



*City of Arts & Innovation*

# Transportation Board

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**TO: TRANSPORTATION BOARD** **DATE: JANUARY 4, 2023**

**FROM: PUBLIC WORKS DEPARTMENT** **WARD: 1**

**SUBJECT: MISSION INN AVENUE AND REDWOOD DRIVE – INTERSECTION  
ALTERNATIVE IMPROVEMENT OPTIONS**

## **ISSUE:**

Consideration of alternatives for traffic safety improvements at the intersection of Mission Inn Avenue at Redwood Drive

## **RECOMMENDATION:**

That the Transportation Board review and provide input regarding the proposed time-limited (3:00 PM – 9:00 PM) left turn restrictions along eastbound and westbound Mission Inn Avenue at Redwood Drive (Alternative Improvement Option 4).

## **BACKGROUND:**

Residents residing within the vicinity of the intersection of Mission Inn Avenue and Redwood Avenue cited traffic concerns and access challenges when making an eastbound or westbound left turn maneuver at the intersection.

City staff sent an initial letter to the surrounding neighborhood community to engage in the potential re-striping modification of the intersection to determine if the adjacent property owners were willing to remove on-street parking in order to construct a new separate left turn lane in the eastbound and westbound direction of the intersection within the existing right-of-way width based on a previously drafted concept plan (Alternative 1).

While there was a general agreement that a change in the left turn movement operations at the intersection was needed, there were four (4) responses received with all four opposed the previously drafted concept plan (Alternative 1) citing the following reasons:

- The Plan will result in the loss of on-street parking along Mission Inn Avenue adjacent to existing residential properties
- Loss of parking will result in negative impacts to parking availability for commercial deliveries such as pizza orders, Amazon, FedEx, UPS, plumbers, lawn maintenance, etc.

- Reduces the property value of the abutting homes due to lack of available on-street parking for residents and guests

Based on the initial feedback from the community opposing Alternative 1 in order to preserve on-street parking, staff prepared additional intersection improvement alternatives for consideration.

## **DISCUSSION:**

### **Existing Conditions:**

Mission Inn Avenue at Redwood Avenue is a traffic signalized intersection. Mission Inn Avenue is a 4-lane undivided roadway with two travel lanes in each direction and a posted speed limit of 35MPH. There are no separate left turn lanes in the eastbound and westbound direction along Mission Inn Avenue at the intersection. Redwood Drive is an undivided two-lane roadway with one lane in each direction and a 25 MPH posted speed limit on the north side of Mission Inn Avenue. Redwood Drive is a 4-lane undivided roadway with two lanes in each direction and a posted speed limit of 40 MPH south of Mission Inn Avenue and changes its roadway name to University Avenue.

On-street parking is currently permitted on the north side of Mission Inn Avenue along both sides of its intersection prior to and after its intersection with Redwood Drive. On-street parking is available on the south side of Mission Inn Avenue east of Redwood Drive after an existing 70-foot red curb parking restriction. There are existing parking restrictions on the south side of Mission Inn Avenue west of its intersection of Redwood Drive.

There is an existing bus stop on the southeast corner of the intersection.

### **Traffic Safety Evaluation:**

Based on a 3-year collision history analysis (10/19-10/22), there were a total of seventeen (17) reported traffic collisions near the intersection. There was a total of seven (7) collisions combined that involved eastbound left turns and westbound left turns maneuvers that resulted in broadside or head-on collisions. Six of the seven collisions occurred during the hours of 3PM to 9PM. One collision occurred at 8AM.

### **Alternative Option 1 – Add new EB & WB Left Turn Lanes including New Parking Restrictions:**

Alternative Option 1 requires new parking restrictions on the north side of Mission Inn Avenue before and after Redwood Drive. New eastbound and westbound left turn lanes would be created that improves visibility for left turn movements. Operationally, permitted left turn phasing would be continued unless new traffic signal poles and mast arms are built to establish protected phasing operations. Separate left turn lanes and improved visibility are considered safety features that are anticipated to reduce future left turn movement incidents. Alternative Option 1 was initially sent to the neighboring community via mail for consideration and staff received four (4) letters opposing this option due to the loss of on-street parking and associated impacts to the adjacent homeowners.

### Alternative Option 2 – Convert One Existing Through Lane to A Left Turn Lane & Preserve Parking:

Alternative Option 2 preserves the existing on-street parking to address the community concerns while simultaneously converting one existing through lane into a left turn lane for the eastbound and westbound direction. This option reduces the roadway capacity for the eastbound and westbound through movements and results in a deficient Level of Service for intersection operations (LOS “F”). Traffic congestion and extensive delays will result from this option. The roadway segment capacity along Mission Inn Avenue west of Redwood Drive requires a minimum of two through travel lanes in each direction (total of 4 through lanes) based on the acceptable volume to capacity (V/C) ratio analysis. Option 2 provides a separate left turn lane but does not improve left turn movement visibility due to unaligned left turn lanes.

### Alternative Option 3 – Split Phase Operations for EB & WB Movements:

Alternative Option 3 preserves the existing on-street parking to address the community concerns while simultaneously modifying the traffic operations to split phase operations. Split phase operations mean all of the eastbound movements (left, thru, right) will start as one phase and then the westbound movement (left, thru, right) as a separate phase. The left turn and opposing through movements would not have a green indication simultaneously so this will improve traffic safety. However, split phase operations for the eastbound and westbound through movements are anticipated to result in a deficient Level of Service for intersection operations (LOS “F”). Traffic congestion and extensive delays will result from this option. Split Phase operations is not an efficient traffic option for these movements because it underutilizes the through movement capacity.

### Alternative Option 4 – Restrict EB & WB Left Turn Movements (3:00 PM - 9:00PM):

Alternative Option 4, implementing EB & WB left turn movement restrictions during the hours of 3:00 PM – 9:00 PM, preserves the existing on-street parking to address the community concerns and is anticipated to drastically reduce (if not eliminate) eastbound and westbound left turn traffic collisions such as broadside and head-on collisions during that specific time frame. The traffic safety evaluation resulted in six of the seven EB & WB left turning traffic collisions to occur during the hours of 3PM-9PM. Option 4 is designed to eliminate those six left-turning collisions during that time frame. The intersection levels of service operations are expected to be acceptable with Option 4 during the PM Peak Hour and has no impact to the AM Peak Hour since there are no restrictions during the morning time. The volume to capacity ratio for the roadway segment analysis is acceptable since all four through travel lanes along Mission Inn are maintained. Eastbound and westbound left turning traffic volumes would be re-routed to adjacent intersections. For eastbound left turning traffic, motorists would be re-directed to make a left turn at Pine St instead of at Redwood Drive during the prohibited hours of 3PM-9PM. For westbound left turning traffic, motorists would be re-routed to make the westbound left turn maneuver at Cedar St, Locust St, Brockton Ave or make a u-turn maneuver at Scout Ln during the prohibited hours of 3PM-9PM. It should be noted that there are existing westbound left turn restrictions at Pine Street and Arfon Way along Mission Inn. There is a potential for the left turning traffic to impact the operations at the adjacent intersections during the prohibited hours of 3PM-9PM. Based on the evaluation of Alternative Improvement Option 4, staff is recommending proceeding forward with Option 4 due to its

acceptable operational results, anticipated safety benefits and addressing the community's on-street parking.

#### Additional Considerations for Left Turn Protected Phasing:

Protected Left turn phasing requires a separate left turn lane and a signal head indication directly in front of the left turn lane to display a green arrow for each direction. Only Options 1 and 2 proposes separate left turn lane options. New signal poles and new signal mast arms will be required to construct signal head indications directly in front of the left turn lanes to display a green arrow. This high-cost improvement will have to be funded via grant funds and / or capital improvement projects if protected phasing option is warranted.

Protected left turn phasing technical warrants were evaluated using two methods - the Federal Highway Administration's (FHWA) Signal Timing Manual Figure 4-11 Guideline for determining Left Turn Operations and the Highway Capacity Manual (HCM) Exhibit 31-40 Planning Level Analysis for Left Turn Treatment Worksheets. Based on the existing intersection traffic volumes, intersection geometry and 3-year collision history, both of the technical warrants for protected left turn phasing operations are not currently satisfied. Thus, protected left turn phasing operations along eastbound and westbound Mission Inn Avenue are not recommended at this time.

#### **STRATEGIC PLAN ALIGNMENT:**

This proposal follows Strategic Plan Goal 2.4, to "Support programs and innovations that enhance community safety, encourage neighborhood engagement, and build public trust." Additionally, proposed signage relates to the cross-cutting threads as demonstrated below:

1. Community Trust: This project is directly responsive to resident requests for traffic safety evaluation at the subject intersection. Traffic Engineering sent out mailers to obtain feedback and received input from the community regarding alternative concepts and to preserve on-street parking availability.
2. Equity: The proposed evaluation of intersection improvement options balances the needs for access in the abutting residential neighborhoods, residential parking demands and motorists along Mission Inn Avenue.
3. Fiscal Responsibility: City Streets Division crews would fabricate and install necessary signage and striping to implement the proposed Alternative Option 4 improvements to minimize project costs. The low-cost counter-measure signage restriction improvements are fiscally responsible to allow for further assessment of effectiveness and overall impacts prior to considering more costly permanent improvements.
4. Innovation: This proposed Alternative Option 4 supports innovative measures to mitigate traffic and parking impacts and preserve neighborhood safety and quality of life in highly impacted areas.
5. Sustainability & Resiliency: The proposed improvement Alternative Option 4 are intended to reduce left turn and through vehicular movement conflicts while preserving the on-street parking capacity for long-term sustainable demands.

#### **FISCAL IMPACT:**

The cost of sign fabrication and installation for Alternative Option 4 is estimated to be \$300. Funding is available in the existing Public Works Department budget, Signing Supplies account

number 4110100-424143, to cover this cost.

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Attachments:

1. Site Map
2. Aerial Map
3. Initial Email Traffic Safety Concern
4. City Letter
5. Responses Received
6. Traffic Safety Evaluation Summary & Collision History
7. Alternative Options 1-4
8. Intersection Level of Service Summary & Reports
9. Roadway Capacity Evaluation
10. Protected Left Turn Phasing Evaluation
11. Presentation