

# CASTLE PINES

**METROPOLITAN DISTRICT**  
Serving Castle Pines Village Since 1973

## **WATER EDUCATION AND WATER RATES** **June 2007**

### **INTRODUCTION**

This Education Article is the annual water update of our system in Castle Pines Village (“CPV”). The Background Information (Part A) below is written to provide CPV residents with a better understanding of the water resources in Colorado and within CPV. The Water Rates section (Part B) provides some discussion and specifics with respect to water usage and rates in CPV. Please remember that **water is our most precious resource; it cannot be replaced by other resources.**

No matter how much is written, and realizing that Colorado will always be a semi-arid region, water conservation is our best answer. For those of you who have always been or who have recently become conservation minded (and there are many of you), your neighbors and the Castle Pines Metropolitan District thank you. For those who have not yet embraced the need for conservation, hopefully this Education Article will provide you the knowledge to also become conservation minded.

### **PART A. BACKGROUND INFORMATION**

#### **Who manages your water?**

The Castle Pines Metropolitan District (“Metro” or “District”) is a quasi-governmental entity under Colorado law, which was established in 1973 for the purpose of providing water, wastewater treatment, operation and maintenance of street improvements and storm drainage services to the CPV community. The Metro Board consists of five Village residents elected by the community to serve four-year terms, and it provides guidance and direction to a Metro staff of approximately 17 full-time employees and 14 part-time and seasonal employees.

#### **What are the two principal sources of water?**

- Groundwater. Groundwater may be found in underground rock formations, caverns, sand and gravel beds, and are collectively known as aquifers. We get this water from wells or natural springs. Metro’s current source of water is **only** from underground aquifers.
- Surface Water. Sources of fresh water found on the earth’s surface include lakes, streams, rivers, ponds and reservoirs. Much of this water is the result of snowmelt. Metro has limited surface water rights on East Plum Creek;(East Plum Creek runs along the west side of Santa Fe) however, Metro does not currently have the costly infrastructure (e.g., additional storage and enhanced well treatment facilities) in place to utilize these surface water rights. This is further discussed below under conjunctive use.



The US Geological Survey estimates that 467 million acre-feet of water are in storage in the bedrock aquifers in the Denver Basin; but that 259 million acre-feet are theoretically recoverable by gravity drainage of the aquifers. The Douglas County storage and recoverable portions are 92 and 49 million acre-feet, respectively. Generally, aquifers cannot be completely drained by wells, so the volume of recoverable water represents a theoretical, rather than practical, upper limit on yield.

In 1985 the State Legislature passed Senate Bill 5, which defined the tributary status of the Denver Basin supplies, how the ground water in the aquifers will be calculated, and “assumed” that the aquifers have a life of 100 years. Note that the State Legislature and **not the scientific community** determined the 100-year life. It is suspected that the 100-year life was defined as an easy way for administering the water supply of each of the aquifers. Depending upon the amount of use, these aquifers may or may not last 100 years. **It should be noted that these aquifers are not significantly recharged (less than 1 foot a year) by rain water and are therefore, considered a “non-renewable” supply of water. While most water industry experts believe that the supply will not go to zero anytime in the near future, they do believe that the cost to retrieve such supply from these aquifers will eventually become prohibitive. Although there appears to be adequate water supply for the next few generations, such water supply will eventually be depleted and/or become cost prohibitive. Thus, our current usage of water needs to be responsible...thinking ahead to the water needs of our grandchildren.**

As noted above, the effects of natural rain water recharge are limited! The Denver Basin underlies an area that is characterized as a **semi-arid climate, with only 14 inches of average annual precipitation**. This compares to about 50 inches of average annual evaporation. The 14 inches of average annual precipitation also compares to an approximate 32 to 40 inches of water needed to irrigate grass; thus, one can recognize the immediate problem.

### **How much water is Metro entitled to pump annually?**

It was noted above that Douglas County had approximately 49 million acre-feet of recoverable water within the four aquifers. Based on the Legislature’s 100-year scenario, Metro owns water rights from the combined four aquifers of the Denver Basin of about 5,000 acre-feet per year, which would approximate 0.5 million acre-feet over 100 years or about 1% of the 49 million acre-feet for all of Douglas County.

As of January 1, 2007, Metro has eight wells: four Arapahoe wells, three Denver wells, (including 1 well conveyed to Metro from Aslan in December 2006), and one Lower Dawson well. Metro is currently pumping slightly more than 1,000 acre-feet per year as compared to its decreed water rights of approximately 5,000 acre-feet. **However, we would be mistaken to take too much comfort from this positive “usage to decreed rights” relationship because there are several reasons why this can change overnight:**

- As CPV has continued to grow over the years, the amount of water pumped has considerably risen:
  - 638 acre-feet in 1999
  - 898 acre-feet in 2003
  - 851 acre-feet in 2004, lower due to a combination of greater precipitation, lower temperatures and conservation
  - 966 acre-feet in 2005
  - 1,092 acre-feet in 2006However, at full build-out of CPV, the demand could almost double to 2,000 acre-feet.
- The water in the Laramie-Fox Hills aquifer is not of the best quality plus it is quite deep. Thus, the decreed rights of about 900 acre-feet (included in the 5,000 acre-feet noted above)

may not have as much practical meaning.

- **It is quite possible that Metro’s decreed water rights might be significantly reduced because:**

- The 100-year supply assumption may, in fact, be significantly less.
- Other communities such as Denver and Aurora may begin to draw upon these underground aquifers rather than using their primary water supply of surface water. It should be noted that these underground aquifers are shared by numerous communities.
- The State Legislature has the authority to revise the decreed water rights as water supply and demand problems become more acute. As an example and primarily due to Colorado’s drought conditions, there were dozens of water bills that were introduced into the new Colorado State Legislature during calendar years 2003-2006.

**Notwithstanding the above discussion of decreed water rights, we need to be responsible citizens and not overuse our finite water supply to the detriment of future generations. In addition, we need to recognize that the cost to retrieve water from diminishing aquifers will continue to increase. For example, when current wells no longer can produce at acceptable rates, new wells will need to be drilled. Such new wells, depending on the depth of the aquifer, currently would cost a minimum of \$563,000 and possibly as much as \$1,000,000 each.**

**How much water does CPV use annually?**

Although the legislatures and the engineers normally talk in terms of acre-feet, usage is billed to consumers in gallons. Recall that one acre-foot approximates 326,000 gallons. Billable gallons in the past few calendar years have risen dramatically.

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| <b>2001</b> – 239 million gallons | <b>2004</b> – 225 million gallons |
| <b>2002</b> – 254 million gallons | <b>2005</b> – 266 million gallons |
| <b>2003</b> – 240 million gallons | <b>2006</b> – 300 million gallons |

We are encouraged by the many homeowners that are utilizing water conservation efforts to reduce their annual water usage but we also understand weather plays a big factor in usage. Although some of the additional demand over the years arose from further build-out of the community, the severe drought of the last few years has been a major factor in the increase.

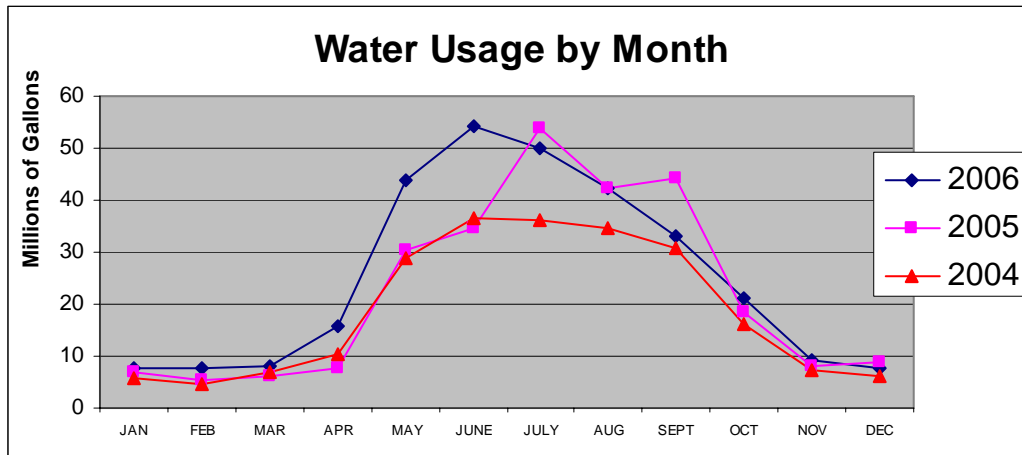
Of the 300 million billable gallons for 2006, a breakdown of use is as follows:

|   | <b>Millions of Gallons</b> | <b>Percent to Total</b> |
|---|----------------------------|-------------------------|
| Home “domestic” use (non-irrigation), estimated at 5 to 6 million gallons every month                   | 84                         | 28%                     |
| Home irrigation use, primarily occurring during the months of Apr through Oct                           | 193                        | 64%                     |
| Total home use  | 277                        | 92%                     |
| Castle Pines Homes Association and Metro (primarily irrigation of parks, common areas and rights-a-way) | 12                         | 4%                      |
| Commercial use (primarily two golf clubs potable water, developer use and the commercial area)          | 11                         | 4%                      |
| Total   | 300                        | 100%                    |

**Total homes demand:** In the winter non-irrigation months, normal billable gallons for all CPV homes approximate 5 to 6 million gallons. This volume basically represents home domestic use for showers, laundry, dish washing, etc. This winter demand for domestic use is estimated to be the

same during the irrigation months. However, during the irrigation months, total home demand can rise to 40 to 45 million gallons with the difference basically being irrigation demand. (Including CPHA, Metro and commercial use, the demand has risen to over 50 million gallons in a single month).

The graph below shows the three calendar years of 2004 through 2006 by month. Note the high volumes in the prime irrigation months of May through September.



Per household demand: On a per home basis, the average home uses approximately 5,000 to 6,000 gallons per month in the non-irrigation months. However, in the irrigation months, the “average” use balloons to 30,000 to 40,000 gallon per month. Although these monthly gallons by themselves are huge; it is even more pronounced when one considers that peak day demand is even greater. Note that these are mean averages, which are skewed by the 10% to 20% of the homes using in excess of 50,000 gallons (some even use in excess of 100,000 gallons) per month in the irrigation months. On the reverse side, 80% to 90% of the homes use 20,000 to 30,000 gallons even in the irrigation months. **It is the higher volume customers that cause additional costly infrastructure and the necessity for higher water rates.**

|          | All Homes |         | Homes Averaging 50,000 Gallons or Less |         | Homes Averaging More Than 50,000 Gal |         |
|----------|-----------|---------|--|---------|--------------------------------------|---------|
|          | # Homes   | Avg Gal | # Homes                                | Avg Gal | # Homes                              | Avg Gal |
| Jan 2006 | 1034      | 6,169   | 1030                                   | 5,882   | 4                                    | 80,000  |
| Feb      | 1040      | 5,291   | 1035                                   | 4,980   | 5                                    | 69,800  |
| Mar      | 1044      | 6,277   | 1038                                   | 5,636   | 6                                    | 117,167 |
| Apr      | 1046      | 11,690  | 1019                                   | 9,952   | 27                                   | 77,259  |
| May      | 1052      | 34,002  | 907                                    | 24,916  | 145                                  | 90,834  |
| Jun      | 1058      | 40,812  | 867                                    | 30,697  | 191                                  | 86,723  |
| Jul      | 1060      | 37,368  | 901                                    | 28,723  | 159                                  | 86,352  |
| Aug      | 1063      | 30,961  | 941                                    | 23,873  | 122                                  | 85,631  |
| Sep      | 1063      | 24,167  | 982                                    | 19,614  | 81                                   | 79,370  |
| Oct      | 1066      | 14,250  | 1033                                   | 12,589  | 33                                   | 66,212  |
| Nov      | 1067      | 5,900   | 1064                                   | 5,667   | 3                                    | 88,333  |
| Dec 2006 | 1068      | 5,359   | 1067                                   | 5,005   | 1                                    | 382,000 |

If the 50,000 plus-gallon homes had utilized a maximum of 50,000 gallons per month, the total home demand would have decreased by 27.7 million gallons, which represents 11% of the total home demand of 300 million gallons for 2006. (The above table does not include the combined

irrigation and household statistics for Village Lake and the Summit for 2006. Up until 2005, Village Lake irrigation was supplied by the developer and, therefore, comparable statistics were not available. In August 2005, Metro accepted responsibility for the maintenance of Well De8 and the lake. Village Lake irrigation will continue to be supplied by raw water from Well De8, not treated water from the Metro system. In addition, the Summit area was not included since it was anticipated that developer Aslan-Rivendell would supply water via their own private water company. Effective December 28, 2006, Aslan conveyed its private water system to Metro and the District has integrated its operation to include the Summit area. The Summit area will be included in water stats starting in 2007.

### **What assets are included in Metro's infrastructure?**

Due to increased growth of homes and increase in peak demand, Metro added a second water treatment plant and a 7<sup>th</sup> well in 2002. The total cost approximated \$4.40 million of which developers contributed \$2.85 million with the remainder financed by Metro Revenue Notes through year 2016.

The principal components of Metro's water system include:

- 8 wells with a total maximum output of 2,450 gallons per minute or 3.5 million gallons per day
- 2 water treatment plants with a total capacity of 3.8 million gallons per day
- 2 water storage tanks with a capacity of 3 million gallons
- 2 pump stations to lift water to higher elevation
- Approximately 84.7 miles of water lines
- 60 miles of sanitary sewer lines

Above, it was noted that the District consumed 50 million gallons in a given month. The simple arithmetic average would be about 1.6 million gallons per day over a 30 day month; but in essence, this might equate to 4.0 million gallons or more on a peak day or in a peak hour with very little volume on other days. **The cost problem here is that infrastructure needs to be sized to meet peak daily and hourly demands and not average demands.**

The current infrastructure is more than sufficient to meet the winter (non-irrigation) months' demand. With the 2002 addition of the second water treatment plant, it is believed that the current infrastructure can handle "current" summer demand (with all its irrigation requirements) and possibly future summer demand through build-out..... **IF CONSERVATION MEASURES ARE INCREASED.**

### **What is conjunctive use?**

As noted above, Metro utilizes deep wells to supply 100% of its water. These Denver Basin aquifers are very large and contain a significant amount of water, but water levels have been declining because many developments in the South Metro area of Denver also utilize these aquifers. In late 2003, there was considerable media coverage of the drought and Denver Basin well level issues after watering restrictions were implemented in Denver. Also, in December 2003, a comprehensive study of the Denver Basin aquifers was completed by a group of water districts called the South Metro Water Supply Study Board. The focus of the study was to determine whether these aquifers can meet the long-term demands of the existing and future population of the area and whether alternatives that utilize surface water to supplement the groundwater were feasible. **This combination of groundwater and surface water is called "conjunctive use".**

Your Castle Pines Metro District has been in the forefront of this issue and has been monitoring its well levels for over 20 years and in the mid 1990's utilized new technology and constructed a recharge, storage and recovery well. In 1985 the District secured some surface water rights in East Plum Creek. Also, the Plum Creek Wastewater Authority, managed by the District, has been providing a highly treated

wastewater effluent as reuse water for over 20 years to the two Castle Pines Village golf courses; and just recently, this effluent is supplied to the Ridge golf course in Castle Pines North. In addition, the District has been promoting water conservation for the last ten years and has assisted homeowner's with water audits and education on xeriscaping and other low water use landscaping. As a result, peak day water demands have been reduced and water use is lower but we have further reductions which need to be made in the water conservation area. However, even with these actions taken, water levels in the wells continue to decline which result in lower well pumping rates, which will eventually result in the addition of new wells.

In 2004, the District continued its efforts concerning long-term water supply issues by retaining independent engineers to prepare our own Conjunctive Use Study to determine what needed to be done for Castle Pines to assure a long-term water supply. Building on the data developed in the South Metro Water Supply Study (SMS), the Castle Pines Study (CPS) indicated that use of East Plum Creek surface water to augment and extend the District's existing groundwater aquifers was feasible "if" additional water rights and storage were obtained along East Plum Creek. The District filed for the additional water rights and storage in late 2004. The CPS also concluded that utilizing East Plum Creek as a renewable water supply to supplement the groundwater would require significantly fewer new future wells with a 2004 cost of approximately \$16 million. The CPS also evaluated the alternative of remaining exclusively reliant on groundwater for its supply in the future. The CPS concluded that if the predictions of well pumping rate declines in the SMS were correct, approximately 31 additional wells would need to be drilled in the next 50 years at a 2004 cost of approximately \$25 million. With either approach, the long-term water supply development can be done in phases with adequate time for planning if work continues methodically.

### **What are the key summary points?**

1. **Finite water supply.** Although our current water supply appears adequate, such supply is finite since it comes from non-replenishable underground aquifers. We need to be responsible citizens and continue to think about future generations.
2. **Effects on property values and operating costs.** Water supply affects the Village's property values and homeowners' annual operating costs. As demand increases, the well pumps must be lowered and possibly new wells added with a pass-through of the resulting higher costs to the residents in the form of higher fixed charges and/or usage charges. As pumps are lowered in the same well, the pumping rate of a well will decline which will result in the drilling of costly new wells (e.g. if a current well can produce 600 gallons per minute and eventually decreases to 200 gallons per minute, more wells will have to be drilled to make up for the decline).
3. **Peaks in water demand.** Peaks in water demand, primarily due to irrigation demands, may necessitate additional costly infrastructure such as new wells and treatment plants, as was the case with the addition of Metro's second water treatment plant and a 7<sup>th</sup> well in 2002. An 8<sup>th</sup> well was conveyed to Metro in December 2006 from Aslan.
4. **Conservation. As a community, we need to promote conservation in order to:**
  - a. **Protect and prolong our finite supply of water.**
  - b. **Reduce the necessity of additional infrastructural assets. Note that conservation is a lot less expensive than additional infrastructure, whether for ground or surface water.**

**PART B. WATER RATES**  
**FREQUENTLY ASKED QUESTIONS**

**1. What is the District's Current Water Rate Structure?** The District utilizes a combination of fixed and variable water rates. The fixed rate is based on the meter size (e.g. one inch meter, which is typical of most homes, is \$26.25 per month). The variable portion is based on actual water usage. The primary reasons for a tiered structure are to (a) promote water conservation by all users and (b) recognize the additional cost of providing water in "peak-demand" irrigation periods. The District had a tiered water rate structure for approximately 15 years before temporarily adopting a flat rate structure on June 1, 2001. That temporary flat rate change was made to give the District time to develop and evaluate the tiered structure that is currently in place.

**2. What are the current variable or usage water rates?**

The District's variable water rates, which became effective April 1, 2007, are as follows:

- Tier 1            1 to 15,000 gallons per month        \$2.95 per 1000 gallons
- Tier 2            15,001 and more gallons per month    \$4.72 per 1000 gallons

**3. Does the Metro District have the right to revise the water rate structure?**

The District, a quasi-governmental entity under Colorado law, has been given the authority to set water rates under the laws of the State of Colorado. The District had had NO rate increases in four years! The Metro Board of Directors had not increased the rates since 2003, but a 5% increase was added to the tiered-rate water structure for the variable portion and for the base rate, which will help to off-set both infrastructure and normal operating costs.

**4. Are the District water rates comparable to the water rates being charged by other communities in the area?**

The water rate schedules of several communities in the area are continuously evaluated and considered in developing the fixed and variable water rates of the District. Generally, the District rates are comparable to the other communities (although, the District has seen other communities in 2004 beginning to again raise water rates as well as instituting prohibitions on watering). **However, due to the larger lot sizes in Castle Pines, the District's tiers were set at considerably higher levels than in other communities.**

**5. Was acreage considered in determining a tiered-rate structure?**

After considerable discussion, the Conservation Committee and the Metro Board concluded that acreage should not be a consideration for several reasons:

- Acreage was not a consideration in determining tap fees. For example, only 1 tap fee was charged for a single home on a 10-acre parcel; although 20 taps fees were charged in a 20-unit development on a similar 10-acre parcel. As we know, taps fees are necessary to pay for increased infrastructure.
- Charging tap fees based on acreage would have placed the conservationist at a disadvantage. It is quite possible for a 2 acre home to use less water than a ½ acre home as a result of conservation. **Such conservation might come from electing to irrigate less land and/or planting grasses that require less water.**
- In addition, acreage is not a consideration is establishing these monthly water usage rates because each home can control the amount of land that it wishes to irrigate and the amount of water it wishes to use. If homes elect to irrigate more, they need to be charged appropriately for these peak demands, which result in costly infrastructure.

**As noted in question #4 above, the only exception to the acreage question was to set the tiers at considerably higher levels than in other communities...thereby recognizing larger lot sizes in Castle Pines Village.**

**6. Where can I get help to lower my water usage?**

The District will provide expert **water meter management advice** free of charge to all interested residents. Almost all those that have already taken advantage of the District's water audits during the last three years have realized considerable savings. In addition, a **master gardener** is available for consultation on changing landscapes to a more water-conserving environment. This service is also free of charge. In 2007, the District has offered **free Slow the Flow irrigation audits** that are performed by an outside party. The District set aside \$15,000 in 2007 to fund this audit program. Also in 2007, the Board of Directors voted to give homeowners rebates for the purchase/installation of an **ET Controller**, which works in conjunction with your current irrigation system. The Board approved rebates of 50% of the purchase price of an ET Controller/Installation up to \$500 per household. You can call Sue Mantz at the District Office at 303-688-8330 to arrange for these services.

**7. Do the CPV golf courses use aquifer water for irrigation?**

No, the Village's two golf courses (The Golf Club at Castle Pines and the Country Club at Castle Pines) are almost entirely irrigated with effluent water, which is treated "sewer" water from the Plum Creek Waste Water Authority. Combined, the two golf courses used approximately 178 million gallons of effluent water in 2006.

**8. How are commercial customers charged?**

Commercial customers include the golf courses (primarily non-irrigation use), developers and retail establishments. These customers are charged for water using the same rate schedule that homeowners use.

**9. Is the District doing its part in promoting conservation?**

The Metro Board formed a Water Conservation Committee in May 2002. Today, the Committee consists of two resident/board members, five other community residents, two DRC committee members of the Castle Pines Homes Association, the CPHA manager and three Metro staff members. The Committee's primary purpose is (a) to provide continuing education to the community as to our water supply, demand, and rates, and (b) to increase water conservation within the Village. During the first six months or so, the Committee met monthly. It now meets monthly during the irrigation season and every other month in the winter, in addition to working behind the scenes gathering water statistics, etc. If you are interested in joining this committee, please call Sue Mantz at the District (303) 688-8330, for more information. This education article is a product of the Water Conservation Committee.

**10. Does the Water Conservation Committee have an action plan?**

The Committee has an on-going Action Plan, which is broken down into these areas:

- Continuing education. The belief is that if people truly understand the facts, they will lead, or at least actively participate in, the conservation effort.
- Use of conservation equipment. Metro has already installed a telemetry system and other devices to shut-off Metro's pre-set water clocks during rain and during periods of high humidity. In 2007, Metro added an additional weather monitoring system, which includes an ET rate. This system is connected to Metro's irrigation clocks and can monitor the clocks and shut them off based on actual weather events, if necessary. In the near future, the District plans to provide ET rate information, to homeowners with installed ET Controllers. The information will be provided on Channel 22 and the District's website.

- More detailed monitoring of water volumes. This enables Metro to better understand what is causing peak loads.
- Re-implementation of tiered water rates to encourage conservation.
- Interaction with Castle Pines Village Design Review Committee to encourage landscaping with less water requirements.
- Other actions including consideration of untreated well water (e.g. concept for Village Lakes area) or even effluent water to reduce demand on water treatment plants

**11. Is Castle Pines Metro District participating in the Reuter Hess project?**

The Reuter-Hess project is a reservoir being built by the Parker Water and Sanitation District in anticipation of their own conjunctive use plan. The reservoir was designed (and is being constructed) with expansion envisioned. The expansion will allow other communities to buy storage space in the reservoir. This requires the participating community to “bring your own” water since the community would only be buying “water storage space” in Reuter Hess, not storage with useable water. The District is evaluating whether Reuter Hess can fit into the District’s conjunctive use plan economically. The District is also monitoring surrounding community water planning efforts to determine whether other joint water projects could benefit the Metro District.

**12. What Capital Improvement Program is Metro involved in?**

**Transfer Pump Station & Line** - The District is currently finishing up construction of a water pumping station at Water Plant No. 1 on Happy Canyon Road and a water line that connects the two District Water Treatment Plants. This project will allow the District to pump water from any of its wells and treat the water at either water treatment plant. This creates redundancy and improves the reliability of the District’s water system. Also, this capability will be required as the District continues to develop more water from both groundwater and surface supplies. The District has also been re-drilling existing Wells De-10 and LDa-10 located behind Gate 3. These wells are being replaced due to the lower production rates and damage to the existing wells.

**13. Who is responsible for the operations and maintenance at Village Lakes?**

Lexi Development LLC, the successor to Fidelity Castle Pines, Ltd. (“Fidelity”), signed over to Metro the responsibility for the irrigation systems and lake within the Village Lakes area. Fidelity had drilled a single well into the Denver aquifer. This well supplies untreated well water to the lake and the irrigation systems within Village Lake. **It is important to note that these gallons do “not” flow through Metro’s water treatment plants, thereby saving Metro and the Village additional water treatment infrastructure investment.** Per contractual agreement between Metro and Lexi Development, Metro became responsible for this system in August 2005. The individual homes within Village Lake receive potable treated water direct from Metro for domestic use but not for irrigation use.

**14. Is Metro responsible for the entire area of Castle Pines Village?**

Yes, Metro is responsible for the entire area of Castle Pines Village. Developer Aslan-Rivendell (“Aslan”) formed a private water company to serve the residents located in the Summit area. Aslan was responsible for drilling and operating wells and for delivering potable water to the residents. Effective December 2006, Aslan conveyed the private water system to the District. This included a one million gallon storage tank, 1 additional booster pump station, 1 additional well, and approximately 14 miles of water lines. Metro is now responsible for the entire water system operation located within the Village. Aslan retains a portion of its capacity for future development.