Water Resource Committee

Patricia Olsen, Karen Krippene, Rose Mary Barnes

Webpage

The BCRC Water Resource webpage was updated. The follow links/documents were added:

- The University of Arizona Extension Well Owner's Guide to Groundwater Resources in Yavapai County
- The Yavapai County Water Advisory Committee documents:
  - Where is the Water?
  - How much water is there?
  - Water Budgets
- The Holocene Alluvium Report (Maps) by USGS

Consumer Confidence Report

Arizona Water Company and Montezuma Rimrock Water Company (MRWC) were contacted to discuss the possibility of adding their Consumer Confidence Reports (CCR) or a link to the BCRC Water Resource Page. These reports are published in July for the preceding year. MRWC has agreed to publish their report. A response from Arizona Water Company is pending. As soon as they are reviewed and approved by ADEQ they will be added to the Water Resource page.

The CCRs detail the water quality of the groundwater pumped by the two companies. This may be helpful to those private well owners within the vicinity of the companies' wells. This provides a glimpse of what groundwater in close proximity of the wells may be. However, private well owners should not rely completely on these reports to determine their groundwater quality.

MRWC

MRWC is a private utility company and is not obligated to discuss their operations with outside organizations. However, out of courtesy, MRWC is willing to state that it is not currently making any changes to its system.

CYWRMS

The Central Yavapai Highlands Water Resource Management Study (CYHWRMS) is investigating the Septic System and Groundwater Alternative sources. These reports discuss the conversion of septic systems to a centralized waste water treatment system. Likewise, this also discusses the private well owners to a centralized water treatment facility. Lake Montezuma and the Rimrock areas are included in this report. The reports are on subsequent pages.

Alternative #3
Conversion of Existing Septic Systems (Urban)

Description

A source of unutilized wastewater is those from septic systems. This alternative proposes converting existing septic systems to sewer service resulting in increased effluent production, specifically in urban areas. For the purposes of this discussion only, urban areas are those serviced by a water provider. These areas are believed to have smaller lots and a higher density of households than non-urban areas. Higher density will result in a more cost effective alternative than in rural areas. Furthermore, resources may already in place that would facilitate the construction of sewer infrastructure, such as right-of-ways.

The new or additional effluent will only be of value if it reduces demand for another water supply or provides a new water supply. Two "uses" of the additional effluent will be considered. Direct use will consist of irrigation that replaces a particular volume of an existing water source. Indirect use will include recharge into the groundwater supply. The amount of treatment and resulting cost will depend on the desired use.

There are several combinations of infrastructure requirements possible, the extent of which is dependent on the existence and capacity of existing infrastructure as well as the geographic relationship of septic systems to existing facilities. Use of the effluent may also require additional infrastructure to increase or create new capacity to deliver effluent.

Three scenarios have been identified. Planning areas will be categorized into each scenario or group. Each group will be described and discussed in terms of cost, legal and institutional issues and environmental issues. The description of infrastructure and costing will be general in nature. Estimates of additional capacity or new treatment facilities will be provided. Costing of sewer lines will be limited to a per mile cost. Gravity sewer systems will be assumed. There may also be a cost for the septic system owner and an average cost per conversion will be provided. Finally, an average cost of direct or indirect use will be calculated.

Group A – existing wastewater treatment facility can accommodate additional capacity

Group B – existing wastewater treatment facility will need to build additional capacity

Group C – a new wastewater treatment facility is required

Table xx. Grouping of Planning Areas

	Planning Area	Volume of Septic Wastewater (acre-feet per year)
Group A	Camp Verde	207
	Chino Valley	47
	Jerome	10
	Prescott Valley	664
	Sedona	151

Group B	Big Park	276
	Clarkdale	40
	Cottonwood	821
	Prescott	751
Group C	Lake Montezuma	254
	Paulden	146

Infrastructure

The type and amount of infrastructure required will depend on the scenario or grouping of each planning area, as well as the eventual use of the new effluent. A gravity sewage collection system is assumed. A wastewater treatment plant with secondary treatment using primarily biological (solid screening and sedimentation) and some chemical treatment (chlorine disinfection) is the standard used throughout the alternative analysis.

Group A infrastructure requirements are limited to sewage collection systems if needed. Sewer lines, manholes and lift stations are the main components of this additional infrastructure. Septic system owners need a yard line and tap to connect to a sewer system. The use of the effluent may also require infrastructure. Direct use will include a pressurized system with valves to deliver effluent to a location for irrigation. Indirect use will consist of pipe and simple recharge structure.

Group B includes the requirements from Group A and infrastructure to increase the capacity of an existing wastewater treatment plant. Examples of needed infrastructure can include screens, clarifiers, pumps and basins. Costing will be for the increased capacity as a whole and not detailed by equipment.

Group C includes the requirements from Group A and the construction of a new wastewater treatment plant. The capacity of the plant will be specific to a planning area.

Alternative Analysis

Cost

The unique situation of each planning area will have a big impact on detailed estimates. However, determining detailed estimates requires information beyond the scope of an appraisal analysis. Meaningful and comparative estimates can be made by providing general and, where appropriate, specific costs by group. For example, the cost of added sewage collection infrastructure will be given as cost per linear mile. This cost applies to all groups. On the other hand, the cost to increase wastewater treatment capacity can be approximated by planning area using a cost per volume of wastewater.

Group A

The costs associated with collecting and treating wastewater are limited to sewage collection system, abandonment of septic system and cost of connecting to the sewer system. Only construction costs are discussed. Table xx shows the wastewater volumes associated with these planning areas.

Table xx. Group A Wastewater Volumes

Planning Area	New Wastewater Volume *	Current Effluent Generated*	Current Plant Capacity*
Camp Verde	207	195	728
Chino Valley	47	242	560
Jerome	10	56	78
Prescott Valley	664	2,750	4,200
Sedona	151	1,410	1,792

*- Acre-feet per year

Table xx and Table xx show the costs associated with Group A. Assumptions are described immediately after each table.

Table xx. Group A Sewage Collection Cost Estimate per Mile

	Unit Cost Estimate	
Sewage Collection System		
Pipe costs	$28.69/linear foot	$151,483
Trenching, backfill and compaction	$91.14/cubic yard	$142,543
Manholes (13 per mile)	$2,356/manhole	$30,624
Repavement	$675,950/mile	$675,950
Lift Station		

Sewer line construction assumes the use of vitrified clay pipe 12" diameter. The trench is assumed to be 4ft deep, 2ft wide and 5280ft long. Manholes are spaced at 400 feet. Repavement costs are an estimate taken from Larimer County, Colorado.

Table xx Group A Septic Owner Cost Estimate

	Unit Cost Estimate	
Connection to Sewer		$3,027
Pipe costs including trenching	$10.08/linear foot	$2,016
Backfill and compaction	$35.28cubic yard	$261
Connection to sewer line	$750	$750

A common ordinance of many cities and towns is that any septic systems within 400 feet of a sewer collection line must connect to the sewer system. An average distance of 200 feet and 18" depth is assumed for a yard line for a cost estimate. The pipe material is 4" pvc.

Table xx. Group B Wastewater Volumes

Planning Area	New Wastewater Volume *	Current Effluent Generated*	Current Plant Capacity*

Big Park	276	224	560
Clarkdale	40	291	280
Cottonwood	821	1,008	1,680
Prescott[1]	751	3,696	4,032

*- Acre-feet per year

[1]- Current volume and capacity are for Sundog and Airport plants only

Table xx. Group C Wastewater Volumes

Planning Area	New Wastewater Volume *	Current Effluent Generated*	Current Plant Capacity*
Lake Montezuma	254	N/A	N/A
Paulden	146	N/A	N/A

*- Acre-feet per year

Facility cost 2008 $6.45 gallon for 1.0 MGD plant
Lake Montezuma – 230,000 gallons per day = $1,462,581 cost

Legal and Institutional

Environmental

Central Yavapai Highlands Water Resource Management Study
ALTERNATIVE FORMULATION – GROUNDWATER
PRELIMINARY DRAFT SUBJECT TO REVISION
Prepared by Marvin Murray
February 2011

BIG CHINO SUB-BASIN: EXEMPT WELLS

Big Chino Sub-Basin -- Community Data (Population Change to 2050)

Big Chino Sub-basin	Population Change (2000 – 2050)	Average Persons per Household (2000 census)*	Household Units	2050 Water Demand -- Increase Only (afy)	Average 2050 Daily Demand (gpm)
Paulden CDP	8,757	2.99	2,929	-659	407
Prescott CCD	3,582	2.37	1,511	-40	25
Ashfork CCD	67,530	2.44	27,676	-10,231	6,336

*US Census Bureau: Households and Families 2000 – County – County Subdivision and Place, Census 2000 Summary File 2 (SF2) 100-Percent Data, GCT-P7.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF2_GCTP7.CY10&prodType=table

2050 Water Use by Household

Big Chino Sub-basin	Average Persons per Household (2000 census)*	Minimum Daily Water Use per Household (gpd)*	Annual Water Use per Household (afy)
Paulden CDP	2.99	206	0.23
Prescott CCD	2.37	164	0.18
Ashfork CCD	2.44	168	0.19

*Expected daily water use per person = 69 gpd

Exempt Wells -- Capital Costs ($):

Big Chino Sub-basin	Exempt Wells (#)*	Discharge Rate (gpm)	Exempt Well Cost ($/well)**	Collective Exempt Well Costs ($)
Paulden CDP	2,929	≤ 35	17,500	51,257,500
Prescott CCD	1,511	≤ 3	17,500	26,442,500
Ashfork CCD	27.676	≤ 35	17,500	484,330,000

*Household Unit ↔ Exempt Wells
**1st quarter 2011 capital costs (Cost Data provided as researched by John Rasmussen personal communication)

- Economics: System Cost: Range -- $15,000 to $20,000 (includes equipped well, storage tank, and other appurtenances necessary to deliver a source of groundwater to a user.). It is assumed that each exempt well is fully equipped and

connected to a household. The probable cost of an exempt well is expected to cost $17,500. FY 2011 Water Project Discount Rate = 4.125%

- Technical -- Groundwater System:
  - Water Supply System
    - Well and related equipment
    - Storage
    - Treatment System (Arsenic only) – Household System, Potable use only – RO @ $600 per household – POU only
    - Distribution/Delivery

Big Chino Sub-basin -- Average Well Parameters (Production rate ≤ 35 gpm; Well Data: 2000 -- Present)*

Discharge (gpm)	Casing Diameter (inches)	Average Drilled Depth (ft)	Pump (hp)
≤35	6	389	5

*Source: https://gisweb.azwater.gov/WellRegistry/SearchWellReg.aspx; Big Chino Subbasin

Exempt Wells – Daily Power and Energy Requirements

Power and Energy Per Exempt Well				
Big Chino Sub-basin	Power (kw/well/day)	Total Power Requirements All Exempt Wells (kw/day)	Energy (kwh/well/day)	Total Energy Requirements – All Exempt Wells (kwh/day)
Paulden CDP	3.7	10,837	90	263,610
Prescott CCD	3.7	5,591	90	135,990
Ashfork CCD	3.7	102,401	90	2,490,840

Institutional:

Ownership/Operation and Maintenance

- Exempt Well Owners
- Others

Regulatory:

- Arizona Department of Water Resources
- Arizona Department of Environmental Quality
- Arizona Department of Health Services
- Yavapai County
- Others

Others

Legal:

- Federal Law and Federal Register Directives
- Arizona State Law and Administrative Code
- Yavapai County Resolutions and Ordinances
- Other

BIG CHINO SUB-BASIN: NON-EXEMPT WELLS

Big Chino Sub-Basin -- Community Data

Big Chino Sub-basin	Population Change (2000 – 2050)	Persons per Household (2000 census)	2050 Water Demand -- Increase Only (afy)	Average 2050 Daily Demand (gpm)
Paulden CDP	8,757	2.99	-659	407
Prescott CCD	3,582	2.37	-40	25
Ashfork CCD	67,530	2.44	-10,231	6,336

Non-Exempt Wells -- Capital Costs ($):

Big Chino Sub-basin	Non-Exempt Wells (#)*	Discharge Rate (≥ 35 gpm)	Non-Exempt Well Cost ($/well)**	Total Non-Exempt Well Costs ($)
Paulden CDP	3	313	46,500	139,500
Prescott CCD	2	35	17,500	35,000
Ashfork CCD	25	313	46,500	1,162,500

*Required Well + Variable Redundancy to the nearest whole well)
**1st quarter 2011 costs (Cost Data provided as researched by John Rasmussen personal communication)

Big Chino Sub-basin -- Average Well Parameters (Production rate 35 gpm≥; Well Data: 2000 -- Present)*

Discharge (gpm)	Casing Diameter (inches)	Average Drilled Depth (ft)	Pump (hp)
313	8	400	40

*Source: https://gisweb.azwater.gov/WellRegistry/SearchWellReg.aspx; Big Chino Subbasin

2011 Water Project Discount Rate = 4.125%

Big Chino Subbasin Non-Exempt Wells

Big Chino Sub-basin	Operational Wells (#)	Redundant Wells (#)	Total Wells (#)
Paulden CDP	2	1	3
Prescott CCD	1	1	2
Ashfork CCD	20	5	25

Big Chino Sub-basin Power and Energy Requirements (Production rate 35 gpm≥; Data: 2000 -- Present)

Big Chino Sub-basin	Total Dynamic Head per well (ft)	Power per well (kw)	Daily Energy Demand per Well (kwh)
Paulden CDP	440	30	720
Prescott CCD (portion)	440	5	120
Ashfork CCD	440	30	720

Non-Exempt Wells -- Power and Energy Requirements

Power and Maximum Energy per Well and Total for All Wells				
Big Chino Sub-basin	Power (kw/well)	Total Power Requirements (kw/day)	Energy (kwh/well/day)	Total Energy Requirements(kwh/day) (#/wells)
Paulden CDP	30	60	720	1,440
Prescott CCD	5	5	120	120
Ashfork CCD	30	600	720	14,400

Technical:

Groundwater System

- Water Supply System
  - Well and related equipment
  - Storage
  - Treatment (Arsenic only) Household System, Potable use only – RO @ $600 per household – POU or Central System (See Arsenic Treatment)
  - Distribution/Delivery
  - Point of Use
- Economics

Non-Exempt Wells: Arsenic Treatment only – Central System (Flow Rate = 320 gpm)

Treatment Method	Capital Cost ($)*	Annual O&M Cost ($)*
Iron Oxidant and Filtration	411,100	11,900
Ion Exchange	319,500	55,200
Iron Based Sorbents	299,200	118,500
Activated Alumina	319,000	124,800

*4th qtr 2005 indexed to 4th qtr 2010 – Bureau of Reclamation Construction Cost Trends Composite Index

Cost Source: Guidance Document: Arsenic Treatment for Small Water Systems, Washington State Department of Health, November 2005.

http://smallwatersystems.ucdavis.edu/documents/ArsenicTreatmentForSmallWaterSystems.pdf

Institutional:

Ownership/Operation and Maintenance

- Public
- Private
- Other

Regulatory

- Arizona Corporation Commission
- Arizona Department of Water Resources
- Arizona Department of Environmental Quality
- Arizona Department of Health Services
- Yavapai County
- Others

Legal:

- Federal Law and Federal Register Directives
- AZ State Law and Administrative Code
- County Ordinances and Resolutions
- Other

PRESCOTT AMA SUB-BASIN – EXEMPT WELLS

Prescott AMA Community Data: (Population Change to 2050):

Prescott AMA	Population Change (2000 – 2050)	Persons per Household (2000 census)*	Household Units	2050 Water Demand -- Increase Only (afy)	Average 2050 Daily Demand (gpm)
Dewey Humboldt	2,810	2.25	1,249	113	71
Prescott Valley	102,390	2.60	39,381	-13,898	8,617
Chino Valley	51,000	2.58	19,767	-7,576	4,698
Prescott	50,928	2.11	23,838	-3,856	2,391
Prescott CCD (portion)	20,298	2.35	8,637	857	532
Mingus Mountain CCD (portion)	1,960	2.39	820	-6	4
Humboldt CCD (portion)	45	2.50	18	4	3

**US Census Bureau: Households and Families 2000 – County – County Subdivision and Place, Census 2000 Summary File 2 (SF2) 100-Percent Data, GCT-P7.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF2_GCTP7.CY10&prodType=tabl

2050 Water Use by Household

Prescott AMA Subbasin	Average Persons per Household (2000 census)*	Minimum Daily Water Use per Household (gpd)*	Annual Water Use per Household (afy)
Dewey Humboldt	2.25	155	0.17
Prescott Valley	2.60	179	0.20
Chino Valley	2.58	178	0.20
Prescott	2.11	146	0.16
Prescott CCD (portion)	2.35	162	0.18
Mingus Mountain CCD (portion)	2.39	165	0.18
Humboldt CCD (portion)	2.50	172	0.19

*Expected daily water use per person = 69 gpd

Prescott AMA Exempt Wells Capital Cost ($)

Prescott AMA Subbasin	Exempt Wells (#)*	Discharge Rate (gpm)	Exempt Well Cost ($/well)**	Collective Exempt Well Costs ($)
Dewey Humboldt	1,249	≤35	17,500	21,857,500
Prescott Valley	39,381	≤35	17,500	689,167,500
Chino Valley	19,767	≤35	17,500	345,922,500
Prescott	23,838	≤35	17,500	417,165,000
Prescott CCD (portion)	8,637	≤35	17,500	151,147,500
Mingus Mountain CCD (portion)	820	≤35	17,500	14,350,000
Humboldt CCD (portion)	18	≤35	17,500	315,000

*Household Unit ↔ Exempt Wells

**1st quarter 2011 capital costs (Cost Data provided as researched by John Rasmussen personal communication)

- Economics: System Cost: Range -- $15,000 to $20,000 (includes equipped well, storage tank, and other appurtenances necessary to deliver a source of groundwater to a user.). It is assumed that each exempt well is fully equipped and connected to a household. The probable cost of an exempt well is expected to cost $17,500. 1st quarter Capital Cost 2011. Water Project Discount Rate, FY 2011 = 4.125%
- Technical -- Groundwater System:
  - Water Supply System
    - Well and related equipment
    - Storage
    - Treatment System (Arsenic only) – Potable use only – RO @ $600 per household – POU only
    - Distribution/Delivery

Prescott AMA Sub-basin -- Average Well Parameters (Production rate ≤ 35 gpm; Well Data: 2000 -- Present)

Discharge (gpm)	Casing Diameter (inches)	Average Drilled Depth (ft)	Pump (hp)
35	6	452	5

Source: https://gisweb.azwater.gov/WellRegistry/SearchWellReg.aspx; Prescott AMA Subbasin

Exempt Wells – Daily Power and Energy Requirements

Power and Energy Per Exempt Well				
Prescott AMA	Power (kw/well/day)	Total Power Requirements All Exempt Wells (kw/day)	Energy (kwh/well/day)	Total Energy Requirements – All Exempt Wells (kwh/day)
Dewey Humboldt	3.7	4,621	89	111,161
Prescott Valley	3.7	1,473,747	89	3,544,959
Chino Valley	3.7	731,379	89	1,759,263
Prescott	3.7	882,006	89	2,121,582
Prescott CCD (portion)	3.7	31,957	89	768,693
Mingus Mountain CCD (portion)	3.7	3,034	89	72,980
Humboldt CCD (portion)	3.7	67	89	1,602

Prescott AMA Non-Exempt Wells

NOTE: No Non-Exempt Well Alternatives will be formulated for the Prescott AMA.

VERDE VALLEY SUB-BASIN

Communities/(Population Change to 2050):

Verde Valley Sub-Basin	Population Change (2000 – 2050)	Persons per Household (2000 census)*	2050 Water Demand -- Increase Only (afy)	Average 2050 Daily Demand (gpm)
Camp Verde	10,608	2.52	1,423	883
Clarkdale	18,461	2.39	-1,712	1062
Cottonwood	57,230	2.27	-11,112	6890
Jerome	290	1.81	-0	0
Sedona	6,020	2.12	-3,061	1898
Big Park CDP	1,079	2.01	-1,096	6796
Cornville CDP	3,373	2.47	866	537
Lake Montezuma CDP	4,071	2.27	-887	550
Cottonwood – Verde Village CDP	7,335	2.53	-1,160	720
Verde CCD	8,300	2.27	-1,637	1015
Mingus Mountain CCD (portion)	840	2.60	-61	38
Humboldt CCD (portion)	2,225	2.50	-62	39

**US Census Bureau: Households and Families 2000 – County – County Subdivision and Place, Census 2000 Summary File 2 (SF2) 100-Percent Data, GCT-P7.
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF2_GCTP7.CY10&prodType=table

Verde Valley Exempt Wells //////////////////////

Verde Valley Sub-Basin -- Community Data (Population Change to 2050)

Verde Valley Sub-basin	Population Change (2000 – 2050)	Average Persons per Household (2000 census)*	Household Units	2050 Water Demand -- Increase Only (afy)	Average 2050 Daily Demand (gpm)
Camp Verde	10,608	2.52	4,210	1,423	882
Clarkdale	18,461	2.39	7,724	-1,712	1,061
Cottonwood	57,230	2.27	25,211	-11,112	6,889
Jerome	290	1.81	160	-0	0
Sedona	6,020	2.12	2,840	-3,061	1,898
Big Park CDP	1,079	2.01	537	-1,096	680
Cornville	3,373	2.47	1,366	866	847

CDP					
Lake Montezuma CDP	4,071	2.27	1,793	-887	550
Cottonwood – Verde Village CDP	7,335	2.53	2,899	-1,160	719
Verde CCD	8,300	2.27	3,656	-1,637	1015
Mingus Mountain CCD (portion)	840	2.60	323	-61	38
Humboldt CCD (portion)	2,225	2.50	890	-62	38

*US Census Bureau: Households and Families 2000 – County – County Subdivision and Place, Census 2000 Summary File 2 (SF2) 100-Percent Data, GCT-P7.
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*Expected daily water use per person = 69 gpd

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    - Water Supply System

- Well and related equipment
- Storage
- Treatment System (Arsenic only) – Household System, Potable use only – RO @ $600 per household – POU only
- Distribution/Delivery

Big Chino Sub-basin -- Average Well Parameters (Production rate ≤ 35 gpm; Well Data: 2000 -- Present)*

Discharge (gpm)	Casing Diameter (inches)	Average Drilled Depth (ft)	Pump (hp)
≤35	6	389	5

*Source: https://gisweb.azwater.gov/WellRegistry/SearchWellReg.aspx; Big Chino Subbasin

Exempt Wells – Daily Power and Energy Requirements

Power and Energy Per Exempt Well				
Big Chino Sub-basin	Power (kw/well/day)	Total Power Requirements All Exempt Wells (kw/day)	Energy (kwh/well/day)	Total Energy Requirements – All Exempt Wells (kwh/day)
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Prescott CCD	3.7	5,591	90	135,990
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Institutional:

Ownership/Operation and Maintenance

- Exempt Well Owners
- Others

Regulatory:

- Arizona Department of Water Resources
- Arizona Department of Environmental Quality
- Arizona Department of Health Services
- Yavapai County
- Others

Others

Legal:

- Federal Law and Federal Register Directives
- Arizona State Law and Administrative Code

- Yavapai County Resolutions and Ordinances
- Other

BIG CHINO SUB-BASIN: NON-EXEMPT WELLS

Big Chino Sub-Basin -- Community Data

Big Chino Sub-basin	Population Change (2000 – 2050)	Persons per Household (2000 census)	2050 Water Demand -- Increase Only (afy)	Average 2050 Daily Demand (gpm)
Paulden CDP	8,757	2.99	-659	407
Prescott CCD	3,582	2.37	-40	25
Ashfork CCD	67,530	2.44	-10,231	6,336

Non-Exempt Wells -- Capital Costs ($):

Big Chino Sub-basin	Non-Exempt Wells (#)*	Discharge Rate (≥ 35 gpm)	Non-Exempt Well Cost ($/well)**	Total Non-Exempt Well Costs ($)
Paulden CDP	3	313	46,500	139,500
Prescott CCD	2	35	17,500	35,000
Ashfork CCD	25	313	46,500	1,162,500

*Required Well + Variable Redundancy to the nearest whole well)
**1st quarter 2011 costs (Cost Data provided as researched by John Rasmussen personal communication)

Big Chino Sub-basin -- Average Well Parameters (Production rate 35 gpm≥; Well Data: 2000 -- Present)*

Discharge (gpm)	Casing Diameter (inches)	Average Drilled Depth (ft)	Pump (hp)
313	8	400	40

*Source: https://gisweb.azwater.gov/WellRegistry/SearchWellReg.aspx; Big Chino Subbasin

2011 Water Project Discount Rate = 4.125%

Big Chino Subbasin Non-Exempt Wells

Big Chino Sub-basin	Operational Wells (#)	Redundant Wells (#)	Total Wells (#)
Paulden CDP	2	1	3
Prescott CCD	1	1	2
Ashfork CCD	20	5	25

Big Chino Sub-basin Power and Energy Requirements (Production rate 35 gpm≥; Data: 2000 -- Present)

Big Chino Sub-basin	Total Dynamic Head per well (ft)	Power per well (kw)	Daily Energy Demand per Well (kwh)

Paulden CDP	440	30	720
Prescott CCD (portion)	440	5	120
Ashfork CCD	440	30	720

Non-Exempt Wells -- Power and Energy Requirements

Power and Maximum Energy per Well and Total for All Wells				
Big Chino Sub-basin	Power (kw/well)	Total Power Requirements (kw/day)	Energy (kwh/well/day)	Total Energy Requirements(kwh/day) (#/wells)
Paulden CDP	30	60	720	1,440
Prescott CCD	5	5	120	120
Ashfork CCD	30	600	720	14,400

Technical:

Groundwater System

- Water Supply System
  - Well and related equipment
  - Storage
  - Treatment (Arsenic only) Household System, Potable use only – RO @ $600 per household – POU or Central System (See Arsenic Treatment)
  - Distribution/Delivery
  - Point of Use
- Economics

Non-Exempt Wells: Arsenic Treatment only – Central System (Flow Rate = 320 gpm)

Treatment Method	Capital Cost ($)*	Annual O&M Cost ($)*
Iron Oxidant and Filtration	411,100	11,900
Ion Exchange	319,500	55,200
Iron Based Sorbents	299,200	118,500
Activated Alumina	319,000	124,800

*4th qtr 2005 indexed to 4th qtr 2010 – Bureau of Reclamation Construction Cost Trends Composite Index

Cost Source: Guidance Document: Arsenic Treatment for Small Water Systems, Washington State Department of Health, November 2005.

http://smallwatersystems.ucdavis.edu/documents/ArsenicTreatmentForSmallWaterSystems.pdf

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Non-Exempt Wells