

Town of Bethlehem

Department of Public Works



Future Water Supply Alternatives Presentation

October 13, 2010

DPW Mission



The Department of Public Works (DPW) is responsible for providing the following services to the Town of Bethlehem in a fiscally responsible manner that best meets the evolving needs of the residents:

- Purification and Distribution of Safe Drinking Water
- Collection and Treatment of Wastewater
- Engineering and Technical support
- Administrative Services
- Stormwater Management

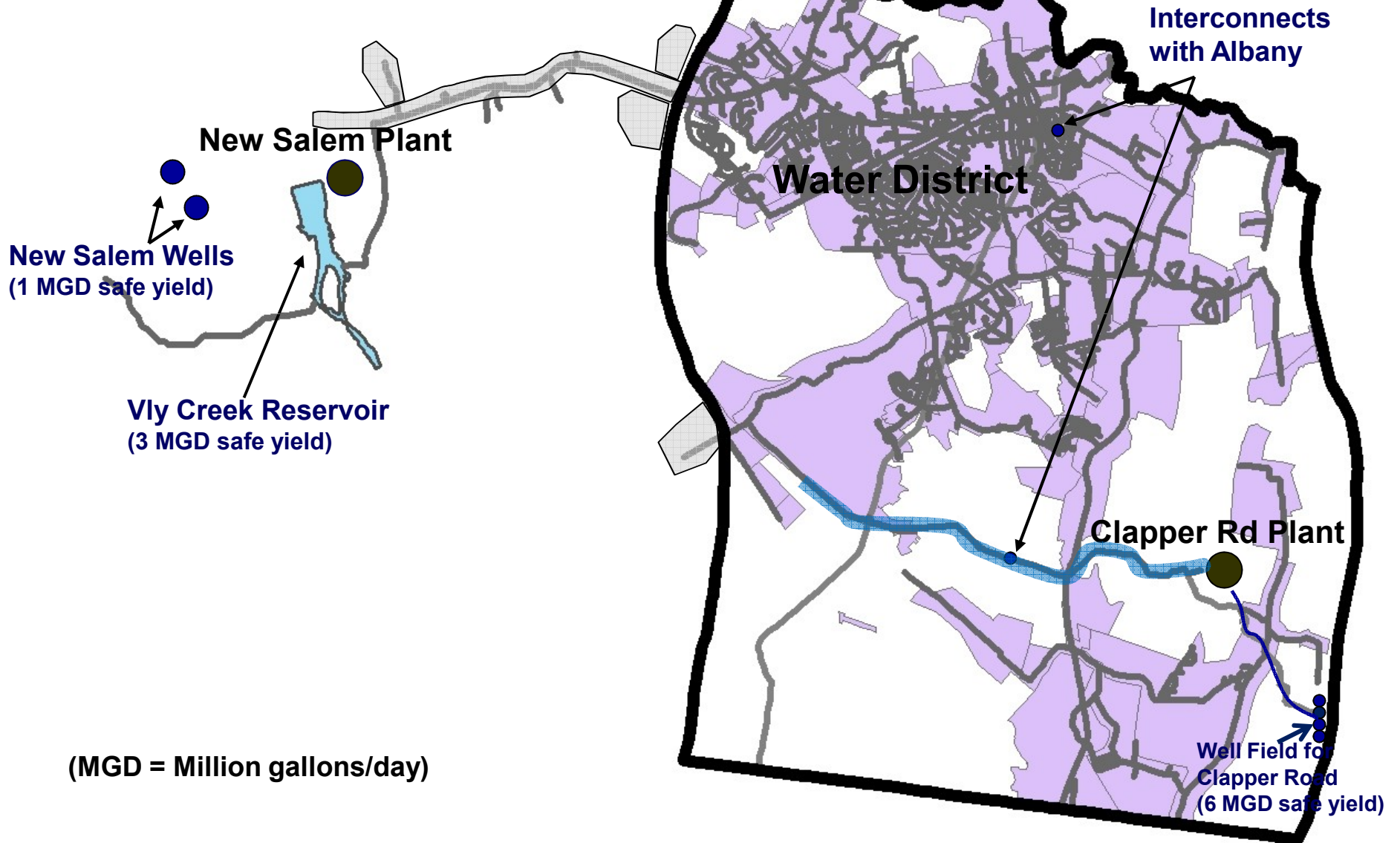
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Current Water Supply Resources



Water Treatment Plants



New Salem

Water Treatment Plant

- Constructed 1958; expanded in 1972
- Max. Treatment Capacity is 6 MGD
- Avg. Treatment (2009) was 2.3 MGD
- Peak Treatment (2009) was 6 MGD
- Facility in need of major repairs
- Most equipment in need of replacement



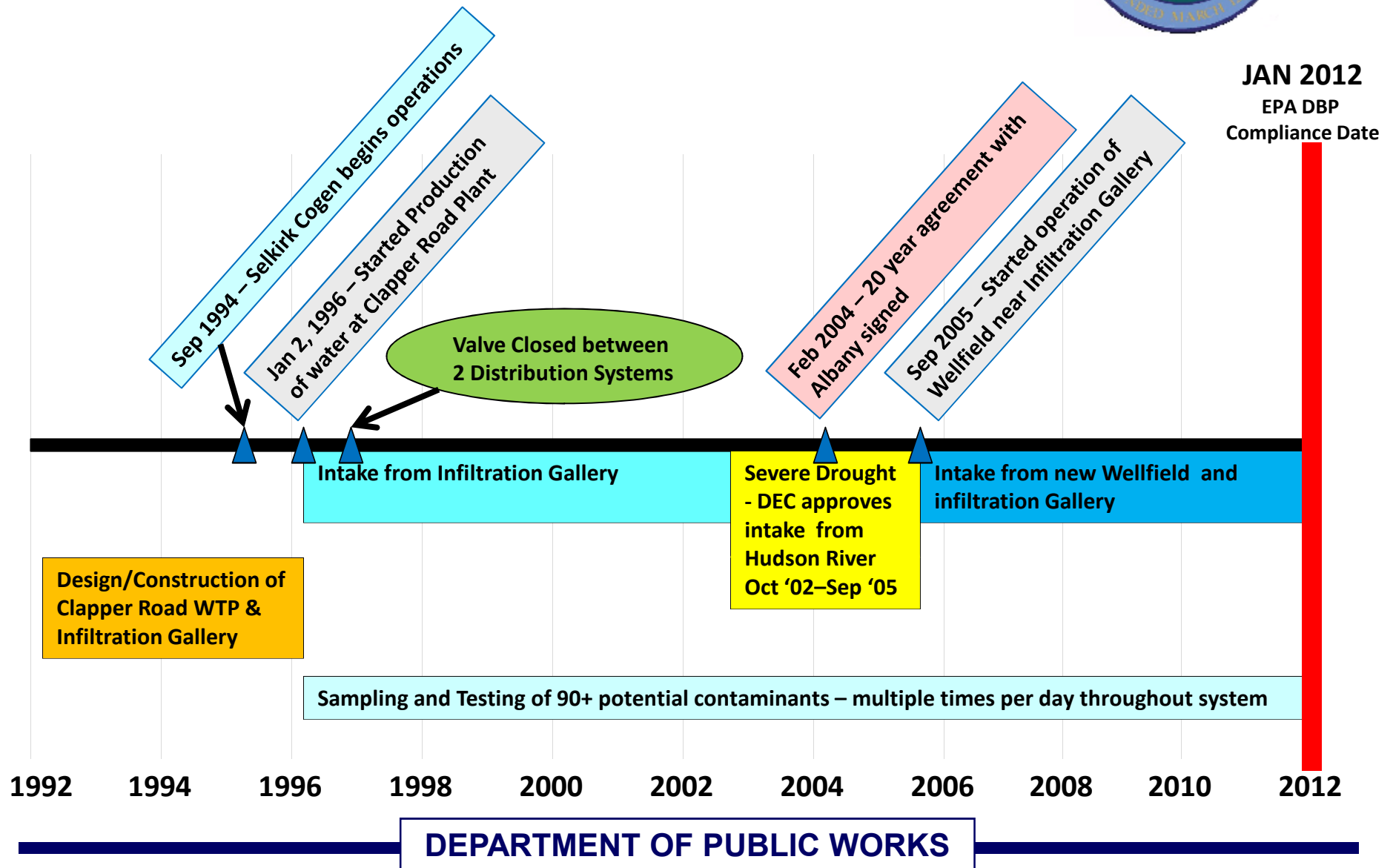
Clapper Road

Water Treatment Plant

- Constructed 1994
- Designed to be expandable to 12 MGD
- Max. Treatment Capacity is 6 MGD
- Avg. Treatment (2009) was 2.0 MGD
- Peak Treatment (2009) was 3 MGD



Clapper Road History



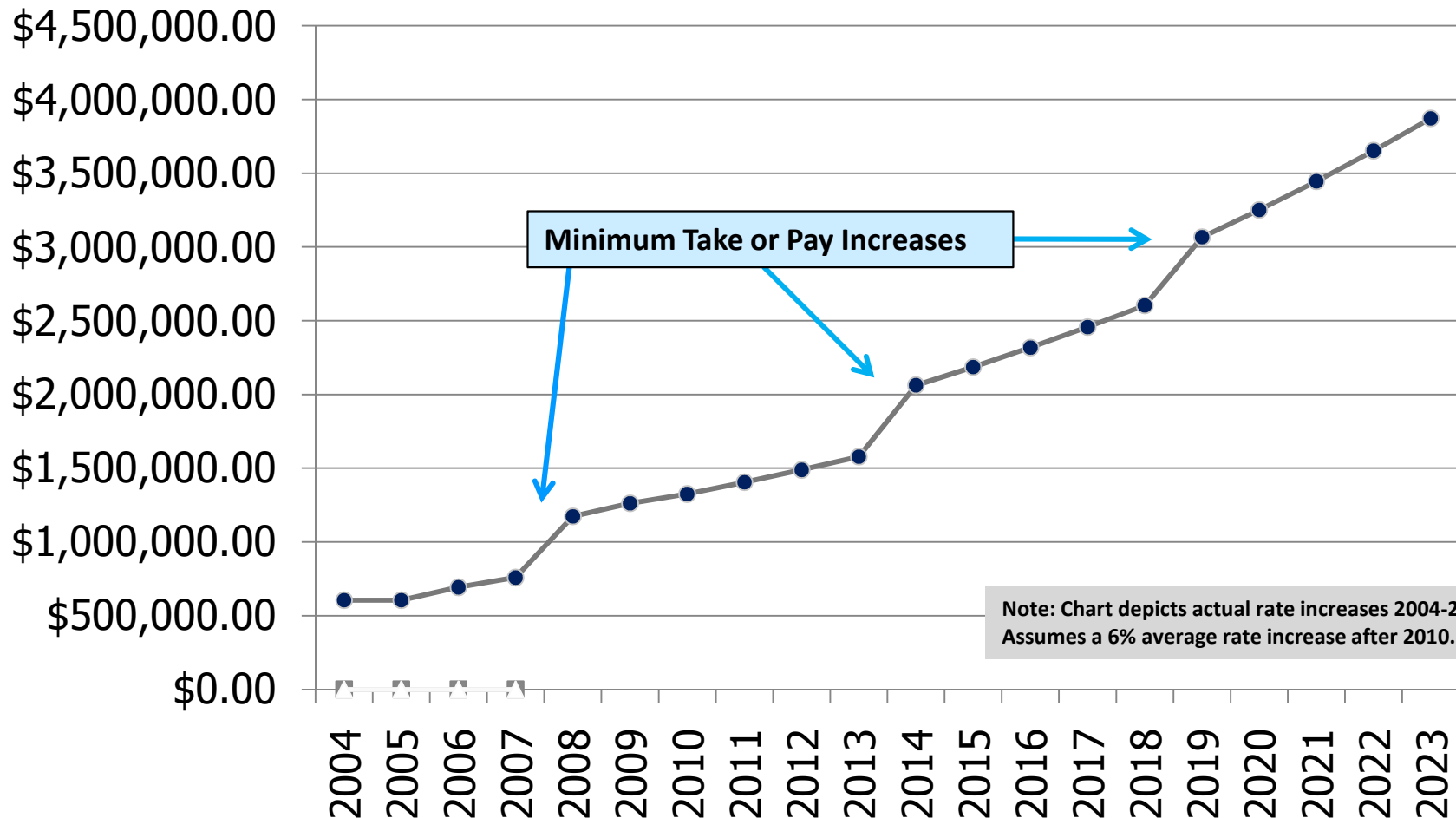
Current Albany Water Agreement



- **20 Year Contract for Finished Water (2004-2023)**
- **Minimum take or pay, increases every 5th year.**
 - Went from 250 MGY in 2007 to 365 MGY in 2008 (46% increase)
- **Rate increases based on Albany residential rate increases.**
 - Albany Rates have increased 50% since 2004
- **Increase to Water Budget last 6 years:**
 - 2004 - \$605,000
 - 2010 - \$1,320,000 **118%**
- **Cost per 1000 gallons is \$3.63**
 - Average Cost per 1000 gallons at New Salem Wells = \$0.72
 - Average Cost per 1000 gallons at two treatment plants = \$2.26

Albany Water Agreement

20-Year Finished Water Agreement (2004-2023)



DEPARTMENT OF PUBLIC WORKS

New Salem Plant Challenges



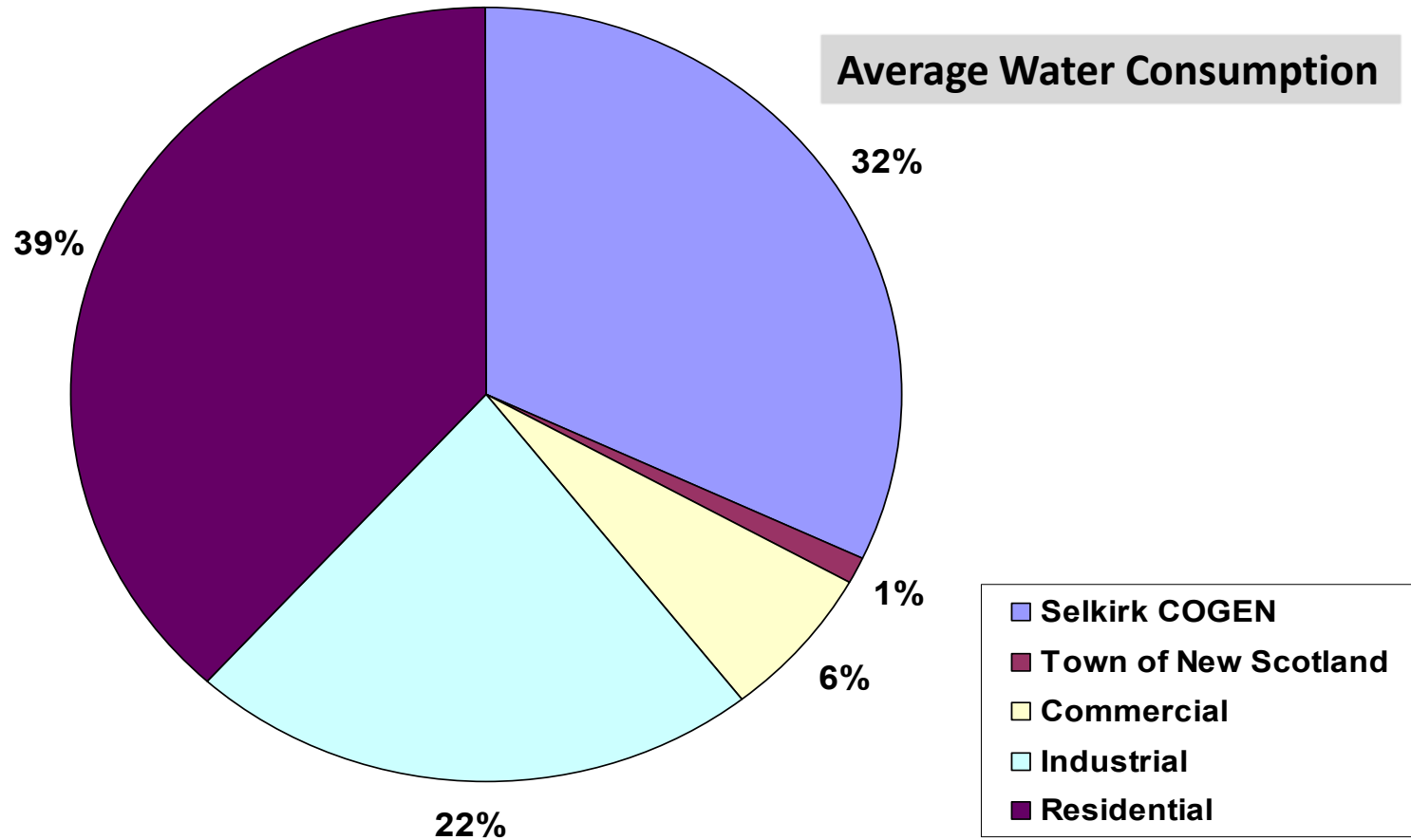
- **Regulatory changes – more stringent water quality requirements beginning in 2012.**
 - Requires significant treatment process changes
- **Aging New Salem WTP**
 - Clarifier baffle repairs
 - Flow meter replacements
 - Pump & motor replacements
 - Piping repairs
 - Roof replacements
 - Building repairs
- **Satisfy long-term water demands**
 - Reservoir yield limit



Demand Composition



Average Water Consumption



Other Considerations



- **Managing Exposure to Albany Water Outages**
 - Planned Maintenance
 - Emergency at WTP or transmission main
 - High Demand
 - Albany has +/- 10 days of storage vs. TOB having 3 days
- **Economic Development**
 - Comprehensive Plan goals – “balanced tax base”; “promote commercial & industrial growth...”
 - 20/20 Committee Report – fiscal sustainability & economic development goals – help address financial issues
 - Economic Development = diversified water customer base
 - Competitive rates needed to encourage Economic Development

Experience Starts with History

For more than a century Malcolm Pirnie's engineers and scientists have helped clients nationwide and abroad solve problems of the environment – the earth, the water and the air around us. The Albany Office was opened in 1968.



Malcolm Pirnie's Drinking Water Services

- Water Supply
 - Source Development and Redevelopment
- Water Treatment
 - Facility Planning & Rehabilitation
- Water Distribution
 - Assessments, Planning, Modeling and Design
- Water Resources/
Watershed Management
- Residuals Management
- Security
 - Vulnerability Assessment
 - Emergency/Contingency Planning
 - Environmental Security Consulting
- Start-up Training, O&M Manuals



Public Interests Come First

The Public



Our Clients



Malcolm Pirnie

Malcolm Pirnie's Role

- Initiated services for Town in 2006
 - Water Supply Study initiated in 2008
- Satisfy Water Supply Objective
- Review Previous Studies
- Identify and Screen Alternatives
- Provide Independent and Objective Analysis

Water Supply Objective

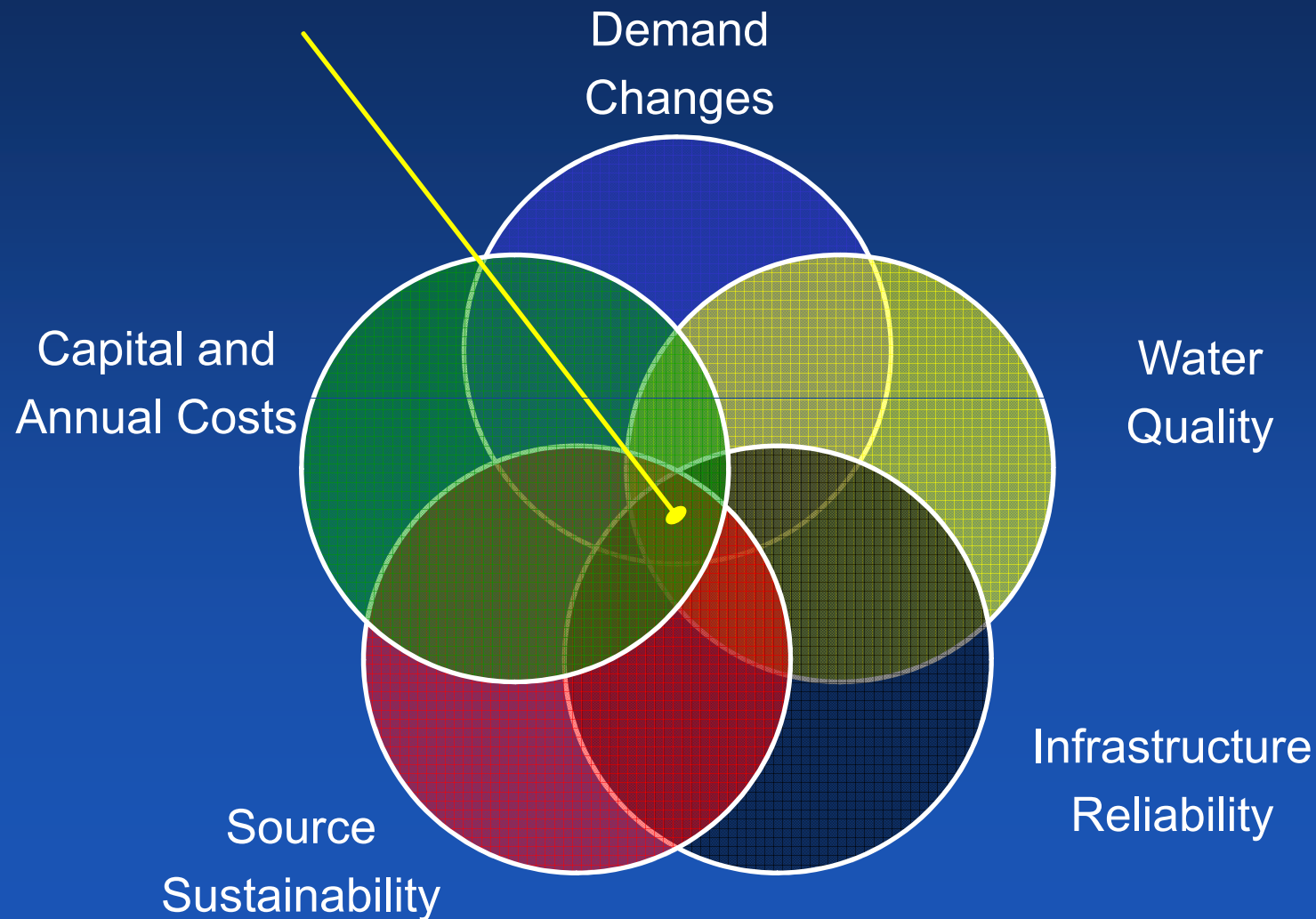
To cost effectively achieve a long term system of water supply to meet projected average and peak system demand through planning period.

Water Source and Supply Considerations

- Source Sustainability
- Demand Changes
- Infrastructure Reliability
- Capital and Annual Costs
- Water Quality



The Preferred Water Supply Solution



Shortlist of Feasible Alternatives

**Rebuild New Salem Water
Treatment Plant**

**Purchase Additional Finished
Water from Albany**

**Maximize Clapper Road Water
Production Capability**

Rebuild New Salem Water Treatment Plant

Capital Projects

- Pretreatment @ Clapper Road WTP
- New Salem WTP Rebuilt to 3 MGD avg., 6 MGD peak
- New Route 85 Finished Water Transmission Main

Financial Impacts

- Manage Debt for Capital Projects
- Project Cumulative Cost $\approx$ \$140M (2023)
- Projected 2011 Rate Increase $\approx$ 25%

Other Considerations

- No additional commitment to long term contracts
 - Increased risk to changes in demand
 - Maintain independence
- Investment in our own infrastructure

Purchase Additional Finished Water From Albany

Capital Projects

- Pretreatment @ Clapper Road WTP
- Creble–Esplande Finished Water Connection
 - pH Adjustment for Corrosion Control
- Upgrades and Maintenance for New Salem WTP

Financial Impacts

- Reduced Operating Costs at New Salem WTP
 - Manage Debt from Capital Projects
- Project Cumulative Cost ≈ \$130M (2023)
- Projected 2011 Rate Increase ≈ 40%

Other Considerations

- Improves terms of existing AWB contract
- Challenge of managing monthly take or pay
- Increased risk related to changes in demand
 - Increased dependency on Albany

Maximize Clapper Road Water Production Capability

Capital Projects

- Pretreatment @ Clapper Road WTP
- Minor upgrades at New Salem WTP

Financial Impacts

- Reduced Operating Costs at New Salem WTP
- Increased costs at Clapper Road well field
- Project Cumulative Cost $\approx$ \$130M (2023)
 - Projected 2011 Rate Increase $\approx$ 7%

Other Considerations

- Requires a unified distribution system
 - Increased maintenance at well fields
- No additional commitment to long term contracts
- Frees up money for other capital improvements
 - Minimize risk related to changes in demand
 - Maintain independence
- Expandable for demand beyond 2030

Water Quality Considerations for Clapper Road WTP

- Meets all Federal and State Drinking Water Standards
 - Same criteria for New Salem WTP and Albany Finished Water
 - 7,300 individual analyses since 1996
- Compliance reported in the Annual Water Quality Report since 1999
- 15 Years of demonstrated compliance
- Operation as residential supply supported by Department of Health



Volatile Organic Chemical Sampling

-Required by NYSDOH & USEPA Safe Drinking Water Act

- Compound (maximum contaminant level in parts per billion)
- Benzene (5)
- Bromobenzene (n/a)
- Bromochloromethane (n/a)
- Bromomethane (n/a)
- N-Butylbenzene (n/a)
- Sec-Butylbenzene (n/a)
- Tert-Butylbenzene (n/a)
- Carbon Tetrachloride (5)
- Chlorobenzene (100)
- Chloroethane (n/a)
- Chloromethane (n/a)
- 2-Chlorotoluene (n/a)
- 4-Chlorotoluene (n/a)
- Dibromomethane (n/a)
- 1,2-Dibromomethane (n/a)
- 1,2-Dichlorobenzene (600)
- 1,3-Dichlorobenzene (n/a)
- 1,4-Dichlorobenzene (75)
- Dichlorodifluoromethane (n/a)
- 1,1-Dichloroethane (n/a)
- 1,2-Dichloroethane (5)
- 1,1-Dichloroethene (7)
- Cis-1,2-Dichloroethene (70)
- Trans-1,2-Dichloroethene (100)
- 1,2-Dichloropropane (5)
- 1,3-Dichloropropane (n/a)
- Methyl Tert Butyl Ether (MTBE) (10)
- 2,2-Dichloropropane (n/a)
- 1,1-Dichloropropene (n/a)
- 1,3-Dichloropropene (n/a)
- Ethylbenzene (700)
- Hexachlorobutadiene (n/a)
- Isopropylbenzene (n/a)
- P-Isopropyltoluene (n/a)
- Methylene Chloride (5)
- N-Propylbenzene (n/a)
- Styrene (100)
- 1,1,1,2-Tetrachloroethane (n/a)
- 1,1,2,2-Tetrachloroethane (n/a)
- Tetrachloroethene (5)
- Toluene (1,000)
- 1,2,3-Trichlorobenzene (n/a)
- 1,2,4-Trichlorobenzene (70)
- 1,1,1-Trichloroethane (200)
- 1,1,2-Trichloroethane (5)
- Trichloroethene (5)
- Trichlorofluoromethane (n/a)
- 1,2,3-Trichloropropane (n/a)
- 1,2,4-Trimethylbenzene (n/a)
- 1,3,5-Trimethylbenzene (n/a)
- Vinyl Chloride (2)
- M-Xylene (10,000 total)
- O-Xylene (10,000 total)
- P-Xylene (10,000 total)

Synthetic Organic Chemical Sampling

-Required by NYSDOH & USEPA Safe Drinking Water Act

- Compound (maximum contaminant level in parts per billion)
- Alachlor (2)
- Aldrin (n/a)
- Atrazine (3)
- Benzo(a)pyrene (0.2)
- Di(2-ethylhexyl)adipate (400)
- Di(2-ethylhexyl)phthalate (6)
- Butachlor (n/a)
- Endrin (2)
- Heptachlor (0.4)
- Heptachlor epoxide (0.2)
- Hexachlorobenzene (1)
- Hexachlorocyclopentadiene (50)
- Lindane (0.2)
- Methoxychlor (40)
- Metolachlor (n/a)
- Metribuzin (n/a)
- Propachlor (n/a)
- Simazine (4)
- Dieldrin (n/a)
- Aldicarb (n/a)
- Aldicarb Sulfone (n/a)
- Aldicarb Sulfoxide (n/a)
- Carbofuran (40)
- Oxamyl (200)
- Methomyl (n/a)
- 3-Hydroxy Carbofuran (n/a)
- Carbaryl (n/a)
- 1,2-Dibromomethane (0.05)
- 1,2-Dibromo-3-chloropropane (0.2)
- 2,4-D (50)
- Dalapon (200)
- Dicamba (n/a)
- Dinoseb (7)
- Pentachlorophenol (1)
- Picloram (500)
- 2,4,5-TP (10)
- PCBs (0.5)
- Chlordane (2)
- Toxaphene (3)

Inorganic Chemical, Physical Property, Bacteriological Sampling

Required by USEPA Safe Drinking Water Act

- Compound (maximum contaminant level in parts per billion)

- Arsenic (10)
- Barium (2,000)
- Cadmium (5)
- Chromium (100)
- Mercury (2)
- Selenium (50)
- Fluoride (2,200)
- Antimony (6)
- Beryllium (4)
- Nickel (n/a)
- Thallium (2)
- Sulfate (250,000)
- Cyanide (200)
- Nitrate (10,000)
- Nitrite (1,000)
- Cryptosporidium
- Giardia lamblia
- Turbidity (1 monthly average)

Required by NYSDOH

- Chloride (250,000)
- Iron (300)
- Manganese (300)
- Sodium (n/a)
- Zinc (5,000)
- Color (15 units)
- Odor (3 units)
- pH (6.5-8.5 units)
- Total Dissolved Solids (n/a)
- Hardness (n/a)
- Lead (n/a)
- Copper (n/a)
- Silver (100)
- Alkalinity (n/a)

PCB Sampling

23 samples analyzed for PCBs from 2002 to 2009

- 19 analyzed using EPA Method 508 (detection limit 20 ppt)
- 4 analyzed using Green Bay Method (detection limit 9.34 ppt)
- EPA drinking water standard for PCBs is 500 ppt

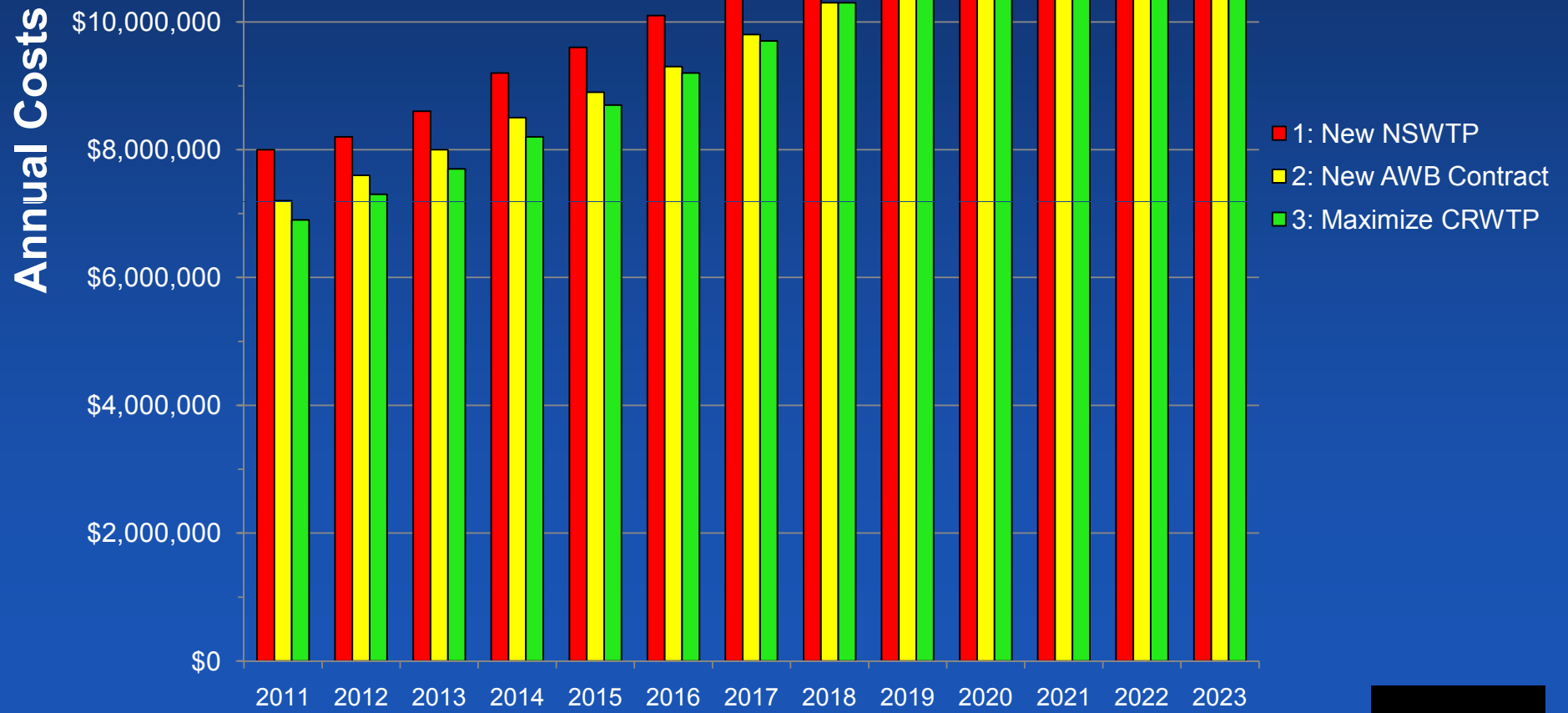
6 samples were collected during 2009 dredging period

- 3 were analyzed using EPA Method 508
- 3 were analyzed using more sensitive Green Bay Method

No PCBs were detected in the 6 samples collected during the 2009 dredging period

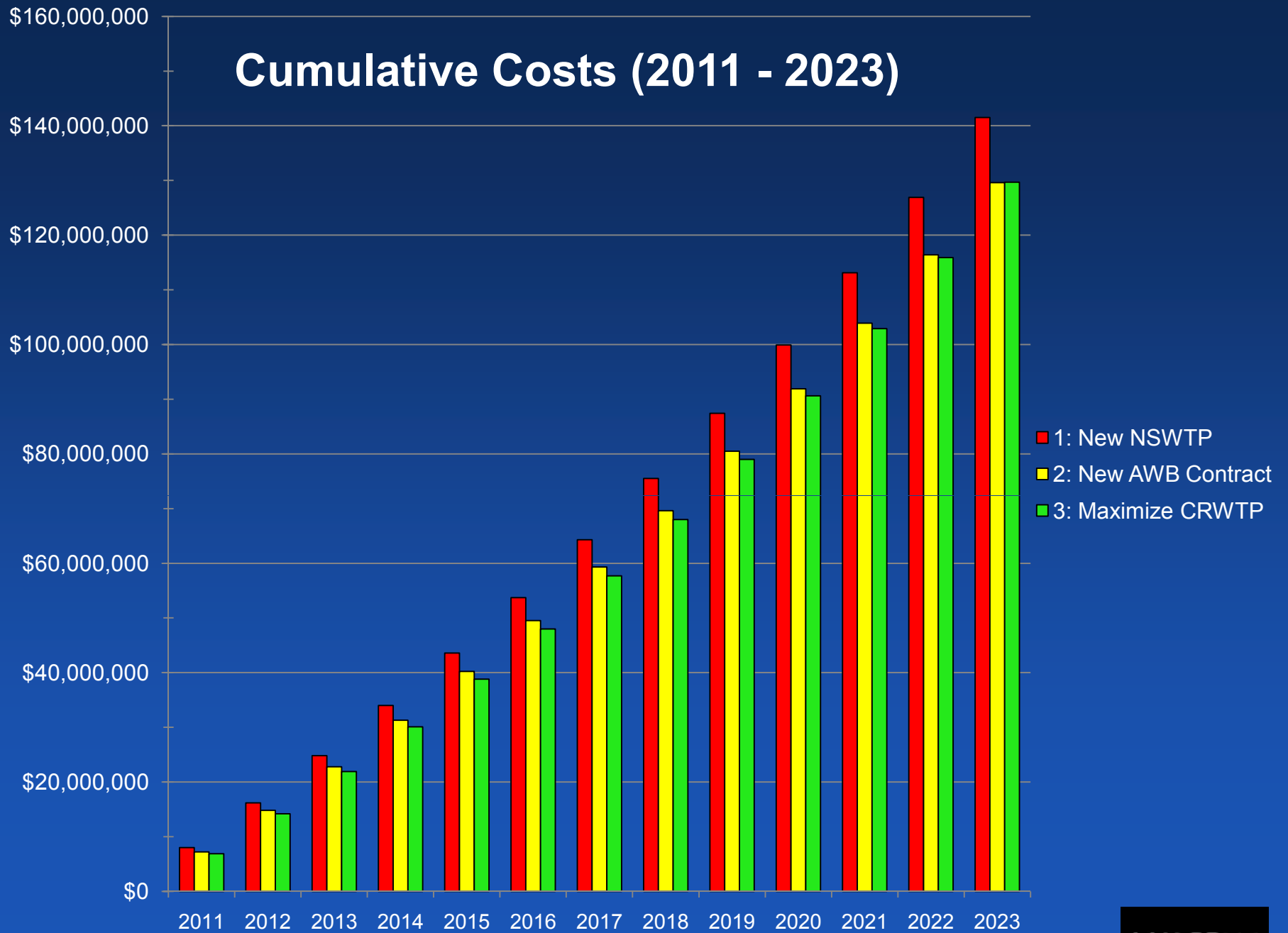
- From 2002 to 2009, no detections of PCBs using EPA Method 508
- Only detection of PCBs - November 2008 at 9.57 ppt, before dredging began using more sensitive Green Bay method. Another sample collected the same day, analyzed with EPA Method 508, detected no PCBs.

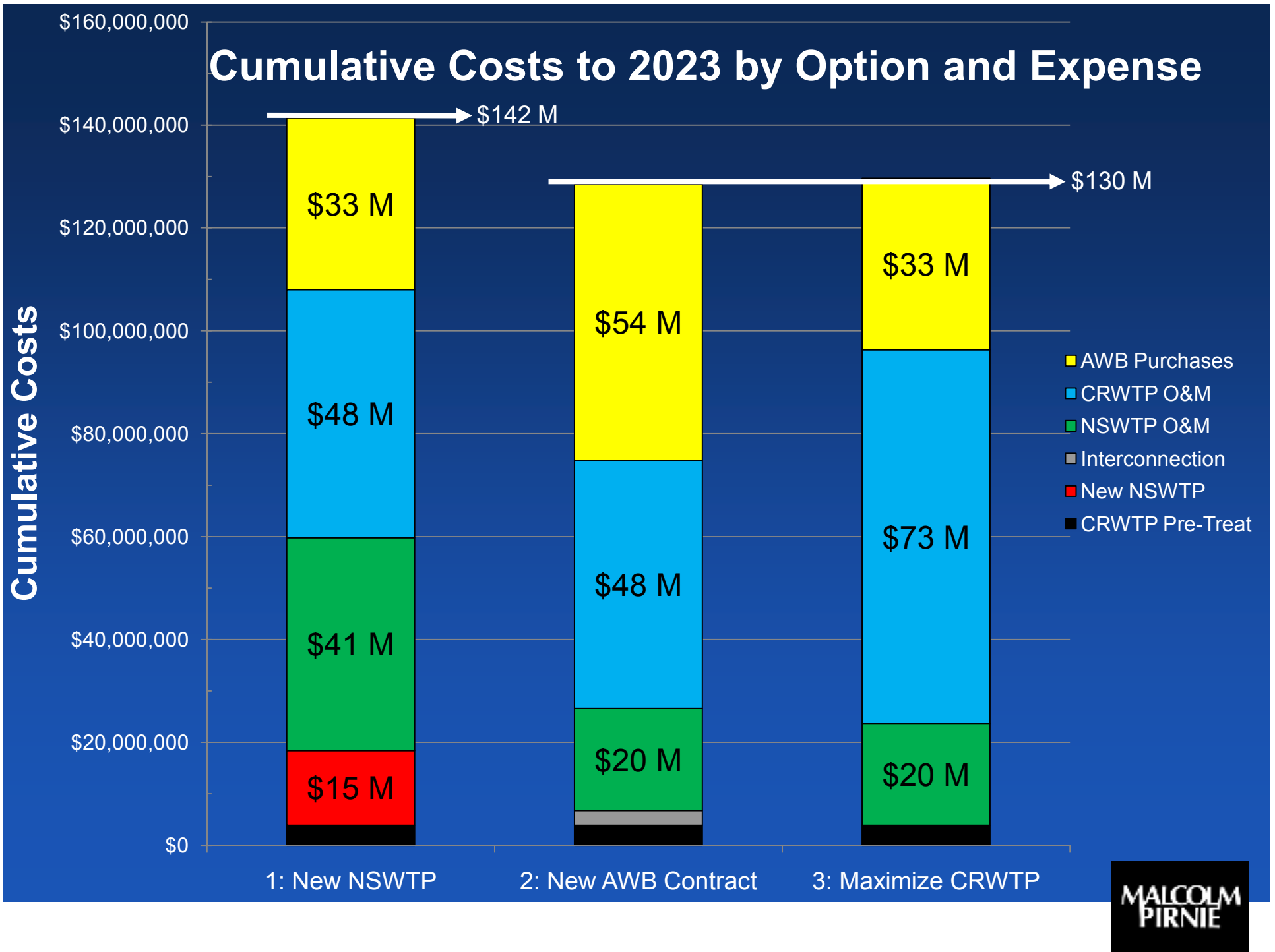
Annual Costs (2011 - 2023)



Cumulative Costs (2011 - 2023)

Cumulative Costs





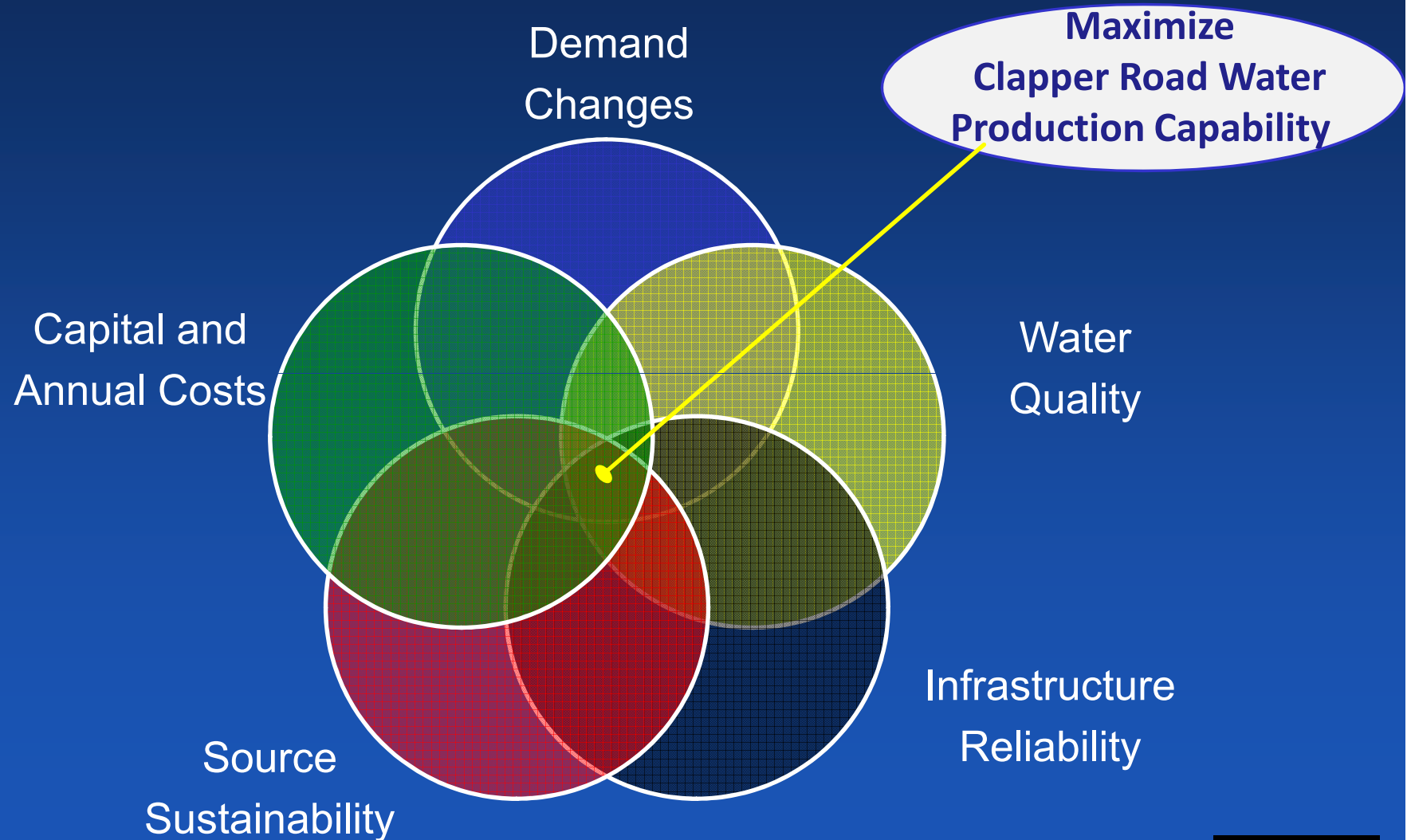
Ranking of Alternatives

Considerations	Rebuild New Salem Water Treatment Plant	Purchase Additional Finished Water from Albany	Maximize Clapper Road Water Production Capability
Source Sustainability	3	1	2
Demand Changes	2	3	1
Infrastructure Reliability	1	2	1
Capital and Annual Costs	3	2	1
Water Quality *	1	1	1

1 = Most Favorable / 3 = Least Favorable Alternative

* All options meet or exceed Federal and State safe drinking water standards

Recommended Alternative



Cost Comparison



Alternative	Initial Capital Cost	Cumulative Cost (thru 2023)	Initial Budget Impact \$	Initial Water Rate Increase
Rebuild New Salem Water Treatment Plant	\$18.2M	\$140M	\$1,114,257	25%
Purchase Additional Finished Water from Albany	\$7.3M	\$130M	\$1,845,089	40%
Maximize Clapper Road Water Production Capability	\$4.5M	\$130M	\$276,262	7%

Summary



2½ Year Study with Malcolm Pirnie:

- Goal was to analyze alternatives to determine which meets our future needs as economically as possible
- Evaluated 40+ future water supply alternatives
- All alternatives were constrained by 20-year Agreement with Albany
- Recommended alternatives had to meet new EPA guidelines



Recommended Alternative- *Maximize Clapper Road Production Capability:*

- Provides Safe Water Supply - 7,300 tests over past 15 years exceeded all Federal/State quality standards
- Minimizes budget impact to Town and customers
- Provides greater flexibility to adapt to demand changes; Avoids long-term commitment of taxpayer \$\$ until absolutely necessary
- Maintains Town control and independence
- Fully utilizes assets that taxpayers are still paying for until 2023