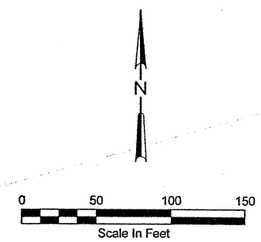
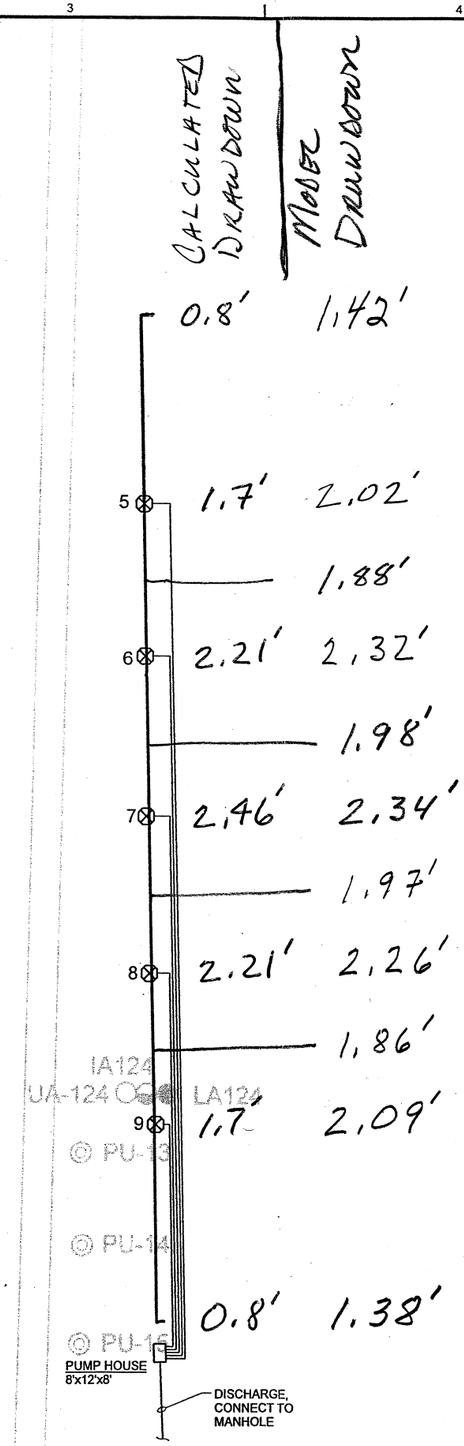
Well Spacing Calc's
184243.FD.01
pg 3 of 16





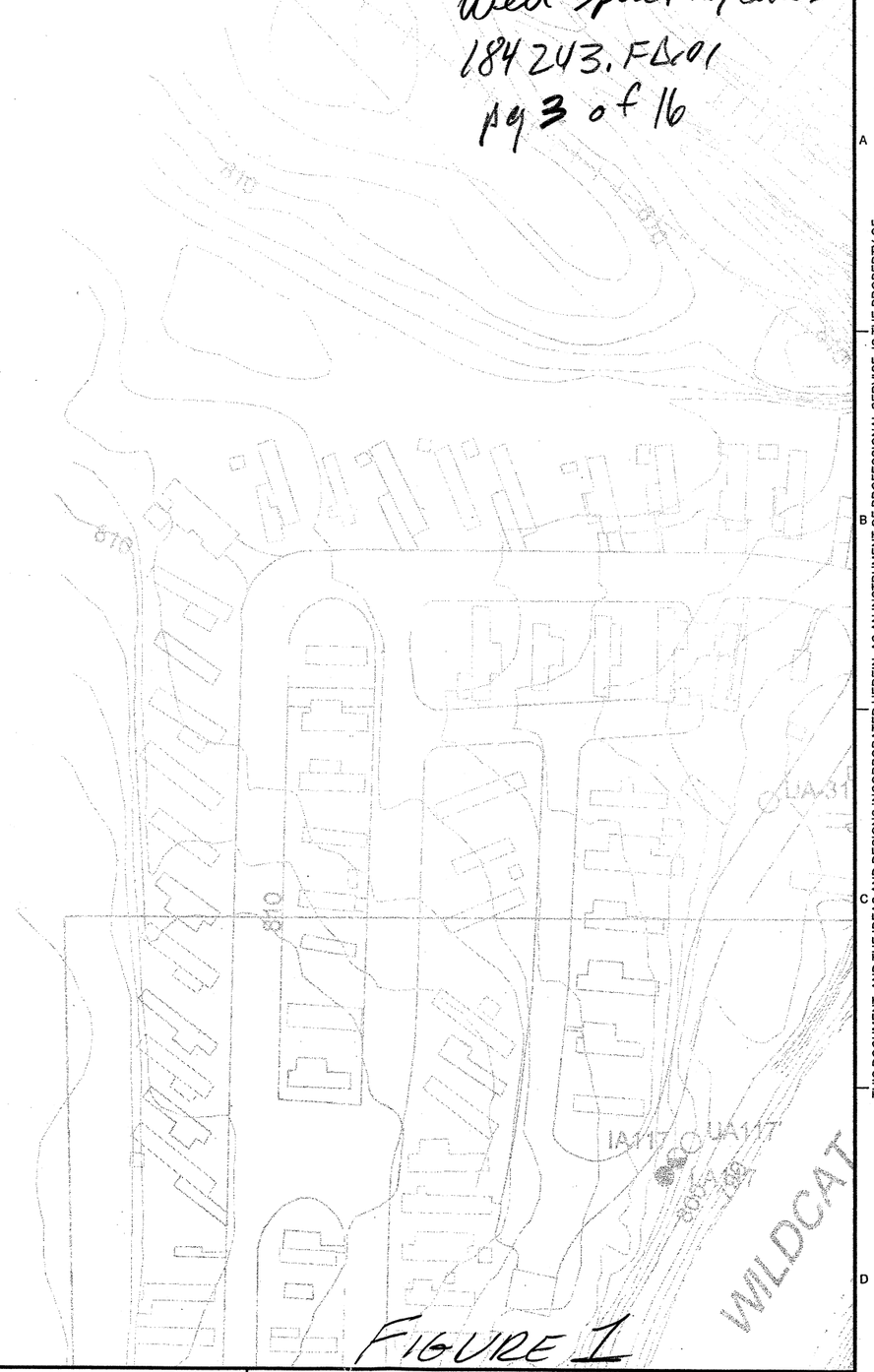


FIGURE 1

PRELIMINARY
NOT FOR CONSTRUCTION

DSGN	W.M.ANDRAE
DR	J.M.ZAFFKE
CHK	D.J.PLOMB
APVD	

NO.	DATE	REVISION	BY	APVD

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CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
SITEWIDE GROUNDWATER (OU1)
GOUNDWATER EXTRACTION

SITEWORK
SITE PLAN
MILLBROOK LANE AREA

SHEET	7
DWG	C-3
DATE	JANUARY 2004
PROJ	184243.FD.01

FILENAME: cs5c03d.dgn PLOT DATE: 06-JAN-2004 PLOT TIME: 11:31:22

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BASED ON LAW OF Superposition, AND DRAWDOWNS MEASURED DURING TEST:

Estimated drawdown - Millbrook Lane.	125' north of RS5	RS5	RS6	RS7	RS8	RS9	125' south of RS6
Effective drawdown from RS5	0.53	0.9	0.53	0.25			
Effective drawdown from RS6	0.25	0.53	0.9	0.53	0.25		
Effective drawdown from RS7		0.25	0.53	0.9	0.53	0.25	
Effective drawdown from RS8			0.25	0.53	0.9	0.53	0.25
Effective drawdown from RS9				0.25	0.53	0.9	0.53
Total drawdown	0.78	1.68	2.21	2.46	2.21	1.68	0.78

- DRAWDOWNS RANGE FROM 2.5' AT RS7 TO 0.8' OUTSIDE THE collection AREA.

- AS A CONFIRMATION, THESE WELLS AND ASSOCIATED FLOWRATES WERE PLACED IN THE MODEL (ATTACHMENT D2) WITH THE FOLLOWING RESULTS: (See Figure 2)

Starting Head	Pumping Head	Drawdown	Location
789.74	788.32	1.42	North of RS5
789.6	787.58	2.02	RS5
789.62	787.74	1.88	Between RS5/6
789.6	787.28	2.32	RS6
789.55	787.57	1.98	Between RS6/7
789.5	787.16	2.34	RS7
789.47	787.5	1.97	Between RS7/8
789.4	787.14	2.26	RS8
789.38	787.52	1.86	Between RS8/9
789.32	787.23	2.09	RS9
789.2	787.82	1.38	South of RS9

- IN General, match very close, CALCULATIONS SLIGHTY UNDERESTIMATE DRAWDOWN AT DISTANCE DUE TO CONSERVATIVE Assumption of NO INFLUENCE OF WELL BEYOND 200'

Well Spacing Calcs
184243, FDA1
DJP
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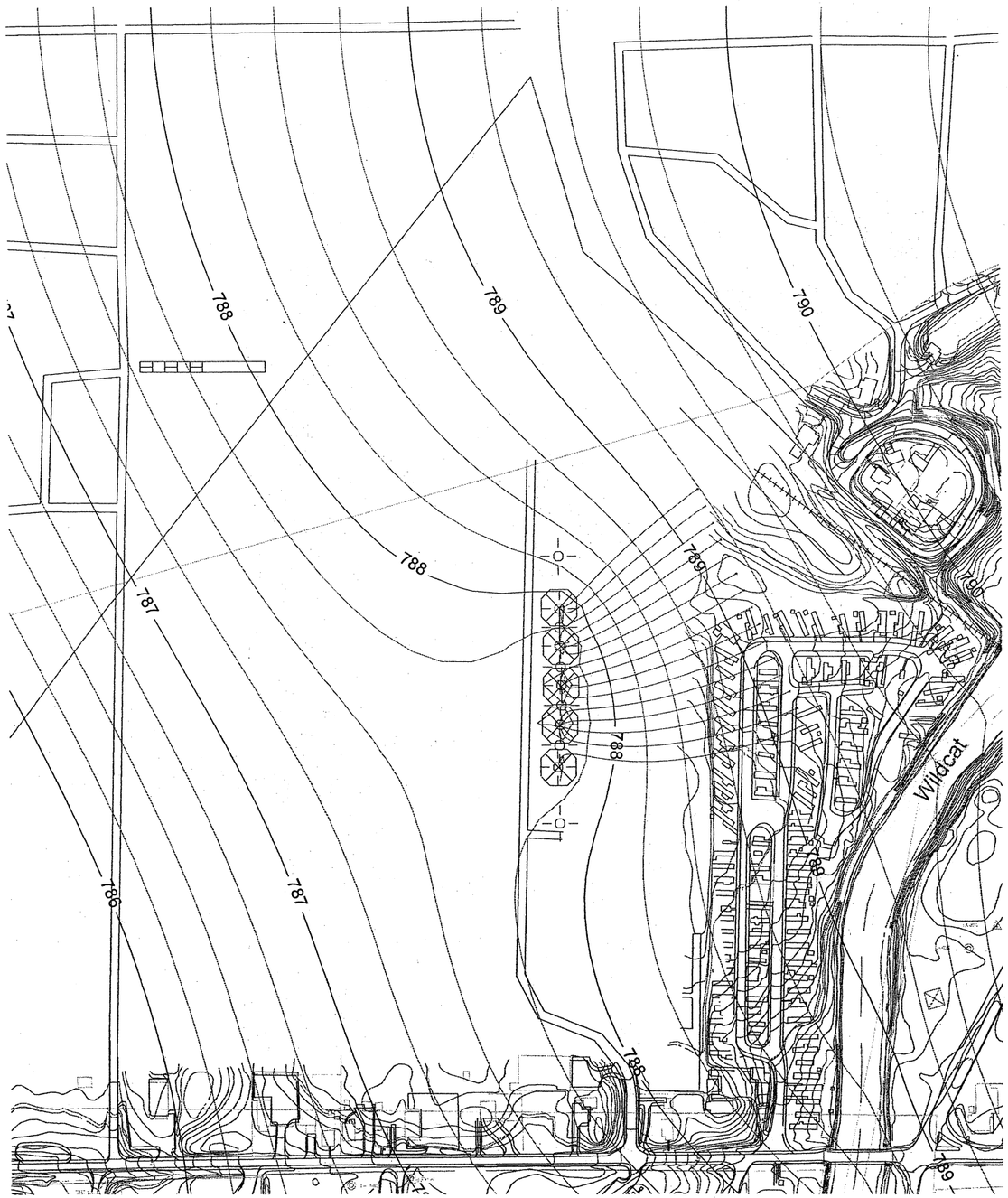

FIGURE 2

West Markland Ave

4 Extraction Wells, Spaced 80-125' apart. Drawdown Based of 6 gpm/well, and Super Imposed Drawdown:

Estimated drawdown - West markland Ave.

	125' west of RS1	RS1	RS2	RS3	RS4	125' east of RS4
Effective drawdown from RS-1	0.53	0.9	0.53	0.25	0	0
Effective drawdown from RS-2	0.25	0.53	0.9	0.53	0.25	0
Effective drawdown from RS3	0	0.25	0.53	0.9	0.53	0.25
Effective drawdown from RS4	0	0	0.25	0.53	0.9	0.53
total drawdown	0.78	1.68	2.21	2.21	1.68	0.78

Drawdowns range from 2.2' in center, to 0.8' at outside edges (Figure 3)

East Bank - Wildcat Creek

Propose 6 Extraction Wells/6gpm per well; Spaced ~150' apart

Drawdown Based on Superposition:

Estimated drawdown - East Bank.

	125' west of RS10	RS10	RS11	RS12	RS13	RS14	RS15	125' east of RS15
Effective drawdown from RS10	0.53	0.9	0.4	0.2				
Effective drawdown from RS11	0.2	0.4	0.9	0.4	0.2			
Effective drawdown from RS12		0.2	0.4	0.9	0.4	0.2		
Effective drawdown from RS13			0.2	0.4	0.9	0.4	0.2	
Effective drawdown from RS14				0.2	0.4	0.9	0.4	0.2
Effective drawdown from RS15					0.2	0.4	0.9	0.53
total drawdown	0.73	1.5	1.9	2.1	2.1	1.9	1.5	0.73

Drawdowns range from 2.1' in center to 0.7' at outside edges (Figure 4)

Well Spacing
CSSS
pg 7 of 16
184243.FD.01

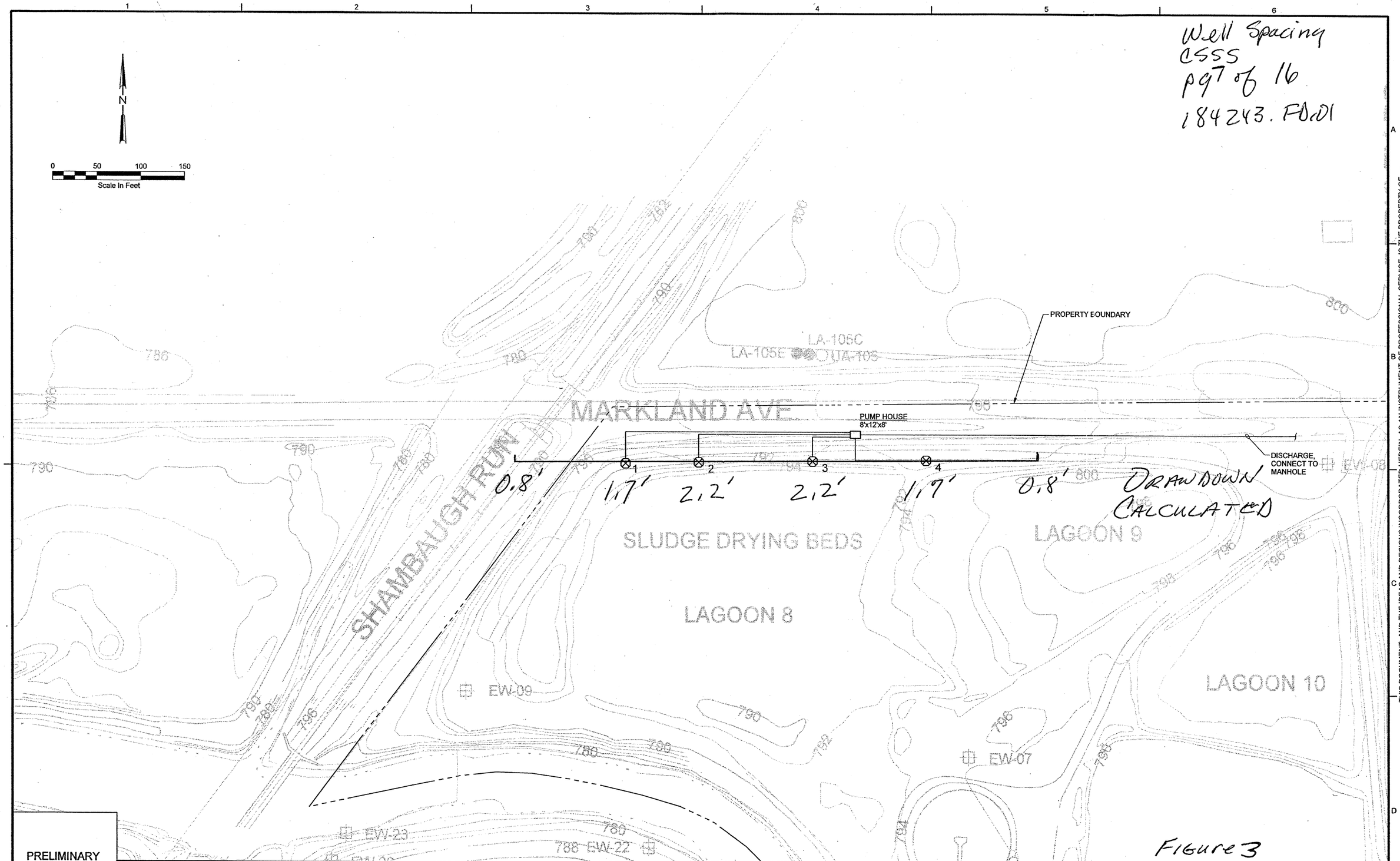

Figure 3

PRELIMINARY

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DR	J.M.ZAFFKE
CHK	D.J.PLOMB
APVD	

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CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

SITEWIDE GROUNDWATER (OU1)
GOUNDWATER EXTRACTION

SITEWORK

SITE PLAN
WEST MARKLAND AVENUE

SHEET	6
DWG	C-2
DATE	JANUARY 2004
PROJ	184243.FD.01

FILENAME: cs5c02d.dgn PLOT DATE: 07-JAN-2004 PLOT TIME: 11:10:10

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Well Spacing
DJP
Pg 8 of 16
184423.FD.01

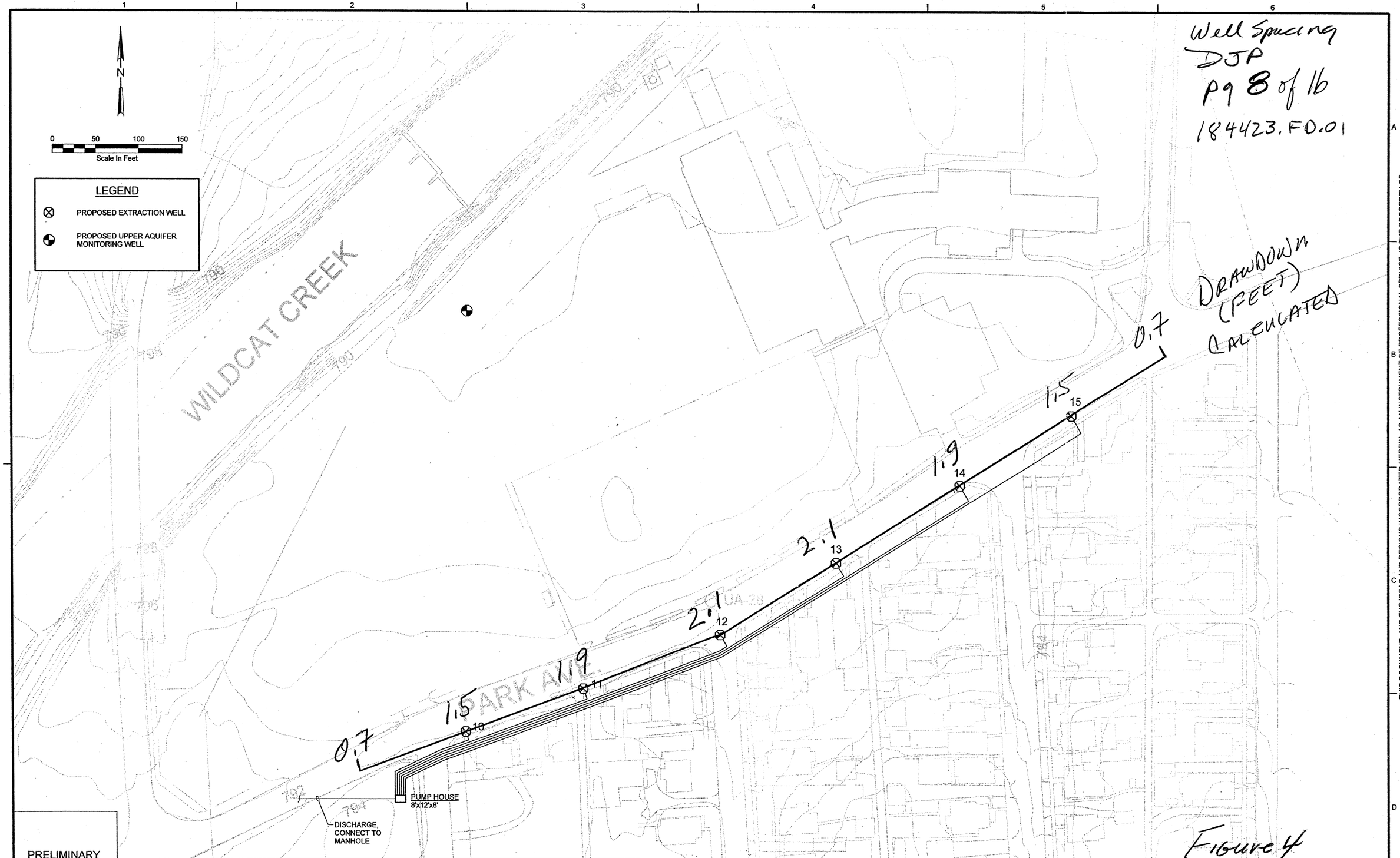

Figure 4

PRELIMINARY

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DR	J.M.ZAFFKE
CHK	D.J.PLOMB
APVD	

NO.	DATE	REVISION	BY	APVD

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CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

SITEWIDE GROUNDWATER (OU1)
GOUNDWATER EXTRACTION

SITEWORK

SITE PLAN
EAST BANK WILDCAT CREEK

SHEET	8
DWG	C-4
DATE	JANUARY 2004
PROJ	184243.FD.01

FILENAME: cs5c04d.dgn PLOT DATE: 21-JAN-2004 PLOT TIME: 10:42:59

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Markland Quarry

- Single well - 42 gpm
- Assumes surgerock backfill more permeable than Limestone
- Pumping out of Surge Rock will better impact fractures in aquifer where contaminants are migrating
- Flow based on IDEM modeling, confirmed w/ CH2M modeling
- To be field tested during quarry remediation, when extraction from quarry pond required

Contingency

To provide factor of safety - increase flows from West Markland, Millbrook Lane & East Bank by 40%

Results

Proposed well designs (flow rates & locations modeled w/ following results:

CH2MHILL

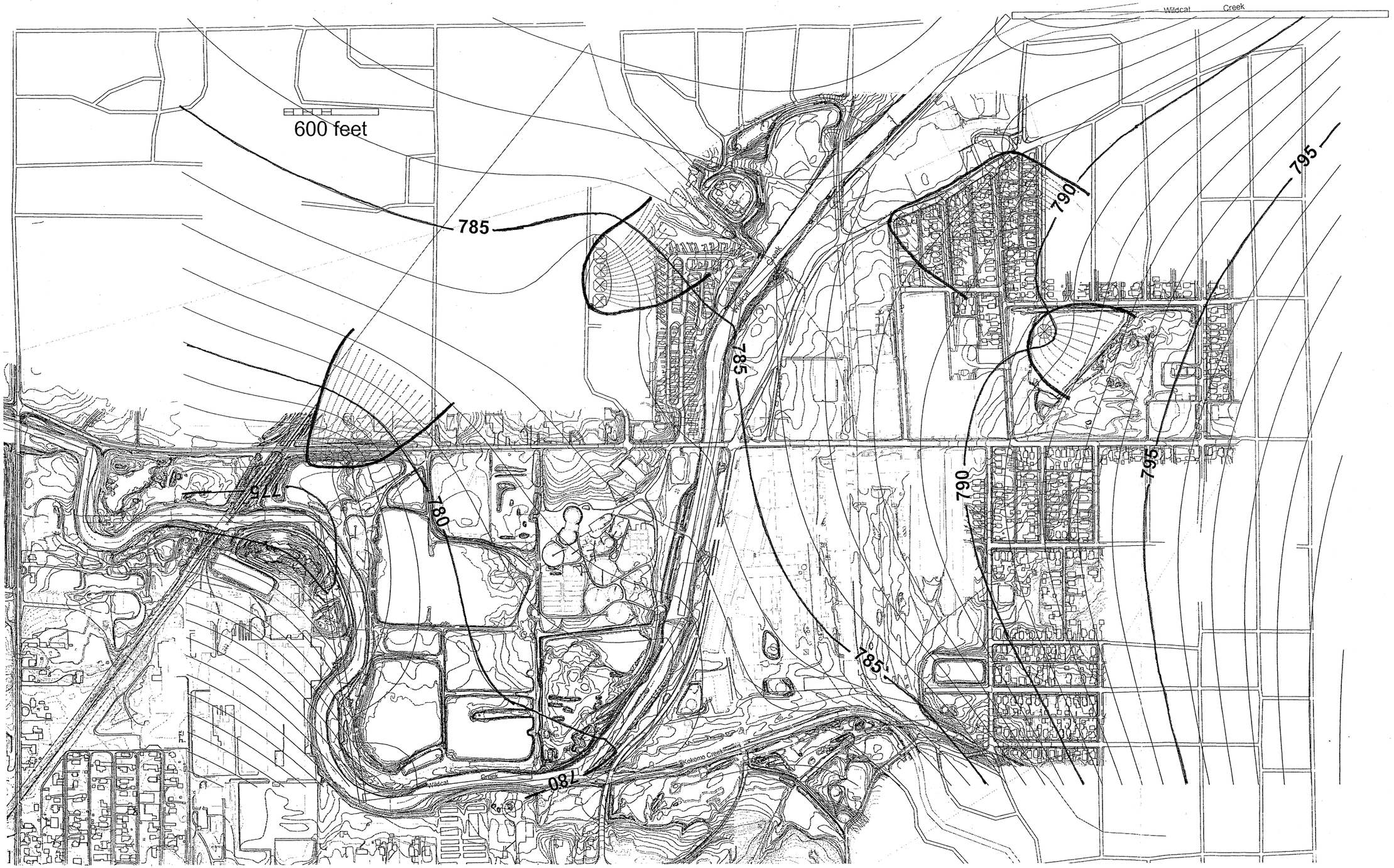
SUBJECT Well Spacing BY DJP

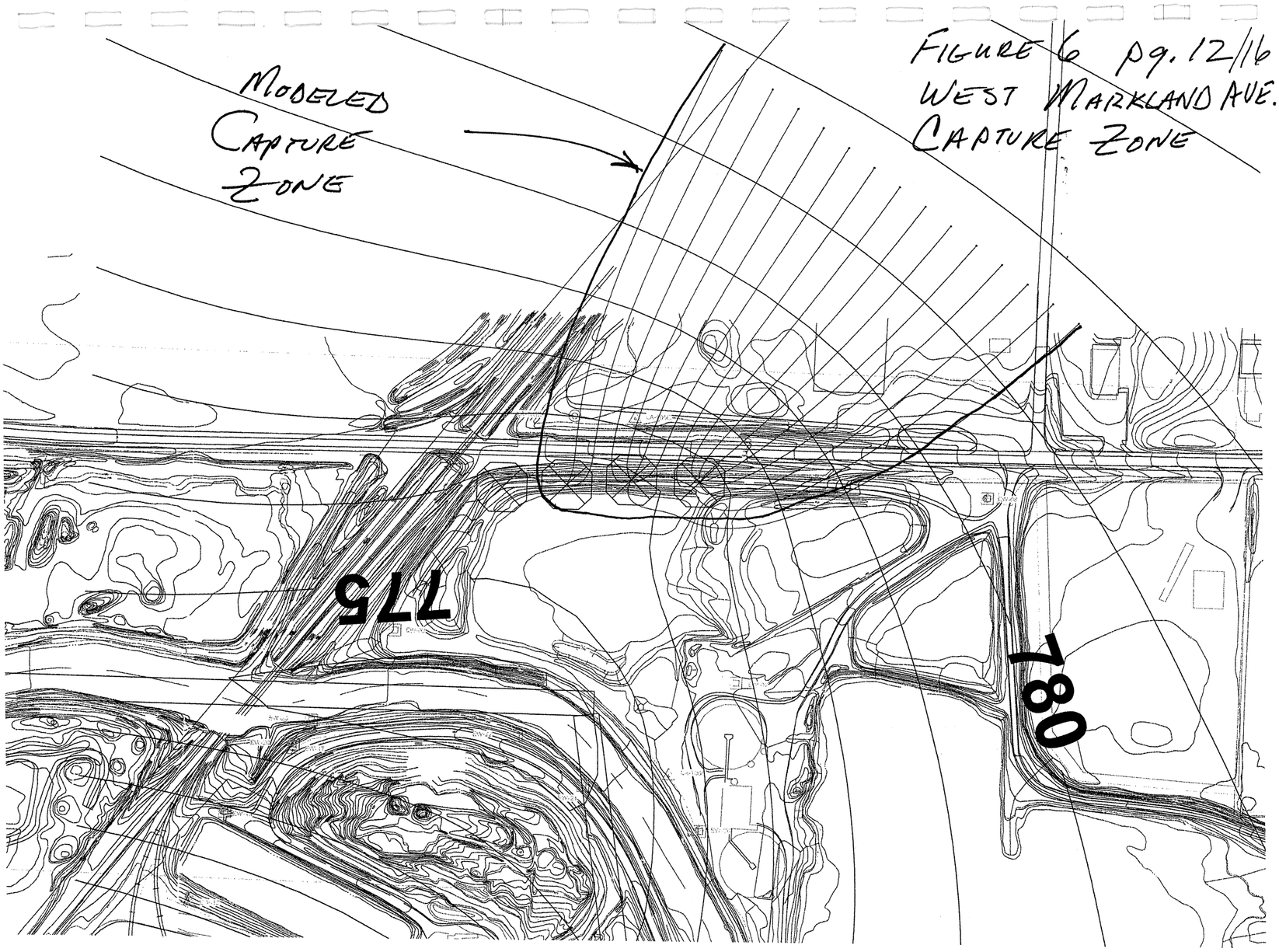
SHEET NO. 10 of 16 DATE

PROJECT NO. 184423.FD.01

- ALL LOCATION INDICATE CAPTURE BASED ON PARTICLE TRACKING ANALYSIS (FIGURE 5)
- INDIVIDUAL CAPTURE ZONES SHOWN IN FIGURES 6, 7, 8, 9
- CAPTURE COMPARED TO CIS-1,2-DCE PLUME SHOWN IN FIGURE 10

Figure 5 Pg 11 of 16
Particle - Tracking
Capture Zone Analysis




MODELED CAPTURE ZONE
FIGURE 6 pg. 12/16
WEST MARKLAND AVE.
CAPTURE ZONE
775
780

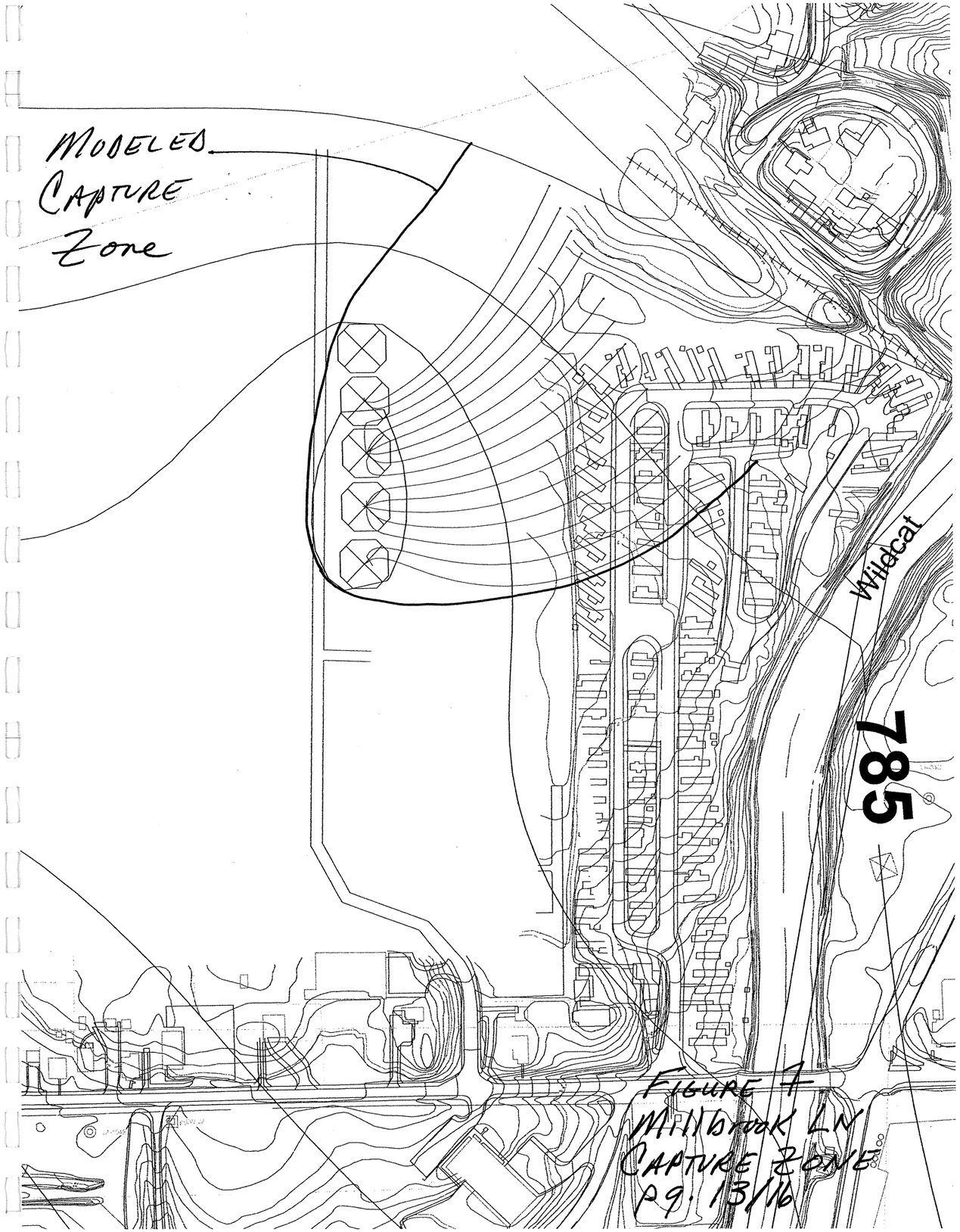


FIGURE 7
MILLBROOK LN
CAPTURE ZONE
pg. 13/16

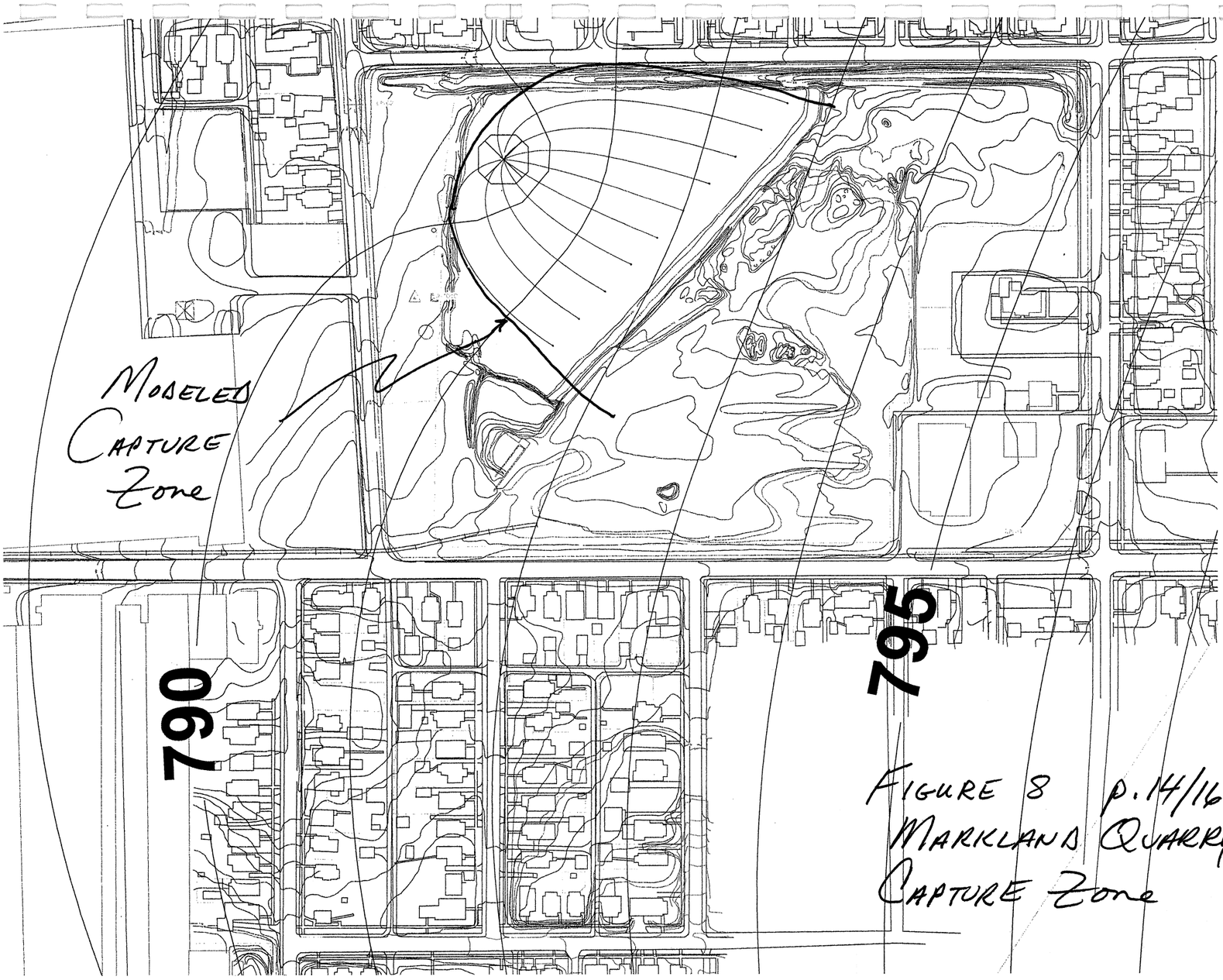


Figure 8 p.14/16
Markland Quarry
Capture Zone

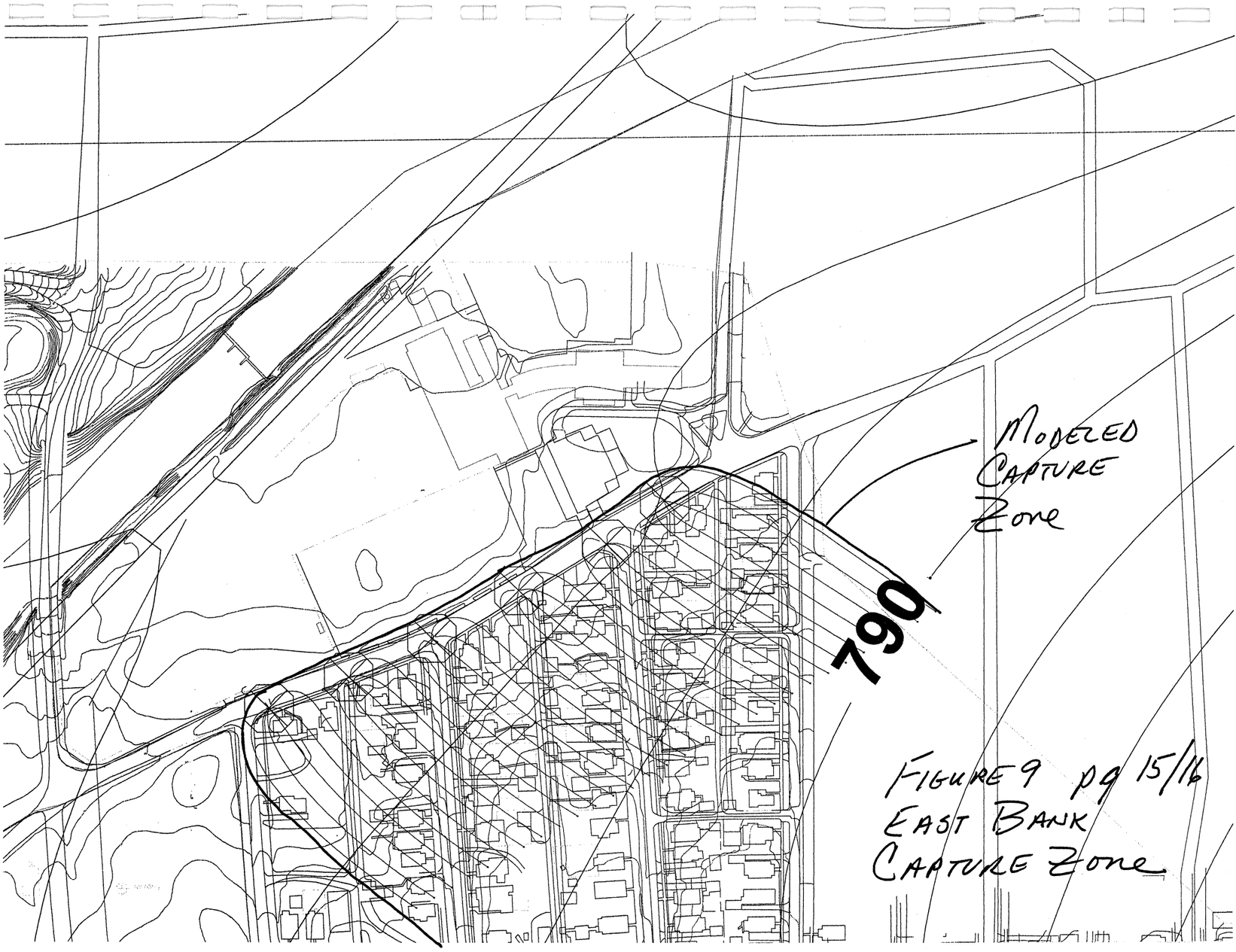


FIGURE 9 pg 15/16
EAST BANK
CAPTURE ZONE

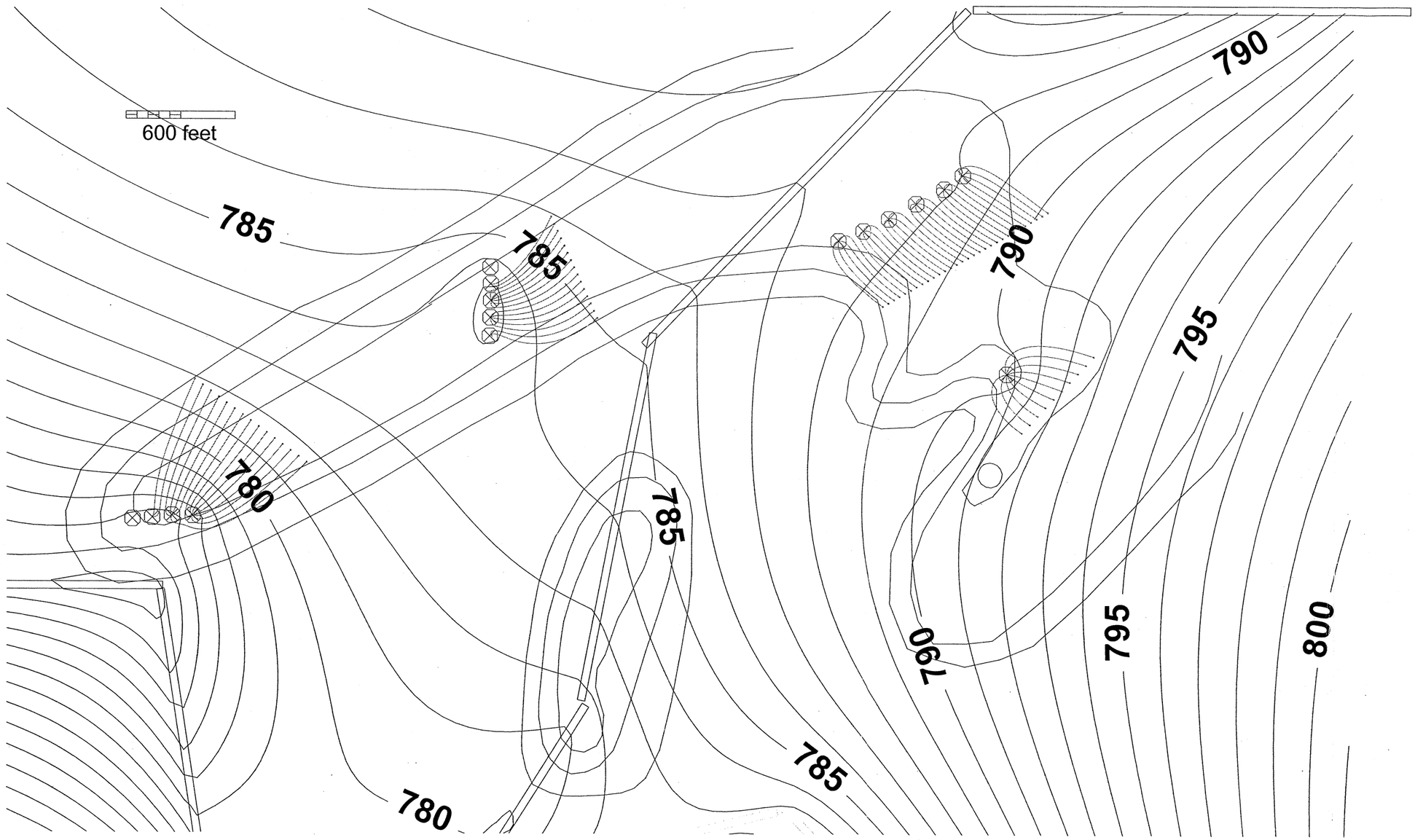



Figure 10
pg 16/16
Well Spacing
CSSS
Cis, 1,2,-DCE Plume
(ug/l)