



THE CITY OF SAN DIEGO  
PUBLIC UTILITIES  
DEPARTMENT

# Planning for Conversion from CEPT to Secondary Treatment on a Space Constrained Site

## Hawaii Water Environment Association

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# Presentation Outline

- Existing Metropolitan Sewerage System
- Existing Point Loma Wastewater Treatment Plant
- Drive to Maximizing Reclamation and Conversion of PLWTP to Secondary
- Maximizing Recycled Water Use
- Considerations for Converting to Secondary
- Options at PLWTP





# Metropolitan Sewerage System

- Population Served: 2.2M
- Participating Agencies: 16
- Sewer Mains: 3,000 miles
- Pump Stations: 83
- Treatment Plants
  - 240 mgd Point Loma Wastewater Treatment Plant
  - 30 mgd North City Water Reclamation Plant
  - 15 mgd South Bay Water Reclamation Plant
- Metropolitan Biosolids Center





# Existing PLWTP

- 240 mgd avg & 432 mgd peak capacity
- 180 mgd current annual average daily flow
- Outfall: 4.5 miles offshore; 310-ft deep
- Operates with a modified NPDES permit
  - CEPT only - does not require full secondary treatment
  - Authorized by Section 301 (h) of the Clean Water Act modified by the Ocean Pollution Reduction Act of 1994 (OPRA)
- Recent studies indicate discharge not detrimental to receiving water
- Final stages of third waiver approval





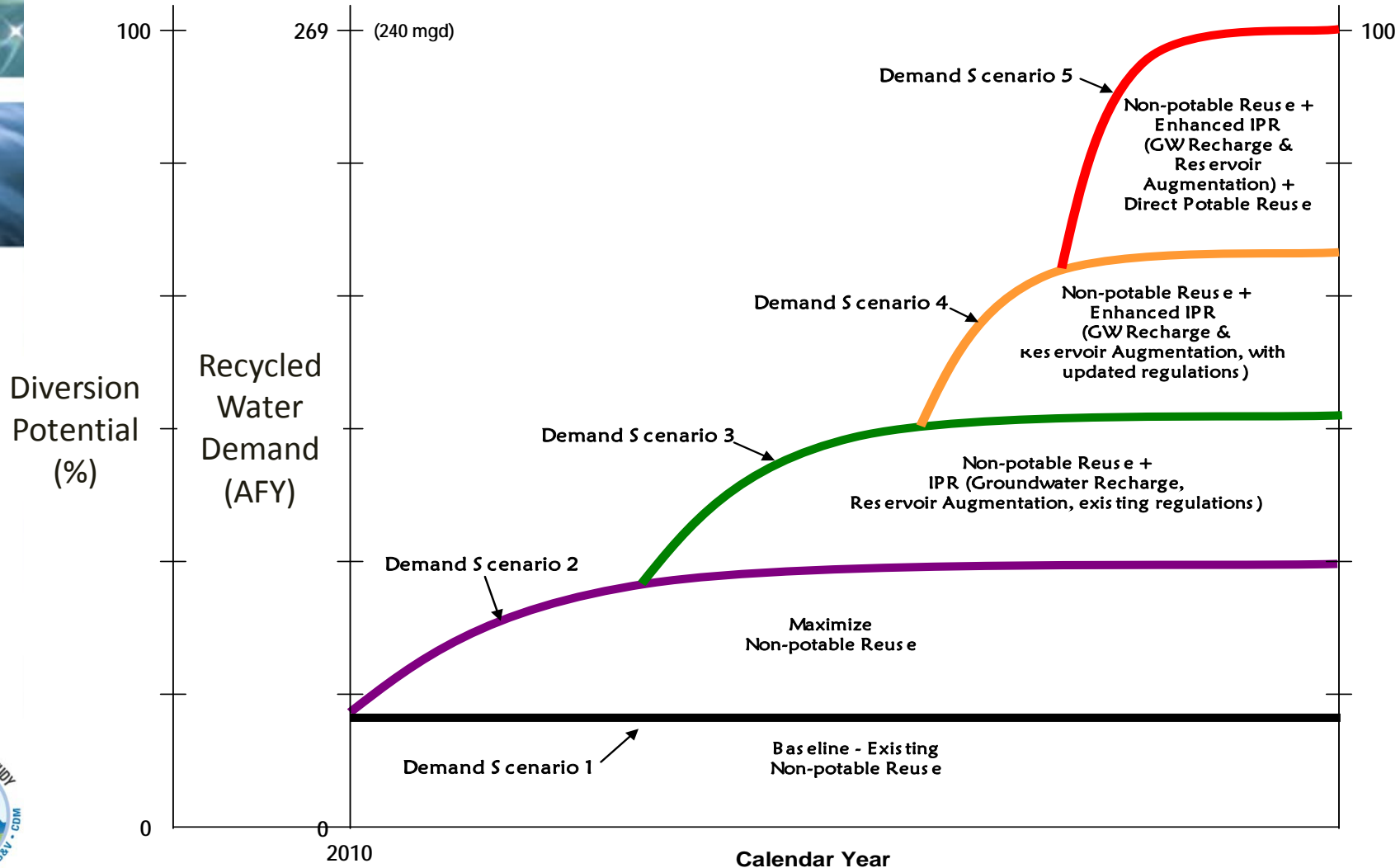
# Drive to Maximizing Water Reuse and Conversion of PLWTP

- Only 301(h) waiver in California
- Negotiations with stakeholders (Coastkeeper, Surfrider, etc.)
- Concern over imported water supply reliability
- Maximizing reclamation more sustainable and better use of resources
- Conversion of PLWTP to Secondary





# Increasing Recycled Water Use





# Considerations for Converting to Secondary

- Site Constraints
- Treatment of influent waste streams
- Solids processing
- Wet weather conditions



# Site Constraints at the PLWTP



- Restricted, cliff-side location severely limits the size and capacity of treatment process upgrades





# The Existing Waiver

Parameter	Mean Annual Percent Removal	Mean Monthly Percent Removal	Monthly Average	Annual Mass Emission Rate
TSS	N/A	>80%	75 mg/L	13,599 mt/y
TBOD	>58%	N/A	N/A	N/A

mt/yr= metric tons per year





# Secondary Treatment Standards

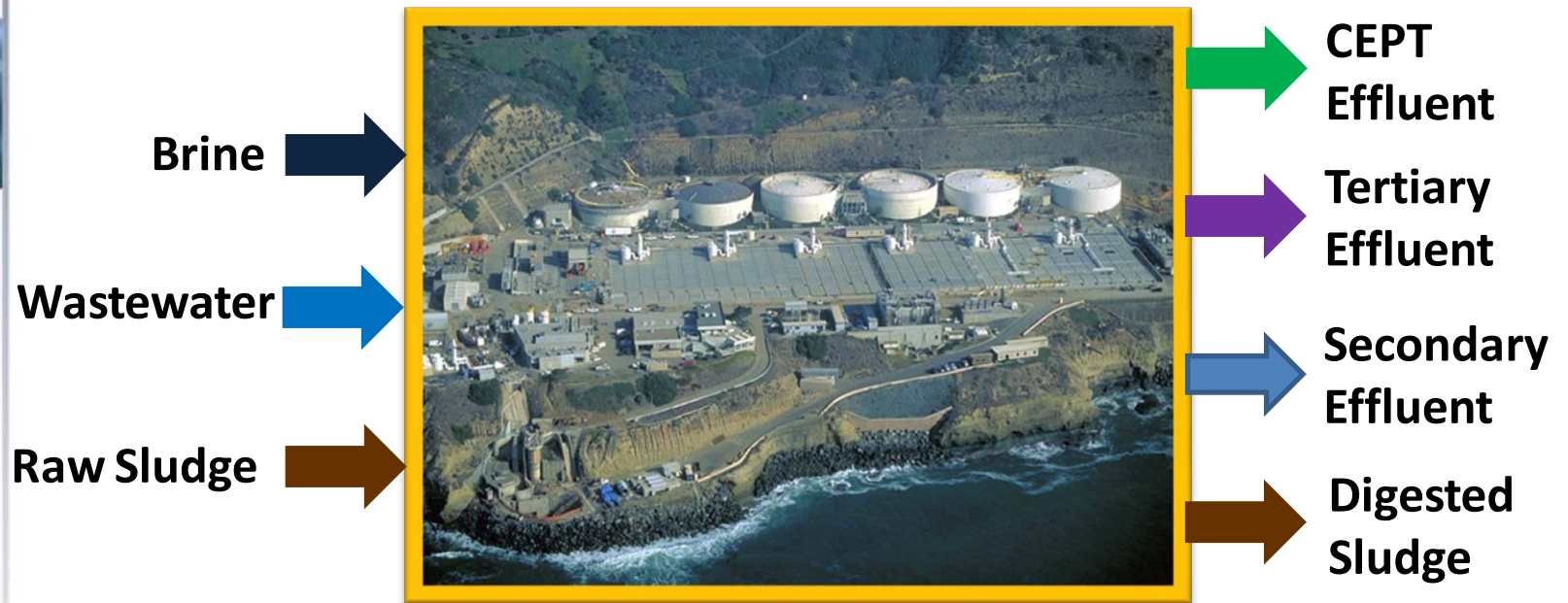
Parameter	30-day running average (mg/L)	7-day running average (mg/L)
TSS	30	45
TBOD	30	45
CBOD	25	40

- *TSS Removal  $\geq 85\%$*
- *$6 \leq pH \leq 9$*





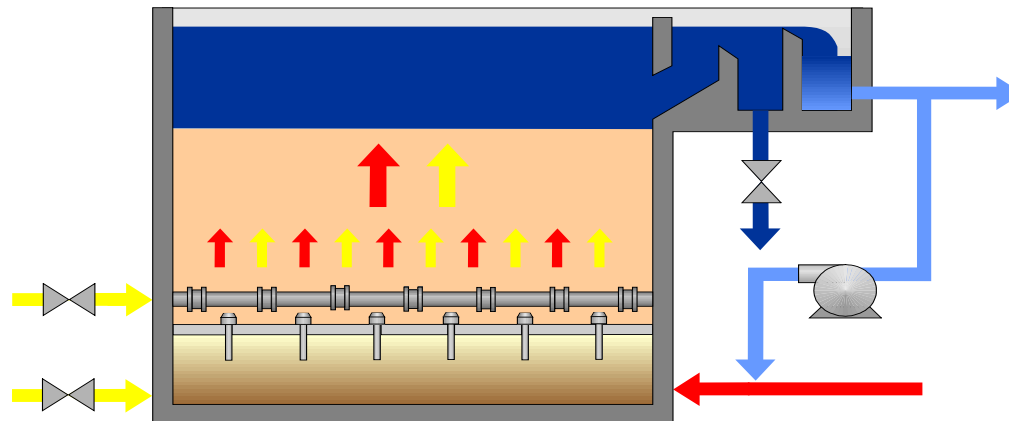
# Inlet /Outlet Flows at PLWTP



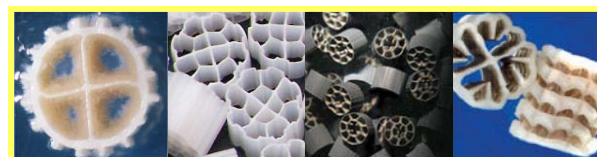


# Treatment Options

- Chemically Enhanced Primary Treatment
- Conventional Air Activated Sludge
- Biological Aerated Filtration



- Moving Bed Bioreactors





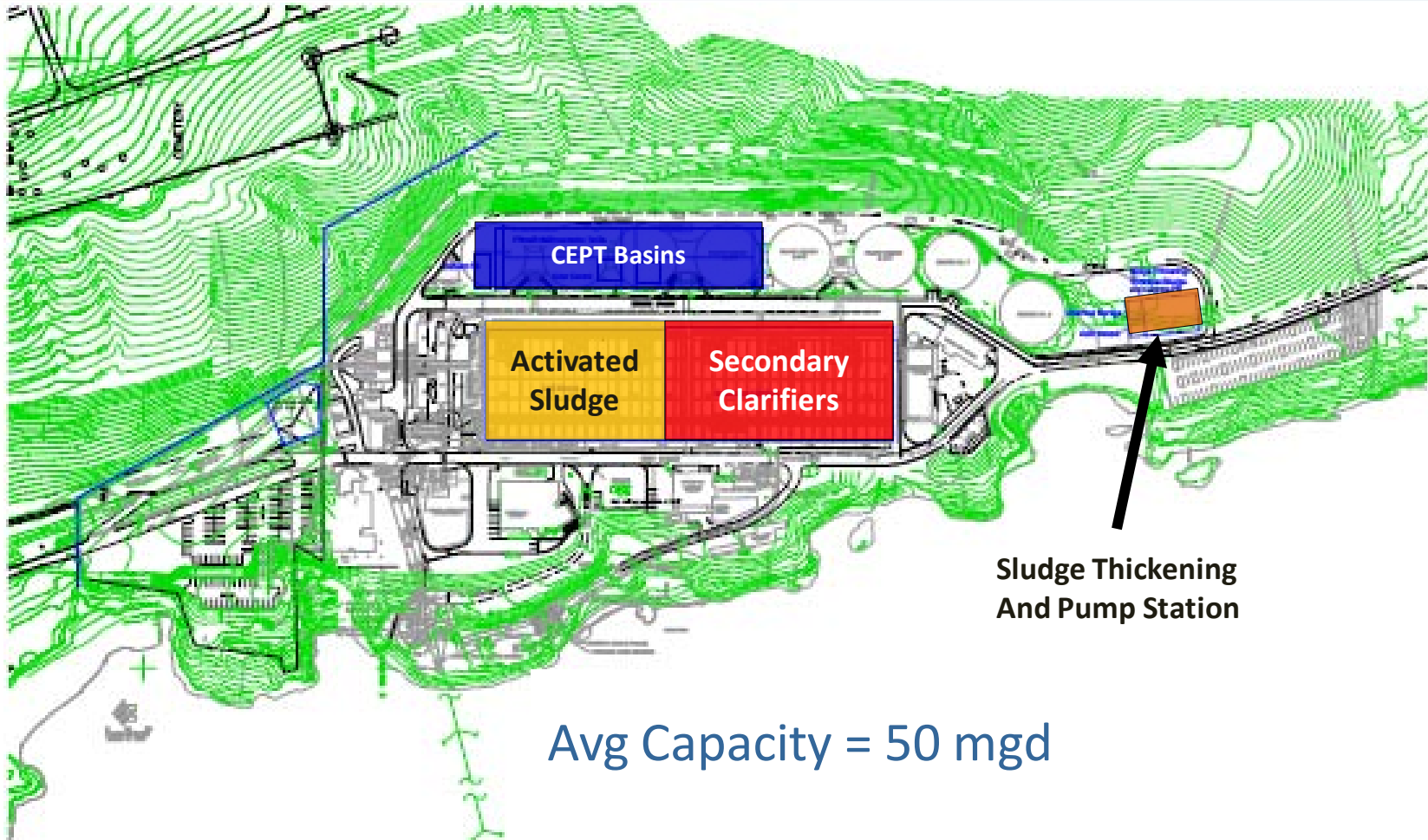
# Estimated Average Capacities of Candidate Secondary Systems

System	Average Annual Daily Flow (mgd)
Conventional Activate Sludge + New CEPT Basins	50
Conventional Activate Sludge + High Rate Clarifiers	100
Biological Aerated Filters + Existing CEPT Basins	180
Biological Aerated Filters + High Rate Clarifiers	240
Moving Bed Bioreactors + High Rate Clarifiers	240





# Option 1 – Conventional Activated Sludge & New CEPT Basins

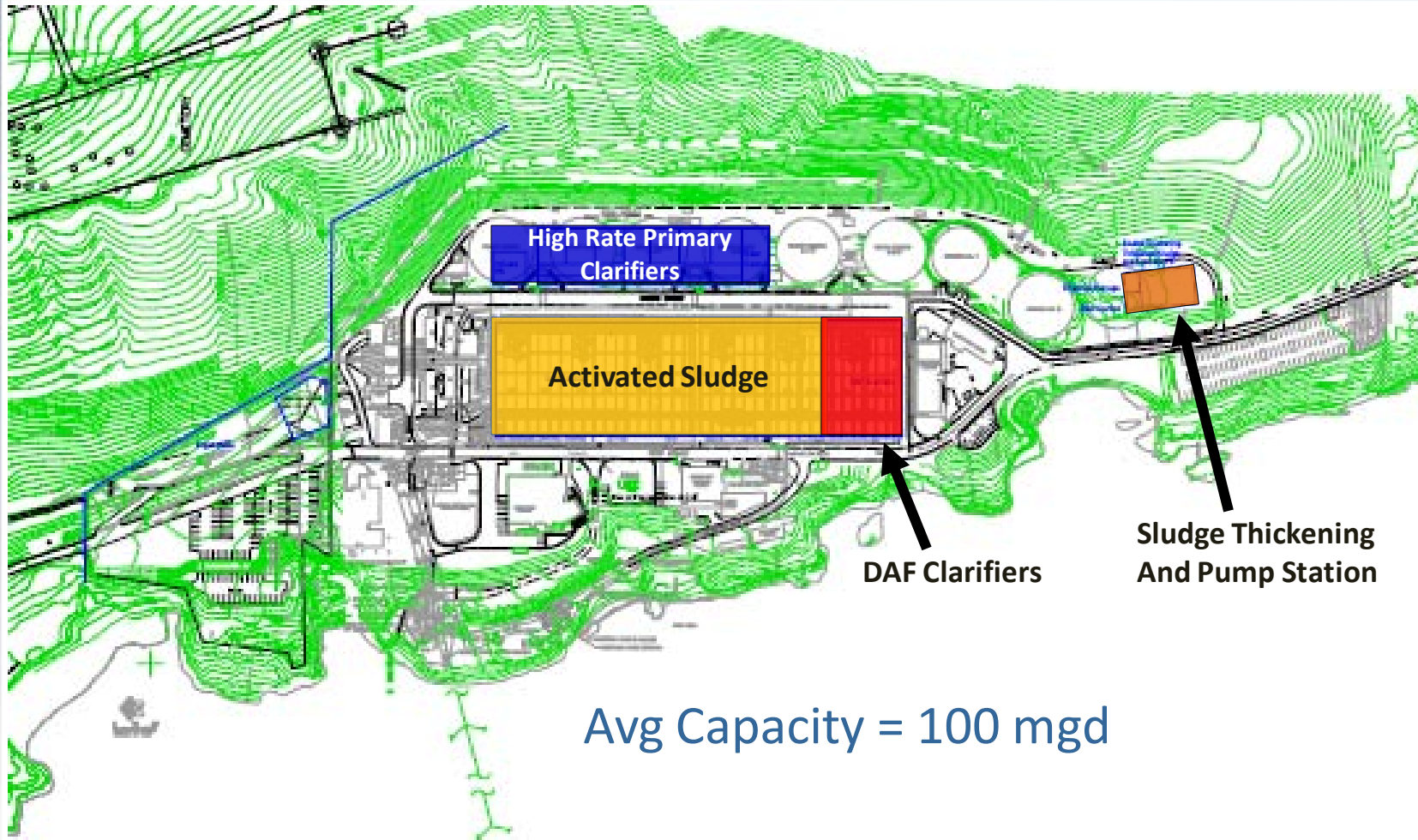


Avg Capacity = 50 mgd





# Option 2 – Conventional Activated Sludge & High Rate Clarifiers

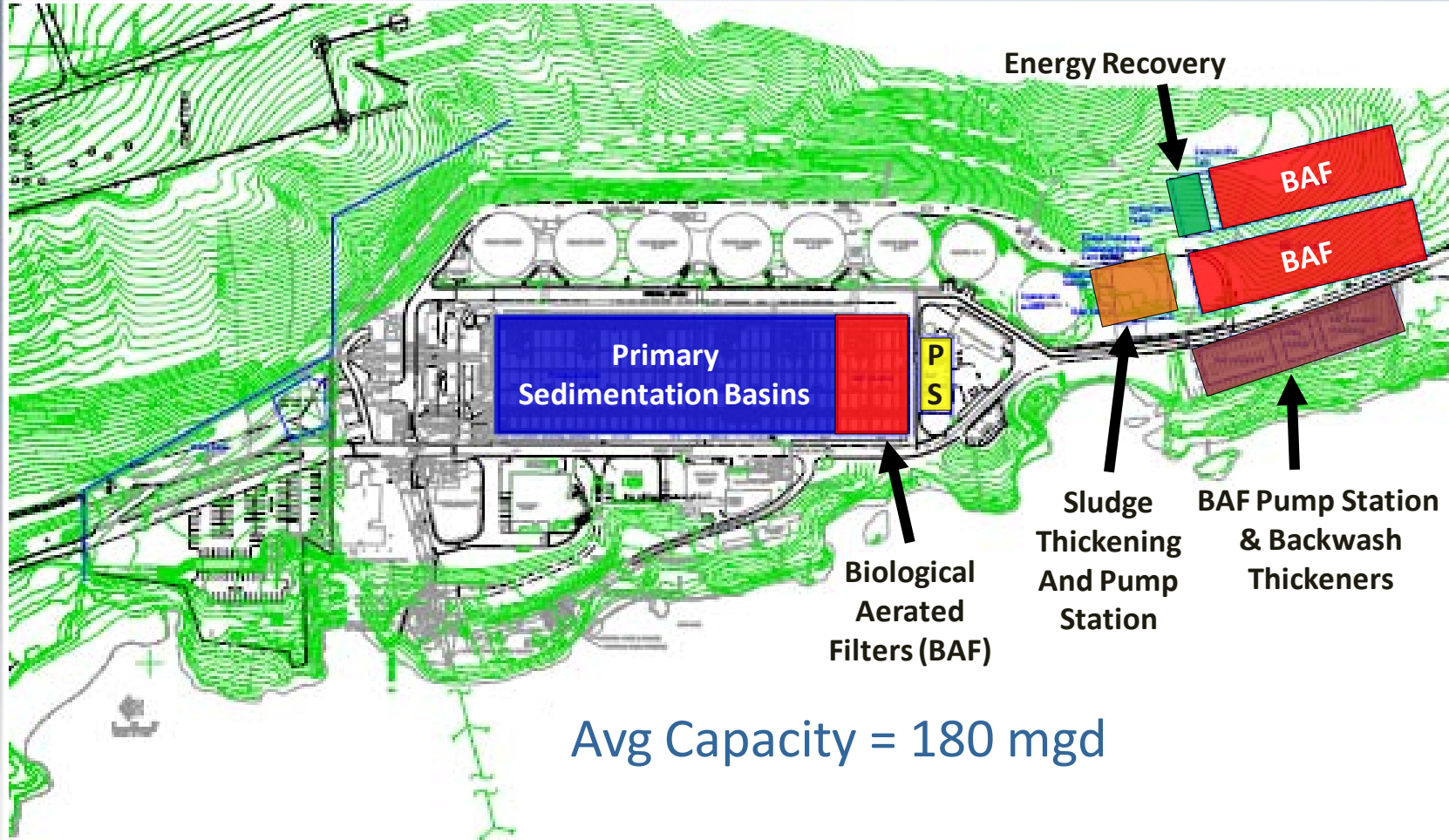


Avg Capacity = 100 mgd





# Option 3 – Biological Aerated Filters & Existing CEPT Basins

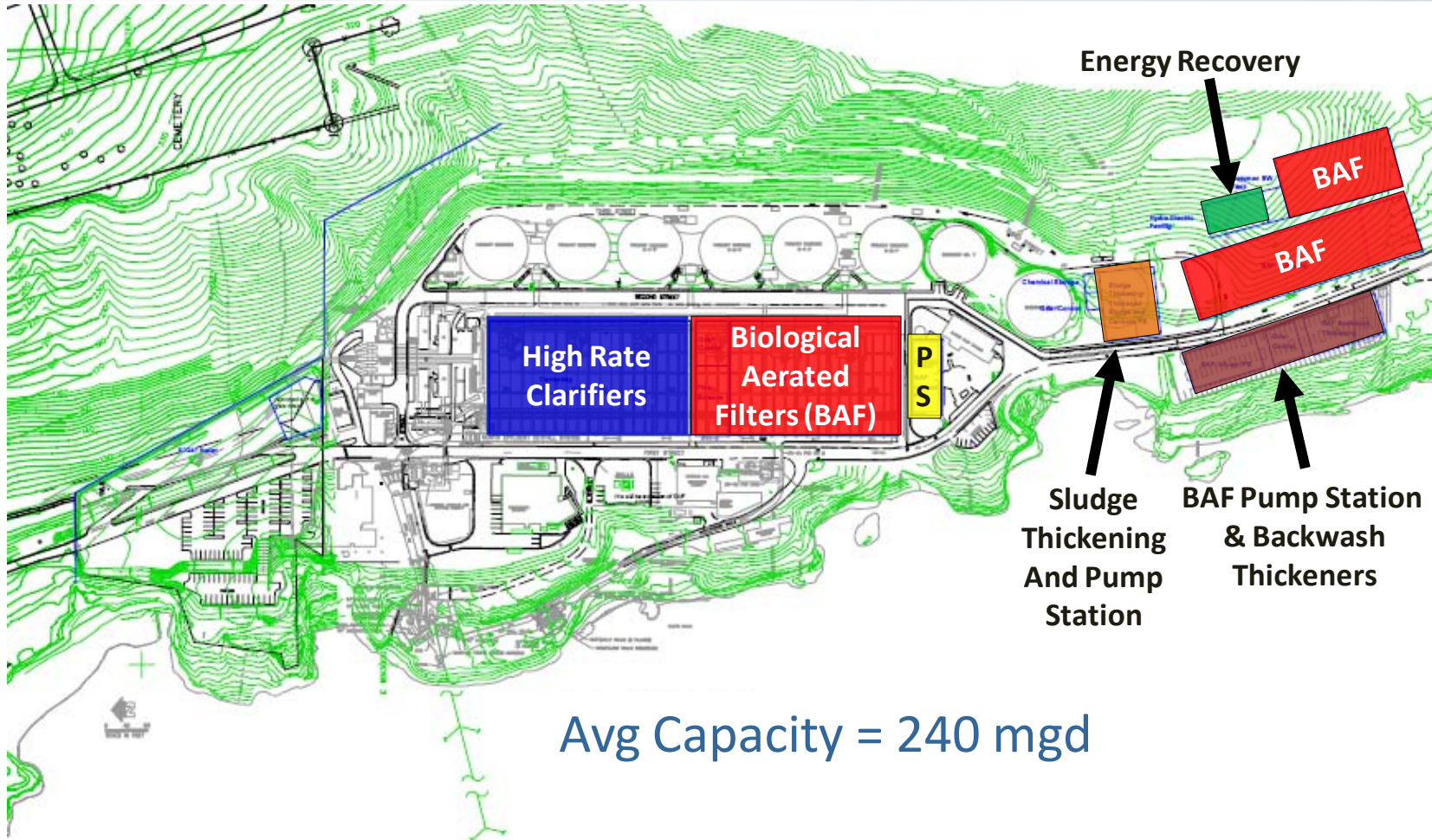


Avg Capacity = 180 mgd





# Option 4 – Biological Aerated Filters & High Rate Clarifiers

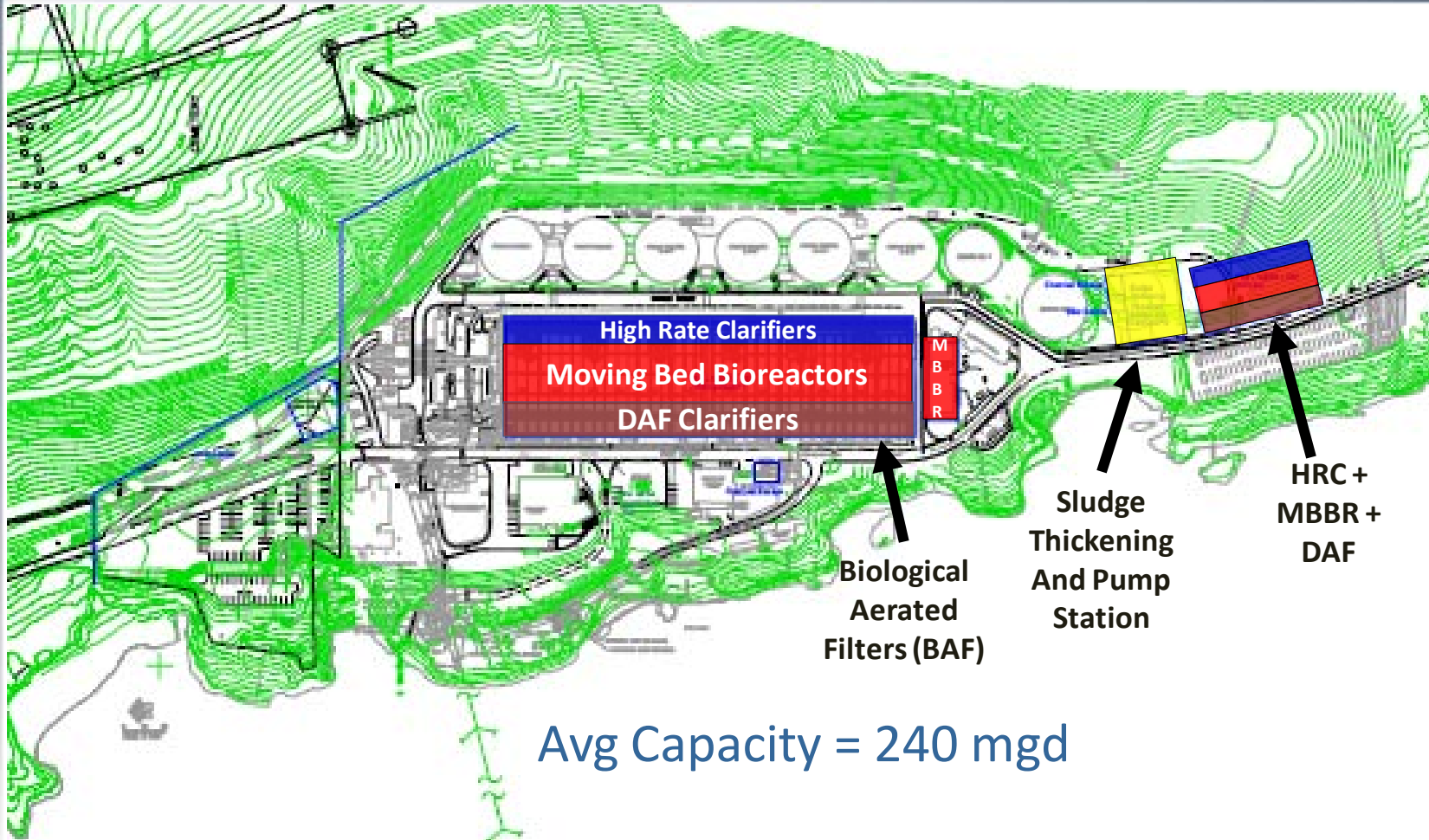


Avg Capacity = 240 mgd





# Option 5 – Moving Bed Bioreactors & High Rate Clarifiers

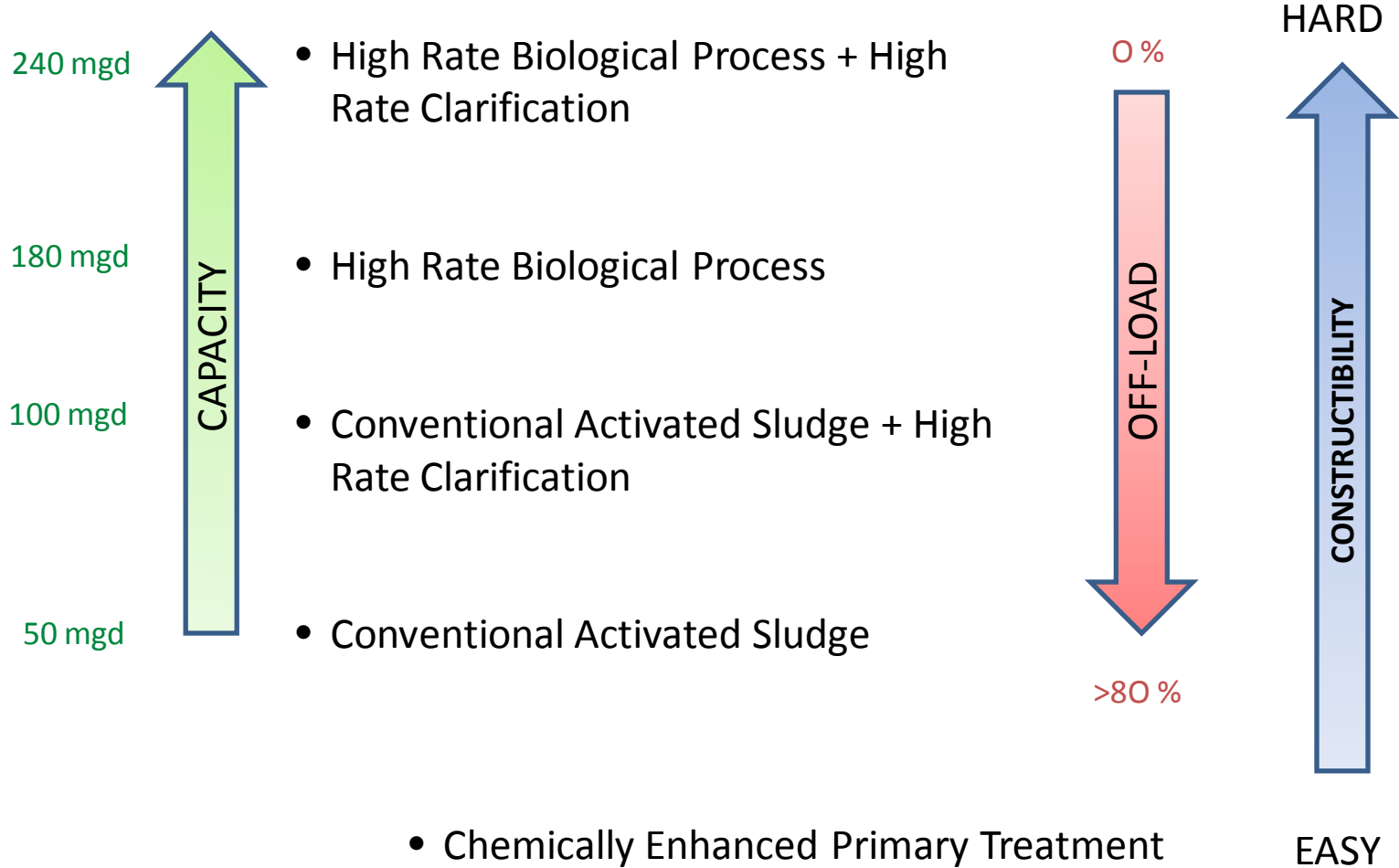


Avg Capacity = 240 mgd





# Implementation Scale at the PLWTP





# Wet Weather Management and Treatment Alternatives

- Alternative treatment technologies at PLWTP
- Blending at PLWTP
- Infiltration/Inflow reduction
- Equalization storage
- Live stream discharge
- Secondary effluent discharge to Point Loma Ocean Outfall





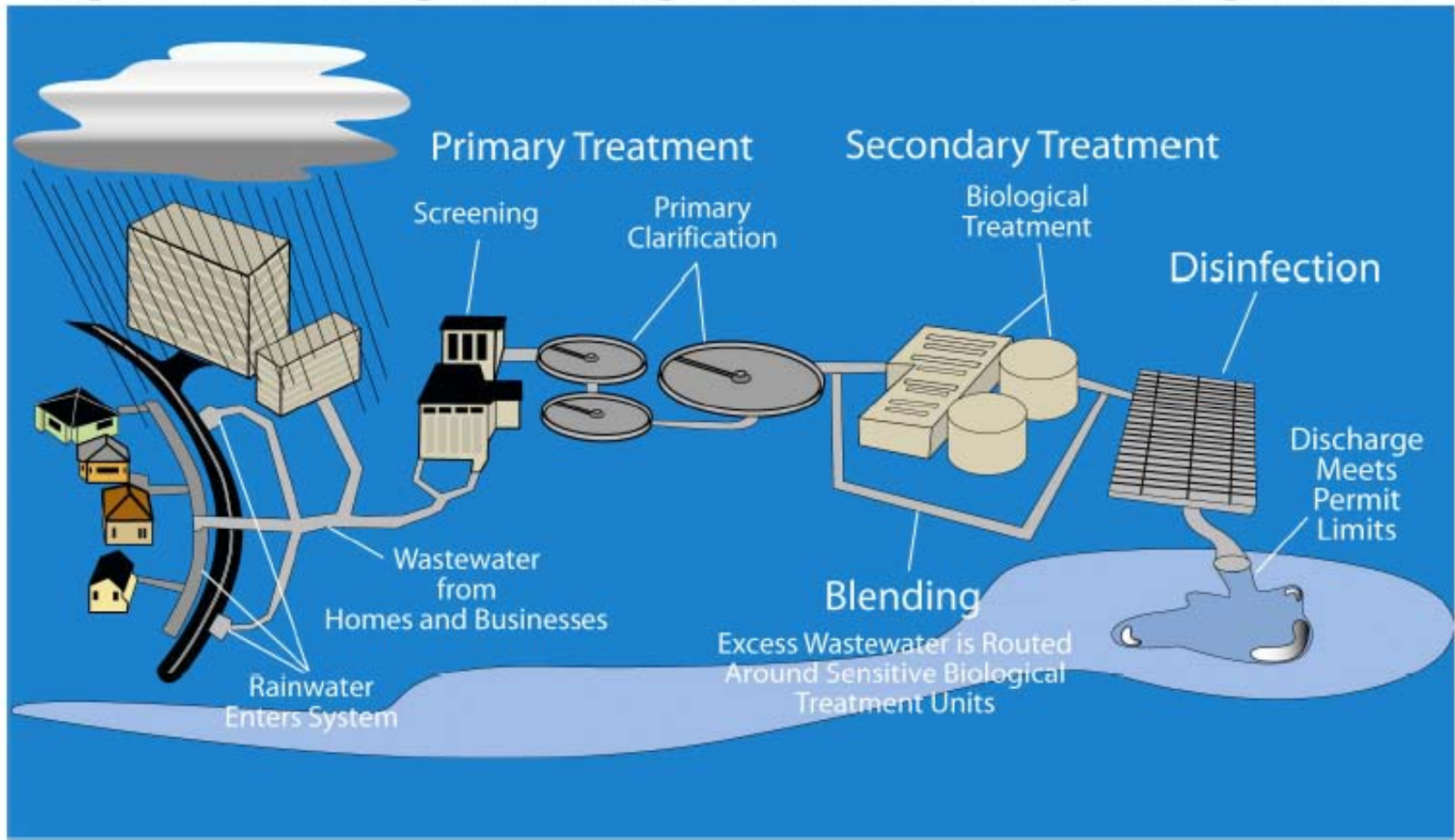
# Estimated Average and Peak Capacities of Candidate Systems

System	Avg Annual Daily Flow (mgd)	Peak Wet Weather Flow (mgd)
Conventional Activate Sludge + New CEPT Basins	50	91
Conventional Activate Sludge + High Rate Clarifiers	100	161
Biological Aerated Filters + Existing CEPT Basins	180	323
Biological Aerated Filters + High Rate Clarifiers	240	432
Moving Bed Bioreactors + High Rate Clarifiers	240	432



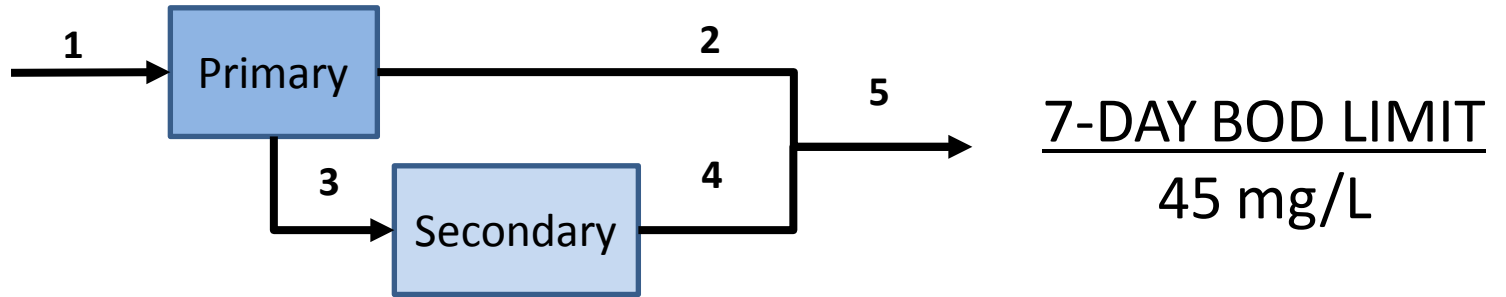


# Blending at Peak Wet Weather Flow Conditions





# Estimated Blended Wet Weather Effluent BOD



System	Flow -1 & 5 (mgd)	Flow-3 & 4 (mgd)	BOD-2 (mg/L)	BOD-4 (mg/L)	Flow-2 (mgd)	BOD-5 (mg/L)
CAS + PSB	483	91	100	30	392	87
CAS + HRC	483	161	100	30	322	77
BAF + PSB	483	323	100	30	160	53
BAF + HRC	483	432	100	30	51	37
MBBR + HRC	483	432	100	30	51	37



# Path Forward

- Define Non-potable, Indirect Potable, and Direct Potable Demands
- Define Satellite Treatment Plant Options
- Develop Distribution and Storage Options
- Identify Waste Streams and Peak Flow Management
- Create “System” Options
- Estimate Costs
- Identify Optimum System





# Questions

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