Comments on SAWS 2017 Draft Water Management Plan
Dr. Meredith McGuire, Co-Chair, Conservation Committee, Alamo Sierra Club
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These comments are addressed, not only to SAWS Water Planning professionals and Administration, but also to the Mayor and City Council. It is extremely important to reframe SAWS' Water Management Plan (WMP) and to improve future WMP reports (including semi-annual and annual reports) so that they include much more data and specify assumptions made, as well as risks recognized. Those improvements will enable both SAWS' Board and City Council to make better-informed decisions and policies.

Overall, this draft WMP is a big improvement over the 2012 WMP, which was (as Calvin Finch's Water Policy Study noted) less focused on conservation than the 2009 WMP. It also addresses several issues that were conspicuously missing in the 2012 WMP: climate change and its water-related challenges, need for an improved drought model, need for a disaggregated demand model, and the connection between SAWS' water management planning and San Antonio's Sustainability Plan.

There are still serious flaws in the 2017 Draft WMP. The most egregious flaw is SAWS' claim to be embracing the "One Water" approach. What SAWS is doing and proposing (e.g., pp. 7-9) appear to be deliberately misconstrued as "One Water," when they actually are trying to justify monopolizing regional water sales outside of our "One Water" community. Promoting San Antonio as "Waterful" and WaterCitySA" is, likewise completely inappropriate in a truly sustainable plan. As my Sierra Club colleagues and I urged SAWS water planning personnel when we spoke with them in July, it is essential that SAWS adopt a true and thorough "One Water" approach in order to accomplish the kind of integrated water management that would prepare San Antonio for withstanding the longer, more intense droughts and more serious periodic flooding that climate change is likely to cause.

San Antonio needs to embrace the new paradigm for water management that has emerged worldwide. As you (all) consider a Water Management Plan for San Antonio for the next 5 years, keep in mind that – by employing that new paradigm (variously referred to as "Water-sensitive Urban Design," "Integrated Water Management," "Planning for Water-Neutral Growth," and "One Water," discussed further, below) for all new development and for retrofitting the old, in the second half of this century, <u>San Antonio could be using much less water, even with greatly increased population, than it uses today.</u> Consider, too, that there already exist technological innovations in building design (already proven effective in many cities) that decentralize water-related functions, such that the water and energy captured on-site are used and recycled internally, making the building essentially self-sustaining for energy and water.

In the future, SAWS' role in managing our water will inevitably have to change in order to accomplish the integrated planning and emphasis on careful use (and reuse) of local, renewable water that the new paradigm requires. Only when SAWS meets all the criteria of the new paradigm can it claim to be "World Class."

The comments below are meant to help us get SAWS and San Antonio back on track for sustainable water.

Demand Projections and Growth Projections

SAWS' 2012 WMP was seriously flawed in its demand projections, and – while the 2017 draft is much improved – projected water demand is still greatly over-estimated. For all water demand projections: Supply more data, better disaggregated data, more comparative data, and specifying definitions, variable factors, and embedded assumptions. A well-explained appendix of actual, disaggregated data about supply and demand should accompany all annual reports, all proposals for rate increases, and other important changes in SAWS' objectives. Such data should be made readily accessible online to the public.

According to *A Community Guide for Evaluating Future Urban Water Demand*,[i] the 'level of effort in a forecast should be commensurate with the decisions that will be based on it. More detailed methods are called for when potentially large investments are to be based on forecasting results." Were the decisions to build the brackish desalination plant and the Vista Ridge pipeline based on such vague and incorrect demand projections? Has SAWS presented more precise and validated water demand models to justify those extremely expensive water supplies to the SAWS Board or City Council? If so, where are the data to support them?

Considering the huge financial risks of a take-or-pay contract for delivery of so much water, whether we need it or not, SAWS should have done multiple, thoroughly vetted and analyzed projections, including careful consideration of assumptions underlying both demand and population projections. This is a very real likelihood that future demand (as gpcd) will drop further and faster than SAWS estimated in 2014. Did no one (other than the environmentalist community) question SAWS' assumptions and projections? Who is going to pay for all that water that we do not need and should not use?

There is an equally real likelihood that SAWS' rate-structure (already very unfair to lower-income residential users) will produce greater inequity in San Antonio, as rate increases will be added to compensate for the losses of revenue due to greater conservation than SAWS anticipated.
Recommendation: Just as City Council is considering the City Budget through the lens of equity, City Council should demand the same of SAWS. Those who use the most water should bear most of the costs of Vista Ridge and desalination water.

In February of 2014, when announcing that no pipeline project would be built, Mr. Puente referred to a staff report showing that San Antonio did not need the water from any of the pipeline projects proposed (in response to its earlier RFP) in the 10-15 years after the project would be built. Does that staff report have details about supply and demand that would support the decision (in less than a month later) to build the Vista Ridge pipeline anyway? All of these data should have been readily available to the Council and the public, so there would be well-informed public consideration of such an expensive, long-term and inflexible project which, unlike the desalination plant, cannot be phased in as needed.

Here are some of the *Community Guide*'s criteria for evaluating water demand forecasts:

- Are major classes of water users (e.g., single and multi-family residential, industrial, commercial, institutional, and large-landscape irrigation) analyzed separately?
- Does the forecast take into account increasing water use efficiency (e.g., among commercial users, how much more water-efficiency could be achieved by hotels, restaurants, laundries, data centers, etc.)? In addition to "active conservation," (e.g., incentive programs promoted by SAWS' effective Conservation Department) does it include "passive conservation," due to uptake of yet-more efficient appliances and fixtures, mandated required by advanced standards and codes?
- Does the forecast use recent, up-to-date data? Does it take into account recent trends or developments in water use? If the forecaster is making a projection that contradicts recent trends, it should be explained and justified with sufficient evidence.
- Does the forecast reflect any structural changes in the economy (e.g., region's shift from manufacturing to service economy)? What about changes in the economy wrought by climate change? (e.g., One of SAWS heaviest water users was a beef processing plant that folded during the recent drought-of-record due to its suppliers giving up on their emaciated herds.)
- Does the forecast include the effects of climate change on water use, especially outdoor water use?
- Are drought impacts (and drought restrictions) included? Does the forecaster assume that some of this reduction will be permanent; if not, what evidence shows there would be a rebound to the pre-drought usage rate?
- Is projected population growth realistic? How does this model compare with other planning documents in the region? Does the forecast consider factors that are like to accelerate, slow, or even reverse the growth pattern? (e.g., climate-change impact tripling the number of triple-digit heat days by the second half of the century may reverse population migration in this region).
- Are there multiple forecasts representing other possible future scenarios? (For example, the Pacific Institute[ii] created a computer modeling tool for California communities that takes into account different areas' rainfall patterns and proportion of water demand that is urban water use; it then offered different scenarios that incorporated official population projections specific to each community, 3 different climate change scenarios based on assuming no warming, low warming (SRES B1) and medium-high warming (SRES A2), in addition to 3 different water efficiency/conservation projections, based on assuming no further reductions in demand due to efficiency/conservation, further reductions at the same rate only to 2020, and further reductions at the same rate until 2100. This modeling tool is an outstanding example of specifying, as exactly as possible, the underlying assumptions, definitions, and limitations underlying each projection.

Recommendation: City Council and the Mayor should choose several of the above-described criteria and require that the resulting data and evaluations be posted on SAWS website not later than one month after City Council has been briefed on them.

Recommendation: SAWS should be required to supply within __ weeks of today, as part of WMP 2017, enough of these data and information, relevant to justifying Vista Ridge and other

near-term additional water supply decisions. Specifically, these data – already in SAWS' possession – would be useful for evaluating SAWS' projections:

- Specifically, explain how SAWS calculated annual total gpcd for required reporting to TCEQ; explain how residential gpcd is calculated and how the remainder of annual water usage is converted into gpcd. Explain the difference (if any) between those numbers (e.g., "117 gpcd in 2016" on p.24) and the gpcd of 125 referred to on page 61.
- For each of the categories named in the first bullet point from the *Community Guide* (above), please disaggregate the annual water usage of both *potable water* and *recycled water*. For *each year* from 2011 to 2016, show *for each disaggregated customer class* the annual volume of water used (potable and recycled, calculated separately), and that amount calculated as gpcd. Then, dividing each customer class into quintiles according to annual volume of water used (again, with potable and recycled calculated separately), show the median and mean of each quintile, as well as the range of volumes within that quintile.
- What proportion of (single-family) residential customers *increased* usage markedly from 2011 levels to 2012, 2013, and 2014 levels? What proportion markedly *reduced* water use in 2012 and 2013 voluntarily (i.e., before E.A.A. mandated drought restrictions in 2014)?
- Using the average usage figures for each year for the *top quintile* of each customer class, show how the 2015 *change in rate structure* would have affected the costs borne by San Antonio's heaviest users in each class. Do those changes substantiate the claim (p. 25) that "Higher water rates reflecting the cost of more expensive new water supplies are also expected to suppress demand and encourage conservation."? [My calculations show that the new rate structure actually *reduces* the cost for Residential class high water use during the summer, due to eliminating the higher seasonal rate, in addition to (as in 2014) avoiding the fine imposed for using so much water during stage 4 drought. Calculations for General Class show huge *reductions* in cost of water, such that there is now *less* incentive for a business to conserve water or to switch to Irrigation rates for its outdoor water use.]

Recommendation: Show us the math.

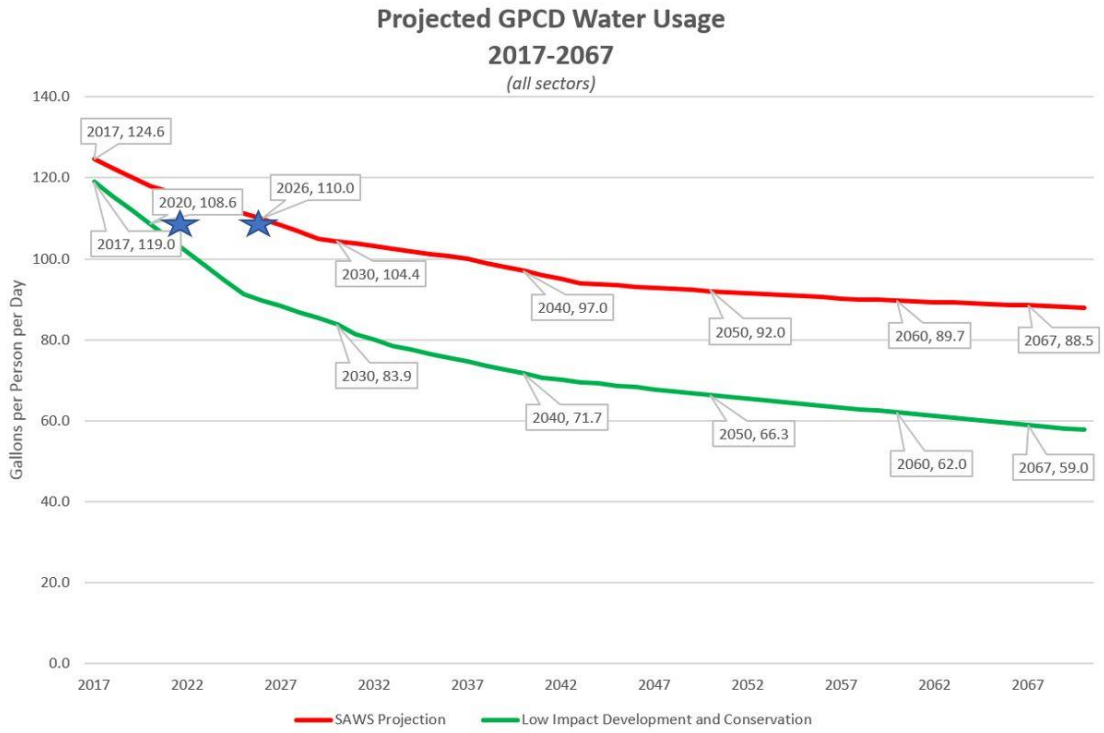
Recommendation: Additionally, SAWS should include scenarios about future population that reflect, not only different kinds/levels of growth, but also possible levels of population decrease or economic decline. It is very foolish to assume that the future will be only growth. Specifically, studies of likely impacts of climate change on Bexar County, show that (assuming moderate greenhouse gas emissions), in the next 20 years, this area is likely to experience increasing numbers (40-60) of days/yr. of dangerously high heat (i.e., over 95º F/ 35º C). By mid-century, that number is predicted to rise to 60-80 days/yr. So many dangerously hot days will likely reduce the number of retirees considering retirement here, and it may deter businesses (especially those involving working outdoors during daytime heat) from locating anywhere in the region. Local GDP is also likely to drop somewhat, due to climate change-related impacts (e.g., drop in tourism during high-heat seasons).[iii]

How much water does San Antonio really need?

In the Fall of 2014, before the Council vote on the Vista Ridge contract, Amy Hardberger, water law expert and professor at St. Mary's School of Law, criticized SAWS for bringing this extremely expensive project online when the water would not be needed for many decades except during a drought of record – and then, only needed to avoid stages 3 and 4 drought watering restrictions. She argues that the real goal of this financially risky move is to tout San Antonio as a place of abundant, not just adequate, water during a drought of record.[iv]

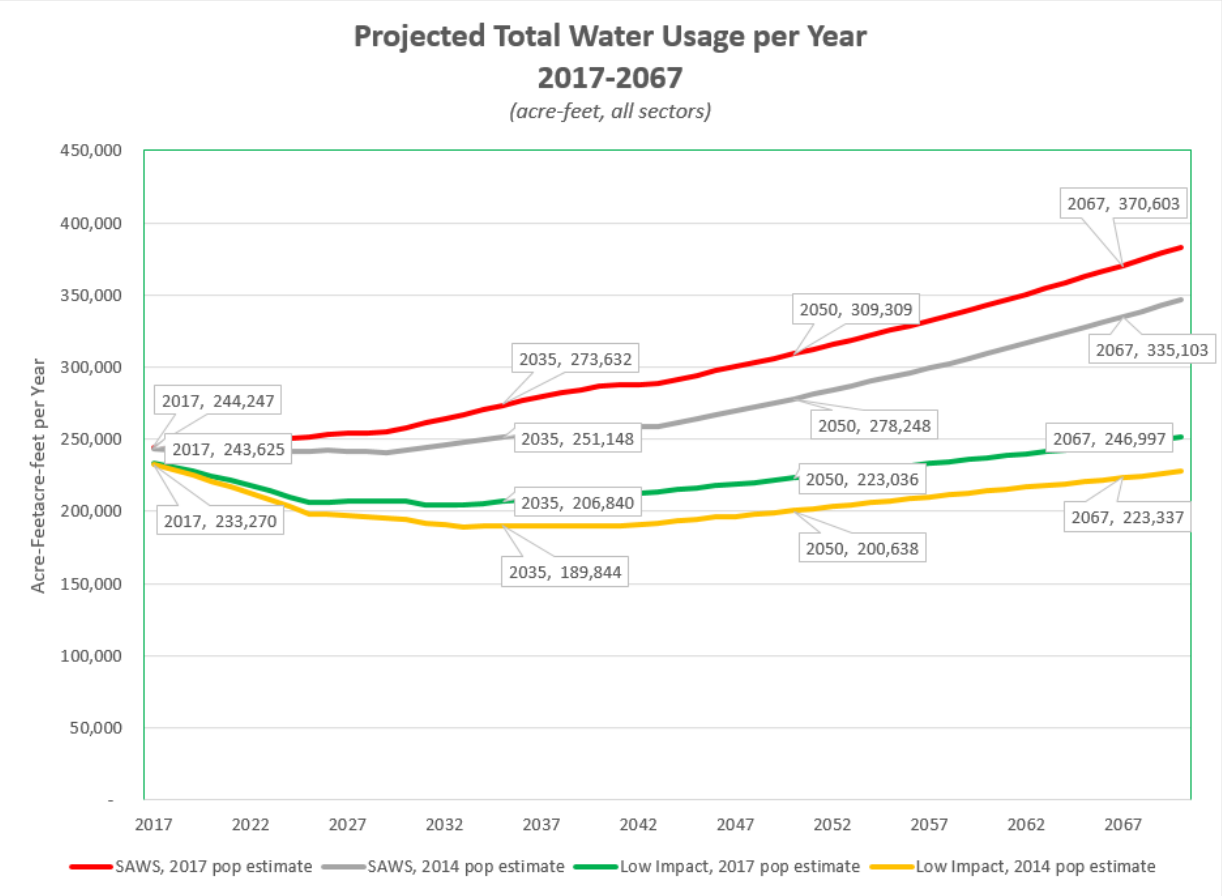
SAWS' demand projections were based on assumptions about how residents would behave under extended drought: Water use rose to 143 gpcd in 2011, the hottest dry year in all of the city's weather history, and SAWS expected the gpcd to stay high as the drought continued, with – at best – one gpcd reduction each year in response to stage 1 and 2 drought restrictions. SAWS was very wrong, because the vast majority of SAWS' customers voluntarily reduced their consumption greatly – even before the Edwards Aquifer Authority declared stages 3 and 4 (35% and 40%) pumping cuts.[v]

SAWS' misjudgment of residential demand-reduction led the SA Tomorrow planning process to a very unambitious goal for water usage in 2040: to get the total gpcd (gallons per person per day) down to 110 (from 125 in 2015). In fact, the actual total usage in 2015 was 118 and it kept dropping. Now SAWS is projecting that 110 will be reached by 2026 and that, by 2040, it could reach 97. The figure below (Projected GPCD Water Usage 2017-2017) is an approximation of the figure 5.5 on WMP p.28, because SAWS has never released any of the actual numbers or factors resulting in this figure. The red line is SAWS demand projection of mid-2017. Notice that SAWS now admits that the SA Tomorrow goals can be met by 2026, instead of 2040 previously projected.



The Sierra Club's alternative Sustainable WMP suggests that, with greater drought preparedness and emphasis on Low Impact Development for new construction, the goal of 110 gpcd could be surpassed *before* 2020, and that the gpcd goal for 2040 should be lower than 72. As the figure below demonstrates, with Sierra Club's "One Water" approach, the **total water usage in 2050** (i.e., approximately the end of the Vista Ridge contract) would be approximately 223,000 acre-feet/ year (using SAWS' newer population projections). That's more than 10,000 acre-feet LESS than is used today!

Assumptions: The reductions of gpcd represented in the green line are the moderate demand-reduction figures achievable by drought preparedness and emphasis on Low Impact Development for new construction. A more rapid demand reduction would occur if a serious drought occurs, as happened in the city of Melbourne. There is every reason to believe that, had our drought lasted years longer, San Antonio residents would have cut their usage just as far as the residents of Melbourne did in their 13-years-long drought. And after the drought ended, the gpcd would have stayed similarly low, never returning nearly so high as the pre-drought level. The silver and yellow lines represent SAWS and our earlier projections, based on 2014 population projections and SAWS' higher demand projections, used in a projection model to determine whether SAWS could sell 15,000 AF/yr of Vista Ridge water and still be able to cope with a drought-of-record without invoking stage 3 and 4 watering restrictions. [Needless to say, SAWS was deliberately overestimating demand and refusing to encourage much conservation during such a drought.]



Here's how we extrapolate those estimates:

Before acquiring new water supply, conserve first – **What Melbourne did**: Melbourne's total per capita water use dropped approximately 50%, reaching a historic low and staying low long after the drought ended. *Voluntary conservation* and *water efficiency* measures reduced **residential** gpcd from about 79 to below 40. Detecting and fixing water system leaks reduced water loss from 9% before the drought to 5.4%.

What San Antonio could do: San Antonio is far ahead of most U.S. cities in water conservation, and SAWS' Conservation Department is outstanding. However, the decision to promote San Antonio as a place of "abundant water" threatens to de-rail San Antonio's water future. San Antonio could, with voluntary conservation, water efficiency measures, and fixing indoor leaks, reduce **residential** gpcd from 73 gpcd in 2015 to below 50 by 2025, at current rates of reduced usage, or - in case of severe drought - to 32 gpcd. Detecting and fixing SAWS' much greater system leaks (more than 11 billion gallons/year) could cut water loss by more than half. If SAWS' leaks were reduced from 15% to to 7.5%, that alone would reduce the **total** gpcd from 118 to 109.

Sustainability planning, Demand-projections, and Demand-Reduction

Drought Preparedness requires more refined restrictions that encourage residents and businesses to self-regulate water usage. Knowing how much rainwater is left in your cistern guides self-restriction. Likewise, knowing how much of the ASR water is "yours" to protect for as long as the drought lasts would also promote much greater care about conservation. Cities like Melbourne increased the number and severity of drought watering restrictions, such that those who wasted a lot at stage 3 entered stage 4a with a disadvantage and a surcharge, and those who exceeded their "share" during stage 4b risked having a flow-restrictor placed on the pipes for the remainder of the drought. Such drought restrictions would likely motivate those using excessive amounts to invest in obtaining their own "fit-for-purpose" water supply.

Recommendation: Consider making ordinances designed to plan for water-neutral growth. The Alliance for Water Efficiency, Environmental Law Institute, and River Network recently released the Net Blue Ordinance Toolkit, available online.

Watering Restrictions and Misuse of ASR. It is not sustainable to use the ASR to protect residents and businesses from drought watering restrictions. If the next drought of record lasts 25 years, and the ASR reserves are depleted in the first 5 years, the waste of potable water on inappropriate irrigation would be inexcusable. It is better to start now to let those residents and businesses know that they are responsible for reducing their irrigation needs to quantities that they can supply with their own water-harvesting investments. With drought-tolerant native plants and drip irrigation, if any, rain water collection in large cisterns is likely to be adequate, even in years when the rainfall is low.

Here's a brief capsule of what SAWS got right – and wrong – in its draft version of a new Water Management Plan:

1. Diversified Water Supply. Avoiding over-reliance on the Edwards Aquifer is important, because – as the population grows – San Antonio must not risk over-drawing the aquifer that is our main source of water. Building a huge pipeline to draw water from someone else's aquifer in a distant water basin is NOT true diversification, however, because it still risks overdrawing an aquifer. San Antonio's water sources, at present, are all either ground water sources (i.e., aquifers), at risk from overdrawing faster than the source can recharge, or surface-water sources (i.e., lakes, reservoirs, rivers) that are at risk from rapid evaporation. The only truly diverse resources to add to San Antonio's supply would be water that falls as rain in our local water catchment and is, subsequently, stored where it does not quickly evaporate.

2. The "One Water" approach is, indeed, the best approach for the future, but SAWS' WMP fails to use the concept accurately. "One Water" emphasizes these three water sources (groundwater, surface-water, and rain-water) that are all available in our local water catchment and watershed.

    a. Vista Ridge pipeline water is NOT our "One Water." Nor is it "innovative." Vista Ridge is merely the same 19th century approach that Los Angeles used to make that arid city appear to be a lush, tropical area. Now (after severe regional drought reduced the water available from two major pipelines) L.A. is urgently trying to optimize its

use of all the water that falls in its own catchment. San Antonio gets more than 3 times as much rainfall as L.A., so "One Water" could easily supply more than half our water, even in a prolonged drought.

b. SAWS alone cannot do the kind of water planning that the "One Water" approach requires. For example, SAWS does an admirable job with the recycling of wastewater, but without "One Water" conservation measures for recycled water reuse, too much water is wasted through evaporation or disposal. "One Water" communities need ALL water-related decisions and spending to be planned in a fully collaborative, integrated way, with multiple agencies contributing funds and know-how.

c. "One Water" approaches emphasize BOTH centralized and <u>decentralized</u> water supply sources. SAWS is too focused on the water sources it can sell. The entire Vista Ridge project is based on the goal of SAWS as a regional water purveyor, but that goal is not good for San Antonio, nor for the communities in the region that, instead, should be emphasizing water capture and reuse in their own water catchments. Rainwater and stormwater collection and usage, ideally close to where the rain fell, is comparable to rooftop solar energy collection and usage. Using rainwater/ stormwater as a "fit-for-purpose" substitute for potable water (e.g., for irrigation) would both increase water supply and reduce runoff that increases flooding.

3. <u>Climate Action and Drought Preparedness.</u> This is the first proposed WMP that even mentions climate issues and the possibility of future droughts being more intense and/or longer. It fails to acknowledge climate change as a central challenge, and it talks about resiliency in the abstract. Even though the new drought model that SAWS uses is a big improvement of the old model (based on the 1950s drought-of-record), because it includes the high heat intensity of the 2011-15 drought of record. That model is completely inadequate, because <u>we need to develop community-wide drought preparedness</u>. Climate scientists in Texas argued in 2010 that, regardless of the climate change projections, Texas water planners should be preparing for much longer droughts, because this region experienced many-decades-long droughts in the centuries before weather record-keeping began. Now, with the additional probability of Climate Change-related climate extremes (e.g., heat-waves, drought, and flooding), even Climate Change-deniers should care about drought-preparedness.*
4. <u>Drought Preparedness and Infrastructure Improvements for the Urban Forest Canopy.</u> The "One Water" approach must also include integrating the City water planning into <u>every</u> street, stormwater abatement, sidewalk, park, school, and building project. In particular, there must be planning for capturing stormwater, cleaning it enough, and getting it to where it is needed to make sure that the urban forest canopy is increased and maintained, even during serious drought. The City should invest in capturing and using stormwater for irrigating (with good conservation practices) essential playing fields and shade trees. Such planning should happen, even after the fact, for all the proposed Bond stormwater and parks projects. Future development should be required to plant trees with stormwater capture infrastructure already in place. Areas of town with serious vulnerability to the Heat Island effect should get priority for installing such infrastructure. Costs can be greatly reduced by combining the planning and execution by multiple agencies working collaboratively, instead of their separate silos.

The Water/Energy Nexus. The City's Climate Action plan, not yet written, is very likely to include ambitious goals of reducing of greenhouse gas emissions. To achieve those goals, it will be necessary to reduce CPS Energy's reliance on steam-generated energy production. While CPS Energy is investing a lot in renewable energy that emits no greenhouse gasses, SAWS (its biggest customer) has invested in two extremely energy-intensive water projects: the brackish desalination plant at H2Oaks, and the Vista Ridge pipeline project. The Vista Ridge pipeline should be jettisoned, because it is inherently unsustainable. But if VR is not halted, SAWS should be required to pay for solar arrays adequate to supply the energy needed for all that excessive pumping and to hasten the closure of all coal-fired power plants in San Antonio (thus improving the air quality). The brackish desalination plant, already in service, should be "dialed back" and operated only as needed. The rate structure should be changed to make those residents and businesses that use excessive water for irrigation pay for the entire cost of that extremely expensive water. Such incentives for reducing water use would also help SAWS conserve brackish water for use during extreme droughts.

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[i] Heberger, Matthew, Kristina Donnelly, Heather Cooley, 2016. *A Community Guide for Evaluating Future Urban Water Demand,* Pacific Institute.

[ii] Christian-Smith, Julie, Matthew Heberger, and Lucy Allen, 2012. *Urban Water Demand in California to 2100: Incorporating Climate Change,* Pacific Institute. Online at: http://pacinst.org/wp-content/uploads/2014/04/2100-urban-water-efficiency.pdf

[iii] Hsiang, Solomon, Robert Kopp, Amir Jina, James Rising, Michael Delgado, Shashank Mohan, D. J. Rasmussen, Robert Muir-Wood, Paul Wilson, Michael Oppenheimer, Kate Larsen, Trevor Houser, 2017. "Estimating economic damage from climate change in the United States," Science 30(June): 1362-1369.

[iv] Hardberger, Amy. "Vista Ridge project creates more questions than answers," October 6, 2014. Texas Living Waters Project, online at: http://texaslivingwaters.org/vista-ridge-project-creates-questions-answers/

[v] Gibbons, Brendan. "SAWS' top 100 water users consumed far more in 2014, 2015 than previous two years," *San Antonio Express-News,* May 6, 2017.