Edwards Aquifer Habitat Conservation Plan
Nonroutine Adaptive Management Proposal

To: **EAHCP Implementing, Stakeholder, and Science Committees**
From: **Roland Ruiz, General Manager, Edwards Aquifer Authority**
Date: **January 22, 2018/Revised January 31, 2018**
Re: **Proposed Adaptive Modifications to "Use of the SAWS ASR for Springflow Protection" Measure (EAHCP §5.5.1)**

PREAMBLE

The Edwards Aquifer Habitat Conservation Plan ("EAHCP") currently includes a springflow protection program ("ASR Program or "Program") that utilizes the San Antonio Water System ("SAWS") Aquifer Storage and Recovery Facility ("ASR Facility") for storage and recovery of leased Edwards Aquifer water. Broadly, the current program is based on the acquisition by the Edwards Aquifer Authority ("EAA") of 50,000 acre-feet (A/F) per year of leases and lease options of Edwards Aquifer groundwater withdrawal permits to be utilized to fill, idle, and maintain in storage a portion of the capacity of the ASR Facility for subsequent use to protect springflows during identified drought-of-record conditions. When specific triggers (described in the EAHCP) are reached: (1) SAWS is obligated to forbear on its rights to make withdrawals at specific amounts from the Edwards Aquifer pursuant to its Edwards Aquifer groundwater withdrawal permits; (2) water stored in the ASR Facility is available to SAWS for recovery to offset its forbearance in order to meet customer demand; and (3) the EAA, when not utilizing leased water to fill the ASR Facility, is obligated to forbear pumping of the entirety of its leased or lease option water (50,000 acre feet). This combination of SAWS and EAA forbearance contributes significantly to protecting flows at the Comal and San Marcos spring systems during the periods of drought conditions for which this program is triggered.

This document presents a formal proposal for a Nonroutine Adaptive Management action ("Nonroutine AMP") involving administrative modifications to the ASR Program from its original design in the EAHCP. The proposal, if approved, does not modify in any way the Biological Goals or Objectives contained in the EAHCP. Rather, the proposal presents a preferred alternative to the process currently identified in the EAHCP by which those goals and objectives are achieved and implemented. Specifically, in order to optimize the Program's success, the EAA proposes to amend the leasing structure of the Program and implement the following:

1. Replace the current, three-tiered leasing/lease option structure with a simplified two-tiered leasing/forbearance agreement structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 A/F per year of Edwards Aquifer groundwater); and

2. Revise the Ten-Year Rolling Average of Estimated Recharge threshold used for triggering forbearance for EAA-controlled groundwater withdrawal rights to 500,000 A/F.

BACKGROUND AND OVERVIEW

The ASR Program has been in operation for over four years. During the course of implementation, firsthand experiences with implementation challenges, as well as market responses to proposed leasing and lease-option products have contributed to the identification of opportunities to improve the operational and financial efficiencies of the EAA's water acquisition responsibilities under the ASR Program while providing the same or greater benefit to springflow protection.

On January 12, 2017, the EAA General Manager submitted a memorandum entitled *An Opportunity for ASR Improvement* (Exhibit A) to both the Implementing and Stakeholder Committees of the EAHCP. The memo cited programmatic issues related to the implementation of the ASR Program that could serve as targets to be addressed through potential Nonroutine AMP. Of the issues and potential solutions identified in the memo, the following five are particularly relevant to this proposal:

1. *Only unrestricted water rights [irrigation, municipal, and industrial] are eligible for enrollment into ASR; agriculture permits tied to the land [restricted irrigation permits] could be used for forbearance in ASR, if appropriate modifications were made;*

2. *Triggers for Tier II and Tier III (10-year rolling average recharge) are unfamiliar to permit holders; the ASR program will be more successful if it uses a familiar and comfortable trigger (i.e. J-17);*

3. *The current tiered system is not fiscally efficient; lease rates, rather than forbearance agreement rates, are paid for water that will, in some cases, more than likely, never be injected;*

4. *The ASR is almost full; therefore, maintaining an account of 50,000 ac-ft. of unrestricted water rights, eligible for injection, is unnecessary and fiscally inefficient; and*

5. *The current ASR program anticipated continued filling/injecting during the early years of the DOR, which is likely to create conflict perception issues in the region (i.e. SAWS pumping from the aquifer at the request of the EAA while other permit holders are required to cut back withdrawals), and filling/injecting during this time runs counter to the overall objective of sustaining aquifer levels to ensure continuous minimum springflows. The same or, more likely, greater benefit could be achieved if the full amount required for storage was injected prior to the drought such that no injection had to occur after the onset of the DOR.*

Throughout 2016 and early 2017, the EAA internally vetted the issues identified with the ASR Program, and initially identified two potential advantageous modifications to the design of the Program. These proposed modifications were also presented to the SAWS ASR Regional Advisory Group at their February 14, 2017, meeting, and were met with general support from the group. The two potential advantageous modifications were:

- *To consolidate the current three-tiered leasing approach into a simplified two-pronged leasing/forbearance program; and*
- *To use J-17 levels as a more recognizable trigger for forbearance of EAA permits.*

It was generally assumed that the two modifications would achieve the following desired outcomes:

1. Provide a more understandable and marketable product that will achieve long-term control of 50,000 A/F of Edwards Aquifer groundwater for forbearance by the EAA during the drought conditions that trigger the ASR Program; and
2. Provide greater springflow during a repeat of such drought through the use of a more impactful, J-17 level-based forbearance trigger.

Performance Comparison:

A simulation using an updated version[1] of the Edwards Aquifer MODFLOW groundwater model was performed in order to compare the springflow results achieved with implementation of the ASR Program as described in the EAHCP to the springflow results achieved with implementation of the Program using the above-described modifications. The results of the exercise are summarized below in ~~the following table~~Table 1.~~.~~

TABLE 1: COMPARISON OF POTENTIAL FORBEARANCE TRIGGERS – COMAL SPRINGS

POTENTIAL FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 A/F per year (Tier 2); and 10-year rolling recharge average of 472,000 A/F per year (Tier 3)	29.71
J-17 at 635 (msl) on Aug. 1	28.64
J-17 at 636 (msl) on Aug. 1	29.32
J-17 at 637 (msl) on Aug. 1	29.32
J-17 at 641 (msl) on Aug. 1	29.8

As demonstrated by the simulation results, impacts within the model were not as sensitive to a J-17 level-based trigger as presumed originally. While the modeled results showed desirable springflow impacts could be achieved with higher J-17 level-based triggers (e.g. 641(msl) and above),the resulting increased frequency of required forbearance is highly likely to significantly diminish the marketability of such a forbearance agreement option, and would thus render the program ineffective in achieving the desired goals and objectives of the EAHCP.

Therefore, with long-term control of Edwards Aquifer groundwater still a critical need under the EAHCP, EAA staff reconsidered a revised 10-year-average rolling recharge trigger. Ultimately, a modeled analysis of a 10-year rolling recharge average of 500,000 A/F per annum for a forbearance trigger showed to provide similar springflow protection as the current ASR Program under a simplified forbearance approach using a recognizable and understandable forbearance trigger. The results of this secondary analysis are summarized below in ~~the following table~~Table 2:~~.~~

[1] For more information regarding the EAA's updated Edwards Aquifer MODFLOW groundwater model, please see *Updates to the MODLFOW Groundwater Model of the San Antonio Segment of the Edwards Aquifer* available at: http://www.edwardsaquifer.org/documents/2017_Liu-etal_UpdatestotheMODFLOWGroundwaterModeloftheSanAntonioSegmentoftheEdwardsAquifer.pdf.pdf

TABLE 2: SECONDARY ANALYSIS OF POTENTIAL FORBEARANCE TRIGGER – ROLLING RECHARGE

FORBEARANCE TRIGGERS	SPRINGFLOW ACHIEVED (CFS) AT COMAL SPRINGS
Current EAHCP triggers (three-tiered system): 10-year rolling recharge average of 572,000 A/F per year; and 10-year rolling recharge average of 472,000 A/F per year	29.71
Proposed 10-year rolling recharge average of 500,000 A/F per year (two-tiered system)	29.8

Put simply, the study determined that the ASR Program could be modified in a manner that provided both a simplified, two-tiered leasing/forbearance approach at an equivalent or stronger springflow benefit as the current ASR Program if a 10-year rolling recharge average of at or below 500,000 acre-feet per annum was used as a forbearance trigger. Therefore, this demonstration of equivalent program efficacy is consistent with the intent of the HCP and the Incidental Take Permit for the Program. A representative table of the modeling results is attached as Exhibit B.

In addition, considering the EAA has a sufficient amount of long-term lease commitments to ensure that the storage assumptions contained in the EAHCP and the Interlocal Agreement between SAWS and the EAA are satisfied, it would be more efficient to administer the two tiers of leases and forbearance agreements through a "sliding scale approach." SAWS currently has approximately 80,000 A/F of EAHCP regionally-leased groundwater stored on behalf of the EAHCP in its ASR Facility. Assuming the EAA makes an average of 12,000 A/F of leased rights available to SAWS for injection into the ASR Project each year, full storage of 126,000 A/F of groundwater can be achieved by 2021. Therefore, a reasonable "sliding scale" for each tier (based on EAA's long-term leases and their expiration dates) ~~would be as follows:~~ is represented in Table 3.

TABLE 3: REPRESENTATIVE "SLIDING SCALE" OF LEASES AND FORBEARANCE AGREEMENTS (2018-2027)

DATE	LEASE AGREEMENTS (A/F)	FORBEARANCE AGREEMENTS (A/F)	TOTAL LEASE/FORBEARANCE AGREEMENTS (A/F)
2018	40,594.303	0	40,594.303
2019	16,674.753	33,325.247	50,000.000
2020	15,924.077	34,075.923	50,000.000
2021	14,561.797	35,438.203	50,000.000
2022	12,837.627	37,162.373	50,000.000
2023	12,754.164	37,245.836	50,000.000
2024	12,753.164	37,246.836	50,000.000
2025	11,486.018	38,513.982	50,000.000
2026	10,864.898	39,135.102	50,000.000
2027	10,263.498	39,736.502	50,000.000

In summary, revisiting the five relevant goals listed above:

1. *Only unrestricted water rights are eligible for enrollment into ASR; agriculture permits tied to the land [restricted irrigation permits] could be used for forbearance in ASR, if appropriate modifications were made.*

Current legal limitations on restricted irrigation permits prohibit the use of the water for withdrawal and injection into the ASR Facility for municipal purposes. However, this proposed amendment would allow the EAA to enroll such permits into the Program because the forbearance agreement approach would not require the permitted water to be withdrawn; only forborne. Thus, this provides a larger pool of Edwards groundwater to be available to the ASR Program.

2. *Triggers for Tier II and Tier III (10-year rolling average recharge) are unfamiliar to permit holders; the ASR program will be more successful if it uses a familiar and comfortable trigger (i.e. J-17).*

Considering what was learned from the EAA's modeling exercises, permit holder familiarity with a J-17 trigger is outweighed by the marketability and springflow protection benefits associated with the revised 10-year rolling recharge average trigger of less than 500,000 acre-feet per year.

In addition, this trigger matches the recharge average trigger in the EAHCP that is currently associated with SAWS' obligation to forbear its Edwards Aquifer groundwater withdrawal permit. Therefore, as an added benefit, the proposed amendment would result in the EAHCP utilizing one common rolling recharge average trigger – which simplifies overall administration.

3. *The current tiered system is not fiscally efficient; lease rates, rather than forbearance agreement rates, are paid at a greater premium for water that will, in some cases, more than likely, never be injected.*

The proposed amendment would allow the EAA to set a rate for the forbearance agreements that is appropriate for the benefit received and is within the EACHP's Table 7.1 estimated budget.

4. *The ASR is almost full; therefore, maintaining an account of 50,000 ac-ft. of unrestricted water rights, eligible for injection, is unnecessary and fiscally inefficient.*

The proposed amendment recognizes a key distinction in the EAA's two major obligations under the ASR Program – the duty to provide Edwards water to SAWS to fill the ASR Facility at the required levels, and the duty to forbear 50,000 AF/yr when the drought conditions triggering SAWS' forbearance obligations under the ASR Program are met. In light of the fact that the EAA's responsibilities to deliver Edwards water to SAWS for injection associated with the ASR Program are certain to be met by 2021, this amendment would enable the EAA to adjust its water acquisition initiatives accordingly, prioritizing efforts on long-term forbearance commitments.

5. *The current ASR program anticipated continued filling/injecting during the early years of the DOR, which is likely to create conflict perception issues in the region (i.e. SAWS pumping from the aquifer at the request of the EAA while other permit holders are required to cut back withdrawals), and filling/injecting*

during this time runs counter to the overall objective of sustaining aquifer levels to ensure continuous minimum springflows. The same or, more likely, greater benefit could be achieved if the full amount required for storage was injected prior to the drought such that no injection had to occur after the onset of the DOR.

Due to the fact that the injection responsibilities associated with the ASR Program are certain to be met by 2021, concerns related to this conflict perception are alleviated.

PROPOSED NONROUTINE ADAPTIVE MANAGEMENT ACTION

Due to the firsthand experiences of program administrators described in this document, current results of the EAA leasing program, and the results of an internal EAA modeling exercise that represents the level of research and development underpinning this proposed Nonroutine AMP, the EAA respectfully requests that certain proposed amendments to the ASR Program be approved. The information used to develop the proposed amendment is an advancement over the scientific and commercial data available at the time of the writing of the EAHCP.

Specifically, the EAA proposes to amend the leasing structure of the ASR Program to:

1. Replace the current, three-tiered leasing/lease option structure with a two-tiered leasing/forbearance structure that coordinates existing long-term leases with new, long-term forbearance agreements (together providing control of the necessary 50,000 acre-feet per year of Edwards Aquifer groundwater required under the current ASR Program); and

2. Exercise (trigger) forbearance by the EAA in years following a recognition of the Ten-year Rolling Average of the Estimated Annual Recharge to the Aquifer declining to amounts at or below 500,000 acre-feet per annum.

A redlined version of Section 5.5.1 of the EAHCP, showing edits that would occur upon approval of this proposal, is attached for reference as Exhibit C.

BUDGETARY IMPLICATIONS AND FISCAL IMPACT

All EAHCP programming, including the ASR Program, is subject to the funding limitations and funding processes described in EAHCP Table 7.1 and the Funding and Management Agreement. Given limited resources and responsibility for stewarding public funds, a budgetary exercise was conducted by EAA staff to determine the budgetary and fiscal impacts of the proposed ASR Program modifications.

Fiscal Impact:

Adoption of this proposal will not result in any deviations from the funding allowances prescribed in Table 7.1 of the EAHCP. Furthermore, the proposed Nonroutine AMP action would remain consistent with the assumptions made in HDR's October 2011 *Evaluation of Water Management Programs and Alternatives for Springflow*

Protection of Endangered Species at Comal and San Marcos Springs.[2] Specifically the Program will remain within the budgetary confines of Table 7.1 of the EAHCP by utilizing a price point that falls below the average lease rate assumed in HDR's analysis of $125 and the ten-year standby rate for the Voluntary Irrigation Suspension Program Option (VISPO) of $70.20.

Budgetary Implications:

The sole budgetary implication related to this proposal is that full funding for the acquisition of portions of the groundwater rights associated with the ASR Program (Tier 2 and Tier 3) will no longer be dependent upon Reserve Funds. All funding will be associated with long-term contractual commitments that are paid annually. Unlike VISPO, the "triggers" within the contracts are intended to only be associated with the act of forbearance. The price point associated with the agreements will remain the same, regardless of whether or not forbearance is exercised under the agreement.

[2] HDR's October 2011 *Evaluation of Water Management Programs and Alternatives for Springflow Protection of Endangered Species at Comal and San Marcos Springs* may be found at: http://www.eahcp.org/documents/Appendix%20K.pdf

GLOSSARY OF TERMS

As used in this proposal for a Nonroutine Adaptive Management action and this Glossary, the following terms have the following meanings:

"Forbearance" means the complete curtailment of all or part of a right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

"Forbearance Agreement" is a contractual agreement whereby a party agrees to terms whereby the complete curtailment of all or part of the party's right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit is required when certain conditions, commonly referred to as "triggers" are met.

"Trigger" means to cause an event or situation to happen or exist. In the case of a Forbearance Agreement, a trigger would be a condition that causes or requires the curtailment of all or part of the right to make withdrawals under a specific Edwards Aquifer Authority Groundwater Withdrawal Permit.

"Curtail" or "Curtailment" means the act of reducing or restricting something. In the case of a Forbearance Agreement, the right to withdrawal under an Edwards Aquifer Authority Groundwater Withdrawal Permit would be reduced or restricted.

"Edwards Aquifer Authority Groundwater Withdrawal Permit" means an Initial Regular Permit or Regular Permit issued by the Edwards Aquifer Authority.

"Initial Regular Permit" means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority under Subsection 1.16(d) of the Edwards Aquifer Authority Act.

"Edwards Aquifer Authority Act" means the Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, as amended.

"Regular Permit" means an Edwards Aquifer Authority Groundwater Withdrawal Permit issued by the Edwards Aquifer Authority after August 12, 2008, resulting from the sale or amendment of an Initial Regular Permit or the consolidation of two or more such permits.

"Withdrawal" means an act that results in taking groundwater from the Edwards Aquifer by or through man-made facilities, including pumping.

"Lease Option" means a type of contractual agreement whereby a party has the option to lease property when certain conditions are met. In the context of the Edwards Aquifer Habitat Conservation Plan, the Edwards Aquifer Authority is charged with entering into such contracts with the option to lease an Edwards Aquifer Authority Groundwater Withdrawal Permit becoming actionable upon the existence of a specific ten-year rolling recharge average. The difference between a Lease Option and a Forbearance Agreement is that a Lease Option is a

contractual agreement to lease property rights under certain conditions and a Forbearance Agreement is an contractual agreement to curtail withdrawal of an Edwards Aquifer Authority Groundwater Withdrawal Permit under certain conditions.

"Ten-year Rolling Average" or "10-year Rolling Average" means the unweighted arithmetic mean of the ten (10) most recent consecutive years at any given time.

"Estimated Annual Recharge" Annual recharge is estimated by the United States Geological Survey using a water-balance method that: (1) relies on precipitation and streamflow measurements in the nine (9) drainage basins indicated in "Method of Estimating Natural Recharge to the Edwards Aquifer in the San Antonio Area, Texas," 1978, USGS WRI-7810, by Celso Puente; (2) considers only precipitation and stream flow that originates over the Contributing Zone and Recharge Zone of the Edwards Aquifer; and (3) excludes interformational flows from adjacent aquifers.

"Ten-year Rolling Average Recharge" or "10-year Rolling Average Recharge" means the unweighted arithmetic mean of annual recharge to the Edwards Aquifer over the ten (10) most recent consecutive years at any given time.

EDWARDS AQUIFER AUTHORITY

MEMORANDUM

TO: HCP IMPLEMENTING & STAKEHOLDER COMMITTEES
FROM: ROLAND RUIZ, EAA GENERAL MANAGER
SUBJECT: AN OPPORTUNITY FOR ASR IMPROVEMENT
DATE: JANUARY 12, 2017

An Opportunity for ASR Improvement

Observation: after four years of operation, the Aquifer Storage and Recovery (ASR) program has become very successful. However, during the last two years of significant accomplishments, it appears the ASR Program, as detailed in the Habitat Conservation Program (HCP), can be modified to improve the operational and financial efficiency, while still providing the same benefit to Springflow protection.

Goal: To ensure compliance with the HCP and Incidental Take Permit, while addressing issues such as: efficiencies, market conditions, program costs and savings, lease terms, forbearance, and triggers.

ASR Description in the HCP

The goal is to control 50,000 acre-feet (AF) of Edwards Aquifer Permits through acquisition of three Tiers of approximately 16,666 AF each and have stored 80,000 AF in the SAWS Twin Oaks facility.

- Tier I – always used as a lease to fill;
- Tier II – works somewhat like the Voluntary Irrigation Suspension Program Option (VISPO) as it incorporates two types of payments: a smaller standby provided at all times when the 10-year annual recharge average is greater than 572,000 AF and, a higher option payment provided when the 10-year annual recharge average is less than 572,000 AF. If a Tier II condition is in effect and the ASR is not full, the water will be injected. However, if the ASR is full and no further storage is required or drought conditions do not allow for additional injections, the contracted water will be forborne;
- Tier III – works exactly like Tier II; except the 10-year recharge threshold is 472,000 AF. Also, Tier III will only be needed during the deepest part of a repeat of the drought of record (DOR). And therefore will be more likely forborne rather than injected into the ASR.

Issues

1. Only unrestricted water rights are eligible for enrollment into ASR; agriculture permits tied to the land could be used for forbearance in ASR if appropriate modifications were made.
2. Triggers for Tier II and Tier III (10-year rolling average recharge) are unfamiliar to permit holders; the program will be more successful if it uses a familiar and comfortable trigger (i.e. J-17).
3. The current Tiered system is not fiscally efficient; lease rates, rather than forbearance rates, are paid for water that will, in some cases, more than likely, never be injected.
4. The ASR is almost full; therefore, maintaining an account of 50,000 AF of unrestricted water rights, eligible for injection, is unnecessary and fiscally inefficient.
5. The current ASR program anticipates continued filling/injecting during the early years of the DOR, which is likely to create conflict perception issues in the region (i.e. SAWS pumping from the aquifer at the request of the EAA while other permit holders are required to cut back withdrawals), and filling/injecting during this time runs counter to the overall objective of sustaining aquifer levels to ensure continuous minimum spring flows. The same or, more likely, greater benefit could be achieved if the full amount required for storage was injected prior to the drought such that no injection had to occur after the onset of the DOR.
6. The current ASR program was constructed utilizing academic assumptions, we now have real world data and experiences to inform the modification of the ASR program.
7. Current standby and forbearance payments used for financial projections in the HCP are not in line with the current market or the VISPO program.
8. Modeling conducted by HDR indicates that, once ASR is full (80,000 AF), utilizing a VISPO-like forbearance option achieves nearly the same spring flow results as the Tier II and III leases described in the HCP.
9. Current ASR Tier triggers result in a delay and lag time between when the benefit is needed and when deeper more conservative Tiers actually come on line.

Conceptual Path Forward:

- Continue an aggressive leasing program in 2017 and 2018, built on the successes of 2015 and 2016, to accumulate a comfortable ASR storage volume of at least 95,000 AF (identified in the ASR Interlocal Contract), preferably the total amount of water necessary to recover for a DOR sequence.
- Consolidate the current three-tiered leasing approach into a simplified two-pronged program: 1) leases for filling the ASR prior to the DOR and for forbearance during the DOR (currently Tier I) and 2) lease option agreements for forbearance during the DOR (similar to VISPO, current Tier 2 and Tier 3).
- Use the updated Edwards Aquifer groundwater model to determine the mix or ratio of lease versus forbearance contracts, and a more recognizable trigger such as J-17 and/ or Comal Springs spring flow that will provide the same benefit as the current ASR program.
- Initially, utilize the ASR Staff Workgroup and ASR Regional Advisory Group to vet technical ideas and concepts.
- If the initial technical analysis results in programmatic modifications of significance or it is necessary for informational/buy-in purposes, utilize the Adaptive Management Process (AMP) to formalize modifications and inform.

Timeline for AMP Information Development and Timeline:

January February 2017

1. Review the National Academies of Science Report #2 to utilize any input from the Academies.
2. Have initial conversations with SAWS.
3. Convene the ASR Regional Advisory Group to inform them of the process and potential AMP.

Jan 2017 – June 2017

Develop technical information and scenarios for consideration. This would be accomplished through a collaborative effort between EAA and SAWS.

June 2017 – August 2017

1. Evaluation by HCP staff if scope or magnitude of proposed change requires:
   a. Adaptive Management (would follow Submerged Aquatic Vegetation template)
   b. Requires outside review or further development (3rd party technical review)
   c. In the event it does not trigger adaptive management, establish a process for communicating proposed changes to all Committees, prior to final decisions
2. Present technical information and proposed modifications to the ASR Regional Advisory Group for input and potential modifications. Ultimately the group would be asked to endorse or recommend to the EAHCP Committees during the AMP process.

August 2017 – December 2017

Adaptive Management Process / Communication

2018

Implementation - Clarification/Amendment; Leasing/Forbearance
Contract Amendment w/ SAWS

Exhibit B

Year	ASR Lease Trigger Scenarios					
	Original HDR Assumptions	J-17 < 635 ft on Aug. 1 prior year	J-17 < 636 ft on Aug. 1 prior year	J-17 < 637 ft on Aug. 1 prior year	J-17 < 641 ft on Aug. 1 prior year	10-yr Avg Rechg < 500k Acre-feet two years prior
1947	ASR2	VC	VC	VC	VC	VC
1948	ASR2	VC	VC	VC	ASR3	ASR3
1949	ASR3	ASR3	ASR3	ASR3	ASR3	ASR3
1950	ASR2	VC	ASR3	ASR3	ASR3	ASR3
1951	ASR3	ASR3	ASR3	ASR3	ASR3	ASR3
1952	ASR3	ASR3	ASR3	ASR3	ASR3	ASR3
1953	ASR3	ASR3	ASR3	ASR3	ASR3	ASR3
1954	ASR3	ASR3	ASR3	ASR3	ASR3	ASR3
1955	ASR3	ASR3	ASR3	ASR3	ASR3	ASR3
1956	ASR3	ASR3	ASR3	ASR3	ASR3	ASR3
1957	ASR3	ASR3	ASR3	ASR3	ASR3	ASR3
1958	ASR3	VC	VC	ASR3	ASR3	ASR3
Comal Min. Flow 8/31/1956	29.71	28.64 cfs	29.32 cfs	29.32 cfs	29.8 cfs	29.8 cfs
San Marcos Min. Flow 8/31/1956	48.11	47.84 cfs	47.95 cfs	47.95 cfs	48.03 cfs	48.03 cfs

VC = VISPO and Conservation implemented in addition to critical period reductions
ASR2 = ASR tiers 1 and 2 triggered in addition to VC and critical period reductions
ASR3 = ASR Tiers 1-3 triggered in addition to VC and critical period reductions

5.5.1 Use of the SAWS ASR for Springflow Protection

…

EAA will acquire through both lease and ~~option~~ forbearance agreements 50,000 ac-ft/yr of EAA-issued Final Initial Regular Permits. The EAA may use SAWS as its agent for this purpose. The leases and forbearance agreements~~options~~ will be acquired by EAA to fill, idle, and maintain a portion of the capacity of the SAWS ASR Project for subsequent use, to protect springflows during identified drought-of-record conditions as described below.

The lease/forbearance agreement program is comprised of ~~three~~ two components. The first ~~one-third~~, a sliding scale approximating 10,000 to 16,667 acre-feet of permits, will be leased for immediate storage in the ASR. The remaining pumping rights will be placed under forbearance agreements~~a lease option~~. ~~One-third~~ (The second, a sliding scale approximating 33,333 to 40,000~~16,667~~ ac/ft~~)~~ of the total, will be ~~options~~forbearance agreements exercised in the year after the 10-year moving annual average of Edwards recharge falls below ~~572,000~~500,000 ac-ft/yr, as determined by the EAA (*see* Section 6.2.3)~~, and is likely to continue to decrease~~. ~~The last one-third will be options exercised when the 10-year moving recharge average is less than 472,000 ac-ft/yr, as determined by the EAA (see Section 6.2.3).~~ When the leases are in place, this water will either be pumped to fill the SAWS ASR or not pumped for any reason. When the forbearance agreements are in place, this water will not be pumped for any reason when the identified drought conditions are triggered. When the ASR is in recovery mode (*i.e.*, when water is being returned from the ASR), the leased water will not be pumped. The water to fill the SAWS ASR is generally provided by SAWS from ~~their~~ its existing Edwards supplies and the ~~first one-third of the~~ regional leases water (10,000 to 16,667 ac-ft) which will be maintained at all times throughout the HCP duration. SAWS will store its own unused Edwards permits in addition to the HCP leases ~~and lease options~~ in the ASR when possible. SAWS, with the assistance of the Regional

Advisory Group, will describe in the Annual Report the storage and recovery activities.

Trigger levels for implementation of ASR management in accordance with the HCP will be 630 ft-MSL at the J-17 index well during an identified repeat of drought conditions similar to the drought of record as indicated by the ten-year rolling average of Edwards recharge of 500,000 ac-ft, as determined by the EAA. When triggered, the ASR or other supplies capable of utilizing shared infrastructure will be activated to deliver up to 60 million gallons per day to SAWS' distribution system during a repeat of drought of record-like conditions. When the monthly average groundwater levels at J-17 are below 630 ft-MSL and the ten-year rolling average of Aquifer recharge is 500,000 ac-ft or less, pumping of selected wells on the northeast side of SAWS' water distribution system will be reduced in an amount that on a monthly basis equals the amount of water returned from the ASR only to the extent of the Aquifer water provided by the EAA for storage in the ASR. SAWS will use up to 100 percent of the conveyance capacity of existing SAWS ASR facilities to off-set SAWS' Edwards Aquifer demand.

…