MEMORANDUM

Date: April 15, 2019

To: The Honorable Chairman and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

Re: **Cost Comparison: The Loop Pedestrian, Bike Paths and Roadway Bike Paths**

Supervisor Ally Miller requested information at the March 26, 2019 Transportation Advisory Committee meeting related to the cost of various bicycle facilities and paths. Regional Flood Control District Director Suzanne Shields prepared the attached April 10, 2019 response. The report compares the costs associated with the Loop pathway, adjacent to our regional watercourses with other multi-use pathways adjacent to roadways or when a bike lane is incorporated into a regional, arterial roadway.

In summary, the cost of our Loop path is $118,000 per mile; within the road right-of-way $250,000 per mile, and integrated as part of a street improvement project $500,000 per mile.

Clearly, the Loop, which has its primary function of open access adjacent to major flood control bank stabilization of the regional river system, also functions as a popular recreation corridor. It is the most cost effective method of constructing bicycle and/or multi-use pathways for public use.

CHH/anc

Attachment

c: Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Suzanne Shields, Director, Regional Flood Control District

PIMA COUNTY
FLOOD CONTROL

MEMORANDUM

DATE: April 10, 2019

TO: Pima County Transportation Advisory Committee

FROM: Suzanne Shields, P.E.
Director

SUBJECT: **The Loop Pedestrian and Bike Paths, and Roadway Bike Paths – Cost Comparison**

This memorandum is in response to the Honorable Ally Miller, District 1, request at the March 26, 2019 Pima County Transportation Advisory Committee (PCTAC) meeting for cost information for bike and pedestrian paths along The Loop.

In today's dollars, installation of a basic one-mile segment of paved Loop pathway is as little as $118,000 per mile. Nearly all of The Loop pathways installed by the Pima County Regional Flood Control District (District) are to serve first and foremost as designated maintenance access routes for the District to perform their regulatory maintenance activities in the abutting regional watercourses. The attached work sheet shows costs for the paved Loop paths ($118,000/mile); within the road right-of-way ($250,000/mile) and bike lanes as part of a street improvement project ($500,000/mile).

With the addition of a small amount of striping and signing, an incremental cost of approximately $8,000 per mile, the District is able to cost-effectively convert these paved maintenance pathways into recreational facilities. The installation of many segments of The Loop are a minor element within a much larger District flood control/protection and environmental restoration project. The typical Loop related improvements make up about 3% of the overall cost of these larger projects.

In addition to the paved path, the District installs cross drainage structures and maintenance bridges. Some segments along the Loop may have no bridges and other segments have multiple bridges; the average number is one bridge for every three miles of The Loop. Costs for these bridges average $200,000. Bridges are preferred since a concrete culvert is typically twice the cost. In some areas, installation of an overpass bridge over a roadway is a transportation safety enhancement. As an example, the overpass at Camino de la Tierra and the Rillito River for The Loop was a safety improvement funded by a federal grant using from the Transportation Enhancement Grant and Surface Transportation Program.

Over the past 35 years, the District has constructed projects ensuring their projects include environmental, habitat and archeological preservation while adhering to all of the required components of federal, state, and Pima County regulations. Additionally, the District's projects often include augmented open space and recreational elements not necessarily associated with the developed Loop pathway. These elements include features such as designated soft trails for hiking and equestrian uses as well as developed aquatic features for wildlife and birding interests.

These individual segments of linear paved pathways, soft trails, restored vegetative corridors, aquatic features and protected open space have been combined and connected over the years, which began to form continuous, linear river park systems along several regional watercourses. Over the past decade, the District has aggressively worked towards making key connections to link these larger regional watercourse river parks. Specifically, the Santa Cruz River Park was connected to the Rillito

River Park, the Rillito River Park was connected to the Pantano River Park, the Pantano River Park was connected to the Harrison Greenway, the Harrison Greenway was connected to the Julian Wash Greenway, and the Julian Wash Greenway was connected to the Santa Cruz River Park. Linking these larger river park segments have formed a continuous, looped system that has become The Chuck Huckelberry Loop. Again, the paved Loop pathway is just a minor (albeit very popular) element within the overall Loop/river park system.

Today, The Loop is a linear multi-use facility that traverses the entirety of the Rillito River and significant segments of the Santa Cruz River and the Pantano Wash that provides regional connectivity with Tucson, the Town of Marana, the Town of Oro Valley and the City of South Tucson.

SS/tj

Attachments

c: C. H. Huckelberry, County Administrator
Carmine DeBonis, Deputy County Administrator – Public Works
Chris Cawein, Director – Natural Resources, Parks and Recreation
Eric Shepp, P.E., Deputy Director – Regional Flood Control District
Andy Dinauer, P.E., Division Manager – Regional Flood Control District
Annabelle Valenzuela, Transportation Support Services Division Manager

THE LOOP PEDESTRIAN AND BIKE PATHS, AND ROADWAY BIKE PATHS
COST COMPARISON SUMMARY

Loop Pathway (Adjacent to Regional Watercourses) **$118,000/Mile**

- A pavement section is typically two inches of asphalt on compacted subgrade or compacted native material including striping.
- A path is typically a single ribbon of asphalt (i.e., one pass of the paver and one lift/layer of asphalt).
- Minimal conflict points/intersecting uses that require detailed grading or paving.
- No utility conflicts/concerns during construction or after construction.
- Limited or no property acquisition costs specifically for the paths installed on top of the soil cement prism.

Multi-Use Pathway (Off-Street/Roadside, Adjacent to a Regional Arterial Roadway) **$250,000/Mile**

- A pavement section is typically two inches of asphalt on compacted subgrade or native material.
- A path is typically a single ribbon of asphalt.
- Roadside paths require detailed grading and paving operations to tie into driveways and side streets thereby increasing installation costs.
- Roadside paths increase the overall width of the roadway corridor thereby adding significantly to acquisition costs for rights-of-way.
- Location of roadside pathways require additional warning signs due to numerous interactions with cross traffic.
- Roadside paths are prone to disturbance from any number of adjacent subsurface utilities (water, gas, electric, sewer, lighting, cable, fiber optic, landscape irrigation, etc.) typically co-located within roadway rights-of-way.

Bike Lane (On Street within a Regional Arterial Roadway) **$500,000+/Mile**

- Because a bike lane is located within the curbed portion of a roadway, the pavement section is consistent with the pavement section for vehicular travel lanes, typically six inches of asphalt on eight inches of compacted aggregate base on top of compacted subgrade/native material. The pavement thickness alone translates into bike lanes costing nearly three times as much as a section of Loop pathway.
- Installation of bike lanes on both sides of a street is a requirement, thereby increasing the overall construction cost.
- Bike lanes require moderately detailed grading and paving operations, thereby causing an increase in installation costs.
- Bike lanes, like roadside pathways, can add significantly to acquisition costs for rights-of-way.
- Bike lanes require a significantly elevated level of warning signs and striping due to the proximity of a bike lane relative to a higher speed vehicular travel lane as well as the numerous conflict points with cross traffic.
- Bike lanes are subject to disturbance from any number of adjacent subsurface utilities (water, gas, electric, sewer, lighting, cable, fiber optic, landscape irrigation, etc.) that are typically co-located within a roadway right-of-way.

Note: Roadside paths or on street bike lanes require multi-use bridges and/or longer roadway bridge decks, respectively, at all drainage crossings.

TREXLER

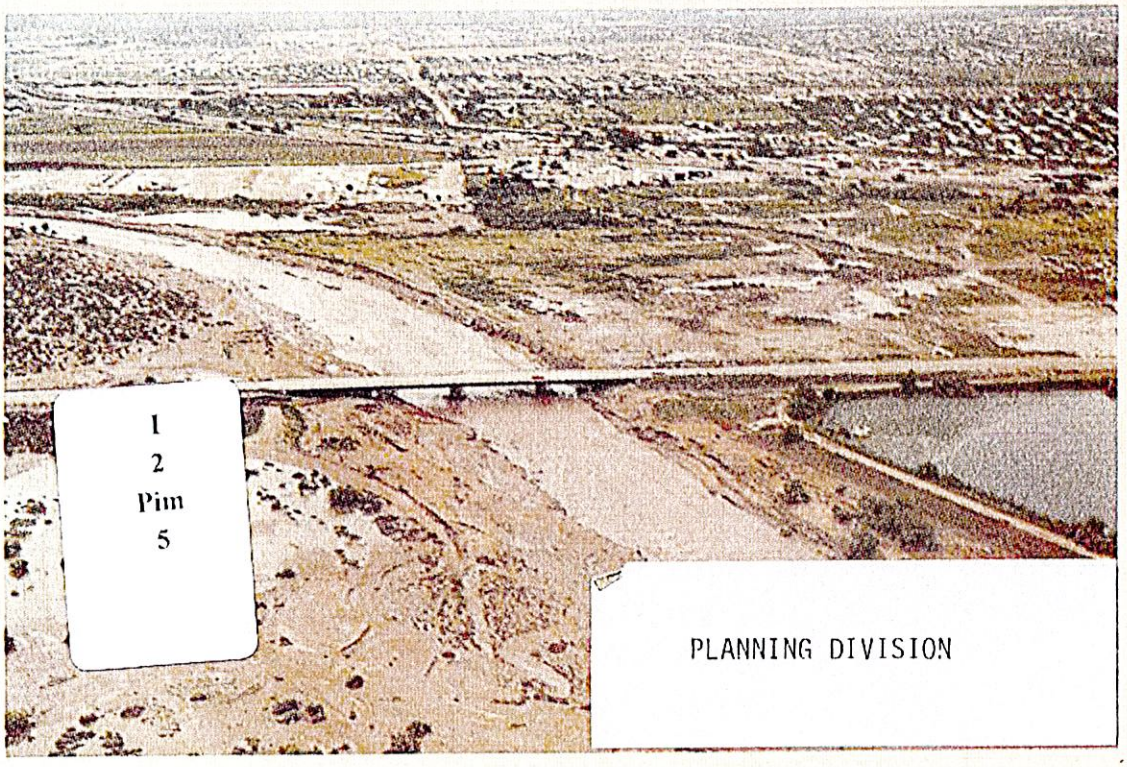
FLOOD REPAIR AND FLOOD HAZARD MITIGATION PROGRAM

PIMA COUNTY, ARIZONA

El Camino del Cerro Bridge

OCTOBER 1977 FLOOD DISCHARGE 20,000 CFS

FLOOD DAMAGE:
TOTAL LOSS



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PLANNING DIVISION

OCTOBER 1983 FLOOD DISCHARGE 45,000 CFS

FEDERAL REPAIR	$ 471,138
LOCAL MITIGATION	$1,490,035
TOTAL	$1,961,173

FLOOD DAMAGE:
MINOR

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RIVER	LOCATION	DESIGN CRITERIA (FLOOD RETURN FREQUENCY: YEAR)	YEAR BUILT
RILLITO CREEK	La Cholla Boulevard	+100	1981
RILLITO CREEK	Craycroft Road	100	1982
PANTANO WASH	Tanque Verde Road	+100	1978
PANTANO WASH	Houghton Road	100	1981
TANQUE VERDE WASH	Sabino Canyon Road	100	1982
SANTA CRUZ RIVER	El Camino del Cerro	100	1979
SANTA CRUZ RIVER	Twenty-Second Street	+100	1978
SANTA CRUZ RIVER	Irvington Road	+100	1981
CANADA DEL ORO	Thornydale Road	100	1983

Other flood control projects which prevent flood damage are characterized as either bank protection or stabilization projects. Pima County has also adopted strict state of the art standards for bank protection/stabilization construction and installation. These standards are listed below.

BANK PROTECTION/STABILIZATION - STANDARDS FOR NEW CONSTRUCTION OR REPLACEMENT

1. Soil-cement bank protection/stabilization will be provided on major watercourses and shall be herein referred to as "bank protection".

2. The bank protection shall be constructed to a finished thickness of not less than eight feet.

3. All bank protection shall be designed to withstand the 100-year flood discharge with reasonable freeboard, as well as, long or short term stream bed profile change.

4. All bank protection above the natural channel bottom shall be constructed on a slope no steeper than one horizontal to one vertical.

5. The horizontal alignment of all bank protection shall be consistent with sound principles of hydraulic design.

6. Upstream and downstream ends of bank protection shall be properly keyed into the natural banks to prevent erosion behind the bank protection in the advent of natural lateral channel migration.

7. All bank protection shall be designed with proper access provided for maintenance vehicles. Ramps for equestrian and other recreation access to the channel bottom shall be constructed at intervals not to exceed one mile on each bank.

8. All bank protection shall be designed to minimize adverse effects of erosion on property upstream, downstream or adjacent to said protection.

The following is a list of bank protection/stabilization projects using these standards since 1980.