WTD CAPITAL PROJECT COST ESTIMATING & PROJECT CONTROL PROCESS IMPROVEMENT EFFORT

Henry Chen (Seattle Public Utilities) and Andrew Lee (City of Bellevue)
MWPAAC E&P BRIEFING

- Process Improvement Approach
- Workshops
- Proof of Concepts & Pilots
- Next Steps
WORKPLAN AND TASK PROGRESS

- Analysis and Issues Identification (Oct-Dec 2015)
- Trend Analysis Fundamentals (January)
- Basis of Estimate (January & February)
- Contingency (March)
- Risk Management (April)
- Work Breakdown Structure, Coding and Estimate Format (May)
- Estimate Format / Estimate Deliverables Checklist / Estimate Reconciliation & Validation (July)

- Historical Data (TBD)

- TWG to make Final Recommendations to the Council and Executive December 7, 2016
BASIS OF ESTIMATE

- Basis of Estimate Concept Overview
- Development of Template and Guidance
- Initial Staff Training Completed (February)
- CSI Program Pilot
- CSO Program Pilot
- Basis of Estimate Draft Template Available for use by staff
TREND ANALYSIS

- Trend Analysis Concept Overview
- Framework
- Change Management
- Process Guidance
- Templates

- Development of Tool and Guidance
- Magnolia Proof of Concept
- Pilot Project Kickoff (June)
PROJECT COST BUILD-UP

- Out of Scope – Management Reserve
- Unexpected WBS Elements
- Expected WBS Elements

Cost vs. Time

- Project Cost = Allied + Construction Cost
- Construction Pricing Uncertainty Allowance
- Allowance for Indeterminants
- Construction Contract Change Order Allowance
- Project Contingency
# Contingency

### WTD Construction Contingency

<table>
<thead>
<tr>
<th>Construction Pricing Uncertainty Factor</th>
<th>Construction Definition Uncertainty Factor</th>
<th>Construction Change Order Contingency</th>
<th>Project Contingency</th>
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</thead>
</table>

### WTD Construction Allowances

<table>
<thead>
<tr>
<th>Estimate Uncertainty Allowance</th>
<th>Design Uncertainty Allowance (AFIs)</th>
<th>Construction Change Order Allowance</th>
<th>Project Cont.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantified Project Contingency (Using Confidence Intervals)</td>
<td>Project Reserves Management Reserve</td>
<td></td>
<td></td>
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## CONTINGENCY

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<tbody>
<tr>
<td>Up to 5%</td>
<td>25%</td>
<td>10%</td>
<td>30%</td>
</tr>
<tr>
<td>Up to 3%</td>
<td>20%</td>
<td>10%</td>
<td>25%</td>
</tr>
<tr>
<td>Up to 2%</td>
<td>15%</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>Up to 1%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>0%</td>
<td>0%</td>
<td>10%</td>
<td>5%</td>
</tr>
</tbody>
</table>

**WTD Estimating & Construction Allowances**

<table>
<thead>
<tr>
<th>Construction Pricing Uncertainty Factor</th>
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<tr>
<td>Up to 5%</td>
<td>25%</td>
<td>10%</td>
<td>30% (P=90)</td>
</tr>
<tr>
<td>Up to 3%</td>
<td>20%</td>
<td>10%</td>
<td>25% (P=80)</td>
</tr>
<tr>
<td>Up to 2%</td>
<td>15%</td>
<td>10%</td>
<td>15% (P=70)</td>
</tr>
<tr>
<td>Up to 1%</td>
<td>10%</td>
<td>10%</td>
<td>10% (P=80)</td>
</tr>
<tr>
<td>0%</td>
<td>0%</td>
<td>10%</td>
<td>5% (P=50)</td>
</tr>
</tbody>
</table>

**Project Reserves**

- Calculated
The arrows illustrate the continuous and iterative nature of the process recommended to be undertaken throughout project delivery.

Working to develop a scalable approach to Risk Analysis that fits WTD's business.

Manage Identified Risks
- Identify & Prioritize Risks to Manage
- Use Model Results as a Barometer
- Develop Actionable Responses
WBS & CODING

- Work Breakdown Structure (WBS)
- Cost Breakdown Structure (CBS)
- Risk Breakdown Structure (RBS)

Project Phase
- Project Objective(s)
- Project Characteristics
- Project Type (WBS Level 1)
- Project Elements (WBS Level 2)
- Project Sub-Elements (WBS Level 3)
## PROOF-OF-CONCEPT AND PILOT PROJECTS

<table>
<thead>
<tr>
<th>WTD Pilot Projects (to-date)</th>
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<tbody>
<tr>
<td>Lake Hills and NW Lake Sammamish Interceptor Upgrade</td>
</tr>
<tr>
<td>North Mercer Island &amp; Enatai Interceptors Upgrade</td>
</tr>
<tr>
<td>Coal Creek Siphon &amp; Trunk Parallel</td>
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<td>CSO Control &amp; Improvements – Magnolia</td>
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<tr>
<td>West Point Treatment Plant OGADS Replacement (Oxygen Generation and Dissolution System)</td>
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<td>Georgetown Wet Weather Treatment Station</td>
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<td>40+ CSO – Combined Sewer Overflow new project estimates</td>
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<td>40+ CSI – Conveyance System Improvements new project estimates</td>
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QUESTIONS