City of Arts & Innovation

Mobility & Infrastructure Committee Memorandum

TO: **MOBILITY & INFRASTRUCTURE COMMITTEE** **DATE: JANUARY 12, 2023**

FROM: **PUBLIC WORKS DEPARTMENT** **WARDS: 5 & 6**

SUBJECT: **TYLER STREET BETWEEN SR-91 INTERCHANGE AND BURLINGTON NORTHERN SANTA FE RAILROAD CROSSING – CONCEPTUAL IMPROVEMENTS**

ISSUE:

Receive conceptual improvements for Tyler Street between SR-91 Interchange and Burlington Northern Santa Fe railroad crossing.

RECOMMENDATION:

That the Mobility & Infrastructure Committee receive and file an update on conceptual improvements for Tyler Street at SR-91 Interchange and Burlington Northern Santa Fe railroad crossing.

BACKGROUND:

Tyler Street is a north/south arterial that accommodates approximately 16,000 daily motorists through the Burlington Northern Santa Fe (BNSF) at-grade crossing. The amount of traffic just north of the SR-91 Interchange more than doubles to over 40,000 daily motorists. Tyler Street experiences heavy congestion as there are four signalized intersections (Indiana Avenue (S), Indiana Avenue (N), SR-91 Eastbound Ramps, and SR-91 Westbound Ramps) within a span of 880-feet. The approximately 104 trains/day traversing the at-grade crossing "preempt" nearby traffic signals to flush traffic away from the railroad tracks and provide constant disruptions through this section of Tyler Street. The corridor is also impacted by emergency responders disrupting signal coordination. The holiday season brings additional local and regional shoppers to the Galleria at Tyler and adds to typical traffic volumes and congestion.

Staff have worked with Caltrans to deploy and maintain City-generated traffic signal coordination plans through the SR-91 Interchange which allows the signals to recover faster after a railroad or emergency vehicle preemption event. Also, staff restriped the intersection of Tyler Street at the Target Shopping Center to move the southerly crosswalk leg to the northerly side of the intersection to coincide with the heavier traffic movement leaving the Galleria at Tyler. These changes have resulted in improved traffic operations, but motorists continue to be delayed during each train crossing.

On June 20, 2006, the Public Works Department presented short-, mid-, and long-term solutions to City Council to improve Tyler Street. City Council authorized staff to complete engineering studies to determine the feasibility and cost effectiveness of mid- and long-term strategies to reduce congestion through the Tyler Street/SR-91 Interchange. Staff worked with Caltrans and hired a consultant to develop conceptual alternatives that focused on eliminating the two heaviest traffic movements, south Tyler Street onto eastbound SR-91 and eastbound SR-91 onto northbound Tyler Street. The goal was to relocate the eastbound SR-91 Ramps intersection away from the BNSF rail crossing to lessen the delay to traffic entering or exiting the freeway.

Using Caltrans *Value Analysis* methodology, the following seven alternatives were generated (also see Attachment 2 – Location Map). It should be noted that updated Caltrans best practices and procedures may result in different alternatives should the project be pursued further.

Options

Option 1. New Eastbound Loop On-Ramp and Realignment of Indiana Avenue

This alternative constructs a new southbound Tyler Street to eastbound SR 91 loop ramp, moves the Indiana Avenue/Tyler Street intersection southerly to accommodate the new loop on-ramp and moves the westbound freeway ramps northerly to improve the spacing between the ramps. The bridge for new loop on-ramp would be constructed to accommodate a future widening of the 91 freeway. The estimated cost of this alternative is $80 million.

Advantages	Disadvantages
• Eliminated the conflict of the freeway eastbound off/on traffic	• Substantial right-of-way impacts
• SB Tyler St to EB 91 traffic should be unimpeded during railroad preemption	• SB Tyler ST traffic may back up during railroad preemption blocking traffic needing to enter EB SR-91
	• EB SR-91 off-ramp/Indiana Ave intersection is adjacent to the rail crossing

This alternative should provide efficient operation even with continuation of the railroad traffic signal pre-emptions. During pre-emption, movements off the eastbound freeway, going through on Indiana Avenue or left onto Tyler Street could receive a green signal for continued operation. Likewise, the southbound Tyler Street to the eastbound SR 91 loop on-ramp would also be able to continue to operate, provided that traffic on southbound Tyler Street does not block traffic before it can reach the loop on-ramp. This problem could be resolved if the bridge over the freeway were reconstructed and widened but that has substanial added cost and construction impacts. The development of PF Chang's Restaurant and the partial and full right-of-way takes would likely increase the construction cost. The close proximity of the realigned Indiana Ave. and eastbound SR 91 exit ramp to the existing railroad crossing may pose a concern to BNSF. Circulation on Diana Ave. would additionally be impacted.

Option 2. Single-Point Urban Interchange

This alternative reconstructs the interchange as a single point urban interchange. The estimated cost of this alternative is $50 million.

Advantages	Disadvantages
• Improves intersection spacing	• Ramp geometry is not standard

- Minimizes right-of-way impacts
- Reduces effects of railroad pre-emption, but requires further study
- May need to reconstruct SR 91 mainline to standardize sight distance at substantial additional cost
- Major construction traffic impacts

The single point urban interchange has the least right-of-way impact; however, the construction-related impacts on traffic and businesses would be significant. This alternative does not fully solve the closely spaced intersection with Indiana Avenue (N), nor does it eliminate the impacts of the railroad pre-emption of the traffic signals. Additional traffic analysis is required to better define the impacts of the traffic signal pre-emption and spacing of the intersection. By pushing the eastbound exit ramp further to the south, movements from the ramp to eastbound Indiana Ave. become more challenging and could require an exclusive signal phase that would impact signal coordination. To be successful, this alternative may need to be coupled with the relocation of the Indiana/Tyler Street intersection further south or grade separating Tyler Street with the railroad.

Option 3. Realigning Indiana Avenue and Relocating Railroad At-Grade Crossing West of Current Location and Adding Eastbound Hook On-/Off-Ramps

This alternative constructs new eastbound on and off ramps west of Tyler and relocates the Tyler Street railroad at-grade crossing west of its current location. The estimated cost of this alternative is $47 million.

Advantages

- Eliminates the conflict of eastbound off and eastbound on traffic
- Southbound traffic accessing the eastbound 91 should be unimpeded during railroad pre-emptions
- Improves intersection spacing

Disadvantages

- Nonstandard ramp geometry
- May require an additional traffic signal
- Reduced railroad crossing geometry including potentially non-standard vertical curvature
- Substantial right-of-way impacts

This alternative alleviates the major operational conflicts, as the turning movements for the eastbound on- and off-ramps no longer conflict with each other, the intersection spacing is improved, and the at-grade railroad crossing is shifted far enough from the ramp termini that railroad pre-emption should not be required. However, the geometry of the new hook ramps as well as the new railroad grade crossing would need to be validated if this alternative is pursued.

Option 4A. Construct Bow Tie Interchange north side of SR 91

This alternative relocates all the freeway ramps on the north side of the freeway and closes the existing eastbound freeway ramps. The estimated cost of this alternative is $62 million.

Advantages

- Greatly reduces right-of-way requirements
- Avoids modification of bridge deck
- Greatly reduces effects of railroad pre-emption
- Eliminates width of Tyler Street overcrossing as being a constraint
- Improves queuing distance at intersections

Disadvantages

- The eastbound on-ramp may be too close to Van Buren off-ramp requiring braiding of the ramps at additional cost
- Requires closure of Diana Street west of Tyler Street

This alternative would significantly improve operations as the eastbound ramp traffic is moved away from the at-grade railroad crossing, the intersection spacing is improved, there would be one less traffic signal in the area and the constraint imposed by the width of Tyler Street under SR 91 would no longer be an issue. This alternative also minimizes the amount of right-of-way needed to improve operations. This alternative could also be constructed with minimal disruption to local operations and access to local businesses during construction.

Option 4B. Construct Partial Bow Tie Interchange north side of SR 91

Same as 4A but the east bound on-ramp is not relocated, eliminating potential conflicts with the eastbound Van Buren off-ramp. This variation would reduce effectiveness as a partial signal would need to be maintained.

Option 5. Eastbound SR-91 Direct Connector to Hughes Alley

This alternative provides a direct connector from eastbound 91 Freeway to Hughes Alley. The estimated cost of this alternative is $38 million.

Advantages	Disadvantages
• Distributes eastbound 91 traffic to Hughes Alley & Galleria at Tyler • Provides almost direct access for eastbound 91 motorists to the two Galleria parking structures (Tyler and Hughes Alley) • Eliminates queuing of eastbound 91 traffic exiting the freeway onto the freeway mainline • Places increased traffic demand at Hughes Alley at Magnolia Ave	• May requires partial conversion of Hughes Alley to one-way • Creates isolated off-ramp not meeting Caltrans standards • May create cut-through traffic at ramp terminus through residential neighborhoods • Further design required to better understand right-of-way impacts

This alternative provides eastbound 91 to northbound Tyler Street traffic two possible routes and provides a direct connection to the Galleria at Tyler parking structure on Hughes Alley. Local residents and regional travelers going to other destinations north of SR 91 could also use this connection to Hughes Alley to access Magnolia Avenue.

Option 6. Hughes Alley Local Overcrossing

This alternative would provide a direct connection between Hughes Alley and Indiana Avenue by constructing a new bridge over the freeway, no freeway access is proposed from this connector. The Diana Avenue entrance to the Galleria at Tyler would remain open. The estimated cost of this alternative is $22 million.

Advantages	Disadvantages
• Provides local traffic an alternate route between Indiana Avenue and the north side of the 91 Freeway	• Right-of-way impacts • Slow speed connector

This alternative would provide a connection for local residents south of SR 91 to access the Galleria at Tyler and other destinations north of SR 91 removing this traffic from either Tyler Street or Van Buren Boulevard interchanges.

Option 7. Realign Indiana Avenue and Relocate Railroad Crossing West (Grade Separate)
This alternative would grade separate Tyler Street by extending Indiana Avenue west of Tyler Street and constructing an overpass over the BNSF Railroad. The existing Tyler Street at-grade rail crossing would be closed. The estimated cost of this alternative is $90 million.

Advantages

- Eliminates the railroad at-grade crossing and the impacts of the railroad pre-emption

Disadvantages

- Does not improve intersection spacing or vehicle storage deficiencies associated with the existing interchange.
- Significant right-of-way impacts

This alternative, or variations of, appears to be best approach to constructing a grade separation while minimizing impacts to the freeway and surrounding properties. This alternative could be constructed as a stand-alone project or be combined with other alternatives.

A more traditional grade separation along the existing Tyler Street alignment, either by raising or lowering the road, was determined to be difficult due to the close proximity of the railroad tracks to the freeway. Consequently, the consultant was able to develop only one grade separation alternative. Ultimately, the consultant recommended that improvements should be focused on the freeway interchange.

On April 11, 2017, the City Council approved Third Street at BNSF as the top priority grade separation and prioritized Spruce Street, Mary Street, and Jackson Street (no particular order) as future grade separation projects. Tyler Street was not selected as a viable grade separation project.

DISCUSSION:

Per the *2012 Grade Separation Priority Update Study for Alameda Corridor East (Riverside County)* train volumes are expected to significantly increase by 2035 as shown in Table 1.

Table 1: Train Volumes on the BNSF & UPRR (Riverside Line)

2011				2035 (Projected)			
Freight	Metrolink	Amtrak	Total	Freight	Metrolink	Amtrak	Total
66	35	3	**104**	137	54	4	**195**

With population growth, increased train and traffic volumes, the Vehicle Hours of Delay and Gate Down Time are expected to significantly increase. Table 2 reflects existing and projected impacts at the respective City at-grade crossings.

Table 2: Vehicle Delay and Gate Down Time at City at-grade Rail Crossings

		Vehicle Hours of Delay		**Gate Down Time (Minutes)**	
Rail Line	**Cross Street**	**2010**	**Projected 2035**	**2010**	**Projected 2035**
BNSF	Buchanan St	12.51	42.54	104.94	261.45
BNSF	Pierce St	13.47	69.76	105.35	261.45
BNSF	**Tyler St**	**19.32**	**111.79**	**105.35**	**261.45**
BNSF	Harrison St	8.23	22.48	104.94	260.60

BNSF	Gibson St	0.92	3.0	104.94	260.60
BNSF	Jackson St	9.11	80.56	105.35	261.45
BNSF	Adams St	22.88	157.86	105.35	261.45
BNSF	Jefferson St	8.89	21.88	104.94	260.60
BNSF	Madison St	19.77	140.14	105.35	261.45
BNSF	Washington St	10.21	61.43	104.94	261.45
BNSF	Mary St	14.14	111.79	105.35	261.45
BNSF & UP	Cridge St	6.42	19.04	159.97	241.78
BNSF & UP	Mission Inn Ave	12.84	144.29	173.42	457.66
BNSF & UP	Third St	27.39	127.30	173.42	457.66
BNSF & UP	Spruce St	17.91	322.67	173.42	457.66
BNSF & UP	Chicago Ave	36.31	115.28	173.42	457.66
BNSF & UP	Palmyrita Ave	9.15	35.47	172.75	456.13

Train volumes are anticipated to increase from 104 to 195 trains/day (88% increase) and gate down time may increase from 105.35 to 261.45 minutes (148% increase) per day. Based on the forecasted impacts to traffic and quality of life, the City may need to consider interchange improvements and/or a grade separation at the BNSF rail crossing to mitigate delay and operational concerns.

To evaluate the benefits, staff would hire a consultant to model the alternatives to assess the operational improvements, construction cost, right-of-way impacts, and construction challenges. After receiving preliminary results, staff would engage Caltrans to prepare a Project Study Report (PSR) and subsequently a Project Approval & Environmental Documentation (PA&ED) to assess the alternatives, design constraints, construction cost, and benefit-to-cost ratio to select the preferred alternative and complete the environmental documentation. During the following phase, the engineering plans, specifications, and engineer's estimate would be generated before awarding the project and proceeding to construction. Depending on the preferred alternative, the process can take several years to complete as the environmental phase and right-of-way acquisition/certification can be lengthy. Staff would engage the Galleria at Tyler, local neighborhoods, and other relevant stakeholders. Staff would additionally provide elected officials with regular updates regarding project milestones and funding. City has extensive experience with similarly complex projects having completed six grade separation and two interchange projects in the past eleven years. These projects often receive ample funding from various sources to plan and design the project, acquire necessary right-of-way and complete construction.

STRATEGIC PLAN ALIGNMENT:

This item contributes to **Strategic Priority 6 – Infrastructure, Mobility & Connectivity** and **Goal 6.2** - Maintain, protect and improve assets and infrastructure within the City's built environment to ensure and enhance reliability, resiliency, sustainability, and facilitate connectivity.

This item aligns with each of the five Cross-Cutting Threads as follows:

1. **Community Trust:** Capital improvements along Tyler Street to improve traffic progression are in the best intertest of the public and benefit the City's diverse populations and would result in greater public good.

2. **Equity:** Improved traffic progression through Tyler Street would improve the residential

neighborhood south of Indiana Avenue (S), emergency response times, improve safety, and facilitate trips to/from the Galleria at Tyler.

3. **Fiscal Responsibility:** Excessive gate-down time impacts commerce and quality of life. Staff would work with Caltrans and/or BNSF to select a project to make travel through the corridor more predictable to support commerce and retail business at the Galleria at Tyler. City staff would pursue grant funding, obtain financial commitments from the State and/or BNSF, and use local funds to pursue the selected project.

4. **Innovation:** The *Value Analysis* methodology presents seven alternatives that can be modeled to estimate their benefit to accommodate current and future traffic demand. The alternatives take into consideration the close proximity between the railroad tracks and SR-91 Interchange and right-of-way impacts to recommend various improvements and alignments.

5. **Sustainability & Resiliency:** The seven alternatives would be modeled to ensure selected improvements account for increased train volume, gate down time, projected population growth, and future traffic volumes on both Tyler Street and Caltrans entrance and exit ramps.

FISCAL IMPACT:

There is no fiscal impact associated with this update.

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Attachments:

1. Location Map
2. Design Alternatives
3. Presentation