
- \* • The crosswalk at Hickory Woods (Novi Road) is signalized and functions seven days a week between the hours of 6 AM and 9 PM to facilitate pedestrian crossing of Novi Road.
- X • The proposed school speed zone on Novi Road should result in decreased speeds during arrival and dismissal times for Hickory Woods Elementary School and would maintain the existing posted speed during arrival and dismissal at Meadowbrook Elementary School.
- X • There is currently sufficient signage to warn of pedestrians at the marked crosswalks in these locations.
- X • Sidewalks and pathways along these segments are largely located at a distance greater than the minimum recommended distance from the road.
- The crash history was reviewed and no crashes were found to involve sidewalks, pathways, or crosswalks.

→



- There was a limited amount of pedestrian activity observed outside of school hours (2 to 4 per hour per direction and 3 to 5 per hour per direction on Meadowbrook Road and Novi Road, respectively).
- The existing safety provisions (signalized crosswalk, walks located a safe distance from road, signage, etc.) along with the proposed school speed zones and existing crossing guards provide an adequate level of protection for pedestrian traffic during school hours.

The report concludes that recommended speed limits for Meadowbrook Road and Novi Road are not expected to result in significant increases in the prevailing speed. This conclusion is supported by the data presented in our August 10, 2010 memo (attached) that demonstrates that the observed 85<sup>th</sup> percentile speed on Cabot Drive, Lewis Drive, Beck Road, and Eleven Mile Road increased an average of 0.8 miles per hour after the posted speed limit was increased to meet the observed 85<sup>th</sup> percentile speed. The report also concludes that while there is a limited amount of pedestrian activity observed outside of school hours, those pedestrians can safely and comfortably use the pathways adjacent to these roads.

We propose to present the traffic control orders for the speed limit recommendations for consideration by City Council on an upcoming agenda.

cc: David Molloy, Director of Public Safety/Chief of Police

September 20, 2010

Brian T. Coburn, P.E.  
Engineering Div., Dept. of Public Services  
City of Novi  
26300 Delwal Drive  
Novi, MI 48375  
[bcoburn@cityofnovi.org](mailto:bcoburn@cityofnovi.org)



**Subject: Pedestrian Considerations Relative to Speed Limits on Novi and Meadowbrook Roads**

Dear Mr. Coburn:

As you know, we completed separate speed studies for Meadowbrook Road between 12 and 13 Mile, and Novi Road between 12 and 14 Mile, on May 3, 2010 and May 13, 2010, respectively. In each study report, we cited – among “other factors that may be considered” (per the *Michigan Manual of Uniform Traffic Control Devices*) – “parking and pedestrian activity.”

Pedestrian activity was not, however, specifically addressed in either study. A City Council member has asked that it be addressed prior to taking action on the recommended speed limit increases. At your request, we conducted the additional study documented herein.

#### Recommendations

1. The recommendations in our May 3 and May 13 speed studies should be followed.
2. To adhere to MMUTCD guidelines, no additional pedestrian-related signage should be installed.
3. The school speed zones during dismissal times should apply from 3:45-4:30 p.m.

#### Data Collection and Analysis

Per our August 25 proposal, the additional study consisted of:

- A literature search on pedestrian safety as a function of sidewalk location and the speed of traffic.
- An inventory of the width, location, and condition of existing sidewalks, safety paths, and crosswalks.
- A reexamination of the accident history to identify any incidents involving pedestrians or bicycles.
- Observations during the afternoon and evening to determine existing sidewalk and crosswalk use.

Results relative to each of the above subject areas are discussed in the following sections.

**Pedestrian Safety as a Function of Sidewalk Offset from Road** – A brief literature search was made relative to pedestrian safety as a function of sidewalk location and the speed of nearby traffic. Key findings are summarized as follows:

- The Institute of Transportation Engineers, in its 1984 publication entitled *Guidelines for Urban Major Street Design*, states that “The placement of the sidewalk in the right-of-way will also affect the design width. Normally, sidewalks are located near the property line...[but] sometimes the sidewalk is

placed next to the curb. If so, the walk should be widened [typically by at least two feet] to afford more safety to the pedestrian." Continuing on page 55, "Curb walks are not a good practice in terms of pedestrian safety and comfort. To the degree practical, a walk setback of at least 5 feet and desirably 10 feet... is needed to:

- 1) Reduce "splashing" of pedestrians.
  - 2) Minimize hazard of stumbling or being pushed (as by children in play).
  - 3) Provide clearance from snow windrows in northern climates.
  - 4) Reduce step-down at driveways.
  - 5) Provide space for utilities and traffic signs.
- The Federal Highway Administration, in its 1992 publication entitled *Safety Effectiveness of Highway Design Features – Volume VI: Pedestrians and Bicyclists*, identifies 13 distinct pedestrian accident types reflected in large research data bases. Most pedestrian accidents in urban and suburban areas involve pedestrians walking in or across the roadway. Only one type appears potentially related to sidewalk location: "Walking Along the Roadway" – defined as a "pedestrian struck while walking along the edge of the highway or on the shoulder, and representing only 1% of all pedestrian accidents. No mention is made of pedestrian hazard as a function of the lateral offset from moving traffic, with or without a curb. Later (on page 11), it is noted that 1988 survey results from 48 state and local highway agencies placed the following condition at the top of the list of conditions where sidewalks are considered most beneficial: "Suburban streets, particularly those with moderate to high pedestrian volumes or with high traffic volumes or speeds" (high speed is defined as 50 mph and above).
- The American Association of State Highway and Transportation Officials, in its 2004 publication entitled *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, reminds us that "Motorists will tend to drive at the speeds they feel comfortable... regardless of the posted speed limit." Also (on page 50), "Lowering the posted speed limit below the 85<sup>th</sup> percentile speed... will only increase the number of speed limit violations, with little or no effect on the actual prevailing speeds..." And, "If the anticipated 85<sup>th</sup> percentile speed... is inconsistent with the anticipated level of pedestrian activity or other factors in the roadway environment, then an effective method to reduce prevailing speeds may be to reduce the roadway design speed and modify the roadway geometrics accordingly" (by reducing lane widths or implementing other traffic calming actions). Finally (on page 59), AASHTO states that "In areas where there is no on-street parking or bike lane, the 'ideal' width of planting strip [for separating pedestrians from traffic] is 6 ft." This latter guidance appears inconsistent, however, with the urban arterial section of the 2004 AASHTO "Green Book" (*A Policy on Geometric Design of Highways and Streets*), which states (on page 479) that "the minimum border [between road and sidewalk] should be 8 ft wide and preferably 12 ft or more."

In summary, no data were found indicating the degree of pedestrian hazard, let alone pedestrian comfort, resulting from alternative sidewalk setbacks from the traveled way. While maximizing sidewalk setback is ideal – at least away from intersections – it appears that practical minimum setbacks of 6-12 ft are typical for suburban roads with typical suburban arterial speeds (i.e., 35-50 mph).

**Sidewalk Inventory** – Based on spot samples collected on-foot along the three miles of road, the width, setback, and condition of existing sidewalks and safety paths were inventoried. The inventory for Meadowbrook Road is summarized in Table 1, and the inventory for Novi Road is summarized in Table 2. Highlights are as follows:

**Table 1. Sidewalk / Safety Path Inventory for Meadowbrook Road, 12-13 Mile Roads**

Location (listed north to south)	West Side of Road			East Side of Road		
	Width (ft)	Setback (ft) <sup>1</sup>	Pavement <sup>2</sup> / Condition	Width (ft)	Setback (ft) <sup>1</sup>	Pavement <sup>2</sup> / Condition
13 Mile to school drive	8	6	Asphalt / Fair	5	Variable, 5½ +	Concrete / Fair
Church frontage	8	5½	Asphalt / Fair	5	18 <sup>3</sup>	Concrete / Good
Vicinity of Burroughs Ave.	8	6½	Asphalt / Fair	5	6½	Concrete / Fair
Top of hill south of Burroughs Ave.	8	6	Asphalt / Good	5	6	Concrete / Good
Field North of Agr. Exper. Stn. (AES)	8	19	Asphalt / Good	5	5½	Concrete / Good
Adjacent to north parking lot of AES	8	6	Asphalt / Good	5	5½	Concrete / Good
By rail-equipped AES boardwalk	8	3½ - 4½	Wood / Fair	5	5½	Concrete / Good
Adjacent to AES welland	8	6	Asphalt / Good	5	5½	Concrete / Good

<sup>1</sup> From face of roadway curb to near edge of walk or path.

<sup>2</sup> Asphalt = asphaltic concrete and Concrete = Portland cement concrete

<sup>3</sup> Original walk nearer road, shown in Figure 3 of the May 3, 2010 speed study report, was replaced (with a walk having a greater setback) when road was widened to extend center left-turn lane further south to serve church driveway.

- A continuous 8-ft-wide asphalt safety path is found along the west side of Meadowbrook Road, and a continuous 5-ft concrete sidewalk is found along the east side of that road. The predominant path setback from the traveled way is 6 ft (plus or minus ½ ft), although 18-19 ft setbacks exist on the immediate frontages of the church and agricultural experiment station field. Based on the literature search cited above – as well as engineering judgment – a nominal sidewalk setback of 6 ft appears to be an acceptable minimum for a two-lane minor arterial such as Meadowbrook, given its relatively low speeds (35 mph or less) and relatively low traffic volumes (less than 4,000 vehicles per day).
- An 8-ft-wide asphalt safety path is found along the west side of Novi Road between 12 Mile and Old Novi Roads, and between 13 Mile and 14 Mile Roads. Along the intermediate section on the west side, and on all of the east side, there is a 5-ft wide concrete sidewalk. The predominant path setback from the traveled way is 9-10 ft, although setbacks as large as 20-22 ft exist in places. Based on the above review, these setbacks slightly to significantly exceed the 8-12-ft setbacks considered desirable along an “urban arterial” (i.e., a multi-lane road serving moderate volumes at moderate speeds of generally less than 50 mph).
- Well-marked crosswalks exist on Meadowbrook Road at 12 Mile, Meadowbrook Elementary, and 13 Mile, and on Novi Road at 12 Mile, Old Novi / Sandstone, 13 Mile, Hickory Woods Elementary, and 14 Mile. All but the crossing at Meadowbrook Elementary are aided by signals, and the one at that school is aided by a crossing guard during the school's arrival and dismissal times.

**Table 2. Sidewalk / Safety Path Inventory for Novi Road, 12-14 Mile Roads**

Location (listed north to south)	West Side of Road			East Side of Road		
	Width (ft)	Setback (ft) <sup>1</sup>	Pavement <sup>2</sup> / Condition	Width (ft)	Setback (ft) <sup>1</sup>	Pavement <sup>2</sup> / Condition
Shopping center frontage	8	10	Asphalt / Fair	5	10 - 21½	Concrete / Good
Shopping center to school	8	9-10	Asphalt / Fair	5	10	Concrete / Fair to Good
School frontage	8	9	Asphalt / Fair	5	10	Concrete / Fair to Good
Just south of school	8	10½	Asphalt / Fair	5	10	Concrete / Fair to Good
From Wimbleton to Berkshire	8	29	Asphalt / Good	5	9	Concrete / Fair to Good
First few hundred ft north of 13 Mile	8	Several feet behind guardrail	Asphalt / Good	5	Several feet behind guardrail	Concrete / Fair to Good
First few hundred ft south of 13 Mile	5 <sup>3</sup>	Approx. 20	Concrete / Good	5	Approx. 20	Concrete / Good
By Fitzgerald & opposing welland	5 <sup>3</sup>	21½	Concrete / Good	5	10	Concrete / Good
Near Alcolt Circle	5 <sup>3</sup>	22	Concrete / Fair	5	21½	Concrete / Good
Just north of Old Novi / Sandstone	5 <sup>3</sup>	10½	Concrete / Fair to Good	5	21½	Concrete / Fair to Good
At 12½ Mile Rd	8	8½	Asphalt / Fair	5	10 - 20	Concrete / Fair
Several hundred ft south of 12½ Mile	8	Several feet behind guardrail	Asphalt / Fair	5	10	Concrete / Fair
Near north cemetery driveway	8	7½	Asphalt / Fair	5	10	Concrete / Fair
Several hundred ft north of gas station	8	Several feet behind guardrail	Asphalt / Fair	5	9+	Concrete / Good
Gas station frontage	8	8	Asphalt / Fair	5	2½ <sup>4</sup>	Concrete / Good

<sup>1</sup> From face of roadway curb to near edge of walk or path

<sup>2</sup> Asphalt = asphaltic concrete and Concrete = Portland cement concrete

<sup>3</sup> Per the City's Bicycle & Pedestrian Master Plan, the 8-ft-wide path follows Old Novi and 13 Mile rather than this section of Novi Road.

<sup>4</sup> Less than 100 linear feet along cemetery entrance area, immediately north of 12 Mile Road

**Crash History** – The crash histories presented in our prior reports for Meadowbrook and Novi Roads were reviewed again to identify any incidents involving pedestrians or bicycles. It was found that:

- ❑ The five-year (2005-2009) crash history for Meadowbrook Road included a total of seven crashes. None involved a pedestrian or bicycle.
- ❑ The three-year (2007-2009) crash history for Novi Road included a total of 17 crashes. Only one, occurring in on April 28, 2008 near the north cemetery entrance, involved a pedestrian or bicycle. The UD-10 police report was retrieved, and it was found that in this particular situation, four bicyclists were riding in the northbound curb lane. A 19-year-old car driver approached from the rear, and despite the daylight, fair-weather conditions, did not respond early enough to successfully avoid the bicyclists. Luckily, however, the severe braking accomplished by the car resulted in only one bicycle being damaged and no one even being injured.

In summary, none of the reported crashes – on either road – involved the use of sidewalks, safety paths, or crosswalks. With respect to the one on-road bicycle accident, it appears likely that driver inattentiveness played a larger causal role than the speed chosen by the driver.

**Observed Pedestrian and Bicycle Activity** – On two very pleasant days about a week after school began this fall, Birchler Arroyo staff observed and counted pedestrian and bicycle movements in the vicinity of each school. Observations began at 3:45 p.m., nominally 15 minutes before dismissal, and ended at 7:45 p.m., the approximate time of sunset. Tables 3 and 4 summarize the counts. Key findings were as follows:

- ❑ At Meadowbrook Elementary (Figure 1 and Table 3), a total of 45 pedestrians and bicyclists crossed to the west side of the road via the marked crosswalk and crossing guard, all associated with school dismissal. A very similar number used the north path from the school to the road, in order to continue north toward 13 Mile Road. There was a distinct lull in activity once school departures ended but before nearby residents began their evening outings. Between 4:15 and 7:45 p.m., those outings on any particular section of path were relatively few, typically averaging only 2-4 per hour per direction on the west side of the road, generally associated with the Tollgate Ravines community. Notably fewer people used the sidewalk on the east side of the road, and no one was observed going to or from the play area behind the school.
- ❑ At Hickory Woods Elementary (Figure 2 and Table 4), the predominant movement was from the school to the east side of the Novi Road via the marked crosswalk that is served by both a signal and a crossing guard (22 people between 3:45 and 4:15 p.m.). As above, there was a distinct lull in activity once school departures ended but before nearby residents began their evening outings. Between 4:15 and 7:45 p.m., those outings were slightly more numerous than those observed along Meadowbrook Road (above), typically averaging 3-5 per hour per direction on both sides of the road. The slightly greater numbers using the path south of the school on the west side of the road (especially after 6:30 p.m.) were likely due to people visiting the school playground in the southwest corner of the site. Although not counted, there appeared to be more people visiting the rear of the school (presumably the playground) via motor vehicle than on foot or by bicycle.

Path users near both schools appeared to be relaxed and not adversely affected by the speeds or volumes of passing vehicular traffic. Many were walking dogs, chatting on cell phones, or chatting with a companion. There were also a few joggers. Interestingly, where a choice exists between two parallel paths on the same side of the road (Figure 2), only 2 out of 36 people used the asphalt path further from the road.



Figure 1. Paths Near Meadowbrook Elementary



**Table 3. Pedestrian and Bicycle Activity Along Meadowbrook Road Near Meadowbrook Elementary<sup>1</sup>**

15 Minutes Ending	On Paths South of School				In Marked Crosswalk		On Paths Just North of School Driveway				On North Path To/From School	
	East Side		West Side		EB	WB	East Side		West Side		EB	WB
	NB	SB	NB	SB			NB	SB	NB	SB		
4:00	0	0	2	1	13	2	0	0	0	1	4	25
4:15	0	0	0	1	0	41	1	1	5	0	0	16
4:30	0	0	1	3	0	2	0	0	0	1	0	0
4:45	0	0	0	0	0	0	0	0	0	0	0	0
5:00	1	0	0	0	0	0	0	0	0	0	0	0
5:15	2	0	1	1	0	0	0	0	1	0	0	0
5:30	0	0	2	0	0	0	0	0	2	0	0	0
5:45	1	0	0	0	0	0	1	0	0	1	0	0
6:00	0	0	0	3	0	0	0	0	0	0	0	0
6:15	0	0	1	4	0	0	0	0	1	2	0	0
6:30	2	0	0	0	0	0	0	0	1	0	0	0
6:45	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	1	1	0	0	0	0	0	1	0	0	0
7:15	0	0	1	0	0	0	0	0	1	0	0	0
7:30	0	0	0	3	0	0	0	0	0	1	0	0
7:45	0	0	0	0	0	0	0	0	0	1	0	0
4-Hr Total	6	1	9	16	13	45	2	1	12	7	4	41
After 4:15	6	1	7	14	0	2	1	0	7	6	0	0
Per Hour	1.7	0.3	2.0	4.0	0.0	0.6	0.3	0.0	2.0	1.7	0.0	0.0

<sup>2</sup> On Wednesday, 9-15-10. Weather was sunny and warm. School dismissal was at 4:00 pm (per shaded row); however, quite a few left via north school path 5-10 minutes before that time. No distinction was made between pedestrians and bikes. Bicyclists riding in the road were not counted. People passing the school were counted twice, as they approached and as they departed.



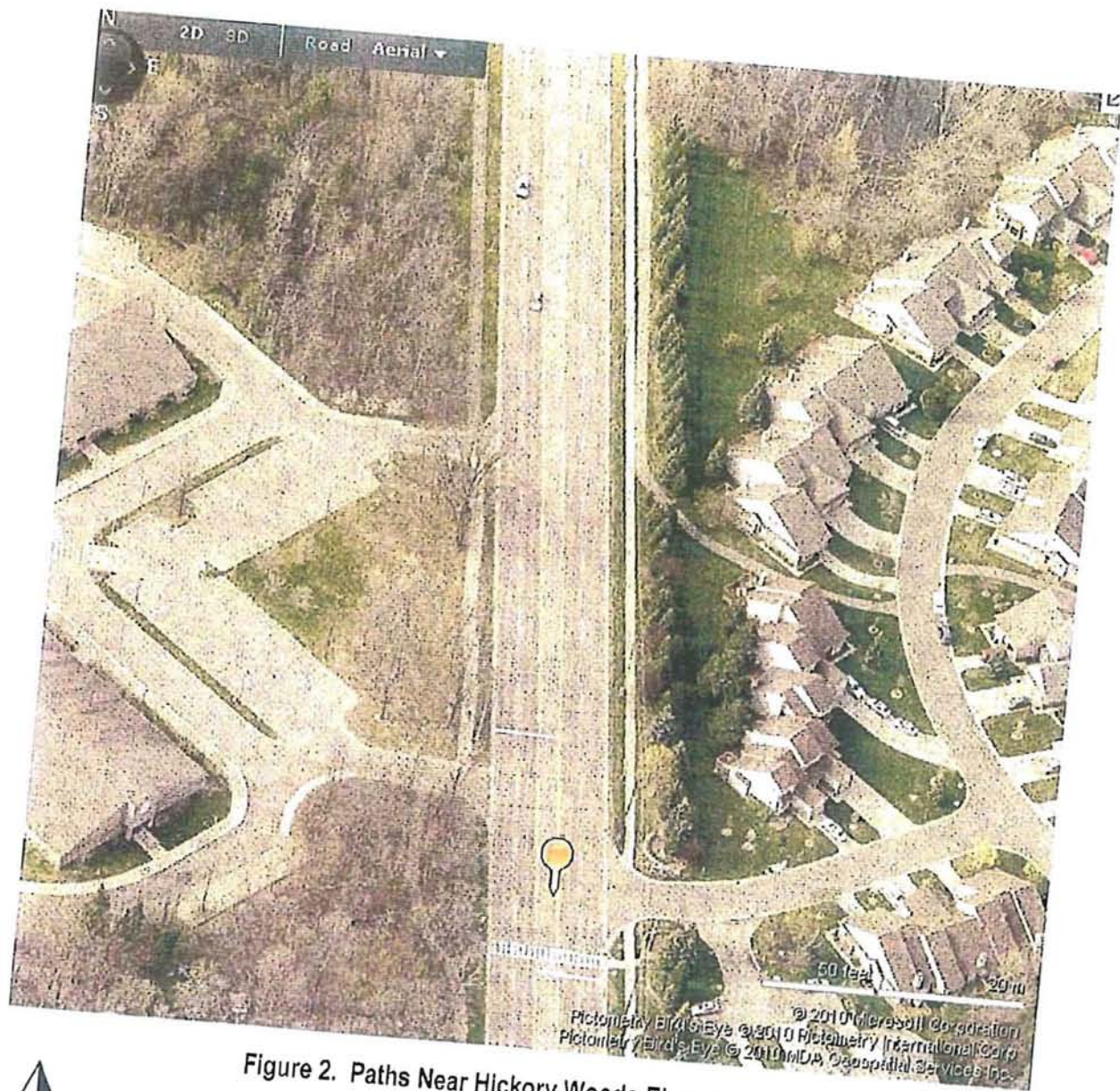


Figure 2. Paths Near Hickory Woods Elementary



**Table 4. Pedestrian and Bicycle Activity Along Novi Road Near Hickory Woods Elementary<sup>1</sup>**

15 Minutes Ending	On Paths North of School				In Marked Crosswalk		On Paths South of School			
	West Side		East Side		EB	WB	West Side		East Side	
	NB	SB	NB	SB			NB	SB	NB	SB
4:00	0	0	0	0	3	3	3	11	3	1
4:15	1	0	3	1	19	3	5	23	0	5
4:30	0	0	0	0	0	0	0	0	0	0
4:45	0	0	1	3	0	0	0	0	0	0
5:00	0	1	2	0	0	0	0	0	0	0
5:15	0	0	0	0	0	0	0	0	0	0
5:30	0	0	0	2	0	1	0	0	1	0
5:45	0	0	0	2	0	2	0	0	0	0
6:00	0	1	0	2	1	0	0	1	0	1
6:15	2	1	1	0	0	1	1	0	1	0
6:30	0	2	3	0	0	0	0	1	2	2
6:45	4	5	3	0	0	1	4	2	2	0
7:00	2	3	2	0	0	0	4	3	2	1
7:15	3	2	3	1	0	0	3	2	5	0
7:30	0	0	0	4	0	1	4	0	1	3
7:45	1	2	1	2	0	0	1	2	1	2
4-Hr Total	13	17	19	17	23	12	25	45	18	15
After 4:15	12	17	16	16	1	6	17	11	15	9
Per Hour	3.4	4.9	4.6	4.6	0.3	1.7	4.9	3.1	4.3	2.6

<sup>2</sup> On Monday, 9-13-10. Weather was sunny, warm, and breezy. School dismissal was at 4:00 pm (per shaded row); however, a few bicyclists left 5-10 minutes before that time. No distinction was made between pedestrians and bikes. Many of those counted were counted twice; for example, upon dismissal, 19 of the 23 SB on west side later used crosswalk EB.

**Signs Warning of Pedestrians** – School speed zones will be posted near both Meadowbrook and Hickory Woods Elementary Schools. This signage indirectly but clearly warns of younger pedestrians in the area.

With respect to specific pedestrian warning signs, it should be noted that:

- Such signs already exist at the Meadowbrook Road crosswalk just south of Brownstone Drive.
- No such signs exist near the signalized Novi Road crosswalk at Waverly Drive, consistent with the *Michigan Manual of Uniform Traffic Control Devices*, Section 7B.09.

**Early Dismissal** – As noted above, pedestrian and bicycle activity increased notably a few minutes before the formal school dismissal time of 4:00 p.m. Upon checking with the schools, it was learned that walkers are dismissed five minutes before the hour at Hickory Woods and six minutes before the hour at Meadowbrook. It would therefore be appropriate to make the recommended school speed zone (30 mph near Hickory Woods and 25 mph near Meadowbrook) applicable during the period of 3:45-4:30 p.m.

### Summary of Findings and Conclusions

The above results and discussion show that:

- The recommended speed limits for Meadowbrook and Novi Roads are not expected to result in significant increases in prevailing speeds. Indeed, the 30-mph speed zone near Hickory Woods Elementary should result in *decreased* speeds during the applicable times.
- Pedestrians can be expected to be reasonably comfortable using sidewalks set back 6-12 ft from the nearest travel lane, with the lower end of this range being appropriate for low speeds (35 mph and below), and the upper end of this range being appropriate for somewhat higher speeds (45-50 mph).
- Paths along both sides of Meadowbrook Road between 12 and 13 Mile have a predominate setback of about 6 ft, which by the above guidelines will be suitable for the existing and expected future operating speeds (mostly 37 mph and below).
- Paths along both sides of Novi Road between 12 and 14 Mile are set back 9-22 ft, which by the above guidelines will be suitable for the existing and expected future operating speeds (mostly 48 mph and below).
- Outside of the school dismissal period (3:54 to about 4:15 p.m.), observed pedestrian and bicycle volumes along Meadowbrook and Novi Roads near the schools were relatively light (i.e., 2-5 per hour per direction on the most-used path sections).
- No additional pedestrian-related signage is warranted, per the MMUTCD and engineering judgment.
- In the afternoon, the school speed zones should apply from 3:45-4:30 p.m.

Sincerely,  
BIRCHLER ARROYO ASSOCIATES, INC.



Rodney L. Arroyo, AICP  
Vice President



William A. Stimpson, P.E.  
Director of Traffic Engineering



cityofnovi.org

## MEMORANDUM

TO: ROB HAYES, P.E.; DIRECTOR OF PUBLIC SERVICES  
FROM: BRIAN COBURN, P.E.; SENIOR CIVIL ENGINEER *BC*  
SUBJECT: PROPOSED SPEED LIMIT CHANGES  
DATE: AUGUST 10, 2010

*8/10/10  
To: Mayor & City  
Council Members*

*Early info on forthcoming  
speed limit changes to be  
presented*

This memo is a follow-up to my April 28, 2010 memo regarding speed limit evaluations. As *presented* you may recall, I conducted an audit of the city's speed limit signs and identified a number of installed signs that lack traffic control orders. The road segments that lack traffic control orders for the posted speed are as follows:

*The  
individual studies are  
available at your  
request and will be  
with the agenda items*

- Novi Road (12 Mile Road to 14 Mile Road)
- Meadowbrook Road (12 Mile Road to 13 Mile Road)
- 13 Mile Road (Meadowbrook Road to Haggerty Road)
- West Park Drive (12 Mile Road to West Road)
- Town Center Drive
- Crescent Blvd
- Crowe Drive
- Ingersol Drive

With the assistance of the Field Operations Division and our traffic consultant, Birchler Arroyo, we have collected speed samples and evaluated these segments to determine the appropriate speed limit. The speed studies for each segment are attached to this memo.

### Legal Requirements for Speed Limits

The Uniform Traffic Code requires that traffic control orders, as issued by the traffic engineer and approved by the City Council, be on file for the enforcement of traffic control signs. As discussed in the Detroit News article attached to the April 28 memo, tickets issued for a speed limit that lacks a traffic control order could be successfully challenged by the motorist. Speed limits are governed by the Michigan Vehicle Code (MVC) and the Michigan Manual of Traffic Control Devices (MMUTCD). The MVC provides a standard "prima facie" speed based on the number of access points on a roadway. The MVC allows the local agency to adjust the speed limit based on a traffic engineering study. The MMUTCD requires an engineering study to determine the speed limit in accordance with established traffic engineering practices.

Generally, speed limits should be set so that the majority of drivers observe them voluntarily. Studies have shown that drivers generally operate their vehicles at speeds that are reasonable and proper, regardless of the posted speeds. Nationally, this is recognized as the 85th percentile speed, which is the speed at or below which 85 percent of the motorists drive on a given road unaffected by slower traffic or poor weather. It is generally accepted that when traffic deviates from the 85th percentile speed, the probability of a traffic crash becomes greater. In addition to the 85th percentile speed, the MMUTCD recommends review of other road characteristics including pedestrian activity, road conditions, crash experience, 10 mph pace, and road side environment. Realistic speed limits should be set at no more than five miles per hour below or above the 85th percentile speed based on these mitigating factors.

Public Perception of Speed Limits

It is usually difficult for the public to understand that even though the road may be posted at one speed, a great number of drivers may actually be driving faster based on their comfort level with the road. There is also a perception that when the posted speed limit is increased that it will result in even higher speeds. For example, if a road is posted at 30 mph and the 85<sup>th</sup> percentile speed is 35 mph, there is a perception that if the posted speed limit is increased to 35 mph, drivers would increase their speed toward 40 mph. To demonstrate the impact of increasing the posted speeds, we have analyzed the speed limits that were changed in 2009. The table below compares the observed 85<sup>th</sup> percentile speed on several road segments before the new speed limit was posted with the observed 85<sup>th</sup> percentile speed after the new speed limit was posted. While there was a notable increase on two segments of Beck Road and on Lewis Drive, there was no change in 85<sup>th</sup> percentile speed for many of the segments. The average change is a 0.8 mph increase in speed.

Road	Segment	Original Posted Speed	New Posted Speed (2009)	85 <sup>th</sup> percentile speed (mph)		
				Before New Posted Speed Limit	After New Posted Speed Limit	Change
11 Mile Road	Town Center to Meadowbrook	30	35	36	37	+1
	Meadowbrook to Seeley	30	35	39	39	0
Cabot Drive	Lewis to 13 Mile	25	35	38	38	0
	South of Lewis	25	35	37	37	0
	North of 12 Mile (curves)	25	30	34	34	0
Lewis Drive	Haggerty to Cabot	25	35	35	37	+2
Beck Road	11 Mile to Grand River	40	45	47	47	0
	10 Mile to 11 Mile	40	45	45	49	+4
	Nine Mile to 10 Mile	40	45	48	46	-2
	Eight Mile to Nine Mile	40	45	47	49	+2
Average Change						+0.8



Proposed Speed Limits

The enclosed studies demonstrate that the speed limits that are currently posted on the subject road segments are not being observed by the majority of drivers. Further, since the posted speeds lack traffic control orders or engineering studies to support the posted speed limits, they must be reviewed to establish legal speed limits. A summary of the proposed speed limits is shown in the table below, with the justification for each recommendation included in the enclosed studies.

Road	Segment	Current Posted Speed Limit	85 <sup>th</sup> Percentile Speed	Recommended Posted Speed Limit
Novi Road	12 Mile to 1,640 feet south of 13 Mile	40	47	45
	1,640 feet south of 13 Mile to 13 Mile	35	45	45
	13 Mile Road to 14 Mile Road	40	48	45 (*)
Meadowbrook Road	12 Mile Road to Meadowbrook Elem	30	36	35
	13 Mile Road to Meadowbrook Elem	25	36	35 (**)
13 Mile Road	Meadowbrook Road to Haggerty Road	40	46	45
West Park Drive	12 Mile Road to West Road	40	47	45
Crowe Drive	Novi Road to Ingersol Drive	25	24	25
Ingersol Drive	Crescent Blvd to Crowe Drive	25	27	25
Crescent Blvd	Novi Road to Town Center Drive	25	33	30
Town Center Drive	Crescent Blvd to 11 Mile Road	25	33	30
	Grand River Ave to 11 Mile Road	25	29	30

No change

(\*)A 30 mph school speed zone is proposed for this segment during school arrival and dismissal times  
 (\*\*)A 25 mph school speed zone is proposed for this segment during school arrival and dismissal times

As noted in the table, there are two school speed zones proposed for implementation. The first is adjacent to Hickory Woods Elementary School on Novi Road. The posted speed limit is currently 40 mph at this location and there is no school speed zone at this time. The report recommends a school speed zone be set at 30 mph in the vicinity of the school property. The second school speed zone is proposed adjacent to Meadowbrook Elementary on Meadowbrook Road. The speed limit is currently set at 25 mph as a regular speed limit that is in effect all-day, every day. The report proposes the implementation of a school speed zone set at 25 mph in the vicinity of the school property. State law (MCL 257.627a) allows the speed limit to be decreased by 15 mph from the posted speed (but set at not less than 25 mph) in a school zone for a period of 30 minutes to one hour before school and 30 minutes to one hour after school, when requested by the school superintendent. We have discussed the proposed school speed zones with Walled Lake Schools. They are supportive of the recommendations and intend to request the school speed zones as proposed.

#### Public Notification

The majority of the segments being studied are located in non-residential areas. Meadowbrook Road has the largest potential impact on the residents since there are several residential units along Meadowbrook Road in the existing 25 mph speed zone. A "Speed Limit Under Review" sign (as shown at right) has been installed at the north and south ends of the Meadowbrook Road segment (12 Mile Road to 13 Mile Road) to notify residents and motorists that the speed limit is being studied. We have received a few calls from residents who were primarily concerned with the speed limit near the school. Our staff has explained that a school speed zone is proposed which calmed their concerns.



#### Implementation

We propose to prepare the traffic control orders for the speed limit recommendations from the studies for consideration by City Council on an upcoming agenda. Once approved by City Council, the new speed signs would be installed by Field Operations staff as recommended by the studies. The new signs would meet the federal retroreflectivity requirements and would be funded by the Traffic Control Sign Replacement Program as approved in the FY2010-11 budget.

cc: David Molloy, Public Safety Director/Police Chief  
Matt Wiktorowski, Field Operations Senior Manager  
Terry Whitfield, Police Department

May 13, 2010

Brian T. Coburn, P.E.  
Engineering Div., Dept. of Public Services  
City of Novi  
26300 Delwal Drive  
Novi, MI 48375  
[bcoburn@cityofnovi.org](mailto:bcoburn@cityofnovi.org)



**Subject: Speed Limit Study of Novi Road, 14 Mile Road to 12 Mile Road**

Dear Mr. Coburn:

Per your request, we have evaluated the above road segments to determine an appropriate general speed limit (or limits), a potentially different school speed limit (near Hickory Woods Elementary), and the possible need for curve warning and/or advisory speed signs. This letter reports our findings and recommendations.

### Recommendations

1. The overall speed limit for Novi Road between 14 Mile and 12 Mile should be set at 45 mph.
2. The Superintendent of the Walled Lake Consolidated School District should be advised of the proposed speed limit change and asked whether or not the District wishes to have a school speed zone established (of no less than 30 mph and within 1,000 ft of Hickory Woods Elementary).
3. A Reverse Curve Warning sign, with a 35-mph advisory, should be present on the northbound and southbound approaches to the first two curves south of 13 Mile Road. This will require new warning signs southbound and the addition of a 35-mph advisory to the existing northbound sign.

### Background and Criteria

Novi Road between 14 and 12 Mile Roads (Figures 1-2) is now posted with a 40-mph or a 35-mph speed limit, depending on both location and direction of travel, as follows:

- 14 Mile to 13 Mile: 40 mph in both directions
- 13 Mile to far end of second curve (about 1,640 ft generally southwest of 13 Mile):  
40 mph southbound and 35 mph northbound
- Ending point described above, to 12 Mile Road: 40 mph in both directions

Having different speed limits by direction of travel through the first two curves south of 13 Mile Road is unconventional and possibly was intended. The first speed-related sign for southbound traffic south of 13 Mile is a (no-longer-standard) Reduced Speed 35 Ahead sign, which informs but does not actually regulate. The first regular 35-mph speed limit sign does not appear until southbound drivers have already passed through these two speed-limiting curves (Figure 2). In contrast, northbound traffic is still governed by a 35-mph speed limit until passing over 13 Mile Road.

In establishing a speed limit, it is appropriate to determine and consider (1) the prima facie limit, (2) the "speed of vehicular traffic" (typically expressed as the 85<sup>th</sup>-percentile speed), and (3) other traffic and roadway characteristics (per the *Michigan Manual of Uniform Traffic Control Devices*).







Figure 2. Novi Road From 12 Mile to North of 13 Mile

A portion of the *Michigan Vehicle Code* (MCL 257.627) establishes prima facie speed limits based on (1) whether or not the road runs through a business district, and (2) the number of access points (driveways or intersecting roadways) within each half mile of road. In a business district or where there are 60 or more access points per half mile, the prima facie limit is 25 mph. Outside a business district, the prima facie limit is 35 mph for 45-59 access points per half mile and 45 mph for 30-44 access points per half mile.

Another portion of the law (MCL 257.628) indicates that a posted speed limit different than the prima facie limit may be determined based on an "engineering and traffic investigation." Relevant guidelines for such an investigation, found in Section 2B.13 of the *MMUTCD* (approved jointly by the MDOT and the State Police), are as follows:

- "When a speed limit is to be posted, it should be within ... 5 mph of the 85<sup>th</sup>-percentile of free-flowing traffic.
- Other factors that may be considered when establishing speed limits are the following:
  - A. Road characteristics, shoulder condition, grade, alignment, and sight distance;
  - B. The pace speed;
  - C. Roadside development and environment;
  - D. Parking practices and pedestrian activity;
  - E. Reported crash experience for at least a 12-month period."

Finally, a school zone speed limit less than the regularly posted speed limit may be posted if requested by the school superintendent and within certain constraints set by law (MCL 257.627a). The reduced limit:

- May be no less than 15 mph below the regular speed limit nor less than 25 mph.
- Must be limited in its application to three specific time periods: 30-60 minutes before the first regularly scheduled school session until school commences; dismissal until 30-60 minutes after the last regularly scheduled school session; and during a lunch period is students are permitted to leave the school.

### Data Collection and Analysis

**Prima Facie Speed Limit** – Our review of recent-vintage aerial photos (Figures 3-17, appended) found an average of 5.5 access points per half mile for both sections of Novi Road (11 for the 1-mile section between 13 and 14 Mile Road, and 14 for the 1.27-mile section between 12 and 13 Mile Road). This access-point frequency is well below any of the ranges specified in MCL 257.627; hence, the prima facie speed limit on both sections of Novi Road is 55 mph.

**Computed Comfortable Curve Speed** – Methodology recommended by the American Association of State Highway and Transportation Officials was used to compute the safe and comfortable speed in each direction of travel on each of Novi Road's five horizontal curves based on curve radius, pavement cross slope (or superelevation), and the assumed maximum comfortable lateral friction coefficient for the computed speed (per AASHTO). Curve radii were taken from construction plans provided by the City, and pavement cross slopes were measured in the field by Birchler Arroyo Associates.

Table 1 summarizes the inputs and outputs of curve speed computations. Note that all computed speeds fall in the range of 37-43 mph, not surprisingly at or slightly above the 35-40 mph posted speed limits. In the

**Table 1. Computed Comfortable (AASHTO) Curve Speeds for Novi Road**

Curve (To South from 14 Mile)	Road Centerline (from Plans)			At Center of Inside and Outside Lane			Comfortable Speed (mph)
	Curve Length (ft)	Deflection	Computed Radius (ft)	Radius (ft)	Superelevation	Lateral Friction	
First	228	27.55°	474	450	+ 0.04	0.170	38 SB
				498	+ 0.04	0.165	39 NB
Second <sup>1</sup>	309	27.55°	643	619	+ 0.04	0.155	42 NB
				667	+ 0.04	0.150	43 SB
Third	705	90°	449	425	+ 0.04	0.170	37 SB
				473	+ 0.02	0.170	37 NB
Fourth <sup>2</sup>	398	45°	507	483	+ 0.02	0.170	37 NB
				531	+ 0.02	0.165	38 SB
Fifth	450	45°	573	549	+ 0.02 (est.)	0.165	39 NB
				597	+ 0.02 (est.)	0.160	40 SB

<sup>1</sup> Speed sampling location #1.

<sup>2</sup> Speed sampling location #3.

event the posted limit is raised to 45 mph, it may therefore be appropriate to consider placing advisory-speed and/or curve-warning signs to assist drivers in their continued choice of a safe and comfortable curve speed.

**85<sup>th</sup>-Percentile Speed** – At our request, City personnel conducted automated speed and volume sampling over 48-hour midweek periods. The five sampling locations are noted on Figures 1, 2, 4, 7, 11, 12, and 15.

Tables 2a and 2b (below) summarize the traffic statistics for the two sections of Novi Road by location, direction, and day. Key findings are as follows:

- Traffic volumes are down sharply from previous counts. For example, the City's 2004 Master Plan shows an August 2003 daily volume of 19,172 for Novi Road between 13 Mile and 14 Mile, whereas the April 2010 average daily volume near Wimbleton Way (location #2) was only 8,416.
- The average speed is 41 mph for the three sampled tangent sections combined, 40 mph for the gentler of the two sampled curves (location #1), and 35 mph for the more severe of the two sampled curves (location #3).
- The 85<sup>th</sup>-percentile speed is 46.7 mph for the three tangent sections combined, 44.1 mph for the gentler of the two curves (location #1), and 39.5 mph for the more severe of the two curves (location #3).
- The 85<sup>th</sup>-percentile speed on the gentler of the two curves exceeds the computed comfortable speed by 1-2 mph and the posted speed limit by 4 mph. Hence, it appears that seat-of-the-pants comfort may be more of an influence on speed choice than posted speed limit.
- The speed statistics on the more severe of the two curves are virtually the same northbound as southbound, despite the fact that the posted speed limits in the two directions are 35 mph and 40 mph, respectively. This lends further support to the above observation that drivers are selecting their speed based on comfort rather than speed limit.

**Crash Experience** – At our request, the Traffic Improvement Association searched its files for crashes occurring along Novi Road from 12-14 Mile Roads between 2007 and 2009, inclusive. Excluded were intersection crashes at the three "Mile" roads, since such crashes would likely be due primarily to factors other than the speed limit on Novi Road.

Detailed crash tabulations are appended to this report. Table 3 (following Tables 2a and 2b) summarizes the 17 crashes reported for the three-year period. Key findings are as follows:

- Three crashes (in shaded rows) occurred on the northbound approach to the mid-section signal at the Hickory Woods Elementary egress / Waverly Drive (Figure 5).
- It appears that a southbound school bus was rear-ended 100 ft north of Waverly on 5/13/09 (there were 38 passengers).
- Four crashes (in bolded font) occurred near the north cemetery driveway (Figures 15-16).
- Excessive speed appears to have been a primary causal factor in only one or two crashes. One of these crashes (on 2/18/08) involved a northbound vehicle slipping off an icy road at the north

Table 2a. Summary of Speed Statistics for Novi Road, 13-14 Mile

Loc.	Dir.	Date	Sample Size	Speed (mph)			
				Average	85th %tile	10-mph Pace	% in Pace
#1 (on second curve south of 14 Mile)	NB	4-27-10 (>11 am)	2881	39.5	43.9	35-45	84.6%
		4-28-10	3706	39.5	44.0	35-45	83.9%
		4-29-10 (<11 am)	783	39.6	44.0	35-45	84.4%
		Average Day	3685	39.5	44.0	35-45	84.2%
	SB	4-27-10 (>11 am)	2256	40.1	44.5	35-45	82.1%
		4-28-10	3590	40.0	44.3	35-45	83.4%
		4-29-10 (<11 am)	1331	40.0	44.1	35-45	86.7%
		Average Day	3589	40.0	44.3	35-45	83.6%
	Both	Average Day	<b>7274</b>	<b>39.8</b>	<b>44.1</b>	<b>35-45</b>	<b>83.9%</b>
	#2 (North of Wimbledon Way)	NB	4-27-10 (>11 am)	3476	42.5	47.4	35-45
4-28-10			4334	42.6	47.7	35-45	70.6%
4-29-10 (<11 am)			855	42.3	47.9	35-45	69.7%
Average Day			4333	42.5	47.6	35-45	71.2%
SB		4-27-10 (>11 am)	2528	42.6	48.2	35-45	68.7%
		4-28-10	4134	42.4	47.5	35-45	72.3%
		4-29-10 (<11 am)	1504	42.6	47.3	35-45	74.0%
		Average Day	4083	42.5	47.7	35-45	71.5%
Both		Average Day	<b>8416</b>	<b>42.5</b>	<b>47.6</b>	<b>35-45</b>	<b>71.3%</b>

Table 2b. Summary of Speed Statistics for Novi Road, 12-13 Mile

Loc.	Dir.	Date	Sample Size	Speed (mph)			
				Average	85th %tile	10-mph Pace	% in Pace
# 3 (by Fitzgerald Blvd)	NB	4-27-10 (>11 am)	1955	35.1	39.4	30-40	83.8%
		4-28-10	2743	34.7	39.2	30-40	83.7%
		4-29-10 (<11 am)	704	34.5	39.0	30-40	83.3%
		Average Day	2701	34.8	39.2	30-40	83.7%
	SB	4-27-10 (>11 am)	2008	35.2	39.8	30-40	80.9%
		4-28-10	3308	35.1	39.7	30-40	80.6%
		4-29-10 (<11 am)	1177	34.8	39.4	30-40	82.5%
		Average Day	3247	35.1	39.7	30-40	81.0%
	Both	<b>Average Day</b>	<b>5948</b>	<b>35.0</b>	<b>39.5</b>	<b>30-40</b>	<b>82.2%</b>
	# 4 (South of Ledge-view)	NB	4-27-10 (>11 am)	1822	39.7	44.6	35-45
4-28-10			2478	39.4	44.3	35-45	77.1%
4-29-10 (<11 am)			537	39.1	44.2	35-45	74.4%
Average Day			2419	39.5	44.4	35-45	77.1%
SB		4-27-10 (>11 am)	2343	39.4	46.8	35-45	70.7%
		4-28-10	3368	39.1	45.0	35-45	71.4%
		4-29-10 (<11 am)	1042	38.7	44.0	35-45	76.1%
		Average Day	3376	39.1	45.5	35-45	71.9%
Both		<b>Average Day</b>	<b>5795</b>	<b>39.3</b>	<b>45.0</b>	<b>35-45</b>	<b>74.1%</b>
# 5 (by North Cemetery Drive)		NB	4-27-10 (>11 am)	2875	42.5	47.9	35-45
	4-28-10		3666	42.7	48.1	35-45	68.0%
	4-29-10 (<11 am)		846	43.0	48.7	40-50	66.6%
	Average Day		3694	42.7	48.1	-	68.7%
	SB	4-27-10 (>11 am)	2231	41.2	46.9	35-45	73.3%
		4-28-10	3691	40.6	45.6	35-45	76.0%
		4-29-10 (<11 am)	1591	40.0	44.3	35-45	82.7%
		Average Day	3756	40.7	45.7	35-45	76.6%
	Both	<b>Average Day</b>	<b>7450</b>	<b>41.6</b>	<b>46.9</b>	<b>-</b>	<b>72.7%</b>

**Table 3. 2007-2009 Crash History for Novi Road between 12 Mile and 14 Mile Roads, Excluding Crashes Near 12, 13, and 14 Mile<sup>1</sup>**

Year	Date	Time	Cross Road	Distance from Cross Road	Crash (Type or #)						Crash Severity (# Persons)				Possible Contributing Factors	
					Angle	Head-On	Sideswipe		Rear-End	Single-Vehicle	Fatal	Personal Injury				Property Damage Only
							Opposite Direction	Same Direction				A	B	C		
2009	12/26	5 p	Waverly	15' S.					NB				2		1	Unclear. V#2 stopped at signal.
	12/17	5 p	Waverly	50' S.					NB					1	2	Unclear. V#2 responding to signal.
	11/09	1 p	Ledgeview	3' S.	WB-NB										2	Failure of turning vehicle to yield <sup>2</sup> .
	11/08	6 p	Fitzgerald	15' S.						Animal					4	Likely deer crossing.
	05/13	11 a	Waverly	100' N.					SB					1	38	Unclear. School bus rear-ended.
	03/07	7 p	Warley	13' N.											2	Crossed centerline in rain, darkness.
	02/05	4 p	12½ Mile	1320' S.					SB					1	3	V#2 slowing for cemetery drive?
2008	06/27	3 p	13 Mile	269' N.					NB						5	Improper lane change.
	04/20	7 a	12 Mile	1294' N.						Bicycle					3	Unclear. Bike/car collision.
	02/18	5 p	13 Mile	301' S.						Sign					1	Speeding, ice, outside of curve.
2007	12/18	8 a	Waverly	50' N.					NB						4	Wet. V#2 stopped for signal.
	12/04	1 p	Fitzgerald	18' S.						Sign etc				1		Speed not cited, but ran off curve.
	11/23	10 p	Ledgeview	20' S.						Animal					1	Hit likely deer on dark, wet road.
	10/01	9 a	13 Mile	243' N.	NBR-NBT										2	Supposed right turn, but to where?
	08/26	2 p	12 Mile	1294' N.					SB						2	V#2 slowing for cemetery drive?
	08/04	12 p	14 Mile	1584' S.					SB						2	Unclear why V#2 was stopped
	06/14	9 p	12 Mile	1320' N.						Object					1	Cycle lost control changing lanes.
Totals					2	0	1	1	7	6	0	0	2	4	73	<b>Bold = All near cemetery drive.</b>

<sup>1</sup> Crashes within 200 ft of a major suburban intersection are typically due to a variety of factors, speed typically not being a leading factor; hence, such crashes have been excluded from this analysis.

<sup>2</sup> Miscoded such that vehicle turning left from Ledgeview is said to be "EB" (Ledgeview is only on east side of Novi Road)

end of the first curve south of 13 Mile Road (where the speed limit is 35 mph). The other crash (on 12/04/07) involved a northbound vehicle on dry pavement crossing the southbound lanes and hitting a sign at Fitzgerald (without further investigation, it is impossible to tell whether the loss of control was attributable to excessive speed or some other factor, such as loss of consciousness).

## Conclusions and Recommendations

- An overall speed limit of 45 mph is supported by the observed 85<sup>th</sup>-percentile speeds, infrequent access points, minimal number of speed-related crashes, and good vertical alignment.
- The five horizontal curves can be comfortably driven at speeds of at least 38-43 mph (per conservative AASHTO criteria). Rather than set an overall speed limit at or below this speed range, we believe that it would be more appropriate to set the overall limit at 45 mph and treat the individual curves as follows:
  - The first curve south of 14 Mile is relatively gentle, and sufficiently short, so as to not warrant any special signage.
  - The second curve (sampling location #1) is also relatively gentle and nearly as short as the first curve. Since the 85<sup>th</sup>-percentile speed is so close to the computed comfortable speed, it appears that drivers are already selecting an appropriate speed without any special signage; hence, none is recommended, even with the overall speed limit increasing to 45 mph.
  - Since the third and fourth curves south of 14 Mile are longer and have the lowest computed comfortable speeds (37-38 mph), we are recommending the installation of Reverse Curve (W1-4 modified) warning signs, accompanied by 35-mph Advisory Speed (W13-1) plates.
  - At the fifth curve south of 14 Mile (i.e., the one at Old Novi Road), we are recommending the installation of a Curve Warning (W1-2) sign in each direction, but no advisory speed plates (since the computed comfortable speed is within 5 mph of the recommended speed limit).
- With the overall speed limit on Novi Road proposed to increase to 45 mph, the school superintendent may wish to see a school speed zone installed. By law, this limit could be no less than 30 mph (i.e., 15 mph below the overall speed limit) and extend to no more than 1,000 ft beyond the school site.

Sincerely,  
BIRCHLER ARROYO ASSOCIATES, INC.



Rodney L. Arroyo, AICP  
Vice President

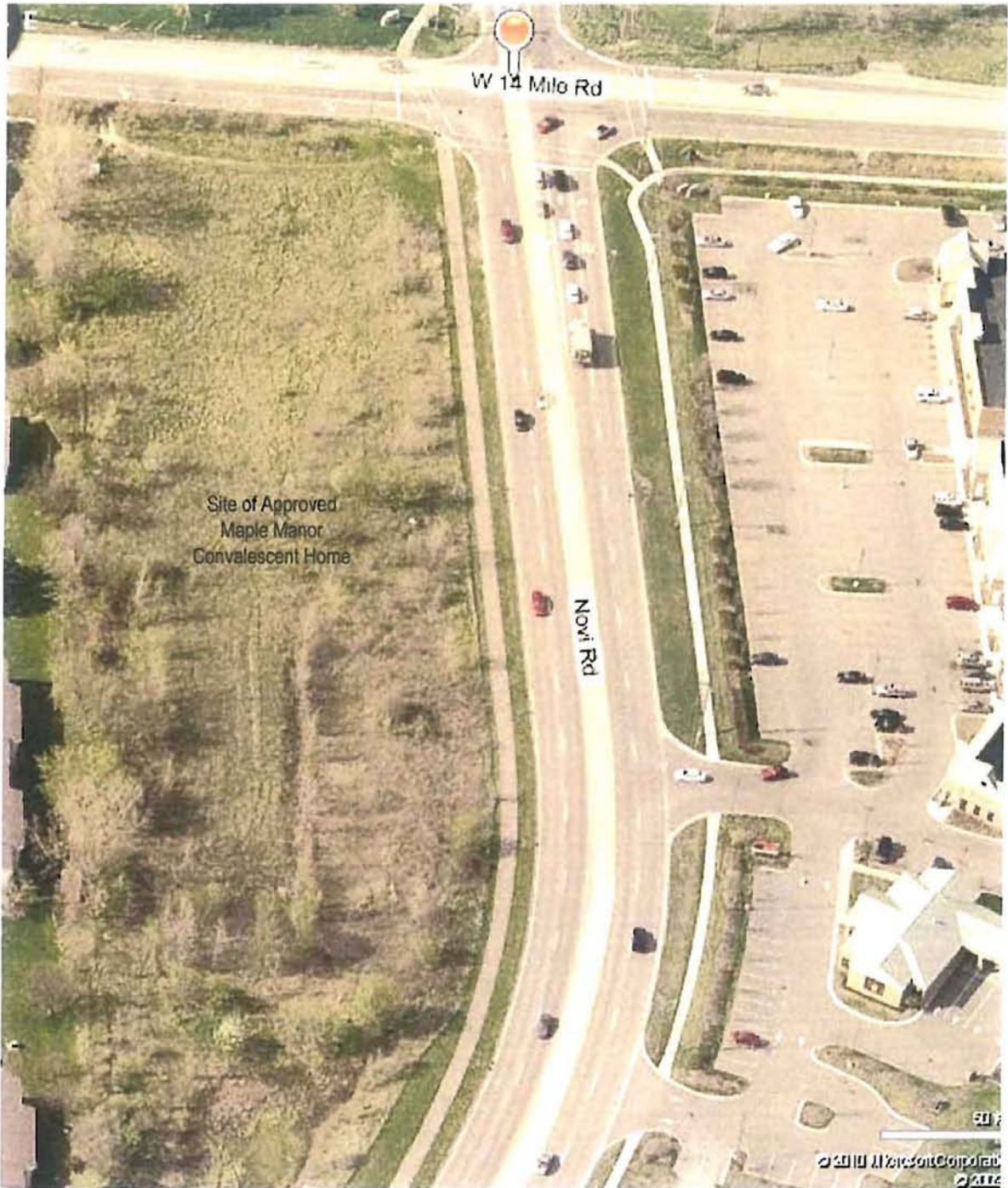


William A. Stimpson, P.E.  
Director of Traffic Engineering

Attachments:  
Birdseye aerial photos of entire corridor, and 2007-2009 crash data tabulations



BIRDSYE AERIAL PHOTOS OF CORRIDOR



Site of Approved  
Maple Manor  
Convalescent Home



Figure 3. Novi Road, From 14 Mile South Past Shopping Center





Figure 4. Novi Road, Second Section South of 14 Mile





Figure 5. Novi Road, Third Section South of 14 Mile



Figure 6. Novi Road, Fourth Section South of 14 Mile

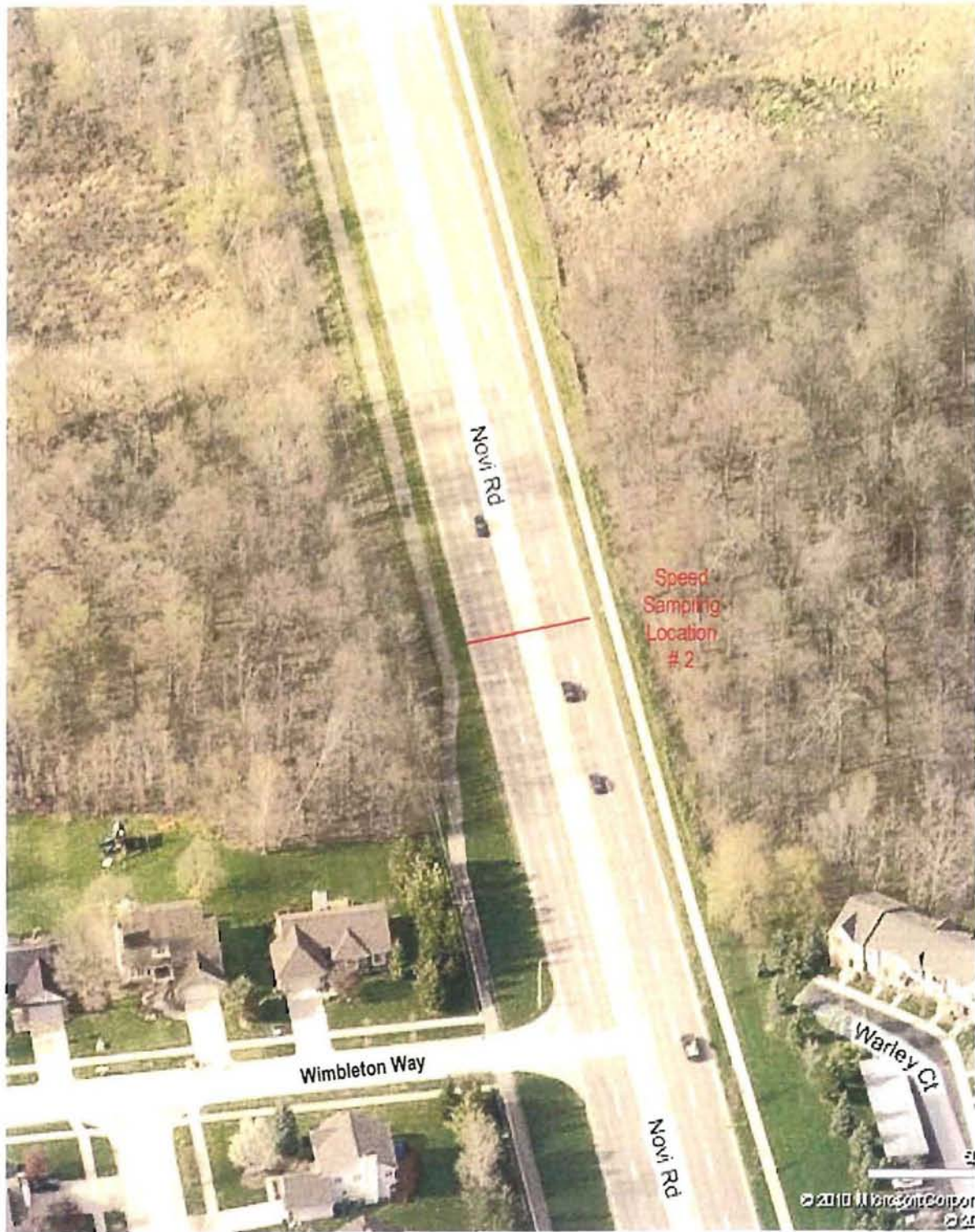


Figure 7. Novi Road, Fifth Section South of 14 Mile



Figure 8. Novi Road, Sixth Section South of 14 Mile



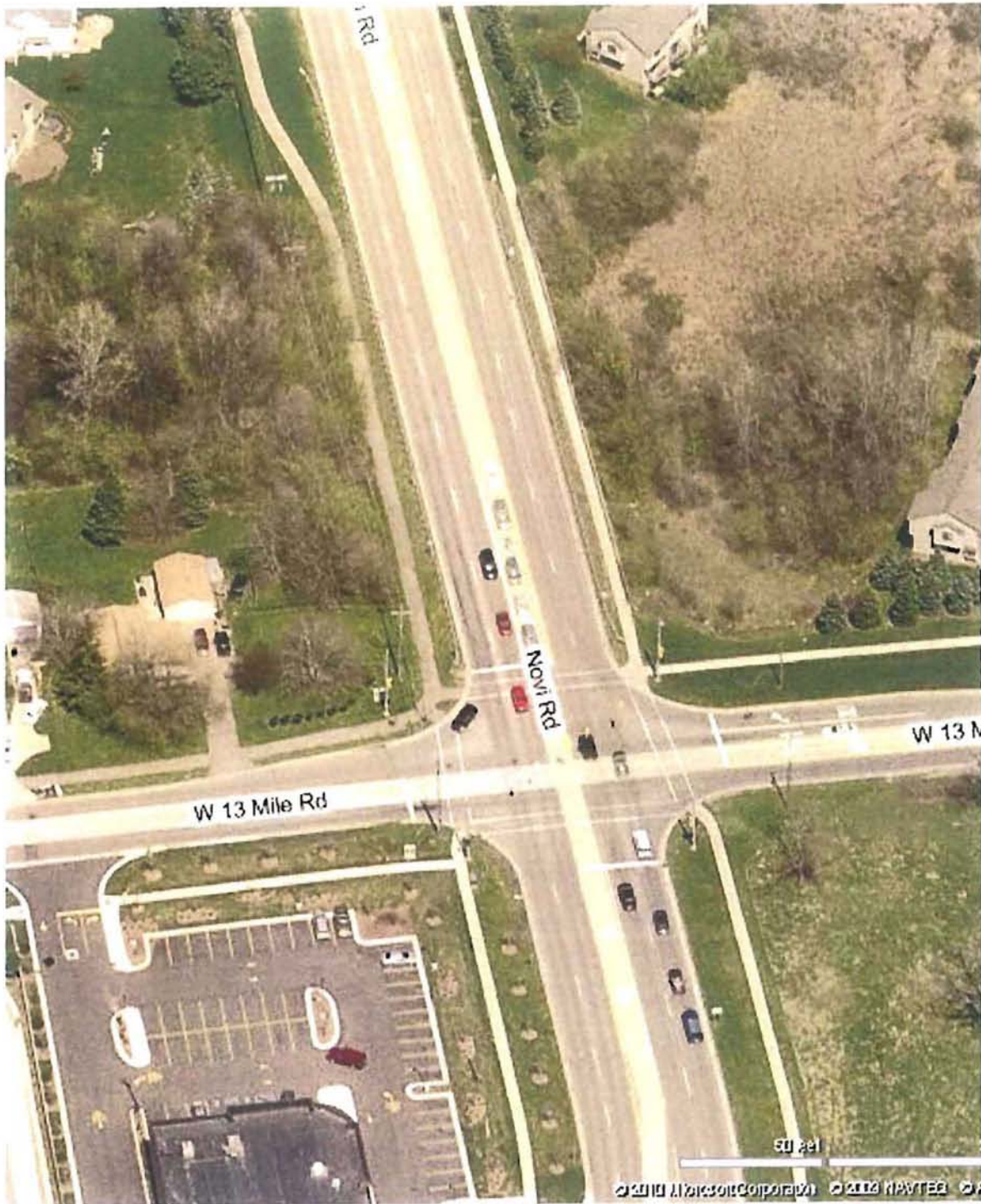


Figure 9. Novi Road and 13 Mile Road







Figure 10. Novi Road, From 13 Mile South Through First Curve



Figure 11. Novi Road, Second Section (and Curve) South of 13 Mile



Figure 12. Novi Road, Third Section South of 13 Mile



Figure 13. Novi Road, Fourth Section South of 13 Mile

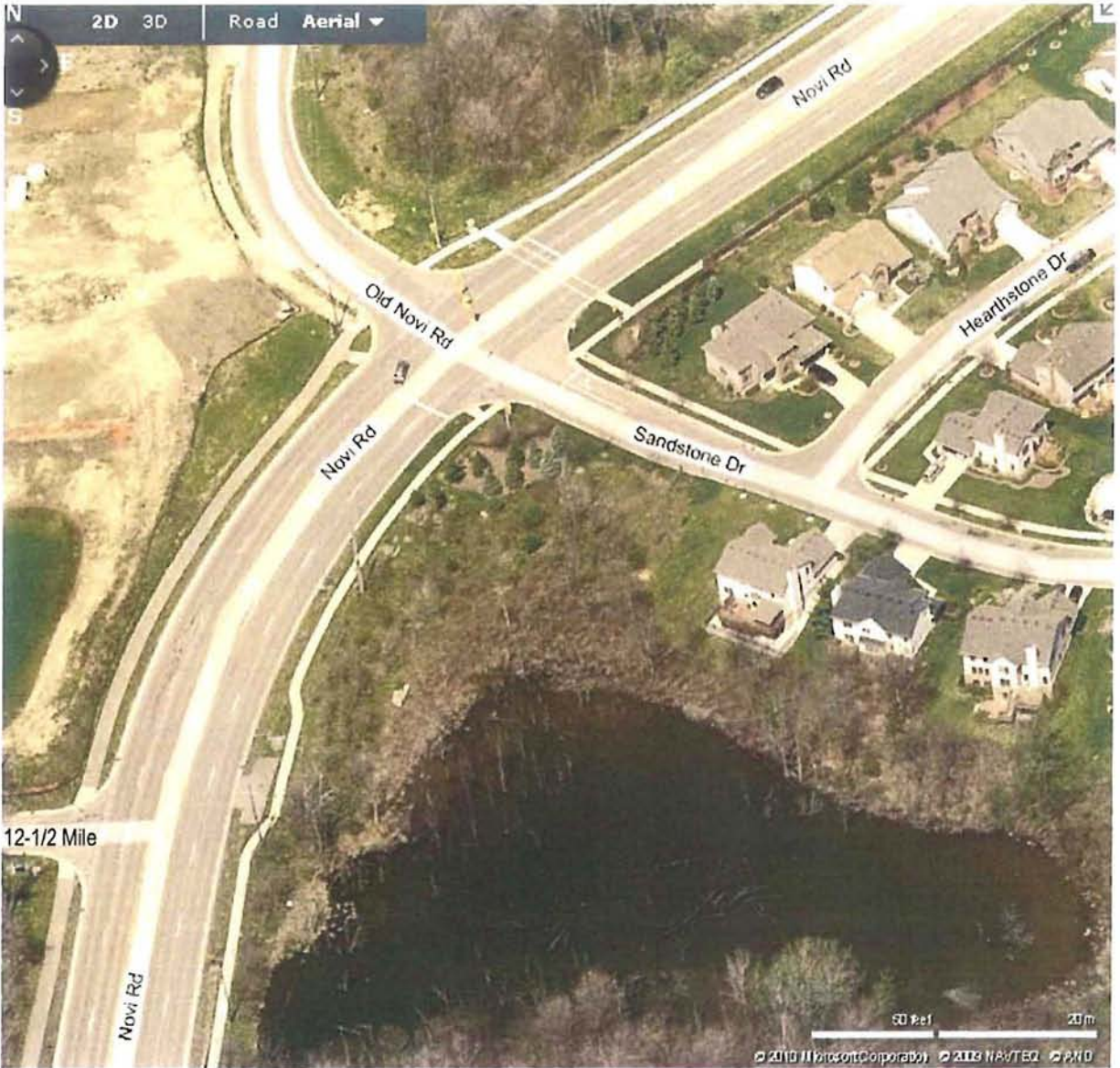


Figure 14. Novi Road, Vicinity of Old Novi Road





Figure 15. Novi Road, From South of 12-1/2 Mile to North Cemetery Driveway



Figure 16. Novi Road, From North Cemetery Driveway to South



Figure 17. Novi Road, From 12 Mile to North



2007-2009 CRASH DATA



Traffic Improvement Association

**Novi from 12 Mile to 14 Mile**  
 Request #: 0003900 Printed By: Dominique Match Printed On: 4/22/2010

FROM_DATE:	1/1/2007
TO_DATE:	12/31/2009

PR/MP	PR 621906 FROM MP 0 TO MP 1.114 [Novi Rd & Novi Rd to Decker Rd & Novi Rd] PR 4412477 FROM MP 0.275 TO MP 0.344 [Wekford Blvd & Windsor Ct to Wekford Blvd & Warley Ct] PR 4412461 FROM MP 0 TO MP 0.016 [Warley Ct & Novi Rd to Warley Ct & Wekford Blvd] PR 4403802 FROM MP 0 TO MP 0.699 [Novi Rd & Novi Rd to Novi Rd & W 13 Mile Rd] PR 4415324 FROM MP 0 TO MP 0.023 [Fitzgerald Blvd & Novi Rd to Fitzgerald Blvd & Whitman Way] PR 621910 FROM MP 0.445 TO MP 1.009 [Old Novi Rd & Novi Rd to Novi Rd & W 12 Mile Rd] PR 4412177 FROM MP 0 TO MP 0.041 [Sandstone Dr & Novi Rd to Sandstone Dr & Hearthstone Ln] PR 4414961 FROM MP 0.1 TO MP 0.122 [Alcott Cir & Emerson Way to Alcott Cir & Novi Rd] PR 4414962 FROM MP 0.332 TO MP 0.36 [Emerson Way & Eliot Ln to Emerson Way & Alcott Cir] PR 4411645 FROM MP 0 TO MP 0.038 [Ledgeview Dr & Novi Rd to Ledgeview Dr & Hearthstone Ln] PR 4411397 FROM MP 0 TO MP 0.328 [Hearthstone Ln & Sandstone Dr to Hearthstone Ln & Ledgeview Dr]
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**#1 Location:** NOVI ROAD (0.77) 1320 feet N of 12 MILE ROAD **Crash ID:** 6703886  
**Crash Date:** 06/14/2007 **Day:** Thu **Hour:** 9pm **Weather:** clear **Roadway:** dry **Light:** dark/unltd  
**Injuries K:** 0 **Inj A:** 0 **Inj B:** 0 **Inj C:** 0 **Inj 0:** 1 **How:** single  
**CVT:** Novi **Area:** straight **HBD:** N **Drugs:** N **Complaint No:** 0736933

Unit No	Veh Dir	Action	Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	change lanes		other fixed obj	none	none	none	none	motorcycle	rtside

UD-10: 075546599

**#2 Location:** DECKER (0.81) 1584 feet S of 14 MILE **Crash ID:** 6740147  
**Crash Date:** 08/04/2007 **Day:** Sat **Hour:** 12pm **Weather:** clear **Roadway:** dry **Light:** day  
**Injuries K:** 0 **Inj A:** 0 **Inj B:** 0 **Inj C:** 0 **Inj 0:** 2 **How:** rr-end  
**CVT:** Novi **Area:** straight **HBD:** N **Drugs:** N **Complaint No:** 0747699

Unit No	Veh Dir	Action	Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd		veh in transpt	none	none	none	unable to stop	pickup	clfrnt
2	S	stop on road		veh in transpt	none	none	none	none	car	clrrrear

UD-10: 075584682

#3 Location: NOVI RD (0.76) 1294 feet N of 12 MILE RD Crash ID: 6752606  
 Crash Date: 08/26/2007 Day: Sun Hour: 2pm Weather: clear Roadway: dry Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 2 How: rr-end  
 CVT: Novi Area: straight HBD: N Drugs: N Complaint No: 0751779

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	rtfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	sm truck	ctrrear

UD-10: 075597838

#4 Location: NOVI RD (0.10) 243 feet N of 13 MILE Crash ID: 6787496  
 Crash Date: 10/01/2007 Day: Mon Hour: 9am Weather: cloudy Roadway: wet Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 2 How: angle  
 CVT: Novi Area: straight HBD: N Drugs: N Complaint No: 0759155

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	none	car	rtside
2		right turn	veh in transpt	none	none	none	unknown	uncoded	

UD-10: 075634154

#5 Location: NOVI RD (0.33) 20 feet S of LODGEVIEW Crash ID: 6837549  
 Crash Date: 11/23/2007 Day: Fri Hour: 10pm Weather: cloudy Roadway: wet Light: dark/unltd  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 1 How: single  
 CVT: Novi Area: inter other HBD: N Drugs: N Complaint No: 0770604

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	animal	none	none	none	none	pickup	ctrfront

UD-10: 070359643

#6 Location: NOVI (0.44) 18 feet S of FITZGERALD Crash ID: 6857658  
 Crash Date: 12/04/2007 Day: Tue Hour: 1pm Weather: cloudy Roadway: dry Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 1 Inj 0: 0 How: unknown  
 CVT: Novi Area: HBD: N Drugs: N Complaint No: 0772403

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	cross ctrline/med hwy traffic sign post	curb	tree	none	none	car	rollovr

UD-10: 070402145

#7 Location: N NOVI (0.67) 50 feet N of WAVERLY Crash ID: 6866904  
 Crash Date: 12/18/2007 Day: Tue Hour: 8am Weather: cloudy Roadway: wet Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 4 How: rr-end  
 CVT: Novi Area: w/i intersection HBD: N Drugs: N Complaint No: 0774734

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	pickup	ctrrear

UD-10: 070421261

#8 Location: NOVI RD (0.64) 301 feet S of W 13 MILE RD Crash ID: 6932916  
 Crash Date: 02/18/2008 Day: Mon Hour: 5pm Weather: cloudy Roadway: icy Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 1 How: unknown  
 CVT: Novi Area: curved HBD: N Drugs: N Complaint No: 80008145

Unit No	Veh Dir	Action	Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight		hwy traffic sign post	none	none	none	speeding	pickup	ctrfront

UD-10: 080096084

#9 Location: NOVI RD (0.76) 1294 feet N of 12 MILE Crash ID: 6985558  
 Crash Date: 04/20/2008 Day: Sun Hour: 7am Weather: clear Roadway: dry Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 3 How: single  
 CVT: Novi Area: straight HBD: N Drugs: N Complaint No: 80018496

Unit No	Veh Dir	Action	Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd		bicyclist	none	none	none	failed to yeild	car	none
2	N	go straight		veh in transpt	none	none	none	none	uncoded	ctrrear

UD-10: 080207137

#10 Location: NOVI RD (0.09) 269 feet N of 13 MILE Crash ID: 7037898  
 Crash Date: 06/27/2008 Day: Fri Hour: 3pm Weather: cloudy Roadway: dry Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 5 How: ss-same  
 CVT: Novi Area: straight HBD: N Drugs: N Complaint No: 80031122

Unit No	Veh Dir	Action	Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	change lanes		veh in transpt	none	none	none	failed to yeild	car	lftrear
2	N	go straight		veh in transpt	none	none	none	none	car	rtfront

UD-10: 080319214

#11 Location: NOVI RD (0.76) 1320 feet S of 12 1/2 MILE RD Crash ID: 7249814  
 Crash Date: 02/05/2009 Day: Thu Hour: 4pm Weather: cloudy Roadway: dry Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 1 Inj 0: 3 How: rr-end  
 CVT: Novi Area: straight HBD: N Drugs: N Complaint No: 90007779

Unit No	Veh Dir	Action	Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd		veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd		veh in transpt	none	none	none	none	car	ctrrear

UD-10: 090086508, 090086508

#12 Location: NOVI RD (0.28) 13 feet N of WARLEY CT Crash ID: 7280866  
 Crash Date: 03/07/2009 Day: Sat Hour: 7pm Weather: rain Roadway: wet Light: dark/unltd  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 2 How: ss-opp  
 CVT: Novi Area: inter driveway HBD: N Drugs: N Complaint No: 90013738

Unit No	Veh Dir	Action	Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight		cross ctrline/med	veh in transpt	none	none	imprp lane use	car	rtfront
2	S	go straight		veh in transpt	none	none	none	none	car	rtside

UD-10: 090153065, 090153065

#13 Location: NOVI RD (0.68) 100 feet N of WAVERLY DR Crash ID: 7316593  
 Crash Date: 05/13/2009 Day: Wed Hour: 11am Weather: clear Roadway: dry Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 1 Inj 0: 38 How: rr-end  
 CVT: Novi Area: inter other HBD: N Drugs: N Complaint No: 90030439

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	other	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	truck/bus	ctrrear

UD-10: 090232163, 090232163

#14 Location: NOVI RD (0.33) 3 feet S of LEDGEVIEW DR Crash ID: 7457440  
 Crash Date: 11/09/2009 Day: Mon Hour: 1pm Weather: clear Roadway: dry Light: day  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 2 How: angle  
 CVT: Novi Area: straight HBD: N Drugs: N Complaint No: 090072723

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E ?	left turn	veh in transpt	none	none	none	failed to yeild	other	rtfront
2	N	go straight	veh in transpt	none	none	none	none	car	rtside

UD-10: 090558591

#15 Location: NOVI RD (0.44) 15 feet S of FITZGERALD BLVD Crash ID: 7457455  
 Crash Date: 11/08/2009 Day: Sun Hour: 6pm Weather: clear Roadway: dry Light: dark/unltd  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 0 Inj 0: 4 How: single  
 CVT: Novi Area: straight HBD: N Drugs: N Complaint No: 090072523

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	animal	none	none	none	none	car	ctrfront

UD-10: 090558636

#16 Location: NOVI RD (0.65) 50 feet S of WAVERLY DR Crash ID: 7496747  
 Crash Date: 12/17/2009 Day: Thu Hour: 5pm Weather: cloudy Roadway: dry Light: dusk  
 Injuries K: 0 Inj A: 0 Inj B: 0 Inj C: 1 Inj 0: 2 How: rr-end  
 CVT: Novi Area: inter other HBD: N Drugs: N Complaint No: 090080862

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD-10: 090653138

#17 Location: NOVI RD (0.66) 15 feet S of WAVERLY DR Crash ID: 7502373  
 Crash Date: 12/26/2009 Day: Sat Hour: 5pm Weather: clear Roadway: dry Light: dark/unltd  
 Injuries K: 0 Inj A: 0 Inj B: 2 Inj C: 0 Inj 0: 1 How: rr-end  
 CVT: Novi Area: inter other HBD: N Drugs: N Complaint No: 090082689

Unit No	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD-10: 090664253

**Crash Type**

Count	Type
0	uncoded
4	single
0	head-on
0	head-on/lt
2	angle
7	rr-end
0	rr-end/lt
0	rr-end/rt
1	ss-same
1	ss-opp
2	unknown
<b>Totals: 17</b>	

**Light Conditions**

Count	Type
0	uncoded
11	day
0	dawn
1	dusk
0	dark/lt
5	dark/unltd
0	unknown
<b>Totals: 17</b>	

**Weather**

Count	Type
0	uncoded
8	clear
8	cloudy
0	fog/smoke
1	rain
0	snow
0	wind
0	sleet/hail
0	unknown
<b>Totals: 17</b>	

**Road Condition**

Count	Type
0	uncoded
12	dry
4	wet
1	icy
0	snowy
0	muddy
0	slushy
0	debris
0	unknown
<b>Totals: 17</b>	

**Vehicle Type**

Count	Type
2	uncoded
18	car
1	other
1	truck/bus
0	van
5	pickup
1	sm truck
1	motorcycle
0	moped
0	go-cart
0	snowmobile
0	off-rd veh
<b>Totals: 29</b>	

**Crashes By Month**

Count	Type
0	January
2	February
1	March
1	April
1	May
2	June
0	July
2	August
0	September
1	October
3	November
4	December
<b>Totals: 17</b>	

**Hazardous Action**

Count	Type
16	none
1	speeding
0	imprp/no signal
0	imprp backing
6	unable to stop
1	other
1	unknown
0	reckls driving
0	negl driving
0	spd too slow
3	failed to yeild
0	disrgd traffic cntrl
0	wrong way
0	left of center
0	imprp passing
1	imprp lane use
0	imprp turn
<b>Totals: 29</b>	

**Unit Type**

Count	Type
0	uncoded
28	vehicle
0	pedestrian
1	bicyclist
0	engineer
<b>Totals: 29</b>	

Crash Severity

	FATAL	A	B	C	No Inj	Total
Persons	0	0	2	4	73	79
Crashes	0	0	1	4	12	17

Alcohol in Crashes

	FATAL	PI	PD	Total
Drinking	0	0	0	0
Not Drinking	0	5	12	17
Total	0	5	12	17

Crashes per Hour by Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Unknown	Total
12a - 1a	0	0	0	0	0	0	0	0	0
1a - 2a	0	0	0	0	0	0	0	0	0
2a - 3a	0	0	0	0	0	0	0	0	0
3a - 4a	0	0	0	0	0	0	0	0	0
4a - 5a	0	0	0	0	0	0	0	0	0
5a - 6a	0	0	0	0	0	0	0	0	0
6a - 7a	0	0	0	0	0	0	0	0	0
7a - 8a	1	0	0	0	0	0	0	0	1
8a - 9a	0	0	1	0	0	0	0	0	1
9a - 10a	0	1	0	0	0	0	0	0	1
10a - 11a	0	0	0	0	0	0	0	0	0
11a - 12p	0	0	0	1	0	0	0	0	1
12p - 1p	0	0	0	0	0	0	1	0	1
1p - 2p	0	1	1	0	0	0	0	0	2
2p - 3p	1	0	0	0	0	0	0	0	1
3p - 4p	0	0	0	0	0	1	0	0	1
4p - 5p	0	0	0	0	1	0	0	0	1
5p - 6p	0	1	0	0	1	0	1	0	3
6p - 7p	1	0	0	0	0	0	0	0	1
7p - 8p	0	0	0	0	0	0	1	0	1
8p - 9p	0	0	0	0	0	0	0	0	0
9p - 10p	0	0	0	0	1	0	0	0	1
10p - 11p	0	0	0	0	0	1	0	0	1
11p - 12a	0	0	0	0	0	0	0	0	0
Unknown Time	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>17</b>