11901 Samuel, Garden Grove, CA 92840-2546

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 A00 A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST | DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 | E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | O W N | T / C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B / C | M A T | RENT RECD (00) | C N D | RENT PAID (00) | NF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74056 | 1 | S | 00208 | BARBER SHOP | 0 | $15 | SF | 1092.0 | 964 | $5 | P | D | $0 | G | $0 | 01 | 0 | $15 | | .0 | F |
| 74056 | 1 | S | 00264 | EXCH SVC OUTLET | 0 | $79 | SF | 885.0 | 961 | $0 | M | D | $0 | G | $0 | 01 | 0 | $79 | | .0 | F |
| 74056 | 1 | S | 00345 | FIXED LAUNDRY | 0 | $416 | SF | 4250.0 | 964 | $19 | B | D | $0 | G | $0 | 01 | 0 | $416 | | 4680.0 | D |
| 74056 | 1 | S | 00347 | FIXED DRY CLG P | 0 | $168 | SF | 1836.0 | 964 | $6 | B | D | $0 | G | $0 | 01 | 0 | $168 | | .0 | D |
| 74056 | 1 | S | 00388 | COFFEE SHOP | 0 | $45 | SF | 468.0 | 964 | $0 | M | D | $0 | G | $0 | 02 | 0 | $45 | | .0 | D |
| 74068 | 1 | S | 00110 | RECREATION BLDG | 0 | $555 | SF | 11369.0 | 966 | $67 | B | D | $0 | A | $0 | 01 | 0 | $555 | | .0 | F |
| 74069 | 3 | S | 00904 | RECREATION BLDG | 0 | $208 | SF | 4644.0 | 979 | $153 | B | G | $0 | A | $0 | 01 | 0 | $208 | | .0 | D |
| 74090 | 1 | S | 00140 | BULK SALE | 0 | $1 | SF | 3000.0 | 988 | $1 | B | D | $0 | A | $0 | 01 | 0 | $1 | | .0 | F |
| 74090 | 1 | S | 00982 | PRESS BOX | 0 | $591 | SF | 298.0 | 988 | $0 | B | A | $0 | R | $0 | 01 | 0 | $591 | | .0 | F |
| 74090 | 1 | S | 00983 | DUGOUT HOUSE | 0 | $39 | SF | 175.0 | 988 | $0 | B | A | $0 | R | $0 | 01 | 0 | $39 | | .0 | F |
| 74090 | 1 | S | 00984 | DUGOUT HOUSE | 0 | $39 | SF | 175.0 | 988 | $0 | B | A | $0 | R | $0 | 01 | 0 | $39 | | .0 | F |
| 17 * | | | | | 0 | $17198 | | 98605.0 | | $1993 | | | $0 | | $0 | | 0 | $17198 | | .0 | |
| 74006 | 1 | T | 00107 | BANK | 0 | $0 | SF | 1388.0 | 000 | $0 | M | D | $0 | R | $0 | 00 | 0 | $0 | | .0 | F |
| 74021 | 1 | T | 00136 | COMMISSARY | 0 | $1559 | SF | 8103.0 | 964 | $15 | B | M | $0 | G | $0 | 01 | 0 | $1559 | | .0 | E |
| 74025 | 1 | T | 00107 | ACES FACILITY | 0 | $50 | SF | 4936.0 | 000 | $0 | M | D | $0 | R | $0 | 00 | 0 | $50 | | .0 | F |
| 74025 | 1 | T | 00236 | ACES FACILITY | 0 | $432 | SF | 4430.0 | 960 | $0 | B | H | $0 | A | $0 | 01 | 0 | $432 | | .0 | D |
| 74025 | 1 | T | 00245 | ACES FACILITY | 0 | $28 | SF | 880.0 | 985 | $0 | B | H | $0 | A | $0 | 01 | 0 | $28 | | .0 | D |
| 74040 | 1 | T | 00126 | LIBRARY BRANCH | 0 | $316 | SF | 4533.0 | 960 | $9 | P | H | $0 | G | $0 | 01 | 0 | $316 | | .0 | E |

DRAFT

701

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 ADD A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | D W/N | T C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B / C | M A T | RENT RECD (00) | C N D | RENT PAID (00) | NF DL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74056 | 1 | T | 00107 | EXCH SVC OUTLET | 0 | $503 | SF | 1138.0 | 000 | $0 | M | D | $0 | R | $0 | 00 | 0 | $503 | | .0 | F |
| 74056 | 1 | T | 00207 | ADMIN GEN PURP | 0 | $58 | SF | 800.0 | 960 | $0 | M | H | $0 | A | $0 | 01 | 0 | $58 | | .0 | D |
| 74060 | 1 | T | 00928 | LUNCH ROOM | 0 | $5 | SF | 512.0 | 986 | $1 | B | A | $0 | R | $0 | 01 | 0 | $5 | | .0 | F |
| 74076 | 1 | T | 00242 | TH W/O DRESS RM | 0 | $494 | SF | 5868.0 | 965 | $49 | B | H | $0 | A | $0 | 01 | 0 | $494 | SE | 335.0 | E |
| 74090 | 1 | T | 00130 | PICNIC HOUSE | 0 | $78 | SF | 512.0 | 989 | $0 | B | | $0 | R | $0 | 01 | 0 | $78 | | .0 | F |
| 74090 | 1 | T | 00132 | OUTDOOR THEATER | 0 | $70 | SF | 640.0 | 986 | $0 | B | A | $0 | G | $0 | 01 | 0 | $70 | SE | 1.0 | F |
| | 8 * | | | | 0 | $3593 | | 33740.0 | | $74 | | | $0 | | $0 | | 0 | $3593 | | .0 | |
| | | | | | | | | | | | | | | | | | | | SE | 336.0 | |
| | 25 / | | | | 0 | $20791 | | 132345.0 | | $2067 | | | $0 | | $0 | | 0 | $20791 | | .0 | |
| | | | | | | | | | | | | | | | | | | | SE | 336.0 | |
| 75010 | 1 | S | 00940 | TENNIS COURTS | 0 | $311 | | .0 | 979 | $0 | | | $0 | A | $0 | 00 | 0 | $311 | EA | 2.0 | F |
| 75011 | 1 | S | 00293 | MULT CT AREA | 0 | $0 | | .0 | 966 | $5 | | | $0 | A | $0 | 00 | 0 | $0 | EA | 1.0 | F |
| 75011 | 1 | S | 00294 | MULT CT AREA | 0 | $0 | | .0 | 966 | $5 | | | $0 | A | $0 | 00 | 0 | $0 | EA | 2.0 | F |
| 75011 | 1 | S | 00296 | MULT CT AREA | 0 | $5 | | .0 | 985 | $39 | | | $0 | R | $0 | 00 | 0 | $5 | EA | 1.0 | F |
| 75011 | 1 | S | 00941 | MULT CT AREAS | 0 | $400 | | .0 | 980 | $0 | | | $0 | A | $0 | 00 | 0 | $400 | EA | 2.0 | F |
| 75011 | 1 | S | 00980 | MULT CT AREAS | 0 | $0 | | .0 | 988 | $0 | B | | $0 | R | $0 | 00 | 0 | $0 | EA | 1.0 | F |
| 75013 | 1 | S | 00148 | VOLLEYBALL CT | 0 | $0 | | .0 | 972 | $1 | | | $0 | G | $0 | 00 | 0 | $0 | EA | 1.0 | F |
| 75015 | 1 | S | 00295 | HANDBALL COURT | 0 | $0 | | .0 | 966 | $3 | | | $0 | A | $0 | 00 | 0 | $0 | EA | 1.0 | F |

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702

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY RCN AKA-004 ADD A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | SG | T | ACTIVE | NON-IND | H | DEPOT | MAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

703

| CAT CODE | O W/N | T / C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B / C | M A T | RENT RECD (00) | C R D | RENT PAID (00) | NF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75020 | 1 | S | 00129 | BASEBALL FIELD | 0 | $46 | | .0 | 964 | $0 | | | $0 | G | $0 | 00 | 0 | $46 | EA | 2.0 | F |
| 75030 | 1 | S | 00146 | OUTDR SWIM POOL | 0 | $831 | | .0 | 966 | $0 | | | $0 | R | $0 | 00 | 0 | $831 | EA | 1.0 | F |
| 75031 | 1 | S | 00149 | WADING POOL | 0 | $1 | SF | 2570.0 | 986 | $0 | | | $0 | A | $0 | 00 | 0 | $1 | GA | 4490.0 | F |
| 75079 | 1 | S | 00086 | BARBQ OD | 0 | $27 | | .0 | 987 | $0 | | | $0 | R | $0 | 00 | 0 | $27 | EA | 1.0 | F |
| | * | | 12 | | 0 | $1621 | | 2570.0 | | $53 | | | $0 | | $0 | | 0 | $1621 | | .0 | |
| | | | | | | | | | | | | | | | | | | | EA | 15.0 | |
| | | | | | | | | | | | | | | | | | | | GA | 4490.0 | |
| 75042 | 1 | T | 00155 | GOLF DRIVE RG | 0 | $0 | AC | .2 | 985 | $13 | | | $0 | R | $0 | 00 | 0 | $0 | EA | 1.0 | F |
| 75079 | 1 | T | 00928 | BARBQ OD | 0 | $4 | | .0 | 987 | $0 | | | $0 | R | $0 | 00 | 0 | $4 | EA | 2.0 | F |
| | * | | 2 | | 0 | $4 | | .2 | | $13 | | | $0 | | $0 | | 0 | $4 | | .0 | |
| | | | | | | | | | | | | | | | | | | | EA | 3.0 | |
| | / | | 14 | | 0 | $1625 | | 2570.2 | | $66 | | | $0 | | $0 | | 0 | $1625 | | .0 | |
| | | | | | | | | | | | | | | | | | | | EA | 18.0 | |
| | | | | | | | | | | | | | | | | | | | GA | 4490.0 | |
| 81110 | 1 | S | 00284 | PWR PL BLDG FOS | 0 | $614 | SF | 235.0 | 986 | $0 | B | D | $0 | R | $0 | 01 | 0 | $614 | | .0 | F |
| 81110 | 1 | S | 00387 | PWR PL BLDG FOS | 0 | $1505 | SF | 235.0 | 987 | $0 | B | D | $0 | R | $0 | 00 | 0 | $1505 | | .0 | F |
| 81110 | 1 | S | 00411 | PWR PL BLDG FOS | 0 | $509 | SF | 315.0 | 987 | $0 | B | D | $0 | R | $0 | 01 | 0 | $509 | | .0 | F |
| 81110 | 1 | S | 00654 | PWR PL BLDG FOS | 0 | $312 | SF | 334.0 | 975 | $0 | B | D | $0 | G | $0 | 01 | 0 | $312 | | .0 | D |

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PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 ADD A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | O T N/ N C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B R / A C T | RENT RECD (00) | C N D | RENT NF PAID DL (00) | S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3 * | 1 | | 0 | $2940 | | 1119.0 | | $0 | | $0 | | $0 | | 0 | $2940 | | .0 | |
| 81110 | 1 T | 00128 | PWR PL BLDG FOS | 0 | $7 | SF | 36.0 | 978 | $0 | B A | $0 | G | $0 | 01 | 0 | $7 | | .0 | F |
| 81110 | 1 T | 00338 | PWR PL BLDG FOS | 0 | $5 | SF | 36.0 | 979 | $0 | B A | $0 | G | $0 | 01 | 0 | $5 | | .0 | F |
| | 2 * | | | 0 | $12 | | 72.0 | | $0 | | $0 | | $0 | | 0 | $12 | | .0 | |
| | 5 / | 1 | | 0 | $2952 | | 1191.0 | | $0 | | $0 | | $0 | | 0 | $2952 | | .0 | |
| 81230 | 1 T | | ELECT EXT LIGHTING | 0 | $3706 | | .0 | 960 | $34 | | $34 | A | $0 | 00 | 0 | $3706 | LF | 69997.0 | F |
| 81241 | 1 T | | ELECT | 0 | $6251 | | .0 | 960 | $123 | | $0 | A | $0 | 00 | 0 | $6251 | LF | 103763.0 | F |
| 81242 | 1 T | | ELEUG | 0 | $2277 | | .0 | 980 | $0 | | $0 | R | $0 | 00 | 0 | $2277 | LF | 5369.0 | F |
| 81260 | 1 T | | ELECT DISTRIBUT XFMR | 0 | $3414 | | .0 | 960 | $54 | | $0 | A | $0 | 00 | 0 | $3414 | KV | 15987.0 | F |
| | * | 4 | | 0 | $15648 | | .0 | | $211 | | $34 | | $0 | | 0 | $15648 | | .0 | |
| | | | | | | | | | | | | | | | | | LF | 179129.0 | |
| | | | | | | | | | | | | | | | | | KV | 15987.0 | |
| | / | 4 | | 0 | $15648 | | .0 | | $211 | | $34 | | $0 | | 0 | $15648 | | .0 | |
| | | | | | | | | | | | | | | | | | LF | 179129.0 | |
| | | | | | | | | | | | | | | | | | KV | 15987.0 | |
| 81320 | 1 S | 00360 | SUBSTATION | 0 | $1 | | .0 | 984 | $0 | | $0 | R | $0 | 00 | 0 | $1 | KV | 6000.0 | F |
| 81320 | 1 S | 00978 | SUB STATION | 0 | $4246 | SF | 4000.0 | 989 | [illegible] | | $0 | R | $0 | 00 | 0 | $4246 | | .0 | F |
| | * | 2 | | 0 | $4247 | | 4000.0 | | $0 | | $0 | | $0 | | 0 | $4247 | | .0 | |

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CO | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | SG | T | ACTIVE | NON-IND | H DEPOT | | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | D W N | T / C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B / C | R A T | RENT RECD (00) | C N D | RENT PAID (00) | MF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | KV | 6000.0 | |
| | / | | 2 | | 0 | $4247 | | 4000.0 | | $0 | | | $0 | | $0 | | 0 | $4247 | | .0 | |
| | | | | | | | | | | | | | | | | | | | KU | 6000.0 | |
| 82116 | 1 | S | 00106 | HEAT PL BLDG | 0 | $2 | SF | 104.0 | 965 | $0 | B | D | $0 | R | $0 | 01 | 0 | $2 | | .0 | F |
| 82116 | 1 | S | 00239 | HEAT PL BLDG | 0 | $2593 | SF | 1761.0 | 987 | $1 | B | D | $0 | A | $0 | 01 | 0 | $2593 | | .0 | F |
| 82116 | 1 | S | 00346 | HEAT PL BLDG | 0 | $227 | SF | 666.0 | 000 | $0 | P | D | $0 | A | $0 | 01 | 0 | $227 | | .0 | F |
| 82116 | 0 | S | 00639 | HEAT PL BLDG | 0 | $696 | SF | 93.0 | 989 | $0 | | D | $0 | R | $0 | 01 | 0 | $696 | | .0 | F |
| 82116 | 1 | S | 00666 | HEAT PL BLDG | 0 | $450 | SF | 1400.0 | 964 | $0 | B | G | $0 | R | $0 | 01 | 0 | $450 | | .0 | D |
| 82116 | 1 | S | 00823 | HT PL BLDG | 0 | $89 | SF | 144.0 | 983 | $0 | B | D | $0 | R | $0 | 01 | 0 | $89 | VE | 1.0 | F |
| 82116 | 3 | S | 00925 | HEAT PL BLDG | 0 | $0 | SF | 1199.0 | 979 | $69 | B | G | $0 | G | $0 | 01 | 0 | $0 | | .0 | F |
| | 7 | * | | | 0 | $4057 | | 5367.0 | | $70 | | | $0 | | $0 | | 0 | $4057 | | .0 | |
| | | | | | | | | | | | | | | | | | | | VE | 1.0 | |
| | 7 | / | | | 0 | $4057 | | 5367.0 | | $70 | | | $0 | | $0 | | 0 | $4057 | | .0 | |
| | | | | | | | | | | | | | | | | | | | VE | 1.0 | |
| 82210 | 1 | T | STLNT | STM CONDENS LN | 0 | $230 | | .0 | 964 | $0 | | | $0 | G | $0 | 00 | 0 | $230 | LF | 1714.0 | F |
| 82220 | 1 | T | HWTRT | HOT WATER LINES | 0 | $2470 | | .0 | 979 | $0 | | | $0 | G | $0 | 00 | 0 | $2470 | LF | 22876.0 | F |
| | * | | 2 | | 0 | $2700 | | .0 | | $0 | | | $0 | | $0 | | 0 | $2700 | | .0 | |
| | | | | | | | | | | | | | | | | | | | LF | 24590.0 | |

705

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 A00 A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | O T W / N C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B M / A C T | RENT RECD (00) | C R D | RENT PAID (00) | NF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | / | 2 | | 0 | $2700 | | .0 | | $0 | | $0 | | $0 | | 0 | $2700 | | .0 | |
| | | | | | | | | | | | | | | | | | LF | 24590.0 | |
| 83114 | 1 S | 00410 | SEWEN TR PL BBG | 0 | $4286 | SF | 5627.0 | 986 | $0 | B D | $0 | R | $0 | 01 | 0 | $4286 | | .0 | F |
| 83120 | 1 S | 00124 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 7000.0 | F |
| 83120S | 1 S | 00071 | SEP TK DRN FLD | 0 | $20 | | .0 | 982 | $0 | | $0 | G | $0 | 00 | 0 | $20 | KG | 1.0 | F |
| 83120S | 1 S | 00085 | SEP TK DRN FLD | 0 | $32 | | .0 | 964 | $0 | | $0 | G | $0 | 00 | 0 | $32 | KG | 2.0 | F |
| 83120S | 1 S | 00116 | SEP TK DRN FLD | 0 | $5 | | .0 | 960 | $0 | | $0 | G | $0 | 00 | 0 | $5 | KG | 1.0 | F |
| 83120S | 1 S | 00122 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 7000.0 | F |
| 83120S | 1 S | 00222 | SEP TK DRN FLD | 0 | $5 | | .0 | 960 | $0 | | $0 | G | $0 | 00 | 0 | $5 | KG | 2.0 | F |
| 83120S | 1 S | 00264 | SEP TK DRN FLB | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 1000.0 | F |
| 83120S | 1 S | 00363 | SEP TK DRN FLB | 0 | $10 | | .0 | 963 | $0 | | $0 | G | $0 | 00 | 0 | $10 | KG | 1.0 | F |
| 83120S | 1 S | 00365 | SEP TK DRN FLD | 0 | $5 | | .0 | 965 | $0 | | $0 | G | $0 | 00 | 0 | $5 | KG | 2.0 | F |
| 83120S | 1 S | 00401 | SEPT TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 13000.0 | F |
| 83120S | 1 S | 00403 | SEPT TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 1000.0 | F |
| 83120S | 1 S | 00568 | SEP TK DRN FLD | 0 | $20 | | .0 | 985 | $0 | | $0 | R | $0 | 00 | 0 | $20 | KG | .8 | F |
| 83120S | 1 S | 00675 | SEP TK DRN FLB | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 2000.0 | F |
| 83120S | 1 S | 00676 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 1000.0 | F |
| 83120S | 1 S | 00684 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 2500.0 | F |

706

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 ADD A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE K5054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST | DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | SG | 1 | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 | E | CHILGUK GUN | CA | 960 | U |

| CAT CODE | D W N | T / C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B / C | M A T | RENT RECD (00) | C M D | RENT PAID (00) | NF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83120S | 1 | S | 00701 | SEP TK DRN FLD | 0 | $16 | | .0 | 964 | $0 | | | $0 | R | $0 | 00 | 0 | $16 | GA | 8.0 | F |
| 83120S | 1 | S | 00702 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | | $0 | R | $0 | 00 | 0 | $0 | GA | 800.0 | F |
| 83120S | 1 | S | 00707 | SEP TK DRN FLD | 0 | $19 | | .0 | 964 | $0 | | | $0 | G | $0 | 00 | 0 | $19 | KG | 3.3 | F |
| 83120S | 1 | S | 00943 | SEPT TK DRN FLD | 0 | $1 | | .0 | 984 | $1 | B | | $0 | A | $0 | 00 | 0 | $1 | GA | 3500.0 | F |
| 83190S | 1 | S | 00703 | SEPTIC TANK | 0 | $287 | | .0 | 964 | $0 | | | $0 | G | $0 | 00 | 0 | $287 | KG | 290.0 | F |
| 83190S | 1 | S | 00970 | GREASE TRAP | 0 | $0 | | .0 | 987 | $0 | B | | $0 | A | $0 | 00 | 0 | $0 | GA | 4800.0 | F |
| | 1 | * | 21 | | 0 | $4706 | | 5627.0 | | $1 | | | $0 | | $0 | | 0 | $4706 | | .0 | |
| | | | | | | | | | | | | | | | | | | | GA | 43608.0 | |
| | | | | | | | | | | | | | | | | | | | KG | 303.1 | |
| 83120S | 1 | T | 00125 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | | $0 | R | $0 | 00 | 0 | $0 | GA | 2000.0 | F |
| 83120S | 1 | T | 00126 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | | $0 | R | $0 | 00 | 0 | $0 | GA | 2000.0 | F |
| 83120S | 1 | T | 00127 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | | $0 | R | $0 | 00 | 0 | $0 | GA | 2000.0 | F |
| 83120S | 1 | T | 00136 | SEP TK DRN FLD | 0 | $1 | | .0 | 000 | $1 | B | | $0 | R | $0 | 00 | 0 | $0 | GA | 2000.0 | F |
| 83120S | 1 | T | 00204 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | | $0 | R | $0 | 00 | 0 | $1 | GA | 1000.0 | F |
| 83120S | 1 | T | 00206 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | | $0 | R | $0 | 00 | 0 | $0 | GA | 2000.0 | F |
| 83120S | 1 | T | 00236 | SEP TK DRN FLD | 0 | $0 | | .0 | 000 | $0 | B | | $0 | R | $0 | 00 | 0 | $0 | GA | 2000.0 | F |
| 83120S | 1 | T | 00520 | SEP TK DRN FLD | 0 | $1 | | .0 | 983 | $0 | | | $0 | R | $0 | 00 | 0 | $0 | GA | 2400.0 | F |
| | | * | 8 | | 0 | $2 | | .0 | | $1 | | | $0 | | $0 | | 0 | $1 | KG | 1.0 | F |
| | | | | | | | | | | | | | | | | | | $2 | | .0 | |

DRAFT

707

PREPARED 29 SEP 90 — INSTALLATION INVENTORY OF MILITARY REAL PROPERTY — PCN AKA-004 ADO — A/OF 28 SEP 90

| INSTALLATION NAME | INSTALLATION NO | RELATION CODE | ARMY LOCATION CODE |
|---|---|---|---|
| CAMP CARROLL | KS116 | KS116 | KS054 |

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | D T N / N C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B M / A C T | RENT RECD (00) | C N D | RENT PAID (00) | NF DL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | GA | 13400.0 | |
| | 1 / | 29 | | 0 | $4708 | | 5627.0 | | $2 | | $0 | | $0 | | 0 | $4708 | KG | 1.0 | |
| | | | | | | | | | | | | | | | | | | .0 | |
| | | | | | | | | | | | | | | | | | GA | 57008.0 | |
| | | | | | | | | | | | | | | | | | KG | 304.1 | |
| 83230 | 1 S | 00638 | SEWAGE PUMP | 0 | $70 | | .0 | 964 | $0 | | $0 | G | $0 | 00 | 0 | $70 | KG | 288.0 | F |
| 83230 | 1 S | 00830 | SEWAGE PUMP | 0 | $1 | | .0 | 988 | $0 | B | $0 | R | $0 | 01 | 0 | $1 | KG | 180.0 | F |
| 83231 | 1 S | 00401 | SEW/PUMP STA BD | 0 | $177 | SF | 186.0 | 964 | $0 | B D | $0 | G | $0 | 01 | 0 | $177 | | .0 | F |
| 83231 | 1 S | 00702 | SEW/PUMP STA BD | 0 | $474 | SF | 520.0 | 964 | $0 | B D | $0 | R | $0 | 01 | 0 | $474 | | .0 | F |
| 83240 | 1 S | 00705 | | 0 | $10 | | .0 | 975 | $0 | | $0 | G | $0 | 00 | 0 | $10 | LF | 260.0 | F |
| 83290 | 1 S | 00682 | GREASE TRAP | 0 | $30 | | .0 | 984 | $0 | | $0 | R | $0 | 00 | 0 | $30 | LF | 13.0 | F |
| 83290 | 1 S | 00708 | GREASE TRAP | 0 | $28 | | .0 | 973 | $0 | | $0 | G | $0 | 00 | 0 | $28 | | .0 | F |
| 83290 | 1 S | 00824 | GREASE TRAP | 0 | $30 | | .0 | 983 | $0 | | $0 | R | $0 | 00 | 0 | $30 | LF | 16.0 | F |
| 83290 | 1 S | 00825 | SEWAGE/ CORRECT | 0 | $0 | | .0 | 000 | $0 | B | $0 | R | $0 | 00 | 0 | $0 | GA | 1000.0 | F |
| 83290 | 1 S | 00945 | GREASE TRAP | 0 | $25 | | .0 | 984 | $0 | | $0 | R | $0 | 00 | 0 | $25 | LF | 13.0 | F |
| | 2 * | 8 | | 0 | $845 | | 706.0 | | $0 | | $0 | | $0 | | 0 | $845 | | .0 | |
| | | | | | | | | | | | | | | | | | KG | 468.0 | |
| | | | | | | | | | | | | | | | | | LF | 302.0 | |

908

PREPARED 29 SEP 90 — INSTALLATION INVENTORY OF MILITARY REAL PROPERTY — PCN AKA-004 ADO

INSTALLATION NAME CAMP CARROLL — INSTALLATION NO KS116 — RELATION CODE KS116 — ARMY LOCATION CODE KS054 — A/OF 28 SEP 90

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST | DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 | E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | O T W / N C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B M / A C T | RENT E RECD R (00) D | RENT NF PAID DL (00) S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | GA | 1000.0 | |
| 83210 | 1 T | SEWRT | SANITARY SEWER | 0 | $5989 | | .0 | 960 | $0 | | $0 R | $0 00 | 0 | $5989 | LF | 67559.0 | F |
| | 4 | 1 | | 0 | $5989 | | .0 | | $0 | | $0 | $0 | 0 | $5989 | | .0 | |
| | | | | | | | | | | | | | | | LF | 67559.0 | |
| | 2 / | 9 | | 0 | $6834 | | 706.0 | | $0 | | $0 | $0 | 0 | $6834 | | .0 | |
| | | | | | | | | | | | | | | | KG | 468.0 | |
| | | | | | | | | | | | | | | | LF | 67861.0 | |
| | | | | | | | | | | | | | | | GA | 1000.0 | |
| 83311 | 1 S | 00717 | INCINERATOR BLD | 0 | $785 | SF | 493.0 | 987 | $0 | B B | $0 R | $0 01 | 0 | $785 | | .0 | F |
| | 1 4 | | | 0 | $785 | | 493.0 | | $0 | | $0 | $0 | 0 | $785 | | .0 | |
| 83311 | 1 T | 00391 | INCINERATOR BLD | 0 | $1 | SF | 64.0 | 983 | $0 | B D | $0 R | $0 01 | 0 | $1 | | 5.0 | F |
| 83311 | 1 T | 00933 | INCENERATOR BLD | 0 | $21 | SF | 64.0 | 984 | $0 | B D | $0 R | '$0 00 | 0 | $21 | TN | .5 | F |
| 83390 | 1 T | TRASH | TRASH BIN | 0 | $303 | | .0 | 988 | $14 | B D | $0 R | $0 00 | 0 | $303 | TN | 29.5 | F |
| | 3 4 | | | 0 | $325 | | 128.0 | | $14 | | $0 | $0 | 0 | $325 | | .0 | |
| | | | | | | | | | | | | | | | TN | 30.0 | |
| | 4 / | | | 0 | $1110 | | 621.0 | | $14 | | $0 | $0 | 0 | $1110 | | .0 | |
| | | | | | | | | | | | | | | | TN | 30.0 | |
| 84111 | 1 S | 00628 | WTR TRMT BLDG | 0 | $543 | SF | 3169.0 | 962 | $0 | B D | $0 A | $0 01 | 0 | $543 | | .0 | D |

709

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 A00 A/OF 28 SEP 90

| INSTALLATION NAME | INSTALLATION NO | RELATION CODE | ARMY LOCATION CODE |
|---|---|---|---|
| CAMP CARROLL | K5116 | K5116 | K5054 |

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR R/U ACQ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 U |

| CAT CODE | D T W / N C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B M / A C T | RENT RECD (00) | C N D | RENT PAID (00) | NF DL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84120 | 1 S | 00144 | ELEV WA STOR TK | 0 | $176 | | .0 | 962 | $0 | | $0 | A | $0 | 00 | 0 | $176 | GA | 135000.0 | F |
| 84120 | 1 S | 00150 | ELEV WA STOR TK | 0 | $2756 | | .0 | 988 | $0 | B | $0 | A | $0 | 00 | 0 | $2756 | GA | 200000.0 | F |
| 84120 | 1 S | 00820 | ELEV WA STOR TK | 0 | $3293 | | .0 | 982 | $0 | | $0 | A | $0 | 00 | 0 | $3293 | GA | 150000.0 | F |
| 84121 | 1 S | 00629 | GND STOR TK | 0 | $300 | | .0 | 962 | $0 | | $0 | G | $0 | 00 | 0 | $300 | GA | 135000.0 | F |
| 84121 | 1 S | 00632 | GND STOR TK | 0 | $630 | | .0 | 964 | $0 | | $0 | G | $0 | 00 | 0 | $630 | GA | 750000.0 | F |
| 84130 | 1 S | 00056 | WATER WELL | 0 | $211 | | .0 | 973 | $0 | | $0 | G | $0 | 00 | 0 | $211 | KG | 79.0 | F |
| 84130 | 1 S | 00057 | WATER WELL | 0 | $280 | | .0 | 970 | $0 | | $0 | G | $0 | 00 | 0 | $280 | KG | 316.0 | F |
| 84130 | 1 S | 00600 | WATER WELL | 0 | $164 | | .0 | 970 | $0 | | $0 | G | $0 | 00 | 0 | $164 | KG | 213.0 | F |
| 84130 | 1 S | 00604 | WATER WELL | 0 | $142 | | .0 | 970 | $0 | | $0 | G | $0 | 00 | 0 | $142 | KG | 109.0 | F |
| 84130 | 1 S | 00851 | WATER WELL | 0 | $233 | | .0 | 974 | $0 | | $0 | G | $0 | 00 | 0 | $233 | KG | 158.0 | F |
| 84130 | 1 S | 00852 | WATER WELL | 0 | $218 | | .0 | 975 | $0 | | $0 | G | $0 | 00 | 0 | $218 | KG | 172.0 | F |
| 84130 | 1 S | 00853 | WATER WELL | 0 | $195 | | .0 | 982 | $0 | | $0 | G | $0 | 00 | 0 | $195 | KG | 170.0 | F |
| 84130 | 1 S | 00854 | WATER WELL | 0 | $1800 | | .0 | 982 | $0 | | $0 | G | $0 | 00 | 0 | $1800 | KG | 180.0 | F |
| 84130 | 1 S | 00950 | WATER WELL | 0 | $1 | | .0 | 000 | $0 | | $0 | R | $0 | 00 | 0 | $1 | KG | 15.0 | F |
| 84130 | 1 S | 00951 | WATER WELL | 0 | $1 | | .0 | 000 | $0 | | $0 | R | $0 | 00 | 0 | $1 | KG | 11.0 | F |
| 84162 | 1 S | 00058 | WTR PUMP STA BD | 0 | $161 | SF | 529.0 | 962 | $0 | B D | $0 | G | $0 | 01 | 0 | $161 | | .0 | F |
| 84162 | 1 S | 00344 | WTR PUMP STA BD | 0 | $485 | SF | 293.0 | 981 | $0 | B D | $0 | G | $0 | 01 | 0 | $485 | | .0 | F |
| 84162 | 1 S | 00627 | WTR PUMP STA BD | 0 | $515 | SF | 1623.0 | 962 | $0 | B D | $0 | G | $0 | 01 | 0 | $515 | | .0 | D |

710

PREPARED 29 SEP 90 — INSTALLATION INVENTORY OF MILITARY REAL PROPERTY — PCN AKA-004 ADO — A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL — INSTALLATION NO KS116 — RELATION CODE KS116 — ARMY LOCATION CODE KS05A

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | O/W/N T/C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B/C M/A/T | RENT RECD (00) C/N/D | RENT PAID (00) NF/OL/S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D/C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84142 | 1 S | 00972 | WTR PUMP STA DD | 0 | $246 | SF | 144.0 | 987 | $0 | B D | $0 R | $0 01 | 0 | $246 | | .0 | F |
| | 5 * | 15 | | 0 | $12350 | | 5758.0 | | $0 | | $0 | $0 | 0 | $12350 | | .0 | |
| | | | | | | | | | | | | | | | | GA1370000.0 | |
| | | | | | | | | | | | | | | | KG | 1423.0 | |
| 84150 | 1 T | 00147 | CHLORINATR BLDG | 0 | $69 | SF | 600.0 | 966 | $0 | B A | $0 R | $0 01 | 0 | $69 | | .0 | F |
| | 1 * | | | 0 | $69 | | 600.0 | | $0 | | $0 | $0 | 0 | $69 | | .0 | |
| | 6 / | 15 | | 0 | $12419 | | 6358.0 | | $0 | | $0 | $0 | 0 | $12419 | | .0 | |
| | | | | | | | | | | | | | | | | GA1370000.0 | |
| | | | | | | | | | | | | | | | KC | 1423.0 | |
| 84210 | 1 T | | WTRPT WATER PIPE LN P | 0 | $10882 | | .0 | 960 | $0 | | $29 G | $0 00 | 0 | $10882 | LF | 118454.0 | F |
| | * | 1 | | 0 | $10882 | | .0 | | $0 | | $29 | $0 | 0 | $10882 | | .0 | |
| | | | | | | | | | | | | | | | LF | 118454.0 | |
| | / | 1 | | 0 | $10882 | | .0 | | $0 | | $29 | $0 | 0 | $10882 | | .0 | |
| | | | | | | | | | | | | | | | LF | 118454.0 | |
| 85110A | 1 S | | RDPVS ROADS PAVED | 0 | $1621 | SY | 7299.0 | 984 | $0 | | $0 R | $0 00 | 0 | $1621 | MI | 675.9 | F |
| | * | 1 | | 0 | $1621 | | 7299.0 | | $0 | | $0 | $0 | 0 | $1621 | | .0 | |
| | | | | | | | | | | | | | | | MI | 675.9 | |
| 85110B | 1 T | | RDPVT ROADS PAVED | 0 | $23106 | SY | 257165.0 | 962 | $0 | | $51 G | $0 00 | 0 | $23106 | MI | 7260.1 | F |

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 ADD A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | O T W / N C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B M / A C T | RENT RECD (00) | C N D | RENT PAID (00) | NF DL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | U / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 85130 | 1 T | ROUTT | ROADS UNTREAT | 0 | $107 | SY | 2147.0 | 963 | $0 | | $0 | G | $0 | 00 | 0 | $107 | MI | .1 | F |
| | * | 2 | | 0 | $23213 | | 259312.0 | | $0 | | $51 | | $0 | | 0 | $23213 | | .0 | |
| | | | | | | | | | | | | | | | | | MI | 7260.2 | |
| | / | 3 | | 0 | $24834 | | 266611.0 | | $0 | | $51 | | $0 | | 0 | $24834 | | .0 | |
| | | | | | | | | | | | | | | | | | MI | 7936.1 | |
| 85215 | 1 S | PRKVS | NON ORG VEH PRK | 0 | $430 | SY | 1831.0 | 984 | $0 | | $0 | R | $0 | 00 | 0 | $430 | | .0 | F |
| 85220 | 1 S | SDWKS | SIDEWALKS | 0 | $1382 | SY | 12718.0 | 962 | $0 | | $0 | R | $0 | 00 | 0 | $1382 | | .0 | F |
| 85230 | 1 S | FBGES | FOOT BRIDGE | 0 | $2 | SY | 10.0 | 963 | $0 | | $0 | R | $0 | 00 | 0 | $2 | LF | 23.0 | F |
| | * | 3 | | 0 | $1814 | | 14559.0 | | $0 | | $0 | | $0 | | 0 | $1814 | | .0 | |
| | | | | | | | | | | | | | | | | | LF | 23.0 | |
| 85210 | 1 T | PRKVT | ORG VEHICLE PRK | 0 | $12560 | SY | 161977.0 | 962 | $8 | | $0 | R | $0 | 00 | 0 | $12560 | | .0 | F |
| 85230 | 1 T | FBRID | FOOT BRIDGE | 0 | $117 | | .0 | 985 | $0 | | $0 | R | $0 | 00 | 0 | $117 | LF | 70.0 | F |
| | * | 2 | | 0 | $12677 | | 161977.0 | | $8 | | $0 | | $0 | | 0 | $12677 | | .0 | |
| | | | | | | | | | | | | | | | | | LF | 70.0 | |
| | / | 5 | | 0 | $14491 | | 176536.0 | | $8 | | $0 | | $0 | | 0 | $14491 | | .0 | |
| | | | | | | | | | | | | | | | | | LF | 93.0 | |
| 86010 | 1 S | 00613 | RAILROAD TRACKS | 0 | $2540 | | .0 | 962 | $0 | | $0 | G | $0 | 00 | 0 | $2540 | LF | 16898.0 | F |
| | * | 1 | | 0 | $2540 | | .0 | | $0 | | $0 | | $0 | | 0 | $2540 | | .0 | |

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY RCN AKA-004 A(X) A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO K5116 RELATION CODE K5116 ARMY LOCATION CODE K5054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST | DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 | E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | O W/ N | T C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B / C | M A T | RENT RECD (00) | C N D | RENT PAID (00) | NF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | LF | 16898.0 | |
| | / | | 1 | | 0 | $2540 | | .0 | | $0 | | | $0 | | $0 | | 0 | $2540 | | .0 | |
| | | | | | | | | | | | | | | | | | | | LF | 16898.0 | |
| 87110 | 1 | S | STRMS | STORM SEWER | 0 | $5950 | | .0 | 962 | $0 | | | $0 | A | $0 | 00 | 0 | $5950 | LF | 32711.0 | F |
| 87120 | 1 | S | DRCVS | DRAIN DITCH PAV | 0 | $4285 | | .0 | 962 | $0 | | | $0 | R | $0 | 00 | 0 | $4285 | LF | 94094.0 | F |
| 87150 | 1 | S | RTWLS | RETAINING WALLS | 0 | $7038 | | .0 | 963 | $0 | | | $0 | R | $0 | 00 | 0 | $7038 | LF | 40254.0 | F |
| | * | | 3 | | 0 | $17273 | | .0 | | $0 | | | $0 | | $0 | | 0 | $17273 | | .0 | |
| | | | | | | | | | | | | | | | | | | | LF | 167059.0 | |
| | / | | 3 | | 0 | $17273 | | .0 | | $0 | | | $0 | | $0 | | 0 | $17273 | | .0 | |
| | | | | | | | | | | | | | | | | | | | LF | 167059.0 | |
| 87220 | 3 | S | 00922 | GUARD TOWERS | 0 | $0 | SF | 136.0 | 979 | $3 | B | D | $0 | G | $0 | 01 | 0 | $0 | EA | 1.0 | F |
| 87220 | 3 | S | 00923 | GUARD TOWERS | 0 | $0 | SF | 136.0 | 979 | $3 | B | D | $0 | G | $0 | 01 | 0 | $0 | EA | 1.0 | F |
| 87230 | 1 | S | 00095 | SENTRY STATION | 0 | $3 | SF | 109.0 | 965 | $0 | B | D | $0 | G | $0 | 01 | 0 | $3 | | .0 | F |
| 87230 | 1 | S | 00265 | SENTRY STATION | 0 | $96 | SF | 466.0 | 962 | $0 | B | D | $0 | A | $0 | 01 | 0 | $96 | | .0 | D |
| 87230 | 1 | S | 00640 | SENTRY STATION | 0 | $79 | SF | 466.0 | 962 | $0 | B | D | $0 | G | $0 | 01 | 0 | $79 | | .0 | D |
| 87230 | 1 | S | 00670 | SENTRY STATION | 0 | $77 | SF | 144.0 | 986 | $0 | B | D | $0 | A | $0 | 01 | 0 | $77 | | .0 | F |
| 87230 | 1 | S | 00947 | SENTRY STATION | 0 | $116 | SF | 73.0 | 987 | $0 | B | D | $0 | A | $0 | 01 | 0 | $116 | | .0 | F |
| 87230 | 1 | S | 00948 | SENTRY STATION | 0 | $99 | SF | 88.0 | 987 | $0 | B | D | $0 | A | $0 | 01 | 0 | $99 | | .0 | F |

713

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 A00 A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR ACQ | R/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 E | CHILGOK GUN | CA | 960 | U |

| CAT CODE | O W N | T / C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | LST VALUE (000) | B A C | M / T | RENT RECD (00) | C N D | RENT PAID (00) | NF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | O / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87235 | 3 | S | 00918 | DISPATCH BLDG | | $241 | SF | 800.0 | 979 | $7 | B | D | $0 | A | $0 | 01 | 0 | $241 | | .0 | F |
| 87240 | 1 | S | 00657 | KENNEL | | $205 | SF | 1000.0 | 969 | $0 | B | A | $0 | A | $0 | 01 | 0 | $205 | | .0 | F |
| 87290 | 1 | S | 00655 | DOG FOOD PREP | | $1007 | SF | 564.0 | 969 | $0 | B | D | $0 | G | $0 | 01 | 0 | $1007 | | .0 | D |
| | * | | 11 | | 0 | $1923 | | 3982.0 | | $13 | | | $0 | | $0 | | 0 | $1923 | | .0 | |
| | | | | | | | | | | | | | | | | | | | EA | 2.0 | |
| 87210 | 1 | T | FNMLT | FENCE OR WALLS | 0 | $8183 | | .0 | 960 | $0 | | | $0 | R | $0 | 00 | 0 | $8183 | LF | 84970.0 | F |
| 87220 | 1 | T | 00103 | GUARD TOWERS | 0 | $13 | SF | 121.0 | 966 | $0 | B | A | $0 | G | $0 | 01 | 0 | $13 | EA | 1.0 | F |
| 87220 | 1 | T | 00268 | GUARD TOWER | 0 | $6 | SF | 121.0 | 987 | $0 | | | $0 | R | $0 | 01 | 0 | $6 | | .0 | F |
| 87220 | 1 | T | 00569 | GUARD TOWERS | 0 | $13 | SF | 121.0 | 966 | $0 | B | A | $0 | G | $0 | 01 | 0 | $13 | EA | 1.0 | F |
| 87220 | 1 | T | 00633 | GUARD TOWERS | 0 | $13 | SF | 84.0 | 966 | $0 | B | A | $0 | G | $0 | 01 | 0 | $13 | EA | 1.0 | F |
| 87220 | 1 | T | 00635 | GUARD TOWERS | 0 | $13 | SF | 84.0 | 966 | $0 | B | A | $0 | G | $0 | 01 | 0 | $13 | EA | 1.0 | F |
| 87220 | 1 | T | 00636 | GUARD TOWERS | 0 | $28 | SF | 84.0 | 973 | $0 | B | A | $0 | G | $0 | 01 | 0 | $28 | EA | 1.0 | F |
| 87220 | 1 | T | 00637 | GUARD TOWERS | 0 | $28 | SF | 84.0 | 973 | $0 | B | A | $0 | G | $0 | 01 | 0 | $28 | EA | 1.0 | F |
| 87220 | 1 | T | 00810 | GUARD TOWERS | 0 | $28 | SF | 83.0 | 973 | $0 | B | A | $0 | G | $0 | 01 | 0 | $28 | EA | 1.0 | F |
| 87220 | 1 | T | 00811 | GUARD TOWERS | 0 | $28 | SF | 83.0 | 973 | $0 | B | A | $0 | G | $0 | 01 | 0 | $28 | EA | 1.0 | F |
| 87220 | 1 | T | 00812 | GUARD TOWERS | 0 | $28 | SF | 83.0 | 973 | $0 | B | A | $0 | G | $0 | 01 | 0 | $28 | EA | 1.0 | F |
| 87220 | 1 | T | 00813 | GUARD TOWERS | 0 | $28 | SF | 121.0 | 973 | $0 | B | A | $0 | G | $0 | 01 | 0 | $28 | EA | 1.0 | F |
| 87220 | 1 | T | 00814 | GUARD TOWERS | 0 | $13 | SF | 121.0 | 966 | $0 | B | A | $0 | G | $0 | 01 | 0 | $13 | EA | 1.0 | F |

714

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY

INSTALLATION NAME CAMP CARROLL PCN AKA-004 ADU A/OF 28 SEP 90

INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR R/U ACQ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| W | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 6 E | CHILGOK GUN | CA | 960 U |

| CAT CODE | U T N / N C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B M / A C T | RENT RECD (00) | C N D | RENT PAID (00) | NF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | U / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87220 | 1 T | 00926 | GUARD TOWERS | 0 | $17 | SF | 85.0 | 966 | $0 | B A | $0 | G | $0 | 01 | 0 | $17 | EA | 1.0 | F |
| 87230 | 1 T | 00357 | SENTRY STATION | 0 | $14 | SF | 28.0 | 000 | $0 | B | $0 | A | $0 | 00 | 0 | $14 | | .0 | F |
| 87270 | 1 T | 00337 | LIGHTNING PROT | 0 | $30 | | .0 | 964 | $0 | | $0 | G | $0 | 00 | 0 | $30 | LF | 180.0 | F |
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| | | | | | | | | | | | | | | | | | LF | 85150.0 | |
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| | | | | | | | | | | | | | | | | | | .0 | |
| | | | | | | | | | | | | | | | | | EA | 14.0 | |
| | | | | | | | | | | | | | | | | | LF | 85150.0 | |
| 89031 | 1 T | 00827 | OXY GEN PLT BDG | 0 | $9 | SF | 63.0 | 985 | $0 | D H | $0 | R | $0 | 00 | 0 | $9 | | .0 | F |
| 89061 | 1 T | 00317 | COOL TWR 26-99T | 0 | $13 | | .0 | 968 | $0 | | $0 | R | $0 | 00 | 0 | $13 | TN | 9.9 | F |
| | 1 * | 1 | | 0 | $22 | | 63.0 | | $0 | | $0 | | $0 | | 0 | $22 | | .0 | |
| | | | | | | | | | | | | | | | | | TN | 9.9 | |
| | 1 / | 1 | | 0 | $22 | | 63.0 | | $0 | | $0 | | $0 | | 0 | $22 | | .0 | |
| | | | | | | | | | | | | | | | | | TN | 9.9 | |
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| 92310 | 3 P | 60127 | LAND FORN AGREE | 0 | $0 | AC | 11.9 | 959 | $6 | | $0 | | $0 | 00 | 0 | $0 | | .0 | F |
| 92310 | 3 P | 60128 | LAND FORN AGREE | 0 | $0 | AC | 526.5 | 959 | $173 | | $0 | | $0 | 00 | 0 | $0 | | .0 | F |

DRAFT

715

PREPARED 29 SEP 90 INSTALLATION INVENTORY OF MILITARY REAL PROPERTY PCN AKA-004 ADO A/OF 28 SEP 90

INSTALLATION NAME CAMP CARROLL INSTALLATION NO KS116 RELATION CODE KS116 ARMY LOCATION CODE KS054

| MAC | USING AGENCY CD | TYPE INSTL | INSTL STATUS | OPER KIND | FUNC CODE | FUNCTION NAME | NEAREST CITY NAME | DIST DIR | COUNTY OR POLITICAL DIV | ST | YEAR F/U ACQ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | SG | T | ACTIVE | NON-IND | H | DEPOT | WAEGWAN | 0 1 | CHILGOK GUN | CA | 960 U |

| CAT CODE | O T W / N C | FAC NUM | CATEGORY DESCRIPTION | AREA OUT-GRANT | COST TO GOVT (00) | UM 1 | AREA TOTAL | YR BLT | EST VALUE (000) | B M / A C T | RENT RECD (00) | C M D | RENT PAID (00) | NF OL S | VACANT AREA | IMPROVE COST | UM 2 | TOTAL CAP | D / C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 92310 | 3 P | G0144 | LAND FORN AGREE | 0 | $0 | AC | 7.2 | 961 | | L | $0 | | $0 | 00 | C | $0 | | .0 | F |
| 92310 | 3 P | G0154 | LAND FORN AGREE | 0 | $0 | AC | 2.9 | 963 | | L | $0 | | $0 | 00 | 0 | $0 | | .0 | F |
| 92310 | 3 P | G0163 | LAND FORN AGREE | 0 | $0 | AC | .1 | 963 | | L | $0 | | $0 | 00 | 0 | $0 | | .0 | F |
| 92310 | 3 P | G0176 | LAND FORN AGREE | 0 | $0 | AC | .7 | 964 | | L | $0 | | $0 | 00 | 0 | $0 | | .0 | F |
| 92310 | 3 P | G0186 | LAND FORN AGREE | 0 | $0 | AC | .2 | 964 | | L | $0 | | $0 | 00 | 0 | $0 | | .0 | F |
| 92310 | 1 P | G0231 | LAND FORN AGREE | 0 | $0 | AC | .1 | 000 | $0 | | $0 | | $0 | 00 | 0 | $0 | | .0 | F |
| 92310 | 1 P | G0237 | LAND FORN AGREE | 0 | $0 | AC | .1 | 000 | $0 | B | $0 | | $0 | 00 | 0 | $0 | | .0 | F |
| | + | 10 | | 0 | $0 | | 735.7 | | $189 | | $0 | | $0 | | 0 | $0 | | .0 | F |
| | / | 10 | | 0 | $0 | | 735.7 | | $189 | | $0 | | $0 | | 0 | $0 | | .0 | |

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282 298

(4,919)

#3

716

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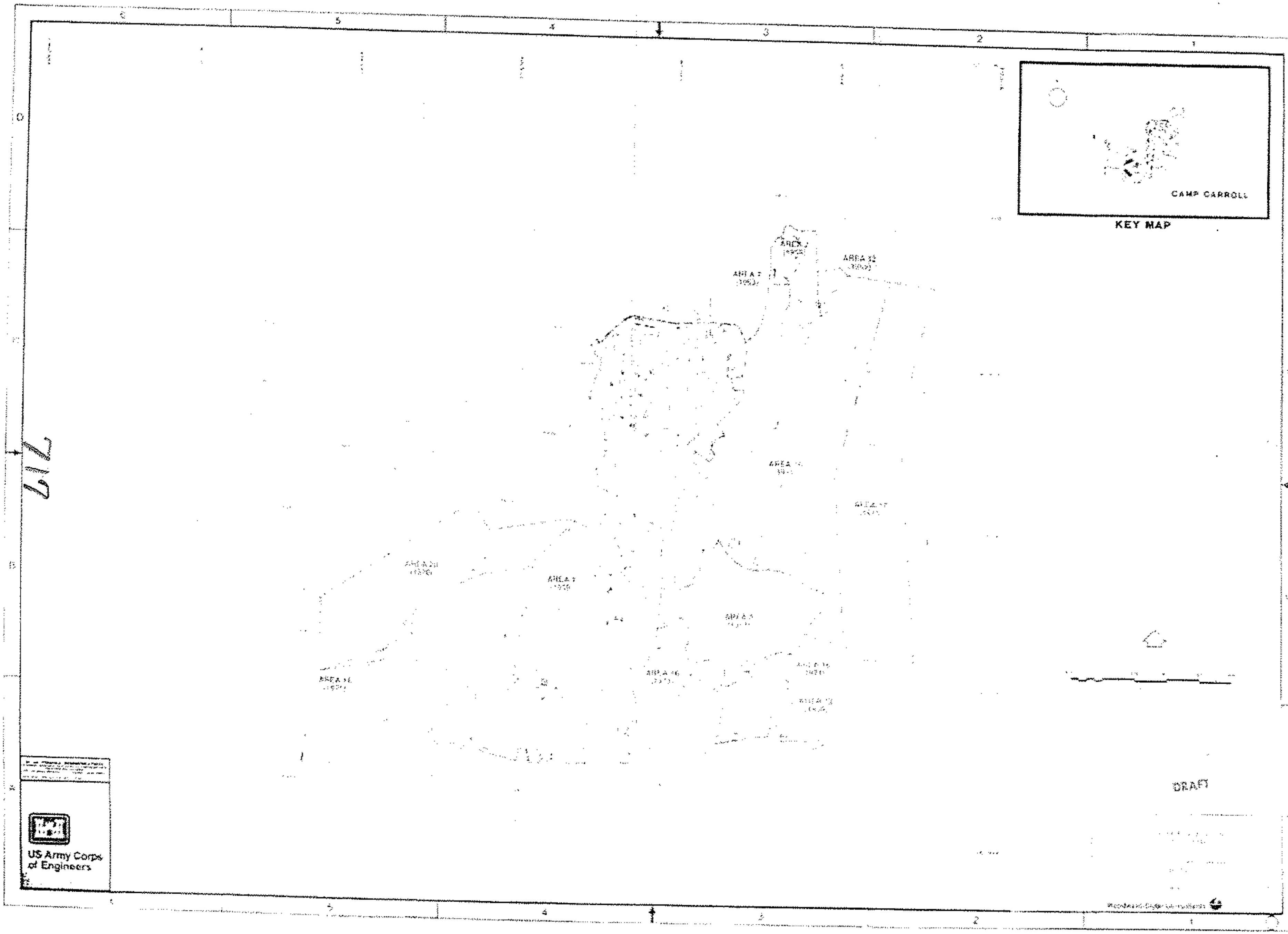
CAMP CARROLL
KEY MAP
DRAFT
US Army Corps
of Engineers


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# FINAL REPORT

## CAMP CARROLL AREA D AND AREA 41
## SITE INVESTIGATION, CAMP CARROLL, KOREA

**Prepared for:**
U.S. Army Corps of Engineers – Far East District
Unit #15546
APO AP 96205-0610

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Contract #DACA81-00-D-0049
Delivery Order #24

July 2004

7/9

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## EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers, Far East District (FED), has contracted with Samsung Corporation under Contract Number DACA81-00-D-0049 to perform a Site Investigation (SI) at Camp Carroll Area D and Area 41, located in the Republic of Korea. The investigation was initiated as a response to potential contamination in the subject areas.

Camp Carroll, depicted on Figure 1-1, is a U.S. Army Installation located adjacent to the village of Waegwan, in the south-central portion of the Republic of Korea (ROK). The present investigation comprises two study areas at Camp Carroll, Area 41 and Area D. Area 41 is located near the southwest boundary of the base, to the south of Building 620, and between the Wash Rack and Building 674. The study area includes approximately 39,375 square feet (3,658) square meters) of flat-lying gravel-covered area in a triangular shape. Area D is located near the southeast boundary of the base, northeast of the Dog Training Area and due south of the Fire Shed. Area D is comprised of approximately 125,000 square feet (11,613 square meters) of a (currently) paved and gravel-covered area (Woodward-Clyde Consultants, WWC 1992a).

### SITE HISTORY

Camp Carroll serves as the Headquarters, U.S. Army Material Support Center, Korea, and functions as a staging ground for U.S. military operations on the Korean peninsula and in the Far East. The primary mission of the base is to serve as a staging facility and a storage and maintenance depot.

Various transport vehicles including trucks, trailers, jeeps, tanks, personnel carriers, and other military vehicles are stored and maintained at the base. Supplies and materials, including but not limited to, armaments, vehicle engines and parts, electronic equipment and components, generators, electrical equipment, fuels, chemicals, and medical items, are received and stored at the base. Hazardous materials and wastes, including solvents, petroleum oils and lubricants (POL), pesticides, herbicides, and other industrial chemicals have been used and stored onsite for over 40 years. A number of potential sources of soil and groundwater contamination exist at the base, and the presence of contaminated groundwater has been documented (WWC 1992a).

A baseline groundwater investigation conducted by Woodward Clyde Consultants (WWC 1992b) reported relatively widespread contamination of the aquifer throughout the base. The most common contaminants identified were the chlorinated solvents trichloroethylene, tetrachloroethylene, and 1,2-dichloroethylene. These contaminants were detected in 15 of 18 groundwater monitoring wells sampled and in 8 of 10 water supply wells sampled during the survey in April 1992.

Cultural activities practiced in an area may result in increased background concentrations of some compounds. The common practice of incinerating wastes in Korea may result in elevated background concentrations of dioxins in surface soils through air transport and deposition. The widespread surface application of pesticides may result in increased background levels of these compounds. Therefore, all detections of these compounds may not necessarily reflect isolated site conditions and should also be reviewed with respect to local background conditions.

Area 41 has been identified as a former drum storage area. According to interviews with onsite personnel, drummed (or otherwise containerized) hazardous materials were stored in Area 41. The drums contained a variety of chemicals including pesticides (including DDT), herbicides, solvents, vehicle fluids (battery acid and antifreeze), POLs, other hydrocarbons, and other chemicals. Numerous spill events reportedly occurred in this area between 1976 and 1981. Eye-witness accounts describing soil discoloration and localized ponding of liquids indicate that a significant amount of leakage and spillage of materials had apparently occurred in the vicinity of stored containers.

Area D has been identified as a former hazardous waste landfill. Numerous hazardous materials were disposed in this landfill between the years of 1977 and 1982. Personnel interviews indicated that many drummed hazardous materials were transported to Area D from Area 41. The drums contained a variety of chemicals including pesticides (including DDT), herbicides, solvents, and over 100 other detected chemicals. The landfill dimensions were approximately 500 feet by 250 feet in area; and 20 to 30 feet deep. Reportedly, much of the landfill material and surrounding soil was excavated between 1982 and 1983 and placed into 55-gallon drums. The fate of the excavated drums is unknown. Despite the removal activity, residual amounts of contaminated material may have remained. No visual evidence of landfilling, such as soil discoloration, dead vegetation, or hummocky terrain, was observed during a 1992 site inspection performed by a Woodward-Clyde Consultants (WWC) field team.

**SCOPE AND OBJECTIVES**

The purpose of this investigation was to assess two related, but discretely located, harardous and toxic waste (HTW) contaminated areas at Camp Carroll. The two sites are identified as Drum Storage Yard (Area 41) and the Hazardous Waster Landfill (Area D), respectively.

The specific objectives of this remedial investigation and remedial design were to:

- Locate, map, and inventory past occurrences of contamination where HTW has been identified or is suspected to have been spilled onto the ground.
- Locate, map and inventory past and present HTW contamination sources that serve as past and/or continuing sources of groundwater contamination.
- Collect sufficient data to provide a baseline from which to assess future cleanup actions.
- Determine the sources of contamination and migration pathways.
- Map and determine the extent and amount of surface and subsurface soil contamination.

**INVESTIGATION ACTIVITIES**

This SI was initiated to investigate possible soil and groundwater contamination associated with a former hazardous waste drum storage area (Area 41) and a prior landfill (Area D). The SI was designed to evaluate the nature and extent of existing contamination, to determine groundwater flow patterns and potential contaminant migration pathways, and to evaluate several potential remedial alternatives.

The SI included the following field activities: Site reconnaissance; geophysical survey, exploratory trenching, exploratory drilling; installation monitoring wells; soil and ground-water sampling; water level monitoring in wells; and aquifer testing. Soil and groundwater samples were analyzed at offsite analytical laboratories. A Human Health Preliminary Risk Evaluation (PRE) was conducted to evaluate the impact of detected contaminant concentrations.

## RESULTS

The following conclusions concerning the site have been developed based on the data acquired during the SI:

Geology and Hydrology

- The site is underlain by granitic gneiss which is covered by varying thicknesses of weathered granitic bedrock material (saprolite) and fill soils derived from a similar source rock. Fractures and faulting were not observed in soil cores during the drilling activities.

- The measured groundwater level within the monitoring wells at Area 41 is approximately 4 to 10 meters bgs, at elevations of approximately 29 to 35 meters msl. The measured groundwater level within the monitoring wells at Area D is approximately 7 to 10 meters bgs, at elevations of approximately 40 to 43 meters msl. The groundwater gradient at each of the two areas investigated is directed to the west.

- On the basis of the available site data, groundwater and aqueous phase contaminants will tend to flow toward the west with the groundwater gradient when the subsurface lithology is permeable in that direction.

Assessment of Soil and Groundwater Impacts

- On the basis of a geophysical survey and exploratory trenching conducted at Area D, it is considered likely that buried drums containing hazardous materials at the site have previously been excavated and removed.

- Soil samples obtained from Area 41 contained concentrations of numerous contaminants including TPH-G, TPH-D, TPH-O, VOCs, SVOCs, pesticides, Resource Conservation and Recovery Act (RCRA) regulated metals, and dioxins. Several soil contaminant concentrations exceeded PRG screening criteria, however, contaminant concentrations are less than the risk criteria evaluated in the PRE. Groundwater samples obtained from Area 41 monitoring wells contained concentrations of TPH-G and TPH-D, VOCs, RCRA Metals, and dioxins. Detected concentrations that exceeded EGS values for groundwater are limited to VOCs. EGS values are not considered appropriate cleanup criteria for the site because the water table aquifer is not used for drinking water purposes in the area.

- Soil samples obtained from Area D contained concentrations of numerous contaminants including TPH-G, TPH-D, TPH-O, VOCs, SVOCs, pesticides, RCRA metals, and dioxins. Several soil contaminant concentrations exceeded PRG screening criteria, however, contaminant concentrations are less than the risk criteria evaluated in the PRE. Groundwater samples obtained from Area D monitoring wells contained concentrations of TPH-G and TPH-D, VOCs, SVOCs, pesticides, RCRA Metals, and dioxins. Detected concentrations that exceeded EGS values for groundwater are limited to VOCs and pesticides. EGS values are not considered appropriate cleanup criteria for the site because the water table aquifer is not used for drinking water purposes in the area.

- Contaminants identified in existing groundwater monitoring wells located to the west of Area 41 and Area D are consistent with a westward direction of groundwater flow and migration of aqueous contaminants at each of these area.

Conceptual Site Model

- The subsurface environment appears to be comprised of weathered granitic bedrock and fill materials derived from similar source rock. No preferred fracture orientations were observed during drilling activities. The direction of groundwater flow and migration of dissolved contaminants are presumed to be consistent with the hydraulic gradient.

- The identified groundwater gradient at each of the two sites investigated is directed toward the west. It appears that dissolved contaminants originating in shallow soils may have migrated downward through the vadose zone to the groundwater table, and then laterally towards the west with groundwater flow. The observed presence of similar contaminants in groundwater wells located to the west of Area 41 (Monitoring Well MW-14) and Area D (Monitoring Well MW-23) are consistent with this scenario.

## Remedial Alternatives

- The four remedial alternatives selected for evaluation were reviewed for their ability to reduce potential human health risk caused by exposure to contaminated soil, and for their ability to reduce continuing impacts to groundwater from the contaminated soil. Alternatives to address groundwater remediation were not included in this remedial alternatives evaluation.

- The remedial alternatives include no action, capping with a geosynthetic liner, capping with a clay liner, and removal of contaminated material.

  - No Action: No remedial activities are implemented at the Site. No costs are associated with this remedial alternative. Site workers will continue to be exposed to impacted soils.

  - Cap with Geosynthetic Liner: The geosynthetic cap will likely consist of a 6 to 12-inch thick leveling and bedding layer; an impermeable geosynthetic liner, a drainage geocomposite, an 18" thick vegetative support layer and a 6" layer of topsoil. Grass will be established in the topsoil layer. The cap will provide a boundary to prevent human contact with the contaminated soils. No precipitation infiltration will occur; therefore, there will be no leaching of contaminants to groundwater. Capital costs are estimated at $179,000, and O&M costs are estimated at $2,650 per year.

  - Cap with a Clay Liner: This remedial alternative is similar to the alternative described above, except that a clay liner is substituted for the geosynthetic liner, and the cap is not designed to meet RCRA Title 35 Subtitle C criteria. The non-geosynthetic cap will likely consist of a 24" thick low-permeability clay layer, a 6" thick vegetative support layer, and a 6" layer of topsoil. Grass will be established in the topsoil layer. This cap will provide a boundary to minimize human contact with the contaminated soils and precipitation infiltration will be greatly reduced (but not completely stopped), therefore, there will be only minimal leaching of contaminants to groundwater. Capital costs are estimated at $105,000, and O&M costs are estimated at $2,900 per year.

- <u>Removal of Contaminated Soils</u>: The dioxin-impacted soils will be excavated and hauled off site for treatment and/or disposal (approximately 57,950 cubic yards) and excavation areas will be backfilled with clean fill materials. It is assumed that excavated materials will be disposed of by shipment to the United States followed by thermal treatment (due to the presence of dioxins). This remedial alternative will eliminate the potential for human contact with the contaminated soils. There will be no leaching of contamination to groundwater, since all soil contamination will be removed. Significant handling of the contaminated soils will be required for this alternative which would pose an increased risk of exposure to workers during excavation and trucking activities. Capital costs are estimated at $93,800,000, and no O&M costs are anticipated.

**RECOMMENDATIONS**

On the Basis of the information and analytical data obtained during the site investigations performed in Area 41 and Area D, the recommendations to address COPCs at Camp Carroll include:

- Additional groundwater investigation is recommended at both Area 41 and Area D to further evaluate the highly elevated concentrations of chlorinated solvents. A 1992 baseline groundwater investigation of the Site (WWC 1992b) reported relatively widespread contamination of the aquifer throughout the base.

- Additional soil investigation is recommended at Area D to further define the limits of impacted soil and the boundaries of the former landfill.

- No remedial actions are recommended at this time. In the event that additional site characterization indicates that contaminant concentrations exceed risk criteria in Area D, it is anticipated that capping of the landfill area using a clay cap will be the preferred method to provide a barrier to human contact with impacted soils and to limit infiltration through the impacted soils.

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## LIST OF ACRONYMS

| | |
|---|---|
| bgs | below ground surface |
| CEM | Conceptual Evaluation Model |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CSM | Conceptual Site Model |
| COC | Chain of Custody |
| COCs | Contaminants of Concern |
| CT&E | CT&E Environmental Services, Inc. of Anchorage, Alaska |
| 1,2-DCE | 1,2-dichloroethylene |
| DC | direct current |
| EGS | Environmental Governing Standards |
| EPC | Exposure Point Concentration |
| FED | Far East District, U.S. Army Corps of Engineers |
| HI | Hazard Index |
| HLEM | Horizontal Loop Electromagnetic |
| HTW | hazardous and toxic waste |
| m/day | meters per day |
| $m^2$/day | meters squared per day |
| m/m | vertical meters per horizontal meter |
| mg/kg | milligrams per kilogram |
| mg/L | milligrams per liter |
| mm | millimeters |
| O&M | operations and maintenance |
| OVM | Organic Vapor Meter |
| PCBs | polychlorinated biphenyls |
| PCE | Tetrachloroethylene |
| pg/g | picograms per gram |
| PID | Photo-Ionization Detector |
| ppb | parts per billion |
| POL | Petroleum, Oils, And Lubricants |
| PRE | Preliminary Risk Evaluation |

| | |
|---|---|
| PRG | Preliminary Remedial Goal |
| PRGnc | Preliminary Remediation Goal based on noncancer effects |
| PVC | polyvinylchloride |
| QA | Quality Assurance |
| QA/QC | Quality Assurance/Quality Control |
| QAPP | Quality Assurance Project Plan |
| RAGS | Risk Assessment Guidance for Superfund |
| RCRA | Resource Conservation and Recovery Act |
| RME | Reasonable Maximum Exposure |
| ROK | Republic of Korea |
| SAP | Sampling and Analysis Plan |
| SI | Site Investigation |
| SOPs | Standard Operation Procedures |
| SSHP | Site Safety and Health Plan |
| STL | Severn Trent Laboratory of Seattle, Washington |
| SVOCs | Semivolatile Organics |
| TCE | Trichloroethene |
| TOC | Top of Casing |
| TPH | Total Petroleum Hydrocarbon |
| TR | Target Risk |
| USEPA | United States Environmental Protection Agency |
| USFK | United States Forces, Korea |
| VOCs | Volatile Organics |
| WWC | Woodward-Clyde Consultants |

# SECTION 1
# INTRODUCTION

The U.S. Army Corps of Engineers, Far East District (FED), has contracted with Samsung Corporation under Contract Number DACA81-00-D-0049 to perform a Site Investigation (SI) at Camp Carroll Area D and Area 41, located in the Republic of Korea. The investigation was initiated as a response to potential contamination in the subject areas.

The following sections present background information on the Camp Carroll site, including site history, a summary of previous investigations, and a description of investigation objectives.

## 1.1 SITE HISTORY AND CONTAMINANTS

### 1.1.1 General Site Description

Camp Carroll, depicted on Figure 1-1, is a U.S. Army Installation located adjacent to the village of Waegwan, in the south-central portion of the Republic of Korea (ROK). Camp Carroll is bounded by urban areas on the northwest, west, and southwest. Hilly forested areas bound the base on the north and east sides. Agricultural fields (mostly rice paddies) border the base on the northeast and to the south. The Naktonggang River flows nearby to the southwest of the base. The base is built around a discontinuous north-south trending ridgeline which splits the base into eastern and western halves. Extensive regrading has occurred throughout the base to produce level lots suitable for large warehouse buildings. In the two valleys located in the central and western portions of the base, the original terraced terrain has been leveled by the addition of up to 20 feet of fill material.

The present investigation comprises two study areas at Camp Carroll, Area 41 and Area D. Area 41 is located near the southwest boundary of the base, to the south of Building 620, and between the Wash Rack and Building 674. This study area includes approximately 39,375 square feet (3,658 square meters) of flat-lying, gravel-covered area in a triangular shape. Area D is located near the southeast boundary of the base, northeast of the Dog Training Area and due south of the Fire Shed. Area D is comprised of approximately 125,000 square feet (11,613 square meters) of a (currently) paved and gravel-covered area (WWC 1992a).

### 1.1.2 Site History

Camp Carroll serves as the Headquarters, U.S. Army Material Support Center, Korea, and functions as a staging ground for U.S. military operations on the Korean peninsula and in the Far East. The primary mission of the base is to serve as a staging facility and a storage and maintenance depot.

Various transport vehicles including trucks, trailers, jeeps, tanks, personnel carriers, and other military vehicles are stored and maintained at the base. Supplies and materials, including but not limited to, armaments, vehicle engines and parts, electronic equipment and components, generators, electrical equipment, fuels, chemicals, and medical items, are received and stored at the base. Hazardous materials and wastes, including solvents, petroleum oils and lubricants (POL), pesticides, herbicides, and other industrial chemicals have been used and stored onsite for over 40 years. A number of potential sources of soil and groundwater contamination exist at the base, and the presence of contaminated groundwater has been documented (WWC 1992a).

A baseline groundwater investigation conducted by Woodward Clyde Consultants (WWC 1992b) reported relatively widespread contamination of the aquifer throughout the base. The most common contaminants identified were the chlorinated solvents trichloroethylene, tetrachloroethylene, and 1,2-dichloroethylene. These contaminants were detected in 15 of 18 groundwater monitoring wells sampled and in 8 of 10 water supply wells sampled during the survey in April 1992.

Cultural activities practiced in an area may result in increased background concentrations of some compounds. The common practice of incinerating wastes in Korea may result in elevated background concentrations of dioxins in surface soils though air transport and deposition. The widespread surface application of pesticides may result in increased background levels of these compounds.

Area 41 has been identified as a former drum storage area. According to numerous personnel reports, drummed (or otherwise containerized) hazardous materials were stored in Area 41. The drums contained a variety of chemicals including pesticides (including

DDT), herbicides, solvents, vehicle fluids (battery acid and antifreeze), POLs, other hydrocarbons, and other chemicals. Numerous spill events reportedly occurred in this area between 1976 and 1981. Eye-witness accounts describing soil discoloration and localized ponding of liquids indicate that a significant amount of leakage and spillage of listed materials had apparently occurred in the vicinity of stored containers.

Area D has been identified as a former hazardous waste landfill. Numerous hazardous materials were disposed in this landfill between the years of 1977 and 1982. Personnel interviews indicated that many drummed hazardous materials were transported to Area D from Area 41. The drums contained a variety of chemicals including pesticides (including DDT), herbicides, solvents, and over 100 other detected chemicals. The landfill dimensions were approximately 500 feet by 250 feet in area; and 20 to 30 feet deep. Reportedly, much of the landfill material and surrounding soil was excavated between 1982 and 1983 and placed into 55-gallon drums. The fate of the excavated drums is unknown. Despite the removal activity, residual amounts of contaminated material may have remained. No visual evidence of landfilling, such as soil discoloration, dead vegetation, or hummocky terrain, was observed during a 1992 site inspection performed by a Woodward-Clyde Consultants (WWC) field team.

### 1.1.3 Existing Conditions

Area 41

Area 41 is currently comprised of a relatively flat-lying, graded lot. The lot is presently vacant with the exception of some stored metal plates in the north-western portion that were previously used to cover the surface soils at the site. The ground surface is unpaved and composed of decomposed granitic bedrock and fill soils derived from the same type of materials. The site appears to have been a former hill that was flattened for use by scrape and fill methods. Area 41 is slightly higher than the adjoining lots to the north and is separated from them by a drainage ditch. Mature locust and willow trees exist to the west of the graded area. The southern and western portions of the site descend in a steep vegetated hillside that abuts a concrete-lined drainage ditch. The asphalt-paved Oregon Avenue is located to the south of the drainage ditch. One groundwater monitoring well (MW14) was previously installed within the paved lot adjacent to the southwest portion of Area 41 by WWC in 1992. The well extends to a depth of approximately 29 feet below the existing ground surface (bgs). Groundwater samples obtained from this well in April 1992 contained tetrachloroethylene (PCE) at a concentration of 7 parts per billion (ppb), 1,2-dichloroethylene (1,2-DCE) at a concentration of 7 ppb, lead at a concentration of 4 ppb, and nitrate at a concentration of 90 ppb. This well was accessed again during the current investigation to measure groundwater levels. The elevation of the wellhead is approximately 10 feet below that of the graded portion of Area 41. The well was noted to be located near a current hazardous materials storage area.

Area D

Area D is comprised of a predominantly flat-laying graded lot. Portions of the lot are paved with asphalt. The ground surface in unpaved portions is composed of fill soils derived from decomposed granite. The southern and western edges of the level portion of the site are bounded by concrete-lined drainage ditches. Beyond the ditches, grass-covered slopes extend down to the grade level of the adjacent lot. The graded area is currently used to store materials and equipment in large metal containers. A number of the containers were temporarily moved to facilitate this investigation. One groundwater monitoring well (MW23) was previously installed adjacent to the southwest portion of Area D by WWC in 1992. The well extends to a depth of approximately 50 feet ßbelow the existing ground surface (bgs). Groundwater samples obtained from this well in April 1992 contained nitrate at a concentration of 90 ppb and barium at a concentration of 150 ppb. This well was accessed again during the current investigation to measure groundwater levels and obtain a groundwater sample for analysis.

### 1.1.4 Contaminants of Concern

The contaminants of concern (COCs) are comprised of listed chemicals that have been known to have been stored or landfilled at the site or have been detected in soil or groundwater samples collected during previous environmental investigations. These COCs include volatile organic compounds, semivolatile organic compounds, organochlorine pesticides, polychlorinated biphenyls (PCBs), chlorinated herbicides, petroleum hydrocarbons, and metals.

It should be noted that widespread contamination of the aquifer by chlorinated solvents has been documented at the base (WWC 1992b). Detected levels of these compounds may reflect the overall base-wide contamination rather than a location specific problem.

### 1.1.5 Potential Contaminant Sources

The potential contaminant sources identified for Area 41 are comprised of containers of harardous materials previously stored at the site. Leaks and spills of the stored materials reportedly occurred in the past. Currently, all such containers have been removed from the site and any source materials remaining are likely to consist of residual contaminants in the soil and groundwater underlying the site.

The potential contaminant sources identified for Area D are comprised of containers of materials previously buried at the site. One origin of the buried containers may have been the materials previously stored at Area 41. Reportedly, the buried containers were later excavated and removed from the site to an unknown destination. Source materials remaining at Area D are likely to consist primarily of residual contaminants in the soil and groundwater underlying the site, however, some of the buried containers may still be present in the previous landfill area.

The approximate locations of these potential sources are depicted on Figure 1-2. The evaluation processes regarding these potential sources are presented in Section 2-2.

### 1.1.6 Summary of Existing Site Data

One groundwater monitoring well (MW14) was installed adjacent to the southwest portion of Area 41 by WWC in 1992. The well extends to a depth of approximately 29 feet below the existing ground surface (bgs). Groundwater samples obtained from this well in April 1992 contained tetrachloroethylene (PCE) at a concentration of 7 parts per billion (ppb), 1,2-dichloroethylene (1,2-DCE) at a concentration of 7 ppb, lead at a concentration of 4 ppb and nitrate at a concentration of 90 ppb.

One groundwater monitoring well (MW23) was installed adjacent to the southwest portion of Area D by WWC in 1992. The well extends to a depth of approximately 50 feet below the existing ground surface (bgs). Groundwater samples obtained from this well in April 1992 contained nitrate at a concentration of 90 ppb and barium at a concentration of 150 ppb.

## 1.2 SCOPE AND OBJECTIVES

The purpose of this investigation was to assess two related, but discretely located, harardous and toxic waste (HTW) contaminated areas at Camp Carroll. The two sites are identified as Drum Storage Yard (Area 41) and the Hazardous Waster Landfill (Area D), respectively.

The specific objectives of this remedial investigation and remedial design were to:

- Locate, map, and inventory past occurrences of contamination where HTW has been identified or is suspected to have been spilled onto the ground.
- Locate, map and inventory past and present HTW contamination sources that serve as past and/or continuing sources of groundwater contamination.
- Collect sufficient data to provide a baseline from which to assess future cleanup actions.
- Determine the sources of contamination and migration pathways.
- Map and determine the extent and amount of surface and subsurface soil contamination.

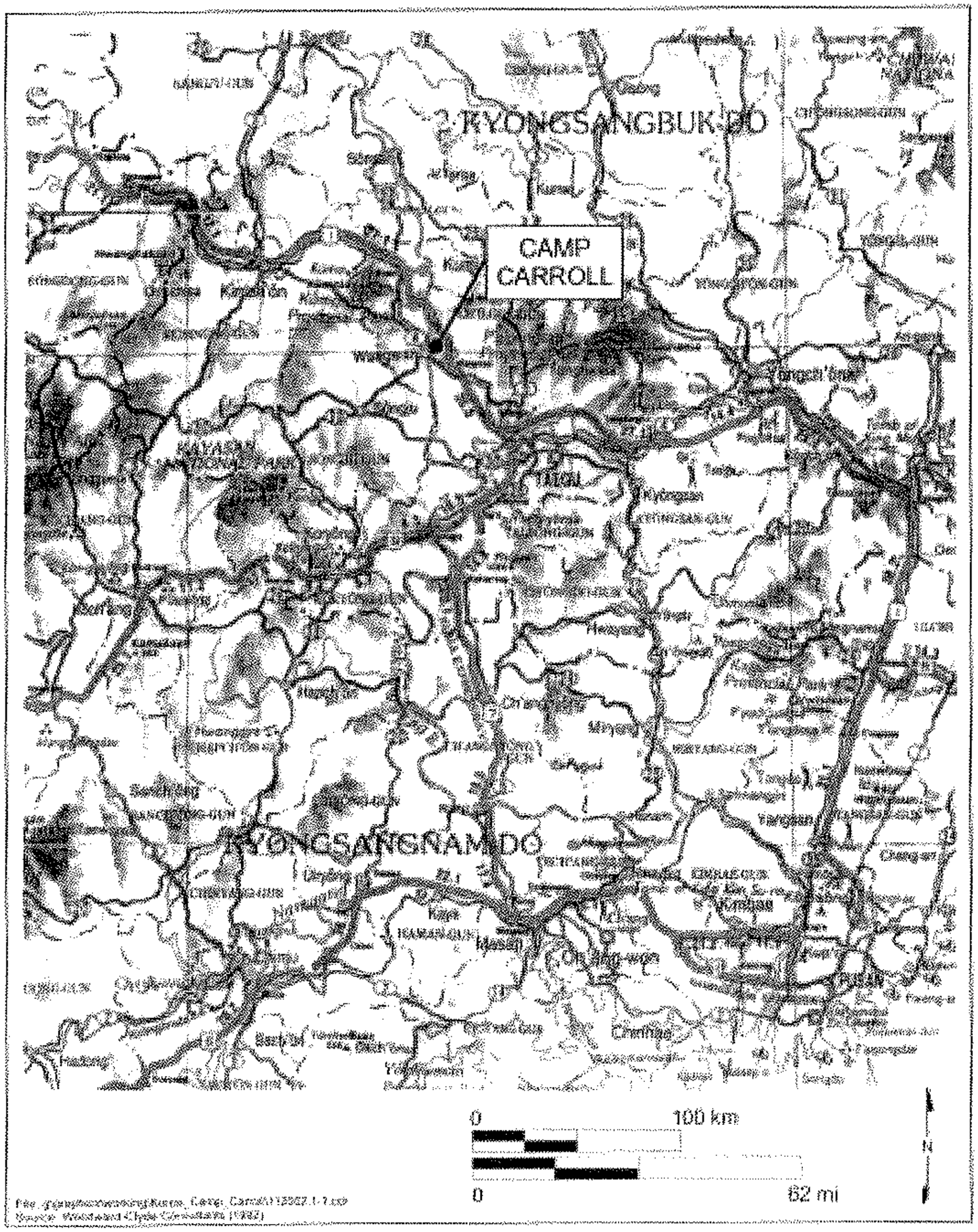


**Figure 1-1 Site Location Map, Camp Carroll, Korea**

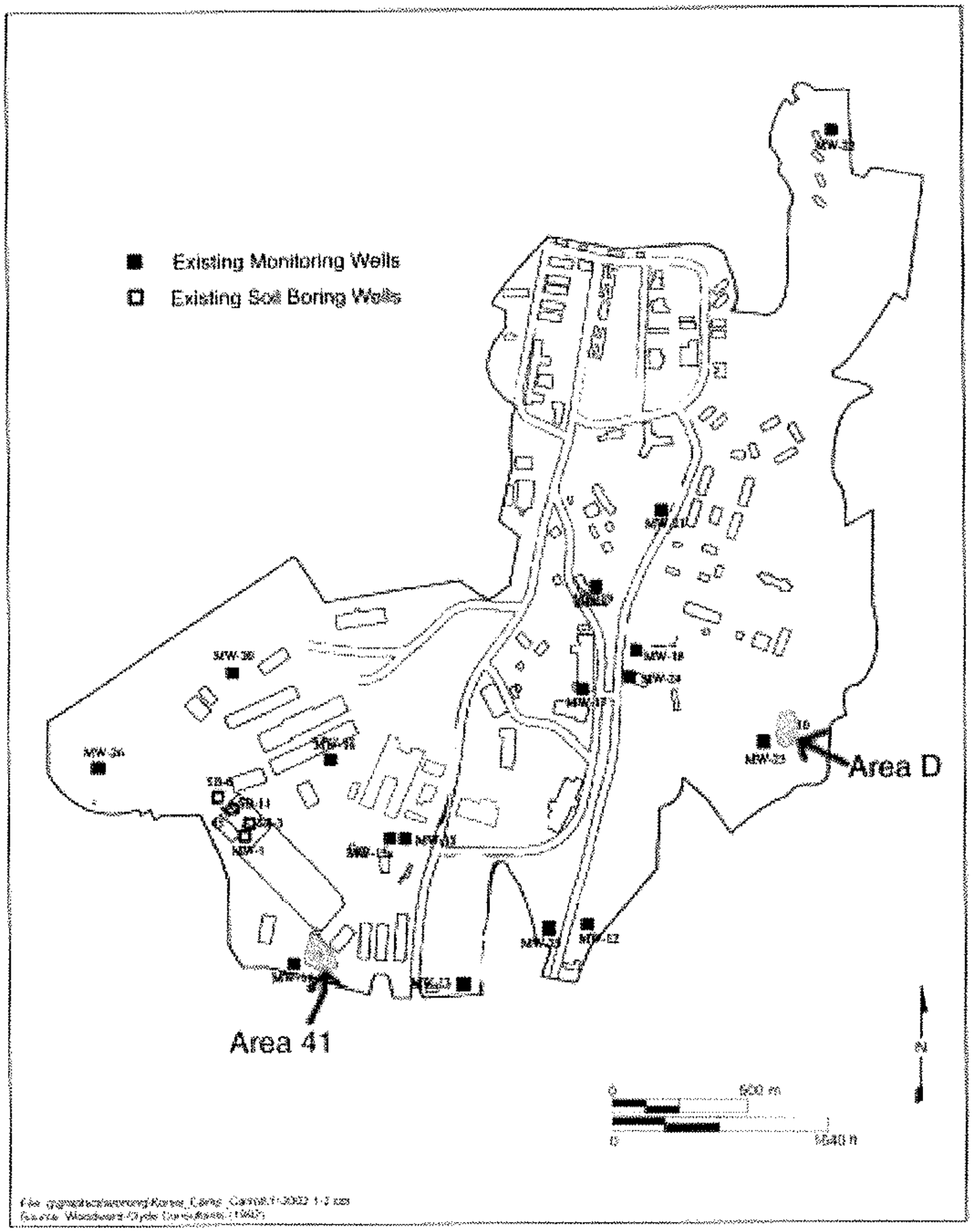


**Figure 1-2 Site Plan, Camp Carroll, Korea**

# SECTION 2
# SITE INVESTIGATION ACTIVITIES

Site investigation activities were conducted in accordance with procedures presented in the Sampling and Analysis Plan (SAP) [Samsung 2003a], the Quality Assurance Project Plan (QAPP) [Samsung 2003b], and the Site Safety and Health Plan (SSHP) [Samsung 2003c] for the Camp Carroll Area D and Area 41 Site Investigations. Any significant deviations from those procedures are described in the following sections.

## 2.1 GEOGRAPHIC ORGANIZATION

### 2.1.1 Site Reconnaissance

A preliminary field reconnaissance was conducted in March 2003 to establish a grid system for the geophysical survey and determine site clearance for field activities and continued on April 1, 2003 to determine and mark sampling locations. The field team used available maps to locate and mark approximate locations of surface water drainage, general topography, cultural features, proposed soil sampling locations, and the location of existing and proposed monitoring wells. Access to proposed drilling and trenching locations were evaluated. A copy of the field logbook detailing the investigation activities is presented in Appendix B.

### 2.1.2 Grid Location System.

To facilitate sampling activities, a rectangular grid system was marked on the ground surface within each of the two investigation areas (Area 41 and Area D). Each grid compartment selected for exploratory activities was identified by a number (i.e., grid numbers 1 through 41 and 80 for Area D; and grid numbers 51 through 70 for Area 41). The respective grid location identifier was subsequently used as part of the soil and groundwater sample identifiers during sampling activities. The grid system used is depicted on Figure 2-1 and Figure 2-2.

### 2.1.3 Sample Nomenclature

Each sample container sent to the laboratory was assigned a unique identifier. The following format of aabccddee was used.

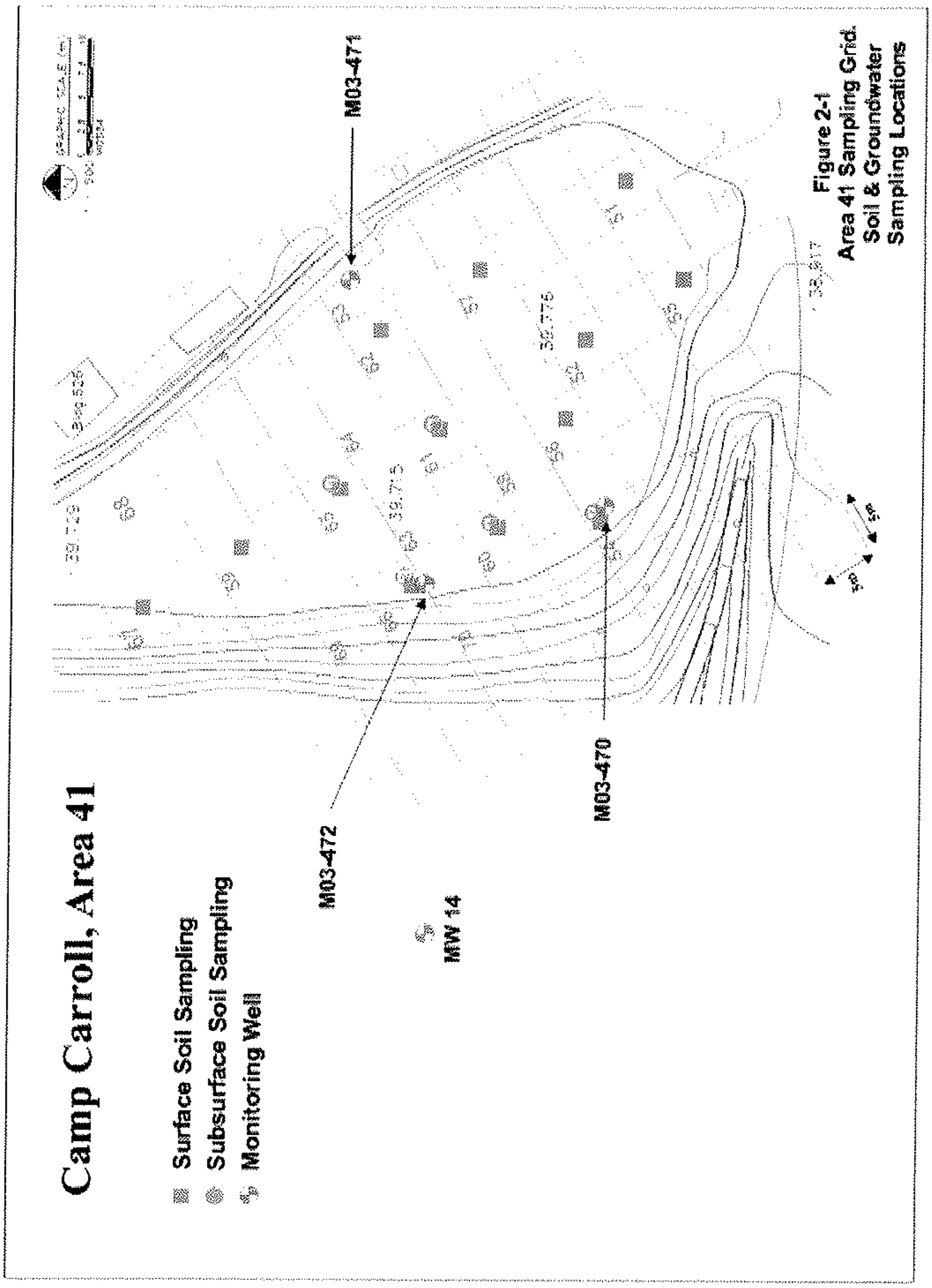


Figure 2-1
Area 41 Sampling Grid
Soil & Groundwater
Sampling Locations

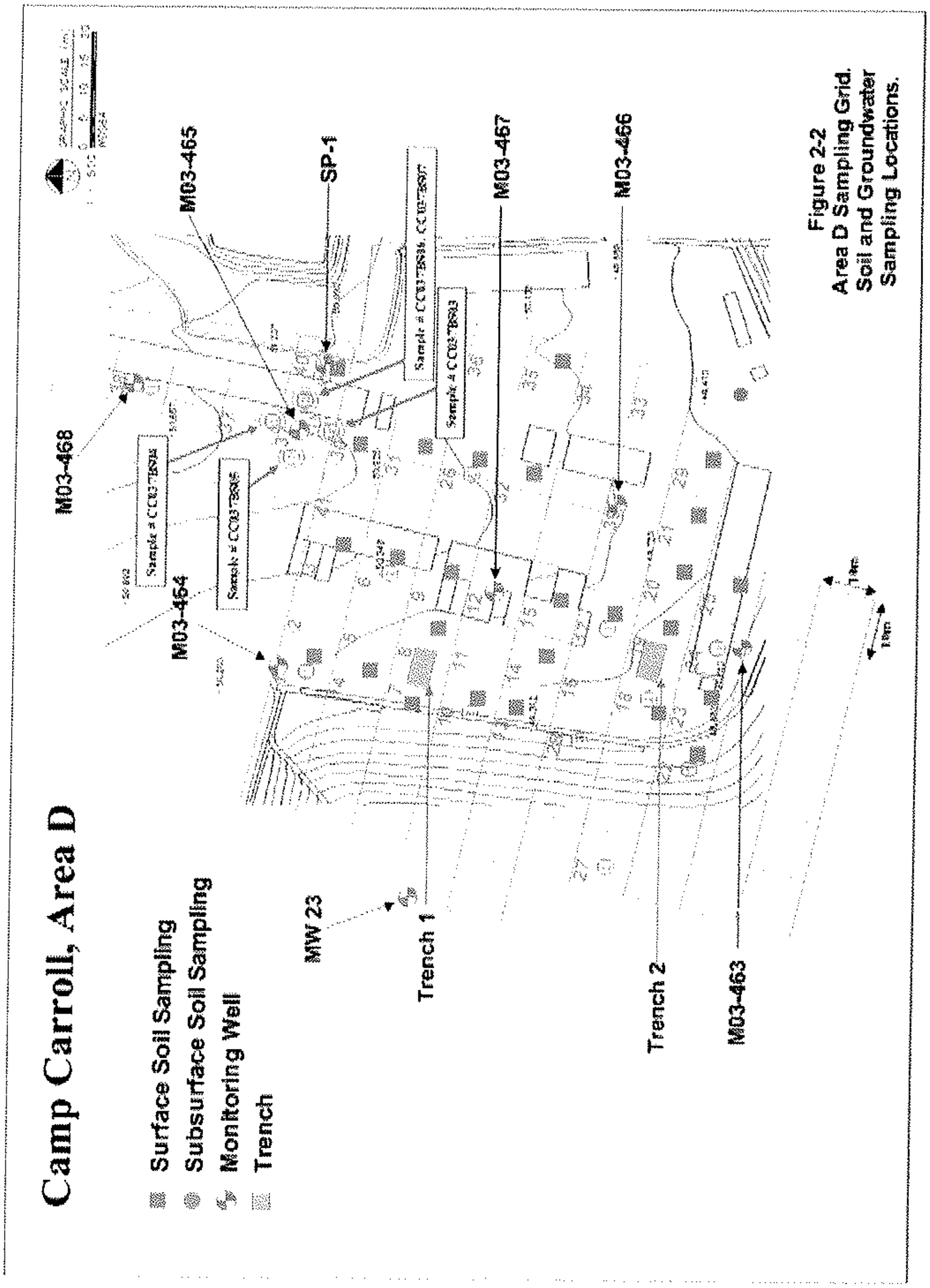


Figure 2-2
Area D Sampling Grid,
Soil and Groundwater
Sampling Locations.

Where,

aa a two letter acronym designating the site location ("CC" was used to indicate the Camp Carroll Site);

b a one digit numeral designating the sample purpose ("0" indicating a primary sample, "1" indicating a QC duplicate sample, and "2" indicating a QA duplicate sample);

cc a two digit numeral designating the soil grid location where the sample was collected ("01" through "40" or "80" for Area D and "51" through "70" for Area 41);

dd matrix identifiers ("SS" for surface soil samples, "BS" for subsurface (boring) soil samples, and "WS" for groundwater samples);

ee a two digit chronological number from a particular sampling location for each event or sampling depth (e.g., during the first samping round at a particular well, all groundwater samples were identified with "01". During subsequent sampling events, all samples collected from the same well will receive the next chronological digit, "02)".

For example, primary and duplicate groundwater samples collected during the first round of sampling from a monitoring well located within grid cell 25 would be labeled "CC025WS01" and "CC125WS01", respectively.

## 2.2 POTENTIAL SOURCE EVALUATION CRITERIA

Features that were identified as potential sources of hazardous waste releases were selected and evaluated on the basis of the following criteria:

- Records of known releases, prior environmental investigation results, or visible evidence of potential releases (such as visual soil staining).
- Presence of subsurface geophysical anomalies (Area D).
- Identification of soil or groundwater impacts.

- Presence of potential migration pathways to identified soil or groundwater impacts.

Potential sources were evaluated on the basis of visual observation of site conditions and geology, physical evidence of potential release (such as staining or odor), evaluation of geophysical data, exploratory subsurface trenching, analytical results of groundwater samples, and consideration of potential contaminant migration pathways.

## 2.3 Existing Monitoring Wells

One groundwater monitoring well (MW14) was previously installed within the paved lot adjacent to the southwest portion of Area 41 by WWC in 1992. The well extends to a depth of approximately 29 feet below the existing ground surface (bgs). Groundwater samples obtained from this well in April 1992 contained tetrachloroethylene (PCE) at a concentration of 7 parts per billion (ppb), 1,2-dichloroethylene (1,2-DCE) at a concentration of 7 ppb, lead at a concentration of 4 ppb, and nitrate at a concentration of 90 ppb. This well was accessed again during the current investigation to measure groundwater levels and obtain a groundwater sample for analysis. The elevation of the wellhead is approximately 10 feet (3 meters) below that of the graded portion of Area 41. The groundwater level on April 3, 2003 was measured as 21.234 feet (6.472 meters) below the top of well casing. The well was noted to be located near a hazardous materials storage area.

One groundwater monitoring well (MW23) was previously installed adjacent to the southwest portion of Area D by WWC in 1992. The well extends to a depth of approximately 50 feet below the existing ground surface (bgs). Groundwater samples obtained from this well in April 1992 contained nitrate at a concentration of 90 ppb and barium at a concentration of 150 ppb. This well was accessed again during the current investigation to measure groundwater levels and obtain a groundwater sample for analysis.

## 2.4 Geophysical Survey

A geophysical survey was conducted at Area D in March 2003. The purpose of the survey was to evaluate the potential presence of buried metallic containers and obtain information regarding the approximate depth to bedrock in the former landfill area. The survey location was determined on the basis of information regarding the former landfill boundaries provided by the Department of Public Works (DPW) of Camp Carroll. A direct current (DC) electrical resistivity survey comprised of 4 survey lines and a horizontal loop electromagnetic (HLEM) survey comprised of 12 survey lines were conducted at Area D. An ABEC Terrameter SAS 300C system was used to conduct the resistivity survey and an EM31-MK2 system was used to conduct the HLEM survey. The results of the geophysical report are presented in Appendix A and summarized in Section 3.4.

## 2.5 EXPLORATORY TRENCHING

Exploratory trenching activities were conducted at Area D during the first week of April 2003. Approximately 40 trenches were excavated to depths ranging between approximately 3 to 10 feet (1 to 3) meters below the ground surface (bgs) using a rubber-tired backhoe to identify and locate potential buried objects. The trenching locations were selected on the basis of the soil sampling grid, visual observations, and the results of the geophysical survey. The results of the exploratory trenching are summarized in Section 3.5. The approximate trenching/sampling locations are depicted on Figure 2-1 and Figure 2-2.

## 2.6 DIRECT-PUSH DRILLING

Direct-push drilling activities were conducted between April 1 and April 4, 2003. Eight, 1-inch diameter soil borings (B-6, B-10, B-17, B-18, B22, and B-26 through B-28)) were completed in Area D and 17 borings (B-51, B-52, B-55 through B-65, and B-67 through B-70) were completed in Area 41. The approximate boring locations are depicted on Figure 2-1 and Figure 2-2. Borings were advanced to depths ranging from approximately 23 feet to 33 feet (7.0 meters to 10.0 meters) at Area D and from approximately 3 feet to 16 feet (0.9 meter to 5.0) meters bgs at Area 41. Each borehole was advanced using a hydraulic direct-push drill rig mounted on an all-terrain track. Because the pesticide compound malathion was omitted from the original laboratory analyses, a number of the boring locations were revisited and resampled in June 2003.

Continuous core soil samples were collected using a split-spoon core barrel fitted with an acrylic sleeve. Core samples were visually inspected for evidence of staining and monitored for volatile organic vapors using an organic vapor meter (OVM) equipped with a photo-ionization detector (PID). In addition, the lithology and other properties (e.g., hardness, staining, and degree of weathering) were documented. Descriptions were recorded on boring logs (Appendix C). Selected cores were photographed (Appendix D). Sampling equipment was decontaminated prior to each sampling effort. The borings were filled with bentonite pellets and hydrated with potable water following logging and sampling activities.

## 2.7 ROTARY BOREHOLE DRILLING

Rotary borehole drilling activities were conducted between April 8 and April 15, 2003. A rotary drill rig was used to reach greater depths than feasible with direct-push technology and to facilitate the installation of groundwater monitoring wells. Seven soil borings (B03-463 through B03-469) were completed in Area D and three borings (B03-470 through B03-472) were completed in Area 41. The approximate boring locations are depicted on Figure 2-1 and Figure 2-2. Borings were advanced to depths ranging from approximately 33 feet to 49 feet (10 meters to 15 meters) bgs. Each borehole was advanced using a hollow stem auger until refusal. When refusal was encountered, air or water rotary methods were employed to continue drilling. The borings were advanced by FED using a CME drill rig.

Continuous core soil samples were collected using a split-spoon core barrel. Core samples were visually inspected for evidence of staining and monitored for volatile organic vapors using an organic vapor meter (OVM) equipped with a photo-ionization detector (PID). In addition, the lithology and other properties (e.g., hardness, staining, and degree of weathering) were documented. Descriptions were recorded on boring logs (Appendix C). Selected cores were photographed (Appendix D). Sampling equipment was decontaminated prior to each sampling effort. Borings not selected for groundwater monitoring well installation were filled with bentonite pellets and hydrated with potable water following logging and sampling activities.

## 2.8 MONITORING WELL INSTALLATION

Each rotary borehole (with the exception of B03-469) was completed as a monitoring well to facilitate monitoring of fluid levels and sampling of groundwater and free product, if encountered. Each monitoring well was constructed of 2-inch diameter polyvinylchloride (PVC) casing with a 20-foot long 0.01-inch slotted screen section. The annular space adjacent to the screen was filled with silica sand and sealed with a bentonite plug above the perforated section. The upper portion of the annular space with filled with a bentonite and Portland cement grout. Surface casings were capped and concrete pads were constructed at ground surface to prevent surface water infiltration along the casings. Following well completions, an airlift pump was used to develop each well. Well completion and development logs are presented in Appendix C.

**TABLE 2-1**
**Summary of Newly Installed Wells**
**Camp Carroll Area 41**

| Monitoring Well ID | Grid Cell Identifier | Elevation (feet TOC) | Well Depth (feet bgs) |
|---|---|---|---|
| M03-470 | #54 | 39.30 | 43.7 |
| M03-471 | #66 | 39.36 | 49.0 |
| M03-472 | #53 | 39.61 | 39.5 |

Notes: TOC = top of well casing, bgs = below ground surface.

**TABLE 2-2**
**Summary of Newly Installed Wells**
**Camp Carroll Area D**

| Monitoring Well ID | Grid Cell Identifier | Elevation (feet TOC) | Well Depth (feet bgs) |
|---|---|---|---|
| M03-463 | # 24 | 48.55 | 39.5 |
| M03-464 | #001 | 49.79 | 43.0 |
| M03-465 | #37 | 50.90 | 42.5 |
| M03-466 | #39 | 49.58 | 40.5 |
| M03-467 | #12 | 49.79 | 40.5 |
| M03-468 | #38 | 51.41 | 44.0 |

Notes: TOC = top of well casing, bgs = below ground surface.

## 2.9 Groundwater Sampling

Groundwater samples were collected from each of the newly installed monitoring wells in Area D and Area 41. The samples were delivered to analytical laboratories under chain of custody (COC) procedures. The custody documents are provided in Appendix F. A summary of the groundwater samples collected is provided in Table 4-1.

Six groundwater samples were obtained from Area D monitoring wells (B03-463 through B03-468) on May 27 through June 2, 2003. Three groundwater samples were obtained from Area 41 monitoring wells (B03-470 through B03-472) on June 3 through June 4, 2003. In addition groundwater samples were obtained from previously installed monitoring wells MW-23 and MW-14 on June 2 and June 4, respectively. Prior to sample collection, the wells were purged in accordance with EPA protocol to facilitate collecting representative groundwater samples. Samples were collected using a submersible pump.

## 2.10 GROUNDWATER LEVEL MEASUREMENTS

An electronic water level meter was used to measure the ground-water elevation within the newly installed monitoring wells (M03-463 through M03-472) and in the existing groundwater monitoring wells MW-14 and MW-23. Fluid level measurements were conducted on a number of occasions between April 10 and August 20, 2003. The results of the groundwater monitoring for these wells are presented in Section 3.3.4.

## 2.11 AQUIFER PUMPING TESTS

Nine aquifer tests were conducted by Samsung to obtain information regarding the aquifer characteristics in the vicinity of the newly installed monitoring wells (M03-463 through M03-468 and M03-470 through M03-472). Interpretation of the well recovery tests provides estimates for aquifer parameters such as hydraulic conductivity, transmissivity, and storativity. The tests were conducted as single well recovery tests on April 26 through April 28, 2003. Each test consisted of pumping a volume of groundwater from the respective monitoring well at a controlled rate for a specified time period and then monitoring the recovery of the water level within the well. The results of the pumping tests for these wells are presented in Section 3.3.3.

## 2.12 LABORATORY ANALYSES

Primary and duplicate soil and groundwater samples were analyzed at CT&E Environmental Services, Inc. (CT&E) of Anchorage, Alaska. QA groundwater samples were analyzed at Severn Trent Laboratory (STL) of Seattle, Washington.

Seventy-six primary and nine duplicate QC soil samples were submitted to CT&E for analyses. Nine duplicate QA soil samples were submitted to STL for analyses. Eleven primary and one duplicate QC groundwater samples were submitted to CT&E for analyses. One duplicate QA groundwater sample was submitted to STL for analyses. Selected samples were analyzed for TPH (gasoline, diesel and oil ranges) in accordance with EPA Method 8015/8020B, VOCs in accordance with Method 8260B, SVOCs in accordance with Method 8270, pesticides in accordance with Method 8081A, PCBs in accordance with Method 8082, herbicides in accordance with Method 8151, malathion in accordance with Method 8141, eight RCRA metals in accordance with Methods SW6020/SW7471A, and dioxins in accordance with EPA Method 8290. The results of the laboratory analyses are discussed in Section 4. Laboratory data reports are presented in Appendix F.

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# SECTION 3
# PHYSICAL CHARACTERISTICS

The physical characteristics of the Camp Carroll site, including information regarding geology, surface water hydrology, and groundwater hydrology, are presented in the following sections.

## 3.1 GEOLOGY AND SOILS

The basement rock underlying Camp Carroll is composed of Precambrian granitic gneiss (WWC 1992b) and Mesozoic granite. Siliceous dikes intrude the gneiss without any observed dominant regional trend. In the northern part of the nearby town of Waegwan, thin beds of quartzite, calcarious-schist, and limestone have been reported. On the basis of drilling logs from 11 groundwater wells located in the southern portion of Camp Carroll, the bedrock in this part of the base is composed largely of granitic gneiss and granodiorite. The upper 100 to 200 feet is weathered, with the degree of weathering decreasing with depth. Calcarious-schist and limestone were reportedly encountered near the bottom of some of the deeper wells. The overburden in the vicinity of these wells varies from 20 to 40 feet in thickness and ranges in composition from silty clays to gravel-rich sandy silts.

The soils observed during drilling and trenching activities for this project can be generally described as moist, medium dense, strong brown (7.5YR 5/6), silty to clayey, fine to coarse sand (SM to SC), with approximately 20 percent to 40 percent gravels and cobbles. The soils are predominantly derived from weathered granitic materials. Detailed boring logs are provided in Appendix C.

## 3.2 GENERAL SITE HYDROLOGY

### 3.2.1 Precipitation

Most of the annual precipitation at Camp Carroll occurs during the summer monsoons (June, July, August, and September) and less than 5% occurs in the dry season (December, January and February). Field work for this project occurred in April through early June, 2003. The rainfall at the site for the period between April 1 through June 17, 2003 was 437.5 mm. The rainfall at the site for the period from April 1 through August 20 totaled 1198.8 mm. A table summarizing the daily temperature and rainfall events for this period is provided in Appendix E.

### 3.2.2 Hydrologic Setting

The general hydrology near the site is described in this section, based on a review of topographic maps and the results of the site reconnaissance conducted during April 2003.

Area D is comprised of a relatively flat, graded lot. The ground surface is predominantly unpaved and composed of fill soils derived from decomposed granite. The southern and western edges of the level portion of the site are bounded by concrete-lined drainage ditches. Beyond the ditches, grass-covered slopes are formed that extend down to the level of the adjacent lot. The graded area is currently used to store materials and equipment in large metal containers. Surface runoff would exit the site via the drainage ditches to the south and west.

Area 41 is comprised of a relatively flat, graded lot. The ground surface is unpaved and comprised of decomposed granitic bedrock and fill soils derived from the same type of materials. The site appears to have been a former hill that was flattened for use by scrape and fill methods. Area 41 is slightly higher than the adjoining lots to the north and is separated from them by a drainage ditch. Mature locust and willow trees exist to the west of the graded area. The southern and western portions of the site descend in a steep vegetated hillside that abuts a concrete-lined drainage ditch. The asphalt-paved Oregon Avenue is located to the south of the drainage ditch. Surface runoff would exit the site via the drainage ditches to the south and west.

## 3.3 GROUNDWATER HYDROLOGY

### 3.3.1 Water Table Aquifer

Based on groundwater elevation measurements obtained from within 18 monitoring wells installed in 1992 by Woodward-Clyde Consultants (WWC), the groundwater table elevation beneath Camp Carroll ranged from approximately 51 feet to 123 feet msl on April 16, 1992, with water in one well in the northern portion of the site at approximately 191 feet msl. The overall groundwater flow direction beneath the Camp Carroll base is to the south and southwest. The north-south trending ridgeline may act as a groundwater divide, since the groundwater gradient is to the southwest in portions of the base to the west of this ridge and to the southeast in portions to the east of the ridge (WWC 1992b).

### 3.3.2 Aquifer Permeability

The granitic gneiss bedrock underlying Camp Carroll has low primary porosity. Fractures forming secondary porosity probably contribute to the storage and transmittal of groundwater through the aquifer. The uppermost, more weathered portion of the gneiss may be somewhat more permeable and probably contributes the majority of the water to the wells. Water wells drilled on the base are generally extended to depths of 200 to 350 feet. Specific capacities for these wells are typically low.

The movement of groundwater in the subsurface materials may be limited by the character and orientation of interconnected fractures in the bedrock. Groundwater and contaminants tend to flow in the direction of the hydraulic gradient (i.e., from higher fluid elevations to lower fluid elevations); however, this flow may be disrupted by the non-homogeneous nature of fractured rock media.

### 3.3.3 Aquifer Testing

Nine aquifer tests were conducted by Samsung to obtain information regarding the aquifer characteristics in the vicinity of the newly installed monitoring wells (M03-463 through M03-468 and M03-470 through M03-472). Interpretation of the well recovery tests provides estimates to aquifer parameters such as hydraulic conductivity, transmissivity, and storativity. The tests were conducted as single well recovery tests on April 26 through April 28, 2003. Each test consisted of pumping a volume of groundwater from the respective monitoring well at a controlled rate for a specified time period and then monitoring the recovery of the water level within the well. A one horsepower submersible pump was placed in each well at a depths ranging from approximately 40 feet to 50 feet (12.2 to 15.1 meters) below the well top of casing (TOC). Depth to water measurements were collected during the subsequent recovery period using an electronic water level meter. Maximum observed drawdown in the wells ranged from 2.23 feet to 15.60 feet (0.68 meters to 3.84 meters). Pumping duration ranged from 2 minutes to 70 minutes for the various wells, and recovery periods monitored ranged from 20 minutes to 70 minutes. The pumping test data is presented in Appendix E.

The results of the recovery tests were evaluated using two different algorithms. Each algorithm or model is a simplified approximation of the anticipated conditions of the aquifer, and each is subject to different assumptions and limitations. The resulting estimates of aquifer parameters, such as saturated hydraulic conductivity, transmissivity, and storativity, are limited in value to the degree that the respective model agrees with the physical conditions in the aquifer. In practice, none of the approximations perfectly fit the aquifer conditions and a selection of models is generally applied to evaluate different aspects or possibilities for the system. The resulting range of estimated aquifer parameters provide bounds to the anticipated aquifer behavior. The software program AQTESOLV was used to apply the algorithms.

The first algorithm applied to the recovery data is a solution developed by Moench in 1997 for an unconfined aquifer. This model can be used to approximate a constant-discharge test in a single well that partially penetrates the aquifer. It is based on a curve-fitting method that takes the storage capacity of the well and delayed gravity response into account. The method was designed to interpret drawdown data obtained during the pumping portion of an aquifer test, but can be used to evaluate the residual drawdown of the recovery period when image-well theory is applied. When the pumping well has not reached a steady state condition, the projected further drawdown from continued pumping must be extrapolated. When the appropriate conditions are met, the Moench solution facilitates estimation of the hydraulic conductivity, transmissivity and storativity of the aquifer. The assumptions that apply to the use of this solution include: the aquifer has infinite areal extent, the aquifer is homogeneous, isotropic and of uniform thickness, the aquifer is unconfined, and flow is unsteady. The Moench solution was applied to evaluate each of the nine pumping tests conducted.

The second algorithm applied to the recovery data is a line-source solution developed by Neuman in 1974 and enhanced by Moench in 1993 and 1996. This model can be used to approximate a constant-discharge test in a single well that partially penetrates an unconfined aquifer. It is based on a mathmatical method that takes delayed gravity response into account but does not consider well bore storage. When the appropriate conditions are met, the Quick Neuman solution facilitates estimation of the hydraulic conductivity, transmissivity and storativity of the aquifer. The assumptions that apply to the use of this solution include: the aquifer has infinite areal extent, the aquifer is homogeneous, isotropic and of uniform thickness, the aquifer is unconfined, flow is unsteady, and the diameter of the pumping well is very small so that well bore storage can be ignored. The Quick Neuman solution was applied to evaluate two of the pumping tests conducted.

The aquifer parameters calculated using the Moench solution for the nine wells resulted in hydraulic conductivity values ranging from 2.88E-03 meters per day (m/day) to 4.12E-01 m/day with a mean value of 1.67E-01; transmissivity values ranging from 1.833E-02 meters squared per day ($m^2$/day) to 1.605E00 $m^2$/day with a mean value of 7.143E-01 $m^2$/day; and storativity values ranging from 1.204E-03 to 3.704E-02 with a mean value of 1.409E-02.

The aquifer parameters calculated using the Neuman solution for two of the wells (M03-465 in Area D and M03-471 in Area 41) resulted in hydraulic conductivity values of 1.28E00 m/day and 7.61E-01 m/day; transmissivity values of 4.745E00 $m^2$/day and 6.049E00 $m^2$/day; and storativity values of 1.606E-02 and 1.888E-02, respectively.

The pumping test data and calculated aquifer parameters are presented in Appendix E. The calculated aquifer parameters are summarized in Table 3.1.

### 3.3.4 Groundwater Elevations and Gradients

An electronic water level meter was used to measure the ground-water elevation within the newly installed monitoring wells (M03-463 through M03-472) and in the existing groundwater monitoring wells MW-14 and MW-23. Fluid level measurements were conducted on a number of occasions between April 10 and August 20, 2003. The results of the water level measurements are summarized in Appendix E. A series of ground-water table elevation maps were prepared from water level measurements made in monitoring wells at the site and are presented as Figures 3-1 through 3-6. A review of the four maps depicting the groundwater table beneath Area 41 (Figure 3-1 through 3-4) indicates that the groundwater depths vary somewhat with time and rainfall events, while the groundwater flow direction remains relatively constant. Figure 3-1 depicting the

**Table 3-1**
**Summary of Calculated Aquifer Parameters**
**Aquifer Pumping Tests Area D and Area 41**

| Monitoring Well | Analysis Method | Saturated Thickness (m) | Hydraulic conductivity (m/day) | Transmissivity (m2/day) | Storativity |
|---|---|---|---|---|---|
| **Area D** | | | | | |
| M03-463 | Moench | 6.136 | 2.99E-03 | 0.01833 | 0.00909 |
| M03-464 | Moench | 5.416 | 2.80E-01 | 1.519 | 0.00659 |
| M03-465 | Moench (1) | 4.637 | 7.07E-02 | 0.328 | 0.02839 |
| M03-465 | Moench (2) | 3.706 | 2.22E-03 | 0.00824 | 7.90E-06 |
| M03-465 | Quick Neuman | 3.706 | 1.28 | 4.745 | 0.01606 |
| M03-466 | Moench | 4.637 | 6.56E-02 | 0.3041 | 0.03433 |
| M03-467 | Moench | 4.227 | 1.03E-01 | 0.4342 | 0.3704 |
| M03-468 | Moench | 4.094 | 3.92E-01 | 1.605 | 0.00123 |
| **Area 41** | | | | | |
| M03-470 | Moench | 3.342 | 4.12E-01 | 1.378 | 0.00268 |
| M03-471 | Moench | 7.952 | 2.88E-03 | 0.02291 | 0.00651 |
| M03-471 | Quick Neuman | 7.952 | 7.61E-01 | 6.049 | 0.01888 |
| M03-472 | Moench | 4.828 | 1.70E-01 | 0.8188 | 0.0012 |

Notes:
m = meters
m/day = meters per day
m2/day = square meters per day

groundwater table on April 18, 2003 shows an average gradient of 0.8018 vertical foot per horizontal foot (ft/ft) {0.2444 meters per meter (m/m)) directed S87W in the central portion of the site. During this measurement period, the groundwater elevation ranged from 94.8 feet to 115.5 feet (28.9 to 35.2 meters) msl. On April 28, 2003 (Figure 3-2) the gradient has changed slightly to 0.7802 ft/ft (0.2378 m/m) directed due West, with 3.90 inches {99 millimeters (mm)} of precipitation recorded for this 10-day time interval. The groundwater elevation now ranges from 9.7 feet to 116.1 feet (29.1 to 35.4 meters) msl. By June 3, 2003 (Figure 3-3), the average groundwater gradient is 0.6873 ft/ft (0.2095 m/m) directed S89W, with 7.86 inches (197.2) mm of precipitation recorded for this 36-day time interval. The groundwater elevation ranges from 97.4 feet to 116.5 feet (29.7 to 35.5 meters) msl. Finally, by August 20, 2003 (Figure 3-4) the gradient has decreased to 0.5551 ft/ft (0.1692 m/m) directed N87W, with 32.10 inches (815.3 mm) of precipitation recorded for this 78-day time interval. The groundwater elevation for this time ranges from 10.4 feet to 117.8 feet (31.1 to 35.9 meters} msl in the central portion of the site. The groundwater gradient flattens markedly to the west of the newly installed monitoring wells.

The variations in water table elevation are presumed to result from large quantities of infiltrated rainwater during storm events. The site is bounded on three sides by concrete-lined drainage ditches. While the ditches are designed to divert water from the site, it is also possible that leaks in the storm-drain system may contribute periodic influxes of water, changing the local groundwater gradient. The overall effect of rainfall events at the site appears to be the increase of groundwater elevations over the site, with greater increases in the western portion. The groundwater flow direction remains relatively constant, flowing from east to west.

A review of the two maps depicting the groundwater table beneath Area D (Figure 3-5 and 3-6) also indicates that the groundwater depths vary with time and rainfall events, while the groundwater flow direction remains relatively constant. Figure 3-5 depicting the groundwater table on April 25, 2003 shows a relatively flat water table beneath the flat-lying portion of the former landfill with a steep hydraulic gradient to the west beneath the topographic slope. The greatest mapped groundwater gradient is in the vicinity of monitoring wells M03-564 and MW-23. The gradient here is approximately 0.2772 ft/ft (0.0845 m/m) directed due West. The groundwater elevations range from 134.0 feet to 137.7 feet (40.85 meters msl to 41.975 meters) msl beneath the former landfill area and were measured at 123.23 feet (37.56 meters) msl in MW-23 in the adjoining lot. The groundwater map for August 20, 2003 (Figure 3-6) depicts a similar groundwater flow pattern. The groundwater elevations for this date are approximately 4.9 feet to 5.2 feet (1.5 meters to 1.6) meters higher in each monitoring well. The greatest mapped groundwater gradient is approximately 0.2723 ft/ft (0.0830 m/m) directed due West. There are no groundwater monitoring wells located to the south of the former landfill, however, the data suggests that the groundwater flow may mimic the topography in this area and have a component of flow directed to the south and southwest.

### 3.4 Geophysical Survey

The results of the DC resistivity are consistent with a two-layer geologic model, with the top layer of higher-resistivity materials consisting of unsaturated sandy soils overlying a lower-resistivity zone interpreted to be the saturated zone of the water table aquifer. The bedrock depth was not identified on the profiles, and is anticipated to be greater than 66 feet (20 meters). The resistivity of the saturated zone was noted to be approximately 30 to 80 ohm-meters. These low resistivity values may indicate that dissolved metals or other contaminants are present in the groundwater. Two anomalous zones of low resistivity are also visible on the plots for Line 3 and Line 4. These anomalies are consistent with the signature for buried metallic objects and were targeted for exploratory trenching activities.

The results of the HLEM survey are in general agreement with the DC resistivity survey. Line 8 of the HLEM survey contains a linear anomaly that could be caused by buried metallic objects such as a pipeline or series of metallic drums. The anomalous zone was coincident with one of the resistivity anomalies and was targeted for exploratory trenching activities .

### 3.5 Exploratory Trenching

Exploratory trenching activities were conducted during the first week of April 2003. Approximately 40 trenches were excavated to depths ranging between approximately 3 to 10 feet (1 to 3 meters) below the ground surface (bgs) using a rubber-tired backhoe. The trenching locations were selected on the basis of the soil sampling grid, visual observations, and the results of the geophysical survey. Approximately 26 trenches were excavated in Area D and 13 trenches were excavated in Area 41 to evaluate shallow soil conditions and collect surficial samples. Two additional trenches were excavated to evaluate geophysical anomalies observed in Area D. The approximate trenching locations are depicted by the numbered grid cells on Figure 2-1 and Figure 2-2.

The soils observed during trenching activities can be generally described as moist, medium dense, strong brown (7.5YR 5/6), silty to clayey, fine to coarse sand (SM), with approximately 20 percent to 40 percent gravels and cobbles. Wood fragments and small metallic debris were observed in some locations. Buried drums or other containers were not encountered during the trenching activities.

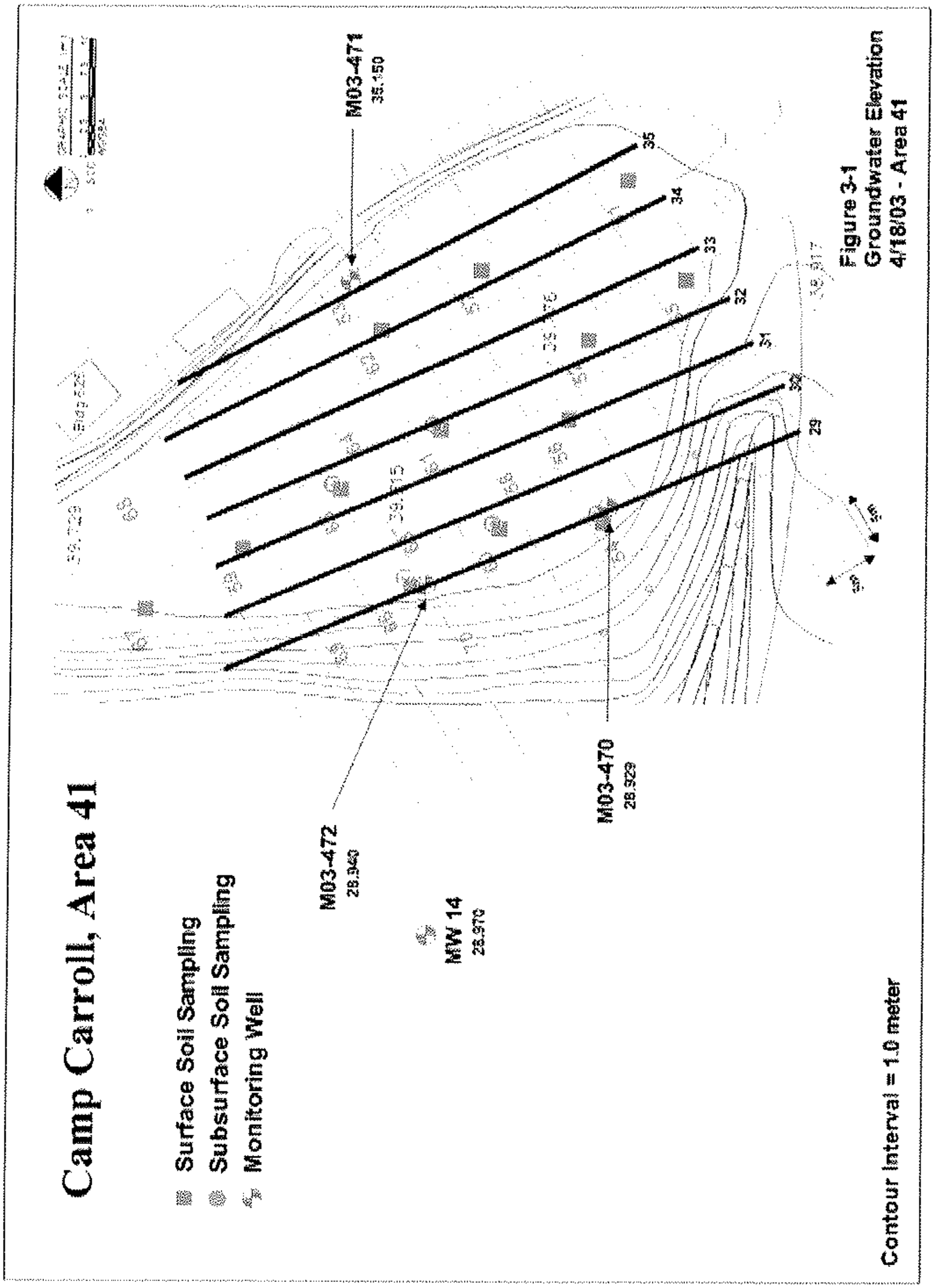



Figure 3-1
Groundwater Elevation
4/18/03 - Area 41

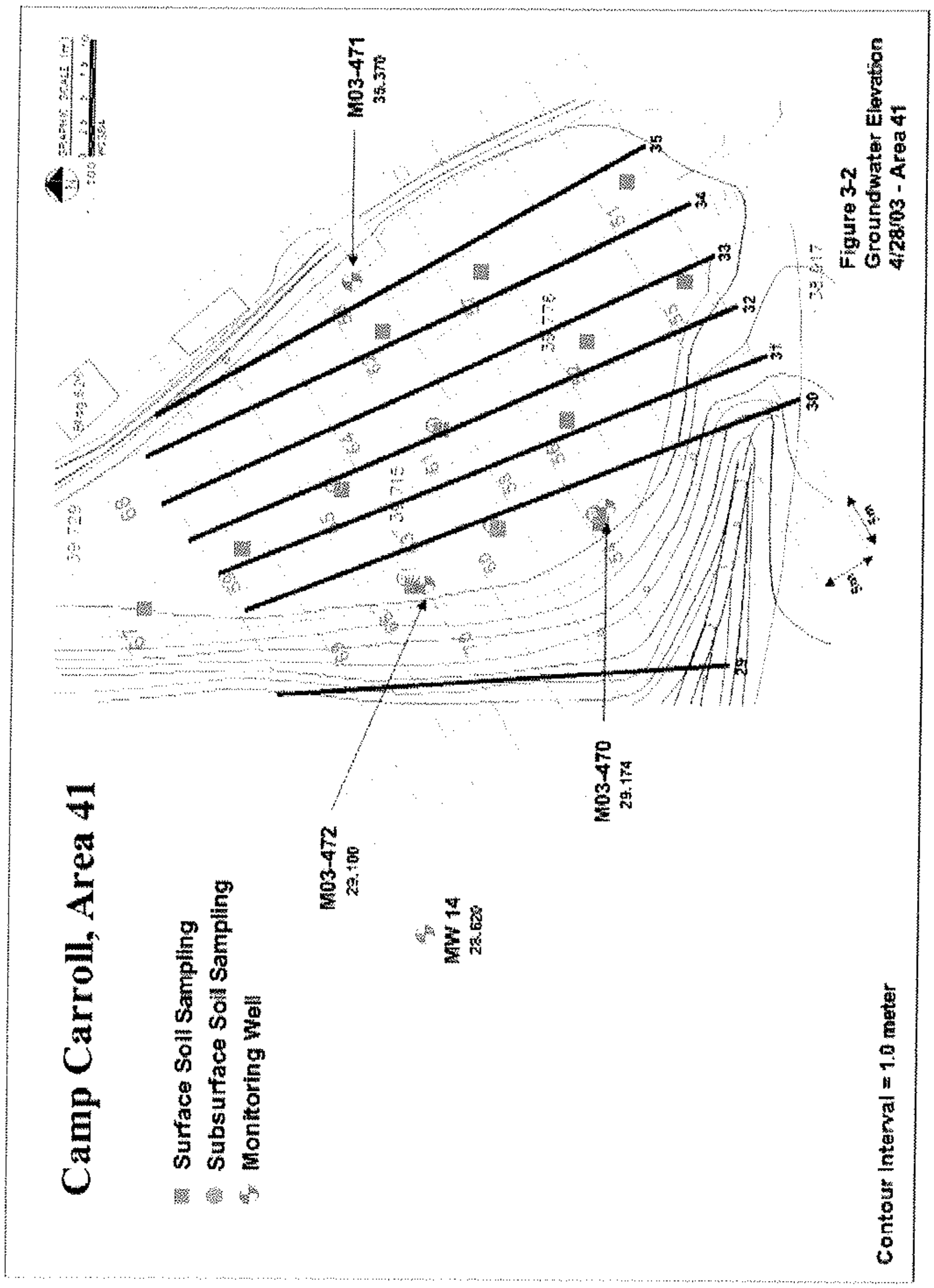



Figure 3-2
Groundwater Elevation
4/28/03 - Area 41

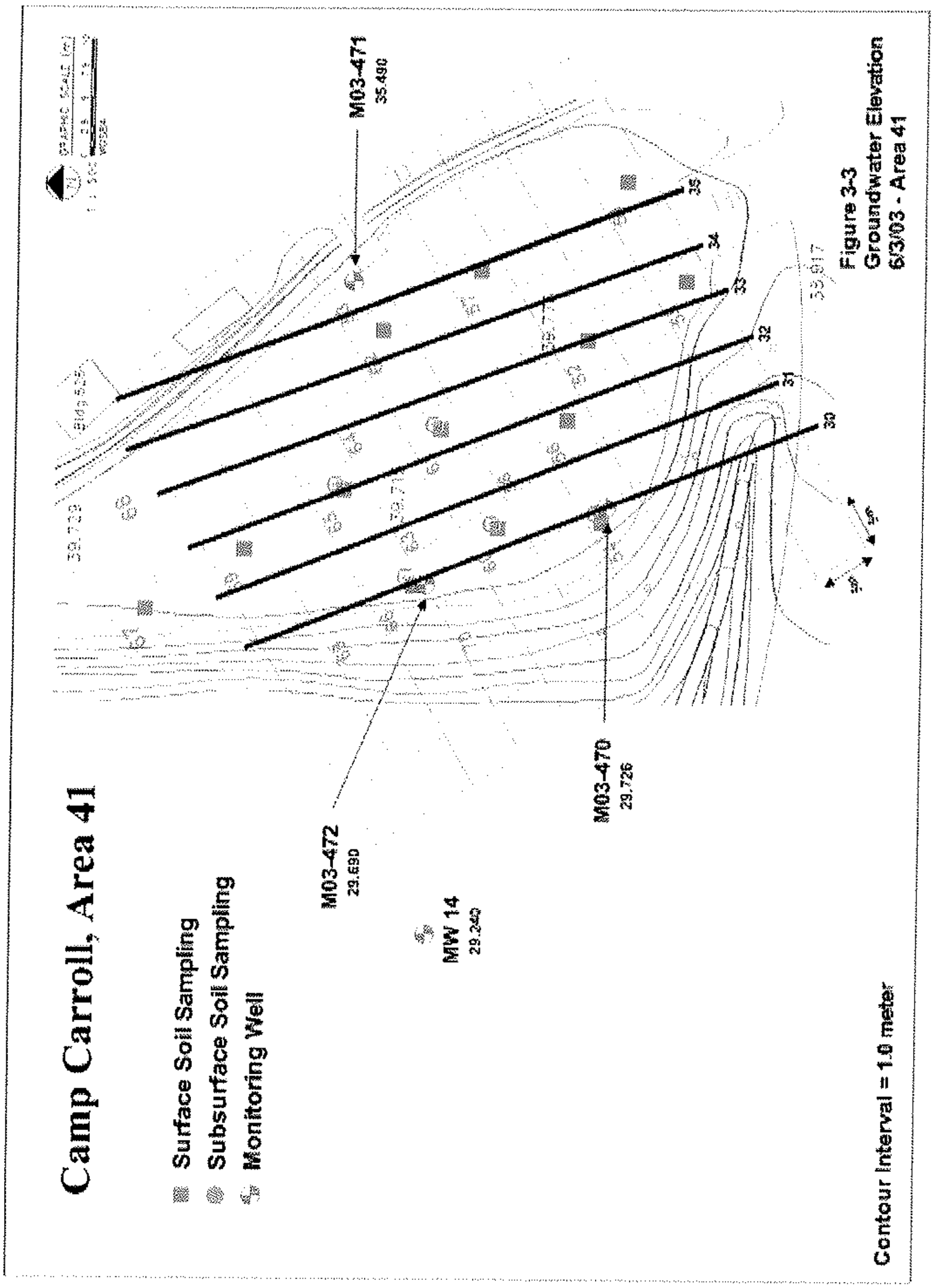
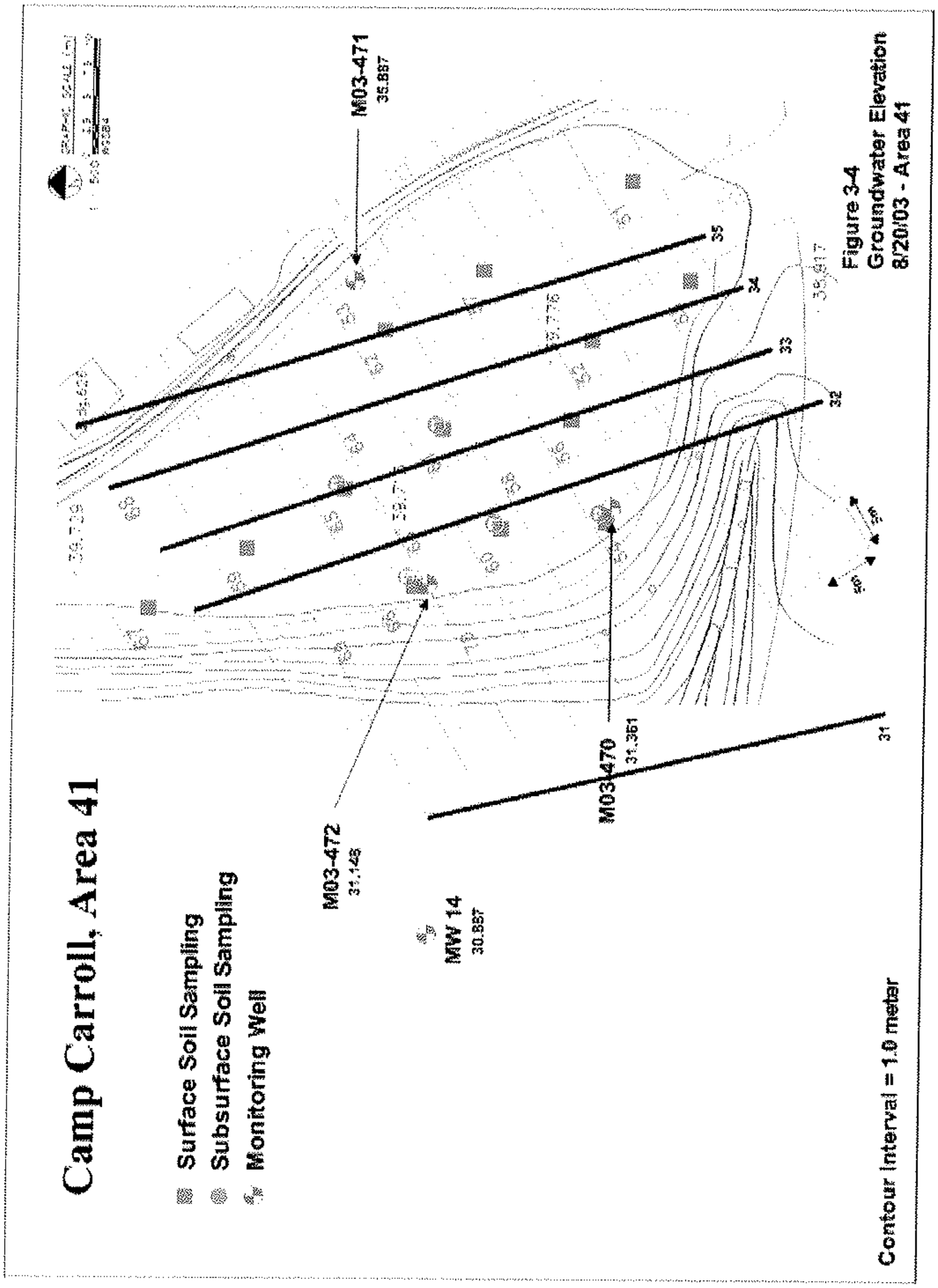



Figure 3-3
Groundwater Elevation
6/3/03 - Area 41


Camp Carroll, Area 41
Surface Soil Sampling
Subsurface Soil Sampling
Monitoring Well
M03-471
35.887
M03-472
31.143
M03-470
31.361
MW 14
30.887
35
34
33
32
31
Contour Interval = 1.0 meter
Figure 3-4
Groundwater Elevation
8/20/03 - Area 41



770

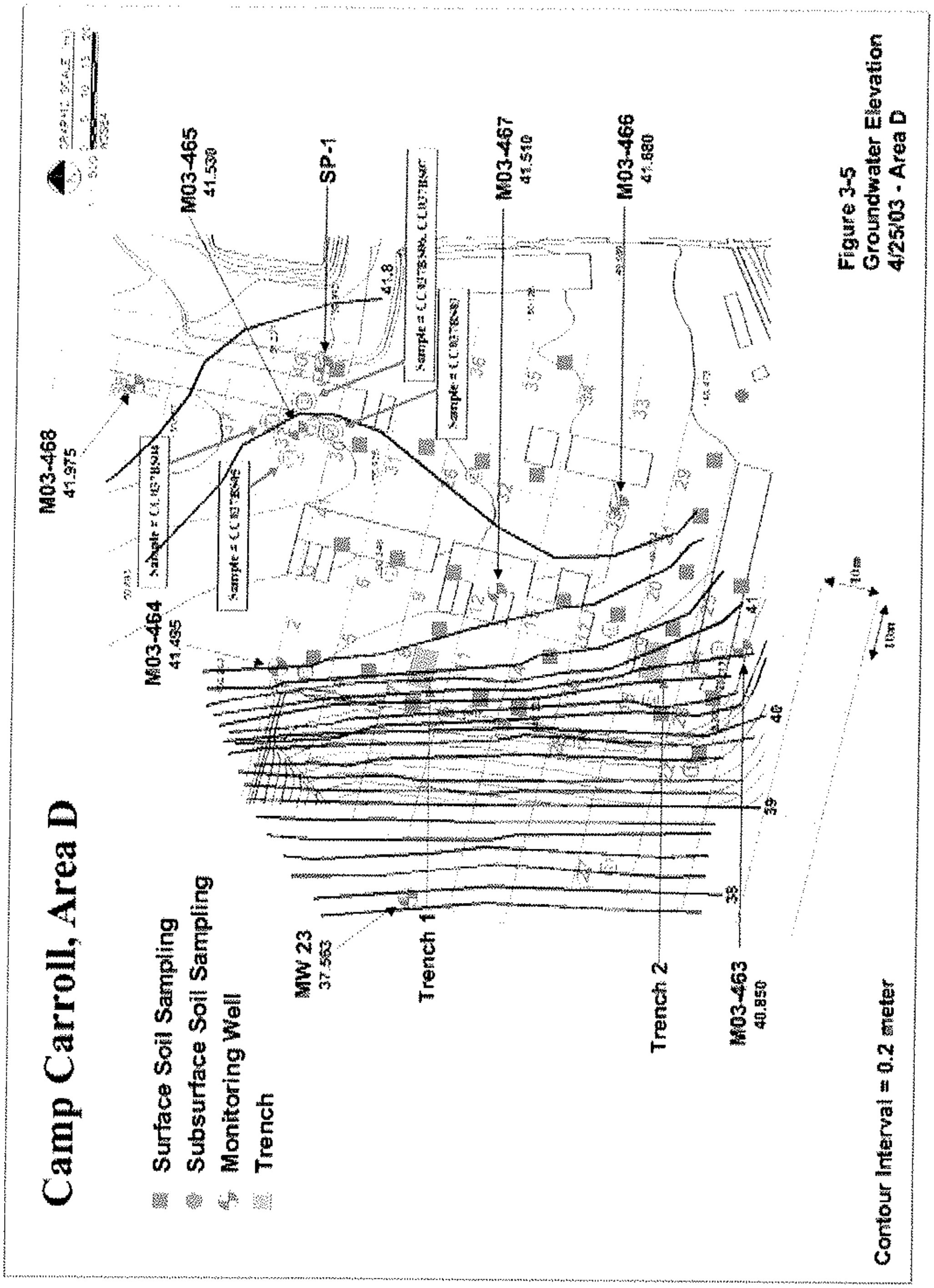



Figure 3-5
Groundwater Elevation
4/25/03 - Area D



72

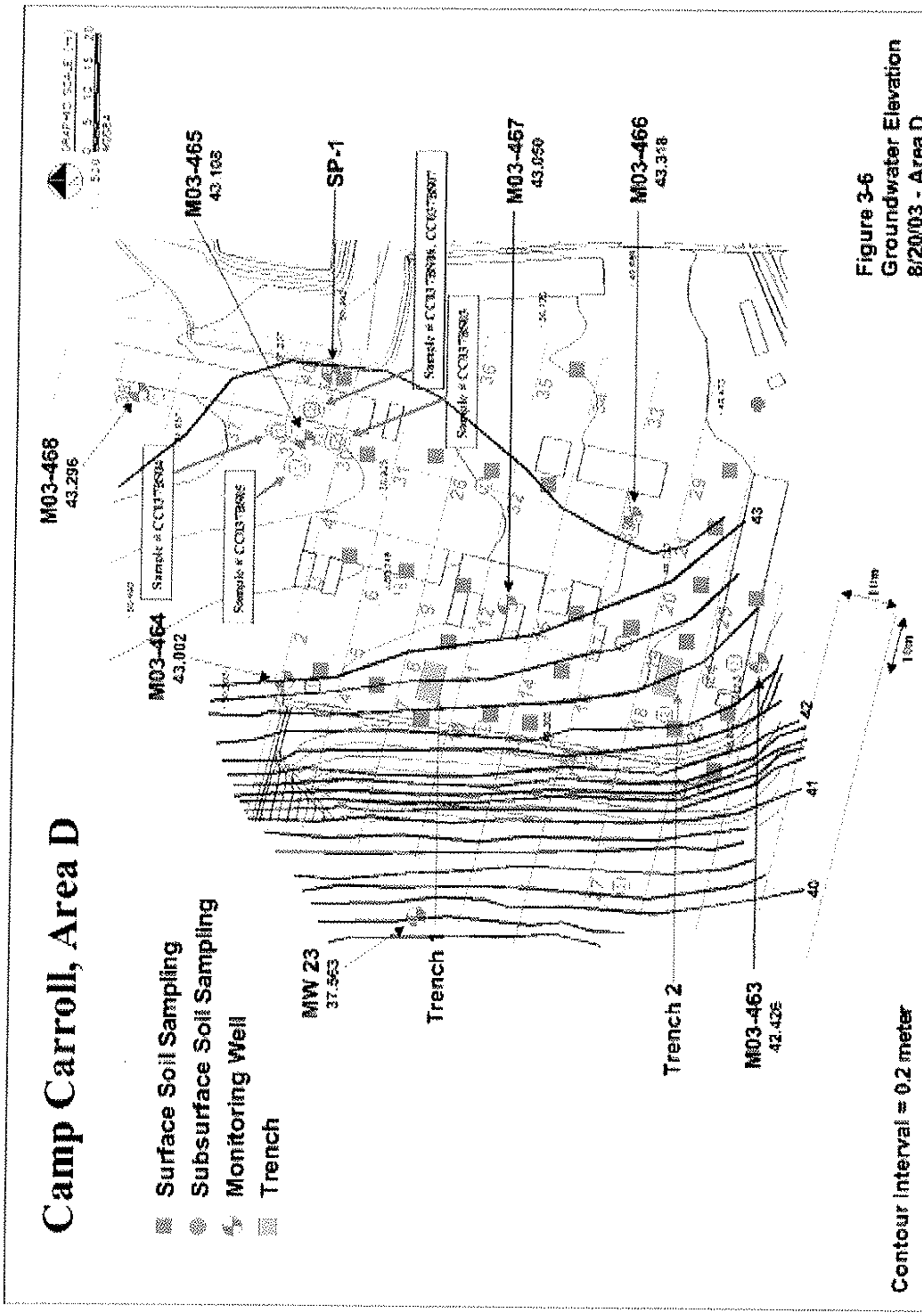


Figure 3-6
Groundwater Elevation
8/20/03 - Area D

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# SECTION 4
# ASSESSMENT OF POTENTIAL IMPACTS

Section 4 presents the overall findings of the SI regarding the nature and extent of contamination at the Site. The term "nature" refers to the type and concentration of contamination, while the term "extent" refers to the spatial distribution of contamination.

## 4.1 SUMMARY OF ANALYTICAL RESULTS

The results of the laboratory analyses of soil and groundwater samples collected during the investigation are summarized below. Soil samples were collected using a number of different field methods (as discussed in Section 2), including drive sampling in HSA borings, direct push sampling, and grab sampling from exploratory trenches. Where noted, analytical results are illustrated on maps of the Site. The maps depicting the results of various constituents were compiled using a detected concentration of an analyte at each sample location without regard to sample depth. Thus, the maps may be used to evaluate the lateral extent of overall Site contamination, but are not specific to a particular depth interval or geologic horizon. The collection depths for the samples are presented on the accompanying summary data tables. To standardize the presentation of laboratory results, all soil sample analyses (with the exception of Dioxins) are presented using units of milligrams per kilogram (mg/kg) and all groundwater sample analyses (with the exception of Dioxins) are presented using units of milligrams per liter (mg/L). The analytical laboratory data reports and data validation documentation are presented in Appendix F. A summary of soil and groundwater samples collected and submitted for laboratory analyses is provided in Table 4-1. A summary of detected contaminants by analytical method is presented in Table 4-2. The information presented on Table 4-2 was used to prepare the contaminant maps referenced below.

Two deviations from standard operating protocols (SOPs) were followed during soil sampling and should be noted. Firstly, due to exceeded holding times or the decision to add additional laboratory analyses, several sampling locations were visited a second time to collect soil samples at a later date. These samples were assigned the same name as the original sample collected at that location. They may be distinguished in the tables and text of this report by the unique laboratory reference identifier assigned to them. For example, a surface soil sample was collected from within grid location 60 on April 4, 2003 and assigned sample number CC060SS01. This sample was subjected to analyses for TPH-G, TPH-D, SVOCs, pesticides, PCBs, herbicides, and RCRA metals. Grid location 60 was sampled again on June 5, 2003 to be tested for malathion. This sample was also assigned sample number CC060SS01. The unique laboratory reference numbers for these two sampling events are 103190204 and 103322406, respectively. Each such occurrence is detailed on Tables 4-1 through 4-8. The second deviation from SOPs regards sampling depths for soil samples listed as "surface soil" and denoted in each sample number by an "SS" designation. In some instances, surface soil samples were collected beneath shallow fill soils identified by the principal investigator during exploratory trenching activities. Such surface soil samples may have been collected from an actual depth of 3 feet to 6 feet (1 meter to 2 meters) below the existing ground surface. The actual sample collection depths are summarized with PID measurements in Appendix C.

Where appropriate, detected concentrations have been compared to United States Forces, Korea (USFK) Environmental Governing Standards (EGS) for groundwater and United States Environmental Protection Agency (USEPA) Region 9 Preliminary Remedial Goals (PRGs) for soil. It should be noted that the PRG values are formulated for industrial use based on a conservative risk factor of 1.0E-06. These values have been used for screening purposes, however under CERCLA guidance a risk factor of 1.0E-04 is generally used to trigger site remedial actions. The subject sites are utilized for industrial purposes on an intermittent basis and a risk factor of 1.0E-04 is considered an appropriate criterion.

### 4.1.1 Area 41

The laboratory results for soil and groundwater samples collected within Area 41 are discussed below. It should be noted that two soil samples collected from within Area 41 were mislabeled when shipped to the analytical laboratory. When the error was noted, the sample numbers were corrected on the original chain of custody document, however, the laboratory processed the samples using the incorrect identifiers. The samples CC054BS01 and CC054SS01 thus appear as CC007BS01 and CC007SS01 in the STL laboratory report number 113100. In this report, these sample numbers have been corrected to reflect the actual sample identity and location. Additionally, the labels for two other samples

(CC080BS01 and CC181BS01) in this shipment were not readable by the laboratory and recorded as "Unknown 127.74" and "Unknown 127.90". Because of this, it is possible that the reported analytical values for these two samples may be switched. However, since CC181BS01 was collected as a QC duplicate of CC080BS01, the two samples are coincident and may be considered interchangeable.

#### 4.1.1.1 Soil Sample Results

Area 41 soil sample results for each laboratory analytical method are presented in this section.

##### 4.1.1.1.1 Total Petroleum Hydrocarbons (TPH)

Selected soil samples obtained from Area 41 were analyzed for TPH-G and TPH-D&O in accordance with EPA Methods 8015 and 8020B. Fourteen surface soil samples (designated by "SS" in the sample identifier) and eight subsurface soil samples (designated by "BS" in the sample identifier) were analyzed for TPH-G and sixteen surface soil samples and eight subsurface soil samples were analyzed for TPH-D&O. The TPH method analytical results are summarized in Table 4-2. TPH detections are summarized on Table 4-3.

A review of the laboratory results indicates that TPH-G was detected in one surface soil sample (Sample CC256SS01) at a concentration of 34.5 milligrams per kilogram (mg/kg). TPH-D was detected in six surface soil samples and in two subsurface soil samples at concentrations ranging between 41.4 mg/kg and 1,840 mg/kg (Sample CC066SS01). TPH-O was detected in three surface soil samples and in one subsurface soil sample at concentrations ranging between 24.5 mg/kg and 78.8 mg/kg (Sample CC054SS01). The approximate locations of TPH constituents detected within Area 41 are depicted on Figure 4-1.

USEPA Region 9 PRGs are not available for TPH compounds.

#### 4.1.1.1.2 Volatile Organic Compounds (VOCs)

One surface soil sample and six subsurface soil samples were analyzed for VOCs in accordance with Method 8260B. The method analytical results are summarized in Table 4-2. VOC detections are summarized on Table 4-4.

A review of the laboratory results indicates that VOCs were detected in five surface soil samples. Tetrachloroethene (PCE) was detected in five samples at concentrations ranging from 0.012 mg/kg to 0.502 mg/kg (Sample CC065BS01). A toluene concentration of 0.0875 was reported in Sample CC054BS01. The approximate locations of detected VOCs within Area 41 are depicted on Figure 4-2.

The reported VOC detections did not exceed USEPA Region 9 PRGs.

#### 4.1.1.1.3 Semivolatile Organic Compounds (SVOCs)

Sixteen surface soil sample and eight subsurface soil samples were analyzed for SVOCs in accordance with Method 8270. The method analytical results are summarized in Table 4-2. VOC detections are summarized on Table 4-5.

A review of the laboratory results indicates that SVOCs were detected in three surface soil samples. The greatest measured SVOC constituent concentration was 2.08 mg/kg benzo[b]flouranthene (Sample CC065SS01). Pyrene and benzo[a]pyrene were also among the ten detected SVOC constituents. The approximate locations of detected SVOCs within Area 41 are depicted on Figure 4-3.

The benzo[a]pyrene concentraton of 0.64 mg/kg in surface soil sample CC065SS01 exceeded the USEPA Region 9 PRG of 0.21 mg/kg for this constituent. The benzo[b]flouranthene concentration of 2.08 mg/kg in the same sample was slightly below the USEPA Region 9 PRG of 2.1 for this constituent. Other detected SVOCs in Area 41 soil samples did not exceed USEPA Region 9 PRGs.

#### 4.1.1.1.4 Pesticides

Sixteen surface soil samples and eight subsurface soil samples were analyzed for organochlorine pesticides in accordance with Method 8081A. The method analytical results are summarized in Table 4-2. Pesticide detections are summarized on Table 4-6.

A review of the laboratory results indicates that pesticides were detected in fifteen surface soil samples and seven subsurface soil samples. The greatest measured pesticide constituent concentration was 218 mg/kg 4,4'-DDT (Sample CC065SS01). 4,4'-DDD and 4,4'-DDE were also among the eighteen detected pesticide constituents. The approximate locations of detected pesticides within Area 41 are depicted on Figure 4-4.

The USEPA Region 9 PRG for DDD of 10 mg/kg was exceeded in two surface soil samples (CC062SS01 and CC065SS01), the PRG for DDT of 7 mg/kg was exceeded in four surface soil samples (CC054SS01, CC060SS01, CC062SS01, and CC065SS01), and the 0.11 mg/kg PRG for Dieldrin was exceeded in one surface soil sample (CC065SS01). Other detected Pesticides in Area 41 soil samples did not exceed USEPA Region 9 PRGs.

#### 4.1.1.1.5 Polychlorinated Biphenyls (PCBs)

Fifteen surface soil sample and eight subsurface soil samples were analyzed for PCBs in accordance with Method 8082. The method analytical results are summarized in Table 4-2. PCBs were not reported at concentrations greater than the laboratory method detection limit for Area 41 soil samples.

#### 4.1.1.1.6 Herbicides

Thirteen surface soil sample and eight subsurface soil samples were analyzed for herbicides in accordance with Method 8151. The method analytical results are summarized in Table 4-2. Herbicide constituents were not reported at concentrations greater than the laboratory method detection limit for Area 41 soil samples.

#### 4.1.1.1.7 Malathion

Sixteen surface soil sample and seven subsurface soil samples were analyzed for malathion in accordance with Method 8141. The method analytical results are summarized in Table 4-2. Malathion was not reported at concentrations greater than the laboratory method detection limit for Area 41 soil samples.

#### 4.1.1.1.8 RCRA Metals

Sixteen surface soil sample and eight subsurface soil samples were analyzed for eight RCRA Metals in accordance with Methods 6020/7471. The method analytical results are summarized in Table 4-2. Metal detections are summarized on Table 4-7.

A review of the laboratory results indicates that RCRA metals were detected in all 24 soil samples analyzed. Arsenic was detected in 13 soil samples at concentrations ranging from 0.756 mg/kg to 8.24 mg/kg, barium was detected in 24 soil samples at concentrations ranging from 37.4 mg/kg to 235 mg/kg, cadmium was detected in 2 soil samples at concentrations of 0.0328 mg/kg and 0.586 mg/kg, chromium was detected in 24 soil samples at concentrations ranging from 2.21 mg/kg to 79.9 mg/kg, lead was detected in 24 soil samples at concentrations ranging from 3.56 mg/kg to 38.0 mg/kg,, selenium was detected in 2 soil samples at concentrations of 0.388 mg/kg and 0.444 mg/kg,, silver was detected in 5 soil samples at concentrations ranging from 0.00866 mg/kg to 0.056 mg/kg, and mercury was detected in 4 soil samples at concentrations ranging from 0.00617 mg/kg to 0.0128 mg/kg.

The USEPA Region 9 PRG for arsenic (calculated for a cancer endpoint) of 1.6 mg/kg was exceeded in eleven soil samples, The non-cancer endpoint arsenic PRG of 260 mg/kg was not exceeded in the samples analyzed. Other detected metals in Area 41 soil samples did not exceed USEPA Region 9 PRGs.

#### 4.1.1.1.9 Dioxins

Four surface soil sample and four subsurface soil samples were analyzed for dioxins in accordance with Method 8290. The method analytical results are summarized in Table 4-2. Dioxin detections are summarized on Table 4 8.

A review of the laboratory results indicates that dioxins were detected in four surface soil samples and two subsurface soil samples. The greatest measured dioxin constituent concentration was 793 picograms per gram (pg/g) OCDD (Sample CC051SS01). The approximate locations of detected dioxins within Area 41 are depicted on Figure 4-5.

The USEPA has established a PRG of 1.6E-05 mg/kg (0.016 pg/g) for the dioxin 2,3,7,8-TCDD. Total TCDD concentrations were less than the laboratory method detection limit in the soil samples analyzed.

#### 4.1.1.2 Groundwater Sample Results

Area 41 groundwater sample results for each laboratory analytical method are presented in this section.

##### 4.1.1.2.1 Total Petroleum Hydrocarbons (TPH)

Selected groundwater samples obtained from Area 41 were analyzed for TPH-G and TPH-D&O in accordance with EPA Methods 8015 and 8020B. Four groundwater samples (designated by "WS" in the sample identifier) were analyzed for TPH-G and TPH-D&O. The TPH method analytical results are summarized in Table 4-2. TPH detections are summarized on Table 4-9.

A review of the laboratory results indicates that TPH-G was detected in two groundwater samples at concentrations of 0.308 milligrams per liter (mg/L) and 2.39 mg/L (Sample CC054WS01). TPH-D was detected in one groundwater sample at a concentration of 1.8 mg/L (Sample CC054WS01). The approximate locations of TPH constituents detected in groundwater beneath Area 41 are depicted on Figure 4-6.

USFK EGS are not available for TPH compounds.

##### 4.1.1.2.2 Volatile Organic Compounds (VOCs)

Four groundwater samples were analyzed for VOCs in accordance with Method 8260B. The method analytical results are summarized in Table 4-2. VOC detections are summarized on Table 4-10.

A review of the laboratory results indicates that VOCs were detected in all four groundwater samples. The greatest measured VOC constituent concentration was 11.1 mg/L PCE (Sample CC054WS01). Trichloroethene (TCE) and benzene were also among the nine detected VOC constituents. The approximate locations of detected VOCs within Area 41 are depicted on Figure 4-7.

The USFK EGS for tetrachloroethene of 0.005 mg/L was exceeded in all four groundwater samples analyzed. The USFK EGS for trichloroethene of 0.005 mg/L was exceeded in all four groundwater samples analyzed. The USFK EGS for 1,2-dichloroethene of 0.005 mg/L was exceeded in one groundwater sample (CC054WS01). It should be noted that some detected VOC constituents have not been assigned EGS values.

#### 4.1.1.2.3 Semivolatile Organic Compounds (SVOCs)

Four groundwater samples were analyzed for SVOCs in accordance with Method 8270. The method analytical results are summarized in Table 4-2. SVOC detections are summarized on Table 4-11. SVOCs were not reported at concentrations greater than the laboratory method detection limit for Area 41 groundwater samples.

#### 4.1.1.2.4 Pesticides

Four groundwater samples were analyzed for organochlorine pesticides in accordance with Method 8081A. The method analytical results are summarized in Table 4-2. Pesticide detections are summarized on Table 4-12. Pesticides were not reported at concentrations greater than the laboratory method detection limit for Area 41 groundwater samples.

#### 4.1.1.2.5 Polychlorinated Biphenyls (PCBs)

Four groundwater samples were analyzed for PCBs in accordance with Method 8082. The method analytical results are summarized in Table 4-2. PCBs were not reported at concentrations greater than the laboratory method detection limit for Area 41 groundwater samples.

#### 4.1.1.2.6 Herbicides

Four groundwater samples were analyzed for herbicides in accordance with Method 8151. The method analytical results are summarized in Table 4-2. Herbicide constituents were not reported at concentrations greater than the laboratory method detection limit for Area 41 groundwater samples.

#### 4.1.1.2.7 Malathion

Four groundwater samples were analyzed for malathion in accordance with Method 8141. The method analytical results are summarized in Table 4-2. Malathion was not reported at concentrations greater than the laboratory method detection limit for Area 41 groundwater samples.

#### 4.1.1.2.8 RCRA Metals

Four groundwater samples were analyzed for eight RCRA Metals in accordance with Methods 6020/7471. The method analytical results are summarized in Table 4-2. Metal detections are summarized on Table 4-13.

A review of the laboratory results indicates that RCRA metals were detected in all four groundwater samples analyzed. Barium was detected in 4 groundwater samples at concentrations ranging from 0.0167 mg/L to 0.204 mg/L and chromium was detected in 3 groundwater samples at concentrations ranging from 0.00958 mg/L to 0.0806 mg/L.

Detected metals in Area 41 groundwater samples did not exceed USFK EGS.

#### 4.1.1.2.9 Dioxins

Two groundwater samples were analyzed for dioxins in accordance with Method 8290. The method analytical results are summarized in Table 4-2. Dioxin detections are summarized on Table 4-14.

A review of the laboratory results indicates that dioxins were detected in two groundwater samples. The greatest measured dioxin constituent concentration was 0.00349 nanograms per liter (ng/L) 1,2,3,7,8-PeCDF (Sample CC053WS01). The approximate locations of detected dioxins within Area 41 are depicted on Figure 4-8.

The USFK has established a EGS of 3.0E-08 mg/L for the dioxin 2,3,7,8-TCDD. Total TCDD concentrations were less than the laboratory method detection limit in the groundwater samples analyzed.

#### 4.1.2 AREA D

The laboratory results for soil and groundwater samples collected within Area D are discussed below.

##### 4.1.2.1 Soil Sample Results

Area D soil sample results for each laboratory analytical method are presented in this section.

###### 4.1.2.1.1 Total Petroleum Hydrocarbons (TPH)

Selected soil samples obtained from Area D were analyzed for TPH-G and TPH-D&O in accordance with EPA Methods 8015 and 8020B. Thirty-two surface soil samples and thirty-seven subsurface soil samples were analyzed for TPH-G and TPH-D&O. The TPH method analytical results are summarized in Table 4-2. TPH detections are summarized on Table 4-3.

A review of the laboratory results indicates that TPH-G was detected in two subsurface soil samples at concentrations of 5.51 mg/kg and 121 mg/kg (Sample CC037BS03). TPH-D was detected in two surface soil samples and in two subsurface soil samples at concentrations ranging between 25.1 mg/kg and 62.6 mg/kg (Sample CC018SS01). TPH-O was detected in three surface soil samples and in four subsurface soil samples at concentrations ranging between 24.5 mg/kg and 199 mg/kg (Sample CC144SS01). The approximate locations of TPH constituents detected within Area D soils are depicted on Figure 4-9.

USEPA Region 9 PRGs are not available for TPH compounds.

###### 4.1.2.1.2 Volatile Organic Compounds (VOCs)

Forty-nine subsurface soil samples were analyzed for VOCs in accordance with Method 8260B. The method analytical results are summarized in Table 4-2. VOC detections are summarized on Table 4-4.

A review of the laboratory results indicates that VOCs were detected in seventeen subsurface soil samples. The greatest VOC constituent concentration measured was 245 mg/kg Toluene (Sample CC037BS03). PCE and TCE were among the eight VOCs reported. The approximate locations of detected VOCs within Area D are depicted on Figure 4-10.

The USEPA Region 9 PRG for trichloroethene of 0.11 mg/kg was exceeded in one sub-surface soil sample (CC037BS01) at a concentration of 0.165 mg/kg. Other detected VOCs in Area D soil samples did not exceed USEPA Region 9 PRGs.

#### 4.1.2.1.3 Semivolatile Organic Compounds (SVOCs)

Thirty-two surface soil sample and thirty-seven subsurface soil samples were analyzed for SVOCs in accordance with Method 8270. The method analytical results are summarized in Table 4-2. VOC detections are summarized on Table 4-5.

A review of the laboratory results indicates that SVOCs were detected in two subsurface soil samples. The greatest measured SVOC constituent concentration was 1.19 mg/kg 3&4-methylphenol (Sample CC037BS01). 2-Methylphenol and bis(2-ethylhexyl)phthalate were also detected. The approximate locations of detected SVOCs within Area D are depicted on Figure 4-11.

The reported SVOC detections did not exceed USEPA Region 9 PRGs.

#### 4.1.2.1.4 Pesticides

Thirty-three surface soil sample and thirty-seven subsurface soil samples were analyzed for organochlorine pesticides in accordance with Method 8081A. The method analytical results are summarized in Table 4-2. Pesticide detections are summarized on Table 4-6.

A review of the laboratory results indicates that pesticides were detected in twenty-nine surface soil samples and eighteen subsurface soil samples. The greatest measured pesticide constituent concentration was 29.3 mg/kg 4,4'-DDT (Sample CC040SS01). 4,4'-DDD and 4,4'-DDE were also among the ten detected pesticide constituents. The approximate locations of detected pesticides within Area D are depicted on Figure 4-12.

The USEPA Region 9 PRG for DDT of 7 mg/kg was exceeded in two surface soil samples (CC030SS01 and CC040SS01). Other detected Pesticides in Area D soil samples did not exceed USEPA Region 9 PRGs.

#### 4.1.2.1.5 Polychlorinated Biphenyls (PCBs)

Thirty-two surface soil sample and thirty-seven subsurface soil samples were analyzed for PCBs in accordance with Method 8082. The method analytical results are summarized in Table 4-2. PCBs were not reported at concentrations greater than the laboratory method detection limit for Area D soil samples.

#### 4.1.2.1.6 Herbicides

Thirty-two surface soil sample and thirty-one subsurface soil samples were analyzed for herbicides in accordance with Method 8151. The method analytical results are summarized in Table 4-2. Herbicide constituents were not reported at concentrations greater than the laboratory method detection limit for Area D soil samples.

#### 4.1.2.1.7 Malathion

Thirty-two surface soil sample and thirty-nine subsurface soil samples were analyzed for malathion in accordance with Method 8141. The method analytical results are summarized in Table 4-2. Malathion was not reported at concentrations greater than the laboratory method detection limit for Area D soil samples.

#### 4.1.2.1.8 RCRA Metals

Thirty-two surface soil sample and thirty-seven subsurface soil samples were analyzed for eight RCRA Metals in accordance with Methods 6020/7471. The method analytical results are summarized in Table 4-2. Metal detections are summarized on Table 4-7.

A review of the laboratory results indicates that RCRA metals were detected in all 69 soil samples analyzed. Arsenic was detected in 66 soil samples at concentrations ranging from 0.916 mg/kg to 20.7 mg/kg, barium was detected in 69 soil samples at concentrations ranging from 61 mg/kg to 211 mg/kg, cadmium was detected in 46 soil samples at concentrations of 0.188 mg/kg and 2.87 mg/kg, chromium was detected in 68 soil samples at concentrations ranging from 1.4 mg/kg to 15.6 mg/kg, lead was detected in 69 soil samples at concentrations ranging from 3.57 mg/kg to 52.0 mg/kg,, silver was detected in 17 soil samples at concentrations ranging from 0.0285 mg/kg to 0.472 mg/kg, and mercury was detected in 5 soil samples at concentrations ranging from 0.00947 mg/kg to 0.0146 mg/kg.

The USEPA Region 9 PRG for arsenic (calculated for a cancer endpoint) of 1.6 mg/kg was exceeded in 64 soil samples, The non-cancer endpoint arsenic PRG of 260 mg/kg was not exceeded in the samples analyzed. Other detected metals in Area D soil samples did not exceed USEPA Region 9 PRGs.

#### 4.1.2.1.9 Dioxins

Six surface soil sample and twenty-one subsurface soil samples were analyzed for dioxins in accordance with Method 8290. The method analytical results are summarized in Table 4-2. Dioxin detections are summarized on Table 4-8.

A review of the laboratory results indicates that dioxins were detected in five surface soil samples and eighteen subsurface soil samples. The greatest measured dioxin constituent concentration was 388 pg/g OCDD (Sample CC040SS01). The approximate locations of detected dioxins within Area D are depicted on Figure 4-13.

The USEPA has established a PRG of 1.6E-05 mg/kg (0.016 pg/g) for the dioxin 2,3,7,8-TCDD. A total TCDD concentration of 0.461 pg/g was reported for sample CC027BS02, however the 2,3,7,8-TCDD concentration was less than the laboratory method detection limit. Total TCDD concentrations were less than the laboratory method detection limit in the remaining soil samples analyzed.

### 4.1.2.2 Groundwater Sample Results

Area D groundwater sample results for each laboratory analytical method are presented in this section.

#### 4.1.2.2.1 Total Petroleum Hydrocarbons (TPH)

Selected groundwater samples obtained from Area 41 were analyzed for TPH-G and TPH-D&O in accordance with EPA Methods 8015 and 8020B. Nine groundwater samples were analyzed for TPH-G and TPH-D&O. The TPH method analytical results are summarized in Table 4-2. TPH detections are summarized on Table 4-9.

A review of the laboratory results indicates that TPH-G was detected in five groundwater samples at concentrations ranging between 0.559 mg/L and 1.63 mg/L (Sample CC039WS01). TPH-D was detected in six groundwater samples at a concentration ranging between 0.229 mg/L and 0.666 mg/L (Sample CC039WS01). The approximate locations of TPH constituents detected in groundwater beneath Area D are depicted on Figure 4-14.

USFK EGS are not available for TPH compounds.

#### 4.1.2.2.2 Volatile Organic Compounds (VOCs)

Nine groundwater samples were analyzed for VOCs in accordance with Method 8260B. The method analytical results are summarized in Table 4-2. VOC detections are summarized on Table 4-10.

A review of the laboratory results indicates that VOCs were detected in all nine groundwater samples. The greatest measured VOC constituent concentration was 1.67 mg/L cis-1,2-dichloroethene (Sample CC237WS01). PCE and TCE were also among the twenty-eight detected VOC constituents. The approximate locations of detected VOCs within Area D are depicted on Figure 4-15.

The USFK EGS for tetrachloroethene of 0.005 mg/L was exceeded in seven groundwater samples. The USFK EGS for trichloroethene of 0.005 mg/L was exceeded in five groundwater samples. The USFK EGS for cis-1,2-dichloroethene of 0.005 mg/L was exceeded in seven groundwater samples. The USFK EGS for trans-1,2-dichloroethene of 0.005 mg/L was exceeded in two groundwater samples. The USFK EGS for benzene of 0.005 mg/L was exceeded in four groundwater samples. It should be noted that some detected VOC constituents have not been assigned EGS values.

#### 4.1.2.2.3 Semivolatile Organic Compounds (SVOCs)

Nine groundwater samples were analyzed for SVOCs in accordance with Method 8270. The method analytical results are summarized in Table 4-2. SVOC detections are summarized on Table 4-11.

A review of the laboratory results indicates that SVOCs were detected in two groundwater samples. The greatest measured SVOC constituent concentration was 1.7 mg/L diethylphthalate (Sample CC237WS01). Napthalene and 1,4-dichlorobenzene were also among the eleven detected SVOC constituents. The approximate locations of detected VOCs within Area D are depicted on Figure 4-16.

Detected SVOC concentrations did not exceed EGS values. It should be noted that some detected SVOC constituents have not been assigned EGS values.

#### 4.1.2.2.4 Pesticides

Nine groundwater samples were analyzed for organochlorine pesticides in accordance with Method 8081A. The method analytical results are summarized in Table 4-2. Pesticide detections are summarized on Table 4-12.

A review of the laboratory results indicates that pesticides were detected in four groundwater samples. The greatest measured pesticide constituent concentration was 8.76 mg/L gamma-BHC (Lindane) (Sample CC024WS01). Dieldrin and heptachlor were also among the seven detected pesticide constituents. The approximate locations of detected pesticides within Area D are depicted on Figure 4-17.

The USFK EGS for Lindane of 0.002 mg/L was exceeded in three groundwater samples. The USFK EGS for Chlordane of 0.002 mg/L was exceeded in one groundwater sample. It should be noted that some detected pesticide constituents have not been assigned EGS values.

#### 4.1.2.2.5 Polychlorinated Biphenyls (PCBs)

Nine groundwater samples were analyzed for PCBs in accordance with Method 8082. The method analytical results are summarized in Table 4-2. PCBs were not reported at concentrations greater than the laboratory method detection limit for Area D groundwater samples.

#### 4.1.2.2.6 Herbicides

Nine groundwater samples were analyzed for herbicides in accordance with Method 8151. The method analytical results are summarized in Table 4-2. Herbicide constituents were not reported at concentrations greater than the laboratory method detection limit for Area D groundwater samples.

#### 4.1.2.2.7 Malathion

Nine groundwater samples were analyzed for malathion in accordance with Method 8141. The method analytical results are summarized in Table 4-2. Malathion was not reported at concentrations greater than the laboratory method detection limit for Area D groundwater samples.

#### 4.1.2.2.8 RCRA Metals

Nine groundwater samples were analyzed for eight RCRA Metals in accordance with Methods 6020/7471. The method analytical results are summarized in Table 4-2. Metal detections are summarized on Table 4-13.

A review of the laboratory results indicates that RCRA metals were detected in all nine groundwater samples analyzed. Arsenic was detected in 2 groundwater samples at concentrations of0.000379 mg/L and 24.2 mg/L, barium was detected in 9 groundwater samples at concentrations ranging from 0.101 mg/L to 161 mg/L, chromium was detected in 5 groundwater samples at concentrations ranging from 0.00434 mg/L to 11.6 mg/L, lead was detected in one groundwater sample at a concentration of 0.000176 mg/L, selenium was detected in one groundwater sample at a concentration of 0.00224 mg/L, silver was detected in one groundwater sample at a concentration of 0.000356 mg/L, and mercury was detected in 3 goundwater samples at concentrations ranging from 0.000243 mg/L to 0.808 mg/L.

Detected metals in Area D groundwater samples did not exceed USFK EGS.

#### 4.1.2.2.9 Dioxins

Four groundwater samples were analyzed for dioxins in accordance with Method 8290. The method analytical results are summarized in Table 4-2. Dioxin detections are summarized on Table 4-14.

A review of the laboratory results indicates that dioxins were detected in two groundwater samples. The greatest measured dioxin constituent concentration was 0.0119 ngL OCDD (Sample CC037WS01). The approximate locations of detected dioxins within Area D are depicted on Figure 4-18.

The USFK has established an EGS of 3.0E-08 mg/L for the dioxin 2,3,7,8-TCDD. Total TCDD concentrations were less than the laboratory method detection limit in the groundwater samples analyzed.

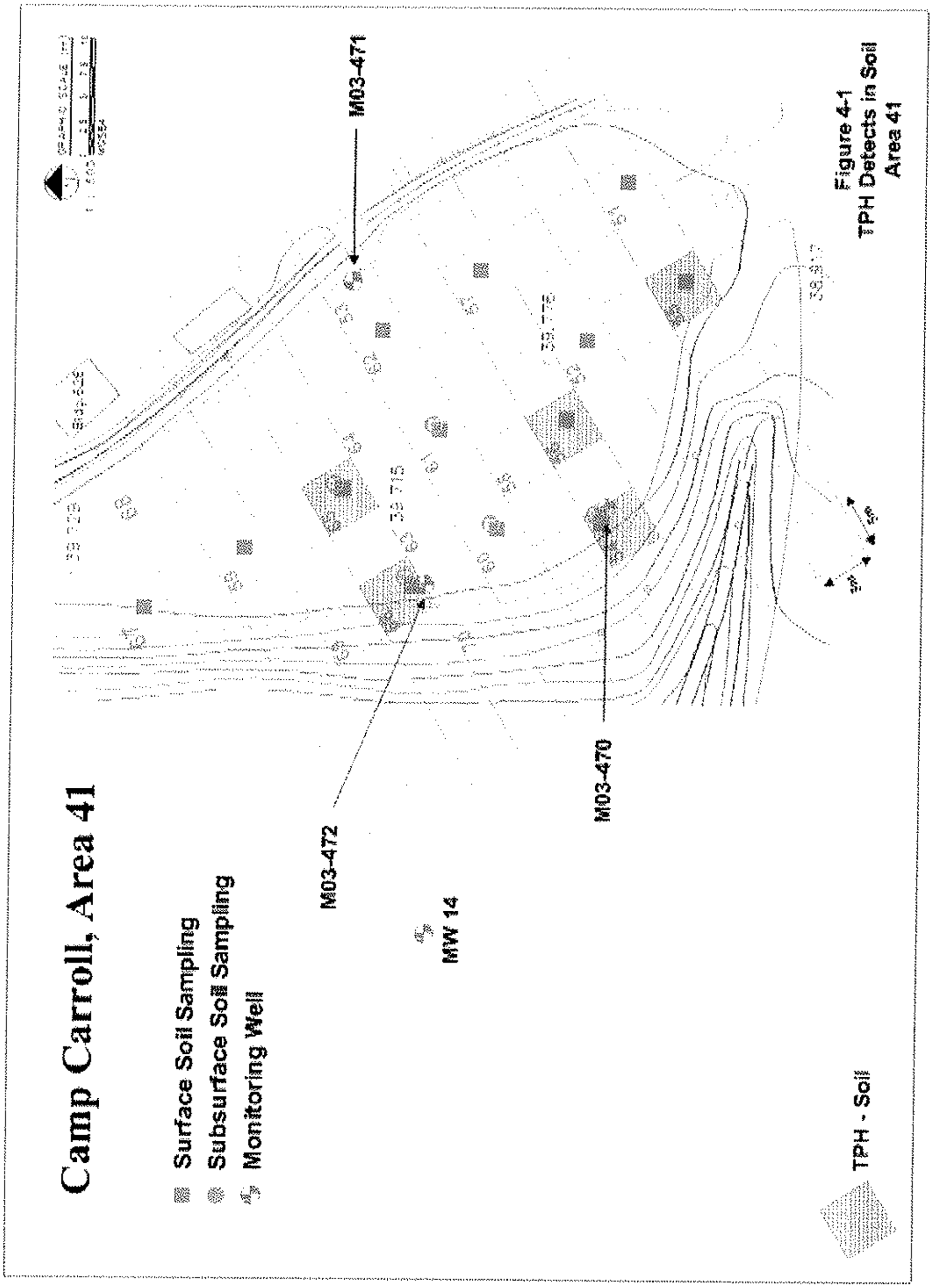



Figure 4-1
TPH Detects in Soil
Area 41



791

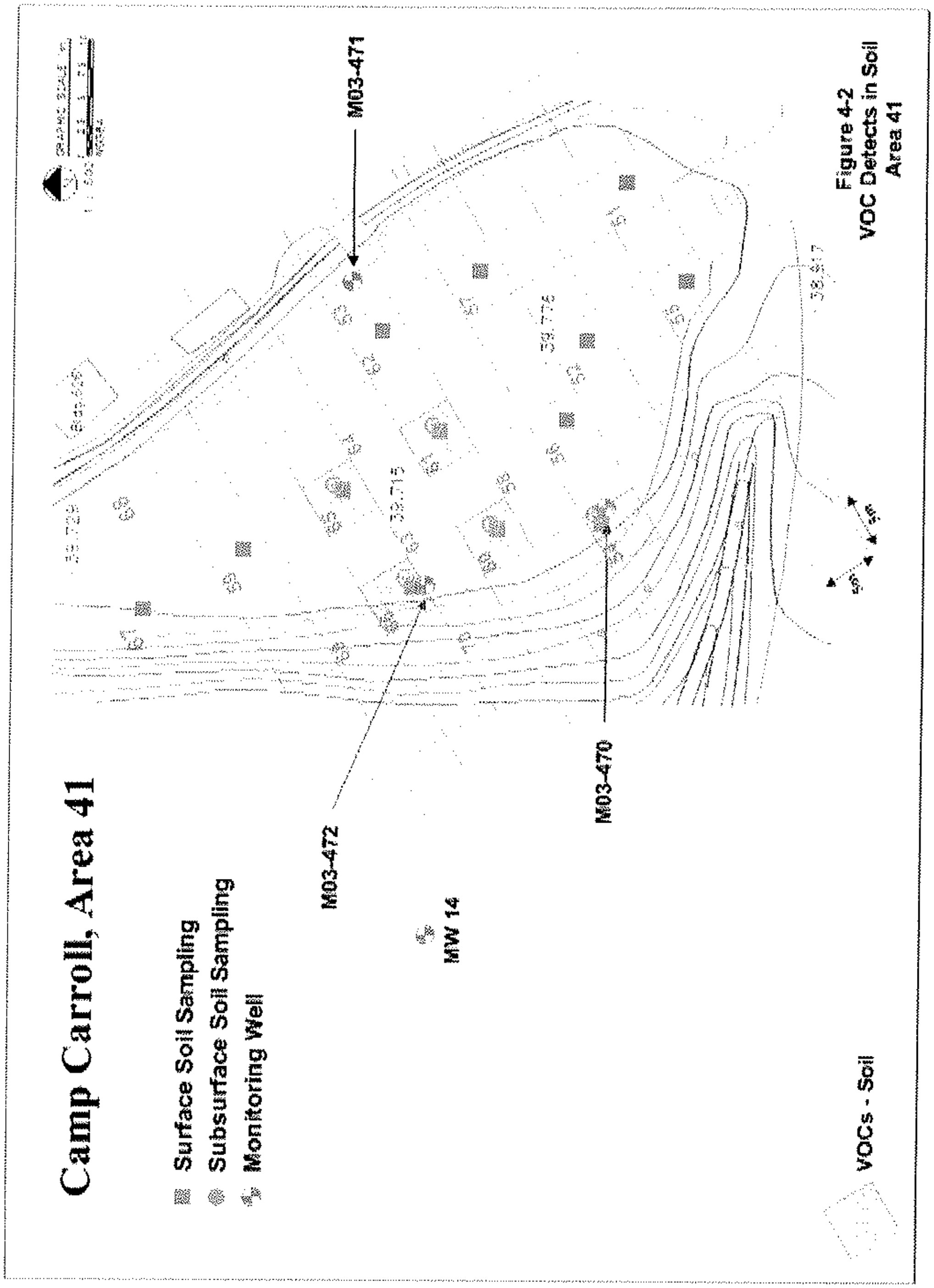



Figure 4-2
VOC Detects in Soil
Area 41

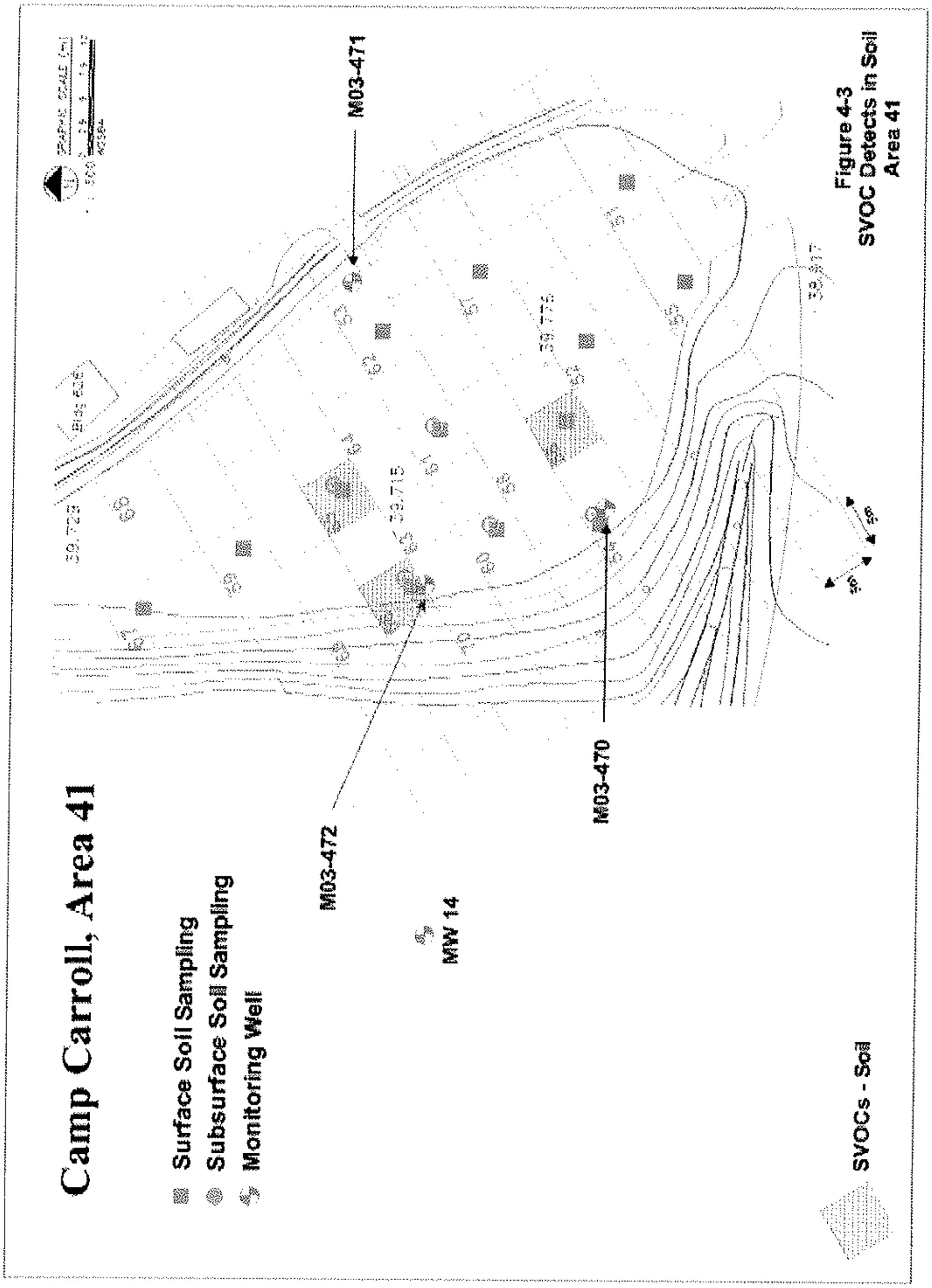
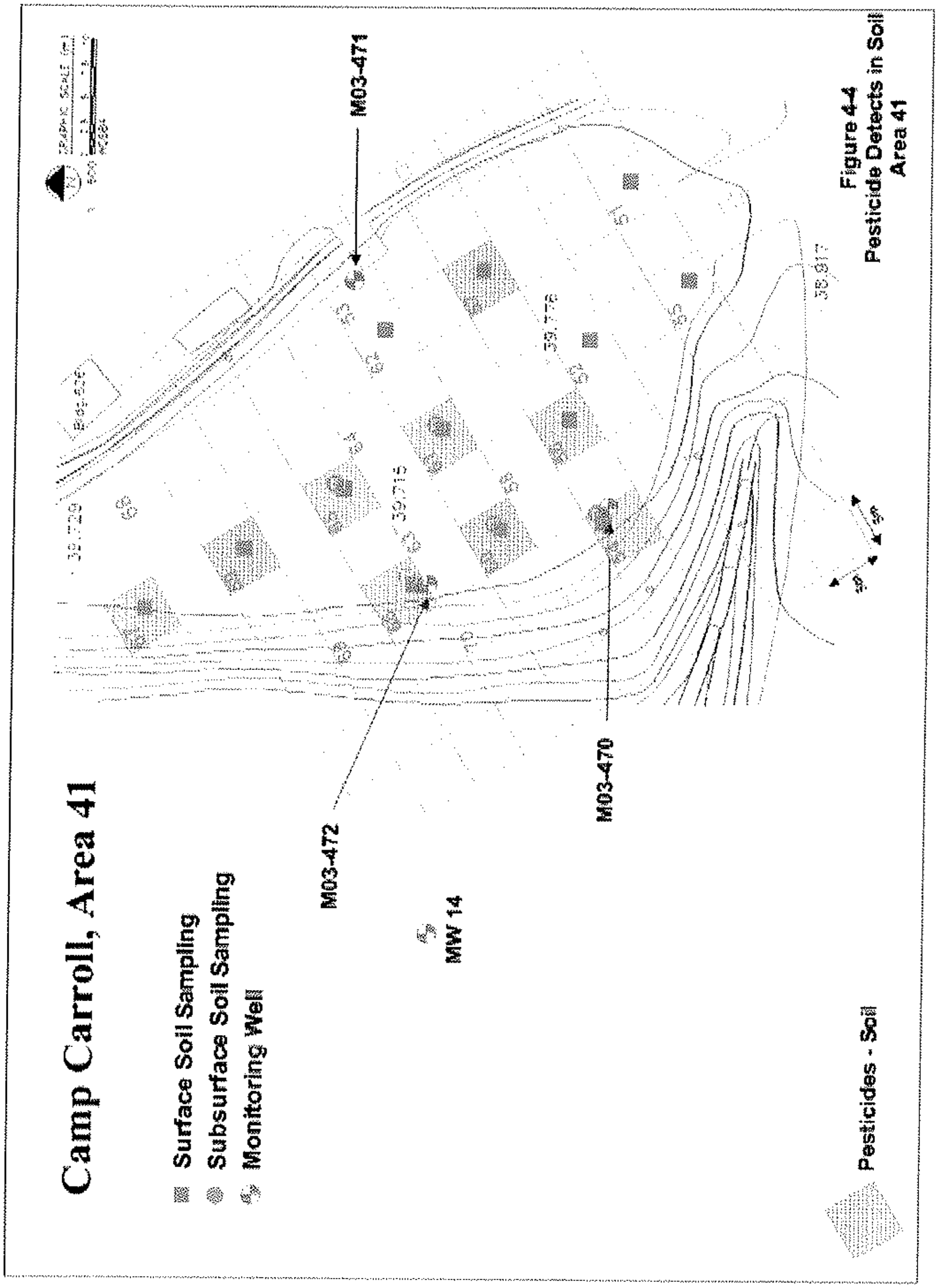



Figure 4-3
SVOC Detects in Soil
Area 41


Camp Carroll, Area 41
Surface Soil Sampling
Subsurface Soil Sampling
Monitoring Well
M03-471
M03-472
M03-470
MW 14
Pesticides - Soil
Figure 4-4
Pesticide Detects in Soil
Area 41

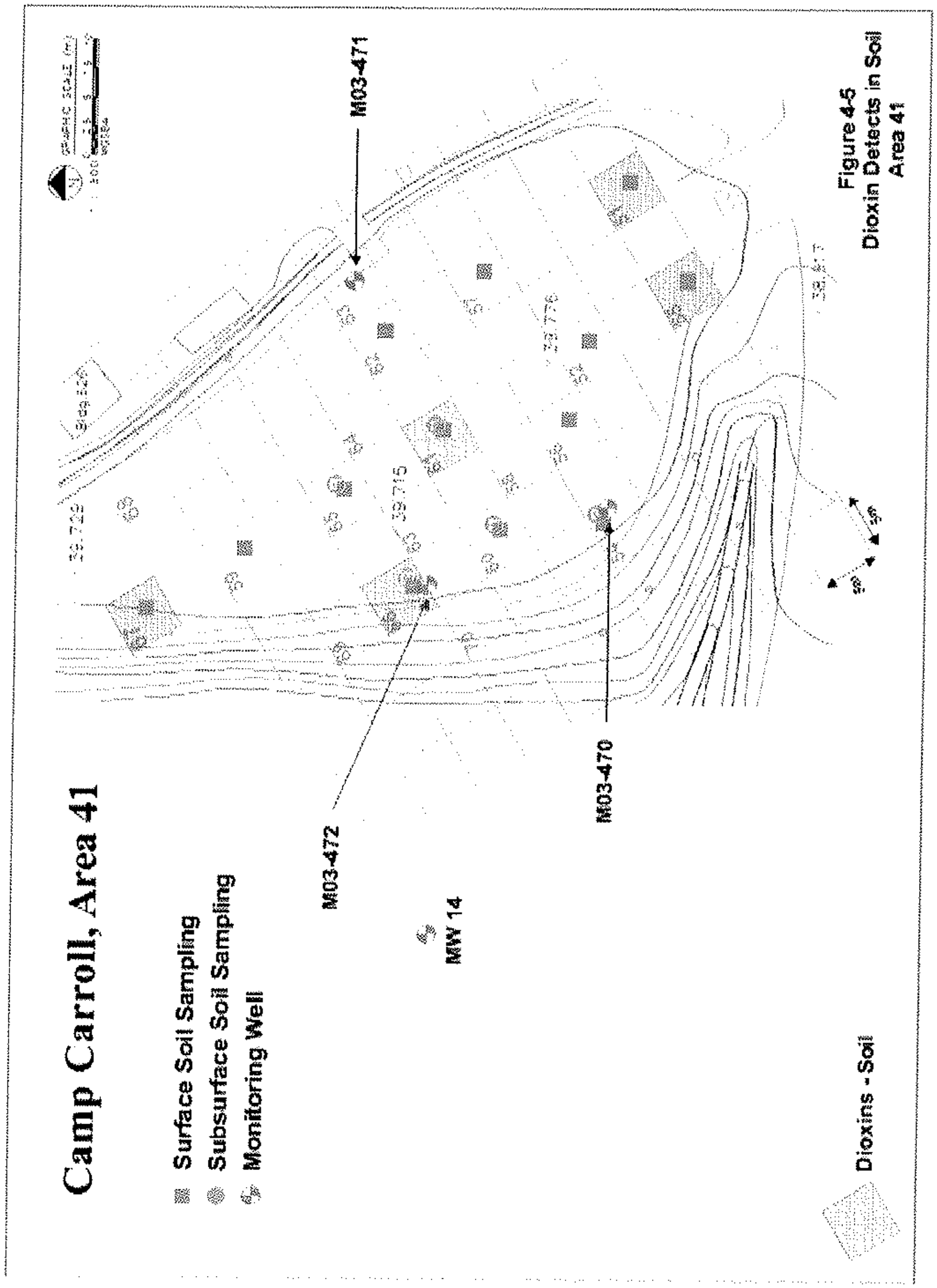



Figure 4-5
Dioxin Detects in Soil
Area 41

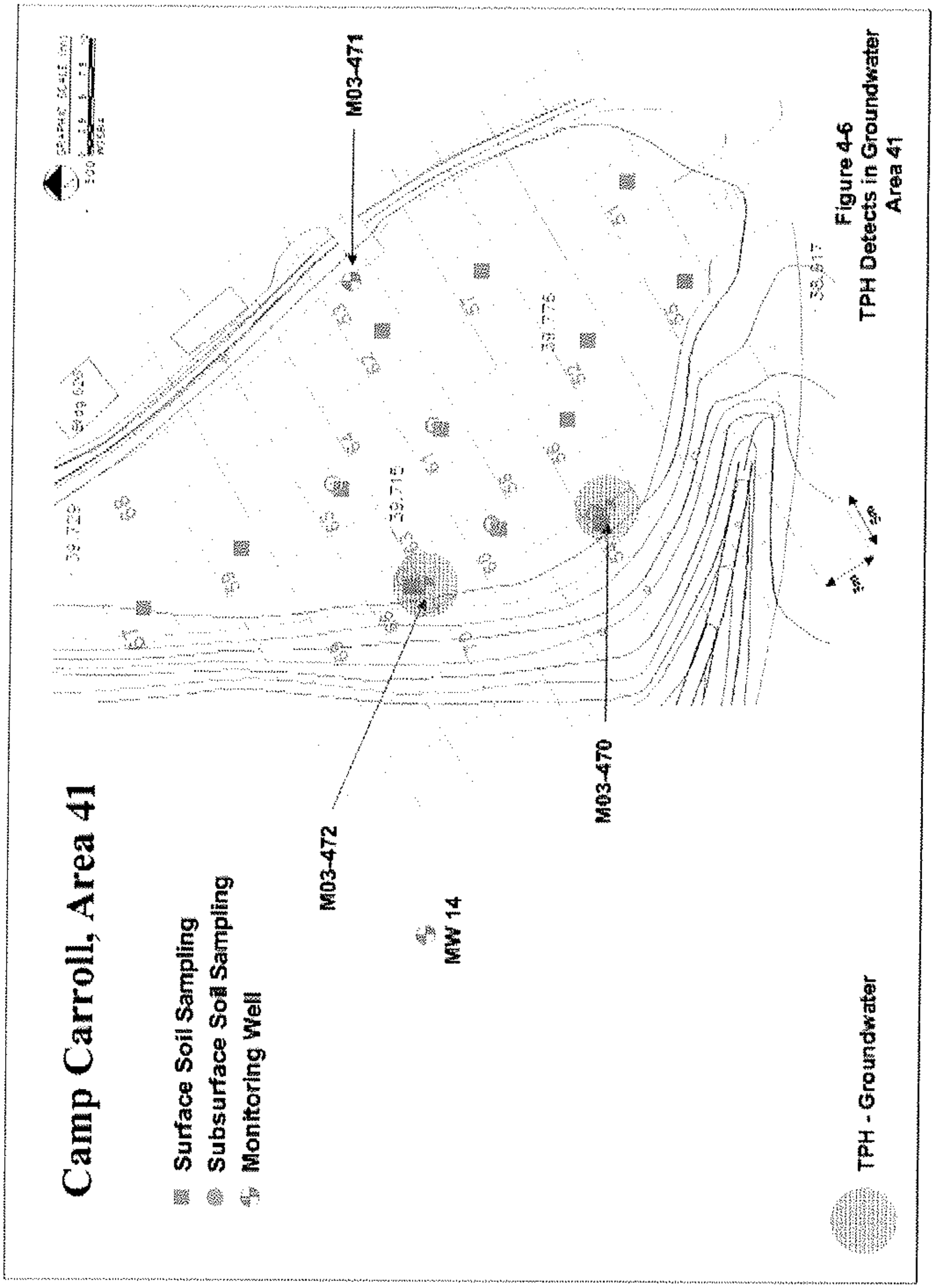



Figure 4-6
TPH Detects in Groundwater
Area 41

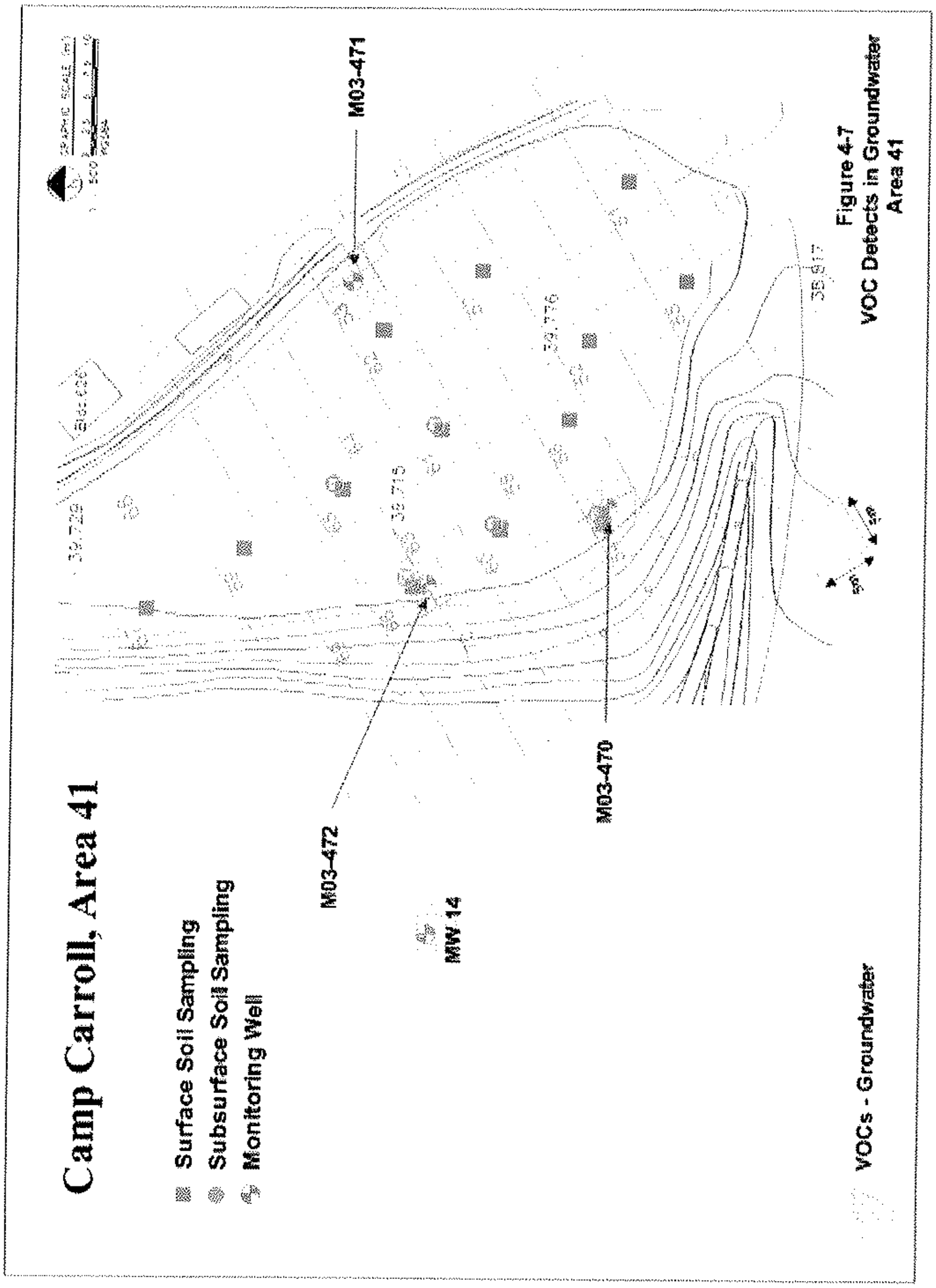



Figure 4-7
VOC Detects in Groundwater
Area 41

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# SECTION 5
# CONCEPTUAL SITE MODEL AND PRELIMINARY SCREENING EVALUATION

## 5.1 CONCEPTUAL SITE MODEL

The Conceptual Site Models (CSMs) for the Camp Carroll site (Figure 5-1 and Figure 5-2) identify potential sources and migration pathways for contaminants observed at the site. The CSM facilitates visualization of potential migration and discharge pathways associated with the releases, as well as identification of existing impacts.

A number of potential sources for the identified contaminants have been identified. These include numerous drums of petroleum hydrocarbons and hazardous materials that were previously stored on the ground surface (Area 41) or buried beneath the surface in a temporary landfill (Area D). Interviews with former workers at the sites indicate that spills of the stored chemicals occurred at various times.

A geophysical survey and exploratory trenching were conducted during this study to evaluate the potential for the continued existence of buried drums within Area D. The results of the geophysical survey showed some electromagnetic anomalies that suggested possible buried metallic objects, however when trenching was conducted at these locations only minor quantities of small scrap metal was uncovered. While it is possible that buried drums may still be located within Area D at depths greater than those explored, on the basis of the geophysical survey and trenching conducted, it is considered likely that the original contaminant sources (drums) have been removed.

The remaining sources of contamination are considered to be the residual chemicals identified in soils at the sites. These contaminants may pose an exposure danger to onsite personnel or contribute to continued contamination of groundwater beneath the sites. The areal extents of the various contaminants are depicted on Figures 4-1 through 4-14 and represented in a generalized manner on the CSMs (Figures 5-1 and 5-2).

The site is underlain by granitic gneiss bedrock. The native rock is covered by both weathered granitic rock (saprolite) and fill materials derived from the same source. The movement of groundwater in the subsurface materials is limited by the character and orientation of primary and secondary openings in the bedrock and overburden. Groundwater will attempt to flow in the direction of the hydraulic gradient (i.e., from