

Submitted to:

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September 27, 2023

# **ZAIN PLACE MULTIFAMILY HOUSING PROJECT TRAFFIC IMPACT AND ACCESS STUDY OXFORD, MA**

**PREPARED BY:**



FORT HILL INFRASTRUCTURE  
14 MAIN STREET SUITE 3E  
HUDSON, MA 01749

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## **Introduction**

Zain Place is a proposed multifamily residential development in Oxford, Massachusetts which will contain forty-two residential housing units. The proposed development will be accessible via Main Street (State Route 12). The existing site is currently located in a primarily commercial corridor, with excellent access to the interstate highway system where via Depot Road, which intersects I-395 approximately one half mile away.

## **Existing Conditions**

### **Study Area**

Zain Place will be located on the east side (northbound side) of Main Street (State Route 12) in Oxford, Massachusetts. The site is approximately 1500 feet south of depot Road, which provides access to I-395. The general character of the surrounding area is a mix of commercial uses undeveloped land.

The proposed study area intersection, Main Street at Depot Road, is shown in Figure 1. Main Street (State Route 12) is classified as a Minor Arterial roadway. Just to the north of the proposed development is Depot Road, which intersects Main Street and is classified as a Major Collector. Depot Road connects Main Street with Interstate 395, just to the east. The proposed site will have driveway access via Main Street, which will require new curb cuts to provide access to the development. The intersection of Main Street at Depot Road was evaluated for traffic impacts.





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TRAFFIC IMPACT & ACCESS STUDY

STUDY AREA INTERSECTION

PM:	W. F. LYONS
DESIGNER:	.
SCALE:	NTS
DATE:	09/17/2023

FIGURE 1

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## **Roadway Inventory**

Main Street is an undivided two-lane minor arterial roadway, with one lane traveling in the northbound direction and two lanes traveling in the southbound direction, including a through lane and a left turn lane. The regulatory speed limit on Main Street is 40 mph. Main Street is 42-feet wide with twelve foot lanes northbound and southbound and approximately 3-foot offsets on both sides. On the east side, there is a bituminous sidewalk and vertical granite curbing. On the west side there is no sidewalk and bituminous berm.

Depot Road is an undivided major collector. Depot Road east of Main Street includes a twelve foot lane in each direction, with no shoulder. The north side has bituminous berm and a bituminous sidewalk, and the south side only has a bituminous berm.

## **Intersection Inventory**

Main Street at Depot Road is an unsignalized three-way intersection with Main Street approaching from the north and south, and Depot Road approaching from the east. The Main Street northbound approach consists of one multipurpose lane. Main Street southbound includes one through lane and one left turn lane. The Depot Road westbound approach consists of one right turn lane and a short, wide left turn lane. The eastbound and westbound lanes are separated by a short median island.

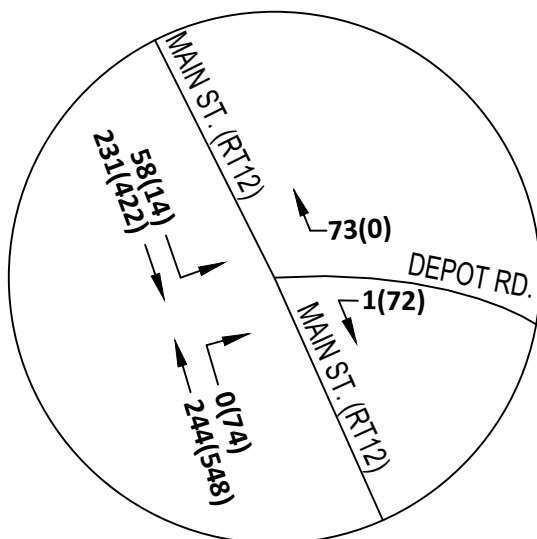
## **Crash Records**

MassDOT Crash Records for the Town of Oxford were evaluated for the last five years available (2018-2022) to determine the number of crashes within the study area and crash rates at the study area intersections. At the intersection of Main Street and Depot Road, there have been two recorded crashes. The average intersection crash rate per million vehicles for unsignalized intersections in MassDOT District 3 is 0.61. Applying this data to the peak hour counts collected for the intersection of Main Street and Depot Road, the crash rate for this intersection would be 0.06, which is substantially lower than the average for unsignalized intersections in District 3.

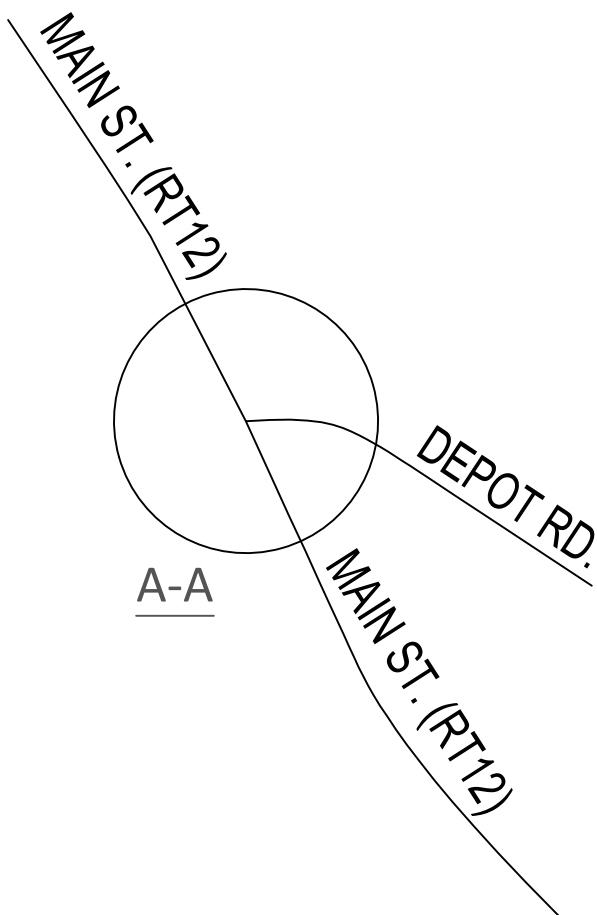
## **Existing Traffic Volumes**

Traffic counts were conducted at the study area intersection in the month of August 23, 2023. The counts were collected at the study area intersection between the hours of 7:00AM and 9:00AM, and 4:00PM and 6:00PM. The AM peak hour was calculated as being from 7:30AM-8:30AM. The PM peak hour was calculated as being from 4:30PM-5:30PM. The existing traffic volumes are provided in Figure 2.





A-A



A-A



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2023 Existing Peak Volumes  
AM (PM)

Main St. (RT12) & Depot Rd.  
Oxford, MA

PM:	W.LYONS
DESIGNER:	M.PAQUIN
SCALE:	NONE
DATE:	09/18/23

FIGURE 2

SHEET 1 OF 1

## Existing Conditions Traffic Analysis

Traffic analysis was conducted for existing conditions using Synchro analysis software to determine a Level of Service for each intersection in the study area. Level of Service is a function of the delay that vehicles must wait in order to navigate through the intersection safely. Level of Service receives a letter value between “A” and “F” with “A” representing very low delay and “F” representing higher delays and greater congestion. Generally, Level of Service “D” or better is considered preferable, although higher delays and Level of Service may be appropriate in congested areas. The results of the analysis for the existing traffic conditions can be seen in Table 2.

**Table 1 - 2023 Existing Capacity Analysis**

Main Street at Depot Road	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	V/C	LOS	Delay (s)	V/C
WB	B	10.2	0.10	D	30.0	0.35
NB	A	0.0	0.16	A	0.0	0.40
SBL	A	7.9	0.05	A	9.0	0.02
SBT	A	0.0	0.15	A	0.0	0.27
<b>Intersection</b>	<b>A</b>	<b>2.0</b>	<b>0.16</b>	<b>A</b>	<b>2.0</b>	<b>0.40</b>

Given the information provided in Table 1, the Main Street intersection at Depot Road operates at an acceptable LOS during both the AM and PM peak hours. While the Depot Road westbound approach to the intersection is operating at an LOS D, this is not uncommon for stop controlled side streets. An LOS D in this context does not necessarily indicate a requirement for mitigation, absent additional indications of required mitigation.

## Future Conditions

The proposed build year of 2030 was selected to evaluate the future conditions of the roadways and intersections in the study area.

### Background Growth

The background growth was calculated using data in MassDOT’s Transportation Data Management System. There is a count station on I-395 in Oxford proximate to the site (Location ID: 3300). This count station was used to derive growth rates given its close proximity to the study area intersection.

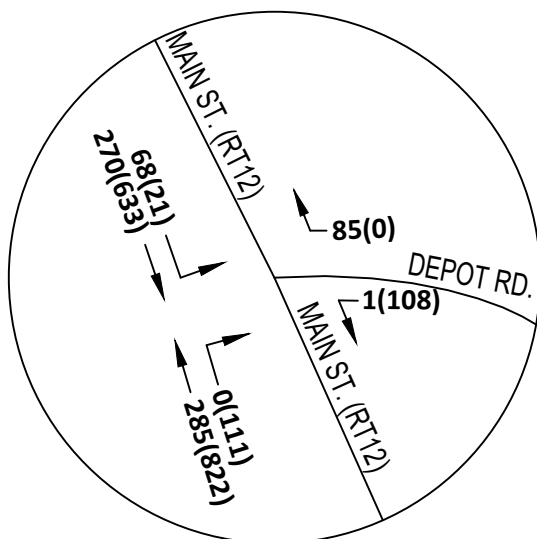
Due in part to the Covid 19 pandemic, traffic volumes which have fluctuated highly in area since 2018. The annual growth rates for the last five full years as reported by MassDOT are shown in Table 2 below.



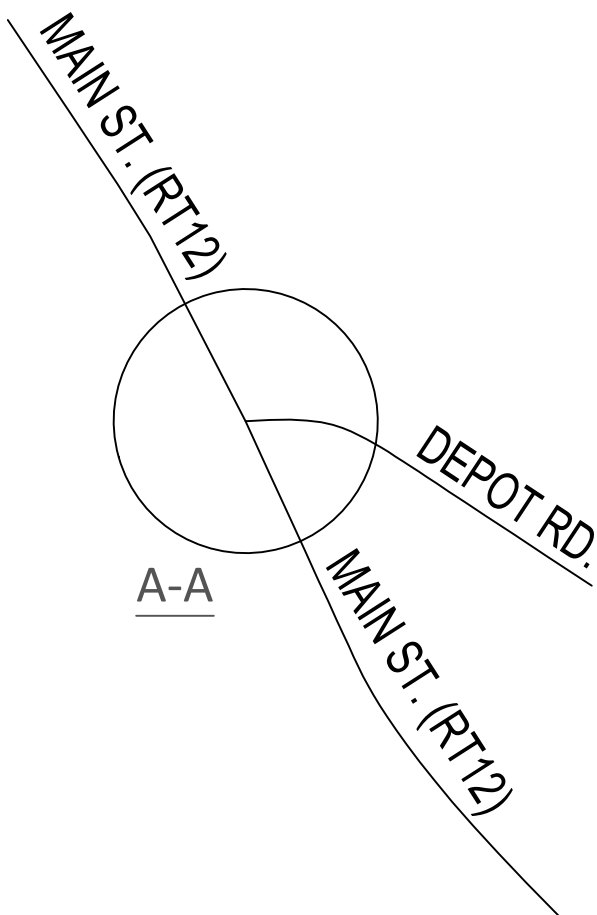
Table 2 – Annual Growth Rates Reported by MassDOT

Location ID	Average Annual Growth Rate
2022	2%
2021	11%
2020	-20%
2019	7%
2018	1%

Although there was a 20% decrease in 2020 during the Covid-19 pandemic, we focused on the fact that the growth rate has slowed to 2% in 2022 after recovering from the pandemic in 2021 with a growth rate of 11%. For this study, we elected to take the five-year average of 1%. The resulting proposed 2030 No Build Traffic volumes shown in Figure 3.



A-A



A-A



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2030 No Build Peak Volumes  
AM (PM)

Main St. (RT12) & Depot Rd.  
Oxford, MA

PM:	W.LYONS
DESIGNER:	M.PAQUIN
SCALE:	NONE
DATE:	09/18/23

FIGURE 3

SHEET 1 OF 1

## Future Traffic Analysis

The 2030 projected traffic volumes were analyzed using the same methods as the existing 2023 conditions. The 2030 projected traffic analysis results, under a no-build scenario, can be seen in Table 5.

**Table 3 - 2030 No-Build Traffic Capacity Analysis**

	AM Peak Hour			PM Peak Hour		
<b>Main Street at Depot Road</b>	<b>LOS</b>	<b>Delay (s)</b>	<b>V/C</b>	<b>LOS</b>	<b>Delay (s)</b>	<b>V/C</b>
WB	B	10.7	0.13	F	228.6	1.19
NB	A	0.0	0.18	A	0.0	0.60
SBL	A	8.1	0.06	B	10.4	0.03
SBT	A	0.0	0.17	A	0.0	0.40
<b>Intersection</b>	<b>A</b>	<b>2.1</b>	<b>0.18</b>	<b>B</b>	<b>14.7</b>	<b>1.19</b>

Given the information provided in Table 3 with future projections, the Main Street intersection at Depot Road to the north of the proposed development will still operate at an acceptable LOS during both the AM and PM peak hours. It is important to note that the westbound approach of Depot Road will operate at an anticipated LOS F during the PM peak period.

## Trip Generation

Zain Place is a proposed 42-unit residential development. Utilizing the ITE Trip Generation Handbook, it was determined that this proposed development would be represented as a “Mid-Rise Apartment” (223) to assess the trips generated by this development. Note that weekday volumes during the AM and PM peak hours were taken into consideration for trip generation rates. The trip generation rates are shown in Table 4.

**Table 4 - Trip Generation Rates (Mid-Rise Apartments)**

Land Use Type	Land Use Code	Size (units)	AM Trips			PM Trips		
			Total	IN	OUT	Total	IN	OUT
Mid-Rise Apartment	221	42	36	9	27	39	24	15

For Mid-Rise apartments, the average rate equations returned the values for AM and PM trips as seen in Table 5. For the PM peak hour, the average rate and fitted curve rate were equal. However, for the AM peak period, the fitted curve rates was substantially less than the average rate, so the higher average rates was used to ensure a more conservative outcome.

There is no mode split anticipated for this project, as the vast majority of the trips are expected to arrive by single occupant vehicle, since there are limited pedestrian and bicycle facilities in the area.

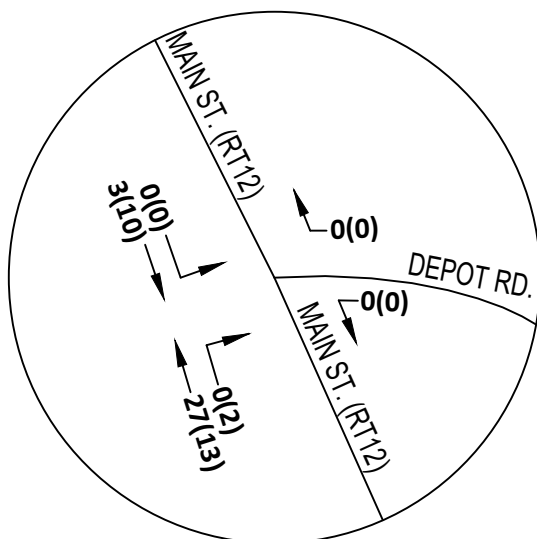
## **Trip Distribution**

Project generated trips will only be entering/exiting the proposed site from the 478 Main Street entrance. The existing travel patterns show that Main Street southbound and northbound directions at Depot Road would be utilized for entering and exiting the proposed development (from the north). On a daily basis, approximately 49% of traffic on Main Street is from the north of Depot Road and 51% of the traffic is from the south. Accordingly, these splits were used to generate trip distribution for the project. The site generated trips are shown in Figure 4.

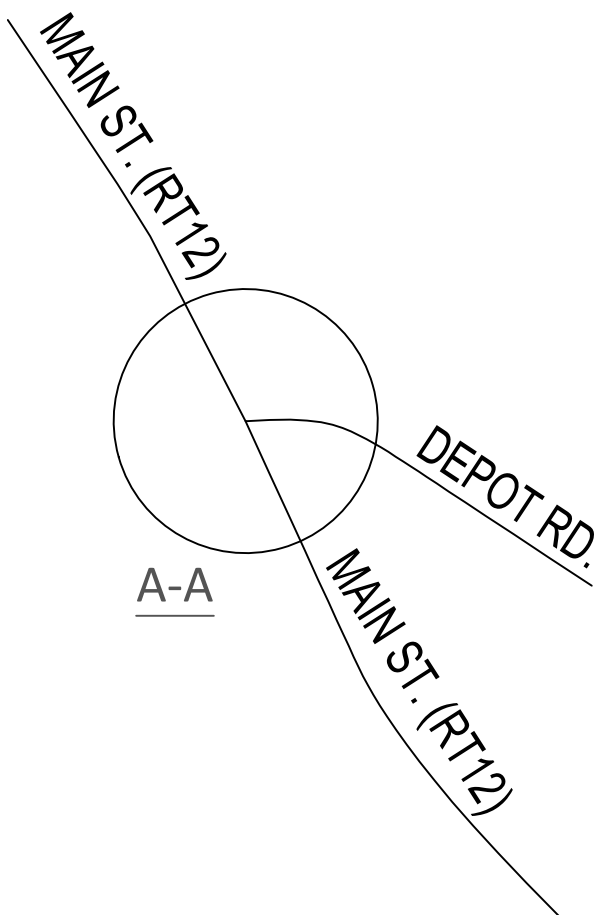
## **Future Build Traffic Volumes**

The site generated trips were added to the 2030 No Build volumes in order to determine the proposed 2030 build condition traffic volumes. The 2030 Future Build traffic volumes are shown in Figure 5.

N



A-A



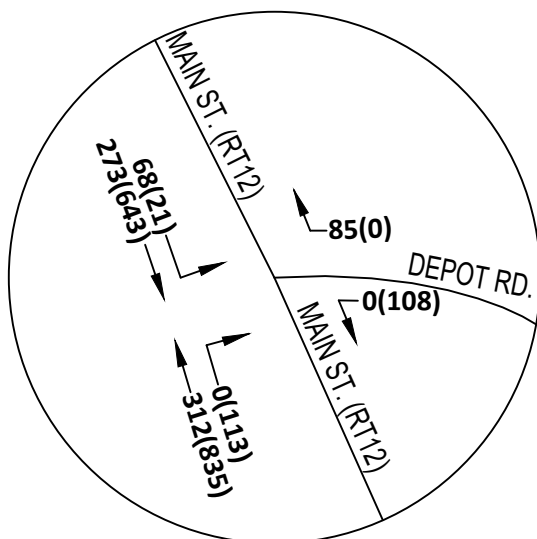
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Site Generated Trips  
AM (PM)  
Main St. (RT12) & Depot Rd.  
Oxford, MA

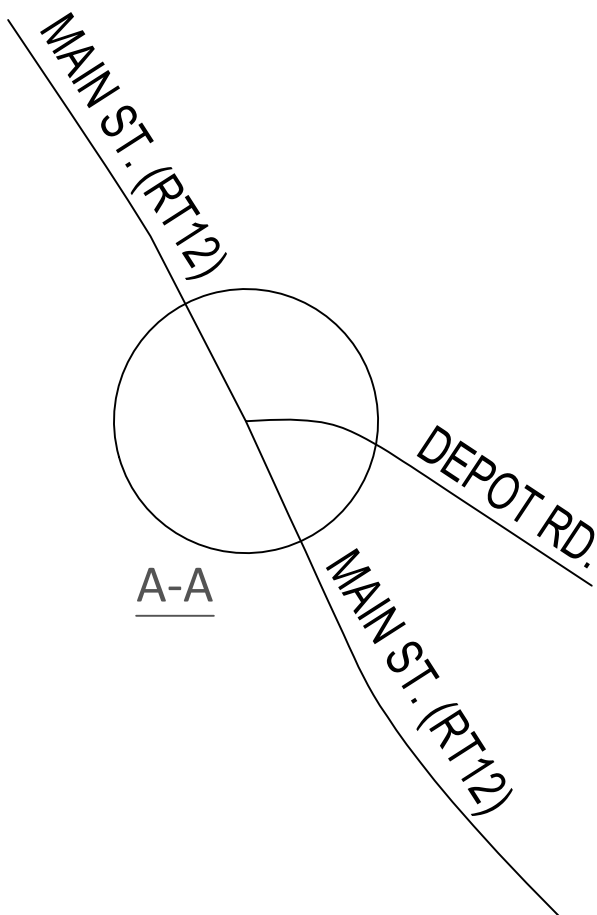
PM:	W.LYONS
DESIGNER:	M.PAQUIN
SCALE:	NONE
DATE:	09/18/23

FIGURE 4

SHEET 1 OF 1



A-A



A-A



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2030 Future Build Volumes AM (PM)

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Oxford, MA

PM:	W.LYONS
DESIGNER:	M.PAQUIN
SCALE:	NONE
DATE:	09/18/23

FIGURE 5

SHEET 1 OF 1



## Future Build Traffic Analysis

The 2030 Future traffic volumes were analyzed to determine LOS, volume to capacity ratios, and delay during the AM and PM peak hours at the two study area intersections. The results of the traffic analysis are provided in Table 6.

**Table 5 - 2030 Future Build Traffic Capacity Analysis**

	AM Peak Hour			PM Peak Hour		
<b>Main Street at Depot Road</b>	<b>LOS</b>	<b>Delay (s)</b>	<b>V/C</b>	<b>LOS</b>	<b>Delay (s)</b>	<b>V/C</b>
WB	B	10.9	0.13	F	249.3	1.23
NB	A	0.0	0.20	A	0.0	0.61
SBL	A	8.1	0.06	B	10.5	0.03
SBT	A	0.0	0.17	A	0.0	0.41
<b>Intersection</b>	<b>A</b>	<b>2.0</b>	<b>0.20</b>	<b>C</b>	<b>15.7</b>	<b>1.23</b>

The intersection of Main Street at Depot Road is expected to operate at a LOS of A in the morning peak hour and LOS C in the evening peak period. Notably, the westbound approach will operate at a LOS of F due to the very short left turn lane. However, short of signalization, which is not currently warranted, an unsignalized side street approach with a LOS F is neither unusual nor unacceptable.

## Conclusions

Zain Place is a proposed development in Oxford, MA, which will contain forty-two units of multifamily residential housing. The proposed site will have one main driveway, which will connect to Main Street.

The proposed development is anticipated to generate 36 vehicle trips during the morning peak hour and 39 vehicles trips during the evening peak hour. This amounts to less than one vehicle every minute under both peak hour conditions. As a result, the proposed development will have negligible impacts on traffic in the surrounding area and should not impede the flow of traffic on nearby streets and intersections.

The existing pedestrian and bicycle accommodations in the area are currently adequate with sidewalks along both streets studied.