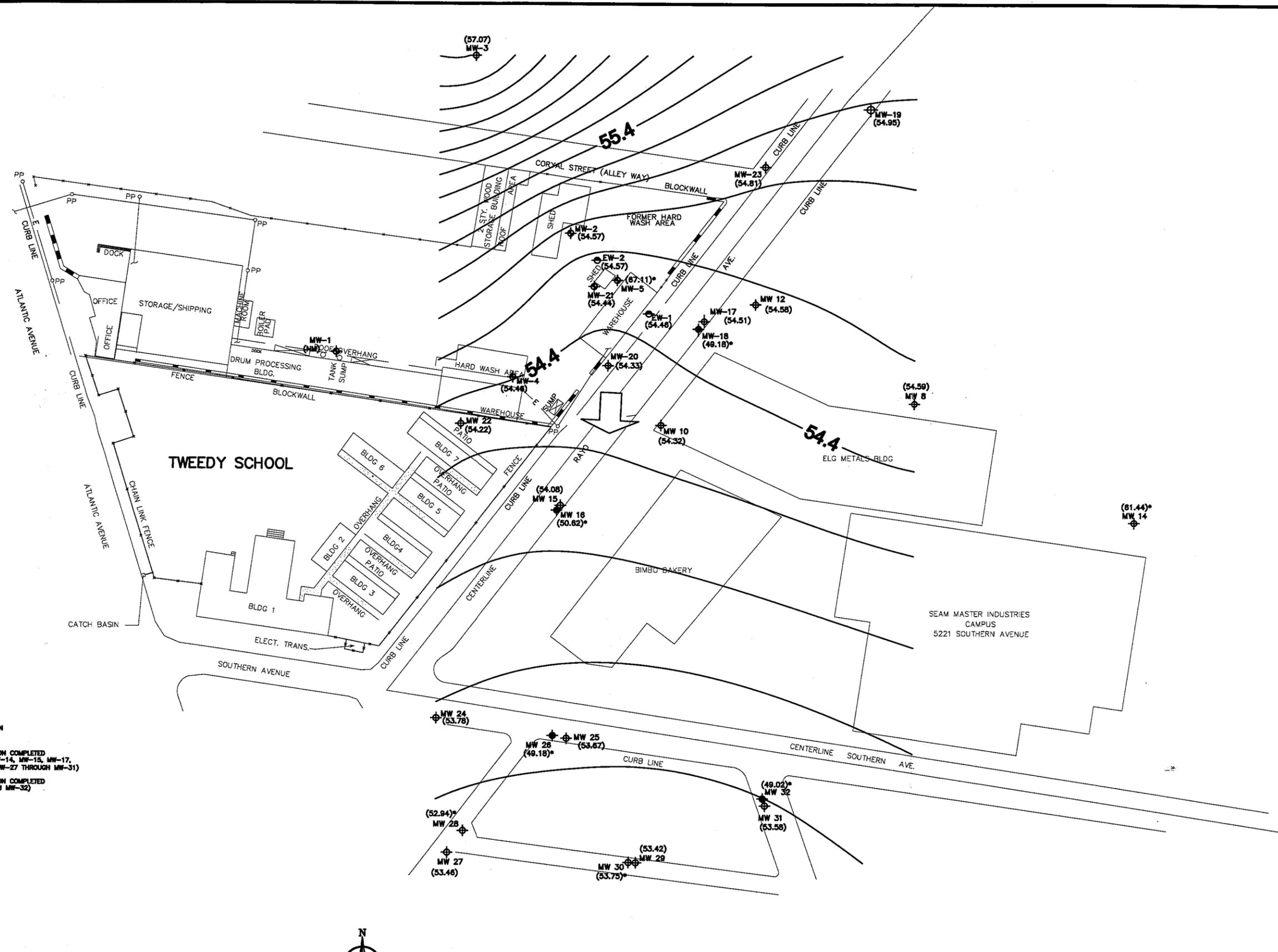

APPENDIX D

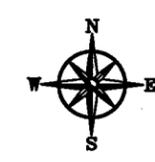
**Groundwater Surface Elevation
Contour Maps**

G:\GRAD_APPRO4_Radial Basis Function.dwg
 LEA Jan 28, 2005
 COOPER



LEGEND

- ⊕ ON-SITE GROUNDWATER MONITORING WELL LOCATION (MW-1 through MW-5, and MW-21)
- ⊕ OFF-SITE GROUNDWATER MONITORING WELL LOCATION COMPLETED IN SHALLOW AQUIFER (MW-8, MW-10, MW-12, MW-14, MW-15, MW-17, MW-19, MW-20, MW-22 THROUGH MW-25, and MW-27 THROUGH MW-31)
- ⊕ OFF-SITE GROUNDWATER MONITORING WELL LOCATION COMPLETED IN DEEPER AQUIFER (MW-16, MW-18, MW-26, and MW-32)
- ⊕ GROUNDWATER EXTRACTION WELL LOCATION
- (54.29) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 54.6 — GROUNDWATER ELEVATION CONTOUR
- NM NOT MEASURED
- NOT USED IN CONTOURING
- ➔ GROUNDWATER FLOW DIRECTION

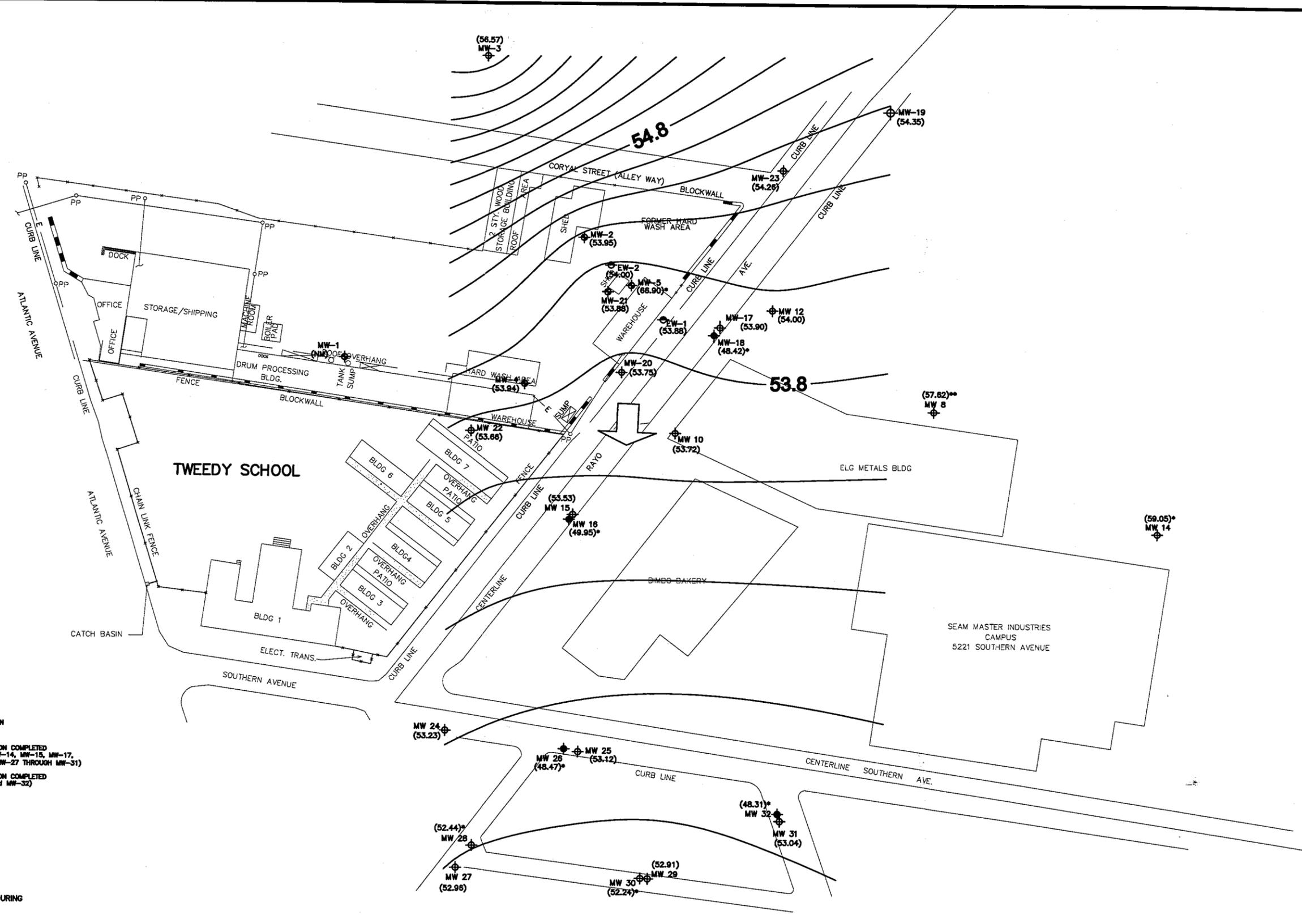


Cooper Drum Company
 South Gate, California

FIGURE D-1
 Groundwater Elevations
 April 16, 2004

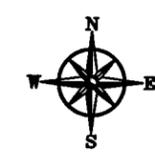
URS
 2870 GATEWAY OAKS DRIVE, SUITE 300
 SACRAMENTO, CA 95833

GW/GRAD_AUG04_Radiol Baseis Function_2.dwg
 LEA Jan 28, 2005
 COOPER



LEGEND

- ◆ ON-SITE GROUNDWATER MONITORING WELL LOCATION (MW-1 through MW-5, and MW-21)
- ◆ OFF-SITE GROUNDWATER MONITORING WELL LOCATION COMPLETED IN SHALLOW AQUIFER (MW-8, MW-10, MW-12, MW-14, MW-15, MW-17, MW-19, MW-20, MW-22 THROUGH MW-25, and MW-27 THROUGH MW-31)
- ◆ OFF-SITE GROUNDWATER MONITORING WELL LOCATION COMPLETED IN DEEPER AQUIFER (MW-16, MW-18, MW-26, and MW-32)
- ⊕ GROUNDWATER EXTRACTION WELL LOCATION
- (54.29) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 54.6- GROUNDWATER ELEVATION CONTOUR
- NM NOT MEASURED
- * NOT USED IN CONTOURING
- ** MEASUREMENT ERROR; NOT USED IN CONTOURING
- ➔ GROUNDWATER FLOW DIRECTION

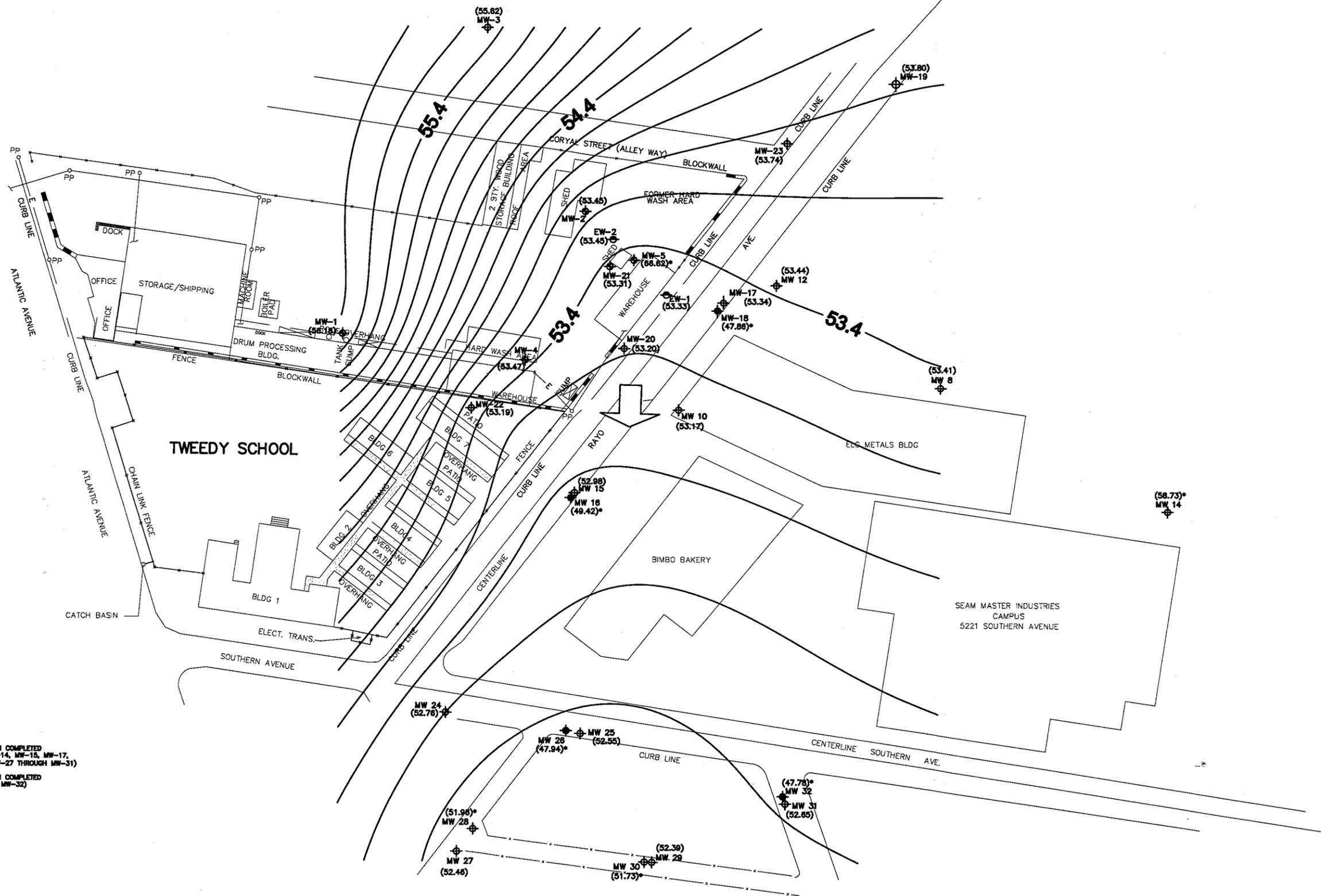


URS
 2870 GATEWAY OAKS DRIVE, SUITE 300
 SACRAMENTO, CA 95833

Cooper Drum Company
 South Gate, California

FIGURE D-2
 Groundwater Elevations
 August 27, 2004

GWGRMAD_DECK4_Radial Brails Function.dwg
LEA Jan 28, 2005
COOPER



LEGEND

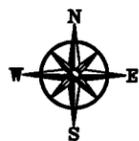
- ◆ ON-SITE GROUNDWATER MONITORING WELL LOCATION (MW-1 through MW-5, and MW-21)
- ◆ OFF-SITE GROUNDWATER MONITORING WELL LOCATION COMPLETED IN SHALLOW AQUIFER (MW-6, MW-10, MW-12, MW-14, MW-15, MW-17, MW-19, MW-20, MW-22 THROUGH MW-25, and MW-27 THROUGH MW-31)
- ◆ OFF-SITE GROUNDWATER MONITORING WELL LOCATION COMPLETED IN DEEPER AQUIFER (MW-16, MW-18, MW-28, and MW-32)
- GROUNDWATER EXTRACTION WELL LOCATION

(54.29) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL

— 54.6 — GROUNDWATER ELEVATION CONTOUR

- NM NOT MEASURED
- NOT USED IN CONTOURING

➔ GROUNDWATER FLOW DIRECTION

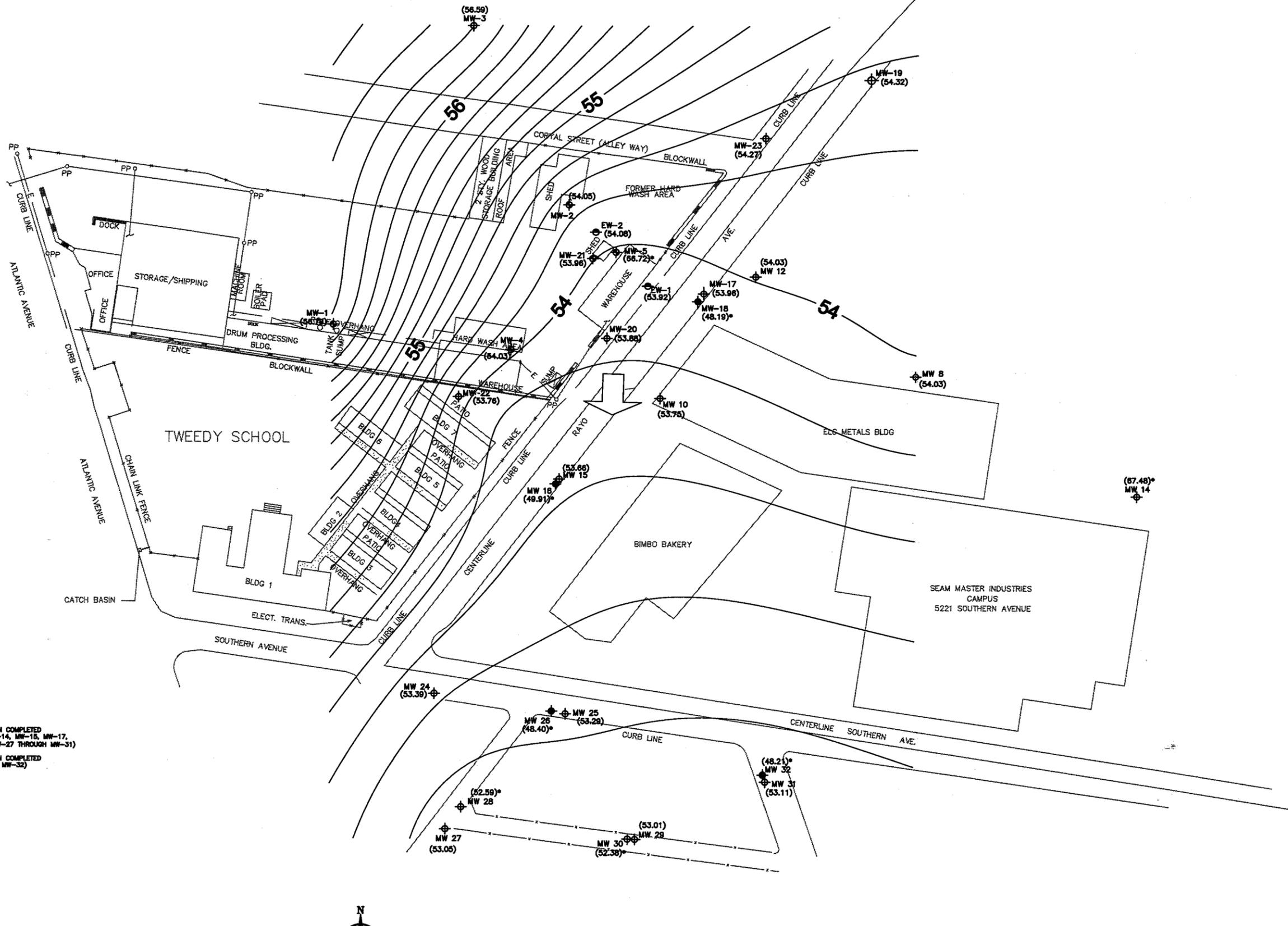


SCALE IN FEET

Cooper Drum Company
South Gate, California

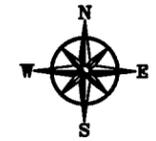
FIGURE D-3
Groundwater Elevations
December 22, 2004

GWGRAD_APR05_Radial Basis Function.dwg
 MRA Apr 20, 2005
 COOPER



LEGEND

- ◆ ON-SITE GROUNDWATER MONITORING WELL LOCATION (MW-1 through MW-5, and MW-21)
- ◆ OFF-SITE GROUNDWATER MONITORING WELL LOCATION COMPLETED IN SHALLOW AQUIFER (MW-8, MW-10, MW-12, MW-14, MW-15, MW-17, MW-19, MW-20, MW-22 THROUGH MW-25, and MW-27 THROUGH MW-31)
- ◆ OFF-SITE GROUNDWATER MONITORING WELL LOCATION COMPLETED IN DEEPER AQUIFER (MW-16, MW-18, MW-28, and MW-32)
- ⊖ GROUNDWATER EXTRACTION WELL LOCATION
- (54.29) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 54.6- GROUNDWATER ELEVATION CONTOUR
- NM NOT MEASURED
- NOT USED IN CONTOURING
- ➔ GROUNDWATER FLOW DIRECTION



Cooper Drum Company
 South Gate, California

FIGURE D-4
 Groundwater Elevations
 April 20, 2005

APPENDIX E

Data Quality Assessment

Appendix E

Data Quality Assessment

This appendix presents a data quality assessment for soil, soil gas, and groundwater data collected at the Cooper Drum Company Superfund Site (Cooper Drum) during seven separate sampling events in April/May 2003, December 2003, January 2004, February 2004, April 2004, July 2004, and November 2004. Validation packages for the specified sampling events in 2003 and 2004 have been prepared and are summarized below.

E.1 Analytical Program

A summary of the analytical program detailed in this appendix is listed in Table E-1. Fifty-four (54) soil samples, one hundred and fourteen (114) groundwater samples, and seventy-five (75) soil gas samples were collected at the Cooper Drum site during separate sampling events between April 28, 2003, and May 13, 2003; December 3 and 4, 2003; January 13 through 21, 2004; February 25 and 26, 2004; April 27 through 29, 2004; July 19 through 22, 2004; and November 1 through 5, 2004. All samples were collected in accordance with the Sampling and Analysis Plan (SAP) (URS, 2003a). The soil and groundwater samples were submitted to U.S. Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) labs Ceimic Corporation, Mitkem Corporation in Rhode Island, A4 Scientific in Texas, Datachem in Utah, or EnviroSystems, Inc., in Maryland for analysis of total lead (by ICP-AES ILM05.2), VOCs (CLP Volatiles OLC03.2), PAHs and base-neutral/acid extractable SVOCs (SVOCs or CLP BNAs OLM04.3), and/or PCBs (CLP PCBs OLM04.3). In addition, seven soil gas samples for VOCs by Method TO-15 and 89 groundwater samples were submitted to the EPA Region 9 Laboratory in Richmond, California for analysis of alkalinity by Method SM2320; total dissolved solids (TDS) by Method 160.1; cations (boron, calcium, iron, magnesium, manganese, potassium, sodium) by Method E200.7; anions (chloride, nitrate, sulfate) by Method E300.0; sulfide by Method E376.2; biochemical oxygen demand (BOD) by Method 405.1; 1,4-dioxane by Method 8270B; and/or total organic carbon (TOC) by Method E415.1. Seventy-seven groundwater samples were analyzed by EMAX Laboratories Inc., in Torrance, California, or Keystone Laboratory Inc. in Iowa for ethane, ethene, and methane by headspace Method SW3810/RSK-175. Sixty-eight of the soil gas samples were submitted to EMAX Laboratories Inc., in Torrance, California, for VOCs analysis by Method TO-14. In addition, 30 groundwater samples were submitted to Microseeps Inc., in Pennsylvania, Keystone Laboratory, Inc., in Iowa, or Emax Laboratories Inc. for analysis of volatile fatty acids (VFAs) (acetic, butyric, lactic, propionic, pyruvic) by Method SW8015 Modified, and six samples for dissolved hydrogen by Method AM 19GA (by Microseeps, Inc.).

Field quality control (QC) samples including field duplicates, field blanks, equipment rinsates, and trip blanks were submitted to the appropriate laboratories. Upon receipt of the analytical reports, the data were reviewed for completeness and compliance with the laboratory contract scope of work and project objectives specified in the data quality objectives (DQOs) section of the SAP (URS, 2003a).

E.2 Data Evaluation

The following data quality issues that may affect the quality of the Cooper Drum RD and hydrogen release compound (HRC) supplemental soil, groundwater, and soil gas sample results were identified based on

review of the CLP and Regional Laboratory data validation reports from ICF Consulting (ICF) and DataVal, Inc., plus internal URS review of electronic or hard copy data packages.

Total Lead in Soil by CLP Inorganics (ICP-AES)

- Based on the CLP data validation report (ICF, 2003) and the electronic data provided, there are no limitations on the use of total lead data for soil.
- Results from field duplicate pairs showed satisfactory precision for lead results in soil data.

Table E-1

Summary of Laboratory Analyses and Data Validation

Sampling Event	No. and Type of Samples	Laboratory	Analysis	Validation
Initial RD April 28, 2003, and May 13, 2003	49 Soil 72 Groundwater	Ceimic Corp. Mitkem Corp.	CLP lead CLP VOCs CLP SVOCs CLP PCBs	20% Tier 3
	15 of 72 Groundwater	EPA Region 9	Chloride, nitrate, sulfate by E300.0	
			Sulfide by E376.2	
			Alkalinity by SM2320	
			TDS by E160.1	
			BOD by E405.1 TOC by E415.1	
31 Soil Gas 15 of 72 Groundwater	EMAX Labs	VOCs by TO-14 Ethene, ethane, methane by SW3810/RSK-175		
HRC Monitoring December 3–4, 2003	6 Groundwater	Mitkem Corp.	CLP VOCs	100% Tier 3
		EPA Region 9	Chloride, nitrate, sulfate by E300.0	
			Sulfide by E376.2	
			Alkalinity by SM2320	
			TDS by E160.1	
			Cations by E200.7	
			BOD by E405.1 TOC by E415.1	
		Microseeps	Biodegradation Indicator Gases by AM20GAx H ₂ by AM 19GA	

Table E-1 (Continued)

Sampling Event	No. and Type of Samples	Laboratory	Analysis	Validation	
		EPA Region 9	Chloride, nitrate, sulfate by E300.0 Sulfide by E376.2		
		37 Soil Gas	EMAX Labs		VOCs by TO-14
		23 Groundwater			Ethene, ethane, methane by SW3810/RSK-175
HRC Monitoring January 13-21, 2004	17 Groundwater	A4 Scientific	CLP VOCs	20% Tier 3	
		EPA Region 9	Chloride, nitrate, sulfate by E300.0		
			Sulfide by E376.2		
			Alkalinity by SM2320		
			TDS by E160.1		
			Cations by E200.7		
		BOD by E405.1			
TOC by E415.1					
45 Soil Gas	EMAX	VOCs by TO-14			
20 Groundwater		Ethene, ethane, methane by SW3810/RSK-175			
HRC Monitoring February 25 and 26, 2004	6 Groundwater	Mitkem Corp.	CLP VOCs	100% Tier 3	
		EPA Region 9	Chloride, nitrate, sulfate by E300.0		
			Sulfide by E376.2		
			Alkalinity by SM2320		
			TDS by E160.1		
			Cations by E200.7		
			BOD by E405.1		
		TOC by E415.1			
Microseeps		Biodegradation Indicator Gases by AM20Gax H ₂ by AM 19GA			
7 Soil Gas	EPA Region 9	VOCs by TO-15			
HRC Monitoring April 27-29, 2004	7 Groundwater	A4 Scientific	CLP VOCs	20% Tier 3	
		EPA Region 9	1,4-Dioxane by 8270C		
			Chloride, nitrate, sulfate by E300.0		
			Sulfide by E376.2		
			Alkalinity by SM2320		
			TDS by E160.1		
			Cations by E200.7		
			BOD by E405.1		
		TOC by E415.1			
Keystone		VFAs by SW8015 Modified			

Table E-1 (Continued)

Sampling Event	No. and Type of Samples	Laboratory	Analysis	Validation
			Ethene, ethane, methane by SW3810/RSK-175 H ₂ by AM 19GA	
HRC Monitoring and 2 nd Round of New Well Sampling July 19-22, 2004	14 Groundwater	Datachem	CLP VOCs	20% Tier 3
		Region 9	1,4-Dioxane by 8270C	
			Chloride, nitrate, sulfate by E300.0	
			Sulfide by E376.2	
			Alkalinity by SM2320	
			TDS by E160.1	
			Cations by E200.7	
			BOD by E405.1	
			TOC by E415.1	
		EMAX	Ethene, ethane, methane by SW3810/RSK-175 VFAs by SW8015 Modified	
HRC Monitoring and 3 rd Round of New Well Sampling November 1-5, 2004	18 Groundwater	Envirosystems, Inc.	CLP VOCs	20% Tier 3
		Region 9	1,4-Dioxane by 8270C	
			Chloride, nitrate, sulfate by E300.0	
			Sulfide by E376.2	
			Alkalinity by SM2320	
			TDS by E160.1	
			Cations by E200.7	
			TOC by E415.1	
			EMAX	

Key

- AM 19GA = Microseeps Inc. analytical method for hydrogen analysis
- BOD = biochemical oxygen demand
- CLP = EPA Contract laboratory program
- HRC = hydrogen release compound
- H₂ = hydrogen
- PCB = polychlorinated biphenyl
- SM = Standard Methods for the Examination of Water and Wastewater (AWWA, 1999 and updates)
- SVOC = semi volatile organic compound
- SW = Test Methods for Evaluating Solid Waste (SW-846) (EPA, 1986 and updates)
- TDS = total dissolved solids
- VFA = volatile fatty acids
- VOC = volatile organic compound

VOCs in Groundwater by CLP Volatiles

- Based on the CLP data validation reports (ICF, 2003; 2004; 2005) and Regional Lab data validation reports (DataVal, 2004), and the electronic data provided, limitations on the VOCs in groundwater data are presented below. All results below the contract-required quantitation limit (CRQL) denoted with the laboratory “L” qualifier are estimated (J).
- Results for acetone (in Y0W85 and Y0W92), bromoform (all results <20 micrograms per liter [µg/L]), chloromethane (in Y1673 and Y1674), methylene chloride (in all samples except Y0W21), trichloroethene (TCE), and xylenes in selected samples are qualified as nondetected and estimated (UJ) due to method blank contamination.
- Results for chloroform in selected samples are qualified as nondetected and estimated (UJ) due to trip blank contamination. Note some trip blank results are attributed to method blank detects.
- The following data are qualified as estimated (J) due to high relative standard deviations (RSD >30) in their initial calibrations: methylene chloride result in sample Y0W21; 1,2,3-trichlorobenzene in samples Y16A7, Y16A9, and Y16B0; and acetone and methyl acetate in samples Y16A0 through Y16A6, and Y16A8.
- The 1,1-dichloroethane (1,2-DCA) results in samples Y1695, Y16A5, Y16A6, Y16H10, and Y1H11; and 1,1-dichloroethene (1,1-DCE) in samples Y16A4, Y16A5, Y16A6; and Y1H10 and vinyl chloride in sample Y1H08; are estimated biased low due to their concentrations exceeding the 25 µg/L calibration range.
- The following analytes were qualified as estimated (J) in most samples due to low relative response factors (RRFs <0.05) in the initial and/or continuing calibrations: acetone; 2-butanone; and 1,2-dibromo-3-chloropropane (DBCP). Detection limits for 4-methyl-2-pentanone were also estimated (J) for low RRFs in several samples collected in November 2004.
- Detected results and quantitation limits for the listed analytes in selected samples are estimated (J) due to large (>30%) RSDs in the initial calibration: methylene chloride, xylenes, styrene, isopropylbenzene, and methyl acetate.
- The following analytes were qualified as estimated (J) in selected samples due to large percent differences (>25%D) in continuing calibrations: acetone; 2-butanone; DBCP; dichlorofluoromethane; 2-hexanone; carbon disulfide; 4-methyl-2-pentanone; chloromethane; cyclohexane; 1,1-DCE; methyl tert-butyl ether; methyl acetate; methylene chloride; trichlorofluoromethane; and trichlorotrifluoroethane.
- The indicated analytes are estimated in samples MW-21 (1,1-DCA; cis-1,2-DCE; and TCE) and MW-25 (1,2-DCA) due to poor field duplicate precision (RPD>30%).
- Results and quantitation limits for cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; bromochloromethane; bromodichloromethane; chloroform; cyclohexane; 1,2-dichloropropane (1,2-DCP); 1,2-DCA; 1,1-DCE; cis-1,2-DCP; trans-1,2-DCP; 1,1,2-TCA; dibromochloromethane; 1,2-dibromoethane (1,2-DBA); vinyl chloride; carbon disulfide; and bromoform are qualified as estimated in selected samples due to poor surrogate recovery of deuterated monitoring compounds (DMCs).
- Quantitation limits for vinyl chloride, dichlorodifluoromethane, chloromethane, bromomethane, chloroethane, and carbon disulfide in sample Y16A4 (EW-1) on April 28, 2004, are rejected due to 0% recovery of DMCs.
- The following samples were correctly diluted due to high TCE and other target compound concentrations: Y0W82 (2x), Y1H14 (2x), Y1H15 (2x), Y0W83 (3x), Y0W91 (3x), Y1H13 (5x), Y1691 (10x), Y16A8 (10x), Y1692 (20x), Y16A1 (20x), Y1H06 (25x), Y1690 (40x), Y1693 (40x), Y1694 (40x), Y1695 (80x), Y1696 (80x), Y16A0 (80x), Y16A2 (80x), Y16A3 (80x),

Y16A4 (80x), Y1H05 (100x), Y1H07 (100x), Y1H08 (100x), Y1H09 (100x), Y16A5 (150x), Y16A6 (150x), Y1H10 (200x), and Y1H11 (200x).

- The detected result for TCE in sample Y1H12 (027 µg/L) is estimated due to potential carryover from sample Y1H11 (130 µg/L) since no instrument blank separated these consecutive samples and TCE was not detected in the reanalysis of Y1H12.
- Results from field duplicate pairs generally showed acceptable precision for water samples.
- Tentatively identified compounds (TICs) were found in samples Y1690 through Y1696.

VOCs in Soil by CLP Volatiles

- Based on the CLP data validation reports (ICF, 2003) and the electronic data provided, limitations on the VOCs in soil data are presented below.
- All results below the CRQL denoted with the laboratory “L” qualifier are estimated (J).
- Results for acetone, methylene chloride, TCE, and xylenes in selected samples are qualified as nondetected and estimated (UJ) due to method blank contamination.
- The following analytes were qualified as estimated (J) in selected samples due to large percent differences (>25%D) in continuing calibrations: 2-butanone, bromomethane, chloroethane, methylene chloride, 2-hexanone, and 4-methyl-2-pentanone.
- The matrix spike/matrix spike duplicate (MS/MSD) recovery for 1,1-DCE in sample Y0WC3 was low, indicating matrix interference.
- Results from field duplicate pairs showed typical heterogeneity for soil samples.

VOCs in Soil Gas by TO-14

- Based on the CLP data validation reports (ICF, 2003) and the electronic data provided, limitations on the VOCs in soil gas data are presented below. All results below the CRQL denoted with the laboratory “L” qualifier are estimated (J).
- High relative standard deviations (RSD >25) in the initial calibration require all detected results and quantitation limits to be qualified as estimated (J) for the following analytes: chloromethane; 1,1-DCA; 1,2-DCA; and 1,2-dichloropropane.
- Benzene results were qualified as estimated nondetects (UJ) due to field blank contamination in the following samples: 33019, 33023, 33024, 33030, and 33031.
- TCE results in samples 33019, 33020, 33021, and 33032, are estimated (J) due to a high laboratory control sample (LCS) recovery (133%).
- The following analytes were qualified as estimated (J) in selected samples due to large percent differences (>25%D) in continuing calibrations: chloromethane; 1,1-DCA; 1,2-DCA; and cis-1,2-DCE.
- Due to internal standard areas outside QC limits, all detected results and quantitation limits in samples 33010, 33019, 33020, and 33021 were qualified as estimated (J) for the following analytes: benzene; chloroform; carbon tetrachloride; 1,2-DCA; cis-1,3-dichloropropene; 1,2-dichloropropane; toluene; PCE; trans-1,3-dichloropropene; TCE; 1,1,1-TCE; 1,1,2-TCA; and 1,2-DBA.
- The VOC results from January 15, 2004, in sample SG-34 at 30 feet below surface (bgs) (5x) and the field duplicate pair at SG-30 at 30 feet bgs (5x) were correctly diluted due to exceedance of the calibration range; quantitation limits were adjusted accordingly.

- Results from field duplicate pairs showed satisfactory precision (<50%, with at least one result >5x the RL) for soil gas samples except as follows: tetrachloroethene (PCE) (52%) in SG-30 at 30 feet bgs; methylene chloride (54%) and m+p-xylenes (60%) in SG-34 at 20 feet bgs; 1,1-DCA (59%) in SG-38 at 10 feet bgs.

VOCs in Soil Gas by TO-15

- Based on the EPA Region 9 lab data validation report (DataVal, 2004) and the electronic data provided, limitations on the VOCs in seven soil gas samples analyzed by Method TO-15 are presented below. All results below the CRQL denoted with the laboratory “L” qualifier are estimated (J).
- High relative standard deviations (RSD >30) in the initial calibration require all detected results and quantitation limits to be qualified as estimated (J) for the following analytes: methylene chloride (dichloromethane) (58%).
- The following analytes were qualified as estimated (J) in all samples due to large percent differences (>30%D) in continuing calibrations: methylene chloride (-35%, -38%, and -37%).

PAHs and SVOCs in Soil by CLP Semivolatiles

- Based on the CLP data validation reports (ICF, 2003) and the electronic data provided, limitations on the PAHs and SVOCs in soil data are presented below.
- All results below the CRQL denoted with the laboratory “L” qualifier are estimated (J).
- All detected results for bis(2-ethylhexyl)phthalate are qualified as nondetected and estimated (UJ) due to method blank contamination.
- The following analytes were qualified as estimated (J) in selected samples due to large percent differences (>25%D) in continuing calibrations: benzaldehyde; bis(2-chloroethyl)ether; and benzo(g,h,i)perylene.
- Samples Y0WB0 (30-fold), Y0WC8 (2-fold), Y0WE0 (3-fold), Y0WE5 (3-fold), Y0WE6 (2-fold), Y0WE7 (10-fold), Y0WF2 (10-fold), and Y0WF3 (2-fold) were diluted due to matrix interference; quantitation limits were adjusted accordingly.
- Results from field duplicate pairs showed typical heterogeneity for soil samples.

PCBs and Pesticides in Soil by CLP Pest/PCBs

- Based on the CLP data validation reports (ICF, 2003) and the electronic data provided, limitations on the organochlorine pesticide and PCB data are presented below.
- All results below the CRQL denoted with the laboratory “L” qualifier, are estimated (J).
- The following analytes are considered presumptively identified at an estimated concentration (NJ) in sample Y0WB0 due to large differences (>25%D) between the two confirmation column results: 4,4'-DDE; endrin; 4,4'-DDT; endrin ketone; alpha-chlordane; and gamma-chlordane.
- Sample Y0WB0 (10-fold) was diluted due to a high level of Aroclor 1254 that exceeded the calibration range. The result for Aroclor 1254 is from the diluted sample, with results for all other analytes reported from the undiluted sample.
- Sample Y0WA3 (10-fold) was diluted prior to gel-permeation chromatography (GPC) cleanup, and quantitation limits were adjusted accordingly.

- Results from field duplicate pairs showed satisfactory precision for soil samples.

Total Dissolved Solids in Groundwater by E160.1

- The sample temperature upon receipt (8 °C) exceeds the ideal range of 2 °C to 6 °C. No data qualification appears warranted.
- Based on the data validation report (DataVal, 2004), the EPA Region 9 laboratory report (EPA, 2003) and the electronic data provided, there are no limitations on the TDS in water data.

Cations in Groundwater by E200.7

- The sample temperature upon receipt (8 °C) exceeds the ideal range of 2 °C to 6 °C. No data qualification appears warranted.
- Based on the data validation report (DataVal, 2004), the EPA Region 9 laboratory report (EPA, 2003) and the electronic data provided, there are no limitations on the boron, calcium, iron, magnesium, manganese, potassium, and sodium data from water samples.

Anions in Groundwater by E300.0

- The sample temperature upon receipt (8 °C) exceeds the ideal range of 2 °C to 6 °C. No data qualification appears warranted.
- Based on the data validation report (DataVal, 2004) and the electronic data provided, there are no limitations on the chloride, nitrate, and sulfate data from water samples.

Sulfide in Groundwater by E376.1

- The sample temperature upon receipt (8 °C) exceeds the ideal range of 2 °C to 6 °C. No data qualification appears warranted.
- The results for sulfide in samples collected on February 25 and 26, 2004, from wells MW-2, MW-5, MW-20, MW-21, EW-1, and EW-2 are considered estimated due to imprecision (>20% RPD) in the associated laboratory duplicate of 25%.
- Based on the data validation report (DataVal, 2004), the EPA Region 9 laboratory report (EPA, 2003) and the electronic data provided, there are no other limitations on the sulfide in water data.

Biological Oxygen Demand (BOD) in Groundwater by E405.1

- The sample temperature upon receipt (8 °C) exceeds the ideal range of 2 °C to 6 °C. No data qualification appears warranted.
- The BOD results in samples from MW-5, MW-21, and EW-2 are considered estimated due to low LCS recovery (75%).
- Based on the data validation report (DataVal, 2004), the EPA Region 9 laboratory report (EPA, 2003) and the electronic data provided, there are no other limitations on the BOD in water data.

Total Organic Carbon in Groundwater by E415.1

- The sample temperature upon receipt (8 °C) exceeds the ideal range of 2 °C to 6 °C. No data qualification appears warranted.

- All TOC results are considered estimated, biased high, due to matrix effects.
- The TOC result in sample MW-21 is estimated due to poor field duplicate precision (RPD = 69%).
- Based on the data validation report (DataVal, 2004), the EPA Region 9 laboratory report (EPA, 2003) and the electronic data provided, there are no other limitations on the TOC in water data.

Ethane, Ethene, and Methane in Groundwater by SW3810/RSK-175

- Based on the CLP data validation reports (ICF, 2003) and the electronic data provided, limitations on the ethane, ethene, and methane in water data are presented below.
- Methane results from April/May 2003 for the following wells are qualified as estimated non-detects (UJ) due to equipment blank and/or trip blank contamination: EW-1, EW-2, MW-1, MW-3, MW-4, MW-5, MW-10, MW-15, MW-16, MW-17, MW-18, and MW-19.
- The methane results from January 2004 in samples MW-3 (50x), MW-22 (2x), and MW-31 (2x), were correctly diluted due to exceedance of the calibration range; quantitation limits were adjusted accordingly.

Data Quality Summary

Six VOC analytes in one sample were rejected due to 0% surrogate recoveries. All other data are acceptable for decision-making purposes with the qualifiers described above. In general, the data qualifiers listed above are typical of the calibration, blank contamination and matrix problems associated with a large data set of several matrixes, with a wide range of analytical methods, sent to multiple analytical labs. The overall field sampling procedures and analytical performance meets acceptable data quality guidelines, with the data completeness result exceeding 99 percent.

REFERENCES

ICF Consultants, 2003. Memoranda from ICF Consulting to Eric Yunker, Remedial Project Manager, USEPA Region IX. Reviews of Analytical Data, Tier 3 and Tier 1. July, August.

URS Group, Inc., 2003a. *Cooper Drum Company Remedial Design Sampling and Analysis Plan*. April 21.

APPENDIX F

**Basis for Estimated Soil Volume
Requiring Excavation**

Appendix F

Basis for Estimated Soil Volume Requiring Excavation

This appendix provide the basis for determining the volume of non-VOC contaminated soil that may require excavation in the Former Hard Wash Area and the Drum Processing Area.

F.1 Soil Sampling for Non-VOCs

The non-VOC sample results for the former HWA and DPA are recounted below, followed by a summary describing the total estimated volume of impacted soil.

F.1.1 Former Hard Wash Area

Lead

The lateral and vertical extent of lead was limited to the 1-foot below ground surface (bgs) sample from SB-9 (see Figure 10). Assuming excavation would be required in a 50-foot-square area around SB-9 and down to a depth of 2.5 feet bgs, the estimated volume to be excavated would be approximately 230 cubic yards (275 tons).

PCB and PAHs

Polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) at concentrations greater than cleanup levels are limited to the 1 foot bgs samples collected at SB-11 and SB-20 (see Figures 8 and 9). The lateral extent of PCBs are undefined east of SB-20. Additionally, as a result of elevated detection limits for PAHs from the 1 foot bgs sample at SB-20, the calculated PAH concentration exceeded the cleanup level when using the detection limit in the calculation. The lateral extent of PCBs and PAHs are estimated to be the same. Assuming contamination extends to 2.5 feet bgs and using the estimated area (110 feet by 50 feet) shown on Figures 8 and 9, the estimated excavated volume would be approximately 510 cubic yards (610 tons). These assumptions include excavating approximately 35 feet east of SB-20. Further characterization of PCBs and PAHs east of SB-20 should be performed during the remedial action phase as part of the confirmation soil sampling during excavation.

F.1.2 Drum Processing Area

Lead

The lateral and vertical extent of lead was limited to the 5- and 10-foot bgs samples from SB-14 and SB-27 (see Figure 12). Assuming excavation would be required in a 50- by 25-foot-square area surrounding these two borings, between a depth of 2.5 and 12.5 feet bgs, the estimated volume requiring excavation would be approximately 460 cubic yards (550 tons). Non-detectable concentrations of lead in borings SB-31 and SB-30 located on each end of the sump and adjacent to the building foundation indicate that lead contamination may not extend beneath the sump or building. However, the shallow lead-contaminated soil (5-foot depth) found at both these borings also contains PAHs at concentrations greater than the cleanup levels, as discussed in the following paragraph.

PAHs

The extent of PAH soil contamination in the DPA appears to be confined to two areas down to a maximum depth of 5 feet bgs (see Figure 11). Based on positive detection of PAHs at concentrations greater than cleanup levels in borings adjacent to the drum processing building foundation (SB-26, SB-30 and SB-31), soil contamination (down to a depth of 5 feet) extends beneath the building. The extent of soil contamination beneath the building is undefined. Additionally, the lateral extent of PAH soil contamination north of SB-25 and between the two areas highlighted on Figure 11 is undefined. Elevated detection limits above cleanup levels were reported at three borings. However, two of the borings (SB-28 and SB-29) contained at least two shallow samples with concentrations below cleanup levels. Based on the shallow distribution of PAH soil contamination, it is unlikely the deeper samples (12 and 17 feet bgs) would require excavation. Assuming contamination extends to 2.5 feet bgs in the western area and 7.5 feet bgs in the eastern area shown on Figure 11 and using the two estimated areas (50 feet by 110 feet and 60 feet by 90 feet), the estimated excavated volume would be approximately 2,010 cubic yards (2,410 tons). Further characterization of PAH contamination north of SB-25 should be performed during the remedial action as part of the confirmation soil sampling excavation activities. Assuming soil excavation and land use restrictions are both applied to the site, any soil contamination that could not be excavated adjacent to and from beneath the building may be left in place. This would reduce the excavation volume shown on Figure 11 by approximately one-third (670 cubic yards) down to total of 1,340 cubic yards (1,610 tons).

F.1.3 Summary

The overall estimated volume of soil requiring excavation in the former HWA and DPA (as depicted on Figures 8 through 12) is approximately 2,310 cubic yards (2,780 tons). This estimate discounts the co-contaminated lead and PAH soil volume (230 cubic yards, 280 tons) at SB-14 and SB-27 and the material beneath the drum processing building. The total volume estimated in the ROD for non-VOC soil contamination was 2,700 tons which is 80 tons less than the current estimated volume. Sampling in the areas east of borings SB-20 (former HWA) and SB-25 (DPA) will be performed during the excavation of these areas.