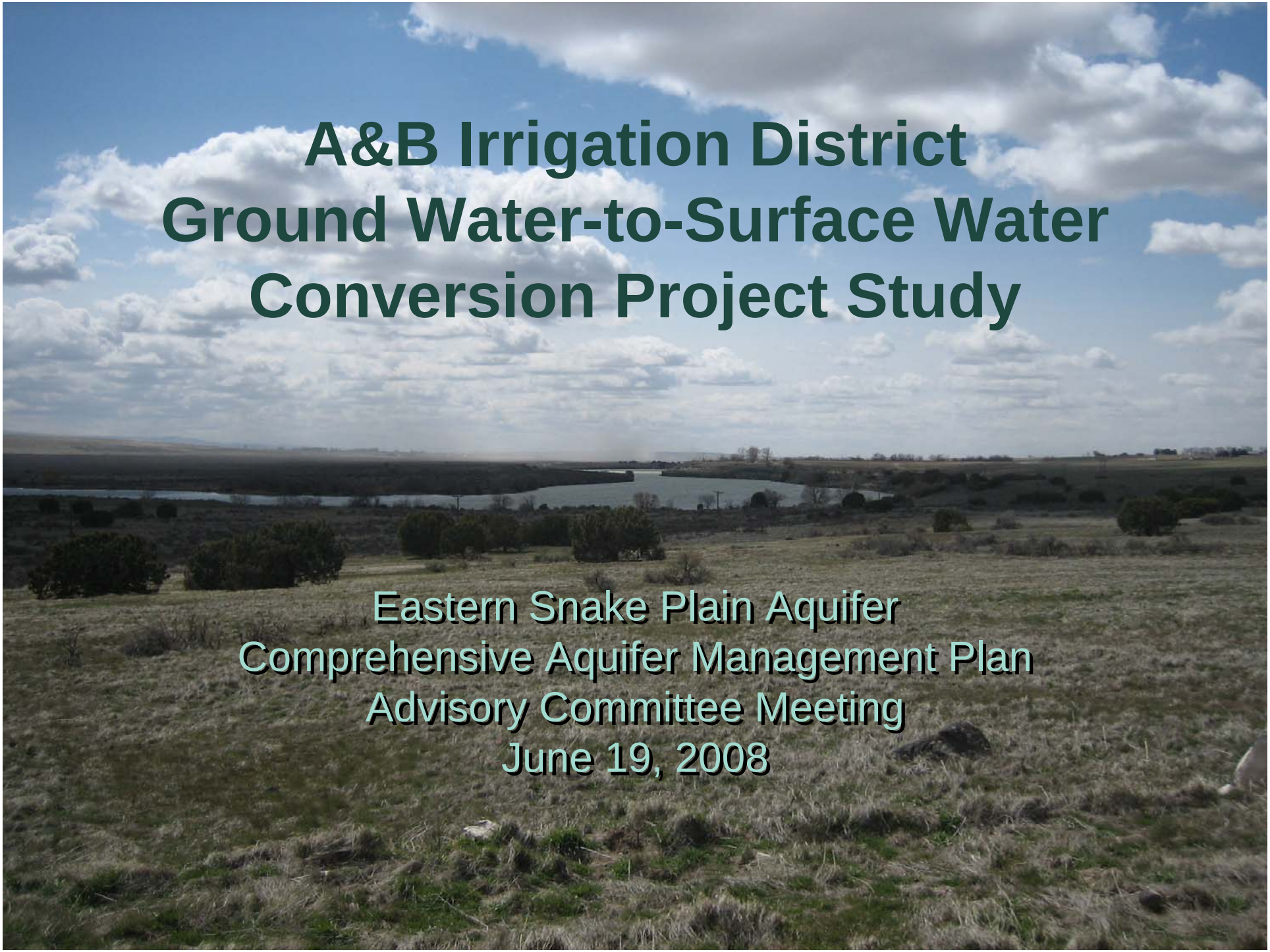


A&B Irrigation District Ground Water-to-Surface Water Conversion Project Study

Eastern Snake Plain Aquifer
Comprehensive Aquifer Management Plan
Advisory Committee Meeting
June 19, 2008

Introduction

- Conceptual Study
  - Evaluated conceptual alternatives for conversion of Unit B of the A&B Irrigation District from ground water to surface water
  - Prepared Class 5 cost opinion for recommended alternative
- Assumptions
  - Surface water supply will be available from the Snake River to *completely* replace ground water currently delivered to Unit B
  - Unit B maximum demand of 1,000 cfs

Ground Water Production Records (1995-2007)

Appendix A: Ground Water Production Records Summary

	April-May	May-June	June-July	July-Aug	Aug-Sept	Sept-Oct	Annual Usage
1995	5331	11817	43589	44418	34859	20206	160220
1996	19586	24239	52904	41925	33985	17551	190190
1997	14651	38026	48221	32921	27993	12459	174271
1998	12221	14501	45177	41710	34523	12122	160254
1999	3640	28095	52141	41365	30350	19427	175018
2000	22483	41521	53126	41272	32145	16541	207088
2001	16859	41039	52005	40698	32249	13518	196368
2002	11718	33966	52075	38324	31859	14692	182635
2003	1876	38948	53315	41491	30861	16570	183059
2004	23724	35526	48892	35384	25346	13049	181921
2005	1552	15740	46312	39608	33856	13095	150163
2006	7625	30409	49855	39567	35167	9903	172525
2007	17082	38278	51245	36188	32041	9001	183834
AVG	**12181**	**30162**	**49912**	**39605**	**31941**	**14472**	**178273**
MAX	**23724**	**41521**	**53315**	**44418**	**35167**	**20206**	**207088**

** Volumes given in acre-ft*

Conceptual Alternatives

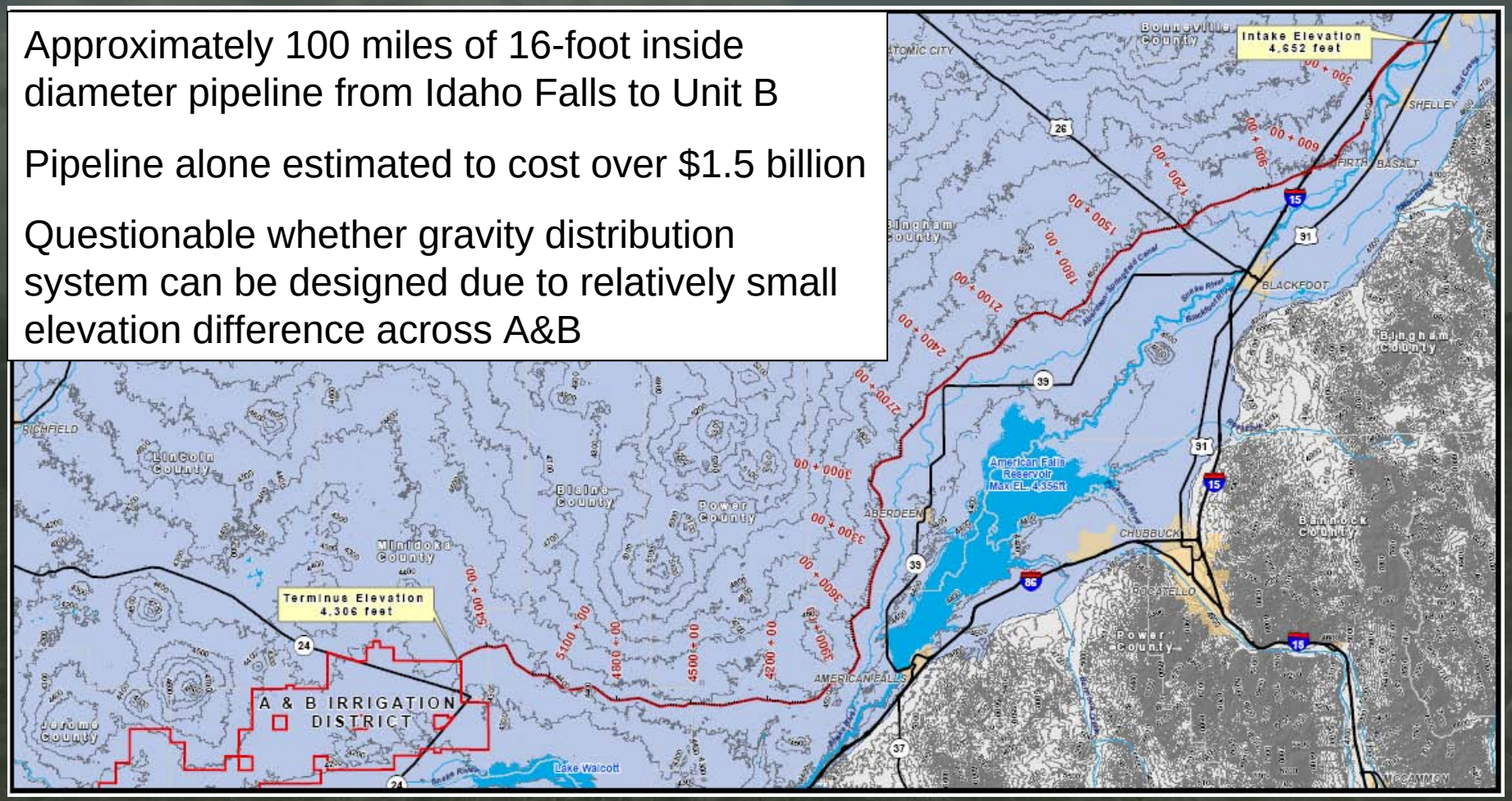
- Alternative 1: Gravity diversion from Snake River
- Alternative 2: Pressurized diversion from Snake River
- Alternative 3: Surface delivery for ground water recharge

Alternative 1: Gravity Diversion

Approximately 100 miles of 16-foot inside diameter pipeline from Idaho Falls to Unit B

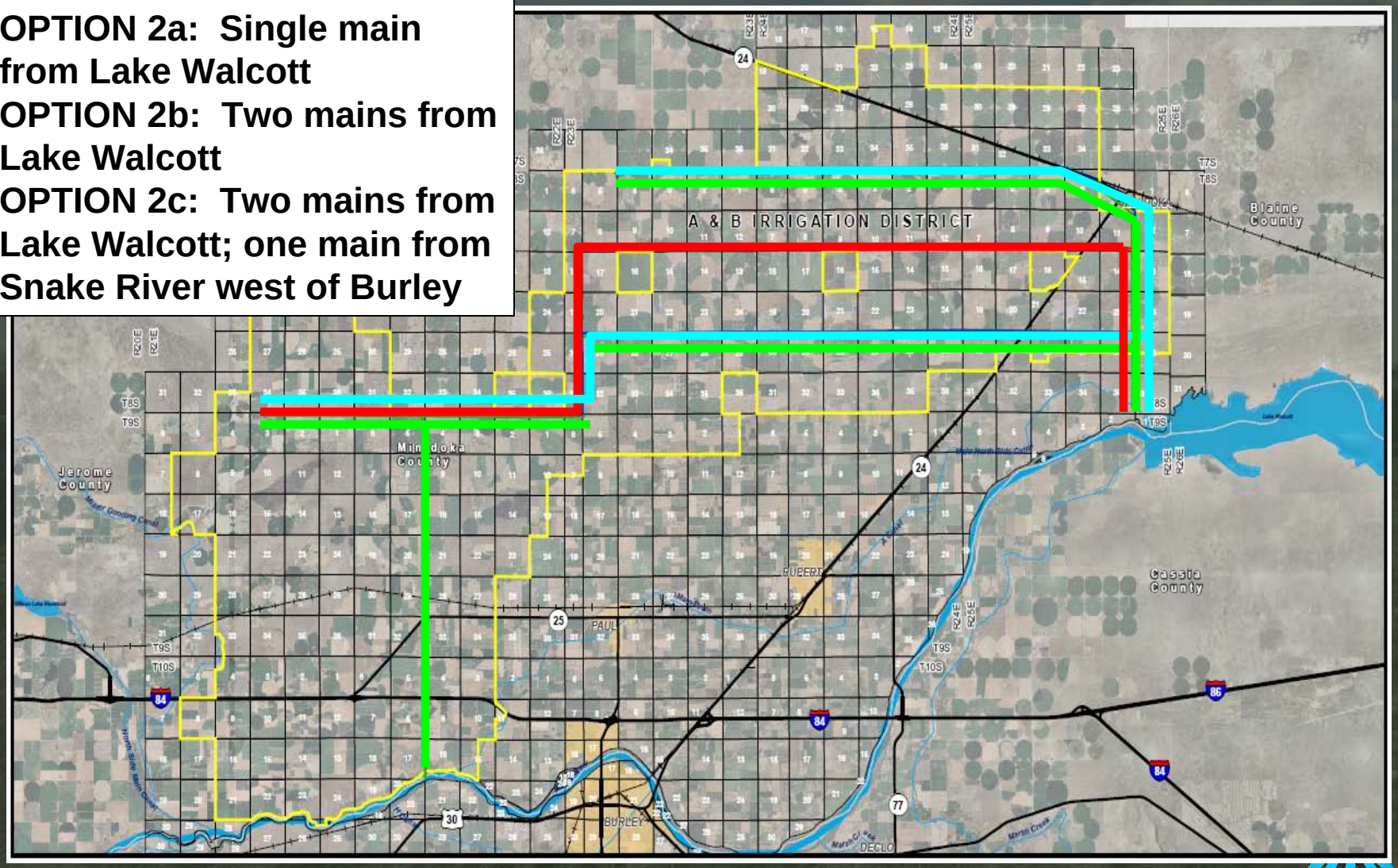
Pipeline alone estimated to cost over $1.5 billion

Questionable whether gravity distribution system can be designed due to relatively small elevation difference across A&B



Alternative 2: Pressurized Diversion

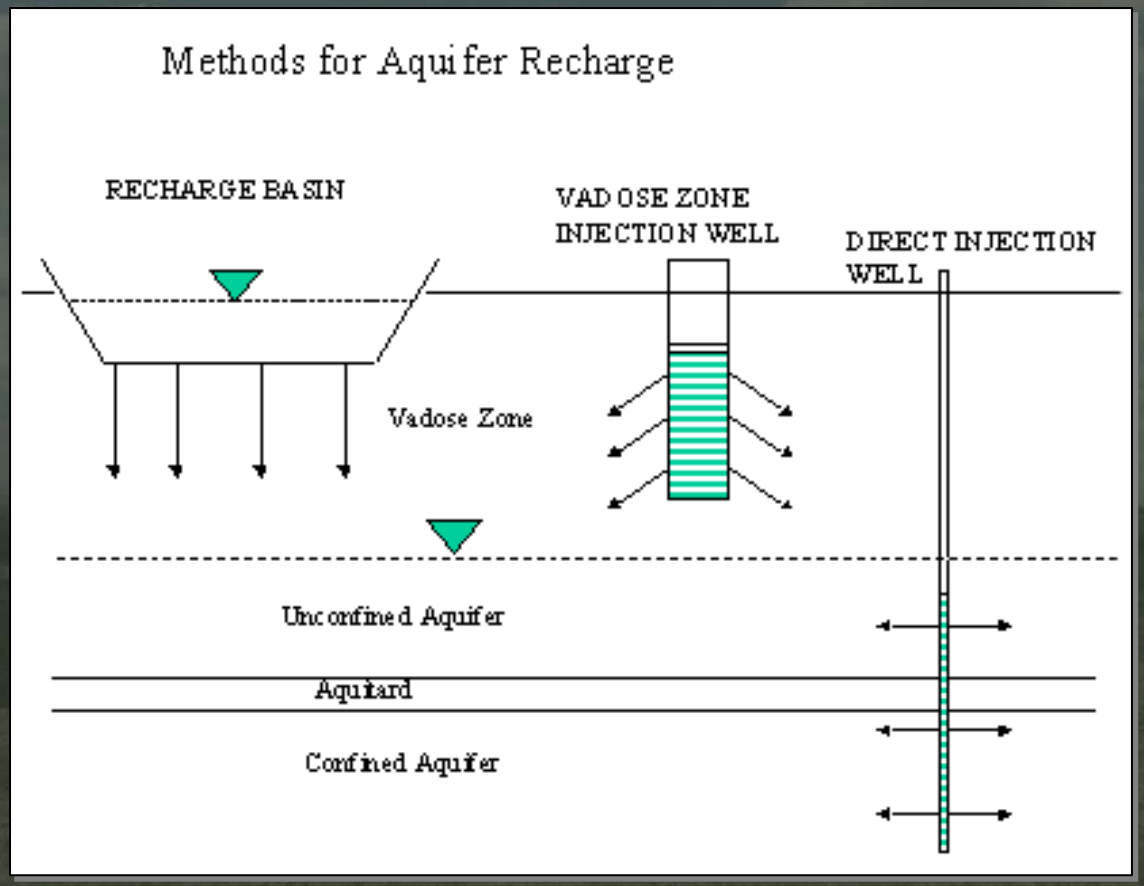
OPTION 2a: Single main from Lake Walcott
OPTION 2b: Two mains from Lake Walcott
OPTION 2c: Two mains from Lake Walcott; one main from Snake River west of Burley



Alternative 2: Pressurized Diversion

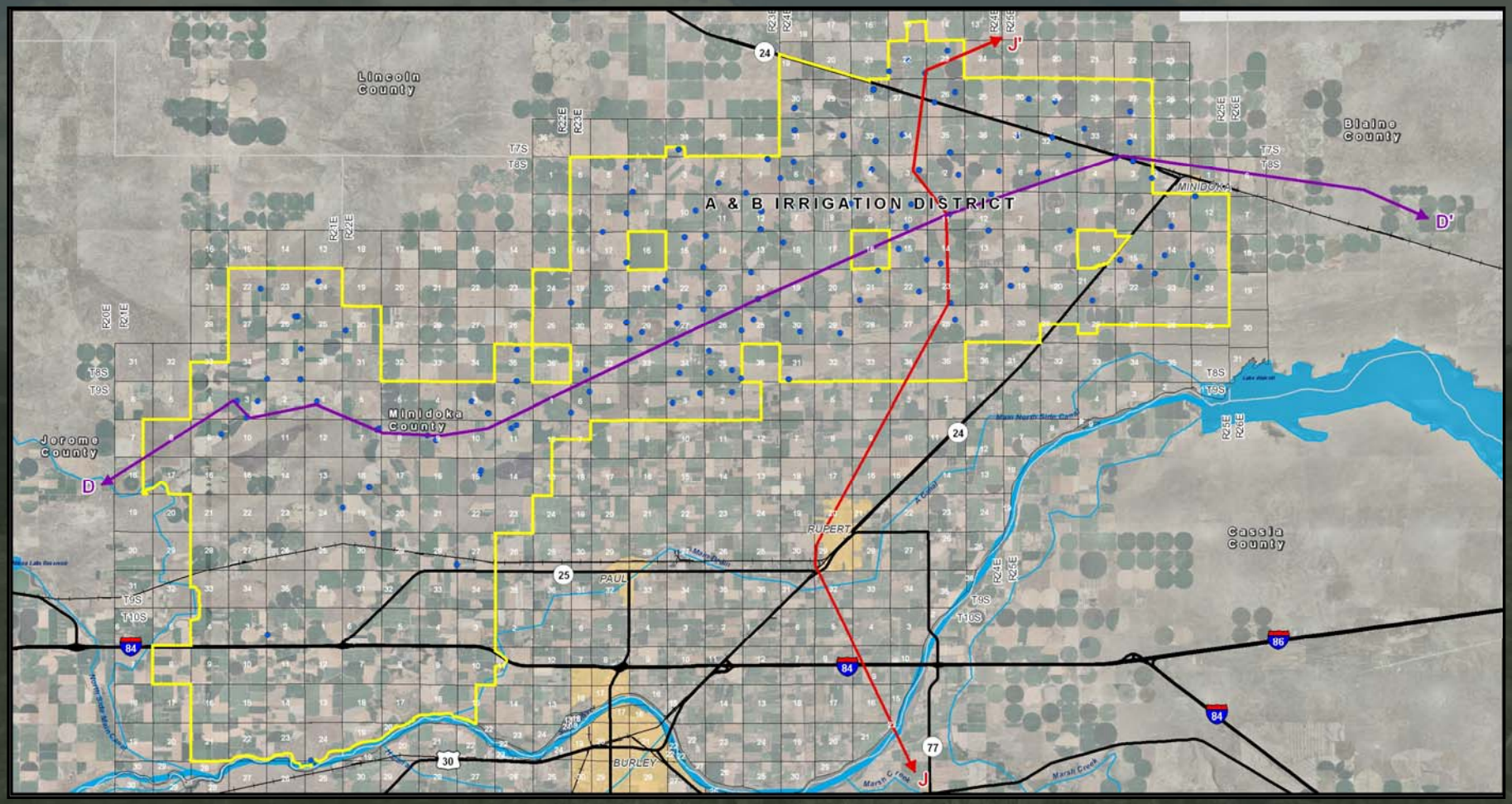
- Preliminary cost comparison of main lines and pump stations for three options fell within 10 percent of each other
- Single main line option would require onsite pipe fabrication
- Dual distribution system option would require additional capital costs
  - Power transmission
  - Additional elevation
  - Right-of-way crossings
- Preferred Option: One Diversion, Two Mains

Alternative 3: Ground Water Recharge

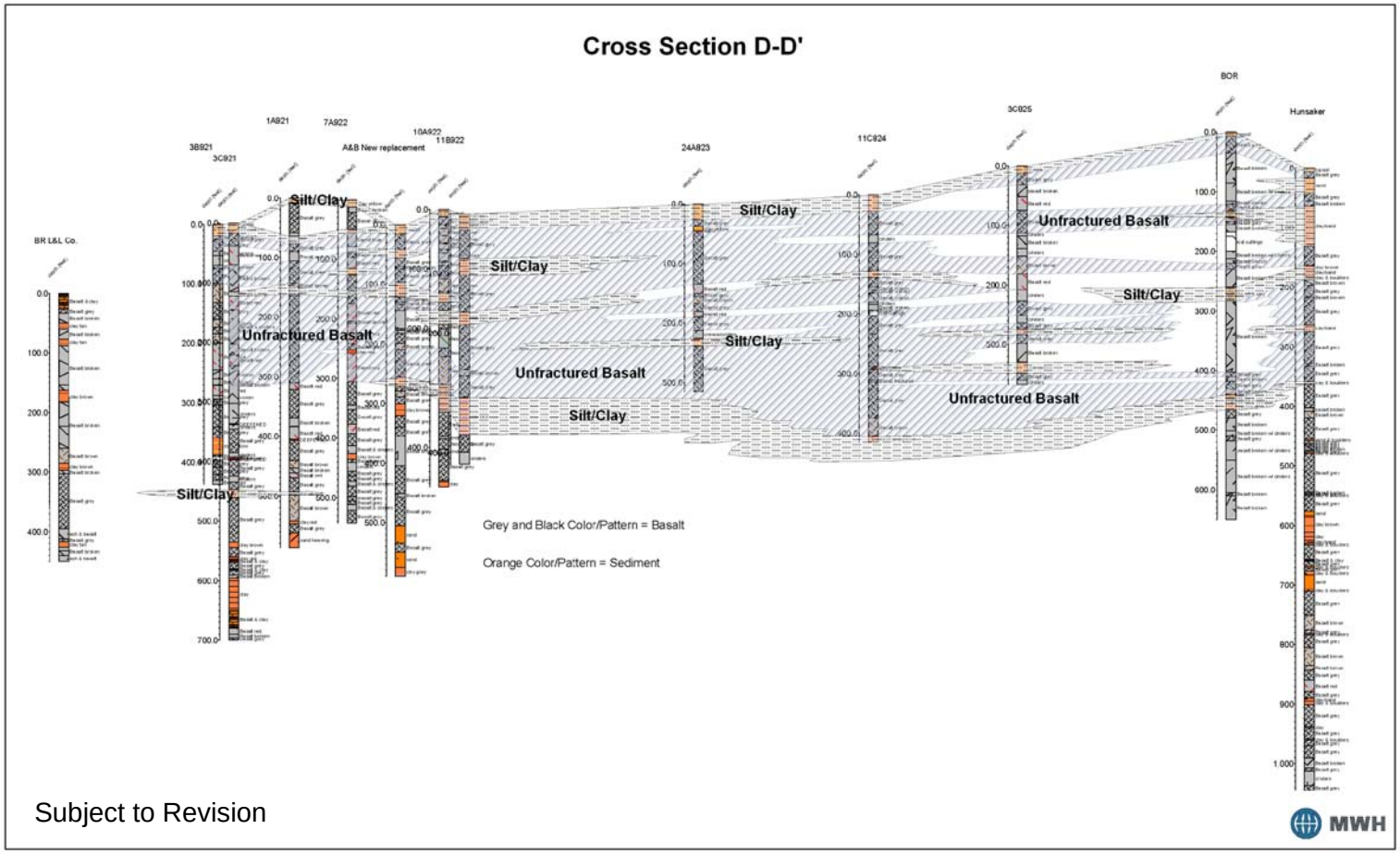


- OPTION 3a: Shallow infiltration basins
- OPTION 3b: Injection into vadose zone wells
- OPTION 3c: Aquifer injection wells

Preliminary Geologic Cross-Sections

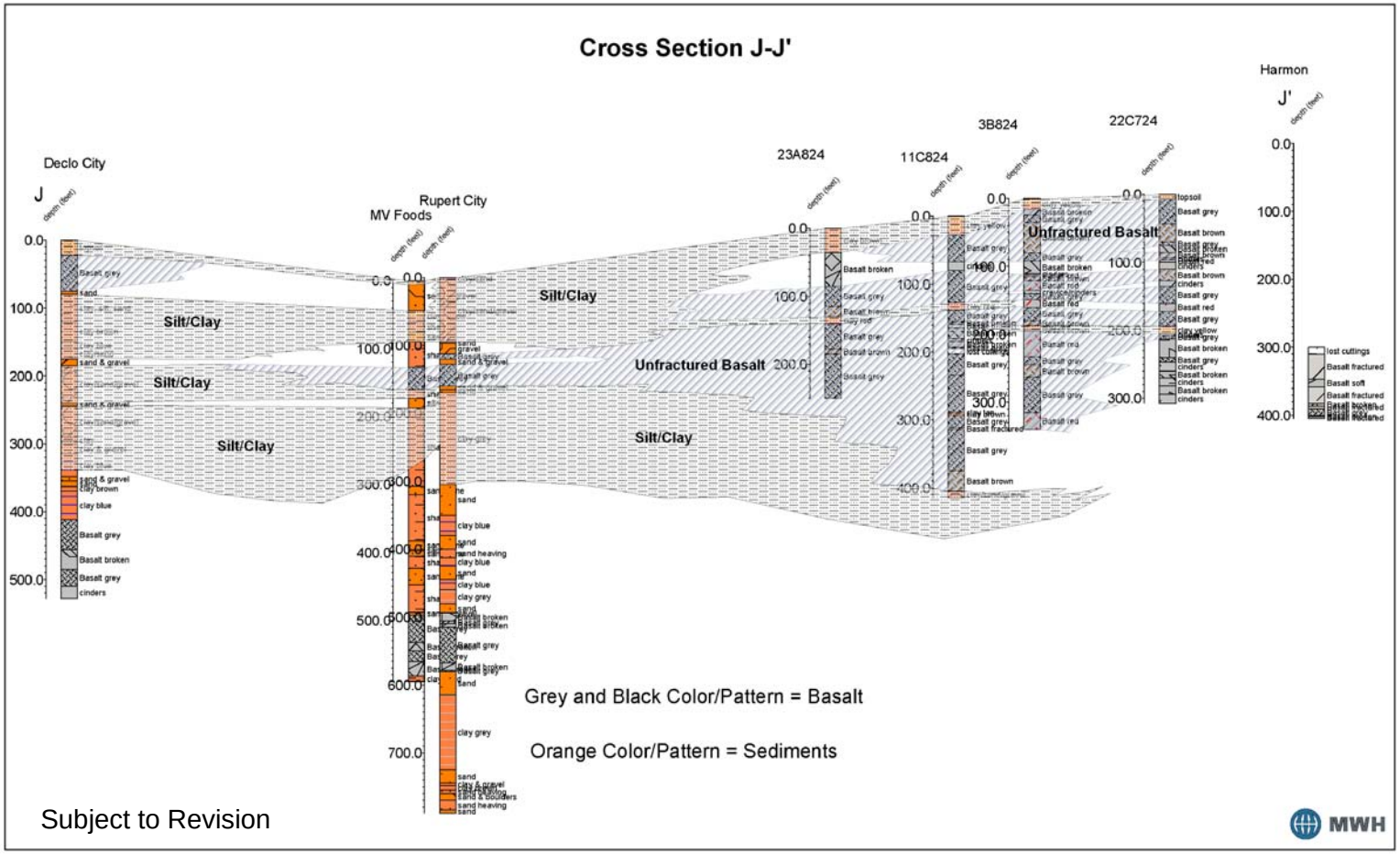


Preliminary Geologic Section D-D'



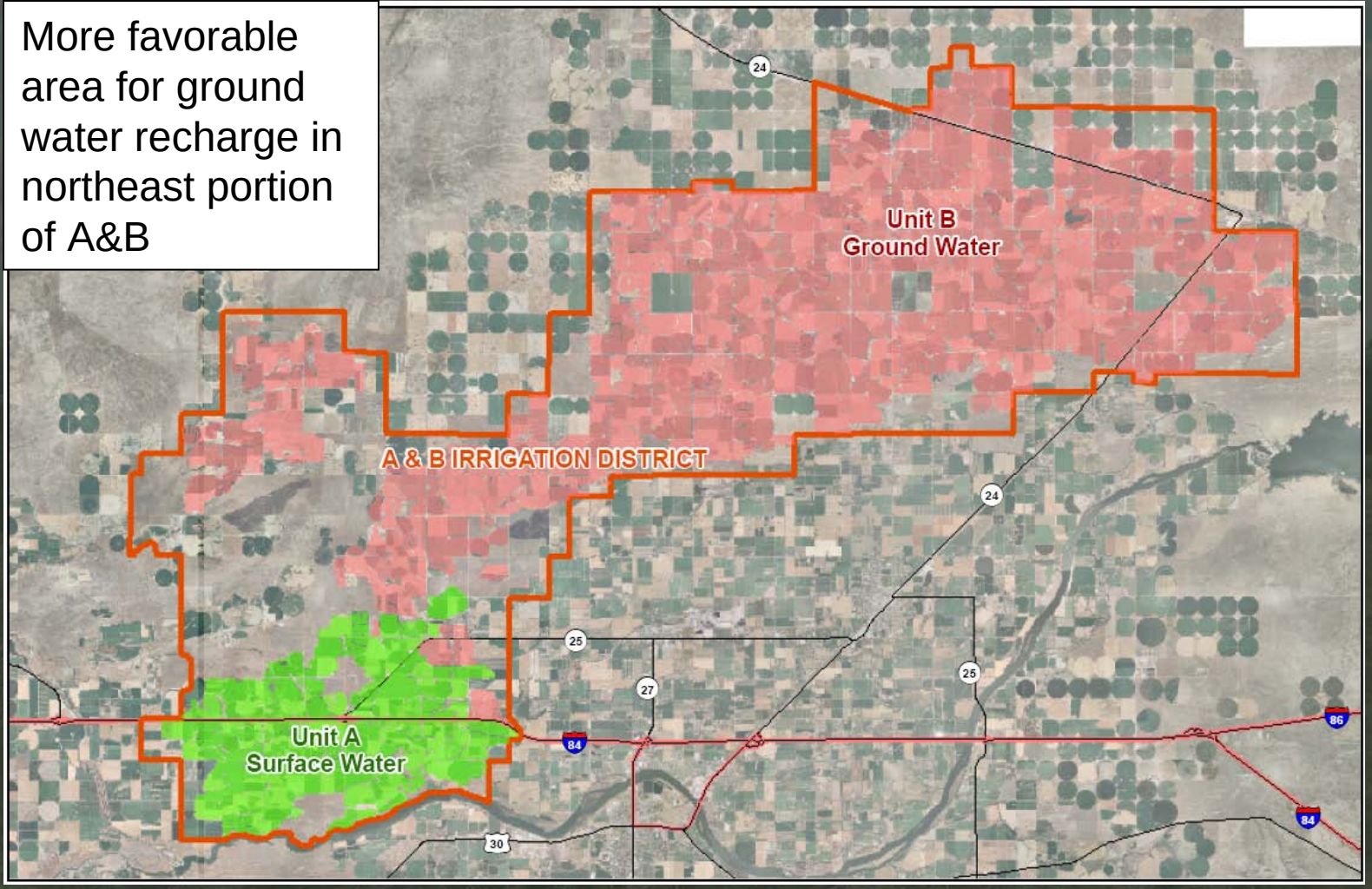
Subject to Revision

Preliminary Geologic Section J-J'



Alternative 3: Ground Water Recharge

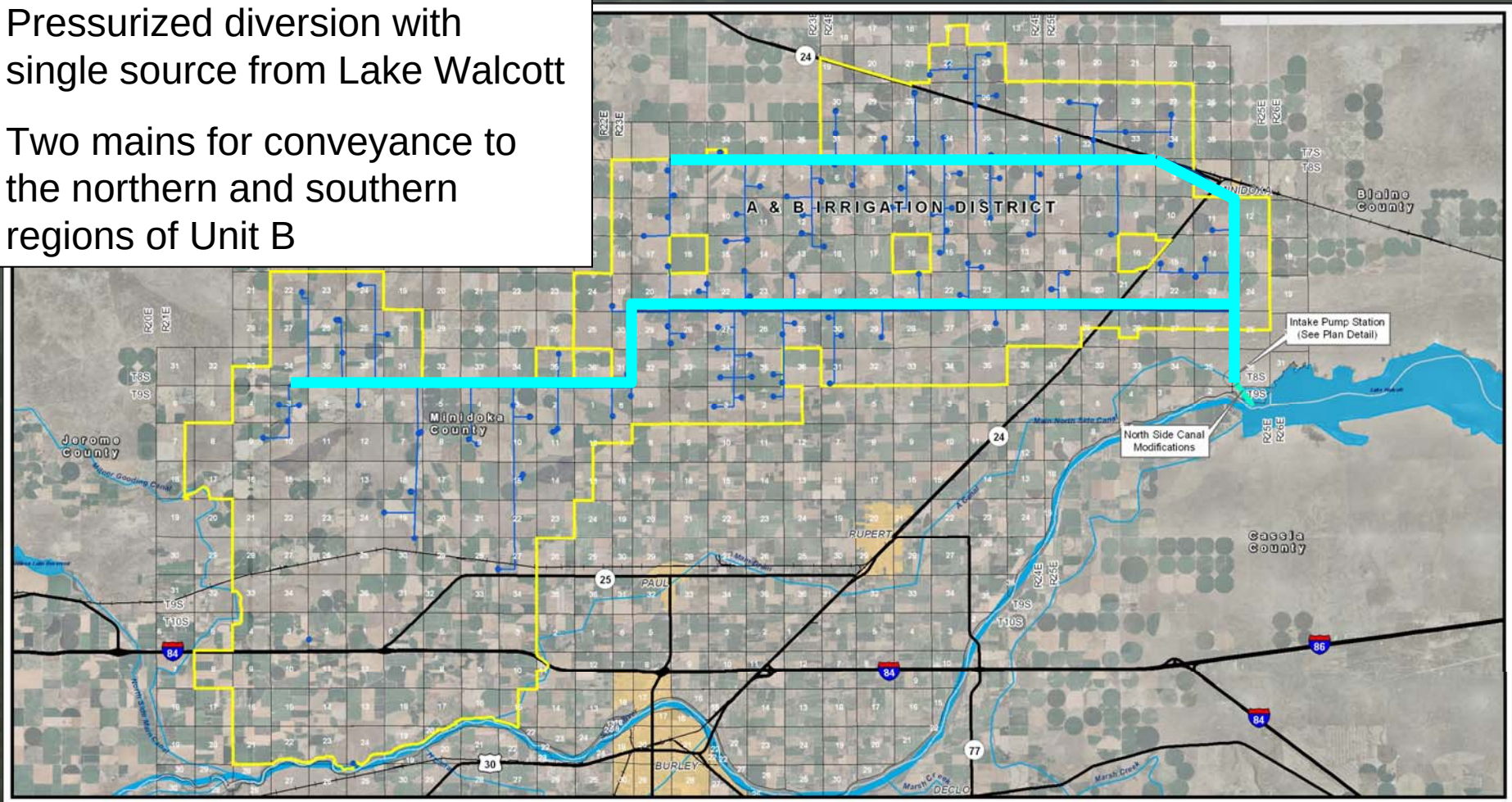
More favorable area for ground water recharge in northeast portion of A&B



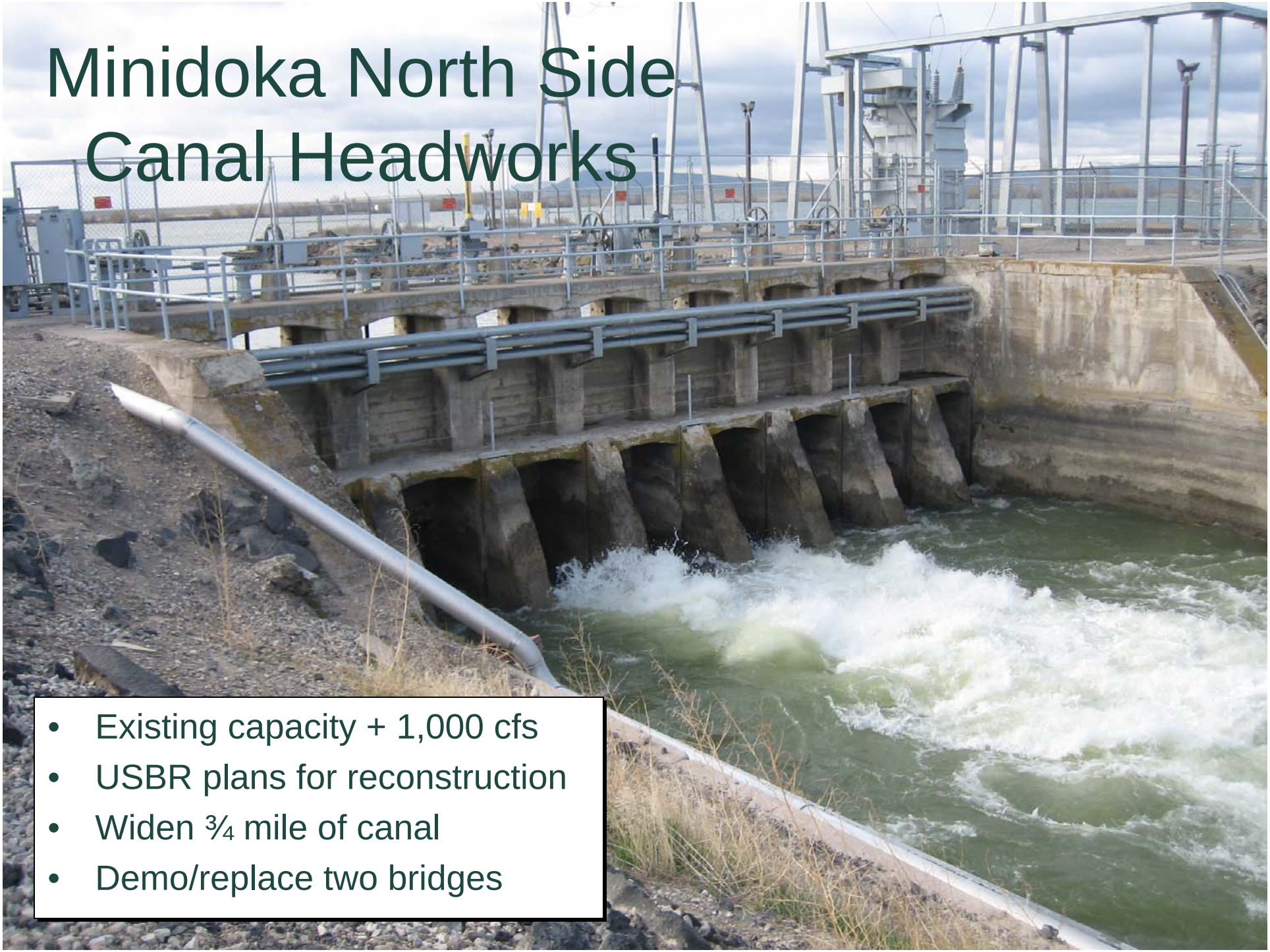
Recommended Alternative

Pressurized diversion with single source from Lake Walcott

Two mains for conveyance to the northern and southern regions of Unit B

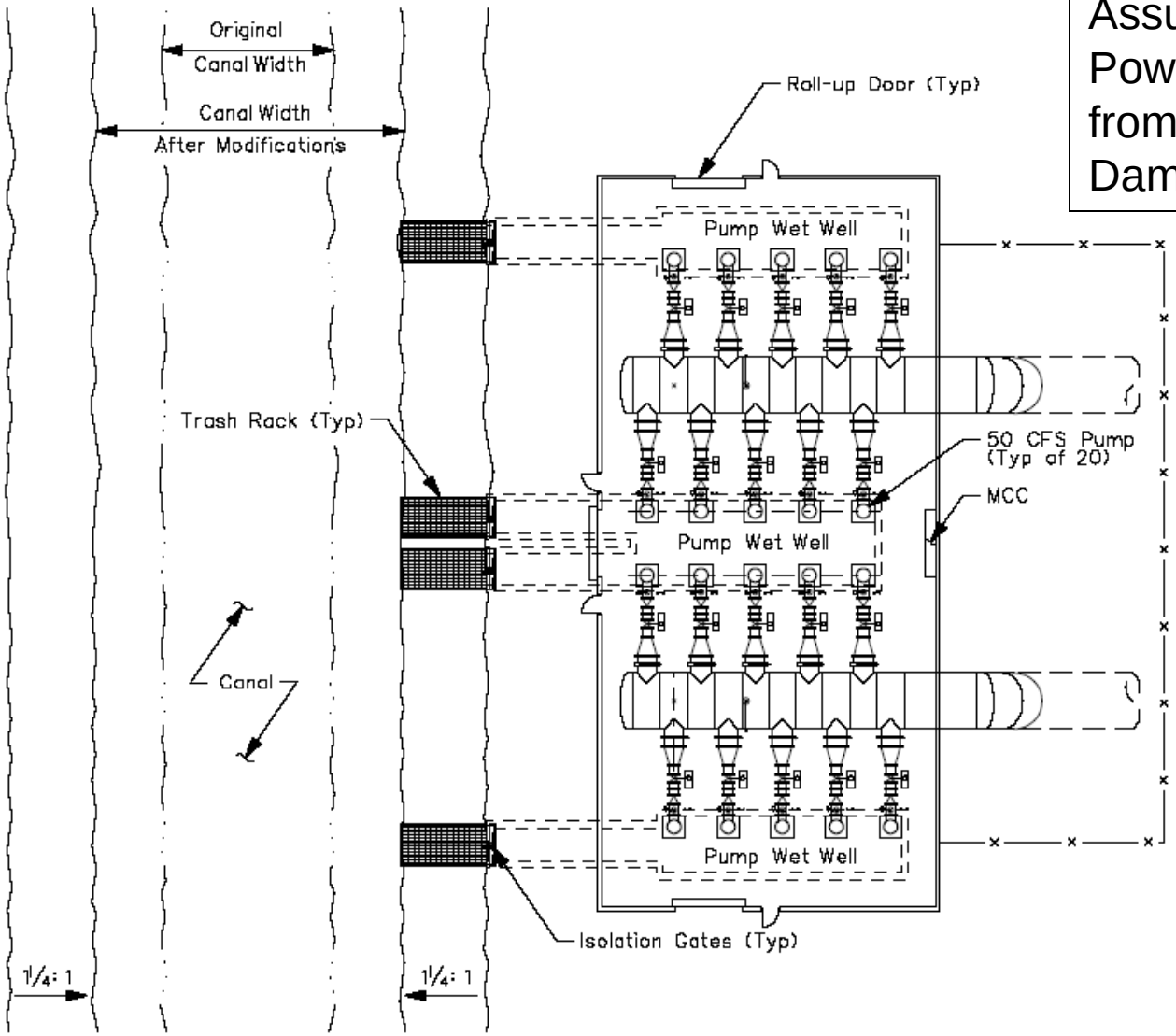


Minidoka North Side Canal Headworks



- Existing capacity + 1,000 cfs
- USBR plans for reconstruction
- Widen ¾ mile of canal
- Demo/replace two bridges

Minidoka North Side Canal Pump Station



Assumption:
Power supplied from Minidoka Dam Power Plant

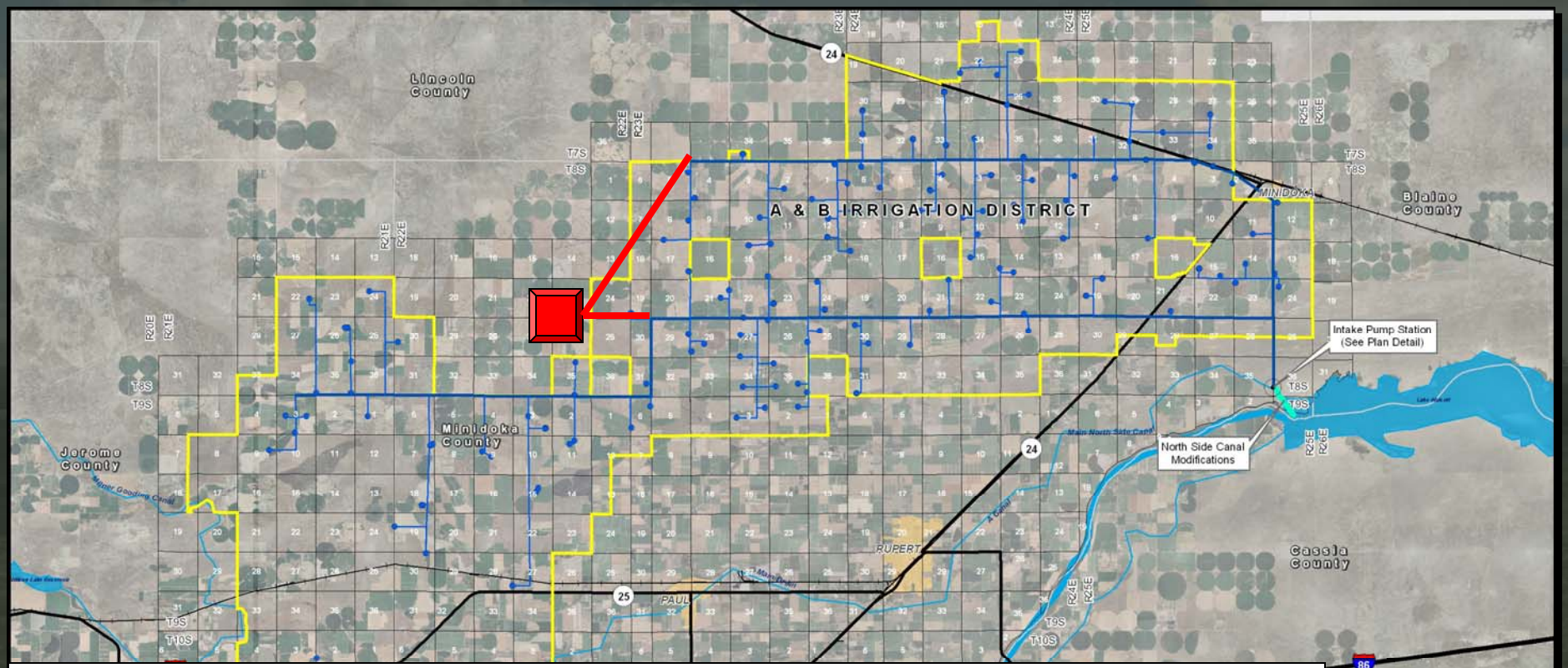
Opinion of Probable Cost

- Association for the Advancement of Cost Engineering (AACE) – International Class 5
- Prepared with very limited information
- Prepared for strategic planning purposes and assessments of viability
- Expected accuracy ranges
  - Low side: -20 to -50 percent
  - High side: +30 to +100 percent

Opinion of Probable Project Cost – Class 5

Cost Item	Cost Opinion (2008 Dollars)
North Side Canal Modifications	$1,100,000
Pipeline (Includes valves, earthwork, & borings)	$268,500,000
Pump Stations (Includes power & SCADA)	$33,500,000
Regulating Storage	$2,400,000
SUBTOTAL	$305,500,000
Estimating Contingency @ 15%	$45,800,000
ROUNDED BASE CONSTRUCTION COST	**$350,000,000**
Engineering, Administration, Environmental, Construction Services	$10,000,000
OPINION OF PROBABLE PROJECT COST	**$360,000,000**

Surface Storage - Cost Sensitivity Analysis



Sensitivity analysis showed storage volumes of 5,000, 10,000, and 15,000 acre-ft could result in project savings of 4, 7 and 9 percent, respectively

Annual O&M Cost Opinion

O&M Item	Cost Opinion (2008 Dollars)
Power*	$900,000
Labor	$700,000
Maintenance	$1,800,000
TOTAL ANNUAL O&M COST	**$3,400,000**

*Power cost based on 2008 inflated price per kWh from USBR billing summaries: 19.96 mills

- Preliminary comparison showed surface water system uses roughly half of the energy of the existing ground water system
- Surface water system labor costs could potentially be less than existing system due to SCADA control

Annualized Cost Analysis

- Financing rate of 6 percent for 30 year term

Project Cost Component	**Cost Opinion (2008 Dollars)**
Annual Capital Cost *	$26,200,000
Annual O&M Cost	$3,400,000
TOTAL ANNUAL PROJECT COST	**$29,600,000**

*Capital cost includes engineering, administration, environmental, and construction services costs

Recommendations

- Additional study of recommended alternative
  - Identify most cost effective capacity of the system based on variability of identified water supplies
- Consider conjunctive use of surface and ground water
  - Reduction of pipeline sizes

April-May	May-June	June-July	July-Aug	Aug-Sept	Sept-Oct	Annual Usage	System Capacity[1]	Pipeline Diameters[1]
12,181	**30,162**	**49,912**	**39,605**	**31,941**	**14,472**	**178,273[2]**	**835 cfs**	**(2) 108”**
12,181	30,162	40,000	39,605	31,941	14,472	168,361	670 cfs	(2) 98”
12,181	30,000	30,000	30,000	30,000	14,472	146,653	500 cfs	(1) 120”
12,181	25,000	25,000	25,000	25,000	14,472	126,653	415 cfs	(1) 108”
10,000	10,000	10,000	10,000	10,000	10,000	60,000	170 cfs	(1) 70”

[1] Preliminary information for general comparison purposes only
[2] Average based on 1995 through 2007 data

Recommendations – cont.

- Consider partial replacement of existing system with surface water
  - Reduce acreage served by surface water
  - Potential for incidental groundwater recharge

Questions?