



# Clark Public Utilities

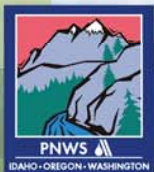
## 50-Year Water Supply Plan



# Clark Public Utilities

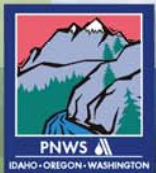
- Formed in 1938, Water Service Started in 1951
- Water Service Population of 97,000
- Electric Service Population of 450,000
- Power Generation 248 MW
- Total Revenue 2007 = \$480M, Water \$10M

Municipality	Population		Rank by 2007 Population
	2000	2007	
Seattle	563,376	586,200	1
Spokane	195,629	202,900	2
Tacoma	193,556	201,700	3
Vancouver	143,560	160,800	4
Bellevue	109,827	118,100	5
Everett	91,488	101,800	6
Spokane Valley @	--	88,280	7
Federal Way	83,259	87,390	8
Kent	79,524	86,660	9
Yakima	71,845	82,940	10



# CPU Objectives

- Meet Water Demand Needs for CPU, & Potentially Battle Ground and Ridgefield
- Plan for 50-Year Period
- Provide Service at Reasonable Cost to Rate Payers - Reliable, Uninterruptible
- Meet Requirements of WRIA 27/28 Planning Policies





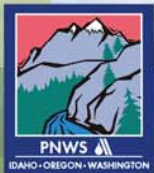
# Clark Public Utilities

- Overview of Presentation

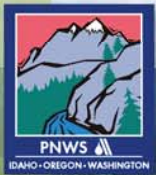
1. Clark County Water Supply Picture

2. Clark Public Utilities Supply

3. Future Supply Alternatives



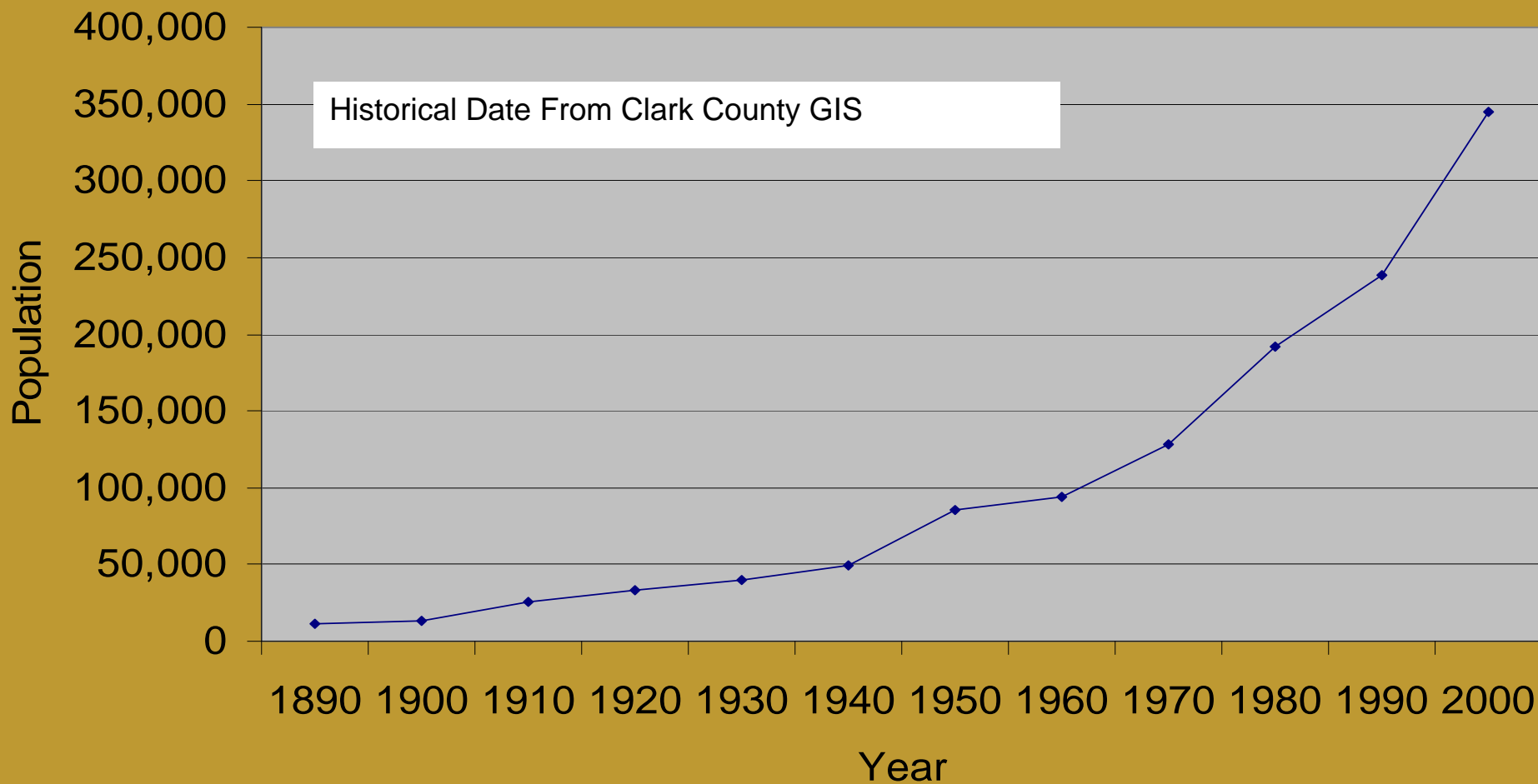
- Clark County, WA
- Bounded by Columbia River, North Fork of Lewis River, Cascade Mtns
- Forest, Agriculture, Urbanizing
- Ranked No. 1 Growth County in State between 1990 & 2000 at 45.03%
- Ranked No. 2 Growth County from 200 to 2007 at 20.21%





# Clark County 1890- 2000

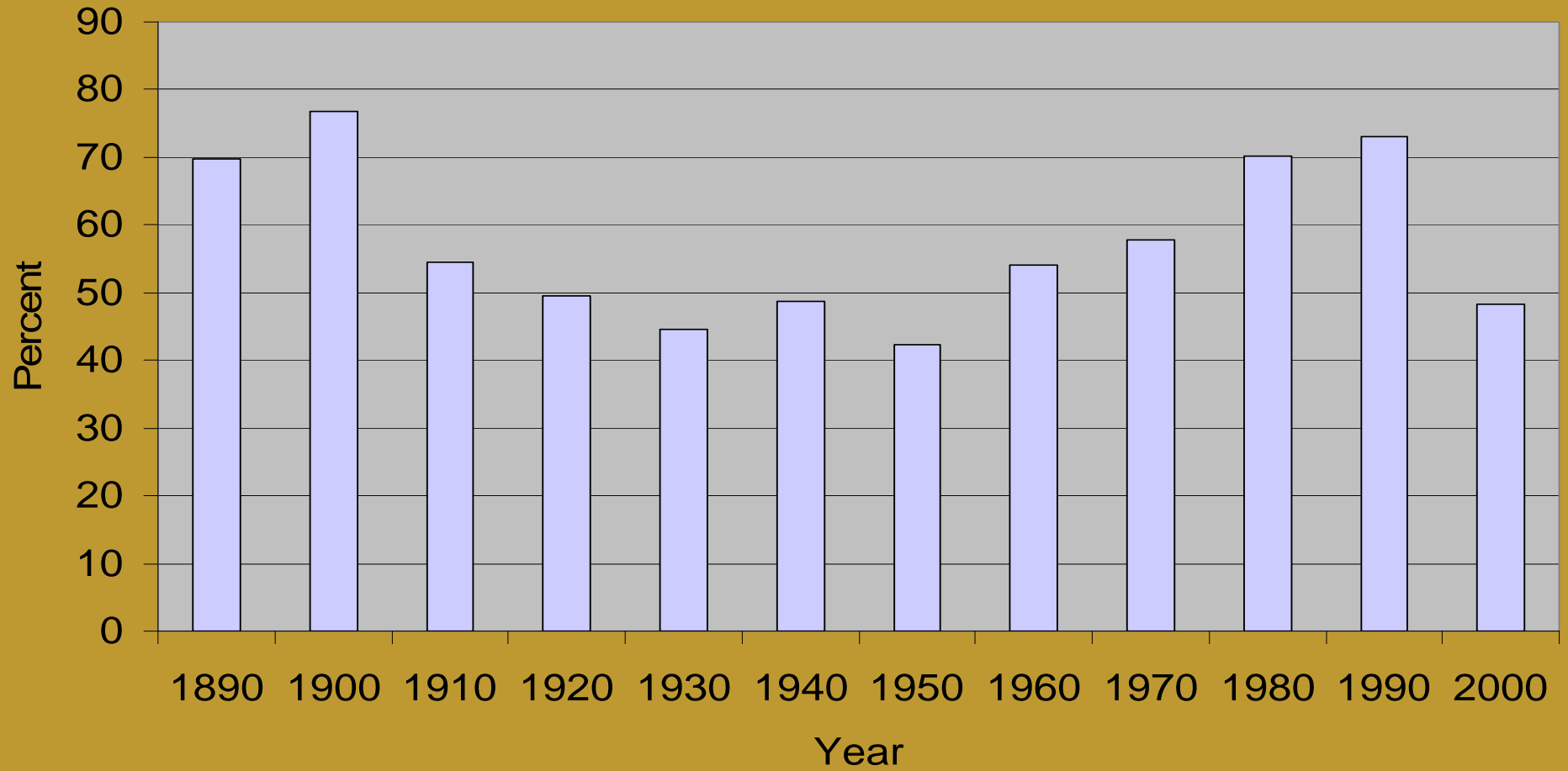
Clark



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# Clark County - Percent Unincorporated

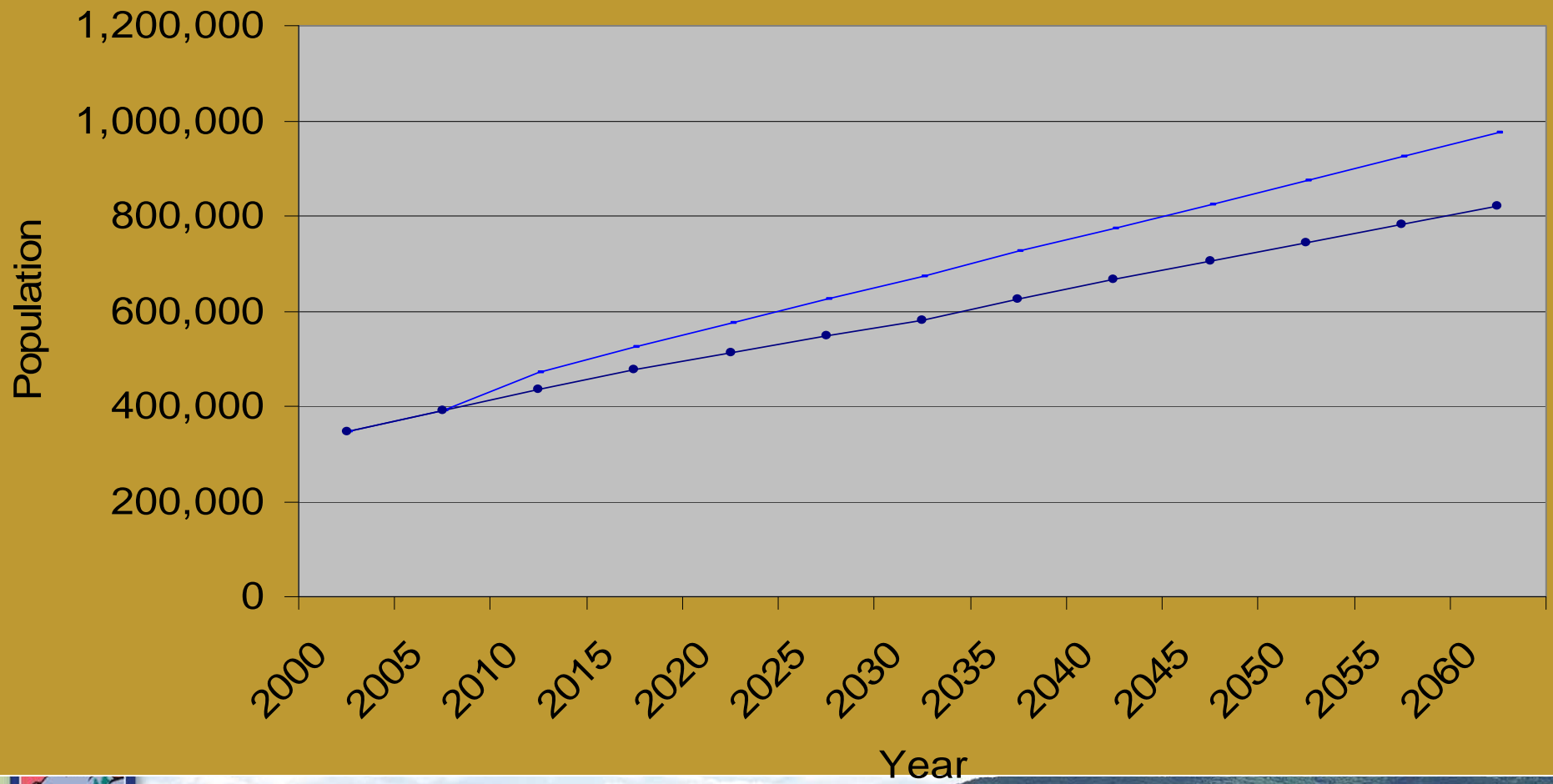
unincorporated



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# Clark County Population Forecast

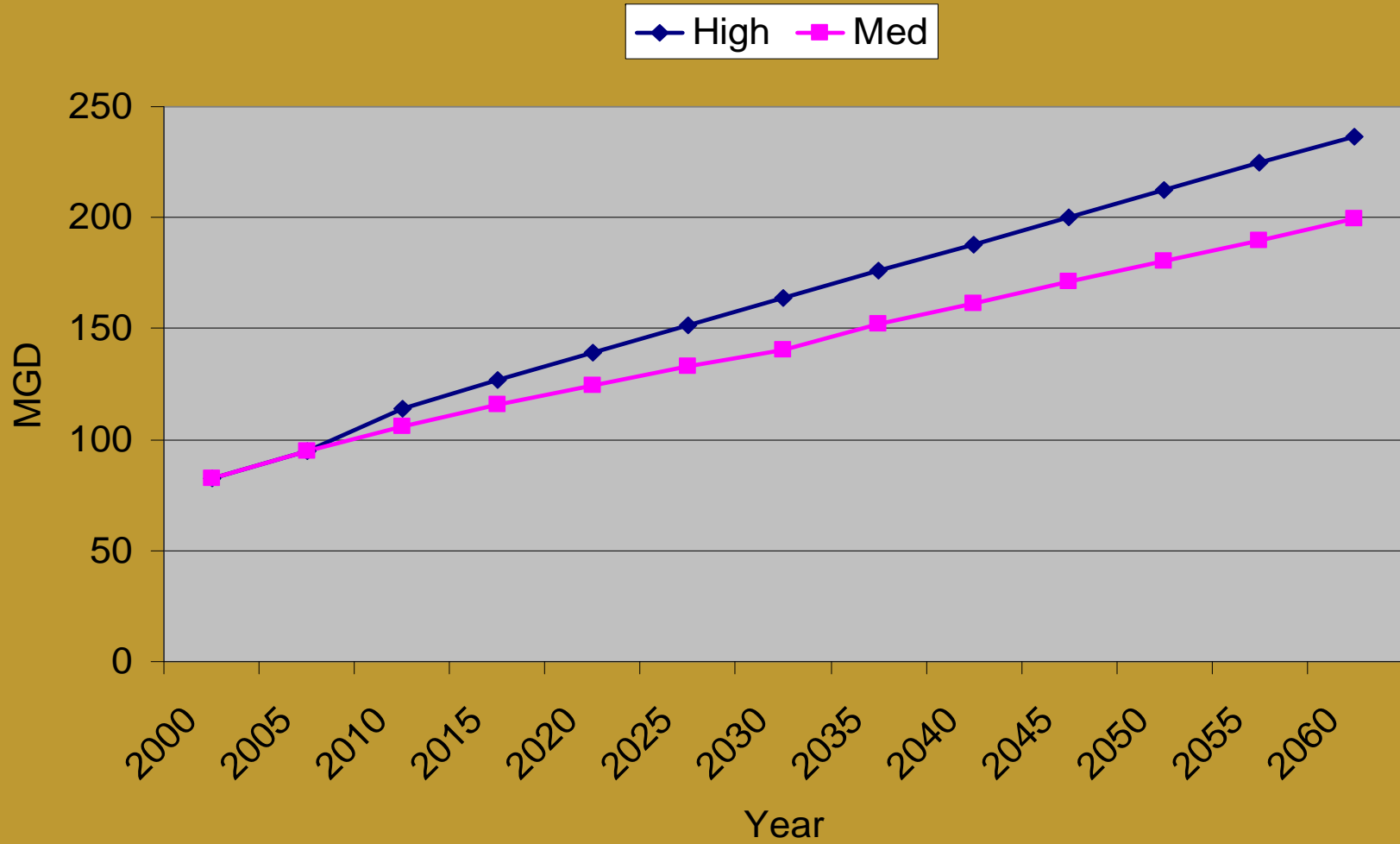
High Med



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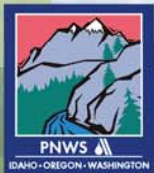


# Clark County Municipal Demand Projections - Peak Day



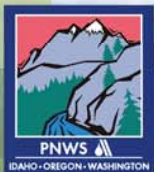
# Average Day Municipal Demand (mgd)

Year	CPU, BG & Ridgefield	Vancouver	County Wide*
2000	10.8	25.1	40.7
2020	21.1	33.6	64.5
2050	39.7	52.2	107.3



# Current Annual Water Rights (Primary)

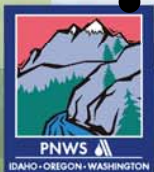
CPU, BG & Ridgefield	14.4 mgd	16,088 af/yr
Vancouver	30.9 mgd	34,615 af/yr
County-Wide Municipal	54.5 mgd	61,068 af/yr





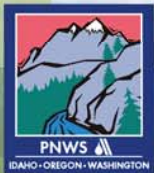
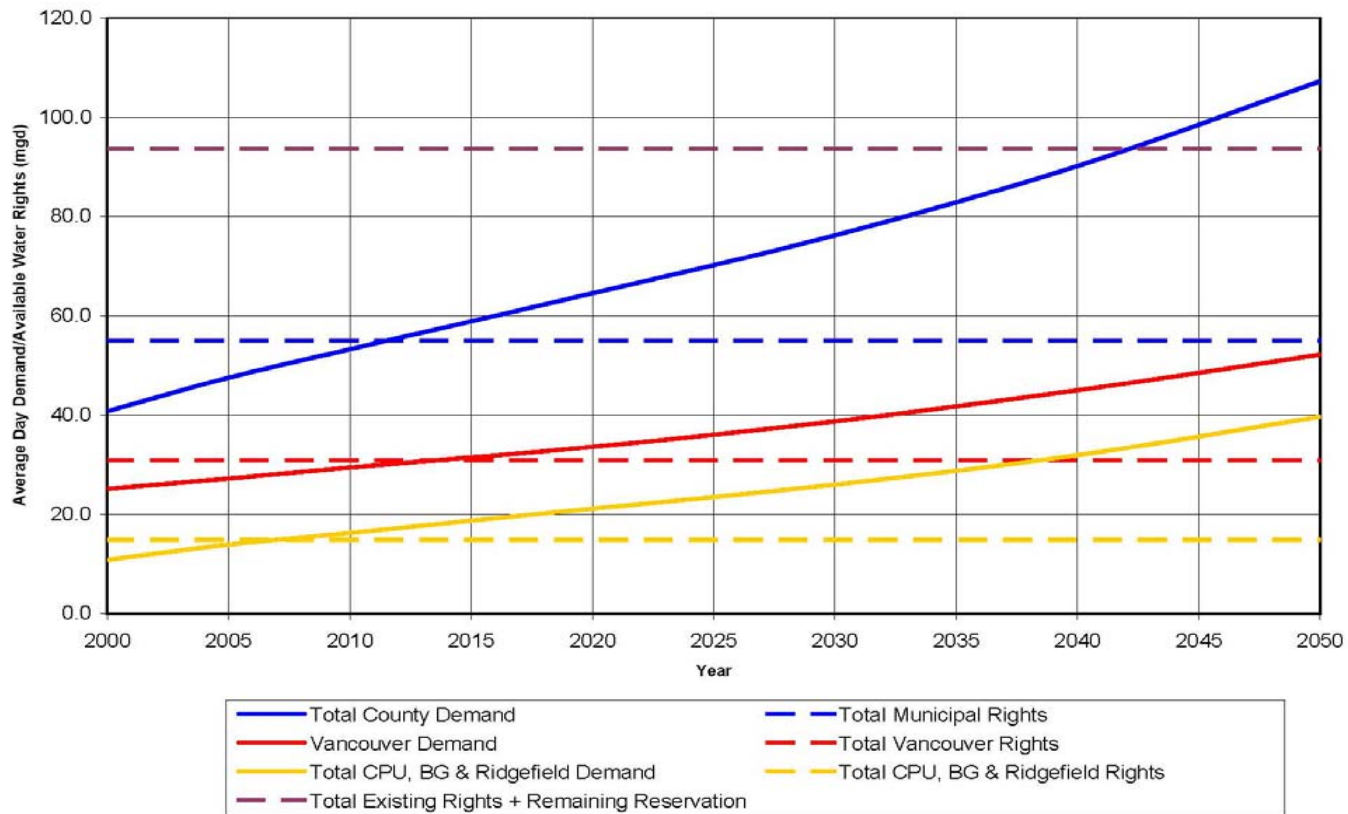
# Clark County Water Right Reservation

- Reserves Groundwater within Clark County for Future Public Use (WAC 173-592)
- Future Municipal Rights have Priority Date of August 13, 1986
- WAC 173-152-90: Policy of Department to protect quality; discourage contamination or impair beneficial use
- Reservation includes 97,000 gpm and 65,300 af/yr
- Current Allocations include 28,735 gpm and 21,887 af/yr
- Remaining Reserves include 68,265 gpm and 43,413 af/yr (38.7 mgd)



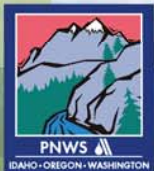
# Projected Average Day Water Demand versus Available Water Rights

Projected Average Day Water Demand versus Available Water Rights



# Principal Supply Aquifers

- Recent Alluvial Aquifer (RAA)
- Pleistocene Alluvial Aquifer (PAA)
- Upper Troutdale Aquifer (UTA)
- Lower Troutdale Aquifer (LTA)
- Sand and Gravel Aquifer (SGA)





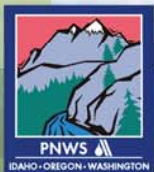
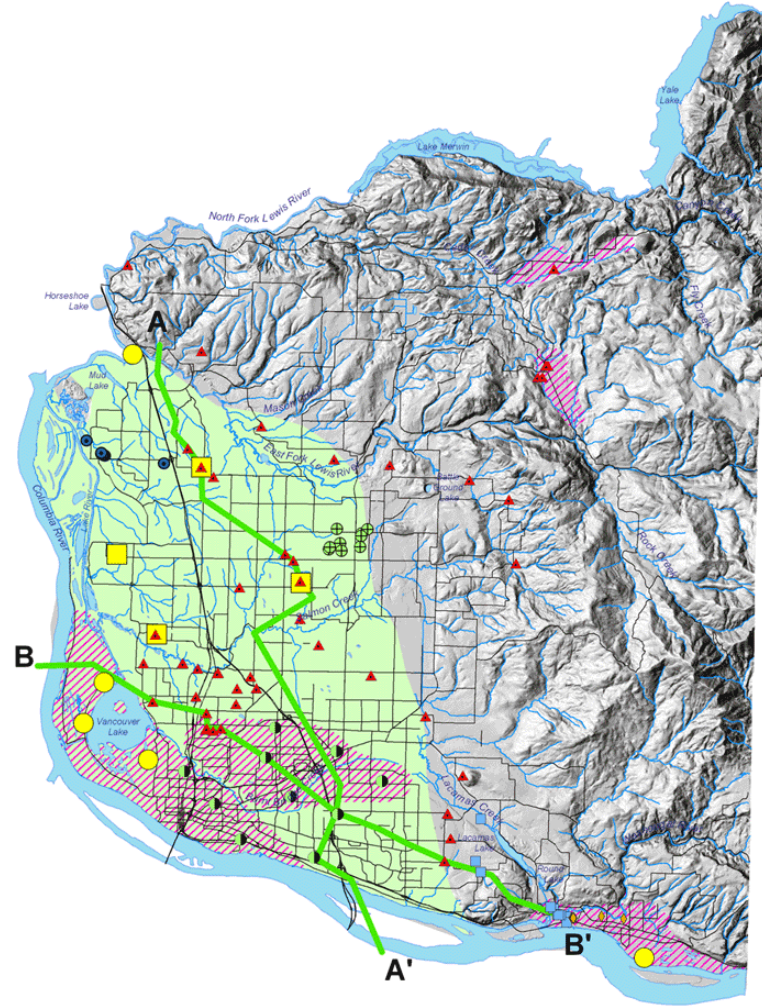
# Aquifer Occurrence

## Existing Public Supply Wells

- ⊕ Battleground Wells
- Camas Wells
- ▲ Clark Public Utilities Wells
- Port of Ridgefield Wells
- Vancouver Wells
- ◆ Washougal Wells

## Potential Water Supply Locations

- Lowland Wellfields
- Upland Wellfields
- ↗ Cross Section Alignments
- ☪ Water Bodies
- ~ Streams
- Roads
- Deep Aquifers
- ▨ Shallow Aquifers





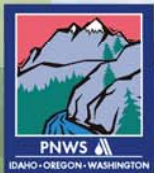
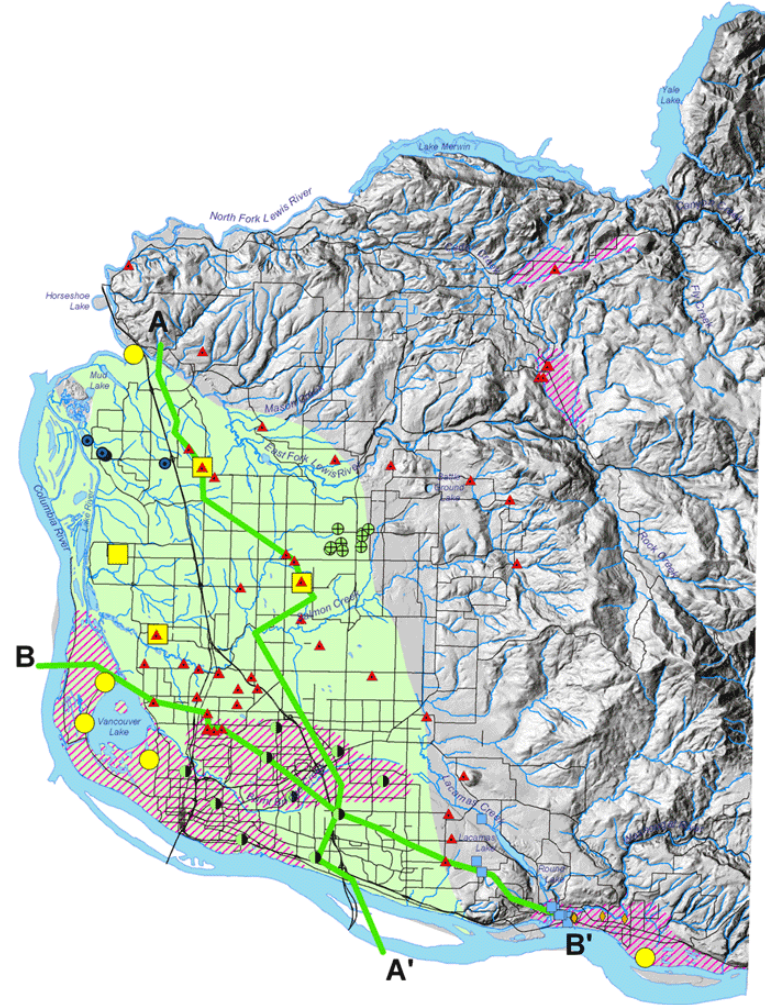
# Distribution of Existing Municipal Supply Sources

## Existing Public Supply Wells

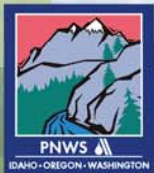
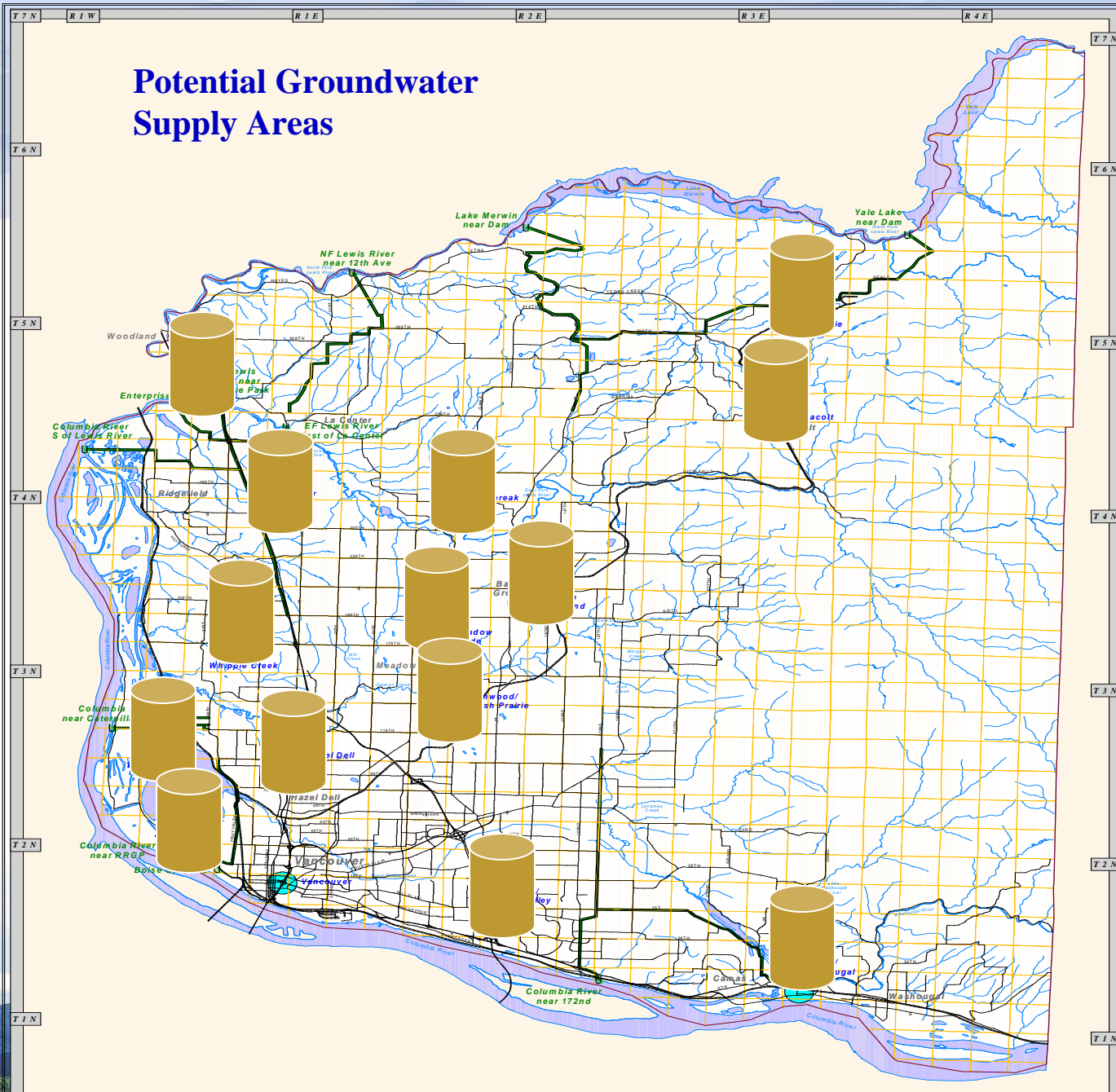
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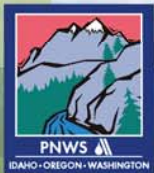
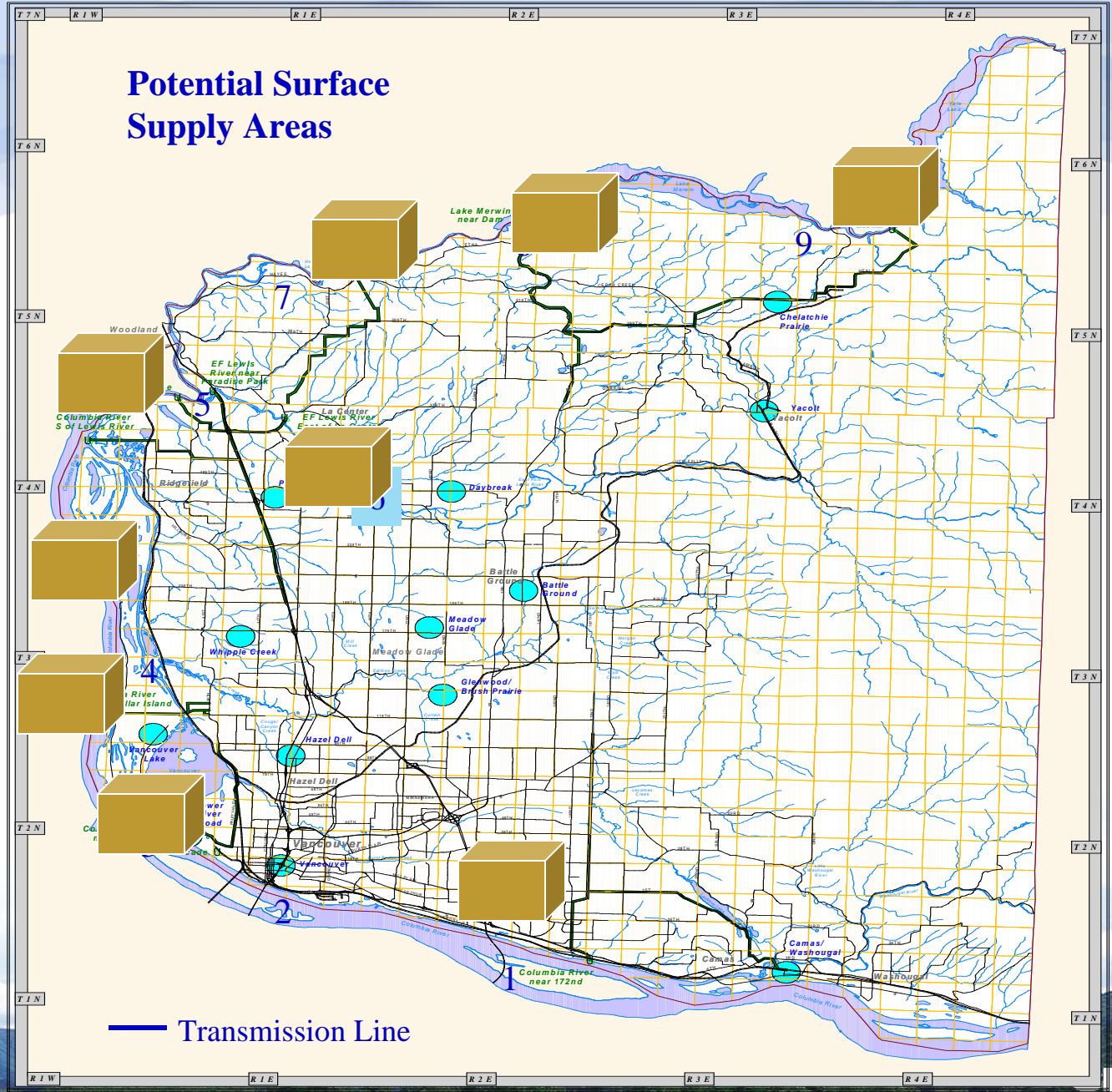


# Potential Groundwater Supply Areas



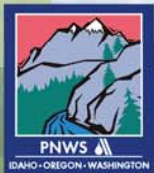


# Potential Surface Supply Areas



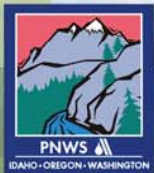
## WRIA 27/28 Watershed Plan Policies

- New Water Supplies should Avoid or Minimize Impacts to Stream Flow
- Regional Planning for Water Supply is Strongly Encouraged
- Impacts to Upland Streams must be Mitigated
- Focus Future Development in Tidally Influenced Lowland Areas and Deep Aquifers



# Future Supply Considerations

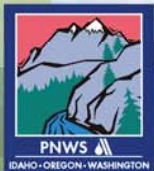
- ESA Issues Limit Further Use of Shallow Upland Aquifers
- Deep Aquifer are Recharge Limited
- Future Demand must be met through Use of Shallow Lowland Supply Sources





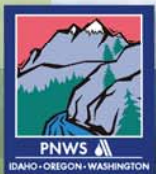
# Potential Future Supply Options/Areas

- SGA – Uplands (North of Salmon Creek)
- SGA - Vancouver Lake Lowlands
- PAA – Lewis River Lowlands
- PAA – Steigerwald Wildlife Refuge
- PAA – Westside Vancouver Lake
- PAA – South Lake Area



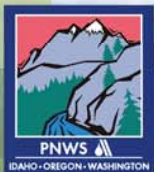
## SGA – Uplands (North of Salmon Creek)

- Potential for Impacts to the East Fork Lewis River (mitigation required)
- Fe/Mn Treatment Costs
- Total Additional Yield likely < 5 mgd



## SGA - Vancouver Lake Lowlands

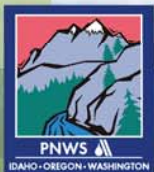
- Fe/Mn Treatment Costs
- Total Additional Yield likely > 10 mgd
- Yield and WQ need to be confirmed through Testing
- Avoids Impacts to Port Cleanup





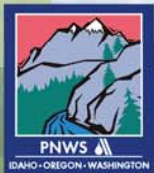
## PAA – Lewis River Lowlands

- Yield Potential Unknown (hydrogeologic setting suggests < 10 mgd)
- Fe/Mn Treatment Likely Required
- Located within Tidally Influenced Area
- Remote from Area of Highest Demand and Growth
- Transmission Infrastructure Costs are High



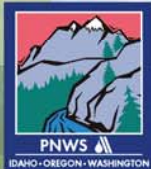
## PAA – East County

- Yield Potential Unknown (hydrogeologic setting would suggest high yield potential)
- Water Quality Unknown (hydrogeologic setting would suggest elevated Fe, Mn)
- Infrastructure Costs Limit Use as Regional Source (lengthy transmission pipeline required to reach CPU service area)
- May be suitable to meet long-term needs of Camas & Washougal



## PAA – Westside Vancouver Lake

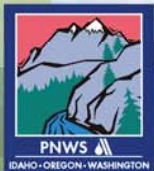
- Productive Supply Area (> 50 mgd)
- Natural Water Quality Exhibits High Mineral Content (Fe, Mn, As, Hardness)
- Higher Infrastructure Costs for Treatment and Transmission
- Higher O&M Cost
- Sensitive Area designation Complicates Development
- Plume Containment will be required for Development of Large Water Supplies





## PAA – South Lake Area

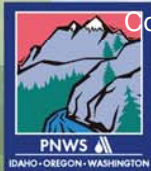
- Most Productive Supply Area in Clark County (> 50 mgd)
- Preferred Site considering WQ
  - Natural WQ Exhibits Low Mineral Content
  - WQ Meets SDWA req'ts untreated
  - WQ safeguard via VOC treatment
- Preferred Site considering Environmental Reg's
- Preferred Site considering Cost
  - Proximate to demand area
- Plume Containment is the Issue Impacting Development of New Water Supply



# Supply Options Cost Summary

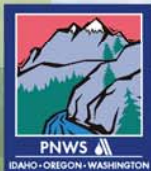
Option Number	Source	Capacity MGD	Total Capital Costs	Annualized Capital Cost	Annual O&M	Cost/MG	Cost/CCF	50 year cost
Groundwater:								
1	SGA-Uplands	5	\$6,979,500	\$ 633,434	\$ 90,180	\$ 793	\$ 0.59	\$ 11,488,500
2	SGA-Van. Lake Lowlands	10	\$12,340,350	\$ 1,119,966	\$ 180,360	\$ 713	\$ 0.53	\$ 21,358,350
3	PAA-Lewis River Lowlands	10	\$15,160,500	\$ 1,375,912	\$ 180,360	\$ 853	\$ 0.64	\$ 24,178,500
4	PAA-Steigerwald	25	\$54,189,000	\$ 4,917,998	\$ 450,900	\$ 1,177	\$ 0.88	\$ 76,734,000
Subtotals for Options 1 - 4		50						\$ 133,759,350
5	PAA-Westside Van. Lake	50	\$72,994,500	\$ 6,624,718	\$ 1,594,350	\$ 901	\$ 0.67	\$ 152,712,000
6	PAA-South Lake	50	\$35,629,875	\$ 3,233,639	\$ 928,800	\$ 456	\$ 0.34	\$ 82,069,875
Surface Water:								
7	Columbia River Near 172nd	50	\$116,286,300	\$ 10,553,725	\$ 3,277,260	\$ 1,516	\$ 1.13	\$ 280,149,300
8	Columbia River Near RRGP	50	\$108,009,720	\$ 9,802,573	\$ 3,277,260	\$ 1,433	\$ 1.07	\$ 271,872,720
9	Columbia River Near Catepillar Island	50	\$101,166,435	\$ 9,181,501	\$ 3,277,260	\$ 1,365	\$ 1.02	\$ 265,029,435
10	Columbia River S. of Lewis River Confluence	50	\$106,276,320	\$ 9,645,256	\$ 3,277,260	\$ 1,416	\$ 1.06	\$ 270,139,320
11	Lower Lewis River	50	\$98,529,075	\$ 8,942,144	\$ 3,277,260	\$ 1,339	\$ 1.00	\$ 262,392,075
12	Lake Meridian near Dam	50	\$69,458,175	\$ 6,303,774	\$ 4,211,218	\$ 1,152	\$ 0.86	\$ 280,019,088
13	Yale Reservoir near Dam	50	\$80,524,598	\$ 7,308,122	\$ 4,211,218	\$ 1,262	\$ 0.94	\$ 291,085,510

Cost estimates are preliminary and subject to further refinements.



# CPU Supply Strategy

- Short-Term Supply Options:
  - Continued Development of SGA Supply Sources
    - Sara Area Sources
    - Mitigation via Water Right Acquisition
  - Exploration of Lewis River Lowland Source
    - Tidal Zone
  - Interim Options *may* be Sufficient to meet 10 to 15-Year Growth Needs
- Long-Term Supply Option: South Lake Area
  - Testing, Permitting
  - Containment of Port's Contamination





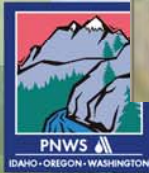


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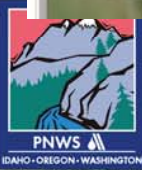
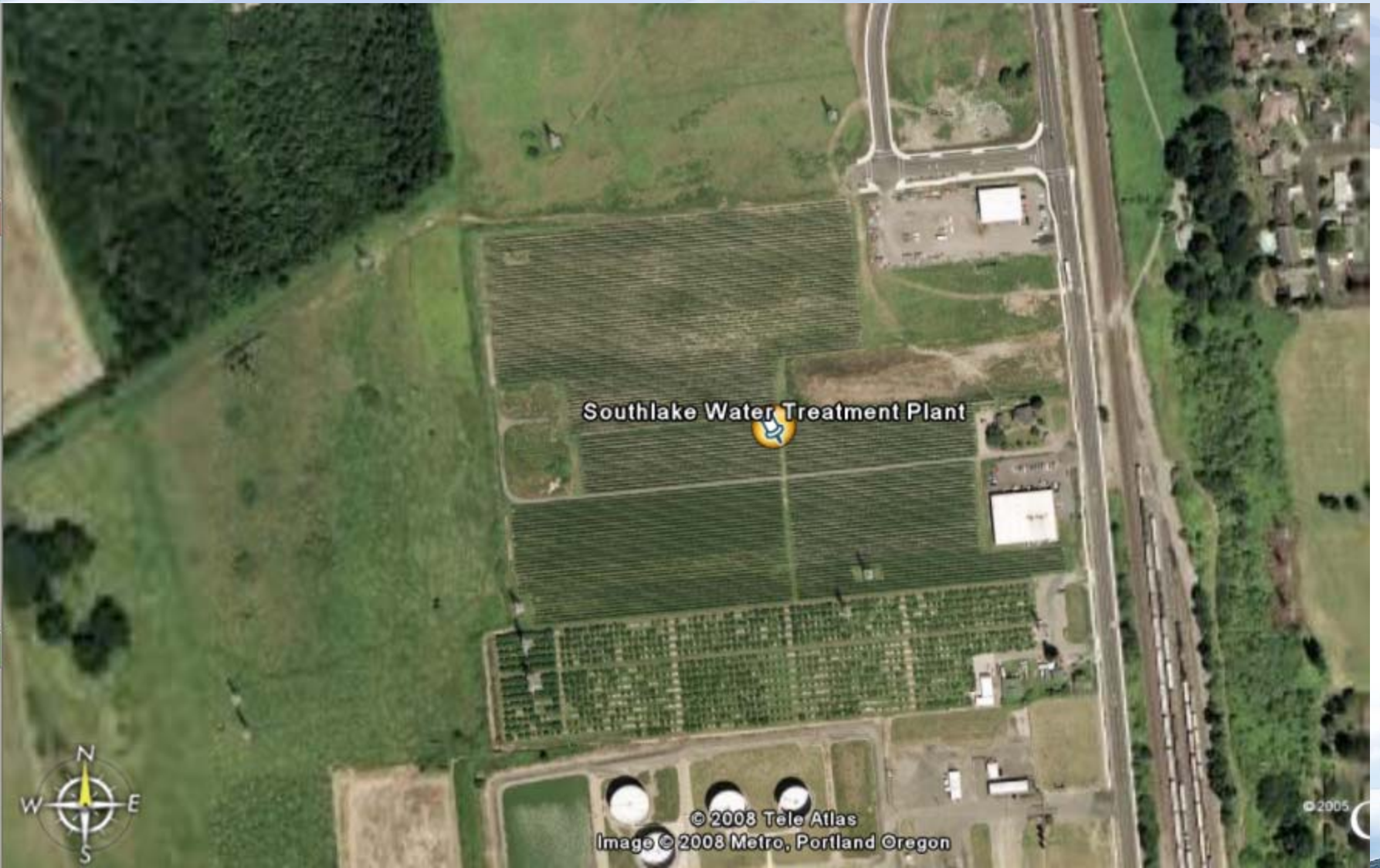
Figure 7-1  
Conceptual Layout of



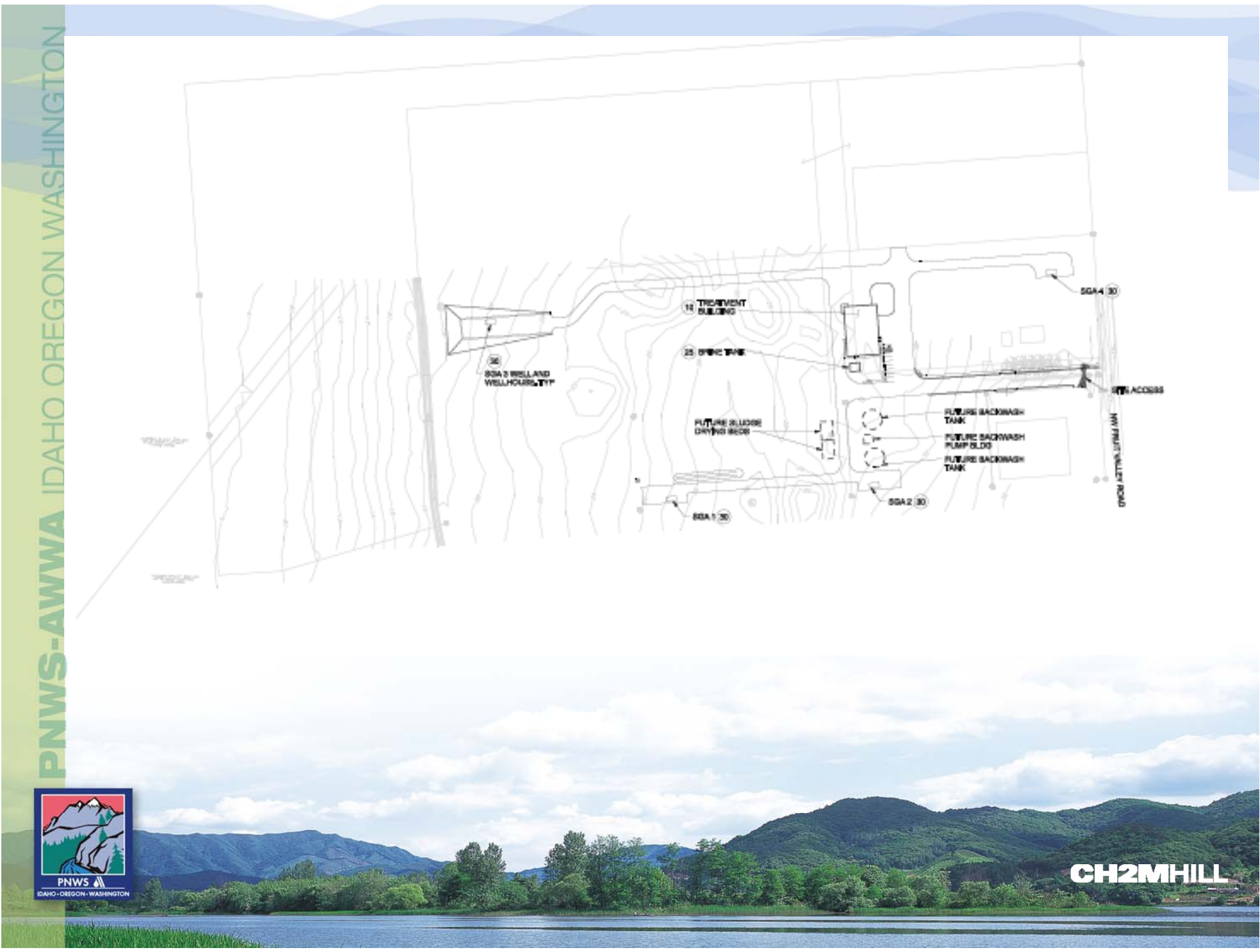
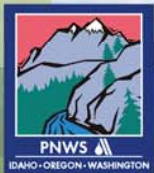
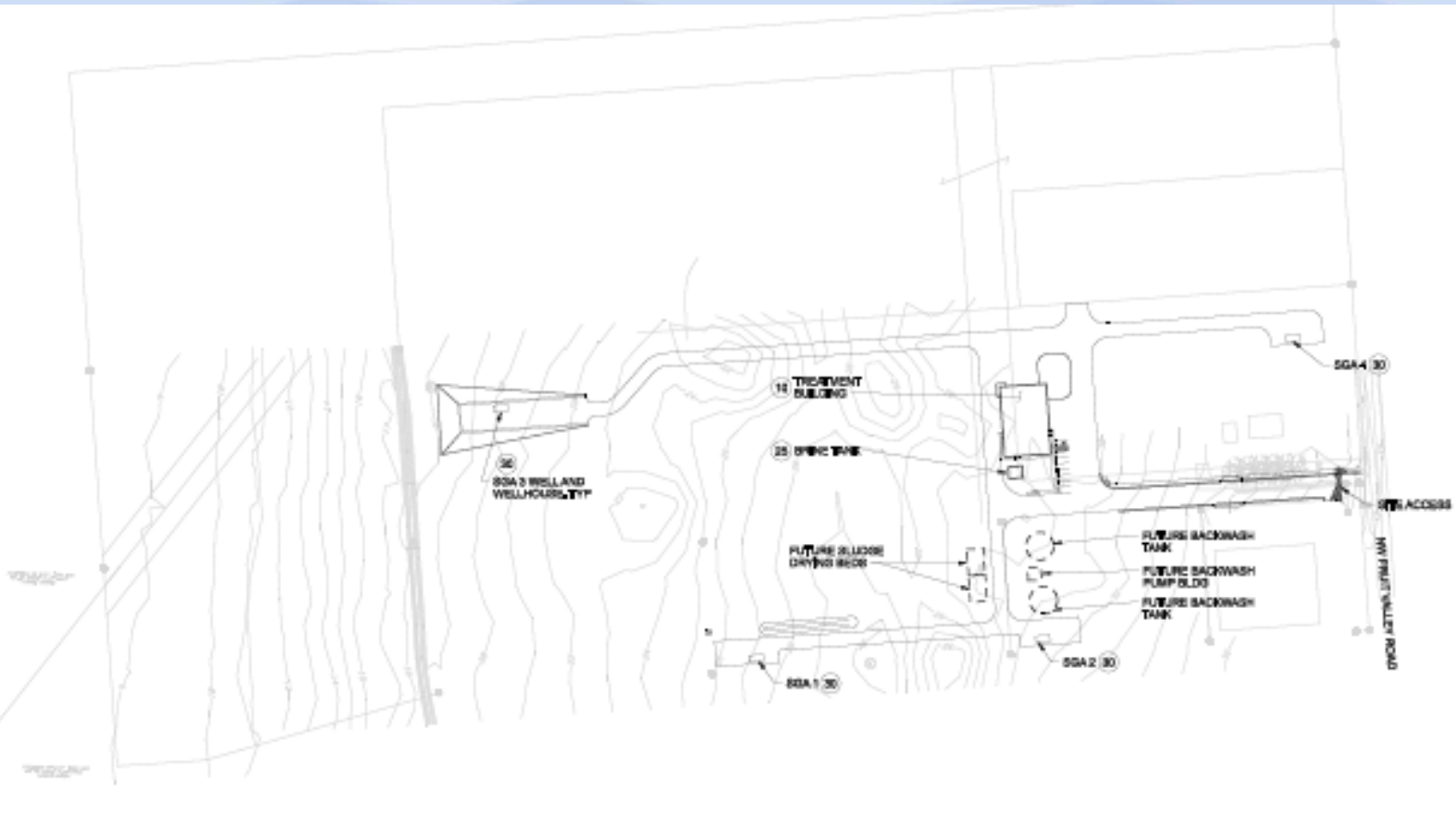




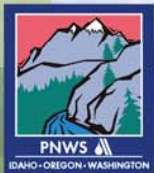
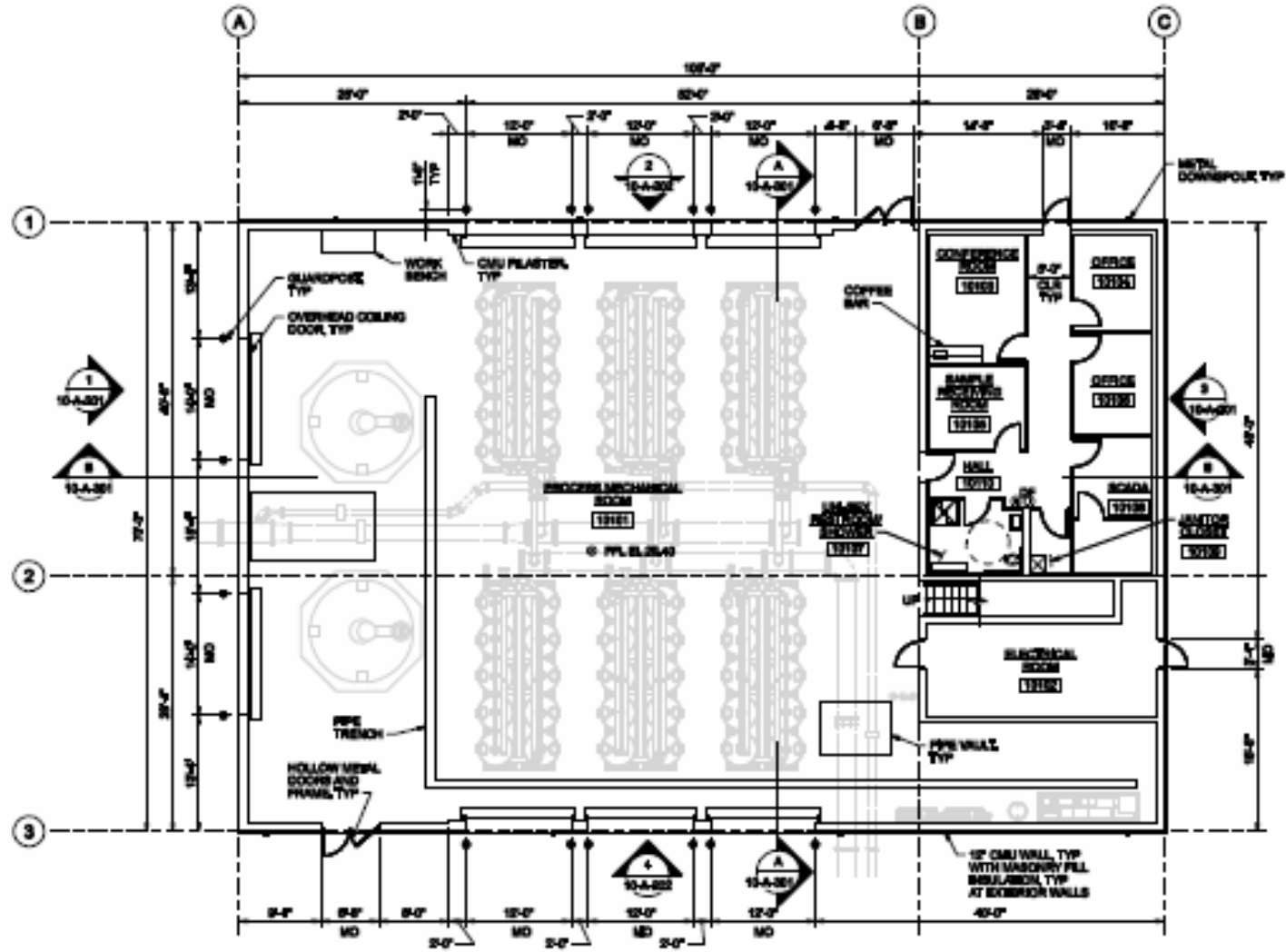










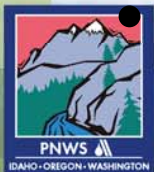




# Key Issues for South Lake Development

- Timeframe & Method for Cleanup needs to be Established
- Regulatory Decisions on Source Control may greatly influence Cleanup Timeframes
- Uncertainties in Cleanup Timeframes need to be Considered
- State needs to Establish Containment Requirements for Contamination
- Future Withdrawals must be Considered (Vancouver, CPU, Port, Alcoa, Other Privates)

Who is Responsible for Containment?





Questions?

