DEPARTMENT
OF
TOXIC SUBSTANCES CONTROL

DTSC Investigation Autumnwood Development Wildomar, CA

Bill Bosan, PhD, Theo Johnson, CEG
and Marina Perez, PPS

Explanation:

- Soil Gas sample location
- Sub-slab sample location
- Soil/Soil Gas sample location
- Soil/Soil Gas/Groundwater sample location
- Limits of project area

All locations are approximate

Basemap modified from ESRI World Imagery 2013

SAMPLE LOCATIONS
Autumnwood Development
Wildomar, California

By: jbd	Date: 12/02/2013	Project No. NB1016075P
amec		Figure 2

Plot Date: 12/02/2013 1:25:50 PM, Plotted by: pat.hartig, Drawing Path: Y:\NB\1016075P\ACAD_TS-GIS_SAMPLING LOCATIONS.DWG, Figure 2_Proposed Sample Locations

Explanation:

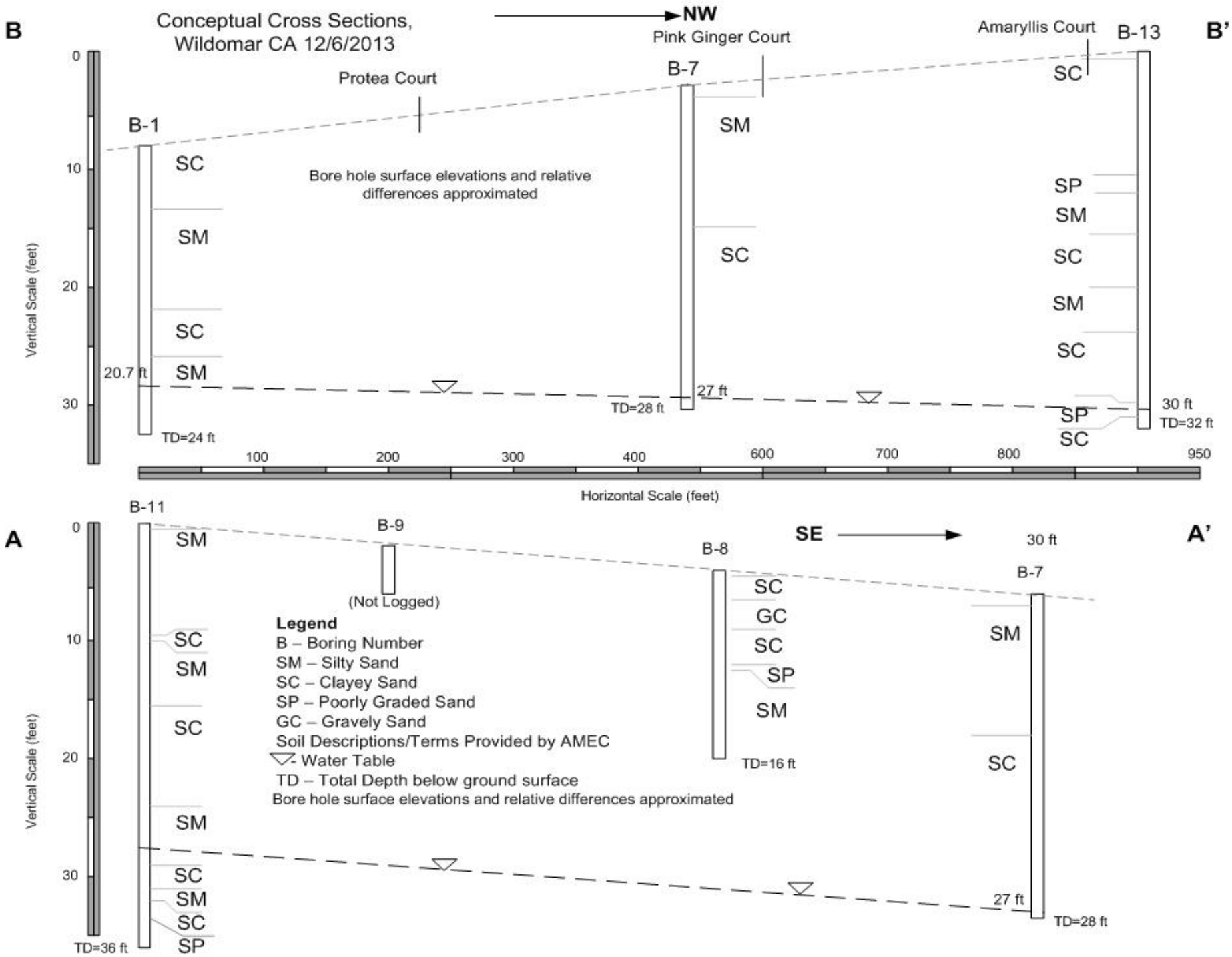
- Soil Gas sample location
- Sub-Slab sample location
- Soil/Soil Gas sample location
- Soil/Soil Gas/Groundwater sample location
- Limits of Study Area

All locations are approximate

Basemap modified from ESRI World Imagery 2013

SAMPLE LOCATIONS
Autumnwood Development
Wildomar, California
(Cross Section Locations Added by DTSC)

By: jbd	Date: 12/02/2013	Project No. NB1016075P
amec		Figure 2


Conceptual Cross Sections,
Wildomar CA 12/6/2013
B
B'
NW
Pink Ginger Court
Protea Court
Amaryllis Court
B-1
B-7
B-13
SC
SM
SC
SM
SC
20.7 ft
TD=24 ft
27 ft
TD=28 ft
SP
SM
SC
SM
SC
30 ft
TD=32 ft
SP
SC
Bore hole surface elevations and relative differences approximated
Vertical Scale (feet)
0
10
20
30
100
200
300
400
600
700
800
950
Horizontal Scale (feet)
A
A'
SE
B-11
B-9
B-8
B-7
SM
(Not Logged)
SC
GC
SC
SP
SM
SC
SM
SC
SM
SC
SP
TD=16 ft
30 ft
27 ft
TD=28 ft
TD=36 ft
Legend
B – Boring Number
SM – Silty Sand
SC – Clayey Sand
SP – Poorly Graded Sand
GC – Gravely Sand
Soil Descriptions/Terms Provided by AMEC
Water Table
TD – Total Depth below ground surface
Bore hole surface elevations and relative differences approximated

Grading Information

- Prior to construction, site soils were excavated and re-compacted to reduce settlement from low density soils
- Excavation depths ranged from a minimum of 10 feet to a maximum of 15 feet

Soil Types and Groundwater Levels

- Soil types encountered during geotechnical and DTSC sampling were predominately silty and clayey sands also classified as sandy clayey loam
- Groundwater was encountered between 20 and 30 feet below ground surface

Soil and Groundwater Sampling Results

- All metals are within background
- No pesticides (OCPs) detected
- No PCBs detected
- Only one SVOC, bis-2ethylhexylphthalate, detected at the detection limit (2.6 mg/kg)
- No VOCs detected in groundwater
- No formaldehyde detected in groundwater

Soil Gas Results

Concentrations reported in micrograms per liter (µg/L)

Sample Location	Sample Depth (feet bgs)	Sample Identification	Sample Date	Tetrachloroethene	Chloroform	Benzene	Toluene	Ethylbenzene	m, p-Xylene	O-Xylene	1,2,4-Trimethylbenzene	1,3,5- Trimethylbenzene	Naphthalene	p-Isopropyltoluene	Methanol	Tracer 1,1 Difluoroethane (LCC)
		CHHSL	**(µg/L)**	**0.47**	**0.42**	**0.09**	**320**	**1**	**800**	**740**	**3.65**	**3.65**	**0.09**	**210**		
1-SV	5	1-SV-5	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	5-Rep	1-SV-5-Rep	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	10	1-SV-10	11/15/13	ND	ND	**0.03**	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
2-SV-1PV	5	2-SV-5	11/14/13	ND	ND	ND	ND	ND	**0.19**	ND	ND	ND	ND	ND	--	ND
2-SV-3PV				ND	ND	**0.02**	ND	ND	**0.21**	ND	ND	ND	ND	ND	--	ND
2-SV-10PV				ND	**0.04**	**0.02**	ND	ND	**0.27**	ND	ND	ND	ND	ND	--	ND
2SV	15	2-SV-15	11/14/13	ND	ND	**0.08**	**0.25**	ND	**0.26**	ND	**0.10**	ND	**0.20**	ND	--	ND
4-SV	15	4-SV-15	11/15/13	ND	ND	**0.10**	**0.29**	ND	**0.30**	ND	ND	ND	ND	ND	--	ND
	5	4-SV-5	11/15/13	ND	ND	**0.02**	ND	ND	ND	ND	ND	ND	ND	ND	--	**1.1**
5-SV	15	5-SV-15	11/14/13	ND	ND	**0.03**	ND	ND	**0.27**	ND	**0.17**	ND	ND	ND	--	**0.27**
	5	5-SV-5	11/14/13	ND	**0.04**	ND	ND	ND	**0.14**	ND	ND	ND	ND	ND	--	ND
6-SV	15	6-SV-15	11/14/13	ND	ND	**0.02**	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	15-Rep	6-SV-15-Rep	11/14/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	3	6-SV-3	11/15/13	ND	ND	**0.02**	ND	ND	**0.18**	ND	ND	ND	ND	ND	--	ND
7-SV	5	7-SV-5	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	15	7-SV-15	11/15/13	ND	ND	**0.08**	**0.23**	**0.25**	**1.5**	**0.42**	**0.13**	ND	ND	**0.15**	--	ND

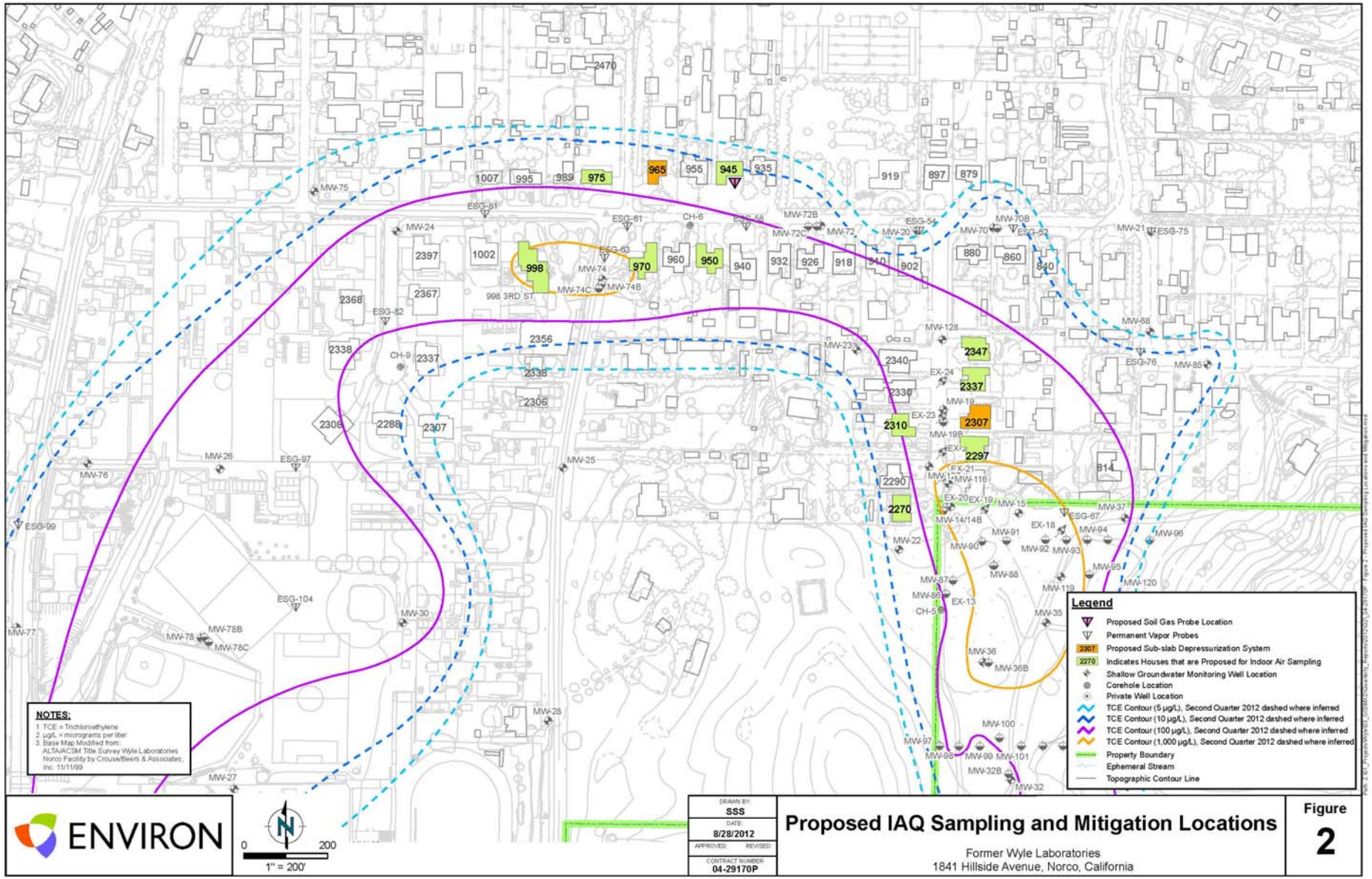
Soil Gas Results

Concentrations reported in micrograms per liter (µg/L)

Sample Location	Sample Depth (feet bgs)	Sample Identification	Sample Date	Tetrachloroethene	Chloroform	Benzene	Toluene	Ethylbenzene	m, p-Xylene	O-Xylene	1,2,4-Trimethylbenzene	1,3,5- Trimethylbenzene	Naphthalene	p-Isopropyltoluene	Methanol	Tracer 1,1 Difluoroethane (LCC)
		CHHSL	**(µg/L)**	**0.47**	**0.42**	**0.09**	**320**	**1**	**800**	**740**	**3.65**	**3.65**	**0.09**	**210**		
8-SV	3	8-SV-3	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	15	8-SV-15	11/15/13	ND	ND	**0.08**	ND	**0.13**	**0.71**	**0.20**	**0.14**	ND	ND	**0.22**	--	ND
9-SV	15	9-SV-15	11/15/13	ND	ND	**0.03**	ND	ND	**0.24**	ND	**0.37**	**0.14**	ND	ND	--	ND
	5	9-SV-5	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
11-SV	15	11-SV-15	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	5	11-SV-5	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
12-SV-1PV	15	12-SV-15	11/13/13	ND	ND	**0.06**	**0.26**	ND	**0.33**	**0.12**	ND	ND	**0.02**	ND	--	**0.70**
12-SV-3PV				ND	ND	**0.02**	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
12-SV-10PV				ND	ND	**0.02**	ND	ND	**0.13**	ND	ND	ND	ND	ND	--	ND
12-SV	5	12-SV-5	11/14/13	ND	ND	**0.02**	ND	ND	**0.11**	ND	**0.11**	ND	ND	ND	--	**0.89**
13-SV	15	13-SV-15	11/14/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	5	13-SV-5	11/14/13	ND	**0.02**	**0.06**	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
15-SV	15	15-SV-15	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND
	5	15-SV-5	11/15/13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	ND

Soil Gas Sampling Results

- BETX and fuel-related VOCs detected in soil gas
- One detection of benzene above its soil gas CHHSL
- One detection of naphthalene above its soil gas CHHSL
- No indication of a subsurface source or soil gas plume
- VOCs detected in soil gas appear to be ambient or background


Legend
Proposed Soil Gas Probe Location
Permanent Vapor Probes
2307 Proposed Sub-slab Depressurization System
2270 Indicates Houses that are Proposed for Indoor Air Sampling
Shallow Groundwater Monitoring Well Location
Corehole Location
Private Well Location
TCE Contour (5 µg/L), Second Quarter 2012 dashed where inferred
TCE Contour (10 µg/L), Second Quarter 2012 dashed where inferred
TCE Contour (100 µg/L), Second Quarter 2012 dashed where inferred
TCE Contour (1,000 µg/L), Second Quarter 2012 dashed where inferred
Property Boundary
Ephemeral Stream
Topographic Contour Line
NOTES:
1. TCE = Trichloroethylene
2. µg/L = micrograms per liter
3. Base Map Modified from: ALTA/ACSM Title Survey Wyle Laboratories Norco Facility by Crouse/Beers & Associates, Inc. 11/11/99
0
200
1" = 200'
ENVIRON
DRAWN BY: SSS
DATE: 8/28/2012
APPROVED: REVISED:
CONTRACT NUMBER: 04-29170P
Proposed IAQ Sampling and Mitigation Locations
Former Wyle Laboratories
1841 Hillside Avenue, Norco, California
Figure 2

Wyle Labs Example 1

Sample Depth (feet bgs)	Sample Identification	Sample Date		Benzene	Toluene	Ethylbenzene	m, p-Xylene	O-Xylene	1,2,4-Trimethylbenzene	1,3,5- Trimethylbenzene
	Soil Gas CHHSL (µg/L)			0.09	320	1	800	740	3.65	3.65
4	ASG-21	07/20/05		0.07	0.59	0.2	0.44	0.33	0.56	0.19
5	ASG-22	07/20/05		0.05	0.58	0.2	0.45	0.33	0.54	0.18
5	ASG-23	07/20/05		0.02	0.23	0.09	0.21	0.16	0.32	0.09
9	ASG-23	07/20/05		0.13	0.34	0.1	0.18	0.14	0.24	0.07
5	ASG-24	07/20/05		0.05	0.44	0.16	0.34	0.25	0.41	0.14
5	ASG-25	07/20/05		0.03	0.17	0.08	0.18	0.14	0.32	0.09
4	ASG-26	07/20/05		0.04	0.19	0.18	0.38	0.25	0.3	0.08

Wyle Example 2

Sample Depth (feet bgs)	Sample Identification	Sample Date		Benzene	Trichloroethene
	Soil Gas CHHSL (µg/L)			0.09	0.22
5	ESG-51	10/11/04		0.02	5
14	ESG-51	10/11/04		0.03	13
5	VW-1	10/12/04		0.11	98
12	VW-1	10/12/04		0.42	910
5	VW-2	10/12/04		0.04	2.4
5	VW-3	10/12/04		0.1	43
10	VW-3	10/12/04		0.36	300
5	VW-4	10/12/04		0.1	90
13	VW-4	10/12/04		<0.58	730
5	VW-5	10/12/04		<0.05	13
15	VW-5	10/12/04		0.18	190

Soil Gas Risk and Hazard

Volatile Organic Compound	Maximum Soil Gas Concentration ($\mu g/m^3$)	Soil Gas Depth (feet)	Maximum Indoor Air Risk	Maximum Indoor Air Hazard
Benzene	100	15	3.5E-07	9.4E-04
Chloroform	40	5	7.3E-08	1.1E-04
Ethylbenzene	250	15	6.6E-08	6.1E-05
p-Isopropyltoluene	220	15	NC	1.2E-04
Naphthalene	200	15	5.7E-07	1.3E-02
Toluene	290	15	NC	2.7E-04
1,2,4-Trimethylbenzene	370	15	NC	1.1E-02
1,3,5-Trimethylbenzene	140	15	NC	4.7E-03
m,p-Xylene	1,500	15	NC	1.2E-03
o-Xylene	420	15	NC	3.8E-03
		Total	**1.E-06**	**0.04**

Soil Gas Summary

- No formaldehyde detected in soil gas
- VOCs detected in soil gas do not pose an indoor air risk or hazard
- Soil gas does not pose a vapor intrusion threat

Sub-Slab Soil Gas Results

Concentrations reported in micrograms per liter (µg/L)

Sample Location	Sample Identification	Sample Date	Tetrachloroethene	Chloroform	Benzene	Toluene	Ethylbenzene	m, p-Xylene	O-Xylene	1,2,4-Trimethylbenzene	1,3,5- Trimethylbenzene	Naphthalene	p-Isopropyltoluene	Methyl tert-butyl ether	Methylene Chloride	Methanol	Tracer 1,1 Difluoroethane (LCC)
3B (bedroom)	3B-SV	11/14/2013	ND	ND	**0.02**	**0.06**	**0.02**	**0.05**	**0.02**	**0.02**	ND	ND	ND	ND	ND	**0.54**	**0.008**
3G (garage)	3G-SV	11/14/2013	**0.02**	**0.01**	**0.06**	**0.14**	**0.03**	**0.07**	**0.02**	**0.01**	ND	ND	ND	ND	**0.01**	**0.1**	**0.008**
10L (living room)	10L-SV	11/14/2013	**0.02**	ND	**0.02**	**0.08**	**0.02**	**0.03**	**0.01**	**0.01**	ND	ND	ND	ND	ND	ND	**0.019**
10B (bedroom)	10B-SV	11/14/2013	ND	ND	**0.01**	**0.02**	ND	**0.02**	**0.01**	**0.01**	ND	ND	ND	ND	**0**	**0.23**	**1**
10B duplicate	10B-SV-Rep	11/14/2013	ND	ND	**0.01**	**0.01**	ND	**0.01**	**0.01**	**0.01**	ND	ND	ND	ND	ND	**0.19**	**0.12**
14G (garage)	14G-SV	11/14/2013	ND	ND	**0.03**	**0.06**	**0.01**	**0.03**	**0.01**	**0.02**	ND	ND	ND	ND	ND	**0.1**	**0.02**
14B (bedroom)	14B-SV	11/14/2013	**0.01**	ND	**0.11**	**0.16**	**0.04**	**0.08**	**0.03**	**0.02**	ND	ND	ND	**0.01**	ND	**0.04**	**0.012**

Sub-Slab Soil Gas Summary

- Maximum estimated indoor air concentration of benzene would be 5 µg/m^3
  - Consistent with measured indoor air concentrations
  - Within the median range of background for homes without vapor intrusion
  - Can not distinguish potential vapor intrusion from ambient air and indoor air sources
- Maximum estimated indoor air concentration of methanol would be 27 µg/m^3
  - Well below the chronic REL (4,000 µg/m^3)and acute REL (28,000 µg/m^3)

Sub-Slab Soil Gas Summary

Concentrations reported in micrograms per cubic meter ($\mu g/m^3$)

Sample Location	Sample Depth (feet bgs)	Sample Identification	Sample Date	Formaldehyde
2-SV	5	2-SV-5	11/14/13	ND
6-SV	15	6-SV-15	11/14/13	ND
6-SV Dup	15	60-SV-15	11/14/13	ND
8-SV	3	8-SV-3	11/14/13	ND
12-SV	15	12-SV-15	11/14/13	ND
13-SV	15	13-SV-15	11/14/13	ND
3B-SV	sub-slab	3B-SV	11/14/13	**6.53**
10L-SV	sub-slab	10L-SV	11/14/13	**6.64**
14B-SV	sub-slab	14B-SV	11/14/13	**8.10**
Blank	--	Blank	11/14/13	ND

Sub-Slab Soil Gas Summary

- Low levels of formaldehyde detected in sub-slab soil gas (6 – 8 µg/m^3)
  - ➢ Likely from indoor air
- Indoor air concentrations of formaldehyde ranged from 23 – 82 µg/m^3
  - ➢ For vapor intrusion to be occurring, the sub-slab soil gas concentration would have to be 460 – 1,640 µg/m3
- Formaldehyde is an indoor air source

Conclusions

Based on multiple lines of evidence

1. No evidence of soil contamination
2. VOCs detected in soil gas are consistent with background or ambient levels of VOCs in soil gas throughout southern California
3. Shallow groundwater is not a source of VOCs
4. VOCs detected in soil gas do not pose a significant indoor air risk or hazard
5. Per DTSC's VI Guidance, vapor intrusion is not occurring at the Autumnwood Development
6. VOCs detected in indoor air are from indoor air sources, not vapor intrusion

DTSC Contact Information

For more information regarding these investigation activities, please contact:

- Dr. Bill Bosan, DTSC Senior Toxicologist, (714) 484-5399, william.bosan@dtsc.ca.gov
- Theo Johnson, DTSC Senior Geologist, (714) 484-5414, theo.johnson@dtsc.ca.gov
- Marina Perez, DTSC Public Participation Specialist, (818) 717-6569 or toll-free, 1-866-495-5651, marina.perez@dtsc.ca.gov
- For media inquiries, please contact Russ Edmondson, Public Information Officer, (916) 323-3372, russ.edmondson@dtsc.ca.gov

Multiple Agencies Contact Information

For indoor air quality or health issues, please contact:

- Dr. Cameron Kaiser, Riverside County Public Health Officer, Department of Public Health, (951) 358-5000, ckaiser@rivcocha.org
- Dr. Rick Kreutzer, Division Chief, Environmental and Occupation Disease Control, California Department of Public Health, (510) 620-3126, rick.kreutzer@cdph.ca.gov
- Dr. Gabriele Windgasse, Chief, Site Assessment Section, California Department of Public Health, (510) 620-3610, gabriele.windgasse@cdph.ca.gov