

PEACE RIVER MANASOTA REGIONAL WATER SUPPLY AUTHORITY

Hon. Priscilla Trace
Manatee County

Hon. Ken Doherty
Charlotte County

Hon. Elton A. Langford
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Hon. Alan Maio
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Patrick J. Lehman, P.E., Executive Director

July 30, 2020

Mr. Joe Habersfeld, P.G.
Aquifer Protection Program
Florida Department of Environmental Protection
2600 Blair Stone Road
Mail Station 3530
Tallahassee, Florida 32399-2400

RE: PA File # 136595-014-UO/5Q
ASR Operation Permit Renewal/Modification – Supplemental Information

Dear Mr. Habersfeld:

Pursuant to our conference call of July 14, 2020 regarding the above referenced permit application, this correspondence is intended to provide a proposed plan on the use of partially treated water (PTW) including disinfection treatment as a source water at the Peace River Facility's (PRF) ASR Wellfield No. 2 (WF2). With the information provided, the Peace River Manasota Regional Water Supply Authority (Authority) requests PTW to be included as a source water (for use at WF2) operation permit renewal application for this facility that is currently under review at the Florida Department of Environmental Protection (FDEP) aquifer protection program.

Background

The Authority operates a potable water ASR system at the Peace River Facility (PRF) consisting of 9 ASR wells at Wellfield No. 1 (WF1) located near the water treatment plant, and 12 ASR wells in Wellfield No. 2 (WF2) located near Reservoir No. 1 (**Figure 1**). In addition to the 21 ASR wells, there are 24 monitor wells associated with the ASR system. **Figure 2 and Figure 3** show the location of the wells in WF1 and WF2, respectively. The ASR system is under a single FDEP Class V Group 7 permit (136595-014-UO/5Q) issued April 24, 2013. In addition to the operation permit, a Water Quality Criteria Exemption was granted for arsenic.

A pilot test using PTW was conducted under the authority of FDEP via a major modification to the permit (136595-016-017-UO/M5A) issued December 14, 2016. Two cycle tests using PTW at ASR wells S-4 and S-20 were conducted in 2017. Based on the success of the testing, PTW was proposed as an additional source water for WF2 in the renewal permit application for the ASR system submitted to the FDEP February 19, 2018. The FDEP issued a Request for Additional Information (RAI) and a response was submitted to FDEP October 11, 2018. Subsequent

communication from the FDEP indicated that PTW would not be supported since the groundwater discharge standard for total coliform would not be met in the source water.

The Authority is requesting to include PTW in the permit under the condition that the water is disinfected so that the total coliform standard is met. The disinfection treatment will be done in a manner that will not result in disinfection by-product (DBP) formation exceeding the primary drinking water standard (DWS) maximum contaminant level (MCL). During the July 14, 2020 conference call, the FDEP requested that the Authority submit the following for review:

- A proposed plan for the implementation of disinfection treatment of the PTW source water.
- A review of the secondary DWS of the source water that may require a zone of discharge or water quality criteria exemption
- A proposed monitoring plan.

The requested information is contained in the remainder of this submittal provided below.

Proposed Plan for Implementing PTW

Additional infrastructure is required to implement PTW at WF2, including a new pump station, additional piping, and filtration. In addition to these infrastructure modifications, the Authority proposes disinfection treatment of the PTW. At this time, chloramine disinfection is proposed as the disinfection method, however other methods may be considered during preliminary design. Regardless of the treatment method, the intent will be to meet the total coliform groundwater discharge standard while also not exceeding any other primary DWS such as DBPs in the PTW. Chloramine is formed from the combination of chlorine and ammonia. Chloramine has been used successfully as a disinfection method and has the advantage over hypochlorite in that it reduces the formation potential of DBP such as Total Trihalomethanes (TTHM) and Total Haloacetic Acids (HAA5s), both primary DWS. Since PTW will be relatively high in organic carbon, the use of chloramine is expected to be necessary to keep the TTHM and HAA5 concentration below their respective MCL. The PRF water treatment plant currently uses chlorine and ammonia forming chloramines for disinfection of the potable water.

The chloramine concentration and total contact time required for an effective disinfection of the PTW will be determined through a study which is anticipated to be completed before the end of 2020. The results of the testing will provide design criteria to be used during the design phase for the related infrastructure. The design phase of the project will begin following issuance of the permit by the FDEP. The design of the PTW related infrastructure will be sent to the FDEP aquifer protection program for comment at the preliminary design phase and 90% design phase, or as requested by the FDEP. It is anticipated that the necessary infrastructure could be in place in approximately three years from issuance of the permit. Prior to using PTW as a source water for ASR, a request to begin operational testing will be sent to the FDEP following completion of the necessary infrastructure. The request will include an updated or amended operation and maintenance manual and record drawings for the newly constructed components of the ASR system.

Secondary Drinking Water Standards

During permitting of the PTW pilot test, total coliform, aluminum, color, and odor were the only parameters above their DWS MCL. A review of historical data has shown that on occasion iron concentrations have been over the DWS MCL, however infrequently. Aluminum, color, iron, and odor are secondary drinking water standards and are not regulated by Environmental Protection Agency (EPA). PTW will be disinfected to meet the total coliform groundwater standard of less than 4 colony forming units per 100 milliliters (CFU/100mL). The Authority requests that a zone of discharge (ZOD) be included in the permit that extends to the property boundary for aluminum, iron, color, and odor. A review of the available data from the reservoir confirmed that these are the only secondary DWS requiring a ZOD, and that there are no primary DWS of concern other than total coliform.

Aluminum concentrations from samples collected between 2015 and June 2020 from Reservoir No. 1 averaged 384 mg/L. Aluminum in the reservoir is derived partly from alum used in the treatment process at the PRF and the conservation practice of recycling water treatment plant backwash water to the reservoir system. Color averaged 65 platinum cobalt units (PCU) in Reservoir No. 1 between 2015 and June 2020, which is typical for a surface water source. Iron concentration in Reservoir No. 1 between 2015 and June 2020 averaged 115 mg/L with the maximum at 243 mg/L, however earlier data has shown infrequent exceedances of iron. Odor is not collected frequently at the reservoir; however, a single sample was recorded at 4 threshold odor number (TON) prior to PTW pilot testing. Native groundwater odor is likely significantly higher than 4 TON, however background levels for odor are not well established at the site. With the variability and subjectivity of odor laboratory results, the Authority requests that a ZOD be included for odor.

The Authority currently has a WQCE for arsenic mobilization and it has been indicated by the FDEP that a ZOD for arsenic is preferred over a WQCE. The Authority requests that the permit include a ZOD for arsenic, aluminum, iron, color, and odor that encompasses the Suwannee Limestone on property owned or otherwise controlled by the Authority. In this area, the requested ZOD depth interval would extend from 500 – 1,000 feet below land surface (bls).

Proposed Monitoring Plan

The Authority has an extensive monitoring well network associated with the ASR system. Many of the monitor wells were added in 2005 with partial funding from the Southwest Florida Water Management District (SWFWMD) to demonstrate the limited nature of the arsenic mobilization associated with ASR in an effort to advance ASR technology so it could be implemented throughout the water management district. As such, many of these wells are redundant and are no longer needed to effectively monitor the ASR system for compliance. FDEP has also indicated that purge water from the monitor wells can no longer be discharged to ground surface, which will require significant cost to add the infrastructure to convey water from all of the monitor wells to an approved location. The Authority is therefore requesting to remove and /or plug and abandon some of the monitor wells. Below is a list of the wells proposed for plugging and abandonment or removal from the permit and the justification for each. The locations of the wells are shown on **Figures 1 through 3**. The well construction details for the ASR wells and monitor wells in WF1

and WF2 are shown in **Table 1 and Table 2**, respectively. Water quality trends of the monitor wells are available in the ASR annual reports provided to the FDEP.

Monitor Well I-10: Plug and Abandon

Well I-10 is 312 feet deep, completed in the Intermediate aquifer, and is located about 1 mile west of ASR WF2. The well was originally utilized as part of the SWFWMD ASR Wetland Project to provide data on the potential effects of ASR operations on wetlands in proximity to ASR WF2. In March 2007, SWFWMD agreed that the operation of the ASR system did not impact the condition of wetlands and approved the discontinuation of the ASR Wetland Project. In the 2010 FDEP ASR Permit, Well I-10 was added to the routine ASR monitoring system. Data collected from I-10 has shown no water quality influence from ASR wellfield operations. We propose to plug and abandoned I-10.

Monitor Wells E and M-22: Plug and Abandon.

These wells are located on the PRF site near ASR wells T-1, S-1, and S-2. Well E is 200 feet deep and is completed in the upper portion of the Intermediate aquifer. Well M-22 is 572 feet deep and is completed in the Suwanee Limestone ASR storage zone in the Upper Floridan aquifer. Monitor well M-22 was installed in 2005 as part of the enhanced monitoring program that was partially funded by SWFWMD to study the arsenic mobilization associated with ASR wells. The wells were originally intended to monitor the impacts of the original ASR production wells; S-1, S-2 and T-1 that were completed in 1984. As the oldest and lowest capacity ASR production wells on site, these wells are not considered to be rehabilitation candidates and the Authority anticipates plugging and abandoning the production wells in the next 7 years, followed by expansion of the treatment facilities into this portion of the plant site. These two monitoring wells (E & M-22) are not located near a property boundary and have provided sufficient data for us to understand the system response to ASR operations in this immediate area. We propose to plug and abandon these wells.

Monitor Wells M-6, M-12, M-13 and M-16: Cease Water Quality Monitoring. Continue Water Level Monitoring.

Monitor well M-6 is located about 1.6 miles south of ASR wellfield 2 (see Figure 1). The well is 640 feet deep and is completed in the Suwannee Limestone. M-6 was originally added to the ASR System to provide regional background data for use during the operations of the ASR System. Because the water quality data from the well has not shown any influence from ASR operations, we propose to retain water level monitoring in the well but remove the water quality monitoring requirement from the ASR permit.

Monitor wells M-12, M-13, and M-16 are part of the additional ASR monitor wells added to the WF2 ASR monitoring system by the SWFWMD and Authority in 2005. These monitor wells were added to the system to support additional information about ASR impacts to the aquifer. These monitor wells are in very close proximity to other wells monitoring the same zone and parameters, with very similar results. We propose to retain water level monitoring at the wells but remove the water quality monitoring requirement from the ASR permit.

Monitor Well M-15: Cease use as a Compliance Well.

Monitor well M-15 is located about 900 feet west of ASR Production well S-14 in WF2. The well is 668 feet deep and is completed in the Suwannee Limestone. M-15 was one of the additional ASR monitor wells added to the WF2 ASR monitoring system by the SWFWMD and the Authority in 2005. This well, despite its location toward the interior of the Authority controlled 6,000-acre RV Griffin Reserve property is listed in the WQCE associated with the current ASR Operation Permit as an arsenic compliance well. The wells proximity to WF2 ASR production wells and significant distance from the property boundary do not support continued use of M-15 as an arsenic compliance well and we propose that the compliance well designation be removed with respect to the ZOD conditions that are anticipated to be added to the permit in replacement of the WQCE. Water quality and water level monitoring is proposed to continue.

The proposed sampling plan is shown in **Table 3**. The monitoring plan includes parameters important in the monitoring of PTW. Parameters specific to the use of PTW are noted in the table and sampling of these parameters would begin if/when the use of PTW is implemented by the Authority and authorized by FDEP. The table also reflects the removal of monitoring wells as previously discussed. The parameter list is the same as that submitted in the RAI response regarding the current permit application, with the addition of monitoring for TTHM and HAA5s once PTW is in use since the water will be disinfected and has the potential for DBP formation. Odor and iron were also added to the list as these are secondary DWS parameters for which a ZOD is being requested.

The FDEP has voiced concerns over purging the ASR monitor wells to ground surface. The Authority proposes the following measures to mitigate these concerns.

- **Wellfield 2 Monitor Wells**

The Authority proposes to route all purge water for the wells listed below to Reservoir 1 thereby eliminating discharge of purge water onto the ground. PVC pipe will be connected to the following WF2 monitor wells enabling sample collection while purging to Reservoir 1:

M-8, M-11, M-14, M-15, M-17, M-18, M-19, T-8, T-11, I-8

A purge volume analysis was submitted to the FDEP Fort Myers office which indicates that purging two well volumes appears to provide stabilized quality for monitor wells completed in the Suwannee, Tampa and Intermediate aquifers. The Authority proposes to utilize this consistent two well volume purge for all sample collection. This will also make sampling of the wells more manageable and predictable for sampling logistics purposes.

- **Wellfield 1 Monitor Wells.**

The Authority proposes to route purge water from WF1 monitor wells listed below to raw water pipelines going to Reservoir 1 or Reservoir 2 thereby eliminating discharge of purge water to the ground.

M-2 M-7, M-20, M-21, T-2, T-7, I-7

As with the WF2 monitor wells, the Authority proposes to utilize a consistent two well volume purge for all sample collection from the WF1 monitor wells.

Summary

The Authority is requesting to add PTW as a source water for WF2 to the PRF ASR system Class V operation permit that is currently under review, with a condition that the water will be disinfected to meet the total coliform groundwater discharge standard of less than 4 CFU/100 mL. No other primary DWS are expected to be an issue in the PTW source. Secondary DWS aluminum, iron, color and odor are anticipated to possibly be over their respective DWS MCL. As these are aesthetic based parameters not regulated by EPA, the Authority request a ZOD to be included in the permit for these parameters. It is anticipated that implementation of a PTW system at the PRF will take approximately 3 years. The proposed sampling plan provided includes provisions for additional sampling once the PTW system is online and authorized for use by the FDEP.

Please feel free to contact me at 941-316-1776 if you have any questions regarding this request.

Sincerely,



Mike Coates, P.G.
Deputy Director

enclosures: Figure and Tables

cc: Pete Larkin / Mark McNeal, ASRus

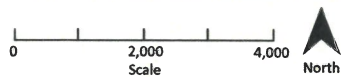
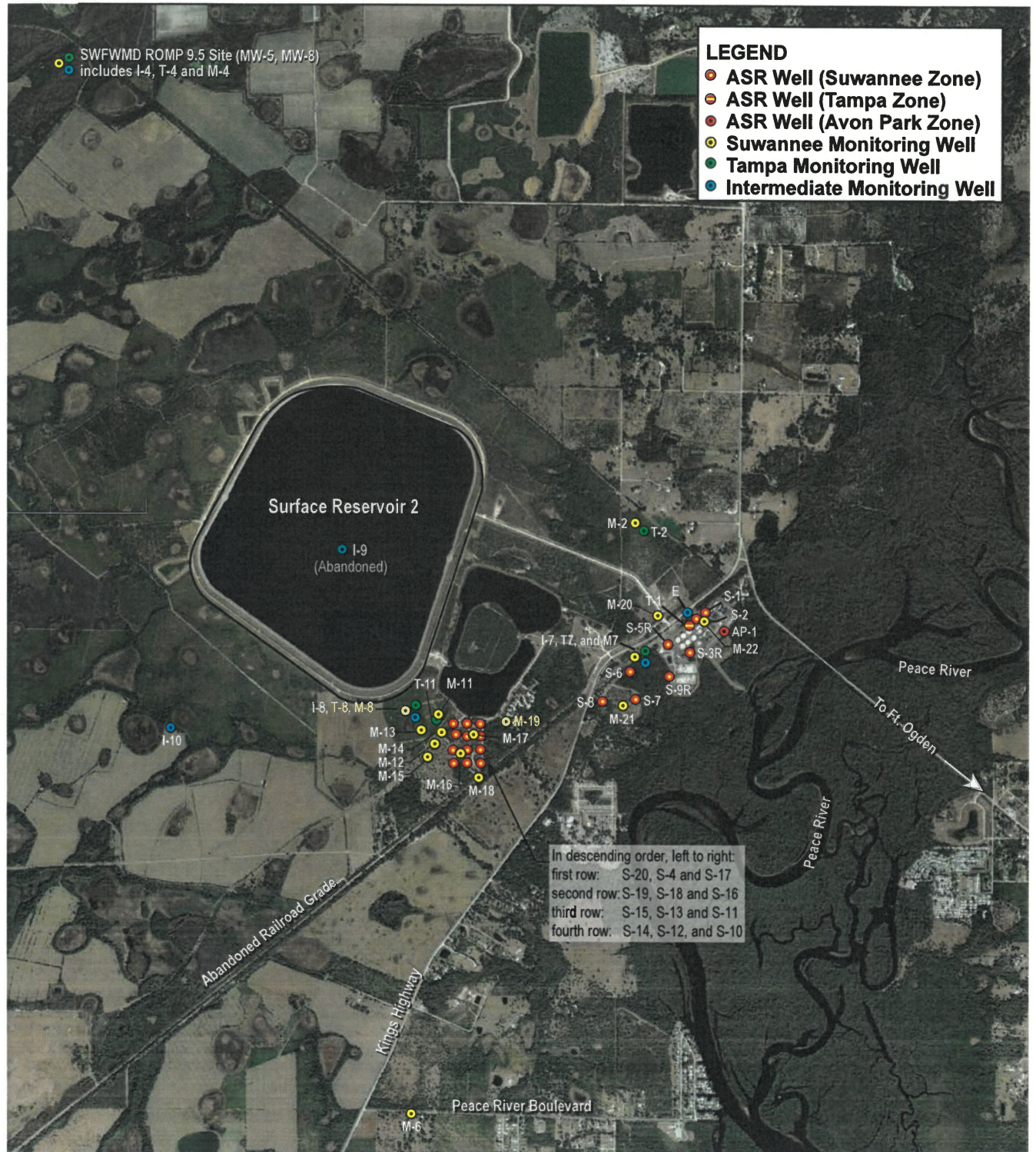


FIGURE 1
Peace River Facility ASR Site Plan





LEGEND

- ASR Well (Suwannee Zone)
- ASR Well (Tampa Zone)
- ASR Well (Avon Park Zone)
- ◆ Suwannee Monitoring Well
- ◆ Tampa Monitoring Well
- Intermediate Monitoring Well



FIGURE 2
WF1 Site Plan

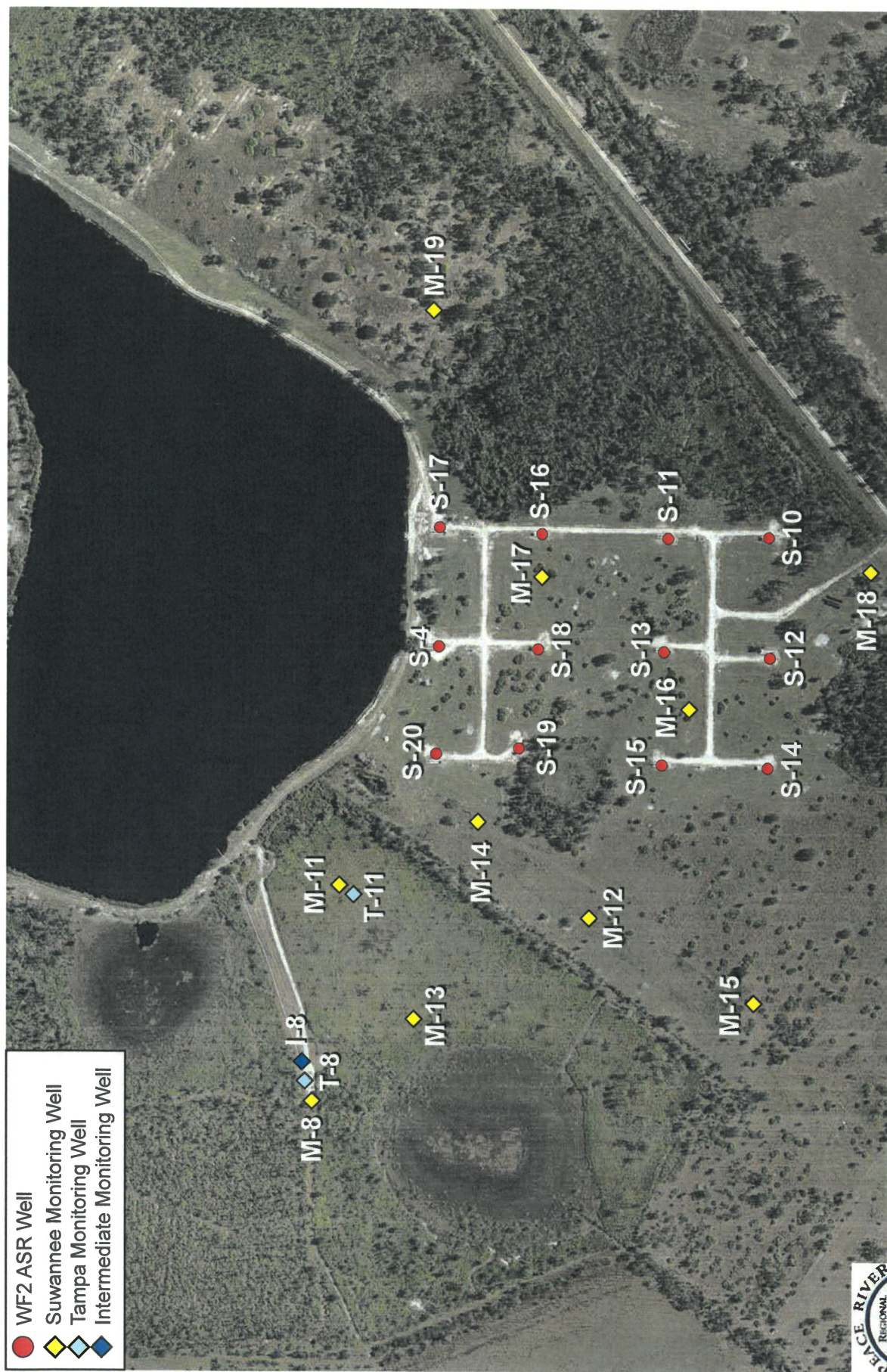


FIGURE 3
WF2 Site Plan

Table 1

WF1 ASR Wells and Monitoring Well Construction Details

Well	Casing Diameter (inches)	Casing Depth (feet bls)	Total Depth (feet bls)	Latitude	Longitude	Hydrogeologic Interval
T-1	12	380	482	27 5' 29.04"	82 0' 9.78"	LPZ
S-1	8	570	920	27 5' 27.96"	82 0' 17.28"	Suwannee Zone
S-2	12	570	900	27 5' 29.46"	82 0' 9.24"	Suwannee Zone
S-6	12	580	910	27 5' 17.52"	82 0' 26.34"	Suwannee Zone
S-7	12	575	915	27 5' 11.76"	82 0' 25.2"	Suwannee Zone
S-8	12	510	623	27 5' 22.2"	82 0' 33.3"	Suwannee Zone
S-3R	16	580	769	27 5' 22.2"	82 0' 9.3"	Suwannee Zone
S-5R	16	650	808	27 5' 24.06"	82 0' 16.56"	Suwannee Zone
S-9R	16	580	906	27 5' 16.14"	82 0' 16.26"	Suwannee Zone
E	6	140	200	27 05' 28"	82 00' 06"	UPZ
T-2	4	393	490	27 06' 24"	82 00' 30"	LPZ
M-2	6	596	900	27 06' 24"	82 00' 30"	Suwannee Zone
M-6	6	579	640	27 03' 39.6114"	82 01' 19.6979"	Suwannee Zone
I-7	6	220	261	27 05' 21.2475"	82 00' 25.7496"	LPZ
T-7	6	349	400	27 05' 21.1874"	82 00' 25.8985"	LPZ
M-7	6	580	605	27 05' 21.1291"	82 00' 26.0461"	Suwannee Zone
M20	6	584	688	27 5.472'	82 0.304'	Suwannee Zone
M21	6	575	672	27 5.186'	82 0.457'	Suwannee Zone
M22	6	565	572	27 5.490'	82 0.151'	Suwannee Zone

LPZ = lower producing zone of the Intermediate Aquifer System UPZ = upper producing zone of the Intermediate Aquifer System
 Suwannee Zone = refers to the Upper Floridan aquifer permeable unit within the Suwannee Limestone formation
Wells proposed to Plug and Abandon
 Wells proposed to cease water quality monitoring. Water level monitoring will continue.
 Proposed ZOD Compliance Wells

Table 2

WF2 ASR Wells and Monitoring Wells Construction Details

Well	Casing Diameter (inches)	Casing Depth (feet bls)	Total Depth (feet bls)	Latitude	Longitude	Hydrogeologic Interval
S-4	12	570	905	27 05' 06.1042"	82 01' 06.4977"	Suwannee Zone
S-10	16	620	906	27 04' 57.1407"	82 01' 03.3015"	Suwannee Zone
S-11	16	585	900	27 05' 00.1137"	82 01' 03.2584"	Suwannee Zone
S-12	16	600	900	27 04' 57.1524"	82 01' 06.6125"	Suwannee Zone
S-13	16	621	898	27 05' 00.1531"	82 01' 06.5644"	Suwannee Zone
S-14	16	588	900	27 04' 57.2286"	82 01' 09.9465"	Suwannee Zone
S-15	16	583	900	27 05' 00.2032"	82 01' 09.8760"	Suwannee Zone
S-16	16	583	902	27 05' 03.0748"	82 01' 03.2110"	Suwannee Zone
S-17	16	579	883	27 05' 06.0299"	82 01' 03.1812"	Suwannee Zone
S-18	16	592	900	27 05' 03.1111"	82 01' 06.5295"	Suwannee Zone
S-19	16	585	900	27 05' 05.7252"	82 01' 03.2877"	Suwannee Zone
S-20	16	586	898	27 05' 03.2466"	82 01' 02.7664"	Suwannee Zone
T11	6	350	400	27 5.117'	82 1.225'	LPZ
M11	6	570	677	27 5.125'	82 1.222'	Suwannee Zone
M12	6	585	705	27 5.037'	82 1.230'	Suwannee Zone
M13	6	550	670	27 5.108'	82 1.284'	Suwannee Zone
M14	6	575	676	27 5.077'	82 1.187'	Suwannee Zone
M15	6	570	678	27 4.976'	82 1.270'	Suwannee Zone
M16	6	560	673	27 4.988'	82 1.138'	Suwannee Zone
M17	6	565	670	27 5.051'	82 1.074'	Suwannee Zone
M18	6	575	700	27 4.914'	82 1.071'	Suwannee Zone
M19	6	580	680	27 5.100'	82 0.958'	Suwannee Zone
I-8	6	155	190	27 05' 09.3137"	82 01' 19.0732"	UPZ
T-8	12	354	401	27 05' 09.4042"	82 01' 18.5632"	LPZ
M-8	10	570	860	27 05' 09.1883"	82 01' 19.6788"	Suwannee Zone
I-10	6	260	312	27 05' 04.0074"	82 02' 19.8766"	LPZ

LPZ = lower producing zone of the Intermediate Aquifer System

UPZ = upper producing zone of the Intermediate Aquifer System

Suwannee Zone = refers to the Upper Floridan aquifer permeable unit within the Suwannee Limestone formation

Wells proposed to Plug and Abandon**Wells proposed to cease water quality monitoring. Water level monitoring will continue.****Proposed ZOD Compliance Wells**

Table 3

Proposed Monitoring Plan for the Peace River ASR System

Parameter	Units	Recording Frequency	Frequency of Analysis				
			ASR	M-2, M-18, M-19, M-21, T-2, T-7, T-11	M-7, M-8, M-14, M-15, M-17, M-20	I-7, I-8, T-8, M-11	M-6, M-12, M-13, M-16
Flow Rate, Max.	gpm	continuous	a				
Flow Rate, Min.	gpm	continuous	a				
Flow Rate, Avg.	gpm	continuous	a				
Total Volume Recharged	mg	daily	b				
Total Volume Recovered	mg	daily	b				
Injection Pressure, Max.	psi	continuous	a				
Injection Pressure, Min.	psi	continuous	a				
Injection Pressure, Avg.	psi	continuous	a				
Water Level Max.	feet (NGVD)	continuous		c	c	c	c
Water Level Min.	feet (NGVD)	continuous		c	c	c	c
Water Level Avg.	feet (NGVD)	continuous		c	c	c	c
pH ^d	std. units	grab	W ^e	W	M	Q	-
Specific Conductance ^d	u mhos/cm	grab	W ^e	W	M	Q	-
Temperature ^d	°C	grab	W ^e	W	M	Q	-
Dissolved Oxygen ^d	mg/L	grab	W ^e	W	M	Q	-
Turbidity ^d		grab	W ^e	W	M	Q	-
Oxidation Reduction Potential ^d	mV	grab	W ^e	W	M	Q	-
Total Dissolved Solids	mg/L	grab	W ^e	W	M	Q	-
Chloride	mg/L	grab	W ^e	W	M	Q	-
Sulfate	mg/L	grab	W ^e	W	M	Q	-
Arsenic	mg/L	grab	W ^e	W	M	Q	-
Sulfide	mg/L	grab	W ^e	W	M	Q	-
Phosphorous	mg/L	grab	W ^e	W	M	Q	-
Total Suspended Solids ⁱ	mg/L	grab	W ^e	W	M	Q	-
Nitrate (N) ⁱ	mg/L	grab	W ^e	W	M	Q	-
TKN ⁱ	mg/L	grab	W ^e	W	M	Q	-
Ammonia ⁱ	mg/L	grab	W ^e	W	M	Q	-
TOC ⁱ	mg/L	grab	W ^e	W	M	Q	-
Color ⁱ	PCU	grab	W ^e	W	M	Q	-
Aluminum ⁱ	mg/L	grab	W ^e	W	M	Q	-
Iron ⁱ	mg/L	grab	W ^e	W	M	Q	-
Total Coliform ⁱ	CFU/100 mL	grab	W ^e	W	M	Q	-
Escherichia coli ⁱ	CFU/100 mL	grab	W ^e	W	M	Q	-
Total Trihalomethanes ⁱ	ug/L	grab	W/M ^j	M	Q	-	-
Haloacetic Acids ⁱ	ug/L	grab	W/M ^j	M	Q	-	-
Odor ⁱ	TON	grab	M	M	Q	-	-
Gross Alpha	pCi/L	grab	Q	Q	Q	-	-
Total Uranium	ug/L	grab	Q ^f	Q ^f	Q ^f	-	-
Total Trihalomethanes	ug/L	grab	A ^g	A	A	-	-
Primary and Secondary Standards		grab	A ^h	-	-	-	-

W - weekly; M - monthly; Q - quarterly; A - annually

No sampling of ASR wells during storage. During extended storage periods greater than 30 days the monitoring well water quality parameters may be sampled and analyzed monthly.

a - Operational data reporting flows, pressures and water levels; daily max, min, and average from continuous reporting; monthly max, min and average (calculated from average)

b - ASR Production Wells Operational data reporting for volume recharge/recovered: daily totalizer from continuous flow meter reading; monthly max, min and average are calculated from daily values

c - Monitoring Wells Operational data reporting for water levels: daily max, min and average from continuous readings; monthly max, min average are calculated from averages

d - Field samples

e - Weekly during recovery from operating wells; monthly from common distribution line (potable or partially treated water) during recharge

f - During Recovery only

g - analyzed only if Gross Alpha exceeds 15 pCi/L

h - July or August - recharge water (potable and/or partially treated water)

i - Analysis of these parameters to begin once recharge with partially treated water begins. Parameters apply only to ASR wellfield in which partially treated water is used. With regard to the monitor wells, analysis will begin at the monitor wells associated with their respective wellfield (WF1 or WF2) once recharge of PTW begins at that wellfield. WF1 monitor wells: M-2, M-21, T-2, T-7, M-7, M-20, I-7

WF2 monitor wells: M-18, M-19, T-11, M-8, M-14, M-15, M-17, I-8, T-8, M-11

j - to be collected for partially treated water only - weekly during recharge and monthly during recovery