



500 West Big Beaver
Troy, MI 48084
troymi.gov



CITY COUNCIL AGENDA ITEM

Date: April 23, 2024

To: Mark F. Miller, City Manager

From: Robert J. Bruner, Deputy City Manager
Megan E. Schubert, Assistant City Manager
G. Scott Finlay, City Engineer/Traffic Engineer

Subject: Traffic Committee Recommendations and Minutes – April 17, 2024

At the Traffic Committee meeting of April 17 2024, the following recommendations were made for City Council approval:

4. Request for Traffic Control – West Troy Meadows

RESOLVED, that the Harlow Drive Approach at Blakely Court be **MODIFIED** from UNCONTROLLED, to STOP CONTROLLED.

BE IT FURTHER RESOLVED, that the Harlow Drive Approach at Audley Court be **MODIFIED** from UNCONTROLLED, to YIELD CONTROLLED

BE IT FURTHER RESOLVED, that the Webb Avenue Approach at Virgilia Drive be **MODIFIED** from UNCONTROLLED, to YIELD CONTROLLED

BE IT FINALLY RESOLVED, that the Blakely Court Approach at Virgilia Drive be **MODIFIED** from UNCONTROLLED, to YIELD CONTROLLED

Minutes of the meeting are attached.

A regular meeting of the Troy Traffic Committee was held Wednesday, April 17, 2024 in the Lower Level Conference Room at Troy City Hall. Pete Ziegenfelder called the meeting to order at 7:30 p.m.

1. Roll Call

Present: Shama Kenkre
Cindy Nurak
Al Petrulis
Abi Swaminathan
Pete Ziegenfelder

Absent: Deputy Fire Chief, Michael Koehler
Sgt. Brian Warzecha, Police Department
Angela Zhou, Student Representative

Also present: G. Scott Finlay, City Engineer
Merissa Clark, Administrative Assistant

2. Minutes – March 20, 2024 Traffic Committee

Resolution # 2024-04-09
Moved by Swaminathan
Seconded by Kenkre

To approve the March 20, 2024 minutes as printed.

Yes: Kenkre, Nurak, Petrulis, Swaminathan, Ziegenfelder
No: None
Absent: None

MOTION CARRIED**PUBLIC HEARINGS****3. No Public Hearing****REGULAR BUSINESS****4. Request for Traffic Control – West Troy Meadows**

West Troy Meadows Site Condominiums has been completed. All intersections within this development were reviewed for intersection control. OHM provided a detailed study attached and makes the following recommendations: OHM recommends implementing STOP sign on the Harlow Drive approach at Blakely Court and YIELD signs on the Harlow Drive approach at Audley Court, the Webb Avenue approach at Virgilia Drive, and the Blakely Court approach at Virgilia Drive.

Pete Ziegenfelder stated he is in favor of stop signs at all intersections.

Shama Kenkre agreed.

Cindy Nurak is not a fan of stop signs being installed at all intersections because she thinks it causes more rolling stops, and accidents/injuries can happen.

Al Petrulis stated that yields can be changed to stops if need be in the future.

MOTION CARRIED

Resolution # 2024-04-10

Moved by Nurak

Seconded by Petrulis

Yes: Kenkre, Nurak, Petrulis, Swaminathan, Ziegenfelder

No: None

Absent: None

RESOLVED, that the Harlow Drive Approach at Blakely Court be modified from UNCONTROLLED, to STOP CONTROLLED.

BE IT FURTHER RESOLVED, that the Harlow Drive Approach at Audley Court be modified from UNCONTROLLED, to YIELD CONTROLLED

BE IT FURTHER RESOLVED, that the Webb Avenue Approach at Virgilia Drive be modified from UNCONTROLLED, to YIELD CONTROLLED

BE IT FINALLY RESOLVED, that the Blakely Court Approach at Virgilia Drive be modified from UNCONTROLLED, to YIELD CONTROLLED

5. Public Comment

No public comment.

6. Other Business

I.D. Badges were discussed for Traffic Committee members, new badges are needed.

7. Adjourn

The meeting adjourned at 7:45 PM.

Pete Ziegenfelder -Chairperson

G. Scott Finlay, City Engineer/Traffic Engineer

March 6, 2024

Mr. Scott G Finlay, PE
City Engineer
City of Troy
500 W. Big Beaver Rd
Troy, MI 48084

RE: Traffic Control Recommendation for
West Troy Meadows

Dear Mr. Finlay:

As requested, we have reviewed the intersections within the West Troy Meadows development to determine the proposed traffic control. These intersections include Blakely Court at Harlow Drive, Audley Court at Harlow Drive, Virgilia Drive at Webb Avenue, and Virgilia Drive at Blakely Court. All of these intersections are 3-legged intersections located in the City of Troy. The speed limit on all of these streets under investigation is 25 mph. The intersections currently do not have any controlled approaches. Attached are aerial and intersection photos.

Types of Roadways

Blakely Court, Harlow Drive, Audley Court, Virgilia Drive, and Webb Avenue are all considered local streets. Harlow Drive and Virgilia Drive run north to south providing access within the neighborhood. Blakely Court, Audley Court, and Webb Avenue run east to west. Webb Avenue offers access to the neighborhood off of Livernois Road.

The surrounding land use is mostly single-family residential with the Troy School District Transportation building nearby, to the east of the subject area. There are no evident parking restrictions on any of these streets. There is no clear major versus minor streets. However, for the purpose of analysis Audley Court, Virgilia Drive, and Blakely Court (at the intersection with Harlow Drive) are presumed to be the major roads, while Harlow Drive, Webb Avenue, and Blakely Drive (at the intersection with Virgilia Drive) are considered the minor roads. All roads serve as key routes throughout the neighborhood.

Traffic Control Analyses

Traffic control analyses described herein adheres to the requirements presented in the Michigan Manual on Uniform Traffic Control Devices (MMUTCD) that are considered mandates of state law. A reference document explaining the background behind the analyses is attached to this memo.

Crash Analysis

Based on information obtained through the Traffic Improvement Association of Michigan, there were no crashes recorded in the past full five (5) years within a 250' radius of the intersections. The crash history does not constitute a compelling case for modifying the existing controls.



Traffic Volumes

Traffic counts were not collected in the vicinity of the intersections. Traffic volumes in residential areas are predominantly driven by the number of single-family residential homes in the neighborhood. Based on the residential nature and the number of homes in the surrounding area it is highly improbable that this location would satisfy any of the minimum volume warrants for an all-way STOP (see attached Reference Guide).

It is therefore extremely unlikely that any of the defined major roads meet and sustain the 300 vehicles per hour threshold for a minimum of 8 hours. The combined vehicular, pedestrian, and bicycle volumes entering from any of the defined minor roads is similarly unlikely to average at least 200 units for any 8 hours. Additionally, since the posted speed limit is only 25 mph, it is reasonable to assume that the 85th percentile approach speed does not exceed 40 mph on either road; thus, the minimum vehicular volume warrants cannot be discounted to 70 percent of the values described previously. Finally, the study intersections are likely to fall significantly shy even of the reduced 80 percent volumes, based on expected trip generation for this neighborhood. Therefore, the minimum volume criteria for an all-way STOP has not likely been met.

Approach Speed Limits

The approach speed limit on all study streets is 25 mph. Speed limits alone cannot be used in this case to determine which direction of traffic should be assigned the right-of-way.

Sight Distance

The major potential sight distance obstruction at the intersections were house corners. These obstructions impact the calculated safe approach speeds for the intersections. The safe approach speed is the speed at which a vehicle can approach an intersection and still stop in time to avoid a collision with a vehicle seen on the cross street.

When the safe approach speed is found to be 10 mph or less, a STOP sign is recommended. When the safe approach speed is found to be more than 10 mph, a YIELD sign is recommended. The safe approach speeds and results for each intersection are shown in Table 1 below.

Table 1. Safe Approach Speeds per Intersection

Intersection	Safe Approach Speed	Vehicle Direction	Result
Blakely Ct at Harlow Dr	9.9 mph	Eastbound	STOP
Audley Ct at Harlow Dr	13.1 mph	Northbound	YIELD
Virgilia Dr at Webb Ave	12.1 mph	Westbound	YIELD
Virgilia Dr at Blakely Cr	14.6 mph	Northbound	YIELD

The safe approach speed calculation spreadsheets for the intersections are attached for reference.

Recommendation

The preceding analysis did not determine that any criteria were met for all-way STOP-control. The safe approach speed calculations suggested STOP-control would be appropriate for the minor street approach of Harlow Drive at Blakely Drive and YIELD-control would be appropriate for the minor street approaches of Harlow Drive at Audley Court, Webb Avenue at Virgilia Drive, and Blakely Court at Virgilia Drive.



OHM recommends implementing a STOP sign on the Harlow Drive approach at Blakely Court and YIELD signs on the Harlow Drive approach at Audley Court, the Webb Avenue approach at Virgilia Drive, and the Blakely Court approach at Virgilia Drive. These intersections should be reevaluated if traffic volumes increase, or crashes begin to occur.

Sincerely,
OHM Advisors

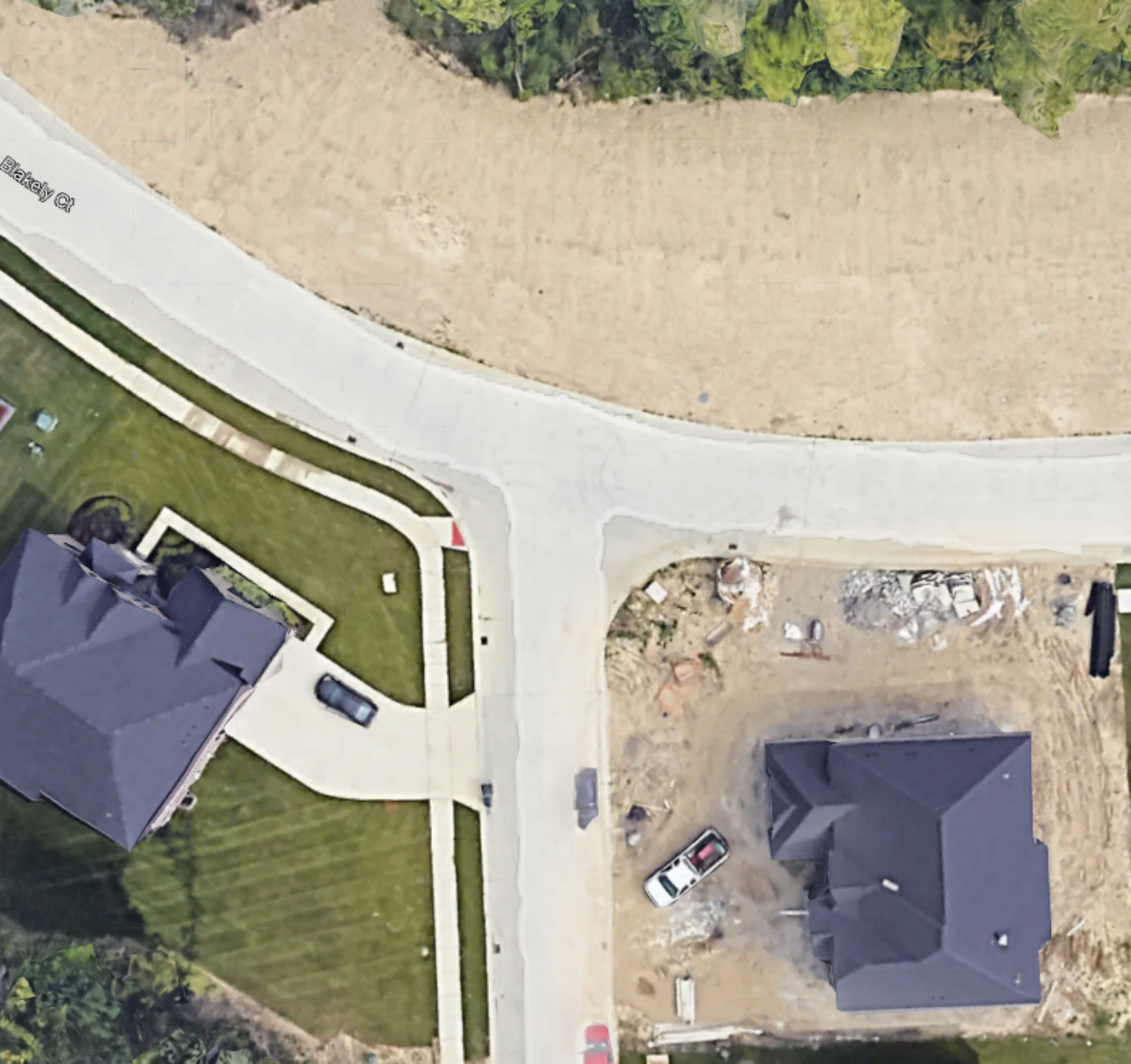
Lauren Hull, EIT
Traffic Engineer

Attachments:

- Aerial Photo
- Safe Approach Speed Calculation Spreadsheet
- Intersection Photos
- Traffic Control Determination Reference Guide

Blakely Ct at Harlow Dr

Blakely Ct



Safe Approach Speed Calculation

Blakely Ct and Harlow Dr
City of Troy

Measured:

Width of Roads
Road 1 = 25 (ft)
Road 2 = 25 (ft)
Distance to Obstruction
a = 26.5 (ft)
b = 21 (ft)
c = 34.5 (ft)
d = 47 (ft)

Angle of Intersection
Delta = 62 (degrees, measure counterclockwise)
Road 1 Posted
Speed Limit = 25 (mph)

Assumed:

Speed of Vehicle A = Speed of Vehicle C
= Posted Speed Limit on Road 1

+ 5 (mph)
V₁ = 30 (mph)

Perception / Reaction Time (AASHTO)

t = 2.5 (sec)

Deceleration rate (AASHTO)

A = 11.20

Clearance distance in excess of safe stopping distance (AAA)

EC = 0 (ft)

Calculated Safe Approach Speed for Vehicle B

Approaching on Road 2

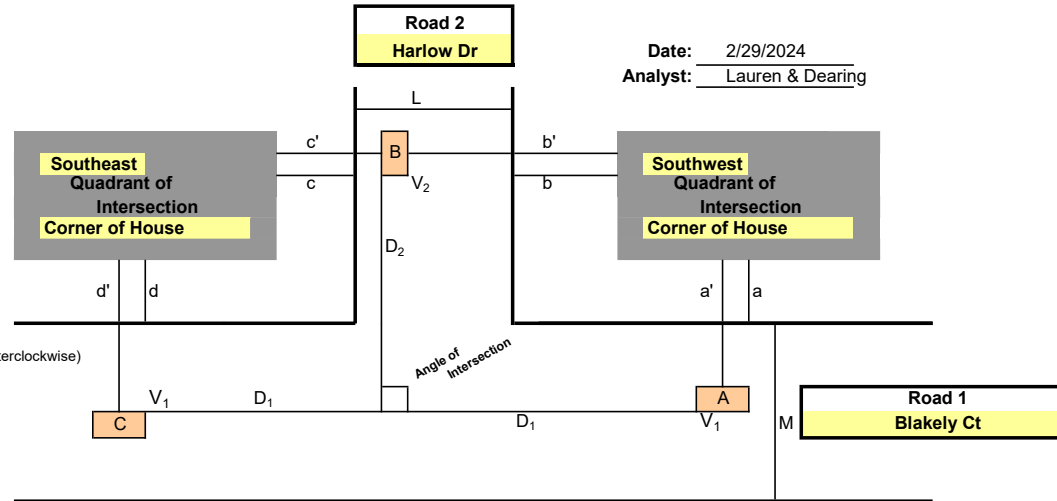
FALSE or V₂ = 9.9 (mph) [Based on Veh. A]
FALSE or V₂ = 14.0 (mph) [Based on Veh. C]

Threshold of Safe Approach Speed (AAA, FHWA & NSC)

to Recommend STOP Control 10.0 (mph)

to Recommend YIELD Control 25.0 (mph)

Otherwise Recommends NO CONTROL.



Intermediate Calculations:

D₁ = 196

D_{2A} = 45.8

D_{2C} = 70.1

a' = 32.5

b' = 34

c' = 40.5

d' = 60

Based On $D_1 = (1.075 V_1^2 / A) + 1.4667 V_1 t + EC$

$D_{2A} = \frac{a' * D_1}{(D_1 - b')}$ or $D_{2C} = \frac{c' * D_1}{(D_1 - d')}$

Notes: Enter field measurements in yellow highlighted area.

Blue fields are std. default values; change only for cause.

Calculated by spreadsheet

Recommended ROW control for Road 2

based on safe approach speed : STOP Sign



Photograph No. 1: Blakely Ct - Heading West Looking Left
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 2: Blakely Ct - Heading West
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 3: Harlow Dr - Heading North Looking Left
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 4: Harlow Dr - Heading North
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 5: Harlow Dr - Heading North Looking Right
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 6: Blakely Ct - Heading East
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 7: Blakely Ct - Heading East Looking Right
Date: 02/29/2024 **Photographer:** Lauren Hull

Audley Ct at Harlow Dr



Safe Approach Speed Calculation

Audley Ct and Harlow Dr
City of Troy

Date: 2/29/2024
Analyst: Lauren & Dearing

Measured:

Width of Roads
Road 1 = 25 (ft)
Road 2 = 25 (ft)
Distance to Obstruction
a = 37.5 (ft)
b = 36.5 (ft)
c = 43 (ft)
d = 37.5 (ft)
Angle of Intersection
Delta = 90 (degrees, measure counterclockwise)
Road 1 Posted
Speed Limit = 25 (mph)

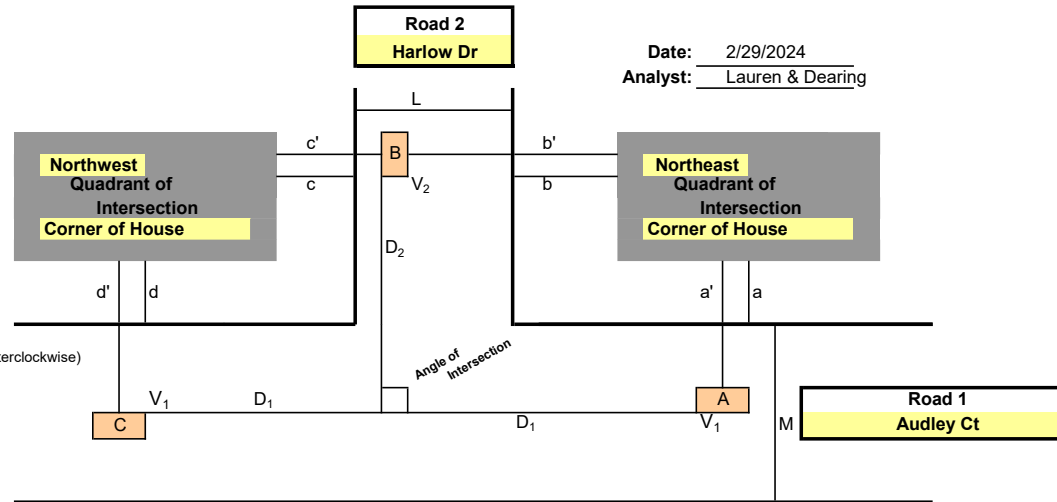
Assumed:

Speed of Vehicle A = Speed of Vehicle C
= Posted Speed Limit on Road 1
+ 5 (mph)
V₁ = 30 (mph)
Perception / Reaction Time (AASHTO)
t = 2.5 (sec)
Deceleration rate (AASHTO)
A = 11.20
Clearance distance in excess of safe stopping distance (AAA)
EC = 0 (ft)

Calculated Safe Approach Speed for Vehicle B Approaching on Road 2

TRUE 12.1 (mph) [Based on Veh. A]
FALSE or V₂ = 13.3 (mph) [Based on Veh. C]

Threshold of Safe Approach Speed (AAA, FHWA & NSC)
to Recommend STOP Control 10.0 (mph)
to Recommend YIELD Control 25.0 (mph)
Otherwise Recommends NO CONTROL.



Intermediate Calculations:

D₁ = 196
D_{2A} = 58.2
D_{2C} = 66.0
a' = 43.5
b' = 49.5
c' = 49
d' = 50.5

Based On $D_1 = (1.075 V_1^2 / A) + 1.4667 V_1 t + EC$
 $D_{2A} = \frac{a' * D_1}{(D_1 - b')}$ or $D_{2C} = \frac{c' * D_1}{(D_1 - d')}$

Notes: Enter field measurements in yellow highlighted area.
Blue fields are std. default values; change only for cause.
Calculated by spreadsheet

Recommended ROW control for Road 2
based on safe approach speed : YIELD SIGN



Photograph No. 1: Audley Ct - Heading East Looking Left
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 2: Audley Ct - Heading East
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 3: Harlow Dr - Heading South Looking Left
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 4: Harlow Dr - Heading South
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 5: Harlow Dr - Heading South Looking Right
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 6: Audley Ct - Heading West
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 7: Audley Ct - Heading West Looking Right
Date: 02/29/2024 **Photographer:** Lauren Hull

Virgilia Dr at Webb Ave



Webb Ave

Safe Approach Speed Calculation

Virgilia Dr and Webb Ave
City of Troy

Measured:

Width of Roads
Road 1 = 25 (ft)
Road 2 = 25 (ft)
Distance to Obstruction
a = 43 (ft)
b = 53 (ft)
c = 53.5 (ft)
d = 40 (ft)

Angle of Intersection
Delta = 90 (degrees, measure counterclockwise)
Road 1 Posted
Speed Limit = 25 (mph)

Assumed:

Speed of Vehicle A = Speed of Vehicle C
= Posted Speed Limit on Road 1

+ 5 (mph)
V₁ = 30 (mph)

Perception / Reaction Time (AASHTO)

t = 2.5 (sec)

Deceleration rate (AASHTO)

A = 11.20

Clearance distance in excess of safe stopping distance (AAA)

EC = 0 (ft)

Calculated Safe Approach Speed for Vehicle B

Approaching on Road 2

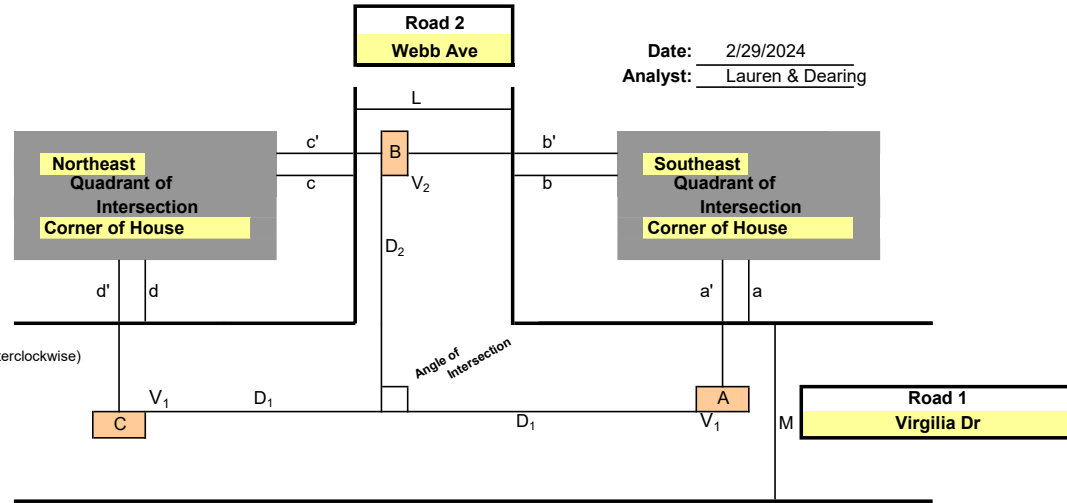
TRUE 14.6 (mph) [Based on Veh. A]
FALSE or V₂ = 15.7 (mph) [Based on Veh. C]

Threshold of Safe Approach Speed (AAA, FHWA & NSC)

to Recommend STOP Control 10.0 (mph)

to Recommend YIELD Control 25.0 (mph)

Otherwise Recommends NO CONTROL.



Intermediate Calculations:

D₁ = 196

D_{2A} = 73.8

D_{2C} = 81.5

a' = 49

b' = 66

c' = 59.5

d' = 53

Based On $D_1 = (1.075 V_1^2 / A) + 1.4667 V_1 t + EC$

$D_{2A} = \frac{a' * D_1}{(D_1 - b')}$ or $D_{2C} = \frac{c' * D_1}{(D_1 - d')}$

Notes: Enter field measurements in yellow highlighted area.

Blue fields are std. default values; change only for cause.

Calculated by spreadsheet

Recommended ROW control for Road 2

based on safe approach speed : YIELD SIGN



Photograph No. 1: Virgilia Dr - Heading North
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 2: Virgilia Dr - Heading North Looking Right
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 3: Webb Ave - Heading West Looking Left
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 4: Webb Ave - Heading West
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 5: Webb Ave - Heading West Looking Right
Date: 02/29/2024 **Photographer:** Lauren Hull



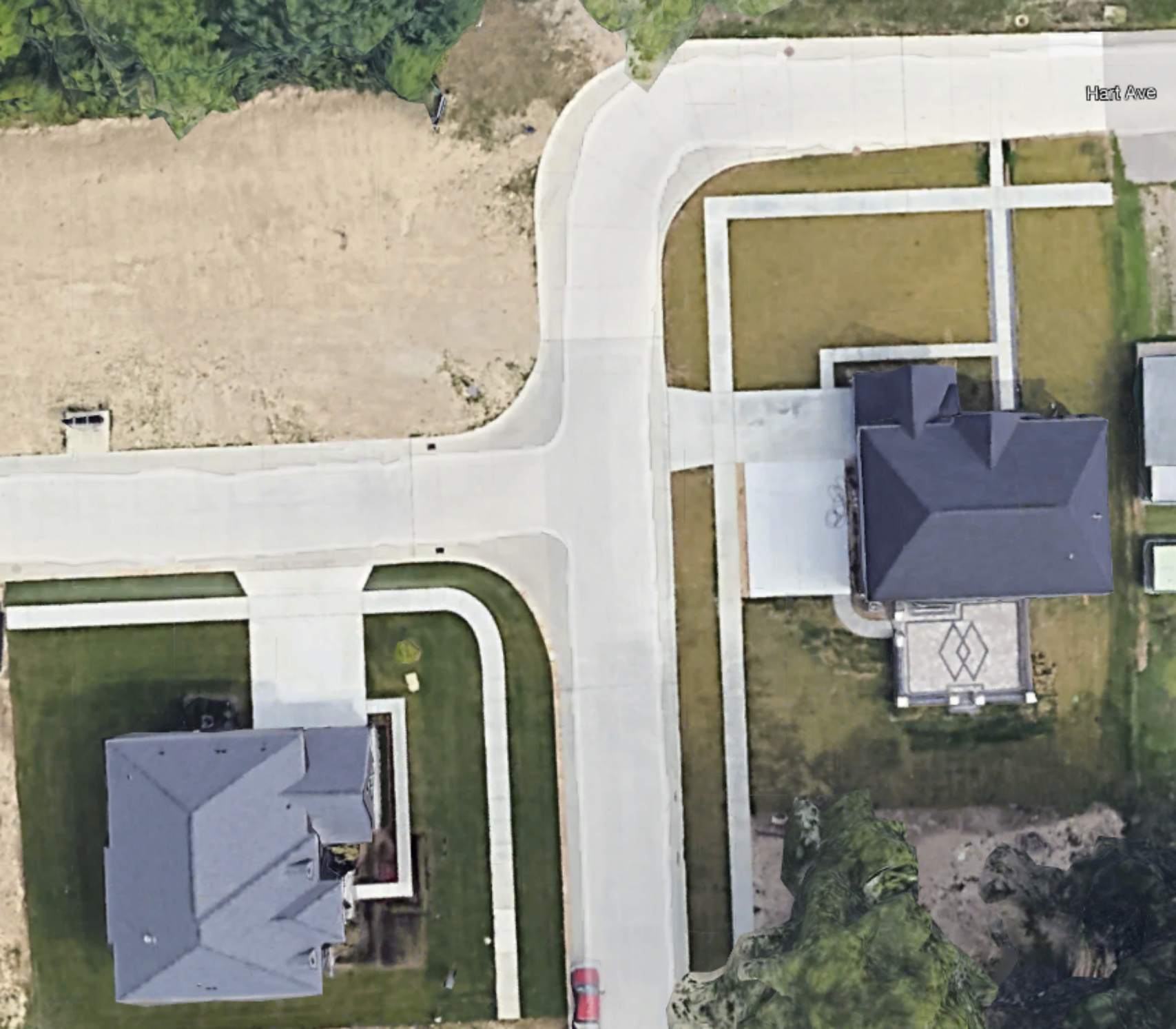
Photograph No. 6: Virgilia Dr - Heading South Looking Left
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 7: Virgilia Dr - Heading South
Date: 02/29/2024 **Photographer:** Lauren Hull

Virgilia Dr at Blakely Ct

Hart Ave



Safe Approach Speed Calculation

Virgilia Dr and Blakely Ct
City of Troy

Measured:

Width of Roads
Road 1 = 25 (ft)
Road 2 = 25 (ft)
Distance to Obstruction
a = 100 (ft)
b = 75 (ft)
c = 42 (ft)
d = 37 (ft)
Angle of Intersection
Delta = 90 (degrees, measure counterclockwise)
Road 1 Posted
Speed Limit = 25 (mph)

Assumed:

Speed of Vehicle A = Speed of Vehicle C
= Posted Speed Limit on Road 1
+ 5 (mph)
V₁ = 30 (mph)
Perception / Reaction Time (AASHTO)
t = 2.5 (sec)
Deceleration rate (AASHTO)
A = 11.20
Clearance distance in excess of safe stopping distance (AAA)
EC = 0 (ft)

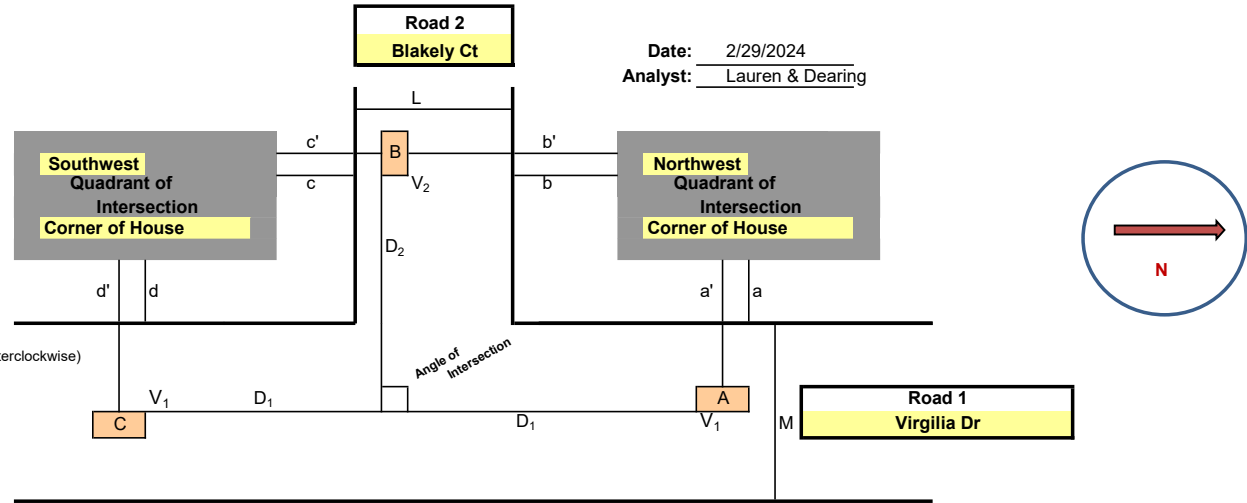
Calculated Safe Approach Speed for Vehicle B

Approaching on Road 2

TRUE 29.5 (mph) [Based on Veh. A]
FALSE or V₂ = 13.1 (mph) [Based on Veh. C]

Threshold of Safe Approach Speed (AAA, FHWA & NSC)

to Recommend STOP Control 10.0 (mph)
to Recommend YIELD Control 25.0 (mph)
Otherwise Recommends NO CONTROL.



Intermediate Calculations:

D₁ = 196
D_{2A} = 192
D_{2C} = 64.4
a' = 106
b' = 88
c' = 48
d' = 50

Based On $D_1 = (1.075 V_1^2 / A) + 1.4667 V_1 t + EC$
 $D_{2A} = \frac{a' * D_1}{(D_1 - b')}$ or $D_{2C} = \frac{c' * D_1}{(D_1 - d')}$

Notes: Enter field measurements in yellow highlighted area.

Blue fields are std. default values; change only for cause.

Calculated by spreadsheet

Recommended ROW control for Road 2

based on safe approach speed : YIELD SIGN



Photograph No. 1: Virgilia Dr - Heading North Looking Left
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 2: Virgilia Dr - Heading North
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 3: Blakely Ct - Heading East Looking Left
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 4: Blakely Ct - Heading East
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 5: Blakely Ct - Heading East Looking Right
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 6: Virgilia Dr - Heading South
Date: 02/29/2024 **Photographer:** Lauren Hull



Photograph No. 7: Virgilia Dr - Heading South Looking Right
Date: 02/29/2024 **Photographer:** Lauren Hull

Reference Guide on Traffic Control Determination in the State of Michigan

Background

This document is intended to be used as a reference guide for performing intersection traffic control studies of intersections on public roadways in Michigan. The document explains the procedure and requirements necessary to implement traffic control at an intersection as stipulated by the Michigan Manual on Uniform Traffic Control Devices (MMUTCD). Act 300 of Public Acts of 1949 (as amended) requires the adoption of this Manual, and further requires conformance to the manual for all state highways, county roads and local streets open to public travel.

Generally, the starting premise is an uncontrolled intersection. The first step would then be to verify if the intersection should remain uncontrolled or if YIELD or STOP controls on the minor street approach(es) should be provided. For locations with higher traffic volumes and /or crash issues, then an evaluation of the location for all-way STOP warrants would be performed. The appropriate analysis for each level of control described below.

YIELD Traffic Control Guidance

The use of a YIELD sign is intended to assign the right-of-way at intersections where it is not usually necessary to stop before proceeding into the intersection. Conversely, the STOP sign is intended for use where it is usually necessary to stop before proceeding into the intersection.

The following conditions should be fully evaluated to determine how the right-of-way should be assigned:

- Traffic Volumes: Normally, the heavier volume of traffic should be given the right-of-way.
- Approach Speeds: The higher speed traffic should normally be given the right-of-way.
- Types of Highways: When a minor highway intersects a major highway, it is usually desirable to control the minor highway.
- Sight Distance: Sight distance across the corners of the intersection is the most important factor and is critical in determining safe approach speeds.

STOP Traffic Control Guidance

Based on the MMUTCD there are four conditions where STOP signs may be warranted:

- At the intersection of a less important road with a main road where application of the normal right-of-way rule is unduly hazardous.
- On a street entering a through highway or street.
- At an unsignalized intersection in a signalized area.
- At other intersections where a combination of high speed, restricted view, or crash records indicate a need for control by the STOP sign.

In many cases STOP signs are installed where they may not be warranted. Traffic experts agree that unnecessary STOP signs:

- Cause accidents they are designed to prevent.
- Breed contempt for other necessary STOP signs.
- Waste millions of gallons of gasoline annually.
- Create added noise and air pollution.
- Increase, rather than decrease, speeds between intersections.

There is also an explicit restriction in the MMUTCD that STOP signs are not to be used for speed control, in Section 2B.04.

Evaluation of All-Way STOP Traffic Control

Based on the MMUTCD there are four conditions where **all-way** STOP signs may be warranted:

- A. *Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.*
- B. *Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.*
- C. *Minimum volumes:*
 - 1. *The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and*
 - 2. *The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but*
 - 3. *If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*
- D. *Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.*