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Bubaris  **Traffic**
A S S O C I A T E S
Planning • Engineering • Design

December 22, 2018

Mr. Jason Pazzaglia
Pazz Construction, LLC
P.O. Box 817
East Lyme, CT 06333

**Re: Site Traffic Assessment
Proposed Multifamily Residential Development
90 North Bride Brook Road
East Lyme, Connecticut**



Dear Mr. Pazzaglia:

Reference is made to the proposal to construct a 250-unit, low rise, multifamily residential development on the parcel of land located on the west side of North Bride Brook Road, in the Town of East Lyme, Connecticut. This parcel abuts I-95 on its west (rear) side, but without direct access/egress to and from I-95. North Bride Brook Road is a two-way town road running north-south in the vicinity of the proposed site drive. Its northern terminus ends at Route 1 (Boston Post Road). Its southern terminus ends at CT Route 156 (West Main Street).

Please refer to Exhibit 1 of the Appendix which locates this site with respect to the surrounding roadway network.

Please refer to Exhibit 2 of the Appendix which provides a conceptual site plan for the proposed development.

Introduction

The development will be served by one, two-way site drive intersecting the west side of North Bride Brook Road. The site drive will be located to optimize available sight line distances to and from the north and south of the site drive. At this point in time, it is estimated that this residential development will consist of 208 apartment units and 42 condominium units, for a total of 250 units. It has been assumed that full occupancy of the development will occur by 2023, or 5 years hence from now.

Traffic Volume and Traffic Speed Parameters

For purposes of the traffic operations analyses that follow, automatic traffic recorder measurements were conducted over a one-week period in late-May 2017 when we were first retained, to measure approaching traffic volumes and traffic speeds on a typical week which included weekdays and a weekend. These measurements were conducted on North Bride Brook Road in the vicinity of the proposed site drive.

The actual traffic volume measurements are included in Exhibit 3 of the Appendix.

The actual traffic speed measurements are included in Exhibit 4 of the Appendix.

A review of Exhibit 3 show that North Bride Brook Road in the vicinity of the subject site carries from about 700 to 1,300 two-way vehicles per day, and about 1,000 two-way vehicles per day on a Saturday and Sunday, which are considered relatively low traffic volumes. The two-way count shows about a 50-50 split for the two directions of travel.

Please refer to Exhibits 5 and 6 of the Appendix which graphically summarize the existing, and to Exhibits 7 and 8 of the Appendix which graphically summarize the projected background (no-build) weekday am and pm peak hour traffic volumes for North Bride Brook Road in the vicinity of the proposed site drive. In the case of the projected 2023 background (no-build), these were derived by expanding the 2017 existing traffic volumes by two percent per year for each of six years, where it has been assumed that this development will be fully occupied by 2023, where the typical growth factor for traffic in this area of two percent per year is applicable.

A review of Exhibit 4 shows that North Bride Brook Road in the vicinity of the proposed site drive location carries traffic with average and 85th-percentile speeds of about 32 and 36 miles per hour, respectively, which are considered reasonable given the good condition of North Bride Brook Road in this area. The posted speed limit for the entire length of North Bride Brook Road is 25 miles per hour in both directions.

Site-Generated Traffic Volumes

For the purpose of estimating site-generated traffic volumes associated with the proposed residential development, we utilized the trip generation data made available for this purpose, by land use, in Trip Generation Report, by the Institute of Transportation Engineers (ITE), tenth edition, 2017.

Please refer to Exhibits 9 of the Appendix that summarizes the trip generation calculations that were made for the proposed development assuming the full development of 250 units consisting of apartments and/or condominiums.

Please refer to Table A on the next page which summarizes the results of the trip generation calculations from Exhibit 9 of the Appendix.

A review of Table A show that the subject 250-unit low rise, multifamily residential development can be expected to generate from 98 to 130 trips per hour during the weekday am and pm commuter peak periods. A trip is defined as a one-way vehicular trip traveling either to or from the site. Note that there are typically two such peaks during both the am and pm peaks depending on how far residents live from their place of employment (i.e., the farther away the point of employment, the earlier they leave in the am and the later they return in the pm).

Finally, given that the existing peak hour traffic volumes on the abutting road to the site are distributed about 50 percent to and from the north and 50 percent to and from the south, it was assumed that site-generated traffic traveling to and from the subject residential subdivision will follow the same traffic distribution patterns.

Please refer to the right columns of Table A which show the estimated site-generated peak hour traffic volumes that will travel to and from the subject subdivision assuming a 50-50 split, north versus south, similar to existing traffic distributions.

Background and Combined Traffic Volumes

Please refer to Exhibits 10 and 11 of the Appendix which graphically show the estimated combined peak hour traffic volumes associated with the weekday am and pm commuter peak periods as derived from the foregoing. Exhibits 10 and 11 were derived by combining the background volumes from Exhibits 7 and 8 with the estimated site-generated volumes from the two right-most columns from Table A.

A review of Exhibits 10 and 11 shows that the combined (build) condition for the road immediately serving the subject residential subdivision will remain at very low traffic volume levels.

Table A
Trip Generation and Trip Distribution
Residential Subdivision
90 North Bride Brook Road
East Lyme, Connecticut

	<u>Trip Distribution</u>	
<u>Trip Generation</u>	To/From NORTH via <u>North Bride Brook Road</u> 50%	To/From SOUTH via <u>North Bride Brook Road</u> 50%
<u>250 low-rise multifamily residential units</u>		
<u>Weekday AM Peak Hour</u>		
Inbound	20	10
<u>Outbound</u>	<u>78</u>	<u>39</u>
Total	98	49
<u>Weekday PM Peak Hour</u>		
Inbound	85	43
<u>Outbound</u>	<u>45</u>	<u>22</u>
Total	130	65

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December 2018

Operations Analysis

Intersection operational analyses were performed for the proposed site drive intersection on North Bride Brook Road utilizing the methodology described in the latest edition of Highway Capacity Manual, Special Report 209, Transportation Research Board, 1985, updated to 2016. Application of this methodology was facilitated by use of Synchro Analysis Software, developed by the Trafficware Corporation, Version 9. Operational analyses are utilized to determine a Level of Service (LOS) for a given intersection operating under either signalized or unsignalized control.

In the case of unsignalized intersections similar to the proposed site drive intersection, Level of Service (LOS) is defined in terms of the average control delay for the approach or movement evaluated. Control delay involves movements at slower speeds and stops on intersection approaches as vehicles move up in the queue or slow down upstream of an intersection. The delay experienced by a motorist is comprised of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference time that would result during base conditions in the absence of incident, control, traffic, or geometric delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. At two-way stop-controlled and all-way stop-controlled intersections, control delay is the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The control delay also includes the time required to decelerate to a stop and to accelerate to the free-flow speed. Level of Service for a one-way or two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS for a one-way or two-way stop-controlled intersection is **not defined** for the intersection as a whole. In today's environment, Levels of Service D to F are common and are often experienced on minor street approaches to major streets carrying relatively high traffic volumes.

Please refer to Exhibit 12 in the Appendix, which provides details on the definitions of Levels of Service for unsignalized intersections.

Please refer to Table B on the next page which summarizes the results of the traffic operational analyses that were conducted.

The computer-generated worksheets for these operational analyses are included as Exhibits 13 and 14 of the Appendix for the combined (build) weekday am and pm commuter peak periods.

A review of Table B shows that the levels of service for the proposed site drive intersection at North Bride Brook Road will operate at level of service A, considered excellent, for all the inbound, outbound, and through movements at this intersection.

Table B
Summary of Traffic Operations Analysis
Levels of Service
Residential Subdivision
90 North Bride Brook Road
East Lyme, Connecticut

	<u>2019 Combined</u>	
	<u>(Build)</u>	
	<u>AM Peak</u>	<u>PM Peak</u>
<u>North Bride Brook Road at Proposed Site Drive</u>		
North Bride Brook Road northbound approach	A	A
North Bride brook Road southbound approach	A	A
Proposed Site Drive eastbound (outbound) approach	A	A
Outbound Delay per vehicle (sec.)	9.3	9.9
Average delay per vehicle for entire intersection (sec.)	4.2	2.6

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December 2018

Therefore, the proposed development should not have an adverse impact on traffic operations that would otherwise exist without this development.

Traffic Crash Experience

A review was made of the most recent five-year traffic crash experience summary for the subject study area which included the entire length of North Bride Brook Road as compiled and made available by the Connecticut Department of Transportation (2012-2014) and the UConn Traffic Crash Depository (2015-2017) for the five-year period from January 2012 through December 2017.

The actual traffic crash data are included in Exhibit 15 of the Appendix.

A review of Exhibit 15 shows an excellent traffic crash experience for this road, and NONE in the vicinity of the proposed site drive intersection. This excellent traffic crash experience shows no reason to expect that the proposed residential development with its relatively low site-generated traffic volumes would exacerbate this favorable condition.

Sight Line Evaluation

In the absence of an actual site plan to review, a field view of actual conditions indicated that available sight lines from a site drive location on North Bride Brook Road can be located and designed to provide satisfactory sight line distances of 450 to 500 feet to accommodate prevailing approaching traffic speeds as recently measured.

Conclusions

It is the professional opinion of Bubaris Traffic Associates that the proposed residential development at 90 North Bride Brook Road, consisting of about 250 low rise multifamily residential units, should not adversely impact traffic operations on the surrounding roadway network when it is completed and occupied.

The proposed residential development is expected to generate from 98 to 130 trips per hour during the weekday am and pm commuter peak periods.

Operational analyses indicate that the proposed development will experience excellent levels of service at the proposed site drive intersection given the relatively low traffic volumes on North Bride Brook Road.

It appears that the required sight lines to and from the proposed site drive intersection can be provided given our preliminary field view.

The traffic crash experience for the immediate study area is excellent with no reason to expect that the subject development will exacerbate this excellent condition.



Very truly yours,
Bubaris Traffic Associates, Inc.

James G. Bubaris

James G. Bubaris, P.E.
Conn. Reg. No. 9203
Principal

**Site Traffic Assessment
Proposed Residential Subdivision
90 North Bride Brook Road
East Lyme, Connecticut**

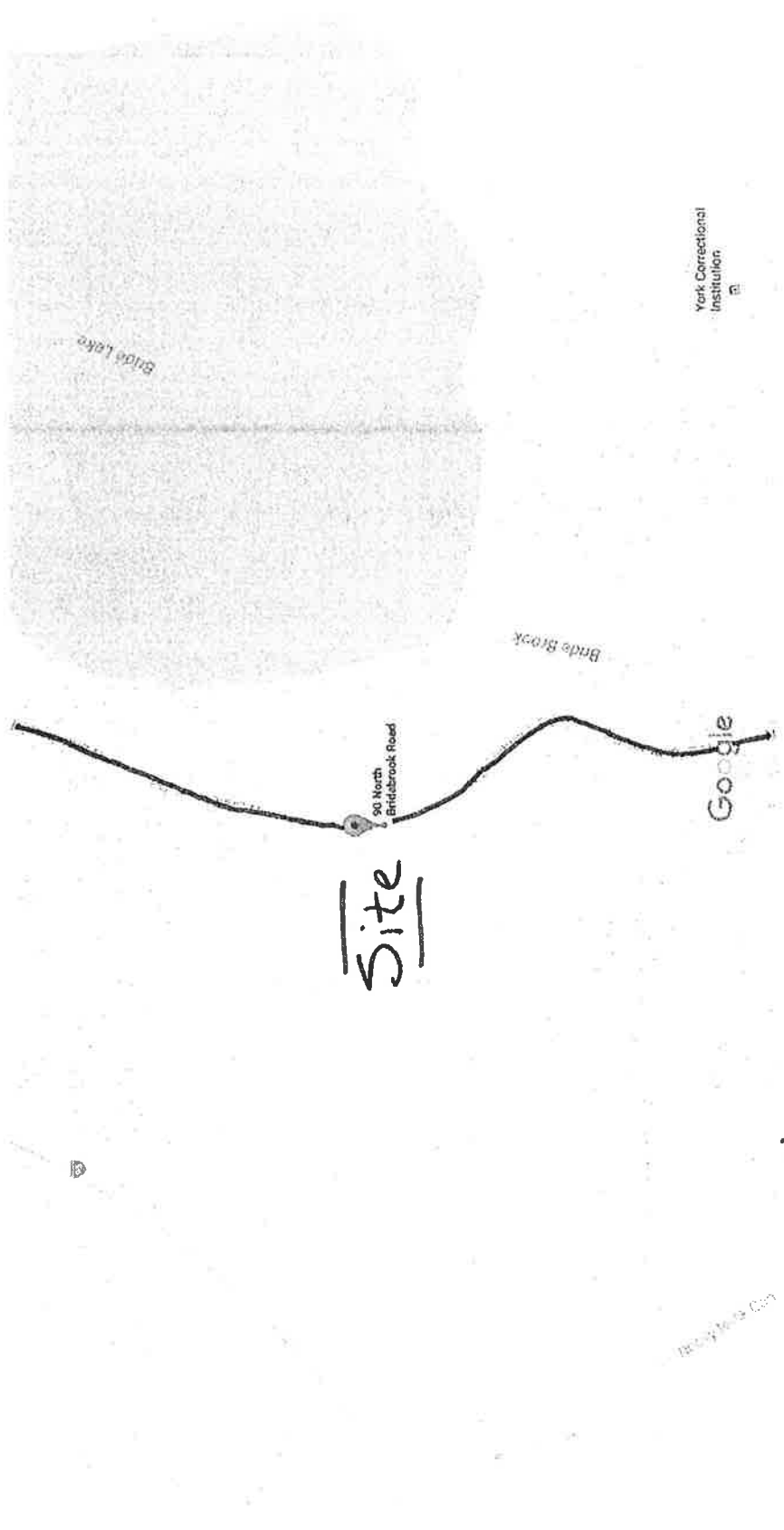
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Exhibit 1
Location Maps
Proposed Residential Subdivision
90 North Bride Brook Road
East Lyme, Connecticut

Google Maps 90 N Bridebrook Rd



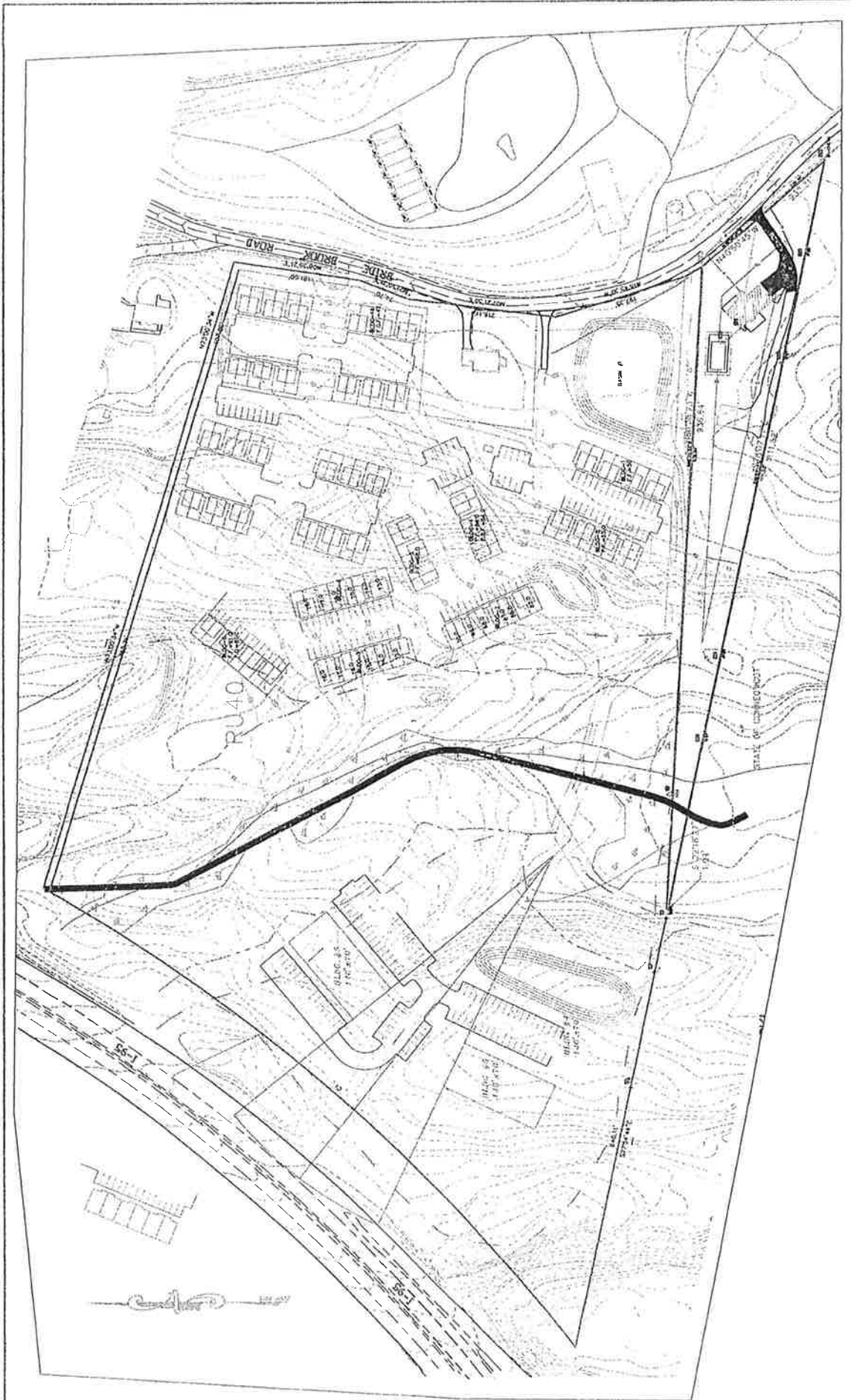
Map data ©2016 Google 200 ft

Google Maps 90 N Bridebrook Rd



Imagery ©2016 Google, Map data ©2016 Google 200 ft

**Exhibit 2
Site Plan
Proposed Residential Subdivision
90 North Bride Brook Road
East Lyme, Connecticut**



DRAWN BY: RDP		DATE: AUGUST 24, 2014	I. ROBERT REYNOLDS & ASSOCIATES, P.C. CIVIL ENGINEERS & LAND SURVEYORS 27 GRAND STREET, NANTUCKET, CONNECTICUT 06577 TEL. 860-734-9216 FAX. 860-734-0893	GRAPHIC SCALE 1 inch = 50 feet	TITLE: PELLERIN ROAD SUBDIVISION CONSULTING ENGINEERS 1000 WEST 10TH AVENUE DENVER, CO 80202	SHEET NUMBER 1 OF 1
NO.	DATE	DESCRIPTION				

LOCATION: Rt. North Side Brook Road - Nantucket, Connecticut

Exhibit 3
Automatic Traffic Volume Measurements
North Bride Brook Road vicinity of No. 90
East Lyme, Connecticut

Connecticut Counts LLC

Kensington, Connecticut 06037

(860) 828-1693

90 North Bridebrook Road
East Lyme, Connecticut

Site Code: 4321
Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	15-May-17		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo
12:00 AM	*	*	*	*	*	*	3	3	6	0	4	2	8	6	5	3
01:00	*	*	*	*	*	*	2	2	2	2	5	2	4	1	3	2
02:00	*	*	*	*	*	*	2	2	0	1	3	1	2	3	2	2
03:00	*	*	*	*	*	*	1	1	2	1	1	0	0	0	1	0
04:00	*	*	*	*	*	*	1	1	2	0	3	2	2	2	2	1
05:00	*	*	*	*	*	*	7	8	2	6	2	1	5	3	4	4
06:00	*	*	*	*	*	*	10	14	17	18	3	5	5	13	9	12
07:00	*	*	*	*	*	*	18	24	13	30	20	18	15	10	16	20
08:00	*	*	*	*	*	*	24	19	24	25	15	32	22	24	21	25
09:00	*	*	*	*	*	*	36	31	19	23	42	41	29	29	32	31
10:00	*	*	*	*	*	*	18	28	30	26	41	36	21	35	28	31
11:00	*	*	*	*	*	*	31	31	28	32	42	30	32	36	33	32
12:00 PM	*	*	*	*	*	*	24	25	26	24	39	24	50	35	35	27
01:00	*	*	*	*	*	*	23	31	44	37	40	38	38	60	36	42
02:00	*	*	*	*	*	*	33	39	31	41	43	52	33	39	35	43
03:00	*	*	*	*	*	*	52	24	57	51	49	41	47	36	51	38
04:00	*	*	*	*	*	*	40	47	72	66	39	48	33	44	44	49
05:00	*	*	*	*	*	*	45	50	60	62	44	32	39	45	48	48
06:00	*	*	*	*	*	*	33	48	46	38	29	30	36	34	40	38
07:00	*	*	*	*	*	*	61	37	41	39	23	16	19	24	31	31
08:00	*	*	*	*	*	*	38	24	32	31	15	20	17	14	26	23
09:00	*	*	*	*	*	*	19	16	30	77	20	9	5	5	18	24
10:00	*	*	*	*	*	*	5	9	13	27	11	14	12	9	10	13
11:00	*	*	*	*	*	*	7	4	7	11	10	3	7	2	7	5
Lane	0	0	0	0	256	474	533	515	604	668	543	497	481	509	544	544
Day	0	0	0	0	1048	1272	1048	1048	1272	1040	1040	990	990	1088	1088	1088
AM Peak	-	-	-	-	09:00	09:00	09:00	09:00	10:00	11:00	09:00	09:00	11:00	11:00	11:00	11:00
Vol.	-	-	-	-	36	31	30	32	30	41	42	41	32	36	33	32
PM Peak	-	-	-	-	18:00	17:00	19:00	17:00	16:00	14:00	15:00	14:00	12:00	13:00	15:00	16:00
Vol.	-	-	-	-	57	51	61	50	72	77	49	52	50	60	51	49

Connecticut Counts LLC
Kensington, Connecticut 06037
(860) 828-1693

90 North Bridebrook Road
 East Lyme, Connecticut

Site Code: 4321
 Station ID:

Latitude: 0' 0.0000 Undefined

Start Time	22-May-17		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo	Nonrthbo	Southbo
12:00 AM	3	3	0	4	1	1	0	0	0	0	0	0	0	0	0	2
01:00	1	3	1	0	1	1	0	0	0	0	0	0	0	0	0	1
02:00	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	2
03:00	1	1	3	2	0	2	0	0	0	0	0	0	0	0	0	1
04:00	2	0	3	1	1	1	1	0	0	0	0	0	0	0	0	2
05:00	1	4	1	4	2	4	4	0	0	0	0	0	0	0	0	1
06:00	6	14	8	14	6	14	14	0	0	0	0	0	0	0	0	7
07:00	21	26	21	28	25	23	23	0	0	0	0	0	0	0	0	22
08:00	15	20	24	27	23	26	26	0	0	0	0	0	0	0	0	21
09:00	17	28	12	23	18	25	25	0	0	0	0	0	0	0	0	16
10:00	24	20	24	30	28	20	20	0	0	0	0	0	0	0	0	25
11:00	14	12	21	23	27	31	31	0	0	0	0	0	0	0	0	22
12:00 PM	22	19	20	22	25	23	23	0	0	0	0	0	0	0	0	21
01:00	24	21	30	19	35	23	23	0	0	0	0	0	0	0	0	30
02:00	25	33	27	53	40	75	75	0	0	0	0	0	0	0	0	31
03:00	35	29	61	36	44	34	34	0	0	0	0	0	0	0	0	47
04:00	38	29	63	56	27	35	35	0	0	0	0	0	0	0	0	43
05:00	34	23	68	47	*	*	*	0	0	0	0	0	0	0	0	40
06:00	11	23	45	39	*	*	*	0	0	0	0	0	0	0	0	51
07:00	13	13	37	25	*	*	*	0	0	0	0	0	0	0	0	31
08:00	19	8	14	20	*	*	*	0	0	0	0	0	0	0	0	28
09:00	11	9	6	14	*	*	*	0	0	0	0	0	0	0	0	19
10:00	0	5	5	4	*	*	*	0	0	0	0	0	0	0	0	16
11:00	4	2	5	11	*	*	*	0	0	0	0	0	0	0	0	8
Lane	341	346	504	501	306	341	341	0	0	0	0	0	0	0	0	428
Day	687	687	1005	1005	647	647	647	0	0	0	0	0	0	0	0	863
AM Peak	10:00	09:00	08:00	10:00	10:00	08:00	08:00	-	-	-	-	-	-	-	-	10:00
Vol.	24	28	24	30	28	26	26	-	-	-	-	-	-	-	-	25
PM Peak	16:00	14:00	17:00	16:00	15:00	14:00	14:00	-	-	-	-	-	-	-	-	17:00
Vol.	38	33	68	56	44	75	75	-	-	-	-	-	-	-	-	51

Comb. Total 687 1005 1121 1048 1272 1040 990 1951

ADT ADT 1,003 AADT 1,003

Exhibit 4
Automatic Traffic Speed Measurements
North Bride Brook Road vicinity of No. 90
East Lyme, Connecticut

Connecticut Counts LLC
Kensington, Connecticut 06037
(860) 828-1693

90 North Bridebrook Road
 East Lyme, Connecticut

Site Code: 4321
 Station ID:

Latitude: 0' 0.0000 Undefined

Nonrthbound	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Pace	Number
Start Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Speed	in Pace
05/24/17	0	0	0	0	0	1	0	0	0	0	0	0	0	0	29-38	1
01:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	34-43	1
02:00	0	0	0	0	1	2	0	0	0	0	0	0	0	0	30-39	3
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	29-38	1
05:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	24-33	2
06:00	0	0	1	1	4	0	0	0	0	0	0	0	0	0	26-35	5
07:00	0	0	2	8	12	2	1	0	0	0	0	0	0	0	26-35	20
08:00	0	0	3	6	10	3	1	0	0	0	0	0	0	0	26-35	16
09:00	0	0	0	8	10	0	0	0	0	0	0	0	0	0	26-35	18
10:00	0	0	0	6	16	5	1	0	0	0	0	0	0	0	26-35	22
11:00	0	0	2	4	14	6	1	0	0	0	0	0	0	0	30-39	20
12 PM	0	0	1	4	15	5	0	0	0	0	0	0	0	0	29-38	20
13:00	1	2	2	10	17	3	0	0	0	0	0	0	0	0	26-35	27
14:00	1	1	0	13	19	5	1	0	0	0	0	0	0	0	26-35	32
15:00	1	0	2	10	25	5	0	1	0	0	0	0	0	0	26-35	35
16:00	0	1	1	10	13	2	0	0	0	0	0	0	0	0	26-35	23
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	3	4	14	81	157	40	6	1	0	0	0	0	0	0		306
Percent	1.0%	1.3%	4.6%	26.5%	51.3%	13.1%	2.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
AM Peak			08:00	07:00	10:00	11:00	01:00									10:00
Vol.	1	2	3	8	16	6	1									28
PM Peak	13:00	13:00	13:00	14:00	15:00	12:00	14:00	15:00								15:00
Vol.	1	2	2	13	25	5	1									44
Total	44	72	139	918	1674	606	91	16	3	4	1	0	0	0		3568
Percent	1.2%	2.0%	3.9%	25.7%	46.9%	17.0%	2.6%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%		

← NB

Stats : 10 MPH Pace Speed : 26-35 MPH
 Number in Pace : 2592
 Percent in Pace : 72.6%
 Number of Vehicles > 25 MPH : 3313
 Percent of Vehicles > 25 MPH : 92.9%
 Mean Speed(Average) : 32 MPH

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90 North Bridebrook Road
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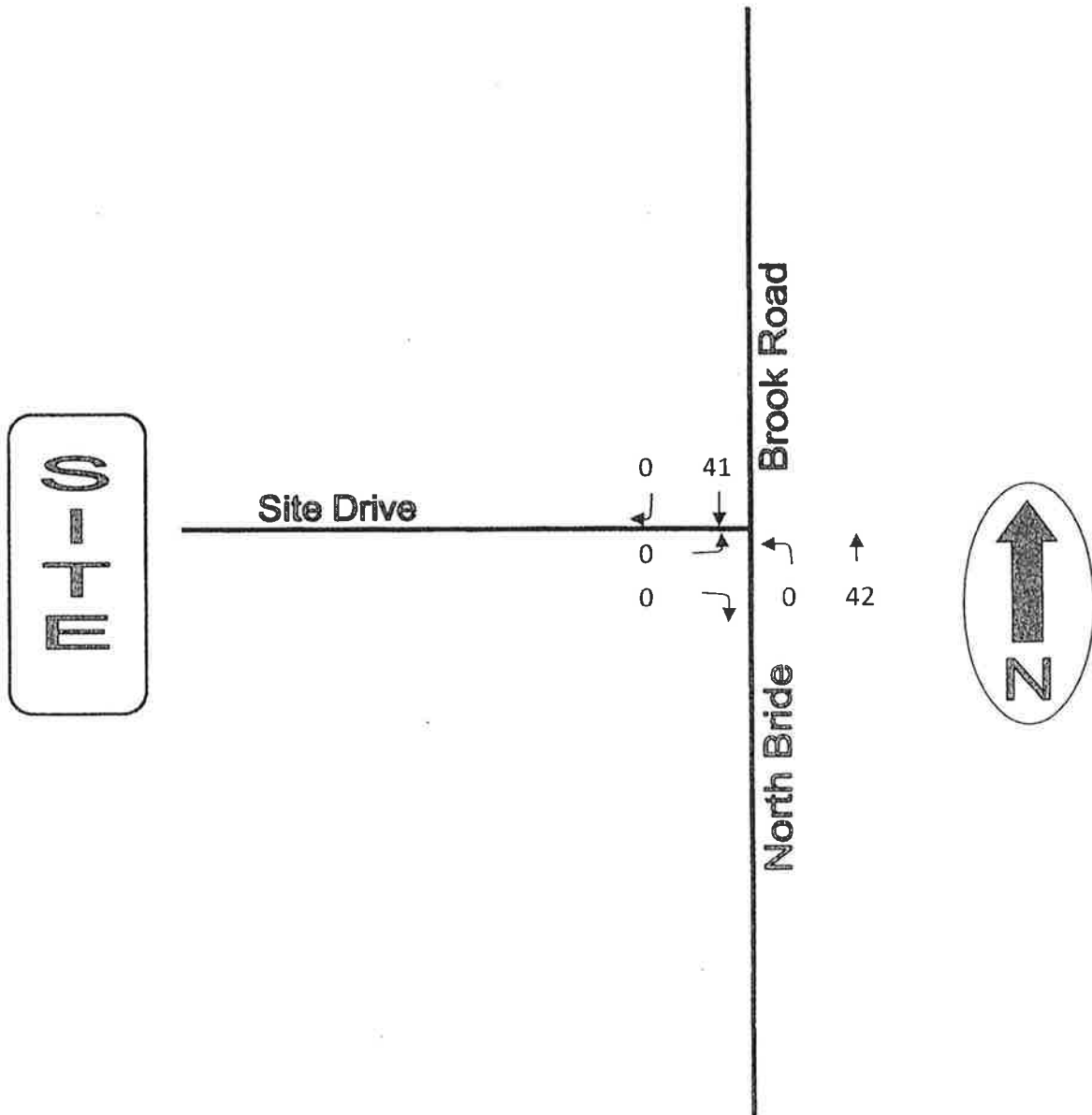
Site Code: 4321
 Station ID:

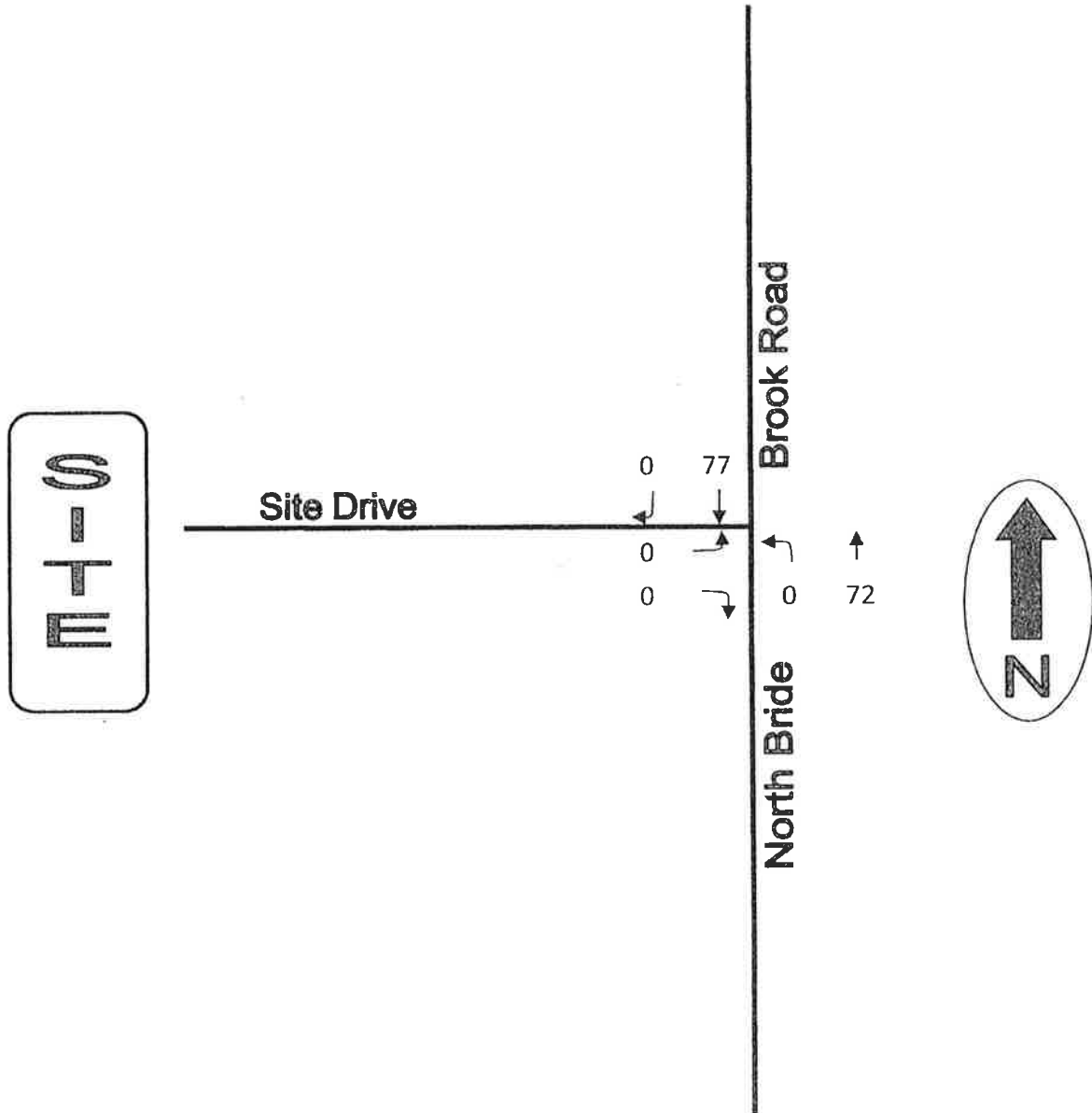
Latitude: 0° 0.0000 Undefined

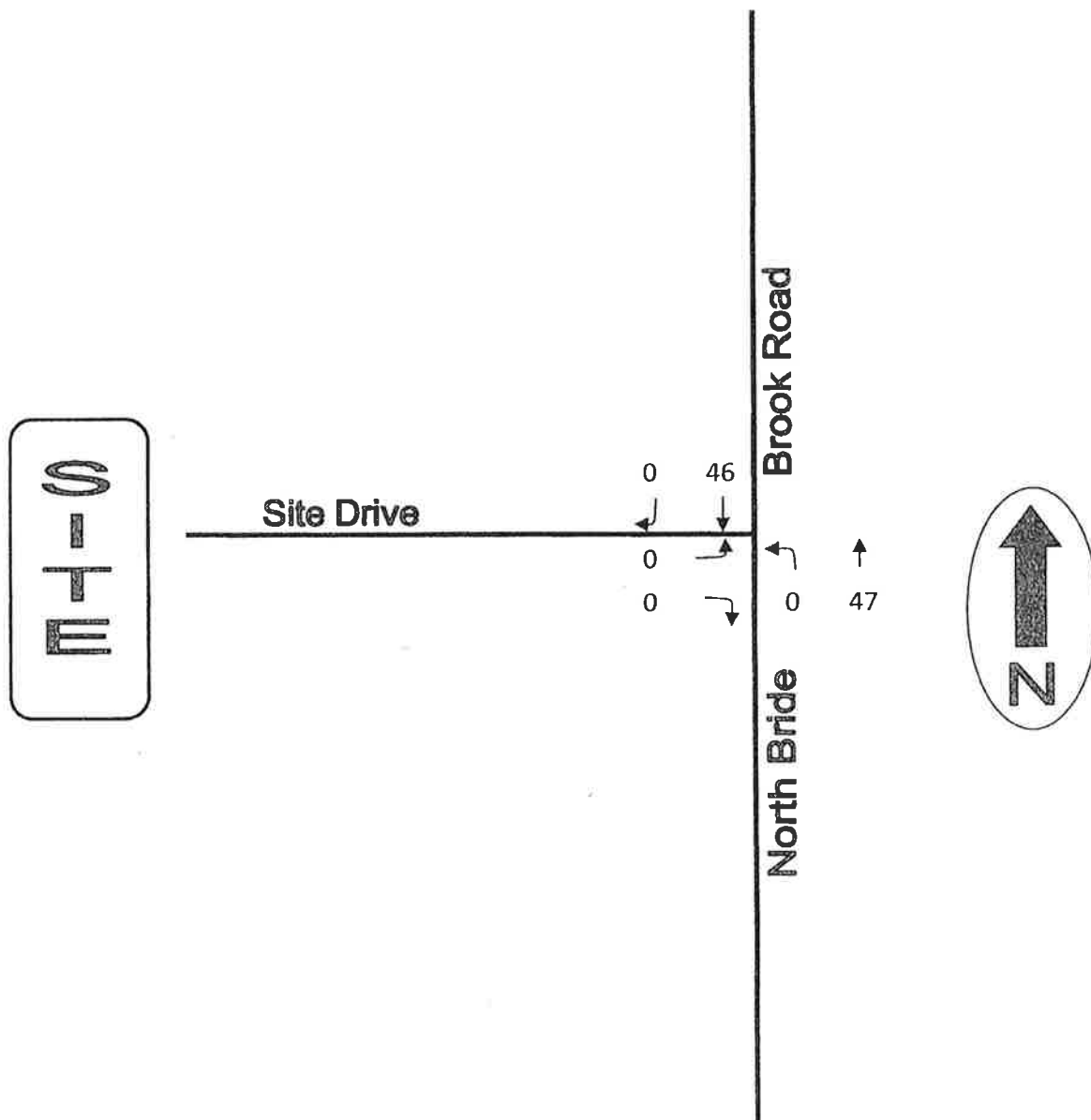
Start Time	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace Speed	Number in Pace
05/24/17	1	0	0	1	1	1	0	0	0	0	0	0	0	4	29-38	2
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2	29-38	2
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	19-28	1
05:00	0	0	1	0	0	0	0	0	0	0	0	0	0	4	30-39	3
06:00	0	0	4	6	4	0	0	0	0	0	0	0	0	14	31-40	10
07:00	0	0	7	12	3	1	0	0	0	0	0	0	0	23	26-35	19
08:00	0	1	9	12	3	1	1	0	0	0	0	0	0	26	26-35	21
09:00	0	1	6	12	4	1	0	0	0	0	0	0	0	25	26-35	18
10:00	0	1	3	10	1	1	0	0	0	0	0	0	0	20	26-35	13
11:00	0	0	7	15	1	0	0	0	0	0	0	0	0	24	26-35	22
12 PM	0	2	8	11	10	0	0	0	0	0	0	0	0	31	30-39	21
13:00	0	2	11	8	1	1	0	0	0	0	0	0	0	23	26-35	19
14:00	0	4	22	33	15	1	0	0	0	0	0	0	0	75	26-35	55
15:00	0	0	10	17	4	1	0	0	0	0	0	0	0	34	26-35	27
16:00	0	0	8	23	3	1	0	0	0	0	0	0	0	35	26-35	31
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	0	5	15	97	161	8	1	0	0	0	0	0	0	341		
Percent	0.0%	1.5%	4.4%	28.4%	47.2%	2.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	00:00	10:00	08:00	08:00	11:00	06:00	08:00							08:00		
Vol.	1	4	9	15	4	1	1							26		
PM Peak	13:00	14:00	14:00	14:00	14:00	13:00								14:00		
Vol.	2	4	22	33	15	1								75		
Total	16	49	207	1188	1609	474	5	0	1	0	0	0	0	3595		
Percent	0.4%	1.4%	5.8%	33.0%	44.8%	13.2%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

← SB

Stats
 10 MPH Pace Speed : 26-35 MPH
 Number in Pace : 2797
 Percent in Pace : 77.8%
 Number of Vehicles > 25 MPH : 3323
 Percent of Vehicles > 25 MPH : 92.4%
 Mean Speed(Average) : 31 MPH







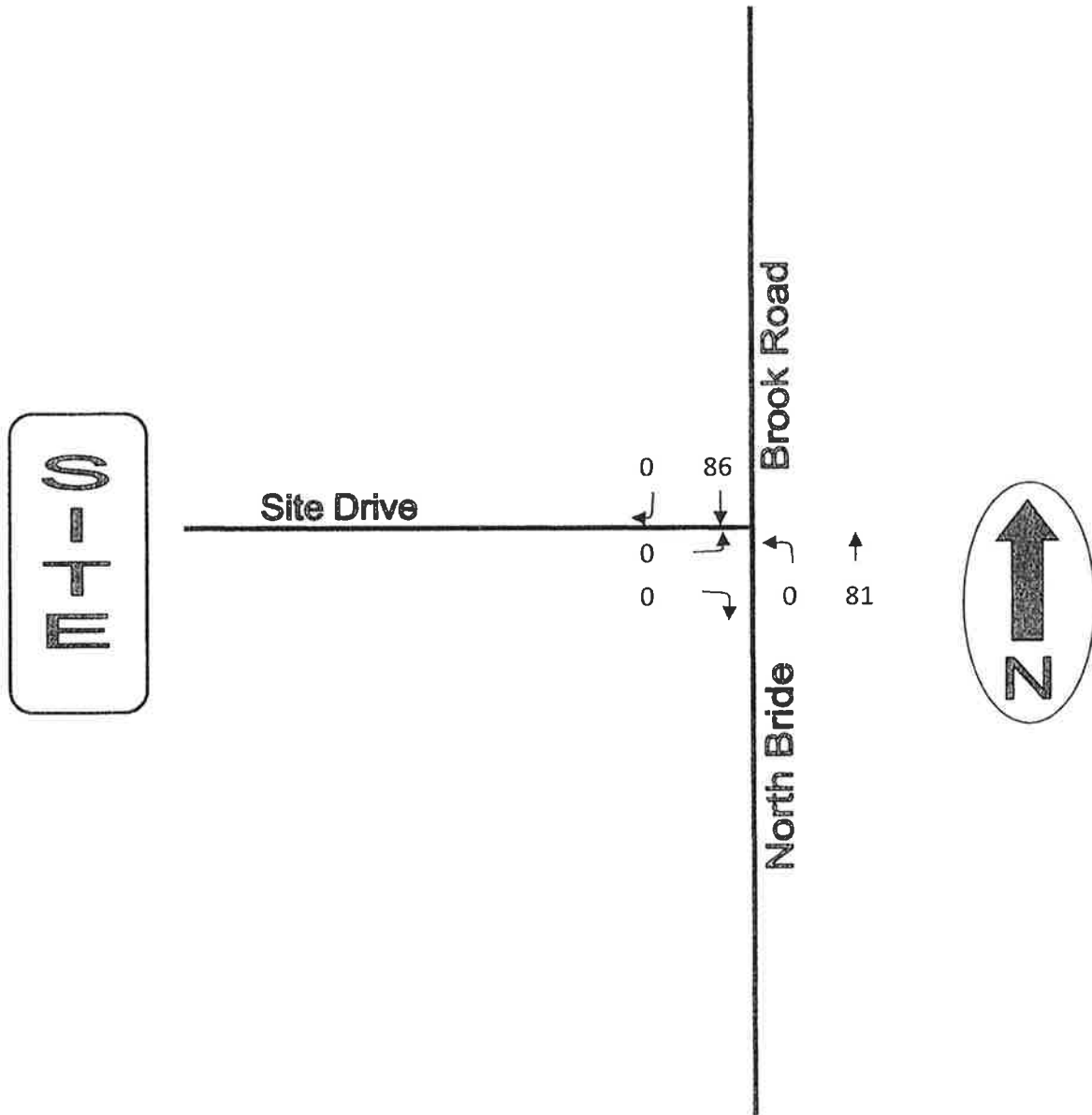


Exhibit 9
Trip Generation Calculations
Low Rise Multifamily Residential Development
ITE Land Use Code #220

Trip Generation Summary

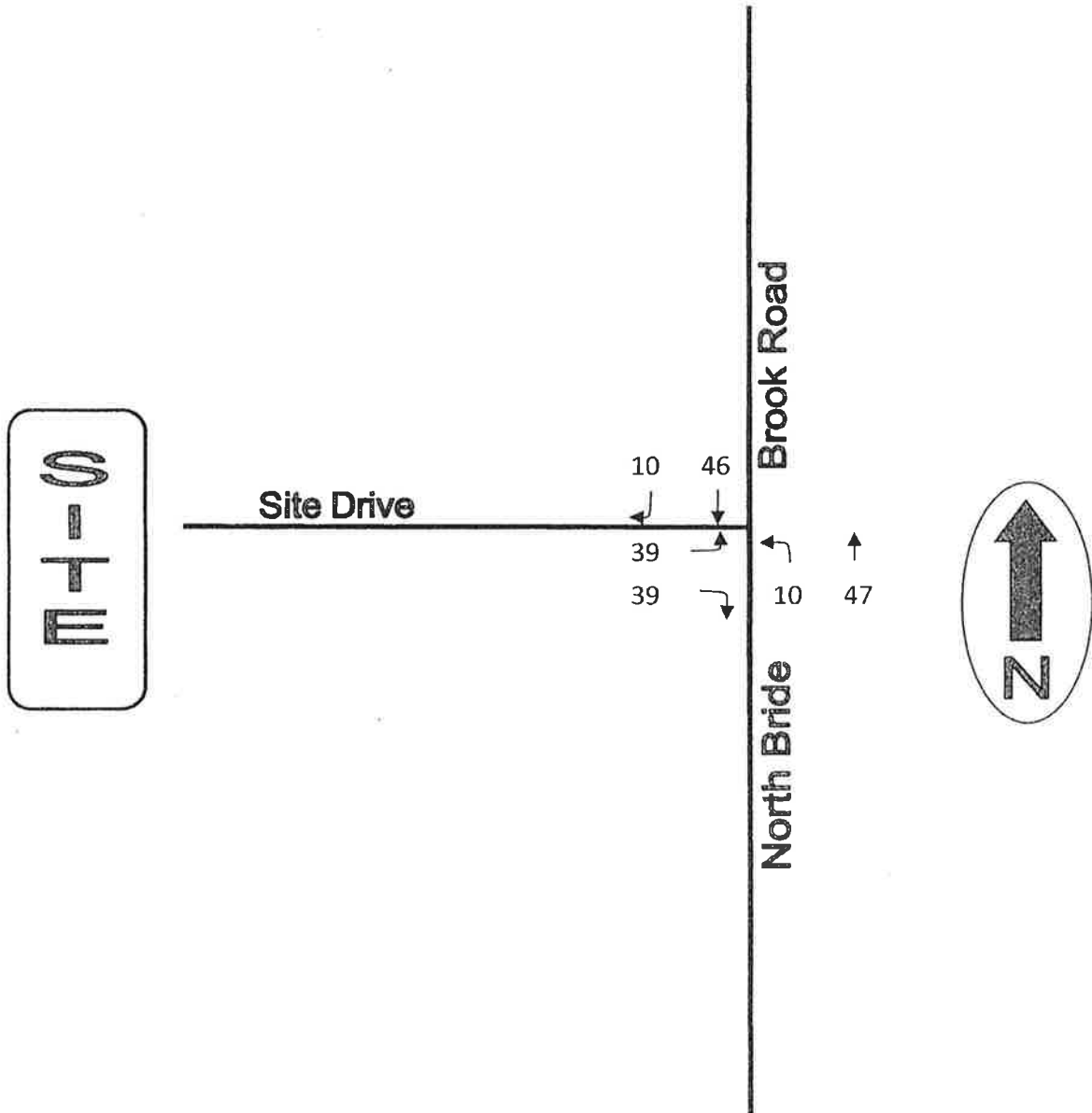
Alternative: Alternative 1
 Phase:
 Project: Pazzaglia Subdivision

Open Date: 12/16/2018
 Analysis Date: 12/16/2018

ITE	Land Use	Weekday Average Daily Trips			Weekday AM Peak Hour of Adjacent Street Traffic			Weekday PM Peak Hour of Adjacent Street Traffic		
		* Enter	Exit	Total	* Enter	Exit	Total	* Enter	Exit	Total
220	LOW-RISE 1	789	789	1578	20	78	98	85	45	130
250	Occupied Dwelling Units									
	Unadjusted Volume	789	789	1578	20	78	98	85	45	130
	Internal Capture Trips	0	0	0	0	0	0	0	0	0
	Pass-By Trips	0	0	0	0	0	0	0	0	0
	Volume Added to Adjacent Streets	789	789	1578	20	78	98	85	45	130

Total Weekday Average Daily Trips Internal Capture = 0 Percent
 Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent
 Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

* - Custom rate used for selected time period.



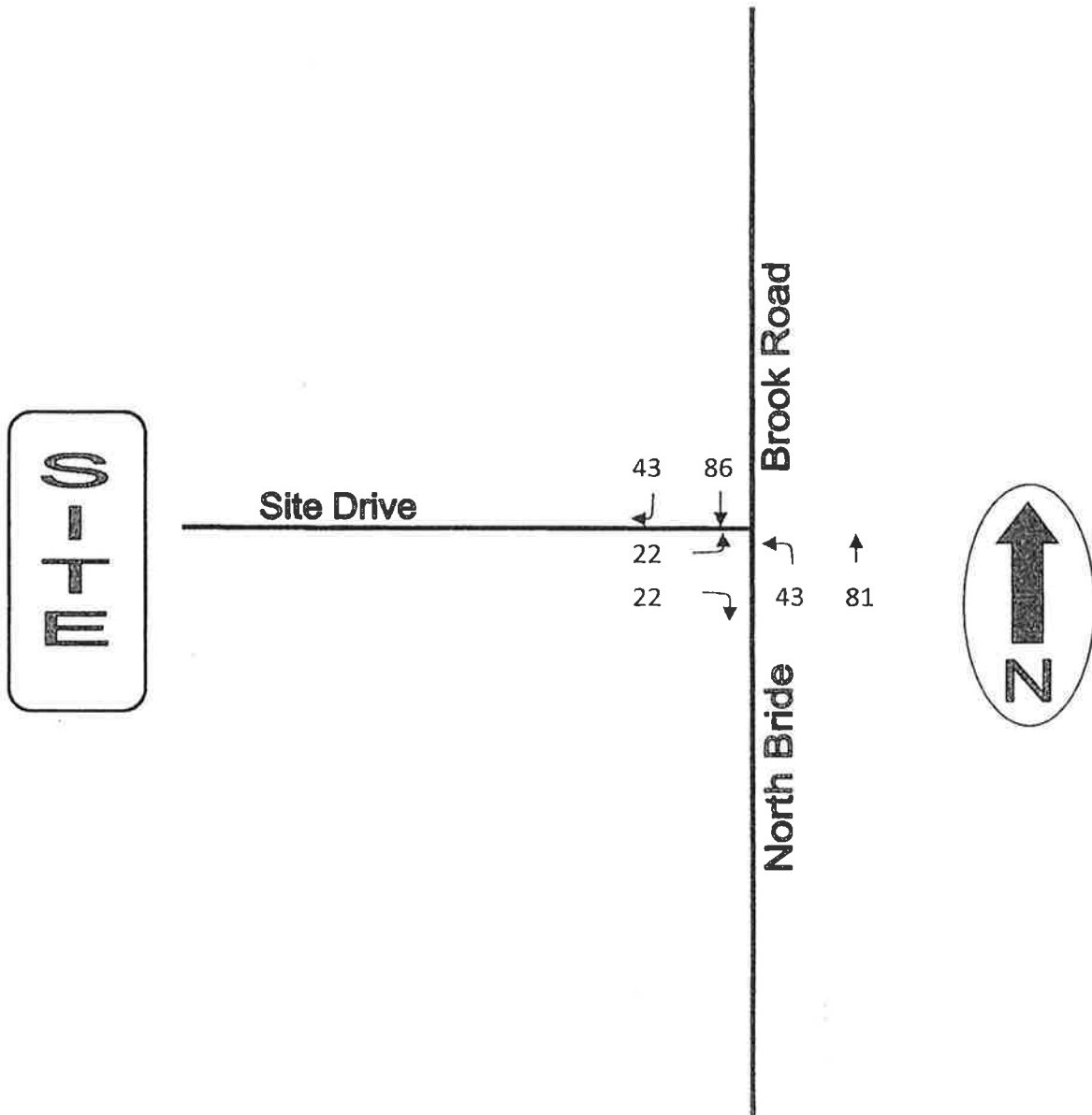


EXHIBIT 12
LEVEL OF SERVICE CRITERIA
UNSIGNALIZED INTERSECTIONS

SOURCE: HIGHWAY CAPACITY MANUAL (HCM), 2010
TRANSPORTATION RESEARCH BOARD (1)

Level of Service for **unsignalized intersections** similar to the study intersections is defined in terms of the average control delay for the approach or movement evaluated. Control delay involves movements at slower speeds and stops on intersection approaches as vehicles move up in the queue or slow down upstream of an intersection.

The delay experienced by a motorist is comprised of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference time that would result during base conditions in the absence of incident, control, traffic, or geometric delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

At two-way stop-controlled and all-way stop-controlled intersections, control delay is the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The control delay also includes the time required to decelerate to a stop and to accelerate to the free-flow speed.

Level of Service (LOS) for a two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. LOS is **not defined** for the intersection as a whole.

Level of Service (LOS) for an all-way stop-controlled intersection is determined by the computed or measured control delay and is defined for all movements. A LOS is **then defined** for the intersection as a whole.

Levels of Service (LOS) for **unsignalized intersections** are defined as follows:

LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	CONDITION
LOS A	0 TO 10	LITTLE OR NO DELAY
LOS B	> 10 TO 15	SHORT DELAY
LOS C	> 15 TO 25	AVERAGE DELAY
LOS D	> 25 TO 35	LONG DELAY
LOS E	> 35 TO 50	VERY LONG DELAY
LOS F	> 50	EXTREME DELAY

In today's environment, Levels of Service D to F are common and are often experienced on minor street approaches to major streets carrying relatively high traffic volumes.

(1) **HCM**, Exhibits 17-2 and 17-22.

Exhibit 13
Traffic Operations Analysis Worksheets
Combined Weekday AM Peak

Intersection

Int Delay, s/veh	4.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	
Traffic Vol, veh/h	39	39	10	47	46	10
Future Vol, veh/h	39	39	10	47	46	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	42	11	51	50	11

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	129	56	61	0	-	0
Stage 1	56	-	-	-	-	-
Stage 2	73	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	865	1011	1542	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	950	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	859	1011	1542	-	-	-
Mov Cap-2 Maneuver	859	-	-	-	-	-
Stage 1	960	-	-	-	-	-
Stage 2	950	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	1.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1542	-	929	-	-
HCM Lane V/C Ratio	0.007	-	0.091	-	-
HCM Control Delay (s)	7.4	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Exhibit 14
Traffic Operations Analysis Worksheets
Combined Weekday PM Peak

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	
Traffic Vol, veh/h	22	22	43	81	86	43
Future Vol, veh/h	22	22	43	81	86	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	24	47	88	93	47

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	299	117	140	0	0
Stage 1	117	-	-	-	-
Stage 2	182	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	692	935	1443	-	-
Stage 1	908	-	-	-	-
Stage 2	849	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	668	935	1443	-	-
Mov Cap-2 Maneuver	668	-	-	-	-
Stage 1	877	-	-	-	-
Stage 2	849	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	2.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1443	-	779	-	-
HCM Lane V/C Ratio	0.032	-	0.061	-	-
HCM Control Delay (s)	7.6	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Exhibit 15
Summary of Traffic Crash Experience
Immediate Study Area
East Lyme, Connecticut
Three Years: 2012 through 2014

North Bride Brook Road

From 1/1/2012 12:00:00 AM until 12/31/2014 11:59:59 PM

page 1 of 2

Report Generated 6/19/2017 8:53:43 AM

Town of East Lyme Route/Road Mile Marker 0.00 to 2.84 2012 To 2014 East Lyme North Bride Brook Road MM 0.00 To MM 2.84

Total of 8 accidents

1/1/2012 to 12/31/2014 Accident Experience Detail Report

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Fri Jul-12-13 4:39	East Lyme	NORTH BRIDE BROOK RD	0.02	100 feet South of US 1-BOSTON POST RD	2068688	1300436239	Speed Too Fast For Conditions	Dawn	Dry	No Adverse Condition	Fixed Object
Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix			1st/2nd Object Struck	1st/2nd Object Location		Injuries K A B C Total	
*	North	Automobile	None Apply	Vehicle Negotiating Curve			Fire Hydrant / Tree	Off Road and Shoulder, Right / Off Road and Shoulder, Right		0 0 0 0 0	
Fri Jan-25-13 21:35	East Lyme	NORTH BRIDE BROOK RD	0.20	2 tenths South of US 1-BOSTON POST RD	2025704	1300051042	Speed Too Fast For Conditions	Dark - Not Lighted	Snow/Slush	Snow	Fixed Object
Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix			1st/2nd Object Struck	1st/2nd Object Location		Injuries K A B C Total	
*	South	Automobile	None Apply	Vehicle Going Straight			Utility Pole	Off Road and Shoulder, Right		0 0 0 0 0	
Wed Oct-29-14 9:03	East Lyme	NORTH BRIDE BROOK RD	0.37	250 feet South of APPLEWOOD COMMON	2222686	1400674694	Failed To Grant Right Of Way	Daylight	Dry	No Adverse Condition	Turning - Intersecting Paths
Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix			1st/2nd Object Struck	1st/2nd Object Location		Injuries K A B C Total	
*	West	Automobile	None Apply	Vehicle Turning Right From Driveway						0 0 0 0 0	
	South	Automobile	None Apply	Vehicle Going Straight						0 0 0 0 0	
Sat Jun-14-14 1:33	East Lyme	NORTH BRIDE BROOK RD	1.11	200 feet North of WEST SOCIETY RD	2192531	1400366414	Speed Too Fast For Conditions	Dark - Not Lighted	Wet	Rain	Fixed Object
Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix			1st/2nd Object Struck	1st/2nd Object Location		Injuries K A B C Total	
*	North	Single Unit Truck 2 Axle 4 Tires	None Apply	Vehicle Skidding in Roadway			Wall / Tree	Off Road and Shoulder, Left / Off Road and Shoulder, Left		0 0 0 0 0	

Town of East Lyme Route/Road Mile Marker 0.00 to 2.84 2012 To 2014 East Lyme North Bride Brook Road MM 0.00 To MM 2.84

Total of 8 accidents

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Thu Aug-30-12 0:00	East Lyme	NORTH BRIDE BROOK RD	1.17	100 feet South of WEST SOCIETY RD	1884214	1200491767	Animal Or Foreign Object In Road	Dark - Not Lighted	Dry	No Adverse Condition	Fixed Object
Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck		1st/2nd Object Location		Injuries		
*	South	Automobile	None Apply	Vehicle Going Straight	Utility Pole		Off Road and Shoulder, Left		K A B C Total 0 0 0 0 0		
Tue Jan-21-14 13:13	East Lyme	NORTH BRIDE BROOK RD	1.75	3 tenths South of UP I-95	2145406	1400041777	Speed Too Fast For Conditions	Daylight	Snow/Slush	Snow	Fixed Object
Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck		1st/2nd Object Location		Injuries		
*	South	Automobile	None Apply	Vehicle Negotiating Curve	Utility Pole		Off Road and Shoulder, Left		K A B C Total 0 0 0 0 0		
Wed Jan-15-14 19:12	East Lyme	NORTH BRIDE BROOK RD	1.79	8 tenths North of ATWOOD DR	2144738	1400029414	Speed Too Fast For Conditions	Dark - Lighted	Wet	No Adverse Condition	Fixed Object
Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck		1st/2nd Object Location		Injuries		
*	North	Automobile	None Apply	Vehicle Negotiating Curve	Curbing / Tree		Off Road and Shoulder, Right / Off Road and Shoulder, Right		K A B C Total 0 0 0 1 1		
Tue Oct-28-14 21:07	East Lyme	NORTH BRIDE BROOK RD	2.80	200 feet North of RT 156-WEST RD	2220636	1400673813	Speed Too Fast For Conditions	Dark - Lighted	Dry	No Adverse Condition	Turning - Intersecting Paths
Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck		1st/2nd Object Location		Injuries		
*	East	Automobile	None Apply	Vehicle Turning Left From Driveway	Fire Hydrant		Off Road and Shoulder, Right		K A B C Total 0 0 0 0 0		
	South	Automobile	None Apply	Vehicle Going Straight					0 0 0 0 0		

Plus

North Bride Brook Road, north of Bride Brook, south of I-95, 9-12-15, non-collision off road, east side

North Bride Brook Road, south of Bride Brook, north of Health & Rehab. Center, 8-27-17, southbound, hit deer.