PCE/TCE Groundwater Contamination Update

December 2006

Overview

- Recap of contamination/litigation
- Recap of rate increase
- Current status of litigation
- Review of remediation techniques
- Current status of remediation
- Future plans

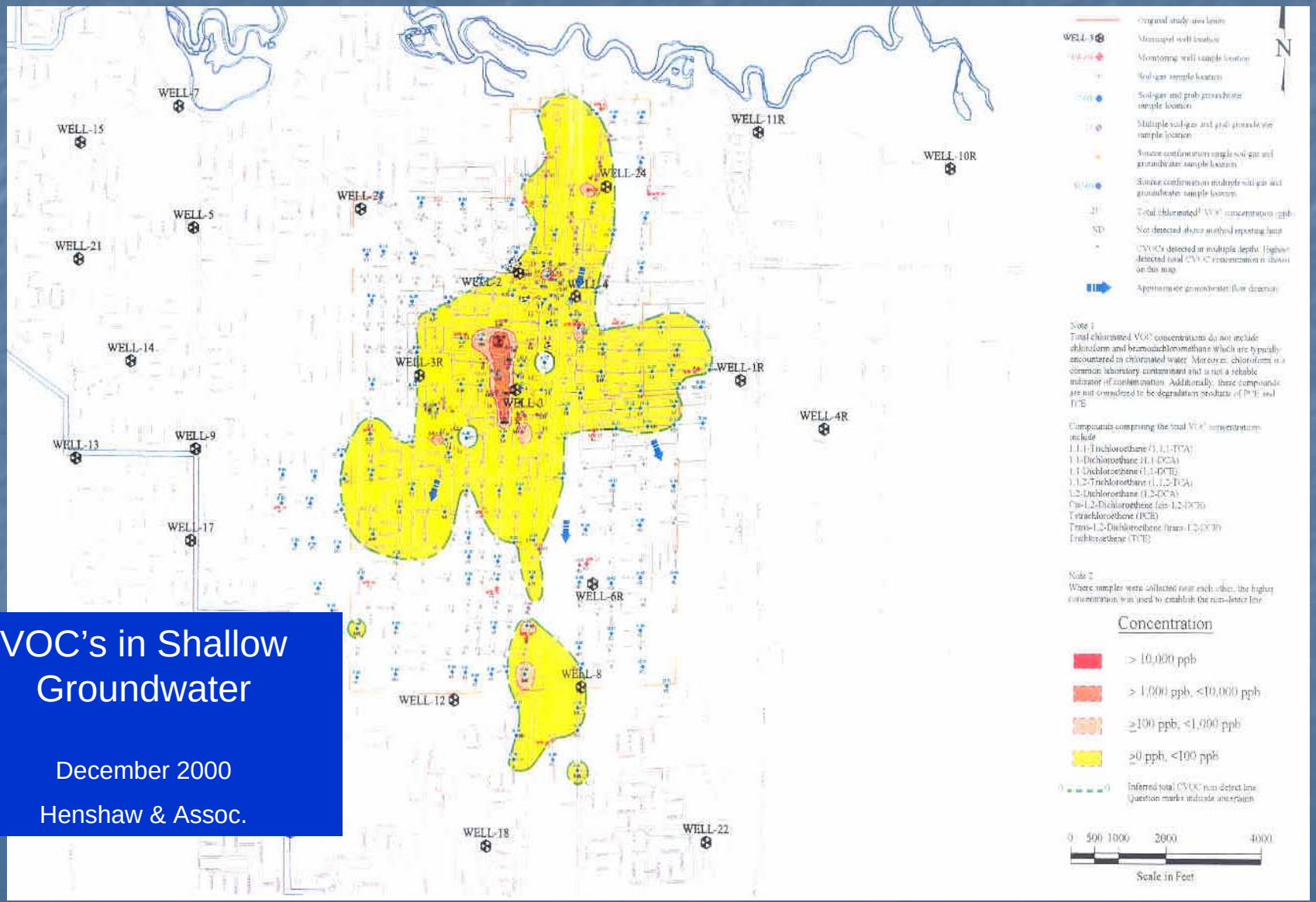
PCE/TCE – What are they?

- Chlorinated solvents used in dry cleaning (mainly PCE) and other industrial and commercial applications (mainly TCE)
- Carcinogenic
  - Drinking water limit is 5 parts per billion
  - Public health goals are lower (0.06 PCE; 0.8 TCE)
- Do not accumulate in food chain
- Physical properties such that they move readily through soil to groundwater and create large plumes

Recap (1)

- Contamination discovered in 1989
- Two rounds of State investigation
  - 1994 URS report – finds widespread contamination, recommends further investigation
  - 1996 NERI Study – identified a number of potential sources and recommended further work
- City involved due to sewers and alleged operation of municipal wells
- 1996 – City hires Michael Donovan with strategy to pursue responsible parties' insurance and recover all City costs
- 1999 – As money to pursue strategy runs out, City borrows funds from Lehman Bros.

Recap (2)



VOC's in Shallow Groundwater

December 2000

Henshaw & Assoc.

Recap (3)

- 2004 – Strategy ends unsuccessfully with various court rulings and City Council action to terminate attorneys and consultants involved; new attorneys and consultants hired
- 2004 – Settlements reached with:
  - Busy Bee defendants who will pursue cleanup
  - USF&G (one of City's insurers) for $9 million
  - Lehman - $32 million claim for principal & interest settled with $6 million payment to Lehman

Recap (4)

- 2005 – Central Plume Settlement
  - $7.375 million received from other parties
  - $2.2 million added by City to establish C.P. trust fund
  - total cost (including operations & maintenance for 30 years) for cleanup method proposed by City estimated at $15.8 million
- 2006 – Settlement (in concept) Southern Plume; needs court approval
- 2006 – Northern and Western Plume joint defense work nearly completed and settlement mediations underway (trial date – June 2008)
- 2006 – City still in litigation with Donovan and other City insurers
- 2006 – rate recall initiative fails 64% to 36%

2005 Cost Estimate

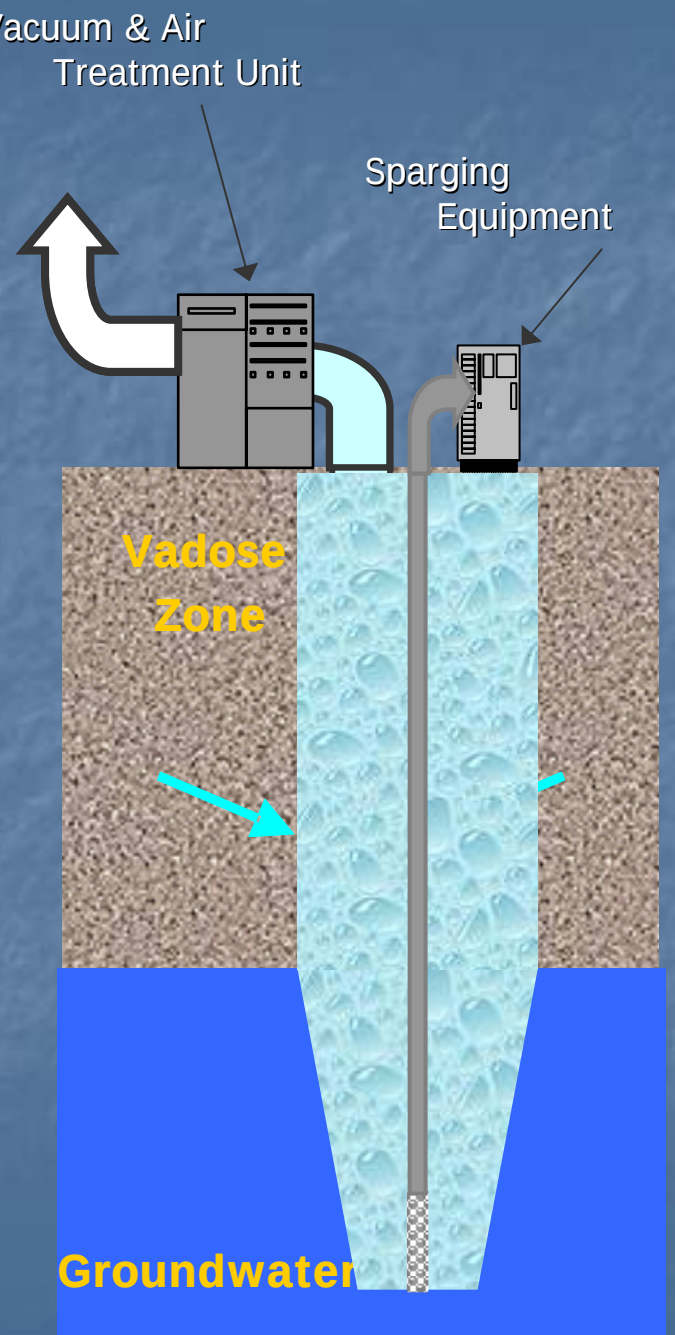
- Net cost of implementing remediation plan is estimated to be $45.7 million and includes capital, operating, and legal expenses, and settlements due to other parties less settlement revenues due to the City
- Above costs include pay back of past expenses (total $12.2 million, which includes $1.9 million of expenses owed to the sewer utility)
- Need for funding (rate increase) determined

2005 Rate Increase Criteria

- No General Fund Impact
- Pay all costs (net of settlements) including past expenses
- Pay past expenses over 15 years, starting in year 3 of program
- Pay out of water fund, not sewer fund
- Maintain reserve in water fund
- Maintain water capital program, with allowance for water meters
- Modified “pay as you go” approach; no outside borrowing
- Result: Three $3.50/month increases implemented over 18 months; final increase scheduled for July 2007

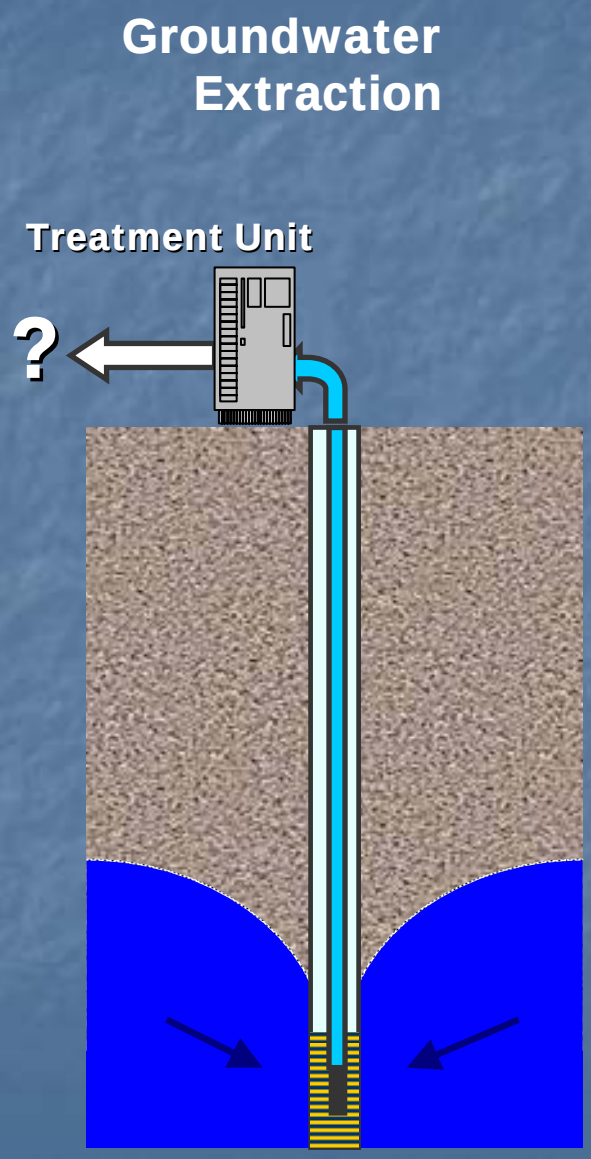
Remediation Techniques

- Soil Vapor Extraction (SVE) – vacuum fans remove vapors from soil above groundwater via special wells; vapors removed from air with carbon or other methods
- “Sparging” – Injection of air (or oxidants, such as ozone) in groundwater to volatize (or destroy) the contaminants so they can be removed using SVE
- SVE/Sparge could run for five years



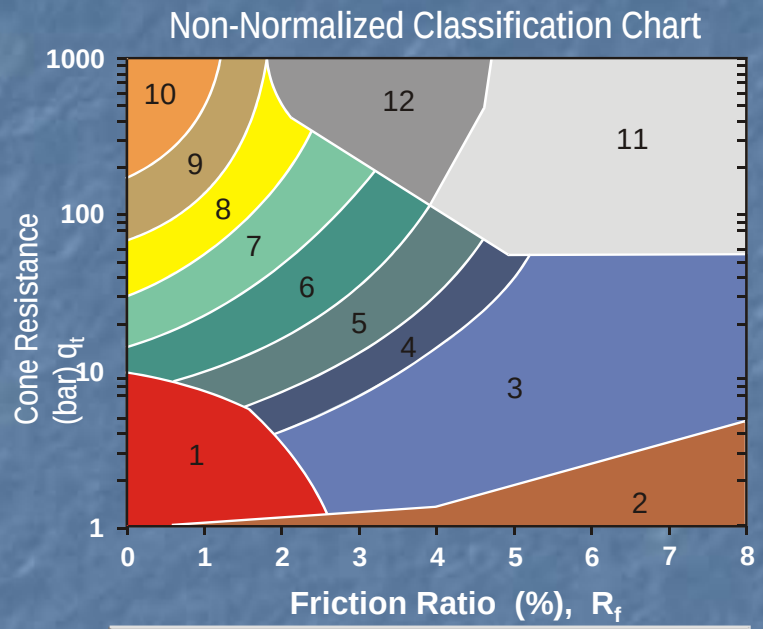
Remediation Techniques

- Groundwater Extraction – pumping groundwater containing PCE/TCE and removing from the water with carbon or other methods; water disposal to be determined
- Focused source area pumping for 3 to 10 years
- Pumping to remove low level contamination will take 30 + years
- Ongoing monitoring and reporting



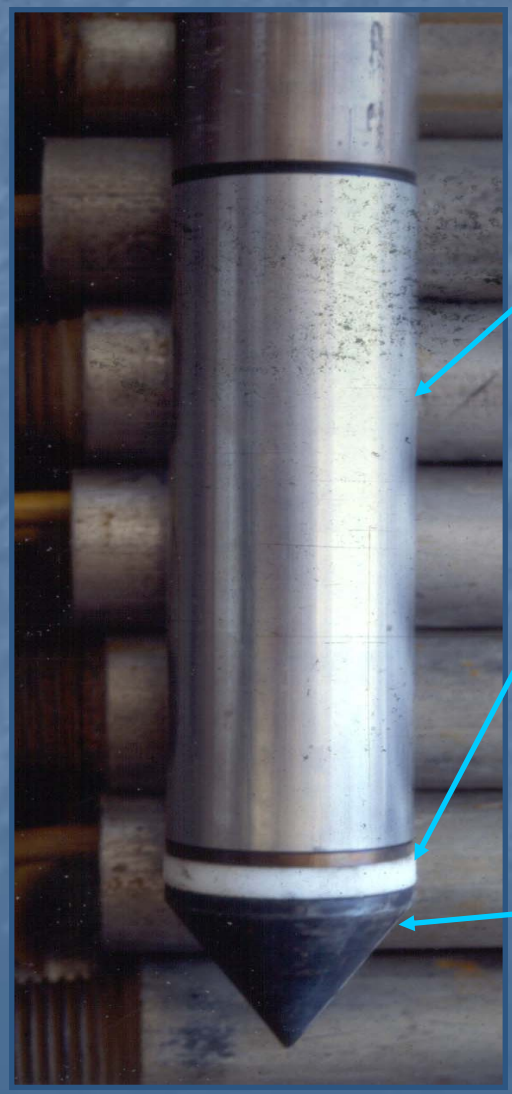
Drilling

CPT Data



Zone		q_t / N	Soil Behavior Type
1		2	sensitive fine grained
2		1	organic material
3		1	clay
4		1.5	silty clay to clay
5		2	clayey silt to silty clay
6		2.5	sandy silt to clayey silt
7		3	silty sand to sandy silt
8		4	sand to silty sand
9		5	sand
10		6	gravelly sand to sand
11		1	very stiff fine grained *
12		2	sand to clayey sand *

* overconsolidated or cemented



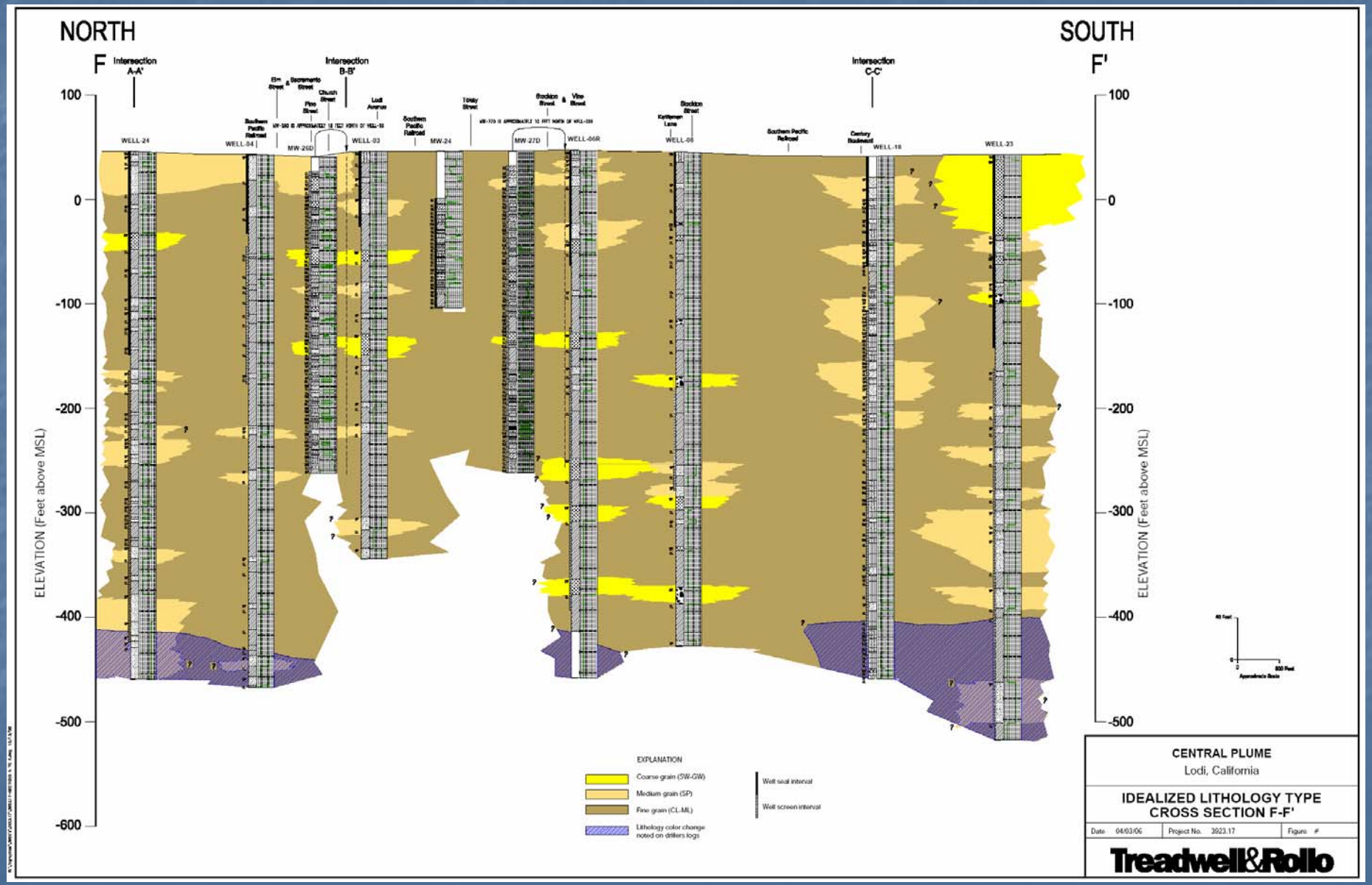
Sleeve Friction
f_s (tsf) = $^{load}/_{2\pi rh}$

Pore Pressure
u_2 (psi)

Tip Resistance
q_c (tsf) = $^{load}/_{\pi r^2}$

Typical CPT Log:

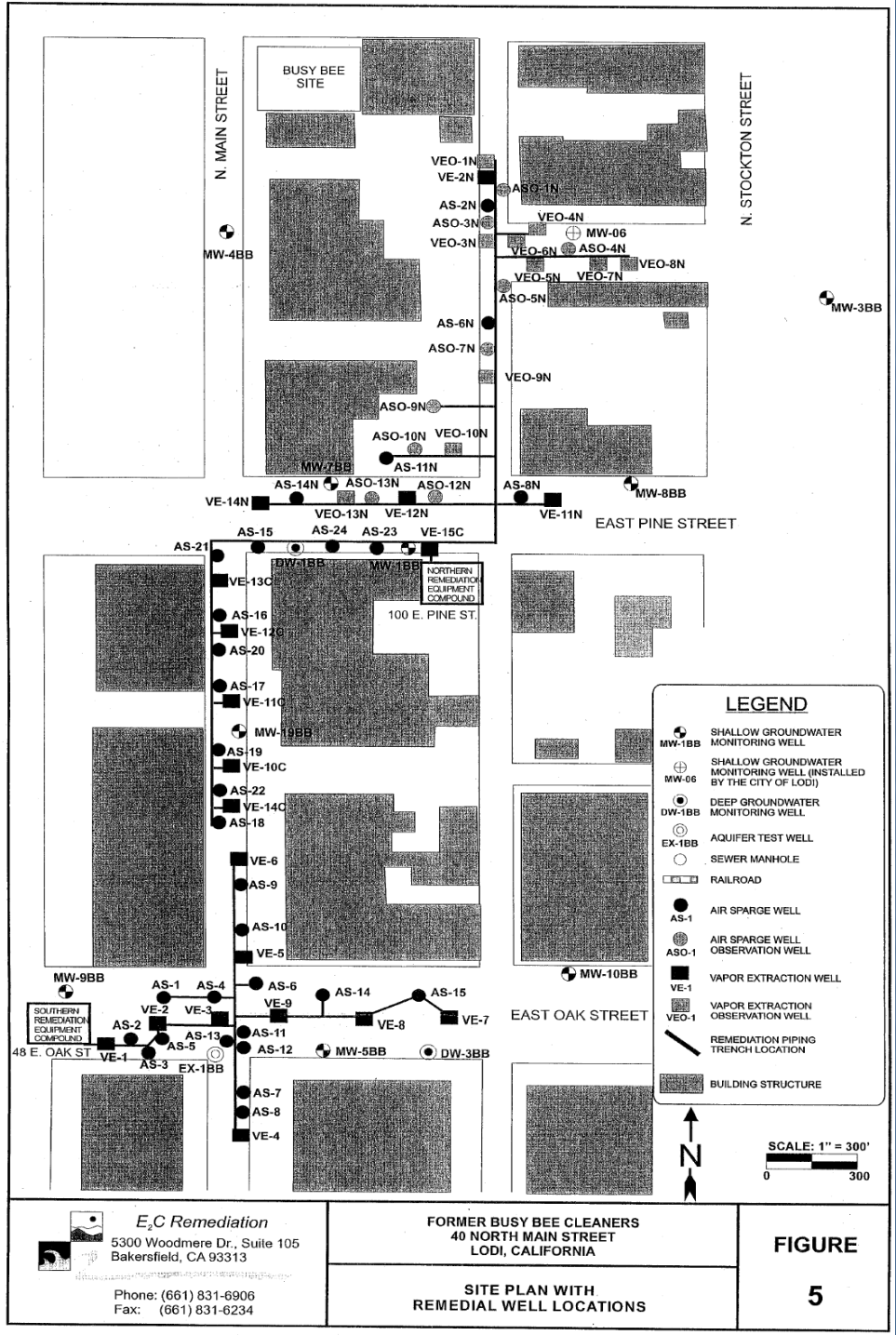
Lithology Cross Section



Sampling

Busy Bee Remediation

- Source located at Elm/Main
- SVE and air sparging wells located to south
- Treatment units located on Pine and Oak Streets
- Work being done through pay for performance contract issued by Busy Bee insurers



Busy Bee System

Top right – Pine St. in Adopt-A-Child parking lot

Lower right – Oak St. at railroad tracks w/Main

Top – Interior of Pine St. system

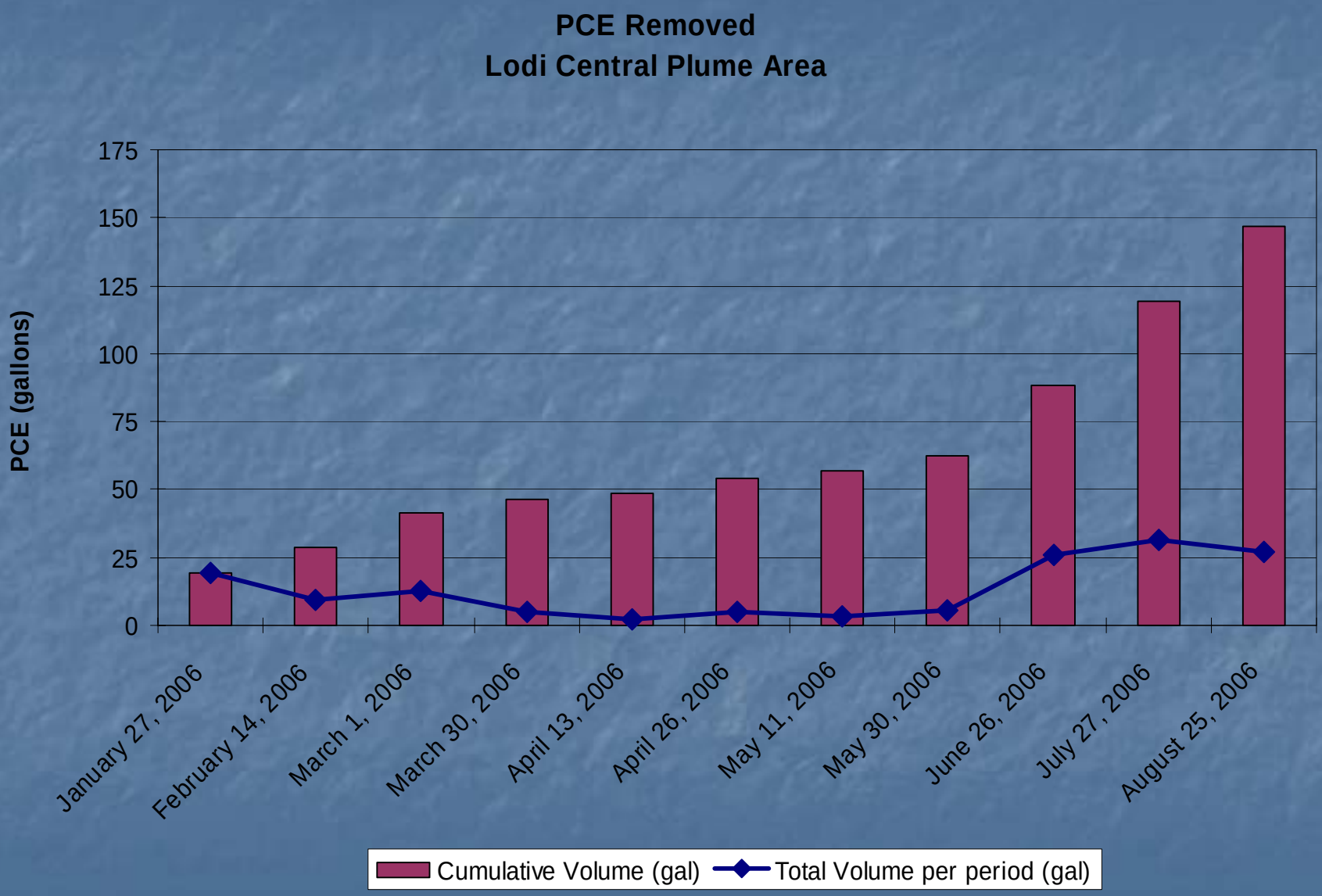
Central Plume Remediation

- Source area at alley south of Pine between Church & Pleasant
- Plume extends nearly one mile south, with eastern movement at southern end
- Plan submitted to Regional Board included:
  - Wellhead treatment planned at City Well 6 in Blakely Park
  - Groundwater extraction planned at southern part of high concentration area

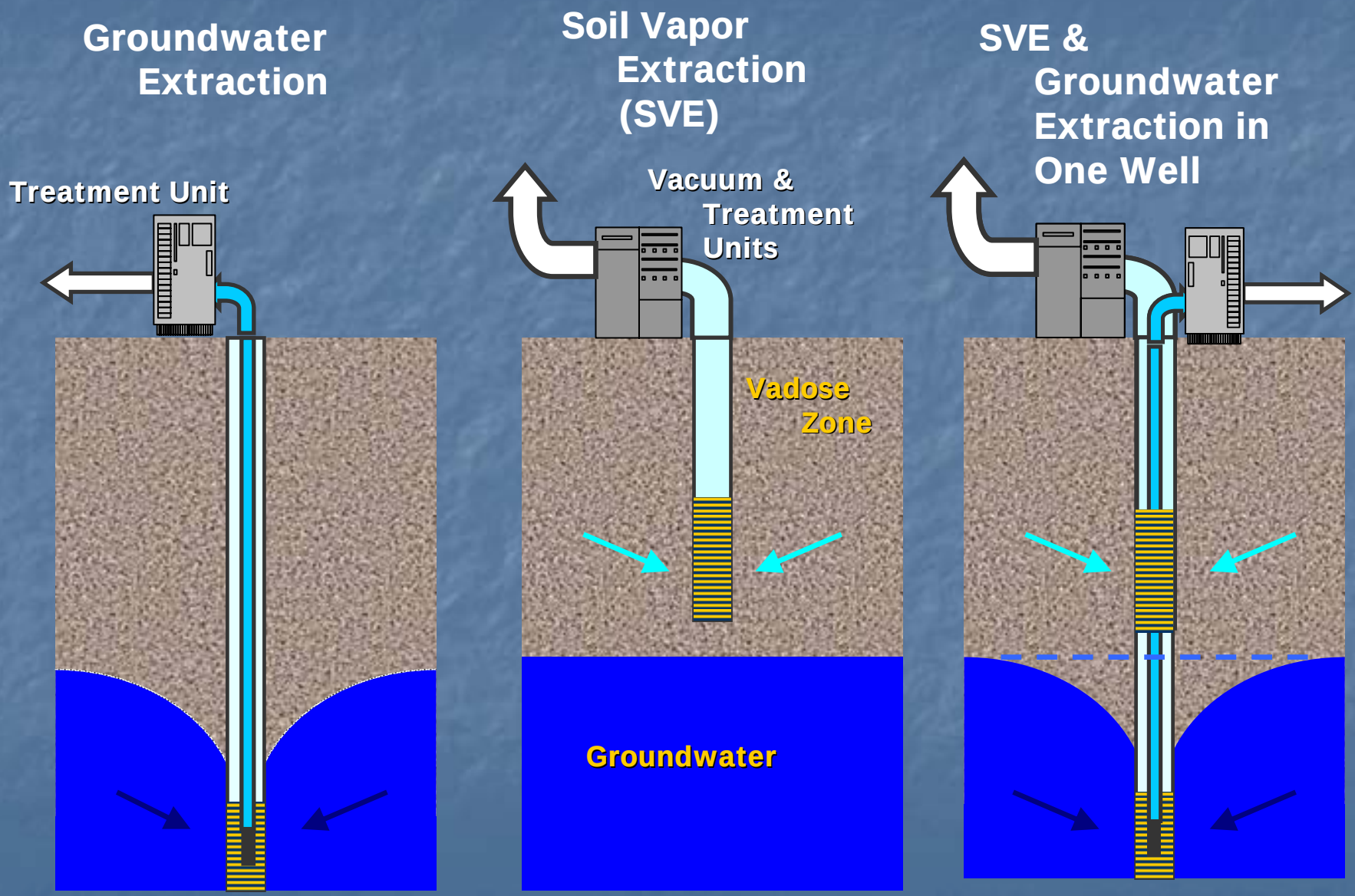
Guild Soil Vapor Extraction System

Soil Vapor Extraction Plumbing & Valves

Soil Vapor Extraction


PCE Removed
Lodi Central Plume Area
PCE (gallons)
175
150
125
100
75
50
25
0
January 27, 2006
February 14, 2006
March 1, 2006
March 30, 2006
April 13, 2006
April 26, 2006
May 11, 2006
May 30, 2006
June 26, 2006
July 27, 2006
August 25, 2006
Cumulative Volume (gal)
Total Volume per period (gal)

New Approach – Dual Phase Extraction



DPE System at Oddfellows Parking Lot

DPE Equipment

Left: Carbon Vapor Treatment Vessel

Above: Water Treatment Vessels

Future Plans (2007)

- Central Plume –
  - Finish DPE test design & install full system
  - Install down-gradient capture & treatment system at Well 6R (2007/8)
- Southern Plume
  - Begin actual remediation work
- Northern & Western Plume
  - Continue settlement negotiations
  - Hope to complete in early 2007; trial date – June 2008 for non-settled parties
  - Begin remediation work afterwards

Next Steps

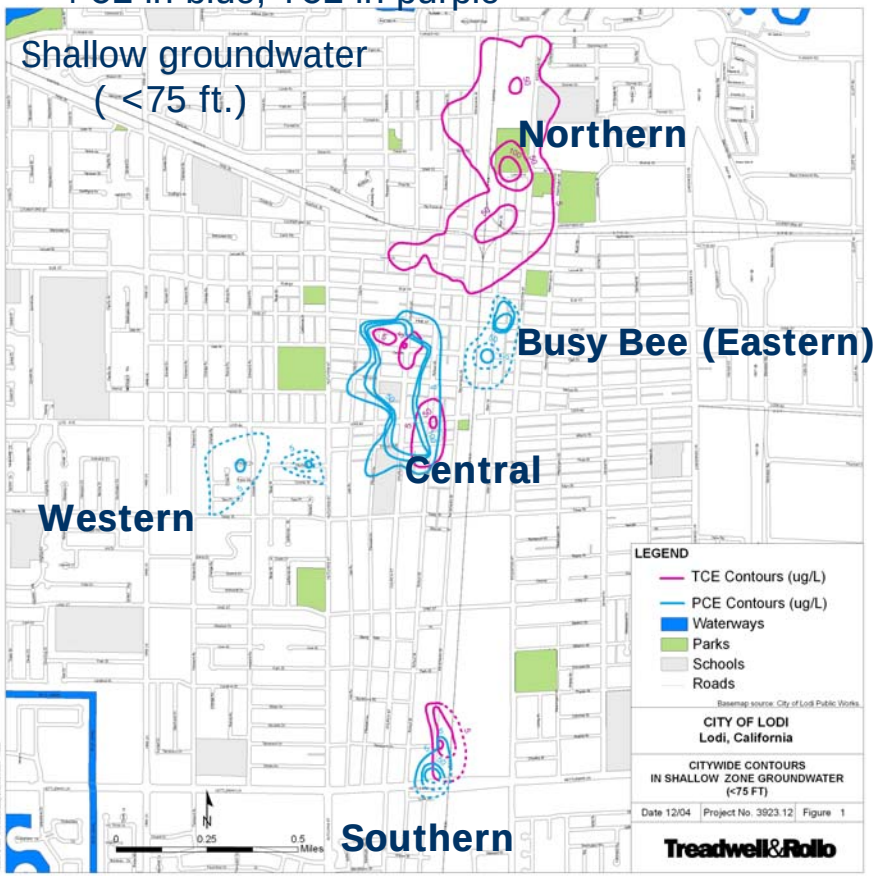
- Evaluate remediation of plumes together rather than individually
- Ongoing monitoring
  - consolidate monitoring & reporting to city-wide rather than individual plumes
  - simplify reporting
  - bid work directly rather than through other consultants
- Revisit 2005 rate increase criteria when:
  - capital costs are known
  - we have better O&M cost estimates
  - significant legal costs are over

Remediation Goals

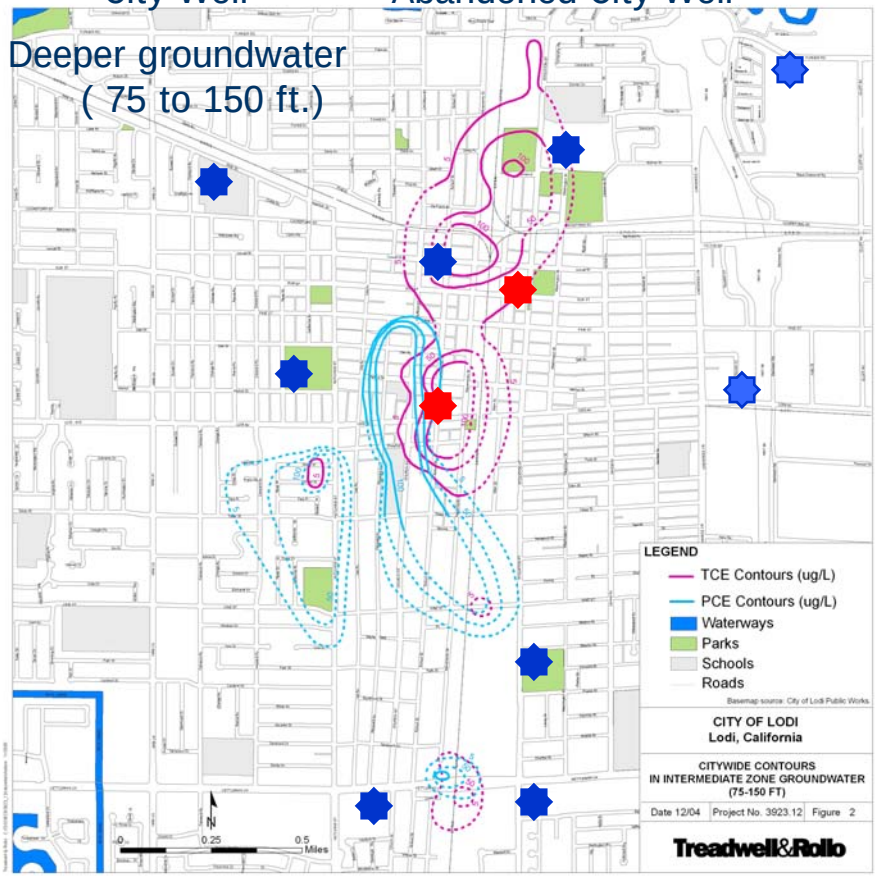
- #1 - Protect the water the City provides to its citizens
- #2 – Protect the groundwater resource
  - don’t waste the water
  - don’t let the contamination leave the area
- #3 – Do 1 & 2 in a cost-effective and affordable way

Current Groundwater Situation

PCE in blue, TCE in purple



City Well Abandoned City Well



The data presented in this figure is for information purposes only. Much of it is sourced from third party work and the City makes no representations or adoptive admissions regarding its accuracy.

Proposed Remediation Concept

- Treat major “hot spots” at source with minimal groundwater extraction; possibly reinject treated water or put to some beneficial use
- Use drinking water production wells (both existing and replacement wells) with treatment units to remove contaminants and to capture and contain plume

Questions/Comments?

- Information being posted on City website
- Older reports available at Library
- Website includes e-mail address for inquiries