R.L. Buford & Associates Engineering, LLC
LAND SURVEYORS – CIVIL ENGINEERS – DEVELOPMENT CONSULTANTS
OFFICE: 201 MAIN STREET, SUITE 6, PARKVILLE, MO 64152
MAILING: PO BOX 14069, PARKVILLE, MO 64152
(816) 741-6152

Whispering Creek Farms, 2nd Plat

Traffic Impact Study

September 4, 2026

Prepared for:
Whispering Creek Farms, LLC

Prepared by:
Lindsay Vogt, PE



Table of Contents

Section	Page Number
Introduction	1
Existing Conditions	1
Sight Distance	1
Proposed Conditions	1
Trip Generation	2
Trip Distribution	2
Traffic Signal Warrants	2
Crash History	3
Capacity Analysis	3
Conclusion	4

Appendix
Figure 1 Turning Movement Counts (Existing + Proposed)
Turning Movement Counts – Raw Data
Approved Traffic Safety Memo

Introduction

This document was prepared to analyze the potential traffic impacts of the proposed Whispering Creek Farms development in Smithville, Missouri. The site is located on NE 144th Street just east of Mt. Olivet Rd. This development will have access on NE 144th Street for 30 homes as well as another access on Black Oak Drive for 2 homes on the northeast portion of the site.

Existing Conditions

NE 144th Street is a local street with no shoulders and no pavement markings, and a posted speed limit of 35 MPH . Mt. Olivet Road is collector street with a posted speed limit of 45 MPH. AADT data was obtained from Clay County Road and Bridge Department and outlined below in Table 1.

Table 1: AADT (2026)

AADT	DAILY
NE 144th St.	141
Mt. Olivet Rd.	1495

Peak Hour intersection turning movements counts were collected at the intersection of NE 144th St. at Mt. Olivet Rd. in traffic observation conducted on August 19th, 2026 and summarized in Table 2. More detailed traffic counts are included in the Appendix.

Table 2: Peak Hour Counts

Movement	AM	PM
Eastbound NE 144th St.	5	17
Westbound NE 144th St.	7	4
Northbound Mt. Olivet Rd.	41	88
Southbound Mt. Olivet Rd.	50	78

Sight Distance

Sight Distance at the new proposed intersection of NE 144th St. at Whispering Creek Farms was studied in a previous analysis that was approved by the Clay County Road and Bridge Department. That analysis is included in the appendix.

Proposed Conditions

Whispering Creek Farms is a proposed development of 32 single family homes located in Smithville, Missouri. There will be one new access point for the development on NE 144th Street, with a stop sign on Whispering Creek Drive. Additionally. There will be a dynamic warning sign installed at the intersection to warn Southbound and Eastbound drivers of any approaching Westbound vehicles.

Trip Generation

Using the 12th edition of the ITE Trip Generation Manual, we have estimated the new trips that will be generated by the proposed Whispering Creek Farms. Land Use Code 210 was used for the Single-Family homes and divided into two separate access points. The estimated AM and PM Peak Hour traffic volumes are shown below in Table 3.

Table 3: Trips Generated, Peak Hour

USE	Intensity	Daily	AM			PM		
ITE 210		Total	Total	In	Out	Total	In	Out
Single Family Detached - NE 144th St.	30	273	21	6	15	28	17	11
Single Family Detached - Black Oak Dr.	2	18	1	0	1	2	1	1

Trip Distribution

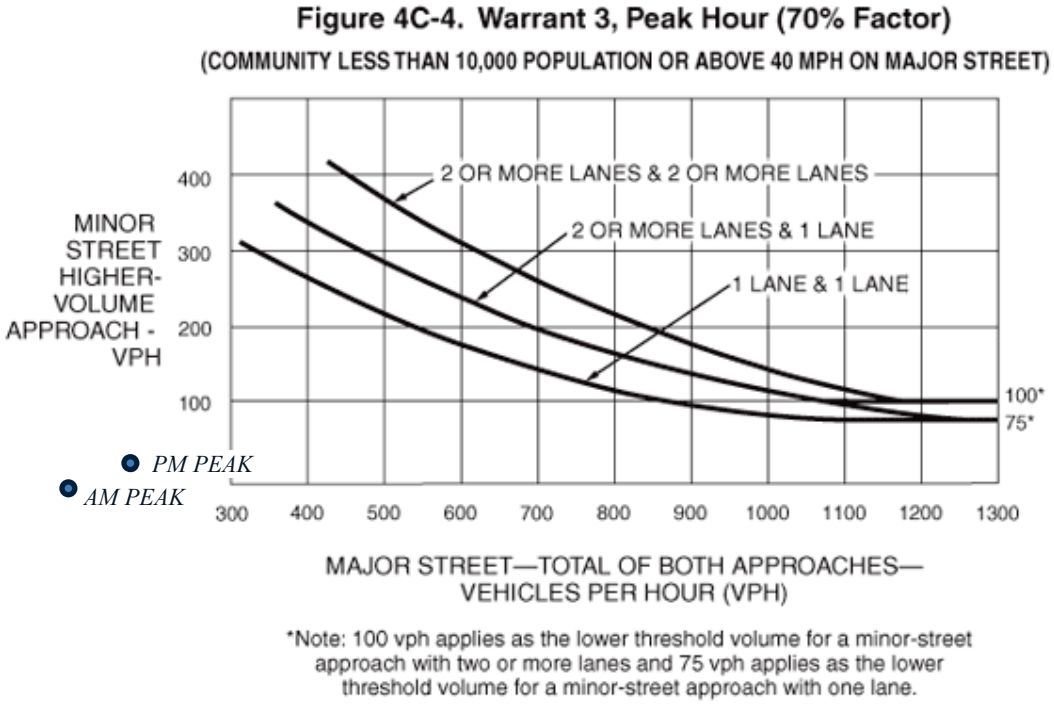
Based on our observations of the intersections in the area and existing traffic flows, we have determined the trip distribution for this development. We have assumed that 100% of the trips will be entering and exiting the development from the west. Of those trips coming from the intersection of Mt. Olivet @ 144th Street, we have assumed that 45% will be Northbound, 45% will be Southbound and 10% will be Eastbound. The proposed trips have been added to the existing peak hour turning movement counts and are displayed in Table 4.

Table 4: Peak Hour Counts, Proposed

Movement	AM	PM
Eastbound NE 144th St.	6	19
Westbound NE 144th St.	22	15
Northbound Mt. Olivet Rd.	43	96
Southbound Mt. Olivet Rd.	53	85

Traffic Signal Warrants

The need for traffic signals was evaluated using the Manual on Uniform Traffic Control Devices Chapter 4C and MoDOT EPG Section 902.3. Using the proposed peak hour counts, there will not be enough traffic volumes at the intersection of Mt. Olivet Rd. @ 144th St. to satisfy Warrant 4C, peak hour warrant.



Crash History

Crash history was reviewed for the NE 144TH St and Mt. Olivet intersection as well as NE 144th St. from Long Road to Mt. Olivet Road using the State of Missouri STARS reporting system from January 1, 2023 through January 1, 2026.

- Mt. Olivet @ NE 144th St.:
  - 2023: 2 Property Damage Only crashes in Daylight.
  - 2024: No crashes
  - 2025: No crashes

- NE 144th St.:
  - 2023: No crashes
  - 2024: No crashes
  - 2025: No crashes

Capacity Analysis

A capacity analysis in accordance with Highway Capacity Manual (HCM) methodologies, indicates that the single-lane, Two-Way Stop-Controlled (TWSC) intersection of NE 144th St. and Mt. Olivet Rd. operates under excellent free-flowing conditions and possesses immense reserve capacity, maintaining an optimal overall Level of Service (LOS) A across all studied scenarios. Under existing conditions, low

conflicting traffic volumes allow major-street movements to flow unimpeded while minor-street drivers encounter negligible delay. Incorporating the proposed peak hour counts introduces a minor traffic adjustment that results in zero operational degradation, as stop-controlled drivers on NE 144th St. continue to benefit from immediate, abundant gaps to safely turn onto or cross Mt. Olivet Rd. A 20-year future scenario was simulated utilizing a standard 2.0% annual compound growth rate. Even with this long-term volume expansion, the major-street traffic density remains low enough that the calculated capacity of the stop signs far exceeds peak demand. Consequently, this confirms that the intersection will retain its LOS A conditions indefinitely.

Conclusion

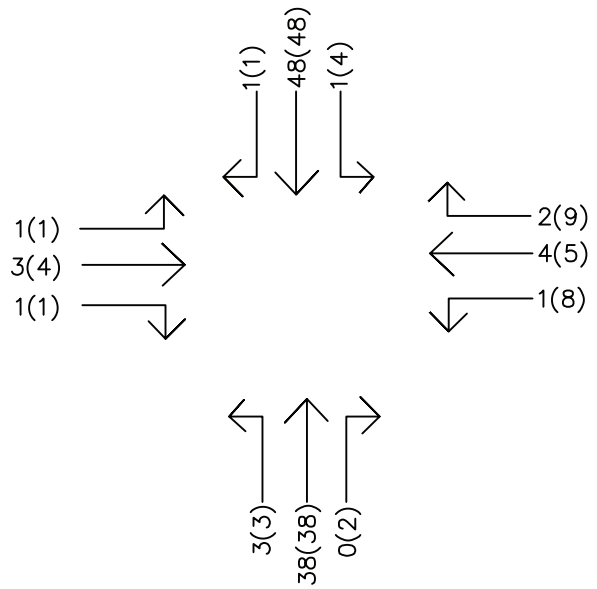
This study examined the potential impacts associated with the proposed Whispering Creek Farms residential development at the intersections of NE 144th St. @ Whispering Creek Drive and NE 144th St. @ Mt. Olivet Rd. Other than the signage improvements approved by Clay County Road and Bridge, no further capacity or safety improvements are warranted at this time.

Please contact us if you have any questions or require further information.

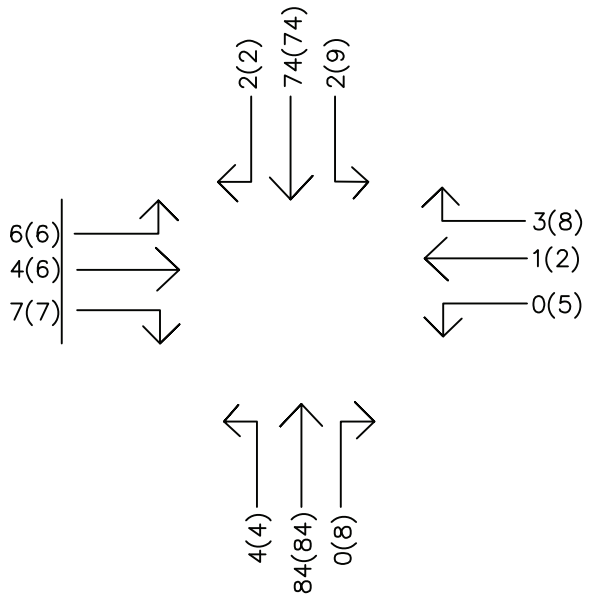
Appendix

FIGURE 1 WHISPERING CREEK FARMS
TURNING MOVEMENT COUNTS

AM PEAK HOUR NE 144TH ST. @ MT. OLIVET RD.



PM PEAK HOUR NE 144TH ST. @ MT. OLIVET RD.



EXISTING (PROPOSED)

NE 144th St & Mt Olivet Rd - TMC

Wed Aug 19, 2026
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Vehicles)
All Movements
ID: 1425284, Location: 39.354068, -94.538383

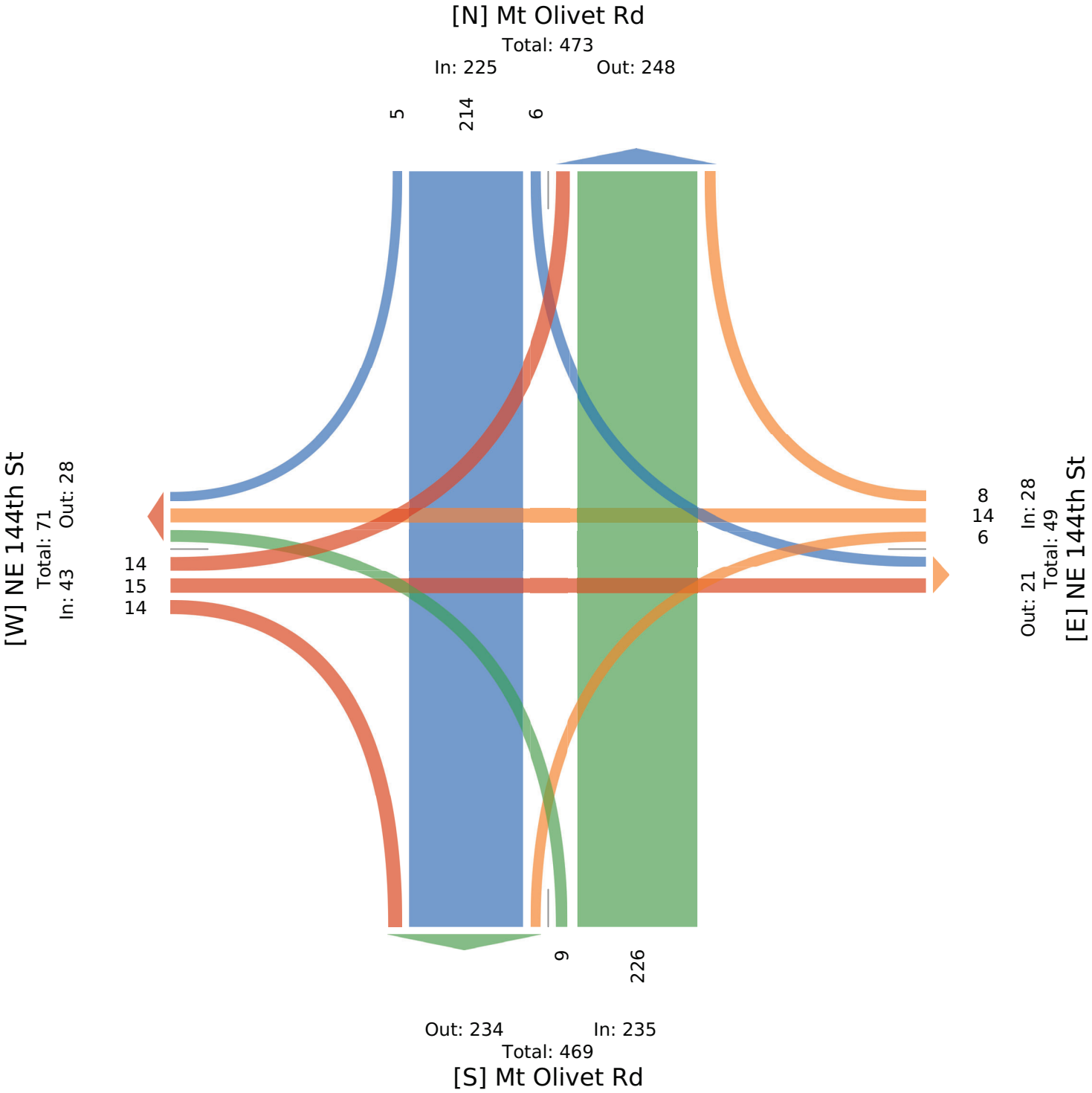
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mt Olivet Rd					NE 144th St					Mt Olivet Rd					NE 144th St					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2026-08-19 7:00AM	1	13	0	0	**14**	0	0	1	0	**1**	0	10	0	0	**10**	1	0	1	0	**2**	**27**
7:15AM	0	12	0	0	**12**	1	1	0	0	**2**	0	8	1	0	**9**	0	1	0	0	**1**	**24**
7:30AM	0	13	1	0	**14**	1	2	0	0	**3**	0	12	2	0	**14**	0	1	0	0	**1**	**32**
7:45AM	0	10	0	0	**10**	0	1	0	0	**1**	0	8	0	0	**8**	0	1	0	0	**1**	**20**
Hourly Total	1	48	1	0	**50**	2	4	1	0	**7**	0	38	3	0	**41**	1	3	1	0	**5**	**103**
8:00AM	0	8	1	0	**9**	1	1	1	0	**3**	0	7	0	0	**7**	1	0	0	0	**1**	**20**
8:15AM	0	10	0	0	**10**	0	0	1	0	**1**	0	12	0	0	**12**	0	0	0	0	**0**	**23**
8:30AM	0	11	0	0	**11**	1	1	0	0	**2**	0	10	0	0	**10**	0	0	0	0	**0**	**23**
8:45AM	0	8	1	0	**9**	0	2	2	0	**4**	0	12	0	0	**12**	2	0	3	0	**5**	**30**
Hourly Total	0	37	2	0	**39**	2	4	4	0	**10**	0	41	0	0	**41**	3	0	3	0	**6**	**96**
4:00PM	0	9	0	0	**9**	0	1	0	0	**1**	0	12	0	0	**12**	0	0	2	0	**2**	**24**
4:15PM	1	27	0	0	**28**	0	2	0	0	**2**	0	16	0	0	**16**	0	4	1	0	**5**	**51**
4:30PM	1	6	0	0	**7**	1	0	1	0	**2**	0	18	1	0	**19**	1	2	1	0	**4**	**32**
4:45PM	0	13	1	0	**14**	0	2	0	0	**2**	0	17	1	0	**18**	2	2	0	0	**4**	**38**
Hourly Total	2	55	1	0	**58**	1	5	1	0	**7**	0	63	2	0	**65**	3	8	4	0	**15**	**145**
5:00PM	0	16	1	0	**17**	0	0	0	0	**0**	0	28	2	0	**30**	4	1	2	0	**7**	**54**
5:15PM	0	15	0	0	**15**	0	0	0	0	**0**	0	22	1	0	**23**	1	1	1	0	**3**	**41**
5:30PM	0	20	1	0	**21**	2	1	0	0	**3**	0	19	1	0	**20**	0	1	3	0	**4**	**48**
5:45PM	2	23	0	0	**25**	1	0	0	0	**1**	0	15	0	0	**15**	2	1	0	0	**3**	**44**
Hourly Total	2	74	2	0	**78**	3	1	0	0	**4**	0	84	4	0	**88**	7	4	6	0	**17**	**187**
Total	5	214	6	0	**225**	8	14	6	0	**28**	0	226	9	0	**235**	14	15	14	0	**43**	**531**
% Approach	2.2%	95.1%	2.7%	0%	**-**	28.6%	50.0%	21.4%	0%	**-**	0%	96.2%	3.8%	0%	**-**	32.6%	34.9%	32.6%	0%	**-**	-
% Total	0.9%	40.3%	1.1%	0%	**42.4%**	1.5%	2.6%	1.1%	0%	**5.3%**	0%	42.6%	1.7%	0%	**44.3%**	2.6%	2.8%	2.6%	0%	**8.1%**	-
Vehicles	5	214	6	0	**225**	8	14	6	0	**28**	0	226	9	0	**235**	14	15	14	0	**43**	531
% Vehicles	100%	100%	100%	0%	**100%**	100%	100%	100%	0%	**100%**	0%	100%	100%	0%	**100%**	100%	100%	100%	0%	**100%**	100%

*L: Left, R: Right, T: Thru, U: U-Turn

NE 144th St & Mt Olivet Rd - TMC
Wed Aug 19, 2026
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Vehicles)
All Movements
ID: 1425284, Location: 39.354068, -94.538383

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



NE 144th St & Mt Olivet Rd - TMC

Wed Aug 19, 2026
AM Peak (7 AM - 8 AM)
All Classes (Vehicles)
All Movements
ID: 1425284, Location: 39.354068, -94.538383

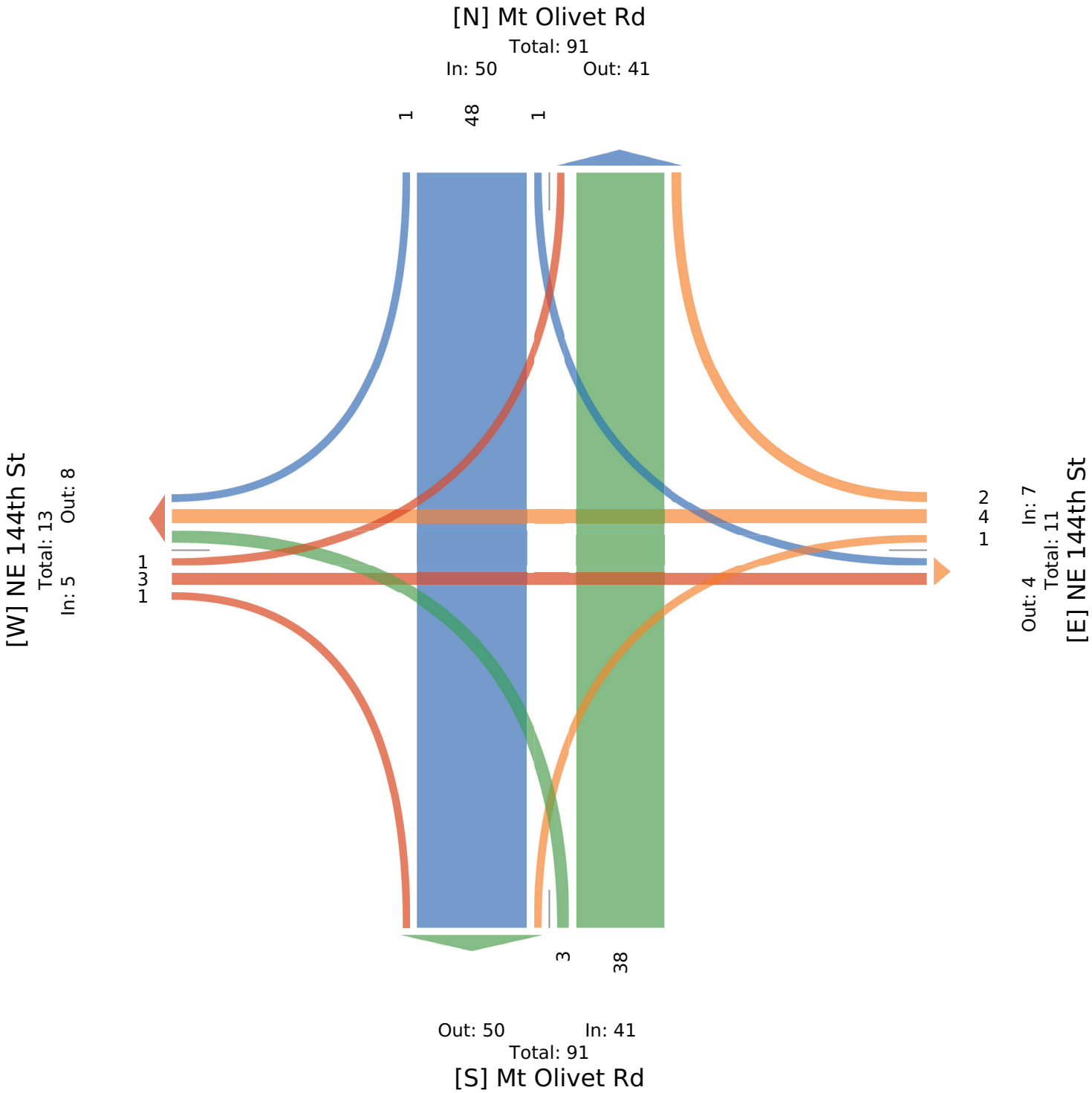
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mt Olivet Rd					NE 144th St					Mt Olivet Rd					NE 144th St					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	**App**	R	T	L	U	**App**	R	T	L	U	**App**	R	T	L	U	**App**	**Int**
2026-08-19 7:00AM	1	13	0	0	**14**	0	0	1	0	**1**	0	10	0	0	**10**	1	0	1	0	**2**	**27**
7:15AM	0	12	0	0	**12**	1	1	0	0	**2**	0	8	1	0	**9**	0	1	0	0	**1**	**24**
7:30AM	0	13	1	0	**14**	1	2	0	0	**3**	0	12	2	0	**14**	0	1	0	0	**1**	**32**
7:45AM	0	10	0	0	**10**	0	1	0	0	**1**	0	8	0	0	**8**	0	1	0	0	**1**	**20**
Total	1	48	1	0	**50**	2	4	1	0	**7**	0	38	3	0	**41**	1	3	1	0	**5**	**103**
% Approach	2.0%	96.0%	2.0%	0%	**-**	28.6%	57.1%	14.3%	0%	**-**	0%	92.7%	7.3%	0%	**-**	20.0%	60.0%	20.0%	0%	**-**	-
% Total	1.0%	46.6%	1.0%	0%	**48.5%**	1.9%	3.9%	1.0%	0%	**6.8%**	0%	36.9%	2.9%	0%	**39.8%**	1.0%	2.9%	1.0%	0%	**4.9%**	-
PHF	0.250	0.923	0.250	-	**0.893**	0.500	0.500	0.250	-	**0.583**	-	0.792	0.375	-	**0.732**	0.250	0.750	0.250	-	**0.625**	0.805
Vehicles	1	48	1	0	**50**	2	4	1	0	**7**	0	38	3	0	**41**	1	3	1	0	**5**	103
% Vehicles	100%	100%	100%	0%	**100%**	100%	100%	100%	0%	**100%**	0%	100%	100%	0%	**100%**	100%	100%	100%	0%	**100%**	100%

*L: Left, R: Right, T: Thru, U: U-Turn

NE 144th St & Mt Olivet Rd - TMC
Wed Aug 19, 2026
AM Peak (7 AM - 8 AM)
All Classes (Vehicles)
All Movements
ID: 1425284, Location: 39.354068, -94.538383

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



NE 144th St & Mt Olivet Rd - TMC

Wed Aug 19, 2026
MP Meak (7 MP - 6 MP 8-) leGass Meak VhuC
Ass i saccec (o evmsec8
Ass P hl et eI I2
:4 51L2723L, . hnaI2hI 5r 9hr 7L063, -9LL7r 3r 3r

GEWALT HAMILTON ASSOCIATES, INC.

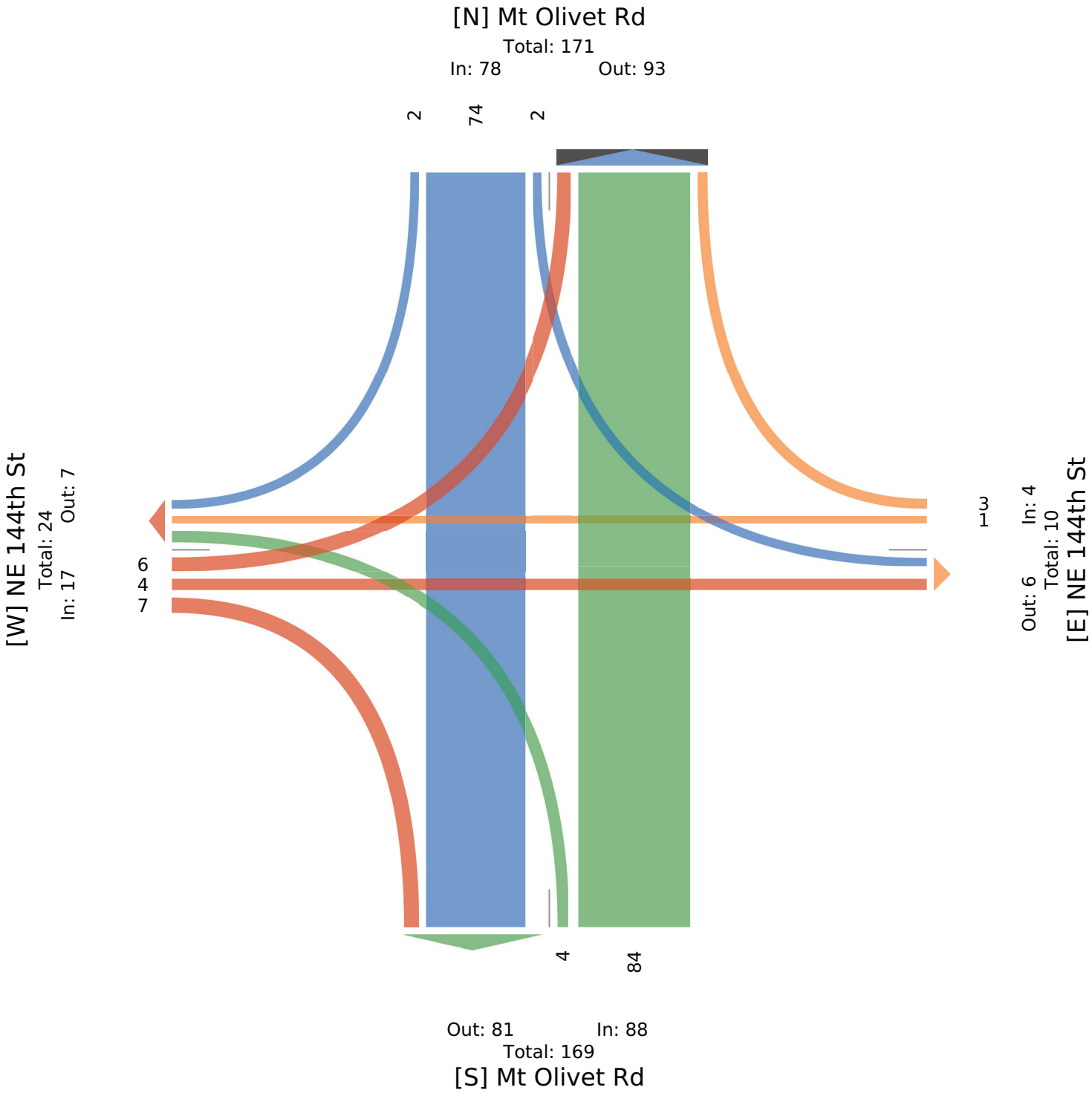
MCh1 mded yG5weHasDVat msD1 Acchnma2c :Inb
627 FhGecDEdge 4 Ghe, o eC1 hI Vmssc, :. , 60061, US

. eg 4 mGenD1hI	P D) smheDOd ShuD9yhuI d					RE 1LLD9 SD WecD9yhuI d					P D) smheDOd RhCD9yhuI d					RE 1LLD9 SD EacD9yhuI d					
Nmne	O	N	.	U	**ATT**	O	N	.	U	**ATT**	O	N	.	U	**ATT**	O	N	.	U	**ATT**	**:I D**
2026-03-19 7500MP	0	16	1	0	**1p**	0	0	0	0	**0**	0	23	2	0	**r0**	L	1	2	0	**p**	**7L**
75l7MP	0	17	0	0	**17**	0	0	0	0	**0**	0	22	1	0	**2r**	1	1	1	0	**r**	**L1**
75r0MP	0	20	1	0	**21**	2	1	0	0	**r**	0	19	1	0	**20**	0	1	r	0	**L**	**L3**
75L7MP	2	2r	0	0	**27**	1	0	0	0	**1**	0	17	0	0	**17**	2	1	0	0	**r**	**LL**
Nhl2as	2	pL	2	0	**p3**	r	1	0	0	**L**	0	3L	L	0	**33**	p	L	6	0	**1p**	**13p**
% ATTCbanv	2h6%	9LD9%	2h6%	0%	**-**	p7h0%	27h0%	0%	0%	**-**	0%	97b7%	LD7%	0%	**-**	L1h2%	2rb7%	r 7hr %	0%	**-**	**-**
% Nhl2as	1bl%	r 9h6%	1bl%	0%	**L1hp%**	1h6%	0b7%	0%	0%	**2bl%**	0%	LLD9%	2bl%	0%	**Lphl%**	r hp%	2bl%	r h2%	0%	**9bl%**	**-**
MVF	0b270	0b30L	0b700	**-**	**0hp30**	0hr p7	0b270	**-**	**-**	**0hr r r**	**-**	0hp70	0b700	**-**	**0hpr r**	0hLr 3	1h000	0b700	**-**	**0h60p**	0b366
o evmsec	2	pL	2	0	**p3**	r	1	0	0	**L**	0	3L	L	0	**33**	p	L	6	0	**1p**	13p
% o evmsec	100%	100%	100%	0%	**100%**	100%	100%	0%	0%	**100%**	0%	100%	100%	0%	**100%**	100%	100%	100%	0%	**100%**	100%

*. 5. efD)O5OrgvD)N5NvG1, U5U-NuC1

NE 144th St & Mt Olivet Rd - TMC
Wed Aug 19, 2026
PM Peak (5 PM - 6 PM) - Overall Peak Hour
All Classes (Vehicles)
All Movements
ID: 1425284, Location: 39.354068, -94.538383

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



R.L. Buford & Associates Engineering, LLC
LAND SURVEYORS – CIVIL ENGINEERS – DEVELOPMENT CONSULTANTS
OFFICE: 201 MAIN STREET, SUITE 6, PARKVILLE, MO 64152
MAILING: PO BOX 14069, PARKVILLE, MO 64152
(816) 741-6152

DATE: July 27, 2026

TO: Tom Degenhardt, PE, LS, PTOE
Road and Bridge Director
Clay County Road and Bridge

FROM: Lindsay Vogt, PE

RE: Whispering Creek Farm
Development, NE 144th St.
Traffic Safety Analysis



Whispering Creek Farm is a proposed development of 30 single family lots on NE 144th St. near Mt. Olivet Rd. in Smithville, Missouri. The proposed entrance to the subdivision is just west of a vertical curve, which could cause some sight distance concerns for the traffic entering and exiting the development. The traffic along NE 144th St. is estimated to be less than 100 vehicles per day. According to the 12th Edition of ITE TripGen, this development would be generating approximately 136 entering trips and 137 exiting trips per day.

The developer wishes to make this entrance safe for all vehicles, with the main concern being westbound vehicles on NE 144th St. not having adequate time to slow down if a car was turning right onto westbound 144th St. from Whispering Creek Farm or turning left from eastbound 144th st into Whispering Creek Farm. According to our preliminary design, the intersection sight distance for the new proposed entrance to Whispering Creek Farm does not satisfy the requirements for the posted speed of 35 MPH as displayed in the table below. However, it does meet the requirements for stopping sight distance at 35 MPH. Both requirements are satisfied with the proposed advisory speed of 25 MPH.

Sight Distance: 144th St. @ Whispering Creek Farm

	Stopping Sight Distance	Intersection Sight Distance	Intersection Sight Distance (Right Turn)
Design/Measured	276’	290’	290’
Required 35 MPH	250’	390’	335’
Required 25 MPH	155’	280’	240’

To help increase the safety of these movements, we would propose the installation of warning signs when this entrance is constructed. Those signs would be maintained by the Homeowners’ association and would require routine testing to ensure the safety and accuracy of the warning system. We propose a standard intersection ahead warning sign with a flashing beacon and 25 MPH advisory speed for westbound 144th St. Additionally, we would recommend the installation of a dynamic warning sign

visible to both eastbound 144th vehicles turning left and southbound Whispering Creek Farms vehicles exiting the development. This sign would include either induction loops in the pavement or a video camera system to detect the westbound vehicles.

It is our belief that this intersection can be safely constructed with the combination of the intersection advisory signs, advisory speed of 25 MPH, and dynamic warning system.

R.L. Buford & Associates Engineering, LLC
LAND SURVEYORS – CIVIL ENGINEERS – DEVELOPMENT CONSULTANTS
OFFICE: 201 MAIN STREET, SUITE 6, PARKVILLE, MO 64152
MAILING: PO BOX 14069, PARKVILLE, MO 64152
(816) 741-6152

DATE: July 27, 2026

TO: Tom Degenhardt, PE, LS, PTOE
Road and Bridge Director
Clay County Road and Bridge

FROM: Lindsay Vogt, PE

RE: Whispering Creek Farm
Development, NE 144th St.
Traffic Safety Analysis



Whispering Creek Farm is a proposed development of 30 single family lots on NE 144th St. near Mt. Olivet Rd. in Smithville, Missouri. The proposed entrance to the subdivision is just west of a vertical curve, which could cause some sight distance concerns for the traffic entering and exiting the development. The traffic along NE 144th St. is estimated to be less than 100 vehicles per day. According to the 12th Edition of ITE TripGen, this development would be generating approximately 136 entering trips and 137 exiting trips per day.

The developer wishes to make this entrance safe for all vehicles, with the main concern being westbound vehicles on NE 144th St. not having adequate time to slow down if a car was turning right onto westbound 144th St. from Whispering Creek Farm or turning left from eastbound 144th st into Whispering Creek Farm. According to our preliminary design, the intersection sight distance for the new proposed entrance to Whispering Creek Farm does not satisfy the requirements for the posted speed of 35 MPH as displayed in the table below. However, it does meet the requirements for stopping sight distance at 35 MPH. Both requirements are satisfied with the proposed advisory speed of 25 MPH.

Sight Distance: 144th St. @ Whispering Creek Farm

	Stopping Sight Distance	Intersection Sight Distance	Intersection Sight Distance (Right Turn)
Design/Measured	276’	290’	290’
Required 35 MPH	250’	390’	335’
Required 25 MPH	155’	280’	240’

To help increase the safety of these movements, we would propose the installation of warning signs when this entrance is constructed. Those signs would be maintained by the Homeowners’ association and would require routine testing to ensure the safety and accuracy of the warning system. We propose a standard intersection ahead warning sign with a flashing beacon and 25 MPH advisory speed for westbound 144th St. Additionally, we would recommend the installation of a dynamic warning sign

visible to both eastbound 144th vehicles turning left and southbound Whispering Creek Farms vehicles exiting the development. This sign would include either induction loops in the pavement or a video camera system to detect the westbound vehicles.

It is our belief that this intersection can be safely constructed with the combination of the intersection advisory signs, advisory speed of 25 MPH, and dynamic warning system.