

April 12, 2024

Mr. David J. Levesque  
Brewed Awakenings  
1316 Bald Hill Road  
Warwick, RI 02886

RE: Proposed Commercial Redevelopment  
*Brewed Awakenings Coffee House*  
1234 Oaklawn Avenue  
Cranston, Rhode Island

Dear Mr. Levesque:

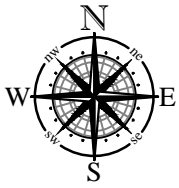
Crossman Engineering, in accordance with our scope of services, has completed a planning level traffic assessment to determine if the above referenced redevelopment project on Oaklawn Avenue in the City of Cranston, Rhode Island has adequate and safe access to the immediate local servicing roadways. The property, defined by Assessors Plat 15-1, Lot 1015 contains approximately 33,124 square feet of land. The site is fully developed with a commercial building that contains the former *Superior Bakery* business and the *Athenian Deli & Restaurant*. Refer to Figure 1 for project location within the community.

Based upon information provided by your office, and a review of the current site plan prepared by *DiPrete Engineering*, it is our understanding that the existing building will be razed to allow redevelopment of the parcel to accommodate a single, smaller building containing a new *Brewed Awakenings* coffee house business. Access and egress to the new business will be provided from modified existing driveway openings on Oaklawn Avenue and Oak Hill Drive.

The following is a summary of our investigation of the potential impacts and recommendations to provide safe and efficient access to the subject property.

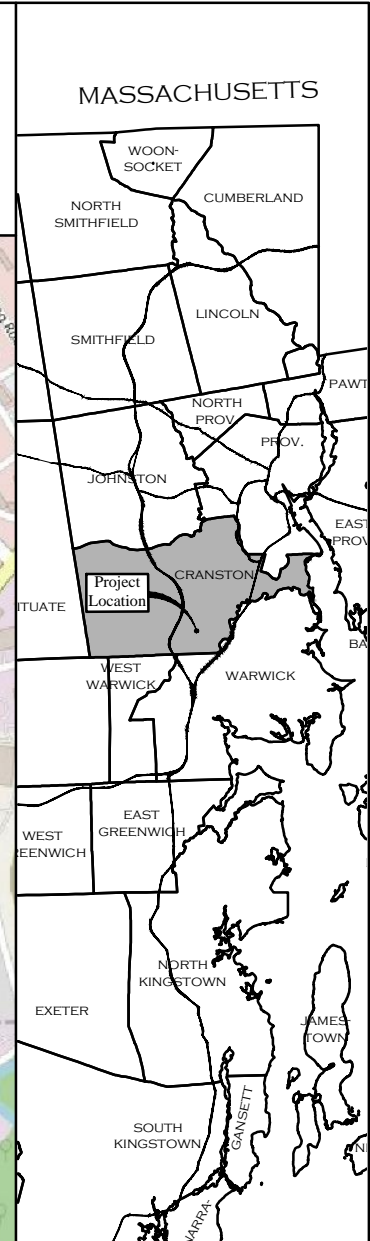
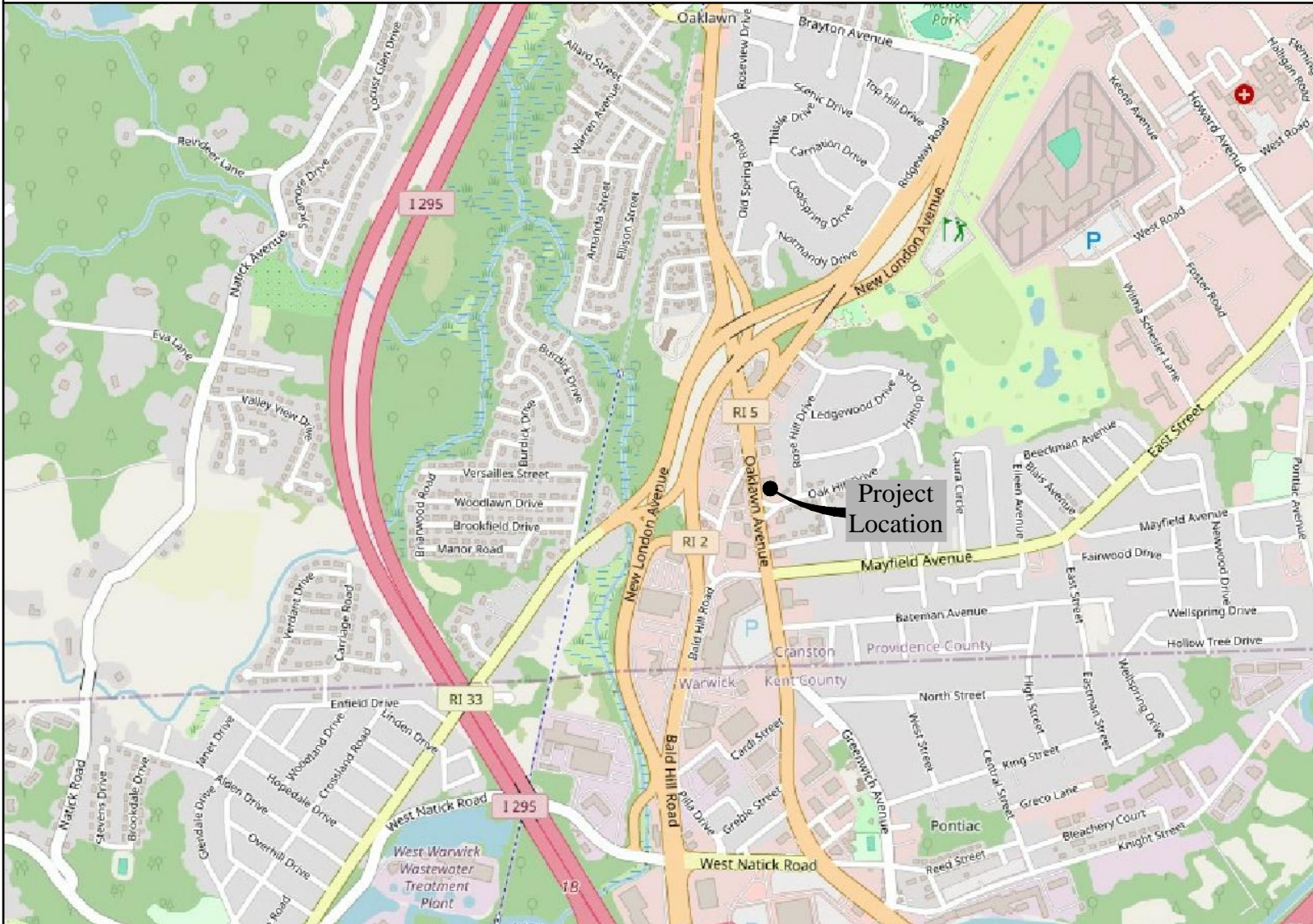
## PROJECT APPROACH

The objective of this study is to determine if there are any existing operational and/or safety concerns along the local servicing roadways, specifically Oaklawn Avenue (Route 5) and Oak Hill Drive, including their junctions and the proposed site access driveways. A review of the existing roadway features was completed to determine if any potential deficiencies presently warrant mitigation. In addition to the existing conditions analysis, the study also included the assessment of potential impacts resulting from traffic generated by the proposed redevelopment project. The study focused on these issues and makes recommendations for improvements if determined necessary, based upon the findings of the data collection and analysis phases of the study.



# Brewed Awakenings

## CRANSTON, RHODE ISLAND



■ TOWN / CITY LOCATION  
LOCUS MAP  
NO SCALE

*In order to complete our analysis, the following scope of work was conducted for the project:*

- An inventory of the physical roadway characteristics of Route 5 in the immediate site vicinity, including roadway alignment, pavement width, signage and traffic control to determine the adequacy of the existing roadway geometric features relating to access, sight distances, safety, and operations.
- A traffic counting program to define the existing traffic patterns and operational characteristics along the servicing roadways. The data collection included an automatic traffic recorder (ATR) count on Oaklawn Avenue in the site vicinity and a manual turning movement count (TMC) at the Oaklawn Avenue intersection with Oak Hill Drive.
- An analysis of accident records obtained from the Cranston Police Department to determine if there are any safety concerns relative to the frequency, severity or pattern of crashes in the immediate project area.
- A site plan for the proposed commercial business prepared by *DiPrete Engineering* was reviewed to define future roadway conditions at the site driveway intersections to the *Brewed Awakenings*.
- An analysis of the data collected, evaluation of the proposed design and development of recommendations to provide a safe and efficient access to the new business.

## Project Area

As noted in the previous section, the subject property is situated on the easterly side of Oaklawn Avenue between Mayfield Avenue and New London Avenue (Route 2). The parcel is approximately 0.77 acres in sizes and is fully developed with a single 13,000 square foot commercial building containing two tenants. The building has been utilized for decades for commercial use including a bakery business, *Superior Bakery* and a restaurant business, the *Athenian Deli & Restaurant*. *Superior Bakery* was closed in 2023 and the *Athenian Deli & Restaurant* remains open.

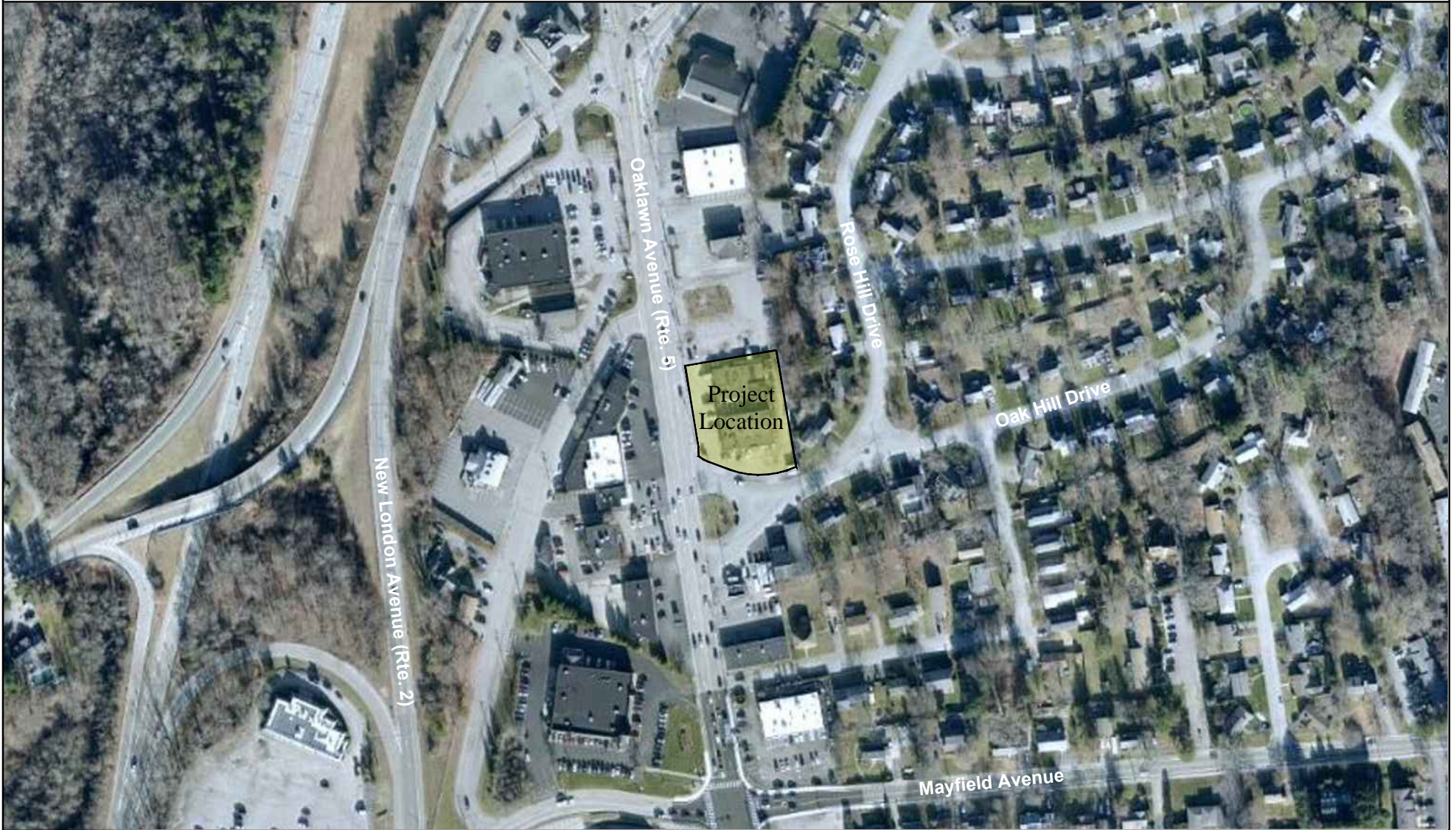
Land use in the immediate area can be defined as predominately commercial in nature along the Oaklawn Avenue corridor consisting of small retail plazas with buildings containing multiple tenants such as salons, medical services, restaurants and professional offices, and single use lots containing small commercial businesses such as the *CVS Pharmacy* and *Washington Trust* bank. Medium density residential neighborhoods are situated off of intersecting side streets. Immediately abutting the property to the north, south and west are commercial properties. To the east are residential properties within the small *Oak Hill Terrace* neighborhood with access to both Oaklawn Avenue and New London Avenue. In addition, further south are larger commercial developments including Marshall's Plaza and the Warwick Mall.

Based upon the good operating characteristics of Oaklawn Avenue in the immediate area and the small scale of the redevelopment proposal, a study impact area was defined for this project. The limits of our analysis focused on Oaklawn Avenue between Mayfield Avenue and New London Avenue, and specifically at the intersection of Oaklawn Avenue with Oak Hill Drive adjacent to the site, and at the proposed site driveway. Figure 2 on the following page depicts the subject property and the general project area of the study.



# Brewed Awakenings

CRANSTON, RHODE ISLAND



## Existing Conditions

### ROADWAYS

#### Oaklawn Avenue (Route 5)

Route 5 is a primary north/south urban principal arterial through several communities, paralleling Interstate 295 from Warwick to Smithfield. It varies in name, but for much of its length in the City of Cranston, it is known as Oaklawn Avenue. It provides immediate local access to abutting properties but also links to higher order facilities including Route 37 to the north via New London Avenue and I-295 to the south via Bald Hill Road.

In the project area, Route 5 is approximately 48 feet wide consisting of two 11-foot travel lanes and 2-foot shoulder in each direction as depicted on the photograph looking north along Route 5 with the subject property on the right. The pavement condition can be classified as being fair to poor with block cracking, rutting, and patching.

There is a mixture of both granite and cement concrete curbing along this section of road, where some areas of the concrete curbing are in poor condition. There is also a mixture of concrete and bituminous sidewalks along both sides of the road, though in some areas adjacent to small commercial plazas, they are not delineated



from the parking areas. As seen in the photograph along both sides of Oaklawn Avenue, including the subject property, the bituminous parking lots extend from the building frontages to the roadway, resulting in no defined sidewalk/walking path along the road. Cobra-head light fixtures on utility poles are provided sporadically on the easterly side of Route 5 for nighttime illumination of the roadway. The speed limit is posted at 35 mph in the site vicinity.

It should be noted that Route 5 south of the immediate project area from Mayfield Avenue to Interstate 95 to the south was recently reconstructed with new curbing, sidewalks, pavement surface, traffic signals and signing and pavement markings. This southern section of road extending into Warwick is in very good condition, and the project area north of Mayfield Avenue is scheduled for a reconstruction upgrade in 2030.

#### Oak Hill Drive

Oak Hill Drive is a local residential street running in an east/west orientation extending approximately 1,200 feet from Route 5 into the *Oak Hill Terrace* neighborhood. It provides access to medium density single family residential properties along with other neighborhood streets including Rose Hill Drive, Hilltop Drive and Ledgewood Drive.

In the immediate project area, Oak Hill Drive is approximately 30 feet wide consisting of an undelineated 15-foot travel lane in each direction that widens as it approaches the Oaklawn Avenue intersection. The pavement can be classified as being in fair condition with visible minor block cracking. The street is posted at 25 mph. There are no sidewalks along the road or within the neighborhood, though intermittent curbing is available along the streets. Cobra-head light fixtures are provided on utility poles along the southerly side of Oak Hill Drive for nighttime illumination of the roadway.

## INTERSECTIONS

### Oaklawn Avenue (Route 5) at Oak Hill Drive

Route 5 intersects Oak Hill Drive to form an unsignalized, three-way junction with stop control on the minor side street approach including a *Stop* line, but no formal *Stop* sign is provided to alter motorist of the intersecting roadway. Oaklawn Avenue along this segment immediately south of New London Avenue as noted, has four lanes of travel, narrow shoulders, curbing and sidewalks.

The side street approach to Oaklawn Avenue is a divided roadway that has a large landscaped island containing Historical Cemetery No. 34, that is maintained and properly signed with markers and plaques. Parking is permitted along the perimeter of the island, allowing employees of adjacent business to park in the street. On either side of the island there are wide, variable width (35-40 feet) one-way lanes entering the neighborhood on the south side, and exiting on the north side of the median. This width could result in driver confusion as each direction of travel is sufficient for two-way travel. There is limited to no pavement markings or signing to properly direct motorist where to enter and exit the side street around the island.



The width of the side street exiting approach to Oaklawn Avenue provides for separate right and left turn lane operations, though the approach is undelineated except for the *Stop* line noted above. With the limited control measures reinforcing movements through the intersection, it is recommended that enhancements to both signing and striping be considered by the city to properly direct motorist who are not familiar with the junction.

## TRAFFIC FLOW DATA

Existing traffic flow characteristics for this area were developed from a traffic counting program completed by Crossman, and a review of record information available from the Rhode Island Department of Transportation and previous traffic studies completed in the area. Specifically, for this project, a manual turning movement count was conducted at the intersection of Oaklawn Avenue with Oak Hill Drive in March 2024. Data was collected during the peak weekday morning period between 7:00 and 10:00 AM and during the mid-day period between 11:00 AM and 2:00 PM representing peak site use conditions, in combination with the adjacent roadway peaks. A review of RIDOT Seasonal

Adjustment factors for Urban Principal Arterials determined that the data obtained on a weekday in March represents slightly higher than average traffic conditions along the roadway. Based on this, count data was not adjusted lower to represent average conditions for our study, therefore a conservative analysis of traffic operations was completed.

The results of the ATR data collection effort determined that traffic volumes on Oaklawn Avenue north of Oak Hill Drive on a typical weekday, begin to increase at 6:00 AM and throughout the morning, with no defined morning commuter peak hour. Traffic volumes consistently increases hourly over the course of the day until the late afternoon peak, typical of most suburban commercial retail corridors. Volumes increased from approximately 850 vehicles per hour between 7:00 and 8:00 AM, to approximately 1,160 vehicles per hour between 11:00 AM and Noon. Volumes then continue to increase until the late afternoon period where approximately 1,500 vehicles per hour are serviced between 4:00 and 5:00 PM, resulting from a combination of retail activity along the corridor, and the afternoon commuter peak traffic. These hourly volumes translate into a daily volume of approximately 17,000 vehicles per day serviced along this section of Oaklawn Avenue.

This data is consistent with the record data where approximately 18,600 vehicles per day are serviced along the section of Route 5 south of Mayfield Avenue in the vicinity of the Warwick Mall. For reference, daily traffic volumes along the Route 5 corridor have remained relatively consistent since the 1990's, fluctuating slightly as shopping patterns change, and businesses have changed or been closed over this period.

In addition to the ATR information, manual turning movement counts were obtained at the main study intersection of Route 5 with Oak Hill Drive as noted. The turning movement count data found that during the busiest periods of the new site use (morning and mid-day), approximately 1,000 vehicles are serviced along the Oaklawn Avenue frontage during the 8:00 to 9:00 AM period with approximately 450 vehicles northbound and 550 vehicles southbound. During the mid-day peak between 12:00 and 1:00 PM approximately 1,295 vehicles are serviced with approximately 675 vehicles northbound and 620 vehicles southbound. Figure 3 on the following page depicts the hourly turning movement volumes for the study periods at the Oak Hill Drive intersection. Complete count information can be found in the Attachments.

## Safety Analysis

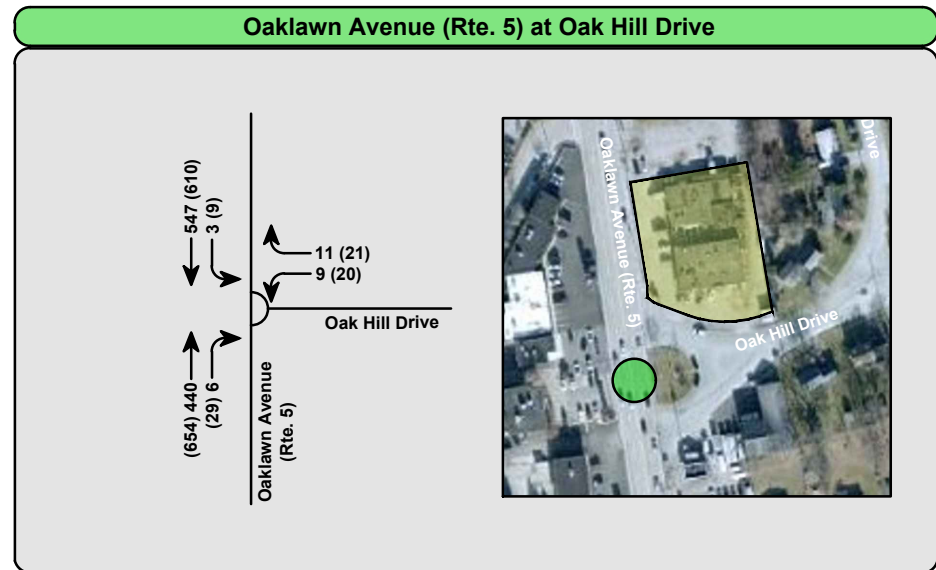
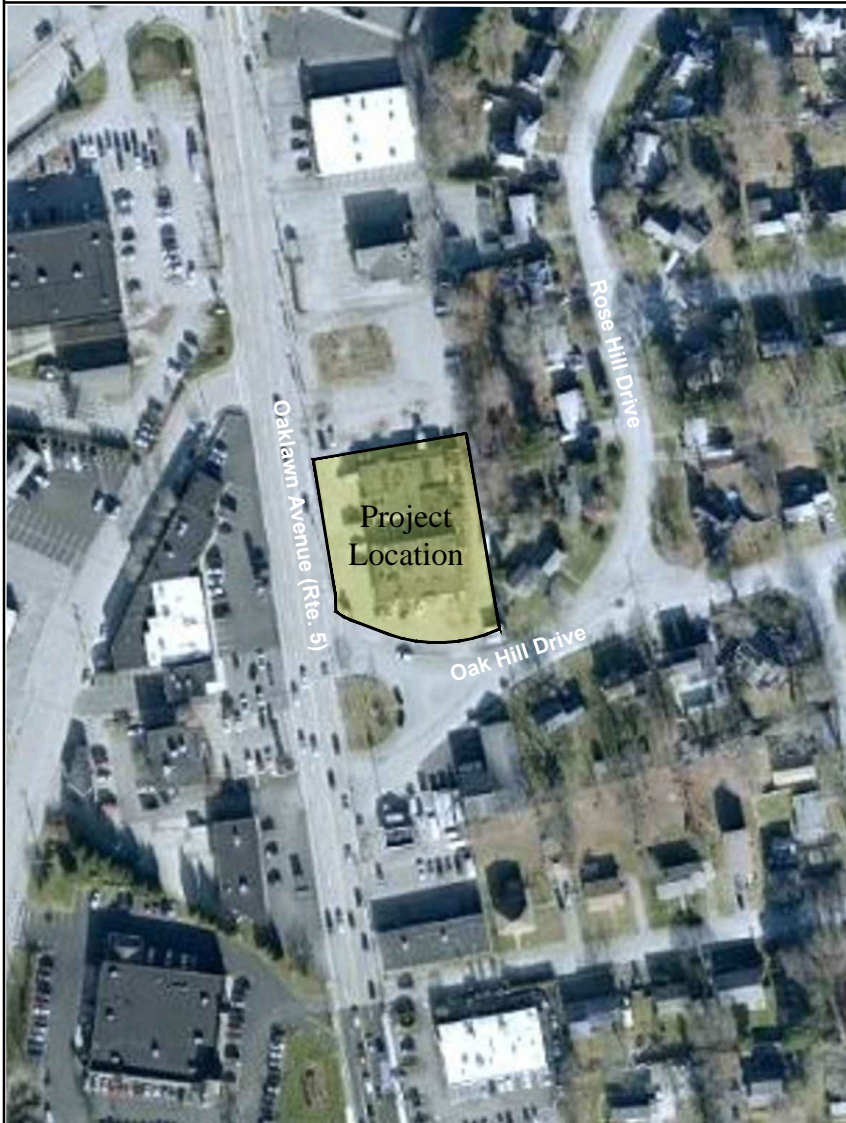
The physical characteristics of Route 5 in the project area were investigated to determine if there are any limiting factors affecting safety. These limiting factors would potentially include horizontal or vertical alignment changes or roadside obstructions that limit sight distances for vehicles traveling along the road or entering the road from a side street or driveway location. In this instance, the sight distance standard is necessary to permit turning vehicles to safely enter and exit the proposed site access driveway.

The horizontal and vertical alignment of Route 5 in the project area can be described as generally straight and level with a minor crest curve in the vicinity of Woodrow Avenue. These physical features provide sight distances in excess of 750 feet to the north and south of the proposed site access drive intersection. These values are greater than AASHTO's recommended minimum sight distance of 250 feet for the posted speed of 35 mph and 425 feet based on observed travel speeds of vehicles between 35 and 45 mph during free flow conditions. Travel speeds are relatively low and highly variable along



# Brewed Awakenings

CRANSTON, RHODE ISLAND



| LEGEND: |                                 |
|---------|---------------------------------|
|         | TURN LANE                       |
| XXX     | AM PEAK VOLUMES (8:15 TO 9:15)  |
| (XXX)   | PM PEAK VOLUMES (12:00 TO 1:00) |
|         | STUDY INTERSECTION              |



this section of Oaklawn Avenue due to the stopping and starting conditions associated with the signal-controlled intersections to the immediate north and south of the Oak Hill Drive.

As a result of the preliminary evaluation of the existing roadway geometry and physical features, it does not appear that any significant physical roadway safety deficiencies exist within the defined study area other than the lack of intersection control signing and pavement markings previously noted. Also, as part of our analysis, a review of crash statistics was completed. Data was reviewed from the City of Cranston Police Department for the latest full three-year period (2019 and 2022-2023) not influenced by restrictions implemented during the pandemic to determine if any location in the immediate vicinity of the development experienced a high frequency or pattern of crashes. The 2020 and 2021 data were not requested due to the atypical travel conditions during both years.

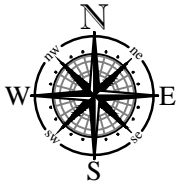
Based upon review of the research information, a total of 25 crashes (avg. 8 per year) were on record with the Cranston Police Department, along the section of Oaklawn Avenue between Woodrow Avenue and New London Avenue. Summarizing the data, twelve were rear-end crashes associated with vehicles stopped and turning into commercial driveways or slowing to the New London Avenue signal, nine involved left turning traffic into or out of commercial driveways, two were sideswipe associated with lane changes and two were single vehicle off-road crashes. Seventy two percent were limited to vehicle property damage only crashes and those with injuries were typically minor in nature. No accidents were recorded at the study intersection of Route 5 with Oak Hill Drive during the study period. Based upon the historical accident data obtained from the local police, and a review of existing roadway geometry and operations, immediate roadway or traffic related safety improvements are currently not warranted to improve traffic operations or safety within the project area.

## Trip Generation

To determine the traffic impact of a proposed development, estimates of anticipated traffic to be generated by that particular land use must be calculated. As previously discussed, the site redevelopment proposal consists of razing the existing building on the property to allow construction of a new 4,000 square-foot *Brewed Awakenings Coffee House* with a drive-thru window. A single access/egress driveway to the site is proposed on Oaklawn Avenue. There are presently two driveways providing access to the property, the northern one will be closed and the southern expansive width driveway opening, will be modified and reduced to meet current state standards. A secondary exit only driveway is proposed on Oak Hill Drive, limiting exiting traffic from the site, to right turns only. The site plan, prepared by *DiPrete Engineering Associates, Inc.*, depicting the site layout and access can be found on Figure 4 on the following page.

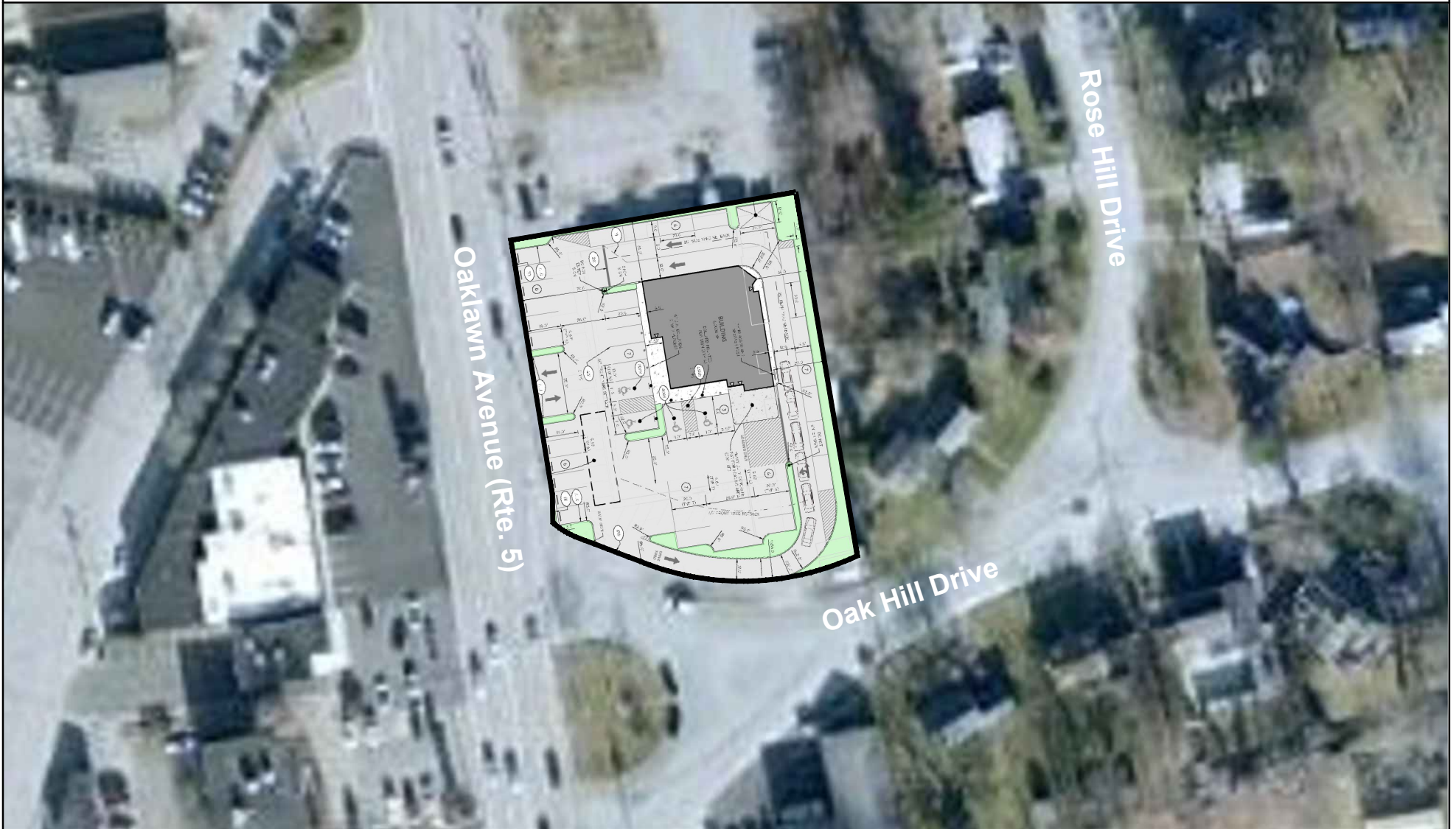
For the redevelopment project, estimated traffic volumes for the new use were based on independent data collected by our office for the business, and the use of trip generation factors. These factors are taken from the "Trip Generation Manual", an informational report published by the Institute of Transportation Engineers (ITE), a national professional organization for traffic and transportation engineers. The data provided in the ITE report are based on extensive traffic studies for various types of land uses (residential, commercial, industrial, etc.). This data has been found to be very reliable and provides a sound basis for estimating vehicle trips for new development projects.

For the proposed *Brewed Awakenings*, Land Use Code 937 *Coffee/Donut Shop with Drive-Through Window* was reviewed for applicability as it would be the most closely related land use available from the manual. In addition to this method, traffic and operational data was obtained from the owner at



# Brewed Awakenings

CRANSTON, RHODE ISLAND



existing *Brewed Awakenings* locations in Rhode Island, to provide a comparison of the estimated site generated traffic volumes for this type of business. The ITE manual suggests that if a similar or more appropriate land use is available in the region of study, data could be obtained to confirm ITE rates, or to use the independent study rates if they are more applicable.

The data was obtained at *Brewed Awakenings* locations in Cranston and Johnston, Rhode Island. Data was collected during the morning and mid-day peaks when the proposed site use would generate its greatest hourly volumes over the course of a typical day. Comparison of the actual trip rates at the *Brewed Awakenings* business in Cranston, with the trip estimate using ITE rates for the coffee shop business, determined that the *Brewed Awakenings* would be expected to generate approximately 40 percent less peak hour trips than what would be projected for this land use when utilizing ITE average rates during the morning peak. This can be attributed to the use of higher volume national/regional chain coffee/donut shops in the ITE reference data, versus a small local Rhode Island coffee shop, which caters more to low turnover, sit down style coffee house clientele. Typically, 30 to 40 customers are serviced during the morning and mid-day peak conditions of the business at the Cranston and Johnston sites, which have been operating for over a decade. To be conservative in our analysis, the higher ITE values were utilized for our study. A summary of the peak hour trip volumes estimated utilizing the empirical and ITE data for comparison are shown in Table 1 below.

It should be noted that a trip is defined as a one-way vehicle movement, therefore driving to and from the site, for example is equivalent to two trips. In developing the intersection volumes to be analyzed under build conditions, a directional distribution of the site traffic was estimated. The distribution was based on the traffic data collected for the project defining the current traffic patterns along the servicing roadway, where it is estimated that 55 and 48 percent of site related traffic will be destined to and from the north during the morning and mid-day periods respectively.

TABLE 1: Trip Generation Estimate

|                     | Description                       | Enter | Exit | Total |
|---------------------|-----------------------------------|-------|------|-------|
| <u>AM Peak Hour</u> |                                   |       |      |       |
| ITE Code 937        | Coffee/Donut Shop with Drive Thru | 75    | 73   | 148   |
| Independent Study   | Brewed Awakenings                 | 45    | 43   | 88    |
| <u>MD Peak Hour</u> |                                   |       |      |       |
| ITE Code 937        | Coffee/Donut Shop with Drive Thru | 39    | 38   | 77    |
| Independent Study   | Brewed Awakenings                 | 31    | 30   | 61    |

## Traffic Operational Analysis

The key to any traffic impact analysis is the evaluation of roadway operations during peak traffic periods on the servicing roadway system. This situation would occur when the site-generated traffic, combined with the traffic volumes on the main roadways result in the highest one-hour volume serviced along a roadway segment, or through an intersection. Review of the traffic data and proposed land use found that the weekday morning and mid-day peak hours would represent this worst-case combination of site-generated traffic with the servicing roadway peak traffic period.

The results of this procedure are expressed in terms of Level of Service (LOS). Level of Service is a qualitative measure of traffic flow efficiency based on anticipated vehicle delays. For example, LOS "A" represents the best condition with little or no delay, while LOS "F" indicates that the roadway/intersection is at full capacity resulting in extended vehicle delays and potential queuing.

Table 2 outlines the Level of Service delay criteria presented in the Highway Capacity Manual for unsignalized and signalized intersections.

TABLE 2: Highway Capacity Manual Criteria

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

In order to properly assess the impacts of a development, future traffic conditions of area roadways should be estimated for the period when the development is constructed and fully occupied. Typically, the expansion of base traffic is calculated when a project is to be constructed over an extended period (+3 to 5 years). In all instances, area growth that may affect capacity results should be considered. It is anticipated that the new business will be constructed and fully operational within a 12-month period but for this project, to be conservative a future three-year design period was estimated for analysis purposes.

Base traffic growth along Oaklawn Avenue was estimated at 1.0 percent per year that would reflect a conservative growth value based upon level daily traffic conditions experienced over the last few decades as previously noted, and average growth rates from RIDOT. In addition to base growth, new site-specific developments were considered in our analysis and included a car wash that is under

construction immediately south of Mayfield Avenue, and a municipal credit union proposed on the adjacent vacant property to the north.

It should also be noted that the existing developed site has been generating traffic with the two successful businesses including the bakery and restaurant that have been operating on the property for decades. The morning traffic would be different from existing conditions due to the addition of the coffee house use, but would occur during lower traffic periods serviced along Oaklawn Avenue as previously noted. The *Athenian Deli & Restaurant* is a busy lunch and dinner business currently contributing traffic from the site to the adjacent servicing roadways. Therefore, the new coffee house business will not be generating *new* traffic from an undeveloped lot, but will be replacing similar mid-day lunch period traffic that presently occurs at the site driveways for the fully developed property. Figure 5 on the following page depicts the future build traffic conditions at the study intersection estimated for this project.

Tables 3 and 4 summarize the results of the Existing and Future Build analyses, and the HCS reports are included in the Attachment for reference.

TABLE 3 - Existing Conditions Level of Service Summary

| Location / Movement                         | EXISTING 2024 CONDITIONS |       |  |      |              |       |  |      |
|---|--------------------------|-------|--|------|--------------|-------|--|------|
|   | AM Peak Hour             |       |  |      | MD Peak Hour |       |  |      |
|   | LOS                      | Delay | 95 <sup>th</sup> %<br>Queue<br>Length (veh.) | v/c  | LOS          | Delay | 95 <sup>th</sup> %<br>Queue<br>Length (veh.) | v/c  |
| <i>Oaklawn Avenue at Oak Hill Drive (U)</i> |                          |       |  |      |              |       |  |      |
| Oaklawn Avenue SB Left                      | A                        | 8.3   | 0  | 0.00 | A            | 9.1   | 0  | 0.01 |
| Oak Hill Drive WB Left                      | C                        | 15.7  | 1  | 0.03 | C            | 22.7  | 1  | 0.09 |
| Oak Hill Drive WB Right                     | A                        | 9.7   | 0  | 0.01 | B            | 10.8  | 1  | 0.03 |
| <i>Oaklawn Avenue at Site Driveway (U)</i>  |                          |       |  |      |              |       |  |      |
| Oaklawn Avenue SB Left                      | -                        | -     | -  | -    | -            | -     | -  | -    |
| Site Driveway WB Left/Right                 | -                        | -     | -  | -    | -            | -     | -  | -    |

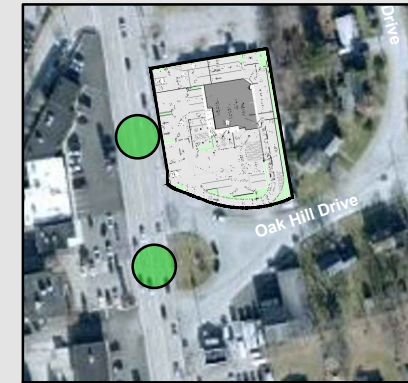
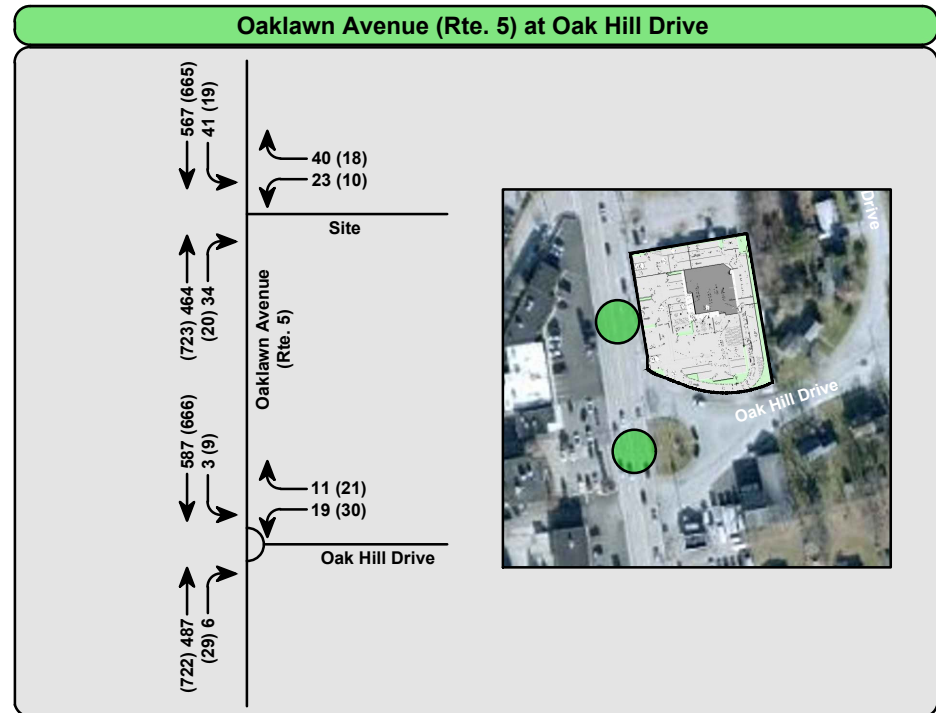
(U) – Unsignalized

Table 3 presents the *Existing* conditions analysis for the morning and mid-day peak hours reviewed in our study. For the study intersection, all critical movements on Oaklawn Avenue are anticipated to operate at LOS A or better during the daily peak periods with minor delays. This good operational condition is expected to continue under the *Future Build* period as can be seen in Table 4, with only minimal increases in vehicle delay time experienced for left turning traffic on Oaklawn Avenue. The existing minor approach of Oak Hill Drive experiences acceptable delays typical of all side streets and driveways along this section of Oaklawn Avenue. The minor approach presently services low hourly volumes during the daily peaks resulting in minor delays, no congestion and acceptable operations.



# Brewed Awakenings

CRANSTON, RHODE ISLAND



**LEGEND:**

- TURN LANE
- XXX AM PEAK VOLUMES (8:15 TO 9:15)
- (XXX) PM PEAK VOLUMES (12:00 TO 1:00)
- STUDY INTERSECTION

Under Future Build conditions, the Oak Hill Drive approach is expected to operate as it does today as side street volumes will see a minor increase in volumes based upon the proposed site configuration and restricted side street access from the business. The traffic from the site will be minor and limited to right turns only, resulting in acceptable operations with minor delays as seen in Table 4.

One condition that has a positive impact on the available gaps in main street traffic that would reduce the minor approach delays noted from the analysis, are the adjacent signalized junctions at the Route 5 intersections with the New London Avenue to the north, and with Mayfield Avenue to the south. These adjacent traffic signals help create gaps in Oaklawn Avenue traffic during the change intervals that driveway and side street traffic along this section of Oaklawn Avenue can utilize to access the main road. The positive effect of the adjacent signals in reducing delays cannot be adequately modeled into the HCS analysis due to limitations in the software, resulting in conservative delay results shown in the table.

TABLE 4 – Future Build Level of Service Summary

| Location / Movement                         | FUTURE BUILD 2027 CONDITIONS |       |  |      |              |       |  |      |
|---|------------------------------|-------|--|------|--------------|-------|--|------|
|   | AM Peak Hour                 |       |  |      | MD Peak Hour |       |  |      |
|   | LOS                          | Delay | 95 <sup>th</sup> %<br>Queue<br>Length (veh.) | v/c  | LOS          | Delay | 95 <sup>th</sup> %<br>Queue<br>Length (veh.) | v/c  |
| <i>Oaklawn Avenue at Oak Hill Drive (U)</i> |                              |       |  |      |              |       |  |      |
| Oaklawn Avenue SB Left                      | A                            | 8.4   | 0  | 0.00 | A            | 9.3   | 0  | 0.01 |
| Oak Hill Drive WB Left                      | C                            | 17.4  | 1  | 0.06 | D            | 27.3  | 1  | 0.16 |
| Oak Hill Drive WB Right                     | A                            | 9.9   | 0  | 0.02 | B            | 11.1  | 1  | 0.04 |
| <i>Oaklawn Avenue at Site Driveway (U)</i>  |                              |       |  |      |              |       |  |      |
| Oaklawn Avenue SB Left                      | A                            | 8.6   | 1  | 0.04 | A            | 9.4   | 1  | 0.02 |
| Site Driveway WB Left/Right                 | B                            | 14.3  | 1  | 0.15 | C            | 16.8  | 1  | 0.09 |

(U) – Unsignalized

The unsignalized capacity analysis results are conservative and the expected delays would be consistent with what is experienced at most unsignalized driveway or side street intersections along the corridor. Any amount of minor approach side street or driveway traffic would yield the delay results found in our study due to the main street peak hour volumes and limitations of the unsignalized analysis. Of concern is whether the minor approach has the appropriate stacking distance to accommodate potential queuing based upon the volume, and that favorable intersection geometry (lane configuration and sight distances) exists in order for drivers to efficiently utilize available gaps in main street traffic. In this instance, both concerns are satisfied in addition to the previously mentioned signalization factor, which promotes additional gaps to yield better operations than the analysis results indicate. It is anticipated that the westbound approaches at both Oak Hill Drive and the proposed site driveway will operate with acceptable delays, with average queuing of one to two vehicles, resulting in no congestion and acceptable operations.

## Conclusions and Recommendations

In summary, the study has shown that the proposed site access and circulation plan has been designed to maintain a desirable level of safety and efficiency on the servicing roadway system. The safety of the proposed access drive intersection with Oaklawn Avenue was reviewed for geometry and sight distances. The intersection was determined to provide sufficient sight distances in accordance with AASHTO criteria for visibility and decision making of drivers attempting to enter/exit main street traffic from the proposed commercial driveway.

In addition to safety, the results of the operational analysis determined that the estimated volume of traffic during the peak periods resulting from the proposed commercial reuse of the property will have negligible effect on overall operations at the Oaklawn Avenue intersection with Oak Hill Drive, particularly during the daily morning and mid-day peak hours when the site services its greatest daily volumes. Under future traffic conditions along this section of Oaklawn Avenue considering a base traffic growth and site-specific traffic from recent development projects approved or are under construction in the immediate area, combined with the subject development, there should be no discernable operational impacts to Route 5 in the project area, and specifically at the junction with Oak Hill Drive.

In review of the proposed site driveway operations during the daily peak hours, acceptable minor delays should occur at the study intersection, similar to existing conditions currently experienced at the site driveways for the restaurant and at low volume commercial driveways along the corridor. Based upon the estimated minor volume of traffic exiting the redeveloped site (63 AM and 28 MD), typically only one to two vehicles would be queued on the minor driveway approach waiting to access Route 5, resulting in no congestion and adequate and safe access to the new business.

Therefore, based upon the analysis and study completed for this project, it can be concluded that the future traffic conditions resulting from the *Brewed Awakenings* redevelopment project, will provide for adequate and safe access to a public street, and will not have a detrimental effect on public safety and welfare in the study area. We trust this letter sufficiently addresses the requirements of the City of Cranston to obtain your local approvals. If you should have any questions or require any additional information, please do not hesitate to contact our office.

Very truly yours,  
Crossman Engineering, Inc.



Paul J. Bannon  
Senior Project Director



# ATTACHMENTS

- 
- A. Traffic Data
  - B. Traffic Crash Analysis
  - C. Trip Generation
  - D. Operational Analysis

# ATTACHMENT A – Traffic Data

---

## Automatic Traffic Recorder Count

Oaklawn Avenue (Route 5)

## Intersection Turning Movement Count

Oaklawn Avenue at Oak Hill Drive

A

---

Automatic Traffic Recorder Count

Oaklawn Avenue (Route 5)

Oaklawn Avenue (Route 5)

**Transportation Data Corporation**

Oaklawn Avenue (Route 5)  
 north of Oak Hill Drive  
 City, State: Cranston, RI  
 Client: Crossman/P. Bannon

Mario Perone, mperone1@verizon.net  
 tel (781)587-0086 cell (781)439-4999

05821Avolume  
 Site Code: 2842

| Start Time | 25-Mar-24<br>Mon | 26-Mar-24<br>Tue | 27-Mar-24<br>Wed | 28-Mar-24<br>Thu | 29-Mar-24<br>Fri | Weekday<br>Average | 30-Mar-24<br>Sat | 31-Mar-24<br>Sun |
|------------|------------------|------------------|------------------|------------------|------------------|--------------------|------------------|------------------|
| 12:00 AM   | *                | 56               | 36               | 56               | *                | 49                 | *                | *                |
| 01:00      | *                | 31               | 25               | 31               | *                | 29                 | *                | *                |
| 02:00      | *                | 29               | 20               | 24               | *                | 24                 | *                | *                |
| 03:00      | *                | 17               | 17               | 22               | *                | 19                 | *                | *                |
| 04:00      | *                | 47               | 55               | 45               | *                | 49                 | *                | *                |
| 05:00      | *                | 106              | 110              | 112              | *                | 109                | *                | *                |
| 06:00      | *                | 261              | 344              | 355              | *                | 320                | *                | *                |
| 07:00      | *                | 799              | 905              | 813              | *                | 839                | *                | *                |
| 08:00      | *                | 957              | 981              | 1028             | *                | 989                | *                | *                |
| 09:00      | *                | 917              | 940              | 944              | *                | 934                | *                | *                |
| 10:00      | *                | 1006             | 966              | 1035             | *                | 1002               | *                | *                |
| 11:00      | *                | <b>1138</b>      | <b>1183</b>      | <b>1155</b>      | *                | 1159               | *                | *                |
| 12:00 PM   | *                | 1234             | 1334             | 1256             | *                | 1275               | *                | *                |
| 01:00      | *                | 1203             | 1277             | 1215             | *                | 1232               | *                | *                |
| 02:00      | *                | 1302             | 1356             | 1337             | *                | 1332               | *                | *                |
| 03:00      | *                | 1322             | 1364             | 1398             | *                | 1361               | *                | *                |
| 04:00      | *                | <b>1534</b>      | <b>1505</b>      | <b>1455</b>      | *                | 1498               | *                | *                |
| 05:00      | *                | 1322             | 1370             | 1325             | *                | 1339               | *                | *                |
| 06:00      | *                | 954              | 1036             | 947              | *                | 979                | *                | *                |
| 07:00      | *                | 641              | 767              | 673              | *                | 694                | *                | *                |
| 08:00      | *                | 470              | 537              | 604              | *                | 537                | *                | *                |
| 09:00      | *                | 266              | 338              | 389              | *                | 331                | *                | *                |
| 10:00      | *                | 179              | 133              | 196              | *                | 169                | *                | *                |
| 11:00      | *                | 107              | 103              | 107              | *                | 106                | *                | *                |
| Total      | 0                | 15898            | 16702            | 16522            | 0                |                    | 0                | 0                |
| Percentage | 0.0%             | 97.1%            | 102.0%           | 100.9%           | 0.0%             |                    | 0.0%             | 0.0%             |
| AM Peak    | -                | 11:00            | 11:00            | 11:00            | -                | -                  | -                | -                |
| Vol.       | -                | 1138             | 1183             | 1155             | -                | -                  | -                | -                |
| PM Peak    | -                | 16:00            | 16:00            | 16:00            | -                | -                  | -                | -                |
| Vol.       | -                | 1534             | 1505             | 1455             | -                | -                  | -                | -                |
| Total      |                  | 15898            | 16702            |                  |                  |                    |                  |                  |

**Transportation Data Corporation**  
 Mario Perone, mperone1@verizon.net  
 tel (781)587-0086 cell (781)439-4999

Oaklawn Avenue (Route 5)  
 north of Oak Hill Drive  
 City, State: Cranston, RI  
 Client: Crossman/P. Bannon

05821Avolume  
 Site Code: 2842

| Start Time | 25-Mar-24 |    | Tue   |       | Wed   |       | Thu   |       | Fri |    | Weekday Average |       | Sat |    | Sun |    |
|------------|-----------|----|-------|-------|-------|-------|-------|-------|-----|----|-----------------|-------|-----|----|-----|----|
|            | NB        | SB | NB    | SB    | NB    | SB    | NB    | SB    | NB  | SB | NB              | SB    | NB  | SB | NB  | SB |
| 12:00 AM   | *         | *  | 30    | 26    | 24    | 12    | 35    | 21    | *   | *  | 30              | 20    | *   | *  | *   | *  |
| 01:00      | *         | *  | 19    | 12    | 11    | 14    | 14    | 17    | *   | *  | 15              | 14    | *   | *  | *   | *  |
| 02:00      | *         | *  | 10    | 19    | 8     | 12    | 15    | 9     | *   | *  | 11              | 13    | *   | *  | *   | *  |
| 03:00      | *         | *  | 7     | 10    | 5     | 12    | 8     | 14    | *   | *  | 7               | 12    | *   | *  | *   | *  |
| 04:00      | *         | *  | 17    | 30    | 19    | 36    | 15    | 30    | *   | *  | 17              | 32    | *   | *  | *   | *  |
| 05:00      | *         | *  | 52    | 54    | 52    | 58    | 58    | 54    | *   | *  | 54              | 55    | *   | *  | *   | *  |
| 06:00      | *         | *  | 137   | 124   | 162   | 182   | 171   | 184   | *   | *  | 157             | 163   | *   | *  | *   | *  |
| 07:00      | *         | *  | 415   | 384   | 459   | 446   | 398   | 415   | *   | *  | 424             | 415   | *   | *  | *   | *  |
| 08:00      | *         | *  | 446   | 511   | 449   | 532   | 454   | 574   | *   | *  | 450             | 539   | *   | *  | *   | *  |
| 09:00      | *         | *  | 464   | 453   | 464   | 476   | 429   | 515   | *   | *  | 452             | 481   | *   | *  | *   | *  |
| 10:00      | *         | *  | 505   | 501   | 532   | 434   | 504   | 531   | *   | *  | 514             | 489   | *   | *  | *   | *  |
| 11:00      | *         | *  | 596   | 542   | 702   | 481   | 583   | 572   | *   | *  | 627             | 532   | *   | *  | *   | *  |
| 12:00 PM   | *         | *  | 686   | 548   | 717   | 617   | 611   | 645   | *   | *  | 671             | 603   | *   | *  | *   | *  |
| 01:00      | *         | *  | 657   | 546   | 707   | 570   | 610   | 605   | *   | *  | 658             | 574   | *   | *  | *   | *  |
| 02:00      | *         | *  | 719   | 583   | 745   | 611   | 618   | 719   | *   | *  | 694             | 638   | *   | *  | *   | *  |
| 03:00      | *         | *  | 752   | 570   | 825   | 539   | 777   | 621   | *   | *  | 785             | 577   | *   | *  | *   | *  |
| 04:00      | *         | *  | 874   | 660   | 893   | 612   | 808   | 647   | *   | *  | 858             | 640   | *   | *  | *   | *  |
| 05:00      | *         | *  | 772   | 550   | 823   | 547   | 739   | 586   | *   | *  | 778             | 561   | *   | *  | *   | *  |
| 06:00      | *         | *  | 541   | 413   | 614   | 422   | 456   | 491   | *   | *  | 537             | 442   | *   | *  | *   | *  |
| 07:00      | *         | *  | 387   | 254   | 447   | 320   | 361   | 312   | *   | *  | 398             | 295   | *   | *  | *   | *  |
| 08:00      | *         | *  | 281   | 189   | 315   | 222   | 298   | 306   | *   | *  | 298             | 239   | *   | *  | *   | *  |
| 09:00      | *         | *  | 150   | 116   | 191   | 147   | 192   | 197   | *   | *  | 178             | 153   | *   | *  | *   | *  |
| 10:00      | *         | *  | 92    | 87    | 75    | 58    | 111   | 85    | *   | *  | 93              | 77    | *   | *  | *   | *  |
| 11:00      | *         | *  | 63    | 44    | 63    | 40    | 53    | 54    | *   | *  | 60              | 46    | *   | *  | *   | *  |
| Total      | 0         | 0  | 8672  | 7226  | 9302  | 7400  | 8318  | 8204  | 0   | 0  | 8766            | 7610  | 0   | 0  | 0   | 0  |
| Day        | 0         |    | 15898 |       | 16702 |       | 16522 |       | 0   |    | 16376           |       | 0   |    | 0   |    |
| AM Peak    | -         | -  | 11:00 | 11:00 | 11:00 | 08:00 | 11:00 | 08:00 | -   | -  | 11:00           | 08:00 | -   | -  | -   | -  |
| Vol.       | -         | -  | 596   | 542   | 702   | 532   | 583   | 574   | -   | -  | 627             | 539   | -   | -  | -   | -  |
| PM Peak    | -         | -  | 16:00 | 16:00 | 16:00 | 12:00 | 16:00 | 14:00 | -   | -  | 16:00           | 16:00 | -   | -  | -   | -  |
| Vol.       | -         | -  | 874   | 660   | 893   | 617   | 808   | 719   | -   | -  | 858             | 640   | -   | -  | -   | -  |

|             |            |             |       |       |   |       |   |   |
|-------------|------------|-------------|-------|-------|---|-------|---|---|
| Comb. Total | 0          | 15898       | 16702 | 16522 | 0 | 16376 | 0 | 0 |
| ADT         | ADT 16,374 | AADT 16,374 |       |       |   |       |   |   |

# A

---

## Intersection Turning Movement Counts

Oaklawn Ave at Oak Hill Drive

Oaklawn Ave at Oak Hill Drive







# Transportation Data Corporation

Mario Perone, mperone1@verizon.net

tel (781)587-0086 cell (781)439-4999

N/S: Oaklawn Avenue (Route 5)

E: Oak Hill Drive

City, State: Cranston, RI

Client: Crossman/P. Bannon

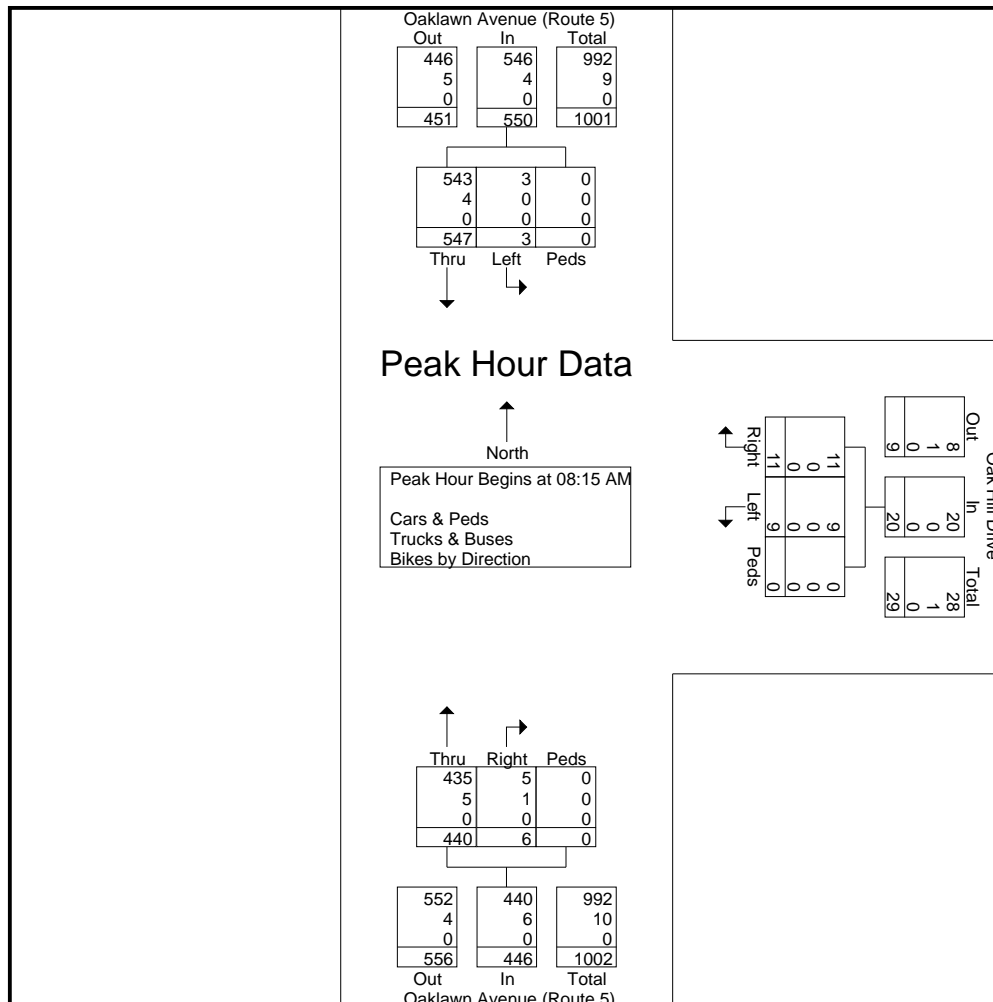
File Name : 05821A

Site Code : 2842

Start Date : 3/26/2024

Page No : 1

| Start Time   | Oaklawn Avenue (Route 5)<br>From North |      |      |            | Oak Hill Drive<br>From East |      |      |            | Oaklawn Avenue (Route 5)<br>From South |      |      |            | Int. Total |
|--|--|------|------|------------|-----------------------------|------|------|------------|--|------|------|------------|------------|
|  | Thru                                   | Left | Peds | App. Total | Right                       | Left | Peds | App. Total | Right                                  | Thru | Peds | App. Total |            |
| Peak Hour Analysis From 07:00 AM to 10:15 AM - Peak 1 of 1 |  |      |      |            |                             |      |      |            |  |      |      |            |            |
| Peak Hour for Entire Intersection Begins at 08:15 AM       |  |      |      |            |                             |      |      |            |  |      |      |            |            |
| 08:15 AM   | 126                                    | 1    | 0    | 127        | 5                           | 1    | 0    | 6          | 2                                      | 109  | 0    | 111        | 244        |
| 08:30 AM   | 144                                    | 0    | 0    | 144        | 4                           | 3    | 0    | 7          | 3                                      | 99   | 0    | 102        | 253        |
| 08:45 AM   | 146                                    | 1    | 0    | 147        | 1                           | 2    | 0    | 3          | 1                                      | 115  | 0    | 116        | 266        |
| 09:00 AM   | 131                                    | 1    | 0    | 132        | 1                           | 3    | 0    | 4          | 0                                      | 117  | 0    | 117        | 253        |
| Total Volume   | 547                                    | 3    | 0    | 550        | 11                          | 9    | 0    | 20         | 6                                      | 440  | 0    | 446        | 1016       |
| % App. Total   | 99.5                                   | 0.5  | 0    |            | 55                          | 45   | 0    |            | 1.3                                    | 98.7 | 0    |            |            |
| PHF  | .937                                   | .750 | .000 | .935       | .550                        | .750 | .000 | .714       | .500                                   | .940 | .000 | .953       | .955       |
| Cars & Peds  | 543                                    | 3    | 0    | 546        | 11                          | 9    | 0    | 20         | 5                                      | 435  | 0    | 440        | 1006       |
| % Cars & Peds  | 99.3                                   | 100  | 0    | 99.3       | 100                         | 100  | 0    | 100        | 83.3                                   | 98.9 | 0    | 98.7       | 99.0       |
| Trucks & Buses   | 4                                      | 0    | 0    | 4          | 0                           | 0    | 0    | 0          | 1                                      | 5    | 0    | 6          | 10         |
| % Trucks & Buses   | 0.7                                    | 0    | 0    | 0.7        | 0                           | 0    | 0    | 0          | 16.7                                   | 1.1  | 0    | 1.3        | 1.0        |
| Bikes by Direction   | 0                                      | 0    | 0    | 0          | 0                           | 0    | 0    | 0          | 0                                      | 0    | 0    | 0          | 0          |
| % Bikes by Direction                                       | 0                                      | 0    | 0    | 0          | 0                           | 0    | 0    | 0          | 0                                      | 0    | 0    | 0          | 0          |



# Transportation Data Corporation

Mario Perone, mperone1@verizon.net

tel (781)587-0086 cell (781)439-4999

N/S: Oaklawn Avenue (Route 5)

E: Oak Hill Drive

City, State: Cranston, RI

Client: Crossman/P. Bannon

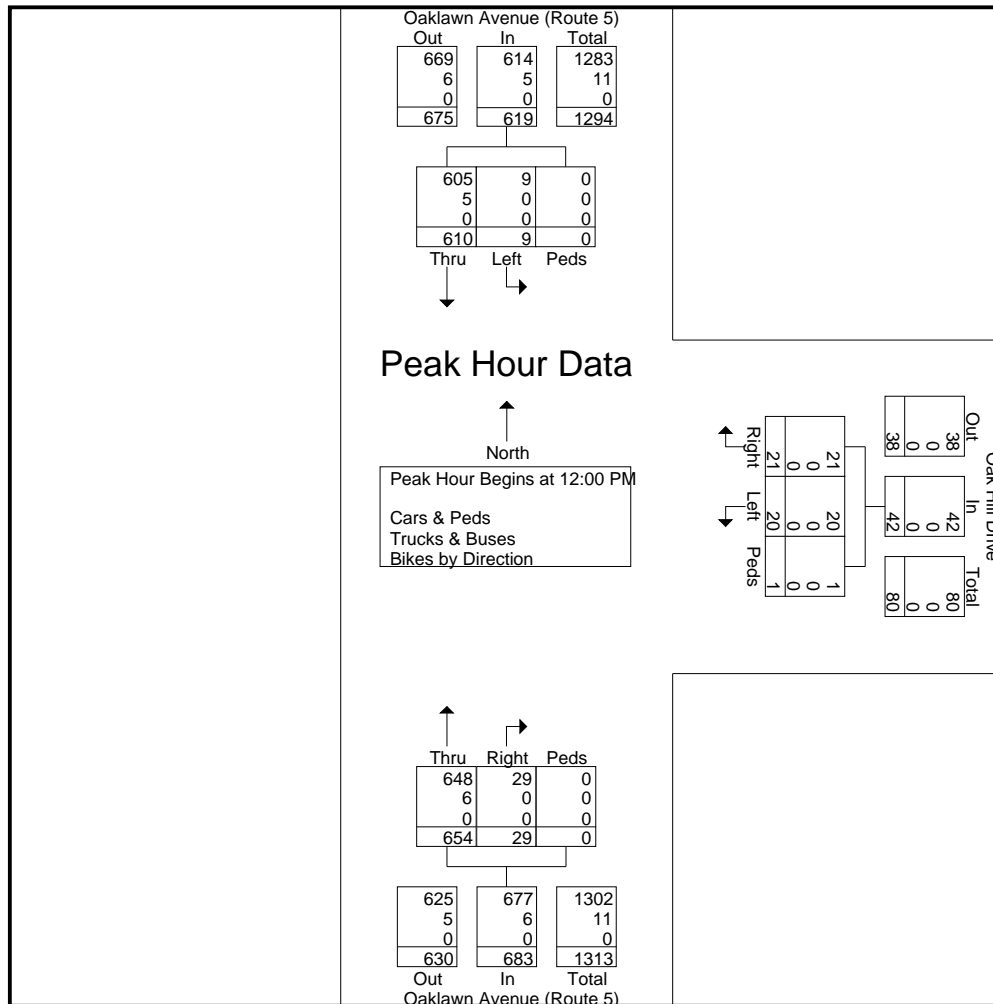
File Name : 05821A

Site Code : 2842

Start Date : 3/26/2024

Page No : 2

| Start Time   | Oaklawn Avenue (Route 5)<br>From North |      |      |            | Oak Hill Drive<br>From East |      |      |            | Oaklawn Avenue (Route 5)<br>From South |      |      |            | Int. Total |
|--|--|------|------|------------|-----------------------------|------|------|------------|--|------|------|------------|------------|
|  | Thru                                   | Left | Peds | App. Total | Right                       | Left | Peds | App. Total | Right                                  | Thru | Peds | App. Total |            |
| Peak Hour Analysis From 10:30 AM to 01:45 PM - Peak 1 of 1 |  |      |      |            |                             |      |      |            |  |      |      |            |            |
| Peak Hour for Entire Intersection Begins at 12:00 PM       |  |      |      |            |                             |      |      |            |  |      |      |            |            |
| 12:00 PM   | 142                                    | 1    | 0    | 143        | 7                           | 7    | 0    | 14         | 12                                     | 173  | 0    | 185        | 342        |
| 12:15 PM   | 159                                    | 3    | 0    | 162        | 1                           | 7    | 0    | 8          | 4                                      | 167  | 0    | 171        | 341        |
| 12:30 PM   | 151                                    | 3    | 0    | 154        | 6                           | 3    | 0    | 9          | 6                                      | 162  | 0    | 168        | 331        |
| 12:45 PM   | 158                                    | 2    | 0    | 160        | 7                           | 3    | 1    | 11         | 7                                      | 152  | 0    | 159        | 330        |
| Total Volume   | 610                                    | 9    | 0    | 619        | 21                          | 20   | 1    | 42         | 29                                     | 654  | 0    | 683        | 1344       |
| % App. Total   | 98.5                                   | 1.5  | 0    |            | 50                          | 47.6 | 2.4  |            | 4.2                                    | 95.8 | 0    |            |            |
| PHF  | .959                                   | .750 | .000 | .955       | .750                        | .714 | .250 | .750       | .604                                   | .945 | .000 | .923       | .982       |
| Cars & Peds  | 605                                    | 9    | 0    | 614        | 21                          | 20   | 1    | 42         | 29                                     | 648  | 0    | 677        | 1333       |
| % Cars & Peds  | 99.2                                   | 100  | 0    | 99.2       | 100                         | 100  | 100  | 100        | 100                                    | 99.1 | 0    | 99.1       | 99.2       |
| Trucks & Buses   | 5                                      | 0    | 0    | 5          | 0                           | 0    | 0    | 0          | 0                                      | 6    | 0    | 6          | 11         |
| % Trucks & Buses   | 0.8                                    | 0    | 0    | 0.8        | 0                           | 0    | 0    | 0          | 0                                      | 0.9  | 0    | 0.9        | 0.8        |
| Bikes by Direction   | 0                                      | 0    | 0    | 0          | 0                           | 0    | 0    | 0          | 0                                      | 0    | 0    | 0          | 0          |
| % Bikes by Direction                                       | 0                                      | 0    | 0    | 0          | 0                           | 0    | 0    | 0          | 0                                      | 0    | 0    | 0          | 0          |



## APPENDIX B – Traffic Crash Analysis

---

January 2019 through December 2019

January 2022 through December 2023

Oaklawn Avenue (Route 5)

### Crash Data Summary

2019 and 2022 - 2023 Record Crash Data

| Date                      | Major Street | Intersecting Street | Type     | Direction | Severity | Contributing Factor        |
|---------------------------|--------------|---------------------|----------|-----------|----------|----------------------------|
| <b>Accident Year 2019</b> |              |                     |          |           |          |                            |
| 2/14/2019                 | Oaklawn Ave  | Old Bald Hill Rd    | Angle    | NB/SB     | PP       | Failure to Yield           |
| 2/22/2019                 | Oaklawn Ave  | New London Ave      | Rear-End | NB/NB     | PP       | Driver Error               |
| 3/8/2019                  | Oaklawn Ave  | Driveway            | Rear-End | NB/NB     | PP       | Driver Error               |
| 3/20/2019                 | Oaklawn Ave  | Woodrow Ave         | Rear-End | WB/WB     | PP       | Driver Error               |
| 7/17/2019                 | Oaklawn Ave  | Driveway            | Off-Road | NB        | I        | DUI Striking UP            |
| 7/26/2019                 | Oaklawn Ave  | New London Ave      | Rear-End | NB/NB     | PP       | Driver Error - Abrupt Stop |
| 7/27/2019                 | Oaklawn Ave  | Driveway            | Rear-End | NB/NB     | PP       | Driver Error               |
| 8/10/2019                 | Oaklawn Ave  | New London Ave      | Rear-End | NB/NB     | PP       | Driver Error               |
| 11/27/2019                | Oaklawn Ave  | New London Ave      | Rear-End | NB/NB     | PP       | Distracted Driver          |
| 12/29/2019                | Oaklawn Ave  | New London Ave      | Rear-End | NB/NB     | I        | Driver Error               |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |
|                           |              |                     |          |           |          |                            |



| Date                      | Major Street | Intersecting Street | Type      | Direction | Severity | Contributing Factor         |
|---------------------------|--------------|---------------------|-----------|-----------|----------|-----------------------------|
| <b>Accident Year 2023</b> |              |                     |           |           |          |                             |
| 2/1/2023                  | Oaklawn Ave  | New London Ave      | Broadside | NB/SB     | I        | Left Turn Failure to Yield  |
| 4/11/2023                 | Oaklawn Ave  | New London Ave      | Rear-End  | NB/NB     | I        | Driver Error - Abrupt Stop  |
| 6/26/2023                 | Oaklawn Ave  | n/a                 | Sideswipe | SB/SB     | PP       | Lane Control - Driver Error |
| 7/24/2023                 | Oaklawn Ave  | Driveway            | Broadside | NB/WB     | I        | Left Turn Failure to Yield  |
| 8/11/2023                 | Oaklawn Ave  | Driveway            | Angle     | EB/WB     | PP       | Left Turn Failure to Yield  |
| 9/29/2023                 | Oaklawn Ave  | New London Ave      | Rear-End  | NB/NB     | PP       | Driver Error                |
| 10/31/2023                | Oaklawn Ave  | Driveway            | Broadside | EB/SB     | I        | Left Turn Failure to Yield  |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |
|                           |              |                     |           |           |          |                             |



## Crash Analysis Summary

All Intersections and Segments

|                          |                               | 2019      | 2022     | 2023     | Total     | Percent     |
|--------------------------|-------------------------------|-----------|----------|----------|-----------|-------------|
| <b>Collision Type</b>    |                               |           |          |          |           |             |
| Controlled Intersection  |                               | 7         | 1        | 3        | 11        |             |
| Non-Intersection         |                               | 3         | 7        | 4        | 14        |             |
|                          | Rear End                      | 8         | 2        | 2        | 12        | 48.0%       |
|                          | Angle                         | 1         | 3        | 1        | 5         | 20.0%       |
|                          | Head On                       |           |          |          | 0         | 0.0%        |
|                          | Single Vehicle Crash          | 1         | 1        |          | 2         | 8.0%        |
|                          | Sideswipe, Same Direction     |           | 1        | 1        | 2         | 8.0%        |
|                          | Sideswipe, Opposite Direction |           |          |          | 0         | 0.0%        |
|                          | Broadside                     |           | 1        | 3        | 4         | 16.0%       |
|                          | Unknown/Other                 |           |          |          | 0         | 0.0%        |
|                          | <b>Total</b>                  | <b>10</b> | <b>8</b> | <b>7</b> | <b>25</b> | <b>100%</b> |
| <b>Accident Severity</b> |                               |           |          |          |           |             |
|                          | Property Damage Only          | 8         | 7        | 3        | 18        | 72%         |
|                          | Injury                        | 2         | 1        | 4        | 7         | 28%         |
|                          | Fatal                         |           |          |          | 0         | 0%          |
|                          | Not Reported                  |           |          |          | 0         | 0%          |
| <b>Light Condition</b>   |                               |           |          |          |           |             |
|                          | Day                           | 9         | 7        | 7        | 23        | 92.0%       |
|                          | Night                         | 1         |          |          | 1         | 4.0%        |
|                          | Dusk/Dawn                     |           |          |          | 0         | 0.0%        |
|                          | Dark, Lighted Roadway         |           | 1        |          | 1         | 4.0%        |
|                          | Dark, Roadway Not Lighted     |           |          |          | 0         | 0.0%        |
|                          | Not Reported                  |           |          |          | 0         | 0.0%        |
| <b>Road Condition</b>    |                               |           |          |          |           |             |
|                          | Dry                           | 9         | 6        | 6        | 21        | 84%         |
|                          | Wet                           | 1         | 2        | 1        | 4         | 16%         |
|                          | Snow                          |           |          |          | 0         | 0%          |
|                          | Ice                           |           |          |          | 0         | 0%          |
|                          | Not Reported                  |           |          |          | 0         | 0%          |
| <b>Hour of Day</b>       |                               |           |          |          |           |             |
|                          | 6:00 AM -9:00 AM              | 1         | 2        |          | 3         | 12%         |
|                          | 9:00 AM -3:00 PM              | 4         | 1        | 4        | 9         | 36%         |
|                          | 3:00 PM -6:00 PM              | 4         | 5        | 3        | 12        | 48.0%       |
|                          | 6:00 PM -6:00 AM              | 1         |          |          | 1         | 4.0%        |
|                          | <b>Total Accidents:</b>       | <b>10</b> | <b>8</b> | <b>7</b> | <b>25</b> |             |

# APPENDIX C – Trip Generation

---

## ITE Trip Generation Summary

### ITE Land Use Code

ITE Land Use Code 937 – Coffee/Donut Shop with Drive-Through Window

### Independent Study

Brewed Awakenings - Cranston

# C

---

## ITE Trip Generation Summary

## Trip Generation Summary

### Brewed Awakenings

#### Summary;

| <u>Source</u>                              | <u>Description</u>                | <u>Enter</u> | <u>Exit</u> | <u>Total</u> |
|--|-----------------------------------|--------------|-------------|--------------|
| <u>AM Peak Hour</u>                        |                                   |              |             |              |
| ITE Code 937                               | Coffee/Donut Shop with Drive Thru | 75           | 73          | 148          |
| Independent Study                          | Brewed Awakenings                 | 45           | 43          | 88           |
| <u>PM Peak Hour of Generator (Mid-day)</u> |                                   |              |             |              |
| ITE Code 937                               | Coffee/Donut Shop with Drive Thru | 39           | 38          | 77           |
| Independent Study                          | Brewed Awakenings                 | 31           | 30          | 61           |

#### Calculations;

##### Code 937 – Coffee/Donut Shop with Drive-Thru Window

Independent Variable (X) = Peak Hour of Adjacent Street Traffic

X = 989/1,275 vph AM/PM

##### AM Peak      *Directional Distribution 51% Entering, 49% Exiting*

$$T = 0.15 (X)$$

$$T = 0.15 (989)$$

$$T = 148$$

$$\text{Enter: } 75$$

$$\text{Exit: } 73$$

$$\text{Total } 148$$

##### PM Peak      *Directional Distribution 51% Entering, 49% Exiting*

$$T = 0.06 (X)$$

$$T = 0.06 (1,275)$$

$$T = 77$$

$$\text{Enter: } 39$$

$$\text{Exit: } 38$$

$$\text{Total } 77$$

Independent Study Rates –Brewed AwakeningsAM Peak

|                 |                 |
|-----------------|-----------------|
| T = 0.089 (X)   | Enter: 45       |
| T = 0.089 (989) | <u>Exit: 43</u> |
| T = 88          | Total 88        |

PM Peak of Generator (12:00 – 1:00 PM)

|                   |                 |
|-------------------|-----------------|
| T = 0.048 (X)     | Enter: 31       |
| T = 0.048 (1,275) | <u>Exit: 30</u> |
| T = 61            | Total 61        |

Independent Study Rate Calculation – Existing Brewed Awakenings – Pontiac Avenue, Cranston, RI

The below calculations are based upon the Peak Hour volume of the adjacent street traffic.

Cranston Brewed Awakenings Statistics;

| <u>Pontiac Avenue Peak Hour Volumes</u> |                         | <u>Brewed Awakenings</u> |
|---|-------------------------|--------------------------|
| AM                                      | 2,075 vehicles per hour | 185 trips                |
| MD                                      | 2,185 vehicles per hour | 105 trips                |

Calculation for Independent Study Rate (R)

|    |                                      |
|----|--------------------------------------|
| AM | R = 185 trips/2,075 vph<br>R = 0.089 |
| MD | R = 105 trips/2,185 vph<br>R = 0.048 |

# C

---

## ITE Land Use Code

ITE Land Use Code 937 – Coffee/Donut Shop with Drive-Through Window

# Land Use: 937

## Coffee/Donut Shop with Drive-Through Window

---

### Description

This land use includes any coffee and donut restaurant that has a drive-through window as well as a walk-in entrance area at which a patron can purchase and consume items. The restaurant sells freshly brewed coffee (along with coffee-related accessories) and a variety of food/drink products such as donuts, bagels, breads, muffins, cakes, sandwiches, wraps, salads, and other hot and cold beverages. The restaurant marketing and sales may emphasize coffee beverages over food (or vice versa).

A coffee/donut shop typically holds long store hours (more than 15 hours) with an early morning opening. Limited indoor seating is generally provided for patrons, but table service is not provided.

Coffee/donut shop without drive-through window (Land Use 936) and coffee/donut shop with drive-through window and no indoor seating (Land Use 938) are related uses.

### Additional Data

The sites were surveyed in the 1990s, the 2000s, and the 2010s in California, Colorado, Connecticut, Illinois, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, New York, Ontario (CAN), Pennsylvania, Quebec (CAN), Tennessee, Vermont, Washington, and Wisconsin.

### Specialized Land Use Data

One study was conducted during the pandemic in 2020. Twelve sites were counted in Illinois and Missouri during the AM and PM adjacent street peak hours. The data have not been incorporated within the overall ITE trip generation database and are not reflected in the data plots for this land use. Consideration for their inclusion will be given for the 12th Edition of *Trip Generation Manual* after additional post-pandemic data are collected. Overall, the pandemic counts yielded an AM adjacent street peak weighted average rate of 84 vehicle trips per 1,000 square feet GFA, roughly equivalent to the pre-pandemic average. The PM adjacent street peak rate was 56 (roughly 40 percent higher than the pre-pandemic value). The higher PM peak rate for these coffee/donut shops conforms with anecdotal observations that with the temporary or permanent closures of many restaurants during the pandemic, the drive-through restaurants that were open did a brisk business even during their off-peak periods.

### Source Numbers

594, 599, 615, 617, 618, 621, 622, 635, 639, 712, 714, 725, 726, 728, 853, 854, 892, 903, 928, 959, 979, 982, 1004, 1042, 1044

# Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: AM Peak Hour Traffic on Adj. St.

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 10

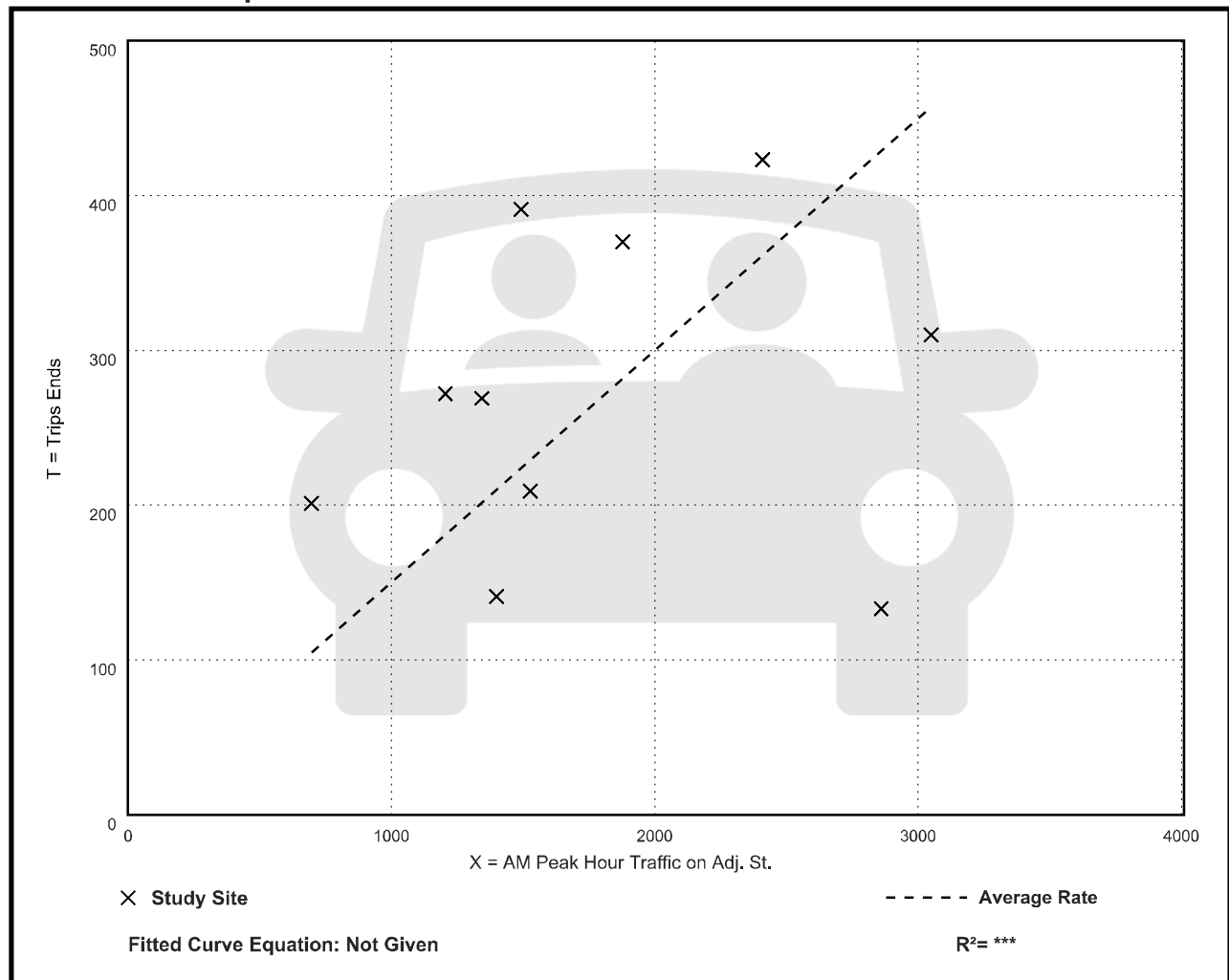
Avg. AM Peak Hour Traffic on Adj. St.: 1786

Directional Distribution: 51% entering, 49% exiting

## Vehicle Trip Generation per AM Peak Hour Traffic on Adj. St.

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 0.15         | 0.05 - 0.29    | 0.07               |

## Data Plot and Equation





# Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: PM Peak Hour Traffic on Adj. St.

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 8

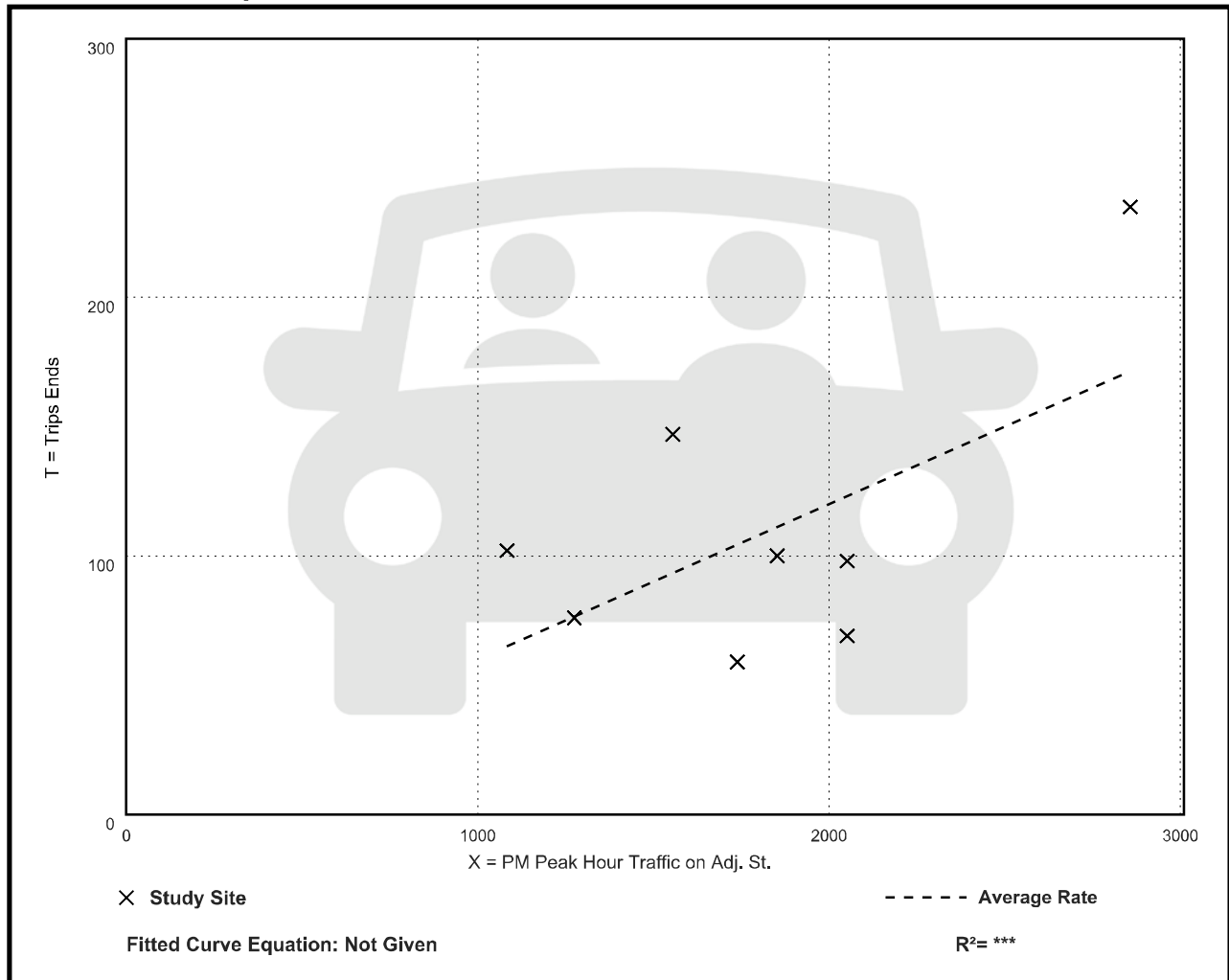
Avg. PM Peak Hour Traffic on Adj. St.: 1808

Directional Distribution: 51% entering, 49% exiting

## Vehicle Trip Generation per PM Peak Hour Traffic on Adj. St.

| Average Rate | Range of Rates | Standard Deviation |
|--------------|----------------|--------------------|
| 0.06         | 0.03 - 0.09    | 0.02               |

## Data Plot and Equation



# C

---

Independent Study

Brewed Awakenings (Cranston)

## APPENDIX D – Operational Analysis

---

### Existing Conditions

Oaklawn Avenue at Oak Hill Road

### Future Build Conditions

Oaklawn Avenue at Oak Hill Road

Oaklawn Avenue at Site Driveway

# D

---

Existing Weekday AM / MD Peak Hour

Oaklawn Avenue at Oak Hill Road



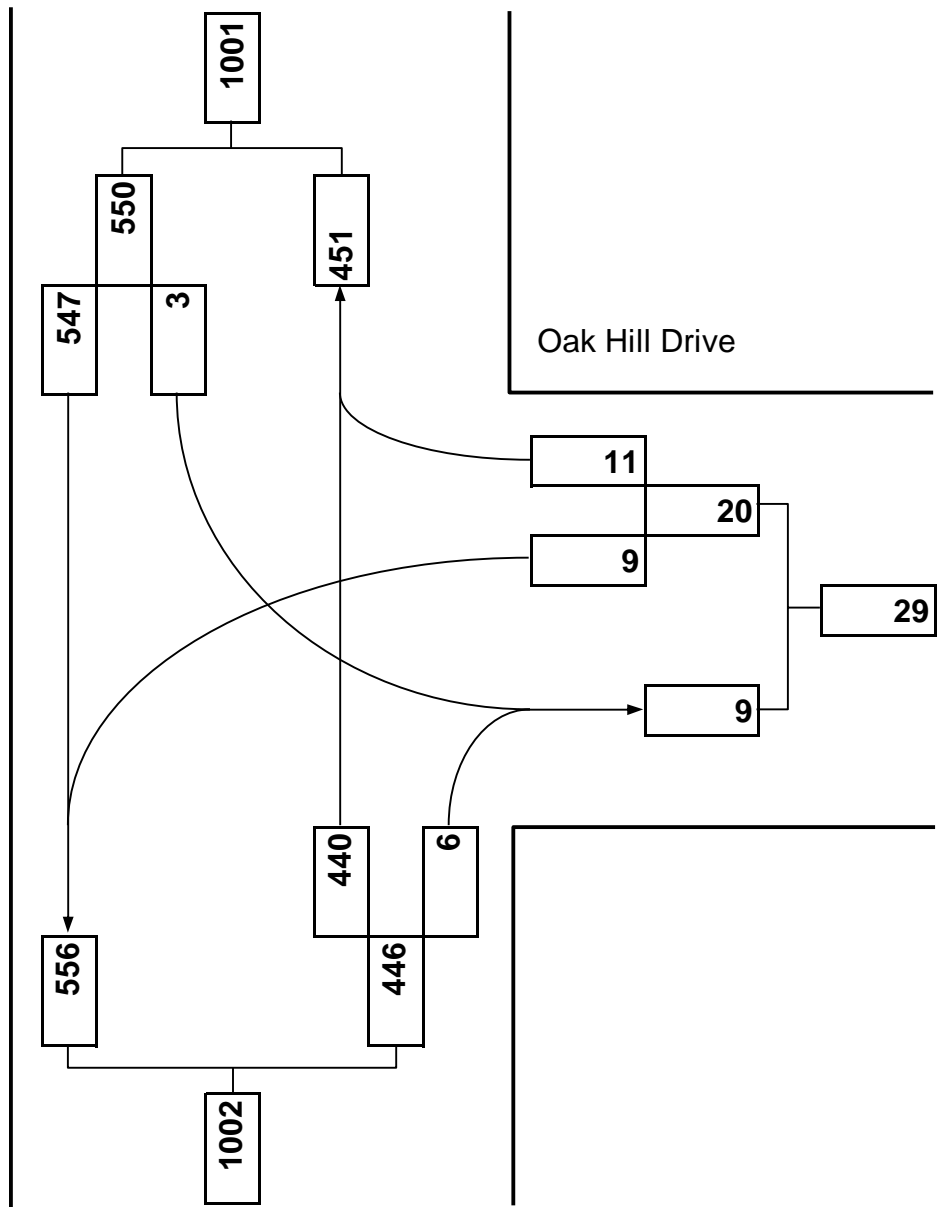
### Turning Movement Diagram

|                |                |
|----------------|----------------|
| Major Street:  | Oaklawn Avenue |
| City/Town:     | Cranston       |
| Reference No.: | 2842           |
| Existing:      | AM Peak        |

|               |                |
|---------------|----------------|
| Minor Street: | Oak Hill Drive |
| Day of Week:  | Weekday        |
| Peak Period:  | 8:00-9:00 AM   |
| Future:       | n/a            |



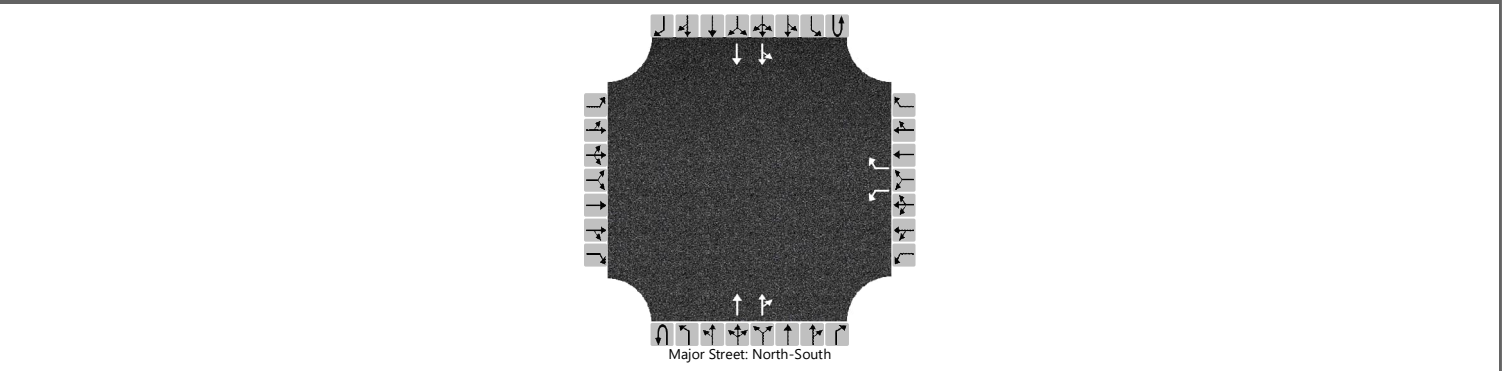
Oaklawn Avenue (Route 5)



# HCS7 Two-Way Stop-Control Report

| General Information      |                            |  |  | Site Information           |                       |  |  |
|--------------------------|----------------------------|--|--|----------------------------|-----------------------|--|--|
| Analyst                  | Traffic Group              |  |  | Intersection               | Oaklawn at Oak Hill   |  |  |
| Agency/Co.               | Crossman                   |  |  | Jurisdiction               | Cranston              |  |  |
| Date Performed           | 4/2/2024                   |  |  | East/West Street           | Oak Hill Drive        |  |  |
| Analysis Year            | 2024                       |  |  | North/South Street         | Oaklawn Ave (Route 5) |  |  |
| Time Analyzed            | Existing AM Peak           |  |  | Peak Hour Factor           | 0.95                  |  |  |
| Intersection Orientation | North-South                |  |  | Analysis Time Period (hrs) | 0.25                  |  |  |
| Project Description      | Proposed Brewed Awakenings |  |  |                            |                       |  |  |

## Lanes



## Vehicle Volumes and Adjustments

| Approach                   | Eastbound |    |    |    | Westbound |   |   |    | Northbound |   |     |    | Southbound |    |     |   |
|----------------------------|-----------|----|----|----|-----------|---|---|----|------------|---|-----|----|------------|----|-----|---|
|                            | U         | L  | T  | R  | U         | L | T | R  | U          | L | T   | R  | U          | L  | T   | R |
| Priority                   |           | 10 | 11 | 12 |           | 7 | 8 | 9  | 1U         | 1 | 2   | 3  | 4U         | 4  | 5   | 6 |
| Number of Lanes            |           | 0  | 0  | 0  |           | 1 | 0 | 1  |            | 0 | 2   | 0  |            | 0  | 2   | 0 |
| Configuration              |           |    |    |    |           | L |   | R  |            |   | T   | TR |            | LT | T   |   |
| Volume (veh/h)             |           |    |    |    |           | 9 |   | 11 |            |   | 440 | 6  |            | 3  | 547 |   |
| Percent Heavy Vehicles (%) |           |    |    |    |           | 0 |   | 0  |            |   |     |    |            | 0  |     |   |
| Proportion Time Blocked    |           |    |    |    |           |   |   |    |            |   |     |    |            |    |     |   |
| Percent Grade (%)          |           |    |    |    | 0         |   |   |    |            |   |     |    |            |    |     |   |
| Right Turn Channelized     |           |    |    |    | No        |   |   |    |            |   |     |    |            |    |     |   |
| Median Type   Storage      | Undivided |    |    |    |           |   |   |    |            |   |     |    |            |    |     |   |

## Critical and Follow-up Headways

|                              |  |  |  |  |  |      |  |      |  |  |  |  |  |  |      |  |
|------------------------------|--|--|--|--|--|------|--|------|--|--|--|--|--|--|------|--|
| Base Critical Headway (sec)  |  |  |  |  |  | 7.5  |  | 6.9  |  |  |  |  |  |  | 4.1  |  |
| Critical Headway (sec)       |  |  |  |  |  | 6.80 |  | 6.90 |  |  |  |  |  |  | 4.10 |  |
| Base Follow-Up Headway (sec) |  |  |  |  |  | 3.5  |  | 3.3  |  |  |  |  |  |  | 2.2  |  |
| Follow-Up Headway (sec)      |  |  |  |  |  | 3.50 |  | 3.30 |  |  |  |  |  |  | 2.20 |  |

## Delay, Queue Length, and Level of Service

|   |  |  |  |  |      |      |  |      |  |  |  |  |     |  |      |  |
|---|--|--|--|--|------|------|--|------|--|--|--|--|-----|--|------|--|
| Flow Rate, v (veh/h)                    |  |  |  |  |      | 9    |  | 12   |  |  |  |  |     |  | 3    |  |
| Capacity, c (veh/h)                     |  |  |  |  |      | 345  |  | 773  |  |  |  |  |     |  | 1103 |  |
| v/c Ratio                               |  |  |  |  |      | 0.03 |  | 0.01 |  |  |  |  |     |  | 0.00 |  |
| 95% Queue Length, Q <sub>95</sub> (veh) |  |  |  |  |      | 0.1  |  | 0.0  |  |  |  |  |     |  | 0.0  |  |
| Control Delay (s/veh)                   |  |  |  |  |      | 15.7 |  | 9.7  |  |  |  |  |     |  | 8.3  |  |
| Level of Service (LOS)                  |  |  |  |  |      | C    |  | A    |  |  |  |  |     |  | A    |  |
| Approach Delay (s/veh)                  |  |  |  |  | 12.4 |      |  |      |  |  |  |  | 0.1 |  |      |  |
| Approach LOS                            |  |  |  |  | B    |      |  |      |  |  |  |  |     |  |      |  |



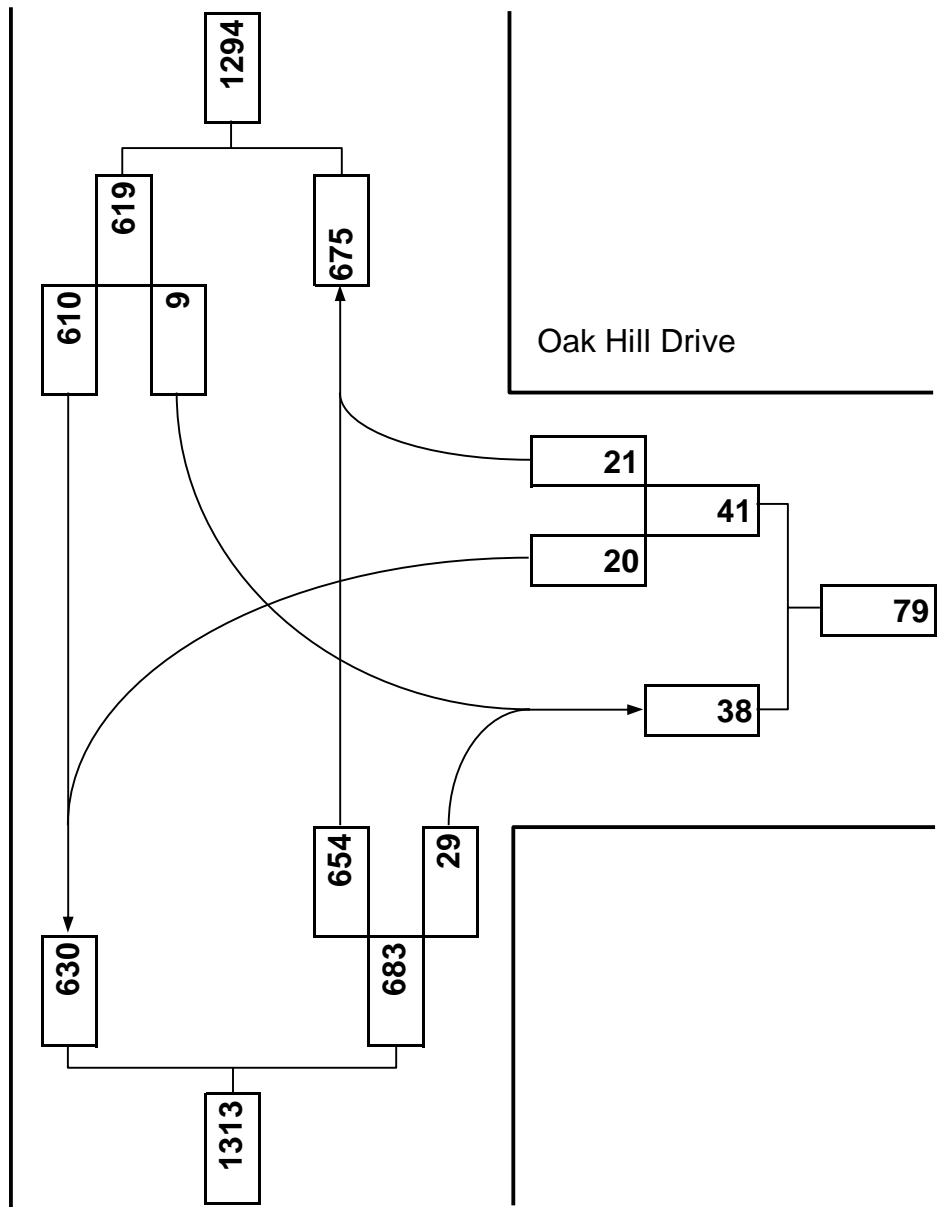
### Turning Movement Diagram

|                |                |
|----------------|----------------|
| Major Street:  | Oaklawn Avenue |
| City/Town:     | Cranston       |
| Reference No.: | 2842           |
| Existing:      | Mid-Day Peak   |

|               |                |
|---------------|----------------|
| Minor Street: | Oak Hill Drive |
| Day of Week:  | Weekday        |
| Peak Period:  | 12:00-1:00 PM  |
| Future:       | n/a            |



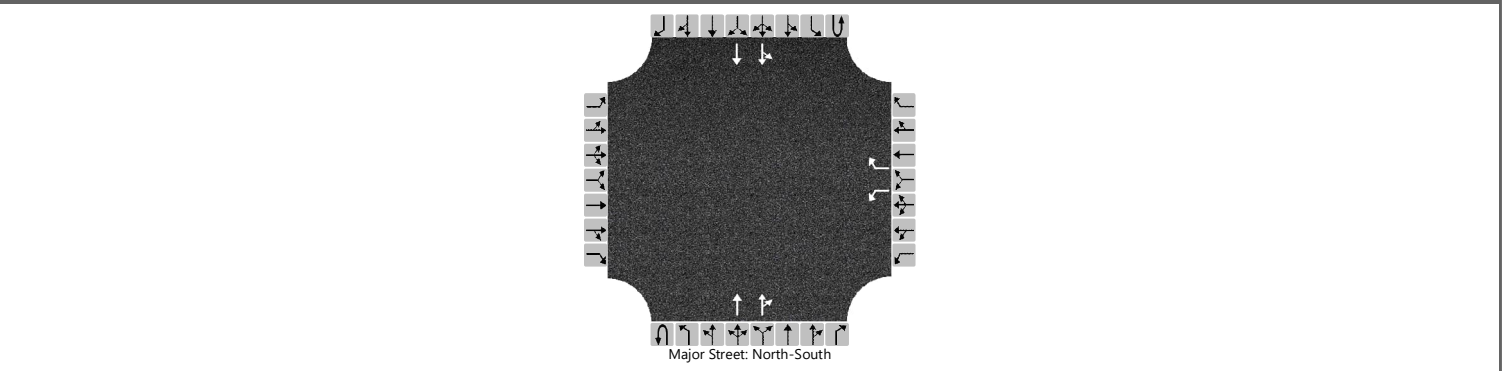
Oaklawn Avenue (Route 5)



# HCS7 Two-Way Stop-Control Report

| General Information      |                            |  |  | Site Information           |                       |  |  |
|--------------------------|----------------------------|--|--|----------------------------|-----------------------|--|--|
| Analyst                  | Traffic Group              |  |  | Intersection               | Oaklawn at Oak Hill   |  |  |
| Agency/Co.               | Crossman                   |  |  | Jurisdiction               | Cranston              |  |  |
| Date Performed           | 4/2/2024                   |  |  | East/West Street           | Oak Hill Drive        |  |  |
| Analysis Year            | 2024                       |  |  | North/South Street         | Oaklawn Ave (Route 5) |  |  |
| Time Analyzed            | Existing MD Peak           |  |  | Peak Hour Factor           | 0.95                  |  |  |
| Intersection Orientation | North-South                |  |  | Analysis Time Period (hrs) | 0.25                  |  |  |
| Project Description      | Proposed Brewed Awakenings |  |  |                            |                       |  |  |

## Lanes



## Vehicle Volumes and Adjustments

| Approach                   | Eastbound |    |    |    | Westbound |    |   |    | Northbound |   |     |    | Southbound |    |     |   |
|----------------------------|-----------|----|----|----|-----------|----|---|----|------------|---|-----|----|------------|----|-----|---|
|                            | U         | L  | T  | R  | U         | L  | T | R  | U          | L | T   | R  | U          | L  | T   | R |
| Priority                   |           | 10 | 11 | 12 |           | 7  | 8 | 9  | 1U         | 1 | 2   | 3  | 4U         | 4  | 5   | 6 |
| Number of Lanes            |           | 0  | 0  | 0  |           | 1  | 0 | 1  | 0          | 0 | 2   | 0  | 0          | 0  | 2   | 0 |
| Configuration              |           |    |    |    |           | L  |   | R  |            |   | T   | TR |            | LT | T   |   |
| Volume (veh/h)             |           |    |    |    |           | 20 |   | 21 |            |   | 654 | 29 |            | 9  | 610 |   |
| Percent Heavy Vehicles (%) |           |    |    |    |           | 0  |   | 0  |            |   |     |    |            | 0  |     |   |
| Proportion Time Blocked    |           |    |    |    |           |    |   |    |            |   |     |    |            |    |     |   |
| Percent Grade (%)          |           |    |    |    | 0         |    |   |    |            |   |     |    |            |    |     |   |
| Right Turn Channelized     |           |    |    |    | No        |    |   |    |            |   |     |    |            |    |     |   |
| Median Type   Storage      | Undivided |    |    |    |           |    |   |    |            |   |     |    |            |    |     |   |

## Critical and Follow-up Headways

|                              |  |  |  |  |  |      |  |      |  |  |  |  |  |  |      |  |
|------------------------------|--|--|--|--|--|------|--|------|--|--|--|--|--|--|------|--|
| Base Critical Headway (sec)  |  |  |  |  |  | 7.5  |  | 6.9  |  |  |  |  |  |  | 4.1  |  |
| Critical Headway (sec)       |  |  |  |  |  | 6.80 |  | 6.90 |  |  |  |  |  |  | 4.10 |  |
| Base Follow-Up Headway (sec) |  |  |  |  |  | 3.5  |  | 3.3  |  |  |  |  |  |  | 2.2  |  |
| Follow-Up Headway (sec)      |  |  |  |  |  | 3.50 |  | 3.30 |  |  |  |  |  |  | 2.20 |  |

## Delay, Queue Length, and Level of Service

|   |  |  |  |  |      |      |  |      |  |  |  |  |     |  |      |  |
|---|--|--|--|--|------|------|--|------|--|--|--|--|-----|--|------|--|
| Flow Rate, v (veh/h)                    |  |  |  |  |      | 21   |  | 22   |  |  |  |  |     |  | 9    |  |
| Capacity, c (veh/h)                     |  |  |  |  |      | 224  |  | 643  |  |  |  |  |     |  | 892  |  |
| v/c Ratio                               |  |  |  |  |      | 0.09 |  | 0.03 |  |  |  |  |     |  | 0.01 |  |
| 95% Queue Length, Q <sub>95</sub> (veh) |  |  |  |  |      | 0.3  |  | 0.1  |  |  |  |  |     |  | 0.0  |  |
| Control Delay (s/veh)                   |  |  |  |  |      | 22.7 |  | 10.8 |  |  |  |  |     |  | 9.1  |  |
| Level of Service (LOS)                  |  |  |  |  |      | C    |  | B    |  |  |  |  |     |  | A    |  |
| Approach Delay (s/veh)                  |  |  |  |  | 16.6 |      |  |      |  |  |  |  | 0.2 |  |      |  |
| Approach LOS                            |  |  |  |  | C    |      |  |      |  |  |  |  |     |  |      |  |



D

---

Future Build Weekday AM / MD Peak Hour

Oaklawn Avenue at Oak Hill Road

Oaklawn Avenue at Oak Hill Road



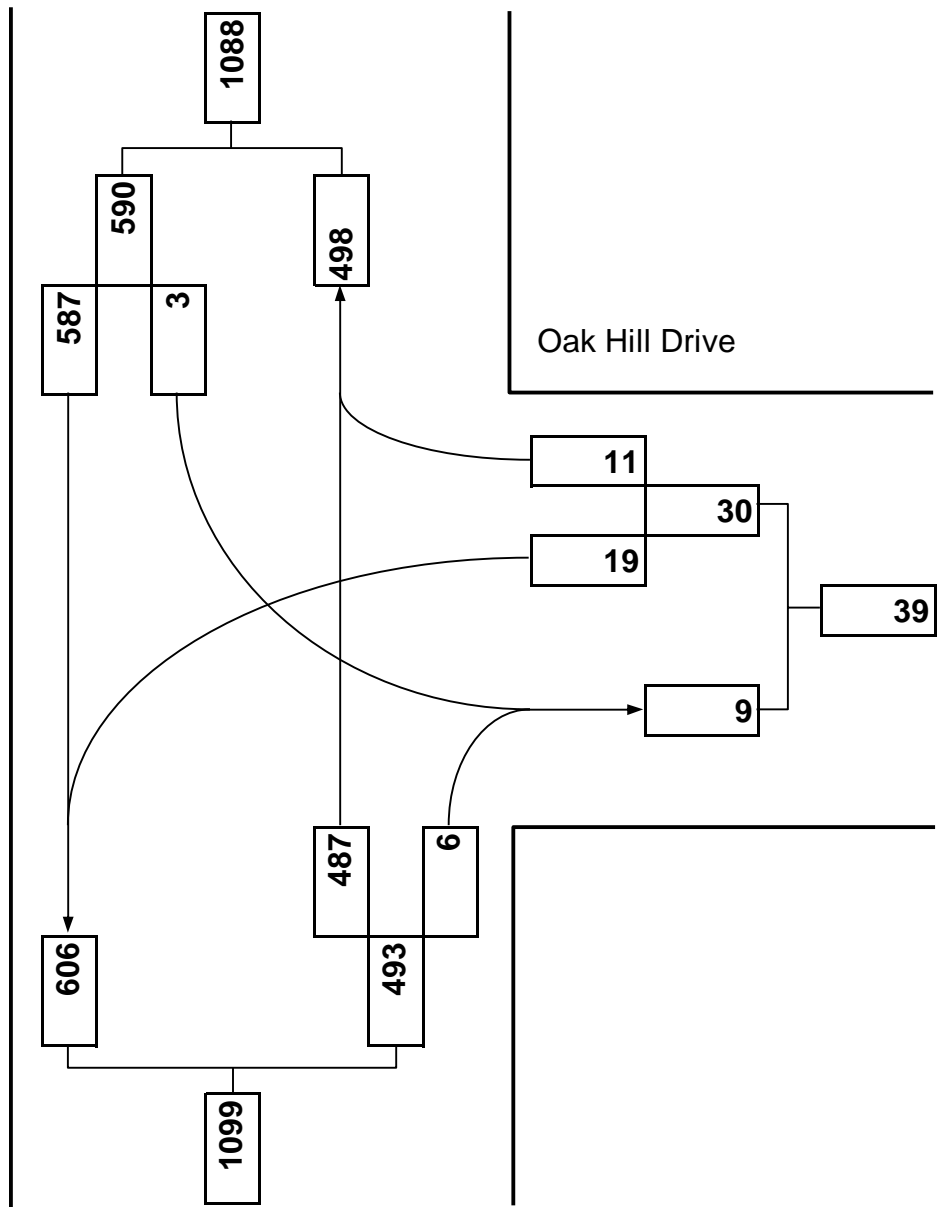
### Turning Movement Diagram

|                       |                |
|-----------------------|----------------|
| <b>Major Street:</b>  | Oaklawn Avenue |
| <b>City/Town:</b>     | Cranston       |
| <b>Reference No.:</b> | 2842           |
| <b>Existing:</b>      | n/a            |

|                      |                |
|----------------------|----------------|
| <b>Minor Street:</b> | Oak Hill Drive |
| <b>Day of Week:</b>  | Weekday        |
| <b>Peak Period:</b>  | AM Peak        |
| <b>Future:</b>       | Build          |



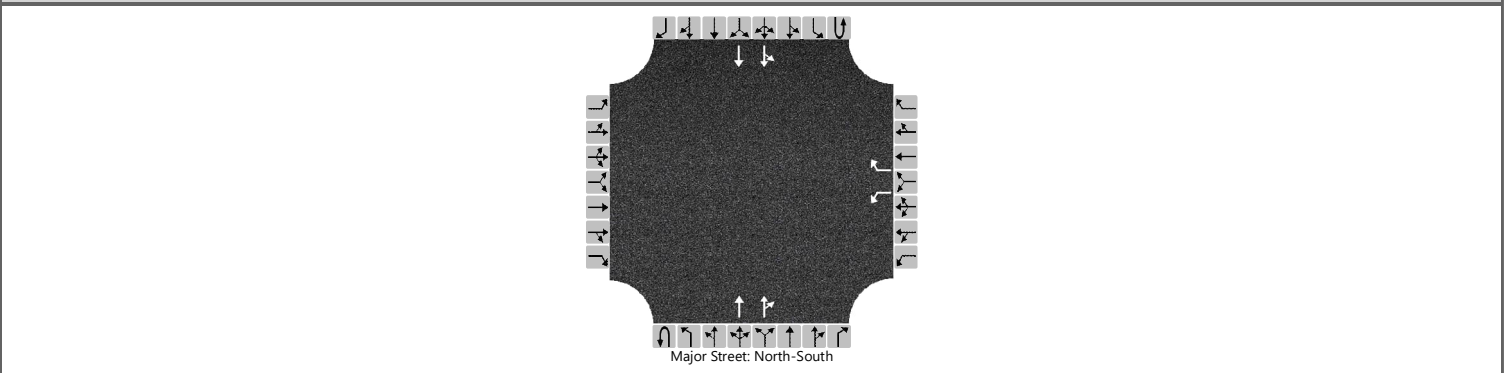
Oaklawn Avenue (Route 5)



# HCS7 Two-Way Stop-Control Report

| General Information      |                            |  |  | Site Information           |                       |  |  |
|--------------------------|----------------------------|--|--|----------------------------|-----------------------|--|--|
| Analyst                  | Traffic Group              |  |  | Intersection               | Oaklawn at Oak Hill   |  |  |
| Agency/Co.               | Crossman                   |  |  | Jurisdiction               | Cranston              |  |  |
| Date Performed           | 4/2/2024                   |  |  | East/West Street           | Oak Hill Drive        |  |  |
| Analysis Year            | 2027                       |  |  | North/South Street         | Oaklawn Ave (Route 5) |  |  |
| Time Analyzed            | Build AM Peak              |  |  | Peak Hour Factor           | 0.95                  |  |  |
| Intersection Orientation | North-South                |  |  | Analysis Time Period (hrs) | 0.25                  |  |  |
| Project Description      | Proposed Brewed Awakenings |  |  |                            |                       |  |  |

## Lanes



## Vehicle Volumes and Adjustments

| Approach                   | Eastbound |    |    |    | Westbound |    |   |    | Northbound |   |     |    | Southbound |    |     |   |
|----------------------------|-----------|----|----|----|-----------|----|---|----|------------|---|-----|----|------------|----|-----|---|
|                            | U         | L  | T  | R  | U         | L  | T | R  | U          | L | T   | R  | U          | L  | T   | R |
| Priority                   |           | 10 | 11 | 12 |           | 7  | 8 | 9  | 1U         | 1 | 2   | 3  | 4U         | 4  | 5   | 6 |
| Number of Lanes            |           | 0  | 0  | 0  |           | 1  | 0 | 1  | 0          | 0 | 2   | 0  | 0          | 0  | 2   | 0 |
| Configuration              |           |    |    |    |           | L  |   | R  |            |   | T   | TR |            | LT | T   |   |
| Volume (veh/h)             |           |    |    |    |           | 19 |   | 11 |            |   | 487 | 6  |            | 3  | 587 |   |
| Percent Heavy Vehicles (%) |           |    |    |    |           | 0  |   | 0  |            |   |     |    |            | 0  |     |   |
| Proportion Time Blocked    |           |    |    |    |           |    |   |    |            |   |     |    |            |    |     |   |
| Percent Grade (%)          |           |    |    |    | 0         |    |   |    |            |   |     |    |            |    |     |   |
| Right Turn Channelized     |           |    |    |    | No        |    |   |    |            |   |     |    |            |    |     |   |
| Median Type   Storage      | Undivided |    |    |    |           |    |   |    |            |   |     |    |            |    |     |   |

## Critical and Follow-up Headways

|                              |  |  |  |  |  |      |  |      |  |  |  |  |  |  |  |      |  |
|------------------------------|--|--|--|--|--|------|--|------|--|--|--|--|--|--|--|------|--|
| Base Critical Headway (sec)  |  |  |  |  |  | 7.5  |  | 6.9  |  |  |  |  |  |  |  | 4.1  |  |
| Critical Headway (sec)       |  |  |  |  |  | 6.80 |  | 6.90 |  |  |  |  |  |  |  | 4.10 |  |
| Base Follow-Up Headway (sec) |  |  |  |  |  | 3.5  |  | 3.3  |  |  |  |  |  |  |  | 2.2  |  |
| Follow-Up Headway (sec)      |  |  |  |  |  | 3.50 |  | 3.30 |  |  |  |  |  |  |  | 2.20 |  |

## Delay, Queue Length, and Level of Service

|   |  |  |  |  |      |      |  |      |  |  |  |  |     |  |  |      |  |
|---|--|--|--|--|------|------|--|------|--|--|--|--|-----|--|--|------|--|
| Flow Rate, v (veh/h)                    |  |  |  |  |      | 20   |  | 12   |  |  |  |  |     |  |  | 3    |  |
| Capacity, c (veh/h)                     |  |  |  |  |      | 311  |  | 745  |  |  |  |  |     |  |  | 1057 |  |
| v/c Ratio                               |  |  |  |  |      | 0.06 |  | 0.02 |  |  |  |  |     |  |  | 0.00 |  |
| 95% Queue Length, Q <sub>95</sub> (veh) |  |  |  |  |      | 0.2  |  | 0.0  |  |  |  |  |     |  |  | 0.0  |  |
| Control Delay (s/veh)                   |  |  |  |  |      | 17.4 |  | 9.9  |  |  |  |  |     |  |  | 8.4  |  |
| Level of Service (LOS)                  |  |  |  |  |      | C    |  | A    |  |  |  |  |     |  |  | A    |  |
| Approach Delay (s/veh)                  |  |  |  |  | 14.6 |      |  |      |  |  |  |  | 0.1 |  |  |      |  |
| Approach LOS                            |  |  |  |  | B    |      |  |      |  |  |  |  |     |  |  |      |  |



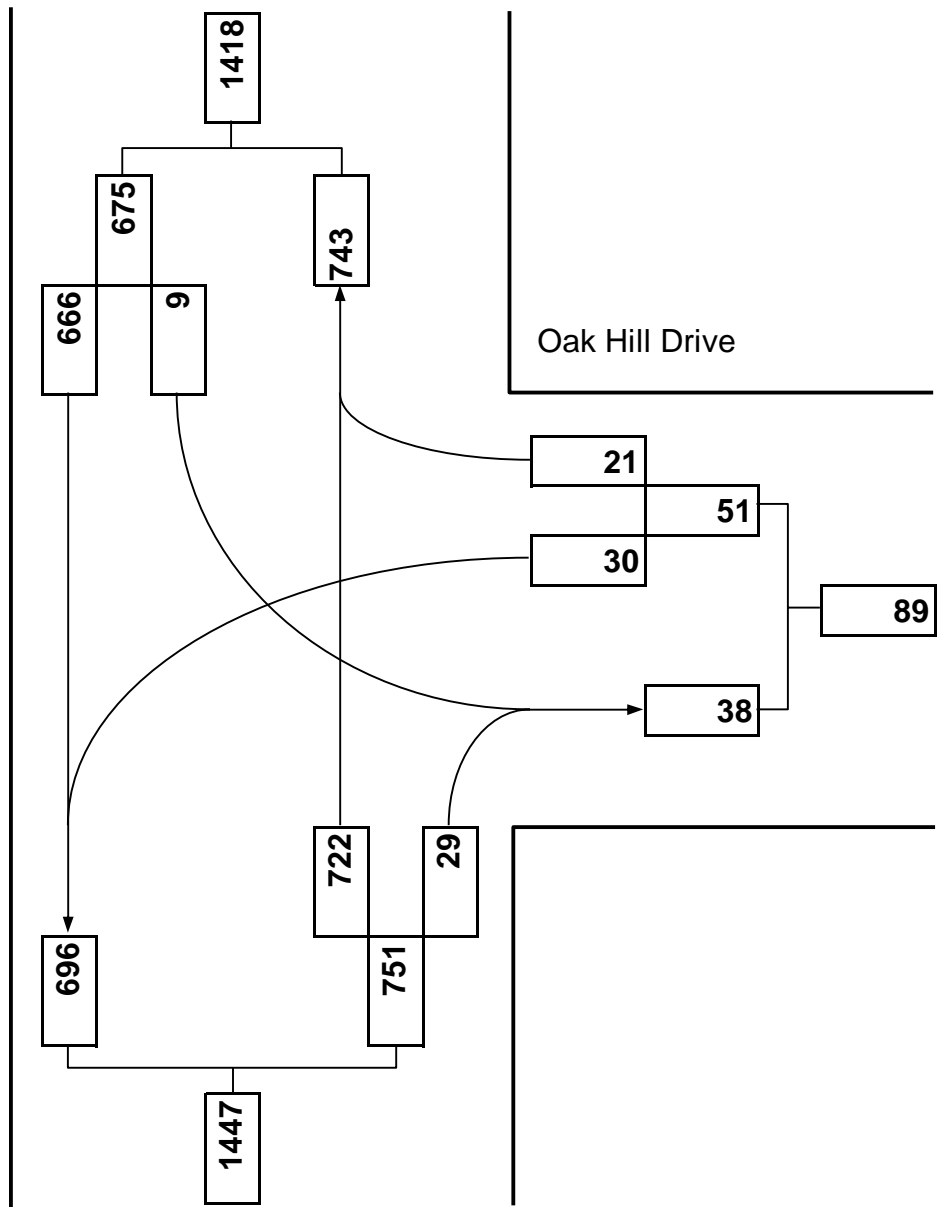
### Turning Movement Diagram

|                |                |
|----------------|----------------|
| Major Street:  | Oaklawn Avenue |
| City/Town:     | Cranston       |
| Reference No.: | 2842           |
| Existing:      | n/a            |

|               |                |
|---------------|----------------|
| Minor Street: | Oak Hill Drive |
| Day of Week:  | Weekday        |
| Peak Period:  | Mid-Day Peak   |
| Future:       | Build          |



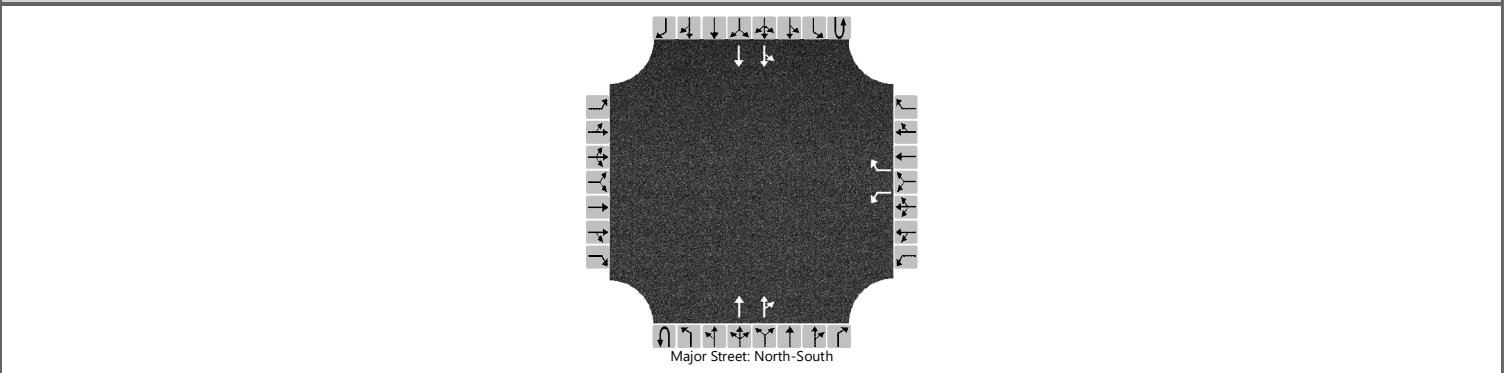
Oaklawn Avenue (Route 5)



# HCS7 Two-Way Stop-Control Report

| General Information      |                            |  |  | Site Information           |                       |  |  |
|--------------------------|----------------------------|--|--|----------------------------|-----------------------|--|--|
| Analyst                  | Traffic Group              |  |  | Intersection               | Oaklawn at Oak Hill   |  |  |
| Agency/Co.               | Crossman                   |  |  | Jurisdiction               | Cranston              |  |  |
| Date Performed           | 4/2/2024                   |  |  | East/West Street           | Oak Hill Drive        |  |  |
| Analysis Year            | 2027                       |  |  | North/South Street         | Oaklawn Ave (Route 5) |  |  |
| Time Analyzed            | Build MD Peak              |  |  | Peak Hour Factor           | 0.95                  |  |  |
| Intersection Orientation | North-South                |  |  | Analysis Time Period (hrs) | 0.25                  |  |  |
| Project Description      | Proposed Brewed Awakenings |  |  |                            |                       |  |  |

## Lanes



## Vehicle Volumes and Adjustments

| Approach                   | Eastbound |    |    |    | Westbound |           |   |    | Northbound |   |     |    | Southbound |    |     |   |
|----------------------------|-----------|----|----|----|-----------|-----------|---|----|------------|---|-----|----|------------|----|-----|---|
|                            | U         | L  | T  | R  | U         | L         | T | R  | U          | L | T   | R  | U          | L  | T   | R |
| Priority                   |           | 10 | 11 | 12 |           | 7         | 8 | 9  | 1U         | 1 | 2   | 3  | 4U         | 4  | 5   | 6 |
| Number of Lanes            |           | 0  | 0  | 0  |           | 1         | 0 | 1  | 0          | 0 | 2   | 0  | 0          | 0  | 2   | 0 |
| Configuration              |           |    |    |    |           | L         |   | R  |            |   | T   | TR |            | LT | T   |   |
| Volume (veh/h)             |           |    |    |    |           | 30        |   | 21 |            |   | 722 | 29 |            | 9  | 666 |   |
| Percent Heavy Vehicles (%) |           |    |    |    |           | 0         |   | 0  |            |   |     |    |            | 0  |     |   |
| Proportion Time Blocked    |           |    |    |    |           |           |   |    |            |   |     |    |            |    |     |   |
| Percent Grade (%)          |           |    |    |    |           | 0         |   |    |            |   |     |    |            |    |     |   |
| Right Turn Channelized     |           |    |    |    |           | No        |   |    |            |   |     |    |            |    |     |   |
| Median Type   Storage      |           |    |    |    |           | Undivided |   |    |            |   |     |    |            |    |     |   |

## Critical and Follow-up Headways

|                              |  |  |  |  |  |      |  |      |  |  |  |  |  |  |      |  |
|------------------------------|--|--|--|--|--|------|--|------|--|--|--|--|--|--|------|--|
| Base Critical Headway (sec)  |  |  |  |  |  | 7.5  |  | 6.9  |  |  |  |  |  |  | 4.1  |  |
| Critical Headway (sec)       |  |  |  |  |  | 6.80 |  | 6.90 |  |  |  |  |  |  | 4.10 |  |
| Base Follow-Up Headway (sec) |  |  |  |  |  | 3.5  |  | 3.3  |  |  |  |  |  |  | 2.2  |  |
| Follow-Up Headway (sec)      |  |  |  |  |  | 3.50 |  | 3.30 |  |  |  |  |  |  | 2.20 |  |

## Delay, Queue Length, and Level of Service

|   |  |  |  |  |  |      |  |      |  |  |  |  |  |     |      |  |  |
|---|--|--|--|--|--|------|--|------|--|--|--|--|--|-----|------|--|--|
| Flow Rate, v (veh/h)                    |  |  |  |  |  | 32   |  | 22   |  |  |  |  |  |     | 9    |  |  |
| Capacity, c (veh/h)                     |  |  |  |  |  | 193  |  | 610  |  |  |  |  |  |     | 839  |  |  |
| v/c Ratio                               |  |  |  |  |  | 0.16 |  | 0.04 |  |  |  |  |  |     | 0.01 |  |  |
| 95% Queue Length, Q <sub>95</sub> (veh) |  |  |  |  |  | 0.6  |  | 0.1  |  |  |  |  |  |     | 0.0  |  |  |
| Control Delay (s/veh)                   |  |  |  |  |  | 27.3 |  | 11.1 |  |  |  |  |  |     | 9.3  |  |  |
| Level of Service (LOS)                  |  |  |  |  |  | D    |  | B    |  |  |  |  |  |     | A    |  |  |
| Approach Delay (s/veh)                  |  |  |  |  |  | 20.7 |  |      |  |  |  |  |  | 0.2 |      |  |  |
| Approach LOS                            |  |  |  |  |  | C    |  |      |  |  |  |  |  |     |      |  |  |

Oaklawn Avenue at Site Driveway



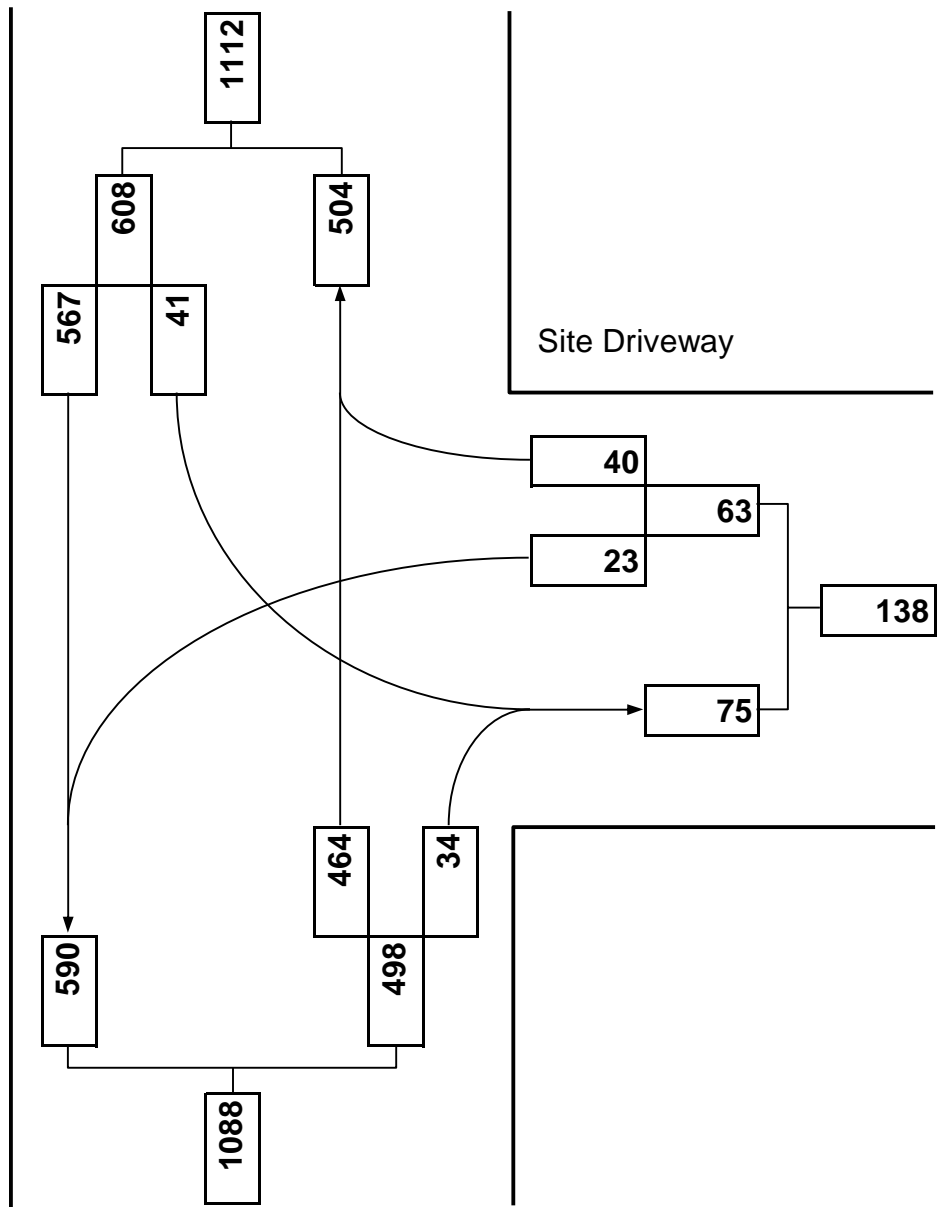
### Turning Movement Diagram

|                |                |
|----------------|----------------|
| Major Street:  | Oaklawn Avenue |
| City/Town:     | Cranston       |
| Reference No.: | 2842           |
| Existing:      | n/a            |

|               |               |
|---------------|---------------|
| Minor Street: | Site Driveway |
| Day of Week:  | Weekday       |
| Peak Period:  | AM Peak       |
| Future:       | Build         |



Oaklawn Avenue (Route 5)

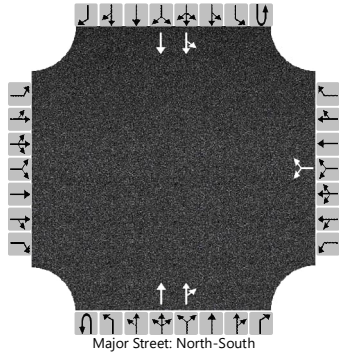




# HCS7 Two-Way Stop-Control Report

| General Information      |                            |  |  | Site Information           |                          |  |  |
|--------------------------|----------------------------|--|--|----------------------------|--------------------------|--|--|
| Analyst                  | Traffic Group              |  |  | Intersection               | Oaklawn at Site Driveway |  |  |
| Agency/Co.               | Crossman                   |  |  | Jurisdiction               | Cranston                 |  |  |
| Date Performed           | 4/2/2024                   |  |  | East/West Street           | Site Driveway            |  |  |
| Analysis Year            | 2027                       |  |  | North/South Street         | Oaklawn Ave (Route 5)    |  |  |
| Time Analyzed            | Build AM Peak              |  |  | Peak Hour Factor           | 0.95                     |  |  |
| Intersection Orientation | North-South                |  |  | Analysis Time Period (hrs) | 0.25                     |  |  |
| Project Description      | Proposed Brewed Awakenings |  |  |                            |                          |  |  |

## Lanes



## Vehicle Volumes and Adjustments

| Approach                   | Eastbound |    |    |    | Westbound |    |    |    | Northbound |   |     |    | Southbound |    |     |   |
|----------------------------|-----------|----|----|----|-----------|----|----|----|------------|---|-----|----|------------|----|-----|---|
|                            | U         | L  | T  | R  | U         | L  | T  | R  | U          | L | T   | R  | U          | L  | T   | R |
| Priority                   |           | 10 | 11 | 12 |           | 7  | 8  | 9  | 1U         | 1 | 2   | 3  | 4U         | 4  | 5   | 6 |
| Number of Lanes            |           | 0  | 0  | 0  |           | 0  | 1  | 0  | 0          | 0 | 2   | 0  | 0          | 0  | 2   | 0 |
| Configuration              |           |    |    |    |           |    | LR |    |            |   | T   | TR |            | LT | T   |   |
| Volume (veh/h)             |           |    |    |    |           | 23 |    | 40 |            |   | 464 | 34 |            | 41 | 567 |   |
| Percent Heavy Vehicles (%) |           |    |    |    |           | 0  |    | 0  |            |   |     |    |            | 0  |     |   |
| Proportion Time Blocked    |           |    |    |    |           |    |    |    |            |   |     |    |            |    |     |   |
| Percent Grade (%)          |           |    |    |    | 0         |    |    |    |            |   |     |    |            |    |     |   |
| Right Turn Channelized     |           |    |    |    |           |    |    |    |            |   |     |    |            |    |     |   |
| Median Type   Storage      | Undivided |    |    |    |           |    |    |    |            |   |     |    |            |    |     |   |

## Critical and Follow-up Headways

|                              |  |  |  |  |  |      |  |      |  |  |  |  |  |  |      |  |
|------------------------------|--|--|--|--|--|------|--|------|--|--|--|--|--|--|------|--|
| Base Critical Headway (sec)  |  |  |  |  |  | 7.5  |  | 6.9  |  |  |  |  |  |  | 4.1  |  |
| Critical Headway (sec)       |  |  |  |  |  | 6.80 |  | 6.90 |  |  |  |  |  |  | 4.10 |  |
| Base Follow-Up Headway (sec) |  |  |  |  |  | 3.5  |  | 3.3  |  |  |  |  |  |  | 2.2  |  |
| Follow-Up Headway (sec)      |  |  |  |  |  | 3.50 |  | 3.30 |  |  |  |  |  |  | 2.20 |  |

## Delay, Queue Length, and Level of Service

|   |  |  |  |  |      |      |  |  |  |  |  |  |     |  |      |  |
|---|--|--|--|--|------|------|--|--|--|--|--|--|-----|--|------|--|
| Flow Rate, v (veh/h)                    |  |  |  |  |      | 66   |  |  |  |  |  |  |     |  | 43   |  |
| Capacity, c (veh/h)                     |  |  |  |  |      | 451  |  |  |  |  |  |  |     |  | 1053 |  |
| v/c Ratio                               |  |  |  |  |      | 0.15 |  |  |  |  |  |  |     |  | 0.04 |  |
| 95% Queue Length, Q <sub>95</sub> (veh) |  |  |  |  |      | 0.5  |  |  |  |  |  |  |     |  | 0.1  |  |
| Control Delay (s/veh)                   |  |  |  |  |      | 14.3 |  |  |  |  |  |  |     |  | 8.6  |  |
| Level of Service (LOS)                  |  |  |  |  |      | B    |  |  |  |  |  |  |     |  | A    |  |
| Approach Delay (s/veh)                  |  |  |  |  | 14.3 |      |  |  |  |  |  |  | 0.8 |  |      |  |
| Approach LOS                            |  |  |  |  | B    |      |  |  |  |  |  |  |     |  |      |  |



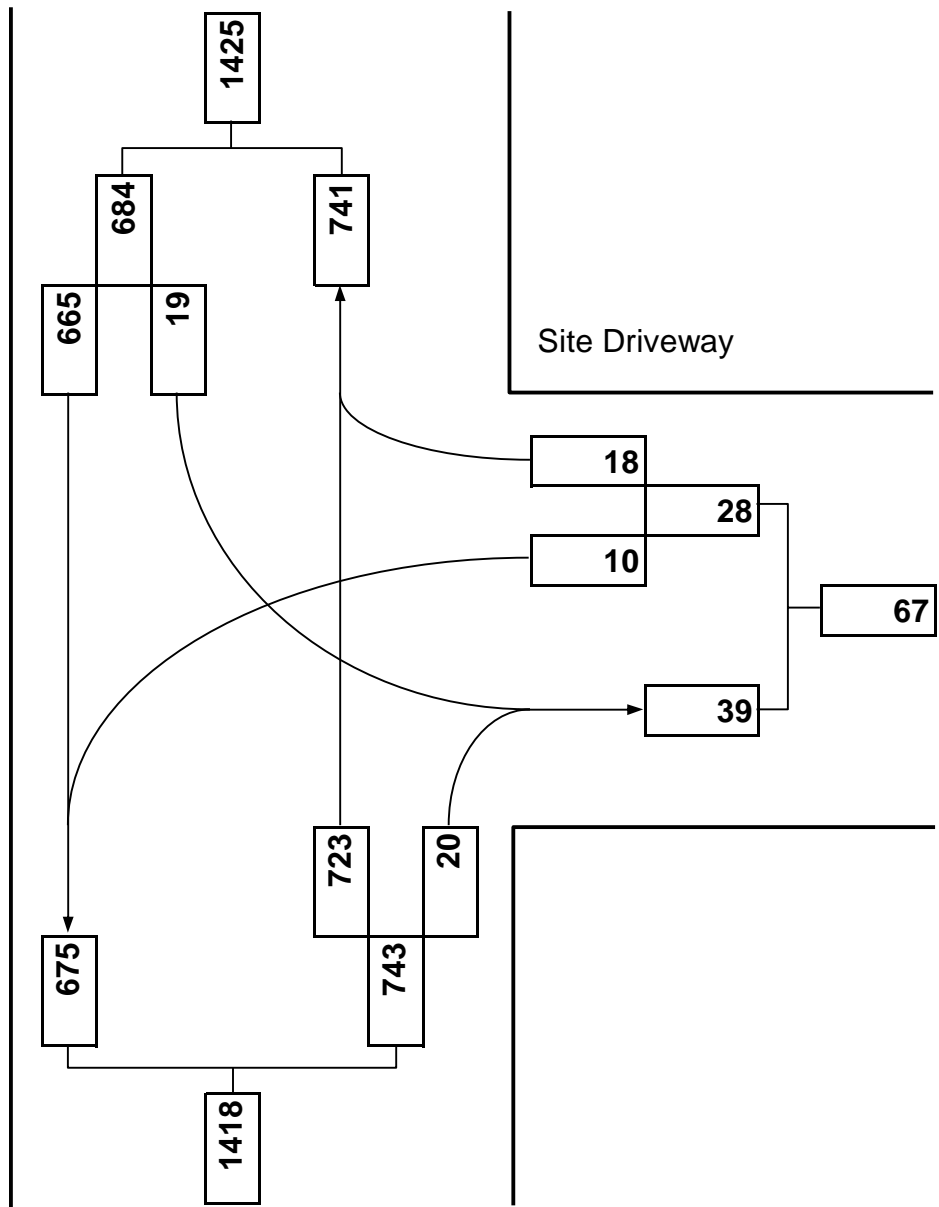
### Turning Movement Diagram

|                |                |
|----------------|----------------|
| Major Street:  | Oaklawn Avenue |
| City/Town:     | Cranston       |
| Reference No.: | 2842           |
| Existing:      | n/a            |

|               |               |
|---------------|---------------|
| Minor Street: | Site Driveway |
| Day of Week:  | Weekday       |
| Peak Period:  | Mid-Day       |
| Future:       | Build         |



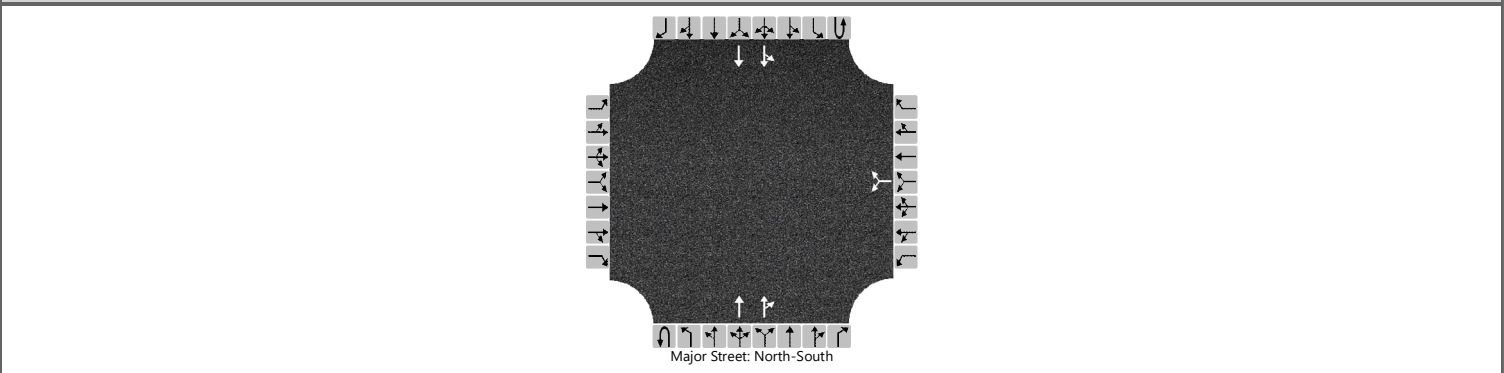
Oaklawn Avenue (Route 5)



# HCS7 Two-Way Stop-Control Report

| General Information      |                            |  |  | Site Information           |                          |  |  |
|--------------------------|----------------------------|--|--|----------------------------|--------------------------|--|--|
| Analyst                  | Traffic Group              |  |  | Intersection               | Oaklawn at Site Driveway |  |  |
| Agency/Co.               | Crossman                   |  |  | Jurisdiction               | Cranston                 |  |  |
| Date Performed           | 4/2/2024                   |  |  | East/West Street           | Site Driveway            |  |  |
| Analysis Year            | 2027                       |  |  | North/South Street         | Oaklawn Ave (Route 5)    |  |  |
| Time Analyzed            | Build MD Peak              |  |  | Peak Hour Factor           | 0.95                     |  |  |
| Intersection Orientation | North-South                |  |  | Analysis Time Period (hrs) | 0.25                     |  |  |
| Project Description      | Proposed Brewed Awakenings |  |  |                            |                          |  |  |

## Lanes



## Vehicle Volumes and Adjustments

| Approach                   | Eastbound |    |    |    | Westbound |           |    |    | Northbound |   |     |    | Southbound |    |     |   |
|----------------------------|-----------|----|----|----|-----------|-----------|----|----|------------|---|-----|----|------------|----|-----|---|
|                            | U         | L  | T  | R  | U         | L         | T  | R  | U          | L | T   | R  | U          | L  | T   | R |
| Priority                   |           | 10 | 11 | 12 |           | 7         | 8  | 9  | 1U         | 1 | 2   | 3  | 4U         | 4  | 5   | 6 |
| Number of Lanes            |           | 0  | 0  | 0  |           | 0         | 1  | 0  | 0          | 0 | 2   | 0  | 0          | 0  | 2   | 0 |
| Configuration              |           |    |    |    |           |           | LR |    |            |   | T   | TR |            | LT | T   |   |
| Volume (veh/h)             |           |    |    |    |           | 10        |    | 18 |            |   | 723 | 20 |            | 19 | 665 |   |
| Percent Heavy Vehicles (%) |           |    |    |    |           | 0         |    | 0  |            |   |     |    |            | 0  |     |   |
| Proportion Time Blocked    |           |    |    |    |           |           |    |    |            |   |     |    |            |    |     |   |
| Percent Grade (%)          |           |    |    |    |           | 0         |    |    |            |   |     |    |            |    |     |   |
| Right Turn Channelized     |           |    |    |    |           |           |    |    |            |   |     |    |            |    |     |   |
| Median Type   Storage      |           |    |    |    |           | Undivided |    |    |            |   |     |    |            |    |     |   |

## Critical and Follow-up Headways

|                              |  |  |  |  |  |      |  |      |  |  |  |  |  |  |      |  |
|------------------------------|--|--|--|--|--|------|--|------|--|--|--|--|--|--|------|--|
| Base Critical Headway (sec)  |  |  |  |  |  | 7.5  |  | 6.9  |  |  |  |  |  |  | 4.1  |  |
| Critical Headway (sec)       |  |  |  |  |  | 6.80 |  | 6.90 |  |  |  |  |  |  | 4.10 |  |
| Base Follow-Up Headway (sec) |  |  |  |  |  | 3.5  |  | 3.3  |  |  |  |  |  |  | 2.2  |  |
| Follow-Up Headway (sec)      |  |  |  |  |  | 3.50 |  | 3.30 |  |  |  |  |  |  | 2.20 |  |

## Delay, Queue Length, and Level of Service

|   |  |  |  |  |  |      |  |  |  |  |  |  |  |      |  |  |  |
|---|--|--|--|--|--|------|--|--|--|--|--|--|--|------|--|--|--|
| Flow Rate, v (veh/h)                    |  |  |  |  |  | 29   |  |  |  |  |  |  |  | 20   |  |  |  |
| Capacity, c (veh/h)                     |  |  |  |  |  | 334  |  |  |  |  |  |  |  | 845  |  |  |  |
| v/c Ratio                               |  |  |  |  |  | 0.09 |  |  |  |  |  |  |  | 0.02 |  |  |  |
| 95% Queue Length, Q <sub>95</sub> (veh) |  |  |  |  |  | 0.3  |  |  |  |  |  |  |  | 0.1  |  |  |  |
| Control Delay (s/veh)                   |  |  |  |  |  | 16.8 |  |  |  |  |  |  |  | 9.4  |  |  |  |
| Level of Service (LOS)                  |  |  |  |  |  | C    |  |  |  |  |  |  |  | A    |  |  |  |
| Approach Delay (s/veh)                  |  |  |  |  |  | 16.8 |  |  |  |  |  |  |  | 0.4  |  |  |  |
| Approach LOS                            |  |  |  |  |  | C    |  |  |  |  |  |  |  |      |  |  |  |