



Maricopa County

Elections Department

Geographic Information Systems

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Maricopa County Elections GIS Director



Maricopa County, Arizona

- 9,224 square miles
- 3,817,117 residents according to 2010 Census
- 1,972,381 voters as of July 16th, 2015
- 1,276,501 permanent early voters
- 1,650,000+ addresses
- 8 congressional districts
- 20 legislative districts
- 5 board of supervisor districts
- 5 special health care districts
- 5 community college districts
- 26 justice of the peace precincts
- 724 voting precincts
- 25 cities & towns
- 49 elementary and unified school districts
- 6 high school districts
- 2 technical education districts
- 23 fire districts



GIS In Elections

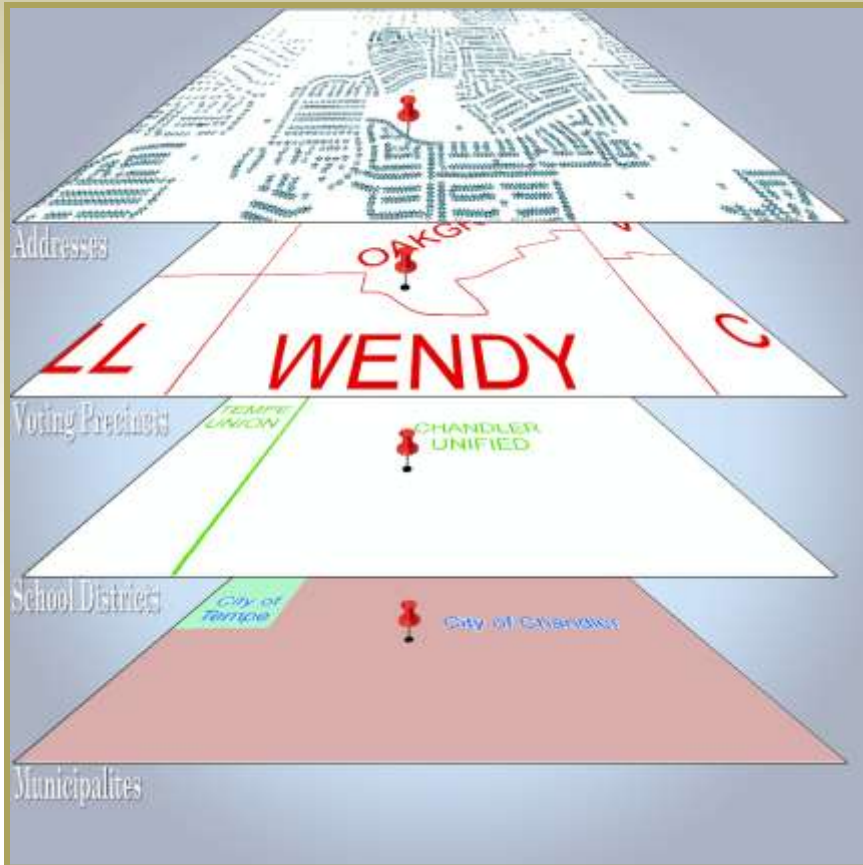
In the Elections Department at Maricopa County, GIS is used in many different aspects

- voter registration
- election setup
- election day management
- routing deliveries
- redistricting

Voter registration

When a voter registers or changes their address, districts are assigned based on the given address

House Number	Street Dir.	Street Name	Street Type	Street Suffix	Zip Code
2600	E	KNOX	RD		85224



Spatially enabled databases make integrating GIS into existing applications easier

```
Query - regisprod.GISPROD.RECORDER\bilottag - F:\GIS\Queries\SqlServer2008S...
DB: GISPROD

Select b.BdType,b.BdVal
From
    (Select *
     From ElectionBoundaries (NOLOCK)) b,|
    (Select Shape,AddressType
     From Addresses (NOLOCK)
     Where Hseno = '2600' and StDir = 'E' and StName='KNOX'
     and StType = 'RD' and StSufx='' and Zip='85224') a
where a.SHAPE.STIntersects(b.Shape)=1
```

BdType	BdVal
C	CH
P	0117
S	080
Q	Q100
V	V09

Query batch completed. Exec time: 0:00:00 5 rows Ln 6, Col 38

Voter registration

When addresses or boundaries change, triggers query and update the database for voters that are affected.



```

-----get voters intersecting a specific election boundary
select d.*
from voter(nolock) d
right outer join
(select a.hseno, a.stdir, a.stname, a.stsufx, a.sttype, a.zip)
from
(select * from gisaddresses(nolock) a,
(select * from giselectionboundaries(nolock) where objectid=160046) b
where a.SHAPE.STIntersects(b.Shape)=1) c
on d.hseno=c.hseno and d.stdir=c.stdir and d.stname=c.stname and d.sttype=c.sttype and d.zip=c.zip
    
```

VOTERID	LASTNAME	FIRSTNAME	MIDNAME	NAMEPRFX	NAMESUFX	ADDRTYPE	HSENO	HSENO5UFX	STDIR	STNAM
160046	2000	JOHN	LEE			S	1000		W	WILSON
160046	2000	LARRY				S	1000		W	WILSON
160046	2000	WENDELL	WAL			S	1000		W	WILSON

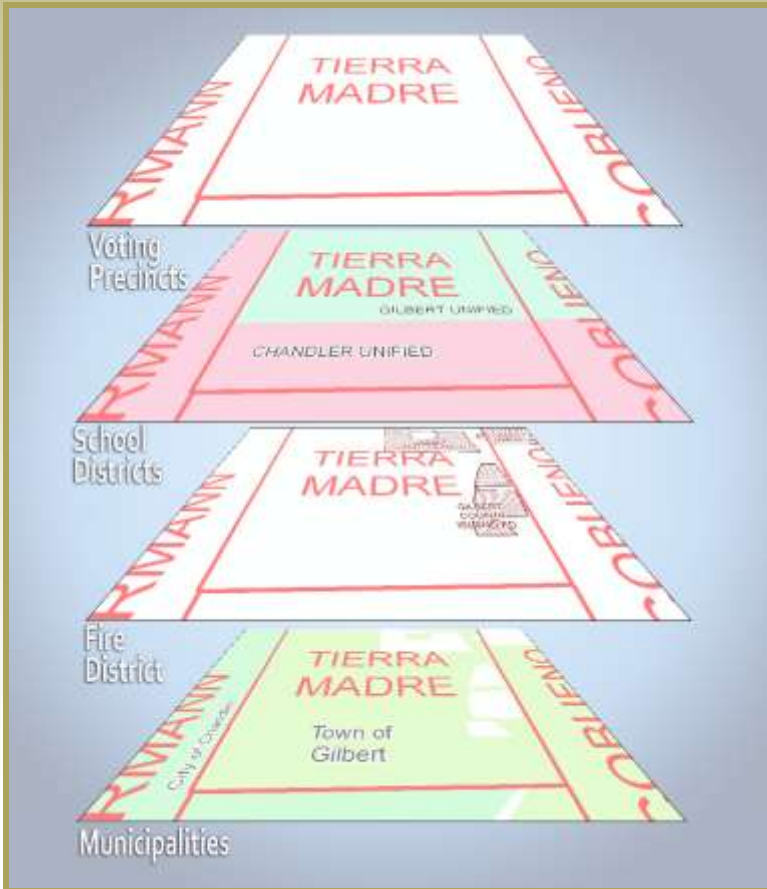
```

-----get voters intersecting a specific election boundary
select * from district(nolock) where voterid in (
select d.voterid
from voter(nolock) d
right outer join
(select a.hseno, a.stdir, a.stname, a.stsufx, a.sttype, a.zip)
from
(select * from gisaddresses(nolock) a,
(select * from giselectionboundaries(nolock) where objectid=160046) b
where a.SHAPE.STIntersects(b.Shape)=1) c
on d.hseno=c.hseno and d.stdir=c.stdir and d.stname=c.stname and d.sttype=c.sttype and d.zip=c.zip)
    
```

VOTERID	DISTTYPE	DISTVAL
160046	C	M1
160046	F	Q224
160046	Q	Q002
160046	Q	Q007
160046	Q	Q018
160046	Q	Q100
160046	S	004
160046	V	V01
160046	C	M1

Election setup

Determine which voting districts fall within a voting precinct for ballot creation



```
Query - regisprod.GISPROD.RECORDER\bilottag - (untitled) - Select b.BdTyp...
DB: GISPROD
Select b.BdType,b.BdVal
From
  (Select *
   From ElectionBoundaries (NOLOCK) where BdType<>'P') b,
  (Select Shape
   From ElectionBoundaries (NOLOCK)
   Where BdType='P' and BdVal=1074) a
Where a.SHAPE.STIntersects(b.Shape)=1
```

BdType	BdVal
D	D88
Q	Q100
F	F17
S	041
C	CH
C	GI
S	080
V	V09

(8 row(s) affected)

Results

Query batch completed. Exec time: 0:00:00 8 rows Ln 4, Col 52

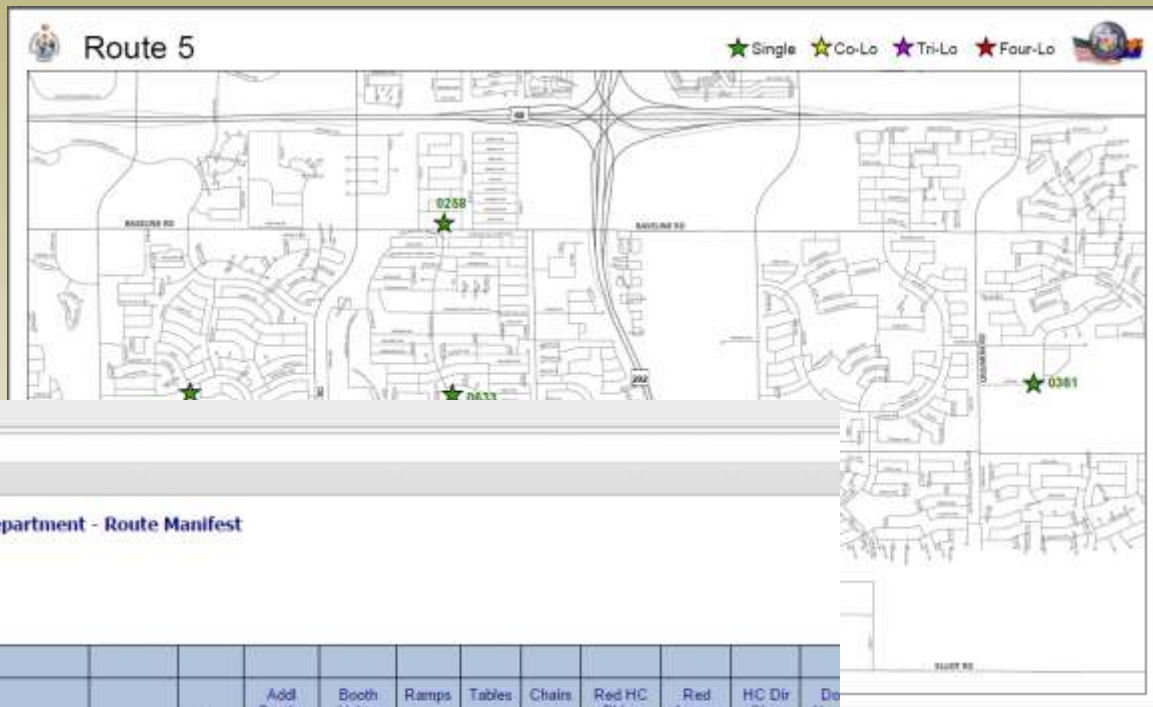
Election setup

Assign voting precincts to troubleshooters interactively

The screenshot shows a web browser window with the URL `regiswebtest/troubleshooterjs/`. The page title is "Maricopa County Election". Below the browser window, there is a toolbar with a hand icon, a "Table of Contents" button, and a "Save" button. The main area is a map of precincts, each labeled with a number. Many precincts have a yellow star icon next to them, indicating they are assigned to a troubleshooter. The map includes street names such as "W Bethany Home Rd", "E Bethany Home Rd", "W Camelback Rd", "N 27th Ave", "N Camelback Ave", "N 7th Ave", "E Camelback Rd", "N 31st Ave", "E Camelback Rd", "N 35th Ave", "E Camelback Rd", "N 39th Ave", "E Camelback Rd", "N 43rd Ave", "E Camelback Rd", "N 47th Ave", "E Camelback Rd", "N 51st Ave", "E Camelback Rd", "N 55th Ave", "E Camelback Rd", "N 59th Ave", "E Camelback Rd", "N 63rd Ave", "E Camelback Rd", "N 67th Ave", "E Camelback Rd", "N 71st Ave", "E Camelback Rd", "N 75th Ave", "E Camelback Rd", "N 79th Ave", "E Camelback Rd", "N 83rd Ave", "E Camelback Rd", "N 87th Ave", "E Camelback Rd", "N 91st Ave", "E Camelback Rd", "N 95th Ave", "E Camelback Rd", "N 99th Ave", "E Camelback Rd".

Polling place delivery routing

Election delivery routes, route maps, and route manifest



Maricopa County Elections Department - Route Manifest

Election Date: 11/04/2014
 Route #: 3
 Delivery Date:

Notes	Facility Number	Delivery	Precinct	Polling Place	Address	City	Phone #	Add Booths	Booth Lights	Ramps	Tables	Chairs	Red HC Pking	Red Arrows	HC Dir Sign	Do Has
	14494		0113	MCQUEEN ROAD BAPTIST CH	24211 S MCQUEEN RD	CHANDLER	1402-506-3853	5	N	1/1W			2		2	
	14084		0405	HULL SCHOOL	2424 E MAREN DR	CHANDLER	1402-883-4207	7	N	W						
	14812		0436	SANTAN K-8 SCHOOL	1550 E CHANDLER HEIGHTS RD	CHANDLER	1402-883-4700	4	N	W						
	14818		0099	CHANDLER PUBLIC LIBRARY@BASHA HIGH SCHOOL	5990 S VAL VISTA DR	CHANDLER	1402-782-2856	7	N	W						
	15033		0617	NAVARRETE SCHOOL	5490 S SUN GROVES BLVD	CHANDLER	1402-883-4850	7	N	W						
1	15407		0496	CENTRAL CHRISTIAN CHURCH@GILBERT	965 E GERMANN RD	GILBERT	1402-325-7300	7	N	W				2		
	15486		0024	ENVIRONMENTAL EDUCATION CENTER	4050 E CHANDLER HEIGHTS RD	CHANDLER	1402-782-2892	7	N	W						

1. Comments: CLOSED ON FRIDAYS

Election day

Polling Place Locator to help voters locate their polling place

Maricopa County Elections Polling Place Locator Results - Windows Internet Explorer

http://recorder.maricopa.gov/pollingplace/pollingplacereults.as

Maricopa County Elections Polling Place Locator

MARICOPA COUNTY ELECTIONS
POLLING PLACE LOCATOR RESULTS

Disclaimer: In order to vote you must be registered. The following information does not ensure that a person is registered to vote. This is not an Early Voting site. This Polling Place will only be open on the day of the election.

Your Polling Place for the election to be held on 08/07/13:
Precinct Code: 0051
Precinct Name: PHAG 1 - TEMPE/HYDRO
Facility Name: TEMPE FIELD SERVICES FACILITY
Facility Address: 55 S PRIEST DR, TEMPE 85281
Facility Location: EAST OF PRIEST DR SOUTH OF SKY HARBOR BLVD
Hours of Operation: Polling places are open from 6:00am to 7:00pm on election day.
See a map to your facility below.

View facility photos

Disclaimer: This is a sample only.
View 2 sample photos available for this precinct:

1321-01.pdf
1321-02.pdf

Map to your facility:

See a GIS map

Done Local intranet | Protected Mode: Off 75%

http://recorder.maricopa.gov

Maricopa County Recorder's Elections

Table of Contents

Address Search, ex: 111 S 3rd Ave 85003

Draw Search Export

TEMPE FIELD SERVICES FACILITY
55 S PRIEST DR 85281
Call 602-506-1511 for Election Information

Enter a facility number.
13203
Find Clear

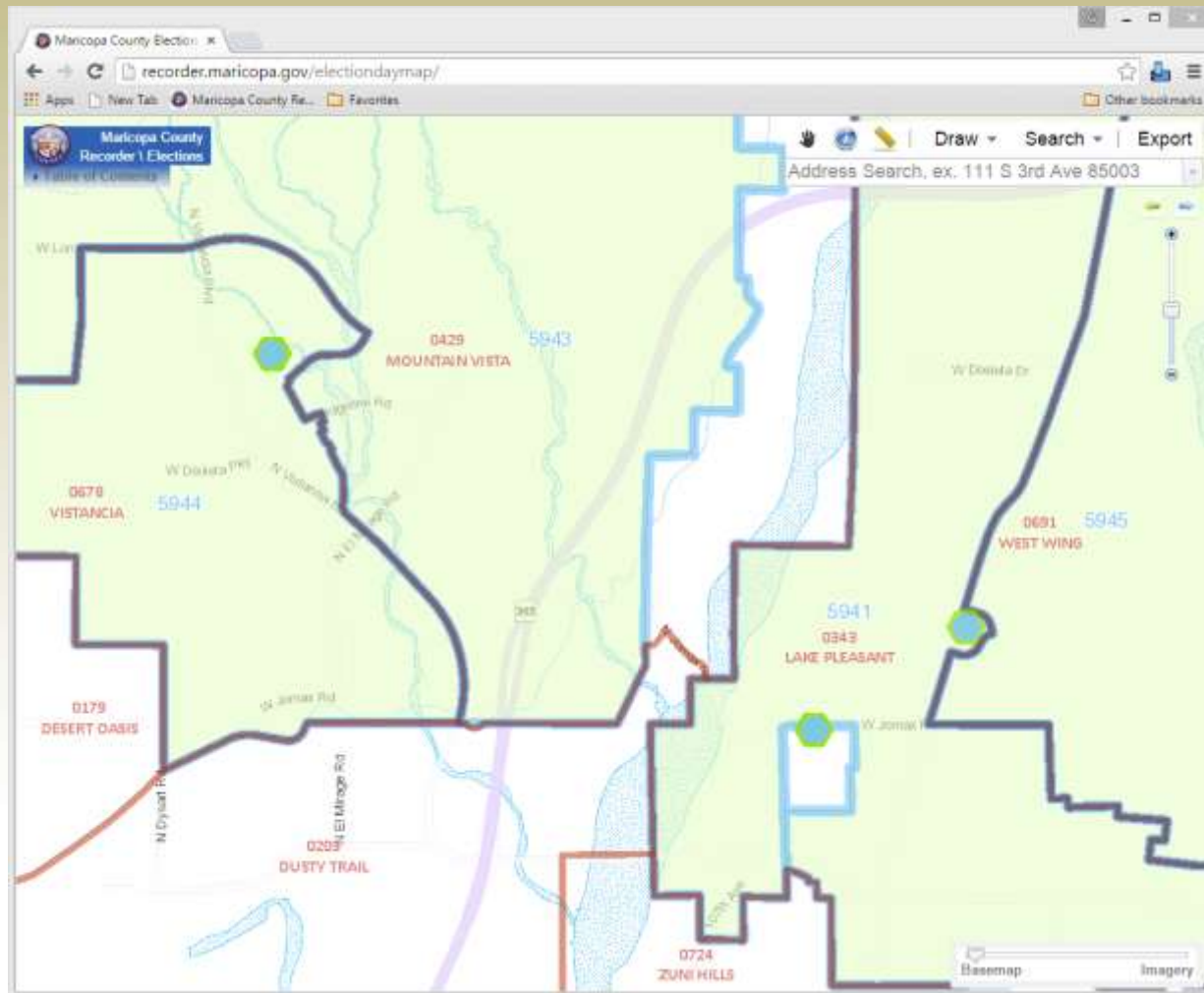
TEMPE FIELD SERVICES FACILITY
55 S PRIEST DR 85281
EAST OF PRIEST DR SOUTH OF SKY HARBOR BLVD
Call 602-506-1511 for Election Information

Basemap Imagery

100%

Election day

Interactive map showing ballot boundaries, troubleshooter areas, polling places, and polling place equipment return sites to help election staff.



Election day

Voters with Early Voting ballots can use our mobile website to locate the closest facility where they can drop off their early ballot on election day

Maricopa County Elections

Early-Ballot Drop Off Only

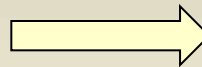
The sites listed below are based on your approximate location.
The GPS accuracy from your browser was low.

**GOODYEAR CITY HALL
REPLACEMENT BALLOT ONLY
190 N LITCHFIELD RD
GOODYEAR, AZ 85338** [Map It](#)

**CROSS OF GLORY
EVANGELICAL LUTH CHR
10111 W JOMAX RD
PEORIA, AZ 85383** [Map It](#)

**CIBOLA VISTA RESORT
27501 N LAKE PLEASANT PKY
PEORIA, AZ 85383** [Map It](#)

The sites listed are only for dropping off an early ballot.
To Find Your Polling Place, [Click Here.](#)



← from Your location to 33°26'54.9"N 112°21'34.1"W

23 min (17.7 miles)
Via I-10 W

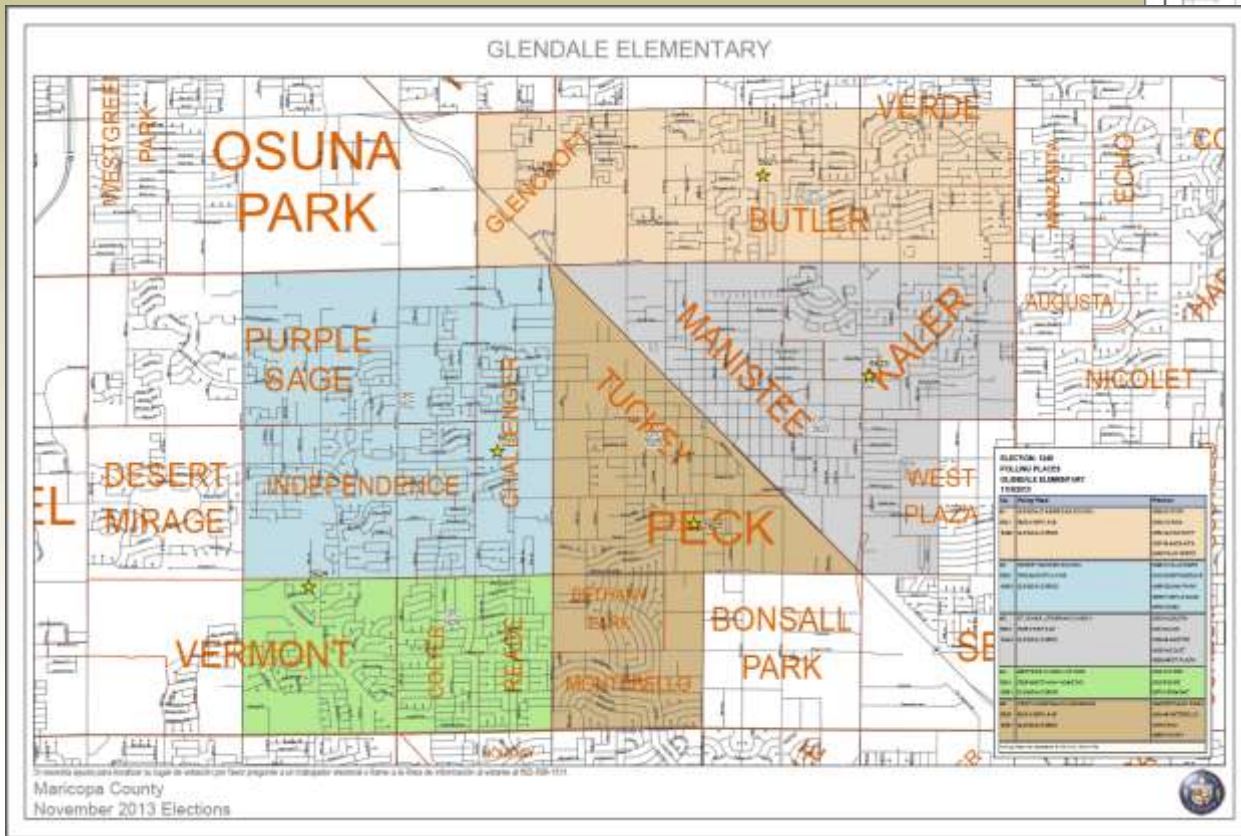
Your location

↑ Head north on N 4th Ave toward W Monroe St
0.1 mi

↙ Turn left at the 2nd cross street onto W Van Buren St
0.2 mi

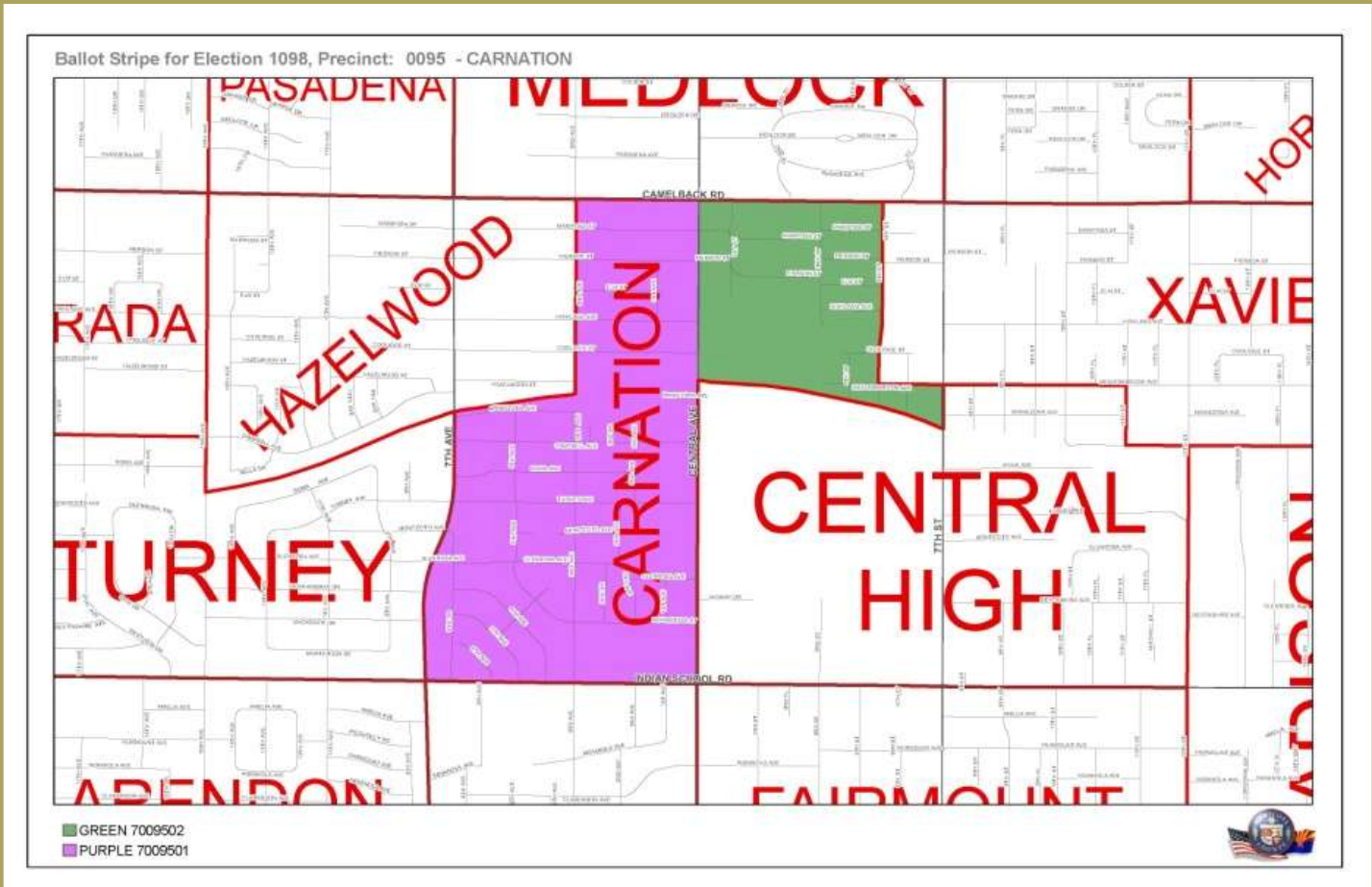
Election day

Polling place election maps showing adjacent precinct polling place information



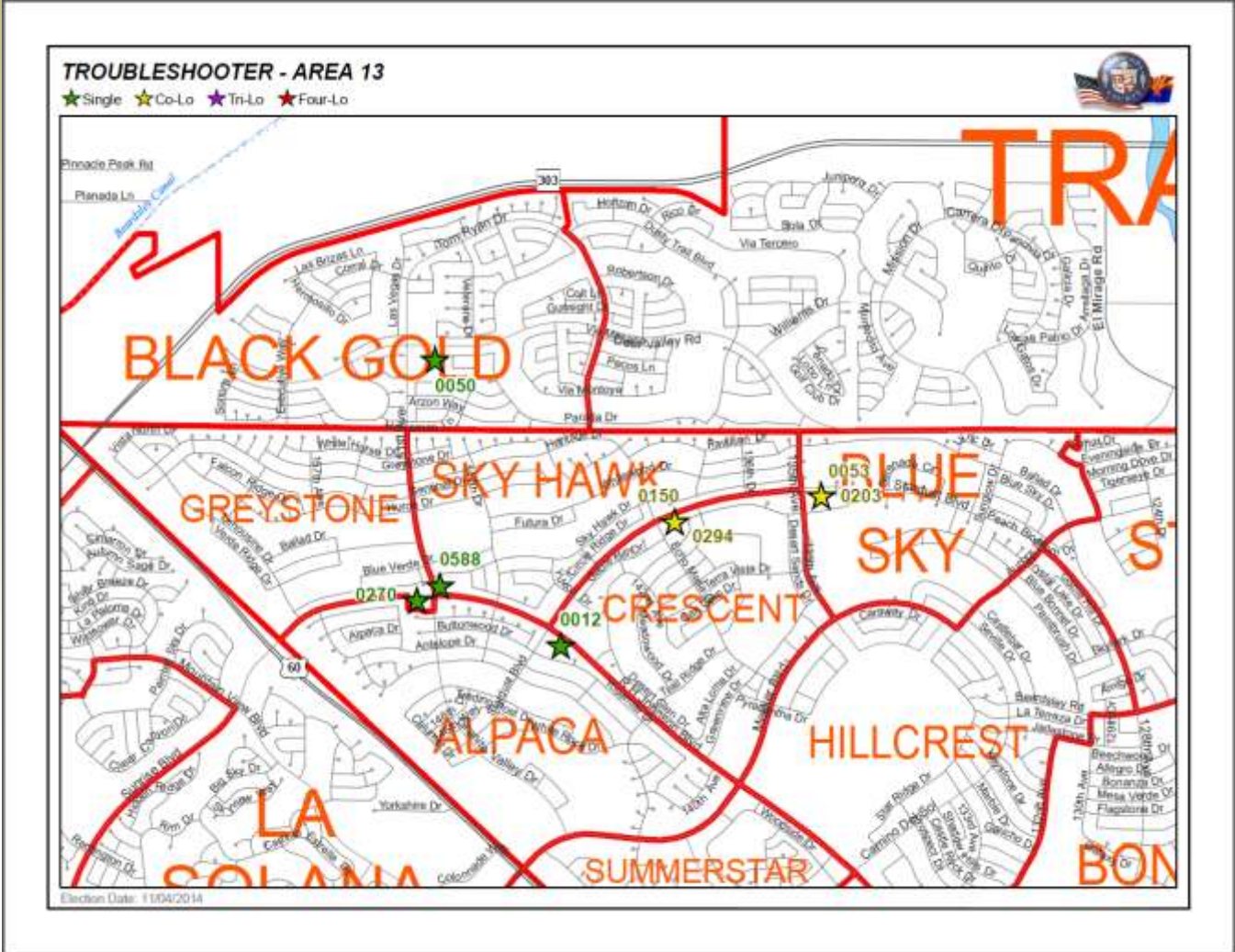
Election day

Polling place election maps to help determine ballot style for new or unregistered voters in the precinct



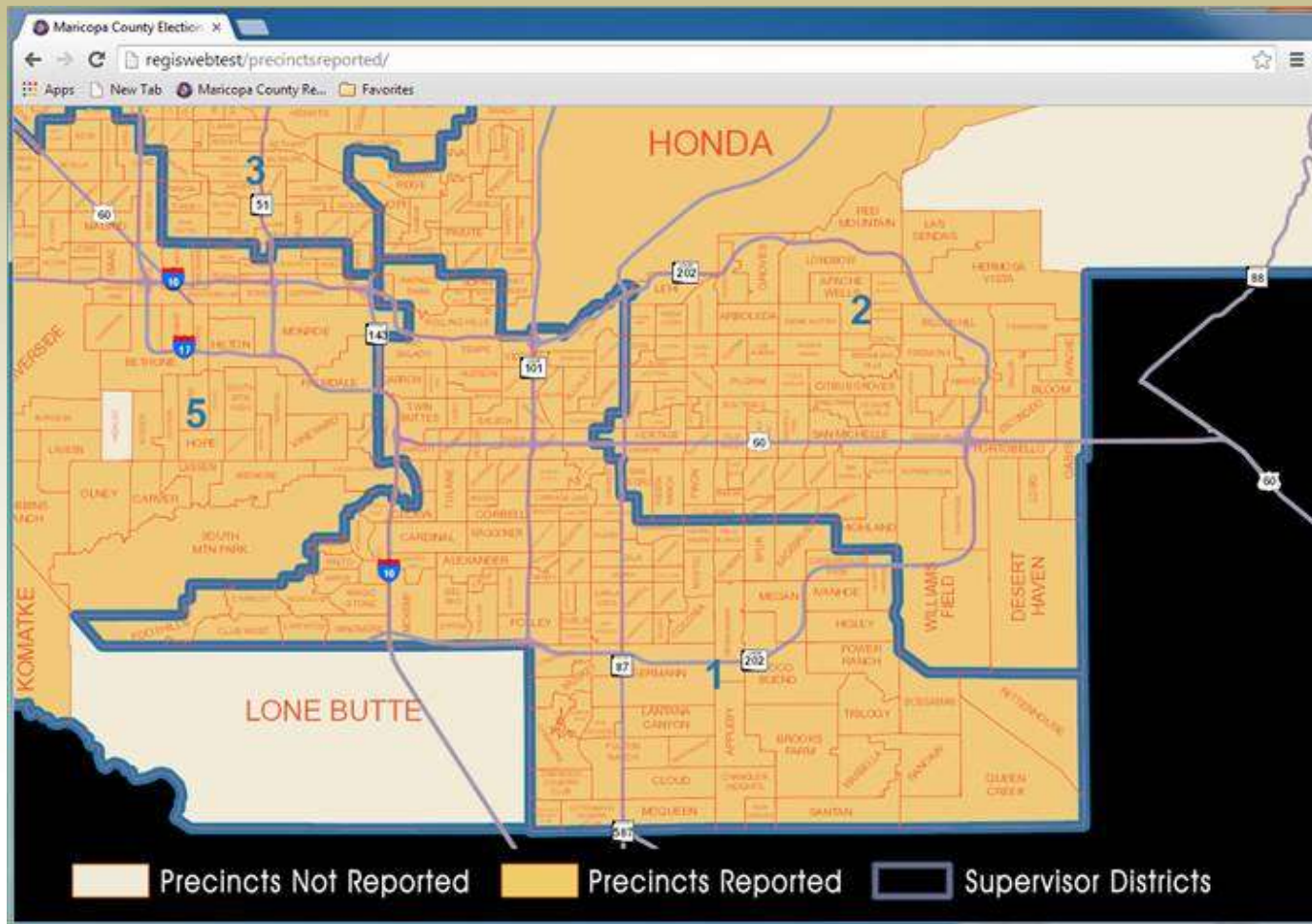
Election day

Troubleshooter maps show the assigned polling places



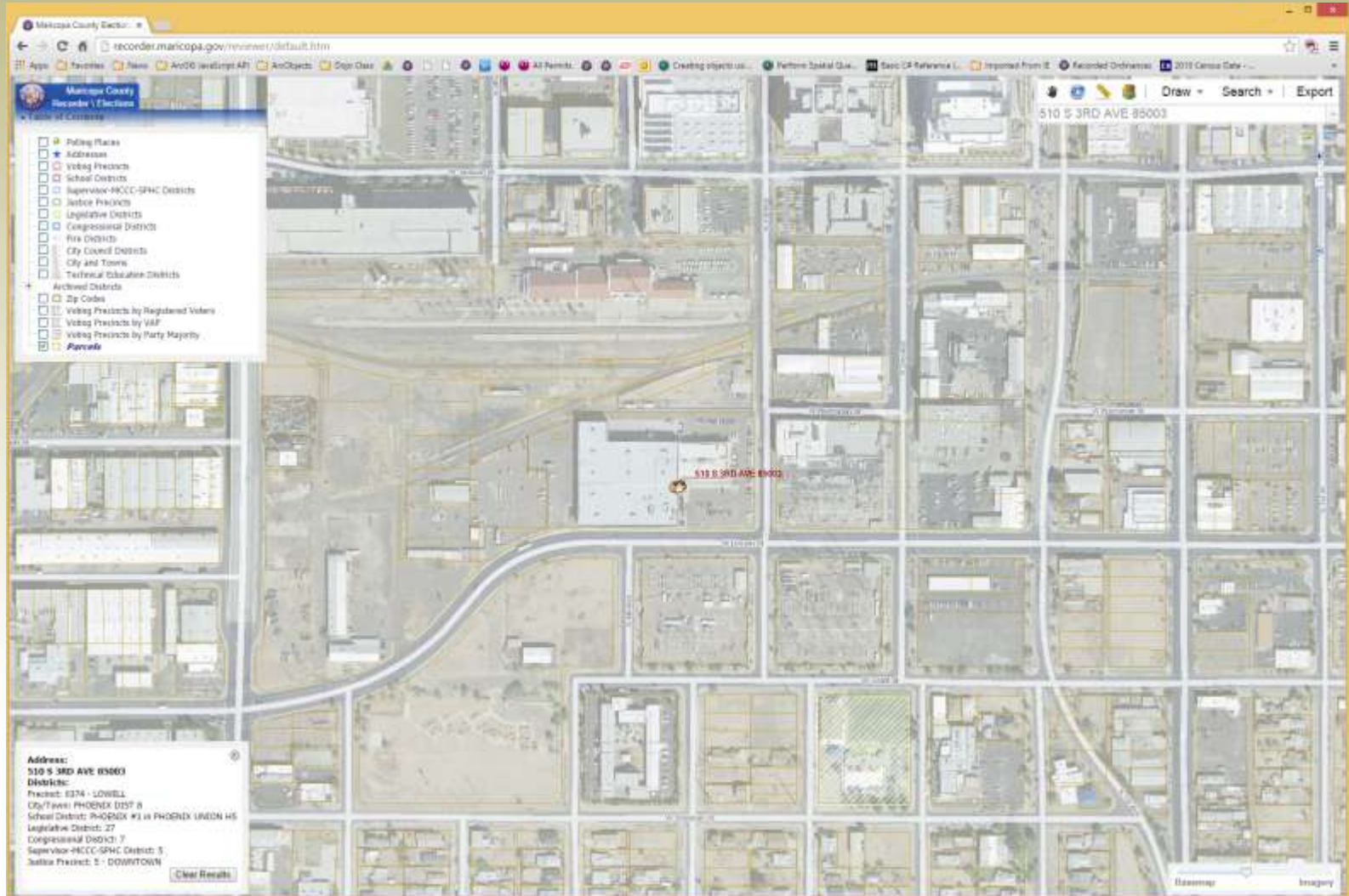
Election night

Candidates, the media, election officials, and the public are interested in knowing which precincts have reported results on election night



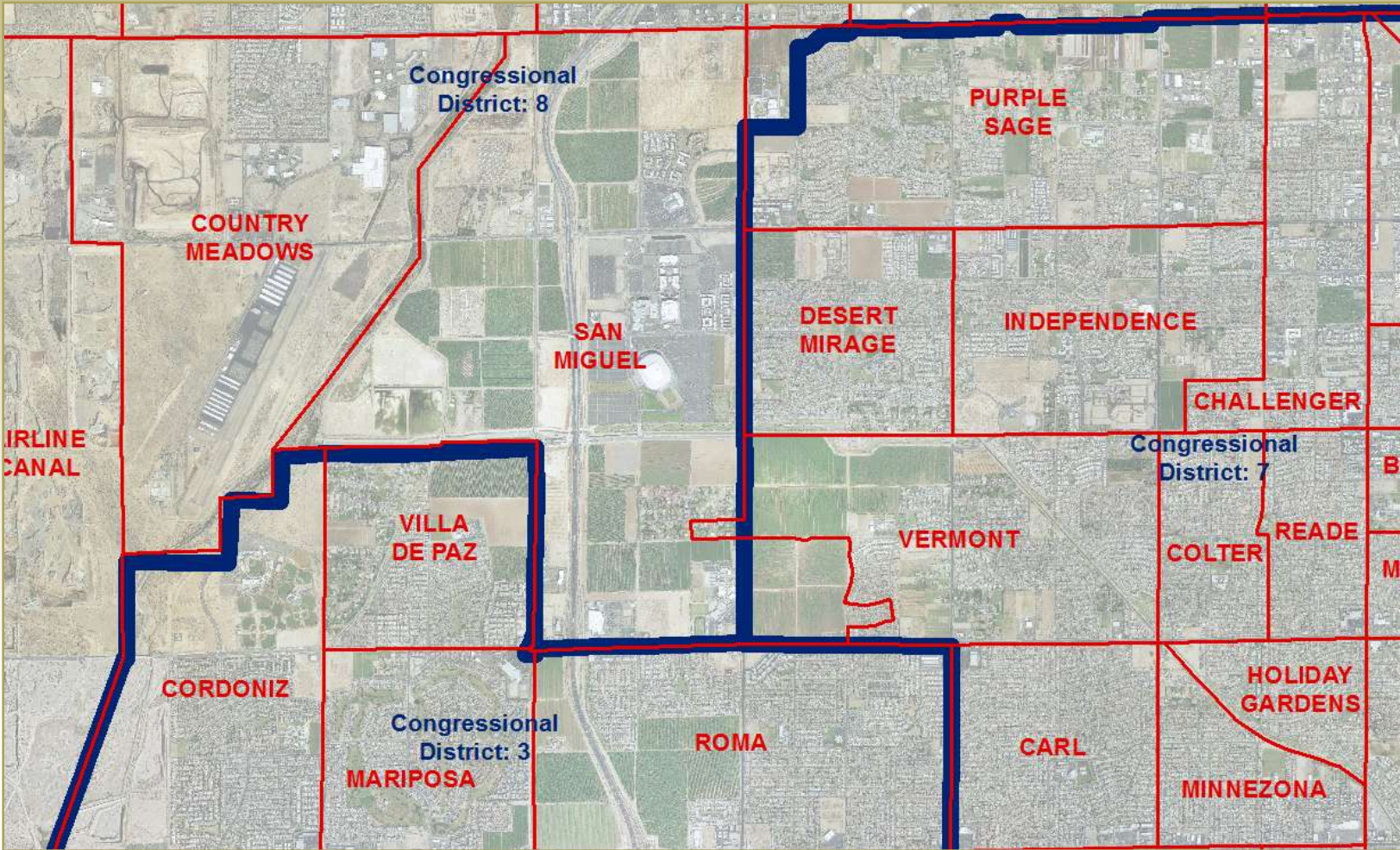
Public information

Interactive map for the public to look up district information



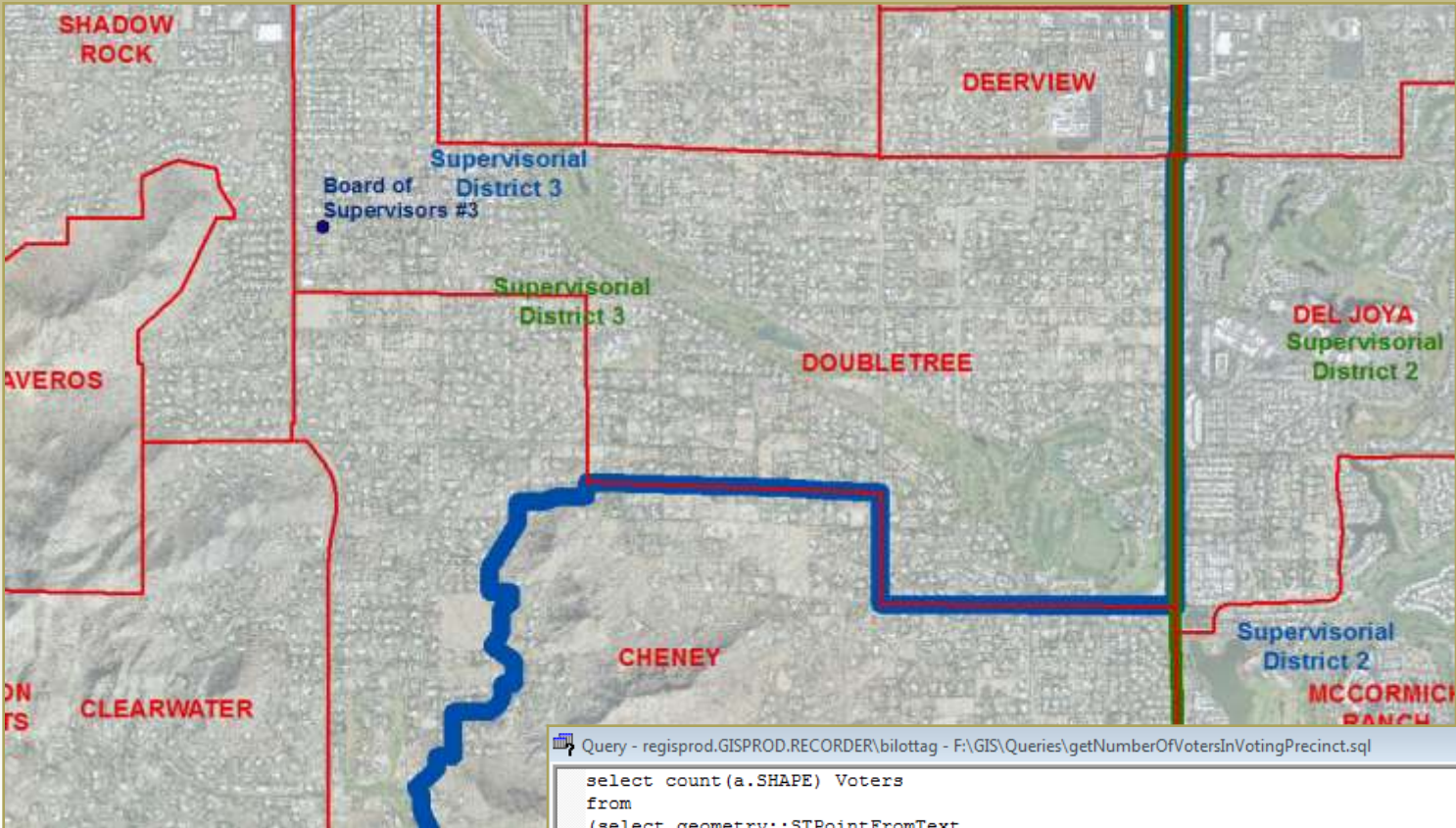
Redistricting

Using GIS, when Congressional and Legislative Districts from the state are received, we can make the appropriate changes to our districts quickly.



Redistricting

District voter total changes can be seen real time as boundaries are adjusted



Query - regisprod.GISPROD.RECORDER\bilottag - F:\GIS\Queries\getNumberOfVotersInVotingPrecinct.sql

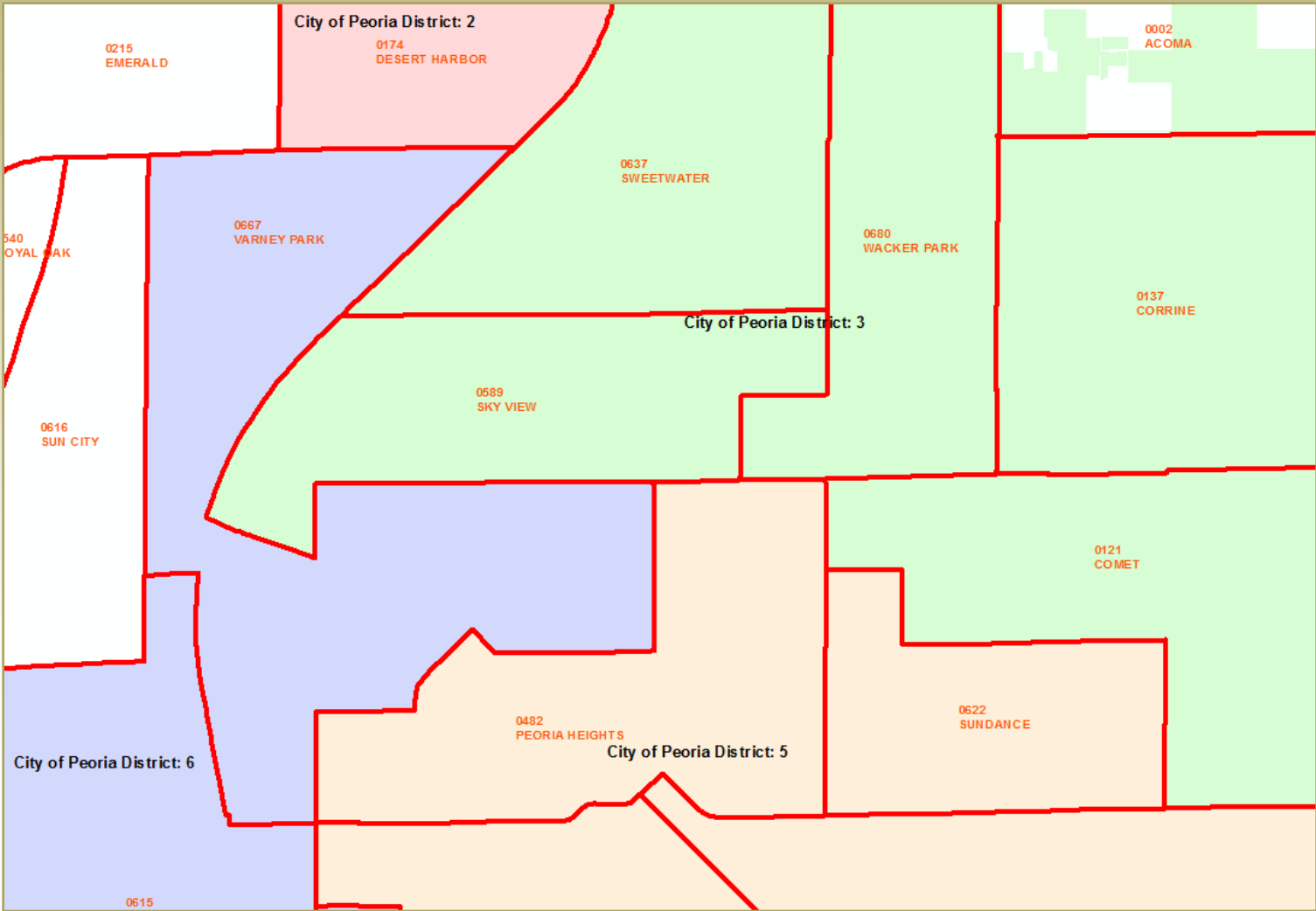
```
select count(a.SHAPE) Voters
from
(select geometry::STPointFromText
 ('POINT(' + cast(X as varchar(20)) + ' ' + cast(Y as varchar(20)) + ')',2) SHAPE
 from voterxy(nolock)) a,
(select Shape from VotingPrecincts(nolock) where bname='CHENEY') b
where a.SHAPE.STIntersects(b.Shape)=1
```

	Voters
1	3372



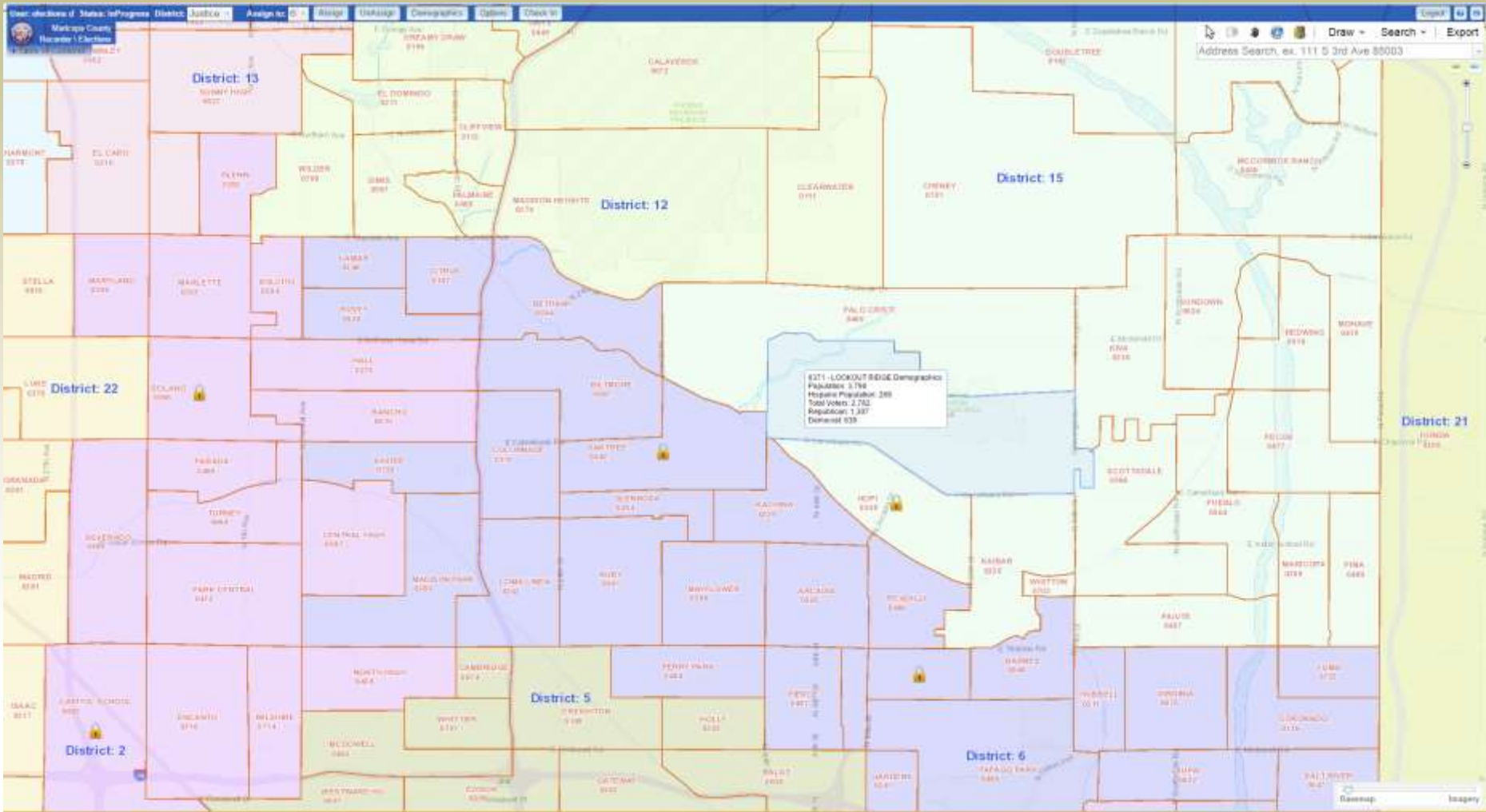
Redistricting

When we receive new ward boundaries from cities and towns, we try to align to their boundaries as well.



Redistricting

The online redistricting website gives the public the ability to make suggestions for new district boundaries



Redistricting

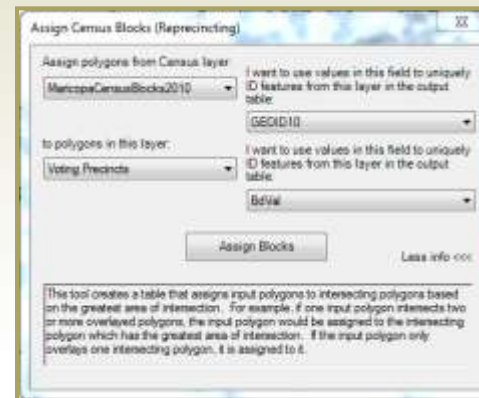
Create legal descriptions

```

AGUILA-0006
Starting at the Nw corner of section 17 T06N R07W of the Gila and Salt River Base and Mer
Thence South 29 degrees 33 minutes 38 seconds East a distance of 54.105 Feet
to the true point of beginning
Thence South 88 degrees 37 minutes 14 seconds East a distance of 5423.76 Feet
Thence North 89 degrees 43 minutes 28 seconds East a distance of 5328.968 Feet
Thence South 89 degrees 26 minutes 18 seconds East a distance of 5349.506 Feet
Thence South 89 degrees 25 minutes 56 seconds East a distance of 5297.072 Feet
Thence South 88 degrees 51 minutes 57 seconds East a distance of 5297.883 Feet
Thence North 90 degrees 0 minutes 0 seconds East a distance of 5139.499 Feet
Thence South 88 degrees 50 minutes 34 seconds East a distance of 5192.997 Feet
Thence South 89 degrees 59 minutes 57 seconds East a distance of 5191.905 Feet
Thence South 89 degrees 27 minutes 16 seconds East a distance of 5506.875 Feet
Thence North 90 degrees 0 minutes 0 seconds East a distance of 5139.501 Feet
Thence North 89 degrees 44 minutes 56 seconds East a distance of 1397.939 Feet
Thence North 89 degrees 44 minutes 56 seconds East a distance of 3437.701 Feet
Thence North 89 degrees 44 minutes 55 seconds East a distance of 369.69 Feet
Thence South 0 degrees 20 minutes 30 seconds East a distance of 3380.741 Feet
Thence South 0 degrees 20 minutes 30 seconds East a distance of 2243.675 Feet
Thence South 1 degrees 29 minutes 26 seconds West a distance of 5833.412 Feet
Thence South 0 degrees 0 minutes 0 seconds West a distance of 5663.937 Feet
Thence South 0 degrees 0 minutes 0 seconds West a distance of 346.655 Feet
Thence South 0 degrees 0 minutes 0 seconds West a distance of 368.837 Feet
Thence South 0 degrees 0 minutes 0 seconds West a distance of 159.277 Feet
Thence South 0 degrees 0 minutes 0 seconds West a distance of 1324.161 Feet
Thence South 0 degrees 0 minutes 0 seconds West a distance of 115.204 Feet
Thence South 0 degrees 0 minutes 0 seconds West a distance of 2405.865 Feet
Thence South 1 degrees 40 minutes 6 seconds West a distance of 5295.883 Feet
Thence South 1 degrees 40 minutes 4 seconds West a distance of 108.158 Feet
Thence South 0 degrees 34 minutes 35 seconds East a distance of 556.394 Feet
Thence South 0 degrees 34 minutes 36 seconds East a distance of 1169.058 Feet
Thence South 0 degrees 34 minutes 32 seconds East a distance of 26.498 Feet
Thence South 0 degrees 34 minutes 34 seconds East a distance of 118.044 Feet
    
```

Using decennial census data, the department redraws voting precinct, board of supervisor, and justice of the peace boundaries

Assign census blocks to voting precincts to summarize demographics



GEOID10 *	BdVal
040136106003004	0986
040136100004012	0051
040136100004029	0051
040136100004004	0051
040136100004008	0051
040136100004014	0051
040136103001017	1111
040136119001043	0222
040136119001012	0222
040136114003008	1113
040136114003003	1113
040136102003020	0011
040136102002004	1097



Thank you

Questions?

Contact: Gary Bilotta
Maricopa County Elections
gbilotta@risc.maricopa.gov