15 September 2014

Memorandum

To: Mr. Curt Sauer
General Manager
Joshua Basin Water District

From: Sandra Carlson and Mary Lou Cotton

Subject: Update to Service Area Population and Baseline per Capita Water Use
K/J 1444221*00

This memorandum provides an evaluation and revision of the Joshua Basin Water District (District, JBWD) service area population and baseline per capita water use as it relates to the Water Conservation Act of 2009 (SBX7-7) and the Urban Water Management Planning Act.

Kennedy/Jenks prepared JBWD's 2010 Urban Water Management Plan (UWMP). Preparation included calculation of the JBWD service area population and baseline per capita water use to meet the requirements of SBX7-7 using the best available data at the time. In their review of the 2010 UWMP, California Department of Water Resources (DWR) staff has requested that JBWD utilize a specific methodology that was developed as the 2010 U.S. Census data was released in early 2011.

Since the preparation of the 2010 UWMP, new data has become available regarding JBWD's service area population. The 2010 U.S. Census data was not available during the preparation of the UWMP. Also, a digital version of JBWD's service area boundary is now available. With this new data, JBWD's service area population has been re-calculated by overlaying the service area on 2000 and 2010 census block data using GIS.

Task 1 – Evaluate and Update Service Area Population and Housing

Because the District's service area is not a city or a census data place (CDP), the following DWR-recommended method for estimating population for the baseline years was used:

1. Kennedy/Jenks used the available GIS shapefiles of the District's service area boundary and overlaid the 2000 Census GIS shapefile - at the BLOCK[1] level - to estimate the District population for the year 2000 – which is estimated at 8,073 (slightly less than the 2010 UWMP derived year 2000 population of 8,137).

2. Then JBWD's total number of residential connections for the year 2000 (multi- and single family connections combined) were obtained (along with the number of residential connections for all baseline years (for use in step 4)). For 2000, there were 3,712 residential connections as shown in Table 2-1.

[1] A block is the smallest geographic unit for which the Census Bureau tabulates 100-percent data. It is bounded by visible features, such as streets, roads, streams, and railroad tracts, and by nonvisible boundaries, such as selected property lines and city, township, school districts, and county limits.

3. Next, the year 2000 population was divided by the year 2000 residential connections to get "persons per residential connection" (Therefore: 8,073 population/3,712 residential connections = 2.2 persons per residential connection).

4. Finally, the "persons per residential connection" (Step 3) was used to multiply by the number of residential connections for each baseline year (1995-2009) to estimate the necessary District population for baseline years.

Table 2-1 presents the estimated population from 1995-2009 for JBWD.

TABLE 2-1
JBWD POPULATION ESTIMATES

Baseline Year	Persons per connection(1)	No. of Res. Connections(2)	Population(3)
1995	2.2	3,501	7,594
1996	2.2	3,501	7,594
1997	2.2	3,739	8,111
1998	2.2	3,755	8,145
1999	2.2	3,663	7,946
2000(4)	2.2	3,712	8,073
2001	2.2	3,691	8,006
2002	2.2	3,796	8,234
2003	2.2	3,840	8,330
2004	2.2	4,503	9,768
2005	2.2	4,271	9,265
2006	2.2	4,217	9,147
2007	2.2	4,266	9,254
2008	2.2	4,249	9,217
2009	2.2	4,295	9,317
2010(4)	2.2	4,301	9,514

(1) From Step 3, this number is only calculated for the years 2000 and 2010.
(2) Provided by the District and includes multiple and single family.
(3) (Persons/connection x no. of residential connections)
(4) Population estimated from US Census Block shapefiles.

As a check for Table 2.1, the 2010 Census GIS shapefile - at the BLOCK level was used to calculate the population for the District in 2010 and the same method was used to derive the persons/connection as discussed previously for the year 2000. The same 2.2 persons per connection factor was derived in 2010 as was calculated in 2000, which shows consistency with using this methodology.

Based on the District's assumptions for future population growth, it is predicted that the service area population will grow at a rate of approximately 1.1 percent per year from 2005 through 2035. Table 2-2 presents projected population estimates calculated using information from Table 2-1 and the Mojave Water Agency (MWA) forecast demand model to project the population to 2035. Please note the annual 1.1 percent change is stated to be approximate and the percent change between the five (5) year increments may not match exactly with the annual change. However, the average will match the 1.1 percent. The Southern California Association of Governments (SCAG) projection data that was used in the model was for year 2020.

TABLE 2-2
JBWD PROJECTED POPULATION ESTIMATES

2005	2010	2015	2020	2025	2030	2035	Annual % Change 2005-2035
9,265	9,514	10,448	11,108	11,551	11,993	12,436	1.1%

Note: Source is MWA's 2010 demand model forecast and District assumptions.

Task 2 – Update Per Capita Baseline Water Use and SBX7-7 Targets

As described in Senate Bill 7 of Special Extended Session 7 (SBX7-7), it is the intent of the California legislature to increase water use efficiency and the legislature has set a goal of a 20 percent per capita reduction in urban water use statewide by 2020. The requirements of SBX7-7 apply to retail water suppliers. Consistent with SBX7-7, 2010 UWMPs must provide an estimate of Base Daily Per Capita Water Use. This estimate utilizes information on population as well as base gross water use. Base gross water use is defined as the total volume of water, treated or untreated, entering the distribution system of JBWD, excluding: recycled water; net volume of water placed into long-term storage; and water conveyed to another urban water supplier. This calculation of Base Daily Per Capita Water Use is limited to JBWD's retail service area.

The UWMP Act allows urban water retailers to evaluate their base daily per capita water use using a 10 or 15-year period. A 15-year base period within the range January 1, 1990 to December 31, 2010 is allowed if recycled water made up 10 percent or more of the 2008 retail water delivery. If recycled water did not make up 10 percent or more of the 2008 retail water delivery, then a retailer must use a 10-year base period within the range January 1, 1995 to December 31, 2010. Recycled water did not make up 10 percent of the 2008 delivery to the JBWD retail areas and for this reason Base Daily Per Capita Water Use has been based on a 10-year period. In addition, urban retailers must report daily per capita water use for a five year period within the range January 1, 2003 to December 31, 2010. This 5-year base period is compared to the Target Based Daily Per Capita Water Use to determine the minimum water use reduction requirement. Table 2-4 reports the revised population data used to calculate the Base

Daily Per Capita Water Use in gallons per capita per day (gpcd), and the 10-year and 5-year base periods.

TABLE 2-4
BASE DAILY PER CAPITA WATER USE

Base Period Year		Distribution System Population[(1)]	Annual System Gross Water Use (afy)	Annual Daily Per Capita Water Use (gpcd)	10-Year Average (gpcd)	5-Year Average (gpcd)
Sequence Year	*Calendar Year*					
1	1995	7,594	1,521	179		
2	1996	7,594	1,596	188		
3	1997	8,111	1,658	182		
4	1998	8,145	1,463	160		
5	1999	7,946	1,323	149		
6	2000	8,073	1,588	176		
7	2001	8,006	1,636	182		
8	2002	8,234	1,657	180		
9	2003	8,330	1,593	171		
10	2004	9,768	1,683	154	**172.00**	
11	2005	9,265	1,600	154	169.54	
12	2006	9,147	1,786	174	168.21	
13	2007	9,254	1,875	181	168.05	**166.78**
14	2008	9,217	1,515	147	166.70	161.99
15	2009	9,317	1,690	162	168.03	163.61
				Period Selected		**167**

Note: Shaded cells show calendar years used in selected 5-year average.
(1) See Table 2-1 for Population calculation.

Task 2.1.1 Urban Water Use Targets for SBX7-7 Reduction

In addition to calculating base gross water use, SBX7-7 requires that JBWD identify their demand reduction targets for year 2015 and 2020 by utilizing one of four options:

- Option 1. 80 percent of baseline gpcd water use (i.e., a 20 percent reduction).
- Option 2. The sum of the following performance standards: indoor residential use (provisional standard set at 55 gpcd); plus landscape use, including dedicated and residential meters or connections equivalent to the State Model Landscape Ordinance (80 percent ETo existing landscapes, 70 percent of ETo for future landscapes); plus 10 percent reduction in baseline commercial, industrial institutional use by 2020.
- Option 3. 95 percent of the applicable state hydrologic region target as set in the DWR "20x2020 Water Conservation Plan" (February, 2010) (20x2020 Plan).

- Option 4. Not applicable.

JBWD's service area is within the Colorado Hydrologic Region (#10) as defined by DWR and this hydrologic region has been assigned a 2020 water use target of 211 gpcd per the DWR 20x2020 Plan (DWR, 2010). In order to use Option 3, JBWD's daily per capita water use for the 5-year base period would have to be close to 95 percent of the 211 gpcd target (i.e., 200 gpcd), which it is. The calculated base gross water use is well below the 95 percent limit at 167 gpcd. Therefore, to comply with the SBX7-7 requirements, the District selects Option 3 to reduce its Base Daily Per Capita Water Use by 5 percent. This results in the 2020 gpcd target for JBWD to be 159 gpcd as shown in Table 2-5.

TABLE 2-5
COMPONENTS OF TARGET DAILY PER CAPITA WATER USE

Period	Value		Unit	
10-year period selected for baseline gpcd	*First Year*	1995	*Last Year*	2004
5-year period selected for maximum allowable gpcd	*First Year*	2003	*Last Year*	2007
Highest 10-year Average	172		gpcd	
Highest 5-year Average	167		gpcd	
Compliance Water Use Target (20% Reduction on 10yr)	138		gpcd	
Maximum Allowable Water Use Target (5% Reduction 5yr)	159		gpcd	
2020 Target	**159**		gpcd	
2015 Interim Target	**163**		gpcd	
Methodology Used	Option No. 3			

JBWD plans to meet the proposed 20x2020 water use target using the existing methods of conservation that have been implemented to date by the District and other methods as discussed in the 2010 UWMP Section 2.6.2 and Chapter 7 Demand Management Measures.

Table 2-6 summarizes JBWD's projected water demands through 2035, with and without conservation, using the SBX7-7 requirements discussed earlier. Please note that JBWD's demand projections are the same with and without conservation.

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TABLE 2-6
PROJECTED WATER DEMANDS

	2005	2010	2015	2020	2025	2030	2035
Water Demands[(a)] (af)	1,600	1,560	1,877	1,944	2,022	2,099	2,177
GPCD[(b)] (No Conservation)	154	146	160	159	159	159	159
SBX7-7 Req'd GPCD[(c)]	N/A	167	163	159	159	159	159
SBX7-7 Savings[(d)] (af)	N/A	0	0	0	0	0	0
Water Demands w/ Conservation[(e)]	N/A	1,560	1,877	1,944	2,022	2,099	2,177

Source is water production report from JBWD in calendar years and MWA's 2010 demand model forecast.
Notes:
(a) JBWD's demand projections without conservation.
(b) Calculated using the estimated population from Table 2-2.
(c) See Table 2-5.
(d) Calculated as the difference between the projected GPCD without conservation and the SBX7-7 required GPCD times the population.
(e) JBWD's demand projections with conservation using the SBX7-7 requirements. Please note that the demands are the same with and without conservation. Also, 2010 data is actual.

JBWD may now utilize these updated demand data and calculations to provide as responses to DWR.

References

California State Senate, 2002. Senate Bill 1938 (Machado).

California State Senate, 2006. Senate Bill 1087.

California State Senate, 2010. SBX7-7 (Steinberg).

California Department of Water Resources (DWR), 2010. *20x2020 Water Conservation Plan*, Sacramento, CA. February, 2010.

Mojave Water Agency (MWA), 2011. *2010 Final Urban Water Management Plan*, Apple Valley, CA. Prepared by Kennedy/Jenks Consultants. June.