



*City of Arts & Innovation*

# Transportation Committee

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**TO: TRANSPORTATION COMMITTEE MEMBERS      DATE: NOVEMBER 9, 2017**  
**FROM: PUBLIC WORKS DEPARTMENT      WARD: 1**  
**SUBJECT: DOWNTOWN DIAGONAL CROSSING PILOT PROJECT FOLLOW-UP**

## **ISSUE:**

Consideration of permanent diagonal crosswalk installations following the one-month diagonal crosswalk pilot project.

## **RECOMMENDATION:**

That the Transportation Committee recommend that the City Council approve the installation of permanent diagonal crosswalks at the intersections of Mission Inn Avenue at Market Street and University Avenue at Market Street.

## **BACKGROUND:**

On May 11<sup>th</sup>, 2017 the Public Works Department presented information regarding the downtown diagonal crossing grant-funded pilot project, which took place on June 1<sup>st</sup>, 2017 in Downtown Riverside. The previous report discussed the unique operations of a diagonal crosswalk, which allow pedestrians to cross directly from one corner of the intersection to any other corner during a single pedestrian phase. The report also cited local examples and national research to demonstrate the benefits to pedestrian safety that a diagonal crosswalk can provide. The City of Riverside currently has one operational diagonal crosswalk at the intersection of Canyon Crest Boulevard and Linden Avenue that serves University of California, Riverside students.

The diagonal crosswalks proposed for the June 1<sup>st</sup>, 2017 pilot project were successfully installed at the intersections of Mission Inn Avenue at Market Street, and Mission Inn Avenue at Lemon Street. The Market Street crosswalk remained in place for several weeks to facilitate data collection.



Figure 1: Diagonal Crosswalk at Mission Inn Avenue at Market Street

## **DISCUSSION:**

The temporary diagonal crosswalk at Mission Inn Avenue and Market Street was studied using several performance measures:

1. Pedestrian volumes
2. Motorist delay
3. Resident feedback

### **1. Pedestrian Volumes**

Pedestrian counts were conducted during the diagonal crosswalk's pilot period, and on corresponding dates under regular crossing conditions.

During the pilot project, 30% of pedestrians crossing at Market Street & Mission Inn chose to cross diagonally through the intersection. On its peak operating day during the study, 1,293 out of 4,306 pedestrians crossed diagonally, with over 200 of these crossings taking place during a single 15 minute interval.

The volume counts indicate that more pedestrians made use of the intersection while the diagonal crosswalk was in place. The sharp increase in pedestrians observed on Saturday at the crosswalk is the result of an event hosted at the Fox Theater.

| Scenario               | Total Pedestrian Crossings Per Day |        |          |
|------------------------|------------------------------------|--------|----------|
|                        | Thursday                           | Friday | Saturday |
| Regular Crossing       | 3527                               | 1360   | 1140     |
| With Diagonal Crossing | 4306                               | 1375   | 3710     |
|                        | +22%                               | +1%    | +325%*   |

\*NPC West Coast Classic Event at Fox Theater

Many variables contribute to pedestrian traffic levels in the downtown, but the data suggests that even on non-event days more pedestrians were attracted to use the intersection. The data also suggests that the diagonal crosswalk allows the intersection to convey more pedestrians than a typical crosswalk design.

## 2. Motorist Delay

The initial report presented to the Transportation Committee anticipated that delays to motorists would be an inevitable result of providing an exclusive pedestrian signal phase to accommodate the diagonal crosswalk.

The Traffic Division conducted GPS travel time studies with and without the diagonal crosswalk to measure the impact to motorists. Using collected data, staff produced a Corridor Synchronization Performance Index (CSPI), a measurement of motorists' average speed, number of stops per mile, and the number of green lights a motorist receives on a corridor. The CSPI score is translated to a traditional letter grade from A-F.

It is important to note that a CSPI score in areas with lower speed limits is inherently lower; areas such as Downtown Riverside with densely spaced intersections, frequent interruptions by emergency vehicles, and a high number of pedestrian crossings, often have lower CSPI scores when compared to major arterials with intersections spaced 1500' apart or greater. The study was conducted between 10<sup>th</sup> Street and 1<sup>st</sup> Street along Market Street- which is one of the most impacted areas of Downtown.

In general, CSPI Scores less than 70 can use improvement. The City of Riverside Traffic Division has previously demonstrated a need to retime the Downtown traffic signals under existing conditions, and has already secured grant funding through the Highway Safety Improvement Program Cycle 7 to replace traffic signal controllers, install additional cameras, and provide consultant services to retime the downtown grid in response to recent and upcoming development. These funded changes would improve the baseline conditions shown in Table 2.

Table 2 demonstrates the change in corridor progression following implementation of the diagonal crosswalk:

| Market Street (10 <sup>th</sup> – 1 <sup>st</sup> ) Corridor Synchronization Performance Index |               |            |            |
|--|---------------|------------|------------|
| AM Peak Hour of Traffic  |               |            |            |
|  | Average Speed | CSPI Score | CSPI Grade |
| Regular Xwalk  | 27.3 MPH      | 81.4       | B          |
| Diagonal Xwalk   | 25.0 MPH      | 61.0       | D          |
| PM Peak Hour of Traffic  |               |            |            |
|  | Average Speed | CSPI Score | CSPI Grade |
| Regular Xwalk  | 25.6 MPH      | 65.7       | D          |
| Diagonal Xwalk   | 20.3 MPH      | 21.9       | F          |

Corridor progression deteriorated during both the AM and PM peak hours of traffic; staff observed the most significant increase in delay along the northbound direction of travel during the PM commute. Additionally, the left turns from Mission Inn Avenue to north and southbound Market Street experienced increased delays.

## 3. Resident Feedback

The Southern California Association of Governments SCAG conducted a survey of pedestrians at the diagonal crosswalk, and collected comments from 152 individuals regarding the pilot project improvements. SCAG reported in the feedback summary provided to the City that all comments

were positive and a majority of comments were in support of the proposed improvements. Residents noted that the diagonal crosswalk saved them time and made them feel safe as they crossed the intersection.

The City of Riverside Traffic Division did receive several service requests regarding signal progression performance during the pilot project. While Traffic Staff made efforts to improve the signal coordination, measured results indicate that progression continued to remain sub-optimal throughout the pilot.

SCAG also conducted a more focused study survey of a smaller sample size (17 individuals) who were asked in-depth questions regarding the streetscape improvements. Of the respondents, 16 of the 17 supported pedestrian scramble crosswalks as permanent changes in their community.

## Findings

With 4,306 pedestrian crossings at the intersection during the diagonal crosswalk pilot project, pedestrians accounted for approximately 11% of the daily combined vehicular and pedestrian entering traffic at Market Street & Mission Inn Avenue. The intersection is also highly traversed by pedestrians during the month-long Festival of Lights. This significant usage is only anticipated to increase as housing, dining, hotel, and other upcoming land uses are constructed in the Downtown along Market Street. Pedestrians are the most vulnerable of our roadway users, and the Transportation Research Board has published findings that identify diagonal crosswalks as a viable pedestrian collision countermeasure.

Traffic Staff observed an increase in vehicle delay during the diagonal crosswalk pilot program, but anticipates that the delay can be mitigated in part through the implementation of the following recommendations:

1. Install a second diagonal crosswalk at Market Street and University Avenue. This second crossing will allow staff to keep the intersection at Mission Inn Avenue more closely in step with University Avenue, and ensure vehicles proceeding northbound across University Avenue will clear Mission Inn Avenue during the PM peak hour of traffic.
2. Install “no right turn” blank-out lighted signage to restrict right turns during the diagonal crossing movement. A portion of the delay at the intersection was caused by the “no right turn on red” signage that limited right turn movements at all times. Installation of the blank-out signs, which are activated by the traffic signal, will limit the restriction to pedestrian crossing times only.
3. Install “accessible pedestrian signal” push-buttons that allow staff to program a faster walking rate into the traffic signal and reduce the amount of time the diagonal crosswalk is activated. The button can be depressed longer to allow for an extended crossing time, and this information will be relayed via signage and an audio message at the push-button. The “accessible pedestrian signal” buttons are already funded through the Active Transportation Program Cycle 1 – which has already been bid and is expected to be awarded in 2017.

The above signal improvements will help facilitate a more complete approach to pedestrian and motorist service along Market Street.

**FISCAL IMPACT:**

Striping and signage for the diagonal crosswalk can be implemented by staff within the existing Public Works budget.

The total cost to purchase 8 blank-out signs at the proposed intersections is approximately \$20,000, and the cost for the additional 8 pedestrian signal indications is approximately \$6,400. The Miscellaneous Signal Revisions account (586133-440313) would be used to fund the improvements, with a total cost of \$26,400.

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availability of funds: Adam Raymond, Chief Financial Officer/City Treasurer  
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Attachment: Presentation