GRU DNAPL Team Comments to

"Supplemental Hawthorn Group Investigation and Monitoring Well Installation Report"

March 18, 2008 GeoTrans

The GRU DNAPL Team has reviewed the *Supplemental Hawthorn Group Investigation and Monitoring Well Installation Report for the Koppers Inc. Site* dated March 18, 2008. We offer the following comments to the report.

1. DNAPL Not Present Off Site

GeoTrans concluded in this report on p. 21 that "The relatively low dissolved-phase constituent concentrations in the off-site Upper or Lower Hawthorn monitoring wells are not indicative of residual of free-phase NAPLs in the vicinity of these wells". The implication in this conclusion is that DNAPL is not present in the Hawthorn deposits off the Koppers site. We believe that the data indicate otherwise.

The naphthalene concentration in well HG-26S in the Upper Hawthorn was 1,300 µg/L (average of duplicates 1,400 and 1,200 µg/L). This concentration represents about 10% of the effective solubility of naphthalene in water in contact with typical creosote. The theoretical effective solubility of naphthalene is about 10,000 µg/L to 20,000 µg/L for creosote containing 10% to 20% naphthalene. This theoretical value is consistent with the concentrations measured in Upper Hawthorn monitoring wells that contain free-phase creosote (HG-11S: 20,200 µg/L, HG-15S: 8,690 µg/L).

In cases where dissolved-phase concentrations exceed 1% of effective solubility, it is common practice in Superfund site investigations[1] to interpret that DNAPL is present in the subsurface. In the case of HG-26S, it would commonly be interpreted that DNAPL was present in the vicinity, i.e. probably off the Koppers site.

[1] Newell, C. J. and R. R. Ross (1992). Estimating Potential for Occurrence of DNAPL at Superfund Sites. USEPA Publication 9355.4-07FS, January 1992; and see Feenstra, S. and J.A. Cherry, 1996, Dense Chlorinated Solvents and other DNAPLs in Groundwater, Waterloo Press, Figure 13.27, p. 457.

However, in this case it is known also that DNAPL is present upgradient of HG-26S at HG-11S and HG-15S in the former Process Area where dissolved-phase concentrations are about 100% of the effective solubility for naphthalene. There are no other monitoring wells in the Upper Hawthorn between HG-26S and the former Process Area, a distance of about 500 feet. The areal extent of DNAPL in the former Process Area may be limited to the Koppers site or may extend some distance off site toward, or even close to, HG-26S. However, from the available data from HG-26S and HG-11S / HG-15S, it is not possible to conclude that DNAPL either is, or is not, present off the Koppers site in the Upper Hawthorn.

2. Distribution of COCs

The 2006 Review & Recommendations report by GRU's DNAPL team presented two figures showing the spatial distribution of naphthalene (Figure 4-22) and 2,4-dimethylphenol (Figure 4-23) in the HG sediments and monitoring wells (MW). One well – HG-11S which is situated next to PW-1 in the southeast corner of the site – contained 20,200 ppb of naphthalene, 3,690 ppb of pentachlorophenol, and 1,840 ppb of benzene in July 2004. Three deep HG monitoring wells – HG-10D, HG-12D, and HG-16D – all either produced sufficient DNAPL to test for viscosity (HG-16D) or had a measurable thickness in the newly installed wells (HG-10D and HG-12D). None of these heavily contaminated wells were sampled during the GeoTrans investigation; however the concentrations of benzene, carbazole, and naphthalene are substantial and document that the HG is heavily contaminated. **Therefore, we recommend that Beazer re-sample all the HG wells that were left un-sampled during the December 2007 sampling event.** The fate of this contamination in the Hawthorn is unknown.

The R&R report states on p. 3-8 that "naphthalene concentrations in FW-6 have ranged from 2,560 µg/L to 840 µg/L, which represent 10% to 20% of [the] expected effective solubility of naphthalene from creosote [DNAPL]." Figure 1 is based upon Figure 4-3 of the GeoTrans report and shows the monitoring wells completed within the HG and sampled since 2000 that contain groundwater with concentrations of naphthalene, pentachlorophenol, or benzene in excess of 1,000 µg/L. It shows that the Upper HG sediments are heavily contaminated by creosote components and by PCP in the southeast corner of the Site. The Lower HG sediments are also heavily contaminated with naphthalene at levels that indicate the nearby presence of creosote DNAPL, i.e., 1,000 μg/L is 10-20% of its effective solubility in creosote.

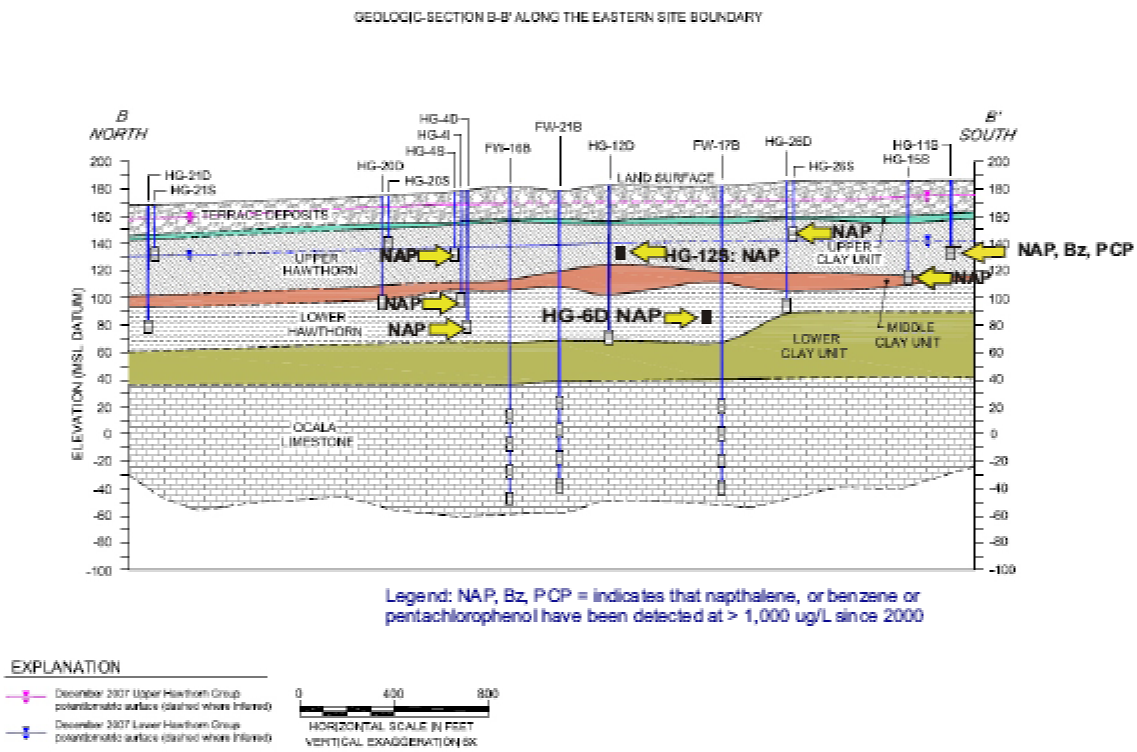


Figure 1: Geologic cross section along the Eastern Site Boundary [Fig 4-3, GeoTrans report]

Figure 1 summarizes what the R&R report concluded: (a) Creosote DNAPL is widespread in the Lower HG and (b) beneath some parts of the Site the DNAPL has been sufficiently mobile – and therefore was at sufficient saturation (i.e., >20% of pore volume) – to flow into boreholes HG-10D, HG-12D, and HG-16D. Furthermore, the present level of understanding of the spatial distribution of this contamination in the HG does not, in our opinion, satisfy Recommendation #3 of EPA's Second Five Year Review Report; "Further characterization of the Hawthorn Group sediment is necessary for remedial design and action." We believe that Figure 1 shows a seepage face where creosote DNAPL is slowly migrating beneath the railroad tracks and beyond the Site boundaries where it may intersect permeable pathways through the HG into the Ocala aquifer.

The contamination is not confined to the southeast section of the Site. The drilling log for HG-21D (Appendix A – Geologic Core Section Field Forms) indicates moderate to faint creosote odors between 14.5 feet and 24 feet below grade with no recovery between 24 feet and 28 feet. The boring log for HG-20D indicates various chemical odors from 8 feet to at least 64.5 feet below grade. The experience of GRU's DNAPL Team is that such smells are commonly associated with the proximity to DNAPL. Therefore, we believe that the eastern seepage face shown in Figure 1 above should be regarded as heavily contaminated by creosote DNAPL throughout its entire length.

3. DNAPL Penetration of Well Screens

It is approximately 20 m from the bottom of the Surficial Aquifer (~170 ft amsl) to the top of the Lower Clay Unit (~110 ft amsl) that separates the Ocala from the LHG, therefore the pressure head on this clay from creosote (specific gravity of HG-16D sample = 1.10) is about 200 kPa. This is apparently sufficient head to drive this viscous NAPL (40 cP at in-situ temperature) into well HG-16D (see Table 12 of the September 2004 Data Report for Additional Investigation of Hawthorn Group DNAPL Source Evaluation for the Koppers Industries Properties). That means that there was and probably still is mobile creosote in the LHG. However; the pressure head in the Surficial Aquifer is much lower due to the significantly lower head that the creosote can exert on a well screen – perhaps just one meter of head difference (not 20) with a consequent decrease in pressure head to around 10-20 kPa. This may explain why none of the monitoring wells in the Surficial Aquifer had measurable amounts of creosote when tested during 2007 (2007 First Semiannual Stage 2 Groundwater Monitoring Report, August 15, 2007).

Therefore, one cannot conclude that there has not been appreciable off-site migration of creosote DNAPL in the Surficial Aquifer, or any aquifer, simply because DNAPL is not entering wells. As shown in the Review and Recommendations report (February 2006), there is strong evidence in the dissolved-phase database that creosote DNAPL migrated off-site to ITW-21, which displayed 5,570 µg/L of naphthalene when it was plugged and abandoned in February 2004 (Review and Recommendations report, p.4-39 and Figure 4-8) and to various wells in the UHG and the LHG.

4. Distribution of Contaminants

The presence of increasing contaminant concentrations with depth in Floridan well FW-12B has been puzzling. However, the boring log, presented in the July 26, 2006 Supplemental Upper Floridan Aquifer Monitoring Well Installation report reveals that cores exhibited "faint to strong creosote-like odors" between 217 ft and 233 ft below grade. We present the relevant section of the FW-12B boring log, rock core section log, and GeoTrans core description codes sheet as an attachment to these comments. The lowermost of the four screens in this well spans the approximate interval 215 ft to 225 ft below grade. About 6 feet of the borehole that exhibited faint to strong creosote odor is not intersected by the lowest well screen. As a result, concentrations of creosote compounds may be higher at greater depths at this location than sampled by the existing installation. The presence of strong creosote odors at this depth in the Floridan suggests that DNAPL may have penetrated to this depth in the Floridan. We believe this finding further supports our position that additional investigation in the Lower Hawthorn and FAS is warranted.

Also, we believe that GeoTrans' April 2, 2008 document titled "Attachment A: Response to Comments, EPA's Memorandum" Dated December 22, 2007 is relevant to the discussion presented above. We provide our comments to that April 2, 2008 document as an attachment to this document.

Attachment A

GRU DNAPL Team Comments to

"Attachment A: Response to Comments, EPA's Memorandum Dated December 22, 2007 by GeoTrans April 2, 2008"

The GRU DNAPL Team has reviewed Attachment A: Response to Comments, EPA's Memorandum Dated December 22, 2007 submitted by GeoTrans on April 2, 2008. We offer the following comments to the report.

Majority of DNAPL is Immobile

This document states (p. 5) that "*The majority of the DNAPL is at residual saturation"* (within the Surficial Aquifer and HG deposits) "*and is currently immobile*".

There is little basis for estimating the relative proportion of DNAPL that is mobile or immobile, in any of the subsurface units at Koppers. Quantifying the volume of mobile DNAPL is difficult even in ideal cases, but essentially impossible at the Koppers Site given the heterogeneous geologic conditions and size of the site in comparison to the level of detail of the subsurface investigations, particularly in the Hawthorn deposits. Just because DNAPL does not flow into a well, does not mean that mobile DNAPL is not present.

In order to identify DNAPL as mobile, a soil boring or monitoring well must directly intersect the DNAPL layer or pool. To identify DNAPL as mobile in a soil core sample, the sample must be relatively undisturbed and DNAPL observed to drain spontaneously. Several factors will interfere with this type of observation even if the DNAPL is in fact mobile. Creosote is relatively viscous and will drain from samples slowly. Drainage from thin mobile layers may not be noted if surrounded by staining and visual evidence of residual DNAPL. To identify DNAPL in a monitoring well, the fluid potentials of the DNAPL must be sufficient to enter the filter pack of the well, and the volumes of

DNAPL that drain to the filter pack must be sufficiently large to accumulate in the well screen and to be recovered and identifiable during sampling. Viscous DNAPL in thin layers or accumulations may not necessarily be reflected as free-phase DNAPL in a monitoring well because of the required entry pressure to overcome the resistance offered by the filter pack. In any event, even if identified in a monitoring well, it is not possible to estimate the volume of mobile DNAPL that might be present in the vicinity of the well.

In addition, the size of the site in comparison to the level of detail of the subsurface investigations makes it impossible to quantify that the majority of the DNAPL is immobile, particularly in the Hawthorn deposits. This is most clearly evident in the Upper Hawthorn. Attached is a modified version of Figure 5 of the GeoTrans document showing the top of the Middle Hawthorn Clay unit to show the locations in the Upper Hawthorn at which free-phase (i.e. mobile) DNAPL was observed in monitoring wells and borings which exhibited DNAPL staining in core samples. Mobile DNAPL was observed in every monitoring well in the Upper Hawthorn installed near each of the four principal release areas (North Lagoon, South Lagoon, former Process Area, and Drip Track Area). Starting from these monitoring wells with mobile DNAPL, the nearest borings or wells that do not show evidence of mobile DNAPL or DNAPL staining (i.e. residual) are between 100 feet and 500 feet distant. Within these intervening distances, it is not possible to define the areal extent of DNAPL, mobile or residual.

Attached is a modified version of Figure 8 of the GeoTrans document (top of the Lower Hawthorn Clay unit) which shows the locations in the Lower Hawthorn at which free-phase (i.e. mobile) DNAPL was observed in monitoring wells and borings which exhibited DNAPL staining in core samples. Mobile DNAPL was observed in the Lower Hawthorn only near the North Lagoon and DNAPL staining was observed at the Drip Track Area. Surrounding the monitoring well with mobile DNAPL and borings with DNAPL staining, the nearest borings or wells that do not show evidence of mobile DNAPL or DNAPL staining are between 100 feet and 500 feet distant. Within these intervening distances, it is not possible to define the areal extent of DNAPL, mobile or residual. There are no wells or borings in the Lower Hawthorn beneath the South Lagoon or former Process Area.

No Free-Phase DNAPL in Upper Hawthorn at South Lagoon

The GeoTrans document states (p. 3) that "*No free-phase DNAPL has been observed in borings adjacent to the former South Lagoon*". We do not believe this conclusion is supported by past site data. DNAPL was recovered during development of well HG-9S as reported by GeoTrans (p. 44) in their report entitled "Data Report for Additional Investigation of Hawthorn Group DNAPL Source Evaluation for the Koppers Industries Property" dated September 15, 2004.

No Evidence of DNAPL In Surficial Aquifer at South Lagoon at CPT-7S

The GeoTrans document states (p. 2) "*this boring did not contain any evidence of DNAPL during the source area delineation investigation*" (GeoTrans September 15, 2004 report noted above). This is consistent with the interpretations regarding creosote presence listed in Table 7 of the 2004 report. However, faint DNAPL staining with creosote odor was, in fact, noted in the boring log of CPT-7S near the base of the Surficial Aquifer. Similarly, there were notations of DNAPL staining with creosote odor in the boring logs for two other locations that were not listed in Table 7 of the 2004 report. These locations included CPT-49S near the North Lagoon, and CPT-66S near the former Process Area. The presence of DNAPL staining with creosote odor can be interpreted to likely reflect the presence of residual DNAPL. Therefore, it cannot be concluded that there is no evidence of DNAPL in the surficial aquifer in any of the known source areas.

The data from Table 7 of the 2004 report, together with the corrections noted above, are plotted on Figure 2 of the GeoTrans document showing the top of the Upper Hawthorn Clay unit that has been modified to show the locations in the Surficial Aquifer at which DNAPL staining and creosote odors were observed in core samples. At many of these locations, evidence of DNAPL occurred close to the base of the Surficial Aquifer.

It can be seen that there is evidence of DNAPL staining with creosote odors (i.e. DNAPL residual) beyond of the orange outlines that mark the former source areas, in some cases by a few hundred feet.

Spatial Density of Data

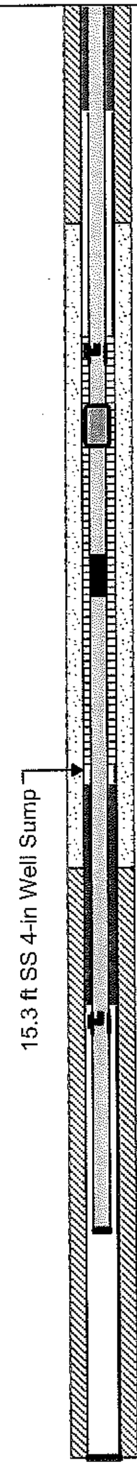
Figures 3 and 6 of the April 2, 2008 document illustrate the elevations of the bottom of the Upper and Middle Hawthorn Clays, respectively. These figures also illustrate the lack of data available to characterize soil conditions in Hawthorn sediments. Regarding the Upper Hawthorn Clay, only two borings penetrate the clay at the Process Area and only one penetrates the clay at the South Lagoon. Three borings penetrate the clay at the Drip Track – all are essentially co-located. Regarding the Middle Clay, no borings penetrate the clay at the Process Area or the South Lagoon; only one boring penetrates the clay at the North Lagoon and one at the Drip Track. In no case is data available to put lateral bounds on contamination at the source areas. Additional data will be required before or during implementation of remedial alternatives in the Hawthorn.

BORING LOG AND MONITOR WELL COMPLETION

Monitor Well ID: FW-12B

SUBSURFACE PROFILE				SOIL SAMPLE			AS-BUILT
Depth (ft bgs)	Elevation ft NGVD-29	Symbol	Lithologic Description of Sample	Recovery (ft)	Remarks	Formation	As-Built
209–215	-33.2		**(205.5 to 215) ft bgs** Differentially weathered Packstone (SAA). Interlayered PIP and WIP [MIP layers absent]. Very pale orange [10YR 8/2], wet, faint sulfide odor grading to faint petroleum-like odor. Estimated core integrity volumes: 75% Unconsolidated (PIP/WIP) 25% Consolidated (MIP med-coarse gravel-size aggregates). RQD = 0.0	10		Ocala LS	
215–235	-53.2		**(215 to 235) ft bgs** Differentially weathered Packstone (SAA). Interlayered PIP, WIP and MIP layers and gravel-size aggregates. Very pale orange [10YR 8/2], wet, moderate creosote-like odors 217-223.5 ft bgs and faint to strong creosote odors 225-233 ft bgs. Two (2) MIP layers observed approximately 1-in and 3-in thick. Estimated core integrity volumes: 75-80% Unconsolidated (PIP/WIP) 20-25% Consolidated (MIP layers and med-coarse gravel-size aggregates). RQD = 0.0	10 10	Faint to strong creosote-like odors noted from 217-233 ft bgs Lost 2,100 net gallons potable water w/ 3,700 mg/L NaBr tracer into Ocala LS during drilling and well installation TD core = 235.0 ft bgs		
235–239.7			NO SAMPLE COLLECTED (235 - 239.7) ft bgs End of Log		4-in Well TD = 239.66 ft bgs		

Depth scale (ft bgs): 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241



ROCK CORE SECTION LOG FORM

KOPPERS SITE, UPPER FLORIDAN INVESTIGATION PROGRAM, GeoTrans, Inc.

Boring ID: FW-12B	Core Run Depth Interval (ft bgs): 215 - 225	Core Run Length (ft): 10	Core Run No. 18	Core Type: 4x7	Comments: Circulation maintained
Core Interval Log Sheet 1 of 1	Date: 11/19/05	Full length Coring Time (min): 1 min	Logger: JT	Core Recovery (ft): 10	

Core Interval (feet BGS)	Relative Drilling Rates	PID internal core (ppm)	Odor	NAPL	Color, Hue, Chroma (wet)	Rock Type (Dunham's Classification, Mineralogy...)	HCl Reaction	Moisture	Fracture Frequency	Bedding	RQD	USCS Classification	Induration: Poor	Induration: Weak	Induration: Moderate	Comments
215	4	0.0	O	A												
		0.0	O													
216		0.0	O													
		0.0	O													
217		1.7	Cr-3		Very Pale Orange	Packstone	S	W	NA	NA	O	GM				
		0.3	Cr-3		[10YR 8/2]	(SAA)						GW				
218		9.1	Cr-3													
		0.3	Cr-3													
219		6.3	Cr-3													
		5.6	Cr-3													
220		3.3	Cr-3													
		5.1	Cr-3													
221		5.7	Cr-3													
		4.2	Cr-3													
222		3.9	Cr-3													
		6.1	Cr-3													
223		3.2	Cr-3													
		0.0	O													predominantly VF Sand
224		0.0	O													
225	4	—	O	A												

Approx. Core Recovery Volume:
~80 % Unconsolidated PIP & WIP
~20 % Consolidated MIP Gravels
(Layers Absent)

ROCK CORE SECTION LOG FORM

KOPPERS SITE, UPPER FLORIDAN INVESTIGATION PROGRAM, GeoTrans, Inc.

Boring ID: FW-12B	Core Run Depth Interval (ft bgs): 225-235	Core Run Length (ft): 10	Core Run No. 19	Core Type: 4x7	Comments: Used Photovac 2020 Pro 11.7eV (175'-235')
Core Interval Log Sheet 1 of 1	Date: 11/19/05	Full length Coring Time (min): 2min *	Logger: JT	Core Recovery (ft):	

Core Interval (feet BGS)	Relative Drilling Rates	PID internal core (ppm)	Odor	NAPL	Color, Hue, Chroma (wet)	Rock Type (Dunham's Classification, Mineralogy...)	HCl Reaction	Moisture	Fracture Frequency	Bedding	RQD	USCS Classification	Induration: Poor	Induration: Weak	Induration: Moderate	Comments
225	5	0.0	Cr-1	A												* override casing. Drilling rates from
		0.0	Cr-1	↑												175'-235' were longer
226	5	0.0	Cr-1													than expected, likely due
		0.0	Cr-1													to the fine silica sand
227	5	0.0	Cr-1		S.A.A. Color	Packstone	S	W	NA	NA	O	GM				engineered sand pack
		0.0	Cr-1			(SAA)						GW				backfill that sand-locked rotation if
228	3	0.0	Cr-1													feed rate wasn't slowed
		0.3	Cr-1													
229	3	0.0	Cr-1													
		1.0	Cr-3													
230	3	1.2	Cr-3													
		0.9	Cr-3													
231	3	7.6	Cr-3													
		16.0	Cr-4													
232	3	23.8	Cr-4													
		7.2	Cr-3													
233	3	0.0	0													
		0.0	0													
234	3	0.0	0	↓												
235		—	0	A												

Approx. Core Recovery Volume:
~75 % Unconsolidated PIP & WIP
~25 % Consolidated MIP Layers
& Gravels / Lenses

CODES - SOIL CORE SECTION LOG FORM

GeoTrans, Inc.

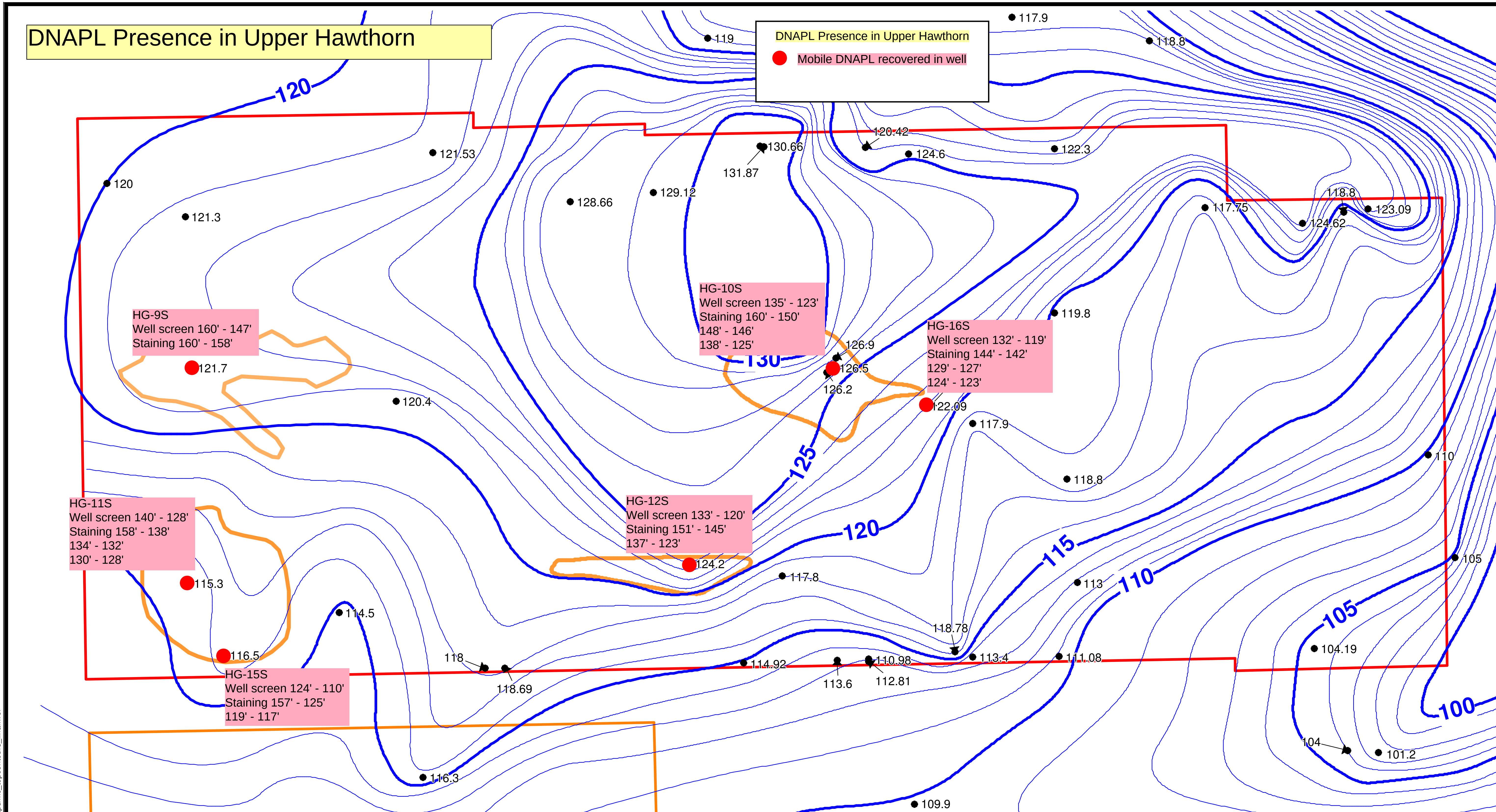
PROPERTY	DESCRIPTION	LOG CODE
RELATIVE DRILLING RATES		
Very Slow		1
	grading to:	↓
Very Fast		5
ODOR (enter letter and number codes)		
Odorless		O
Hydrogen Sulfide		HS
Creosote		Cr
Petroleum		P
Septic		Se
Natural Organic		Nat Org
Qualifiers:	Faint	1
	Slight	2
	Moderate	3
	Strong	4
	Very Strong	5
NAPL		
Absent	none observed	A
Staining	Faint	Ft
	Distinct	Ds
	Prominent	Pr
NAPL	NAPL appears immobile	R
	NAPL appears mobile	FP
HCl REACTION - Dilute 10%		
None	no visible reaction	N
Weak	slow bubble formation	W
Moderate	Moderate bubble formation	M
Strong	immed. & vigorous bubbles	S
MOISTURE		
Dry	absence of moisture	D
Moist	damp but no visible water	M
Wet	visible free water	W
CEMENTATION		
Weak	crumbles or breaks with handling or little pressure	W
Moderate	crumbles or breaks with moderate pressure	M
Strong	will not crumble or break with finger pressure	S
ANGULARITY		
Angular	refer to chart	A
SubAngular	refer to chart	SA
SubRounded	refer to chart	SR
Rounded	refer to chart	R
MATRIX / CLAST		
Clast supported		C
Matrix supported		M
GRAIN TYPE	Qtz=quartz, Sh=shells, LS=limestone fragments, DF=dolomite fragments, C=unspecified carbonate PhF = phosphate rock fragments	

Proportions:
TRACE (0-10%)
LITTLE (10-20%)
SOME (20-35%)
AND (35-50%)

PROPERTY	DESCRIPTION	LOG CODE
COHESIVE SOILS		
CONSISTENCY		
Very Soft	thumb will penetrate soil >1"	VS
Soft	thumb will penetrate soil ~1"	So
Firm	thumb will indent soil ~1/4"	F
Stiff	thumb won't indent soil, thumbnail will	St
Hard	thumbnail will not readily indent soil	H
PLASTICITY (if fine-grained)		
Non-Plastic	a 1/8" thread can' be rolled at any water content	NP
Low	a 1/8" thread can barely be rolled	L
Medium	a 1/8" thread is easy to roll and not much time is required to reach the plastic limit, but the thread cannot be rerolled after reaching the plastic limit	M
High	a 1/8" thread is easily rolled, takes a long time to reach the PL, and can be re-rolled after reaching the PL	H
STRUCTURE		
Stratified	alternating layers of varying material color with layers at least 1/4" thick	S
Laminated	alternating layers of varying material color with layers <1/4" thick	La
Fissured	breaks along defined planes of fracture with little resistance to fracturing	F
Slickensided	fracture planes appear polished	Sl
Blocky	cohesive soil that can be broken down into small angular fragments	B
Lenses	inclusion of small pockets of different soil	Le
Homogeneous	same color and appearance throughout	H
Platty, Nuggety, Friable, Varved, Massive, Prismatic, Columnar, Cemented, Cluster, Dispersed, Flocculated (Cardhouse), Single-Grained, Skeleton		
NON COHESIVE SOILS		
RELATIVE DENSITY (Estimated Compactness)		
Loose	Estimate, consider drilling rates	L
Compact	Estimate, consider drilling rates	C
Dense	Estimate, consider drilling rates	D
GRADATION		
Poorly Graded	poorly-graded soil consists primarily of 1 size or has missing intermediate grain size fractions	P
Gap Graded		G
Well Graded	well-graded soil has a wide range of particle sizes and a substantial amount of intermediate sizes	W
DOMINANT GRAIN SIZE		
Gravel = **G** / Coarse Sand = **CS** / Medium Sand = **MS** / Fine Sand = **FS** / Very Fine Sand = **VFS** / Silt = **Si** / Clay = **C**		
ORGANIC MATERIAL (typ. dk brown to black color, possesses organic odor, will not have a high toughness or plasticity)		
Peat	>50% organic matter	P
Organic	15-50% organic matter	O
Some	5-15% organic matter	S

Abundance: Few, Common, Many
Contrast: Faint, Distict, Prominent

NR Not Recorded
NA Not Applicable
SAA Same as Above



Explanation

114.5 Well location with clay unit elevation, in feet above msl

120 Clay surface contour elevation, in feet

Former Source Area

0 215 430

SCALE IN FEET

W N E S

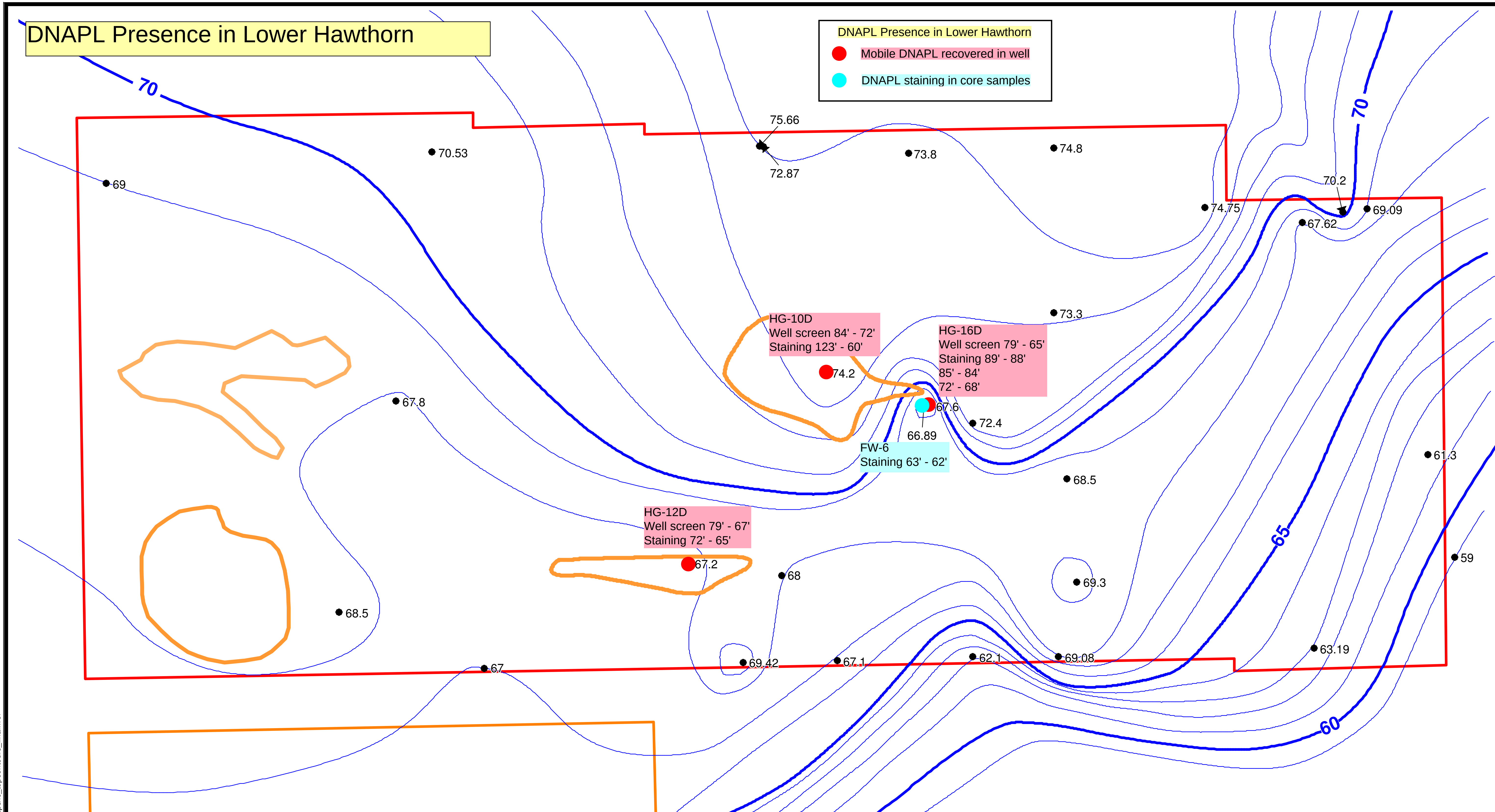
TITLE: Elevation Contours for Top of Hawthorn Group Deposits -- Middle Clay Unit

LOCATION: Gainesville, Florida

GeoTrans, Inc. A TETRA TECH COMPANY

CHECKED	JRE	FIGURE:
DRAFTED	KDO	5
FILE	MC_TopContours.wor	
DATE	2/26/2008	

T:/gainesville/mapinfo/lithology/clay_thick_maps/mc_topcontours_final.wor



T:/gainesville/mapinfo/lithology/clay_thick_maps/lc_topcontours_final.wor

Explanation

- 70.53 ● Well location with clay unit elevation, in feet above msl
- 60 Clay surface contour elevation, in feet
- Former Source Area

0 215 430

SCALE IN FEET

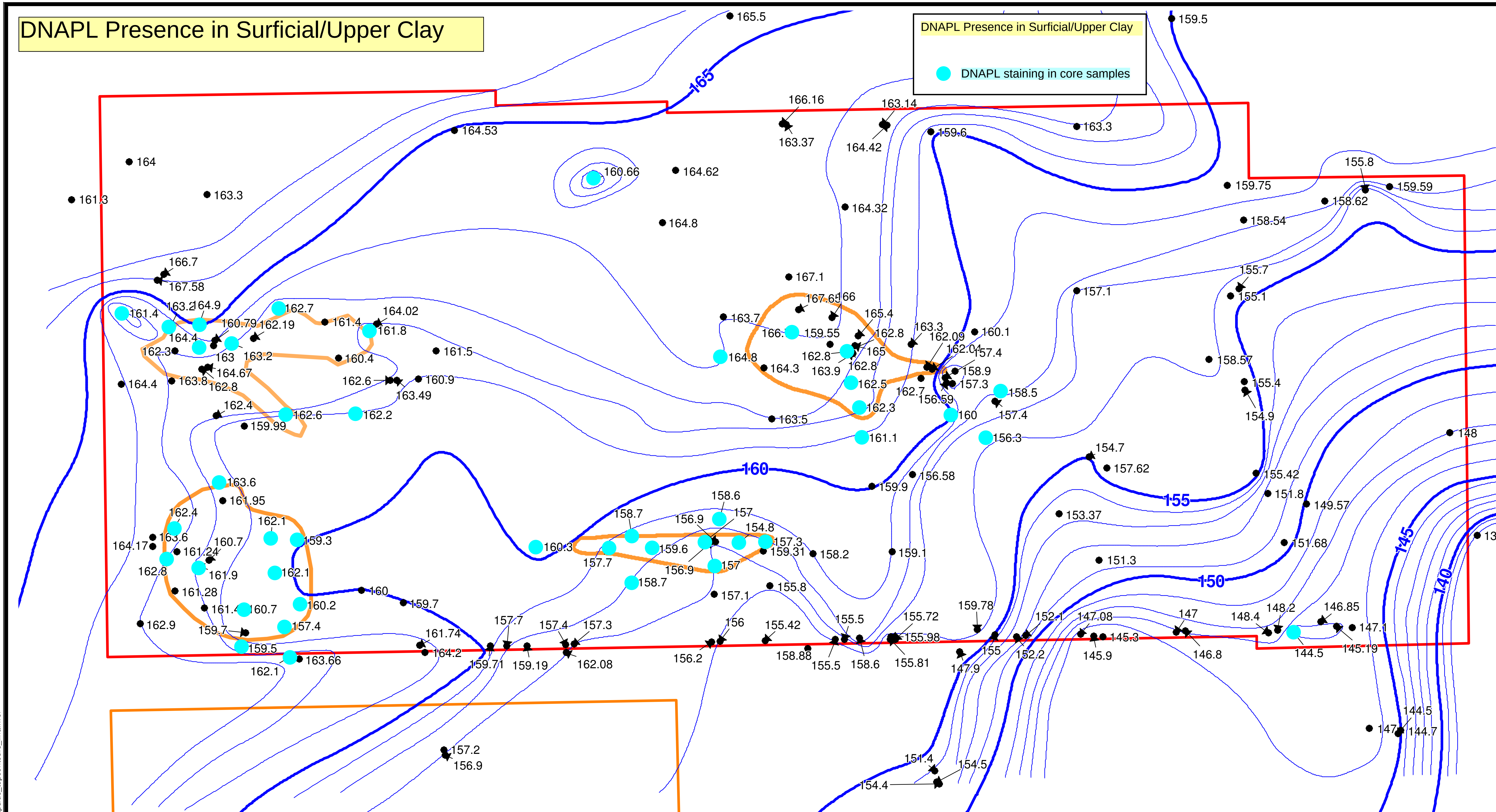
W N E S

TITLE: Elevation Contours for Top of Hawthorn Group Deposits -- Lower Clay Unit

LOCATION: Gainesville, Florida

GeoTrans, Inc. A TETRA TECH COMPANY

CHECKED	JRE	FIGURE:
DRAFTED	KDO	8
FILE	LC_TopContours.wor	
DATE	2/26/2008	



Explanation

160.3 Well location with clay unit elevation, in feet above msl

160 Clay surface contour elevation, in feet

Former Source Area

0 215 430

SCALE IN FEET

W N E S

TITLE: Elevation Contours for Top of Hawthorn Group Deposits -- Upper Clay Unit

LOCATION: Gainesville, Florida

CHECKED	JRE
DRAFTED	KDO
FILE	UC_TopContours.wor
DATE	2/26/2008

FIGURE: 2

GeoTrans, Inc. A TETRA TECH COMPANY

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