

8. CONCLUSION

This report presents five viable alternatives for long-term solutions to Manteno's well contamination issues, along with a sixth alternative that was dismissed. These alternatives include utilization of the shallow limestone aquifer only; pumping from the deep aquifer only; combined usage of both the shallow aquifer and the deep sandstone aquifers; and obtaining potable water from an outside source. Some specifics are presented below.

Alternative 1: Obtain water from the shallow aquifer only, and drill new wells as necessary.

Alternative 1a:

- Treat for bacteriological contamination using a mixed media filtration system.
- Post-treat with chlorination sufficient to cause 0.5 log inactivation of *Giardia*.
- Incorporate used UV reactors into post-treatment.
- Add water storage facilities.
- Total 20-year capital and O&M costs are estimated on a present worth basis at \$53.1 million.

Alternative 1b:

- Treat for bacteriological contamination using a membrane filtration system.
- Post-treat with chlorination sufficient to cause 0.5 log inactivation of *Giardia*.
- Incorporate used UV reactors into post-treatment.
- Add water storage facilities.
- Total 20-year capital and O&M costs are estimated on a present worth basis at \$54.3 million.

Alternative 2: Obtain water from the deep aquifers, and drill new wells as necessary.

Alternative 2a (dismissed):

- Obtain water from the deep aquifers only.
- Remove radium through ion exchange softening
- Reduce dissolved chloride, sodium, and sulfate levels using reverse osmosis.
- Chemically treat the water to reduce its corrosiveness.
- Post-treat the water with chlorination to establish residual.
- Add water storage facilities.

Alternative 2b:

- Obtain water from both the deep aquifers and the shallow aquifer.
- Reduce concentrations of radium and dissolved solids in the deep well water to acceptable levels by blending with shallow well water.
- Treat for bacteriological contamination using a mixed media filtration system.

- Incorporate used UV reactors into post-treatment.
- Post-treat with chlorination sufficient to cause 0.5 log inactivation of *Giardia*.
- Add water storage facilities.
- Total 20-year capital and O&M costs are estimated on a present worth basis at \$50.4 million.

Alternative 3: Obtain water from an outside source (Aqua Illinois Water Company).

Alternative 3a:

- Purchase capacity in AI's water treatment system.
- Purchase water in bulk from AI; Village retains ownership of distribution system.
- Extend water mains to connect to AI's mains and re-distribute water within the system.
- Add water storage facilities.
- Abandon all existing water supply wells.
- Total 20-year capital, O&M, and water usage costs are estimated on a present worth basis at \$44.6 million.

Alternative 3b:

- AI purchases the Village's entire water works system.
- AI bills all customers in Manteno individually (at rates higher than bulk rates).
- Abandon all existing water supply wells.
- Add water storage facilities and extend water mains to facilitate connection with AI's mains and re-distribute water within Manteno's system.
- Total 20-year water usage costs are estimated on a present worth basis at \$50.6 million.

The five viable alternatives are compared below using a scoring system. Each alternative is given a score based on its relative cost, long-term sustainability, and the level of service that would be provided to customers. Possible scores in each category range from 1 to 5, with 1 being very poor and 5 being very good.

Alternative	Cost	Sustainability	Service	Total
1a	3	3	5	11
1b	3	3	5	11
2b	4	3	5	12
3a	5	5	3	13
3b	4	5	1	10

As shown above, Alternative 3a received the highest score. It has the lowest present worth cost of the five alternatives, and as a surface water source, is sustainable in

the long-term. The level of service within the Village (billing, customer service, distribution system maintenance) would still be high in this alternative, but the Village would have to depend on AI to reliably get the water to the Village. If a disruption occurred in AI's treatment facility or transmission mains, residents of Manteno would be dependent on AI to correct the problem in a timely manner.

Alternative 2b received the second highest score. It received a lower score than Alternative 3a for cost because its total present worth cost is more than ten percent higher than that for Alternative 3a. Alternative 2b beat Alternative 3a in service because the Village would retain complete control over all facets of water supply, treatment, and distribution. It received a lower score in sustainability because it relies partially on the deep sandstone aquifers, which are almost certainly not sustainable in the long-term, and also the shallow limestone aquifers, which are only sustainable if Manteno drills remote well fields.

Alternatives 1a and 1b tie for the third highest score. They were scored the lowest on total present worth cost. They received a lower score on sustainability because they rely on the shallow aquifer, which cannot satisfy Manteno's increasing water demands unless additional wells are drilled in remote areas outside Manteno. These two alternatives received the highest score for service because, as in Alternative 2b, the Village would control all aspects of the water works system.

Alternative 3b received the lowest score. Though the total present worth cost to rate payers in Manteno would be the second lowest of all the alternatives, the level of service could potentially be very low compared to what Village residents are used to. If AI owned Manteno's entire water works system, the Village would have to depend on AI entirely to properly maintain the distribution system, repair any damages, and handle customer service. For instance, if a water main break occurred in Manteno, it could be hours before a repair crew arrived from Kankakee to fix it. Customers with billing or service concerns would have to conduct all dealings with customer service representatives by phone, rather than being able to go to Manteno Village Hall to resolve an issue in person. Alternative 3b would, however, be sustainable in the long-term.

Because Alternative 3a received the highest score, and because it would have the lowest 20-year cost to the Village, we recommend that the Village pursue this alternative as the long-term water supply solution.

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX A: Coliform Testing Results

Coliform Results as Reported by Certified Labs

Well #	Results	1998	1999	2000	2001	2002	2003	2004 ¹
3	Total Coliform	1	0	3	8	6	10	13
	Fecal Coliform	0	0	0	0	0	1	1
4	Total Coliform	4	1	0	3	1	7	7
	Fecal Coliform	0	0	0	0	0	0	0
5	Total Coliform	0	0	2	3	2	3	5
	Fecal Coliform	0	0	0	0	0	0	0
6	Total Coliform	0	1	0	0	2	2	3
	Fecal Coliform	0	0	0	0	0	0	1
7	Total Coliform	N/A	2	2	1	4	2	1
	Fecal Coliform	N/A	0	1	0	0	1	0
9	Total Coliform	N/A	N/A	N/A	N/A	10	7	14
	Fecal Coliform	N/A	N/A	N/A	N/A	2	2	3
Total Unsatisfactory Results ²		5	4	8	15	27	35	48

¹ As of September 8, 2004

² An unsatisfactory result is defined as any detection of total or fecal coliforms in a raw water sample.

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX B: Well Pumpage

Month	Gallons Pumped	Gallons Billed
May 2001	23,071,000	21,050,000
June 2001	25,105,200	16,559,000
July 2001	31,091,100	14,007,000
Aug. 2001	25,943,200	21,893,000
Sept. 2001	21,353,900	25,388,000
Oct. 2001	20,020,600	20,141,000
Nov. 2001	19,088,500	19,680,000
Dec. 2001	19,295,400	16,205,000
Jan. 2002	20,426,800	17,365,000
Feb. 2002	18,153,400	16,525,000
March 2002	20,285,000	16,896,000
April 2002	20,555,000	14,718,000
Total	264,389,100	220,427,000

Month	Gallons Pumped	Gallons Billed
May 2002	23,203,400	16,507,000
June 2002	27,236,500	18,027,000
July 2002	32,292,000	20,860,000
Aug. 2002	29,734,300	20,942,000
Sept. 2002	26,238,300	31,373,000
Oct. 2002	23,149,400	21,661,000
Nov. 2002	21,575,600	21,572,000
Dec. 2002	21,091,300	15,355,000
Jan. 2003	21,879,600	19,719,000
Feb. 2003	20,628,800	16,675,000
March 2003	25,511,000	15,687,000
April 2003	27,193,100	13,850,000
Total	299,733,300	232,228,000

Month	Gallons Pumped	Gallons Billed
May 2003	28,973,600	18,023,000
June 2003	31,644,700	14,681,000
July 2003	26,916,700	24,834,000
Aug. 2003	29,893,900	20,674,000
Sept. 2003	25,236,100	29,696,000
Oct. 2003	23,801,100	21,058,000
Nov. 2003	20,228,200	17,178,000
Dec. 2003	21,142,300	15,982,000
Jan. 2004	20,288,200	21,948,000
Feb. 2004	20,239,700	15,869,000
March 2004	21,787,800	17,669,000
April 2004	23,872,200	19,813,900
Total	264,389,100	220,427,000

**VILLAGE OF MANTENO, ILLINOIS
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APPENDIX C: Population and Water Usage Projections

Year	Population	# of Connections (assuming 2.5 people per connection)	Average Daily Usage @ 112 gpcd (gallons/day)	Peak Daily Usage @ Peak: Avg. Ratio of 1.58:1 (gallons/day)	Annual Usage Avg. Daily Use * 365 (gallons) @
2003	6,900	2,760	772,800	1,221,024	282,072,000
2004	7,600	3,040	851,200	1,344,896	310,688,000
2005	8,300	3,320	929,600	1,468,768	339,304,000
2006	9,000	3,600	1,008,000	1,592,640	367,920,000
2007	9,800	3,920	1,097,600	1,734,208	400,624,000
2008	10,900	4,360	1,220,800	1,928,864	445,592,000
2009	12,000	4,800	1,344,000	2,123,520	490,560,000
2010	13,100	5,240	1,467,200	2,318,176	535,528,000
2011	14,300	5,720	1,601,600	2,530,528	584,584,000
2012	15,600	6,240	1,747,200	2,760,576	637,728,000
2013	17,000	6,800	1,904,000	3,008,320	694,960,000
2014	18,700	7,480	2,094,400	3,309,152	764,456,000
2015	20,600	8,240	2,307,200	3,645,376	842,128,000
2016	22,500	9,000	2,520,000	3,981,600	919,800,000
2017	24,700	9,880	2,766,400	4,370,912	1,009,736,000
2018	27,100	10,840	3,035,200	4,795,616	1,107,848,000
2019	29,500	11,800	3,304,000	5,220,320	1,205,960,000
2020	32,400	12,960	3,628,800	5,733,504	1,324,512,000
2021	33,900	13,560	3,796,800	5,998,944	1,385,832,000
2022	35,400	14,160	3,964,800	6,264,384	1,447,152,000
2023	36,900	14,760	4,132,800	6,529,824	1,508,472,000
2024	38,400	15,360	4,300,800	6,795,264	1,569,792,000
2025	39,900	15,960	4,468,800	7,060,704	1,631,112,000

VILLAGE OF MANTENO, ILLINOIS
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APPENDIX D: Coliform Sampling Schedule

Manteno (IL0910600) Coliform Sampling Schedule

October 14, 2004

Distribution Sampling

Initial Monitoring Duration:	3 Weeks
No. Samples Per Week:	3 sets of 7 samples (21 total samples)
Timing of Samples:	Monday, Wednesday, and Friday
Sample Locations:	5 samples must be collected from 5 random routine coliform sample locations
	1 sample must be collected from the first service connection representative of Well 5
	1 sample must be collected from the first service connection representative of Well 7

Thereafter pending no positive samples*	Bi-Weekly
No. Samples Every Two-weeks:	1 set of 7 samples (7 total samples)
Sample Locations:	5 samples must be collected from 5 random routine coliform sample locations
	1 sample must be collected from the first service connection representative of Well 5
	1 sample must be collected from the first service connection representative of Well 7

RAW (Well) Sampling

Initial Monitoring Duration:	3 Weeks
No. Samples Per Week:	1 sample per Well (5 & 7) three times a week (6 total samples)
Timing of Samples:	Monday, Wednesday, and Friday

Thereafter, pending no positive samples*	Bi-Weekly
No. Samples Every Two-weeks:	1 sample from Well 5 & Well 7 (2 total samples)

BOIL ORDERS – Test Results

A system wide boil order must be initiated if any of the following occur:

- Any single distribution sample result is TC and/or fecal coliform positive FOLLOWED by a TC and/or fecal coliform positive REPEAT sample
- Immediately following two or more positive TC and/or fecal coliform distribution sample results (regardless of REPEAT sample results)
- Chlorine residual at Well 5 (or first service connection) drops below 3.4 for more than 4 hours
- Chlorine residual at Well 7 (or first service connection) drops below 2.0 for more than 4 hours

* If positive samples present, initial monitoring requirements must continue

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX E: Projected Capital Costs for Alternative 1A

Alternative 1A Future Capital Expense Projections	<u>Capital Cost</u> <u>2006</u>	<u>Capital Cost</u> <u>2011</u>	<u>Capital Cost</u> <u>2016</u>	<u>Capital Cost</u> <u>2021</u>
Plant No. 1 (east)				
Excavation	\$60,000	\$0	\$0	\$0
Concrete & Superstructure	\$1,730,000	\$0	\$0	\$0
Mixed Media Filtration Equipment	\$900,000	\$150,000	\$300,000	\$300,000
High Service Pumps	\$60,000	\$10,000	\$20,000	\$20,000
Chemical Feed Systems	\$30,000	\$10,000	\$10,000	\$10,000
Piping & Valves	\$160,000	\$30,000	\$50,000	\$50,000
Plumbing	\$60,000	\$0	\$0	\$0
HVAC	\$60,000	\$0	\$0	\$0
Plant No. 1 Total	\$3,060,000	\$200,000	\$380,000	\$380,000
Plant No. 2 (west)				
Excavation	\$40,000	\$0	\$0	\$0
Concrete & Superstructure	\$1,040,000	\$0	\$0	\$0
Mixed Media Filtration Equipment	\$300,000	\$150,000	\$150,000	\$150,000
High Service Pumps	\$20,000	\$10,000	\$10,000	\$10,000
Chemical Feed Systems	\$10,000	\$10,000	\$10,000	\$10,000
Piping & Valves	\$50,000	\$30,000	\$30,000	\$30,000
Plumbing	\$40,000	\$0	\$0	\$0
HVAC	\$30,000	\$0	\$0	\$0
Plant No. 2 Total	\$1,530,000	\$200,000	\$200,000	\$200,000
New Shallow Wells				
Well Drilling	\$450,000	\$600,000	\$450,000	\$600,000
Well Pumps	\$150,000	\$200,000	\$150,000	\$200,000
Meter & Valve Vault	\$230,000	\$310,000	\$230,000	\$310,000
Shallow Well Total	\$830,000	\$1,110,000	\$830,000	\$1,110,000
Raw Water Transmission Mains	\$3,880,000	\$750,000	\$560,000	\$750,000
Finished Water Transmission Mains	\$3,000,000	\$0	\$0	\$0
Water Storage Tanks	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
Subtotal (Plants 1 & 2, Wells, Trans. Mains)	\$14,300,000	\$4,300,000	\$4,000,000	\$4,400,000
Electrical & Instrumentation @ 12%	\$1,700,000	\$500,000	\$500,000	\$500,000
General Conditions @ 5%	\$800,000	\$200,000	\$200,000	\$200,000
Contractor's Overhead, Profit, Insurance @ 15%	\$2,500,000	\$800,000	\$700,000	\$800,000
Total Construction Cost	\$19,300,000	\$5,800,000	\$5,400,000	\$5,900,000
Contingency @ 20%	\$3,900,000	\$1,200,000	\$1,100,000	\$1,200,000
Engineering @ 15%	\$3,500,000	\$1,100,000	\$1,000,000	\$1,100,000
Legal & Administrative @ 1%	\$300,000	\$100,000	\$100,000	\$100,000
TOTAL CAPITAL COST (in 2005 \$\$)	\$27,000,000	\$8,200,000	\$7,600,000	\$8,300,000
2006 Present Worth Single Payment	\$27,800,000	\$5,600,000	\$3,500,000	\$2,600,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$39.5 million				

**VILLAGE OF MANTENO, ILLINOIS
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APPENDIX F: Projected O&M Costs for Alternative 1A

Alternative 1A	<u>Avg. Annual O&M Costs for Years 2006-2010</u>	<u>Avg. Annual O&M Costs for Years 2011- 2015</u>	<u>Avg. Annual O&M Costs for Years 2016- 2020</u>	<u>Avg. Annual O&M Costs for Years 2021- 2025</u>
Future O&M Expense Projections				
Personal Services	\$290,000	\$380,000	\$480,000	\$600,000
Payroll Taxes and Benefits	\$90,000	\$150,000	\$230,000	\$340,000
Utilities	\$90,000	\$150,000	\$220,000	\$320,000
Materials and Supplies	\$40,000	\$60,000	\$80,000	\$110,000
Insurance	\$10,000	\$20,000	\$30,000	\$50,000
Professional Services	\$70,000	\$100,000	\$150,000	\$200,000
Equipment	\$50,000	\$90,000	\$150,000	\$250,000
Water Main Repair & Replacement	\$80,000	\$80,000	\$80,000	\$80,000
Well Repair & Replacement	\$70,000	\$120,000	\$170,000	\$250,000
New Water Meters and Replacements	\$100,000	\$100,000	\$100,000	\$100,000
Filtration O&M	\$30,000	\$40,000	\$70,000	\$90,000
Other	\$10,000	\$10,000	\$10,000	\$10,000
Annual O&M Expense Total	\$930,000	\$1,300,000	\$1,770,000	\$2,400,000
Five-Year Present Worth (in 2005 \$\$)	\$3,700,000	\$5,200,000	\$7,100,000	\$9,600,000
2006 Present Worth Single Payment	\$3,800,000	\$3,500,000	\$3,300,000	\$3,000,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$13.6 million				

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX G: Projected Capital Costs for Alternative 1B

Alternative 1B	<u>Capital Cost</u>	<u>Capital Cost</u>	<u>Capital Cost</u>	<u>Capital Cost</u>
Future Capital Expense Projections	<u>2006</u>	<u>2011</u>	<u>2016</u>	<u>2021</u>
Plant No. 1 (east)				
Excavation	\$40,000	\$0	\$0	\$0
Concrete & Superstructure	\$1,260,000	\$0	\$0	\$0
Mixed Media Filtration Equipment	\$1,620,000	\$270,000	\$540,000	\$540,000
High Service Pumps	\$60,000	\$10,000	\$20,000	\$20,000
Chemical Feed Systems	\$30,000	\$10,000	\$10,000	\$10,000
Piping & Valves	\$160,000	\$30,000	\$50,000	\$50,000
Plumbing	\$50,000	\$0	\$0	\$0
HVAC	\$40,000	\$0	\$0	\$0
Plant No. 1 Total	\$3,260,000	\$320,000	\$620,000	\$620,000
Plant No. 2 (west)				
Excavation	\$20,000	\$0	\$0	\$0
Concrete & Superstructure	\$710,000	\$0	\$0	\$0
Mixed Media Filtration Equipment	\$540,000	\$270,000	\$270,000	\$270,000
High Service Pumps	\$20,000	\$10,000	\$10,000	\$10,000
Chemical Feed Systems	\$10,000	\$10,000	\$10,000	\$10,000
Piping & Valves	\$50,000	\$30,000	\$30,000	\$30,000
Plumbing	\$30,000	\$0	\$0	\$0
HVAC	\$30,000	\$0	\$0	\$0
Plant No. 2 Total	\$1,410,000	\$320,000	\$320,000	\$320,000
New Shallow Wells				
Well Drilling	\$450,000	\$600,000	\$450,000	\$600,000
Well Pumps	\$150,000	\$200,000	\$150,000	\$200,000
Meter & Valve Vault	\$230,000	\$310,000	\$230,000	\$310,000
Shallow Well Total	\$830,000	\$1,110,000	\$830,000	\$1,110,000
Raw Water Transmission Mains	\$3,880,000	\$750,000	\$560,000	\$750,000
Finished Water Transmission Mains	\$3,000,000	\$0	\$0	\$0
Water Storage Tanks	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
Subtotal (Plants 1 & 2, Wells, Trans. Mains)	\$14,400,000	\$4,500,000	\$4,300,000	\$4,800,000
Electrical & Instrumentation @ 12%	\$1,700,000	\$500,000	\$500,000	\$600,000
General Conditions @ 5%	\$800,000	\$300,000	\$200,000	\$300,000
Contractor's Overhead, Profit, Insurance @ 15%	\$2,500,000	\$800,000	\$800,000	\$900,000
Total Construction Cost	\$19,400,000	\$6,100,000	\$5,800,000	\$6,600,000
Contingency @ 20%	\$3,900,000	\$1,200,000	\$1,200,000	\$1,300,000
Engineering @ 15%	\$3,500,000	\$1,100,000	\$1,100,000	\$1,200,000
Legal & Administrative @ 1%	\$300,000	\$100,000	\$100,000	\$100,000
TOTAL CAPITAL COST (in 2005 \$\$)	\$27,100,000	\$8,500,000	\$8,200,000	\$9,200,000
2006 Present Worth Single Payment	\$27,900,000	\$5,800,000	\$3,800,000	\$2,900,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$40.4 million				

**VILLAGE OF MANTENO, ILLINOIS
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APPENDIX H: Projected O&M Costs for Alternative 1B

Alternative 1B	<u>Avg. Annual O&M Costs for Years 2006-2010</u>	<u>Avg. Annual O&M Costs for Years 2011- 2015</u>	<u>Avg. Annual O&M Costs for Years 2016- 2020</u>	<u>Avg. Annual O&M Costs for Years 2021- 2025</u>
Future O&M Expense Projections				
Personal Services	\$290,000	\$380,000	\$480,000	\$600,000
Payroll Taxes and Benefits	\$90,000	\$150,000	\$230,000	\$340,000
Utilities	\$90,000	\$150,000	\$220,000	\$320,000
Materials and Supplies	\$40,000	\$60,000	\$80,000	\$110,000
Insurance	\$10,000	\$20,000	\$30,000	\$50,000
Professional Services	\$70,000	\$100,000	\$150,000	\$200,000
Equipment	\$50,000	\$90,000	\$150,000	\$250,000
Water Main Repair & Replacement	\$80,000	\$80,000	\$80,000	\$80,000
Well Repair & Replacement	\$70,000	\$120,000	\$170,000	\$250,000
New Water Meters and Replacements	\$100,000	\$100,000	\$100,000	\$100,000
Filtration O&M	\$40,000	\$70,000	\$110,000	\$150,000
Other	\$10,000	\$10,000	\$10,000	\$10,000
Annual O&M Expense Total	\$940,000	\$1,330,000	\$1,810,000	\$2,460,000
5-Year Present Worth (in 2005 \$\$)	\$3,800,000	\$5,300,000	\$7,200,000	\$9,800,000
2006 Present Worth Single Payment	\$3,900,000	\$3,600,000	\$3,300,000	\$3,100,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$13.9 million				

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX I: Projected Capital Costs for Alternative 2B

Alternative 2B	<u>Capital Cost</u> <u>2006</u>	<u>Capital Cost</u> <u>2011</u>	<u>Capital Cost</u> <u>2016</u>	<u>Capital Cost</u> <u>2021</u>
Future Capital Expense Projections				
Plant No. 1 Total (from above)	\$3,060,000	\$200,000	\$380,000	\$380,000
Plant No. 2 Total (from above)	\$1,530,000	\$200,000	\$200,000	\$200,000
New Shallow Wells				
Well Drilling	\$150,000	\$600,000	\$150,000	\$300,000
Well Pumps	\$50,000	\$200,000	\$50,000	\$100,000
Meter & Valve Vault	\$80,000	\$310,000	\$80,000	\$150,000
Shallow Well Total	\$280,000	\$1,110,000	\$280,000	\$550,000
New Deep Wells				
Well Drilling	\$500,000	\$0	\$500,000	\$500,000
Well Pumps	\$150,000	\$0	\$150,000	\$150,000
Meter & Valve Vault	\$80,000	\$0	\$80,000	\$80,000
Deep Well Total	\$730,000	\$0	\$730,000	\$730,000
Raw Water Transmission Mains	\$2,350,000	\$500,000	\$140,000	\$260,000
Finished Water Transmission Mains	\$3,000,000	\$0	\$0	\$0
Water Storage Tanks	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
Subtotal (Plants 1 & 2, Wells, Trans. Mains)	\$13,000,000	\$4,000,000	\$3,700,000	\$4,100,000
Electrical & Instrumentation @ 12%	\$1,600,000	\$500,000	\$400,000	\$500,000
General Conditions @ 5%	\$700,000	\$200,000	\$200,000	\$200,000
Contractor's Overhead, Profit, Insurance @ 15%	\$2,300,000	\$700,000	\$600,000	\$700,000
Total Construction Cost	\$17,600,000	\$5,400,000	\$4,900,000	\$5,500,000
Contingency @ 20%	\$3,500,000	\$1,100,000	\$1,000,000	\$1,100,000
Engineering @ 15%	\$3,200,000	\$1,000,000	\$900,000	\$1,000,000
Legal & Administrative @ 1%	\$200,000	\$100,000	\$100,000	\$100,000
TOTAL CAPITAL COST (in 2005 \$\$)	\$24,500,000	\$7,600,000	\$6,900,000	\$7,700,000
2006 Present Worth Single Payment	\$25,200,000	\$5,200,000	\$3,200,000	\$2,400,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$36.0 million				

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX J: Projected O&M Costs for Alternative 2B

Alternative 2B	<u>Avg. Annual O&M Costs for Years 2006-2010</u>	<u>Avg. Annual O&M Costs for Years 2011- 2015</u>	<u>Avg. Annual O&M Costs for Years 2016- 2020</u>	<u>Avg. Annual O&M Costs for Years 2021- 2025</u>
Future O&M Expense Projections				
Personal Services	\$290,000	\$380,000	\$480,000	\$600,000
Payroll Taxes and Benefits	\$90,000	\$150,000	\$230,000	\$340,000
Utilities	\$120,000	\$190,000	\$250,000	\$340,000
Materials and Supplies	\$40,000	\$50,000	\$110,000	\$180,000
Insurance	\$10,000	\$10,000	\$20,000	\$40,000
Professional Services	\$70,000	\$100,000	\$150,000	\$200,000
Equipment	\$50,000	\$80,000	\$210,000	\$410,000
Water Main Repair & Replacement	\$80,000	\$80,000	\$80,000	\$80,000
Well Repair & Replacement	\$70,000	\$130,000	\$190,000	\$280,000
New Water Meters and Replacements	\$100,000	\$100,000	\$100,000	\$100,000
Filtration O&M	\$30,000	\$40,000	\$70,000	\$90,000
Other	\$10,000	\$10,000	\$10,000	\$10,000
Annual O&M Expense Total	\$960,000	\$1,320,000	\$1,900,000	\$2,670,000
5-Year Present Worth (in 2005 \$\$)	\$3,800,000	\$5,300,000	\$7,600,000	\$10,700,000
2006 Present Worth Single Payment	\$3,900,000	\$3,600,000	\$3,500,000	\$3,400,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$14.4 million				

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX K: Projected Capital Costs for Alternative 3A

Alternative 3A	<u>Capital Cost</u> 2006	<u>Capital Cost</u> 2011	<u>Capital Cost</u> 2016	<u>Capital Cost</u> 2021
Future Capital Expense Projections				
Payment to AI for Capacity	\$4,200,000	\$0	\$0	\$0
Finished Water Transmission Mains	\$3,000,000	\$0	\$0	\$0
Water Storage Tanks	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
Subtotal	9,200,000	2,000,000	2,000,000	2,000,000
Electrical & Instrumentation @ 12%	\$1,100,000	\$200,000	\$200,000	\$200,000
General Conditions @ 5%	\$500,000	\$100,000	\$100,000	\$100,000
Contractor's Overhead & Profit, Insurance @ 15%	\$1,600,000	\$300,000	\$300,000	\$300,000
Project Cost	\$12,400,000	\$2,600,000	\$2,600,000	\$2,600,000
Contingency @ 20%	\$2,500,000	\$500,000	\$500,000	\$500,000
Engineering @ 15%	\$2,200,000	\$500,000	\$500,000	\$500,000
Legal & Administrative @ 1%	\$200,000	\$0	\$0	\$0
TOTAL CAPITAL COST (in 2005 \$\$)	\$17,300,000	\$3,600,000	\$3,600,000	\$3,600,000
2006 Present Worth Single Payment	\$17,800,000	\$2,500,000	\$1,700,000	\$1,100,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$23.1 million				

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX L: Projected O&M Costs for Alternative 3A

Alternative 3A	<u>Avg. Annual O&M Costs for Years 2006-2010</u>	<u>Avg. Annual O&M Costs for Years 2011- 2015</u>	<u>Avg. Annual O&M Costs for Years 2016- 2020</u>	<u>Avg. Annual O&M Costs for Years 2021- 2025</u>
Future O&M Expense Projections				
Personal Services	\$290,000	\$380,000	\$480,000	\$600,000
Payroll Taxes and Benefits	\$90,000	\$150,000	\$230,000	\$340,000
Utilities	\$60,000	\$70,000	\$90,000	\$110,000
Materials and Supplies	\$40,000	\$50,000	\$60,000	\$70,000
Insurance	\$10,000	\$10,000	\$10,000	\$10,000
Professional Services	\$70,000	\$100,000	\$150,000	\$200,000
Equipment	\$50,000	\$60,000	\$70,000	\$80,000
Water Main Repair & Replacement	\$80,000	\$80,000	\$80,000	\$80,000
New Water Meters and Replacements	\$100,000	\$100,000	\$100,000	\$100,000
Other	\$10,000	\$10,000	\$10,000	\$10,000
Annual O&M Expense Total	\$800,000	\$1,010,000	\$1,280,000	\$1,600,000
5-Year Present Worth (in 2005 \$\$)	\$3,200,000	\$4,000,000	\$5,100,000	\$6,400,000
2006 Present Worth Single Payment	\$3,300,000	\$2,700,000	\$2,400,000	\$2,000,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$10.4 million				

**VILLAGE OF MANTENO, ILLINOIS
WATER SYSTEM SUPPLY INVESTIGATION**

APPENDIX M: Projected Capital Costs for Alternative 3B

Alternative 3B	<u>Capital Cost</u> <u>2006</u>	<u>Capital Cost</u> <u>2011</u>	<u>Capital Cost</u> <u>2016</u>	<u>Capital Cost</u> <u>2021</u>
Future Capital Expense Projections				
Finished Water Transmission Mains	\$3,000,000	\$0	\$0	\$0
Water Storage Tanks	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000
Subtotal	5,000,000	2,000,000	2,000,000	2,000,000
Electrical & Instrumentation @ 12%	\$600,000	\$200,000	\$200,000	\$200,000
General Conditions @ 5%	\$300,000	\$100,000	\$100,000	\$100,000
Contractor's Overhead & Profit, Insurance @ 15%	\$900,000	\$300,000	\$300,000	\$300,000
Project Cost	\$6,800,000	\$2,600,000	\$2,600,000	\$2,600,000
Contingency @ 20%	\$1,400,000	\$500,000	\$500,000	\$500,000
Engineering @ 15%	\$1,200,000	\$500,000	\$500,000	\$500,000
Legal & Administrative @ 1%	\$100,000	\$0	\$0	\$0
TOTAL CAPITAL COST (in 2005 \$\$)	\$9,500,000	\$3,600,000	\$3,600,000	\$3,600,000
2006 Present Worth Single Payment	\$9,800,000	\$2,500,000	\$1,700,000	\$1,100,000
TOTAL PRESENT WORTH in 2006 \$\$ = \$15.1 million				