2010 FONR IMPACT ASSESSMENT AND HABITAT AND RARE PLANT SPECIES SURVEY RESULTS FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

Prepared for:

U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814-2922

Contract No. DACA45-03-D-0029
Delivery Order CM01

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January 2011

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

LIST OF APPENDICES (on Compact Disc)

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

ACL	aquifer cleanup level
COC	contaminant of concern
DD&A	Denise Duffy and Associates, Inc.
FDA	Fire Drill Area
FONR	Fort Ord Natural Reserve
GAC	granular activated carbon
GIS	geographic information system
GPS	global positioning system
GWETS	groundwater extraction and treatment system
HGL	HydroGeoLogic, Inc.
LTM	long-term monitoring
NWTS	Northwest Treatment System
OU	operable unit
ROD	Record of Decision
RTE	rare, threatened, or endangered
SOC	species of concern
TCE	trichloroethene
UCNRS	University of California Natural Reserve System
UCSC	University of California – Santa Cruz
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

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1.0 INTRODUCTION

HydroGeoLogic, Inc. (HGL) was contracted by the U.S. Army Corps of Engineers (USACE)-Sacramento District to conduct a Fixed-Price Remediation with Insurance scope of work for Operable Unit (OU)-1 at the former U.S. Army Post Fort Ord located in Monterey County, California. This work was contracted in December 2003 by the USACE-Omaha District, under Contract Number DACA45-03-D-0029, and was administered through the USACE-Sacramento District. The objectives of this effort are the same as those of the Record of Decision (ROD) signed in July 1995 by the U.S. Army, U.S. Environmental Protection Agency (USEPA), and the California Environmental Protection Agency (U.S. Army, 1995).

The primary remediation objectives specified in the ROD are as follows:

- Establish hydraulic control and contain contaminated groundwater.
- Extract and treat groundwater exceeding aquifer cleanup levels (ACL).

OU-1 cleanup activities must comply with U.S. Fish and Wildlife guidance (see Section 1.4) to protect critical habitat and protected species within the Fort Ord Natural Reserve (FONR).

Figure 1.1 illustrates the location of Former Fort Ord and the OU-1 source area. The OU-1 source area is the former Fort Ord Fritzsche Army Airfield Fire Drill Area (FDA). Activities associated with operations at the FDA between 1962 and 1985 resulted in contaminants being released to soils and groundwater. Although 10 volatile organic compounds were identified as contaminants of concern (COC) in groundwater underlying the FDA, trichloroethene (TCE) is the contaminant that is detected at the highest concentrations and across the greatest extent of the affected aquifer. Thus far, data show that the extent of groundwater impacted by TCE encompasses that of the other nine COCs. Figure 1.2 shows the estimated extent of the TCE plume in September 2010. The area surrounding the OU-1 contaminant plume is part of the University of California Natural Reserve System (UCNRS) designated as the FONR. The FONR is managed by staff at the University of California – Santa Cruz (UCSC).

The U.S. Army consulted with the U.S Fish and Wildlife Service (USFWS) in 1998 to assess what effects groundwater investigation and remediation activities might have on two protected planted species within the FONR. These species were the sand gilia (*Gilia tenuiflora ssp. arenaria*) and the Monterey spineflower (*Chorizanthe pungens var. pungens*). The Biological and Conference Opinion was issued on March 30, 1999. The Army consulted USFWS again in 2002 and 2007 to address impacts to Monterey spineflower critical habitat and the California tiger salamander (*Ambystoma californiense*). Various mitigation measures were identified as a result of these consultations and were implemented before, during, and after field work associated with groundwater remediation activities were conducted within the FONR.

Intermittent biological surveys within the OU-1 area have been undertaken since 1998. Specifically, these include:

- 1998 survey by Harding Lawson Associates (1998),
- 2001 survey by Harding ESE (2001),
- 2002 and 2003 surveys by MACTEC (2003, 2004), and
- 2004 through 2010 by HGL subcontractors (HGL, 2007a, 2008, 2009a, and 2010a)
    - by CH2M Hill in 2004 and 2005 [CH2M Hill, 2004 and 2005]
    - by Denise Duffy and Associates, Inc [DD&A] from 2006 through 2009.

These surveys focused on mapping the extent and population of federally protected rare, threatened, or endangered (RTE) plant species within the FONR, including the endangered sand gilia and the threatened Monterey spineflower.

This document presents the results of the 2010 rare plant survey and discusses the potential impact to date on those plants associated with the OU-1 remediation activities conducted since 2004. The 2010 rare plant survey was conducted by DD&A under subcontract to HGL. In accordance with the accepted recommendations presented in the 2009 annual report, the rare plant survey within the OU-1 portion of the FONR was suspended. The 2010 survey was limited to a reference area established to the southwest of the OU-1 area. The reference area is located within the area bounded by Imjin Road on the west, University Research Drive on the north, West Blanco Road to the east, and Reservation Road to the south (discussed in Section 1.3.1). The following information is included in this report:

- A description of the FONR site and overview of past activities,
- Descriptions of the actions taken and site management protocols implemented to minimize adverse impacts to the FONR habitat,
- A summary of the site activities conducted by HGL during 2010 and planned future activities, and
- Results of the 2010 rare plant survey and interim impact assessment.

The following sections address these topics.

1.1 SITE DESCRIPTION

Fort Ord was established in 1917 as a military training base for infantry troops. In January 1991, the Secretary of Defense announced the closure of the base. In August 1994, portions of the property were transferred to the UCSC and the FONR was established in June 1996. Additional information regarding past land use at this site is presented in the Final Operable Unit 1 Project Management Plan, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California (HGL, 2004b).

The former Fort Ord is located near Monterey Bay, which is located approximately 80 miles south of San Francisco. The base consists of approximately 28,000 acres near the cities of Seaside, Sand City, Monterey, Del Rey Oaks, and Marina. Monterey Bay marks the western boundary of the former Fort Ord. Toro Regional Park borders the base to the southeast, and land use to the east is primarily agricultural.

OU-1 occupies approximately 590 acres of the FONR in the southwestern corner of the former Fritzsche Army Airfield, west of Imjin Road and north of Reservation Road. The dominant habitats found in OU-1 include coast live oak woodland, maritime chaparral, and annual grassland. The dominant habitats within the FONR are coast live oak woodland, coastal scrub, maritime chaparral and annual grassland. The maritime chaparral is considered a rare habitat by the California Department of Fish and Game. The former Fort Ord area contains large areas of maritime chaparral habitat.

Several federally protected RTE species are known or suspected to be present within the FONR. These include the endangered sand gilia, the threatened Monterey spineflower, and the threatened California tiger salamander. Several plant and animal species of concern (SOC) are also present in the FONR. Other plant SOC include the following:

- Coast wallflower (Erysimum ammophilum),
- Eastwood's ericameria (Ericameria fasciculata),
- Monterey ceanothus (Ceanothus cuneatus var. rigidus),
- Sandmat manzanita (Arctostaphylos pumila), and
- Toro manzanita (A. montereyensis).

The animal SOC include the following:

- California black legless lizard (Anniella pulchra nigra),
- California coast horned lizard (Phrynosoma coronatum), and
- Monterey ornate shrew (Sorex ornatus salarius).

The northern boundary of OU-1 is adjacent to a large expanse of privately owned, non-native grassland. Transmission of non-native grass species into OU-1 is accelerated by the prevailing winds, which blow the seeds south and into the OU-1 area (Fusari, 2004). Non-native grasses and weedy forbs are already present throughout much of the OU-1 area. Significant expansion of the non-native grasses could result in population declines of federally listed plants.

Sand gilia appears to be less tolerant of competing plant cover than the Monterey spineflower. This hypothesis is based on the observation that numerous small Monterey spineflower populations were identified within the dense grassland habitat bordering the main FONR habitat to the east and north or on the roadways bordering this grassland in the initial 1998 survey. Subsequent rare plant surveys conducted between 2001 and 2007 also observed Monterey spineflower in this region. Sand gilia was not observed in these areas in any of those surveys.

Although sand gilia was not detected in the dense grassland border areas during the 1998 – 2007 surveys, sand gilia populations were observed in 2007 within a small "island" of grassland species within the more extensive oak woodland habitat near the OU-1 plume source area (that is, the former FDA; see Figure A3.4 in the 2007 FONR Impact Report Appendix A [HGL, 2008]). The small open area in which the sand gilia population was observed is bordered by grasses that are surrounded by oak woodland and understory habitat. Several Monterey spineflower populations also were observed thriving within dense patches of non-native grasses

in the same vicinity. This occurrence suggests that both rare plant species may occur in the presence of non-native grasses within more supportive habitat. This region was not surveyed in 2010 because it has been more than three years since construction activities were completed.

1.2 OVERVIEW OF OPERABLE UNIT-1 REMEDIATION ACTIVITIES WITHIN THE FORT ORD NATURAL RESERVE

Numerous wells and soil borings were constructed within the FONR as part of the investigative effort to define the extent of environmental contamination or to remediate that contamination. Table 1.1 lists the wells that have been installed within the OU-1 portion of the FONR. Table 1.2 lists the destroyed wells and the soil borings that were drilled within the FONR portion of OU-1 between 2004 and 2006 without constructing a well. Figure 1.3 illustrates the OU-1 well and soil boring locations. No new wells or soil borings have been constructed by HGL within the FONR since 2006.

1.3 SITE ACTIVITY SUMMARY

In 1987, about 4,000 cubic yards of contaminated soils were excavated and replaced with clean fill. The OU-1 ROD (U.S. Army, 1995) stated that the contaminated soils at the FDA were remediated. The ROD also defined groundwater extraction and treatment as the selected remedial action for OU-1 groundwater. A groundwater extraction and treatment system (GWETS) was constructed in 1988 to remediate TCE and other related groundwater contaminants. The 1988 GWETS consisted of extraction wells EW-OU1-17-A and EW-OU1-18-A and was located slightly downgradient of the FDA. Extracted groundwater was transported through pipelines to a treatment unit located at the former FDA and passed through vessels containing granular activated carbon (GAC). The treated effluent was spray-irrigated in the southern portion of the FDA.

Despite a steady overall decline in contaminant levels within the groundwater capture zone of the 1988 GWETS, COCs were subsequently detected at concentrations above ACLs in groundwater downgradient from the extraction zone. Additional wells installed between 1997 and 2001 (MW-OU1-21-A through MW-OU1-46-A) revealed that TCE exceeded the ACL as far as 2,100 feet downgradient from the existing capture zone. These TCE sample results showed that contaminated groundwater north and west of extraction well EW-OU1-17A was not captured by the original groundwater extraction system.

The HGL remediation contract was awarded in December 2003 and a draft design to expand the original GWETS was presented in the Draft Remedial System Modification Plan (HGL, 2004a). New wells were installed and aquifer testing began in 2004 and continued through 2007. The draft GWETS expansion design was adjusted as new data from the well installation and aquifer testing were processed; the final design was issued in the three-volume Final Engineering Design Report in 2006 (HGL, 2006a, 2006b, and 2006c).

Construction of the first component of the GWETS expansion, the Hydraulic Control Pilot Project (HGL, 2006d), was initiated and completed in 2006. The remainder of the GWETS expansion (the FONR system) was constructed from July through September 2007. These construction activities are described in detail in the Final Hydraulic Control Pilot Project Construction Report (HGL, 2007b) and the Final FONR System Construction Report (HGL,

2009b). Additional details concerning the GWETS expansion and a summary of OU-1 site activities conducted during 2007 relating to habitat monitoring and impacts are provided in the 2007 FONR Impact Assessment and Habitat and Rare Plant Survey Results (HGL, 2008).

During 2010, the activities conducted by HGL within the FONR habitat area were as follows:

- Collecting performance monitoring samples from the northwest treatment system (NWTS) (samples collected from eight extraction wells and the treatment plant);
- Collecting samples from wells in the OU-1 groundwater long-term monitoring (LTM) network;
- Installing a pump in existing well IW-OU1-10-A;
- Constructing an underground pipeline and an underground power line within the existing roadway to connect IW-OU1-10-A to the terminus of the existing remediation system (at extraction well MW-OU1-87-A); the design parameters for this expansion are described in the Remediation System Expansion Design Technical Memorandum (HGL, 2010b).

In addition to the HGL activities listed above, UCSC performed weed control activities in selected areas (see Appendix B)

Figure 1.4 illustrates the layout and components of the OU-1 groundwater remediation system within the FONR as of December 31, 2010. The sampling activities used only light vehicles (pickup trucks or sedans). The construction activities used light vehicles, a road grader, a trailer to haul equipment, a small ditch-digging machine and a drilling rig (to install the pump in the existing well). All vehicles traveled only on established roadways. The following sections describe the 2010 sampling activities and the 2010 rare plant survey.

1.3.1 2010 Rare Plant and Habitat Surveys

The 2009 survey marked the end of the 3-year post-construction monitoring period for the wells installed as part of the OU-1 groundwater remediation effort. In accordance with the recommendation in the 2009 annual impact report (HGL, 2010a), the third year of rare plant monitoring in the roadways where pipelines were constructed in 2007 was not warranted. These roadway areas were common to most well-drilling activities and had been monitored yearly from 2001 through 2009. Consequently, no rare plant surveys were conducted within the OU-1 portion of the FONR in 2010.

A reference area located outside the FONR and not subject to disturbance was identified to aid in making future assessments of construction impacts in the OU-1 area. This area is located approximately 3,300 feet southeast of the former OU-1 source area. Surveys for sand gilia and Monterey spineflower were conducted by DD&A on April 16, 2010. The timing of the survey was intended to correspond with the peak blooming period (late April to early May), which was established through communications with UCSC natural resource staff and by observing a known occurrence of sand gilia in the vicinity of FONR. Figure 1.5 shows the area surveyed. Section 2.0 of this report presents an overview of the biological survey results, and Appendix A includes a detailed description of this effort.

1.3.2 2010 Sampling Activities

No drilling or aquifer testing activities were conducted by HGL within OU-1 during 2010. Groundwater samples were collected during 2010 from many of the existing wells within the FONR as part of the OU-1 groundwater LTM program. As the remediation effort progresses, the number of wells included in the network decreases and the monitoring frequency diminishes. In the past, wells included in the LTM network typically have been sampled quarterly, semiannually, or annually and the NWTS performance monitoring samples have been collected bimonthly. The quarterly sampling usually occurs in March, June, September, and December of each year. During 2009 the LTM sampling program was modified to semiannually and annually only. Thus in 2010, LTM samples were collected only in March and September. The performance monitoring sample frequency also was modified in 2009 and those samples were collected quarterly in 2010. NWTS samples during 2010 were collected from the treatment system and operating extraction wells during March, June, September, and December. Table 1.3 summarizes the 2010 sampling events conducted at each of the OU-1 wells. Table 1.3 also lists those wells that have been eliminated from the groundwater monitoring network and are no longer sampled.

Previous results from the groundwater quality monitoring program showed that cleanup targets within the capture zone of the original GWETS extraction wells (Figure 1.4) were achieved during 2005. Groundwater pumping and treatment from the existing GWETS area was suspended in February 2006 as part of the rebound evaluation. A rebound evaluation to assess if the improved groundwater quality could be sustained without additional remediation was completed during 2007. The Draft Rebound Evaluation Report (HGL, 2007c) was submitted for regulatory review and it was agreed that the groundwater sampling frequency in this region can be greatly reduced. Sampling from selected groundwater monitoring wells in this region will continue for some wells, though at a reduced frequency.

Groundwater levels are measured quarterly at most wells within the OU-1 LTM network and are taken either concurrently with or within a few days of sample collection. Groundwater measurements collected from wells that are no longer sampled are listed in Table 1.3.

1.3.3 2010 Construction Activities

During September and October of 2010, HGL installed a pump in existing well IW-OU1-10-A and constructed an underground water transmission pipeline and power line to connect the new pump to the existing remediation system (see Figure 1.6). All work was performed within existing roadways. The trench was approximately 3 feet deep and approximately 1 foot wide (see Photograph 1.1).

Photograph 1.1 – Typical Trench Construction

The water pipeline and the power conduit were installed in the same trench. The top few inches of soil along the trench alignment were segregated and replaced as the surface layer during the post-construction grading. Environmental monitoring during the construction effort was provided by DD&A staff. Procedures and management policies used successfully during past construction activities were followed during the 2010 effort. A detailed report describing the IW-OU1-10-A construction is being prepared (HGL, 2011 in progress).

The pump installed in IW-OU1-10-A will significantly accelerate the completion of the OU-1 remediation effort and thereby hasten the end of the routine groundwater monitoring activities within the FONR. No new areas were disturbed as part of the IW-OU1-10-A construction and neither Monterey spineflower nor sand gilia have been observed in previous surveys along the pipeline route.

1.4 IMPACT PREVENTION AND MITIGATION MEASURES

Activities conducted within the FONR are strictly limited to those that are essential to achieving the remediation goals for the project. The remedial design and construction and the ongoing operation of the remedial system have been and will continue to be consistent with the biological opinions and guidance regarding mitigation measures to reduce and avoid impacts to RTE SOC on the project site. Guidance for the remedial design and action(s) includes the following:

- The March 30, 1999, Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California (1-8-99-F/C-39R) (USFWS, 1999) and supporting documentation, such as Enclosure 2 to the request for consultation (Harding Lawson Associates, 1998);
- The October 22, 2002, Biological Opinion on the Closure and Reuse of Fort Ord, Monterey County, California, as it affects Monterey spineflower Critical Habitat, (1-8-01-F-70R) (USFWS, 2002);

- The March 14, 2005, Biological Opinion on the Cleanup and Reuse of Former Fort Ord, Monterey County, California, as it affects California Tiger Salamander and Critical Habitat for Contra Costa Goldfields (1-8-04-F-25R) (USFWS, 2005);
- The June 1, 2007, Amendment to Biological Opinion 1-8-04-F-25R, Cleanup and Reuse of Former Fort Ord, Monterey County, California, as it affects California Tiger Salamander and Critical Habitat for Contra Costa Goldfields (1-8-04-F-25R) (USFWS, 2007);
- Guidance and direction from UCNRS staff; and
- Former Fort Ord Habitat Management Plan (U.S. Army, 1997).

To avoid or minimize impact to the FONR during ecologically sensitive periods (specifically, the rainy season, typically ranging between November and April), construction was scheduled at other times insofar as possible within the overall project constraints. The final FONR system construction, for example, began in July 2007 and was completed in September 2007 before the seasonal rains began. Likewise, the construction activity related to the IW-OU1-10-A pump placement was completed in October before the onset of significant rainfall.

In addition to compliance with the above guidance, in 2007 HGL subcontracted with UCSC to implement weed control measures at selected locations within the OU-1 portion of the FONR. This subcontract was renewed annually through 2010 and the weed control program has continued. UCSC staff began treatments on 9 March 2010 and continued through 6 October 2010. Each weed control segment received between one and three treatments (weed-eater and hand pulling) depending on site-specific phenology, response to treatments, and species composition. UCSC staff also surveyed well sites to identify the composition of the plant population in the immediate vicinity of the wells. UCSC prepared a report that describes and summarizes their efforts regarding weed control and plant surveys; the report is included as Appendix B.

The objectives of the weed control activities are as follows:

- Cut down or remove undesirable vegetation from areas disturbed by OU-1 construction activities during 2004 through 2006 before such vegetation released seeds into the environment.
- Prevent or reduce the expansion of non-native plants into areas disturbed by construction related to OU-1 activities during the 2004 through 2006 period.
- Prevent the occurrence of unacceptable impacts to the Monterey spineflower and sand gilia populations within that portion of the FONR affected by OU-1 remediation activities.

Figure 1.7 illustrates the locations where weed control measures were performed. Weed control consisted of cutting the weeds using manual methods (hand pulling, clipping) and mechanical (such as powered string trimmers or similar, easily portable equipment) during 2010 (Appendix B). Herbicides or similar poisons have not been used as part of this effort in any year. Disposing of cut weeds depended on both the plant species and the timing of the weed cutting episode. Cut weeds were left on the ground if there was no danger that the seeds would germinate and sprout

after cutting; otherwise, the cut weeds were bagged and removed from the site for proper disposal. The species subject to weed control included plant species that are listed as a noxious weed by the California Department of Food and Agriculture, included on invasive plant lists maintained by the California Invasive Plant Council, or considered to be a problematic species by the UCSC FONR natural resource staff.

1.5 FUTURE ACTIVITIES

Currently planned, potential, or recommended activities for 2011 include the following:

- Continue operating the NWTS and FONR systems.
- Continue sampling groundwater quality at selected existing wells.
- Continue weed control treatments through UCSC.
- Resume rare plant monitoring in the areas affected by the IW-OU1-10-A construction that are not bordered by grassland.
- Destroy selected wells.
- Resume rare plant monitoring where appropriate at wells to be destroyed in 2011 (see Section 4.2).
- Consider transferring the existing pump from extraction well EW-OU1-60-A to existing monitoring well MW-OU1-61-A and installing a pipeline to connect the latter well to the existing treatment system.

If implemented, the transfer of the existing pump from well EW-OU1-60-A to existing monitoring well MW-OU1-61-A will have no significant impact on FONR habitat or rare plant populations. Both wells are located along the FONR northwest boundary road adjacent to the Armstrong Ranch grassland (see Figure 1.3). Well MW-OU1-61-A is located approximately 30 feet from the existing water transmission and power lines. Consequently, the trenching needed to connect this well to the system will be minimal and will take place along the edge of the existing roadway. Both wells can be accessed from the existing roadway. This action will be implemented only if the duration of the overall cleanup will be shortened.

No new wells within OU-1 at the FONR are planned at this time. As the remediation progresses, the number of wells that are included in the sampling program and/or the number of samples collected will be reduced. The seven operational extraction wells (four other extraction wells have been shut down because groundwater cleanup targets have been met in those areas) and the NWTS facility will be sampled either quarterly or semiannually. To date, sampling has been suspended at 62 OU-1 monitoring wells. Of the remaining 39 monitoring wells, five wells will be sampled quarterly, 22 wells semiannually, and 10 wells annually. Two wells are sampled on a 5-year cycle. The frequency of groundwater level measurements also has been reduced. Water levels in 2011 will be monitored at 40 wells on a semiannual basis (March and September) and quarterly at 17 wells (June and December). Groundwater level measurements have been suspended at the remaining wells.

The monitoring wells and treatment facilities will be destroyed and removed after verification that the groundwater cleanup targets established in the ROD have been met. The timetable for decommissioning activities is not established.

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2.0 OVERVIEW OF 2010 RARE PLANT SURVEY RESULTS

The objectives of the 2010 rare plant survey were to: (1) identify locations and estimate rare plant populations at an identified reference site, and (2) map Monterey spineflower and sand gilia at the reference site. The reference site encompasses approximately one-half acre and its location is shown in Figure 1.5. This site has been used by DD&A biologists for several years to identify the peak the blooming period for Monterey spineflower and sand gilia. Initiating rare plant surveys at former Fort Ord and other locations has been triggered in part by these observations to ensure that such surveys are conducted at appropriate times.

Coast live oak woodland is the dominant habitat in the reference area. Grassland and coast live oak woodland is adjacent to the reference site on the northwestern boundary. All other sides of the reference area are bordered by developed roads (Reservation Road, Mbest Drive, and University Drive). Non-native grasses and weedy forbs are already present throughout much of the reference area.

Surveys for sand gilia and Monterey spineflower across the entire site were conducted by a DD&A biologist and a DD&A global positioning system (GPS) technician on April 16, 2010. The survey was timed to coincide with the peak blooming period insofar as possible. The peak blooming period was determined through communications with UCSC FONR natural resource management staff and by intermittent observations of sand gilia populations in the reference site during the previous weeks. Appendix A presents the complete survey report.

The 2010 spring rainfall total for the period preceding the survey (January through April) give date range) was 14.72 inches.

2.1 RARE PLANT SURVEY METHODS

Large areas of Monterey spineflower and sand gilia were mapped as polygons, using a Trimble Pathfinder ProXH GPS unit. Smaller plant groups and individuals were mapped as points with attributes to identify the number of individuals at each location. When a rare plant was identified, the survey in that area was extended to the boundary of the population encountered.

Individual counts were made for all sand gilia populations whether they were mapped using points (population less than 10) or polygons (population greater than 10). However, Monterey spineflower were only counted as individuals when groups of less than five were mapped. Monterey spineflower mapped as polygons were characterized according to the percent of cover. The categories ranged from very sparse (corresponding to an absolute cover of less than 3 percent), sparse (3 to 25 percent), medium low (26 to 50 percent), medium (51 to 76 percent), and medium high (76 to 97 percent) to very high (greater than 97 to 100 percent). GPS data were exported to shapefile format for use in a geographic information system (GIS) (ESRI ArcGIS) and mapped on high-resolution aerial photography. These maps are presented in Appendix A (Figure A3.1).

2.2 SAND GILIA SURVEY RESULTS

Sand gilia was observed and mapped at the DD&A reference site. A total of 14 populations (seven polygons and seven points) of sand gilia were mapped within the DD&A reference area

survey boundaries (see Appendix A Table A3.1 and Figure A3.1). A total of 1,086 individual plants were mapped at the 14 populations.

2.3 MONTEREY SPINEFLOWER SURVEY RESULTS

Two populations (two polygons) of Monterey spineflower were mapped at the DD&A reference site (see Appendix A, Table A3.2 and Figure A3.1). Because population size estimates are not as easily quantified as the sand gilia populations, individual Monterey spineflower plants were not counted within the GIS polygons. As mentioned in the methods section of this document, populations of Monterey spineflower were given a percentage of cover using visual estimation. One of the two populations of Monterey spineflower that were mapped as polygons had a medium-low (26 to 50 percent) cover class and the other had a sparse cover class (3 to 25 percent).

3.0 IMPACT ASSESSMENT

The 2009 rare plant survey marked the end of the 3-year post-disturbance monitoring period for the OU-1 area within the FONR. Consequently, the 2010 DD&A rare plant survey was limited to a reference area outside the footprint of OU-1 activities within the FONR habitat. This reference area was not surveyed in the past. The 2010 survey results were summarized in the preceding sections and presented in more detail in Appendix A. These data will be considered along with data collected in future annual surveys to assess overall impact upon completing the OU-1 remedial action.

UCSC staff also observed rare plant populations during selected control activities. These observations were tabulated in terms of the number of individual population patches within various area coverage categories and the estimated actual area of each population patch. The UCSC observations are presented in Appendix B. The UCSC surveys were conducted over the period from April 14, 2010, through June 2, 2010. Observations made after the peak blooming period at a given location may underestimate the plant population present at the site.

HGL staff conducted visual reconnaissance surveys to detect erosion resulting from construction activity along the roadways used to access the construction areas and the monitoring well network. These erosion surveys are conducted routinely during the quarterly groundwater monitoring events and on occasion during routine system maintenance. Significant erosion was not observed on the FONR roadways during 2010.

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4.0 SUMMARY AND RECOMMENDATIONS

Construction efforts were undertaken by HGL from 2004 through 2007 and in 2010 to remediate contaminated groundwater within the OU-1 portion of the FONR. The construction area is shown in Figure 4.1 and included the following activities:

- Drilling soil borings;
- Constructing extraction, injection, and monitoring wells;
- Installing water conveyance pipelines;
- Installing infiltration trenches; and
- Constructing a groundwater treatment facility.

4.1 SUMMARY

A critical concern throughout the project has been the protection of the rare plant species within the FONR. To that end, direct impacts (such as construction activity within the footprint of known populations of Monterey spineflower or sand gilia) have been minimized by using preconstruction surveys to delineate population locations. The results of the surveys were used to adjust the locations of remediation facilities to avoid previously identified areas wherever possible. This strategy enabled the construction activity to avoid direct impact in nearly all cases. Proactive construction management techniques were also employed throughout the construction effort to mitigate potential impacts to rare plant populations.

UCSC staff responsible for managing the FONR expressed significant concern that construction activities could alter the habitat and indirectly impact rare plant species. Clearing existing, native vegetation to enable equipment access for well or pipeline construction may provide a pathway for non-native, invasive plant species from the surrounding areas to encroach farther into the FONR. The UCSC concern is that such encroachment may result in declining rare plant populations as the non-native newcomers out-compete the existing plants and come to dominate the overall species distribution (UCSC, 2006). To address this concern, HGL has conducted annual rare plant surveys from 2004 through 2009 (through subcontractors) and conducted habitat surveys in 2006 and 2007. The data gathered through these efforts and evaluated annually (HGL, 2007a, 2008, 2009a, and 2010a) has not shown significant impact to rare plant populations.

In addition, HGL has contributed funding to support weed control efforts by UCSC starting in 2007 and continuing through 2010. The most recent effort is described in detail in Appendix B. UCSC is confident that the weed abatement efforts are having a positive impact on reducing weed populations on the OU-1 cleanup sites and, very importantly, have removed a large portion of the invasive weed seed source for 2011.

4.2 RECOMMENDATIONS

HGL recommends the following actions be performed in 2011:

- Continue the weed control program. The areas in which weed control will be implemented (Figure 1.7) and the methodology that will be used is the same as employed in 2010.
- Minimize roadway traffic during quarterly groundwater sampling activities to the extent practical.
- Reduce the sampling frequency from the groundwater monitoring well network to minimize road traffic, wherever such reductions can be made consistent with remediation and performance monitoring objectives for the OU-1 cleanup. This action requires regulatory stakeholder approval.
- Resume rare plant monitoring in the area disturbed by the 2010 construction effort, specifically in the vicinity of well IW-OU1-10-A and along the roadway between that well and the access to well EW-OU1-71-A (see Figure 1.6).
- Destroy 55 wells in areas where remediation is complete and the wells are no longer needed to perform groundwater monitoring. Most of the wells within the original GWETS area (see Figure 1.4) are included in this category and will be destroyed in accordance with the applicable regulatory requirements. The procedures and specific wells to be destroyed will be described in a separate technical memorandum. This activity is scheduled for the July – August period in 2011.

The results of the 2011 rare plant survey and weed control activities will be described in the 2011 annual FONR OU-1 impact report.

5.0 REFERENCES

CH2M Hill, Inc., 2004. Results of 2004 Monterey spineflower and Sand Gilia Surveys OU-1, Former Fort Ord, California. Prepared for HydroGeoLogic, Inc. June.

CH2M Hill, 2005. 2005 Monterey spineflower and Sand Gilia Survey Results Fort Ord Operable Unit 1, Former Fort Ord, California. Prepared for HydroGeoLogic, Inc. December.

Fusari, Margret, Ph.D., 2004. Director, University of California Santa Cruz Natural Reserves. Telephone conversations and e-mail correspondence with Amy Hiss, Gary Santolo, and Roy Evans regarding the federally listed species and noxious weeds. June.

Harding ESE, 2001. 2001 Annual Monitoring Report Biological Baseline Studies and Follow-up Monitoring Former Fort Ord Monterey, California. January 22.

Harding Lawson Associates, 1998. Biological information for agency consultation related to groundwater remediation activities and quarterly groundwater sampling at FONR Fort Ord Natural Reserve. Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California (1-8-99-F/C-39R), Enclosure 2. Letter to Jane Holte.

HydroGeoLogic, Inc. (HGL), 2004a. Draft Remedial System Modification Plan, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. July.

HGL, 2004b. Final Operable Unit 1 Project Management Plan, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. Prepared for the U.S. Army Corps of Engineers. February.

HGL, 2006a. Final 100% Engineering Design Report, Volume 1, Geology and Conceptual Site Model, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. September.

HGL, 2006b. Final 100% Engineering Design Report, Volume 2 of 3, Groundwater Modeling and Design Analysis, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. July.

HGL, 2006c. Final 100% Engineering Design Report, Volume 3 of 3, Engineering Calculations, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. October.

HGL, 2006d. Final Work Plan Hydraulic Control Pilot Project Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. April.

HGL, 2007a. Final 2006 FONR Impact Assessment and Habitat and Rare Plant Survey Results, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. September.

HGL, 2007b. Final Hydraulic Control Pilot Project Construction Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. January.

HGL, 2007c. Draft Rebound Evaluation Report Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. November.

HGL, 2008. 2007 FONR Impact Assessment and Habitat and Rare Plant Survey Results, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. February.

HGL, 2009a. 2008 FONR Impact Assessment and Habitat and Rare Plant Survey Results, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. August.

HGL, 2009b. Final FONR System Construction Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. January.

HGL, 2010a. 2009 FONR Impact Assessment and Habitat and Rare Plant Survey Results, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. January.

HGL, 2010b. Final Fort Ord Natural Reserve (FONR) Remediation System Expansion Design Technical Memorandum, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. October.

HGL, 2011. Draft IW-OU1-10-A Construction Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. In progress.

MACTEC, 2003. 2002 Annual Monitoring Report Biological Baseline Studies and Follow-up Monitoring Former Fort Ord Monterey, California. January 28.

MACTEC, 2004. 2003 Annual Monitoring Report Biological Baseline Studies and Follow-up Monitoring Former Fort Ord Monterey, California. January 22.

University of California Santa Cruz, 2006. Meeting with Dr. Margaret Fusari (UCSC), Sean McStay (UCSC), Gary Santolo (CH2MHill), Amy Hiss (CH2MHill), Michael Bombard (HGL) and Roy Evans (HGL) at University of California Santa Cruz campus. 10 January.

U.S. Army, 1995. Record of Decision, Operable Unit I, Fritzsche Army Airfield Fire Drill Area. Fort Ord, California. July 25.

U.S. Army, 1997. Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California. April.

U.S. Fish and Wildlife Service (USFWS), 1999. Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California (1-8-99-F/C-39R). March 30.

USFWS, 2002. Biological Opinion on the Closure and Reuse of Fort Ord, Monterey County, California, as it affects Monterey spineflower Critical Habitat, (1-8-01-F-70R). October 22.

USFWS, 2005. Biological Opinion on the Cleanup and Reuse of Former Fort Ord, Monterey County, California, as it affects California Tiger Salamander and Critical Habitat for Contra Costa Goldfields (1-8-04-F-25R). March 14.

USFWS, 2007. Amendment to Biological Opinion 1-8-04-F-25R, Cleanup and Reuse of Former Fort Ord, Monterey County, California, as it affects California Tiger Salamander and Critical Habitat for Contra Costa Goldfields (1-8-04-F-25R). June 6.

Table 1.1
Wells Within the Fort Ord Natural Reserve

Wells Installed/Sampled Before 2004				Wells Installed for Enchanced Reductive Dechlorination Pilot Study		Wells Installed 2004 through 2006			
Identification	**Year Installed**	**Identification**	**Year Installed**	**Identification**	**Year Installed**	**Identification**	**Year Installed**	**Identification**	**Year Installed**
MW-B-10-A	1976	MW-OU1-24-AR	2003	IW-OU1-ERD-01-A	2002	IW-OU1-01-A	2004	PZ-OU1-10-A1	2005
MW-OU1-01-A	1986	MW-OU1-25-A	1998	MW-OU1-ERD-01-A	2002	IW-OU1-02-A	2004	PZ-OU1-46-AD2	2005
MW-OU1-02-A	1986	MW-OU1-26-A	1998	IW-OU1-ERD-02-A	2002	PZ-OU1-02-A1	2004		
MW-OU1-03-A	1986	MW-OU1-27-A	1998	MW-OU1-ERD-02-A	2002	IW-OU1-05-A	2004		
MW-OU1-04-A	1986	MW-OU1-28-A	1998	IW-OU1-ERD-03-A	2002	IW-OU1-10-A	2004	EW-OU1-60-A	2006
MW-OU1-05-A	1986	MW-OU1-29-A	1998	MW-OU1-ERD-03-A	2002	IW-OU1-13-A	2004	MW-OU1-61-A	2006
MW-OU1-06-A	1986	MW-OU1-32-A	1998	IW-OU1-ERD-04-A	2002	IW-OU1-24-A	2004	EW-OU1-62-A	2006
MW-OU1-07-A	1986	MW-OU1-33-A	1998	MW-OU1-ERD-04-A	2002	IW-OU1-25-A	2004	EW-OU1-63-A	2006
MW-OU1-08-A	1986	MW-OU1-34-A	1998	MW-OU1-ERD-05-A	2002	EW-OU1-46-AD	2004	MW-OU1-64-A1	2006
MW-OU1-09-A	1986	PZ-OU1-35-A	1998	MW-OU1-ERD-06-A	2002	EW-OU1-47-A	2004	MW-OU1-64-A2	2006
MW-OU1-10-A	1987	MW-OU1-36-A	1999	MW-OU1-ERD-07-A	2002	*EW-OU1-48-A**	2004	MW-OU1-65-A	2006
MW-OU1-11-SVA	1986	MW-OU1-37-A	1999	MW-OU1-ERD-08-A	2002	EW-OU1-49-A	2004	EW-OU1-66-A	2006
*MW-OU1-12-A**	1988	MW-OU1-38-A	1999			PZ-OU1-49-A1	2004	MW-OU1-67-A	2006
PZ-OU1-13-A	1988	MW-OU1-39-A	1999			MW-OU1-50-A	2004	MW-OU1-68-A	2006
PZ-OU1-14-A	1988	MW-OU1-40-A	1999			MW-OU1-51-A	2004	EW-OU1-71-A	2006
PZ-OU1-15-A	1988	MW-OU1-41-A	2001			EW-OU1-52-A	2004	EW-OU1-72-A	2006
PZ-OU1-16-A	1988	MW-OU1-43-A	2001			EW-OU1-53-A	2004	IW-OU1-73-A	2006
EW-OU1-17-A	1987	MW-OU1-44-A	2001			EW-OU1-54-A	2004	IW-OU1-74-A	2006
EW-OU1-18-A	1987	MW-OU1-45-A	2001			EW-OU1-55-A	2004	MW-OU1-82-A	2006
MW-OU1-19-A	1993	MW-OU1-46-A	2001			MW-OU1-56-A	2004	MW-OU1-83-A	2006
MW-OU1-20-A	1993					MW-OU1-57-A	2004	MW-OU1-84-A	2006
MW-OU1-21-A	1997					MW-OU1-58-A	2004	MW-OU1-85-A	2006
MW-OU1-22-A	1997	MW-OU1-01-180	2000			MW-OU1-59-A	2004	MW-OU1-86-A	2006
MW-OU1-23-A	1997	MW-OU1-02-180	2000					MW-OU1-87-A	2006
*MW-OU1-24-A**	1997	MW-OU1-03-180	2000					MW-OU1-88-A	2006

Notes:

*Italics indicate well has been abandoned.

ERD - enhanced reduction dechlorination

EW - extraction well

IW - injection well

MW - monitoring well

OU1 - Operable Unit 1

PZ - piezometer

SVA - Salinas Valley Acquiclude

Table 1.2
Soil Borings and Well Abandoned 2004 - 2006
Within the Fort Ord Natural Reserve

Identification	Year Abandoned
SB-OU1-2004-I	2004
SB-OU1-2004-J	2004
SB-OU1-2004-K	2004
SB-OU1-2004-L	2004
SB-OU1-2004-M	2004
SB-OU1-46-AD1	2005
SB-OU1-60-A	2005
EW-OU1-48-A	2006

Notes:

EW - extraction well

OU1 - Operable Unit 1

SB - soil boring

Table 1.3
Summary of 2010 Groundwater Long-Term Monitoring Program

Well Identification	Groundwater Sampling Events*				
	Mar-10	May-10	Jun-10	Sep-10	Dec-10
MW-OU1-46-AD	X	--	X	X	X
EW-OU1-60-A	X	--	X	X	X
EW-OU1-62-A	--	--	--	--	--
EW-OU1-63-A	--	--	--	--	--
EW-OU1-66-A	X	--	X	X	X
EW-OU1-71-A	X	--	X	X	X
MW-OU1-85-A	X	--	X	X	X
MW-OU1-87-A	X	--	X	X	X
IW-OU1-01-A	X	--	--	X	--
MW-OU1-01-A	no longer sampled				
IW-OU1-02-A	X	--	--	X	--
MW-OU1-02-A	no longer sampled				
MW-OU1-03-A	no longer sampled				
MW-OU1-04-A	X	--	--	X	--
MW-OU1-05-A	water level only				
MW-OU1-06-A	no longer sampled				
MW-OU1-07-A	no longer sampled				
MW-OU1-08-A	--	--	--	X	--
MW-OU1-09-A	--	--	--	--	--
IW-OU1-10-A	X	--	--	X	X
MW-OU1-10-A	no longer sampled				
PZ-OU1-10-A1	--	--	--	X	X
MW-OU1-11-SVA	no longer sampled				
IW-OU1-13-A	water level only				
EW-OU1-17-A	no longer sampled				
EW-OU1-18-A	no longer sampled				
MW-OU1-19-A	--	--	--	X	--
MW-OU1-20-A	--	--	--	X	--
MW-OU1-21-A	no longer sampled				
MW-OU1-22-A	X	--	--	X	--
MW-OU1-23-A	X	--	--	X	--
IW-OU1-24-A	no longer sampled				
MW-OU1-24-AR	water level only				
IW-OU1-25-A	no longer sampled				
MW-OU1-25-A	--	--	--	X	--
MW-OU1-26-A	X	--	--	X	--
MW-OU1-27-A	--	--	--	X	--
MW-OU1-28-A	water level only				
MW-OU1-29-A	water level only				
MW-OU1-30-A	water level only				
MW-OU1-31-A	no longer sampled				

Table 1.3
Summary of 2010 Groundwater Long-Term Monitoring Program

Well Identification	Groundwater Sampling Events*				
	Mar-10	May-10	Jun-10	Sep-10	Dec-10
MW-OU1-32-A	no longer sampled				
MW-OU1-33-A	no longer sampled				
MW-OU1-34-A	no longer sampled				
PZ-OU1-35-A	no longer sampled				
MW-OU1-36-A	no longer sampled				
MW-OU1-37-A	no longer sampled				
MW-OU1-38-A	no longer sampled				
MW-OU1-39-A	--	--	--	--	--
MW-OU1-40-A	water level only				
MW-OU1-41-A	water level only				
MW-OU1-42-A	no longer sampled				
MW-OU1-43-A	water level only				
MW-OU1-44-A	no longer sampled				
MW-OU1-45-A	water level only				
MW-OU1-46-A	water level only				
EW-OU1-47-A	water level only				
EW-OU1-48-A	no longer sampled				
EW-OU1-49-A	water level only				
PZ-OU1-49-A1	X	--	--	X	--
MW-OU1-50-A	X	--	--	X	--
MW-OU1-51-A	water level only				
EW-OU1-52-A	X	--	--	X	--
EW-OU1-53-A	X	--	--	X	--
EW-OU1-54-A	no longer sampled				
EW-OU1-55-A	no longer sampled				
MW-OU1-56-A	water level only				
MW-OU1-57-A	--	X	--	X	--
MW-OU1-58-A	--	X	--	X	--
MW-OU1-59-A	water level only				
MW-OU1-61-A	X	--	--	X	--
MW-OU1-64-A1	water level only				
MW-OU1-64-A2	water level only				
MW-OU1-65-A	water level only				
MW-OU1-67-A	--	--	--	X	--
MW-OU1-68-A	water level only				
MW-OU1-69-A2	X	--	--	X	--
MW-OU1-70-A	X	--	--	X	--
EW-OU1-72-A	X	--	--	X	--
IW-OU1-73-A	water level only				
IW-OU1-74-A	water level only				
MW-OU1-82-A (MW-G)	X	--	--	X	--

Table 1.3
Summary of 2010 Groundwater Long-Term Monitoring Program

Well Identification	Groundwater Sampling Events*				
	Mar-10	May-10	Jun-10	Sep-10	Dec-10
MW-OU1-83-A (MW-F)	--	--	--	X	--
MW-OU1-84-A (MW-E)	--	--	--	X	--
MW-OU1-86-A (MW-C)	X	--	--	X	--
MW-OU1-88-A (MW-A)	X	--	--	X	--
MW-B-10-A	--	--	--	X	--
MW-OU1-ERD-01-A	no longer sampled				
MW-OU1-ERD-02-A	water level only				
MW-OU1-ERD-03-A	no longer sampled				
MW-OU1-ERD-04-A	no longer sampled				
MW-OU1-ERD-05-A	no longer sampled				
MW-OU1-ERD-06-A	no longer sampled				
MW-OU1-ERD-07-A	water level only				
MW-OU1-ERD-08-A	water level only				
IW-OU1-ERD-01-A	no longer sampled				
IW-OU1-ERD-02-A	no longer sampled				
IW-OU1-ERD-03-A	no longer sampled				
IW-OU1-ERD-04-A	no longer sampled				

Notes:

* includes sampling of extraction wells

Italicized well name indicates the well is not located within the Fort Ord Natural Reserve.

Identification in parantheses indicates temporary well name used in early planning documents.

X - sample collected

-- no sample collected

ERD - enhanced reductive dechlorination

EW - extraction well

IW - injection well

SVA - Salinas Valley Aquiclude

OU1 - Operable Unit 1

MW - monitoring well

PZ - piezometer

Approximate Scale

0 2 4

Miles

Y:\Fort_Ord\OM9\TO_201\FONR_Impact_2010\(1-01)location_map.mxd
1/19/2011 rbemrich
Map Source: MS MapPoint

HGL HydroGeoLogic, Inc

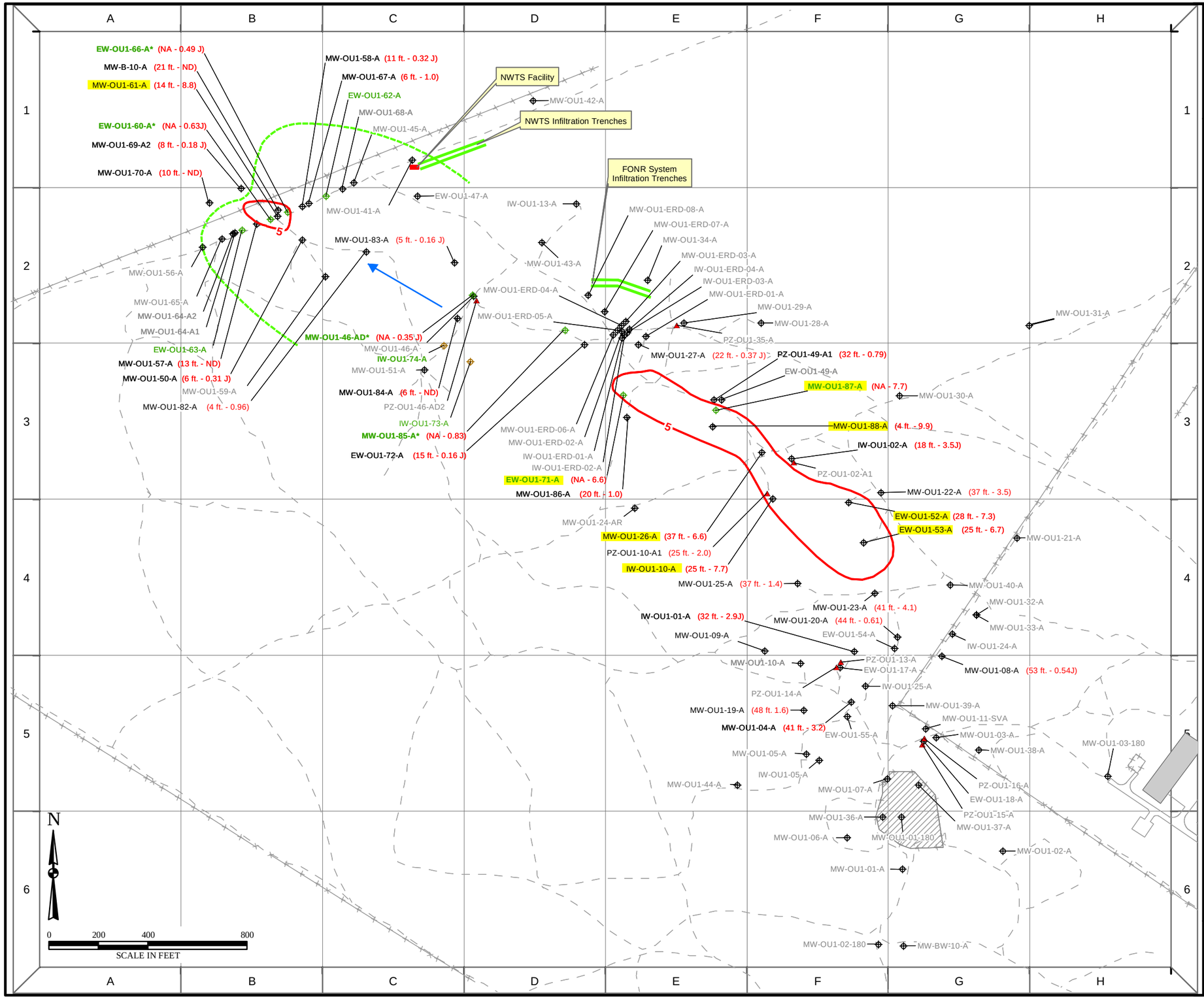
Legend

OU-1 Treatment Plant

Former Fort Ord Boundary

Figure 1.1
Former Fort Ord
Location Map

Figure 1.2
OU-1 FONR
TCE Concentrations in Groundwater
September 2010



Legend

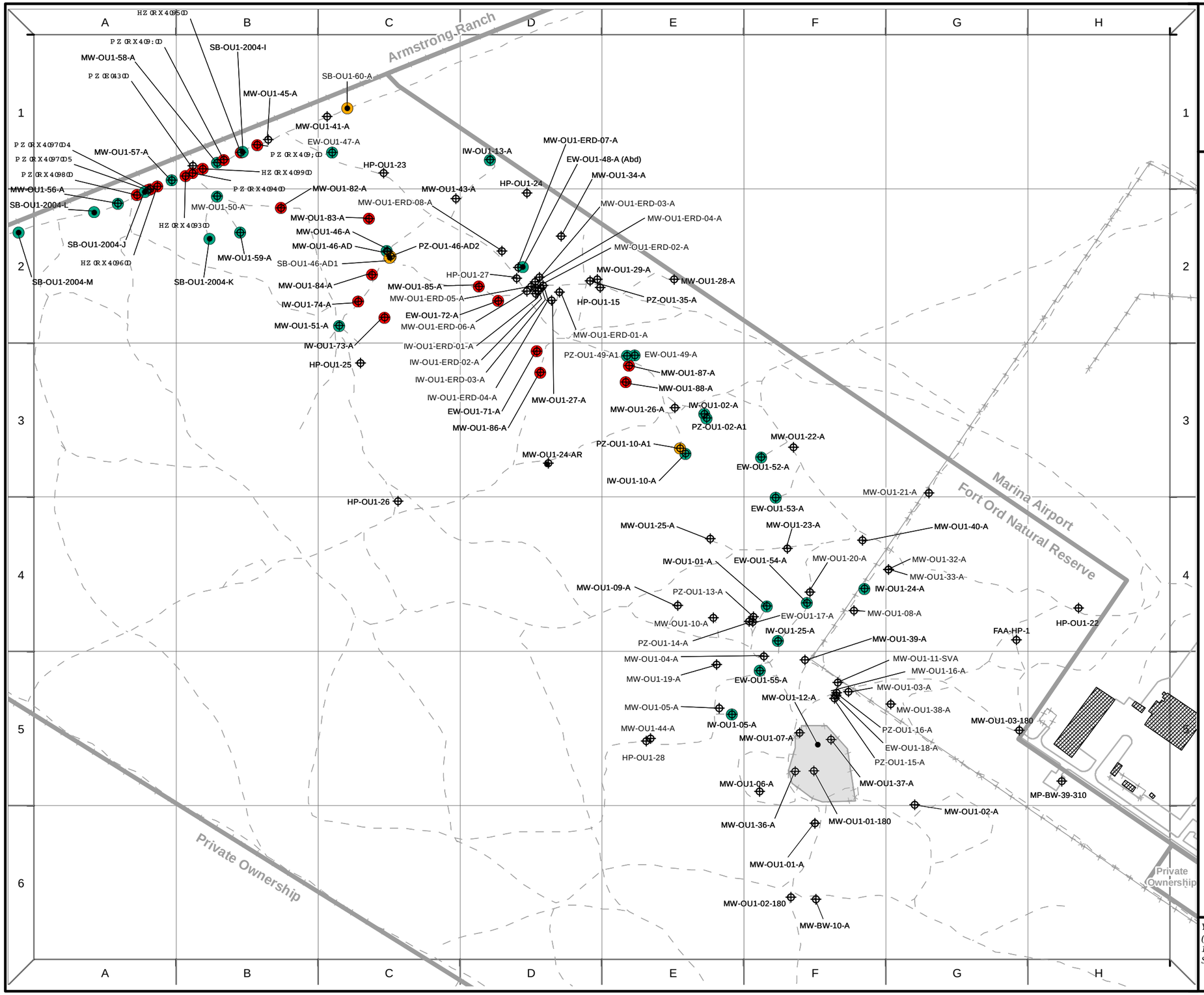
- Monitoring Well
- Extraction Well
  Bold green font indicates active well
- Injection Well
  Bold green font indicates active well
- Piezometer
- MW-OU1-88-A — Locations With September 2010 TCE Concentration At Or Above ACL (5 µg/L)
- 5 — TCE Contour (µg/L)
  Based on September 2010 Data
- MW-OU1-88-A (4 ft. - 7.0) — Well ID; September 2010 TCE Result (µg/L); Sample Elevation (feet above mean sea level)
- Trail/Unimproved Road
- Fence
- Treated Water Infiltration Trench
- Estimated Northwest Treatment System Capture Zone
- Former Fire Drill Area
- General Direction of Groundwater Flow

Notes:
Units of TCE concentrations are in ppb
ND = Nondetect
NA = Depth is not applicable - sample is from pumping well
J = Estimated Value
µg/L = Micrograms per liter
Wells shown with an asterisk were not used to develop contour boundaries.
Active extraction wells were typically not included because the data is not location-specific. Data from extraction wells EW-OU1-71-A and MW-OU1-87-A were used to infer the 5 µg/L TCE contour because the results at those wells suggest higher TCE concentrations nearby.
PZ-OU1-10-A1 was not used in the TCE contouring because nearby IW-OU1-10-A values were higher.
Well names appearing in gray were not included in the OU1-Groundwater Monitoring Program.
Wells for which no data are posted were not sampled.

Y:\Fort_Ord\OM9\TO_201\FONR_Impact_2010\(1-02)TCE_in_GW_September_2010_v2.mxd
1/20/2011 jpetermann
Source: HydroGeoLogic, Inc.

HydroGeoLogic, Inc

Figure 1.3
OU-1 Soil Borings, Wells, and Piezomenters Constructed Within the FONR

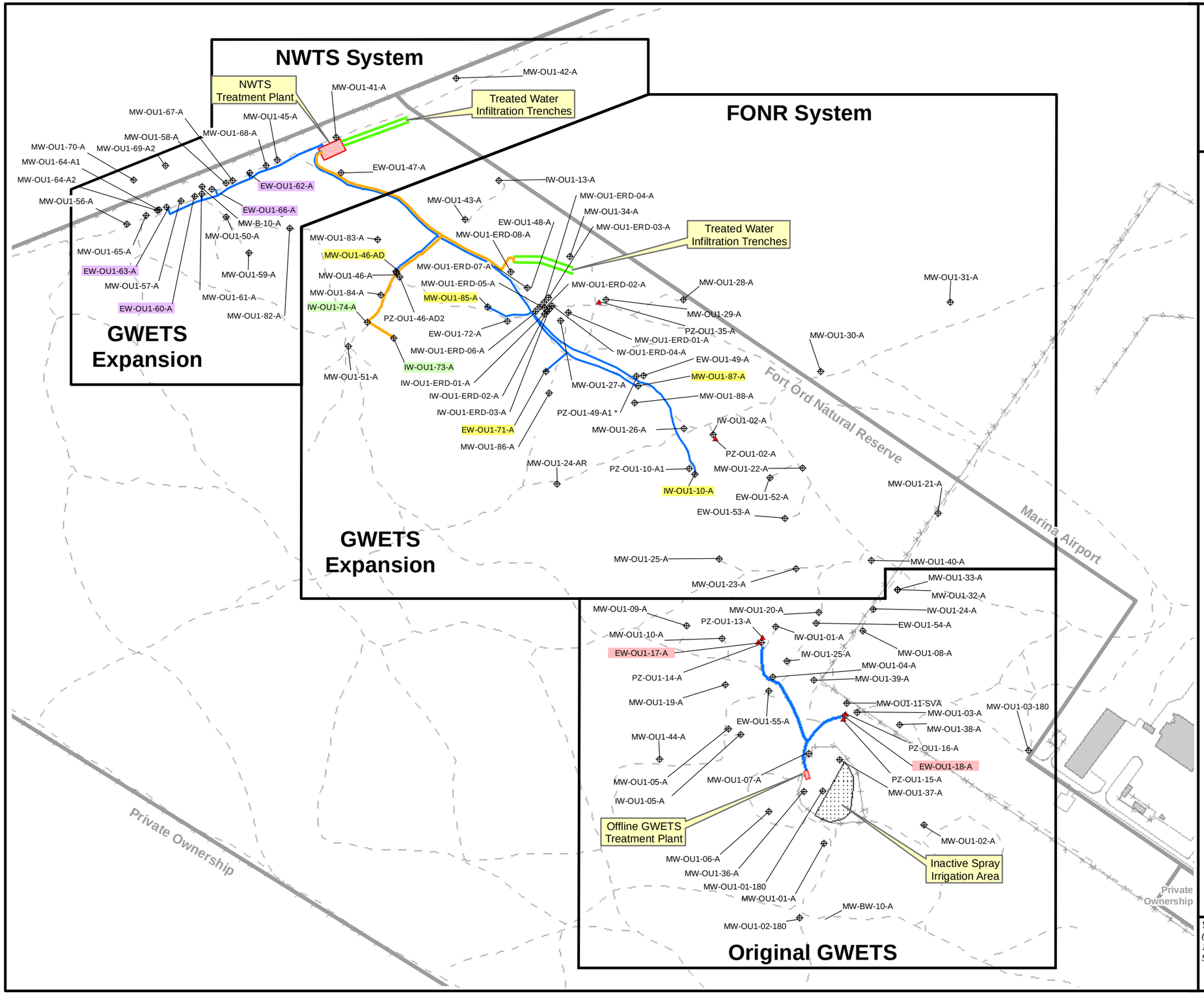


Legend

- Well/Piezometer Drilled Before 2004
- Abandoned Soil Boring/Well/Piezometer
- 2004 Well/Piezometer
- 2004 Soil Boring
- 2005 Well/Piezometer
- 2005 Soil Boring
- 2006 Well/Piezometer
- 2006 Soil Boring
- Trail/Unimproved Road
- Fence
- Fire Drill Area (FDA)

Y:\Fort_Ord\OM9\TO_201\FONR_Impact_2010\(1-03)FONR_Sampling.mxd
1/20/2011 jpetermann
Source: HydroGeoLogic, Inc.

Figure 1.4
Former Fort Ord Natural Reserve (FONR)
Remediation System Areas



Legend

- Monitoring Well
- EW-OU1-18-A — Original GWETS Extraction Well
- SIW 36061 — FONR Injection Well
- MW-OU1-46-AD — FONR Extraction Well
- EW-OU1-63-A — NWTS Extraction Well
- Piezometer
- Trail/Unimproved Road
- Fence
- Extraction Pipeline
- Treated Water Pipeline
- Treatment Plant

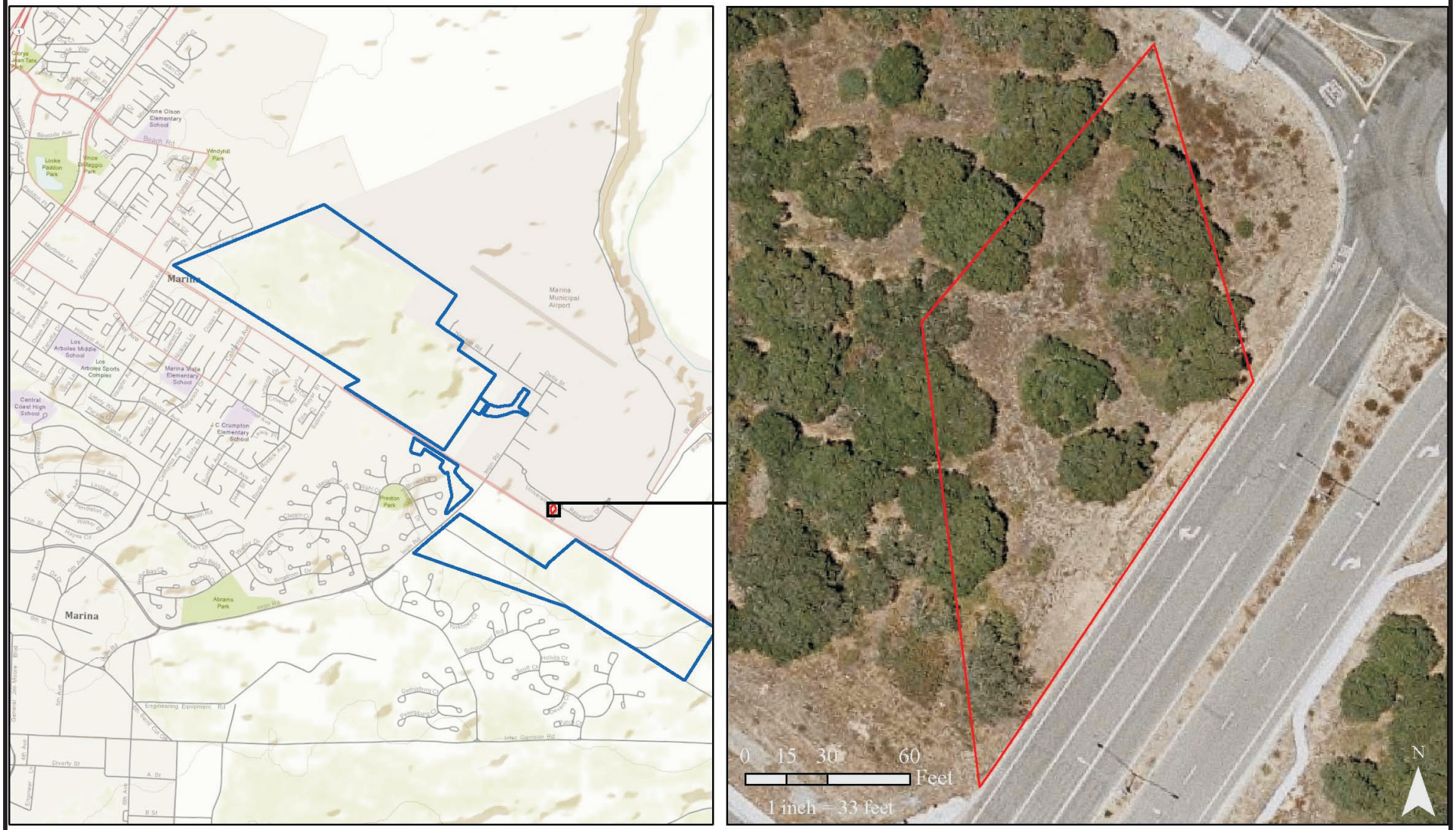
Notes:
NWTS = Northwest Treatment System
FONR = Fort Ord Natural Reserve
GWETS = Groundwater Extraction and Treatment System
The treated water and extraction water pipelines are located in separate trenches within or near the existing roadway. The separation shown in this figure is exaggerated for clarity.
Extraction well EW-OU1-63-A has been disconnected from the treatment system pending completion of the remediation effort.

N

0 200 400 800
SCALE IN FEET

Y:\Fort_Ord\OM9\TO_201\FONR_Impact_2010
(1-04)GW_Remediation _Sys.mxd
1/25/2011 jpetermann
Source: HydroGeoLogic, Inc.

HGL HydroGeoLogic, Inc



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01/19/2011 rbemrich
Revised 01/20/2011 JP
Source: HydroGeoLogic, Inc.; DD&A

HydroGeoLogic, Inc

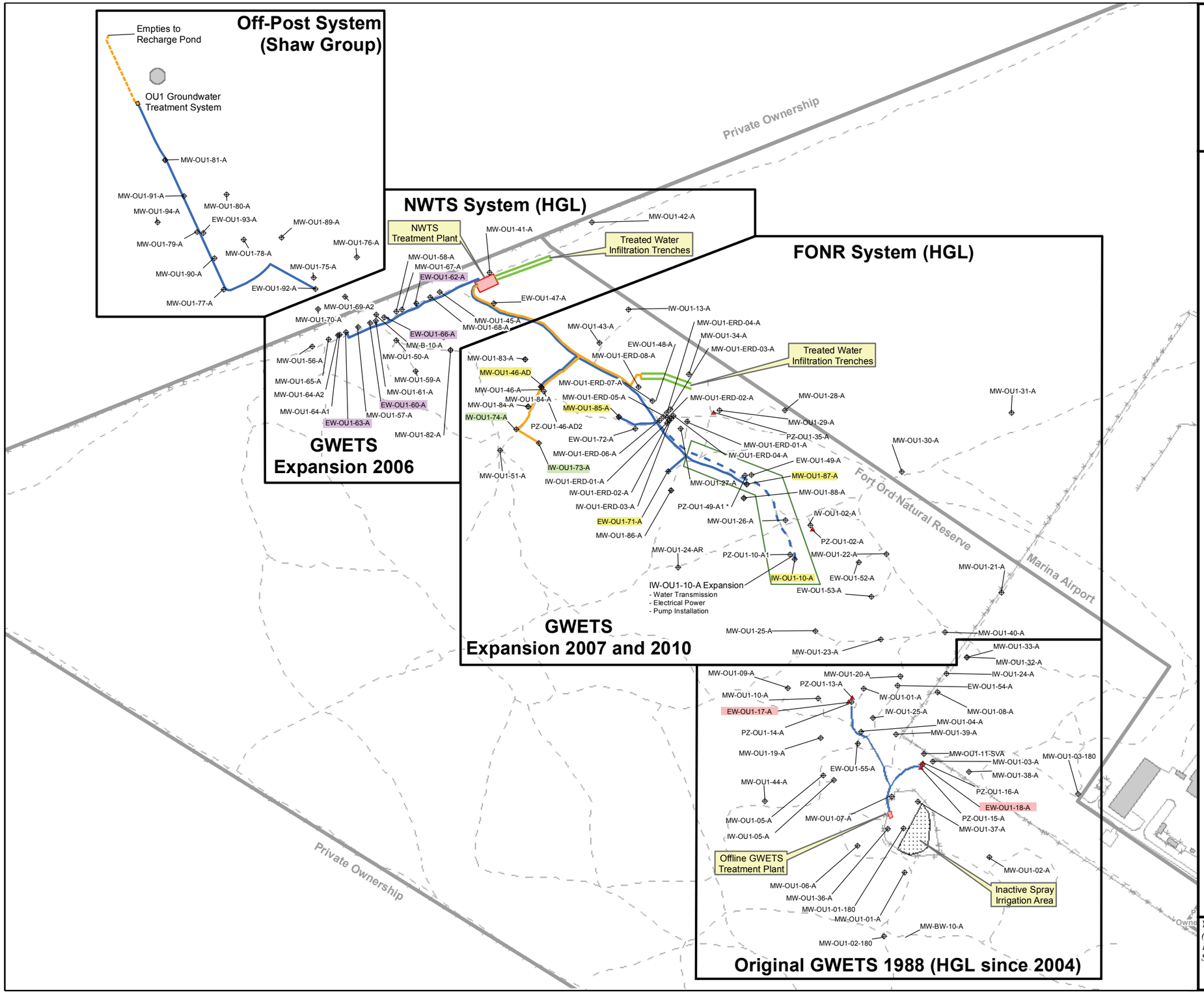
Legend

Survey Area

UC FONR Boundary

Figure 1.5
Reference Site Surveyed for FONR OU-1
2010 Rare Plant Survey

Figure 1.6
Former Fort Ord Natural Reserve (FONR) Remediation System Areas



Legend

- Monitoring Well
- EW-OU1-18-A — Original GWETS Extraction Well
- SIW 36061 — FONR Injection Well
- MW-OU1-46-AD — FONR Extraction Well
- EW-OU1-63-A — NWTS Extraction Well
- Piezometer
- Trail/Unimproved Road
- Fence
- Discharge Pipe
- IW-OU1-10-A Pipeline
- Extraction Pipeline
- Treated Water Pipeline
- Treated Water Infiltration Trench
- Treatment Plant

Notes:
NWTS = Northwest Treatment System
FONR = Fort Ord Natural Reserve
GWETS = Groundwater Extraction and Treatment System
The treated water and extraction water pipelines are located in separate trenches within or near the existing roadway. The separation shown in this figure is exaggerated for clarity.

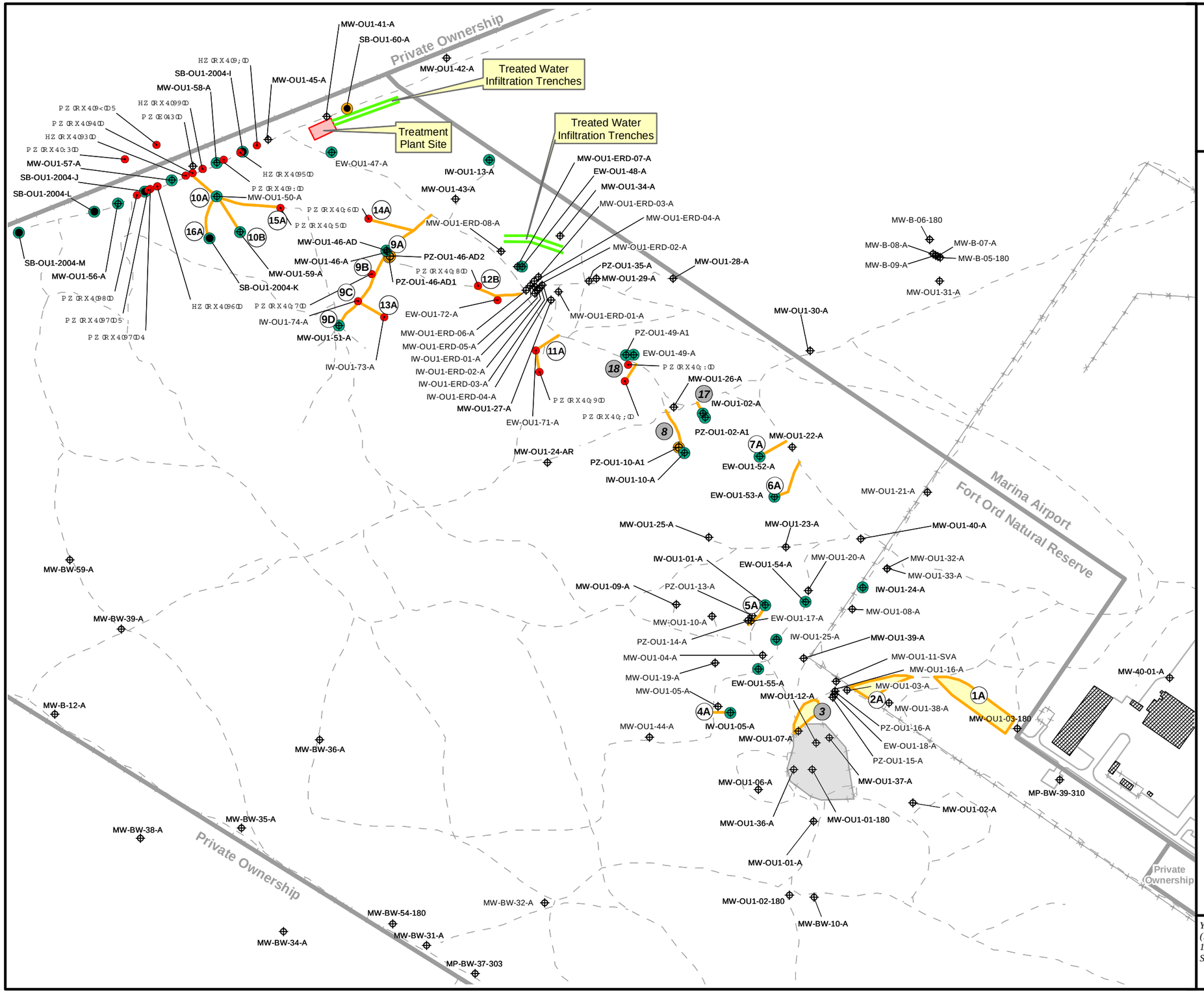
N

0 150 300 600
SCALE IN FEET

Y:\Fort_Ord\OM9\TO_201\FONR_Impact_2010\(1-06)GW_Remediation _Sys.mxd
1/25/2011 jpetermann
Source: HydroGeoLogic, Inc.

HydroGeoLogic, Inc

Figure 1.7
Year 2010
Weed Control Segment Locations



Legend

- MW-OU1-31-A — Well/Piezometer Drilled Before 2004
- Abandoned Soil Boring
- 2004 Drilling
- 2005 Drilling
- 2006 Drilling
- Trail/Unimproved Road
- Weed Control Segment
- Fence
- Fire Drill Area (FDA)
- Southern Staging Area in 2004
- (1) 2010 Weed Control Segment Identification Number
- (*1*) Weed Control Segment Addressed in Previous Years

N

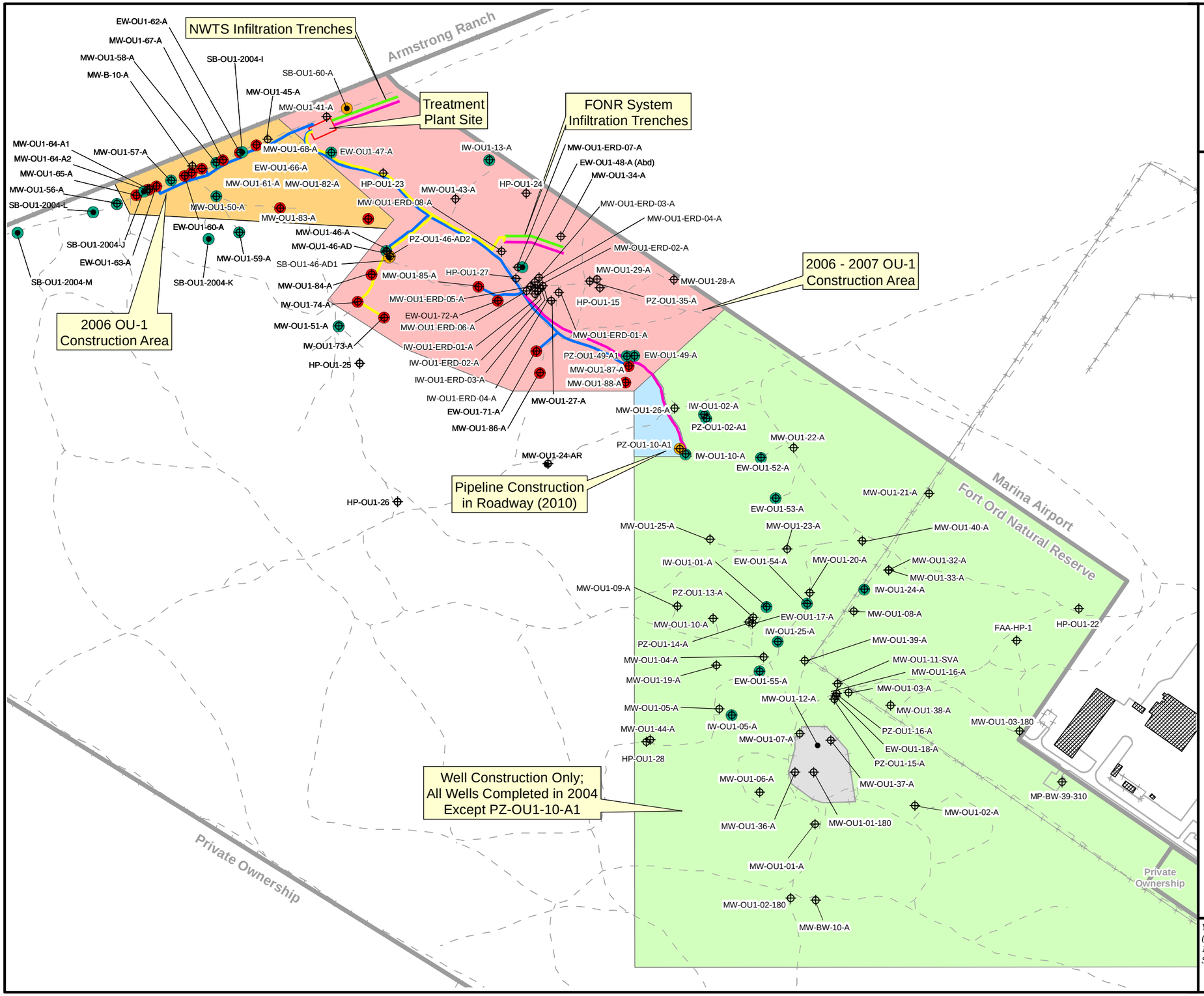
0 200 400 800

SCALE IN FEET

Y:\Fort_Ord\OM9\TO_201\FONR_Impact_2010
(1-07)Weed_Control_2009.mxd
1/20/2011 jpetermann
Source: HydroGeoLogic, Inc.

HydroGeoLogic, Inc

Figure 4.1
OU-1 Construction Activity 2004-2010



Legend

- Well/Piezometer Drilled Before 2004
- Abandoned Soil Boring/Well/Piezometer
- 2004 Well/Piezometer
- 2004 Soil Boring
- 2005 Well/Piezometer
- 2005 Soil Boring
- 2006 Well/Piezometer
- 2006 Soil Boring
- IW-OU1-10-A Pipeline Route
- Extraction Pipeline
- Infiltration Trench
- Treated Water Pipeline
- Trail/Unimproved Road
- Fence
- Fire Drill Area (FDA)

Note:
FONR = Fort Ord Natural Reserve
NWTS = Northwest Treatment System
The treated water and extraction water pipelines are located in separate trenches within or near the existing roadway. The separation shown in this figure is exaggerated for clarity.

N

0 200 400 800

SCALE IN FEET

Y:\Fort_Ord\OM9\TO_201\FONR_Impact_2010
(4-01)Constr_Activity.mxd
1/25/2011 jpetermann
Source: HydroGeoLogic, Inc.

HydroGeoLogic, Inc

2010 FONR IMPACT ASSESSMENT AND HABITAT AND RARE PLANT SPECIES SURVEY RESULTS FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

Appendix A
Results of 2010 Monterey Spineflower and Sand Gilia Surveys

Results of 2010 Monterey Spineflower and Sand Gilia Surveys

DD&A Reference Site, California

Prepared for HydroGeoLogic Inc.

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Prepared By Denise Duffy and Associates, Inc.

TABLE OF CONTENTS

List of Figures

List of Tables

A1.0 Introduction

HydroGeoLogic, Inc. (HGL) is executing a groundwater remediation project at Operable Unit (OU)-1 at the former Fort Ord U.S. Army Base located in Monterey County, California. This work was awarded in December 2003 by the U.S. Army Corps of Engineers (USACE)-Sacramento District under Contract Number DACA45-03-D-0029; it is being administered by the USACE-Sacramento District.

Fort Ord was established in 1917 as a military training base for infantry troops. In January 1991, the Secretary of Defense announced the downsizing/closure of the base. In August 1994, portions of the property were transferred to the University of California and the Fort Ord Natural Reserve (FONR) was established in June 1996. The former Fort Ord is located near Monterey Bay approximately 80 miles south of San Francisco (Figure A1.1). The base consists of approximately 28,000 acres near the cities of Seaside, Sand City, Monterey, Del Rey Oaks, and Marina. Monterey Bay marks the western boundary, Toro Regional Park borders the base to the southeast and land use east is primarily agricultural.

Activities conducted at the former Fort Ord Fritzsche Army Airfield Fire Drill Area (FDA) (i.e., OU-1) between 1962 and 1985 resulted in the release of contaminants to soils and groundwater. Although 10 separate volatile organic compounds (VOCs) were identified as contaminants of concern in groundwater underlying OU-1, trichloroethene (TCE) is the contaminant that was detected at the highest concentrations and across the greatest extent of the affected aquifer. A groundwater extraction and treatment system (GWETS) was constructed in 1988 to remediate TCE and other groundwater contaminants.

A key factor affecting the design and implementation of the groundwater cleanup is the fact the groundwater plume lies beneath a part of the University of California Natural Reserve System (UCNRS) designated as the FONR. The FONR area potentially impacted by the construction of OU-1 remediation facilities is approximately 130 acres. Therefore, the project has the additional constraint that activities undertaken to achieve the OU-1 cleanup adequately protect and maintain the special-status species found within the FONR, specifically two federally listed plant species, Monterey spineflower (*Chorizanthe pungens* var. *pungens*) and sand gilia (*Gilia tenuiflora ssp. arenaria*).

A1.1 Survey Objectives

The objectives of the 2010 rare plant survey were to: 1) identify locations and estimate rare plant populations at an identified reference site utilized by Denise Duffy and Associates (DD&A) biologists to determine the blooming period for Monterey spineflower and sand gilia; and 2) to map Monterey spineflower and sand gilia. The DD&A reference site location is shown on Figure A1.2.

A1.2 Site Location and Description

Coast live oak woodland is the dominant habitat in the reference area. Grassland and coast live oak woodland is adjacent to the reference site on the northwestern boundary. All other sides of the reference area are bordered by developed roads (Reservation Road, Mbest Drive and University Drive). Non-native grasses and weedy forbs are already present throughout much of the reference area. The spread of non-native, invasive species into newly disturbed areas might result in population declines of Monterey spineflower and, especially, sand gilia, which is less tolerant of plant cover than Monterey spineflower.

A1.1.1 Sand Gilia

Sand gilia is a small annual in the phlox family (Polemonaceae). Plants range in height from two to six inches with a small, basal rosette of leaves. The lower branches of the stem are generally densely glandular. Plants typically bloom from April through June and have funnel-shaped flowers with narrow, purple to pinkish petal lobes and a purple throat. This species occurs in open sandy soils in dune scrub, coastal sage scrub, and maritime chaparral habitats. Sand gilia is endemic to Monterey Bay and the peninsular dune complexes. A search of the California Natural Diversity Database (CNDDB) revealed that there are 28 occurrences within Monterey County, including the occurrences at Fort Ord (CDFG 2010). It is likely that some of these occurrences are no longer present and the exact number of extant (still in existence) occurrences are unknown.

A1.1.2 Monterey Spineflower

Monterey spineflower is a small, prostrate annual in the buckwheat family (Polygonaceae) that blooms from April to June. The white to rose floral tube of Monterey spineflower distinguishes it from the more common, but closely related diffuse spineflower (*Chorizanthe diffusa*), which has a lemon-yellow floral tube. This species typically occurs on open sandy or gravelly soils in coastal dune, coastal scrub, and maritime chaparral habitats. There are 20 records of Monterey spineflower within Monterey County in the CNDDB (CDFG 2010); however, it is not known how many of these are extant.

A2.0 Methods

The survey area consisted of the DD&A reference site outlined in Figure A1.2. The area was surveyed for rare plants Monterey spineflower and sand gilia completely on one survey effort conducted on April 16, 2010.

A2.1 Rare Plant Surveys

The survey for sand gilia and Monterey spineflower was conducted by a DD&A biologist and GPS technician on April 16, 2010.

When a rare plant was identified, the survey in that area was extended to the boundary of the population encountered.

Mapping of rare plant species was done using a Trimble Pathfinder ProXH GPS unit. Large areas of Monterey spineflower and sand gilia were mapped as polygons; smaller groups and individuals were mapped as points with attributes to identify the number of individuals at each location.

Individual counts were made for all sand gilia populations whether they were mapped using points (population < 10) or polygons (population ≥ 10). However, Monterey spineflower were only counted as individuals when groups of less than five were mapped. Monterey spineflower mapped as polygons were characterized according to the percent of cover. The categories ranged from Very Sparse (corresponding to an absolute cover of less than 3 percent), Sparse (3-25 percent), Medium Low (26-50 percent), Medium (51-76 percent), and Medium High (76-97 percent) to Very High (>97-100 percent). GPS data was exported to shapefile format for use in a Geographic Information System (ESRI ArcGIS) and mapped on high resolution aerial photography. The map is represented in Figure A3.1.

A3.0 Results

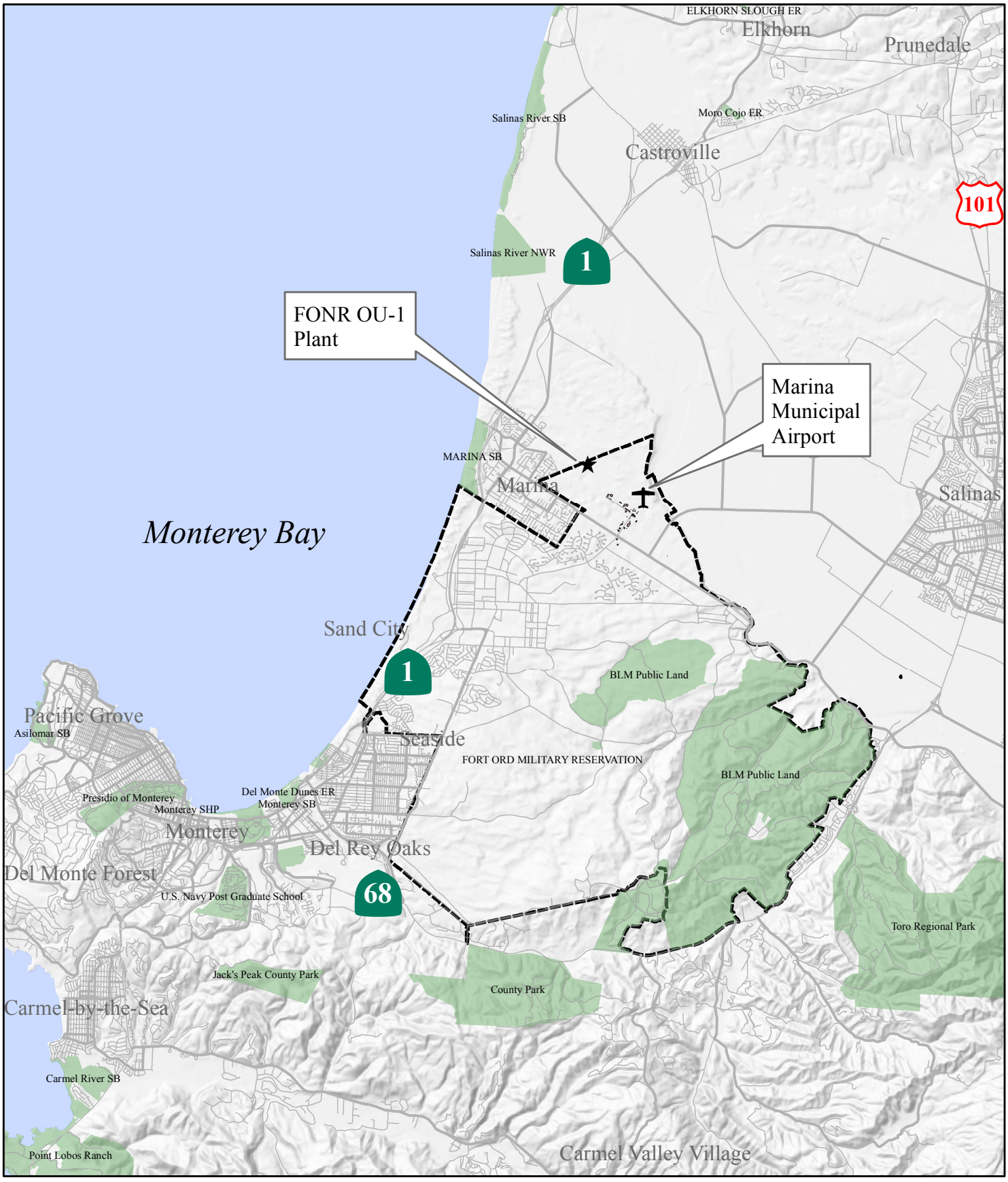
A3.1 Rare Plant Survey Results

A3.1.1 Sand Gilia

Sand gilia was observed and mapped at the DD&A reference site. A total of 14 populations (seven polygons and seven points) of sand gilia were mapped within the DD&A reference area survey boundaries (Table A3.1 and Figure A3.1). A total of 1086 individual plants were mapped at the 14 populations.

A3.1.2 Monterey Spineflower

A total of two populations (two polygons) of Monterey spineflower were mapped at the DD&A reference site (Table A3.2 and Figure A3.1). Because population size estimates are not as easily quantified as the sand gilia populations, individual Monterey spineflower plants were not counted within the GIS polygons. As mentioned in the methods section of this document, populations of Monterey spineflower were given a percentage of cover using visual estimation. Of the two populations of Monterey spineflower that were mapped as polygons, one population had Medium-Low (26-50 percent) cover class and one population had a Sparse cover class (3-25 percent).



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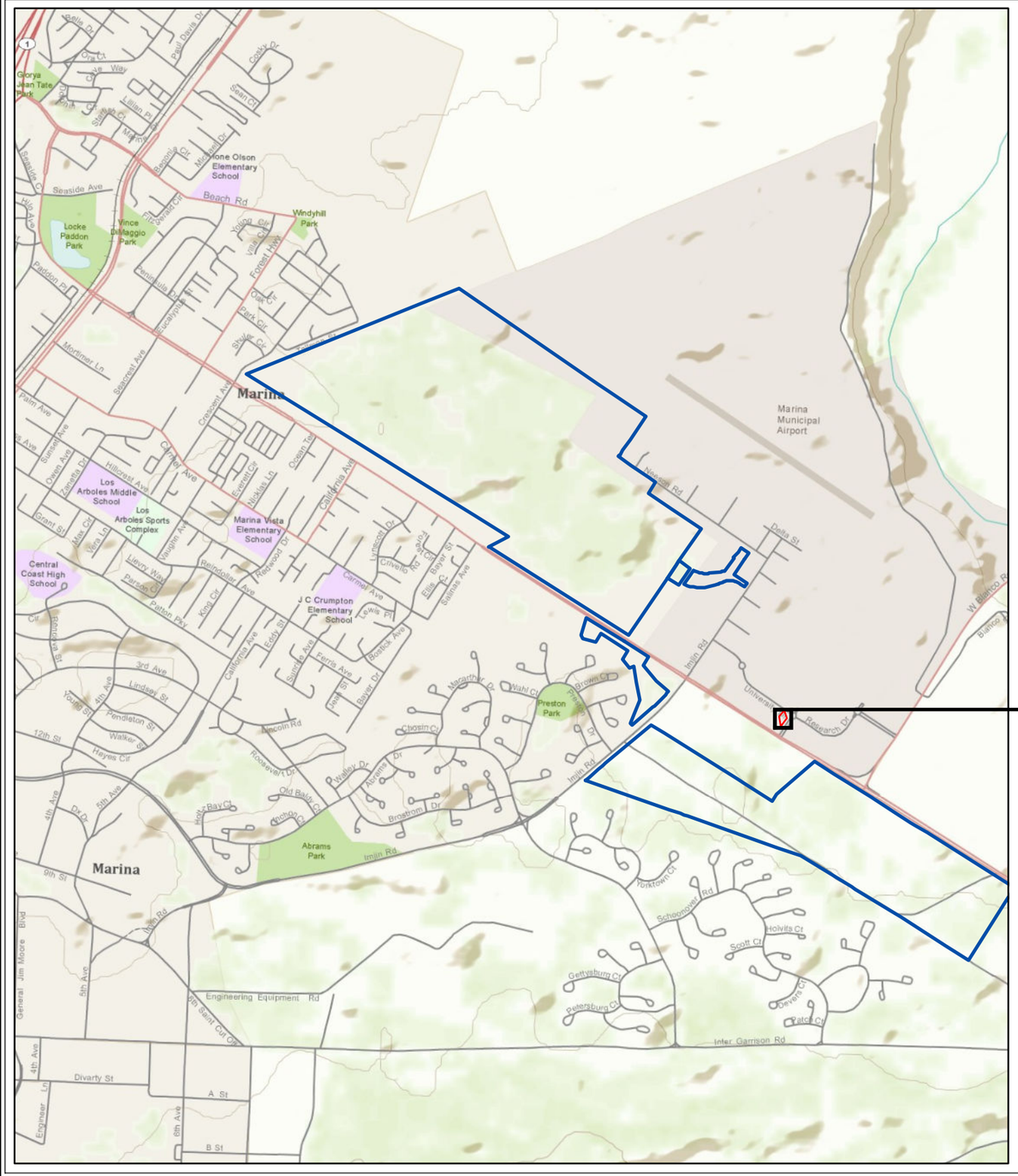
0 1.25 2.5 5 Miles

0 2.5 5 10 Kilometers

Figure A1.1

Project Vicinty Map



Survey Area

UC FONR Boundary

Figure A1.2

DD&A Reference Site Map

Monterey Spineflower Polygons

Sparse

Medium-Low

Sand Gilia Points

Sand Gilia Polygons

Survey Area

Figure A3.1

2010 Rare Plant Survey Results
DD&A Reference Area

Table A3.1 Sand Gilia Populations Identified During 2010 Survey

FONR Location	Population #	Number of Individuals	GIS Feature Type	Survey Date	Figure Number
DD&A Reference Site	1	4	Point	4/16/2010	**A3.1**
DD&A Reference Site	2	2	Point	4/16/2010	**A3.1**
DD&A Reference Site	3	3	Point	4/16/2010	**A3.1**
DD&A Reference Site	4	1	Point	4/16/2010	**A3.1**
DD&A Reference Site	5	4	Point	4/16/2010	**A3.1**
DD&A Reference Site	6	1	Point	4/16/2010	**A3.1**
DD&A Reference Site	7	3	Point	4/16/2010	**A3.1**
DD&A Reference Site	8	803	Polygon	4/16/2010	**A3.1**
DD&A Reference Site	9	49	Polygon	4/16/2010	**A3.1**
DD&A Reference Site	10	48	Polygon	4/16/2010	**A3.1**
DD&A Reference Site	11	133	Polygon	4/16/2010	**A3.1**
DD&A Reference Site	12	6	Polygon	4/16/2010	**A3.1**
DD&A Reference Site	13	6	Polygon	4/16/2010	**A3.1**
DD&A Reference Site	14	23	Polygon	4/16/2010	**A3.1**

Table A3.2 Monterey Spineflower Populations Identified During 2010 Survey

FONR Location	Population #	Number of Individuals or Percent Cover	Cover Class	Survey Date	Figure Number
DD&A Reference Site	15	50	Medium-Low	4/16/2010	**A3.1**
DD&A Reference Site	16	15	Sparse	4/16/2010	**A3.1**

2010 FONR IMPACT ASSESSMENT AND HABITAT AND RARE PLANT SPECIES SURVEY RESULTS FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

Appendix B
Report on Weed Control Segment Treatments Spring 2010

OPERABLE UNIT 1 (OU-1)

2010 WEED CONTROL SEGMENT TREATMENT REPORT

UNIVERSITY OF CALIFORNIA - FORT ORD NATURAL RESERVE

SPRING 2010

Prepared for:

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TABLE OF CONTENTS

TABLES

ATTACHMENTS

Introduction

Weed control efforts continued on HydroGeoLogic, Inc. (HGL) work sites within the Operable Unit 1 (OU-1) portion of the Fort Ord Natural Reserve (FONR) in 2010. Weed control work was similar to the 2009 efforts and emphasized control of non-native grasses before they established in habitat disturbed by groundwater clean-up activities. Comprehensive vegetation surveys (e.g. species composition and cover data) of Weed Control Segments (WCS) were not conducted in 2010, which is consistent with the 2008 and 2009 weed control efforts. It is our opinion that these comprehensive vegetation surveys are not necessary each year. Rather, vegetation surveys are intended to evaluate success of WCS treatments, which might not be evident within one year. This report summarizes the 2010 weed control efforts, data collection and survey results.

Methods

WCS treatments began 9 March 2010 and continued through 6 October 2010. Each WCS received between 1-3 treatments (weedeater and hand pulling) depending on site-specific phenology, response to treatments, and species composition. Two WCS were treated three times, 14 WCS were treated twice, and six WCS (5A, 6A, 7A, 13A, 14A, 15A) received only one treatment. Prior to the initial treatment, rare plant surveys were conducted within each WCS. In addition, pre-treatment photos were taken from photo stations within each WCS. After performing a treatment, a WCS treatment record and a WCS treatment diagram were completed. The WCS treatment record includes: treatment date, treatment method(s), species treated, treatment duration, photo stations, and any additional notes about the site or treatment. The WCS treatment diagram includes the extent of the treatment and the species treated within the site. These diagrams, although not drawn to scale, also show the spatial extent, well location, well site/road boundaries, and photo stations/points for each WCS. After performing the final treatment of the season, post-treatment photos were taken from appropriate photo stations within each WCS.

Results

The 2010 weed control program significantly reduced the survivorship, abundance, and seed production of target species in areas disturbed by OU-1 cleanup activities. Pre-treatment rare plant surveys (Attachment 2) identified locations of rare plants prior to treatments. Thus, we were able to avoid areas with protected species and ensure they were not negatively impacted by treatments. The results of the rare plant surveys (Table 3) show that sand gilia (*Gilia tenuiflora ssp. arenaria*) were present in 2 WCS (5A, 6A) and Monterey spineflower (*Chorizanthe pungens var. pungens*) were present in 18 WCS. Treatment details for each WCS are summarized in Tables 1 & 2. Along with this report, we have included the following documentation as attachments:

- treatment diagrams (described above; Attachment 1)
- rare plant survey data (Attachment 2)
- rare plant survey diagrams (Attachment 3)
- detailed photo log (Attachment 4)
- pre- & post treatment photos (Attachment 5 – on compact disc)

Discussion

Early spring implementation enabled us to implement control activities of non-native annual grasses and forbs. Both mechanical and hand control methods were utilized making the weed control efforts more effective and broad scale. Multiple treatments were focused on high priority sites, with prioritization based on habitat type, rare plant presence, and weed species composition. Pre-treatment rare plant surveys identified 37 m^2 of sand gilia occupied habitat and 874 m^2 of Monterey spineflower occupied habitat. These pre-treatment surveys are essential to ensure mechanical weed treatments do not have a negative impact on protected species. Because weed control efforts were initiated at the

appropriate time, we were able reduce seed production of a significant portion of non-native annual grasses in locations where control was critical (i.e. within or adjacent to chaparral and scrub habitat). The continued removal of invasive forbs resulted in a reduction of thousands of invasive weeds from the well sites that may have otherwise expanded their distribution into FONR and increased their seed bank in areas disturbed by OU-1 clean-up activities. It is difficult to determine with measureable certainty if the relatively low weed abundance observed this year is a result of annual variation, climate conditions, or effective weed control. However, we are confident the weed abatement efforts are having a positive impact on reducing weed populations on the OU-1 cleanup sites. As a result, our efforts have reduced the number of invasive plants and, very importantly, removed a large portion of the invasive weed seed source for 2011.

Table 1. Summary of Weed Control Segment (WCS) treatments, spring 2010.

WCS	Well ID	# of Treatments	Time (hrs)	Treatment Method	Species Treated	Rare Plants Present	WCS of High Concern**
1A	NA – Staging Area	2	3.8	weedeater	aica, avsp, brca, brdi, brmaru, ersp, hysp, ruac, vusp	Y	
4A	IW-OU1-05-A	2	3.1	weedeater	brmaru, vusp	Y	*
5A	IW-OU1-01-A	1	4.1	weedeater	aica, avsp, brca, brdi, brmaru, ersp, hysp, vusp	Y	*
6A	EW-OU1-53-A	1	5.1	weedeater, hand pull	aica, avsp, brdi, caed, hysp, sima, vusp	Y	*
7A	EW-OU1-52-A	1	2.35	weedeater	brdi, brmaru, vusp	Y	
8A	IW-OU1-10-A, PZ-OU1-10-A2	3	4.05	weedeater, hand pull	aica, anca, avsp, brca, brdi, brho, brimax, brmaru, coma, ersp, hysp, oxpe, ruac, sima, vusp	N	
9A	MW-OU1-46-A MW-OU1-46-AD PZ-OU1-46-AD2	2	8.1	weedeater, hand pull	aica, anar, avsp, brca, brdi, brho, brmaru, coma, ersp, hysp, vusp	Y	
9B	MW-OU1-84-A	2	6.6	weedeater, hand pull	aica, anar, avsp, brdi, brho, brmaru, coma, hysp, vusp	Y	
9C	MW-OU1-50-A	2	5.1	weedeater	avsp, brdi, brho, brmaru, ersp, hysp, vusp	Y	*
9D	MW-OU1-51-A	2	2.85	weedeater	aica, anca, avsp, brdi, brho, brmaru, capy, hysp, ruac, vusp	Y	*
10A	MW-OU1-50-A	2	3.85	weedeater	avsp, brdi, brmaru, ersp, hysp, ruac, vusp	Y	
10B	MW-OU1-59-A	2	2.6	weedeater, hand pull	aica, avsp, brdi, brmaru, capy, hysp, vusp	Y	
11A	IW-OU1-71-A	2	3.85	weedeater	aica, avsp, brdi, brho, brimax, brmaru, capy, ersp, hysp, oxpe, ruac, vusp	Y	
11B	EW-OU1-86-A	2	2.1	weedeater	aica, avsp, brdi, brimax, ersp, hovu, hysp, oxpe, ruac, vusp	N	
12A	EW-OU1-72-A	2	2.35	weedeater, hand pull	aica, brca, brdi, brimax, brmaru, coma, ersp, hysp, vusp	N	

WCS	Well ID	# of Treatments	Time (hrs)	Treatment Method	Species Treated	Rare Plants Present	WCS of High Concern**
12B	MW-OU1-85-A	2	2.85	weedeater	aica, avsp, brca, brdi, brimax, brmaru, ersp, hysp, ruac, vusp	Y	
13A	IW-OU1-73-A	1	2.35	weedeater	aica, avsp, brdi, brho, brimax, brmaru, hysp, vusp	Y	*
14A	MW-OU1-83-A	1	6.1	weedeater	aica, avsp, brdi, brho, brimax, brmaru, hysp, vusp	Y	*
15A	MW-OU1-82-A	1	2.35	weedeater	avsp, brdi, brca, brmaru, hysp, vusp	Y	*
16A	SB-OU1-2004-K	2	6.35	weedeater, hand pull	anar, anca, avsp, brdi, brca, brho, brmaru, capy, coma, hysp, sool, vusp	Y	*
17A	PZ-OU1-02-A IW-OU1-02-A	3	2.85	weedeater	anar, avsp, brdi, brmaru, hysp, vusp	N	
18A	MW-OU1-88A	2	2.85		aica, avsp, brdi, brho, brimax, brmaru, ersp, hysp, ruac, vusp	N	

**** WCS of High Concern**– this classification represents a subjective judgment based on a number of factors, including (among others) the number and frequency of treatments, observed response to treatments, and the species composition of the site.

Table 2. Invasive species treated within the 22 Weed Control Segments (WCS), spring 2010.

Genus	Species	Code	Common Name
Aira	*caryophyllea*	aica	slivery hair-grass
Anaglis	*arvensis*	anar	scarlet pimpernel
Anthriscus	*caucalis*	anca	bur-chervil
Avena	species	avsp	wild oat species (Note: species not identified – avsp includes both *Avena barbata* and *A. fatua*)
Briza	*maxima*	brimax	rattlesnake grass
Bromus	*catharticus*	brca	prairie grass
Bromus	*diandrus*	brdi	ripgut grass
Bromus	*hordeaceus*	brho	soft chess
Bromus	*madritensis ssp. rubens*	brmaru	red brome
Carpobrotus	*edulis*	caed	iceplant, hottentot fig
Carduus	*pycnocephalis*	capy	Italian thistle
Conium	*maculatum*	coma	poison hemlock
Erodium	species	ersp	Erodium species (Note: species not identified – ersp includes *Erodium botrys, Erodium brachycarpum, Erodium cicutarium* and *Erodium moschatum*)
Hordeum	*vulgare*	hovu	common barley
Hypochaeris	species	hysp	cats ear species (Note: species not identified – hysp includes both *Hypochaeris glabra* and *H. radicata)*
Oxalis	*pes-caprae*	oxpe	Bermuda buttercup
Rumex	*acetosella*	ruac	sheep sorrel
Silybum	*marianum*	sima	milk thistle
Sonchus	*oleraceus*	sool	common sowthistle
Vulpia	species	vusp	fescue species (Note: species not identified – vusp includes *Vulpia bromoides, V. myuros var. hirsute,* and *V. myuros var. myuros*)

Table 3. Summary Weed Control Segment (WCS) rare plant surveys, spring 2010.

WCS	Well ID	Rare Plant Species Present	# Patches within WCS	Total Occupied Area (m^2)	Patch Density/Coverage & Patch Area Sub-total
1A	Staging Area	*Chorizanthe pungens* var. *pungens*	1	2	1 patch Sparse / 2 m^2
2A	Staging Area	*Chorizanthe pungens* var. *pungens*	1	1	1 patch Very Sparse / 1 m^2
4A	IW-OU1-05-A	*Chorizanthe pungens* var. *pungens*	30	37	1 patch - High / 2 m^2 5 patches – Medium / 10 m^2 9 patches - Sparse / 10 m^2 15 patches - Very Sparse / 15 m^2
5A	IW-OU1-01-A	*Chorizanthe pungens* var. *pungens*	48	100	5 patches - High / 23 m^2 14 patches - Medium / 36 m^2 14 patches – Sparse / 26 m^2 15 patches Very Sparse / 15 m^2
		Gilia tenuiflora ssp. arenaria	2	2	1 patch – low / 1 m^2 1 patch – very low / 1 m^2
6A	EW-OU1-53-A	*Chorizanthe pungens* var. *pungens*	26	38	8 patches - Sparse / 16 m^2 18 patches - Very Sparse / 22 m^2
		Gilia tenuiflora ssp. arenaria	23	35	1 patch – Very High / 4 m^2 2 patches – High / 7 m^2 2 patches – Medium / 5 m^2 9 patches – Low / 10 m^2 9 patches Very Low / 9 m^2
7A	EW-OU1-52-A	*Chorizanthe pungens* var. *pungens*	9	9	5 patches - Sparse / 5 m^2 4 patches - Very Sparse / 4 m^2
9A	MW-OU1-46-A MW-OU1-46-AD PZ-OU1-46-AD2	*Chorizanthe pungens* var. *pungens*	87	162	14 patches - High / 40.5 m^2 22 patches – Medium / 41.5 m^2 24 patches - Sparse / 51 m^2 27 patches - Very Sparse / 29 m^2
9B	MW-OU1-84-A	*Chorizanthe pungens* var. *pungens*	56	68	6 patches – Medium / 13 m^2 28 patches - Sparse / 31 m^2 22 patches - Very Sparse / 24 m^2
9C	MW-OU1-50-A	*Chorizanthe pungens* var. *pungens*	64	87	13 patches – Medium / 20 m^2 29 patches - Sparse / 43 m^2 22 patches - Very Sparse / 24 m^2

WCS	Well ID	Rare Plant Species Present	# Patches within WCS	Total Occupied Area (m^2)	Patch Density/Coverage & Patch Area Sub-total
9D	MW-OU1-51-A	*Chorizanthe pungens* var. *pungens*	15	21.5	1 patch – Medium / 4 m^2 7 patches - Sparse / 10.5 m^2 7 patches - Very Sparse / 7 m^2
10A	MW-OU1-50-A	*Chorizanthe pungens* var. *pungens*	36	121	5 patches - High / 57 m^2 11 patches – Medium / 44 m^2 13 patches - Sparse / 13 m^2 7 patches - Very Sparse / 7 m^2
10B	MW-OU1-59-A	*Chorizanthe pungens* var. *pungens*	22	27.5	1 patch - High / 6.5 m^2 4 patches – Medium / 4 m^2 7 patches - Sparse / 7 m^2 10 patches - Very Sparse / 10 m^2
11A	IW-OU1-71-A	*Chorizanthe pungens* var. *pungens*	16	24	10 patches - Sparse / 18 m^2 6 patches - Very Sparse / 6 m^2
12B	MW-OU1-85-A	*Chorizanthe pungens* var. *pungens*	5	5	4 patches - Sparse / 4 m^2 1 patch - Very Sparse / 1 m^2
13A	IW-OU1-73-A	*Chorizanthe pungens* var. *pungens*	7	7	1 patch - Sparse / 1 m^2 6 patches - Very Sparse / 6 m^2
14A	MW-OU1-83-A	*Chorizanthe pungens* var. *pungens*	79	129	5 patch - High / 17 m^2 19 patches – Medium / 31.5 m^2 37 patches - Sparse / 62.5 m^2 18 patches - Very Sparse / 18 m^2
15A	MW-OU1-82-A	*Chorizanthe pungens* var. *pungens*	24	24	1 patch – Medium / 1 m^2 11 patches - Sparse / 11 m^2 12 patches - Very Sparse / 12 m^2
16A	SB-OU1-2004-K	*Chorizanthe pungens* var. *pungens*	3	11	1 patch - High / 9 m^2 1 patch – Medium / 1 m^2 1 patch - Very Sparse / 1 m^2

Attachment 1

‘TREATMENT DIAGRAMS 2010’

The attached diagrams show the extent of the treatment and the species treated within each Weed Control Segment (WCS) for the 2010 weed control program within the Operable Unit 1 portion of the FONR. These diagrams (not drawn to scale) also show the spatial extent, well location, well site/road boundaries, and photo stations/points for each Weed Control Segment.

Well Site/Road Diagram

Well ID: N/A

WCS Sub Group W1S

Total Aprox. Area 2,480 (m^2)

Well Rd. Area (m^2)

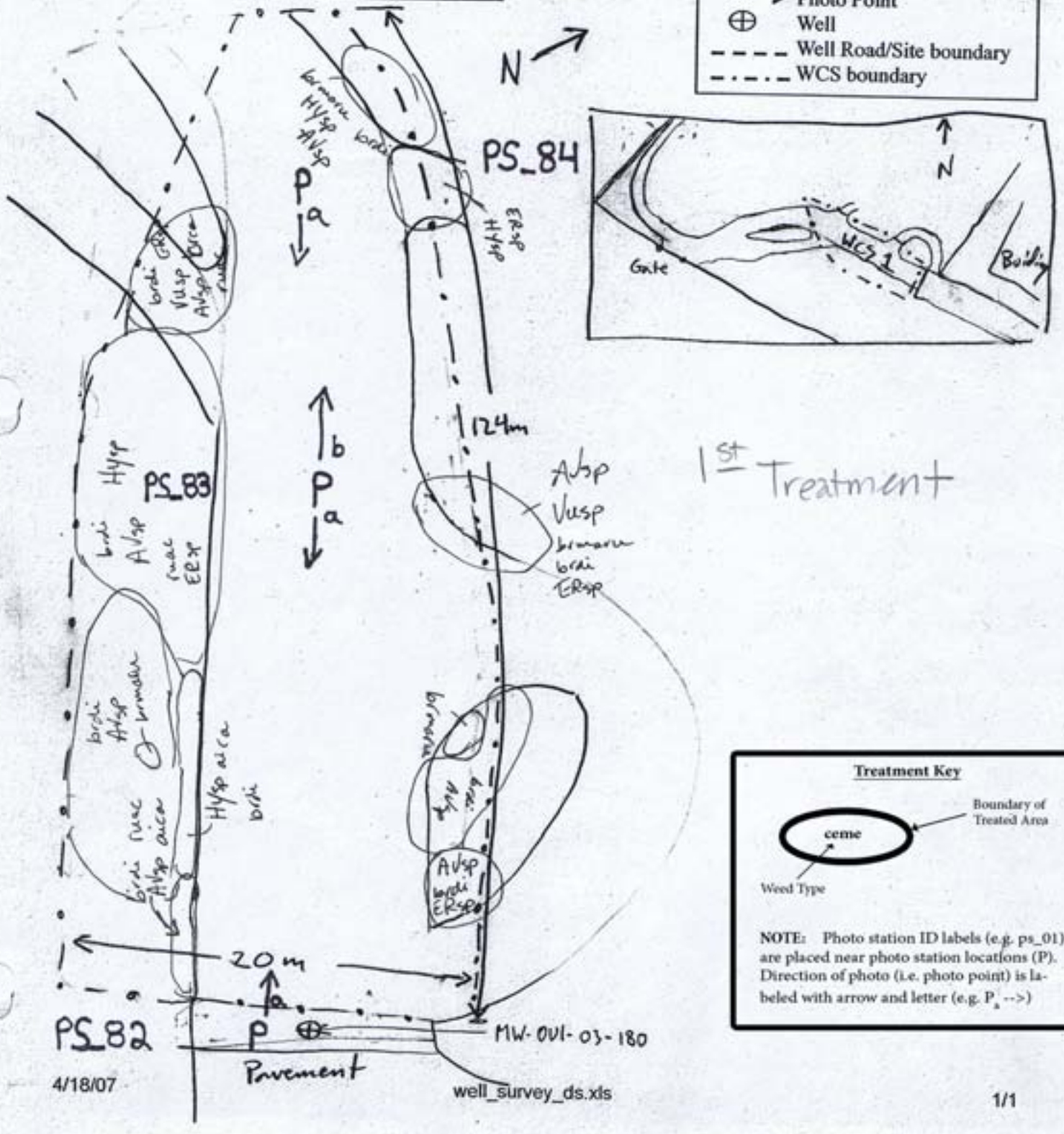
Well Site Area N/A (m^2)

Date 4-26-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: IW-OU1-05-A

WCS Sub Group 4A

Date 3-17-10

Surveyor CAE

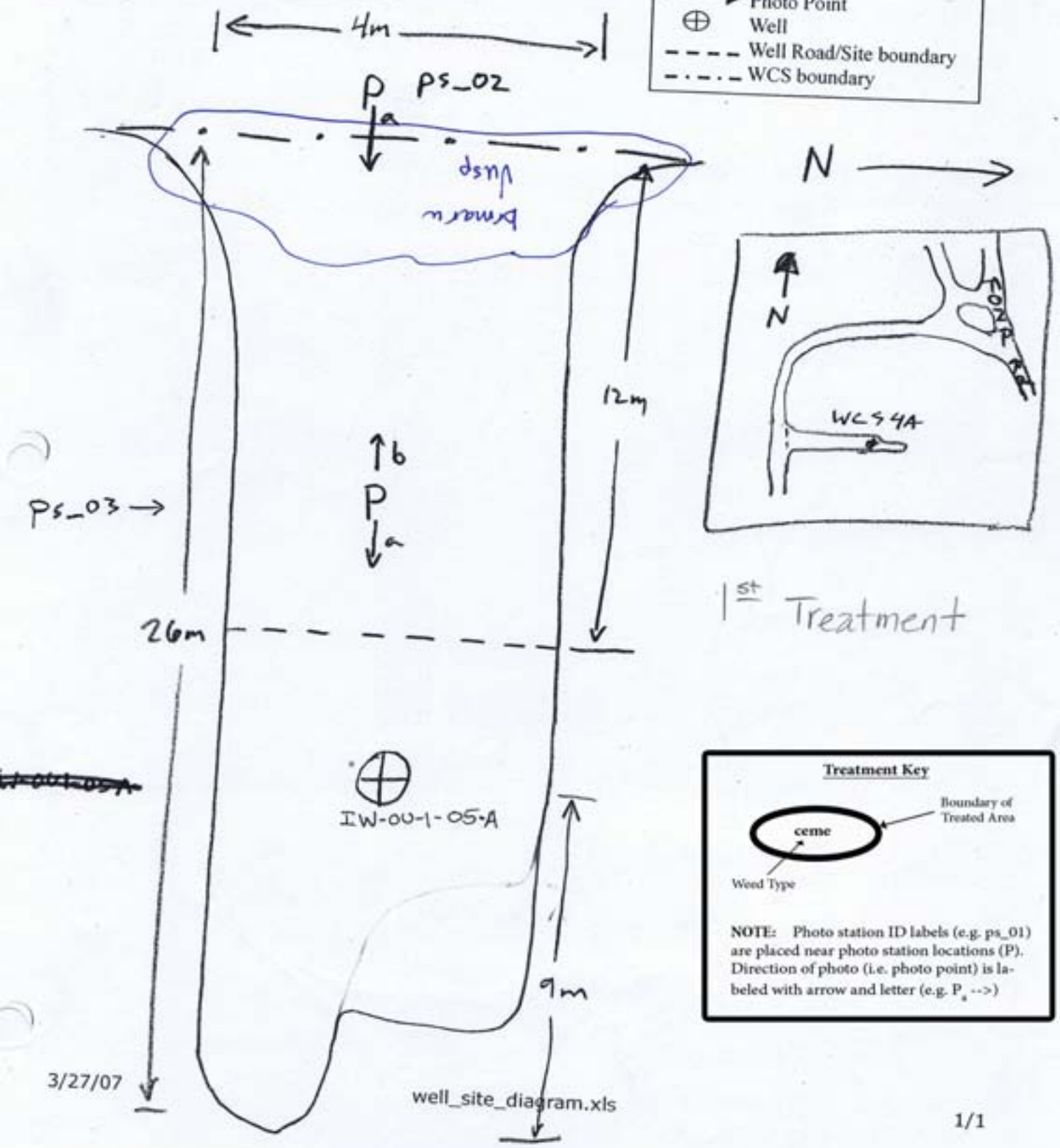
tal Aprox. Area 94 (m^2)

.ell Rd. Area 48 (m^2)

Well Site Area 46m (m^2)

Legend

IA	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary



Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: IW-OU1-05-A

WCS Sub Group 4A

Date 4-28-10

Surveyor CAE

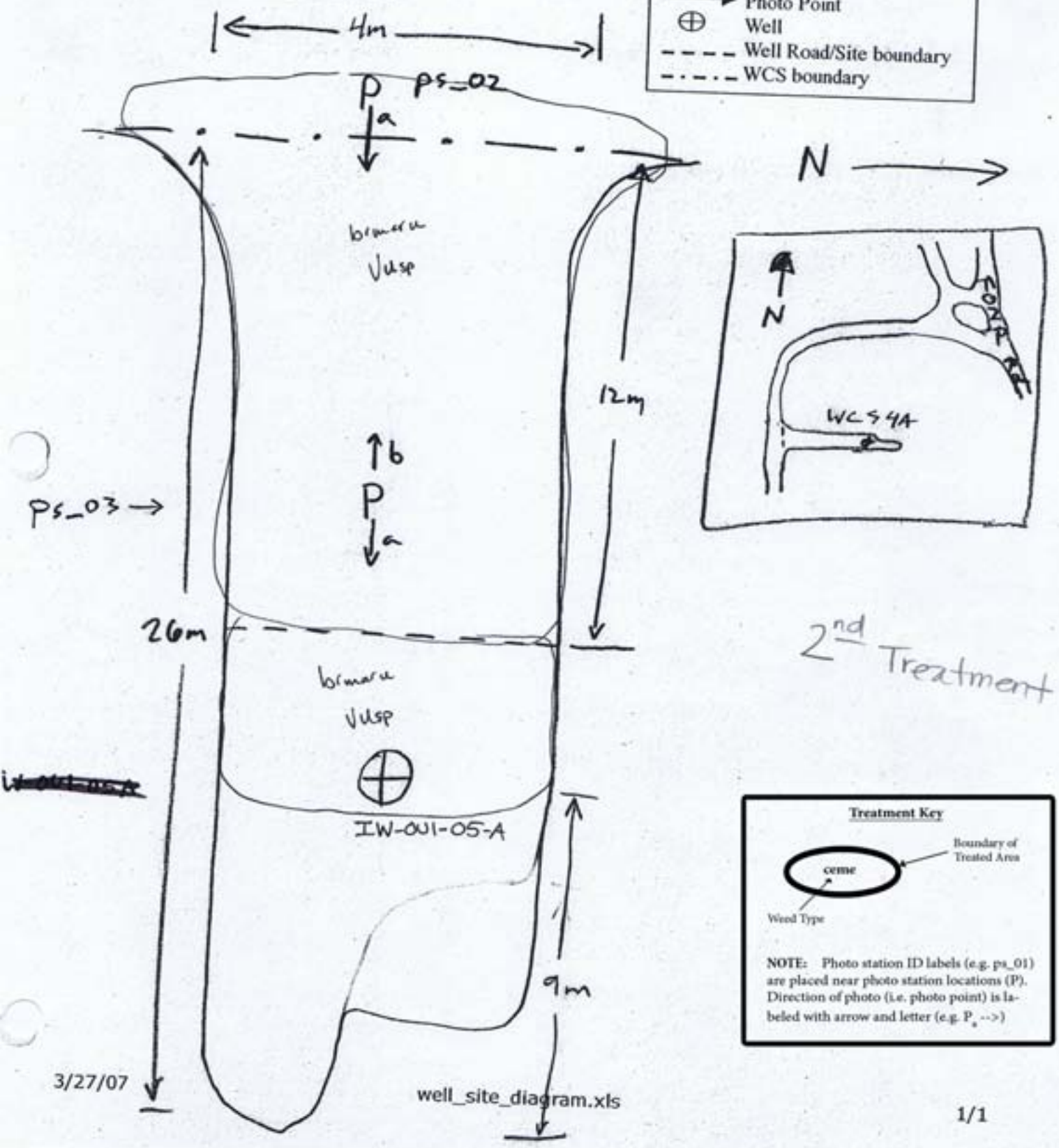
Total Aprox. Area 94 (m^2)

Well Rd. Area 48 (m^2)

Well Site Area 46m (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary



Treatment Key

Boundary of Treated Area

cenne

Weed Type

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: IW-OU1-01-A

WCS Sub Group: 5-A

Total Aprox. Area: 240 (m^2)

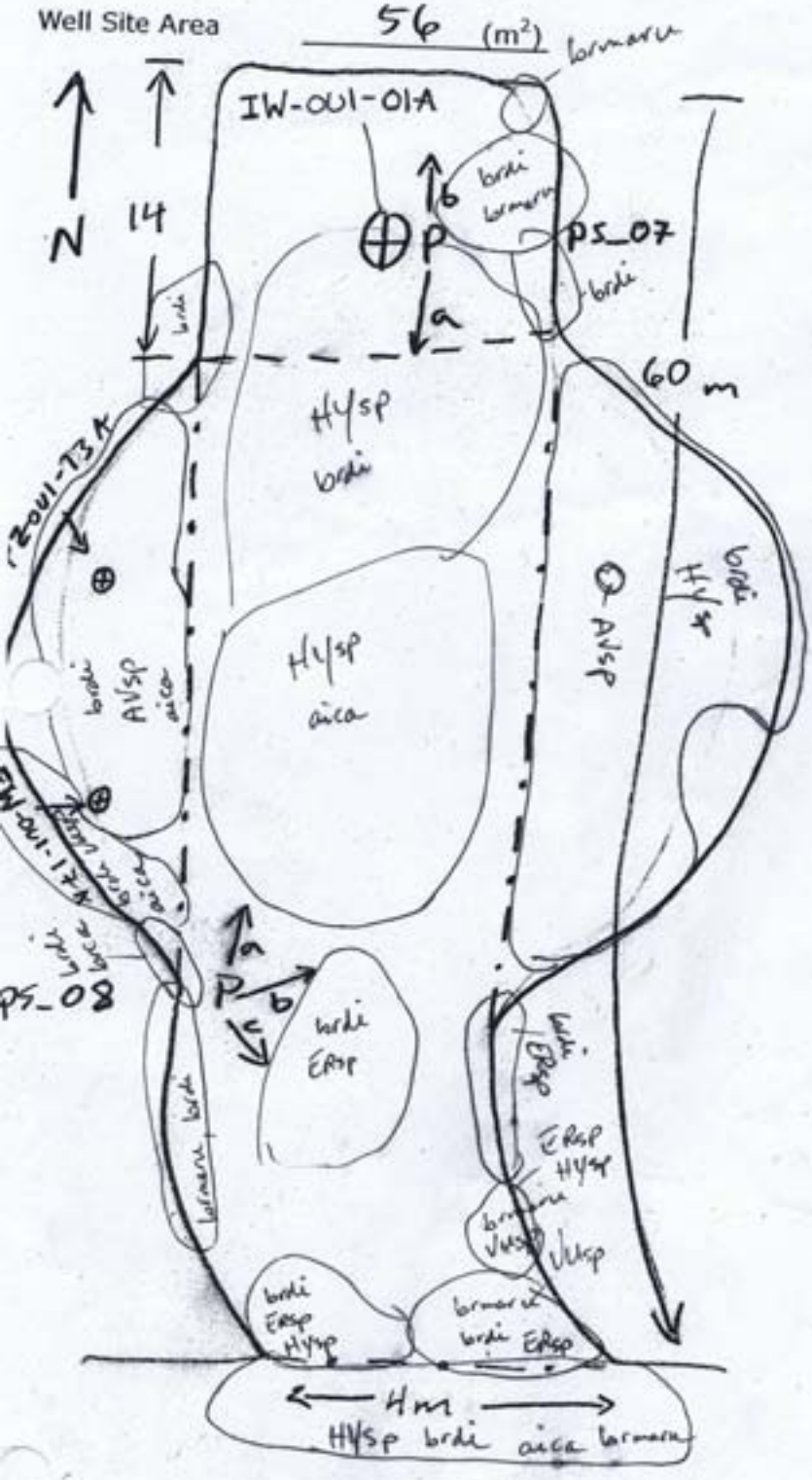
Well Rd. Area: 174 (m^2)

Well Site Area: 56 (m^2)

Date: 4-28-2010

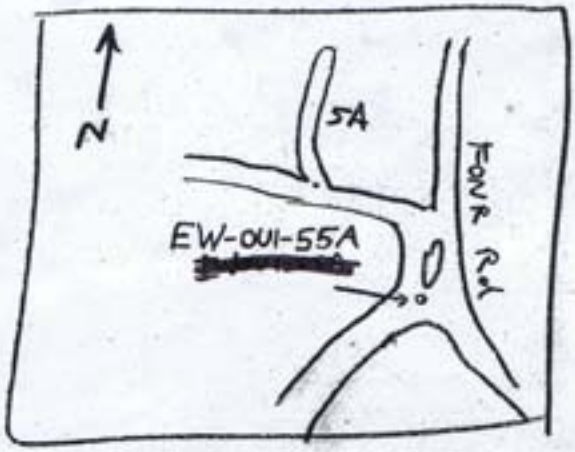
Surveyor: CAE

A



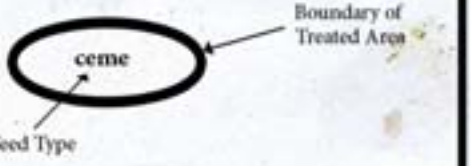
Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary



1st Treatment

Treatment Key



NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: EW-OU1-53-A

Date 3-17-10

WCS Sub Group 6A

Surveyor CAE

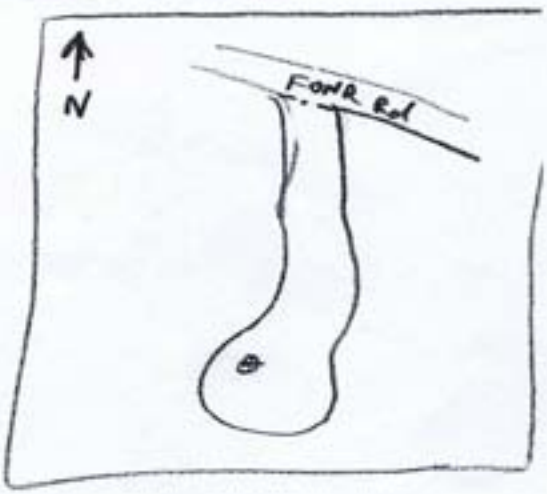
Total Aprox. Area 220 (m^2)

Well Rd. Area 138 (m^2)

Well Site Area 82 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: EW-OUI-53-A

Date 4-14-10

WCS Sub Group 6A

Surveyor CAE

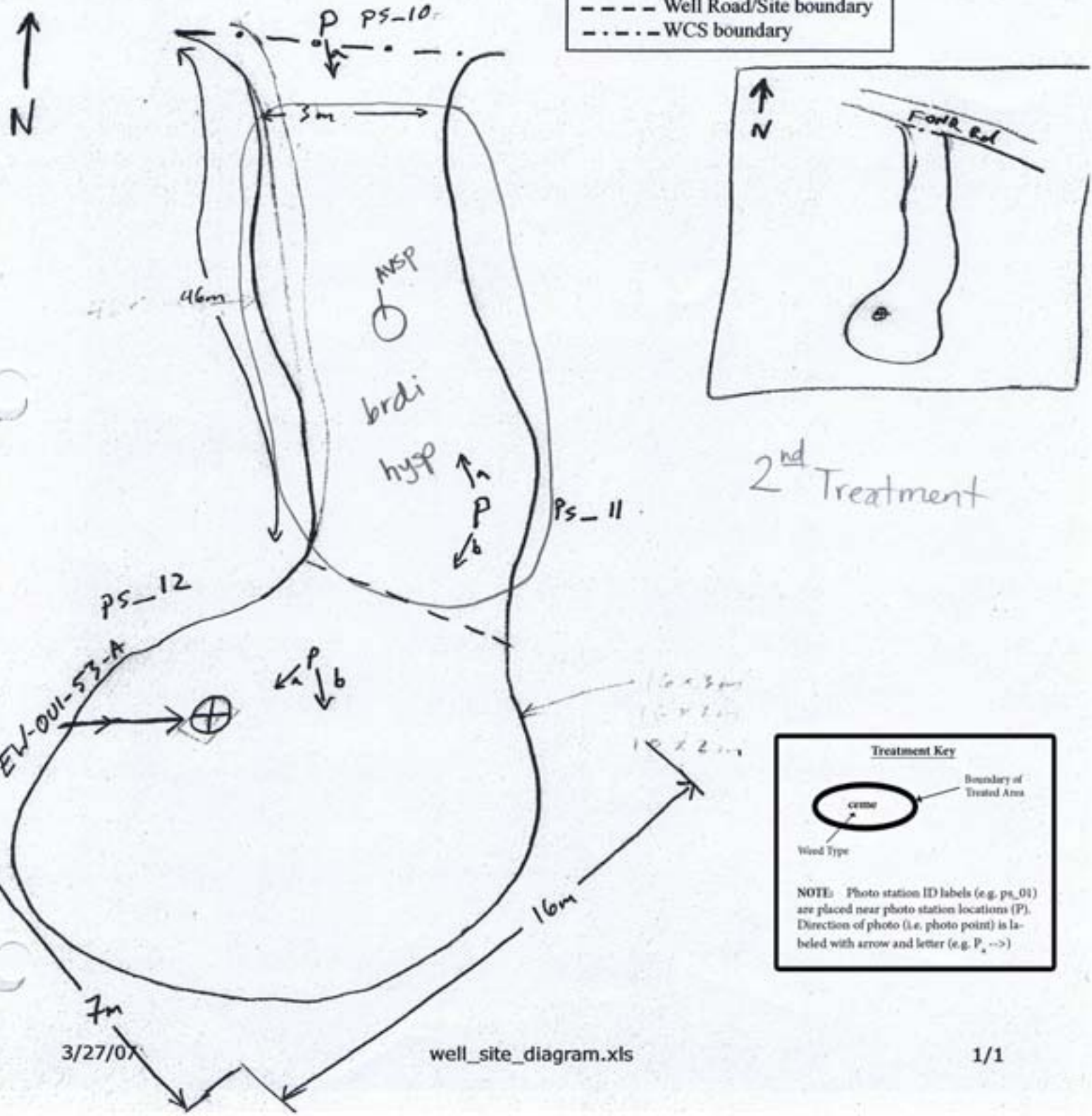
Total Aprox. Area 220 (m^2)

Well Rd. Area 138 (m^2)

Well Site Area 82 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary



Well ID: EW-OU1-52A

Date 4/14/2010

WCS Sub Group 7A

Surveyor CAE

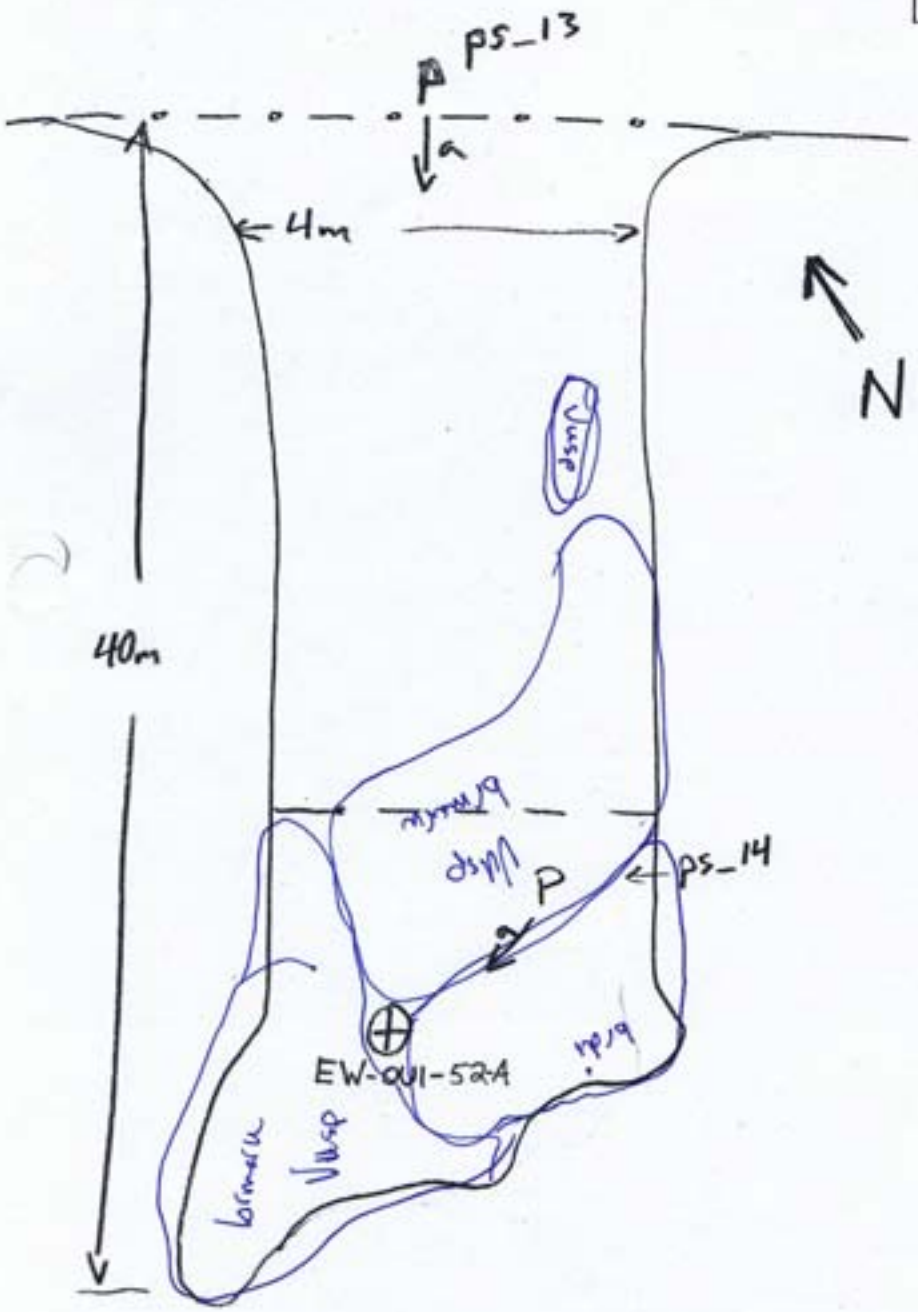
tal Aprox. Area 164 (m^2)

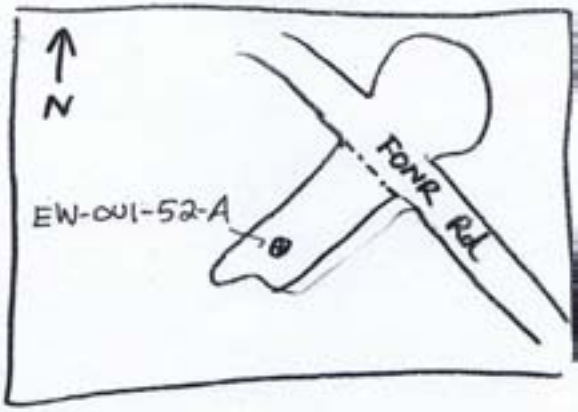
ell Rd. Area 120 (m^2)

Well Site Area 44 (m^2)

Legend

IA	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





1ST Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: PZ-OU1-10-A1
IW-OU1-10-A

WCS Sub Group 8A

Date 3-17-10

Surveyor CAE

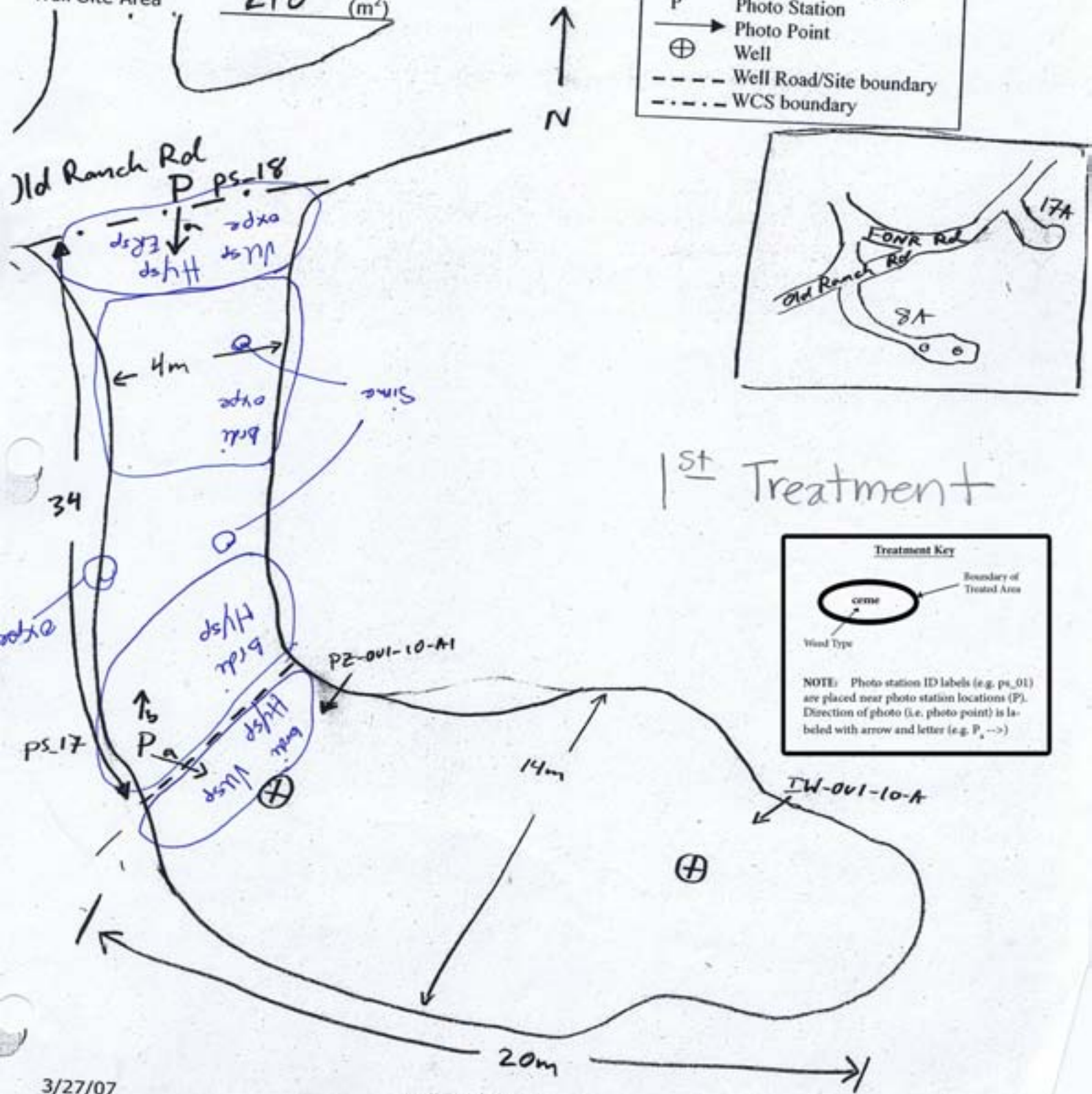
tal Aprox. Area 347 (m^2)

Vell Rd. Area 137 (m^2)

Well Site Area 210 (m^2)

Legend

IA	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
-·-·-	WCS boundary



1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

3/27/07

well_site_diagram.xls

Well ID: PZ-OU1-10-A1 / IW-OU1-10-A

WCS Sub Group: 8A

Date: 4-14-10

Surveyor: CHE

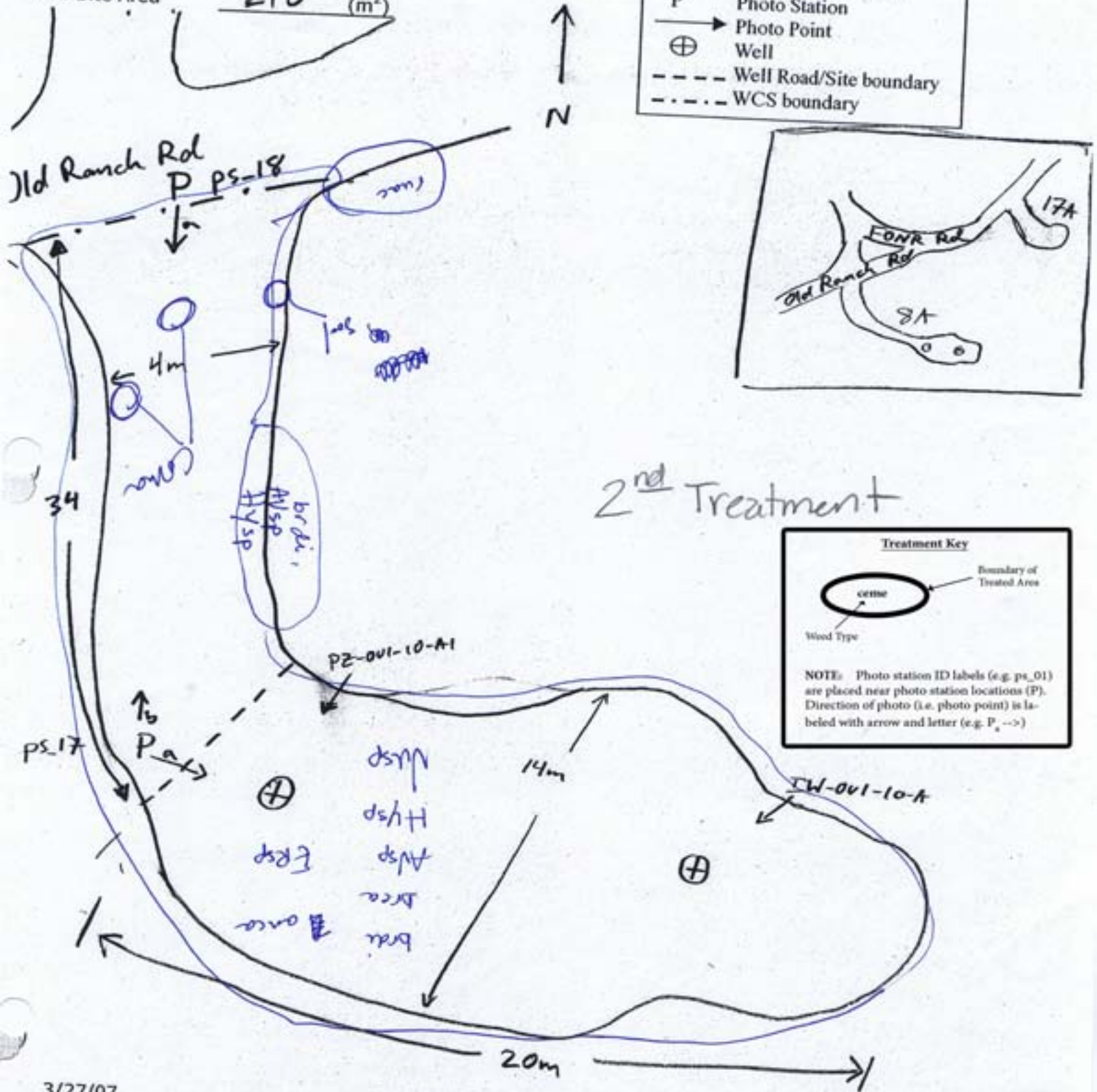
tal Aprox. Area: 347 (m^2)

ell Rd. Area: 137 (m^2)

Well Site Area: 210 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



3/27/07

well_site_diagram.xls

Well ID: PZ-OU1-10-A1
IW-OU1-10-A

WCS Sub Group 8A

Date 6-2-10

Surveyor CAE

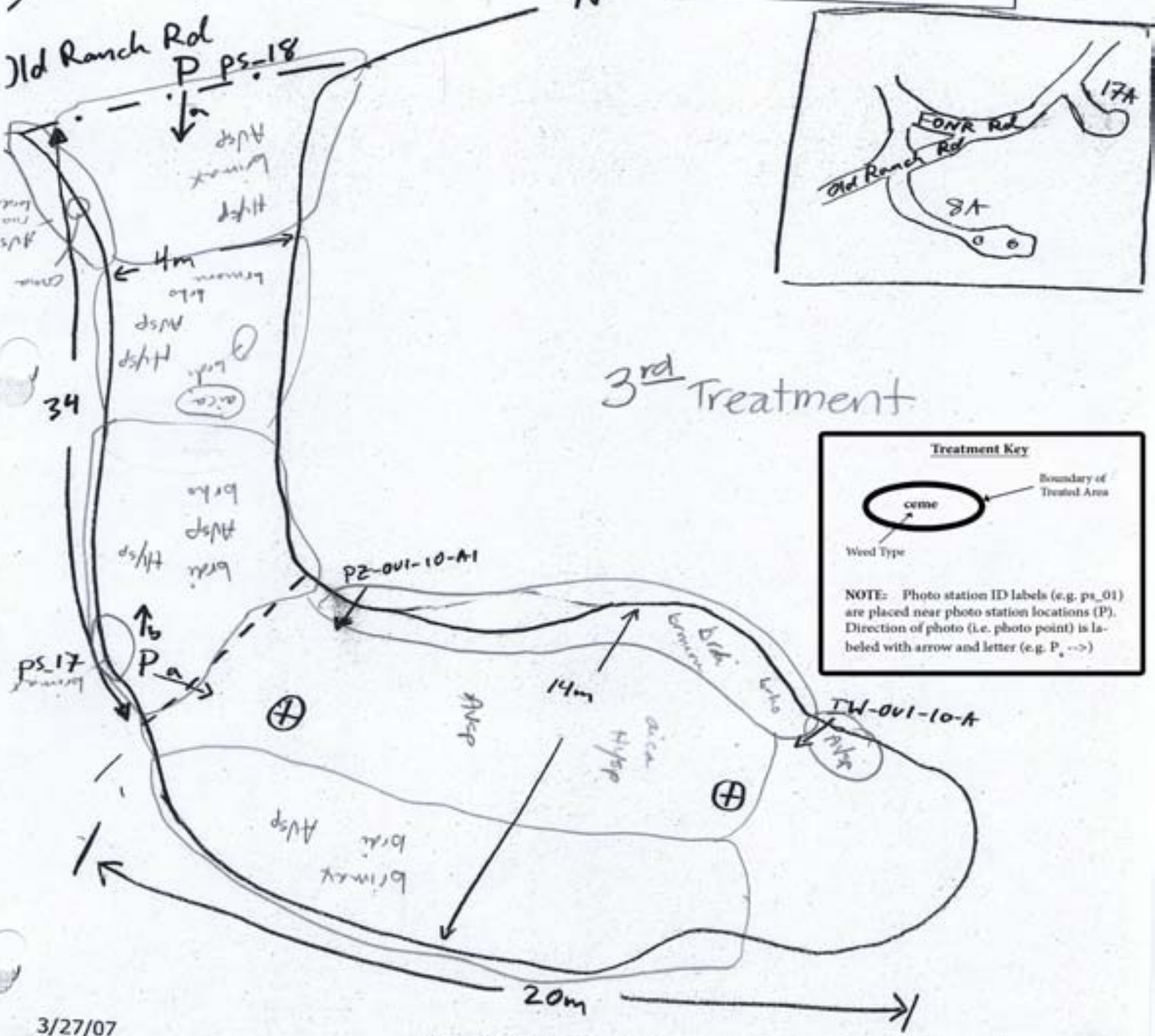
tal Aprox. Area 347 (m^2)

ell Rd. Area 137 (m^2)

Well Site Area 210 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
-·-·-	WCS boundary



Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OU1-46AD / PZ-OU1-46-AD2, MW-OU1-46-A#

WCS Sub Group: 9A

Total Aprox. Area: 369 (m^2)

Well Rd. Area: 256 (m^2)

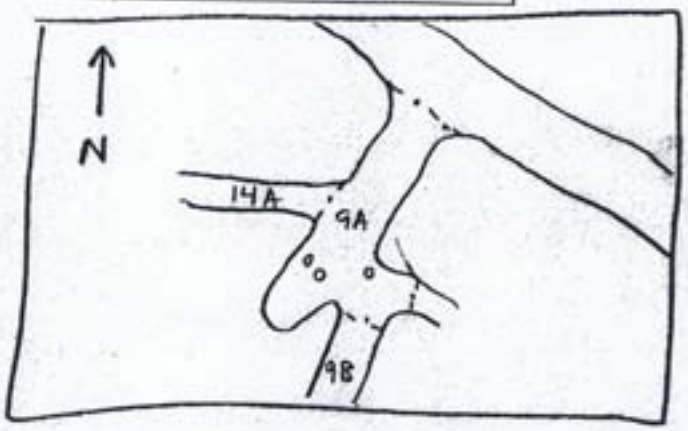
Well Site Area: 113 (m^2)

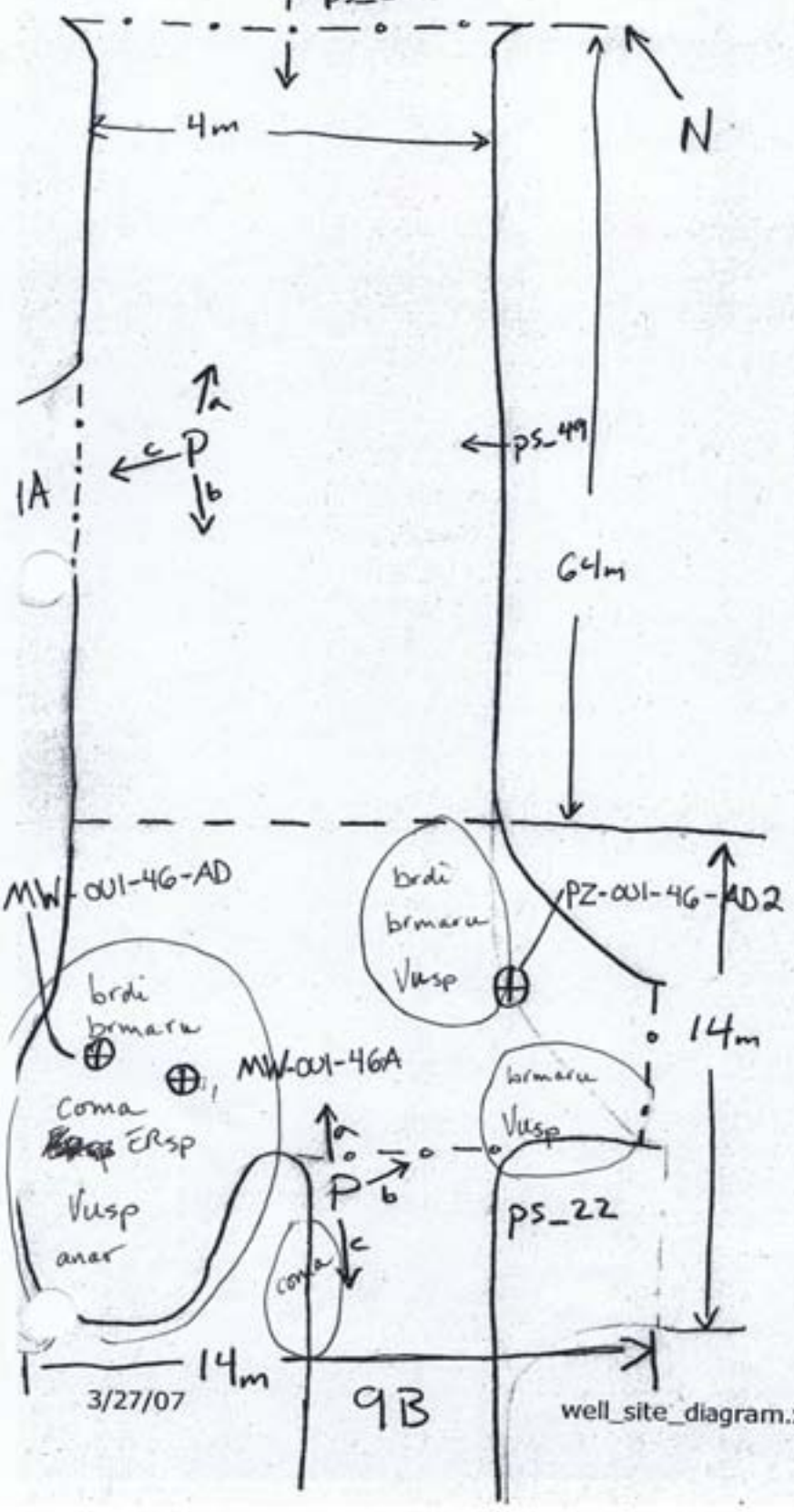
Date: 3-10-2010

Surveyor: CAE & STM

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
-·-·-	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

well_site_diagram.xls

Well ID: MW-001-46AD, PZ-001-46-AD2, MW-001-46-A

Date 5/18/2010

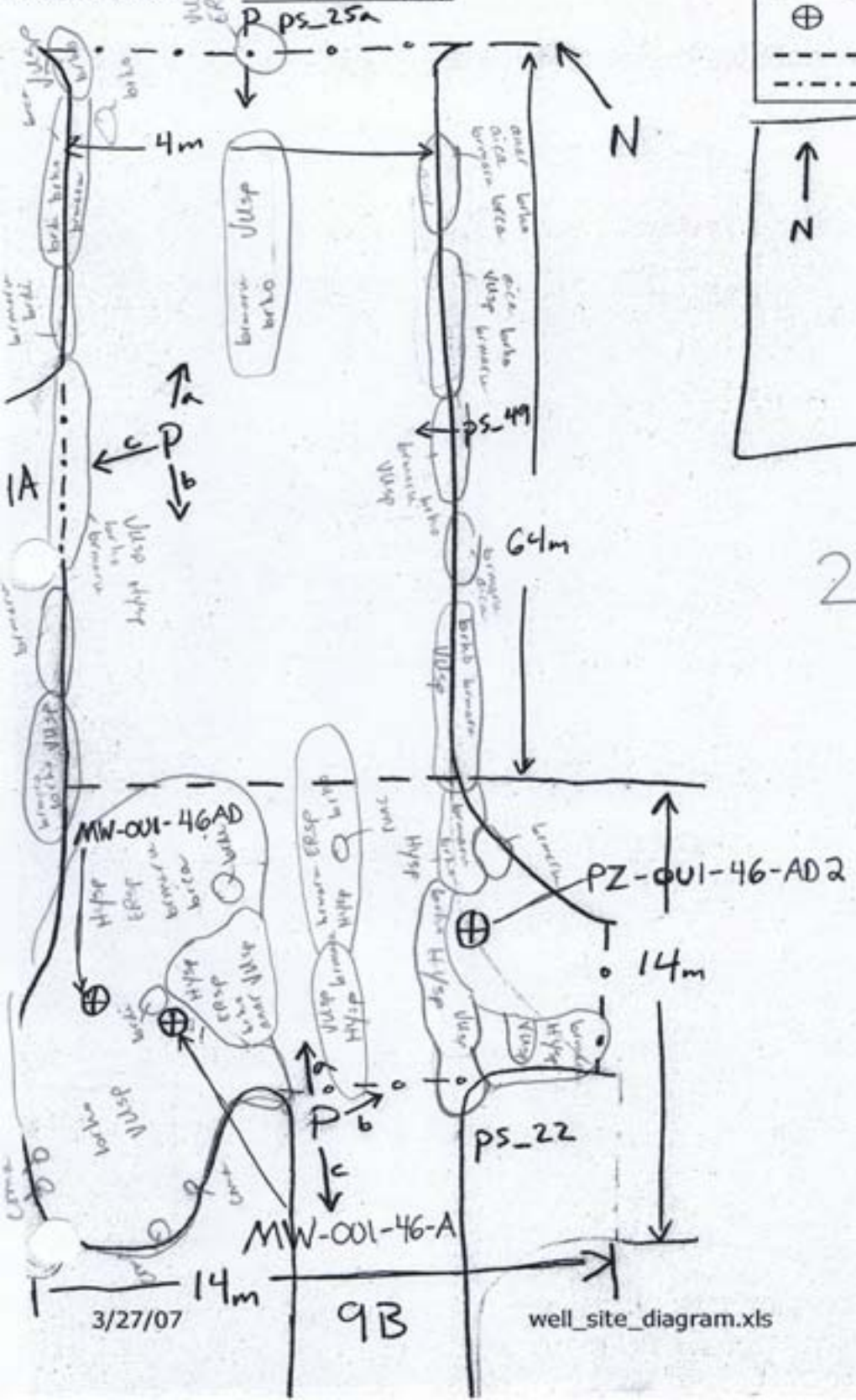
WCS Sub Group 9A

Surveyor CAF

Total Aprox. Area 369 (m^2)

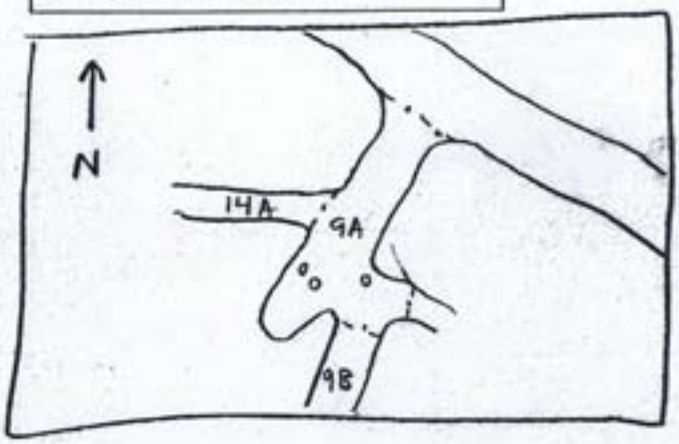
Well Rd. Area 256 (m^2)

Well Site Area 113 (m^2)



Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OU1-84A

WCS Sub Group 9B

Total Aprox. Area 304 (m^2)

Well Rd. Area 64 (m^2)

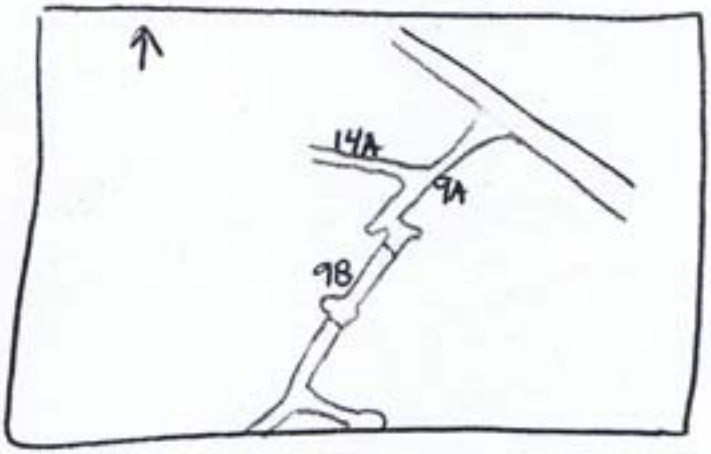
Well Site Area 240 (m^2)

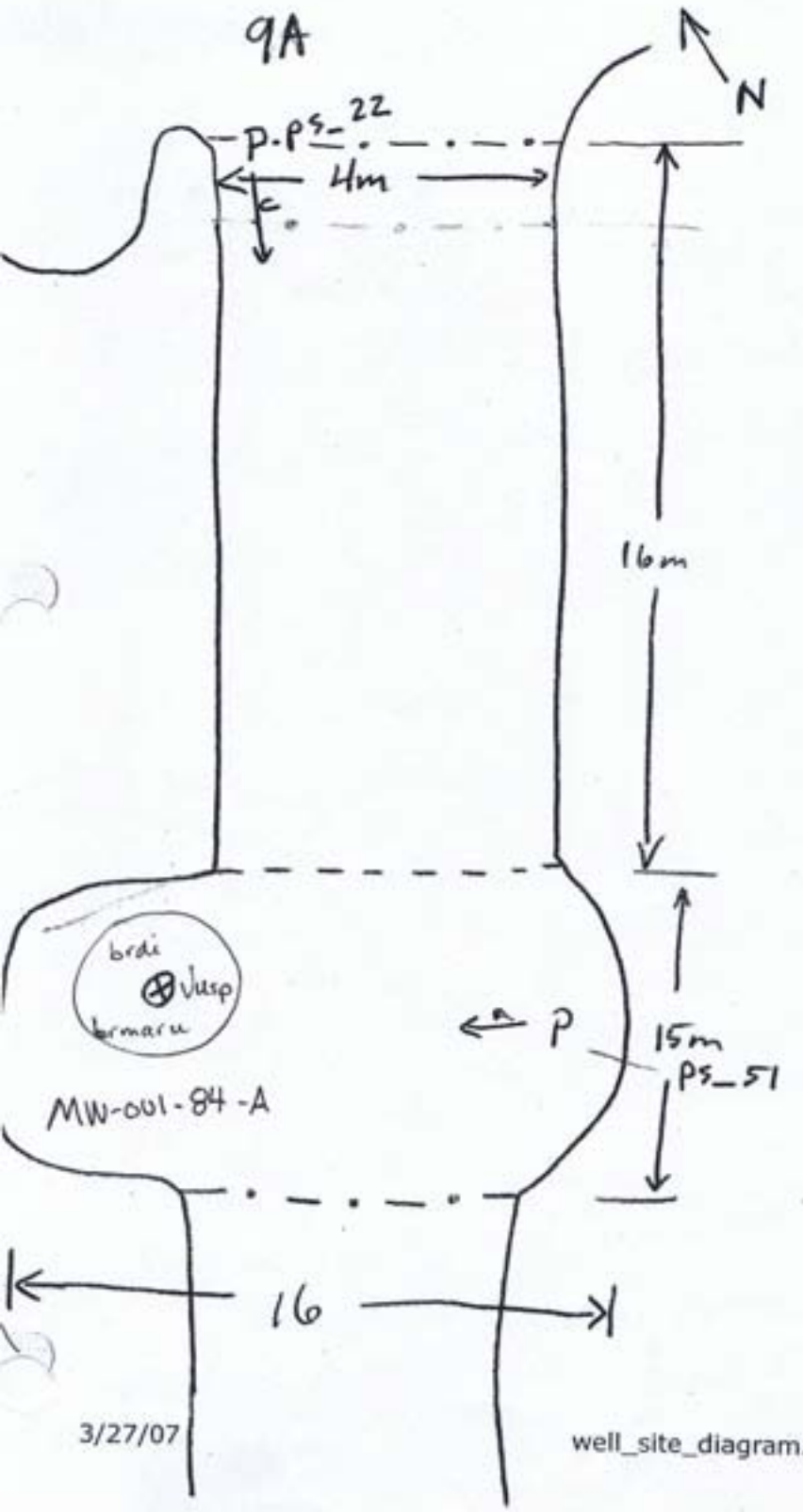
Date 3-10-2010

Surveyor CAE & STM

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OU1-84A

WCS Sub Group 9B

Date 5-19-10

Surveyor CAE

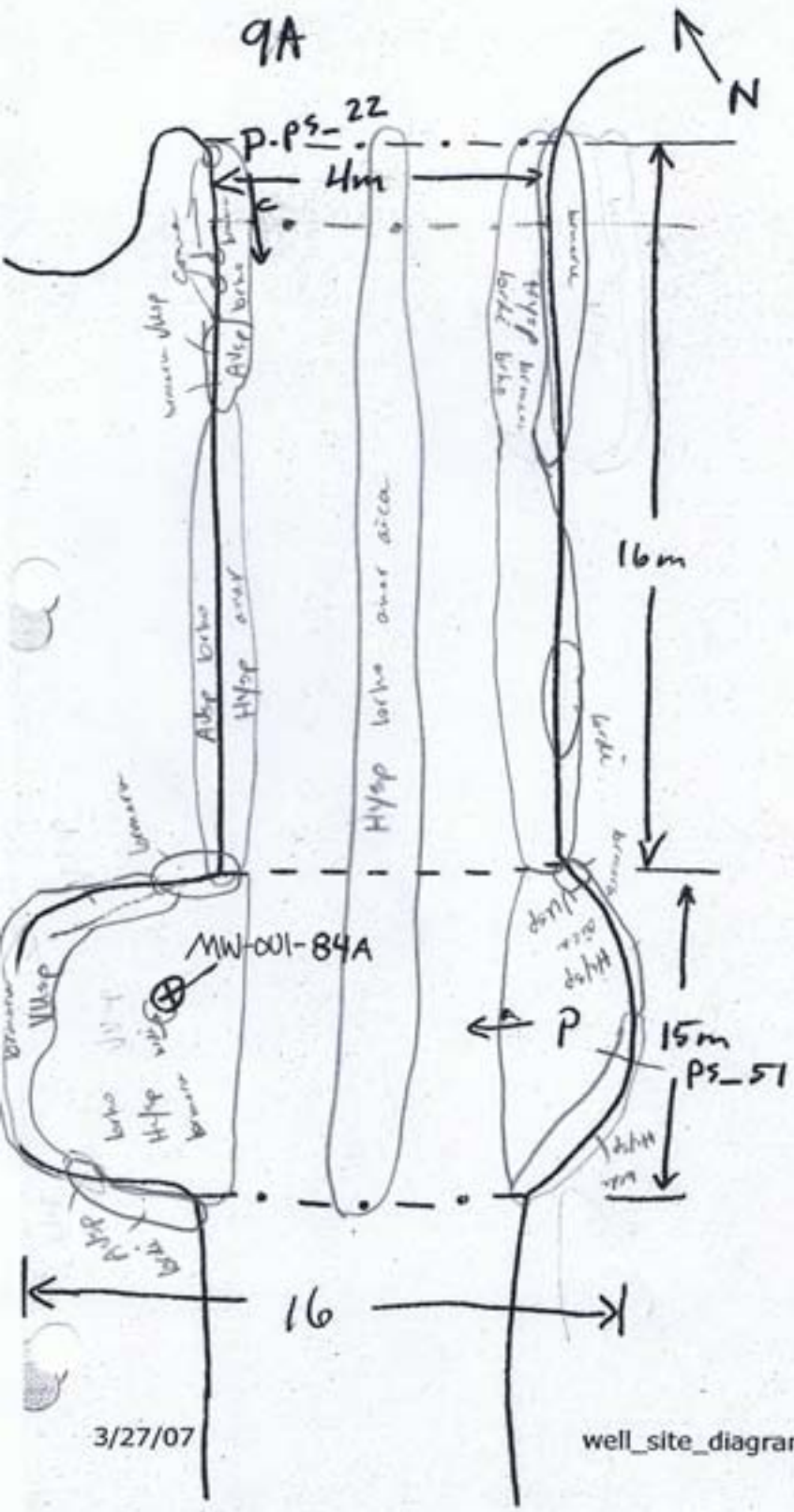
al Aprox. Area 304 (m^2)

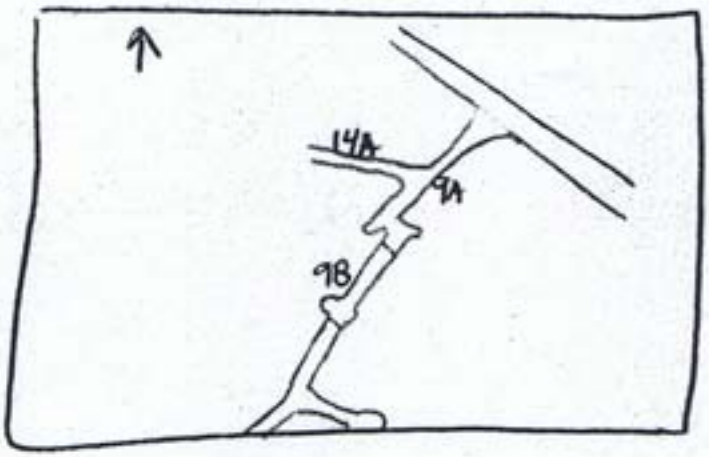
ell Rd. Area 64 (m^2)

Well Site Area 240 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: IW-OUI-74A

WCS Sub Group 9C

tal Aprox. Area 198 (m²)

Well Rd. Area 144 (m²)

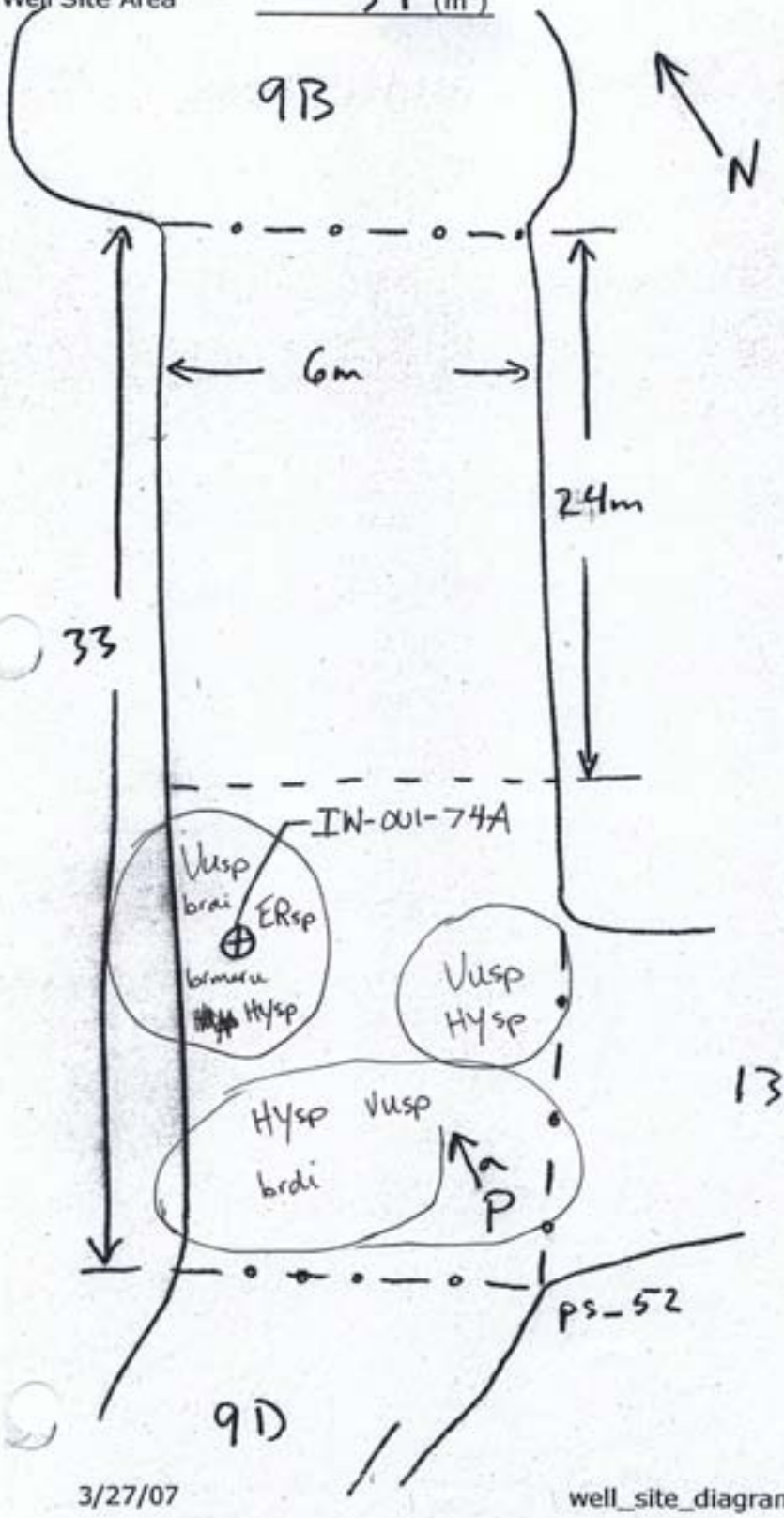
Well Site Area 54 (m²)

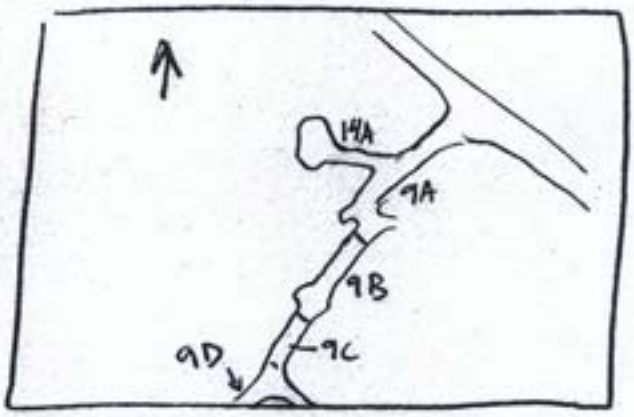
Date 3-10-2010

Surveyor CAE & STM

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
-·-·-	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: IW-OUI-74A

WCS Sub Group 9C

tal Aprox. Area 198 (m^2)

vell Rd. Area 144 (m^2)

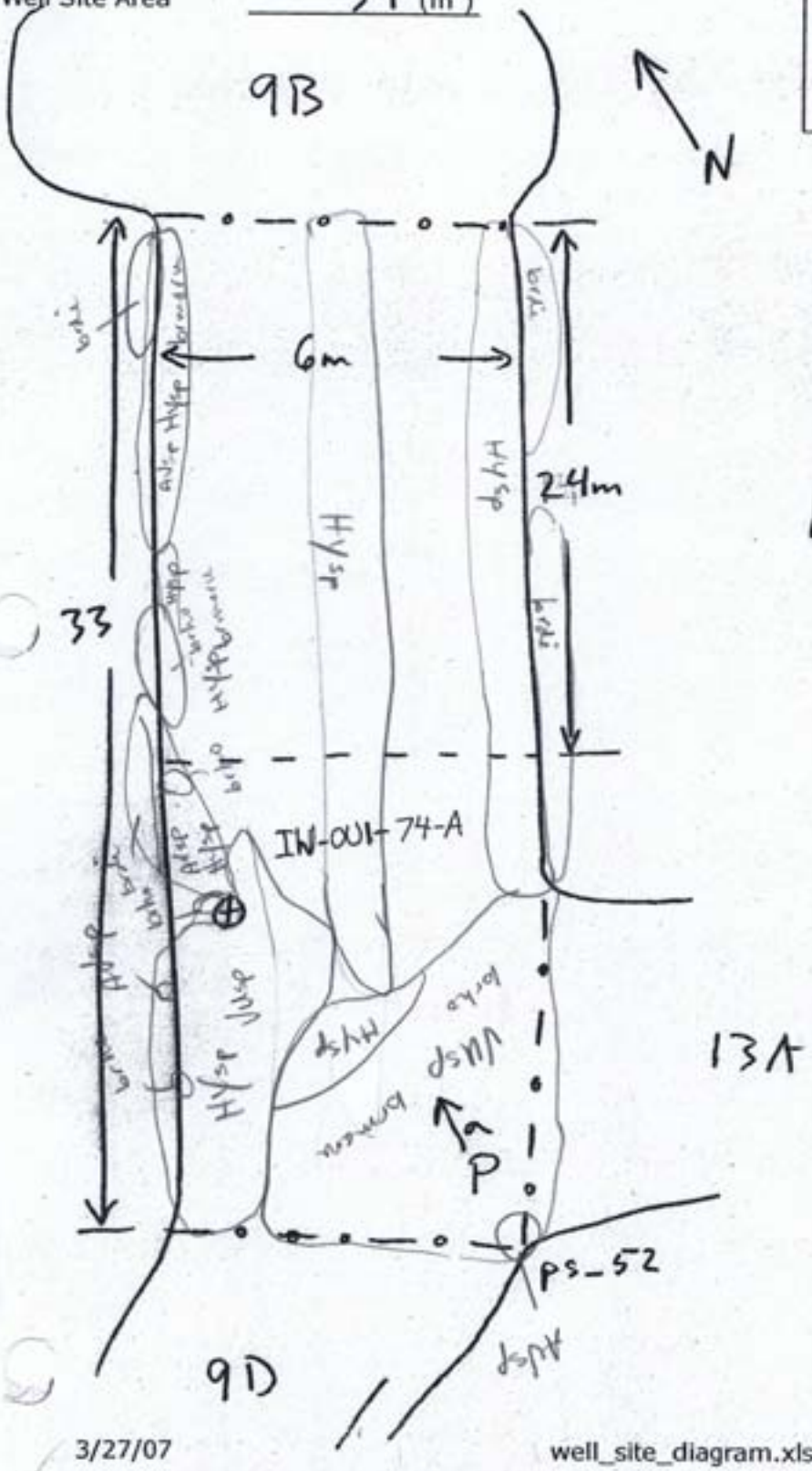
Well Site Area 54 (m^2)

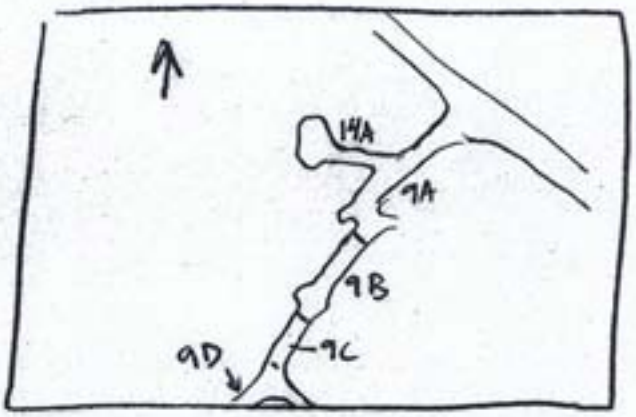
Date 5-24-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OU1-51A

WCS Sub Group 9D

tal Aprox. Area 160 (m^2)

ell Rd. Area 104 (m^2)

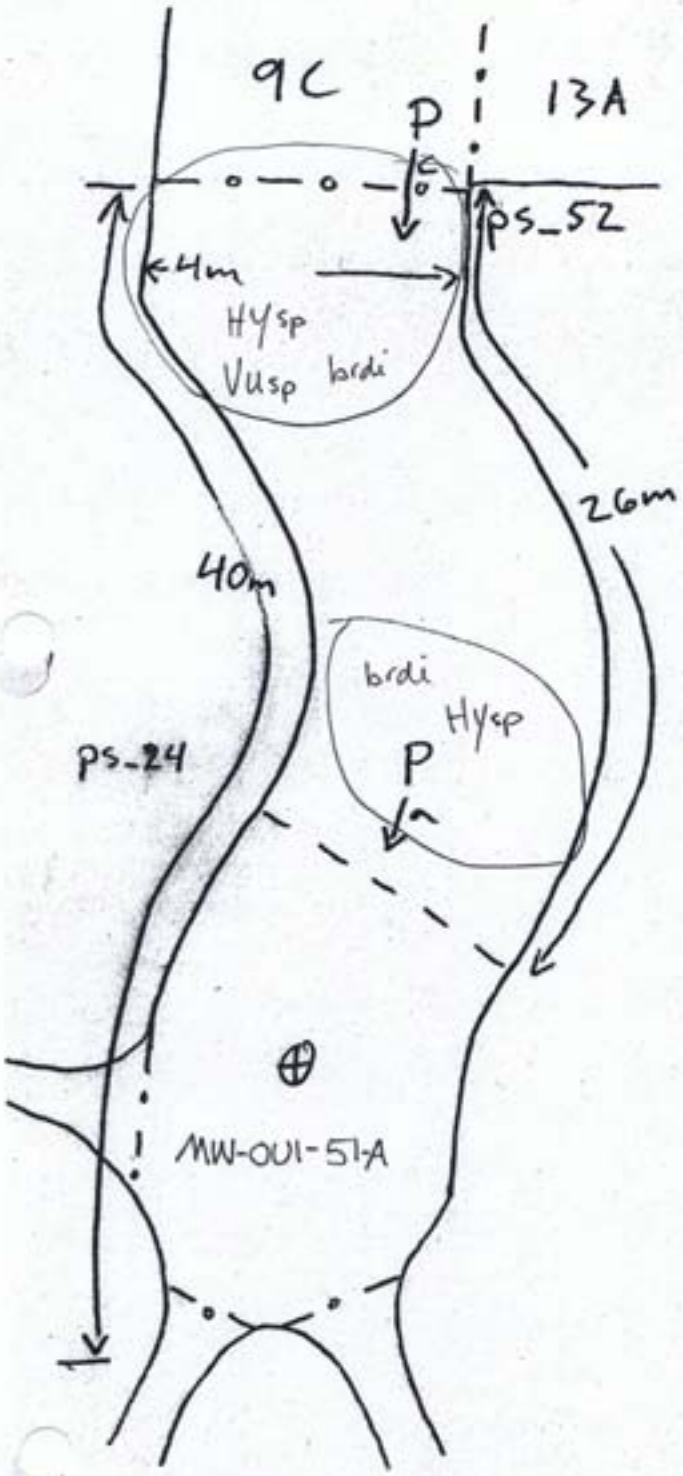
Well Site Area 56 (m^2)

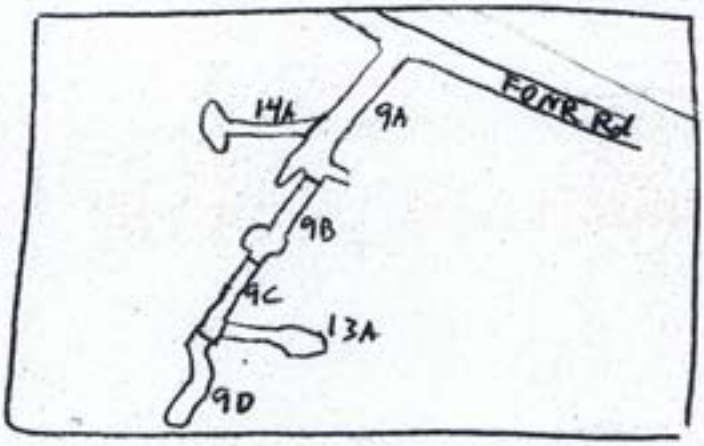
Date 3-10-2010

Surveyor CHE & STH

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-001-51A

WCS Sub Group 9D

Date 5-24-10

Surveyor CAE

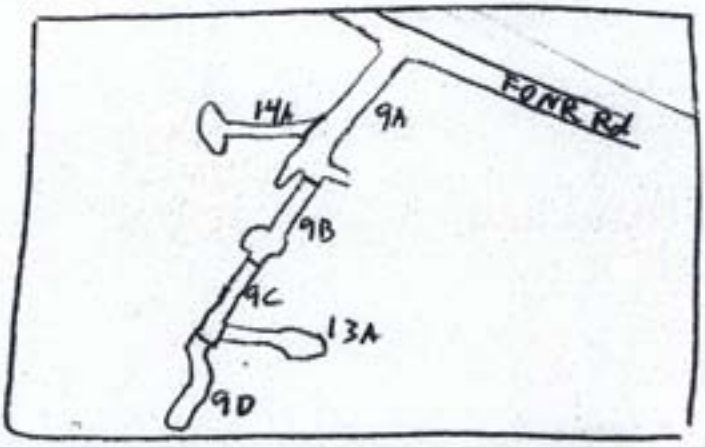
tal Aprox. Area 160 (m^2)

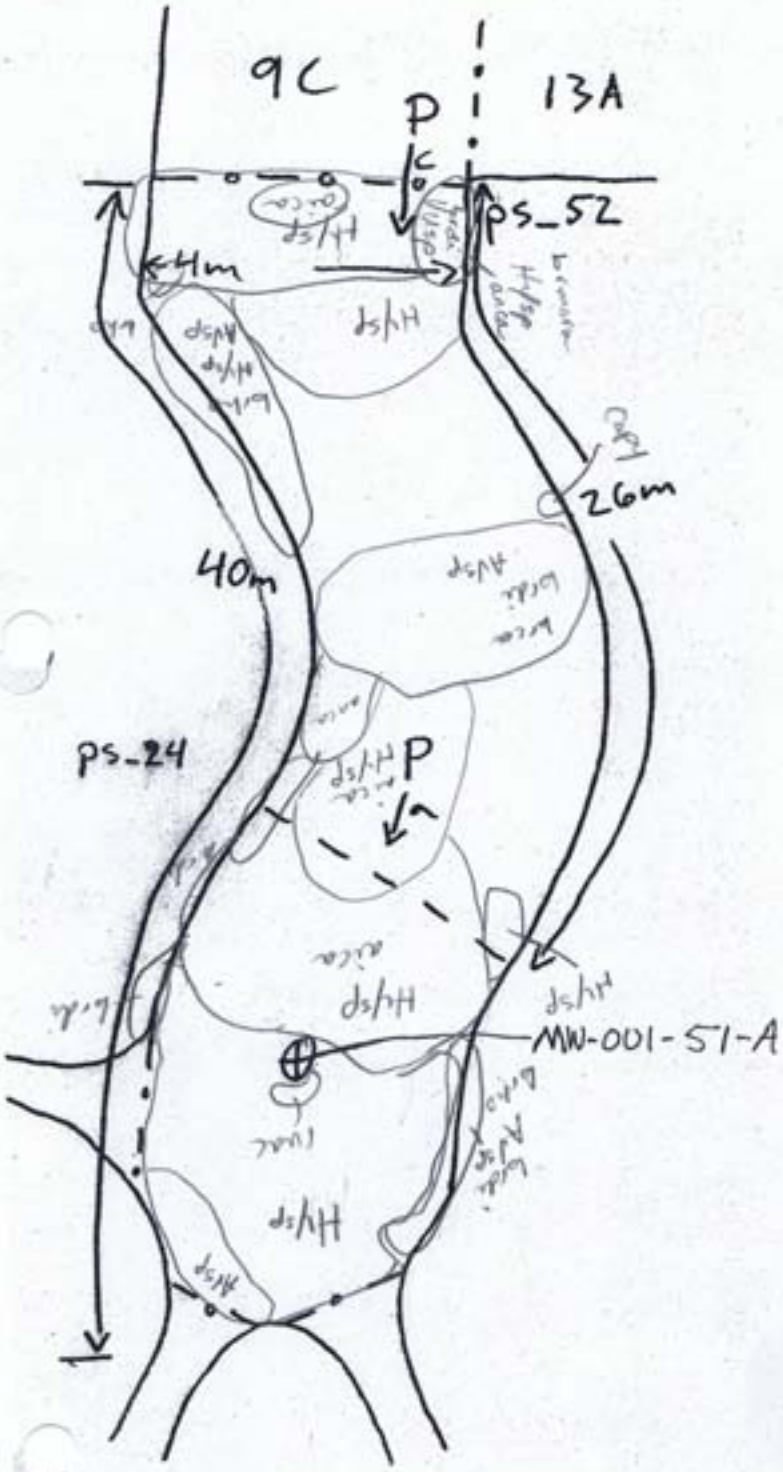
ell Rd. Area 104 (m^2)

Well Site Area 56 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OUI-50A

WCS Sub Group 10A

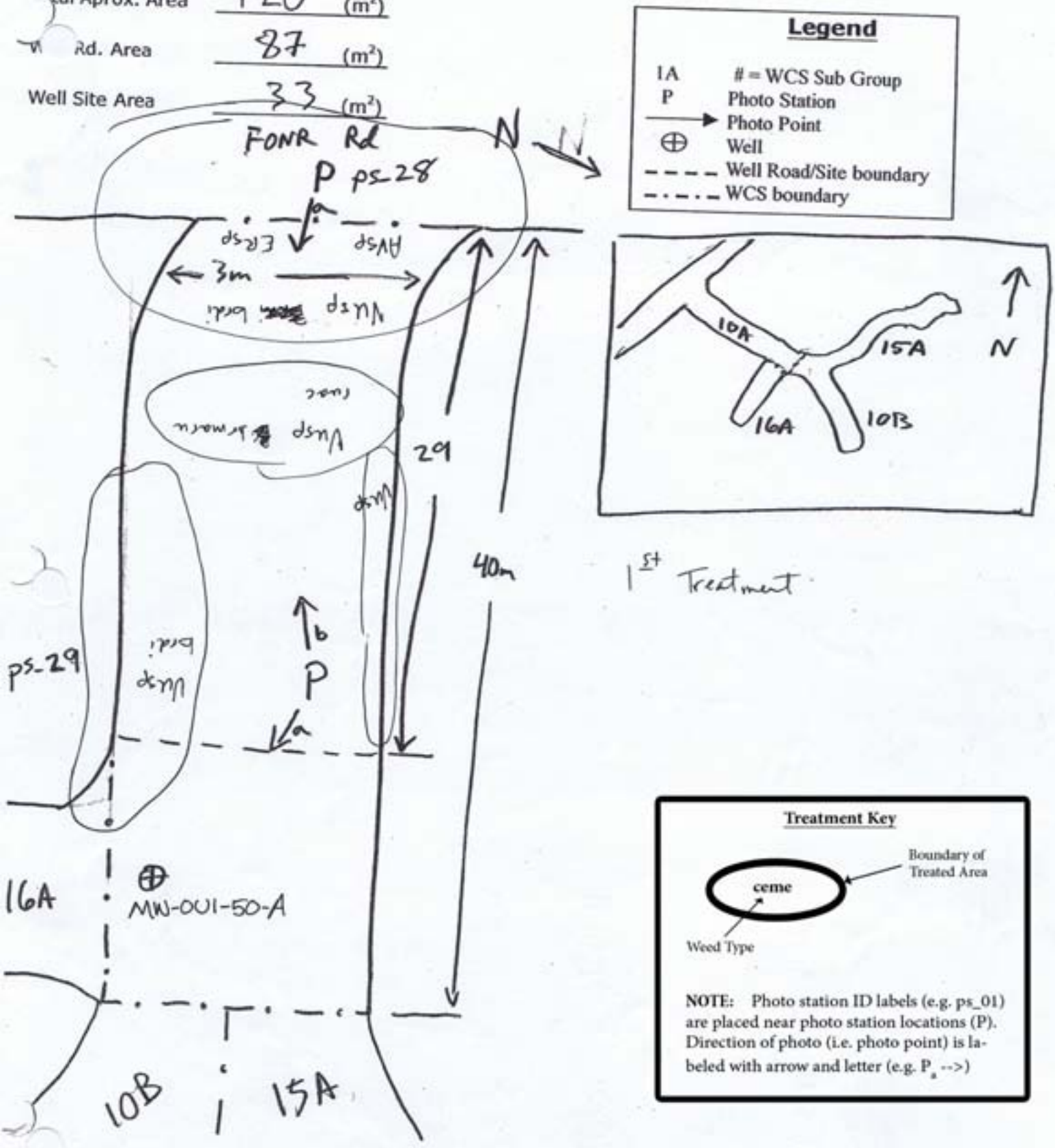
Total Aprox. Area 120 (m²)

Rd. Area 87 (m²)

Well Site Area 33 (m²)

Date 3-10-2010

Surveyor CAE & STM



Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary

1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OUI-50A

WCS Sub Group: 10A

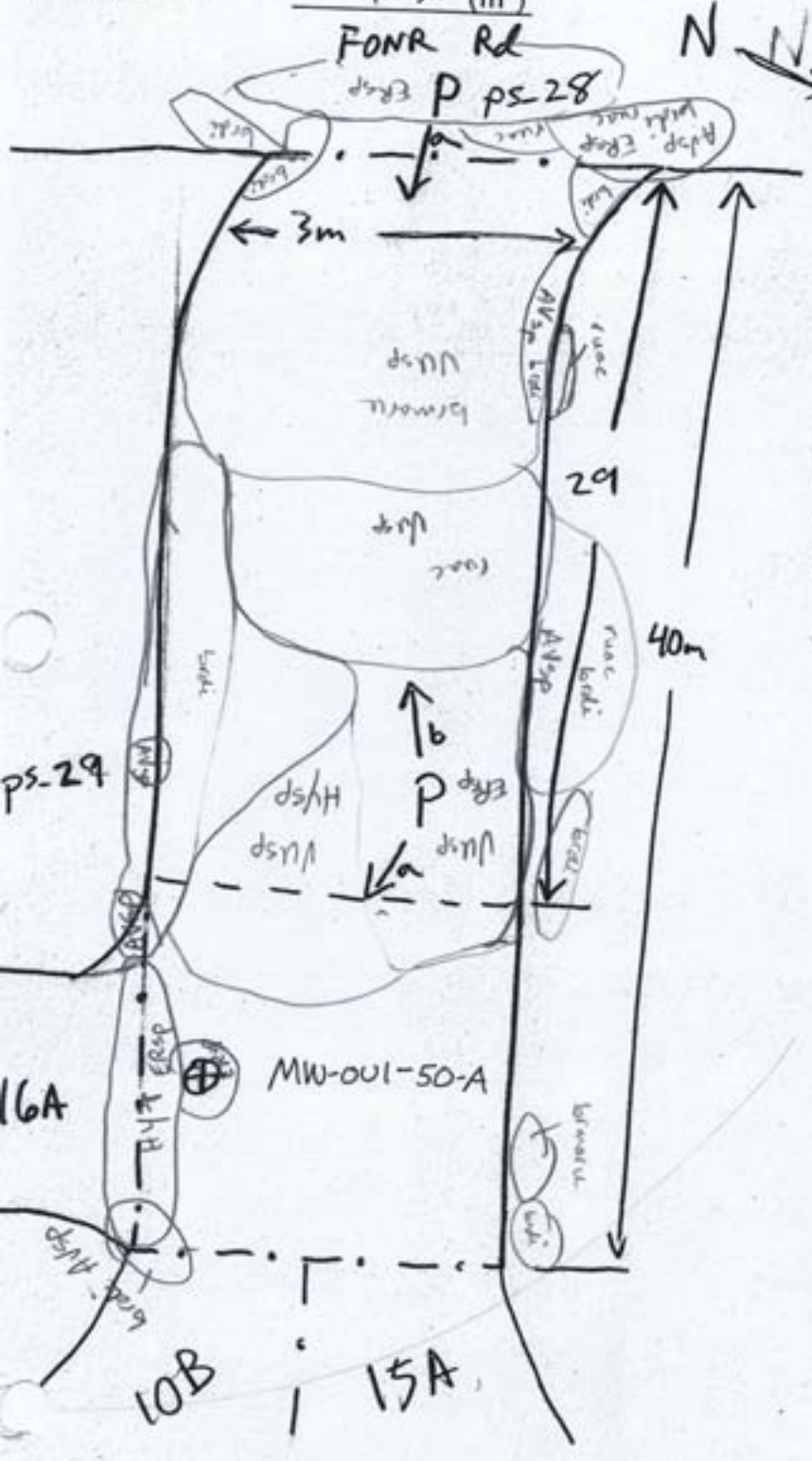
Total Aprox. Area: 120 (m^2)

Well Rd. Area: 87 (m^2)

Well Site Area: 33 (m^2)

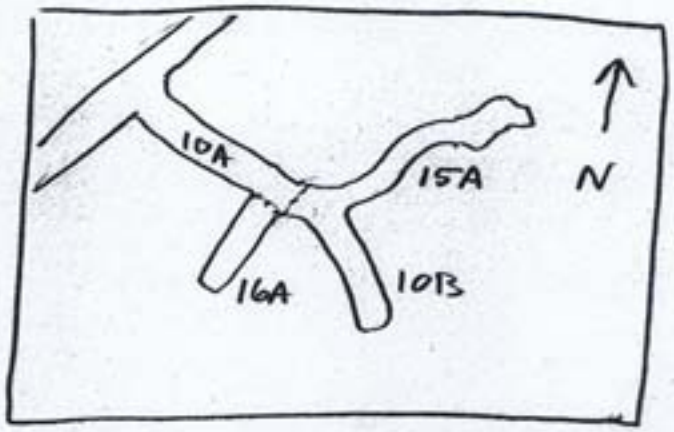
Date: 5-5-2010

Surveyor: CAE



Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-001-59A

WCS Sub Group 10B

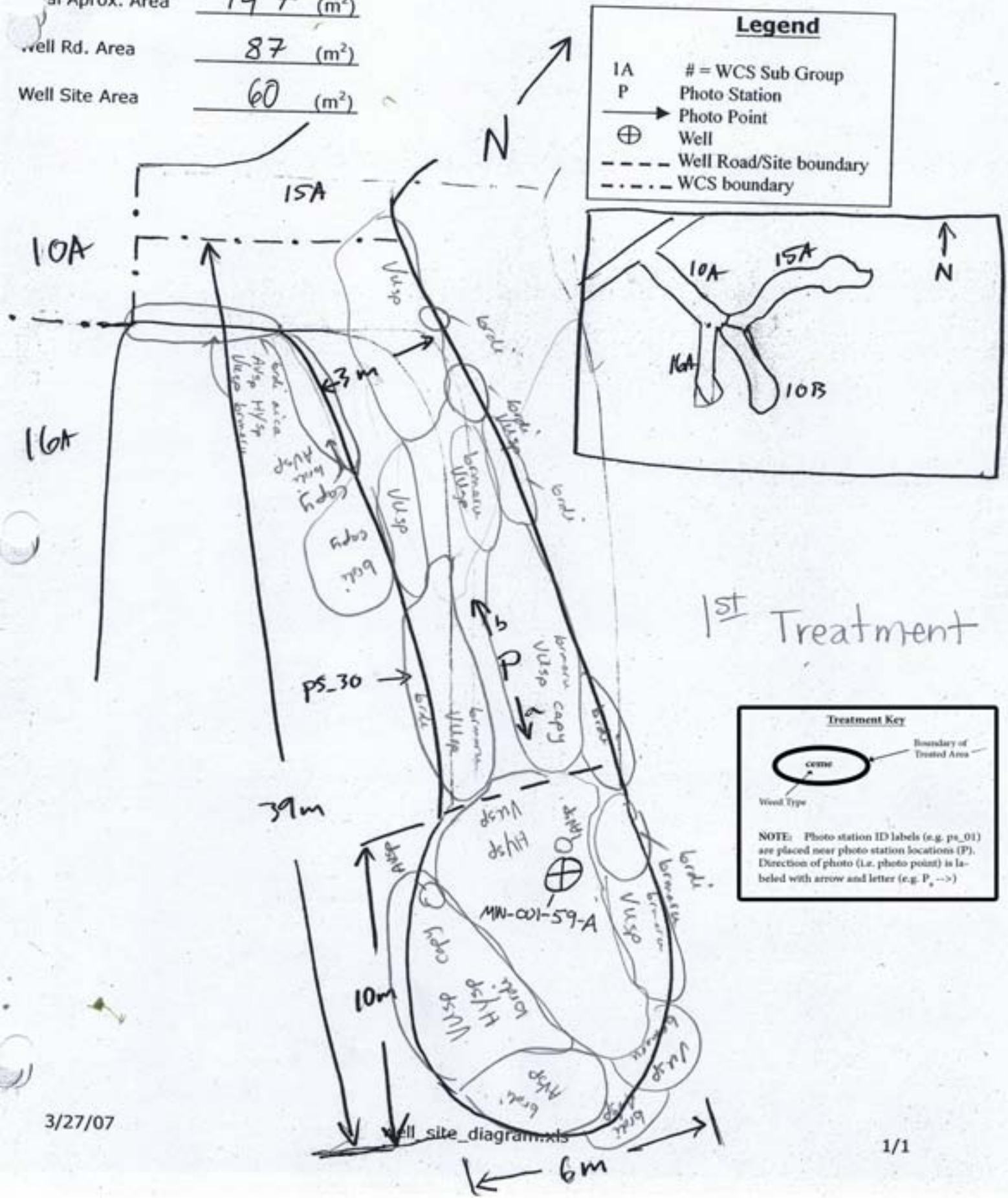
Date 5-5-2010

Surveyor CAE

al Aprox. Area 147 (m²)

Well Rd. Area 87 (m²)

Well Site Area 60 (m²)



3/27/07

well_site_diagram.xls

Well ID: EW-001-71A

WCS Sub Group 11A

Total Aprox. Area 329 (m^2)

Rd. Area 224 (m^2)

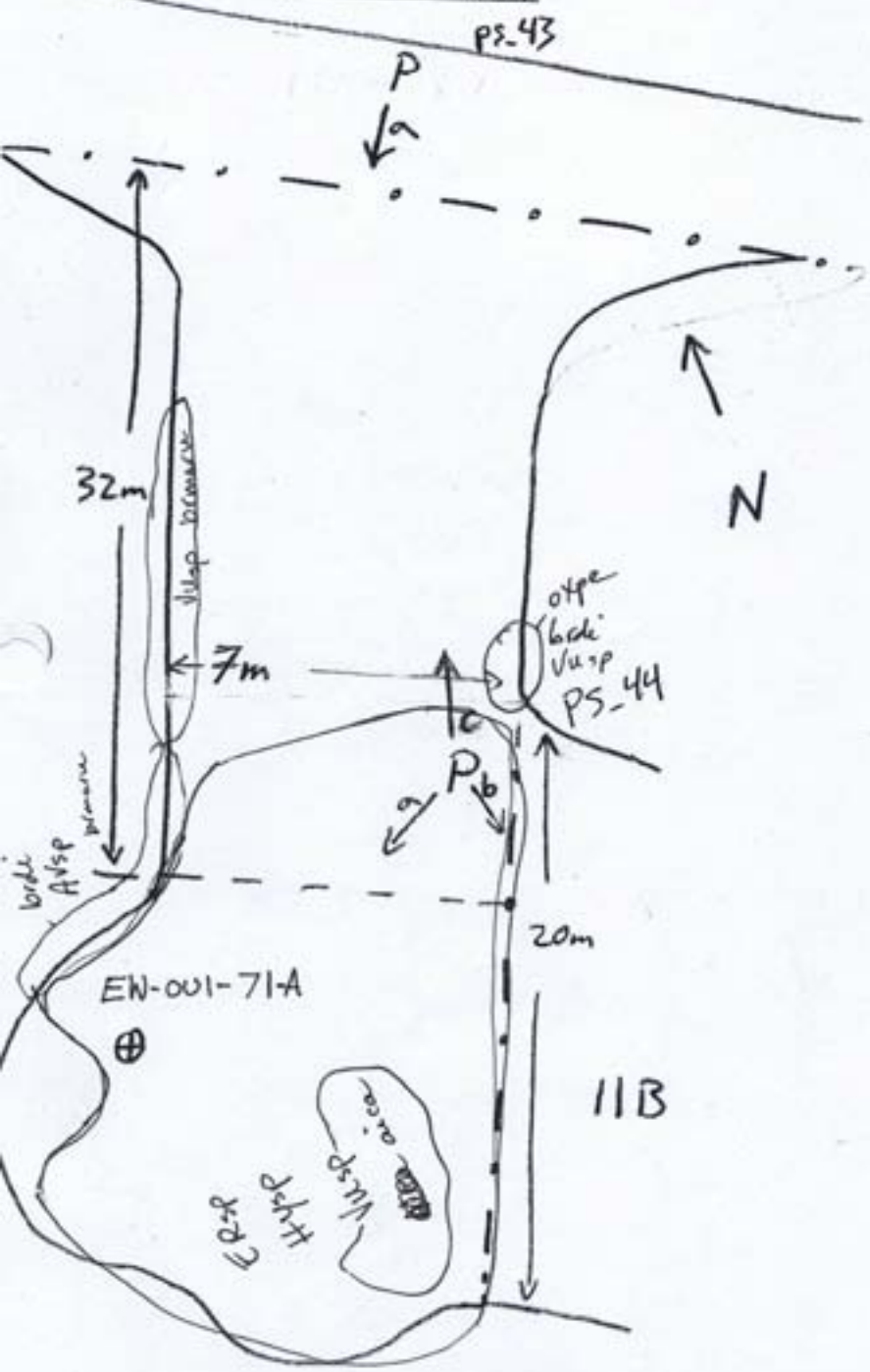
Well Site Area 105 (m^2)

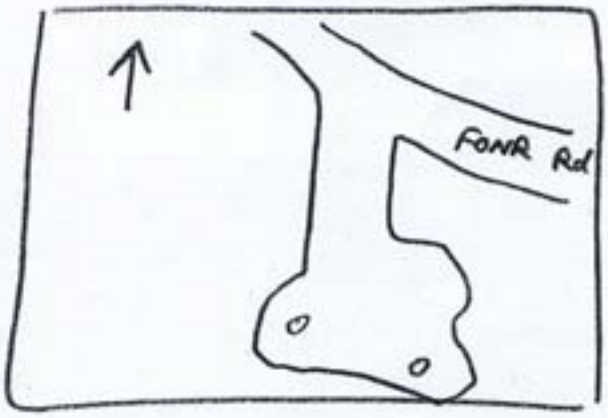
Date 3-29-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: EW-OUI-71A

WCS Sub Group 11A

Date 5-26-2010

Surveyor CAE

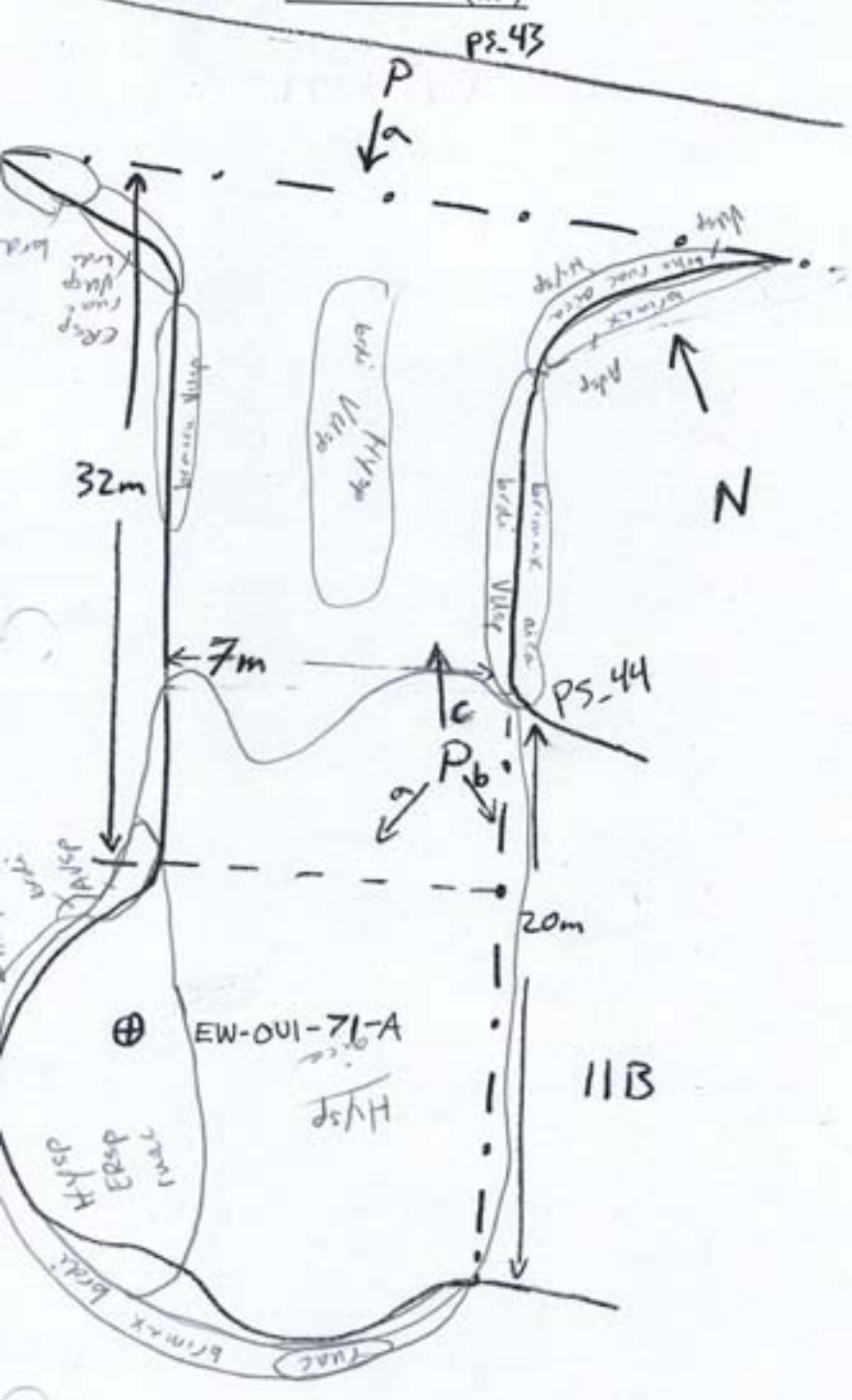
al Aprox. Area 329 (m^2)

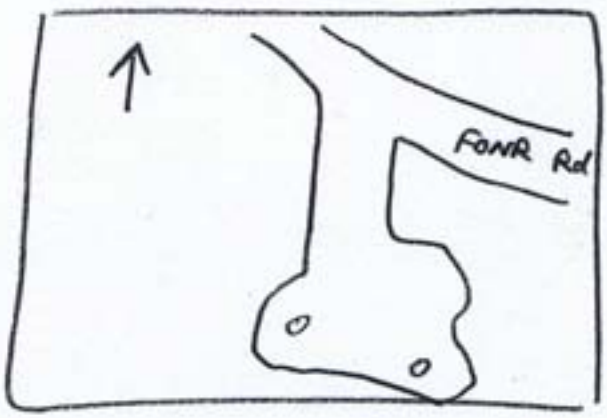
ll Rd. Area 224 (m^2)

Well Site Area 105 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OU1-86A

WCS Sub Group: 11B

Total Aprox. Area: 390 (m^2)

Well Rd. Area: N/A (m^2)

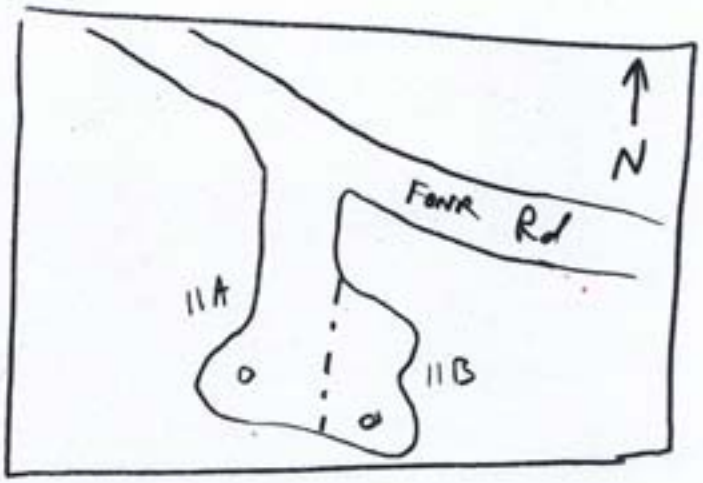
Well Site Area: 390 (m^2)

Date: 3-29-10

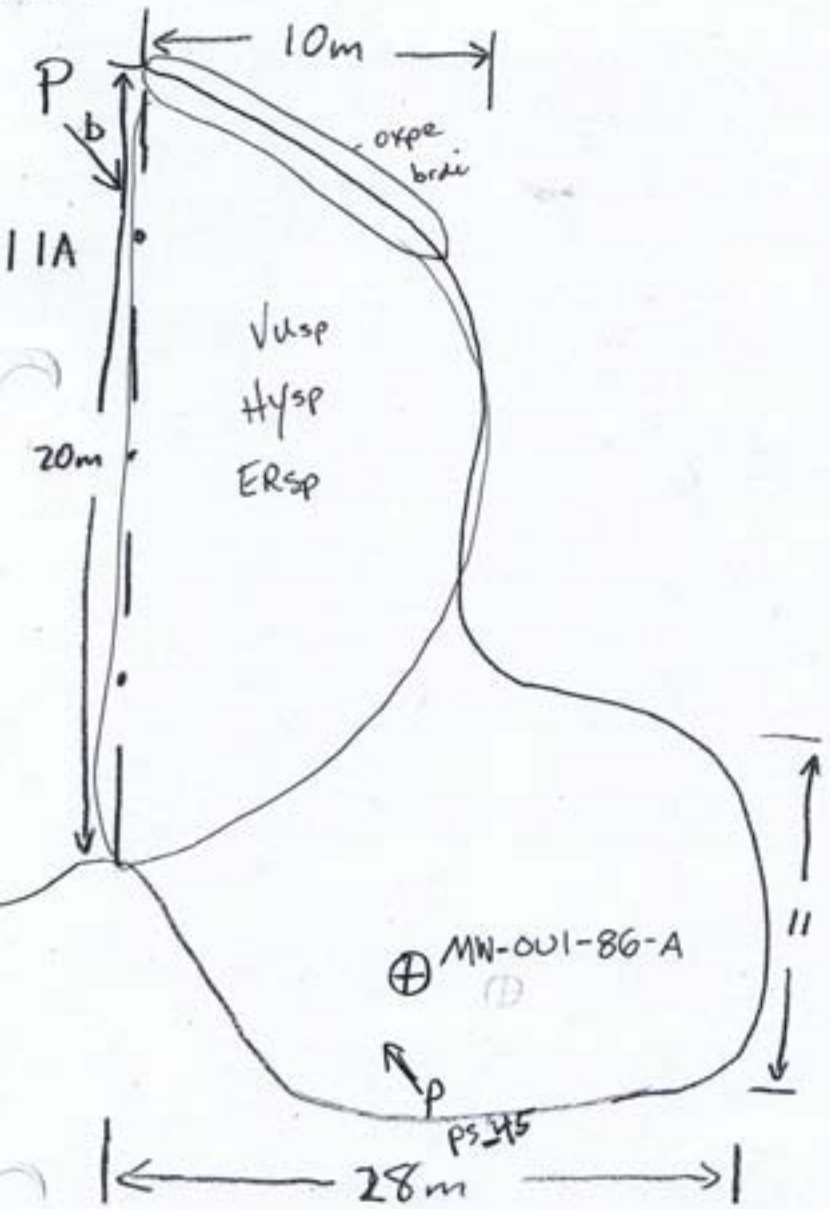
Surveyor: CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary



ps_44



1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OU1-86A

WCS Sub Group: 11B

Total Aprox. Area: 390 (m^2)

Rd. Area: N/A (m^2)

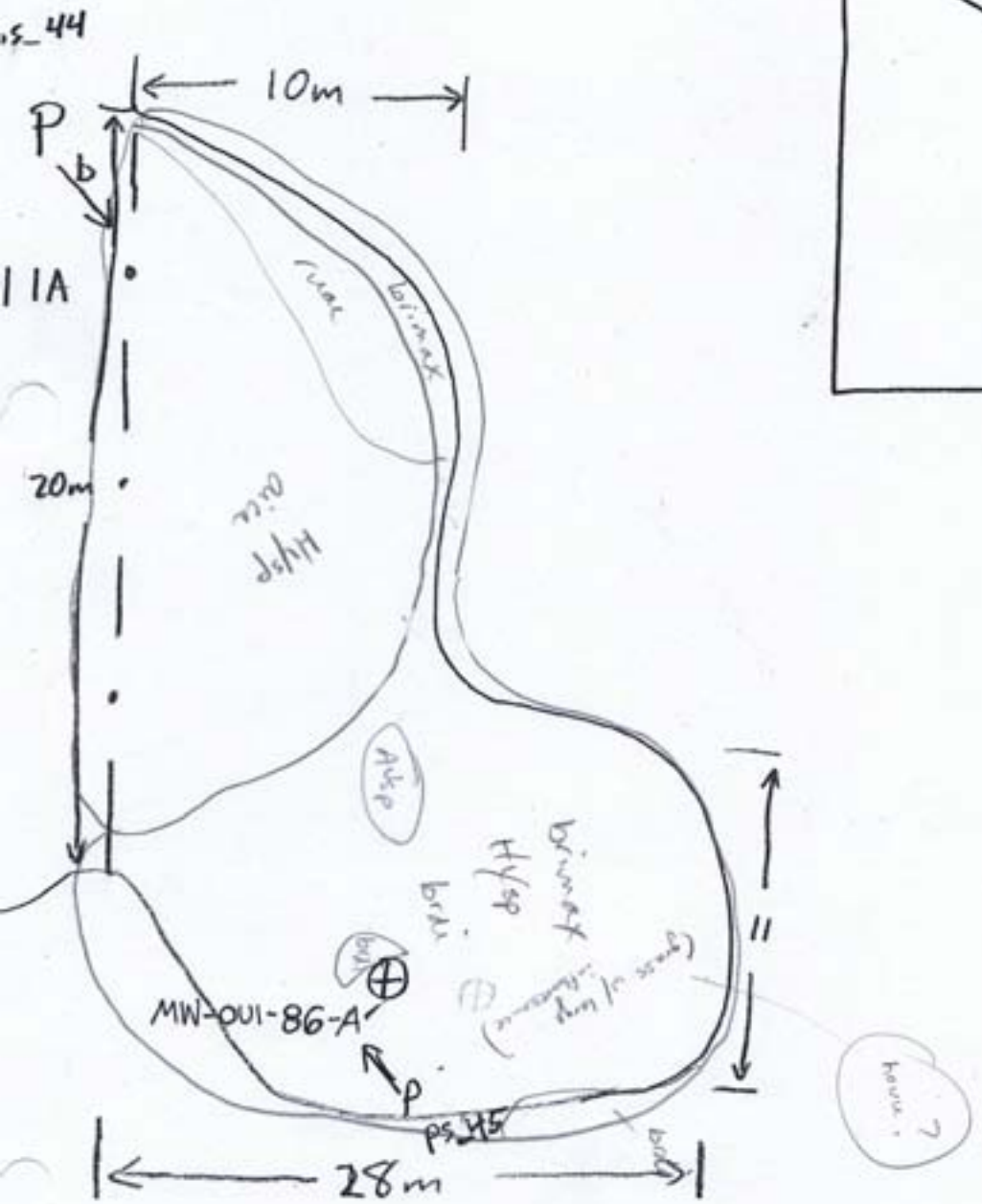
Well Site Area: 390 (m^2)

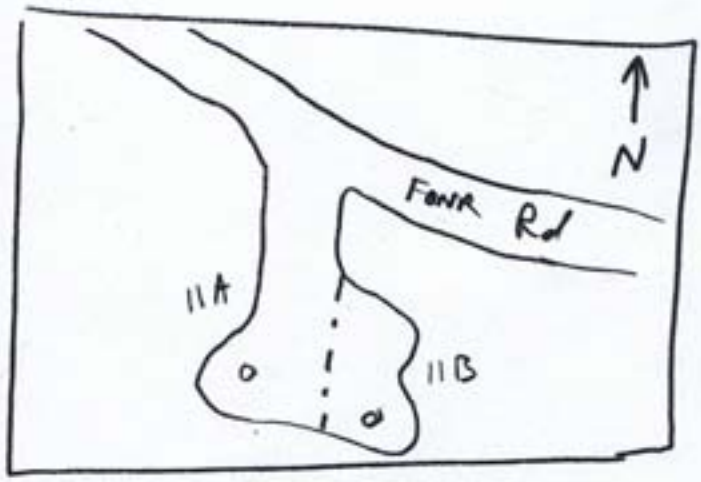
Date: 5-26-2010

Surveyor: CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P$_a$ -->)

Well ID: EW-001-72A

WCS Sub Group 12A

Total Aprox. Area 148 (m^2)

Well Rd. Area 128 (m^2)

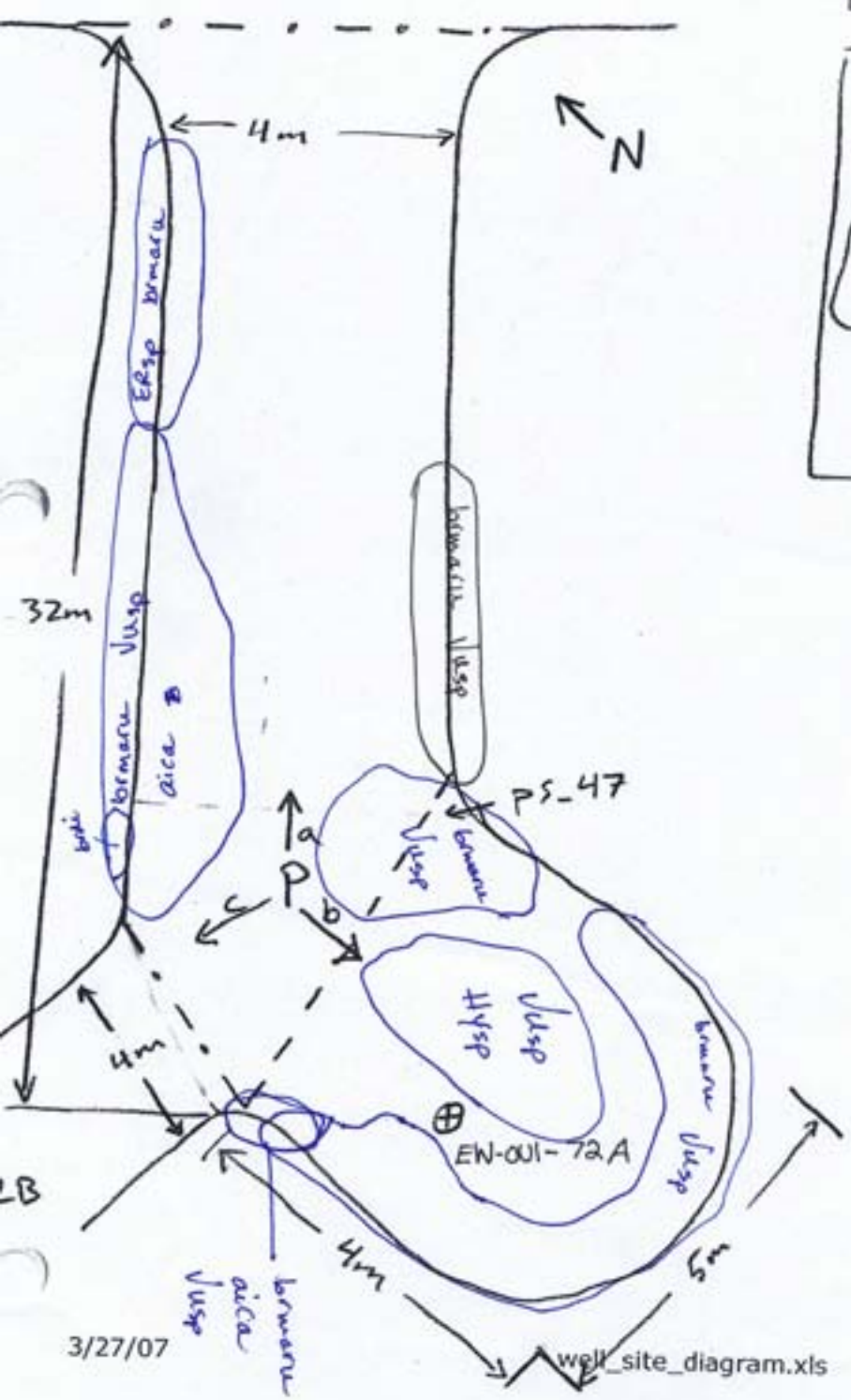
Well Site Area 20 (m^2)

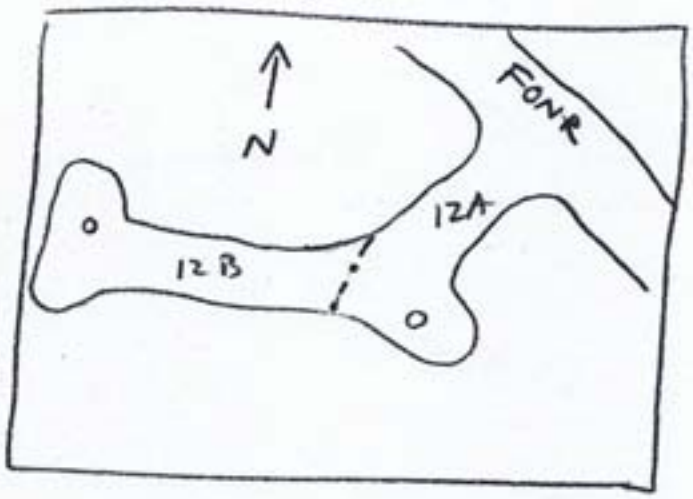
Date 3-29-10

Surveyor C+E

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: EW-001-72A

WCS Sub Group 12A

tal Aprox. Area 148 (m^2)

ell Rd. Area 128 (m^2)

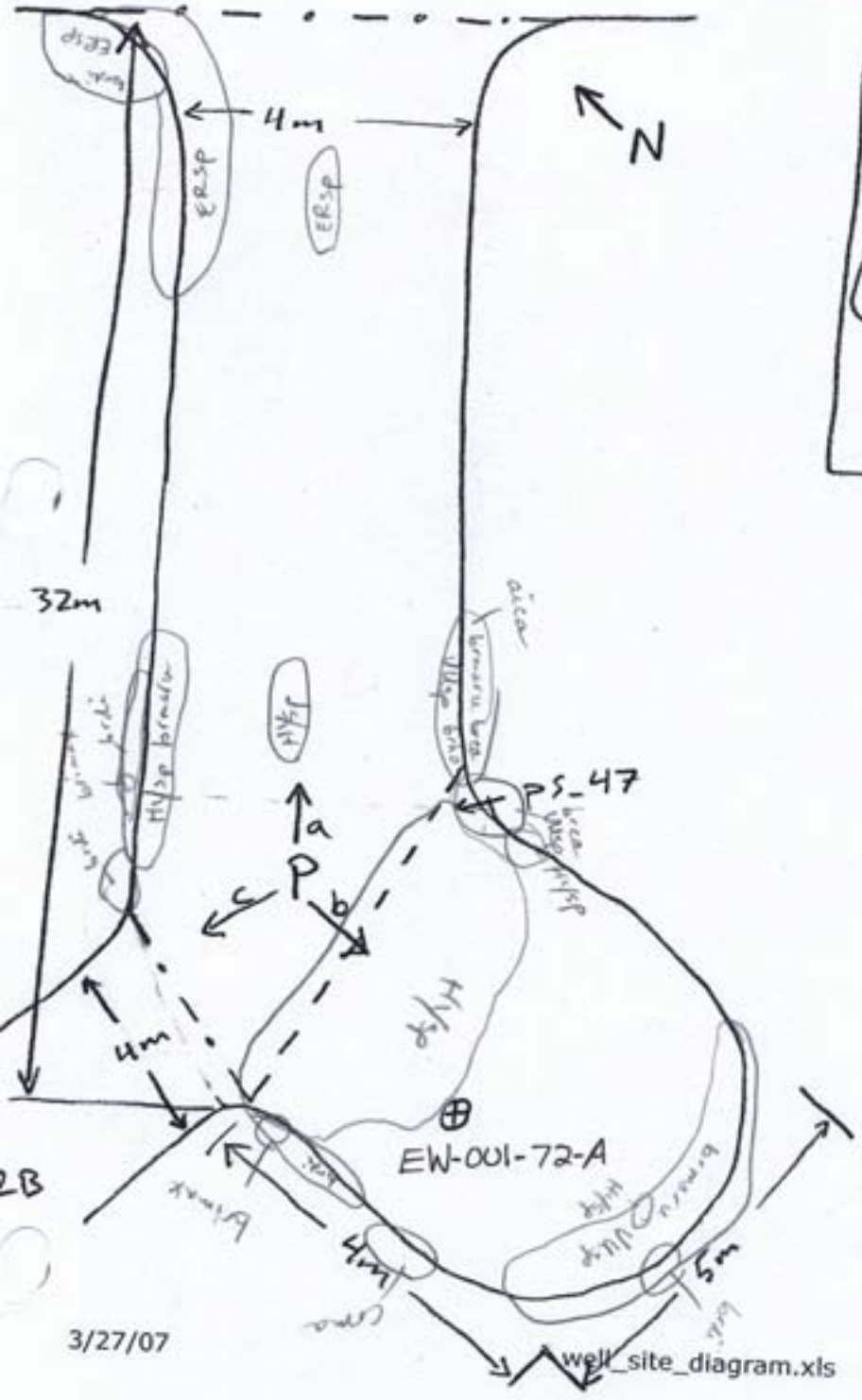
Well Site Area 20 (m^2)

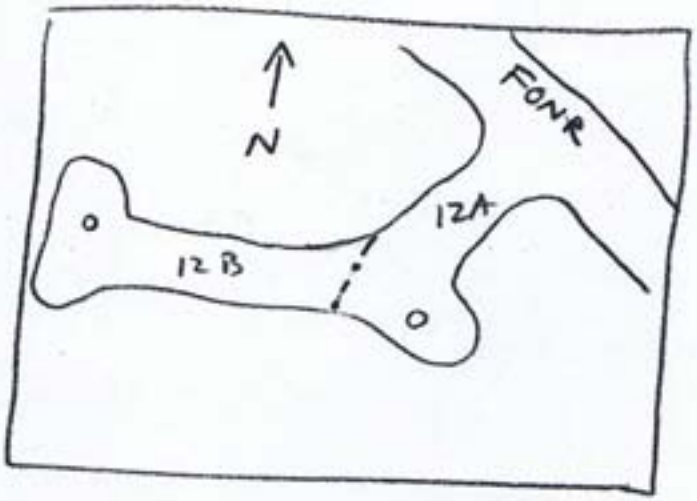
Date 5-26-2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

3/27/07

well_site_diagram.xls

Well ID: MW-OU1-85-A

WCS Sub Group 12B

Total Aprox. Area 164 (m^2)

Well Rd. Area 76 (m^2)

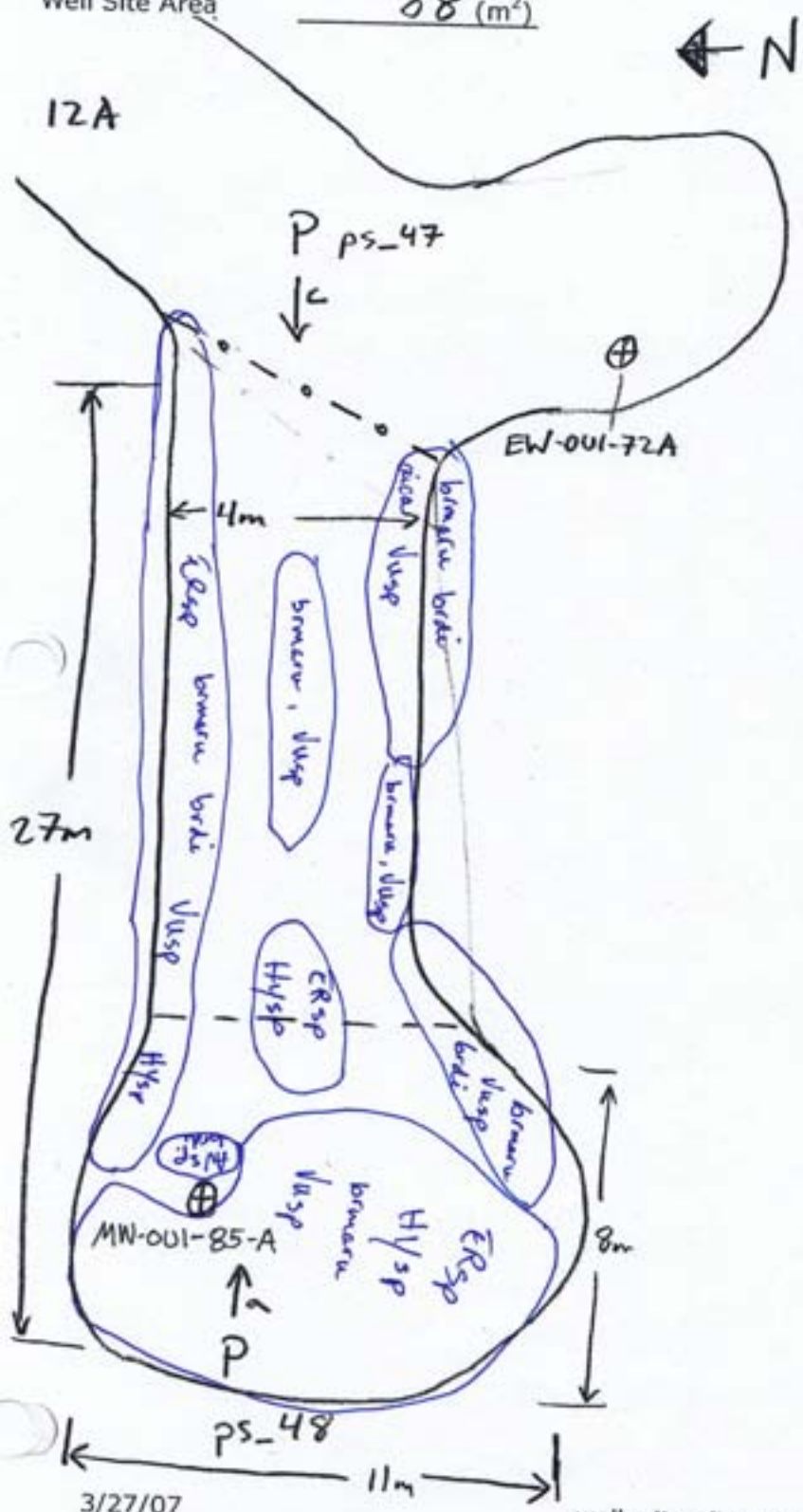
Well Site Area 88 (m^2)

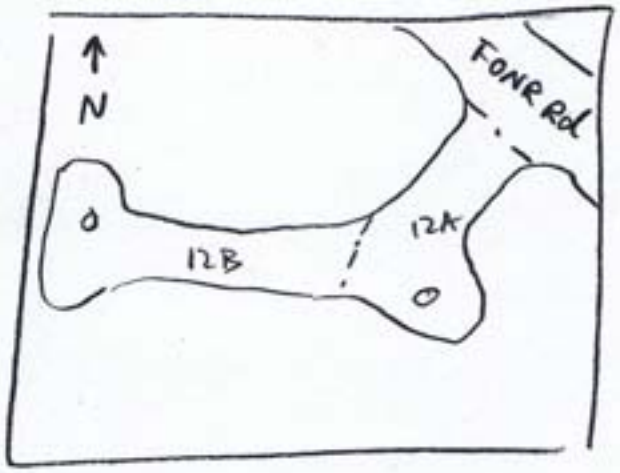
Date 3-29-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OU1-85-A

WCS Sub Group 12B

Total Aprox. Area 164 (m^2)

Well Rd. Area 76 (m^2)

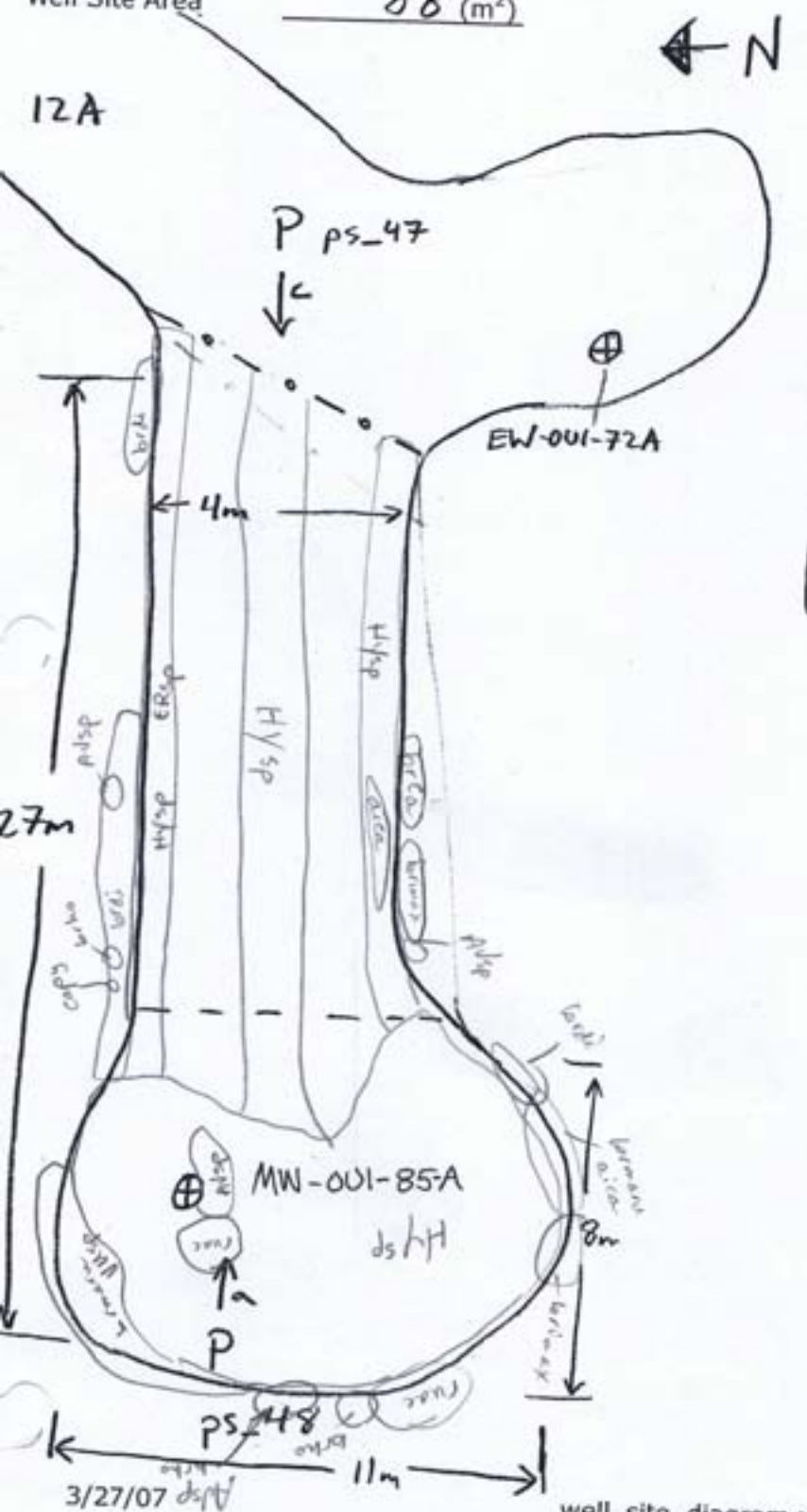
Well Site Area 88 (m^2)

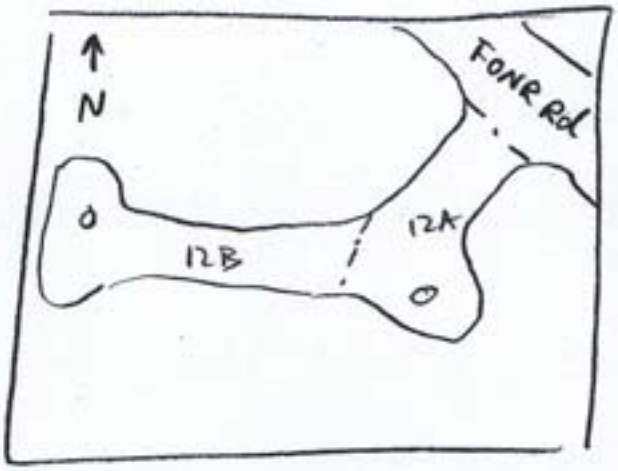
Date 5-26-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: IW-OU1-73A

WCS Sub Group 13A

Date 5-24-10

Surveyor CAE

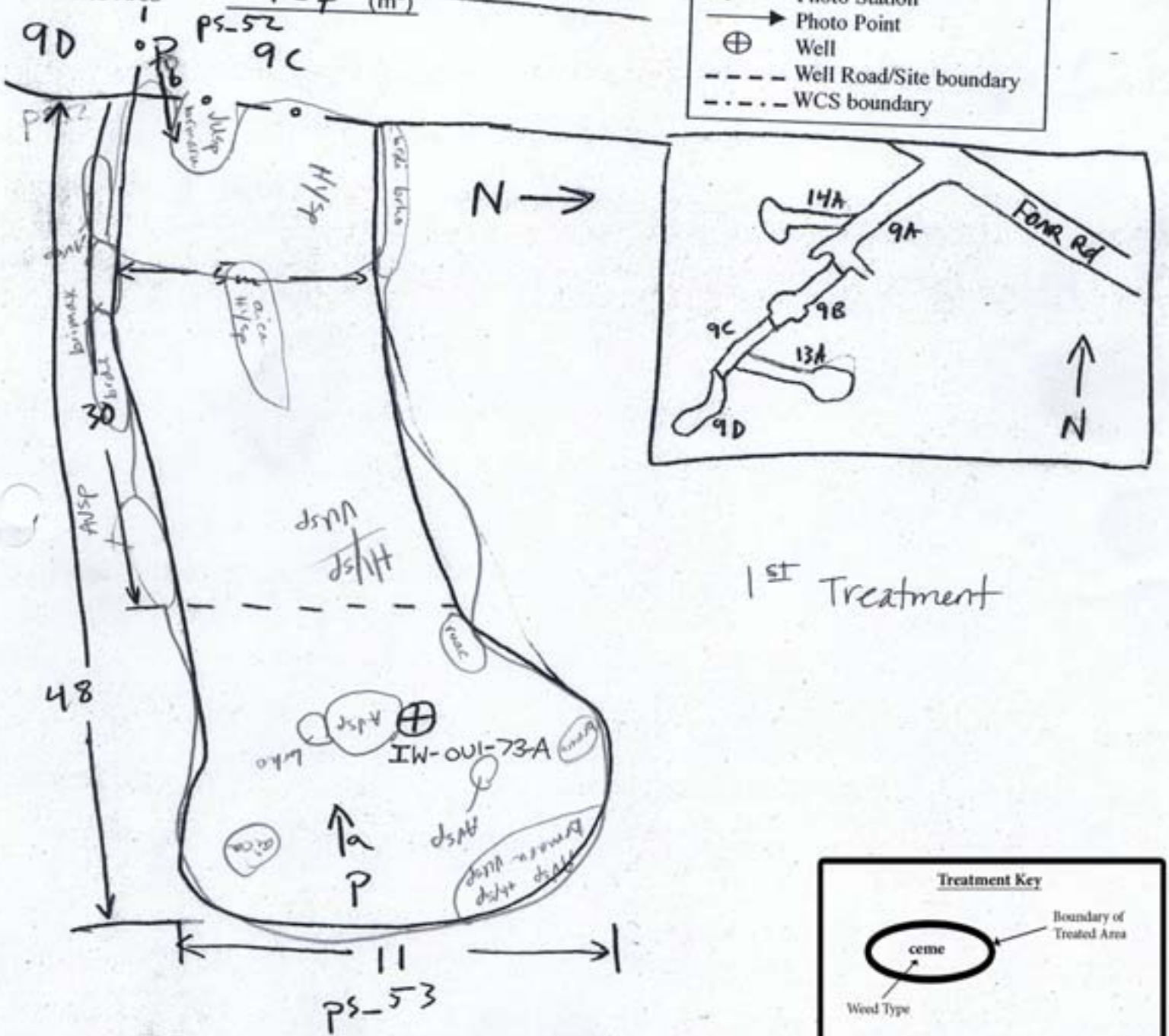
al Aprox. Area 277 (m^2)

ell Rd. Area 150 (m^2)

Well Site Area 127 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



1ST Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OU1-83A

WCS Sub Group 14A

Total Aprox. Area 327 (m^2)

Well Rd. Area 215 (m^2)

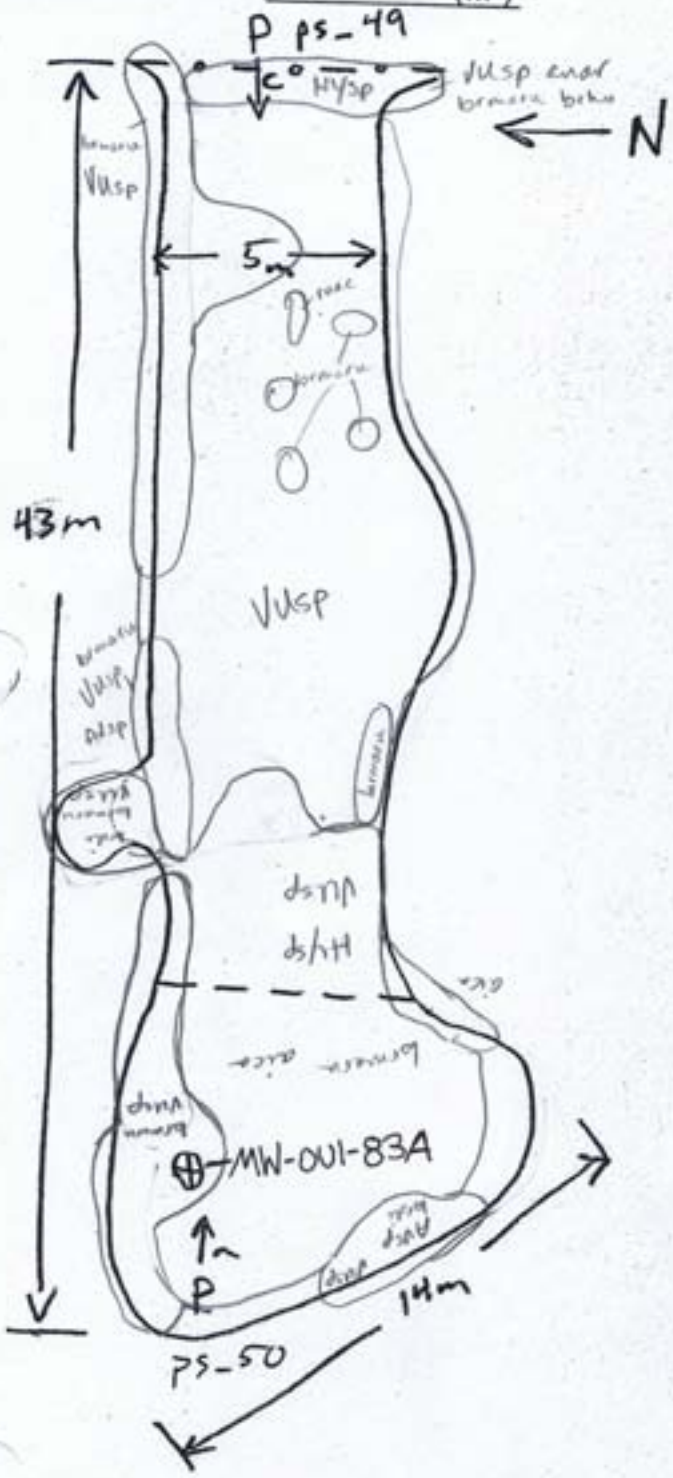
Well Site Area 112 (m^2)

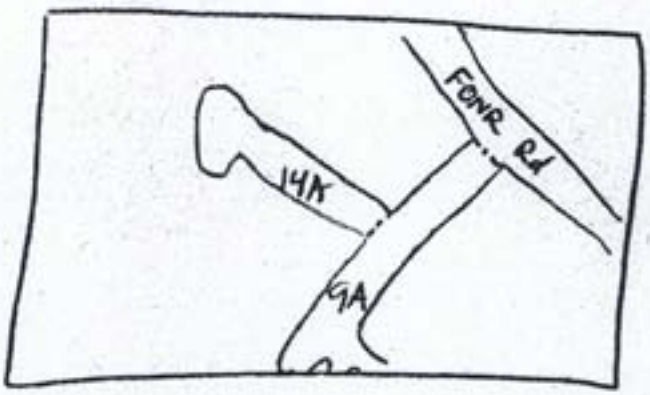
Date 5-19-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-001-82A

WCS Sub Group 15A

Total Aprox. Area 326 (m^2)

Well Rd. Area 208 (m^2)

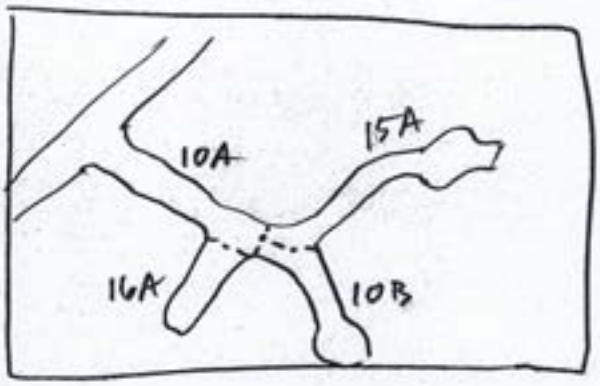
Well Site Area 118 (m^2)

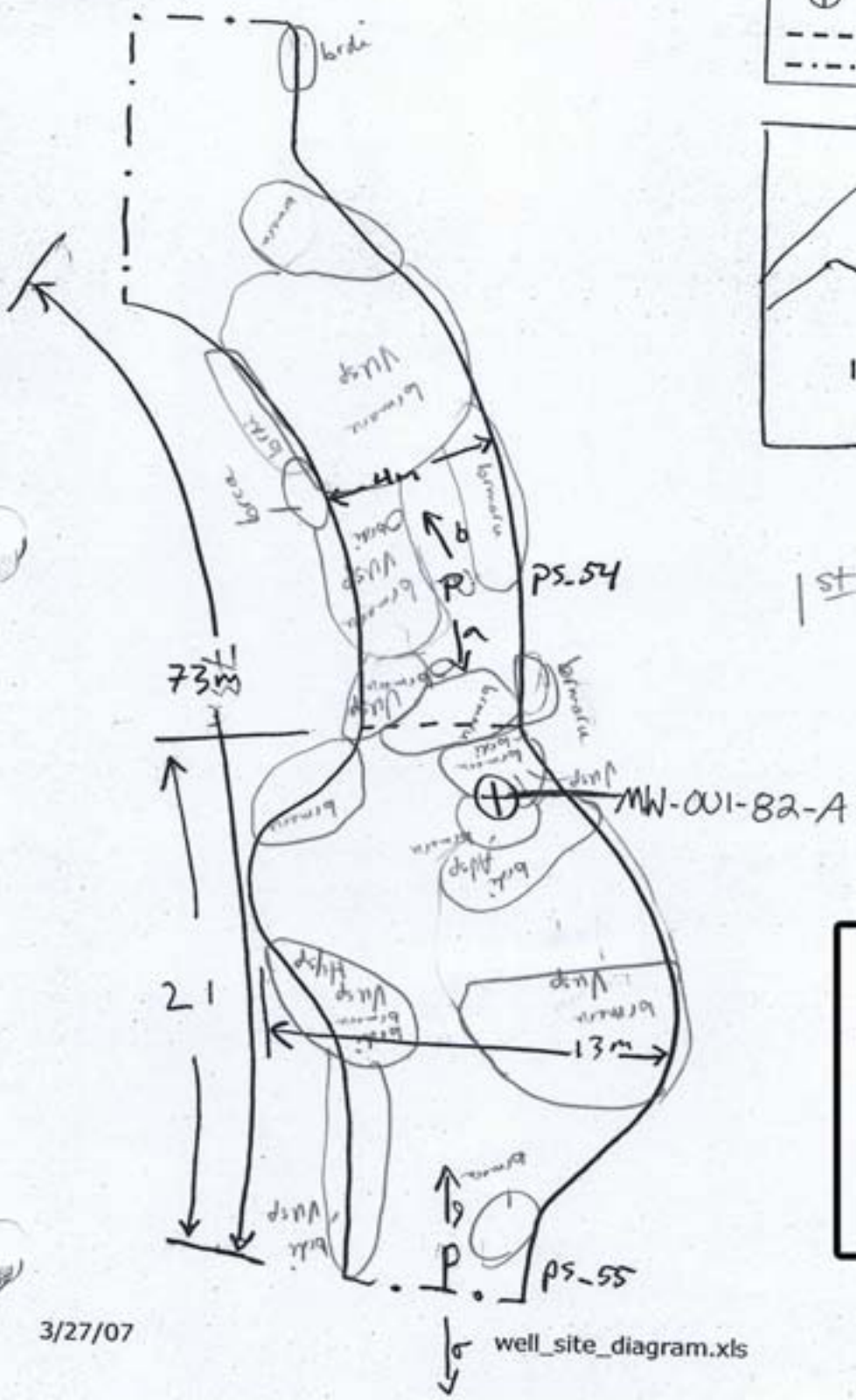
Date 5-5-2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: SB-OU1-2004K

WCS Sub Group 16A

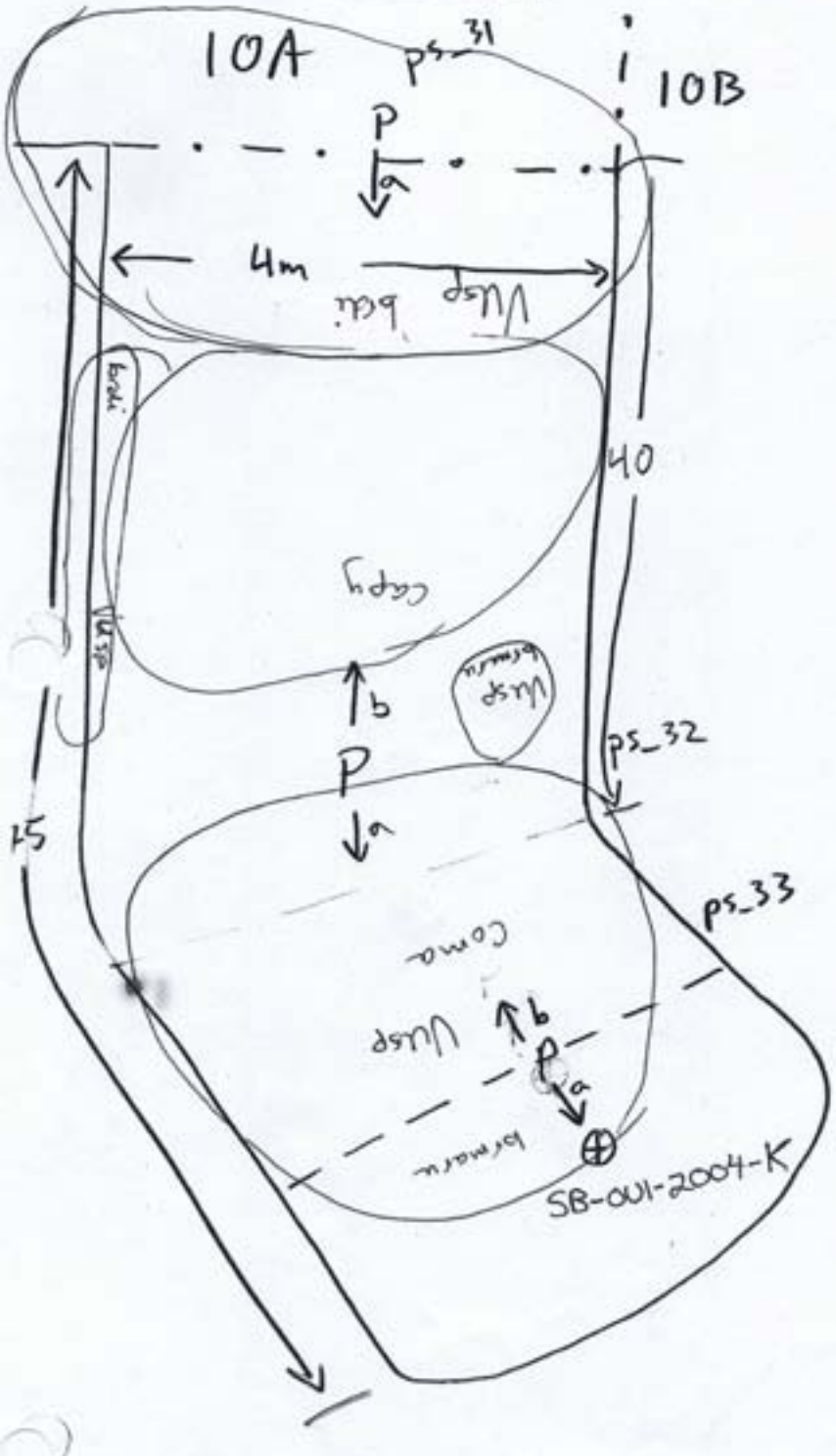
Total Aprox. Area 300 (m^2)

Rd. Area 160 (m^2)

Well Site Area 140 (m^2)

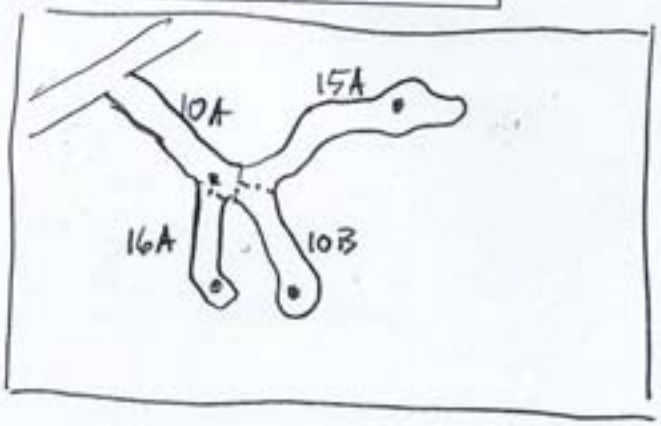
Date 3-10-2010

Surveyor CAE & STH



Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: SB-OU1-2004K

WCS Sub Group 16A

Total Aprox. Area 300 (m^2)

Well Rd. Area 160 (m^2)

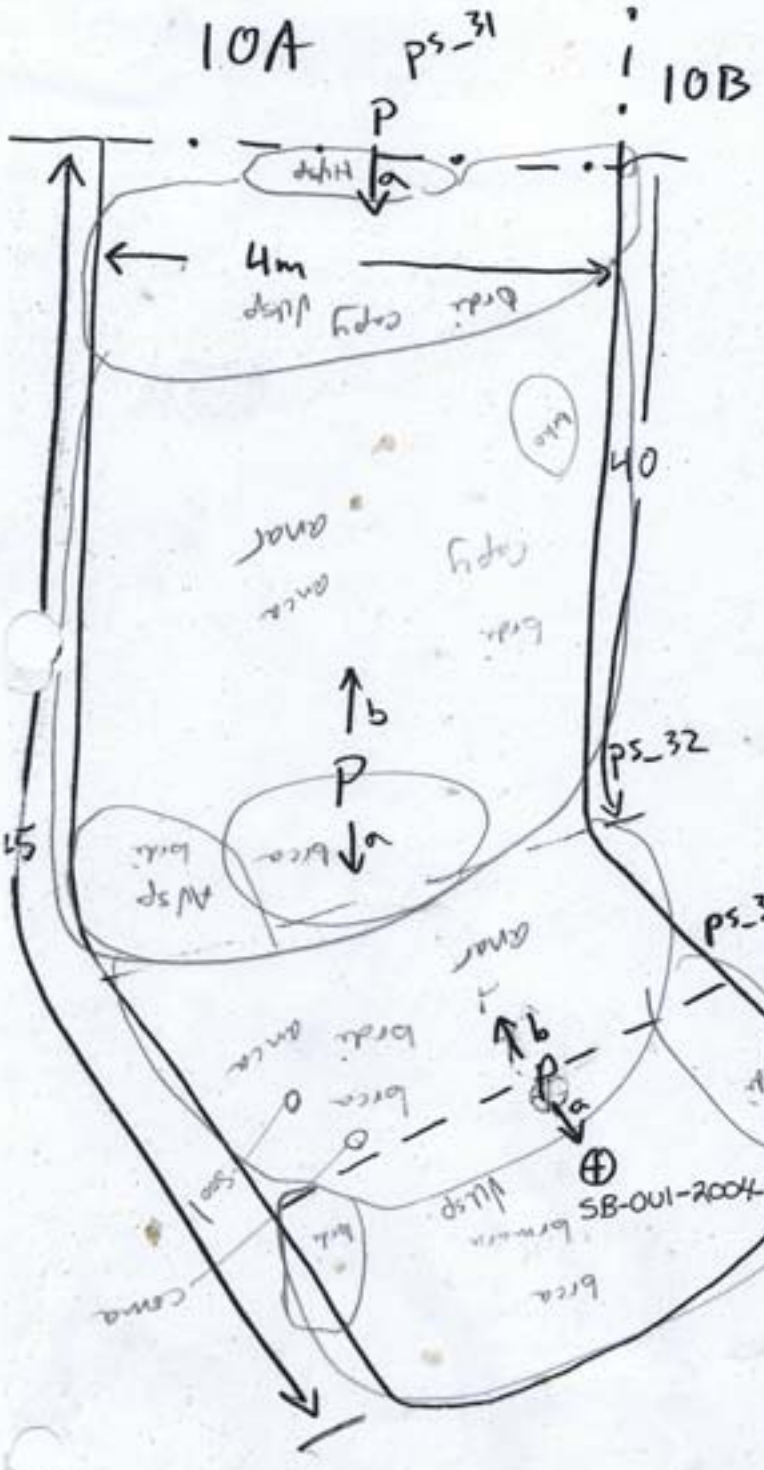
Well Site Area 140 (m^2)

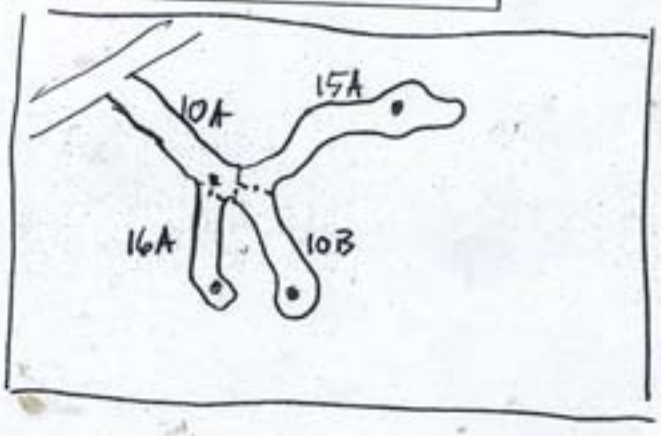
Date 5-10-2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a ->)

Well ID: PZ-OU1-02-A / IW-OU1-02-A

Date: 3-17-10

WCS Sub Group: 17A

Surveyor: CAE

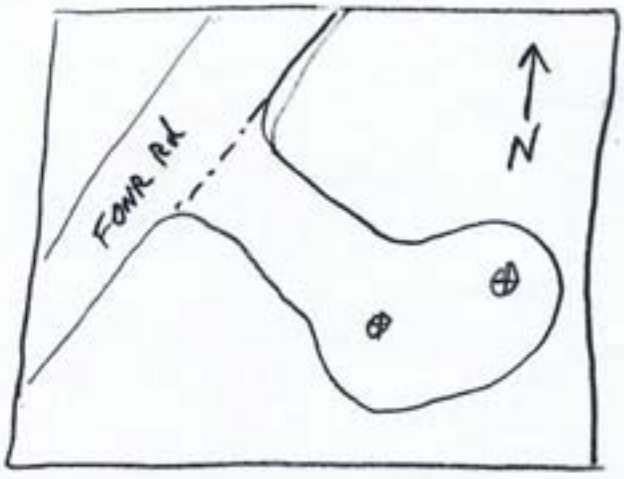
Total Aprox. Area: 100 (m^2)

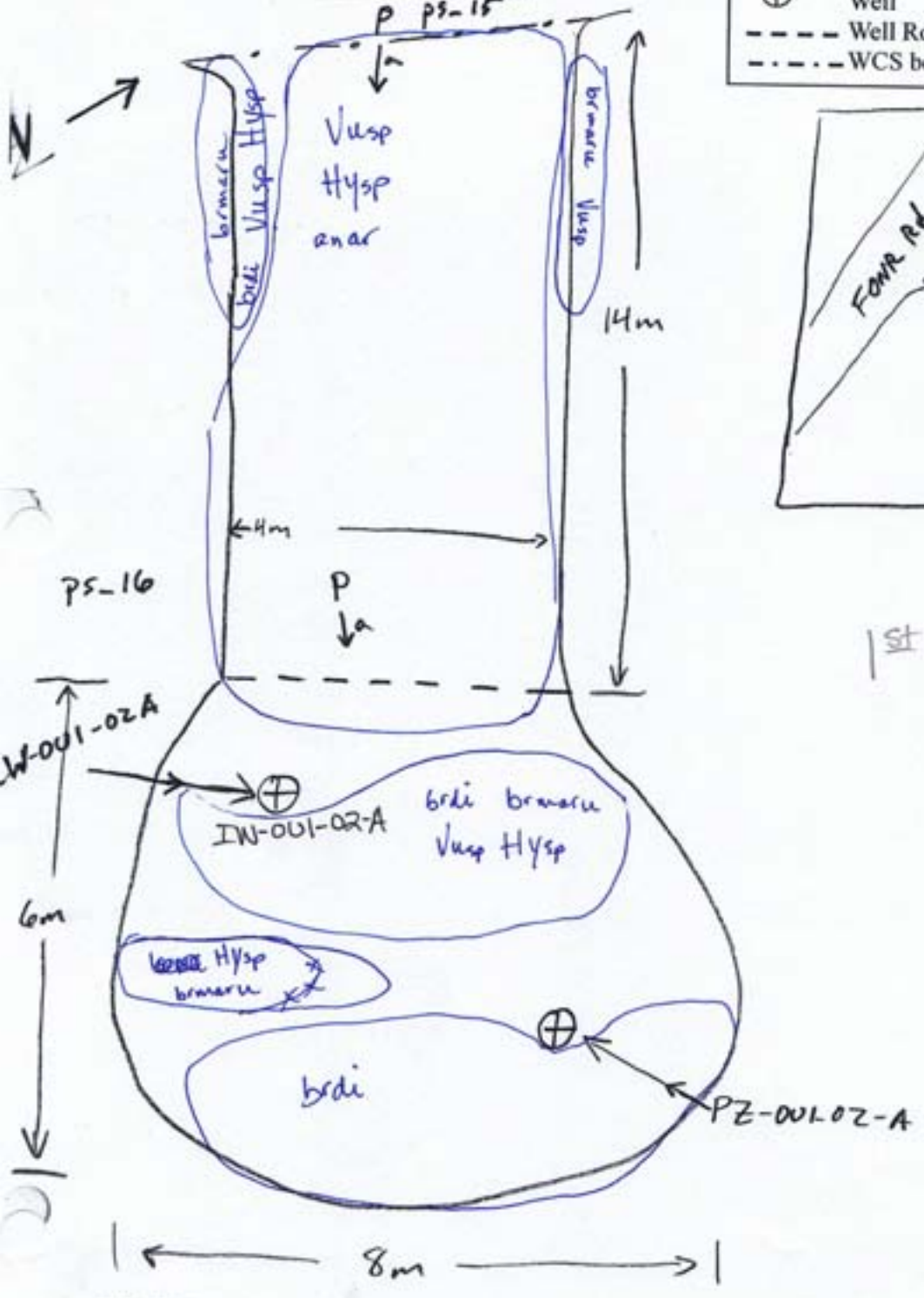
Well Rd. Area: 48 (m^2)

Well Site Area: 52 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: PZ-OU1-02-A / IW-OU1-02-A

Date: 4-14-10

WCS Sub Group: 17A

Surveyor: CAE

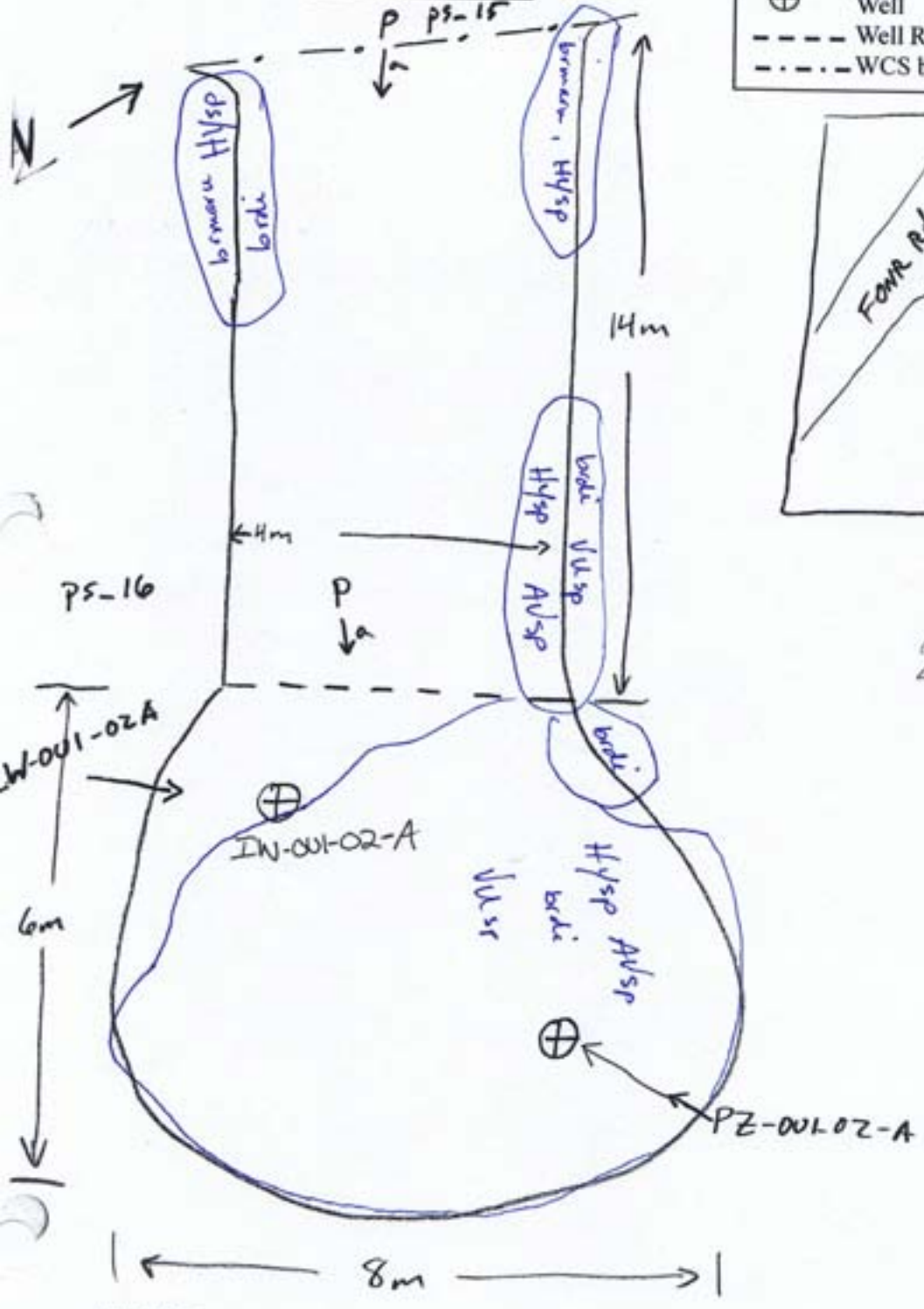
Total Aprox. Area: 100 (m^2)

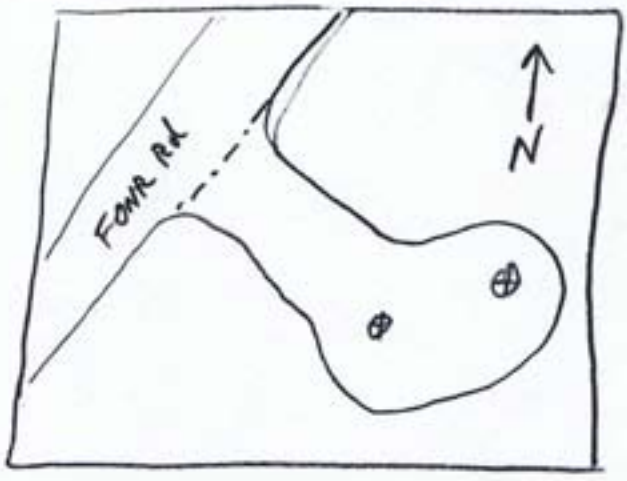
Well Rd. Area: 48 (m^2)

Well Site Area: 52 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: PZ-OU1-02-A / IW-OU1-02-A

Date: 6-2-10

WCS Sub Group: 17A

Surveyor: CAE

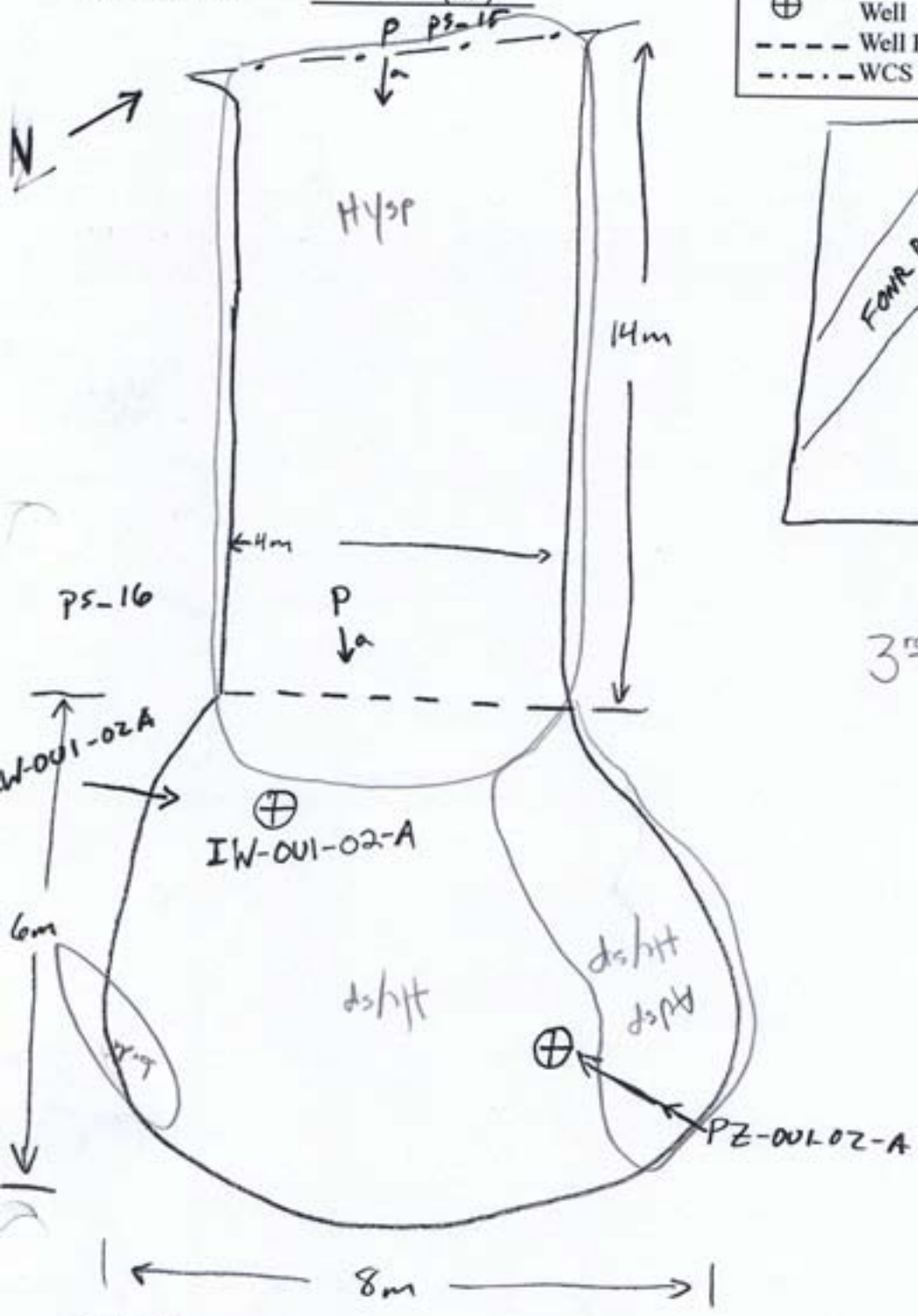
Total Aprox. Area: 100 (m^2)

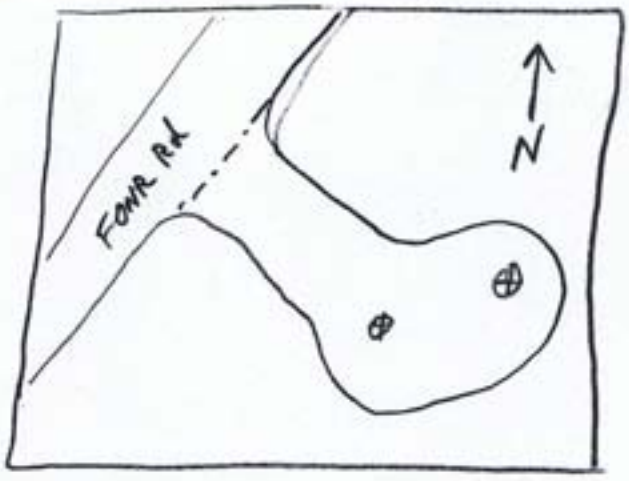
Well Rd. Area: 48 (m^2)

Well Site Area: 52 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
-·-·-	WCS boundary





3rd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

Well ID: MW-OUI-88-A

WCS Sub Group 18A

Total Aprox. Area 168 (m^2)

Well Rd. Area 56 (m^2)

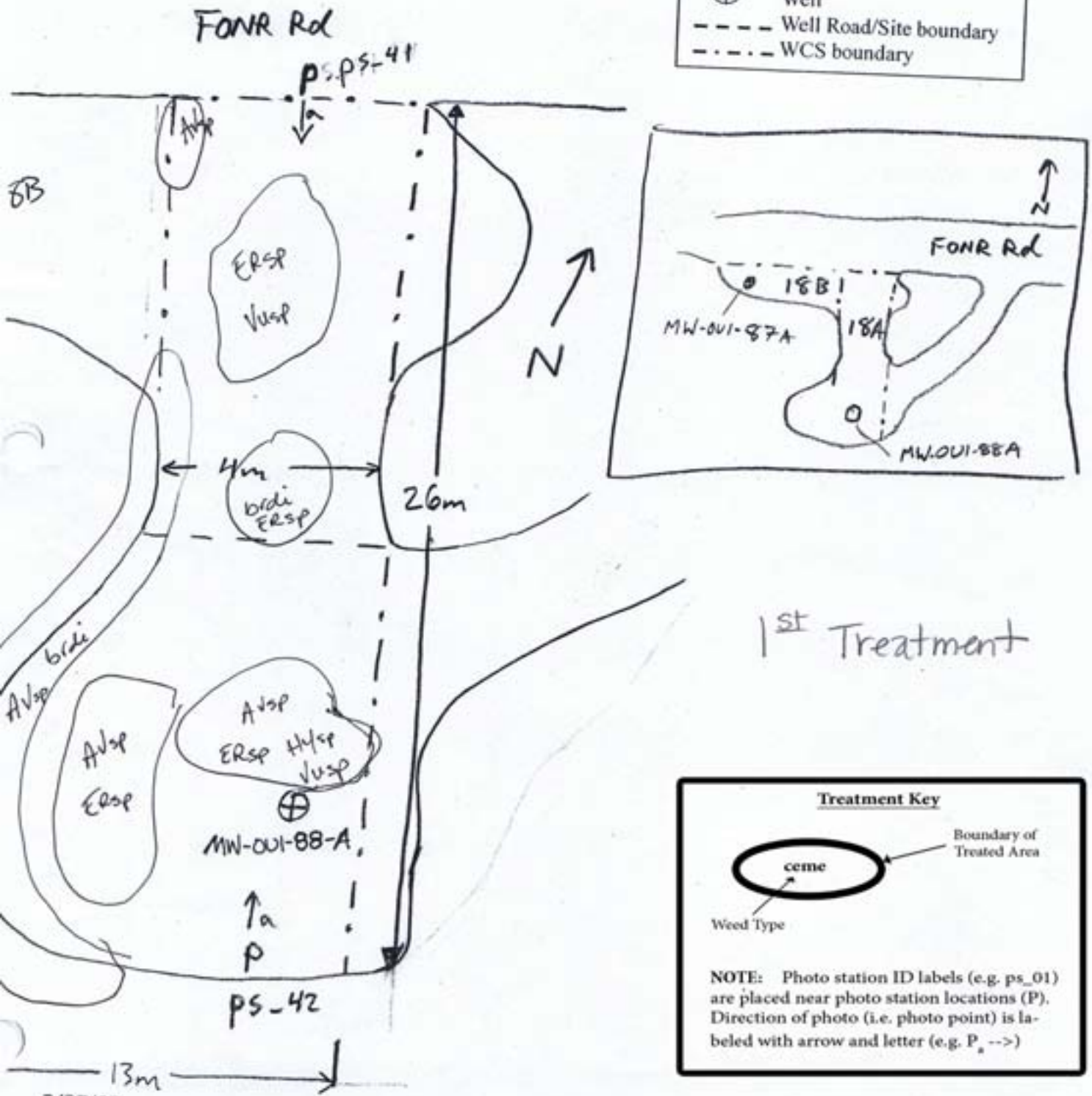
Well Site Area 112 (m^2)

Date 3-29-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary



1st Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

3/27/07

Well ID: MW-OU1-88-A

WCS Sub Group 18A

Total Aprox. Area 168 (m^2)

Well Rd. Area 56 (m^2)

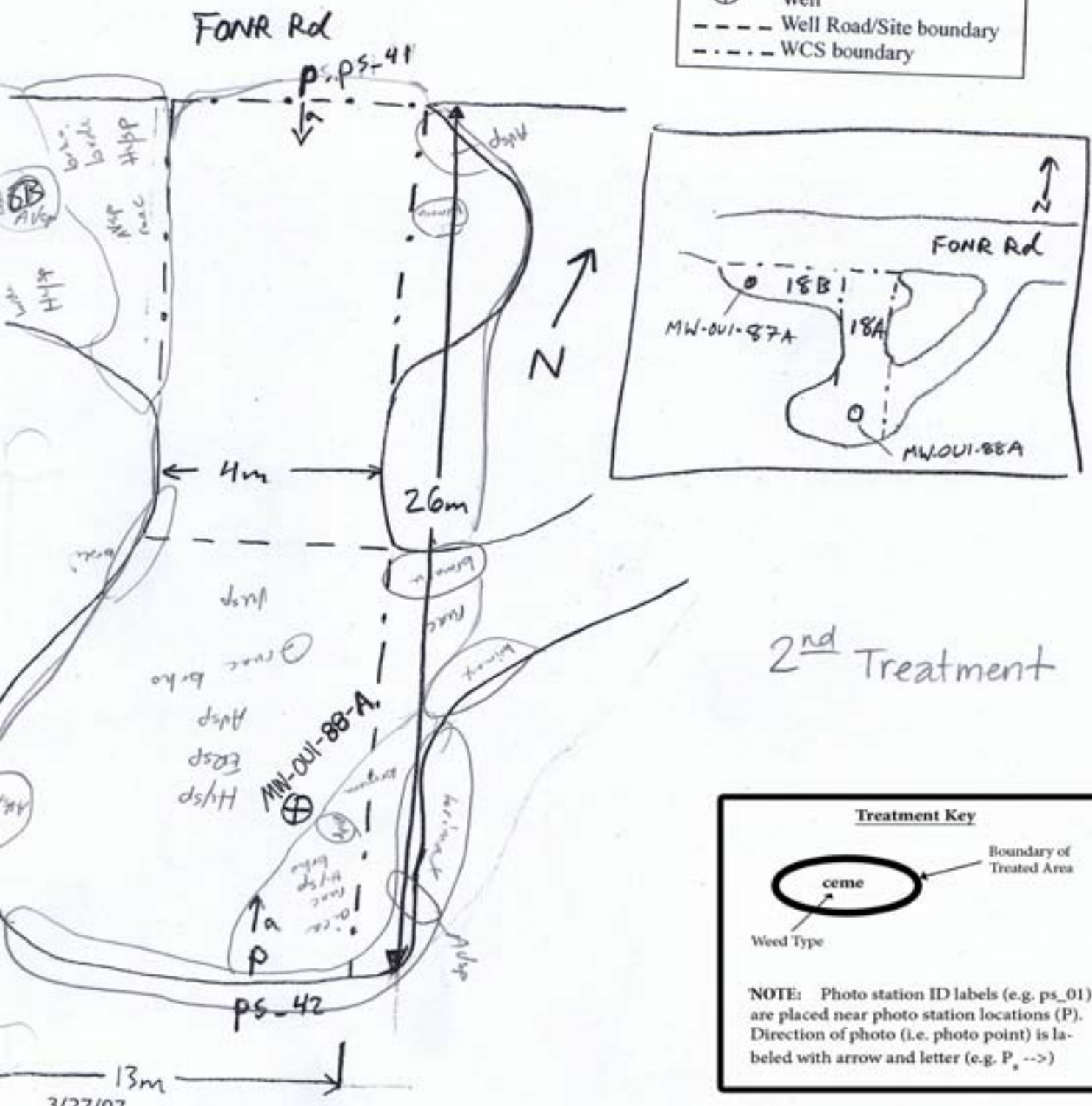
Well Site Area 112 (m^2)

Date 6-2-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary



2nd Treatment

Treatment Key

NOTE: Photo station ID labels (e.g. ps_01) are placed near photo station locations (P). Direction of photo (i.e. photo point) is labeled with arrow and letter (e.g. P_a -->)

3/27/07

Attachment 2

‘RARE PLANT SURVEY DATA 2010’

The attached spreadsheet (HGL_WCS_RarePlant_2010.xls) contains rare plant survey data from pre-treatment rare plant surveys within each Weed Control Segment (WCS) during the 2010 weed control program within the Operable Unit 1 portion of the FONR.

HGL - WCS Rare Plant Survey Data 2010

sand gilia (*Gilia tenuiflora ssp. arenaria*) patch count and density class summary pivot table

Count of Patch ID	WCS		
Density	**5A**	**6A**	**Grand Total**
VH		1	**1**
H		2	**2**
M		2	**2**
L	1	9	**10**
VL	1	9	**10**
Grand Total	**2**	**23**	**25**

sand gilia (*Gilia tenuiflora ssp. arenaria*) patch area (m^2) and density class summary pivot table

Sum of Area (m2)	WCS		
Density	**5A**	**6A**	**Grand Total**
VH		4	**4**
H		7	**7**
M		5	**5**
L	1	10	**11**
VL	1	9	**10**
Grand Total	**2**	**35**	**37**

HGL - WCS Rare Plant Survey Data 2010

Monterey spineflower (*Chorizanthe pungens var. pungens*) patch count and cover class summary pivot table

Count of Patch ID	WCS																	
Coverage	**01A**	**02A**	**04A**	**05A**	**06A**	**07A**	**09A**	**09B**	**09C**	**09D**	**10A**	**10B**	**11A**	**12B**	**13A**	**14A**	**15A**	**16A**	**Grand Total**
H			1	5			14				5	1				5		1	**32**
M			5	14			22	6	13	1	11	4				19	1	1	**97**
S	1		9	14	8	5	24	28	29	7	13	7	10	4	1	37	11		**208**
VS		1	15	15	18	4	27	22	22	7	7	10	6	1	6	18	12	1	**192**
Grand Total	**1**	**1**	**30**	**48**	**26**	**9**	**87**	**56**	**64**	**15**	**36**	**22**	**16**	**5**	**7**	**79**	**24**	**3**	**529**

Monterey spineflower (*Chorizanthe pungens var. pungens*) patch area (m^2) and cover class summary pivot table

Sum of Area (m2)	WCS																	
Coverage	**01A**	**02A**	**04A**	**05A**	**06A**	**07A**	**09A**	**09B**	**09C**	**09D**	**10A**	**10B**	**11A**	**12B**	**13A**	**14A**	**15A**	**16A**	**Grand Total**
H			2	23			40.5				57	6.5				17		9	**155**
M			10	36			41.5	13	20	4	44	4				31.5	1	1	**206**
S	2		10	26	16	5	51	31	43	10.5	13	7	18	4	1	62.5	11		**311**
VS		1	15	15	22	4	29	24	24	7	7	10	6	1	6	18	12	1	**202**
Grand Total	**2**	**1**	**37**	**100**	**38**	**9**	**162**	**68**	**87**	**21.5**	**121**	**27.5**	**24**	**5**	**7**	**129**	**24**	**11**	**874**

HGL - WCS Rare Plant Survey Data 2010
sand gilia (Gilia tenuiflora ssp. arenaria) survey data

AM = Adrienne Mages	Gilia Density:
CAE = Charles Endris	Very High (VH): > 51 / m2
SM = Sean McStay	High (H): 21-50 / m2
	Medium (M): 11-20 / m2
	Low (L) 3-10 / m2
	Very Low (VL): 1-2 / m2

Date	WCS	Well ID	Surveyor	Patch ID	Density	Area (m^2)
28-Apr-10	5A	IW-OU1-01A	AFM	AM200	VL	1
28-Apr-10	5A	IW-OU1-01A	AFM	AM201	L	1
17-Mar-10	6A	EW-OU1-53-A	STM	NOTE: No patehes mapped on 2010-03-17- Pre-Treatment survey - too early in season for accurate gilia survey (i.e. many plants still germenating but some rosettes present. Patches mapped to identify areas to avoid during treatment.		
14-Apr-10	6A	EW-OU1-53-A	AFM	AM03	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM04	L	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM05	L	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM07	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM09	L	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM10	L	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM19	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM20	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM21	L	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM22	M	3
14-Apr-10	6A	EW-OU1-53-A	AFM	AM23	L	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM24	L	2
14-Apr-10	6A	EW-OU1-53-A	AFM	AM25	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM28	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM29	VH	4
14-Apr-10	6A	EW-OU1-53-A	AFM	AM30	L	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM31	H	4
14-Apr-10	6A	EW-OU1-53-A	AFM	AM32	M	2
14-Apr-10	6A	EW-OU1-53-A	AFM	AM35	L	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM37	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM40	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM43	VL	1
14-Apr-10	6A	EW-OU1-53-A	AFM	AM44	H	3

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

AM = Adrienne Mages	Chorizanthe Coverage:
CAE = Charles Endris	Very High (VH): > 98 % coverage
SM = Sean McStay	High (H): 76-97 % coverage
	Medium (M): 26-75 % coverage
	Sparse (S) 3-25 % coverage
	Very Sparse (VS): 1-2 % coverage

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
21-Apr-10	01A	N/A - Staging Area	AFM	AM46	S	2
21-Apr-10	02A	N/A - Staging Area	AFM	AM50	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE01	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE02	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE03	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE04	S	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE05	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE06	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE07	S	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE08	M	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE09	S	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE10	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE11	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE12	S	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE13	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE14	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE15	S	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE16	M	5
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE17	S	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE18	M	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE19	M	2
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE20	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE21	S	2
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE22	H	2
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE23	M	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE24	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE25	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE26	S	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE27	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE28	S	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE29	VS	1
26-Apr-10	04A	IW-OU1-05-A	CAE	CAE30	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE31	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE32	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE33	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE34	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE35	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE36	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE37	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE38	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE39	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE40	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE41	VS	1

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE42	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE43	M	5
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE44	H	2
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE45	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE46	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE47	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE48	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE49	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE50	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE51	H	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE52	M	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE53	S	2
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE54	VS	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE55	M	4
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE56	M	2
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE57	M	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE58	M	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE59	S	2
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE60	M	4
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE61	H	18
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE62	H	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE63	S	2
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE64	M	2
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE65	M	4
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE66	H	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE67	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE68	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE69	M	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE70	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE71	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE72	S	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE73	M	3
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE74	M	1
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE75	M	5
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE76	M	2
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE77	S	9
26-Apr-10	05A	IW-OU1-01-A	CAE	CAE78	S	2
14-Apr-10	06A	EW-OU1-53-A	AFM	AM01	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM02	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM06	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM08	S	3
14-Apr-10	06A	EW-OU1-53-A	AFM	AM11	S	2
14-Apr-10	06A	EW-OU1-53-A	AFM	AM12	S	2
14-Apr-10	06A	EW-OU1-53-A	AFM	AM13	S	2
14-Apr-10	06A	EW-OU1-53-A	AFM	AM14	S	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM15	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM16	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM17	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM18	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM26	VS	3
14-Apr-10	06A	EW-OU1-53-A	AFM	AM27	S	2
14-Apr-10	06A	EW-OU1-53-A	AFM	AM33	VS	1

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
14-Apr-10	06A	EW-OU1-53-A	AFM	AM34	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM36	S	2
14-Apr-10	06A	EW-OU1-53-A	AFM	AM38	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM39	VS	2
14-Apr-10	06A	EW-OU1-53-A	AFM	AM41	VS	2
14-Apr-10	06A	EW-OU1-53-A	AFM	AM42	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM45	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM46	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM47	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM48	VS	1
14-Apr-10	06A	EW-OU1-53-A	AFM	AM49	S	2
02-Jun-10	07A	EW-OU1-52A	CAE	CAE79	VS	1
02-Jun-10	07A	EW-OU1-52A	CAE	CAE80	VS	1
02-Jun-10	07A	EW-OU1-52A	CAE	CAE81	S	1
02-Jun-10	07A	EW-OU1-52A	CAE	CAE82	S	1
02-Jun-10	07A	EW-OU1-52A	CAE	CAE83	VS	1
02-Jun-10	07A	EW-OU1-52A	CAE	CAE84	S	1
02-Jun-10	07A	EW-OU1-52A	CAE	CAE85	S	1
02-Jun-10	07A	EW-OU1-52A	CAE	CAE86	S	1
02-Jun-10	07A	EW-OU1-52A	CAE	CAE87	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE88	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE89	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE90	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE91	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE92	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE93	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE94	S	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE95	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE96	S	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE97	VS	1

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE98	H	5
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE99	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE100	H	0.5
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE101	H	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE102	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE103	M	5
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE104	H	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE105	S	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE106	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE107	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE108	S	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE109	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE110	M	4
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE111	H	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE112	M	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE113	H	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE114	M	5

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE115	S	3
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE116	S	3
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE117	M	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE118	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE119	M	0.5
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE120	H	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE121	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE122	H	0.5
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE123	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE124	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE125	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE126	M	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE127	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE128	H	15
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE129	M	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE130	H	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE131	S	3

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE132	M	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE133	S	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE134	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE135	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE136	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE137	VS	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE138	S	4
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE139	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE140	S	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE141	M	3
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE142	S	5
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE143	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE144	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE145	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE146	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE147	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE148	VS	1

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE149	H	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE150	M	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE151	M	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE152	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE153	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE154	H	4
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE155	H	3.5
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE156	H	3
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE157	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE158	S	7
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE159	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE160	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE161	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE162	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE163	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE164	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE165	S	2

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE166	S	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE167	M	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE168	VS	2
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE169	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE170	S	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE171	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE172	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE173	VS	1
12-May-10	09A	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	CAE	CAE174	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE175	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE176	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE177	S	2
18-May-10	09B	MW-OU1-84A	CAE	CAE178	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE179	VS	3
18-May-10	09B	MW-OU1-84A	CAE	CAE180	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE181	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE182	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE183	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE184	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE185	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE186	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE187	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE188	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE189	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE190	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE191	M	1
18-May-10	09B	MW-OU1-84A	CAE	CAE192	M	1
18-May-10	09B	MW-OU1-84A	CAE	CAE193	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE194	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE195	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE196	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE197	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE198	M	1
18-May-10	09B	MW-OU1-84A	CAE	CAE199	S	1

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
18-May-10	09B	MW-OU1-84A	CAE	CAE200	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE201	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE202	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE203	M	1
18-May-10	09B	MW-OU1-84A	CAE	CAE204	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE205	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE206	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE207	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE208	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE209	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE210	S	2
18-May-10	09B	MW-OU1-84A	CAE	CAE211	M	8
18-May-10	09B	MW-OU1-84A	CAE	CAE212	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE213	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE214	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE215	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE216	M	1
18-May-10	09B	MW-OU1-84A	CAE	CAE217	S	2
18-May-10	09B	MW-OU1-84A	CAE	CAE218	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE219	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE220	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE221	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE222	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE223	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE224	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE225	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE226	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE227	S	1
18-May-10	09B	MW-OU1-84A	CAE	CAE228	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE229	VS	1
18-May-10	09B	MW-OU1-84A	CAE	CAE230	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE231	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE232	S	2
24-May-10	09C	IW-OU1-74A	CAE	CAE233	M	2
24-May-10	09C	IW-OU1-74A	CAE	CAE234	S	3
24-May-10	09C	IW-OU1-74A	CAE	CAE235	M	1
24-May-10	09C	IW-OU1-74A	CAE	CAE236	S	2.5
24-May-10	09C	IW-OU1-74A	CAE	CAE237	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE238	S	1.5
24-May-10	09C	IW-OU1-74A	CAE	CAE239	VS	3
24-May-10	09C	IW-OU1-74A	CAE	CAE240	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE241	M	1
24-May-10	09C	IW-OU1-74A	CAE	CAE242	S	7
24-May-10	09C	IW-OU1-74A	CAE	CAE243	M	1.5
24-May-10	09C	IW-OU1-74A	CAE	CAE244	S	3
24-May-10	09C	IW-OU1-74A	CAE	CAE245	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE246	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE247	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE248	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE249	M	1
24-May-10	09C	IW-OU1-74A	CAE	CAE250	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE251	S	2

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
24-May-10	09C	IW-OU1-74A	CAE	CAE252	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE253	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE254	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE255	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE256	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE257	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE258	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE259	M	1
24-May-10	09C	IW-OU1-74A	CAE	CAE260	M	4
24-May-10	09C	IW-OU1-74A	CAE	CAE261	M	1
24-May-10	09C	IW-OU1-74A	CAE	CAE262	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE263	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE264	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE265	M	1.5
24-May-10	09C	IW-OU1-74A	CAE	CAE266	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE267	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE268	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE269	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE270	M	1
24-May-10	09C	IW-OU1-74A	CAE	CAE271	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE272	M	2.5
24-May-10	09C	IW-OU1-74A	CAE	CAE273	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE274	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE275	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE276	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE277	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE278	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE279	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE280	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE281	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE282	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE283	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE284	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE285	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE286	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE287	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE288	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE289	VS	1
24-May-10	09C	IW-OU1-74A	CAE	CAE290	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE291	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE292	S	1
24-May-10	09C	IW-OU1-74A	CAE	CAE293	M	1
24-May-10	09C	IW-OU1-74A	CAE	CAE294	M	1.5
24-May-10	09D	MW-OUI-51A	CAE	CAE295	VS	1
24-May-10	09D	MW-OUI-51A	CAE	CAE296	VS	1
24-May-10	09D	MW-OUI-51A	CAE	CAE297	VS	1
24-May-10	09D	MW-OUI-51A	CAE	CAE298	VS	1
24-May-10	09D	MW-OUI-51A	CAE	CAE299	VS	1
24-May-10	09D	MW-OUI-51A	CAE	CAE300	VS	1
24-May-10	09D	MW-OUI-51A	CAE	CAE301	S	1
24-May-10	09D	MW-OUI-51A	CAE	CAE302	S	1
24-May-10	09D	MW-OUI-51A	CAE	CAE303	S	1

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
24-May-10	09D	MW-OUI-51A	CAE	CAE304	M	4
24-May-10	09D	MW-OUI-51A	CAE	CAE305	S	4
24-May-10	09D	MW-OUI-51A	CAE	CAE306	S	1
24-May-10	09D	MW-OUI-51A	CAE	CAE307	S	1
24-May-10	09D	MW-OUI-51A	CAE	CAE308	S	1.5
24-May-10	09D	MW-OUI-51A	CAE	CAE309	VS	1
05-May-10	10A	MW-OUI-50A	CAE	CAE310	VS	1
05-May-10	10A	MW-OUI-50A	CAE	CAE311	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE312	M	2
05-May-10	10A	MW-OUI-50A	CAE	CAE313	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE314	VS	1
05-May-10	10A	MW-OUI-50A	CAE	CAE315	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE316	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE317	M	2
05-May-10	10A	MW-OUI-50A	CAE	CAE318	M	4
05-May-10	10A	MW-OUI-50A	CAE	CAE319	H	40
05-May-10	10A	MW-OUI-50A	CAE	CAE320	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE321	M	10
05-May-10	10A	MW-OUI-50A	CAE	CAE322	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE323	VS	1
05-May-10	10A	MW-OUI-50A	CAE	CAE324	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE325	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE326	M	1
05-May-10	10A	MW-OUI-50A	CAE	CAE327	H	6
05-May-10	10A	MW-OUI-50A	CAE	CAE328	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE329	H	9
05-May-10	10A	MW-OUI-50A	CAE	CAE330	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE331	H	1
05-May-10	10A	MW-OUI-50A	CAE	CAE332	M	10
05-May-10	10A	MW-OUI-50A	CAE	CAE333	H	1
05-May-10	10A	MW-OUI-50A	CAE	CAE334	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE335	VS	1
05-May-10	10A	MW-OUI-50A	CAE	CAE336	VS	1
05-May-10	10A	MW-OUI-50A	CAE	CAE337	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE338	S	1
05-May-10	10A	MW-OUI-50A	CAE	CAE339	M	6
05-May-10	10A	MW-OUI-50A	CAE	CAE340	M	6
05-May-10	10A	MW-OUI-50A	CAE	CAE341	M	1
05-May-10	10A	MW-OUI-50A	CAE	CAE342	VS	1
05-May-10	10A	MW-OUI-50A	CAE	CAE343	M	1
05-May-10	10A	MW-OUI-50A	CAE	CAE344	VS	1
05-May-10	10A	MW-OUI-50A	CAE	CAE345	M	1
05-May-10	10B	MW-OUI-59A	CAE	CAE346	S	1
05-May-10	10B	MW-OUI-59A	CAE	CAE347	VS	1
05-May-10	10B	MW-OUI-59A	CAE	CAE348	S	1
05-May-10	10B	MW-OUI-59A	CAE	CAE349	S	1
05-May-10	10B	MW-OUI-59A	CAE	CAE350	M	1
05-May-10	10B	MW-OUI-59A	CAE	CAE351	M	1
05-May-10	10B	MW-OUI-59A	CAE	CAE352	S	1
05-May-10	10B	MW-OUI-59A	CAE	CAE353	VS	1
05-May-10	10B	MW-OUI-59A	CAE	CAE354	VS	1
05-May-10	10B	MW-OUI-59A	CAE	CAE355	VS	1

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
05-May-10	10B	MW-OUI-59A	CAE	CAE356	VS	1
05-May-10	10B	MW-OUI-59A	CAE	CAE357	VS	1
05-May-10	10B	MW-OUI-59A	CAE	CAE358	VS	1
05-May-10	10B	MW-OUI-59A	CAE	CAE359	S	1
05-May-10	10B	MW-OUI-59A	CAE	CAE360	H	6.5
05-May-10	10B	MW-OUI-59A	CAE	CAE361	S	1
05-May-10	10B	MW-OUI-59A	CAE	CAE362	M	1
06-May-10	10B	MW-OUI-59A	CAE	CAE363	VS	1
07-May-10	10B	MW-OUI-59A	CAE	CAE364	VS	1
08-May-10	10B	MW-OUI-59A	CAE	CAE365	VS	1
09-May-10	10B	MW-OUI-59A	CAE	CAE366	M	1
10-May-10	10B	MW-OUI-59A	CAE	CAE367	S	1
26-May-10	11A	MW-OUI-59A	CAE	CAE368	S	5
26-May-10	11A	EW-OUI-71A	CAE	CAE369	S	1
26-May-10	11A	EW-OUI-71A	CAE	CAE370	S	1
26-May-10	11A	EW-OUI-71A	CAE	CAE371	VS	1
26-May-10	11A	EW-OUI-71A	CAE	CAE372	S	5
26-May-10	11A	EW-OUI-71A	CAE	CAE373	VS	1
26-May-10	11A	EW-OUI-71A	CAE	CAE374	S	1
26-May-10	11A	EW-OUI-71A	CAE	CAE375	VS	1
26-May-10	11A	EW-OUI-71A	CAE	CAE376	VS	1
26-May-10	11A	EW-OUI-71A	CAE	CAE377	S	1
26-May-10	11A	EW-OUI-71A	CAE	CAE378	VS	1
26-May-10	11A	EW-OUI-71A	CAE	CAE379	S	1
26-May-10	11A	EW-OUI-71A	CAE	CAE380	S	1
26-May-10	11A	EW-OUI-71A	CAE	CAE381	S	1
26-May-10	11A	EW-OUI-71A	CAE	CAE382	VS	1
26-May-10	11A	EW-OUI-71A	CAE	CAE383	S	1
26-May-10	12B	MW-OU1-85S	CAE	CAE384	S	1
26-May-10	12B	MW-OU1-85S	CAE	CAE385	S	1
26-May-10	12B	MW-OU1-85S	CAE	CAE386	VS	1
26-May-10	12B	MW-OU1-85S	CAE	CAE387	S	1
26-May-10	12B	MW-OU1-85S	CAE	CAE388	S	1
12-May-10	13A	IW-OU1-73A	CAE	CAE389	VS	1
12-May-10	13A	IW-OU1-73A	CAE	CAE390	VS	1
12-May-10	13A	IW-OU1-73A	CAE	CAE391	VS	1
12-May-10	13A	IW-OU1-73A	CAE	CAE392	S	1
12-May-10	13A	IW-OU1-73A	CAE	CAE393	VS	1
12-May-10	13A	IW-OU1-73A	CAE	CAE394	VS	1
12-May-10	13A	IW-OU1-73A	CAE	CAE395	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE396	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE397	H	2
12-May-10	14A	MW-OU1-83A	CAE	CAE398	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE399	H	1
12-May-10	14A	MW-OU1-83A	CAE	CAE400	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE401	S	4
12-May-10	14A	MW-OU1-83A	CAE	CAE402	S	5
12-May-10	14A	MW-OU1-83A	CAE	CAE403	S	4
12-May-10	14A	MW-OU1-83A	CAE	CAE404	S	3
12-May-10	14A	MW-OU1-83A	CAE	CAE405	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE406	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE407	S	2

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
12-May-10	14A	MW-OU1-83A	CAE	CAE408	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE409	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE410	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE411	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE412	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE413	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE414	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE415	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE416	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE417	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE418	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE419	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE420	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE421	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE422	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE423	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE424	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE425	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE426	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE427	S	1.5
12-May-10	14A	MW-OU1-83A	CAE	CAE428	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE429	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE430	M	1.5
12-May-10	14A	MW-OU1-83A	CAE	CAE431	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE432	S	3
12-May-10	14A	MW-OU1-83A	CAE	CAE433	M	1.5
12-May-10	14A	MW-OU1-83A	CAE	CAE434	H	1
12-May-10	14A	MW-OU1-83A	CAE	CAE435	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE436	M	2
12-May-10	14A	MW-OU1-83A	CAE	CAE437	H	12
12-May-10	14A	MW-OU1-83A	CAE	CAE438	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE439	H	1
12-May-10	14A	MW-OU1-83A	CAE	CAE440	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE441	M	2
12-May-10	14A	MW-OU1-83A	CAE	CAE442	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE443	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE444	S	4
12-May-10	14A	MW-OU1-83A	CAE	CAE445	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE446	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE447	S	2
12-May-10	14A	MW-OU1-83A	CAE	CAE448	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE449	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE450	S	3
12-May-10	14A	MW-OU1-83A	CAE	CAE451	S	2
12-May-10	14A	MW-OU1-83A	CAE	CAE452	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE453	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE454	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE455	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE456	S	4
12-May-10	14A	MW-OU1-83A	CAE	CAE457	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE458	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE459	M	1

HGL - WCS Rare Plant Survey Data 2010
Monterey spineflower (Chorizanthe pungens var. pungens) survey data

Date	WCS	Well ID	Surveyor	Patch ID-REV	Coverage	Area (m^2)
12-May-10	14A	MW-OU1-83A	CAE	CAE460	M	10.5
12-May-10	14A	MW-OU1-83A	CAE	CAE461	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE462	M	1
12-May-10	14A	MW-OU1-83A	CAE	CAE463	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE464	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE465	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE466	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE467	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE468	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE469	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE470	S	1
12-May-10	14A	MW-OU1-83A	CAE	CAE471	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE472	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE473	VS	1
12-May-10	14A	MW-OU1-83A	CAE	CAE474	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE475	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE476	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE477	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE478	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE479	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE480	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE481	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE482	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE483	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE484	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE485	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE486	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE487	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE488	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE489	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE490	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE491	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE492	VS	1
05-May-10	15A	MW-OU1-82A	CAE	CAE493	M	1
05-May-10	15A	MW-OU1-82A	CAE	CAE494	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE495	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE496	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE497	S	1
05-May-10	15A	MW-OU1-82A	CAE	CAE498	S	1
05-May-10	16A	SB-OU1-2004K	CAE	CAE499	M	1
05-May-10	16A	SB-OU1-2004K	CAE	CAE500	H	9
05-May-10	16A	SB-OU1-2004K	CAE	CAE501	VS	1

Attachment 3

‘RARE PLANT SURVEY DIAGRAMS 2010’

The attached diagrams show the distribution of rare plant species found during pre-treatment surveys within each Weed Control Segment (WCS) during the 2010 weed control program within the Operable Unit 1 portion of the FONR. These diagrams (not drawn to scale) also show the spatial extent, well location, well site/road boundaries, and photo stations/points for each WCS.

Well Site/Road Diagram

Well ID: N/A

Date 4-21-10

WCS Sub Group W1s

Surveyor AFM

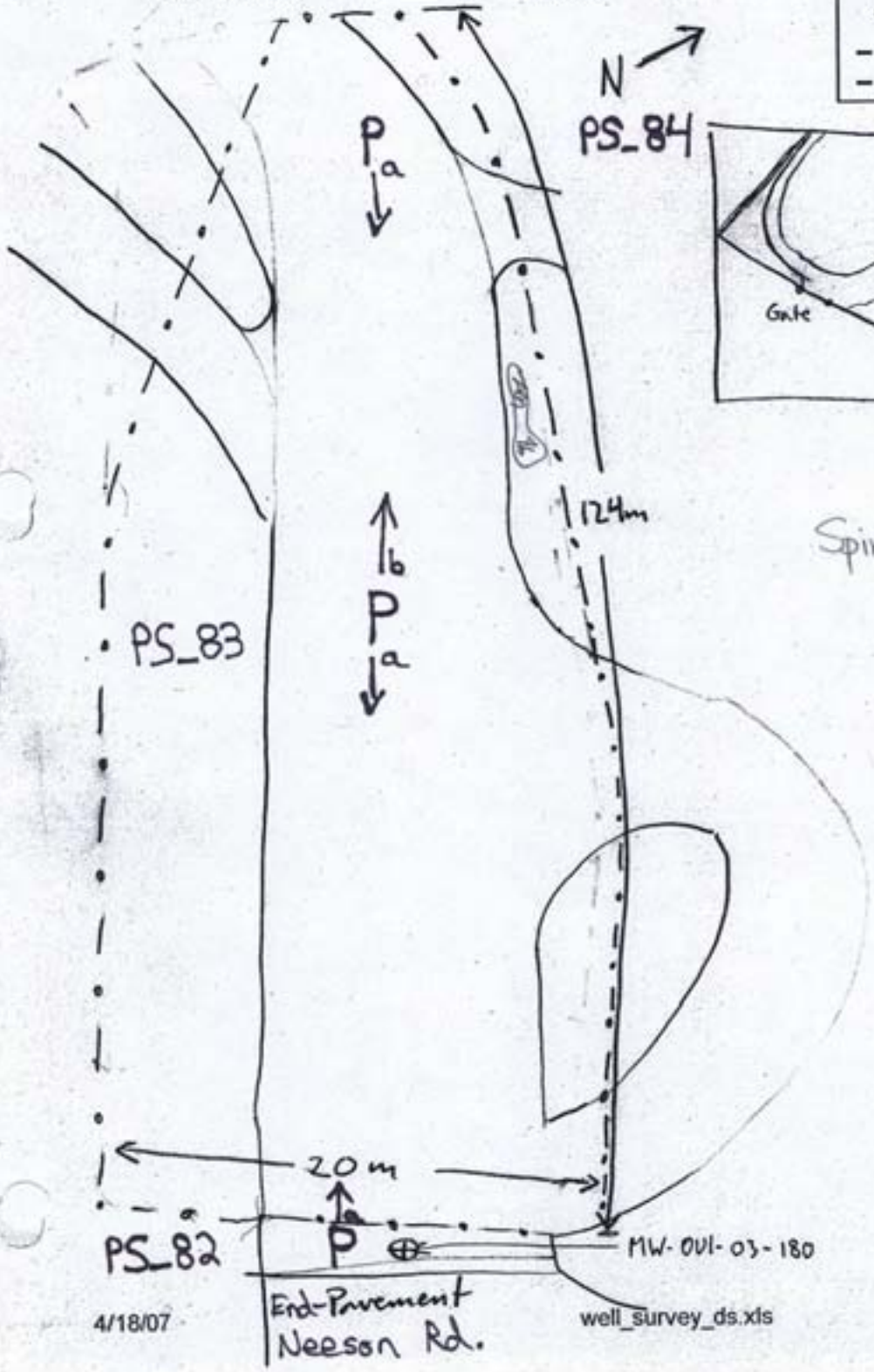
Total Aprox. Area 2,480 (m^2)

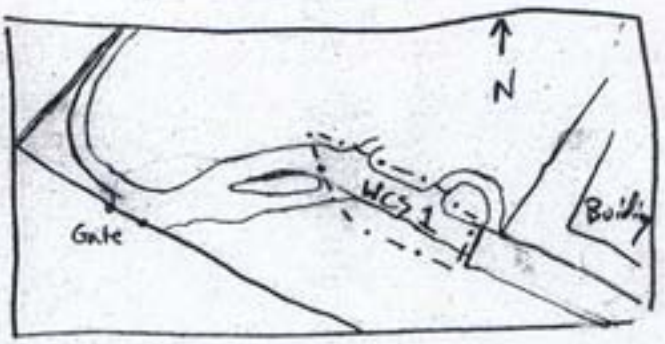
Well Rd. Area N/A (m^2)

Well Site Area N/A (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Spine Flower Survey

Well Site/Road Diagram

Well ID: N/A

WCS Sub Group 2

Total Aprox. Area 418 (m^2)

Well Rd. Area N/A (m^2)

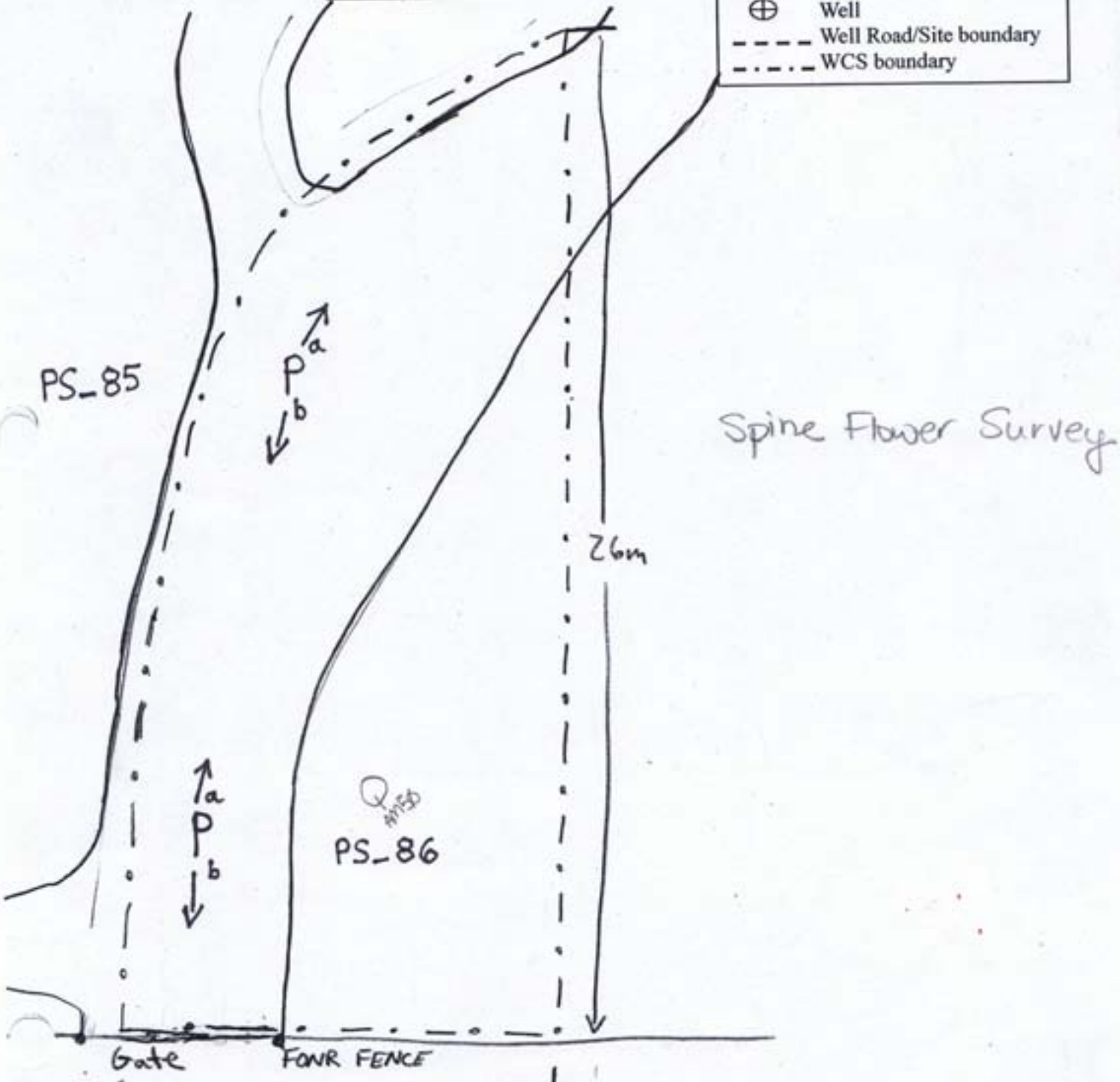
Well Site Area N/A (m^2)

Date 4/21/18

Surveyor AFM

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



Well ID: IW-OU1-05A

Date 4/24/2010

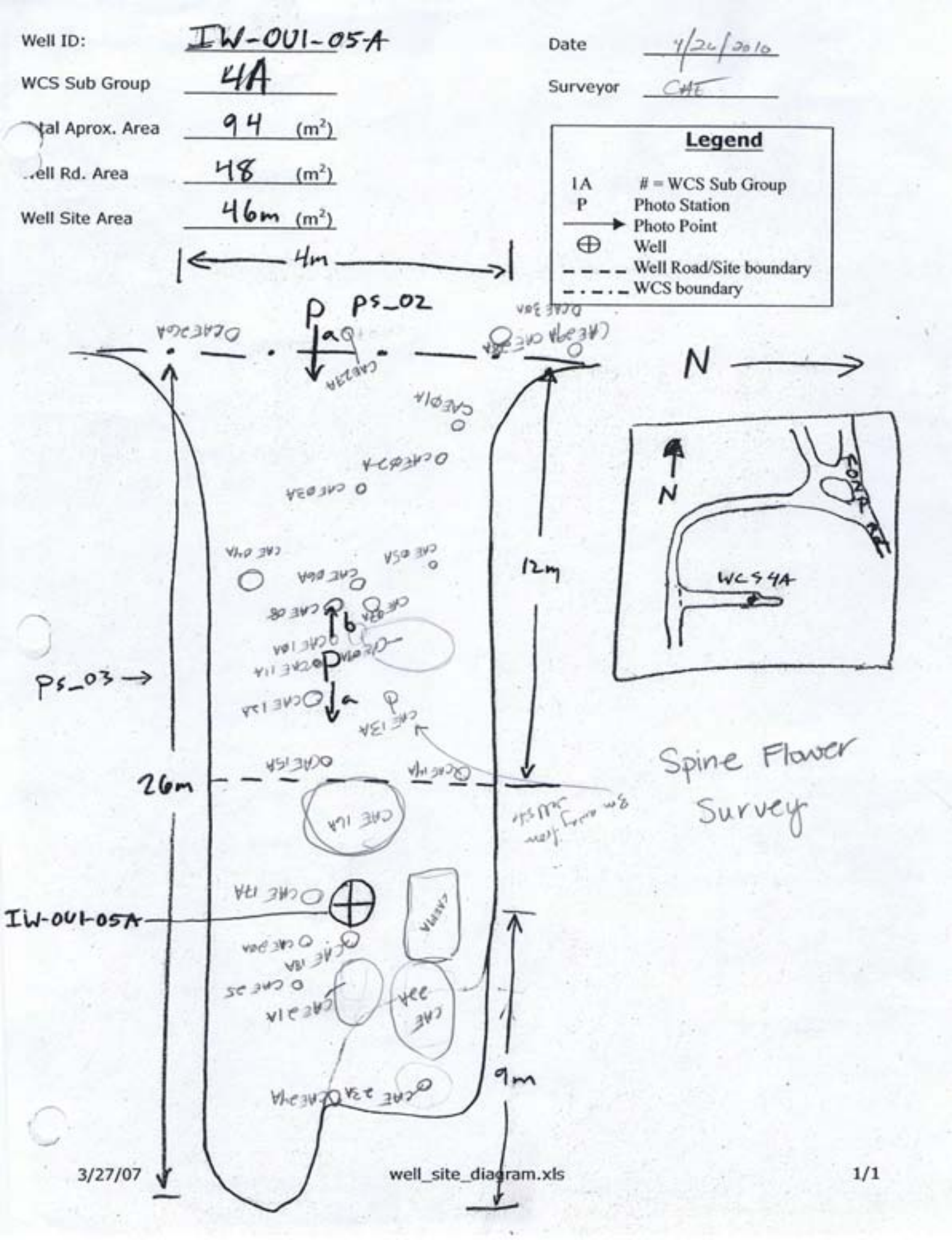
WCS Sub Group 4A

Surveyor CHE

Total Aprox. Area 94 (m^2)

Well Rd. Area 48 (m^2)

Well Site Area 46m (m^2)



Well ID: IW-OU1-01-A

WCS Sub Group 5-A

tal Aprox. Area 240 (m^2)

Well Rd. Area 174 (m^2)

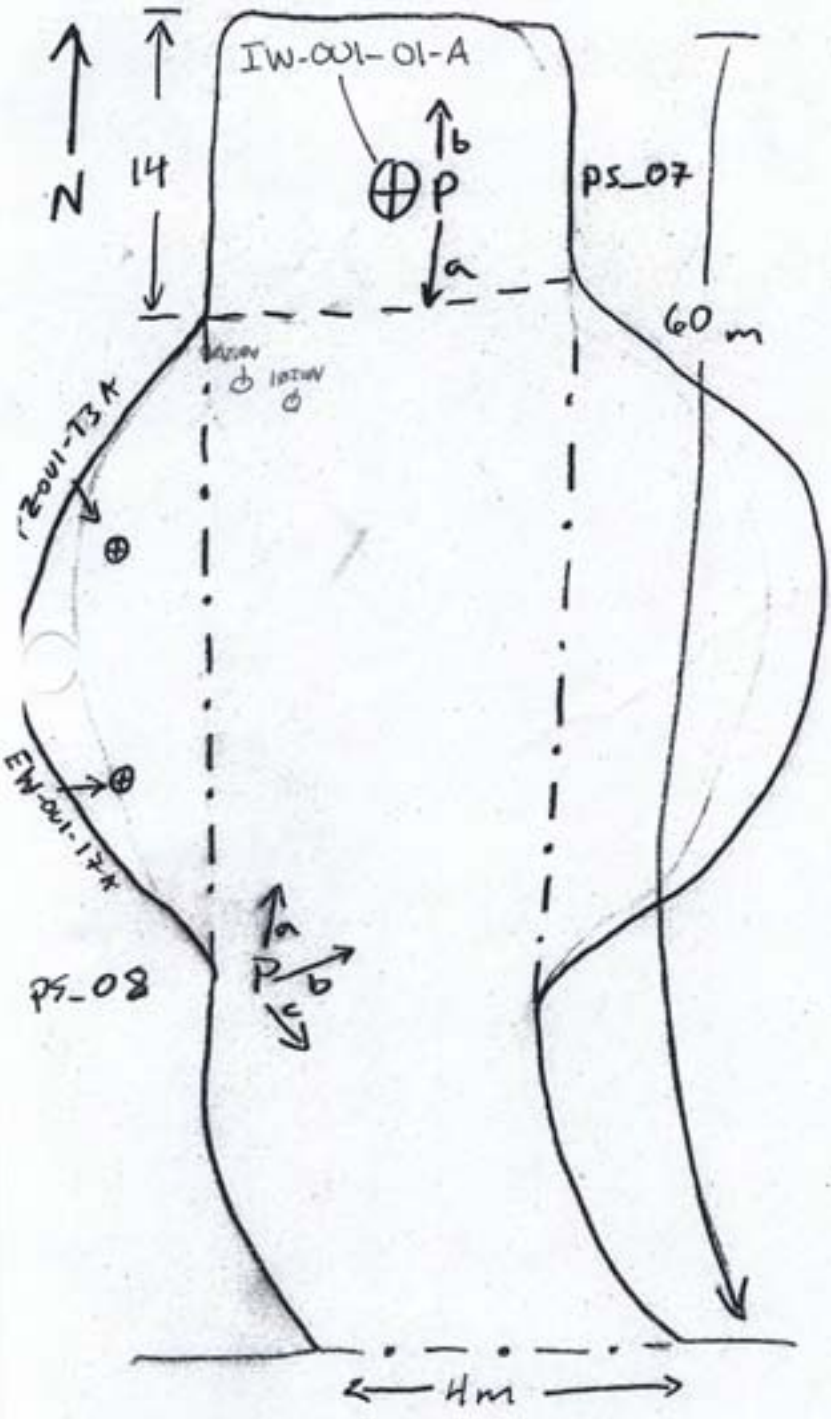
Well Site Area 56 (m^2)

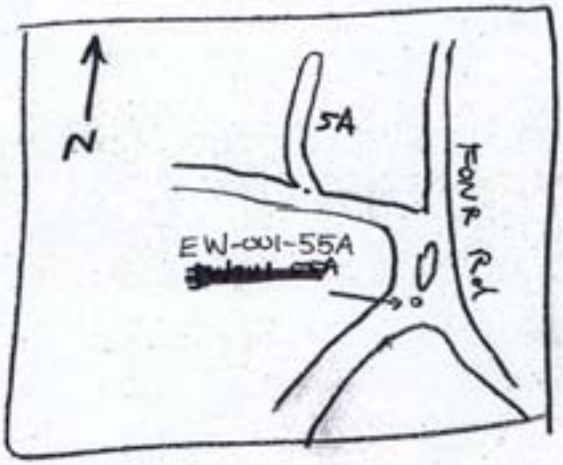
Date 4/28/10

Surveyor AFM/CTM

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Sand Gilia Survey

Well ID: IW-OU1-01-A

WCS Sub Group 5-A

tal Aprox. Area 240 (m^2)

Well Rd. Area 174 (m^2)

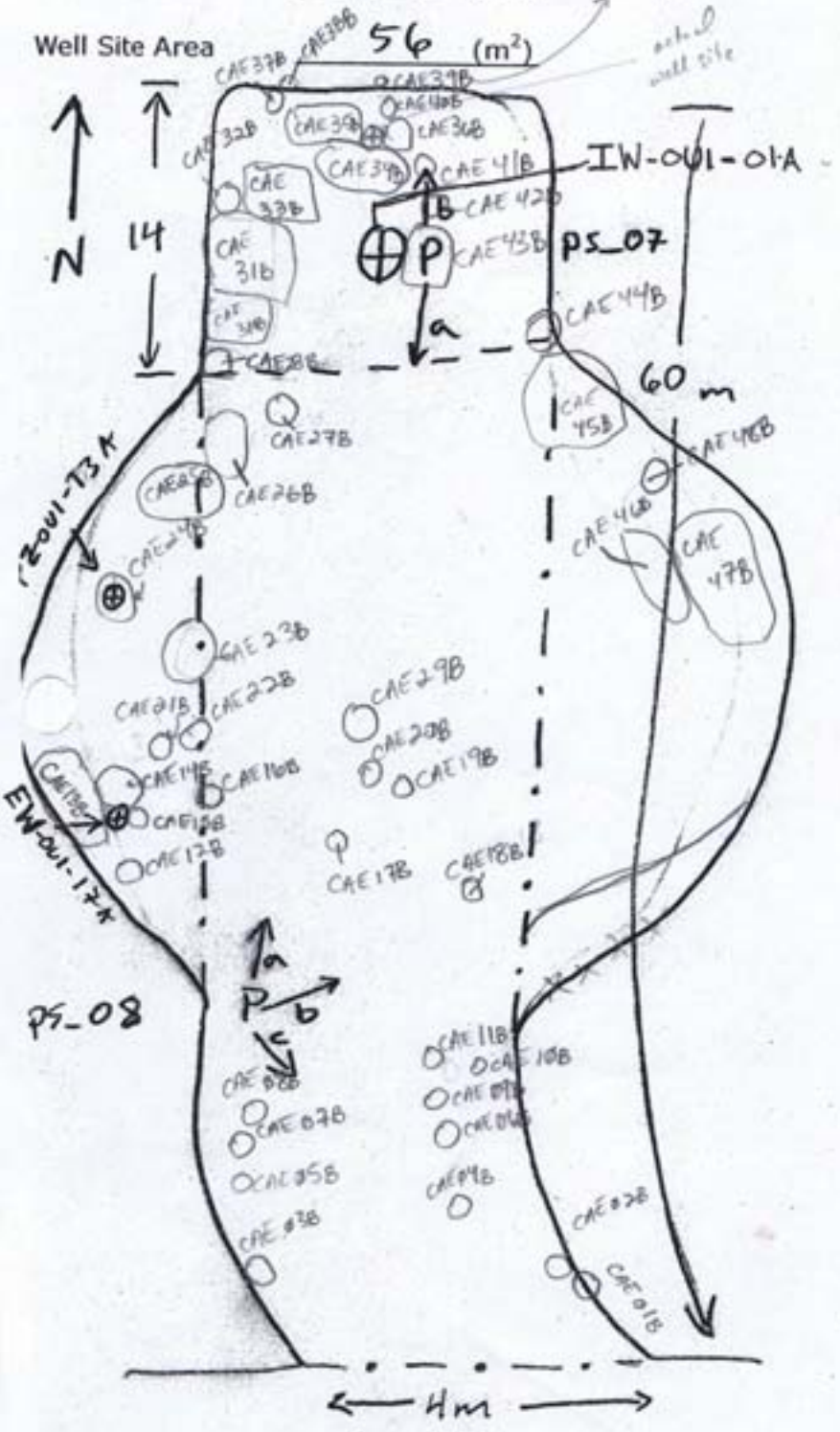
Well Site Area 56 (m^2)

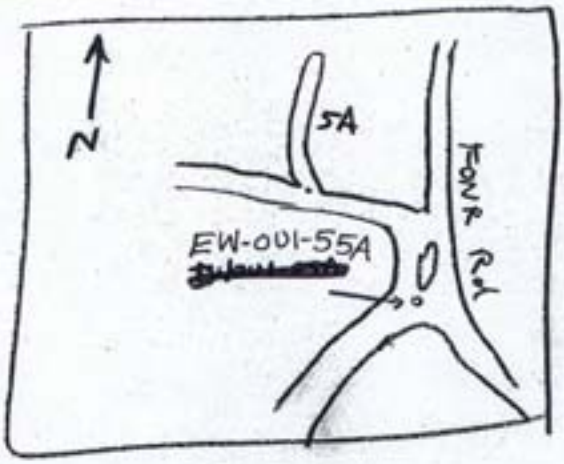
Date 4-26-2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Spine Flower Survey

Well ID: EW-OU1-53-A

Date 3-17-10

WCS Sub Group 6A

Surveyor STM

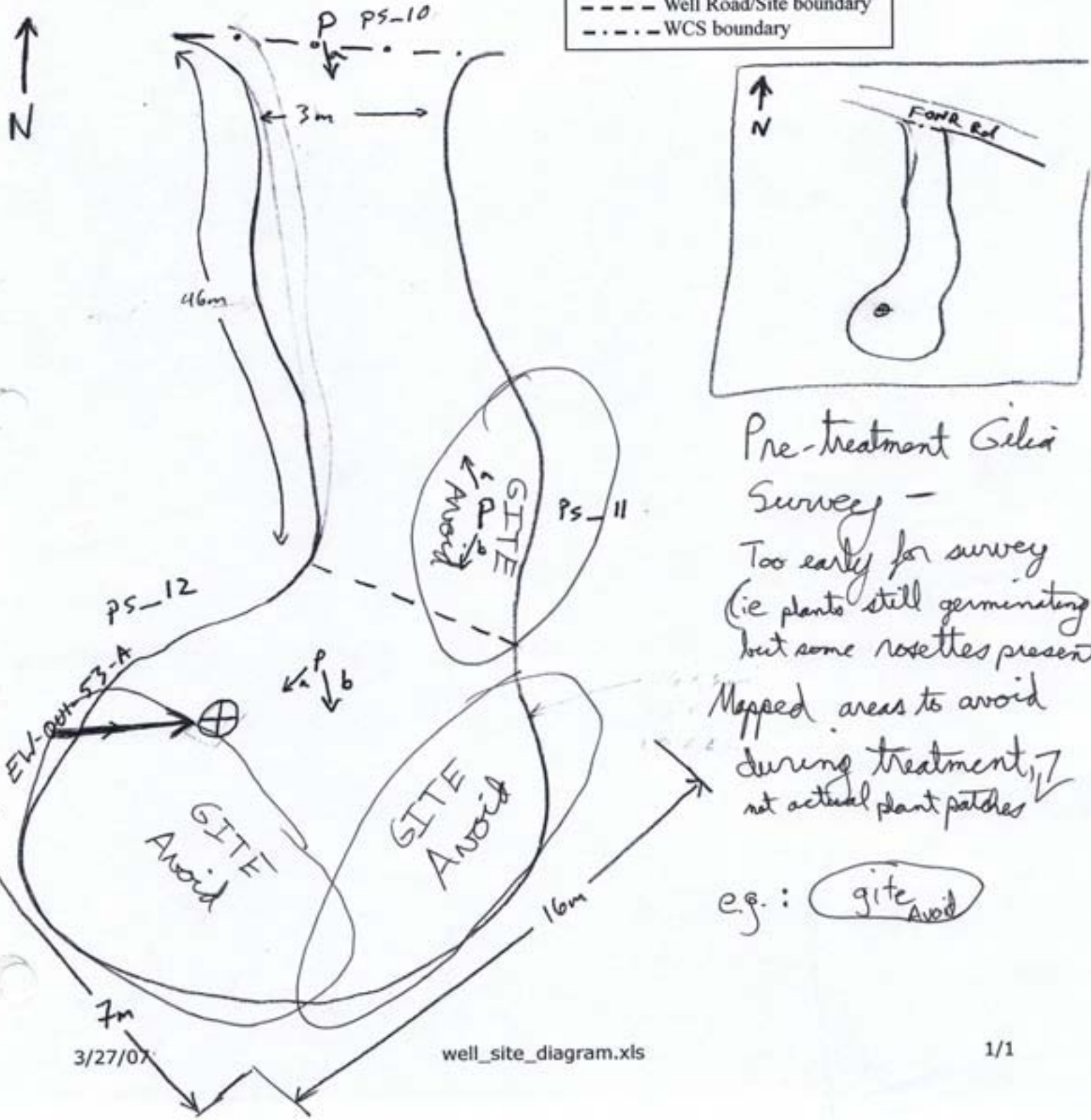
Total Aprox. Area 220 (m^2)

Well Rd. Area 138 (m^2)

Well Site Area 82 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary



Pre-treatment Gilia Survey –

Too early for survey (ie plants still germinating but some rosettes present)

Mapped areas to avoid during treatment, not actual plant patches

e.g.: gite Avoid

Well ID: EW-OU1-53-A

Date 4/14/10

WCS Sub Group 6A

Surveyor AFM

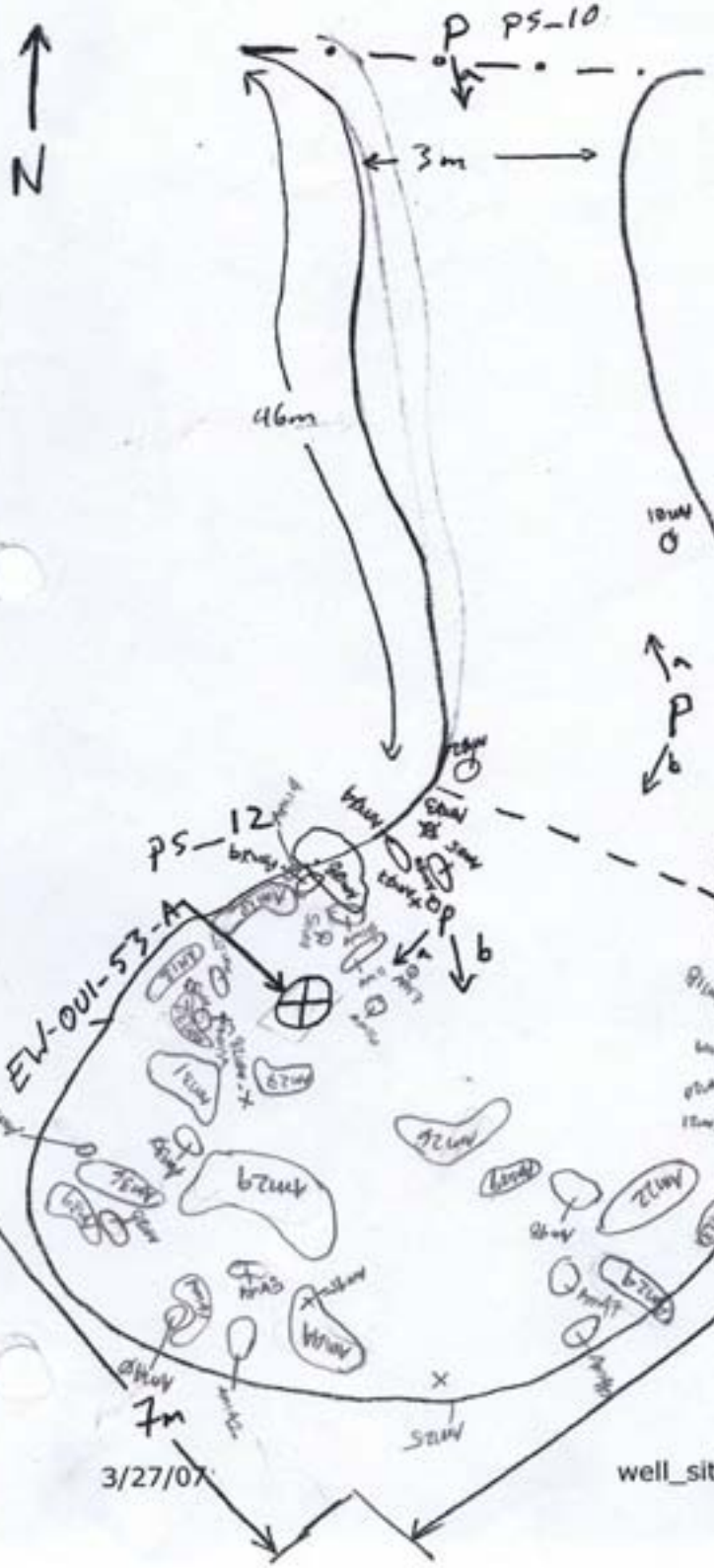
Total Aprox. Area 220 (m^2)

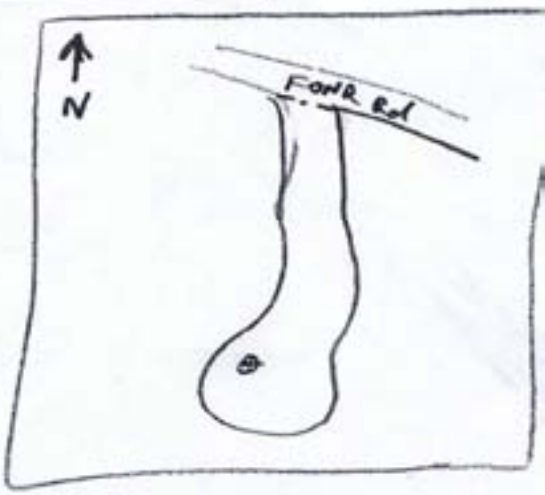
Well Rd. Area 138 (m^2)

Well Site Area 82 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Spine Flower Survey
&
Sand Gilia Survey

Well ID: EW-001-52A

Date 6-2-10

WCS Sub Group 7A

Surveyor CAE

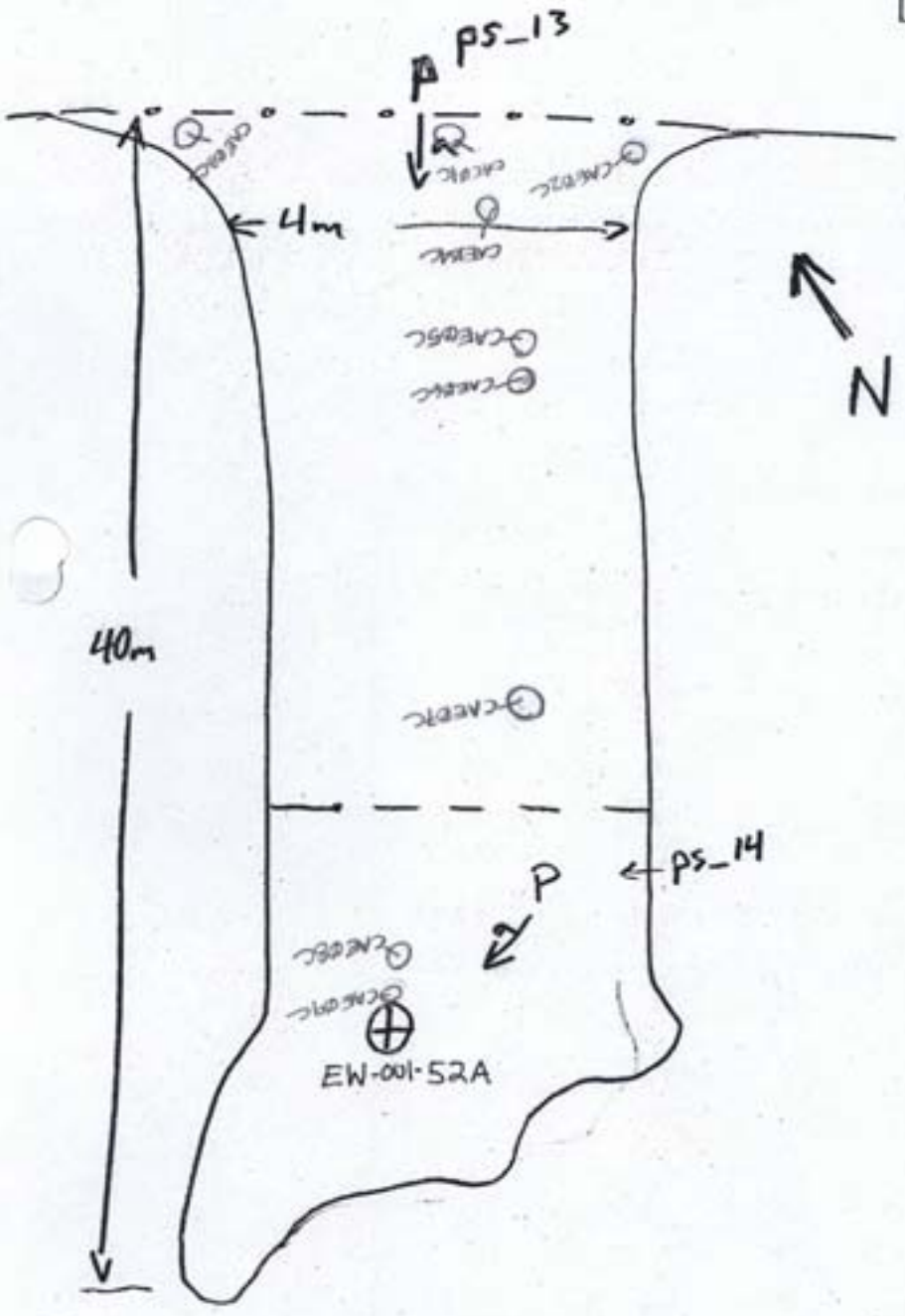
[illegible]al Aprox. Area 164 (m^2)

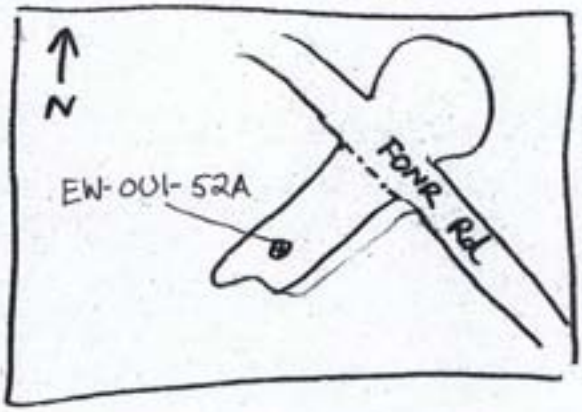
[illegible]ell Rd. Area 120 (m^2)

Well Site Area 44 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





Spine Flower Survey

Well ID: MW-001-46AD, PZ-001-46-AD2, MW-001-46-A#

Date 5-10-10 & 5-12-10

WCS Sub Group 9A

Surveyor CAE

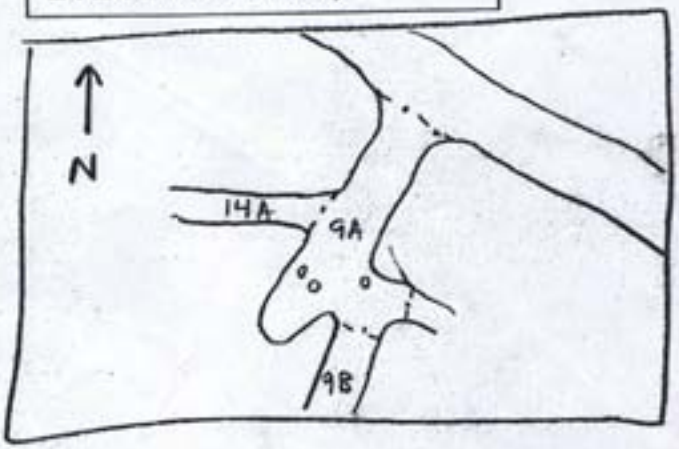
Total Aprox. Area 369 (m^2)

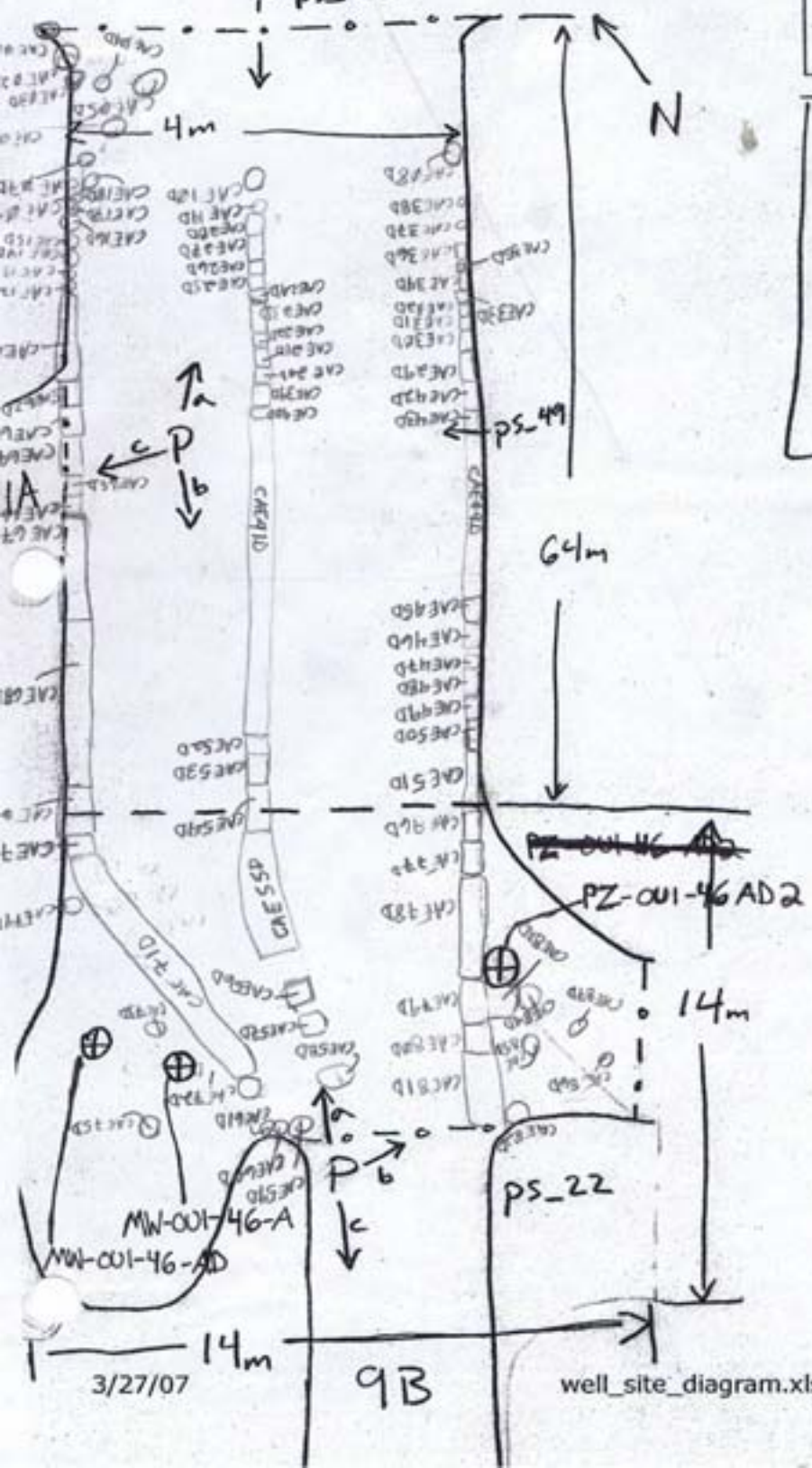
Well Rd. Area 256 (m^2)

Well Site Area 113 (m^2)

Legend

IA	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
-.-.-	WCS boundary





Spine Flower Survey

Well ID: MW-001-84A

WCS Sub Group 9B

Date 5-18-2010

Surveyor CAF

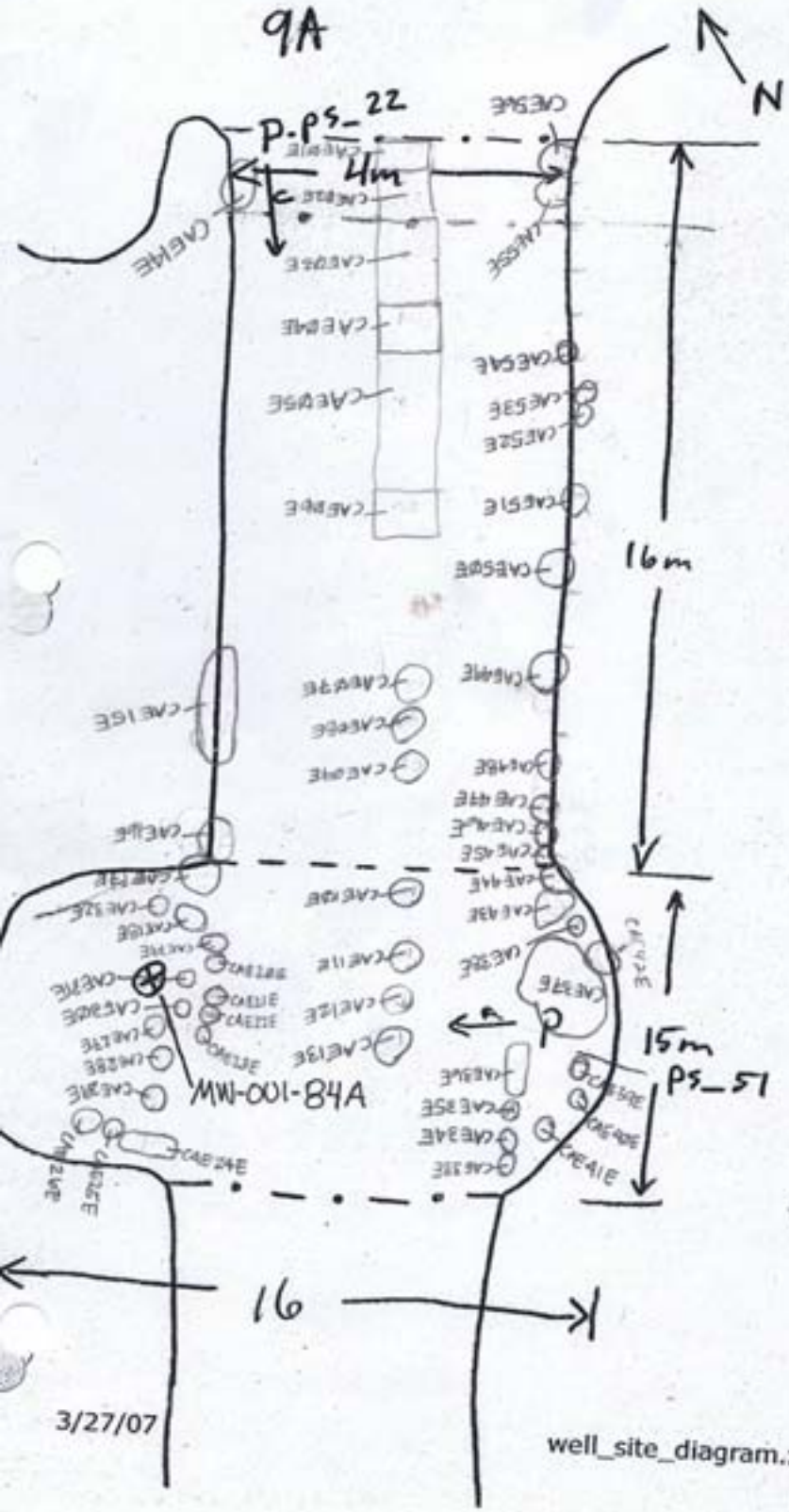
al Aprox. Area 304 (m^2)

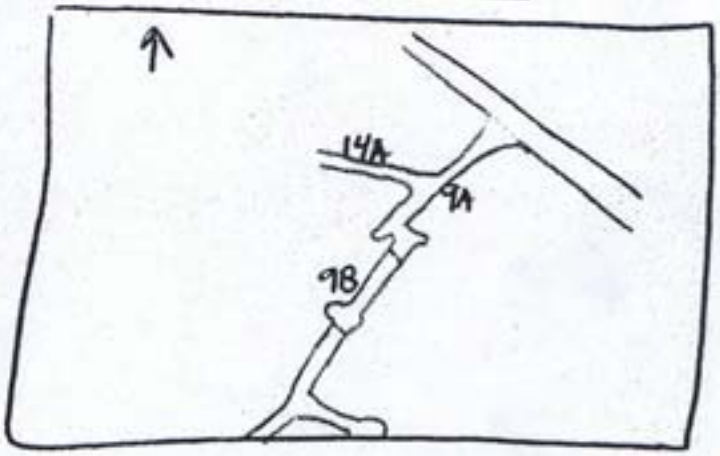
ell Rd. Area 64 (m^2)

Well Site Area 240 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Spine Flower Survey

3/27/07

well_site_diagram.xls

Well ID: IW-OUI-74A

WCS Sub Group 9C

Total Aprox. Area 198 (m^2)

Well Rd. Area 144 (m^2)

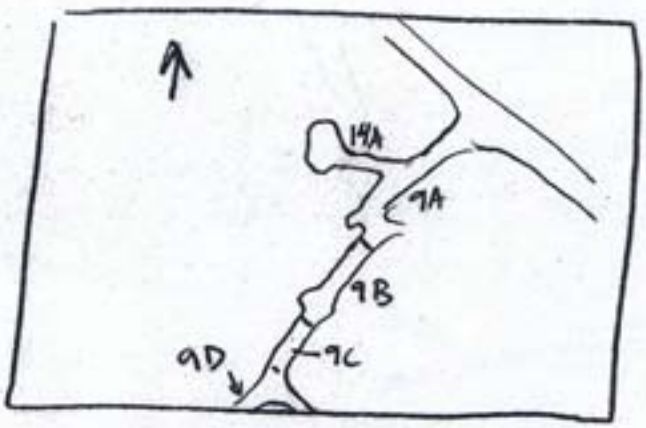
Well Site Area 54 (m^2)

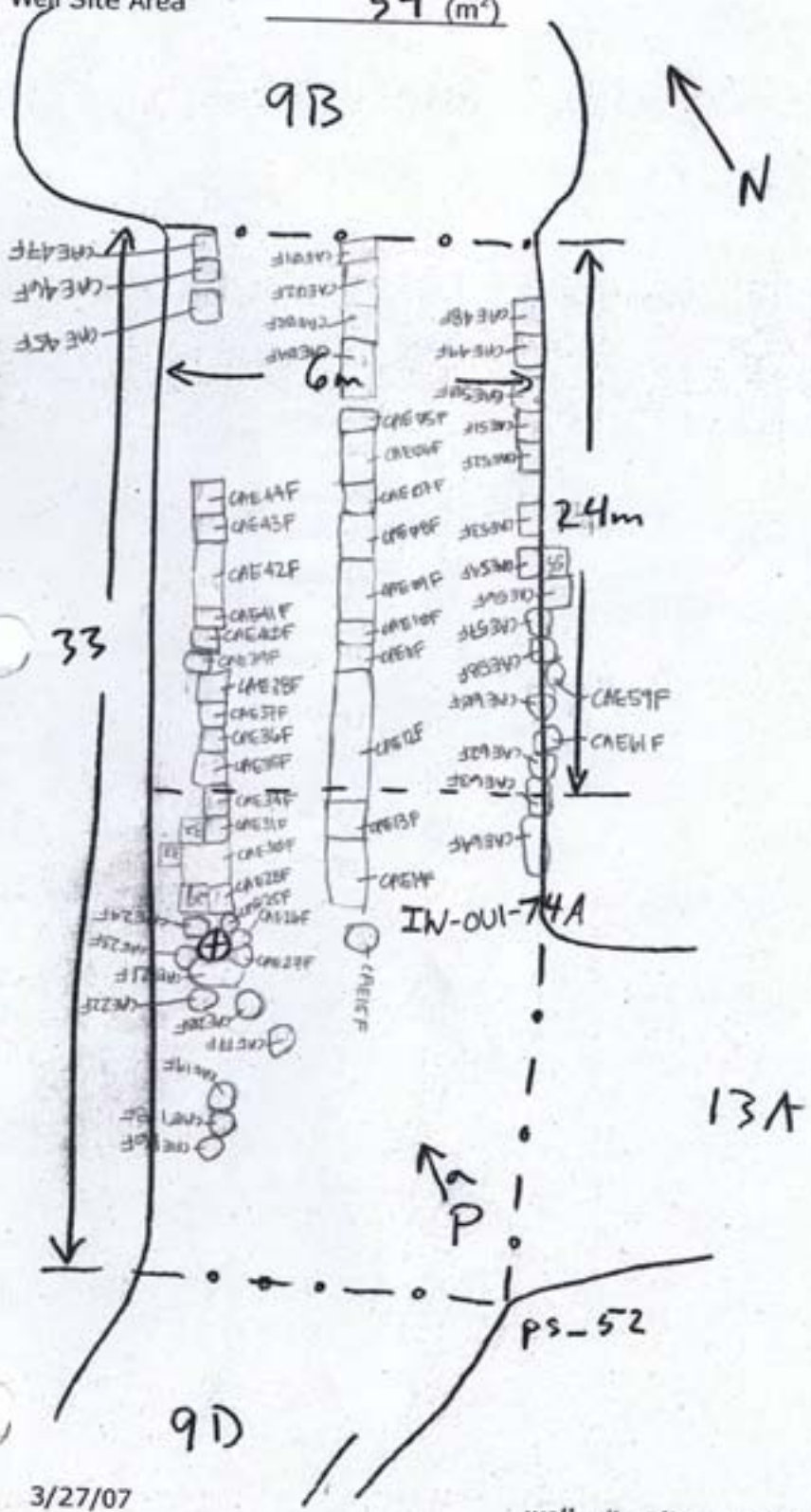
Date 5-24-2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





Spine Flower Survey

Well ID: MW-OU1-51A

WCS Sub Group 9D

Total Aprox. Area 160 (m^2)

Well Rd. Area 104 (m^2)

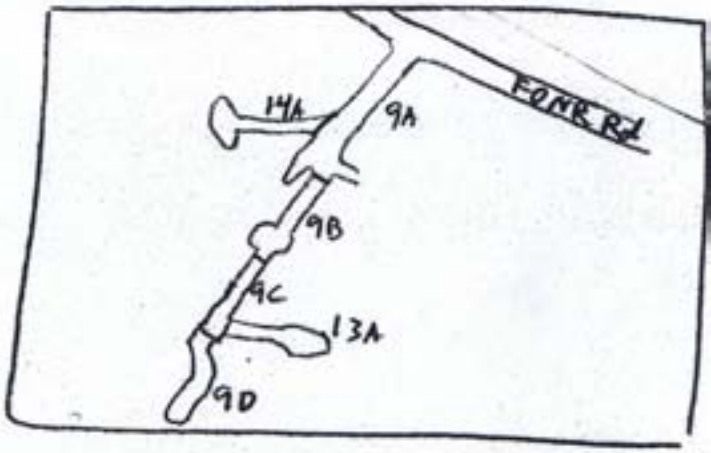
Well Site Area 56 (m^2)

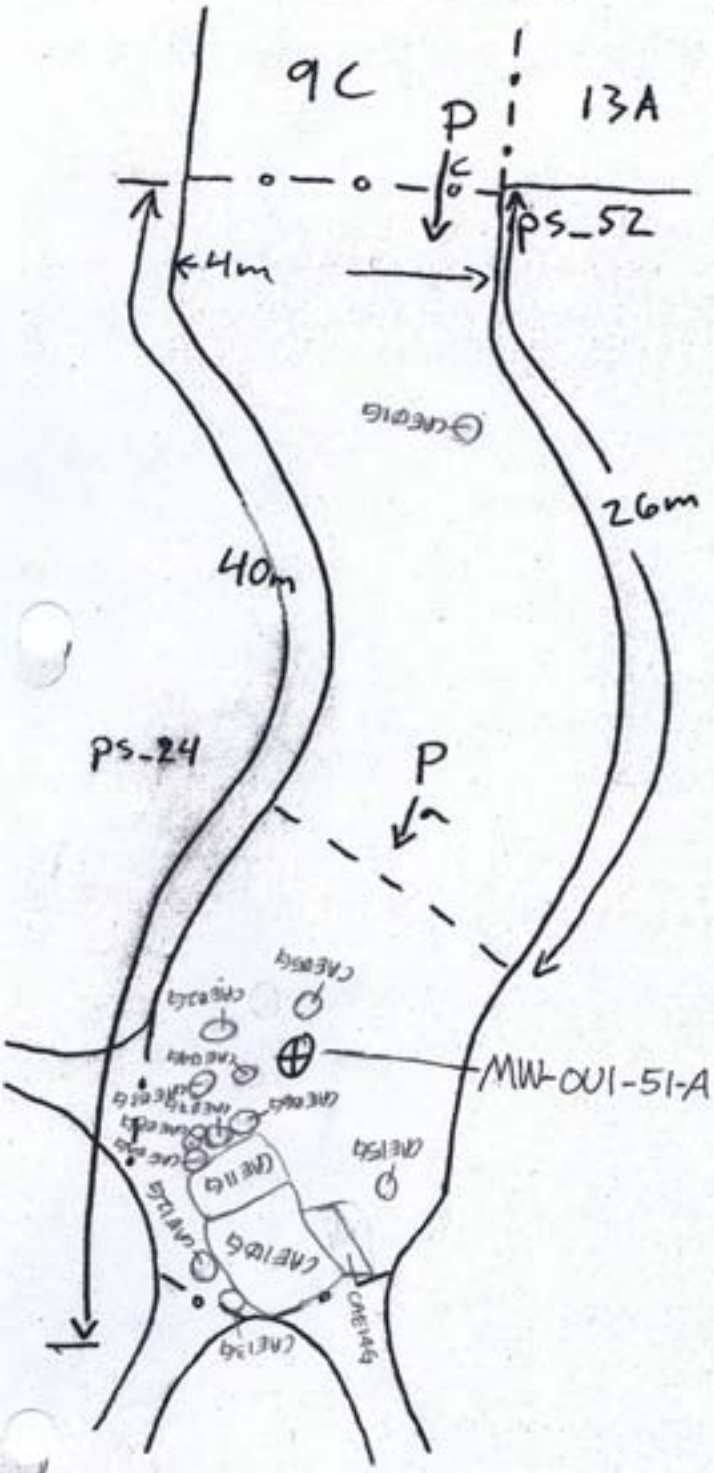
Date 5/24/2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Spine Flower Survey

Well ID: MW-OUI-50A

WCS Sub Group 10A

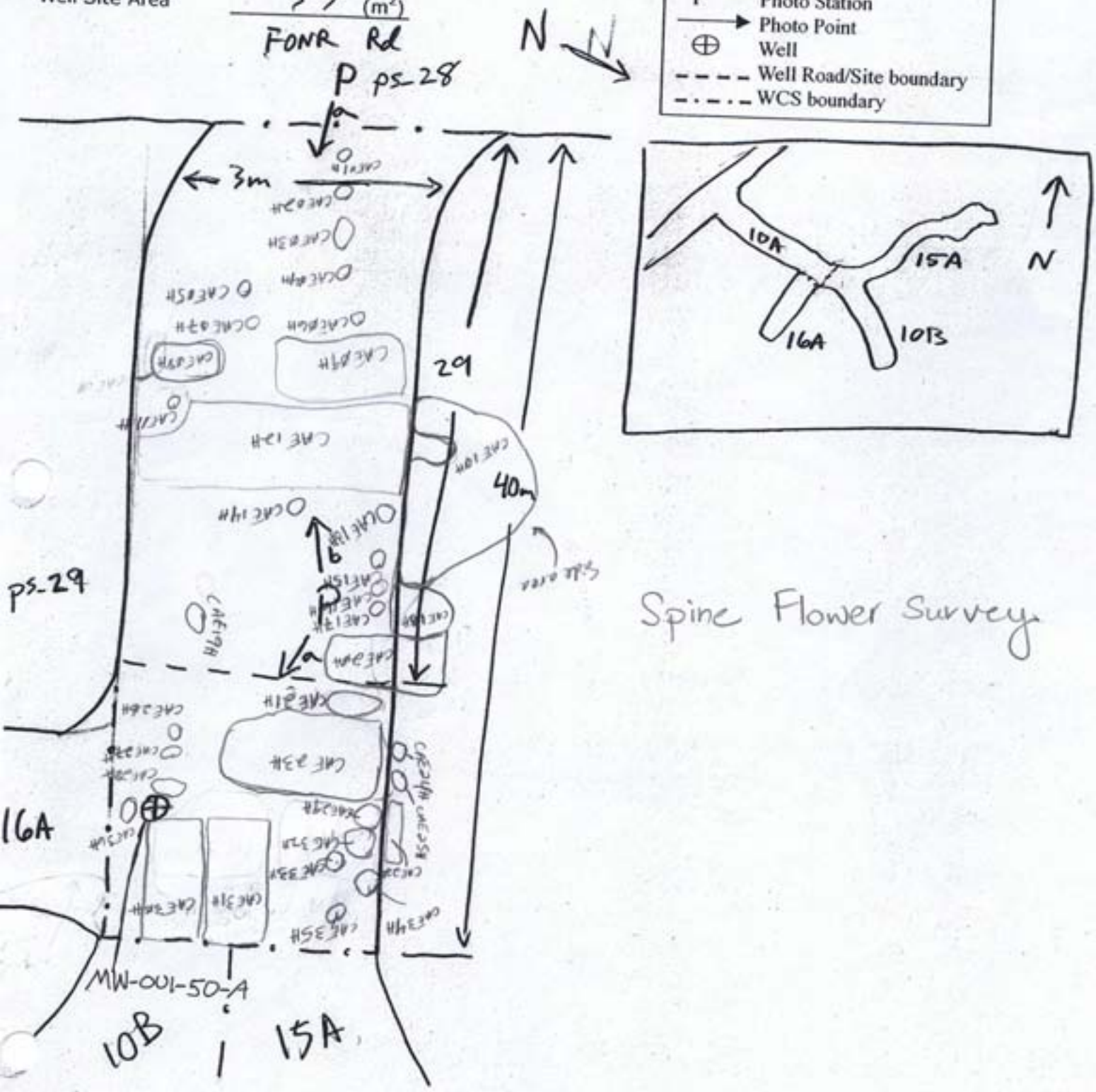
Total Aprox. Area 120 (m^2)

Well Rd. Area 87 (m^2)

Well Site Area 33 (m^2)

Date 5-5-2016

Surveyor CAE



Spine Flower Survey.

3/27/07

well_site_diagram.xls

Well ID: MW-OUI-59A

WCS Sub Group 10B

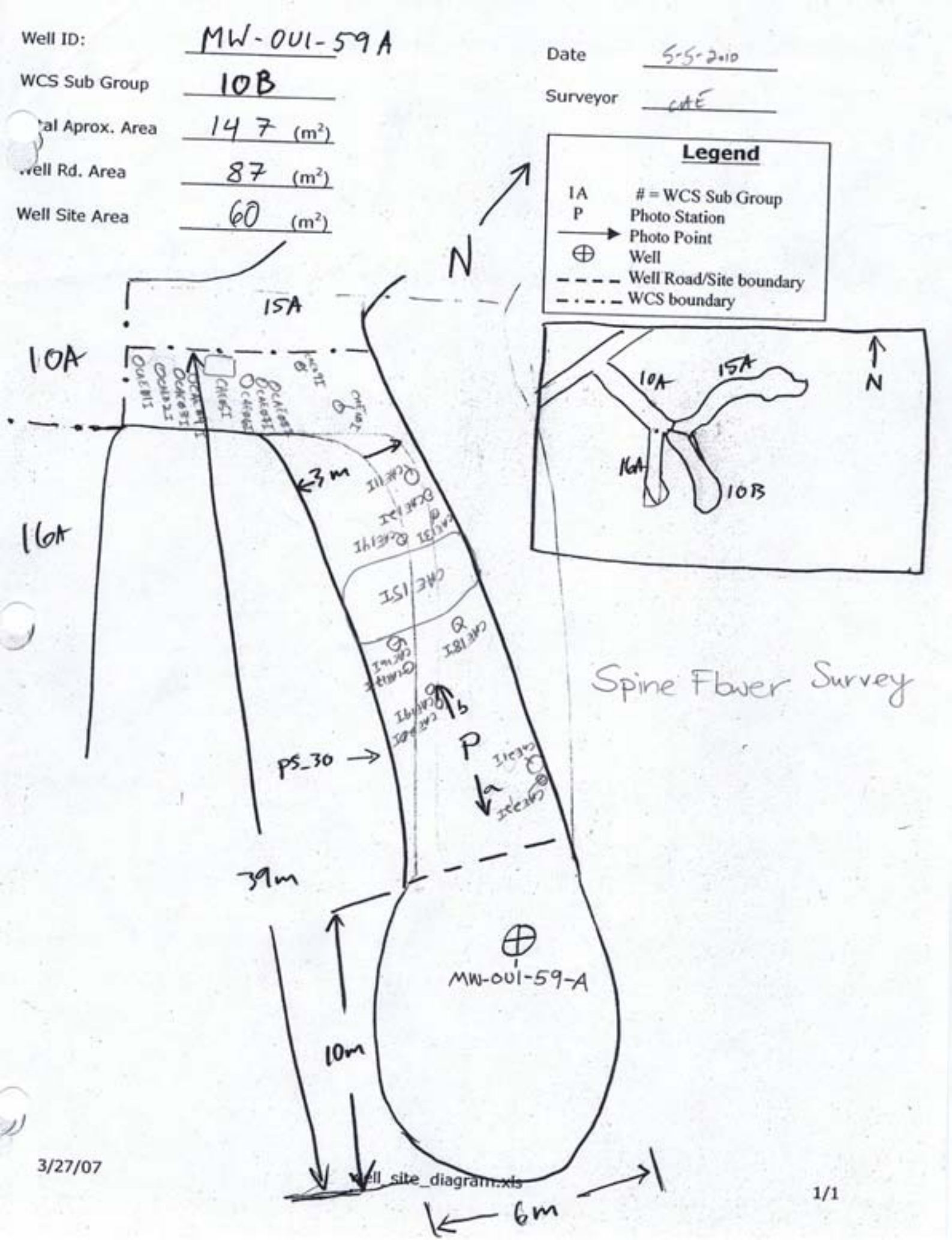
Total Aprox. Area 147 (m^2)

Well Rd. Area 87 (m^2)

Well Site Area 60 (m^2)

Date 5-5-2010

Surveyor CAE



Spine Flwer Survey

3/27/07

well_site_diagram.xls

Well ID: EW-001-71A

WCS Sub Group: 11A

Date: 5-26-10

Surveyor: CAE

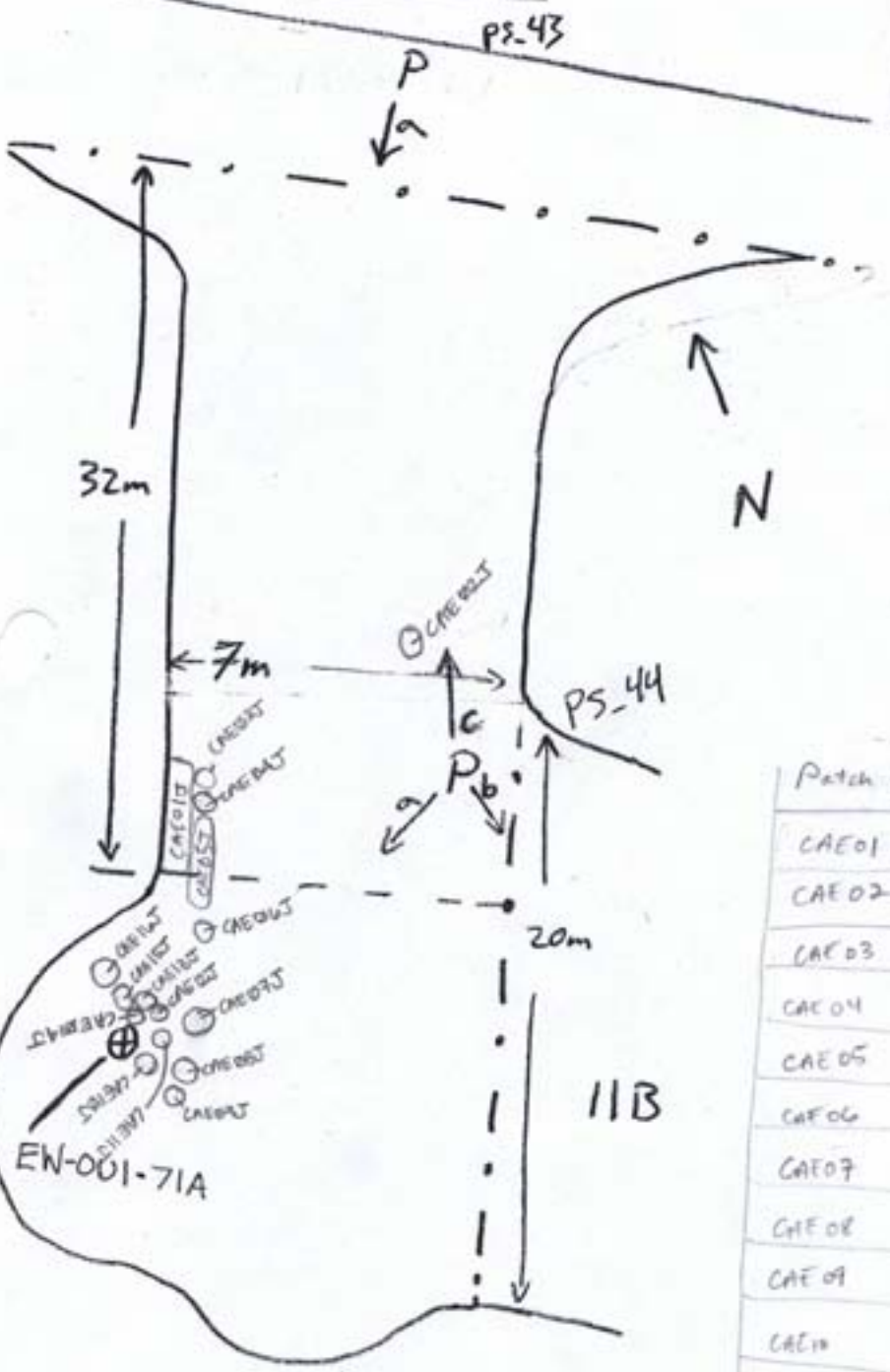
...al Aprox. Area: 329 (m^2)

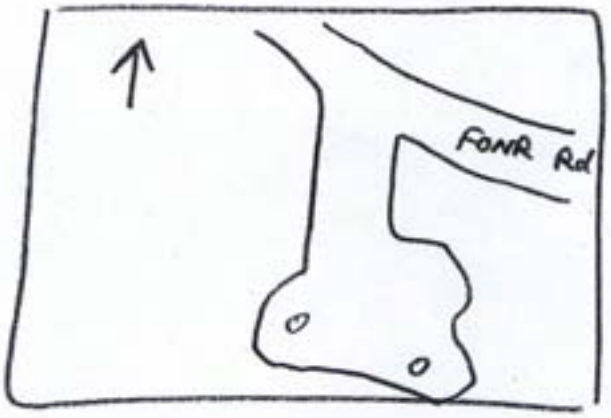
...ell Rd. Area: 224 (m^2)

Well Site Area: 105 (m^2)

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Chronicle Survey
(to be transferred to Survey sheet)
transferred 5/26/10

Patch ID	Coverage	Area (m^2)
CAE01	S	5 (5 x 1 m)
CAE02	S	1
CAE03	S	1
CAE04	VS	1
CAE05	S	5 (5 x 1 m)
CAE06	VS	1
CAE07	S	1
CAE08	VS	1
CAE09	VS	1
CAE10	S	1
CAE11	VS	1
CAE12	S	1
CAE13	S	1
CAE14	S	1
CAE15	VS	1

1/1

3/27/07

Well ID: MW-OU1-85-A

WCS Sub Group 12B

Total Aprox. Area 164 (m^2)

Well Rd. Area 76 (m^2)

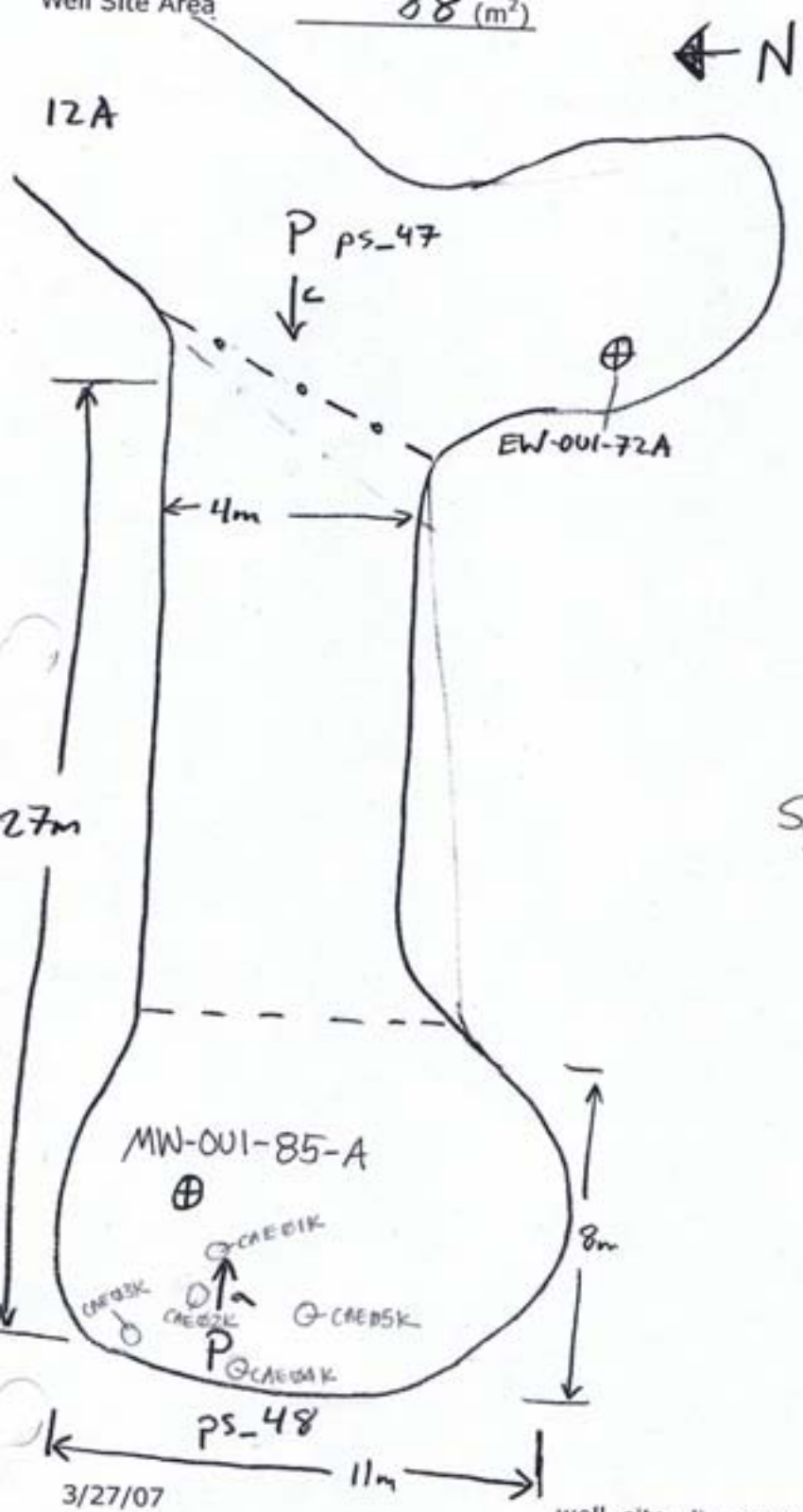
Well Site Area 88 (m^2)

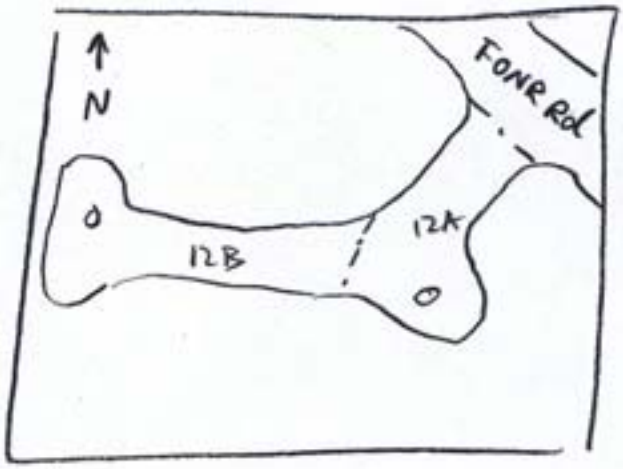
Date 5-24-2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Spine Flower Survey

3/27/07

well_site_diagram.xls

Well ID: IW-001-73A

WCS Sub Group 13A

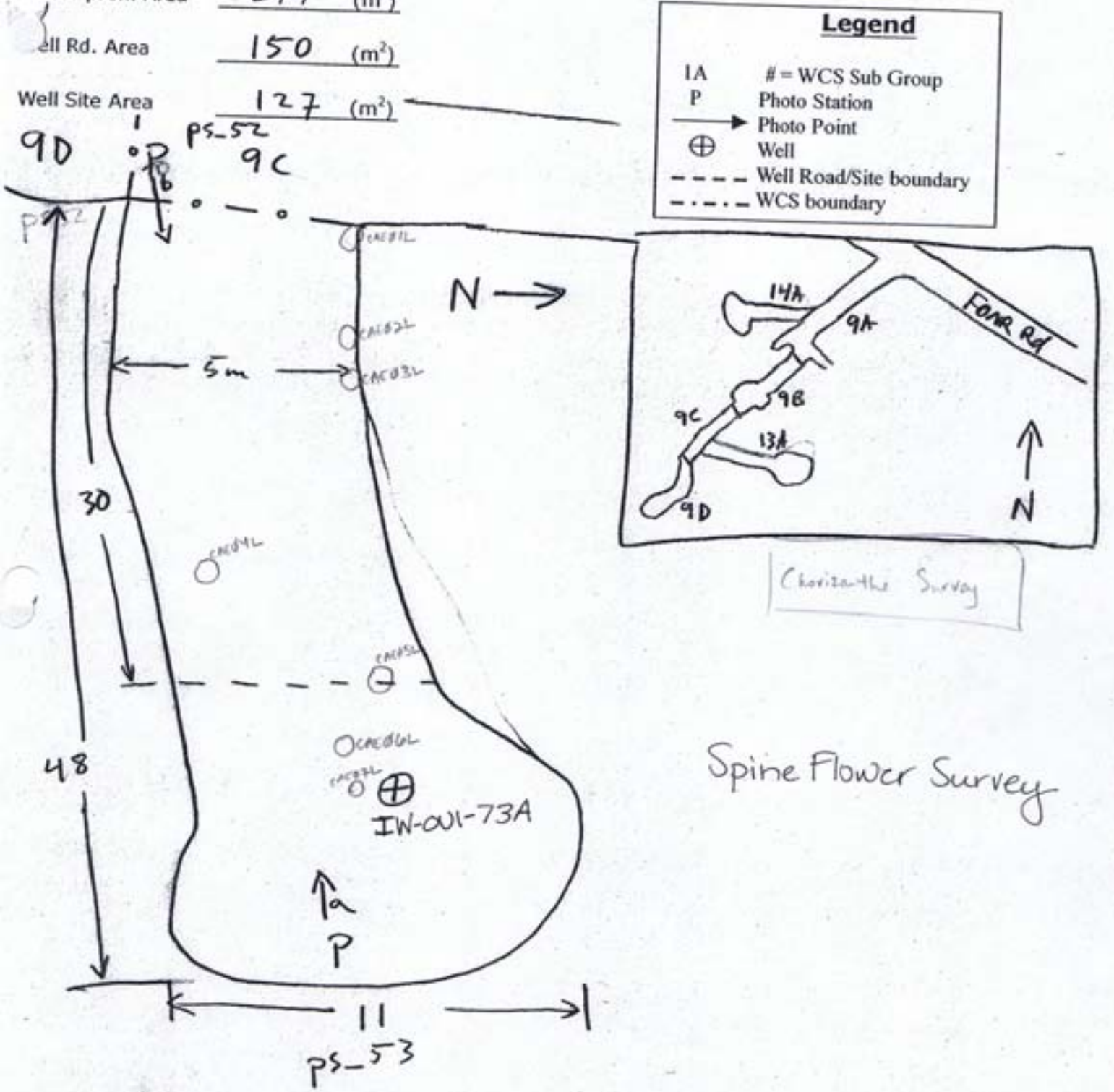
Date 5-12-1

Surveyor CAE

al Aprox. Area 277 (m²)

ell Rd. Area 150 (m²)

Well Site Area 127 (m²)



Chorizanthe Survey

Spine Flower Survey

Well ID: MW-001-83A

WCS Sub Group 14A

Total Aprox. Area 327 (m^2)

Well Rd. Area 215 (m^2)

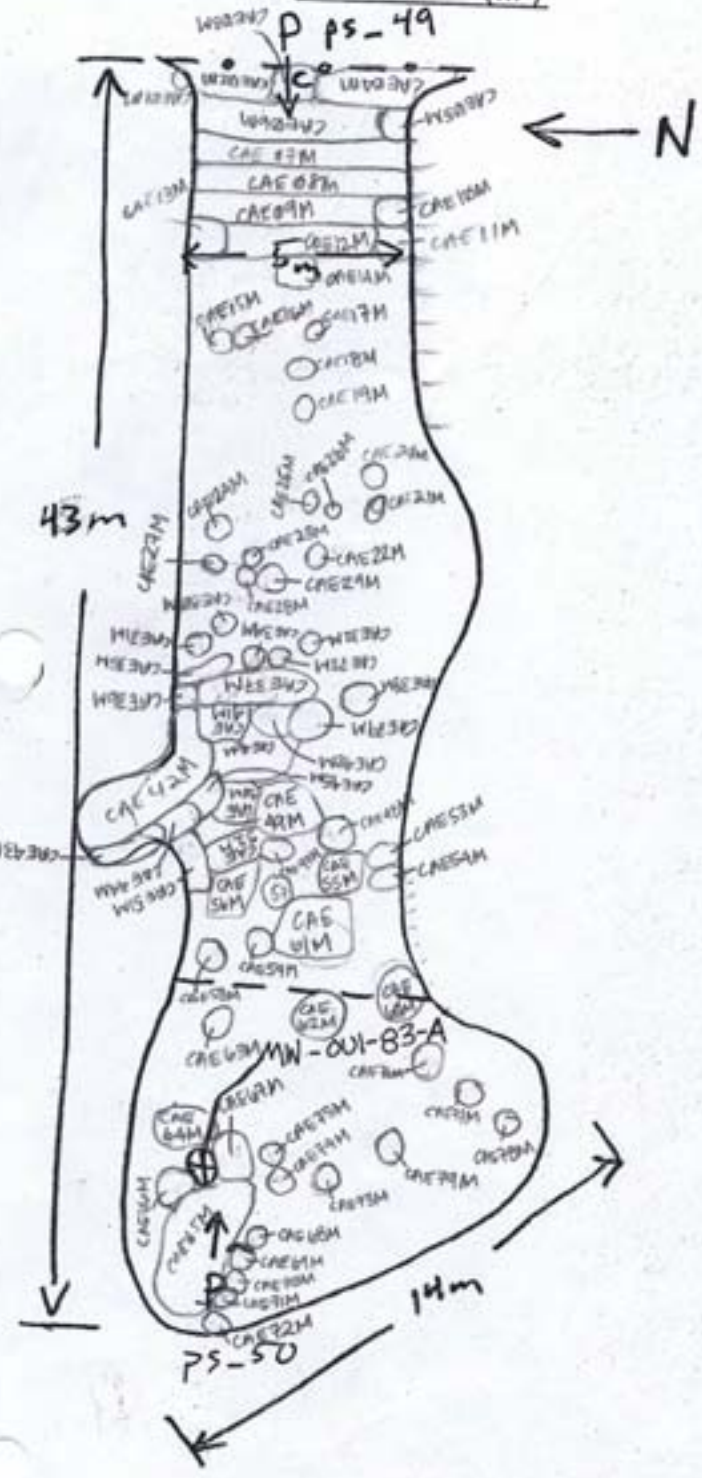
Well Site Area 112 (m^2)

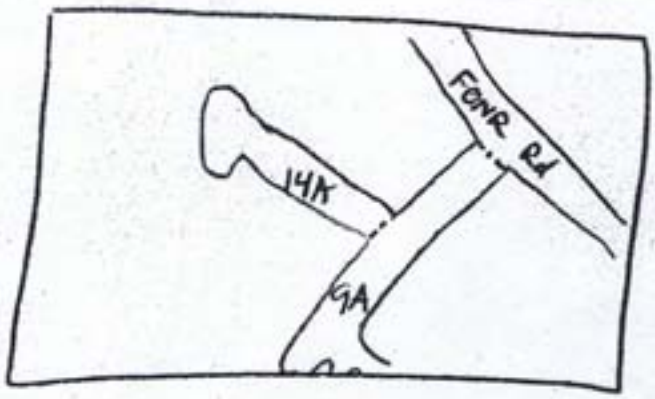
Date 5-12-10

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
-·-·-	WCS boundary





Spire Flower Survey

Well ID: MW-001-82A

WCS Sub Group 15A

Total Aprox. Area 326 (m^2)

Well Rd. Area 208 (m^2)

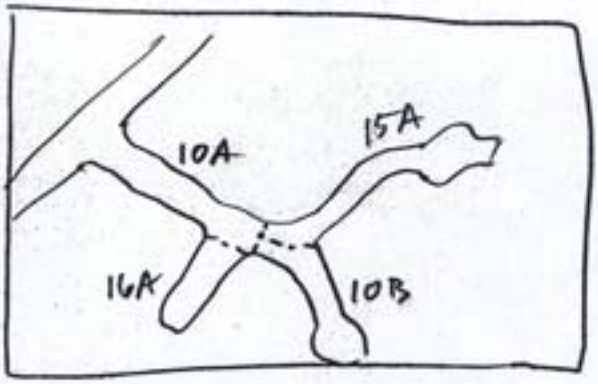
Well Site Area 118 (m^2)

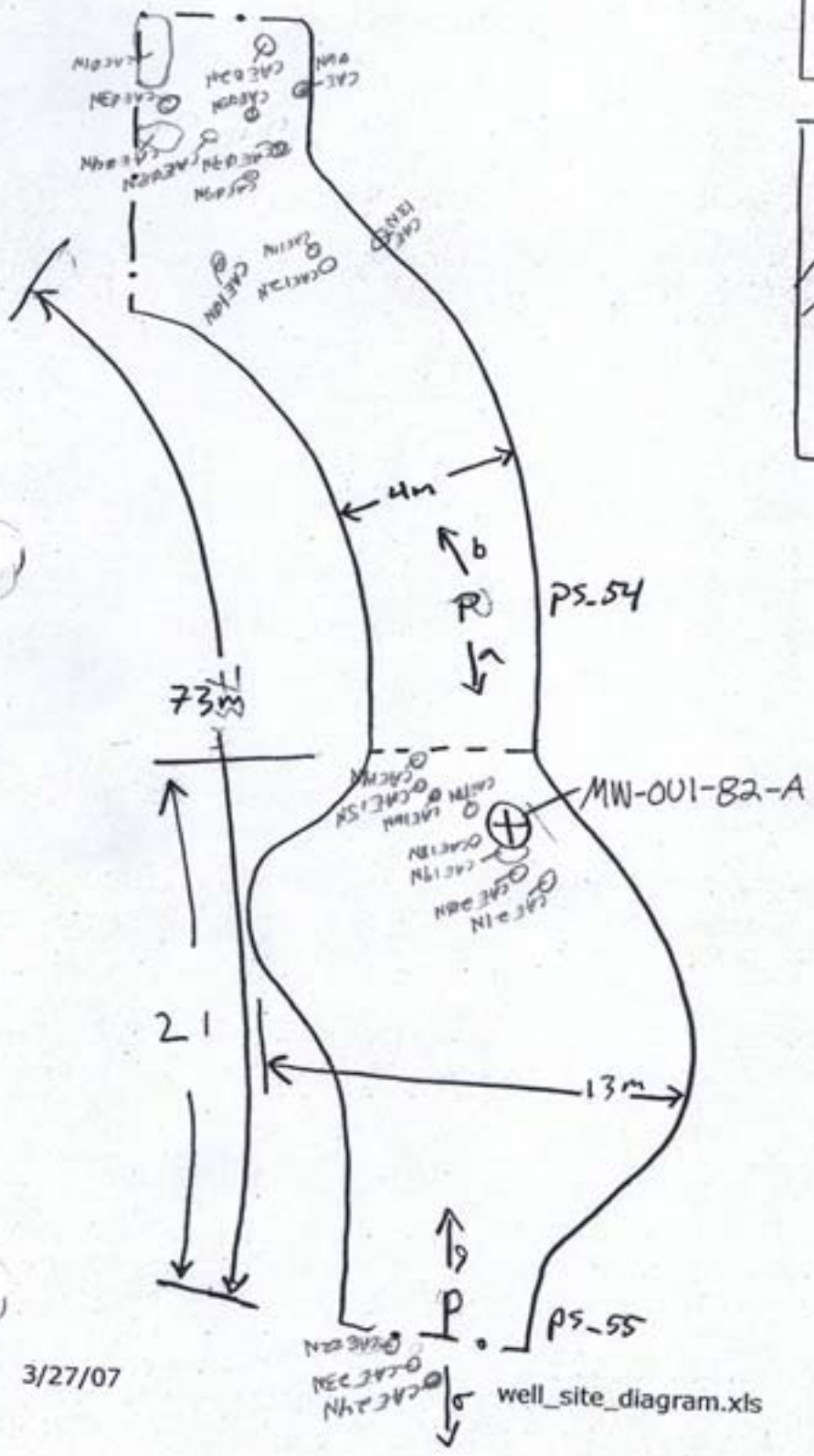
Date 5-5-2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- · - · -	WCS boundary





Spine Flower Survey

Well ID: SB-OUI-2004K

WCS Sub Group 16A

tal Aprox. Area 300 (m^2)

ll Rd. Area 160 (m^2)

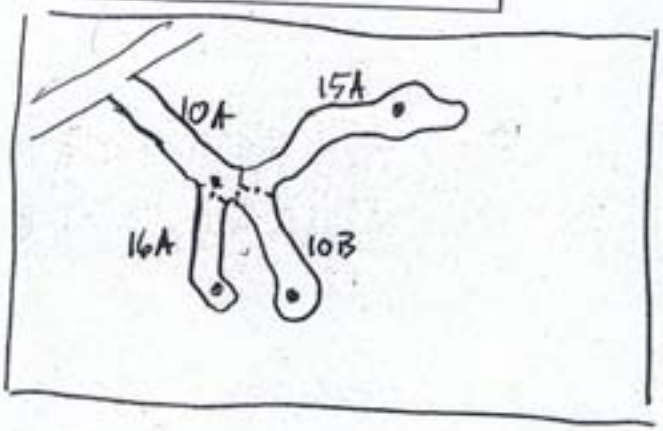
Well Site Area 140 (m^2)

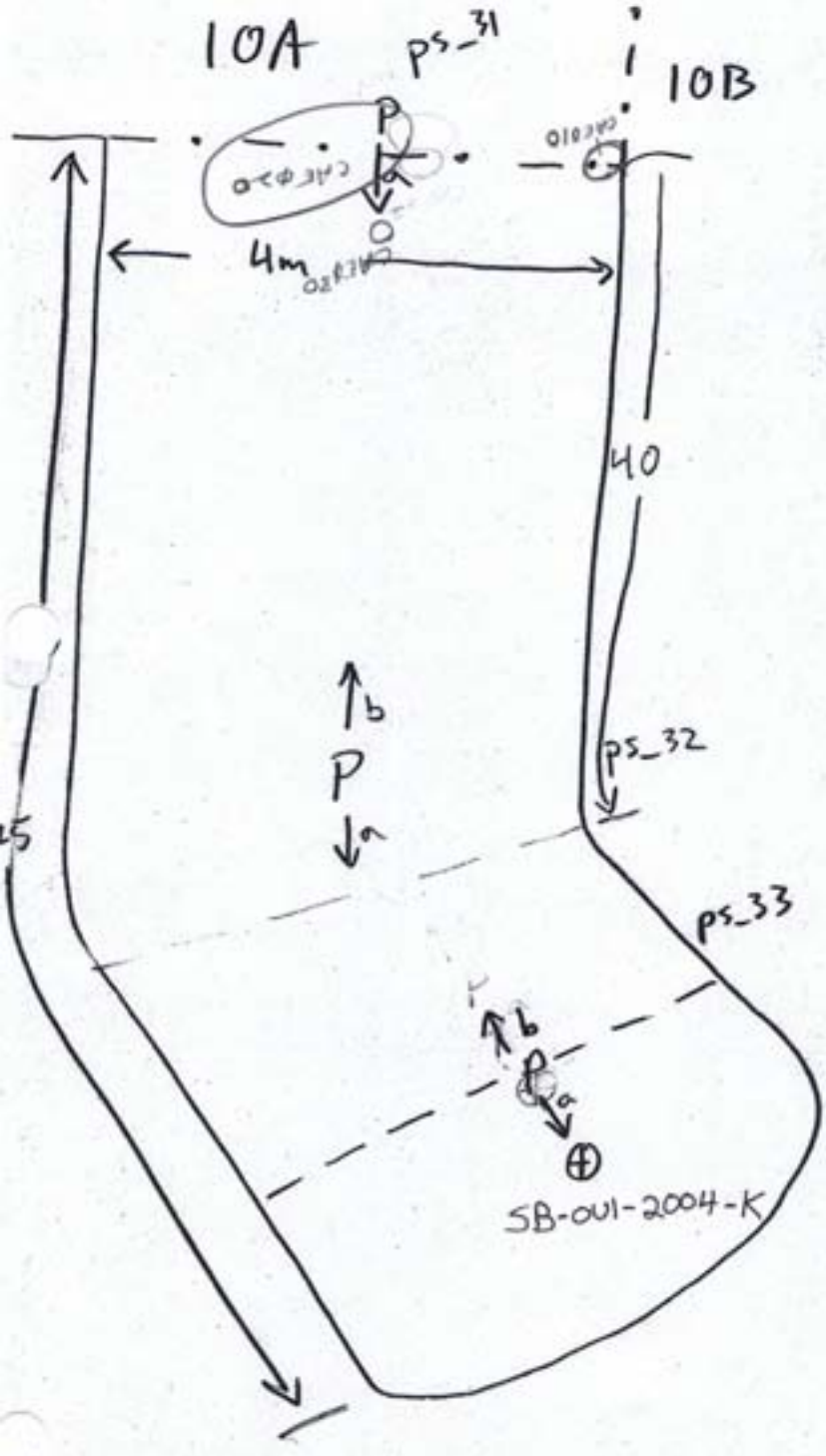
Date 5-5-2010

Surveyor CAE

Legend

1A	# = WCS Sub Group
P	Photo Station
→	Photo Point
⊕	Well
- - - -	Well Road/Site boundary
- . - . -	WCS boundary





Spine Flower Survey

Key

∅ = Zero, #

O = letter O

Attachment 4

‘WCS Photo Log 2010’

The attached spreadsheet (HGL_WCS_PhotoLog_2010.xls) contains a detailed log of all photographs (pre- and post-treatment) taken during the 2010 weed control program within the Operable Unit 1 portion of the FONR.

HGL - WCS 2010 - Photo Log

Date= photo treatment date
WCS= Weed Control Segment; HGL defined weed management area with corresponding wells.

Photo filenames:
All filenames given in following format: <fonr_ps_##x_year-mo-date>
where: ps= photo station ; ##= number; x= photo point; year= year four digit format (e.g., 2010);
mo= month (e.g., april=04); date= date (09 instead of 9); Photo dates are not always the same as treatment dates

Date	Photo #	WCS #	Photo Station	Photo Point	Well/Road #	Notes
3/9/2010	0330	01A	82	a	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0631	01A	82	a	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0331	01A	83	a	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0632	01A	83	a	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0332	01A	83	b	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0633	01A	83	b	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0333	01A	84	a	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0634	01A	84	a	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0334	02A	85	a	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0635	02A	85	a	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0335	02A	85	b	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0636	02A	85	b	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0336	02A	86	a	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0637	02A	86	a	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0337	02A	86	b	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0638	02A	86	b	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0338	03A	87	a	N/A - Staging Area	New photo station Pre-Treatment Photos
10/5/2010	0639	03A	87	a	N/A - Staging Area	Post-Treatment Photos
3/9/2010	0339	04A	2	a	IW-OU1-05-A	Pre-Treatment Photos
10/5/2010	0640	04A	2	a	IW-OU1-05-A	Post-Treatment Photos
3/9/2010	0340	04A	3	a	IW-OU1-05-A	Pre-Treatment Photos
10/5/2010	0641	04A	3	a	IW-OU1-05-A	Post-Treatment Photos
3/9/2010	0341	04A	3	b	IW-OU1-05-A	Pre-Treatment Photos
10/5/2010	0642	04A	3	b	IW-OU1-05-A	Post-Treatment Photos
3/9/2010	0345	05A	7	a	IW-OU1-01-A	Pre-Treatment Photos
10/5/2010	0643	05A	7	a	IW-OU1-01-A	Post-Treatment Photos
3/9/2010	0346	05A	7	b	IW-OU1-01-A	Pre-Treatment Photos
10/5/2010	0644	05A	7	b	IW-OU1-01-A	Post-Treatment Photos
3/9/2010	0342	05A	8	a	IW-OU1-01-A	Pre-Treatment Photos
10/5/2010	0645	05A	8	a	IW-OU1-01-A	Post-Treatment Photos
3/9/2010	0343	05A	8	b	IW-OU1-01-A	Pre-Treatment Photos
10/5/2010	0646	05A	8	b	IW-OU1-01-A	Post-Treatment Photos
3/9/2010	0344	05A	8	c	IW-OU1-01-A	Pre-Treatment Photos
10/5/2010	0647	05A	8	c	IW-OU1-01-A	Post-Treatment Photos
3/9/2010	0351	06A	10	a	EW-OU1-53-A	Pre-Treatment Photos
10/5/2010	0648	06A	10	a	EW-OU1-53-A	Post-Treatment Photos

HGL - WCS 2010 - Photo Log

3/9/2010	0347	06A	11	a	EW-OU1-53-A	Pre-Treatment Photos
10/5/2010	0649	06A	11	a	EW-OU1-53-A	Post-Treatment Photos
3/9/2010	0348	06A	11	b	EW-OU1-53-A	Pre-Treatment Photos
10/5/2010	0650	06A	11	b	EW-OU1-53-A	Post-Treatment Photos
3/9/2010	0349	06A	12	a	EW-OU1-53-A	Pre-Treatment Photos
10/5/2010	0651	06A	12	a	EW-OU1-53-A	Post-Treatment Photos
3/9/2010	0350	06A	12	b	EW-OU1-53-A	Pre-Treatment Photos
10/5/2010	0652	06A	12	b	EW-OU1-53-A	Post-Treatment Photos
3/9/2010	0352	07A	13	a	EW-OU1-52-A	Pre-Treatment Photos
10/5/2010	0653	07A	13	a	EW-OU1-52-A	Post-Treatment Photos
3/9/2010	0353	07A	14	a	EW-OU1-52-A	Pre-Treatment Photos
10/5/2010	0654	07A	14	a	EW-OU1-52-A	Post-Treatment Photos
3/9/2010	0357	08A	17	a	PZ-OU1-10-A1, IW-OU1-10A	Pre-Treatment Photos
10/6/2010	0683	08A	17	a	PZ-OU1-10-A1, IW-OU1-10A	Post-Treatment Photos
3/9/2010	0358	08A	17	b	PZ-OU1-10-A1, IW-OU1-10A	Pre-Treatment Photos
10/6/2010	0684	08A	17	b	PZ-OU1-10-A1, IW-OU1-10A	Post-Treatment Photos
3/9/2010	0356	08A	18	a	PZ-OU1-10-A1, IW-OU1-10A	Pre-Treatment Photos
10/6/2010	0685	08A	18	a	PZ-OU1-10-A1, IW-OU1-10A	Post-Treatment Photos
3/10/2010	0377	09A	22	a	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Pre-Treatment Photos
10/6/2010	0702	09A	22	a	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Post-Treatment Photos
3/10/2010	0378	09A	22	b	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Pre-Treatment Photos
10/6/2010	0703	09A	22	b	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Post-Treatment Photos
3/10/2010	0373	09A	25	a	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Pre-Treatment Photos
10/6/2010	0698	09A	25	a	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Post-Treatment Photos
3/10/2010	0374	09A	49	a	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Pre-Treatment Photos
10/6/2010	0699	09A	49	a	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Post-Treatment Photos
3/10/2010	0375	09A	49	b	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Pre-Treatment Photos
10/6/2010	0700	09A	49	b	MW-OU1-46AD, PZ-OU1-46-AD2, MW-OU1-46-A	Post-Treatment Photos
3/10/2010	0379	09B	22	c	MW-OU1-84A	Pre-Treatment Photos

HGL - WCS 2010 - Photo Log

10/6/2010	0704	09B	22	c	MW-OU1-84A	Post-Treatment Photos
3/10/2010	0380	09B	51	a	MW-OU1-84A	Pre-Treatment Photos
10/6/2010	0705	09B	51	a	MW-OU1-84A	Post-Treatment Photos
3/10/2010	0383	09C	52	a	IW-OU1-74A	Pre-Treatment Photos
10/6/2010	0706	09C	52	a	IW-OU1-74A	Post-Treatment Photos
3/10/2010	0387	09D	24	a	MW-OU1-51A	Pre-Treatment Photos
10/6/2010	0710	09D	24	a	MW-OU1-51A	Post-Treatment Photos
3/10/2010	0386	09D	52	c	MW-OU1-51A	Pre-Treatment Photos
10/6/2010	0708	09D	52	c	MW-OU1-51A	Post-Treatment Photos
3/10/2010	0389	10A	28	a	MW-OU1-50A	Pre-Treatment Photos
10/6/2010	0712	10A	28	a	MW-OU1-50A	Post-Treatment Photos
3/10/2010	0390	10A	29	a	MW-OU1-50A	Pre-Treatment Photos
10/6/2010	0713	10A	29	a	MW-OU1-50A	Post-Treatment Photos
3/10/2010	0391	10A	29	b	MW-OU1-50A	Pre-Treatment Photos
10/6/2010	0714	10A	29	b	MW-OU1-50A	Post-Treatment Photos
3/10/2010	0392	10B	30	a	MW-OU1-59A	Pre-Treatment Photos
10/6/2010	0720	10B	30	a	MW-OU1-59A	Post-Treatment Photos
3/10/2010	0393	10B	30	b	MW-OU1-59A	Pre-Treatment Photos
10/6/2010	0721	10B	30	b	MW-OU1-59A	Post-Treatment Photos
3/9/2010	0361	11A	43	a	EW-OU1-71A	Pre-Treatment Photos
10/6/2010	0688	11A	43	a	EW-OU1-71A	Post-Treatment Photos
3/9/2010	0363	11A	44	a	EW-OU1-71A	Pre-Treatment Photos
10/6/2010	0689	11A	44	a	EW-OU1-71A	Post-Treatment Photos
3/9/2010	0364	11A	44	b	EW-OU1-71A	Pre-Treatment Photos
10/6/2010	0690	11A	44	b	EW-OU1-71A	Post-Treatment Photos
3/9/2010	0365	11A	44	c	EW-OU1-71A	Pre-Treatment Photos
10/6/2010	0691	11A	44	c	EW-OU1-71A	Post-Treatment Photos
3/9/2010	0367	11B	45	a	MW-OU1-86A	Pre-Treatment Photos
10/6/2010	0692	11B	45	a	MW-OU1-86A	Post-Treatment Photos
3/9/2010	0368	12A	46	a	EW-OU1-72A	Pre-Treatment Photos
10/6/2010	0693	12A	46	a	EW-OU1-72A	Post-Treatment Photos
3/9/2010	0369	12A	47	a	EW-OU1-72A	Pre-Treatment Photos
10/6/2010	0694	12A	47	a	EW-OU1-72A	Post-Treatment Photos
3/9/2010	0370	12A	47	b	EW-OU1-72A	Pre-Treatment Photos
10/6/2010	0695	12A	47	b	EW-OU1-72A	Post-Treatment Photos
3/9/2010	0371	12A	47	c	EW-OU1-72A	Pre-Treatment Photos
10/6/2010	0696	12A	47	c	EW-OU1-72A	Post-Treatment Photos
3/9/2010	0372	12B	48	a	MW-OU1-85A	Pre-Treatment Photos
10/6/2010	0697	12B	48	a	MW-OU1-85A	Post-Treatment Photos
3/10/2010	0384	13A	52	b	IW-OU1-73A	Pre-Treatment Photos
10/6/2010	0707	13A	52	b	IW-OU1-73A	Post-Treatment Photos
3/10/2010	0385	13A	53	a	IW-OU1-73A	Pre-Treatment Photos
10/6/2010	0709	13A	53	a	IW-OU1-73A	Post-Treatment Photos
3/10/2010	0376	14A	49	c	MW-OU1-83A	Pre-Treatment Photos
10/6/2010	0701	14A	49	c	MW-OU1-83A	Post-Treatment Photos
3/10/2010	0388	14A	50	a	MW-OU1-83A	Pre-Treatment Photos
10/6/2010	0711	14A	50	a	MW-OU1-83A	Post-Treatment Photos
3/10/2010	0394	15A	54	a	MW-OU1-82A	Pre-Treatment Photos
10/6/2010	0722	15A	54	a	MW-OU1-82A	Post-Treatment Photos
3/10/2010	0395	15A	54	b	MW-OU1-82A	Pre-Treatment Photos
10/6/2010	0723	15A	54	b	MW-OU1-82A	Post-Treatment Photos
3/10/2010	0396	15A	55	a	MW-OU1-82A	Pre-Treatment Photos
10/6/2010	0724	15A	55	a	MW-OU1-82A	Post-Treatment Photos
3/10/2010	0397	15A	55	b	MW-OU1-82A	Pre-Treatment Photos
10/6/2010	0725	15A	55	b	MW-OU1-82A	Post-Treatment Photos

HGL - WCS 2010 - Photo Log

3/10/2010	0407	16A	31	a	SB-OU1-2004K	Pre-Treatment Photos
10/6/2010	0715	16A	31	a	SB-OU1-2004K	Post-Treatment Photos
3/10/2010	0408	16A	32	a	SB-OU1-2004K	Pre-Treatment Photos
10/6/2010	0716	16A	32	a	SB-OU1-2004K	Post-Treatment Photos
3/10/2010	0409	16A	32	b	SB-OU1-2004K	Pre-Treatment Photos
10/6/2010	0717	16A	32	b	SB-OU1-2004K	Post-Treatment Photos
3/10/2010	0410	16A	33	a	SB-OU1-2004K	Pre-Treatment Photos
10/6/2010	0718	16A	33	a	SB-OU1-2004K	Post-Treatment Photos
3/10/2010	0411	16A	33	b	SB-OU1-2004K	Pre-Treatment Photos
10/6/2010	0719	16A	33	b	SB-OU1-2004K	Post-Treatment Photos
3/9/2010	0354	17A	15	a	IW-OU1-02-A	Pre-Treatment Photos
10/6/2010	0678	17A	15	a	IW-OU1-02-A	Post-Treatment Photos
3/9/2010	0355	17A	16	a	IW-OU1-02-A	Pre-Treatment Photos
10/6/2010	0679	17A	16	a	IW-OU1-02-A	Post-Treatment Photos
3/9/2010	0359	18A	41	a	MW-OU1-88-A	Pre-Treatment Photos
10/6/2010	0686	18A	41	a	MW-OU1-88-A	Post-Treatment Photos
3/9/2010	0360	18A	42	a	MW-OU1-88-A	Pre-Treatment Photos
10/6/2010	0687	18A	42	a	MW-OU1-88-A	Post-Treatment Photos

Attachment 5

‘HGL_WCS_Photos_2010’

The enclosed compact disc (CD) contains digital photographs taken during the 2010 weed control program performed by FONR staff. Photographs on the CD are organized in the folder 'HGL_WCS_Photos_2010_jpgs'. This folder contains photo files (.jpg format) with the file name designating the reserve (fonr), the photo station number (‘_ps#’), and the date the photo was taken (_year-month-day).

e.g. ‘fonr_ps13a_2010-03-09’
‘fonr_ps13a_2010-10-06’

Each photo station has at least two photos, one pre-treatment and one post-treatment, designated by date of photo. Refer to photo log (HGL_WCS_Photo_Log_2010.xls) for more detailed information.

In addition to the digital photograph files, the enclosed CD also contains an Adobe PDF file 'HGL_WCS_Photos_2010.pdf' with the pre-treatment and post-treatment photos for each WCS labeled and formatted on a standard letter (8.5" x 11") portrait layout.

WCS# 1A ps82a Staging Area Pre-Treatment 09 March 2010

WCS# 1A ps82a Staging Area Post-Treatment 5 October 2010

WCS# 1A ps83a Staging Area Pre-Treatment 09 March 2010

WCS# 1A ps83a Staging Area Post-Treatment 5 October 2010

WCS# 1A ps84a Staging Area Pre-Treatment 09 March 2010

WCS# 1A ps84a Staging Area Post-Treatment 5 October 2010

WCS# 2A ps85a Staging Area Pre-Treatment 09 March 2010

WCS# 2A ps85a Staging Area Post-Treatment 5 October 2010

WCS# 2A ps85b Staging Area Pre-Treatment 9 March 2010

WCS# 2A ps85b Staging Area Post-Treatment 5 October 2010

WCS# 2A ps86a Staging Area Pre-Treatment 9 March 2010

WCS# 2A ps86a Staging Area Post-Treatment 5 October 2010

WCS# 2A ps86b Staging Area Pre-Treatment 9 March 2010

WCS# 2A ps86b Staging Area Post-Treatment 5 October 2010

WCS# 3A ps87a Staging Area Pre-Treatment 9 March 2010

WCS# 3A ps87a Staging Area Post-Treatment 5 October 2010

WCS# 4A ps2a IW-OU1-05-A Pre-Treatment 9 March 2010

WCS# 4A ps2a IW-OU1-05-A Post-Treatment 5 October 2010

WCS# 4A ps3a IW-OU1-05-A Pre-Treatment 9 March 2010

WCS# 4A ps3a IW-OU1-05-A Post-Treatment 5 October 2010

WCS# 4A ps3b IW-OU1-05-A Pre-Treatment 9 March 2010

WCS# 4A ps3b IW-OU1-05-A Post-Treatment 5 October 2010

WCS# 5A ps7a IW-OU1-01-A Pre-Treatment 9 March 2010

WCS# 5A ps7a IW-OU1-01-A Post-Treatment 5 October 2010

WCS# 5A ps7b IW-OU1-01-A Pre-Treatment 9 March 2010

WCS# 5A ps7b IW-OU1-01-A Post-Treatment 5 October 2010

WCS# 5A ps8a IW-OU1-01-A Pre-Treatment 9 March 2010

WCS# 5A ps8a IW-OU1-01-A Post-Treatment 5 October 2010

WCS# 5A ps8b IW-OU1-01-A Pre-Treatment 9 March 2010

WCS# 5A ps8b IW-OU1-01-A Post-Treatment 5 October 2010

WCS# 5A ps8c IW-OU1-01-A Pre-Treatment 9 March 2010

WCS# 5A ps8c IW-OU1-01-A Post-Treatment 5 October 2010

WCS# 6A ps10a EW-OU1-53-A Pre-Treatment 9 March 2010

WCS# 6A ps10a EW-OU1-53-A Post-Treatment 5 October 2010

WCS# 6A ps11a EW-OU1-53-A Pre-Treatment 9 March 2010

WCS# 6A ps11a EW-OU1-53-A Post-Treatment 5 October 2010

WCS# 6A ps11b EW-OU1-53-A Pre-Treatment 9 March 2010

WCS# 6A ps11b EW-OU1-53-A Post-Treatment 5 October 2010

WCS# 6A ps12a EW-OU1-53-A Pre-Treatment 9 March 2010

WCS# 6A ps12a EW-OU1-53-A Post-Treatment 5 October 2010

WCS# 6A ps12b EW-OU1-53-A Pre-Treatment 9 March 2010

WCS# 6A ps12b EW-OU1-53-A Post-Treatment 5 October 2010

WCS# 7A ps13a EW-OU1-52-A Pre-Treatment 9 March 2010

WCS# 7A ps13a EW-OU1-52-A Post-Treatment 5 October 2010

WCS# 7A ps14a EW-OU1-52-A Pre-Treatment 9 March 2010

WCS# 7A ps14a EW-OU1-52-A Post-Treatment 5 October 2010

WCS# 8A ps17a IW-OU1-10-A Pre-Treatment 9 March 2010

WCS# 8A ps17a IW-OU1-10-A Post-Treatment 6 October 2010

WCS# 8A ps17b IW-OU1-10-A Pre-Treatment 9 March 2010

WCS# 8A ps17b IW-OU1-10-A Post-Treatment 6 October 2010

WCS# 8A ps18a IW-OU1-10-A Pre-Treatment 9 March 2010

WCS# 8A ps18a IW-OU1-10-A Post-Treatment 6 October 2010

WCS# 9A ps22a MW-OU1-46-A Pre-Treatment 10 March 2010

WCS# 9A ps22a MW-OU1-46-A Post-Treatment 6 October 2010

WCS# 9A ps22b MW-OU1-46-A Pre-Treatment 10 March 2010

WCS# 9A ps22b MW-OU1-46-A Post-Treatment 6 October 2010

WCS# 9A ps25a MW-OU1-46-A Pre-Treatment 10 March 2010

WCS# 9A ps25a MW-OU1-46-A Post-Treatment 6 October 2010

WCS# 9A ps49a MW-OU1-46-A Pre-Treatment 10 March 2010

WCS# 9A ps49a MW-OU1-46-A Post-Treatment 6 October 2010

WCS# 9A ps49b MW-OU1-46-A Pre-Treatment 10 March 2010

WCS# 9A ps49b MW-OU1-46-A Post-Treatment 6 October 2010

WCS# 9A ps49c MW-OU1-46-A Pre-Treatment 10 March 2010

WCS# 9A ps49c MW-OU1-46-A Post-Treatment 6 October 2010

WCS# 9B ps22c MW-OU1-84A Pre-Treatment 10 March 2010

WCS# 9B ps22c MW-OU1-84A Post-Treatment 6 October 2010

WCS# 9B ps51a MW-OU1-84A Pre-Treatment 10 March 2010

WCS# 9B ps51a MW-OU1-84A Post-Treatment 6 October 2010

WCS# 9C ps52a IW-OU1-74A Pre-Treatment 10 March 2010

WCS# 9C ps52a IW-OU1-74A Post-Treatment 6 October 2010

WCS# 9D ps24a MW-OU1-51-A Pre-Treatment 10 March 2010

WCS# 9D ps24a MW-OU1-51-A Post-Treatment 6 October 2010

WCS# 9D ps52c MW-OU1-51-A Pre-Treatment 10 March 2010

WCS# 9D ps52c MW-OU1-51-A Post-Treatment 6 October 2010

WCS# 10A ps28a MW-OU1-50-A Pre-Treatment 10 March 2010

WCS# 10A ps28a MW-OU1-50-A Post-Treatment 6 October 2010

WCS# 10A ps29a MW-OU1-50-A Pre-Treatment 10 March 2010

WCS# 10A ps29a MW-OU1-50-A Post-Treatment 6 October 2010

WCS# 10A ps29b MW-OU1-50-A Pre-Treatment 10 March 2010

WCS# 10A ps29b MW-OU1-50-A Post-Treatment 6 October 2010

WCS# 10B ps30a MW-OU1-59-A Pre-Treatment 10 March 2010

WCS# 10B ps30a MW-OU1-59-A Post-Treatment 6 October 2010

WCS# 10B ps30b MW-OU1-59-A Pre-Treatment 10 March 2010

WCS# 10B ps30b MW-OU1-59-A Post-Treatment 6 October 2010

WCS# 11A ps43a EW-OU1-71-A Pre-Treatment 10 March 2010

WCS# 11A ps43a EW-OU1-71-A Post-Treatment 6 October 2010

WCS# 11A ps44a EW-OU1-71-A Pre-Treatment 10 March 2010

WCS# 11A ps44a EW-OU1-71-A Post-Treatment 6 October 2010

WCS# 11A ps44b EW-OU1-71-A Pre-Treatment 10 March 2010

WCS# 11A ps44b EW-OU1-71-A Post-Treatment 6 October 2010

WCS# 11A ps44c EW-OU1-71-A Pre-Treatment 10 March 2010

WCS# 11A ps44c EW-OU1-71-A Post-Treatment 6 October 2010

WCS# 11B ps45a MW-OU1-86-A Pre-Treatment 10 March 2010

WCS# 11B ps45a MW-OU1-86-A Post-Treatment 6 October 2010

WCS# 12A ps46a EW-OU1-72-A Pre-Treatment 10 March 2010

WCS# 12A ps46a EW-OU1-72-A Post-Treatment 6 October 2010

WCS# 12A ps47a EW-OU1-72-A Pre-Treatment 10 March 2010

WCS# 12A ps47a EW-OU1-72-A Post-Treatment 6 October 2010

WCS# 12A ps47b EW-OU1-72-A Pre-Treatment 10 March 2010

WCS# 12A ps47b EW-OU1-72-A Post-Treatment 6 October 2010

WCS# 12A ps47c EW-OU1-72-A Pre-Treatment 10 March 2010

WCS# 12A ps47c EW-OU1-72-A Post-Treatment 6 October 2010

WCS# 12B ps48a MW-OU1-85-A Pre-Treatment 10 March 2010

WCS# 12B ps48a MW-OU1-85-A Post-Treatment 6 October 2010

WCS# 13A ps52b IW-OU1-73A Pre-Treatment 10 March 2010

WCS# 13A ps52b IW-OU1-73A Post-Treatment 6 October 2010

WCS# 13A ps53a IW-OU1-73A Pre-Treatment 10 March 2010

WCS# 13A ps53a IW-OU1-73A Post-Treatment 6 October 2010

WCS# 14A ps49c MW-OU1-83A Pre-Treatment 10 March 2010

WCS# 14A ps49c MW-OU1-83A Post-Treatment 6 October 2010

WCS# 14A ps50a MW-OU1-83A Pre-Treatment 10 March 2010

WCS# 14A ps50a MW-OU1-83A Post-Treatment 6 October 2010

WCS# 15A ps54a MW-OU1-82A Pre-Treatment 10 March 2010

WCS# 15A ps54a MW-OU1-82A Post-Treatment 6 October 2010

WCS# 15A ps54b MW-OU1-82A Pre-Treatment 10 March 2010

WCS# 15A ps54b MW-OU1-82A Post-Treatment 6 October 2010

WCS# 15A ps55a MW-OU1-82A Pre-Treatment 10 March 2010

WCS# 15A ps55a MW-OU1-82A Post-Treatment 6 October 2010

WCS# 15A ps55b MW-OU1-82A Pre-Treatment 10 March 2010

WCS# 15A ps55b MW-OU1-82A Post-Treatment 6 October 2010

WCS# 16A ps31a SB-OU1-2004K Pre-Treatment 10 March 2010

WCS# 16A ps31a SB-OU1-2004K Post-Treatment 6 October 2010

WCS# 16A ps32a SB-OU1-2004K Pre-Treatment 10 March 2010

WCS# 16A ps32a SB-OU1-2004K Post-Treatment 6 October 2010

WCS# 16A ps32b SB-OU1-2004K Pre-Treatment 10 March 2010

WCS# 16A ps32b SB-OU1-2004K Post-Treatment 6 October 2010

WCS# 16A ps33a SB-OU1-2004K Pre-Treatment 10 March 2010

WCS# 16A ps33a SB-OU1-2004K Post-Treatment 6 October 2010

WCS# 16A ps33b SB-OU1-2004K Pre-Treatment 10 March 2010

WCS# 16A ps33b SB-OU1-2004K Post-Treatment 6 October 2010

WCS# 17A ps15a IW-OU1-02-A Pre-Treatment 9 March 2010

WCS# 17A ps15a IW-OU1-02-A Post-Treatment 6 October 2010

WCS# 17A ps16a IW-OU1-02-A Pre-Treatment 9 March 2010

WCS# 17A ps16a IW-OU1-02-A Post-Treatment 6 October 2010

WCS# 18A ps41a MW-OU1-88-A Pre-Treatment 10 March 2010

WCS# 18A ps41a MW-OU1-88-A Post-Treatment 6 October 2010

WCS# 18A ps42a MW-OU1-88-A Pre-Treatment 10 March 2010

WCS# 18A ps42a MW-OU1-88-A Post-Treatment 6 October 2010