



SUNDOG AND AIRPORT WWTP CAPACITY AND TECHNOLOGY MASTER PLAN

Prescott City Council Workshop
December 1, 2009



WWTP Master Plan Scope Components

- ◆ Treatment technology evaluation
- ◆ Biosolids facility planning
- ◆ Industrial/commercial pretreatment limits study
- ◆ Near-term improvements design

Master Planning/Assessment Project Tasks

- ◆ Confirm/Update Regulatory, Compatibility, and Reliability Requirements
- ◆ Assess Existing Facilities – Sundog WWTP and Airport WRF
- ◆ Evaluate/Project WWTP Flows and Loadings
- ◆ Evaluate/Recommend Treatment Alternatives
- ◆ Summarize all findings into Master Plan Reports

Workshop Objectives

1. Review existing WWTP facilities
2. Identify drivers for improvements and expansion
3. Summarize recommended improvements
4. Present CIP costs and schedule

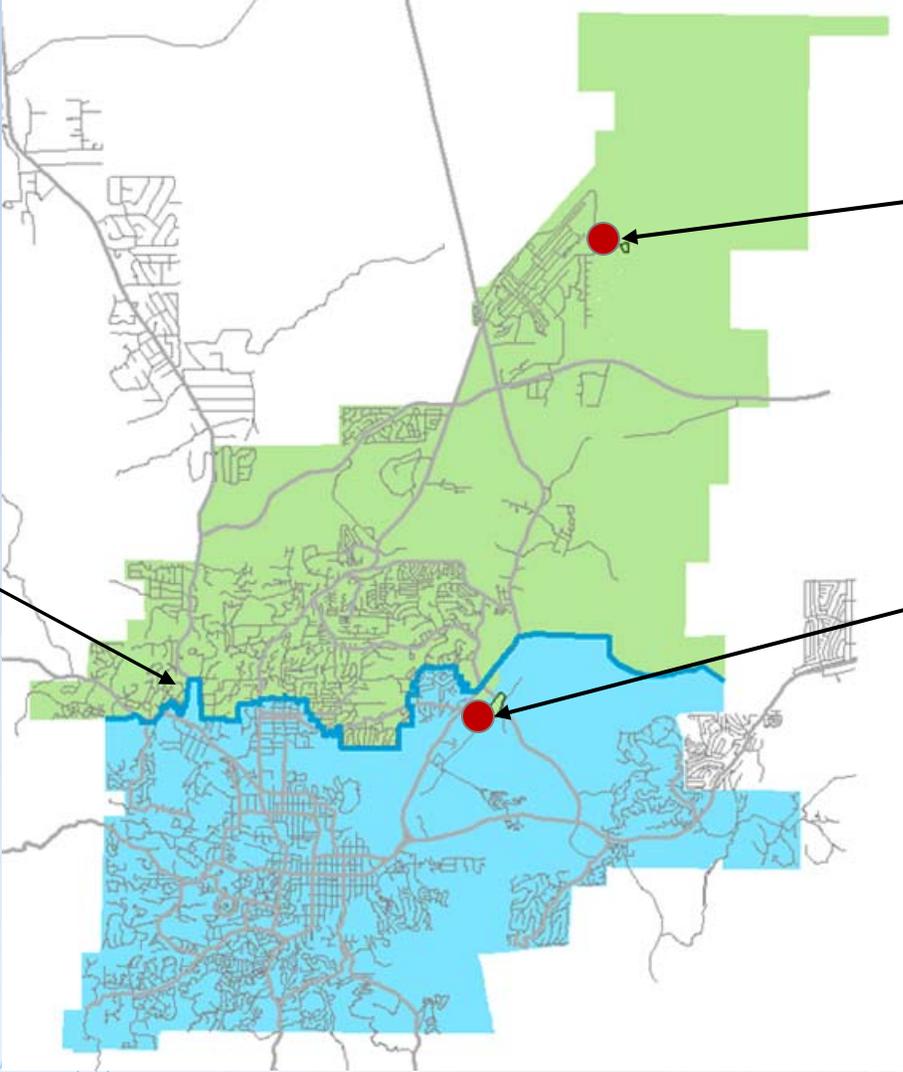
Drivers for Facility Expansion

1. Last major improvements – Sundog 1989
- Airport 1998
2. Recent substantial population growth
3. Increased wastewater concentrations
4. Regulations becoming more stringent
5. Equipment reaching end of useful life

Immediate plant improvements required

Two Facilities Provide City's Wastewater Treatment

Collection Basin Divide



Airport WRF

Sundog WWTP

History / Funding Sundog WWTP



History / Funding Sundog WWTP

- ◆ Initial Construction Date – 1934
- ◆ Plant expansions 1955, 1967, 1979 and 1989
- ◆ Most recent plant design – 1989 – 6 mgd
 - a. Construction cost = \$8.1 M
 - b. Financed through bonds, collection/buy-in fees, and EPA grants
 - c. Produces effluent suitable for open- access irrigation and aquifer recharge

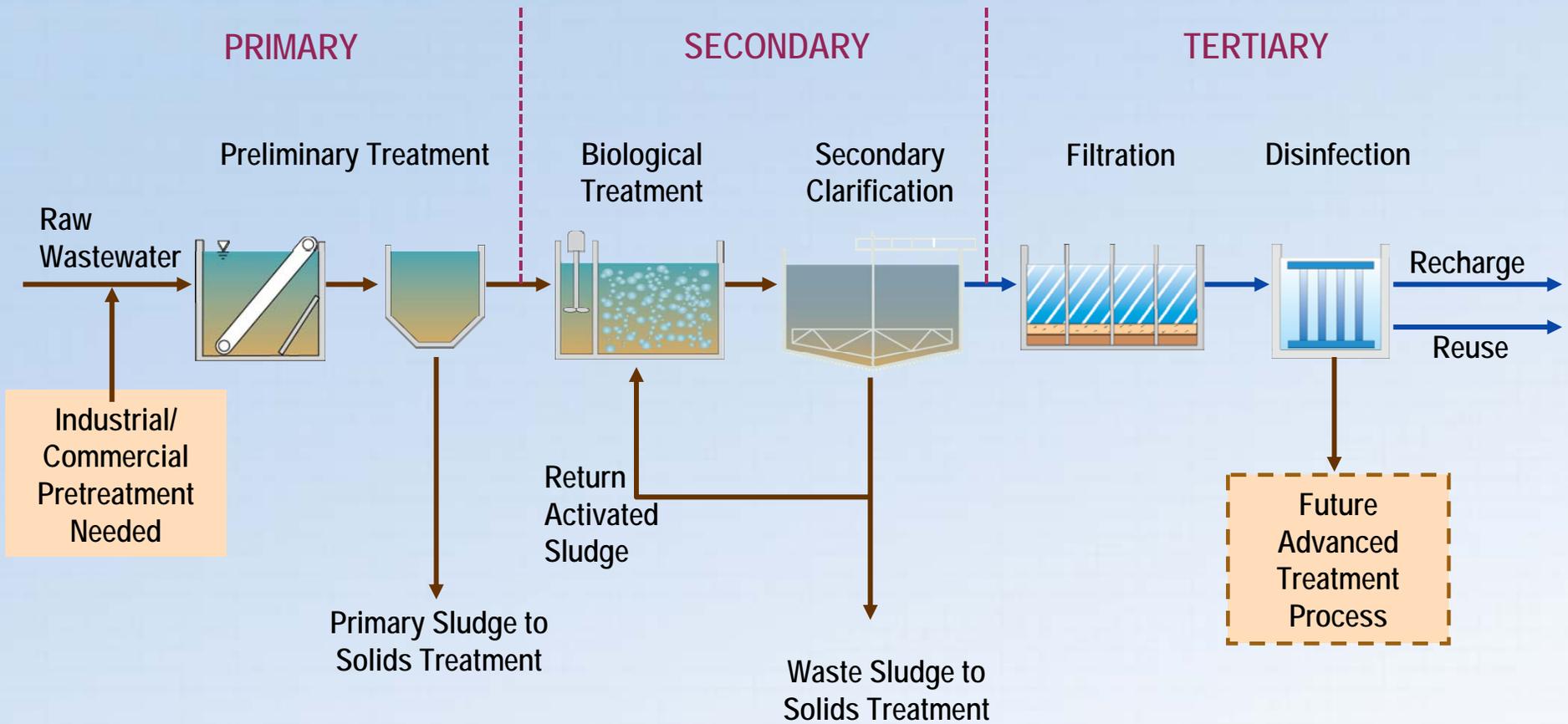
History / Funding Airport WRF



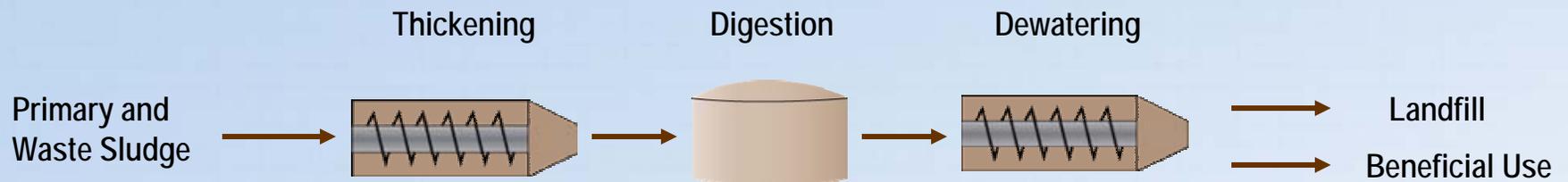
History / Funding Airport WRF

- ◆ Original batch plant – 1965 – 0.04 mgd
- ◆ Oxidation ditch plant – 1978 – 0.75 mgd
- ◆ Last plant design – 1998 – 2.2 mgd
 - a. Construction cost = \$3.5 M
 - b. Financed through bonds and collection of buy-in fees
 - c. Produces effluent suitable for open-access irrigation and aquifer recharge

Wastewater Treatment Processes



Biosolids Treatment Processes



Wastewater Treatment Goals

- ◆ Regulations require removal of solids, organics, contaminants and pathogens
- ◆ Examples:
 - a. Biochemical Oxygen Demand (BOD)
 - b. Ammonia, Nitrates (Nitrogen)
 - c. Fecal coliform and E.coli
- ◆ Produce reclaimed water safe for reuse
- ◆ Produce biosolids safe for beneficial use or land-filling

Treatment Alternatives Considered

- ◆ Extended aeration (oxidation ditch)
- ◆ Modified Ludzak Ettinger (MLE) – Conventional activated sludge
- ◆ Membrane Bioreactor (MBR)
- ◆ Sequencing Batch Reactor (SBR)
- ◆ Integrated Activated Sludge and Fixed Film (IFAS)
- ◆ Fixed Film Processes (eg. Trickling filters)

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Treatment Alternatives Evaluation Criteria

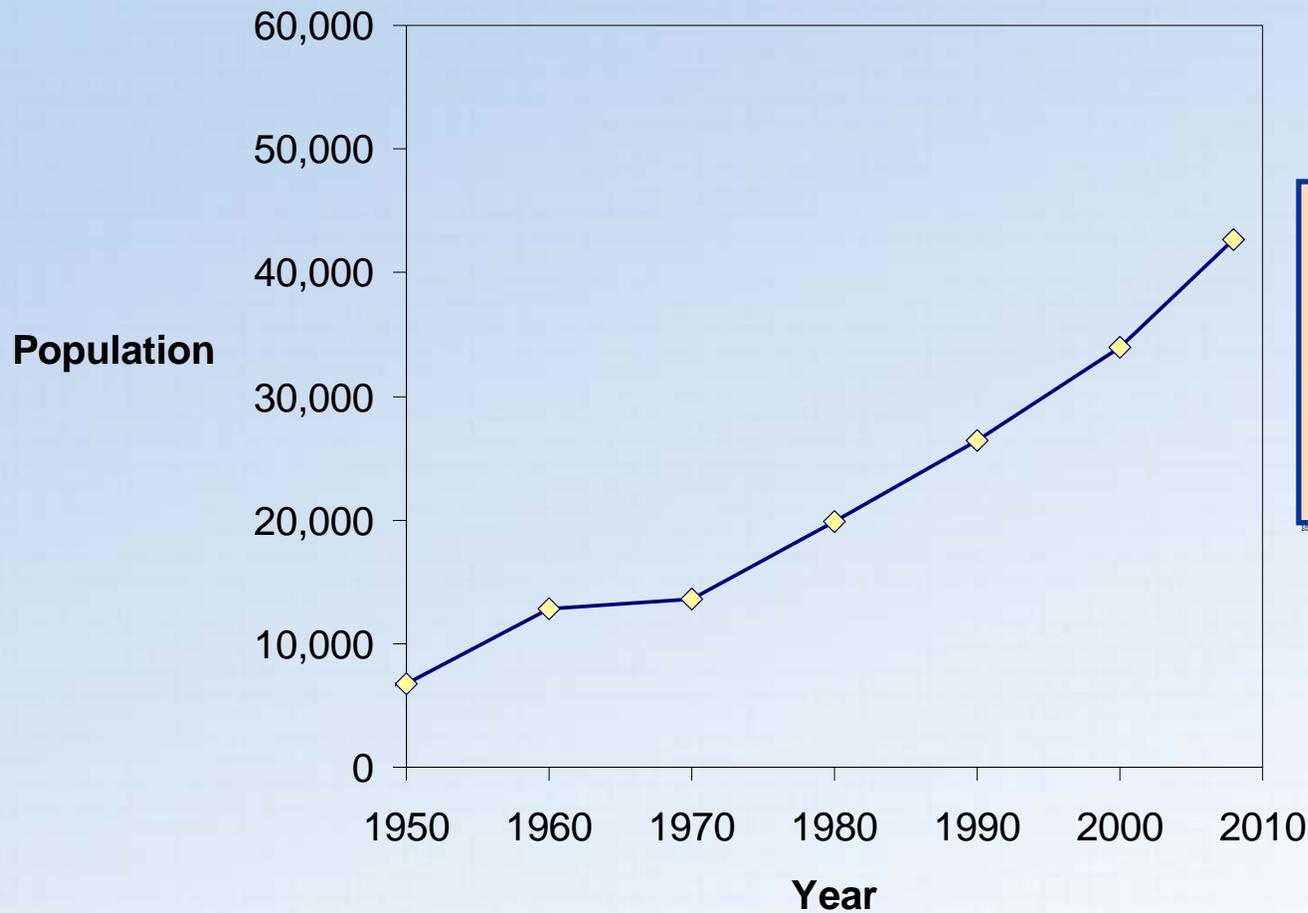
- ◆ Step 1 – Initial screening
- ◆ Step 2 – Detailed cost evaluation
- ◆ Capital costs
- ◆ Operating costs
- ◆ Non-economic factors
 - a. Operations/complexity
 - b. Proven track record
 - c. Compatibility with existing facilities
 - d. Maximizing use of existing facilities
 - e. Footprint requirements
 - f. Compatibility with potential future advanced treatment processes

Drivers for Facility Expansion

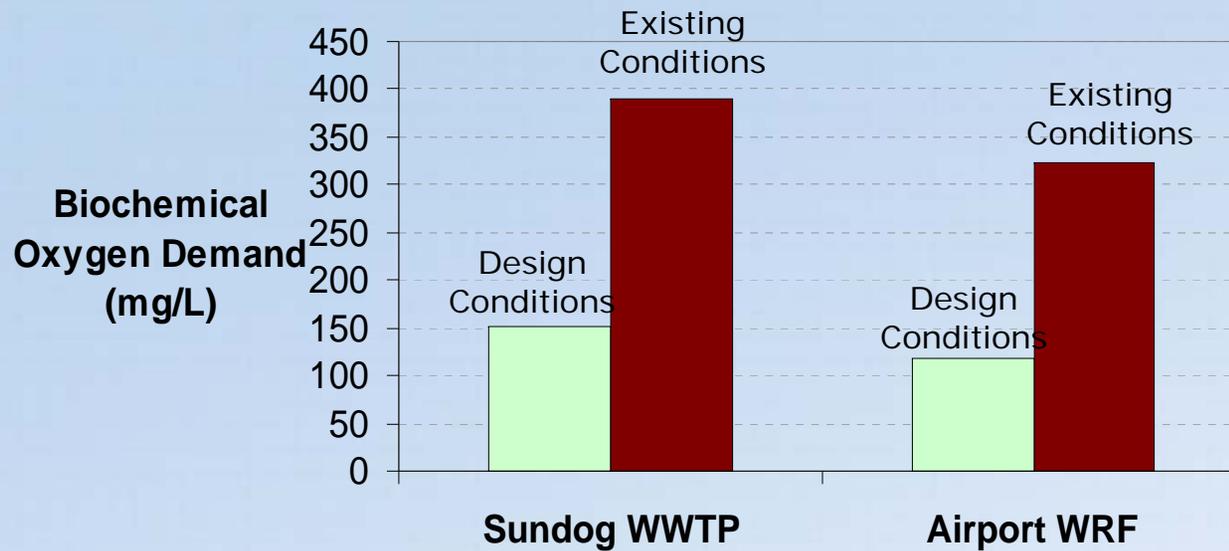
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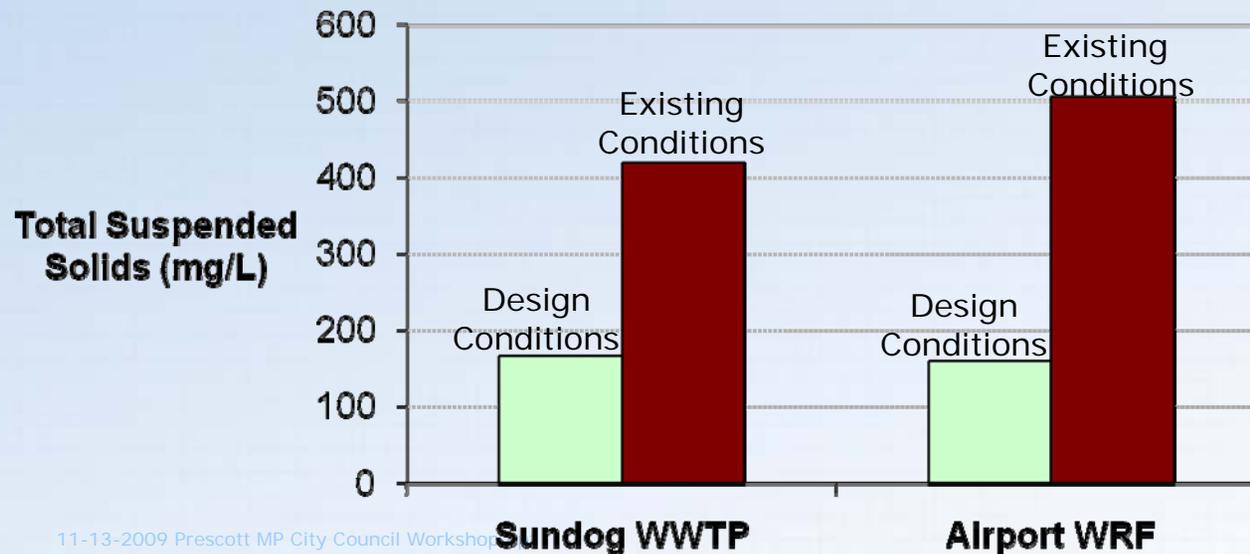
Major Factors Drive Immediate Needs



Major Factors Drive Immediate Needs



Waste Concentration has Nearly Tripled

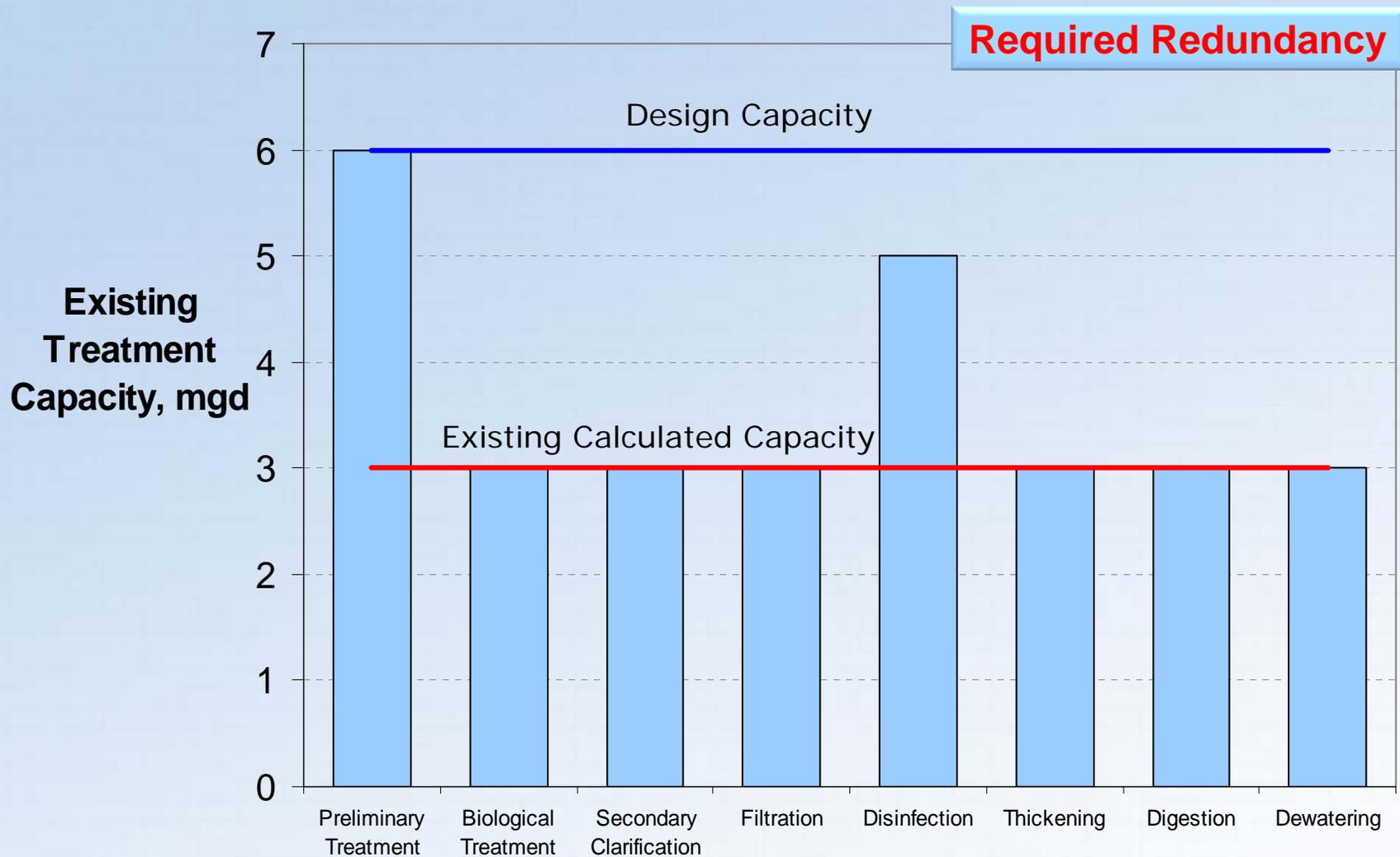


Major Factors Drive Immediate Needs

Parameter	Existing Permit	New Regulations
Tertiary Filtration	Not required	Required
Effluent quality	Class B+	Class A+
Turbidity	No standard	2 NTU
Fecal Coliform	200 cfu/100 ml	Non-detect

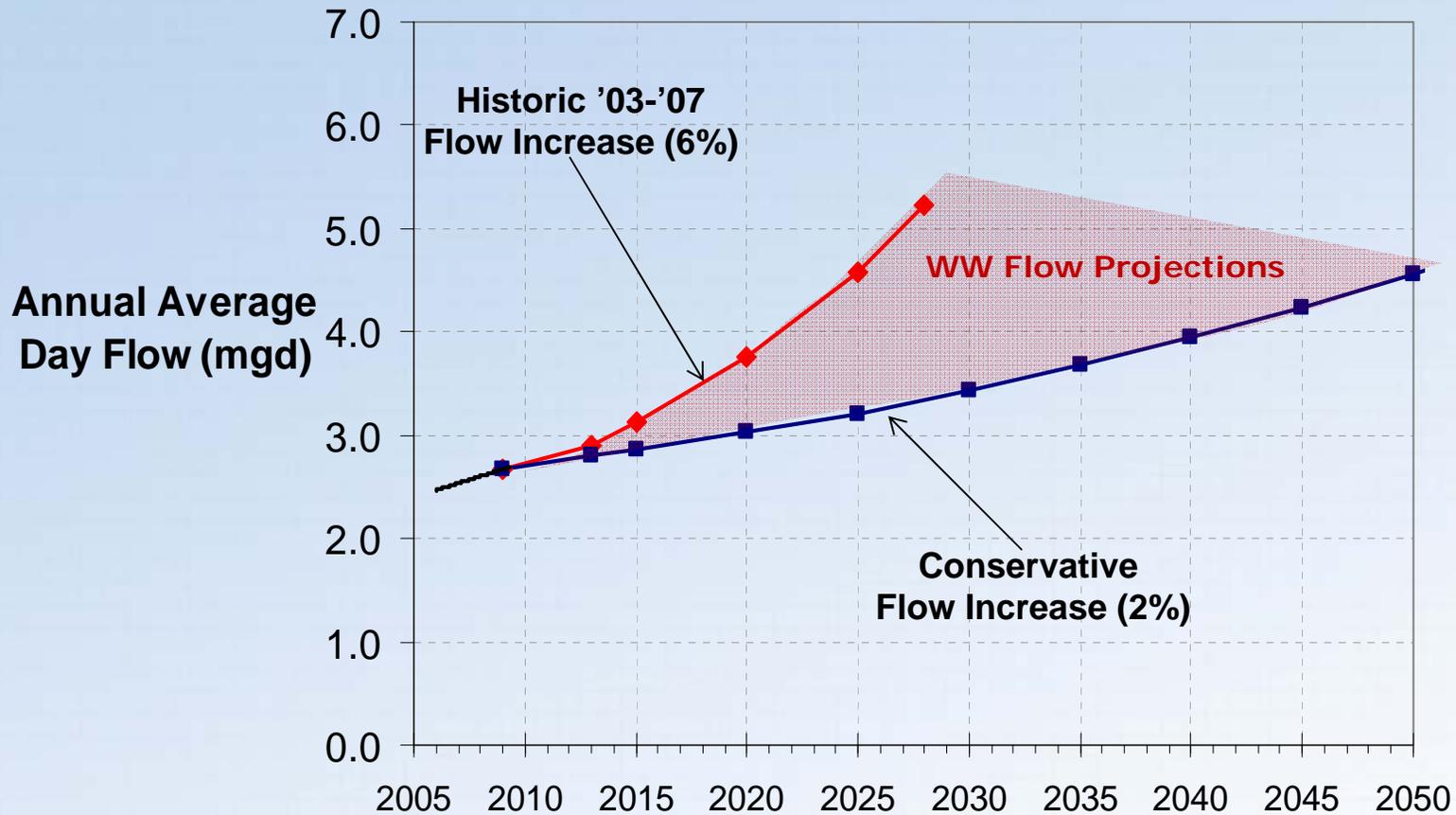
Master Plan Results

Sundog WWTP Capacity



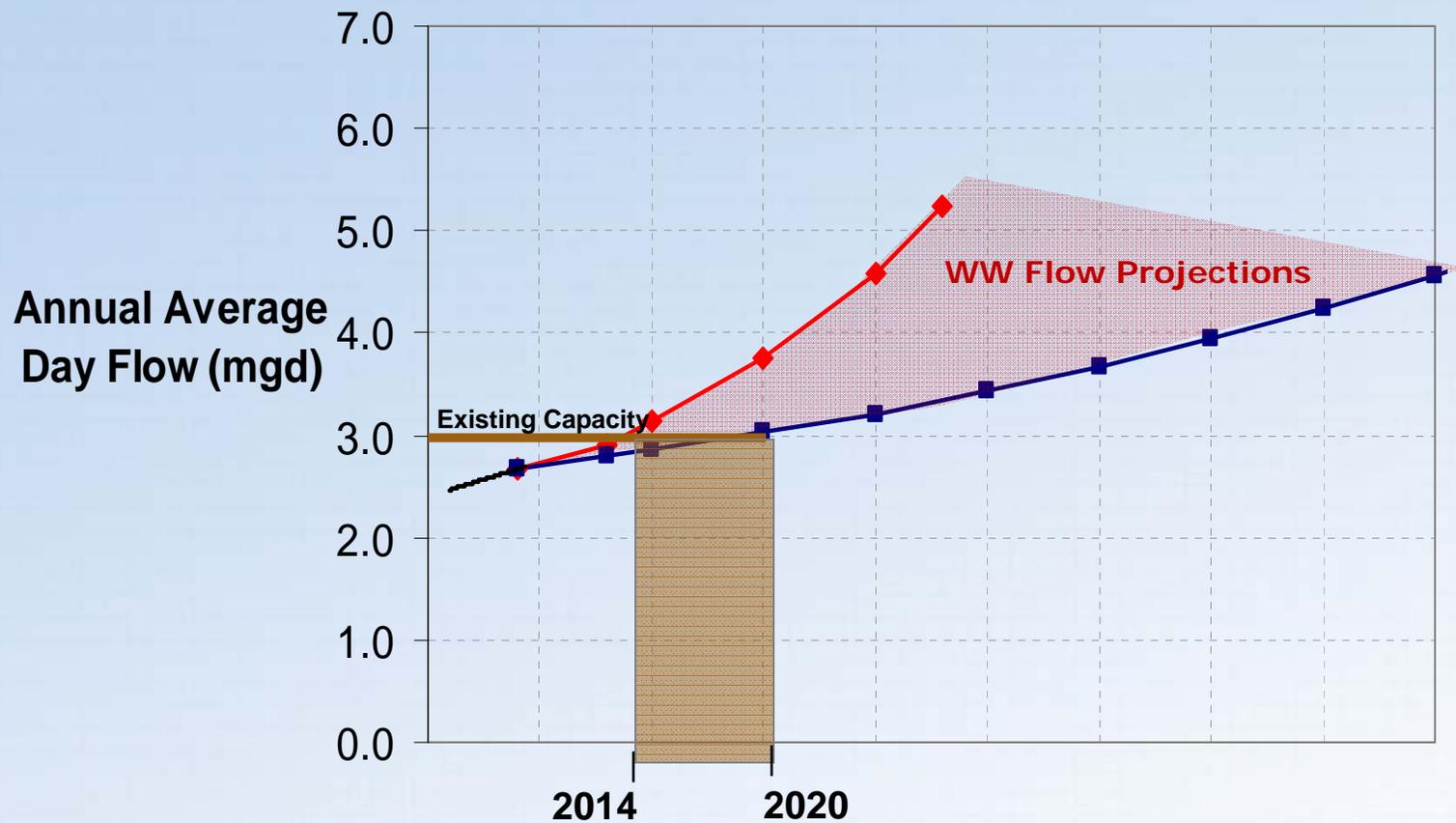
Master Plan Results

Sundog Flow Increase Curves



Master Plan Results

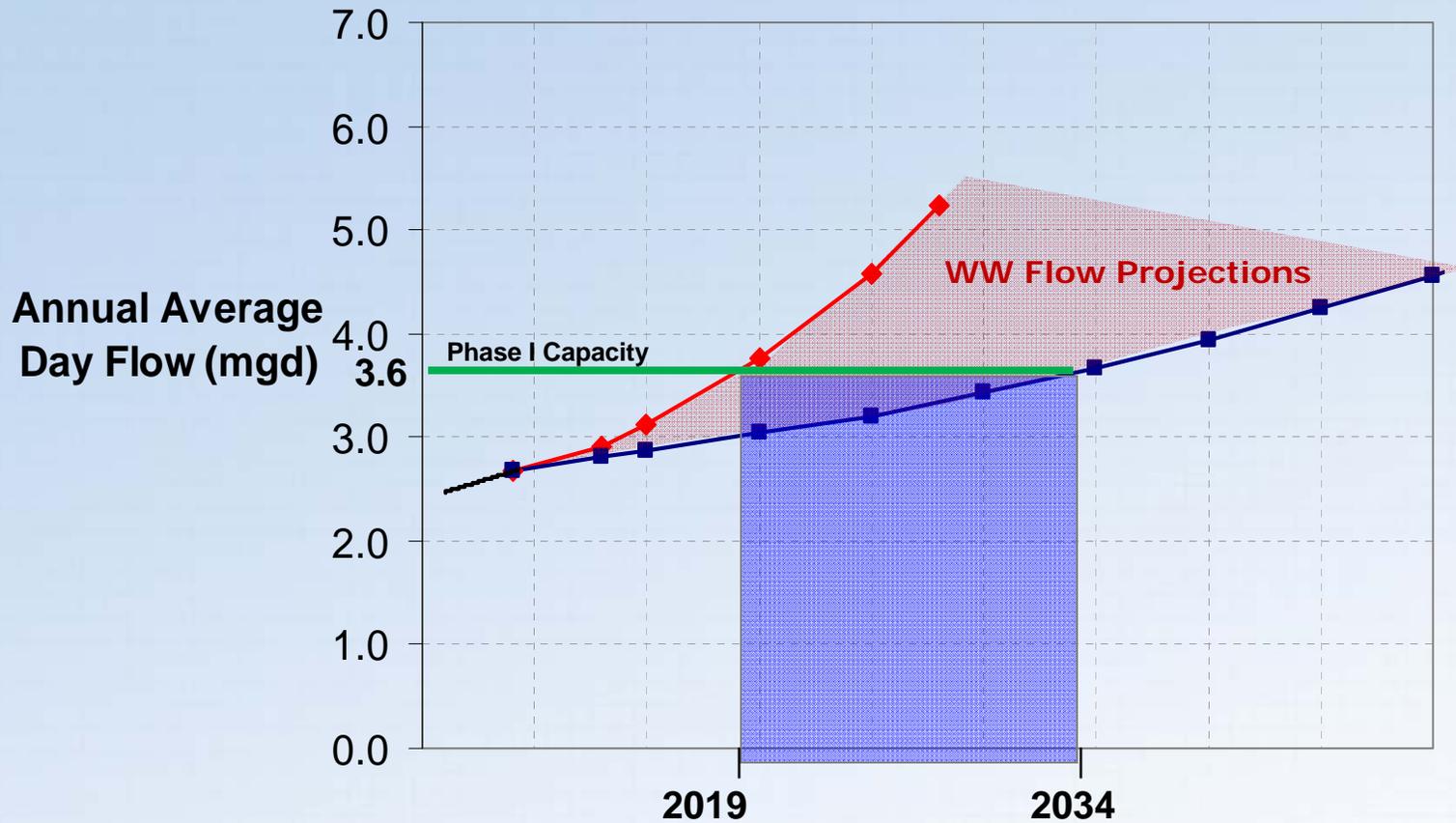
Sundog Flow Increase Curves



Master Plan Results

Sundog Flow Increase Curves

Ultimate Capacity = 5.4 mgd



Sundog WWTP Improvements

Immediate Needs:

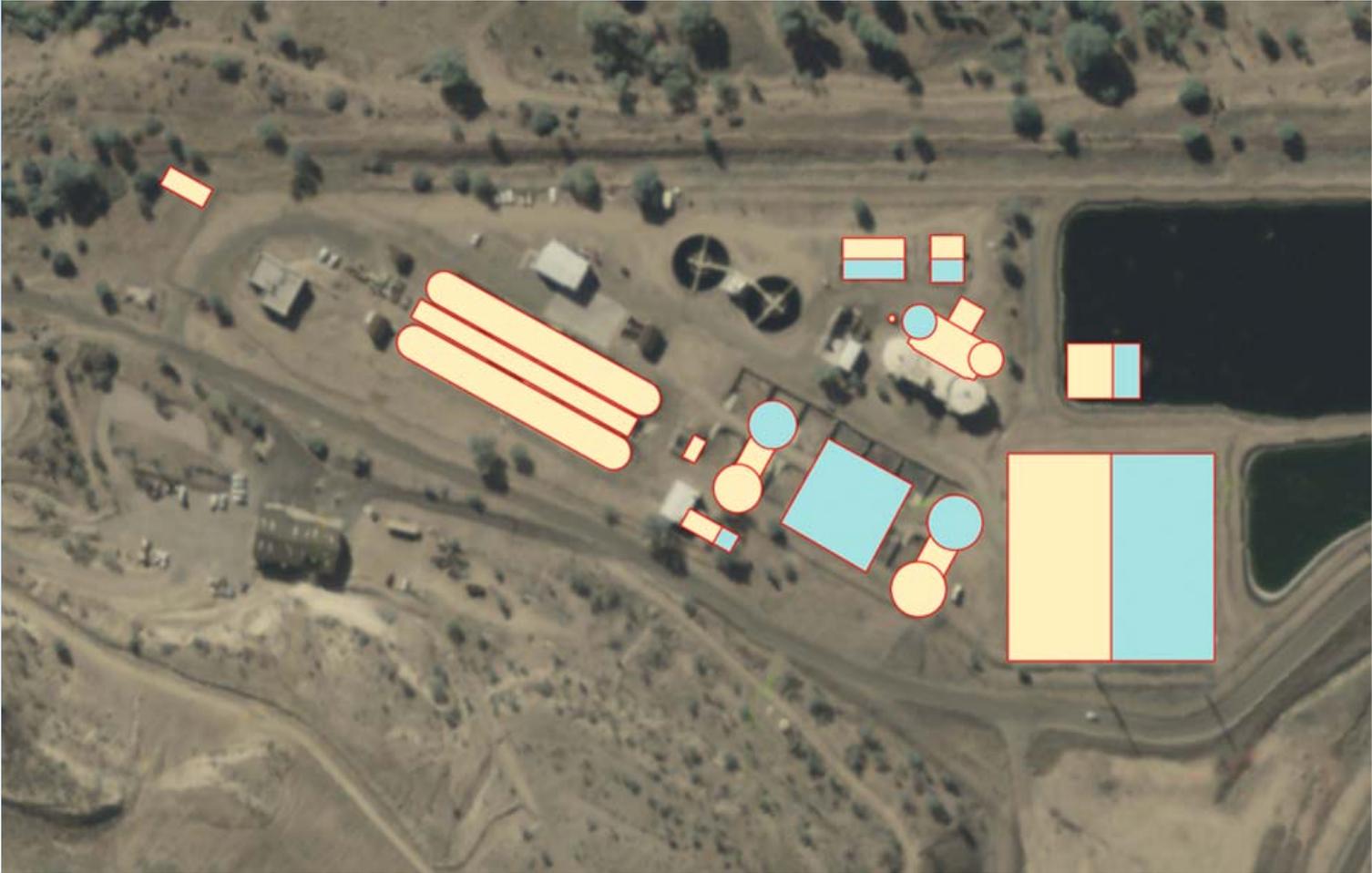
- ◆ Replace existing filters (underdrain failure)
- ◆ Process (de-nitrification) improvements

Phase I Expansion:

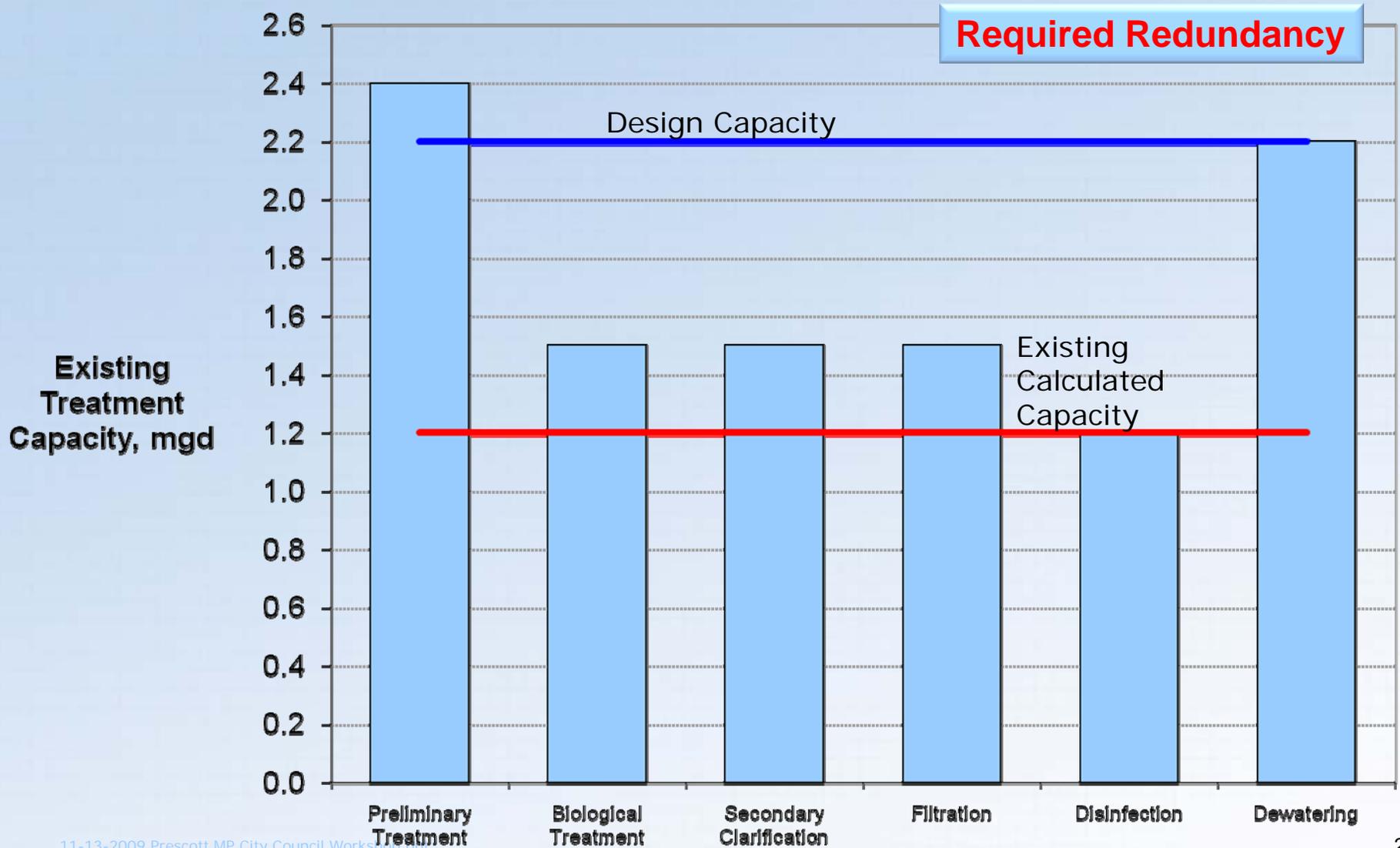
- ◆ Solids handling upgrades
- ◆ Equipment redundancy issues
- ◆ Odor control improvements
- ◆ Septage/grease receiving facilities
- ◆ Flow equalization facilities
- ◆ Expand plant capacity

Master Plan Results Sundog WWTP

	Phase I
	Buildout

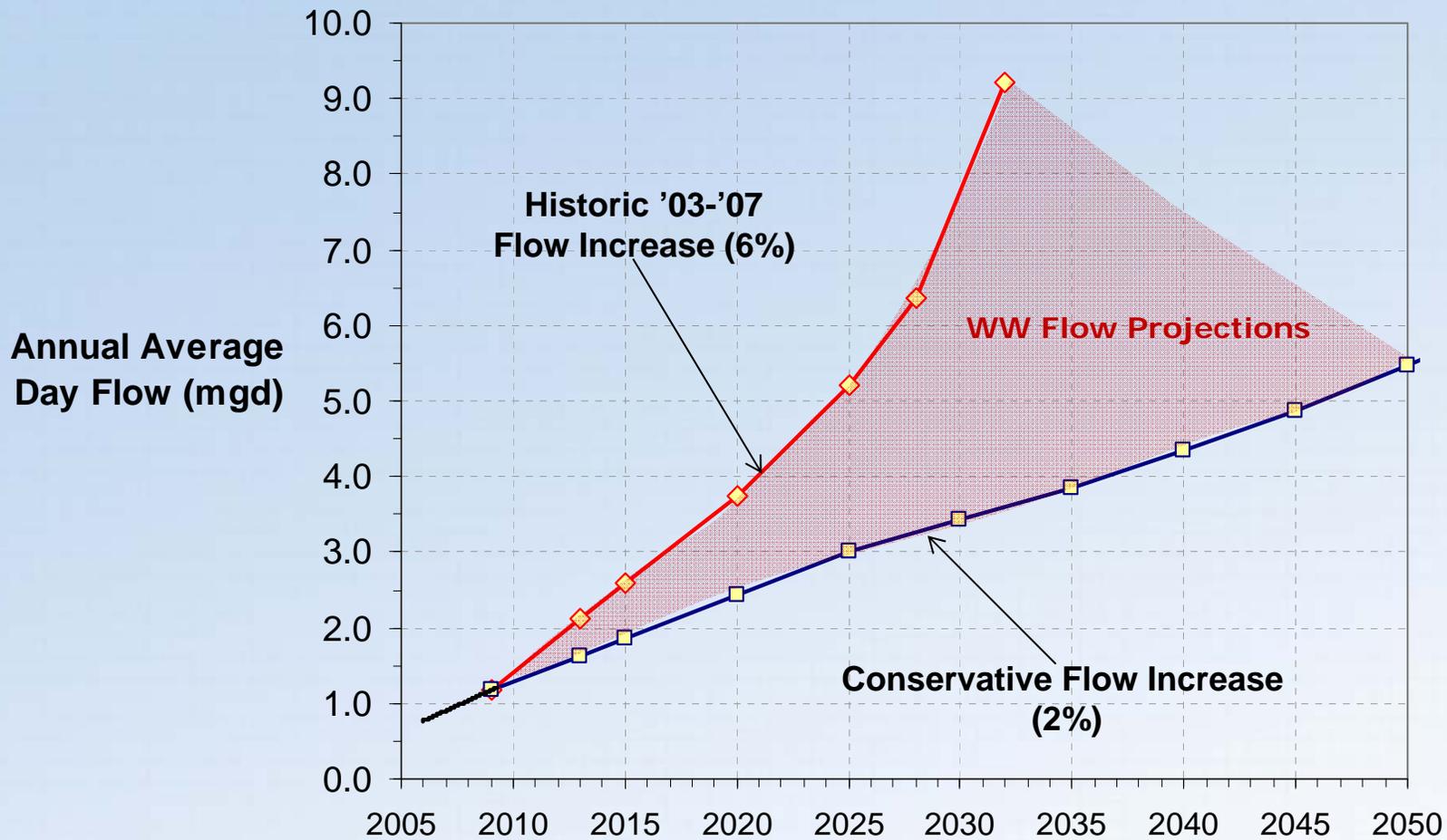


Master Plan Results Airport WRF Capacity



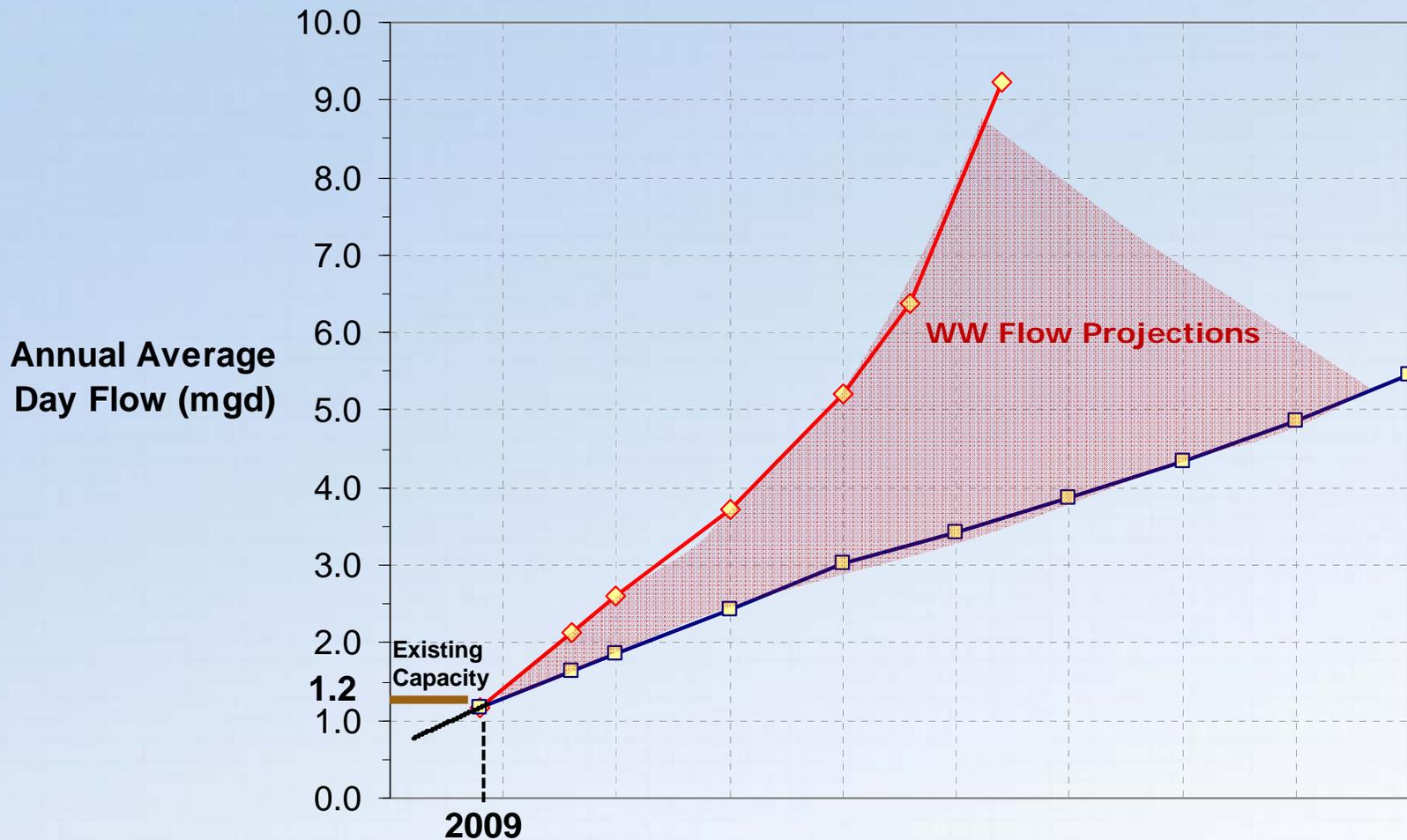
Master Plan Results

Airport WRF Flow Increase Curves



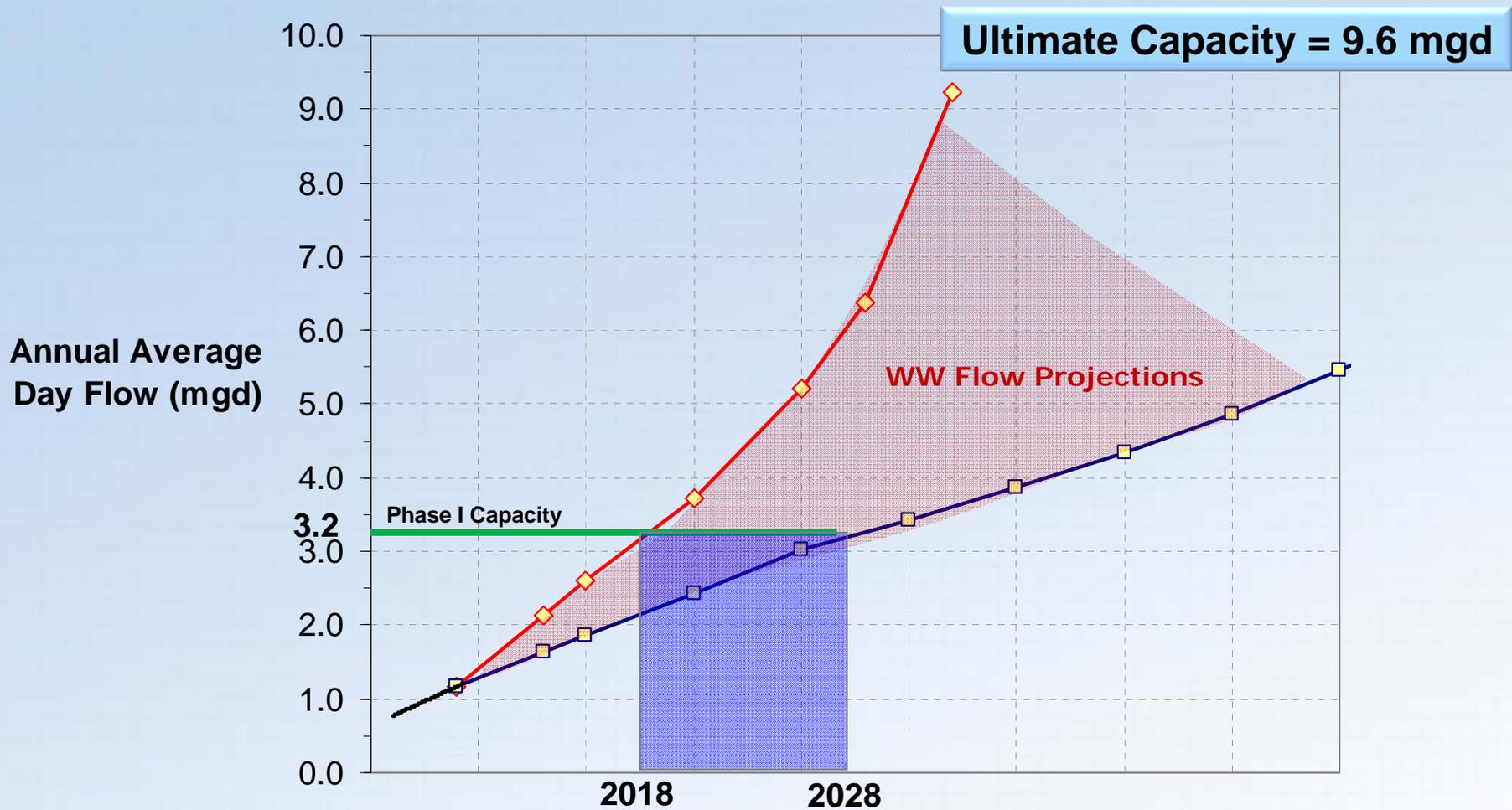
Master Plan Results

Airport WRF Flow Increase Curves



Master Plan Results

Airport WRF Flow Increase Curves



Master Plan Results

Airport WRF

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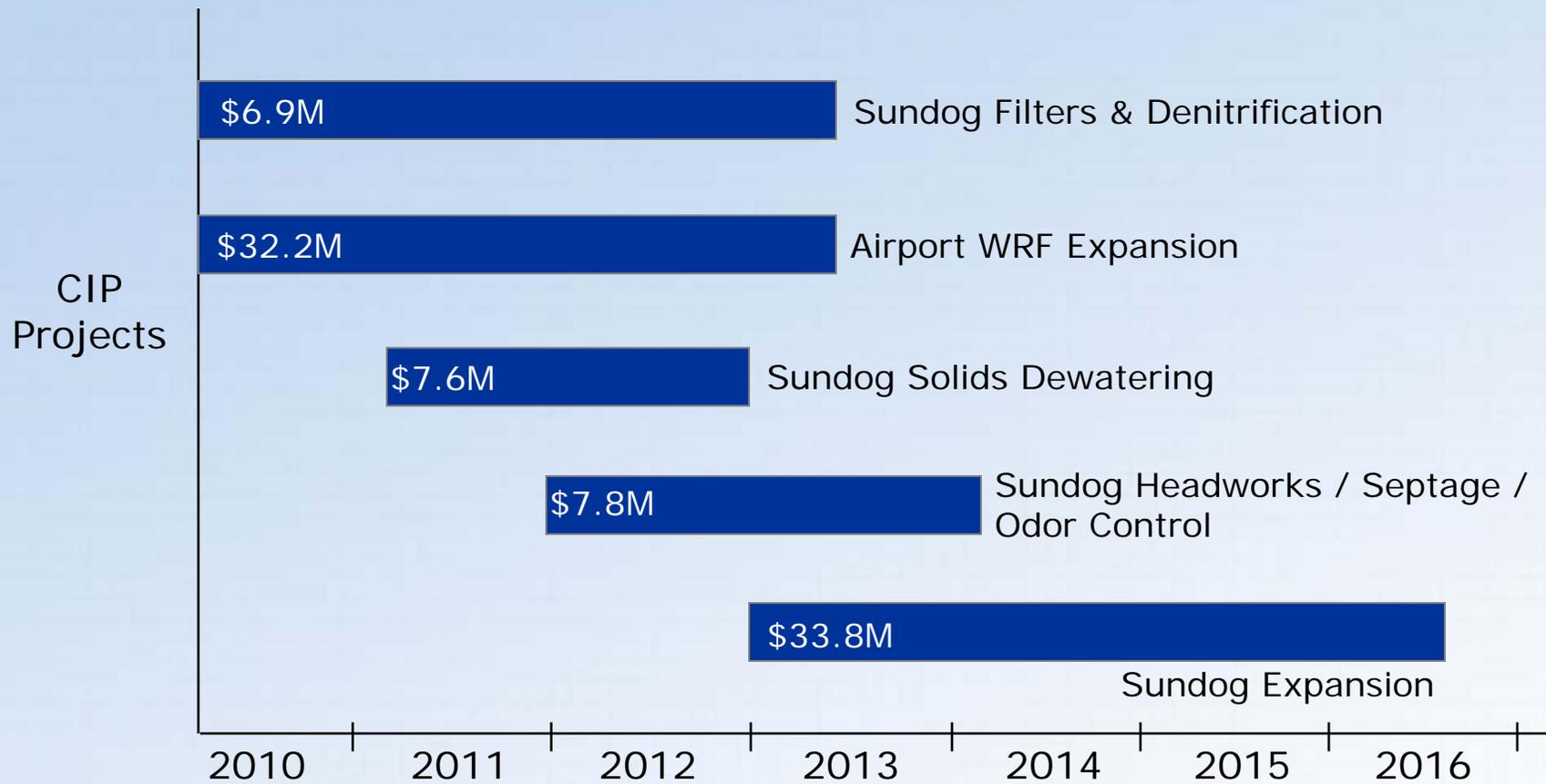


Master Plan Results

Airport WRF

- ◆ Immediate plant expansion
 - a. Preliminary treatment
 - b. Biological treatment
 - c. Secondary clarifiers
 - d. Filtration
 - e. Disinfection
 - f. Solids Handling
- ◆ Provide for adequate equipment redundancy
 - a. Secondary clarifiers
 - b. Filtration
 - c. Disinfection

Recommended Capital Improvements



Capital Improvement Program Funding/Financing Options

- ◆ Rates
- ◆ Bonds
- ◆ Grants & Loans
- ◆ Impact Fees
- ◆ Cash Reserves
- ◆ Alternative Project Delivery



Sundog and Airport WWTP Capacity and Technology Assessment Facilities Plan

QUESTIONS?

