



DelDOT – Development Coordination

Traffic Generation Example

The following Traffic Generation Example has been updated and is provided to give a better understanding of the methodology for creating the Traffic Generation Diagram.

Please note that DelDOT's [Development Coordination Portal](#) and the [Institute of Transportation Engineer's Trip Generation Manual and Handbook](#) provide worksheets and tools for determining various factors necessary to create a Trip Generation Diagram; however, these worksheets and tools are periodically updated and may cause inconsistencies with the examples below. The latest DelDOT-approved editions of the ITE Trip Generation Manual and DelDOT roadway traffic data should be utilized.

Road Traffic Data:

1. Functional Classification and Roadway Maintenance Number – Information within the [DelDOT Gateway](#)
2. Posted Speed – Actual posted speed from the roadway – Google Street View
 - If roadway does not have a posted speed limit, can assume 50 MPH.
 - Speed limit resolution information is available within the [DelDOT Gateway](#), which should be verified with the Google Street View information.
3. AADT - Information from the latest [DelDOT Gateway](#)
4. 10-Year Projected AADT = Current ADT x 10-Year Growth Factor. Apply the same 10-Year Growth Factor that is used in DelDOT's [Auxiliary Lane Worksheet](#). Currently the growth factor is 1.16. The most up-to-date worksheet is located within DelDOT's [Development Coordination Portal](#)
5. Traffic Pattern Group - Information from the [DelDOT Gateway](#)
6. K-Factor, D-Factor, Combo Unit Truck Percentage – Information from the latest DelDOT [Traffic Volume Summary](#)

Site Traffic Data:

1. Trip generation is based on the latest edition of the ITE Trip Generation Manual approved by DelDOT. The procedure to determine if rates and/or fitted curve equations are to be used to calculate the trip generation for the proposed development is based on the guidance provided in the latest ITE Trip Generation Handbook.
 - a. Typically, trip generation should be provided for the weekday ADT (Average Daily Trips), weekday AM peak hour trips, and weekday PM peak hour trips. However, additional ADT and peak hour trips (such as Saturday and Sunday data) may be required to be included on the diagram at DelDOT's discretion. A credit may be taken for pass-by and internal capture trips. For more information on pass-by trips and internal capture trips, please refer to the latest edition of the ITE Trip Generation Manual approved by DelDOT.
2. Number of entrances and corresponding configurations
3. Design Vehicle – Select a design vehicle that is likely to use the proposed development entrances with considerable frequency, ensures that the entrance facility can accommodate the anticipated turning movements, and is consistent with Figure 5.2.3-a from the Development Coordination Manual.
4. Existing Site Traffic (if applicable)
 - a. If the proposed site will replace an existing site that has been active within the past 3 years, a credit for the existing site traffic may be applied at DelDOT's discretion.
5. Total Site Traffic for Proposed Development
6. Net Change in New Traffic between Existing Site and Proposed Development (if applicable)
 - a. May consider internal capture trips, pass-by trips, and existing site trips
 - b. Required to determine if the proposed site meets any Traffic Impact Study (TIS) or Area-Wide Study Fee (AWSF) warrants.
7. Any other trips (i.e. from adjacent sites that share the same access) that would utilize the access from external sites (if applicable)
 - a. Required to be depicted to determine the total trips to include in the auxiliary lane worksheet.
 - b. These trips do not count towards the TIS or AWSF volume warrants for the proposed site.
8. Directional Distribution: If information specific to the site occupant is available, for example, the feeder pattern for a school site, that information should be used. More commonly, this distribution is based on engineering judgment which is based upon existing and /or future traffic patterns surrounding the development area. Details of determining peak hour volumes are located in the **Traffic Generation Diagram** section below. Development generated trips should be assigned to the proposed entrances according to the actual development site plan as well as existing and/or future traffic patterns surrounding the development area.
9. Percent of Peak Hour Heavy Vehicles at Site - Select a percentage that is consistent with the proposed development.

Example Project – One Site Entrance:

A residential development is proposed on the easterly side of Autumn Moon Lane south of Walnut Shade Road in Kent County. The development consists of 52 single family detached units and 96 multifamily housing (low-rise). The site proposes one entrance along Autumn Moon Lane. The site does not have any existing buildings and does not propose to share access with adjacent sites.

- **Road Traffic Data:**

1. Functional Classification and Roadway Maintenance Number – Information within the [DelDOT Gateway: K-369 Autumn Moon Lane – Local](#)
2. Posted Speed – Actual posted speed from the roadway – Google Street View: **50 MPH**
 - If roadway does not have a posted speed limit, can assume 50 MPH.
 - Speed limit resolution information is available within the [DelDOT Gateway](#), which should be verified with the Google Street View information.
3. AADT - Information from the latest [DelDOT Gateway: 1,465 Trips](#) (From 2023 DelDOT Traffic Summary)
4. 10-Year Projected AADT = Current ADT x 10-Year Growth Factor. Apply the same 10-Year Growth Factor that is used in DelDOT's [Auxiliary Lane Worksheet](#). Currently the growth factor is 1.16. The most up-to-date worksheet is located within DelDOT's [Development Coordination Portal](#):
10-year AADT = 1,465 x 1.16 = 1,699 Trips
5. Traffic Pattern Group - Information from the [DelDOT Gateway: TPG – 4](#)
6. K-Factor, D-Factor, Truck Percentage – Information from the latest DelDOT [Traffic Volume Summary](#):
K-Factor = 13.0, D-Factor = 57.6, Combo Unit Truck % = N/A (From 2023 DelDOT Traffic Summary)

- **Site Traffic Data:**

1. Trip generation is based on the latest edition of the ITE Trip Generation Manual approved by DelDOT to utilize. The guidance provided in the latest ITE Trip Generation Handbook should be used to determine whether to use the average rate and/or the fitted curve equation to calculate the trip generation for the proposed use.
 - i. 52 Single Family Detached Units (ITE Land Use Code 210) – Use fitted curve equation which results in **553 ADT (276 Enter/277 Exit), 41 AM Peak (10 Enter/31 Exit), 54 PM Peak (34 Enter/20 Exit)**
 - ii. 96 Multifamily Housing (Low-Rise) (ITE Land Use Code 220) – Use fitted curve equation which results in **691 ADT (345 Enter/346 Exit), 53 AM Peak (13 Enter/40 Exit), 62 PM Peak (39 Enter/23 Exit)**
2. Number of entrances and corresponding configurations – **One Entrance – Full Movement**
3. Design Vehicle – **SU-30**
4. Existing Site Traffic – **None/Vacant**
5. Total Site Traffic for Proposed Development – **1,244 ADT (621 Enter/623 Exit), 94 AM Peak (23 Enter/71 Exit), 116 PM Peak (73 Enter/43 Exit)**
6. Net Change in New Traffic between Existing Site and Proposed Development – **N/A**
7. Other Trips Utilizing Site Access – **None**
8. Directional Distribution:

In this case, **85% to and from the north and 15% to and from the south.**

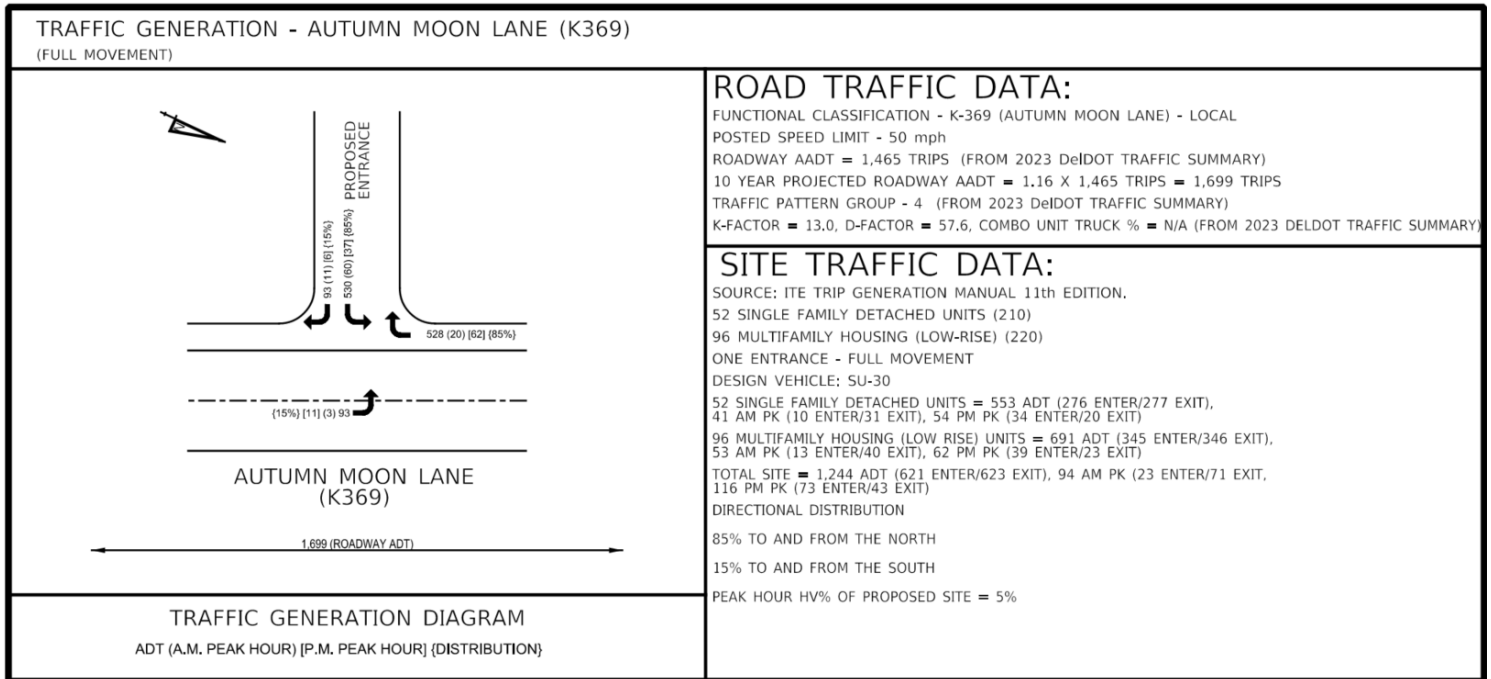
 - **85% to and from the north = $1,244 \times 85\% = 1,058$ ADT (528 Enter/530 Exit), 80 AM Peak (20 Enter/60 Exit), 99 PM Peak (62 Enter/37 Exit)**
 - **15% to and from the south = $1,244 \times 15\% = 186$ ADT (93 Enter/93 Exit), 14 AM Peak (3 Enter/11 Exit), 17 PM Peak (11 Enter/6 Exit)**
9. Percent of Peak Hour Heavy Vehicles at Site – **Peak Hour HV% of Proposed Site = 5%.**

• **Traffic Generation Diagram:**

1. Development generated trips should be assigned to the proposed entrances according to the development site plan as well as existing and/or future traffic patterns surrounding the development area.
2. For the purpose of this example, the directional distribution is 85% to and from the north and 15% to and from the south.

- **Site ADT entering from the south = Entering ADT for Proposed Development x Percentage of Proposed Development from the south = 621 x 15% = 93.**
- **Site ADT entering from the north = Entering ADT for Proposed Development x Percentage of Proposed Development from the north = 621 x 85% = 528.**
- **Site ADT exiting to travel south = Exiting ADT for Proposed Development x Percentage of Proposed Development to south = 623 x 15% = 93.**
- **Site ADT exiting to travel north = Exiting ADT for Proposed Development x Percentage of Proposed Development to north = 623 x 85% = 530.**

The same procedure should be applied for the AM and PM peak hour site traffic.



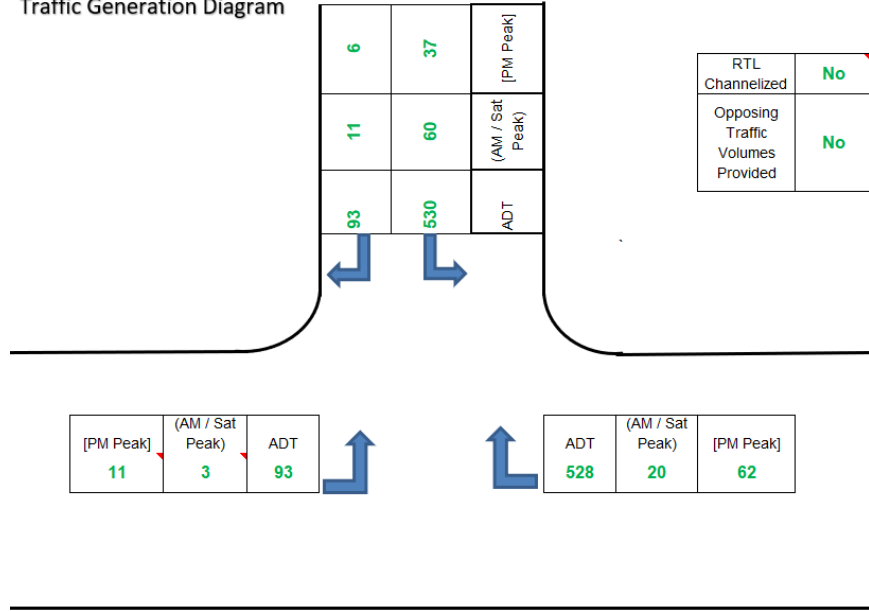
- **DelDOT Auxiliary Lane Worksheet**

Complete the worksheet per below:

1. Fill in the volumes on the **Traffic Generation Diagram** tab consistent with the Traffic Generation Diagram created for the Entrance Plan.
 - i. If the proposed entrance will create the fourth leg to an existing entrance, separate Auxiliary Lane Worksheets shall be completed and submitted for review of both the proposed entrance and the existing entrance.
 - ii. If the proposed entrance will create the fourth leg to an existing T intersection (2 roads), an Auxiliary Lane Worksheet shall be completed for the proposed entrance and all other approaches will need further evaluation per the Development Coordination Manual and associated state and federal manuals (i.e. AASHTO Green Book).
2. If the entrance is an existing access point, left turn and right turn ADT and peak hour volumes shall include site traffic and existing roadway traffic.
3. If opposing roadway traffic volumes were collected, include in the worksheet.
4. If the opposing right-turn movement is channelized, a reduction may be included in the worksheet. Justification for reduction shall be submitted to DelDOT Development Coordination Section for review.
5. If Committed Development traffic information is known, include in the worksheet. This information is commonly included in a Final TIS.
6. In the **User Inputs** tab, fill in the cells with green text.
 - i. If opposing roadway traffic volumes were collected and/or the opposing right- turn movement is channelized, the Left Turn VPH should be the same peak hour as the peak hour chosen for the opposing through and right turn volumes within the **Traffic Generation Diagram** tab.
7. To obtain further clarification on how ADT is determined per approach, see **Left-Right Approach Example** tab within the DelDOT Auxiliary Lane Worksheet.

Creation of DeIDOT Auxiliary Lane Worksheet for Proposed Entrance

Traffic Generation Diagram



Roadway AADT From DeIDOT Traffic Summary:	1465
Committed Development AADT:	0

May 28, 2024										V2024.1		
DeIDOT Auxiliary Lane Worksheet										Manually Update Cell XX		
Roadway Information and Entrance										Auto-Calculated Cells XX		
Name of Project			Example - 1 Access			Date of Submittal			6/17/2024			
Maintenance Road No. (i.e. K234A)			K369			Road Name			Autumn Moon Lane			
Signalized / Unsignalized			Unsignalized			Posted Speed Limit			50			
Roadway ADT (From DeIDOT Traffic Manual)			1465			Traffic Pattern Group			4			
Left Approach Site ADT	186	Committed Development ADT	0	Total Left Approach ADT	186	Right Approach Site ADT	1058	Committed Development ADT	0	Total Right Approach ADT	1058	
Total Number of Through Lanes (Does Not Include Turn Lanes)			2 lanes			Number of intersection legs			3			
Roadway Functional Classification			Local			Calculation for (specify leg)			Proposed Entrance 1			
Left-Approach Projected 10 yr Roadway ADT + Total Site + Committed Development ADT			1885			Right-Approach Projected 10 yr Roadway ADT + Total Site + Committed Development ADT			2757			
K Factor			13			D Factor			57.6			
Left Turn Information					Right Turn Information							
Left Turn VPH			11			Right Turn ADT			Over 400			
Left Turn Approach Grade			0.0%			Right Turn Approach Grade			0.0%			
Heavy Vehicle %			5			Effective Radius of Entrance			R50'			
10 Yr Opposing Vol. (Manual Input - Veh/hr)			0			Right Turn Length			290 ft			
10 Yr Opposing Volume (Calculated)			127 Veh/hr			Bypass and Left Turn Lanes are not required						
10 Yr Opposing Volume (Calculated Vol.)			127 Veh/hr									

Example Project – Two Site Entrances and Existing Use:

A mixed-use development is proposed on the southerly side of Old Coach Road between Upper Pike Creek Road and Polly Drummond Road in New Castle County. The development consists of 200,000 square feet of retail space (195,000 square feet of retail and a 5,000 square foot drive in bank). The site proposes two entrances on Old Coach Road. Existing conditions of the site include 55 multifamily housing units (low-rise) to be demolished, and the two proposed entrances on Old Coach Road would also include an adjacent site of 100 single-family detached homes.

- **Road Traffic Data:**

Functional Classification and Roadway Maintenance Number – Information within the [DelDOT Gateway: N-316 Old Coach Road – Major Collector](#)

1. Posted Speed – Actual posted speed from the roadway – Google Earth: **35 MPH**
2. AADT - Information from the latest [DelDOT Gateway: 5,823 Trips](#) (From 2023 DelDOT Traffic Summary)
3. 10-Year Projected AADT = Current ADT x 10-Year Growth Factor. Apply the same 10-Year Growth Factor that is used in DelDOT's [Auxiliary Lane Worksheet](#). Currently the growth factor is 1.16. The most up-to-date worksheet is located within DelDOT's [Development Coordination Portal](#):

$$10\text{-year AADT} = 5,823 \times 1.16 = \mathbf{6,755 \text{ Trips}}$$

4. Traffic Pattern Group - Information from the [DelDOT Gateway: TPG – 2](#)
5. K-Factor, D-Factor, Truck Percentage – Information from the latest DelDOT [Traffic Volume Summary](#):

K-Factor = 10.8, D-Factor = 56.2, Combo Unit Truck % = 2.6 (From 2023 DelDOT Traffic Summary)

- **Site Traffic Data:**

1. Trip generation is based on the latest edition of the ITE Trip Generation Manual. The guidance provided in the latest ITE Trip Generation Handbook should be used to determine whether to use the average rate and/or the fitted curve equation to calculate the trip generation for the proposed use. Peak hour periods to include in the diagram is at DelDOT's discretion. In this specific example, only AM peak hour and PM peak hour values are represented.
 - i. 200,000 square feet Strip Retail Plaza (ITE Land Use Code 820) – Use fitted curve equation for ADT, AM, and PM, which results in **11,086 ADT (5,543 Enter/5,543 Exit), 252 AM Peak (156 Enter/96 Exit), 930 PM Peak (446 Enter/484 Exit)**
 - ii. Pass-by Trips: Per ITE Trip Generation Manual, 11th Edition, the pass-by average rate for LUC 820 (Shopping Center > 150k) in the Weekday PM Peak Period is 29%.
 - a. PM Peak Period: 930 PM Peak (446 Enter/484 Exit) *29% = **269 (129 Enter/140 Exit)**
2. Number of entrances and corresponding configurations: **Two Entrances – Full Movement**
3. Design Vehicle – Select a design vehicle that is likely to use the proposed development entrances with considerable frequency to ensure that the entrance facility can accommodate the anticipated turning movements and is consistent with Figure 5.2.3-a from the Development Coordination Manual. **WB-40**
4. Site Traffic of Existing Site – 55 multifamily housing units (low-rise) (ITE Land Use Code 220) – Use fitted curve equation which results in **428 ADT, 40 AM Peak, 44 PM Peak**
5. Total Site Traffic for Proposed Development – **11,086 ADT (5,543 Enter/5,543 Exit), 252 AM Peak (156 Enter/96 Exit), 930 PM Peak (446 Enter/484 Exit)**
 - a. Total New Site Traffic for Proposed Development (Total Site Traffic – Pass-by Trips) – **11,086 ADT (5,543 Enter/5,543 Exit), 252 AM Peak (156 Enter/96 Exit), 661 PM Peak (317 Enter/344 Exit)**
6. Net Change in New Traffic between Existing Site and Proposed Development
 - a. ADT: 11,086 ADT Proposed - 428 Existing = **10,658**
 - b. AM: 252 AM Peak Proposed - 40 Existing = **212**
 - c. PM: 661 PM Peak Proposed - 44 Existing = **617**
7. Other Trips (Adjacent Site Traffic) – 100 Single-Family Detached Homes (ITE Land Use Code 210) – Use fitted curve equation which results in **1,009 ADT (505 Enter/504 Exit), 74 AM Peak (19 Enter/55 Exit), 99 PM Peak (63 Enter/36 Exit)**
8. Directional Distribution: If information specific to the site occupant is available, for example, the feeder pattern for a school site, that information should be used. More commonly, this distribution is based on engineering judgment which is based upon existing and /or future traffic patterns surrounding the development area. Details of determining peak hour volumes are located in the **Traffic Generation Diagram** section below.

In this case **75% to and from the west and 25% to and from the east.**

- **75% to and from the west = $(11,086+1,009) \times 75\% = 9,071$ ADT (4,536 Enter/4,535 Exit), 245 AM Peak (132 Enter/113 Exit), 772 PM Peak (382 Enter/390 Exit)**
- **25% to and from the east = $(11,086+1,009) \times 25\% = 3,024$ ADT (1,512 Enter/1,512 Exit), 81 AM Peak (43 Enter/38 Exit), 257 PM Peak (127 Enter/130 Exit)**

9. Percent of Peak Hour Heavy Vehicles at Site - Select a percentage that is consistent with the proposed development – **Peak Hour HV% of Proposed Site = 5%.**

Traffic Generation Diagram:

1. Development generated trips should be assigned to the proposed entrances according to the development site plan as well as existing and/or future traffic patterns surrounding the development area.
2. For the purpose of this example, the directional distribution is 75% to and from the west and 25% to and from the east. In addition, since there are two entrances, the trips coming in and out of the development are assigned 70% for the first entrance passed and 30% for the second entrance passed. Note, the percentages utilized are assumed for this example and different percentages based on specific aspects of a development may be appropriate.

Site ADT Entering from the west

Entrance 1 = Entering Site ADT x Directional Distribution x % at 1st Entrance
 = 6,048 x 75% x 70% = 3,175

Entrance 2 = Entering Site ADT x Directional Distribution x % at 2nd Entrance
 = 6,048 x 75% x 30% = 1,361

Site ADT Exiting to travel west

Entrance 1 = Exiting Site ADT x Directional Distribution x % at 1st Entrance
 = 6,048 x 75% x 70% = 3,175

Entrance 2 = Exiting Site ADT x Directional Distribution x % at 2nd Entrance
 = 6,048 x 75% x 30% = 1,361

Site ADT Entering from the east

Entrance 1 = Entering Site ADT x Directional Distribution x % at 1st Entrance
 = 6,048 x 25% x 30% = 454

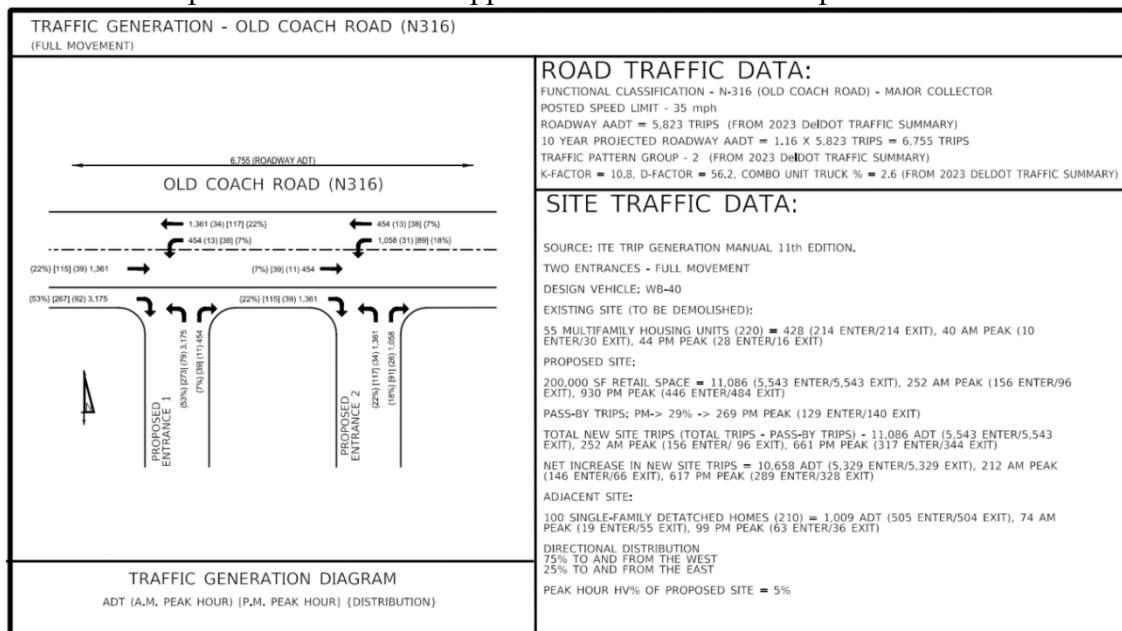
Entrance 2 = Entering Site ADT x Directional Distribution x % at 2nd Entrance
 = 6,048 x 25% x 70% = 1,058

Site ADT Exiting to travel east

Entrance 1 = Exiting Site ADT x Directional Distribution x % at 1st Entrance
 = 6,048 x 25% x 30% = 454

Entrance 2 = Exiting Site ADT x Directional Distribution x % at 2nd Entrance
 = 6,048 x 25% x 70% = 1,058

The same procedure should be applied for the AM and PM peak hour site traffic.



- **DelDOT Auxiliary Lane Worksheet**

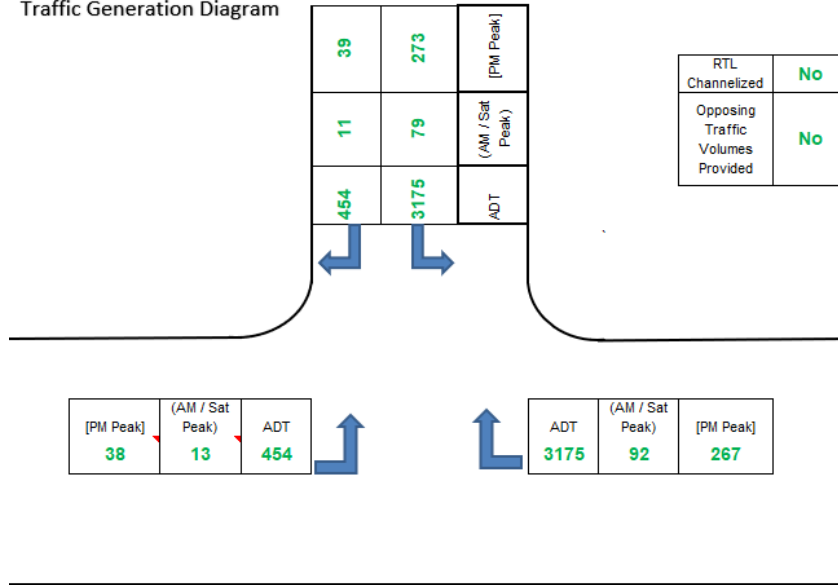
Complete the worksheet per below:

1. Fill in the volumes on the **Traffic Generation Diagram** tab consistent with the Traffic Generation Diagram created for the Entrance Plan.
 - i. If the proposed entrance will create the fourth leg to an existing entrance, separate Auxiliary Lane Worksheets shall be completed and submitted for review of both the proposed entrance and the existing entrance.
 - ii. If the proposed entrance will create the fourth leg to an existing T intersection (2 roads), an Auxiliary Lane Worksheet shall be completed for the proposed entrance and all other approaches will need further evaluation per the Development Coordination Manual and associated state and federal manuals (i.e. AASHTO Green Book).
2. If the entrance is an existing access point, left turn and right turn ADT and peak hour volumes shall include site traffic and existing roadway traffic.
3. If opposing roadway traffic volumes were collected, include in the worksheet.
4. If the opposing right-turn movement is channelized, a reduction may be included in the worksheet. Justification for reduction shall be submitted to DelDOT Development Coordination Section for review.
5. If Committed Development traffic information is known, include in the worksheet. This information is commonly included in a Final TIS.
6. In the **User Inputs** tab, fill in the cells with green text.
 - i. If opposing roadway traffic volumes were collected and/or the opposing right- turn movement is channelized, the Left Turn VPH should be the same peak hour as the peak hour chosen for the opposing through and right turn volumes within the **Traffic Generation Diagram** tab.
7. To obtain further clarification on how ADT is determined per approach, see **Left-Right Approach Example** tab within the DelDOT Auxiliary Lane Worksheet.

Creation of DeIDOT Auxiliary Lane Worksheet for Proposed Entrance 1

*Committed Development AADT contains the site traffic to and from Proposed Entrance 2

Traffic Generation Diagram



Roadway AADT From DeIDOT Traffic Summary:	5823
Committed Development AADT:	2722

May 28, 2024
V2024

DeIDOT Auxiliary Lane Worksheet

Roadway Information and Entrance

Manually Update Cell	XX
Auto-Calculated Cells	XX

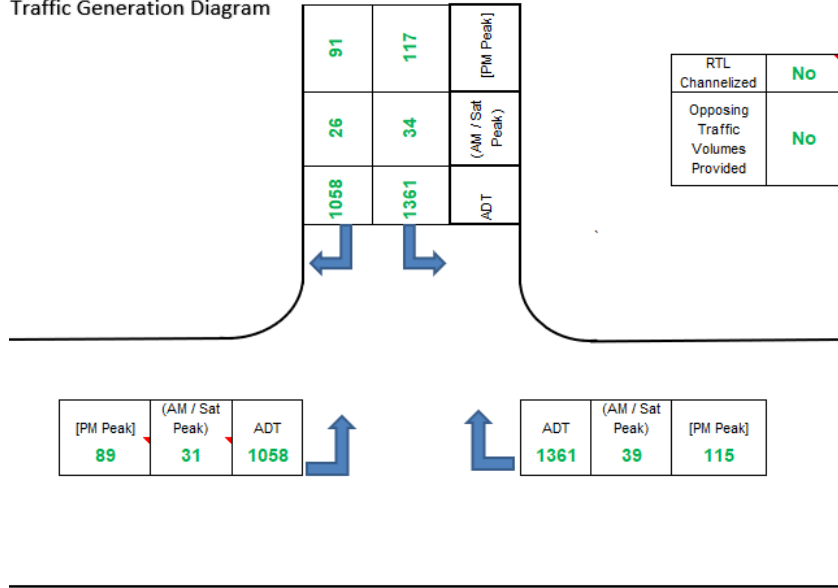
Name of Project		Example - 2 Access		Date of Submittal		6/17/2024	
Maintenance Road No. (i.e. K234A)		N316		Road Name		Old Coach Road	
Signalized / Unsignalized		Unsignalized		Posted Speed Limit		35	
Roadway ADT (From DeIDOT Traffic Manual)		5823		Traffic Pattern Group		2	
Left Approach Site ADT	908	Committed Development ADT	2722	Total Left Approach ADT	3630	Right Approach Site ADT	6350
						Committed Development ADT	2722
				Total Right Approach ADT	9072		
Total Number of Through Lanes (Does Not Include Turn Lanes)		2 lanes		Number of intersection legs		3	
Roadway Functional Classification		Major Collector		Calculation for (specify leg)		Proposed Entrance 1	
Left-Approach Projected 10 yr Roadway ADT + Total Site + Committed Development ADT		10384		Right-Approach Projected 10 yr Roadway ADT + Total Site + Committed Development ADT		15826	
K Factor		10.8		D Factor		56.2	
Left Turn Information				Right Turn Information			
Left Turn VPH		38		Right Turn ADT		Over 400	
Left Turn Approach Grade		0.0%		Right Turn Approach Grade		0.0%	
Heavy Vehicle %		5		Effective Radius of Entrance		RSS0'	
10 Yr Opposing Vol. (Manual Input - Veh/hr)		0		Right Turn Length		240 ft	
10 Yr Opposing Volume (Calculated)		410 Veh/hr					
10 Yr Opposing Volume (Calculated Vol.)		410 Veh/hr					
Left Turn Length		220 ft					

Example - 2 Access

Creation of DeIDOT Auxiliary Lane Worksheet for Proposed Entrance 2

*Committed Development AADT contains the site traffic to and from Proposed Entrance 1

Traffic Generation Diagram



Roadway AADT From DeIDOT Traffic Summary:	5823
Committed Development AADT:	908

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DeIDOT Auxiliary Lane Worksheet			
Roadway Information and Entrance			
		Manually Update Cell	XX
		Auto-Calculated Cells	XX
Name of Project		Example - 2 Access	
Maintenance Road No. (i.e. K234A)		N316	
Signalized / Unsignalized		Unsignalized	
Roadway ADT (From DeIDOT Traffic Manual)		5823	
Date of Submittal		6/17/2024	
Road Name		Old Coach Road	
Posted Speed Limit		35	
Traffic Pattern Group		2	
Left Approach Site ADT	2116	Committed Development ADT	908
Total Left Approach ADT	3024	Right Approach Site ADT	2722
		Committed Development ADT	908
Total Right Approach ADT	3630		
Total Number of Through Lanes (Does Not Include Turn Lanes)		2 lanes	
Number of intersection legs		3	
Roadway Functional Classification		Major Collector	
Calculation for (specify leg)		Proposed Entrance 2	
Left-Approach Projected 10 yr Roadway ADT + Total Site + Committed Development ADT		9778	
Right-Approach Projected 10 yr Roadway ADT + Total Site + Committed Development ADT		10384	
K Factor		10.8	
D Factor		56.2	
Left Turn Information		Right Turn Information	
Left Turn VPH	89	Right Turn ADT	Over 400
Left Turn Approach Grade	0.0%	Right Turn Approach Grade	0.0%
Heavy Vehicle %	5	Effective Radius of Entrance	R50'
10 Yr Opposing Vol. (Manual Input - Veh/hr)	0		
10 Yr Opposing Volume (Calculated)	410 Veh/hr	Right Turn Length	240 ft
10 Yr Opposing Volume (Calculated Vol.)	410 Veh/hr		
Left Turn Length	220 ft		

Example - 2 Access