



May 6, 2024

Mr. Haji Alam  
Faizan Corporation  
390 E. Gobbi Street  
Ukiah, CA 95482

## **Revised Addendum to the *Transportation Impact Study for a Gas Station at 9621 North State Street***

Dear Mr. Alam;

During the March 26, 2024, hearing before the Mendocino County Board of Supervisors regarding the proposed gas station project, it was noted that the trip generation estimates for the project evaluated in the subject study appear unreasonable for Mendocino County based on your experience with a similarly sized and sited Chevron gas station in Ukiah. As requested by the Board, further data has been collected to supplement that provided in the "Addendum to the *Transportation Impact Study for a Gas Station at 9621 North State Street*", March 25, 2024. The purpose of this letter is to present the data gathered as well as an updated analysis based on that information. This letter supersedes the "Addendum" dated March 25, 2024, in its entirety.

### **Trip Generation**

The anticipated trip generation for the proposed project as presented in the Transportation Impact Study (TIS) was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11<sup>th</sup> Edition, 2021, for Convenience Store/Gas Station (2-4 ksf) (LU #945). Based on these rates it was estimated that the project would generate 5,302 trips at the driveways per day, including 321 during the morning peak hour, 368 during the evening peak hour, and 340 during the Saturday peak hour. Based on local experience you have indicated that it appears highly unlikely that the project would actually generate 5,300 trips daily at its driveways.

To determine the peak hour trip generation that might be anticipated at the proposed project given its location in a more rural county, two sites in the Ukiah area that have a similar character in terms of the number of vehicle fueling positions and a convenience store, as well as proximity to US 101, were chosen. Although members of the Board specifically asked that data be collected at the Coyote Valley fuel center and convenience store, because this facility is located on tribal land, permission could not be obtained to install the data collection devices. The two sites chosen for the analysis were the Chevron station at 50 W. Lake Mendocino Drive and the Arco at 615 Talmage Avenue.

Counts were obtained of all vehicles entering and exiting each site on each of three dates, Wednesday, March 17 through Friday, March 19, during the critical two-hour p.m. peak period. This time was chosen as it has the highest existing volumes on the roadways as well as the highest trip generation period for gas stations, and so represents worst-case conditions. The highest volume hour on each date was used to develop the average trip generation for each site, which was then converted to a rate using the same independent variable of vehicle fueling positions, consistent with the ITE methodology. Based on this trip rate, the proposed project at 9621 North State Street would be expected to generate 93 trips during the p.m. peak hour, 50 of which would be inbound trips and 43 of which would be outbound trips. Copies of the counts, as well as the spreadsheet showing the derivation of the trip generation, are enclosed for reference.

**Table 1 – PM Peak Hour Trip Generation Derivation**

| <b>Sample Site</b>      | <b>Units</b>  | <b>Trips In</b> | <b>Trips Out</b> | <b>Total Trips</b> | <b>Rate</b> |
|-------------------------|---------------|-----------------|------------------|--------------------|-------------|
| Arco*                   | 12 vfp        | 28              | 16               | 44                 | 3.67        |
| Chevron*                | 14 vfp        | 36              | 45               | 81                 | 5.79        |
| <i>Average Rate</i>     |               | <i>54%</i>      | <i>46%</i>       |                    | <i>4.67</i> |
| <b>Proposed Project</b> | <b>20 vfp</b> | <b>50</b>       | <b>43</b>        | <b>93</b>          | <b>4.67</b> |

Note: vfp = vehicle fueling position

\* Data shown is the average of the highest hour during the p.m. peak period on each of three days

This count-based p.m. peak hour trip rate is about one-quarter of the published ITE p.m. peak hour rate. This difference is likely due to the age of ITE's data, which is from the 1980's through the 2010's. Since then, there has been increased fuel efficiency, remote work, and online shopping, all of which have reduced the number of trips people make to gas stations. Additionally, much of the data used by ITE was collected in more urbanized areas where traffic volumes are higher, resulting in a higher potential customer base for the stations. Based on the data obtained as well as in consideration of factors affecting the trip generation for gas stations and convenience markets, it appears that the trip generation as used in the traffic analysis substantially overstated the potential effects of the proposed project.

## Right-Turn Lane Warrants

Using the same methodology as used for the analysis detailed in the TIS and the new count-based p.m. peak hour trip generation developed from similar Ukiah area facilities, the volume at which a right-turn lane from US 101 onto North State Street would be warranted was reevaluated. It was determined that up to 64 right turns could be accommodated under current volumes and up to 48 under higher future volumes before the right-turn lane would be warranted. Applying the trip distribution of 75 percent of project-generated trips coming from south of the project site using US 101, the project as proposed would be expected to generate up to 38 right turns onto North State Street from US 101. Even with these volumes added to the eight existing right turns, a right-turn lane would not be warranted under short-term conditions. While a right-turn taper is warranted, there is an existing right-turn taper on US 101 so no further improvements would be needed. A copy of the updated turn-lane warrant analysis is enclosed.

**Finding** – A right-turn lane on US 101 to North State Street is not warranted for the highest volumes evaluated using the count-based trip generation based on similar Ukiah area facilities. A right-turn taper exists, so no further improvements are needed.

## Conclusions and Recommendations

- The trip generation as applied in the TIS was based on standard ITE theoretical rates and does not appear to be reasonable when compared to current local conditions.
- The project's estimated p.m. peak hour trip generation is likely to be one-quarter of that based on standard ITE rates (75 percent lower).
- Using the lower and more realistic trip generation detailed above, a right-turn lane would not be warranted on US 101 even under future volumes. A right-turn taper is warranted on US 101 and is satisfied by the existing geometrics.

Thank you for giving W-Trans the opportunity to provide these services. Please call if you have any questions.

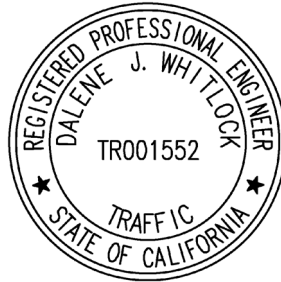
Sincerely,

*William Andrews*

William Andrews, EIT  
Assistant Engineer

*Dalene J. Whitlock*

Dalene J. Whitlock, PE (Civil, Traffic), PTOE  
Senior Principal



DJW/wia/MEX124.L3

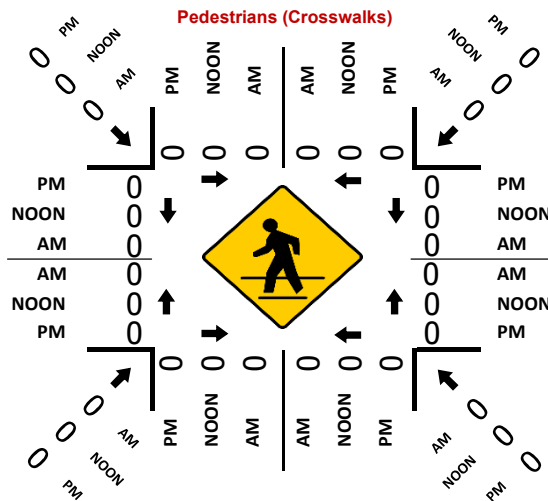
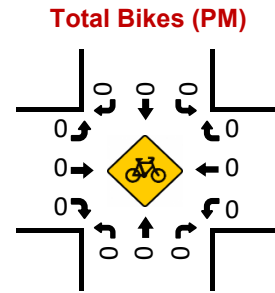
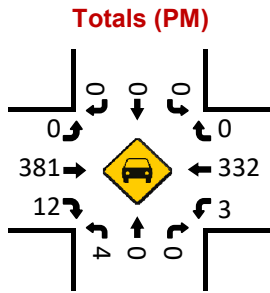
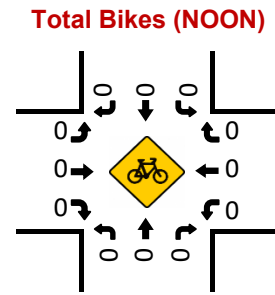
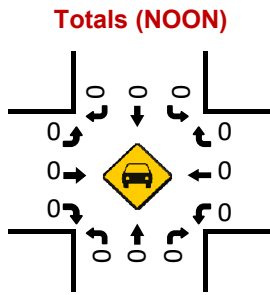
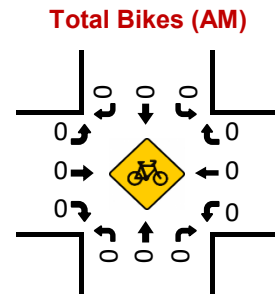
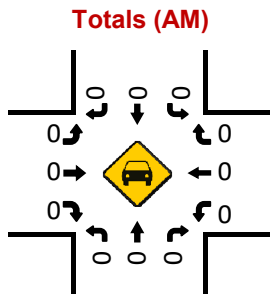
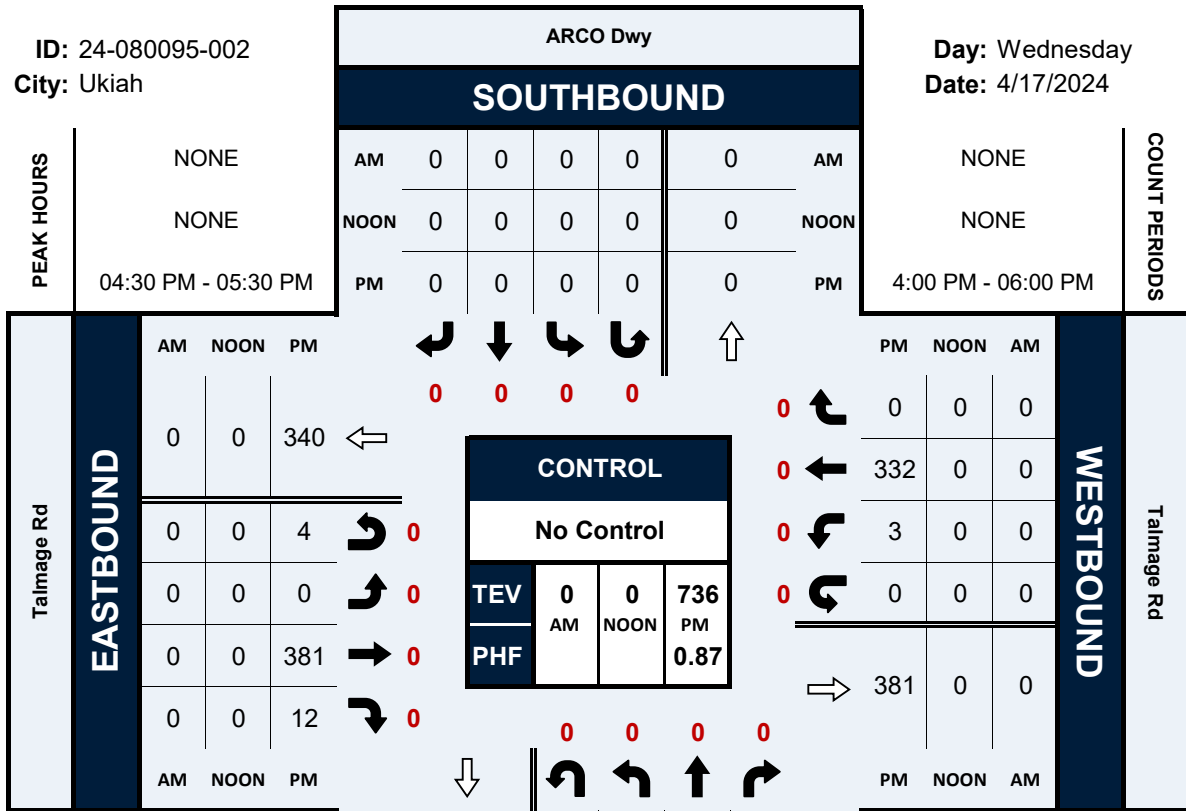
Enclosures: Traffic Counts, Trip Rate Calculation, Turn-lane Warrants

# ARCO Dwy & Talmage Rd

## Peak Hour Turning Movement Count

ID: 24-080095-002  
City: Ukiah

Day: Wednesday  
Date: 4/17/2024

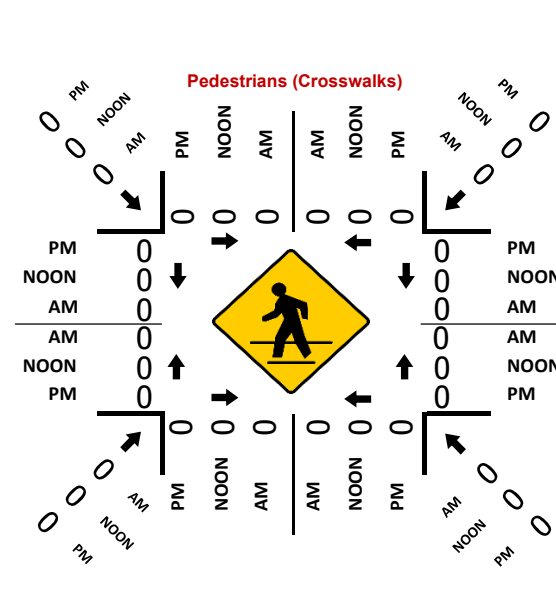
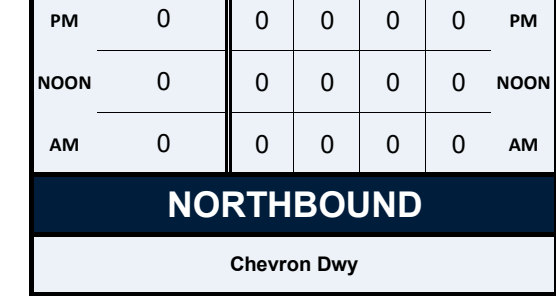
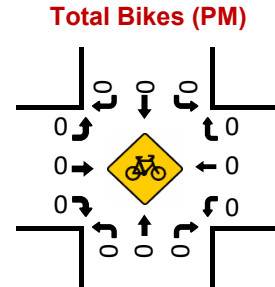
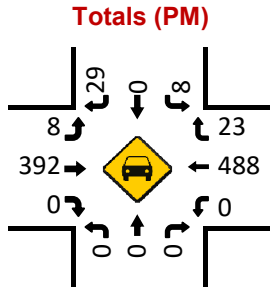
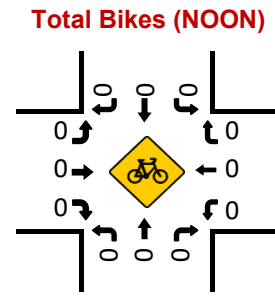
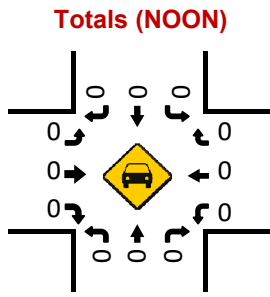
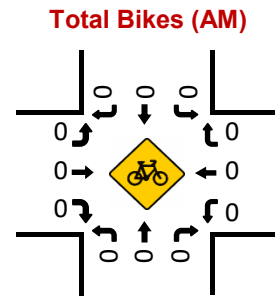
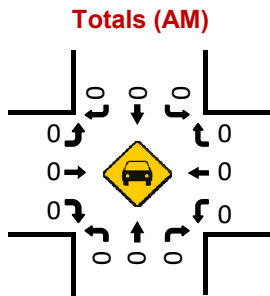
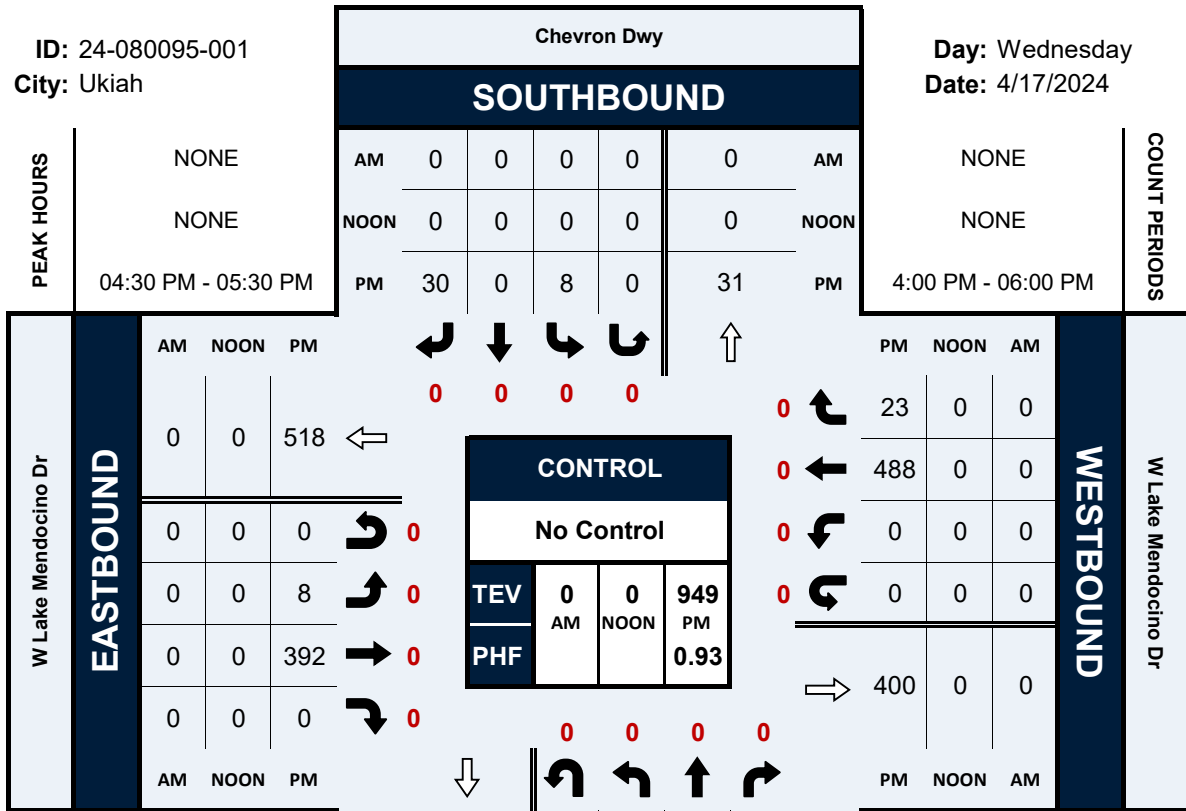


# Chevron Dwy & W Lake Mendocino Dr

## Peak Hour Turning Movement Count

ID: 24-080095-001  
City: Ukiah

Day: Wednesday  
Date: 4/17/2024

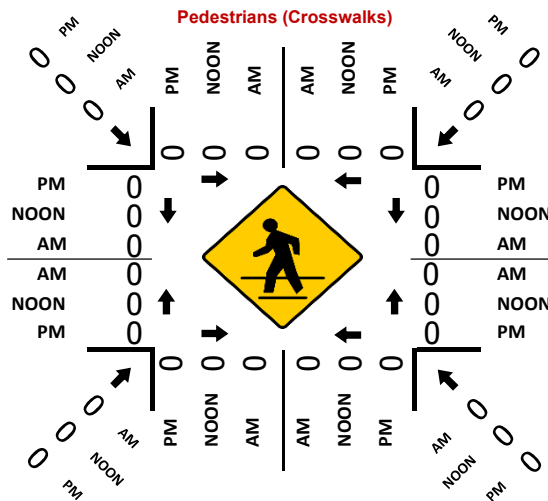
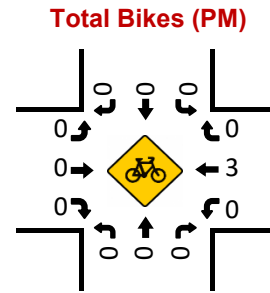
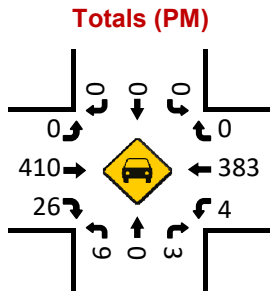
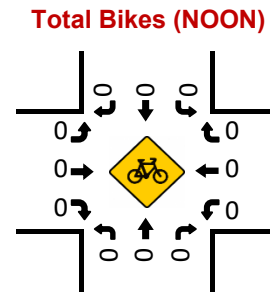
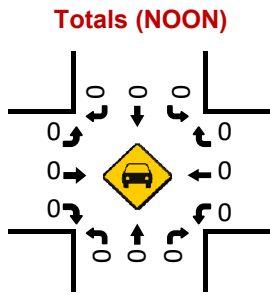
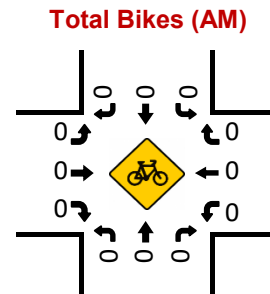
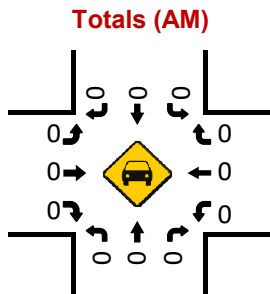
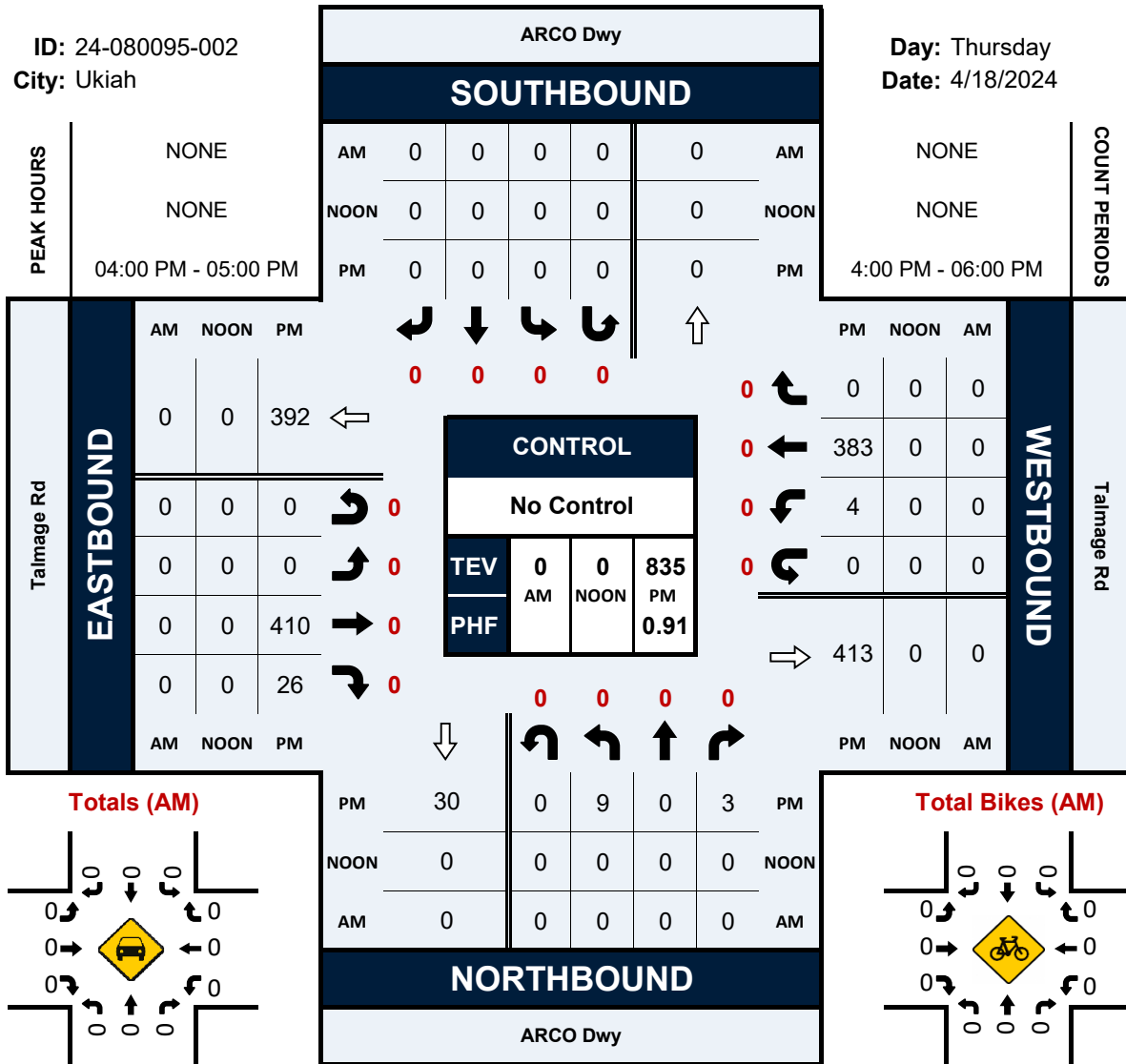


# ARCO Dwy & Talmage Rd

## Peak Hour Turning Movement Count

ID: 24-080095-002  
City: Ukiah

Day: Thursday  
Date: 4/18/2024

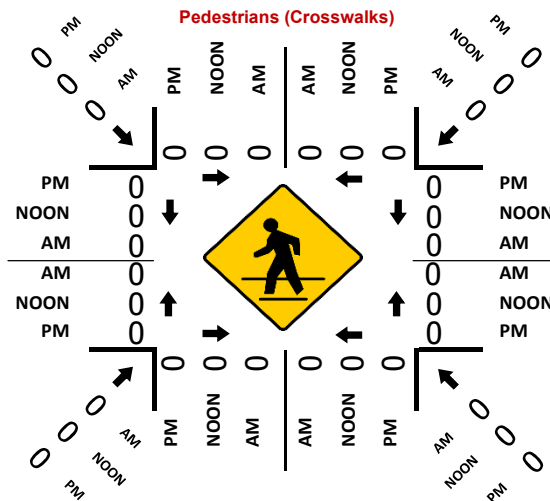
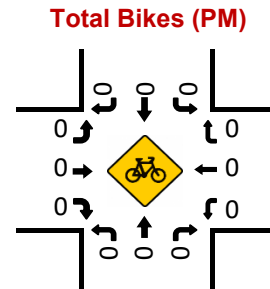
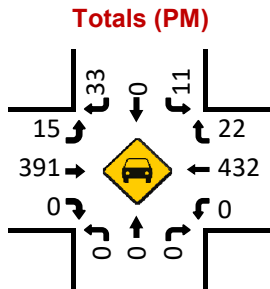
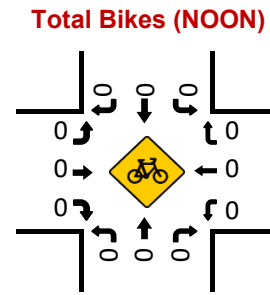
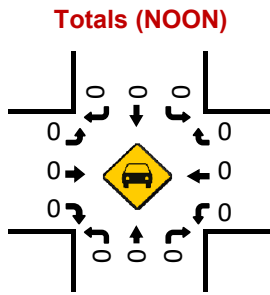
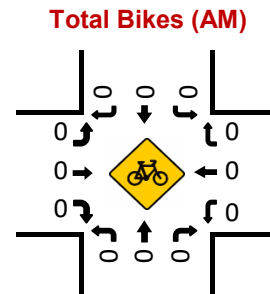
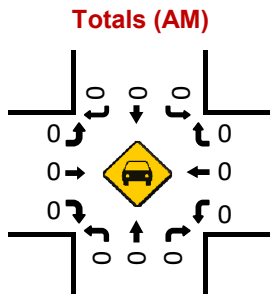
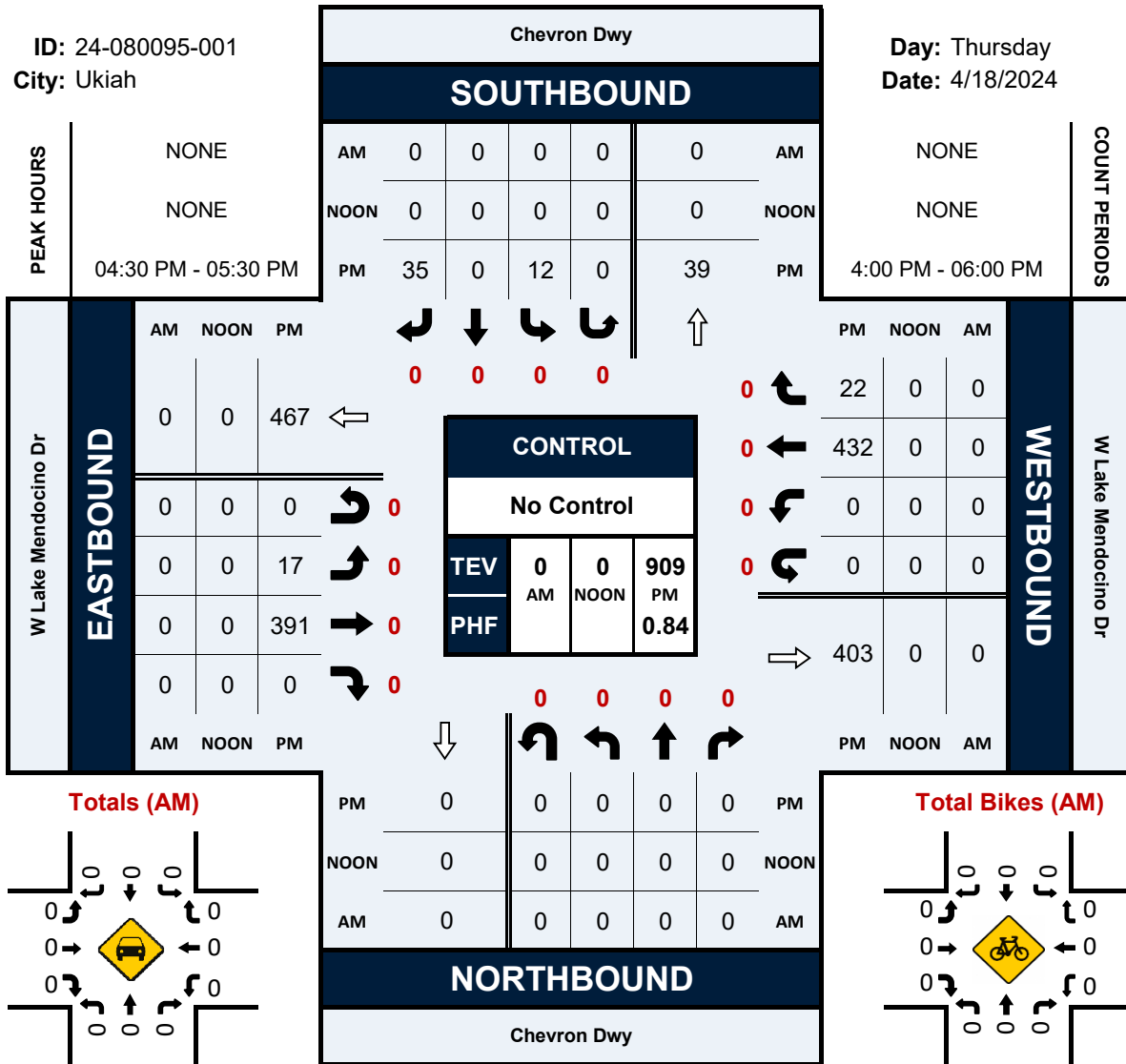


# Chevron Dwy & W Lake Mendocino Dr

## Peak Hour Turning Movement Count

ID: 24-080095-001  
City: Ukiah

Day: Thursday  
Date: 4/18/2024

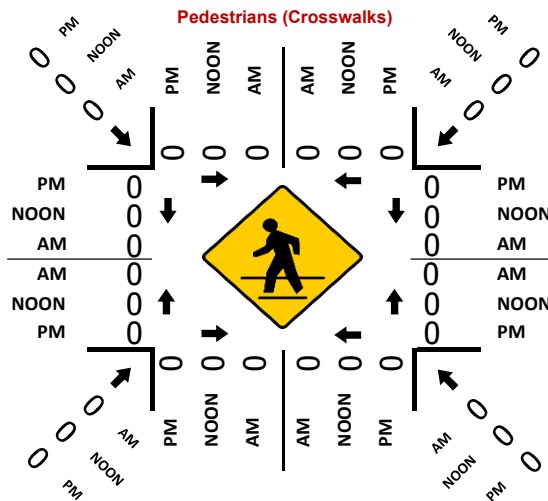
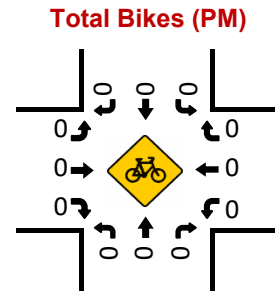
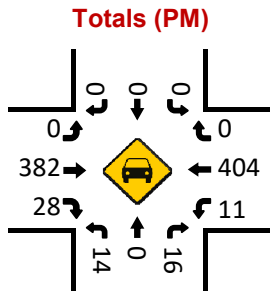
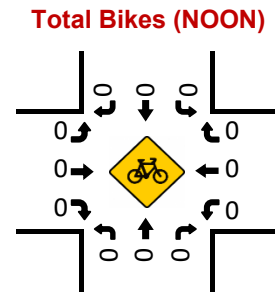
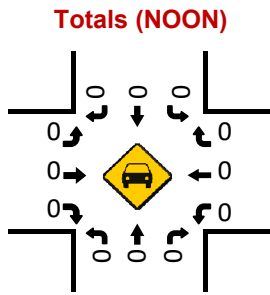
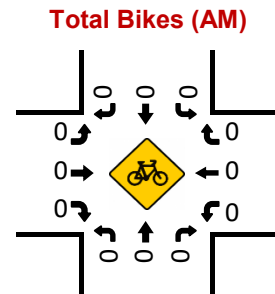
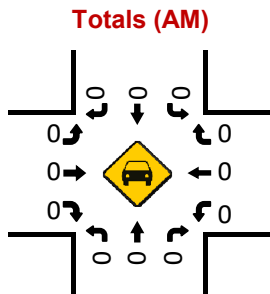
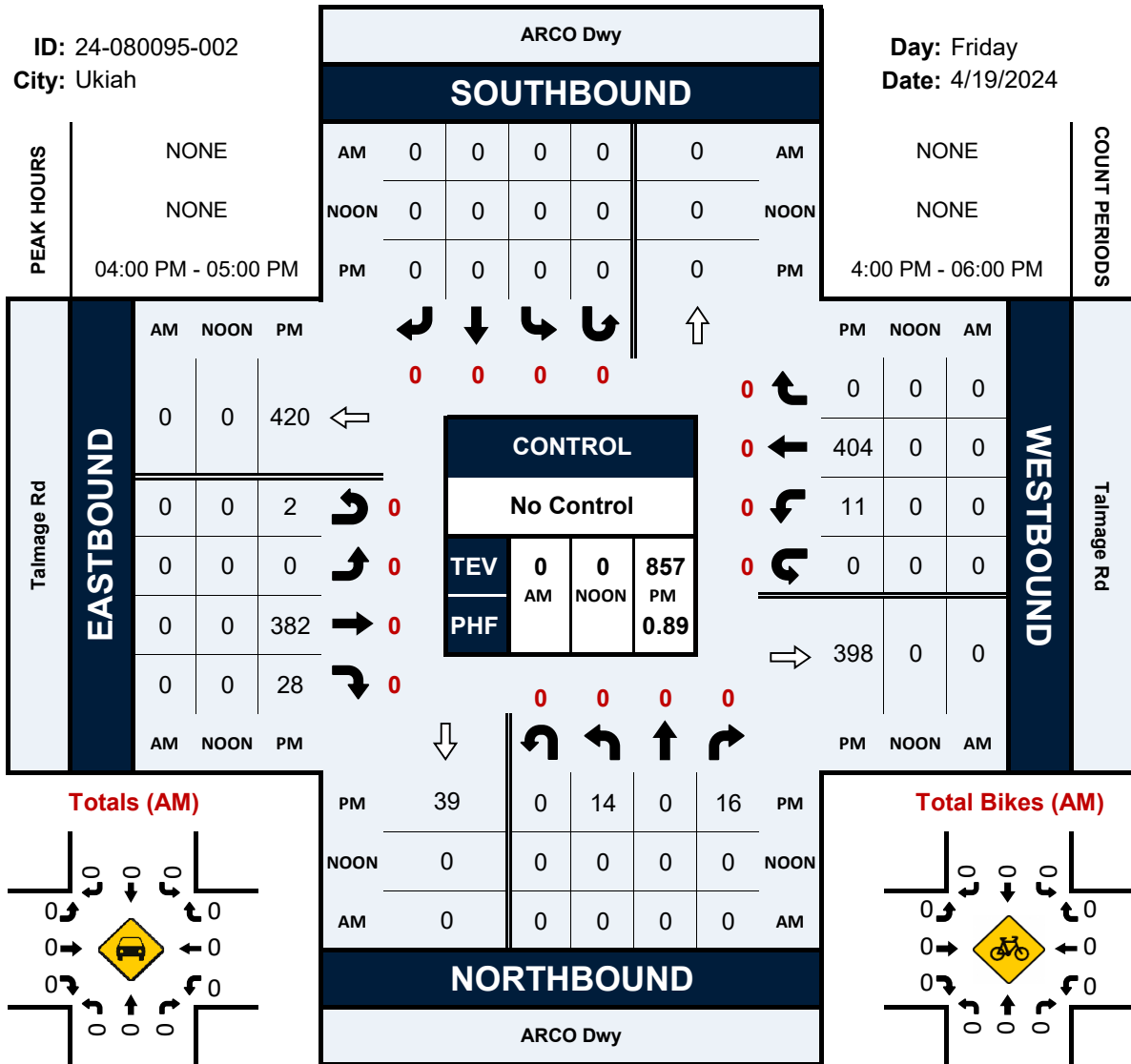


# ARCO Dwy & Talmage Rd

## Peak Hour Turning Movement Count

ID: 24-080095-002  
City: Ukiah

Day: Friday  
Date: 4/19/2024



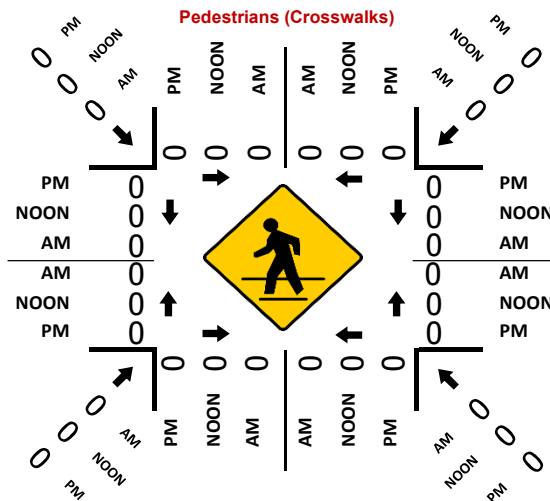
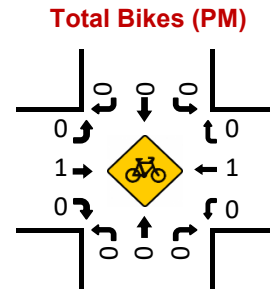
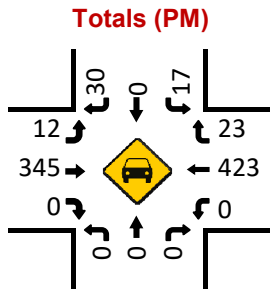
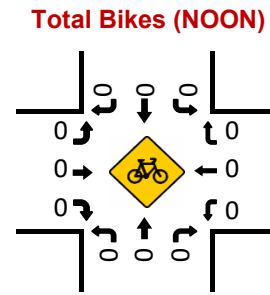
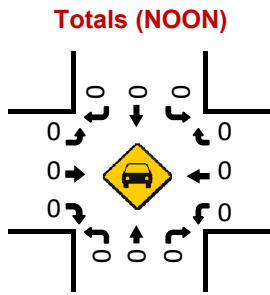
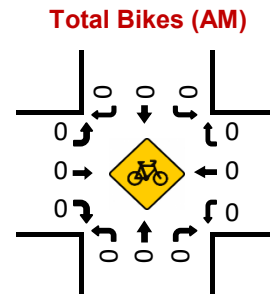
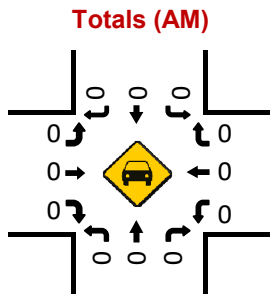
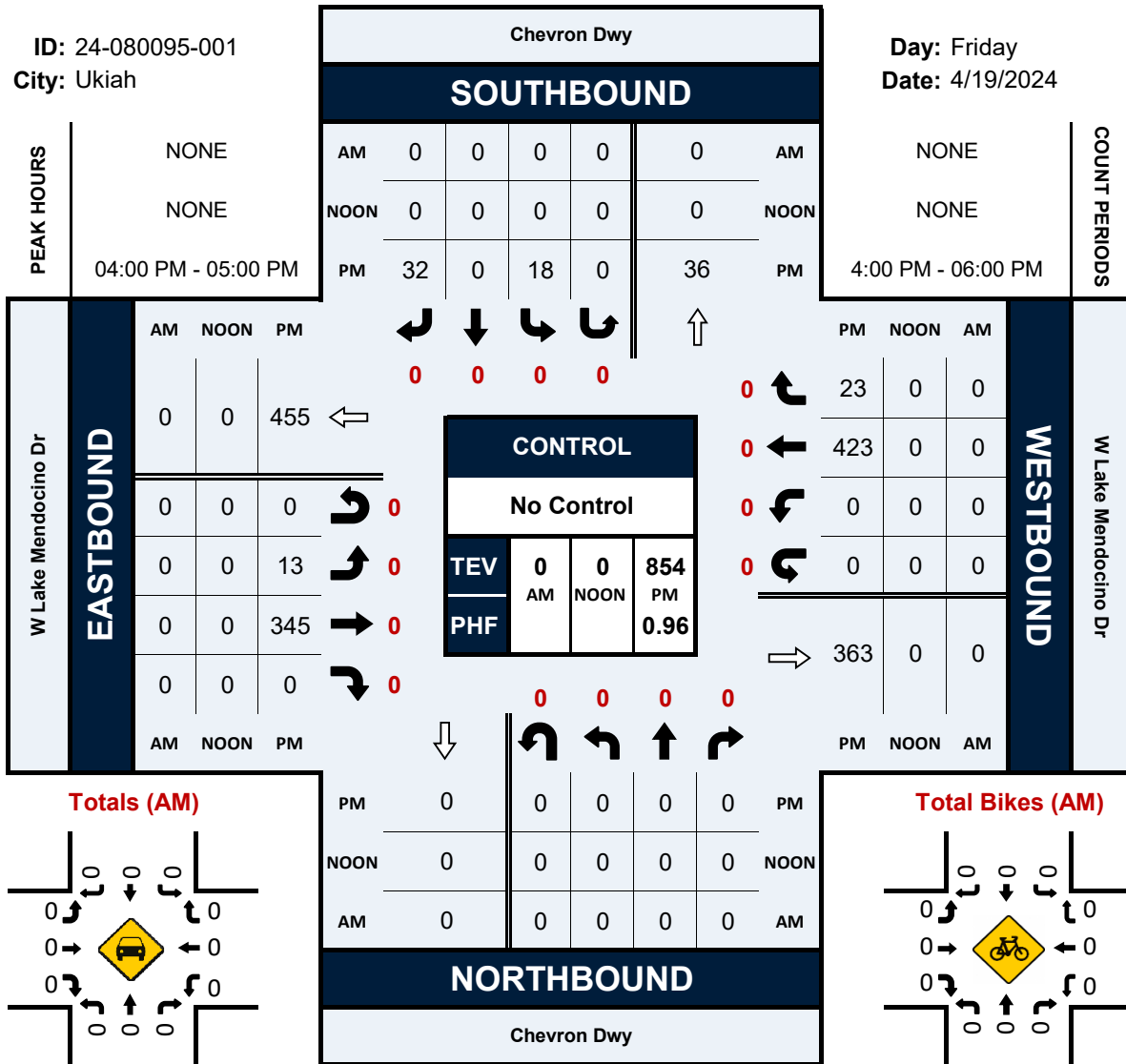


# Chevron Dwy & W Lake Mendocino Dr

## Peak Hour Turning Movement Count

ID: 24-080095-001  
City: Ukiah

Day: Friday  
Date: 4/19/2024



|         |                     | Wednesday 4/17/24 |    |     |      |          |       | Thursday 4/18/24 |          |       |        |          |       | Friday 4/19/24 |          |       |        |      |      |
|---------|---------------------|-------------------|----|-----|------|----------|-------|------------------|----------|-------|--------|----------|-------|----------------|----------|-------|--------|------|------|
|         | # Fueling Positions | Total In          |    | Out |      | Total TR | In TR | Out TR           | Total TR | In TR | Out TR | Total TR | In TR | Out TR         | Total TR | In TR | Out TR |      |      |
|         |                     |                   |    |     |      |          |       |                  |          |       |        |          |       |                |          |       |        |      |      |
| Arco    | 12                  | 19                | 15 | 4   | 1.58 | 1.25     | 0.33  | 42               | 30       | 12    | 3.50   | 2.50     | 1.00  | 69             | 39       | 30    | 5.75   | 3.25 | 2.50 |
| Chevron | 14                  | 69                | 31 | 38  | 4.93 | 2.21     | 2.71  | 86               | 39       | 47    | 6.14   | 2.79     | 3.36  | 86             | 36       | 50    | 6.14   | 2.57 | 3.57 |
|         |                     |                   |    |     | 3.26 | 1.73     | 1.52  |                  |          |       | 4.82   | 2.64     | 2.18  |                |          |       | 5.95   | 2.91 | 3.04 |

Peak Hour Rate Comparison  
Average  
Trips Per Position 4.67  
ITE Rate 18.42  
ITE/Actual Ratio 3.94

In % Out %  
Arco 65% 35%  
Chevron 44% 56%  
Average 54% 46%

Station Averages  
In Out Total Rate/vfp  
Arco 28 15 43 3.61  
Chevro 35 45 80 5.74  
4.67

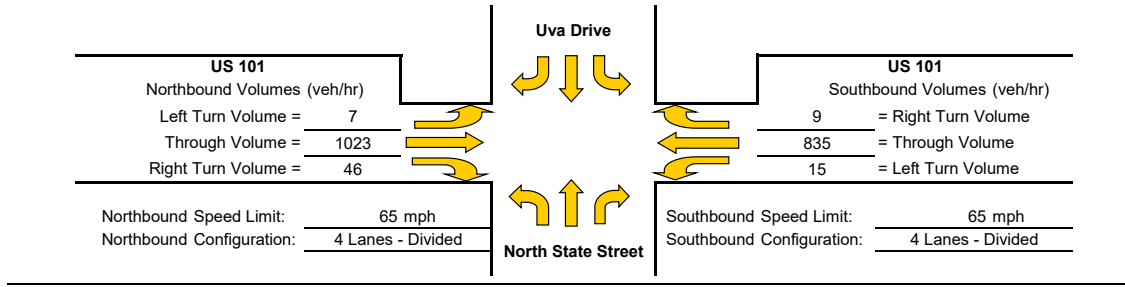
Project  
20 vfp  
93 Trips  
50 In  
43 Out

# Turn Lane Warrant Analysis - 4 Legged Intersections

Study Intersection: US 101/Uva Drive-North State Street

Study Scenario: PM Future plus Project without Closure

Direction of Analysis Street: North/South



## Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for turn lane
 

|                                  |      |
|----------------------------------|------|
| Advancing Volume Threshold: AV = | 1116 |
| Advancing Volume Va =            | 1076 |
| If AV < Va then warrant is met   | No   |

**Right Turn Lane Warranted: NO**

## Northbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for taper
 

|                                 |      |
|---------------------------------|------|
| Advancing Volume Threshold AV = | -200 |
| Advancing Volume Va =           | 1076 |
| If AV < Va then warrant is met  | Yes  |

**Right Turn Taper Warranted: YES**

## Southbound Right Turn Lane Warrants

1. Check for right turn volume criteria

**NOT WARRANTED - Less than 40 vehicles**

2. Check advance volume threshold criteria for turn lane
 

|                                  |     |
|----------------------------------|-----|
| Advancing Volume Threshold: AV = | -   |
| Advancing Volume Va =            | 859 |
| If AV < Va then warrant is met   | No  |

**Right Turn Lane Warranted: NO**

## Southbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for taper
 

|                                 |        |
|---------------------------------|--------|
| Advancing Volume Threshold AV = | 1033.3 |
| Advancing Volume Va =           | 859    |
| If AV < Va then warrant is met  | No     |

**Right Turn Taper Warranted: NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, Jan. 1997. The right turn lane and taper analysis is based on work conducted by Cottrell in 1981. The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.