

# Water Reclamation Facility Master Plan



**City Council Presentation  
December 13, 2016**

# Presentation Overview



- Introduction
- Project Goals
- Project Background
- Recent and Upcoming Schedule
- WRF Program Overview – “Big Picture”
- Draft Facility Master Plan Overview
- Project Financing
- Next Steps
- Q&A

# WRF Project Community Goals



- **Produce Tertiary Disinfected Wastewater**
  - *Project to be designed accordingly*
- **Produce Reclaimed Wastewater Cost-Effectively**
  - *Master Reclamation Plan will address this*
  - *Including reclamation as early as possible reduces long-term costs*
- **Allow for Onsite Composting**
  - *Onsite composting is not recommended, regional facility will be more cost-effective*

# WRF Project Community Goals



- **Design for Energy Recovery**
  - *Consideration included in FMP*
- **Design to Treat for Contaminants of Emerging Concern**
  - *Included in treatment evaluation criteria*
- **Allow for other Municipal Uses**
  - *Site planning in FMP allows for this possibility*

# WRF Project Community Goals



- **Ensure Compatibility with Neighboring Land Uses**
  - *Siting was key to this*
  - *FMP required this in project design; EIR will analyze this*
- **Operational within 5 years**
  - *Project on schedule for beginning operation in 2021*

# WRF Project Background



- **Jan 2013:** CCC denial of CDP for WWTP Upgrade
- **Dec 2013:** Site Options Report 17 sites narrowed to 7; Council direction to compare the best sites (in both Morro and Chorro Valley)
- **May 2014:** Report recommends Morro Valley, but Chorro Valley also suitable; Council direction to compare WRF in MV to regional facility at CMC
- **Dec 2014:** Report determines CMC facility not desirable (very high cost; logistical challenges); Council focus remains on Morro Valley
- **April 2015:** CSD decides to pursue separate project

# WRF Project Background



- **Feb 2016:** Neighborhood concerns in Morro Valley lead to additional site analysis
- **May 2016:** Chorro Valley site (South Bay Boulevard) determined to be most achievable in 5-year timeframe when balancing cost and other logistical issues
- **June 2016:** City Council selects South Bay Boulevard site for detailed studies, FMP site planning, and EIR analysis

# Project Schedule – 2016



Key Milestone	Scheduled Date	Actual Date
City Council Selects Site for Study (South Bay Blvd.)	June 2016	June 2016
Technical Studies (biology, cultural, geotech, survey work)	August 2016	August 2016
EIR Scoping Meeting	August 2016	August 2016
MOU with Property Owner	October 2016	October 2016



# Project Schedule – 2016-17



Key Milestone	Scheduled Date	Actual Date
Draft Facility Master Plan	December 2016	November 2016
Draft Master Water Reclamation Plan	March 2017	On Schedule
Draft EIR Released	August 2017	On Schedule
Final EIR Certified	November 2017	On Schedule

# Project Schedule – 2018-21



Key Milestone	Scheduled Date	Actual Date
Award Contract for Phase I WRF Improvements	May 2018	On Schedule
Begin Project Design	August 2018	On Schedule
Project Construction Begins	June 2019	On Schedule
Completion of Phase I WRF Improvements	May 2021	On Schedule

# WRF Program Overview



## *What we know now ...*

- We can build a WRF at South Bay Blvd site that meets the Community Project Goals
- “Total WRF Project” by June 2021 is possible
  - *Recycled water 2 years ahead of schedule*
- Groundwater injection & extraction appears feasible

# WRF Program Overview



## *What we know now ...*

- **Total WRF Project** can provide recycled water for groundwater injection to supplement the City's **water supply** and provide **water independence**
- **Advantages** of Accelerating Recycled Water Component
  - *Potentially eligible for more **grant money***
  - *Long-term **construction cost savings***
  - *Potential **reduction in State Water Use = Cost Savings***

# WRF Program Overview



## *What we know now ...*

- Estimated Cost without recycled water: \$114M - \$136M\*
  - Estimated Total Cost with recycled water: \$125M - \$168M\*
- \*High includes Contingency + “High Cost” Reuse alternative

# WRF Program Overview

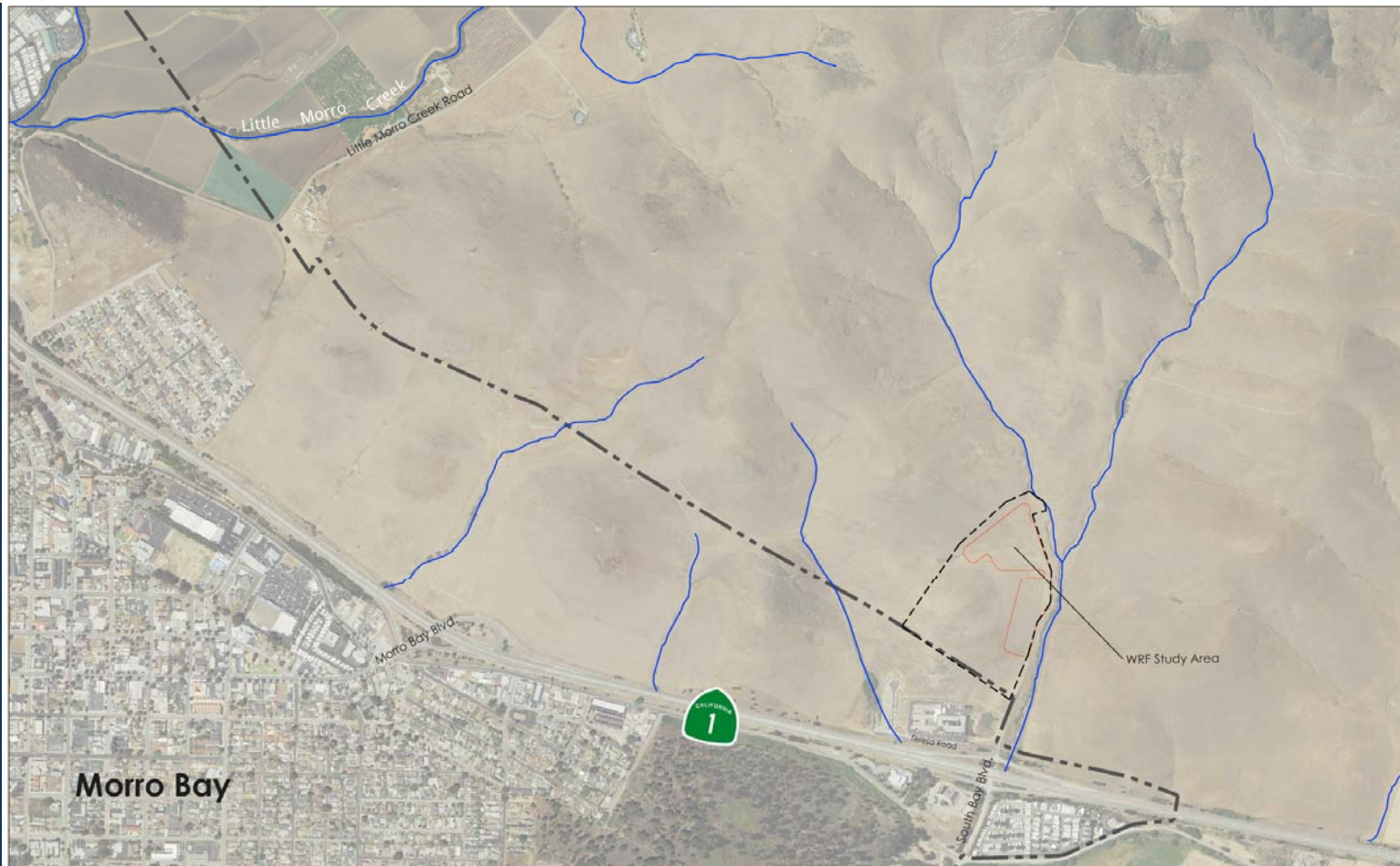


## *What we know now ...*

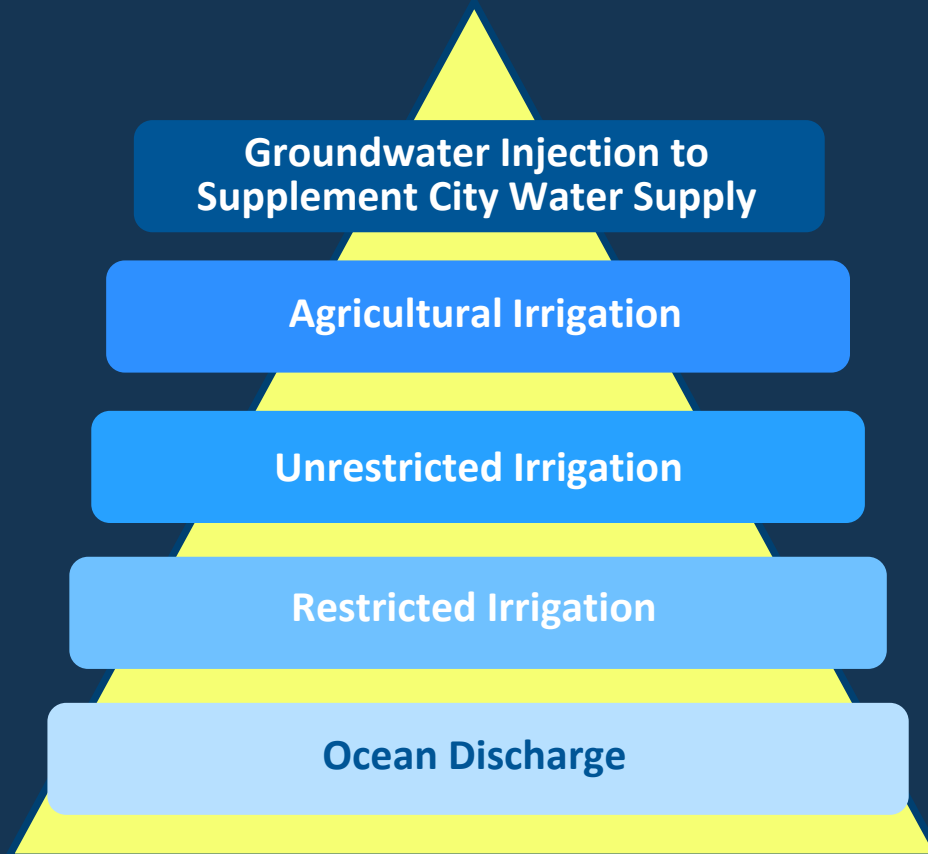
- Anticipated Rates: Estimated Total Cost Effect

	Average Monthly Rate (FY14/15)	Average Monthly Rate Today	Approved Average 19/20 Monthly Rate	Estimated Average Monthly Rate with Total WRF project
Water	\$27.58	\$52.00	\$67.00	\$50 – 67 (TBD)
Sewer	\$45.59	\$62.50	\$83.00	\$127 - \$157
Combined	\$73.17	\$114.50	\$150.00	\$177 - 224

# WRF Site Context



# WRF Provides City Ability to Make “Highest and Best Use” of New Water Supply Resource



*To Be Determined in  
Master Water  
Reclamation Plan*



# Evaluation Criteria Align With Community Goals



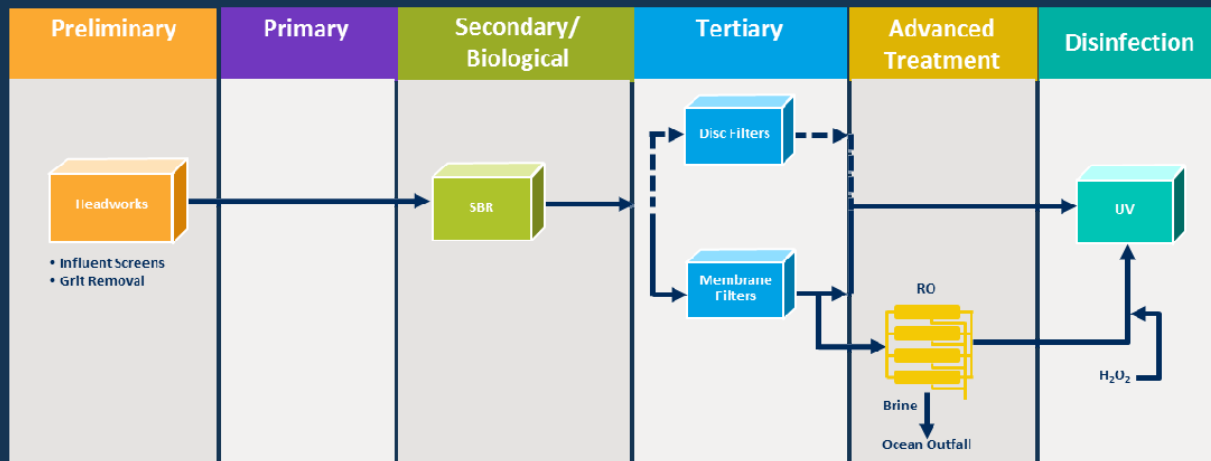
Comparative Capital Cost
Comparative Operating Cost
Odor Mitigation
Technical Complexity
Reliability
Staff Requirements
Scalability
Product Water Quality
Flexibility for Title 22 Redundancy
Visual Impact/Footprint

# List of Treatment Technologies Considered Was Inclusive

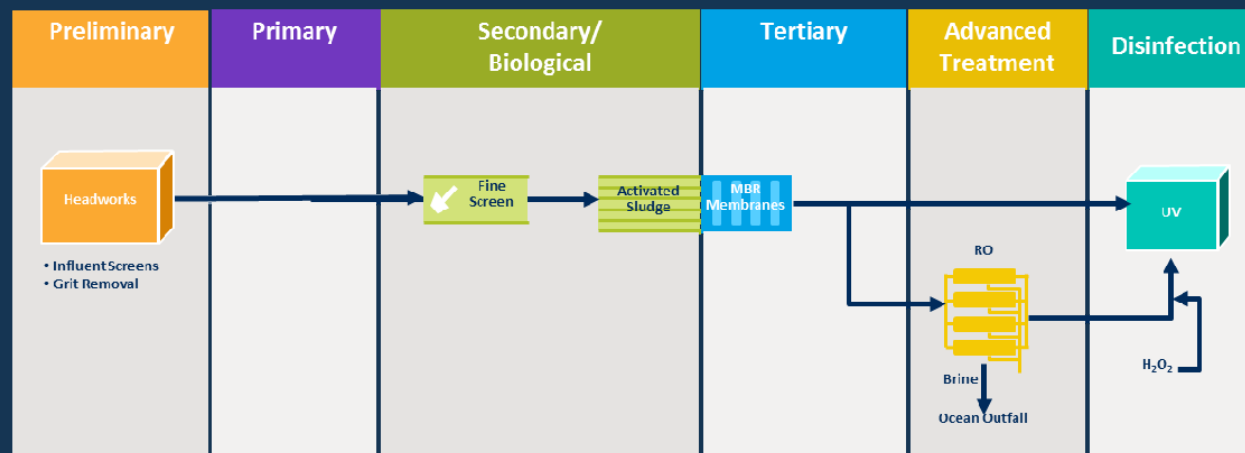
TREATMENT STEP	UNIT PROCESSES
<b>Preliminary Treatment</b>	<ul style="list-style-type: none"> <li>■ Influent Screens <ul style="list-style-type: none"> <li>● Shaftless Spiral Screen</li> <li>● Mechanically-Cleaned Bar Screen</li> </ul> </li> <li>■ Grit Removal <ul style="list-style-type: none"> <li>● Horizontal Flow Grit Chambers</li> <li>● Aerated Grit Chambers</li> <li>● Vortex Grit Chambers</li> </ul> </li> </ul>
<b>Primary Treatment</b>	<ul style="list-style-type: none"> <li>■ Primary Clarifiers <ul style="list-style-type: none"> <li>● Rectangular Clarifiers</li> <li>● Circular Clarifiers</li> </ul> </li> </ul>
<b>Biological Treatment</b>	<ul style="list-style-type: none"> <li>■ Suspended Growth Biological Treatment <ul style="list-style-type: none"> <li>● Activated Sludge (AS)</li> <li>● Sequencing Batch Reactor (SBR)</li> <li>● Oxidation Ditch</li> <li>● Aerated Lagoons/ Pond Systems</li> </ul> </li> <li>■ Fixed Film Biological Treatment <ul style="list-style-type: none"> <li>● Trickling Filters (TFs) and Rotating Biological Contactors (RBCs)</li> <li>● Moving Bed Bioreactors (MBBR)</li> <li>● Biological Aerated Filter (BAF)</li> </ul> </li> <li>■ Hybrid Biological Treatment <ul style="list-style-type: none"> <li>● Integrated Fixed-Film Activated Sludge (IFAS)</li> </ul> </li> <li>■ Membrane Bioreactor (MBR)</li> </ul>
<b>Tertiary Treatment</b>	<ul style="list-style-type: none"> <li>■ Disc Filters</li> <li>■ Media Filters</li> </ul>
<b>Disinfection</b>	<ul style="list-style-type: none"> <li>■ Chlorine</li> <li>■ Ozone</li> <li>■ Ultraviolet Light (UV)</li> </ul>

- Achieve Highest and Best Use of Water
- Proven
- Cost-effective
- Achieve to regulatory compliance
- Appropriate to plants of this size and scale

# Two Treatment Strategy Alternatives Provide for “Highest and Best” End Uses

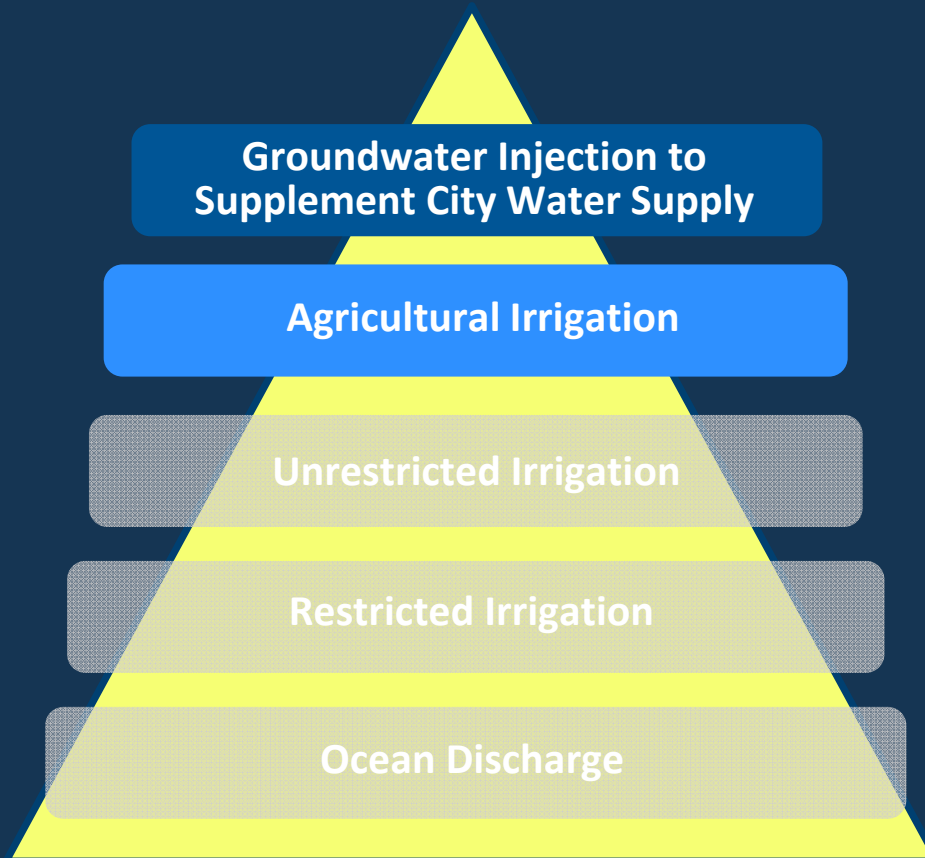


**Conventional Train:  
Sequencing Batch  
Reactor (SBR)**



**Combined  
Secondary/Tertiary  
Train:  
Membrane  
Bioreactor (MBR)**

# Advanced Treatment Required to Achieve Community Goals for Highest and Best Uses of Product Water



- Advanced treatment is used to remove dissolved salts, viruses, TOCs, organic and inorganic chemicals, and emerging contaminants
- Title 22 requires MF/RO + AOP for IPR
- Many agricultural irrigation uses require salt removal (MF/RO)

## New Pipelines and Pump Stations Needed to Connect WRF to City System



- Alignment Generally Follows Quintana Road
- Lower Cost
- Less Environmental Impact
- More Energy Efficient





# New Pipelines and Pump Stations Needed to Connect WRF to City System



- Location Near Existing WWTP Most Efficient and Least Expensive
- Floodplain Issues to be Mitigated
- CCC Supportive of Location

## Solid Material from Treatment Process Will Be Composted at a Regional Facility



### Investigated opportunities to reduce costs for project by:

- Create marketable products processing materials on-site
- Use biosolids to generate energy

- City's current practice is most cost-effective
- Processing on-site or providing facilities to generate energy not cost-effective
- Liberty Composting in Kern County provides beneficial use of processed materials

## Preliminary Architectural Concept Developed for Consistency with Highway 1 Corridor



- Farm or Dairy style buildings
- Color palette similar to buildings along Highway 1 between CMC and Morro Bay
- Landscaping screening envisioned near entrance



# WRF Site Overview



## WRF Site





## WRF Site with Consolidated Maintenance Facilities



# WRF Looking South



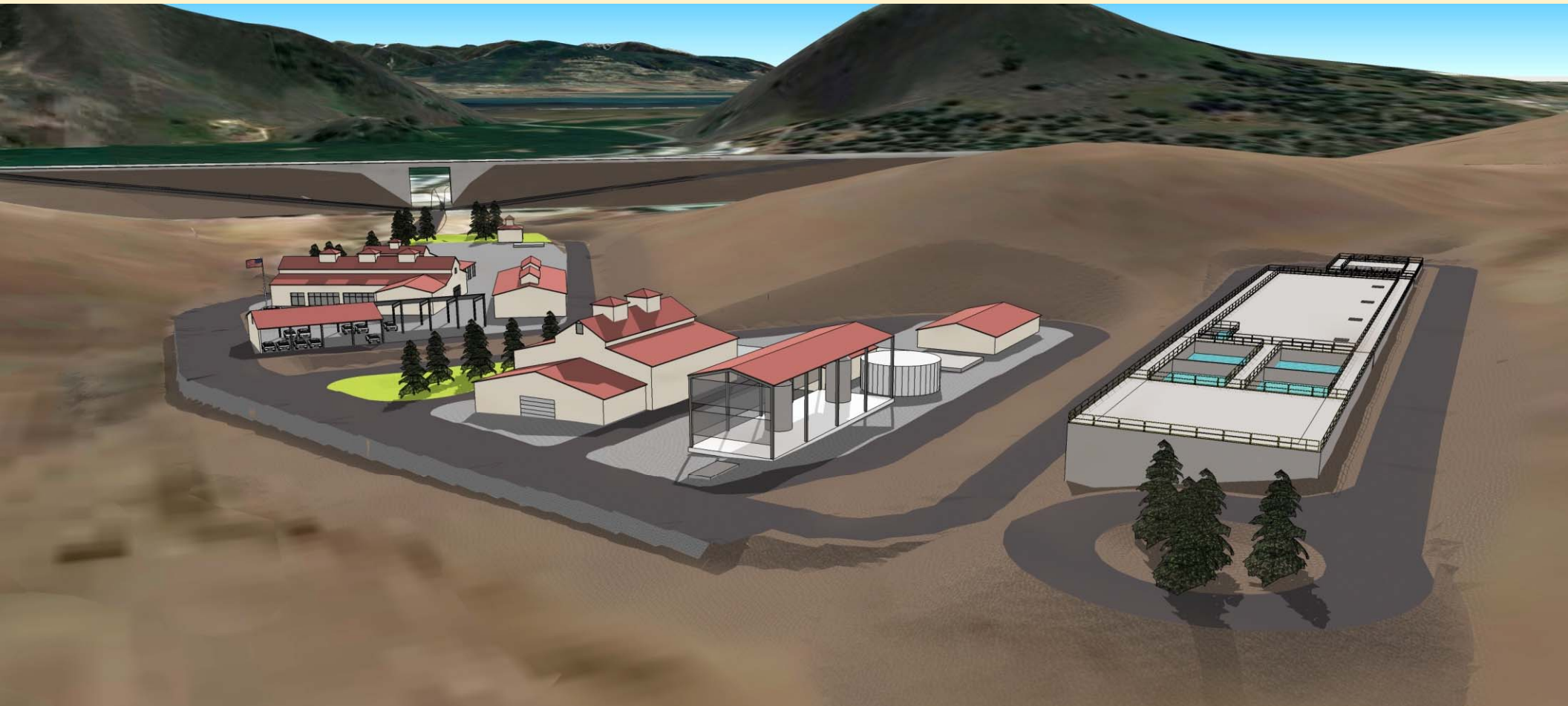
## WRF with Consolidated Maintenance Facilities Looking South





# WRF Looking Southeast

CITY OF MORRO BAY  
**WATER RECLAMATION  
FACILITY PROJECT**

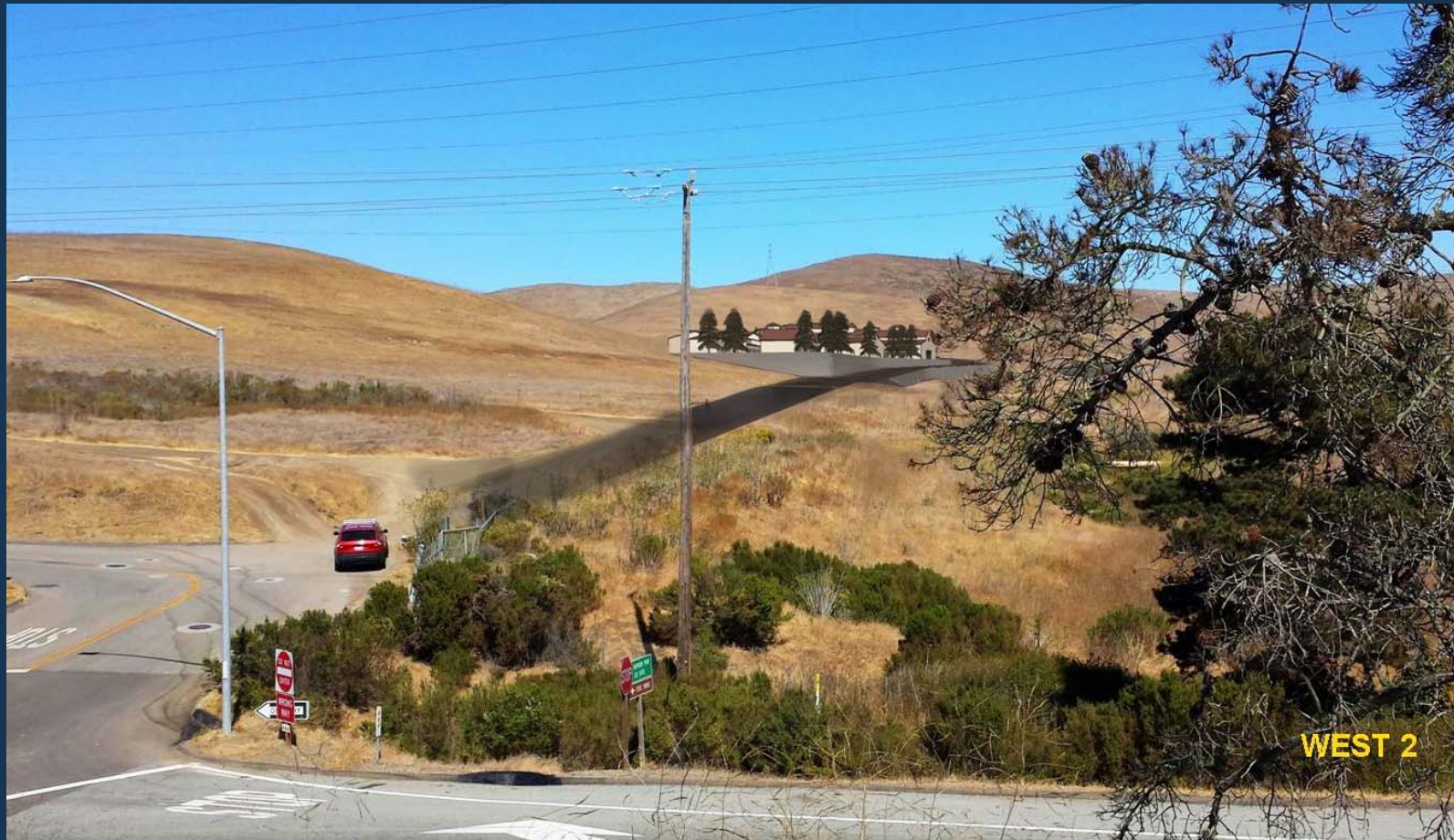


## View From Highway 1 Heading West East of South Bay Boulevard





## View From Highway 1 Heading West Just East of South Bay Boulevard





## View From Highway 1 Heading West Just West of South Bay Boulevard



## View From Highway 1 Heading West West of South Bay Boulevard





# Why So Much Higher than 2013 Costs?

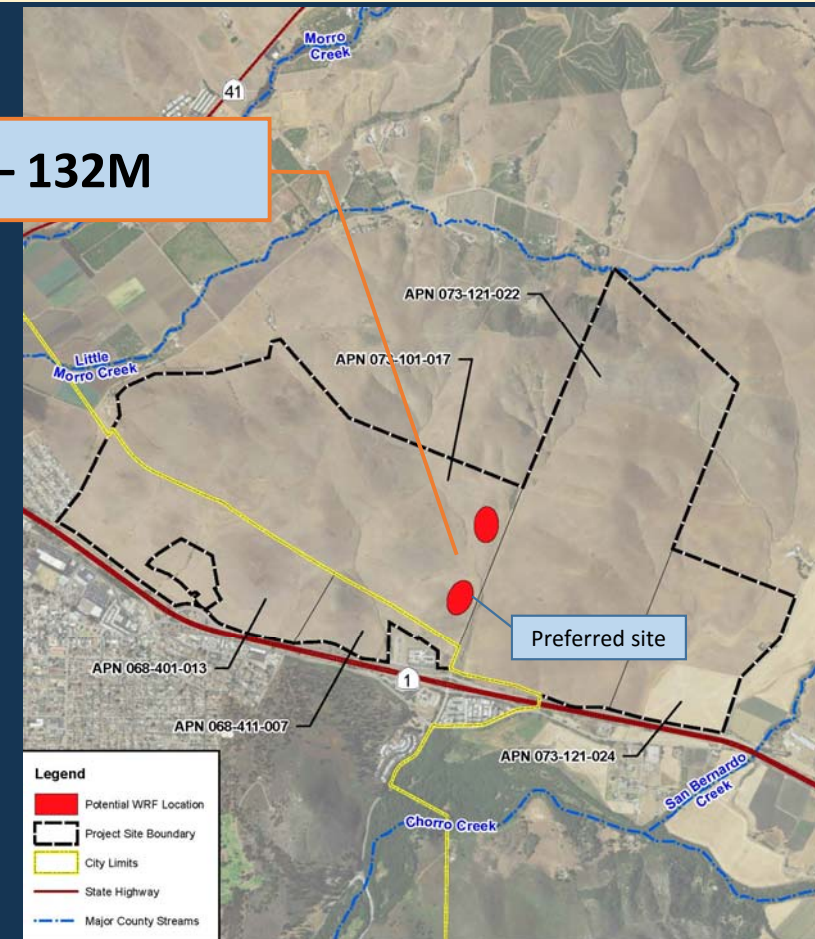


- \$100M Estimate was mid-range for comparison of sites ONLY
- South Bay Boulevard is 10-15% higher than Morro Valley sites
- 3 years of cost escalation was 8-9%
- Highest and best water recycling opportunities required higher-end treatment processes
- Ancillary facilities and work not known or included (plant decommissioning, recycled water delivery system, etc.)

# May 2016 Site Analysis

- Goal was comparison of sites only
- Partial WRF Costs at South Bay Blvd site
  - Midpoint of cost range (based on 2014 assumptions) = \$107M
- 2013 siting studies assumed wide range of treatment technologies
- No regional recycled water system
- No decommissioning of existing site

**\$84M – 132M**



# New Information from FMP and Studies



SBB site is preferred & has less delays

Standalone EQ storage is needed for advanced treatment

WWTP decommissioning costs are higher than previous estimates

SBR/MBR, membrane filtration, and UV disinfection are essential

Groundwater aquifer storage is available in the Morro Valley

Possible to offset State Water deliveries with groundwater injection

# New Opportunities

Water independence is possible

All water demand may be met through reuse and groundwater

Current and future costs of State Water could be eliminated

Initial water/wastewater costs will be higher, but less vulnerable to escalation

WRF will be well positioned to meet the Project Goals

Highest & best use

Lower water rates  
in future

- Reclaimed Water
- Best available treatment for CECs
- Ph 1 + Ph 2 built in 5 yrs

# WRF Cost to Customers



**“Hard” Costs  
(Construction, Demolition)**

**Operation & Maintenance  
(Power, Staffing, and  
Chemicals)**

**“Soft”  
Costs**

# How Do We Predict Rate Impacts?



- What are the Total Project Costs (“Hard”, “Soft”, and Operation & Maintenance (ongoing))?
- Can the WRF Project reduce other customer utility costs?
  - Can we buy less imported water and what would that save?
- What will be the financing cost (interest rates & terms)?
- What grants can we pursue?
- Could project design include solar power to reduce ongoing costs?



# WRF Project Contingency



- “Contingency” – Not a “soft cost”, but not used if not needed
  - “What we don’t know we don’t know”
  - Typically reduced as project moves forward

# WRF Project Components



## Phase 1 WRF

- Lift Station
- WRF for tertiary disinfected
- Pipeline to ocean outfall

## Phase 2 onsite

- Advanced treatment
- Recycled water storage
- Recycled water pump station

## Phase 2 offsite

- Recycled water distribution system options:
  - Groundwater Injection
  - Ag Exchange
  - Urban Irrigation

# Phase 1 WRF Capital Cost Opinion



"Hard" and "Soft" Costs	2016 US \$MM
Phase I WRF Construction Cost Subtotal (FMP w/o contingency)	97.1
Procurement (4%)	4.3
Project Administration and CM (12%)	10.6
Permitting, Monitoring, and Mitigation (1%)	0.9
Existing WWTP Demolition	3.3
Property Acquisition	0.3
<b>Phase 1 WRF Capital Cost Subtotal</b>	<b>114</b>
Construction Contingency (25% of construction subtotal)	22
<b>Phase 1 WRF Capital Cost Opinion Total</b>	<b>136</b>

Note: Phase 1 WRF costs based on Draft Facility Master Plan (Nov 2016)

# WRF Project Capital Cost Opinion



"Hard" and "Soft" Costs	Capital Cost Opinion (2016 US \$MM)
Phase 1 WRF	114
Phase 2 Recycled Water Facilities	11 – 26
<b>Total WRF Capital Cost Subtotal</b>	<b>126 – 140</b>
Construction Contingency	25 – 28
<b>Total WRF Capital Cost Total</b>	<b>150 – 168</b>

Note: Phase 1 WRF costs based on Draft Facility Master Plan (Nov 2016). Phase 2 costs are preliminary and to be further developed in the Master Reclamation Plan (Draft March 2017)

# WRF Project O&M Costs



	Annual O&M Cost Opinion (2016 US \$MM)
Phase 1 WRF	\$1.3 – 1.6
Phase 2 Recycled Water Facilities	\$0.5 – 0.8
<b>Total WRF</b>	<b>\$1.8 – 2.4</b>

Note: Phase 1 WRF O&M costs are based on the Draft Facility Master Plan (Nov 2016). Phase 2 costs are preliminary and to be further developed in the City's Master Reclamation Plan (Draft March 2017)

# Water Supply Costs



- Indirect potable reuse could offset State Water Costs
- State Water Project Costs
  - \$2,000 per acre foot (16/17)
  - \$2,200 - \$2,400 per AF (est. future)
- Morro Valley Groundwater costs
  - \$1,000 per acre foot
  - 580 AFY allocation
- Seawater desalination costs
  - \$1,600 per acre foot

# Annual Cost of State Water



	Estimated Annual Cost
State Water at Current Rate (\$2,000/AF)	\$2.4M
State Water at Estimated Future Rate (\$2,200/AF)	\$2.64M

Note: Annual cost based on 1200 acre-feet (AF)

# How Much Could We Reduce Costs?



	Potential Savings
30 Year SRF Loan Payment (2% vs. 2.5% Financing)	\$1.6M/yr
Savings without State Water Project costs	\$1.5M/yr
Grant Funding	10 – 20% of capital costs
Solar Power Purchase Agreement	Up to 1/3 of power costs



# Water vs. Sewer Rates



- Currently, water and sewer are separate funds
- Water rates were raised to correct existing funding shortfalls (had nothing to do with the WRF project)
- Sewer rates were recently raised to account for a reclamation-ready (Phase 1) project, and assumed Cayucos would participate
- Since we are now considering a full reclamation project alone and have more cost information, sewer rates will need to be increased to account for the difference

## Water vs. Sewer Rates



- A rate study will be needed to determine the potential increase
- This study will occur once both the FMP and Master Reclamation Plan are completed (likely in summer 2017)
- Grants may offset part of that possible increase
- Reduced dependence on current water supplies (State Water, groundwater, and desalinated seawater) may also reduce the net rate increase, when sewer and water are considered together

# Water vs. Sewer Rates



- No current water supply benefit for wastewater disposal
- In the future, highly treated wastewater will become part of the water supply
- Cost for imported water (State Water) is higher than other City water supplies (groundwater and seawater) but...
- Groundwater supply is limited and seawater is expensive and can be treated only during emergencies
- Therefore, new WRF (“sewer project”) can reduce water rates

# What Would be Impact on Utility Rates



	Historic (FY 14/15)	Current (FY 16/17)	Approved (FY 19/20)	With Total WRF Project
Estimated Average Monthly Water Rate	\$27.58	\$52.00	\$67.00	\$50 - \$67 (TBD)
Estimated Average Monthly Sewer Rate	\$45.59	\$62.50	\$83.00	\$127 - 157
Estimated Combined Average Monthly Rate	\$73.17	\$114.50	\$150.00	\$177 – 224
<b>Future Rate Increase</b>				<b>\$27 - 74</b>

Average sewer rate for single family residential and water rate for 5 units/month

# Summary



- Initial Sewer Rate Increase of \$37.41 (2019 from 2014)
  - \$75M Phase I WRF (“not complete”, no recycling)
  - Cayucos Sanitary District as partner
  - \$56.25M investment by Morro Bay (with debt coverage to \$70M)
- Proposed Rate Increase up to \$111.41 (2019 from 2014)
  - Includes current approved rate increase of \$37.41
  - Full water recycling facility (not phased)
  - Over 50% savings in water cost possible



# Project Design/Construction Method



- Current schedule is based on:
  - Design-Build for WRF
  - Design-Bid-Build for pipelines and lift station
- Draft FMP Completed
- No new findings that would conflict with recommendations in Oct 2015 workshop

# Project Delivery Alternatives



- Delivery Alternatives Workshop (Oct 17, 2015)
  - Conventional Design-Bid-Build (DBB)
  - Construction Management at Risk (CMAR)
  - Design-Build (DB)
    - Best Value Design-Build (BVDB)
    - Progressive Design-Build (PDB)
    - Design-Build-Operate (DBO)
    - Design-Build-Finance-Operate (DBFO)

# Project Delivery Alternatives



- Recommendations:
  - Since schedule/cost are critical
    - Lift Station and pipelines: Conventional Design-Bid-Build
    - Water Reclamation Facility: Design-Build
- Based on Delivery Alternatives Workshop (Oct 17, 2015)

# Feedback since November Workshop



- Six (6) letters and/or emails with substantive comments
- Two (2) emails with meeting requests (SLCUSD; Farm Bureau)
- Two (2) speakers at 12-6-16 WRFCAC

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# Feedback: Key Issues



- **FMP Analysis**
  - Explain rationale for combining Phase 1 and 2
  - More detail needed in lift station evaluation?
  - Storage for excessive storm flow—more analysis needed?
- **CEQA Issues**
  - Economic impacts?
  - County LCP Consistency?
  - Greenhouse Gas Emissions (and corp yard)

# Feedback: Key Issues



- **Financial Issues**
  - Pumping Costs
  - Interest Rates for loans?
- **Reclamation**
  - Where will water be injected? Need more evaluation
- **Corp Yard**
  - Some support moving corp yard to WRF site; others do not

# Feedback: Key Issues at WRFCAC



- **Public Input**
  - Similar to feedback received in letters

# Feedback: WRFCAC Input 12-6-16

- **Project Costs**

- Minimize costs; focus on the WRF, not other community goals
- Why include a 25% contingency? Too high?
- Unclear as to how project costs were derived; clarify and fine-tune
- Was there peer review of the cost opinions?
- Show effects on sewer and water rates separately
- Questions raised about involvement of City finance staff, use of software, budget report

## Feedback: WRFCAC Input 12-6-16

- **Facility Layout and Amenities**

- Focus on WRF, not other city facilities—intent is to minimize costs
- Other City facilities (like the corp yard) should be studied in EIR
- Possible to have lift station locations between Highway 1 and the coast?
- Pipeline location; disagreement about whether cross-country or in City streets would be better (cheaper? less environmental impact? less traffic disruption?)



## Feedback: WRFCAC Input 12-6-16

- **Environmental and Design Issues**

- How would raw sewage be prevented from leaving the WRF in a storm?
- Potential groundwater contamination?
- Access road width; disagreeing opinions as to need
- Concerned about the amount of cut and fill needed
- Would elimination of corp yard reduce footprint? Or cut/fill?

# Feedback: WRFCAC Input 12-6-16



- **Environmental and Design Issues**

- Need to address biological and cultural resource impacts from pipelines
- Lift Station elevations would be useful to see in EIR for CCC
- If solar is included, address potential battery storage options
- Minimize lighting

# Feedback: WRFCAC Input 12-6-16



- **FMP Document – editorial comments**
  - Executive Summary is clear
  - Some chapters could be more clearly written (Ch.3, for example)
  - Other City facilities (like the corp yard) should be studied in EIR

## Next Steps



- City Council Meeting – **December 13**
- Draft Master Reclamation Plan – **March 2017**
- RFP for Design-Bid-Build of WRF Offsite Improvements – **January 2017**
- RFQ for Design/Build of WRF Onsite Improvements – **June 2017**
- RFP for Design/Build of WRF Onsite Improvements – **October 2017**
- Rate Study – **Summer 2017**
- Draft EIR – **August 2017**
- Final EIR – **November 2017**

# Q&A