

AECOM 7720 N. 16th Street Suite 100 Phoenix, Arizona 85020 www.aecom.com 602 371 1100 tel 602 371 1615 fax

February 22, 2024 Revised: February 26, 2024

Biscuit Flats Dev LLC 2415 East Camelback Road, Suite 920 Phoenix, AZ 85015

Arizona State Land Department 1110 West Washington St. Phoenix, AZ 85007

Subject: North Gateway Indirect Potable Reuse Assumptions - Amended Public Auction No. 53-123709

The North Gateway Water Reclamation Facility (NGWRF) Concept Report provided information associated with the treatment and reuse of domestic and industrial wastewater flows from proposed developments associated with the Arizona State Land Trust's (ASLD) land subject to Auction No. 53-123709. At the time the report was issued, several key assumptions had to be made given the lack of, among other items, (i) clear new regulations and (ii) results of hydrogeologic investigations. Much of that information is still not available as of the date of this letter.

Despite these limitations, potential bidders for the ASLD property have requested additional information and/or input into location, size and scope of improvements at the 78" Infiltration Potable Reuse (IPR) site located north of SR-74 which is generally shown in Figure 1 of the NGWRF Concept Report. AECOM has since met with the City of Phoenix (City) to help provide input and guidance based on their initial work at the 78" IPR site and the North Gateway WRF site. However, we have not conducted and/or received the subsurface hydrogeologic or land survey investigative information that is required in order to assess the detailed design requirements to treat up to 27 MGD of IPR flows through injection/retraction wells and/or infiltration basins at each site. Also, the final ADEQ and Maricopa County regulations on direct potable water reuse are still being developed, which will provide performance standards for these types of facilities. The surveys and regulations will ultimately guide the amount of acreage required for each phase, including recharge/infiltration basins, injection/retraction well fields, brine processing ponds and the actual treatment facility footprints. However, the IPR concepts currently under consideration are based on discussions with the City and assume consistency with the Cave Creek advanced water treatment facility. The City provided a draft document and comments towards the Biscuit Flats Development in a memo dated December 27, 2023. Highlights focused on the SR-74 IPR site (also known as the 78" IPR site in the NGWRF Concept Report) are shown below.



- In 2002 the City conducted pilot recharge testing at the NGWRP site and based on the results of
 pilot testing, shallow depth to bedrock, minimal long-term storage capacity, and the ability to
 recover the recharged water the City abandoned all efforts of recharge at the NGWRP and
 submitted a closure letter with ADWR in 2010. Instead, the City is moving forward with
 recharge and recovery in the area north of SR-74, which has a greater depth to bedrock, long-term
 storage capacity, and ability to recover the recharged water.
- 2. The Advanced Water Treatment Facility (AWTF) will be located north of SR-74; the final location of the AWTF is still yet to be determined. The AWTF could be located at the Lake Pleasant Water Treatment Plant (LPWTP), which could allow for the AWTF to use existing onsite reservoir(s) and booster pumps at the LPWTP. The AWTF could also be located near the recharge basins and the 78-inch potable transmission main. The AWTF will be an end of the line plant and therefore, all solids must be handled onsite. This includes brine generated from the reverse osmosis (RO) membranes. If the AWTF is located at the LPWTP there may be land available for brine disposal ponds, but brine concentrators may be required. If the AWTF is located near the recharge basins additional land would need to be acquired.
- The City has selected the area north of SR-74 for recharge and production/recovery wells. Starting in 1QTR2024, the City will drill exploratory borings in the area to determine the best location for recharge (e.g., basins, vadose zone wells, ASR wells) and recovery wells.
- 4. The land for the NGWRP is already owned by the City, but, is in its undeveloped form; there are not onsite improvements. There is also a wash that runs through the property and it may require a 404 permit to perfect the site. The City owns the land at the Lake Pleasant Waer Treatment Plant (LPWTP) and it is anticipated that no additional land would be required to locate the AWTF at the LPWTP, however, additional land may be necessary for brine disposal and/or brine concentrators. If the brine ponds cannot be located at the LPWTP, then additional land would need to be provided to the City. Land for the recharge basins will also need to be provided to the City. Easements for the reclaimed water transmission main will also need to be provided to the City. Additionally, the City will require land for the production/recovery wells and possibly additional easement for the untreated well water transmission main from the well field to the LPWTP.

The North Gateway WRF Concept Report stated the 78" (SR74) IPR land area requirement was estimated at approximately 510 acres based on the required new IPR facilities including land areas for either infiltration basins or injection/extraction wells, and RO brine evaporation ponds. At this time, the City of Phoenix has requested that no IPR facilities be located at the North Gateway WRF. Hence, IPR facilities at the 78" IPR site is based on hydrogeologic information associated with the Cave Creek Advance Water Reclamation Plant (AWRP) and their associated IPR facilities. The 78" (SR74) IPR Options under consideration include;



- Vadose Wells IPR Option 1 is based on vadose zone wells as the main IPR disposal option from the MBR effluent flows. This Option includes areas required for brine disposal ponds and for the Advanced Water Reclamation Treatment Facility (AWRF) for all phases through buildout. The land area needed for this Option is dependent on the hydrogeologic assumptions listed below.
- Infiltration Basin IPR Option 2 is based on infiltration basins as the sole IPR disposal option and was used in the NGWRF Concept Report which reported a land area of 510 acres. This Option requires the least amount of land and would be less than what the original acreage requirement was based upon. This Option also includes the required brine pond disposal, AWRF and is based on the hydrogeologic assumptions listed below.
- **ASR Wells IPR Option 3** is based on an Aquifer Storage and Recovery (ASR) wells as the IPR disposal option. This Option would require the second lowest land area. This Option is based on the hydrogeologic assumptions listed below and includes the brine disposal ponds and area to allow for the AWRF.

Note that the costs of the equipment and improvements necessary for each of the IPR Options listed above are variable and have not been evaluated for each case. Therefore the overall cost of each Option is not solely dependent upon the land acreage.

The hydrogeologic assumptions in developing a Rough Order of Magnitude (ROM) estimate of the land area required includes the following:

- Infiltration Basins: 0.6 MGD per acre plus a redundancy factor of 1.5.
- ASR Well Capacity = estimated at 1.0 MGD per well plus a redundancy factor of 1.5.
- Vadose Zone Well Capacity = estimated at 0.5 MGD per well plus a redundancy factor of 1.5.
- ASR and Vadose Zone Well Spacing = 500 ft. radius
- Brine Evaporation/Disposal Ponds: evaporation rate of approximately 8.7 ft. per year and RO recovery of 92%.

Based on these updated assumptions, the approximate land area requirements (Table 1) are forecasted to be the following:

- IPR Phase 1 MBR Facilities located on City property at North Gateway site with no additional land acquisition required. Refer to Option 1, 2 or 3 in Table 1 below for Phase 1 IPR land acquisition requirements and plus 20 acres for the MBR effluent conveyance pipeline easement.
- **IPR Phase 2** MBR Facilities located on City property at North Gateway site with no additional land acquisition required. Refer to Option 1, 2 or 3 in Table 1 below for Phase



2 IPR land acquisition requirements and plus 20 acres for the MBR effluent conveyance pipeline easement.

- **IPR Phase 3** MBR Facilities located on City property at North Gateway site with no additional land acquisition required. Refer to Option 1, 2 or 3 in Table 1 below for Phase 3 IPR land acquisition requirements and plus 20 acres for the MBR effluent conveyance pipeline easement.
- **IPR Build-Out** MBR Facilities located on City property at North Gateway site with no additional land acquisition required. Refer to Option 1, 2 or 3 in Table 1 below for Build-Out IPR land acquisition requirements plus 20 acres for the MBR effluent conveyance pipeline easement.

Table 1: 78" (SR74) IPR Site Land Area Requirements Summary												
Α	В	С	D	E	F	G	Н	Ι	J	D+F+J	D + G + J	D + I + J
Phase	North Phoenix 3,500 Time Frames	NGWRF MBR Effluent Conveyed to IPR Site (MGD)	SR74 AWRF Site (AC)	Option 1 - Est. Vadose Zone Wells No.	Vadoze Zone Well(s) Area (AC)	Option 2 - Infiltration Basin(s) (AC)	Est. No. of ASR Wells	Option 3 - ASR Wells Area (AC)	Brine Pond(s) Area (AC)	Option 1 - Est. Total IPR Site Area (AC)	Option 2 - Est. Total IPR Site Area (AC)	Option 3 - Est. Total IPR Site Area (AC)
1	0-5 years	8	5	24	430	20	12	220	85	520	110	310
2	5-10 years	17	5	51	920	43	25	450	180	1,105	228	635
3	10-15 years	22	10	66	1200	55	33	600	230	1,440	295	840
Build Out	>15 years	27	10	81	1460	68	40	720	280	1,750	358	1,010

Again, AECOM has not performed any further hydrogeologic studies or analysis of the SR-74 IPR site to ascertain the exact amount of land, sizing of well capacity for the number of injection wells or extraction wells or infiltration basin sizing. Understanding that some amount of additional land would be necessary in all cases, AECOM maintained assumptions in the NGWRF Concept Report, assuming that the new facilities would be located in proximity to the proposed recharge basins and the existing 78-inch potable transmission main.

Sincerely, **AECOM Technical Services, Inc.**

(T/im Principal-in-Charge tim.volz@aecom.com