STAFF REPORT

DATE: April 12, 2018
TO: Bicycling, Transportation, and Street Safety Commission
FROM: Brian Abbanat, Senior Transportation Planner
SUBJECT: Pole Line Road / Olive Drive Connection Ramp Alignment Alternatives (CIP 8314)

Recommendations
Informational

Background and Information

Background:
The Transportation Implementation Plan (TIP) identified the Pole Line Road-Olive Drive Connection/Montgomery WBAR Improvements, CIP No. 8313, as a high priority project. This project was studied as part of the Richards/Olive Corridor Study (ROCS), and presented to City Council in November 2016.

This project was submitted for regional and/or state grant funding four times in four years. The third submittal to the statewide ATP program resulted in a high overall score (86.5 of 100), but was not selected for funding due to intense competition statewide. The cutoff score in that cycle was 88.

Due to the passage of SB1 the California Transportation Commission (CTC) augmented funding for the statewide ATP program. Recognizing the large number of excellent unfunded projects throughout the state from the previous cycle, the CTC opted to select projects from that list via a short, supplemental application which staff submitted in July 2017. On August 31st, the CTC released its list of recommended projects, including the City’s Pole Line Road / Olive Drive Connection project for $3,540,000.

The below excerpt from the supplemental grant application briefly summarizes the project:

“This project will construct a new bike and pedestrian facility, connecting the Olive Drive neighborhood to the existing multi-use path on the Pole Line Road overcrossing, significantly strengthening the City's multi-use path network, reducing the distance to community destinations (including Montgomery Elementary School), and improving safety for this disadvantaged community. The Montgomery Elementary School improvements will benefit all children that attend the school by improving safety by eliminating right turn slip-lanes, conflicts between turning vehicles and crossing bike paths, and poor yield rate by drivers in right turn lanes.”

Ramp Alternatives
Since the completion of the Richards Olive Corridor Study (ROCS) in Fall 2016, the BTSSC has expressed some interest in exploring alternative potential ramp configurations to the
“switchback” concept produced in that study. In late December 2017, staff hired on-call consultant, Wood Rodgers, to initiate design of this ATP-funded project. Included in the scope of work was a technical memorandum that investigates the benefits and drawbacks of a linear bridge alternative versus the “switchback” alignment from the ROCS (see Attachment 1).

Due to the tight timeframe required to meet the City’s ATP funding schedule commitments, staff and consultants met in late February to discuss the technical memo and other project-related topics, at which point staff directed Rood Rodgers to proceed with design of the linear ramp concept based on the following factors:

- Linear ramp is technically feasible.
- Reduced construction cost.
- User preferences for linear ramp.

The tight decision-making timeframe also explains why this item is brought to the BTSSC as an informational item, though BTSSC feedback is welcomed.

**Schedule**

Staff expects final design to be completed in early 2019. Project construction is anticipated to begin in Summer 2019.

**Attachments**

1. Technical Memo: Ramp Alignment / Structure Type Alternatives
The purpose of this memorandum is to investigate and provide the pros and cons of a linear bridge alternative versus the switchback alignment identified in the Active Transportation Program (ATP) grant application. This information will then be used by the City as a basis to decide which structure type to proceed with for the environmental, design, and construction phases of the project. This memorandum should be considered as a concept level study only. Construction costs shown are ballpark and for comparative purposes only. They are not representative of actual total estimated construction costs – a more refined and detailed cost analysis would be needed for that.

The three (3) concept alternatives that were evaluated are:

1. Alternative 1: Switchback alignment with reinforced concrete slab structure type. This concept is consistent with the exhibit that was submitted with the Cycle 3 Active Transportation Program (ATP) Grant Application.

Wood Rodgers prepared the attached structural memorandum to investigate and compare conceptual alignment, profile, structure type, and a preliminary cost for the three ramp alignment/structure type combination alternatives to connect the existing at-grade Olive Drive Class 1 bike path to the Pole Line Road Overcrossing.

Each alternative in the memorandum presents pros and cons to aid in the decision process. The alternative with the lowest estimated cost is the straight alignment using reinforced concrete box girder structure type (Alternative 3). It has an estimated cost of $2,774,000 as compared to $2,887,000 for Alternative 1 and $3,788,000 for Alternative 2. An independent quantity take-off was performed for each alternative, and construction cost estimates with unit prices based on the 2017 Caltrans Cost Database were prepared.

**Alternative 1**

Alternative 1, the switchback alignment with a reinforced concrete slab structure, would require a more complex staged construction to build the three levels of the switchback alignment. As for
Alternative 2

For Alternative 2, the straight alignment with the same reinforced concrete slab structure type as Alternative 1, more columns would be needed due to the shorter spans. This drives up the cost considerably from Alternative 1 and 3 which would have fewer columns. Alternative 2 is more expensive and provides no discernible benefit versus Alternative 3, so it is assumed the choice would be between Alternatives 1 and 3.

Alternative 3

The straight alignment with a reinforced concrete box girder structure would be approximately 558-feet long. It would begin near the easterly end of the recently constructed cycle track and would climb to the Pole Line Road Overcrossing. For purposes of this study, longitudinal grades of 7.5% for the ramp portions and 1.5% for the pedestrian landings were used. The structure could be shortened by a modest distance if the ramp slopes were increased to up to 8.0% (this accounts for construction tolerance for the code maximum 8.3% maximum slope).

The reinforced concrete box girder structure has been placed immediately south of the existing Class 1 path so that the existing path would remain in place. The provided layout assumes that the existing WB Olive Drive off-ramp would be removed prior to construction of the structure. Coordination with the City and Caltrans to determine the schedules of each project will need occur to verify this assumption. However, it is anticipated that with the use of some short walls and guardrail, the bridge could be constructed and put into use with the off ramp still in operation.

The final alignment would also consider Caltrans planning documents related to future widening of I-80. The alignment would seek to maintain a 30-foot clear recovery zone from the I-80 edge of travelled way to the structure. Protective measures such as Midwest guardrail systems would have to be incorporated if the standard cannot be met.

The straight alignment structure’s location would require removal of approximately seven to ten trees at the western terminus, while they have not yet been surveyed, they appear to be live oaks.

Conclusion

Both Alternative 1 and 3 appear to be viable options, and relatively equal in terms of their pros and cons.

Attachment: Structural Memorandum, Wood Rodgers, February 15, 2018
**STRUCTURAL MEMORANDUM**

**Date:** February 14, 2018  
**Subject:** RAMP ALIGNMENT / STRUCTURE TYPE ALTERNATIVES  
**Project:** Olive Drive Bike Path / Pole Line Road Overcrossing Ramp Connection  
**Project Number:** WR #8359020  
**Prepared By:** Dennis Pecchia, PE; Gerard Murdock, PE, SE

The purpose of this memorandum is to investigate and compare three ramp alignment/structure type combination alternatives. The alignments considered are switchback and straight, and the structure types are reinforced concrete (RC) slab and box girder. The information is to be used so that a decision can be made as to which alignment and structure type to proceed with for environmental, design, and construction phases of the project. Following is a comparison of the three combination alternatives:

<table>
<thead>
<tr>
<th>ALTERNATIVE 1</th>
<th>ALTERNATIVE 2</th>
<th>ALTERNATIVE 3</th>
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</thead>
<tbody>
<tr>
<td>SWITCHBACK ALIGNMENT</td>
<td>STRAIGHT ALIGNMENT</td>
<td>STRAIGHT ALIGNMENT</td>
</tr>
<tr>
<td>RC SLAB STRUCT. TYPE</td>
<td>RC SLAB STRUCT. TYPE</td>
<td>RC BOX GIRDER STRUCT. TYPE</td>
</tr>
</tbody>
</table>

- Ramp curves – difficult for bicyclists to negotiate.  
- No ramp curves – easier for bicyclists to negotiate.  
- No ramp curves – easier for bicyclists to negotiate.  

- Poor site distance for opposing bicyclists at ramp curves. Also, restricted visibility for personal safety at curves.  
- Uninterrupted site distance for opposing bicyclists. Also, high visibility for personal safety.  
- Uninterrupted site distance for opposing bicyclists. Also, high visibility for personal safety.  

- Built in staged construction from bottom to middle to top levels – slower construction.  
- Built in single stage – faster construction.  
- Built in single stage – faster construction.  

- Wider shorter ground footprint.  
- Narrower longer ground footprint.  
- Narrower longer ground footprint.  

- Less visual impact due to ramp touchdown extending shorter distance to the west.  
- More visual impact due to ramp touchdown extending longer distance to the west.  
- More visual impact due to ramp touchdown extending longer distance to the west.  

- Overall ramp length: 364 feet (619 feet stretched length)  
- Overall ramp length: 545 feet  
- Overall ramp length: 558 feet  

- Construction cost: $2,887,000  
- Construction cost: $3,788,000  
- Construction cost: $2,774,000  

- Next Lowest Cost  
- Highest Cost  
- Lowest Cost

1. Ramp grades and length based on profile grade = 7.5% (8.3% max allowed); 30 inch rise maximum between landings; and 5 foot long landings. This complies with the Americans with Disabilities Act (ADA); the Caltrans "Design Information Bulletin Number 82-06, Pedestrian accessibility Guidelines for Highway Projects" dated November 16, 2017; and Caltrans "Highway Design Manual, Chapter 1000 Bicycle Transportation Design" dated December 30, 2015.

2. Construction costs shown are ballpark and for comparative purposes only.

3. Attachments: Drawing and estimate for each of the three alternatives.
AGENDA ITEM #6D

Pole Line Road / Olive Drive Connection

PRELIMINARY LAYOUT

OLIVE DRIVE TRAIL / POLE LINE ROAD RAMP CONNECTION

CITY OF DAVIS  CALIFORNIA

FEBRUARY 2018

ALTERNATIVE 3 (REINFORCED CONCRETE BOX GIRDER)
Alternative 1, Swithcback

**BRIDGE:** Olive Drive Trail / Pole Line Road Ramp Connection

**BR. No.:** ###-####

**DISTRICT:** 3

**TYPE:** RC SLAB

**CU:** CO:

**EA:**

**LENGTH:** 508.55 FT

**WIDTH:** 14.00 FT

**AREA (SF) =** 7,140.00

**DESIGN SECTION:** Wood Rodgers

**# OF STRUCTURES IN PROJECT:** 1

**EST. NO.** 1

**PRICES BY :** G. Murdock

**COST INDEX:**

**PRICES CHECKED BY :** D. Pecchia

**DATE:** 2/8/2018

**QUANTITIES BY:** G. Murdock

**DATE:** 2/8/2018

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**SUBTOTAL** $1,889,670

**TIME RELATED OVERHEAD (@ 10%)** $188,967

**ROUTING**

1. DES SECTION
2. OFFICE OF BRIDGE DESIGN - NORTH
3. OFFICE OF BRIDGE DESIGN - CENTRAL
4. OFFICE OF BRIDGE DESIGN - SOUTH
5. OFFICE OF BRIDGE DESIGN - WEST
6. OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

**SUBTOTAL BRIDGE ITEMS** $2,309,596

**CONTINGENCIES (@ 25%)** $577,399

**BRIDGE TOTAL COST** $2,886,995

**COST PER SQ. FOOT** $404.34

**BRIDGE REMOVAL (CONTINGENCIES INCL.)**

**WORK BY RAILROAD OR UTILITY FORCES**

**GRAND TOTAL** $2,886,995

**BUDGET ESTIMATE AS OF** 2/8/2018

**Escalated Budget Estimate to Midpoint of Construction**

*Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.*

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* Escalation Rate per Year 3.0%
### GENERAL PLAN ESTIMATE

**BRIDGE:** Olive Drive Trail / Pole Line Road Ramp Connection  
**BR. No.:** ##-####  
**DISTRICT:** 3  
**CO:** YOL  
**EA:** 455.00 FT  
**LENGTH:** 455.00 FT  
**WIDTH:** 14.00 FT  
**AREA (SF):** 6,370.00

### DESIGN SECTION:
- **Wood Rodgers**  
- **# OF STRUCTURES IN PROJECT:** 1

### PRICES CHECKED BY:
- D. Pecchia  
- **DATE:** 2/8/2018

### QUANTITIES BY:
- G. Murdock  
- **DATE:** 2/8/2018

### CONTRACT ITEMS

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**SUBTOTAL** $2,478,875  
**TIME RELATED OVERHEAD (@ 10%)** $247,888  
**MOBILIZATION** (@ 10 %) $302,974

### ROUTING

1. DES SECTION  
2. OFFICE OF BRIDGE DESIGN - NORTH  
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4. OFFICE OF BRIDGE DESIGN - SOUTH  
5. OFFICE OF BRIDGE DESIGN - WEST  
6. OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

### COMMENTS:
- **BUDGET ESTIMATE AS OF 2/8/2018** $3,788,000
- **Escalated Bud**
- **g**
- **Escalation Rate per Year 3.0%**

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**AGENDA ITEM #6D**

Pole Line Road / Olive Drive Connection

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*Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.*
### General Plan Estimate

**RCVD BY:** | **OUT EST.:**
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2/8/2018 | 2/8/2018

**Alternative 3, Straight Long Spans**

**BRIDGE:** Olive Drive Trail / Pole Line Road Ramp Connection

**BR. No.:** ##-####

**DISTRICT:** 3

**TYPE:** RC BOX GIRDER

**EA:** YOL

**LENGTH:** 425.00 FT

**WIDTH:** 14.00 FT

**AREA (SF) =** 5,967.00

**DESIGN SECTION:** Wood Rodgers

**# OF STRUCTURES IN PROJECT:** 1

**PRICES BY:** G. Murdock

**COST INDEX:**

**PRICES CHECKED BY:** D. Pecchia

**DATE:** 2/8/2018

**QUANTITIES BY:** G. Murdock

**DATE:** 2/8/2018

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</table>

**SUBTOTAL:** $1,815,388

**TIME RELATED OVERHEAD (@ 10%)** $181,539

**MOBILIZATION ( @ 10 % )** $221,881

**SUBTOTAL BRIDGE ITEMS** $2,218,807

**CONTINGENCIES ( @ 25% )** $554,702

**BRIDGE TOTAL COST** $2,773,509

**COST PER SQ. FOOT** $464.81

**BRIDGE REMOVAL (CONTINGENCIES INCL.)**

**WORK BY RAILROAD OR UTILITY FORCES**

**GRAND TOTAL** $2,773,509

**BUDGET ESTIMATE AS OF** 2/8/2018 $2,774,000

**Escalated Budget Estimate to Midpoint of Construction**

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<th>Estimation Year</th>
<th>Budget Estimate</th>
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<td>$3,216,000</td>
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</tbody>
</table>

*Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.*

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AGENDA ITEM #6D

Pole Line Road / Olive Drive Connection