2/21 JDT 2/28/06 MTB

# ZIEGER TRACT
# RESIDENTIAL DEVELOPMENT
# TRAFFIC IMPACT STUDY

*For Submission To*

**UPPER DUBLIN TOWNSHIP**
**MONTGOMERY COUNTY, PENNSYLVANIA**

**TPD# TOLB.A.00026**

**February 15, 2006**

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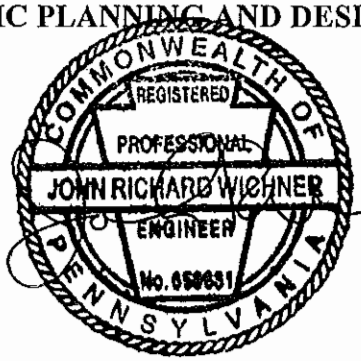


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## EXECUTIVE SUMMARY

The purpose of this study is to examine the potential traffic impact of the proposed Zieger Tract Residential Development on the surrounding transportation system in Upper Dublin Township, Montgomery County, Pennsylvania. Upon completion of the traffic impact study the following has been determined:

- The site for the proposed development is located on the southern side of Welsh Road (S.R. 0063) between Dreshertown Road (S.R. 2024) and Jarrettown Road. The proposed development will consist of 41 single-family homes.
- Access to the proposed site will be provided by one (1) full-access driveway to the external roadway, located on the western side of Dreshertown Road (S.R. 2024), approximately 860 feet south of the centerline of Welsh Road (S.R. 0063). The proposed development will also share internal access with the existing residential development to the south via Harrington Road.
- The proposed development will generate 39 new vehicle-trips during the weekday A.M. peak hour (approximately 1 new vehicle-trip every 2 minutes) and 48 new vehicle-trips during the weekday P.M. peak hour (less than 1 new vehicle-trip every minute).
- Under 2008 Projected Conditions, all approaches and turning movements at the study area intersections and proposed site driveways will continue to operate at the same LOS as 2008 Base Conditions or at LOS D or better during the weekday A.M. and P.M. peak hours, except for the eastbound approach at the proposed site driveway on Dreshertown Road, will operate at LOS F during the weekday A.M. and P.M. peak hours. This LOS deficiency represents conditions for the proposed driveway approaches only and are primarily due to the large number of through vehicles on Dreshertown Road. Any delay or queuing experienced at these approaches will be for site-related vehicles, and will be contained on-site and not on Dreshertown Road. It is TPD's opinion that the only improvement to achieve LOS D or better for all movements is the installation of a traffic signal at the proposed driveway location on Dreshertown Road. However, PennDOT Signal Warrant (xi), the Peak Hour Volume Warrant, will not be satisfied for the proposed driveway location intersection.
- TPD has made the following recommendations in relation to the proposed development:
  - With the development of the proposed site, the northbound leg (private driveway) of the intersection of Welsh Road and Dresher Road will be eliminated. Currently the northbound leg has its own phase in the existing signal timings. Therefore, the signal at the intersection of Welsh Road and Dresher Road should be modified (i.e. signal retiming and equipment) due to the elimination of the existing northbound approach from the signal;
  - Coordinate with the Prudential Eastern Home Office with regards to the planned widening of Dreshertown Road, in order to construct a 75-foot long left-turn lane on northbound Dreshertown Road;
  - Construct a 175-foot long deceleration lane with a 75-foot long taper on southbound Dreshertown Road at the proposed site driveway;
  - Provide 35-foot (minimum) turning radii at the proposed site driveway in order to facilitate safe and efficient ingress and egress to/from the proposed site.

**TABLE A**
**LEVEL OF SERVICE (DELAY) SUMMARY**
**WEEKDAY AM PEAK HOUR**

| Intersection | Movement | AM LOS (DELAY) | | |
|---|---|---|---|---|
| | | 2006 Existing | 2008 Base* | 2008 Projected** |
| Welsh Road & Jarrettown Road/Village Road | EBL | B | A | A |
| | EBTR | E | B | B |
| | WBL | F(108.1) | B | B |
| | WBTR | B | B | B |
| | NB | E | -- | -- |
| | NBLT | -- | D | D |
| | NBR | -- | D | D |
| | SB | D | D | D |
| | **ILOS** | **D** | **B** | **C** |
| Welsh Road & Dresher Road | EB | B | C | D |
| | WBLT | C | D | -- |
| | WBT | -- | -- | D |
| | WBR | E | A | A |
| | NB | A | A | -- |
| | SBL | E | D | D |
| | SBLT | E | D | -- |
| | SBR | C | A | B |
| | **ILOS** | **C** | **C** | **D** |
| Welsh Road & Dreshertown Road | EB | D | -- | -- |
| | EBT | -- | D | D |
| | EBR | -- | B | B |
| | WBL | D | D | D |
| | WBT | A | A | A |
| | NBL | D | D | D |
| | NBR | D | D | D |
| | **ILOS** | **C** | **C** | **C** |
| Jarrettown Road & Holly Hill Lane | EB | B | B | B |
| | NBL | A | A | A |
| Dreshertown Road & Proposed Driveway | EB | -- | -- | F |
| | NBL | -- | -- | A |

* = With Prudential Improvements
** = With Site-Related Recommendations

**TABLE B**
**LEVEL OF SERVICE (DELAY) SUMMARY**
**WEEKDAY PM PEAK HOUR**

| Intersection | Movement | PM LOS (DELAY) | | |
|---|---|---|---|---|
| | | 2006 | 2008 | 2008 |
| | | Existing | Base* | Projected** |
| Welsh Road & Jarrettown Road/Village Road | EBL | B | D | D |
| | EBTR | C | B | B |
| | WBL | D | B | B |
| | WBTR | C | D | D |
| | NB | D | -- | -- |
| | NBLT | -- | D | D |
| | NBR | -- | D | D |
| | SB | E | D | D |
| | **ILOS** | **C** | **C** | **C** |
| Welsh Road & Dresher Road | EB | B | C | D |
| | WBLT | D | F(99.9) | -- |
| | WBT | -- | -- | D |
| | WBR | E | C | A |
| | NB | A | A | -- |
| | SBL | F(121.5) | E | D |
| | SBLT | F(120.6) | E | -- |
| | SBR | B | B | C |
| | **ILOS** | **E** | **E** | **D** |
| Welsh Road & Dreshertown Road | EB | E | -- | -- |
| | EBT | -- | E | E |
| | EBR | -- | B | B |
| | WBL | F(135.0) | E | E |
| | WBT | A | A | A |
| | NBL | D | D | D |
| | NBR | C | B | B |
| | **ILOS** | **D** | **D** | **D** |
| Jarrettown Road & Holly Hill Lane | EB | B | B | B |
| | NBL | A | A | A |
| Dreshertown Road & Proposed Driveway | EB | -- | -- | F |
| | NBL | -- | -- | A |

* = With Prudential Improvements
** = With Site-Related Recommendations

## INTRODUCTION

Traffic Planning and Design, Inc. (TPD) has completed a traffic impact study (TIS) for the proposed Zieger Tract Residential Development in Upper Dublin Township, Montgomery County, PA. As shown in Figure 1, the site for the proposed development is located on the southern side of Welsh Road (S.R. 0063) between Dreshertown Road (S.R. 2024) and Jarrettown Road. As shown in Figure 2, the proposed development will consist of 41 single-family homes.

## EXISTING ROAD NETWORK

A survey of the existing roadway system in the study area is as follows:

Welsh Road (S.R. 0063) is a four-lane, urban principal arterial roadway with a posted speed limit of 45 m.p.h. in the vicinity of the proposed site. Welsh Road has separate eastbound and westbound left-turn lanes at its signalized intersection with Jarrettown Road/Village Road. Welsh Road has a separate westbound right-turn lane at its signalized intersection with Dresher Road. Welsh Road has a separate westbound left-turn lane at its signalized intersection with Dreshertown Road. The pavement and lane markings are in good condition.

Dreshertown Road (S.R. 2024) is a two-lane, north-south urban minor arterial roadway with a posted speed limit of 40 m.p.h. in the vicinity of the proposed site. Dreshertown Road has separate northbound dual left-turn lanes and a separate northbound right-turn lane at its signalized intersection with Welsh Road. The pavement and lane markings are in good condition.

Dresher Road is a four-lane, north-south arterial roadway with a posted speed limit of 35 m.p.h. in the vicinity of the site. At its signalized intersection with Welsh Road, southbound Dresher Road has a separate left-turn lane, a separate through/left lane, and a separate right-turn lane. The pavement and lane markings are in good condition.

Jarrettown Road is a two-lane, north-south collector roadway with a posted speed limit of 35 m.p.h. in the vicinity of the site. At its signalized intersection with Welsh Road and Village Road, Jarrettown Road forms the northbound approach. The pavement is in fair condition and the lane markings are in good condition.

Village Road is a two-lane, north-south local roadway with no posted speed limit in the vicinity of the proposed site. At its signalized intersection with Welsh Road and Jarrettown Road, Village Road forms the southbound approach. The pavement and lane markings are in good condition.

Holly Hill Lane is a two-lane, east-west local roadway with no posted speed limit in the vicinity of the proposed site. Holly Hill Lane forms an unsignalized "T"-intersection with Jarrettown Road, with the eastbound Holly Hill Lane as the STOP-controlled approach. The pavement is in good condition and there are no lane markings.

The existing lane configurations and intersection controls are depicted in Figure 3. Study area photographs are included in Appendix A.

## SITE ACCESS

Access to the proposed site will be provided by one (1) full-access driveway to the external roadway, located on the western side of Dreshertown Road (S.R. 2024), approximately 860 feet south of the centerline of Welsh Road (S.R. 0063). The proposed development will also share internal access with the existing residential development to the south via Harrington Road.

## SIGHT DISTANCE ANALYSIS

A sight distance analysis was performed for the proposed site driveway. The existing continuous sight distances for exiting vehicles and vehicles entering via left-turn movements were measured and compared to the continuous sight distance standards for local roads as specified in Publication 13M (DM-2), Chapter 2, "Design Elements and Design Controls," July, 2002. Due to the fact that Publication 13M (DM-2) does not have criteria regarding the required sight distance to the rear of a vehicle entering via a left-turn movement (approaching from the same direction), the existing sight distance for the movement was compared to PennDOT's safe stopping sight distance (SSSD) standards as calculated by the following equation:

$$\mathbf{SSSD = 1.47VT + V^2/[30(f \pm g)]}$$

SSSD = safe stopping sight distance (acceptable sight distance)
V = 85th Percentile Speed
T = Perception Reaction Time of Driver (2.5 seconds)
f = Coefficient of Friction for Wet Pavements (average of 0.30)
g = Percent of Roadway Grade Divided by 100

PennDOT's safe stopping sight distance standards exceed the stopping sight distance requirements as specified in A Policy on Geometric Design of Highways and Streets, of the American Association of State Highway and Transportation Officials (AASHTO), Chapter III, "Elements of Design," 2001.

Table 1 shows the PennDOT required and existing sight distances at the proposed Dreshertown Road Driveway for vehicles entering and exiting the site.

**TABLE 1**
**SIGHT DISTANCE ANALYSIS – DRESHERTOWN ROAD**

| | Direction | Posted Speed (mph) | Grade[1] (%) | Sight Distances (feet) | |
|---|---|---|---|---|---|
| | | | | ISD[2] | EXIST |
| **Exiting Movements** | To the Left | 40 | -1 | 445 | **650** |
| | To the Right | 40 | +1 | 445 | **695** |
| **Entering Left-Turns** | Approaching Same Direction | 40 | +1 | 319[3] | **650** |
| | Approaching Opposite Direction | 40 | -1 | 325 | **650** |

ISD = Intersection Sight Distance (Pub. 13M (DM-2))
SSSD = PennDOT Safe Stopping Sight Distance
EXIST = Existing (measured) Sight Distance

1. Grade Approaching Driveway
2. Based on Posted Speed Limit
3. Utilizing SSSD

As shown in Table 1, the sight distances at the proposed Dreshertown Road Driveway will satisfy PennDOT sight distance requirements.

## PLANNED ROADWAY IMPROVEMENTS

Based on a review of the PennDOT 12-Year Plan and the DVRPC Transportation Improvement Program (TIP), there are no planned roadway improvements that will affect the intersections in the study area. Based on TPD's experience in Upper Dublin Township, and a conversation with Township Staff, the following roadway improvements are planned near the study area intersections:

- As outlined in the Traffic Impact Study for the Prudential Eastern Home Office (Phases 1 through 5), dated December 1998, the following improvements (not yet constructed) are scheduled at the study area intersections as part of that development:
  - A separate EB Welsh Road right-turn lane at the intersection of Welsh Road and Dreshertown Road;
  - An additional EB Welsh Road through/right lane at the intersection of Welsh Road and Jarrettown Road;
  - A separate NB Jarrettown Road right-turn lane at the intersection of Welsh Road and Jarrettown Road;
  - With the construction of Phase 5, a driveway will be constructed on the eastern side of Dreshertown Road, approximately 2,200 feet south of the centerline of Welsh Road. With this driveway, widening is proposed on the eastern side of Dreshertown Road, from the driveway to Welsh Road.

- Dresher Road Project - Construction of this project was recently completed. This project upgraded the section of Dresher Road between Horsham and Welsh Roads (Routes 463 and 63) in Horsham Township. This project included the following:
  - Reconstruction of the entire roadway from Welsh to Horsham Roads
  - Adding a lane in each direction and providing a left turn lane at the signalized intersections (at Welsh, Walnut Grove, Witmer and Horsham Roads)
  - Reprofiling the roadway to improve the drive and sight distance
  - Upgrading traffic signal technology for all applicable intersections
  - Construction of two reinforced concrete retaining walls between Fair Oaks Avenue and Pine Avenue and between Pine Avenue and Hill Avenue
  - Construction of bike lanes in each direction along Dresher Road from Welsh Road to New Road
  - Stormwater management improvements throughout the project length from Welsh to Horsham Roads
  - Bridge reconstruction of the Dresher Road Bridge over the Pennypack Creek
- Welsh Road widening - It is TPD's understanding that the bridge on Welsh Road over the Pennsylvania Turnpike will be widened in the future. The following improvements will be constructed in conjunction with the planned bridge widening:
  - Construct an additional EB Welsh Road through lane from Blair Mill Road to Twining Road. The through lane will terminate to a dedicated right turn lane at its intersection Twining Road.
  - Construct an additional WB Welsh Road through lane from approximately 400 feet east of Twining Road to Computer Avenue.
  - Construct a NB Twining Road right-turn lane at Route 63.

TPD has included the improvements outlined under the Prudential Eastern Home Office (above) for all future (base and projected) conditions.

## EXISTING TRAFFIC VOLUMES

Manual traffic counts were conducted during the weekday morning (7:00-9:00 A.M.) and weekday evening (4:00-6:00 P.M.) peak hours of street traffic at the following locations:

- Welsh Road (S.R. 0063) and Jarrettown Road/Village Road;
- Welsh Road (S.R. 0063) and Dresher Road;
- Welsh Road (S.R. 0063) and Dreshertown Road (S.R. 2024);
- Jarrettown Road and Holly Hill Lane.

***It should be noted that the scope for this study was confirmed by Upper Dublin Township Staff.***

The counts were taken at fifteen-minute intervals on Wednesday, February 1, 2006. For a given peak traffic period, the "peak hour" consists of the four consecutive 15-minute intervals during which the highest traffic volumes occur.

2006 Existing Condition traffic volumes for the weekday A.M. and P.M. peak hours are shown in Figures 4 and 5, respectively. The manual traffic count printouts are included in Appendix B.

## BASE CONDITIONS

### Background Growth

A background growth factor for the roadways in the study area was developed based on information supplied by the PennDOT Bureau of Planning and Research (BPR). According to the BPR, growth values were determined utilizing an average of the last 9 years of growth information and comparing it to an average calculated from 9 years of historical growth. Based on the calculations, the PennDOT BPR recommends utilizing a background growth trend factor of 1.021 (2.1%) per year in Montgomery County for Functional Class Group (FCG) 3 pertaining to urban minor arterial roadways. Thus, base condition traffic volumes (assuming a no-build scenario) were developed for the build-out year of 2008 utilizing a factor of 1.0424 (2.1% per year compounded for two years) to adjust existing volumes.

### Nearby Planned Developments

Base condition traffic volumes should also include traffic from nearby developments that may be generating traffic by the time the proposed development is completed. Based on a conversation with Township Staff and experience in the area, TPD has included traffic from the following five (5) significant developments:

*Prudential Eastern Home Office* - full build-out of the site located on the south side of Welsh Road, west of the PA Turnpike. It is TPD's understanding that at the time this study was performed, a total of 993,000 square feet of office space was unoccupied/not constructed. Trip distribution for this development was based on the TIS prepared by McMahon Associates, dated December 1998. TPD assumed full occupancy of the site by 2008.

*Proposed Retail Center* – full-build out of the retail site proposed along Blair Mill Road (existing K&S site), north of the Willow Grove Pointe shopping center. The site will consist of 203,000 s.f. of retail space. Trip distribution for this development was based on the TIS prepared by TPD, dated August 8, 2005. TPD assumed full occupancy of the site by 2008.

*Mixed-Use Development* – located on the northeast corner of Dreshertown Road and Limekiln Pike. The site will consist of the following:

- 19,666 s.f. auto service facility;
- 5,000 s.f. bank;
- 1,573 s.f. post office;
- 7,733 s.f. retail.

Trip distribution for this development was based on the rates contained in the ITE Trip Generation Manual. TPD assumed full occupancy of the site by 2008.

Walnut Grove Lot 7 – located on the southern side of Witmer Road, east of Prudential Road. The proposed development will consist of an additional 73,177 s.f. of office space. Trip distribution for this development was based on the TIS prepared by TPD, dated November 17, 2005. TPD assumed full occupancy of the site by 2008.

Spectra Graphics Site – located on the western side of Route 611 (S.R. 0611), adjacent to existing Forms Lane. The development will consist of a 103 room hotel, 101 room extended stay hotel, a 10,000 square foot restaurant, and six (6) 6,500 square foot quality restaurants. Trip distribution for this development was based on the TIS prepared by TPD, dated September 9, 2004. TPD assumed full occupancy of the site by 2008.

The additional traffic volumes due to background growth and nearby developments were added to the existing traffic volumes to produce 2008 Base Condition traffic volumes for the weekday A.M. and P.M. peak hours as shown in Figures 6 and 7, respectively. An individual nearby planned development matrix is included in Appendix C.

## TRIP GENERATION

Trips were generated for the proposed development based on information contained in the manual Trip Generation, Seventh Edition, 2003, an Institute of Transportation Engineers (ITE) Informational Report. For the proposed development, TPD utilized equations pertaining to Single-Family Detached Housing (ITE Land Use Code #210). Table 2 shows the trip generation equations utilized for the proposed development.

**TABLE 2**
**TRIP GENERATION DATA - SINGLE-FAMILY DETACHED HOMES**

| Land Use | Time Period | Equations | Entering | Exiting |
|---|---|---|---|---|
| Single-Family Detached Homes (#210) | Weekday | Ln(T) = 0.92*Ln(X) + 2.71 | 50% | 50% |
| | A.M. Peak Hour | T = 0.70*(X) + 9.43 | 25% | 75% |
| | P.M. Peak Hour | Ln(T) = 0.90*Ln(X) + 0.53 | 63% | 37% |

T = Total Trips X = Independent Variable (dwelling units)

Table 3 summarizes the number of entering and exiting trips that will be generated by the proposed development during the average weekday, and during the weekday A.M. and P.M. peak hours.

**TABLE 3**
**TRIP GENERATION - PROPOSED DEVELOPMENT**

| Time Period | 41 Single-Family Dwelling Units | | |
|---|---|---|---|
| | Enter | Exit | Total |
| Weekday | 229 | 229 | **458** |
| A.M. Peak Hour | 10 | 29 | **39** |
| P.M. Peak Hour | 30 | 18 | **48** |

As indicated in Table 3, the proposed development will generate 39 new vehicle-trips during the weekday A.M. peak hour (approximately 1 new vehicle-trip every 2 minutes) and 48 new vehicle-trips during the weekday P.M. peak hour (less than 1 new vehicle-trip every minute).

## TRIP DISTRIBUTION

The distribution of trips generated for the proposed development was based on the local road network, the existing traffic patterns, the proposed use of the site, and the site access locations. For new trips, the following trip distribution percentages were assumed:

| Direction From/To | Distribution % |
|---|---|
| East via Welsh Road | 30% |
| West via Welsh Road | 25% |
| South via Dreshertown Road | 30% |
| North via Dresher Road | 15% |

The trip distributions for the proposed development during the weekday A.M. and P.M peak hours are shown in Figures 8 and 9, respectively.

## PROJECTED CONDITION TRAFFIC VOLUMES

The site-generated trips were added to the 2008 Base Condition traffic volumes to develop 2008 Projected Condition traffic volumes for the weekday A.M. and P.M peak hours. 2008 Projected Condition traffic volumes for the weekday A.M. and P.M peak hours are shown in Figures 10 and 11, respectively.

## LEVELS OF SERVICE (LOS) FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Level of service criteria are stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in Table 4. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

**TABLE 4**
**LEVEL OF SERVICE CRITERIA***

| Level of Service | Control Delay Per Vehicle (Seconds) | |
|---|---|---|
| | Signalized | Unsignalized |
| A | ≤10 | ≤ 10 |
| B | > 10 and ≤ 20 | > 10 and ≤ 15 |
| C | > 20 and ≤ 35 | > 15 and ≤ 25 |
| D | > 35 and ≤ 55 | > 25 and ≤ 35 |
| E | > 55 and ≤ 80 | > 35 and ≤ 50 |
| F | > 80 | > 50 |

* Source: Transportation Research Board's Highway Capacity Manual, 2000 Edition

## CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M. and P.M. peak hour time periods at the intersections within the study area. These analyses were conducted according to the methodologies contained in the 2000 Highway Capacity Manual (HCM) for the following conditions:

- 2006 Existing Conditions – Figures 4 and 5;
- 2008 Base Conditions - Future year without development – Figures 6 and 7;
- 2008 Projected Conditions - Future year with development – Figures 10 and 11;

It should be noted that all future (base and projected) condition analysis a for the study area intersections included the roadway improvements associated with the Prudential Eastern Home Office site as outlined in the "Planned Roadway Improvements" section of this report. The capacity analysis worksheets are presented in Appendix D.

## LEVELS OF SERVICE IN THE STUDY AREA

Levels of service at the study area intersections are shown in Tables 5 and 6.

## TABLE 5
## LEVEL OF SERVICE (DELAY) SUMMARY
## WEEKDAY AM PEAK HOUR

| Intersection | Movement | AM LOS (DELAY) | | |
|---|---|---|---|---|
| | | 2006 | 2008 | 2008 |
| | | Existing | Base* | Projected** |
| Welsh Road & Jarrettown Road/Village Road | EBL | B | A | A |
| | EBTR | E | B | B |
| | WBL | F(108.1) | B | B |
| | WBTR | B | B | B |
| | NB | E | -- | -- |
| | NBLT | -- | D | D |
| | NBR | -- | D | D |
| | SB | D | D | D |
| | **ILOS** | **D** | **B** | **C** |
| Welsh Road & Dresher Road | EB | B | C | D |
| | WBLT | C | D | -- |
| | WBT | -- | -- | D |
| | WBR | E | A | A |
| | NB | A | A | -- |
| | SBL | E | D | D |
| | SBLT | E | D | -- |
| | SBR | C | A | B |
| | **ILOS** | **C** | **C** | **D** |
| Welsh Road & Dreshertown Road | EB | D | -- | -- |
| | EBT | -- | D | D |
| | EBR | -- | B | B |
| | WBL | D | D | D |
| | WBT | A | A | A |
| | NBL | D | D | D |
| | NBR | D | D | D |
| | **ILOS** | **C** | **C** | **C** |
| Jarrettown Road & Holly Hill Lane | EB | B | B | B |
| | NBL | A | A | A |
| Dreshertown Road & Proposed Driveway | EB | -- | -- | F |
| | NBL | -- | -- | A |

* = With Prudential Improvements
** = With Site-Related Recommendations

## TABLE 6
## LEVEL OF SERVICE (DELAY) SUMMARY
## WEEKDAY PM PEAK HOUR

| Intersection | Movement | PM LOS (DELAY) | | |
|---|---|---|---|---|
| | | 2006 | 2008 | 2008 |
| | | Existing | Base* | Projected** |
| Welsh Road & Jarrettown Road/Village Road | EBL | B | D | D |
| | EBTR | C | B | B |
| | WBL | D | B | B |
| | WBTR | C | D | D |
| | NB | D | -- | -- |
| | NBLT | -- | D | D |
| | NBR | -- | D | D |
| | SB | E | D | D |
| | **ILOS** | **C** | **C** | **C** |
| Welsh Road & Dresher Road | EB | B | C | D |
| | WBLT | D | F(99.9) | -- |
| | WBT | -- | -- | D |
| | WBR | E | C | A |
| | NB | A | A | -- |
| | SBL | F(121.5) | E | D |
| | SBLT | F(120.6) | E | -- |
| | SBR | B | B | C |
| | **ILOS** | **E** | **E** | **D** |
| Welsh Road & Dreshertown Road | EB | E | -- | -- |
| | EBT | -- | E | E |
| | EBR | -- | B | B |
| | WBL | F(135.0) | E | E |
| | WBT | A | A | A |
| | NBL | D | D | D |
| | NBR | C | B | B |
| | **ILOS** | **D** | **D** | **D** |
| Jarrettown Road & Holly Hill Lane | EB | B | B | B |
| | NBL | A | A | A |
| Dreshertown Road & Proposed Driveway | EB | -- | -- | F |
| | NBL | -- | -- | A |

* = With Prudential Improvements
** = With Site-Related Recommendations

## AUXILIARY LANE ANALYSIS

Auxiliary lane analyses were conducted utilizing 2008 Projected Condition traffic volumes during the weekday A.M. and P.M. peak hours.

*Deceleration Lane*

To determine the need for deceleration lanes, TPD relies on the National Cooperative Highway Research Program (NCHRP) Report 279, Intersection Channelization Design Guide, 1985 gives guidelines for addition of right turn lanes at intersections in graphical form.

*Left Turn Lanes*

For unsignalized intersections, District 6-0 determines the need for a left-turn lane based on the AASHTO Manual, 2001, Exhibit 9-75 (Guide for left-turn lanes on two lane highways). This table references Highway Research Record 211 (HRR 211).

***Results***

Full-width right-turn deceleration lane warrants **are satisfied** on southbound Dreshertown Road at its intersection with the proposed site drive. ***Therefore, TPD recommends providing a 175-foot long deceleration lane with a 75-foot long taper on southbound Dreshertown Road at its intersection with the proposed site driveway. In addition, TPD recommends 35-foot minimum turning radii at the proposed site driveway on Dreshertown Road in order to facilitate safe and efficient ingress/egress to/from the proposed site.***

Based on PennDOT criteria, left-turn lane warrants **are satisfied** on northbound Dreshertown Road at its intersection with the proposed site drive. TPD recommends coordination with the Prudential Eastern Home Office with regards to the planned widening of Dreshertown Road, in order to provide a 75-foot long left-turn lane on northbound Dreshertown Road. ***It is TPD's opinion that this warrant is satisfied primarily due to the high traffic volumes anticipated along Dreshertown Road, and not the number of entering left-turn vehicles.***

The Auxiliary turn lane warrant analysis is included in Appendix E.

## RECOMMENDATIONS

*TPD has made the following recommendations in relation to the proposed development:*

- *With the development of the proposed site, the northbound leg (private driveway) of the intersection of Welsh Road and Dresher Road will be eliminated. Currently the northbound leg has its own phase in the existing signal timings. Therefore, the signal at the intersection of Welsh Road and Dresher Road should be modified (i.e. signal retiming and equipment) due to the elimination of the existing northbound approach from the signal;*

- *Coordinate with the Prudential Eastern Home Office with regards to the planned widening of Dreshertown Road, in order to construct a 75-foot long left-turn lane on northbound Dreshertown Road;*

- *Construct a 175-foot long deceleration lane with a 75-foot long taper on southbound Dreshertown Road at the proposed site driveway;*

- *Provide 35-foot (minimum) turning radii at the proposed site driveway in order to facilitate safe and efficient ingress and egress to/from the proposed site.*

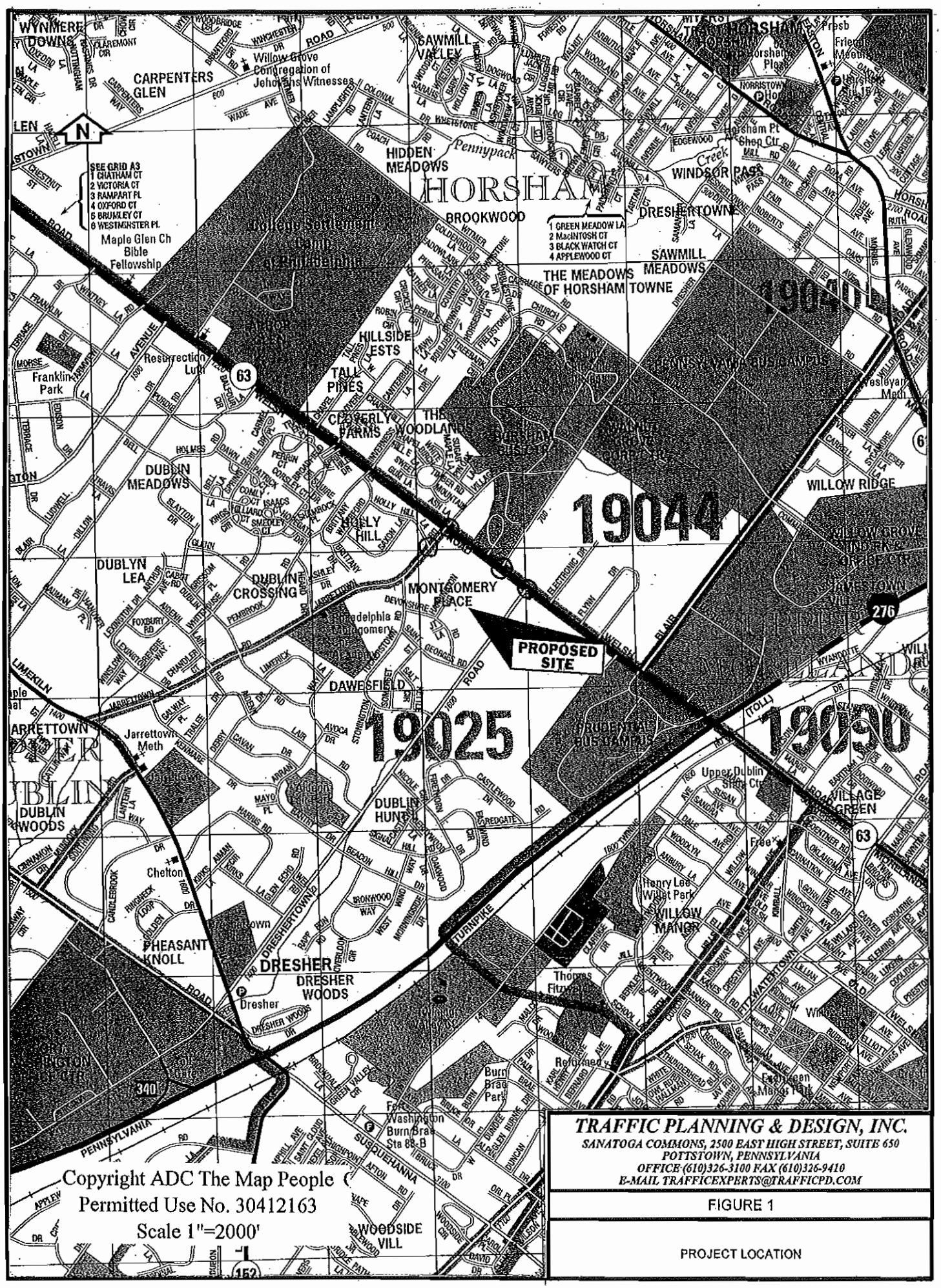
## CONCLUSIONS

*The following conclusions were made as a result of this traffic impact study:*

- *Access to the proposed site will be provided by one (1) full-access driveway to the external roadway, located on the western side of Dreshertown Road (S.R. 2024), approximately 860 feet south of the centerline of Welsh Road (S.R. 0063). The proposed development will also share internal access with the existing residential development to the south via Harrington Road;*

- *The proposed development will generate 39 new vehicle-trips during the weekday A.M. peak hour (approximately 1 new vehicle-trip every 2 minutes) and 48 new vehicle-trips during the weekday P.M. peak hour (less than 1 new vehicle-trip every minute);*

- *Under 2008 Projected Conditions, all approaches and turning movements at the study area intersections and proposed site driveways will continue to operate at the same LOS as 2008 Base Conditions or at LOS D or better during the weekday A.M. and P.M. peak hours, except for the eastbound approach at the proposed site driveway on Dreshertown Road, which will operate at LOS F during the weekday A.M. and P.M. peak hours. This LOS deficiency represents conditions for the proposed driveway approaches only and are primarily due to the large number of through vehicles on Dreshertown Road. Any delay or queuing experienced at these approaches will be for site-related vehicles, and will be contained on-site and not on Dreshertown Road. It is TPD's opinion that the only improvement to achieve LOS D or better for all movements is the installation of a traffic signal at the proposed driveway location on Dreshertown Road. However, PennDOT Signal Warrant (xi), the Peak Hour Volume Warrant, will not be satisfied for the proposed driveway location intersection.*



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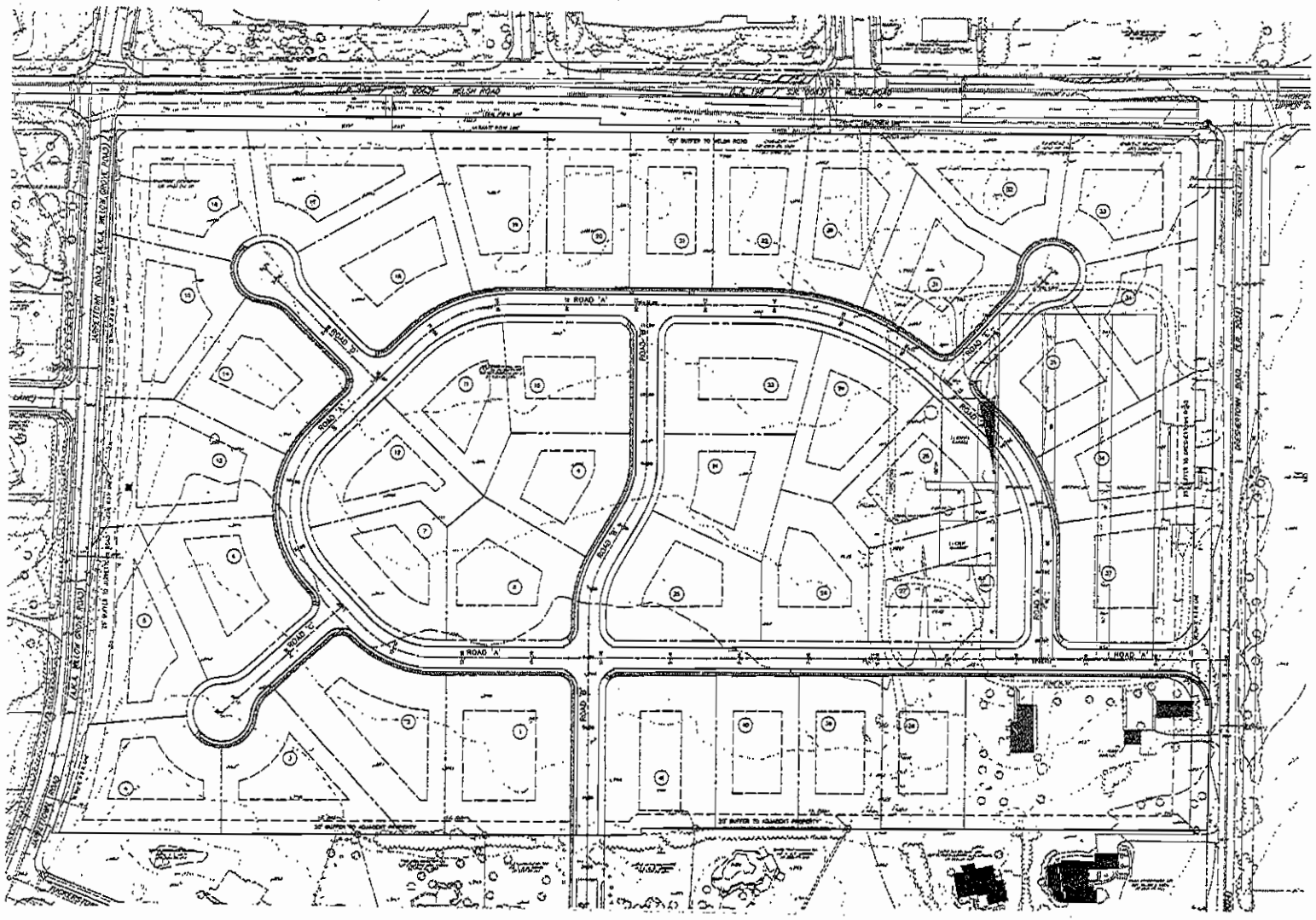
*POTTSTOWN, PENNSYLVANIA*
*OFFICE (610)326-3100 FAX (610)326-9410*
*E-MAIL TRAFFICEXPERTS@TRAFFICPD.COM*

FIGURE 1

PROJECT LOCATION

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OFFICE (610)326-6100 FAX (610)326-9410

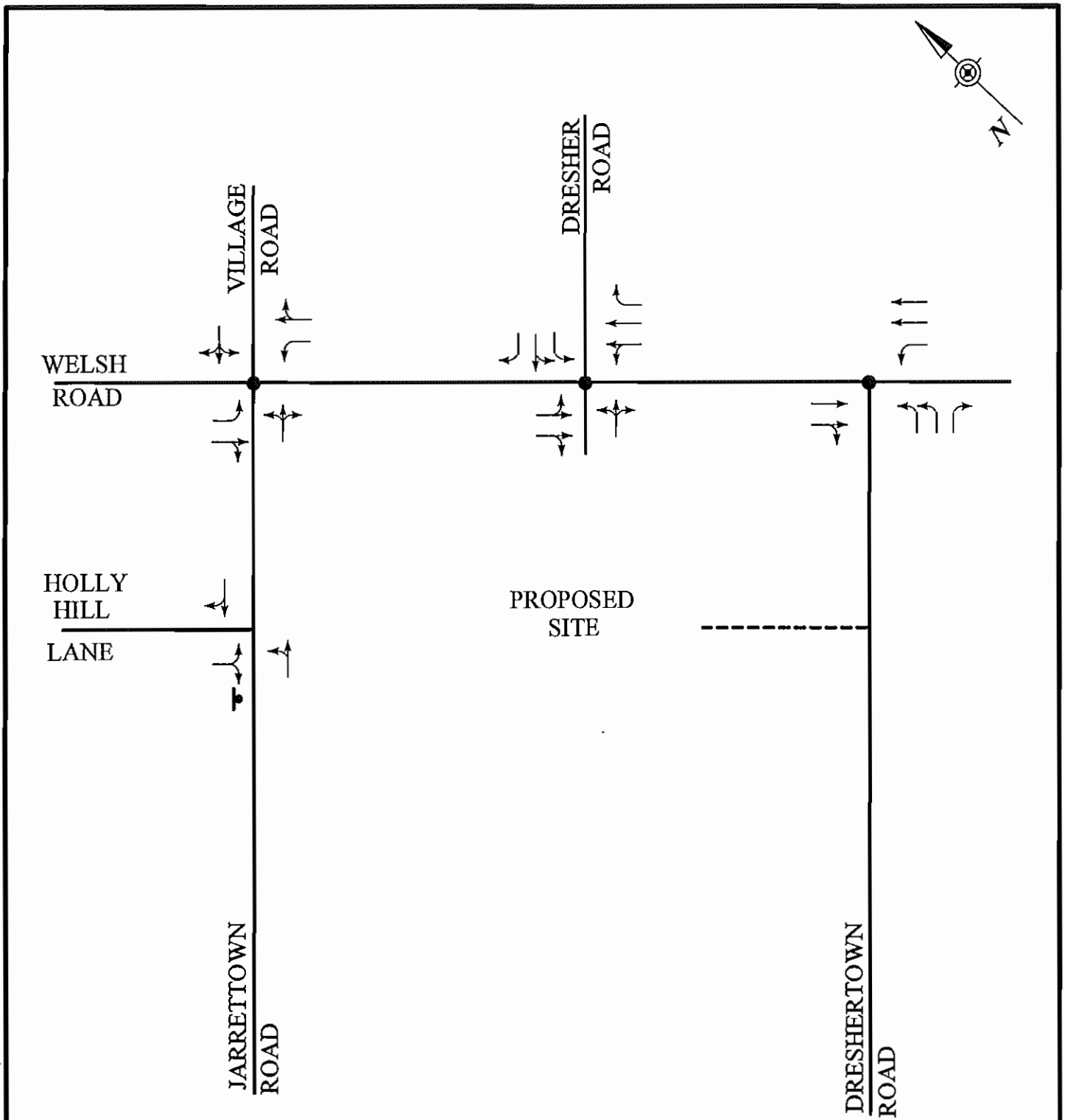
4647 SAUCON CREEK ROAD
CENTER VALLEY, PA 18034
OFFICE (610)625-4242 FAX (610)625-4250

1030 LINGLESTOWN ROAD
HARRISBURG, PA 17110
OFFICE (717)234-1489 FAX (717)234-1490

E-MAIL TRAFFICEXPERTS@TRAFFICPD.COM

FIGURE 2

PROJECT SITE




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

---------- = PROPOSED DRIVEWAY

SCHEMATIC - NOT DRAWN TO SCALE

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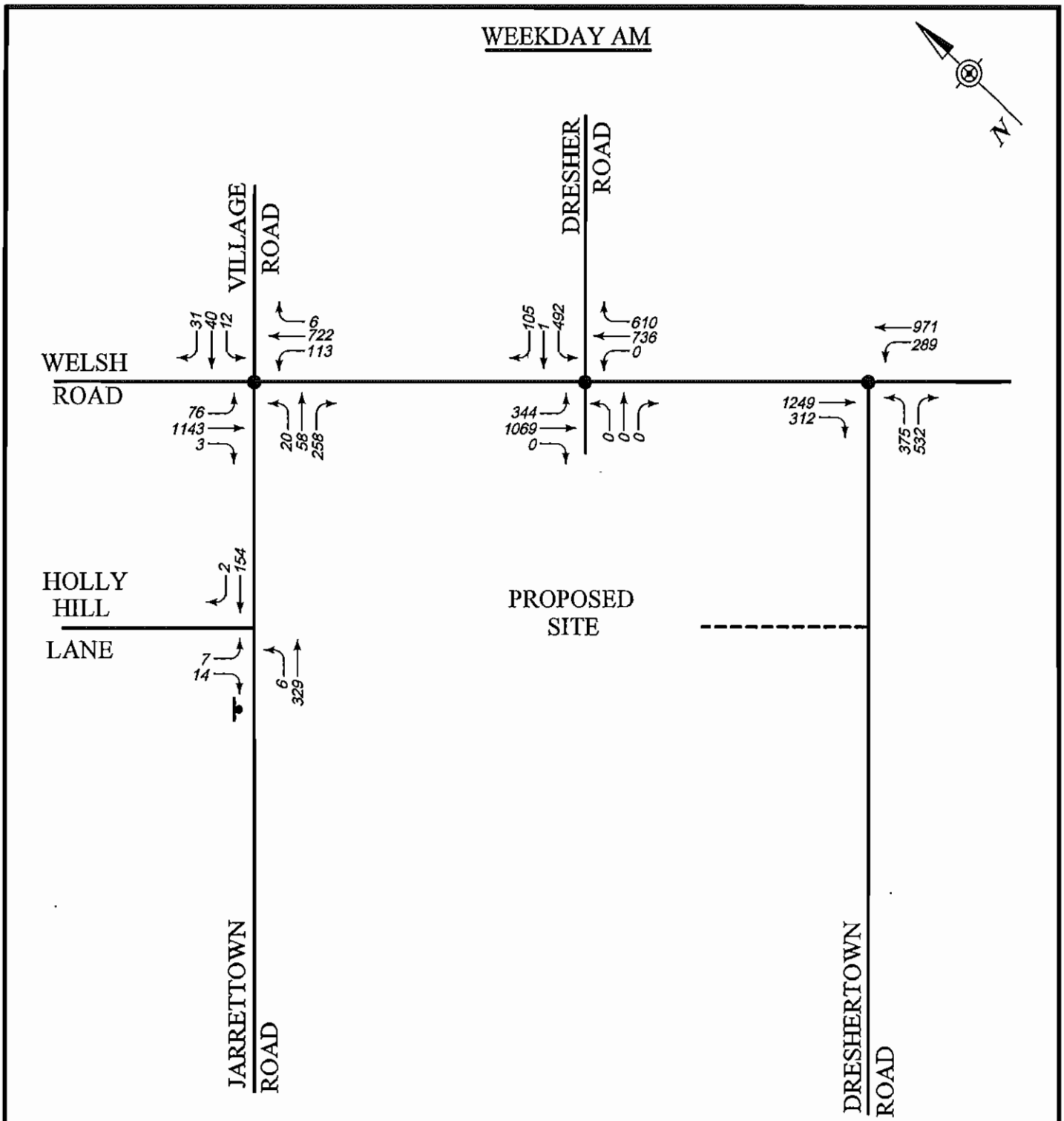
FIGURE 3

EXISTING INTERSECTION CONTROLS & LANE CONFIGURATIONS

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= STOP-CONTROLLED

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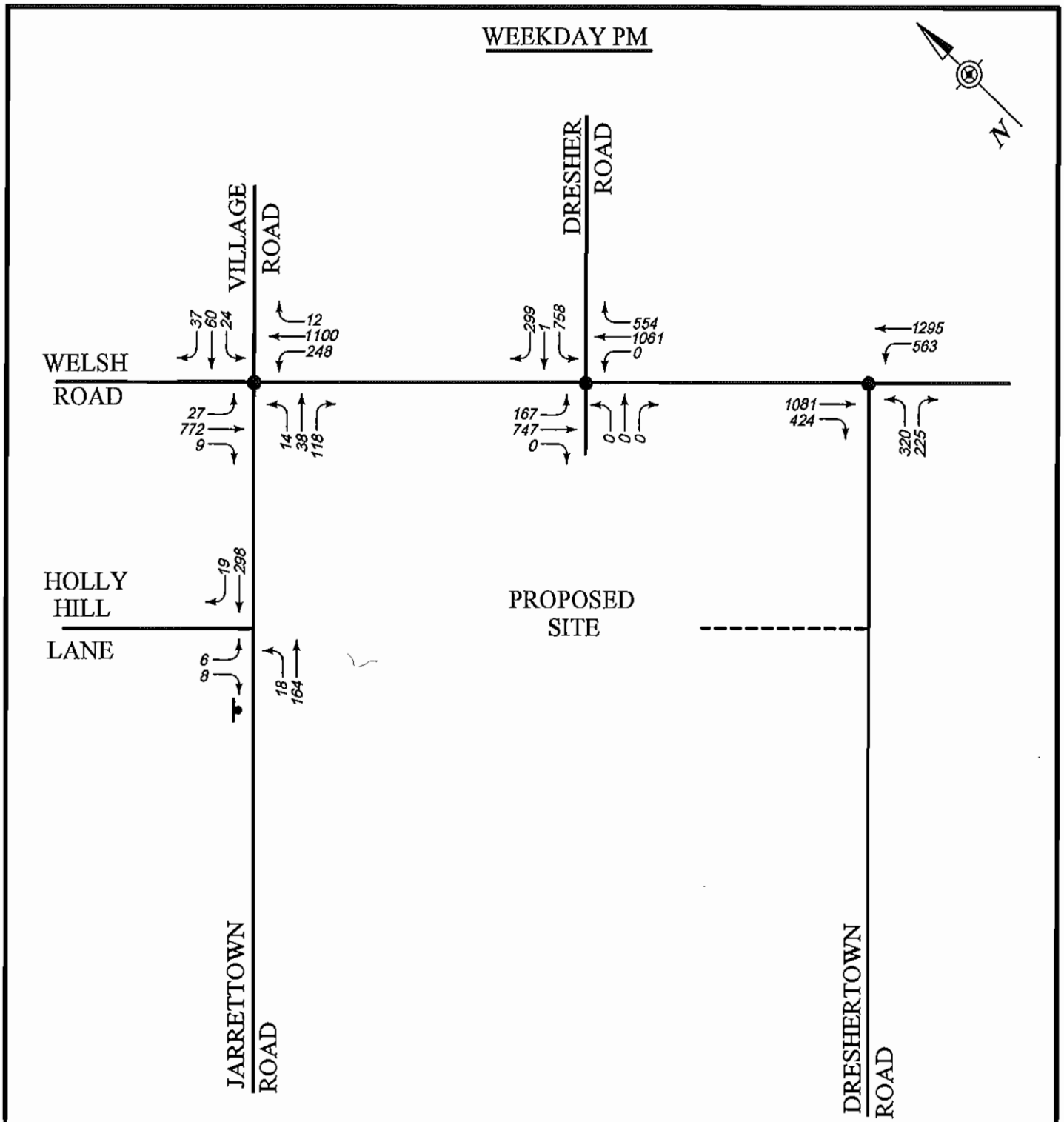
FIGURE 4

2006 EXISTING CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

---------- = PROPOSED DRIVEWAY

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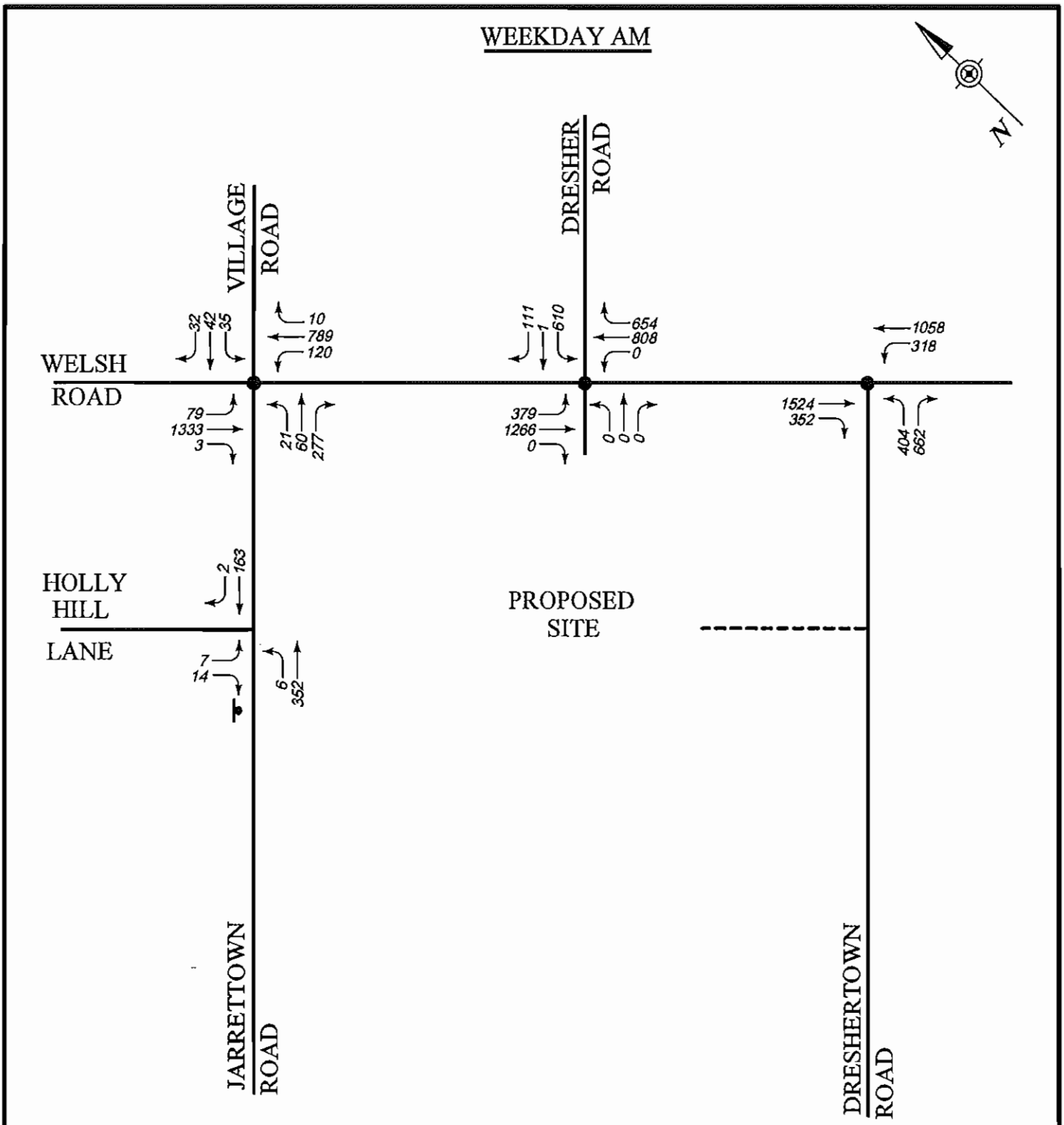
FIGURE 5

2006 EXISTING CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

---------- = PROPOSED DRIVEWAY

SCHEMATIC - NOT DRAWN TO SCALE


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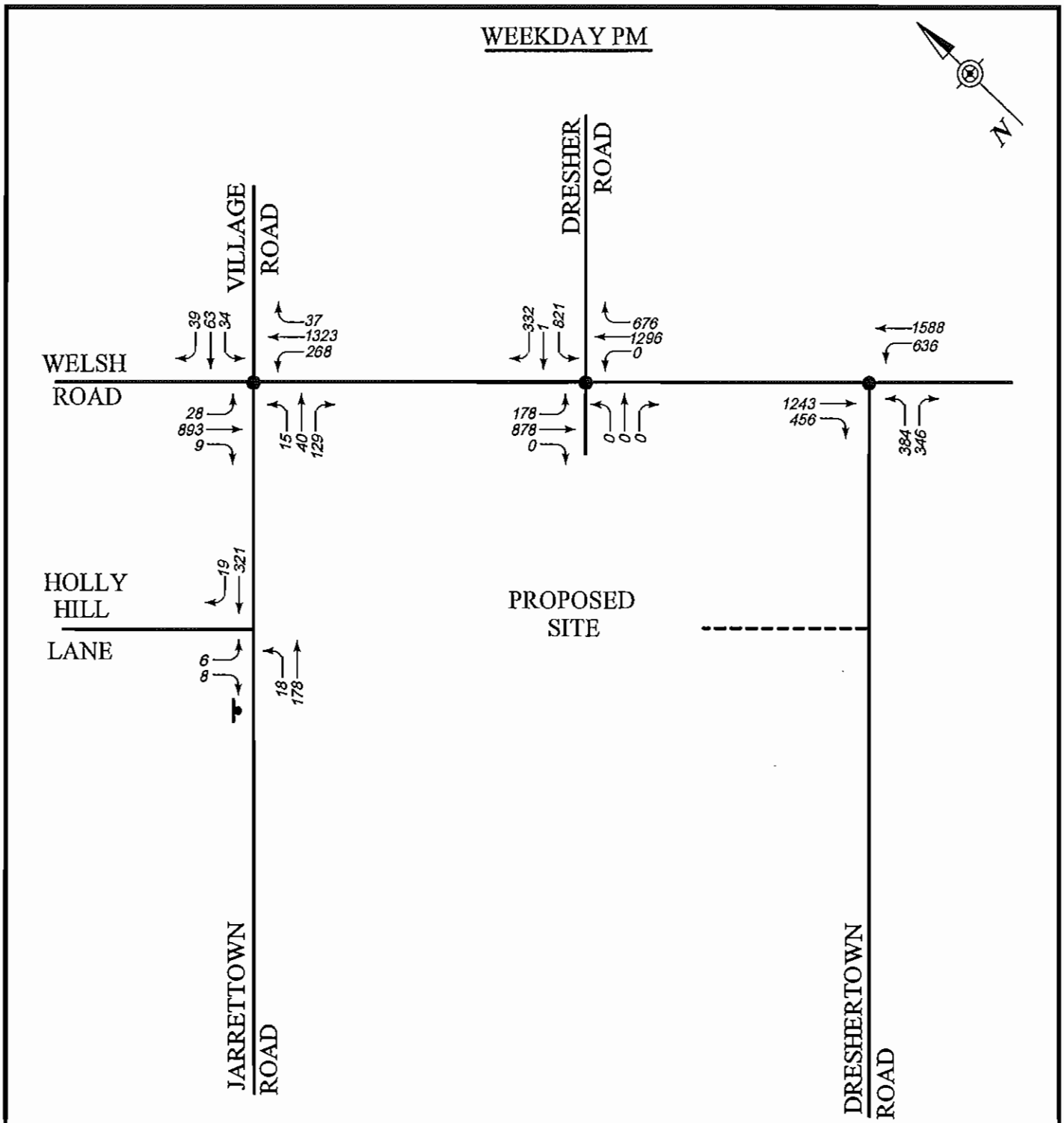
FIGURE 6

2008 BASE CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

---------- = PROPOSED DRIVEWAY

SCHEMATIC - NOT DRAWN TO SCALE


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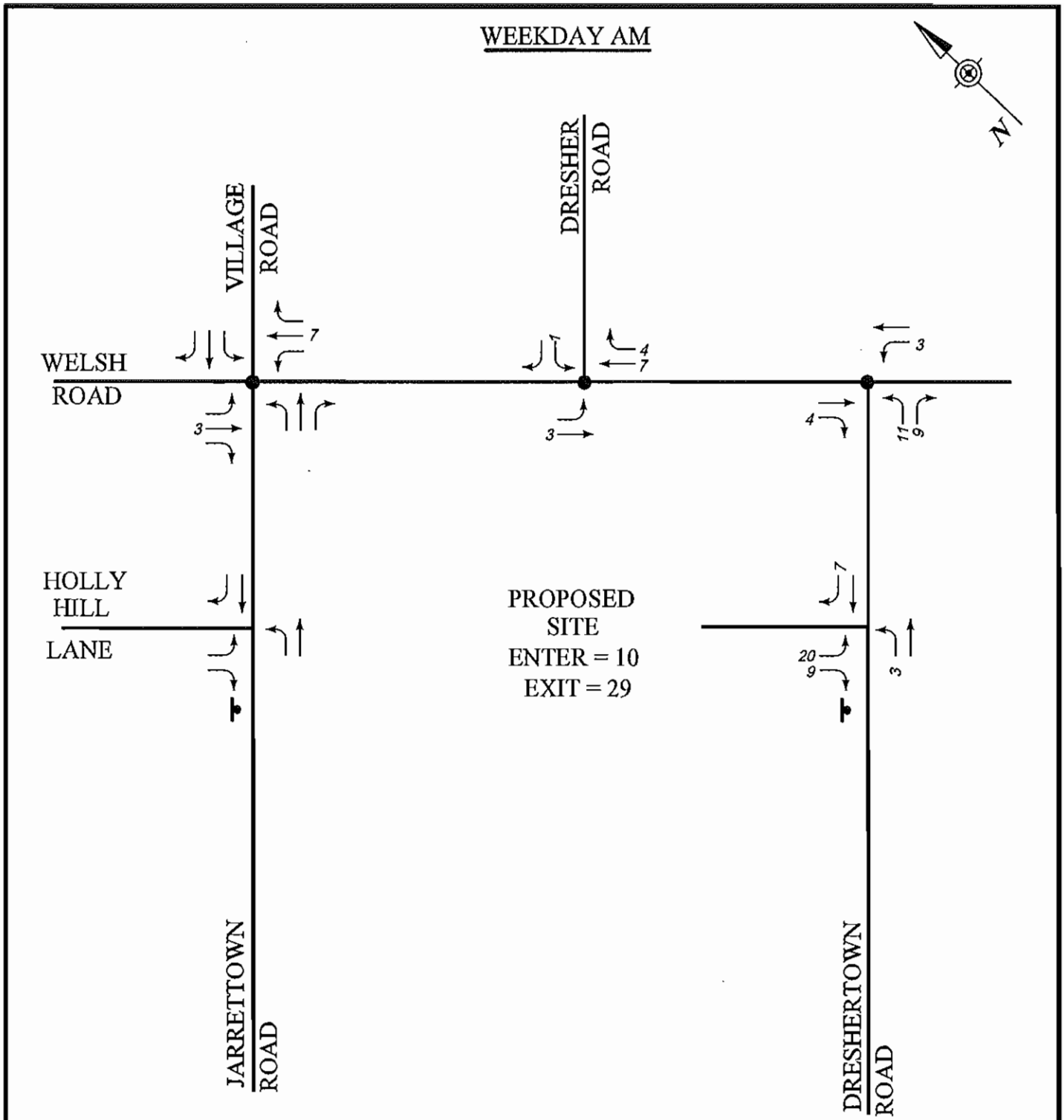
FIGURE 7

2008 BASE CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

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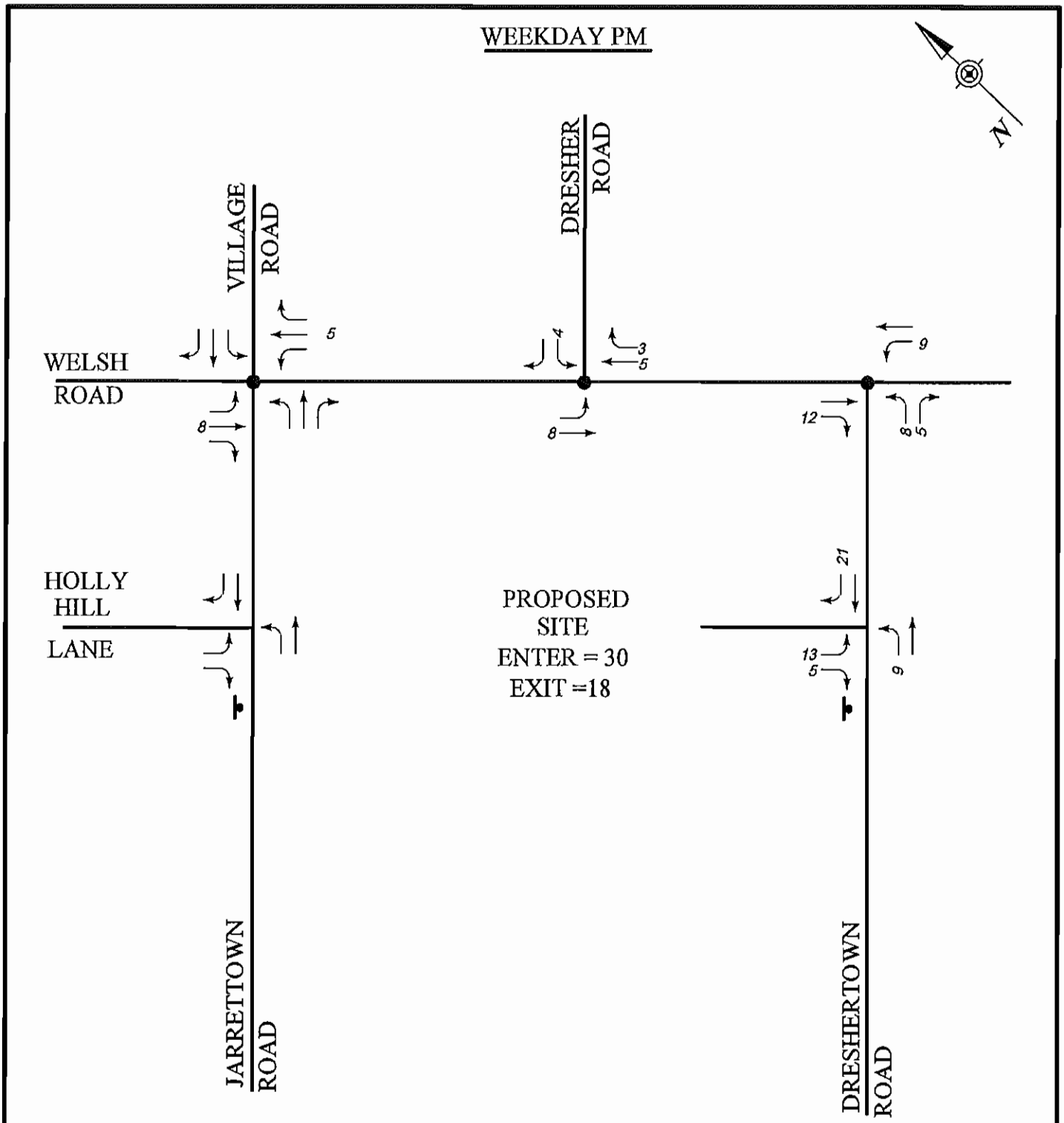
FIGURE 8

WEEKDAY AM PEAK HOUR
TRIP DISTRIBUTION




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

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FIGURE 9

WEEKDAY PM PEAK HOUR
TRIP DISTRIBUTION

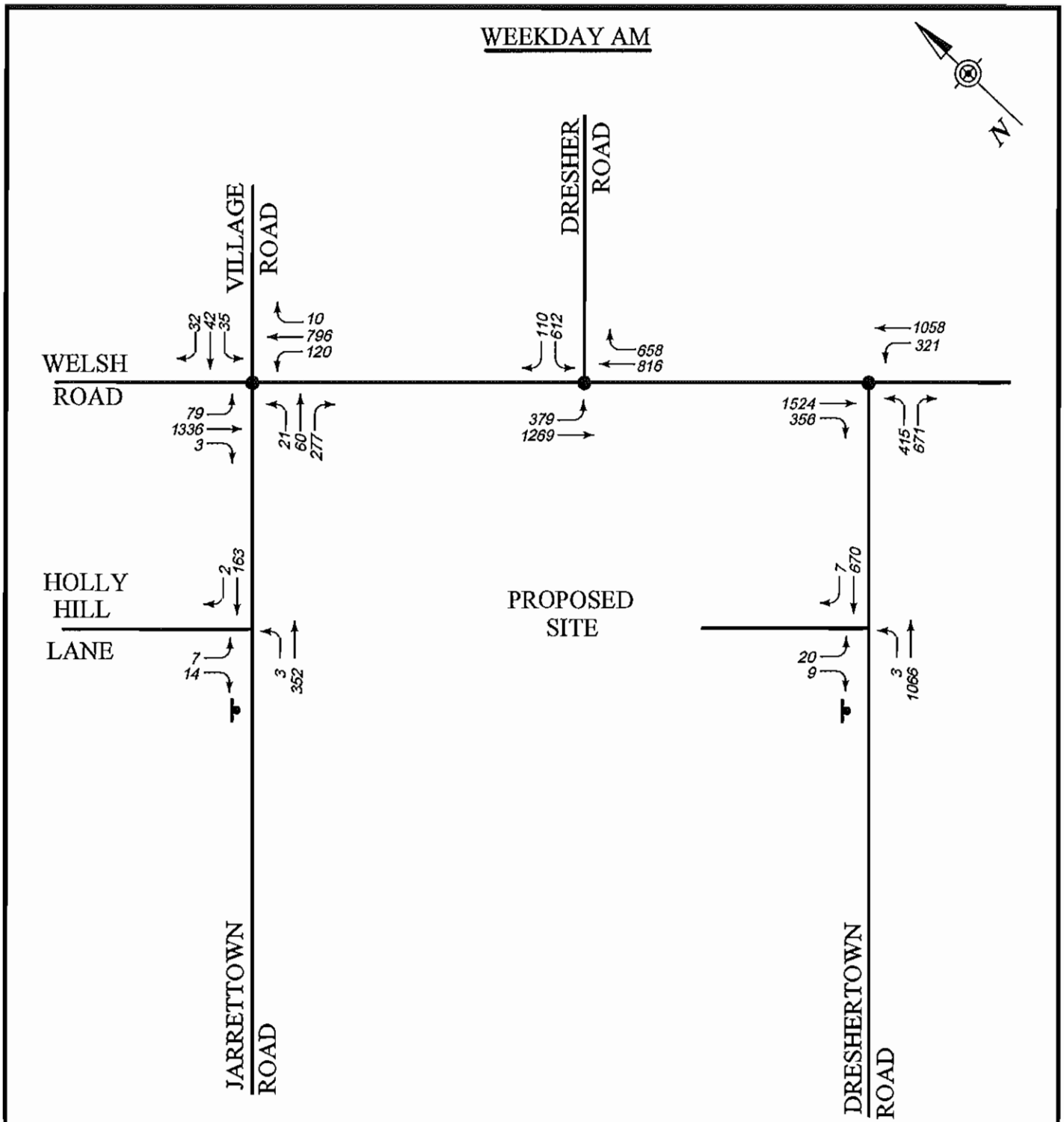


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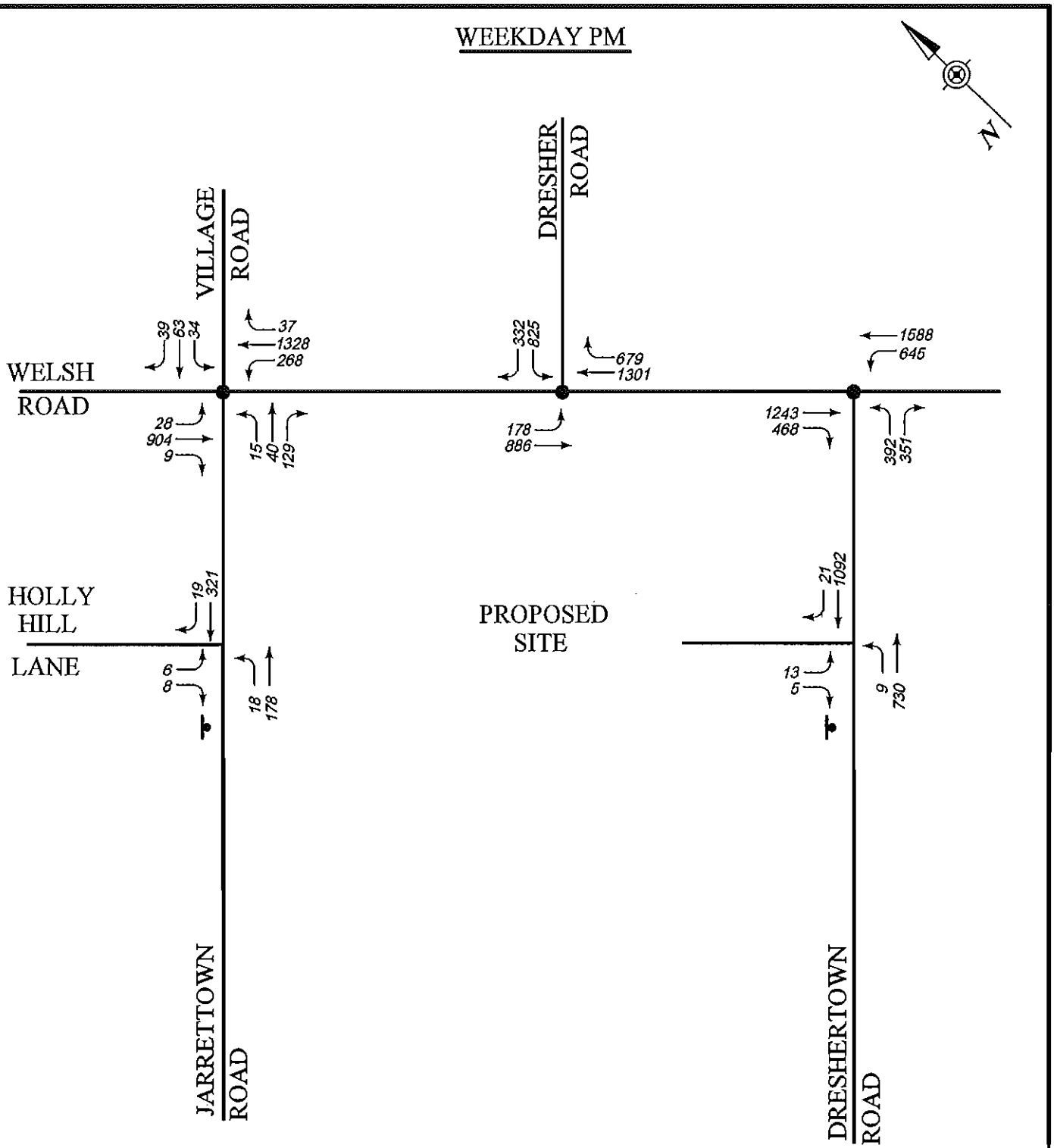
FIGURE 10

2008 PROJECTED CONDITIONS
WEEKDAY AM PEAK HOUR
TRAFFIC VOLUMES




● = SIGNALIZED INTERSECTION

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SCHEMATIC - NOT DRAWN TO SCALE

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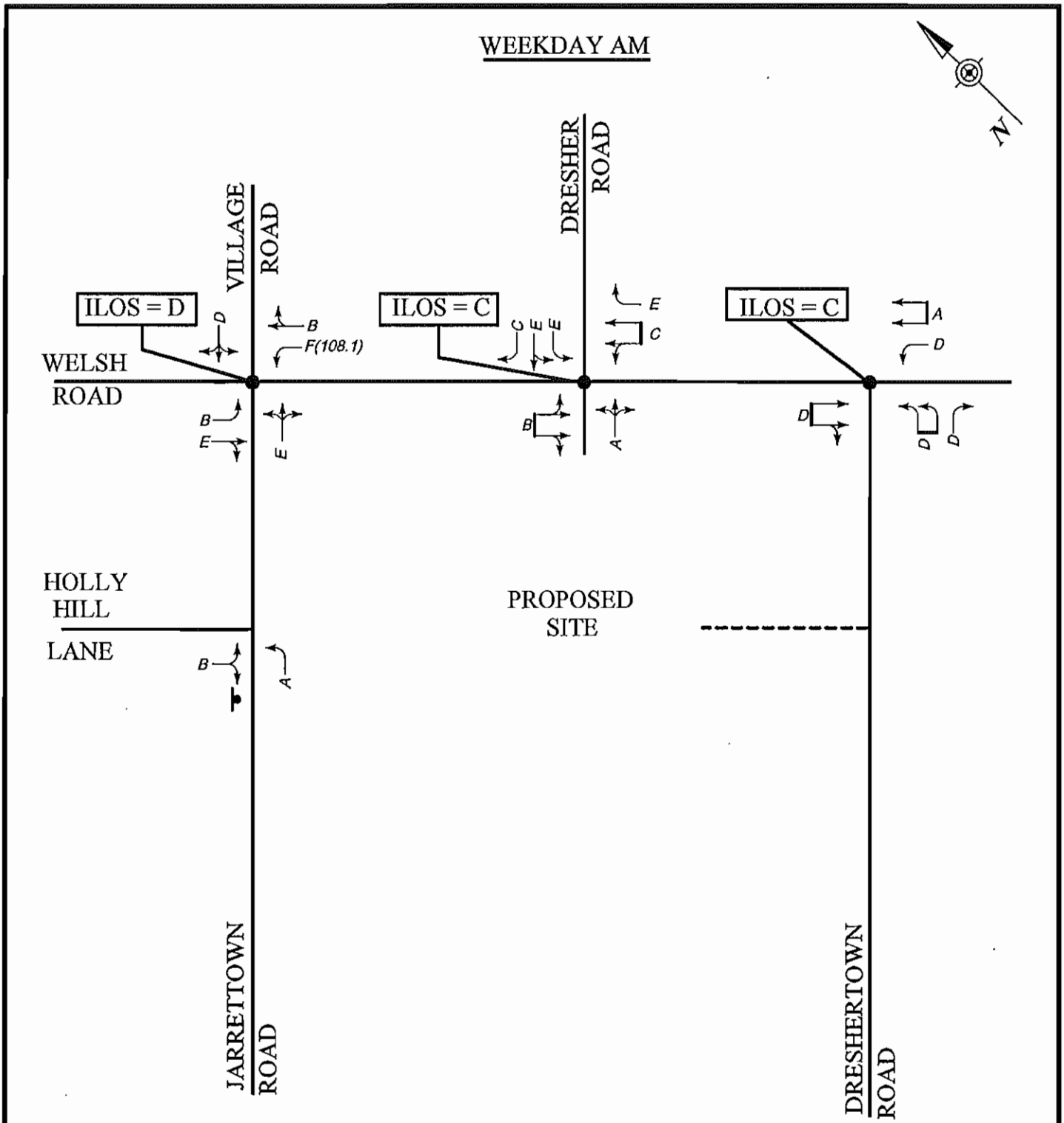
FIGURE 11

2008 PROJECTED CONDITIONS
WEEKDAY PM PEAK HOUR
TRAFFIC VOLUMES




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

---------- = PROPOSED DRIVEWAY

SCHEMATIC - NOT DRAWN TO SCALE

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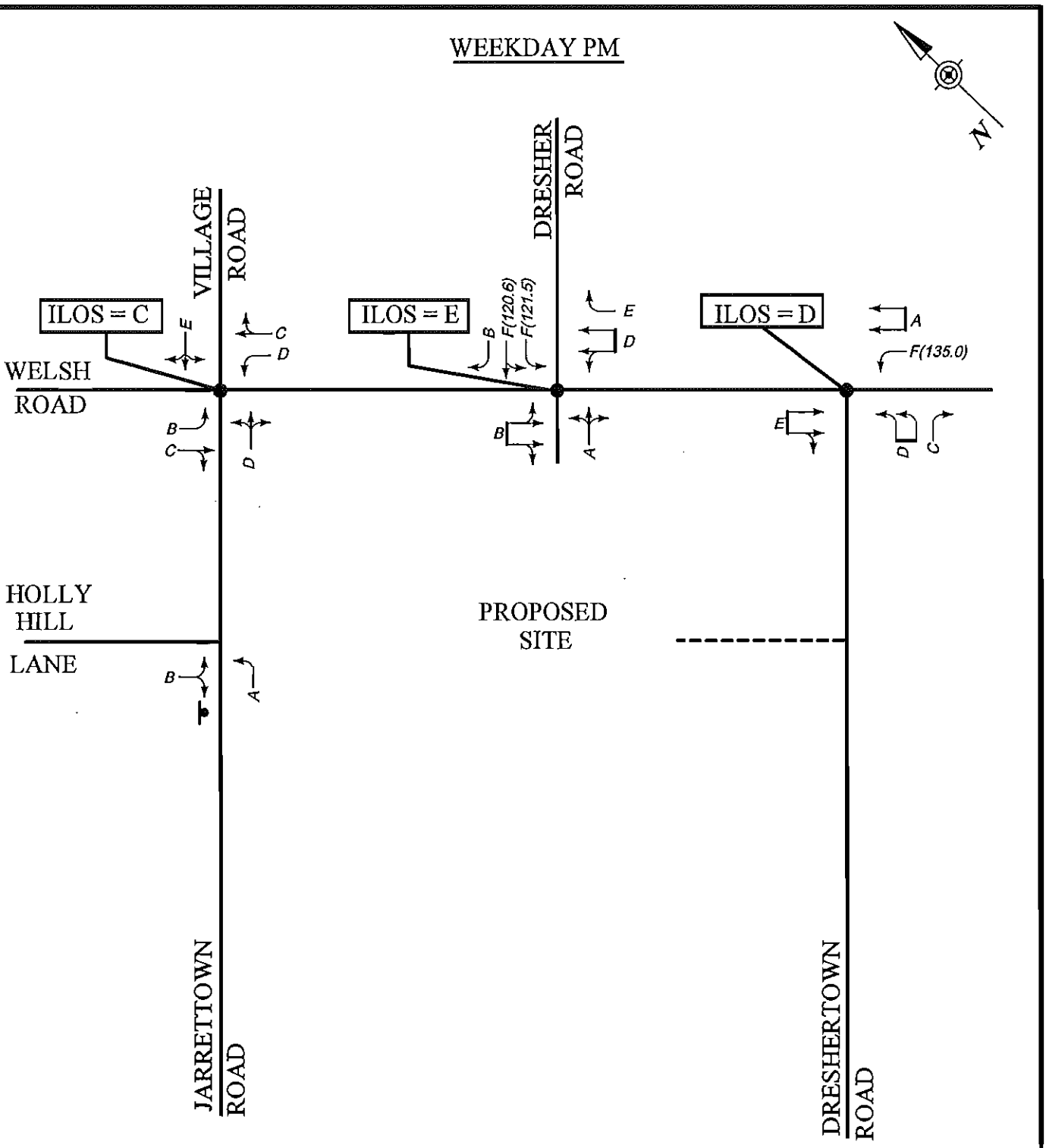
FIGURE 12

2006 EXISTING CONDITIONS
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

---------- = PROPOSED DRIVEWAY

SCHEMATIC - NOT DRAWN TO SCALE

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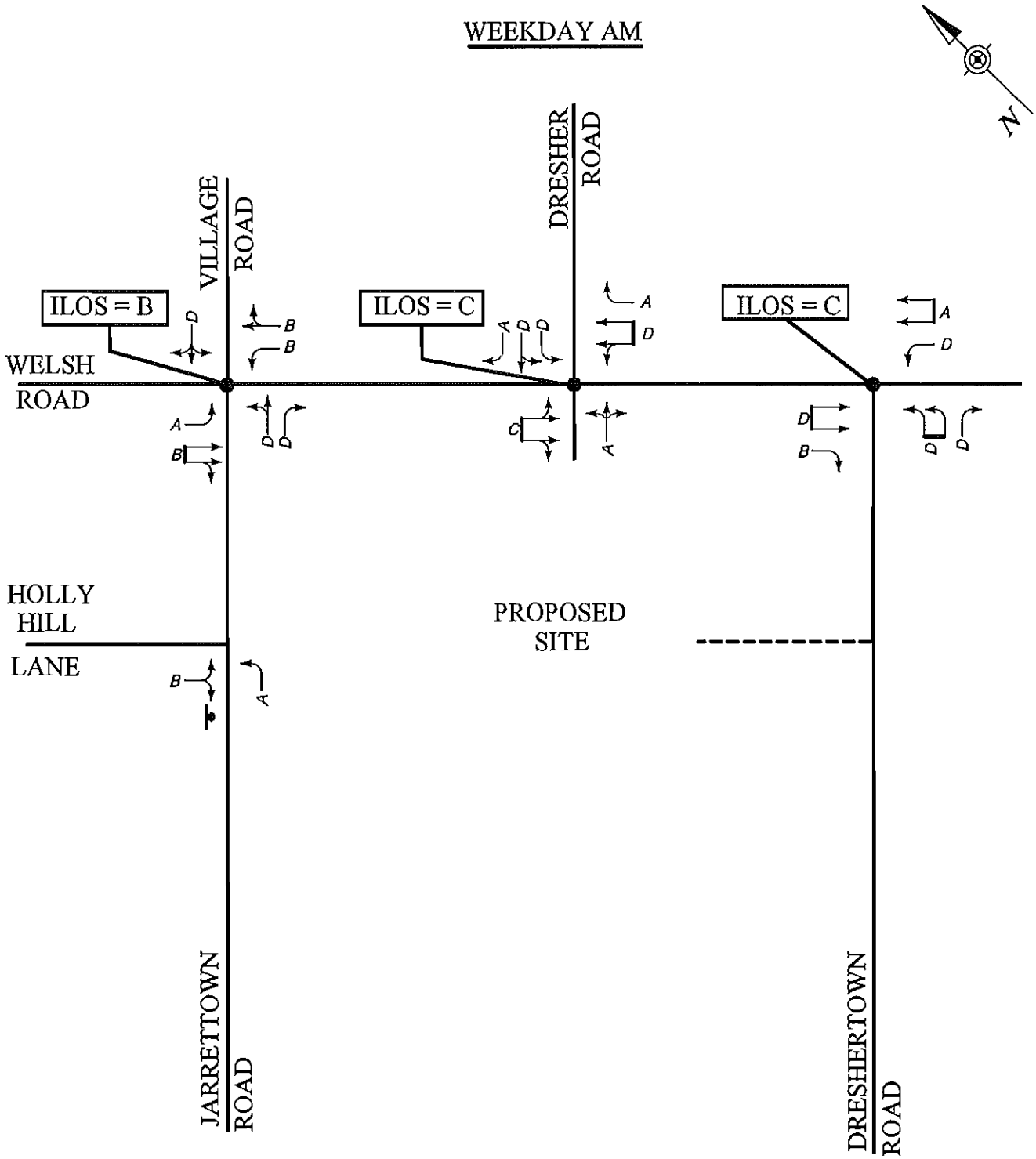
FIGURE 13

2008 EXISTING CONDITIONS
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

---------- = PROPOSED DRIVEWAY

SCHEMATIC - NOT DRAWN TO SCALE

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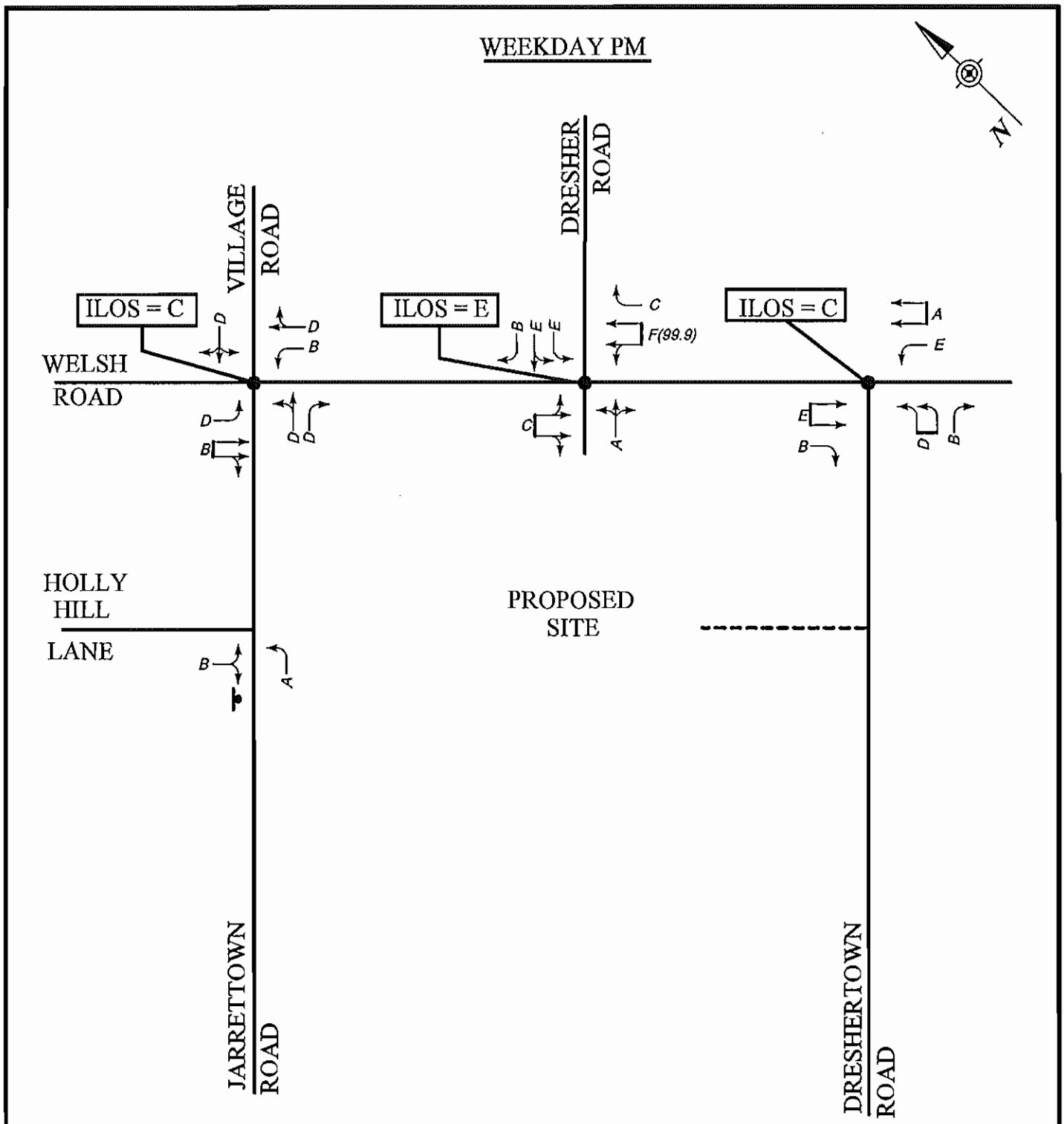
FIGURE 14

2008 BASE CONDITIONS
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

---------- = PROPOSED DRIVEWAY

SCHEMATIC - NOT DRAWN TO SCALE

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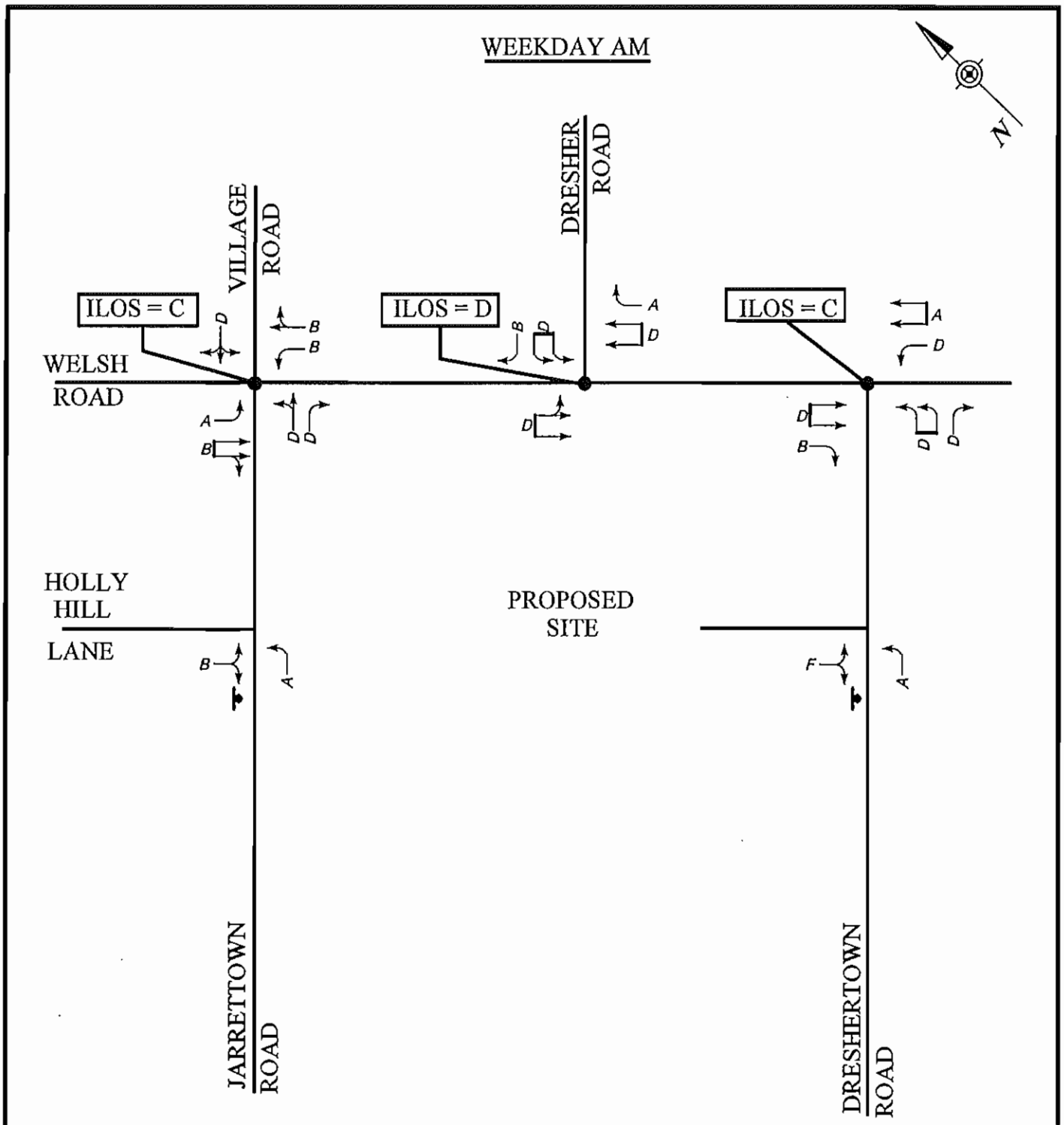
FIGURE 15

2008 BASE CONDITIONS
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

SCHEMATIC - NOT DRAWN TO SCALE

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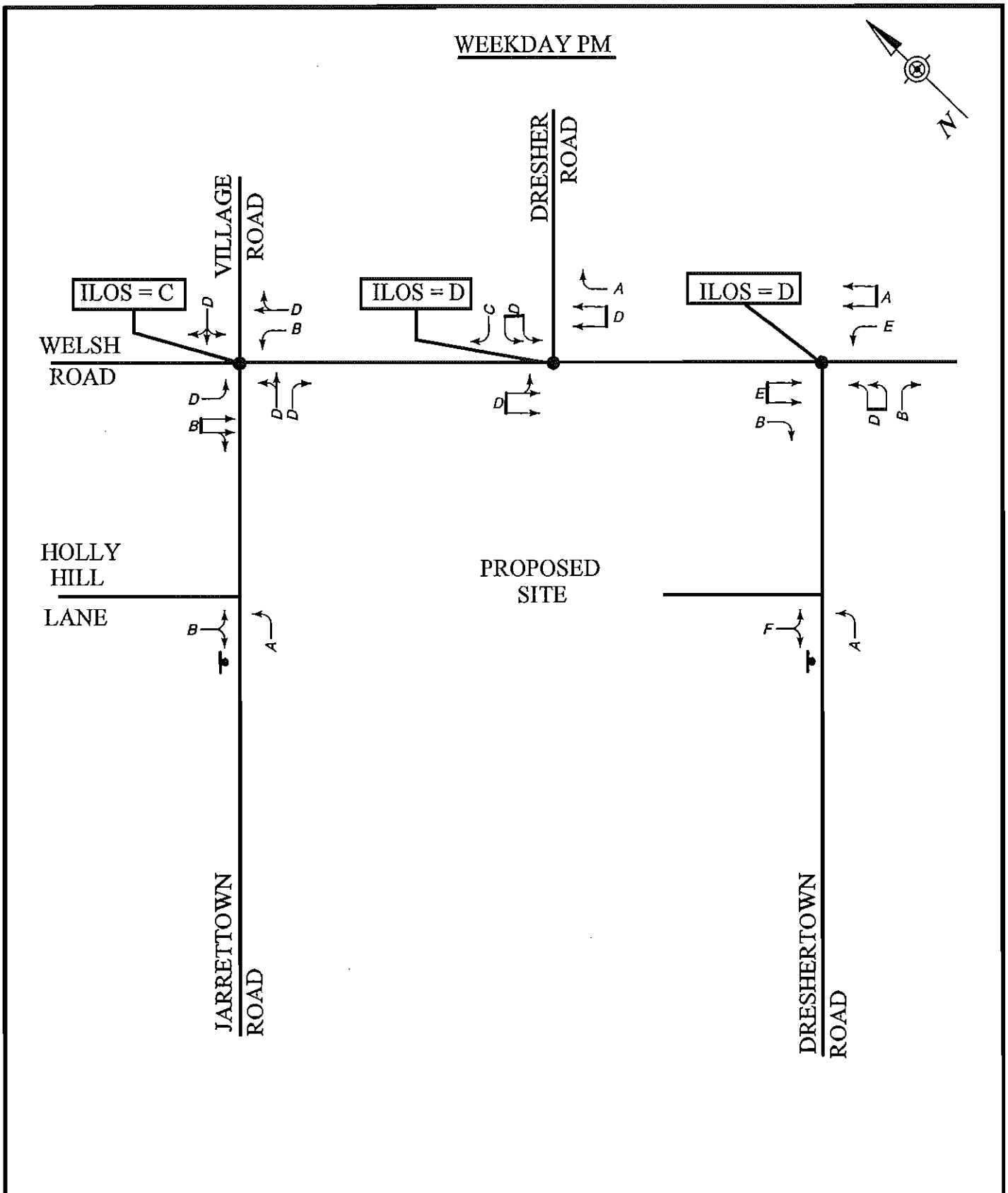
*E-MAIL TRAFFICEXPERTS@TRAFFICPD.COM*

FIGURE 16

2008 PROJECTED CONDITIONS
WEEKDAY AM PEAK HOUR
LEVELS OF SERVICE




● = SIGNALIZED INTERSECTION

= STOP-CONTROLLED

SCHEMATIC - NOT DRAWN TO SCALE

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FIGURE 17

2008 PROJECTED CONDITIONS
WEEKDAY PM PEAK HOUR
LEVELS OF SERVICE

# APPENDIX A

*STUDY AREA PHOTOGRAPHS*

EB WELSH ROAD
APPROACH

WB WELSH ROAD
APPROACH

SB VILLAGE ROAD
APPROACH

NB JARRETTOWN ROAD
APPROACH

WB WELSH ROAD
DEPARTURE

EB WELSH ROAD
DEPARTURE

WB WELSH ROAD
APPROACH

WB WELSH ROAD
DEPARTURE

EB WELSH ROAD
APPROACH

SB DRESHER ROAD
APPROACH

NB DRESHER ROAD
DEPARTURE

NB DRESHERTOWN ROAD
APPROACH

SB DRESHERTOWN ROAD
DEPARTURE

WB WELSH ROAD
APPROACH

EB WELSH ROAD
DEPARTURE

EB WELSH ROAD
APPROACH

WB WELSH ROAD
DEPARTURE

WB HOLLY HILL LANE
DEPARTURE

EB HOLLY HILL LANE
APPROACH

NB JARRETTOWN ROAD
DEPARTURE

NB JARRETTOWN ROAD
APPROACH

SB JARRETTOWN ROAD
DEPARTURE

SB JARRETTOWN ROAD
APPROACH

# APPENDIX B

*MANUAL TRAFFIC COUNT PRINTOUTS*

Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

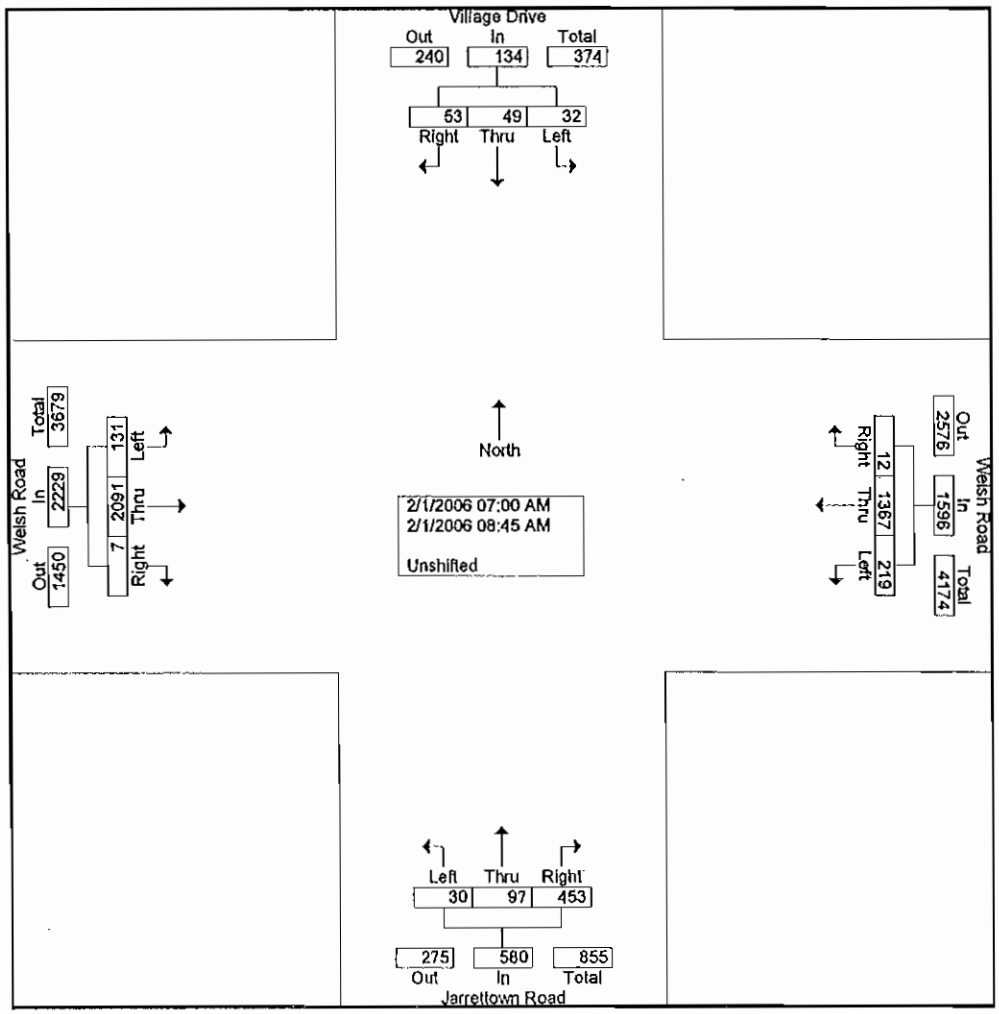
# Jarrettown Road/Village Drive & Welsh Road

Counter: 1
Counted by: SGault
Weather: clear
AMJRWR

File Name : Not Named 1
Site Code : 00000000
Start Date : 2/1/2006
Page No : 1

**Groups Printed- Unshifted**

| | Village Drive Southbound | | | | | Welsh Road Westbound | | | | | Jarrettown Road Northbound | | | | | Welsh Road Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Exclu. Total | Incl. Total | Int. Total |
| 07:00 AM | 4 | 3 | 9 | 0 | 16 | 25 | 154 | 0 | 2 | 179 | 2 | 5 | 37 | 0 | 44 | 10 | 196 | 0 | 2 | 206 | 4 | 445 | 449 |
| 07:15 AM | 4 | 6 | 5 | 0 | 15 | 28 | 148 | 2 | 3 | 178 | 3 | 11 | 46 | 0 | 60 | 9 | 247 | 0 | 3 | 256 | 6 | 509 | 515 |
| 07:30 AM | 9 | 4 | 7 | 1 | 20 | 28 | 206 | 1 | 4 | 235 | 3 | 14 | 56 | 1 | 73 | 12 | 267 | 2 | 1 | 281 | 7 | 609 | 616 |
| 07:45 AM | 4 | 8 | 10 | 0 | 22 | 27 | 148 | 0 | 4 | 175 | 2 | 15 | 65 | 1 | 82 | 14 | 311 | 0 | 7 | 325 | 12 | 604 | 616 |
| Total | 21 | 21 | 31 | 1 | 73 | 108 | 656 | 3 | 13 | 767 | 10 | 45 | 204 | 2 | 259 | 45 | 1021 | 2 | 13 | 1068 | 29 | 2167 | 2196 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| 08:00 AM | 5 | 7 | 9 | 0 | 21 | 31 | 156 | 3 | 2 | 190 | 5 | 9 | 53 | 0 | 67 | 18 | 256 | 1 | 3 | 275 | 5 | 553 | 558 |
| 08:15 AM | 3 | 10 | 6 | 2 | 19 | 34 | 179 | 2 | 5 | 215 | 7 | 14 | 66 | 0 | 87 | 22 | 254 | 0 | 5 | 276 | 12 | 597 | 609 |
| 08:30 AM | 0 | 7 | 6 | 1 | 13 | 21 | 181 | 1 | 9 | 203 | 6 | 20 | 74 | 2 | 100 | 22 | 288 | 2 | 1 | 312 | 13 | 628 | 641 |
| 08:45 AM | 3 | 4 | 1 | 0 | 8 | 25 | 195 | 3 | 27 | 223 | 2 | 9 | 56 | 1 | 67 | 24 | 272 | 2 | 4 | 298 | 32 | 596 | 628 |
| Total | 11 | 28 | 22 | 3 | 61 | 111 | 711 | 9 | 43 | 831 | 20 | 52 | 249 | 3 | 321 | 86 | 1070 | 5 | 13 | 1161 | 62 | 2374 | 2436 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| Grand Total | 32 | 49 | 53 | 4 | 134 | 219 | 1367 | 12 | 56 | 1598 | 30 | 97 | 453 | 5 | 580 | 131 | 2091 | 7 | 26 | 2229 | 91 | 4541 | 4632 |
| Apprch % | 23.9 | 36.6 | 39.6 | | | 13.7 | 85.5 | 0.8 | | | 5.2 | 16.7 | 78.1 | | | 5.9 | 93.8 | 0.3 | | | | | |
| Total % | 0.7 | 1.1 | 1.2 | | 3 | 4.8 | 30.1 | 0.3 | | 35.2 | 0.7 | 2.1 | 10 | | 12.8 | 2.9 | 46 | 0.2 | | 49.1 | 2 | 98 | |

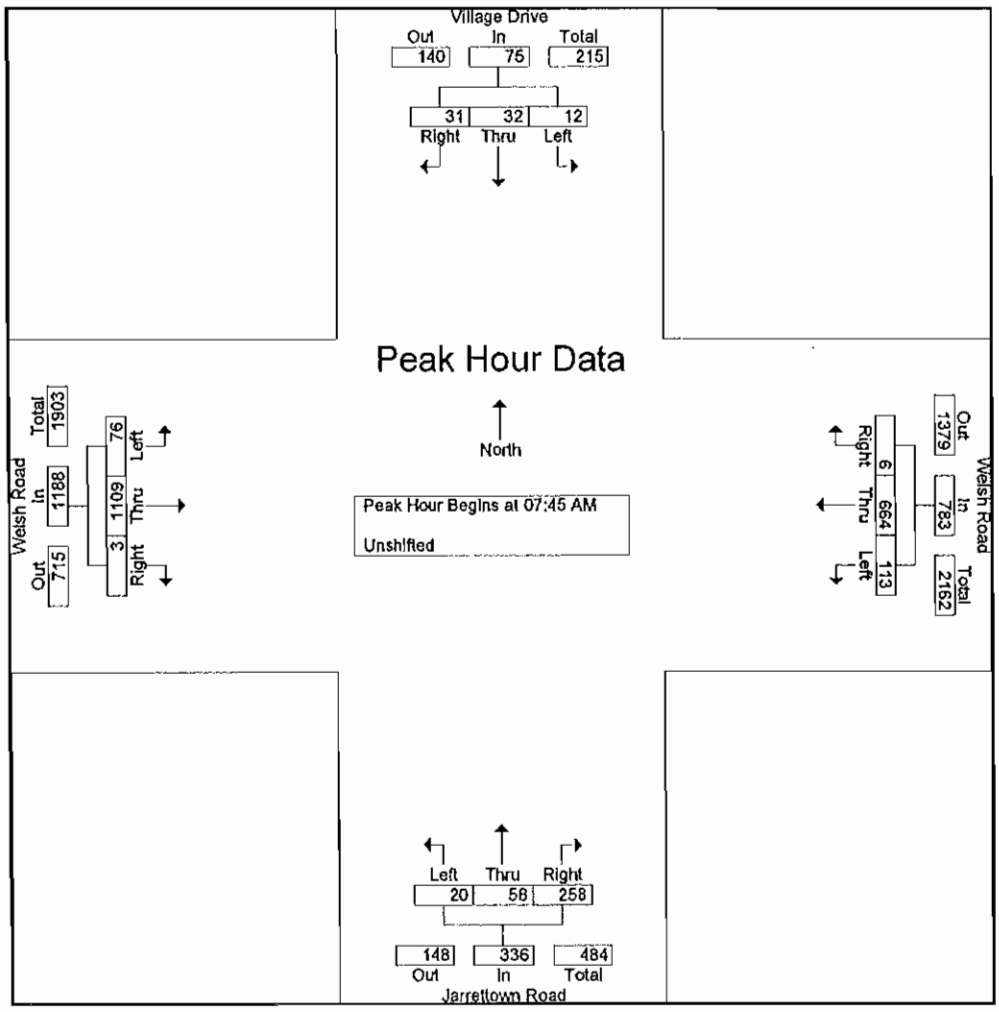


Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

# Jarrettown Road/Village Drive & Welsh Road

File Name : Not Named 1
Site Code : 00000000
Start Date : 2/1/2006
Page No : 2

| | Village Drive Southbound | | | | Welsh Road Westbound | | | | Jarrettown Road Northbound | | | | Welsh Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 4 | 8 | **10** | **22** | 27 | 148 | 0 | 175 | 2 | 15 | 65 | 82 | 14 | **311** | 0 | **325** | 604 |
| 08:00 AM | **5** | 7 | 9 | 21 | 31 | 156 | **3** | 190 | 5 | 9 | 53 | 67 | 18 | 256 | 1 | 275 | 553 |
| 08:15 AM | 3 | **10** | 6 | 19 | **34** | 179 | 2 | **215** | 7 | **14** | 66 | 87 | **22** | 254 | 0 | 276 | 597 |
| 08:30 AM | **0** | 7 | 6 | 13 | 21 | **181** | 1 | 203 | 6 | **20** | **74** | **100** | 22 | 288 | **2** | 312 | **628** |
| Total Volume | 12 | 32 | 31 | 75 | 113 | 664 | 6 | 783 | 20 | 58 | 258 | 336 | 76 | 1109 | 3 | 1188 | 2382 |
| % App. Total | 16 | 42.7 | 41.3 | | 14.4 | 84.8 | 0.8 | | 6 | 17.3 | 76.8 | | 6.4 | 93.4 | 0.3 | | |
| PHF | .600 | .800 | .775 | .852 | .831 | .917 | .500 | .910 | .714 | .725 | .872 | .840 | .864 | .891 | .375 | .914 | .948 |



Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

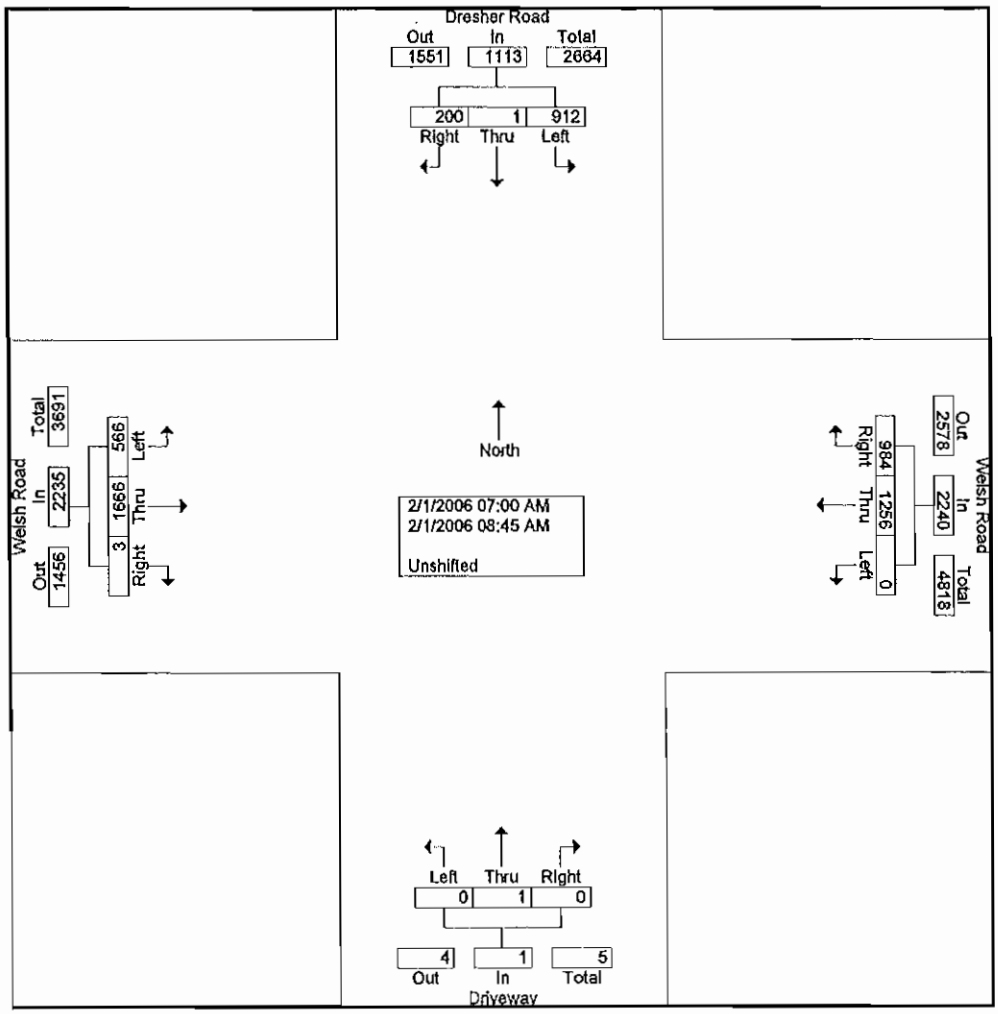
# Dresher Road & Welsh Road

Counter: 1
Counted by: JGabriel
Weather: cloudy
AMDRDWR

File Name : Not Named 3
Site Code : 00000000
Start Date : 2/1/2006
Page No : 1

**Groups Printed- Unshifted**

| | Dresher Road Southbound | | | | | Welsh Road Westbound | | | | | Driveway Northbound | | | | | Welsh Road Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 07:00 AM | 105 | 0 | 32 | 2 | 137 | 0 | 139 | 58 | 4 | 197 | 0 | 0 | 0 | 0 | 0 | 49 | 177 | 0 | 3 | 226 | 9 | 560 | 569 |
| 07:15 AM | 132 | 0 | 32 | 3 | 164 | 0 | 146 | 91 | 5 | 237 | 0 | 0 | 0 | 0 | 0 | 46 | 212 | 0 | 2 | 258 | 10 | 659 | 669 |
| 07:30 AM | 72 | 0 | 7 | 0 | 79 | 0 | 110 | 70 | 4 | 180 | 0 | 1 | 0 | 1 | 1 | 48 | 125 | 3 | 2 | 176 | 7 | 436 | 443 |
| 07:45 AM | 126 | 0 | 16 | 1 | 142 | 0 | 142 | 150 | 7 | 292 | 0 | 0 | 0 | 0 | 0 | 80 | 265 | 0 | 12 | 345 | 20 | 779 | 799 |
| Total | 435 | 0 | 87 | 6 | 522 | 0 | 537 | 369 | 20 | 906 | 0 | 1 | 0 | 1 | 1 | 223 | 779 | 3 | 19 | 1005 | 46 | 2434 | 2480 |
| 08:00 AM | 136 | 1 | 26 | 2 | 163 | 0 | 189 | 158 | 8 | 347 | 0 | 0 | 0 | 0 | 0 | 74 | 225 | 0 | 5 | 299 | 15 | 809 | 824 |
| 08:15 AM | 131 | 0 | 37 | 5 | 168 | 0 | 163 | 155 | 5 | 318 | 0 | 0 | 0 | 0 | 0 | 93 | 203 | 0 | 6 | 296 | 16 | 782 | 798 |
| 08:30 AM | 99 | 0 | 26 | 2 | 125 | 0 | 189 | 147 | 12 | 336 | 0 | 0 | 0 | 0 | 0 | 97 | 246 | 0 | 6 | 343 | 20 | 804 | 824 |
| 08:45 AM | 111 | 0 | 24 | 0 | 135 | 0 | 178 | 155 | 30 | 333 | 0 | 0 | 0 | 0 | 0 | 79 | 213 | 0 | 6 | 292 | 36 | 760 | 796 |
| Total | 477 | 1 | 113 | 9 | 591 | 0 | 719 | 615 | 55 | 1334 | 0 | 0 | 0 | 0 | 0 | 343 | 887 | 0 | 23 | 1230 | 87 | 3155 | 3242 |
| Grand Total | 912 | 1 | 200 | 15 | 1113 | 0 | 1256 | 984 | 75 | 2240 | 0 | 1 | 0 | 1 | 1 | 566 | 1666 | 3 | 42 | 2235 | 133 | 5589 | 5722 |
| Apprch % | 81.9 | 0.1 | 18 | | | 0 | 56.1 | 43.9 | | | 0 | 100 | 0 | | | 25.3 | 74.5 | 0.1 | | | | | |
| Total % | 16.3 | 0 | 3.6 | | 19.9 | 0 | 22.5 | 17.6 | | 40.1 | 0 | 0 | 0 | | 0 | 10.1 | 29.8 | 0.1 | | 40 | 2.3 | 97.7 | |

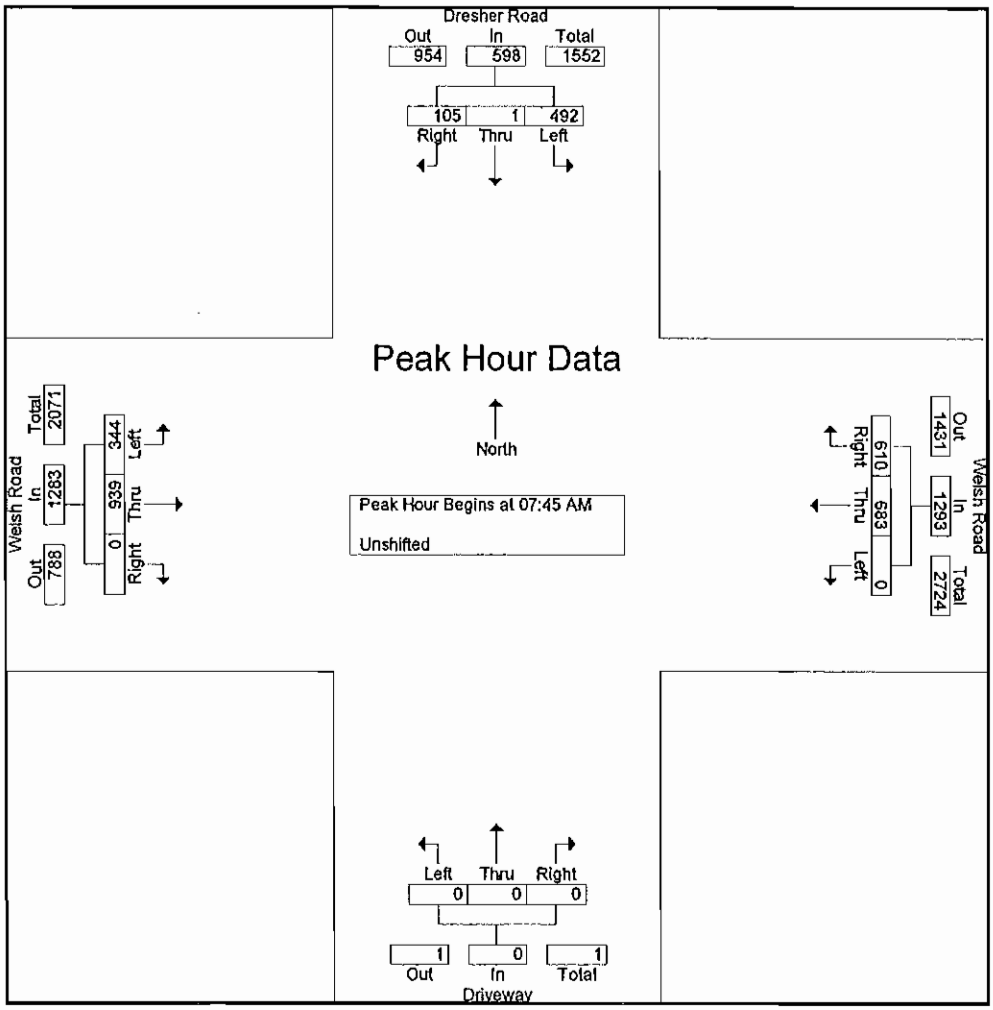


Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

**Dresher Road & Welsh Road**

File Name : Not Named 3
Site Code : 00000000
Start Date : 2/1/2006
Page No : 2

| | Dresher Road Southbound | | | | Welsh Road Westbound | | | | Driveway Northbound | | | | Welsh Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 126 | 0 | 16 | 142 | 0 | 142 | 150 | 292 | 0 | 0 | 0 | 0 | 80 | 265 | 0 | 345 | 779 |
| 08:00 AM | 136 | 1 | 26 | 163 | 0 | 189 | 158 | 347 | 0 | 0 | 0 | 0 | 74 | 225 | 0 | 299 | 809 |
| 08:15 AM | 131 | 0 | 37 | 168 | 0 | 163 | 155 | 318 | 0 | 0 | 0 | 0 | 93 | 203 | 0 | 296 | 782 |
| 08:30 AM | 99 | 0 | 26 | 125 | 0 | 189 | 147 | 336 | 0 | 0 | 0 | 0 | 97 | 246 | 0 | 343 | 804 |
| Total Volume | 492 | 1 | 105 | 598 | 0 | 683 | 610 | 1293 | 0 | 0 | 0 | 0 | 344 | 939 | 0 | 1283 | 3174 |
| % App. Total | 82.3 | 0.2 | 17.6 | | 0 | 52.8 | 47.2 | | 0 | 0 | 0 | | 26.8 | 73.2 | 0 | | |
| PHF | .904 | .250 | .709 | .890 | .000 | .903 | .965 | .932 | .000 | .000 | .000 | .000 | .887 | .886 | .000 | .930 | .981 |



Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

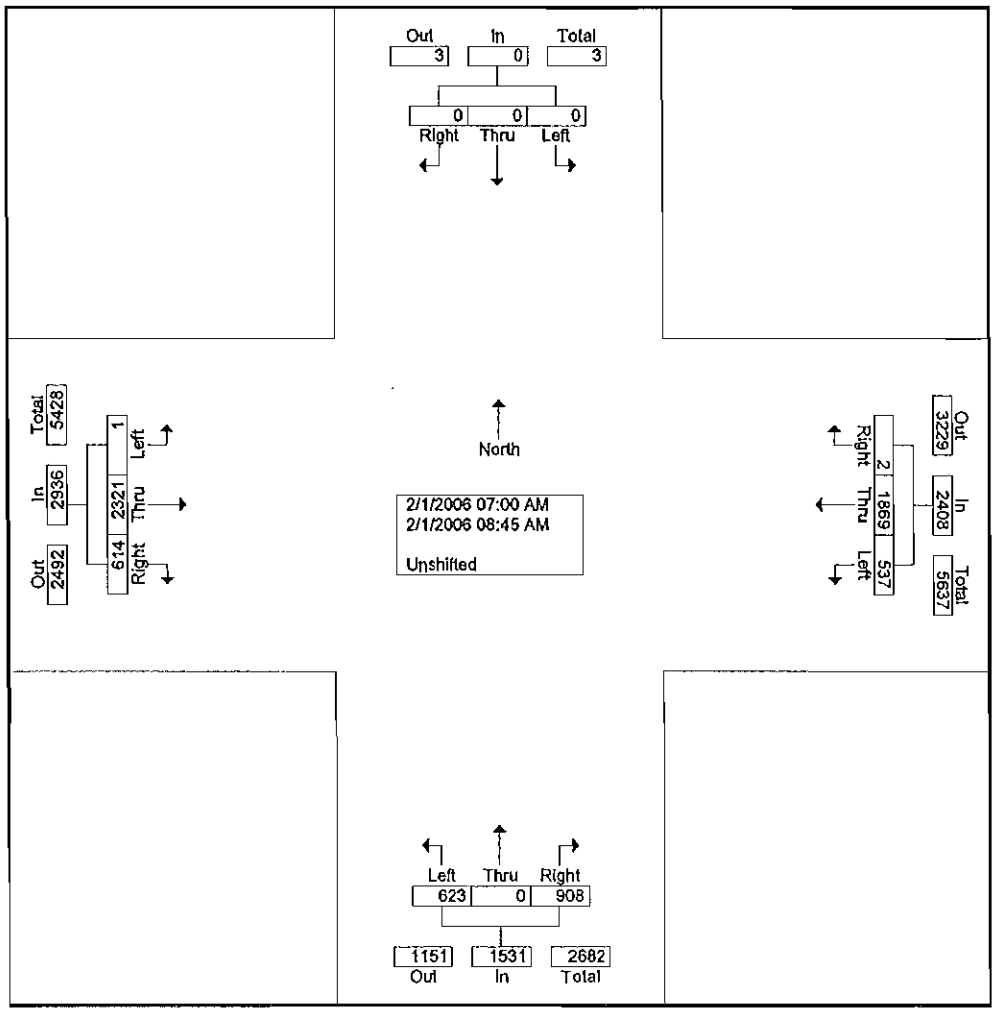
**Dreshertown Road & Welsh Road**

Counter: 2
Counted by: Elghawy/Rumbaugh/Gabriel/Tem
Weather: clear
RR10

File Name : Not Named 2
Site Code : 00000000
Start Date : 2/1/2006
Page No : 1

**Groups Printed- Unshifted**

| | Southbound | | | | | Welsh Road Westbound | | | | | Dreshertown Rd. Northbound | | | | | Welsh Road Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Exclu. Total | Incl. Total | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 40 | 186 | 0 | 3 | 226 | 31 | 0 | 59 | 1 | 90 | 0 | 232 | 80 | 4 | 312 | 8 | 628 | 636 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 42 | 194 | 0 | 9 | 236 | 55 | 0 | 82 | 2 | 137 | 0 | 252 | 89 | 4 | 341 | 15 | 714 | 729 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 74 | 266 | 0 | 7 | 340 | 74 | 0 | 129 | 3 | 203 | 0 | 331 | 75 | 2 | 406 | 12 | 949 | 961 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 82 | 212 | 0 | 3 | 294 | 100 | 0 | 155 | 1 | 255 | 0 | 338 | 67 | 5 | 405 | 9 | 954 | 963 |
| Total | 0 | 0 | 0 | 0 | 0 | 238 | 858 | 0 | 22 | 1096 | 260 | 0 | 425 | 7 | 685 | 0 | 1153 | 311 | 15 | 1464 | 44 | 3245 | 3289 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 63 | 250 | 0 | 4 | 313 | 87 | 0 | 115 | 2 | 202 | 1 | 331 | 87 | 7 | 419 | 13 | 934 | 947 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 70 | 243 | 0 | 5 | 313 | 114 | 0 | 133 | 3 | 247 | 0 | 249 | 83 | 8 | 332 | 16 | 892 | 908 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 77 | 252 | 0 | 15 | 329 | 82 | 0 | 125 | 6 | 207 | 0 | 308 | 62 | 7 | 370 | 28 | 906 | 934 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 89 | 266 | 2 | 32 | 357 | 80 | 0 | 110 | 2 | 190 | 0 | 280 | 71 | 6 | 351 | 40 | 898 | 938 |
| Total | 0 | 0 | 0 | 0 | 0 | 299 | 1011 | 2 | 56 | 1312 | 363 | 0 | 483 | 13 | 846 | 1 | 1168 | 303 | 28 | 1472 | 97 | 3630 | 3727 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 537 | 1869 | 2 | 78 | 2408 | 623 | 0 | 908 | 20 | 1531 | 1 | 2321 | 614 | 43 | 2936 | 141 | 6875 | 7016 |
| Apprch % | 0 | 0 | 0 | | | 22.3 | 77.6 | 0.1 | | | 40.7 | 0 | 59.3 | | | 0 | 79.1 | 20.9 | | | | | |
| Total % | 0 | 0 | 0 | | 0 | 7.8 | 27.2 | 0 | | 35 | 9.1 | 0 | 13.2 | | 22.3 | 0 | 33.8 | 8.9 | | 42.7 | 2 | 98 | |

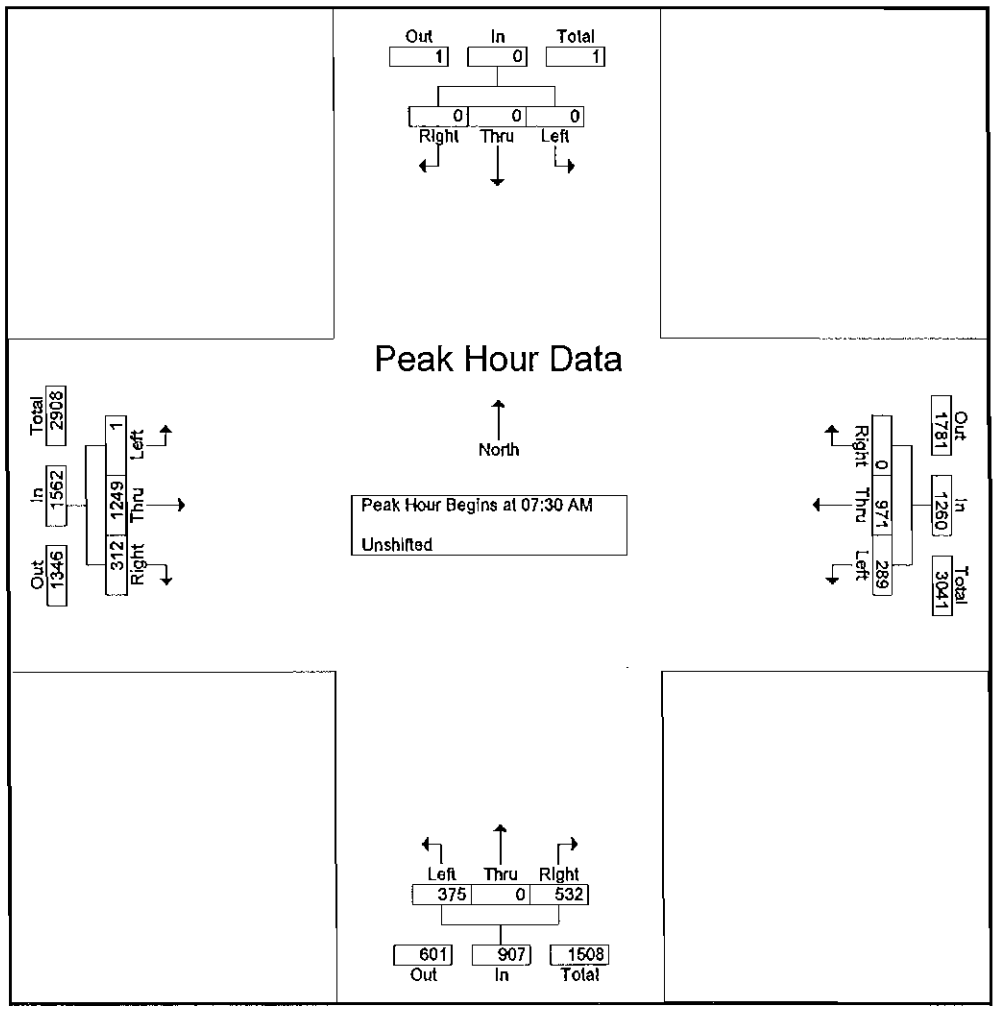


Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

**Dreshertown Road & Welsh Road**

File Name : Not Named 2
Site Code : 00000000
Start Date : 2/1/2006
Page No : 2

| | Southbound | | | | Welsh Road Westbound | | | | Dreshertown Rd. Northbound | | | | Welsh Rd. Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis from 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | 0 | 0 | 0 | 0 | 74 | 266 | 0 | 340 | 74 | 0 | 129 | 203 | 0 | 331 | 75 | 406 | 949 |
| 07:45 AM | 0 | 0 | 0 | 0 | **82** | 212 | 0 | 294 | 100 | 0 | **155** | **255** | 0 | **338** | 67 | 405 | **954** |
| 08:00 AM | 0 | 0 | 0 | 0 | 63 | 250 | 0 | 313 | 87 | 0 | 115 | 202 | **1** | 331 | **87** | **419** | 934 |
| 08:15 AM | 0 | 0 | 0 | 0 | 70 | 243 | 0 | 313 | **114** | 0 | 133 | 247 | 0 | 249 | 83 | 332 | 892 |
| Total Volume | 0 | 0 | 0 | 0 | 289 | 971 | 0 | 1260 | 375 | 0 | 532 | 907 | 1 | 1249 | 312 | 1562 | 3729 |
| % App. Total | 0 | 0 | 0 | | 22.9 | 77.1 | 0 | | 41.3 | 0 | 58.7 | | 0.1 | 80 | 20 | | |
| PHF | .000 | .000 | .000 | .000 | .881 | .913 | .000 | .926 | .822 | .000 | .858 | .889 | .250 | .924 | .897 | .932 | .977 |



Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

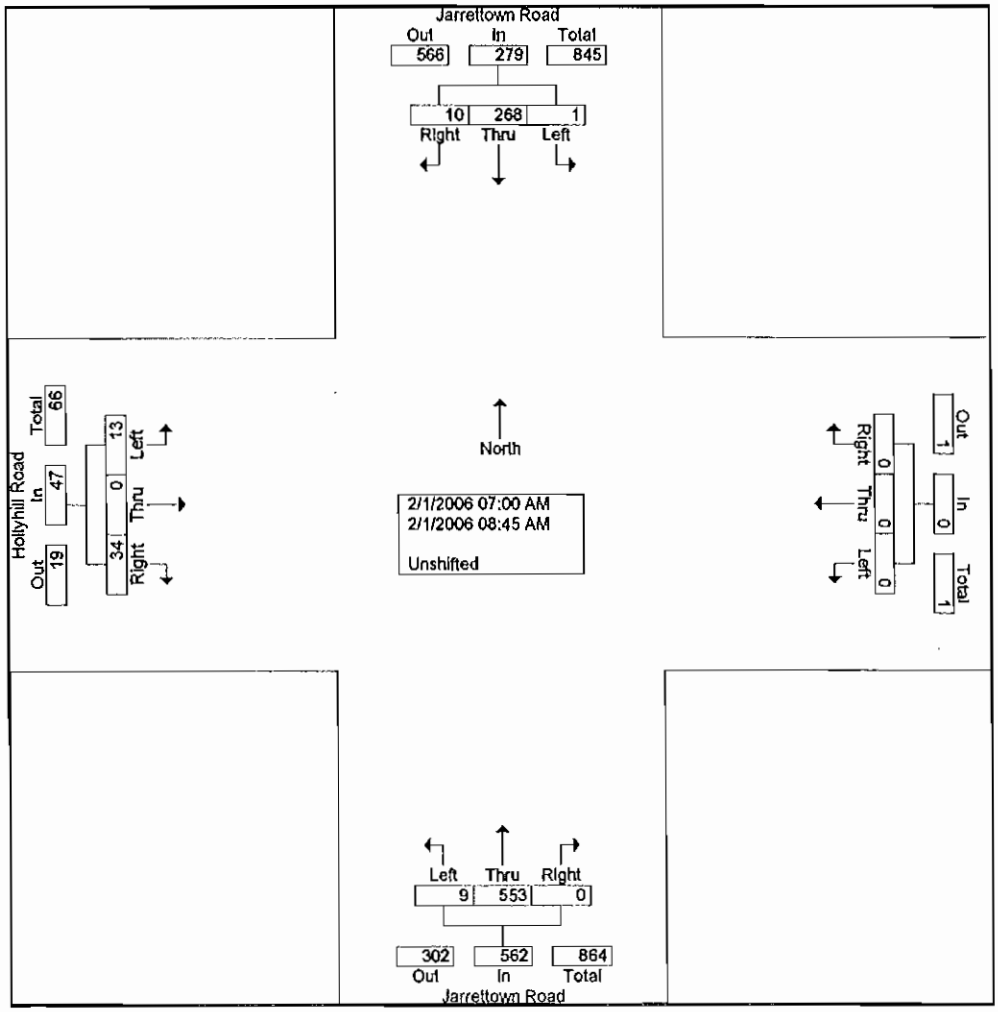
# Jarrettown Road & Hollyhill Road

Counter:
Counted by: JTemple
Weather: clear
AMJRHR

File Name : AMJRHR
Site Code : 00000000
Start Date : 2/1/2006
Page No : 1

**Groups Printed- Unshifted**

| | Jarrettown Road Southbound | | | | | Westbound | | | | | Jarrettown Road Northbound | | | | | Hollyhill Road Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Ped. Total | Veh. Total | Int. Total |
| 07:00 AM | 0 | 27 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 42 | 2 | 0 | 6 | 0 | 8 | 0 | 77 | 77 |
| 07:15 AM | 0 | 34 | 1 | 2 | 35 | 0 | 0 | 0 | 0 | 0 | 1 | 60 | 0 | 1 | 61 | 2 | 0 | 5 | 0 | 7 | 3 | 103 | 106 |
| 07:30 AM | 1 | 28 | 3 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 2 | 67 | 0 | 1 | 69 | 2 | 0 | 4 | 0 | 6 | 1 | 107 | 108 |
| 07:45 AM | 0 | 39 | 1 | 2 | 40 | 0 | 0 | 0 | 0 | 0 | 1 | 84 | 0 | 4 | 85 | 1 | 0 | 3 | 0 | 4 | 6 | 129 | 135 |
| Total | 1 | 128 | 5 | 4 | 134 | 0 | 0 | 0 | 0 | 0 | 4 | 253 | 0 | 6 | 257 | 7 | 0 | 18 | 0 | 25 | 10 | 416 | 426 |
| 08:00 AM | 0 | 44 | 0 | 2 | 44 | 0 | 0 | 0 | 0 | 0 | 2 | 59 | 0 | 0 | 61 | 2 | 0 | 2 | 0 | 4 | 2 | 109 | 111 |
| 08:15 AM | 0 | 46 | 0 | 2 | 46 | 0 | 0 | 0 | 0 | 0 | 2 | 94 | 0 | 0 | 96 | 0 | 0 | 1 | 0 | 1 | 2 | 143 | 145 |
| 08:30 AM | 0 | 25 | 1 | 1 | 26 | 0 | 0 | 0 | 0 | 0 | 1 | 80 | 0 | 2 | 81 | 4 | 0 | 8 | 1 | 12 | 4 | 119 | 123 |
| 08:45 AM | 0 | 25 | 4 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 67 | 0 | 0 | 67 | 0 | 0 | 5 | 0 | 5 | 0 | 101 | 101 |
| Total | 0 | 140 | 5 | 5 | 145 | 0 | 0 | 0 | 0 | 0 | 5 | 300 | 0 | 2 | 305 | 6 | 0 | 16 | 1 | 22 | 8 | 472 | 480 |
| Grand Total | 1 | 268 | 10 | 9 | 279 | 0 | 0 | 0 | 0 | 0 | 9 | 553 | 0 | 8 | 562 | 13 | 0 | 34 | 1 | 47 | 18 | 888 | 906 |
| Apprch % | 0.4 | 96.1 | 3.6 | | | 0 | 0 | 0 | | | 1.6 | 98.4 | 0 | | | 27.7 | 0 | 72.3 | | | | | |
| Total % | 0.1 | 30.2 | 1.1 | | 31.4 | 0 | 0 | 0 | | 0 | 1 | 62.3 | 0 | | 63.3 | 1.5 | 0 | 3.8 | | 5.3 | 2 | 98 | |

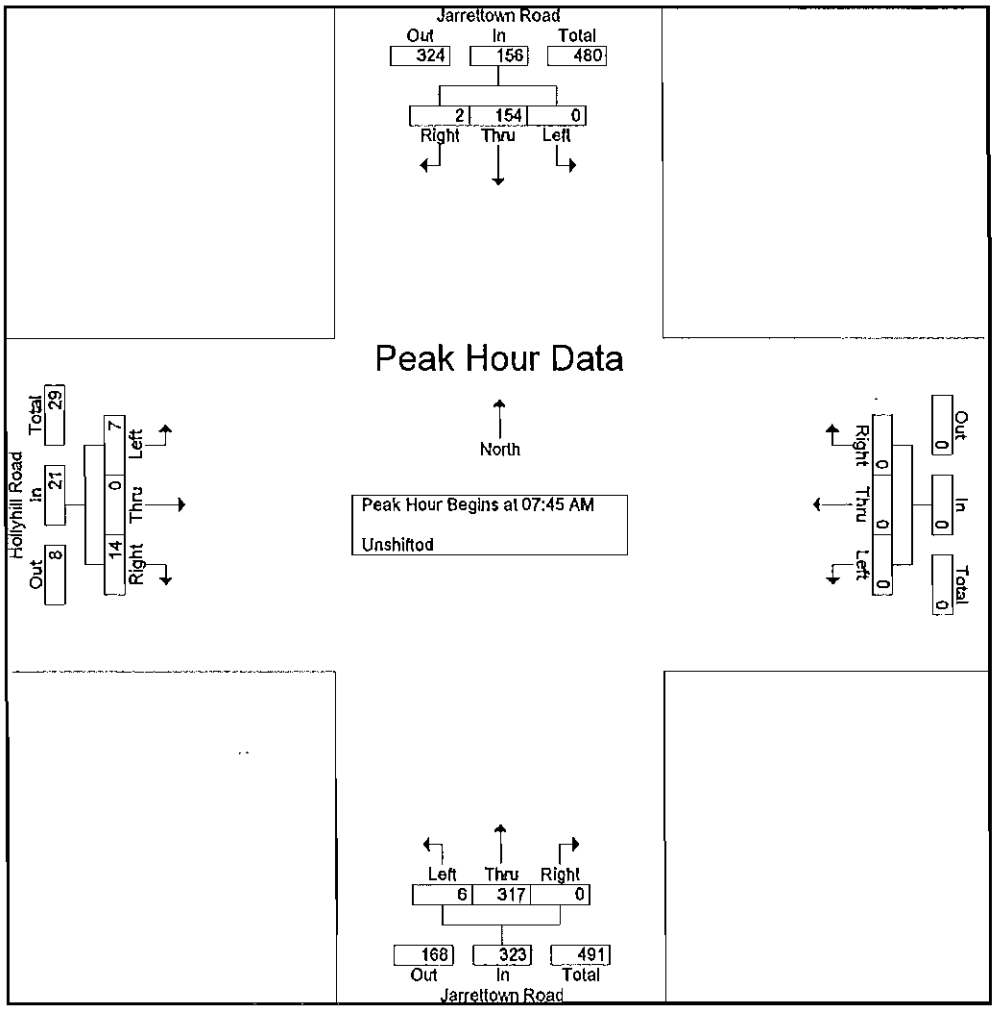


Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

**Jarrettown Road & Hollyhill Road**

File Name : AMJRHR
Site Code : 00000000
Start Date : 2/1/2006
Page No : 2

| | Jarrettown Road Southbound | | | | Westbound | | | | Jarrettown Road Northbound | | | | Hollyhill Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis from 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | |
| 07:45 AM | 0 | 39 | 1 | 40 | 0 | 0 | 0 | 0 | 1 | 84 | 0 | 85 | 1 | 0 | 3 | 4 | 129 |
| 08:00 AM | 0 | 44 | 0 | 44 | 0 | 0 | 0 | 0 | 2 | 59 | 0 | 61 | 2 | 0 | 2 | 4 | 109 |
| 08:15 AM | 0 | 46 | 0 | 46 | 0 | 0 | 0 | 0 | 2 | 94 | 0 | 96 | 0 | 0 | 1 | 1 | 143 |
| 08:30 AM | 0 | 25 | 1 | 26 | 0 | 0 | 0 | 0 | 1 | 80 | 0 | 81 | 4 | 0 | 8 | 12 | 119 |
| Total Volume | 0 | 154 | 2 | 156 | 0 | 0 | 0 | 0 | 6 | 317 | 0 | 323 | 7 | 0 | 14 | 21 | 500 |
| % App. Total | 0 | 98.7 | 1.3 | | 0 | 0 | 0 | | 1.9 | 98.1 | 0 | | 33.3 | 0 | 66.7 | | |
| PHF | .000 | .837 | .500 | .848 | .000 | .000 | .000 | .000 | .750 | .843 | .000 | .841 | .438 | .000 | .438 | .438 | .874 |



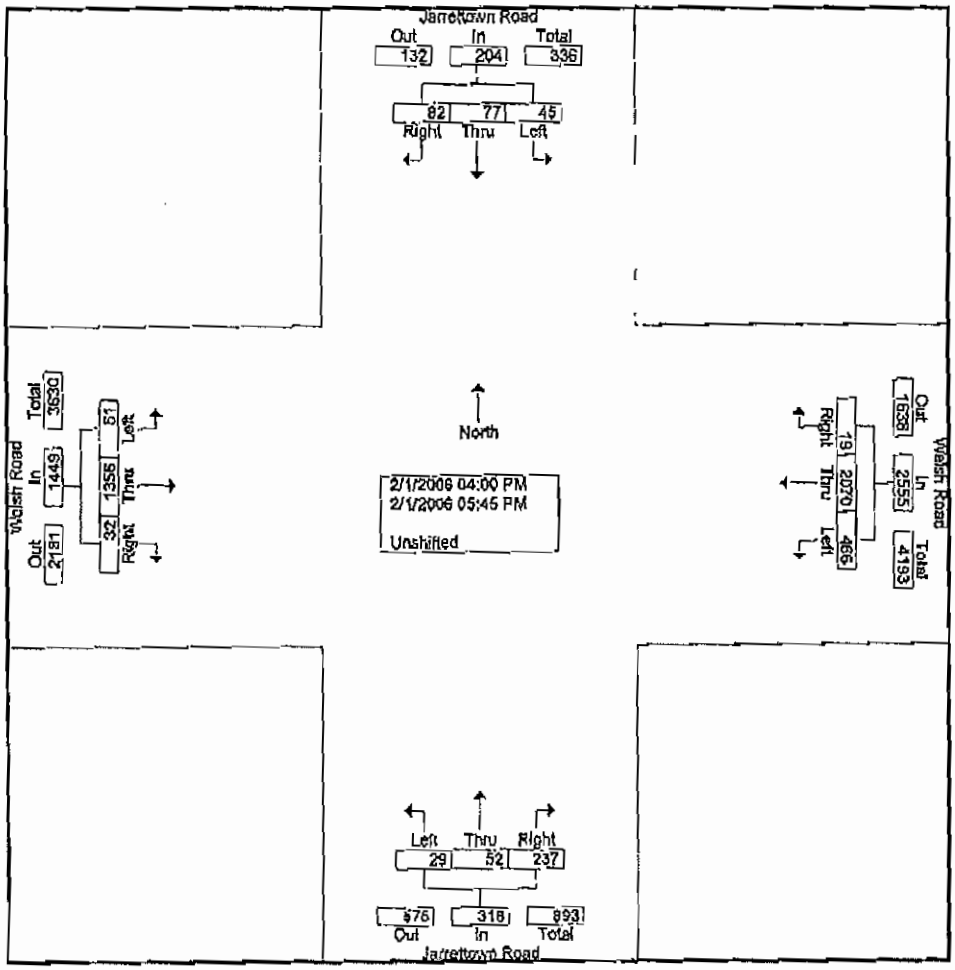
# Traffic Planning & Design, Inc.

4647 Saucon Creek Road
Center Valley,
*Jarrettown Road & Welsh Road*

File Name : Not Named 2
Site Code : 00000000
Start Date : 2/1/2006
Page No : 1

Groups Printed- Unshifted

| | Jarrettown Road Southbound | | | | | Welsh Road Westbound | | | | | Jarrettown Road Northbound | | | | | Welsh Road Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Int. Total | Inc. Total | Int. Total |
| 04:00 PM | 9 | 5 | 12 | 1 | 26 | 46 | 253 | 1 | 3 | 300 | 1 | 5 | 29 | 1 | 35 | 2 | 181 | 6 | 3 | 189 | 8 | 550 | 558 |
| 04:15 PM | 2 | 5 | 6 | 0 | 13 | 59 | 251 | 2 | 4 | 312 | 4 | 4 | 37 | 0 | 45 | 7 | 177 | 9 | 6 | 193 | 10 | 563 | 573 |
| 04:30 PM | 7 | 8 | 18 | 1 | 33 | 52 | 232 | 2 | 3 | 286 | 8 | 5 | 37 | 0 | 50 | 17 | 158 | 5 | 1 | 180 | 5 | 549 | 554 |
| 04:45 PM | 6 | 10 | 8 | 0 | 24 | 53 | 231 | 1 | 3 | 285 | 3 | 6 | 34 | 0 | 43 | 8 | 173 | 1 | 3 | 182 | 6 | 534 | 540 |
| Total | 24 | 28 | 44 | 2 | 96 | 210 | 967 | 6 | 13 | 1183 | 16 | 20 | 137 | 1 | 173 | 34 | 689 | 21 | 13 | 744 | 29 | 2196 | 2225 |
| 05:00 PM | 7 | 16 | 16 | 0 | 39 | 65 | 301 | 3 | 1 | 369 | 6 | 8 | 34 | 1 | 48 | 6 | 141 | 6 | 3 | 153 | 5 | 609 | 614 |
| 05:15 PM | 6 | 15 | 7 | 0 | 28 | 71 | 303 | 5 | 5 | 379 | 2 | 6 | 21 | 1 | 29 | 8 | 201 | 2 | 10 | 211 | 16 | 647 | 663 |
| 05:30 PM | 5 | 12 | 6 | 1 | 23 | 59 | 265 | 3 | 1 | 327 | 3 | 14 | 29 | 1 | 46 | 5 | 156 | 0 | 7 | 161 | 10 | 557 | 567 |
| 05:45 PM | 3 | 6 | 9 | 0 | 18 | 61 | 234 | 2 | 2 | 297 | 2 | 4 | 16 | 0 | 22 | 8 | 169 | 3 | 8 | 180 | 10 | 517 | 527 |
| Total | 21 | 49 | 38 | 1 | 108 | 256 | 1103 | 13 | 9 | 1372 | 13 | 32 | 100 | 3 | 145 | 27 | 667 | 11 | 28 | 705 | 41 | 2330 | 2371 |
| Grand Total | 45 | 77 | 82 | 3 | 204 | 466 | 2070 | 19 | 22 | 2555 | 29 | 52 | 237 | 4 | 318 | 61 | 1356 | 32 | 41 | 1449 | 70 | 4526 | 4596 |
| Apprch % | 22.1 | 37.7 | 40.2 | | | 18.2 | 81 | 0.7 | | | 9.1 | 16.4 | 74.5 | | | 4.2 | 93.6 | 2.2 | | | | | |
| Total % | 1 | 1.7 | 1.8 | | 4.5 | 10.3 | 45.7 | 0.4 | | 56.5 | 0.6 | 1.1 | 5.2 | | 7 | 1.3 | 30 | 0.7 | | 32 | 1.5 | 98.5 | |

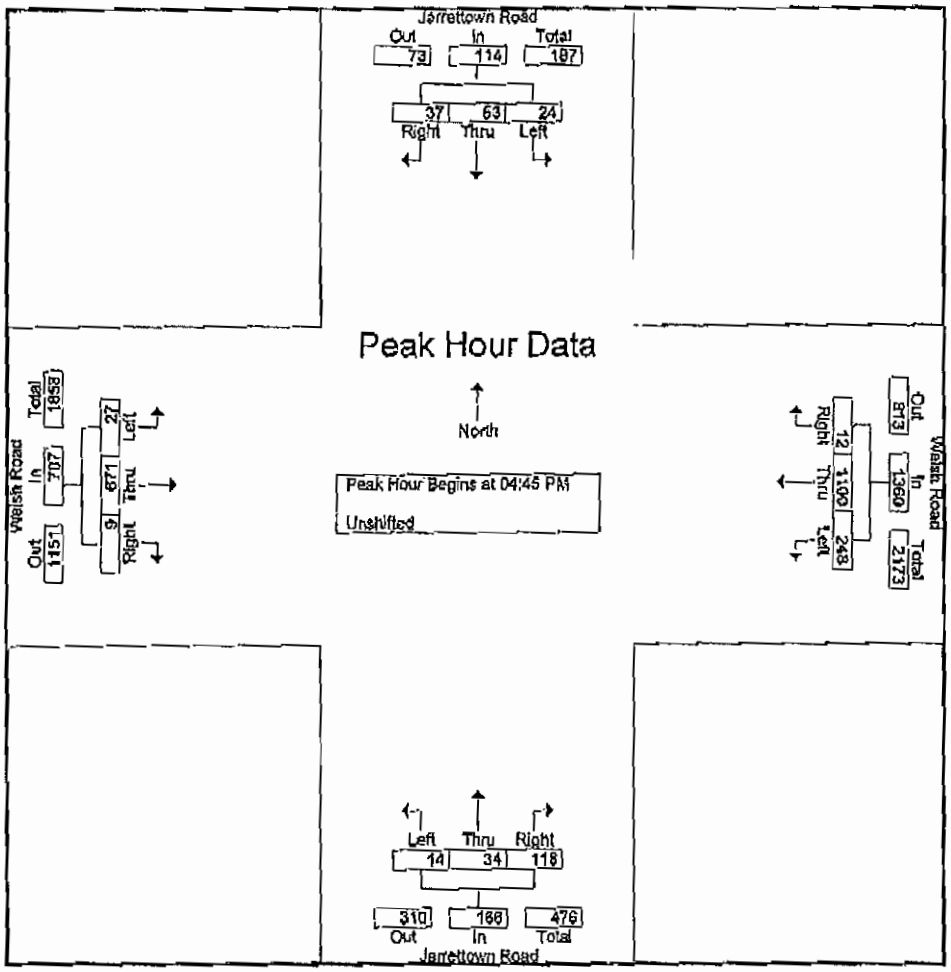


# Traffic Planning & Design, Inc.

4647 Saucon Creek Road
Center Valley,
*Jarrettown Road & Welsh Road*

File Name : Not Named 2
Site Code : 00000000
Start Date : 2/1/2006
Page No : 2

| | Jarrettown Road Southbound | | | | Welsh Road Westbound | | | | Jarrettown Road Northbound | | | | Welsh Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis from 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 6 | 10 | 8 | 24 | 53 | 231 | 1 | 285 | 3 | 6 | 34 | 43 | 8 | 173 | 1 | 182 | 534 |
| 05:00 PM | 7 | 16 | 16 | 39 | 65 | 301 | 3 | 369 | 6 | 8 | 34 | 48 | 6 | 141 | 6 | 153 | 609 |
| 05:15 PM | 6 | 15 | 7 | 28 | 71 | 303 | 5 | 379 | 2 | 6 | 21 | 29 | 8 | 201 | 2 | 211 | 647 |
| 05:30 PM | 5 | 12 | 6 | 23 | 59 | 265 | 3 | 327 | 3 | 14 | 29 | 46 | 5 | 156 | 0 | 161 | 557 |
| Total Volume | 24 | 53 | 37 | 114 | 248 | 1100 | 12 | 1360 | 14 | 34 | 118 | 166 | 27 | 671 | 9 | 707 | 2347 |
| % App. Total | 21.1 | 46.5 | 32.5 | | 18.2 | 80.9 | 0.9 | | 8.4 | 20.5 | 71.1 | | 3.8 | 94.9 | 1.3 | | |
| PHF | .857 | .828 | .578 | .731 | .873 | .908 | .600 | .897 | .583 | .607 | .868 | .865 | .844 | .835 | .375 | .838 | .907 |



Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

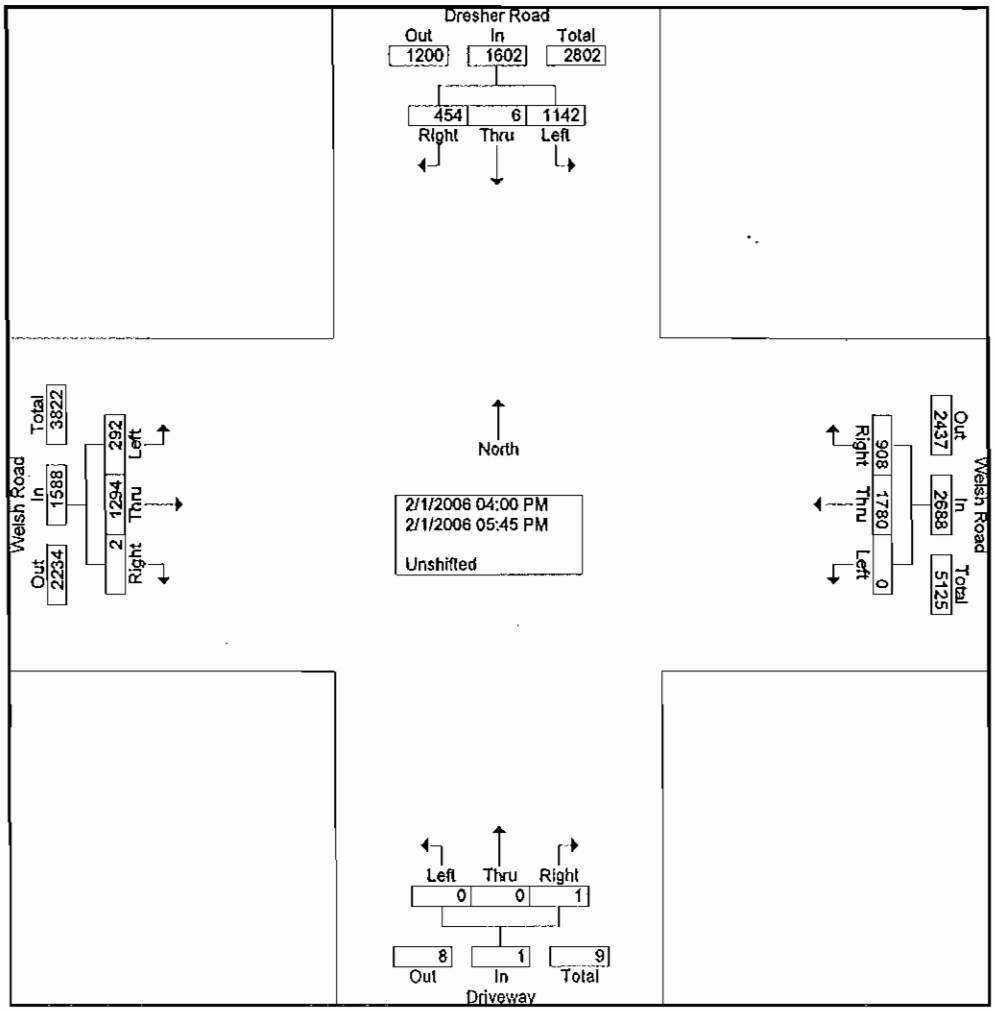
Counter: 1
Counted by: JGabriel
Weather: cloudy
PMDRDWR

# Dresher Road & Welsh Road

File Name : Not Named 8
Site Code : 00000000
Start Date : 2/1/2006
Page No : 1

**Groups Printed- Unshifted**

| | Dresher Road Southbound | | | | | Welsh Road Westbound | | | | | Driveway Northbound | | | | | Welsh Road Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Exclu. Total | Incl. Total | Int. Total |
| 04:00 PM | 136 | 0 | 49 | 1 | 185 | 0 | 247 | 127 | 8 | 374 | 0 | 0 | 0 | 0 | 0 | 36 | 205 | 0 | 4 | 241 | 13 | 800 | 813 |
| 04:15 PM | 124 | 0 | 50 | 1 | 174 | 0 | 225 | 115 | 7 | 340 | 0 | 0 | 0 | 0 | 0 | 37 | 180 | 0 | 3 | 217 | 11 | 731 | 742 |
| 04:30 PM | 59 | 5 | 11 | 0 | 75 | 0 | 107 | 46 | 6 | 153 | 0 | 0 | 1 | 0 | 1 | 22 | 68 | 2 | 0 | 92 | 6 | 321 | 327 |
| 04:45 PM | 155 | 0 | 45 | 2 | 200 | 0 | 208 | 117 | 5 | 325 | 0 | 0 | 0 | 0 | 0 | 38 | 162 | 0 | 1 | 200 | 8 | 725 | 733 |
| Total | 474 | 5 | 155 | 4 | 634 | 0 | 787 | 405 | 26 | 1192 | 0 | 0 | 1 | 0 | 1 | 133 | 615 | 2 | 8 | 750 | 38 | 2577 | 2615 |
| 05:00 PM | 217 | 1 | 91 | 1 | 309 | 0 | 262 | 147 | 4 | 409 | 0 | 0 | 0 | 0 | 0 | 44 | 165 | 0 | 5 | 209 | 10 | 927 | 937 |
| 05:15 PM | 152 | 0 | 75 | 1 | 227 | 0 | 270 | 140 | 6 | 410 | 0 | 0 | 0 | 0 | 0 | 46 | 175 | 0 | 8 | 221 | 15 | 858 | 873 |
| 05:30 PM | 158 | 0 | 77 | 1 | 235 | 0 | 247 | 122 | 4 | 369 | 0 | 0 | 0 | 0 | 0 | 39 | 169 | 0 | 8 | 208 | 13 | 812 | 825 |
| 05:45 PM | 141 | 0 | 56 | 0 | 197 | 0 | 214 | 94 | 5 | 308 | 0 | 0 | 0 | 0 | 0 | 30 | 170 | 0 | 8 | 200 | 13 | 705 | 718 |
| Total | 668 | 1 | 299 | 3 | 968 | 0 | 993 | 503 | 19 | 1496 | 0 | 0 | 0 | 0 | 0 | 159 | 679 | 0 | 29 | 838 | 51 | 3302 | 3353 |
| Grand Total | 1142 | 6 | 454 | 7 | 1602 | 0 | 1780 | 908 | 45 | 2688 | 0 | 0 | 1 | 0 | 1 | 292 | 1294 | 2 | 37 | 1588 | 89 | 5879 | 5968 |
| Apprch % | 71.3 | 0.4 | 28.3 | | | 0 | 66.2 | 33.8 | | | 0 | 0 | 100 | | | 18.4 | 81.5 | 0.1 | | | | | |
| Total % | 19.4 | 0.1 | 7.7 | | 27.2 | 0 | 30.3 | 15.4 | | 45.7 | 0 | 0 | 0 | | 0 | 5 | 22 | 0 | | 27 | 1.5 | 98.5 | |

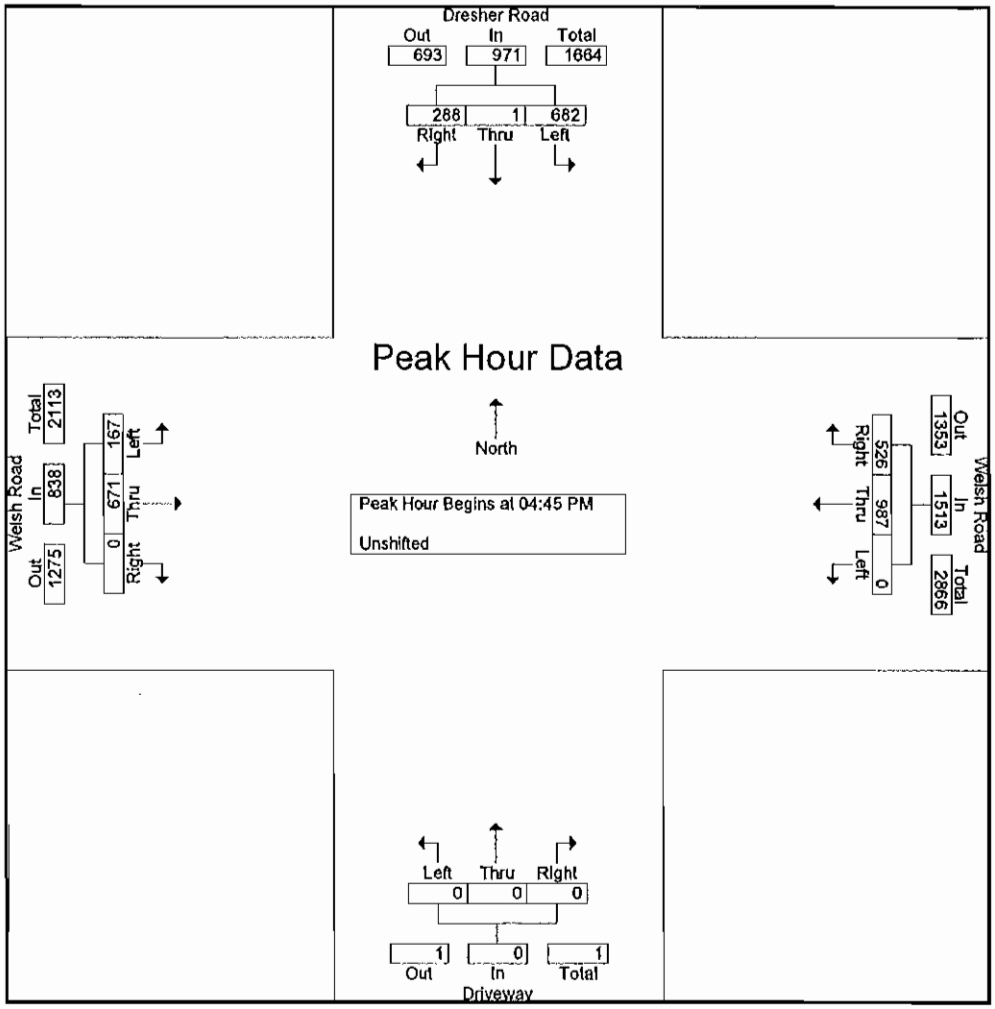


Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

**Dresher Road & Welsh Road**

File Name : Not Named 8
Site Code : 00000000
Start Date : 2/1/2006
Page No : 2

| | Dresher Road Southbound | | | | Welsh Road Westbound | | | | Driveway Northbound | | | | Welsh Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis from 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 155 | 0 | 45 | 200 | 0 | 208 | 117 | 325 | 0 | 0 | 0 | 0 | 38 | 162 | 0 | 200 | 725 |
| 05:00 PM | **217** | 1 | **91** | **309** | 0 | 262 | **147** | 409 | 0 | 0 | 0 | 0 | 44 | 165 | 0 | 209 | **927** |
| 05:15 PM | 152 | 0 | 75 | 227 | 0 | **270** | 140 | **410** | 0 | 0 | 0 | 0 | **46** | **175** | 0 | **221** | 858 |
| 05:30 PM | 158 | 0 | 77 | 235 | 0 | 247 | 122 | 369 | 0 | 0 | 0 | 0 | 39 | 169 | 0 | 208 | 812 |
| Total Volume | 682 | 1 | 288 | 971 | 0 | 987 | 526 | 1513 | 0 | 0 | 0 | 0 | 167 | 671 | 0 | 838 | 3322 |
| % App. Total | 70.2 | 0.1 | 29.7 | | 0 | 65.2 | 34.8 | | 0 | 0 | 0 | | 19.9 | 80.1 | 0 | | |
| PHF | .786 | .250 | .791 | .786 | .000 | .914 | .895 | .923 | .000 | .000 | .000 | .000 | .908 | .959 | .000 | .948 | .896 |



Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

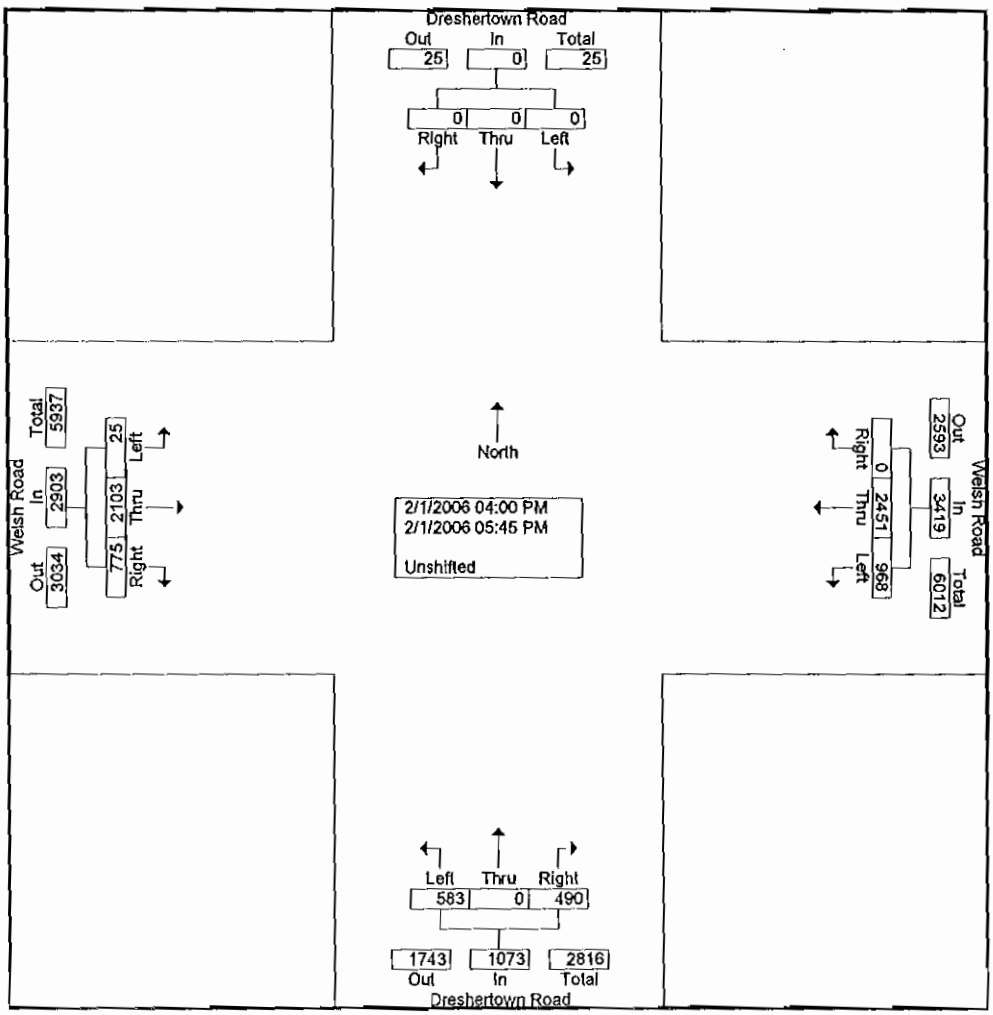
Counter: 2
Counted by: Elghawy/Rumbaugh/Gabriel/Tem
Weather: clear
RR10

# Dreshertown Road & Welsh Road

File Name : Not Named 3
Site Code : 00000000
Start Date : 2/1/2006
Page No : 1

**Groups Printed- Unshifted**

| Start Time | Dreshertown Road Southbound | | | | | Welsh Road Westbound | | | | | Dreshertown Road Northbound | | | | | Welsh Road Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 89 | 295 | 0 | 4 | 384 | 82 | 0 | 59 | 8 | 141 | 0 | 267 | 71 | 5 | 338 | 17 | 863 | 880 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 95 | 295 | 0 | 8 | 390 | 64 | 0 | 71 | 0 | 135 | 0 | 251 | 75 | 3 | 326 | 11 | 851 | 862 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 108 | 293 | 0 | 0 | 401 | 71 | 0 | 64 | 0 | 135 | 0 | 267 | 107 | 1 | 374 | 1 | 910 | 911 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 132 | 301 | 0 | 2 | 433 | 88 | 0 | 48 | 4 | 136 | 0 | 303 | 95 | 2 | 398 | 8 | 967 | 975 |
| Total | 0 | 0 | 0 | 0 | 0 | 424 | 1184 | 0 | 14 | 1608 | 305 | 0 | 242 | 12 | 547 | 0 | 1088 | 348 | 11 | 1436 | 37 | 3591 | 3628 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 146 | 328 | 0 | 0 | 474 | 79 | 0 | 43 | 0 | 122 | 0 | 248 | 134 | 1 | 382 | 1 | 978 | 979 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 146 | 343 | 0 | 4 | 489 | 73 | 0 | 62 | 2 | 135 | 0 | 277 | 106 | 4 | 383 | 10 | 1007 | 1017 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 139 | 303 | 0 | 4 | 442 | 76 | 0 | 72 | 4 | 148 | 1 | 253 | 89 | 6 | 343 | 14 | 933 | 947 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 113 | 293 | 0 | 4 | 406 | 50 | 0 | 71 | 4 | 121 | 24 | 237 | 98 | 2 | 359 | 10 | 886 | 896 |
| Total | 0 | 0 | 0 | 0 | 0 | 544 | 1267 | 0 | 12 | 1811 | 278 | 0 | 248 | 10 | 526 | 25 | 1015 | 427 | 13 | 1467 | 35 | 3804 | 3839 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 968 | 2451 | 0 | 26 | 3419 | 583 | 0 | 490 | 22 | 1073 | 25 | 2103 | 775 | 24 | 2903 | 72 | 7395 | 7467 |
| Apprch % | 0 | 0 | 0 | | | 28.3 | 71.7 | 0 | | | 54.3 | 0 | 45.7 | | | 0.9 | 72.4 | 26.7 | | | | | |
| Total % | 0 | 0 | 0 | | 0 | 13.1 | 33.1 | 0 | | 46.2 | 7.9 | 0 | 6.6 | | 14.5 | 0.3 | 28.4 | 10.5 | | 39.3 | 1 | 99 | |

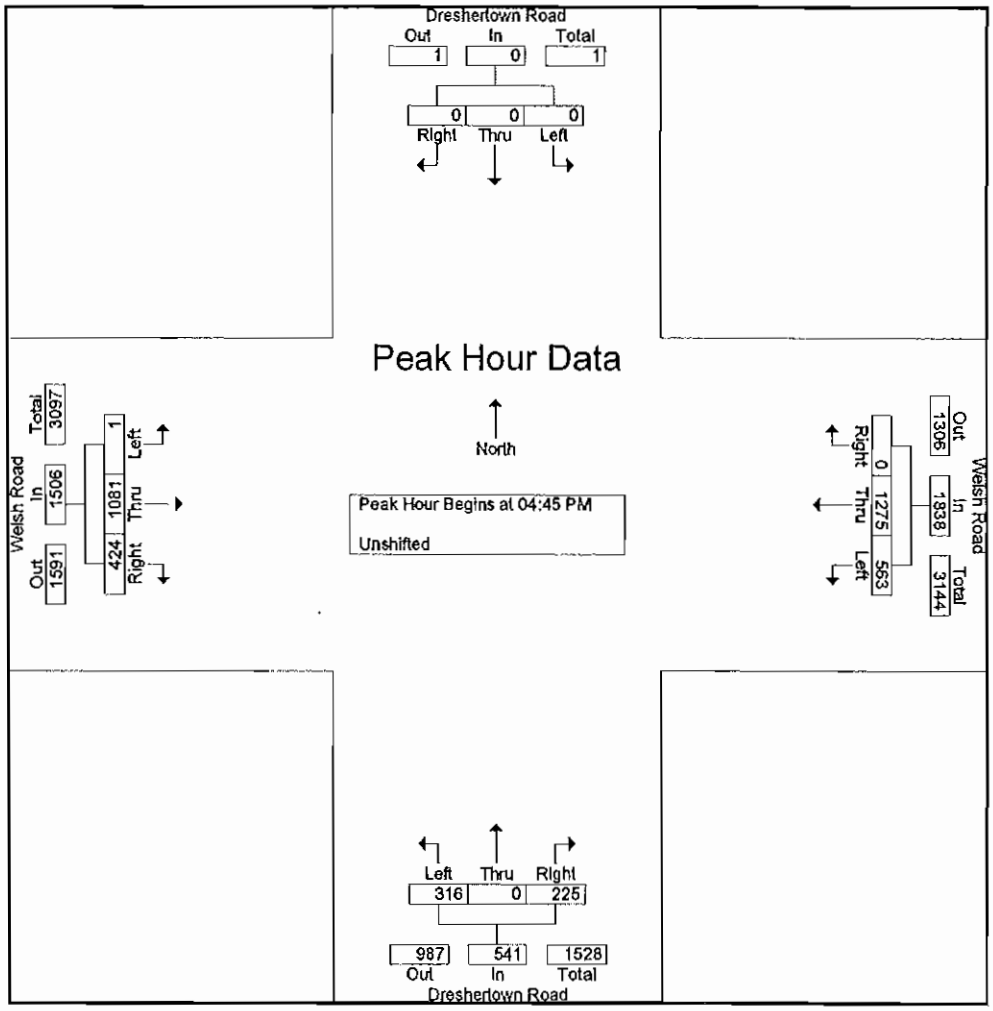


Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

## Dreshertown Road & Welsh Road

File Name : Not Named 3
Site Code : 00000000
Start Date : 2/1/2006
Page No : 2

| | Dreshertown Road Southbound | | | | Welsh Road Westbound | | | | Dreshertown Road Northbound | | | | Welsh Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 0 | 0 | 0 | 0 | 132 | 301 | 0 | 433 | 88 | 0 | 48 | 136 | 0 | 303 | 95 | 398 | 967 |
| 05:00 PM | 0 | 0 | 0 | 0 | 146 | 328 | 0 | 474 | 79 | 0 | 43 | 122 | 0 | 248 | 134 | 382 | 978 |
| 05:15 PM | 0 | 0 | 0 | 0 | 146 | 343 | 0 | 489 | 73 | 0 | 62 | 135 | 0 | 277 | 106 | 383 | 1007 |
| 05:30 PM | 0 | 0 | 0 | 0 | 139 | 303 | 0 | 442 | 76 | 0 | 72 | 148 | 1 | 253 | 89 | 343 | 933 |
| Total Volume | 0 | 0 | 0 | 0 | 563 | 1275 | 0 | 1838 | 316 | 0 | 225 | 541 | 1 | 1081 | 424 | 1506 | 3885 |
| % App. Total | 0 | 0 | 0 | | 30.6 | 69.4 | 0 | | 58.4 | 0 | 41.6 | | 0.1 | 71.8 | 28.2 | | |
| PHF | .000 | .000 | .000 | .000 | .964 | .929 | .000 | .940 | .898 | .000 | .781 | .914 | .250 | .892 | .791 | .946 | .964 |



Traffic Planning & Design
2500 E. High Street Suite 650
Pottstown, PA 19464

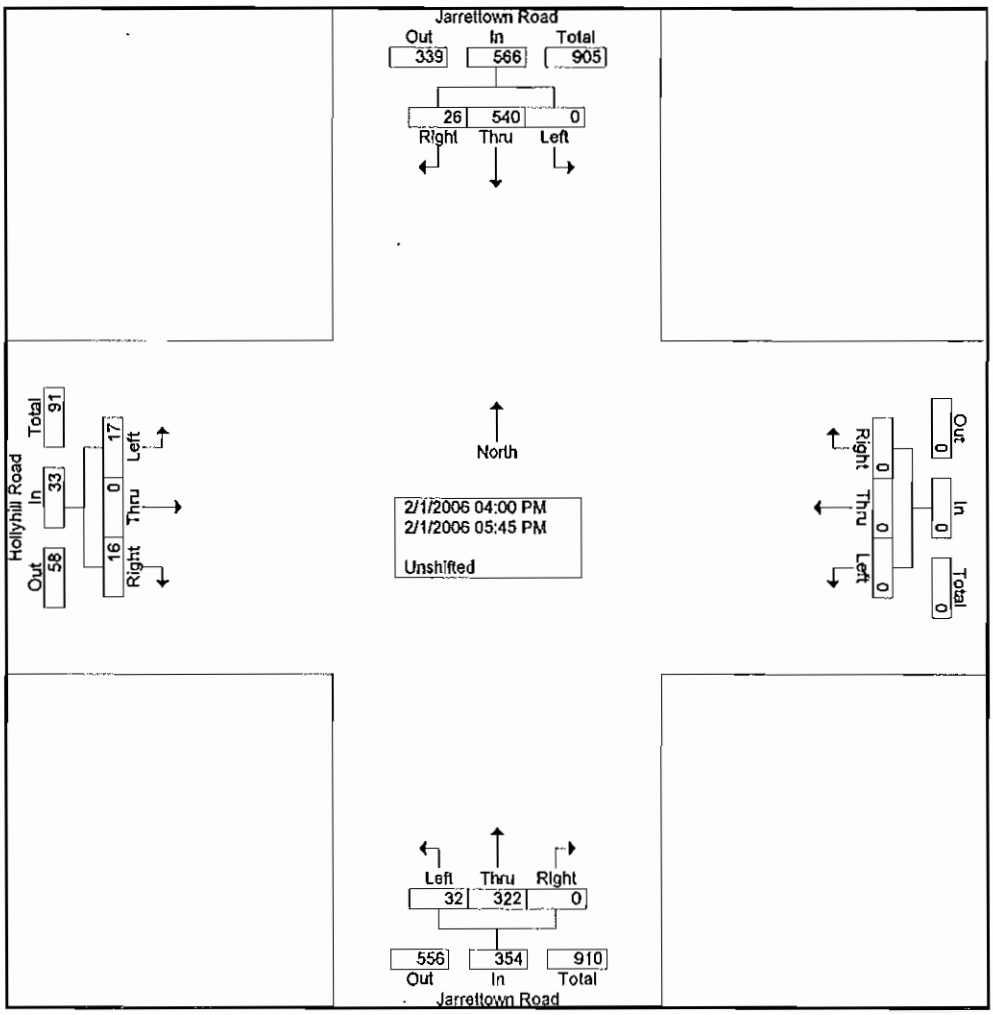
Counter:
Counted by: JTemple
Weather: clear
PMJRHR

# Jarrettown Road & Hollyhill Road

File Name : Not Named 4
Site Code : 00000000
Start Date : 2/1/2006
Page No : 1

**Groups Printed- Unshifted**

| | Jarrettown Road Southbound | | | | | Westbound | | | | | Jarrettown Road Northbound | | | | | Hollyhill Road Eastbound | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Left | Thru | Right | Trucks | App. Total | Exclu. Total | Inclu. Total | Int. Total |
| 04:00 PM | 0 | 54 | 1 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 5 | 32 | 0 | 0 | 37 | 2 | 0 | 3 | 1 | 5 | 1 | 97 | 98 |
| 04:15 PM | 0 | 64 | 3 | 1 | 67 | 0 | 0 | 0 | 0 | 0 | 3 | 42 | 0 | 0 | 45 | 3 | 0 | 4 | 0 | 7 | 1 | 119 | 120 |
| 04:30 PM | 0 | 56 | 2 | 0 | 58 | 0 | 0 | 0 | 0 | 0 | 1 | 51 | 0 | 0 | 52 | 3 | 0 | 2 | 0 | 5 | 0 | 115 | 115 |
| 04:45 PM | 0 | 68 | 5 | 1 | 73 | 0 | 0 | 0 | 0 | 0 | 4 | 37 | 0 | 1 | 41 | 3 | 0 | 1 | 0 | 4 | 2 | 118 | 120 |
| Total | 0 | 242 | 11 | 2 | 253 | 0 | 0 | 0 | 0 | 0 | 13 | 162 | 0 | 1 | 175 | 11 | 0 | 10 | 1 | 21 | 4 | 449 | 453 |
| 05:00 PM | 0 | 78 | 2 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 5 | 49 | 0 | 0 | 54 | 2 | 0 | 3 | 0 | 5 | 0 | 139 | 139 |
| 05:15 PM | 0 | 80 | 7 | 0 | 87 | 0 | 0 | 0 | 0 | 0 | 3 | 36 | 0 | 1 | 39 | 1 | 0 | 2 | 0 | 3 | 1 | 129 | 130 |
| 05:30 PM | 0 | 72 | 5 | 0 | 77 | 0 | 0 | 0 | 0 | 0 | 6 | 42 | 0 | 0 | 48 | 2 | 0 | 0 | 0 | 2 | 0 | 127 | 127 |
| 05:45 PM | 0 | 68 | 1 | 0 | 69 | 0 | 0 | 0 | 0 | 0 | 5 | 33 | 0 | 1 | 38 | 1 | 0 | 1 | 0 | 2 | 1 | 109 | 110 |
| Total | 0 | 298 | 15 | 0 | 313 | 0 | 0 | 0 | 0 | 0 | 19 | 160 | 0 | 2 | 179 | 6 | 0 | 6 | 0 | 12 | 2 | 504 | 506 |
| Grand Total | 0 | 540 | 26 | 2 | 566 | 0 | 0 | 0 | 0 | 0 | 32 | 322 | 0 | 3 | 354 | 17 | 0 | 16 | 1 | 33 | 6 | 953 | 959 |
| Apprch % | 0 | 95.4 | 4.6 | | | 0 | 0 | 0 | | | 9 | 91 | 0 | | | 51.5 | 0 | 48.5 | | | | | |
| Total % | 0 | 56.7 | 2.7 | | 59.4 | 0 | 0 | 0 | | 0 | 3.4 | 33.8 | 0 | | 37.1 | 1.8 | 0 | 1.7 | | 3.5 | 0.6 | 99.4 | |



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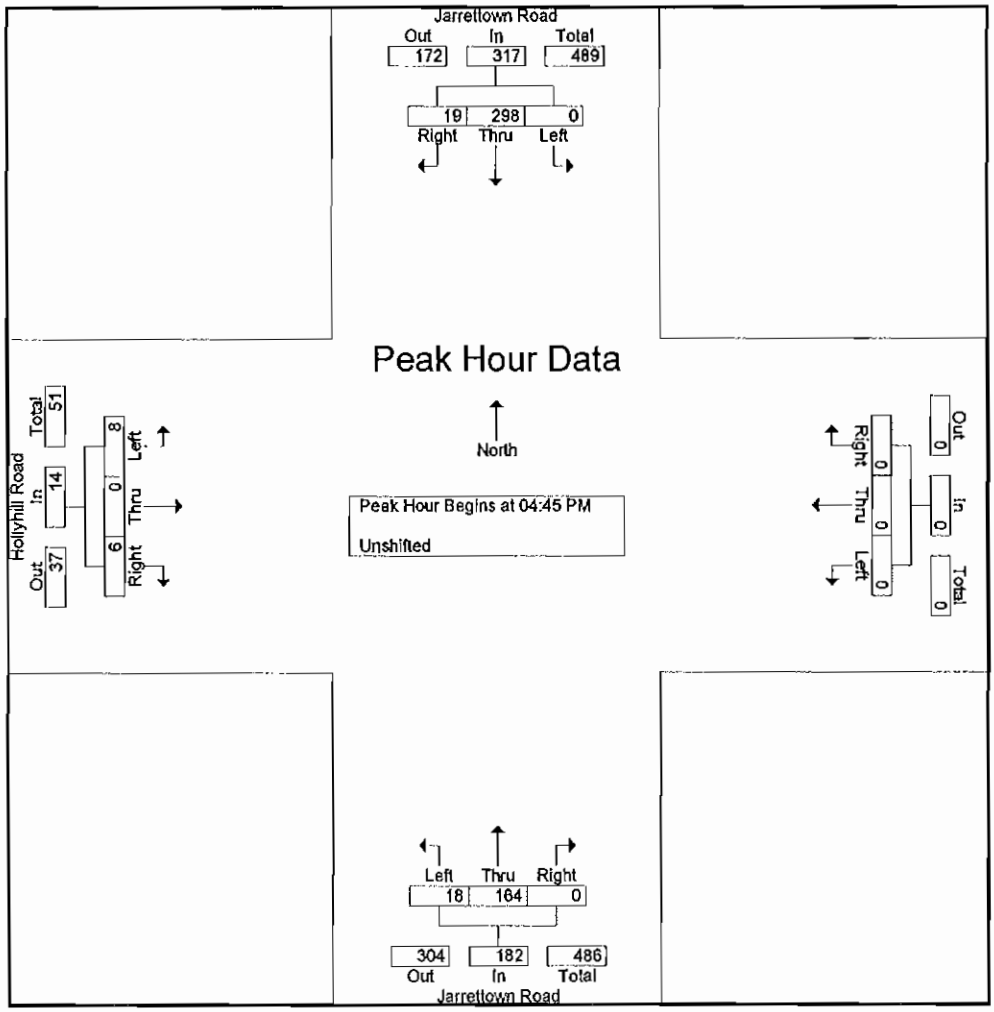
2500 E. High Street Suite 650
Pottstown, PA 19464

## Jarrettown Road & Hollyhill Road

File Name : Not Named 4
Site Code : 00000000
Start Date : 2/1/2006
Page No : 2

| | Jarrettown Road Southbound | | | | Westbound | | | | Jarrettown Road Northbound | | | | Hollyhill Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | |
| 04:45 PM | 0 | 68 | 5 | 73 | 0 | 0 | 0 | 0 | 4 | 37 | 0 | 41 | 3 | 0 | 1 | 4 | 118 |
| 05:00 PM | 0 | 78 | 2 | 80 | 0 | 0 | 0 | 0 | 5 | 49 | 0 | 54 | 2 | 0 | 3 | 5 | 139 |
| 05:15 PM | 0 | 80 | 7 | 87 | 0 | 0 | 0 | 0 | 3 | 36 | 0 | 39 | 1 | 0 | 2 | 3 | 129 |
| 05:30 PM | 0 | 72 | 5 | 77 | 0 | 0 | 0 | 0 | 6 | 42 | 0 | 48 | 2 | 0 | 0 | 2 | 127 |
| Total Volume | 0 | 298 | 19 | 317 | 0 | 0 | 0 | 0 | 18 | 164 | 0 | 182 | 8 | 0 | 6 | 14 | 513 |
| % App. Total | 0 | 94 | 6 | | 0 | 0 | 0 | | 9.9 | 90.1 | 0 | | 57.1 | 0 | 42.9 | | |
| PHF | .000 | .931 | .679 | .911 | .000 | .000 | .000 | .000 | .750 | .837 | .000 | .843 | .667 | .000 | .500 | .700 | .923 |



# APPENDIX C

*NEARBY PLANNED DEVELOPMENTS*
*TRIP DISTRIBUTION MATRICES*

TOLB A 00026
NEARBY PLANNED DEVELOPMENTS
AM PEAK

| | | 1 | 2 | 3 | 4 | 5 | TOTAL |
|---|---|---|---|---|---|---|---|
| WELSH ROAD & JARRETTOWN ROAD/ VILLAGE ROAD | EBL | | | | | | 0 |
| | EBT | 18 | 92 | 21 | 5 | 6 | 142 |
| | EBR | | | | | | 0 |
| | WBL | | | 1 | | 1 | 2 |
| | WBT | 2 | 12 | 12 | 4 | 6 | 36 |
| | WBR | | 3 | 1 | | | 4 |
| | NBL | | | | | | 0 |
| | NBT | | | | | | 0 |
| | NBR | 5 | | 2 | | 1 | 8 |
| | SBL | | 19 | 2 | | 1 | 22 |
| | SBT | | | | | | 0 |
| | SBR | | | | | | 0 |
| WELSH ROAD & DRESHER ROAD | EBL | 20 | | | | | 20 |
| | EBT | 3 | 111 | 25 | 5 | 8 | 152 |
| | WBT | 1 | 15 | 14 | 4 | 7 | 41 |
| | WBR | 5 | 12 | | 1 | | 18 |
| | SBL | 2 | 93 | | 2 | | 97 |
| | SBR | 1 | | | | | 1 |
| WELSH ROAD & DRESHERTOWN ROAD | EBT | 5 | 184 | 25 | | 8 | 222 |
| | EBR | | 20 | | 7 | | 27 |
| | WBL | | 2 | 7 | 7 | 1 | 17 |
| | WBT | 3 | 22 | 14 | | 7 | 46 |
| | NBL | 3 | 5 | | 5 | | 13 |
| | NBR | 1 | 89 | 11 | 5 | 1 | 107 |
| JARRETTOWN ROAD & HOLLY HILL LANE | EBL | | | | | | 0 |
| | EBT | | | | | | 0 |
| | EBR | | | | | | 0 |
| | WBL | | | | | | 0 |
| | WBT | | | | | | 0 |
| | WBR | | | | | | 0 |
| | NBL | | | | | | 0 |
| | NBT | 5 | | 2 | | 1 | 8 |
| | NBR | | | | | | 0 |
| | SBL | | | | | | 0 |
| | SBT | | | 1 | | 1 | 2 |
| | SBR | | | | | | 0 |
| DRESHERTOWN ROAD & PROPOSED DRIVEWAY | EBL | | | | | | 0 |
| | EBR | | | | | | 0 |
| | NBL | | | | | | 0 |
| | NBT | 4 | 94 | 11 | 10 | 1 | 120 |
| | SBR | | | | | | 0 |
| | SBT | | 22 | 7 | 14 | 1 | 44 |

1 = WALNUT LOT 7
2 = PRUDENTIAL
3 = RETAIL 203K
4 = MIXED USE LIMEKILN
5 = SPECTRA RETAIL

TOLB A 00026
NEARBY PLANNED DEVELOPMENTS
PM PEAK

| | | 1 | 2 | 3 | 4 | 5 | TOTAL |
|---|---|---|---|---|---|---|---|
| WELSH ROAD & JARRETTOWN ROAD/ VILLAGE ROAD | EBL | | | | | | 0 |
| | EBT | 4 | 18 | 49 | 8 | 9 | 88 |
| | EBR | | | | | | 0 |
| | WBL | 3 | | 6 | | | 9 |
| | WBT | 20 | 89 | 52 | 9 | 6 | 176 |
| | WBR | | 18 | 6 | | | 24 |
| | NBL | | | | | | 0 |
| | NBT | | | | | | 0 |
| | NBR | 1 | | 4 | | 1 | 6 |
| | SBL | | 4 | 4 | | 1 | 9 |
| | SBT | | | | | | 0 |
| | SBR | | | | | | 0 |
| WELSH ROAD & DRESHER ROAD | EBL | 4 | | | | | 4 |
| | EBT | 1 | 22 | 57 | 8 | 11 | 99 |
| | WBT | 3 | 107 | 64 | 9 | 6 | 189 |
| | WBR | 1 | 89 | 6 | 3 | | 99 |
| | SBL | 7 | 18 | 4 | 2 | | 31 |
| | SBR | 20 | | | | | 20 |
| WELSH ROAD & DRESHERTOWN ROAD | EBT | 8 | 36 | 61 | | 11 | 116 |
| | EBR | | 4 | | 10 | | 14 |
| | WBL | 1 | 14 | 23 | 10 | 1 | 49 |
| | WBT | 4 | 158 | 70 | | 6 | 238 |
| | NBL | | 38 | | 12 | | 50 |
| | NBR | | 77 | 21 | 12 | 1 | 111 |
| JARRETTOWN ROAD & HOLLY HILL LANE | EBL | | | | | | 0 |
| | EBT | | | | | | 0 |
| | EBR | | | | | | 0 |
| | WBL | | | | | | 0 |
| | WBT | | | | | | 0 |
| | WBR | | | | | | 0 |
| | NBL | | | | | | 0 |
| | NBT | 1 | | 4 | | 1 | 6 |
| | NBR | | | | | | 0 |
| | SBL | | | | | | 0 |
| | SBT | 3 | | 6 | | | 9 |
| | SBR | | | | | | 0 |
| DRESHERTOWN ROAD & PROPOSED DRIVEWAY | EBL | | | | | | 0 |
| | EBR | | | | | | 0 |
| | NBL | | | | | | 0 |
| | NBT | | 115 | 21 | 24 | 1 | 161 |
| | SBR | | | | | | 0 |
| | SBT | 1 | 18 | 23 | 20 | 1 | 63 |

1 = WALNUT LOT 7
2 = PRUDENTIAL
3 = RETAIL 203K
4 = MIXED USE LIMEKILN
5 = SPECTRA RETAIL

# APPENDIX D

*CAPACITY ANALYSIS*

# *2006 EXISTING CONDITIONS*

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Volume (vph) | 76 | 1143 | 113 | 722 | 20 | 58 | 12 | 40 |
| Lane Group Flow (vph) | 84 | 1259 | 124 | 800 | 0 | 400 | 0 | 97 |
| Turn Type | Perm | | pm+pt | | Perm | | Perm | |
| Protected Phases | | 2 | 1 | 6 | | 4 | | 8 |
| Permitted Phases | 2 | | 6 | | 4 | | 8 | |
| Detector Phases | 2 | 2 | 1 | 6 | 4 | 4 | 8 | 8 |
| Minimum Initial (s) | 15.0 | 15.0 | 10.0 | 15.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 29.0 | 29.0 | 13.0 | 29.0 | 19.0 | 19.0 | 19.0 | 19.0 |
| Total Split (s) | 77.0 | 77.0 | 15.0 | 92.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| Total Split (%) | 64.2% | 64.2% | 12.5% | 76.7% | 23.3% | 23.3% | 23.3% | 23.3% |
| Yellow Time (s) | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lag | Lead | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | C-Max | C-Max | None | C-Max | None | None | None | None |
| v/c Ratio | 0.21 | 1.06 | 0.59 | 0.55 | | 0.88 | | 0.34 |
| Control Delay | 12.1 | 69.0 | 49.5 | 11.5 | | 54.1 | | 35.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 |
| Total Delay | 12.1 | 69.0 | 49.5 | 11.5 | | 54.1 | | 35.6 |
| Queue Length 50th (ft) | 27 | ~1090 | 71 | 205 | | 214 | | 50 |
| Queue Length 95th (ft) | 56 | #1359 | 134 | 238 | | #329 | | 95 |
| Internal Link Dist (ft) | | 420 | | 395 | | 370 | | 420 |
| Turn Bay Length (ft) | 150 | | 263 | | | | | |
| Base Capacity (vph) | 392 | 1183 | 222 | 1448 | | 464 | | 291 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 |
| Reduced v/c Ratio | 0.21 | 1.06 | 0.56 | 0.55 | | 0.86 | | 0.33 |

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 17 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Welsh Road & Jarrettown Road

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 12 | 14 | 14 | 15 | 15 | 15 | 15 | 15 | 15 |
| Grade (%) | | -4% | | | 1% | | | -3% | | | 4% | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 1.00 | | | 0.90 | | | 0.95 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 1.00 | | | 0.99 | |
| Satd. Flow (prot) | 1805 | 1899 | | 1744 | 1955 | | | 1859 | | | 1857 | |
| Flt Permitted | 0.33 | 1.00 | | 0.05 | 1.00 | | | 0.98 | | | 0.73 | |
| Satd. Flow (perm) | 627 | 1899 | | 93 | 1955 | | | 1822 | | | 1366 | |
| Volume (vph) | 76 | 1143 | 3 | 113 | 722 | 6 | 20 | 58 | 258 | 12 | 40 | 31 |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.84 | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 |
| Adj. Flow (vph) | 84 | 1256 | 3 | 124 | 793 | 7 | 24 | 69 | 307 | 14 | 47 | 36 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 18 | 0 |
| Lane Group Flow (vph) | 84 | 1259 | 0 | 124 | 800 | 0 | 0 | 300 | 0 | 0 | 79 | 0 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 3% | 3% | 3% | 2% | 2% | 2% | 4% | 4% | 4% |
| Turn Type | Perm | | | pm+pt | | | Perm | | | Perm | | |
| Protected Phases | | 2 | | 1 | 6 | | | 4 | | | 8 | |
| Permitted Phases | 2 | | | 6 | | | 4 | | | 8 | | |
| Actuated Green, G (s) | 72.7 | 72.7 | | 86.8 | 86.8 | | | 21.2 | | | 21.2 | |
| Effective Green, g (s) | 74.7 | 74.7 | | 88.8 | 88.8 | | | 23.2 | | | 23.2 | |
| Actuated g/C Ratio | 0.62 | 0.62 | | 0.74 | 0.74 | | | 0.19 | | | 0.19 | |
| Clearance Time (s) | 6.0 | 6.0 | | 3.0 | 6.0 | | | 6.0 | | | 6.0 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 3.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Lane Grp Cap (vph) | 390 | 1182 | | 208 | 1447 | | | 352 | | | 264 | |
| v/s Ratio Prot | | c0.66 | | 0.05 | c0.41 | | | | | | | |
| v/s Ratio Perm | 0.13 | | | 0.39 | | | | c0.16 | | | 0.06 | |
| v/c Ratio | 0.22 | 1.07 | | 0.60 | 0.55 | | | 0.85 | | | 0.30 | |
| Uniform Delay, d1 | 9.9 | 22.7 | | 54.2 | 6.9 | | | 46.7 | | | 41.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.92 | 1.39 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 1.3 | 45.4 | | 4.2 | 1.4 | | | 19.2 | | | 1.3 | |
| Delay (s) | 11.1 | 68.0 | | 108.1 | 11.0 | | | 66.0 | | | 42.8 | |
| Level of Service | B | E | | F | B | | | E | | | D | |
| Approach Delay (s) | | 64.5 | | | 24.0 | | | 66.0 | | | 42.8 | |
| Approach LOS | | E | | | C | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 50.4 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.98 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 101.2% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

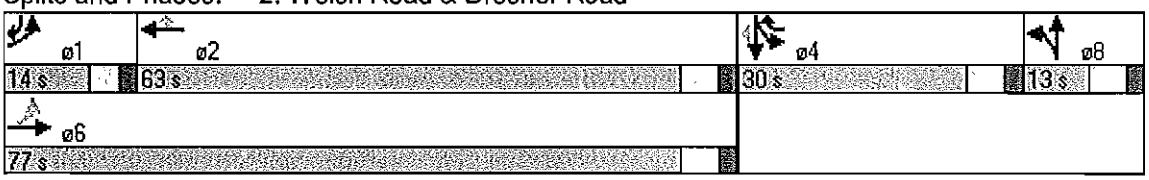
c Critical Lane Group

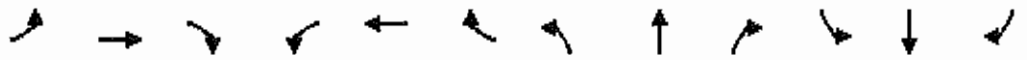
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBT | SBR | ø8 |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Volume (vph) | 344 | 1069 | 736 | 610 | 492 | 1 | 105 | |
| Lane Group Flow (vph) | 0 | 1519 | 791 | 656 | 277 | 277 | 118 | |
| Turn Type | pm+pt | | | pm+ov | Split | | pm+ov | |
| Protected Phases | 1 | 6 | 2 | 4 | 4 | 4 | 1 | 8 |
| Permitted Phases | 6 | | | 2 | | | 4 | |
| Detector Phases | 1 | 6 | 2 | 4 | 4 | 4 | 1 | |
| Minimum Initial (s) | 3.0 | 18.0 | 18.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 12.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 12.0 | 13.0 |
| Total Split (s) | 14.0 | 77.0 | 63.0 | 30.0 | 30.0 | 30.0 | 14.0 | 13.0 |
| Total Split (%) | 11.7% | 64.2% | 52.5% | 25.0% | 25.0% | 25.0% | 11.7% | 11% |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lead | | Lag | | | | Lead | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | Max | C-Max | C-Max | None | None | None | Max | None |
| v/c Ratio | | 0.87 | 0.47 | 0.51 | 0.81 | 0.81 | 0.15 | |
| Control Delay | | 12.0 | 26.3 | 4.2 | 64.4 | 63.9 | 4.0 | |
| Queue Delay | | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 12.0 | 26.3 | 4.4 | 64.4 | 63.9 | 4.0 | |
| Queue Length 50th (ft) | | 231 | 255 | 85 | 213 | 213 | 0 | |
| Queue Length 95th (ft) | | m218 | 314 | 149 | #336 | #336 | 33 | |
| Internal Link Dist (ft) | | 120 | 470 | | | 420 | | |
| Turn Bay Length (ft) | | | | 225 | | | | |
| Base Capacity (vph) | | 1755 | 1674 | 1298 | 362 | 364 | 762 | |
| Starvation Cap Reductn | | 0 | 0 | 145 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.87 | 0.47 | 0.57 | 0.77 | 0.76 | 0.15 | |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 19 (16%), Referenced to phase 2:WBT and 6:EBTL, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Welsh Road & Dresher Road





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 12 | 12 | 12 | 12 |
| Grade (%) | | 0% | | | 1% | | | -2% | | | 1% | |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | | | 0.95 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Frt | | 1.00 | | | 1.00 | 0.85 | | | | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 0.99 | | | 1.00 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Satd. Flow (prot) | | 3497 | | | 3404 | 1523 | | | | 1673 | 1677 | 1575 |
| Flt Permitted | | 0.56 | | | 1.00 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1984 | | | 3404 | 1523 | | | | 1673 | 1677 | 1575 |
| Volume (vph) | 344 | 1069 | 0 | 0 | 736 | 610 | 0 | 0 | 0 | 492 | 1 | 105 |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.92 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 370 | 1149 | 0 | 0 | 791 | 656 | 0 | 0 | 0 | 553 | 1 | 118 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 198 | 0 | 0 | 0 | 0 | 0 | 70 |
| Lane Group Flow (vph) | 0 | 1519 | 0 | 0 | 791 | 458 | 0 | 0 | 0 | 277 | 277 | 48 |
| Turn Type | pm+pt | | | | | pm+ov | Split | | | Split | | pm+ov |
| Protected Phases | 1 | 6 | | | 2 | 4 | 8 | 8 | | 4 | 4 | 1 |
| Permitted Phases | 6 | | | | | 2 | | | | | | 4 |
| Actuated Green, G (s) | | 85.5 | | | 57.0 | 79.5 | | | | 22.5 | 22.5 | 46.0 |
| Effective Green, g (s) | | 87.5 | | | 59.0 | 83.5 | | | | 24.5 | 24.5 | 49.0 |
| Actuated g/C Ratio | | 0.73 | | | 0.49 | 0.70 | | | | 0.20 | 0.20 | 0.41 |
| Clearance Time (s) | | 6.0 | | | 6.0 | 6.0 | | | | 6.0 | 6.0 | 5.0 |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1756 | | | 1674 | 1111 | | | | 342 | 342 | 696 |
| v/s Ratio Prot | | c0.18 | | | 0.23 | 0.08 | | | | c0.17 | 0.17 | 0.01 |
| v/s Ratio Perm | | c0.45 | | | | 0.22 | | | | | | 0.02 |
| v/c Ratio | | 0.87 | | | 0.47 | 0.41 | | | | 0.81 | 0.81 | 0.07 |
| Uniform Delay, d1 | | 11.9 | | | 20.2 | 7.8 | | | | 45.5 | 45.5 | 21.6 |
| Progression Factor | | 1.23 | | | 1.25 | 7.36 | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.6 | | | 0.8 | 0.2 | | | | 13.2 | 13.2 | 0.0 |
| Delay (s) | | 15.3 | | | 26.0 | 57.5 | | | | 58.7 | 58.7 | 21.7 |
| Level of Service | | B | | | C | E | | | | E | E | C |
| Approach Delay (s) | | 15.3 | | | 40.3 | | | 0.0 | | | 52.2 | |
| Approach LOS | | B | | | D | | | A | | | D | |

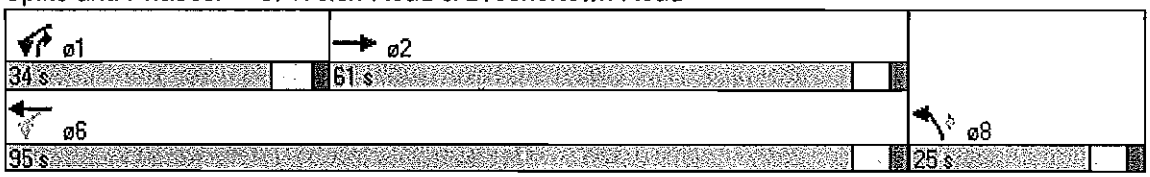
| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 32.0 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.85 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 84.0% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBT | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|
| Lane Configurations | | | | | |
| Volume (vph) | 1249 | 289 | 971 | 375 | 532 |
| Lane Group Flow (vph) | 1678 | 311 | 1044 | 421 | 598 |
| Turn Type | | pm+pt | | | pm+ov |
| Protected Phases | 2 | 1 | 6 | 8 | 1 |
| Permitted Phases | | 6 | | | 8 |
| Detector Phases | 2 | 1 | 6 | 8 | 1 |
| Minimum Initial (s) | 19.0 | 3.0 | 19.0 | 7.0 | 3.0 |
| Minimum Split (s) | 25.0 | 13.0 | 25.0 | 25.0 | 13.0 |
| Total Split (s) | 61.0 | 34.0 | 95.0 | 25.0 | 34.0 |
| Total Split (%) | 50.8% | 28.3% | 79.2% | 20.8% | 28.3% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lead | | | Lead |
| Lead-Lag Optimize? | | | | | |
| Recall Mode | C-Max | None | C-Max | None | None |
| v/c Ratio | 0.94 | 0.73 | 0.39 | 0.76 | 0.83 |
| Control Delay | 39.6 | 39.2 | 5.2 | 57.4 | 39.8 |
| Queue Delay | 67.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 107.2 | 39.2 | 5.2 | 57.4 | 39.8 |
| Queue Length 50th (ft) | 433 | 165 | 124 | 160 | 368 |
| Queue Length 95th (ft) | #683 | 267 | 153 | 214 | 508 |
| Internal Link Dist (ft) | 470 | | 440 | 780 | |
| Turn Bay Length (ft) | | 180 | | 270 | |
| Base Capacity (vph) | 1788 | 470 | 2698 | 578 | 769 |
| Starvation Cap Reductn | 333 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.15 | 0.66 | 0.39 | 0.73 | 0.78 |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 54 (45%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Welsh Road & Dreshertown Road



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | ↑↑↳ | | ↰ | ↑↑ | ↰↰ | ↱ |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 10 | 12 | 11 | 14 |
| Grade (%) | -2% | | | 1% | 1% | |
| Total Lost time (s) | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.95 | | 1.00 | 0.95 | 0.97 | 1.00 |
| Frt | 0.97 | | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 1.00 | | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3468 | | 1643 | 3522 | 3302 | 1680 |
| Flt Permitted | 1.00 | | 0.06 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3468 | | 106 | 3522 | 3302 | 1680 |
| Volume (vph) | 1249 | 312 | 289 | 971 | 375 | 532 |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.89 | 0.89 |
| Adj. Flow (vph) | 1343 | 335 | 311 | 1044 | 421 | 598 |
| RTOR Reduction (vph) | 17 | 0 | 0 | 0 | 0 | 14 |
| Lane Group Flow (vph) | 1661 | 0 | 311 | 1044 | 421 | 584 |
| Turn Type | | | pm+pt | | | pm+ov |
| Protected Phases | 2 | | 1 | 6 | 8 | 1 |
| Permitted Phases | | | 6 | | | 8 |
| Actuated Green, G (s) | 59.3 | | 89.9 | 89.9 | 18.1 | 42.7 |
| Effective Green, g (s) | 61.3 | | 91.9 | 91.9 | 20.1 | 46.7 |
| Actuated g/C Ratio | 0.51 | | 0.77 | 0.77 | 0.17 | 0.39 |
| Clearance Time (s) | 6.0 | | 6.0 | 6.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | | 4.0 | 3.0 | 3.0 | 4.0 |
| Lane Grp Cap (vph) | 1772 | | 422 | 2697 | 553 | 710 |
| v/s Ratio Prot | c0.48 | | 0.16 | 0.30 | 0.13 | c0.18 |
| v/s Ratio Perm | | | 0.40 | | | 0.17 |
| v/c Ratio | 0.94 | | 0.74 | 0.39 | 0.76 | 0.82 |
| Uniform Delay, d1 | 27.5 | | 35.2 | 4.7 | 47.7 | 32.9 |
| Progression Factor | 1.19 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 6.2 | | 7.0 | 0.4 | 6.1 | 8.0 |
| Delay (s) | 39.1 | | 42.3 | 5.1 | 53.8 | 40.9 |
| Level of Service | D | | D | A | D | D |
| Approach Delay (s) | 39.1 | | | 13.6 | 46.2 | |
| Approach LOS | D | | | B | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 32.4 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.89 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 84.1% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 15 | 12 | 12 | 15 | 15 | 12 |
| Grade (%) | -5% | | | 1% | 2% | |
| Storage Length (ft) | 0 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 0 | 0 | | | 0 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | |
| Frt | 0.910 | | | | 0.999 | |
| Flt Protected | 0.984 | | | 0.999 | | |
| Satd. Flow (prot) | 1827 | 0 | 0 | 2037 | 1988 | 0 |
| Flt Permitted | 0.984 | | | 0.999 | | |
| Satd. Flow (perm) | 1827 | 0 | 0 | 2037 | 1988 | 0 |
| Headway Factor | 0.85 | 0.97 | 1.01 | 0.89 | 0.89 | 1.01 |
| Link Speed (mph) | 25 | | | 35 | 35 | |
| Link Distance (ft) | 336 | | | 610 | 450 | |
| Travel Time (s) | 9.2 | | | 11.9 | 8.8 | |
| Volume (vph) | 7 | 14 | 6 | 329 | 154 | 2 |
| Confl. Peds. (#/hr) | | | | | | |
| Confl. Bikes (#/hr) | | | | | | |
| Peak Hour Factor | 0.44 | 0.44 | 0.84 | 0.84 | 0.85 | 0.85 |
| Growth Factor | 100% | 100% | 100% | 100% | 100% | 100% |
| Heavy Vehicles (%) | 5% | 5% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | |
| Mid-Block Traffic (%) | 0% | | | 0% | 0% | |
| Adj. Flow (vph) | 16 | 32 | 7 | 392 | 181 | 2 |
| Lane Group Flow (vph) | 48 | 0 | 0 | 399 | 183 | 0 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 32.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | -5% | | | 1% | 2% | |
| Volume (veh/h) | 7 | 14 | 6 | 329 | 154 | 2 |
| Peak Hour Factor | 0.44 | 0.44 | 0.84 | 0.84 | 0.85 | 0.85 |
| Hourly flow rate (vph) | 16 | 32 | 7 | 392 | 181 | 2 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | 450 | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 588 | 182 | 184 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 588 | 182 | 184 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 97 | 96 | 99 | | | |
| cM capacity (veh/h) | 465 | 853 | 1391 | | | |

| Direction, Lane # | EB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 48 | 399 | 184 |
| Volume Left | 16 | 7 | 0 |
| Volume Right | 32 | 0 | 2 |
| cSH | 667 | 1391 | 1700 |
| Volume to Capacity | 0.07 | 0.01 | 0.11 |
| Queue Length 95th (ft) | 6 | 0 | 0 |
| Control Delay (s) | 10.8 | 0.2 | 0.0 |
| Lane LOS | B | A | |
| Approach Delay (s) | 10.8 | 0.2 | 0.0 |
| Approach LOS | B | | |

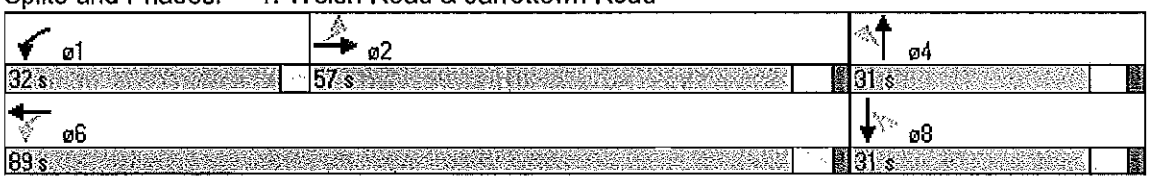
| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.9 | | |
| Intersection Capacity Utilization | 32.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

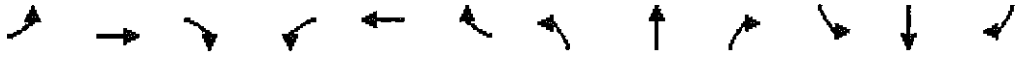
| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Volume (vph) | 27 | 772 | 248 | 1100 | 14 | 38 | 24 | 60 |
| Lane Group Flow (vph) | 32 | 930 | 276 | 1235 | 0 | 196 | 0 | 166 |
| Turn Type | Perm | | pm+pt | | Perm | | Perm | |
| Protected Phases | | 2 | 1 | 6 | | 4 | | 8 |
| Permitted Phases | 2 | | 6 | | 4 | | 8 | |
| Detector Phases | 2 | 2 | 1 | 6 | 4 | 4 | 8 | 8 |
| Minimum Initial (s) | 15.0 | 15.0 | 10.0 | 15.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 29.0 | 29.0 | 13.0 | 29.0 | 19.0 | 19.0 | 19.0 | 19.0 |
| Total Split (s) | 57.0 | 57.0 | 32.0 | 89.0 | 31.0 | 31.0 | 31.0 | 31.0 |
| Total Split (%) | 47.5% | 47.5% | 26.7% | 74.2% | 25.8% | 25.8% | 25.8% | 25.8% |
| Yellow Time (s) | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lag | Lead | | | | | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | C-Max | C-Max | None | C-Max | None | None | None | None |
| v/c Ratio | 0.39 | 0.86 | 0.76 | 0.81 | | 0.53 | | 0.57 |
| Control Delay | 38.0 | 33.1 | 42.3 | 25.7 | | 29.4 | | 48.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 |
| Total Delay | 38.0 | 33.1 | 42.3 | 25.7 | | 29.4 | | 48.8 |
| Queue Length 50th (ft) | 13 | 570 | 178 | 528 | | 75 | | 108 |
| Queue Length 95th (ft) | #61 | #941 | m228 | 703 | | 135 | | 131 |
| Internal Link Dist (ft) | | 420 | | 395 | | 370 | | 420 |
| Turn Bay Length (ft) | 150 | | 263 | | | | | |
| Base Capacity (vph) | 82 | 1084 | 481 | 1522 | | 479 | | 394 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | | 0 | | 0 |
| Reduced v/c Ratio | 0.39 | 0.86 | 0.57 | 0.81 | | 0.41 | | 0.42 |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 4 (3%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Welsh Road & Jarrettown Road





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 12 | 14 | 14 | 15 | 15 | 15 | 15 | 15 | 15 |
| Grade (%) | | -4% | | | 1% | | | -3% | | | 4% | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 1.00 | | | 0.91 | | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 1.00 | | | 0.99 | |
| Satd. Flow (prot) | 1787 | 1878 | | 1761 | 1974 | | | 1877 | | | 1906 | |
| Flt Permitted | 0.13 | 1.00 | | 0.08 | 1.00 | | | 0.95 | | | 0.75 | |
| Satd. Flow (perm) | 240 | 1878 | | 155 | 1974 | | | 1797 | | | 1451 | |
| Volume (vph) | 27 | 772 | 9 | 248 | 1100 | 12 | 14 | 38 | 118 | 24 | 60 | 37 |
| Peak-hour factor, PHF | 0.84 | 0.84 | 0.84 | 0.90 | 0.90 | 0.90 | 0.87 | 0.87 | 0.87 | 0.73 | 0.73 | 0.73 |
| Adj. Flow (vph) | 32 | 919 | 11 | 276 | 1222 | 13 | 16 | 44 | 136 | 33 | 82 | 51 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 0 | 14 | 0 |
| Lane Group Flow (vph) | 32 | 930 | 0 | 276 | 1235 | 0 | 0 | 122 | 0 | 0 | 152 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | Perm | | | pm+pt | | | Perm | | | Perm | | |
| Protected Phases | | 2 | | 1 | 6 | | | 4 | | | 8 | |
| Permitted Phases | 2 | | | 6 | | | 4 | | | 8 | | |
| Actuated Green, G (s) | 67.3 | 67.3 | | 90.6 | 90.6 | | | 17.4 | | | 17.4 | |
| Effective Green, g (s) | 69.3 | 69.3 | | 92.6 | 92.6 | | | 19.4 | | | 19.4 | |
| Actuated g/C Ratio | 0.58 | 0.58 | | 0.77 | 0.77 | | | 0.16 | | | 0.16 | |
| Clearance Time (s) | 6.0 | 6.0 | | 3.0 | 6.0 | | | 6.0 | | | 6.0 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 3.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Lane Grp Cap (vph) | 139 | 1085 | | 378 | 1523 | | | 291 | | | 235 | |
| v/s Ratio Prot | | c0.49 | | 0.12 | c0.63 | | | | | | | |
| v/s Ratio Perm | 0.13 | | | 0.44 | | | | 0.07 | | | c0.10 | |
| v/c Ratio | 0.23 | 0.86 | | 0.73 | 0.81 | | | 0.42 | | | 0.65 | |
| Uniform Delay, d1 | 12.4 | 21.2 | | 32.3 | 8.4 | | | 45.2 | | | 47.1 | |
| Progression Factor | 1.00 | 1.00 | | 1.24 | 2.25 | | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | 3.8 | 8.7 | | 4.6 | 3.1 | | | 2.0 | | | 8.1 | |
| Delay (s) | 16.2 | 29.9 | | 44.7 | 21.9 | | | 47.3 | | | 55.2 | |
| Level of Service | B | C | | D | C | | | D | | | E | |
| Approach Delay (s) | | 29.5 | | | 26.1 | | | 47.3 | | | 55.2 | |
| Approach LOS | | C | | | C | | | D | | | E | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM Average Control Delay | 30.4 | HCM Level of Service | C | |
| HCM Volume to Capacity ratio | 0.82 | | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 | |
| Intersection Capacity Utilization | 93.6% | ICU Level of Service | F | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBT | SBR | ø8 |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Volume (vph) | 167 | 747 | 1061 | 554 | 758 | 1 | 299 | |
| Lane Group Flow (vph) | 0 | 962 | 1153 | 602 | 480 | 480 | 378 | |
| Turn Type | pm+pt | | | pm+ov | Split | | pm+ov | |
| Protected Phases | 1 | 6 | 2 | 4 | 4 | 4 | 1 | 8 |
| Permitted Phases | 6 | | | 2 | | | 4 | |
| Detector Phases | 1 | 6 | 2 | 4 | 4 | 4 | 1 | |
| Minimum Initial (s) | 3.0 | 18.0 | 18.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 12.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 12.0 | 13.0 |
| Total Split (s) | 21.0 | 72.0 | 51.0 | 35.0 | 35.0 | 35.0 | 21.0 | 13.0 |
| Total Split (%) | 17.5% | 60.0% | 42.5% | 29.2% | 29.2% | 29.2% | 17.5% | 11% |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lead | | Lag | | | | Lead | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | Max | C-Max | C-Max | None | None | None | Max | None |
| v/c Ratio | | 0.59 | 0.86 | 0.49 | 1.11 | 1.11 | 0.41 | |
| Control Delay | | 12.1 | 43.7 | 5.1 | 118.7 | 117.8 | 10.1 | |
| Queue Delay | | 0.0 | 1.9 | 0.2 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 12.1 | 45.6 | 5.4 | 118.7 | 117.8 | 10.1 | |
| Queue Length 50th (ft) | | 103 | 448 | 82 | ~447 | ~447 | 87 | |
| Queue Length 95th (ft) | | 248 | 539 | 149 | #541 | #540 | 119 | |
| Internal Link Dist (ft) | | 120 | 470 | | | 420 | | |
| Turn Bay Length (ft) | | | | 225 | | | | |
| Base Capacity (vph) | | 1618 | 1333 | 1231 | 432 | 433 | 928 | |
| Starvation Cap Reductn | | 0 | 78 | 170 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 19 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.60 | 0.92 | 0.57 | 1.11 | 1.11 | 0.41 | |

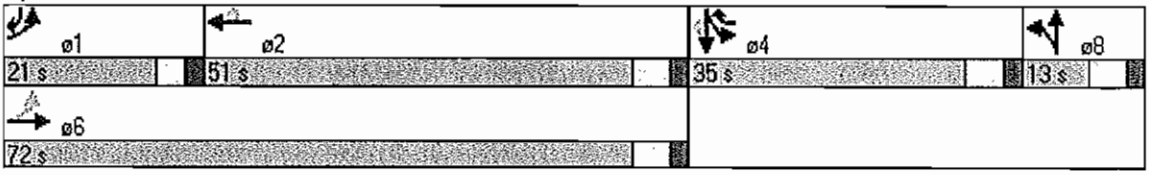
Intersection Summary

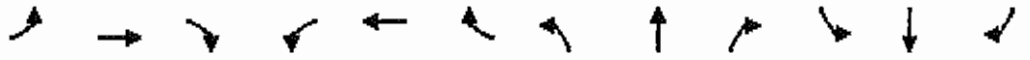
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 2 (2%), Referenced to phase 2:WBT and 6:EBTL, Start of Yellow
Natural Cycle: 85
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Welsh Road & Dresher Road





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 12 | 12 | 12 | 12 |
| Grade (%) | | 0% | | | 1% | | | -2% | | | 1% | |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | | | 0.95 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Frt | | 1.00 | | | 1.00 | 0.85 | | | | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 0.99 | | | 1.00 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Satd. Flow (prot) | | 3473 | | | 3404 | 1523 | | | | 1673 | 1677 | 1575 |
| Flt Permitted | | 0.50 | | | 1.00 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1764 | | | 3404 | 1523 | | | | 1673 | 1677 | 1575 |
| Volume (vph) | 167 | 747 | 0 | 0 | 1061 | 554 | 0 | 0 | 0 | 758 | 1 | 299 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 | 0.79 | 0.79 | 0.79 |
| Adj. Flow (vph) | 176 | 786 | 0 | 0 | 1153 | 602 | 0 | 0 | 0 | 959 | 1 | 378 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 211 | 0 | 0 | 0 | 0 | 0 | 81 |
| Lane Group Flow (vph) | 0 | 962 | 0 | 0 | 1153 | 391 | 0 | 0 | 0 | 480 | 480 | 297 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | pm+pt | | | | | pm+ov | Split | | | Split | | pm+ov |
| Protected Phases | 1 | 6 | | | 2 | 4 | 8 | 8 | | 4 | 4 | 1 |
| Permitted Phases | 6 | | | | | 2 | | | | | | 4 |
| Actuated Green, G (s) | | 79.0 | | | 45.0 | 74.0 | | | | 29.0 | 29.0 | 58.0 |
| Effective Green, g (s) | | 81.0 | | | 47.0 | 78.0 | | | | 31.0 | 31.0 | 61.0 |
| Actuated g/C Ratio | | 0.68 | | | 0.39 | 0.65 | | | | 0.26 | 0.26 | 0.51 |
| Clearance Time (s) | | 6.0 | | | 6.0 | 6.0 | | | | 6.0 | 6.0 | 5.0 |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1618 | | | 1333 | 1041 | | | | 432 | 433 | 853 |
| v/s Ratio Prot | | c0.15 | | | c0.34 | 0.10 | | | | c0.29 | 0.29 | 0.09 |
| v/s Ratio Perm | | 0.25 | | | | 0.16 | | | | | | 0.10 |
| v/c Ratio | | 0.59 | | | 0.86 | 0.38 | | | | 1.11 | 1.11 | 0.35 |
| Uniform Delay, d1 | | 10.6 | | | 33.6 | 9.7 | | | | 44.5 | 44.5 | 17.6 |
| Progression Factor | | 1.26 | | | 1.09 | 6.86 | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 0.9 | | | 6.7 | 0.2 | | | | 77.0 | 76.1 | 0.2 |
| Delay (s) | | 14.2 | | | 43.3 | 66.9 | | | | 121.5 | 120.6 | 17.9 |
| Level of Service | | B | | | D | E | | | | F | F | B |
| Approach Delay (s) | | 14.2 | | | 51.4 | | | 0.0 | | | 91.9 | |
| Approach LOS | | B | | | D | | | A | | | F | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM Average Control Delay | 55.9 | HCM Level of Service | E | |
| HCM Volume to Capacity ratio | 0.86 | | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 | |
| Intersection Capacity Utilization | 85.9% | ICU Level of Service | E | |
| Analysis Period (min) | 15 | | | |

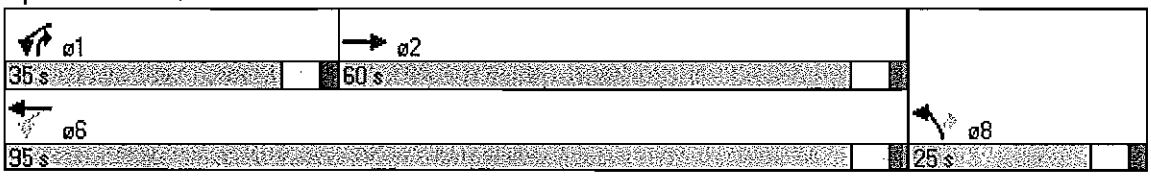
c Critical Lane Group

| Lane Group | EBT | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|
| Lane Configurations | | | | | |
| Volume (vph) | 1081 | 563 | 1295 | 320 | 225 |
| Lane Group Flow (vph) | 1584 | 599 | 1378 | 352 | 247 |
| Turn Type | | pm+pt | | | pm+ov |
| Protected Phases | 2 | 1 | 6 | 8 | 1 |
| Permitted Phases | | 6 | | | 8 |
| Detector Phases | 2 | 1 | 6 | 8 | 1 |
| Minimum Initial (s) | 19.0 | 3.0 | 19.0 | 7.0 | 3.0 |
| Minimum Split (s) | 25.0 | 13.0 | 25.0 | 25.0 | 13.0 |
| Total Split (s) | 60.0 | 35.0 | 95.0 | 25.0 | 35.0 |
| Total Split (%) | 50.0% | 29.2% | 79.2% | 20.8% | 29.2% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lead | | | Lead |
| Lead-Lag Optimize? | | | | | |
| Recall Mode | C-Max | None | C-Max | None | None |
| v/c Ratio | 0.97 | 1.17 | 0.50 | 0.68 | 0.31 |
| Control Delay | 53.0 | 130.2 | 5.9 | 54.4 | 17.6 |
| Queue Delay | 90.6 | 0.0 | 0.1 | 0.0 | 0.0 |
| Total Delay | 143.7 | 130.2 | 6.0 | 54.4 | 17.6 |
| Queue Length 50th (ft) | 464 | ~518 | 180 | 132 | 95 |
| Queue Length 95th (ft) | m550 | #759 | 230 | 181 | 155 |
| Internal Link Dist (ft) | 470 | | 3444 | 780 | |
| Turn Bay Length (ft) | | 180 | | 270 | |
| Base Capacity (vph) | 1633 | 511 | 2732 | 578 | 806 |
| Starvation Cap Reductn | 326 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 249 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.21 | 1.17 | 0.55 | 0.61 | 0.31 |

**Intersection Summary**

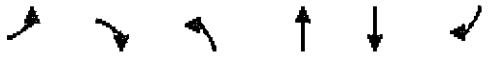
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 38 (32%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Welsh Road & Dreshertown Road



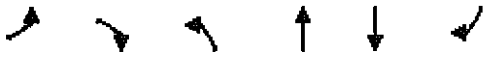
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 10 | 12 | 11 | 14 |
| Grade (%) | -2% | | | 1% | 1% | |
| Total Lost time (s) | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.95 | | 1.00 | 0.95 | 0.97 | 1.00 |
| Frt | 0.96 | | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 1.00 | | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3424 | | 1643 | 3522 | 3302 | 1680 |
| Flt Permitted | 1.00 | | 0.07 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3424 | | 115 | 3522 | 3302 | 1680 |
| Volume (vph) | 1081 | 424 | 563 | 1295 | 320 | 225 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.94 | 0.94 | 0.91 | 0.91 |
| Adj. Flow (vph) | 1138 | 446 | 599 | 1378 | 352 | 247 |
| RTOR Reduction (vph) | 35 | 0 | 0 | 0 | 0 | 23 |
| Lane Group Flow (vph) | 1549 | 0 | 599 | 1378 | 352 | 224 |
| Turn Type | | | pm+pt | | | pm+ov |
| Protected Phases | 2 | | 1 | 6 | 8 | 1 |
| Permitted Phases | | | 6 | | | 8 |
| Actuated Green, G (s) | 54.0 | | 91.1 | 91.1 | 16.9 | 48.0 |
| Effective Green, g (s) | 56.0 | | 93.1 | 93.1 | 18.9 | 52.0 |
| Actuated g/C Ratio | 0.47 | | 0.78 | 0.78 | 0.16 | 0.43 |
| Clearance Time (s) | 6.0 | | 6.0 | 6.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | | 4.0 | 3.0 | 3.0 | 4.0 |
| Lane Grp Cap (vph) | 1598 | | 511 | 2732 | 520 | 784 |
| v/s Ratio Prot | 0.45 | | c0.32 | 0.39 | c0.11 | 0.08 |
| v/s Ratio Perm | | | c0.58 | | | 0.05 |
| v/c Ratio | 0.97 | | 1.17 | 0.50 | 0.68 | 0.29 |
| Uniform Delay, d1 | 31.2 | | 38.3 | 5.0 | 47.7 | 22.0 |
| Progression Factor | 1.47 | | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 9.6 | | 96.7 | 0.7 | 3.5 | 0.3 |
| Delay (s) | 55.4 | | 135.0 | 5.6 | 51.2 | 22.3 |
| Level of Service | E | | F | A | D | C |
| Approach Delay (s) | 55.4 | | | 44.8 | 39.2 | |
| Approach LOS | E | | | D | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 48.1 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.07 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 93.8% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 12 | 12 |
| Grade (%) | -5% | | | 1% | 2% | |
| Storage Length (ft) | 0 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 0 | 0 | | | 0 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | |
| Frt | 0.926 | | | | 0.992 | |
| Flt Protected | 0.978 | | | 0.995 | | |
| Satd. Flow (prot) | 1729 | 0 | 0 | 1844 | 1829 | 0 |
| Flt Permitted | 0.978 | | | 0.995 | | |
| Satd. Flow (perm) | 1729 | 0 | 0 | 1844 | 1829 | 0 |
| Headway Factor | 0.97 | 0.97 | 1.01 | 1.01 | 1.01 | 1.01 |
| Link Speed (mph) | 25 | | | 35 | 35 | |
| Link Distance (ft) | 282 | | | 852 | 450 | |
| Travel Time (s) | 7.7 | | | 16.6 | 8.8 | |
| Volume (vph) | 6 | 8 | 18 | 164 | 298 | 19 |
| Confl. Peds. (#/hr) | | | | | | |
| Confl. Bikes (#/hr) | | | | | | |
| Peak Hour Factor | 0.70 | 0.70 | 0.84 | 0.84 | 0.91 | 0.91 |
| Growth Factor | 100% | 100% | 100% | 100% | 100% | 100% |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | |
| Mid-Block Traffic (%) | 0% | | | 0% | 0% | |
| Adj. Flow (vph) | 9 | 11 | 21 | 195 | 327 | 21 |
| Lane Group Flow (vph) | 20 | 0 | 0 | 216 | 348 | 0 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 33.7% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | -5% | | | 1% | 2% | |
| Volume (veh/h) | 6 | 8 | 18 | 164 | 298 | 19 |
| Peak Hour Factor | 0.70 | 0.70 | 0.84 | 0.84 | 0.91 | 0.91 |
| Hourly flow rate (vph) | 9 | 11 | 21 | 195 | 327 | 21 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | 450 | |
| pX, platoon unblocked | 0.98 | 0.98 | 0.98 | | | |
| vC, conflicting volume | 576 | 338 | 348 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 566 | 322 | 332 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 98 | 98 | 98 | | | |
| cM capacity (veh/h) | 466 | 702 | 1198 | | | |

| Direction, Lane # | EB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 20 | 217 | 348 |
| Volume Left | 9 | 21 | 0 |
| Volume Right | 11 | 0 | 21 |
| cSH | 577 | 1198 | 1700 |
| Volume to Capacity | 0.03 | 0.02 | 0.20 |
| Queue Length 95th (ft) | 3 | 1 | 0 |
| Control Delay (s) | 11.5 | 0.9 | 0.0 |
| Lane LOS | B | A | |
| Approach Delay (s) | 11.5 | 0.9 | 0.0 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.7 | | |
| Intersection Capacity Utilization | 33.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

# *2008 BASE CONDITIONS*

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Volume (vph) | 79 | 1333 | 120 | 789 | 21 | 60 | 277 | 35 | 42 |
| Lane Group Flow (vph) | 87 | 1468 | 132 | 878 | 0 | 96 | 330 | 0 | 128 |
| Turn Type | Perm | | pm+pt | | Perm | | pm+ov | Perm | |
| Protected Phases | | 2 | 1 | 6 | | 4 | 1 | | 8 |
| Permitted Phases | 2 | | 6 | | 4 | | 4 | 8 | |
| Detector Phases | 2 | 2 | 1 | 6 | 4 | 4 | 1 | 8 | 8 |
| Minimum Initial (s) | 15.0 | 15.0 | 10.0 | 15.0 | 3.0 | 3.0 | 10.0 | 3.0 | 3.0 |
| Minimum Split (s) | 29.0 | 29.0 | 13.0 | 29.0 | 19.0 | 19.0 | 13.0 | 19.0 | 19.0 |
| Total Split (s) | 63.0 | 63.0 | 25.0 | 88.0 | 32.0 | 32.0 | 25.0 | 32.0 | 32.0 |
| Total Split (%) | 52.5% | 52.5% | 20.8% | 73.3% | 26.7% | 26.7% | 20.8% | 26.7% | 26.7% |
| Yellow Time (s) | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lag | Lead | | | | Lead | | |
| Lead-Lag Optimize? | | | | | | | | | |
| Recall Mode | C-Max | C-Max | None | C-Max | None | None | None | None | None |
| v/c Ratio | 0.22 | 0.61 | 0.55 | 0.57 | | 0.40 | 0.75 | | 0.51 |
| Control Delay | 11.1 | 13.5 | 24.1 | 13.0 | | 50.8 | 48.2 | | 47.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| Total Delay | 11.1 | 13.5 | 24.1 | 13.0 | | 50.8 | 48.2 | | 47.8 |
| Queue Length 50th (ft) | 23 | 296 | 45 | 689 | | 69 | 225 | | 80 |
| Queue Length 95th (ft) | 63 | 471 | m23 | m782 | | 108 | 268 | | 128 |
| Internal Link Dist (ft) | | 420 | | 395 | | 370 | | | 420 |
| Turn Bay Length (ft) | 150 | | 263 | | | | 150 | | |
| Base Capacity (vph) | 390 | 2408 | 377 | 1549 | | 400 | 573 | | 402 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Reduced v/c Ratio | 0.22 | 0.61 | 0.35 | 0.57 | | 0.24 | 0.58 | | 0.32 |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Welsh Road & Jarrettown Road

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 12 | 14 | 14 | 15 | 12 | 12 | 15 | 15 | 15 |
| Grade (%) | | -4% | | | 1% | | | -3% | | | 4% | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | | | 1.00 | 1.00 | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.85 | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | 1.00 | | 0.98 | |
| Satd. Flow (prot) | 1805 | 3609 | | 1744 | 1954 | | | 1866 | 1607 | | 1861 | |
| Flt Permitted | 0.32 | 1.00 | | 0.11 | 1.00 | | | 0.86 | 1.00 | | 0.84 | |
| Satd. Flow (perm) | 605 | 3609 | | 211 | 1954 | | | 1627 | 1607 | | 1584 | |
| Volume (vph) | 79 | 1333 | 3 | 120 | 789 | 10 | 21 | 60 | 277 | 35 | 42 | 32 |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.84 | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 |
| Adj. Flow (vph) | 87 | 1465 | 3 | 132 | 867 | 11 | 25 | 71 | 330 | 41 | 49 | 38 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 15 | 0 |
| Lane Group Flow (vph) | 87 | 1468 | 0 | 132 | 878 | 0 | 0 | 96 | 315 | 0 | 113 | 0 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 3% | 3% | 3% | 2% | 2% | 2% | 4% | 4% | 4% |
| Turn Type | Perm | | | pm+pt | | | Perm | | pm+ov | Perm | | |
| Protected Phases | | 2 | | 1 | 6 | | | 4 | 1 | | 8 | |
| Permitted Phases | 2 | | | 6 | | | 4 | | 4 | 8 | | |
| Actuated Green, G (s) | 78.0 | 78.0 | | 93.1 | 93.1 | | | 14.9 | 27.0 | | 14.9 | |
| Effective Green, g (s) | 80.0 | 80.0 | | 95.1 | 95.1 | | | 16.9 | 28.0 | | 16.9 | |
| Actuated g/C Ratio | 0.67 | 0.67 | | 0.79 | 0.79 | | | 0.14 | 0.23 | | 0.14 | |
| Clearance Time (s) | 6.0 | 6.0 | | 3.0 | 6.0 | | | 6.0 | 3.0 | | 6.0 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 3.0 | 5.0 | | | 5.0 | 3.0 | | 5.0 | |
| Lane Grp Cap (vph) | 403 | 2406 | | 309 | 1549 | | | 229 | 429 | | 223 | |
| v/s Ratio Prot | | c0.41 | | 0.04 | 0.45 | | | | c0.07 | | | |
| v/s Ratio Perm | 0.14 | | | 0.30 | | | | 0.06 | 0.13 | | 0.07 | |
| v/c Ratio | 0.22 | 0.61 | | 0.43 | 0.57 | | | 0.42 | 0.74 | | 0.51 | |
| Uniform Delay, d1 | 7.8 | 11.2 | | 9.1 | 4.7 | | | 47.1 | 42.6 | | 47.7 | |
| Progression Factor | 1.00 | 1.00 | | 1.27 | 2.24 | | | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 1.2 | 1.2 | | 0.6 | 0.9 | | | 2.6 | 6.4 | | 3.8 | |
| Delay (s) | 9.0 | 12.4 | | 12.1 | 11.4 | | | 49.7 | 49.0 | | 51.5 | |
| Level of Service | A | B | | B | B | | | D | D | | D | |
| Approach Delay (s) | | 12.2 | | | 11.5 | | | 49.2 | | | 51.5 | |
| Approach LOS | | B | | | B | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 18.6 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 77.4% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBT | SBR | ø8 |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Volume (vph) | 379 | 1266 | 808 | 654 | 610 | 1 | 111 | |
| Lane Group Flow (vph) | 0 | 1769 | 869 | 703 | 343 | 343 | 125 | |
| Turn Type | pm+pt | | | pm+ov | Split | | pm+ov | |
| Protected Phases | 1 | 6 | 2 | 4 | 4 | 4 | 1 | 8 |
| Permitted Phases | 6 | | | 2 | | | 4 | |
| Detector Phases | 1 | 6 | 2 | 4 | 4 | 4 | 1 | |
| Minimum Initial (s) | 3.0 | 18.0 | 18.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 12.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 12.0 | 13.0 |
| Total Split (s) | 30.0 | 68.0 | 38.0 | 39.0 | 39.0 | 39.0 | 30.0 | 13.0 |
| Total Split (%) | 25.0% | 56.7% | 31.7% | 32.5% | 32.5% | 32.5% | 25.0% | 11% |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lead | | Lag | | | | Lead | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | Max | C-Max | C-Max | None | None | None | Max | None |
| v/c Ratio | | 0.96 | 0.90 | 0.66 | 0.80 | 0.80 | 0.12 | |
| Control Delay | | 29.8 | 52.5 | 4.0 | 56.2 | 56.0 | 1.6 | |
| Queue Delay | | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 29.8 | 52.5 | 4.1 | 56.2 | 56.0 | 1.6 | |
| Queue Length 50th (ft) | | ~559 | 277 | 16 | 253 | 253 | 0 | |
| Queue Length 95th (ft) | | #858 | #450 | 49 | 360 | 360 | 20 | |
| Internal Link Dist (ft) | | 120 | 470 | | | 420 | | |
| Turn Bay Length (ft) | | | | 225 | | | | |
| Base Capacity (vph) | | 1848 | 964 | 1104 | 488 | 489 | 1068 | |
| Starvation Cap Reductn | | 0 | 0 | 53 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.96 | 0.90 | 0.67 | 0.70 | 0.70 | 0.12 | |

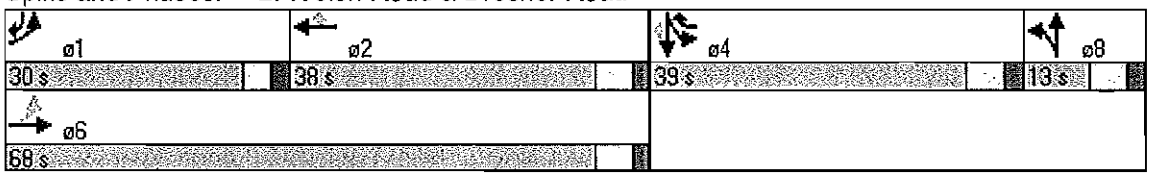
Intersection Summary

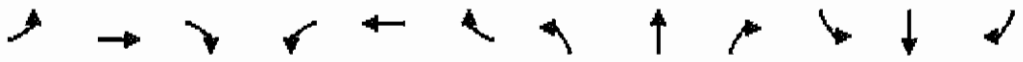
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 79 (66%), Referenced to phase 2:WBT and 6:EBTL, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Welsh Road & Dresher Road





| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 12 | 12 | 12 | 12 |
| Grade (%) | | 0% | | | 1% | | | -2% | | | 1% | |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | | | 0.95 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Frt | | 1.00 | | | 1.00 | 0.85 | | | | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 0.99 | | | 1.00 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Satd. Flow (prot) | | 3499 | | | 3404 | 1523 | | | | 1673 | 1677 | 1575 |
| Flt Permitted | | 0.52 | | | 1.00 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1846 | | | 3404 | 1523 | | | | 1673 | 1677 | 1575 |
| Volume (vph) | 379 | 1266 | 0 | 0 | 808 | 654 | 0 | 0 | 0 | 610 | 1 | 111 |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.92 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 408 | 1361 | 0 | 0 | 869 | 703 | 0 | 0 | 0 | 685 | 1 | 125 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 209 | 0 | 0 | 0 | 0 | 0 | 48 |
| Lane Group Flow (vph) | 0 | 1769 | 0 | 0 | 869 | 494 | 0 | 0 | 0 | 343 | 343 | 77 |
| Turn Type | pm+pt | | | | | pm+ov | Split | | | Split | | pm+ov |
| Protected Phases | 1 | 6 | | | 2 | 4 | 8 | 8 | | 4 | 4 | 1 |
| Permitted Phases | 6 | | | | | 2 | | | | | | 4 |
| Actuated Green, G (s) | | 79.4 | | | 32.0 | 60.6 | | | | 28.6 | 28.6 | 71.0 |
| Effective Green, g (s) | | 81.4 | | | 34.0 | 64.6 | | | | 30.6 | 30.6 | 74.0 |
| Actuated g/C Ratio | | 0.68 | | | 0.28 | 0.54 | | | | 0.26 | 0.26 | 0.62 |
| Clearance Time (s) | | 6.0 | | | 6.0 | 6.0 | | | | 6.0 | 6.0 | 5.0 |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1850 | | | 964 | 871 | | | | 427 | 428 | 1024 |
| v/s Ratio Prot | | c0.35 | | | 0.26 | 0.14 | | | | c0.21 | 0.20 | 0.03 |
| v/s Ratio Perm | | c0.30 | | | | 0.18 | | | | | | 0.02 |
| v/c Ratio | | 0.96 | | | 0.90 | 0.57 | | | | 0.80 | 0.80 | 0.08 |
| Uniform Delay, d1 | | 17.7 | | | 41.4 | 18.4 | | | | 41.9 | 41.9 | 9.2 |
| Progression Factor | | 1.30 | | | 0.98 | 0.23 | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 10.7 | | | 11.7 | 0.7 | | | | 10.5 | 10.3 | 0.0 |
| Delay (s) | | 33.6 | | | 52.1 | 4.9 | | | | 52.3 | 52.2 | 9.3 |
| Level of Service | | C | | | D | A | | | | D | D | A |
| Approach Delay (s) | | 33.6 | | | 31.0 | | | 0.0 | | | 45.6 | |
| Approach LOS | | C | | | C | | | A | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 35.0 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.91 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 95.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 1524 | 352 | 318 | 1058 | 404 | 662 |
| Lane Group Flow (vph) | 1639 | 378 | 342 | 1138 | 454 | 744 |
| Turn Type | | Perm | pm+pt | | | pm+ov |
| Protected Phases | 2 | | 1 | 6 | 8 | 1 |
| Permitted Phases | | 2 | 6 | | | 8 |
| Detector Phases | 2 | 2 | 1 | 6 | 8 | 1 |
| Minimum Initial (s) | 19.0 | 19.0 | 3.0 | 19.0 | 7.0 | 3.0 |
| Minimum Split (s) | 25.0 | 25.0 | 13.0 | 25.0 | 25.0 | 13.0 |
| Total Split (s) | 59.0 | 59.0 | 30.0 | 89.0 | 31.0 | 30.0 |
| Total Split (%) | 49.2% | 49.2% | 25.0% | 74.2% | 25.8% | 25.0% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lag | Lead | | | Lead |
| Lead-Lag Optimize? | | | | | | |
| Recall Mode | C-Max | C-Max | None | C-Max | None | None |
| v/c Ratio | 1.00 | 0.44 | 0.73 | 0.44 | 0.72 | 0.93 |
| Control Delay | 40.5 | 5.8 | 39.9 | 6.8 | 52.2 | 48.6 |
| Queue Delay | 60.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 100.8 | 6.2 | 39.9 | 6.8 | 52.2 | 48.6 |
| Queue Length 50th (ft) | ~601 | 68 | 191 | 153 | 171 | 523 |
| Queue Length 95th (ft) | m#776 | m59 | #357 | 217 | 217 | #772 |
| Internal Link Dist (ft) | 470 | | | 440 | 780 | |
| Turn Bay Length (ft) | | 200 | 180 | | 270 | |
| Base Capacity (vph) | 1639 | 851 | 471 | 2616 | 743 | 802 |
| Starvation Cap Reductn | 220 | 136 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.16 | 0.53 | 0.73 | 0.44 | 0.61 | 0.93 |

Intersection Summary

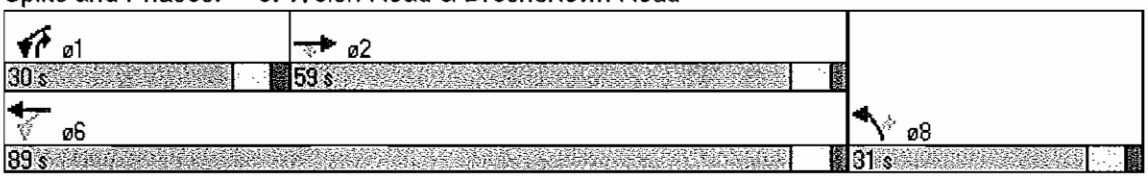
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 86 (72%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Welsh Road & Dreshertown Road



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | ↑↑ | ↱ | ↰ | ↑↑ | ↰↰ | ↱ |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 10 | 12 | 11 | 14 |
| Grade (%) | -2% | | | 1% | 1% | |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.95 | 1.00 | 1.00 | 0.95 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3575 | 1599 | 1643 | 3522 | 3302 | 1680 |
| Flt Permitted | 1.00 | 1.00 | 0.07 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3575 | 1599 | 117 | 3522 | 3302 | 1680 |
| Volume (vph) | 1524 | 352 | 318 | 1058 | 404 | 662 |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.89 | 0.89 |
| Adj. Flow (vph) | 1639 | 378 | 342 | 1138 | 454 | 744 |
| RTOR Reduction (vph) | 0 | 118 | 0 | 0 | 0 | 4 |
| Lane Group Flow (vph) | 1639 | 260 | 342 | 1138 | 454 | 740 |
| Turn Type | | Perm | pm+pt | | | pm+ov |
| Protected Phases | 2 | | 1 | 6 | 8 | 1 |
| Permitted Phases | | 2 | 6 | | | 8 |
| Actuated Green, G (s) | 53.0 | 53.0 | 87.1 | 87.1 | 20.9 | 49.0 |
| Effective Green, g (s) | 55.0 | 55.0 | 89.1 | 89.1 | 22.9 | 53.0 |
| Actuated g/C Ratio | 0.46 | 0.46 | 0.74 | 0.74 | 0.19 | 0.44 |
| Clearance Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 4.0 |
| Lane Grp Cap (vph) | 1639 | 733 | 470 | 2615 | 630 | 798 |
| v/s Ratio Prot | c0.46 | | 0.18 | 0.32 | 0.14 | c0.23 |
| v/s Ratio Perm | | 0.16 | 0.36 | | | 0.21 |
| v/c Ratio | 1.00 | 0.35 | 0.73 | 0.44 | 0.72 | 0.93 |
| Uniform Delay, d1 | 32.5 | 21.0 | 33.8 | 5.9 | 45.5 | 31.7 |
| Progression Factor | 0.78 | 0.58 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 14.1 | 0.5 | 5.9 | 0.5 | 4.1 | 16.8 |
| Delay (s) | 39.6 | 12.7 | 39.7 | 6.4 | 49.6 | 48.5 |
| Level of Service | D | B | D | A | D | D |
| Approach Delay (s) | 34.6 | | | 14.1 | 48.9 | |
| Approach LOS | C | | | B | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 31.8 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.96 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 89.8% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 15 | 12 | 12 | 15 | 15 | 12 |
| Grade (%) | -5% | | | 1% | 2% | |
| Storage Length (ft) | 0 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 0 | 0 | | | 0 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | |
| Frt | 0.910 | | | | 0.999 | |
| Flt Protected | 0.984 | | | 0.999 | | |
| Satd. Flow (prot) | 1827 | 0 | 0 | 2037 | 1988 | 0 |
| Flt Permitted | 0.984 | | | 0.999 | | |
| Satd. Flow (perm) | 1827 | 0 | 0 | 2037 | 1988 | 0 |
| Headway Factor | 0.85 | 0.97 | 1.01 | 0.89 | 0.89 | 1.01 |
| Link Speed (mph) | 25 | | | 35 | 35 | |
| Link Distance (ft) | 336 | | | 610 | 450 | |
| Travel Time (s) | 9.2 | | | 11.9 | 8.8 | |
| Volume (vph) | 7 | 14 | 6 | 352 | 163 | 2 |
| Confl. Peds. (#/hr) | | | | | | |
| Confl. Bikes (#/hr) | | | | | | |
| Peak Hour Factor | 0.44 | 0.44 | 0.84 | 0.84 | 0.85 | 0.85 |
| Growth Factor | 100% | 100% | 100% | 100% | 100% | 100% |
| Heavy Vehicles (%) | 5% | 5% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | |
| Mid-Block Traffic (%) | 0% | | | 0% | 0% | |
| Adj. Flow (vph) | 16 | 32 | 7 | 419 | 192 | 2 |
| Lane Group Flow (vph) | 48 | 0 | 0 | 426 | 194 | 0 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 33.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | -5% | | | 1% | 2% | |
| Volume (veh/h) | 7 | 14 | 6 | 352 | 163 | 2 |
| Peak Hour Factor | 0.44 | 0.44 | 0.84 | 0.84 | 0.85 | 0.85 |
| Hourly flow rate (vph) | 16 | 32 | 7 | 419 | 192 | 2 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | 450 | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 626 | 193 | 194 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 626 | 193 | 194 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 96 | 96 | 99 | | | |
| cM capacity (veh/h) | 442 | 841 | 1379 | | | |

| Direction, Lane # | EB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 48 | 426 | 194 |
| Volume Left | 16 | 7 | 0 |
| Volume Right | 32 | 0 | 2 |
| cSH | 646 | 1379 | 1700 |
| Volume to Capacity | 0.07 | 0.01 | 0.11 |
| Queue Length 95th (ft) | 6 | 0 | 0 |
| Control Delay (s) | 11.0 | 0.2 | 0.0 |
| Lane LOS | B | A | |
| Approach Delay (s) | 11.0 | 0.2 | 0.0 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.9 | | |
| Intersection Capacity Utilization | 33.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 12 | 14 | 14 | 15 | 15 | 15 | 15 | 15 | 15 |
| Grade (%) | | -4% | | | 1% | | | -3% | | | 4% | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | | | 1.00 | 1.00 | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.85 | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | 1.00 | | 0.99 | |
| Satd. Flow (prot) | 1787 | 3569 | | 1761 | 1969 | | | 2052 | 1768 | | 1907 | |
| Flt Permitted | 0.06 | 1.00 | | 0.18 | 1.00 | | | 0.86 | 1.00 | | 0.90 | |
| Satd. Flow (perm) | 110 | 3569 | | 334 | 1969 | | | 1780 | 1768 | | 1744 | |
| Volume (vph) | 28 | 893 | 9 | 268 | 1323 | 37 | 15 | 40 | 129 | 34 | 63 | 39 |
| Peak-hour factor, PHF | 0.84 | 0.84 | 0.84 | 0.90 | 0.90 | 0.90 | 0.87 | 0.87 | 0.87 | 0.73 | 0.73 | 0.73 |
| Adj. Flow (vph) | 33 | 1063 | 11 | 298 | 1470 | 41 | 17 | 46 | 148 | 47 | 86 | 53 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 123 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 33 | 1074 | 0 | 298 | 1510 | 0 | 0 | 63 | 25 | 0 | 173 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | Perm | | | pm+pt | | | Perm | | Perm | Perm | | |
| Protected Phases | | 2 | | 1 | 6 | | | 4 | | | 8 | |
| Permitted Phases | 2 | | | 6 | | | 4 | | 4 | 8 | | |
| Actuated Green, G (s) | 66.6 | 66.6 | | 89.7 | 89.7 | | | 18.3 | 18.3 | | 18.3 | |
| Effective Green, g (s) | 68.6 | 68.6 | | 91.7 | 91.7 | | | 20.3 | 20.3 | | 20.3 | |
| Actuated g/C Ratio | 0.57 | 0.57 | | 0.76 | 0.76 | | | 0.17 | 0.17 | | 0.17 | |
| Clearance Time (s) | 6.0 | 6.0 | | 3.0 | 6.0 | | | 6.0 | 6.0 | | 6.0 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 3.0 | 5.0 | | | 5.0 | 5.0 | | 5.0 | |
| Lane Grp Cap (vph) | 63 | 2040 | | 482 | 1505 | | | 301 | 299 | | 295 | |
| v/s Ratio Prot | | 0.30 | | 0.10 | c0.77 | | | | | | | |
| v/s Ratio Perm | 0.30 | | | 0.37 | | | | 0.04 | 0.01 | | c0.10 | |
| v/c Ratio | 0.52 | 0.53 | | 0.62 | 1.00 | | | 0.21 | 0.08 | | 0.59 | |
| Uniform Delay, d1 | 15.7 | 15.7 | | 9.8 | 14.2 | | | 42.9 | 42.0 | | 46.0 | |
| Progression Factor | 1.00 | 1.00 | | 1.78 | 2.16 | | | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 27.8 | 1.0 | | 0.7 | 13.2 | | | 0.7 | 0.3 | | 4.5 | |
| Delay (s) | 43.5 | 16.7 | | 18.2 | 43.7 | | | 43.7 | 42.3 | | 50.5 | |
| Level of Service | D | B | | B | D | | | D | D | | D | |
| Approach Delay (s) | | 17.5 | | | 39.5 | | | 42.7 | | | 50.5 | |
| Approach LOS | | B | | | D | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 33.0 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.93 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 108.6% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBT | SBR | ø8 |
|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | |
| Volume (vph) | 178 | 878 | 1296 | 676 | 821 | 1 | 332 | |
| Lane Group Flow (vph) | 0 | 1111 | 1409 | 735 | 520 | 520 | 420 | |
| Turn Type | pm+pt | | | pm+ov | Split | | pm+ov | |
| Protected Phases | 1 | 6 | 2 | 4 | 4 | 4 | 1 | 8 |
| Permitted Phases | 6 | | | 2 | | | 4 | |
| Detector Phases | 1 | 6 | 2 | 4 | 4 | 4 | 1 | |
| Minimum Initial (s) | 3.0 | 18.0 | 18.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 12.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 12.0 | 13.0 |
| Total Split (s) | 15.0 | 63.0 | 48.0 | 44.0 | 44.0 | 44.0 | 15.0 | 13.0 |
| Total Split (%) | 12.5% | 52.5% | 40.0% | 36.7% | 36.7% | 36.7% | 12.5% | 11% |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lead | | Lag | | | | Lead | |
| Lead-Lag Optimize? | | | | | | | | |
| Recall Mode | Max | C-Max | C-Max | None | None | None | Max | None |
| v/c Ratio | | 0.78 | 1.13 | 0.56 | 0.94 | 0.94 | 0.44 | |
| Control Delay | | 28.5 | 98.9 | 2.3 | 65.2 | 64.9 | 10.3 | |
| Queue Delay | | 0.0 | 21.0 | 0.3 | 0.9 | 0.9 | 0.0 | |
| Total Delay | | 28.5 | 119.8 | 2.6 | 66.2 | 65.8 | 10.3 | |
| Queue Length 50th (ft) | | 195 | ~672 | 32 | 408 | 407 | 104 | |
| Queue Length 95th (ft) | | 365 | #812 | 36 | #498 | #497 | 136 | |
| Internal Link Dist (ft) | | 120 | 470 | | | 420 | | |
| Turn Bay Length (ft) | | | | 225 | | | | |
| Base Capacity (vph) | | 1431 | 1248 | 1313 | 558 | 559 | 962 | |
| Starvation Cap Reductn | | 0 | 51 | 151 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | 0 | 0 | 5 | 5 | 0 | |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.78 | 1.18 | 0.63 | 0.94 | 0.94 | 0.44 | |

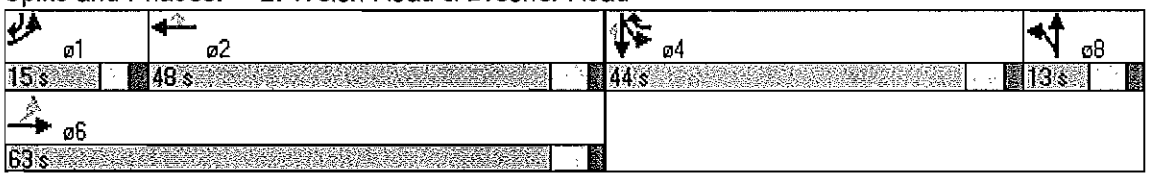
Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 77 (64%), Referenced to phase 2:WBT and 6:EBTL, Start of Yellow
Natural Cycle: 135
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Welsh Road & Dresher Road



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 12 | 12 | 12 | 12 |
| Grade (%) | | 0% | | | 1% | | | -2% | | | 1% | |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | | | | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | | | 0.95 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Frt | | 1.00 | | | 1.00 | 0.85 | | | | 1.00 | 1.00 | 0.85 |
| Flt Protected | | 0.99 | | | 1.00 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Satd. Flow (prot) | | 3476 | | | 3404 | 1523 | | | | 1673 | 1677 | 1575 |
| Flt Permitted | | 0.52 | | | 1.00 | 1.00 | | | | 0.95 | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1819 | | | 3404 | 1523 | | | | 1673 | 1677 | 1575 |
| Volume (vph) | 178 | 878 | 0 | 0 | 1296 | 676 | 0 | 0 | 0 | 821 | 1 | 332 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.95 | 0.92 | 0.92 | 0.92 | 0.90 | 0.90 | 0.90 | 0.79 | 0.79 | 0.79 |
| Adj. Flow (vph) | 187 | 924 | 0 | 0 | 1409 | 735 | 0 | 0 | 0 | 1039 | 1 | 420 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 222 | 0 | 0 | 0 | 0 | 0 | 75 |
| Lane Group Flow (vph) | 0 | 1111 | 0 | 0 | 1409 | 513 | 0 | 0 | 0 | 520 | 520 | 345 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | pm+pt | | | | | pm+ov | Split | | | Split | | pm+ov |
| Protected Phases | 1 | 6 | | | 2 | 4 | 8 | 8 | | 4 | 4 | 1 |
| Permitted Phases | 6 | | | | | 2 | | | | | | 4 |
| Actuated Green, G (s) | | 70.3 | | | 42.0 | 79.7 | | | | 37.7 | 37.7 | 61.0 |
| Effective Green, g (s) | | 72.3 | | | 44.0 | 83.7 | | | | 39.7 | 39.7 | 64.0 |
| Actuated g/C Ratio | | 0.60 | | | 0.37 | 0.70 | | | | 0.33 | 0.33 | 0.53 |
| Clearance Time (s) | | 6.0 | | | 6.0 | 6.0 | | | | 6.0 | 6.0 | 5.0 |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | | | | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1431 | | | 1248 | 1113 | | | | 553 | 555 | 893 |
| v/s Ratio Prot | | c0.16 | | | c0.41 | 0.15 | | | | c0.31 | 0.31 | 0.08 |
| v/s Ratio Perm | | 0.31 | | | | 0.18 | | | | | | 0.14 |
| v/c Ratio | | 0.78 | | | 1.13 | 0.46 | | | | 0.94 | 0.94 | 0.39 |
| Uniform Delay, d1 | | 17.8 | | | 38.0 | 8.1 | | | | 39.0 | 38.9 | 16.5 |
| Progression Factor | | 1.72 | | | 0.88 | 2.54 | | | | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 3.7 | | | 66.5 | 0.2 | | | | 24.3 | 23.4 | 0.3 |
| Delay (s) | | 34.3 | | | 99.9 | 20.8 | | | | 63.3 | 62.4 | 16.7 |
| Level of Service | | C | | | F | C | | | | E | E | B |
| Approach Delay (s) | | 34.3 | | | 72.8 | | | 0.0 | | | 49.6 | |
| Approach LOS | | C | | | E | | | A | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 56.5 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 0.99 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 98.0% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 1243 | 456 | 636 | 1588 | 384 | 346 |
| Lane Group Flow (vph) | 1308 | 480 | 677 | 1689 | 422 | 380 |
| Turn Type | | pm+ov | pm+pt | | | pm+ov |
| Protected Phases | 2 | 8 | 1 | 6 | 8 | 1 |
| Permitted Phases | | 2 | 6 | | | 8 |
| Detector Phases | 2 | 8 | 1 | 6 | 8 | 1 |
| Minimum Initial (s) | 19.0 | 7.0 | 3.0 | 19.0 | 7.0 | 3.0 |
| Minimum Split (s) | 25.0 | 25.0 | 13.0 | 25.0 | 25.0 | 13.0 |
| Total Split (s) | 46.0 | 26.0 | 48.0 | 94.0 | 26.0 | 48.0 |
| Total Split (%) | 38.3% | 21.7% | 40.0% | 78.3% | 21.7% | 40.0% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | | Lead | | | Lead |
| Lead-Lag Optimize? | | | | | | |
| Recall Mode | C-Max | None | None | C-Max | None | None |
| v/c Ratio | 1.05 | 0.51 | 1.00 | 0.63 | 0.74 | 0.39 |
| Control Delay | 65.7 | 9.3 | 65.6 | 8.0 | 55.8 | 14.6 |
| Queue Delay | 23.7 | 0.7 | 0.0 | 1.0 | 0.0 | 0.0 |
| Total Delay | 89.4 | 10.0 | 65.6 | 9.0 | 55.8 | 14.6 |
| Queue Length 50th (ft) | ~566 | 85 | ~512 | 285 | 159 | 147 |
| Queue Length 95th (ft) | m#672 | m127 | #746 | 343 | 215 | 215 |
| Internal Link Dist (ft) | 470 | | | 3444 | 780 | |
| Turn Bay Length (ft) | | 200 | 180 | | 270 | |
| Base Capacity (vph) | 1251 | 957 | 679 | 2683 | 605 | 983 |
| Starvation Cap Reductn | 67 | 210 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 664 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.10 | 0.64 | 1.00 | 0.84 | 0.70 | 0.39 |

Intersection Summary

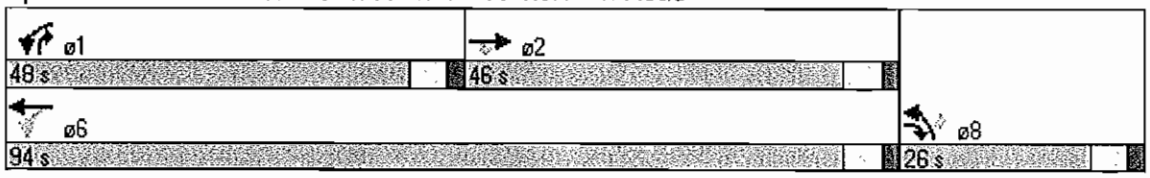
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 25 (21%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Welsh Road & Dreshertown Road



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | ↑↑ | ↱ | ↰ | ↑↑ | ↰↰ | ↱ |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 10 | 12 | 11 | 14 |
| Grade (%) | -2% | | | 1% | 1% | |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.95 | 1.00 | 1.00 | 0.95 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3575 | 1599 | 1643 | 3522 | 3302 | 1680 |
| Flt Permitted | 1.00 | 1.00 | 0.09 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3575 | 1599 | 150 | 3522 | 3302 | 1680 |
| Volume (vph) | 1243 | 456 | 636 | 1588 | 384 | 346 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.94 | 0.94 | 0.91 | 0.91 |
| Adj. Flow (vph) | 1308 | 480 | 677 | 1689 | 422 | 380 |
| RTOR Reduction (vph) | 0 | 56 | 0 | 0 | 0 | 3 |
| Lane Group Flow (vph) | 1308 | 424 | 677 | 1689 | 422 | 377 |
| Turn Type | | pm+ov | pm+pt | | | pm+ov |
| Protected Phases | 2 | | 8 | 1 | 6 | 8 | 1 |
| Permitted Phases | | 2 | 6 | | | 8 |
| Actuated Green, G (s) | 40.0 | 58.6 | 89.4 | 89.4 | 18.6 | 62.0 |
| Effective Green, g (s) | 42.0 | 62.6 | 91.4 | 91.4 | 20.6 | 66.0 |
| Actuated g/C Ratio | 0.35 | 0.52 | 0.76 | 0.76 | 0.17 | 0.55 |
| Clearance Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 4.0 |
| Lane Grp Cap (vph) | 1251 | 887 | 679 | 2683 | 567 | 980 |
| v/s Ratio Prot | 0.37 | 0.08 | c0.38 | 0.48 | c0.13 | 0.15 |
| v/s Ratio Perm | | 0.18 | c0.38 | | | 0.08 |
| v/c Ratio | 1.05 | 0.48 | 1.00 | 0.63 | 0.74 | 0.38 |
| Uniform Delay, d1 | 39.0 | 18.3 | 32.9 | 6.5 | 47.2 | 15.4 |
| Progression Factor | 0.89 | 0.69 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 31.0 | 0.2 | 33.6 | 1.1 | 5.3 | 0.3 |
| Delay (s) | 65.8 | 12.8 | 66.4 | 7.7 | 52.5 | 15.8 |
| Level of Service | E | B | E | A | D | B |
| Approach Delay (s) | 51.6 | | | 24.5 | 35.1 | |
| Approach LOS | D | | | C | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 36.0 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.94 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 90.6% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 12 | 12 | 12 | 12 | 12 | 12 |
| Grade (%) | -5% | | | 1% | 2% | |
| Storage Length (ft) | 0 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 0 | 0 | | | 0 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | |
| Frt | 0.926 | | | | 0.992 | |
| Flt Protected | 0.978 | | | 0.996 | | |
| Satd. Flow (prot) | 1729 | 0 | 0 | 1846 | 1829 | 0 |
| Flt Permitted | 0.978 | | | 0.996 | | |
| Satd. Flow (perm) | 1729 | 0 | 0 | 1846 | 1829 | 0 |
| Headway Factor | 0.97 | 0.97 | 1.01 | 1.01 | 1.01 | 1.01 |
| Link Speed (mph) | 25 | | | 35 | 35 | |
| Link Distance (ft) | 282 | | | 852 | 450 | |
| Travel Time (s) | 7.7 | | | 16.6 | 8.8 | |
| Volume (vph) | 6 | 8 | 18 | 178 | 321 | 19 |
| Confl. Peds. (#/hr) | | | | | | |
| Confl. Bikes (#/hr) | | | | | | |
| Peak Hour Factor | 0.70 | 0.70 | 0.84 | 0.84 | 0.91 | 0.91 |
| Growth Factor | 100% | 100% | 100% | 100% | 100% | 100% |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | |
| Mid-Block Traffic (%) | 0% | | | 0% | 0% | |
| Adj. Flow (vph) | 9 | 11 | 21 | 212 | 353 | 21 |
| Lane Group Flow (vph) | 20 | 0 | 0 | 233 | 374 | 0 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 34.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | -5% | | | 1% | 2% | |
| Volume (veh/h) | 6 | 8 | 18 | 178 | 321 | 19 |
| Peak Hour Factor | 0.70 | 0.70 | 0.84 | 0.84 | 0.91 | 0.91 |
| Hourly flow rate (vph) | 9 | 11 | 21 | 212 | 353 | 21 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | 450 | |
| pX, platoon unblocked | 0.97 | 0.97 | 0.97 | | | |
| vC, conflicting volume | 618 | 363 | 374 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 605 | 342 | 353 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 98 | 98 | 98 | | | |
| cM capacity (veh/h) | 438 | 678 | 1167 | | | |

| Direction, Lane # | EB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 20 | 233 | 374 |
| Volume Left | 9 | 21 | 0 |
| Volume Right | 11 | 0 | 21 |
| cSH | 549 | 1167 | 1700 |
| Volume to Capacity | 0.04 | 0.02 | 0.22 |
| Queue Length 95th (ft) | 3 | 1 | 0 |
| Control Delay (s) | 11.8 | 0.9 | 0.0 |
| Lane LOS | B | A | |
| Approach Delay (s) | 11.8 | 0.9 | 0.0 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.7 | | |
| Intersection Capacity Utilization | 34.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

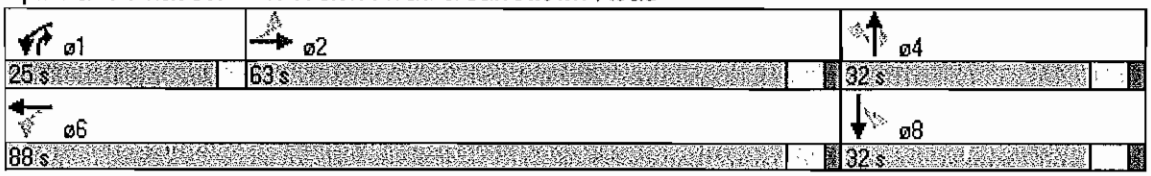
# *2008 PROJECTED CONDITIONS*

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Volume (vph) | 79 | 1336 | 120 | 796 | 21 | 60 | 277 | 35 | 42 |
| Lane Group Flow (vph) | 87 | 1471 | 132 | 886 | 0 | 96 | 330 | 0 | 128 |
| Turn Type | Perm | | pm+pt | | Perm | | pm+ov | Perm | |
| Protected Phases | | 2 | 1 | 6 | | 4 | 1 | | 8 |
| Permitted Phases | 2 | | 6 | | 4 | | 4 | 8 | |
| Detector Phases | 2 | 2 | 1 | 6 | 4 | 4 | 1 | 8 | 8 |
| Minimum Initial (s) | 15.0 | 15.0 | 10.0 | 15.0 | 3.0 | 3.0 | 10.0 | 3.0 | 3.0 |
| Minimum Split (s) | 29.0 | 29.0 | 13.0 | 29.0 | 19.0 | 19.0 | 13.0 | 19.0 | 19.0 |
| Total Split (s) | 63.0 | 63.0 | 25.0 | 88.0 | 32.0 | 32.0 | 25.0 | 32.0 | 32.0 |
| Total Split (%) | 52.5% | 52.5% | 20.8% | 73.3% | 26.7% | 26.7% | 20.8% | 26.7% | 26.7% |
| Yellow Time (s) | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lag | Lead | | | | Lead | | |
| Lead-Lag Optimize? | | | | | | | | | |
| Recall Mode | C-Max | C-Max | None | C-Max | None | None | None | None | None |
| v/c Ratio | 0.23 | 0.61 | 0.54 | 0.57 | | 0.40 | 0.74 | | 0.51 |
| Control Delay | 11.3 | 13.6 | 13.0 | 18.8 | | 50.8 | 47.9 | | 47.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| Total Delay | 11.3 | 13.6 | 13.0 | 18.8 | | 50.8 | 47.9 | | 47.8 |
| Queue Length 50th (ft) | 23 | 297 | 21 | 696 | | 69 | 225 | | 80 |
| Queue Length 95th (ft) | 63 | 473 | m56 | 831 | | 108 | 268 | | 128 |
| Internal Link Dist (ft) | | 420 | | 395 | | 370 | | | 420 |
| Turn Bay Length (ft) | 150 | | 263 | | | | 150 | | |
| Base Capacity (vph) | 382 | 2405 | 377 | 1549 | | 400 | 573 | | 402 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Reduced v/c Ratio | 0.23 | 0.61 | 0.35 | 0.57 | | 0.24 | 0.58 | | 0.32 |

**Intersection Summary**

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Welsh Road & Jarrettown Road



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 12 | 14 | 14 | 15 | 12 | 12 | 15 | 15 | 15 |
| Grade (%) | | -4% | | | 1% | | | -3% | | | 4% | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | | | 1.00 | 1.00 | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.85 | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | 1.00 | | 0.98 | |
| Satd. Flow (prot) | 1805 | 3609 | | 1744 | 1954 | | | 1866 | 1607 | | 1861 | |
| Flt Permitted | 0.31 | 1.00 | | 0.11 | 1.00 | | | 0.86 | 1.00 | | 0.84 | |
| Satd. Flow (perm) | 598 | 3609 | | 210 | 1954 | | | 1627 | 1607 | | 1584 | |
| Volume (vph) | 79 | 1336 | 3 | 120 | 796 | 10 | 21 | 60 | 277 | 35 | 42 | 32 |
| Peak-hour factor, PHF | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.84 | 0.84 | 0.84 | 0.85 | 0.85 | 0.85 |
| Adj. Flow (vph) | 87 | 1468 | 3 | 132 | 875 | 11 | 25 | 71 | 330 | 41 | 49 | 38 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 15 | 0 |
| Lane Group Flow (vph) | 87 | 1471 | 0 | 132 | 886 | 0 | 0 | 96 | 315 | 0 | 113 | 0 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 3% | 3% | 3% | 2% | 2% | 2% | 4% | 4% | 4% |
| Turn Type | Perm | | | pm+pt | | | Perm | | pm+ov | Perm | | |
| Protected Phases | | 2 | | 1 | 6 | | | 4 | 1 | | 8 | |
| Permitted Phases | 2 | | | 6 | | | 4 | | 4 | 8 | | |
| Actuated Green, G (s) | 77.9 | 77.9 | | 93.1 | 93.1 | | | 14.9 | 27.1 | | 14.9 | |
| Effective Green, g (s) | 79.9 | 79.9 | | 95.1 | 95.1 | | | 16.9 | 28.1 | | 16.9 | |
| Actuated g/C Ratio | 0.67 | 0.67 | | 0.79 | 0.79 | | | 0.14 | 0.23 | | 0.14 | |
| Clearance Time (s) | 6.0 | 6.0 | | 3.0 | 6.0 | | | 6.0 | 3.0 | | 6.0 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 3.0 | 5.0 | | | 5.0 | 3.0 | | 5.0 | |
| Lane Grp Cap (vph) | 398 | 2403 | | 310 | 1549 | | | 229 | 430 | | 223 | |
| v/s Ratio Prot | | c0.41 | | 0.04 | 0.45 | | | | c0.07 | | | |
| v/s Ratio Perm | 0.15 | | | 0.30 | | | | 0.06 | 0.13 | | 0.07 | |
| v/c Ratio | 0.22 | 0.61 | | 0.43 | 0.57 | | | 0.42 | 0.73 | | 0.51 | |
| Uniform Delay, d1 | 7.8 | 11.3 | | 9.2 | 4.7 | | | 47.1 | 42.5 | | 47.7 | |
| Progression Factor | 1.00 | 1.00 | | 0.43 | 3.23 | | | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 1.3 | 1.2 | | 0.7 | 1.2 | | | 2.6 | 6.4 | | 3.8 | |
| Delay (s) | 9.1 | 12.5 | | 4.7 | 16.5 | | | 49.7 | 48.9 | | 51.5 | |
| Level of Service | A | B | | A | B | | | D | D | | D | |
| Approach Delay (s) | | 12.3 | | | 15.0 | | | 49.0 | | | 51.5 | |
| Approach LOS | | B | | | B | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 19.8 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 77.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 379 | 1269 | 816 | 658 | 612 | 110 |
| Lane Group Flow (vph) | 0 | 1773 | 877 | 708 | 688 | 124 |
| Turn Type | pm+pt | | | pm+ov | | pm+ov |
| Protected Phases | 1 | 6 | 2 | 4 | 4 | 1 |
| Permitted Phases | 6 | | | 2 | | 4 |
| Detector Phases | 1 | 6 | 2 | 4 | 4 | 1 |
| Minimum Initial (s) | 3.0 | 18.0 | 18.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 12.0 | 30.0 | 30.0 | 30.0 | 30.0 | 12.0 |
| Total Split (s) | 38.0 | 86.0 | 48.0 | 34.0 | 34.0 | 38.0 |
| Total Split (%) | 31.7% | 71.7% | 40.0% | 28.3% | 28.3% | 31.7% |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lead | | Lag | | | Lead |
| Lead-Lag Optimize? | | | | | | |
| Recall Mode | Max | C-Max | C-Max | None | None | Max |
| v/c Ratio | | 1.02 | 0.70 | 0.64 | 0.83 | 0.14 |
| Control Delay | | 42.4 | 35.5 | 4.7 | 52.5 | 8.2 |
| Queue Delay | | 10.1 | 0.4 | 0.3 | 0.0 | 0.0 |
| Total Delay | | 52.5 | 35.9 | 4.9 | 52.5 | 8.2 |
| Queue Length 50th (ft) | | ~571 | 262 | 36 | 258 | 27 |
| Queue Length 95th (ft) | | #832 | 347 | 96 | 325 | 55 |
| Internal Link Dist (ft) | | 120 | 470 | | 420 | |
| Turn Bay Length (ft) | | | | 225 | | |
| Base Capacity (vph) | | 1737 | 1248 | 1120 | 854 | 912 |
| Starvation Cap Reductn | | 0 | 80 | 81 | 0 | 0 |
| Spillback Cap Reductn | | 47 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | | 1.05 | 0.75 | 0.68 | 0.81 | 0.14 |

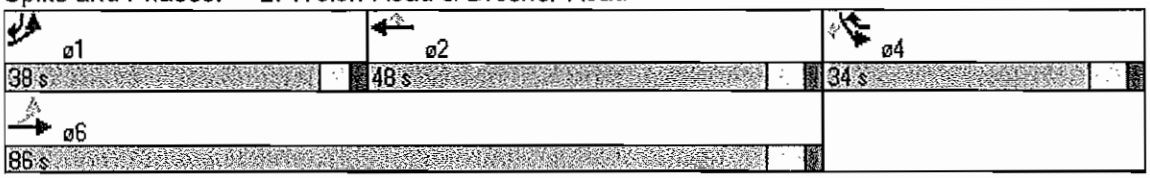
**Intersection Summary**

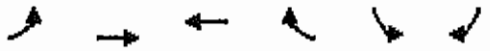
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 79 (66%), Referenced to phase 2:WBT and 6:EBTL, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Welsh Road & Dresher Road





| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 12 | 11 | 11 | 12 | 12 |
| Grade (%) | | 0% | 1% | | 1% | |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | | 0.99 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | | 3499 | 3404 | 1523 | 3416 | 1575 |
| Flt Permitted | | 0.51 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1804 | 3404 | 1523 | 3416 | 1575 |
| Volume (vph) | 379 | 1269 | 816 | 658 | 612 | 110 |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.89 | 0.89 |
| Adj. Flow (vph) | 408 | 1365 | 877 | 708 | 688 | 124 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 145 | 0 | 21 |
| Lane Group Flow (vph) | 0 | 1773 | 877 | 563 | 688 | 103 |
| Turn Type | pm+pt | | | pm+ov | | pm+ov |
| Protected Phases | 1 | 6 | 2 | 4 | 4 | 1 |
| Permitted Phases | 6 | | | 2 | | 4 |
| Actuated Green, G (s) | | 80.8 | 42.0 | 69.2 | 27.2 | 61.0 |
| Effective Green, g (s) | | 82.8 | 44.0 | 73.2 | 29.2 | 64.0 |
| Actuated g/C Ratio | | 0.69 | 0.37 | 0.61 | 0.24 | 0.53 |
| Clearance Time (s) | | 6.0 | 6.0 | 6.0 | 6.0 | 5.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1736 | 1248 | 980 | 831 | 893 |
| v/s Ratio Prot | | c0.30 | 0.26 | 0.14 | c0.20 | 0.03 |
| v/s Ratio Perm | | c0.41 | | 0.23 | | 0.03 |
| v/c Ratio | | 1.02 | 0.70 | 0.57 | 0.83 | 0.12 |
| Uniform Delay, d1 | | 18.6 | 32.4 | 14.0 | 43.0 | 13.9 |
| Progression Factor | | 1.35 | 1.00 | 0.41 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 24.6 | 2.9 | 0.7 | 6.8 | 0.1 |
| Delay (s) | | 49.7 | 35.2 | 6.5 | 49.8 | 14.0 |
| Level of Service | | D | D | A | D | B |
| Approach Delay (s) | | 49.7 | 22.4 | | 44.4 | |
| Approach LOS | | D | C | | D | |

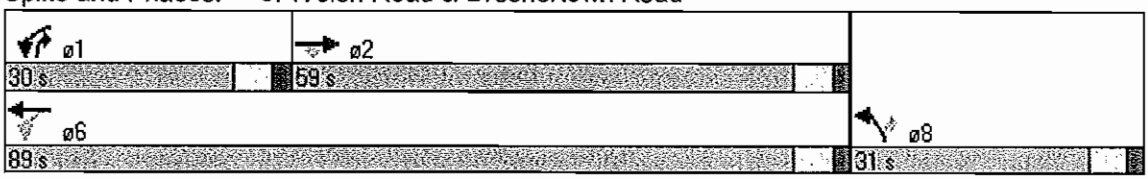
| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM Average Control Delay | 38.3 | HCM Level of Service | D | |
| HCM Volume to Capacity ratio | 0.96 | | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 | |
| Intersection Capacity Utilization | 96.1% | ICU Level of Service | F | |
| Analysis Period (min) | 15 | | | |
| c Critical Lane Group | | | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 1524 | 356 | 321 | 1058 | 415 | 671 |
| Lane Group Flow (vph) | 1639 | 383 | 345 | 1138 | 466 | 754 |
| Turn Type | | Perm | pm+pt | | | pm+ov |
| Protected Phases | 2 | | 1 | 6 | 8 | 1 |
| Permitted Phases | | 2 | 6 | | | 8 |
| Detector Phases | 2 | 2 | 1 | 6 | 8 | 1 |
| Minimum Initial (s) | 19.0 | 19.0 | 3.0 | 19.0 | 7.0 | 3.0 |
| Minimum Split (s) | 25.0 | 25.0 | 13.0 | 25.0 | 25.0 | 13.0 |
| Total Split (s) | 59.0 | 59.0 | 30.0 | 89.0 | 31.0 | 30.0 |
| Total Split (%) | 49.2% | 49.2% | 25.0% | 74.2% | 25.8% | 25.0% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lag | Lead | | | Lead |
| Lead-Lag Optimize? | | | | | | |
| Recall Mode | C-Max | C-Max | None | C-Max | None | None |
| v/c Ratio | 1.00 | 0.45 | 0.74 | 0.44 | 0.73 | 0.94 |
| Control Delay | 39.9 | 5.7 | 41.1 | 6.9 | 52.3 | 50.6 |
| Queue Delay | 92.8 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 132.8 | 6.1 | 41.1 | 6.9 | 52.3 | 50.6 |
| Queue Length 50th (ft) | ~682 | 72 | 195 | 156 | 175 | 536 |
| Queue Length 95th (ft) | m#731 | m59 | #362 | 217 | 222 | #789 |
| Internal Link Dist (ft) | 470 | | | 440 | 780 | |
| Turn Bay Length (ft) | | 200 | 180 | | 270 | |
| Base Capacity (vph) | 1639 | 853 | 465 | 2605 | 743 | 802 |
| Starvation Cap Reductn | 305 | 157 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.23 | 0.55 | 0.74 | 0.44 | 0.63 | 0.94 |

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 86 (72%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Welsh Road & Dreshertown Road



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | ↑↑ | ↱ | ↰ | ↑↑ | ↰↰ | ↱ |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 10 | 12 | 11 | 14 |
| Grade (%) | -2% | | | 1% | 1% | |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.95 | 1.00 | 1.00 | 0.95 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3575 | 1599 | 1643 | 3522 | 3302 | 1680 |
| Flt Permitted | 1.00 | 1.00 | 0.07 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3575 | 1599 | 117 | 3522 | 3302 | 1680 |
| Volume (vph) | 1524 | 356 | 321 | 1058 | 415 | 671 |
| Peak-hour factor, PHF | 0.93 | 0.93 | 0.93 | 0.93 | 0.89 | 0.89 |
| Adj. Flow (vph) | 1639 | 383 | 345 | 1138 | 466 | 754 |
| RTOR Reduction (vph) | 0 | 120 | 0 | 0 | 0 | 4 |
| Lane Group Flow (vph) | 1639 | 263 | 345 | 1138 | 466 | 750 |
| Turn Type | | Perm | pm+pt | | | pm+ov |
| Protected Phases | 2 | | 1 | 6 | 8 | 1 |
| Permitted Phases | | 2 | 6 | | | 8 |
| Actuated Green, G (s) | 53.0 | 53.0 | 86.8 | 86.8 | 21.2 | 49.0 |
| Effective Green, g (s) | 55.0 | 55.0 | 88.8 | 88.8 | 23.2 | 53.0 |
| Actuated g/C Ratio | 0.46 | 0.46 | 0.74 | 0.74 | 0.19 | 0.44 |
| Clearance Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 4.0 |
| Lane Grp Cap (vph) | 1639 | 733 | 466 | 2606 | 638 | 798 |
| v/s Ratio Prot | c0.46 | | 0.18 | 0.32 | 0.14 | c0.23 |
| v/s Ratio Perm | | 0.16 | 0.36 | | | 0.21 |
| v/c Ratio | 1.00 | 0.36 | 0.74 | 0.44 | 0.73 | 0.94 |
| Uniform Delay, d1 | 32.5 | 21.1 | 42.9 | 6.0 | 45.5 | 32.0 |
| Progression Factor | 0.82 | 0.58 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 12.4 | 0.4 | 6.6 | 0.5 | 4.3 | 18.7 |
| Delay (s) | 39.2 | 12.7 | 49.5 | 6.5 | 49.8 | 50.7 |
| Level of Service | D | B | D | A | D | D |
| Approach Delay (s) | 34.2 | | | 16.5 | 50.3 | |
| Approach LOS | C | | | B | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 32.8 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.97 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 90.3% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 15 | 12 | 12 | 15 | 15 | 12 |
| Grade (%) | -5% | | | 1% | 2% | |
| Storage Length (ft) | 0 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 0 | 0 | | | 0 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | |
| Frt | 0.910 | | | | 0.999 | |
| Flt Protected | 0.984 | | | 0.999 | | |
| Satd. Flow (prot) | 1827 | 0 | 0 | 2037 | 1988 | 0 |
| Flt Permitted | 0.984 | | | 0.999 | | |
| Satd. Flow (perm) | 1827 | 0 | 0 | 2037 | 1988 | 0 |
| Headway Factor | 0.85 | 0.97 | 1.01 | 0.89 | 0.89 | 1.01 |
| Link Speed (mph) | 25 | | | 35 | 35 | |
| Link Distance (ft) | 336 | | | 610 | 450 | |
| Travel Time (s) | 9.2 | | | 11.9 | 8.8 | |
| Volume (vph) | 7 | 14 | 6 | 352 | 163 | 2 |
| Confl. Peds. (#/hr) | | | | | | |
| Confl. Bikes (#/hr) | | | | | | |
| Peak Hour Factor | 0.44 | 0.44 | 0.84 | 0.84 | 0.85 | 0.85 |
| Growth Factor | 100% | 100% | 100% | 100% | 100% | 100% |
| Heavy Vehicles (%) | 5% | 5% | 2% | 2% | 4% | 4% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | |
| Mid-Block Traffic (%) | 0% | | | 0% | 0% | |
| Adj. Flow (vph) | 16 | 32 | 7 | 419 | 192 | 2 |
| Lane Group Flow (vph) | 48 | 0 | 0 | 426 | 194 | 0 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 33.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | -5% | | | 1% | 2% | |
| Volume (veh/h) | 7 | 14 | 6 | 352 | 163 | 2 |
| Peak Hour Factor | 0.44 | 0.44 | 0.84 | 0.84 | 0.85 | 0.85 |
| Hourly flow rate (vph) | 16 | 32 | 7 | 419 | 192 | 2 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | 450 | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 626 | 193 | 194 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 626 | 193 | 194 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 96 | 96 | 99 | | | |
| cM capacity (veh/h) | 442 | 841 | 1379 | | | |

| Direction, Lane # | EB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 48 | 426 | 194 |
| Volume Left | 16 | 7 | 0 |
| Volume Right | 32 | 0 | 2 |
| cSH | 646 | 1379 | 1700 |
| Volume to Capacity | 0.07 | 0.01 | 0.11 |
| Queue Length 95th (ft) | 6 | 0 | 0 |
| Control Delay (s) | 11.0 | 0.2 | 0.0 |
| Lane LOS | B | A | |
| Approach Delay (s) | 11.0 | 0.2 | 0.0 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.9 | | |
| Intersection Capacity Utilization | 33.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 15 | 12 | 12 | 12 | 12 | 12 |
| Grade (%) | 0% | | | 1% | -1% | |
| Storage Length (ft) | 0 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | |
| Frt | 0.958 | | | | | 0.850 |
| Flt Protected | 0.967 | | 0.950 | | | |
| Satd. Flow (prot) | 1898 | 0 | 1761 | 1853 | 1872 | 1591 |
| Flt Permitted | 0.967 | | 0.950 | | | |
| Satd. Flow (perm) | 1898 | 0 | 1761 | 1853 | 1872 | 1591 |
| Headway Factor | 0.88 | 1.00 | 1.01 | 1.01 | 0.99 | 0.99 |
| Link Speed (mph) | 25 | | | 40 | 40 | |
| Link Distance (ft) | 330 | | | 535 | 860 | |
| Travel Time (s) | 9.0 | | | 9.1 | 14.7 | |
| Volume (vph) | 20 | 9 | 3 | 1066 | 670 | 7 |
| Confl. Peds. (#/hr) | | | | | | |
| Confl. Bikes (#/hr) | | | | | | |
| Peak Hour Factor | 0.90 | 0.90 | 0.89 | 0.89 | 0.93 | 0.93 |
| Growth Factor | 100% | 100% | 100% | 100% | 100% | 100% |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | |
| Mid-Block Traffic (%) | 0% | | | 0% | 0% | |
| Adj. Flow (vph) | 22 | 10 | 3 | 1198 | 720 | 8 |
| Lane Group Flow (vph) | 32 | 0 | 3 | 1198 | 720 | 8 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 66.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 1% | -1% | |
| Volume (veh/h) | 20 | 9 | 3 | 1066 | 670 | 7 |
| Peak Hour Factor | 0.90 | 0.90 | 0.89 | 0.89 | 0.93 | 0.93 |
| Hourly flow rate (vph) | 22 | 10 | 3 | 1198 | 720 | 8 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | 860 | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1925 | 720 | 728 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1925 | 720 | 728 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 70 | 98 | 100 | | | |
| cM capacity (veh/h) | 73 | 428 | 876 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 32 | 3 | 1198 | 720 | 8 |
| Volume Left | 22 | 3 | 0 | 0 | 0 |
| Volume Right | 10 | 0 | 0 | 0 | 8 |
| cSH | 98 | 876 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.33 | 0.00 | 0.70 | 0.42 | 0.00 |
| Queue Length 95th (ft) | 32 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 58.5 | 9.1 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | A | | | |
| Approach Delay (s) | 58.5 | 0.0 | | 0.0 | |
| Approach LOS | F | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 66.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | |
| Volume (vph) | 28 | 901 | 268 | 1328 | 15 | 40 | 129 | 34 | 63 |
| Lane Group Flow (vph) | 33 | 1084 | 298 | 1517 | 0 | 63 | 148 | 0 | 186 |
| Turn Type | Perm | | pm+pt | | Perm | | Perm | Perm | |
| Protected Phases | | 2 | 1 | 6 | | 4 | | | 8 |
| Permitted Phases | 2 | | 6 | | 4 | | 4 | 8 | |
| Detector Phases | 2 | 2 | 1 | 6 | 4 | 4 | 4 | 8 | 8 |
| Minimum Initial (s) | 15.0 | 15.0 | 10.0 | 15.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 29.0 | 29.0 | 13.0 | 29.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 |
| Total Split (s) | 54.0 | 54.0 | 33.0 | 87.0 | 33.0 | 33.0 | 33.0 | 33.0 | 33.0 |
| Total Split (%) | 45.0% | 45.0% | 27.5% | 72.5% | 27.5% | 27.5% | 27.5% | 27.5% | 27.5% |
| Yellow Time (s) | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 0.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | Lag | Lead | | | | | | |
| Lead-Lag Optimize? | | | | | | | | | |
| Recall Mode | C-Max | C-Max | None | C-Max | None | None | None | None | None |
| v/c Ratio | 0.38 | 0.53 | 0.76 | 1.01 | | 0.20 | 0.35 | | 0.60 |
| Control Delay | 36.3 | 18.6 | 40.0 | 40.7 | | 42.5 | 8.6 | | 49.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 |
| Total Delay | 36.3 | 18.6 | 40.0 | 40.7 | | 42.5 | 8.6 | | 49.4 |
| Queue Length 50th (ft) | 13 | 254 | 169 | ~634 | | 42 | 0 | | 123 |
| Queue Length 95th (ft) | #59 | 375 | m206 | m#1467 | | 76 | 48 | | 145 |
| Internal Link Dist (ft) | | 420 | | 395 | | 370 | | | 420 |
| Turn Bay Length (ft) | 150 | | 263 | | | | 150 | | |
| Base Capacity (vph) | 87 | 2054 | 527 | 1505 | | 454 | 540 | | 437 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | | 0 | 0 | | 0 |
| Reduced v/c Ratio | 0.38 | 0.53 | 0.57 | 1.01 | | 0.14 | 0.27 | | 0.43 |

Intersection Summary

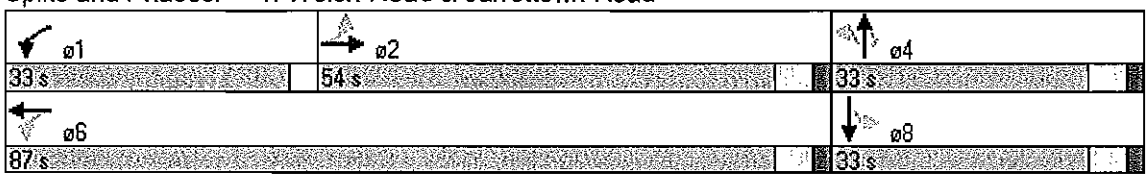
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 87 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Welsh Road & Jarrettown Road



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 12 | 12 | 14 | 14 | 15 | 15 | 15 | 15 | 15 | 15 |
| Grade (%) | | -4% | | | 1% | | | -3% | | | 4% | |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | 4.0 | | 4.0 | |
| Lane Util. Factor | 1.00 | 0.95 | | 1.00 | 1.00 | | | 1.00 | 1.00 | | 1.00 | |
| Frt | 1.00 | 1.00 | | 1.00 | 1.00 | | | 1.00 | 0.85 | | 0.96 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | | | 0.99 | 1.00 | | 0.99 | |
| Satd. Flow (prot) | 1787 | 3570 | | 1761 | 1969 | | | 2052 | 1768 | | 1907 | |
| Flt Permitted | 0.06 | 1.00 | | 0.18 | 1.00 | | | 0.86 | 1.00 | | 0.90 | |
| Satd. Flow (perm) | 109 | 3570 | | 331 | 1969 | | | 1780 | 1768 | | 1744 | |
| Volume (vph) | 28 | 901 | 9 | 268 | 1328 | 37 | 15 | 40 | 129 | 34 | 63 | 39 |
| Peak-hour factor, PHF | 0.84 | 0.84 | 0.84 | 0.90 | 0.90 | 0.90 | 0.87 | 0.87 | 0.87 | 0.73 | 0.73 | 0.73 |
| Adj. Flow (vph) | 33 | 1073 | 11 | 298 | 1476 | 41 | 17 | 46 | 148 | 47 | 86 | 53 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 123 | 0 | 13 | 0 |
| Lane Group Flow (vph) | 33 | 1084 | 0 | 298 | 1516 | 0 | 0 | 63 | 25 | 0 | 173 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | Perm | | | pm+pt | | | Perm | | Perm | Perm | | |
| Protected Phases | | 2 | | 1 | 6 | | | 4 | | | 8 | |
| Permitted Phases | 2 | | | 6 | | | 4 | | 4 | 8 | | |
| Actuated Green, G (s) | 67.1 | 67.1 | | 89.7 | 89.7 | | | 18.3 | 18.3 | | 18.3 | |
| Effective Green, g (s) | 69.1 | 69.1 | | 91.7 | 91.7 | | | 20.3 | 20.3 | | 20.3 | |
| Actuated g/C Ratio | 0.58 | 0.58 | | 0.76 | 0.76 | | | 0.17 | 0.17 | | 0.17 | |
| Clearance Time (s) | 6.0 | 6.0 | | 3.0 | 6.0 | | | 6.0 | 6.0 | | 6.0 | |
| Vehicle Extension (s) | 5.0 | 5.0 | | 3.0 | 5.0 | | | 5.0 | 5.0 | | 5.0 | |
| Lane Grp Cap (vph) | 63 | 2056 | | 475 | 1505 | | | 301 | 299 | | 295 | |
| v/s Ratio Prot | | 0.30 | | 0.10 | c0.77 | | | | | | | |
| v/s Ratio Perm | 0.30 | | | 0.38 | | | | 0.04 | 0.01 | | c0.10 | |
| v/c Ratio | 0.52 | 0.53 | | 0.63 | 1.01 | | | 0.21 | 0.08 | | 0.59 | |
| Uniform Delay, d1 | 15.5 | 15.5 | | 10.0 | 14.2 | | | 42.9 | 42.0 | | 46.0 | |
| Progression Factor | 1.00 | 1.00 | | 1.70 | 1.56 | | | 1.00 | 1.00 | | 1.00 | |
| Incremental Delay, d2 | 27.8 | 1.0 | | 1.3 | 18.2 | | | 0.7 | 0.3 | | 4.5 | |
| Delay (s) | 43.3 | 16.5 | | 18.3 | 40.3 | | | 43.7 | 42.3 | | 50.5 | |
| Level of Service | D | B | | B | D | | | D | D | | D | |
| Approach Delay (s) | | 17.3 | | | 36.6 | | | 42.7 | | | 50.5 | |
| Approach LOS | | B | | | D | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 31.3 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.93 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 108.9% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

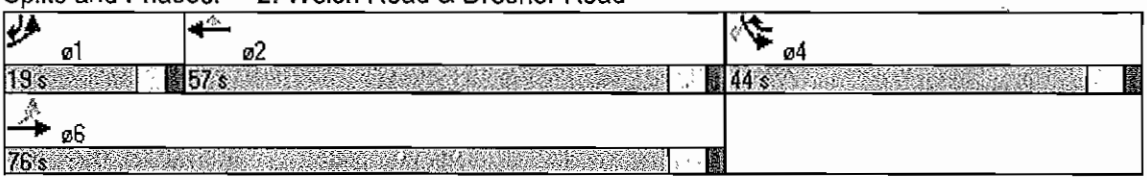
c Critical Lane Group

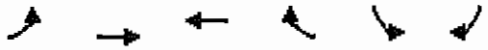
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Volume (vph) | 178 | 886 | 1301 | 679 | 825 | 332 |
| Lane Group Flow (vph) | 0 | 1120 | 1414 | 738 | 1044 | 420 |
| Turn Type | pm+pt | | | pm+ov | | pm+ov |
| Protected Phases | 1 | 6 | 2 | 4 | 4 | 1 |
| Permitted Phases | 6 | | | 2 | | 4 |
| Detector Phases | 1 | 6 | 2 | 4 | 4 | 1 |
| Minimum Initial (s) | 3.0 | 18.0 | 18.0 | 3.0 | 3.0 | 3.0 |
| Minimum Split (s) | 12.0 | 30.0 | 30.0 | 30.0 | 30.0 | 12.0 |
| Total Split (s) | 19.0 | 76.0 | 57.0 | 44.0 | 44.0 | 19.0 |
| Total Split (%) | 15.8% | 63.3% | 47.5% | 36.7% | 36.7% | 15.8% |
| Yellow Time (s) | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lead | | Lag | | | Lead |
| Lead-Lag Optimize? | | | | | | |
| Recall Mode | Max | C-Max | C-Max | None | None | Max |
| v/c Ratio | | 0.88 | 0.94 | 0.55 | 0.92 | 0.54 |
| Control Delay | | 34.3 | 38.2 | 2.5 | 51.8 | 23.5 |
| Queue Delay | | 0.0 | 17.2 | 0.2 | 0.6 | 0.0 |
| Total Delay | | 34.3 | 55.4 | 2.7 | 52.3 | 23.5 |
| Queue Length 50th (ft) | | 205 | 563 | 56 | 398 | 211 |
| Queue Length 95th (ft) | | #375 | #706 | 59 | 404 | 254 |
| Internal Link Dist (ft) | | 120 | 470 | | 420 | |
| Turn Bay Length (ft) | | | | 225 | | |
| Base Capacity (vph) | | 1273 | 1503 | 1340 | 1139 | 781 |
| Starvation Cap Reductn | | 0 | 131 | 142 | 0 | 0 |
| Spillback Cap Reductn | | 0 | 0 | 0 | 12 | 0 |
| Storage Cap Reductn | | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | | 0.88 | 1.03 | 0.62 | 0.93 | 0.54 |

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 77 (64%), Referenced to phase 2:WBT and 6:EBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Welsh Road & Dresher Road





| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 11 | 12 | 11 | 11 | 12 | 12 |
| Grade (%) | | 0% | 1% | | 1% | |
| Total Lost time (s) | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | | 0.95 | 0.95 | 1.00 | 0.97 | 1.00 |
| Frt | | 1.00 | 1.00 | 0.85 | 1.00 | 0.85 |
| Flt Protected | | 0.99 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | | 3476 | 3404 | 1523 | 3416 | 1575 |
| Flt Permitted | | 0.50 | 1.00 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | | 1766 | 3404 | 1523 | 3416 | 1575 |
| Volume (vph) | 178 | 886 | 1301 | 679 | 825 | 332 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.92 | 0.92 | 0.79 | 0.79 |
| Adj. Flow (vph) | 187 | 933 | 1414 | 738 | 1044 | 420 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 128 | 0 | 8 |
| Lane Group Flow (vph) | 0 | 1120 | 1414 | 610 | 1044 | 412 |
| Heavy Vehicles (%) | 3% | 3% | 2% | 2% | 2% | 2% |
| Turn Type | pm+pt | | | pm+ov | | pm+ov |
| Protected Phases | 1 | 6 | 2 | 4 | 4 | 1 |
| Permitted Phases | 6 | | | 2 | | 4 |
| Actuated Green, G (s) | | 70.0 | 51.0 | 89.0 | 38.0 | 52.0 |
| Effective Green, g (s) | | 72.0 | 53.0 | 93.0 | 40.0 | 55.0 |
| Actuated g/C Ratio | | 0.60 | 0.44 | 0.78 | 0.33 | 0.46 |
| Clearance Time (s) | | 6.0 | 6.0 | 6.0 | 6.0 | 5.0 |
| Vehicle Extension (s) | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | | 1273 | 1503 | 1231 | 1139 | 774 |
| v/s Ratio Prot | | c0.11 | c0.42 | 0.17 | c0.31 | 0.07 |
| v/s Ratio Perm | | 0.42 | | 0.24 | | 0.20 |
| v/c Ratio | | 0.88 | 0.94 | 0.50 | 0.92 | 0.53 |
| Uniform Delay, d1 | | 20.3 | 32.0 | 4.9 | 38.4 | 23.3 |
| Progression Factor | | 1.61 | 0.85 | 1.68 | 1.00 | 1.00 |
| Incremental Delay, d2 | | 7.9 | 10.4 | 0.2 | 11.4 | 0.7 |
| Delay (s) | | 40.5 | 37.6 | 8.5 | 49.8 | 24.0 |
| Level of Service | | D | D | A | D | C |
| Approach Delay (s) | | 40.5 | 27.6 | | 42.4 | |
| Approach LOS | | D | C | | D | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| HCM Average Control Delay | 35.2 | HCM Level of Service | D | |
| HCM Volume to Capacity ratio | 0.93 | | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 | |
| Intersection Capacity Utilization | 99.2% | ICU Level of Service | F | |
| Analysis Period (min) | 15 | | | |

c Critical Lane Group

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | ↑↑ | ↱ | ↰ | ↑↑ | ↰↰ | ↱ |
| Volume (vph) | 1243 | 468 | 645 | 1588 | 392 | 351 |
| Lane Group Flow (vph) | 1308 | 493 | 686 | 1689 | 431 | 386 |
| Turn Type | | pm+ov | pm+pt | | | pm+ov |
| Protected Phases | 2 | 8 | 1 | 6 | 8 | 1 |
| Permitted Phases | | 2 | 6 | | | 8 |
| Detector Phases | 2 | 8 | 1 | 6 | 8 | 1 |
| Minimum Initial (s) | 19.0 | 7.0 | 3.0 | 19.0 | 7.0 | 3.0 |
| Minimum Split (s) | 25.0 | 25.0 | 13.0 | 25.0 | 25.0 | 13.0 |
| Total Split (s) | 46.0 | 26.0 | 48.0 | 94.0 | 26.0 | 48.0 |
| Total Split (%) | 38.3% | 21.7% | 40.0% | 78.3% | 21.7% | 40.0% |
| Yellow Time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| All-Red Time (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Lead/Lag | Lag | | Lead | | | Lead |
| Lead-Lag Optimize? | | | | | | |
| Recall Mode | C-Max | None | None | C-Max | None | None |
| v/c Ratio | 1.05 | 0.52 | 1.01 | 0.63 | 0.76 | 0.39 |
| Control Delay | 64.8 | 9.3 | 69.4 | 8.1 | 56.4 | 14.8 |
| Queue Delay | 22.2 | 0.7 | 0.0 | 0.3 | 0.0 | 0.0 |
| Total Delay | 87.0 | 10.0 | 69.4 | 8.4 | 56.4 | 14.8 |
| Queue Length 50th (ft) | ~565 | 94 | ~527 | 285 | 163 | 150 |
| Queue Length 95th (ft) | m#688 | m124 | #763 | 343 | 220 | 219 |
| Internal Link Dist (ft) | 470 | | | 3444 | 780 | |
| Turn Bay Length (ft) | | 200 | 180 | | 270 | |
| Base Capacity (vph) | 1251 | 956 | 678 | 2680 | 605 | 983 |
| Starvation Cap Reductn | 63 | 201 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 406 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.10 | 0.65 | 1.01 | 0.74 | 0.71 | 0.39 |

**Intersection Summary**

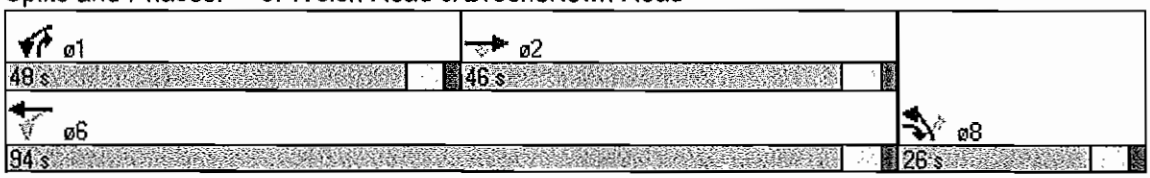
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 25 (21%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

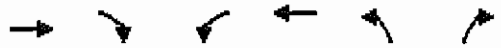
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Welsh Road & Dreshertown Road





| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | ↑↑ | ↱ | ↰ | ↑↑ | ↰↰ | ↱ |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 12 | 12 | 10 | 12 | 11 | 14 |
| Grade (%) | -2% | | | 1% | 1% | |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.95 | 1.00 | 1.00 | 0.95 | 0.97 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (prot) | 3575 | 1599 | 1643 | 3522 | 3302 | 1680 |
| Flt Permitted | 1.00 | 1.00 | 0.09 | 1.00 | 0.95 | 1.00 |
| Satd. Flow (perm) | 3575 | 1599 | 150 | 3522 | 3302 | 1680 |
| Volume (vph) | 1243 | 468 | 645 | 1588 | 392 | 351 |
| Peak-hour factor, PHF | 0.95 | 0.95 | 0.94 | 0.94 | 0.91 | 0.91 |
| Adj. Flow (vph) | 1308 | 493 | 686 | 1689 | 431 | 386 |
| RTOR Reduction (vph) | 0 | 54 | 0 | 0 | 0 | 3 |
| Lane Group Flow (vph) | 1308 | 439 | 686 | 1689 | 431 | 383 |
| Turn Type | | pm+ov | pm+pt | | | pm+ov |
| Protected Phases | 2 | 8 | 1 | 6 | 8 | 1 |
| Permitted Phases | | 2 | 6 | | | 8 |
| Actuated Green, G (s) | 40.0 | 58.7 | 89.3 | 89.3 | 18.7 | 62.0 |
| Effective Green, g (s) | 42.0 | 62.7 | 91.3 | 91.3 | 20.7 | 66.0 |
| Actuated g/C Ratio | 0.35 | 0.52 | 0.76 | 0.76 | 0.17 | 0.55 |
| Clearance Time (s) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Vehicle Extension (s) | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 4.0 |
| Lane Grp Cap (vph) | 1251 | 889 | 678 | 2680 | 570 | 980 |
| v/s Ratio Prot | 0.37 | 0.09 | c0.38 | 0.48 | c0.13 | 0.15 |
| v/s Ratio Perm | | 0.19 | c0.39 | | | 0.08 |
| v/c Ratio | 1.05 | 0.49 | 1.01 | 0.63 | 0.76 | 0.39 |
| Uniform Delay, d1 | 39.0 | 18.4 | 39.6 | 6.6 | 47.2 | 15.5 |
| Progression Factor | 0.90 | 0.68 | 1.00 | 1.00 | 1.00 | 1.00 |
| Incremental Delay, d2 | 29.9 | 0.2 | 37.5 | 1.1 | 5.7 | 0.4 |
| Delay (s) | 65.0 | 12.7 | 77.1 | 7.7 | 52.9 | 15.8 |
| Level of Service | E | B | E | A | D | B |
| Approach Delay (s) | 50.7 | | | 27.8 | 35.4 | |
| Approach LOS | D | | | C | D | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 37.3 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.95 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 91.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 15 | 12 | 12 | 15 | 15 | 12 |
| Grade (%) | -5% | | | 1% | 2% | |
| Storage Length (ft) | 0 | 0 | 0 | | | 0 |
| Storage Lanes | 1 | 0 | 0 | | | 0 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | |
| Frt | 0.926 | | | | 0.992 | |
| Flt Protected | 0.978 | | | 0.996 | | |
| Satd. Flow (prot) | 1902 | 0 | 0 | 2031 | 2012 | 0 |
| Flt Permitted | 0.978 | | | 0.996 | | |
| Satd. Flow (perm) | 1902 | 0 | 0 | 2031 | 2012 | 0 |
| Headway Factor | 0.85 | 0.97 | 1.01 | 0.89 | 0.89 | 1.01 |
| Link Speed (mph) | 25 | | | 35 | 35 | |
| Link Distance (ft) | 282 | | | 852 | 450 | |
| Travel Time (s) | 7.7 | | | 16.6 | 8.8 | |
| Volume (vph) | 6 | 8 | 18 | 178 | 321 | 19 |
| Confl. Peds. (#/hr) | | | | | | |
| Confl. Bikes (#/hr) | | | | | | |
| Peak Hour Factor | 0.70 | 0.70 | 0.84 | 0.84 | 0.91 | 0.91 |
| Growth Factor | 100% | 100% | 100% | 100% | 100% | 100% |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | |
| Mid-Block Traffic (%) | 0% | | | 0% | 0% | |
| Adj. Flow (vph) | 9 | 11 | 21 | 212 | 353 | 21 |
| Lane Group Flow (vph) | 20 | 0 | 0 | 233 | 374 | 0 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 34.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | -5% | | | 1% | 2% | |
| Volume (veh/h) | 6 | 8 | 18 | 178 | 321 | 19 |
| Peak Hour Factor | 0.70 | 0.70 | 0.84 | 0.84 | 0.91 | 0.91 |
| Hourly flow rate (vph) | 9 | 11 | 21 | 212 | 353 | 21 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | 450 | |
| pX, platoon unblocked | 0.97 | 0.97 | 0.97 | | | |
| vC, conflicting volume | 618 | 363 | 374 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 605 | 342 | 353 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 98 | 98 | 98 | | | |
| cM capacity (veh/h) | 438 | 678 | 1167 | | | |

| Direction, Lane # | EB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 20 | 233 | 374 |
| Volume Left | 9 | 21 | 0 |
| Volume Right | 11 | 0 | 21 |
| cSH | 549 | 1167 | 1700 |
| Volume to Capacity | 0.04 | 0.02 | 0.22 |
| Queue Length 95th (ft) | 3 | 1 | 0 |
| Control Delay (s) | 11.8 | 0.9 | 0.0 |
| Lane LOS | B | A | |
| Approach Delay (s) | 11.8 | 0.9 | 0.0 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.7 | | |
| Intersection Capacity Utilization | 34.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width (ft) | 15 | 12 | 12 | 12 | 12 | 12 |
| Grade (%) | 0% | | | 1% | -1% | |
| Storage Length (ft) | 0 | 0 | 75 | | | 0 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Ped Bike Factor | | | | | | |
| Frt | 0.960 | | | | | 0.850 |
| Flt Protected | 0.966 | | 0.950 | | | |
| Satd. Flow (prot) | 1900 | 0 | 1761 | 1853 | 1872 | 1591 |
| Flt Permitted | 0.966 | | 0.950 | | | |
| Satd. Flow (perm) | 1900 | 0 | 1761 | 1853 | 1872 | 1591 |
| Headway Factor | 0.88 | 1.00 | 1.01 | 1.01 | 0.99 | 0.99 |
| Link Speed (mph) | 30 | | | 40 | 40 | |
| Link Distance (ft) | 255 | | | 440 | 860 | |
| Travel Time (s) | 5.8 | | | 7.5 | 14.7 | |
| Volume (vph) | 13 | 5 | 9 | 730 | 1092 | 21 |
| Confl. Peds. (#/hr) | | | | | | |
| Confl. Bikes (#/hr) | | | | | | |
| Peak Hour Factor | 0.90 | 0.90 | 0.91 | 0.91 | 0.94 | 0.94 |
| Growth Factor | 100% | 100% | 100% | 100% | 100% | 100% |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 2% | 2% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | |
| Mid-Block Traffic (%) | 0% | | | 0% | 0% | |
| Adj. Flow (vph) | 14 | 6 | 10 | 802 | 1162 | 22 |
| Lane Group Flow (vph) | 20 | 0 | 10 | 802 | 1162 | 22 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 67.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 1% | -1% | |
| Volume (veh/h) | 13 | 5 | 9 | 730 | 1092 | 21 |
| Peak Hour Factor | 0.90 | 0.90 | 0.91 | 0.91 | 0.94 | 0.94 |
| Hourly flow rate (vph) | 14 | 6 | 10 | 802 | 1162 | 22 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | 860 | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1984 | 1162 | 1184 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1984 | 1162 | 1184 | | | |
| tC, single (s) | 6.4 | 6.2 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 78 | 98 | 98 | | | |
| cM capacity (veh/h) | 66 | 238 | 590 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 20 | 10 | 802 | 1162 | 22 |
| Volume Left | 14 | 10 | 0 | 0 | 0 |
| Volume Right | 6 | 0 | 0 | 0 | 22 |
| cSH | 83 | 590 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.24 | 0.02 | 0.47 | 0.68 | 0.01 |
| Queue Length 95th (ft) | 22 | 1 | 0 | 0 | 0 |
| Control Delay (s) | 61.8 | 11.2 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | B | | | |
| Approach Delay (s) | 61.8 | 0.1 | | 0.0 | |
| Approach LOS | F | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.7 | | |
| Intersection Capacity Utilization | 67.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

# APPENDIX E

*AUXILIARY TURN LANE WARRANT ANALYSIS*

# Unsignalized Intersection Left-Turn Storage Lane Warrant Analysis

Based on Highway Research Record 211
"Volume Warrants for Left-Turn Storage Lanes At Unsignalized Grade Intersection"
M.D. Harmelink

**PROJECT INFORMATION**

| | |
|---|---|
| TPD Project Number: | TOLB.A.00026 |
| Intersection: | PROPOSED DRIVEWAY - DRESHERTOWN |
| Movement: | Left Turns into Site Driveway |
| Analysis Period: | 2008 PROJECTED CONDITIONS - AM PEAK |
| Analyst: | MBRESSLER |

**INPUT**

| | |
|---|---|
| Advancing Volume ($V_A$) = | 1069 |
| Opposing Volume ($V_O$) = | 677 |
| Number of Left Turns = | 3 |
| Speed Limit = | 40 |
| Proportion of Left Turns (L) = | 0.01 |

**CALCULATIONS**

| Headway range, sec | Percent Headways in each range | | Opposing Volume | Number of Headways in Range | Average Headway, sec | Duration, sec |
|---|---|---|---|---|---|---|
| 0-1 | 7 | 0 | 677 | 48.45 | 0.5 | 24.23 |
| 1-2 | 38 | 7 | 677 | 209.38 | 1.5 | 314.07 |
| 2-3 | 60 | 38 | 677 | 149.90 | 2.5 | 374.76 |
| | | | Total | 407.73 | | 713.05 |

$t_w$ = 3.30 Unblocked Time = 2213.78
$t_A$ = 3.37 $\mu$ = 737.93
$\lambda$ = 24.51

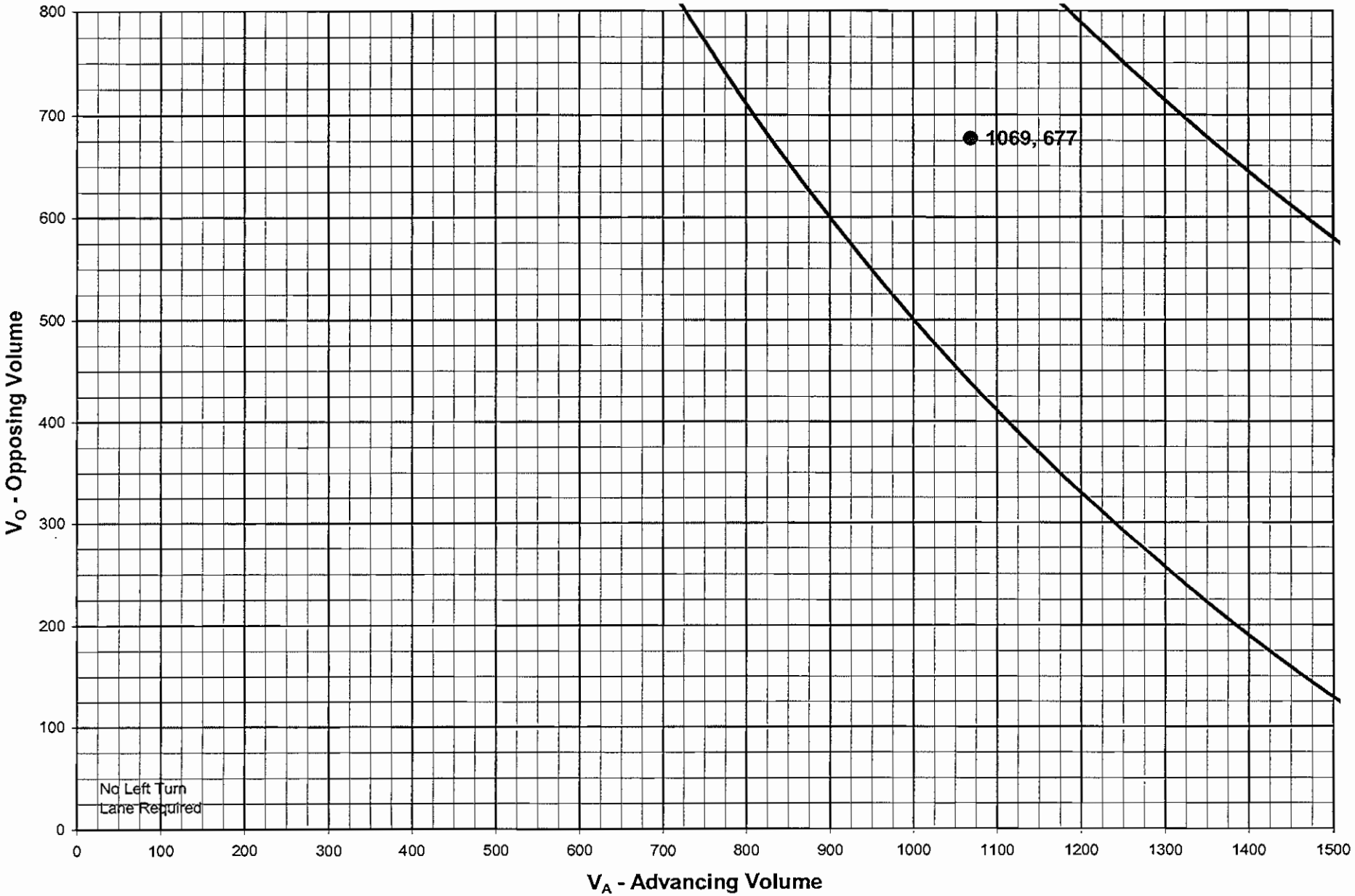
**RESULTS**

Left turn lane warrants are for $\rho$ > than $\rho$ = 0.0332

| | | | | | Limiting Advancing Volume |
|---|---|---|---|---|---|
| 8.00E-06 | for 40 mph | 75 foot lane $\rho^3$ = | 3.66E-05 | satisfied | 830 |
| | | 100 foot lane $\rho^4$ = | 1.22E-06 | | 1353 |
| | | 125 foot lane $\rho^5$ = | 4.04E-08 | | 1814 |
| | | 150 foot lane $\rho^6$ = | 1.34E-09 | | 2206 |
| | | 175 foot lane $\rho^7$ = | 4.46E-11 | | 2537 |
| | | 200 foot lane $\rho^8$ = | 1.48E-12 | | 2817 |
| | | 225 foot lane $\rho^9$ = | 4.92E-14 | | 3056 |
| | | 250 foot lane $\rho^{10}$ = | 1.63E-15 | | 3262 |
| | | 275 foot lane $\rho^{11}$ = | 5.42E-17 | | 3441 |
| | | 300 foot lane $\rho^{12}$ = | 1.80E-18 | | 3597 |
| | | 325 foot lane $\rho^{13}$ = | 5.98E-20 | | 3735 |
| | | 350 foot lane $\rho^{14}$ = | 1.99E-21 | | 3857 |

## Volume Warrants for Left Turn Storage Lanes at Unsignalized Grade Intersections V = 40 m.p.h.; L = 1%

### PROPOSED DRIVEWAY - DRESHERTOWN, 2008 PROJECTED CONDITIONS - AM PEAK



# Unsignalized Intersection Left-Turn Storage Lane Warrant Analysis

Based on Highway Research Record 211
"Volume Warrants for Left-Turn Storage Lanes At Unsignalized Grade Intersection"
M.D. Harmelink

## PROJECT INFORMATION

| | |
|---|---|
| TPD Project Number: | TOLB.A.00026 |
| Intersection: | PROPOSED DRIVEWAY - DRESHERTOWN |
| Movement: | Left Turns into Site Driveway |
| Analysis Period: | 2008 PROJECTED CONDITIONS - PM PEAK |
| Analyst: | MBRESSLER |

## INPUT

| | |
|---|---|
| Advancing Volume ($V_A$) = | 739 |
| Opposing Volume ($V_O$) = | 1103 |
| Number of Left Turns = | 9 |
| Speed Limit = | 40 |

Proportion of Left Turns (L) = 0.01

## CALCULATIONS

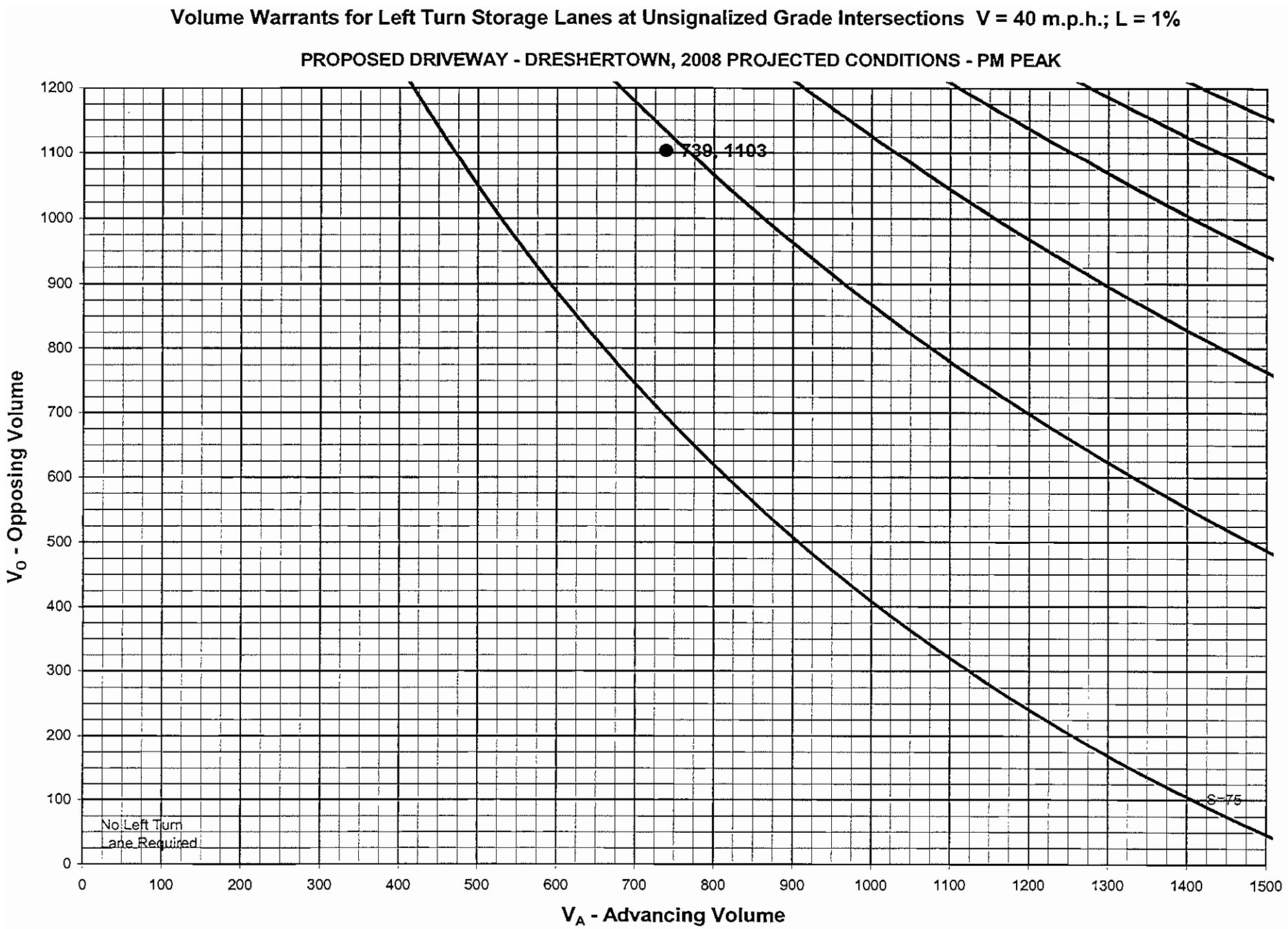
| Headway range, sec | Percent Headways in each range | | Opposing Volume | Number of Headways in Range | Average Headway, sec | Duration, sec |
|---|---|---|---|---|---|---|
| 0-1 | 11 | 0 | 1103 | 117.39 | 0.5 | 58.69 |
| 1-2 | 44 | 11 | 1103 | 373.21 | 1.5 | 559.82 |
| 2-3 | 71 | 44 | 1103 | 292.09 | 2.5 | 730.22 |
| | | | Total | 782.69 | | 1348.73 |

$t_w$ = 6.84 Unblocked Time = 1450.49
$t_A$ = 4.87 $\mu$ = 483.50
$\lambda$ = 23.92

## RESULTS

Left turn lane warrants are for $\rho$ > than $\rho$ = 0.0495

| | | | | | Limiting Advancing Volume |
|---|---|---|---|---|---|
| 8.00E-06 | for 40 mph | 75 foot lane $\rho^3$ = | 1.21E-04 | satisfied | 470 |
| | | 100 foot lane $\rho^4$ = | 5.99E-06 | | 766 |
| | | 125 foot lane $\rho^5$ = | 2.96E-07 | | 1027 |
| | | 150 foot lane $\rho^6$ = | 1.47E-08 | | 1249 |
| | | 175 foot lane $\rho^7$ = | 7.26E-10 | | 1437 |
| | | 200 foot lane $\rho^8$ = | 3.59E-11 | | 1595 |
| | | 225 foot lane $\rho^9$ = | 1.78E-12 | | 1731 |
| | | 250 foot lane $\rho^{10}$ = | 8.79E-14 | | 1848 |
| | | 275 foot lane $\rho^{11}$ = | 4.35E-15 | | 1949 |
| | | 300 foot lane $\rho^{12}$ = | 2.15E-16 | | 2037 |
| | | 325 foot lane $\rho^{13}$ = | 1.06E-17 | | 2115 |
| | | 350 foot lane $\rho^{14}$ = | 5.27E-19 | | 2185 |


Volume Warrants for Left Turn Storage Lanes at Unsignalized Grade Intersections V = 40 m.p.h.; L = 1%
PROPOSED DRIVEWAY - DRESHERTOWN, 2008 PROJECTED CONDITIONS - PM PEAK
739, 1103
S-75
No Left Turn Lane Required
$V_O$ - Opposing Volume
$V_A$ - Advancing Volume
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500

**Guidelines for Right Turn Treatments**

*Two-Lane Highways*

NCHRP Report 279

"Intersection Channelization Guide"

| | |
|---|---|
| Project Number: | TOLB.A.00026 |
| Intersection: | Proposed Site Driveway |
| Movement: | Right Turns into Site Driveways |
| Analyst: | MBRESSLER |

| | Condition | PHV Approach Total | PHV Right Turns | Taper Threshold | Full Lane Threshold | Treatment |
|---|---|---|---|---|---|---|
| 1 | 2008 Proj. AM | 677 | 7 | 20 | 40 | Radius Required |
| 2 | 2008 Proj. PM | 1103 | 21 | 20 | 40 | Taper Required |
| 3 | | | | | | |
| 4 | | | | | | |