

# Appendix E

## Infill Incentives Plan – Unincorporated Pima County Ruthrauff Basin



September, 2017



## Background:

The Ruthrauff Basin is an area of chronic urban sheetflooding problems, resulting largely from development prior to enactment of the National Flood Insurance Program (NFIP), and with little attention to providing drainage for rooftops and roadways on what was previously agricultural land. The problem is most apparent along the UPRR embankment on the west edge of the watershed where water ponds, because the existing drainage infrastructure is unable to pass flows adequately.

Pima County has recognized that having more precise flood hazard information provides a benefit by better assessing actual risk and reducing uncertainty. These regional benefits from the Ruthrauff Basin Management Plan (RBMP) include:

- 1.) **Availability of Better Hydrologic Mapping:** The development of a two-dimensional flood flow model at a 15' grid allows both RFCD and the development community to better understand existing conditions of flood risks in this very complex hydrologic flow regime.
- 2.) **A Starting Point for Future CIP Projects:** The existing conditions and alternatives analysis allow RFCD to begin the process of constructing critical infrastructure such as the proposed culverts through the railroad embankment at Gardner Lane and Highway Drive, currently estimated to be constructed in approximately 2020.
- 3.) **An Infill Incentives Plan:** This plan identifies ways to create incentives for redevelopment and infill that provide retrofit drainage redevelopment. In general, these follow two strategies:
  - a. **Improved Conveyance to the Railroad Embankment,** where new larger culverts and collector channels will improve flows out of the watershed.
  - b. **Improved Redevelopment Strategies for Individual Lot Conditions** that take advantage of the knowledge on flow depth from the FLO-2 floodplain mapping prepared by this study (JEFuller, 2015).

## Flowing Wells Focused Development Area:

The RBMP considers the needs of the Flowing Wells Neighborhood and Community Coalition (FWNACC) that has identified goals within Pima Prospers to create an environment conducive for redevelopment and infill (Exhibit 1).

- 1.) **Flowing Wells Revitalization Strategy Plan** (2001 with update in 2008): The FWNACC led an effort to develop a revitalization strategy for the region. The strategy lays out the need for neighborhood revitalization and a plan which considers the following elements:
  - a. Public safety
  - b. Neighborhood appearance
  - c. Housing
  - d. Infrastructure (including drainage)
  - e. Social services
  - f. Education
  - g. Economic and job opportunities

- 2.) **Flowing Wells Focused Development Area:** Pima Prospers (2015) built on the FWNACC strategy, and identifies Flowing Wells for focused development, which includes measures to (on p. 3.14):
  - a. Support public-private partnerships
  - b. Encourage locating affordable housing
  - c. Remediate deteriorating and blighted conditions
  - d. Support creation of tools to facilitate revitalization
  - e. Support and align local, state and federal resources to facilitate revitalization
  - f. Support the integration of climate adaptation features in revitalization and affordable housing efforts

The idea of the specific infill incentives is to reduce or minimize the need for expensive drainage engineering studies in areas where the flood risks have been determined to be small or limited. The proposed infill incentives are especially intended to remove hurdles for the redevelopment of small parcels.

The proposed incentives are as follows:

### *Site Infill or Redevelopment*

RFCD has developed a tiered approach to take advantage of the flow depths created with the FLO-2D model at RFCD's discretion. These tiers can be used to reduce the need for on-site drainage design, and therefore the need for expensive engineering studies. The proposed tiers are:

- 1.) Proposed Improvement less than 1 foot depth on 100 yr. FLO-2D Depth Map ((JEFuller, 2015) – Simplified approach not needing a drainage report, which may include the following:
  - a. Elevate – The finished floor elevation of a structure must be 1 foot above highest flood depth on building footprint, unless site grading removes local depressions and/or provides for conveyance away from the building footprint.
  - b. If a fill pad is proposed, the fill pad must be armored to protect from erosive flows. Toe down of the erosion protection shall be a minimum of 2 feet below finished grade. If a stem wall is proposed, toe down shall be a minimum of 2 feet below finished grade.
  - c. Provide depressed flow paths with water harvesting if feasible. Existing offsite flow paths greater than 0.5' must be accommodated by grading so that the proposed development does not alter existing downstream drainage patterns and velocities.
  - d. If perimeter fencing is proposed, the fencing shall be a minimum of 25 feet from the property boundary or elevated to allow upstream offsite flows to pass through the fencing without altering upstream drainage patterns.
- 2.) Proposed Improvement in 1 foot to 2 foot of flow depth on 100-yr. depth FLO-2D Map.
  - a. Review site conditions with RFCD,
  - b. If ponded areas can be filled without altering drainage patterns at property boundaries, the method allowed for less than 1 foot flow depth described above may be followed without preparing an engineering drainage report.
  - c. If drainage infrastructure is required to prevent altering drainage patterns at property boundaries, an engineering drainage report and design sealed by a registered engineer is required.

## *Acquisition and Re-purposing Floodprone Land*

Under the Floodprone Land Acquisition Program (FLAP), the District will purchase floodprone lands in regulatory floodplains. Once floodprone structures are removed, these will be repurposed to reduce future flooding problems. Among the possible scenarios are:

- 1.) Repurposing as a multi-use public facility that also acts as a flood detention facility, such as a park or sports field.
- 2.) Repurposing as a flow conveyance property.
- 3.) Regrading the site, adding appropriate drainage infrastructure and dedicated drainage easements, and selling the property for site development. Revenue from the resale of these properties might go into a revolving fund that allows for purchase of additional floodprone land for redevelopment

## The Highway Drive Infill Incentives Area:

FWNACC has previously considered the needs of this area, which was used as a basis for a proposed infill incentives District.

**Flowing Wells Industrial Corridor:** Prepared by the Drachman Institute (2007) for the FWNACC lays out a Plan for the Highway Drive Area that considers:

- 1.) Security
- 2.) Traffic safety and speed
- 3.) Parking
- 4.) Pedestrian/Bicycle facilities
- 5.) Industry and truck amenities
- 6.) Employee amenities
- 7.) Aesthetics

Pima County shares the belief that redevelopment in this area will be economically advantageous because of the access to I-10 and the relatively low value of the existing development. Pima County provided an initial administrative framework for addressing the drainage problems along Highway Drive, in a comprehensive plan amendment that allowed for rezoning the area along Highway Drive to multi-use and allowing for the establishment of an Infill Incentives District (Co7-08-01 – Exhibit 1).

The Incentives District has not yet been established, because the infill incentives plan necessary for establishment of the district (which is required under state law) has not yet been established.

The RBMP identified the need for improved drainage through the railroad embankment, but determined that many of the structures along Highway Drive would continue to be subject to flooding because grades were too low.

The primary proposed incentive along Highway Drive are identification of tributary drainage corridors that connect to the publicly-constructed drainage improvements along the east side of Highway Drive, and upstream of Highway Drive. These channels will drain to the RFCD-constructed proposed channel improvements in the Union Pacific Railroad Right of Way.

### *Proposed Public Drainage Improvements along Highway Drive*

**Public Improvements along Highway Drive:** Pima County is in the process of designing and constructing a culvert along Highway Drive (Ruthrauff South), and associated channel improvements along the Railroad Track and Highway Drive (Exhibit 2) which will dramatically improve the potential for draining the ponded water on the east side of the UPRR.

### *Infill Incentives to Accompany Public Drainage Improvements along Highway Drive*

The proposed incentive is to improve drainage in parcels adjacent to the channel alignments indicated in Exhibit 3 to connect with the publicly constructed improvements adjacent to the railroad track and along the eastern edge of Highway Drive. Existing Conditions FLO-2D mapping indicates that these parcels will continue to be floodprone without improved conveyance. The impact of these conveyance improvements are indicated in Area 2 Alternative 2b, and show a dramatic improvement in flooding conditions.

The conveyance alone will not be adequate to address the flooding conditions on these parcels. As such, structures will need to be elevated, and an earthen channel constructed in the Right of Way.

Therefore, tributary channels along the approximate alignments indicated in Exhibit 3 will be required for redevelopment. A drainage easement along these alignments will be required to construct these channels. In most cases, property will need to be accessible during flow events, so culverts or other structures, will need to be constructed at property access points at the channel.

Channel improvements in the following approximate locations are being considered (Table 1):

Location	Channel ID	Approx Length (ft)	Shape	Bottom Width	Depth (ft)	Side Slope
West of Railroad Embankment Channel 2 to Hamstra Heating	2	2,000	Trapezoidal	8	4	3:1
Channel 3 Connecting to Channel 2	3	725	Triangular	0	4	3:1
North Side of Wetmore - East of Public Improvements on East Side of Highway Drive	4	1,300	Trapezoidal	4	3	3:1
North Side of Poppy Ave - East of Highway Drive	5	1,030	Triangular	0	3	3:1
North Side of Zinnia Ave - Highway Drive to Kain Av	6	1,060	Triangular	0	3	3:1

The actual channel locations will be selected during engineering design, and may differ on length, channel geometry, and side of the street to accommodate site conditions, and the ability of the District to acquire easements. These channels may be constructed at different times. Construction of a channel will not commence until all necessary easements can be acquired.

Channel Construction Along these alignments by the District may occur under the following scenarios:

- 1.) Existing Structures not at risk of flooding: Two possible conditions may occur
  - a. RFCD may purchase a drainage easement.
  - b. The property owner may convey the needed easement to Pima County, which will maintain it as a drainage easement.
- 2.) Development plans for redevelopment along these channel alignments:
  - a. Developer would convey a drainage easement to Pima County for construction of a proposed channel in the easement.
- 3.) Floodprone Parcels with willing sellers: RFCD will consider purchasing floodprone properties from willing sellers under the Floodprone Land Acquisition Program (FLAP) with the intent of redeveloping parcels. An idealized scenario would be:
  - a. Acquire the parcels through FLAP
  - b. Remove flood prone structures
  - c. Construct the proposed channels in Table 1.
  - d. Regrade to buildable lot that will meet floodprone and drainage requirement
  - e. Sell with dedicated drainage easement

### Public Improvements along Gardner Lane:

Currently, there are no culverts at Gardner Lane through the UPRR embankment, so water ponds for extended periods at Gardner Lane and the UPRR. RFCD has also begun to design a channel along the

Gardner Lane alignment for approval by the UPRR. The proposed drainage improvements will benefit both properties on Gardner Lane and downstream to the North (Exhibit 4)

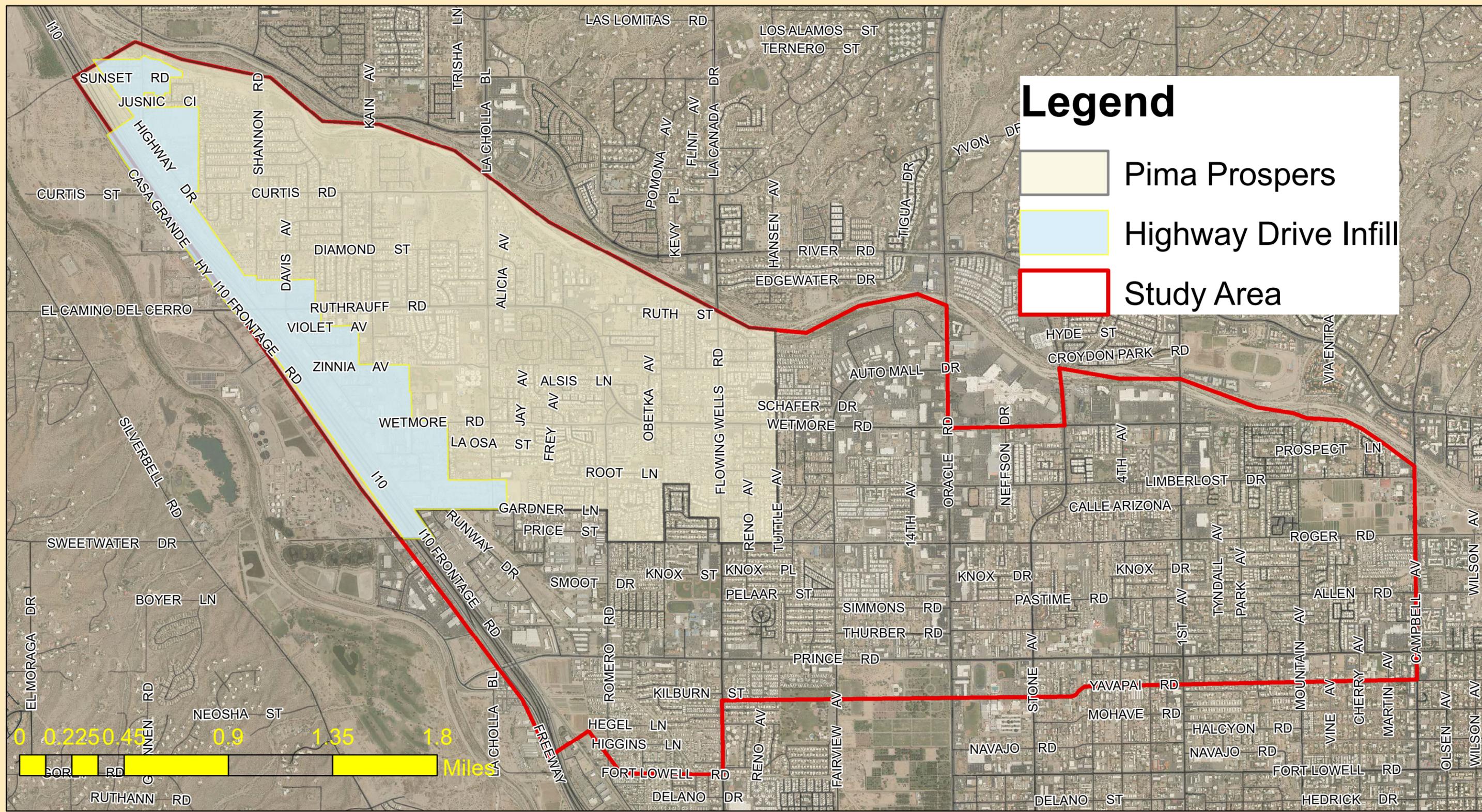
### References:

Drachmann Institute. 2007. *Flowing Wells Industrial Corridor*. Presentation in bound form. Project overseen by Katie Gannon.

ESI Corporation. 2001. *Neighborhood Revitalization Strategy: Flowing Wells*.

Flowing Wells Neighborhood Association and Community Coalition. 2008. *Flowing Wells Neighborhood Revitalization Strategy Plan* (update of 2001 Neighborhood Revitalization Strategy)

JEFuller. 2015. *Ruthrauff Basin Management Plan: Technical Data Notebook for Hydrologic Analysis & Floodplain Mapping Pima County Arizona*.



# Legend

- Pima Prospers
- Highway Drive Infill
- Study Area



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## Exhibit 1 Ruthrauff Project - Incentives Areas

1 inch = 2,151 feet

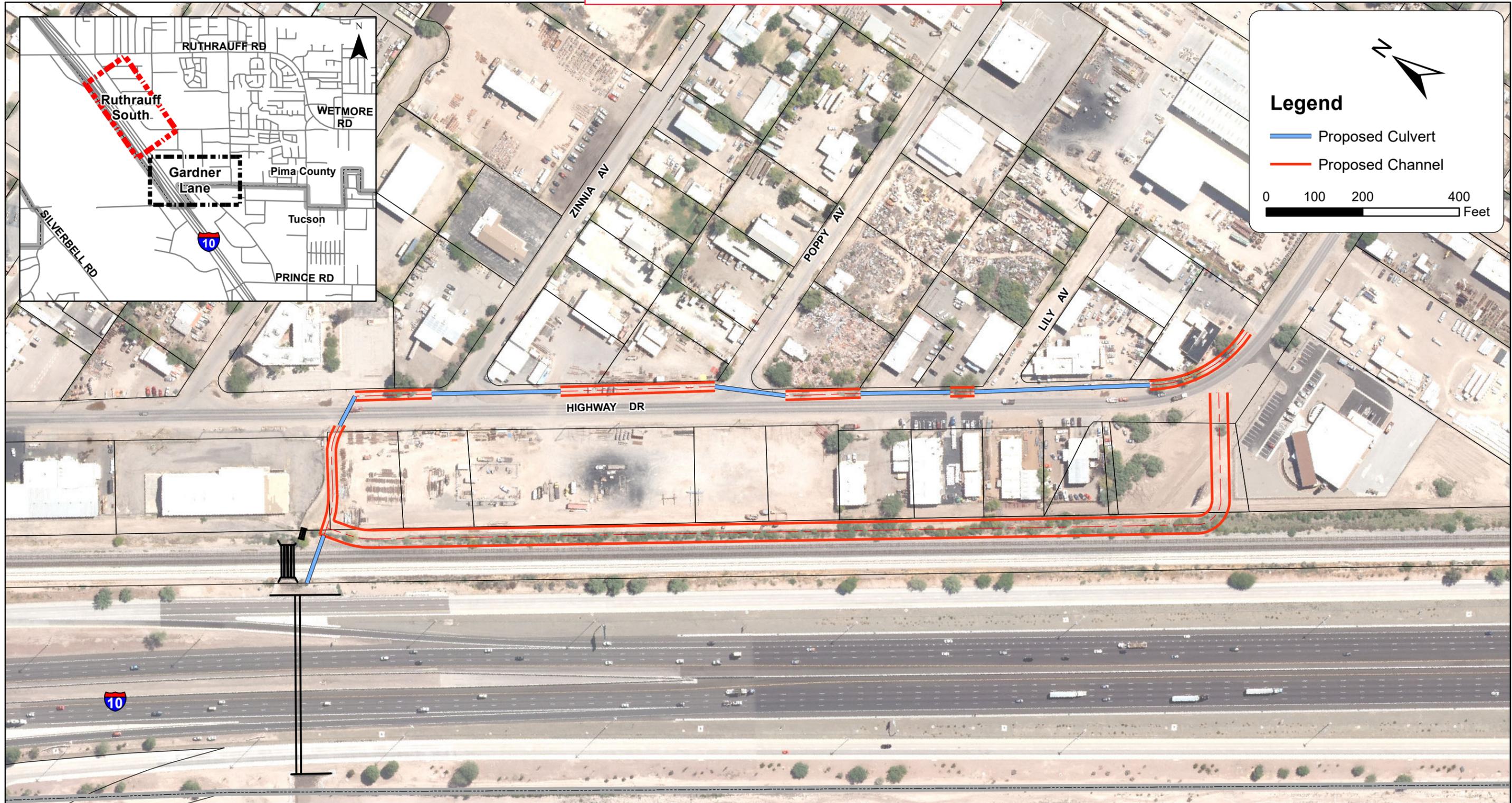


Date:

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preliminary concept - not for construction



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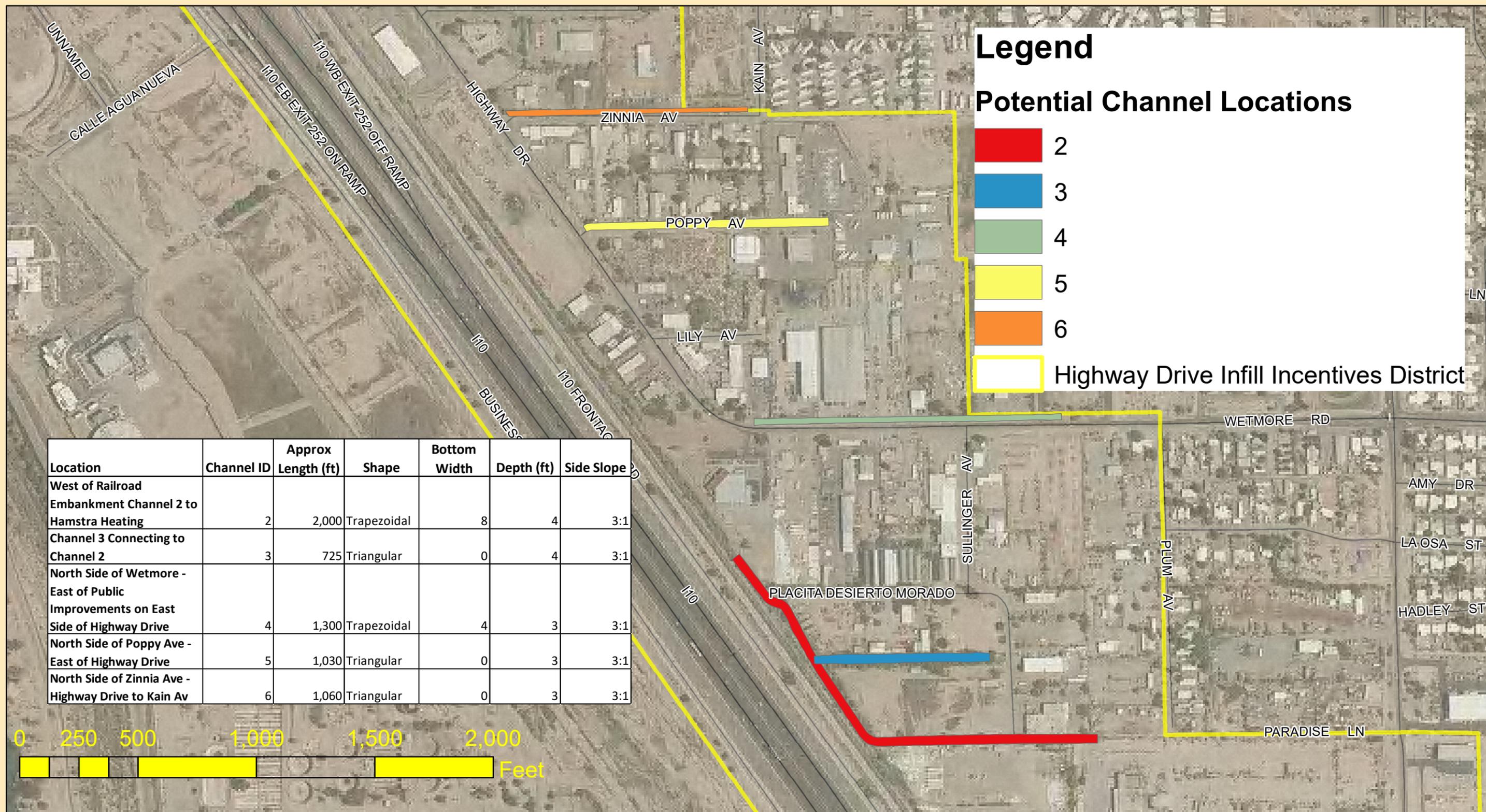
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**Exhibit 2**

**Ruthrauff - UPRR Culverts**

**Ruthrauff South**



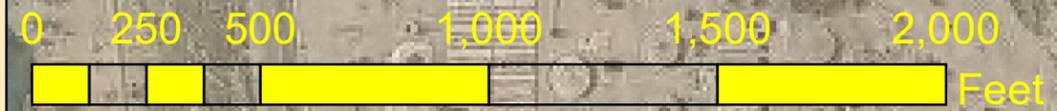


# Legend

## Potential Channel Locations

- 2
- 3
- 4
- 5
- 6
- Highway Drive Infill Incentives District

Location	Channel ID	Approx Length (ft)	Shape	Bottom Width	Depth (ft)	Side Slope
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# Ruthrauff Project - Highway Drive Incentives Channels

Exhibit 3

1 inch = 400 feet

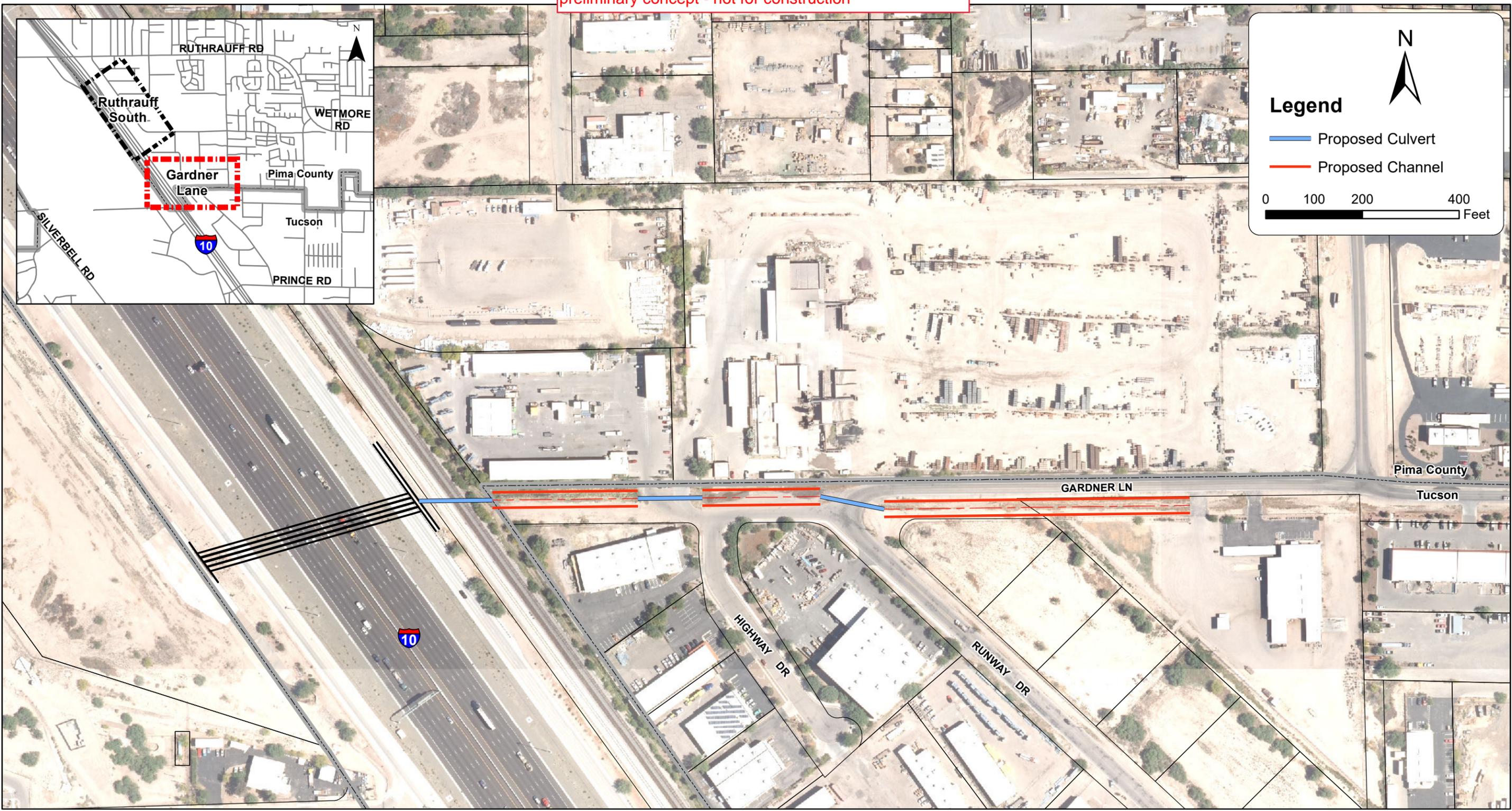
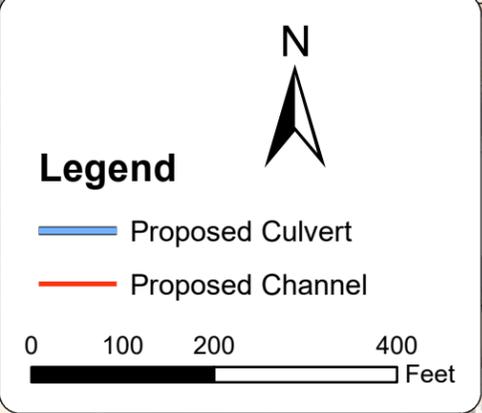
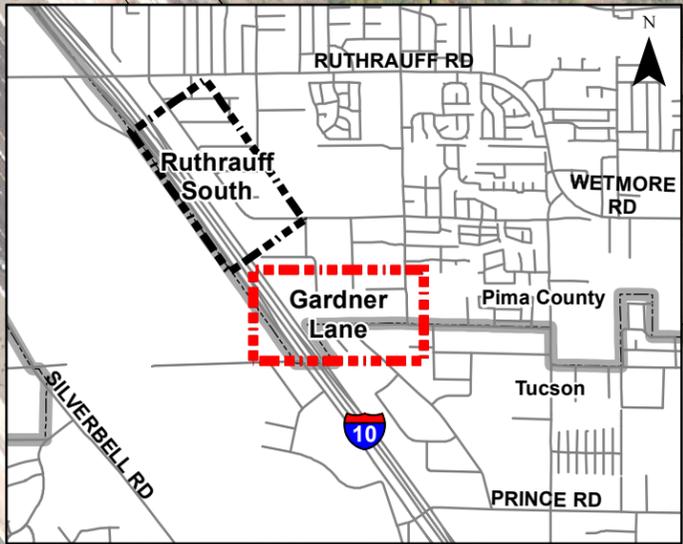


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Exhibit 4

Ruthrauff - UPRR Culverts

Gardner Lane

