



# Environmental & Civil Engineering Services

Engineering ♦ Geotechnical ♦ Testing

Thursday, November 15, 2007

Jerry Kerley  
City of Crossville  
99 Municipal Avenue  
Crossville, TN 38555

RE: City of Crossville  
Water Supply Assessment  
Crossville, TN  
Project #N/A

Dear Mr. Jerry Kerley:

At your request, I have evaluated the water demand, water surface elevations, rainfall, water storage capacity, and intake conditions at the Lake Holiday Water Treatment Plant and the Meadow Park Water Treatment Plant in an effort to ascertain an assessment of the water supply currently available to the City of Crossville. The current drought conditions have the area approximately 17 inches behind in rainfall at the current time for the 2007 calendar year.

No long-range forecasts for the end of the drought can be accurately made. The drought conditions have manifested in the form of severely declined reservoir and pond levels, low stream flows or no stream flows, and a severe reduction in soil moisture and groundwater elevations. The low soil moisture and groundwater elevations will have to be returned to a near saturation level prior to any substantial amount of runoff collecting in impoundments to raise reservoir levels.

I have attached a chart of the City of Crossville's recent pumping rates on a daily basis from late July through early November. During this period, the City has consumed water at the rate of 335 acre-feet per month. This has averaged out to be 161 acre-feet from the Meadow Park Reservoir and 174 acre-feet from the Lake Holiday Reservoir.

In addition, I have attached charts of recorded lake levels and rainfall for each of the reservoirs. The Meadow Park Reservoir has continued to decline despite receiving approximately 8.25 inches of rain since the beginning of August. As I mentioned earlier, the other environmental demands for rainwater will have to be satisfied before significant amounts of runoff contribute to higher lake levels. At the current conditions, rainfall of 1 to 2 inches often will produce little or no runoff that contributes significantly to the lake level. Meadow Park has an estimated 850 acre-feet of storage remaining prior to the intakes being unable to operate. At the current usage levels, this storage will be consumed in approximately 4 months or 120 days with no rainfall. The data analyzed reflects that environmental demands on the water in the reservoir are approximately 50 to 60% of the City's usage. Therefore, the reservoir has been declining at approximately 250 acre-feet per month.

The Lake Holiday Reservoir has less storage available than does the Meadow Park Reservoir and its lake level has been declining at a faster rate than the Meadow Park. The Lake Holiday Reservoir has approximately 90 to 100 days of storage with no rainfall before problems with the intakes produce inability to operate the facility. The Lake Holiday area has shown higher rainfalls of approximately 9.6 inches compared to the Meadow Park area with 8.25 inches; although, the rainfall has yet to produce a stable reservoir level in either location.

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I do not think that the area will continue with no rainfall. The real question is whether the rainfall will be sufficient to meet all environmental needs and produce adequate runoff to stabilize and refill the reservoirs before the end of March. The rainfall of the next four months will be critical to the recovery of the reservoirs as history has shown that the probability of gaining on the reservoir levels is low after the end of March.

For comparison, the average monthly rainfalls for this area are presented below:

**Cumberland County Average  
Rainfall by Month**

January	5.62 inches
February	5.08 inches
March	6.00 inches
April	4.73 inches
May	4.74 inches
June	4.57 inches
July	5.05 inches
August	4.45 inches
September	3.71 inches
October	3.22 inches
November	4.38 inches
December	5.62 inches

Only five years in the measured rainfall history of Cumberland County have exceeded a deficit in excess of 15 inches of rainfall not including the current year and it has not occurred since 1958 at all. September and October rainfall for this year has been at or above normal at both reservoirs. However, historically almost half of our annual rainfall occurs in the next four months. Should we not continue the trend of above average rainfalls such that the lake level charts define an upward trend prior to the end of December, I do not feel that the reservoirs will recover by the end of March. In such an instance the area will begin the next summer period with below normal reservoir levels resulting in a situation of a greatly reduced amount of water supply in storage.

A review of stream gauges in the area show that stream flow is still considerably below normal and has been for a period of approximately 2 years. The recharge of the groundwater system will require a considerable amount of the rainfall that does occur in the area.

If you have any questions regarding this project, please do not hesitate to call me.

Sincerely,  
Environmental & Civil Engineering Services



Scott J. Christian, P.E., NSPE, ASCE, XE  
Partner

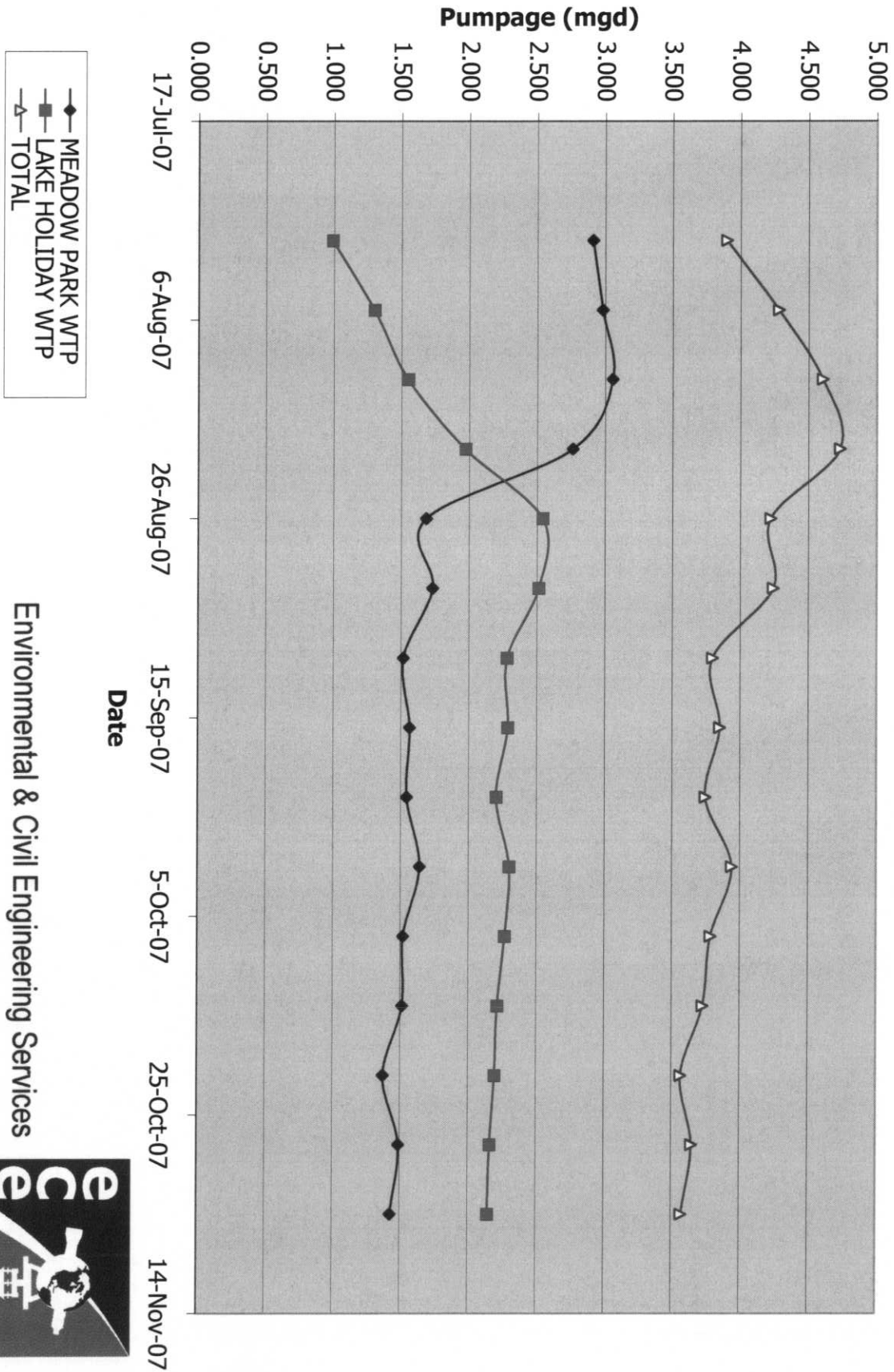
Enclosures: Charts

SJC/erh

CC: Project File



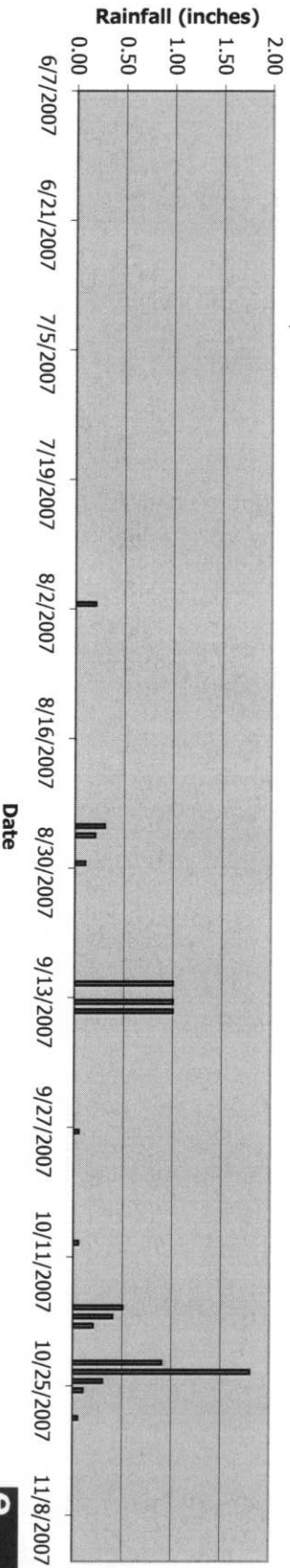
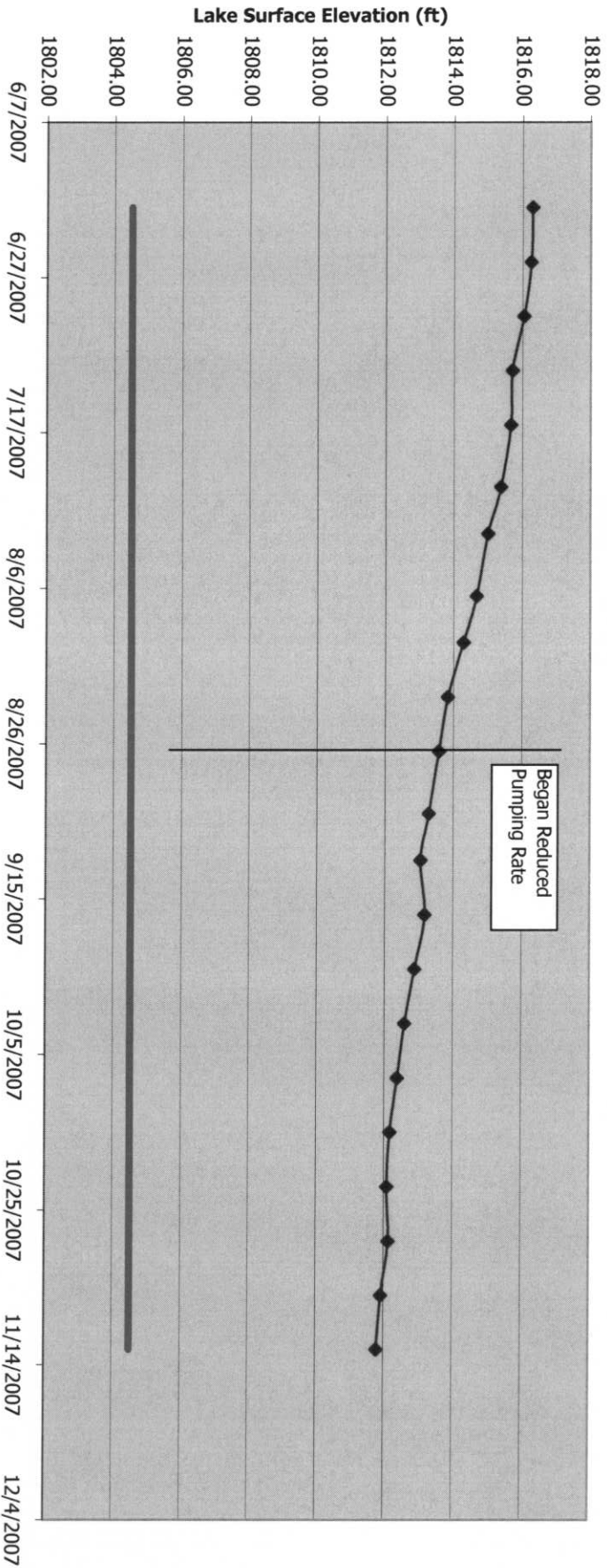
# CITY OF CROSSVILLE WATER SUPPLY ASSESSMENT AVERAGE DAILY PUMPING RATES



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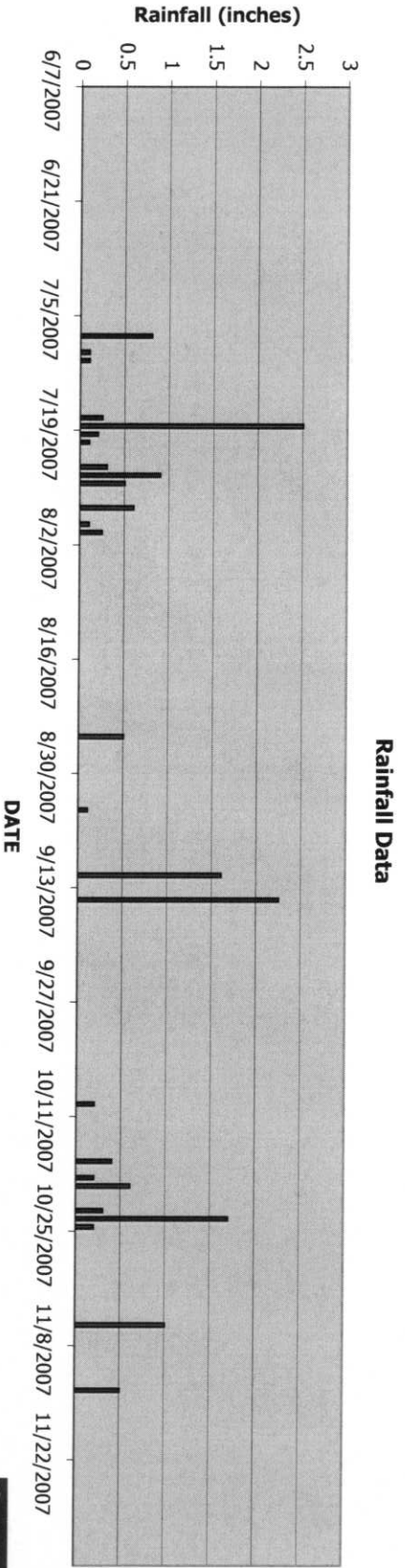
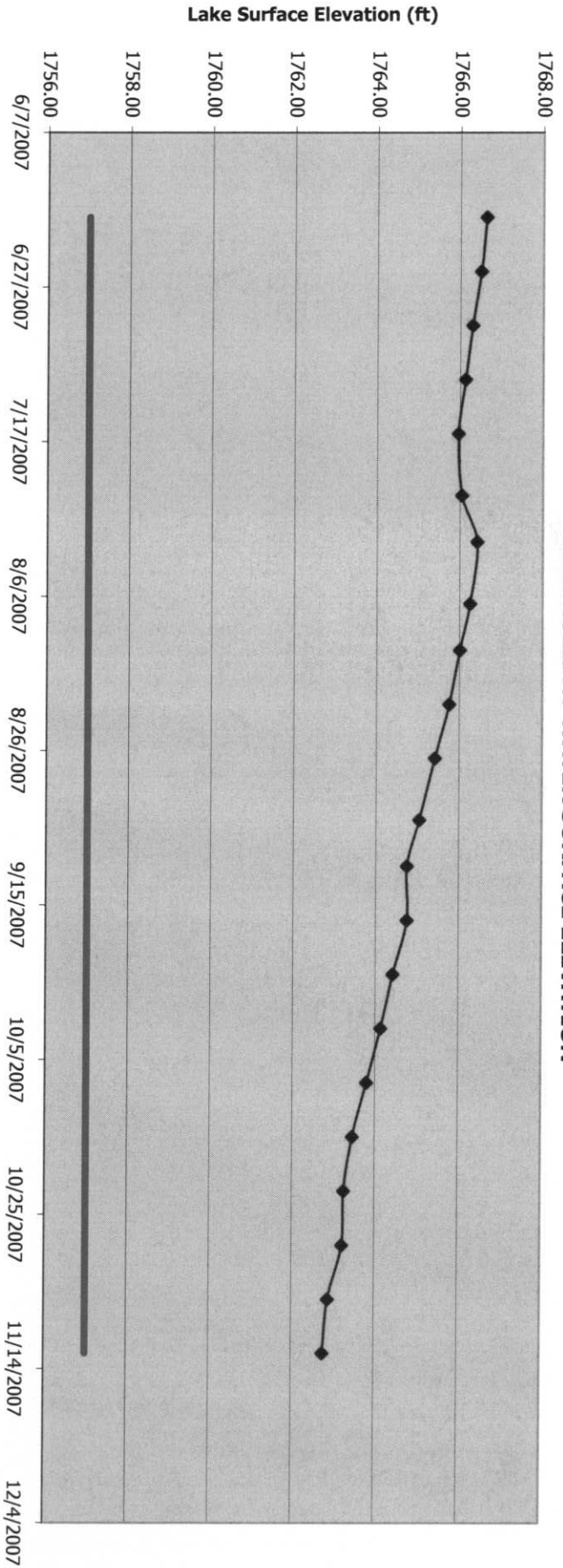
**CITY OF CROSSVILLE  
 WATER SUPPLY ASSESSMENT  
 MEADOW PARK LAKE WATER SURFACE ELEVATION**



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**CITY OF CROSSVILLE  
 WATER SUPPLY ASSESSMENT  
 LAKE HOLIDAY WATER SURFACE ELEVATION**



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