

June 16, 2022

Mr. Jason Dismukes, LLC  
Consulting Engineers  
241 Torrington Road  
P.O. Box 194  
Goshen, CT 06756

**RE: Proposed Convenience Store/Filling Station  
861 Harwinton Road  
Torrington, CT  
Our File # 21120**

Dear Mr. Dismukes:

Pursuant to your request our office has prepared this report to document our findings related to the potential traffic impact of an addition of gasoline service to the existing Sam's Convenience market located at 861 Harwinton Road, Route 4, in the City of Torrington, Connecticut. The site location is presented in Figure 1 with respect to the surrounding roadway network. This report presents our findings.

### **Site Plan**

The property is located on the northeast corner of the intersection of New Harwinton Road and Circle Drive in Torrington. The existing site consists of an existing 2,612 s.f. convenience market with a total of 18 parking spaces. Access to the site is provided from Route 4 by a 30 foot wide full service driveway. Almost the entire site frontage along Circle Drive, approximately 116 feet, is paved. Four of the parking spaces, located west of the convenience store building, are perpendicular to Circle Drive requiring customers to back out into Circle Drive, when exiting the site. A portion of each of the four spaces extends into the City of Torrington right of way. A service driveway to Circle Drive is provided in the rear of the building for deliveries and access to the dumpster.

The current site plan, prepared by your office, depicts the addition of a canopy with two pump islands with 4 vehicle fueling positions, located between the existing building and Route 4. A total of 8 parking spaces, plus the four fueling positions, for a total of 12 spaces are provided. There are 5 spaces provided along the easterly property line, one accessible space in front of the building, and two spaces provided on the west side of the building. The Route 4 driveway will be relocated to the east closer to the property line and will be reduced in width to provide 18 feet of pavement. The driveway will be restricted to entering traffic only. The Circle Drive frontage will be reconfigured with the addition of landscaped islands. There will be a single 18 foot wide driveway in front of the store restricted to exiting traffic only. To allow for access for the fuel truck, raised mountable islands are provided at each driveway. The rear service driveway to Circle Drive will remain.

### **Description of Area**

The site proposed for re-development is located on the north side of New Harwinton Road, Route 4, and east of Circle Drive. Route 4 traverses the City of Torrington from east to west, entering the town from Harwinton approximately 0.4 miles east of the site. The roadway extends in a westerly direction, through a signalized intersection with Route 183, past the subject site and the unsignalized intersection with Circle Drive. The roadway continues westerly through a signalized intersection with Tarringford West Street and then continuing west to a junction with Route 202. Route 4 continues in a westerly direction, providing access to Route 8, then Main Street before continuing into the Town of Goshen. Across the site frontage the roadway provides 40 feet of pavement with a single 12 foot lane and painted shoulder in each direction of travel, separated by a painted double yellow centerline. Land use along the roadway is a mix of commercial and residential uses. There are multiple driveways intersecting the roadway. New Harwinton Road is posted at 40 miles per hour.

Circle Drive is a city maintained roadway that originates at an un-signalized intersection with New Harwinton Road, and extends north past the subject site. Circle Drive provides access to a residential subdivision of approximately 104 single family houses. The roadway provides approximately 24 feet of pavement with a single travel lane in each direction. The roadway widens to approximately 28 feet on the approach to New Harwinton Road. The Circle Drive approach operates under stop sign control with a flashing beacon with a flashing yellow light facing Route 4 traffic and a flashing red beacon facing the Circle Drive approach. The roadway is not marked and is posted at 25 miles per hour. Land use is single family residential, except for those properties fronting to Route 4.

### **Current Traffic Volumes**

The Connecticut DOT maintains a traffic volume count program on all state highways and some local roadways. Included within the DOT database is a count on Route 4, west of Route 183. The latest count at that location was conducted during July 2021. The count indicates an Average Daily Traffic volume (ADT) of 8,600 vehicles with peak hour volumes of 576 vehicles during the a.m. peak hour (8:00 a.m.) and 821 vehicles during the p.m. peak hour (4:00 p.m.). The ConnDOT count is presented in Table 1.

In addition to the automated count outlined above, our office has conducted manual turning movement counts at the intersection of Route 4 and Circle Drive for the morning, afternoon, and Saturday peak hours during July 2021. The observed traffic volumes, together with the automated count data, are shown in Figure 2.

A review of historic ConnDOT counts on Route 4 in this area indicates that traffic volumes have been in decline between 2006 and 2021. Due to the decline in traffic, no adjustments were made to the observed traffic volumes. The higher Route 4 volumes observed in either the DOT counts or the manual counts were held. The turning volumes

into and out of Circle Drive and the convenience store site were held as well. The volumes were balanced to the higher observed volumes. The resultant volumes represent the background traffic volumes for the study area and are presented in Figure 3. Figure 4 represents the adjusted background traffic volumes for the site to reflect the revised driveway layout and proposed turn restrictions.

### **Site Generated Traffic**

The proposal is to retain and remodel the existing 2,612 s.f. convenience market and to add two pumps with a total of 4 vehicle fueling positions. To determine the trip generation for the proposed site, the Institute of Transportation Engineers (ITE) *Trip Generation* Report was consulted. Trip Generation presents estimates for driveway volumes for many land uses based on counts conducted at existing facilities throughout the country. Included within the ITE database are land uses that are applicable to the proposed development. They include Land Use Code (LUC) 851 – Convenience Market and LUC 853 - Convenience Market with Gas Pumps. The ITE report presents data based on the number of vehicle fueling positions (vfp's) and square footage. We have calculated the trip generation potential for both the existing and proposed uses. Our office has also conducted counts at the site for the morning and afternoon peak commuter hours as well as the Saturday midday peak hours. The trip generation results are presented in Table 2. The existing site was observed to have a total trip generation of 36 trips during the morning peak hour, 57 trips during the afternoon peak hour, and 75 trips during the Saturday peak hour.

The proposed development, based on the building square footage, has a trip generation potential of 106 trips during the morning peak hour, 127 trips during the afternoon hour and 163 trips during the Saturday peak hour. These volumes represent an increase of 70, 70 and 88 trips during the morning, afternoon, and Saturday peak hours, respectively, when compared to the observed driveway volumes. According to the ITE *Trip Generation*

Report, a convenience store use has a “pass by” rate of as much as 87% with an average of 61-63%. Pass by traffic is traffic that is already on the local roadway network and utilizes the subject site on its way between its point of origin and its primary destination. Pass by traffic does not reduce the driveway volumes experienced by the site, but this traffic is not new to the roadway network, as it was already passing by the site. No credit for pass by traffic was taken in this analysis.

The site generated traffic was distributed to the local roadway network with a directional distribution equal to that observed during the site counts. The directional distribution used is presented in Figure 5. The site generated traffic volumes, based on these distributions are shown in Figure 6. By adding the site generated traffic in Figure 6 to the background traffic volumes from Figure 3, the combined traffic volumes for the site can be determined. These volumes are presented in Figure 7.

### **Intersection Capacity**

To determine the impact of the site generated traffic on the existing roadway network, capacity analyses were conducted for the background and combined traffic volume conditions for the morning, afternoon and Saturday peak hours. The computer program *SYNCHRO*, which is based on the methodology in the Highway Capacity Manual, was utilized for this purpose. The general method determines how much of the capacity available for each movement is being utilized. This is converted into a delay for each movement, and the delay is rated on a level of service (LOS) scale from A to F, with LOS A being the best level of service with low delays and LOS F being the poorest level of service with high delays. An analysis was completed for the un-signalized intersection of Route 4 with Circle Drive and for the two site driveways. The capacity analysis worksheets are included in the appendix. The level of service results are summarized in Table 3.

**Route 4 (New Harwinton Road) and Circle Drive** - This is an existing un-signalized intersection, with Route 4 oriented in an east/west orientation with Circle Drive approaching from the north. A driveway to a small commercial plaza approaches from the south. Volumes on the commercial drive were minimal, therefore the driveway is not included in the analysis. The Route 4 approaches each provide a single lane approach with a wide shoulder to allow for through vehicles to bypass slowing or stopped vehicles waiting to execute a turn. The Circle Drive approach provides a single lane approach and operates under stop sign control. An analysis indicates that under the background traffic volumes the Route 4 approaches operate at a LOS A during peak hours. The Circle Drive approach operates at a LOS B during the morning and Saturday peak hours and at a LOS C during the afternoon peak hour. With the introduction of the site generated traffic, the Route 4 approaches will continue to operate at a LOS A. The Circle Drive approach will operate at a LOS C during all peak hours, with an increase in delay of between 3 and 6 seconds per vehicle.

**Route 4 (New Harwinton Road) at the Site Driveway** - This is an existing un-signalized intersection with Route 4 oriented in the east/west direction and the site drive approaching from the north. The Route 4 approaches each provide a single lane approach with a wide shoulder to allow for through vehicles to bypass slowing or stopped vehicles waiting to execute a turn. The site driveway approach provides a single lane approach and operates under stop sign control. An analysis indicates that under the background traffic volumes the Route 4 approaches operate at a LOS A while the site driveway approach operates at a LOS B during the morning peak hour and at a LOS C during the afternoon and Saturday peak hours. With the introduction of the fuel pumps and the site generated traffic the driveway will become an enter only driveway. Under this scenario the Route 4 approaches will continue to operate at a LOS A during peak hours. Since the driveway is an enter only driveway there is no delay on the driveway approach.

**Circle Drive at the Site Driveway** - This is an existing un-signalized intersection with Circle Drive oriented in the north/south direction and the site drive approaching from the east. The Circle Drive approaches each provide a single lane approach. The site driveway approach is very wide but in practice operates as a single lane approach under stop sign control. An analysis indicates that under the background traffic volumes all approaches operate at a LOS A during peak hours. With the revised site plan the driveway width will be narrowed to 18 feet and will be restricted to exiting movements only. The driveway will provide a single lane approach and will operate under stop sign control. With these revisions in place all approaches will continue to operate at a LOS A during peak hours.

### **Additional Analysis**

In response to concerns by the commission during the previous public hearings our office has conducted two additional studies of the intersection of Route 4 and Circle Drive. Additional data was collected during the afternoon peak hours on December 14, 2021 and during the morning peak hours on December 15, 2021. Two studies were performed. The first was a gap study to determine the number and length of gaps in the traffic flow of Route 4. This study was conducted to determine if there are enough gaps to accommodate the anticipated volume of traffic exiting Circle Drive. The second study performed was a stop sign delay study. This study measures the time each vehicle is delayed at the stop sign and documents the number of vehicles in the queue waiting to exit the side street.

In a gap study, an observer measures the time between successive vehicles passing by a spot on the roadway. For this study the intersection of Route 4 and Circle Drive was chosen. Measurements were taken for the eastbound and westbound directions, as well as the combined directions. A vehicle exiting a side street is likely to accept a seven second gap between successive vehicles. Longer gaps can be utilized by more than one

vehicle. The engineering rule of thumb is that there need to be twice the number of gaps as the anticipated side street volume for an acceptable level of service. Tables A and B present the data for westbound traffic. A gap in the westbound flow is needed for a vehicle in the side street to execute a right turn. The data indicates that there are enough gaps during the peak hour traffic flow to allow 288 and 306 right turns out of Circle Drive, for the morning and afternoon peak hours, respectively. Under the combined traffic volumes, we have projected a total of 38 and 43 right turns, respectively. Figures C and D present the data for two way traffic. A gap in the two way traffic flow is needed for a vehicle on the side street to execute a left turn. The data indicates that there are enough gaps during the peak hour traffic flow to allow 318 and 214 left turns out of Circle Drive, for the morning and afternoon peak hours, respectively. Under the combined traffic volumes, we have projected a total of 55 and 42 left turns, respectively. At the bottom of each table is presented a Gap Ratio calculated by dividing the number of gaps by the projected traffic volume. As indicated above a ratio of 2.0 is desired to ensure that all vehicles can exit the side street. From the tables the lowest gap ratio calculated is 5.10, indicating that there are a minimum of 5 times the number of gaps available as is required. This number indicates that there is sufficient excess capacity to accommodate the anticipated side street traffic volume.

The second study conducted was a stop sign delay study. In this study the time that each vehicle spends in the queue at the stop bar is observed as well as the number of vehicles in the queue at any given moment. The results of the study are presented in Table E. On the dates of the study, we observed a total of 93 vehicles exiting Circle Drive between 7:00 am and 8:45 am, and a total of 58 vehicles were observed between 4:30 pm and 6:00 pm. The vehicles were delayed on average 9.94 seconds and 10.84 seconds, respectively. The longest observed delays were 53 and 54 seconds, respectively. Maximum queues were observed to be 3 vehicles and 2 vehicles, for the morning and afternoon periods, respectively. Table E includes a breakdown of the LOS experienced



and by how many vehicles. During both peak periods, the majority of vehicles (63 and 38) experienced less than 10 seconds of delay. These vehicles all operated at a LOS A. Only one vehicle during each period experienced a delay in excess of 50 seconds, equating to a LOS F.

The SYNCHRO Capacity analyses indicates that the Circle Drive approach experiences an average delay of 12.7 seconds per vehicle during the morning peak hour and an average of 15.6 seconds during the afternoon peak hour under the background traffic volume conditions. These calculated delays are higher than those observed in the field. The SYNCHRO analysis is representative of the peak 15 minute period while the data in Table E represents the average over the 1 hour and 45 minutes and 2 hour periods respectively. The field data is, in my opinion, consistent with SYNCHRO analysis.

### **Site Driveway Location and Design**

As indicated above the site access to Route 4 will be relocated to the east and restricted to an enter only driveway. The Circle Drive access will be reduced in width from 116 feet to a width of 18 feet and restricted to exiting movements only. The four parking spaces with direct access to Circle Drive have been eliminated.

A truck template plan has been prepared to demonstrate that a WB-40 delivery vehicle can access the site by entering from Route 4 and exiting via a left turn onto Circle Drive, returning to Route 4. Mountable curbing and scored pavement will be provided on either side of the proposed site driveways to allow for delivery truck access into and out of the site. Deliveries will be made when the convenience store is closed to allow for more room on site for the delivery vehicle. Deliveries are anticipated once or twice a week, but are dependent on the volume of sales, so the number of deliveries could be three or four times a week at most.

### **Sight Distances**

The available ISD's from the Circle Drive entrance were observed to be in excess of 400 feet looking to the right, and a distance of approximately 95 feet, to the centerline of the Route 4 westbound lane, looking to the left. The available sight distance looking right, meets the current ConnDOT requirements for approach speeds of 35 mph. Circle Drive is posted at 25 mph.

### **Accident Experience**

The University of Connecticut gathers and compiles traffic accident data for all state highways and some major local roadways. A list of accidents occurring in the area from June 1<sup>st</sup>, 2019 through May 31<sup>st</sup>, 2022 includes the most recent 3 years of available data. Accident records were obtained for Route 4 from a point two tenths of a mile east of Circle Drive to a point two tenths of a mile west of Circle Drive, and for Circle Drive. The 3-year accident history indicates a total of 4 accidents involving a total of 7 vehicles over the three year period. One accident occurred at the intersection of Route 4 with Circle Drive. There were two accidents at Morningside Drive, and one accident on Route 4 east of the site driveway. There were no accidents on Circle Drive. None of the accidents can be directly attributable to the operations of the subject site.

Of the 4 accidents, there was one rear end accident, one angle accident, one sideswipe accident, and one fixed object. All accidents were listed as having occurred on clear and dry days. Two accidents occurred during the morning commuter period, one during the afternoon commuter period, and one accident occurred after nine pm. All of the accidents were recorded as property damage only and there were no injuries and no fatalities reported. One accident involved a school bus. A list of the accidents with relative data and an accident diagrams for each accident are included in the appendix.

### **State Approval**

Since the development has frontage to and access from a State Highway, CT Route 4, it will be necessary to obtain an encroachment permit from the ConnDOT District IV Administration Office prior to the start of any work within the DOT Right of Way. As part of the earlier application, a full set of site plans and a traffic impact report were submitted to ConnDOT for review. On November 1, 2021 the District Office provided a memo indicating that an encroachment permit would be issued for the project subject to the submission of an Encroachment Permit Application, a bond, a certificate of insurance and a check in the amount of \$100. This indicates that the DOT is satisfied with the proposed site layout and that the impacts of the site generated traffic can be accommodated without disruption to the general public.

Since the development includes less than 100,000 s.f. of floor area and fewer than 200 parking spaces, a review by the Office of the State Traffic Administration (OSTA) of the project as a major traffic generator will not be required.

### **Conclusion**

Based on the observed background traffic volumes, the projected site traffic volumes and the analysis as outlined in this report, it is our professional opinion that the traffic volumes associated with the addition of two pumps, with 4 vehicle fueling positions, to the existing Sam's convenience market can readily be accommodated by the existing roadway network without causing undue harm to the traveling public.

The site access driveways are properly located and designed to accommodate the anticipated driveway volumes. The narrowing of the Circle Drive access and the elimination of the four parking spaces fronting to Circle Drive will result in improved access to local roadways. The ConnDOT District IV office has completed a review of the

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development and has indicated that an encroachment permit would be issued upon the submittal of an application for said permit.

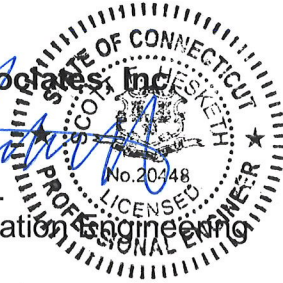
We appreciate the opportunity to provide this analysis to you. We will be available to offer testimony in support of your application before local planning agencies upon your request. If you require additional information regarding this application, please do not hesitate to contact our office.

Very truly yours,

**F. A. Hesketh & Associates, Inc.**

  
Scott F. Hesketh P.E.

Manager of Transportation Engineering



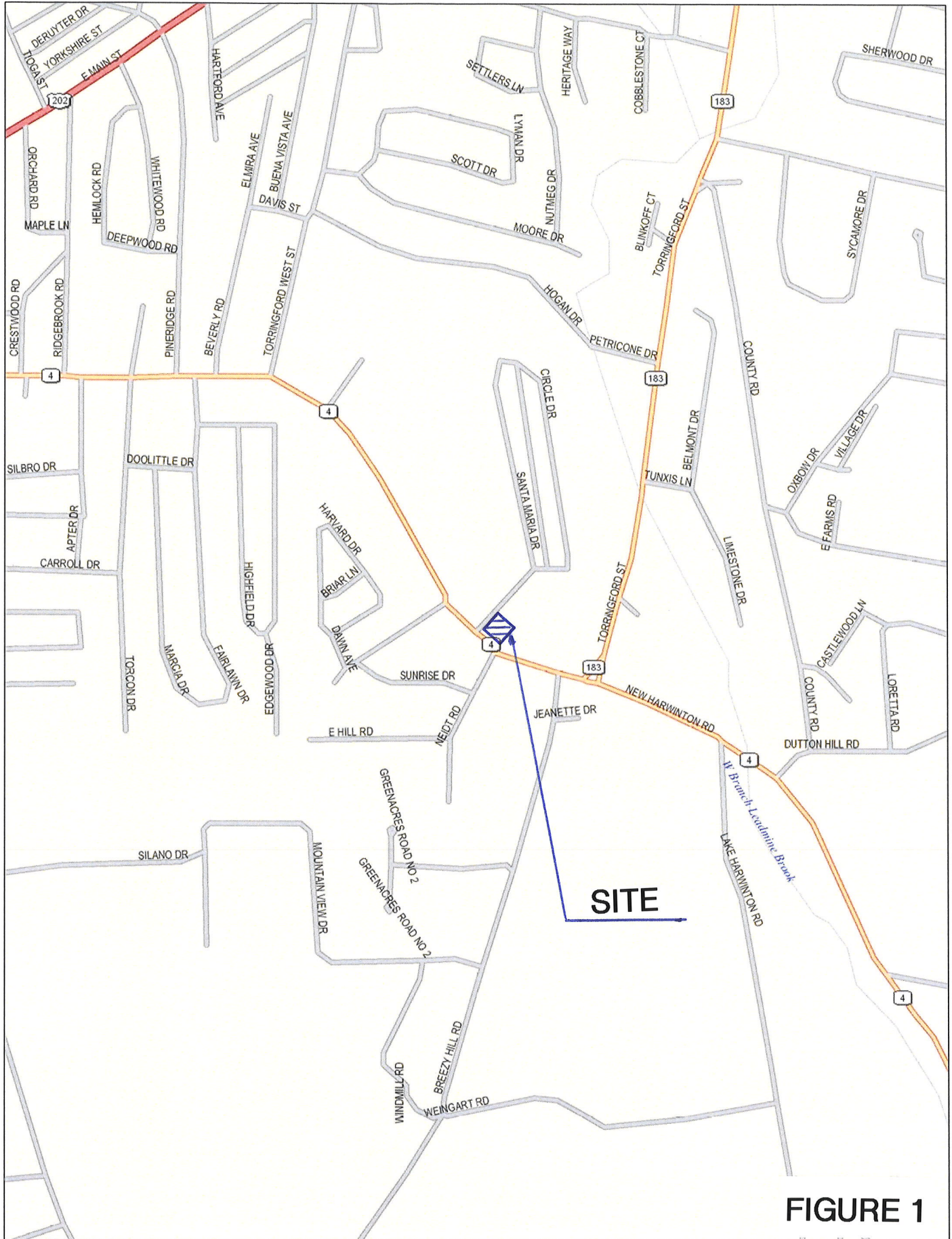


FIGURE 1

TABLE 1  
 ConnDOT Traffic Volumes  
 Route 4 west of Route 183  
 Station No. 252

|       | 21-Jul-21<br>Thursday |            |              | 22-Jul-21<br>Thursday |           |              | 23-Jul-21<br>Thursday |           |              | 24-Jul-21<br>Friday |            |              |
|-------|-----------------------|------------|--------------|-----------------------|-----------|--------------|-----------------------|-----------|--------------|---------------------|------------|--------------|
|       | <u>EB</u>             | <u>WB</u>  | <u>Total</u> | <u>EB</u>             | <u>WB</u> | <u>Total</u> | <u>EB</u>             | <u>WB</u> | <u>Total</u> | <u>EB</u>           | <u>WB</u>  | <u>Total</u> |
| 12:00 |                       |            |              | 9                     | 28        | 37           | 10                    | 26        | 36           | 18                  | 24         | 42           |
| 1:00  |                       |            |              | 8                     | 7         | 15           | 2                     | 8         | 10           | 13                  | 10         | 23           |
| 2:00  |                       |            |              | 9                     | 4         | 13           | 6                     | 6         | 12           | 5                   | 11         | 16           |
| 3:00  |                       |            |              | 10                    | 9         | 19           | 13                    | 6         | 19           | 11                  | 7          | 18           |
| 4:00  |                       |            |              | 39                    | 26        | 65           | 44                    | 28        | 72           | 34                  | 24         | 58           |
| 5:00  |                       |            |              | 107                   | 65        | 172          | 96                    | 77        | 173          | 107                 | 67         | 174          |
| 6:00  |                       |            |              | 199                   | 147       | 346          | 190                   | 165       | 355          | 188                 | 139        | 327          |
| 7:00  |                       |            |              | 224                   | 255       | 479          | 240                   | 276       | 516          | 214                 | 257        | 471          |
| 8:00  |                       |            |              | 246                   | 323       | 569          | 251                   | 292       | 543          | <b>270</b>          | <b>306</b> | <b>576</b>   |
| 9:00  |                       |            |              | 251                   | 252       | 503          | 226                   | 251       | 477          |                     |            |              |
| 10:00 |                       |            |              | 220                   | 291       | 511          | 240                   | 265       | 505          |                     |            |              |
| 11:00 |                       |            |              | 261                   | 270       | 531          | 233                   | 284       | 517          |                     |            |              |
| 12:00 | 264                   | 314        | 578          | 288                   | 324       | 612          | 140                   | 277       | 417          |                     |            |              |
| 1:00  | 278                   | 337        | 615          | 298                   | 302       | 600          | 253                   | 309       | 562          |                     |            |              |
| 2:00  | 253                   | 334        | 587          | 269                   | 375       | 644          | 267                   | 330       | 597          |                     |            |              |
| 3:00  | 336                   | 429        | 765          | 317                   | 436       | 753          | 317                   | 408       | 725          |                     |            |              |
| 4:00  | <b>349</b>            | <b>472</b> | <b>821</b>   | 345                   | 443       | 788          | 253                   | 442       | 695          |                     |            |              |
| 5:00  | 373                   | 422        | 795          | 359                   | 460       | 819          | 311                   | 395       | 706          |                     |            |              |
| 6:00  | 294                   | 377        | 671          | 276                   | 309       | 585          | 264                   | 312       | 576          |                     |            |              |
| 7:00  | 104                   | 150        | 254          | 220                   | 287       | 507          | 183                   | 218       | 401          |                     |            |              |
| 8:00  | 129                   | 181        | 310          | 178                   | 191       | 369          | 133                   | 161       | 294          |                     |            |              |
| 9:00  | 90                    | 129        | 219          | 105                   | 144       | 249          | 94                    | 108       | 202          |                     |            |              |
| 10:00 | 43                    | 50         | 93           | 67                    | 79        | 146          | 44                    | 57        | 101          |                     |            |              |
| 11:00 | 25                    | 33         | 58           | 34                    | 41        | 75           | 26                    | 45        | 71           |                     |            |              |
|       | 2538                  | 3228       | 5766         | 4339                  | 5068      | 9407         | 3836                  | 4746      | 8582         | 860                 | 845        | 1705         |

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**2021 ADT = 8,600 vehicles**

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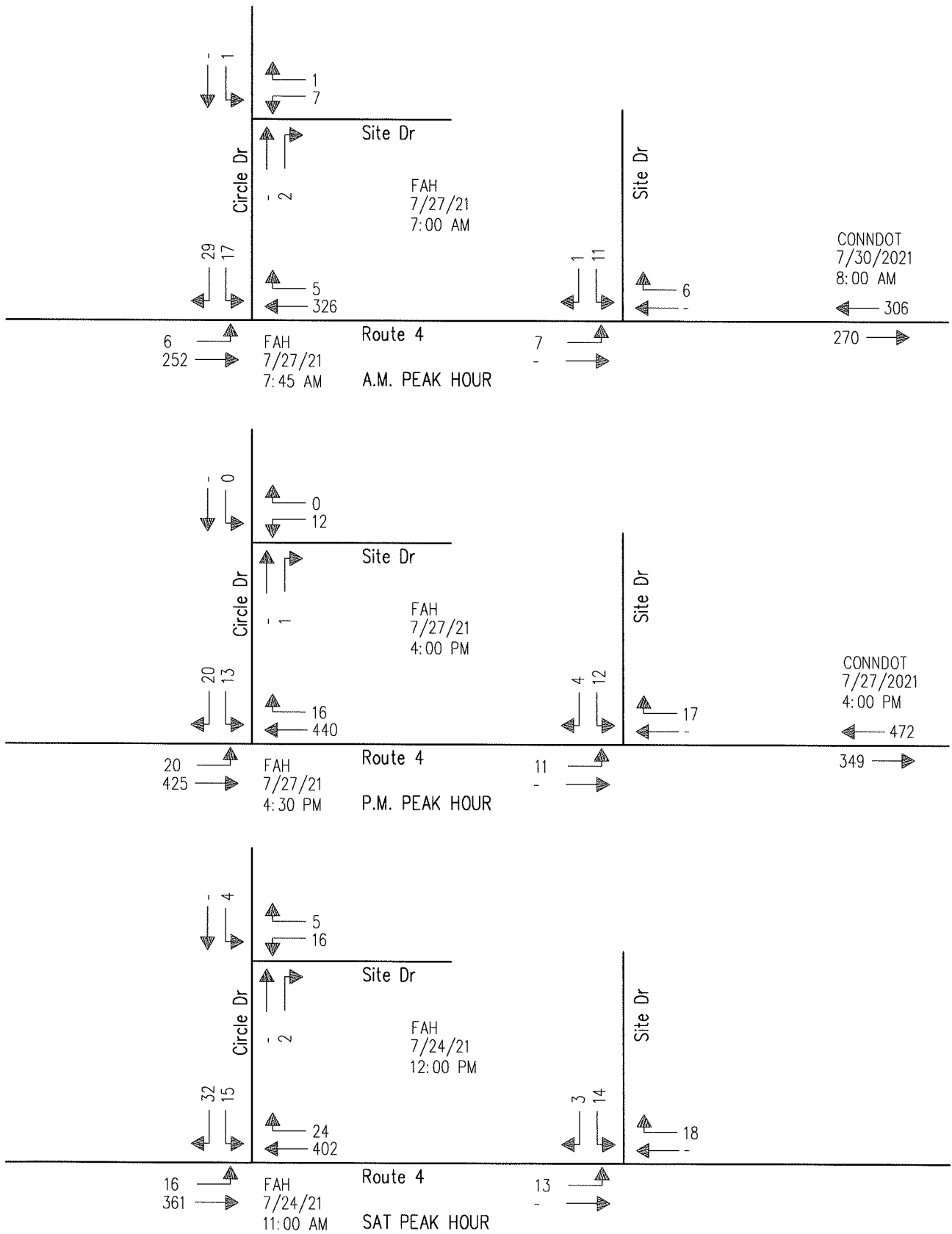


FIGURE 2

6-16-2022

|  |   |
|--|---|
| <p>OBSERVED TRAFFIC VOLUMES<br/>         A.M., P.M. &amp; SAT PEAK HOURS</p> <p>SAM'S CONVENIENCE STORE<br/>         ROUTE 4 (NEW HARWINTON ROAD)<br/>         TORRINGTON, CONNECTICUT</p> | <p><b>F. A. Hesketh &amp; Associates, Inc.</b><br/> <small>6 CREAMERY BROOK, EAST GRANBY, CT 06026</small></p> <p><b>FAH</b> TRAFFIC<br/>         PLANNING<br/>         ENGINEERING<br/>         DESIGN</p> |
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NOT TO SCALE

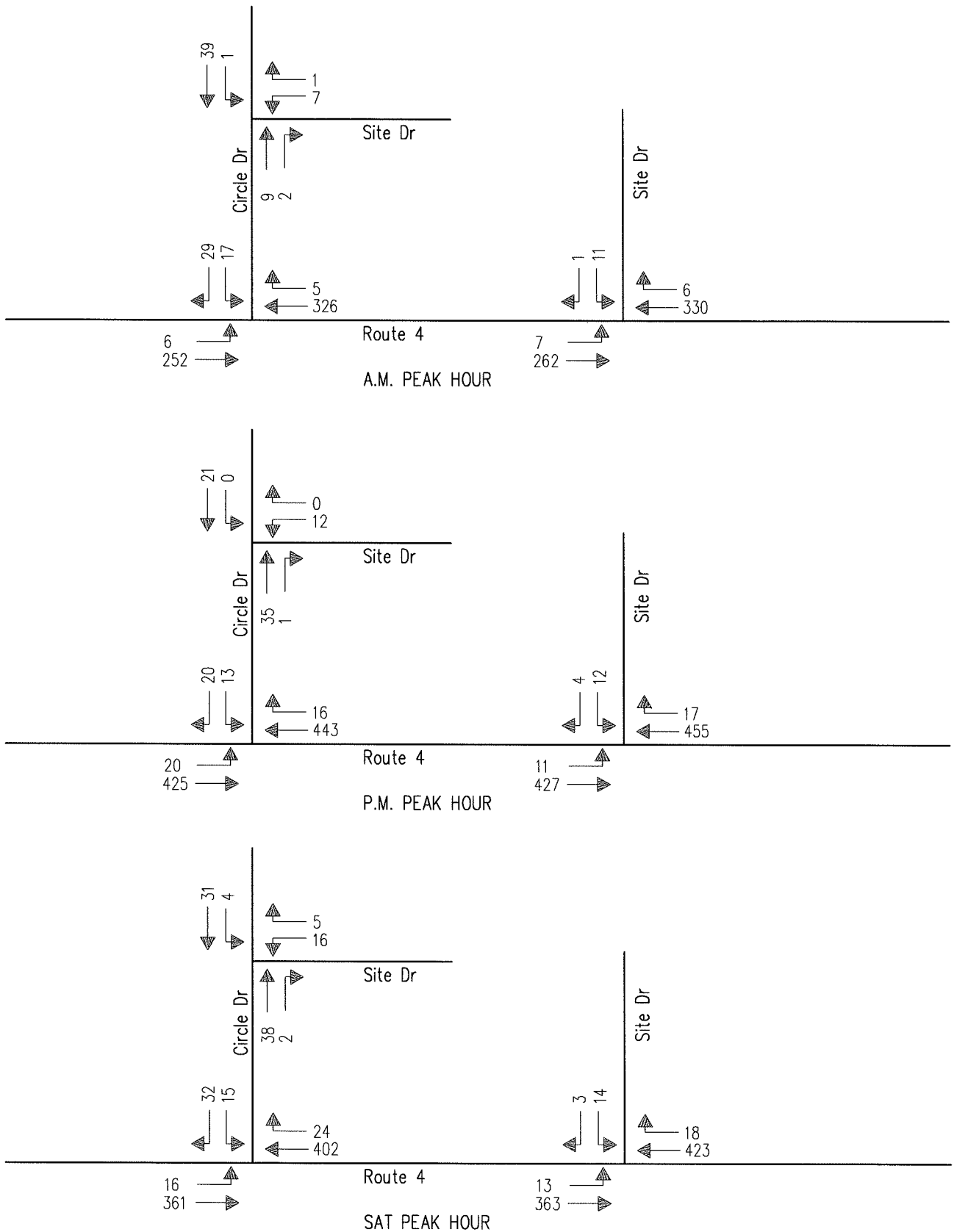


FIGURE 3

BACKGROUND TRAFFIC  
 A.M., P.M. & SAT PEAK HOURS  
 SAM'S CONVENIENCE STORE  
 ROUTE 4 (NEW HARWINTON ROAD)  
 TORRINGTON, CONNECTICUT

6-16-2022

**F. A. Hesketh & Associates, Inc.**  
 6 CREAMERY BROOK, EAST GRANBY, CT 06026

**FAH** TRAFFIC  
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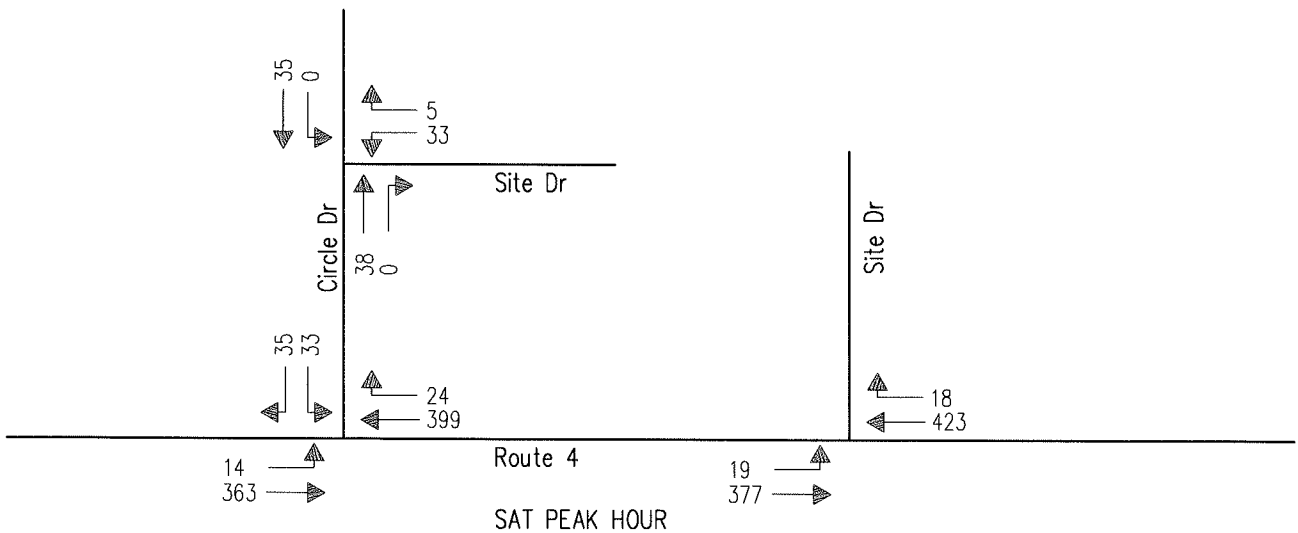
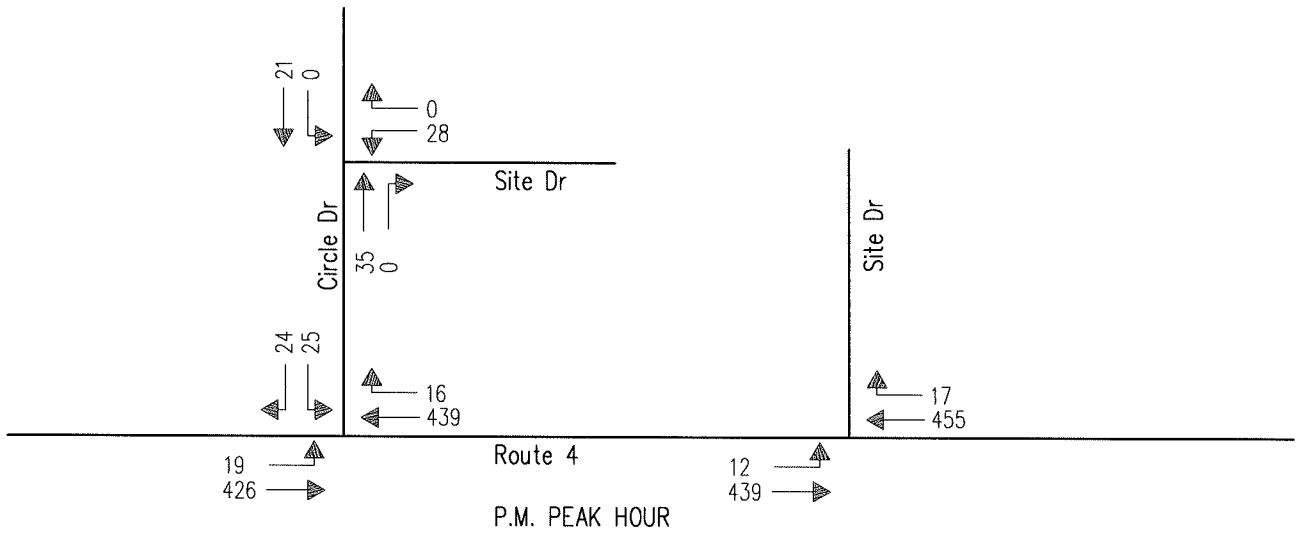
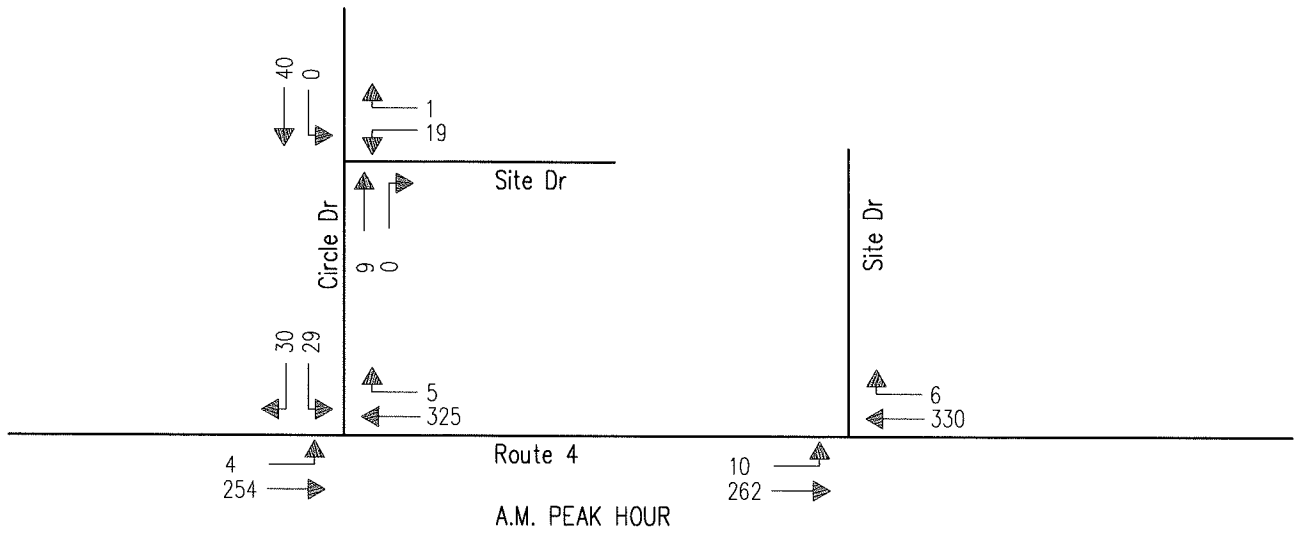


FIGURE 4

ADJUSTED BACKGROUND TRAFFIC  
A.M., P.M. & SAT PEAK HOURS

SAM'S CONVENIENCE STORE  
ROUTE 4 (NEW HARWINTON ROAD)  
TORRINGTON, CONNECTICUT

F. A. Hesketh & Associates, Inc.  
6 CREAMERY BROOK, EAST GRANBY, CT 06026

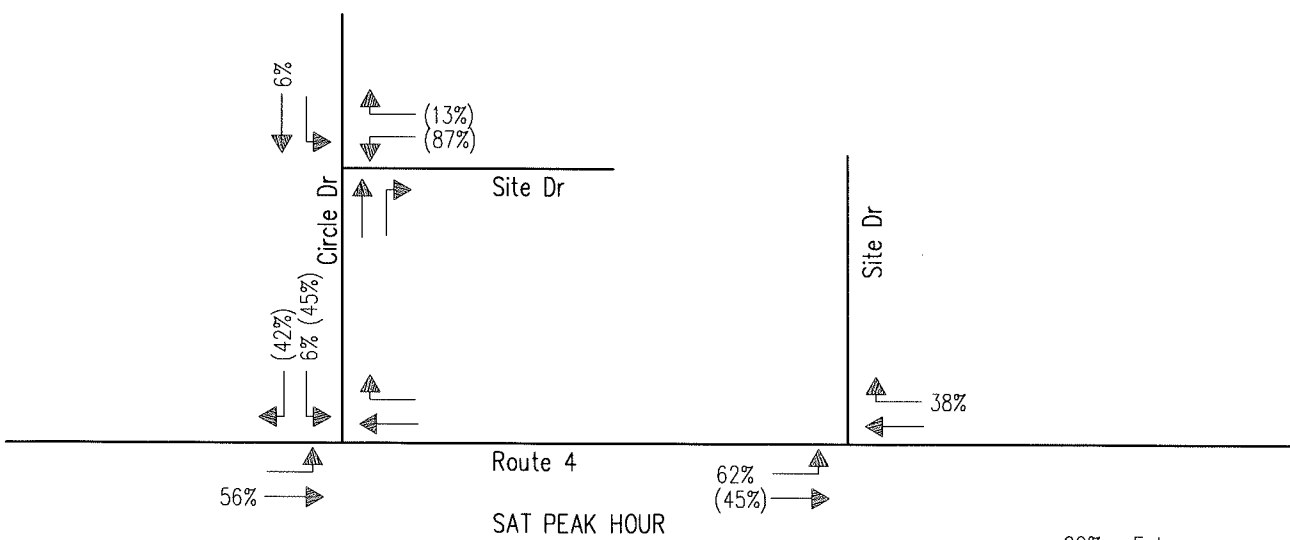
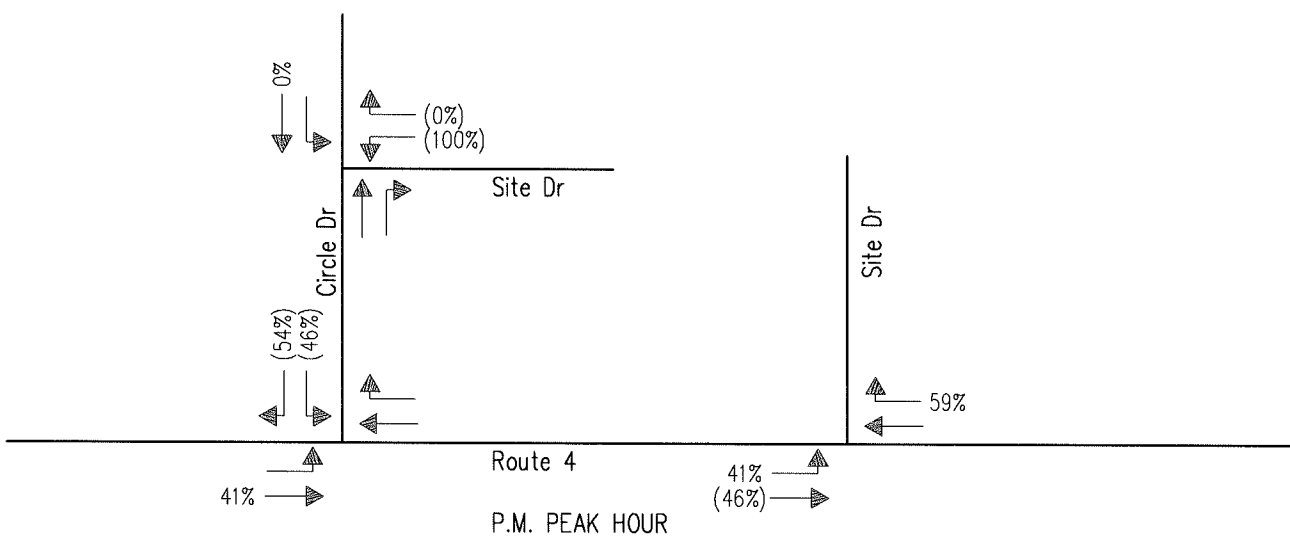
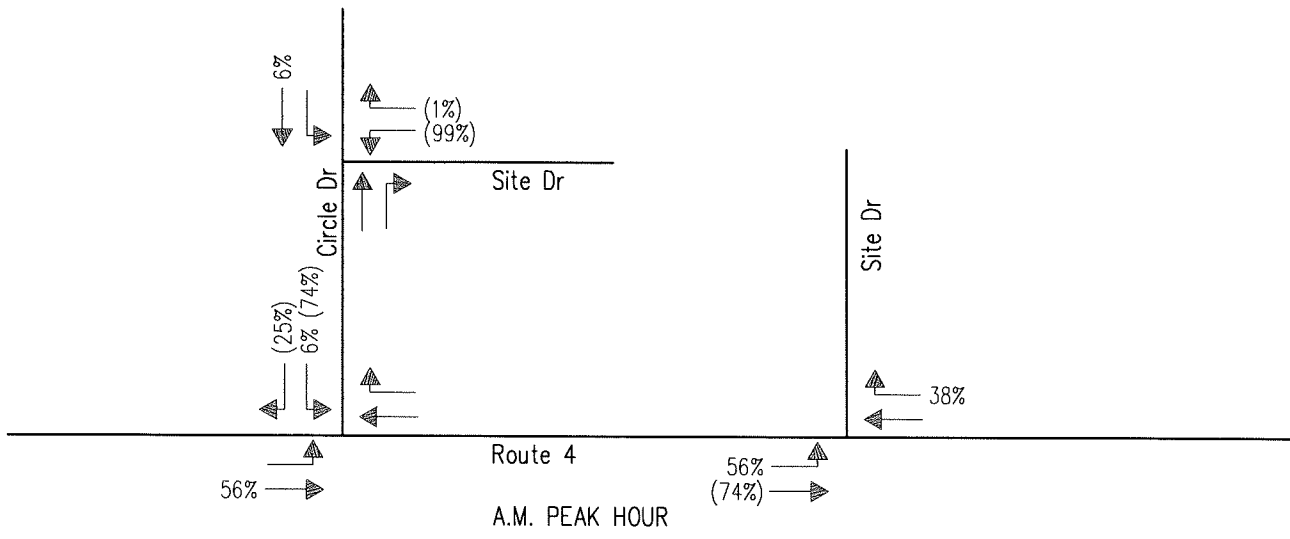
**FAH** TRAFFIC PLANNING ENGINEERING DESIGN

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**Table 2**  
**Trip Generation Summary**  
**Proposed Gasoline Pumps at Existing Convenience Store**  
**Route 4 - Torrington, CT**

| Land Use                             | Size               | ADT         | A.M. Peak Hour |           |            | P.M. Peak Hour |           |            | Saturday    |           | Saturday Peak Hour |            |
|--------------------------------------|--------------------|-------------|----------------|-----------|------------|----------------|-----------|------------|-------------|-----------|--------------------|------------|
|                                      |                    |             | Enter          | Exit      | Total      | Enter          | Exit      | Total      | ADT         | Enter     | Exit               | Total      |
| <b>Existing Development</b>          | <b>2,612 s.f.</b>  | 1990        | 81             | 82        | 163        | 65             | 63        | 128        | 2830        | 103       | 104                | 207        |
|                                      | <b>Counts</b>      |             | <b>16</b>      | <b>20</b> | <b>36</b>  | <b>29</b>      | <b>28</b> | <b>57</b>  |             | <b>37</b> | <b>38</b>          | <b>75</b>  |
| <b>Proposed Development</b>          |                    |             |                |           |            |                |           |            |             |           |                    |            |
| <b>Convenience Market/ Gas Pumps</b> | <b>4 v.f.p.</b>    | 1483        | 32             | 32        | 64         | 37             | 37        | 74         |             | 34        | 34                 | 68         |
| <b>Vehicle Fueling Postions</b>      | <b>2,613 s.f.*</b> | <b>1629</b> | <b>53</b>      | <b>53</b> | <b>106</b> | <b>63</b>      | <b>64</b> | <b>127</b> | <b>1990</b> | <b>81</b> | <b>82</b>          | <b>163</b> |
| <b>Difference</b>                    |                    |             | <b>37</b>      | <b>33</b> | <b>70</b>  | <b>34</b>      | <b>36</b> | <b>70</b>  |             | <b>44</b> | <b>44</b>          | <b>88</b>  |



00% - Enter  
 (00%) - Exit

FIGURE 5

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DIRECTIONAL DISTRIBUTION OF  
 SITE GENERATED TRAFFIC  
 A.M., P.M. & SAT PEAK HOURS  
 SAM'S CONVENIENCE STORE  
 ROUTE 4 (NEW HARWINTON ROAD)  
 TORRINGTON, CONNECTICUT

**F. A. Hesketh & Associates, Inc.**  
 6 CREAMERY BROOK, EAST GRANBY, CT 06026

**FAH** TRAFFIC  
 PLANNING  
 ENGINEERING  
 DESIGN

NOT TO SCALE

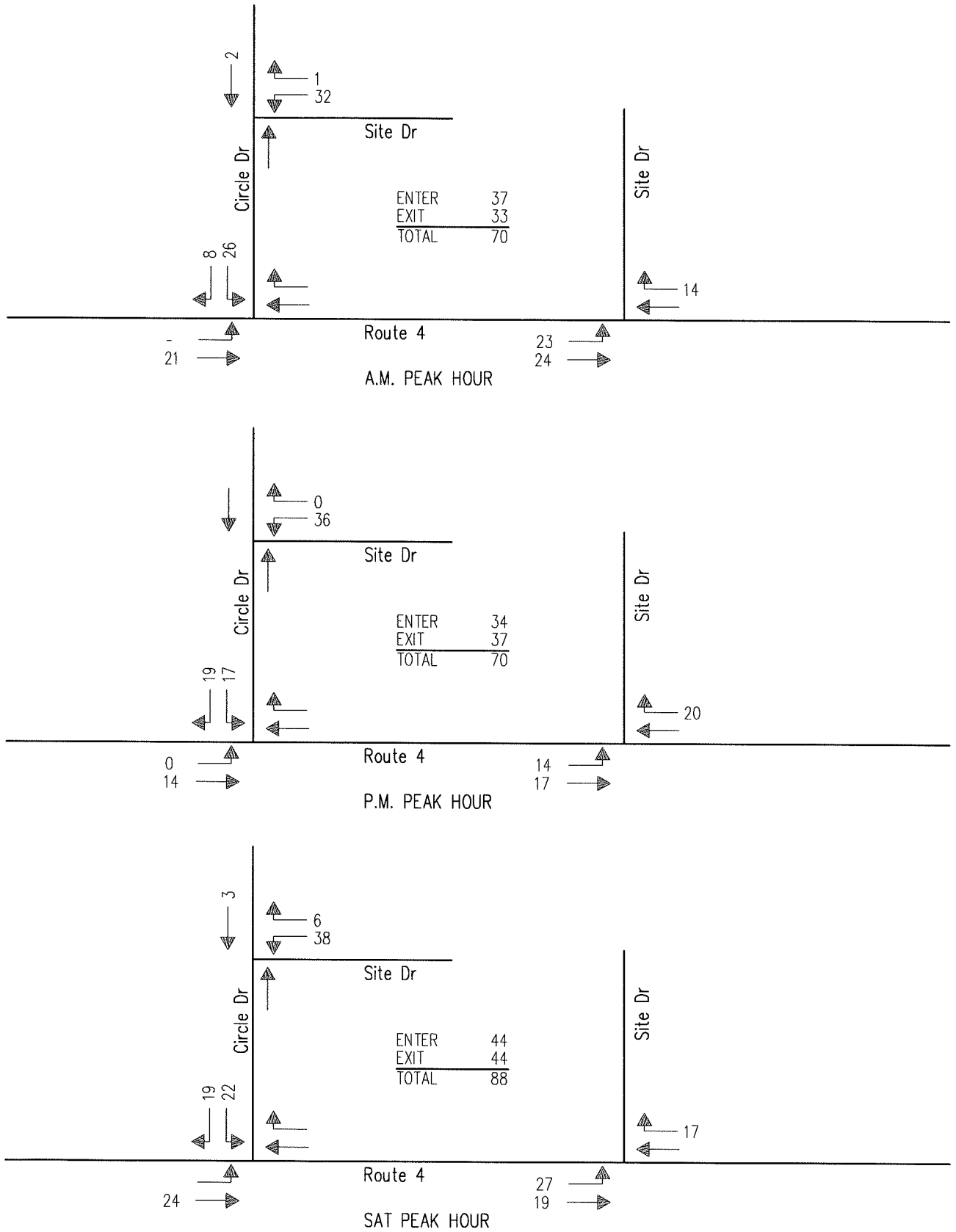


FIGURE 6

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|   |  |
|---|--|
| <p>SITE GENERATED TRAFFIC<br/>A.M., P.M. &amp; SAT PEAK HOURS</p> <p>SAM'S CONVENIENCE STORE<br/>ROUTE 4 (NEW HARWINTON ROAD)<br/>TORRINGTON, CONNECTICUT</p> | <p><b>F. A. Hesketh &amp; Associates, Inc.</b><br/>6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p><b>FAH</b> TRAFFIC<br/>PLANNING<br/>ENGINEERING<br/>DESIGN</p> |
|---|--|

NOT TO SCALE

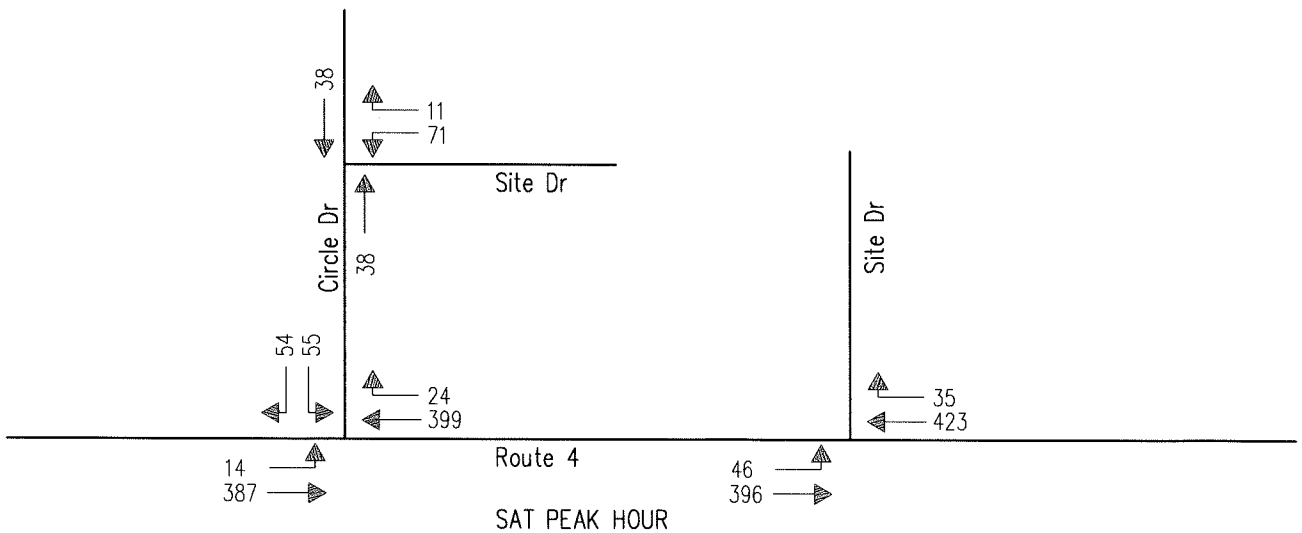
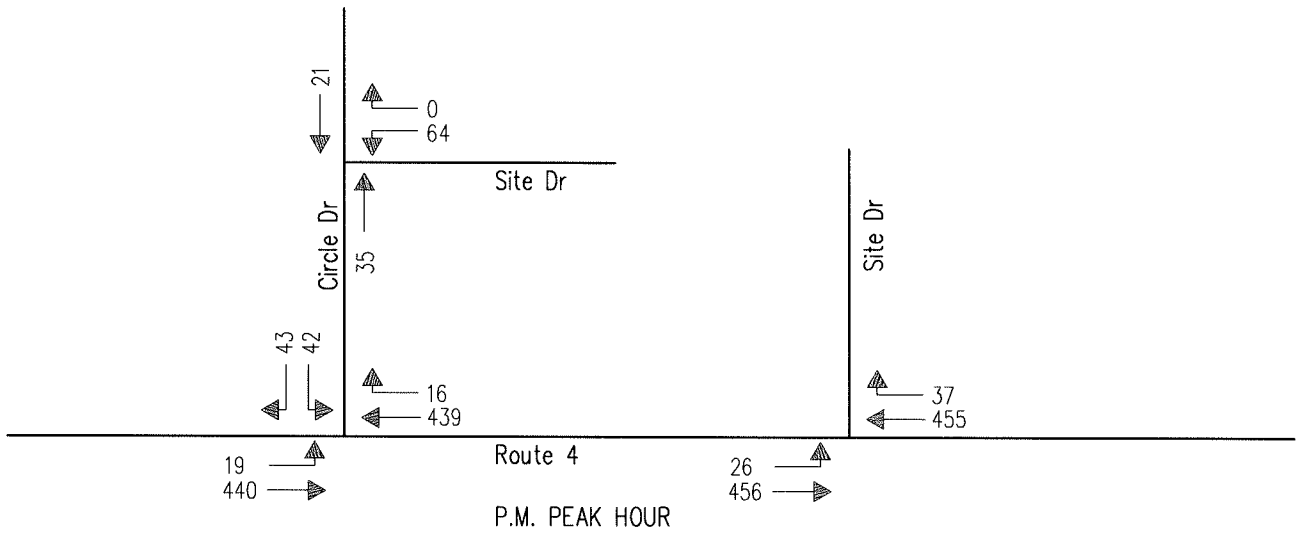
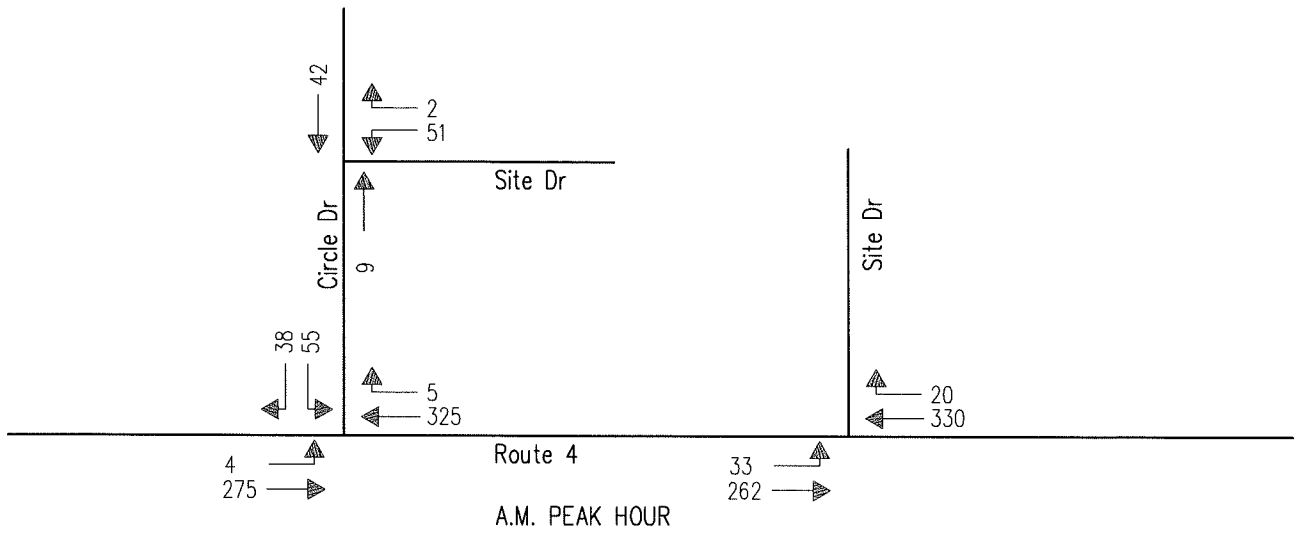


FIGURE 7

6-16-2022

|   |   |
|---|---|
| <p>COMBINED TRAFFIC<br/>A.M., P.M. &amp; SAT PEAK HOURS</p> <p>SAM'S CONVENIENCE STORE<br/>ROUTE 4 (NEW HARWINTON ROAD)<br/>TORRINGTON, CONNECTICUT</p> | <p><b>F. A. Hesketh &amp; Associates, Inc.</b><br/>6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p><b>FAH</b></p> <p>TRAFFIC<br/>PLANNING<br/>ENGINEERING<br/>DESIGN</p> |
|---|---|

NOT TO SCALE

**Table 3**  
**Level Of Service Summary**  
**Sam's Convenience market**  
**Torrington, CT**

| Land Use                             | A.M. Peak Hour |                                |      |            | P.M. Peak Hour |                                |      |            | Saturday Peak Hour |                                |      |            |     |                                |       |            |
|--------------------------------------|----------------|--------------------------------|------|------------|----------------|--------------------------------|------|------------|--------------------|--------------------------------|------|------------|-----|--------------------------------|-------|------------|
|                                      | LOS            | Background Traffic Delay (sec) | v/c  | Queue (ft) | LOS            | Background Traffic Delay (sec) | v/c  | Queue (ft) | LOS                | Background Traffic Delay (sec) | v/c  | Queue (ft) | LOS | Background Traffic Delay (sec) | v/c   | Queue (ft) |
| <b>Route 4 at Circle Drive</b>       |                |                                |      |            |                |                                |      |            |                    |                                |      |            |     |                                |       |            |
| EB                                   | A              | 0.3                            | 0.01 | 0          | A              | 0.2                            | 0.00 | 0          | A                  | 0.6                            | 0.02 | 2          | A   | 0.5                            | 0.02  | 1          |
| WB                                   | A              | 0.0                            | 0.25 | 0          | A              | 0.0                            | 0.25 | 0          | A                  | 0.0                            | 0.30 | 0          | A   | 0.0                            | 0.27  | 0          |
| SB                                   | B              | 12.7                           | 0.10 | 8          | C              | 15.2                           | 0.23 | 22         | C                  | 15.6                           | 0.12 | 11         | B   | 14.1                           | 0.16  | 14         |
| <b>Route 4 at Site Driveway</b>      |                |                                |      |            |                |                                |      |            |                    |                                |      |            |     |                                |       |            |
| EB                                   | A              | 0.3                            | 0.01 | 1          | A              | 1.2                            | 0.03 | 3          | A                  | 0.4                            | 0.01 | 1          | A   | 0.4                            | 0.40  | 1          |
| WB                                   | A              | 0.0                            | 0.25 | 0          | A              | 0.0                            | 0.26 | 0          | A                  | 0.0                            | 0.43 | 0          | A   | 0.0                            | 0.00  | 0          |
| SB                                   | B              | 14.6                           | 0.04 | 3          | C              | 23.0                           | 0.09 | 8          | C                  | 23.0                           | 0.09 | 8          | C   | 16.4                           | 16.40 | 5          |
| <b>Circle Drive at Site Driveway</b> |                |                                |      |            |                |                                |      |            |                    |                                |      |            |     |                                |       |            |
| NB                                   | A              | 0.0                            | 0.01 | 0          | A              | 0.0                            | 0.01 | 0          | A                  | 0.0                            | 0.03 | 0          | A   | 0.0                            | 0.04  | 0          |
| SB                                   | A              | 0.2                            | 0.00 | 0          | A              | 0.0                            | 0.03 | 0          | A                  | 0.0                            | 0.00 | 0          | A   | 0.8                            | 0.00  | 0          |
| WB                                   | A              | 8.8                            | 0.01 | 1          | A              | 9.1                            | 0.07 | 6          | A                  | 9.0                            | 0.02 | 1          | A   | 9.1                            | 0.03  | 2          |

**TABLE A  
SUMMARY OF GAP STUDY  
ROUTE 4 (NEW HARWINTON RD) AT CIRCLE DRIVE  
WESTBOUND GAPS  
DECEMBER 15, 2021 (7:00 - 8:45 AM)**

| Time Period | Observed Gaps |         |          |             | TOTALS |
|-------------|---------------|---------|----------|-------------|--------|
|             | 5-6 Sec       | 7-8 Sec | 9-14 Sec | 15 sec plus |        |
| 7:00 - 7:15 | 8             | 5       | 11       | 19          | 43     |
| 7:15 - 7:30 | 1             | 3       | 13       | 20          | 37     |
| 7:30 - 7:45 | 7             | 5       | 15       | 16          | 43     |
| 7:45 - 8:00 | 7             | 5       | 15       | 17          | 44     |
| 7:00 - 8:00 | 23            | 18      | 54       | 72          | 167    |
| 8:00 - 8:15 | 9             | 6       | 13       | 16          | 44     |
| 8:15 - 8:30 | 7             | 6       | 9        | 16          | 38     |
| 8:30 - 8:45 | 4             | 4       | 14       | 20          | 42     |
| 8:00 - 8:45 | 20            | 16      | 36       | 52          | 124    |

NUMBER OF VEHICLES THAT CAN USE THE AVAILABLE GAPS (7 - 8 am)

|                 | NUMBER                          | CARS PER GAP | TOTAL |
|-----------------|---------------------------------|--------------|-------|
| 7 - 8 sec gap   | 18                              | 1            | 18    |
| 9 - 14 sec gap  | 54                              | 2            | 108   |
| 15 sec plus gap | 54                              | 3            | 162   |
|                 |                                 | TOTAL        | 288   |
|                 | Projected volume of Right Turns |              | 38    |
|                 | Gap Ration (2.0 Required)       |              | 7.58  |

**TABLE B  
SUMMARY OF GAP STUDY  
ROUTE 4 (NEW HARWINTON RD) AT CIRCLE DRIVE  
WESTBOUND GAPS  
DECEMBER 14, 2021 (4:00 - 6:00 PM)**

| Time Period | Observed Gaps |         |          |             | TOTALS |
|-------------|---------------|---------|----------|-------------|--------|
|             | 5-6 Sec       | 7-8 Sec | 9-14 Sec | 15 sec plus |        |
| 4:00 - 4:15 | 10            | 6       | 13       | 19          | 48     |
| 4:15 - 4:30 | 16            | 7       | 10       | 15          | 48     |
| 4:30 - 4:45 | 11            | 10      | 9        | 13          | 43     |
| 4:45 - 5:00 | 11            | 8       | 11       | 16          | 46     |
| 4:00 - 5:00 | 48            | 31      | 43       | 63          | 185    |
| 5:00 - 5:15 | 12            | 10      | 15       | 14          | 51     |
| 5:15 - 5:30 | 10            | 8       | 14       | 18          | 50     |
| 5:30 - 5:45 | 12            | 10      | 14       | 17          | 53     |
| 5:45 - 6:00 | 12            | 7       | 12       | 19          | 50     |
| 5:00 - 6:00 | 46            | 35      | 55       | 68          | 204    |

NUMBER OF VEHICLES THAT CAN USE THE AVAILABLE GAPS (4 - 5 PM)

|                 | NUMBER                          | CARS PER GAP | TOTAL |
|-----------------|---------------------------------|--------------|-------|
| 7 - 8 sec gap   | 31                              | 1            | 31    |
| 9 - 14 sec gap  | 43                              | 2            | 86    |
| 15 sec plus gap | 63                              | 3            | 189   |
|                 |                                 | TOTAL        | 306   |
|                 | Projected volume of Right Turns |              | 43    |
|                 | Gap Ration (2.0 Required)       |              | 7.12  |



**TABLE C  
SUMMARY OF GAP STUDY  
ROUTE 4 (NEW HARWINTON RD) AT CIRCLE DRIVE  
COMBINED GAPS  
DECEMBER 15, 2021 (7:00 - 8:45 AM)**

| Time Period | Observed Gaps |         |          |             | TOTALS |
|-------------|---------------|---------|----------|-------------|--------|
|             | 5-6 Sec       | 7-8 Sec | 9-14 Sec | 15 sec plus |        |
| 7:00 - 7:15 | 16            | 11      | 26       | 5           | 58     |
| 7:15 - 7:30 | 9             | 7       | 17       | 18          | 51     |
| 7:30 - 7:45 | 17            | 10      | 13       | 12          | 52     |
| 7:45 - 8:00 | 11            | 10      | 16       | 10          | 47     |
| 7:00 - 8:00 | 53            | 38      | 72       | 45          | 208    |
| 8:00 - 8:15 | 15            | 9       | 18       | 12          | 54     |
| 8:15 - 8:30 | 15            | 11      | 10       | 15          | 51     |
| 8:30 - 8:45 | 11            | 8       | 18       | 15          | 52     |
| 8:00 - 8:45 | 41            | 28      | 46       | 42          | 157    |

NUMBER OF VEHICLES THAT CAN USE THE AVAILABLE GAPS (7:45 - 8:45 am)

|                 | NUMBER                          | CARS PER GAP | TOTAL |
|-----------------|---------------------------------|--------------|-------|
| 7 - 8 sec gap   | 38                              | 1            | 38    |
| 9 - 14 sec gap  | 62                              | 2            | 124   |
| 15 sec plus gap | 52                              | 3            | 156   |
|                 |                                 | TOTAL        | 318   |
|                 | Projected volume of Right Turns |              | 55    |
|                 | Gap Ration (2.0 Required)       |              | 5.78  |

**TABLE D  
SUMMARY OF GAP STUDY  
ROUTE 4 (NEW HARWINTON RD) AT CIRCLE DRIVE  
COMBINED GAPS  
DECEMBER 14, 2021 (4:00 - 6:00 PM)**

| Time Period | Observed Gaps |         |          |             | TOTALS |
|-------------|---------------|---------|----------|-------------|--------|
|             | 5-6 Sec       | 7-8 Sec | 9-14 Sec | 15 sec plus |        |
| 4:00 - 4:15 | 12            | 8       | 16       | 8           | 44     |
| 4:15 - 4:30 | 19            | 11      | 11       | 6           | 47     |
| 4:30 - 4:45 | 16            | 10      | 10       | 6           | 42     |
| 4:45 - 5:00 | 18            | 11      | 11       | 6           | 46     |
| 4:00 - 5:00 | 65            | 40      | 48       | 26          | 179    |
| 5:00 - 5:15 | 22            | 12      | 14       | 5           | 53     |
| 5:15 - 5:30 | 20            | 15      | 15       | 5           | 55     |
| 5:30 - 5:45 | 18            | 13      | 16       | 9           | 56     |
| 5:45 - 6:00 | 13            | 13      | 16       | 13          | 55     |
| 5:00 - 6:00 | 73            | 53      | 61       | 32          | 219    |

NUMBER OF VEHICLES THAT CAN USE THE AVAILABLE GAPS (4 - 5 PM)

|                 | NUMBER                          | CARS PER GAP | TOTAL |
|-----------------|---------------------------------|--------------|-------|
| 7 - 8 sec gap   | 40                              | 1            | 40    |
| 9 - 14 sec gap  | 48                              | 2            | 96    |
| 15 sec plus gap | 26                              | 3            | 78    |
|                 |                                 | TOTAL        | 214   |
|                 | Projected volume of Right Turns |              | 42    |
|                 | Gap Ration (2.0 Required)       |              | 5.10  |

**Table E**  
**Stop Sign Delay Summary**  
**Route 4 (New Harwinton RD) at Circle Drive**

|                  |             | 15-Dec-21<br>AM Peak<br>(7:00-8:45) | 14-Dec-21<br>PM Peak<br>(4:30-6:00) |
|------------------|-------------|-------------------------------------|-------------------------------------|
| LOS A            | 0 - 10 sec  | 63                                  | 38                                  |
| LOS B            | 10 - 15 Sec | 13                                  | 9                                   |
| LOS C            | 15 - 25 Sec | 11                                  | 7                                   |
| LOS D            | 25 - 35 Sec | 3                                   | 3                                   |
| LOS E            | 35 - 50 sec | 2                                   | 0                                   |
| LOS F            | > 50 Sec    | 1                                   | 1                                   |
| <b>Total</b>     |             | <b>93</b>                           | <b>58</b>                           |
| Avg Stopped Time |             | 9.94 Sec                            | 10.84 Sec                           |
| Max Stopped Time |             | 53 Sec                              | 54 Sec                              |
| Avg Queue Length |             | 0.13 Veh                            | 0.12 Veh                            |
| Maximum Queue    |             | 3 Veh                               | 2 Veh                               |