Agenda Item 5b

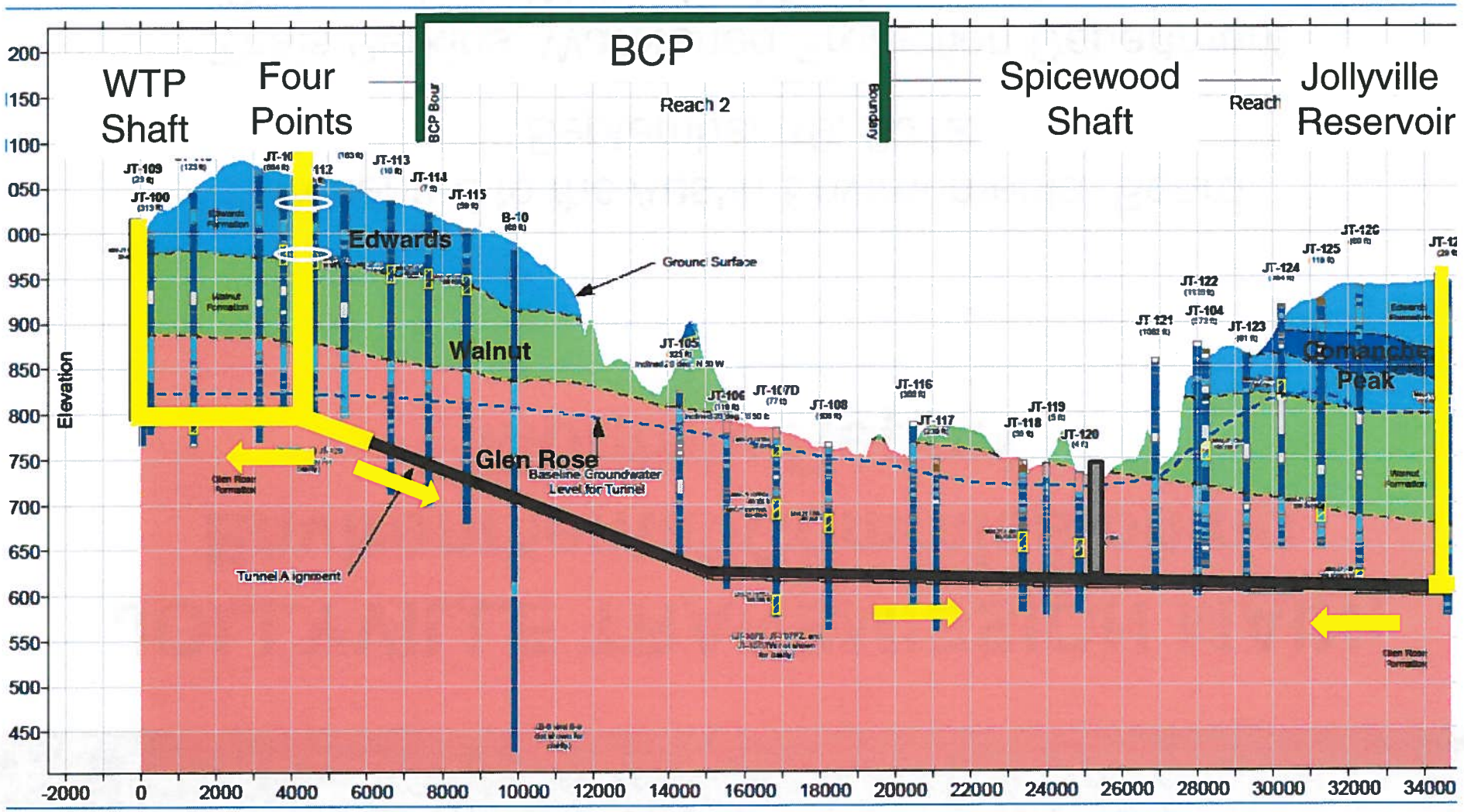
JOLLYVILLE TRANSMISSION MAIN: Environmental Commissioning Monthly Report

Presented to the Austin Environmental Board
September 19, 2012

Thais Perkins, Watershed Protection Department
David Johns, Watershed Protection Department
John Pickens, INTERA

Jollyville Transmission Main Project

= progress



Environmental Commissioning Activities - JVTM

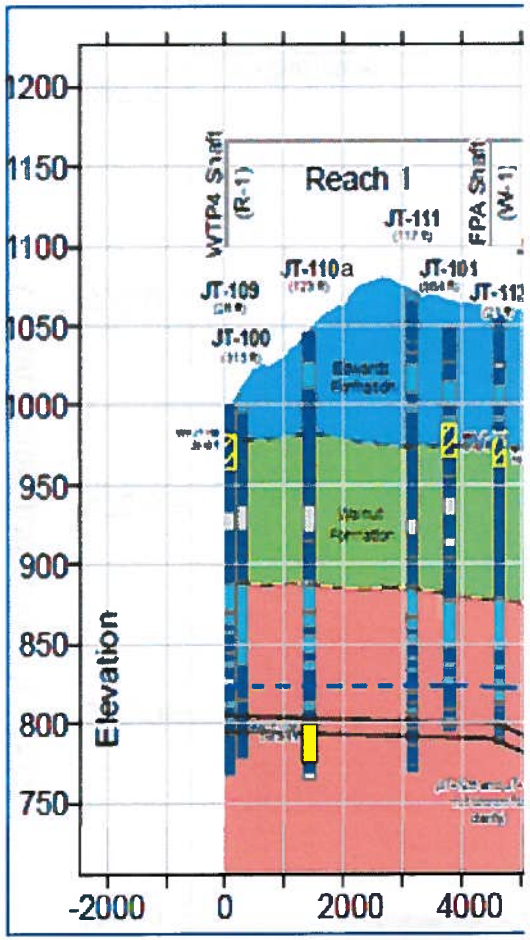
- Monthly shaft site (surface) visits concurrent with plant site visits
- Biweekly shaft/tunnel visits to active shafts (4Points, Jollyville) and tunnel reaches (R2, R3)
- Biweekly meetings of the Environmental Commissioning Coordination Group (ECCG) to resolve possible issues
- Environmental Monitoring
  - *Increased monitoring schedule at adjacent sites as mining progresses in Reach 2, Reach 3 and Spicewood Shaft*
  - *Injected dye into permeable ring at Four Points on Sunday, July 22 to determine whether groundwater is moving along the same path as prior to shaft excavation*
  - *Age Dating sampling 90-95% complete (still will take samples in tunnel once it progresses)*
  - *Conceptual Groundwater Model Update*
  - *Added monitoring of some older wells in BCP*

Environmental Commissioning Cost Summary

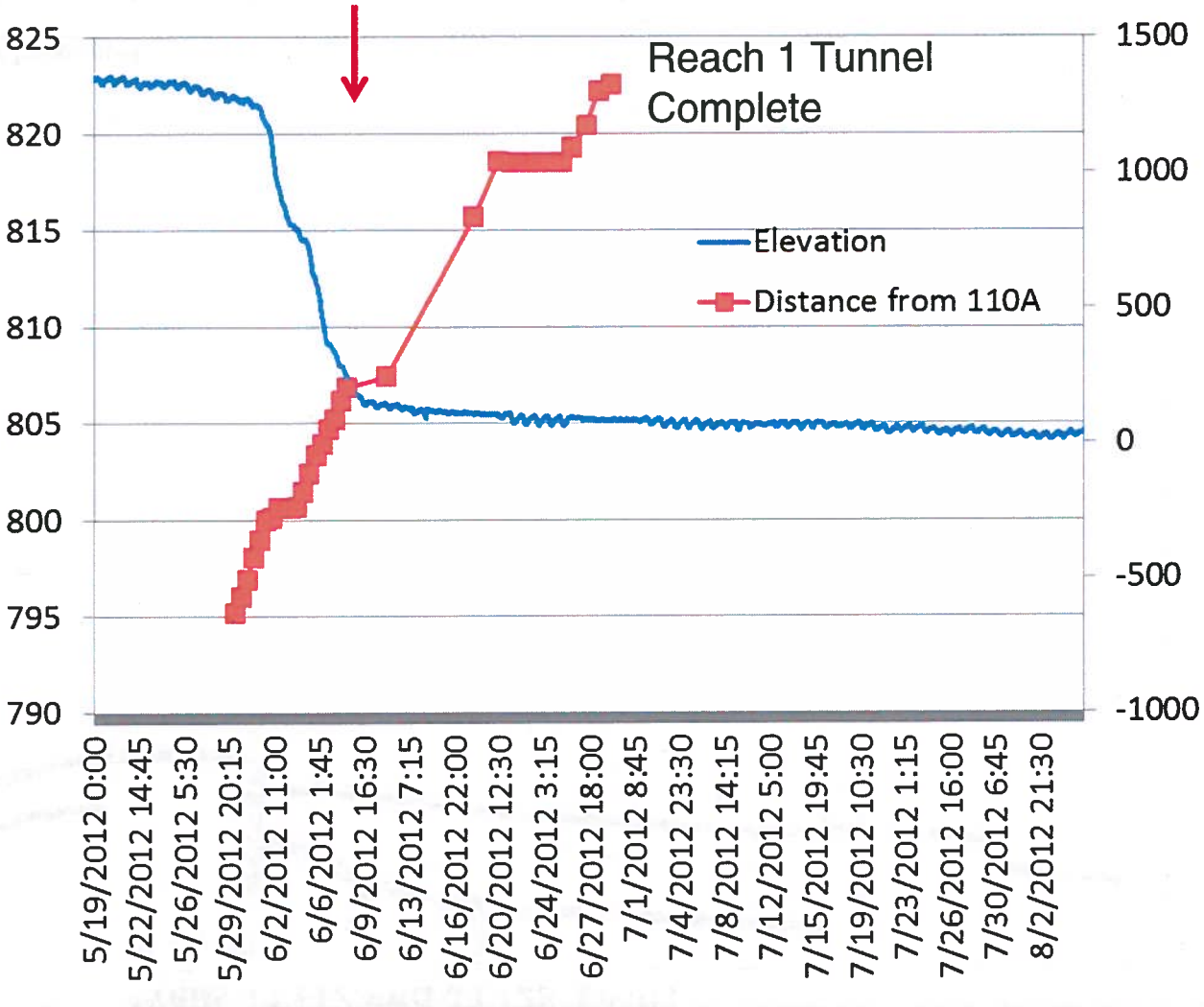
Initial INTERA Contract Amount	$	1,713,814
Total Amount Billed to Date (work from June 2012)	$	1,273,950
Total Remaining	**$**	**416,289**

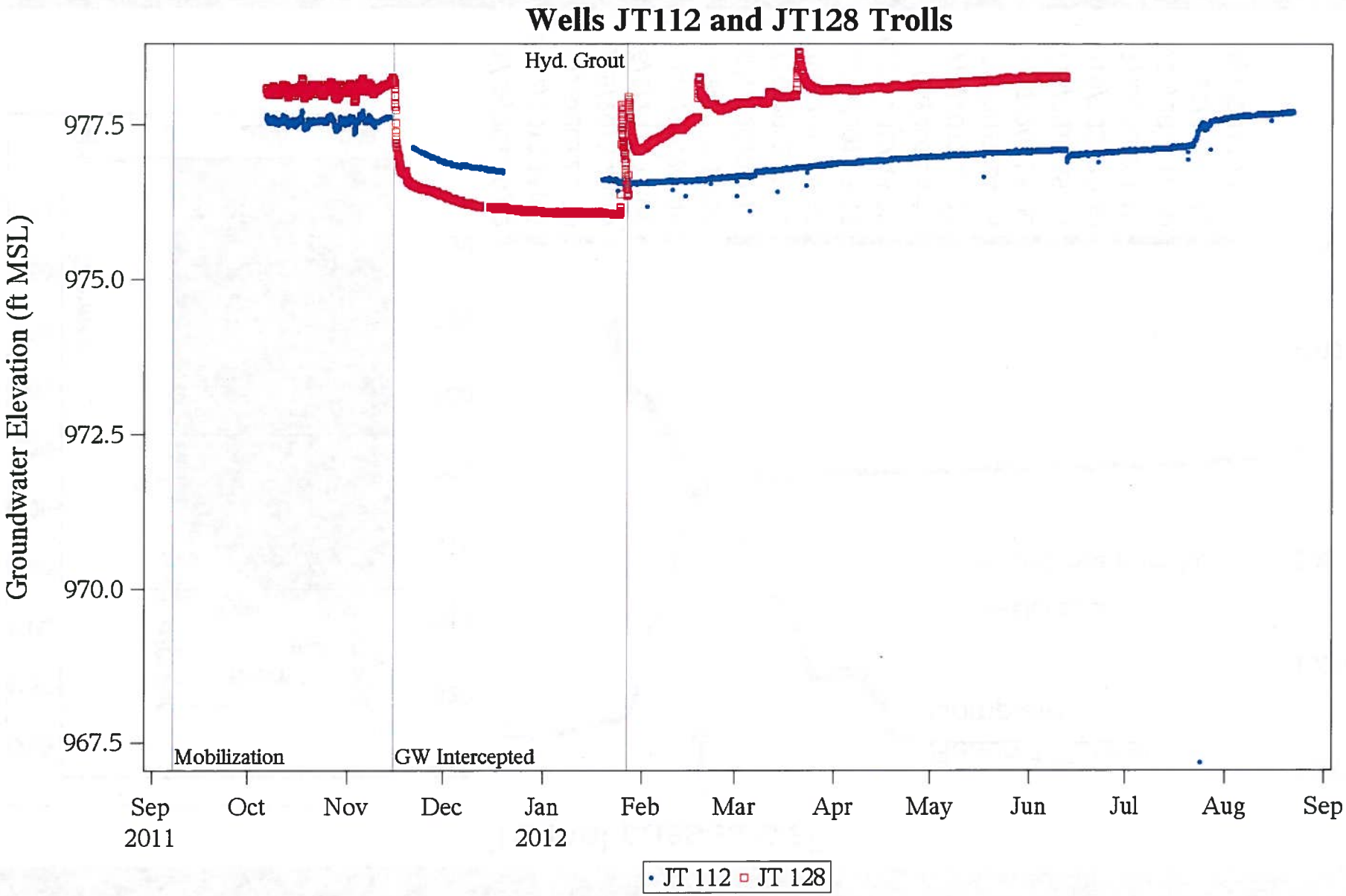
(change of $11,789 from last month)

110A Well

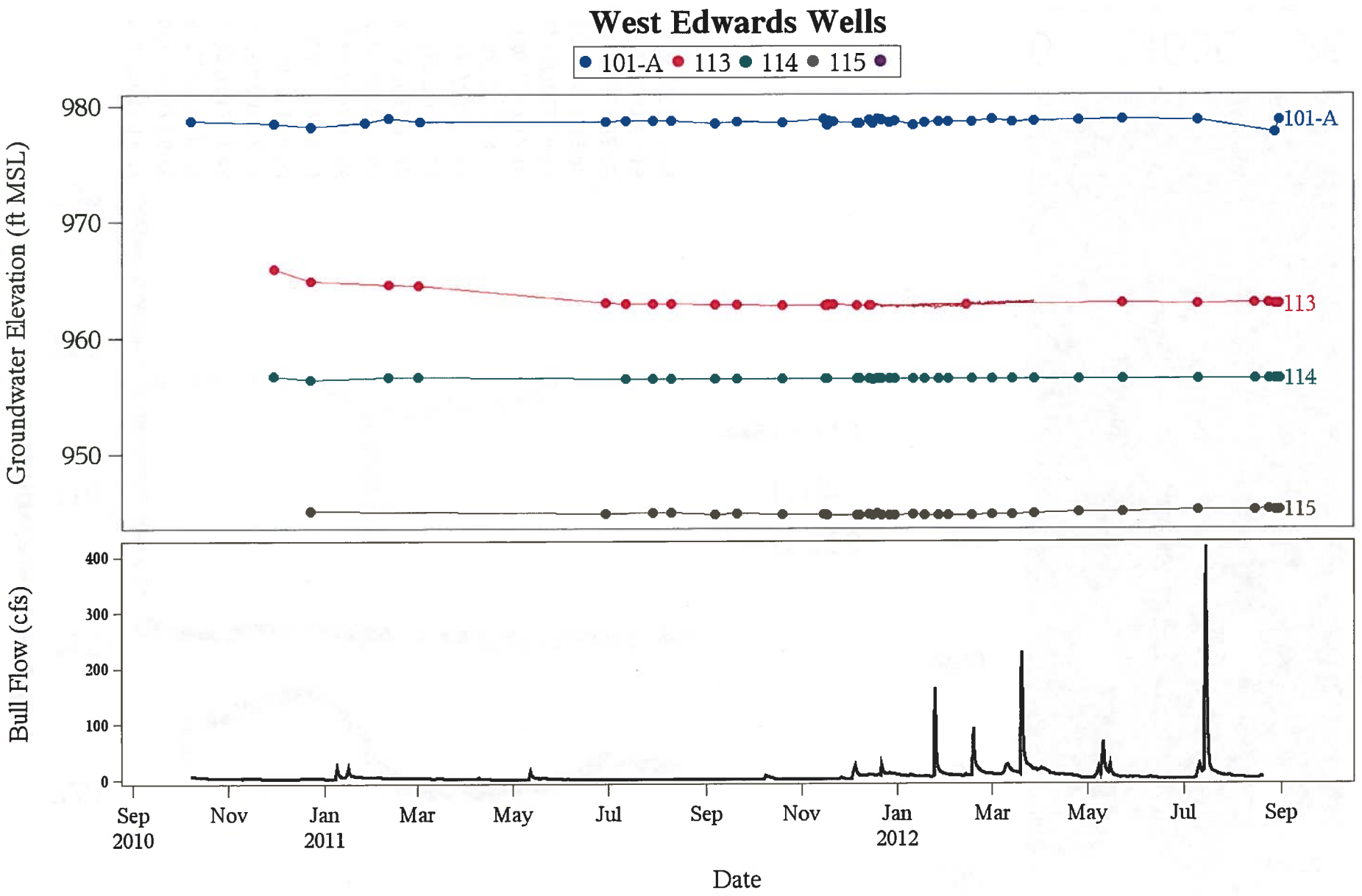


Tunnel passes well

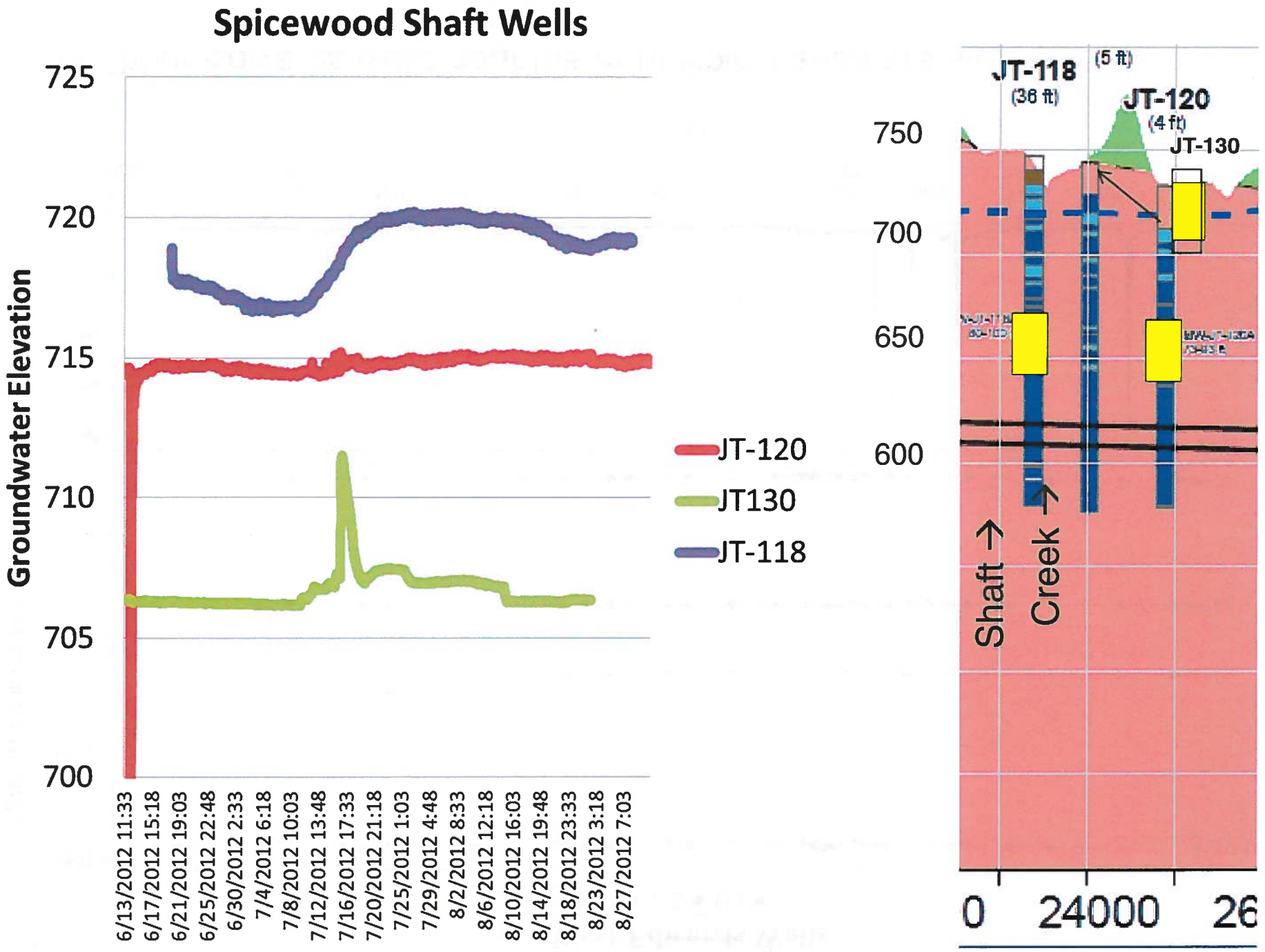


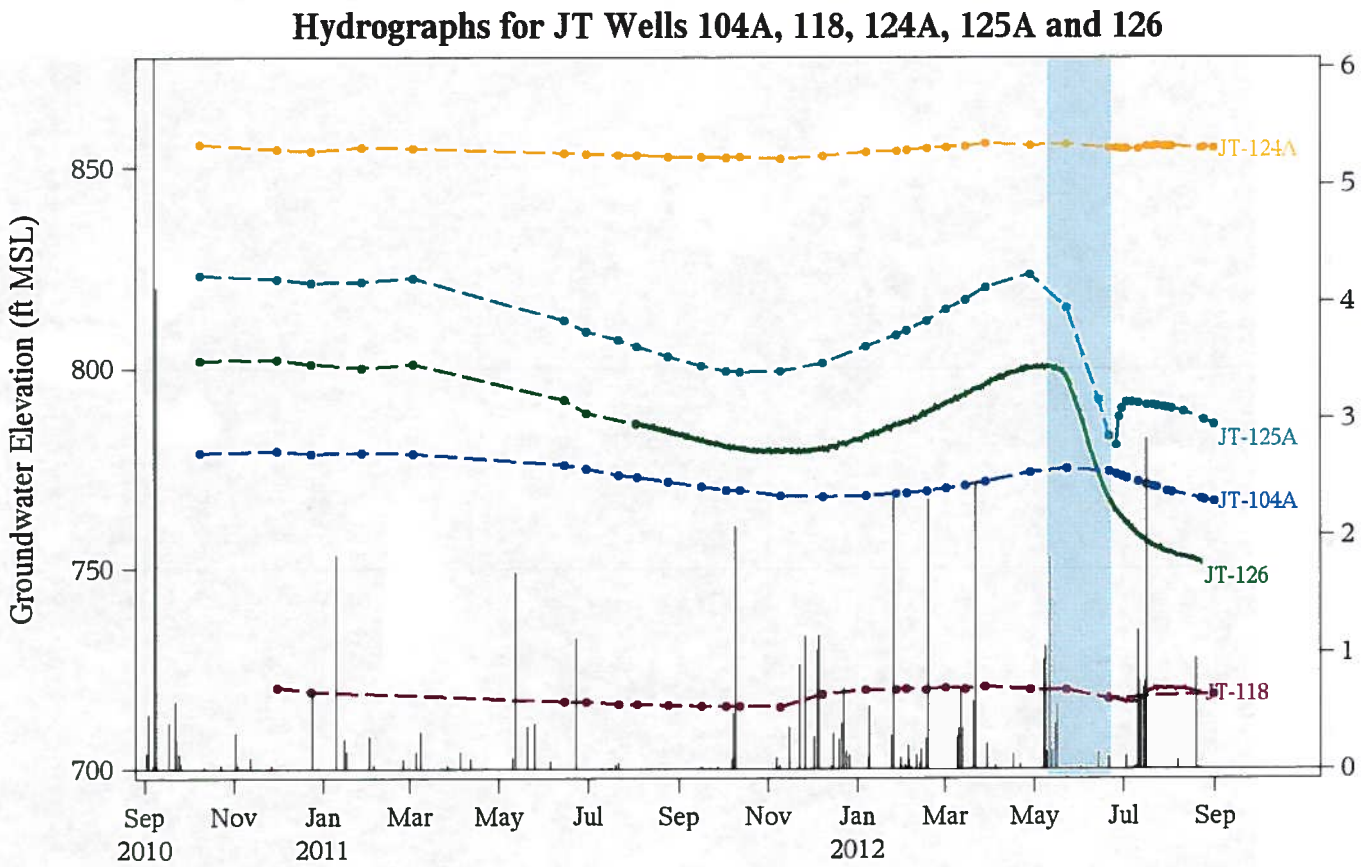


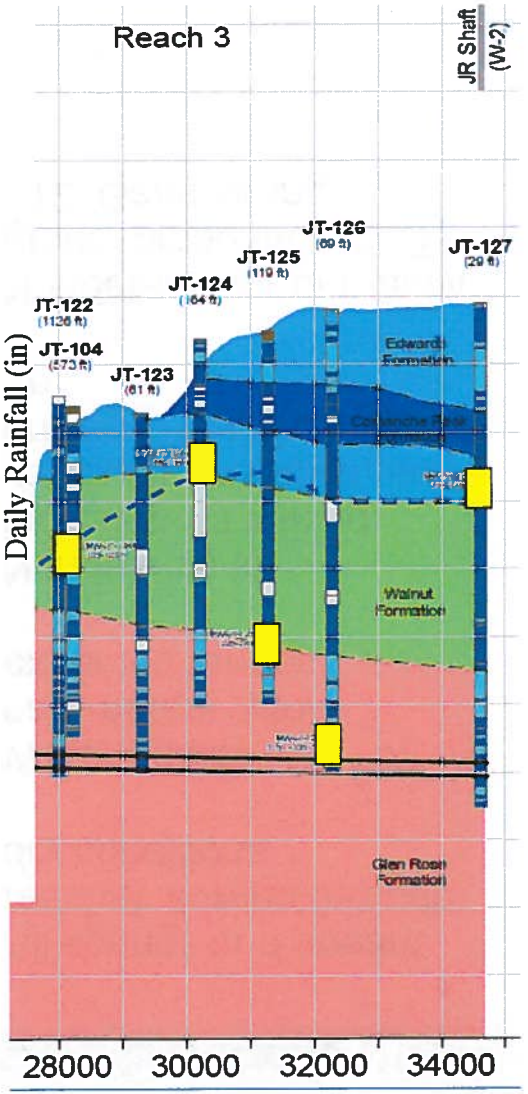
- Groundwater levels near Four Points shaft continue to rise. Both wells now at or above preconstruction levels. Dye trace injection probably responsible for July bump in 112 levels.



- Other Edwards wells near the Four Points shaft are steady

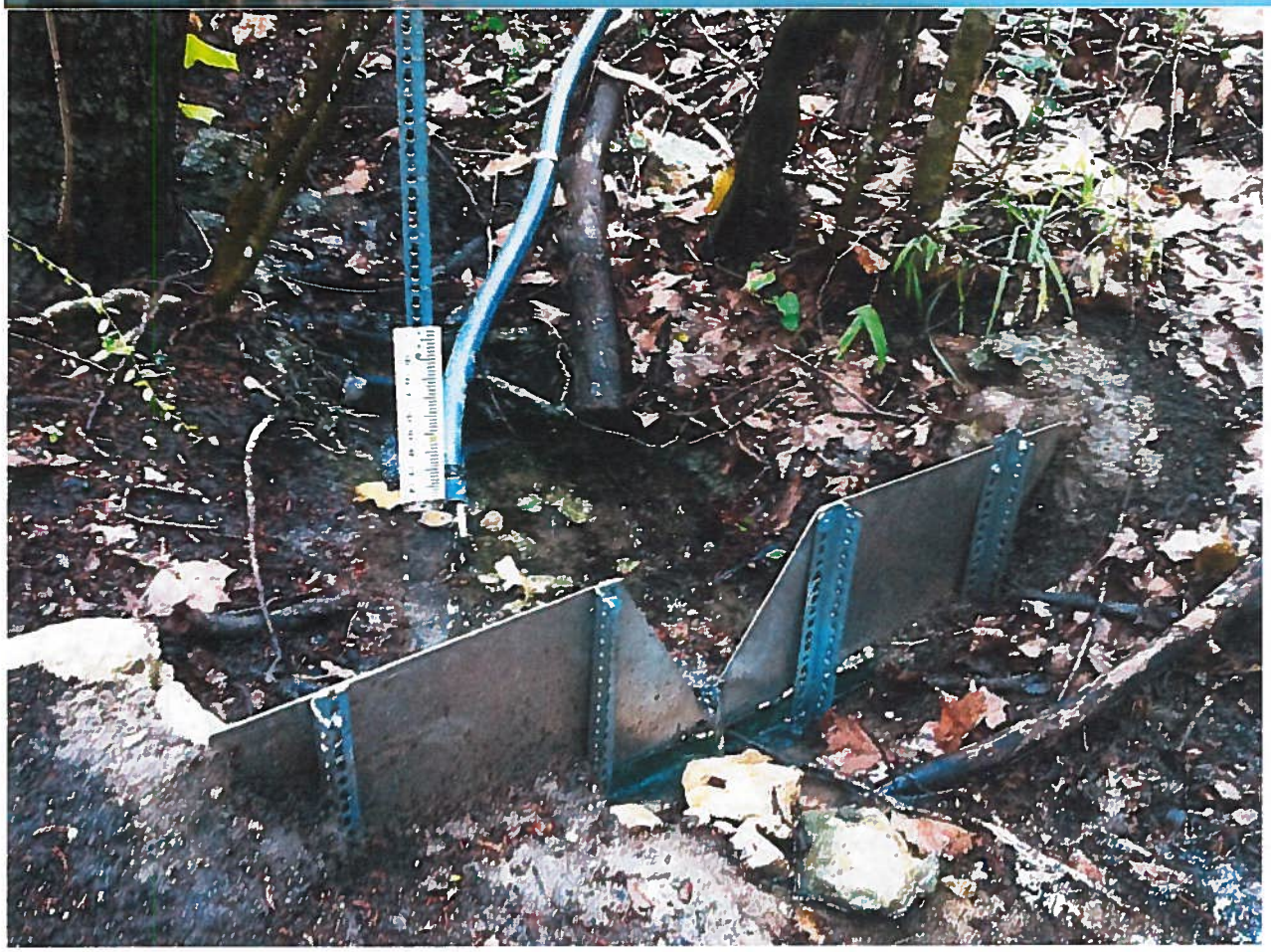

Spicewood Shaft Wells
Groundwater Elevation
725
720
715
710
705
700
6/13/2012 11:33
6/17/2012 15:18
6/21/2012 19:03
6/25/2012 22:48
6/30/2012 2:33
7/4/2012 6:18
7/8/2012 10:03
7/12/2012 13:48
7/16/2012 17:33
7/20/2012 21:18
7/25/2012 1:03
7/29/2012 4:48
8/2/2012 8:33
8/6/2012 12:18
8/10/2012 16:03
8/14/2012 19:48
8/18/2012 23:33
8/23/2012 3:18
8/27/2012 7:03
JT-120
JT130
JT-118
750
700
650
600
JT-118
(36 ft)
(5 ft)
JT-120
(4 ft)
JT-130
Shaft →
Creek →
0
24000
26





- JT-126 is located approximately 2330 ft from the JR Shaft.
- JT-125A is located approximately 3350 ft from the JR Shaft.
- Both wells have similar trends until 6/25

Environmental Monitoring Update – Surface flow



Lanier Spring 7/9/12

- All springs and stream reaches flowing through dry conditions
- Water quality parameters within expected ranges
- Nondetects for indicators of mining, vehicular operation, and drilling (TPH, Cu, Cr, Zn)
- Nondetects for di-n-butyl grout compounds in JT-112, Gaas spring

Jollyville Plateau Salamander Monitoring

Site	Date of Last Count	Count #	Historical Average (& last four counts)
Lanier	Sept 7, 2012	100	65 (100,56,48,59)
Franklin/Pit	May 18, 2012	100	78 (73,87,39,100)
Tanglewood	May 16, 2012	3	8 (0,0,0,3)
Lower Ribelin	Jan 6, 2012	42	42 (53,176,43,42)
Upper Ribelin	May 23, 2011	75	64 (123,74,67, 75)
Trib 4 @ Spicewood	August 1, 2012	0	10 (20, 9, 2,0)

-- provided by Nathan Bendik, Salamander Biologist for WPD

JVTM Environmental Monitoring Summary (cont.)

Trigger	Range	Recent Occurrences
TROLL Alarms	Outside of range of historical Variability	None
Tunnel Inflow Triggers	**Baseline water inflow triggers:** 50 gpm over 10 feet of tunnel length 200 gpm over 500 feet of tunnel length 400 gpm over a single tunnel reach (1, 2, or 3)	No significant tunneling in last month – just beginning Reach 2
	Sensitive area triggers: 25 gpm over 10 ft of tunnel length 100 gpm over 500 ft of tunnel length	No tunneling in sensitive areas
Spring/Streamflow Triggers	Relative to one another; paired comparison analysis	All surface sites responding consistently with rainfall and general trends

Groundwater Update

- Tritium Update
- JT107 Drawdown Preliminary Results
- Conceptual Model Update
- Tracing Update

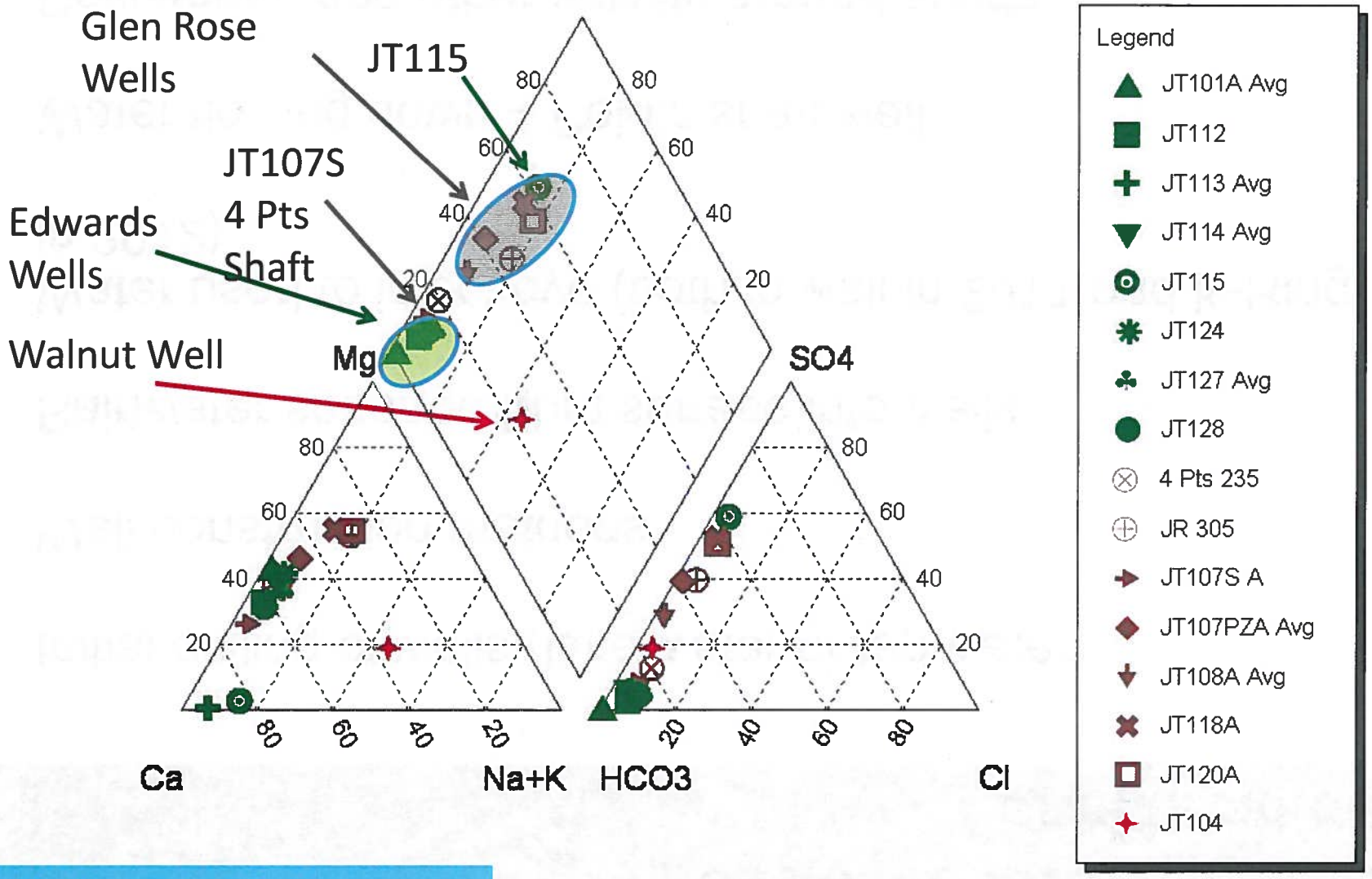
Groundwater Age Dating

- Help verify conceptual groundwater model of poorly connected shallow and deep systems
- Use standard chemistry (ions) to evaluate groundwater characteristics and possible mixing of waters
- Use tritium to determine relative age of water in shallow and deep systems

Possible Sources of Well Contamination

- Initial drilling of wells (lake water or tap water)
- Well construction methods
- Rainwater seepage from surface into wells
- Water used to inject dye (both in well in 2011 and K-Ring in 2012)
- Water flowing down 4 Points shaft wall
- Dewatering and other activity around shafts

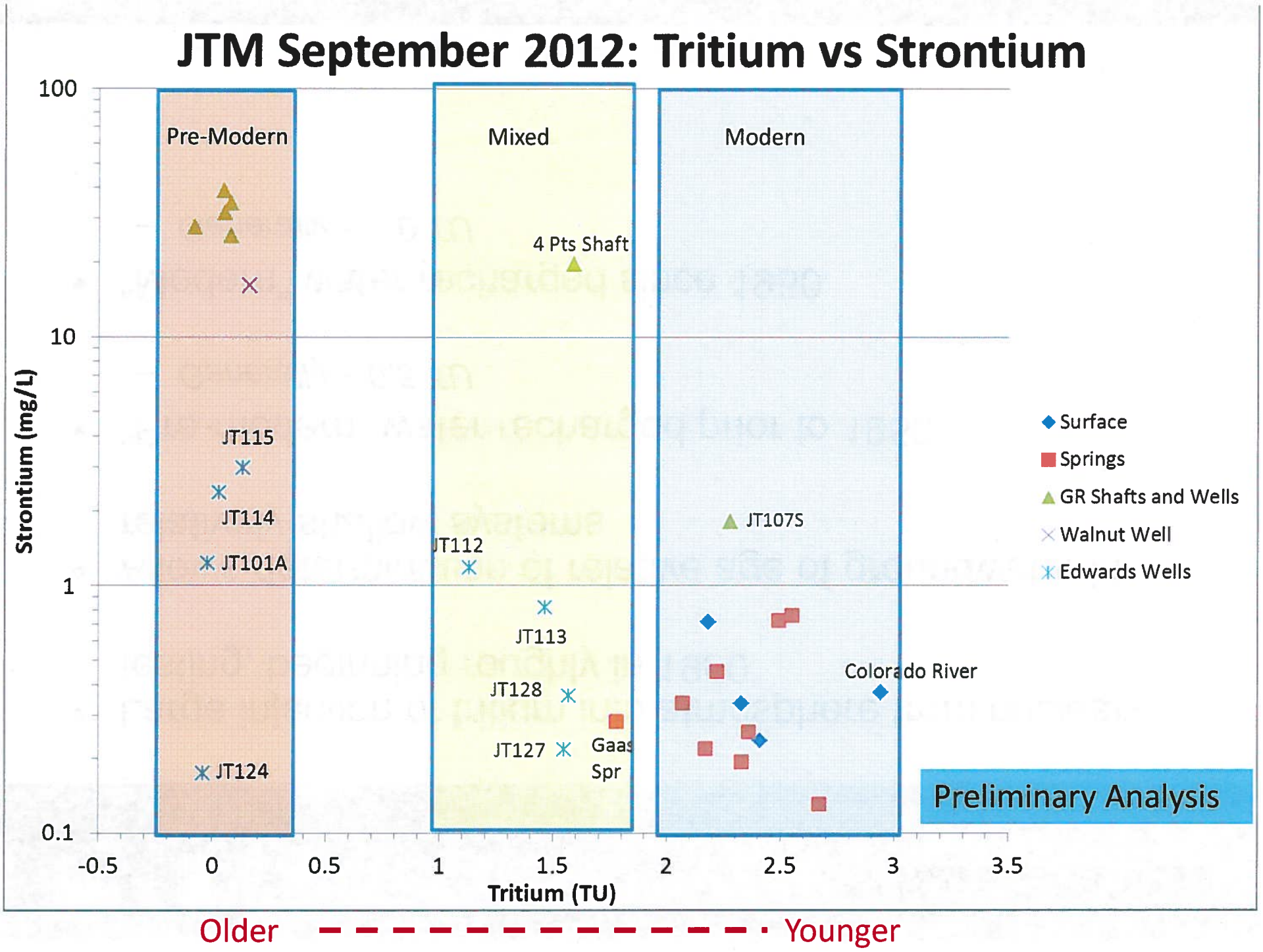
JTM Wells September 2012



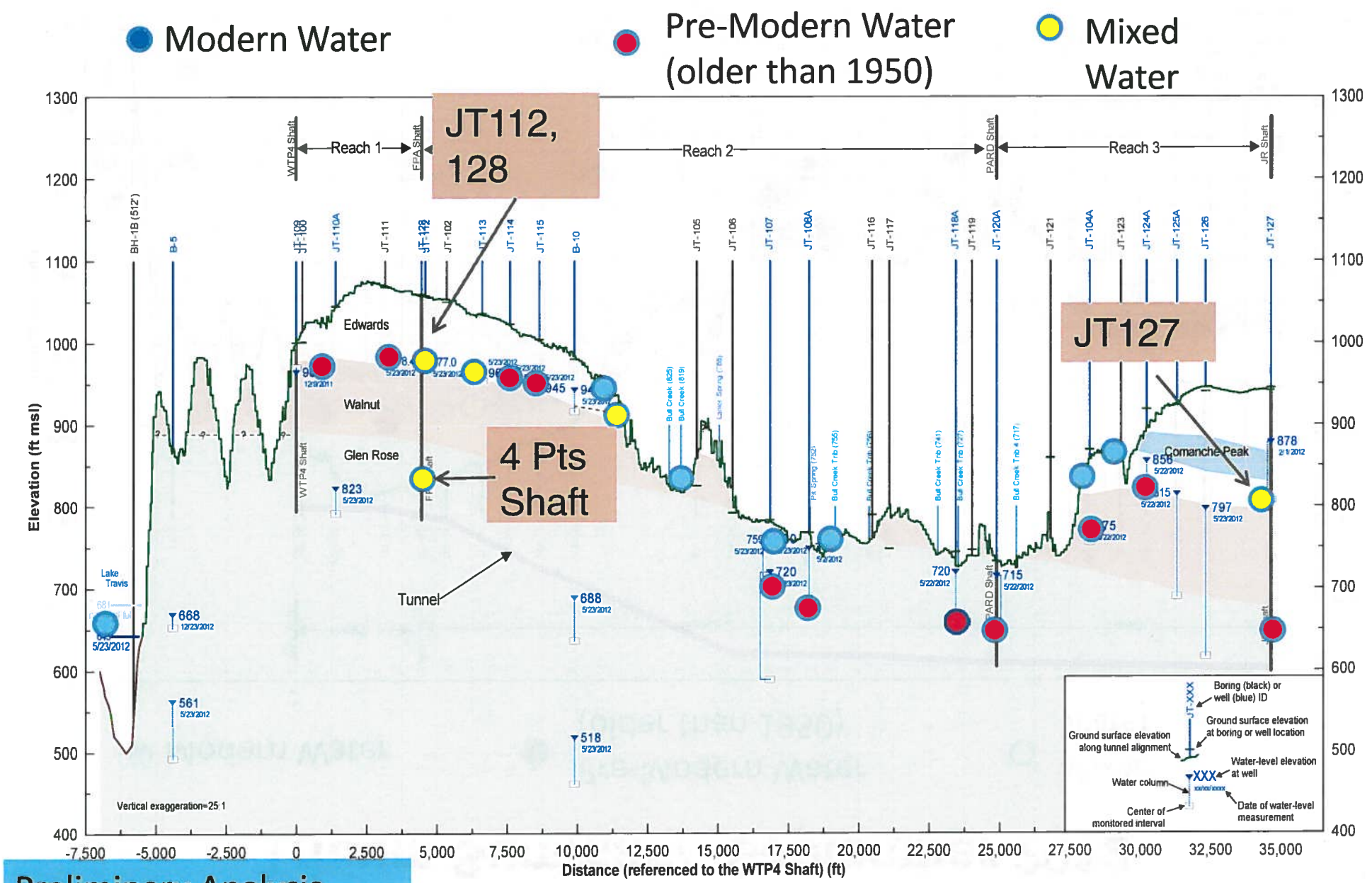
Preliminary Analysis

Tritium Analysis

- Large injection of tritium into atmosphere from nuclear testing, beginning roughly in 1950
- Allows determination of relative age of groundwater in relatively shallow systems
- "Pre-modern" water recharged prior to 1950
  - *Generally < 0.5 TU*
- "Modern" water recharged since 1950
  - *Generally > 2.0 TU*


JTM September 2012: Tritium vs Strontium
100
10
1
0.1
Strontium (mg/L)
Pre-Modern
Mixed
Modern
4 Pts Shaft
JT115
JT114
JT101A
JT124
JT112
JT113
JT128
JT127
Gaas
Spr
JT107S
Colorado River
Surface
Springs
GR Shafts and Wells
Walnut Well
Edwards Wells
Preliminary Analysis
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
Tritium (TU)
Older
Younger

Tritium Summary: September 2012



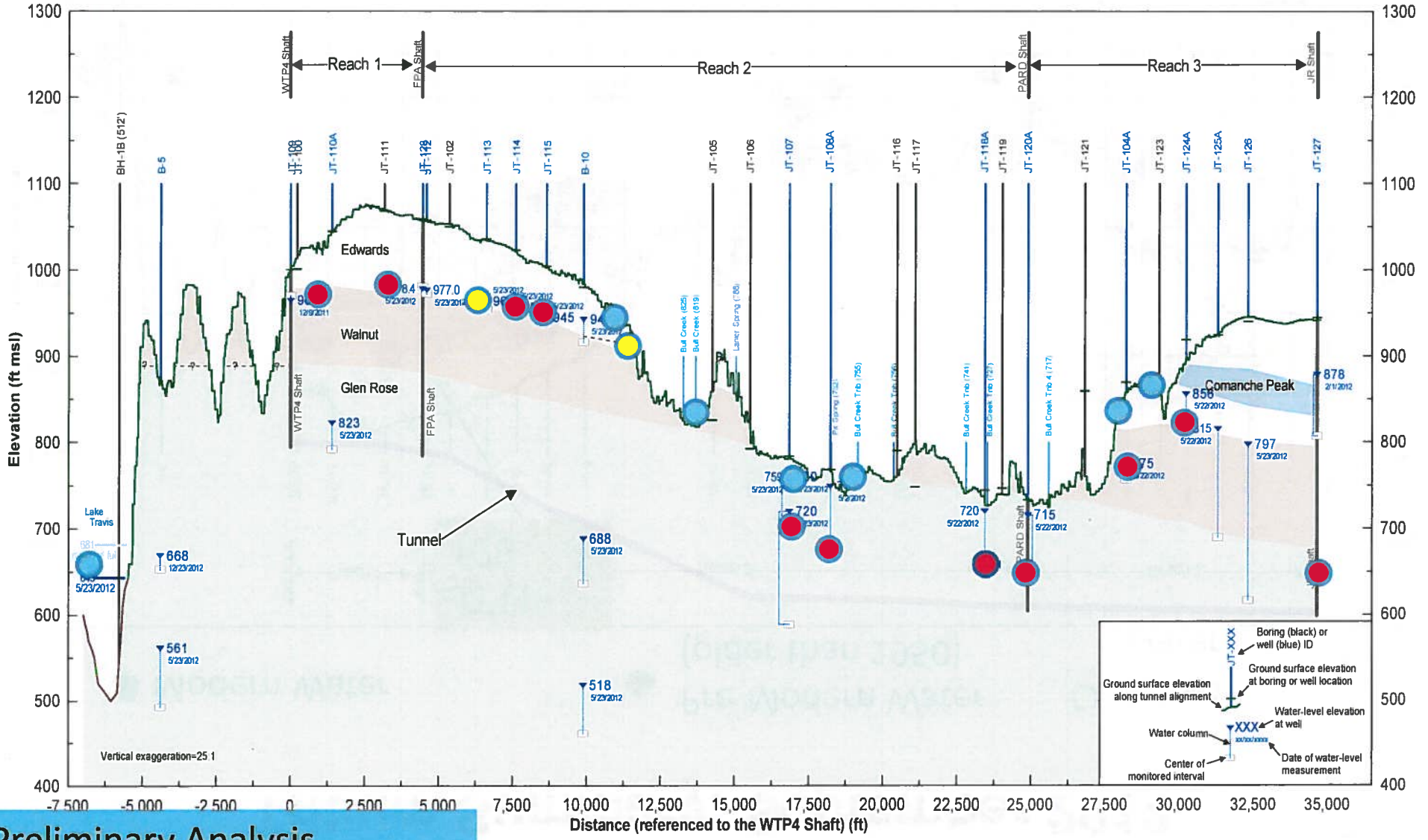
Preliminary Analysis

Tritium Summary: September 2012

Modern Water

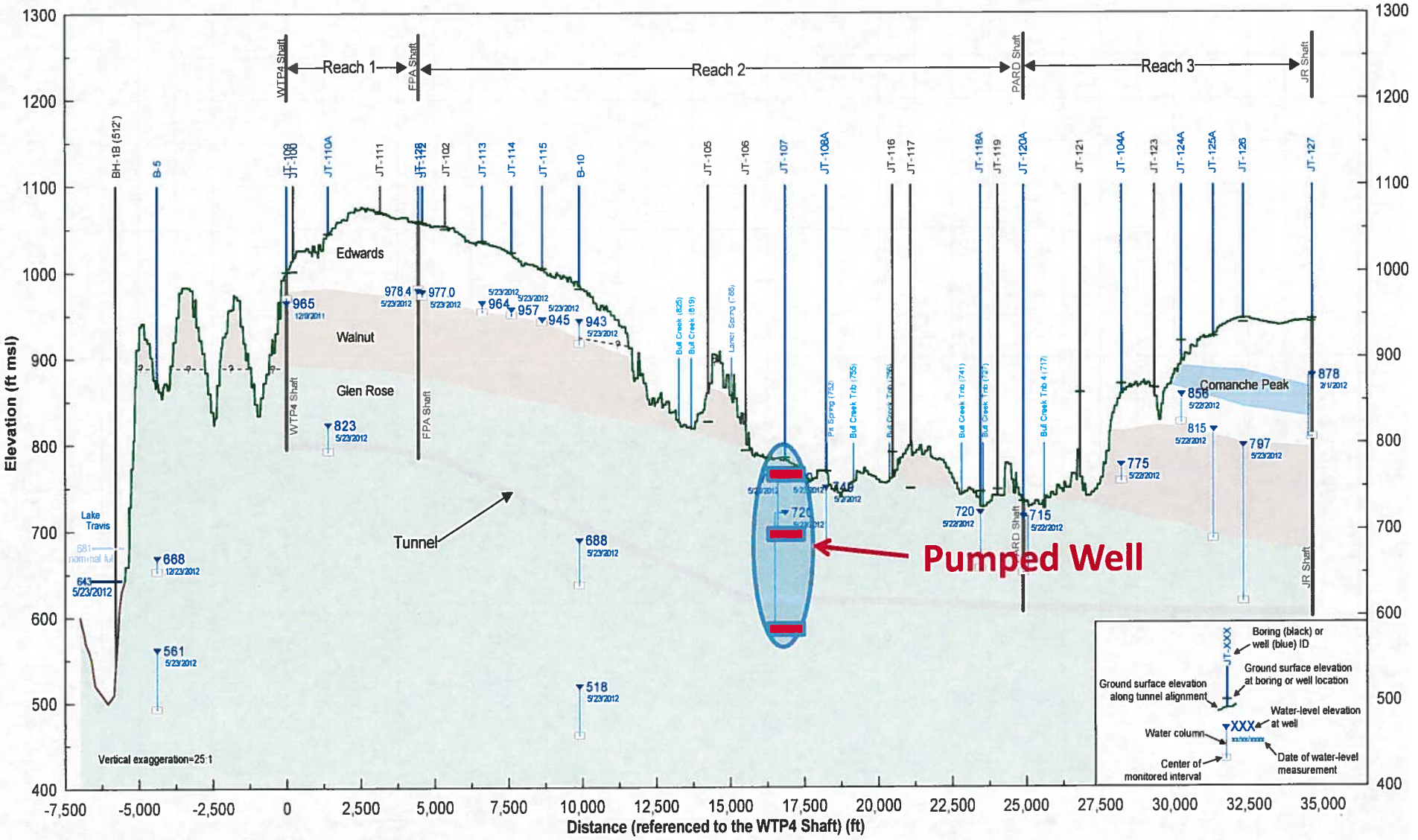
Pre-Modern Water (older than 1950)

Mixed Water



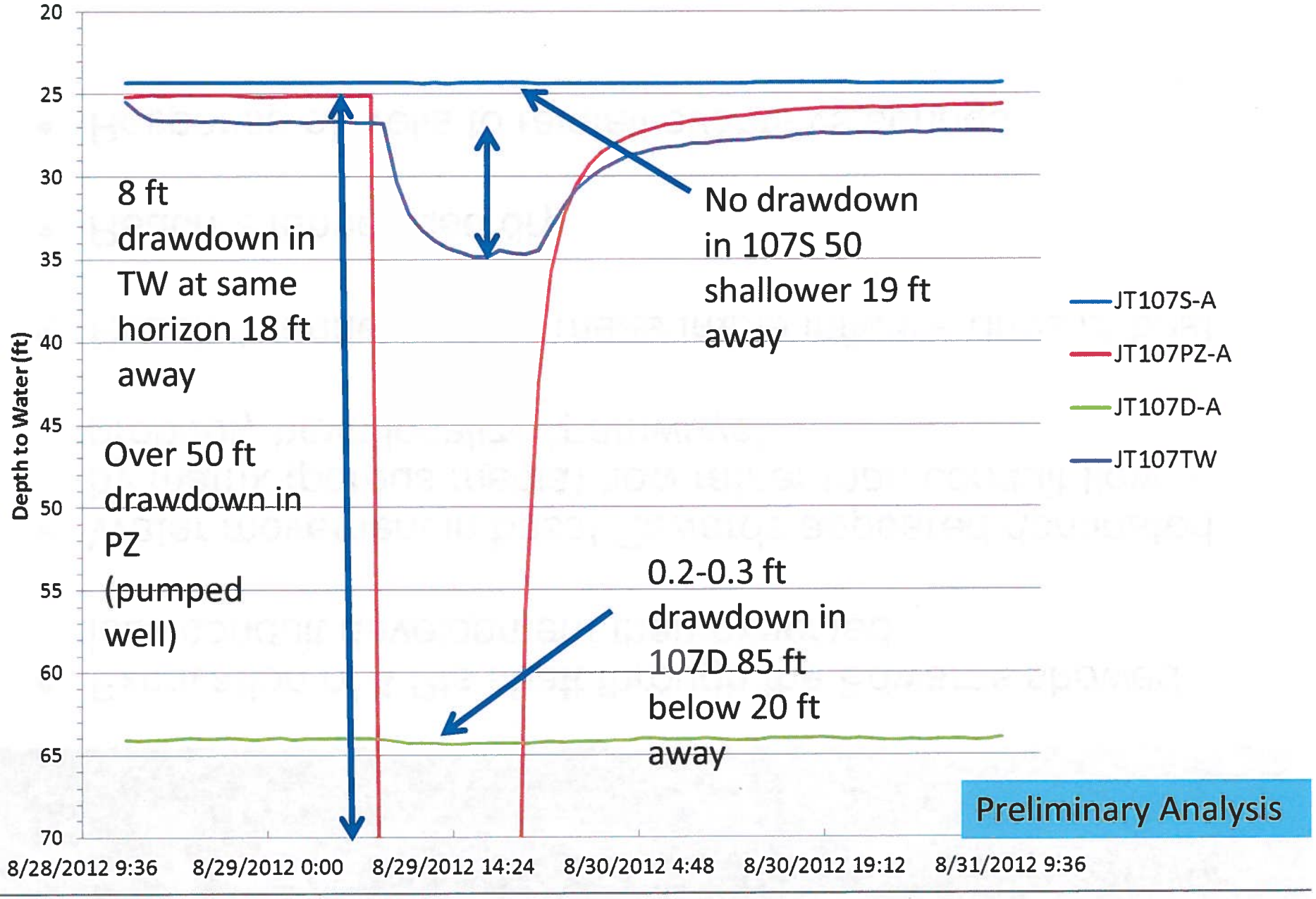
Preliminary Analysis

Drawdown Test in JT107 Cluster




JT-107 Drawdown Test

JT107 Drawdown Summary

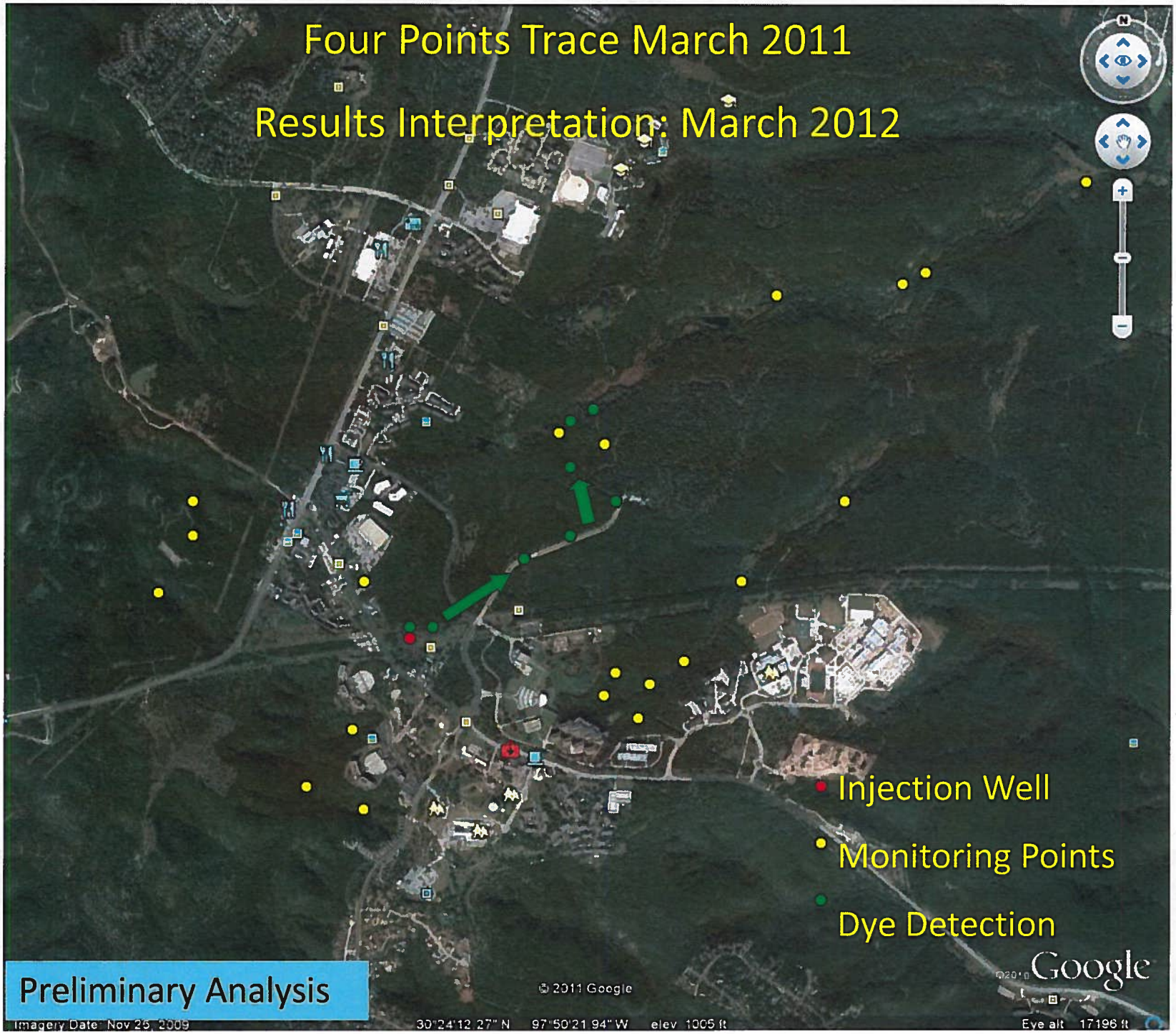


Significant Geologic Observations

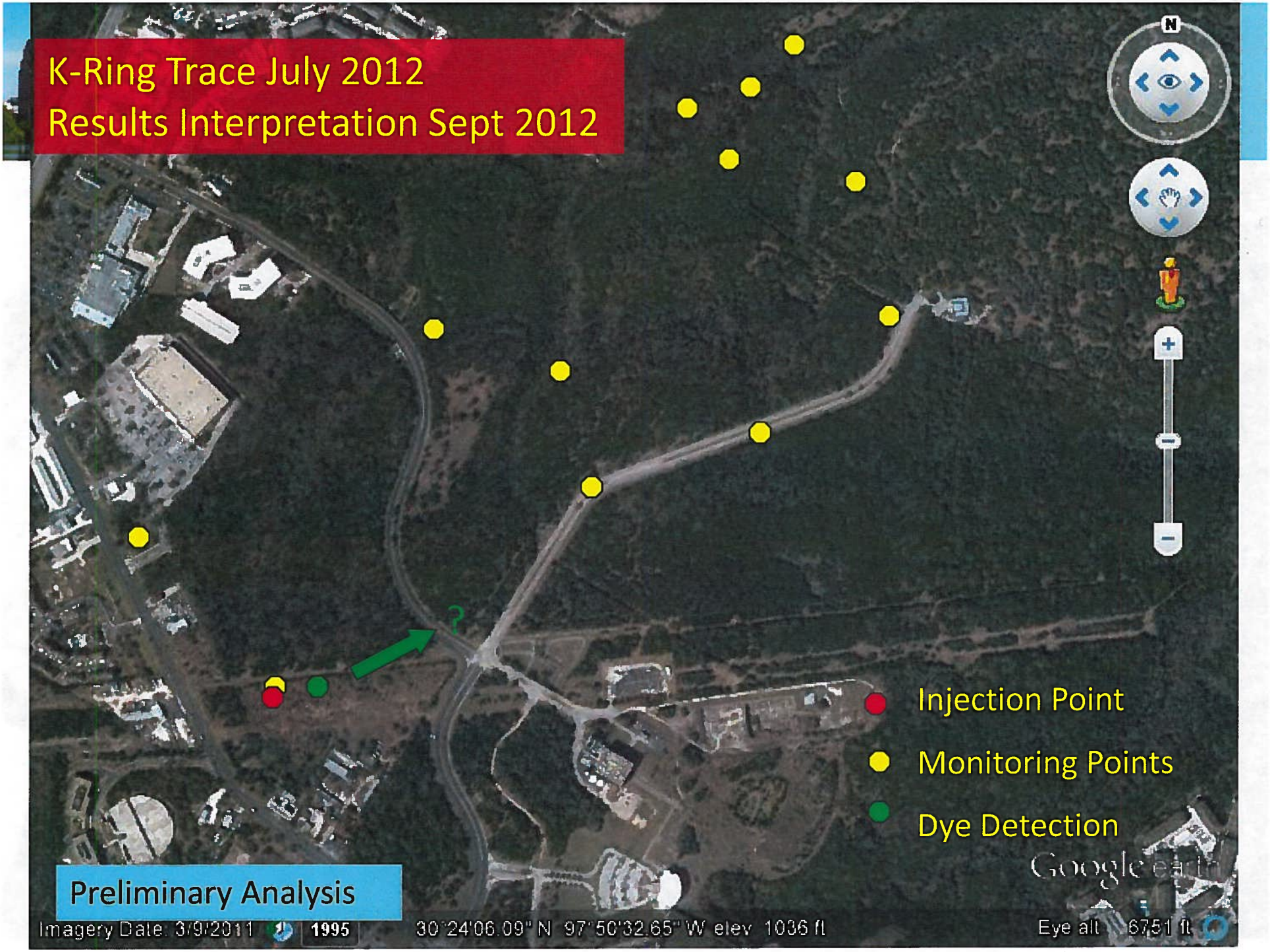
- Excavation of 4 Pts shaft through the Edwards showed less conduit development than expected
- Water movement in basal Edwards appeared dominated by matrix (porous media) flow rather than conduit flow – probably have localize “pathways”
- Reach 1 tunnel had no measurable inflow – drips at best
- Reach 2 tunnel also dry
- Response of wells to rainfall events vs springs

Conceptual Model Update

- Water level declines in monitoring wells are consistent with anticipated low hydrologic conductivities
- Drawdown test data is also consistent with anticipated low hydrologic conductivities and indicates poor vertical connection
- Relative age of groundwater shows “old” deeper and locally shallow groundwater
- All indicate poor connection between shallow and deeper groundwater system


Four Points Trace March 2011
Results Interpretation: March 2012
Injection Well
Monitoring Points
Dye Detection
Preliminary Analysis
© 2011 Google
Google
Imagery Date: Nov 25, 2009
30°24'12.27" N 97°50'21.94" W elev 1005 ft
Eye alt 17196 ft

Permeable ring dye trace –
Sunday, July 22


K-Ring Trace July 2012
Results Interpretation Sept 2012
Injection Point
Monitoring Points
Dye Detection
Preliminary Analysis
Imagery Date: 3/9/2011
1995
30°24'06.09" N 97°50'32.65" W elev 1036 ft
Eye alt 6751 ft

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