

**TOWN OF PAYSON  
WATER RESOURCES MANAGEMENT**

**2012 Status Report**



**APRIL 19<sup>TH</sup>, 2012**

Prepared By:  
Town of Payson Water Department

## **2012 PAYSON WATER RESOURCES STATUS SUMMARY**

The Town of Payson desires to maintain water usage below what is replaced on a long-term average basis by rain and snowfall within the watersheds that recharge or re-fill the aquifer upon which it relies. Maintaining groundwater usage below this amount is considered “Safe Yield”. The amount of groundwater available to the Town of Payson within a Safe Yield state is estimated at up to 2,681ac-ft/y. This value is considered Payson’s maximum available annual groundwater supply.<sup>1</sup>

It is the policy of the Town of Payson local government that the Town will make attempts to manage its water resources to achieve and/or maintain a “Safe Yield” condition of its groundwater supplies. Currently, Payson’s water consumption remains below the long-term state of “Safe Yield”. In 2011, Payson residents consumed local groundwater resources in an amount equal to 61% of “Safe Yield”. The net per person usage of water for 2011 was 79gpcd. This usage value remains very low and is likely affected by the presence of metered yet unoccupied dwellings and businesses owing to prevailing economic conditions.

Below normal annual precipitation has been observed in winter 11-12 and yet, groundwater resource levels remain relatively stable. Therefore, the **Town of Payson will implement Water Conservation Level I** water wise use levels for the period of April 2012 to May 2013. This level of conservation includes prudent measures such as no washing of paved areas such as sidewalks or driveways and limiting outside water use to certain days of the week. Complete details are available at the Payson Water Department and on-line at [www.paysonwater.com](http://www.paysonwater.com). These efforts in combination with increased water conservation education, including the Town’s annual participation in “Arizona Project WET” are meaningful attempts by Town government to maintain the Town’s water resources demand goals. The Level I water use limits are commensurate with the reality of our environment and the potential for recurring drought conditions. Water conservation and demand management continue to positively influence both the short and long-term water supply status of the Town of Payson.

C.C. Cragin (Blue Ridge) surface water and related water resources projects have been moving forward with great success. Much of the engineering, design, and environmental works are now complete. 12.5 miles of 18 inch pipe has been advance purchased for the project. Testing of the water treatment method and recharge wells has also been successfully concluded. Payson continues to move along on the road to achieving a rare condition, water resources sustainability in the desert southwest.

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<sup>1</sup> Agreements made with Salt River Project use 2,520ac-ft/yr (rolling average) as a “groundwater withdrawal cap”. The 2,520 value is not considered Payson’s safe yield.

## 2012 WATER RESOURCES STATUS GROUNDWATER LEVELS

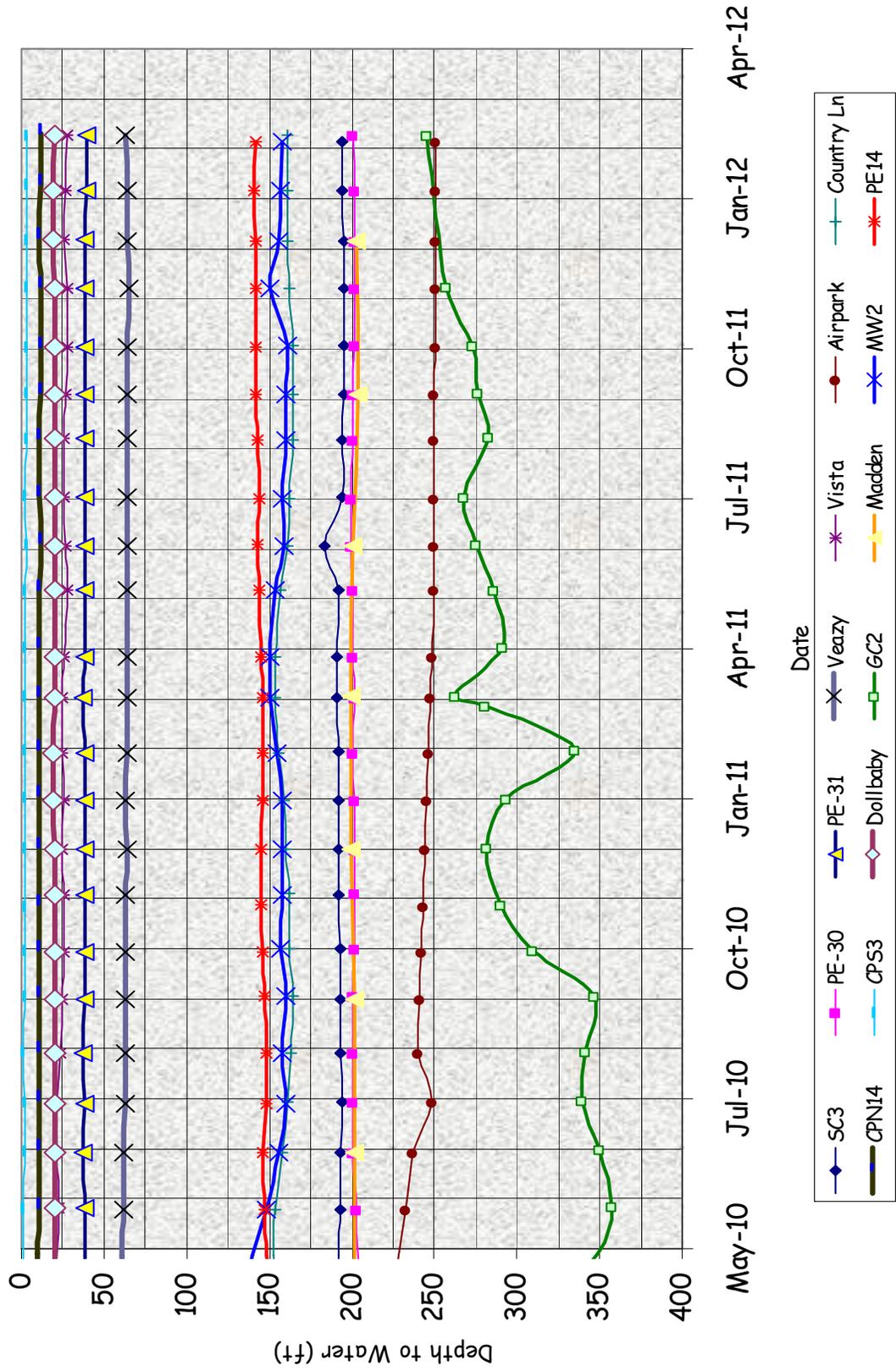
Groundwater levels in the Payson area are ever changing, not only from year to year but also from day to day. It is important to note that changes in groundwater levels either up or down are normal, within the context of a particular area's history. Because the Town of Payson currently obtains all of its potable water supplies from a fractured aquifer groundwater source, highly variable groundwater levels are expected.

Groundwater level changes are related to many factors. Recharge or re-filling of the aquifer occurs in times of precipitation (rainfall and snowmelt). This results in groundwater level rise. In an opposite way, groundwater levels will decline in response to periods of no recharge or drought. Groundwater levels will also drop and rise in response to well(s) pumping or not pumping. The topic becomes more complicated by virtue of the type of aquifer on which the Town and communities in the region depend. The Payson regional aquifer is in fact a complex system of interconnected cracks and sections of porous (sponge like) earth that yield water to wells. Nearly all of the earthen material beneath Payson and its surrounding area consist of the "Payson Granite". Some areas in the granite have more cracks and porous earth (decomposed granite) than others and some of the cracks or "fractures" are more interconnected than others. Therefore, interpreting changes in depth to groundwater can be complicated.

Depth to groundwater levels are measured quarterly from all wells in the Town of Payson's observation network. This network consists of nearly 100 wells in the Payson area. Monthly measurements are collected at all active production wells and also at key observation wells. The water level data is maintained in a database by Water Department staff.

From 2011 to 2012, groundwater levels remain relatively stable and even higher in some areas. The resilience of groundwater levels, in spite of lackluster precipitation in 2011-12, is indicative of an aquifer in "recovery" condition. In other words, water levels are stable or rising because the aquifer is not being pumped more than it is naturally replenished over the long-term (see chart on page 4). The Town's groundwater supply clearly remains in a "Safe Yield" condition.

## Payson Area Groundwater Trends 2010-2012



## 2012 WATER RESOURCES STATUS CONSERVATION

### Conservation Programs

With the ongoing support of the Town Council, rebate programs continued during 2011. These programs include a residential toilet rebate, a commercial plumbing retro-fit rebate, and two low income assistance programs. In 2011, low flow toilets were provided to the Payson Area Habitat for Humanity as they successfully completed their multi-family project near Payson High School. This past fall, nine additional toilets were provided for the final phase for a total of twenty-five low flow toilets installations for the project. Qualifying rebates for both homeowners and businesses have decreased over the years indicating the success of the program. Overall, nineteen toilets and eighteen faucet rebates were provided during 2011 (not including Habitat for Humanity).

The Water Department held its 5th “Project Wet” Water Festival in October, 2011. Project Wet is a multi agency sponsored education program designed for interaction with and the education of 4<sup>th</sup> grade students. Through this festival future water customers are educated about the water cycle, the watershed, groundwater and aquifers and, of course, water conservation. 188 students from six 4<sup>th</sup> grade classes participated. 47 volunteers participated, which included science students from the high school, town employees from Parks & Rec, Streets, HR and Community Development; as well as, employees from APS, SRP, the Payson Roundup, and the Sanitary District.

In May, 2011 the Department co-sponsored an E-Cycling Event with ADEQ, the Town of Star Valley, Gila County and the Sanitary District. Efforts are underway to bring another E-Cycling Event to the area by the end of April 2012.



May, 2011 E-Cycling at the  
Payson Event Center

## 2012 WATER RESOURCES STATUS

### CONSERVATION Continued.....

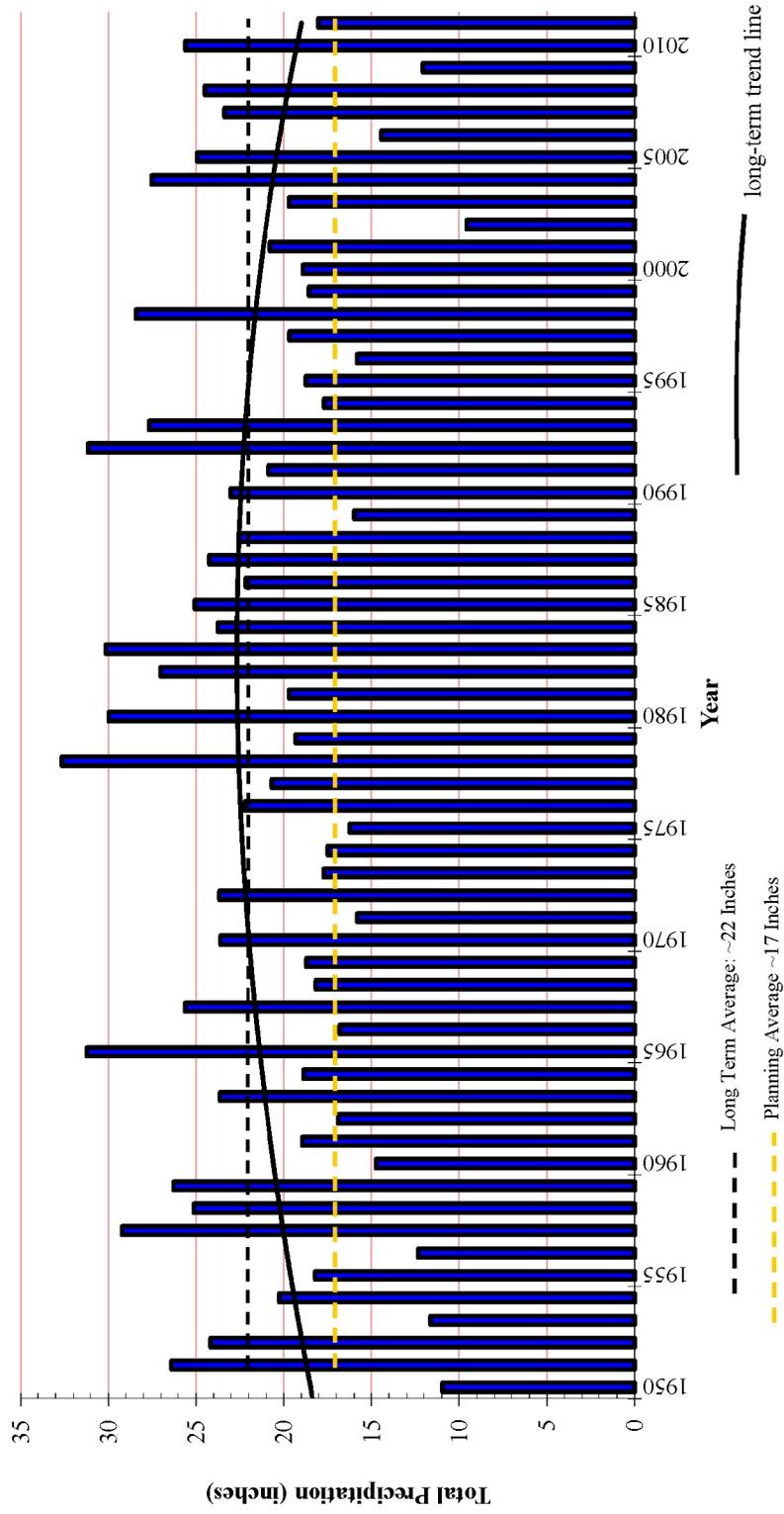
#### Conservation Level

Water conservation requirements pursuant to Resolution No. 1742 anticipate that Water Conservation Level requirements be enacted according to the deficit or surplus of precipitation that occurred in the twelve month period immediately preceding the annual water report. Additional, resource factors are also considered when setting the Water Conservation Level requirements for any given year. Precipitation for Payson's water year of 2011-12 (April 11-March 12) was a low ~16 inches (official values from the NWS were not available at printing time). This amount is below the long-term average of ~22 inches per year, as referenced in conservation ordinances. Long-term precipitation trends continue to indicate the current drought cycle may not bottom out until around the year 2015 (see chart on page 7).

When considered alongside groundwater levels and annual water demand, an observed ~4-inch precipitation deficit in winter 2011-12 does indeed represent a significant shortfall but does not represent any immediate shortage in water supply. It should be acknowledged however that environmental conditions are such that extreme fire hazards may be on tap for 2012.

In light of Payson's already low per person (per capita) water use, it is determined that **Water Conservation Level I remains the appropriate measure to implement upon Council acceptance of this report in April, 2012.** It is anticipated that implementation of Level I water use limitations will continue to promote responsible water use, maintain annual water demand below the targeted 89gpcd (per-person) level, and reserve adequate water supply capacity for fire protection.

### Town of Payson Total Annual Precipitation Since 1950



## 2012 WATER RESOURCES STATUS

### WATER DEMAND

Water demand for the 2011 year increased only slightly from 2010, rising from 1,620 acre-ft. to 1,632 acre-ft. However, the slight increase was not due to any rise in customer use but for the many leaks caused by frozen pipes in January and February 2011. It is notable that in December 2011 water usage declined 24% over December 2010 with January, February, and March of 2012 following suit with 26%, 13%, and 7% decreases respectively. Such declines in winter demand are difficult to explain other than by a lowering in base demand. This implies fewer full-time residents and/or conservation encouraged by the water rate increase in Fall 2011. The actual effect (if any) of increased water rates in the winter is very difficult to measure but is unlikely due to a lack of outdoor watering needs. Therefore, to investigate the declines further, student enrollment was used as a litmus test in estimating recent population trends. Payson Unified School District records indicate 73 students were lost between January 2011 and January 2012. A “typical” family unit base monthly water use is on the order of 7,500 to 10,000 gallons, not including the demand created outside of the home (“multiplier effect”). So too, the closing of Frontier Elementary School is a notable event in 2011. It is believed that the economic down-turn and energy prices are responsible for the above short-term trends as numerous unoccupied homes and businesses properties remain in 2012.

#### Water Consumption 2011

Month 2010	Monthly Consumption	Percent Change From 2010
Jan	41,651,700	<b>19</b>
Feb.	33,583,100	<b>10</b>
March	34,048,700	3
April	38,710,600	-2
May	46,575,800	3
June	62,446,900	4
July	54,729,400	-12
August	57,304,000	11
Sept.	50,581,600	-4
Oct.	45,279,300	3
Nov.	35,480,200	-9
Dec	31,521,000	<b>-24</b>
<b>Total Usage (gal)</b>	<b>531,912,300</b>	<b>1</b>
<b>Total Usage (ac/ft)</b>	<b>1,632</b>	<b>1</b>
<b>Percent Safe Yield</b>	<b>61</b>	<b>1</b>

Frozen Pipes -  
Leaks

Unusual Winter  
Use Decline

## 2012 WATER RESOURCES STATUS

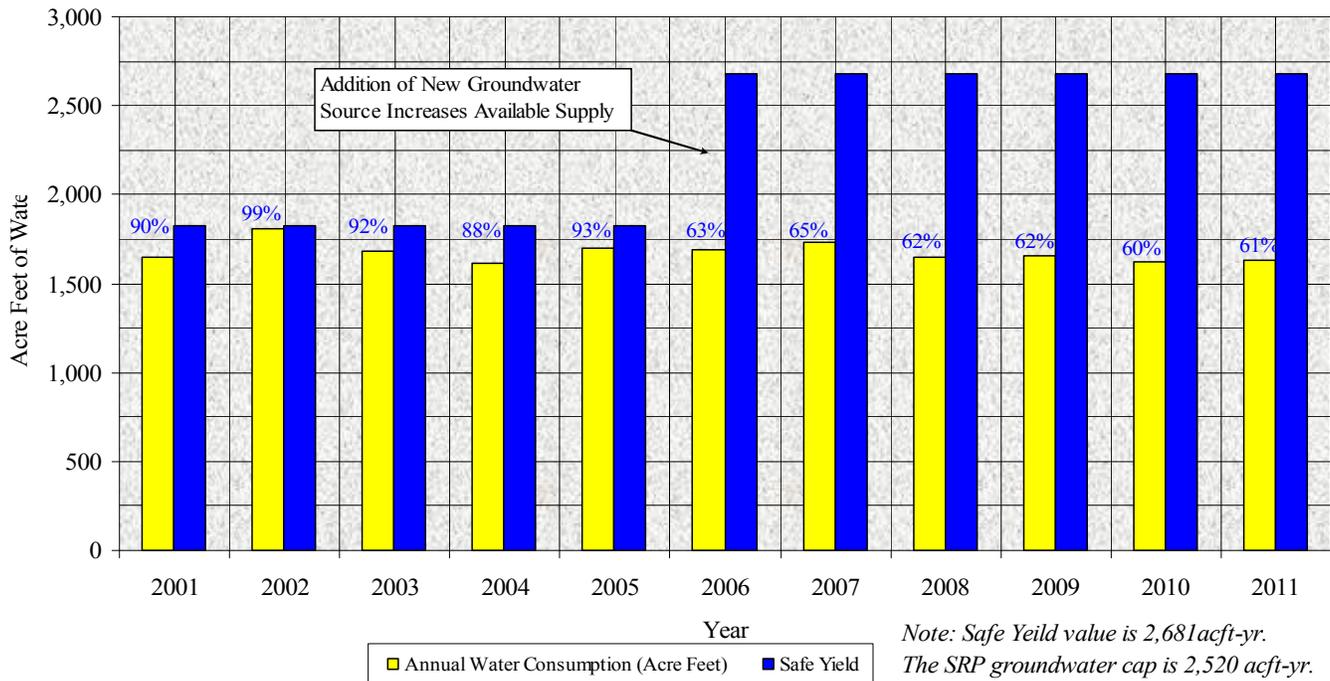
### WATER DEMAND Continued

#### SAFE YIELD

##### Safe Yield Status

Safe Yield is a term commonly used to define the amount of groundwater that is naturally and artificially replenished via deep percolation of precipitation into the subject aquifer. In Payson, this value has been estimated to be 2,681ac-ft/yr for its well fields. The 2,681ac-ft/yr “Safe Yield” is considered quite conservative and by maintaining water use below this value, such as 2,520acft-yr per SRP agreements, Payson can help maintain sustainability of its groundwater supplies. In 2011, groundwater demand was only 1,632ac-ft or 61% of the available groundwater supply.

**Town of Payson Annual Groundwater Consumption  
Since 2001 Relative to % of Safe Yield**



2012 WATER RESOURCES STATUS  
C.C. CRAGIN STATUS

**C. C. Cragin Reservoir Pipeline and Related Projects**

In, 2011 the Water Department and its environmental firm completed the environmental assessment process (EA) to obtain a Forest Service special use permit for ultimate construction of the Cragin Project. A finding of “no significant impact” has been made by the FS. Thus, final construction permitting is now underway.

The Town’s vitally important Cragin water supply project is partially funded by Federal stimulus dollars of the American Recovery and Reinvestment Act “ARRA” of 2009. The Town of Payson was officially awarded a total of \$4.0M of forgivable debt (grant) and a ~\$6.6M Water Infrastructure Finance Authority of Arizona “WIFA” loan in support of the “Phase I” project elements. This phase is nearing completion.

**Payson Cragin Water Pipeline Project – Phase I  
April 2012**

- Water treatment piloting: Complete.
- Water filtration plant preliminary design and engineering: 98% complete
- Finish water (filtered) pipeline design engineering: Complete
- Environmental Assessment: Complete
- SCADA control systems design (preliminary): Complete
- Advance purchase of 12.5 miles of 18 inch pipe: Complete
- Aquifer storage and recovery wells (included drilling and testing): Complete
- In-Town Improvements (Pending)

The Water Department plans to implement initial construction elements of the Project this summer with much of the work involving “in-Town” improvements. This will allow for initial construction efforts to begin while full project funding is pending authorization.

Full project funding of ~\$40M (including refinancing of any qualified existing debt), is currently anticipated to be provided through the Bureau of Reclamation’s Rural Water Program. The Town has already been accepted into this program. Ultimately, Project funding requires the acceptance of the Cragin Project Feasibility Study (pending) and subsequent issuance of a Feasibility Report prepared by the Bureau. Once the Bureau’s Feasibility Report is published, the Town may request Congressional Authorization for full funding and construction of the remaining major project components.

2012 WATER RESOURCES STATUS  
**C.C. CRAGIN STATUS Continued....**

Planning for the eventual delivery of surface water to the Town of Payson is on-going as are many engineering and study efforts. In 2011 through 2012, most major Project engineering works have been completed. This work has paved the way so that the Project may begin initial stages of construction, on schedule, in 2012-13.

The Cragin Project has many moving parts. In 2011-12 alone huge achievements were made in engineering design, water quality sampling, treatment, modeling, and aquifer storage and recovery. The hard work of contract engineers, chemists, hydrologist, economists, and the Town Cragin utilization team is paying off with a draft Feasibility Study now pending submittal to the Bureau of Reclamation. In the meantime, water resources supply and demand data are continually being updated and analyzed to identify and account for changes. Data continue to indicate that, with both groundwater and surface water supplies in-hand, the Town will have achieved its goal of long-term water supply sustainability, able to support virtually any conceivable build-out population estimate. This fact is a rare occurrence in the desert southwest and something for the community to be very proud of.