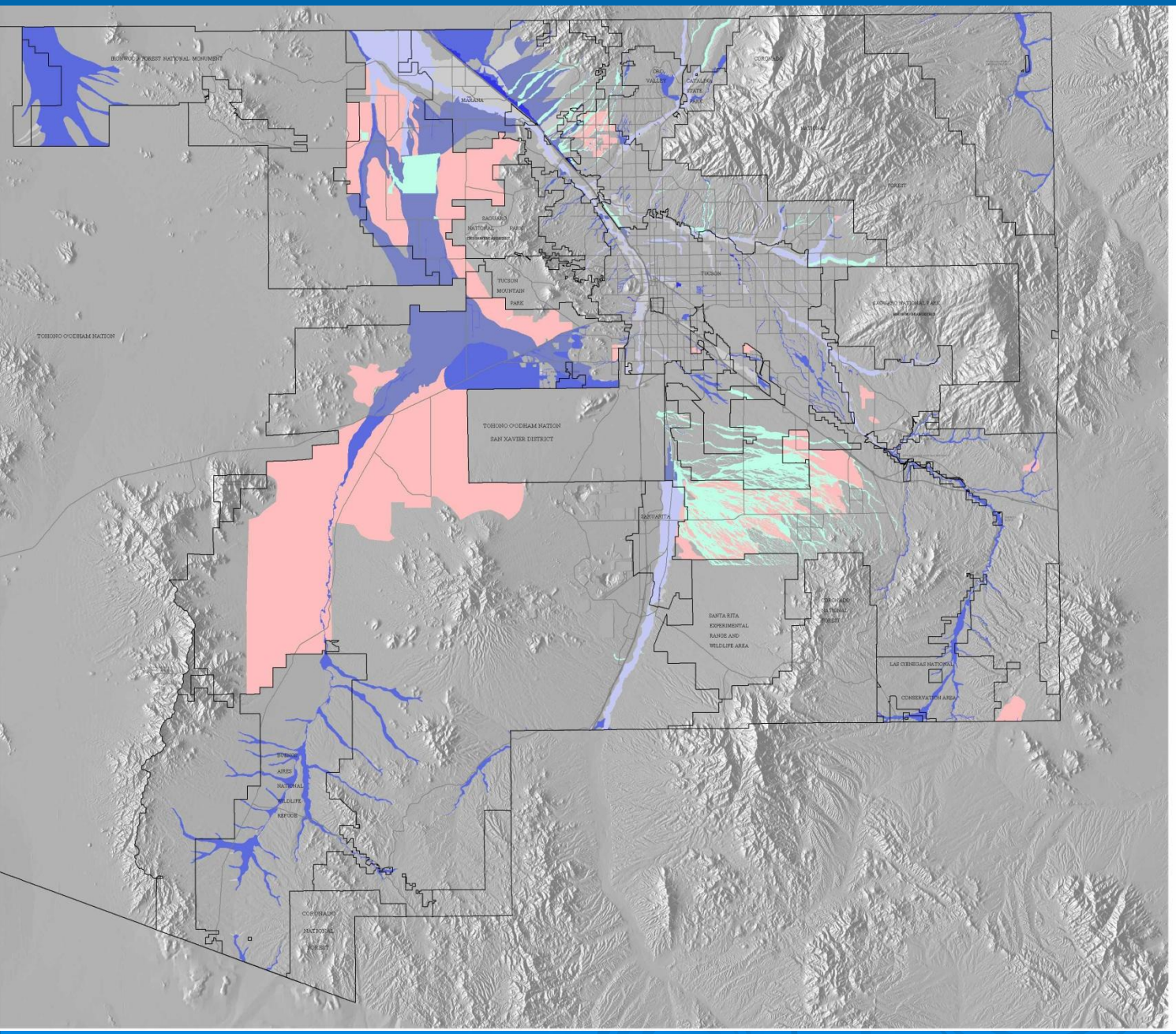
Flood Control and GIS

Managing Floodplains in Pima County with GIS

6/06/2011

A Quick look at What We Do

- **Structural Flood Control Facilities**
  - Over $ 280,000,000 in facilities since the district was formed.
  - These improvements include Levees, Regional Detention Basins, Bridges and more than 75 miles of Bank Protection.



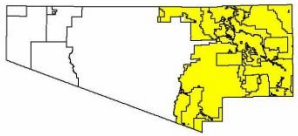
Floodplains in Eastern Pima County

- Jurisdiction Lines
- Major Streets
- Local Floodplains
- Sheet Flooding Areas

FEMA Floodplains

- Zone A
- Zone AE
- Zone AH
- Zone AO
- Zone Shaded X

Pima County Index Map



Index Map Scale 1:5,000,000

The information depicted on this display is the result of digital analyses performed on a variety of databases provided and maintained by several governmental agencies. The accuracy of the information presented is limited to the collective accuracy of these databases on the date of the analysis. The Pima County Regional Flood Control District makes no claims regarding the accuracy of the information depicted herein.

This product is subject to the GIS Division Disclaimer and Use Restrictions.

N

Scale 1:500,000

Pima County Regional Flood Control District

Pima County Regional FLOOD CONTROL DISTRICT

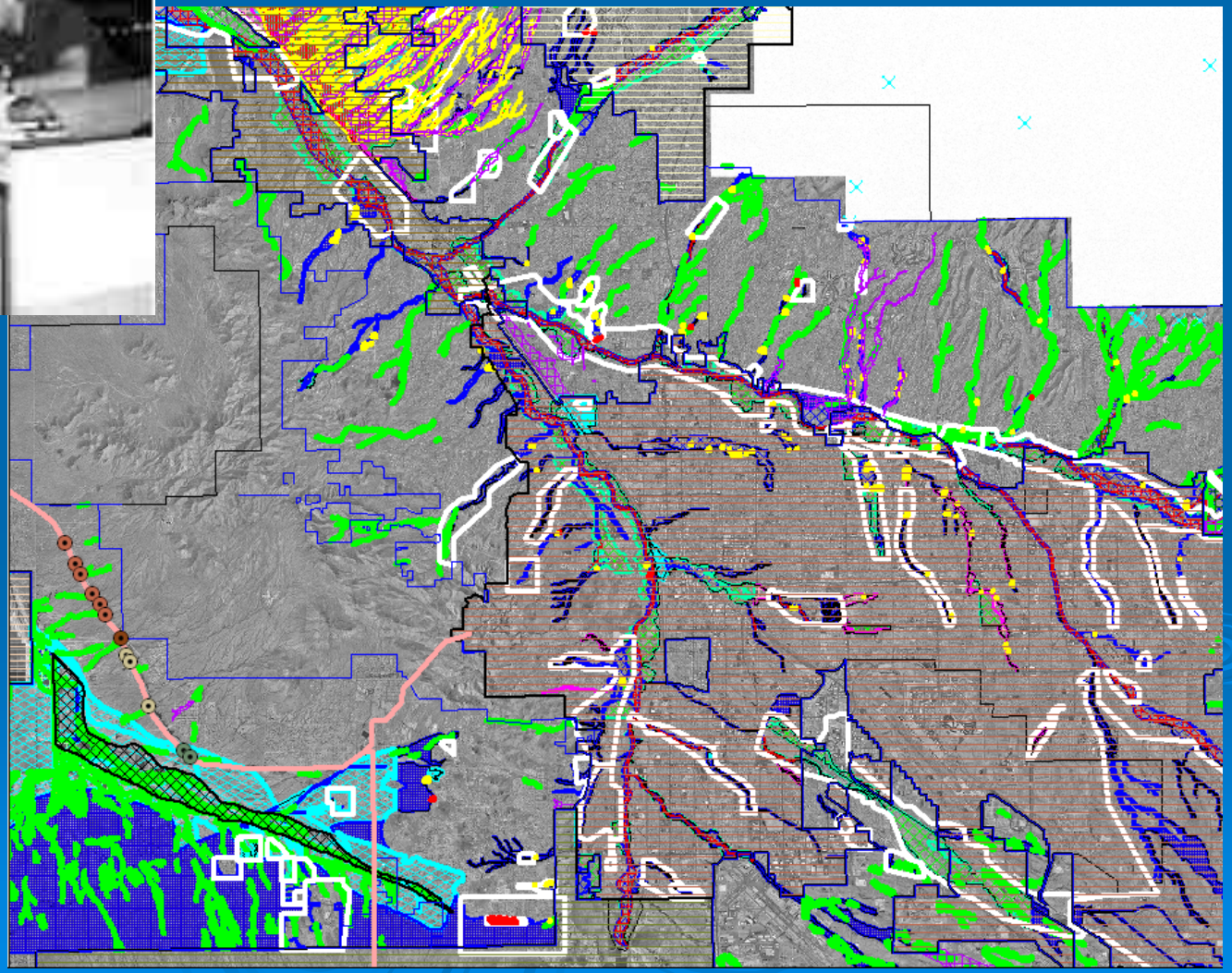
THE SEAL OF PIMA COUNTY ARIZONA

Impact to Pima County

- The District is very proactive in mapping flood hazard areas in addition to those mapped by FEMA

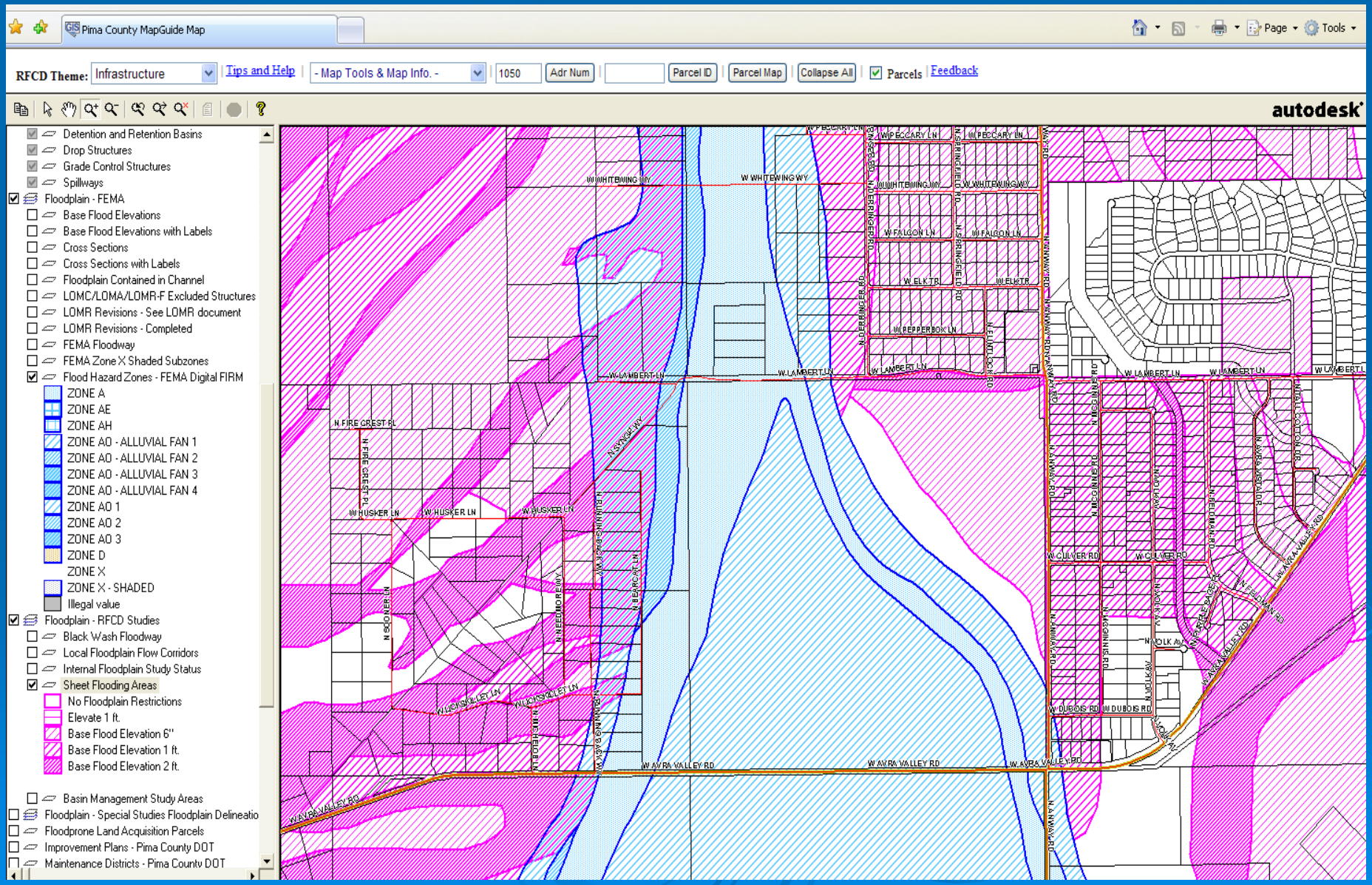
- 827 sq. mi. of mapped flood plain
  - 402 sq. mi. of FEMA mapped floodplain
  - 425 sq. mi. of locally mapped floodplain
    - 345 sq. mi. of locally mapped sheet flow floodplain

Floodplain Management then and now

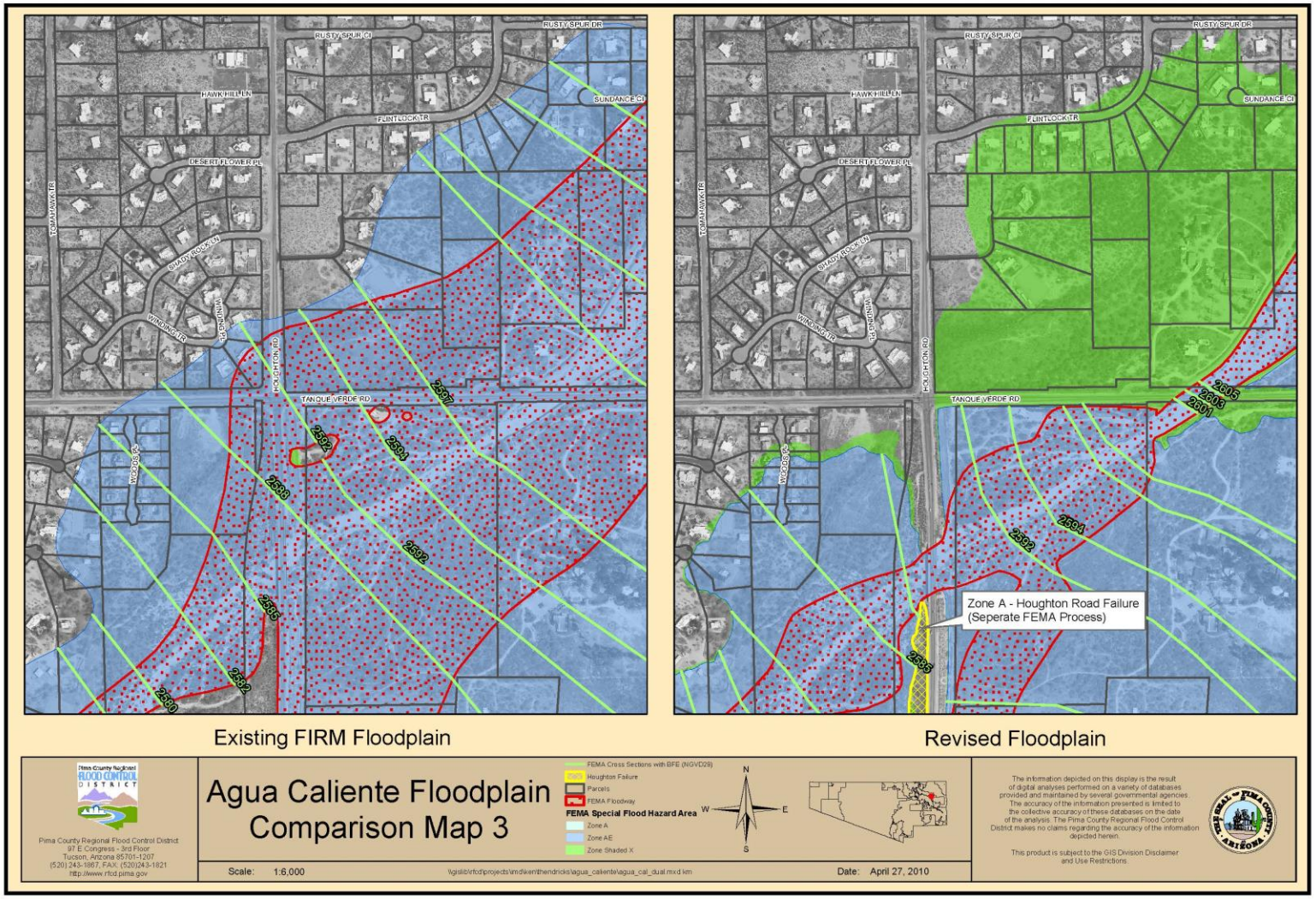


Flood Control Mapguide Map

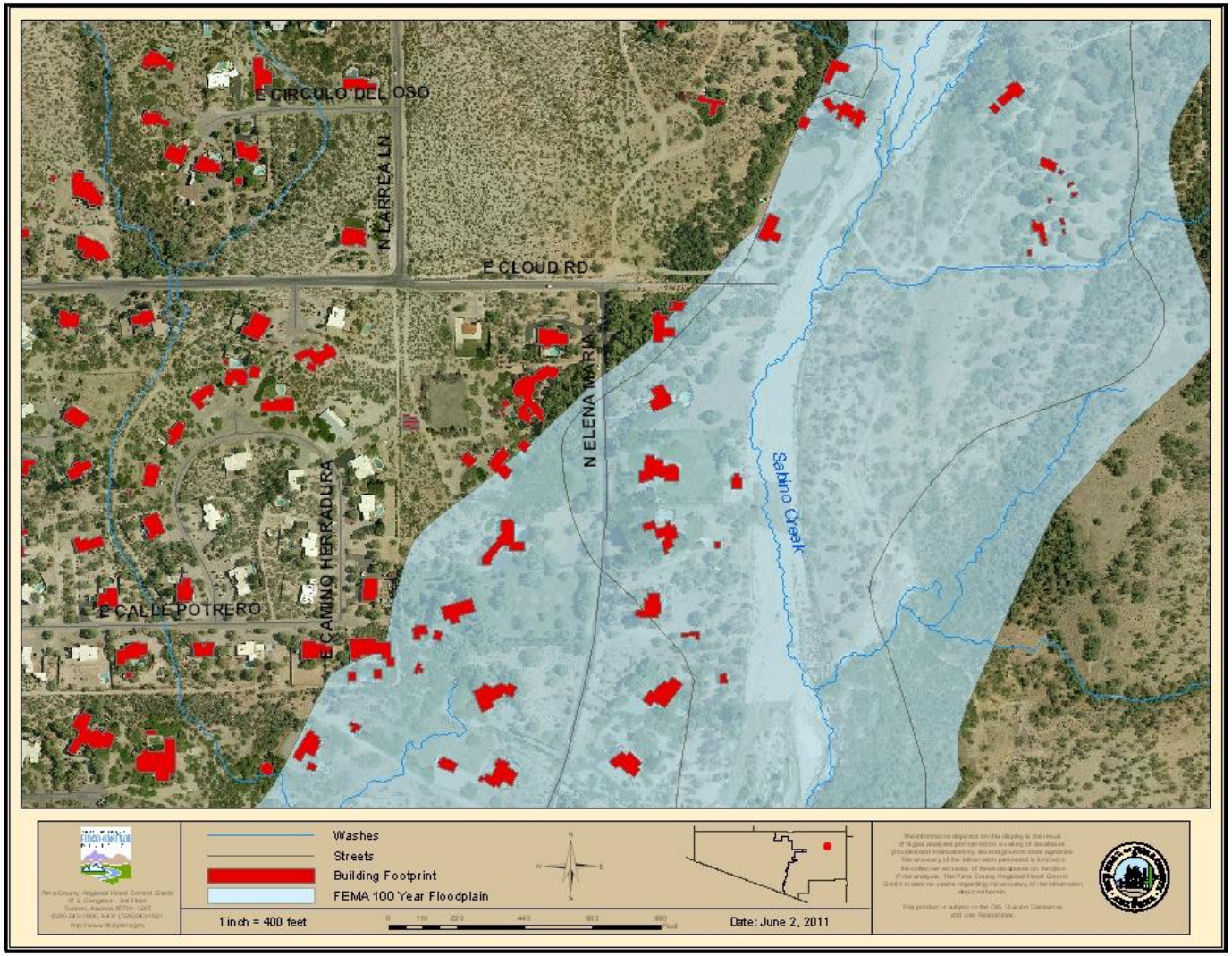
Custom layers for floodplain management and permitting.



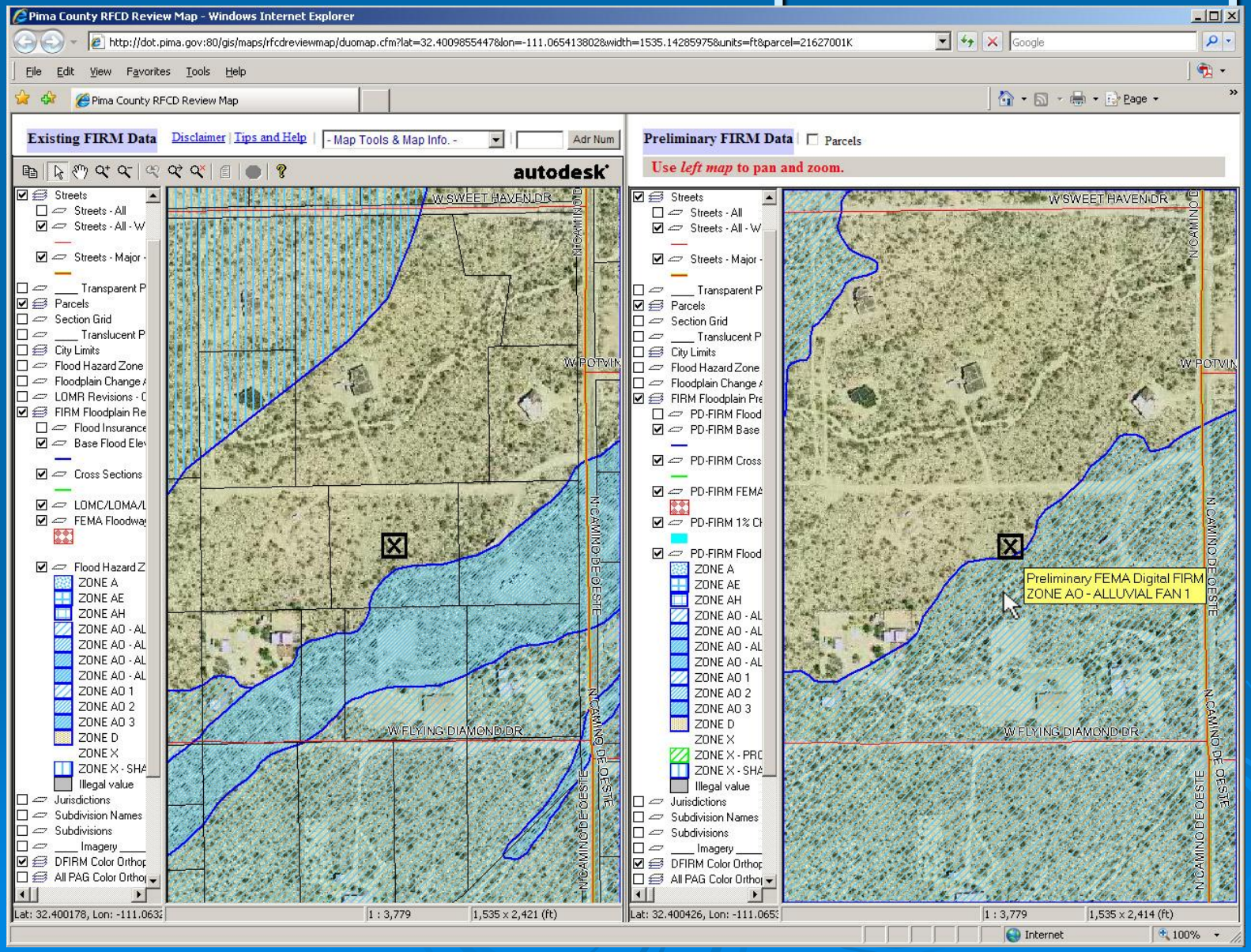
Revised floodplain map comparison



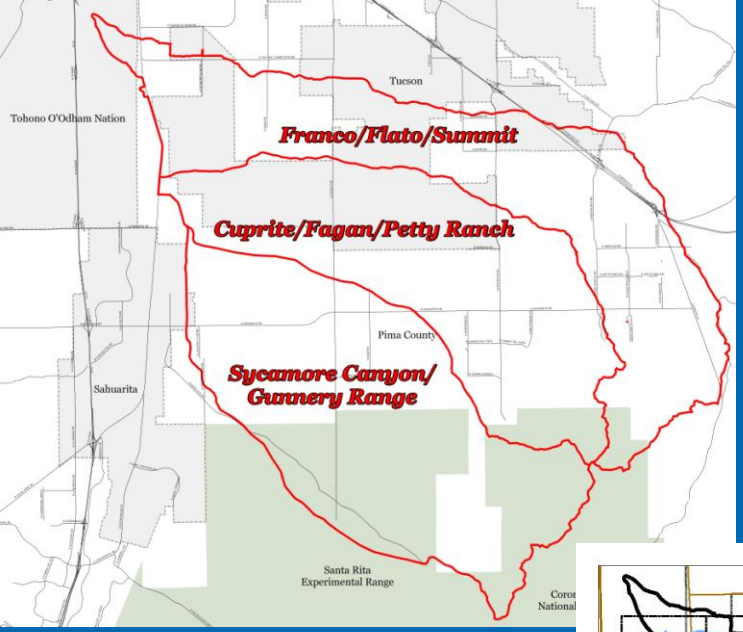
Building footprint analysis within the FEMA 100 year floodplain to determine flood hazards

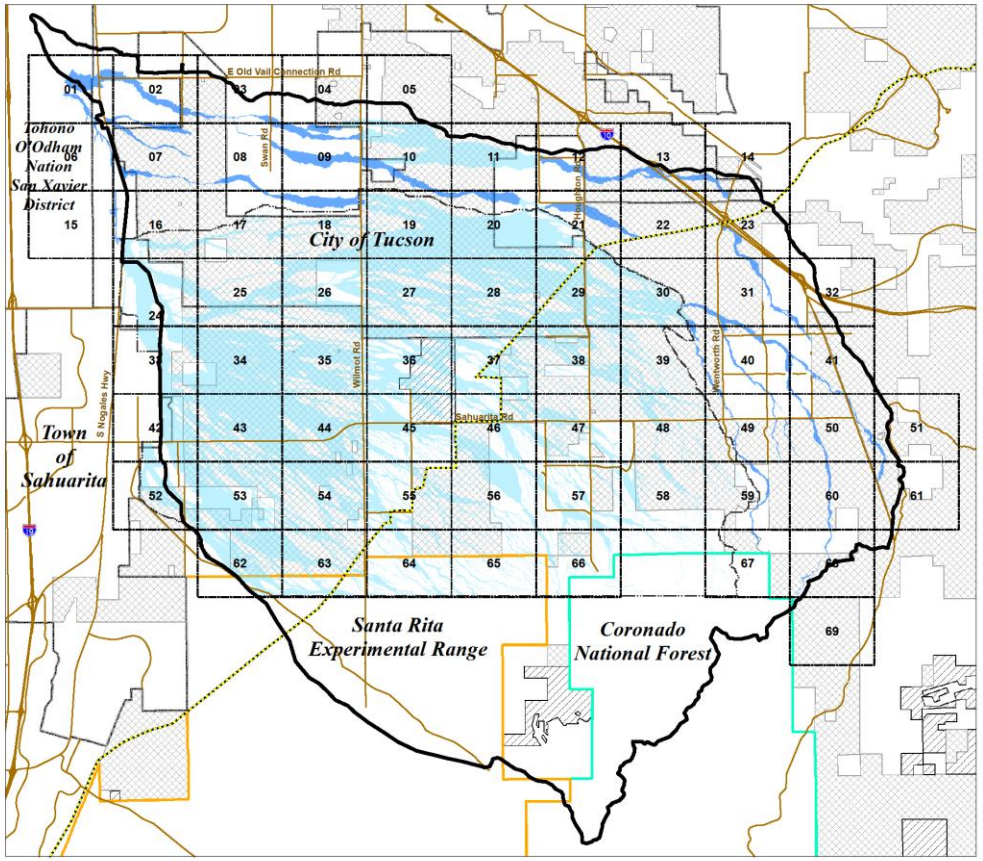


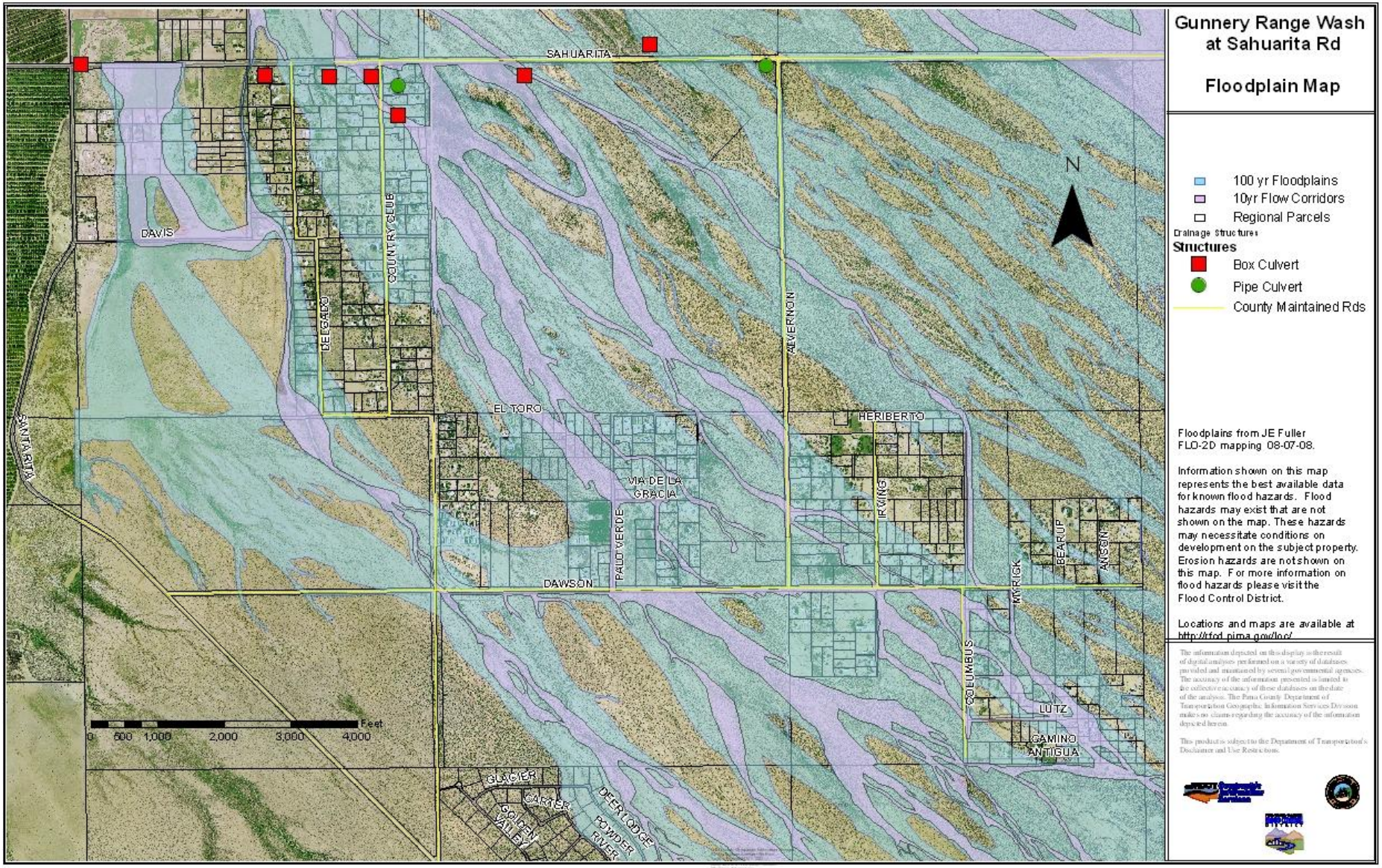
Public Outreach MapGuide Map



Lee Moore Wash

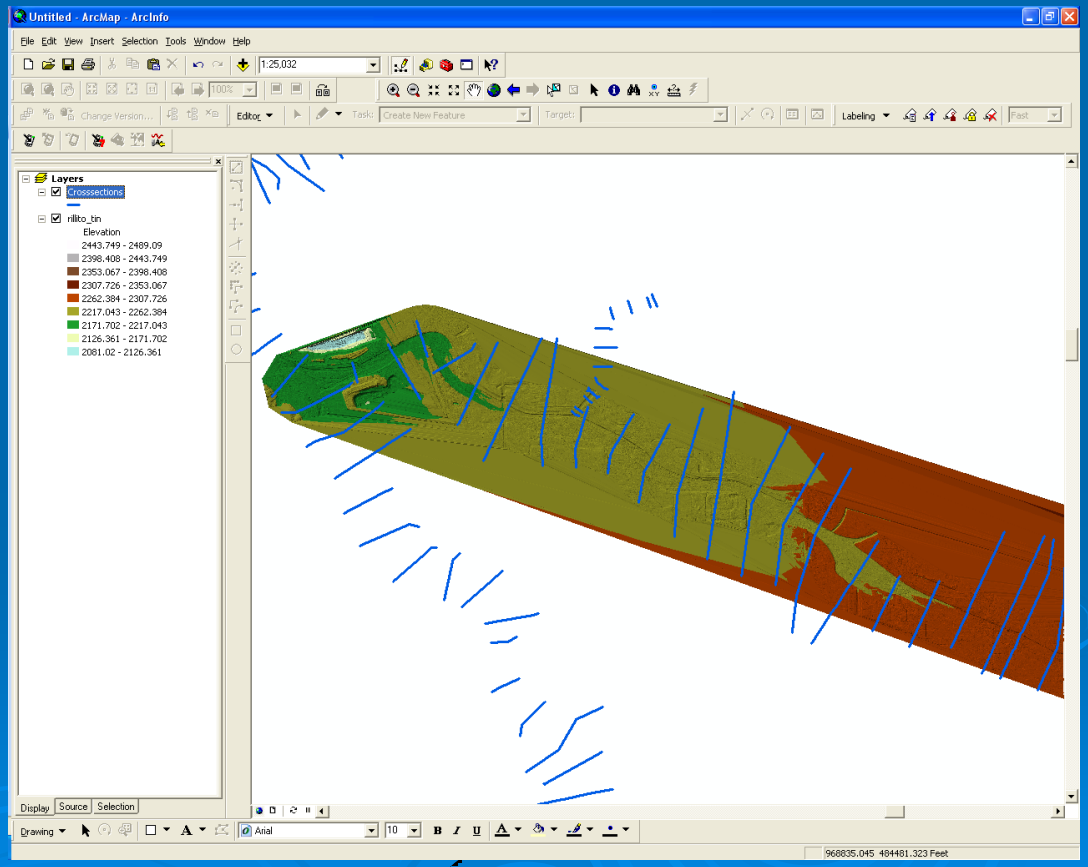




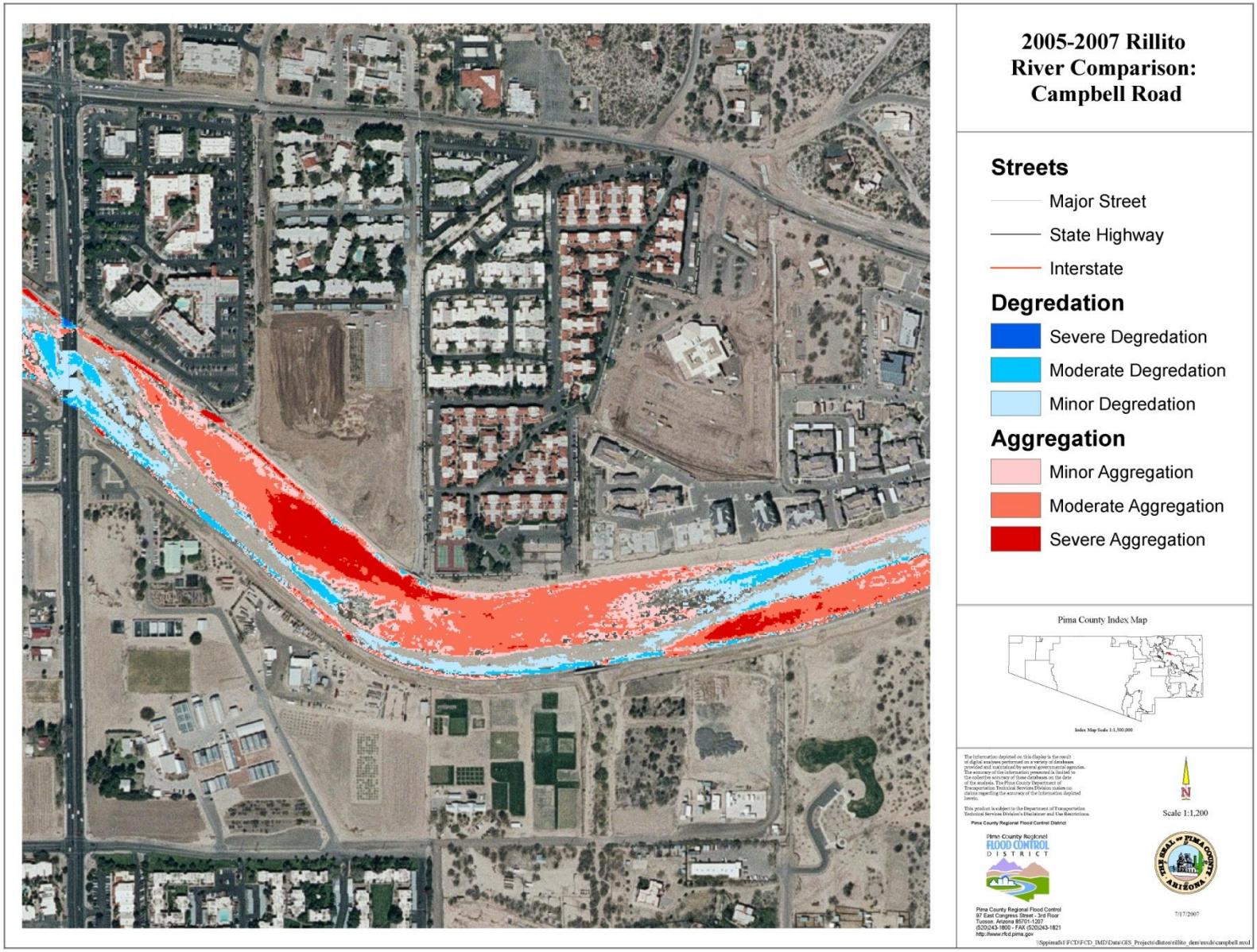

Gunnery Range Wash at Sahuarita Rd
Floodplain Map
SAHUARITA
DAVIS
COUNTRY CLUB
DELGADO
SANTA RITA
EL TORO
VIA DE LA GRACIA
PALO VERDE
DAWSON
HERIBERTO
ALVERNON
IRVING
BEARUP
ANSON
McVICK
COLUMBUS
LUTZ
CAMINO ANTIGUA
GLACIER
CARIBE
GOLDEN VALLEY
DEER LODGE
POWDER RIVER
N
100 yr Floodplains
10yr Flow Corridors
Regional Parcels
Drainage Structures
Structures
Box Culvert
Pipe Culvert
County Maintained Rds
0 500 1,000 2,000 3,000 4,000 Feet
Floodplains from JE Fuller FLO-2D mapping 08-07-08.
Information shown on this map represents the best available data for known flood hazards. Flood hazards may exist that are not shown on the map. These hazards may necessitate conditions on development on the subject property. Erosion hazards are not shown on this map. For more information on flood hazards please visit the Flood Control District.
Locations and maps are available at http://rfcd.pima.gov/loc/
The information depicted on this display is the result of digital analyses performed on a variety of databases provided and maintained by several governmental agencies. The accuracy of the information presented is limited to the collective accuracy of these databases on the date of the analysis. The Pima County Department of Transportation Geographic Information Services Division make no claims regarding the accuracy of the information depicted hereon.
This product is subject to the Department of Transportation's Disclaimer and User Restrictions.

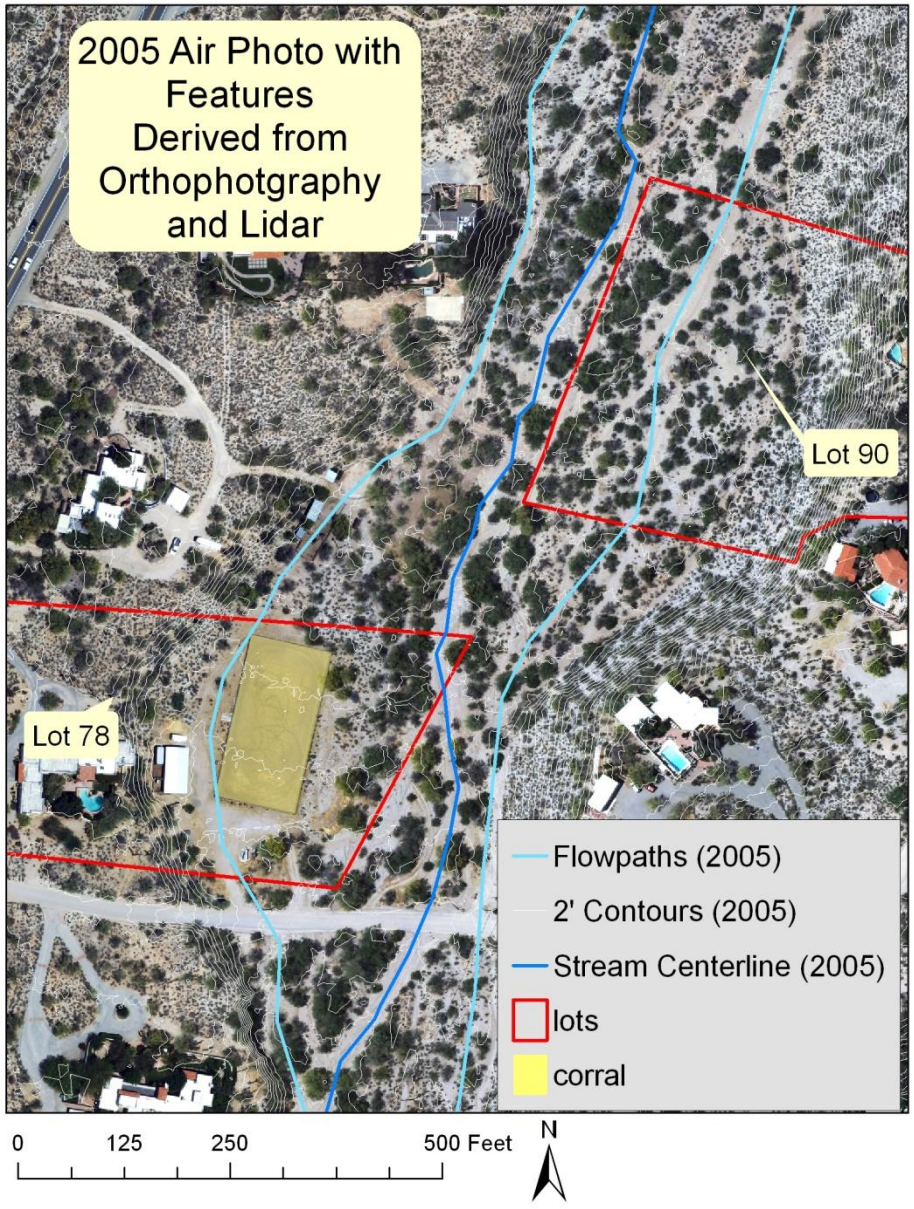
Use of LIDAR to Measure Erosion and Deposition

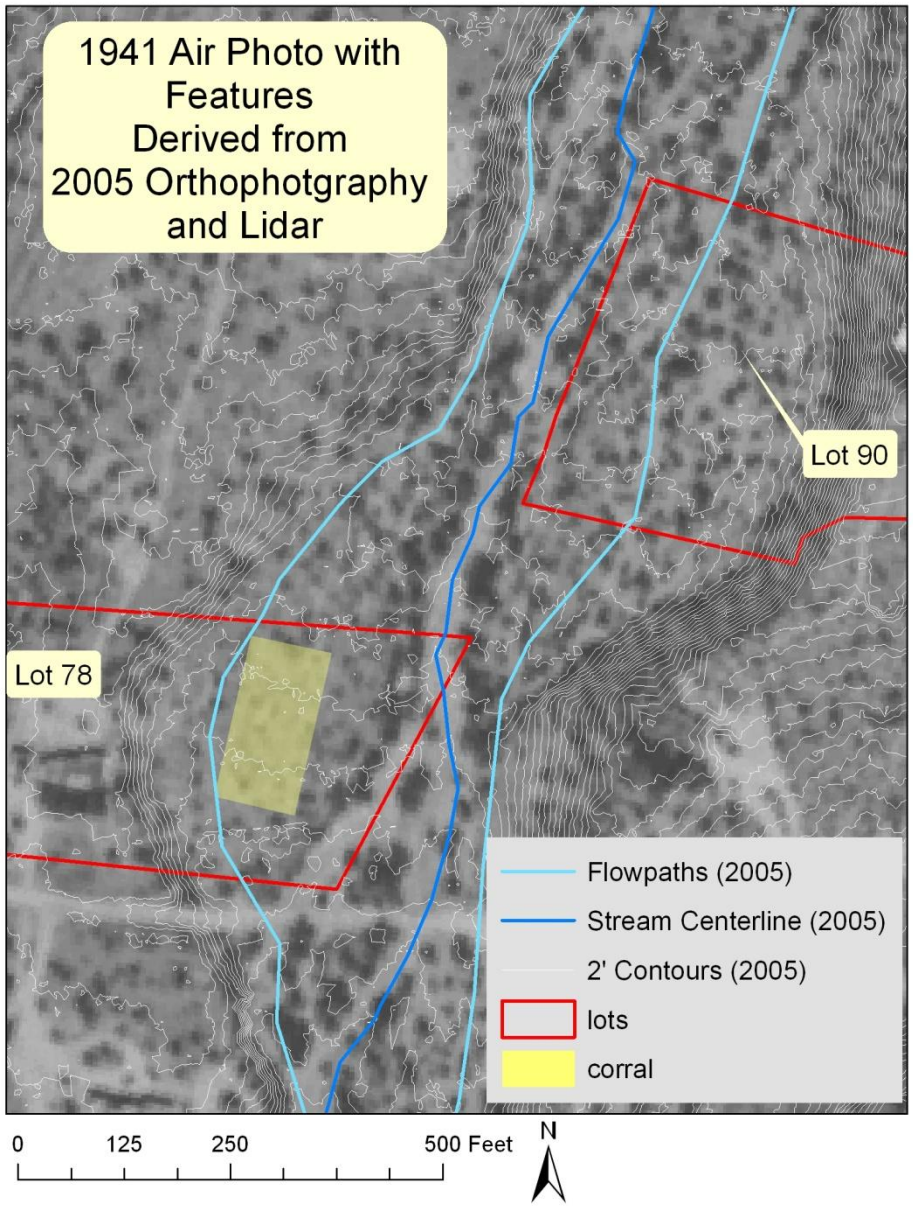
- TIN Created based on Bare-Earth Lidar Data from 2005 Aerial Flight
- Current Cross-Sections Surveyed
- Compare 2005 Cross-Sections against the New Data to determine Deposition or Erosion.



Final product showing change in the riverbed along the Rillito River

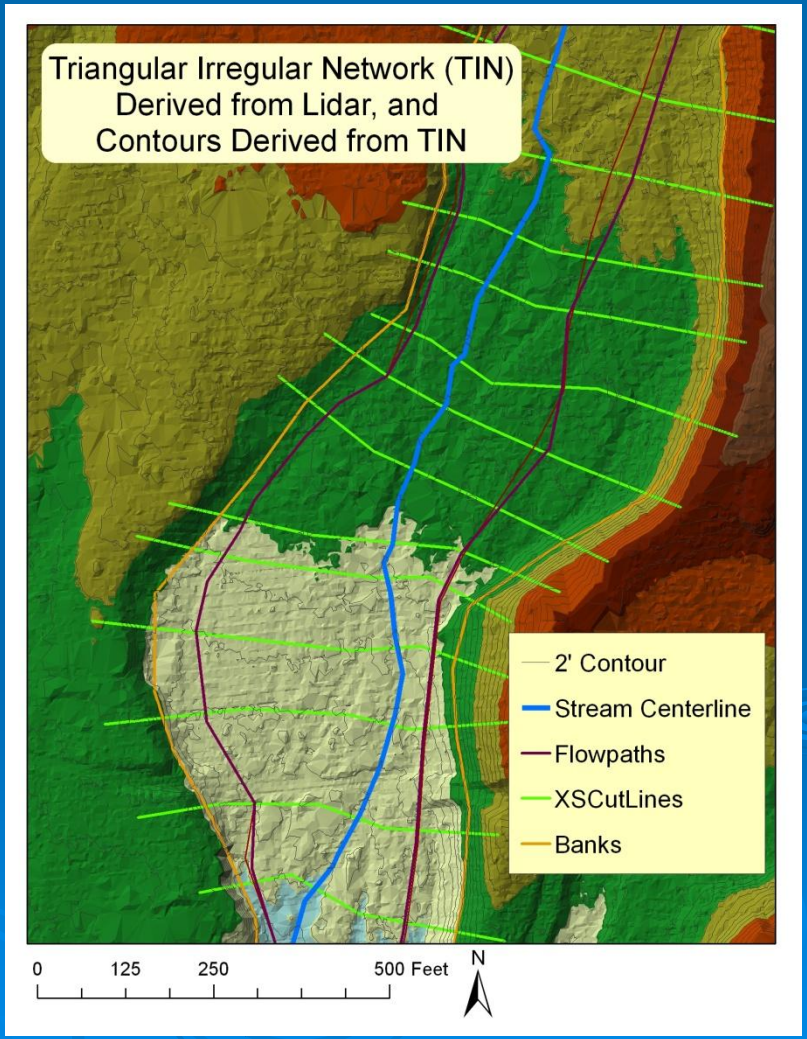



2005 Air Photo with Features Derived from Orthophotgraphy and Lidar
Lot 90
Lot 78
Flowpaths (2005)
2' Contours (2005)
Stream Centerline (2005)
lots
corral
0
125
250
500 Feet
N

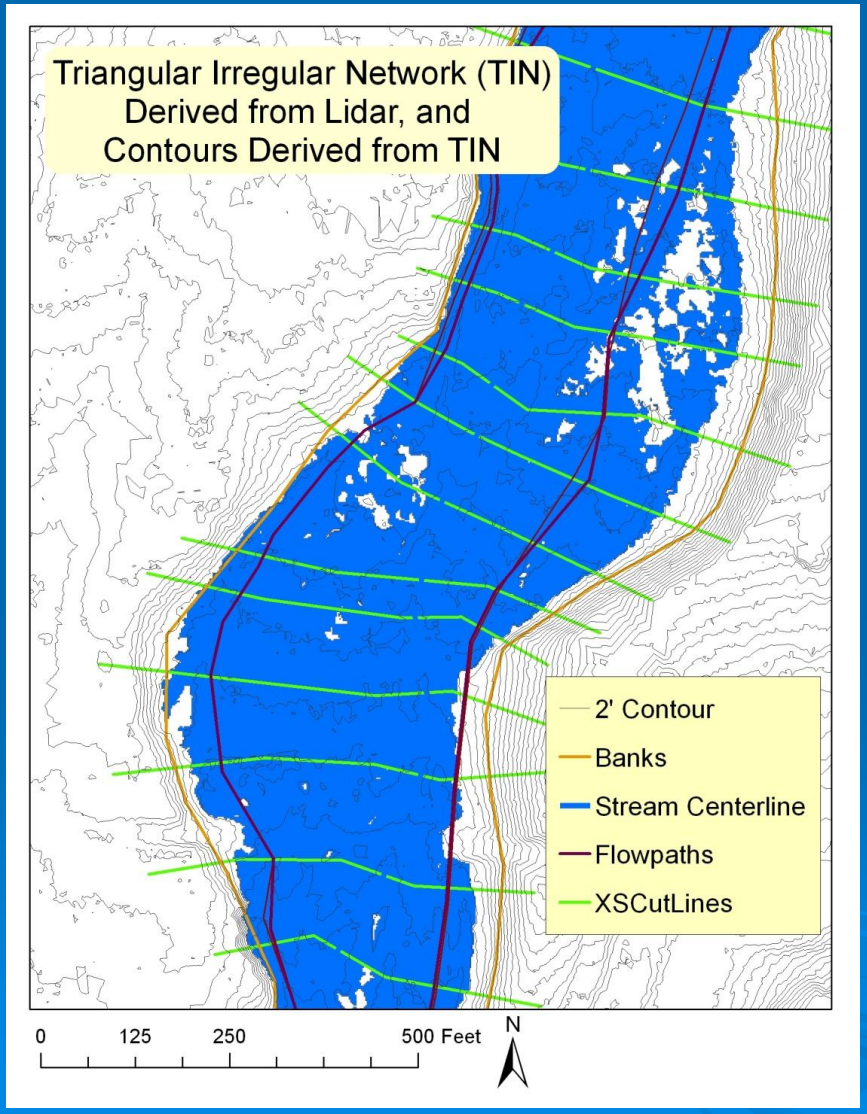

1941 Air Photo with Features Derived from 2005 Orthophotgraphy and Lidar
Lot 90
Lot 78
Flowpaths (2005)
Stream Centerline (2005)
2' Contours (2005)
lots
corral
0
125
250
500 Feet
N

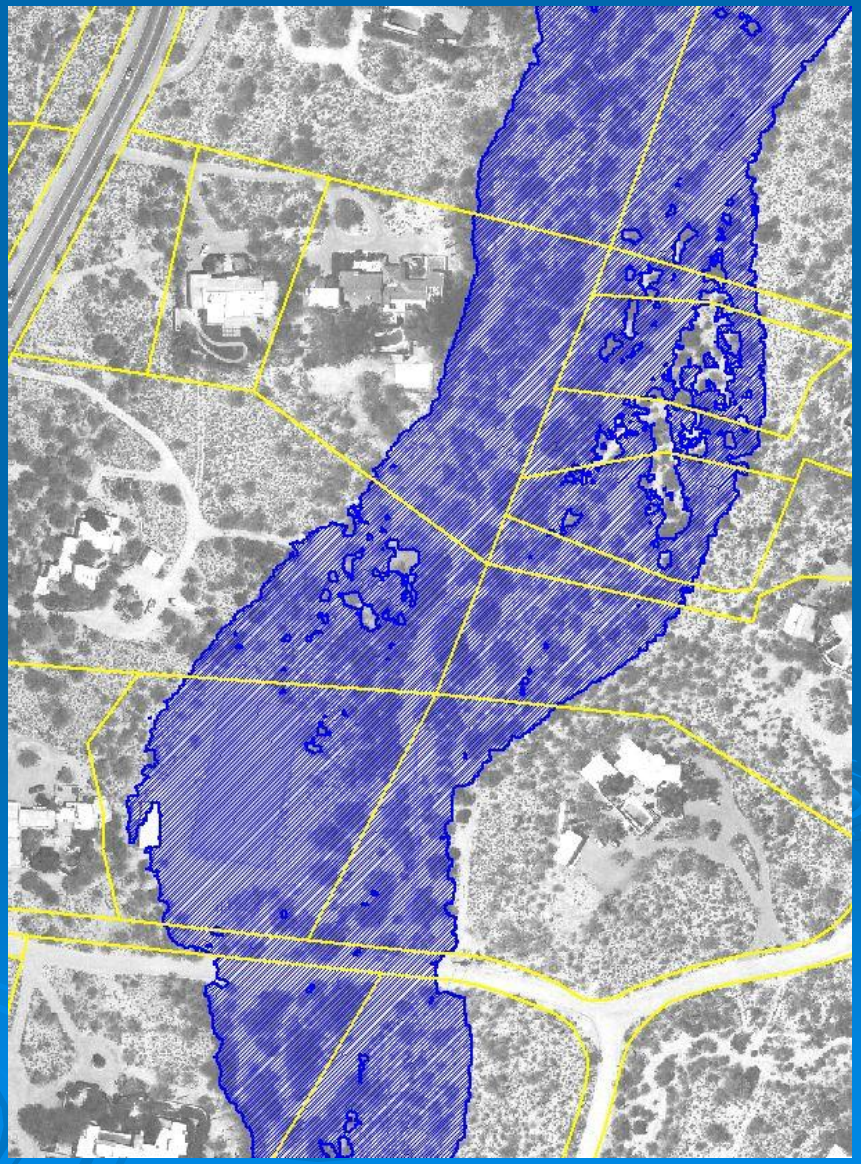
LIDAR use in GIS

- Light Detection and Ranging – a type of remote sensing that measures distances using light
- GIS data derived from LIDAR for floodplain mapping.



Floodplain GIS derived from the previous LIDAR data using specialized software packages





Linking GIS and information, records management

Overview

The RFCD Intranet MapGuide Maps have many data layers that are not available on the public MapGuide maps.

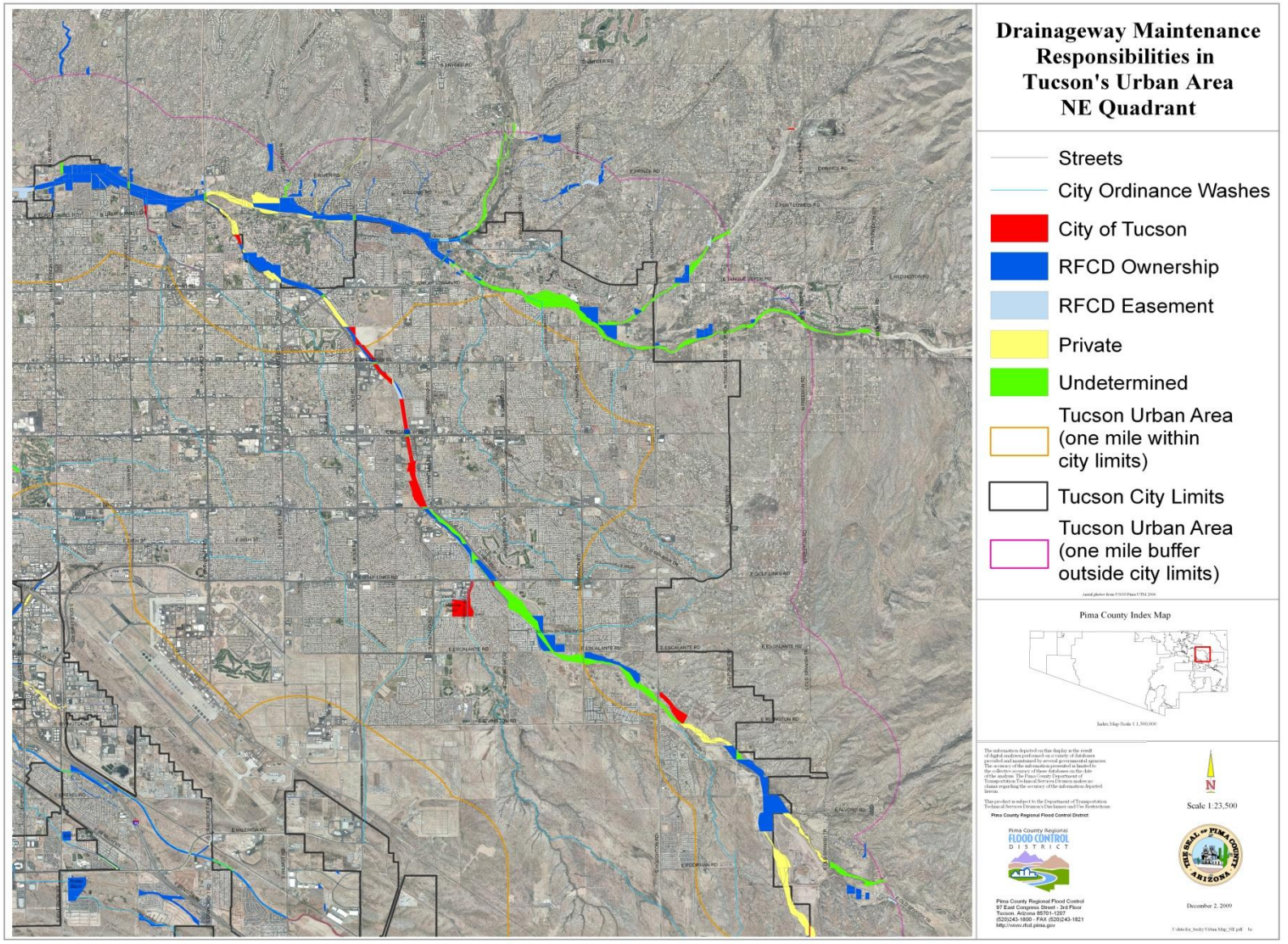
RFCD Intranet Themed MapGuide Maps

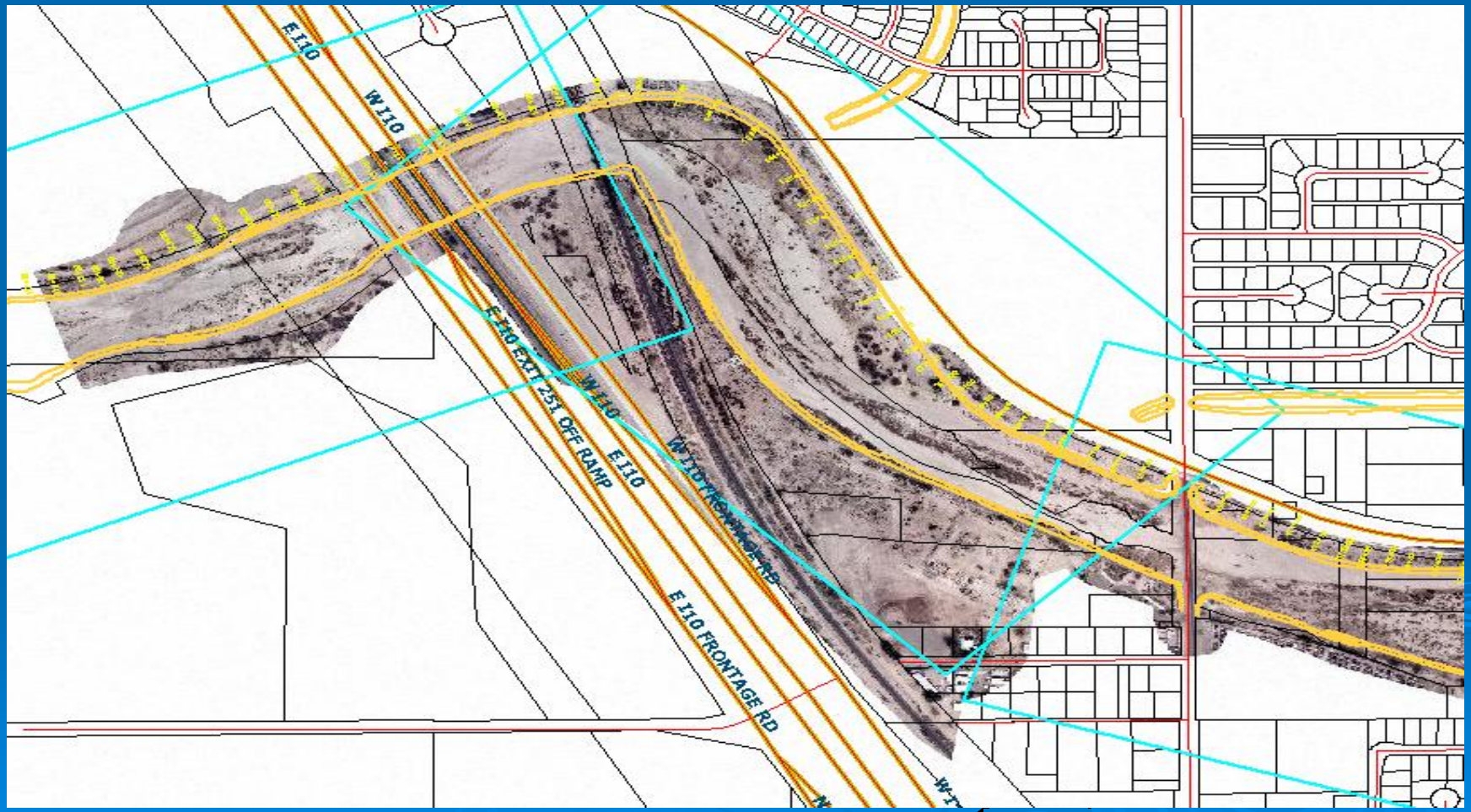
Start with any of the "themes" below. You can switch to any different theme using the drop-down list in the map's title frame. Switching map themes displays the currently displayed area on the ground with the new theme's layers. The new theme shows the same area as your current map view. **We recommend setting this map index page as your browser favorite. If you set browser favorites directly to a maps, the favorites will fail if the map links change.**

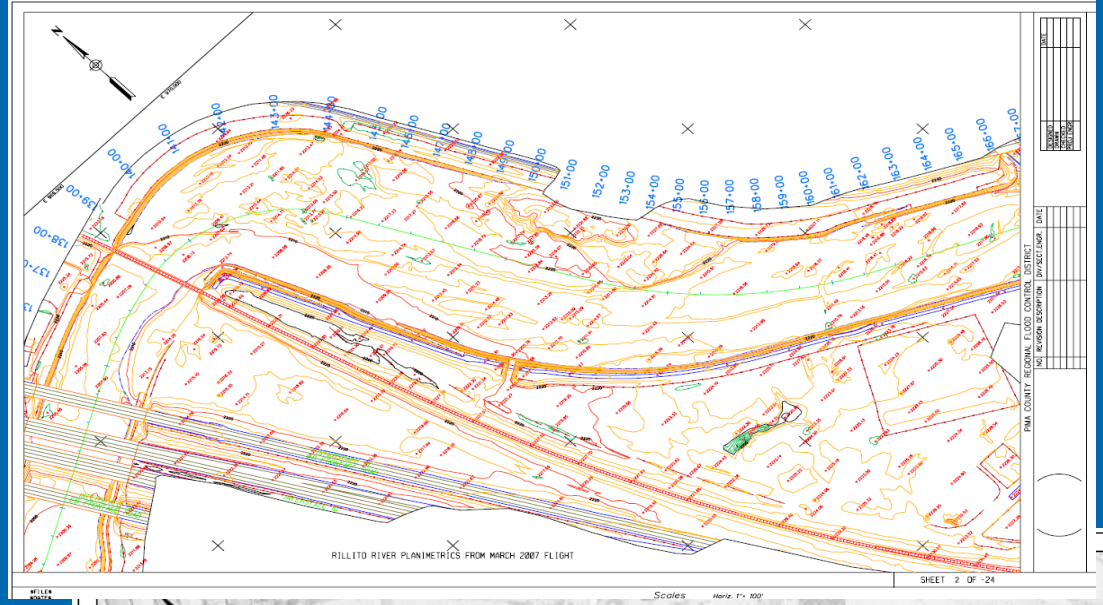
- Read the Disclaimer and Using Autodesk MapGuide.
- Select a starting map theme:

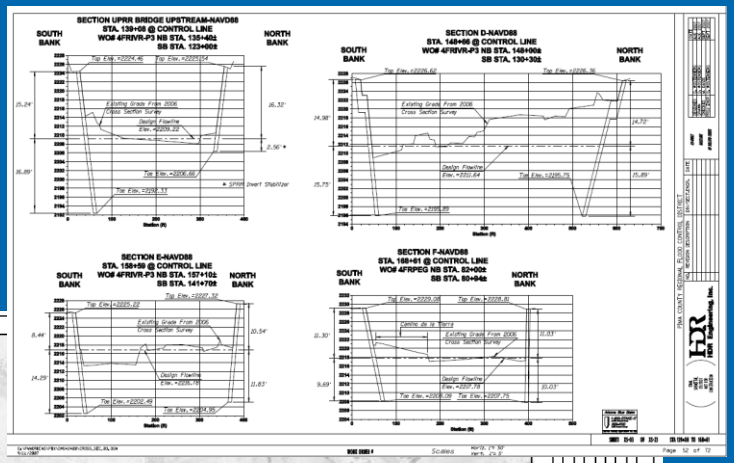
All Layers	This map has **all RFCD map layers** with streets and parcels on by default.
Floodplain Analysis	Selected **floodplain analysis layers** on by default.
DFIRM Effective 6-16-2011	Selected **new "L" Series DFIRM layers** are on by default.
Infrastructure	Layers of interest for **infrastructure management**.
Hydrologist's	Selected **layers for hydrologists** are on by default.
Grid-based Aerial Photo Index	This is the map for the Grid-based Aerial Photos application. Remember to **zoom in to see sections and double-click on a section to see the photos** for that section.
Watercourse and Riparian Habitat Mitigation Map	This map combines selected layers from the SCDP MapGuide Map and RFCD Intranet MapGuide Maps for **mitigation planning and analysis**.
Main MapGuide Map	The Main MapGuide Map with no changes.
SDCP MapGuide Map	The SCDP MapGuide Map with no changes.
Watercourses	**Individual maps of major watercourses**. (These are not map "themes" like the map links above.)

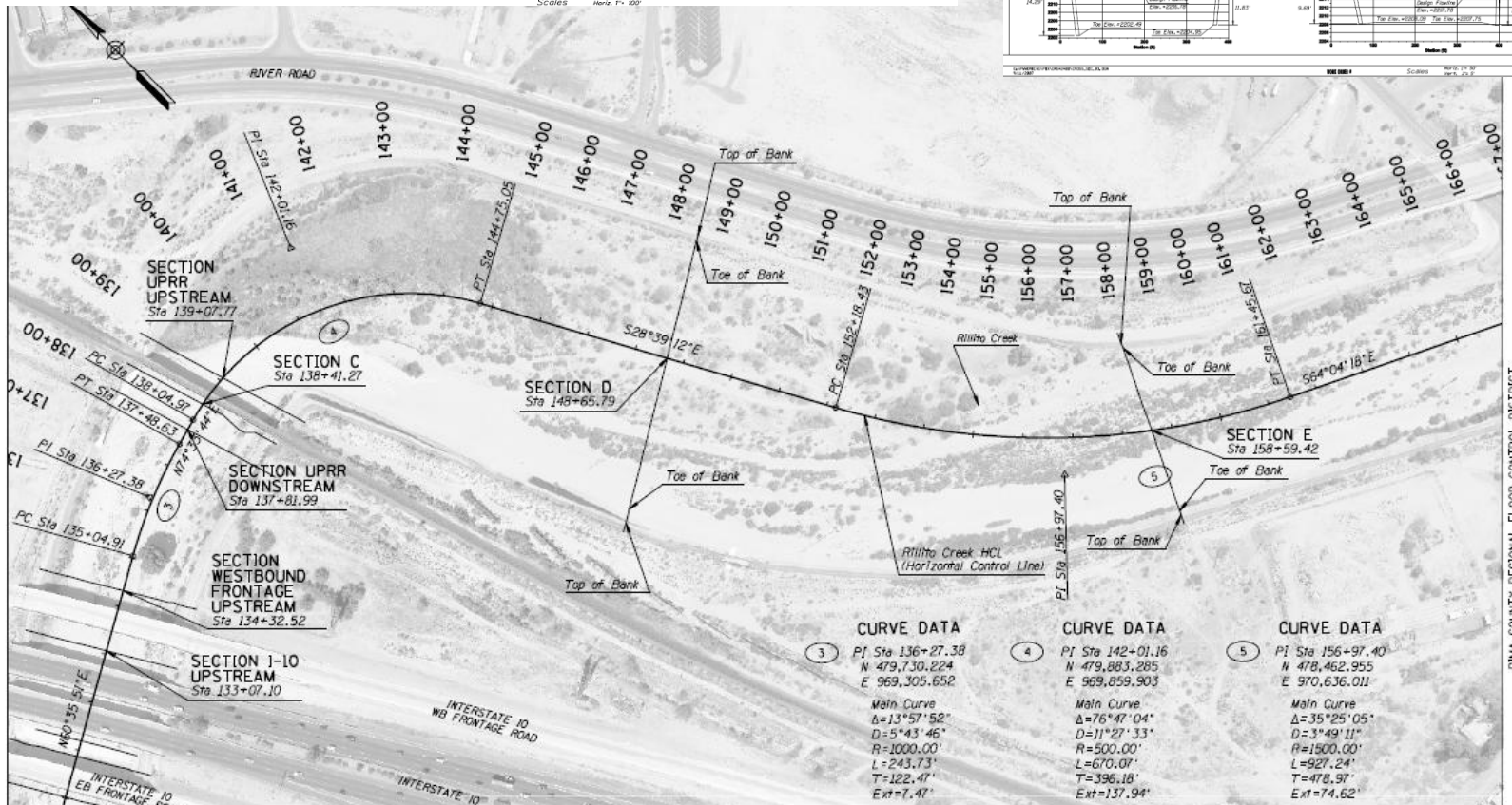
Using GIS Data to Track Maintenance Responsibilities



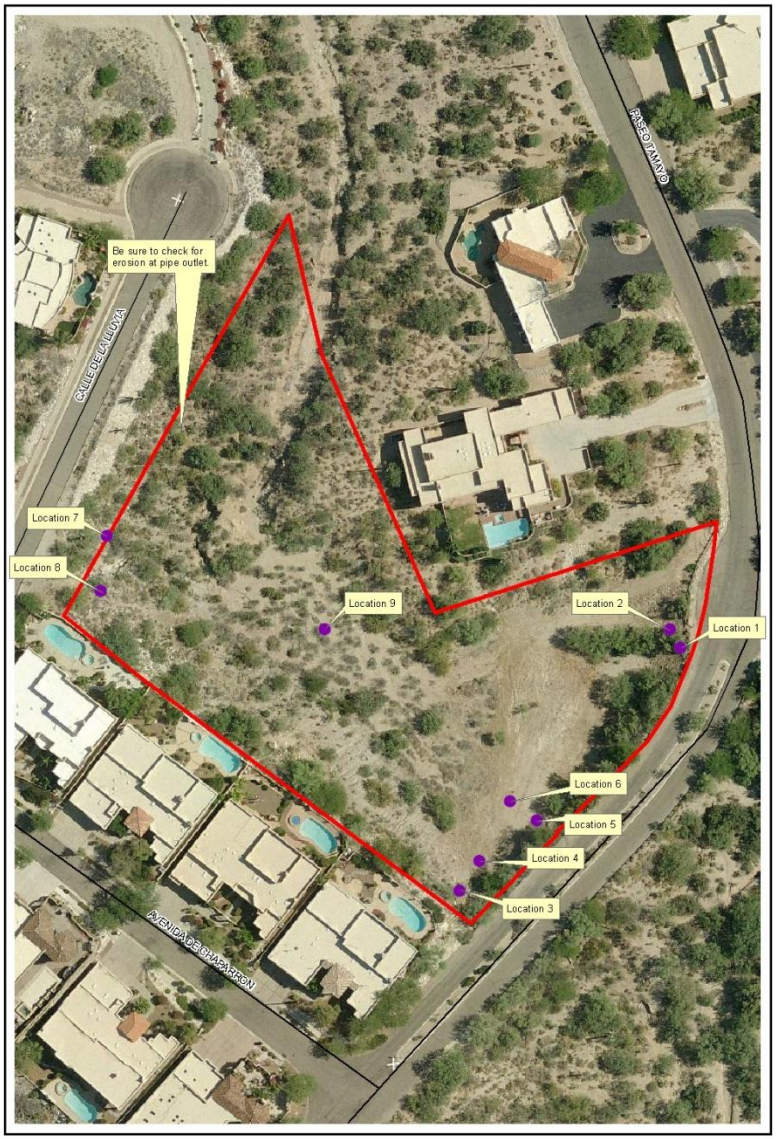

E I10
W I10
E I10 EXIT 251 OFF RAMP
W I10
E I10
E I10 FRONTAGE RD


RILLITO RIVER PLANIMETRICS FROM MARCH 2007 FLIGHT
SHEET 2 OF 24


SECTION UPRR BRIDGE UPSTREAM-NAVD88
STA. 139+08 @ CONTROL LINE
WO# 4FRIVR-P3 NB STA. 135+40±
SB STA. 123+90±
SECTION D-NAVD88
STA. 148+96 @ CONTROL LINE
WO# 4FRIVR-P3 NB STA. 148+00±
SB STA. 130+30±
SECTION E-NAVD88
STA. 158+58 @ CONTROL LINE
WO# 4FRIVR-P3 NB STA. 157+10±
SB STA. 141+70±
SECTION F-NAVD88
STA. 168+61 @ CONTROL LINE
WO# 4FRPEG NB STA. 52+00±
SB STA. 60+94±
SOUTH BANK
NORTH BANK


RIVER ROAD
SECTION UPRR UPSTREAM
Sta 139+07.77
SECTION C
Sta 138+41.27
SECTION UPRR DOWNSTREAM
Sta 137+81.99
SECTION WESTBOUND FRONTAGE UPSTREAM
Sta 134+32.52
SECTION I-10 UPSTREAM
Sta 133+07.10
SECTION D
Sta 148+65.79
SECTION E
Sta 158+59.42
Rillito Creek
Rillito Creek HCL (Horizontal Control Line)
Top of Bank
Toe of Bank
INTERSTATE 10 WB FRONTAGE ROAD
INTERSTATE 10
INTERSTATE 10 EB FRONTAGE
CURVE DATA
3 PI Sta 136+27.38
N 479,730.224
E 969,305.652
Main Curve
Δ=15°57'52"
D=5°43'46"
R=1000.00'
L=243.73'
T=122.47'
Ext=7.47'
CURVE DATA
4 PI Sta 142+01.16
N 479,883.285
E 969,859.903
Main Curve
Δ=76°47'04"
D=11°27'33"
R=500.00'
L=670.07'
T=396.18'
Ext=137.94'
CURVE DATA
5 PI Sta 156+97.40
N 478,462.955
E 970,636.011
Main Curve
Δ=13°25'05"
D=3°49'11"
R=1500.00'
L=927.24'
T=478.97'
Ext=74.62'
PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT
HDR Engineering, Inc.

GIS in the field – Infrastructure inspections



Required Action

Engineer ◉ Maintenance Monitor None Synergen BOS District

Date inspection file closed: May 23, 2011 Name: Paul Wassmuth

Field Notes:

Basin inspection results:

Alta Vista Basin is in good condition and appears to be functioning well. There are two areas that should be noted to monitor in the future.

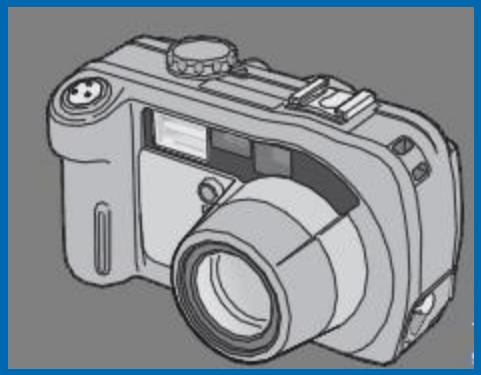
1. The HOA is going to be doing some road repairs along the road right of way and Paseo Tamyo the east bank of the basin. These repairs are to start in May or June of this year to armor the top bank and channel run off to designated spillways. During the repairs the washouts along the guard rail are to be fixed filling in the erosion cuts to stabilizing guard rail posts.

2. On the west bank of the basin there are two culverts outlets that should be reviewed and extended to the floor of the basin so that the discharge runoff doesn't cause further erosion to the west bank of the basin.

Photo Log:

Location:	Photo:	Direction Facing:	Feature Description:
1.	15145	W.	Erosion cut at guard rail post south east corner and spillway area
2.	15146	W.	Close up of erosion cut that exposes guard rail posts and cuts into bank protection
3.	15147	S.	Spillway south east corner of basin rip rap in fare condition.
4.	15148	S.	Wing wall of culvert outlet and rip rap spillway in south east corner of basin.
5.	15149	N.	Over view of bottom of the basin light vegetation.
6.	15150	SE.	Outlet culverts east bank and inlet spillway south east corner
7.	15151	SW.	Close up of erosion caused by the CMP on the west bank.
8.	15152	E.	Erosion cut on the west bank by the CMP.
9.	15153	E.	East over view of the basin bottom light vegetation.

Use of GPS cameras for more accurate field work



x3(4)

Number of visible satellites captured at the current position

Number of satellites used

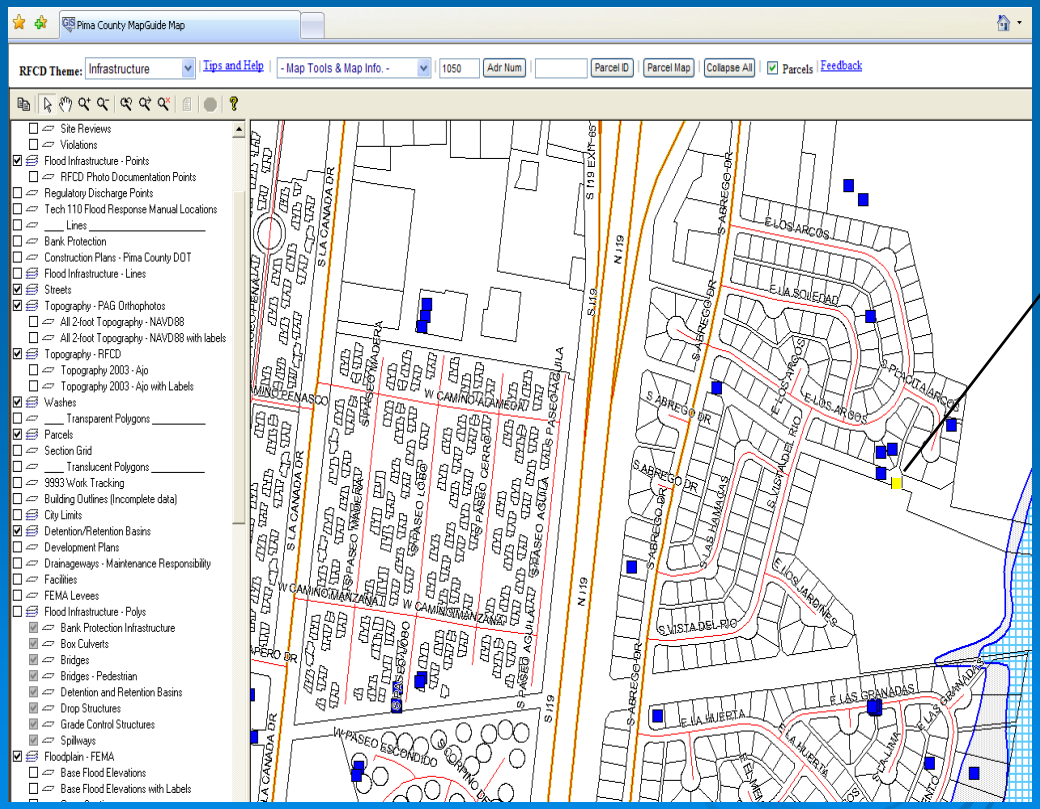
GPS positioning quality

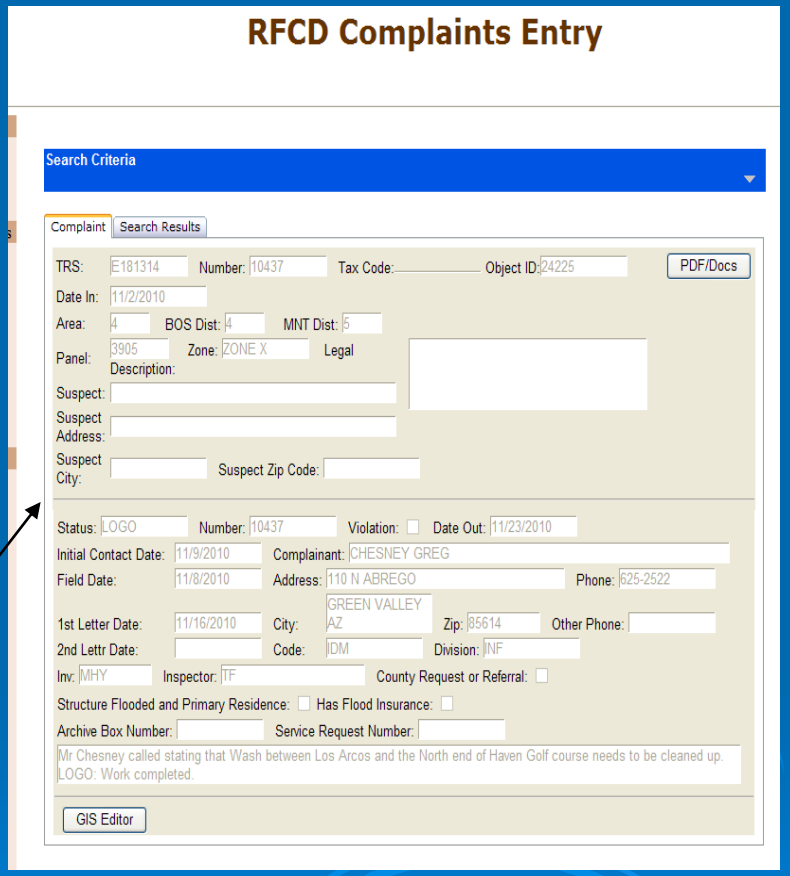
Display	Contents
no fix	The GPS unit cannot receive data.
2d	The NMEA-0183 format GSA positioning mode is 2d.
3d	The NMEA-0183 format GSA positioning mode is 3d.
Diff	The NMEA-0183 format GGA quality is DGPS.

GIS in the field - Identifying critical maintenance issues

Complaints Data Base

- Complaints are logged and mapped into the Flood Control database using ArcServer.
- Staff can then analyze data to better serve the public.





IMD Activity Database to track drainage complaint response

Pima County RFCD IMD Activity Database - IMD-IF-11-0003

File | Return to Home Page | Logout

Advanced Search

Search: imd-if-11

Enter any part of an activity number, DC number, complainant name, or complainant address to search the database.

Advanced

Filter by Status
- [x] New Activity
- [x] Research
- [x] Field
- [x] Letter
- [x] Closed

Filter by Reviewer

Find

Search | Advanced Search | Schedule

Information | Research | Field Review | Maintenance Activity | Response | Crew Day Card

PIMA COUNTY
REGIONAL FLOOD CONTROL DISTRICT

Site Information

Primary Street	N. Shannon Road	Activity Number	IMD-IF-11-0003
Secondary Street	W. Camino De La Joya	DC-Number	
Channel Name	Linda Vista Terrace Basin	Township	12
Channel Type	Drainageway-constructed	Range	13
Ownership Type		Section	16
Riparian Classification	N/A	Master Drainageway Polygon IDs	
		Drainageway Polygon IDs	3537

Equipment

Backhoe | Dump truck | Excavator | Gradall | Hand tools | Other

Duration of Work

Estimated Start Date	Select a date
Estimated Duration in Days	0
Estimated End Date	Select a date
Date Completed	5/26/2011
% Completed	100%

Specialty Items

Residential notification required

Survey required

RFCD's Regulatory Interpretation

Excavation exclusion | Pima County Cultural Resources | Excavation following Nationwide 3 guidelines

US Army Corps of Engineers | US Fish and Wildlife | N/A

Description of Proposed Work Activity

RFCD Vegetation | RFCD Mowing | DOT Maintenance Support | NRPR Maintenance | IMD Maintenance

IMD Maintenance

The north block wall of the basin has been broken down by some local youth so they can enter the basin. There is also some damage to the inlet area on the east side of the block wall.

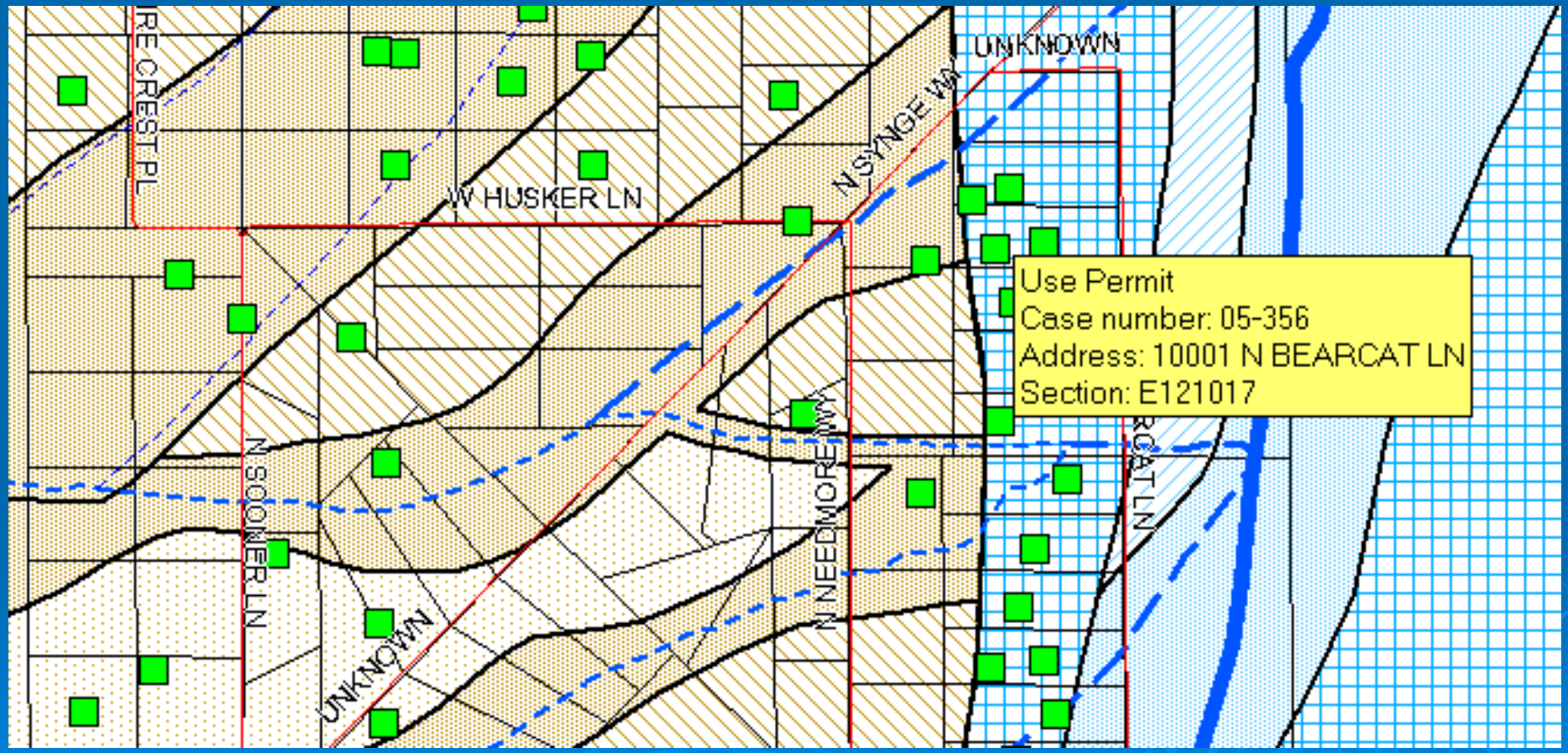
This project has been given to Liberty Fence Company to install ornamental iron fencing between the columns on the north and two panels of fencing at the inlet on the east where damage tot he block wall was discovered.

Save | Print... | Undo

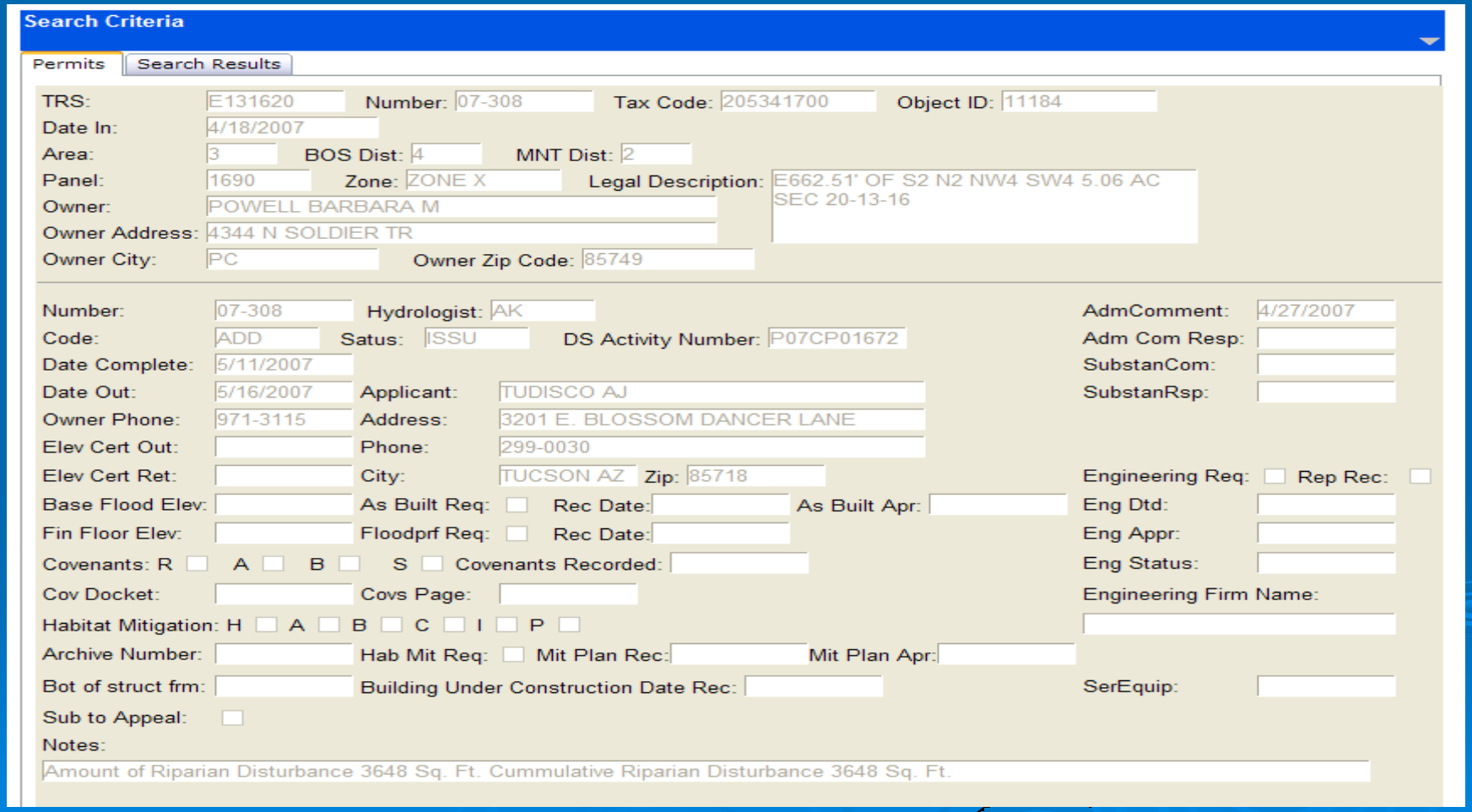
Ready | Rebecca Steinnecker

Spillway entrance area panels have been installed and is completed.

Permits Data Base



Permit Data



Search Criteria

Permits | Search Results

TRS: E131620 Number: 07-308 Tax Code: 205341700 Object ID: 11184
Date In: 4/18/2007
Area: 3 BOS Dist: 4 MNT Dist: 2
Panel: 1690 Zone: ZONE X Legal Description: E662.51' OF S2 N2 NW4 SW4 5.06 AC SEC 20-13-16
Owner: POWELL BARBARA M
Owner Address: 4344 N SOLDIER TR
Owner City: PC Owner Zip Code: 85749

Number: 07-308 Hydrologist: AK AdmComment: 4/27/2007
Code: ADD Satus: ISSU DS Activity Number: P07CP01672 Adm Com Resp:
Date Complete: 5/11/2007 SubstanCom:
Date Out: 5/16/2007 Applicant: TUDISCO AJ SubstanRsp:
Owner Phone: 971-3115 Address: 3201 E. BLOSSOM DANCER LANE
Elev Cert Out: Phone: 299-0030
Elev Cert Ret: City: TUCSON AZ Zip: 85718 Engineering Req: Rep Rec:
Base Flood Elev: As Built Req: Rec Date: As Built Apr: Eng Dtd:
Fin Floor Elev: Floodprf Req: Rec Date: Eng Appr:
Covenants: R A B S Covenants Recorded: Eng Status:
Cov Docket: Covs Page: Engineering Firm Name:
Habitat Mitigation: H A B C I P
Archive Number: Hab Mit Req: Mit Plan Rec: Mit Plan Apr:
Bot of struct frm: Building Under Construction Date Rec: SerEquip:
Sub to Appeal:
Notes:
Amount of Riparian Disturbance 3648 Sq. Ft. Cummulative Riparian Disturbance 3648 Sq. Ft.

Future of GIS and Pima County

- Coordination with countywide Maximo and PimaCore using GIS to track Flood Control assets

Questions?