



**CALIFORNIA**  
**AMERICAN WATER**

# **Monterey Peninsula Water Supply Project**

## **CPUC Cost Workshops**

### **Project Costs**

**December 11 - 13, 2012**

## Disclaimer

- **This presentation contains material that are for discussion purposes.**
- **Various graphics, figures and tables contain numerous estimates which are beyond our control and subject to change.**
- **These items are for illustration purposes only.**

## Topics for Cost Workshop

- **Project Costs [Tue, Dec 11 (Day 1): 11 AM – 2 PM]**
  - Desalination Project Costs
  - Aquifer Storage and Recovery (ASR) Costs
  - Storage and Distribution Facilities Costs
  - Preconstruction Project Costs
  - Groundwater Replenishment (GWR) Costs

## Plant Sizing Assumptions

- Desal Plant Operating greater than 95% of capacity and at a constant rate throughout the year
- Sized to return 8% of total desalination plant production to Salinas Valley during the irrigation season. (i.e. 4% of raw water supply)
- 0.8 MGD maintenance flow through BIRP during the dry season
- 3,500 AF of Carmel River water was used as dilution water for GWR alternatives. (Dilution pipeline cost included in the CAW Only Facilities)
- GWR injection occurred from September to April at a fairly constant rate over 8 months for 3,500 AF
- Ultimate Seaside Basin allocation of 1,474 AFY was assumed. During the ramp down years (through 2021), additional water will be available and may make up for any early years deficiencies caused by lack of ASR carry over storage.

## Updated Demands

<b>Estimated Demand – Mid Range (AFY)</b>	<b>15,296</b>
5 yr Average (AFY)	13,290
Pebble Beach (AFY)*	325
Tourism Bounce back (AFY)	500
Lots of Record (AFY)	1,181

(\*) Pebble Beach is allocated 380 AFY based on improvements to CAWD, +/- 55 AFY is currently contained in 5 yr avg.

## Updated Demands – cont'd

<b>Estimated Demand – High Range (AFY)</b>	<b>16,651</b>
Max year in last 5 years (AFY)	14,645
Pebble Beach (AFY)*	325
Tourism Bounce back (AFY)	500
Lots of Record (AFY)	1,181

<b>Estimated Demand – Low Range (AFY)</b>	<b>13,996</b>
Min year in last 5 years (AFY)	11,990
Pebble Beach (AFY)*	325
Tourism Bounce back (AFY)	500
Lots of Record (AFY)	1,181

## Desal Plant Size without GWR

<b>Sum of Updated Sources of Supply (AFY)</b>	<b>14,550</b>
Seaside Wells (AFY)*	774
Sand City Desal (AFY)	94
Carmel River Legal Right (AFY)	3,376
ASR Recovery (AFY)	1,300
Desal to CAW (AFY)	9,006
<b>Desal needed to produce demand of 15,250 (AFY)**</b>	<b>9,706</b>

(\*) Reduced by 700 AFY to allow for 25 year Basin payback.

(\*\*) Plant size between 9.0 to 9.8 MGD needed to produce 9,706 AFY.

## Desal Plant Size without GWR – Dry Year

<b>Sum of Updated Sources of Supply (AFY)</b>	<b>13,950</b>
Seaside Wells (AFY)	1,474
Sand City Desal (AFY)	94
Carmel River Legal Right (AFY)	3,376
ASR Recovery (AFY)	0
Desal to CAW (AFY)	9,006
<b>Desal needed to meet historical 5 year high demand (AFY)**</b>	<b>9,701</b>

(\*) No Basin payback in Dry Year.

(\*\*) Plant size between 9.0 to 9.8 MGD needed to produce 9,706 AFY.



## Desal Plant Size with GWR

<b>Sum of Updated Sources of Supply (AFY)</b>	<b>14,450</b>
Seaside Wells (AFY)	774
Sand City Desal (AFY)	94
Carmel River Legal Right (AFY)	3,376
ASR Recovery (AFY)	1,300
GWR Recovery (AFY)	3,500
Desal to CAW (AFY)	5,506
<b>Desal needed to produce demand of 15,250 (AFY)**</b>	<b>6,206</b>

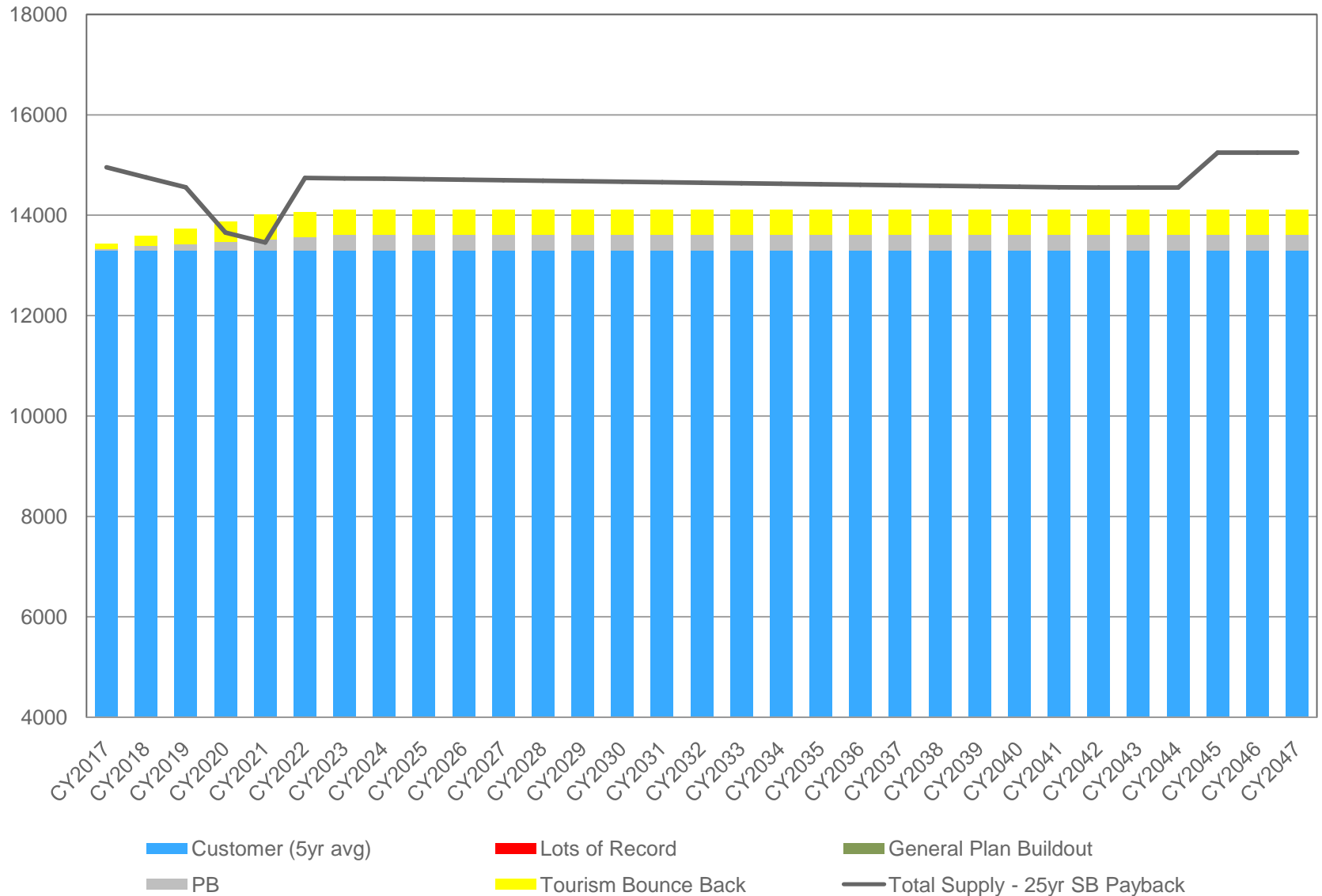
(\*) Reduced by 700 AFY to allow for 25 year Basin payback.

(\*\*) Plant size between 9.0 to 9.8 MGD needed to produce 9,706 AFY.

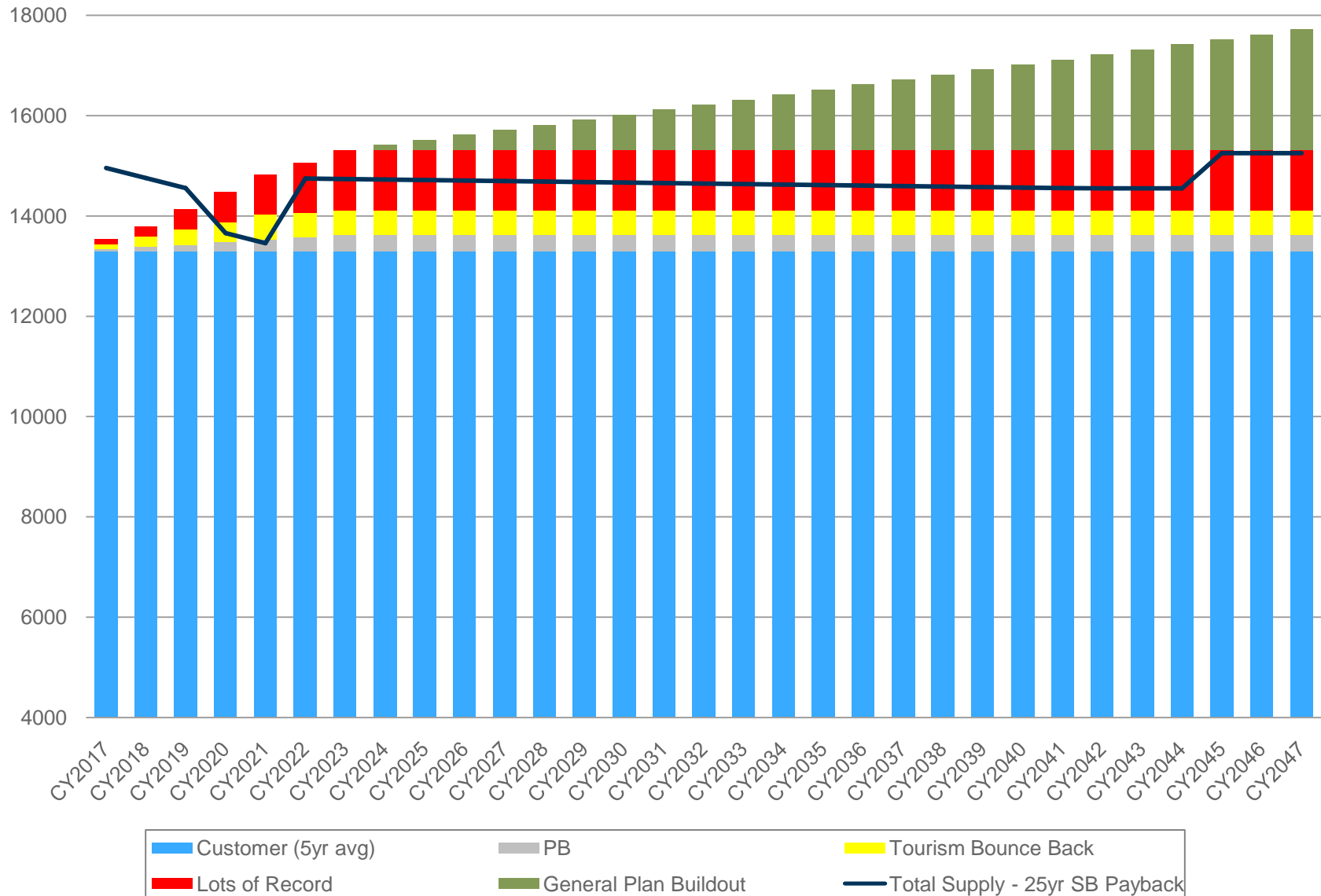
## Long Term Demands

- Lots of Record (LOR) = 1,181 AFA
- General Plan Build Out (GPBO) = 4,545 AFA
- Seaside Basin Replenishment = anticipated at 25 years
- For Demand Scenarios :
  - Uses 5 year Avg. Demand as Starting Point.
  - Reduces Supply from Seaside Basin for payback
  - Uses 7 year and 20 year development of LOR
  - Assumes PB demand occurs in 7 years
  - Assumes Sand City growth occurs over 25 years
  - Assumes no ASR for initial 5 years.
  - Assumes GPBO starts at 100 AFA after LOR
  - Assumes Tourism Bounce Back at 100 AFA for 5 years, then steady at 500 AFA

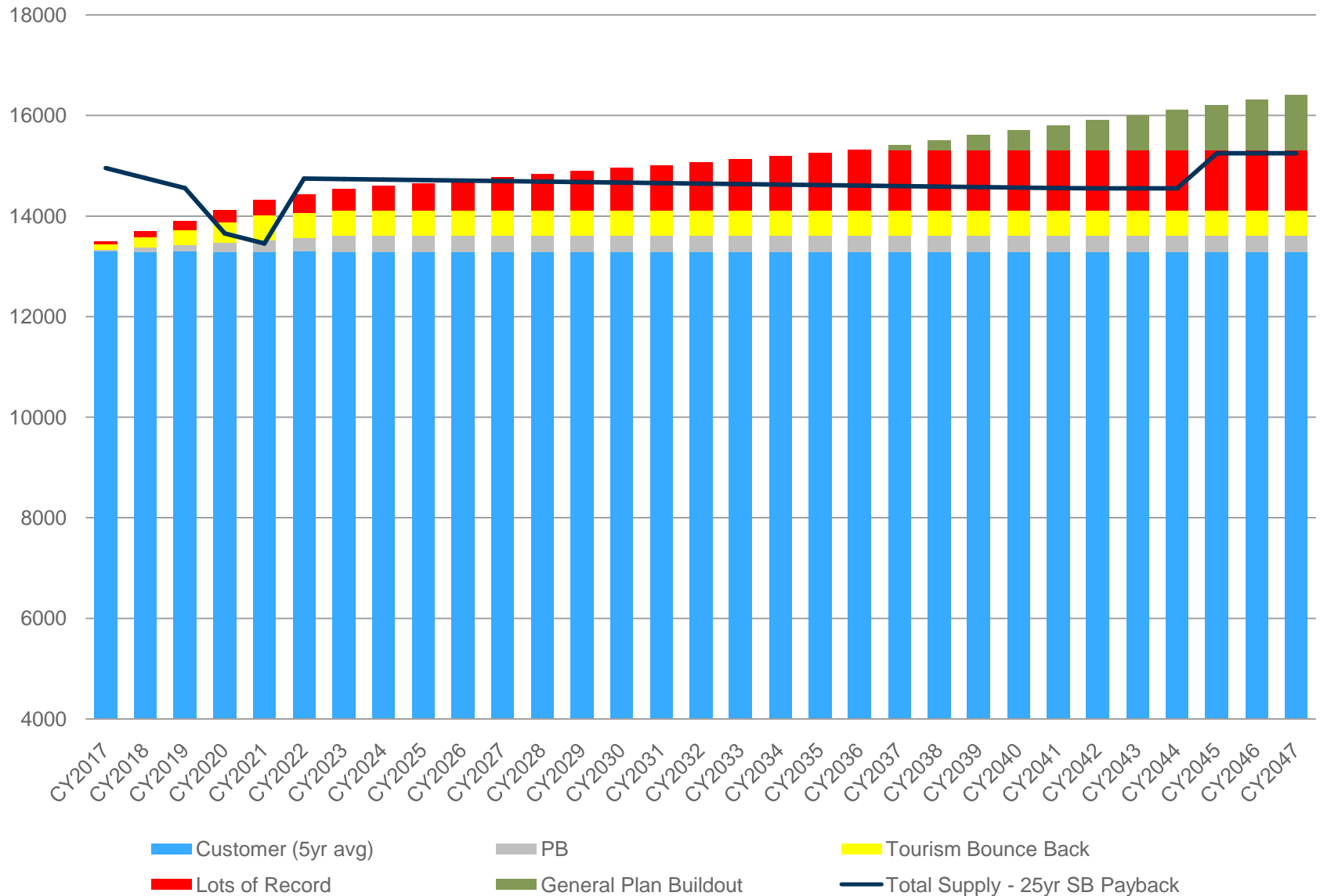
## Scenario 1 - 7yr PB, Tourism Bounce Back, No Growth (except Sand City)



## Scenario 2 - 7yr LOR & PB, Toursim Bounce Back



## Scenario 3 - 7yr PB, 20yr LOR, Tourism Bounce Back



## Capital Cost – without CAW Only Facilities

Item	9.0 MGD Plant	5.4 MGD Plant
Intake & Raw Water Pipeline	\$75.8	\$63.5
Desal Plant	\$161.0	\$127.6
Transfer Pipeline (Plant to CAW Facilities)	\$23.7	\$22.2
<b>Total</b>	<b>\$260.5</b>	<b>\$213.3</b>

All Costs 2012 dollars

## Capital Cost – CAW Only Facilities

Item	9.0 MGD Plant	5.4 MGD Plant
South Transfer Pipeline (from Connection with Transfer Pipeline to Seaside Pipeline)	\$12.4	\$12.4
Seaside Pipeline	\$16.9	\$16.9
Monterey Pipeline (including Valley Greens Pump Station)	\$28.1	\$28.1
Terminal Reservoirs	\$19.1	\$19.1
ASR Facilities	\$30.4	\$30.4
<b>Total</b>	<b>\$106.9</b>	<b>\$106.9</b>

All Costs 2012 dollars

## Capital Cost – Desal Plant

Item	9.0 MGD Plant	5.4 MGD Plant
Base Construction	\$84.2	\$65.5
Implementation/Startup/Property	\$18.0	\$18.0
Most Probable Cost w/o Contingency	\$102.0	\$83.5
Contingency Allowance	\$25.5	\$17.2
Mitigation Allowance	\$1.3	\$1.3
Most Probable Capital Cost w/ Contingency	\$128.8	\$102.0
<b>HIGH END OF ACCURACY RANGE</b>	<b>\$161.0</b>	<b>\$127.6</b>

All Costs 2012 dollars



## Capital Cost – Intake and Raw Water Pipeline

Item	9.0 MGD Plant	5.4 MGD Plant
Base Construction	\$37.0	\$31.7
Implementation/Startup/Property	\$10.9	\$9.9
Most Probable Cost w/o Contingency	\$48.0	\$41.6
Contingency Allowance	\$12.0	\$8.6
Mitigation Allowance	\$0.6	\$0.6
Most Probable Capital Cost w/ Contingency	\$60.6	\$50.8
<b>HIGH END OF ACCURACY RANGE</b>	<b>\$75.8</b>	<b>\$63.5</b>

All Costs 2012 dollars

## Capital Cost – MPWSP Transfer Pipeline

Item	9.0 MGD Plant	5.4 MGD Plant
Base Construction	\$10.9	\$10.9
Implementation/Startup/Property	\$3.7	\$3.7
Most Probable Cost w/o Contingency	\$15.0	\$14.6
Contingency Allowance	\$3.8	\$3.0
Mitigation Allowance	\$0.2	\$0.2
Most Probable Capital Cost w/ Contingency	\$19.0	\$17.8
<b>HIGH END OF ACCURACY RANGE</b>	<b>\$23.7</b>	<b>\$22.2</b>

All Costs 2012 dollars

## MPWSP Facilities – Desal Plant & Intake

- **Cost Components:**
  - Cost developed by RBF Consulting
  - Used Equipment Cost quotes and major project cost elements to arrive at a Base Construction Cost.
  - Added an Implementation cost factor of 20% and land costs to arrive at Most Probable Construction Cost without Contingency
  - Added a 25% Project Contingency to arrive at Most Probable Construction Cost with Contingency, and
  - Finally as used in the prior RDP, added a accuracy factor of -15% to +25% to estimate the Accuracy range of the project.

## MPWSP Facilities - Pipelines Cost Estimate

- **Cost Components:**
  - Used same methodology as CAW Only Facilities (may be discussed later in presentation)

## Capital Cost – Comparison to Past Projects

Item	MPWSP 9.0 MGD Plant	RDP 8,800 AFA Plant	Moss Landing Plant (8,800 AFA)
Intake & Raw Water Pipeline	\$75.8	\$50.4	\$4.1
Desal Plant	\$161.0	\$181.7	\$246.6
Transfer Pipeline (Plant to CAW Facilities)	\$23.7	\$35.8	\$64.1
<b>Total</b>	<b>\$260.5</b>	<b>\$267.9</b>	<b>\$314.8</b>

All Costs 2012 dollars

## Annual O&M Costs for MPWSP

Item	9.0 MGD Plant	5.4 MGD Plant
Power	\$6,500,000	\$4,650,000
Chemicals	\$720,000	\$560,000
Membrane/Media Replacement	\$520,000	\$360,000
R&R	\$1,950,000	\$1,600,000
Purchased Recharge Water(*)	\$0	\$8,750,000
Labor & Misc	\$3,070,000	\$2,680,000
<b>Total</b>	<b>\$12,760,000</b>	<b>\$18,600,000</b>

All Costs 2012 dollars and based on full plant production

(\*) Assumes \$2500 / AF

## Annual O&M Costs for MPWSP – cont'd

Item	9.0 MGD Plant	5.4 MGD Plant
Power	\$6,500,000	\$4,650,000
Chemicals	\$720,000	\$560,000
Membrane/Media Replacement	\$520,000	\$360,000
R&R	\$1,950,000	\$1,600,000
Purchased Recharge Water(*)	\$0	\$10,500,000
Labor & Misc	\$3,070,000	\$2,680,000
<b>Total</b>	<b>\$12,760,000</b>	<b>\$20,350,000</b>

All Costs 2012 dollars and based on full plant production

(\*) Assumes \$3000 / AF

## MPWSP Power Cost Details

- **Electric Cost based on PG&E's E-20 Tariff – Secondary Firm**
- **Escalated to 2012 base year**
- **Used 6 month winter rate of \$0.102 / KWH**
- **Used 6 month summer rate of \$0.150 / KWH**
  
- **“Over the Fence Power” not likely to be available for a couple of reasons**
  - Moss Landing Power Plant is down many evenings and many days during the year based on power demands and the cost of natural gas.
  - Spinning Power not available, because plant has net energy need of 2 MW when off line, and needs 15 to 20 MW to start up.

## MPWSP Power Cost Details (cont'd)

- **Based on Continued Discussion with PG&E & MRWMD we have options:**
  - Continue to explore alternate E-20 tariffs such as Primary Firm and Transmission Firm which could result in reduction to \$0.095 /KWH
  - Continue discussion on Landfill Gas
  - Explore Direct Access
  - Explore Community Choice Aggregation, and
  - Complete Energy Conservation Study as included in last EIR which compared Grid power purchase to natural gas options.



## Annual O&M Costs – Comparison to Past Projects

Item	MPWSP	RDP	Moss Landing
Power	\$6,500,000	\$5,320,000	\$4,420,000
Chemicals	\$720,000	\$1,020,000	\$1,590,000
Membrane/Media Replacement	\$520,000	\$570,000	\$790,000
R&R	\$1,950,000	\$1,700,000	\$3,060,000
Labor & Misc	\$3,070,000	\$3,870,000	\$3,110,000
<b>Total</b>	<b>\$12,760,000</b>	<b>\$12,500,000</b>	<b>\$13,000,000</b>

All Costs 2012 dollars and based on full plant production

## Pre Construction Costs

Item	Budget	Task	Status
Consultants	\$520,000	PEA, CEQA, Permitting, Plant Sizing, Cost Estimate & Outfall Analysis	On Track
CPUC / ESA	\$500,000	CEQA Work	On Track
Legal	\$1,200,000	Legal Work on: CPUC filing, PEA, CEQA, Water Rights, Land.	On Track
Expenses	\$30,000	Travel Expenses for CAW Staff	On Track
Company Labor	\$300,000	For Engineering Team	On Track
Contingency & OH	\$376,000		
<b>Sub-Total</b>	<b>\$2,926,000</b>		
Slant Test Well	\$5,000,000	Cost to Install Slant test well	Scheduled for winter 2013-14.
<b>Total</b>	<b>\$7,926,000</b>		

# Appendix

## CAW Only Facilities - Pipelines Cost Estimate

- **Cost Components:**
  - **Material**
    - Adjusted Vendor Quotes for Pipes
    - Type II Asphalt Concrete
    - Erosion Control (BMP)
  
  - **Labor & Equipment**
    - ROW Preparation, Pipeline Installation, Erosion Control, Surface Restoration, & Bore Pit Construction
    - Prevailing Wages per Department of Labor
    - Variable Production Rates for Standard Crews
    - Off-site Transport and Storage of Excavated Material
    - Required Equipment per Construction expert

## CAW Only Facilities - Pipelines (cont'd)

- **Special Construction**
  - \$1,500/ LF for Jack and Bore
  - Dewatering Wells = \$32,000 per Jack and Bore Crossing
  
- **Cathodic Protection**
  - \$5/ LF for metallic pipelines
  
- **Contractor Overhead & Profit (OH&P)**
  - 18.5% of all above costs

**Average Total Cost: about \$400 per Lineal Foot**

## CAW Only Facilities - Pump Station

- **ASR PS:**
  - Quantity estimates and unit prices per recent similar project estimate (9 MGD capacity, four pumps at 50 hp)
  
- **Valley Green PS:**
  - 3 MGD capacity, 4 pumps at 25 hp
  
- **Other Pump Stations:**
  - Equipment estimated on \$/ Installed HP, plus 25% for taxes, installation, & material, plus 18.5% for contractor OH&P
  - Building based on \$110/ SF, includes contractor OH&P
  - Wet wells based on \$700/ CY of concrete

## CAW Only Facilities - Tanks (Reservoirs)

- **Circumferentially Pre-stressed, Post-Tensioned Concrete Tanks w/ Concrete Covers**
  - Buried Terminal Reservoirs (two – 3MG): \$1.75/ gallon
  - Costs Include 18.5% Contractor OH&P
  - Earthwork, Site work, and Piping estimated separately
  - Based on analysis of two similar recently constructed projects

## CAW Only Facilities - ASR Wells at Fitch Park

- **Monitoring Well, Core, & Test wells at third set of ASR Wells**
- **Stainless Steel Material for Test Wells**
- **Wellhead facilities at third set of ASR Wells**
  - Conversion of Test Wells to Production wells
  - Well Pumps
  - Electrical & Pump Building
  - Well Field Piping & Civil Work
  - Electrical, I&C
  - Back flush Water Reclamation Facility
- **Estimates from ASR Systems**
- **Contractor OH&P included in above**



## CAW Only Facilities – Property

- **ROW Acquisition for Pipelines (Present Worth)**
  - Transportation Agency of Monterey County and private agricultural lands evaluated by licensed real estate appraiser

## CAW Only Facilities - Allowances

- **Contractor OH&P**
  - 18.5%
- **Contractor Mobilization/Demobilization**
  - Typically included in OH&P.

## CAW Only Facilities - Allowances (cont'd)

- **Implementation**

- Project Administration and Management, Engineering, Legal
- Design/Bid/Build Facilities: Used 30% of base construction costs, based on experience, excluding costs through December 31, 2008.

- **Contingency**

- Covers unanticipated changes in project scope or schedule due to unforeseen changed site conditions; regulatory or institutional requirements, including mitigation implementation and permit compliance; and acts of nature.
- Originally 20%, based on AACEI, for “conceptual design” stage of project development.
- Now 25%, based upon July 2009 workshop and consensus

## Accuracy of Cost Estimates

- **Cost estimating accuracy is typically keyed to project development stage**
- **CAW Only Facilities between Class 3 and Class 4**
  - AACEI Class 3-Budget, 10-40%: -10/20% to +10/30%
  - AACEI Class 4-Study, 1-15%: -15/30% to +20/50%
- **Used -15% / +25 %**
- **Final CAW Only Facilities capital cost is estimated to range between \$95M (which is the Median Scenario, or the most probable cost estimate) to \$107M (which is the midpoint between the Median Scenario and the High Cost Estimate Scenario - \$119M)**

## Central Division Consumption

