



Black Hawk Estates Drinking Water Project
SRF Loan #DW1401 (pop. 185)
\$1,001,000

Final Green Project Reserve Justification

Business Case GPR Documentation

INSTALLS ADDITIONAL WATER STORAGE CAPACITY AND APPURTENANCES TO ENABLE SIGNIFICANT ENERGY SAVINGS THROUGH SELECTIVE OFF-PEAK HOURS PUMPING. (Energy Efficiency)
Business Case per C3.1; C3.4-2; C3.5-1: *Projects that cost effectively eliminate pumps or pumping stations.* (\$337,000).

1. ADDITIONAL STORAGE CAPACITY¹

Summary

- A new storage tank will be constructed as part of a water system upgrade project; the size of the tank has been increased beyond that necessary for storage requirements to enable the optimization of power for pumping. The additional costs for the added storage capacity are GPR-eligible.
- Loan amount = \$1,001,000
- Energy savings (green) portion of loan = 34% (\$337,000) (based on contractor low-bid)

Background

- Black Hawk Estates is a fully developed subdivision of 138 homes, managed by the Black Hawk Homeowners Association (BHHO).
- An in-depth engineering review of the design of the water system upgrades for the BHHO indicated that increasing the water storage capacity of the tank would result in substantial power savings by enabling utilization of off-peak power rates. These power rates are approximately one-half of the peak weekday rates.
- In addition, pumping at night and weekends eliminates the power company demand charge, which is currently half of the power rate.
- The lines to the storage tank are currently not optimized for a larger tank. A separate inlet and outlet line is required to ensure mixing. With only one line, the water would surge in and out of the inlet during low flow conditions.
- Current power cost during the irrigation season is from \$4,000 to \$5,000 per month.



Results

- Refer to Table 1 and Table 2 on the next page. The total savings over the length of the loan from pumping in off-peak hours under Table 2 (Electric Service Schedule 35) would be:

Total power cost as billed from Table 1 (Schedule 6) =	\$36,729.40
Potential power cost w/ off-peak pumping and Sch. 35 =	\$14,838.39
Annual savings at consumption rate shown =	\$21,891.01
Energy cost savings over the 30-yr life of the loan =	$\$21,891.01/\text{yr} \times 30 \text{ yr} =$ \$656,730.30 PV @1.25% interest & 3.1171% energy inflation = \$882,689.26

- Switching power service to off-peak power schedule and installing a water storage tank and performing nighttime and weekend pumping operations will reduce power costs for this system by up to 75%.

¹ Energy Audit and Operational Optimization Review. David Start, DJ Power Consulting, LLC

(CONT.) ADDITIONAL STORAGE CAPACITY

Conclusion

- Based on the calculated power and cost savings, installation of additional storage capacity will enable significant energy savings through selective off-peak hours pumping.
- **GPR Costs:** Additional Storage Capacity = \$337,000
- **GPR Justification:** The project is Business Case GPR-eligible (Energy Efficiency) per Sections 3.1, 3.4.2, and 3.5-1²: “*improved technologies and practices to reduce the energy consumption of water projects, use energy in a more efficient way; approaches to integrate energy efficient practices into daily management; energy efficient retrofits, upgrades.*”

Month	Basic Charge	Demand (KW)	Demand		Energy (KWH)	Energy Rate (\$/KWH)	Energy Charge	Total
			Rate (\$/KW)	Demand Charge				
Nov 2012	\$35.00	197	\$10.99	\$2,164.92	3,000	\$0.0353067	\$105.92	\$2,305.84
Dec 2012	\$35.19	190	\$11.01	\$2,091.16	2,100	\$0.0354381	\$74.42	\$2,200.77
Jan 2013	\$37.00	170	\$11.81	\$2,007.70	6,900	\$0.0366957	\$253.20	\$2,297.90
Feb 2013	\$37.00	96	\$11.81	\$1,133.76	9,600	\$0.0366958	\$352.28	\$1,523.04
Mar 2013	\$37.00	151	\$11.81	\$1,783.31	14,400	\$0.0366958	\$528.42	\$2,348.73
Apr 2013	\$37.00	109	\$11.81	\$1,296.87	15,600	\$0.0366962	\$572.46	\$1,906.33
May 2013	\$37.00	203	\$11.81	\$2,915.08	46,200	\$0.0366961	\$1,695.36	\$4,647.44
June 2013	\$37.00	104	\$11.81	\$1,493.44	48,600	\$0.0366961	\$1,783.43	\$3,313.87
July 2013	\$37.00	120	\$11.81	\$1,723.20	51,300	\$0.0366959	\$1,882.50	\$3,642.70
Aug 2013	\$37.00	255	\$11.81	\$3,661.80	42,300	\$0.0366960	\$1,552.24	\$5,251.04
Sept 2013	\$37.00	223	\$11.81	\$3,202.28	30,900	\$0.0366961	\$1,133.91	\$4,373.19
Oct 2013	\$37.00	170	\$11.81	\$2,441.20	12,000	\$0.0366958	\$440.35	\$2,918.55
	\$440.19			\$25,914.72			\$10,374.49	\$36,729.40

Month	Basic Charge	Demand (peak kw)	Demand		Energy (KWH)	Energy Rate (\$/KWH)	Energy Charge	Total
			Rate (\$/KW)	Demand Charge				
Nov 2012	\$67.00	0	\$16.45	\$0.00	3,000	\$0.049609	\$148.83	\$215.83
Dec 2012	\$67.00	0	\$16.45	\$0.00	2,100	\$0.049609	\$104.18	\$171.18
Jan 2013	\$67.00	0	\$16.45	\$0.00	6,900	\$0.049609	\$342.30	\$409.30
Feb 2013	\$67.00	0	\$16.45	\$0.00	9,600	\$0.049609	\$476.25	\$543.25
Mar 2013	\$67.00	0	\$16.45	\$0.00	14,400	\$0.049609	\$714.37	\$781.37
Apr 2013	\$67.00	0	\$16.45	\$0.00	15,600	\$0.049609	\$773.90	\$840.90
May 2013	\$67.00	0	\$16.45	\$0.00	46,200	\$0.049609	\$2,291.94	\$2,358.94
June 2013	\$67.00	0	\$16.45	\$0.00	48,600	\$0.049609	\$2,411.00	\$2,478.00
July 2013	\$67.00	0	\$16.45	\$0.00	51,300	\$0.049609	\$2,544.94	\$2,611.94
Aug 2013	\$67.00	0	\$16.45	\$0.00	42,300	\$0.049609	\$2,098.46	\$2,165.46
Sept 2013	\$67.00	0	\$16.45	\$0.00	30,900	\$0.049609	\$1,532.92	\$1,599.92
Oct 2013	\$67.00	0	\$16.45	\$0.00	12,000	\$0.049609	\$595.31	\$662.31
				\$0.00			\$14,034.39	\$14,838.39

² Attachment 2. 2012 EPA Guidance for Determining Project Eligibility. p.10