GLENDALE EFFLUENT RECHARGE AND REUSE PROGRAMS

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July 2019

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History of Glendale Effluent

- **1892** – The original Glendale Townsite was established.
- **1920** – Glendale had 687 customers and a WS operating budget of $17,000 (Director's salary was $1,300/year).
  - **2019** – Glendale has 63,000 customers and over a $54 million budget.
- **1918** – The Sewage Department was created.
- **1924** – Glendale adopted an ordinance that prohibited open toilets (outhouses) within the town limits.
- **1925** – An additional 150 sewer connections were made due to the ordinance prohibiting outside toilets.

Early Glendale Settlers

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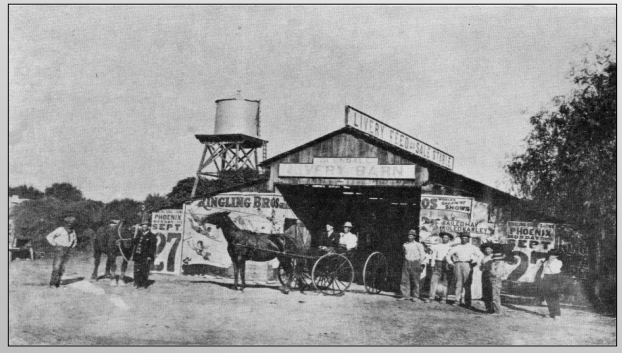
History of Glendale Effluent

- **1950** – Glendale had 19 miles of sewer line.
- **1958** – The 91st Avenue Wastewater Treatment Plant (WWTP) was constructed with a 5 MGD capacity (230 MGD current).
- **1979** – The Sub-Regional Operating Group (SROG) was created for ownership and operation of the 91st Avenue WWTP.
- **1984** – Arrowhead Water Reclamation Plant was constructed. The recharge facility was permitted in 2004.
- **2000** – The West Area Water Reclamation Facility and West Area Aquifer Recharge Facility were constructed.
- **2006** – SRP's New River Agua Fria Underground Storage Project (NAUSP) was constructed.



Original Townsite Water Tower

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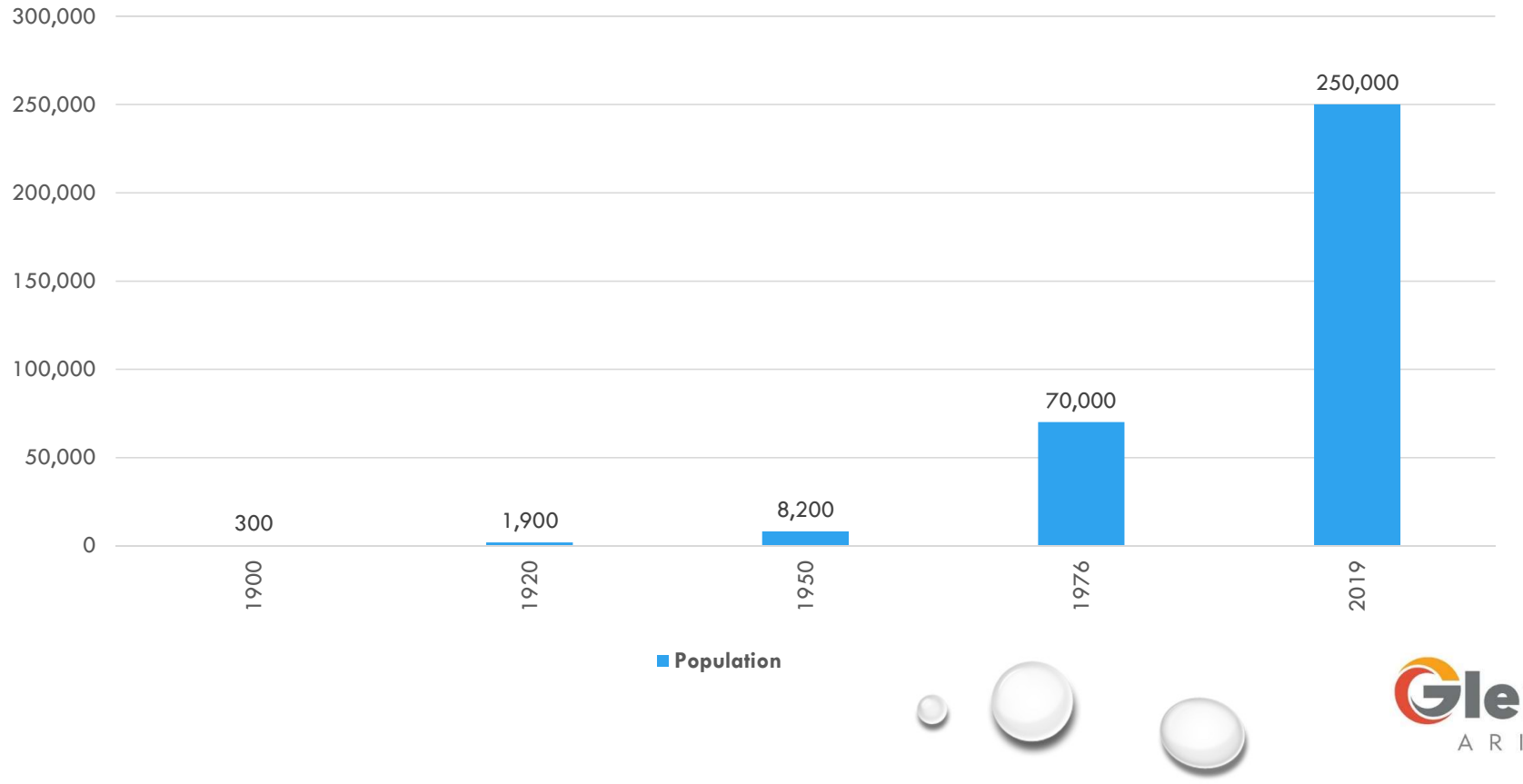
Glendale Population Growth



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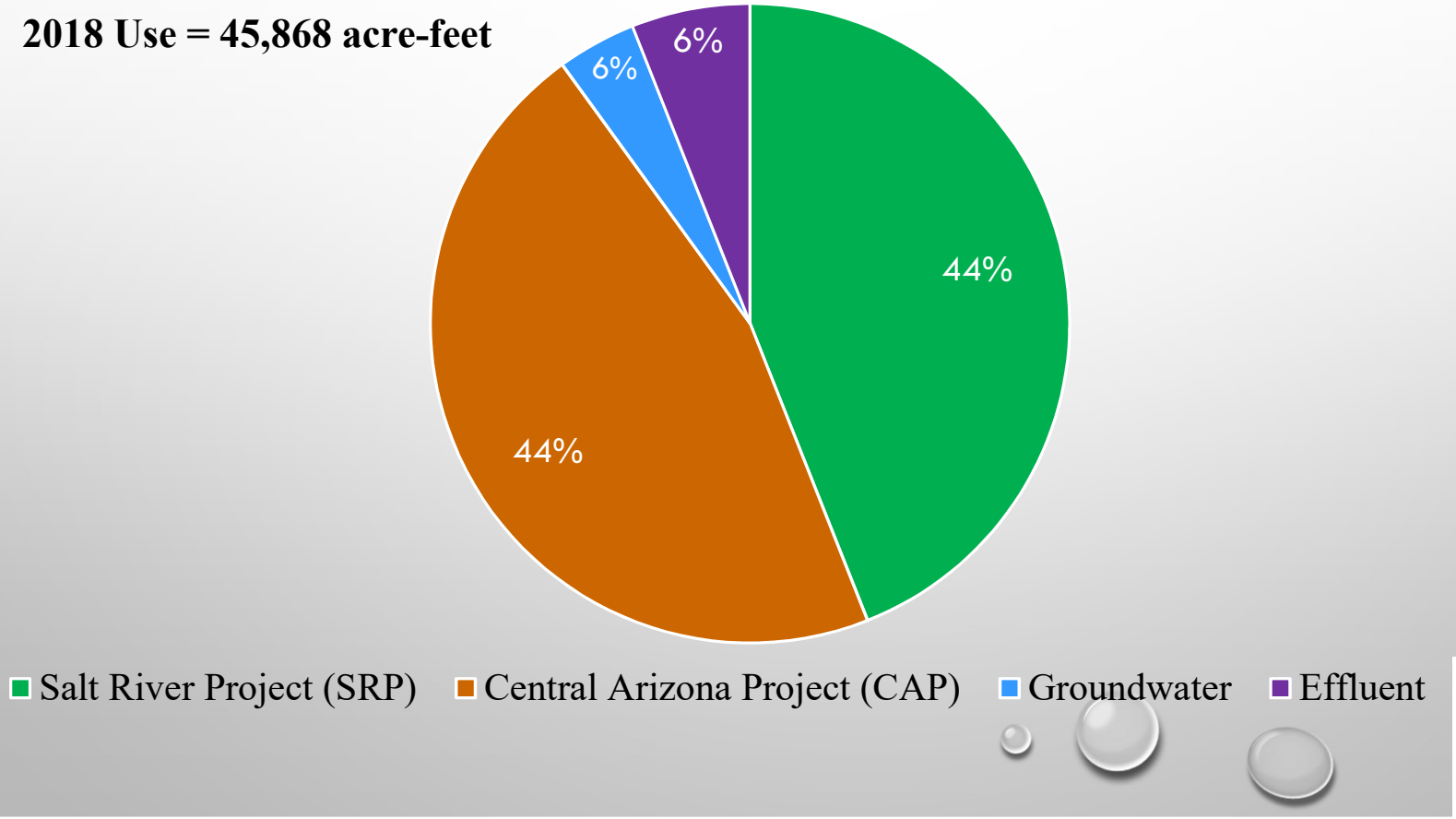
GLENDALE WATER SOURCES

2018 Use = 45,868 acre-feet



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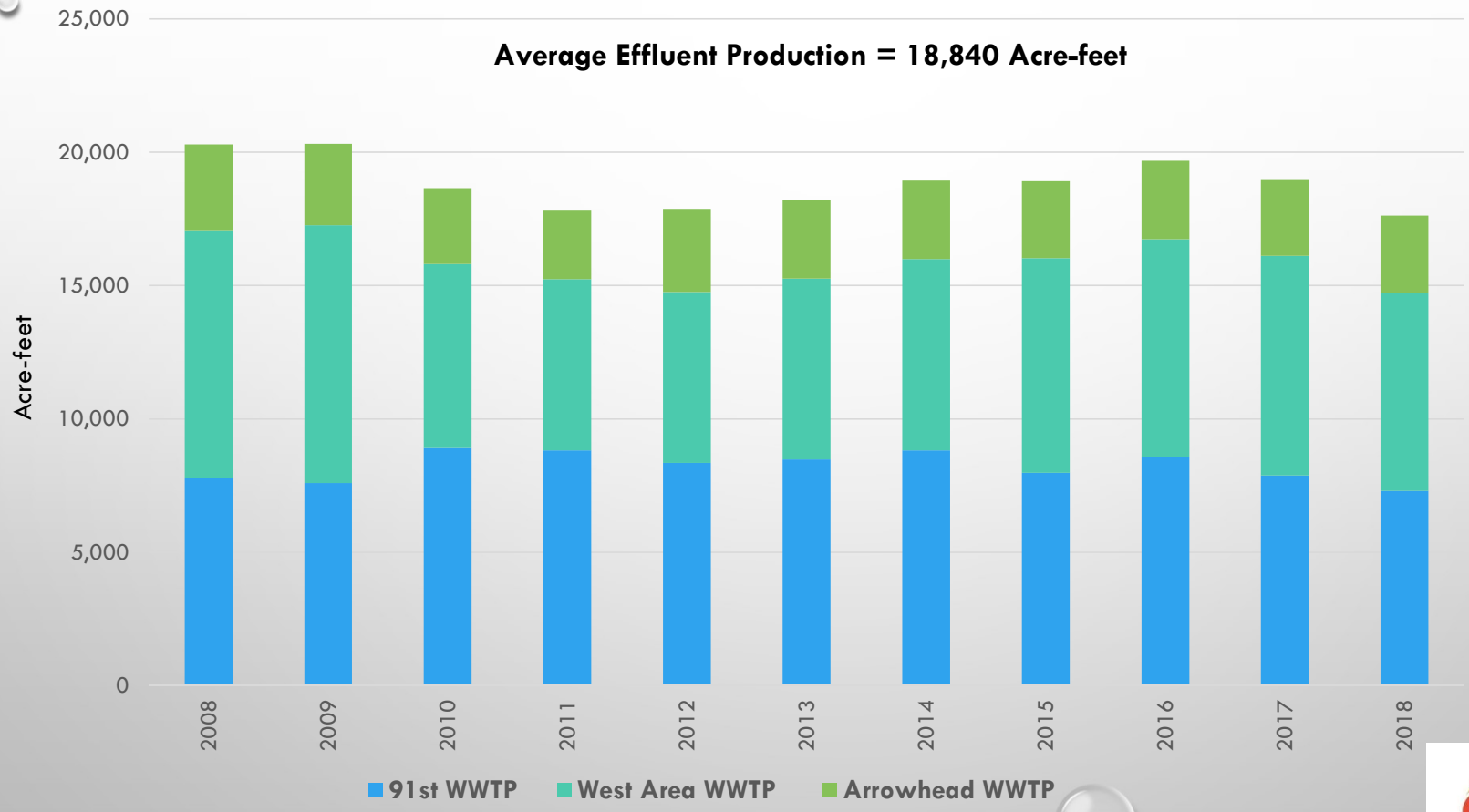
HISTORIC EFFLUENT PRODUCTION



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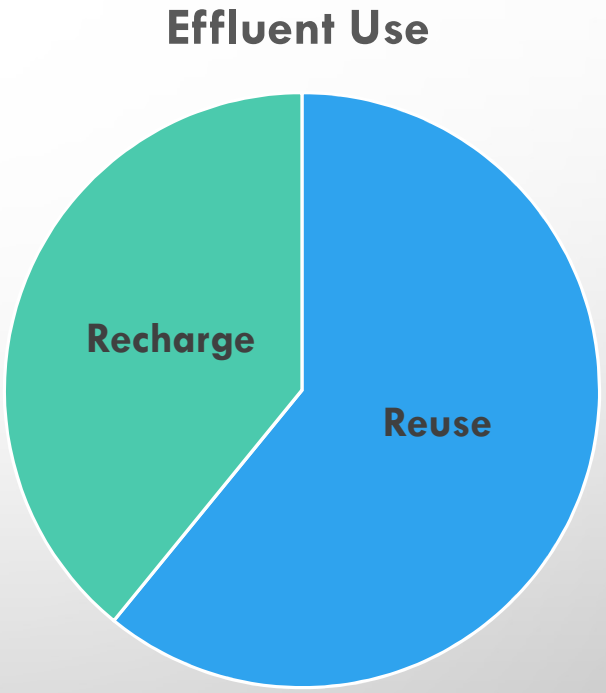
GLENDALE'S EFFLUENT USE

- **Recharge = 38%**
  - At three recharge facilities
- **Reuse = 17%**
  - Mainly Arrowhead Lakes and Golf Courses
- **Reuse (91st Ave WWTP) = 41%**
  - Cooling water at PVNGS
  - Tres Rios
- **Losses = 4%**



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SUB-REGIONAL OPERATING GROUP (SROG)

- SROG is a five member municipal group (Phoenix, Scottsdale, Glendale, Mesa, Tempe).
- Glendale sends water to the 91st Avenue WWTP for treatment.
- SROG meets the PVNGS water demand of 60 to 80 MGD.
- Glendale's ownership capacity is 13.2 MGD (40.5 acre-feet/day).

91st Av. Wastewater Treatment Plant

- Glendale's flow obligation varies from 2.0 to 8.0 MGD with an average of about 7.0 MGD.
- Glendale's average volume is about 8,000 acre-feet/year.

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Municipal Issues with Effluent

- Rapid growth means effluent use/disposal issues. (What do we do with all of this water?)
  <u>The options are:</u>
  - AZPDES
  - Recharge/Indirect Reuse
    - Long-term shortage credits
    - Water level declines
    - Natural attenuation via soil aquifer treatment
  - Direct Reuse
  - Direct Potable Reuse

- There may be issues with permitting timeframes and expense.
- As the value and benefits of effluent increases, the end-use of effluent is also changing.
- Municipalities must look at a variety of options for the best way to effectively use effluent.

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Turning Effluent into a Source Supply

- Glendale utilizes:
  - Recharge of effluent at 3 Underground Storage Facilities
  - Creating long-term storage credits
  - Direct/Indirect Reuse
  - Sub-Regional Operating Group (SROG)

- In the future:
  - Direct potable reuse
  - Continue recharge
  - More direct reuse options
    - Installation of purple pipes for new development

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ARROWHEAD WATER RECLAMATION FACILITY

- Constructed in 1984
- 4.5 MGD capacity
- Serves Arrowhead Ranch Area
- Effluent used directly for Arrowhead Lakes and turf irrigation

Arrowhead Water Reclamation Facility

59th Ave below Thunderbird Park

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Arrowhead Recharge Facility

- 4 Vadose Zone Wells
- 4 ASR Wells
- Effluent Source Water
- Permitted at 2,300 AF/year
- 2018 volume = 263 AF
- Expiration date 1/31/2024

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ARROWHEAD RECHARGE FACILITY

ASR Wells

- >500 gallon per minute capacity
- Recovery possible
- Recharged into aquifer

Arrowhead Water Reclamation Facility ASR Well

Vadose Zone Wells

- 500 gallon per minute capacity
- No pumping/recovery
- Recharge through vadose zone

Arrowhead Water Reclamation Facility Vadose Zone Well

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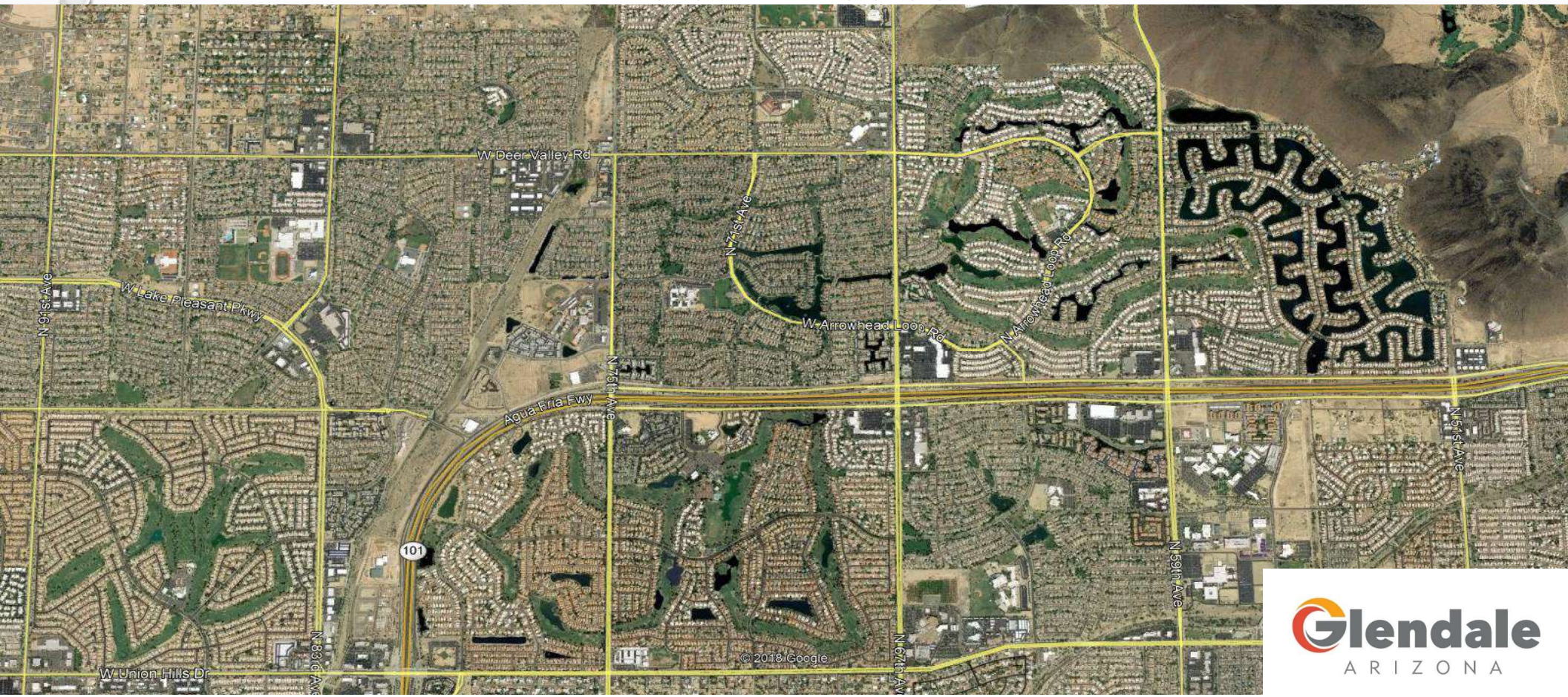
Arrowhead Lakes and Golf Courses
Effluent Reuse



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WEST AREA WATER RECLAMATION PLANT

- Constructed in 2000
- 11.7 MGD capacity
- Serves smaller assorted direct reuse features
- Effluent used directly for Camelback Ranch lake and irrigation

West Area Water Reclamation Facility

Camelback Ranch

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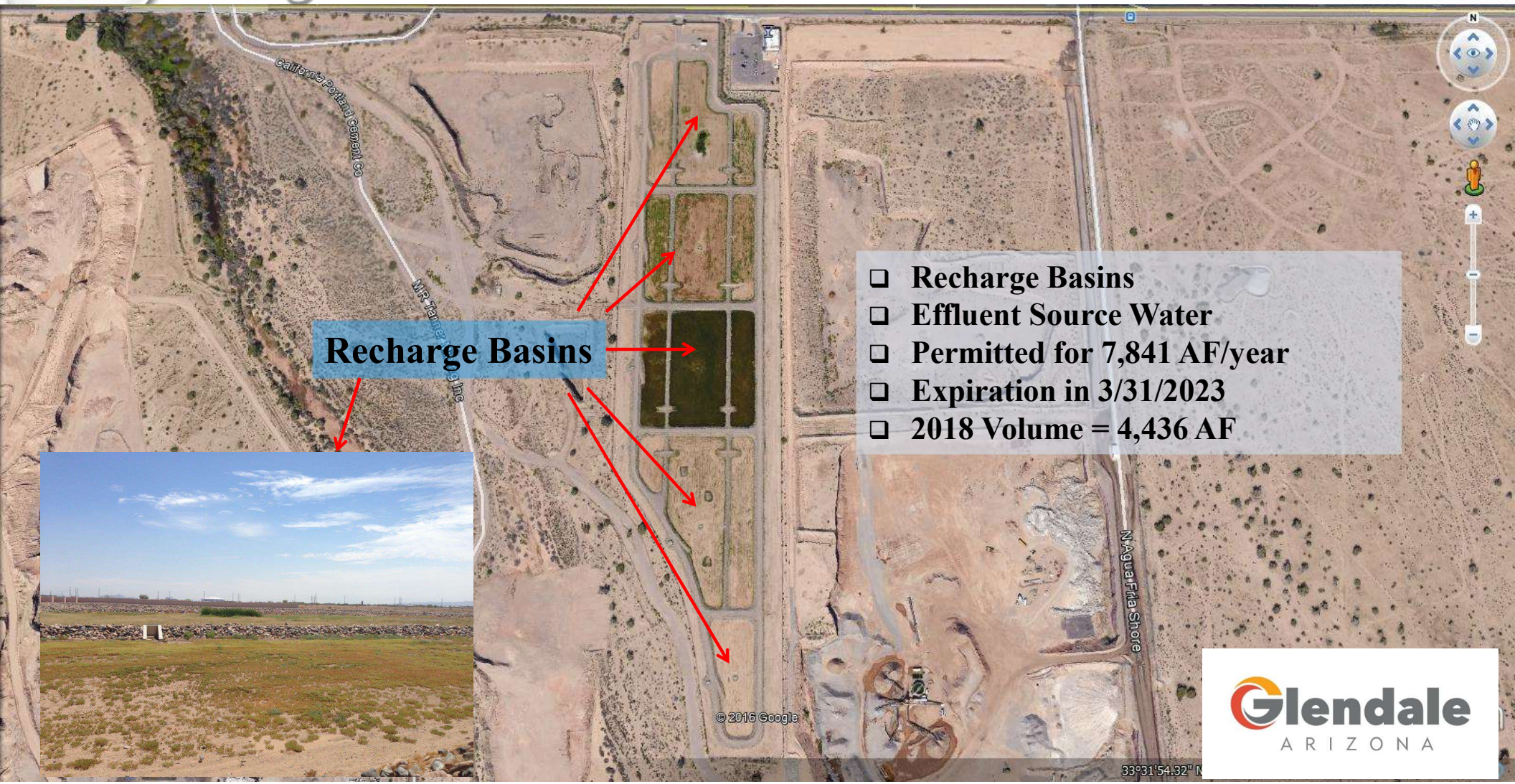
WEST AREA RECHARGE FACILITY



- Recharge Basins
- Effluent Source Water
- Permitted for 7,841 AF/year
- Expiration in 3/31/2023
- 2018 Volume = 4,436 AF

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SRP's New River Agua Fria River Underground Storage Project (NAUSP)

Glendale 20% Owner
Recharge Basins
Permitted for 75,000 AF
Operational Capacity ~ 25,000 AF
Glendale's yearly volume = 4,800 AF

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POSSIBLE DPR PROJECTS

Outdoor Water Recreational Park:

- Limited to non-drinking water source
- Full body contact for water recreation activities
- Use DPR to fill lakes due to ADWR Lakes Bill
- Create a small package plant at Glendale West WWTP

DPR as Drinking Water Source:

- Which AZ Municipality will be the first to develop DPR as long-term supply?

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WEST VALLEY WATER ASSOCIATION (WVWA)

- Formally WestCaps
- WVWA contains eleven West Valley municipal and private water providers
- Reclamation Basin Fund built the WVWA West Salt River Valley Basin Model
- Mitigation strategies to help meet future demands
- Desalinization and DPR are two key strategies
- Larger regional effluent projects that have multi-use benefits
- Basin Study completed by June 2020

LESSONS LEARNED

- We need advanced planning for reuse.
  - Purple pipes need to be installed at the time of development.
- It's great to have LTSC's, but we need the infrastructure for recovery.
  - We must determine the groundwater impacts from recovery.
- DPR is difficult due to cost, operating standards, public perception, and unknowns.
  - Have developers help fund projects or collaborate with other municipalities.
- **To Summarize:**
  - Plan and start early!
  - Do advanced planning for purple pipes.
  - Match recharge and recovery.
  - Determine infrastructure needs and cost.
  - Consider DPR and work through public perception/cost.
  - Plan and start early!

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