



TVWD Water Supply Strategy Update

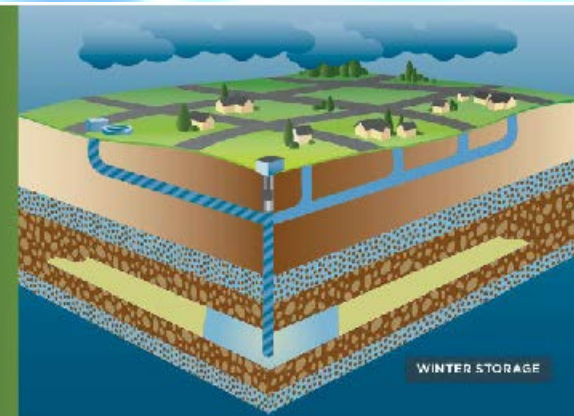


TVWD Board Work Session
April 2, 2013

- 1 Sustainable
- 2 Preserves in-stream flow
- 3 Supports native groundwater system
- 4 Cost beneficial-Delays new infrastructure
- 5 Environmentally friendly
- 6 Emergency back-up

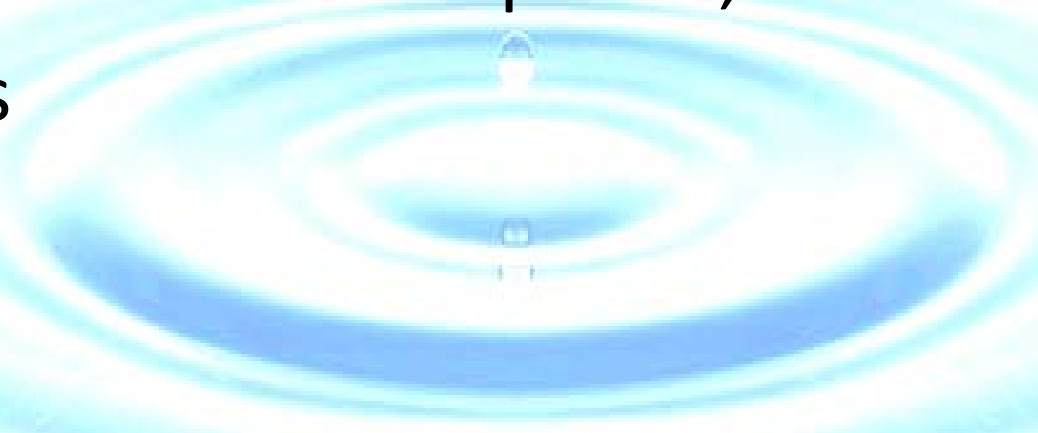
WINTER STORAGE: Water is pulled from the Tualatin River, treated to drinking water standards and then transported by pipe to the AS3 site. There it is pumped into the aquifer and stored.


SUMMER RECOVERY: The treated water stored in the aquifer is now pumped out, re-chlorinated, and put into a pipe to be delivered to homes and businesses in Hillsboro, as well as areas served by Beaverton and Tualatin Valley Water District.





- Review & comment on Tech Memos 1 – 6
- Additional Considerations: Risks & Uncertainties
- Board expectations for April 24, 2013 meeting
- Next Steps



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Technical Memorandum 1

Introduction & Supply Options




- Overview of 2007 Decision / TBWSP
- Summary of changes since 2007
 - Uncertainty of TBWSP
 - Reduction in demand projections
 - Increase efficiency in use of Portland supply
 - Expanded supply options / Hillsboro study
 - Decreased energy costs



Water Supply Options

- Portland Contract
 - o Option: ~~with or~~ without Hillsboro as partner
 - o Option: with ~~or without~~ UV treatment of Bull Run
- Mid-Willamette at Wilsonville
 - o Partner with Hillsboro
 - o Option: Portland ~~or Willamette~~ supply to Metzger
- Tualatin Basin Water Supply Project
 - o Partner with Hillsboro, CWS, Beaverton, FG & TVID
 - o Option: with **AND** without federal funding to fix dam
- Northern Groundwater
 - o Partner with Hillsboro
 - o Portland supply to Metzger

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Technical Memorandum 2

Population & Demand Projections

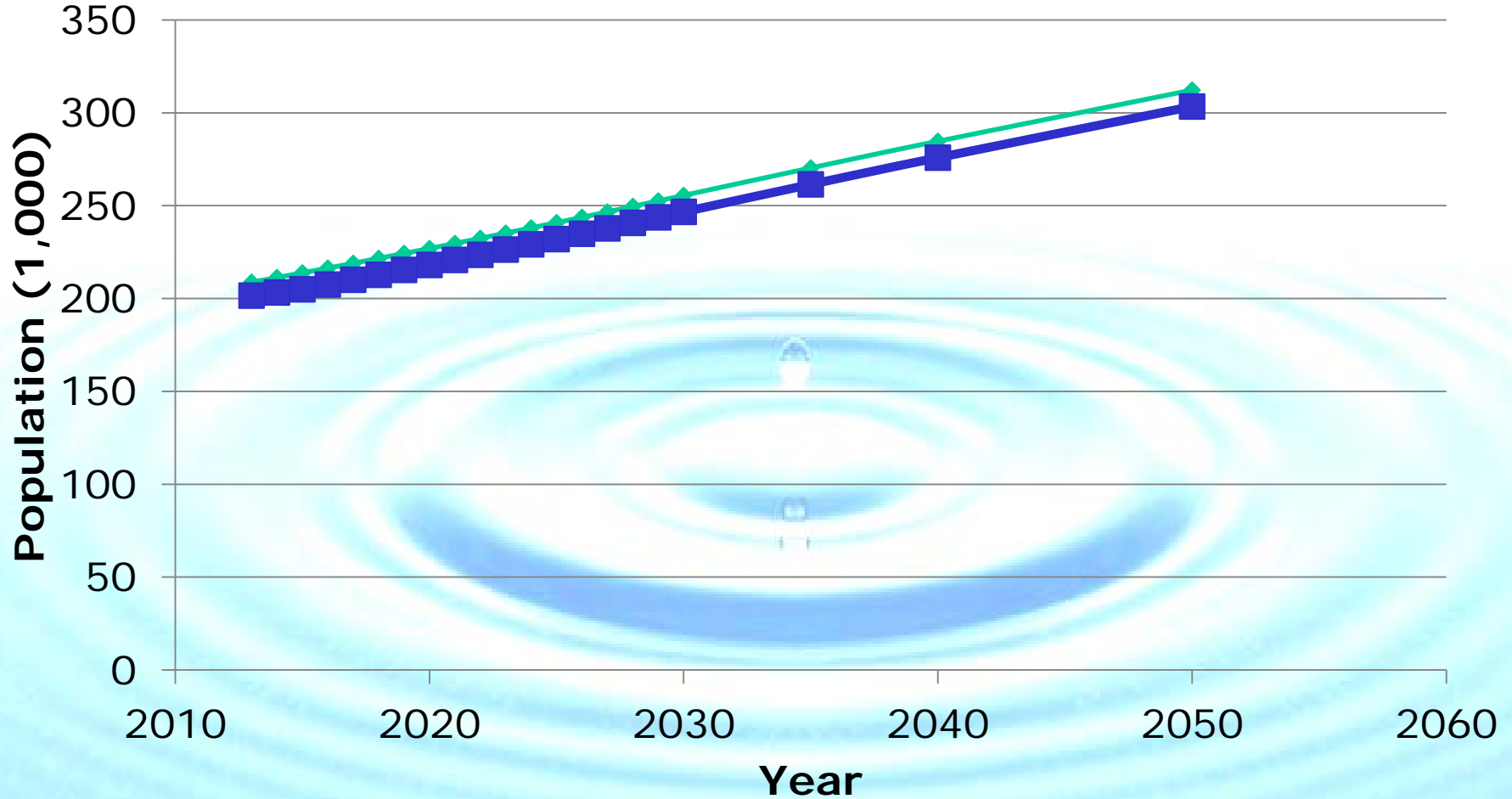


- Original basis – 2007 Water Master Plan Update
- Populations & demands updated in 2010
 - Delayed growth due to economy
 - Reduced per-capita demand
 - Reduced peaking factors





Total Population

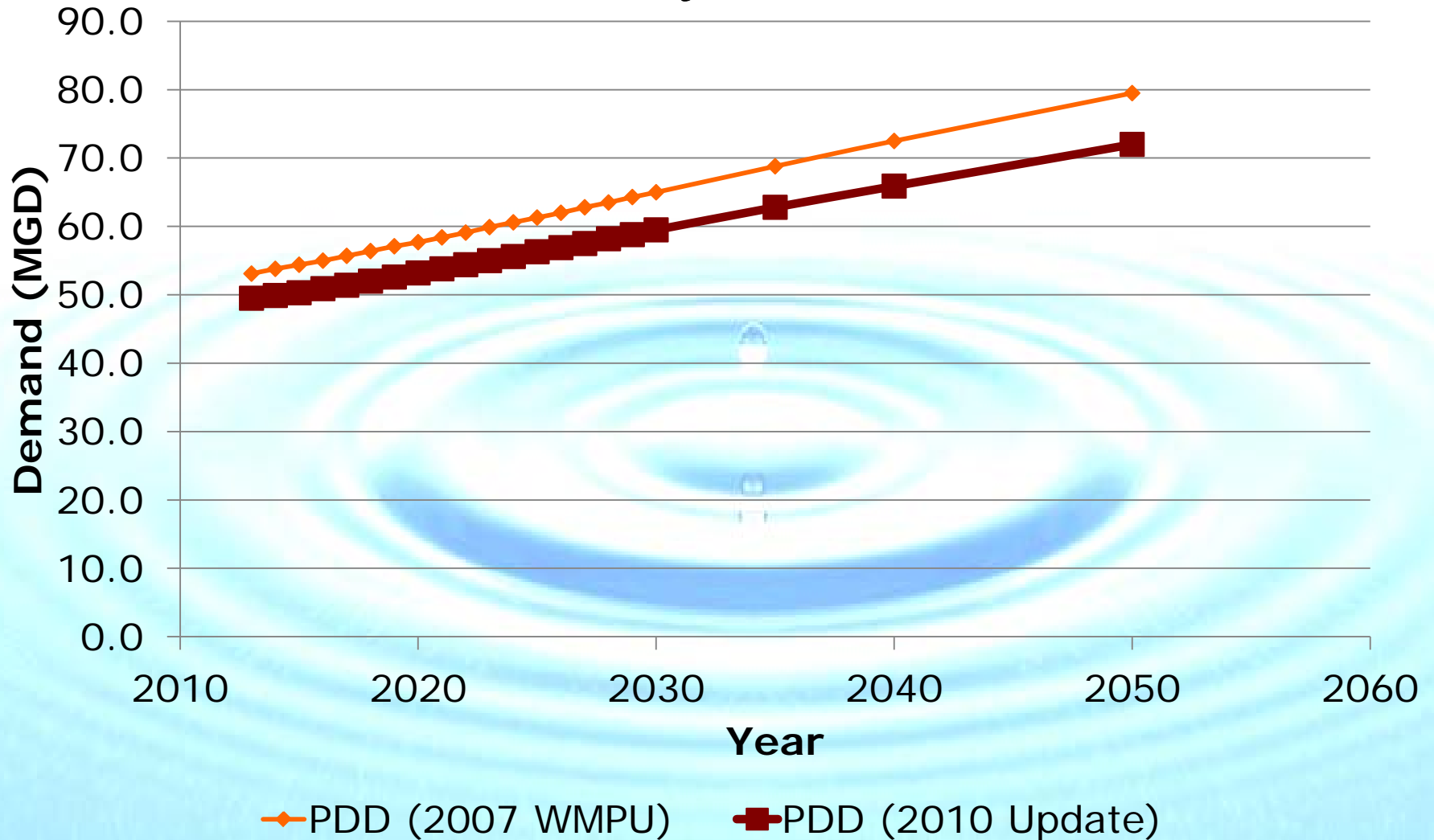


—▲— Pop (2007 WMPU)

—■— Pop (2010 Update)



Peak-Day Demand



The background of the slide is a light blue gradient with a central point where a drop of water has just fallen, creating concentric ripples that expand outwards. The ripples are more pronounced in the center and fade towards the edges.

Technical Memorandum 3

Economic & Financial Evaluation



Economic Analysis

- Present Value Analysis

Risk Analysis

- Monte Carlo

Rate Impacts

- Long-term Financial Forecast



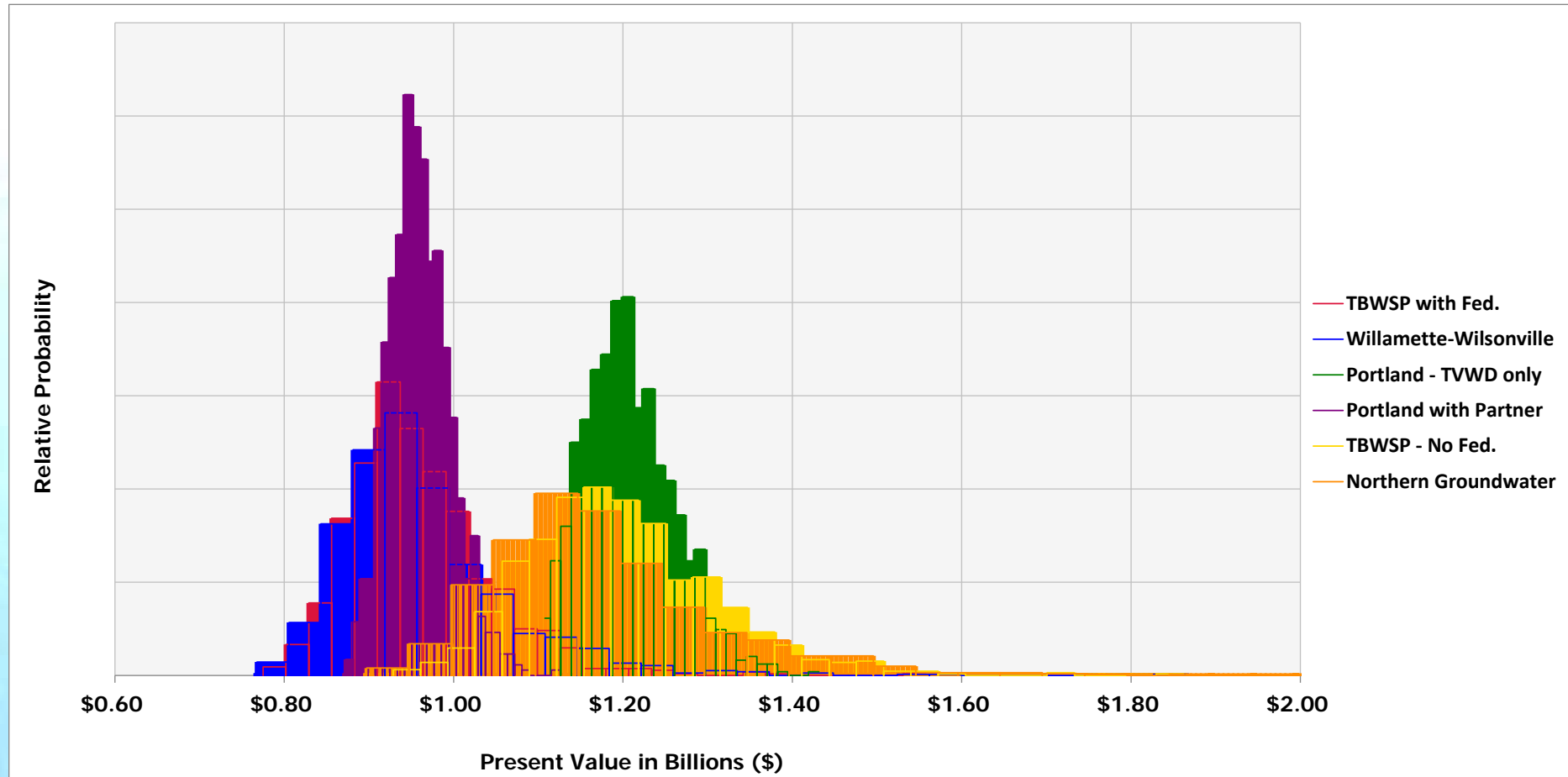
TVWD Net Present Values of Options / Scenarios

(Millions of Dollars)

| Supply Option / Scenario | Net Present Value (Million \$) |
|--|-----------------------------------|
| Portland / Hillsboro partner, no treatment | \$ 922 |
| Portland / TVWD only, no treatment | \$ 1,160 |
| Portland / TVWD only, with UV treatment | \$ 1,208 |
| Mid-Willamette at Wilsonville, Metzger from PWB | \$ 964 |
| Mid-Willamette at Wilsonville, Metzger from Willamette | \$ 739 |
| TBWSP / With 85% federal cost sharing | \$ 961 |
| TBWSP / No federal cost sharing | \$ 1,201 |
| Northern Groundwater | \$ 1,177 |

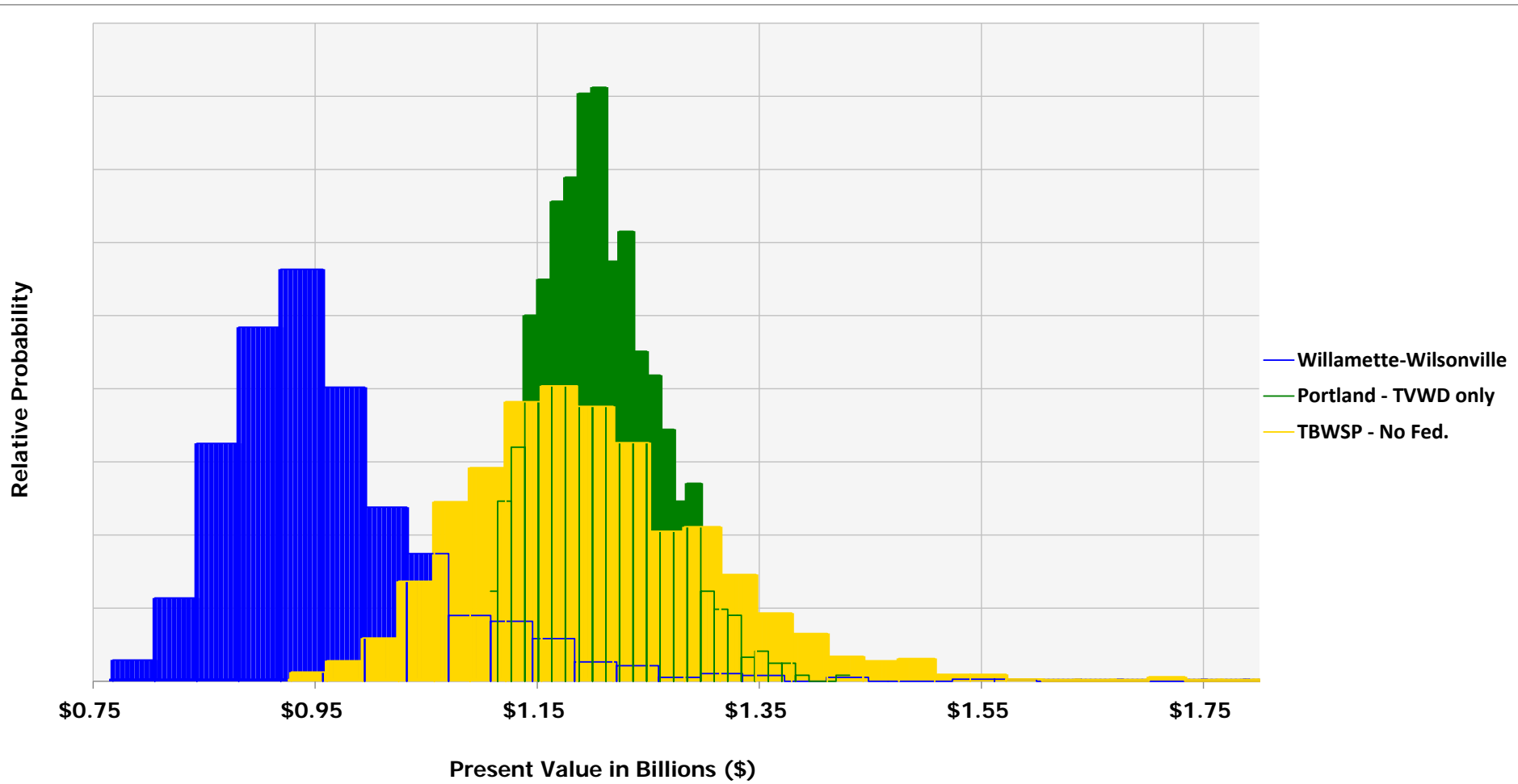


Comparison of Options Analyzed





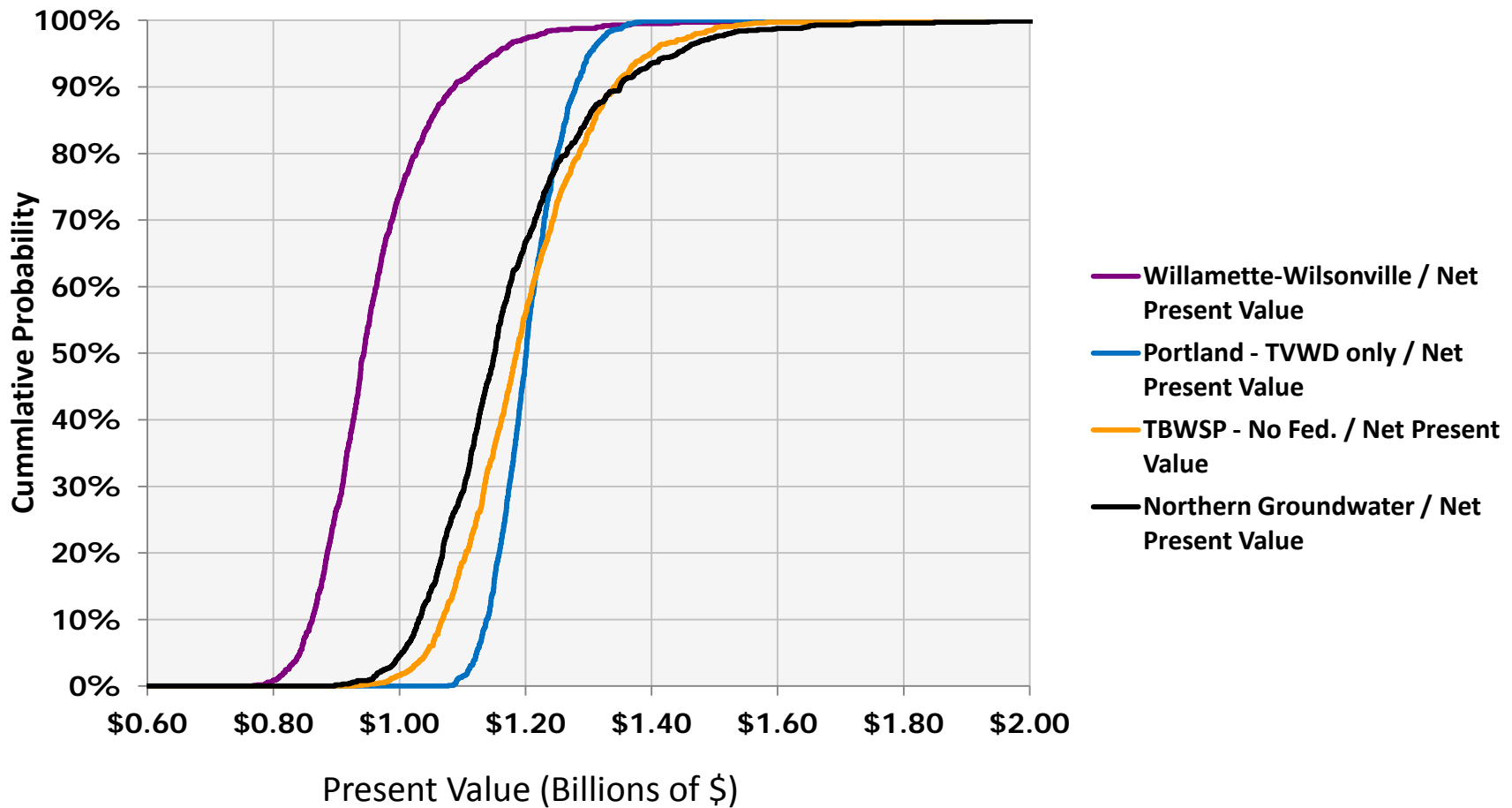
Comparison of Options





Comparison of Options

Using Cumulative Probability





Rate and Financial Analyses

Consistent assumptions applied to all options

Non-supply CIP

Debt funding criteria

O&M assumptions

Not necessarily what we would implement

Expressed as monthly typical customer bill over *TBWSP 2007 Decision*

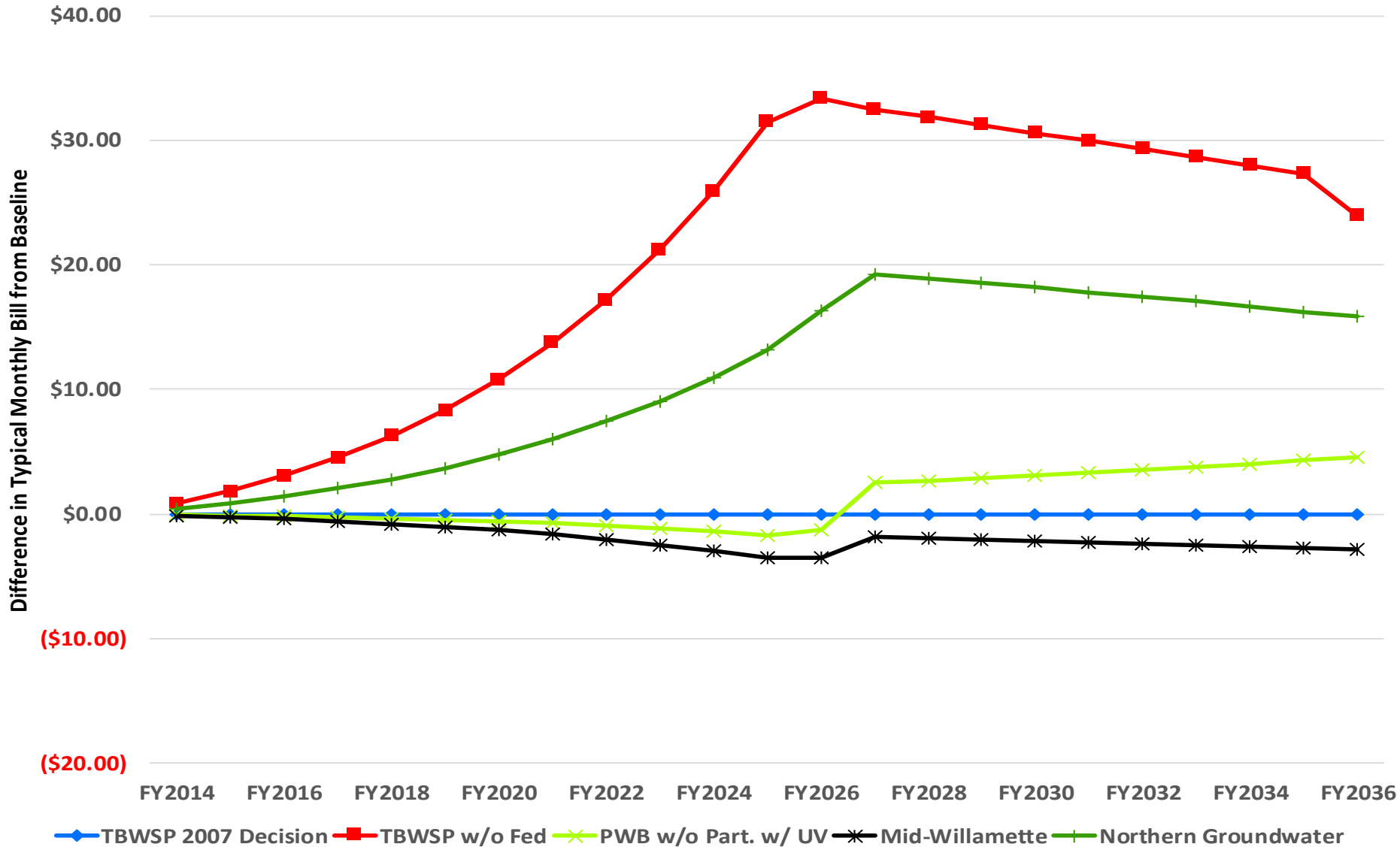
Provides relative financial impacts of supply options

Geared to provide decision-quality information

Presented graphically to provide context over time



Summary of Options





Findings from Economic and Rate Analyses

Economic Analyses

- Results dependent on non-economic assumptions
 - Availability of federal funding for TBWSP
 - Continued availability of Portland supply
 - Certainty of costs for all options

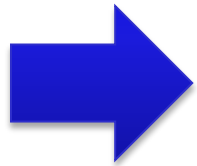
Rate Analyses

- Delaying improvements lowers the immediate rate requirements
- Implementation will require overall capital-funding strategy
- Metzger may be cheaper to serve from alternative supply

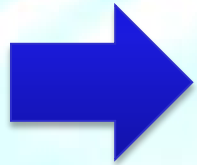
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Technical Memorandum 4

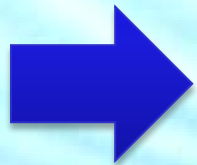
Non-Financial Evaluation



Step 1 – Identify appropriate criteria



Step 2 – Evaluate the options
according to the criteria



Step 3 – Use evaluations to support
decision making



| Criteria | | Description |
|----------|------------------------|--|
| 1 | Demand Uncertainty | Ability of the supply to provide additional capacity if demands are greater than projected and accommodate demands less than forecast thru phasing and/or scaling improvements. |
| 2 | Source Reliability | Ability of the source to deliver required capacity at all times, including consideration of available water resources, existing water rights, natural variation, seismic vulnerability and possible effects of climate change. |
| 3 | Source Redundancy | Ability to meet the goal of all areas served by at least two sources of supply. |
| 4 | Implementation Risk | Risks of project implementation delays and/or cost increases due to unplanned factors such as permitting risk, schedule delays, complexity of required partnering agreements and/or project complexity. |
| 5 | Public Acceptance | Public perception of each of the sources of supply including requirements of industrial and commercial customers as well as general public. |
| 6 | Community Impacts | Impacts on the community due to large infrastructure construction projects. |
| 7 | Metzger Fluoridation | Ability to continue non-fluoridated supply to Metzger. |
| 8 | Finished Water Quality | Ability of the source to meet or exceed existing and anticipated regulatory requirements and aesthetic standards. |
| 9 | Sustainability | Anticipated sustainability of source based on energy requirements, infrastructure requirements and environmental impacts. |
| 10 | Governance | Ability of the District to establish and preserve policies for initial construction and on-going maintenance of capital assets. |



Evaluation on a three score scale

| Score | Definition |
|-------|--|
| + | The option is beneficial, relative to the other options, for the evaluated criterion. |
| 0 | The option is neutral (neither beneficial or detrimental), relative to the other options, for the evaluated criterion. |
| - | The option is detrimental, relative to the other options, for the evaluated criterion. |



Final Ratings

From November 8, 2012 Work Session

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------|----------------|-------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 6. Community Impacts | 0 | 0 | 0 | 0 |
| 7. Metzger Fluoride | 0 | 0 | 0 | 0 |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |

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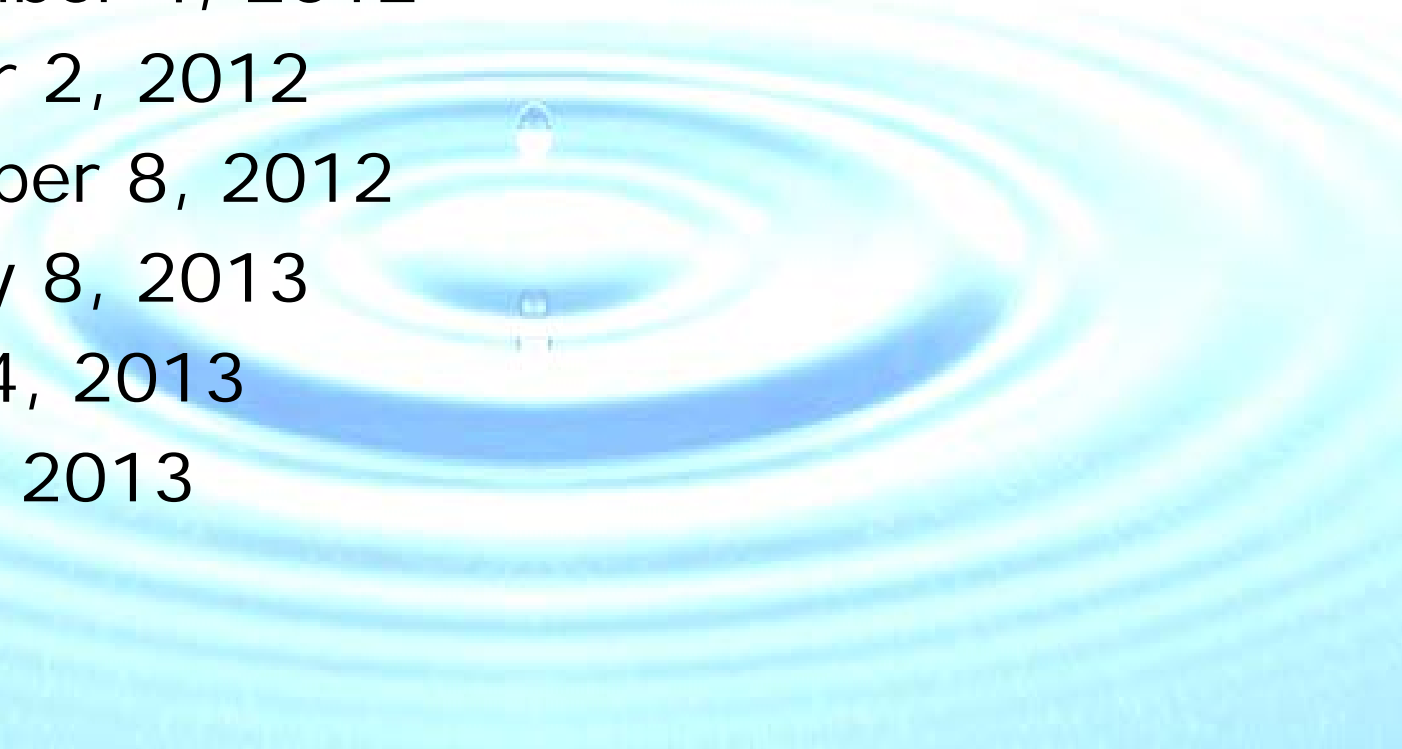
Technical Memorandum 5

Public Outreach & Feedback



TVWD Board Work Sessions

- May 8, 2012
- July 10, 2012
- September 4, 2012
- October 2, 2012
- November 8, 2012
- January 8, 2013
- March 4, 2013
- April 2, 2013





Outreach Information

- *Water Words* newsletter
 - Business Industry and Government newsletter
 - Meeting announcement cards in front office
 - Website notices / dedicated webpage
 - Press releases; one notice in *The Oregonian*
 - One-on-one interview with local reporter
 - Two paid ads in *The Oregonian*
 - 354 invitation postcards & letters sent
 - Phone calls & emails to customers & public groups
- Project Summary & Public Comment Forms



Events

- Two Open Houses
- Business Breakfast
Intel, Providence St. Vincent Hospital, Tualatin Valley Fire and Rescue, Beaverton School District, KG Investment Management, Tektronix, Office of Consolidated Emergency Management
- TVWD employee briefings
- Board-attended events
Washington County Democratic Party, Bethel Congregation Church, Aloha Business Association



Public Presentations & Briefings

- Water Managers Advisory Board Meeting
- Washington County Public Affairs Forum
- Westside Economic Alliance
- Willamette River Water Coalition
- Oregon Health and Science University West Campus
- Beaverton School District
- Tualatin Valley Fire and Rescue
- Intel
- Citizen Participation Organizations (CPO) 3 and 4M



Feedback

- 17 comments forms received from public
- Four emails from public
- 29 comment forms received from employees

Remaining Presentations

- Citizen Participation Organization (CPO) 6
- Five Oaks Triple Creek Neighborhood Association Committee (NAC)

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Technical Memorandum 6

Decision & Recommendations



Final Ratings

From November 8, 2012 Work Session

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------|----------------|-------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 6. Community Impacts | 0 | 0 | 0 | 0 |
| 7. Metzger Fluoride | 0 | 0 | 0 | 0 |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |



Narrowing the Decision Space

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------|----------------|-------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 6. Community Impacts | 0 | 0 | 0 | 0 |
| 7. Metzger Fluoride | 0 | 0 | 0 | 0 |
| 8. Finished wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |



Updated Decision Space

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------|----------------|-------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |



Incorporating Economic & Financial Factors

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------------|----------------|-----------------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |
| Relative Present Value | 26% higher | Least PV | 25% higher | 22% higher |
| 2036 Rate Over Base | \$4.52/mo more | \$2.81/mo less | \$23.97/mo more | \$15.84/mo more |



Updated Decision Space

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------------|----------------|-----------------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |
| Relative Present Value | 26% higher | Least PV | 25% higher | 22% higher |
| 2036 Rate Over Base | \$4.52/mo more | \$2.81/mo less | \$23.97/mo more | \$15.84/mo more |



Further Comparison of Options

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------------|----------------|-----------------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |
| Relative Present Value | 26% higher | Least PV | 25% higher | 22% higher |
| 2036 Rate Over Base | \$4.52/mo more | \$2.81/mo less | \$23.97/mo more | \$15.84/mo more |



Further Comparison of Options

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------------|----------------|-----------------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |
| Relative Present Value | 26% higher | Least PV | 25% higher | 22% higher |
| 2036 Rate Over Base | \$4.52/mo more | \$2.81/mo less | \$23.97/mo more | \$15.84/mo more |



“Sideline” Options

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------------|----------------|-----------------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |
| Relative Present Value | 26% higher | Least PV | 25% higher | 22% higher |
| 2036 Rate Over Base | \$4.52/mo more | \$2.81/mo less | \$23.97/mo more | \$15.84/mo more |



Further Narrowing of Decision Space

| Criteria | Portland | Mid-Willamette | TBWSP | Northern Groundwater |
|-------------------------|----------------|----------------|-----------------|----------------------|
| 1. Demand Uncertainty | + | 0 | - | 0 |
| 2. Source Reliability | 0 | + | + | + |
| 3. Source Redundancy | 0 | + | 0 | + |
| 4. Implementation Risk | 0 | 0 | - | - |
| 5. Public Acceptance | + | 0 | 0 | - |
| 8. Finished Wtr Quality | 0 | + | + | 0 |
| 9. Sustainability | + | 0 | - | - |
| 10. Governance | - | + | 0 | + |
| Relative Present Value | 26% higher | Least PV | 25% higher | 22% higher |
| 2036 Rate Over Base | \$4.52/mo more | \$2.81/mo less | \$23.97/mo more | \$15.84/mo more |



Updated Decision Space

| Criteria | Portland | Mid-Willamette |
|-------------------------|----------------|----------------|
| 1. Demand Uncertainty | + | 0 |
| 2. Source Reliability | 0 | + |
| 3. Source Redundancy | 0 | + |
| 5. Public Acceptance | + | 0 |
| 8. Finished Wtr Quality | 0 | + |
| 9. Sustainability | + | 0 |
| 10. Governance | - | + |
| Relative Present Value | 26% higher | Least PV |
| 2036 Rate Over Base | \$4.52/mo more | \$2.81/mo less |



Further Comparison of Options

| Criteria | Portland | Mid-Willamette |
|-------------------------|----------------|----------------|
| 1. Demand Uncertainty | + | 0 |
| 2. Source Reliability | 0 | + |
| 3. Source Redundancy | 0 | + |
| 5. Public Acceptance | + | 0 |
| 8. Finished Wtr Quality | 0 | + |
| 9. Sustainability | + | 0 |
| 10. Governance | - | + |
| Relative Present Value | 26% higher | Least PV |
| 2036 Rate Over Base | \$4.52/mo more | \$2.81/mo less |



Factors Favoring Portland Option

- **Demand Uncertainty** – can grow into this option over time and time improvements as needed
- **Public Acceptance** – strong acceptance of Bull Run source, less acceptance of Columbia South Shore Wellfield, uncertain implications of fluoride
- **Sustainability** – Gravity supply has lowest energy requirement as compared to all other options



Factors Favoring Mid-Willamette Option

- **Source Reliability** – Available capacity in river; new WTP & pipeline built to seismic standards; limits risk of Portland not renewing contract
- **Source Redundancy** – New source of supply limits impacts from interruption of other sources
- **Finished Water Quality** – Lower turbidity; lower disinfection by-products (DBPs); lower solids; avoids chloramine disinfection; 10+ years without violation or boil water notice



Factors Favoring Mid-Willamette Option

- **Governance** – Joint partnership with other water providers; existing framework of WRWC; would own assets; partner in setting policies & standards; decision authority for capital projects
- **Costs** – Lower present value; lower rate increases; limits risk of future rate increases by Portland; opportunity to share costs with Hillsboro; serving Metzger in the future further reduces unit costs

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Additional Observations Risks & Uncertainties



- **Water Quality Event** – Fire, flood or infestation in Bull Run or spill in wellfield versus spill on Willamette – if Portland selected, lack of adequate backup; if Willamette selected, still have Portland backup: *+ Willamette*
- **Future Regulations** – Portland has reduced risk of contamination versus Willamette treatment plant uses best available technology: *+ Willamette*
- **Seismic Event** – Portland supply system 30 – 100 years old versus Willamette improvements built to highest new standards: *+ Willamette*



- **Source Quality Changes** – Bull Run is protected source versus “Willamette depends on treatment plant.” All options depend on multi-barrier treatment including source: *+ Willamette*
- **Climate** – Portland is vulnerable to longer, dryer summer versus Willamette federal storage and adds redundancy of new source: *+ Willamette*
- **Schedule** – Portland has no critical milestone dates versus Willamette completion by 2026 to avoid 10-year renewal of Portland contract: *+ Portland*



- **Capital Costs** – Could defer or avoid building WCSL-2 (with increased seismic risk) versus fixed investment in Willamette: *+ Portland*
- **O&M Costs** – Portland could offer “great deal” and/or revise contract versus Portland could insist on higher costs in future as condition of renewal; Willamette has greater exposure to future energy costs versus Willamette could serve Metzger in future to reduce unit cost: *+ Willamette*



- **Ownership** – Portland responsible for all O&M versus need to maintain Willamette; risk of Portland not renewing agreement versus decision authority for Willamette: + *Willamette*
- **Political** – Possible public opposition to Willamette and Portland may actively resist loss of largest customer versus Washington County and Hillsboro may actively support Willamette benefits to regional economy: ??



- **Economy** – Lower capital investment in Portland provides “flexibility” during economic downturn versus new source provides certainty of supply to sustain growth of Washington County economy: ~ *Equal*
- **Opportunity** – Portland option continues status-quo versus Willamette partnership with Hillsboro provides new long-term source to region:
+ Willamette



Summary of Risks & Uncertainties

| Risks & Uncertainties | More Resilient Option |
|------------------------|-----------------------|
| Water Quality Event | Willamette |
| Future Regulations | Willamette |
| Seismic Event | Willamette |
| Source Quality Changes | Willamette |
| Climate | Willamette |
| Schedule | Portland |
| Capital Costs | Portland |
| O&M Costs | Willamette |
| Ownership | Willamette |
| Political | ?? |
| Economy | ~ Equal |
| Opportunity | Willamette |



- Board Expectations for April 24, 2013 Meeting
 - Staff Report
 - Recommendations?
 - Public Comments / Public Hearing
 - Board Discussion
 - Decision
- Next Steps