CITIZENS' WATER ADVISORY COMMITTEE
(CWAC)
Technical/Planning and Policy Subcommittee

Wednesday, March 23, 2016, 12:00 p.m.
Director's Conference Room
Tucson Water, 3rd Floor
310 W. Alameda Street, Tucson, Arizona

Legal Action Report

1. Roll Call/Call to Order

The meeting was called to order by Subcommittee Chair Mark Murphy, at 12:00 p.m. Those present and absent were:

Present:

Mark Murphy	Chairperson-Representative, Mayor
Mitch Basefsky	Representative, City Manager
Brian Wong	Representative, City Manager
Placido dos Santos	Representative, City Manager
Chuck Freitas	Representative, City Manager
Kelly Lee	Representative, Ward 6

Absent:

None

Tucson Water Staff Present:

Sandy Elder	Deputy Director
Scott Clark	Deputy Director
Jeff Biggs	Water Administrator
Melodee Loyer	Water Administrator
Ray Wilson	Water Administrator
Pat Eisenberg	Water Administrator
Wally Wilson	Chief Hydrologist
Fernando Molina	Water Program Superintendent
Tom Victory	Engineering Manager
Dan Quintanar	Project Manager
Johanna Hernandez	Staff Assistant
Kris LaFleur	Staff Assistant

Others Present:

Chris Avery	City of Tucson, Attorney's Office

2. Announcements – Member Basefsky announced that Member Taylor has been appointed to the CAWCD, his first meeting will be the April meeting in Casa Grande, and will be streamed online.

3. Call to Audience – No action taken.

4. Review & Approval of February 24, 2016 Legal Action Report and Meeting Minutes – Member Wong motioned to approve the Legal Action Report and Meeting Minutes of February 24, 2016. Member Basefsky seconded. Motion passed unanimously by a voice-vote of 5-0.

Member Lee arrived at 12:08 p.m.

5. **Recycled Water System –** Tucson Water staff members Melodee Loyer and Wally Wilson presented a PowerPoint on the Recycled Water System. An overview of the reclaimed system infrastructure was provided; the system extends up to the Dove Mountain/Oro Valley area, runs through the center of the service area, out to Houghton, and down to Mission. Golf makes up 52.67% of reclaimed users, parks make up 15.34%, Oro Valley makes up 15.21%, and the remaining users are divided between schools, commercial, residential, Pima County, the University of Arizona, and Flowing Wells. Reclaimed allocation and use from 2008 to 2015 was reviewed. The breakdown of effluent production and ownership was provided. Contractors La Paloma, Sunrise, and Ventana received lower than standard contract rates for their participation in establishing the system. The contracted rates increased annually until, this year, their rates equal the standard rate. The University of Arizona also has a special rate for a specific service by contract. That rate is $.06/ccf and is in perpetuity, services not specific to this contract are paid at the standard rate. Rates from 2011 to the present were reviewed, as well as the revenues and expenditures of the system from 2014 to present. Unused reclaimed water is discharged to the river, a portion of which the City receives long-term storage credits for. Currently reclaimed is recharged into the Sweetwater facility, the Managed In-Channel recharge, and the Lower Santa Cruz Recharge Managed Project. In the future, the utility will also recharge at SHARP. Storage at Sweetwater is currently at 11,059 AF, the storage limit is 32,458 AF. After considering production, allocation, and use, there may be around 7,553 AF of effluent available for other uses, including the Conservation Effluent Pool (CEP). The CEP allocation is about 7,000 AF. Reclaimed water delivery to Agua Caliente Park would require developer funded infrastructure, as well as delivery costs. The County could look into sending its water to the lake and recharging it, which may mitigate some of the costs. Challenges to delivery in the area include permitting, possible treatment costs, lake liner requirements, and infrastructure costs. Future plans include a larger wet well between Agua Nueva and the reclaimed facility, re-permitting reclaimed to A+, and bypassing/eliminating filters.

6. **Micro-Hydro Generation –** Tucson Water staff members Dan Quintanar and Tom Victory presented a PowerPoint on Micro-Hydro, or the extraction of energy from flowing water in area with excess energy. The Utility has been evaluating Micro-Hydro since 1992. Micro-Hydro is consistent with the Utility's and City's goals for sustainability. High volume, constant flows, with a large change in elevation, and sufficient onsite load are all needed for Micro-Hydro to be viable. Five sites have been looked at, Ironwood, 3rd Avenue, 24th Street, Tech Drive, and CAVSARP. Each site was reviewed for the energy available, impact to water operations, infrastructure leases, economies of scale, and customization. The CAVSARP PRV site was selected. This site captures energy as it comes from the CAP, is not part of the distribution system, has high volume, decent head and flow, and a large on-site load. CAVSARP flows versus Water Horsepower were reviewed. The latest research reevaluated PRV locations and turbine efficiencies. Tucson Water approached procurement for a Lucid PowerPipe in conduit system; however, it did not qualify for sole source procurement. Next steps include consideration of purchasing a Lucid system, NLine Energy Assessment, possible grant funding, and request for proposals.

7. **Future Meetings/Agenda Items –** See projected agenda for further information.

8. **Adjournment –** Meeting adjourned at 1:01 p.m.

Reclaimed System

CWAC Technical, Planning, & Policy Subcommittee

Presented By:

Melodee Loyer, Planning Administrator

Wally Wilson, Chief Hydrologist

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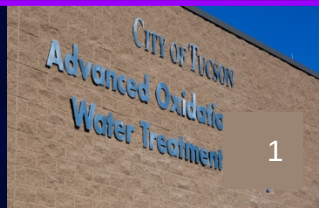
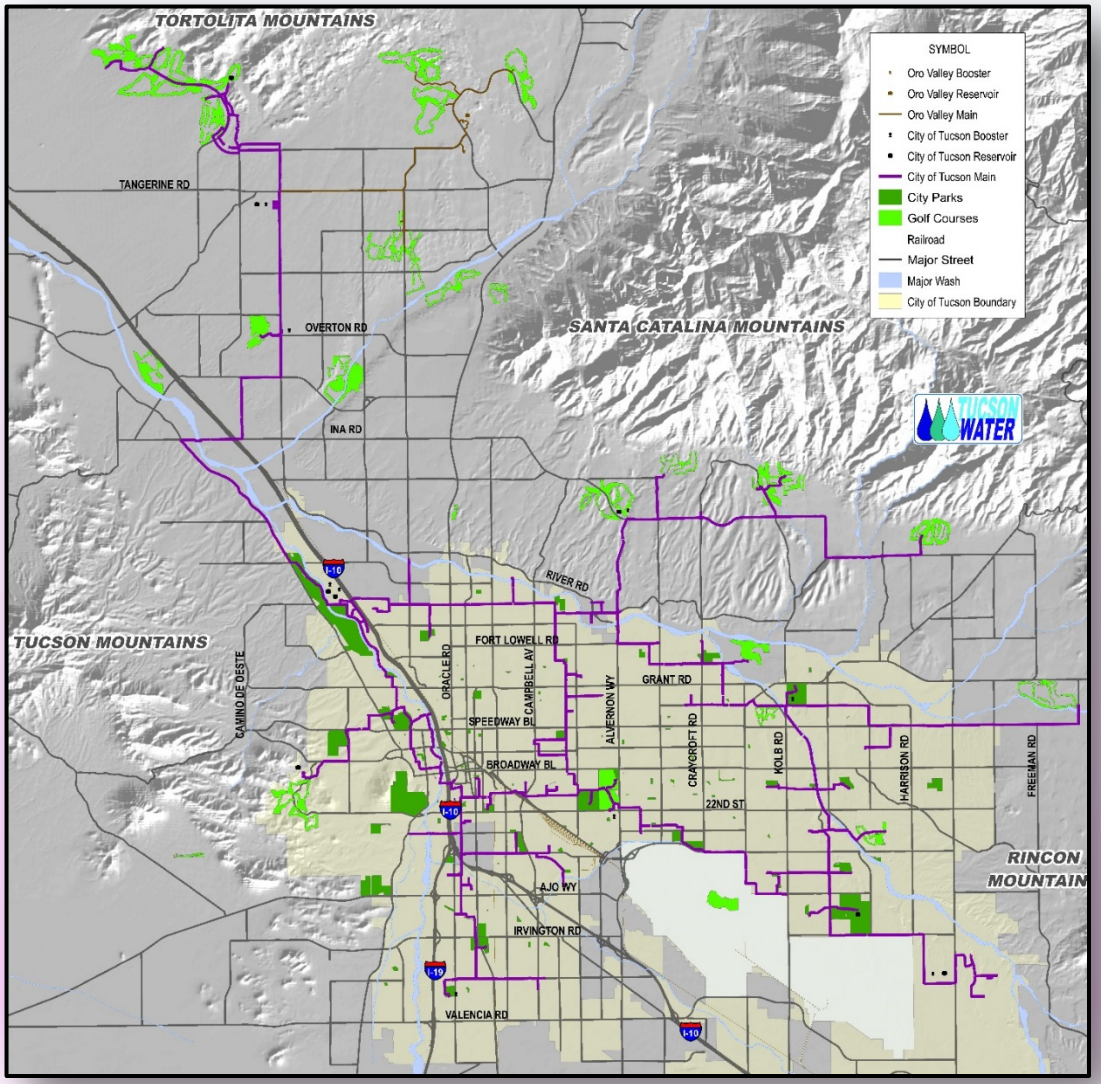
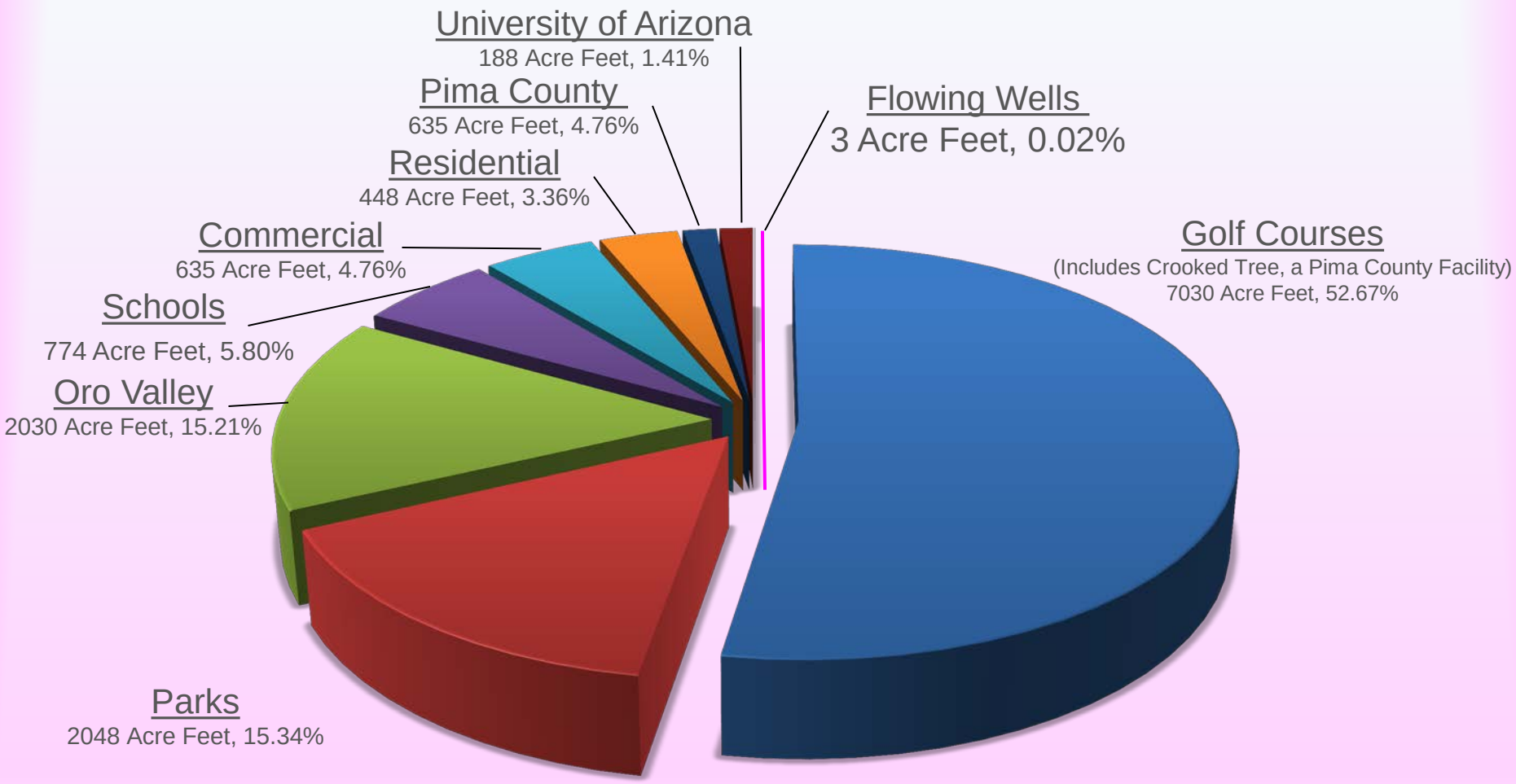


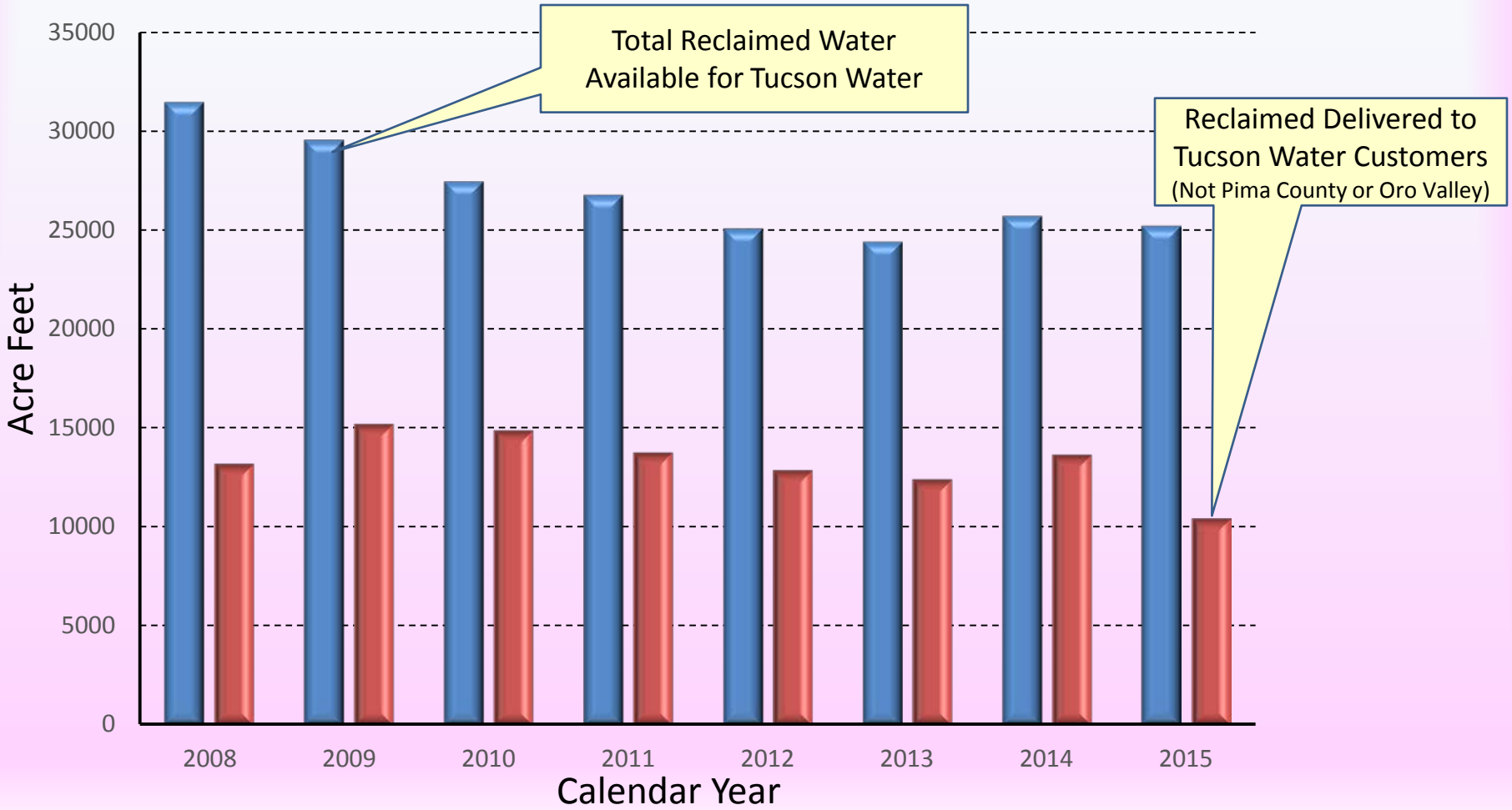
Reclaimed System



Reclaimed Consumption By User



Reclaimed Use



Effluent Ownership (2015)

Based on 61,356 AF/YR Effluent Production (2015)

With CEP contributions

61,356

SAWRSA: -28,200

33,156

CEP: -10,000

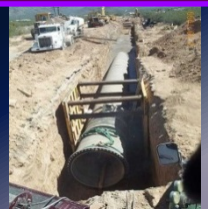
23,156

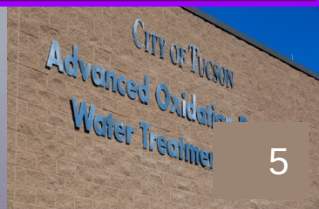
10% **90%**

County: 2,316

Providers: 20,840

FWID:	Oro Valley:	Sp Trail:	Tucson:	Marana:	Metro:
332	1297	28	17,777	60	1346





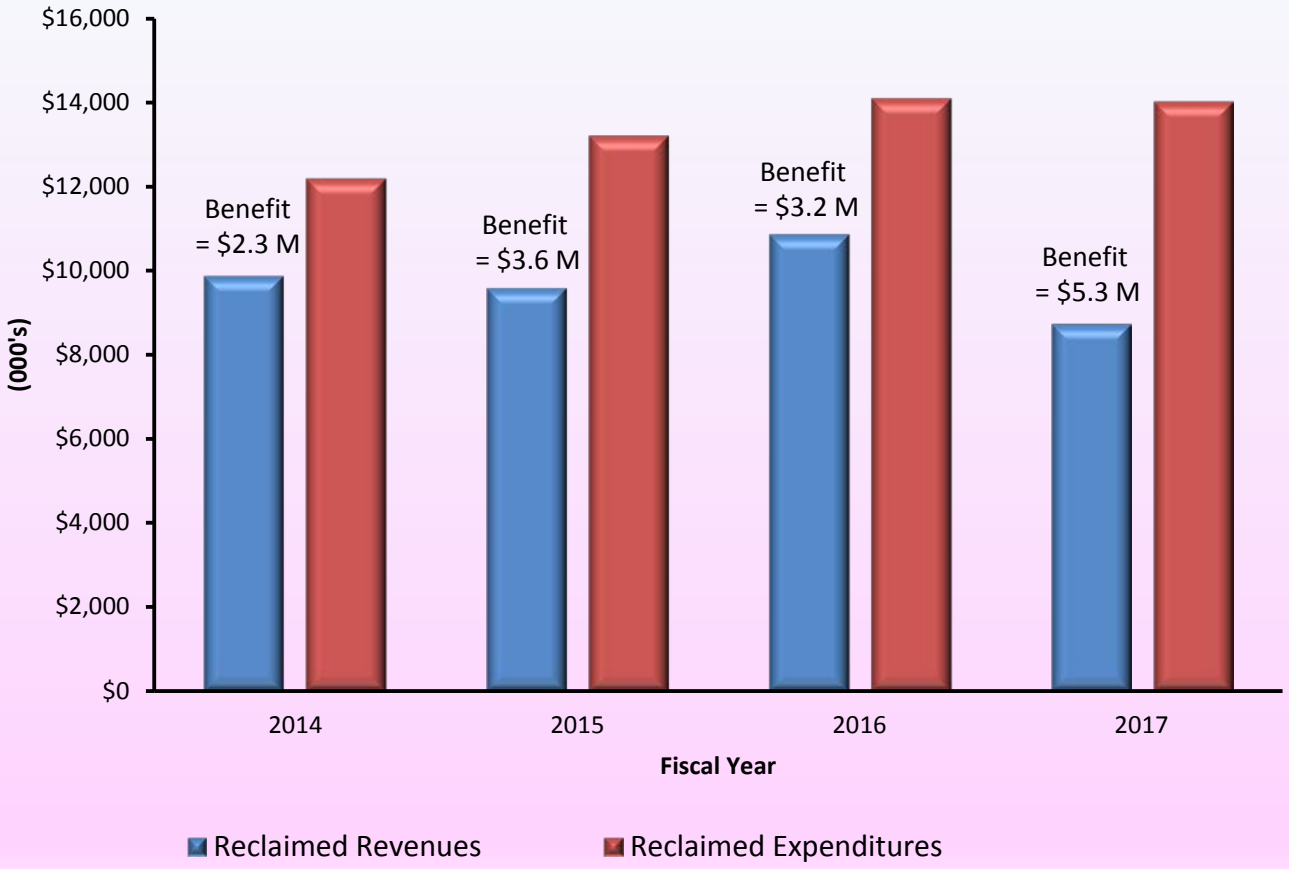
Special Contract Terms

- Golf Courses (La Paloma, Sunrise & Ventana)
  - Courses participated in establishing reclaimed system
  - Rates can increase up to 7%/year until full rate equivalency
  - 3.5% increase expected this coming FY will bring rates up to full rate
- University of Arizona
  - Contract in perpetuity at 0.06$/ccf
  - 2” service fee $49.69/month

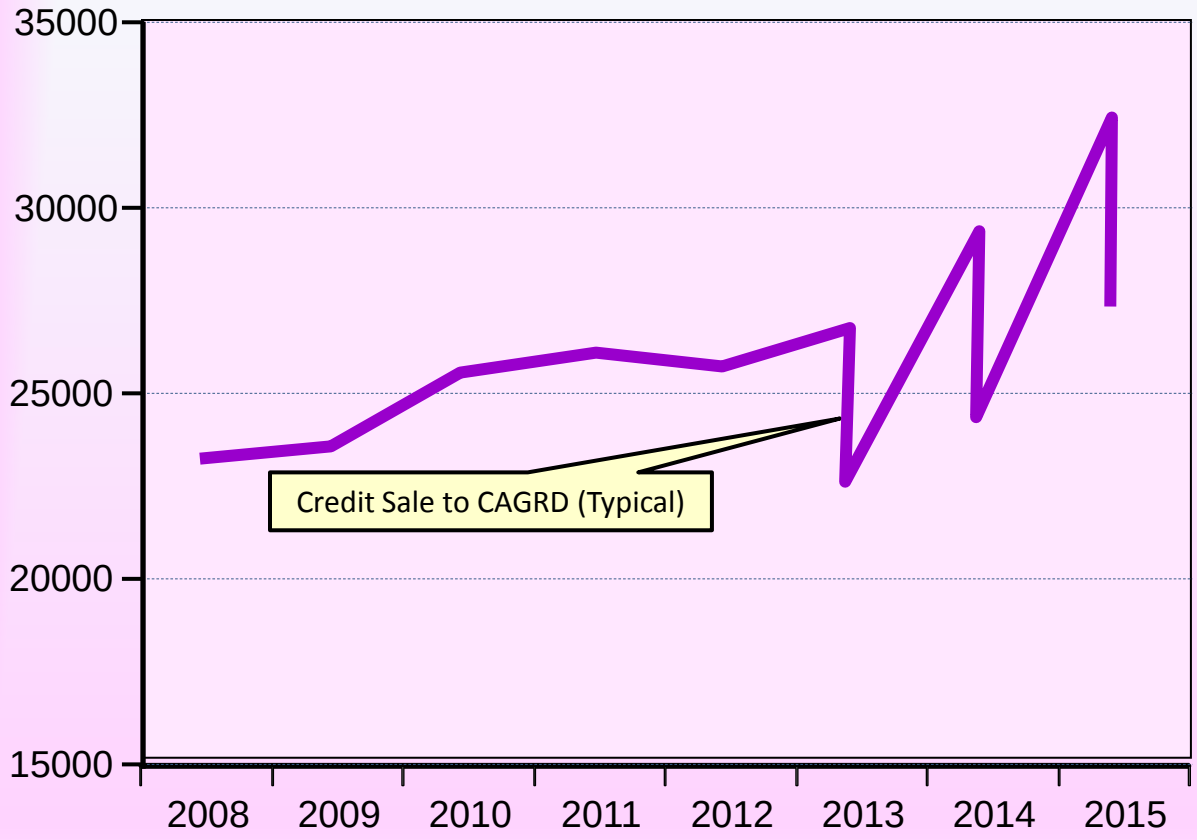
Historical Rates
(per CCF)

Rate Class	Fiscal Year					
	2011	2012	2013	2014	2015	2016
Full Rate	1.83	1.83	1.83	1.87	1.87	1.87
Contract Rates (La Paloma, Sunrise & Ventana)	1.43	1.53	1.64	1.75	1.81	1.87
Environmental Rate (Oro Valley & Pima County	0.66	0.60	0.67	0.67	0.63	TBD
U of A	0.06	0.06	0.06	0.06	0.06	0.06

Cost of Service – Reclaimed Benefit History



Effluent LTSC's Available

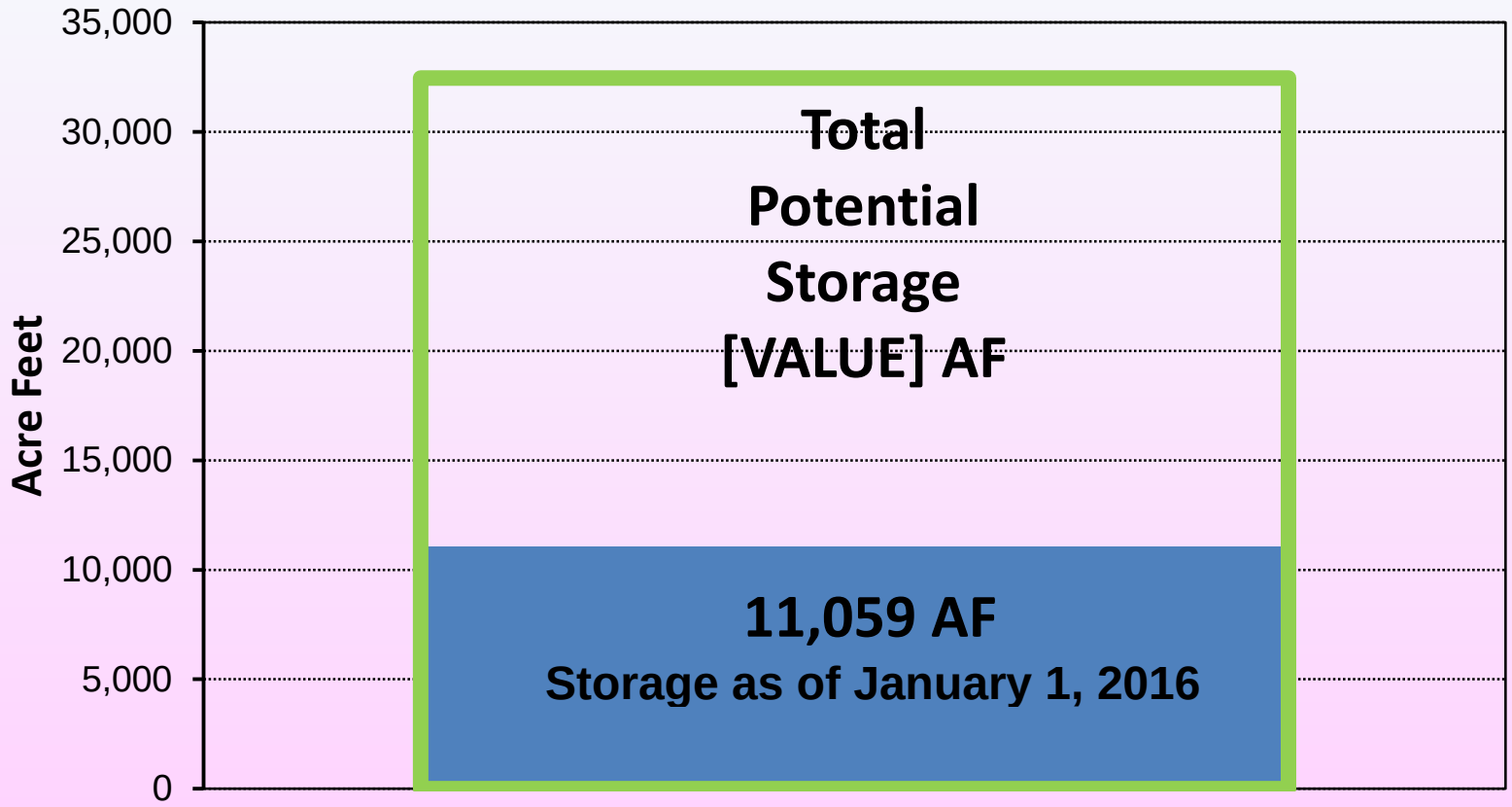


- Discharge to the River
- 50% Credit minus evapotranspiration and water leaving the County
- In 2015 35% effective LTSC

Recharge Facilities

Present	Sweetwater	13,000 AF/yr Max 32,458 Af/yr Max
	Managed In-channel	LTSC's related to Agua Nueva WRF
	LSCRMP	LTSC's related to Tres Rios WRF
Future	SHARP	2,000 Af/yr TW 2,000f/yr Pima County

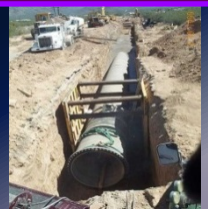
Sweetwater Storage

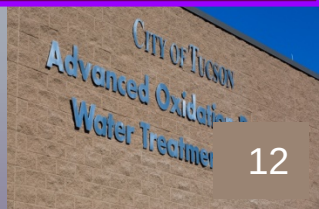


Approximate Effluent That Could Be Available for Other Uses

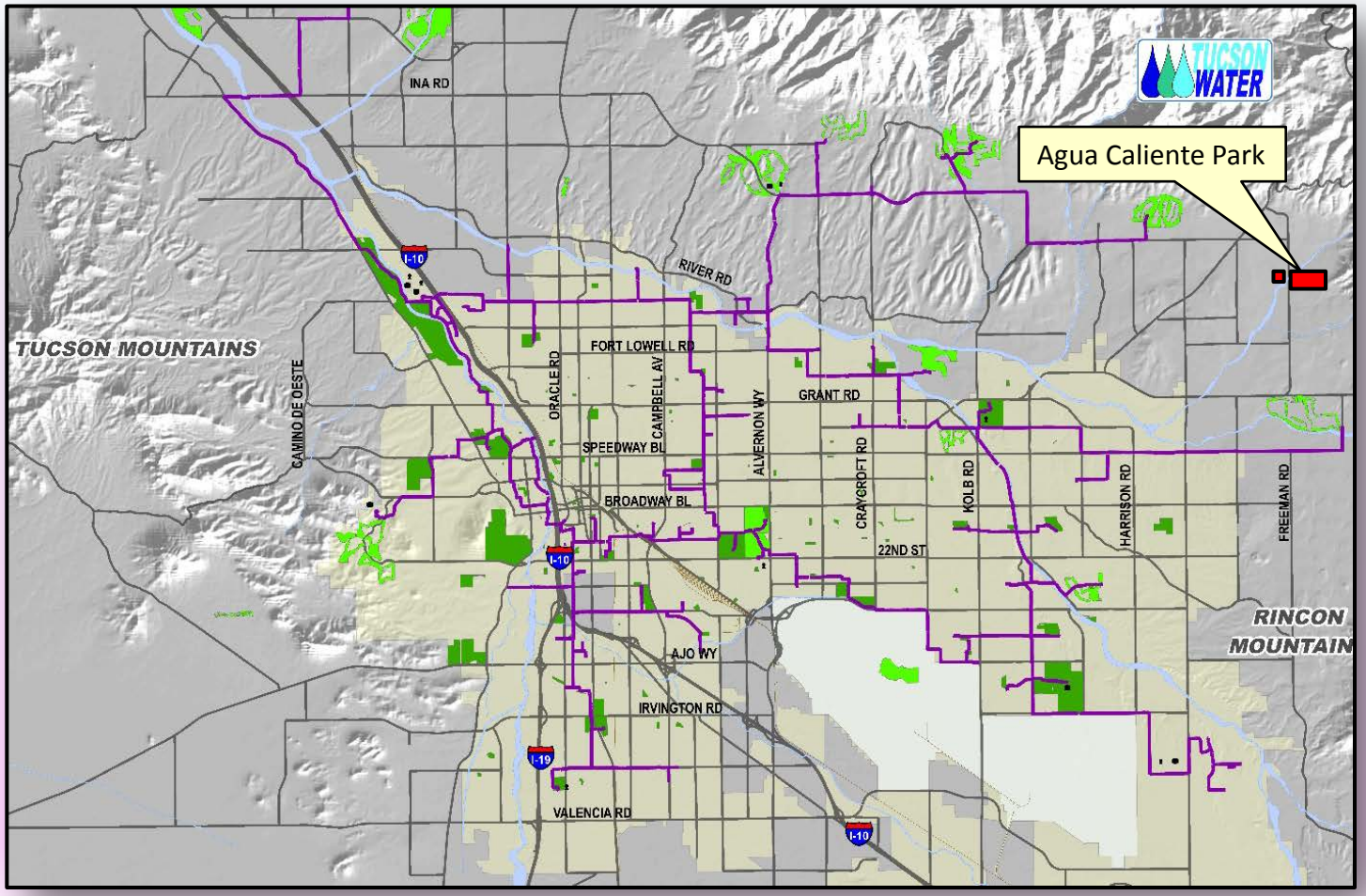
Tucson Water Entitlement	25,234 AF
Storage @ SRF	5,239 AF
Tucson Water Customers (Not including Pima County or Oro Valley)	10,442 AF
Difference LTSC's Flow to River	9,553 AF
SHARP (Future)	2,000 AF
Available until CEP is used	7,553 AF

- Will Tucson Water be required to leave Non CEP water in the river for riparian maintenance?
- Treat to Potable Standards – 7.500 AF is about 8% of our present potable use.
- CEP is ~7,000 AF

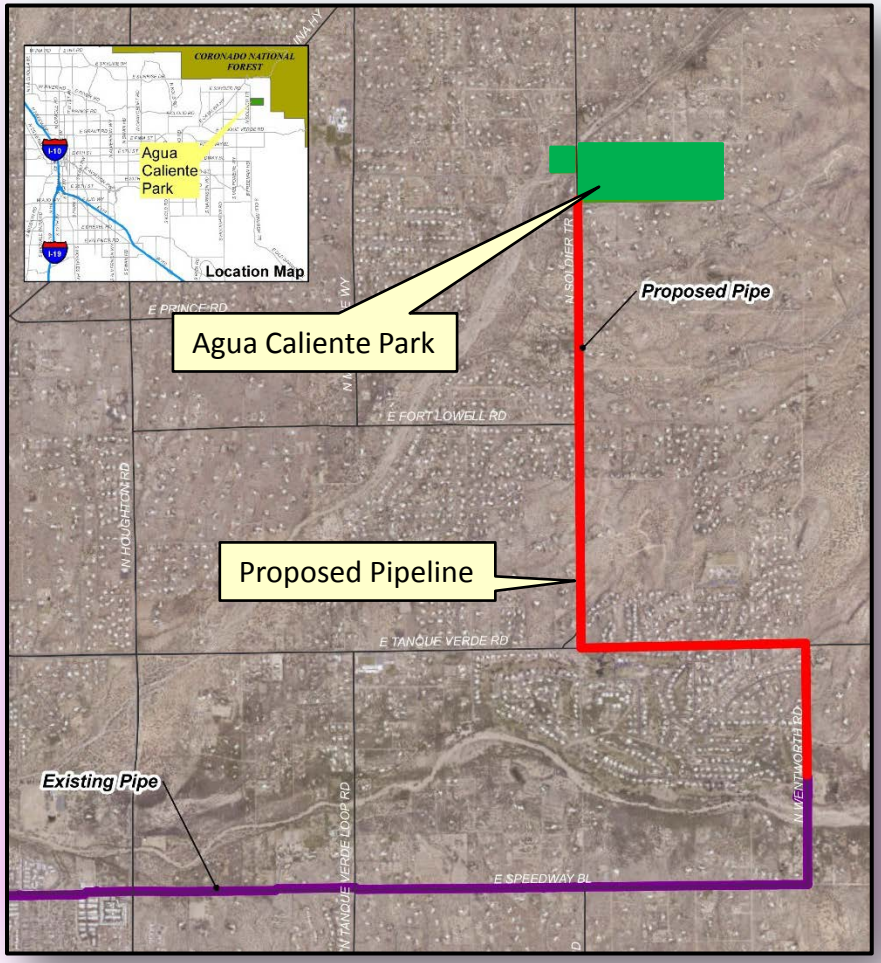




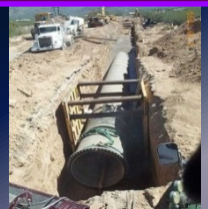
What if Someone Wanted to Deliver Water to Agua Caliente Park?

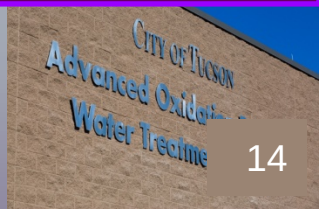


Getting Reclaimed Water to Agua Caliente Park



- 8” or 12” pipeline
- Require a booster pump
- $2.5M ± for connection (user pays)
- Delivered water
  - $815 AF standard rate
  - $274 AF environmental rate if Pima County uses it’s effluent



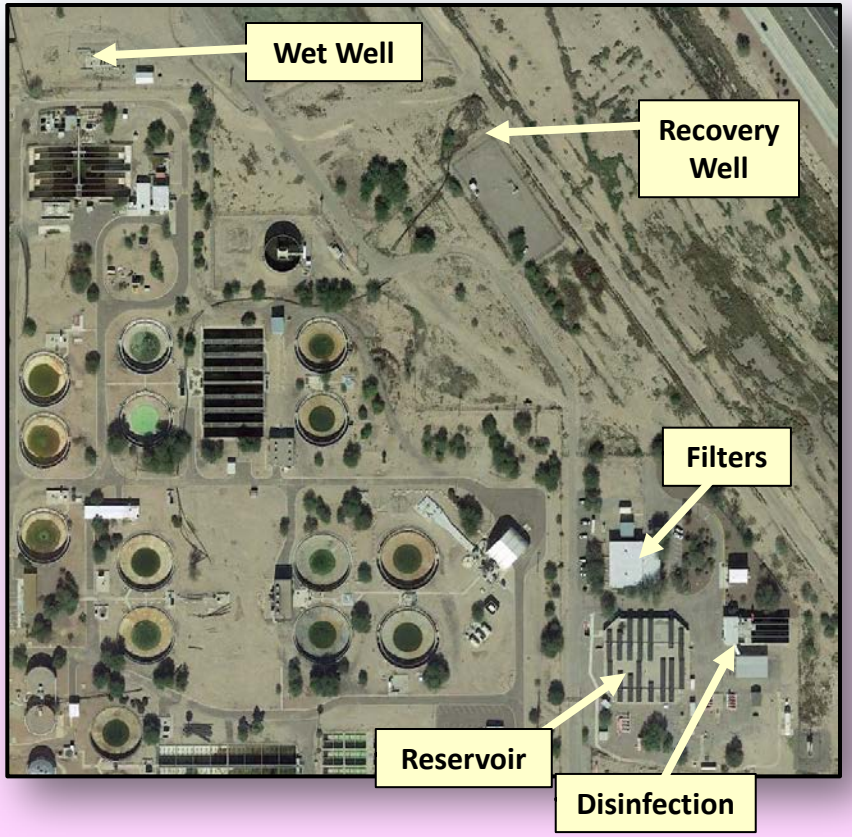


Other Challenges & Possibilities @ Agua Caliente Park

- Permitting
  - Reclaimed Permitted at "A" – needs to be permitted A+
- Will State also require boron & copper treatment
- Can Pima County use the over flow/storm water basins as recharge & claim credits?
- If Pima County claims LTCS's, would they need to line the lake (use liner funding to help pay for pipeline & Booster)

Up Coming Reclaimed Plant CIP's

- Larger wet well between Agua Nueva WRF & Reclaimed Facility for flow attenuation & some additional storage
- Re-permit reclaimed to "A+"
- Bypass and eliminate filters



Questions

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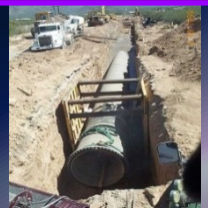
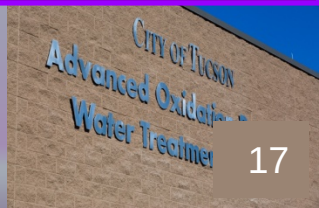
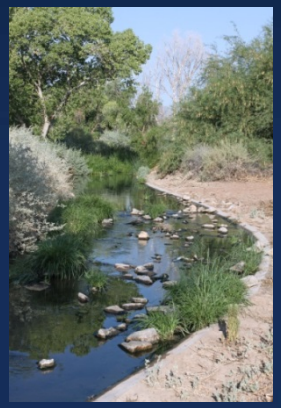
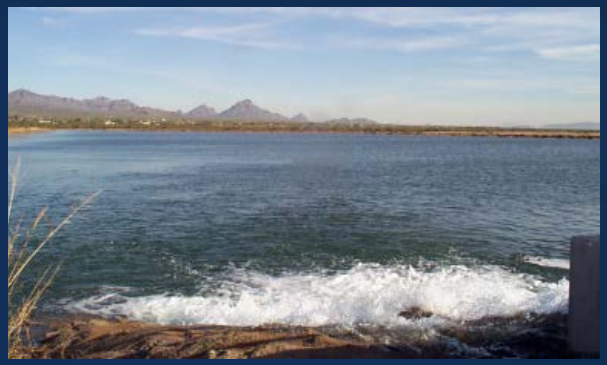


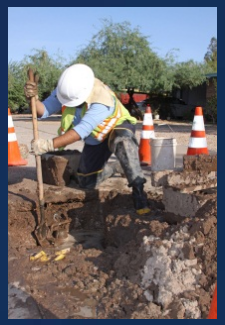


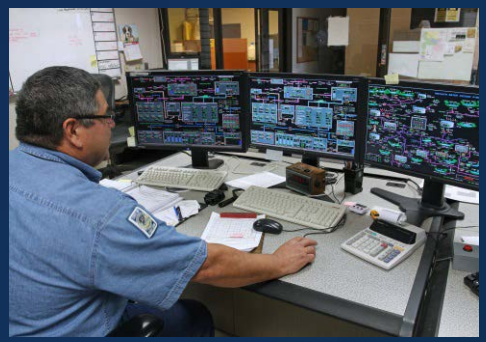
Tucson Water's Micro-Hydro Update

CWAC Technical, Planning, and Policy Committee





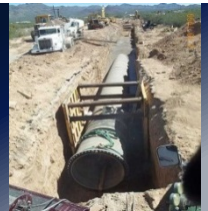


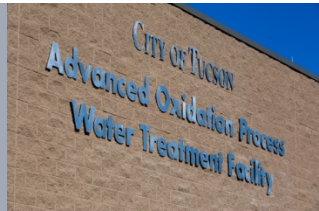


March 23, 2016

Presenters

- **Dan Quintanar,** Project Manager
- **Tom Victory,** Managing Engineer

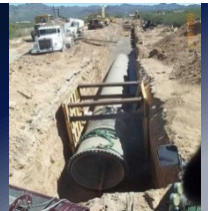


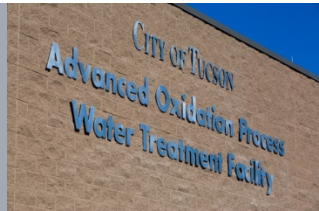


Micro-Hydro: What is it?

In simple terms: extracting energy from water

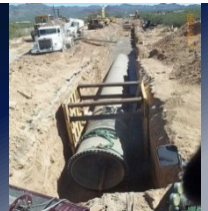
- Recovers energy available in flowing water in pipes/conduit
- Generated at locations that have a need to dissipate excess energy: pressure reducing valves (PRV) in distribution system

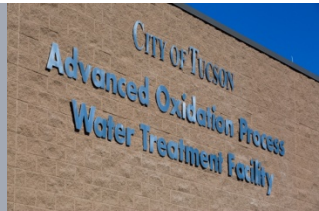




Why do it?

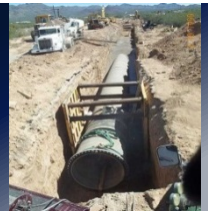
- Aligns with City of Tucson sustainability goals
- Aligns with Tucson Water 2020 Strategic Plan (protecting environment i.e. green energy production)
- Positive community relations
- Testing new & latest technology
- Potential for positive ROI over long term

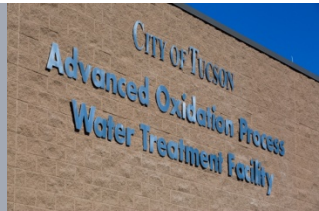




What We Need to Make it Work

- Large change in elevation = lots of head (PSI)
- High volume/flow: generates more kilowatt (kw) per PSI
- Constant flow to optimize turbines
- Sufficient onsite load to offset *retail* energy rates

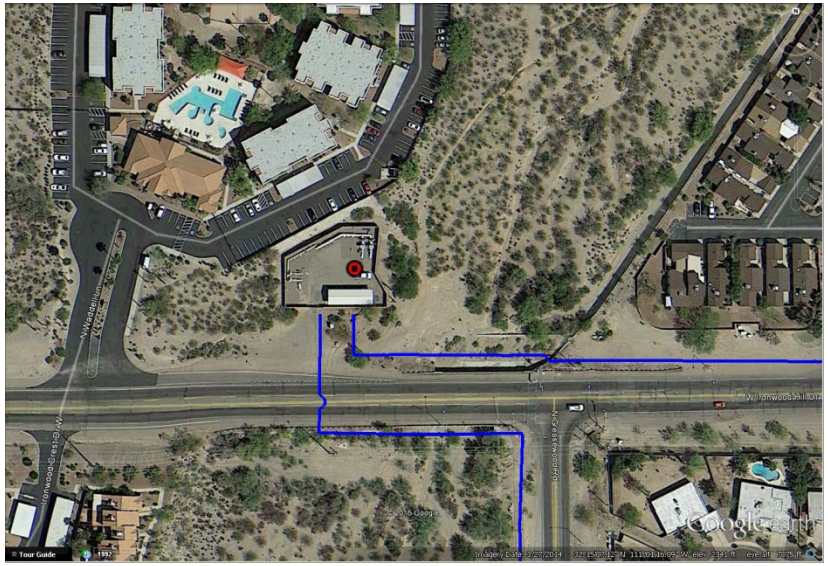




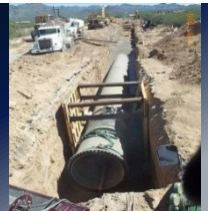
Micro-Hydro Site Selection

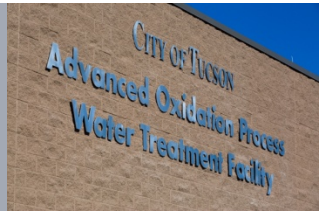
5 PRV sites researched & considered

- Ironwood
- 3rd Avenue
- 24th Street
- Tech Drive

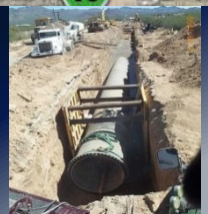


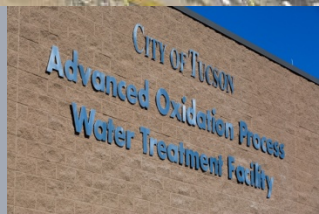
- CAVSARP



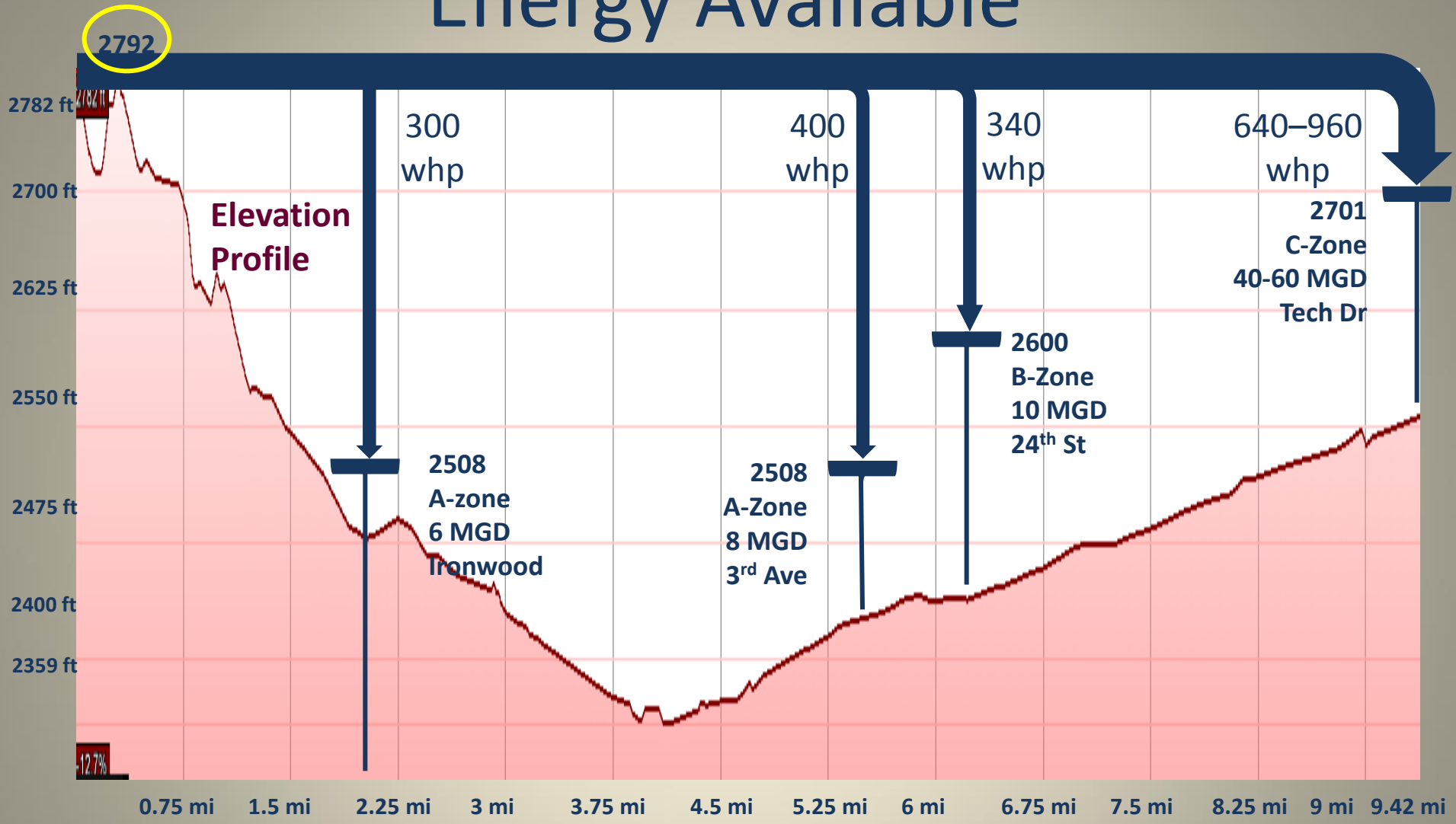


Micro-Hydro Site Selection





Energy Available



Water Horse Power (whp) = Feet * MGD * .175

1000 Water Horse Power = 746 kilowatts

Tucson Water's Experience

Early consultant studies along the 96 inch used *average* flows to estimate energy generation

- ***Overestimated the energy generated and the benefits***

Hourly flow data showed significant diurnal and seasonal fluctuations

- ***Difficult to design turbines that will capture energy efficiently***

Many the sites have no load

- ***Previous estimates were based on fully burdened retail rates-TEP would only have paid for offsetting generation costs***

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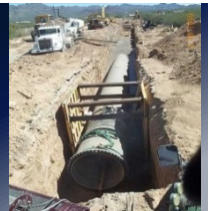
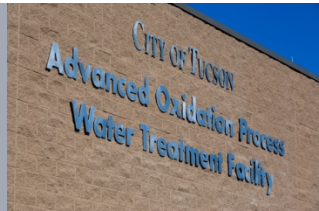
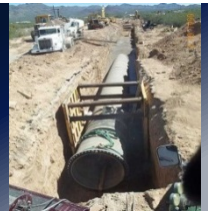
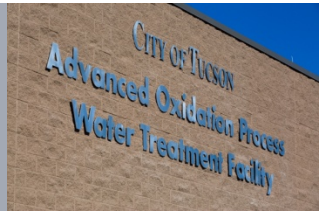




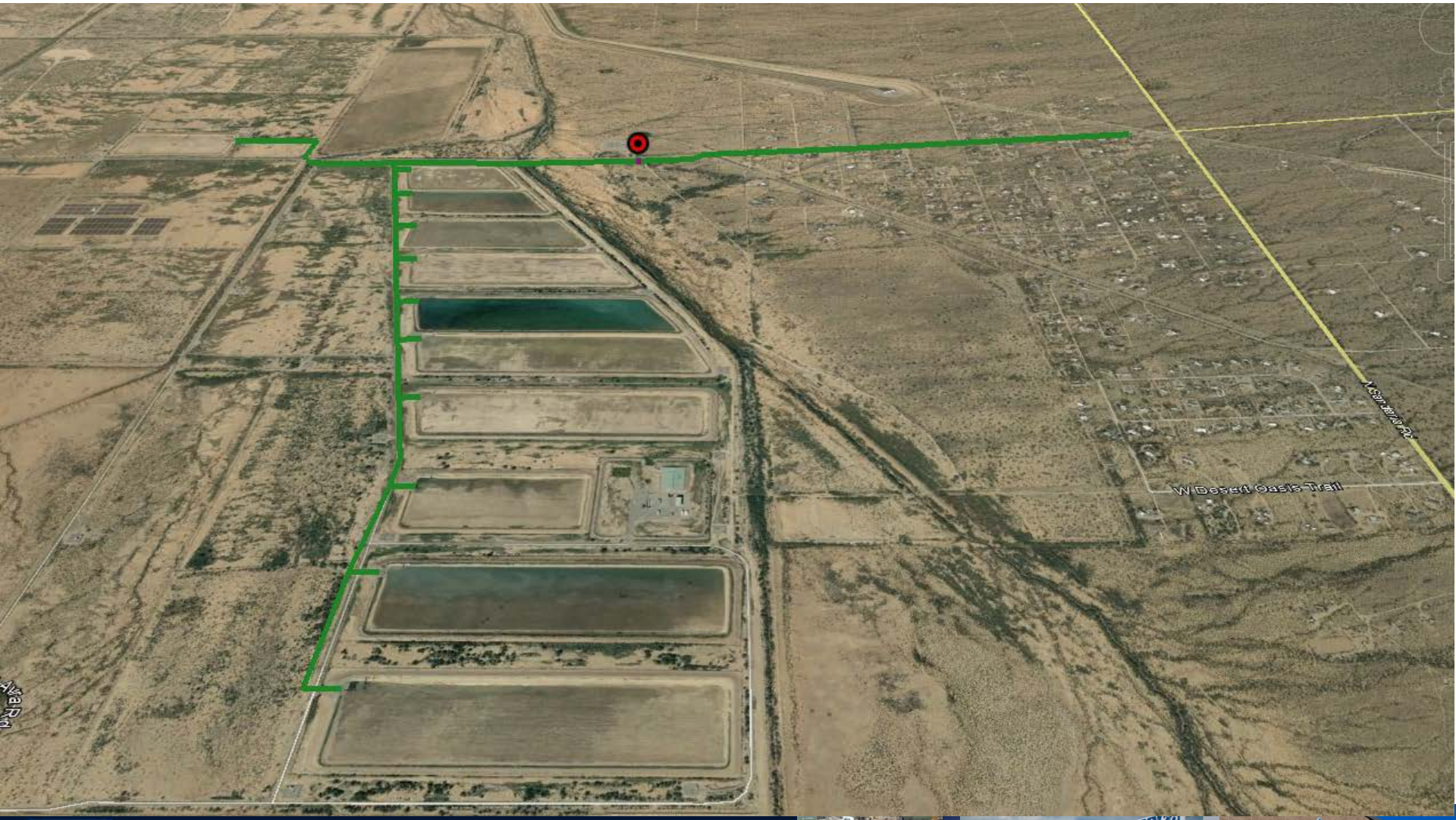
Other considerations/Obstacles

- Water operations must not be encumbered by energy generation
- Micro-hydro system must be designed to allow maintenance & not impact water operations
- Leasing infrastructure as opposed to leasing land as in solar.
- Increasing cost of carbon based generation has not materialized - fracking has stabilizing electricity rates
- No more renewable energy credits
- Difficult for micro-hydro to achieve economies of scale
- Not much energy available – would have no discernable impact on energy cost/consumption



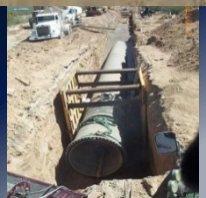


CAVSARP PRV Selected



CITY OF TUCSON

TUCSON WATER



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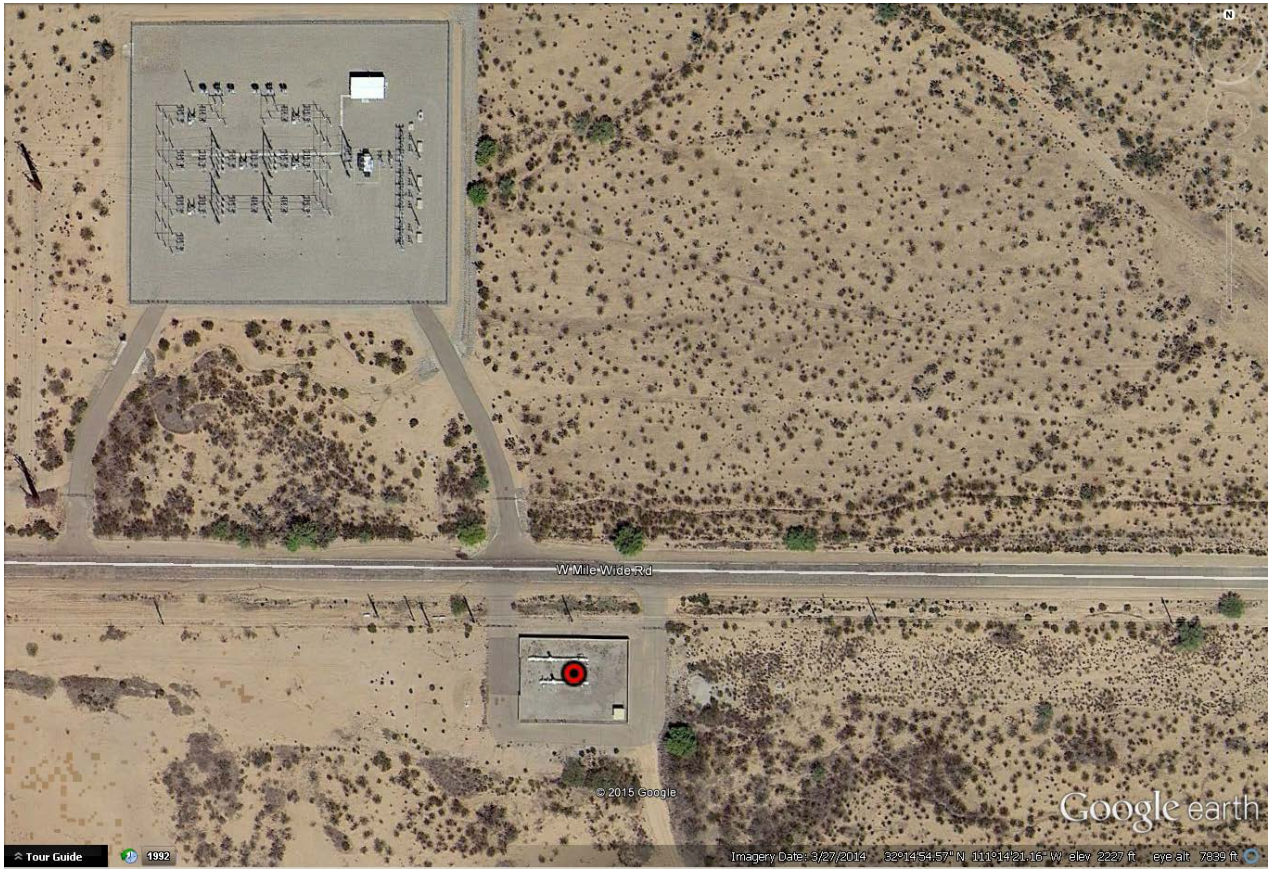
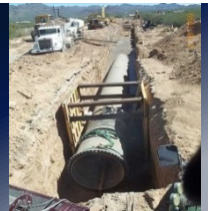
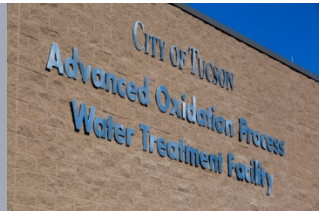


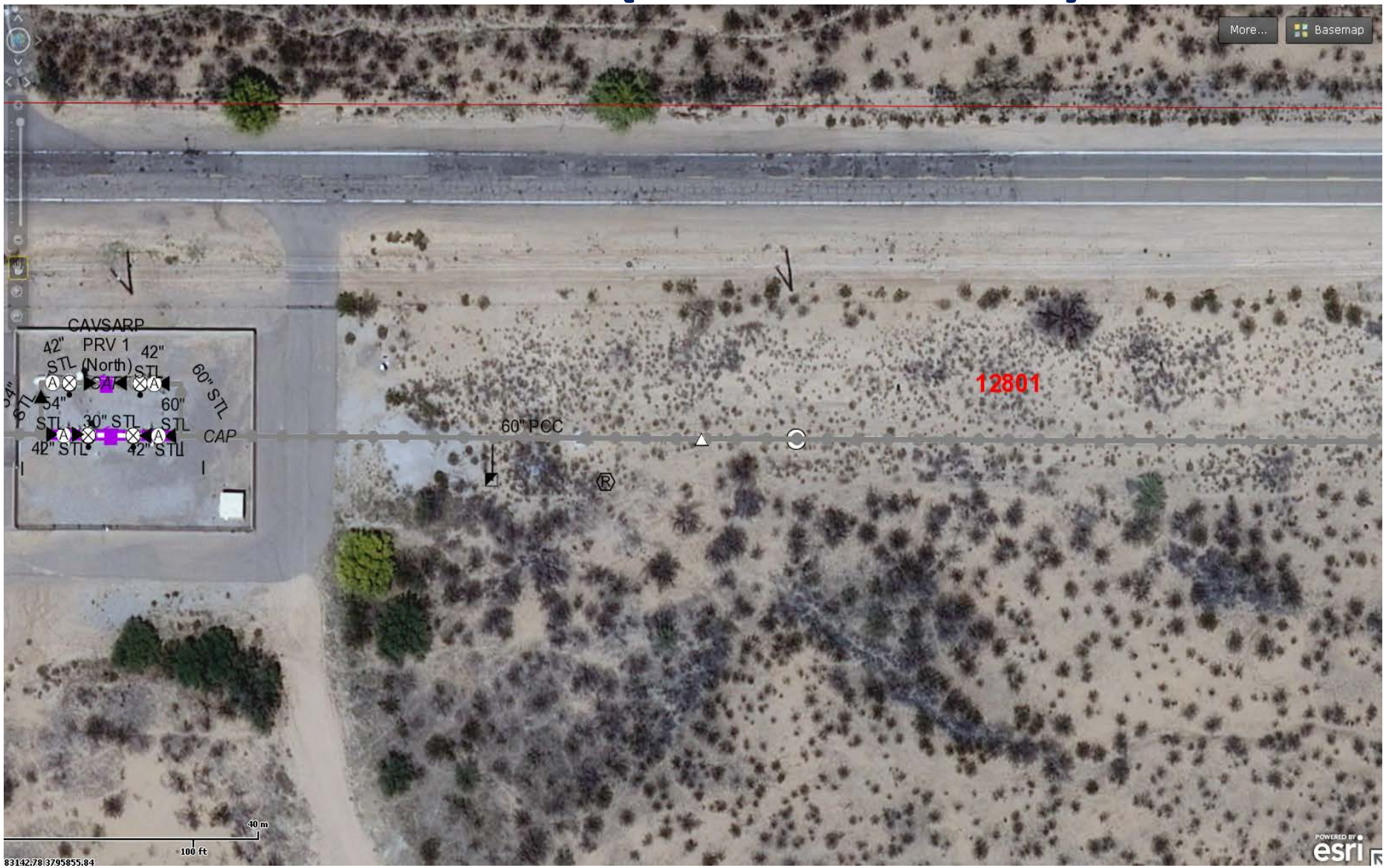
CITY OF TUCSON

TUCSON WATER



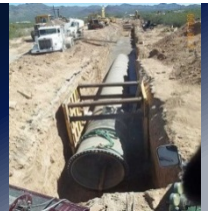


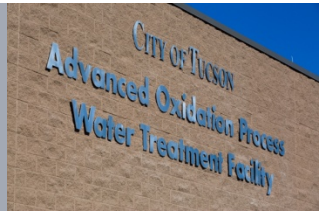
Drill Down: CAVSARP Ideal Location (PRV Station)



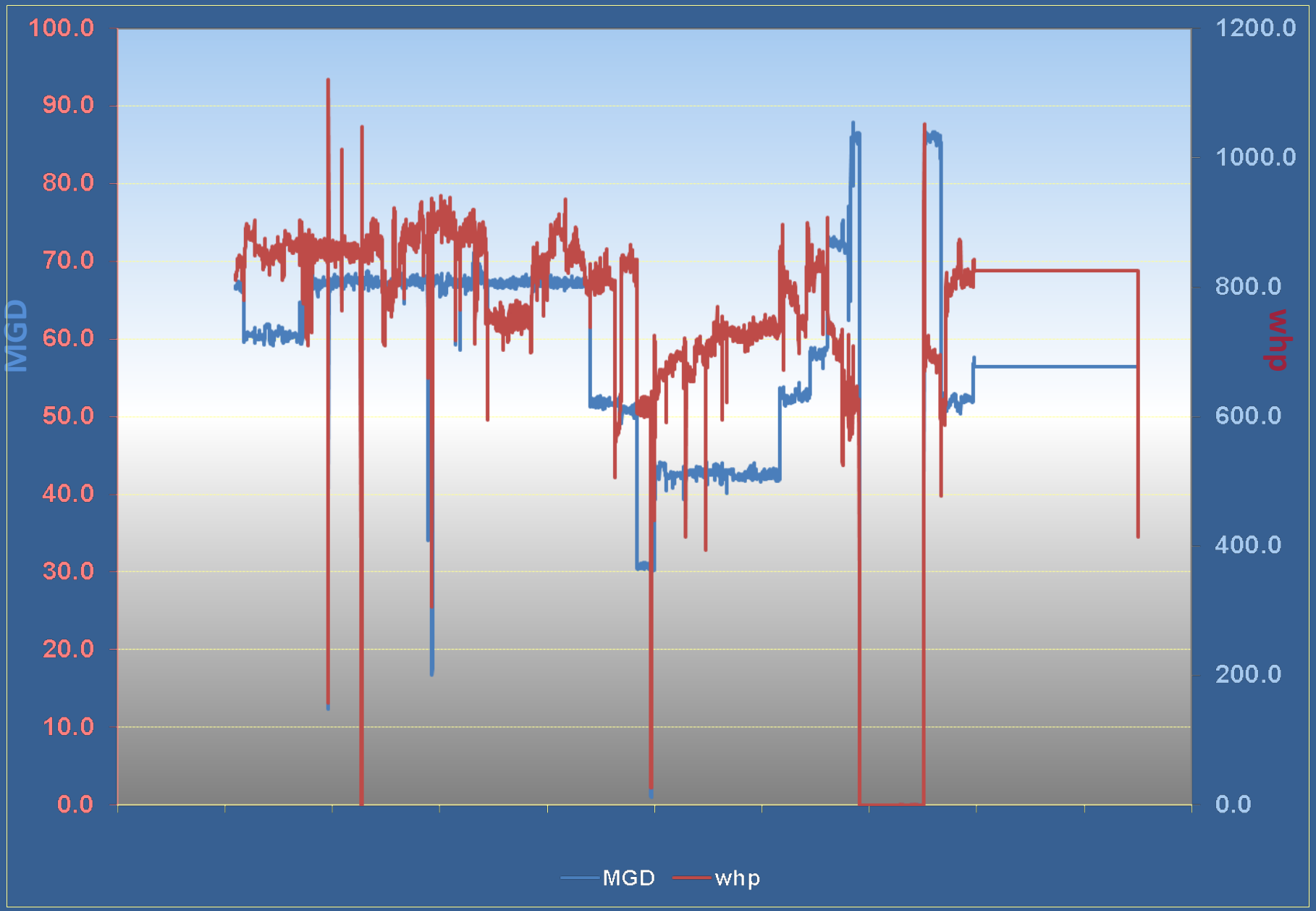
Why Select CAVSARP

- Not part of distribution system
  - *not subject to demand driven diurnal or seasonal fluctuations in flows*
- High volume
- Decent head
- Decent flow regime
- Large retail load on site
  - *While there is load onsite, the tariff has large fixed cost components undermining the economics*



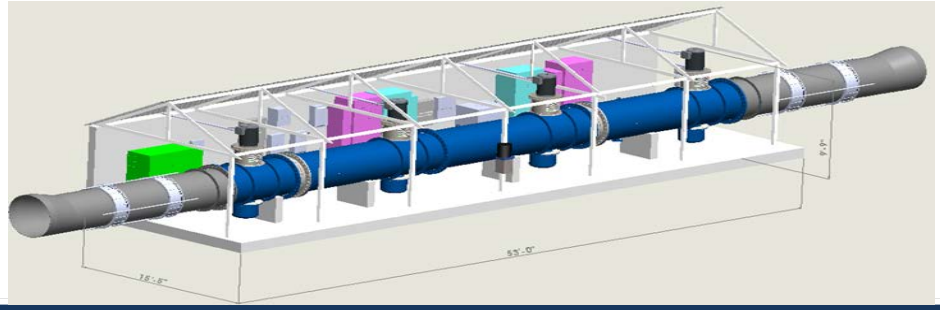


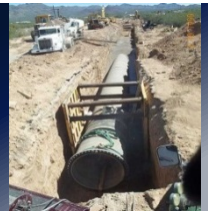
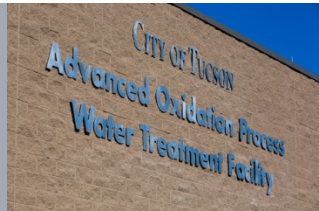
CAVSARP MGD vs Water Horsepower (WHP) Profile 2015



Latest Research

- UA Research Project – "Retrospective Analysis of Energy Availability of Micro Hydropower from the CAP Source Supply"
  - Evaluated PRV locations & turbine efficiencies
- Considered Lucid PowerPipe in conduit system
- Sought sole source procurement process for LucidPipe - rejected



Next Steps: Summer 2016

- NLine Energy Inc. Assessment
- Phase 0 Department of Energy grant funding
- Request for Proposals (RFP)