DRAFT
Cleanup Action Plan
Small Arms Ranges
(RAU 2A)

Camp Bonneville Military Reservation

23201 Northeast Pluss Road,
Vancouver, WA 98682

Prepared For:
Washington State
Department of Ecology

Prepared By:
Bonneville Conservation,
Restoration & Renewal Team

September 2007

BCRRT

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

Proposed Figures and Tables

List of Figures

List of Tables

List of Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

2, 4 DNT	2,4 Dinitrotoluene
ACES	Area Covered by Environmental Services
AEM	Atlanta Environmental Management, Inc.
AOC	Area of Concern
AOPC	Area of Potential Concern
APP	Accident Prevention Plan
AR	Army Regulation
ARARs	Applicable or Relevant and Appropriate Requirements
ARNG	Army National Guard
ARPA	Archaeological Resource Protection Act
ASB	Anomaly Selection Board
ASR	Archives Search Report
bgs	Below Ground Surface
BOCC	Board of County Commissioners
BRAC	Base Realignment and Closure
BCRRT	Bonneville Conservation Restoration and Renewal Team, LLC
BMV	Benchmark Values
CAA	Clean Air Act
CAAA	Clean Air Act Ammendment
CAP	Clean-up Action Plan
CBMR	Camp Bonneville Military Reservation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CCA	Conservation Conveyance Authority
CCC	Civilian Conservation Corps
CERFA	Community Environmental Response Facilitation Act
CITA	Central Impact Target Area
CMTC	Citizens Military Training Camps
COPC	Chemicals of Potential Concern
CRAP	Conceptual Remedail Action Plan
CRZ	Contamination Reduction Zone
CSM	Conceptual Site Model
CWA	Clean Water Act
DA	Department of Army
DAESC	Department of the Army Explosive Safety Council
DGM	Digital Geologic / Geophysical Mapping
DNR	Department of Natural Resources
DOD	Department of Defense
DOE	Washington State Department of Ecology
EA	Environment Assessment
E&R	Excavation and Restoration
EBS	Environment Baseline Study
EIS	Environmental Impact Statement
EE/CA	Engineering Evaluation / Cost Analysis
EHS	Environmental Health and Safety

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Environmental Study Area
ESCA	Environmental Services Cooperative Agreement
ESH	Explosive Safety Hazard
ESS	Explosive Safety Submission
FBI	Federal Bureau of Investigation
FS	Feasibility Study
FOSET	Finding of Suitability for Early Transfer
GIS	Geographical Information System
GOCO	Government Owned, Contracts Operated
GPS	Global Positioning System
HASP	Site Wide Health and Safety Plan
HAZWOPER	Hazardous Waste Operation and Emergency Response Standard
HE	High Explosive
HEAT	High Explosive Anti-Tank
HSR	Hazard Severity Ranking
HSWA	Hazardous and Solid Waste Ammendments
HWMA	Hazardous Waste Management Act
IAWP	Interim Action Work Plan
ICs	Institutional Controls
ID	Identification
IDW	Investigation Derived Waste
LAW	Light Anti-tank Weapon
LDR	Land Disposal Restrictions
LRA	Local Redevelopment Authority
MD	Munition Debris
MEC	Munitions and Explosives of Concern
mg/L	miligrams per liter
MRE	Meal, Ready-to-Eat
msl	mean sea level
MTCA	Model Toxics Control Act
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standards
NCP	National Contingency Plan
NFA	No Further Action
N/A	Not Applicable
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge
NPL	National Priority List
NSPS	New Source Performance Standards
OB/OD	Open Burn / Open Detonation

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

OE	Ordnance and Explosive
OSHA	Occupational Safety and Health Act
PETN	Pentaerythritol Tetranitrate
PHA	Project Hazard Analysis
PDA	Personal Digital Assistant
PPCD	Prospective Purchaser Consent Decree
PPCE	Personal Protective Clothing and Equipment
PPE	Personal Protective Equipment
PRG	Preliminary Remediation Goals
PSD	Prevention of Significant Deterioration
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assuance / Quality Control
RAU 2 A	Remedial Action Unit 3
RCRA	Resource Conservation and Recovery Act
RCW	Reveised Code of Washington
RI	Remedial Investigation
RI/FS	Remedial Investigation / Feasibility Study
ROTC	Reserve Officer Training Corps
RP	Regional Park
RPC	Reuse Planning Committee
RTES	Rare, Threatened Endangered Species
RV	Recreational Vehicle
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SEPA	State Environmental Policy Act
SI	Site Investigation
SIPS	Stae Implementation Plans
SOP	Standard / Standing Operating Procedure
SOW	Statement of Work
SPRT	Sequential Probability Ratio Test
TCLP	Toxicity Characteristic Leaching Procedure
TCRA	Time Critical Removal Action
TEC	Topographic Engineering Center
TLVs	Threshhold Limit Values
TSDF	Treatment, Storage and Disposal Facility
TSRS	Technical Specifications and Requirement Statements
UPL	Upper Confidence Level
USACE	United States Army Corps of Engineers
USAESCH	United States Army Engineering and Support Center, Huntsville
USAR	United States Army Reserve
USATCES	United States Army Technical Center for Explosives Safety
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

WAC	Washington Administrative Code
WMA	Wildlife Management Area
WP	White Phosphorus

1.0 INTRODUCTION

1.1 Cleanup Action Summary

This document sets forth the plans for cleanup of soil contamination of Remedial Action Unit (RAU)-2A, the Small Arms Ranges at the former Camp Bonneville Military Reservation (CBMR) in Clark County, Washington (see **Figure 1-1**). This document is submitted by the Bonneville Conservation, Restoration and Renewal Team (BCRRT), the current owner of CMBR.

The general objectives and scope of this cleanup action are established by the Prospective Purchaser Consent Decree (PPCD) for CBMR which was entered October 13, 2006 (WDOE, 2006). The PPCD identifies cleanup action sub-unit RAU-2A, describes RAU 2A as consisting of the 21 small arms range areas, and requires addressing any lead or other contamination associated with those areas and any risks to human health and the environment associated with such contamination. This Cleanup Action Plan (CAP) is written to provide specific descriptions of the work to be done and the methods to be employed in meeting the prescriptions of the applicable sections of the PPCD. This CAP is further intended to meet the specifications of regulations promulgated under the Washington State Model Toxics Control Act (MTCA) as set forth in Title 173-340 of the Washington Administrative Code (WAC) Sections 380 – Cleanup Action Plans and 400(4) – Plans Describing Cleanup Actions [WAC 173-340-380 and WAC 173-340-400(4)].

The Final Remedial Investigation/Feasibility (RI/FS) Report for RAU-2A dated August 13, 2007 (BCRRT, 2007b) identified areas needing cleanup, presented remedial objectives, identified general response actions, identified specific cleanup technologies applicable to the site along with cleanup action alternatives, evaluated those alternatives with respect to the requirements contained in WAC 173-340-360, and identified the preferred cleanup actions for Small Arms Ranges site soils as “excavation and removal of contaminated soil” for the nine ranges that that had been shown to warrant further action. This plan implements those mandates. When the work described in this CAP is completed, it will have satisfied all the remedial activities contemplated in the Interim Cleanup Action Work Plan for the Small Arms Ranges Berms and Fire Support Areas (Calibre, 2005) and the Final RI/FS Report for the Small Arms Firing Range Floors (BCRRT, 2007b).

In addition, this plan satisfies the applicable requirements of the Environmental Services Cooperative Agreement (ESCA) as those two documents relate to the small arms ranges.

The technical and scoping bases for this CAP are established by integrating the cleanup activities specified in two prior documents, as follows:

- Draft Final Work Plan for Interim Actions at Small Arms Range Berms and Fire Support Areas (Calibre, 2005) which defines soil excavation to be done at the berms and firing points at nine small arms ranges at CBMR. That Work Plan outlines excavation scenarios for free standing berms, hillside berms, and pop-up target berms as well as for impact zones behind these berms and for fire support areas (i.e. small arms firing positions). Based on the history of these excavation areas and the observed physical

Camp Bonneville Military Reservation

Vancouver, Washington

Figure 1-1 - Regional Map

BONNEVILLE
CONSERVATION, RESTORATION & RENEWAL TEAM, LLC

BCRRT

0 1 2 3 4 mi
0 1 2 3 4 km

Scale - 1:100,000; 1 in equals 5.6 mi
Projection - Lambert Conformal Conic
Coordinate System - State Plane Washington South FIPS 4602
Data - Parsons & U.S. Army Corps of Engineers
© BCRRT December 2006

conditions at these areas, the Work Plan was developed without a soil sampling program in these areas because these areas clearly contain lead and will be subject to cleanup actions.

- Final Remedial Investigation/Feasibility Study RI/FS Report for RAU-2A (BCRRT; 2007b) which defines soil excavation to be done in the range floor areas between the berms and the fire support areas. The remedial investigation element of this RI/FS identifies locations of soils with elevated lead concentrations based on analysis of samples from a grid pattern on these range floors. Based on relevant human health and ecological standards, as established at WAC 173-340-360, the feasibility study element of this RI/FS identified the preferred cleanup action for these soils to be excavation and removal.

This plan details the ways and means by which these mandates will be implemented at the following nine small arms ranges:

- Combat Pistol Range
- Undocumented Pistol Range
- 1,000-inch Rifle Range and Machine Gun Range
- 25-meter M60 and Pistol Range
- 25-meter Machine Gun Range
- 25-meter Record Firing Range and Field Firing Range
- Field Ranges No. 1 and No. 2
- Field Fire Ranges No. 1 and No. 2
- Rifle Ranges No. 1 and No. 2

Soil cleanup for lead at these nine small arms ranges will be initiated only after completion of the brush clearance and munitions and explosives of concern (MEC) surface clearance activities in these work areas. These brush and MEC surface clearance activities are being conducted under an Interim Action Work Plan (IAWP) for MEC-related activities (BCRRT, 2007a) [approved by the Washington State Department of Ecology (WDOE)] and an Explosive Safety Submittal (MKM, 2006) that was approved by the United States Army Technical Center for Explosives Safety (USATCES).

It is noted that different documents relating to the small arms ranges at CBMR identify differing numbers of those ranges. These apparent discrepancies arise from changes over the history of the site in range designations by range name and range number and the construction and use of multiple ranges at the same or overlapping locations at different times and the sharing of berm materials by more than one range. The site investigations also demonstrated that clean up actions were not required at certain identified ranges. The list of nine ranges presented above is an accurate and complete list of the small arms ranges areas where cleanup is required.

1.2 Summary of Cleanup Action Objectives

As set forth in the RI/FS, cleanup actions at the Small Arms Ranges would have the objective of preventing potential exposure of human and ecological receptors to concentration of lead in site soils at concentrations greater than applicable cleanup standards for the proposed re-use of the

site. Potential human receptors at the Small Arms Ranges may include on-site workers, visitors to the site, and adjacent residents. Potential ecological receptors include plants and wildlife that may use or inhabit the affected areas.

As described in the RI/FS, soil cleanup standards based on MTCA Method A unrestricted residential use have been determined appropriate for the Small Arms Ranges based on the potential future land use. In addition, the ecological indicator concentrations and cleanup levels shown are applicable to these site soils. These concentrations, as established under MTCA Regulations, are as follows:

- Unrestricted or residential land uses: 250 mg/kg (see WAC 173-340- 900, Table 740-1 – Method A Soil Cleanup Levels for Unrestricted Land Uses)
- Industrial or commercial land uses: 1,000 mg/kg (see WAC 173-340-900, Table 745-1 – Method A Cleanup Levels for Industrial Properties)
- Ecological indicator soil concentration for plants: 50 mg/kg (see WAC 173-340-900, Table 749-3 – Ecological Indicator Soil Concentrations)
- Ecological indicator soil concentration for wildlife: 118 mg/kg (see WAC 173-340-900, Table 749-3 – Ecological Indicator Soil Concentrations)
- Ecological indicator soil concentration for soil biota: 500 mg/kg (see WAC 173-340-900, Table 749-3 – Ecological Indicator Soil Concentrations)

MTCA requires the soil cleanup levels be based on estimates of the reasonable maximum exposure expected under both current and future site use conditions. Historically, the CBMR was an Army military reservation with controlled access and used for short-term, small unit training exercises (AEM, 2005). Future uses proposed for the site may include development of a regional park and environmental preservation area. The proposed future land uses may include educational activities, law enforcement training, and public recreation. The possible public uses may involve short-term camping and group use of existing or new structures for overnight programs (CBLRA, 2003). This CAP will meet these objectives as follows:

- Areas where the average lead concentration has been determined to exceed 118 mg/kg will be remediated by general excavation of those “hot spots”
- Areas where the average concentration is greater than 50 mg/kg but less than 118 mg/kg will be remediated by focused remediation of the area of elevated lead concentration with confirmatory sampling
- Areas where the average concentration is less than 50 mg/kg and no individual sample result exceeds 118 mg/kg will not be subject to further remedial action.

These remediation standards and procedures are described more fully in the following sections of this CAP.

1.3 Organization of this Cleanup Action Plan

- **Section 1.0 Introduction** presents an overview of the regulatory basis for this Corrective Action Plan and reviews the organization of this document.

- **Section 2 Site Description and Background** presents a general description of the CBMR

- **Section 3 Description, Background, and Current Condition of the Small Arms Ranges** presents information describing the locations, history of use, and history of prior investigations with a summary sampling and analysis results for lead at the Small Arms Ranges

- **Section 4 Applicable Laws and Regulations and Cleanup Standards** identifies the applicable laws, regulations, and standards governing this cleanup action with brief digests of the applicable or relevant provisions and identifies the cleanup action objectives established by those laws and regulations. In addition to the requirements for protection of human health and ecological receptors discussed in Section 1.2, these standards also include protection of surface waters, erosion prevention, protection of site workers, visitors, and the public, protection of natural resources (e.g. wetlands), and protection of cultural and historic resources during implementation of this cleanup action. These standards also include appropriate management of the recovered lead by recycling and of the contaminated soils by stabilization or sequestration.

- **Section 5 Cleanup Action Design and Methods** presents the design of the cleanup action including definitions of the work areas and specifications of the methods to be employed for excavation. Soil handling, screening, stabilization, and recycling or disposal. This section also addresses explosives safety and procedures to meet the applicable laws and regulations discussed in Section 4.

- **Section 6 Task-Specific Health and Safety Plan** presents health and safety plan information.

- **Section 7 Schedule** presents a task milestone schedule

- **Section 8 Compliance Monitoring and Cleanup Action Reporting** describes the plans and reports required by the PPCD to guide future monitoring and operations (if needed) and to document the cleanup actions conducted as part of this CAP.

- **Section 9 References**

- A**ppendix A** summarizes the soil sampling locations and results for lead from the RI/FS Report for the floors of the Small Arms Ranges

- **Appendix B** CBMR Permits

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 Location

CBMR is located in southwestern Washington and comprises approximately 3,840 acres (see **Figure 2-1**). CBMR is located in southeastern Clark County, approximately five miles east of the city limits of Vancouver and approximately 3.5 miles north of the city limits of Camas. The site is approximately seven miles north of the Columbia River. The site is located in Township 2 North and Township 3 North of Range 3 East in the Washington Public Lands Survey system.

2.2 General Site Description and Topography

CBMR is mostly undeveloped forested hillsides and creek side drainages. Former military barracks and classrooms are concentrated at the Camp Killpack and Camp Bonneville cantonment areas, which cover approximately 30 acres. Other developed areas include firing ranges, a paved two-lane road connecting the main gate with the two containment areas, and a network of unpaved roads. The main gate to CBMR is located on the western boundary of the camp, approximately one mile north of Pluss Road.

The 3,840-acre camp is located in the western foothills of the Cascade Mountains, in the Lacamas Creek valley. The land surrounding the camp has scattered residences and is used primarily for agriculture and livestock grazing. The nearest town is Proebstel, an unincorporated community about two and one-half miles to the southwest of the western entrance to the camp.

2.3 Summary of Site History

The Army used CBMR for a variety of infantry training exercises in the wooded portions of the site and for live fire of small arms, assault weapons, mortars and artillery at firing ranges, firing points and target areas located on-site between 1910 and 1995. In the early 1950s, the Department of Defense (DoD) to lease an additional 840 acres from the State of Washington to expand training possibilities at post. The primary use of the facility by the United States Department of the Army (Army) has been for training of company-size infantry and artillery units (many from Forts Vancouver and Lewis). In addition, the facility has been used for training by the Army Reserve units in Southern Washington and Northern Oregon. Other Reserve and National Guard components, as well as U.S. Navy Construction Battalions (Sea Bees), the Federal Bureau of Investigation (FBI), and local law enforcement units, have also used the site.

In July of 1995, CBMR was selected for closure under the 1995 Base Realignment and Closure (BRAC) process. Since the CBMR was officially closed, investigations were conducted by the Army and its consultants in order to characterize the nature and extent of contamination at the site and to develop a plan for potentially transferring ownership. Clark County (County) expressed interest in the site and began the process for obtaining the property by developing a Reuse Plan (CBLRA, 2003). The reuse plan developed called for the majority of Camp Bonneville to be transferred to the County for the public benefit – education, law enforcement, parks, and conservation areas with no financial gain to the county.

In October 2006 the Army transferred ownership of the property to the County via a conservation conveyance. The County subsequently transferred ownership to BCRRT. BCRRT will hold the deed of the property during investigation and clean-up activities at the site. After the property is remediated to DOE standards, BCRRT will transfer the property back to the county. The County will then begin implementing the reuse plan.

The Small Arms Ranges have been used as firing ranges for a variety of weapon systems. In the initial post-closure site investigations, approximately 25 potential ranges were been identified from maps and records dating back to 1958. These firing ranges were used for small arms, large-caliber machine guns, rifles, grenades, light anti-tank weapon rockets, and sub caliber weapons. Further review of the maps and other documents as well as on-site reconnaissance activities identified duplications and overlaps in the initial inventory. Of the original 25 potential ranges, some had historically different names and were determined to be at the same location and double counted. As the results of the initial investigations and Remedial Investigation (RI) planning, seventeen discrete firing ranges were identified for investigation during the RI. The RI at the Small Arms Ranges was designed to evaluate the potential for soil contamination from lead or other munitions-related chemicals at these ranges.

2.4 Site Geology and Hydrogeology

A detailed summary of existing information on the geology and hydrogeology of the Camp Bonneville area has been prepared in prior investigation reports. The following sections provide excerpts of the information previously prepared and information collected during the conduct of the RI at CBMR.

2.4.1 Regional Geology

CBMR is situated on the margin of the western foothills of the southern Cascades in the transition zone between the Puget Trough and the Willamette Trough Provinces. The geology of this area generally consists of Eocene and Miocene volcanic and sedimentary rock types overlain by unconsolidated clays, silts, sands, and gravels of the Troutdale Formation.

2.4.2 Site Geology and Soils

CBMR is situated along the structural and physiographic boundary between the western flank of the southern Cascade Mountains and the Portland-Vancouver Basin. The geology of the CBMR vicinity is known primarily from geologic mapping (Mundorff, 1964 and Phillips, 1987), a limited number of well logs available from the general area, and a Multi-Sites Investigation conducted by Shannon & Wilson, (1999a).

The geology at CBMR can be divided into three general areas that correspond approximately to topographic divisions. The area west of Lacamas Creek is composed of a series of predominantly gravel and semi-consolidated conglomerate layers with scattered lenses and stringers of sand (Upper Troutdale Formation).

Underlying the Troutdale Formation and comprising the area to the north and east of Lacamas Creek are predominantly basalt flows and flow breccia, with some pyroclastic and andesitic rocks that are folded and faulted. The bottomland along Lacamas Creek is composed of unconsolidated silt, sand, and gravel valley fill, with some clay. Because of the thick soil and dense vegetation, faults have not been identified within CBMR (ESE, 1983).

The CBMR soils are mainly low-permeability clays, which results in considerable runoff after storms and occasional minor flooding of Lacamas Creek. Upland soils have mainly developed from basalt and are generally gravelly or stony and fairly shallow. Bottomland soils along Lacamas Creek tend to be clayey (Geo Recon, 1981). Shannon & Wilson (1999a) described the four distinctive stratigraphic units that underlie CBMR:

- Quaternary floodplain and stream channel alluvium and lacustrine deposits, which mantle the Lacamas Creek valley floor (Qa).
- A Quaternary landslide deposit (Qls) of surface soils and bedrock displaced from the steep slope along David Creek.
- A thick sequence of Quaternary to Pliocene-age gravel, fine-grained sand, and sand with cobbles and boulders known as the Troutdale Formation (Pt), which underlies areas to the west of the Bonneville cantonment.
- Oligocene volcanic bedrock (Tv), which is exposed at the surface in the eastern part of Camp Bonneville.

Quaternary alluvium deposits comprise the shallow surface soils of the Lacamas Creek valley floor, which is composed of stream channel, floodplain, and alluvial fan sediments. These deposits are expected to consist of a thin layer of clay and silt, underlain by layers of sand/silt and clay. During drilling and excavation activities associated with the removal of an underground storage tank (UST) in Camp Killpack (Hart Crowser, 1996), at least 25 feet of silty clay was encountered and interpreted to be older alluvium. Borings from the Multi-Sites Investigation (Shannon & Wilson, 1999a) also encountered alluvial clays and silts overlying a relatively thick, silty clay deposit in the Camp Bonneville cantonment. These clayey soils probably originated as water borne sediments that were deposited on the valley floor in Quaternary time as a result of catastrophic flooding along the Columbia River (Shannon & Wilson, 1999a).

The Troutdale Formation, which underlies the western-most portion of the camp, ranges from poorly consolidated sand and gravel to a well indurated conglomerate in its upper part. Based on regional boring logs, the Upper Troutdale Formation locally is about 150 feet thick and consists of cemented sand, gravel, sandy clay, and boulders. It is underlain by up to 150 feet of the Lower Troutdale Formation, which contains considerably more clay interspersed with sandy and gravelly layers. There is considerable variation in the lithology and thickness of the Troutdale Formation. In general, the formation thins eastward against the underlying bedrock, and the lower part of the formation reportedly is typically coarser grained toward the east (Mundorff, 1964).

The bedrock that underlies the alluvial deposits and Troutdale Formation is exposed at the surface in the eastern part of CBMR. This bedrock consists of Oligocene-age

andesite and basaltic andesite flows, minor flow breccias, tuffs, and volcaniclastic sandstones. According to the logs of borings from the Multi-Sites Investigation (Shannon & Wilson, 1999a), the uppermost bedrock is severely weathered. This weathered bedrock tends to form surface soils that contain gravel of basalt lithology. During drilling for the Multi-Sites Investigation, bedrock was encountered in 10 soil borings at depths ranging from approximately 6 to 37 feet below ground surface (bgs).

2.4.3 Site Hydrogeology

Limited information is available about the hydrogeology of CBMR. Most prior work throughout the County area has focused on the Troutdale Formation (Mundorff, 1964). CBMR resides over the eastern edge of the Troutdale Formation where it is pinched out by the underlying bedrock. There are two drinking water wells at CBMR: a 385-foot-deep well at the Camp Bonneville cantonment, and a 193-foot-deep well at the Camp Killpack cantonment (ESE, 1983). The latter well is apparently different from the 516-foot-deep well at the Camp Killpack cantonment (Mundorff, 1964). In addition, a well was drilled at the FBI range during 1998, which extends to a depth of 105 feet bgs (Shannon & Wilson, 1999b). Several groundwater monitoring wells associated with the sewage lagoons are located east of the Camp Bonneville cantonment. Based on regional information (Mundorff, 1964) and the reported depths of the wells at the camp, water supply wells in the area generally extend into the Troutdale Formation or underlying bedrock. Most of the nearby wells apparently obtain groundwater from depths of 150 to as much as 500 feet bgs.

The water table is typically within a few feet of the surface in areas underlain by alluvium and appears to fluctuate seasonally by several feet. A rising water table occurs in the early fall through spring during the rainy season, and a declining water table occurs throughout the summer. The localized groundwater flow generally follows local topography toward tributaries and creeks.

Generally, groundwater flows from the uplands towards Lacamas Creek. The elevation of the water table in the alluvial valley areas of CBMR is expected to be fairly shallow (in the range of 5-20 feet bgs) based on the presence of shallow bedrock, multiple creeks, tributaries, and boggy areas.

Two monitoring wells were installed as part of the investigation of Landfill 4, an upland area of CBMR (Shannon & Wilson, 1999b). The depths to water in the wells ranged from 10.4 feet bgs to 18.8 feet bgs. The limited groundwater elevation data suggested a groundwater flow direction towards the creek, which is consistent with the surface topography.

Previous upgradient investigations (Landfill 4) detected explosives and volatile organic compounds in groundwater samples collected from specific wells. Other upgradient land uses that could have contributed chemicals of potential concern (COPCs) include firing ranges, open burning and open detonation grounds, and one or more underground storage tanks that have been removed.

2.5 Surface Water Resources

The principal surface water feature in the vicinity of the investigation area is Lacamas Creek, which flows southward from the confluence of two branch streams in the north-central part of CBMR, exiting the installation at its southwest corner. From the southwestern property boundary, Lacamas Creek flows southwestward to Proebstel, where it turns toward the southeast and continues to its confluence with the Columbia River at the town of Camas. Numerous minor tributaries, that drain adjacent uplands, flow into Lacamas Creek. Buck Creek and David Creek, the largest of these streams, drain the southeastern hills of CBMR.

2.6 Summary of Natural Resources and Rare, Threatened, or Endangered Species.

Most of CBMR is forested undeveloped land that provides habitat for many plant and animal species, including some special status species (United State Army Corps of Engineers [USACE], 2001). Wetlands and riparian areas are primarily associated with Lacamas Creek at CBMR (PBS, 2007). Vegetation and wildlife are described in terms of their association with five plant communities:

- Coniferous forest
- Mixed forest
- Scrub-shrub
- Meadows
- Open-water wetlands

The United States Fish and Wildlife Service (USFWS) has indicated that no listed animal species and one proposed animal species (coastal cutthroat trout) were within CBMR (USACE, 2001). The National Marine Fisheries Service stated that the Lower Columbia River steelhead, Lower Columbia River Chinook salmon, and Columbia River chum may be present at CBMR.

On April 5, 1999, the coastal cutthroat trout was proposed as a threatened species for the Southwest Washington/Columbia River Ecologically Sensitive Unit and may be present at CBMR. Coastal cutthroat trout require relatively cold water for spawning, and continuous forest canopy is important in maintaining cold temperatures. Lacamas Dam blocks upstream fish passage on Lacamas Creek approximately 10 miles downstream from the CBMR western boundary. As a result, Lower Columbia River steelhead, Lower Columbia River chinook salmon, and Columbia River chum are not found above Lacamas Dam. However, coastal cutthroat trout can become resident above a dam and have been found in surveys of Lacamas Creek. It is assumed that the now-resident population of coastal cutthroat trout above the dam still has downstream access over Lacamas Dam and provides flow of genetic material to downstream populations.

The 1995 endangered species survey identified certain Washington State special status target species at CBMR (USACE, 2001). The species that were found during the survey were small-flowered trillium (*Trillium parviflorum*), hairy-stemmed checker-mallow (*Sidalcea hirtipes*), red-legged frog (*Rana aurora*), Vaux's swift (*Chaetura vauxi*), pileated woodpecker (*Drycopus pileatus*), and the brush prairie or northern pocket gopher (*Thomomys talpoides douglasi*).

Two state-listed plant species were found at CBMR. Two populations of small-flowered trillium (state-listed as sensitive) were found within mixed woodland communities. This species likes moist, shady woods. Numerous individuals were found within these populations. Only one population of hairy-stemmed checker-mallow (state-listed as endangered) was found, and included approximately 25 individuals. While this plant is often found along streams and in open fields, it was located at CBMR along a road in association with a ditch.

Two state-listed candidate bird species have been observed at CBMR. Both Vaux's swifts and pileated woodpeckers are found throughout the installation. Vaux's swifts occur in coniferous forested areas. No nesting or roosting sites for Vaux's swifts were found during the survey, but four individuals were sighted. These may not have been residents and may have only been passing through. No nesting sites were found for the pileated woodpecker, but suitable nesting areas exist within the installation, so nesting is possible. This species typically is found in mixed coniferous and deciduous forests. However, resources within the installation are unlikely to support more than two pairs. No spotted owns (*Strix occidentalis caurina*), a federally-threatened and state-listed endangered species, were observed during the spotted owl survey.

Signs of a mammal species that is a federal- and state-listed candidate were observed during the surveys at CBMR. Fresh brush prairie pocket gopher burrows were sighted during the surveys, indicating that the burrows were active and that the species exists on the installation. These pocket gophers are commonly found in meadows.

2.7 Summary of Cultural and Historic Resources.

As a result of Base Realignment and Closure (BRAC) procedures, the Army performed a cultural resources assessment and survey in selected parcels not previously inventoried for cultural resources but considered to have a high probability for prehistoric and/or historic archaeological sites. These areas included the Lacamas Creek valley, Munsell Hill and the Little Baldy (Bald Mountain)/Buck Creek vicinity in the eastern part of the base (Sadler, 2003).

The archaeological survey resulted in the discovery of two historic sites (45CL528 and 45CL529), eight historic isolated finds, and a single prehistoric isolated find. In addition, one previously recorded prehistoric site was revisited (45CL318). None of the sites are recommended as eligible for the National Register of Historic Places (Sadler, 2003).

For information on site geology and hydrogeology, surface water hydrology, a summary of natural resources and rare, threatened, or endangered species, and a summary of cultural and historic resources (see **Appendix A).**

3.0 DESCRIPTION, BACKGROUND, AND CURRENT CONDITION OF THE SMALL ARMS RANGES

3.1 General Description of the Small Arms Ranges

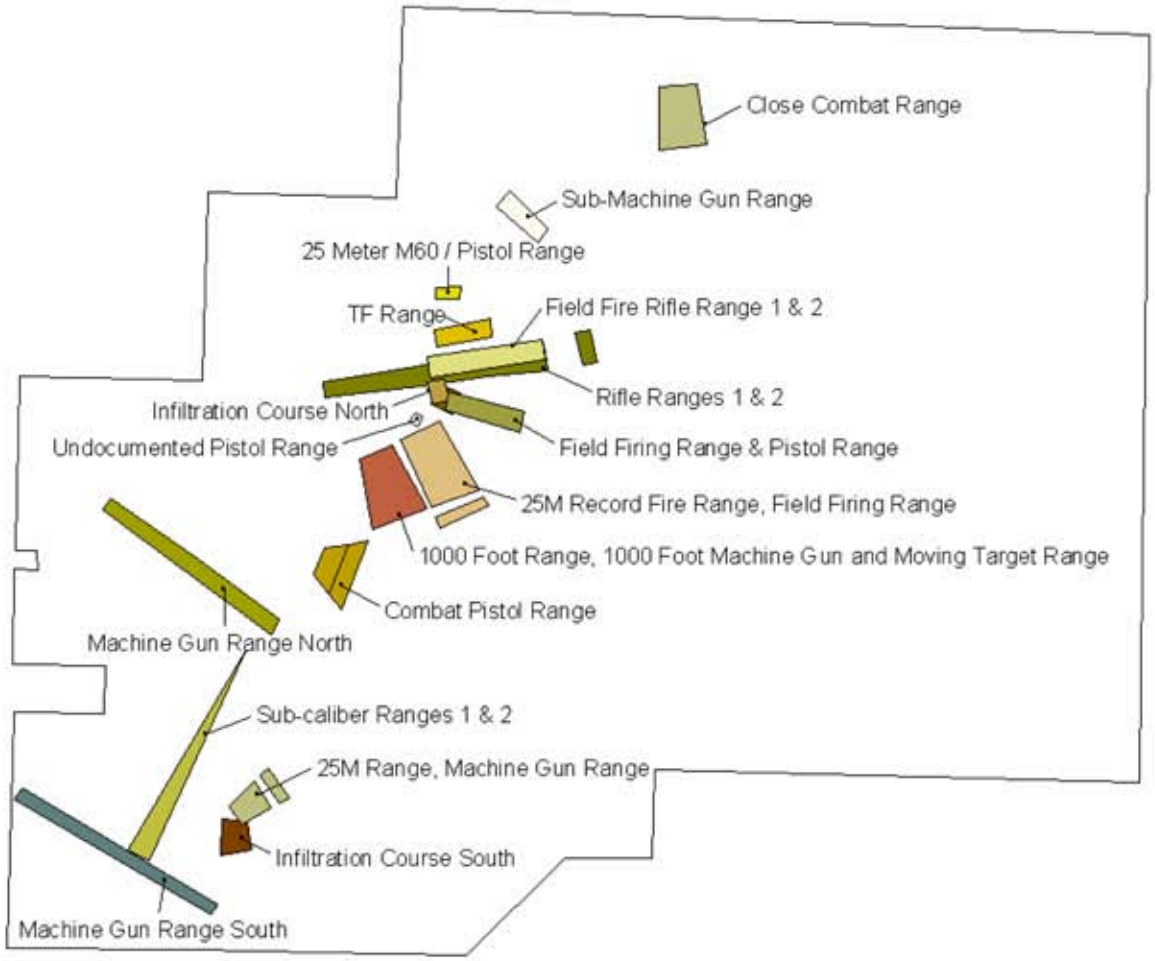
Approximately 25 potential Small Arms Ranges were previously identified within the boundaries of CBMR from maps dating back to 1958. The firing ranges were used for small arms, large-caliber machine guns, rifles, grenades, light antitank weapon rockets, and sub-caliber weapons. Of the 25 potential ranges, it was determined during the RI/FS that eight of the ranges were redundant or double counts from the same range location having different names historically (AEM, 2005 and BCRRT, 207b).

A final total of 17 firing ranges were confirmed and identified for investigation during the RI/FS of the Small Arms Ranges:

- Close Combat Range
- 25 Meter M60 Range/Pistol Range
- Sub Machine Gun Range
- TF Range
- Rifle Ranges 1 & 2
- Field Fire Rifle Ranges 1 & 2
- Infiltration Course North
- Field Firing Ranges 1 & 2 & Pistol Range
- Undocumented Pistol Range
- 1,000 Foot Range, Machine Gun & Moving Target Range
- Combat Pistol Range
- Machine Gun Range North
- Machine Gun Range South
- M31 Sub-Caliber Ranges 1 & 2
- 25 Meter and Machine Gun Range
- Infiltration Course South
- 25 M Record Fire Field/Field Firing Range

Figure 3-1 shows the geographic locations of the 17 ranges addressed in the RI/FS.

Figure 3-1
General Site Map Showing Small Arms Ranges



Range Footprints

- 1000 Foot Range, 1000 Foot Machine Gun and Moving Target Range
- 25 Meter M60 / Pistol Range
- 25M Range, Machine Gun Range
- 25M Record Fire Range, Field Firing Range
- Close Combat Range
- Combat Pistol Range
- Field Fire Rifle Range 1 & 2
- Field Firing Range & Pistol Range
- Infiltration Course North
- Infiltration Course South
- Machine Gun Range North
- Machine Gun Range South
- Pistol Range
- Rifle Ranges 1 & 2
- Sub-Machine Gun Range
- Sub-caliber Ranges 1 & 2
- TF Range
- Undocumented Pistol Range
- Camp Bonneville Boundary

1 0 1 2 Miles

N W E S

BONNEVILLE
CONSERVATION, RESTORATION & RENEWAL TEAM, LLC

BCRRT

3.2 History of Small Arms Range Use

CBMR was used by the Army as firing range for small arms, artillery, and other munitions from the approximately 1910 through 1995. CBMR was established in 1909 as a drill field and rifle range. Troops from Vancouver Barracks began to use part of the facility for a target range in 1910. Installation use grew to include a range for assault weapons, and artillery between 1910 and 1995. The original reservation, consisting of approximately 3,020 acres, was acquired by the federal government in 1918. It was officially named CBMR in 1926. The Camp Bonneville cantonment area was built in the late 1920s. The Camp Killpack cantonment area was built and occupied by the Civilian Conservation Corps (CCC) in 1935. The facilities were used for a variety of military training programs, in addition to being used by Vancouver Barracks. During World War II, the facility was also used to house Italian prisoners of war.

In 1950, many of the buildings and systems at the facility were rehabilitated to use for training Army Reserve units. In the early 1950s, an additional 840 acres of land were leased from the State of Washington. Vancouver Barracks, which included CBMR, became a sub-installation of Fort Lewis, Washington, in 1959.

Since World War II, CBMR has been used as a training camp for active Army, USAR, Army National Guard (ARNG), Marine Corps Reserve, Navy Reserve, and Coast Guard Reserve units, as well as other DOD and government personnel. When not required for military training exercises, CBMR was made available until the late 1980s to local equestrians and hunters, as well as for overnight use of the cantonment areas by 4-H groups and school districts for outdoor schools (CBLRA, 2003).

The FBI currently makes frequent use of one of the firing ranges and will be responsible for cleanup of that range. In 1996, following the selection of Camp Bonneville for closure by the BRAC Commission, all active military training units ceased operations at the camp. All out-grants for using the facilities were cancelled, with the exception of the FBI range.

3.3 History of Investigations of Small Arms Ranges

In July of 1995, CBMR was selected for closure under the 1995 BRAC process. Since the installation was officially closed, investigations were conducted by the Army and its consultants in order to characterize the nature and extent of contamination at the site and to develop a plan for potentially transferring ownership.

The Army implemented RI activities at the Small Arms Ranges in 2002 and 2003. The general investigative approach at each of the 17 Small Arms Ranges collected the following data:

- The concentration of lead residues in the top 0-6 inches of soil at 307 sample areas (one-half acre grids) within the firing ranges.
- The background concentrations of lead in 20 samples from the top 0-6 inches of soil at undisturbed/unused locations within CBMR, and

- The concentrations of explosive residues in soil in 12 muzzle blast areas within the firing ranges, where the firing location was known.

3.3.1 Document and Map Reviews

The following documents and maps were incorporated into this CAP:

- Site Investigation Report – Small Arms Ranges and Demolition Areas 2 and 3, by Atlanta Environmental Management, Inc. (AEM), September 2005
- Draft Final Work Plan for the Interim Actions at the Small Arms Range Berms and Fire Support Areas by Calibre Systems, March 2005
- Final Remedial Investigation/ Feasability Report (RI/FS) Small Arms Ranges (RAU 2A) by Bonneville Conservation Restoration & Renewal Team (BCRRT), January 2007
- Geology and Groundwater Conditions in Clark County Washington, Mundorff (U.S. Geological Survey), 1964
- Geologic Map of the Vancouver Quadrangle – Oregon and Washington, Phillips (Washington Division of Geology and Earth Resources), 1987

3.3.2 Initial Investigations

A Site Investigation (AEM, 2005) became part of the U.S. Army's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) investigation of lead-contaminated ranges and Demolition Areas (DA) 2 and 3 at CBMR. This investigation was conducted under a WDOE Enforcement Order and in accordance with the MTCA.

3.3.3 Remedial Investigation and Feasibility Study (RI/FS)

The RI (BCRRT, 2007b) at the Small Arms Ranges was designed to evaluate the potential for soil contamination from the firing lines of the ranges to the berms and/or potential impact areas. Previous investigations at other ranges had detected lead and explosives in the range soils. The RI included the soil investigation of the 17 Small Arms Ranges, 12 muzzle blast zones (within the ranges where the firing location was known), and background soil sampling. The RI was conducted to characterize soils at these areas at CBMR in order to provide data upon which to base decisions for further actions.

Based on the results of the RI, the FS (BCRRT, 2007b) was conducted to identify and evaluate cleanup action alternatives and select a cleanup action for the Small Arms Ranges. The initial RI/FS was conducted by the Army in accordance with the requirements of the MTCA regulations, which are contained in Chapter 173-340 of the WAC (WAC 173-340).

3.4 Summary of Soil Contamination Information by Range

Variable concentrations of lead were known to exist at CBMR within the surface and near-surface soils at firing ranges. The sources of this lead were the bullets from the firing of small arms, assault weapons, artillery, and field artillery. Most of the lead bullet mass deposited in the impact area

was in the form of intact bullets or large fragments; however small fragments were also present. The majority of lead bullets were likely to have impacted the range berms; however, lead could be present between the firing line and the range berms. Over time elemental lead may corrode and form oxidized products consisting primarily of lead hydroxide and lead carbonates (ITRC 2003). Due to the low mobility of lead in soil, the majority of the lead contamination was expected to have remained near the surface of the soil. The major risk posed by any metal residues arises from direct contact and ingestion of surface soil or fragments.

Sampling of the berms for lead was not included since the berms were identified for remedial action prior to the RI/FS.

3.4.1 RI Sampling

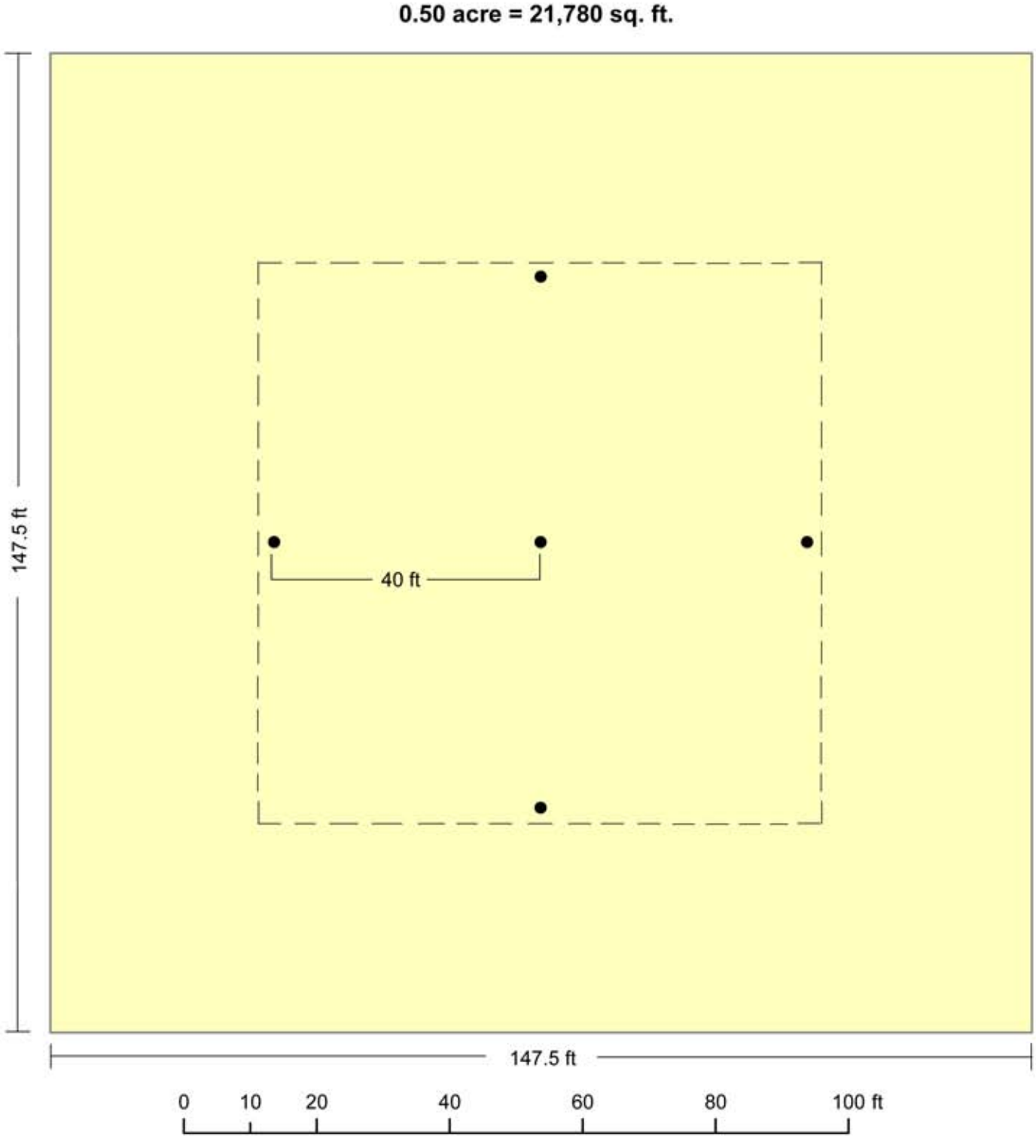
RI soil samples were collected from 307 approximately half-acre grids across all the Small Arms Ranges, in accordance with the approved Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) (AEM, 2003a). All of the range samples were analyzed for lead. The range berms and backstops (where bullets have accumulated) were excluded from this soil sampling program since they were identified for remedial action prior to the RI/FS.

RI Grid Samples - Soil samples in each of the 307 half-acre grids (established in the firing ranges) consisted of five grab soil samples that were collected from 0 – 6 inches in depth below ground surface (bgs). Specific locations were determined by latitude and longitude coordinates, as presented in the approved Sampling and Analysis Plan - Soil (SAP) and the center point of each grid was determined using a GPS unit. After a center point was determined, the field team measured approximately 40 feet north (magnetic), south, east, and west of the grid center. A soil sample was taken at each of these four compass and center point locations. The total sampling area size in each ½ acre grid was approximately 80 feet by 80 feet and covered an area approximately 6,400 square feet (see **Figure 3-2**).

Some sample grids were not square due to obstructions such as target berms/ backstops, and natural barriers such as streams, standing water, and boulders. In those cases, the distance to samples from the center of the grid varied and the modified location was measured with a GPS unit and the compass direction and distance from the planned location was noted.

The number of half-acre plots sampled, the number of muzzle blast zones sampled, and the QA/QC samples collected at each of the 17 locations are detailed in **Table 3-1**.

Figure 3-2
Small Arms Ranges Grid Sampling Example



Muzzle Blast Zones - For ranges where the firing line has been determined, a muzzle blast zone has been designated as a strip in front of and parallel to the firing line. Samples were collected along that strip at approximately 30-foot intervals within 10 feet of the firing line. A point at the end of the firing line was designated and sampled. A line was then run parallel to the firing line from that first sample and subsequent samples taken every 30 feet.

The muzzle blast samples were grab samples of soil from 0 – 6 inches in depth bgs. Samples collected in muzzle blast zones were analyzed in the laboratory for explosives (via USEPA Method 8330 Modified). The muzzle blast zone samples included collection of 68 grab samples from the 12 ranges where the firing lines were known. The ranges and number of muzzle blast zones sampled are presented in **Table 3-1**. There were no contaminants of concern in the muzzle blast zones sampled.

Table 3-1 Grids and Samples from Samll Arms Ranges, Muzzle Blast Zones, and QA/QC

Small Arms Range	Number of Half-Acre Grids Sampled	Number of Samples from each Range	Number of Muzzle Blast Zones Samples	QA/QC Samples (duplicates)	Total Number of Samples
Close Combat Range	24	120	-	11	131
25 Meter M60 Range/Pistol Range	4	20	6	1	27
Sub Machine Gun Range	7	35	-	3	38
TF Range	8	40	2	4	46
Rifle Ranges 1 & 2	32	160	7	14	181
Filed Fire Rifle Ranges 1 & 2	22	110	2	10	122
Infiltration Course North	4	20	2	2	24
Field Firing Range & Pistol Range	14	70	6	16	92
Undocumented Pistol Range	1	5	5	0	10
1,000 Foot Range, Machine Gun & Moving Target Range	30	150	-	15	165
Combat Pistol Range	17	85	6	9	100
Machine Gun Range North	33	165	-	16	181
Machine Gun Range South	26	130	-	13	143
M31 Sub-Caliber Ranges 1 & 2	25	125	6	12	143
25 Meter and Machine Gun Range	13	65	10	7	82
Infiltration Course South	7	35	14	4	53
25M Record Fire Field/Field Firing Range	40	200	2	20	222
Total	307	1,535	68	157	1,760

Background Soil Samples - Soil samples were also collected from 20 background locations using the following criteria:

- Within the CBMR site boundary;
- Within similar geology/geomorphology as range grid samples;
- Not within small arms ranges in the Work Plan or SAP;
- Not within small arms range fan as shown on Plate 30 of July 1997 *Final Archives Search Report – Report Plates* (USACE, 1997);
- Not downslope of range or fan (locate upslope of range or fan if possible);
- Not downrange of firing line; if the firing line is not indicated in the SAP, it was assumed that the firing line was at the low-elevation end of the range and that the direction of fire was toward higher ground surface elevations;
- Not in demolition areas; and
- Not in artillery impact area (for Unexploded Ordnance [UXO] safety reasons).

Table 3-2 lists the locations of the background samples.

Table 3-2. Location Description of Background Samples

Location Description
Up slope from Close Combat Course
Up slope from 25 Meter M60/Pistol Range
Side slope from Close Combat Course
Side slope of TF record Fire and behind firing line
Side slope from Rifle Range and behind firing line
Flat area on east side of creek in vicinity of Rifle Range, Infiltration Course, Field Firing Range, and Undocumented Pistol Range
Same as S506YMMDDC on west side of creek
Flat area on south side of creek behind firing line of 1000 Foot Range, 1000 Foot Machine Gun and Moving Target Range
Side slope from 1000 Foot Range, 1000 Foot Machine Gun and Moving Target Range
Side slope from Combat Pistol Range
Side slope from Machine Gun Range and Combat Pistol Range
Side slope of Machine Gun Range, side slope from and behind firing line of Sub-caliber Artillery
Side slope from 25M Range, Machine Gun Range and up slope from Sub-caliber Artillery
Side slope from Infiltration Course, Machine Gun Range
Up slope from Machine Gun range
Up slope from Machine Gun range
Up slope from Machine Gun range
Side slope from Sub-Machine Gun range
Side slope from Sub-Machine Gun range
Flat area on south side of creek behind firing line of 25M Range, Record Firing Range, Field Firing Range

3.4.2 Sampling and Analysis Results

A total of 1,535 samples, not including duplicate samples, were collected and analyzed for lead from 307 grids sampled. Soil samples collected from the Small Arms Range grid locations were analyzed for lead. Results of the lead analyses were reported on a dry-weight basis.

At ten of the Small Arms Range grid locations, ten samples were randomly selected from the range soils and analyzed for the nine Priority Pollutant Metals. No concentrations of metals were detected in the ten range grid samples at concentrations above MTCA Method A for unrestricted land use, or if no MTCA criteria were available, the USEPA Region 9 Preliminary Remediation Goals (PRGs).

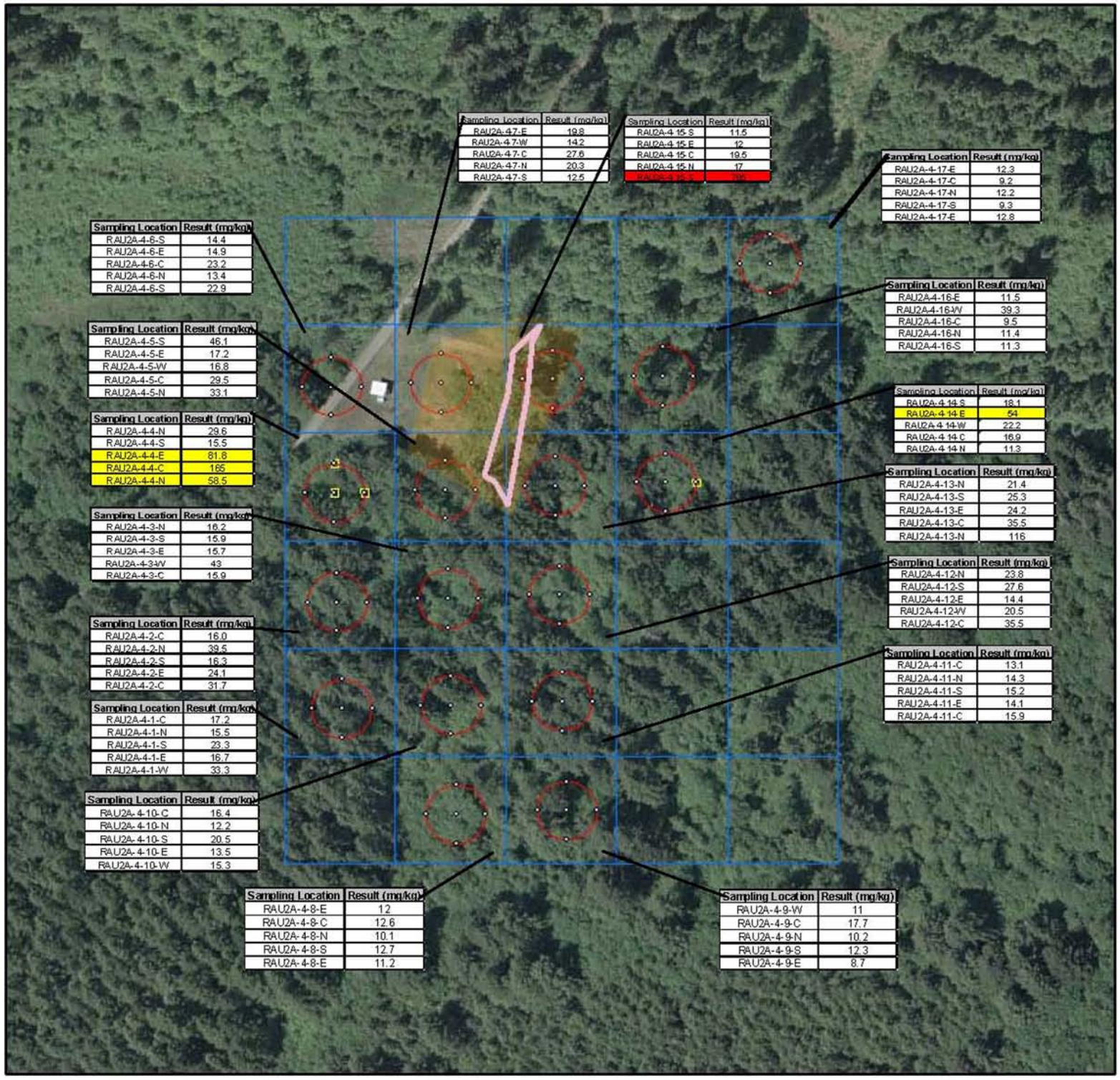
Samples collected from the 12 Muzzle Blast Zones were analyzed for explosive residues, including picric acid and pentaerythritol tetranitrate (PETN). The explosive residue 2,4-dinitrotoluene (2,4-DNT) was detected in 8 of the 10 muzzle blast zone samples from the 25 –Meter and Machine Gun Range. Concentrations of 2,4-DNT detected ranged from 4.9 to 20 mg/kg and were significantly below the PRG value of 120 mg/kg for residential soil.

Background soil samples were analyzed for lead and two randomly selected background samples were also analyzed for Priority Pollutant Metals. Concentrations of lead detected ranged from 9.7 mg/kg to 80.8 mg/kg. The average lead concentration detected was 24.3 mg/kg and were below the most stringent MTCA or PRG value for lead. The 95th percentile upper confidence limit (UCL) on the mean lead background concentration is 33.6 mg/kg. Metals detected were within normal background ranges.

Concentrations of lead were larger than at least one of the benchmark values (BMV) at 12 of the 17 small arms ranges sampled during the SI.

3.4.3 Quantity Estimates by Lead Concentrations

Concentrations of lead in Small Arms Range grid samples exceeded the lowest screening level (50 mg/kg) at 14 of the 17 ranges. Approximately 12% of the samples collected at the 17 firing ranges had concentrations above 50 mg/kg. The number of samples with lead concentrations exceeding 118 mg/kg was 78 (approximately 5%). The percent of samples exceeding 250 mg/kg, 500 mg/kg, and 1,000 mg/kg were approximately 2.5%, 1.7%, and 1%, respectively.



Sampling Location	Result (mg/kg)
RAU2A-4-7-E	19.8
RAU2A-4-7-W	14.2
RAU2A-4-7-C	27.6
RAU2A-4-7-N	20.3
RAU2A-4-7-S	12.5

Sampling Location	Result (mg/kg)
RAU2A-4-15-S	11.5
RAU2A-4-15-E	12
RAU2A-4-15-C	19.5
RAU2A-4-15-N	17
RAU2A-4-15-S	700

Sampling Location	Result (mg/kg)
RAU2A-4-17-E	12.3
RAU2A-4-17-C	9.2
RAU2A-4-17-N	12.2
RAU2A-4-17-S	9.3
RAU2A-4-17-E	12.8

Sampling Location	Result (mg/kg)
RAU2A-4-6-S	14.4
RAU2A-4-6-E	14.9
RAU2A-4-6-C	23.2
RAU2A-4-6-N	13.4
RAU2A-4-6-S	22.9

Sampling Location	Result (mg/kg)
RAU2A-4-16-E	11.5
RAU2A-4-16-W	39.3
RAU2A-4-16-C	9.5
RAU2A-4-16-N	11.4
RAU2A-4-16-S	11.3

Sampling Location	Result (mg/kg)
RAU2A-4-5-S	46.1
RAU2A-4-5-E	17.2
RAU2A-4-5-W	16.8
RAU2A-4-5-C	29.5
RAU2A-4-5-N	33.1

Sampling Location	Result (mg/kg)
RAU2A-4-14-S	18.1
RAU2A-4-14-E	54
RAU2A-4-14-W	22.2
RAU2A-4-14-C	16.9
RAU2A-4-14-N	11.3

Sampling Location	Result (mg/kg)
RAU2A-4-4-N	29.6
RAU2A-4-4-S	15.5
RAU2A-4-4-E	81.6
RAU2A-4-4-C	165
RAU2A-4-4-N	58.5

Sampling Location	Result (mg/kg)
RAU2A-4-13-N	21.4
RAU2A-4-13-S	25.3
RAU2A-4-13-E	24.2
RAU2A-4-13-C	35.5
RAU2A-4-13-N	116

Sampling Location	Result (mg/kg)
RAU2A-4-3-N	16.2
RAU2A-4-3-S	15.9
RAU2A-4-3-E	15.7
RAU2A-4-3-W	43
RAU2A-4-3-C	15.9

Sampling Location	Result (mg/kg)
RAU2A-4-12-N	23.8
RAU2A-4-12-S	27.6
RAU2A-4-12-E	14.4
RAU2A-4-12-W	20.5
RAU2A-4-12-C	35.5

Sampling Location	Result (mg/kg)
RAU2A-4-2-C	16.0
RAU2A-4-2-N	39.5
RAU2A-4-2-S	16.3
RAU2A-4-2-E	24.1
RAU2A-4-2-C	31.7

Sampling Location	Result (mg/kg)
RAU2A-4-11-C	13.1
RAU2A-4-11-N	14.3
RAU2A-4-11-S	15.2
RAU2A-4-11-E	14.1
RAU2A-4-11-C	15.9

Sampling Location	Result (mg/kg)
RAU2A-4-1-C	17.2
RAU2A-4-1-N	15.5
RAU2A-4-1-S	23.3
RAU2A-4-1-E	16.7
RAU2A-4-1-W	33.3

Sampling Location	Result (mg/kg)
RAU2A-4-10-C	16.4
RAU2A-4-10-N	12.2
RAU2A-4-10-S	20.5
RAU2A-4-10-E	13.5
RAU2A-4-10-W	15.3

Sampling Location	Result (mg/kg)
RAU2A-4-8-E	12
RAU2A-4-8-C	12.6
RAU2A-4-8-N	10.1
RAU2A-4-8-S	12.7
RAU2A-4-8-E	11.2

Sampling Location	Result (mg/kg)
RAU2A-4-9-W	11
RAU2A-4-9-C	17.7
RAU2A-4-9-N	10.2
RAU2A-4-9-S	12.3
RAU2A-4-9-E	8.7

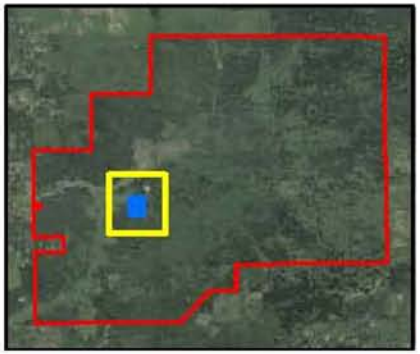


Figure 3-3
Range Floor Grid Sample Locations and Results - Combat Pistol Range

Legend

- Camp Bonneville Property Perimeter
- Firing Ranges
- Berm
- RAU-2A-4 All Sampling Locations
- RAU-2A-4 40 ft Ring from Center Points
- Grids
- 10 ft Box for RCRA Excavation Points
- 10 ft Box for MTCA Excavation Points

N
W E
S

0 40 80 160 240 320 Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA

Combat Pistol Range (RAU-2A-4)
Sampling Locations

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES

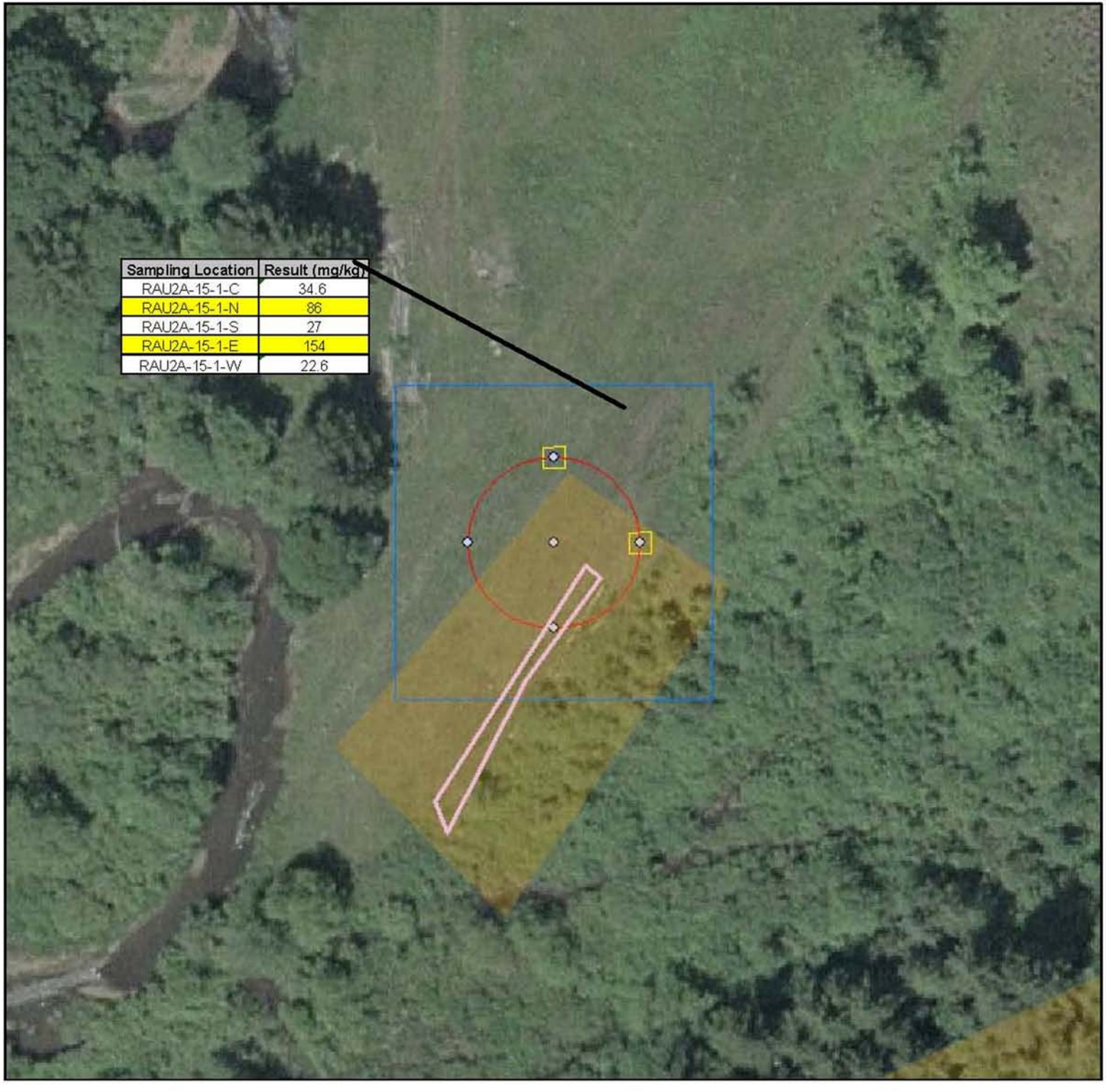


Figure 3-4
Range Floor Grid Sample Locations and Results - Undocumented Pistol Range

Legend
- Camp Bonneville Property Perimeter
- Firing Ranges
- Berm
- RAU-2A-15 All Sampling Locations
- RAU-2A-15 40 ft Ring from Center Points
- Grids
- 10 ft Box for MTCA Excavation Points

N
W E
S

0 12.5 25 50 75 100 Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA

Undocumented Pistol Range (RAU-2A-15)
Sampling Locations

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES

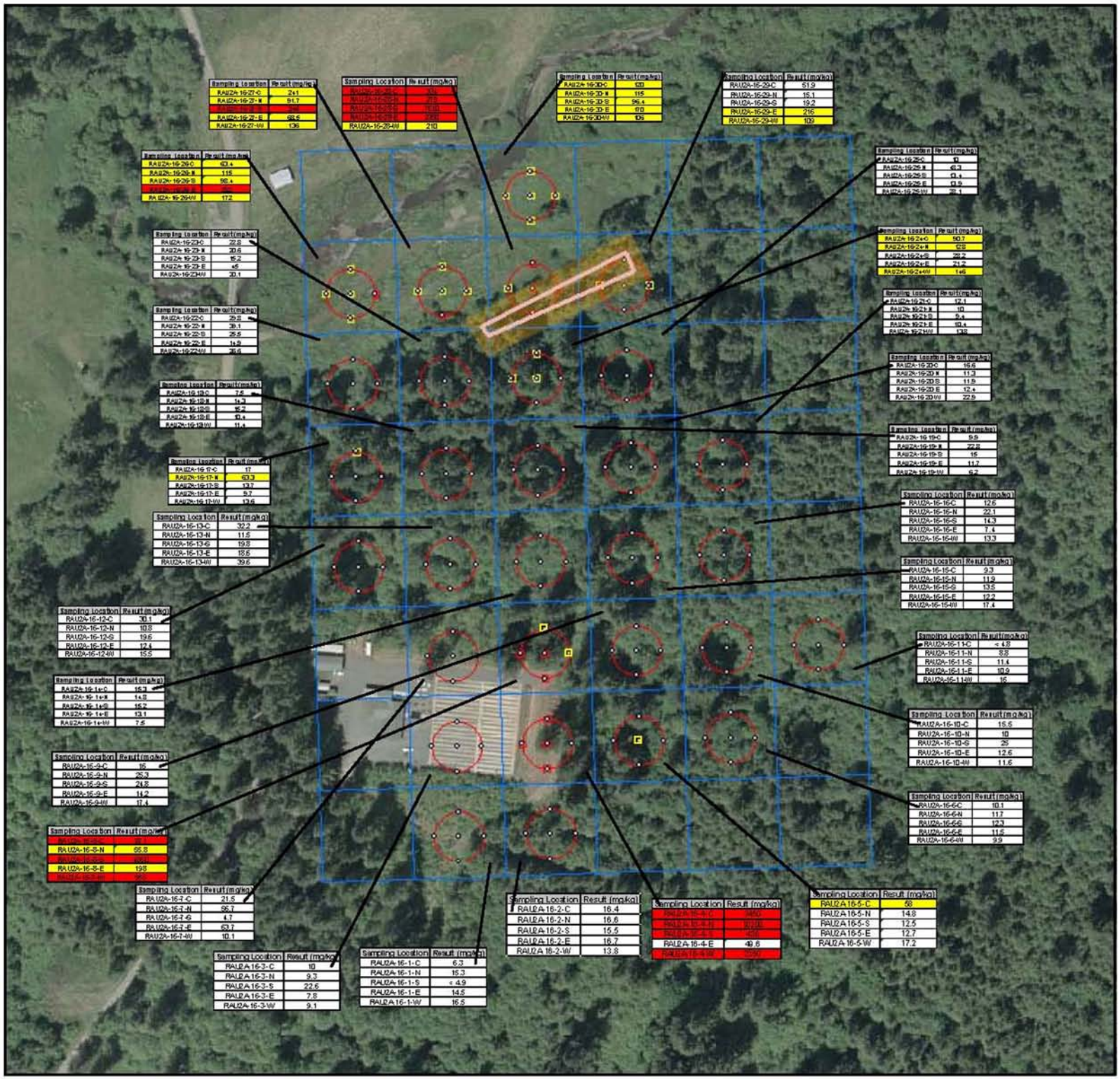


Figure 3-5
Range Floor Grid Sample Locations and Results - 1,000-inch Rifle Range & Machine Gun Range

Legend

- Camp Bonneville Property Perimeter
- Firing Ranges
- Berm
- RAU_2A_16_All_Sampling_Stateplane
- RAU-2A-16 40 ft Ring from Center Points
- Grids
- 10 ft Box for RCRA Excavation Points
- 10 ft Box for MTCA Excavation Points

N
W E
S

0 50 100 200 300 400
Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA INTERNATIONAL, INC.

1,000-ft Rifle Range/Machine Gun Range (RAU-2A-16) Sampling Locations

(This may be the 1,000 inch range)

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES

Figure 3-6
Range Floor Grid Sample Locations and Results - 25-meter M60 and Pistol Range

Legend

- Camp Bonneville Property Perimeter
- Firing Ranges
- Berm
- RAU-2A-17 All Sampling Locations
- RAU-2A-17 40 ft Ring from Center Points
- Grids
- 10 ft Box for MTCA Excavation Points

N
W E
S

0 25 50 100 150 200 Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA

25-meter M60/Pistol Range (RAU-2A-17)
Sampling Locations

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES

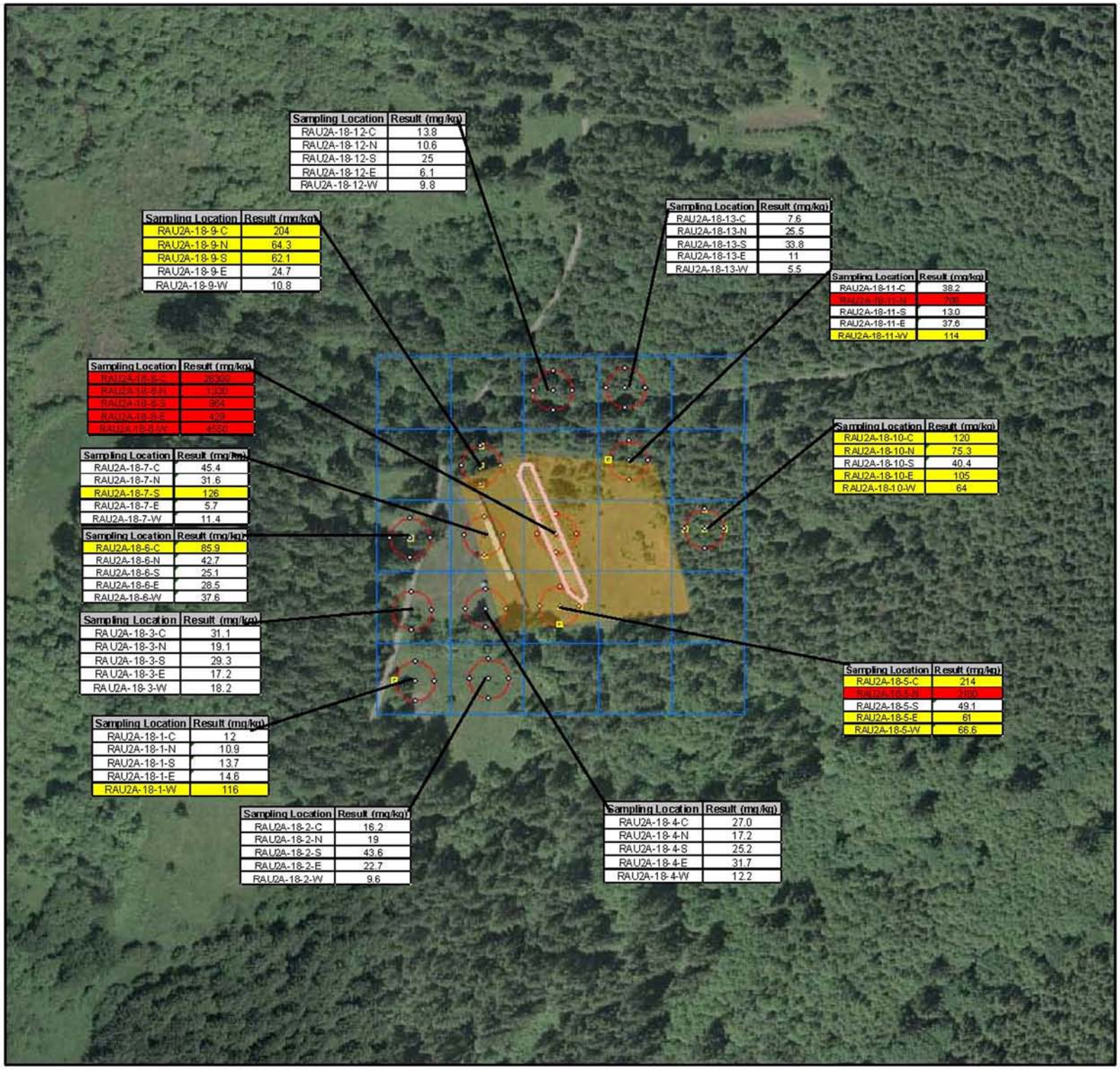


Figure 3-7
Range Floor Grid Sample Locations and Results - 25-meter Machine Gun Range

Legend

- Camp Bonneville Property Perimeter
- Firing Ranges
- Berm
- RAU-2A-18 All Sampling Points
- RAU-2A-18 40 ft Ring from Center Points
- Grids
- 10 ft Box for MTCA Excavation Points
- 10 ft Box for RCRA Excavation Points

N
W E
S

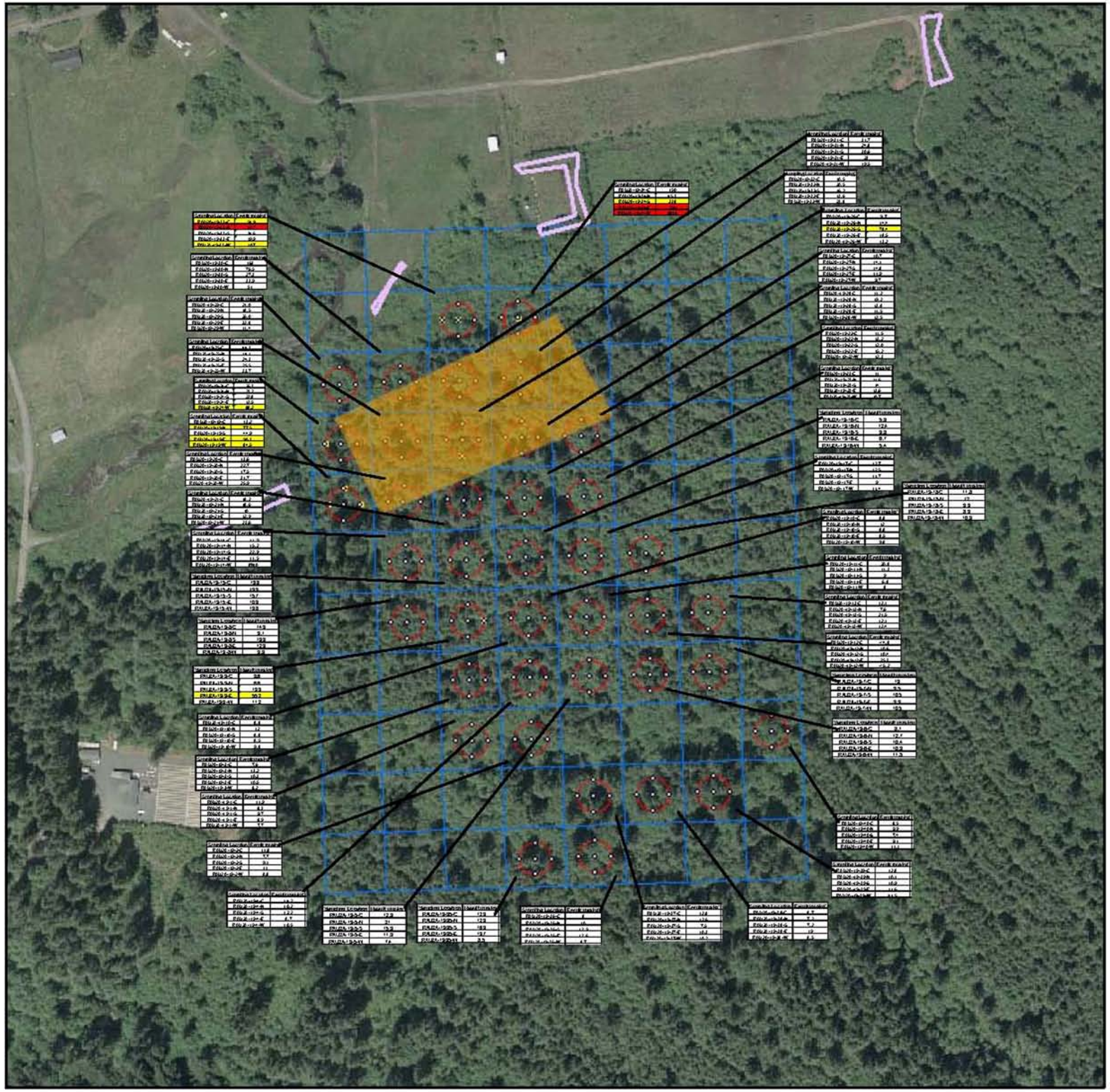
0 60 120 240 360 480
Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA

25 meter Machine Gun Range (RAU-2A-18)
Sampling Locations

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES



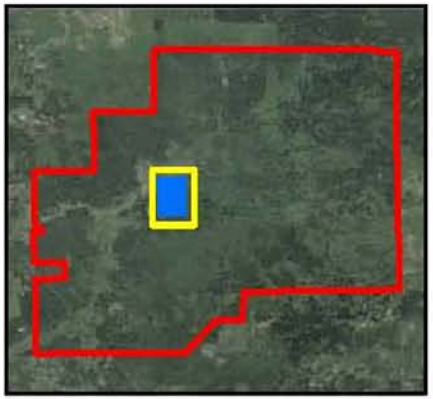


Figure 3-8
Range Floor Grid Sample Locations and Results - 25-meter Record Firing and Field Firing Range

Legend

- Camp Bonneville Property Perimeter
- Firing Ranges
- Berm
- RAU-2A-19 All Sampling Locations
- RAU-2A-19 40 ft Ring from Center Points
- Grids
- 10 ft Box for MTCA Excavation Points
- 10 ft Box for RCRA Excavation Points

N
W E
S

0 70 140 280 420 560 Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA

25-meter Record Firing/Field Firing Range
(RAU 2A-19) Sampling Locations

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES

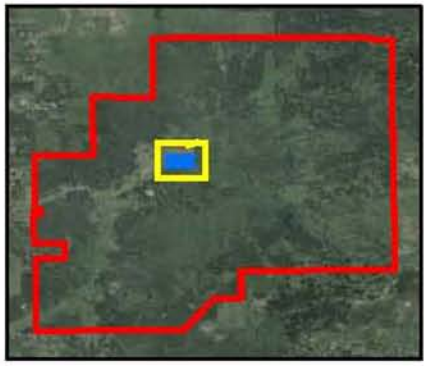


Figure 3-9
Range Floor Grid Sample Locations and Results - Field Firing Ranges No. 1 and No. 2

Legend

- Camp Bonneville Property Perimeter
- Firing Ranges
- Berm
- RAU-2A-20 All Sampling Locations
- RAU-2A-20 40 ft Ring from Center Points
- Grids
- 10 ft Box for RCRA Excavation Points
- 10 ft Box for MTCA Excavation Points

N
W E
S

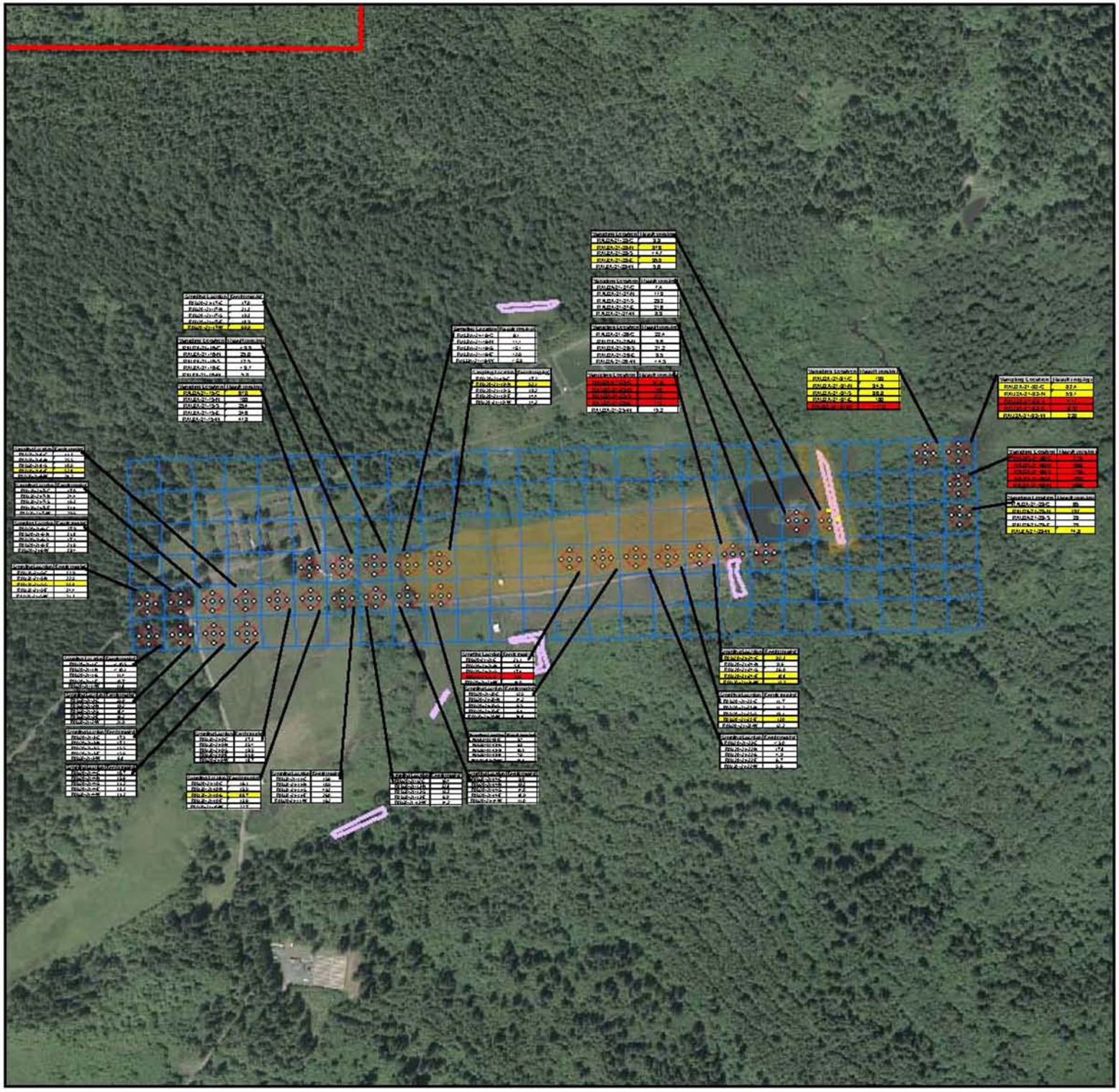
0 50 100 200 300 400 Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA INTERNATIONAL, INC.

Field Firing Ranges No. 1 & 2
(RAU-2A-20) Sampling Locations

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES



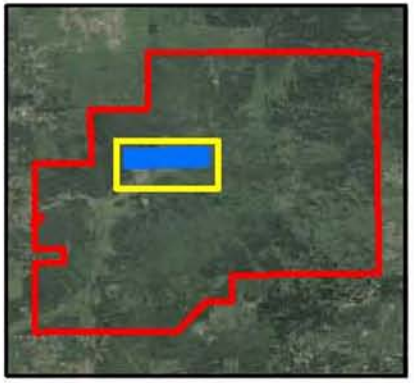


Figure 3-10
Range Floor Grid Sample Locations and Results - Rifle Ranges No. 1 and No. 2

Legend

- Camp Bonneville Property Perimeter
- Firing Ranges
- Berm
- RAU-2A-21 All Sampling Locations
- RAU-2A-21 40 ft Ring from Center Points
- Grids
- 10 ft Box for RCRA Excavation Points
- 10 ft Box for MTCA Excavation Points

N
W E
S

0 140 280 560 840 1,120
Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA INTERNATIONAL, INC.

Rifle Ranges No. 1 and No. 2 (RAU-2A-21)
Sampling Locations

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES

Figure 3-11
Range Floor Grid Sample Locations and Results - Field Fire Ranges No. 1 and No. 2

Legend

- Camp Bonneville Property Perimeter
- Berm
- 10 ft Box for RCRA Excavation Points
- 10 ft Box for MTCA Excavation Points
- RAU-2A-22 All Sampling Locations
- RAU-2A-22 40 ft Ring from Center Points
- Grids

These samples are in the wrong locations, but are according to the RI/FS locations.

N
W E
S

0 55 110 220 330 440 Feet

MKM Engineers, Inc.
4153 Bluebonnett Drive
Stafford, TX 77477

PIKA

Field Fire Ranges No. 1 and No. 2 (RAU 2A-22) Sampling Locations

Drawn On: 5/23/2007 Drawn By: QX Reviewed By: ES

3.5 RI/FS Investigation Sample Result Summary

Based upon the results of the RI sampling and comparison of the results to applicable cleanup criteria (BCRRT, 2007b), it was determined that further action was required at 9 of the small arms ranges:

- 25 Meter M60 Range/Pistol Range
- Rifle Ranges 1 & 2
- Field Fire Rifle Ranges 1 & 2
- Field Firing Ranges 1 & 2 & Pistol Range
- Undocumented Pistol Range
- 1,000 Foot Range, Machine Gun & Moving Target Range
- Combat Pistol Range
- 25 Meter and Machine Gun Range
- 25 M Record Fire Field/Field Firing Range

The results of the RI/FS Sample Results and the Small Arms Ranges Addressed in this CAP are summarized on **Table 3-3** and **3-4** and the ranges being addressed in this CAP is shown in **Figure 3-12**.

Table 3-3 RI/FS Sample Results and Small Arms Ranges Addressed in This Cleanup Action Plan (CAP) (Shaded)

Small Arms Range	Number of Samples From each Range	Number of Samples > 50 mg/kg	Number of Samples > 118 mg/kg	Number of Samples > 250 mg/kg	Number of Samples > 500 mg/kg	Number of Samples > 1,000 mg/kg
Close Combat Range	120	1	0	0	0	0
25 Meter M60 Range/Pistol Range	20	5	2	0	0	0
Sub Machine Gun Range	35	0	0	0	0	0
TF Range	40	0	0	0	0	0
Rifle Ranges 1 & 2	160	50	18	9	6	5
Field Fire Rifle Ranges 1 & 2	110	14	2	1	1	1
Infiltration Course North	20	0	0	0	0	0
Field Firing Ranges 1 & 2 & Pistol Range	70	10	8	4	2	1
Undocumented Pistol Range	5	2	1	0	0	0
1,000 Foot Range, Machine Gun & Moving Target Range	150	39	24	13	8	6
Combat Pistol Range	85	6	2	1	1	0
Machine Gun Range North	165	11	1	0	0	0
Machine Gun Range South	130	2	2	1	0	0
M31 Sub-Caliber Ranges 1 & 2	125	1	0	0	0	0
25 Meter and Machine Gun Range	65	20	11	7	6	4
Infiltration Course South	35	2	1	0	0	0
25 M Record Fire Field/Field Firing Range	200	16	6	3	2	1
Total	**1,535**	**179**	**78**	**39**	**26**	**18**
Totals for Ranges Addressed in this CAP (Shaded)	**865**	**162**	**74**	**38**	**26**	**18**

Table 3-4 Number of Grids with Samples Exceeding Screening Levels (Ranges Subject to Cleanup Are Shaded)

Small Arms Range Designation	Number of Grids with Lead Concentrations				
	> 50 mg/kg	> 118 mg/kg	> 250 mg/kg	> 500 mg/kg	> 1,000 mg/kg
Close Combat Range	1	0	0	0	0
25 Meter M60 /Pistol Range	3	1	0	0	0
Sub Machine Gun Range	0	0	0	0	0
TF Range	0	0	0	0	0
Rifle Range 1 & 2	16	8	4	3	2
Field Fire Rifle Ranges 1 & 2	10	2	1	1	1
Infiltration Course North	0	0	0	0	0
Field Firing Range &Pistol	4	3	2	1	1
Undocumented Pistol Range	1	1	0	0	0
1,000 ft Range, 1,000 Machine	11	8	5	3	3
Combat Pistol Range	4	2	1	1	0
Machine Gun Range North	6	1	0	0	0
Machine Gun Range South	2	2	1	0	0
M31 Sub-Caliber Ranges 1 & 2	1	0	0	0	0
25 m & Machine Gun Range	7	6	3	3	2
Infiltration Course South	2	1	0	0	0
25M Record Fire Field Range/Field Fire Range	7	3	2	2	1
Total Number of Grids	**75**	**38**	**19**	**14**	**10**
Percent of Grids with Samples Above Screening Levels	**24%**	**12%**	**6%**	**5%**	**3%**

25-meter M60/Pistol Range

Rifle Ranges No. 1 and No. 2,

Undocumented Pistol Range

Field Fire Ranges No. 1 and No. 2

Field Ranges No. 1 and No. 2

25-meter Record Firing/Field Firing Range

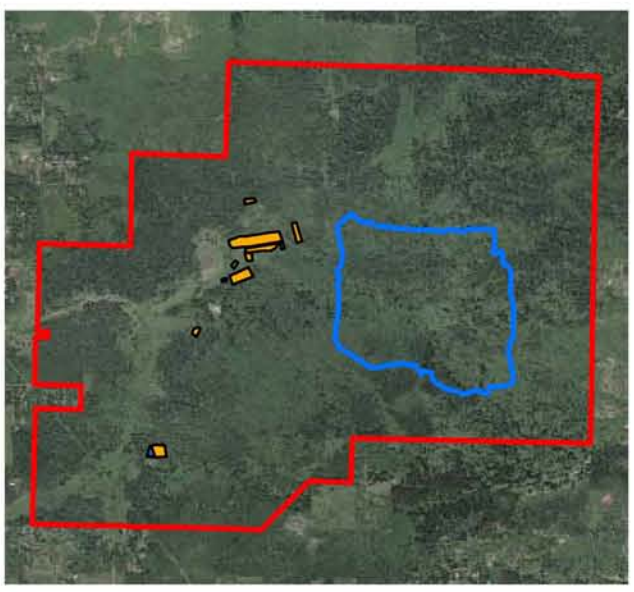
1,000-foot Rifle Range/Machine Gun Range

Combat Pistol Range

25-meter Machine Gun Range

Legend

- Camp Bonneville Property Perimeter
- Central Impact Target Area Perimeter
- Roads and Trails
- Access Route
- Firing Ranges Boundary
- Processing Area 1
- Berm



N

W E

S

0 305 610 1,220 1,830 2,440

Feet

MKM Engineers, Inc.
4153 Bluebonnet Drive
Stafford, TX 77477

Figure 3-12
Geographic Locations of Small Arms Ranges Addressed in this CAP

Drawn On: 4/18/2007 Drawn By: QX Reviewed By: SS

3.5.1. Feasibility Study Analyses and Recommendations

The criteria used for evaluating the alternatives in the Feasibility Study included the requirements established under MTCA (WAC 173-340-360) for evaluation of remedial alternatives. The criteria include four threshold factors: protection of human health and the environment, compliance with cleanup standards, compliance with applicable state and federal laws, and provision for compliance monitoring. The other requirements for the selected alternative were: use permanent solutions to the maximum extent practicable, provide for a reasonable restoration time frame, and consider public concerns.

Identification of Cleanup Action Alternatives

Based on evaluation of candidate technologies, five alternative cleanup actions were identified for the Small Arms Ranges. These alternatives consist of the following:

- **Alternative 1** - No Action.
- **Alternative 2** - Institutional Controls.
- **Alternative 3** - Containment (Capping).
- **Alternative 4** - Consolidation and Containment (Capping)
- **Alternative 5** - Excavation and Off-site Disposal or Recycling

Procedure for Selection of Cleanup Actions

The MTCA Rules specify the procedure to be used to select the cleanup action from the identified alternatives at WAC 173-340-360. This rule specifies Minimum Requirements for Cleanup Actions at WAC 173-340-360 (2). The Minimum Requirements are further divided into two categories, as follows:

- Threshold requirements (WAC 173-340-360 (2) (a)
  - Protection human health and the environment
  - Compliance with applicable cleanup standards
  - Compliance with applicable state and federal laws
  - Provisions for compliance monitoring

- Other requirements (WAC 173-340-360 (2) (b)
  - Use permanent solutions to the maximum extent practical
  - Provide for a reasonable restoration time frame
  - Consider public concerns

The MTCA Rules also set forth a specific procedure to determine whether a cleanup action uses permanent solutions to the maximum extent possible. This procedure is found at WAC 173-340-360 (3) and provides evaluation criteria to determine the permanence of the candidate cleanup action approaches:

These seven evaluation criteria are as follows:

- Protectiveness
- Permanence
- Cost
- Effectiveness over the long term

- Management of short-term risks
- Technical and administrative implementability
- Consideration of public concerns

The evaluation of the five candidate alternative action resulted in the following conclusions:

- **Alternative 1 –** No Action does not meet the threshold requirements.
- **Alternative 2** – Institutional Controls partially meets the threshold requirements and is ranked very low in terms of permanence.
- **Alternative 3** - Containment – meet the threshold requirements except for consideration of public concerns and ranks lower in terms of permanence than Alternative 5.
- **Alternative 4** - Consolidation and Containment – meet the threshold requirements except for consideration of public concerns and ranks lower in terms of permanence than Alternative 5.
- **Alternative 5** – Excavation and Off-site Disposal or Recycling meets the threshold requirements, addresses public concerns, and ranks highest in terms of permanence.

Therefore, the FS recommended Alternative 5, Excavation and removal of contaminated soil for remediation of the Small Arms Ranges.

When the work described in this CAP is completed, it will have satisfied all the remedial activities contemplated in the Interim Cleanup Action Work Plan for the Small Arms Ranges Berms and Fire Support Areas (Calibre, 2005), the RI/FS Report for the Small Arms Firing Range Floors (BCRRT, 2007b), the PPCD, and the Army's ESCA as it relates to the small arms ranges.

Estimated volumes for excavation during the implementation of Alternative 5 are shown in the following **Table 3-5** and the Range locations were shown on the previous **Figure 3-12**. Detailed Range Floor Grid Sampling Analysis for total lead for all grids at all Small Arms Ranges are located in **Appendix A**

TABLE 3-5
Grid Data Analysis Summary
(Volume Estimates Based on Hot Spot Removal)

Range	RAU	Individual Sample Summary			Grid Category Summary					Scenario 1		Scenario 2	
		51 - 118 (ppm)	119-250 (ppm)	251 and > (ppm)	Cat 1 Grids	Cat 2 Grids	Cat 3 Grids	Cat 4 Grids	Cat 5 Grids	MTCA Volumes (yds3)	RCRA Volumes (yds3)	MTCA Volumes (yds3)	RCRA Volumes (yds3)
Combat Pistol Range	2A-4	4	1	0	14	2	1	0	0	101.25	0.00	60.75	0.00
Undocumented Pistol Range	2A-15	1	1	0	0	0	1	0	0	40.50	0.00	40.50	0.00
1,000-inch Rifle Range/Machine Gun Range	2A-16	14	10	3	19	3	3	4	0	486.00	243.00	1235.25	243.00
25-meter M60/Pistol Range	2A-17	3	1	0	1	2	1	0	0	81.00	0.00	20.25	0.00
25-meter Machine Gun Range	2A-18	9	4	2	6	2	3	1	1	263.25	162.00	283.50	162.00
25-meter Record Firing Ranges	2A-19	8	1	1	33	3	1	1	1	182.25	81.00	182.25	81.00
Field Firing Ranges	2A-20	2	4	4	10	1	1	1	1	121.50	324.00	344.25	324.00
Rifle Ranges No. 1 & No. 2	2A-21	13	6	1	17	6	4	1	0	384.75	81.00	506.25	81.00
Field Fire Ranges No. 1 & No.2	2A-22	12	1	1	12	8	1	0	1	263.25	81.00	40.50	81.00
Totals		66	29	12	112	27	16	8	4	1923.75	972	2713.5	972

Assumptions

- A 58-foot x 58-foot x 0.5-foot area would be excavated around each sample location when the grid is Category 4 and 5.
- A 29-foot x 29-foot x 0.5-foot area would be excavated around each sample location when the grid is Category 3 or 4.
- Fluff Factor used was 1.3.
- Category 5 volume removed for estimate is 81 cubic yards per hot spot.
- Category 4 volume removed for estimate is 81 cubic yards per hot spot.
- Category 3 and 4 volume removed for estimate is 20.25 cubic yards per hot spot.
- Berm samples are excluded from this summary.
- Scenario 1 excavation of all sample results greater than 50 mg/Kg.
- Scenario 2 excavation of sample results greater than 50 mg/Kg in grids in Categories 3, 4, and 5.

4.0 APPLICABLE LAWS, REGULATIONS, STANDARDS, AND CLEANUP STANDARD

4.1 Applicable Laws, Regulations, and Standards

4.1.1 Washington State Model Toxics Control Act

Washington's hazardous sites cleanup law is titled the MTCA [Chapter 70.105D Revised Code of Washington (RCW)]. Taken together, this statute, and the regulations promulgated under it [Washington Administrative Code (WAC) Chapter 173-340] govern cleanups at hazardous waste and other contaminated sites in the State of Washington and mandate that those cleanup be done in a manner that is adequately protective of the public and the environment. Accordingly, this statute and these regulations constitute the principal framework defining this cleanup action at RAU 2A – Small Arms Ranges. The regulations specifically address and govern the design and implementation of the current cleanup action and pertinent, applicable sections of these regulations include the following:

- Selection of the cleanup action (WAC 173-340-360)
- Content of the CAP (WAC 173-340-380)
- Implementation of the cleanup action (WAC 173-340-400)
- Compliance with monitoring requirements (WAC 173-340-410)
- Public notice and participation (WAC 173-340-600)
- Cleanup standards (WAC 173-340-700 et seq.)
- Worker safety and health (WAC 173-340-810)
- Sampling and analysis plans (WAC 173-340-820)
- Analytical procedures (WAC 173-340-830)
- General submittal requirements (WAC 173-340-840)
- Recordkeeping requirements (WAC 173-340-850)
- Other sections of this regulation as applicable and relevant to the current cleanup action

The specific cleanup levels applicable to this cleanup action are found in Tables 740-1 for human health protection and Table 749-3 for protection of ecological receptors.

This CAP and the implementation thereof will comply with and be governed by the applicable and relevant sections of the MTCA statute and regulations.

4.1.2 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is the Federal statute which establishes requirements concerning closed hazardous waste sites. This statute is specifically applicable to cleanup funded, directly or indirectly, by the Army. The cleanup action at RAU 2A – Small Arms Ranges at

CBMR is being funded by the Army under the ESCA that was part of the conveyances from the Army to the County and from the County to BCRRT (U.S. Army, 2006). The provisions of CERCLA applicable to this cleanup action are procedural and require certification that the applicable provisions of state law (in this case, MTCA) have been met. At that time, a CERCLA Liability Release will be issued by the Army to Clark County and BCRRT.

4.1.3 Resources Conservation and Recovery Act

The Resources Conservation and Recovery Act (RCRA) is the Federal statute controlling hazardous waste management from "cradle-to-grave" – that is from generation through transportation, treatment, storage, to final disposition of hazardous waste. RCRA also sets forth the framework for the management of non-hazardous or solid wastes. RCRA amendments (know as the Hazardous and Solid Waste Amendments (HSW) specify treatment levels for hazardous wastes (including lead) before land disposal is permissible. RCRA and the amendments thereto are applicable to the offsite disposal of lead-contaminated soils and other wastes resulting from this cleanup action.

Under RCRA, the USEPA is authorized to delegate hazardous and solid waste disposal regulatory enforcement authority to states with their own regulatory programs meeting or exceeding RCRA standards. Washington and Oregon – the two states likely to be the sites of the disposal facilities receiving the soils and other wastes from this cleanup action – are "delegated states" under these provisions of RCRA. Accordingly, the hazardous and solid waste management regulations of those states will govern waste disposal activities for this cleanup action.

4.1.4 Host-State Hazardous and Solid Waste Management Acts

As noted above, the hazardous and solid wastes produced during this cleanup action may be disposed in either Washington or Oregon. Both of these potential host states have hazardous and solid waste management statutes and regulation. These statutes will govern any hazardous or solid waste disposal in those states under this cleanup action. The applicable and relevant portions of these statutes and regulations in provisions governing the following:

- Hazardous and solid waste acceptance criteria at disposal facilities in each state,
- Sampling and analytical procedures required to demonstrate compliance with those acceptance criteria,
- Waste shipping and documentation procedures, and
- Waste disposal operations.

4.1.5 Explosives Safety Programs

Federal explosives safety regulations and guidance are applicable to all military munitions including those remaining at CBMR. Compliance with these regulations is being addressed through the development of an Explosives Safety Submittal (ESS; MKM, 2006) along with the Interim Action Work Plan (IAWP; BCRRT, 2007a) for the Roads and Trails and Small Arms Ranges. This IAWP has been approved by WDOE. The ESS has been reviewed and approved by the United States Army Technical Center for Explosives Safety (USATCES). This IAWP will have been implements before this lead-related cleanup action is initiated. Therefore, explosives safety is not anticipated to be an issue during implementation of the cleanup action covered by the current work plan.

4.1.6 Occupational Safety and Health Act (OSHA)

This Cleanup Action at RAU 2A – Small Arms Ranges will comply with the applicable provisions of the Federal Occupational Safety and Health Act (as amended) and the regulations thereunder. This includes, but is not limited to, the OSHA Construction and Hazardous Waste Operations and Emergency Response (HAZWOPER) standards found in the OSHA regulations in the Code of Federal Regulation (CFR). The applicable regulations include the following:

- OSHA General Industry Standards (29 CFR 1910),
- OSHA Construction Industry Standards (29 CFR 1926), and
- OSHA HAZWOPER Standards (29 CFR 1910.120 and1926.120).

In addition, this cleanup action will follow the procedures of the National Institute of Occupational Safety and Health publication titled “Occupational Safety and Health Guidance for Hazardous Site Activities (NIOSH, 1985).

4.1.7 Washington State Environmental Policy Act

The Washington State Environmental Policy Act (SEPA) [Chapter 43.21C RCW] is the state statutory program to prevent or control and mitigate ecological impacts arising from public or private actions, specifically including g cleanup actions conducted under MTCA. It requires ay agency of state government to assess possible environmental impacts that may result from its decision or actions. SEPA clearly applies to the Cleanup Action at RAU 2A – Small Arms Ranges. However, this Cleanup Action Plan provides adequate and appropriate safeguards and/or restoration of potentially impacted ecological resources at and around the nine small arms ranges subject to this cleanup action. SEPA provides for a “Determination of Nonsignificance (DNS)” for cleanup actions under MTCA where the absence of significant negative ecological impact is demonstrated by

the party conducting the cleanup. BCRRT has submitted the SEPA Environmental Checklist to the Clark County Department of Environmental Services (CCDES) with a request for a DNS finding (see **Appendix B**).

4.1.8 Clean Water Act

Several portions of the Federal Clean Water Act (as variously amended and updated since original enactment and codification) and the state and county clean water programs thereunder are applicable to the implementation of the Cleanup Action Plan for RAU 2A – Small Arms Ranges. These provisions include the following:

- Sedimentation and Erosion Control: This cleanup action will include appropriate measures to prevent erosion or sediment migration to streams, wetlands, or other surface water bodies adjacent to the excavation areas at the nine small arms ranges being cleaned up under this plan. The required Grading and Erosion Control Plan has been submitted to the CCDES for approval before work is initiated as required by the applicable laws, regulations, and ordnances (see **Appendix B**).

- Wetlands Management: This cleanup action will temporarily disturb certain wetlands that are in and immediately adjacent to the excavation areas. Under Section 404 of the Federal Clean Water Act, the United States Army Corps of Engineers (USACE) has established Nationwide Permit No. 38 authorizing cleanup action work to be conducted in regulated wetlands. This permit is applicable to the implementation of this cleanup action. The required pre-construction notification has been submitted to USACE, Ecology, and CCDES. These wetlands have been mapped and will be restored at the completion of this cleanup action (see **Appendix B**).

- Stormwater Management: The Federal Clean Water Act and the paralleling state law and regulations and county ordnances governing stormwater management during excavation and related activities are applicable to this cleanup action and are addressed in the Grading and Erosion Control Plan mentioned above.

- Pollution Prevention: The Federal Clean Water Act and the paralleling state law and regulations and county ordnances governing pollution prevention during excavation and related activities are applicable to this cleanup action. The principal contaminant of concern is lead, which is present at this site in non-soluble metallic form. The erosion and sedimentation control measures described in the Grading and Erosion Control Plan mentioned above will effectively meet these applicable pollution prevention requirements.

4.1.9 Clean Air Act

Portions of the Federal Clean Water Act (as variously amended and updated since original enactment and codification) and the state and county clean water programs thereunder are applicable to the implementation of the Cleanup Action Plan for RAU 2A – Small Arms Ranges. The applicable provisions govern emissions of fugitive dust and airborne lead at the perimeter of the work area during excavation and soil handling. Compliance with these provisions is addressed in this Cleanup Action Plan which includes the following:

- Worker breathing zone monitoring for dust and airborne lead
- Work area perimeter monitoring for dust and airborne lead
- Measures, to be implemented on an as-needed basis depending on weather and dust monitoring results for dust suppression
- A requirement to temporarily stop excavation and soil handling activities should the dust suppression measures be inadequate during times of dry weather and/or low humidity.

4.1.10 Protection of Rare, Threatened or Endangered Species and Sensitive Habitat

Federal and state laws and regulations mandate protection of Rare, Threatened, or Endangered Species and sensitive habitat areas. No Federal or state endangered species have been identified at CBMR. State threatened plant specties have been identified at the CBMR. However, no special-status species have been observed in the areas to be impacted by the Cleanup Action at RAU 2A – Small Arms Ranges. The areas to be impacted may include up to 5.6 acres of riparian habitat, although the actual area of riparian habitat impacted by the planned cleanup is expected to be less. Any riparian habitat impacts will be mitigated be regrading and replanting after the cleanup action has been completed.

4.1.11 Archaeological, Cultural, and Historic Resources Protection

As required by the PPCD (Section X-E, Paragraph 112), BCRRT prepared a Cultural and Historical Resources Protection Plan (Michael Baker Jr., Inc. 2006b) This Plan will be in effect during throughout the implementation of the cleanup actions detailed in this CAP. This plan includes information and guidance to prepare workers in identifying and protecting any cultural and historical resources which may be encountered during CAP implementation.

All workers involved in implementing this CAP will receive review videotapes of Cultural and Historical Resources Protection training previously provided to BCRRT by representatives of the Cowlitz tribe and associated archaeological experts. This training addressed the history of Native American cultures at the CBMR and provided guidance

relating to identification and protection of any cultural or historical artifacts which might have been encountered during CAP implementation.

4.2 Controlling Documents

- *Prospective Purchaser Consent Decree (PPCD; WDOE, 2006) and the attached Conceptual Remedial Action Plan (CRAP), including the following specific sections*:
  - Section 57 (B)(1) – Definition of RAU 2A – Small Arms Ranges
  - Sections 67, 68 and 69 – Status of RAU 2A
  - Section 96 – Deliverables and Schedules for the Final Action at RAU 2A
  - Section titled "Remedial Action Unit 2A" in the CRAP

- *Environmental Services Cooperative Agreement (ESCA; U.S. Army, 2006a)*
  - Table 1 of the Technical Specifications and Requirements Statement, which is Attachment E.1 to the ESCA, establishes the Army's specification and requirements for the Cleanup Action at RAU 2A – Small Arms Ranges.

- *Accident Prevention Plan (APP; Michael Baker) and attachments as follows:*
  - Site-Wide Health and Safety Plan (HASP)
  - Site-Wide Explosives Safety Submittal (ESS)
  - Project Hazard Analysis (PHA) attached thereto.

Note 1: A task-specific health and safety plan is included with this Cleanup Action Plan (see **Section 6**).

Note 2: Explosives safety at these small arms ranges will have been addressed before work is initiated under this Cleanup Action Plan. Explosives safety will have been addressed by a munitions and explosives of concern clearance program conducted at all nine small arms ranges under the Interim Action Work Plan for Roads and Trails and Small Arms Ranges.

5.0 CLEANUP ACTION DESIGN AND METHODS

5.1 Cleanup Action Objectives

The proposed cleanup actions at the Small Arms Ranges at CBMR have the overall objective of preventing the potential exposure of human and ecological receptors to lead contamination at concentrations greater than cleanup standards to support the proposed re-use and/or redevelopment of the CBMR. Potential human receptors at the Small Arms Ranges include on-site workers, visitors to the CBMR, and adjacent residents. Potential ecological receptors at the Small Arms Ranges include plants and wildlife that may use affected areas.

5.1.1 Protection of Human Health – Residential Standards (MTCA)

Cleaning up a Small Arms Range to MTCA Method A residential land use cleanup standards will provide protection of human health because they provide the most protective cleanup levels. A quantitative human health risk assessment is not required under MTCA if a site is cleaned up to residential land use standards. The cleanup action proposed for the Small Arms Ranges will meet these criteria. Therefore, the cleanup action proposed for the ranges will be protective of human health if the ranges are cleaned up to residential land use cleanup standards or 250 mg/kg.

5.1.2 Protection of Ecological Receptors (MTCA)

MTCA requires the soil cleanup levels be based on estimates of the reasonable maximum exposure expected under both current and future site use conditions. Historically, the CBMR was a Army military reservation with controlled access and used for short-term, small unit training exercises. Future uses proposed for the CBMR may include development of a regional park and wildlife management area. The proposed future land uses may include educational activities, hiking, camping, horse and bicycle riding and public recreation. The possible public uses may involve short-term camping and group use of existing or new structures for overnight programs.

Based on these potential future land uses, the appropriate cleanup level for lead was selected from MTCA Table 749-3, Ecological Soil Concentrations (mg/kg) for Protection of Terrestrial Plants and Animals and presented here as **Table 5-1**. Therefore, the proposed cleanup level for lead in soil at the Small Arms Ranges is 50 mg/kg for plant protection. If future land use at CBMR differs from the proposed land use, the appropriate cleanup level should be reevaluated at that time.

Table 5-1. MTCA Ecological Indicator and Cleanup Levels for Lead in Soil

	Ecological Indicator for Plants[1]	Ecological Indicator for Wildlife[2]	Ecological Indicator for Soil Biota	Unrestricted Land Use[3]	Industrial Properties
Lead Concentration (mg/kg)	50	118	500	250	1,000

Notes:

1 From MTCA Table 749-3, Ecological Soil Concentrations (mg/kg) for Protection of Terrestrial Plants and Animals:

- A lead concentration of 50 mg/kg is specified for or protection of plants.
- A lead concentration of 118 mg/kg is specified for protection of wildlife.
- A lead concentration of 500 mg/kg is specified for soil biota.

2 From MTCA Table 740-1, Method A Soil Cleanup Levels for Unrestricted Land Uses. The lead cleanup level is based on preventing unacceptable blood lead levels.

3 From MTCA Table 745-1, Method A Soil Cleanup Levels for Industrial Properties, the cleanup level is based on direct contact.

In developing Method A cleanup levels for unrestricted land use, MTCA [(WAC 173-340-740 (2)] requires that the cleanup level must be as stringent as the following:

- Concentrations in MTCA Table 740-1 and compliance with the corresponding footnotes (this table specifies a lead cleanup level of 250 mg/kg for unrestricted land use);
- Concentrations established under applicable state and federal laws;
- Concentrations that result in no significant adverse effects on the protection and propagation of terrestrial ecological receptors using the procedures specified in WAC 173-340-7490 through 7493 (tables in this section specify ecological indicator soil lead concentrations for plants, soil biota, and wildlife at 50, 500, and 118 mg/kg, respectively).
- Concentrations that are protective of groundwater [Method A cleanup levels were designed to be protective of groundwater, that is, lead concentrations in soil less than 3,000 mg/kg (WDOE, 2001).

5.1.3 Protection of Surface Water and Erosion Prevention (CWA)

Stormwater and/or erosion could transport contaminated soil particles to surface water bodies. Investigations of potential groundwater and surface water contamination at Camp Bonneville have been conducted. There is no evidence of lead impacting surface water or groundwater at CBMR. Appropriate precautions will be taken during cleanup of the small arms ranges to protect surface water and prevent erosion (see Appendix B for draft stormwater and erosion control permits).

5.1.4 Protection of Worker and Public Safety (OSHA)

A site-wide APP has been developed for the Camp Bonneville project to cover all remedial activities required to achieve site closure as defined in the PPCD (Michael Baker, 2006a). A Health and Safety Plan (HASP) was part of the APP developed in compliance with WDOE and OSHA requirements and was submitted under separate cover to Ecology. The requirements of the HASP will be followed throughout the implementation of the actions defined in this CAP.

5.1.5 Protection of Natural Resources

A number of plant and vertebrate animal species that are either federally or state-listed as endangered or threatened, or are candidates for such listing, have either been documented at CBMR or are likely to occur there. These species are described in **Section 4.1.10**. Therefore, care will be required to avoid unnecessary disruption of such species should they be present (see also **Appendix B**).

5.1.6 Protection of Cultural and Historic Resources

As required by the PPCD (Section X-E, Paragraph 112), BCRRT prepared a Cultural and Historical Resources Protection Plan (Michael Baker, 2006b) This Plan will be in effect throughout the implementation of the cleanup actions detailed in this CAP. This plan includes information and guidance to prepare workers in identifying and protecting any cultural and historical resources which may be encountered during CAP implementation.

All workers involved in implementing this CAP will receive review videotapes of Cultural and Historical Resources Protection training previously provided to BCRRT by representatives of the Cowlitz tribe and associated archaeological experts. This training addressed the history of Native American cultures at the CBMR and provided guidance relating to identification and protection of any cultural or historical artifacts which might have been encountered during CAP implementation.

5.1.7 Appropriate Management of Solid and Hazardous Waste (RCRA)

RCRA protocols will be followed for all eligible waste materials excavated during the cleanup of RAU-2A. In addition, Washington State solid waste management regulations will be followed, as applicable, for handling and disposal of soils in Washington.

Host state disposal site regulations will be followed for any soil disposed outside of the State of Washington.

5.2 Cleanup Action Design

The design of this cleanup action is based on excavation, screening, and off-site disposal of lead-containing soils exceeding the applicable cleanup criteria. This is the cleanup action recommended by the Final RI/FS Report (BCRRT, 2007b).

Cleanup action implementation for the small arms ranges will be organized and conducted in two major elements based on the differing requirements and approaches of the Draft Final Work Plan for Interim Actions at Small Arms Range Berms and Fire Support Areas (Calibre, 2005) and the Final RI/FS Report for RAU-2A (BCRRT, 2006). The Draft Final Work Plan for Interim Actions focuses on the berms, and the Final RI/FS Report focuses on the range floor areas. (As noted above, the fire support areas or firing points are actually addressed as parts of the range floor areas where applicable.)

Excavated soils will be managed in three categories, depending on lead content as observed in the field or as confirmed by laboratory test results. These three categories are summarized as follows:

- Category I soil waste contains Toxicity Characteristic Leaching Procedure (TCLP) extractable lead at levels that make the soils subject to management as hazardous waste under RCRA.

- Category II soil waste contains TCLP levels below the hazardous criteria but contains total lead at levels that require management under MTCA.

- Category III soil waste contains total lead at lower levels allowing reuse within the site.

Management of the waste soil in each category is described in **Section 5.5**, and in **Figures 5-8** and **5-9** below.

5.2.1 Firing Range Berms

The cleanup action design for the firing range berms and the fire support areas includes four scenarios depending to the physical conditions at each of the Small Arms Ranges. These scenarios are identified as follows:

- Scenario 1 – Removal of Freestanding Earthen Berm
- Scenario 2 – Removal of Pop-Up Target Berm
- Scenario 3 – Excavation of Hillside Face Berm
- Scenario 4 – Excavation of Impact Zones LocatedBehind Berm

Table 5-2 summarizes which of these four scenarios are to be applied at each of the nine small arms ranges where cleanup is required. **Table 5-3** provides estimated excavation volumes for the berms. Berm excavation is required only at seven of the nine small arms ranges identified for cleanup; two small arms ranges – the Undocumented Pistol Range (RAU 2A-15) and the 25-Meter Record Firing Range/Field Firing Range – require range floor cleanup only. Each of these four scenarios is briefly described below in terms of applicability and methodology. A schematic diagram of each scenario is also provided on the following pages.

Scenario 1 – Removal of Freestanding Earthen Berm is applicable only at the 25-Meter Machine Gun Range (Range RAU 2A-18). **Figure 5-1** presents a schematic profile of the excavation procedure for this berm. This approach is based on previous experience at other ranges and also on the history of the range in question. The freestanding earthen berm will be removed in three phases or work areas, as follows:

- The face of this berm is Work Area 1 which is anticipated to be the area of highest lead impact. Initial excavation of this berm will be the face of the berm, from the surface to two feet deep. Initial excavation will be completed in two one-foot lifts. For planning purposes, the material generated by the initial excavation of the berm face is assumed to be Category I waste. If no visible lead impact is identified during excavation, the excavated materials will be considered Category II wastes.

- The next layer of the berm face and the top of the berm are Work Area 2. This area is anticipated to have some lead impact, but to be Category II waste. Work Area 2 will include a two foot additional depth of the berm face, to be removed in two lifts of one foot each, and a one foot depth from the berm top.

- The balance of the berm is Work Area 3. Because of the history of this berm, which is reported to include prior use of these soils in other berms, it is possible that this soil may have some lead impact. Based on sampling results, this soil will either be included in the Category II wastes for offsite disposal or retained for use as fill and grading at Camp Bonneville.

Scenario 2 – Removal of Pop-Up Target Berms is applicable to the Combat Pistol Range (Range RAU 2A-4) and the Field Fire Ranges No. 1 and No. 2 (Range RAU 2A-22). These berms are soil mounds placed to protect the pop-up target mechanism including the electric power supplies. **Figure 5-2 and 5-3** presents a schematic plan and profile of the removal approach to these berms. It is anticipate that the front side of each berm – the segment between the berm and the firing line – will have greater lead contents than the sides. Therefore, these berms will be excavated in two work areas, as follows:

- The front of each berm, consisting of the soil in front of the concrete structure, will be excavated and examined for visible lead. It is anticipated that this soil will be Category I waste. However, if the soil does not appear to contain significant lead (as evidenced by the presence of lead bullets), it will be tested for

potential management as Category II waste. This material will be excavated in a single lift due to the shallow vertical height of these berms.

- The sides of each berm, consisting of the soils off of the direct line of fire at each berm, will be excavated and examined separately from the fronts of these berms. It is anticipated that this soil will be Category II waste. This material also will be excavated in a single lift due to the shallow vertical height of these berms.

Scenario 3 – Excavation of Hillside Face Berms applies to five ranges – the Combat Pistol Range (Range RAU 2A-4), the 1,000-Inch Rifle Range and Machine Gun Range (Range RAU 2A-16), the 25-Meter M60 and Pistol Range (Range RAU 2A-17), the Field Fire Ranges No. 1 and No. 2 (Range RAU 2A-20), and the Rifle Ranges No. 1 and No. 2 (Range RAU 2A-21). **Figure 5-4** present a generalized schematic profile of the excavation of the hillside face berms. As with the freestanding earthen berm, it is anticipated that lead levels will decrease with depth as excavation proceeds into each hillside face. Therefore, these berms will be excavated in two work areas as follows:

- The first two feet of the surficial soils at each hillside berm will be excavated in two lifts of one foot each. For planning purposes, the material generated by the initial excavation of the berm face is anticipated to be Category I waste. However, if the soil does not appear to contain significant lead, it will be tested for potential management as Category II waste.

- The next two feet will be excavated in two lifts of one foot each. It is anticipated that this material will be Category II waste.

- If necessary based on observations and analytical results, the grid excavation approach defined for the small arms range floors in Section 5.2.2 will be applied to portions or all of the face of a hillside berm after the initial excavation has been conducted.

Scenario 4 – Excavation in Impact Zone behind Berm applies only to the 25-Meter Machine Gun Range (Range RAU 2A-18). **Figure 5-5 and 5-6** presents a schematic profile of the excavation approach in the impact zone behind the berm. The initial excavation in this area will be a single six-inch scraping lift. It is anticipated that this material will be Category II waste. Also, if necessary based on observations and analytical results, the grid excavation approach defined for the small arms range floors in Section 5.2.2 will be applied to portions or all of the face of a hillside berm after the initial excavation has been conducted.

Table 5-2 Remediation Scenarios for Berms by Small Arms Range Number

RAU 2A Subunit Number	Range Designation/Description	Scenario 1 Removal of Freestanding Earthen Berm	Scenario 2 Removal of Pop-Up Target Berms	Scenario 3 Excavation of Hillside Face Berm	Scenario 4 Excavation in Impact Zone Behind Berm
4	Combat Pistol Range		X	X	
15	Undocumented Pistol Range	Range Floor Excavation Only			
16	1,000-Inch Rifle Range & Machine Gun Range			X	
17	25-Meter M60 & Pistol Range			X	
18	25-Meter Machine Gun Range	X			X
19	25-Meter Record Firing Range & Field Firing Range	Range Floor Excavation Only			
20	Field Ranges 1 & 2			X	
21	Rifle Ranges 1 & 2			X	
22	Field Fire Ranges 1 & 2		X		

Source: Table 5-1 Draft Final Work Plan for Interim Actions at Small Arms Ranges Berm and Fire Support Areas at Camp Bonneville (Calibre, March 2005)

Table 5-3 Estimated Excavation Volumes for Berms and Small Arms Range

RAU 2A Range Number	Range Designation/Description	Estimated Excavation Volumes in Cubic Yards				
		Scenario 1 Removal of Freestanding Earthen Berm	Scenario 2 Removal of Pop-Up Target Berms	Scenario 3 Excavation of Hillside Face Berm	Scenario 4 Excavation of Impact Zone Behind Berm	Totals
4	Combat Pistol Range		84	576		660
15	Undocumented Pistol Range	Range Floor Excavation Only				0
16	1,000-Inch Rifle Range and Machine Gun Range			850		850
17	25-Meter M60 and Pistol Range			800		800
18	25-Meter Machine Gun Range	4,032			796	4,828
19	25-Meter Record Firing Range and Field Firing Range	Range Floor Excavation Only				0
20	Field Ranges 1 and 2		84			84
21	Rifle Ranges 1 and 2 (Long Berm and Short Berm)			1,850		1,850
22	Field Fire Ranges 1 and 2			500		500
	TOTALS	4,032	168	4,576	796	9,572

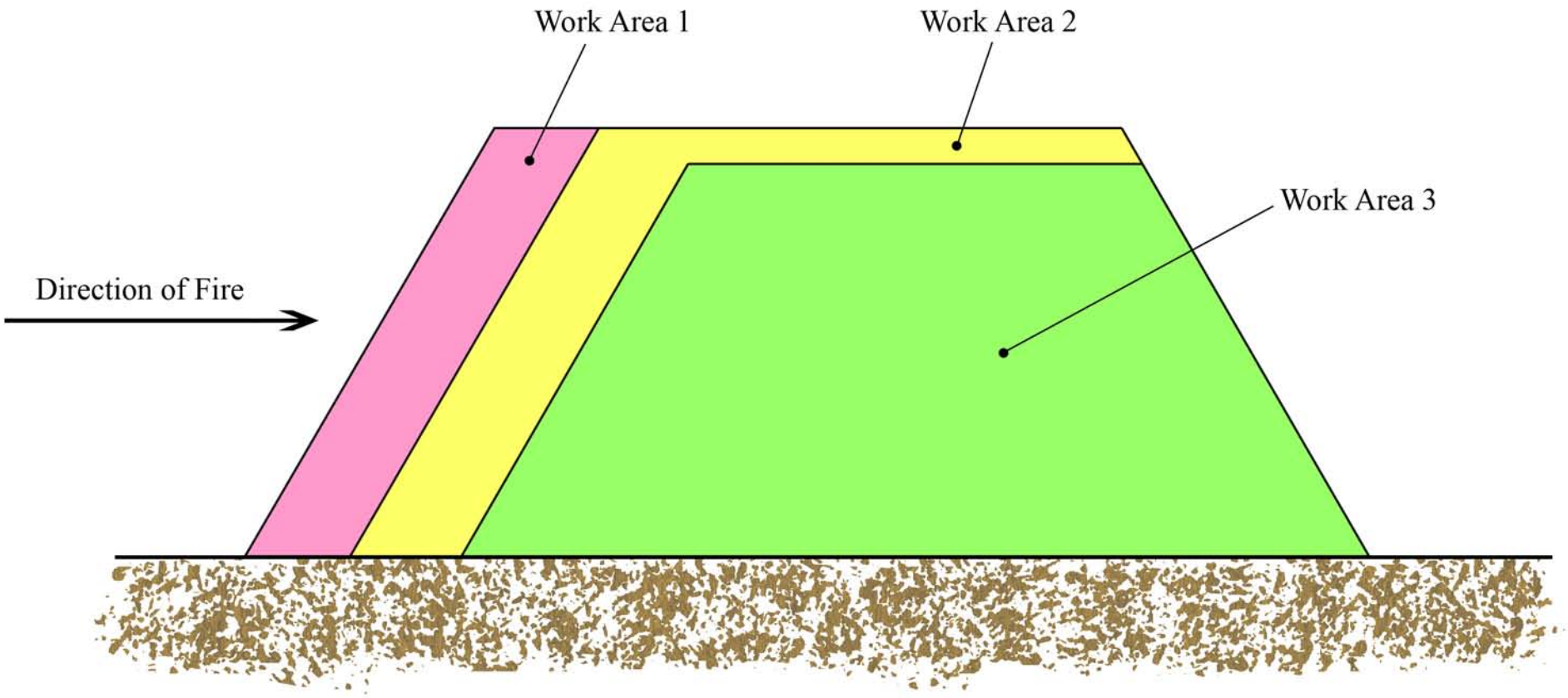


Figure 5-1
Schematic of Scenario 1 – Removal of Freestanding Earthen Berm
(Not to scale)

Figure 5-2
Schematic of Scenario 2 - Removal of Pop-up Target Berm (Plan View)

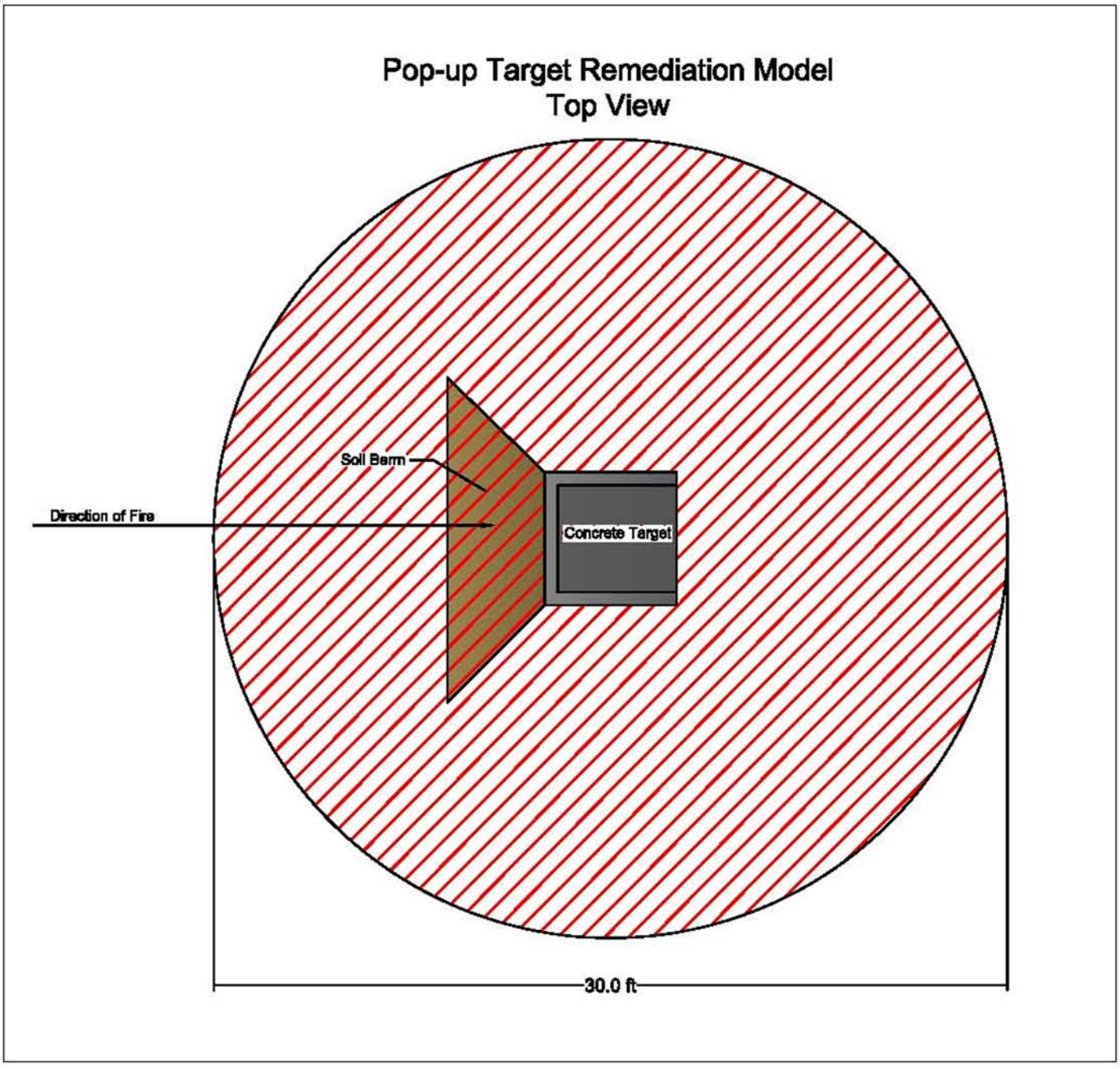


Figure 5-3
Schematic of Scenario 2 - Removal of Pop-up Target Berm (Profile View)

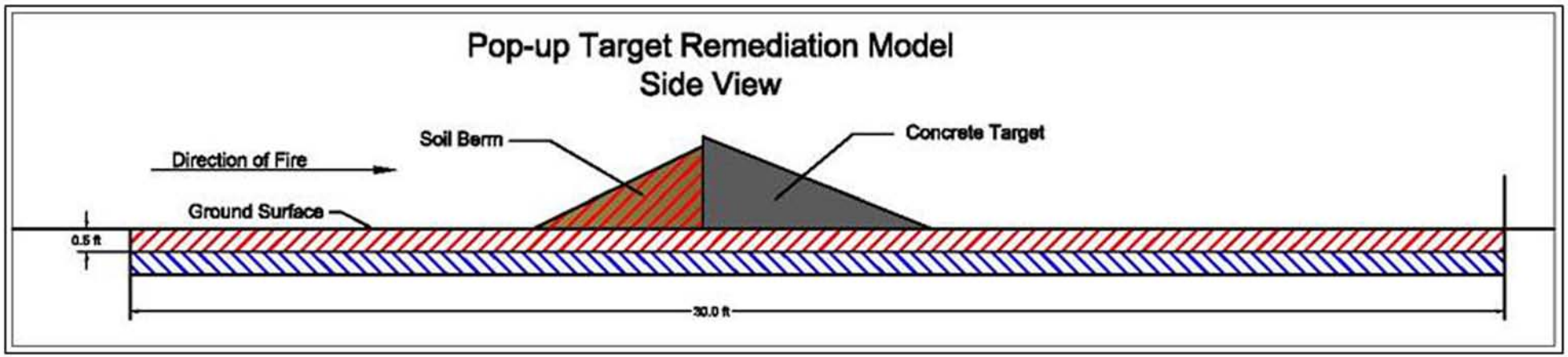


Figure 5-4
Schematic of Scenario 3 - Excavation of Hillside Berm

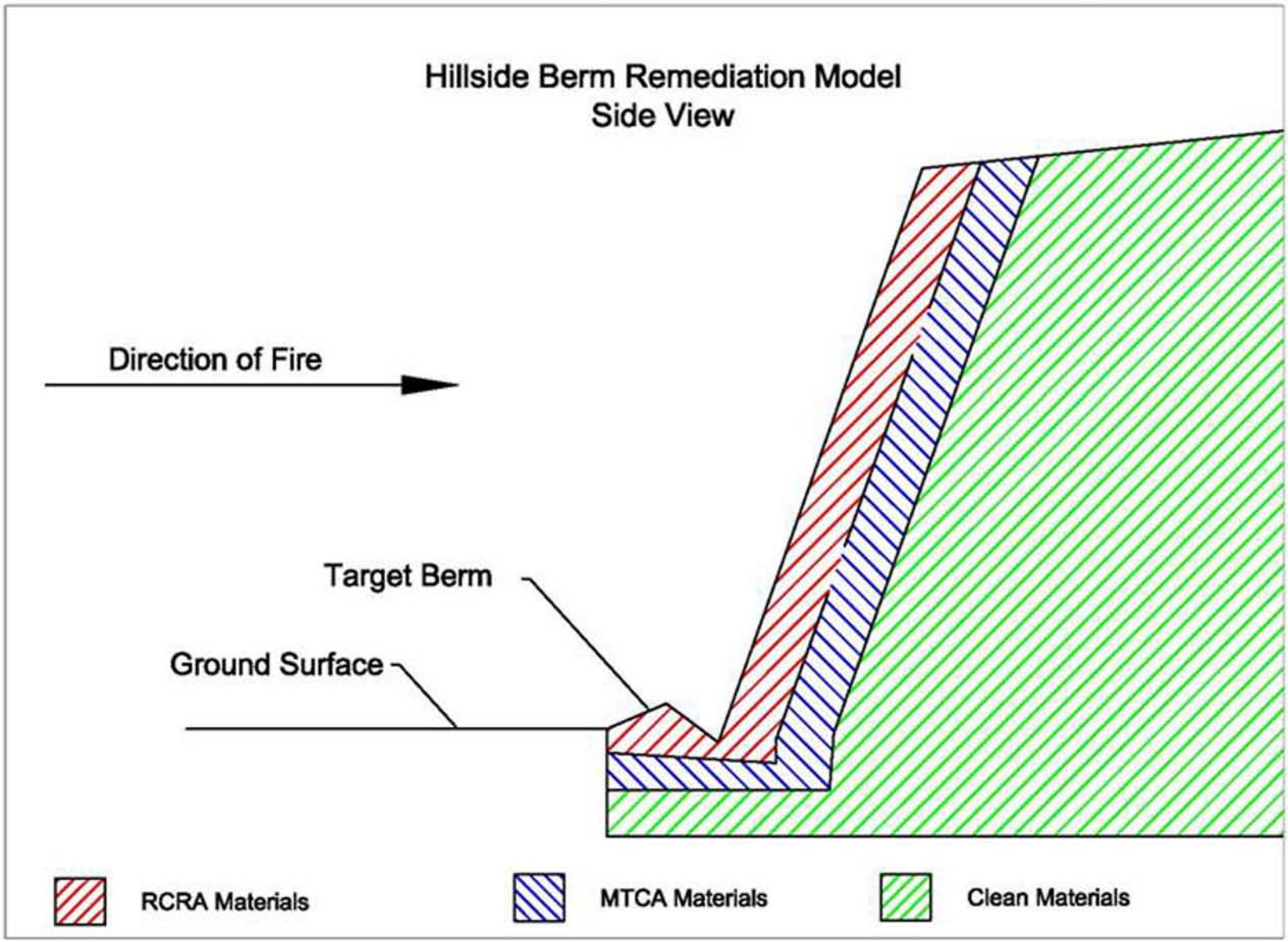


Figure 5-5
Schematic of Scenario 4 - Excavation of Impact Zone behind Berm (Overview)

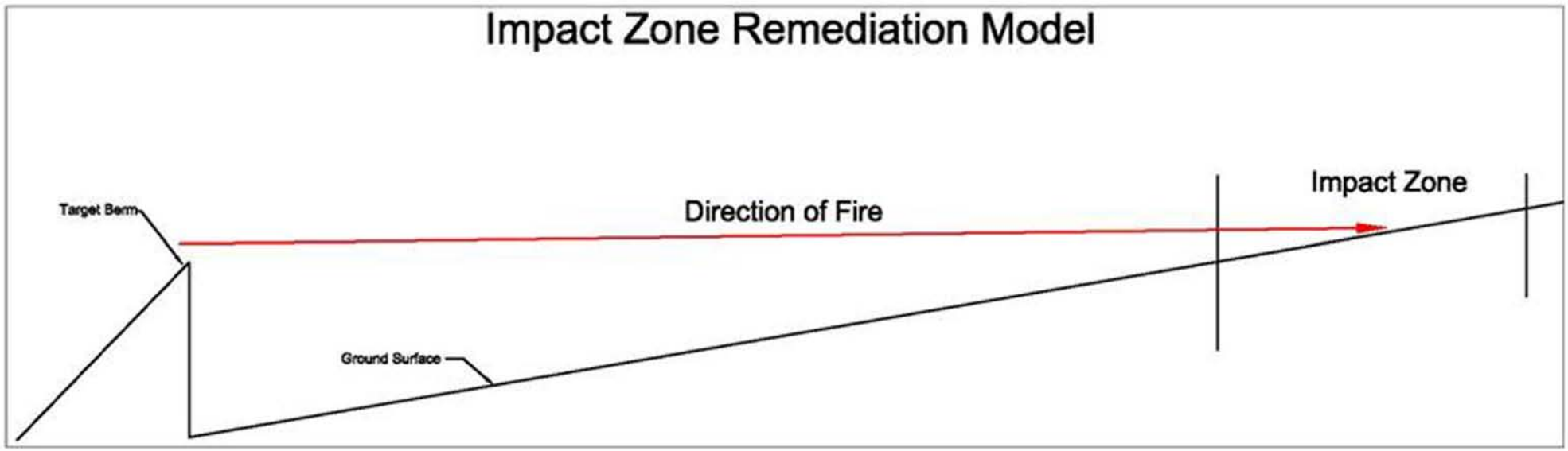
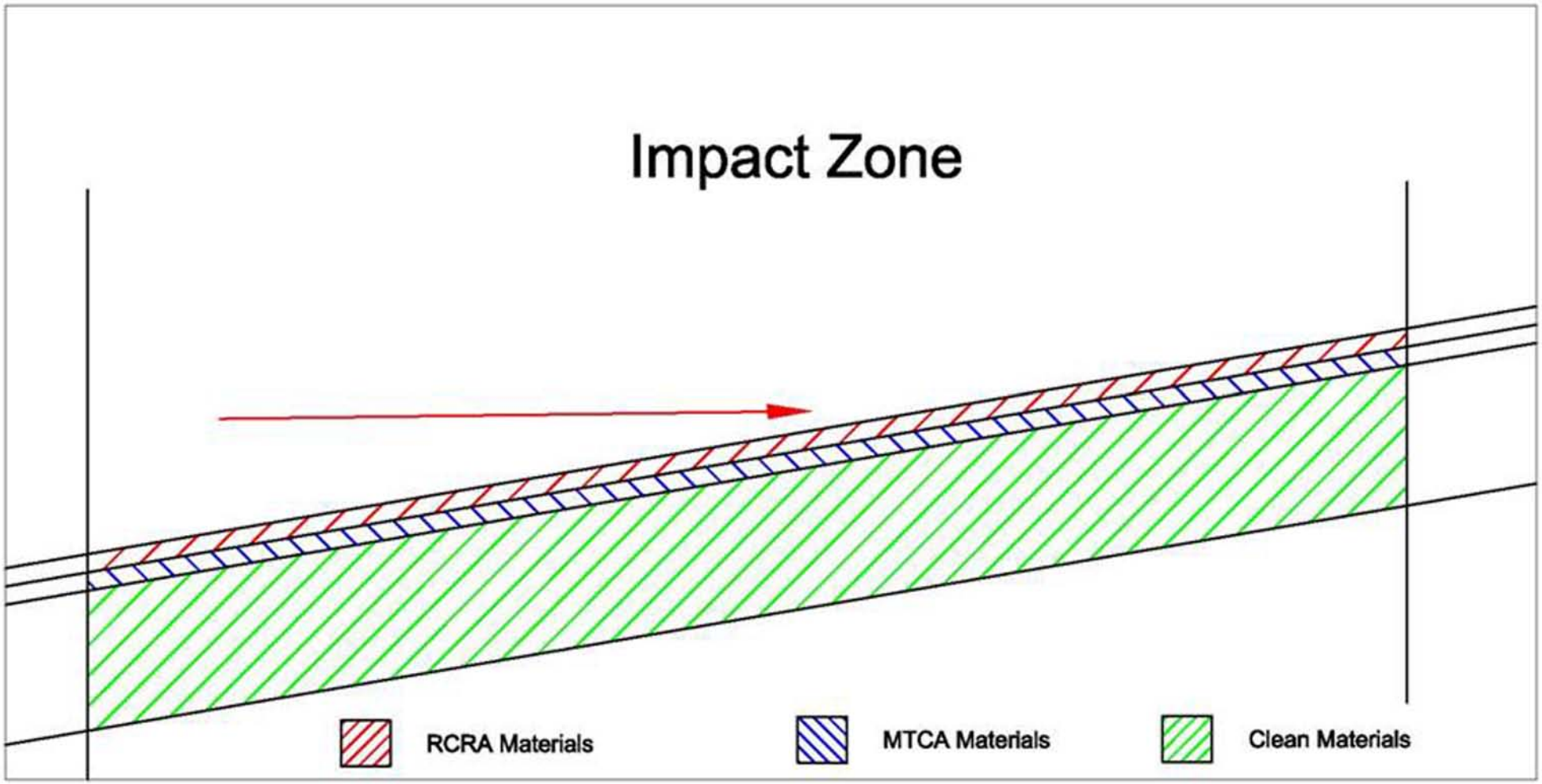


Figure 5-6
Schematic of Scenario 4 - Excavation of Impact Zone behind Berm (Detail)



5.2.2 Firing Range Floors

Areas identified as contaminated based upon previous investigations will be excavated from surface to 6-inches below ground surface (bgs) in accordance with the following technical approach to soils management in the small arms range floors:

5.2.2.1 Previous Investigation Data Summary and General Interpretation:

At the nine small arms firing ranges where cleanup is required in the range floors, the analysis results identified sampling grids were for one or more soil samples contained total lead at a concentration exceeding 50 mg/kg. **Table 5-4** presents the summary of the sampling results for these eight small arms firing ranges in terms of the number of grids sampled, number of samples collected, and the number of results exceeding each of several relevant evaluation levels as determined by the investigation mentioned above:

Table 5-4 Summary of Historic Sampling Results for Total Lead

Small Arms Range	# of Grids Sampled	# of Samples Collected	# of Samples >50 mg/kg	# of Samples >118 mg/kg	# of Samples >250 mg/kg	# of Samples >500 mg/kg	# of Samples >1000 mg/kg
Combat Pistol Range	17	85	6	2	1	1	0
Undocumented Pistol Range	1	5	2	1	0	0	0
1000-ft Rifle Range/Machine Gun Range	30	150	39	24	13	8	6
25-meter M60/Pistol Range	4	20	5	2	0	0	0
25-meter Machine Gun Range	13	65	20	11	7	6	4
25-meter Record Firing/Field Firing Range	40	200	16	6	3	2	1
Field Ranges No. 1 and No. 2	14	70	10	8	4	2	1
Rifle Ranges No. 1 & No. 2	32	160	50	18	9	6	5
Field Fire Rifle Ranges No. 1 and No. 2	22	110	14	2	1	1	1
TOTAL	173	865	162	74	38	26	18
Percent Above SL			19%	9%	4%	3%	2%

- In terms of individual sample results, this data set is summarized further as follows:
  - Analytical results for 703 samples (81%) were less than 50 mg/kg.
  - Analytical results for 88 samples (10%) were greater than 50 but less than 118 mg/kg.
  - Analytical results for 36 samples (5%) were greater than 118 but less than 250 mg/kg.
  - Analytical results for 12 samples were greater than 250 mg/kg but less than 500 mg/kg.
  - Analytical results for 8 samples were greater than 500 mg/kg but less than 1,000 mg/kg.
  - Analytical results for 18 samples exceeded 1,000 mg/kg.
  - In terms of results by grid, this data set is summarized as follows:
  - A total of 36 grids had only one sample containing greater than 50 mg/kg lead.
  - One-third of the samples from these grids contained less than 60 mg/kg lead and two-thirds of the samples contained less than 100 mg/kg lead.
  - Analysis of grids containing two samples greater than 50 mg/kg showed that 63% of these grids had lead levels of 100 mg/kg or less.
  - In most cases, the elevated lead level in sample or samples in one and two sample grids are not significantly higher than that of the remaining samples.
  - When three or more soil samples contained greater than 50 mg/kg lead, lead concentrations seem to be increasing.

5.2.2.2 Proposed Technical Approach:

- BCRRT will apply the 50 mg/kg Total Lead specified Washington State MTCA Regulations [Washington Administrative Code Chapter 173-340]for ecological risk (plants) as the cleanup criteria. A direct approach to remediation of the contaminated soil in the remaining range floor grids will be to excavate the soil around the locations showing elevated lead concentrations (>50 mg/kg) until the exposed soil is rendered clean.

- Tables 749-2 and 749-3 of the MTCA Regulations [WAC 173-340] identify five levels of concern based on soil concentrations of total lead, as follows:

  - Industrial or commercial use: 1,000mg/kg
  - Unrestricted land use: 250 mg/kg
  - Ecological indicator – soil biota: 500 mg/kg
  - Ecological indicator – wildlife: 118 mg/kg
  - Ecological indicator – plants: 50 mg/kg

- Careful examination of the data sets from the individual grids indicates a general and consistent pattern as follows:

  - Higher exceedances – sample results over 250 mg/kg – tend to occur in groups affecting most or all of the impacted grid.
  - Low exceedances – sample results between 50 mg/kg and 250 mg/kg – tend to occur in isolated locations involving a single sample or a pair of samples and affect only non-contiguous parts of a single grid.

- Given the differing potential impact and spatial distribution of the soils with relatively low lead concentration exceedance, it is reasonable to remediate these soils by focused hot spot removal. Those grids with higher exceedance levels and broader spatial distribution will be remediated by more aggressive general excavation centered on those sample collection locations.

- Based on the soil analysis results data from the RI/FS Report and the MTCA soil cleanup criteria for lead, BCRRT has grouped the small arms ranges grids in five categories, as follows:
  - Category 1 – All individual sample concentrations are less than 50 mg/kg (112 grids)
  - Category 2 – All individual sample results are less than 118 mg/kg and the average concentration of all samples from that grid is less than 50 mg/kg (27 grids)
  - Category 3 – All individual sample results are less than 250 mg/kg and the average concentration is between 50 mg/kg and 118 mg/kg (16 grids)
  - Category 4 – The average concentration is between 118 mg/kg and 250 mg/kg (8 grids)
  - Category 5 – The average concentration is greater than 250 mg/kg (4 grids)

- The distribution of grids in these five categories by small arms range is presented in **Table 5-5**, below.

Table 5-5 Distribution of Grids by Category for Each Range

Range Designation	Category 1	Category 2	Category 3	Category 4	Category 5
Combat Pistol Range	14	2	1	0	0
Undocumented Pistol Range	0	0	1	0	0
1,000-inch Rifle & Machine Gun Ranges	19	3	3	4	0
25-meter M-60 & Pistol Range	1	2	1	0	0
25-meter Machine Gun Range	6	2	3	1	1
25-meter Record Firing Ranges	33	3	1	1	1
Field Firing Ranges	10	1	1	1	1
Rifle Ranges No. 1 & No. 2	17	6	4	1	0
Field Fire Ranges No. 1 & No. 2	12	8	1	0	1
Totals	**112**	**27**	**16**	**8**	**4**

BCRRT will conduct remediation in these five grid categories as follows:

- General grid excavation in Category 5 grids, which present some potential human health risk and ecological concerns.
- Focused hot spot excavation with confirmatory sampling and "step-out" and "step-down" procedures where appropriate in Category 4 grids, which present some ecological concerns but no human health risk.
- Focused hot spot excavation in Category 3 grids, which present a very low level of ecological concern.
- Category 2: **No further action** as these grids do not present no measurable human health or ecological concern.
- Category 1: **No further action** as these grids present no measurable human health or ecological concern

These remediation procedures are described more fully in the following three paragraphs.

- **General grid excavation (Category 5)** will consist of the removal and appropriate management all surfacial soils (i.e., 0-6 inches bgs) in a grid. This excavation will be followed by confirmatory sampling in the floor and perimeter of this excavation and by additional excavation as determined by the results for these confirmatory samples. (This process is described more fully in the next section.) This excavation area is equivalent to the proportion of the entire grid represented by the sample in question. (These grids are approximately 130 feet square or 16,900 square feet.
- **Focused hot spot excavation with confirmatory sampling (Category 4)** also will consist of the removal and appropriate management of the

soils in a square area 58 feet by 58 feet (58-foot square contains 3,364 square feet) centered on the sample location of concern to a depth of six inches bgs. This excavation will be followed by confirmatory sampling in the floor and perimeter of this excavation and by additional excavation as determined by the results for these confirmatory samples. (This process in described more fully in the next section.) This approach provides more rigorous management of these grids reflecting the higher level of ecological concern and the absence of any human health risk.

- **Focused hot spot excavation (Category 3)** will consist of the removal and appropriate management of the soils in a square area 29 feet by 29 feet centered on the sample location of concern to a depth of six inches. This excavation will be followed by confirmatory sampling in the floor and perimeter of this excavation and by additional excavation as determined by the results for these confirmatory samples . This approach reflects the limited spatial distribution and low level of ecological concern associated with the soils in this category.

This approach to remediation of the floors of the small arms ranges is summarized in the following table.

Table 5-6 Proposed Remedial Actions by Grid Categories

Description	Action Required
Category 5 – Average concentration is > 250 mg/kg	Excavate the entire grid to a depth of 6 inches bgs with confirmation sampling along grid boundaries and excavation floor and "step-out/step-down" procedures
Category 4 – Average concentration > 118 mg/kg but < 250 mg/kg	Focused 58' x 58' area excavation to a depth of 6 inches bgs over elevated sampling points with confirmation sampling along excavation boundaries and floor and "step-out/step-down" procedures
Category 3 – Average concentration > 50 mg/kg but < 118 mg/kg and no individual sample concentration > 250 mg/kg	Focused 29' x 29' area excavation over sampling point with confirmation sampling along excavation boundaries and floor and "step-out/step-down" procedures
Category 2 – Average concentration < 50 mg/kg and no individual sample concentration >118 mg/kg	No further action
Category 1 – Average and all individual sample concentrations < 50 mg/kg	No further action

5.2.2.3 Procedure for excavation of "Hot Spots" Within Grid Area:

The location of each hot spot identified for removal will be staked out in the field. These proposed excavation sites will be reviewed for both ecological and cultural/historic resources concerns by appropriate professionals. Where

potential ecological and cultural/historic resources impacts are thought to exist, if any, those locations will be reviewed with appropriate WDOE and County personnel to determine if the impact from excavation would be greater than leaving areas intact.

Excavation will be conducted using appropriate mechanical equipment and the excavated soils will be removed to a stockpile area for management and disposition. It is anticipated that most, if not all, excavated soils will disposed offsite at appropriately licensed facilities. Excavated soils categorized as hazardous wastes under RCRA and Washington's HWMA will be treated, as required by applicable law and regulation, prior to disposal.

5.2.2.4 Confirmatory sampling and further action:

At Category 5 grid excavations, seventeen (17) confirmatory samples will be collected after the initial excavation. Three samples will be collected at 30-foot intervals along each wall of the excavation. At the excavation floor, one sample will be collected at the center of the floor and an additional sample in each of the four cardinal compass directions 40 feet from the center

At Category 4 grid excavations, twelve (12) confirmatory samples will be collected after excavating the initial hotspot. Two samples, 20-feet apart (10 feet from the center of each side) will be collected along each wall of the excavation and four samples will be collected from the excavated floor; one sample in each of the four cardinal compass directions 20 feet from the center

At Category 3 grid excavations, six (6) confirmatory samples will be collected after excavating the initial hotspot. Samples will be collected on the perimeter, at the center, of each wall of the excavation and two samples; 10 feet apart will be collected at the center of the excavated floor.

In all categories, if any one of the perimeter confirmatory samples has a concentration greater than 118 mg/kg, a step-out, covering one-half of the initial excavation dimensions, will be made in that direction along the entire side of the excavation to a depth of 6 inches bgs. Confirmatory sampling for a particular category also applies for step-out excavation conducted at that category.

If the floor confirmatory sample has a concentration greater than 118 mg/kg, an additional 6-inch step-down will excavated from the entire excavation floor. Applicable confirmatory sampling for excavation floor, depending on the category will be conducted after a step-down excavation.

The process of confirmatory sampling and excavation will be repeated until all confirmatory samples show lead concentrations less than 118 mg/kg.

The Final RI/FS for RAU-2A (BCRRT 2007b) identified areas needing remediation, presented remedial objectives, identified general response actions, identified specific cleanup technologies applicable to the site along with cleanup action alternatives, evaluated those alternatives with respect to the requirements contained in WAC 173-340-360, and identified the preferred cleanup actions for Small Arms Ranges site soils as "excavation and removal of contaminated soil" for the nine ranges that warrant further action. This plan implements those mandates. When the work described in this CAP is completed, it will have satisfied all the remedial activities contemplated in the Interim Cleanup Action Work Plan for the Small Arms Ranges Berms and Fire Support Areas (Calibre, 2005) and the RI/FS Report for the Small Arms Firing Range Floors (BCRRT, 2007b). It also will have satisfied the applicable provisions of the PPCD and the Environmental Services Cooperative Agreement as those controlling documents relate to the small arms ranges.

5.3 Cleanup Action Implementation

The implementation of this clean up action is outlined graphically on the following three flowcharts. **Figure 5-7** presents a general excavation process flow diagram highlight those activities which are common to both the berms and the range floors. **Figure 5-8** is an excavation process flow diagram showing the activities which are specific to the cleanup of the berms. **Figure 5-9** is an excavation process flow diagram specific to the cleanup activities for the range floors.

5.3.1 Mobilization

After approval of this work plan and the completion of the permitting procedures and technical reviews, the team will mobilize the equipment and personnel needed to implement the cleanup actions for the small arms ranges. These tasks are identified in sequence on **Figure 5-7**.

As part of the cleanup action mobilization, the team will establish a working area for storage, categorization, screening, and loading of the excavated soils. The plot plan for this work area is show in **Figure 5-10**. This working area also will include space for mobile equipment storage and decontamination.

As work is initiated at each individual small arms range, appropriate work zones will be established and demarcated at that range. The work zones will include the following at each range:

- Exclusion Zone – the active work area where excavation will be conducted and lead-containing materials will be handled.

- Contamination Reduction Zone (CRZ) – the ingress and egress route for all personnel, equipment, and excavated material to provide access control and space

and facilities for appropriate decontamination of personnel and vehicles exiting the exclusion zone.

- Support zone – the area outside the other two zones when clean tolls and incoming supplies can be marshaled for use inside the zones at each small arms range

The erosion and sedimentation control measures will be installed at each small arms range prior to initiation of cleanup activities at that range (see also **Appendix B**). . Appropriate erosion and sedimentation control measures also will be installed at the soil storage and screening area. These measures will comply with all applicable federal, state and county regulations for the protection of surface waters.

To prevent the potential spread of contamination to currently uncontaminated soils underlying the equipment laydown and soil storage, liners will be placed before these activities are initiated at a given location. These liners will be heavy duty polyethylene with a minimum thickness of 10 millimeters. These liners will be checked frequently during active cleanup operations and any breaches or tears will be promptly repaired.

Before cleanup field activities and excavation are begun, the team will conduct task-specific training for the cleanup personnel. This training will include the cleanup methods and health and safety issues (see **Section 6**). It also will include awareness training for ecological resources and for cultural and historic resources.

5.3.2 Munitions and Explosives of Concern (MEC) Clearance

All MEC surface clearance activities required at the small arms ranges will have been completed before any activities defined in this CAP are initiated. The necessary MEC clearance activities are currently being conducted under a WDOE-approved IAWP for MEC Clearances for the Roads and Trails and the Small Arms Ranges (BCRRT 2007a) and a USATCES-approved ESS (MKM 2006) for these MEC clearance activities. Therefore MEC clearance issues are not included in this CAP.

5.3.3 Excavation

Excavation will be conducted at each of the nine small arms ranges as described in **Section 5.2**, above. The Excavation Process Flow Diagram for the Berm (**Figure 5-8**) and the Excavation Process Flow Diagram for the Range Floors (**Figure 5-9**) illustrate the excavation and soils handling programs. The excavation will be done in lifts as follows:

- The faces of the freestanding berm and the hillside berms will be excavated in one-foot lifts for the first four feet. If excavation proceeds deeper than four feet at any of these berms, it will continue in six-inch lifts employing the gridding and sampling protocol outlined in **Section 5.2**.

- The top of the free standing berm will be excavated in a single one-foot lift. If excavation proceeds deeper than one foot at this location, it will continue in six-inch lifts employing the gridding and sampling protocol outlined in **Section 5.2**.

- The balance of the freestanding berm and the pop-up berms will be excavated in bulk as described in **Section 5.2**.

- The area behind the freestanding berm and the range floors (including the fire support areas) will be excavated (if necessary) in six-inch lifts following the protocol outlined in **Section 5.2.2**.

All excavation will be done using a Trackhoe™ or Gradall™ style mobile excavator with a smooth-bladed bucket. A smooth-bladed bucket allows for cleaner cuts and greater excavation depth control precision.

Dust control methods will be implemented during excavation operations to minimize fugitive airborne contamination. These controls will be done be watering active excavation areas and stored excavated materials during periods of dry weather.

At CBMR, wet weather is more frequent than dry weather. Accordingly, erosion and sedimentation control will be maintained and inspected daily during excavation and material handling activities.

All excavations will be conducted in full compliance with applicable regulations and site-wide agreements, permits, and plans including the following:

- County grading and building permit procedures

- Applicable provisions of the Washington SEPA for the protection of ecological resources, habitat, and species of concern

- Applicable rules governing soil erosion and sedimentation control and runoff management and the task-specific Erosion and Sedimentation Control Plan

- Applicable Federal and state rules protecting wetlands including USACE National Wetlands Permit No. 38

- Programmatic Agreement and the Camp Bonneville Cultural and Historic Resources Preservation Plan.

- Camp Bonneville Conservation APP and attachments

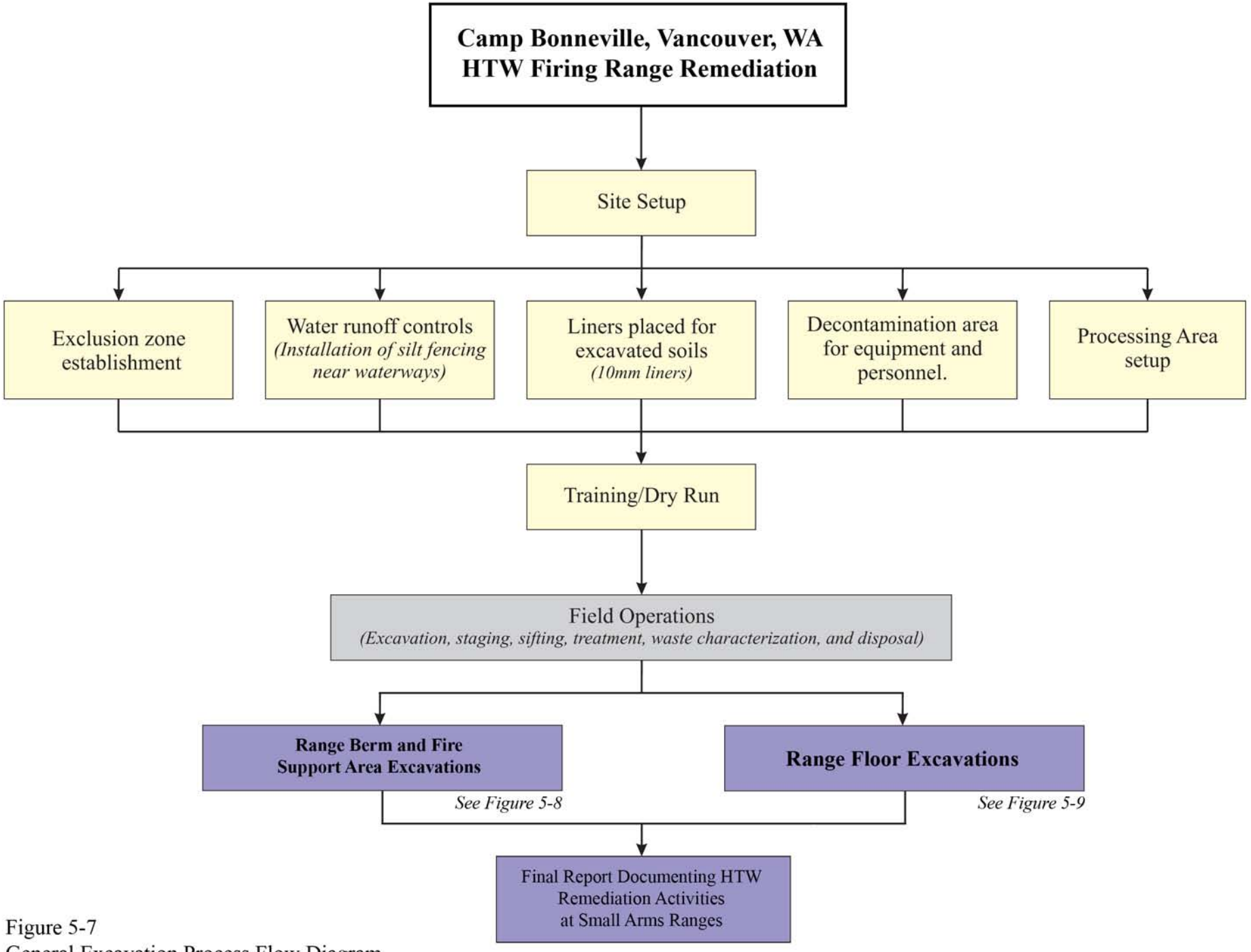
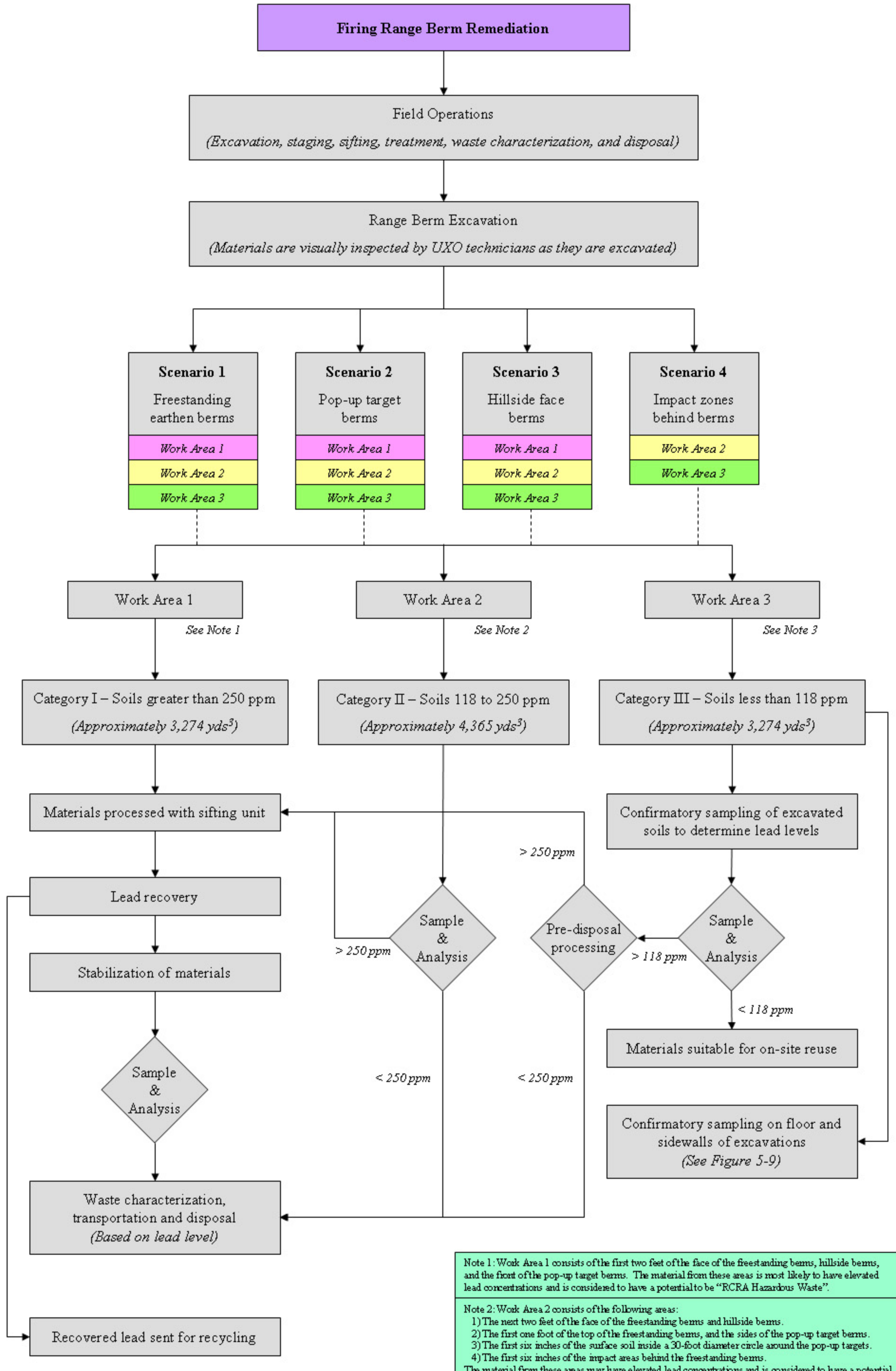


Figure 5-7
General Excavation Process Flow Diagram



Note 1: Work Area 1 consists of the first two feet of the face of the freestanding berms, hillside berms, and the front of the pop-up target berms. The material from these areas is most likely to have elevated lead concentrations and is considered to have a potential to be "RCRA Hazardous Waste".

Note 2: Work Area 2 consists of the following areas:
1) The next two feet of the face of the freestanding berms and hillside berms.
2) The first one foot of the top of the freestanding berms, and the sides of the pop-up target berms.
3) The first six inches of the surface soil inside a 30-foot diameter circle around the pop-up targets.
4) The first six inches of the impact areas behind the freestanding berms.
The material from these areas may have elevated lead concentrations and is considered to have a potential to be MTCA Industrial Waste.

Note 3: Work Area 3 consists of the balance of the freestanding berms and any additional material excavated from the pop-up target areas, hillside berms, and impact areas behind the berms. Materials from these areas will be inspected for visible lead or other evidence of bullet impacts. If lead or other impacts are observed, these soils will be added to the Work Area 2 soils. If no lead or other impacts are observed, these soils will be retained on-site for re-grading purposes.

Figure 5-8
Excavation Process Flow Diagram for the Berms

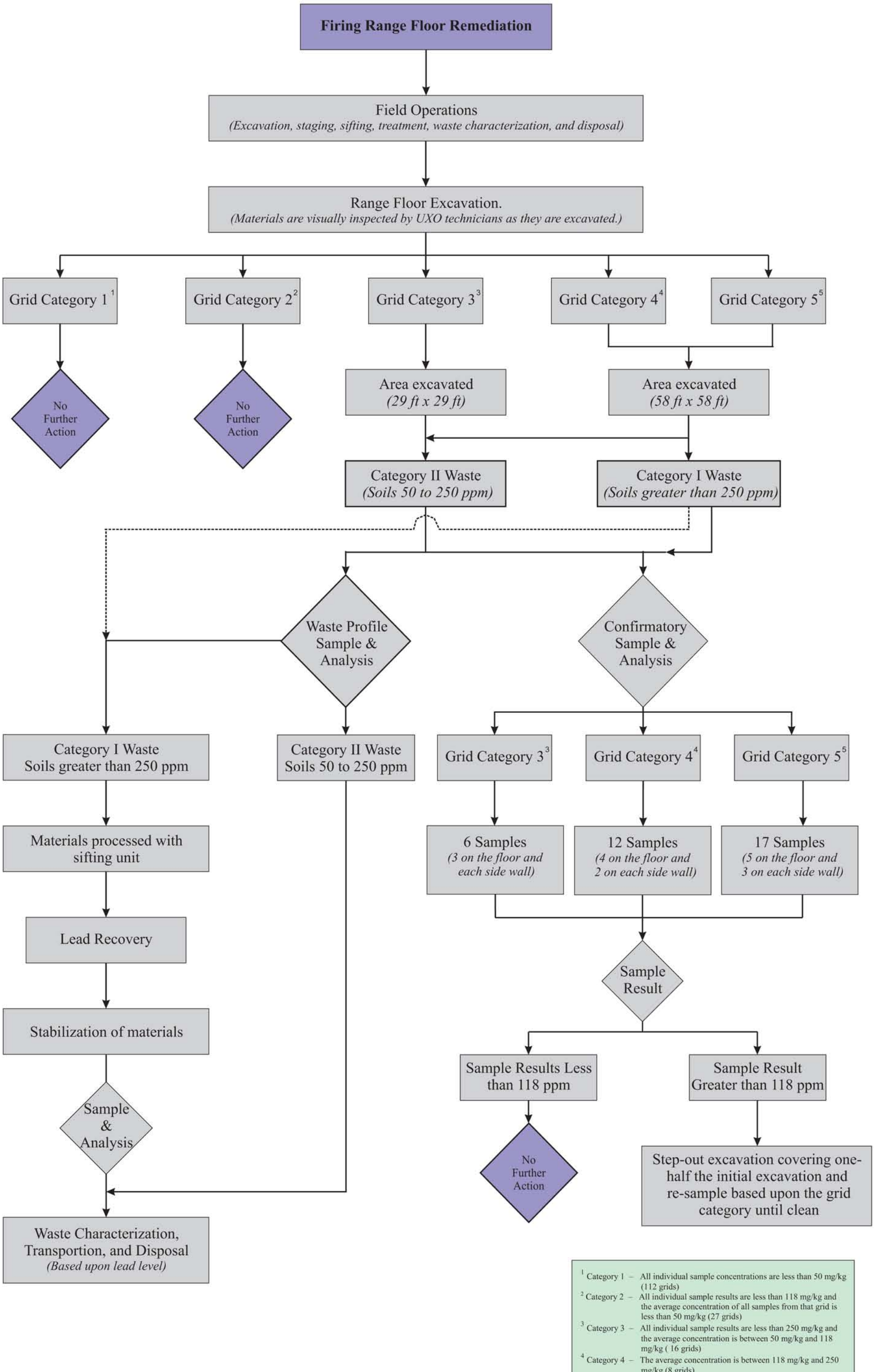
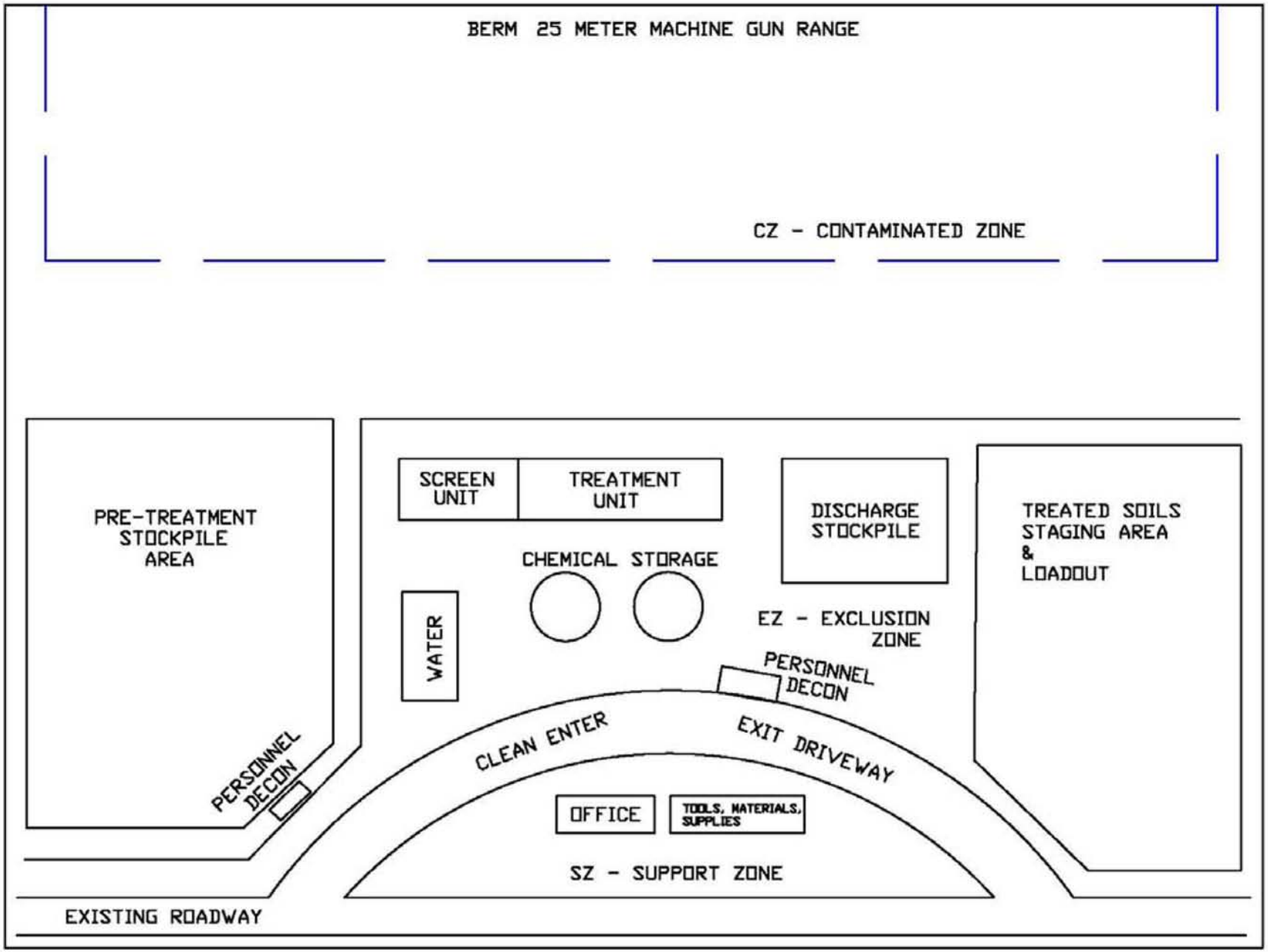


Figure 5-9
Excavation Process Flow Diagram for the Range Floors

Figure 5-10
Excavated Soil Holding, Screening, Processing, and Loading Area Layout Diagram



5.3.4 Stockpiling

As soils are excavated at each small arms range, they will be placed in stockpiles at that range. Soils will be segregated in separate stockpiles based specific excavation locations within each small arms range as outlined in Section 5.2 and based on lead-related visual observations of the as-excavated soils.

All stockpiles – both at the excavation sites and at the screening/loading facility – will be placed on polyethylene liners (10 millimeters thick) to prevent contaminant migration or additional soils contamination.

All soil stockpiles will be covered daily. As noted above, dust control methods will be implemented during excavation and soils handling operations to minimize fugitive airborne contamination.

The individual stockpiles will be sampled and these samples will be analyzed at an off-site laboratory for total and TCLP extractable lead. These analytical results will determine the final categorization, treatment, and disposition of the excavated soils. The stockpiled soil will be treated and handled in three categories depending on these analytical results, as follows:

- Category I – RCRA Hazardous Waste: Soils with TCLP extractable lead levels greater than 5 mg/l regardless of total lead concentration or total lead concentrations greater than 1,000 mg/kg

- Category II – MTCA Industrial Waste: Soils with TCLP extractable lead levels less than 5 mg/l and total lead concentrations less than 1,000 mg/kg but greater than 50 mg/kg

- Category III – Non-Regulated Soils: Soils with TCLP extractable lead levels less than 5 mg/l and total lead concentrations less than 50 mg/kg.

These category assignments will be maintained throughout onsite handling, treatment (if any), loading, and final disposition.

After the categorization sample analysis results are returned by the off-site laboratory, the soils will be scheduled for transport to the screening/loading station.

5.3.5 Screening, Stabilization, and Loading

As part of the mobilization, the work area for excavated soil screening, stabilization, storage and loading will be established as shown on **Figure 5-10** – Excavated Soil Holding, Screening Processing, and Loading Area Layout Diagram. The screening and stabilization equipment will be delivered to the site and installed as shown on **Figure 5-10**. The soils handling and treatment activities are outlined as follows:

- Soil in Categories I and II will be screened to recover discrete lead particles in the form of bullets and larger bullet fragments. These recovered materials will be recycled as described below.

- Soil in Category I may be treated (if necessary) with a stabilizing agent to meet the RCRA Land Disposal Restrictions (LDRs) to be eligible for off-site disposal at an appropriately permitted RCRA Hazardous Waste Treatment, Storage, and Disposal Facility (TSDF). Treatment will be accomplished by the addition chemical reagent that is proven to bind the lead to the soil particles and prevent lead mobilization under normal environmental conditions or under TCLP extraction procedures. It is currently anticipated that this stabilization will be done by the addition, mixing, and curing of the Category 1 soils by the proprietary Apatite™ crystallization process. After treatment, the Category 1 soils will be discharged to a dedicated stockpile and held for loading and transport to the off-site TSDF. These treated soils will be sampled and analyzed to confirm that they meet the applicable TSDF acceptance criteria and the RCRA LDRs.

- After screening, the Category II soil will be placed in a separate dedicated stockpile and held for loading and transport to an appropriately permitted industrial or municipal waste disposal facility. These soils will be resampledand analyzed to confirm that they meet acceptance criteria for use as daily cover at this disposal facility.

- Those Category III soils which are excavated will be held at the originating excavation site for use in filling and grading the excavated areas as part of site restoration.

5.4 Sample Analysis and Data Management

Soil sampling and analysis will be conducted for two purposes, as follows:

- To confirm that the limits of excavation as defined by total lead concentration have been attained as specified in **Section 5.2.2**.

- To categorize the excavated soils for appropriate treatment and disposal of for on-site use.

Sample collection and analysis will be conducted and documented as specified in USEPA procedures and Washington State Regulations. The specific procedures set forth in the SAP for Site Soils (AEM, 2003a and Michael Baker Standard Operating Procedures) for CBMR will be applied to these sampling, analysis, and documentation activities.

These analytical results will be reported in the Cleanup Action Report for RAU 2A – Small Arms Ranges utilizing appropriate table and figures to organize this data. In addition, the waste categorization analysis results will be submitted to the disposal facilities on the appropriate forms

to document attainment of the waste acceptance criteria those waste soils sent to each of these facilities.

5.5 Waste Management

Recovered lead and waste soils will be managed as follows:

- Recovered lead will be sent to a lead smelter or other approved lead recycling facility as specifically approved by USEPA and Washington regulations.To confirm that the limits of excavation as defined by total lead concentration have been attained as specified in **Section 5.2.2**.

- Category I soil (after stabilization to meet the LDRs, if necessary) will be sent to an approved RCRA-permitted hazardous waste TSDF. It currently is antipated that this facility will be in the state of Oregon.

- Category II soil will be sent to an approved, host-state-licensed industrial and/or municipal waste disposal facility. It is anticipated that these soils will be used for daily cover at the receiving facility. This facility may be in Washington or Oregon depending on availability and transportation costs.

The WDOE will be notified in writing on the final waste disposal locations before any wastes are sent to the selected facilities.

5.6 Restoration

After completion of excavation of the berms, the range floors, and any related areas and after receipt of confirmatory sample analysis results demonstrating that the cleanup criteria have been achieved, restoration of the excavation areas will be conducted. In general, excavation areas will be filled and graded to approximate original contours. The area of the freestanding earthen berm at the former 25-Meter Machine Gun Range will be graded to approximate the surrounding contours. This restoration will be done using soils from the following sources:

- Category III soils to the extent they are available and acceptable for this use.
- Borrow from other on-site sources to the extent such material is available
- Borrow from known, clean off-site sources
- Top soil from know, clean off-site sources

If appropriate and prudent, samples will be collected from any off-site soil sources and tested for total metals before any soil fromthese sources is delivered to CBMR.

Following excavation filling and contouring, exposed soils will be seeded with a Clark County-approved seed mixture.

5.7 Cleanup Action Support Activities

5.7.1 Erosion and Sedimentation Control Measures

This cleanup action will be conducted in conformance with the task-specific Erosion and Sedimentation Control Plan (see **Appendix B**). Silt fencing will be placed to control runoff, erosion, and sedimentation for the active excavation areas and from the screen/loading area. In addition, silt fencing will be placed along and adjacent to any streams, ponds, or wetlands within 200 feet of an active excavation area.

5.7.2 Wetlands Management

BCRRT has conducted a wetlands inventory of the nine small arms ranges addressed in this CAP (PBS, 2007). Based on this inventory, portions of five of these small arms ranges were found to be wetlands as shown on **Figure 5-11** – Wetlands Delineation Overview Map. These five ranges are:

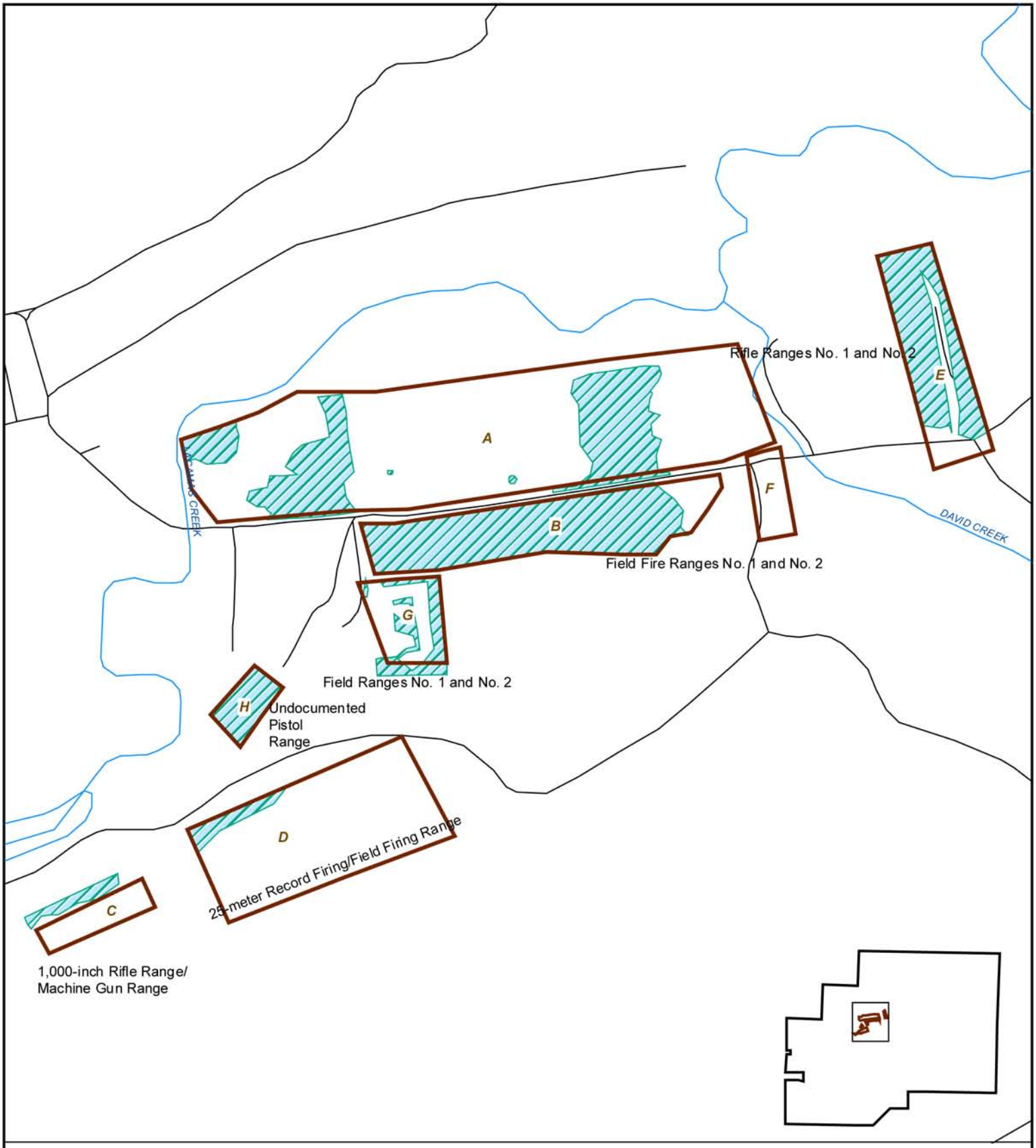
- Field Fire Ranges 1 and 2 (Areas A, B, and E on Figure 5-10)
- 1,000-Inch Rifle Range/Machine Gun Ran (Area C)
- 25-Meter Record Firing/Field Firing Range (Area D)
- Field Ranges 1 and 2 (Area G)
- Undocumented Pistol Range (Area H)

United States Army Corps of Engineers Nationwide Permit No. 38 specifically allows cleanups of hazardous and toxic wastes from wetlands. The preconstruction notification required under this Nationwide Permit has been submitted to the appropriate authorities.

Mitigation of the temporary disturbance of these wetlands is required under the Nationwide Permit. The disturbances associated with this cleanup action will be temporary and the wetlands will be restored as part of the work area restoration activities after the soil excavations are complete. The wetlands areas will be regraded and restored to their approximate pre-excavation contours and the wetlands area will be reseeded to reestablish the native wetlands plant communities.

5.7.3 Access Control

Access to all of the former CBMR is controlled while MEC clearance activities are ongoing. The perimeter fences were repaired and the perimeter warning signs were replaced as part of the initial cleanup activities after BCRRT accepted stewardship of the site. Site access is controlled by security guards and visitors access monitoring/logging on a 24-hour per day, seven-day per week basis. These controls will be in effect throughout implementation of this cleanup action.



Source: Clark County GIS Data, August 2006. Wetland boundaries, sample plot locations, and transects mapped by PBS using a Trimble GeoXT. The GeoXT has sub-meter post processing accuracy.

N

0 140 280

Feet

A Study Areas

Wetlands

Streams

Roads and Trails

PBS

Project #: 70489.000

Date: JULY 2007

Schematic Wetlands Delineation Map for Small Arms Ranges Requiring Remediation
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE 5-11

5.7.4 Decontamination of Personnel and Equipment

Personnel leaving any Exclusion Zone for this cleanup action, including both active excavation areas and the screening/loading area will self-decontaminate in the CRZ. This personnel decontamination will be accomplished by removing their PPCE (boot covers, Tyvek coveralls, respirators (if any), and gloves, in that order, in the CRZ. All of those items will be left in that CRZ for later reuse by the same person or for appropriate disposal as contaminated trash. Pre-moistened towelettes will be provided in each CRZ for use in cleaning the respirators and for any incidental cleaning of exposed skin.

Equipment leaving any Exclusion Zone will be decontaminated using dry methods. Potentially contaminated exterior surfaces of this equipment will be wiped with dry or pre-moistened rags to remove dust or soil particles.

Haul trucks will not enter the Exclusion Zone for loading. They will loaded by a track hoe or front-end loader reaching across and over the line between the Exclusion Zone and the Support Zone. Haul truck exteriors should not require decontamination under this approach. The interiors of the truck beds will be decontaminated using the dry methods whenever a truck leaves the site without a contaminated soil load.

5.8 Estimated Excavation Volumes by Waste Category

Table 5-8 Estimated Excavation Volumes by Waste Category

	Total Volume	Category 1	Category 2	Category 3
Combat Pistol Range	1,015	305	406	305
Undocumented Pistol Range	50	15	20	15
1,00-ft Rifle Range/ Machine Gun Range	850	255	340	255
25-meter M60/ Pistol Range	800	240	320	240
25-Meter Machine Gun Range	4,968	1,490	1,987	1,490
25-Meter Record Firing/ Field Firing Range	553	166	221	166
Field Ranges No.1 and No.2	550	165	220	165
Rifle Ranges No.1 and No.2	1,850	555	740	555
Field Fire Ranges No.1 and No.2	276	83	110	83
Grand Totals	**10912**	**3274**	**4365**	**3274**

5.9 Demobilization after this Cleanup Action

At the completion of all soil excavation and handling activities under this Cleanup Action Plan, these work areas will be demobilized as follows:

- Mobile and stationary equipment will decontaminated as described in the preceding section and removed from Camp Bonneville.

- The haul truck beds will be decontaminated as described in the preceding section and released from the project.

- The soil stockpile liners and covers will be placed in appropriate containers (e.g. roll-off boxes) and sent to the industrial/municipal waste landfill for disposal.

- The erosion control items and the zone fences/barriers will be removed.

- Any wastes related to sampling, analysis, and decontamination activities will be disposed in an appropriate and legally compliant manner.

- Equipment will be decontaminated. Removal of erosion control methods, barriers, decontamination materials, and Investigation Derived Wastes (IDW) will be completed.

6.0 TASK-SPECIFIC HEALTH AND SAFETY PLAN

The cleanup action for the small arms ranges will be conducted in full accordance with the previous established Camp Bonneville Conservation Conveyance APP (Michael Baker, 2006a). This APP is currently being applied to the work being done at CBMR. This plan has four principal elements as follows:

- Accident Prevention Plan (APP)
- Health and Safety Plan (HASP)
- Explosives Safety Submittal (ESS)
- Project Hazard Analysis (PHA)

Each of these elements is related to the work to be done for the cleanup of RAU 2A – Small Arms Ranges. The general procedural specifications of each element will be fully enforced and applied to the small arms ranges cleanup action as those specifications are relevant and appropriate.

The elements of the APP and the program being implemented on a site-wide basis there under are fully compliant with the applicable OSHA rules and guidance for hazardous site work and for general construction work. The APP and its component elements address all relevant topics, including the following:

- Health and Safety Policies
- Site Characteristics
- Site and Task Related Hazards
- Training
- Personal Protective Equipment
- Medical Surveillance
- Exposure Monitoring and Air Sampling Programs
- Physical Hazards
- Site Controls and Work Practices
- Site Operations
- Personal Hygiene and Decontamination
- Emergency Responses
- Accident Reporting
- Documentation and Safety-Related Recordkeeping

In addition to this task-specific health and safety plan, all workers employed in the cleanup of the small arms ranges will be trained in and required to follow the applicable portions of the general site wide APP and its component parts.

6.1 Munitions-Related Hazards

The small arms ranges will have been surface cleared of MEC before implementation of this cleanup action is initiated. Therefore, MEC avoidance is not expected to be an issue during implementation of this Cleanup Action Plan. However, as an additional safety precaution, the

personnel conducting this cleanup action will undergo MEC Awareness Training as outlined below in Section ____ and as described more fully in the APP and ESS. In addition, fully qualified, fully qualified and equipped MEC and unexploded ordnance (UXO) management personnel will be available onsite throughout this project in the unlikely event any suspected MEC items or Munitions Debris (MD) are encountered during any of the activities related to the cleanup of the nine small arms ranges. These MEC personnel will be in radio communications with the personnel conducting the small arms ranges cleanup to provide rapid response to any MEC or MD issues that may potentially arise.

6.2 Chemical Hazards

Based on soil sampling conducted for the RI/FS (Calibre, 2005), the following hazardous substances were detected in soils at one or more of the small arms ranges:

- Arsenic: maximum reported level of 22.9 mg/kg, slightly above the ecological threshold but below the human health risk criteria
- Barium: maximum reported level of 227 mg/kg, slightly above the ecological threshold but below the human health risk criteria
- Lead; maximum reported level of 26,300 mg/kg exceeding the human health and ecological protection criteria and, thus, the target of this cleanup action
- 2,4-Dinitrotoluene; maximum reported of 20 mg/kg which is below regulatory criteria
- Soil dust as a particulate nuisance for worker safety and health with threshold limit values (TLVs) of 10 mg/cubic meter inhaleable and 3 mg/cubic meter respirable

Based on threshold limit values for worker breathing zones, a maximum permissible total dust level has been established for each of the nine small arms ranges being addressed under this cleanup action. These values are as follows:

Table 6-1 RAU 2A Maximum Permitted Airborne Dust Levels

Range Name	Maximum Permitted Total Dust Level	Resulting Maximum Airborne Lead Concentration	Percent of Lead Exposure Limit
	(mg/m^3)	(mg/m^3)	(%)
Combat Pistol Range	10	0.008	16
Undocumented Pistol Range	10	0.002	3
1,000-Inch Rifle and Machine Gun Range	4	0.025	50
25-Meter M60 Machine Gun and Pistol Range	10	0.002	4
25-Meter Machine Gun Range	1	0.026	53
25-Meter Record Firing Range & Field Firing Range	4	0.036	71
Field Ranges 1 and 2	10	0.023	46
Field Fire Ranges 1 and 2	4	0.029	57
Rifle Ranges 1 and 2	4	0.017	35

6.3 Physical Hazards

Excavation depths will be less than four feet at the nine small arms ranges. Therefore, confined space entry and trenching rules are not issues for this cleanup action.

The excavations will require the use of heavy equipment. Workers must be alert to equipment movements and swing radii. In addition, hauling and maintenance vehicles will be moving on and around the work sites; therefore traffic is potential physical hazard. As noted above, the exclusion zones will be delineated with rope or snow fence and will be posted with warning signs.

As discussed in **Section 6.2**, airborne dust is a potential physical, as well as chemical hazard at the excavation points and at the screening/loading station. As discussed in **Section 6.5** below, airborne dust will be the controlling factor in selection of Personal Protective Equipment. RAU 2A work Site perimeter and worker breathing zone air monitoring will be conducted throughout excavation and soils handling operations. If appropriate, dust control and mitigation measures will be conducted by spraying the areas of concern areas with water. In addition, worker breathing zone air samples will be collected using low-volume filter pumps. This information will be monitored by the Site Health and Safety Officer and may used to revise the level of respiratory protection depending upon results.

Whenever the ground is penetrated by excavation, there is potential to encounter underground utilities. Based on site history, existing documentation, and observed site conditions, there is a low probability of encountering underground utilities during excavation operations at the nine small arms ranges. Before starting excavations, site personnel will confirm the absence of underground utilities at the planned excavation locations by further review of site map, conversations with site personnel, and contact with the appropriate underground utilities locator services. This topic will be addressed in the site specific training to alert excavation personnel of the appropriate course of action in the unlikely event any underground utility line is encountered.

Stockpiles at each small arms range and at the holding and screening area will be placed on plastic and sloped to maintain pile stability.

The excavated soil holding and screening area presents several physical hazards, as follows:

- Moving machinery parts such as conveyor and vibrating screens
- Mobile equipment and haul vehicles
- Trips and falls from elevated working or maintenance locations
- Electric power and hydraulic mechanisms
- Dust
- Access by visitors delivering fuel and supplies
- Truck operators removing soil for off site disposal

6.4 Task-Specific Training

As specified by Section 5.1 of the HASP, all personnel assigned to the small arms ranges cleanup will have received OSHA specified hazard site worker training before they begin work on this task. This training will have included the following

- ✓ OSHA-mandated hazardous waste operations (HAZWOPER) training (40 hours)
- ✓ OSHA-mandated site specific training (24 hours of actual on-site work under the direct supervision of a trained and experienced supervisor
- ✓ Supervisors are required to have eight additional hours of HAZWOPER Supervisor training before assuming supervisory duties
- ✓ All personnel will be up-to-date on the OSHA required annual renewal training

Workers assigned to this small arms ranges cleanup task will receive tas-specific training in accordance with the following:

- ✓ Site-specific health and safety training as outlined in Section 5.2 of the HASP

- ✓ MEC awareness training as described in Section 5.3 of the HASP

Before work is initiated on the small arms ranges cleanup, the workers will receive task-specific training on the following topics:

- ✓ Review of the relevant OSHA Standards
- ✓ The content of this work plan including the specific nature of the planned operations and the potentials for chemical hazard exposure and the nature of the physical hazards associated with this task
- ✓ A review of the APP and the task-specific health and safety issues
- ✓ Review of the purpose, limitations, selection, fitting, use, and maintenance of half-face respirators and worker breathing zone air monitors
- ✓ Review of the medical surveillance program
- ✓ Communication of lead-related health hazards

- ✓ Communication of hazards, if any, potentially associated with any stabilizing agents to be used in performing this task
- ✓ Applicable engineering controls and safe-work practices
- ✓ Review of employee right-of-access to records under Federal law
- ✓ Recognition of underground utilities and procedures to follow (i.e. stopping work in the affected area) if such utilities are encountered

6.5 Personal Protective Clothing and Equipment

Initial operations at both the excavation sites and the screening/loading station will conducted wearing Level C Personal Protective Clothing and Equipment (PPCE). Level C PPCE will consist of the following protective items:

- Protective coveralls made of Tyvek™ or other appropriate material
- Steel toed work shoes/boots with thick (one inch) soles
- Boot covers (either disposable polyethylene or non-disposable rubber)
- Rubber gloves
- Hard hats
- Safety glasses with side shields
- Hearing protection
- Half-face air purifying respirator with dust cartridges

If justified by dust monitoring results, the task health and safety officer has the authority to reduce the protection level to Modified Level D PPCE (also known as Level D+) for either excavation area workers, screening/loading station workers, or both. In this event, dust monitoring will continue and the higher level of protection will be reinstated if made necessary by soil types, weather conditions, or other factors.

Modified Level D PPCE will consist of the following protective items:

- Normal work clothes or coveralls
- Steel toed work shoes/boots with thick (one inch) soles
- Boot covers (either disposable polyethylene or non-disposable rubber)
- Rubber gloves
- Hard hats
- Safety glasses with side shields
- Hearing protection

7.0 SCHEDULE

Figure 7-1 Project Schedule

ID	Task Name	Duration
1	**7000 HTW Remdiation Field Operations**	**40 days**
2	**RAU 2A-4 (Combat Pistol Range)**	**40 days**
3	Soil Excavation/Transport	4 days
4	Soil Processing/Treatment	16 days
5	Disposal of Soil	5 days
6	**RAU 2A-15 (Undocumented Pistol Range)**	**37 days**
7	Soil Excavation/Transport	1 day
8	Soil Processing/Treatment	16 days
9	Disposal of Soil	5 days
10	**RAU 2A-16 (1,000ft Rifle/Machine Gun Range)**	**37 days**
11	Soil Excavation/Transport	2 days
12	Soil Processing/Treatment	16 days
13	Disposal of Soil	5 days
14	**RAU 2A-17 (25m M60/Pistol Range)**	**37 days**
15	Soil Excavation/Transport	3 days
16	Soil Processing/Treatment	16 days
17	Disposal of Soil	5 days
18	**RAU 2A-18 (25m Machine Gun Range)**	**37 days**
19	Soil Excavation/Transport	11 days
20	Soil Processing/Treatment	16 days
21	Disposal of Soil	5 days
22	**RAU 2A-19 (25m Record Firing/Field Firing Range)**	**28 days**
23	Soil Excavation/Transport	3 days
24	Soil Processing/Treatment	16 days
25	Disposal of Soil	5 days
26	**RAU 2A-20 (Field Ranges Nos. 1 & 2)**	**25 days**
27	Soil Excavation/Transport	2 days
28	Soil Processing/Treatment	13 days
29	Disposal of Soil	5 days
30	**RAU 2A-21 (Rifle Ranges Nos. 1 & 2)**	**25 days**
31	Soil Excavation/Transport	2 days
32	Soil Processing/Treatment	13 days
33	Disposal of Soil	5 days
34	**RAU 2A-22 (Field Fire Ranges)**	**25 days**
35	Soil Excavation/Transport	2 days
36	Soil Processing/Treatment	13 days
37	Disposal of Soil	5 days

8.0 COMPLIANCE MONITORING AND CLEANUP ACTION REPORTING

8.1 Draft Compliance Monitoring Plan

Within 30 days of the issuance of the final CAP for RAU-2A, a Draft Compliance Monitoring Plan (CMP) will be prepared and submitted to WDOE for review, as per the requirements of the PPCD. In this instance, the CMP will be confirmational in nature (WAC173-340-410). That is, the sampling work detailed in the CMP will be intended to confirm that the cleanup standards defined in this CAP have been meet by the proposed cleanup methods, confirming the effectiveness of the cleanup action in protecting human health and the environment.

After WDOE's comments are received and considered, a Final CMP will be prepared.

8.2 Draft Cleanup Action Report

As per the requirements of the PPCD (WDOE, 2006), a Draft Cleanup Action Report (CAR) will be prepared and submitted to WDOE for review within 30 calendar days of completion of the excavation, screening, stabilization, disposal, and restoration activities outlined in the final CAP for RAU-2A.

This report will conform to the specifications and format requirements set forth in the MTCA regulations and in the PPCD. This report will include the following information:

- ✓ A narrative description of the work done including:
  - ➢ Summary of any remedial investigations conducted (if any are required for RAU-2A);
  - ➢ Summary of cleanup actions conducted;
  - ➢ Results of any cleanup actions conducted;
  - ➢ Results of any compliance monitoring conducted:
  - ➢ Description of each item of MEC encountered during the investigation and cleanup of RAU-2A, but not limited to the following information:
    - Identification of the MEC item;
    - Description of the fusing condition of the MEC item;
    - Description of the location and depth of the MEC item.
- ✓ Explanations of any deviations from this Cleanup Action Plan
- ✓ Photographs of the work in progress
- ✓ Maps of the final excavation areas and depths
- ✓ Confirmatory sampling locations and analytical results
- ✓ Waste disposal documentation

This report, in draft form, will be submitted to the WDOE in the timeframe specified in the PPCD. Review comments from WDOE will be addressed and a Final CAR will be prepared..

8.3 Draft Long-Term Operation and Monitoring Plan.

While the lead removal action detailed in this CAP will not result in the construction of any facility or monitoring wells requiring long-term operations and maintenance, a Draft Long-Term Operation and Monitoring Plan (OMP) will be prepared for RAU-2A, if required. To comply with the requirements of the PPCD, the Draft OMP will be submitted to WDOE for review within 60 calendar days of completion of the work required in the final CAP for RAU-2A.

9.0 REFERENCES

AEM, 2003a — Work Plan for Soil Sampling in Firing Ranges and Demolition Areas 2 and 3, Sampling and Analysis Plan – Soil, Quality Assurance Project Plan, Site Safety and Health Plan, Data Management Plan, and Waste Management and Minimization Plan, prepared for U.S. Army Engineering District Norfolk, Norfolk, Virginia, Atlanta Environmental Management, February 17, 2003.

AEM, 2003b — Draft Site Investigation Report, Small Arms Ranges and Demolition Areas 2 and 3, Camp Bonneville, Vancouver, Washington, prepared for U.S. Army by Atlanta Environmental Management (AEM), April 18, 2003.

AEM, 2005 — Site Investigation Report – Small Arms Ranges and Demolition Areas 2 and 3, Atlantic Environmental Management, Inc., September 2005.

BCRRT, 2007a — Interim Action Work Plan: Remedial Action Units 2A and 3 (Surface Remediation of Roads, Trails and Firing Ranges). Camp Bonneville, Vancouver, Washington, Bonneville Conservation, Restoration, and Renewal Team (BCRRT), April, 2007.

BCRRT, 2007b — Final Remedial Investigation/Feasibility Study Report for RAU 2A – Small Arms Ranges, Bonneville Conservation, Restoration, and Renewal Team (BCRRT), August, 2007.

Calibre, 2005 — Draft Final Work Plan for the Interim Actions at the Small Arms Range Berms and Fire Support Areas; Calibre Systems, Inc., March 2005.

CB LRA, 2003 — Camp Bonneville Reuse Plan, Camp Bonneville Local Redevelopment Authority (CB LRA), updated February 20, 2005.

ESE, 1983 — Installation Assessment of the HQ, I Corps and Ft. Lewis, Washington and the Sub installation Yakima Firing Center, Camp Bonneville, and Vancouver Barracks, Environmental Science and Engineering (ESE), Inc. 1983.

Geo Recon, 1981 — Cultural Resources Survey, Forest Management Project, Ft. Lewis and Camp Bonneville, Washington, for U.S. Army, Ft. Lewis, Geo Recon International, 1981.

Hart Crowser, 1996 — Petroleum Contaminated Soil Investigation, Former Tank no.7-CMBPN, Building no. 4475, Camp Bonneville Washington, Contract No. DACA67-93-D-1004, Hart Crowser, September, 1996.

ITRC, 2003 Technical and Regulatory Guidelines, Characterization and Remediation of Soils at Closed Small Arms Firing Ranges, prepared by Interstate Technology and Regulatory Council (ITRC), Small Arms firing Range Team, 2003.

Michael Baker, 2006a Camp Bonneville Conservation Conveyance Accident Prevention Plan and Attachments, Michael Baker, Jr., Inc., October, 2006.

Michael Baker, 2006b Camp Bonneville Cultural and Historical Resources Protection Plan, prepared for Bonneville Conservation, Restoration and Renewal Team, Michael Baker, Jr., Inc., November 2006.

MKM, 2006 Explosive Safety Submittal, Camp Bonneville, Vancouver, Washington, as approved by the United States Army Technical Center for Explosives Safety (USATCES), prepared by MKM Engineers Inc.(MKM), January 5, 2007.

Mundorff, 1964 Geology and groundwater conditions of Clark County, Washington, with a description of major alluvial aquifer supply along the Columbia River: U.S. Geological Survey Water Supply Paper 1600, 268 p., Mundorff, MR., 1964.

NIOSH, 1985 Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute for Occupational Safety and Health (NIOSH), 1985.

ORNL, 1997 Toxicological Benchmarks for Screening Potential Contaminants of concern for effects on Terrestrial Plants, Oak Ridge National Laboratory (ORNL), 1997 Revision.

PBS, 2007 Wetland Delineation Report, Camp Bonneville, Small Arms Ranges, Clark County, Washington, PBS Engineering and Environmental, July 2007.

Phillips, 1987 Geologic map of the Vancouver quadrangle, Washington and Oregon: Washington Division of Geology and Earth Resources Open File Report 87-10, Phillips, W., 1987.

Sadler, 2003 Cultural Resource Survey of Selected Areas, Camp Bonneville, Clark County, Washington, Sadler, Dale L, May, 2003.

Shannon & Wilson, 1999a Final Report Volume 1 Multi-Sites Investigations, Camp Bonneville, Washington, Contract No. DACA 67-94-D-1014, Shannon & Wilson, July, 1999.

Shannon & Wilson, 1999b Final Landfill 4 Investigation Report, Camp Bonneville, Washington. Contract DACA 67-94-D-1014, Shannon & Wilson, August, 1999.

USACE, 1997 Final Archives Search Report. Camp Bonneville. Clark County, Washington, US Army Corps of Engineers (USACE), Huntsville Engineering and Support Center, July 1997.

USACE, 2001 Environmental Assessment for Disposal and Reuse of Camp Bonneville, Washington, US Army Corps of Engineers (USACE), Seattle District, October 2001.

US Army, 2006 Environmental Cooperative Services Agreement for the Camp Bonneville Conservation Conveyance (with attachments and modifications thereto), United States Department of the Army, July 28, 2006.

WDOE, 2001 Cleanup Levels and Risk Calculations under the Model Toxics Control Act Cleanup Regulations (CLARC), Version 3.1, Part II, Soil Cleanup Levels for Unrestricted Land Use, Table 2, Washington Department of Ecology (WDOE), Publication No. 94-145, November, 2001.

WDOE, 2006 Prospective Purchaser Consent Decree for the Camp Bonneville Military Reservation (with attachments thereto); State of Washington, Department of Ecology; October 13, 2006.

APPENDIX A -
RANGE FLOOR GRID SAMPLE ANALYSIS RESULTS FOR TOTAL LEAD FOR ALL GRIDS SAMPLED AT ALL SMALL ARMS RANGES

Grid Data Analysis Summary
(Volume Estimates Based on Hotspot Removal)

		Individual Sample Summary			Grid Category Summary					Scenario 1		Scenario 2	
Range	RAU	51-118 (ppm)	119-250 (ppm)	251 and > (ppm)	Cat 1 Grids	Cat 2 Grids	Cat 3 Grids	Cat 4 Grids	Cat 5 Grids	MTCA Volume (yds^3)	RCRA Volume (yds^3)	MTCA Volume (yds^3)	RCRA Volume (yds^3)
Combat Pistol Range	2A-4	4	1	0	14	2	1	0	0	101.25	0.00	60.75	0.00
Undocumented Pistol	2A-15	1	1	0	0	0	1	0	0	40.50	0.00	40.50	0.00
1,000-inch Rifle Range/Machine Gun Range	2A-16	14	10	3	19	3	3	4	0	486.00	243.00	384.75	243.00
25-meter M60/Pistol Range	2A-17	3	1	0	1	2	1	0	0	81.00	0.00	20.25	0.00
25-meter Machine Gun Range	2A-18	9	4	2	6	2	3	1	1	263.25	162.00	222.75	162.00
25-meter Record Firing Ranges	2A-19	8	1	1	33	3	1	1	1	182.25	81.00	121.50	81.00
Field Firing Ranges	2A-20	2	4	4	10	1	1	1	1	121.50	324.00	101.25	324.00
Rifle Ranges No. 1 & No. 2	2A-21	13	6	1	17	6	4	1	0	384.75	81.00	263.25	81.00
Field Fire Ranges No. 1 & No. 2	2A-22	12	1	1	12	8	1	0	1	263.25	81.00	40.50	81.00
Totals		**66**	**29**	**12**	**112**	**27**	**16**	**8**	**4**	**1,923.75**	**972.00**	**1,255.50**	**972.00**

Assumptions

- *A 58-foot x 58-foot x 0.5 -foot area would be excavated around each sample location when the grid is Category 5.*
- *A 29-foot x 29-foot x 0.5 -foot area would be excavated around each sample location when the grid is Category 3 or 4.*
- *Fluff factor used was 1.3*
- *Category 5 volume removed for estimate is 81 cubic yards per hot spot.*
- *Category 3 and 4 volume removed for estimate is 20.25 cubic yards per hot spot.*
- *Berm samples are excluded from the summary.*
- *Scenario 1 excavation of all sample results greater than 50 mg/Kg.*
- *Scenario 2 excavation of sample results exceeding 50 mg/Kg in grids in Categories 3, 4, and 5.*

Combat Pistol Range (RAU 2A-4)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Combat Pistol Range	2A-4	1	C	17.2	mg/Kg		21.20	1		
Combat Pistol Range	2A-4	1	N	15.5	mg/Kg					
Combat Pistol Range	2A-4	1	E	23.3	mg/Kg					
Combat Pistol Range	2A-4	1	S	16.7	mg/Kg					
Combat Pistol Range	2A-4	1	W	33.3	mg/Kg					
Combat Pistol Range	2A-4	2	C	16	mg/Kg		25.52	1		
Combat Pistol Range	2A-4	2	N	39.5	mg/Kg					
Combat Pistol Range	2A-4	2	E	16.3	mg/Kg					
Combat Pistol Range	2A-4	2	S	24.1	mg/Kg					
Combat Pistol Range	2A-4	2	W	31.7	mg/Kg					
Combat Pistol Range	2A-4	3	C	16.2	mg/Kg		21.34	1		
Combat Pistol Range	2A-4	3	N	15.9	mg/Kg					
Combat Pistol Range	2A-4	3	E	15.7	mg/Kg					
Combat Pistol Range	2A-4	3	S	43	mg/Kg					
Combat Pistol Range	2A-4	3	W	15.9	mg/Kg					
Combat Pistol Range	2A-4	4	C	29.6	mg/Kg		70.08	3	60.75	
Combat Pistol Range	2A-4	4	N	15.5	mg/Kg					
Combat Pistol Range	2A-4	4	E	81.8	mg/Kg					
Combat Pistol Range	2A-4	4	S	165	mg/Kg					
Combat Pistol Range	2A-4	4	W	58.5	mg/Kg					
Combat Pistol Range	2A-4	5	C	46.1	mg/Kg		28.54	1		
Combat Pistol Range	2A-4	5	N	17.2	mg/Kg					
Combat Pistol Range	2A-4	5	E	16.8	mg/Kg					
Combat Pistol Range	2A-4	5	S	29.5	mg/Kg					
Combat Pistol Range	2A-4	5	W	33.1	mg/Kg					
Combat Pistol Range	2A-4	6	C	14.4	mg/Kg		17.76	1		
Combat Pistol Range	2A-4	6	N	14.9	mg/Kg					
Combat Pistol Range	2A-4	6	E	23.2	mg/Kg					
Combat Pistol Range	2A-4	6	S	13.4	mg/Kg					
Combat Pistol Range	2A-4	6	W	22.9	mg/Kg					
Combat Pistol Range	2A-4	7	C	19.8	mg/Kg		18.88	1		
Combat Pistol Range	2A-4	7	N	14.2	mg/Kg					
Combat Pistol Range	2A-4	7	E	27.6	mg/Kg					
Combat Pistol Range	2A-4	7	S	20.3	mg/Kg					
Combat Pistol Range	2A-4	7	W	12.5	mg/Kg					
Combat Pistol Range	2A-4	8	C	12	mg/Kg		11.72	1		
Combat Pistol Range	2A-4	8	N	12.6	mg/Kg					
Combat Pistol Range	2A-4	8	E	10.1	mg/Kg					
Combat Pistol Range	2A-4	8	S	12.7	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Combat Pistol Range (RAU 2A-4)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Combat Pistol Range	2A-4	8	W	11.2	mg/Kg					
Combat Pistol Range	2A-4	9	C	11	mg/Kg		11.98	1		
Combat Pistol Range	2A-4	9	N	17.7	mg/Kg					
Combat Pistol Range	2A-4	9	E	10.2	mg/Kg					
Combat Pistol Range	2A-4	9	S	12.3	mg/Kg					
Combat Pistol Range	2A-4	9	W	8.7	mg/Kg					
Combat Pistol Range	2A-4	10	C	16.4	mg/Kg		15.58	1		
Combat Pistol Range	2A-4	10	N	12.2	mg/Kg					
Combat Pistol Range	2A-4	10	E	20.5	mg/Kg					
Combat Pistol Range	2A-4	10	S	13.5	mg/Kg					
Combat Pistol Range	2A-4	10	W	15.3	mg/Kg					
Combat Pistol Range	2A-4	11	C	13.1	mg/Kg		14.52	1		
Combat Pistol Range	2A-4	11	N	14.3	mg/Kg					
Combat Pistol Range	2A-4	11	E	15.2	mg/Kg					
Combat Pistol Range	2A-4	11	S	14.1	mg/Kg					
Combat Pistol Range	2A-4	11	W	15.9	mg/Kg					
Combat Pistol Range	2A-4	12	C	23.8	mg/Kg		24.36	1		
Combat Pistol Range	2A-4	12	N	27.6	mg/Kg					
Combat Pistol Range	2A-4	12	E	14.4	mg/Kg					
Combat Pistol Range	2A-4	12	S	20.5	mg/Kg					
Combat Pistol Range	2A-4	12	W	35.5	mg/Kg					
Combat Pistol Range	2A-4	13	C	21.4	mg/Kg		44.48	2		
Combat Pistol Range	2A-4	13	N	25.3	mg/Kg					
Combat Pistol Range	2A-4	13	E	24.2	mg/Kg					
Combat Pistol Range	2A-4	13	S	35.5	mg/Kg					
Combat Pistol Range	2A-4	13	W	116	mg/Kg					
Combat Pistol Range	2A-4	14	C	18.1	mg/Kg		24.50	2		
Combat Pistol Range	2A-4	14	N	54	mg/Kg					
Combat Pistol Range	2A-4	14	E	22.2	mg/Kg					
Combat Pistol Range	2A-4	14	S	16.9	mg/Kg					
Combat Pistol Range	2A-4	14	W	11.3	mg/Kg					
Combat Pistol Range	2A-4	15	C	11.5	mg/Kg		15.00	1		
Combat Pistol Range	2A-4	15	N	12	mg/Kg					
Combat Pistol Range	2A-4	15	E	19.5	mg/Kg					
Combat Pistol Range	2A-4	15	S	17	mg/Kg					
Combat Pistol Range	2A-4	15	W	785	mg/Kg	*				
Combat Pistol Range	2A-4	16	C	11.5	mg/Kg		16.60	1		
Combat Pistol Range	2A-4	16	N	39.3	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.
Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Combat Pistol Range (RAU 2A-4)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Combat Pistol Range	2A-4	16	E	9.5	mg/Kg					
Combat Pistol Range	2A-4	16	S	11.4	mg/Kg					
Combat Pistol Range	2A-4	16	W	11.3	mg/Kg					
Combat Pistol Range	2A-4	17	C	12.3	mg/Kg		11.16	1		
Combat Pistol Range	2A-4	17	N	9.2	mg/Kg					
Combat Pistol Range	2A-4	17	E	12.2	mg/Kg					
Combat Pistol Range	2A-4	17	S	9.3	mg/Kg					
Combat Pistol Range	2A-4	17	W	12.8	mg/Kg					
								Totals	**60.75**	**0**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Undocumented Pistol Range (RAU 2A-15)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Undocumented Pistol Range	2A-15	1	C	34.6	mg/Kg		74.3	3	40.5	
Undocumented Pistol Range	2A-15	1	N	86	mg/Kg					
Undocumented Pistol Range	2A-15	1	S	27	mg/Kg	*				
Undocumented Pistol Range	2A-15	1	E	154	mg/Kg					
Undocumented Pistol Range	2A-15	1	W	22.6	mg/Kg					
								Totals	**40.5**	**0**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

1,000-inch Rifle Range/Machine Gun Range (RAU 2A-16)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
1,000-inch Rifle Range	2A-16	1	C	6.3	mg/Kg		10.5	1		
1,000-inch Rifle Range	2A-16	1	N	15.3	mg/Kg					
1,000-inch Rifle Range	2A-16	1	E	0.0	mg/Kg					
1,000-inch Rifle Range	2A-16	1	S	14.5	mg/Kg					
1,000-inch Rifle Range	2A-16	1	W	16.5	mg/Kg					
1,000-inch Rifle Range	2A-16	2	C	16.4	mg/Kg		15.8	1		
1,000-inch Rifle Range	2A-16	2	N	16.6	mg/Kg					
1,000-inch Rifle Range	2A-16	2	E	15.5	mg/Kg					
1,000-inch Rifle Range	2A-16	2	S	16.7	mg/Kg					
1,000-inch Rifle Range	2A-16	2	W	13.8	mg/Kg					
1,000-inch Rifle Range	2A-16	3	C	10.0	mg/Kg		11.8	1		
1,000-inch Rifle Range	2A-16	3	N	9.3	mg/Kg					
1,000-inch Rifle Range	2A-16	3	E	22.6	mg/Kg					
1,000-inch Rifle Range	2A-16	3	S	7.8	mg/Kg					
1,000-inch Rifle Range	2A-16	3	W	9.1	mg/Kg					
1,000-inch Rifle Range	2A-16	4	C	3,450.0	mg/Kg	*	N/A	N/A		
1,000-inch Rifle Range	2A-16	4	N	10,200.0	mg/Kg	*				
1,000-inch Rifle Range	2A-16	4	E	438.0	mg/Kg	*				
1,000-inch Rifle Range	2A-16	4	S	49.6	mg/Kg	*				
1,000-inch Rifle Range	2A-16	4	W	2,350.0	mg/Kg	*				
1,000-inch Rifle Range	2A-16	5	C	58.0	mg/Kg		23.0	2		
1,000-inch Rifle Range	2A-16	5	N	14.8	mg/Kg					
1,000-inch Rifle Range	2A-16	5	E	12.5	mg/Kg					
1,000-inch Rifle Range	2A-16	5	S	12.7	mg/Kg					
1,000-inch Rifle Range	2A-16	5	W	17.2	mg/Kg					
1,000-inch Rifle Range	2A-16	6	C	10.1	mg/Kg		11.1	1		
1,000-inch Rifle Range	2A-16	6	N	11.7	mg/Kg					
1,000-inch Rifle Range	2A-16	6	E	12.3	mg/Kg					
1,000-inch Rifle Range	2A-16	6	S	11.5	mg/Kg					
1,000-inch Rifle Range	2A-16	6	W	9.9	mg/Kg					
1,000-inch Rifle Range	2A-16	7	C	21.5	mg/Kg		31.3	2		
1,000-inch Rifle Range	2A-16	7	N	56.7	mg/Kg					
1,000-inch Rifle Range	2A-16	7	E	4.7	mg/Kg					
1,000-inch Rifle Range	2A-16	7	S	63.7	mg/Kg					
1,000-inch Rifle Range	2A-16	7	W	10.1	mg/Kg					
1,000-inch Rifle Range	2A-16	8	C	871.0	mg/Kg	*	55.8	3	20.25	
1,000-inch Rifle Range	2A-16	8	N	55.8	mg/Kg					
1,000-inch Rifle Range	2A-16	8	E	4,560.0	mg/Kg	*				
1,000-inch Rifle Range	2A-16	8	S	198.0	mg/Kg	*				

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

1,000-inch Rifle Range/Machine Gun Range (RAU 2A-16)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
1,000-inch Rifle Range	2A-16	8	W	566.0	mg/Kg	*				
1,000-inch Rifle Range	2A-16	9	C	16.0	mg/Kg		19.5	1		
1,000-inch Rifle Range	2A-16	9	N	25.3	mg/Kg					
1,000-inch Rifle Range	2A-16	9	E	24.8	mg/Kg					
1,000-inch Rifle Range	2A-16	9	S	14.2	mg/Kg					
1,000-inch Rifle Range	2A-16	9	W	17.4	mg/Kg					
1,000-inch Rifle Range	2A-16	10	C	15.5	mg/Kg		14.9	1		
1,000-inch Rifle Range	2A-16	10	N	10.0	mg/Kg					
1,000-inch Rifle Range	2A-16	10	E	25.0	mg/Kg					
1,000-inch Rifle Range	2A-16	10	S	12.6	mg/Kg					
1,000-inch Rifle Range	2A-16	10	W	11.6	mg/Kg					
1,000-inch Rifle Range	2A-16	11	C	0.0	mg/Kg		9.4	1		
1,000-inch Rifle Range	2A-16	11	N	8.8	mg/Kg					
1,000-inch Rifle Range	2A-16	11	E	11.4	mg/Kg					
1,000-inch Rifle Range	2A-16	11	S	10.9	mg/Kg					
1,000-inch Rifle Range	2A-16	11	W	16.0	mg/Kg					
1,000-inch Rifle Range	2A-16	12	C	30.1	mg/Kg		17.7	1		
1,000-inch Rifle Range	2A-16	12	N	10.8	mg/Kg					
1,000-inch Rifle Range	2A-16	12	E	19.6	mg/Kg					
1,000-inch Rifle Range	2A-16	12	S	12.4	mg/Kg					
1,000-inch Rifle Range	2A-16	12	W	15.5	mg/Kg					
1,000-inch Rifle Range	2A-16	13	C	32.2	mg/Kg		24.3	1		
1,000-inch Rifle Range	2A-16	13	N	11.5	mg/Kg					
1,000-inch Rifle Range	2A-16	13	E	19.8	mg/Kg					
1,000-inch Rifle Range	2A-16	13	S	18.6	mg/Kg					
1,000-inch Rifle Range	2A-16	13	W	39.6	mg/Kg					
1,000-inch Rifle Range	2A-16	14	C	15.3	mg/Kg		13.2	1		
1,000-inch Rifle Range	2A-16	14	N	14.8	mg/Kg					
1,000-inch Rifle Range	2A-16	14	E	15.2	mg/Kg					
1,000-inch Rifle Range	2A-16	14	S	13.1	mg/Kg					
1,000-inch Rifle Range	2A-16	14	W	7.5	mg/Kg					
1,000-inch Rifle Range	2A-16	15	C	9.3	mg/Kg		12.9	1		
1,000-inch Rifle Range	2A-16	15	N	11.9	mg/Kg					
1,000-inch Rifle Range	2A-16	15	E	13.5	mg/Kg					
1,000-inch Rifle Range	2A-16	15	S	12.2	mg/Kg					
1,000-inch Rifle Range	2A-16	15	W	17.4	mg/Kg					
1,000-inch Rifle Range	2A-16	16	C	12.6	mg/Kg		13.9	1		
1,000-inch Rifle Range	2A-16	16	N	22.1	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

1,000-inch Rifle Range/Machine Gun Range (RAU 2A-16)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
1,000-inch Rifle Range	2A-16	16	E	14.3	mg/Kg					
1,000-inch Rifle Range	2A-16	16	S	7.4	mg/Kg					
1,000-inch Rifle Range	2A-16	16	W	13.3	mg/Kg					
1,000-inch Rifle Range	2A-16	17	C	17.0	mg/Kg		23.5	2		
1,000-inch Rifle Range	2A-16	17	N	63.3	mg/Kg					
1,000-inch Rifle Range	2A-16	17	E	13.7	mg/Kg					
1,000-inch Rifle Range	2A-16	17	S	9.7	mg/Kg					
1,000-inch Rifle Range	2A-16	17	W	13.6	mg/Kg					
1,000-inch Rifle Range	2A-16	18	C	7.5	mg/Kg		11.8	1		
1,000-inch Rifle Range	2A-16	18	N	14.3	mg/Kg					
1,000-inch Rifle Range	2A-16	18	E	15.2	mg/Kg					
1,000-inch Rifle Range	2A-16	18	S	10.4	mg/Kg					
1,000-inch Rifle Range	2A-16	18	W	11.4	mg/Kg					
1,000-inch Rifle Range	2A-16	19	C	9.9	mg/Kg		13.1	1		
1,000-inch Rifle Range	2A-16	19	N	22.8	mg/Kg					
1,000-inch Rifle Range	2A-16	19	E	15.0	mg/Kg					
1,000-inch Rifle Range	2A-16	19	S	11.7	mg/Kg					
1,000-inch Rifle Range	2A-16	19	W	6.2	mg/Kg					
1,000-inch Rifle Range	2A-16	20	C	16.6	mg/Kg		15.0	1		
1,000-inch Rifle Range	2A-16	20	N	11.3	mg/Kg					
1,000-inch Rifle Range	2A-16	20	E	11.9	mg/Kg					
1,000-inch Rifle Range	2A-16	20	S	12.4	mg/Kg					
1,000-inch Rifle Range	2A-16	20	W	22.9	mg/Kg					
1,000-inch Rifle Range	2A-16	21	C	12.1	mg/Kg		11.1	1		
1,000-inch Rifle Range	2A-16	21	N	10.0	mg/Kg					
1,000-inch Rifle Range	2A-16	21	E	9.4	mg/Kg					
1,000-inch Rifle Range	2A-16	21	S	10.4	mg/Kg					
1,000-inch Rifle Range	2A-16	21	W	13.8	mg/Kg					
1,000-inch Rifle Range	2A-16	22	C	29.8	mg/Kg		27.2	1		
1,000-inch Rifle Range	2A-16	22	N	39.1	mg/Kg					
1,000-inch Rifle Range	2A-16	22	E	25.5	mg/Kg					
1,000-inch Rifle Range	2A-16	22	S	14.9	mg/Kg					
1,000-inch Rifle Range	2A-16	22	W	26.6	mg/Kg					
1,000-inch Rifle Range	2A-16	23	C	22.8	mg/Kg		24.7	1		
1,000-inch Rifle Range	2A-16	23	N	20.6	mg/Kg					
1,000-inch Rifle Range	2A-16	23	E	15.2	mg/Kg					
1,000-inch Rifle Range	2A-16	23	S	45.0	mg/Kg					
1,000-inch Rifle Range	2A-16	23	W	20.1	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

1,000-inch Rifle Range/Machine Gun Range (RAU 2A-16)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
1,000-inch Rifle Range	2A-16	24	C	90.7	mg/Kg		82.8	3	60.75	
1,000-inch Rifle Range	2A-16	24	N	128.0	mg/Kg					
1,000-inch Rifle Range	2A-16	24	E	28.2	mg/Kg					
1,000-inch Rifle Range	2A-16	24	S	21.2	mg/Kg					
1,000-inch Rifle Range	2A-16	24	W	146.0	mg/Kg					
1,000-inch Rifle Range	2A-16	25	C	10.0	mg/Kg		22.7	1		
1,000-inch Rifle Range	2A-16	25	N	48.3	mg/Kg					
1,000-inch Rifle Range	2A-16	25	E	13.4	mg/Kg					
1,000-inch Rifle Range	2A-16	25	S	13.9	mg/Kg					
1,000-inch Rifle Range	2A-16	25	W	28.1	mg/Kg					
1,000-inch Rifle Range	2A-16	26	C	63.4	mg/Kg		146.2	4	81	81
1,000-inch Rifle Range	2A-16	26	N	115.0	mg/Kg					
1,000-inch Rifle Range	2A-16	26	E	98.4	mg/Kg					
1,000-inch Rifle Range	2A-16	26	S	282.0	mg/Kg					
1,000-inch Rifle Range	2A-16	26	W	172.0	mg/Kg					
1,000-inch Rifle Range	2A-16	27	C	241.0	mg/Kg		176.6	4	81	81
1,000-inch Rifle Range	2A-16	27	N	91.7	mg/Kg					
1,000-inch Rifle Range	2A-16	27	E	346.0	mg/Kg					
1,000-inch Rifle Range	2A-16	27	S	68.5	mg/Kg					
1,000-inch Rifle Range	2A-16	27	W	136.0	mg/Kg					
1,000-inch Rifle Range	2A-16	28	C	334.0	mg/Kg	*	244.5	4	20.25	81
1,000-inch Rifle Range	2A-16	28	N	279.0	mg/Kg					
1,000-inch Rifle Range	2A-16	28	E	7,610.0	mg/Kg	*				
1,000-inch Rifle Range	2A-16	28	S	2,350.0	mg/Kg	*				
1,000-inch Rifle Range	2A-16	28	W	210.0	mg/Kg					
1,000-inch Rifle Range	2A-16	29	C	51.9	mg/Kg	*	117.6	3	20.25	
1,000-inch Rifle Range	2A-16	29	N	15.1	mg/Kg	*				
1,000-inch Rifle Range	2A-16	29	E	19.2	mg/Kg					
1,000-inch Rifle Range	2A-16	29	S	216.0	mg/Kg					
1,000-inch Rifle Range	2A-16	29	W	109.0	mg/Kg	*				
1,000-inch Rifle Range	2A-16	30	C	120.0	mg/Kg		121.5	4	101.25	
1,000-inch Rifle Range	2A-16	30	N	115.0	mg/Kg					
1,000-inch Rifle Range	2A-16	30	E	96.4	mg/Kg					
1,000-inch Rifle Range	2A-16	30	S	170.0	mg/Kg					
1,000-inch Rifle Range	2A-16	30	W	106.0	mg/Kg					
								Totals	**384.75**	**243.00**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter M60 Range/Pistol Range (RAU 2A-17)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter M60	2A-17	1	C	29.9	mg/Kg		49.1	2		
25-meter M60	2A-17	1	N	108	mg/Kg					
25-meter M60	2A-17	1	S	21.9	mg/Kg					
25-meter M60	2A-17	1	E	64.6	mg/Kg					
25-meter M60	2A-17	1	W	21.1	mg/Kg					
25-meter M60	2A-17	2	C	21.8	mg/Kg		20.3	1		
25-meter M60	2A-17	2	N	21.1	mg/Kg					
25-meter M60	2A-17	2	S	22.2	mg/Kg					
25-meter M60	2A-17	2	E	11.8	mg/Kg					
25-meter M60	2A-17	2	W	24.8	mg/Kg					
25-meter M60	2A-17	3	C	37.2	mg/Kg	*	85.3	3	20.25	
25-meter M60	2A-17	3	N	136	mg/Kg					
25-meter M60	2A-17	3	S	34.6	mg/Kg					
25-meter M60	2A-17	3	E	219	mg/Kg	*				
25-meter M60	2A-17	3	W	35.3	mg/Kg	*				
25-meter M60	2A-17	4	C	68.3	mg/Kg		33.9	2		
25-meter M60	2A-17	4	N	13.8	mg/Kg					
25-meter M60	2A-17	4	S	44.9	mg/Kg					
25-meter M60	2A-17	4	E	8.7	mg/Kg					
25-meter M60	2A-17	4	W	33.7	mg/Kg	*				
								Totals	**20.25**	**0**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.
Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter Machine Gun Range (RAU 2A-18)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter Machine Gun Range	2A-18	1	C	12.00	mg/Kg		33.44	2		
25-meter Machine Gun Range	2A-18	1	N	10.90	mg/Kg					
25-meter Machine Gun Range	2A-18	1	E	13.70	mg/Kg					
25-meter Machine Gun Range	2A-18	1	S	14.60	mg/Kg					
25-meter Machine Gun Range	2A-18	1	W	116.00	mg/Kg					
25-meter Machine Gun Range	2A-18	2	C	16.20	mg/Kg		22.22	1		
25-meter Machine Gun Range	2A-18	2	N	19.00	mg/Kg					
25-meter Machine Gun Range	2A-18	2	E	43.60	mg/Kg					
25-meter Machine Gun Range	2A-18	2	S	22.70	mg/Kg					
25-meter Machine Gun Range	2A-18	2	W	9.60	mg/Kg					
25-meter Machine Gun Range	2A-18	3	C	31.10	mg/Kg		22.98	1		
25-meter Machine Gun Range	2A-18	3	N	19.10	mg/Kg					
25-meter Machine Gun Range	2A-18	3	E	29.30	mg/Kg					
25-meter Machine Gun Range	2A-18	3	S	17.20	mg/Kg					
25-meter Machine Gun Range	2A-18	3	W	18.20	mg/Kg					
25-meter Machine Gun Range	2A-18	4	C	27.00	mg/Kg		22.66	1		
25-meter Machine Gun Range	2A-18	4	N	17.20	mg/Kg					
25-meter Machine Gun Range	2A-18	4	E	25.20	mg/Kg					
25-meter Machine Gun Range	2A-18	4	S	31.70	mg/Kg					
25-meter Machine Gun Range	2A-18	4	W	12.20	mg/Kg					
25-meter Machine Gun Range	2A-18	5	C	214.00	mg/Kg		113.87	3	60.75	
25-meter Machine Gun Range	2A-18	5	N	2,180.00	mg/Kg	*				
25-meter Machine Gun Range	2A-18	5	E	49.10	mg/Kg	*				
25-meter Machine Gun Range	2A-18	5	S	61.00	mg/Kg					
25-meter Machine Gun Range	2A-18	5	W	66.60	mg/Kg					
25-meter Machine Gun Range	2A-18	6	N	42.70	mg/Kg		40.15	1		
25-meter Machine Gun Range	2A-18	6	E	25.10	mg/Kg					
25-meter Machine Gun Range	2A-18	6	S	28.50	mg/Kg					
25-meter Machine Gun Range	2A-18	6	W	37.60	mg/Kg					
25-meter Machine Gun Range	2A-18	7	C	45.40	mg/Kg		44.02	2		
25-meter Machine Gun Range	2A-18	7	N	31.60	mg/Kg					
25-meter Machine Gun Range	2A-18	7	E	126.00	mg/Kg					
25-meter Machine Gun Range	2A-18	7	S	5.70	mg/Kg					
25-meter Machine Gun Range	2A-18	8	W	11.4	mg/Kg					
25-meter Machine Gun Range	2A-18	8	C	26,300.00	mg/Kg	*	964.00	5		81
25-meter Machine Gun Range	2A-18	8	N	1,330.00	mg/Kg	*				
25-meter Machine Gun Range	2A-18	8	E	964.00	mg/Kg					
25-meter Machine Gun Range	2A-18	8	S	429.00	mg/Kg	*				
25-meter Machine Gun Range	2A-18	8	W	4,550.00	mg/Kg	*				

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter Machine Gun Range (RAU 2A-18)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter Machine Gun Range	2A-18	9	C	204.00	mg/Kg		73.18	3	60.75	
25-meter Machine Gun Range	2A-18	9	N	64.30	mg/Kg					
25-meter Machine Gun Range	2A-18	9	E	62.10	mg/Kg					
25-meter Machine Gun Range	2A-18	9	S	24.70	mg/Kg					
25-meter Machine Gun Range	2A-18	9	W	10.80	mg/Kg					
25-meter Machine Gun Range	2A-18	10	C	120.00	mg/Kg		80.94	3	81	
25-meter Machine Gun Range	2A-18	10	N	75.30	mg/Kg					
25-meter Machine Gun Range	2A-18	10	E	40.40	mg/Kg					
25-meter Machine Gun Range	2A-18	10	S	105.00	mg/Kg					
25-meter Machine Gun Range	2A-18	10	W	64.00	mg/Kg					
25-meter Machine Gun Range	2A-18	11	C	38.20	mg/Kg		182.16	4	20.25	81
25-meter Machine Gun Range	2A-18	11	N	708.00	mg/Kg					
25-meter Machine Gun Range	2A-18	11	E	13.00	mg/Kg					
25-meter Machine Gun Range	2A-18	11	S	37.60	mg/Kg					
25-meter Machine Gun Range	2A-18	11	W	114.00	mg/Kg					
25-meter Machine Gun Range	2A-18	12	C	13.80	mg/Kg		13.06	1		
25-meter Machine Gun Range	2A-18	12	N	10.60	mg/Kg					
25-meter Machine Gun Range	2A-18	12	E	25.00	mg/Kg					
25-meter Machine Gun Range	2A-18	12	S	6.10	mg/Kg					
25-meter Machine Gun Range	2A-18	12	W	9.80	mg/Kg					
25-meter Machine Gun Range	2A-18	13	C	7.60	mg/Kg		16.68	1		
25-meter Machine Gun Range	2A-18	13	N	25.50	mg/Kg					
25-meter Machine Gun Range	2A-18	13	E	33.80	mg/Kg					
25-meter Machine Gun Range	2A-18	13	S	11.00	mg/Kg					
25-meter Machine Gun Range	2A-18	13	W	5.50	mg/Kg					
								Totals	**222.75**	**162**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter Record Firing Range (RAU 2A-19)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter Record Firing Range	2A-19	1	C	11.9	mg/Kg		9.3	1		
25-meter Record Firing Range	2A-19	1	N	8.3	mg/Kg					
25-meter Record Firing Range	2A-19	1	S	9.7	mg/Kg					
25-meter Record Firing Range	2A-19	1	E	8.9	mg/Kg					
25-meter Record Firing Range	2A-19	1	W	7.7	mg/Kg					
25-meter Record Firing Range	2A-19	2	C	11.8	mg/Kg		9.7	1		
25-meter Record Firing Range	2A-19	2	N	7.7	mg/Kg					
25-meter Record Firing Range	2A-19	2	S	9.1	mg/Kg					
25-meter Record Firing Range	2A-19	2	E	11.0	mg/Kg					
25-meter Record Firing Range	2A-19	2	W	8.8	mg/Kg					
25-meter Record Firing Range	2A-19	3	C	7.6	mg/Kg		10.0	1		
25-meter Record Firing Range	2A-19	3	N	13.2	mg/Kg					
25-meter Record Firing Range	2A-19	3	S	10.3	mg/Kg					
25-meter Record Firing Range	2A-19	3	E	10.5	mg/Kg					
25-meter Record Firing Range	2A-19	3	W	8.2	mg/Kg					
25-meter Record Firing Range	2A-19	4	C	14.2	mg/Kg		11.2	1		
25-meter Record Firing Range	2A-19	4	N	10.2	mg/Kg					
25-meter Record Firing Range	2A-19	4	S	12.2	mg/Kg					
25-meter Record Firing Range	2A-19	4	E	8.7	mg/Kg					
25-meter Record Firing Range	2A-19	4	W	10.5	mg/Kg					
25-meter Record Firing Range	2A-19	5	C	12.9	mg/Kg		13.8	1		
25-meter Record Firing Range	2A-19	5	N	21.0	mg/Kg					
25-meter Record Firing Range	2A-19	5	S	15.9	mg/Kg					
25-meter Record Firing Range	2A-19	5	E	11.9	mg/Kg					
25-meter Record Firing Range	2A-19	5	W	7.4	mg/Kg					
25-meter Record Firing Range	2A-19	6	C	8.1	mg/Kg		10.7	1		
25-meter Record Firing Range	2A-19	6	N	12.7	mg/Kg					
25-meter Record Firing Range	2A-19	6	S	10.4	mg/Kg					
25-meter Record Firing Range	2A-19	6	E	10.9	mg/Kg					
25-meter Record Firing Range	2A-19	6	W	11.5	mg/Kg					
25-meter Record Firing Range	2A-19	7	C	13.0	mg/Kg		10.6	1		
25-meter Record Firing Range	2A-19	7	N	9.5	mg/Kg					
25-meter Record Firing Range	2A-19	7	S	10.5	mg/Kg					
25-meter Record Firing Range	2A-19	7	E	9.3	mg/Kg					
25-meter Record Firing Range	2A-19	7	W	10.5	mg/Kg					
25-meter Record Firing Range	2A-19	8	C	14.3	mg/Kg		13.0	1		
25-meter Record Firing Range	2A-19	8	N	9.1	mg/Kg					
25-meter Record Firing Range	2A-19	8	S	19.3	mg/Kg					
25-meter Record Firing Range	2A-19	8	E	12.9	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.
Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter Record Firing Range (RAU 2A-19)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter Record Firing Range	2A-19	8	W	9.3	mg/Kg					
25-meter Record Firing Range	2A-19	9	C	9.6	mg/Kg		19.3	2		
25-meter Record Firing Range	2A-19	9	N	6.6	mg/Kg					
25-meter Record Firing Range	2A-19	9	S	13.9	mg/Kg					
25-meter Record Firing Range	2A-19	9	E	55.2	mg/Kg					
25-meter Record Firing Range	2A-19	9	W	11.2	mg/Kg					
25-meter Record Firing Range	2A-19	10	C	8.8	mg/Kg		9.6	1		
25-meter Record Firing Range	2A-19	10	N	12.0	mg/Kg					
25-meter Record Firing Range	2A-19	10	S	8.8	mg/Kg					
25-meter Record Firing Range	2A-19	10	E	8.5	mg/Kg					
25-meter Record Firing Range	2A-19	10	W	9.8	mg/Kg					
25-meter Record Firing Range	2A-19	11	C	20.8	mg/Kg		11.2	1		
25-meter Record Firing Range	2A-19	11	N	11.3	mg/Kg					
25-meter Record Firing Range	2A-19	11	S	9.0	mg/Kg					
25-meter Record Firing Range	2A-19	11	E	6.8	mg/Kg					
25-meter Record Firing Range	2A-19	11	W	8.0	mg/Kg					
25-meter Record Firing Range	2A-19	12	C	0.0	mg/Kg		9.3	1		
25-meter Record Firing Range	2A-19	12	N	10.6	mg/Kg					
25-meter Record Firing Range	2A-19	12	S	10.4	mg/Kg					
25-meter Record Firing Range	2A-19	12	E	25.3	mg/Kg					
25-meter Record Firing Range	2A-19	12	W	0.0	mg/Kg					
25-meter Record Firing Range	2A-19	13	C	12.1	mg/Kg		13.1	1		
25-meter Record Firing Range	2A-19	13	N	7.6	mg/Kg					
25-meter Record Firing Range	2A-19	13	S	21.5	mg/Kg					
25-meter Record Firing Range	2A-19	13	E	12.1	mg/Kg					
25-meter Record Firing Range	2A-19	13	W	12.4	mg/Kg					
25-meter Record Firing Range	2A-19	14	C	11.9	mg/Kg		12.3	1		
25-meter Record Firing Range	2A-19	14	N	15.2	mg/Kg					
25-meter Record Firing Range	2A-19	14	S	22.9	mg/Kg					
25-meter Record Firing Range	2A-19	14	E	11.5	mg/Kg					
25-meter Record Firing Range	2A-19	14	W	0.0	mg/Kg					
25-meter Record Firing Range	2A-19	15	W	13.8	mg/Kg		14.7	1		
25-meter Record Firing Range	2A-19	15	C	19.9	mg/Kg					
25-meter Record Firing Range	2A-19	15	N	15.7	mg/Kg					
25-meter Record Firing Range	2A-19	15	S	10.3	mg/Kg					
25-meter Record Firing Range	2A-19	15	E	13.8	mg/Kg					
25-meter Record Firing Range	2A-19	16	C	5.9	mg/Kg		7.9	1		
25-meter Record Firing Range	2A-19	16	N	12.4	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter Record Firing Range (RAU 2A-19)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter Record Firing Range	2A-19	16	S	9.3	mg/Kg					
25-meter Record Firing Range	2A-19	16	E	6.7	mg/Kg					
25-meter Record Firing Range	2A-19	16	W	5.4	mg/Kg					
25-meter Record Firing Range	2A-19	17	C	12.7	mg/Kg		11.5	1		
25-meter Record Firing Range	2A-19	17	N	12.5	mg/Kg					
25-meter Record Firing Range	2A-19	17	S	11.7	mg/Kg					
25-meter Record Firing Range	2A-19	17	E	9.0	mg/Kg					
25-meter Record Firing Range	2A-19	17	W	11.4	mg/Kg					
25-meter Record Firing Range	2A-19	18	C	11.8	mg/Kg		10.6	1		
25-meter Record Firing Range	2A-19	18	N	12.0	mg/Kg					
25-meter Record Firing Range	2A-19	18	S	9.3	mg/Kg					
25-meter Record Firing Range	2A-19	18	E	8.9	mg/Kg					
25-meter Record Firing Range	2A-19	18	W	10.9	mg/Kg					
25-meter Record Firing Range	2A-19	19	C	13.2	mg/Kg		62.1	3	60.75	
25-meter Record Firing Range	2A-19	19	N	77.5	mg/Kg					
25-meter Record Firing Range	2A-19	19	S	44.9	mg/Kg					
25-meter Record Firing Range	2A-19	19	E	90.3	mg/Kg					
25-meter Record Firing Range	2A-19	19	W	84.5	mg/Kg					
25-meter Record Firing Range	2A-19	20	C	13.6	mg/Kg		22.3	1		
25-meter Record Firing Range	2A-19	20	N	22.7	mg/Kg					
25-meter Record Firing Range	2A-19	20	S	17.5	mg/Kg					
25-meter Record Firing Range	2A-19	20	E	31.7	mg/Kg					
25-meter Record Firing Range	2A-19	20	W	25.9	mg/Kg					
25-meter Record Firing Range	2A-19	21	C	18.2	mg/Kg		16.7	1		
25-meter Record Firing Range	2A-19	21	N	18.6	mg/Kg					
25-meter Record Firing Range	2A-19	21	S	10.0	mg/Kg					
25-meter Record Firing Range	2A-19	21	E	12.9	mg/Kg					
25-meter Record Firing Range	2A-19	21	W	23.6	mg/Kg					
25-meter Record Firing Range	2A-19	22	C	11.5	mg/Kg		12.8	1		
25-meter Record Firing Range	2A-19	22	N	13.2	mg/Kg					
25-meter Record Firing Range	2A-19	22	S	12.0	mg/Kg					
25-meter Record Firing Range	2A-19	22	E	15.2	mg/Kg					
25-meter Record Firing Range	2A-19	22	W	12.3	mg/Kg					
25-meter Record Firing Range	2A-19	23	C	11.0	mg/Kg		12.2	1		
25-meter Record Firing Range	2A-19	23	N	11.6	mg/Kg					
25-meter Record Firing Range	2A-19	23	S	14.0	mg/Kg					
25-meter Record Firing Range	2A-19	23	E	13.6	mg/Kg					
25-meter Record Firing Range	2A-19	23	W	10.7	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter Record Firing Range (RAU 2A-19)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter Record Firing Range	2A-19	24	C	26.3	mg/Kg		34.8	2		
25-meter Record Firing Range	2A-19	24	N	23.2	mg/Kg					
25-meter Record Firing Range	2A-19	24	S	22.8	mg/Kg					
25-meter Record Firing Range	2A-19	24	E	13.5	mg/Kg					
25-meter Record Firing Range	2A-19	24	W	88.2	mg/Kg					
25-meter Record Firing Range	2A-19	25	C	44.3	mg/Kg		28.4	1		
25-meter Record Firing Range	2A-19	25	N	14.1	mg/Kg					
25-meter Record Firing Range	2A-19	25	S	24.3	mg/Kg					
25-meter Record Firing Range	2A-19	25	E	25.5	mg/Kg					
25-meter Record Firing Range	2A-19	25	W	33.7	mg/Kg					
25-meter Record Firing Range	2A-19	26	C	9.7	mg/Kg		26.8	2		
25-meter Record Firing Range	2A-19	26	N	14.4	mg/Kg					
25-meter Record Firing Range	2A-19	26	S	78.4	mg/Kg					
25-meter Record Firing Range	2A-19	26	E	18.5	mg/Kg					
25-meter Record Firing Range	2A-19	26	W	13.2	mg/Kg					
25-meter Record Firing Range	2A-19	27	C	10.7	mg/Kg		12.2	1		
25-meter Record Firing Range	2A-19	27	N	14.1	mg/Kg					
25-meter Record Firing Range	2A-19	27	S	14.8	mg/Kg					
25-meter Record Firing Range	2A-19	27	E	11.9	mg/Kg					
25-meter Record Firing Range	2A-19	27	W	9.7	mg/Kg					
25-meter Record Firing Range	2A-19	28	C	11.2	mg/Kg		13.6	1		
25-meter Record Firing Range	2A-19	28	N	19.2	mg/Kg					
25-meter Record Firing Range	2A-19	28	S	13.8	mg/Kg					
25-meter Record Firing Range	2A-19	28	E	11.5	mg/Kg					
25-meter Record Firing Range	2A-19	28	W	12.5	mg/Kg					
25-meter Record Firing Range	2A-19	29	C	21.0	mg/Kg		21.9	1		
25-meter Record Firing Range	2A-19	29	N	18.5	mg/Kg					
25-meter Record Firing Range	2A-19	29	S	26.0	mg/Kg					
25-meter Record Firing Range	2A-19	29	E	32.8	mg/Kg					
25-meter Record Firing Range	2A-19	29	W	11.4	mg/Kg					
25-meter Record Firing Range	2A-19	30	C	163.0	mg/Kg	*	45.9	2		
25-meter Record Firing Range	2A-19	30	N	76.5	mg/Kg					
25-meter Record Firing Range	2A-19	30	S	27.3	mg/Kg					
25-meter Record Firing Range	2A-19	30	E	33.9	mg/Kg					
25-meter Record Firing Range	2A-19	30	W	51.0	mg/Kg	*				
25-meter Record Firing Range	2A-19	31	C	31.7	mg/Kg		25.9	1		
25-meter Record Firing Range	2A-19	31	N	24.8	mg/Kg					
25-meter Record Firing Range	2A-19	31	S	30.6	mg/Kg					
25-meter Record Firing Range	2A-19	31	E	23.0	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter Record Firing Range (RAU 2A-19)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter Record Firing Range	2A-19	31	W	19.5	mg/Kg					
25-meter Record Firing Range	2A-19	32	C	10.5	mg/Kg		16.9	1		
25-meter Record Firing Range	2A-19	32	N	20.5	mg/Kg					
25-meter Record Firing Range	2A-19	32	S	16.2	mg/Kg					
25-meter Record Firing Range	2A-19	32	E	13.6	mg/Kg					
25-meter Record Firing Range	2A-19	32	W	23.8	mg/Kg					
25-meter Record Firing Range	2A-19	33	C	94.9	mg/Kg	*	377.0	5	40.5	81
25-meter Record Firing Range	2A-19	33	N	647.0	mg/Kg					
25-meter Record Firing Range	2A-19	33	S	34.6	mg/Kg	*				
25-meter Record Firing Range	2A-19	33	E	19.9	mg/Kg	*				
25-meter Record Firing Range	2A-19	33	W	107.0	mg/Kg					
25-meter Record Firing Range	2A-19	34	C	150.0	mg/Kg	*	141.7	4	20.25	
25-meter Record Firing Range	2A-19	34	N	45.3	mg/Kg					
25-meter Record Firing Range	2A-19	34	S	238.0	mg/Kg					
25-meter Record Firing Range	2A-19	34	E	296.0	mg/Kg	*				
25-meter Record Firing Range	2A-19	34	W	8,880.0	mg/Kg	*				
25-meter Record Firing Range	2A-19	35	C	12.9	mg/Kg		12.7	1		
25-meter Record Firing Range	2A-19	35	N	12.3	mg/Kg					
25-meter Record Firing Range	2A-19	35	S	16.3	mg/Kg					
25-meter Record Firing Range	2A-19	35	E	13.7	mg/Kg					
25-meter Record Firing Range	2A-19	35	W	8.5	mg/Kg					
25-meter Record Firing Range	2A-19	36	C	8.0	mg/Kg		10.4	1		
25-meter Record Firing Range	2A-19	36	N	10.0	mg/Kg					
25-meter Record Firing Range	2A-19	36	S	12.9	mg/Kg					
25-meter Record Firing Range	2A-19	36	E	12.6	mg/Kg					
25-meter Record Firing Range	2A-19	36	W	8.7	mg/Kg					
25-meter Record Firing Range	2A-19	37	C	12.8	mg/Kg		10.7	1		
25-meter Record Firing Range	2A-19	37	N	12.6	mg/Kg					
25-meter Record Firing Range	2A-19	37	S	7.5	mg/Kg					
25-meter Record Firing Range	2A-19	37	E	10.3	mg/Kg					
25-meter Record Firing Range	2A-19	37	W	10.2	mg/Kg					
25-meter Record Firing Range	2A-19	38	C	8.7	mg/Kg		10.1	1		
25-meter Record Firing Range	2A-19	38	N	7.2	mg/Kg					
25-meter Record Firing Range	2A-19	38	S	7.2	mg/Kg					
25-meter Record Firing Range	2A-19	38	E	19.0	mg/Kg					
25-meter Record Firing Range	2A-19	38	W	8.5	mg/Kg					
25-meter Record Firing Range	2A-19	39	C	12.8	mg/Kg		17.4	1		
25-meter Record Firing Range	2A-19	39	N	10.1	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

25-meter Record Firing Range (RAU 2A-19)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
25-meter Record Firing Range	2A-19	39	S	10.9	mg/Kg					
25-meter Record Firing Range	2A-19	39	E	11.6	mg/Kg					
25-meter Record Firing Range	2A-19	39	W	41.5	mg/Kg					
25-meter Record Firing Range	2A-19	40	C	8.5	mg/Kg		9.2	1		
25-meter Record Firing Range	2A-19	40	N	9.9	mg/Kg					
25-meter Record Firing Range	2A-19	40	S	7.4	mg/Kg					
25-meter Record Firing Range	2A-19	40	E	9.1	mg/Kg					
25-meter Record Firing Range	2A-19	40	W	11.1	mg/Kg					
								Totals	**121.50**	**81.00**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Field Ranges No. 1 No. 2 (RAU 2A-20)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Field Ranges No. 1 & No. 2	2A-20	1	C	9.6	mg/Kg		9.9	1		
Field Ranges No. 1 & No. 2	2A-20	1	N	8.8	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	1	S	11.2	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	1	E	9.9	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	1	W	10.1	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	2	C	8.6	mg/Kg		9.5	1		
Field Ranges No. 1 & No. 2	2A-20	2	N	6.9	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	2	S	9.9	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	2	E	8.1	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	2	W	13.8	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	3	C	68.1	mg/Kg		101.7	4	40.5	81
Field Ranges No. 1 & No. 2	2A-20	3	N	17.1	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	3	S	259.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	3	E	154.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	3	W	10.4	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	4	C	11.5	mg/Kg		13.0	1		
Field Ranges No. 1 & No. 2	2A-20	4	N	11.9	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	4	S	15.2	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	4	E	13.6	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	4	W	13.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	5	C	8.8	mg/Kg		10.8	1		
Field Ranges No. 1 & No. 2	2A-20	5	N	9.2	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	5	S	13.6	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	5	E	11.7	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	5	W	10.6	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	6	C	17.7	mg/Kg		22.2	2		
Field Ranges No. 1 & No. 2	2A-20	6	N	58.5	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	6	S	9.2	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	6	E	13.9	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	6	W	11.9	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	7	C	9.2	mg/Kg		8.4	1		
Field Ranges No. 1 & No. 2	2A-20	7	N	8.1	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	7	S	8.2	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	7	E	5.8	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	7	W	10.7	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	8	C	21.0	mg/Kg		17.8	1		
Field Ranges No. 1 & No. 2	2A-20	8	N	16.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	8	S	25.9	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	8	E	12.7	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Field Ranges No. 1 No. 2 (RAU 2A-20)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Field Ranges No. 1 & No. 2	2A-20	8	W	13.5	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	9	C	13.1	mg/Kg		39.5	3	20.25	
Field Ranges No. 1 & No. 2	2A-20	9	N	11.8	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	9	S	17.2	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	9	E	136.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	9	W	19.6	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	10	C	13.9	mg/Kg		17.4	1		
Field Ranges No. 1 & No. 2	2A-20	10	N	13.7	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	10	S	20.3	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	10	E	18.7	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	10	W	20.3	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	11	C	10.6	mg/Kg		14.3	1		
Field Ranges No. 1 & No. 2	2A-20	11	N	11.7	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	11	S	20.4	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	11	E	14.8	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	11	W	13.8	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	12	C	7,150.0	mg/Kg		1,691.4	5	40.5	243
Field Ranges No. 1 & No. 2	2A-20	12	N	125.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	12	S	267.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	12	E	728.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	12	W	187.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	13	C	15.8	mg/Kg		23.7	1		
Field Ranges No. 1 & No. 2	2A-20	13	N	49.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	13	S	13.1	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	13	E	24.6	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	13	W	16.0	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	14	C	10.0	mg/Kg		10.6	1		
Field Ranges No. 1 & No. 2	2A-20	14	N	11.4	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	14	S	10.7	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	14	E	10.5	mg/Kg					
Field Ranges No. 1 & No. 2	2A-20	14	W	10.4	mg/Kg					
								Totals	**101.25**	**324.00**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Rifle Ranges No. 1 No. 2 (RAU 2A-21)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Rifle Ranges No. 1 & No. 2	2A-21	1	C	< 10.5	mg/Kg		11.3	1		
Rifle Ranges No. 1 & No. 2	2A-21	1	N	< 10.1	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	1	S	11.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	1	E	10.7	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	1	W	11.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	2	C	25.9	mg/Kg		20.3	1		
Rifle Ranges No. 1 & No. 2	2A-21	2	N	19.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	2	S	18.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	2	E	16.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	2	W	21.9	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	3	C	17.5	mg/Kg		14.5	1		
Rifle Ranges No. 1 & No. 2	2A-21	3	N	17.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	3	S	15.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	3	E	15.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	3	W	6.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	4	C	10.7	mg/Kg		12.4	1		
Rifle Ranges No. 1 & No. 2	2A-21	4	N	15.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	4	S	11.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	4	E	13.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	4	W	11.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	5	C	32.9	mg/Kg		33.4	2		
Rifle Ranges No. 1 & No. 2	2A-21	5	N	22.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	5	S	55.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	5	E	34.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	5	W	21.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	6	C	27.9	mg/Kg		27.6	1		
Rifle Ranges No. 1 & No. 2	2A-21	6	N	31.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	6	S	17.1	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	6	E	21.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	6	W	39.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	7	C	17.0	mg/Kg		23.7	1		
Rifle Ranges No. 1 & No. 2	2A-21	7	N	24.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	7	S	16.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	7	E	31.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	7	W	29.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	8	C	11.3	mg/Kg		24.9	2		
Rifle Ranges No. 1 & No. 2	2A-21	8	N	25.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	8	S	10.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	8	E	52.8	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Rifle Ranges No. 1 No. 2 (RAU 2A-21)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Rifle Ranges No. 1 & No. 2	2A-21	8	W	24.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	9	C	37.3	mg/Kg		32.5	2		
Rifle Ranges No. 1 & No. 2	2A-21	9	N	35.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	9	S	19.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	9	E	51.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	9	W	18.7	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	10	C	16.1	mg/Kg		29.7	2		
Rifle Ranges No. 1 & No. 2	2A-21	10	N	15.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	10	S	80.7	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	10	E	13.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	10	W	22.7	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	11	C	15.6	mg/Kg		23.5	1		
Rifle Ranges No. 1 & No. 2	2A-21	11	N	10.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	11	S	49.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	11	E	26.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	11	W	16.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	12	C	16.4	mg/Kg		17.1	1		
Rifle Ranges No. 1 & No. 2	2A-21	12	N	32.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	12	S	15.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	12	E	6.9	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	12	W	14.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	13	C	8.7	mg/Kg		9.3	1		
Rifle Ranges No. 1 & No. 2	2A-21	13	N	5.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	13	S	10.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	13	E	7.9	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	13	W	14.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	14	C	9.0	mg/Kg		14.4	1		
Rifle Ranges No. 1 & No. 2	2A-21	14	N	19.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	14	S	14.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	14	E	18.9	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	14	W	11.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	15	C	67.0	mg/Kg		53.4	3	40.5	
Rifle Ranges No. 1 & No. 2	2A-21	15	N	108.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	15	S	25.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	15	E	24.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	15	W	41.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	16	C	< 3.9	mg/Kg		14.4	1		
Rifle Ranges No. 1 & No. 2	2A-21	16	N	25.0	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Rifle Ranges No. 1 No. 2 (RAU 2A-21)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Rifle Ranges No. 1 & No. 2	2A-21	16	S	12.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	16	E	< 3.7	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	16	W	5.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	17	C	17.0	mg/Kg		29.3	2		
Rifle Ranges No. 1 & No. 2	2A-21	17	N	21.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	17	S	19.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	17	E	18.9	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	17	W	69.9	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	18	C	8.1	mg/Kg		11.6	1		
Rifle Ranges No. 1 & No. 2	2A-21	18	N	11.1	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	18	S	15.1	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	18	E	12.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	18	W	< 5.9	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	19	C	17.2	mg/Kg		23.4	2		
Rifle Ranges No. 1 & No. 2	2A-21	19	N	52.1	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	19	S	19.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	19	E	14.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	19	W	14.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	20	C	12.5	mg/Kg		14.9	1		
Rifle Ranges No. 1 & No. 2	2A-21	20	N	14.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	20	S	6.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	20	E	6.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	20	W	34.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	21	C	21.1	mg/Kg		69.7	4		81
Rifle Ranges No. 1 & No. 2	2A-21	21	N	5.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	21	S	17.4	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	21	E	290.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	21	W	14.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	22	C	< 5.0	mg/Kg		8.8	1		
Rifle Ranges No. 1 & No. 2	2A-21	22	N	17.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	22	S	4.9	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	22	E	6.7	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	22	W	5.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	23	C	11.7	mg/Kg		36.8	3	20.25	
Rifle Ranges No. 1 & No. 2	2A-21	23	N	11.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	23	S	19.1	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	23	E	130.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	23	W	12.2	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Rifle Ranges No. 1 No. 2 (RAU 2A-21)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Rifle Ranges No. 1 & No. 2	2A-21	24	C	92.3	mg/Kg		75.6	3	60.75	
Rifle Ranges No. 1 & No. 2	2A-21	24	N	9.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	24	S	36.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	24	E	108.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	24	W	132.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	25	C	51.3	mg/Kg		119.1	4	81	
Rifle Ranges No. 1 & No. 2	2A-21	25	N	145.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	25	S	212.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	25	E	172.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	25	W	15.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	26	C	22.4	mg/Kg		14.2	1		
Rifle Ranges No. 1 & No. 2	2A-21	26	N	3.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	26	S	21.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	26	E	9.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	26	W	< 4.5	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	27	C	7.4	mg/Kg		15.6	1		
Rifle Ranges No. 1 & No. 2	2A-21	27	N	11.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	27	S	29.2	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	27	E	21.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	27	W	8.3	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	28	C	9.3	mg/Kg	*	5.6	1		
Rifle Ranges No. 1 & No. 2	2A-21	28	N	87.6	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	28	S	< 4.7	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	28	E	95.8	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	28	W	5.6	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	29	C	65.0	mg/Kg		64.6	3	60.75	
Rifle Ranges No. 1 & No. 2	2A-21	29	N	137.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	29	S	23.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	29	E	23.0	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	29	W	74.8	mg/Kg					
Rifle Ranges No. 1 & No. 2	2A-21	30	C	273.0	mg/Kg	*	N/A	N/A		
Rifle Ranges No. 1 & No. 2	2A-21	30	N	1,690.0	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	30	S	1,750.0	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	30	E	1,850.0	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	30	W	4,330.0	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	31	C	199.0	mg/Kg	*	N/A	N/A		
Rifle Ranges No. 1 & No. 2	2A-21	31	N	94.5	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	31	S	96.8	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	31	E	180.0	mg/Kg	*				

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.
Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Rifle Ranges No. 1 No. 2 (RAU 2A-21)
Grid Data Analysis

Range	RAU	Grid	Location	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Rifle Ranges No. 1 & No. 2	2A-21	31	W	1,770.0	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	32	C	82.4	mg/Kg	*	N/A	N/A		
Rifle Ranges No. 1 & No. 2	2A-21	32	N	59.1	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	32	S	417.0	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	32	E	670.0	mg/Kg	*				
Rifle Ranges No. 1 & No. 2	2A-21	32	W	220.0	mg/Kg	*				
								Totals	**263.25**	**81.00**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Field Fire Ranges No. 1 No. 2 (RAU 2A-22)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Field Fire Ranges No. 1 & No. 2	2A-22	1	C	6.4	mg/Kg		6.7	1		
Field Fire Ranges No. 1 & No. 2	2A-22	1	N	0.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	1	S	7.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	1	E	11.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	1	W	8.6	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	2	C	23.6	mg/Kg		17.3	1		
Field Fire Ranges No. 1 & No. 2	2A-22	2	N	14.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	2	S	17.5	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	2	E	23.6	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	2	W	7.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	3	C	48.8	mg/Kg		21.0	1		
Field Fire Ranges No. 1 & No. 2	2A-22	3	N	16.8	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	3	S	14.6	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	3	E	13.5	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	3	W	11.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	4	C	11.0	mg/Kg		10.4	1		
Field Fire Ranges No. 1 & No. 2	2A-22	4	N	9.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	4	S	15.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	4	E	16.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	4	W	0.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	5	C	97.0	mg/Kg		41.8	2		
Field Fire Ranges No. 1 & No. 2	2A-22	5	N	7.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	5	S	23.7	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	5	E	69.9	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	5	W	11.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	6	C	62.4	mg/Kg		24.1	1		
Field Fire Ranges No. 1 & No. 2	2A-22	6	N	15.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	6	S	7.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	6	E	6.1	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	6	W	29.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	7	C	18.7	mg/Kg		17.3	1		
Field Fire Ranges No. 1 & No. 2	2A-22	7	N	15.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	7	S	20.8	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	7	E	19.6	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	7	W	12.3	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	8	C	10.7	mg/Kg		9.7	1		
Field Fire Ranges No. 1 & No. 2	2A-22	8	N	11.1	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	8	S	11.5	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	8	E	8.9	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Field Fire Ranges No. 1 No. 2 (RAU 2A-22)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Field Fire Ranges No. 1 & No. 2	2A-22	8	W	6.1	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	9	C	26.2	mg/Kg		14.0	1		
Field Fire Ranges No. 1 & No. 2	2A-22	9	N	19.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	9	S	5.1	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	9	E	9.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	9	W	10.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	10	C	0.0	mg/Kg		6.6	1		
Field Fire Ranges No. 1 & No. 2	2A-22	10	N	10.7	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	10	S	6.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	10	E	7.7	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	10	W	8.5	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	11	C	13.4	mg/Kg		19.8	2		
Field Fire Ranges No. 1 & No. 2	2A-22	11	N	10.1	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	11	S	61.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	11	E	6.9	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	11	W	7.5	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	12	C	6.8	mg/Kg		12.8	1		
Field Fire Ranges No. 1 & No. 2	2A-22	12	N	11.7	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	12	S	19.1	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	12	E	7.6	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	12	W	18.7	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	13	C	17.1	mg/Kg		19.5	1		
Field Fire Ranges No. 1 & No. 2	2A-22	13	N	8.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	13	S	28.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	13	E	5.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	13	W	38.8	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	14	C	8.0	mg/Kg		467.2	5		81
Field Fire Ranges No. 1 & No. 2	2A-22	14	N	10.8	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	14	S	7.9	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	14	E	2,300.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	14	W	9.3	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	15	C	8.4	mg/Kg		18.0	1		
Field Fire Ranges No. 1 & No. 2	2A-22	15	N	9.1	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	15	S	20.6	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	15	E	44.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	15	W	7.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	16	C	59.1	mg/Kg		40.8	2		
Field Fire Ranges No. 1 & No. 2	2A-22	16	N	23.1	mg/Kg					

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

Field Fire Ranges No. 1 No. 2 (RAU 2A-22)
Grid Data Analysis

Range	RAU	Grid	Loc	Result	Unit	Berm	Avg.	Grid Category	MTCA	RCRA
Field Fire Ranges No. 1 & No. 2	2A-22	16	S	95.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	16	E	17.7	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	16	W	8.5	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	17	C	32.3	mg/Kg		38.4	2		
Field Fire Ranges No. 1 & No. 2	2A-22	17	N	0.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	17	S	37.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	17	E	53.3	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	17	W	69.3	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	18	C	35.6	mg/Kg		41.5	2		
Field Fire Ranges No. 1 & No. 2	2A-22	18	N	23.6	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	18	S	47.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	18	E	22.5	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	18	W	78.5	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	19	C	114.0	mg/Kg		64.4	3	40.5	
Field Fire Ranges No. 1 & No. 2	2A-22	19	N	29.3	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	19	S	15.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	19	E	149.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	19	W	14.9	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	20	C	25.9	mg/Kg		18.2	1		
Field Fire Ranges No. 1 & No. 2	2A-22	20	N	17.7	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	20	S	9.4	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	20	E	8.1	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	20	W	29.8	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	21	C	52.3	mg/Kg		25.2	2		
Field Fire Ranges No. 1 & No. 2	2A-22	21	N	23.8	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	21	S	13.9	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	21	E	11.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	21	W	24.7	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	22	C	5.8	mg/Kg		24.6	2		
Field Fire Ranges No. 1 & No. 2	2A-22	22	N	47.3	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	22	S	8.2	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	22	E	9.0	mg/Kg					
Field Fire Ranges No. 1 & No. 2	2A-22	22	W	52.6	mg/Kg					
								Totals	**40.50**	**81.00**

* Sample location on the berm and not included in the average.
Yellow = 51 to 118 mg/kg
Blue = 119 to 250 mg/kg
Red = 251mg/Kg and greater
Category 1: Average and Individual Sample Concentrations < 50 mg/Kg.

Category 2: Average Concentration is < 50 mg/Kg and no individual sample concentration is >118 mg/Kg.
Category 3: Average Concentration is > 50 mg/Kg but < 118 mg/Kg and no individual sample concentration is > 250 mg/Kg
Category 4: Average Concentration is > 118 mg/Kg but < 250 mg/Kg
Category 5: Average Concentration is > 250 mg/Kg.

APPENDIX B
ASSOCIATED PERMITS

Please Note:

The following draft permits are provided for information only:

- USACE Nationwide Permit #38 Application
- Clark County DES -- Habitat Permit
- Clark County DES -- Wetlands Permit
- Clark County DES -- Grading Permit

Details may change as they are finalized.

AGENCY USE ONLY	
Agency Reference #:	Date Received:
Circulated by:	(local govt. or agency)

JOINT AQUATIC RESOURCES PERMIT APPLICATION FORM (JARPA)

(for use in Washington State)

PRE-CONSTRUCTION NOTIFICATION FOR NATIONWIDE PERMIT #38

☐ Application for a Fish Habitat Enhancement Project per requirements of RCW 77.55.290. You must submit a copy of this completed JARPA application form and the (Fish Habitat Enhancement JARPA Addition) to your local Government Planning Department and Washington Department of Fish & Wildlife Area Habitat Biologist on the same day.

NOTE: LOCAL GOVERNMENTS – You must submit any comments on these projects to WDFW within 15 working days.

Based on the instructions provided, I am sending copies of this application to the following: *(check all that apply)*

☐ Local Government for shoreline: ☐ Substantial Development ☐ Conditional Use ☐ Variance ☐ Exemption ☐ Revision
☐ Floodplain Management ☐ Critical Areas Ordinance

☐ Washington Department of Fish and Wildlife for HPA (Submit 3 copies to WDFW Region)
☐ Washington Department of Ecology for 401 Water Quality Certification (to Regional Office-Federal Permit Unit)
☐ Washington Department of Natural Resources for Aquatic Resources Use Authorization Notification
☒ Corps of Engineers for: ☒ Section 404 ☐ Section 10 permit
☐ Coast Guard for: ☐ General Bridge Act Permit ☐ **P**rivate **A**ids **t**o **N**avigation (for non-bridge projects)
☐ For Department of Transportation projects only: This project will be designed to meet conditions of the most current Ecology/Department of Transportation Water Quality Implementing Agreement

SECTION A - Use for all permits covered by this application. Be sure to ALSO complete Section C (Signature Block) for all permit applications.

1. APPLICANT
Clark County Public Works Department – ATTN: Jerry Barnett

MAILING ADDRESS
PO Box 9810, Vancouver, WA 98666

WORK PHONE	E-MAIL ADDRESS	HOME PHONE	FAX #
360-397-6118 x4969	Jerry.Barnett@clark.wa.gov	—	360-397-6051

If an agent is acting for the applicant during the permit process, complete #2. Be sure agent signs Section C (Signature Block) for all permit applications

2. AUTHORIZED AGENT
PBS Engineering and Environmental, ATTN: Christy McDonough

MAILING ADDRESS
1310 Main Street, Vancouver, WA 98660

WORK PHONE	E-MAIL ADDRESS	HOME PHONE	FAX #
360-213-0444	christy_mcdonough@pbsenv.com	—	360-696-9064

3. Relationship of applicant to property: ☐ OWNER ☐ PURCHASER ☐ LESSEE ☒ Other

4. Name, address and phone number of property owner(s) if other than applicant: Mike Gage, Bonneville Conservation, Restoration and Renewal Team (BCRRT), 23201 NE Pluss Road, Vancouver WA 98682, 505-699-1214

5. Location (street address, including city, county and zip code, where proposed activity exists or will occur)
23201 NE Pluss Road, Vancouver, Clark County, Washington, 98682
Local government with jurisdiction (city or county) Clark County

Waterbody you are working in Lacamas Creek
Is this waterbody on the 303(d) List** YES ☒ NO ☐
If **YES**, what parameter(s)? pH, DO, Temperature
**For 303d List, http://www.ecy.wa.gov/programs/wq/303d/index.html

Tributary of	WRIA #
Lacamas Creek	28

Shoreline designation N/A

Zoning designation Forest Tier I-80

¼ Section	Section	Township	Range	Government Lot
NE	10, 3	2N	3E	
NW	2	2N	3E	
SW	35	3N	3E	

DNR stream type if known F

Latitude and Longitude: N45.69° W122.42°

Tax Parcel Number 170186-000, 168044-000, 167940-000, 208417-000

6. Describe the current use of the property, and structures existing on the property. Have you completed any portion of the proposed activity on this property? ☐ YES ☒ NO
For any portion of the proposed activity already completed on this property, indicate month and year of completion.

The Department of the Army used Camp Bonneville for live fire of small arms, assault weapons, and field and air defense artillery between 1910 and 1995. Investigations to characterize and cleanup areas of contamination have been ongoing at Camp Bonneville. Camp Bonneville itself is comprised of two small cantonment areas (Bonneville Cantonment and Killpack Cantonment) that together cover about 30 acres. A few of the barracks at the Killpack Cantonment are being used as temporary offices by project team members. The remainder of the installation area includes 18 training areas, 28 firing ranges, and a 1,500-foot long helicopter landing area. There are also some forest management areas onsite. Adjacent, surrounding land use is predominantly agricultural, rural residential, and forest.

Is the property agricultural land? ☐ YES ☒ NO Are you a USDA program participant? ☐ YES ☒ NO

7a. Describe the proposed work that needs aquatic permits: Complete plans and specifications should be provided for all work waterward of the ordinary high water mark or line, including types of equipment to be used. If applying for a shoreline permit, describe all work within and beyond 200 feet of the ordinary high water mark. If you have provided attached materials to describe your project, you still must summarize the proposed work here. Attach a separate sheet if additional space is needed.

The proposed work is for remedial actions nine firing ranges located on the site. Berms at the firing ranges were used as a safety feature behind the targets and served as the impact areas for lead bullets. The fire support areas are in the vicinity of the firing lines where brass casings and/or residuals from live loads may have accumulated. The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include excavating, screening, and sorting soil from berms and fire support areas, and grading of the former firing ranges to match surrounding topography after clean up is complete.

Eleven (11) wetland areas are within the identified work areas. Two of these are likely isolated wetlands; the other nine are hydrologically connected to Lacamas Creek or one of its tributaries (see enclosed Wetland Delineation Report).

Excavation will occur based on one, or a combination of, four scenarios: 1) Earthen Berm Excavation; 2) Pop-Up Target Excavation; 3) Hillside Berm Excavation; or 4) Impact Zone Excavation.

SCENARIO 1 – EARTHEN BERMS

Rifle Ranges 1 & 2; Field Fire Ranges 1 & 2; Field Ranges 1 & 2; 25-meter Machine Gun Range; Undocumented Pistol Range

Removal action will involve excavation of any identified "hot spot" areas and approximately the front 2 feet of each berm face and top, and a six-inch lift off of the back. Soil samples will be taken to determine the necessity of removing an additional 1-foot lift from the berm face. All excavated soil will be screened to remove bullets, brass casings, other metal, organic material, and rock. The screening equipment will have multiple screen sizes to remove various size materials. The last screen will have ¼" opening size to capture bullet-sized metal. Screened soils will be stockpiled based on their contamination level. Appropriate disposal/recycling options will be selected based on the measured lead concentrations from each of the stockpiles. Metal collected during screening operations will be recycled and/or disposed of appropriately off-site.

Berm Face Excavation – An X-ray fluorescence spectrometer (XRF) will be used to determine lead concentrations in the remaining berm face after hot spot areas have been removed. The berm will be divided into 15-foot sections and two samples for XRF analysis will be collected in the center of each section. The XRF results will be used to segregate the soils into lead concentration groups. The berm soils will be excavated, screened, and stockpiled based on the concentrations of lead in each berm section.

After the 2-foot soil lift is removed from each berm, the surface and near-surface soils will be visually inspected for bullets. If no bullets are observed, soil samples will be collected from each section, sieved with a 2 mm screen, and analyzed for lead using the XRF. Samples below cleanup levels will be submitted for confirmation laboratory analysis. A berm section is considered "clean" if both XRF sample results for lead concentration are below 50 mg/Kg. Excavation of the sections along the berm face will continue until no bullets are encountered and the XRF analysis determines remaining soils are below the cleanup level.

Fire Support Areas - A 6-inch soil lift will be removed from fire support areas (e.g., range floors). The soil removal will occur across an area 20 feet wide by the length of the firing line. The 20-foot section will extend from 5 feet in front of the firing line to 15 feet behind the firing line. Excavated soils will be screened and stockpiled separate from the berm soils. Excavation outside of the identified 20-foot wide section identified above will be based on the results of confirmatory sampling. If elevated levels of lead are identified an additional adjoining area will be excavated. This will continue until sample results for lead concentration are below 50 mg/Kg.

Sample Grid Areas - During soil sampling at the site a number of samples displayed elevated levels of lead. Grids identified during the soil sampling will be excavated as follows:

- A 6-inch soil lift will be excavated from the entire 58x58-foot grid when average lead soil concentrations exceed 250 mg/Kg (4 of 307 grids)

- A 6-inch soil lift will be excavated from a 29x29-foot area around the sample point when the average soil lead concentrations are greater than 50 mg/kg but less than 118 mg/kg with no individual sample contains greater than 250mg/kg. Or where the average lead concentration per grid is >118 mg/Kg but less than 250 mg/Kg. (24 of 307 grids) Confirmatory sampling will occur at each edge of the hot spot excavation area and from the center point.

  If necessary, an additional 6-inch soil lift will be removed from a 14.5x 29-foot section.
  - No excavation will occur in areas where samples displayed lead levels below 50 mg/Kg, or where lead concentrations average less than 50 mg/Kg and where no single sample from a grid exceeds 118mg/kg. (139 of 307 grids)

Grading – When laboratory results confirm the lead concentration in the berm soils are below 50 mg/Kg, the remaining berm will be graded to match surrounding contours. Organic material and rocks stockpiled during sieving will be combined with clean soils and remain on site. All graded sites will be reseeded.

Exceptions - Berm 1 at the 25-meter Machine Gun Range will be completely removed because it was likely reworked over the years and is, thus, potentially contaminated deeper than the 2 feet proposed for removal on all other berms. Additionally, the top 6 inches of soil in the area behind the main range berm will be removed. Lead bullets are visible on the ground surface and it appears as though the hillside may have been used as the target prior to construction of the berm

SCENARIO 2 – POP-UP TARGET BERMS

Rifle Ranges 1 & 2; Field Fire Ranges 1 & 2; Combat Pistol Range

The pop-up target berms will be completely removed. In addition, a 6-inch (0.5-ft) soil lift will be removed from an approximate 15-foot radius from the center of the concrete target. The area within the 15-foot radius will be surface cleared using Shoenstedt's hand-held magnetometers. If nothing is discovered in the area behind the target, soil within that area will not be removed. The soil will be processed and the area graded as described above under Scenario 1.

SCENARIO 3 – HILLSIDE BERMS

25-meter M60/Pistol Range; 25-meter Record Firing/Field Firing Range; Combat Pistol Range; 1,000-inch Rifle Range/Machine Gun Range

The target berm located in front of the hillside will be completely removed. In addition, the front of the hillside will be excavated, processed, and the area graded as described above under Scenario 1.

SCENARIO 4 – IMPACT ZONE

Rifle Ranges 1 & 2

At this range, additional pop-up targets were placed on a target berm across the pop-up area pond. The identified impact area behind the target berm will be excavated until clean material is left. The impact zone is the area behind the target berm where the trajectory of the bullet would land assuming it missed the target berm. The impact zone will be excavated, processed, and the area graded as described above under Scenario 1.

PREPARATION OF DRAWINGS: See sample drawings and guidance for completing the drawings. ***ONE SET OF ORIGINAL OR GOOD QUALITY REPRODUCIBLE DRAWINGS MUST BE ATTACHED.*** NOTE: Applicants are encouraged to submit photographs of the project site, but these DO NOT substitute for drawings. ***THE CORPS OF ENGINEERS AND COAST GUARD REQUIRE DRAWINGS ON 8-1/2 X 11 INCH SHEETS. LARGER DRAWINGS MAY BE REQUIRED BY OTHER AGENCIES.***

7b. Describe the purpose of the proposed work and why you want or need to perform it at the site. Please explain any specific needs that have influenced the design.

All proposed grading activities are associated with remedial actions undertaken to improve the environmental and soil quality of the site. Firing range berms and fire support areas will be excavated to remove contaminated soils. All soils will be excavated, screened and stockpiled based on the concentrations of lead they contain. Soils with concentrations below the clean up screening level (50 mg/Kg) for lead will be reused to grade the site consistent with the surrounding topography.

7c. Describe the potential impacts to characteristic uses of the water body. These uses may include fish and aquatic life, water quality, water supply, recreation, and aesthetics. Identify proposed actions to avoid, minimize, and mitigate detrimental impacts and provide proper protection of fish and aquatic life. Identify which guidance documents you have used. Attach a separate sheet if additional space is needed.

Impacts to wetlands will be temporary in nature. The area will be excavated and graded as necessary for the remediation of lead contamination within the identified firing ranges. The area will then be re-graded to match the contours of immediately adjacent wetland areas and seeded with native wetland species.

7d. For in water construction work, will your project be in compliance with the State of Washington water quality standards for turbidity WAC 173.201A-110? ☐ YES ☐ NO (See USEFUL DEFINITIONS AND INSTRUCTIONS)

8. Will the project be constructed in stages? YES ☐ NO ☒

Proposed starting date: August 2007

Estimated duration of activity: October 2007

9. Check if any temporary or permanent structures will be placed:

☐ Waterward of the ordinary high water mark or line for fresh or tidal waters AND/OR

☐ Waterward of the mean higher high water for tidal waters?

10. Will fill material (rock, fill, bulkhead, or other material) be placed:

☐ Waterward of the ordinary high water mark or line for fresh waters?

If **YES**, VOLUME (cubic yards) / AREA (acres)

☐ Waterward of the mean higher high water for tidal waters?

If **YES**, VOLUME (cubic yards) / AREA (acres)

11. Will material be placed in wetlands? ☒ YES ☐ NO

If **YES**:

A. Impacted area in acres: exact area unknown, will be less than 7.7 acres

B. Has a delineation been completed? **If YES**, please submit with application. ☒ YES ☐ NO

C. Has a wetland report been prepared? **If YES**, please submit with application ☒ YES ☐ NO

D. Type and composition of fill material (e.g., sand, etc.) clean on-site material

E. Material source: work area

F. List all soil series (type of soil) located at the project site, and indicate if they are on the county's list of hydric soils. Soils information can be obtained from the natural Resources Conservation Service (NRCS).

- Hesson Clay Loam, 0 to 8 percent slopes (HcB)
- McBee Silty Clay Loam, 0 to 3 percent slopes (MeA)
- Olympic Stony Clay Loam, 3 to 30 percent slopes (OmE)
- Olympic Stony Clay Loam, 30 to 60 percent slopes (OmF)

None of the soils are classified as hydric, however, the Hesson and McBee units have inclusions of hydric soils (NRCS 2001). Most of the study areas are within the McBee unit.

G. WILL PROPOSED ACTIVITY CAUSE FLOODING OR DRAINING OF WETLANDS? ☐ YES ☒ NO

If **YES**, IMPACTED AREA IS _____ ACRES OF DRAINED WETLANDS.

NOTE: If your project will impact greater than ½ of an acre of wetland, submit a mitigation plan to the Corps and Ecology for approval along with the JARPA form.

NOTE: A 401 water quality certification will be required from Ecology in addition to an approved mitigation plan if your project impacts wetlands that are: a) greater than ½ acre in size, or b) tidal wetlands or wetlands adjacent to tidal water. Please submit the JARPA form and mitigation plan to Ecology for an individual 401 certification if a) or b) applies.

12. Stormwater Compliance for Nationwide Permits Only: This project is (or will be) designed to meet ecology's most current stormwater manual, or an Ecology approved local stormwater manual. ☒ YES ☐ NO

If **YES** – Which manual will your project be designed to meet? 2005 Stormwater Management Manual for Western Washington

If **NO** – For clean water act Section 401 and 404 permits only – Please submit to Ecology for approval, along with this JARPA application, documentation that demonstrates the stormwater runoff from your project or activity will comply with the water quality standards, WAC 173.201(A)

13. Will excavation or dredging be required in water or wetlands? ☒ YES ☐ NO

If **YES**:

A. Volume: unknown (cubic yards) /area _____ (acre)

B. Composition of material to be removed: lead contaminated soil

C. Disposal site for excavated material: off-site hazardous waste site

D. Method of dredging: excavators

14. Has the State Environmental Policy Act (SEPA) been completed ☒ YES ☐ NO

SEPA Lead Agency: Clark County

SEPA Decision: DNS, MDNS, EIS, Adoption, Exemption DNS Decision Date (end of comment period) July 20, 2007

SUBMIT A **COPY OF YOUR SEPA DECISION LETTER** TO WDFW AS REQUIRED FOR A COMPLETE APPLICATION

15. List other Applications, approvals or certifications from other federal, state or local agencies for any structures, construction discharges or other activities described in the application (i.e. preliminary plat approval, health district approval, building permit, SEPA review, federal energy regulatory commission license (FERC), Forest practices application, etc.). Also, indicate whether work has been completed and indicate all existing work on drawings. NOTE: For use with Corps Nationwide Permits, identify whether your project has or will need an NPDES permit for discharging wastewater and/or stormwater.

TYPE OF APPROVAL	ISSUING AGENCY	IDENTIFICATION NO.	DATE OF APPLICATION	DATE APPROVED	COMPLETED?
Wetland Permit	Clark County				
Habitat Permit	Clark County				
Grading Permit	Clark County				
SEPA	Clark County	SEP2007-00088	06/13/07	07/20/17	

16. Has any agency denied approval for the activity you're applying for or for any activity directly related to the activity described herein?

☐ YES ☒ NO

If **YES**, explain:

SECTION B - Use for Shoreline and Corps of Engineers permits only:

17a. Total cost of project. This means the fair market value of the project, including materials, labor, machine rentals, etc.

17b. If a project or any portion of a project receives funding from a federal agency, that agency is responsible for ESA consultation. Please indicate if you will receive federal funds and what federal agency is providing those funds. See instructions for information on ESA.*

FEDERAL FUNDING [x] YES [ ] NO If **YES**, please list the federal agency. U.S. Army

18. Local government with jurisdiction: Clark County

19. For Corps, Coast Guard and DNR permits, provide names, addresses and telephone numbers of adjoining property owners, lessees, etc. - ***Please note:*** *Shoreline Management Compliance may require additional notice – consult your local government.*

NAME	ADDRESS	PHONE NUMBER

SECTION C - This section MUST be completed for any permit covered by this application

20. Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby grant to the agencies to which this application is made, the right to enter the above-described location to inspect the proposed, in-progress or completed work. I agree to start work **ONLY** after all necessary permits have been received.

SIGNATURE OF APPLICANT	DATE
SIGNATURE OF AUTHORIZED AGENT	DATE

I HEREBY DESIGNATE PBS Engineering and Environmental TO ACT AS MY AGENT IN MATTERS RELATED TO THIS APPLICATION FOR PERMIT(S). I UNDERSTAND THAT IF A FEDERAL PERMIT IS ISSUED, I MUST SIGN THE PERMIT.

SIGNATURE OF APPLICANT DATE

SIGNATURE OF LANDOWNER (EXCEPT PUBLIC ENTITY LANDOWNERS, E.G. DNR)

THIS APPLICATION MUST BE SIGNED BY THE APPLICANT AND THE AGENT, IF AN AUTHORIZED AGENT IS DESIGNATED.

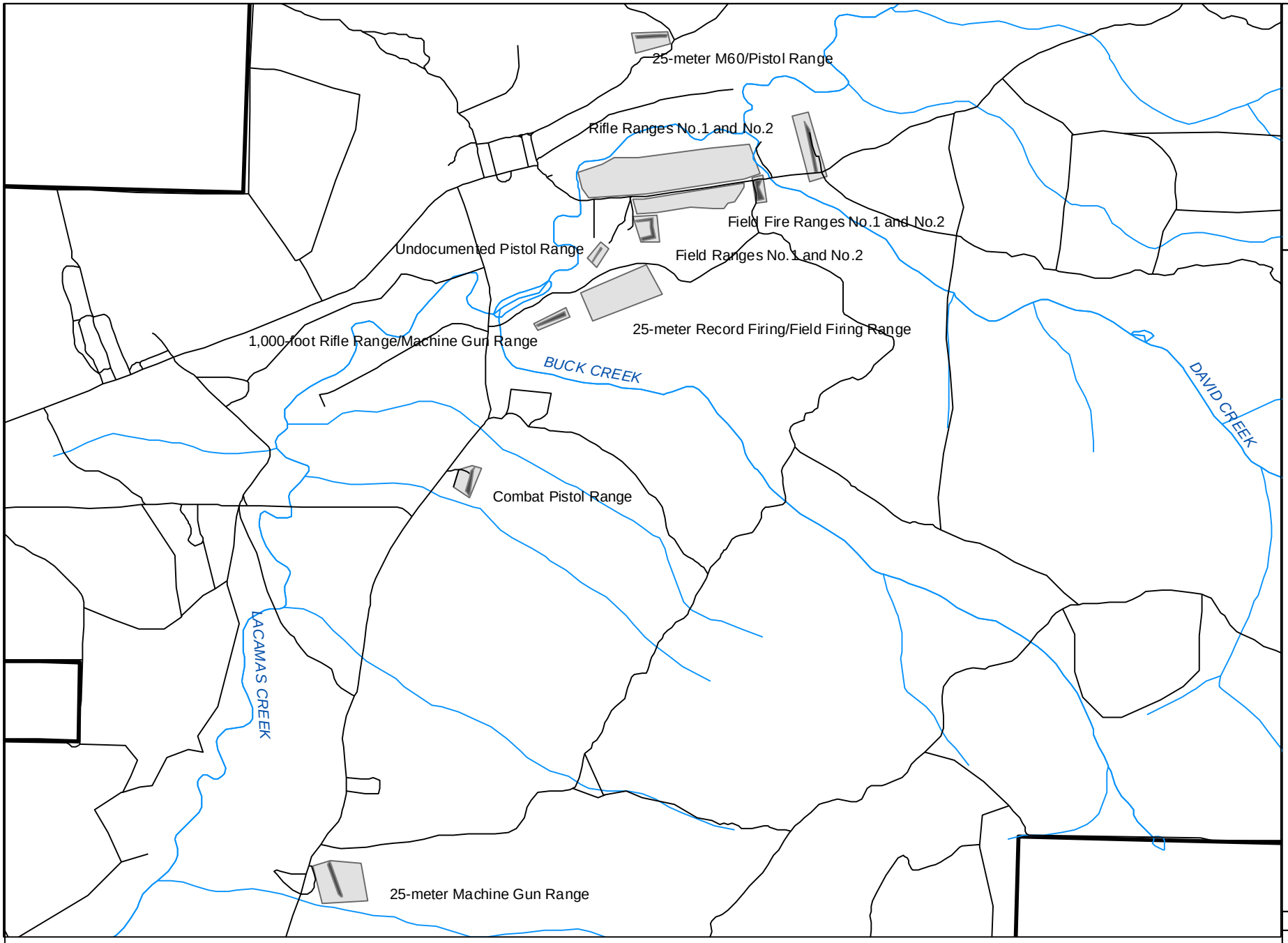
18 U.S.C §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both.

COMPLETED BY LOCAL OFFICIAL

A. Nature of the existing shoreline. (Describe type of shoreline, such as marine, stream, lake, lagoon, marsh, bog, swamp, flood plain, floodway, delta; type of beach, such as accretion, erosion, high bank, low bank, or dike; material such as sand, gravel, mud, clay, rock, riprap; and extent and type of bulkheading, if any)

B. In the event that any of the proposed buildings or structures will exceed a height of thirty-five feet above the average grade level, indicate the approximate location of and number of residential units, existing and potential, that will have an obstructed view:

C. If the application involves a conditional use or variance, set forth in full that portion of the master program which provides that the proposed use may be a conditional use, or, in the case of a variance, from which the variance is being sought:



BCRRT
BONNEVILLE CONSERVATION, RESTORATION & RENEWAL TEAM, LLC

CAMP BONNEVILLE

23201 NE PLUSS ROAD
CLARK COUNTY, WASHINGTON

FIRING RANGE
LOCATION MAP

PROJECT: 70489.000

DATE: SEPTEMBER 2007

FIGURE:
1

PBS

PORTLAND
SEATTLE
VANCOUVER
EUGENE
BEND
TRI-CITIES
BANDON

CAMP BONNEVILLE

CLARK COUNTY, WASHINGTON

SEPTEMBER 2007

HABITAT PERMIT APPLICATION

Location: 23201 NE Pluss Road, Vancouver, WA 98682
Sections 34 and 35 Township 3 North, Range 3 East and Sections 1,2,3 and 10 Township 2 North, Range 3 East

Request: The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.

Applicant: Clark County Department of Public Works
Attn: Jerry Barnett
1300 Franklin Street, 4th Floor
Vancouver, WA 98660
(360) 397-6118 x4969; (360) 759-6330 Fax
Jerry.Barnett@clark.wa.gov

Consultant: PBS Engineering and Environmental
Attn: Christy McDonough
1310 Main Street
Vancouver, WA 98660
(360) 213-0444; (360) 696-9064 Fax
christy_mcdonough@pbsenv.com

TABLE OF CONTENTS

SECTION 1
APPLICATION FORM

DEVELOPMENT REVIEW APPLICATION FORM

(Form DS1000-Revised 4/14/06)

PROJECT NAME: Camp Bonneville – Grading at Small Range Berms and Fire Support Areas		
TYPE(S) OF APPLICATION (See Reverse Side): **Wetland, Habitat**		
DESCRIPTION OF PROPOSAL: The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.		
APPLICANT NAME: Clark County Public Works c/o Jerry Barnett	Mailing Address: PO Box 9810 Vancouver, WA 98666	
E-mail Address: Jerry.Barnett@clark.wa.gov	Phone and Fax: 360.397.6118 ext 4969; 360-397-6051 (fax)	
PROPERTY OWNER NAME (list multiple owners on a separate sheet)**:** Bonneville Conservation, Restoration and Renewal Team Attn: Mike Gage	Address: 23201 NE Pluss Road Vancouver, WA 98682	
E-mail Address: mike.gage@bcrrt.org	Phone and Fax: 505-699-1214	
CONTACT PERSON NAME (list if not same as APPLICANT)**:** Applicant or Owner	Address: Same as above	
E-mail Address: Same as above	Phone and Fax: Same as above	
PROJECT SITE INFORMATION: Site Address: 23201 NE Pluss Road Vancouver, WA 98682	Comp Plan Designation: Forest Tier I	
Cross Street: NE 88th Street	Zoning: Forest Tier I-80	Serial #'s of Parcels: See attached
Overlay Zones: See attached.	Legal: See attached.	Acreage of Original Parcels: Total: 3,840 See attached.
Township: See attached.	Range: See attached.	¼ of Section: See attached.

AUTHORIZATION

The undersigned hereby certifies that this application has been made with the consent of the lawful property owner(s) and that all information submitted with this application is complete and correct. False statements, errors, and/or omissions may be sufficient cause for denial of the request. This application gives consent to the County to enter the properties listed above.

Authorized Signature Date

For Staff Only:

CASE NUMBER:	
WORK ORDER NUMBER:	

Camp Bonneville
Application Form Attachment

Serial # of Parcels	Legal	Acreage	Township	Range	¼ of Section	Overlay Districts
167837-000	ALL SEC 1 T2NR3EWM 640A	640	2N	3E	NE, NW, SE, SW of Section 1	
167940-000	#1 SEC 2 T2NR3EWM 640.94A	640.94	2N	3E	NE, NW, SE, SW of Section 2	
168044-000	#5 SEC 3 T2NR3EWM 619.12A	619.12	2N	3E	NE, NW, SE, SW of Section 3	Comprehensive Plan: Mining Zoning: Mining Combining District
170186-000	#15 SEC 10 T2NR3EWM 320A	320	2N	3E	NE, NW of Section 10	Comprehensive Plan: Mining Zoning: Mining Combining District
170393-000	#4 SEC 11 T2NR3EWM 120A	120	2N	3E	NW of Section 11	
170394-000	#5 SEC 11 T2NR3EWM 40A	40	2N	3E	NE of Section 11	
170398-000	#9 SEC 11 T2NR3EWM 40A	40	2N	3E	NW of Section 11	
208215-000	#7 OF SEC 34 T3NR3EWM 160A	160	3N	3E	SE of Section 34	Comprehensive Plan: Mining Zoning: Mining Combining District
208417-000	#1 OF SEC 35 T3NR3EWM 640A TARGET RANGE	640	3N	3E	NE, NW, SE, SW of Section 35	
208619-000	#1 OF SEC 36 T3NR3EWM 640A	640	3N	3E	NE, NW, SE, SW of Section 36	

SECTION 2
PERMIT NARRATIVE

HABITAT IMPACT SUMMARY

Vegetation will be removed, where necessary, to allow for remediation of lead contaminated soils at firing range berms, range floors and fire support areas. Only portions of these activities will impact riparian habitat areas. The exact area of impact depends on the extent of necessary removal. The table below shows the maximum area of riparian habitat impact. It is likely the actual impact area will be smaller.

FIRING RANGE	STUDY AREA	RIPARIAN HABITAT		Habitat Description
		SQ. FT	ACRES	
25-meter Machine Gun Range	—	12,934	0.30	A coniferous dominated riparian forest exists along the south range boundary. The area within the range boundary has a mix of native and non-native grasses and forbs.
Combat Pistol Range	—	2,769	0.06	A mixed coniferous and deciduous riparian forest surrounds the range to the north, south, and east. Within in the range boundaries there is a mix of native and non-native shrubs, grasses, and forbs.
1,000-inch Rifle Range/Machine Gun Range	C	3,019	0.07	Wetland C1 occurs along northern edge of Study Area C, but not within it. Study area C runs along the edge of Douglas-fir forest and contains a few red alder along its perimeter.
Undocumented Pistol Range	H	13,464	0.31	The majority of Wetland H1extends into the riparian buffer for Lacamas Creek. The wetland is drier to the north with the boundary not far beyond the edge of the study area. It gets wetter to the south where the study area adjoins a spiraea thicket. The south edge is dominated by small trees and shrubs including red alder, cascara, Oregon ash, creek dogwood, cluster rose, and Douglas' spiraea with slough sedge sparse in the understory. The open area contains scattered patches of cluster rose and a mix of herbaceous species including slough sedge, sweet vernal grass, common velvet grass, self heal, and English plantain.
Rifle Ranges No.1 and No.2	E	192,024	4.41	This area is along at the southern corner of study area E, within the riparian buffer for David Creek, a tributary to Lacamas Creek. Area is dominated by red alder, Douglas fir, trailing blackberry, tufted hairgrass, orchardgrass, bracken fern and ox-eye daisy. A small area (361 SF) of the wetland extends from the northern corner of the study area into the buffer of Lacamas Creek. The northern portion of the study area adjoins an extensive area of wetland forest and scrub-shrub thicket.
	A			Northeast corner – This area includes the northern portion of Wetland A1 and borders both Lacamas and David Creek. Dominant vegetation in this area includes: spotted cat's-ear, creeping bentgrass, sweet vernal grass, red alder, Virginia strawberry, tall fescue, and Scotch broom. Northwest corner – This area contains wetlands A3 and portions of A2. Wetland A3 borders Lacamas Creek. The vegetation is strongly dominated by creek dogwood with cascara and vine maple scattered along the edge. There is a large red alder near the center on the bank of the creek along with several saplings. Dominant vegetation in this area includes: tall fescue, red fescue, orchardgrass, common velvetgrass, Canada thistle, trailing blackberry, slough sedge, Queen Anne's lace, creek dogwood, and tall oatgrass.
Field Fire Ranges No.1 and No.2	F	19,383	0.44	Within the riparian habitat buffer for David Creek. Dominant species include red alder, Himalayan blackberry, bracken fern, swordfern, Douglas fir, and Canada thistle.
TOTAL		**243,593**	**5.59**	

PROPOSED MITIGATION

Mitigation for temporary riparian habitat impacts will be through restoring each impact area by regrading the affected areas to match the contours of immediately adjacent areas and seeding with native vegetation. Additionally, invasive and noxious weed species will be removed from those areas.

Species seeded in the impacted areas will include native trees, shrubs, grasses, and herbaceous species observed growing on and adjacent to the affected area.

SECTION 3
PROJECT DESCRIPTION

CAMP BONNEVILLE
Small Range Berms and Fire Support Areas

BACKGROUND

The Department of the Army used Camp Bonneville for live fire of small arms, assault weapons, and field and air defense artillery between 1910 and 1995. Investigations to characterize and cleanup areas of contamination have been ongoing at Camp Bonneville. Berms at the firing ranges were used as a safety feature behind the targets and served as the impact areas for lead bullets. The fire support areas are in the vicinity of the firing lines where brass casings and/or residuals from live loads may have accumulated. The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.

PROJECT DESCRIPTION

Excavation will occur based on one, or a combination of, four scenarios: 1) Earthen Berm Excavation; 2) Pop-Up Target Excavation; 3) Hillside Berm Excavation; or 4) Impact Zone Excavation.

SCENARIO 1 – EARTHEN BERMS

(Rifle Ranges 1 & 2; Field Fire Ranges 1 & 2; Field Ranges 1 & 2; 25-meter Machine Gun Range; Undocumented Pistol Range (Figure 1))

Removal action will involve excavation of any identified “hot spot” areas and approximately the front 2 feet of each berm face and top, and a six-inch lift off of the back. Soil samples will be taken to determine the necessity of removing an additional 1-foot lift from the berm face.

All excavated soil will be screened to remove bullets, brass casings, other metal, organic material, and rock. The screening equipment will have multiple screen sizes to remove various size materials. The last screen will have ¼” opening size to capture bullet-sized metal. Screened soils will be stockpiled into one of six different piles, as follows:

- Rocks, Gravel, Vegetation
- Hot Spot Soils
- < 50 mg/Kg Soil
- 50 ≤ 250 mg/Kg Soil
- 250 ≤ 1000 mg/Kg Soil
- 1000+ mg/Kg Soil

Appropriate disposal/recycling options will be selected based on the measured lead concentrations from each of the stockpiles. Metal collected during screening operations will be recycled and/or disposed of appropriately off-site. Based on laboratory analysis the soil samples of the above stockpiles, the soils will be characterized into one of three following categories:

- Category 1 – soils with Toxic Characteristics Leaching Procedure (TCLP) lead concentrations greater than 5 mg/L. These soils will be transported to a licensed landfill for stabilization and disposal.
- Category 2 – soils with maximum lead concentrations greater than 50 mg/Kg and TCLP lead concentrations less than 5 mg/L. These soils will be recycled or disposed of at an appropriate landfill.
- Category 3 – soils with maximum lead concentrations less than 50 mg/Kg and TCLP lead concentrations less than 5 mg/L. These soils will remain on site and be used for contour grading purposes.

Berm Face Excavation – An X-ray fluorescence spectrometer (XRF) will be used to determine lead concentrations in the remaining berm face after hot spot areas have been removed. The berm will be divided into 15-foot sections and two samples for XRF analysis will be collected in the center of each section. The XRF results will be used to segregate the soils into four lead concentration groups (<50 mg/Kg; 50 ≤ 250 mg/Kg; 250 ≤ 1000 mg/Kg; 1000+ mg/Kg). The berm soils will be excavated, screened, and stockpiled based on the concentrations of lead in each berm section.

After the 2-foot soil lift is removed from each berm, the surface and near-surface soils will be visually inspected for bullets. If no bullets are observed, soil samples will be collected from each section, sieved with a 2 mm screen, and analyzed for lead using the XRF. Samples below cleanup levels will be submitted for confirmation laboratory analysis. A berm section is considered "clean" if both XRF sample results for lead concentration are below 50 mg/Kg. Excavation of the sections along the berm face will continue until no bullets are encountered and the XRF analysis determines remaining soils are below the cleanup level.

Fire Support Areas - A 6-inch soil lift will be removed from fire support areas (e.g. range floors). The soil removal will occur across an area 20 feet wide by the length of the firing line. The 20-foot section will extend from 5 feet in front of the firing line to 15 feet behind the firing line. Excavated soils will be screened and stockpiled separate from the berm soils.

Excavation outside of the identified 20-foot wide section identified above will be based on the results of confirmatory sampling. If elevated levels of lead are identified an additional adjoining area will be excavated. This will continue until sample results for lead concentration are below 50 mg/Kg.

Sample Grid Areas - During soil sampling at the site a number of samples displayed elevated levels of lead. Grids identified during the soil sampling will be excavated as follows:

- A six-inch soil lift will be excavated from the entire 58x58 foot grid when average lead soil concentrations exceed 250 mg/Kg (4 of 307 grids)
- A six-inch soil lift will be excavated from a 29x29 foot area around the sample point when the average soil lead concentrations are greater than 50 mg/kg but less than 118 mg/kg with no indivudal sample contains greater than 250mg/kg. Or where the average lead concentration per grid is >118 mg/Kg but less than 250 mg/Kg. (24 of 307 grids) Confirmatory sampling will occur at each edge of the hot spot excavation area and from the center point.

  If necessary, an additional 6-inch soil lift will be removed from a 14.5x 29 foot section.
  - No excavation will occur in areas where samples displayed lead levels below 50 mg/Kg, or where lead concentrations average less than 50 mg/Kg and where no single sample from a grid exceeds 118mg/kg. (139 of 307 grids)

Grading – When laboratory results confirm the lead concentration in the berm soils are below 50 mg/Kg, the remaining berm will be graded to match surrounding contours. Organic material and rocks stockpiled during sieving will be combined with clean soils and remain on site. All graded sites will be reseeded.

Exceptions - Berm 1 at the 25-meter Machine Gun Range will be completely removed because it was likely reworked over the years and is, thus, potentially contaminated deeper than the 2-feet proposed for removal on all other berms. Additionally, the top 6 inches of soil in the area behind the main range berm will be removed. Lead bullets are visible on the ground surface and it appears as though the hillside may have been used as the target prior to construction of the berm

SCENARIO 2 – POP-UP TARGET BERMS
(Rifle Ranges 1 & 2; Field Fire Ranges 1 & 2; Combat Pistol Range (Figure 1))

The pop-up target berms will be completely removed. In addition, a 6-inch (0.5-ft) soil lift will be removed from an approximate 15-foot radius from the center of the concrete target. The area within the 15-foot

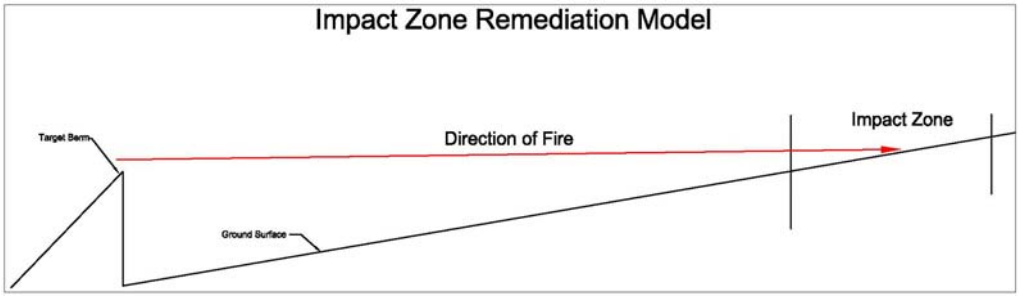
radius will be surface cleared using Shoenstedt's hand-held magnetometers. If nothing is discovered in the area behind the target, soil within that area will not be removed. The soil will be processed and the area graded as described above under Scenario 1.

SCENARIO 3 – HILLSIDE BERMS
(25-meter M60/Pistol Range; 25-meter Record Firing/Field Firing Range; Combat Pistol Range; 1,000-inch Rifle Range/Machine Gun Range (Figure 1))

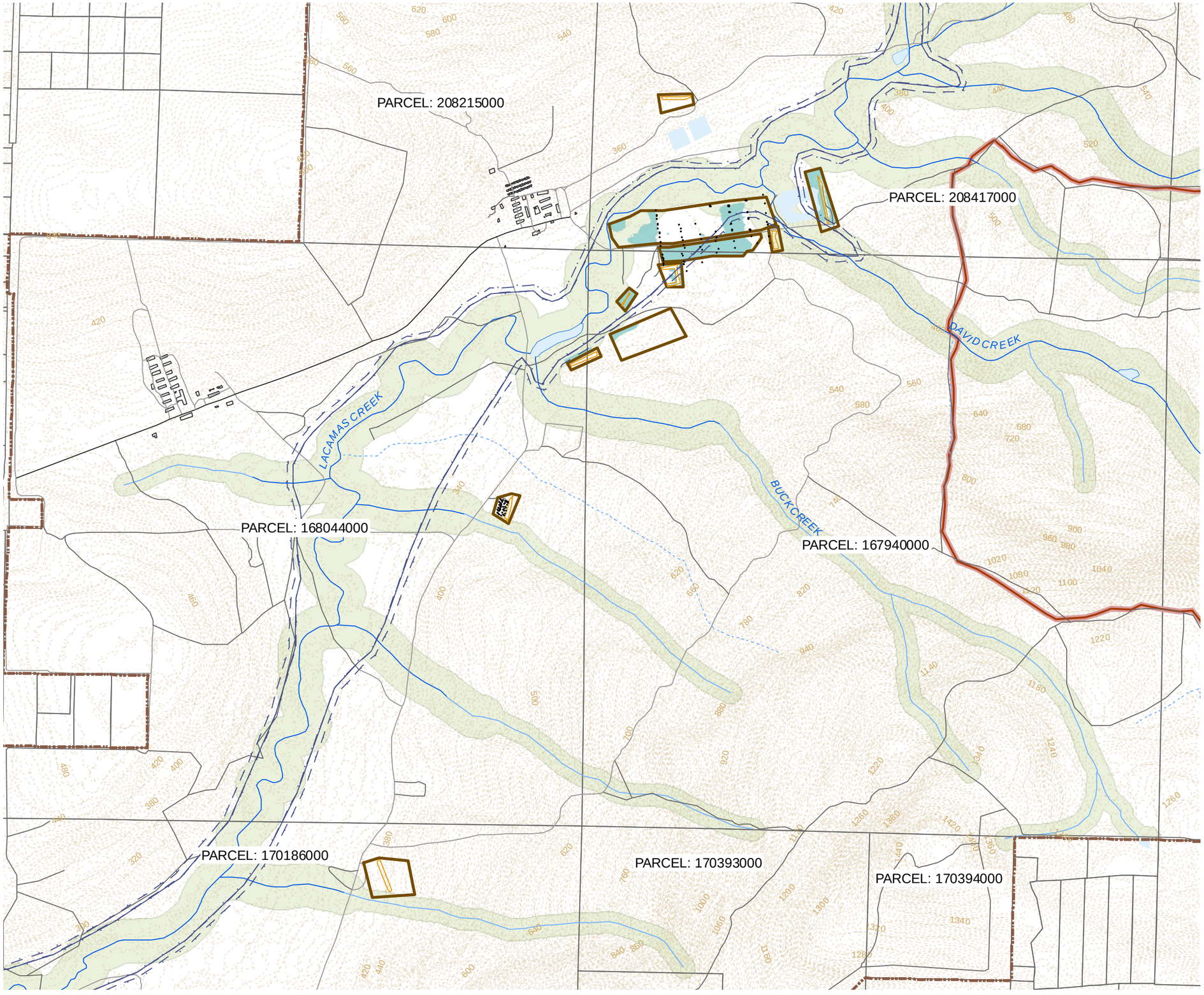
The target berm located in front of the hillside will be completely removed. In addition, the front of the hillside will be excavated, processed, and the area graded as described above under Scenario 1.

SCENARIO 4 – IMPACT ZONE
(Rifle Ranges 1 & 2 (Figure 1))

At this range, additional pop up targets were placed on a target berm across the pop up pond. The identified impact area behind the target berm will be excavated until clean material is left. The impact zone is the area behind the target berm where the trajectory of the bullet would land assuming it missed the target berm. The impact zone will be excavated, processed, and the area graded as described above under Scenario 1.



SECTION 4
EXISTING CONDITIONS MAP



Legend

- Camp Bonneville
- Central Impact Target Area
- Firing Ranges
- Berms
- Pop-up Berms
- Riparian Habitat Buffer
- Flood Transition Area
- Floodway Fringe
- Tax Lots
- Contours

Roads & Trails

- Paved
- Dirt
- Gravel
- Dirt Trail

Streams

- Fish
- Non-Fish
- Unknown
- Water Bodies and Ponds
- Wetlands

0 450 900 Feet

N

Data Sources: Clark County GIS (August 2006); Wetland boundaries marked in the field using a Trimble Geo XT GPS. Camp Bonneville layers provided by Michael Baker Jr., Inc. and MKM Engineers, Inc.

PBS

BCRRT

BONNEVILLE CONSERVATION, RESTORATION & RENEWAL TEAM, LLC

CAMP BONNEVILLE

23201 NE PLUSS ROAD
CLARK COUNTY, WASHINGTON

EXISTING
CONDITIONS MAP

PROJECT: 70489.000

JULY 2007

FIGURE:
1

PBS

PORTLAND
SEATTLE
VANCOUVER
EUGENE
BEND
TRI-CITIES
BANDON

CAMP BONNEVILLE

CLARK COUNTY, WASHINGTON

SEPTEMBER 2007

WETLAND PERMIT APPLICATION

Location: 23201 NE Pluss Road, Vancouver, WA 98682
Sections 34 and 35 Township 3 North, Range 3 East and Sections 1,2,3 and 10 Township 2 North, Range 3 East

Request: The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.

Applicant: Clark County Department of Public Works
Attn: Jerry Barnett
1300 Franklin Street, 4th Floor
Vancouver, WA 98660
(360) 397-6118 x4969; (360) 759-6330 Fax
Jerry.Barnett@clark.wa.gov

Consultant: PBS Engineering and Environmental
Attn: Christy McDonough
1310 Main Street
Vancouver, WA 98660
(360) 213-0444; (360) 696-9064 Fax
christy_mcdonough@pbsenv.com

TABLE OF CONTENTS

SECTION 1

APPLICATION FORM

SUPPLEMENTAL WETLAND REVIEW APPLICATION FORM

DEVELOPMENT REVIEW APPLICATION FORM

(Form DS1000-Revised 4/14/06)

PROJECT NAME: Camp Bonneville – Grading at Small Range Berms and Fire Support Areas		
TYPE(S) OF APPLICATION (See Reverse Side): **Wetland, Habitat**		
DESCRIPTION OF PROPOSAL: The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.		
APPLICANT NAME: Clark County Public Works c/o Jerry Barnett	Mailing Address: PO Box 9810 Vancouver, WA 98666	
E-mail Address: Jerry.Barnett@clark.wa.gov	Phone and Fax: 360.397.6118 ext 4969; 360-397-6051 (fax)	
PROPERTY OWNER NAME (list multiple owners on a separate sheet)**:** Bonneville Conservation, Restoration and Renewal Team Attn: Mike Gage	Address: 23201 NE Pluss Road Vancouver, WA 98682	
E-mail Address: mike.gage@bcrrt.org	Phone and Fax: 505-699-1214	
CONTACT PERSON NAME (list if not same as APPLICANT)**:** Applicant or Owner	Address: Same as above	
E-mail Address: Same as above	Phone and Fax: Same as above	
PROJECT SITE INFORMATION: Site Address: 23201 NE Pluss Road Vancouver, WA 98682	Comp Plan Designation: Forest Tier I	
Cross Street: NE 88th Street	Zoning: Forest Tier I-80	Serial #'s of Parcels: See attached
Overlay Zones: See attached.	Legal: See attached.	Acreage of Original Parcels: Total: 3,840 See attached.
Township: See attached.	Range: See attached.	¼ of Section: See attached.

AUTHORIZATION

The undersigned hereby certifies that this application has been made with the consent of the lawful property owner(s) and that all information submitted with this application is complete and correct. False statements, errors, and/or omissions may be sufficient cause for denial of the request. This application gives consent to the County to enter the properties listed above.

Authorized Signature Date

For Staff Only:

CASE NUMBER:	
WORK ORDER NUMBER:	

Camp Bonneville
Application Form Attachment

Serial # of Parcels	Legal	Acreage	Township	Range	¼ of Section	Overlay Districts
167837-000	ALL SEC 1 T2NR3EWM 640A	640	2N	3E	NE, NW, SE, SW of Section 1	
167940-000	#1 SEC 2 T2NR3EWM 640.94A	640.94	2N	3E	NE, NW, SE, SW of Section 2	
168044-000	#5 SEC 3 T2NR3EWM 619.12A	619.12	2N	3E	NE, NW, SE, SW of Section 3	Comprehensive Plan: Mining Zoning: Mining Combining District
170186-000	#15 SEC 10 T2NR3EWM 320A	320	2N	3E	NE, NW of Section 10	Comprehensive Plan: Mining Zoning: Mining Combining District
170393-000	#4 SEC 11 T2NR3EWM 120A	120	2N	3E	NW of Section 11	
170394-000	#5 SEC 11 T2NR3EWM 40A	40	2N	3E	NE of Section 11	
170398-000	#9 SEC 11 T2NR3EWM 40A	40	2N	3E	NW of Section 11	
208215-000	#7 OF SEC 34 T3NR3EWM 160A	160	3N	3E	SE of Section 34	Comprehensive Plan: Mining Zoning: Mining Combining District
208417-000	#1 OF SEC 35 T3NR3EWM 640A TARGET RANGE	640	3N	3E	NE, NW, SE, SW of Section 35	
208619-000	#1 OF SEC 36 T3NR3EWM 640A	640	3N	3E	NE, NW, SE, SW of Section 36	

WETLAND REVIEW
SUPPLEMENTAL APPLICATION FORM

(Form DS1594-Revised 8/30/06)

If an activity or project that is not explicitly exempt under CCC 40.450.010(C) affects wetlands or wetland buffers, a wetland review will be required. Use this for to identify the type of wetland review that is needed and the associated fee. The handouts referenced in the right hand column will list the specific submittal requirements.

Check applicable box(es) below	Review Type	Fee	Handout
Wetland Pre-determination			
A wetland pre-determination is a request to have County wetland staff conduct an on-site review of up to 40 acres. This is an **optional** application that should only be submitted in advance of a development application for the site or project.			
☐ Wetland Pre-determination	Type I	$443	35B
Single Family Residence Projects			
Wetland permits associated with residential building permits and home business permits are Type I reviews. The reasonable use exception is for cases where the requirements of the ordinance would prevent the construction of a home and/or normal accessory structures on existing legal lots.			
☐ Single family residence	Type I	$700	35C
☐ Home business	Type I	$700	35C
☐ Reasonable use exception (single family)	Type I	$700	35C
Development and Grading Projects			
Permit typing and submittal requirements for development permits is based on the extent of impact proposed. The reasonable use exception is for cases where the requirements of the ordinance would otherwise render the property unbuildable or would result in denial of a linear project (roads and utilities) deemed to be in the public interest.			
☐ Buffer modification only (no direct wetland impact)	Type I	$700	35D
☐ Less than 0.1 acre of direct wetland impact	Type I	$700	35E
☒ 0.1 acre of direct wetland Impact or more	Type II	$1580	35E
☐ Reasonable use exception	Type III	$7500	35F
☐ Reauthorization of an approved permit	Type I	$700	35G
Programmatic Permits			
Programmatic permits are intended to be used for ongoing operations or repetitive activities at multiple sites where impacts and mitigation requirements can be applied without specific County review of each individual impact.			
☐ Programmatic permit – SEPA exempt	Type I	$1400	35H
☐ Programmatic permit – SEPA required	Type I	$2800	35H
☐ Reauthorization of an approved programmatic permit	Type I	$700	35I
☐ *Combined wetland and habitat programmatic permit (check the type of programmatic permit above)*	*10% fee reduction*		

This form is required for a Counter Complete wetland permit application

SECTION 2
NARRATIVE
PROJECT DESCRIPTION

WETLAND IMPACT SUMMARY

A wetland delineation completed by PBS Engineering and Environmental in 2007 identified twelve wetlands within the project area. Of these, eleven have the potential to be temporarily impacted by the proposed construction. The table below shows the maximum area of wetland impact. The actual impact area will be smaller. The grading areas are outlined in the project description and will fall under one or more of the four scenarios described.

FIRING RANGE	WETLAND	WETLANDS	
		SQUARE FEET	ACRES
1,000-inch Rifle Range/Machine Gun Range	C1	OUTSIDE OF STUDY AREA	
25-meter Record Firing/Field Firing Range	D1	9,463	0.22
Undocumented Pistol Range	H1	18,209	0.42
Field Ranges No1. and No.2	G1	251	0.01
	G2	13,641	0.31
Rifle Ranges No.1 and No.2	A1	56,136	1.29
	A2	43,593	1.00
	A3	11,406	0.26
	Isolated 1	313	0.01
	Isolated 2	113	—
Field Fire Ranges No.1 and No.2	B1	116,536	2.68
TOTAL		**269,661**	**6.2**

MITIGATION SUMMARY

Mitigation for temporary wetland impacts will be through restoring each impact area by regrading the affected wetland areas to match the contours of immediately adjacent areas and seeding with native wetland vegetation. Additionally, invasive and noxious weed species will be removed from those areas.

Species seeded in the wetland area will include native trees, shrubs, grasses, and herbaceous species observed growing on and adjacent to the impact areas.

CAMP BONNEVILLE
Small Range Berms and Fire Support Areas

BACKGROUND

The Department of the Army used Camp Bonneville for live fire of small arms, assault weapons, and field and air defense artillery between 1910 and 1995. Investigations to characterize and cleanup areas of contamination have been ongoing at Camp Bonneville. Berms at the firing ranges were used as a safety feature behind the targets and served as the impact areas for lead bullets. The fire support areas are in the vicinity of the firing lines where brass casings and/or residuals from live loads may have accumulated. The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.

PROJECT DESCRIPTION

Excavation will occur based on one, or a combination of, four scenarios: 1) Earthen Berm Excavation; 2) Pop-Up Target Excavation; 3) Hillside Berm Excavation; or 4) Impact Zone Excavation.

SCENARIO 1 – EARTHEN BERMS

(Rifle Ranges 1 & 2; Field Fire Ranges 1 & 2; Field Ranges 1 & 2; 25-meter Machine Gun Range; Undocumented Pistol Range (Figure 1))

Removal action will involve excavation of any identified “hot spot” areas and approximately the front 2 feet of each berm face and top, and a six-inch lift off of the back. Soil samples will be taken to determine the necessity of removing an additional 1-foot lift from the berm face.

All excavated soil will be screened to remove bullets, brass casings, other metal, organic material, and rock. The screening equipment will have multiple screen sizes to remove various size materials. The last screen will have ¼” opening size to capture bullet-sized metal. Screened soils will be stockpiled into one of six different piles, as follows:

- Rocks, Gravel, Vegetation
- Hot Spot Soils
- < 50 mg/Kg Soil
- 50 ≤ 250 mg/Kg Soil
- 250 ≤ 1000 mg/Kg Soil
- 1000+ mg/Kg Soil

Appropriate disposal/recycling options will be selected based on the measured lead concentrations from each of the stockpiles. Metal collected during screening operations will be recycled and/or disposed of appropriately off-site. Based on laboratory analysis the soil samples of the above stockpiles, the soils will be characterized into one of three following categories:

- Category 1 – soils with Toxic Characteristics Leaching Procedure (TCLP) lead concentrations greater than 5 mg/L. These soils will be transported to a licensed landfill for stabilization and disposal.
- Category 2 – soils with maximum lead concentrations greater than 50 mg/Kg and TCLP lead concentrations less than 5 mg/L. These soils will be recycled or disposed of at an appropriate landfill.
- Category 3 – soils with maximum lead concentrations less than 50 mg/Kg and TCLP lead concentrations less than 5 mg/L. These soils will remain on site and be used for contour grading purposes.

Berm Face Excavation – An X-ray fluorescence spectrometer (XRF) will be used to determine lead concentrations in the remaining berm face after hot spot areas have been removed. The berm will be divided into 15-foot sections and two samples for XRF analysis will be collected in the center of each section. The XRF results will be used to segregate the soils into four lead concentration groups (<50 mg/Kg; 50 ≤ 250 mg/Kg; 250 ≤ 1000 mg/Kg; 1000+ mg/Kg). The berm soils will be excavated, screened, and stockpiled based on the concentrations of lead in each berm section.

After the 2-foot soil lift is removed from each berm, the surface and near-surface soils will be visually inspected for bullets. If no bullets are observed, soil samples will be collected from each section, sieved with a 2 mm screen, and analyzed for lead using the XRF. Samples below cleanup levels will be submitted for confirmation laboratory analysis. A berm section is considered "clean" if both XRF sample results for lead concentration are below 50 mg/Kg. Excavation of the sections along the berm face will continue until no bullets are encountered and the XRF analysis determines remaining soils are below the cleanup level.

Fire Support Areas - A 6-inch soil lift will be removed from fire support areas (e.g. range floors). The soil removal will occur across an area 20 feet wide by the length of the firing line. The 20-foot section will extend from 5 feet in front of the firing line to 15 feet behind the firing line. Excavated soils will be screened and stockpiled separate from the berm soils.

Excavation outside of the identified 20-foot wide section identified above will be based on the results of confirmatory sampling. If elevated levels of lead are identified an additional adjoining area will be excavated. This will continue until sample results for lead concentration are below 50 mg/Kg.

Sample Grid Areas - During soil sampling at the site a number of samples displayed elevated levels of lead. Grids identified during the soil sampling will be excavated as follows:

- A six-inch soil lift will be excavated from the entire 58x58 foot grid when average lead soil concentrations exceed 250 mg/Kg (4 of 307 grids)
- A six-inch soil lift will be excavated from a 29x29 foot area around the sample point when the average soil lead concentrations are greater than 50 mg/kg but less than 118 mg/kg with no indivudal sample contains greater than 250mg/kg. Or where the average lead concentration per grid is >118 mg/Kg but less than 250 mg/Kg. (24 of 307 grids) Confirmatory sampling will occur at each edge of the hot spot excavation area and from the center point.

  If necessary, an additional 6-inch soil lift will be removed from a 14.5x 29 foot section.
  - No excavation will occur in areas where samples displayed lead levels below 50 mg/Kg, or where lead concentrations average less than 50 mg/Kg and where no single sample from a grid exceeds 118mg/kg. (139 of 307 grids)

Grading – When laboratory results confirm the lead concentration in the berm soils are below 50 mg/Kg, the remaining berm will be graded to match surrounding contours. Organic material and rocks stockpiled during sieving will be combined with clean soils and remain on site. All graded sites will be reseeded.

Exceptions - Berm 1 at the 25-meter Machine Gun Range will be completely removed because it was likely reworked over the years and is, thus, potentially contaminated deeper than the 2-feet proposed for removal on all other berms. Additionally, the top 6 inches of soil in the area behind the main range berm will be removed. Lead bullets are visible on the ground surface and it appears as though the hillside may have been used as the target prior to construction of the berm

SCENARIO 2 – POP-UP TARGET BERMS
(Rifle Ranges 1 & 2; Field Fire Ranges 1 & 2; Combat Pistol Range (Figure 1))

The pop-up target berms will be completely removed. In addition, a 6-inch (0.5-ft) soil lift will be removed from an approximate 15-foot radius from the center of the concrete target. The area within the 15-foot

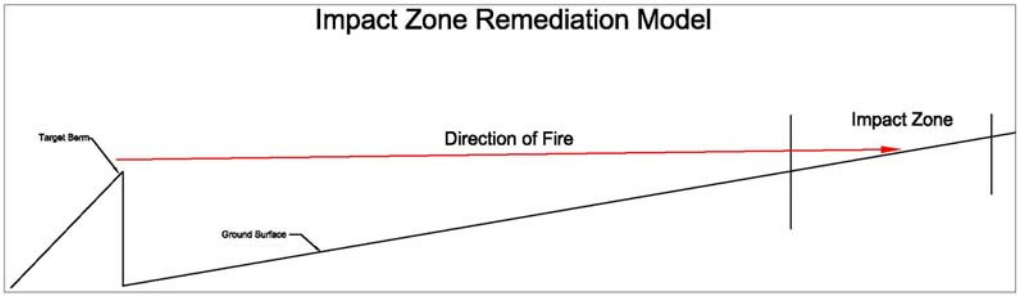
radius will be surface cleared using Shoenstedt's hand-held magnetometers. If nothing is discovered in the area behind the target, soil within that area will not be removed. The soil will be processed and the area graded as described above under Scenario 1.

SCENARIO 3 – HILLSIDE BERMS
(25-meter M60/Pistol Range; 25-meter Record Firing/Field Firing Range; Combat Pistol Range; 1,000-inch Rifle Range/Machine Gun Range (Figure 1))

The target berm located in front of the hillside will be completely removed. In addition, the front of the hillside will be excavated, processed, and the area graded as described above under Scenario 1.

SCENARIO 4 – IMPACT ZONE
(Rifle Ranges 1 & 2 (Figure 1))

At this range, additional pop up targets were placed on a target berm across the pop up pond. The identified impact area behind the target berm will be excavated until clean material is left. The impact zone is the area behind the target berm where the trajectory of the bullet would land assuming it missed the target berm. The impact zone will be excavated, processed, and the area graded as described above under Scenario 1.

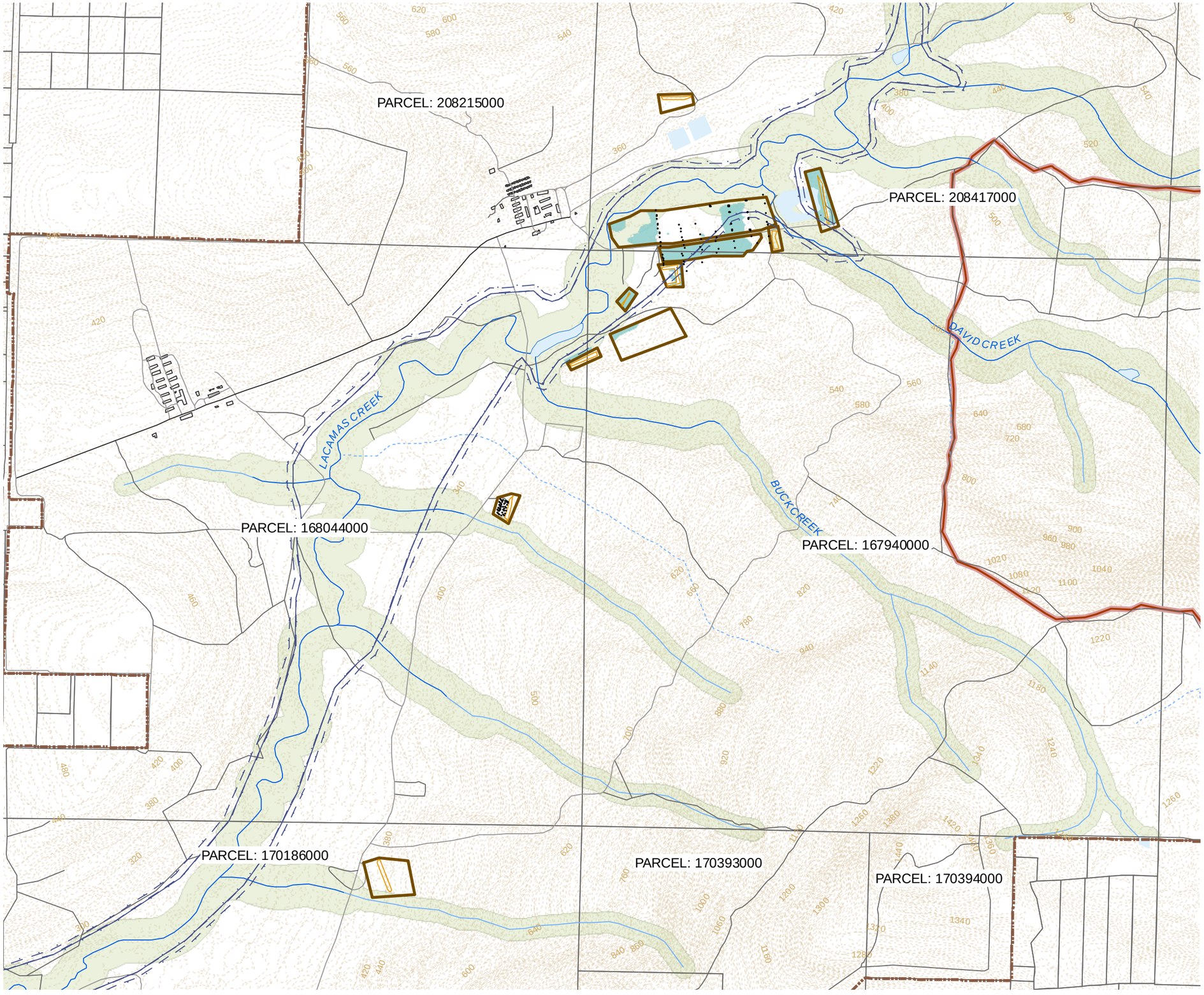


SECTION 3

WETLAND DELINEATION REPORT

WETLAND RATING FORM (APPENDIX D OF DELINEATION REPORT)

SECTION 4
EXISTING CONDITIONS MAP



Legend

- Camp Bonneville
- Central Impact Target Area
- Firing Ranges
- Berms
- Pop-up Berms
- Riparian Habitat Buffer
- Flood Transition Area
- Floodway Fringe
- Tax Lots
- Contours

Roads & Trails

- Paved
- Dirt
- Gravel
- Dirt Trail

Streams

- Fish
- Non-Fish
- Unknown
- Water Bodies and Ponds
- Wetlands

0 450 900 Feet

N

Data Sources: Clark County GIS (August 2006); Wetland boundaries marked in the field using a Trimble Geo XT GPS. Camp Bonneville layers provided by Michael Baker Jr., Inc. and MKM Engineers, Inc.

PBS

BCRRT

BONNEVILLE CONSERVATION, RESTORATION & RENEWAL TEAM, LLC

CAMP BONNEVILLE

23201 NE PLUSS ROAD
CLARK COUNTY, WASHINGTON

EXISTING
CONDITIONS MAP

PROJECT: 70489.000

JULY 2007

FIGURE:
1

PBS

Wetland Delineation Report

Camp Bonneville, Small Arms Firing Ranges
Clark County, Washington

Prepared for:
Michael Baker Jr., Inc.
Crown Point, Indiana

July 2007
Project No.: 70489.000, Task 520K

1310 Main Street
Vancouver, WA 98660
360.690.4331 MAIN
360.696.9064 FAX
888.873.7273 TOLL FREE

ENGINEERING AND ENVIRONMENTAL | www.pbsenv.com

WETLAND DELINEATION REPORT

Camp Bonneville – Small Arms Firing Ranges
TPN: 168044-000, 167940-000, and 208417-000
Clark County, Washington

Prepared for
Michael Baker Jr., Inc
Attn: Mr. Mark Knight
5621 Fountain Drive, Suite A
Crown Point, IN 46307

This report is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced in total or in part without the expressed written consent of the client and PBS.

Prepared by
PBS Engineering and Environmental
1310 Main Street
Vancouver, WA 98660
(360) 690-4331

PBS Project No.: 70489.000, Task 520K

July 2007

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

PBS Engineering and Environmental (PBS) was contracted by Michael Baker Jr., Inc. (Baker) to delineate wetlands within specific areas of the 3,840-acre Camp Bonneville property in Clark County, Washington. The Bonneville Conservation, Restoration & Renewal Team (BCRRT) currently owns the property. BCRRT is working to characterize and cleanup areas of contamination at the former military site. PBS biologists, Jason Clark and Caroline Stimson, conducted the fieldwork on June 26 - 29, 2007.

The delineation was conducted using a modified version of the Comprehensive Determinations procedures in the Washington State Wetlands Identification and Delineation Manual (Ecology 1997). Wetland boundaries were determined based solely on the composition of the plant communities and visually observable surface hydrology indicators due to the hazards associated with digging holes on the site.

The wetland boundaries described in this report are PBS's best professional opinion based on the circumstances and site conditions encountered at the time of this study. The final determination of the wetland boundary, classification, and required setback and buffer will be made by local, state, and federal jurisdictions.

2.0 SITE DESCRIPTION

2.1 Location

Camp Bonneville is located on the western slopes of the Cascade Mountains in the Lacamas Creek Valley in Clark County, Washington, approximately 15 miles northeast of Portland, Oregon and approximately 10 miles northeast of Vancouver, Washington. The entrance to Camp Bonneville is located at 23201 NE Pluss Road. The site occupies approximately 3,840 acres in sections 34 and 35, Township 3 North, Range 3 East, and sections 1, 2, 3 and 10, Township 2 North, Range 3 East, Willamette Meridian (Figure 1).

The study areas are within identified small arms firing ranges at the site. This area consists of tax parcels 168044-000, 167940-000, and 208417-000 (Figure 2).

2.2 Site Description

Most of the site is currently undeveloped. Camp Bonneville itself is comprised of two small cantonment areas (Bonneville Cantonment and Killpack Cantonment) that together cover about 30 acres. The remainder of the installation includes 18 training areas, 28 firing ranges, and a 1,500-foot long helicopter landing area. Some portions of the site consist of managed forest. Adjacent, surrounding land use is predominantly agricultural, rural residential, and forest.

The western edge of the installation is within the Fifth Plain area, which is generally flat. Elevations at the installation range from approximately 300 feet above sea level (along Lacamas Creek) to about 1,640 feet in the southeastern corner of the installation.

2.3 Hydrology

The major sources of water in the project area are precipitation, ground water, and Lackamas Creek with its associated tributaries and sloughs. Some of the project area is within the mapped floodway fringe of Lacamas Creek.

Clark County has a predominantly temperate marine climate typical of much of the west coast. Summers are warm and relatively dry, and winters tend to be mild, but rather wet. The coastal mountains protect the county from the intense winter storms common on the coast. Mean high temperatures for Vancouver, Washington, range from 46°F in December to 79°F in August. Mean low temperatures range from 32°F in January to 50°F in August. Precipitation was below the normal range for June 2007. Precipitation levels are considered normal when they fall between figures for which there is a 30% chance of more than that amount and a 30% chance of less than that amount (Table 1). For the month of June 2007, the area received less rainfall than average and total precipitation was lower than the normal range. In June 2007, rainfall was 0.66 inches below the average of 1.74 inches (Table 1). Daily precipitation totals for the two weeks prior to the day of fieldwork are listed in Table 2.

Table 1: Monthly precipitation data for Vancouver, Washington.
(WETS data for Vancouver 4 NNE, NRCS 2007
and NOAA National Weather Service Forecast Office 2007)

	Precipitation (inches)			
		1971-2000		
		30% chance will have		
Month	Recorded Totals	Less than	More than	Average
July-06	0.47	0.31	0.99	0.80
August-06	0.10	0.39	1.29	1.06
September-06	0.86	0.71	2.20	1.76
October-06	1.40	1.93	3.99	3.28
November-06	11.92	4.23	7.52	6.29
December-06	5.85	4.44	7.50	6.32
January-07	2.72	3.83	6.97	5.81
February-07	3.47	3.45	5.72	4.84
March-07	3.20	3.32	4.84	4.21
April-07	2.01	2.23	3.62	3.07
May-07	1.45	1.69	3.18	2.64
June-07	1.08	1.14	2.09	1.74

Table 2: Daily precipitation totals for Vancouver one week prior to and during fieldwork.
(NOAA National Weather Service Forecast Office 2007.)

June-07	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	28-Jun	29-Jun
Precipitation (in.)	0.00	0.00	0.00	0.00	trace	trace	0.16	0.00	0.00	0.00	0.07	0.03

2.4 Mapped Soils

The Clark County Soil Survey shows four soil map units in the study area identified for this project (Figure 4).

- Hesson Clay Loam, 0 to 8 percent slopes (HcB)
- McBee Silty Clay Loam, 0 to 3 percent slopes (MeA)
- Olympic Stony Clay Loam, 3 to 30 percent slopes (OmE)
- Olympic Stony Clay Loam, 30 to 60 percent slopes (OmF)

None of the soils are classified as hydric, however, the Hesson and McBee units have inclusions of hydric soils (NRCS 2001). Most of the study areas are within the McBee unit.

The Hesson Series consists of deep, well drained soils, mostly level to gently rolling with some areas that are hilly and very steep. The parent material is deeply weathered, mixed old alluvium containing varying amounts of gravel. The surface layer is about 8 inches thick and consists of a dark reddish-brown (5YR 2.5/2) clay loam. It is underlain by about 4 inches of a dark reddish-brown (5YR 3/2) clay loam. The next 10 inches consists of a friable, dark reddish-brown (5YR 3/3) clay loam. The substratum is a reddish-brown (5YR 4/4) clay.

The McBee Series consists of deep, somewhat poorly drained and moderately well drained, nearly level to gently sloping soils. These soils formed in alluvium derived from quartzite and basalt and are found in back-bottom positions along streams and rivers. The surface layer is silty clay loam about 11 inches thick. It is very dark brown (10YR 2/2) in the uppermost part and dark brown (10YR 3/3) in the lower part. The next layer is about 41 inches thick and consists of (top down): very dark reddish-brown (5YR 3/2) silty clay loam; dark brown (7.5YR 4/4) silty clay loam; and grayish-brown (10YR 5/1) and dark yellowish-brown (10YR 4/4) silty clay loam. The underlying material (to 65 inches) is gray (10YR 6/1) and brown (7.5YR 4/4) clay.

The Olympic Series consists of well drained, gently sloping to very steep soils underlain by basalt bedrock. These soils formed on mountainous foot slopes in weathered igneous lava flows. The surface layer is about 13 inches thick and consists of dark reddish-brown (5YR 3/2) clay loam. The subsurface layer is 46 inches thick and consists of, in sequence from the top, a friable, dark reddish-brown (5YR 3/2) clay loam (7 inches); reddish-brown (5YR 4/4) heavy silty clay loam (12 inches); firm, reddish-brown (5YR 3/2) heavy clay loam (12 inches); and the lower 15 inches is very firm, dark brown (7.5YR 4/4) gravelly clay loam. The underlying material is weathered basalt bedrock (McGee 1972).

2.5 Plant Communities

The plant communities in the study area have been affected by a history of disturbance and regular mowing that ceased when the area was vacated by the military in 1997. The vegetation includes wetland and upland herbaceous communities, wetland forest, wetland scrub-shrub, and upland coniferous forest. Upland areas were primarily dominated by non-native grasses and forbs including sweet vernal grass (*Anthoxanthum odoratum*), spreading bentgrass (*Agrostis stolonifera*), ox-eye daisy (*Leucanthemum vulgare*), wild carrot (*Daucus carota*), and spotted cat's-ear (*Hypochaeris radicata*). Some upland areas had significant cover of trailing

blackberry (*Rubus ursinus*) and some had Douglas-fir (*Pseudotsuga menziesii*) saplings and poles. Upland portions of Study Areas C and D contain Douglas-fir dominated forest. Wetland plant communities ranged from emergent communities dominated by sedges (*Carex spp.*), rushes (*Juncus spp.*), and various grass species to areas with young saplings and shrubs that have emerged since the cessation of mowing on the site. These include red alder (*Alnus rubra*), Oregon ash (*Fraxinus latifolia*), Douglas's spirea (*Spiraea douglasii*), and clustered rose (*Rosa pisocarpa*).

3.0 METHODS

The delineation was conducted using a modified version of the Comprehensive Determinations procedures in the Washington State Wetlands Identification and Delineation Manual (Ecology 1997). Wetland boundaries were determined based solely on the composition of the plant communities and visually observable surface hydrology indicators. No holes to examine soils and subsurface hydrology indicators were dug because the ranges have not been cleared of munitions and explosives of concern (MEC) and there are hazards associated with digging holes on the site. Transects were spaced 75 to 100 feet apart and sample plots were placed every 75 feet along the transects. Vegetation was examined and recorded at each sample point. The vegetation was examined in three strata: herbaceous ground cover, shrubs, and trees. Visual estimates of percent cover of each species occurring within a sample plot were made for each stratum. Cover for trees, saplings, and shrubs (where present) was estimated within a 10-meter radius of each sample point. Cover for herbs was estimated within a 1-meter square plot placed immediately southwest of the sample point. Raw cover of each species was converted to relative cover for each stratum in the field or during data processing.

Dominance was determined using the 50/20 rule. Dominant plant species for each stratum are those that cumulatively make up the most abundant 50 percent (relative cover), plus any additional species with 20 percent or more cover. In most cases, a 15% raw cover threshold was used as a criterion for dominance in addition to the 50/20 rule. The wetland indicator status for each dominant plant species was used to determine the presence or absence of a wetland (hydrophytic) plant community based on the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988, 1993). Where more than 50% of the dominant species were FAC or wetter, the plot was identified as having a hydrophytic plant community, and therefore designated as wetland. Where less than 50% of the dominant species were FAC or wetter, the plot was designated upland. Where exactly 50% of the dominant species were FAC or wetter, best professional judgment was used to designate the plot as wetland or upland. Professional judgment took into account the non-dominant species present in the plot and visual indicators of surface hydrology.

Preliminary preparation prior to the on-site investigation consisted of collecting and reviewing existing data and information that included the following:

- USGS Topographic Map, Battle Ground 7.5-minute Quadrangle (1975)
- Clark County tax lot information (Figure 2)
- Aerial photographs (Figure 3)
- Clark County soil survey and hydric soils list (Figure 4)
- National wetland inventory map (Figure 5a)
- Local wetland inventory map (Figure 5b)

- Clark County's Potential Wetland Area Map for Camp Bonneville (Figure 6)

The study areas were identified based on the range locations or portions of ranges that were within the boundary of Clark County's Potential Wetland Area Map for Camp Bonneville (Figure 6). This area was identified by Clark County based on site topography and the NWI and LWI maps. Portions of the ranges that fell outside this boundary were excluded from the investigation because they were clearly upland due to a rise in topography and corresponding change in vegetation.

Delineation fieldwork was conducted on June 26-29, 2007. Data were recorded for 198 sample plots. Sample plots were sited along transects to establish the location of the wetland boundaries. Other criteria, such as topography and visible hydrologic indicators, were also used. Each sample plot was marked in the field using pink wire flags or pink flagging ribbon (depending on the vegetation) labeled with the transect number and the plot number (e.g., T1, P1 for Transect 1 Plot 1). The wetland boundary was marked in the field using pink wire flags or pink flagging ribbon and a predefined labeling system. Wetland boundary flags were labeled with the name of the identified wetland plus sequential numbers going in a counter clockwise direction (e.g., A1-1, A1-2, and so on). PBS located the wetland boundary markers and sample plot locations with a Trimble GeoXT, a GPS unit with sub-meter accuracy after post-processing and differential corrections.

4.0 RESULTS

4.1 National and Local Wetlands Inventories

The National Wetlands Inventory and Clark County Local Wetland Inventory shapefiles provided by the Clark County GIS Department (2007) identified wetlands within portions of the identified study areas (Figure 5a and 5b). These did not identify most of the area delineated as wetland during this investigation.

4.2 Growing Season

The Natural Resources Conservation Service (NRCS) currently defines the growing season as that portion of the year when soil temperatures at 20 inches below the soil surface are higher than biological zero (41°F or 5°C). When soil temperature data are not available, the Wetland Delineation Manual allows using the closest and best available weather station data to estimate the length of the growing season based on a 50% probability of a temperature of 28°F or higher (Ecology 1997, paragraph 46).

Based on the 28° standard and climatic data for Vancouver, Washington (NRCS 2005), the growing season is approximately 292 days at least 50 percent of the time, extending from February 11 to December 1 (McGee 1972). Native plants in the study area were actively growing at the time of the site visit in June 2007.

4.3 Delineated Wetlands

PBS investigated each study area for wetlands and waters of the state. Twelve wetlands were delineated during the investigation. The wetlands were named with the letter of the identified study area (A through H) and a number (e.g., Wetland A1, A2, and A3). In most cases, the identified wetlands extend beyond the boundaries of the study areas. The combined area of wetlands occurring within the study areas under the jurisdiction of Clark County and the US Army Corps of Engineers is 7.68 acres.

The wetlands varied in the apparent level and duration of inundation and saturation. The wettest areas contained a dominance of sedges, small-flowered bulrush (*Scirpus microcarpus*), spikerush (*Eleocharis sp.*), or often had saplings of Oregon ash. Facultative (FAC) grasses (e.g., *Agrostis stolonifera*) occurred in and out of the wetlands, as did facultative upland (FACU) species (e.g., *Anthoxanthum odoratum* and *Cirsium arvense*). Common rush (*Juncus effusus*) is also present both in and out of the wetlands, and while thriving in moist conditions, did not appear to be a reliable indicator on this site given the history of disturbance. The upland boundary was often determined by the dominance of ox-eye daisy (*Leucanthemum vulgare*), sweet vernal grass (*Anthoxanthum odoratum*), spotted cat's-ear (*Hypochaeris radicata*), Virginia strawberry (*Fragaria virginiana*), and wild carrot (*Daucus carota*).

Wetland A1

Wetland A1 is in the northeastern portion of Study Area A and covers 1.29 acres. The topography consists of a gentle swale that conducts water north towards the creek, although it infiltrates short of the creek and the wetland does not connect to it. The vegetation is sparse with bare cracked soil exceeding 50% in some areas. Common plant species include: soft rush (*Juncus effusus),* taper-tip rush (*Juncus acuminatus*), bog St. John's-wort (*Hypericum anagalloides*), hairy cat's-ear (*Hypochaeris radicata*) and pointed broom sedge (*Carex scoparia*). Douglas-fir (*Pseudotsuga menziesii*) and red alder (*Alnus rubra*) saplings are encroaching near the eastern boundary of the wetland.

Wetland A2

Wetland A2 is on the west side of Study Area A and covers 1.00 acre of the study area. This wetland lies on a generally flat plain with subtle undulations at the base of a slope between the road and the creek. It is diversely vegetated including patches of slough sedge (*Carex obnupta*), common rush (*Juncus effusus*), pointed broom sedge (*Carex scoparia*), red fescue (*Festuca rubra*), and common velvet grass (*Holcus lanatus*). Canada thistle (*Cirsium arvense*) is fairly dense in some areas and often mixed with slough sedge. Ox-eye daisy, orchard grass (*Dactylis glomerata*), sweet vernal grass, spotted cat's-ear, and meadow knapweed (*Centaurea pratensis*) are present in areas but generally with low amounts of cover. Cluster rose is present in scattered patches. One small group of red alder is present near the center of the wetland. Most of the water collected in this wetland infiltrates into the soil, although the wetland does appear to connect to Lacamas Creek and wetlands south of the road.

Wetland A3

Wetland A3 is at the northwest corner of Study Area A and covers 0.26 acres of the study area. This wetland borders Lacamas Creek. The vegetation is strongly dominated by creek dogwood (*Cornus sericea*) with buckthorn cascara (*Rhamnus purshiana*) and vine maple (*Acer circinatum*) scattered along the edge. There is a large red alder near the center on the bank of the creek along with several saplings.

Wetland B1

Wetland B1 covers 2.68 acres of Study Area B and thus occupies the majority of it. This is a wetland mosaic with approximately 20% inclusions of small upland areas. Since the site was last mowed, Oregon ash, Douglas's spirea, and cluster rose have colonized the site,

occasionally in dense patches or as scattered individuals. The ash was generally less than 10 feet tall, while the spirea was often 4 to 6 feet. Trailing blackberry (*Rubus ursinus*) is common. In the herbaceous layer, there is a scattered distribution of slough sedge and common rush. The more open areas generally appear dryer and contain ox-eye daisy, spotted-cat's ear, wild carrot, self heal (*Prunella vulgaris*), Canadian goldenrod (*Solidago canadensis*), sweet vernal grass, and California oatgrass (*Danthonia californica*). Areas of bare soil typically have a cracked crust on the surface indicating recent inundation. Reed canarygrass (*Phalaris arundinacea*) is growing on and around the pop-up mounds that were used in training. Small-flowered bulrush occurs in a few patches. In the lowest area next to the road across from Wetland A1, the area was inundated.

Wetland C1

Wetland C1 occurs along the northern edge of Study Area C, but not within it. Study area C runs along the edge of Douglas-fir forest and contains a few red alder along its perimeter. The wetland covers a broad area and appears to connect to the creek in some places. Red alder, cluster rose, and Douglas's spirea occur in patches within a matrix of FAC and FACW grasses including reed canarygrass, common velvetgrass (*Holcus lanatus*), and slender hairgrass (*Deschampsia elongata*).

Wetland D1

Wetland D1 is in the northwest corner of Study Area D and covers 0.22 acres. The wetland lies on the edge of the flat valley floor abutting the Douglas-fir forest on the adjacent slope. The vegetation is a red alder dominated forest with a diversity of hydrophytic shrubs including creek dogwood, salmonberry (*Rubus spectabilis*), and twinberry honeysuckle (*Lonicera involucrata*). The herb layer contains lady fern (*Athyrium filix-femina*), western swordfern (*Polystichum munitum*), Siberian miner's lettuce (*Claytonia sibirica*), and common monkey flower (*Mimulus guttatus*).

Wetland E1

Wetland E1 covers 1.49 acres of Study Area E and occupies the entire area north of the road, with the exception of the berm. The inundated edge of the pond along the west side of the study area is dominated by creeping spikerush (*Eleocharis palustris*). This grades into slough sedge, taper-tip rush (*Juncus acuminatus*), and patches of Douglas's spirea and red alder along the base of the berm. The berm is vegetated predominantly with FACU species and is steeply sloped along the west side rising approximately 12 feet from the surrounding land. A constructed wall supports the east side of the berm. The northern portion of the study area adjoins an extensive area of wetland forest and scrub-shrub thicket.

Wetland G1

Wetland G1 covers 251 square feet (0.01 acre) in the northwest corner of Study Area G. The wetland consists of a ditch that runs along the east side of an old road track west of the adjacent slope. The vegetation contains an abundance of small-fruited bulrush along with slough sedge, common velvet grass, pointed broom sedge, and large-leaf avens (*Geum macrophyllum*). Saplings of Oregon ash, Douglas's spirea, and Himalayan blackberry are also present. The ditch drains to the south where it merges with wetland forest and scrub-shrub thickets.

Wetland G2
Wetland G2 consists of areas inside and outside of the horseshoe-shaped berm in Study Area G. It covers 0.31 acres of the study area. The berm rises 15 to 25 feet from the surrounding ground and is very steeply sloped. It is densely covered with common horsetail (*Equisetum arvense*), grasses, and Himalayan blackberry. The interior portion of the wetland is dominated by common rush (*Juncus effusus*) and lesser amounts of Canada thistle. Several Douglas's spirea and a few Oregon ash, red alder, and cascara are also present. To the north lies Wetland B1. To the east lies an extensive area of inundated Douglas's spirea thicket. To the south, there is wetland forest of Oregon ash, red alder, and Sitka willow (*Salix sitchensis*) with native shrub and herb layers. The portion inside the berm connects to the portion outside the berm in the southwest corner of the study area.

Wetland H1
Wetland H1 consists of all of Study Area H covering 0.42 acres. The wetland is drier to the north with the boundary not far beyond the edge of the study area. It gets wetter to the south where the study area adjoins a spirea thicket. Small trees and shrubs dominate the south edge including red alder, cascara, Oregon ash, creek dogwood, cluster rose, and Douglas' spirea with slough sedge sparse in the understory. The open area contains scattered patches of cluster rose and a mix of herbaceous species including slough sedge, sweet vernal grass, common velvet grass, self heal, and English plantain (*Plantago lanceolata*). The berm is a low mound approximately 2 feet tall supported by a wooden wall on the south side, but is dominated by hydrophytic vegetation.

Isolated Wetlands
Two small, isolated wetlands were identified within Study Area A. Wetland A4 is 144 square feet and consists of slough sedge with minor amounts of trailing blackberry, red fescue, and ox-eye daisy. Wetland A5 is 400 square feet and contains slough sedge with common rush and common velvet grass around the edge and several Oregon ash saplings.

4.4 Wetland Functional Values and Wetland Categories
The Washington Department of Ecology and Chapter 40.450.020 of the Clark County Code require the use of the Washington State Wetlands Rating System for Western Washington (Hruby 2004) to determine wetland categories. This system assesses values for water quality, hydrologic, and habitat functions. The values for these wetland functions are shown in Table 3. For the purposes of the wetland rating system, the entire wetland is rated as a whole, not just the portion that occurs within a given study area. Wetlands A1, A2, A3, B1, C1, D1, G1, G2, and H1 were rated together because they are connected to each other outside the boundaries of the study areas and are part of a valley bottom wetland complex that covers approximately 22 acres. Wetland E1 is also part of a larger wetland covering approximately 18 acres. Wetlands A4 and A5 were rated individually, because they are not connected to other wetlands and are considered isolated.

The valley bottom wetland complex includes nine of the delineated wetland areas within the study areas (A1, A2, A3, B1, C1, D1, G1, G2, and H1) and scored high for water quality, hydrologic, and habitat functions. The potential for water quality functions is enhanced by the seasonal ponding in some areas and the unmowed, ungrazed vegetation, while the presence of

lead in the soil provides the opportunity for pollutants to be filtered. The potential for hydrologic functions is enhanced by the depth of water storage and the intermittent outlet of the wetland, while flooding issues on Lacamas Creek provide the opportunity for the wetlands to reduce peak flows. The habitat functions are enhanced by the variety of vegetation types, habitat interspersion, high species diversity, and natural buffers with connectivity to other habitats and wetlands. Based on the results of this analysis, the wetland meets the criteria of a Category 2 wetland.

Wetland E1 has many of the same characteristics as those described above and scored the same for water quality and habitat functions. It scored slightly higher for hydrologic functions because of the depth of water storage in the pond. It also meets the criteria of a Category 2 wetland.

Wetlands A4 and A5 are very similar and scored the same for each function. The water quality score was relatively high because the wetlands are a depression with no outlet, they have persistent, ungrazed, unmowed vegetation, and because lead in the soils provides the opportunity for them to contribute to water quality. They scored slightly lower than those above because they are shallow depressions and lack significant seasonal ponding. The hydrologic score was also limited by the lack of water storage. The habitat functions were limited by the single vegetation type, absence of habitat interspersion, and low species diversity. Based on the results of this analysis, A4 and A5 meet the criteria of Category 3 wetlands.

Table 3. Functional values for wetlands delineated at Camp Bonneville.

Wetland	Water Quality	Hydrologic	Habitat	Total Score	Category
A1, A2, A3, B1, C1, D1, G1, G2, H1	18	10	31	59	2
E1	18	14	31	63	2
A4	16	6	11	33	3
A5	16	6	11	33	3

5.0 CONCLUSION

5.1 Summary

The identified study areas within the Camp Bonneville property contain twelve wetlands. Nine of these wetlands are hydrologically connected to each other and are part of a valley bottom wetland complex. Wetland E1 is also part of a larger wetland. Small, isolated wetlands, such as Wetlands A4 and A5, will not likely be regulated by the US Army Corps of Engineers (Corps) or Clark County, but are regulated by the Washington State Department of Ecology (See Section 5.2 below). The total area of the ten wetlands occurring within the identified study areas that are under the jurisdiction of the Corps and Clark County is 7.68 acres. Wetlands A4 and A5 have a combined area of 544 square feet (0.012 acres). The wetland boundaries

identified in this study were based on the presence of wetland plant communities, and visual surface hydrology indicators within the wetlands, and conditions in adjacent areas lacking indicators of one or more of the wetland criteria.

5.2 Regulatory Context

Wetlands are regulated as "Waters of the United States" by the US Army Corps of Engineers (Corps) under § 404 of the Clean Water Act, as "waters of the state" by the Washington Department of Ecology (Ecology) under Washington's Water Pollution Control Act (Chapter 90.48 RCW) and associated water quality regulations (Chapter 173-201A WAC), and by Clark County under its Wetland Protection Ordinance (Chapter 40.450).

The Corps regulates wetlands that are "tributary to navigable waters," which excludes most isolated wetlands. The Clark County Code exempts isolated Category 3 wetlands less than 2,500 square feet from regulation (Chapter 40.450.010C2a). Therefore, wetlands A4 and A5 fall outside the jurisdiction of the Corps and Clark County.

Washington State water quality regulations do not distinguish between isolated and non-isolated wetlands. Therefore, wetlands A4 and A5 fall under the jurisdiction of the Washington State Department of Ecology (90.48 RCW, Chapter 173-201A WAC).

5.3 Wetland and Water Body Buffer Requirements

The Clark County Code (Chapter 40.450.030E) prescribes regulatory buffers based on the score for water quality functions or habitat functions. The water quality buffer for Category 2 wetlands is 50 feet for low intensity use, 75 feet for moderate intensity use, and 100 feet for high intensity use.

The required buffers for habitat functions exceed the water quality buffer if the habitat score from the wetland functions assessment exceeds 19 points. Ten wetlands described in this report (A1, A2, A3, B1, C1, D1, E1, G1, G2, and H1) have a habitat score of 31 points. The habitat buffer for Category 2 wetlands with a habitat score of 31 or greater is 150 feet for low intensity use, 225 feet for moderate intensity use, and 300 feet for high intensity use.

5.4 Permits for Activities in Wetlands, Streams and Buffers

Clark County regulates activities in and adjacent to wetlands and their buffers through a Wetland Permit, and streams and their adjacent riparian areas through a Habitat Permit. The permit processes require submittal of a permit application along with a plan to mitigate for adverse effects of the proposed action. For temporary activities, such as clearing and grading associated with removing hazardous materials, restoring the wetland, buffer, and Habitat Area to pre-project conditions will likely satisfy mitigation requirements.

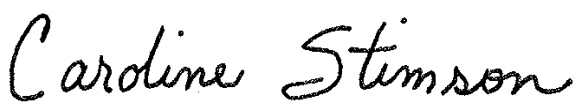
The Corps of Engineers allows temporary disturbance to regulated wetlands for cleanup of hazardous materials under Nationwide Permit 38. NWP 38 requires that the applicant notify the District Engineer 30 days prior to commencing activities in waters of the US and requires a mitigation plan for areas greater than 1/10 of an acre. Like the Clark County permits, restoration of the site to pre-project conditions will likely meet the mitigation requirement.

The Washington Department of Ecology will issue a Water Quality Certification under § 401 of the Clean Water Act for those wetlands under federal jurisdiction. For isolated wetlands not under jurisdiction of the Corps, Ecology requires that the applicant obtain an Administrative Order pursuant to the anti-degradation provisions of state water quality standards for surface waters.

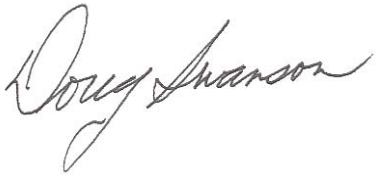
This wetland assessment report documents the investigation, best professional judgment and conclusions of PBS Engineering and Environmental. It is correct and complete to the best of our knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters until it has been reviewed and approved in writing by the appropriate jurisdictional authorities.

Respectfully submitted,

Jason Clark, MS
Botanist



Caroline Stimson
Botanist



Doug Swanson, PWS
Manager, Natural Resources

6.0 REFERENCES

Clark County GIS. 2007. Maps online. Clark County, Washington Available at http://gis.clark.wa.gov/ccgis/mol/property.htm.

Cooke, S. S. 1997. A field guide to the common wetland plants of western Washington and northwestern Oregon. Seattle Audubon Society, Seattle, Washington.

Cowardin, L. M., C. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-78/31. US Department of the Interior, Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Ecology. 1997. Washington State wetlands identification and delineation manual. Ecology Publication # 96-94. Washington State Department of Ecology, Olympia, Washington.

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Technical Report Y-87-1. US Department of the Army, Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi.

Guard, B. J. 1995. Wetland plants of Oregon and Washington. Lone Pine Publishing, Vancouver, British Columbia.

Hruby, T. 2004. Washington State wetland rating system for western Washington – Revised. Publication # 04-06-025. Washington State Department of Ecology, Olympia, Washington.

McGee, D. A. 1972. Soil survey of Clark County, Washington. US Department of Agriculture Soil Conservation Service in cooperation with Washington Agricultural Experiment Station. US Government Printing Office, Washington, DC.

NOAA. 2007. Preliminary Climatological Data, Portland, Oregon. National Weather Service Forecast Office, National Oceanic and Atmospheric Administration, Portland, Oregon. http://www.weather.gov/climate/index.php?wfo=pqr

Natural Resources Conservation Service (NRCS). 2001. Hydric soils list: Clark County, Washington. http://www.wa.nrcs.usda.gov/technical/soils/hydric_lists/hydsoil-wa-011.pdf

NRCS. 2007. Climate data for Vancouver, Washington. National Water and Climate Center. ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/wa/53011.txt

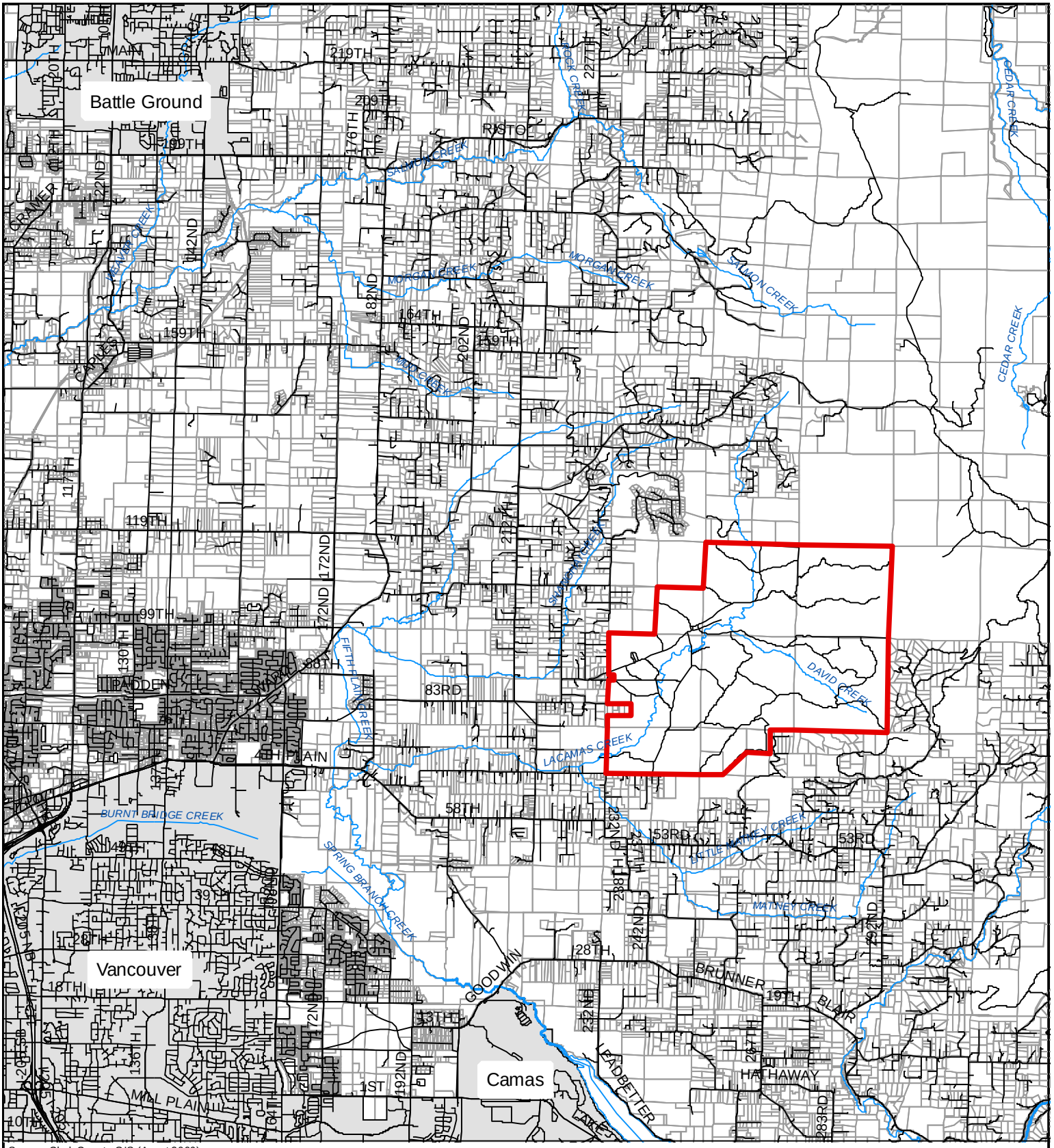
Pojar, J. and A. MacKinnon. 1994. Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska. Lone Pine Publishing, Vancouver, British Columbia.

Reed, P. B., Jr. 1988. National list of plant species that occur in wetlands: Northwest (Region 9). Biological Report 88(26.9). US Department of the Interior, Fish and Wildlife Service, St. Petersburg, Florida.

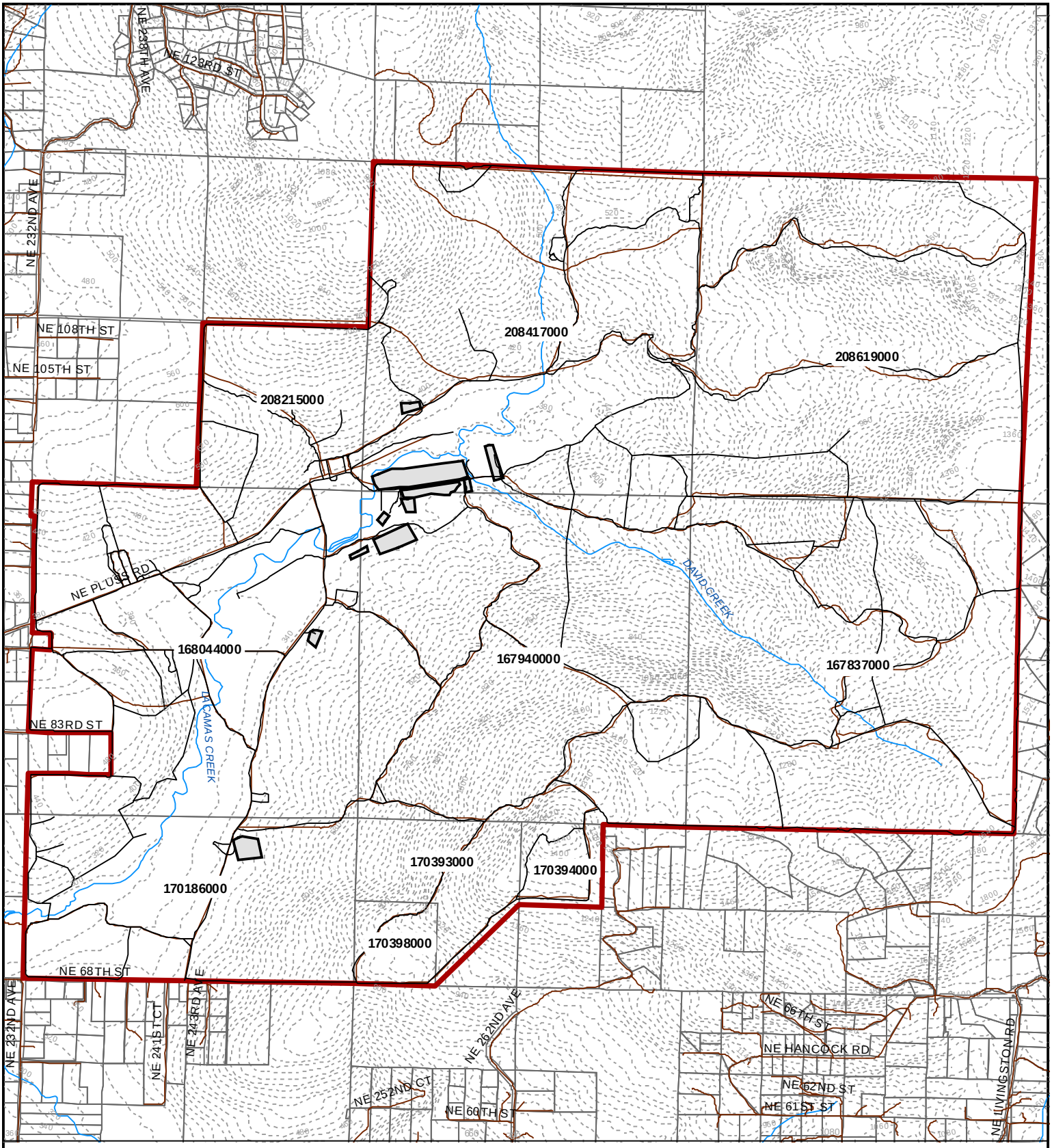
Reed, P. B., Jr. 1993. 1993 Supplement to the list of plant species that occur in wetlands: Northwest (Region 9). Supplement to Biological Report 88(26.9). US Department of the Interior, Fish and Wildlife Service, St. Petersburg, Florida.

US Fish and Wildlife Service. 2007. National Wetland Inventory Map. http://www.fws.gov/nwi/

FIGURES



PBS	Project #: 70489.000 Date: JULY 2007	VICINITY MAP Camp Bonneville 23201 NE Pluss Road CLARK COUNTY, WASHINGTON	FIGURE 1



Source: Clark County GIS (Agust 2006)

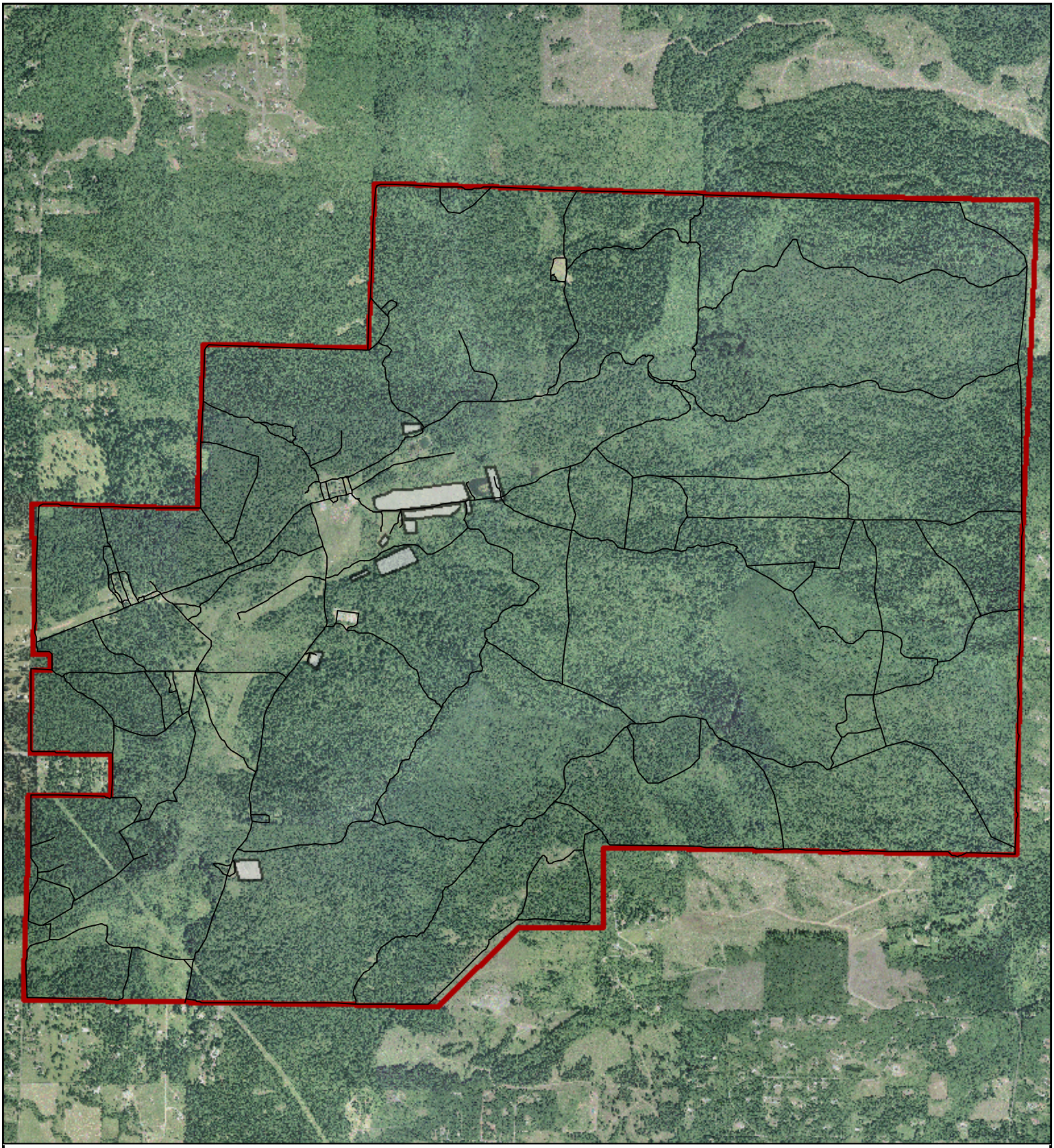
Camp Bonneville
Firing Ranges
Roads and Trails
Streams
170393000 Tax Lots
Contours (20 ft)

N

0 0.25 0.5
Miles

PBS	Project #: 70489.000 Date: JULY 2007	PROJECT SITE Camp Bonneville 23201 NE Pluss Road CLARK COUNTY, WASHINGTON

FIGURE
2



Source: Clark County GIS (Agust 2006)

Camp Bonneville
Firing Ranges
Roads and Trails

N

0 0.25 0.5
Miles

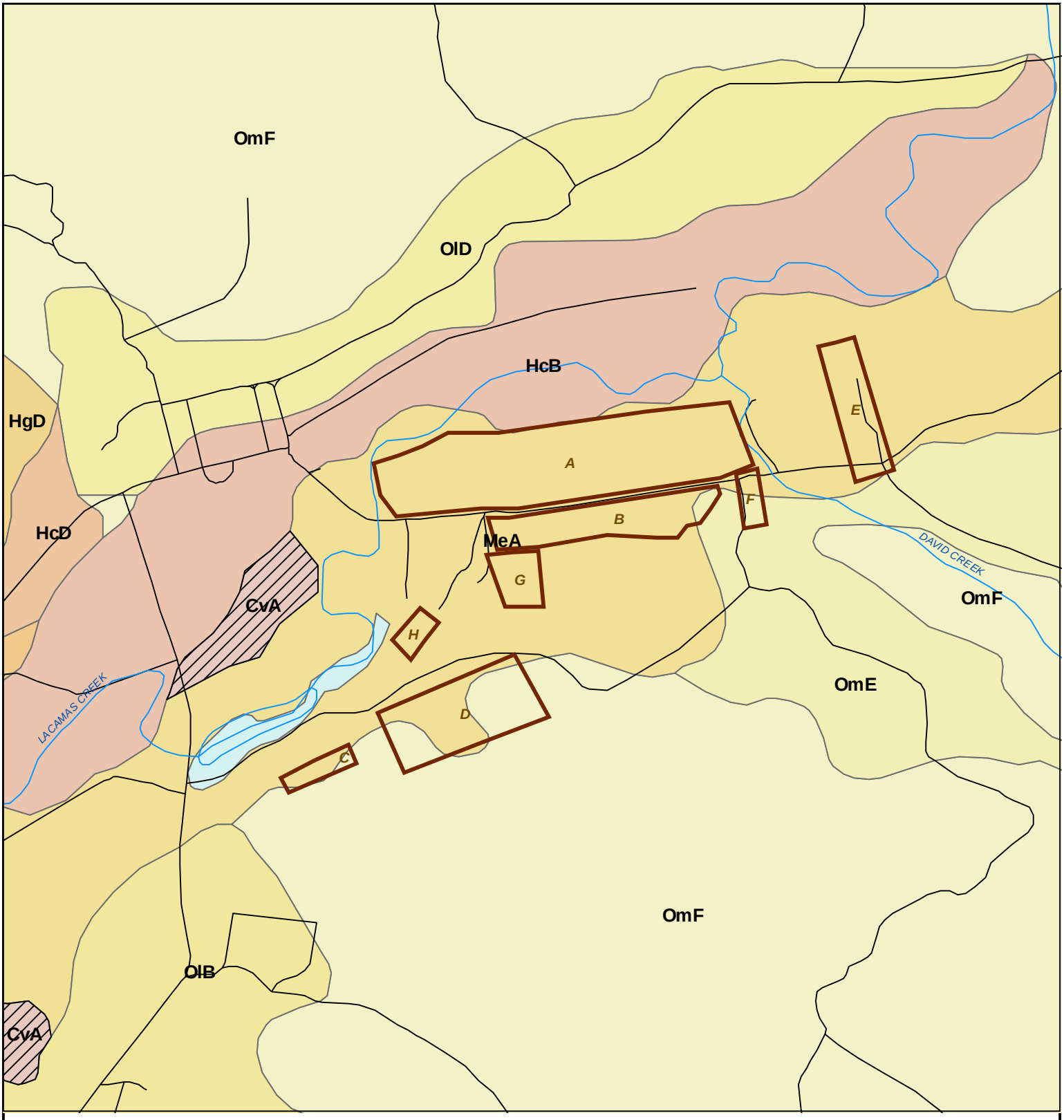
PBS

Project #: 70489.000

Date: JULY 2007

AERIAL PHOTOGRAPH
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE
3



A Study Areas
Streams
Roads and Trails
Hydric Soils

Soil Class

- CvA - Cove Silty Clay Loam, 0 to 3 Percent Slopes
- HcB - Hesson Clay Loam,) to 8 Percent Slopes
- HcD - Hesson Clay Loam, 8 to 20 Percent Slopes
- HgB - Hesson Gravelly Clay Loam, 0 to 8 Percent Slopes
- HgD - Hesson Gravelly Clay Loam, 8 to 20 Percent Slopes
- MeA - McBee Silty Clay Loam, 0 to 3 Percent Slopes
- OlB - Olympic Clay Loam, 3 to 8 Percent Slopes
- OlD - Olympic Clay Loam, 8 to 20 Percent Slopes
- OmE - Olympic Stony Clay Loam, 3 to 30 Percent Slopes
- OmF - Olympic Stony Clay Loam, 30 to 60 Percent Slopes
- Water

N

0 210 420
Feet

Source: Soil Survey of Clark County Washington

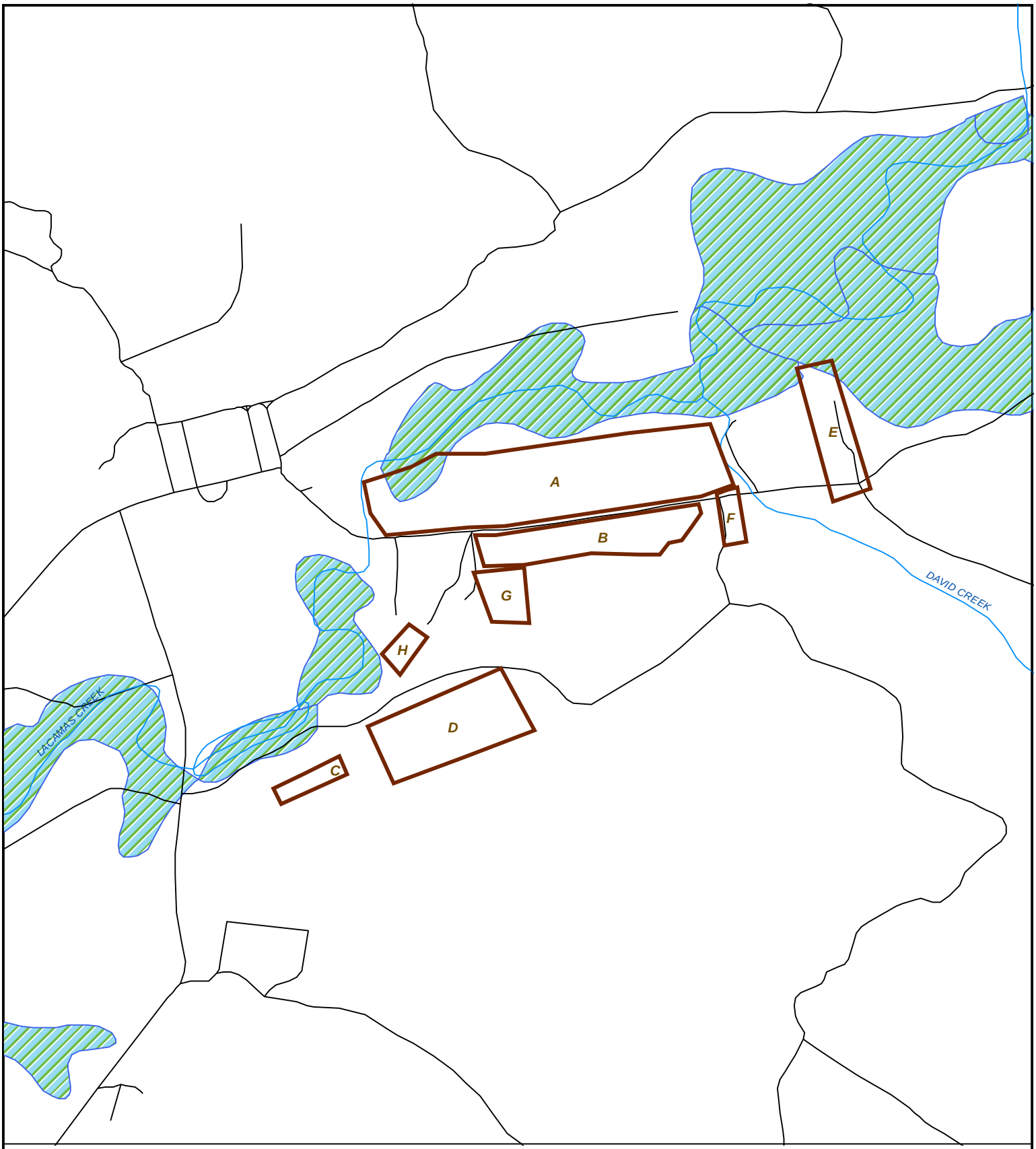
PBS

Project #: 70489.000

Date: JULY 2007

CLARK COUNTY SOIL SURVEY
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE
4



Source: US Fish and Wildlife Service National Wetland Inventory

N

0 210 420

Feet

A Study Areas

National Wetland Inventory

Streams

Roads and Trails

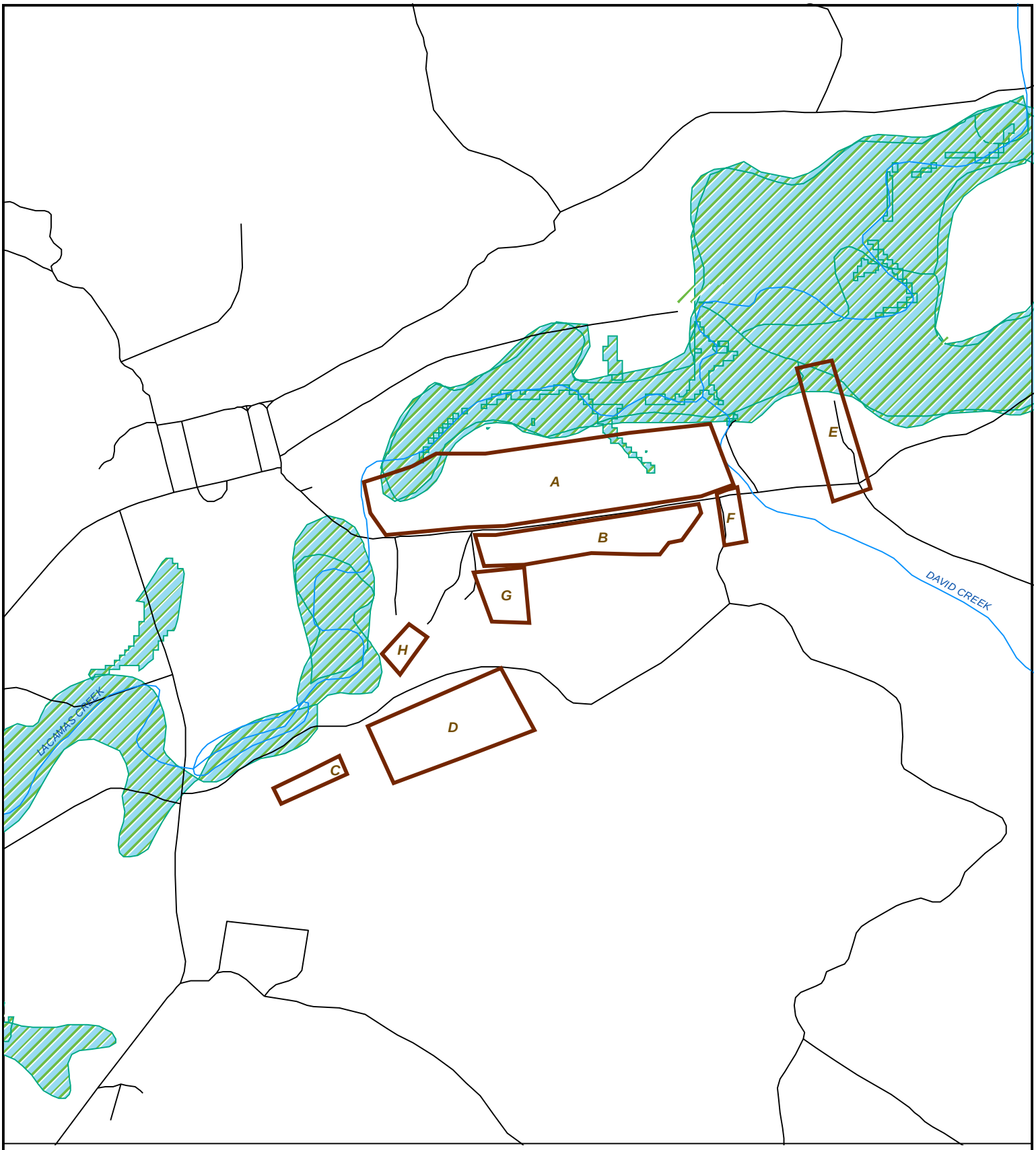
PBS

Project #: 70489.000

Date: JULY 2007

NATIONAL WETLAND INVENTORY
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE
5A



Source: Clark County Local Wetland Inventory GIS Data (August 2006).

N

0 210 420

Feet

A Study Areas

Streams

Roads and Trails

Clark County Local Wetland Inventory

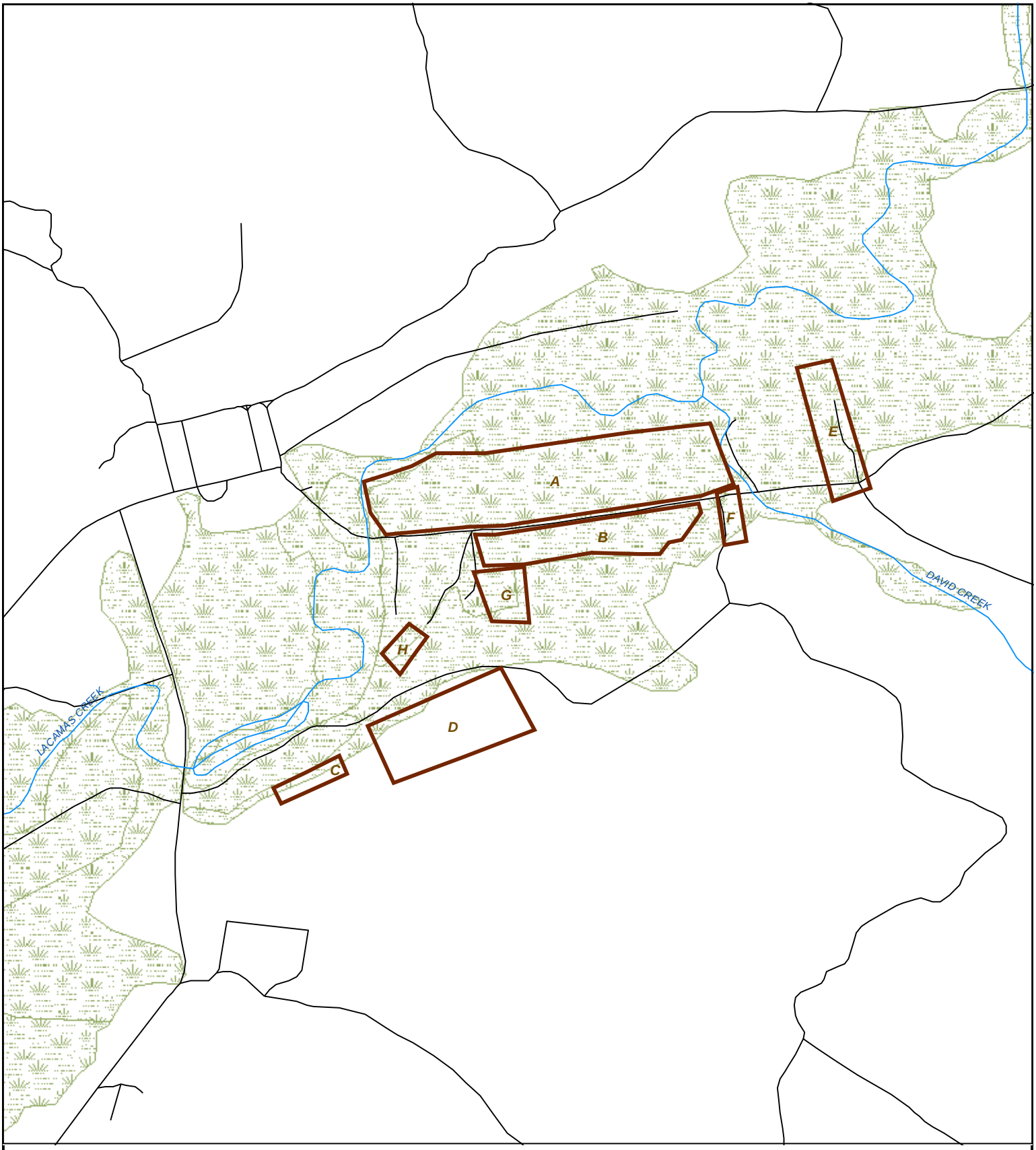
PBS

Project #: 70489.000

Date: JULY 2007

CLARK COUNTY LOCAL WETLAND INVENTORY
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE
5B



Source: Clark County Wetland Biologist identified potential wetland areas at the site.

N

0 210 420

Feet

A Study Areas

Streams

Roads and Trails

Wetland Areas

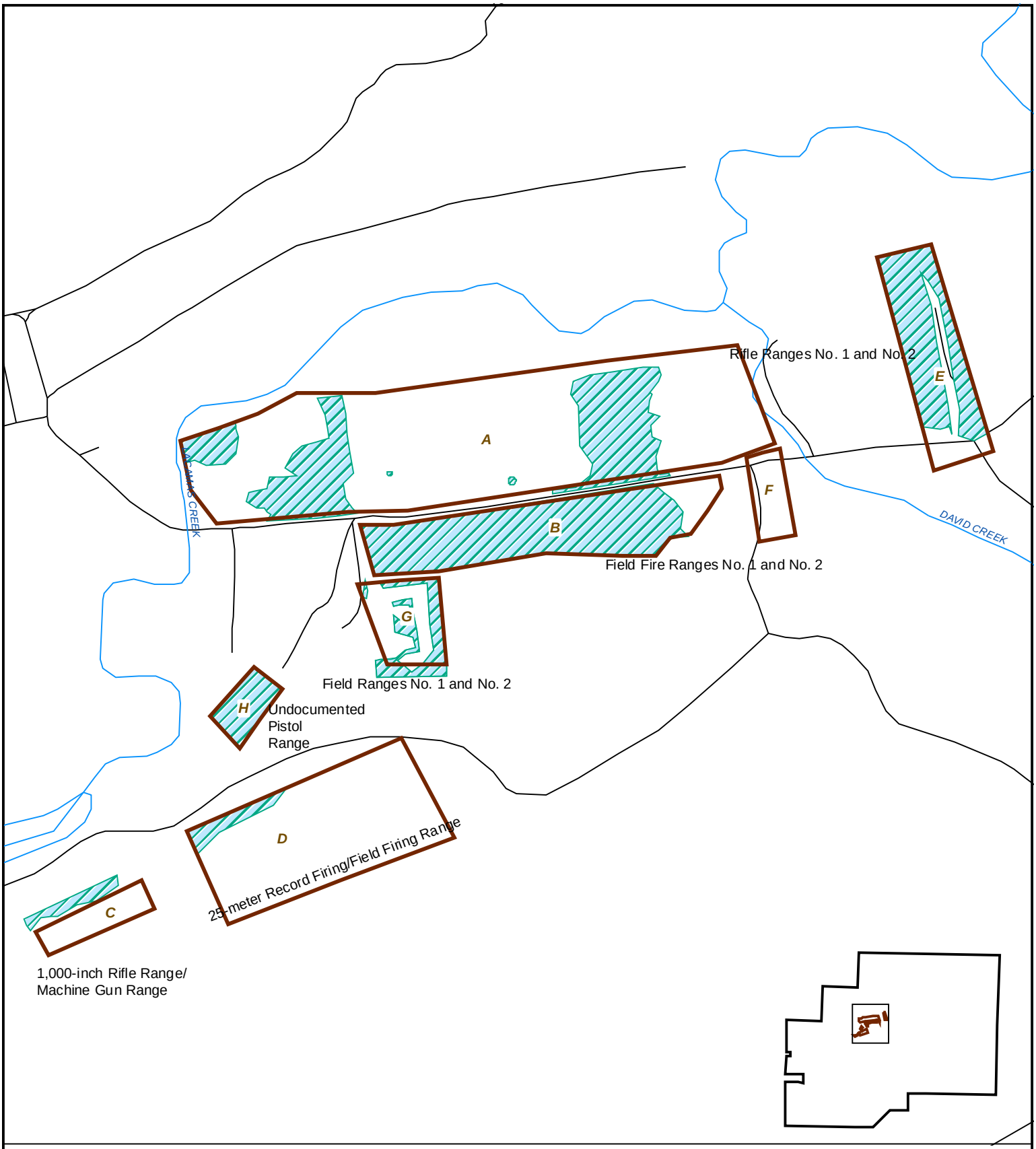
PBS

Project #: 70489.000

Date: JULY 2007

CLARK COUNTY - POTENTIAL WETLAND AREAS
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE 6



Source: Clark County GIS Data, August 2006. Wetland boundaries, sample plot locations, and transects mapped by PBS using a Trimble GeoXT. The GeoXT has sub-meter post processing accuracy.

N

0 140 280

Feet

A Study Areas

Wetlands

Streams

Roads and Trails

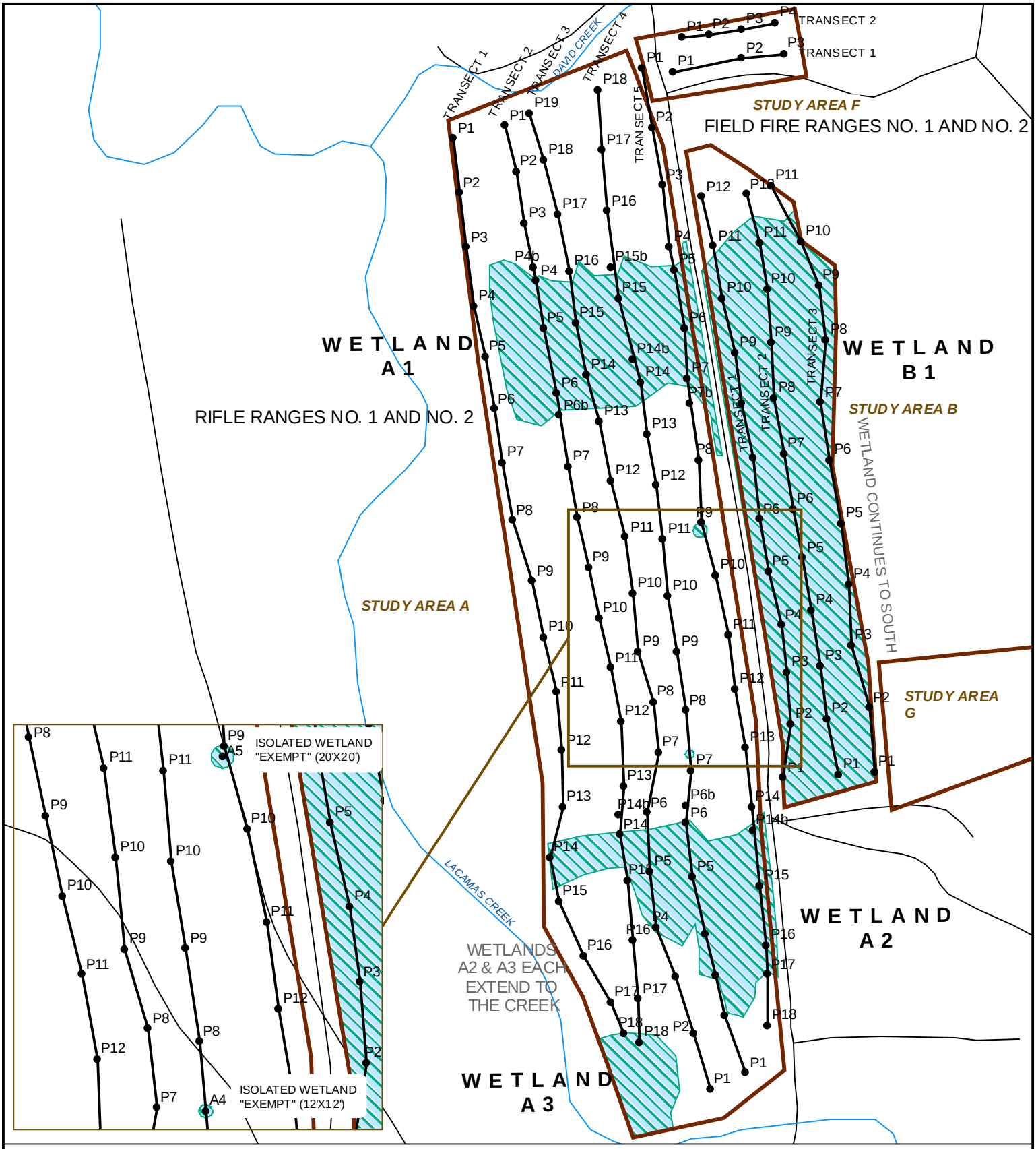
PBS

Project #: 70489.000

Date: JULY 2007

WETLAND DELINEATION - OVERVIEW MAP
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE 7



Source: Clark County GIS Data, August 2006. Wetland boundaries, sample plot locations, and transects mapped by PBS using a Trimble GeoXT. The GeoXT has sub-meter post processing accuracy.

N

0 90 180

Feet

Study Area (Firing Range)
Wetlands
Transects
Data Plots
Streams
Roads and Trails

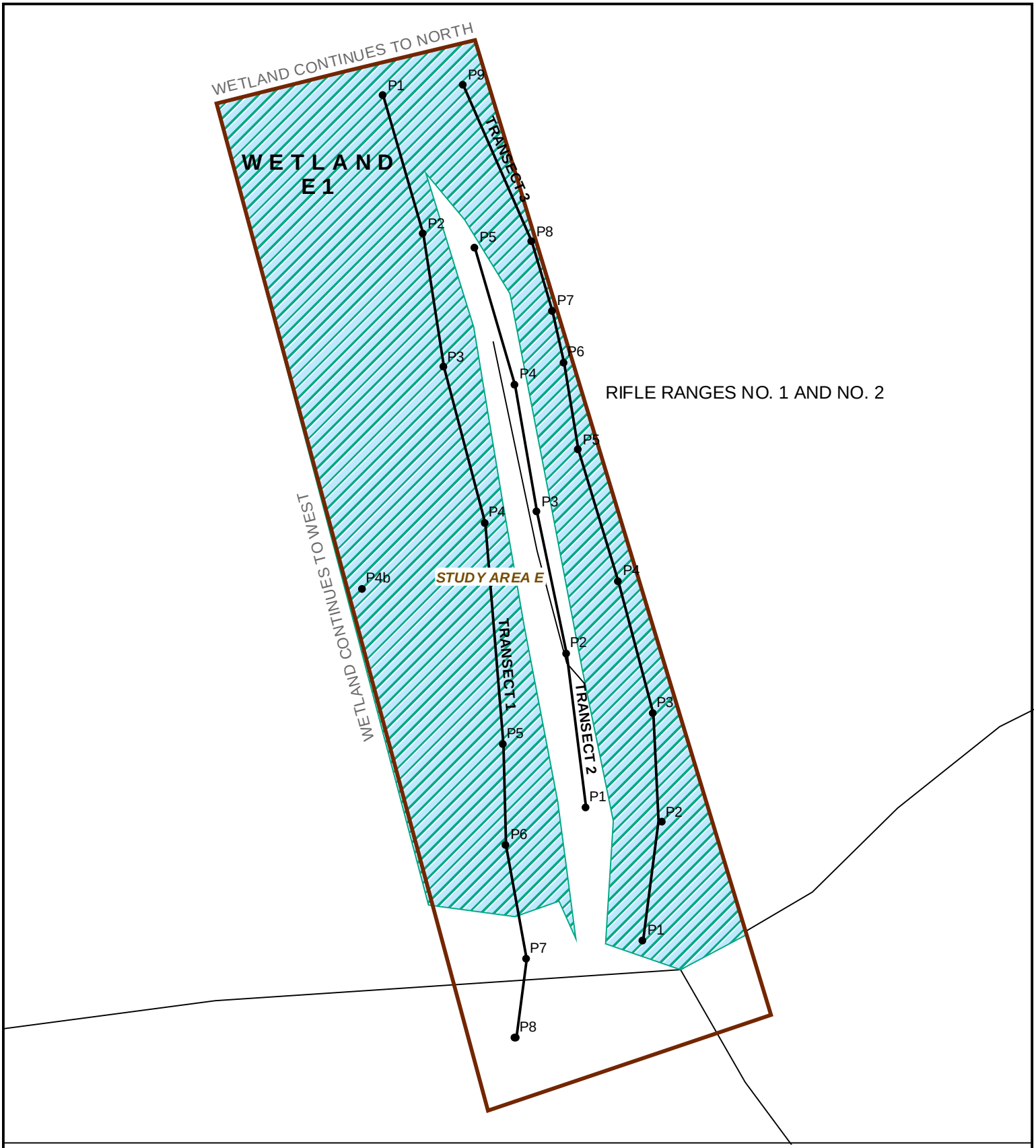
PBS

Project #: 70489.000

Date: JULY 2007

WETLAND DELINEATION - WETLANDS A1, A2, A3, B1
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE 7A



Source: Clark County GIS Data, August 2006. Wetland boundaries, sample plot locations, and transects mapped by PBS using a Trimble GeoXT. The GeoXT has sub-meter post processing accuracy.

N

0 40 80

Feet

Study Area (Firing Range)
Wetlands
Data Plots
Streams
Roads and Trails

PBS

Project #: 70489.000

Date: JULY 2007

WETLAND DELINEATION - WETLAND E1
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE 7B

Source: Clark County GIS Data, August 2006. Wetland boundaries, sample plot locations, and transects mapped by PBS using a Trimble GeoXT. The GeoXT has sub-meter post processing accuracy.

N

0 20 40

Feet

Study Area (Firing Range)
Wetlands
Data Plots
Transects
Streams
Roads and Trails

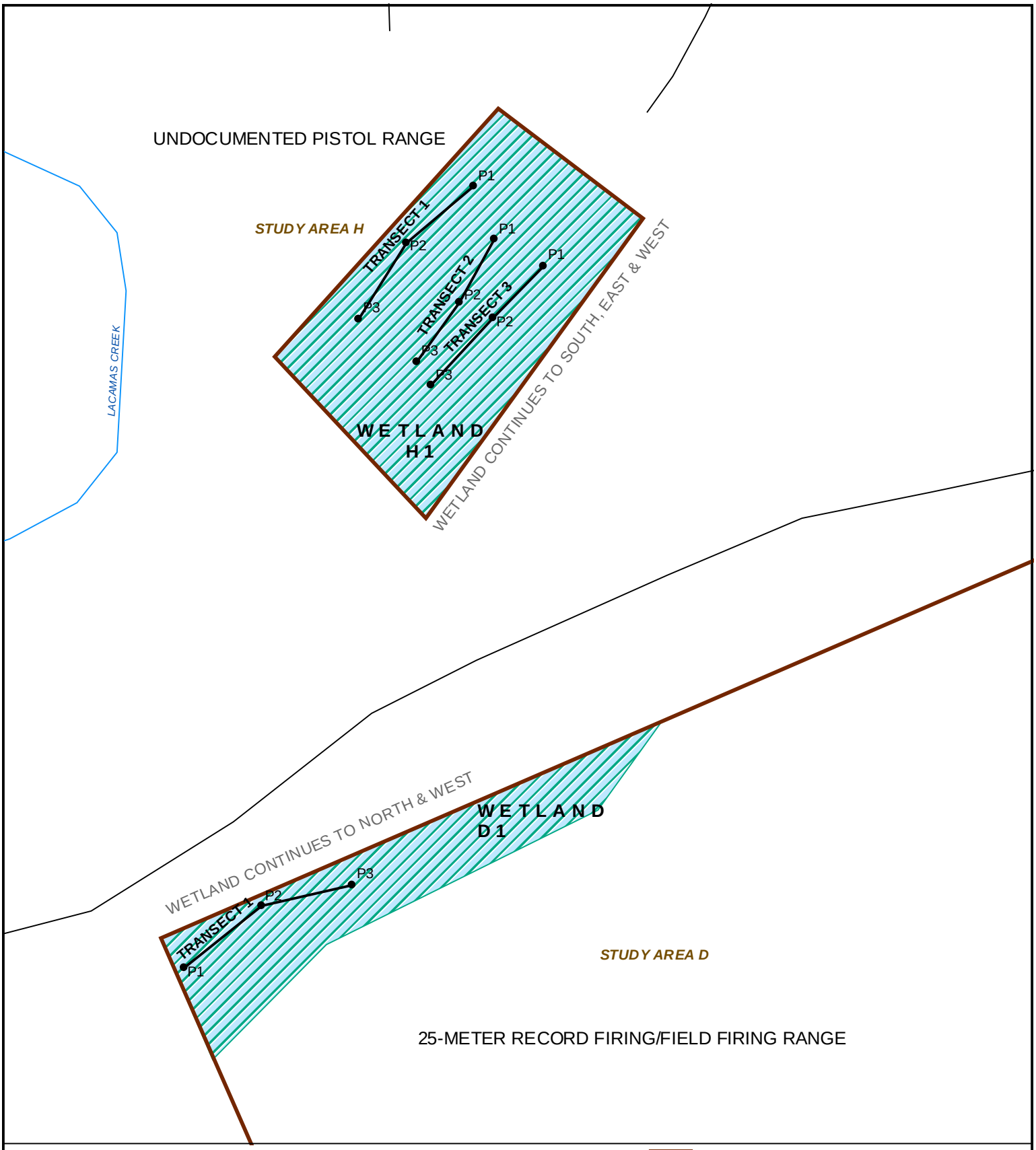
PBS

Project #: 70489.000

Date: JULY 2007

WETLAND DELINEATION - WETLAND C1
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE 7C



Source: Clark County GIS Data, August 2006. Wetland boundaries, sample plot locations, and transects mapped by PBS using a Trimble GeoXT. The GeoXT has sub-meter post processing accuracy.

N

0 30 60

Feet

Study Area (Firing Range)
Wetlands
Data Plots
Transects
Streams
Roads and Trails

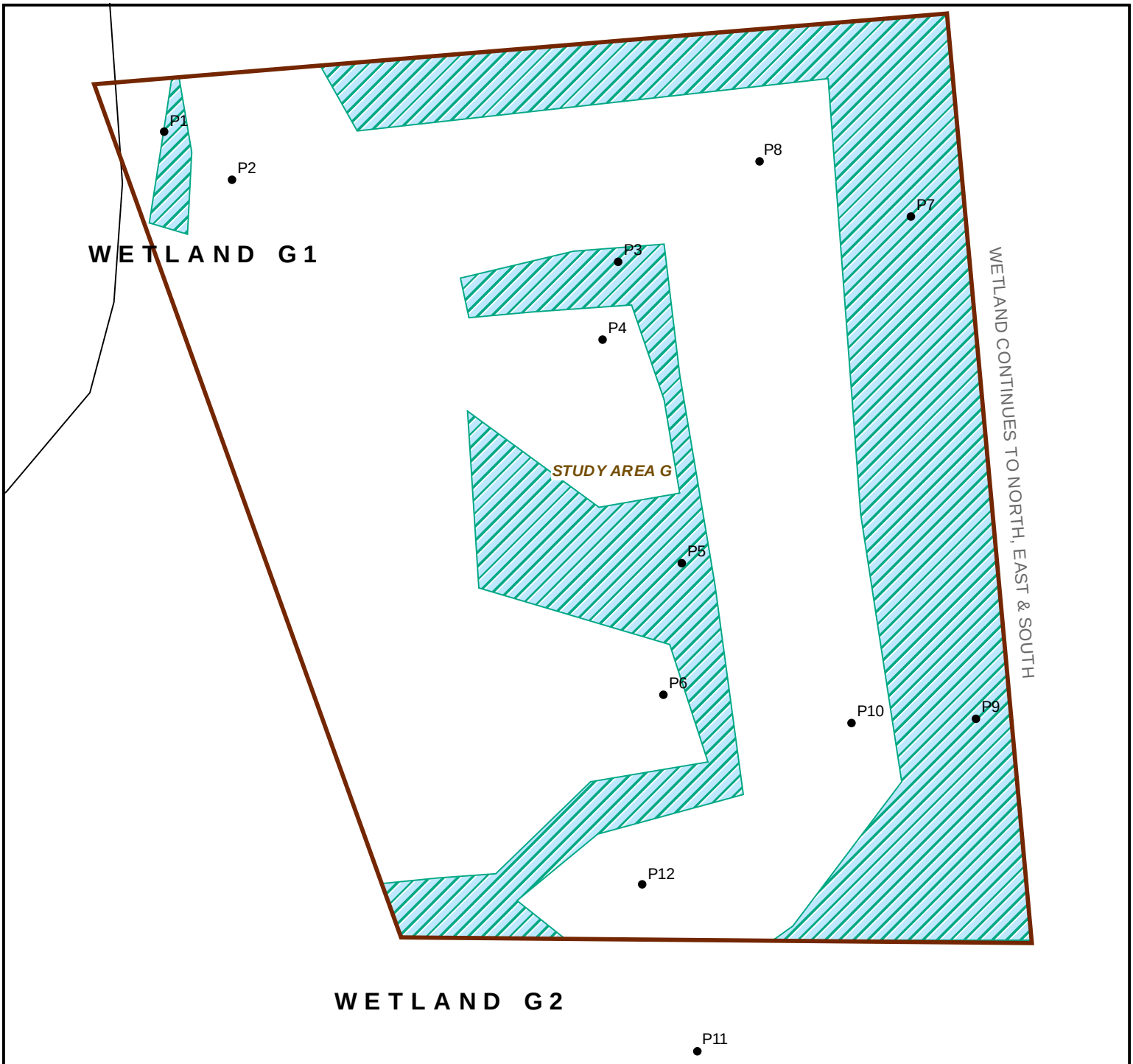
PBS

Project #: 70489.000

Date: JULY 2007

WETLAND DELINEATION - WETLANDS D1, H1
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE 7D



FIELD RANGES NO. 1 AND NO. 2

Source: Clark County GIS Data, August 2006. Wetland boundaries, sample plot locations, and transects mapped by PBS using a Trimble GeoXT. The GeoXT has sub-meter post processing accuracy.

N

0 20 40

Feet

Study Area (Firing Range)
Wetlands
Data Plots
Streams
Roads and Trails

PBS

Project #: 70489.000

Date: JULY 2007

WETLAND DELINEATION - WETLAND G1, G2
Camp Bonneville
23201 NE Pluss Road
CLARK COUNTY, WASHINGTON

FIGURE 7E

APPENDIX A

Site Photographs

Photo 1: Study Area A Wetland A1- Reddish plant is taper-tip rush (*Juncus acuminatus*). OBL

Photo 2: Study Area A Wetland A1-Cracked soil indicating periodic inundation.

Photo 3: Study Area A Overview of site, oxeye daisy an introduced weed dominates drier site areas.

Photo 4: Study Area A Wetland A1-Ungulate hoof prints in recently saturated soil.

Photo 5: Study Area A Wetland A2-Dense patch of slough sedge (*Carex obnupta*) OBL and pointed broom sedge (*Carex scoparia*). OBL

Photo 6: Study Area A Wetland A2-View of wetland looking west.

Photo 7: Study Area A Wetland A3-Close-up of red- osier dogwood (*Cornus sericea*). FACW

Photo 8: Study Area A Wetland A3-Shrubby riparian thicket above Lacamas Creek.

Photo 09: Study Area B Wetland B1-Patches of Douglas' spiraea (*Spiraea douglasii*) FACW and soft rush (*Juncus effusus*). FACW

Photo 10: Study Area B Wetland B1-Low depressional area with saturation to surface. Reddish area dominated by mats of needle spikerush (*Eleocharis acicularis*). OBL

Photo 11: Study Area C Wetland C1- Douglas' spiraea (*Spiraea douglasii*). FACW

Photo 12: Study Area C Wetland C1-Red alder in background.

Photo 13: Study Area D Wetland D1-Red alder riparian forest.

Photo 14: Study Area E Wetland E1-View of the pond looking west. Island is on the left.

Photo 15: Study Area E Wetland E1-Berm excluded from wetland.

Photo 16: Study Area E Wetland E1-Overgrown un-paved road on east side of berm.

Photo 17: Study Area E Wetland E1-Small-fruit bulrush (*Scripus microcarpus*) OBL and soft rush (*Juncus effusus*) FACW, growing up through the old roadbed. Northern end.

Photo 18: Study Area F No wetlands, site mainly a raised berm. (above the white sign)

Photo 19: Study Area G Wetland G2-View of wetland looking south-east.

Photo 20: Study Area G Wetland G2-View of wetland from top of berm looking west.

Photo 21: Study Area H Wetland H1-Patch of slough sedge (*Carex opnupta*) OBL and velvet grass (*Holcus lanatus*) FAC.

Photo 22: Study Area H Wetland H1-Overview of wetland with red alder in the background.

APPENDIX B

Data Sheets

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P1	*Rubus ursinus*	shrub	20	1	FACU	*
	Anthoxanthum odoratum	Herb	20	25	FACU	*
	Leucanthemum vulgare	Herb	20	25	NL	*
	Fragaria virginiana	Herb	20	25	FACU	*
	Festuca rubra	Herb	20	25	FAC-	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P2	*Leucanthemum vulgare*	Herb	5	14	NL	
	Hypochaeris radicata	Herb	25	71	FACU	*
	Agrostis stolonifera	Herb	5	14	FAC	
	bare ground		65			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P3	*Leucanthemum vulgare*	Herb	10	22	NL	*
	Hypochaeris radicata	Herb	25	56	FACU	*
	Agrostis stolonifera	Herb	5	11	FAC	
	Anthoxanthum odoratum	Herb	5	11	FACU	
	bare ground		55			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P4	*Leucanthemum vulgare*	Herb	10	18	NL	
	Hypochaeris radicata	Herb	35	64	FACU	*
	Agrostis stolonifera	Herb	10	18	FAC	
	bare ground		45			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P5	*Leucanthemum vulgare*	Herb	5	10	NL	
	Hypochaeris radicata	Herb	40	80	FACU	*
	Agrostis stolonifera	Herb	5	10	FAC	
	bare ground		50			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P5b	*Juncus tenuis*	Herb	20	50	FACW--	*
	Navarretia intertexta	Herb	10	25	FACW	*
	Hypochaeris radicata	Herb	10	13	FACU	
	bare ground		60			
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
Note: Soil surface is a whitish, cracked crust indicating inundation						

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P6	*Leucanthemum vulgare*	Herb		10	NL	
	Hypochaeris radicata	Herb		60	FACU	*
	Agrostis stolonifera	Herb		10	FAC	
	Fragaria virginiana	Herb		10	FACU	
	Daucus carota			5	NL	
	Trifolium dubium			5	UPL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P7	*Anthoxanthum odoratum*	Herb		30	FACU	*
	Centaurea pratensis	Herb		30	NL	*
	Prunella vulgaris	Herb		5	FACU+	
	Hypochaeris radicata	Herb		30	FACU	*
	Daucus carota			5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P8	*Anthoxanthum odoratum*	Herb		25	FACU	*
	Danthonia californica	Herb		25	FACU	*
	Leucanthemum vulgare	Herb		20	NL	*
	Daucus carota	Herb		3	NL	
	Prunella vulgaris	Herb		2	FACU+	
	Fragaria virginiana	Herb		5	FACU	
	Hypochaeris radicata	Herb		20	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P9	*Rubus ursinus*	Sap/Shrub	25	100	FACU	*
	Leucanthemum vulgare	Herb		27	NL	*
	Anthoxanthum odoratum	Herb		27	FACU	*
	Hypochaeris radicata	Herb		7	FACU	
	Agrostis stolonifera	Herb		33	FAC	*
	Cirsium arvense	Herb		7	FACU+	
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T1, P10	*Anthoxanthum odoratum*	Herb		45	FACU	*
	Leucanthemum vulgare	Herb		20	NL	*
	Cirsium arvense	Herb		15	FACU+	
	Daucus carota	Herb		10	NL	
	Agrostis stolonifera	Herb		5	FAC	
	Festuca rubra	Herb		5	FAC-	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P11	*Rubus ursinus*	Sap/Shrub	10	0	FACU	
	Agrostis stolonifera	Herb		7	FAC	
	Anthoxanthum odoratum	Herb		7	FACU	
	Cirsium arvense	Herb		86	FACU+	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P12	*Rubus ursinus*	Sap/Shrub	65	100	FACU	*
	Leucanthemum vulgare	Herb		42	NL	*
	Agrostis stolonifera	Herb		14	FAC	
	Anthoxanthum odoratum	Herb		14	FACU	
	Cirsium arvense	Herb		28	FACU+	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P13	*Rubus ursinus*	Sap/Shrub	15	0	FACU	
	Leucanthemum vulgare	Herb		23	NL	*
	Cirsium arvense	Herb		12	FACU+	
	Anthoxanthum odoratum	Herb		18	FACU	*
	Hypochaeris radicata	Herb		24	FACU	*
	Holcus lanatus	Herb		6	FAC	
	Festuca rubra	Herb		6	FAC	
	Danthonia californica	Herb		6	FACU	
	Equisetum arvense	Herb		6	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P14	*Festuca rubra*	Herb		50	FAC	*
	Cirsium arvense	Herb		50	FACU+	*
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
T1, P15	*Rubus ursinus*	Sap/Shrub	5	0	FACU	
	Leucanthemum vulgare	Herb		6	NL	
	Arrhenatherum elatius	Herb		88	UPL	*
	Anthoxanthum odoratum	Herb		6	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P16	*Symphoricarpos albus*	Sap/Shrub	5	0		
	Leucanthemum vulgare	Herb		15	NL	
	Anthoxanthum odoratum	Herb		10	FACU	
	Trifolium dubium	Herb		23	UPL	*
	Fragaria virginiana	Herb		37	FACU	*
	Daucus carota	Herb		5	NL	
	Trifolium pratense	Herb		10	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P17	*Leucanthemum vulgare*	Herb		25	NL	
	Anthoxanthum odoratum	Herb		10	FACU	
	Cirsium arvense	Herb		60	FACU+	*
	Dactylis glomerata	Herb		5	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P18	*Cornus sericea*	Sap/Shrub	100	100	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T2, P1	*Agrostis stolonifera*	Herb		30	FAC	*
	Leucanthemum vulgare	Herb		10	NL	
	Hypochaeris radicata	Herb		5	FACU	
	Anthoxanthum odoratum	Herb		20	FACU	*
	Plantago lanceolata	Herb		15	FAC	
	Daucus carota	Herb		20	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P2	*Agrostis stolonifera*	Herb		20	FAC	*
	Leucanthemum vulgare	Herb		20	NL	*
	Anthoxanthum odoratum	Herb		40	FACU	*
	Fragaria virginiana	Herb		20	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T2, P3	*Agrostis stolonifera*	Herb		20	FAC	*
	Leucanthemum vulgare	Herb		15	NL	
	Anthoxanthum odoratum	Herb		25	FACU	*
	Hypochaeris radicata	Herb		40	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P4	*Alnus rubra*	Tree	20	100		*
	Agrostis stolonifera	Herb		25	FAC	*
	Juncus tenuis	Herb		10	FACW-	
	Anthoxanthum odoratum	Herb		15	FACU	
	Hypochaeris radicata	Herb		50	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T2, P4b	*Agrostis stolonifera*	Herb		50	FAC	*
	Anthoxanthum odoratum	Herb		25	FACU	*
	Hypochaeris radicata	Herb		25	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P5	*Agrostis stolonifera*	Herb		45	FAC	*
	Carex obnupta	Herb		20	OBL	*
	Carex scoparia	Herb		20	FACW	*
	Hypochaeris radicata	Herb		5	FACU	
	Juncus tenuis	Herb		5	FACW-	
	Hypericum anagalloides	Herb		5	OBL	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T2, P6	*Agrostis stolonifera*	Herb		45	FAC	*
	Leucanthemum vulgare	Herb		5	NL	
	Hypochaeris radicata	Herb		50	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
Note: Hypochaeris was depauperate from saturated condition.						
T2, P7	*Agrostis stolonifera*	Herb		30	FAC	*
	Leucanthemum vulgare	Herb		18	NL	
	Hypochaeris radicata	Herb		25	FACU	*
	Anthoxanthum odoratum	Herb		25	FACU	*
	Trifolium dubium	Herb		2	UPL	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P8	*Rubus ursinus*	Sap/Shrub	30	100	FACU	
	Agrostis stolonifera	Herb		15	FAC	
	Leucanthemum vulgare	Herb		40	NL	*
	Daucus carota	Herb		10	NL	
	Anthoxanthum odoratum	Herb		30	FACU	*
	Achillea millefolium	Herb		5	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T2, P9	*Agrostis stolonifera*	Herb		20	FAC	*
	Leucanthemum vulgare	Herb		20	NL	*
	Festuca rubra	Herb		15	FAC	
	Cirsium arvense	Herb		40	FACU+	*
	Poa pratensis	Herb		5	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P10	*Anthoxanthum odoratum*	Herb		20	FACU	*
	Leucanthemum vulgare	Herb		30	NL	*
	Festuca arundinacea	Herb		5	FAC-	
	Cirsium arvense	Herb		10	FACU+	
	Plantago lanceolata	Herb		5	FAC	
	Daucus carota	Herb		30	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P11	*Anthoxanthum odoratum*	Herb		25	FACU	*
	Leucanthemum vulgare	Herb		13	NL	
	Rumex acetosella	Herb		2	FACU	
	Danthonia californica	Herb		t	FACU	
	Cirsium arvense	Herb		10	FACU+	
	Plantago lanceolata	Herb		25	FAC	*
	Daucus carota	Herb		25	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P12	*Rubus ursinus*	Sap/Shrub	20	100	FACU	*
	Anthoxanthum odoratum	Herb		25	FACU	*
	Leucanthemum vulgare	Herb		15	NL	
	Festuca arundinacea	Herb		15	FAC-	
	Daucus carota	Herb		10	NL	
	Cirsium arvense	Herb		5	FACU+	
	Hypochaeris radicata	Herb		30	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T2, P13	*Anthoxanthum odoratum*	Herb		35	FACU	*
	Leucanthemum vulgare	Herb		22	NL	*
	Agrostis stolonifera	Herb		3	FAC	
	Daucus carota	Herb		5	NL	
	Plantago lanceolata	Herb		20	FAC	*
	Hypochaeris radicata	Herb		15	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P14	*Rubus ursinus*	Sap/Shrub	5	0	FACU	*
	Dactylis glomerata	Herb		5	FACU	*
	Festuca rubra	Herb		60	FAC	
	Cirsium arvense	Herb		30	FACU+	*
	Poa pratensis	Herb		2	FAC	
	Equisetum arvense	Herb		3	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P14b	*Rubus ursinus*	Sap/Shrub	20	100	FACU	*
	Anthoxanthum odoratum	Herb		5	FACU	
	Festuca arundinacea	Herb		45	FAC-	*
	Agrostis stolonifera	Herb		17	FAC	
	Cirsium arvense	Herb		33	FACU+	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P15	*Rosa pisocarpa*	Herb	35	100	FAC	*
	Anthoxanthum odoratum	Herb		30	FACU	*
	Cirsium arvense	Herb		5	FACU+	
	Leucanthemum vulgare	Herb		5	NL	
	Dactylis glomerata	Herb		50	FACU	*
	Daucus carota	Herb		10	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P16	*Symphoricarpos albus*	Sap/Shrub	15	0	FACU	
	Anthoxanthum odoratum	Herb		20	FACU	*
	Cirsium arvense	Herb		5	FACU+	
	Leucanthemum vulgare	Herb		20	NL	*
	Fragaria virginiana	Herb		25	FACU	*
	Daucus carota	Herb		25	NL	*
	Equisetum arvense	Herb		5	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T2, P17	*Anthoxanthum odoratum*	Herb		5	FACU	
	Cirsium arvense	Herb		35	FACU+	*
	Equisetum arvense	Herb		20	FAC	*
	Agrostis stolonifera	Herb		5	FAC	
	Leucanthemum vulgare	Herb		15	NL	
	Dactylis glomerata	Herb		25	FACU	*
	Daucus carota	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2, P18	*Cornus sericea*	Sap/Shrub	100	100	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T3, P1	*Festuca arundinacea*	Herb		70	FAC-	*
	Cirsium arvense	Herb		10	FACU+	
	Dactylis glomerata	Herb		10	FACU	
	Holcus lanatus	Herb		10	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T3, P2	*Dactylis glomerata*	Herb		15	FACU	*
	Anthoxanthum odoratum	Herb		35	FACU	*
	Leucanthemum vulgare	Herb		15	NL	*
	Fragaria virginiana	Herb		15	FACU	*
	Daucus carota	Herb		15	NL	*
	Senecio jacobaea	Herb		5	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P3	*Anthoxanthum odoratum*	Herb		20	FACU	*
	Fragaria virginiana	Herb		15	FACU	
	Leucanthemum vulgare	Herb		10	NL	
	Dactylis glomerata	Herb		5	FACU	
	Holcus lanatus	Herb		15	FAC	
	Plantago lanceolata	Herb		5	FAC	
	Daucus carota	Herb		30	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T3, P4	*Carex obnupta*	Herb		60	OBL	*
	Cirsium arvense	Herb		10	FACU+	
	Holcus lanatus	Herb		15	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T3, P5	*Rubus ursinus*	Sap/Shrub	35	100	FACU	*
	Anthoxanthum odoratum	Herb		23	FACU	*
	Dactylis glomerata	Herb		53	FACU	*
	Agrostis stolonifera	Herb		15	FAC	
	Cirsium arvense	Herb		8	FACU+	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T3, P6	*Anthoxanthum odoratum*	Herb		5	FACU	
	Festuca arundinacea	Herb		85	FAC-	*
	Cirsium arvense	Herb		5	FACU+	
	Hypochaeris radicata	Herb		2	FACU	
	Daucus carota	Herb		3	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T3, P7	*Anthoxanthum odoratum*	Herb		30	FACU	*
	Fragaria virginiana	Herb		10	FACU	
	Leucanthemum vulgare	Herb		10	NL	
	Prunella vulgaris	Herb		5	FACU+	
	Hypochaeris radicata	Herb		35	FACU	*
	Daucus carota	Herb		10	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P8	*Cytisus scoparius*	Sap/Shrub	15	0	NL	
	Anthoxanthum odoratum	Herb		23	FACU	*
	Fragaria virginiana	Herb		6	FACU	
	Leucanthemum vulgare	Herb		6	NL	
	Plantago lanceolata	Herb		18	FAC	*
	Hypochaeris radicata	Herb		23	FACU	*
	Cirsium arvense	Herb		6	FACU+	
	Daucus carota	Herb		18	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T3, P9	*Rubus ursinus*	Sap/Shrub	5	0	FACU	
	Anthoxanthum odoratum	Herb		15	FACU	
	Leucanthemum vulgare	Herb		21	NL	*
	Plantago lanceolata	Herb		21	FAC	*
	Hypochaeris radicata	Herb		21	FACU	*
	Daucus carota	Herb		21	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T3, P10	*Rubus ursinus*	Sap/Shrub	20	100	FACU	*
	Anthoxanthum odoratum	Herb		25	FACU	*
	Leucanthemum vulgare	Herb		25	NL	*
	Hypochaeris radicata	Herb		25	FACU	*
	Daucus carota	Herb		25	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T3, P11	*Anthoxanthum odoratum*	Herb		10	FACU	
	Leucanthemum vulgare	Herb		30	NL	*
	Phleum pratense	Herb		5	FAC-	
	Rumex acetosella	Herb		5	FACU+	
	Cirsium arvense	Herb		10	FACU+	
	Daucus carota	Herb		40	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T3, P12	*Anthoxanthum odoratum*	Herb		30	FACU	*
	Leucanthemum vulgare	Herb		30	NL	*
	Prunella vulgaris	Herb		5	FACU+	
	Hypochaeris radicata	Herb		30	FACU	*
	Holcus lanatus	Herb		5	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P13	*Anthoxanthum odoratum*	Herb		30	FACU	*
	Leucanthemum vulgare	Herb		30	NL	*
	Prunella vulgaris	Herb		5	FACU+	
	Hypochaeris radicata	Herb		30	FACU	*
	Agrostis stolonifera	Herb		5	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T3, P14	*Juncus tenuis*	Herb		55	FACW-	*
	Prunella vulgaris	Herb		5	FACU+	
	Hypochaeris radicata	Herb		20	FACU	*
	Agrostis stolonifera	Herb		20	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T3, P15	*Carex scoparia*	Herb		65	FACW	*
	Hypochaeris radicata	Herb		25	FACU	*
	Agrostis stolonifera	Herb		5	FAC	
	Hypericum anagalloides	Herb		5	OBL	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
Note: The Hypericum was depauperate from growing in the saturated conditions.						
T3, P16	*Anthoxanthum odoratum*	Herb		5	FACU	
	Leucanthemum vulgare	Herb		5	NL	
	Prunella vulgaris	Herb		5	FACU+	
	Hypochaeris radicata	Herb		45	FACU	*
	Daucus carota	Herb		5	NL	
	Agrostis stolonifera	Herb		35	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
Note: Considering the non-dominant species, this plot does not have hydrophytic vegetation.						
T3, P17	*Anthoxanthum odoratum*	Herb		30	FACU	*
	Hypochaeris radicata	Herb		30	FACU	*
	Daucus carota	Herb		30	NL	*
	Agrostis stolonifera	Herb		5	FAC	
	Aira caryophyllea	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T3, P18	*Rubus ursinus*	Sap/Shrub	5	0	FACU	
	Hypochaeris radicata	Herb		35	FACU	*
	Leucanthemum vulgare	Herb		30	NL	*
	Prunella vulgaris	Herb		20	FACU+	*
	Agrostis stolonifera	Herb		10	FAC	
	Aira caryophyllea	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P19	*Rubus ursinus*	Sap/Shrub	5	0	FACU	
	Anthoxanthum odoratum	Herb		25	FACU	*
	Fragaria virginiana	Herb		30	FACU	*
	Leucanthemum vulgare	Herb		20	NL	*
	Plantago lanceolata	Herb		5	FAC	
	Prunella vulgaris	Herb		5	FACU+	
	Daucus carota	Herb		15	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T4, P1	*Cirsium arvense*	Herb		25	FACU+	*
	Holcus lanatus	Herb		25	FAC	*
	Anthoxanthum odoratum	Herb		15	FACU	
	Poa pratensis	Herb		5	FAC	
	Phleum pratense	Herb		20	FAC-	*
	Festuca rubra	Herb		10	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T4, P2	*Rosa pisocarpa*	Sap/Shrub	10	0	FAC	
	Dactylis glomerata	Herb		50	FACU	*
	Holcus lanatus	Herb		20	FAC	*
	Cirsium arvense	Herb		20	FACU+	*
	Agropyron repens	Herb		10	FAC-	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T4, P3	*Carex obnupta*	Herb		45	OBL	*
	Cirsium arvense	Herb		35	FACU+	*
	Holcus lanatus	Herb		20	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T4, P4	*Carex obnupta*	Herb		90	OBL	*
	Equisetum arvense	Herb		10	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T4, P5	*Alnus rubra*	Tree	20	50	FAC	*
	Rhamnus purshiana	Tree	20	50	FAC-	*
	Rubus ursinus	Sap/Shrub	50	100	FACU	*
	Festuca rubra	Herb		20	FAC	*
	Holcus lanatus	Herb		35	FAC	*
	Cirsium arvense	Herb		20	FACU+	*
	Anthoxanthum odoratum	Herb		5	FACU	
	Agrostis stolonifera	Herb		20	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					57
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T4, P6	*Festuca rubra*	Herb		40	FAC	*
	Anthoxanthum odoratum	Herb		35	FACU	*
	Daucus carota	Herb		5	NL	
	Juncus effusus	Herb		20	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T4, P6b	*Festuca arundinacea*	Herb		80	FAC-	*
	Anthoxanthum odoratum	Herb		15	FACU	
	Daucus carota	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					Yes
T4, P7	*Anthoxanthum odoratum*	Herb		35	FACU	*
	Hypochaeris radicata	Herb		35	FACU	*
	Leucanthemum vulgare	Herb		5	NL	
	Agrostis stolonifera	Herb		25	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T4, P8	*Anthoxanthum odoratum*	Herb		15	FACU	
	Hypochaeris radicata	Herb		50	FACU	*
	Leucanthemum vulgare	Herb		20	NL	*
	Agrostis stolonifera	Herb		5	FAC	
	Danthonia californica	Herb		t	FACU	
	Solidago canadensis	Herb		10	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T4, P9	*Anthoxanthum odoratum*	Herb		60	FACU	*
	Leucanthemum vulgare	Herb		10	NL	
	Agrostis stolonifera	Herb		20	FAC	
	Festuca arundinacea	Herb		35	FAC-	*
	Daucus carota	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T4, P10	*Anthoxanthum odoratum*	Herb		60	FACU	*
	Leucanthemum vulgare	Herb		10	NL	
	Agrostis stolonifera	Herb		20	FAC	
	Festuca arundinacea	Herb		35	FAC-	*
	Daucus carota	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T4, P11	*Rubus ursinus*	Sap/Shrub	20	100	FACU	*
	Anthoxanthum odoratum	Herb		25	FACU	*
	Madia sp.	Herb		50	NL	*
	Agrostis stolonifera	Herb		20	FAC	*
	Daucus carota	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T4, P12	*Anthoxanthum odoratum*	Herb		20	FACU	*
	Hypochaeris radicata	Herb		25	FACU	*
	Leucanthemum vulgare	Herb		25	NL	*
	Madia sp.	Herb		25	NL	*
	Danthonia californica	Herb		t	FACU	
	Daucus carota	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T4, P13	*Anthoxanthum odoratum*	Herb		35	FACU	*
	Hypochaeris radicata	Herb		35	FACU	*
	Leucanthemum vulgare	Herb		5	NL	
	Agrostis stolonifera	Herb		25	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T4, P14	*Hypochaeris radicata*	Herb		25	FACU	*
	Leucanthemum vulgare	Herb		10	NL	
	Agrostis stolonifera	Herb		40	FAC	*
	Juncus tenuis	Herb		10	FACW	
	Prunella vulgaris	Herb		15	FACU+	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
Note: With the presence of Juncus tenuis, BPJ determines that this plot has hydrophytic vegetation.						
T4, P14b	*Hypochaeris radicata*	Herb		5	FACU	
	Carex scoparia	Herb		15	FACW	
	Agrostis stolonifera	Herb		50	FAC	*
	Juncus tenuis	Herb		30	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T4, P15	*Hypochaeris radicata*	Herb		20	FACU	*
	Carex aurea	Herb		25	FACW+	*
	Agrostis stolonifera	Herb		30	FAC	*
	Juncus tenuis	Herb		10	FACW	
	Anthoxanthum odoratum	Herb		5	FACU	
	Solidago canadensis	Herb		5	FACU	
	Juncus effusus	Herb		5	FACW	
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes

	6/26/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T4, P15b	*Anthoxanthum odoratum*	Herb		25	FACU	*
	Hypochaeris radicata	Herb		35	FACU	*
	Prunella vulgaris	Herb		5	FACU+	
	Parentucellia viscosa	Herb		5	FAC-	
	Agrostis stolonifera	Herb		15	FAC	
	Danthonia californica	Herb		5	FACU	
	Trifolium dubium	Herb		10	UPL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T4, P16	*Anthoxanthum odoratum*	Herb		15	FACU	
	Hypochaeris radicata	Herb		30	FACU	*
	Leucanthemum vulgare	Herb		20	NL	*
	Aira caryophyllea	Herb		5	NL	
	Agrostis stolonifera	Herb		30	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T4, P17	*Daucus carota*	Herb		15	NL	
	Hypochaeris radicata	Herb		20	FACU	*
	Leucanthemum vulgare	Herb		25	NL	*
	Agrostis stolonifera	Herb		40	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T4, P18	*Anthoxanthum odoratum*	Herb		25	FACU	*
	Hypochaeris radicata	Herb		10	FACU	
	Leucanthemum vulgare	Herb		10	NL	
	Agrostis stolonifera	Herb		40	FAC	*
	Festuca arundinacea	Herb		40	FAC-	*
	Prunella vulgaris	Herb		5	FACU+	
	Fragaria virginiana	Herb		5	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/27/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T5, P1	*Anthoxanthum odoratum*	Herb		25	FACU	*
	Hypochaeris radicata	Herb		5	FACU	
	Agrostis stolonifera	Herb		10	FAC	
	Daucus carota	Herb		5	NL	
	Fragaria virginiana	Herb		15	FACU	
	Plantago lanceolata	Herb		20	FAC	*
	Leucanthemum vulgare	Herb		20	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T5, P2	*Pseudotsuga menziesii*	Tree	15	50	FACU	*
	Alnus rubra	Tree	15	50	FAC	*
	Cytisus scoparius	Sap/Shrub	5	100	NL	
	Anthoxanthum odoratum	Herb		20	FACU	*
	Leucanthemum vulgare	Herb		5	NL	
	Hypochaeris radicata	Herb		25	FACU	*
	Agrostis stolonifera	Herb		15	FAC	
	Daucus carota	Herb		5	NL	
	Trifolium dubium	Herb		25	UPL	*
	Festuca rubra	Herb		5	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					20
	Hydrophytic Vegetation Present?					No
T5, P3	*Pseudotsuga menziesii*	Tree	35	100	FACU	*
	Rubus ursinus	Sap/Shrub	30	100	FACU	*
	Anthoxanthum odoratum	Herb		35	FACU	*
	Leucanthemum vulgare	Herb		15	NL	
	Hypochaeris radicata	Herb		20	FACU	*
	Agrostis stolonifera	Herb		25	FAC	*
	Daucus carota	Herb		5	NL	
	bare ground		5			
	Percent of Dominants that are FAC, FACW, or OBL =					20
	Hydrophytic Vegetation Present?					No
T5, P4	*Pseudotsuga menziesii*	Tree	22	100	FACU	*
	Anthoxanthum odoratum	Herb		25	FACU	*
	Leucanthemum vulgare	Herb		8	NL	
	Hypochaeris radicata	Herb		20	FACU	*
	Agrostis stolonifera	Herb		30	FAC	*
	Daucus carota	Herb		2	NL	
	Trifolium dubium	Herb		10	UPL	
	Prunella vulgaris	Herb		2	FACU+	
	Parentucellia viscosa	Herb		3	FAC-	
	bare ground		5			
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No

	6/27/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T5, P5	*Alnus rubra*	Tree	20	74	FAC	*
	Salix sitchensis	Tree	7	26	FACW	
	Rubus ursinus	Sap/Shrub	20	57	FACU	*
	Spiraea douglasii	Sap/Shrub	15	43	FACW	*
	Anthoxanthum odoratum	Herb		5	FACU	
	Hypochaeris radicata	Herb		5	FACU	
	Prunella vulgaris	Herb		15	FACU+	
	Juncus effusus	Herb		30	FACW	*
	Carex obnupta	Herb		40	OBL	*
	Solidago canadensis	Herb		5	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					80
	Hydrophytic Vegetation Present?					No
T5, P6	*Spiraea douglasii*	Sap/Shrub	7	100	FACW	
	Hypochaeris radicata	Herb		25	FACU	*
	Carex aurea	Herb		25	FACW+	*
	Agrostis stolonifera	Herb		25	FAC	*
	Juncus tenuis	Herb		20	FACW	*
	Prunella vulgaris	Herb		3	FACU+	
	Holcus lanatus	Herb		2	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
T5, P7	*Anthoxanthum odoratum*	Herb		25	FACU	*
	Hypochaeris radicata	Herb		40	FACU	*
	Agrostis stolonifera	Herb		25	FAC	*
	Carex aurea	Herb		10	FACW+	
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					Yes
Note: The Hypochaeris was depauperate from growing in the wet conditions and the bare soil was cracked indicating inundation. Given the presence of Carex aurea, BPJ determines this plot is hydrophytic.						
T5, P7b	*Anthoxanthum odoratum*	Herb		20	FACU	*
	Leucanthemum vulgare	Herb		20	NL	*
	Hypochaeris radicata	Herb		30	FACU	*
	Agrostis stolonifera	Herb		10	FAC	
	Trifolium dubium	Herb		3	UPL	
	Prunella vulgaris	Herb		15	FACU+	
	Aira caryophyllea	Herb		2	NL	
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/27/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T5, P8	*Anthoxanthum odoratum*	Herb		15	FACU	
	Hypochaeris radicata	Herb		2	FACU	
	Agrostis stolonifera	Herb		5	FAC	
	Leucanthemum vulgare	Herb		13	NL	
	Madia sp.	Herb		65	NL	*
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T5, P9	*Fraxinus latifolia*	Tree	5	100	FACW	
	Anthoxanthum odoratum	Herb		5	FACU	
	Leucanthemum vulgare	Herb		5	NL	
	Juncus effusus	Herb		5	FACW	
	Carex obnupta	Herb		80	OBL	*
	Holcus lanatus	Herb		5	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T5, P10	*Anthoxanthum odoratum*	Herb		5	FACU	
	Leucanthemum vulgare	Herb		20	NL	*
	Hypochaeris radicata	Herb		25	FACU	*
	Festuca arundinacea	Herb		45	FAC-	*
	Prunella vulgaris	Herb		5	FACU+	
	bare ground		5			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T5, P11	*Anthoxanthum odoratum*	Herb		5	FACU	
	Hypochaeris radicata	Herb		35	FACU	*
	Agrostis stolonifera	Herb		50	FAC	*
	Solidago canadensis	Herb		5	FACU	
	bare ground		20			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
Note: Taking into account the non-dominant species, BPJ determines that this plot is not hydrophytic.						
T5, P12	*Anthoxanthum odoratum*	Herb		10	FACU	
	Hypochaeris radicata	Herb		35	FACU	*
	Agrostis stolonifera	Herb		5	FAC	
	Solidago canadensis	Herb		15	FACU	
	Juncus effusus	Herb		30	FACW	*
	Madia sp.	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
Note: Juncus effusus is a poor indicator of wetlands in disturbed areas like this site.						

	6/27/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T5, P13	*Anthoxanthum odoratum*	Herb		10	FACU	
	Hypochaeris radicata	Herb		48	FACU	*
	Agrostis stolonifera	Herb		40	FAC	*
	Daucus carota	Herb		2	NL	
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
T5, P14	*Anthoxanthum odoratum*	Herb		10	FACU	
	Hypochaeris radicata	Herb		2	FACU	
	Agrostis stolonifera	Herb		35	FAC	*
	Leucanthemum vulgare	Herb		3	NL	
	Daucus carota	Herb		20	NL	*
	Fragaria virginiana	Herb		5	FACU	
	Plantago lanceolata	Herb		5	FAC	
	Centaurea pratensis	Herb		15	NL	
	Festuca arundinacea	Herb		5	FAC-	
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
T5, P14b	*Anthoxanthum odoratum*	Herb		5	FACU	
	Hypochaeris radicata	Herb		3	FACU	
	Leucanthemum vulgare	Herb		2	NL	
	Daucus carota	Herb		3	NL	
	Juncus effusus	Herb		30	FACW	*
	Carex obnupta	Herb		10	OBL	
	Carex scoparia	Herb		15	FACW	*
	Holcus lanatus	Herb		15	FAC	*
	Prunella vulgaris	Herb		2	FACU+	
	Festuca arundinacea	Herb		15	FAC-	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T5, P15	*Anthoxanthum odoratum*	Herb		5	FACU	
	Carex obnupta	Herb		10	OBL	
	Carex nebrascensis	Herb		15	OBL	*
	Holcus lanatus	Herb		15	FAC	*
	Prunella vulgaris	Herb		2	FACU+	
	Festuca rubra	Herb		15	FAC	*
	Erigeron sp.	Herb		35	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/27/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T5, P16	*Carex obnupta*	Herb		85	OBL	*
	Carex stipata	Herb		1	OBL	
	Carex scoparia	Herb		3	FACW	
	Veronica sp.	Herb		3	NL	
	Geum macrophyllum	Herb		3	FACW-	
	Erigeron sp.	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T5, P17	*Rubus ursinus*	Sap/Shrub	20	100	FACU	*
	Anthoxanthum odoratum	Herb		15	FACU	
	Hypochaeris radicata	Herb		3	FACU	
	Leucanthemum vulgare	Herb		20	NL	*
	Daucus carota	Herb		2	NL	
	Fragaria virginiana	Herb		5	FACU	
	Holcus lanatus	Herb		5	FAC	
	Festuca rubra	Herb		50	FAC	*
	bare ground		5			
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T5, P18	*Anthoxanthum odoratum*	Herb		3	FACU	
	Leucanthemum vulgare	Herb		20	NL	*
	Daucus carota	Herb		10	NL	
	Prunella vulgaris	Herb		2	FACU+	
	Holcus lanatus	Herb		2	FAC	
	Festuca rubra	Herb		45	FAC	*
	Cirsium arvense	Herb		8	FACU+	
	Dactylis glomerata	Herb		10	FACU	
	Poa pratensis	Herb		t	FAC	
	bare ground		5			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No

	6/27/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P1	*Agrostis stolonifera*	Herb		25	FAC	*
	Leucanthemum vulgare	Herb		22	NL	*
	Hypochaeris radicata	Herb		20	FACU	*
	Fragaria virginiana	Herb		3	FACU	
	Festuca rubra	Herb		5	FAC	
	Prunella vulgaris	Herb		2	FACU+	
	Plantago lanceolata	Herb		23	FAC	*
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
T1, P2	*Anthoxanthum odoratum*	Herb		15	FACU	
	Agrostis stolonifera	Herb		5	FAC	
	Madia sp.	Herb		30	NL	*
	Hypochaeris radicata	Herb		30	FACU	*
	Prunella vulgaris	Herb		5	FACU+	
	Juncus effusus	Herb		5	FACW	
	bare ground		10			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P3	*Anthoxanthum odoratum*	Herb		60	FACU	*
	Leucanthemum vulgare	Herb		20	NL	
	Hypochaeris radicata	Herb		5	FACU	
	Daucus carota	Herb		10	NL	
	Phalaris arundinacea	Herb		5	FACW	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P4	*Anthoxanthum odoratum*	Herb		60	FACU	*
	Leucanthemum vulgare	Herb		10	NL	
	Madia sp.	Herb		5	NL	
	Cirsium arvense	Herb		10	FACU+	
	Prunella vulgaris	Herb		3	FACU+	
	Holcus lanatus	Herb		10	FAC	
	Senecio jacobaea	Herb		2	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P5	*Anthoxanthum odoratum*	Herb		5	FACU	
	Leucanthemum vulgare	Herb		2	NL	
	Hypochaeris radicata	Herb		76	FACU	*
	Agrostis stolonifera	Herb		10	FAC	
	Prunella vulgaris	Herb		3	FACU+	
	Sisyrinchium douglasii	Herb		2	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/27/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P6	*Bellis perennis*	Herb	1	3	NL	
	Leucanthemum vulgare	Herb	4	11	NL	
	Hypochaeris radicata	Herb	30	86	FACU	*
	bare ground		65			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					Yes
Note: The Hypochaeris was depauperate from growing in the wet conditions and the bare soil was cracked indicating inundation. BPJ determines this plot is hydrophytic.						
T1, P7	*Rosa pisocarpa*	Sap/Shrub	15	100	FAC	*
	Leucanthemum vulgare	Herb		40	NL	*
	Hypochaeris radicata	Herb		40	FACU	*
	Agrostis stolonifera	Herb		20	FAC	*
	bare ground		65			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
Note: The Hypochaeris was depauperate from growing in the wet conditions and the bare soil was cracked indicating inundation. BPJ determines this plot is hydrophytic.						
T1, P8	*Anthoxanthum odoratum*	Herb		5	FACU	
	Leucanthemum vulgare	Herb		5	NL	
	Hypochaeris radicata	Herb		85	FACU	*
	Prunella vulgaris	Herb		1	FACU+	
	Daucus carota	Herb		4	NL	
	bare ground		5			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P9	*Juncus acuminatus*	Herb		40	OBL	*
	Juncus tenuis	Herb		15	FACW	*
	Hypericum anagalloides	Herb		10	OBL	
	Carex scoparia	Herb		10	FACW	
	Madia sp.	Herb		10	NL	
	Eleocharis acicularis	Herb		10	OBL	
	Agrostis stolonifera	Herb		5	FAC	
	bare ground		50			
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/27/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P10	*Juncus acuminatus*	Herb		10	OBL	
	Hypochaeris radicata	Herb		70	FACU	*
	Leucanthemum vulgare	Herb		1	NL	
	Prunella vulgaris	Herb		10	FACU+	
	Daucus carota	Herb		1	NL	
	Agrostis stolonifera	Herb		1	FAC	
	Carex aurea	Herb		2	FACW+	
	Trifolium dubium	Herb		5		
	bare ground		25			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					Yes
Note: The Hypochaeris was depauperate from growing in the wet conditions. Given the presence of Juncus tenuis and Carex aurea, BPJ determines this plot is hydrophytic.						
T1, P11	*Anthoxanthum odoratum*	Herb		10	FACU	
	Leucanthemum vulgare	Herb		5	NL	
	Hypochaeris radicata	Herb		80	FACU	*
	Daucus carota	Herb		1	NL	
	Fragaria virginiana	Herb		1	FACU	
	Prunella vulgaris	Herb		2	FACU+	
	Aira caryophyllea	Herb		1	NL	
	bare ground		4			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T1, P12	*Pseudotsuga menziesii*	Tree	40	100	FACU	*
	Rubus ursinus	Sap/Shrub	10	90	FACU	
	Cytisus scoparius	Sap/Shrub	1	10		
	Anthoxanthum odoratum	Herb		40	FACU	
	Leucanthemum vulgare	Herb		2	NL	
	Hypochaeris radicata	Herb		20	FACU	*
	Daucus carota	Herb		1	NL	
	Agrostis stolonifera	Herb		35	FAC	
	Bellis perennis	Herb		1	NL	
	bare ground		10			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/28/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P1	*Spiraea douglasii*	Sap/Shrub	25	100	FACW	*
	Anthoxanthum odoratum	Herb		10	FACU	
	Leucanthemum vulgare	Herb		10	NL	
	Hypochaeris radicata	Herb		15	FACU	*
	Daucus carota	Herb		15	NL	*
	Agrostis stolonifera	Herb		14	FAC	
	Plantago lanceolata	Herb		25	FAC	*
	Trifolium dubium	Herb		10	UPL	
	Danthonia californica	Herb		1	FACU	
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
T2, P2	*Fraxinus latifolia*	Sap/Shrub	3	38	FACW	
	Rubus discolor	Sap/Shrub	5	63	FACU	
	Anthoxanthum odoratum	Herb		5	FACU	
	Leucanthemum vulgare	Herb		5	NL	
	Hypochaeris radicata	Herb		70	FACU	*
	Daucus carota	Herb		5	NL	
	Plantago lanceolata	Herb		5	FAC	
	Prunella vulgaris	Herb		5	FACU+	
	Festuca rubra	Herb		5	FAC	
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
T2, P3	*Fraxinus latifolia*	Tree	10	50	FACW	*
	Rhamnus purshiana	Tree	10	50	FAC-	*
	Rubus discolor	Sap/Shrub	10	50	FACU	*
	Spiraea douglasii	Sap/Shrub	10	50	FACW	*
	Phalaris arundinacea	Herb	100	100	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					60
	Hydrophytic Vegetation Present?					Yes
T2, P4	*Fraxinus latifolia*	Tree	20	80	FACW	*
	Rhamnus purshiana	Tree	5	20	FAC-	
	Rosa pisocarpa	Sap/Shrub	5	50	FACW	
	Spiraea douglasii	Sap/Shrub	5	50	FACW	
	Leucanthemum vulgare	Herb		5	NL	
	Juncus effusus	Herb		65	FACW	*
	Solidago canadensis	Herb		20	FACU	*
	Eriophyllum lanatum	Herb		10	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes

	6/28/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P5	*Fraxinus latifolia*	Tree	5	100	FACW	
	Fraxinus latifolia	Sap/Shrub	15	43	FACW	*
	Spiraea douglasii	Sap/Shrub	20	57	FACW	*
	Leucanthemum vulgare	Herb		5	NL	
	Juncus effusus	Herb		85	FACW	*
	Hypochaeris radicata	Herb		15	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T2, P6	*Fraxinus latifolia*	Sap/Shrub	25	45	FACW	*
	Spiraea douglasii	Sap/Shrub	30	55	FACW	*
	Leucanthemum vulgare	Herb		3	NL	
	Solidago canadensis	Herb		5	FACU	
	Juncus effusus	Herb		80	FACW	*
	Hypochaeris radicata	Herb		10	FACU	
	Prunella vulgaris	Herb		2	FACU+	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T2, P7	*Fraxinus latifolia*	Sap/Shrub	25	38	FACW	*
	Spiraea douglasii	Sap/Shrub	30	46	FACW	*
	Rubus ursinus	Sap/Shrub	10	15	FACU	
	Anthoxanthum odoratum	Herb		35	FACU	*
	Leucanthemum vulgare	Herb		10	NL	
	Hypochaeris radicata	Herb		15	FACU	
	Agrostis stolonifera	Herb		15	FAC	
	Danthonia californica	Herb		15	FACU	
	Daucus carota	Herb		2	NL	
	Madia sp.	Herb		3	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T2, P8	*Fraxinus latifolia*	Sap/Shrub	3	60	FACW	
	Spiraea douglasii	Sap/Shrub	1	20	FACW	
	Rosa pisocarpa	Sap/Shrub	1	20	FAC	
	Anthoxanthum odoratum	Herb	1	3	FACU	
	Leucanthemum vulgare	Herb	1	3	NL	
	Hypochaeris radicata	Herb	20	57	FACU	*
	Agrostis stolonifera	Herb	1	3	FAC	
	Prunella vulgaris	Herb	1	3	FACU+	
	Juncus tenuis	Herb	1	3	FACW	
	Holcus lanatus	Herb	1	3	FAC	
	Juncus effusus	Herb	9	26	FACW	*
	bare ground		60			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes

	6/28/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P9	*Leucanthemum vulgare*	Herb	1	3	NL	
	Hypochaeris radicata	Herb	12	30	FACU	*
	Agrostis stolonifera	Herb	20	50	FAC	*
	Juncus tenuis	Herb	5	13	FACW	
	Madia sp.	Herb	2	5	FACU	
	bare ground		60			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
T2, P10	*Leucanthemum vulgare*	Herb	1	1	NL	
	Hypochaeris radicata	Herb	30	38	FACU	*
	Agrostis stolonifera	Herb	15	19	FAC	*
	Madia sp.	Herb	15	19	FACU	*
	Danthonia californica	Herb	1	1	FACU	
	Daucus carota	Herb	1	1	NL	
	Solidago canadensis	Herb	15	19	FACU	*
	Prunella vulgaris	Herb	2	3	FACU+	
	bare ground		20			
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T2, P11	*Pseudotsuga menziesii*	Tree	20	100	FACU	*
	Rosa pisocarpa	Sap/Shrub	20	44	FAC	*
	Spiraea douglasii	Sap/Shrub	10	22	FACW	
	Rubus discolor	Sap/Shrub	10	22	FACU	
	Rubus ursinus	Sap/Shrub	5	11	FACU	
	Leucanthemum vulgare	Herb	10	10	NL	
	Juncus effusus	Herb	20	20	FACW	*
	Solidago canadensis	Herb	10	10	FACU	
	Cirsium arvense	Herb	10	10	FACU+	
	Carex obnupta	Herb	45	45	OBL	*
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
T2, P12	*Pseudotsuga menziesii*	Sap/Shrub	30	68	FACU	*
	Rosa pisocarpa	Sap/Shrub	2	5	FAC	
	Rubus discolor	Sap/Shrub	2	5	FACU	
	Rubus ursinus	Sap/Shrub	10	23	FACU	
	Leucanthemum vulgare	Herb		1	NL	
	Hypochaeris radicata	Herb		5	FACU	
	Agrostis stolonifera	Herb		85	FAC	*
	Daucus carota	Herb		3	NL	
	Prunella vulgaris	Herb		2	FACU+	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No

	6/28/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
PBX	*Juncus effusus*	Herb	5	6	FACW	
	Carex obnupta	Herb	70	82	OBL	*
	Veronica scutellata	Herb	10	12	OBL	
	Portulaca oleracea	Herb	t	t	FAC	
	Eleocharis acicularis	Herb	t	t	FACU+	
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
Note: Soil surface was saturated.						
T3, P1	*Alnus rubra*	Tree	10	100	FAC	
	Alnus rubra	Sap/Shrub	4	15	FAC	
	Rubus ursinus	Sap/Shrub	10	38	FACU	
	Fraxinus latifolia	Sap/Shrub	3	12	OBL	
	Spiraea douglasii	Sap/Shrub	8	31	FACW	
	Cornus sericea	Sap/Shrub	1	4	FACW	
	Anthoxanthum odoratum	Herb	20	20	FACU	*
	Leucanthemum vulgare	Herb	5	5	NL	
	Daucus carota	Herb	5	5	NL	
	Festuca rubra	Herb	20	20	FAC	*
	Juncus effusus	Herb	10	10	FACW	
	Equisetum arvense	Herb	15	15	FAC	*
	Plantago lanceolata	Herb	10	10	FAC	
	Fragaria virginiana	Herb	10	10	FACU	
	Prunella vulgaris	Herb	5	5	FACU+	
	bare ground		0			
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T3, P2	*Alnus rubra*	Sap/Shrub	7	18	FAC	
	Rhamnus purshiana	Sap/Shrub	5	13	FAC-	
	Fraxinus latifolia	Sap/Shrub	4	11	OBL	
	Spiraea douglasii	Sap/Shrub	22	58	FACW	*
	Anthoxanthum odoratum	Herb	10	10	FACU	
	Leucanthemum vulgare	Herb	5	5	NL	
	Juncus effusus	Herb	50	50	FACW	*
	Equisetum arvense	Herb	3	3	FAC	
	Plantago lanceolata	Herb	5	5	FAC	
	Geum macrophyllum	Herb	2	2	FACW-	
	Holcus lanatus	Herb	20	20	FAC	*
	Prunella vulgaris	Herb	5	5	FACU+	
	bare ground		0			
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/28/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P3	*Alnus rubra*	Tree	25	100	FAC	*
	Pseudotsuga menziesii	Sap/Shrub	4	25	FACU	
	Fraxinus latifolia	Sap/Shrub	6	38	OBL	
	Spiraea douglasii	Sap/Shrub	6	38	FACW	
	Anthoxanthum odoratum	Herb		20	FACU	*
	Leucanthemum vulgare	Herb		5	NL	
	Daucus carota	Herb		5	NL	
	Agrostis stolonifera	Herb		40	FAC	*
	Hypochaeris radicata	Herb		25	FACU	*
	Lotus purshiana	Herb		5	FAC	
	bare ground		35			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
Note: Soil surface was a cracked crust indicating inundatio						
T3, P4	*Alnus rubra*	Tree	50	100	FAC	*
	Alnus rubra	Sap/Shrub	10	17	FAC	
	Pseudotsuga menziesii	Sap/Shrub	10	17	FACU	
	Fraxinus latifolia	Sap/Shrub	20	33	OBL	*
	Spiraea douglasii	Sap/Shrub	20	33	FACW	*
	Anthoxanthum odoratum	Herb		30	FACU	*
	Leucanthemum vulgare	Herb		5	NL	
	Daucus carota	Herb		5	NL	
	Agrostis stolonifera	Herb		20	FAC	*
	Hypochaeris radicata	Herb		40	FACU	*
	Juncus acuminatus	Herb		t	FACW	
	bare ground		10			
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T3, P5	*Pseudotsuga menziesii*	Sap/Shrub	5	7	FACU	
	Rubus ursinus	Sap/Shrub	25	33	FACU	*
	Fraxinus latifolia	Sap/Shrub	5	7	OBL	
	Spiraea douglasii	Sap/Shrub	40	53	FACW	*
	Anthoxanthum odoratum	Herb	10	10	FACU	
	Leucanthemum vulgare	Herb	10	10	NL	
	Daucus carota	Herb	5	5	NL	
	Festuca rubra	Herb	50	50	FAC	*
	Hypochaeris radicata	Herb	20	20	FACU	*
	Prunella vulgaris	Herb	5	5	FACU+	
	bare ground		0			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes

	6/28/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P6	*Pseudotsuga menziesii*	Sap/Shrub	10	15	FACU	
	Rubus ursinus	Sap/Shrub	15	23	FACU	*
	Fraxinus latifolia	Sap/Shrub	15	23	OBL	*
	Spiraea douglasii	Sap/Shrub	25	38	FACW	*
	Anthoxanthum odoratum	Herb	10	10	FACU	
	Leucanthemum vulgare	Herb	5	5	NL	
	Daucus carota	Herb	2	2	NL	
	Festuca rubra	Herb	70	70	FAC	*
	Hypochaeris radicata	Herb	5	5	FACU	
	Prunella vulgaris	Herb	3	3	FACU+	
	Agrostis stolonifera	Herb	5	5	FAC	
	bare ground		0			
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
T3, P7	*Pseudotsuga menziesii*	Sap/Shrub	5	13	FACU	
	Rosa nutkana	Sap/Shrub	15	38	FAC	*
	Fraxinus latifolia	Sap/Shrub	5	13	OBL	
	Spiraea douglasii	Sap/Shrub	15	38	FACW	*
	Anthoxanthum odoratum	Herb	15	15	FACU	
	Leucanthemum vulgare	Herb	10	10	NL	
	Daucus carota	Herb	3	3	NL	
	Carex obnupta	Herb	45	45	OBL	*
	Solidago canadensis	Herb	25	25	FACU	*
	Prunella vulgaris	Herb	2	2	FACU+	
	bare ground		0			
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
T3, P8	*Pseudotsuga menziesii*	Sap/Shrub	10	29	FACU	
	Rosa nutkana	Sap/Shrub	5	14	FAC	
	Fraxinus latifolia	Sap/Shrub	5	14	OBL	
	Spiraea douglasii	Sap/Shrub	15	43	FACW	*
	Anthoxanthum odoratum	Herb		10	FACU	
	Leucanthemum vulgare	Herb		14	NL	
	Danthonia californica	Herb		1	FACU	
	Carex obnupta	Herb		50	OBL	*
	Solidago canadensis	Herb		2	FACU	*
	Madia sp.	Herb		5	FACU	
	Hypochaeris radicata	Herb		10	FACU	
	Agrostis stolonifera	Herb		5	FAC	*
	Juncus tenuis	Herb		3	FACW	
	bare ground		4			
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes

	6/28/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P9	*Pseudotsuga menziesii*	Sap/Shrub	5	20	FACU	
	Rosa nutkana	Sap/Shrub	12	48	FAC	
	Fraxinus latifolia	Sap/Shrub	5	20	OBL	
	Spiraea douglasii	Sap/Shrub	3	12	FACW	
	Anthoxanthum odoratum	Herb	5	5	FACU	
	Leucanthemum vulgare	Herb	20	20	NL	
	Daucus carota	Herb	3	3	NL	
	Carex obnupta	Herb	40	40	OBL	*
	Solidago canadensis	Herb	25	25	FACU	*
	Prunella vulgaris	Herb	2	2	FACU+	
	Madia sp.	Herb	3	3	FACU	
	Carex scoparia	Herb	2	2	FACW	
	bare ground		0			
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					Yes
Note: The ash, spirea, and rose have insufficiently low covers to be considered dominant, but given their presence, BPJ determines this plot to have hydrophytic vegetation.						
T3, P10	*Alnus rubra*	Tree	35	100	FAC	*
	Pseudotsuga menziesii	Sap/Shrub	35	58	FACU	*
	Rosa nutkana	Sap/Shrub	5	8	FAC	
	Spiraea douglasii	Sap/Shrub	5	8	FACW	
	Rubus ursinus	Sap/Shrub	15	25	FACU	*
	Anthoxanthum odoratum	Herb		15	FACU	
	Leucanthemum vulgare	Herb		5	NL	
	Glyceria elata	Herb		25	FACW+	*
	Festuca rubra	Herb	70	55	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					60
	Hydrophytic Vegetation Present?					Yes
T3, P11	*Alnus rubra*	Tree	3	38	FAC	
	Pseudotsuga menziesii	Tree	5	63	FACU	
	Pseudotsuga menziesii	Sap/Shrub	35	66	FACU	*
	Rhamnus purshiana	Sap/Shrub	1	2	FAC-	
	Rubus ursinus	Sap/Shrub	15	28	FACU	*
	Spiraea douglasii	Sap/Shrub	2	4	FACW	
	Anthoxanthum odoratum	Herb		10	FACU	
	Leucanthemum vulgare	Herb		20	NL	*
	Hypochaeris radicata	Herb		25	FACU	*
	Prunella vulgaris	Herb		20	FACU+	*
	Agrostis stolonifera	Herb		2	FAC	
	Daucus carota	Herb		5	NL	
	Centaurea x pratense	Herb		15	NL	
	Plantago lanceolata	Herb		3	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No

	6/26/2007					
Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
P1	*Pseudotsuga menziesii*	Tree	10	33	FACU	
	Alnus rubra	Tree	20	67	FAC	*
	Crataegus douglasii	Sap/Shrub	20	27	FAC	*
	Rubus ursinus	Sap/Shrub	20	27	FACU	*
	Rhamnus purshiana	Sap/Shrub	20	27	FAC-	*
	Gaultheria shallon	Sap/Shrub	15	20	FACU	*
	Deschampsia elongata	Herb	40	50	FACW-	*
	Anthoxanthum odoratum	Herb	40	50	FACU	*
	Claytonia sibirica	Herb	t		FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					43
	Hydrophytic Vegetation Present?					No
P2	*Rhamnus purshiana*	Tree	50	100	FAC-	*
	Rubus ursinus	Sap/Shrub	20	40	FACU	*
	Gaultheria shallon	Sap/Shrub	25	50	FACU	*
	Rosa pisocarpa	Sap/Shrub	5	10	FAC	
	Deschampsia elongata	Herb	17	22	FACW-	*
	Anthoxanthum odoratum	Herb	1	1	FACU	
	Festuca arundinacea	Herb	60	76	FAC-	*
	Galium aparine		1	1	FACU	
	Claytonia sibirica	Herb	t		FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					20
	Hydrophytic Vegetation Present?					No
P3	*Pseudotsuga menziesii*	Tree	20	29	FACU	*
	Alnus rubra	Tree	50	71	FAC	*
	Rubus ursinus	Sap/Shrub	60	92	FACU	*
	Rosa pisocarpa	Sap/Shrub	5	8	FAC	
	Deschampsia elongata	Herb	25	83	FACW-	*
	Festuca arundinacea	Herb	5	17	FAC-	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
Note: Given the dominance of Rubus ursinus and the presence of Pseudotsuga, BPJ determines this not to be hydrophytic vegetation.						
P4	*Pseudotsuga menziesii*	Tree	10	17	FACU	
	Alnus rubra	Tree	50	83	FAC	*
	Rubus ursinus	Sap/Shrub	75	94	FACU	*
	Rosa pisocarpa	Sap/Shrub	5	6	FAC	
	Deschampsia elongata	Herb	5	100	FACW-	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
Note: Given the dominance of Rubus ursinus and the presence of Pseudotsuga, BPJ determines that the vegetation in this plot is not hydrophytic.						

	6/26/2007					
Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
P4b	*Alnus rubra*	Tree	5	100	FAC	
	Rubus ursinus	Sap/Shrub	40	50	FACU	*
	Rosa pisocarpa	Sap/Shrub	20	25	FAC	*
	Spiraea douglasii	Sap/Shrub	20	25	FACW	*
	Deschampsia elongata	Herb	75	94	FACW-	*
	Festuca arundinacea	Herb	2	3	FAC-	
	Holcus lanatus	Herb	2	3	FAC	
	Galium aparine	Herb	1	1	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
P5	*Pseudotsuga menziesii*	Tree	10	25	FACU	
	Alnus rubra	Tree	30	75	FAC	*
	Rubus ursinus	Sap/Shrub	40	47	FACU	*
	Rosa pisocarpa	Sap/Shrub	20	24	FAC	*
	Spiraea douglasii	Sap/Shrub	20	24	FACW	*
	Acer circinatum	Sap/Shrub	5	6	FAC-	
	Phalaris arundinacea	Herb	75	100	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					80
	Hydrophytic Vegetation Present?					Yes

	6/26/2007					
Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
P1	*Alnus rubra*	Tree	60	100	FAC	*
	Cornus sericea	Sap/Shrub	10	25	FACW	
	Rubus spectabilis	Sap/Shrub	30	75	FAC+	*
	Osmorhiza chilensis	Herb		90	NL	*
	Stellaria calycantha	Herb		5	FACW+	
	Claytonia sibirica	Herb		5	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
P2	*Alnus rubra*	Tree	20	33	FAC	*
	Rhamnus purshiana	Tree	40	67	FAC-	*
	Cornus sericea	Sap/Shrub	20	21	FACW	*
	Rubus spectabilis	Sap/Shrub	40	42	FAC+	*
	Rubus ursinus	Sap/Shrub	15	16	FACU	
	Spiraea douglasii	Sap/Shrub	20	21	FACW	*
	Athyrium filix-femina	Herb	50	83	NL	*
	Galium aparine	Herb	5	8	FACU	
	Claytonia sibirica	Herb	5	8	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
P3	*Alnus rubra*	Tree	80	89	FAC	*
	Pseudotsuga menziesii	Tree	10	11	FACU	
	Cornus sericea	Sap/Shrub	15	20	FACW	*
	Rubus spectabilis	Sap/Shrub	40	53	FAC+	*
	Rosa pisocarpa	Sap/Shrub	5	7	FAC	
	Lonicera involucrata	Sap/Shrub	5	7		
	Rubus ursinus	Sap/Shrub	10	13	FACU	
	Athyrium filix-femina	Herb	8	9	FAC	
	Carex obnupta	Herb	70	77	OBL	*
	Polystichum munitum	Herb	10	11	FACU	
	Mimulus guttatus	Herb	3	3	OBL	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P1	*Rosa pisocarpa*	Sap/Shrub	10	20	FAC	
	Rubus ursinus	Sap/Shrub	40	80	FACU	*
	Anthoxanthum odoratum	Herb	10	17	FACU	
	Cirsium arvense	Herb	10	17	FACU+	
	Deschampsia elongata	Herb	15	25	FACW	*
	Holcus lanatus	Herb	15	25	FAC	*
	Festuca arundinacea	Herb	10	17	FAC-	
	Claytonia sibirica	Herb	t	t	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T1, P2	*Alnus rubra*	Tree	80	100	FAC	*
	Rhamnus purshiana	Sap/Shrub	10	22	FAC-	
	Rubus ursinus	Sap/Shrub	30	67	FACU	*
	Spiraea douglasii	Sap/Shrub	5	11	FACW	
	Anthoxanthum odoratum	Herb	3	4	FACU	
	Deschampsia elongata	Herb	55	80	FACW	*
	Solidago canadensis	Herb	1	1	FACU	
	Hypericum perforatum	Herb	10	14	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T1, P3	*Alnus rubra*	Tree	50	100	FAC	*
	Rhamnus purshiana	Sap/Shrub	5	11	FAC-	
	Rubus ursinus	Sap/Shrub	20	44	FACU	*
	Spiraea douglasii	Sap/Shrub	15	33	FACW	*
	Gaultheria shallon	Sap/Shrub	5	11	FACU	
	Deschampsia elongata	Herb	20	67	FACW	*
	Holcus lanatus	Herb	5	17	FAC	
	Hypericum perforatum	Herb	1	3	NL	
	Anthoxanthum odoratum	Herb	4	13	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
T1, P4	*Alnus rubra*	Tree	40	100	FAC	*
	Amelanchier alnifolia	Sap/Shrub	10	25	FAC-	
	Rubus ursinus	Sap/Shrub	10	25	FACU	
	Spiraea douglasii	Sap/Shrub	15	38	FACW	*
	Rubus discolor	Sap/Shrub	5	13	FACU	
	Deschampsia elongata	Herb	50	63	FACW	*
	Cirsium arvense	Herb	1	1	FACU+	
	Prunella vulgaris	Herb	1	1	FACU+	
	Juncus effusus	Herb	25	25	FACW	*
	Equisetum arvense	Herb	3	3	FAC	
	Carex scoparia	Herb	20	20	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P5	*Rhamnus purshiana*	Tree	5	25	FAC-	
	Pseudotsuga menziesii	Tree	15	75	FACU	*
	Symphoricarpos albus	Sap/Shrub	15	19	FACU	
	Rubus ursinus	Sap/Shrub	15	19	FACU	
	Spiraea douglasii	Sap/Shrub	40	50	FACW	*
	Corylus cornuta	Sap/Shrub	5	6	FACU	
	Rosa pisocarpa	Sap/Shrub	5	6	FAC	
	Anthoxanthum odoratum	Herb		1	FACU	
	Carex scoparia	Herb		5	FACW	
	Deschampsia elongata	Herb		45	FACW	*
	Phalaris arundinacea	Herb		45	FACW	*
	Lotus corniculatus	Herb		1	FAC	
	Carex stipata	Herb		2	NL	
	Solidago canadensis	Herb		1	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
T1, P6	*Scirpus microcarpus*	Herb	60	75	OBL	*
	Lotus corniculatus	Herb	5	6	FAC	
	Carex stipata	Herb	5	6	NL	
	Carex scoparia	Herb	5	6	FACW	
	Geum macrophyllum	Herb	5	6	FACW-	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T1, P7	*Alnus rubra*	Tree	40	73	FAC	*
	Pseudotsuga menziesii	Tree	15	27	FACU	*
	Spiraea douglasii	Sap/Shrub	60	100	FACW	*
	Phalaris arundinacea	Herb		100	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
T1, P8	*Alnus rubra*	Tree	40	100	FAC	*
	Rosa pisocarpa	Sap/Shrub	10	100	FAC	
	Spiraea douglasii	Sap/Shrub	90	90	FACW	*
	Phalaris arundinacea	Herb		100	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T1, P9	*Spiraea douglasii*	Sap/Shrub	60	60	FACW	*
	Rosa pisocarpa	Sap/Shrub	20	20	FAC	*
	Cornus sericea	Sap/Shrub	20	20	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P1	*Rhamnus purshiana*	Sap/Shrub	30	40	FAC-	*
	Rubus ursinus	Sap/Shrub	15	20	FACU	*
	Rosa pisocarpa	Sap/Shrub	20	27	FAC	*
	Acer circinatum	Sap/Shrub	10	13	FAC-	
	Holcus lanatus	Herb	5	13	FAC	
	Polystichum munitum	Herb	6	16	FACU	
	Hypericum perforatum	Herb	3	8	NL	
	Dactylis glomerata	Herb	10	26	FACU	*
	Equisetum arvense	Herb	10	26	FAC	*
	Pteridium aquilinum	Herb	4	11	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T2, P2	*Rhamnus purshiana*	Sap/Shrub	5	6	FAC-	
	Rubus ursinus	Sap/Shrub	15	19	FACU	*
	Rosa pisocarpa	Sap/Shrub	20	25	FAC	*
	Rubus discolor	Sap/Shrub	15	19	FACU	*
	Corylus cornuta	Sap/Shrub	10	13	FACU	
	Symphoricarpos albus	Sap/Shrub	15	19	FACU	*
	Holcus lanatus	Herb	10	18	FAC	*
	Elymus glaucus	Herb	3	5	FACU	
	Deschampsia elongata	Herb	3	5	FACW	
	Dactylis glomerata	Herb	7	13	FACU	
	Equisetum arvense	Herb	25	45	FAC	*
	Pteridium aquilinum	Herb	5	9	FACU	
	Leucanthemum vulgare	Herb	3	5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
T2, P3	*Rhamnus purshiana*	Sap/Shrub	3	13	FAC-	
	Rubus ursinus	Sap/Shrub	20	87	FACU	*
	Equisetum arvense	Herb	40	38	FAC	*
	Holcus lanatus	Herb	10	9	FAC	
	Hypericum perforatum	Herb	2	2	NL	
	Anthoxanthum odoratum	Herb	5	5	FACU	
	Dactylis glomerata	Herb	35	33	FACU	*
	Cirsium vulgare	Herb	1	1	FACU	
	Daucus carota	Herb	3	3	NL	
	Plantago lanceolata	Herb	3	3	FAC	
	Fragaria virginiana	Herb	1	1	FACU	
	Leucanthemum vulgare	Herb	6	6	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P4	*Rhamnus purshiana*	Sap/Shrub	10	22	FAC-	
	Rubus ursinus	Sap/Shrub	35	78	FACU	*
	Holcus lanatus	Herb	5	5	FAC	
	Hypericum perforatum	Herb	5	5	NL	
	Dactylis glomerata	Herb	25	27	FACU	*
	Equisetum arvense	Herb	30	32	FAC	*
	Pteridium aquilinum	Herb	5	5	FACU	
	Cirsium arvense	Herb	20	22	FACU	*
	Leucanthemum vulgare	Herb	3	3	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T2, P5	*Rhamnus purshiana*	Sap/Shrub	10	11	FAC-	
	Rubus ursinus	Sap/Shrub	20	21	FACU	*
	Rosa pisocarpa	Sap/Shrub	45	47	FAC	*
	Symphoricarpos albus	Sap/Shrub	20	21	FACU	*
	Equisetum arvense	Herb	10	50	FAC	*
	Pteridium aquilinum	Herb	10	50	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					40
	Hydrophytic Vegetation Present?					No
T3, P1	*Alnus rubra*	Tree	25	100	FAC	*
	Cornus sericea	Sap/Shrub	40	40	FACW	*
	Spiraea douglasii	Sap/Shrub	40	40	FACW	*
	Rosa pisocarpa	Sap/Shrub	20	20	FAC	*
	Glyceria elata	Herb	10	50	FACW+	*
	Oenanthe sarmentosa	Herb	5	25	OBL	
	Equisetum arvense	Herb	5	25	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
Note: Soil surface was saturated.						
T3, P2	*Alnus rubra*	Tree	45	64	FAC	*
	Salix scouleriana	Tree	10	14	FAC	
	Fraxinus latifolia	Tree	15	21	FACW	*
	Fraxinus latifolia	Sap/Shrub	10	14	FACW	
	Spiraea douglasii	Sap/Shrub	5	7	FACW	
	Rhamnus purshiana	Sap/Shrub	5	7	FAC-	
	Rubus ursinus	Sap/Shrub	10	14	FACU	
	Rubus spectabilis	Sap/Shrub	15	21	FAC+	*
	Rosa pisocarpa	Sap/Shrub	25	36	FAC	*
	Scirpus microcarpus	Herb	20	49	OBL	*
	Equisetum arvense	Herb	5	12	FAC	*
	Athyrium filix-femina	Herb	5	12	FAC	*
	Galium triflorum	Herb	3	7	FACU	
	Veronica sp.	Herb	3	7	NL	
	Carex deweyana	Herb	5	12	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					88
	Hydrophytic Vegetation Present?					Yes

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P3	*Alnus rubra*	Tree	35	100	FAC	*
	Alnus rubra	Sap/Shrub	10	17	FAC	
	Spiraea douglasii	Sap/Shrub	50	83	FACW	*
	Juncus effusus	Herb	15	25	FACW	*
	Equisetum arvense	Herb	5	8	FAC	
	Carex obnupta	Herb	35	58	OBL	*
	Geum macrophyllum	Herb	5	8	FACW-	
	bare ground		15			
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
Note: Soil surface was saturated.						
T3, P4	*Alnus rubra*	Tree	15	83	FAC	*
	Pseudotsuga menziesii	Tree	3	17	FACU	
	Alnus rubra	Sap/Shrub	10	30	FAC	*
	Spiraea douglasii	Sap/Shrub	20	61	FACW	*
	Rhamnus purshiana	Sap/Shrub	3	9	FAC-	
	Carex scoparia	Herb	10	11	FACW	
	Prunella vulgaris	Herb	5	6	FACU+	
	Carex obnupta	Herb	60	67	OBL	*
	Juncus acuminatus	Herb	10	11	OBL	
	Unidentified forb	Herb	5	6	NL	
	bare ground		20			
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T3, P4b	Eleocharis palustris	Herb	50	100	OBL	*
	bare ground		50			
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
Note: Inundated 2 inches deep.						
T3, P5	*Alnus rubra*	Sap/Shrub	35	90	FAC	*
	Salix sitchensis	Sap/Shrub	4	10	FACW	
	Carex scoparia	Herb	35	37	FACW	*
	Juncus acuminatus	Herb	35	37	OBL	*
	Holcus lanatus	Herb	10	11	FAC	
	Oenanthe sarmentosa	Herb	5	5	OBL	
	Agrostis stolonifera	Herb	7	7	FAC	
	Unidentified forb	Herb	3	3	NL	
	bare ground		25			
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T3, P6	*Alnus rubra*	Sap/Shrub	80	62	FAC	*
	Pseudotsuga menziesii	Sap/Shrub	10	8	FACU	
	Rubus ursinus	Sap/Shrub	40	31	FACU	*
	Holcus lanatus	Herb	2	4	FAC	
	Deschampsia elongata	Herb	40	77	FACW	*
	Anthoxanthum odoratum	Herb	4	8	FACU	
	Danthonia californica	Herb	1	2	FACU	
	Dactylis glomerata	Herb	5	10	FACU	
	bare ground		5			
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T3, P7	*Rubus ursinus*	Sap/Shrub	20	100	FACU	*
	Festuca arundinacea	Herb		5	FAC-	
	Deschampsia elongata	Herb		20	FACW	*
	Anthoxanthum odoratum	Herb		10	FACU	
	Agrostis stolonifera	Herb		5	FAC	
	Dactylis glomerata	Herb		20	FACU	*
	Plantago lanceolata	Herb		10	FAC	
	Leucanthemum vulgare	Herb		15	NL	*
	Hypericum perforatum	Herb		5	NL	
	bare ground		5			
	Percent of Dominants that are FAC, FACW, or OBL =					25
	Hydrophytic Vegetation Present?					No
T3, P8	*Alnus rubra*	Tree	20	57	FAC	*
	Pseudotsuga menziesii	Tree	15	43	FACU	*
	Pseudotsuga menziesii	Sap/Shrub	35	30	FACU	*
	Rubus ursinus	Sap/Shrub	10	9	FACU	
	Gaultheria shallon	Sap/Shrub	20	17	FACU	*
	Symphoricarpos albus	Sap/Shrub	15	13	FACU	
	Corylus cornuta	Sap/Shrub	17	15	FACU	*
	Rhamnus purshiana	Sap/Shrub	10	9	FAC-	
	Acer circinatum	Sap/Shrub	5	4	FAC-	
	Vaccinium parvifolium	Sap/Shrub	3	3	NL	
	Pteridium aquilinum	Herb	10	100	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					17
	Hydrophytic Vegetation Present?					Yes

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1,P1	*Alnus rubra*	Tree	20	100	FAC	*
	Symphoricarpos albus	Sap/Shrub	15	60	FACU	*
	Rubus ursinus	Sap/Shrub	10	40	FACU	
	Holcus mollis	Herb	15	25	FACU	*
	Deschampsia elongata	Herb	25	42	FACW	*
	Cirsium arvense	Herb	20	20	FACU+	*
	Percent of Dominants that are FAC, FACW, or OBL =					40
	Hydrophytic Vegetation Present?					No
T1,P2	*Alnus rubra*	Tree	20	100	FAC	*
	Alnus rubra	Sap/Shrub	15	25	FAC	*
	Rubus ursinus	Sap/Shrub	5	8	FACU	
	Rubus discolor	Sap/Shrub	35	58	FACU	*
	Symphoricarpos albus	Sap/Shrub	5	8	FACU	
	Holcus mollis	Herb	15	38	FACU	*
	Pteridium aquilinum	Herb	25	63	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					40
	Hydrophytic Vegetation Present?					No
T1,P3	*Alnus rubra*	Tree	25	100	FAC	*
	Alnus rubra	Sap/Shrub	45	31	FAC	*
	Rubus ursinus	Sap/Shrub	70	48	FACU	*
	Rubus discolor	Sap/Shrub	10	7	FACU	
	Pseudotsuga menziesii	Sap/Shrub	20	14	FACU	
	Polystichum munitum	Herb	20	50	FACU	*
	Deschampsia elongata	Herb	10	25	FACW	*
	Galium aparine	Herb	10	25	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					40
	Hydrophytic Vegetation Present?					No
T2,P1	*Alnus rubra*	Tree	25	29	FAC	*
	Pseudotsuga menziesii	Tree	60	71	FACU	*
	Rubus ursinus	Sap/Shrub	20	36	FACU	*
	Rubus discolor	Sap/Shrub	10	18	FACU	
	Symphoricarpos albus	Sap/Shrub	25	45	FACU	*
	Pteridium aquilinum	Herb	10	67	FACU	*
	Hypericum perforatum	Herb	5	33	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					20
	Hydrophytic Vegetation Present?					No
T2,P2	*Alnus rubra*	Tree	25	29	FAC	*
	Pseudotsuga menziesii	Sap/Shrub	60	75	FACU	*
	Rubus ursinus	Sap/Shrub	20	25	FACU	*
	Cirsium arvense	Herb	5	100	FACU+	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2,P3	*Alnus rubra*	Tree	80	89	FAC	*
	Pseudotsuga menziesii	Tree	10	11	FACU	
	Rubus ursinus	Sap/Shrub	90	90	FACU	*
	Rubus discolor	Sap/Shrub	10	10	FACU	
	Pteridium aquilinum	Herb	10	100	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
T2,P4	*Alnus rubra*	Tree	65	93	FAC	*
	Pseudotsuga menziesii	Tree	5	7	FACU	
	Rubus ursinus	Sap/Shrub	90	100	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No

	6/29/2007					
Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
P1	*Fraxinus latifolia*	Sap/Shrub	20	40	FACW	*
	Spiraea douglasii	Sap/Shrub	10	20	FACW	*
	Rubus discolor	Sap/Shrub	20	40	FACU	*
	Carex scoparia	Herb		10	FACW	
	Geum macrophyllum	Herb		5	FACW-	
	Scirpus microcarpus	Herb		70	OBL	*
	Holcus lanatus	Herb		5	FAC	
	Carex obnupta	Herb		10	OBL	
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					No
Note: Plot is in ditch between berm and old road.						
P2	*Alnus rubra*	Tree	10	100	FAC	
	Rubus discolor	Sap/Shrub	30	86	FACU	*
	Rhamnus purshiana	Sap/Shrub	5	14	FAC-	
	Festuca arundinacea	Herb		90	FAC-	*
	Anthoxanthum odoratum	Herb		5	FACU	
	Daucus carota	Herb		5	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
P3	*Anthoxanthum odoratum*	Herb		1	FACU	
	Leucanthemum vulgare	Herb		1	NL	
	Hypochaeris radicata	Herb		1	FACU	
	Carex obnupta	Herb		70	OBL	*
	Carex scoparia	Herb		1	FACW	
	Juncus effusus	Herb		25	FACW	*
	Prunella vulgaris	Herb		1	FACU+	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
P4	*Anthoxanthum odoratum*	Herb		10	FACU	
	Leucanthemum vulgare	Herb		1	NL	
	Hypochaeris radicata	Herb		75	FACU	*
	Trifolium dubium	Herb		1	UPL	
	Aira caryophyllea	Herb		1	NL	
	Prunella vulgaris	Herb		1	FACU+	
	Danthonia californica	Herb		10	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					0
	Hydrophytic Vegetation Present?					No
P5	*Rubus discolor*	Sap/Shrub	10	18	FACU	
	Fraxinus latifolia	Sap/Shrub	5	9	OBL	
	Spiraea douglasii	Sap/Shrub	40	73	FACW	*
	Juncus effusus	Herb	40	57	FACW	*
	Carex obnupta	Herb	25	36	OBL	*
	Equisetum arvense	Herb	5	7	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/29/2007					
Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
P6	*Alnus rubra*	Tree	20	67	FAC	*
	Pseudotsuga menziesii	Tree	10	33	FACU	
	Pseudotsuga menziesii	Sap/Shrub	10	29	FACU	*
	Fraxinus latifolia	Sap/Shrub	5	14	OBL	
	Spiraea douglasii	Sap/Shrub	10	29	FACW	*
	Rubus ursinus	Sap/Shrub	10	29	FACU	*
	Anthoxanthum odoratum	Herb		35	FACU	*
	Leucanthemum vulgare	Herb		5	NL	
	Daucus carota	Herb		5	NL	
	Trifolium repens	Herb		5	FAC	
	Hypochaeris radicata	Herb		15	FACU	
	Fragaria virginiana	Herb		35	FACU	*
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
P7	*Alnus rubra*	Tree	25	100	FAC	*
	Alnus rubra	Sap/Shrub	10	10	FAC	
	Spiraea douglasii	Sap/Shrub	90	90	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
Note: Edge of inundated Spiraea thicket at edge of berm.						
P8	*Alnus rubra*	Tree	25	100	FAC	*
	Rubus discolor	Sap/Shrub	25	36	FACU	*
	Pseudotsuga menziesii	Sap/Shrub	15	21	FACU	*
	Rubus ursinus	Sap/Shrub	30	43	FACU	*
	Deschampsia elongata	Herb	15	27	FACW	*
	Cirsium arvense	Herb	20	36	FACU+	*
	Leucanthemum vulgare	Herb	5	9	NL	
	Equisetum arvense	Herb	5	9	FAC	
	Festuca arundinacea	Herb	10	18	FAC-	
	Percent of Dominants that are FAC, FACW, or OBL =					33
	Hydrophytic Vegetation Present?					No
P9	*Alnus rubra*	Tree	35	100	FAC	*
	Alnus rubra	Sap/Shrub	5	5	FAC	
	Spiraea douglasii	Sap/Shrub	95	95	FACW	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
Note: Edge of inundated Spiraea thicket at edge of berm.						

	6/29/2007					
Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
P10	*Alnus rubra*	Tree	25	100	FAC	*
	Rubus discolor	Sap/Shrub	20	50	FACU	*
	Rubus ursinus	Sap/Shrub	20	50	FACU	*
	Deschampsia elongata	Herb	10	10	FACW	
	Cirsium arvense	Herb	10	10	FACU+	
	Leucanthemum vulgare	Herb	2	2	NL	
	Equisetum arvense	Herb	68	68	FAC	*
	Festuca arundinacea	Herb	10	10	FAC-	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No
Note: Equisetum is abundant on the berm, but it doesn't indicate a wet condition.						
P11	*Alnus rubra*	Tree	60	80	FAC	*
	Fraxinus latifolia	Tree	15	20	FACW	*
	Alnus rubra	Sap/Shrub	20	31	FAC	*
	Spiraea douglasii	Sap/Shrub	20	31	FACW	*
	Rosa pisocarpa	Sap/Shrub	15	23	FAC	*
	Salix sitchensis	Sap/Shrub	5	8	FACW	
	Rubus spectabilis	Sap/Shrub	5	8	FAC+	
	Scirpus microcarpus	Herb	15	27	OBL	*
	Glyceria elata	Herb	25	45	FACW+	*
	Oenanthe sarmentosa	Herb	15	27	OBL	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
Note: Inundated 1 inch deep.						
P12	*Alnus rubra*	Tree	20	100	FAC	*
	Spiraea douglasii	Sap/Shrub	5	7	FACW	
	Rubus ursinus	Sap/Shrub	70	93	FACU	*
	Deschampsia elongata	Herb	20	45	FACW	*
	Cirsium arvense	Herb	20	45	FACU+	*
	Holcus lanatus	Herb	4	9	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					50
	Hydrophytic Vegetation Present?					No

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T1, P1	*Anthoxanthum odoratum*	Herb		15	FACU	
	Leucanthemum vulgare	Herb		10	NL	
	Carex obnupta	Herb		55	OBL	*
	Festuca arundinacea	Herb		10	FAC-	
	Fragaria virginiana	Herb		10	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T1,P2	*Anthoxanthum odoratum*	Herb		2	FACU	
	Leucanthemum vulgare	Herb		2	NL	
	Carex obnupta	Herb		85	OBL	*
	Hypericum perforatum	Herb		1	NL	
	Daucus carota	Herb		1	NL	
	Rubus ursinus	Herb		5	FACU	
	Deschampsia elongata	Herb		2	FACW	
	Holcus lanatus	Herb		1	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T1, P3	*Anthoxanthum odoratum*	Herb		1	FACU	
	Leucanthemum vulgare	Herb		5	NL	
	Carex obnupta	Herb		90	OBL	*
	Prunella vulgaris	Herb		1	FACU+	
	Daucus carota	Herb		1	NL	
	Fragaria virginiana	Herb		1	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T2, P1	*Anthoxanthum odoratum*	Herb		20	FACU	*
	Leucanthemum vulgare	Herb		2	NL	
	Festuca arundinacea	Herb		13	FAC-	
	Poa pratensis	Herb		20	FAC	*
	Agrostis stolonifera	Herb		5	FAC	
	Plantago lanceolata	Herb		5	FAC	
	Hypochaeris radicata	Herb		10	FACU	
	Festuca rubra	Herb		25	FAC	*
	Holcus lanatus	Herb		5	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					67
	Hydrophytic Vegetation Present?					Yes
T2, P2	*Anthoxanthum odoratum*	Herb		15	FACU	
	Equisetum arvense	Herb		25	FAC	*
	Poa pratensis	Herb		35	FAC	*
	Daucus carota	Herb		5	NL	
	Holcus lanatus	Herb		20	FAC	*
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes

	6/29/2007					
Transect, Plot	**Species**	**Stratum**	**Raw Cover**	**Relative Cover**	**Indicator Status**	**Dominant Species**
T2, P3	*Rosa pisocarpa*	Sap/Shrub	15	50	FAC	*
	Rubus ursinus	Sap/Shrub	15	50	FACU	*
	Carex obnupta	Herb		60	OBL	*
	Holcus lanatus	Herb		30	FAC	*
	Hypericum perforatum	Herb		3	NL	
	Cirsium arvense	Herb		7	FACU+	
	Percent of Dominants that are FAC, FACW, or OBL =					75
	Hydrophytic Vegetation Present?					Yes
T3, P1	*Pseudotsuga menziesii*	Tree	10	100	FACU	
	Alnus rubra	Sap/Shrub	35	36	FAC	*
	Rosa pisocarpa	Sap/Shrub	4	4	FAC	
	Spiraea douglasii	Sap/Shrub	25	26	FACW	*
	Gaultheria shallon	Sap/Shrub	7	7	FACU	
	Cornus sericea	Sap/Shrub	5	5	FACW	
	Fraxinus latifolia	Sap/Shrub	7	7	FACW	
	Carex obnupta	Herb	15	75	OBL	*
	Equisetum arvense	Herb	5	25	FAC	
	Percent of Dominants that are FAC, FACW, or OBL =					100
	Hydrophytic Vegetation Present?					Yes
T3, P2	*Alnus rubra*	Tree	20	100	FAC	*
	Alnus rubra	Sap/Shrub	3	5	FAC	
	Rosa pisocarpa	Sap/Shrub	10	16	FAC	
	Spiraea douglasii	Sap/Shrub	20	33	FACW	*
	Gaultheria shallon	Sap/Shrub	10	16	FACU	
	Cornus sericea	Sap/Shrub	15	25	FACW	*
	Fraxinus latifolia	Sap/Shrub	3	5	FACW	
	Rhamnus purshiana	Sap/Shrub	20	33	FAC-	*
	Pseudotsuga menziesii	Sap/Shrub	1	2	FACU	
	Carex obnupta	Herb	35	88	OBL	*
	Pteridium aquilinum	Herb	5	13	FACU	
	Percent of Dominants that are FAC, FACW, or OBL =					80
	Hydrophytic Vegetation Present?					Yes
T3, P3	*Alnus rubra*	Tree	25	100	FAC	*
	Rosa pisocarpa	Sap/Shrub	15	15	FAC	
	Spiraea douglasii	Sap/Shrub	35	35	FACW	*
	Cornus sericea	Sap/Shrub	20	20	FACW	*
	Rhamnus purshiana	Sap/Shrub	25	25	FAC-	*
	Viburnum trilobum	Sap/Shrub	5	5	FACU	
	Epilobium ciliatum	Herb	5	25	FACW_	
	Hypericum anagalloides	Herb	10	50	OBL	*
	Veronica sp.	Herb	5	25	NL	
	Percent of Dominants that are FAC, FACW, or OBL =					80
	Hydrophytic Vegetation Present?					Yes

APPENDIX C

Plant List and Wetland Indicator Status

US Fish and Wildlife Service Plant Indicator Status (Reed 1988, Reed 1993)

Indicator Status[1]	Definition
Obligate Wetland (OBL)	Occur almost always (estimated probability > 99%) under natural conditions in wetlands.
Facultative Wetland (FACW)	Usually occur in wetlands (estimated probability 67% -99%), but occasionally found in non-wetlands.
Facultative (FAC)	Equally likely to occur in wetlands or non-wetlands (estimate probability 34% - 66%).
Facultative Upland (FACU)	Usually occur in non-wetlands, but occasionally found in wetlands (estimated probability 1%-33%).
Obligate Upland (UPL)	May occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified.
No Indicator Status (NI)	Insufficient information exists to assign an indicator status.
Not Listed (NL)	Not on the National List in any region.

[1]A plus sign (+) after the indicator status category means that the plant is more likely to be adapted to wet conditions than the category indicated. A minus sign (-) means the plant is less likely to be adapted to wet conditions than the category indicated.

Plant List for Camp Bonneville; July 2007

Scientific Name	Common Name	Indicator Status
Acer circinatum	vine maple	FAC-
Achillea millefolium	common yarrow	FACU
Agropyron repens	quackgrass	FAC-
Agrostis stolonifera	creeping bentgrass	FAC
Aira caryophyllea	silver hairgrass	NL
Alnus rubra	red alder	FAC
Amelanchier alnifolia	Saskatoon service-berry	FAC-
Anthoxanthum odoratum	sweet vernal grass	FACU
Arrhenatherum elatius	tall oatgrass	UPL
Athyrium filix-femina	lady fern	NL
Bellis perennis	lawndaisy	NL
Carex aurea	golden-fruit sedge	FACW+
Carex deweyana	short-scale sedge	FACU
Carex obnupta	slough sedge	OBL
Carex scoparia	pointed broom sedge	FACW
Carex stipata	awlfruit sedge	NL
Centaurea x pratense	meadow knapweed	NL
Cirsium arvense	Canada thistle	FACU+
Cirsium vulgare	bull thistle	FACU
Claytonia sibirica	Siberian springbeauty	FAC
Cornus sericea	creek dogwood	FACW
Corylus cornuta	beaked hazelnut	FACU
Crataegus douglasii	Douglas' hawthorn	FAC
Cytisus scoparius	Scotch broom	NL
Dactylis glomerata	orchardgrass	FACU
Danthonia californica	California oatgrass	FACU
Daucus carota	Queen Anne's lace	NL
Deschampsia elongata	slender hairgrass	FACW-
Eleocharis acicularis	least spikerush	OBL
Eleocharis palustris	creeping spikerush	OBL
Elymus glaucus	blue wild-rye	FACU
Epilobium ciliatum	hairy willow-herb	FACW_
Equisetum arvense	field horsetail	FAC
Eriophyllum lanatum	common wooly sunflower	NL
Festuca arundinacea	tall fescue	FAC-
Festuca rubra	red fescue	FAC
Fragaria virginiana	Virginia strawberry	FACU
Fraxinus latifolia	Oregon ash	FACW

Plant List for Camp Bonneville continued; July 2007

Scientific Name	Common Name	Indicator Status
Galium aparine	catchweed bedstraw	FACU
Galium triflorum	sweet-scent bedstraw	FACU
Gaultheria shallon	salal	FACU
Geum macrophyllum	large-leaf avens	FACW-
Glyceria elata	tall manna grass	FACW+
Holcus lanatus	common velvetgrass	FAC
Holcus mollis	creeping velvetgrass	FACU
Hypericum perforatum	common St. Johnswort	NL
Hypericum anagalloides	bog St. Johnswort	OBL
Hypochaeris radicata	spotted cat's-ear	FACU
Juncus acuminatus	taper-tip rush	OBL
Juncus effusus	soft rush	FACW
Juncus tenuis	slender rush	FACW-
Leucanthemum vulgare	ox-eye daisy	NL
Lonicera involucrata	twinberry honeysuckle	FAC+
Lotus corniculatus	birds-foot trefoil	FAC
Lotus purshianus	Spanish clover	FAC
Madia sp.	tarweed	NL
Mimulus guttatus	common large monkey-flower	OBL
Navarretia intertexta	needle-leaf Navarretia	FACW
Oenanthe sarmentosa	water parsley	OBL
Osmorhiza chilensis	sweet cicely	NL
Phalaris arundinacea	reed canarygrass	FACW
Phleum pratense	timothy	FAC-
Plantago lanceolata	English plantain	FAC
Poa pratensis	Kentucky bluegrass	FAC
Polystichum munitum	swordfern	FACU
Portulaca oleracea	common purslane	FAC
Prunella vulgaris	heal-all	FACU+
Pseudotsuga menziesii	Douglas-fir	FACU
Pteridium aquilinum	bracken fern	FACU
Rhamnus purshiana	cascara	FAC-
Rosa nutkana	Nootka rose	FAC
Rosa pisocarpa	clustered rose	FAC
Rubus discolor	Himalayan blackberry	FACU
Rubus spectabilis	salmonberry	FAC+

Plant List for Camp Bonneville continued; July 2007

Scientific Name	Common Name	Indicator Status
Rubus ursinus	trailing blackberry	FACU
Rumex acetosella	sheep sorrel	FACU
Salix scouleriana	Scouler's willow	FAC
Salix sitchensis	Sitka willow	FACW
Scirpus microcarpus	small-fruit bulrush	OBL
Senecio jacobaea	stinking-willie	FACU
Sisyrinchium douglasii	purple blue-eye-grass	FACU
Solidago canadensis	Canada golden-rod	FACU
Spiraea douglasii	Douglas' spirea	FACW
Stellaria calycantha	northern starwort	FACW+
Symphoricarpos albus	snowberry	FACU
Trifolium dubium	suckling clover	UPL
Trifolium pratense	red clover	FACU
Trifolium repens	white clover	FAC
Vaccinium parvifolium	red huckleberry	NL
Veronica scutellata	marsh speedwell	OBL
Veronica sp.	speedwell	NL
Viburnum trilobum	American cranberrybush	FACU

APPENDIX D

Wetland Rating Form

WATER QUALITY FUNCTIONS

		Wetland	A1, A2, A3, B1, C1, D1, G1, G2, H1	E1	A4	A5
DEPRESSIONAL WETLAND						
Potential						
	Surface flow out:	Depression with no outlet -3 Intermittent or Constricted Outlet - 2 Unconstricted Outlet - 1 Flat with no outlet or outlet is ditch- 1	2	2	3	3
	Surface soils	Clay, organic, or smells anoxic yes = 4, no = 0	0	0	0	0
	Persistent, Ungrazed, Unmowed Vegetation	> = 95% area - 5 > = 1/2 area - 3 > = 1/10 area - 1 < 1/10 area - 0	5	5	5	5
	Seasonal Ponding > 2 months	> 1/2 total area of wetland - 4 >1/4 total area of wetland - 2 < 1/4 total area of wetland - 0	2	2	0	0
		Subtotal	9	9	8	8
Opportunity						
	Pollutants coming into wetland	From grazing in wetland or w/in 150 ft, untreated stormwater discharges, tilled fields, or orchards w/in 150 of wetland, residential, urban areas, golf course w/in 150 ft upslope of wetland, a stream or culvert discharging into wetland, wetland is fed by groundwater high in phosphorus or nitrogen. Yes: multiplier is 2, No: multiplier is 1	2	2	2	2
SLOPE WETLAND						
Potential						
	Average slope of wetland:	< = 1% - 3 1 - 2% - 2 2 - 5% - 1 > 5% - 0				
	Surface soils	Clay, organic, or smells anoxic yes = 3, no = 0				
	Vegetation that trap sediments and pollutants	Dense, ungrazed, herbaceous veg > 90% - 6 Dense, ungrazed, herbaceous veg > 1/2 - 3 Dense, woody, veg >1/2 of area - 2 Dense , ungrazed, herbaceous veg > 1/4 - 1 Does not meet any criteria above - 0				
		Subtotal	0	0	0	
Opportunity						
	Pollutants coming into wetland	From grazing in wetland or w/in 150 ft, untreated stormwater discharges, tilled fields, logging, or orchards w/in 150 of wetland, residential, urban areas, golf course w/in 150 ft upslope of wetland. Yes: multiplier is 2, No: multiplier is 1				
RIVERINE/FRESHWATER TIDAL WETLAND						
Potential						
	Area of surface depressions:	> 3/4 of area - 8 > 1/2 of area - 4 < 1/2 of area - 2 No depressions - 0				
	Vegetation characteristics	Forest or shrub > 2/3 of area - 8 Forest or shrub > 1/3 of area - 6 Ungrazed, emergent pls. > 2/3 of area - 6 Ungrazed, emergent pls. > 1/3 of area - 3 Forest, shrub, and ungrazed emergent < 1/3 of area - 0				
		Subtotal	0	0	0	
Opportunity						
	Pollutants coming into wetland	From grazing in wetland or w/in 150 ft, untreated stormwater discharges, tilled fields, logging, or orchards w/in 150 of wetland, residential, urban areas, golf course w/in 150 ft upslope of wetland. Or river/stream linked to wetland has a contributing basin where humans have raised levels of sediment, toxics, or nutrients above water quality standards. Yes: multiplier is 2, No: multiplier is 1				
Total Water Quality Score			**18**	**18**	**16**	**16**

HYDROLOGIC FUNCTIONS

			A1, A2, A3, B1, C1, D1, G1, G2, H1	E1	A4	A5
		Wetland				
DEPRESSIONAL WETLAND						
Potential						
	Characteristics of surface water flow out	No surface water outlet - 4 Intermittent or highly constricted outlet - 2 Flat with no outlet or outlet is ditch - 1 Unconstricted outlet - 0	2	2	3	3
	Depth of storage	3 ft or more - 7 headwater wetland - 5 2 ft to 3 ft - 5 0.5 to 2 ft - 3 flat with small depressions - 1 < 0.5 ft - 0	3	5	0	0
	Contribution to watershed storage	Basin is < 10 times area of wetland - 5 Basin is 10 to 100 times bigger - 3 Basin is > 100 times bigger - 0	0	0	0	0
		Subtotal	5	7	3	3
Opportunity						
	Flood storage or energy dissipation	Yes if: wetland drains to a river or stream that has flooding problems or has no outlet and impounds water that might otherwise contribute to downstream flooding. No if: water coming into wetland is controlled by flood gate, tide gate, flap valve, reservoir, etc. or more than 90% of water is from groundwater. Yes: multiplier is 2, No: multiplier is 1	2	2	2	2
SLOPE WETLAND						
Potential						
	Characteristics of veg that reduce velocity of surface flows	Dense, uncut, rigid veg > 90% - 6 Dense, uncut, rigid veg >1/2 - 3 Dense, uncut, rigid veg >1/4 - 1 >1/4 is grazed, mowed, tilled, or veg is not rigid - 0				
	Characteristics that hold back small flood flows	Wetland has small surface depressions that can retain water over at least 10% of its area: Yes - 2 No - 0				
		Subtotal	0	0	0	
Opportunity						
	Flood storage or energy dissipation	Yes if: wetland has surface runoff that drains to a river or stream that has flooding problems. No if: major source of water is controlled by a reservoir. Yes: multiplier is 2, No: multiplier is 1				
RIVERINE/FRESHWATER TIDAL WETLAND						
Potential						
	Overbank storage Ratio: wetland width/ stream width	> 20 - 9 10 - 20 - 6 5 - 10 - 4 1 - 5 - 2 < 1 - 1				
	Characteristics of veg that reduce water velocity during floods	Forest, shrub, lg. woody for > 1/3 area OR emergent pls. > 2/3 area - 7 Forest, shrub, lg. woody for > 1/10 area OR emergent pls. > 1/3 area - 4 Neither criteria met - 0				
		Subtotal	0	0	0	
Opportunity						
	Reducing flooding and erosion	Wetland in a location in the watershed storage and velocity reduction protect downstream property and aquatic resources from flooding or erosion? Yes: multiplier is 2, No: multiplier is 1 __Human structures and activities downstream __Nat. res. downstream i.e.. salmon redds __Other _____				
Total Hydrologic Score			**10**	**14**	**6**	**6**

HABITAT FUNCTIONS

			A1, A2, A3, B1, C1, D1, G1, G2, H1	E1	A4	A5
		Wetland				
Potential						
	Vegetation structure	Number of vegetation types: Aquatic bed, emergent plants, scrub/shrub, forested, forested with at least 3 strata. >= 4 types = 4 3 types = 2 2 types = 1 1 type = 0	4	4	0	0
	Hydroperiods	Permanently flooded or inundated Seasonally flooded or inundated Occasionally flooded or inundated Saturated only Permanent stream in or adjacent to the wetland Seasonal stream in or adjacent to the wetland >= 4 types = 3 3 types = 2 2 types = 1 lake-fringe = 2, freshwater tidal = 2	3	3	0	0
	Plant species diversity	Number of species covering at least 10 sq ft Do not count reed canarygrass, purple loosestrife, Canada thistle > 19 species = 2 5-19 = 1 < 5 =0	2	2	0	0
	Habitat interspersion	None = 0 low=1 moderate = 2 high = 3	3	3	0	0
	Special habitats	1 point for each of the following: *large downed woody debris *standing snags *undercut banks at least 2m long or overhanging vegetation at least 1m x 10m *stable steep banks of fine material *at least 1/3 acre thin-stemmed persistent vegetation *invasive plants cover less than 25% of wetland area in each stratum	6	6	0	0
		Subtotal	18	18	0	0
Opportunity						
	Buffers	see text next page; 0 - 5 pts.	5	5	5	5
	Corridors and connections	Vegetated corridor >=150ft wide with >= 30% cover that connects to > 250 acre block = 4 Vegetation corridor >= 50 ft wide with >= 30% cover that comments to > 25 acre block, or lake fringe = 2 Wetland is within 5 mi of salt water estuary, or 3 mi of field or pasture > 40 acres or within 1 mi of a lake > 20 acres = 1	4	4	4	4
	Near priority habitats	Number of priority habitats within 100m of wetland: 3 or more = 4 2 = 3 1 = 1	2	2	0	0
	Wetland landscape	At least 3 other wetlands within 0.5 miles with relatively undisturbed connections = 5 At least 3 other wetland with 0.5 miles but connections are disturbed = 3 At least 1 other wetland within 0.5 miles = 2 No wetlands within 0.5 miles = 0	2	2	2	2
		Subtotal	13	13	11	
Total Habitat Score			**31**	**31**	**11**	**11**
TOTAL SCORE			**59**	**63**	**33**	**33**
CATEGORY						

Wetland Name or Number _____

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Name of Wetland (if known) A4 Date of site visit: June 26-29, 2007

Rated by Jason Clark Trained by Ecology? Yes ☐ No ☒ Date of Training _____

SEC: 2 & 3 TWNSHP: 2N RNGE: 3E Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure 7 Estimated size 144 sq. ft.

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ☐ II ☐ III ☒ IV ☐

Category I – Score > = 70	
Category II – Score 51-69	
Category III – Score 30-50	
Category IV – Score < 30	

Score for Water Quality Functions	16
Score for Hydrologic Functions	6
Score for Habitat Functions	11
TOTAL score for Functions	33

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ **Does not Apply** ☒

Final Category (choose the "highest" category from above) 3

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		**Wetland HGM Class Used for Rating**	
Estuarine	☐	**Depressional**	☒
Natural Heritage Wetland	☐	**Rivering**	☐
Bog	☐	**Lake-fringe**	☐
Mature Forest	☐	**Slope**	☐
Old Growth Forest	☐	**Flats**	☐
Coastal Lagoon	☐	**Freshwater Tidal**	☐
Interdunal	☐		☐
None of the above		Check is unit has multiple HGM classes present	☐

Wetland Name or Number _____

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Name of Wetland (if known) A5 Date of site visit: June 26-29, 2007

Rated by Jason Clark Trained by Ecology? Yes ☐ No ☒ Date of Training _____

SEC: 2 & 3 TWNSHP: 2N RNGE: 3E Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure 7 Estimated size 400 sq. ft.

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ☐ II ☐ III ☒ IV ☐

Category I – Score > = 70	
Category II – Score 51-69	
Category III – Score 30-50	
Category IV – Score < 30	

Score for Water Quality Functions	16
Score for Hydrologic Functions	6
Score for Habitat Functions	11
TOTAL score for Functions	33

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ **Does not Apply** ☒

Final Category (choose the "highest" category from above) 3

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		**Wetland HGM Class Used for Rating**	
Estuarine	☐	**Depressional**	☒
Natural Heritage Wetland	☐	**Rivering**	☐
Bog	☐	**Lake-fringe**	☐
Mature Forest	☐	**Slope**	☐
Old Growth Forest	☐	**Flats**	☐
Coastal Lagoon	☐	**Freshwater Tidal**	☐
Interdunal	☐		☐
None of the above		Check is unit has multiple HGM classes present	☐

Wetland Name or Number _____

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Name of Wetland (if known) E1 Date of site visit: June 26-29, 2007

Rated by Jason Clark Trained by Ecology? Yes ☐ No ☒ Date of Training _____

SEC: 2 & 3 TWNSHP: 2N RNGE: 3E Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure 7 Estimated size 18 ac.

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ☐ II ☒ III ☐ IV ☐

Category I – Score > = 70	
Category II – Score 51-69	
Category III – Score 30-50	
Category IV – Score < 30	

Score for Water Quality Functions	18
Score for Hydrologic Functions	14
Score for Habitat Functions	31
TOTAL score for Functions	63

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ **Does not Apply** ☒

Final Category (choose the "highest" category from above) 2

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		**Wetland HGM Class Used for Rating**	
Estuarine	☐	**Depressional**	☒
Natural Heritage Wetland	☐	**Rivering**	☐
Bog	☐	**Lake-fringe**	☐
Mature Forest	☒	**Slope**	☐
Old Growth Forest	☐	**Flats**	☐
Coastal Lagoon	☐	**Freshwater Tidal**	☐
Interdunal	☐		☐
None of the above		Check is unit has multiple HGM classes present	☒

Wetland Name or Number _____

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Name of Wetland (if known) A1, A2, A3, B1, C1, D1, G1, G2, & H1 Date of site visit: June 26-29, 2007

Rated by Jason Clark Trained by Ecology? Yes ☐ No ☒ Date of Training _____

SEC: 2 & 3 TWNSHP: 2N RNGE: 3E Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure 7 Estimated size 22 ac.

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ☐ II ☒ III ☐ IV ☐

Category I – Score > = 70	
Category II – Score 51-69	
Category III – Score 30-50	
Category IV – Score < 30	

Score for Water Quality Functions	18
Score for Hydrologic Functions	10
Score for Habitat Functions	31
TOTAL score for Functions	59

Category based on SPECIAL CHARACTERISTICS of wetland

I ☐ II ☐ **Does not Apply** ☒

Final Category (choose the "highest" category from above) 2

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		**Wetland HGM Class Used for Rating**	
Estuarine	☐	**Depressional**	☒
Natural Heritage Wetland	☐	**Rivering**	☐
Bog	☐	**Lake-fringe**	☐
Mature Forest	☒	**Slope**	☐
Old Growth Forest	☐	**Flats**	☐
Coastal Lagoon	☐	**Freshwater Tidal**	☐
Interdunal	☐		☐
None of the above		Check is unit has multiple HGM classes present	☒

PBS

PORTLAND
SEATTLE
VANCOUVER
EUGENE
BEND
TRI-CITIES
BANDON

CAMP BONNEVILLE

CLARK COUNTY, WASHINGTON

SEPTEMBER 2007

GRADING PERMIT APPLICATION

Location: 23201 NE Pluss Road, Vancouver, WA 98682
Sections 34 and 35 Township 3 North, Range 3 East and Sections 1,2,3 and 10 Township 2 North, Range 3 East

Request: The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.

Applicant: Clark County Department of Public Works
Attn: Jerry Barnett
1300 Franklin Street, 4th Floor
Vancouver, WA 98660
(360) 397-6118 x4969; (360) 759-6330 Fax
Jerry.Barnett@clark.wa.gov

Consultant: PBS Engineering and Environmental
Attn: Christy McDonough
1310 Main Street
Vancouver, WA 98660
(360) 213-0444; (360) 696-9064 Fax
christy_mcdonough@pbsenv.com

TABLE OF CONTENTS

SECTION 1
APPLICATION FORM

ENGINEERING SERVICES GRADING APPLICATION REVIEW SUBMITTAL REQUIREMENTS

The following checklist identifies information to be included with the application. All submittals that are determined ***not*** "Counter Complete" will be ***returned*** to the applicant for correction and resubmittal. Submittals determined to be "Counter Complete" will be routed to Engineering Services for review.

GRADING PERMIT SUBMITTAL REQUIREMENTS

- ☐ Application Fee
- ☐ Application Form
- ☐ Developer's GIS Packet Information
- ☐ Narrative: Described the existing conditions and proposal in detail. Must identify the total cubic yards of cuts and fills, location of cuts and fills, and any cuts and fills required offsite for the project.
- ☐ Plan Set Copies - Four (4) copies Plans, including but not limited to:
  - ☐ Cover Sheet
  - ☐ Existing Conditions
  - ☐ Entire legal lot included, drawn to scale, showing north arrow, property lines, easements, cuts and fills , footprint of existing structures, abutting streets (name, centerline, curb & sidewalk), driveway locations, and utilities
  - ☐ Topography with existing and planned drainage features and structures
  - ☐ Location of any existing environmentally sensitive areas on the site, as indicated in the GIS materials
  - ☐ Existing surfacing and features on all portions of the site, such as asphalt, landscaping, lawn, gravel, stormwater swale, etc.
  - ☐ Existing and proposed drainage conditions/facilities
  - ☐ Proposed finished grades and limits of grading
- ☐ Proposed Erosion Control Plan
- ☐ Copy of Easements or Right of Way Agreements
- ☐ State Environmental Review

GRADING PERMIT APPLICATION FORM

PROJECT NAME:

Camp Bonneville - Grading at Small Range Berms and Fire Support Areas

DESCRIPTION AND PURPOSE FOR GRADING/EXCAVATION:

The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.

SCOPE OF WORK: ☐ **Grading Prior to Bldg Permit** ☐ **Grading Prior to ENG Approval** ☐ **Other On-Site Grading** ☒ **Stand Alone Grading**

AMOUNT OF WORK: _____(cy) Excavation Amount _____(cy) Fill Amount
_____ Max Depth Excavation _____ Max Depth Fill
_____(sf) Excav Area Cover _____(sf) Fill Area Cover

APPLICANT NAME: Clark County Public Works Attn: Jerry Barnett	Address: 1300 Franklin Street Vancouver, WA 98666-9810
E-mail Address: Jerry.Barnett@clark.wa.gov	Phone: 360-397-6118 x4969
PROPERTY OWNER (list multiple owners on a separate sheet): Bonneville Conservation Restoration and Renewal Team (BCRRT), Attn: Mike Gage	
CONTACT PERSON (list if not same as APPLICANT): PBS Engineering and Environmental	
Name: Christy McDonough	Address: 1310 Main Street, Vancouver, WA 98660
E-Mail Address: christy_mcdonough@pbsenv.com	Phone: 360-213-0444
LOCATION OF PROJECT: Site Address: 23201 NE Pluss Road	Serial Number(s): See attached

AUTHORIZATION

The undersigned hereby certifies that this application has been made with the consent of the lawful property owner(s) and that all information submitted with this application is complete and correct. False statements, errors, and/or omissions may be sufficient cause for denial of the request. This application gives consent to the County to enter the properties listed above.

The granting of this permit does not presume to give authority to violate or cancel the provision of any other state or local law regulating this type of work requiring approval or permit.

If the erosion control measures detailed on the approved plans are not complied with, any permits issued will be revoked.

If the erosion control measures as approved are not adequate, additional plans and controls will be required. Also, a stop work order may be issues.

I understand that this permit is not valid until all fees are paid.

If the permit expires prior to completion of proposed grading activities, a new application and fees will be required. Permits may be extended prior to expiration of the initial term with payment of applicable fees.

Authorized Signature Date

Fees must be paid prior to application processing.

Camp Bonneville
Application Form Attachment

Serial # of Parcels	Legal	Acreage	Township	Range	¼ of Section	Overlay Districts
167837-000	ALL SEC 1 T2NR3EWM 640A	640	2N	3E	NE, NW, SE, SW of Section 1	
167940-000	#1 SEC 2 T2NR3EWM 640.94A	640.94	2N	3E	NE, NW, SE, SW of Section 2	
168044-000	#5 SEC 3 T2NR3EWM 619.12A	619.12	2N	3E	NE, NW, SE, SW of Section 3	Comprehensive Plan: Mining Zoning: Mining Combining District
170186-000	#15 SEC 10 T2NR3EWM 320A	320	2N	3E	NE, NW of Section 10	Comprehensive Plan: Mining Zoning: Mining Combining District
170393-000	#4 SEC 11 T2NR3EWM 120A	120	2N	3E	NW of Section 11	
170394-000	#5 SEC 11 T2NR3EWM 40A	40	2N	3E	NE of Section 11	
170398-000	#9 SEC 11 T2NR3EWM 40A	40	2N	3E	NW of Section 11	
208215-000	#7 OF SEC 34 T3NR3EWM 160A	160	3N	3E	SE of Section 34	Comprehensive Plan: Mining Zoning: Mining Combining District
208417-000	#1 OF SEC 35 T3NR3EWM 640A TARGET RANGE	640	3N	3E	NE, NW, SE, SW of Section 35	
208619-000	#1 OF SEC 36 T3NR3EWM 640A	640	3N	3E	NE, NW, SE, SW of Section 36	

SECTION 2

DEVELOPER'S GIS PACKET

SECTION 3
NARRATIVE

SUMMARY OF EXISTING CONDITIONS

Land in the vicinity of the project includes rural residential and forest lands. The majority of the Camp Bonneville site is located in the western slope foothills of the Cascade Mountains. The firing ranges are located within the valley floor.

Parts of Lacamas Creek and its tributaries are located within the installation boundary. Wetlands and a created in-stream pond are present at the site and are located along Lacamas Creek and it's tributaries. As shown on the existing conditions map, the project area is located in the floodway fringe of Lacamas Creek. Lacamas Creek flows southwest across the site.

A wetland delineation completed by PBS Engineering and Environmental in 2007 identified twelve wetland areas within the project area. The National Wetlands Inventory identified wetlands along Lacamas Creek and its tributaries. The Clark County Local Wetland Inventory is very similar to the NWI wetlands. Hydric soils are present in a few small areas of the project site.

Soil types and classification vary across the site. Soils in the eastern and central portion of Camp Bonneville are mainly Olympic series soils, specifically Olympic stony clay loam on areas between a 30 and 60 percent slope and Olympic clay loam on slopes between eight and 30 percent. McBee and Cove series soils are mapped within the Lacamas Creek valley, which are primarily silt or silty clay loams found at slopes ranging from zero to five percent. Finally, along the western edge of the installation, there are Hesson series soils that are gravelly clay loams from zero to 20 percent slopes and clay loam at zero to eight percent slopes.

Camp Bonneville is comprised of forested, undeveloped land, specifically coniferous forest and mixed coniferous and deciduous forest. Shrub communities are found primarily along drainages and wetland depressions and consist of red alder, hardhack, willows, red osier dogwood, and soft stem bulrush, in addition to non-native specifies such as Himalayan blackberry and scotch broom. There are meadows scattered throughout the upland and wetland portions of the site, and wetlands and riparian areas as well.

SUMMARY OF GRADING ACTIVITIES

The project will involve grading associated with the proposed remedial actions undertaken to improve the environmental and soil quality of the site. Firing range berms and fire support areas will be excavated to remove contaminated soils. All soils will be excavated, screened and stockpiled based on the concentrations of lead they contain. Soils with concentrations below the clean up screening level (50 mg/Kg) for lead will be reused to grade the site consistent with the surrounding topography. A precise quantity for removal/fill/grading cannot be determined until after each berm and fire support area has been screened, sorted, analyzed, and the classifications of the soils are determined.

EROSION PREVENTION AND SEDIMENT CONTROL PLAN

Approved erosion and sediment control measures will be installed prior to commencement of grading and maintained throughout construction to prevent sediment from entering the stream. Please refer to the attached Erosion Control Plans for more specific details and locations of measures that will be employed to prevent sediment from entering Lacamas Creek or its tributaries.

SECTION 4

PROJECT DESCRIPTION

CAMP BONNEVILLE
Small Range Berms and Fire Support Areas

BACKGROUND

The Department of the Army used Camp Bonneville for live fire of small arms, assault weapons, and field and air defense artillery between 1910 and 1995. Investigations to characterize and cleanup areas of contamination have been ongoing at Camp Bonneville. Berms at the firing ranges were used as a safety feature behind the targets and served as the impact areas for lead bullets. The fire support areas are in the vicinity of the firing lines where brass casings and/or residuals from live loads may have accumulated. The earthen berms and some support areas soils are expected to contain elevated levels of lead. Proposed activities include the excavation, screening, and sorting of soil from berms and fire support areas, and the grading of the former firing ranges to match surrounding topography after clean up is complete.

PROJECT DESCRIPTION

Excavation will occur based on one, or a combination of, four scenarios: 1) Earthen Berm Excavation; 2) Pop-Up Target Excavation; 3) Hillside Berm Excavation; or 4) Impact Zone Excavation.

SCENARIO 1 – EARTHEN BERMS

(Rifle Ranges 1 & 2; Field Fire Ranges 1 & 2; Field Ranges 1 & 2; 25-meter Machine Gun Range; Undocumented Pistol Range (Figure 1))

Removal action will involve excavation of any identified “hot spot” areas and approximately the front 2 feet of each berm face and top, and a six-inch lift off of the back. Soil samples will be taken to determine the necessity of removing an additional 1-foot lift from the berm face.

All excavated soil will be screened to remove bullets, brass casings, other metal, organic material, and rock. The screening equipment will have multiple screen sizes to remove various size materials. The last screen will have ¼” opening size to capture bullet-sized metal. Screened soils will be stockpiled into one of six different piles, as follows:

- Rocks, Gravel, Vegetation
- Hot Spot Soils
- < 50 mg/Kg Soil
- 50 ≤ 250 mg/Kg Soil
- 250 ≤ 1000 mg/Kg Soil
- 1000+ mg/Kg Soil

Appropriate disposal/recycling options will be selected based on the measured lead concentrations from each of the stockpiles. Metal collected during screening operations will be recycled and/or disposed of appropriately off-site. Based on laboratory analysis the soil samples of the above stockpiles, the soils will be characterized into one of three following categories:

- Category 1 – soils with Toxic Characteristics Leaching Procedure (TCLP) lead concentrations greater than 5 mg/L. These soils will be transported to a licensed landfill for stabilization and disposal.
- Category 2 – soils with maximum lead concentrations greater than 50 mg/Kg and TCLP lead concentrations less than 5 mg/L. These soils will be recycled or disposed of at an appropriate landfill.
- Category 3 – soils with maximum lead concentrations less than 50 mg/Kg and TCLP lead concentrations less than 5 mg/L. These soils will remain on site and be used for contour grading purposes.

Berm Face Excavation – An X-ray fluorescence spectrometer (XRF) will be used to determine lead concentrations in the remaining berm face after hot spot areas have been removed. The berm will be divided into 15-foot sections and two samples for XRF analysis will be collected in the center of each section. The XRF results will be used to segregate the soils into four lead concentration groups (<50 mg/Kg; 50 ≤ 250 mg/Kg; 250 ≤ 1000 mg/Kg; 1000+ mg/Kg). The berm soils will be excavated, screened, and stockpiled based on the concentrations of lead in each berm section.

After the 2-foot soil lift is removed from each berm, the surface and near-surface soils will be visually inspected for bullets. If no bullets are observed, soil samples will be collected from each section, sieved with a 2 mm screen, and analyzed for lead using the XRF. Samples below cleanup levels will be submitted for confirmation laboratory analysis. A berm section is considered "clean" if both XRF sample results for lead concentration are below 50 mg/Kg. Excavation of the sections along the berm face will continue until no bullets are encountered and the XRF analysis determines remaining soils are below the cleanup level.

Fire Support Areas - A 6-inch soil lift will be removed from fire support areas (e.g. range floors). The soil removal will occur across an area 20 feet wide by the length of the firing line. The 20-foot section will extend from 5 feet in front of the firing line to 15 feet behind the firing line. Excavated soils will be screened and stockpiled separate from the berm soils.

Excavation outside of the identified 20-foot wide section identified above will be based on the results of confirmatory sampling. If elevated levels of lead are identified an additional adjoining area will be excavated. This will continue until sample results for lead concentration are below 50 mg/Kg.

Sample Grid Areas - During soil sampling at the site a number of samples displayed elevated levels of lead. Grids identified during the soil sampling will be excavated as follows:

- A six-inch soil lift will be excavated from the entire 58x58 foot grid when average lead soil concentrations exceed 250 mg/Kg (4 of 307 grids)
- A six-inch soil lift will be excavated from a 29x29 foot area around the sample point when the average soil lead concentrations are greater than 50 mg/kg but less than 118 mg/kg with no indivudal sample contains greater than 250mg/kg. Or where the average lead concentration per grid is >118 mg/Kg but less than 250 mg/Kg. (24 of 307 grids) Confirmatory sampling will occur at each edge of the hot spot excavation area and from the center point.

  If necessary, an additional 6-inch soil lift will be removed from a 14.5x 29 foot section.
  - No excavation will occur in areas where samples displayed lead levels below 50 mg/Kg, or where lead concentrations average less than 50 mg/Kg and where no single sample from a grid exceeds 118mg/kg. (139 of 307 grids)

Grading – When laboratory results confirm the lead concentration in the berm soils are below 50 mg/Kg, the remaining berm will be graded to match surrounding contours. Organic material and rocks stockpiled during sieving will be combined with clean soils and remain on site. All graded sites will be reseeded.

Exceptions - Berm 1 at the 25-meter Machine Gun Range will be completely removed because it was likely reworked over the years and is, thus, potentially contaminated deeper than the 2-feet proposed for removal on all other berms. Additionally, the top 6 inches of soil in the area behind the main range berm will be removed. Lead bullets are visible on the ground surface and it appears as though the hillside may have been used as the target prior to construction of the berm

SCENARIO 2 – POP-UP TARGET BERMS
(Rifle Ranges 1 & 2; Field Fire Ranges 1 & 2; Combat Pistol Range (Figure 1))

The pop-up target berms will be completely removed. In addition, a 6-inch (0.5-ft) soil lift will be removed from an approximate 15-foot radius from the center of the concrete target. The area within the 15-foot

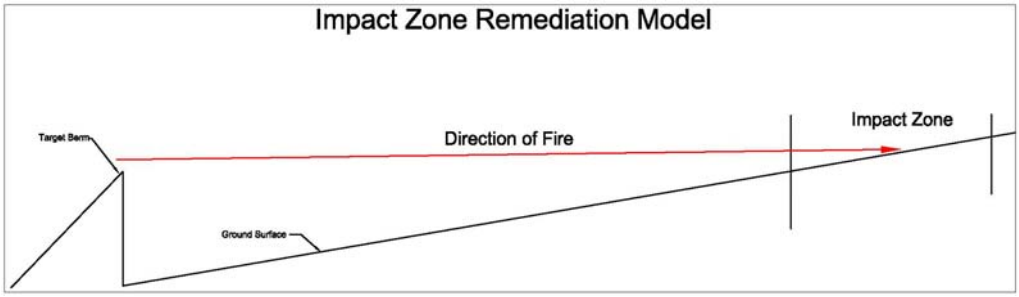
radius will be surface cleared using Shoenstedt's hand-held magnetometers. If nothing is discovered in the area behind the target, soil within that area will not be removed. The soil will be processed and the area graded as described above under Scenario 1.

SCENARIO 3 – HILLSIDE BERMS
(25-meter M60/Pistol Range; 25-meter Record Firing/Field Firing Range; Combat Pistol Range; 1,000-inch Rifle Range/Machine Gun Range (Figure 1))

The target berm located in front of the hillside will be completely removed. In addition, the front of the hillside will be excavated, processed, and the area graded as described above under Scenario 1.

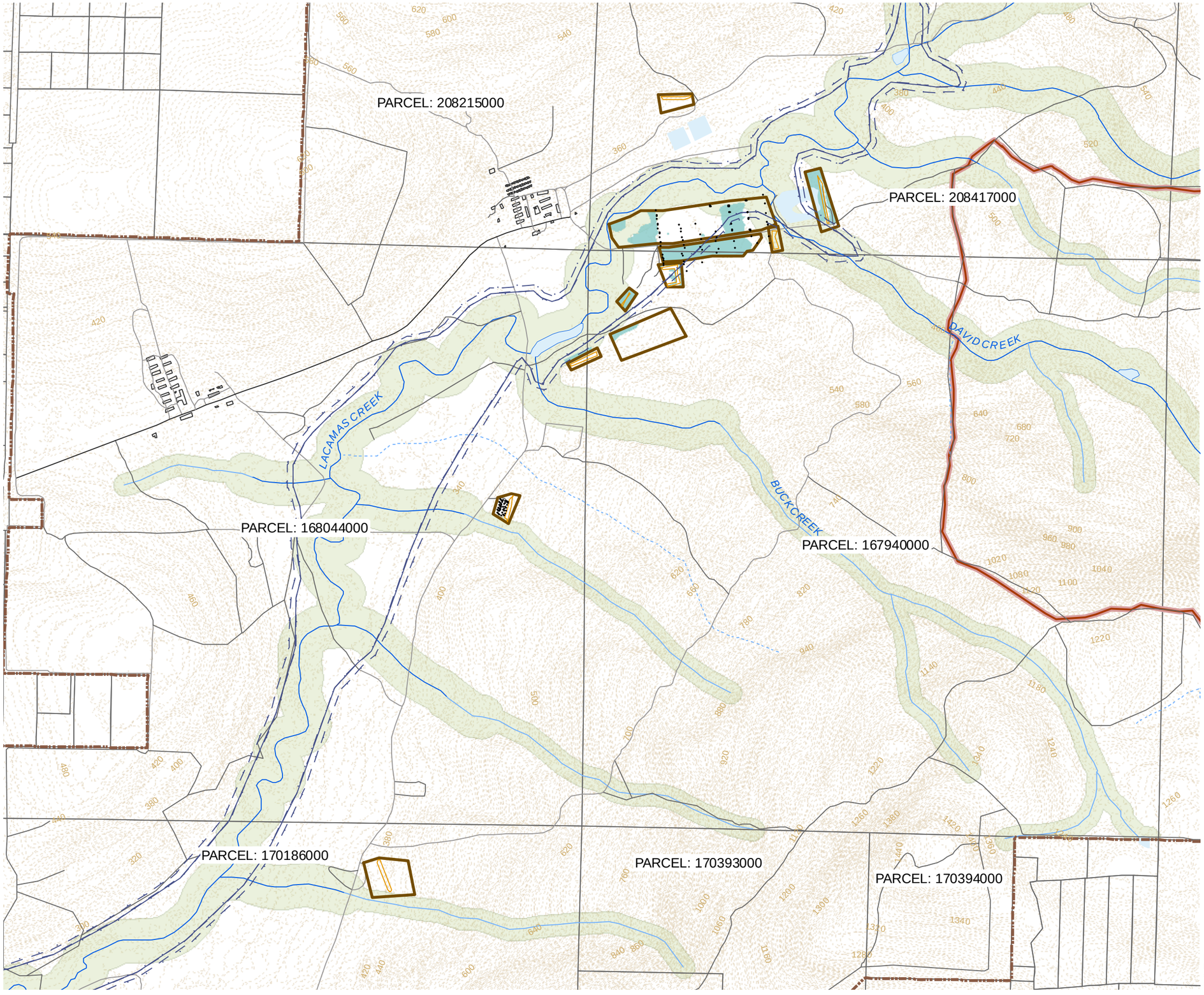
SCENARIO 4 – IMPACT ZONE
(Rifle Ranges 1 & 2 (Figure 1))

At this range, additional pop up targets were placed on a target berm across the pop up pond. The identified impact area behind the target berm will be excavated until clean material is left. The impact zone is the area behind the target berm where the trajectory of the bullet would land assuming it missed the target berm. The impact zone will be excavated, processed, and the area graded as described above under Scenario 1.



SECTION 5

EXISTING CONDITIONS MAP



Legend

- Camp Bonneville
- Central Impact Target Area
- Firing Ranges
- Berms
- Pop-up Berms
- Riparian Habitat Buffer
- Flood Transition Area
- Floodway Fringe
- Tax Lots
- Contours

Roads & Trails

- Paved
- Dirt
- Gravel
- Dirt Trail

Streams

- Fish
- Non-Fish
- Unknown
- Water Bodies and Ponds
- Wetlands

0 450 900 Feet

N

Data Sources: Clark County GIS (August 2006); Wetland boundaries marked in the field using a Trimble Geo XT GPS. Camp Bonneville layers provided by Michael Baker Jr., Inc. and MKM Engineers, Inc.

PBS

BCRRT

BONNEVILLE CONSERVATION, RESTORATION & RENEWAL TEAM, LLC

CAMP BONNEVILLE

23201 NE PLUSS ROAD
CLARK COUNTY, WASHINGTON

EXISTING
CONDITIONS MAP

PROJECT: 70489.000

JULY 2007

FIGURE:
1

SECTION 6

GRADING AND EROSION CONTROL PLAN

SECTION 7

STATE ENVIRONMENTAL POLICY REVIEW

TYPE II DEVELOPMENT & ENVIRONMENTAL REVIEW, STAFF REPORT & DECISION

SEPA Review by Wetland Biologist
(Form DS1593)

Project Name:	**Camp Bonneville SEPA**
Case Number:	**SEP2007-00088**
Location:	23201 NE Pluss Road
Request:	Grading to remove lead from firing range berms.
Applicant:	Clark County Public Works Jerry Barnett 1300 Franklin Street Vancouver, WA 98666 397.6118.4969
Contact Person:	Same as above
Property Owner:	Bonneville Conservation R & R 2320 NE Russ Road Vancouver, WA 98682
Planner:	Travis Goddard
Report Issue Date:	July 20, 2007
Vesting Date:	June 13, 2007

SEPA Determination
Determination of Non-significance (DNS)
Planner's Initials:_____ Date Issued: July 20, 2007

County Review Staff:
Planner — Travis Goddard, (360) 397-2375 x4180

Parcel No: 167837-000, 208417-000, 208619-000, 170393-000, 170394-000, 208215-000, 167940-000, 170398-000, 168044-000, 170186-000

Comp Plan Designation: Forest Resource Land
Zoning Designation FR-80

Applicable Laws:
WAC Chapter 197-111 (SEPA), and Clark County Code Chapters: 40.570 (SEPA), 40.510.020 (Procedures), 40.380 (Stormwater and Erosion Control), 40.210 (Rural and Resource Districts), 40.440 (Habitat Conservation), 40.450 (Wetland Protection), and 14.07 (Grading).

Neighborhood Association/Contact:
Proebstel Neighborhood Association; Wendy Garrett;
PM Box 315 ; 6700 NE 162 Ave. #611 ; Vancouver, WA 98682 ; 253-9659
E-mail: proebstelnawendy@yahoo.com

Time Limits:
The application was determined to be fully complete on July 3, 2007. Therefore, the County Code requirement for issuing a decision within 78 days lapses on May 9, 2007. The State requirement for issuing a decision within 120 calendar days lapses on June 20, 2007.

Vesting:
An application is reviewed against the subdivision, zoning, transportation, stormwater and other land development codes in effect at the time a fully complete application for preliminary approval is submitted. If a pre-application conference is required, the application shall earlier contingently vest on the date the fully complete pre-application is filed. Contingent vesting requires that a fully complete application for substantially the same proposal is filed within 180 calendar days of the date the county issues its pre-application conference report.

The fully complete application was submitted on June 13, 2007 and determined to be fully complete on July 3, 2007. Given these facts, the application is vested on June 13, 2007.

Public Notice:
Notice of application and likely SEPA Determination of Non-Significance was mailed to the applicant, property owners within 500 feet of the site, the Proebstel Neighborhood Association**,** and other agencies on July 5, 2007.

Public Comments:
The Cowlitz Indian Tribe expressed concerns regarding cultural resources on the site. This discussion resulted in the County's Archaeological Review Coordinator including the attached finding and mitigation measure.

Background/Project Description

The applicant proposes to excavate and clean berms at 9 existing firing ranges within Camp Bonneville. The work will entail removal of berm soils, sifting and sorting of contaminated soils, and export, disposal, and recycling of sorted fractions as deemed necessary by the lead content of each fraction. Detailed procedures are outlined in the SEPA Checklist.

Major Issues and Analysis

Staff first analyzed the proposal in light of the 16 topics from the Environmental Checklist (see list below). The purpose of this analysis was to identify any potential adverse environmental impacts that may occur without the benefit of protection found within existing ordinances.

1. Earth
2. Air
3. Water
4. Plants
5. Animals
6. Energy and Natural Resources
7. Environmental Health
8. Land and Shoreline Use
9. Housing
10. Aesthetics
11. Light and Glare
12. Recreation
13. Historic and Cultural Preservation
14. Transportation
15. Public Services
16. Utilities

Then staff reviewed the proposal for compliance with applicable code criteria and standards in order to determine whether all potential impacts will be mitigated by the requirements of the code.

Staff's analysis also reflects review of agency and public comments received during the comment period, and knowledge gained through a site visit.

Only the major issues, errors in the SEPA Checklist and/or development proposal, and/or justification for any mitigation conditions are discussed below. Staff finds that all other aspects of this proposed development comply with the applicable code requirements, and, therefore, are not discussed.

SEPA ELEMENTS

1. EARTH:

Finding 1 The applicant has not applied for a Clark County Grading permit. This permit is required under CCC 14.07. Compliance with the standards of this chapter will ensure that there are no significant impacts to soils.

Mitigation Measure:

The applicant shall obtain a Clark County Grading Permit prior to starting work on the firing ranges.

3. WATER:

Finding 1 the applicant has submitted preliminary data and analysis indicated that several of the firing ranges where grading is proposed contains wetlands and wetland buffers. Wetland analysis is based solely on vegetation because the firing ranges have not been certified to be clear of unexploded ordinance. The analysis indicates that limits of Field Range

No. 2 and the Combat Pistol Range do not contain wetlands or wetland buffers.

Compliance with CCC 40.450 through a Clark County Wetland Permit will be required to ensure that there are no significant impacts to soils.

Mitigation Measure:

The applicant shall obtain a Clark County Wetland Permit prior to starting work on all firing ranges except Field Fire Range No. 2 and the Combat Pistol Range.

4. PLANTS and
5. ANIMALS:

Finding 1 The applicant has not applied for a Clark County Habitat permit. This permit is required under CCC 40.440. Compliance with the standards of this chapter will ensure that there are no significant impacts to habitat.

Mitigation Measure:

The applicant shall obtain a Clark County Habitat Permit prior to starting work on the firing ranges.

13. HISTORIC AND CULTURAL PRESERVATION

Finding 1 Currently, the safety concerns regarding exposure to contaminants and unexploded ordinance restrict or limit the possibility of conducting archaeological investigations during the site clean-up phase. Therefore, prior to any ground disturbing activities associated with the development of the site, the applicant, shall be required to conduct archaeological investigations.

Mitigation Measure:

The applicant shall perform archaeological investigations for the areas disturbed by activity associated with this review, as part of the permitting process for the future development of this site.

SEPA Determination

The likely SEPA Determination of Non-Significance (DNS) in the Notice of Development Review Application issued on July 5, 2007 is hereby revised to a Mitigated Determination of Non-Significance (MDNS).

Mitigation Conditions:

1. The applicant shall obtain a Clark County Grading Permit prior to starting work on the firing ranges.
2. The applicant shall obtain a Clark County Wetland Permit prior to starting work on all firing ranges except Field Fire Range No. 2 and the Combat Pistol Range.
3. The applicant shall obtain a Clark County Habitat Permit prior to starting work on the firing ranges.
4. The applicant shall perform archaeological investigations for the areas disturbed by activity associated with this review, as part of the permitting process for the future development of this site.

Note: The Development Services Manager reserves the right to develop a complete written report and findings of fact regarding this decision, if appealed.

An **appeal** of any aspect of this decision, including the SEPA determination and any required mitigation measures, may be appealed only by a party of record (i.e., the applicant and those individuals who submitted written testimony to the Planning Director within the designated comment period). The appeal shall be filed with the Department of Community Development within fourteen (14) calendar days from the date the notice of final land use decision is mailed to parties of record. This decision was mailed on July 20, 2007. Therefore any appeal must be received in this office by 4:30 PM August 3, 2007.

APPEAL FILING DEADLINE

Date: August 3, 2007

Any appeal of the final land use decisions shall be in writing and contain the following information:

1. The case number designated by the County and the name of the applicant;
2. The name and signature of each person or group (petitioners) and a statement showing that each petitioner is entitled to file an appeal as described under Clark County Code, Section 40.510.020 H. If multiple parties file a single petition for review, the petition shall designate one party as the contact representative with the Development Services Manager. All contact with the Development Services Manager regarding the petition, including notice, shall be with this contact person;
3. The specific aspect(s) of the decision and/or SEPA issue being appealed, the reasons why each aspect is in error as a matter of fact or law, and the evidence relied on to prove the error; and,
4. A check in the amount of **$1080** (made payable to the Community Development Department).

The appeal request and fee shall be submitted to the Community Development Department, Permit Services Center, between 8:00 a.m. and 4:30 p.m. Monday through Friday, at the address listed above.

A copy of the SEPA Checklist and Clark County Code are available for review at:

Community Development Department
1408 Franklin Street
P.O. Box 9810
Vancouver, WA 98666-9810
Phone: (360) 397-2375; Fax: (360) 397-2011

A copy of the Clark County Code is also available on our Web Page at:
http://www.co.clark.wa.us

DEVELOPER'S GIS PACKET

Produced by:
Clark County Department of Assessment and GIS

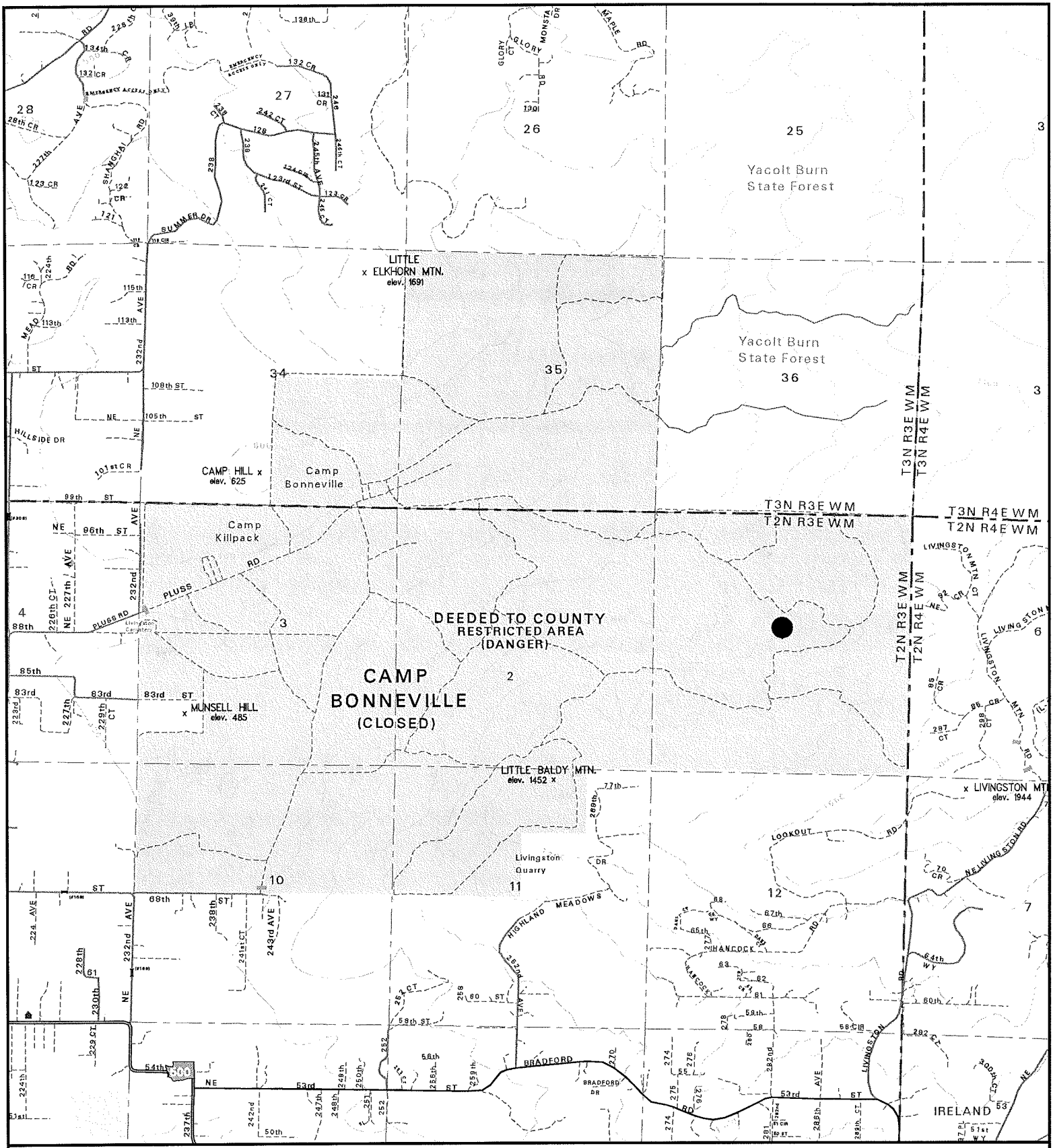
For:
CHRISTY McDONOUGH
213-0444

Subject Parcel Serial Number(s):
167837–000
167940–000
168044–000
170186–000
170393–000
170394–000
170398–000
208215–000
208417–000
208619–000

Printed: July 11, 2007
Expires: July 11, 2008

proud past, promising future
CLARK COUNTY
WASHINGTON

Table of Contents



Scale 1:31680

1 Miles

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

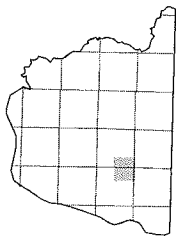
Order 29677 GIS Product 1_24

Plotted: July 11, 2007

General Location

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

● Subject Property Location



Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Property Information Fact Sheet

Mailing Information:

Serial No.: 167837–000, 167940–000, 168044–000, 170186–000, 170393–000, 170394–000, 170398–000, 208215–000, 208417–000, 208619–000
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

Assessed Parcel Size: 3860.06 Acres
Property Type: MILITARY BUILDINGS / FACILITIES

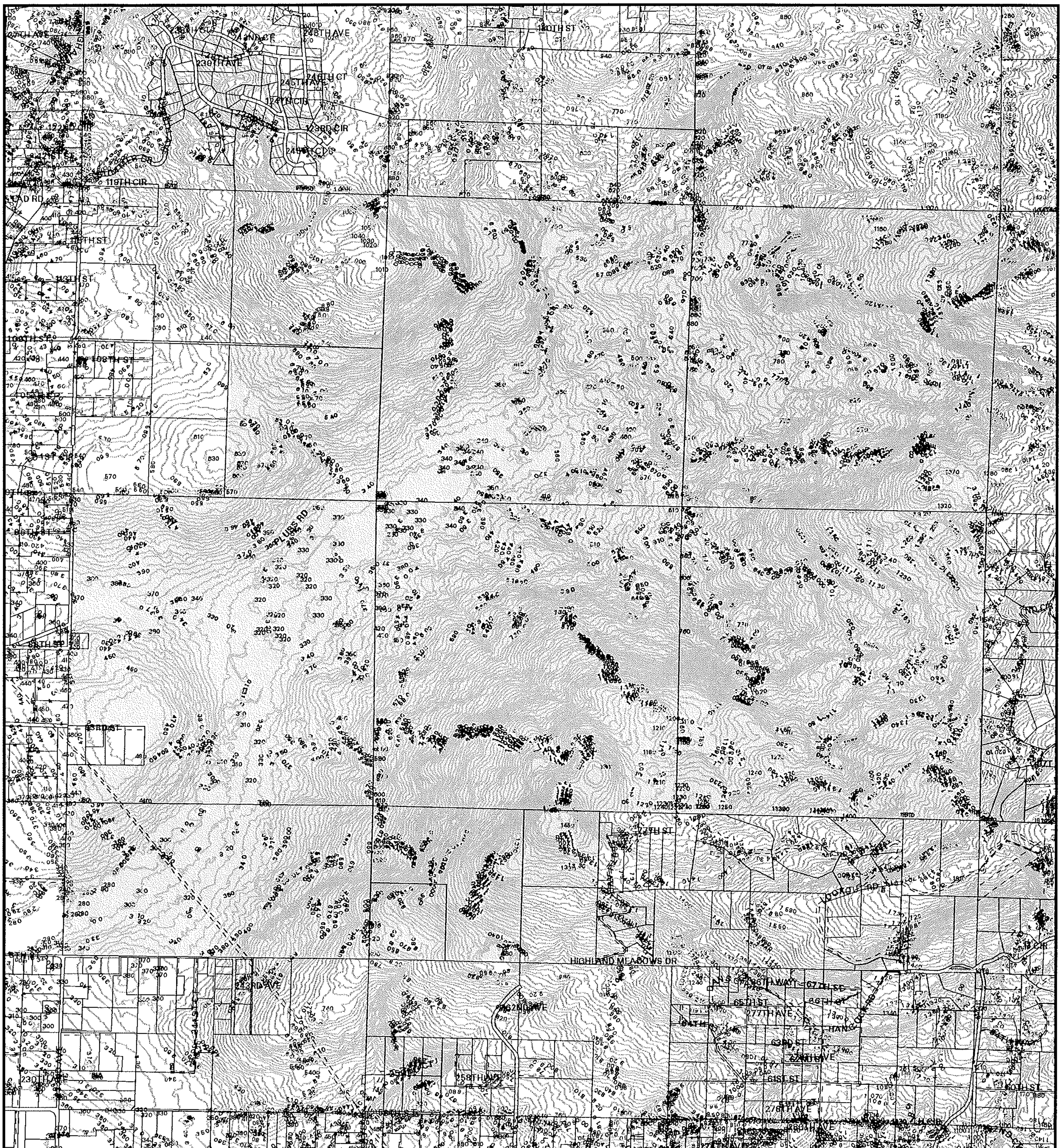
PARCEL LOCATION FINDINGS:

Quarter Section(s): NE 1/4 of Sec 01, T2N R3E W.M.
NW 1/4 of Sec 01, T2N R3E W.M.
SE 1/4 of Sec 01, T2N R3E W.M.
SW 1/4 of Sec 01, T2N R3E W.M.
NE 1/4 of Sec 02, T2N R3E W.M.
NW 1/4 of Sec 02, T2N R3E W.M.
SE 1/4 of Sec 02, T2N R3E W.M.
SW 1/4 of Sec 02, T2N R3E W.M.
NE 1/4 of Sec 03, T2N R3E W.M.
SE 1/4 of Sec 03, T2N R3E W.M.
NW 1/4 of Sec 03, T2N R3E W.M.
SW 1/4 of Sec 03, T2N R3E W.M.
NE 1/4 of Sec 10, T2N R3E W.M.
NW 1/4 of Sec 10, T2N R3E W.M.
NW 1/4 of Sec 11, T2N R3E W.M.
NE 1/4 of Sec 11, T2N R3E W.M.
SE 1/4 of Sec 34, T3N R3E W.M.
NW 1/4 of Sec 35, T3N R3E W.M.
SW 1/4 of Sec 35, T3N R3E W.M.
NE 1/4 of Sec 35, T3N R3E W.M.
SE 1/4 of Sec 35, T3N R3E W.M.
NW 1/4 of Sec 36, T3N R3E W.M.
NE 1/4 of Sec 36, T3N R3E W.M.
SE 1/4 of Sec 36, T3N R3E W.M.
SW 1/4 of Sec 36, T3N R3E W.M.

Municipal Jurisdiction: Clark County
Urban Growth Area: County
Zoning: FR–80
Comprehensive Plan Designation: FR–1
Neighborhood Association(s): Proebstel
School District: Camas –Impact Fee, Evergreen –Impact Fee, Hockinson –Impact Fee
Elementary School: Lacamas Heights, Pioneer, Hockinson Heights
Junior High School: Liberty, Frontier, Hockinson
Senior High School: Camas, Heritage, Hockinson
Fire District: East County, No District
Trans. Impact Fee Area: None
Park Impact Fee Dist: None
Sewer District: Rural/Resource
Water District: Clark Public Utilities
Building Moratorium Area: No Indicators
Late-Comer Area: None
Soil Type(s): OmF, 63% of parcel
OlD, 12%
OmE, 2%
MeA, 3%
WAT, 0%
OlB, 3%
HgD, 6%
HgB, 4%
HcB, 3%

Liquefaction Susceptibility: Bedrock, Very Low
NEHRP: B, C
Slope: 15 –25 percent, 33% of parcel
25 –40 percent, 19%
10 –15 percent, 18%
40 –100 percent, 3%
0 –5 percent, 12%
5 –10 percent, 14%
Unknown, 0%
Landslide Hazards: Slopes > 15%
Areas of Older Landslide Debris
Slope Stability: Severe erosion hazard areas
Flood Zone Designation: Outside Flood Area
Floodway Fringe
Flood Transition Are
CARA: 0, 2
Columbia River Gorge NSA: No
Wildland: 500+ elev. & forest, slopes, or no FD
500+ elev. and nothing else
Priority Habitat and Species Areas: Riparian Habitat Conservation Area
Priority Species Area Buffer: No Mapping Indicators
Priority Habitat Area Buffer: No Mapping Indicators
Archeological Predictive: Low (0 – 20 percent), 46% of parcel
High (80 – 100 percent), 28%
Moderate–High (60 – 80 percent), 15%
Low–Moderate (20 – 40 percent), 9%
Moderate (40 – 60 percent), 3%
Archeological Site Buffers: Yes

NOTE THIS DATA IS COMPILED FROM MANY SOURCES AND SCALES. CLARK COUNTY MAKES THIS INFORMATION AVAILABLE AS A SERVICE, AND ACCEPTS NO RESPONSIBILITY FOR ANY INACCURACY, ACTUAL OR IMPLIED.



Scale 1:27000

500 0 500 1000 1500 Feet

Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24
Plotted: July 11, 2007

Subject Parcel
Public Road
Elevation Contour
Transportation or Major Utility Easement

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

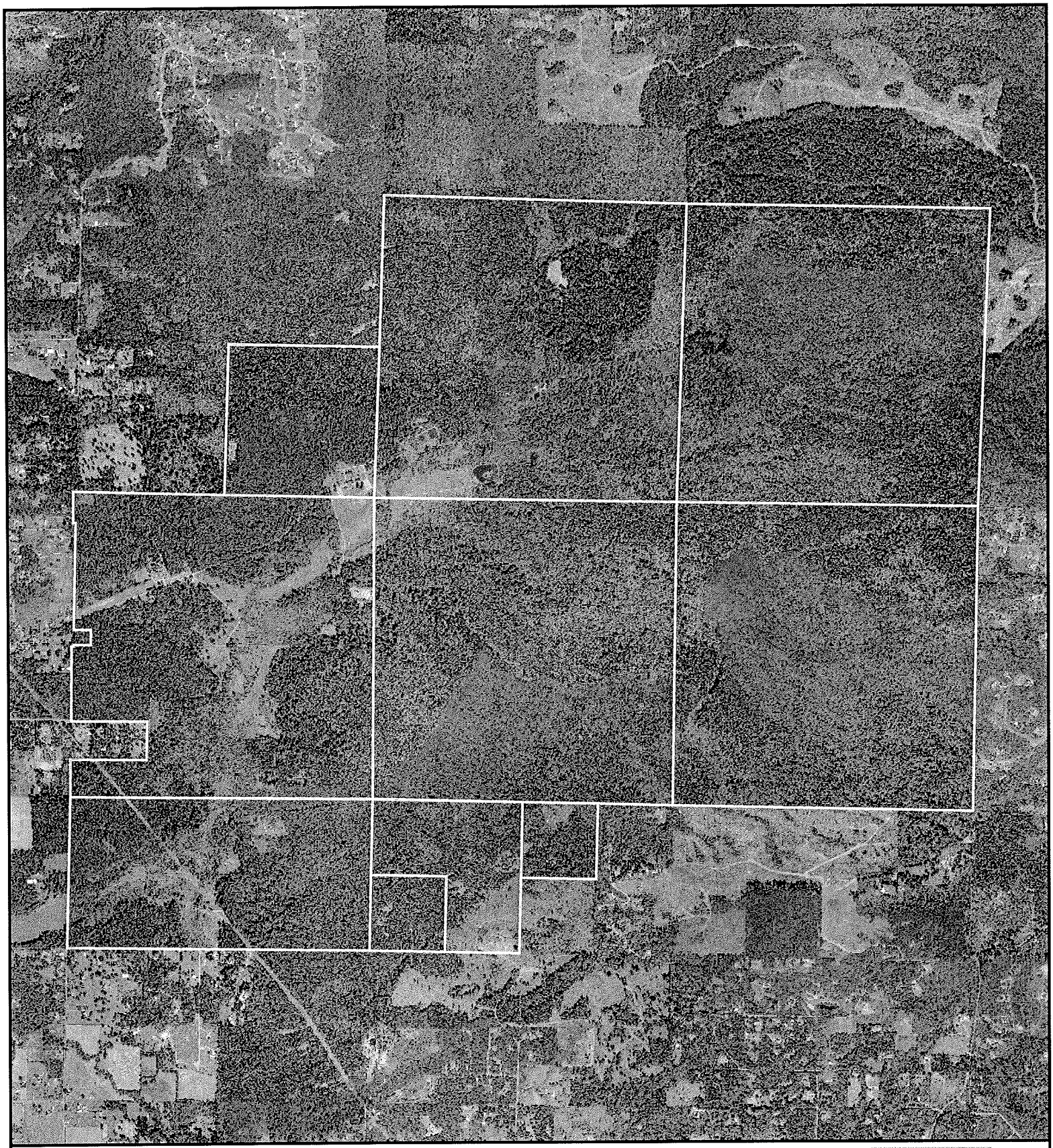
Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

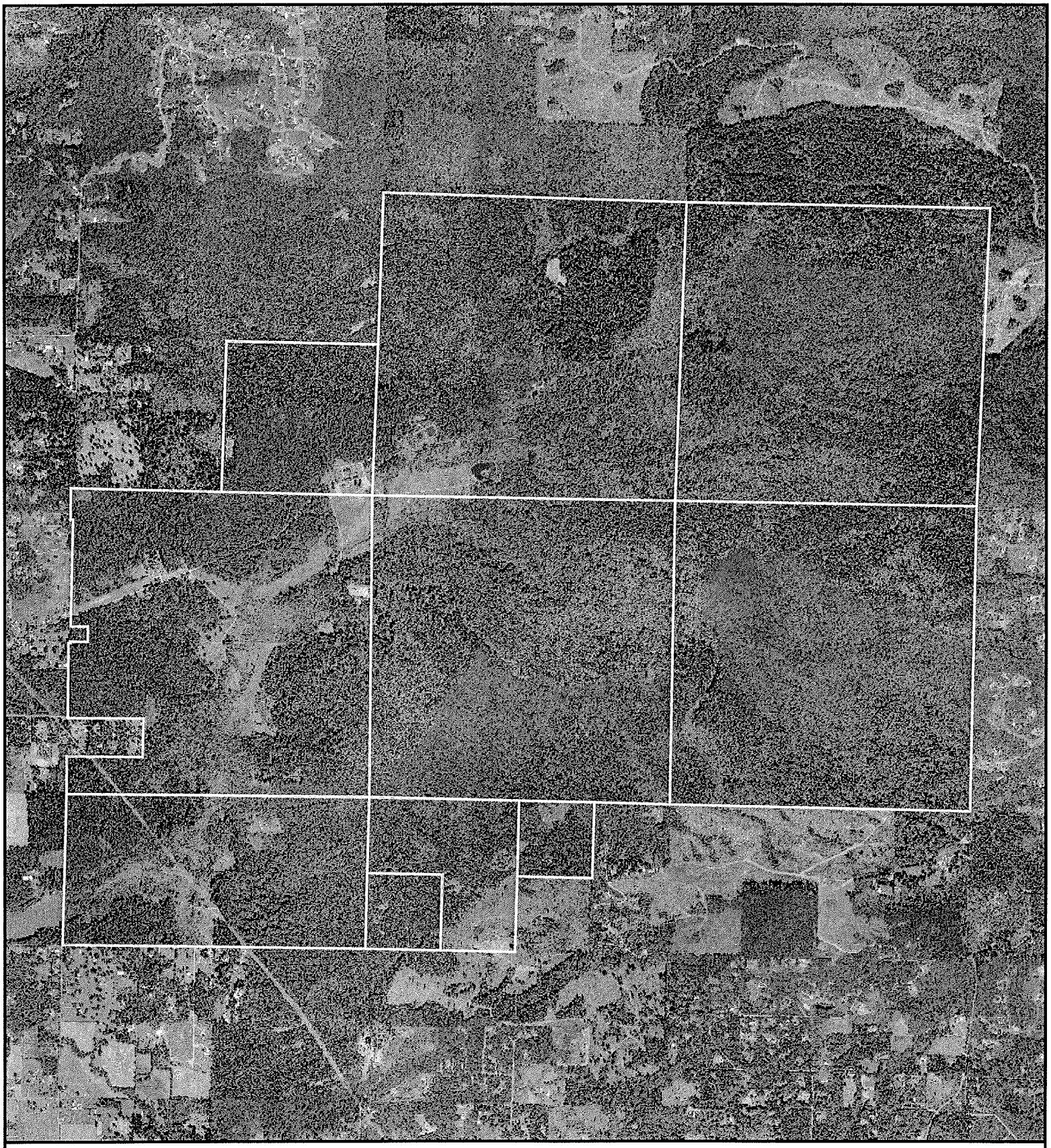
Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

N

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

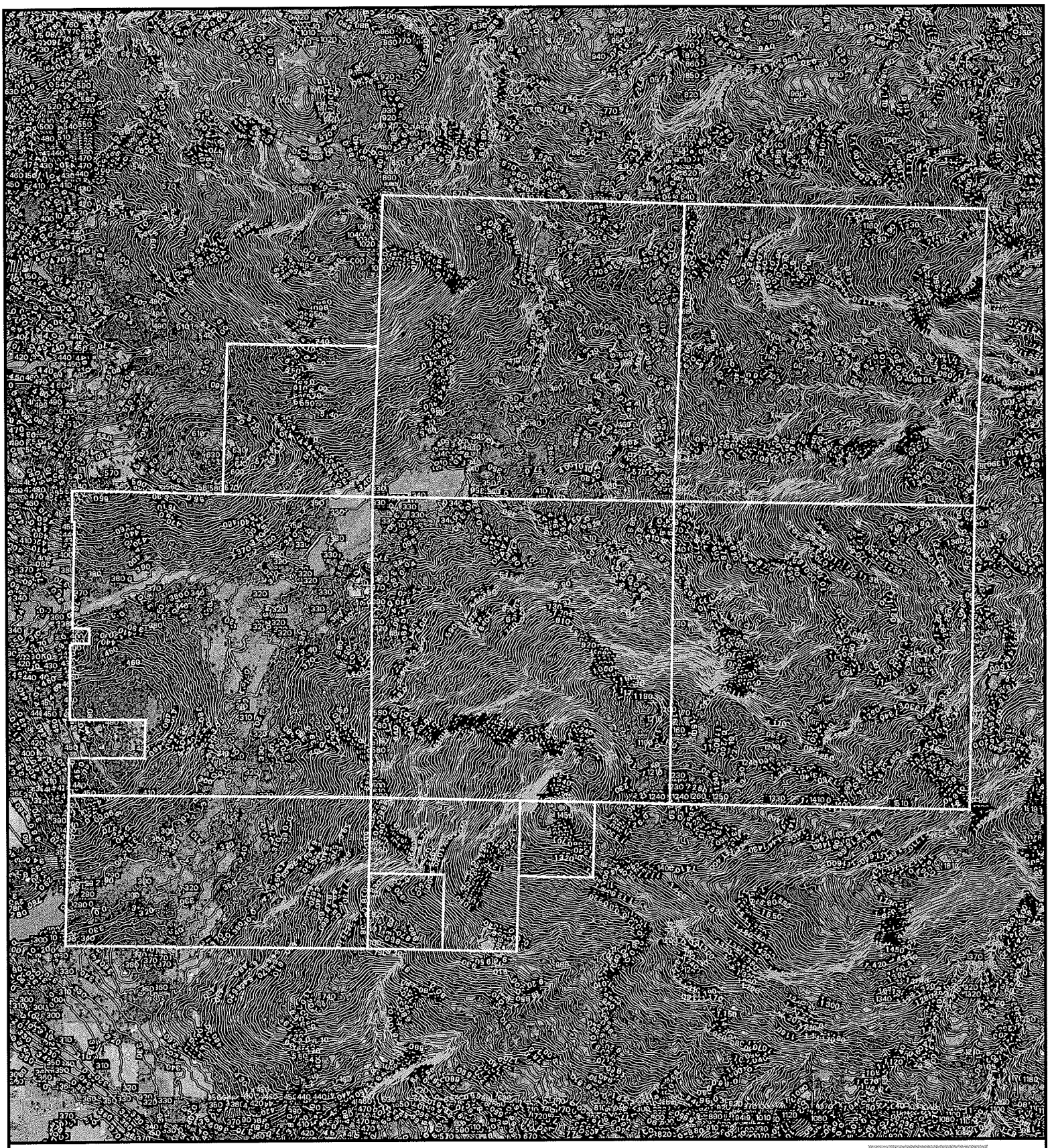
Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

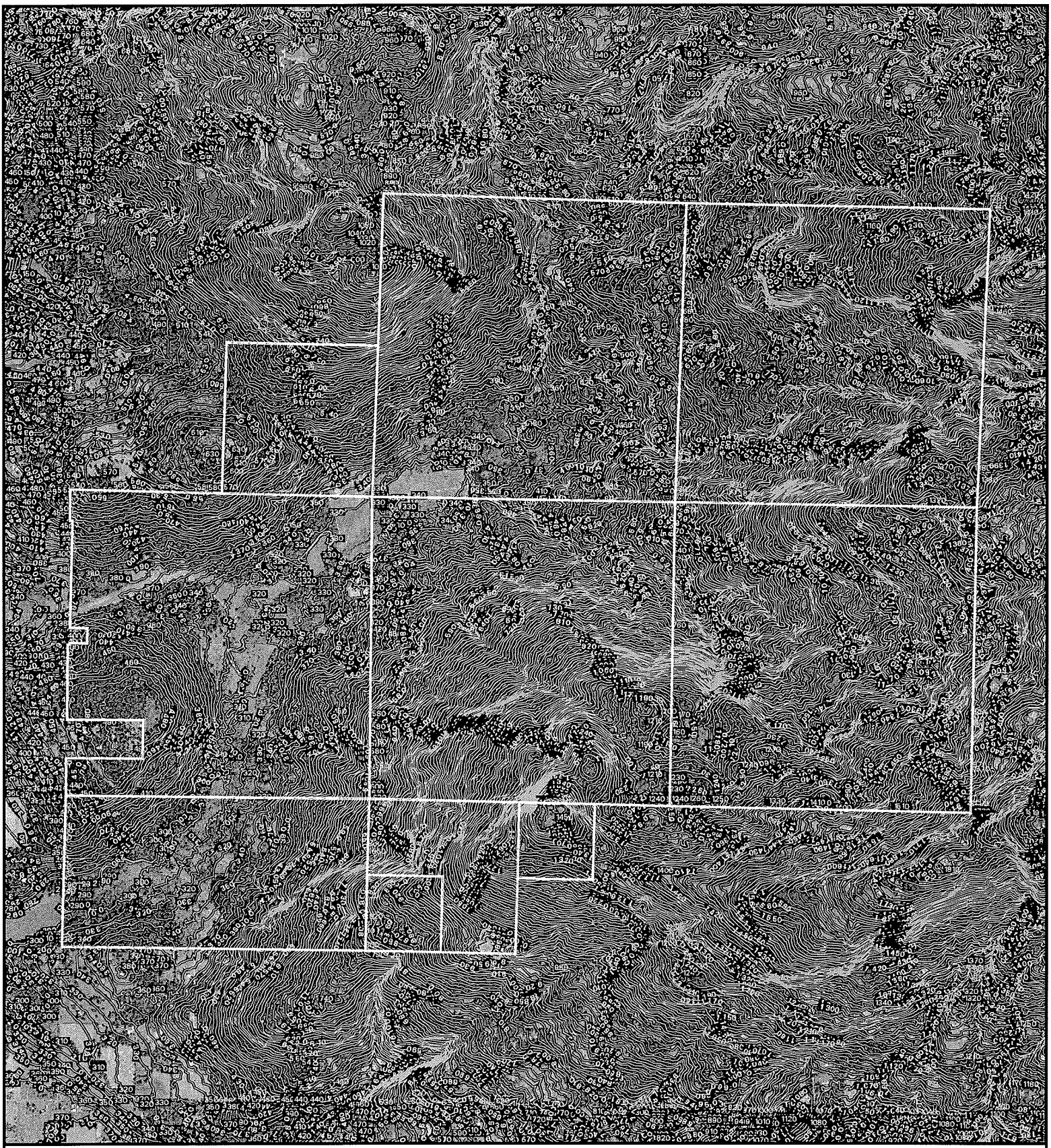
Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

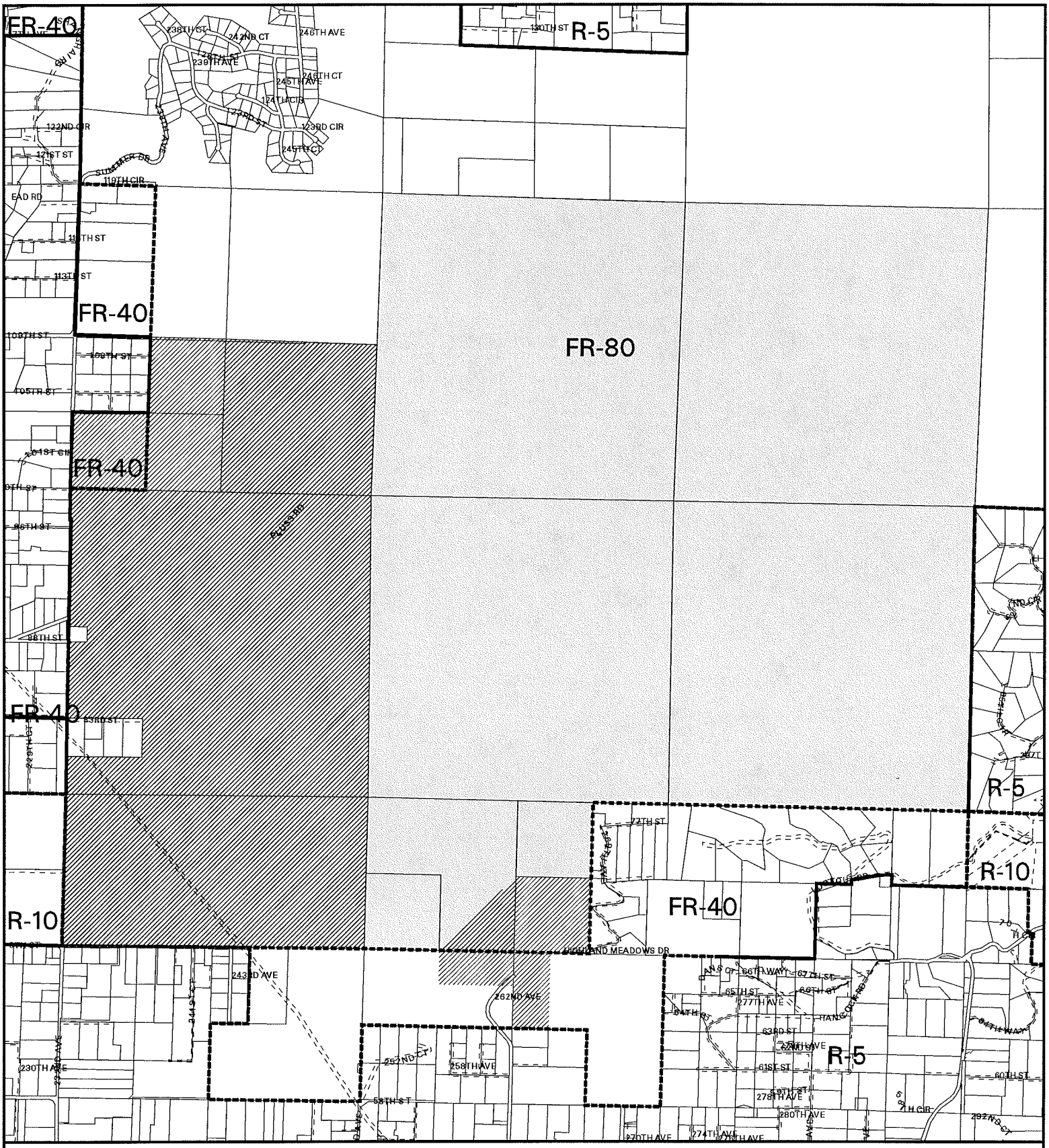
Plotted: July 11, 2007

2005 Photography with Elevation Contours

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

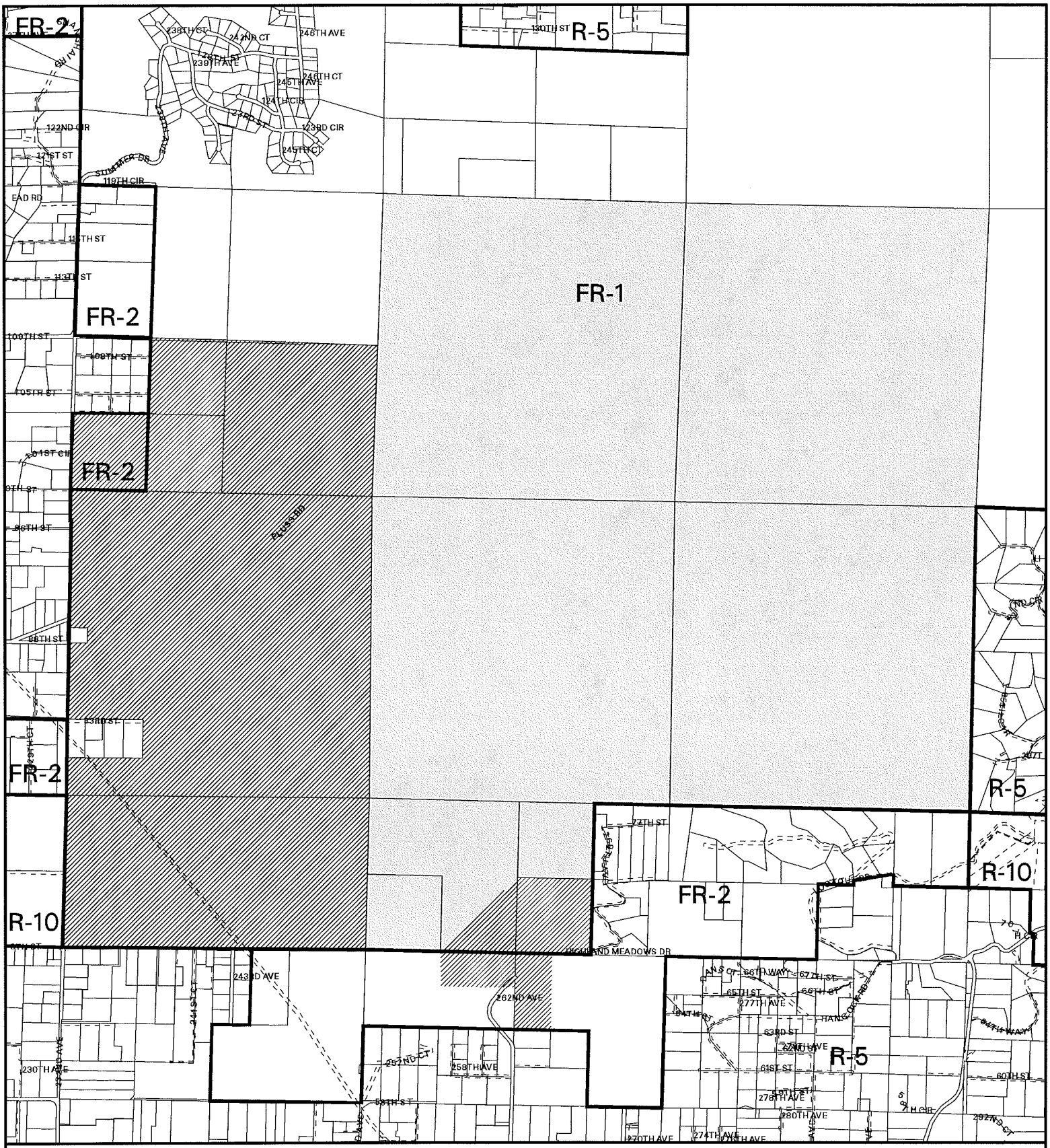
Zoning Designation: 'FR-80'

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

- Subject Parcel
- Public Road
- Contingent Zoning
- Urban Holding - 10
- Urban Holding - 20
- Urban Holding - 40
- Mining Combining Dist.
- Transportation or Major Utility Easement
- Zoning Boundary

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

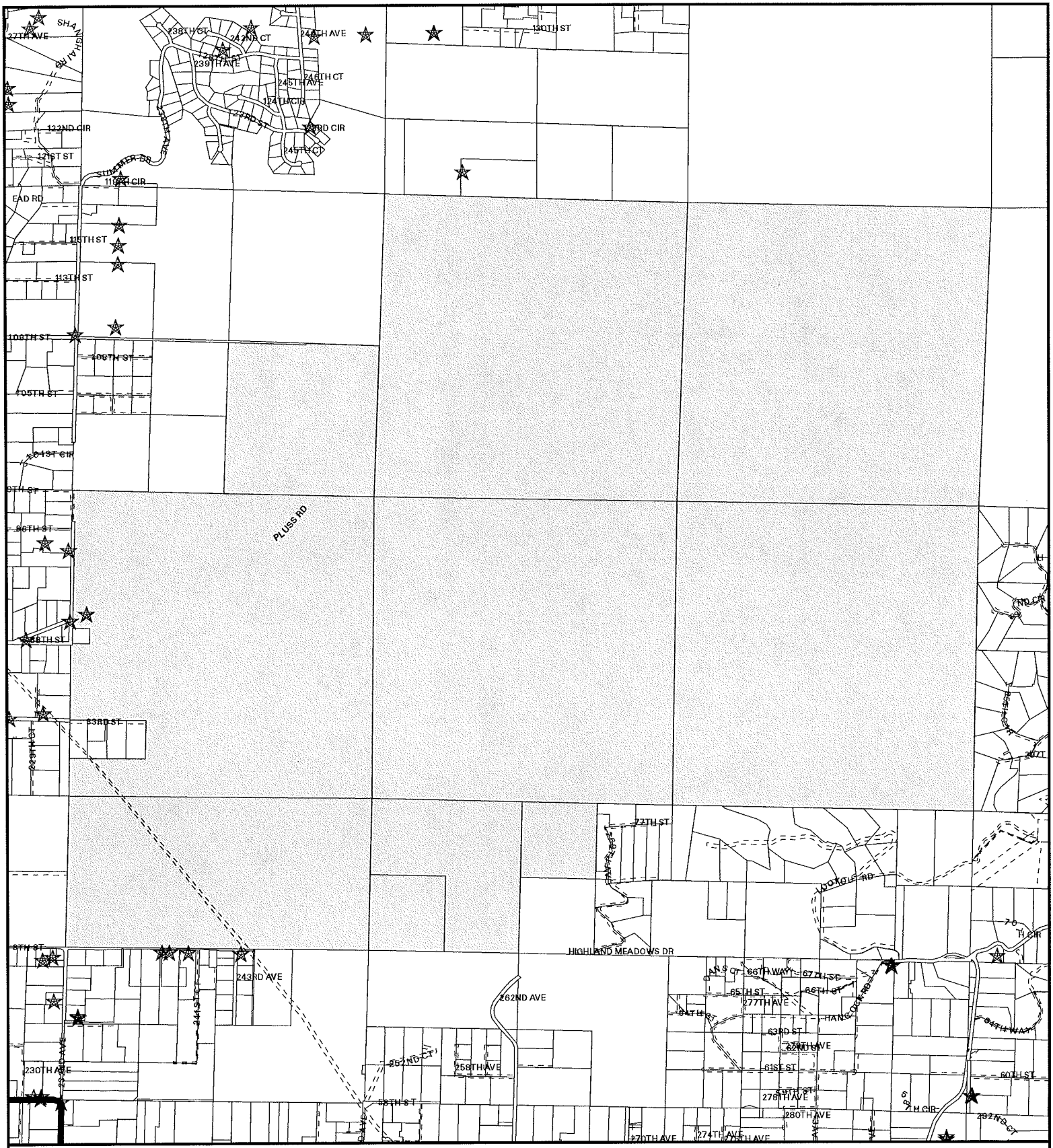
Comprehensive Plan Designation: R-5 FR-2 FR-1 R-5

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

- Subject Parcel
- Public Road
- Mining
- Industrial Reserve
- Open Space/Density Transfer
- Columbia River Gorge N.S.A.
- Transportation or Major Utility Easement
- Comprehensive Plan Boundary

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

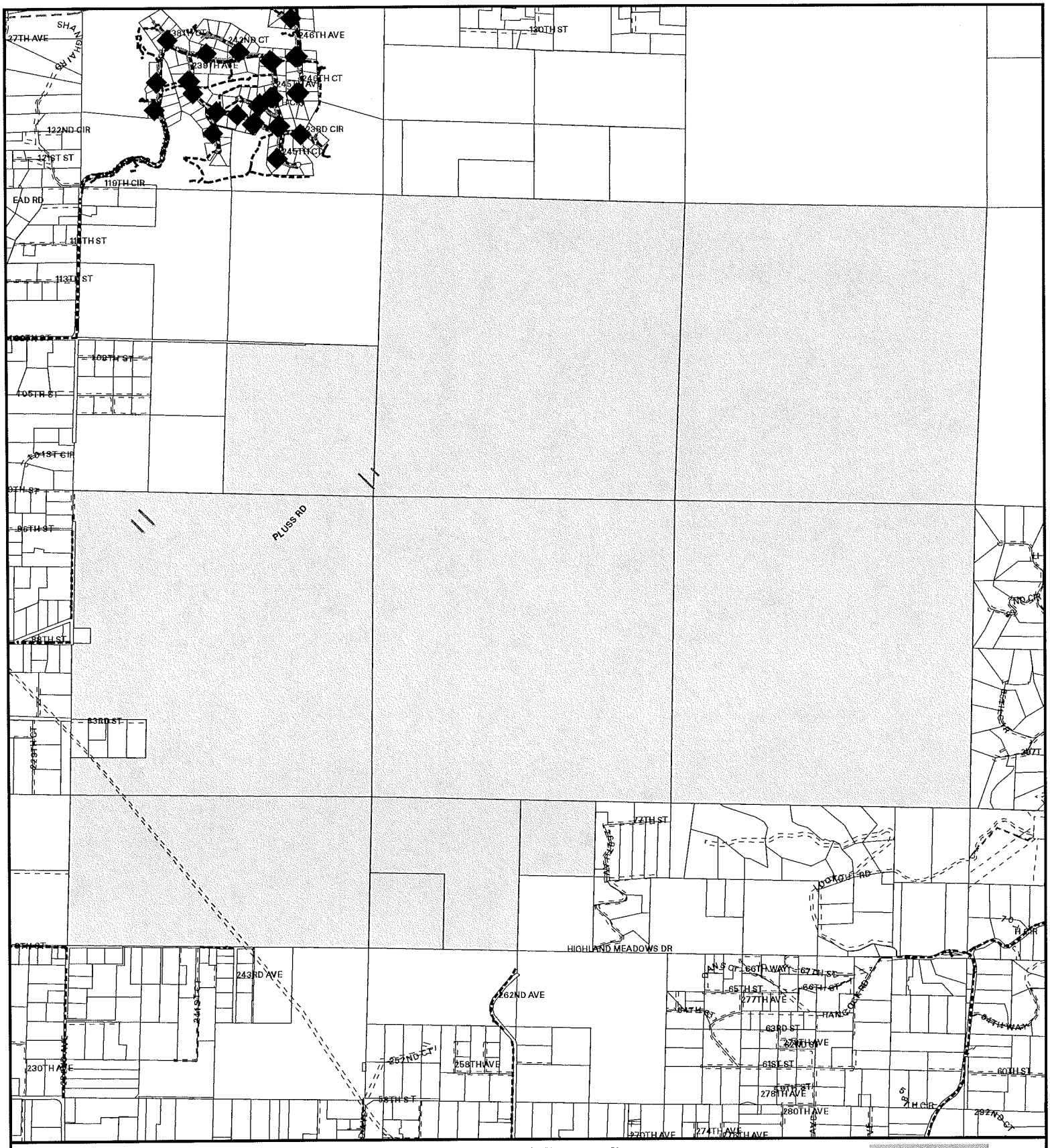
Arterials, C-Tran Routes, Parks & Trails

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

- Subject Parcel
- Public Road
- Parks
- Transportation or Major Utility Easement
- C-Tran Route
- Trails
- State Route
- Principal Arterial
- Minor Arterial
- Urban Collector
- Rural Major Collector
- Rural Minor Collector
- Scenic Highway
- Proposed
- School Bus Stop

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

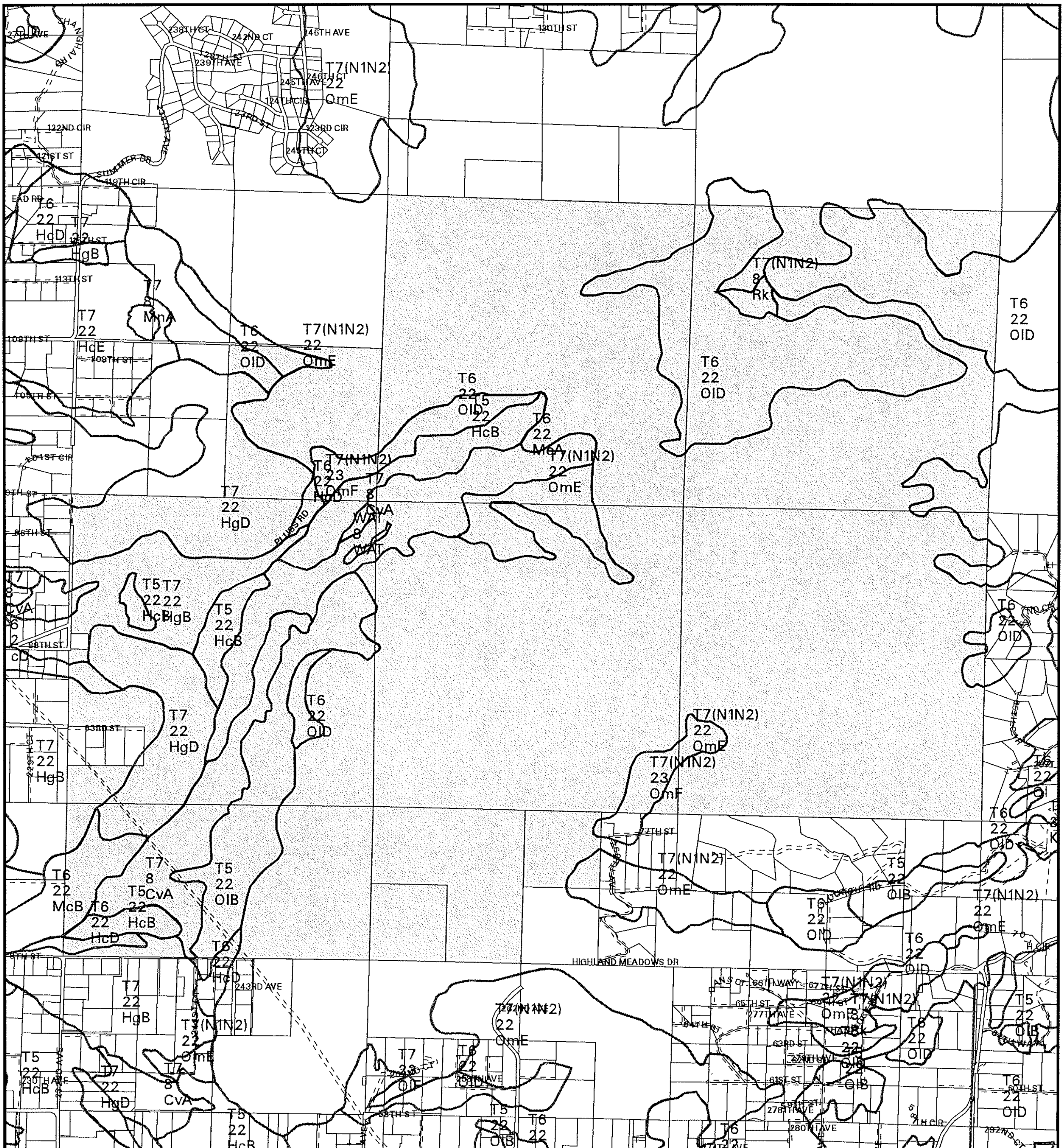
Water, Sewer and Storm Systems

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

- Subject Parcel
- Public Road
- 1-year Wellhead ZOC
- 5-year Wellhead ZOC
- 10-year Wellhead ZOC
- Transportation or Major Utility Easement
- Storm Sewer Lines
- Water Lines
- Sewer Lines
- Hydrant

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Soil Types

Scale 1:27000

500 0 500 1000 1500 Feet

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

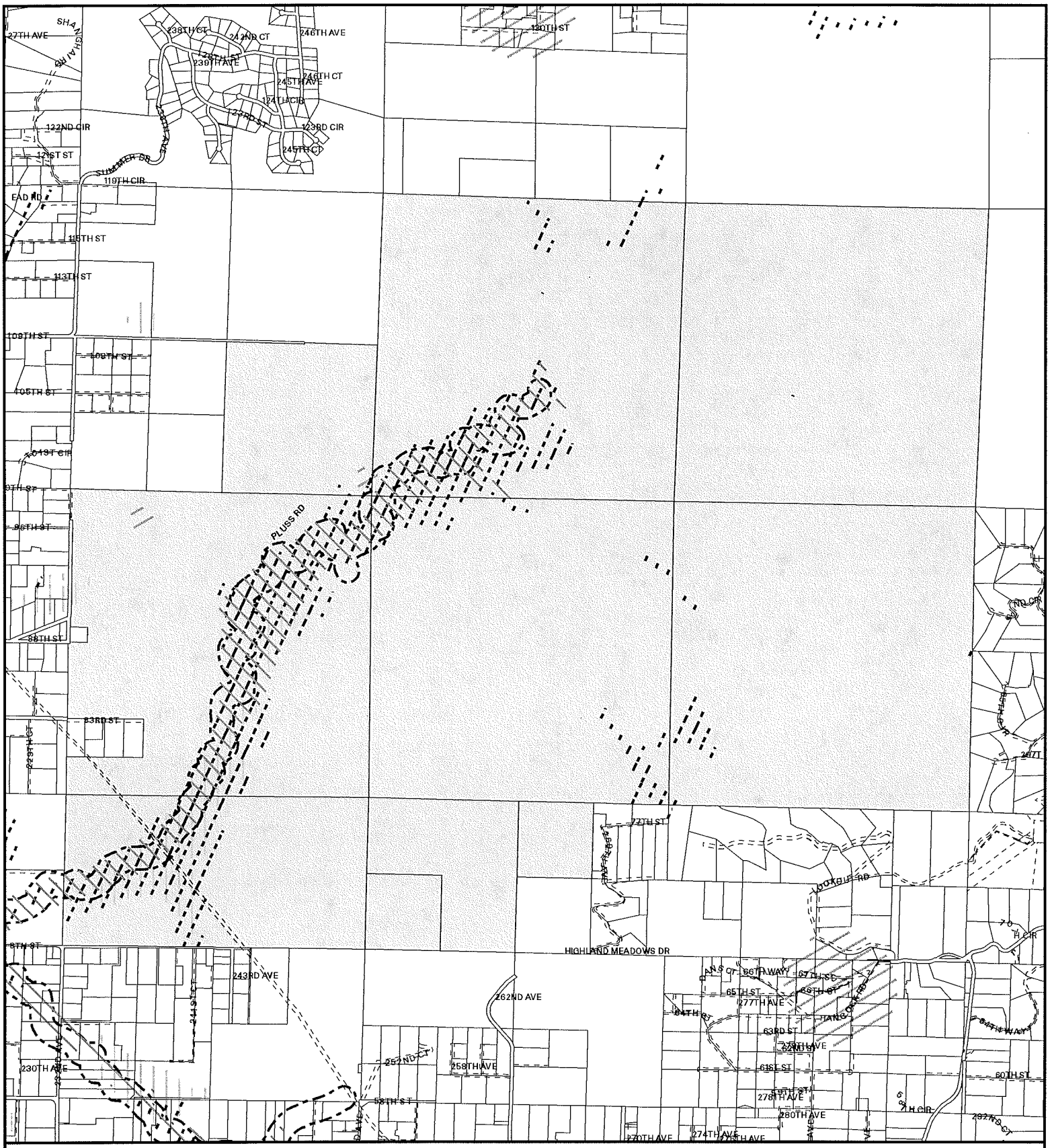
Subject Parcel

Public Road

Transportation or Major Utility Easement

Soil Type Boundary

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

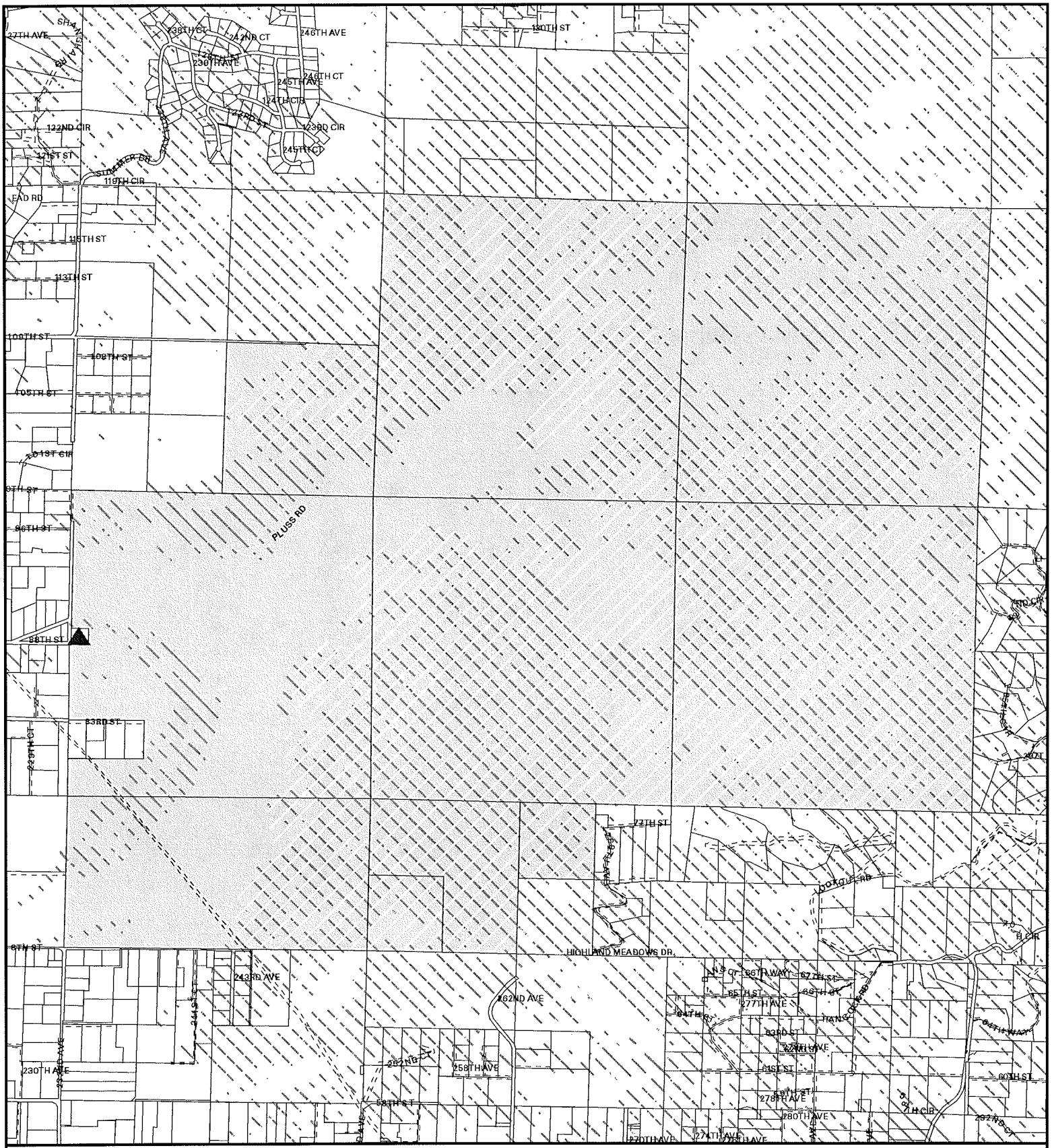
Environmental Constraints I

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

- Subject Parcel
- Public Road
- Hydric soils
- Wetland Inventory
- CARA Category 1
- 100 yr Floodplains
- Floodways
- Shorelines
- Streams
- Transportation or Major Utility Easement

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

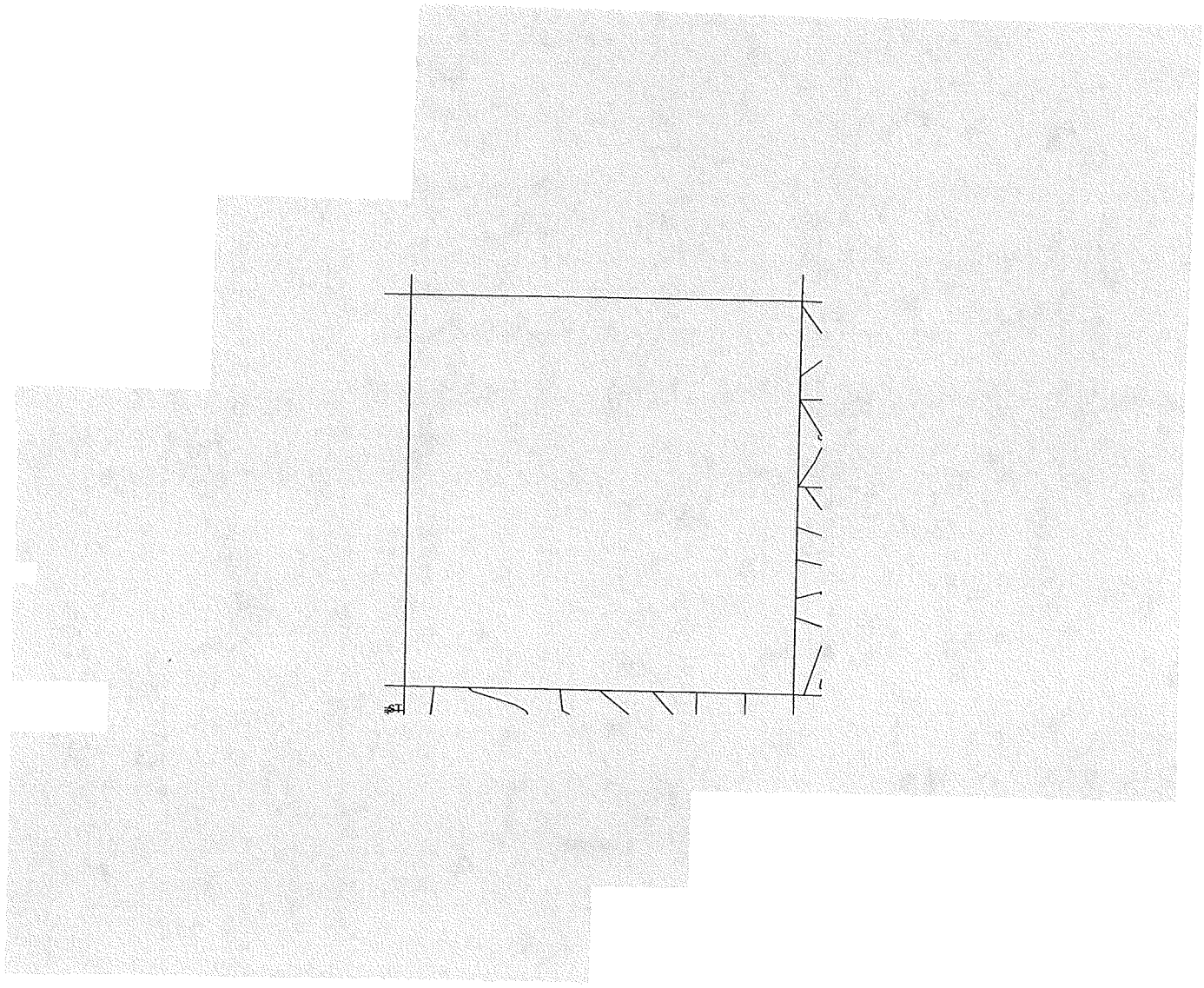
Environmental Constraints II

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

33135	33136	34131
23102	23101	24106
23111	23112	24107

- Subject Parcel
- Public Road
- Slopes Greater Than 15 percent
- Potentially Unstable Slope
- Historic or Active Landslide
- Severe Erosion Hazard Areas
- Transportation or Major Utility Easement
- CCHR Historic Site
- NRHP Historic Site
- INV Historic Site

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Scale 1:27000

500 0 500 1000 1500 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

Plotted: July 11, 2007

Adjacent Development

Serial No.: 167837-000, 167940-000, 168044-000, 170186-000, . . .
Owner: BONNEVILLE CONSERVATION RandR
Address: 2320 NE RUSS RD
C/S/Z: VANCOUVER, WA 98682

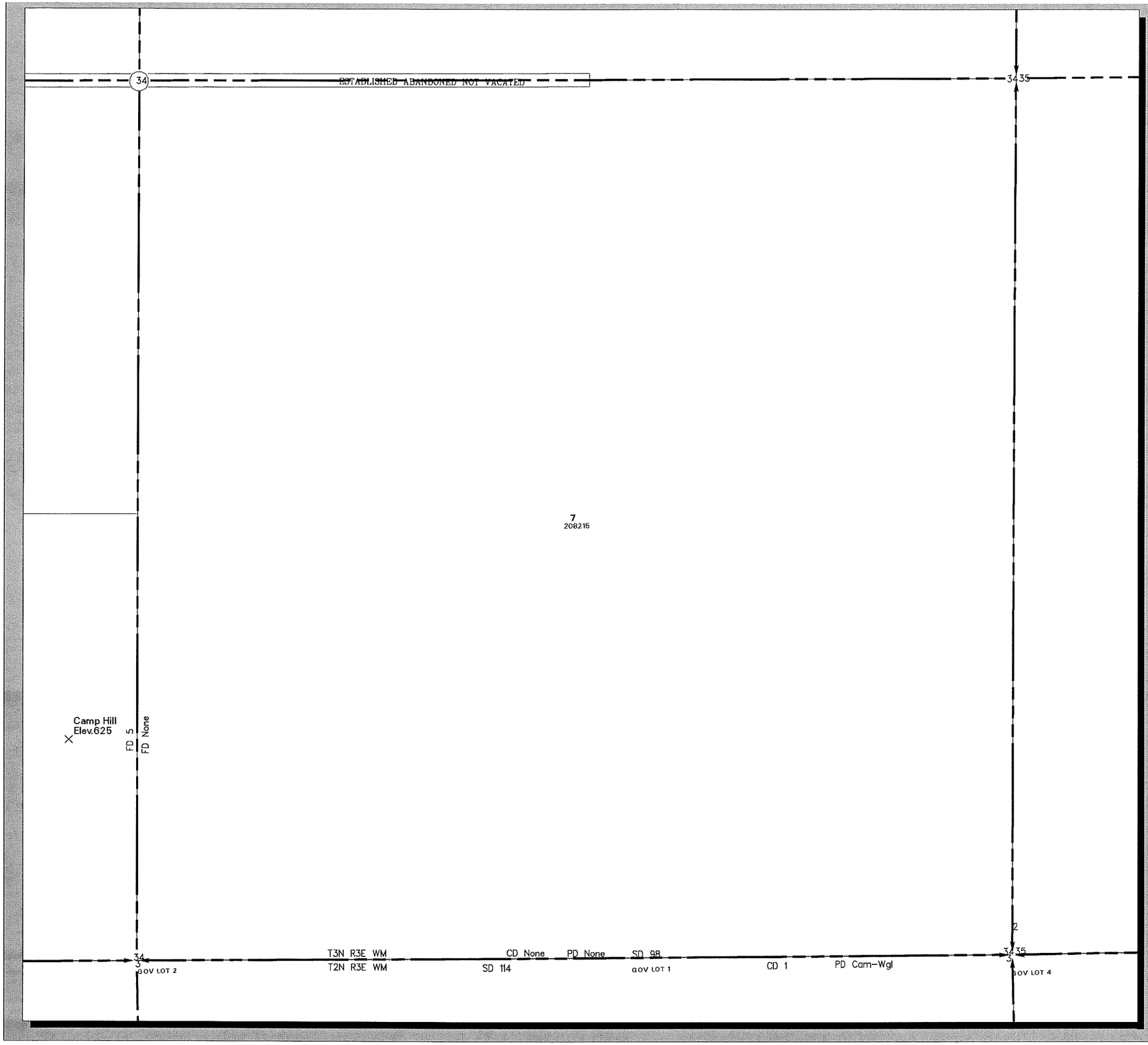
Subject Parcel

Public Road

Transportation or Major Utility Easement

33135	33136	34131
23102	23101	24106
23111	23112	24107

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



Clark County

Washington

SE Qtr of Section 34 T3N R3E WM

Explanation

Streams

Tax Code Line

Donation Land Claim

Easements

Control Lines

History

Subdivision Lines

City Boundary

Road Right of Way
' Actual Road May Not Exist'

Water

Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
Hockinson–Impact Fee

Fire District:
FD 5, No District

Port District:

Developer's GIS Packet: Page 14 of 41

Atlas Page(s)
21

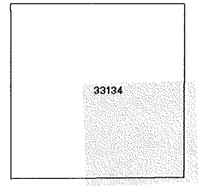
Scale 1:3600

0 100 200 300 400 500 600 Feet

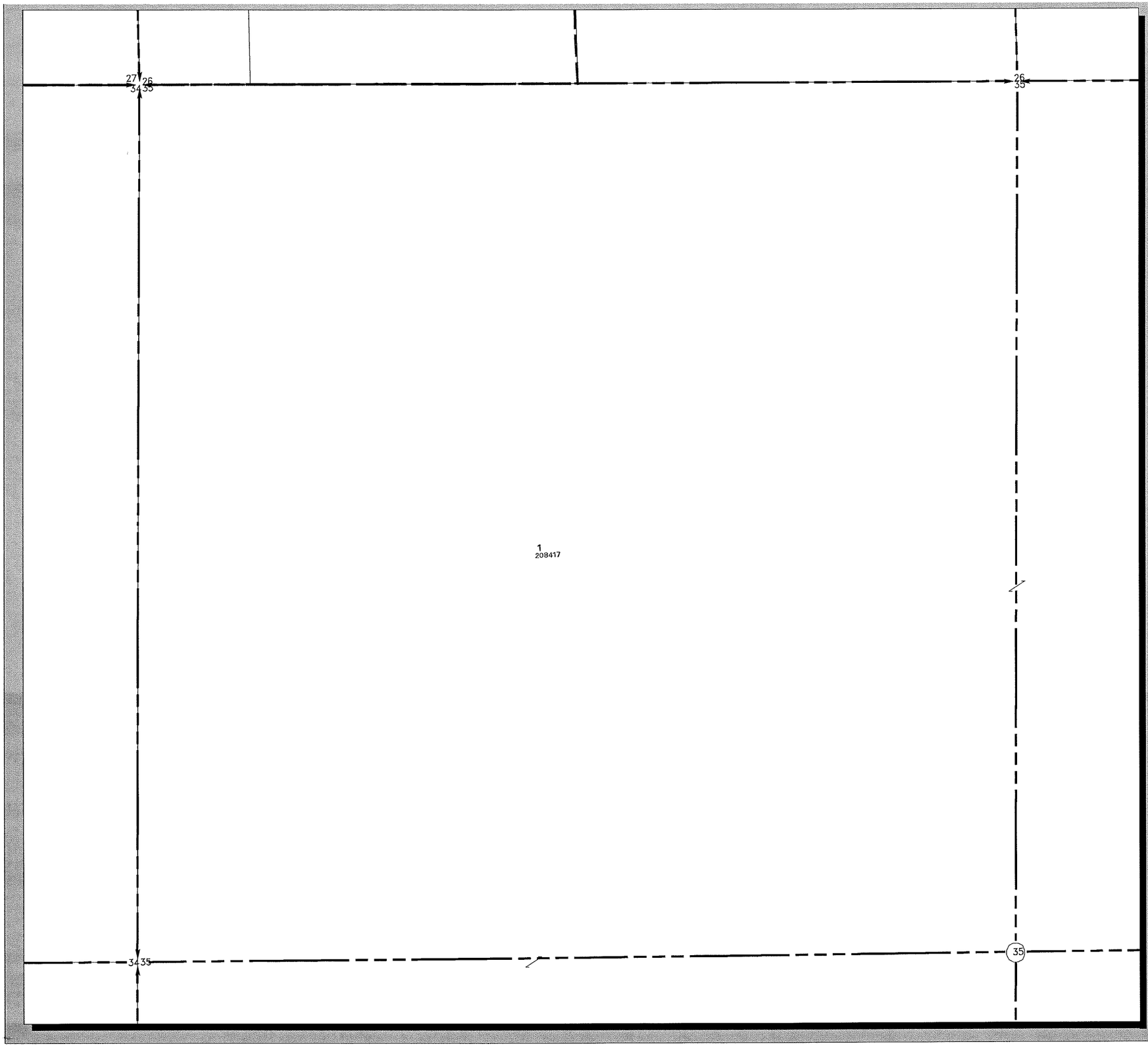
CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NW Qtr of Section 35 T3N R3E WM

Explanation

Streams

Tax Code Line

Donation Land Claim

Easements

Control Lines

History

Subdivision Lines

City Boundary

Road Right of Way
' Actual Road May Not Exist'

Water

Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
98-Hock

Fire District:
FD 3, No District

Port District:

Developer's GIS Packet: Page 15 of 41

Atlas Page(s)
30
21

Scale 1:3600

0 100 200 300 400 500 600 Feet

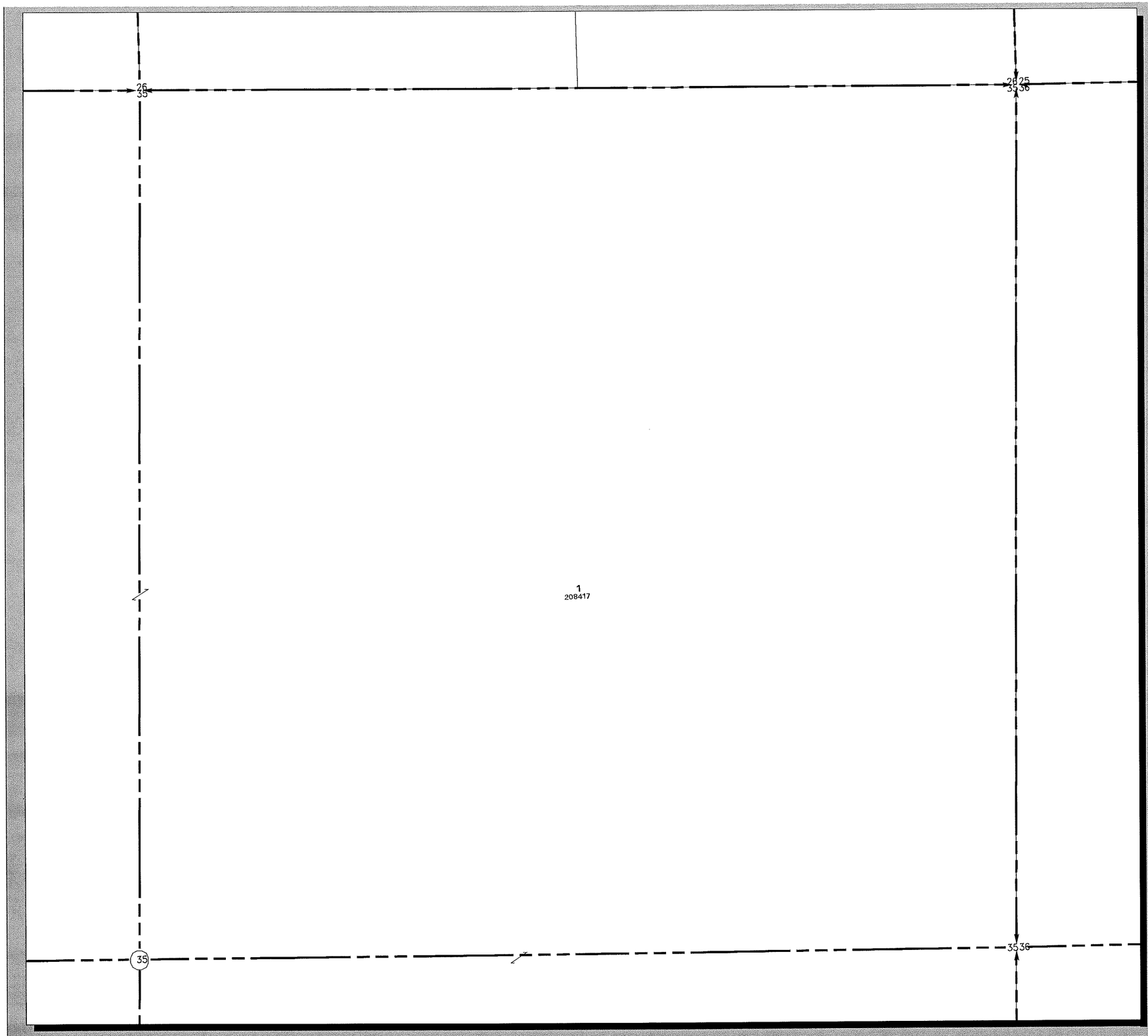
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

33135

CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NE Qtr of Section 35 T3N R3E WM

Explanation

Streams

Tax Code Line

Donation Land Claim

Easements

Control Lines

History

Subdivision Lines

City Boundary

Road Right of Way
' Actual Road May Not Exist'

Water

Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
98-Hock

Fire District:
FD 3, No District

Port District:

Developer's GIS Packet: Page 16 of 41

Atlas Page(s)
30
21

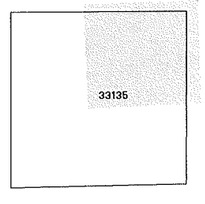
Scale 1:3600

0 100 200 300 400 500 600 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

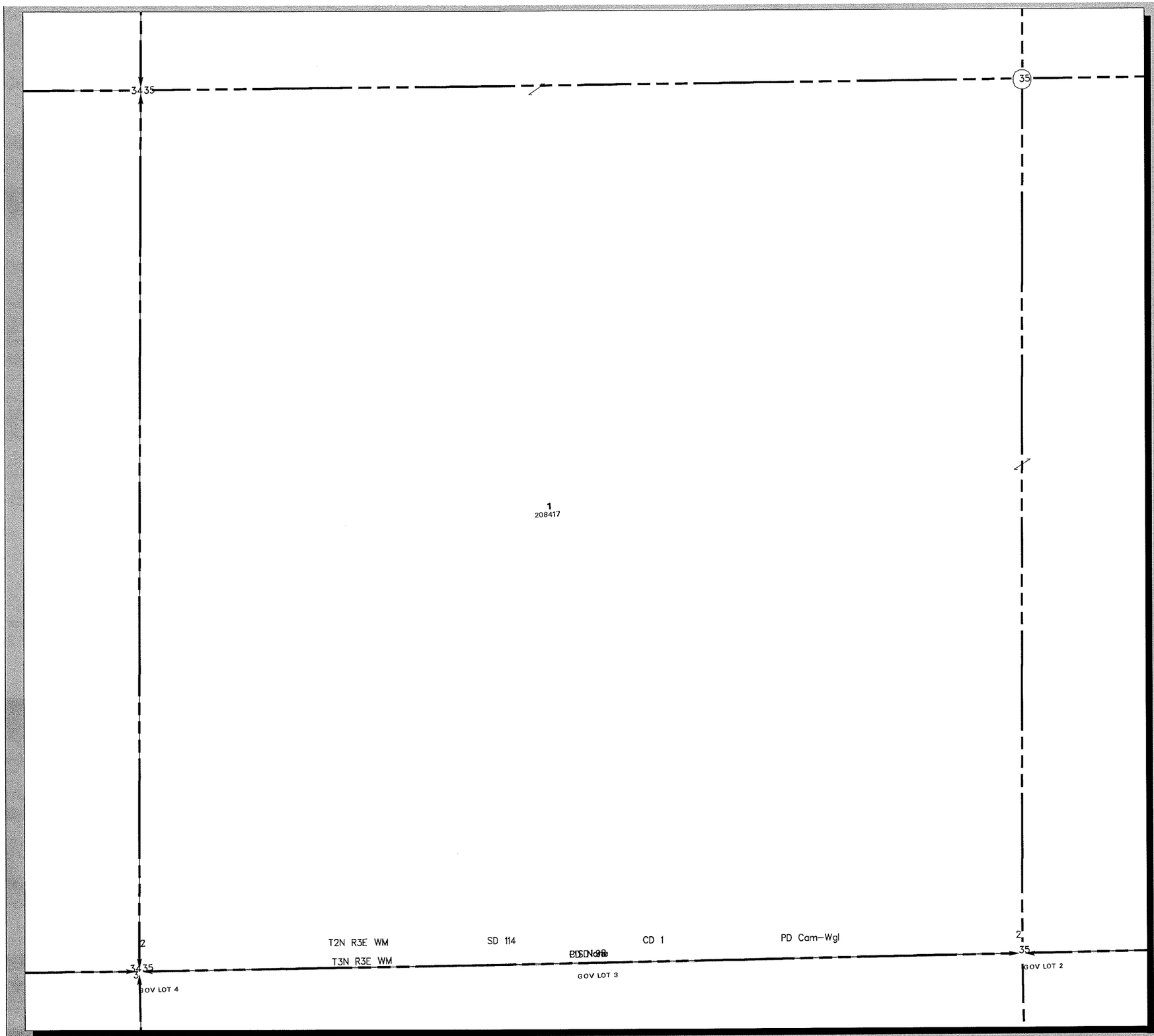


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SW Qtr of Section 35 T3N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
98-Hock

Fire District:
No District

Port District:

Developer's GIS Packet: Page 17 of 41

Atlas Page(s)
21

Scale 1:3600

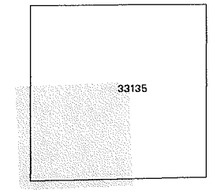
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON

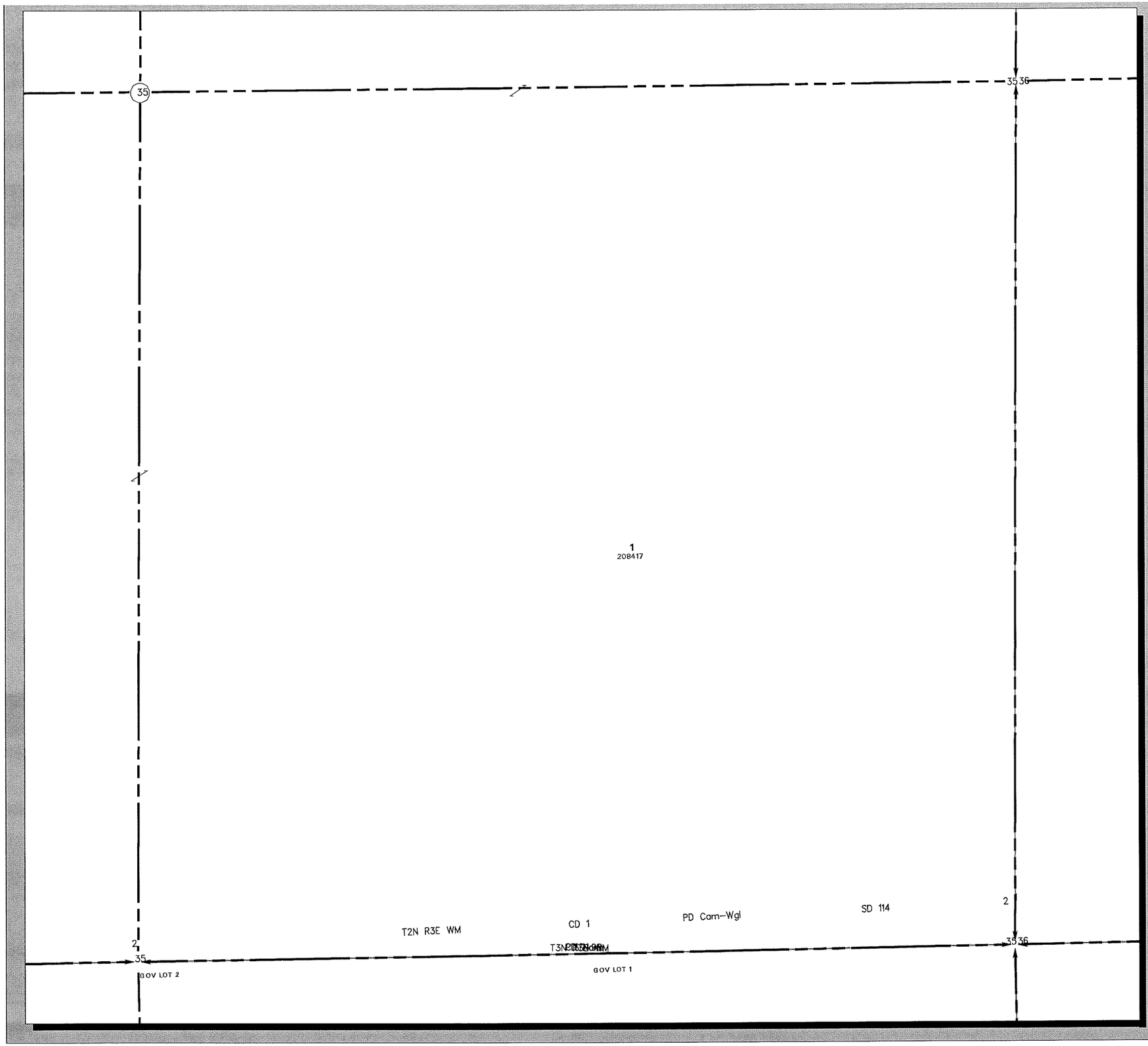
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

SE Qtr of Section 35 T3N R3E WM

Explanation

Streams
Tax Code Line
Donation Land Claim
Easements
Control Lines
History
Subdivision Lines
City Boundary

Road Right of Way
' Actual Road May Not Exist'

Water

Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
98-Hock

Fire District:
No District

Port District:

Developer's GIS Packet: Page 18 of 41

Atlas Page(s)
21

Scale 1:3600

0 100 200 300 400 500 600 Feet

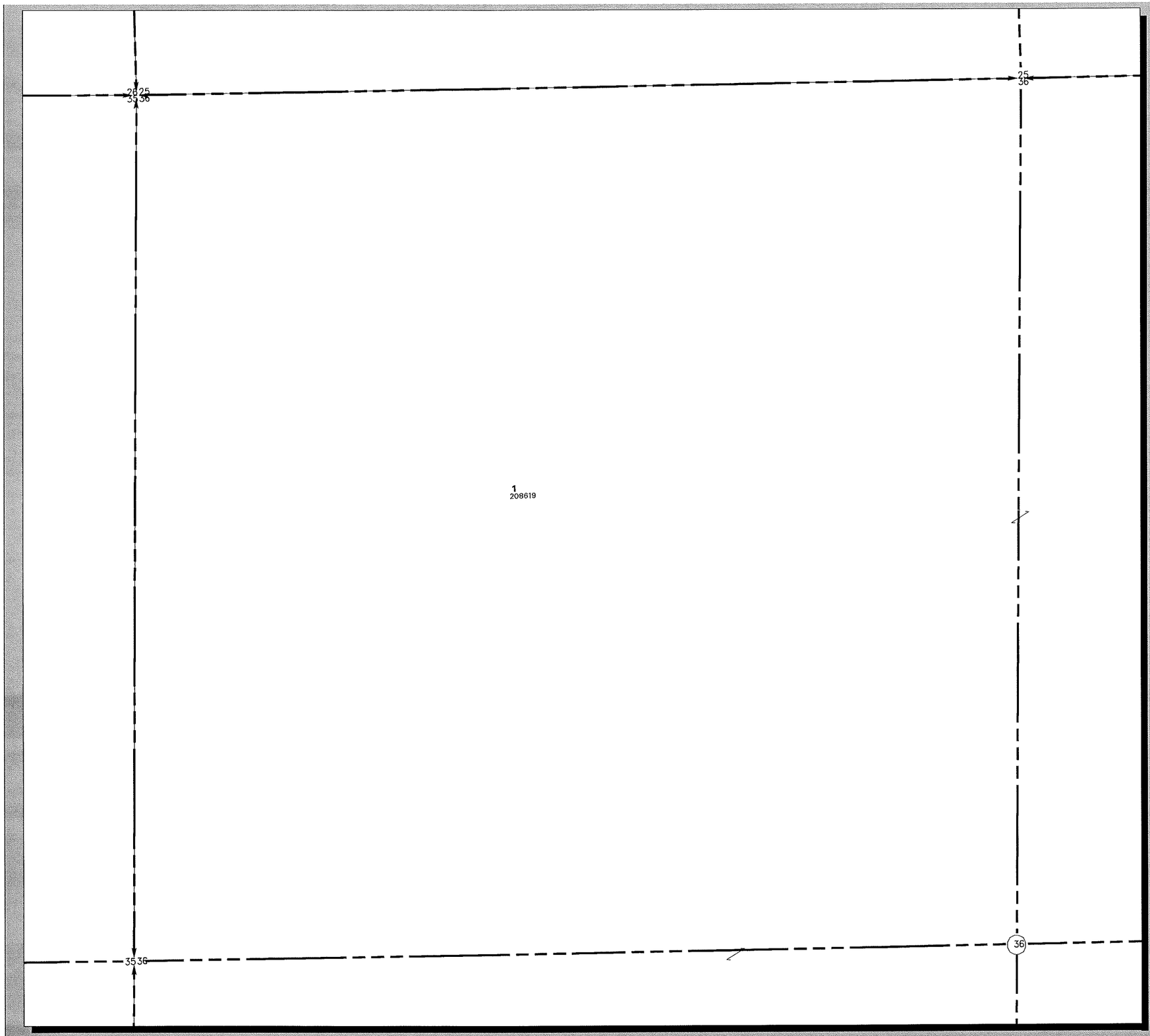
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

33135

CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NW Qtr of Section 36 T3N R3E WM

Explanation

Streams

Tax Code Line

Donation Land Claim

Easements

Control Lines

History

Subdivision Lines

City Boundary

Road Right of Way
' Actual Road May Not Exist'

Water

Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
98-Hock

Fire District:
FD 3, No District

Port District:

Developer's GIS Packet: Page 19 of 41

Atlas Page(s)
30
21

Scale 1:3600

0 100 200 300 400 500 600 Feet

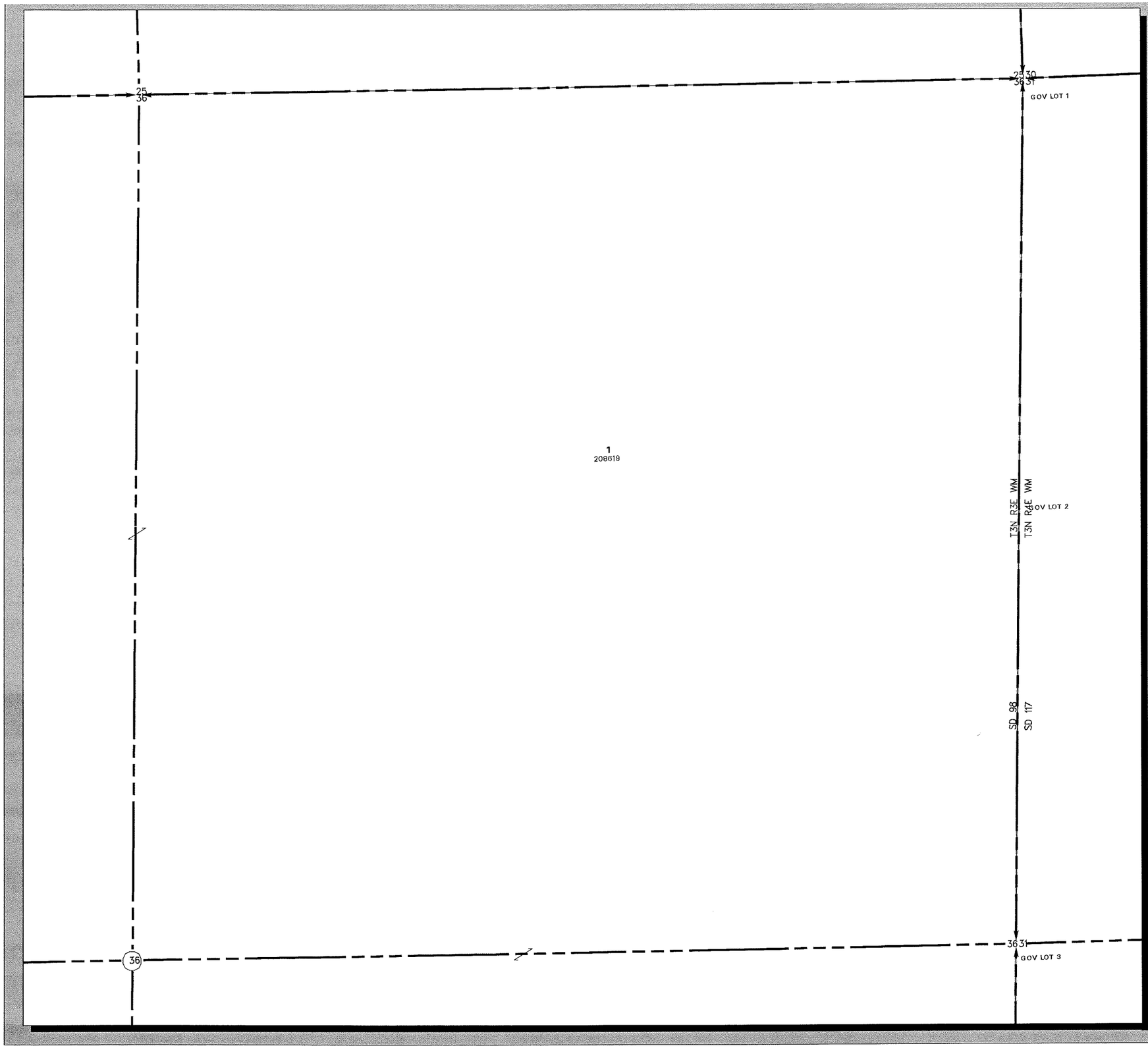
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

33136

CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NE Qtr of Section 36 T3N R3E WM

Explanation

Streams

Tax Code Line

Donation Land Claim

Easements

Control Lines

History

Subdivision Lines

City Boundary

Road Right of Way
' Actual Road May Not Exist'

Water

Marsh

Municipality:
CC

School District:
98-Hock

Fire District:
FD 3, No District

Port District:

None

Cemetery District:
None

Developer's GIS Packet: Page 20 of 41

Atlas Page(s)
30
31
21
22

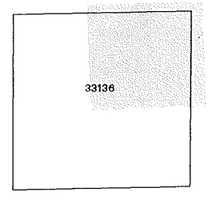
Scale 1:3600

0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

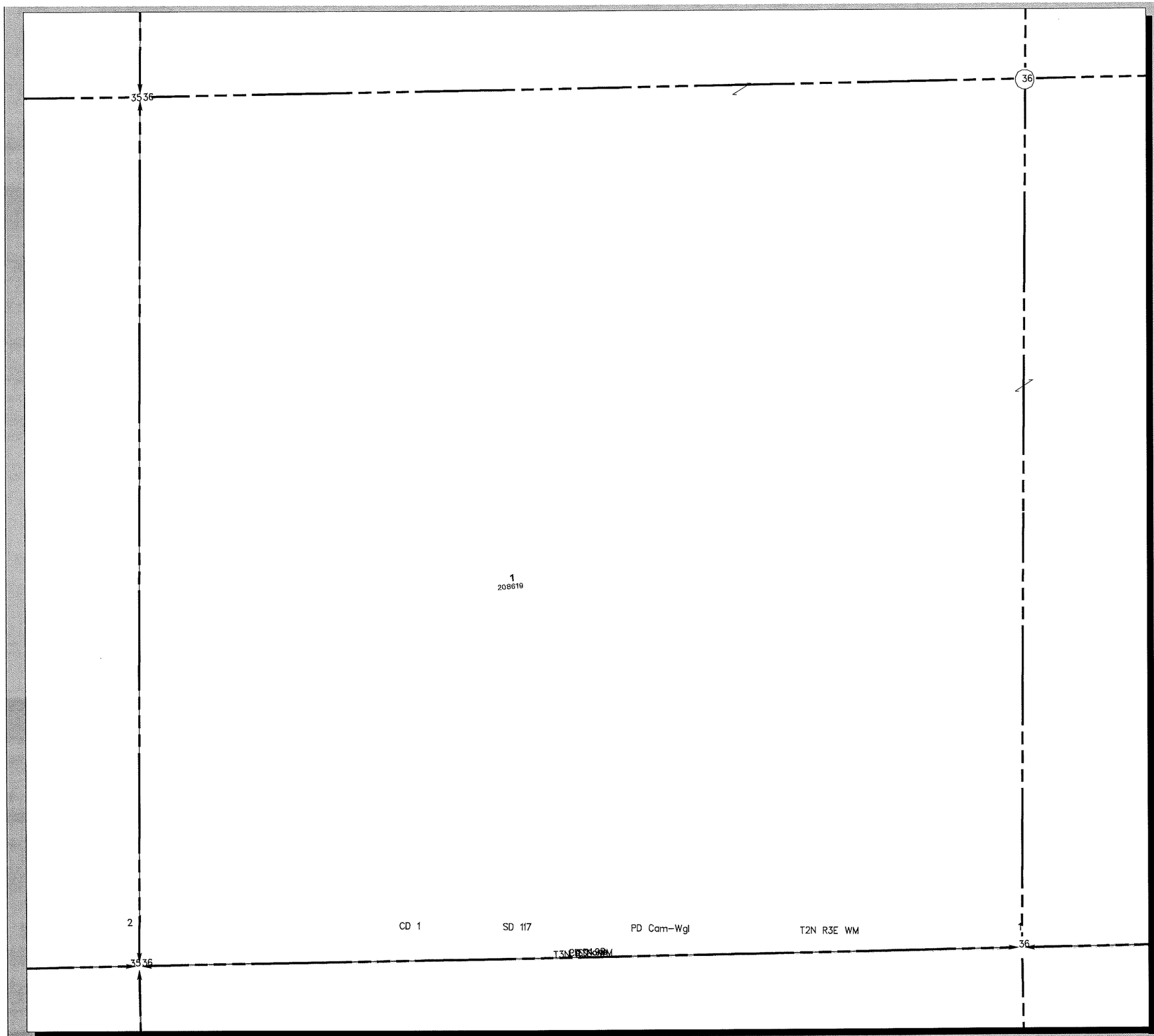


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SW Qtr of Section 36 T3N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
98-Hock

Fire District:
No District

Port District:

Developer's GIS Packet: Page 21 of 41

Atlas Page(s)
21

Scale 1:3600

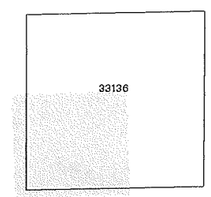
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

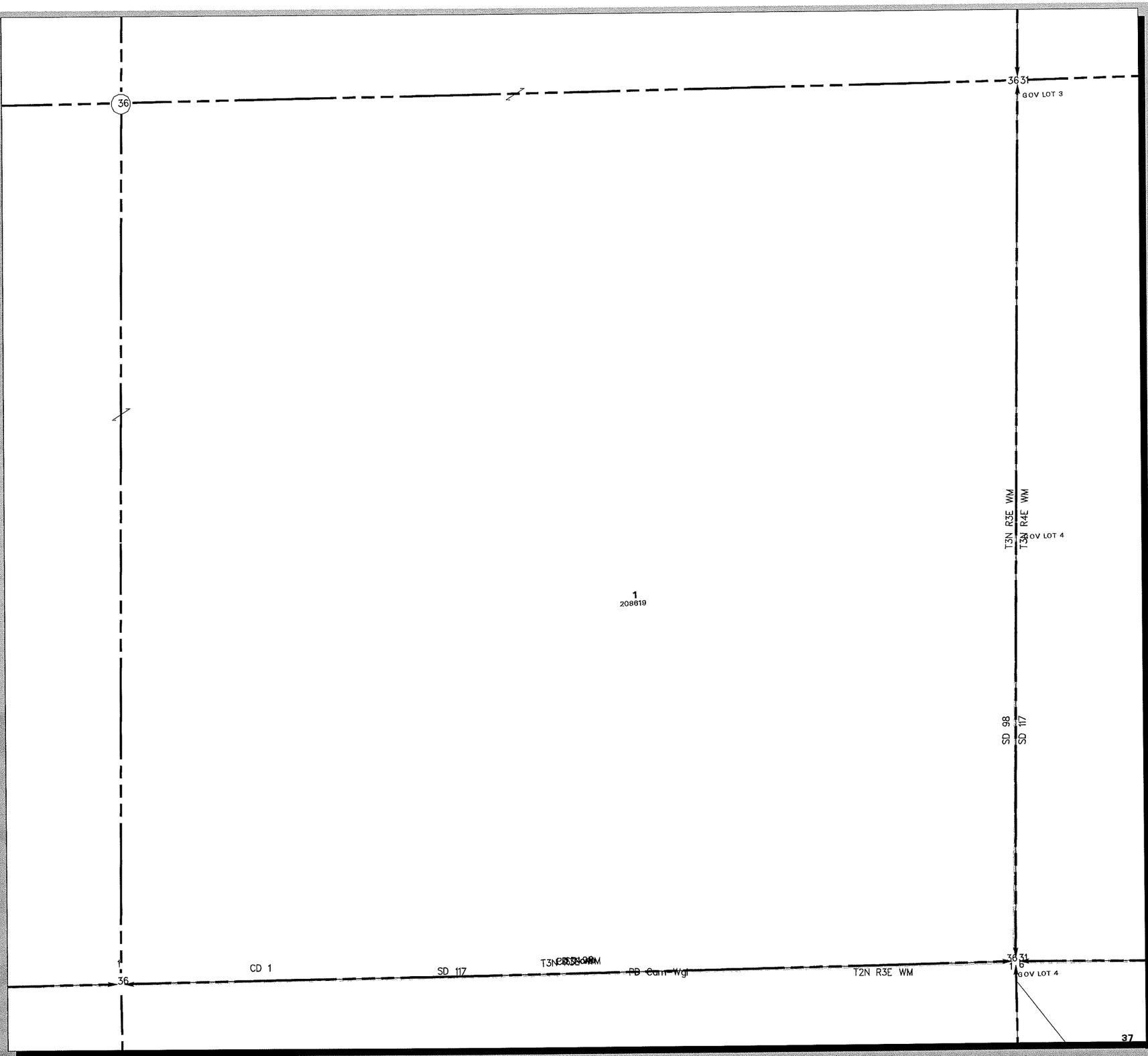


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SE Qtr of Section 36 T3N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
98-Hock

Fire District:
FD 3, No District

Port District:

Developer's GIS Packet: Page 22 of 41

Atlas Page(s)
21
22

Scale 1:3600

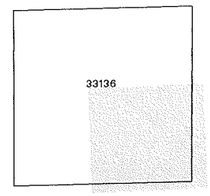
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SW Qtr of Section 31 T3N R4E WM

Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

None

Cemetery District:
None

Municipality:
CC

School District:
117-Cam

Fire District:
East County, FD 3, No District

Port District:

Developer's GIS Packet: Page 23 of 41

Atlas Page(s)
21
22

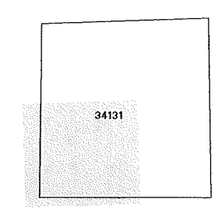
Scale 1:3600

0 100 200 300 400 500 600 Feet

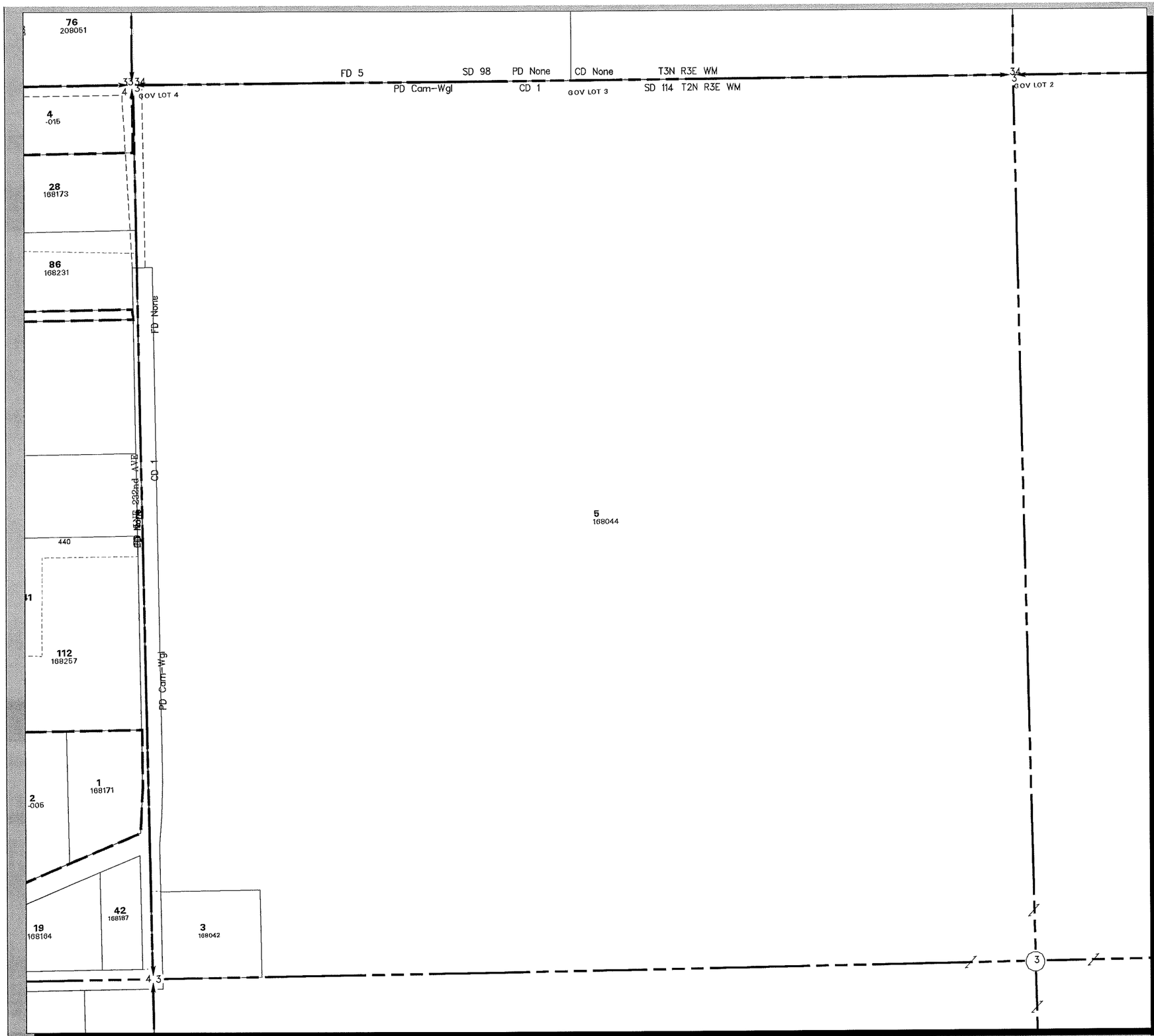
CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NW Qtr of Section 3 T2N R3E WM

Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
1

Municipality:
CC

School District:
114-Evr

Fire District:
FD 5, No District

Port District:

Developer's GIS Packet: Page 24 of 41

Atlas Page(s)
20
21

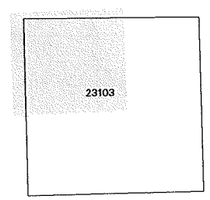
Scale 1:3600

0 100 200 300 400 500 600 Feet

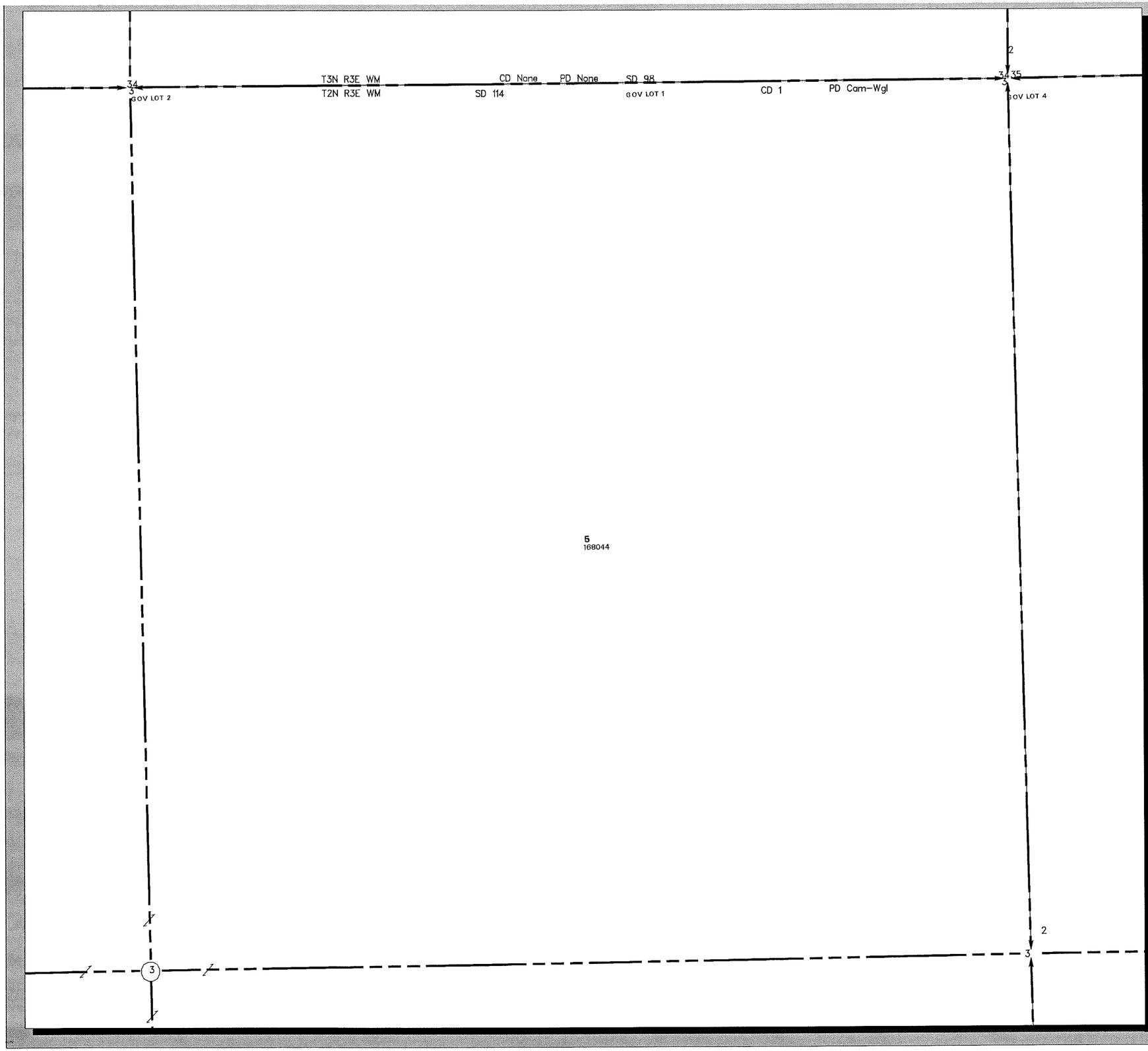
CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NE Qtr of Section 3 T2N R3E WM

Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
1

Municipality:
CC

School District:
114-Evr

Fire District:
No District

Port District:

Developer's GIS Packet: Page 25 of 41

Atlas Page(s)
21

Scale 1:3600

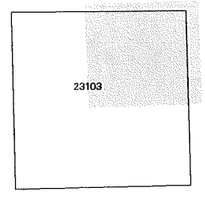
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

N

Order 29677 GIS Product 1_24

July 11, 2007

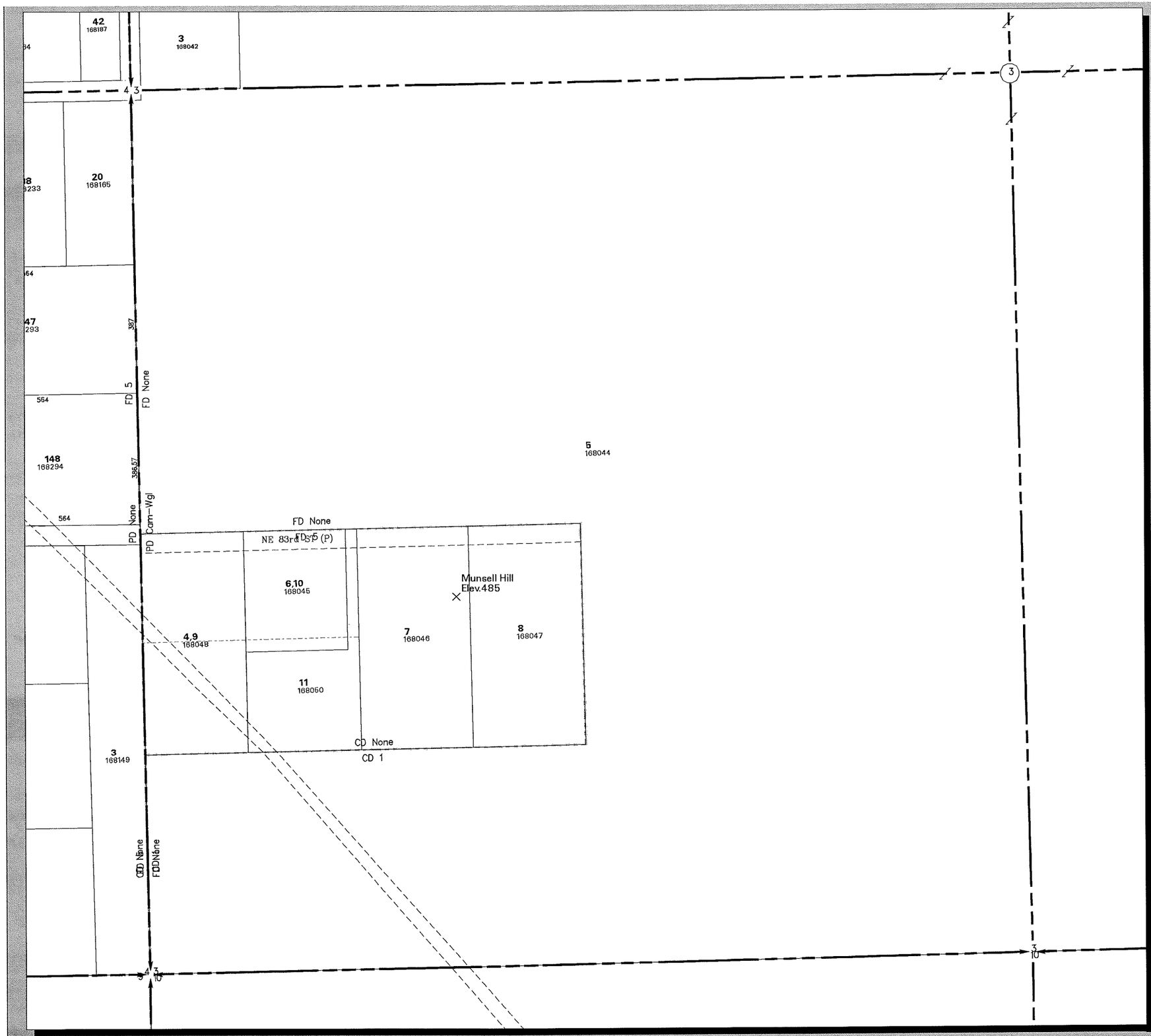


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SW Qtr of Section 3 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way
  ' Actual Road May Not Exist'
- Water
- Marsh

Municipality:
CC

School District:
114-Evr

Fire District:
FD 5, No District

Port District:

Cam

Cemetery District:
None, 1

Developer's GIS Packet: Page 26 of 41

Atlas Page(s)
20
21

Scale 1:3600

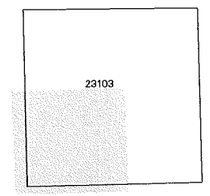
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON

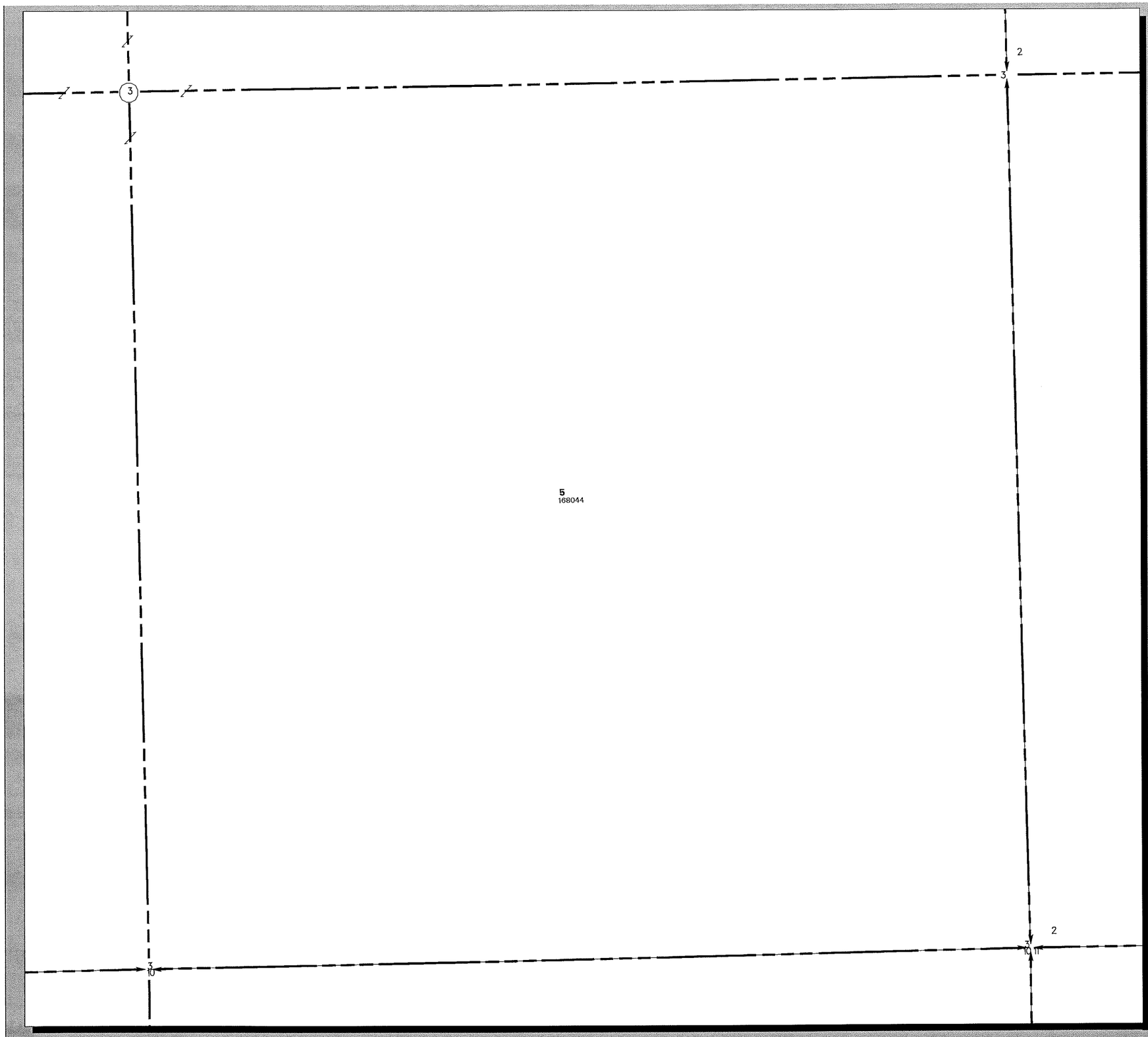
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

SE Qtr of Section 3 T2N R3E WM

Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District: 1

Municipality: CC

School District: 114-Evr

Fire District: No District

Port District:

Developer's GIS Packet: Page 27 of 41

Atlas Page(s) 21

Scale 1:3600

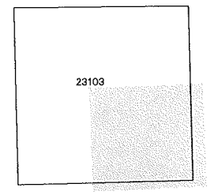
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON

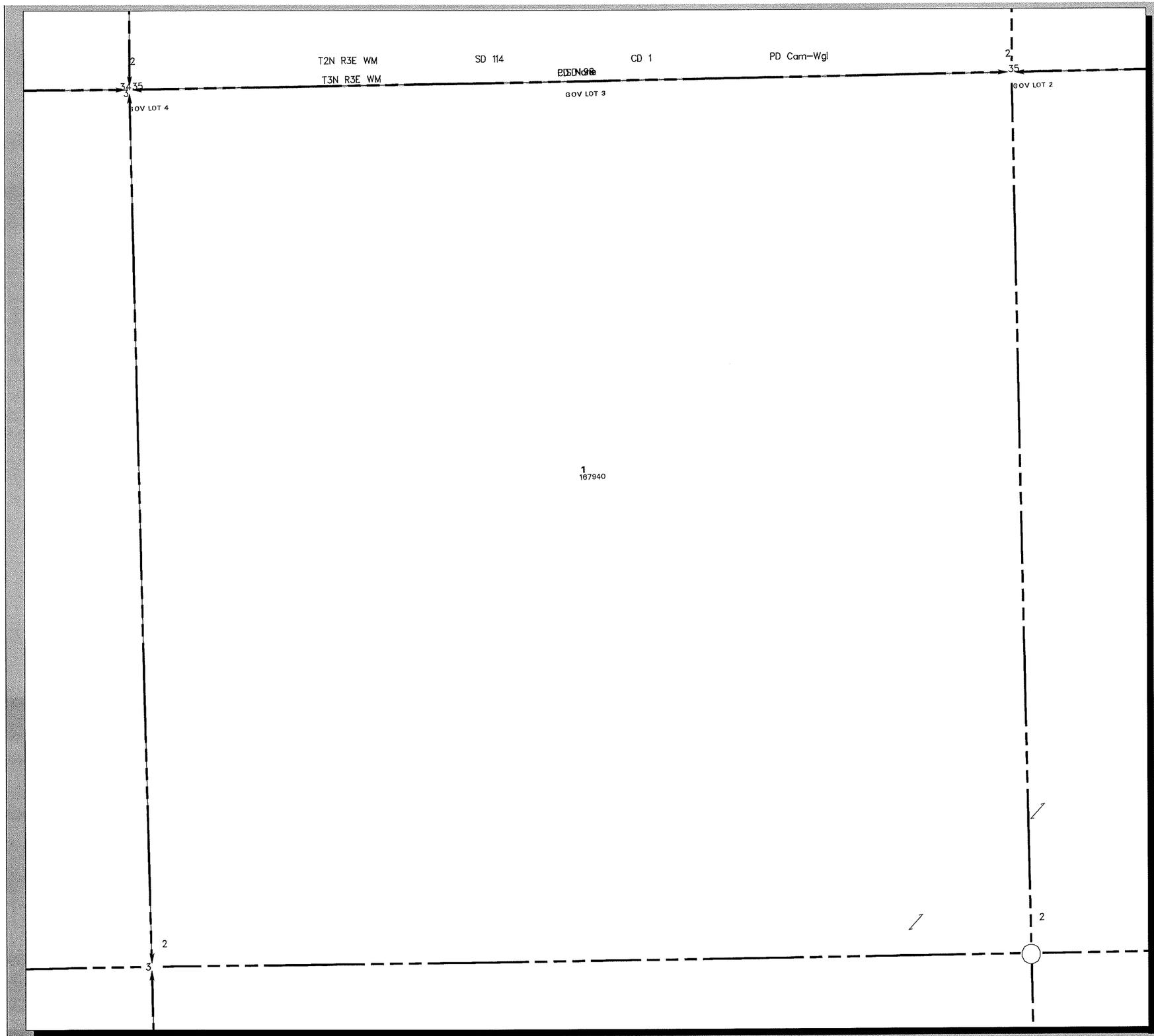
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NW Qtr of Section 2 T2N R3E WM

Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
1

Municipality:
CC

School District:
114-Evr

Fire District:
No District

Port District:

Developer's GIS Packet: Page 28 of 41

Atlas Page(s)
21

Scale 1:3600

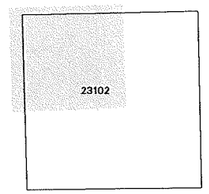
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

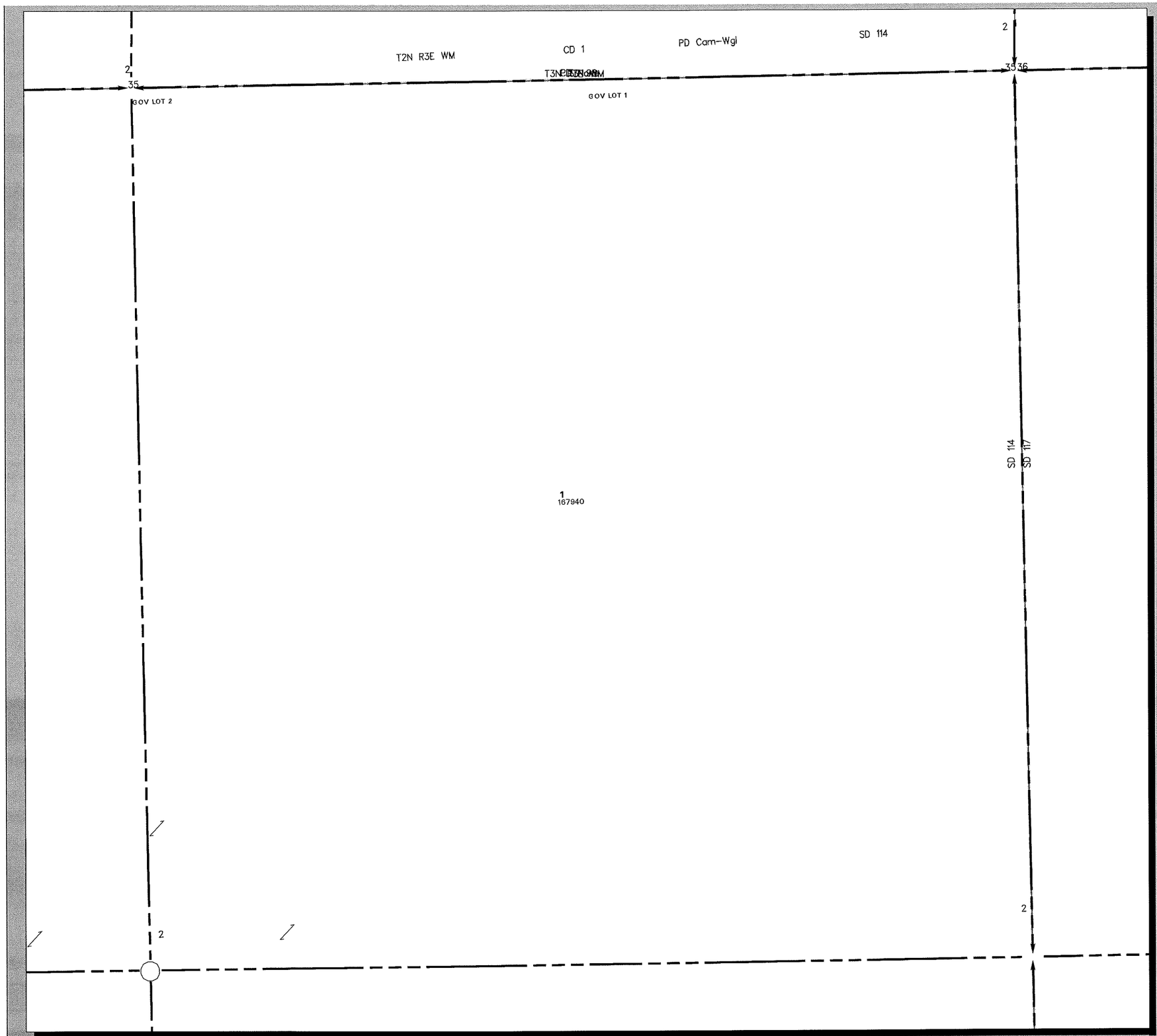
N

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NE Qtr of Section 2 T2N R3E WM

Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
1

Municipality:
CC

School District:
114-Evr

Fire District:
No District

Port District:

Developer's GIS Packet: Page 29 of 41

Atlas Page(s)
21

Scale 1:3600

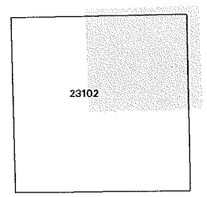
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON

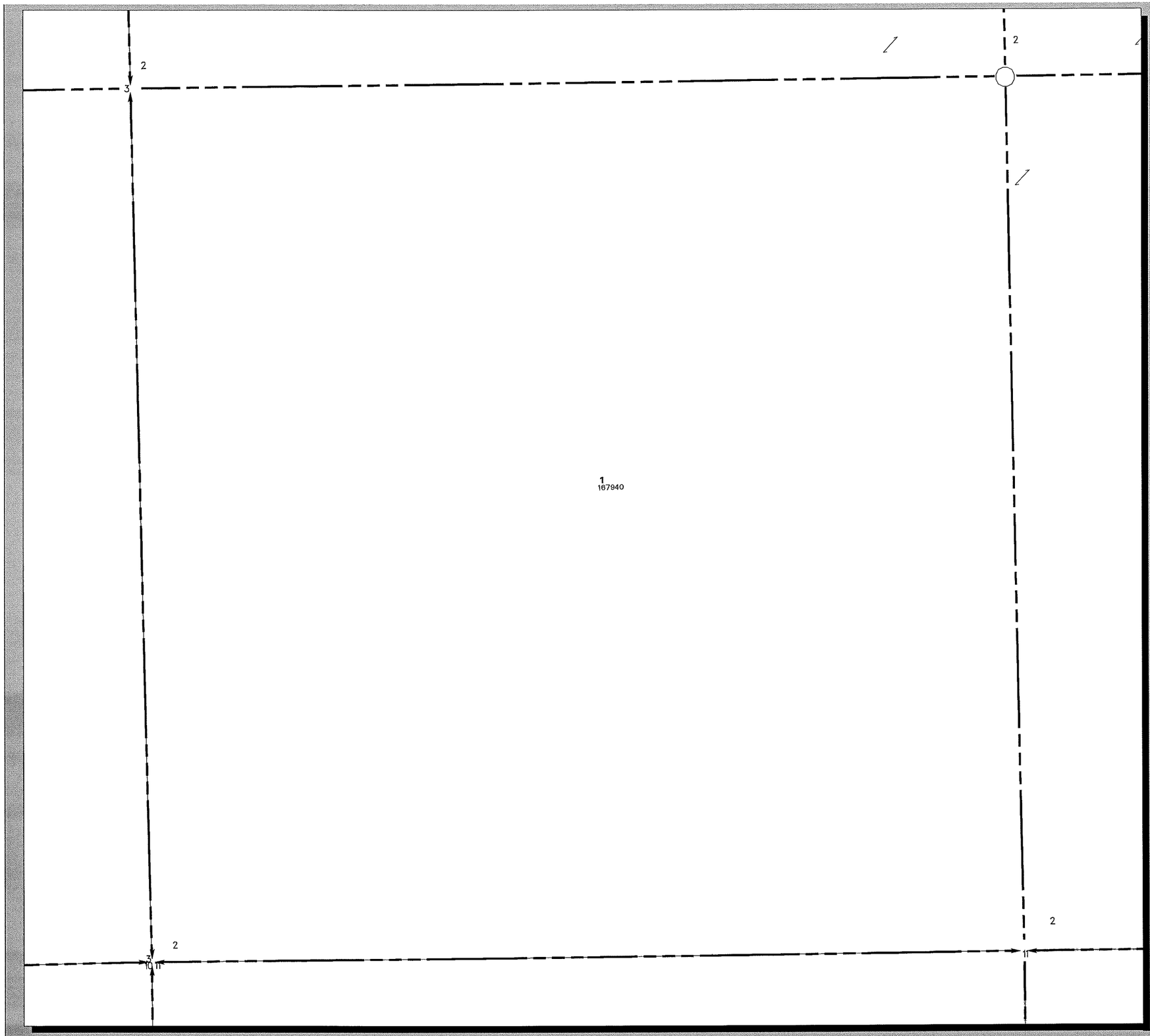
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

SW Qtr of Section 2 T2N R3E WM

Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
I

Municipality:
CC

School District:
114-Evr

Fire District:
No District

Port District:

Developer's GIS Packet: Page 30 of 41

Atlas Page(s)
21

Scale 1:3600

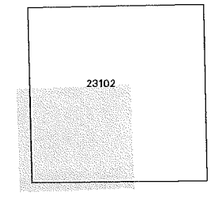
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

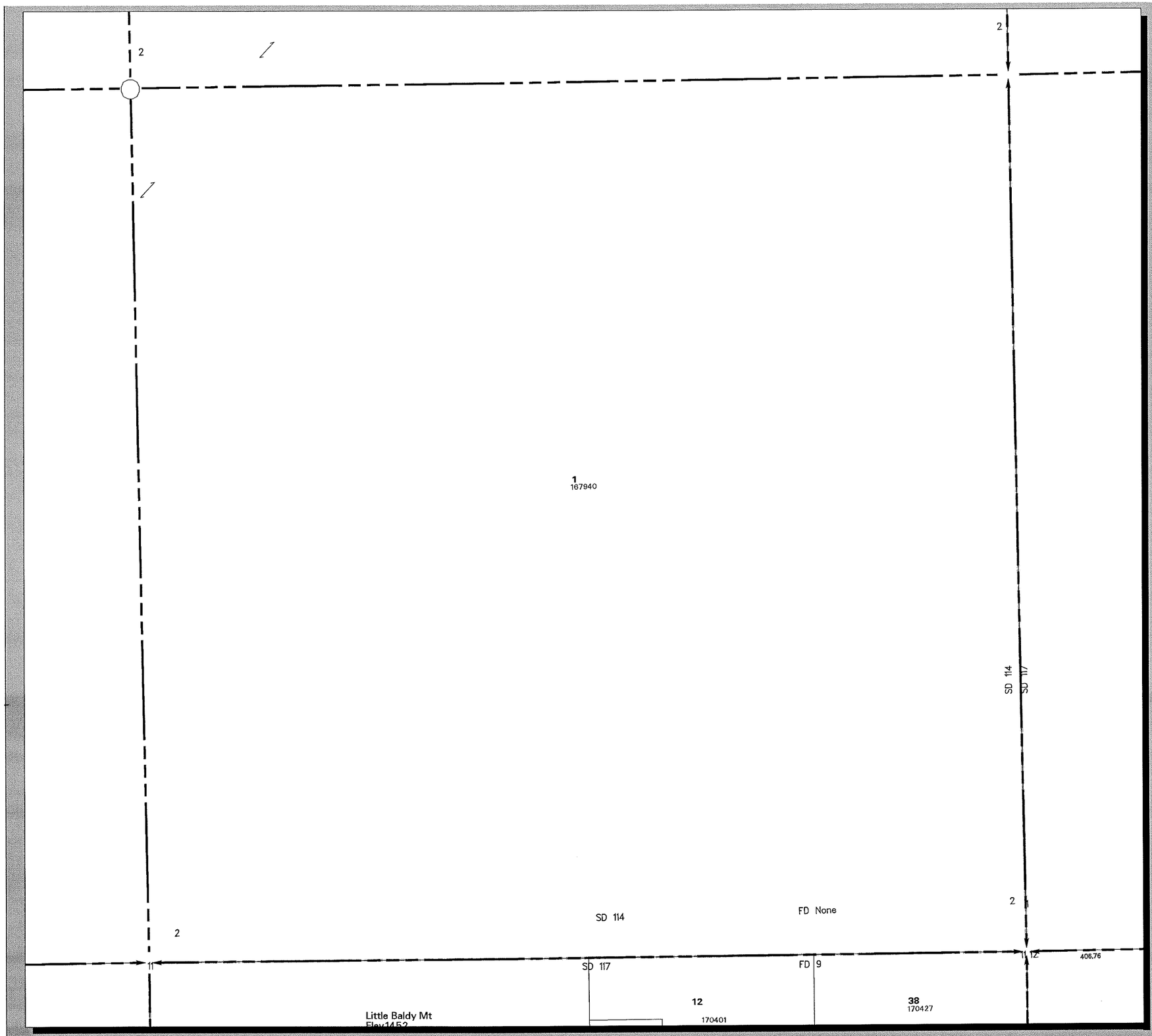


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SE Qtr of Section 2 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
1

Municipality:
CC

School District:
114-Evr

Fire District:
East County, No District

Port District:

Developer's GIS Packet: Page 31 of 41

Atlas Page(s)
21

Scale 1:3600

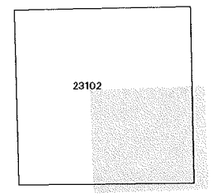
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

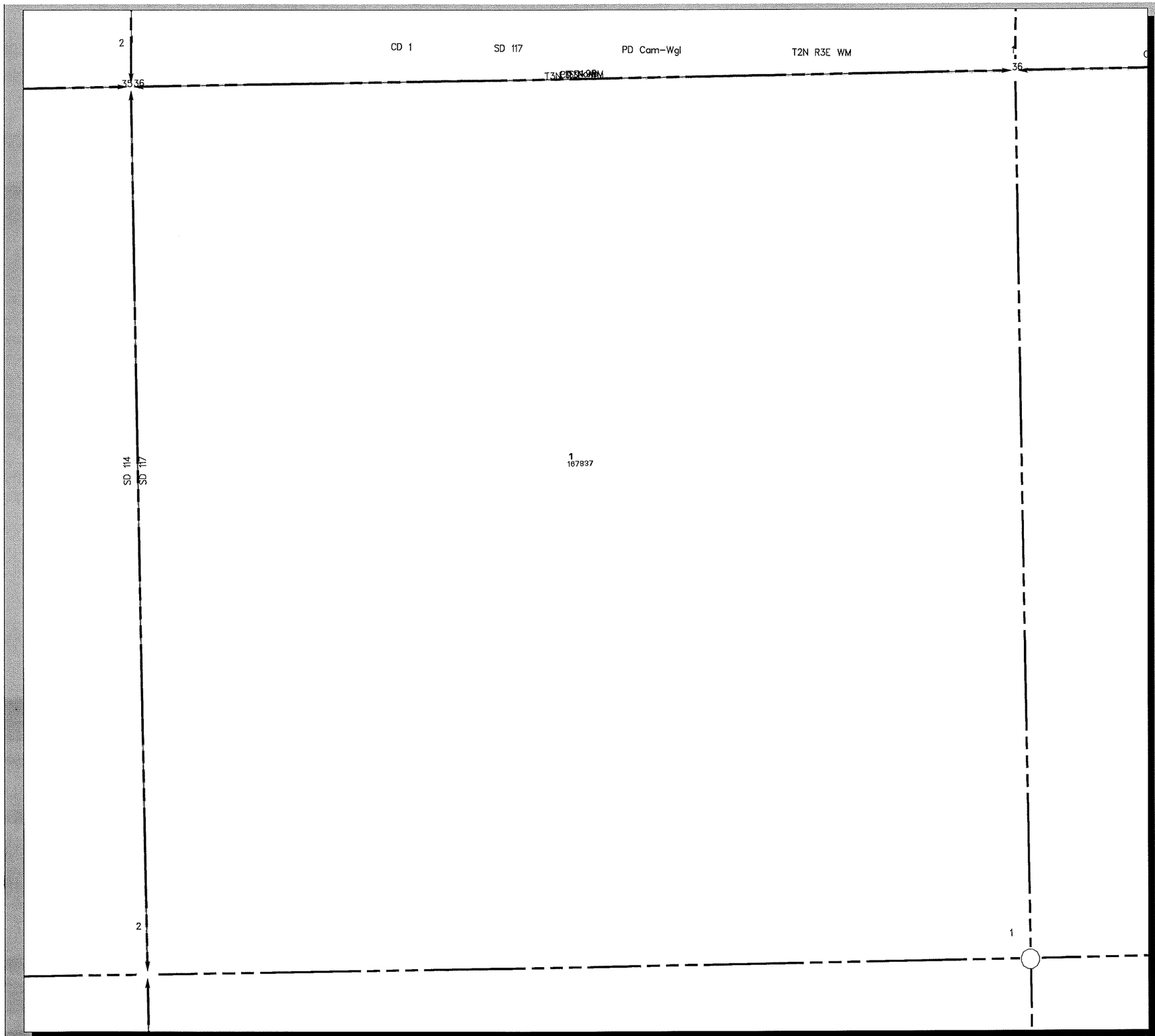
N

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.



Clark County

Washington

NW Qtr of Section 1 T2N R3E WM

Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
None, 1

Municipality:
CC

School District:
117-Cam

Fire District:
No District

Port District:

Developer's GIS Packet: Page 32 of 41

Atlas Page(s)
21

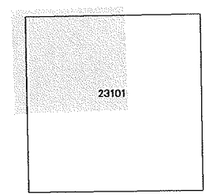
Scale 1:3600

0 100 200 300 400 500 600 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

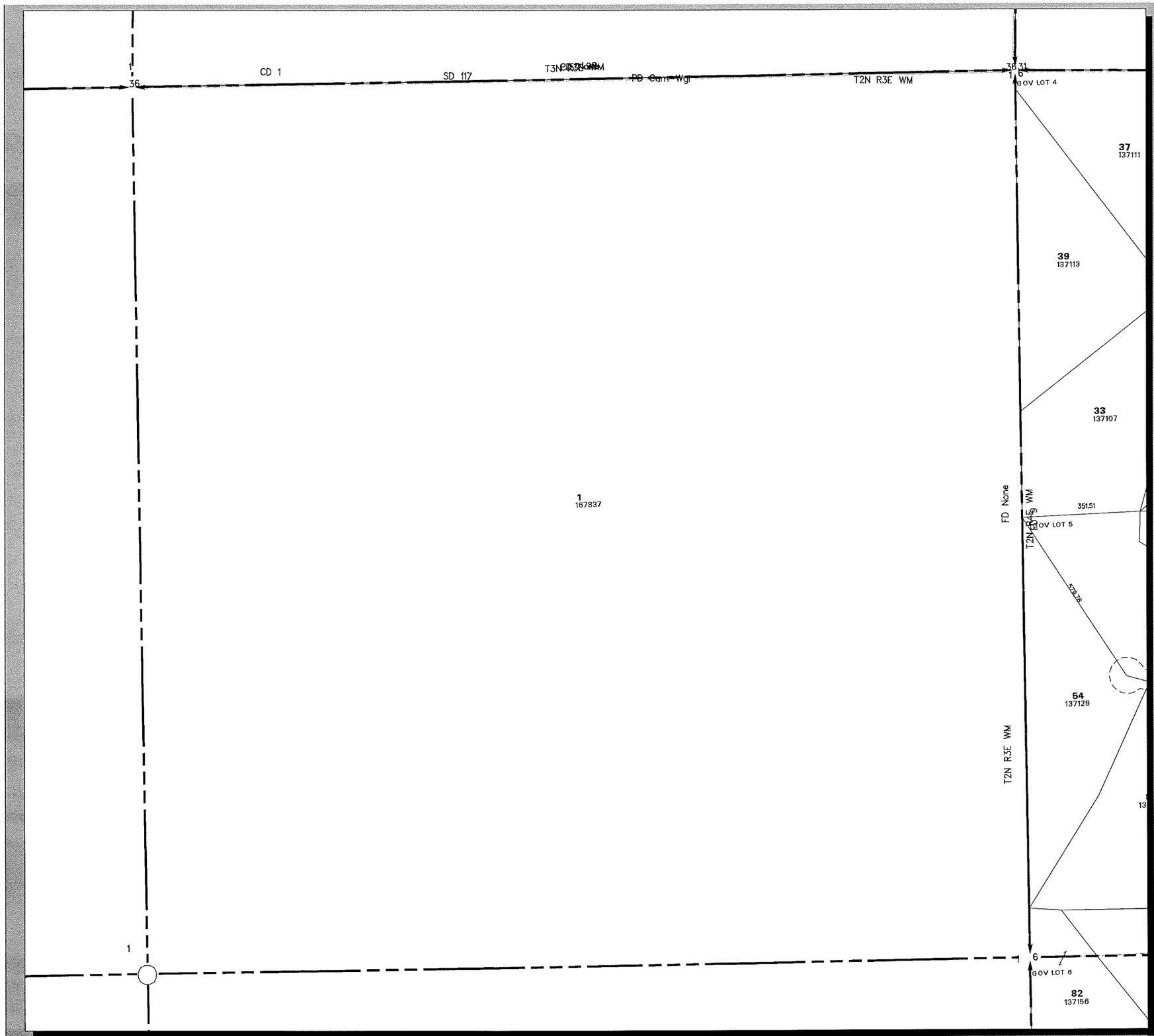


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

NE Qtr of Section 1 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
None, 1

Municipality:
CC

School District:
98-Hock

Fire District:
East County, FD 3, No District

Port District:

Developer's GIS Packet: Page 33 of 41

Atlas Page(s)
21
22

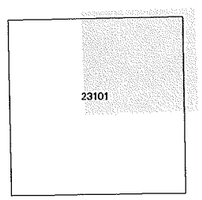
Scale 1:3600

0 100 200 300 400 500 600 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

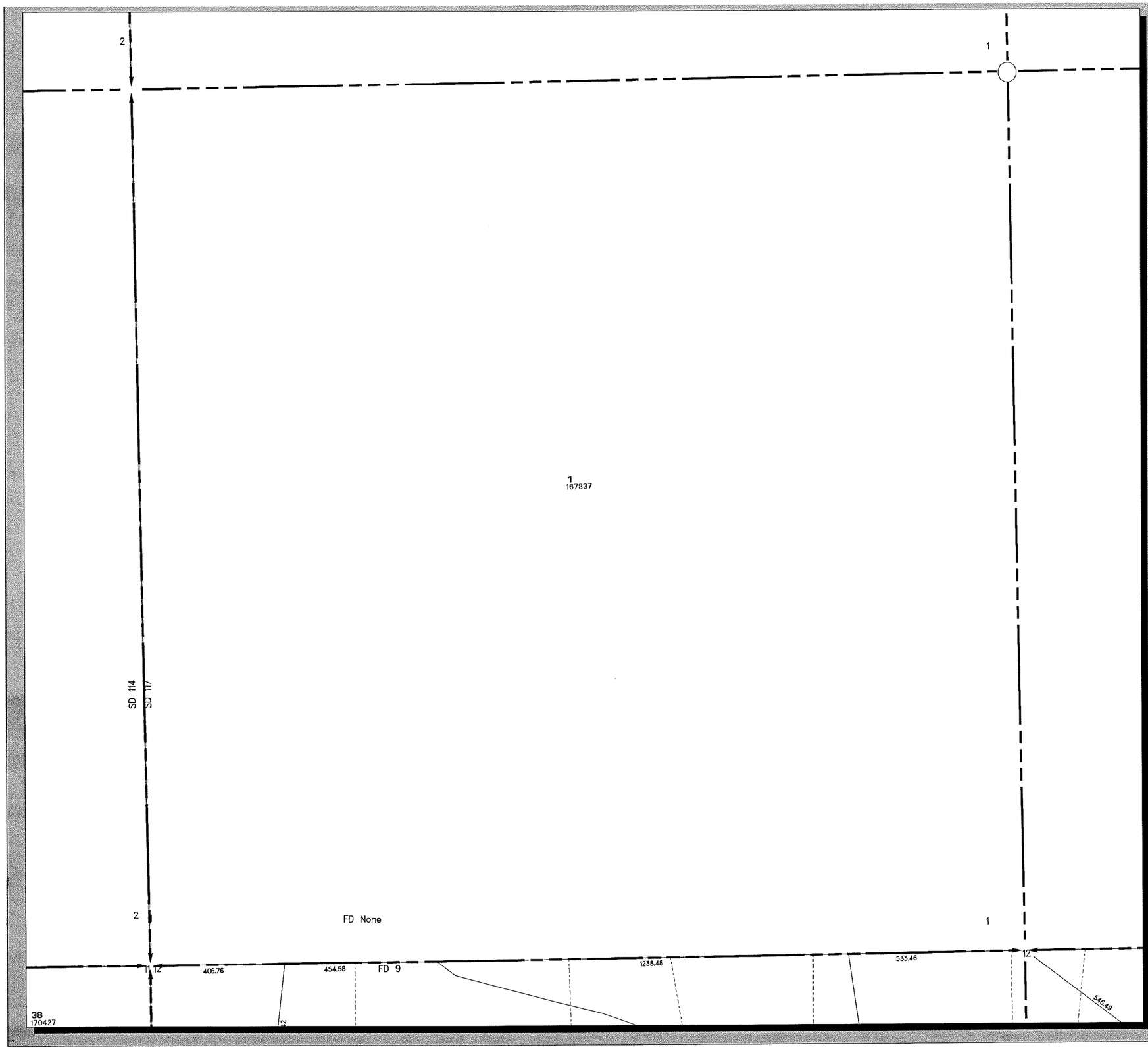


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SW Qtr of Section 1 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District: 1

Municipality: CC

School District: 117-Cam

Fire District: East County, No District

Port District:

Developer's GIS Packet: Page 34 of 41

Atlas Page(s) 21

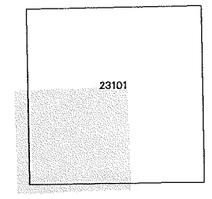
Scale 1:3600

0 100 200 300 400 500 600 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

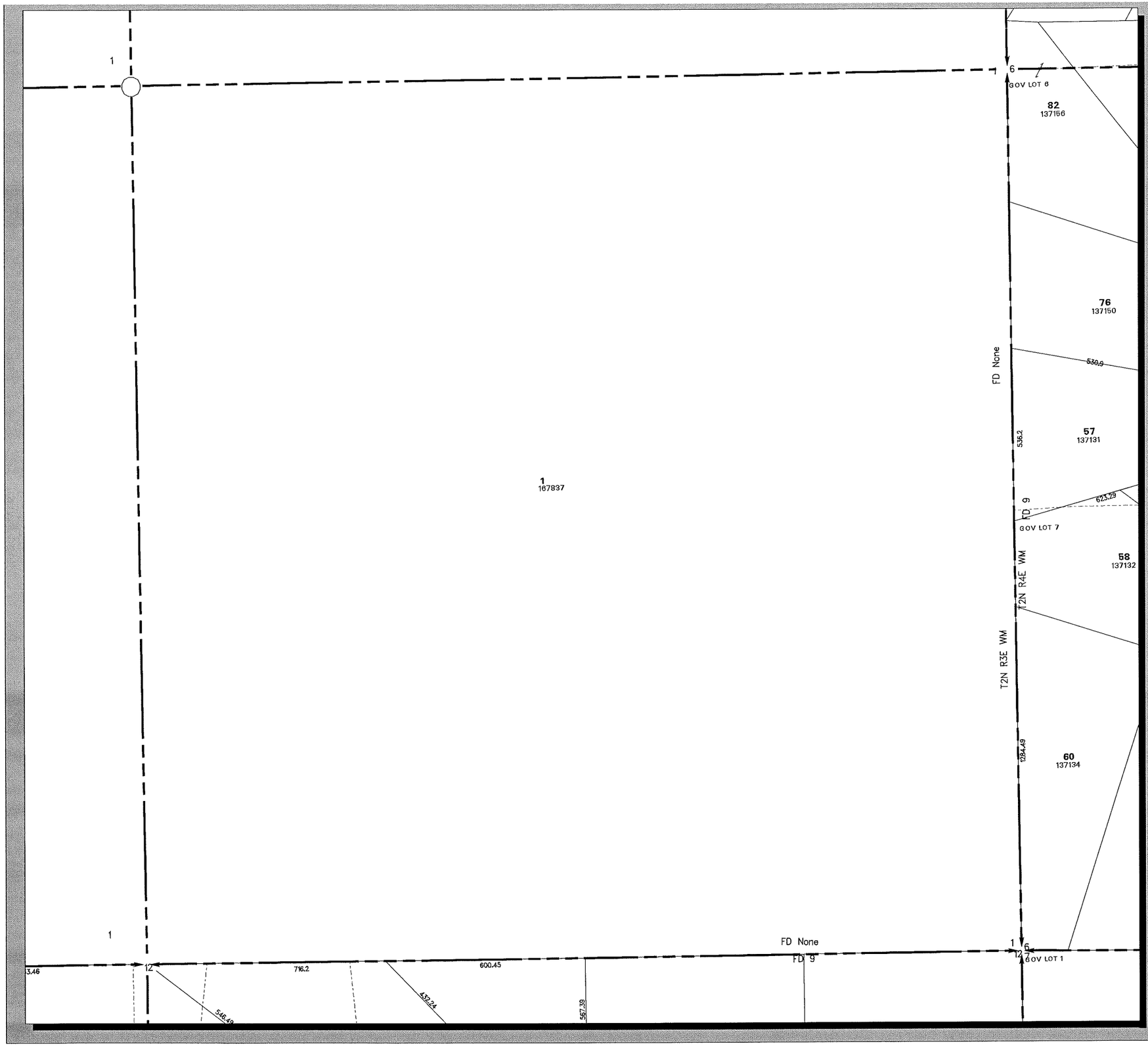


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SE Qtr of Section 1 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Municipality:
CC

School District:
117-Cam

Fire District:
East County, No District

Port District:

Cam

Cemetery District:
1

Developer's GIS Packet: Page 35 of 41

Atlas Page(s)
21
22

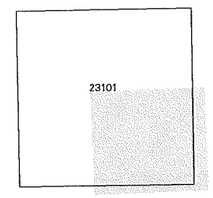
Scale 1:3600

0 100 200 300 400 500 600 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

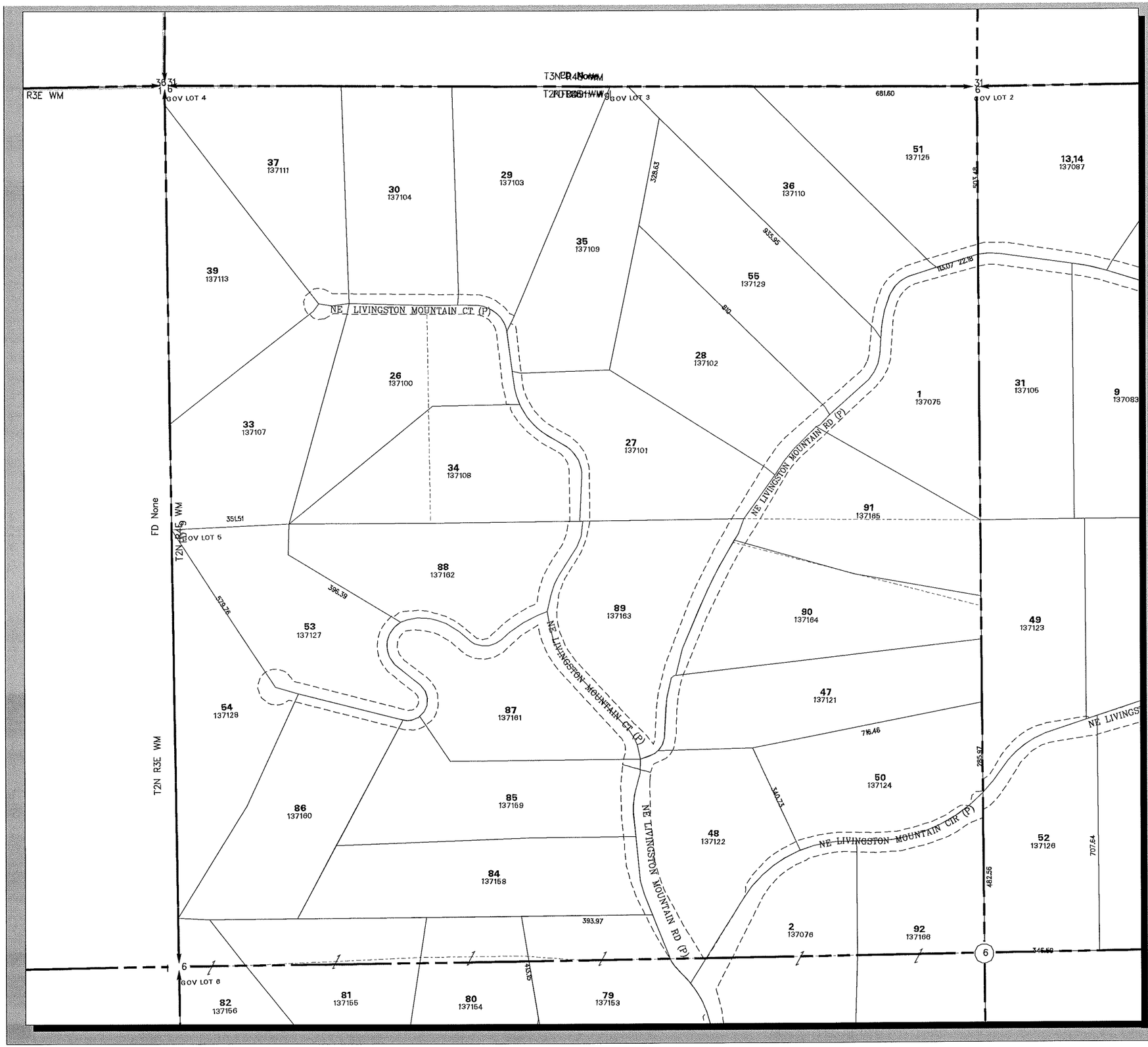


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

NW Qtr of Section 6 T2N R4E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
None, 1

Municipality:
CC

School District:
117-Cam

Fire District:
East County, FD 3, No District

Port District:

Developer's GIS Packet: Page 36 of 41

Atlas Page(s)
21
22

Scale 1:3600

0 100 200 300 400 500 600 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

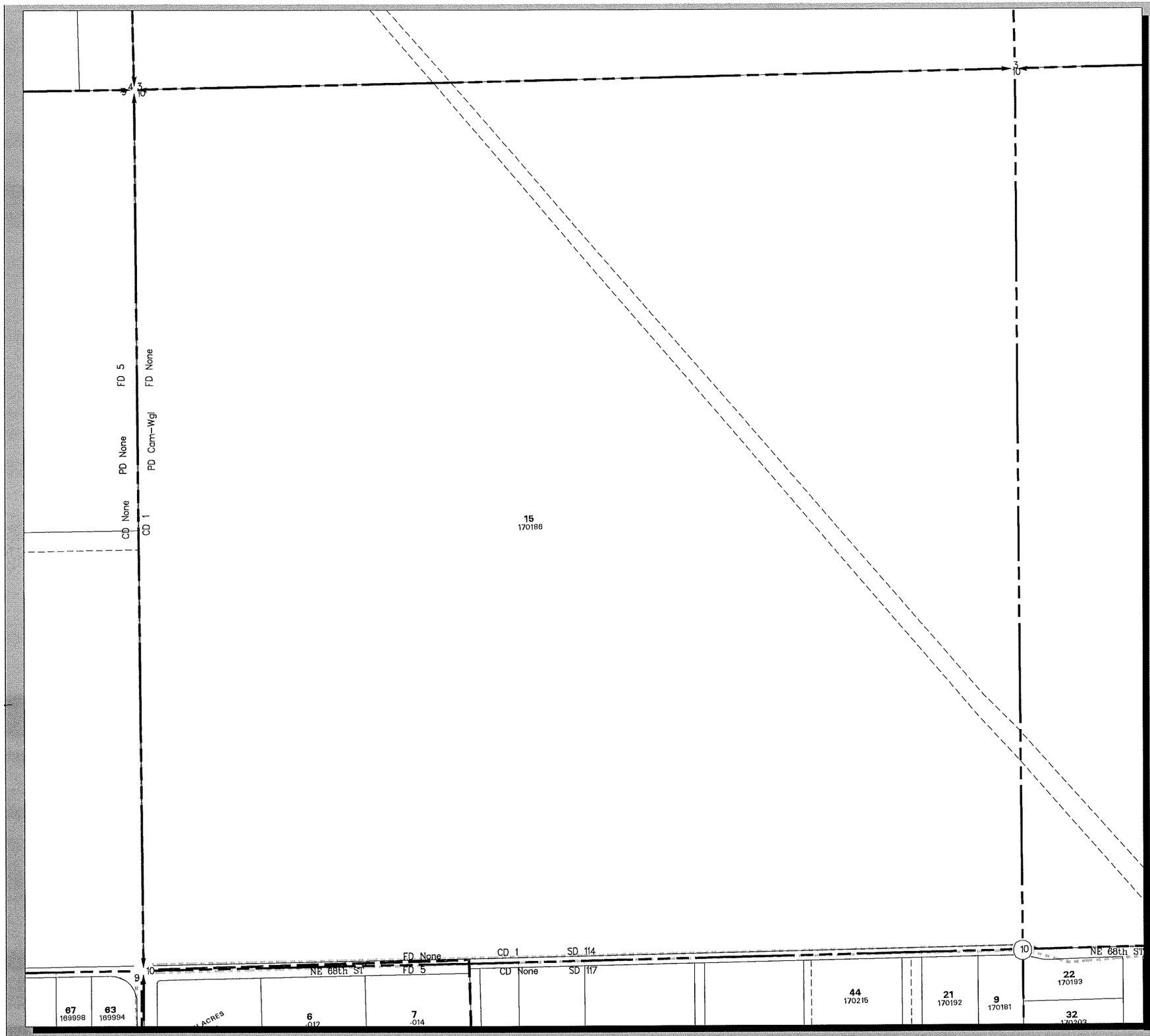
24106

CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

NW Qtr of Section 10 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
I

Municipality:
CC

School District:
114-Evr

Fire District:
FD 5, No District

Port District:

Developer's GIS Packet: Page 37 of 41

Atlas Page(s)
20
21

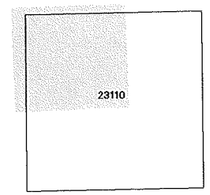
Scale 1:3600

0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

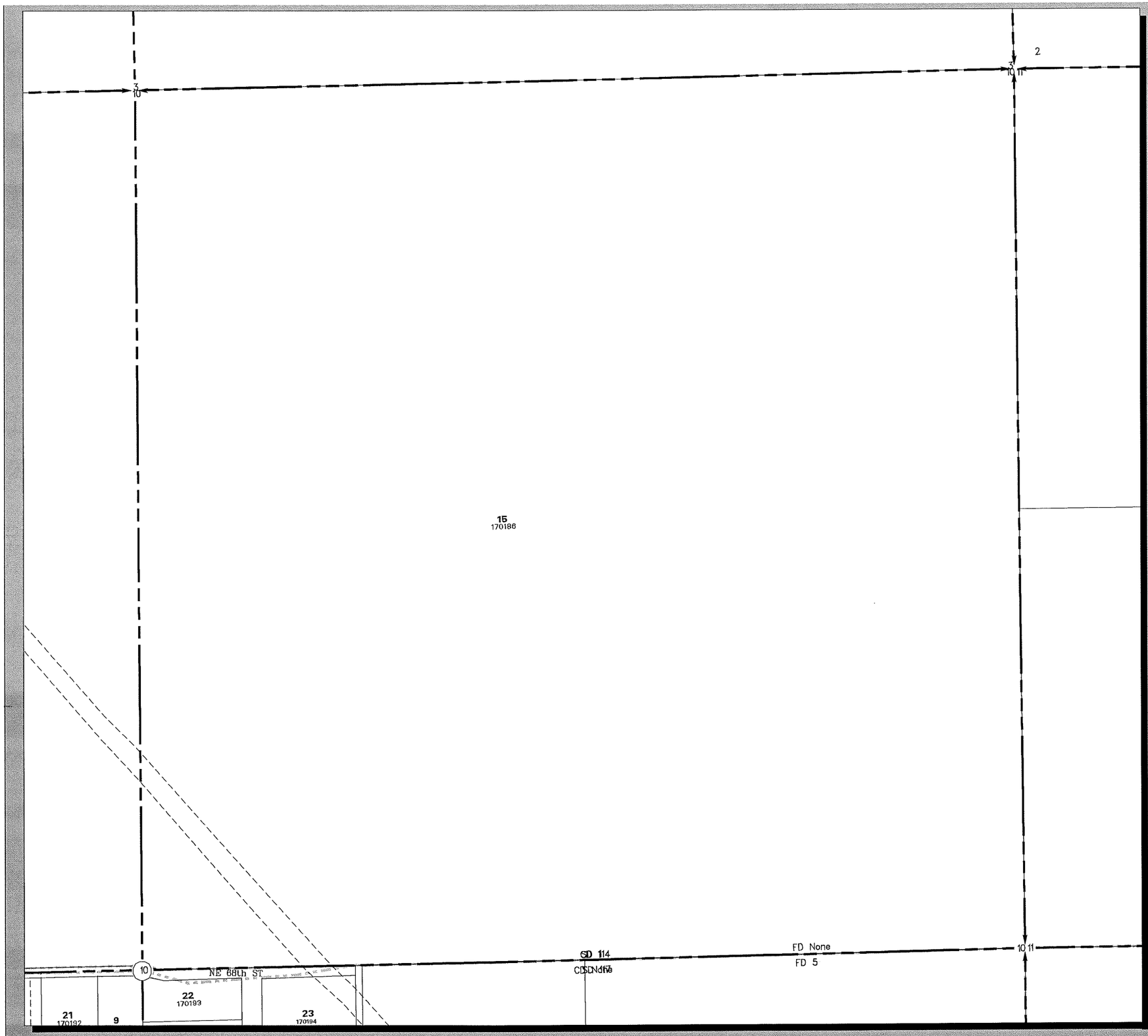


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

NE Qtr of Section 10 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
1

Municipality:
CC

School District:
114-Evr

Fire District:
FD 5, No District

Port District:

Developer's GIS Packet: Page 38 of 41

Atlas Page(s)
21

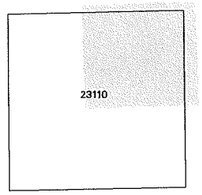
Scale 1:3600

0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON
Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

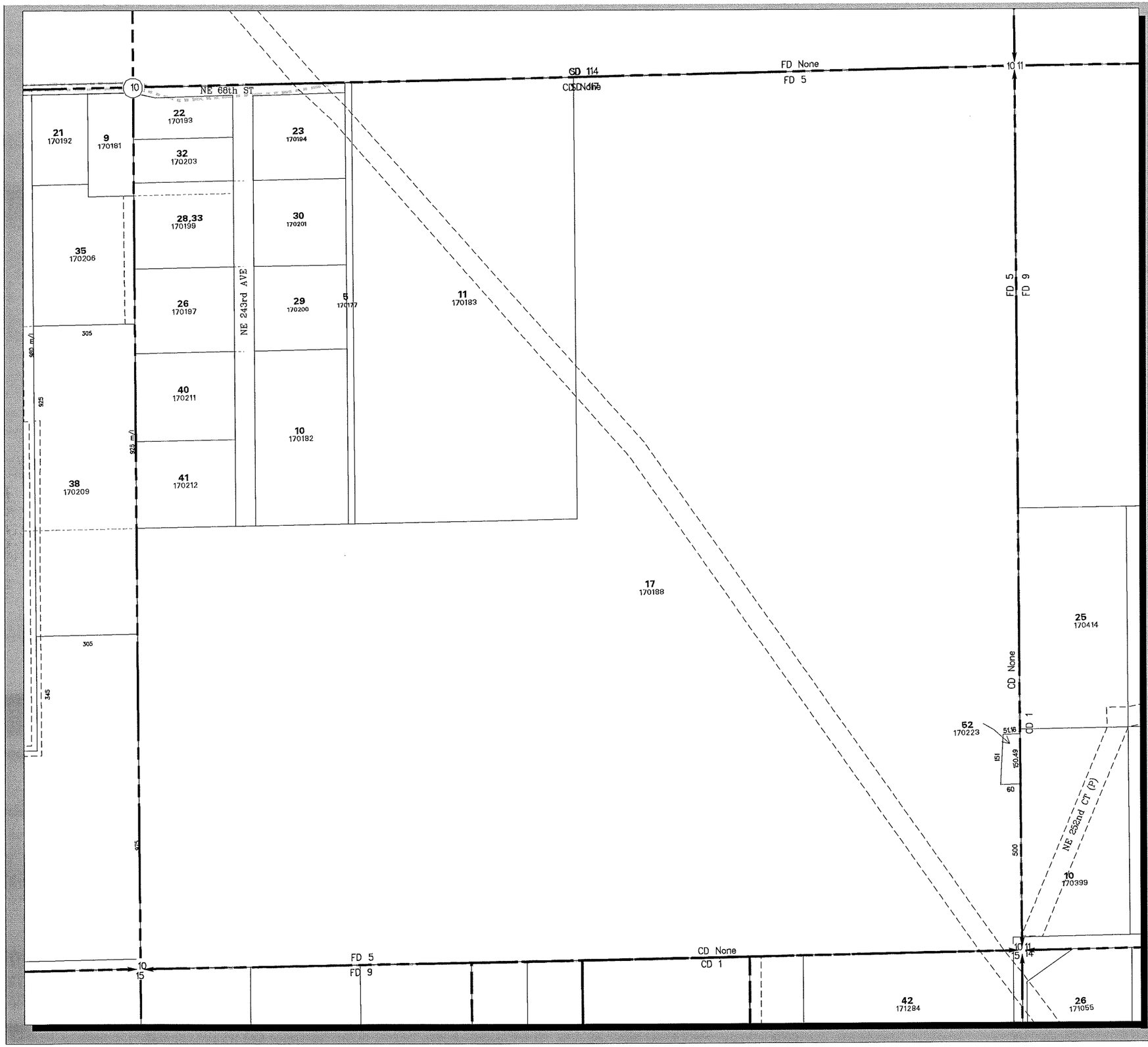


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

SE Qtr of Section 10 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
None, I

Municipality:
CC

School District:
114-Evr

Fire District:
East County, FD 5, No District

Port District:

Developer's GIS Packet: Page 39 of 41

Atlas Page(s)
21

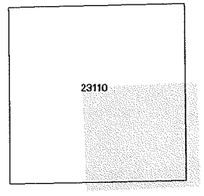
Scale 1:3600

0 100 200 300 400 500 600 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

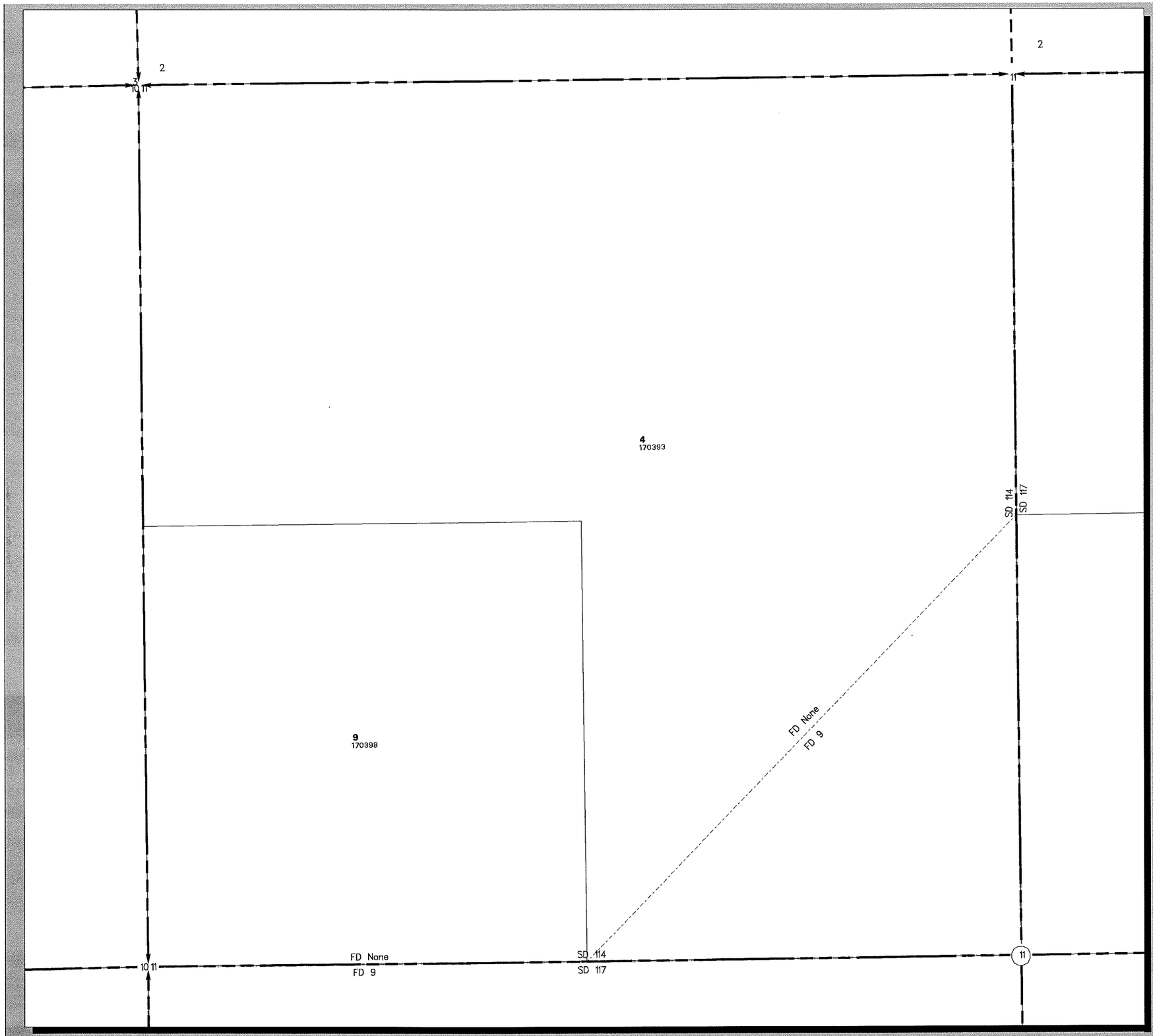


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

NW Qtr of Section 11 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
1

Municipality:
CC

School District:
114-Evr

Fire District:
East County, No District

Port District:

Developer's GIS Packet: Page 40 of 41

Atlas Page(s)
21

Scale 1:3600

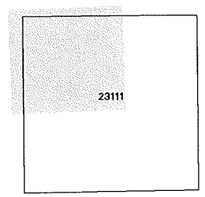
0 100 200 300 400 500 600 Feet

CLARK COUNTY, WASHINGTON

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007

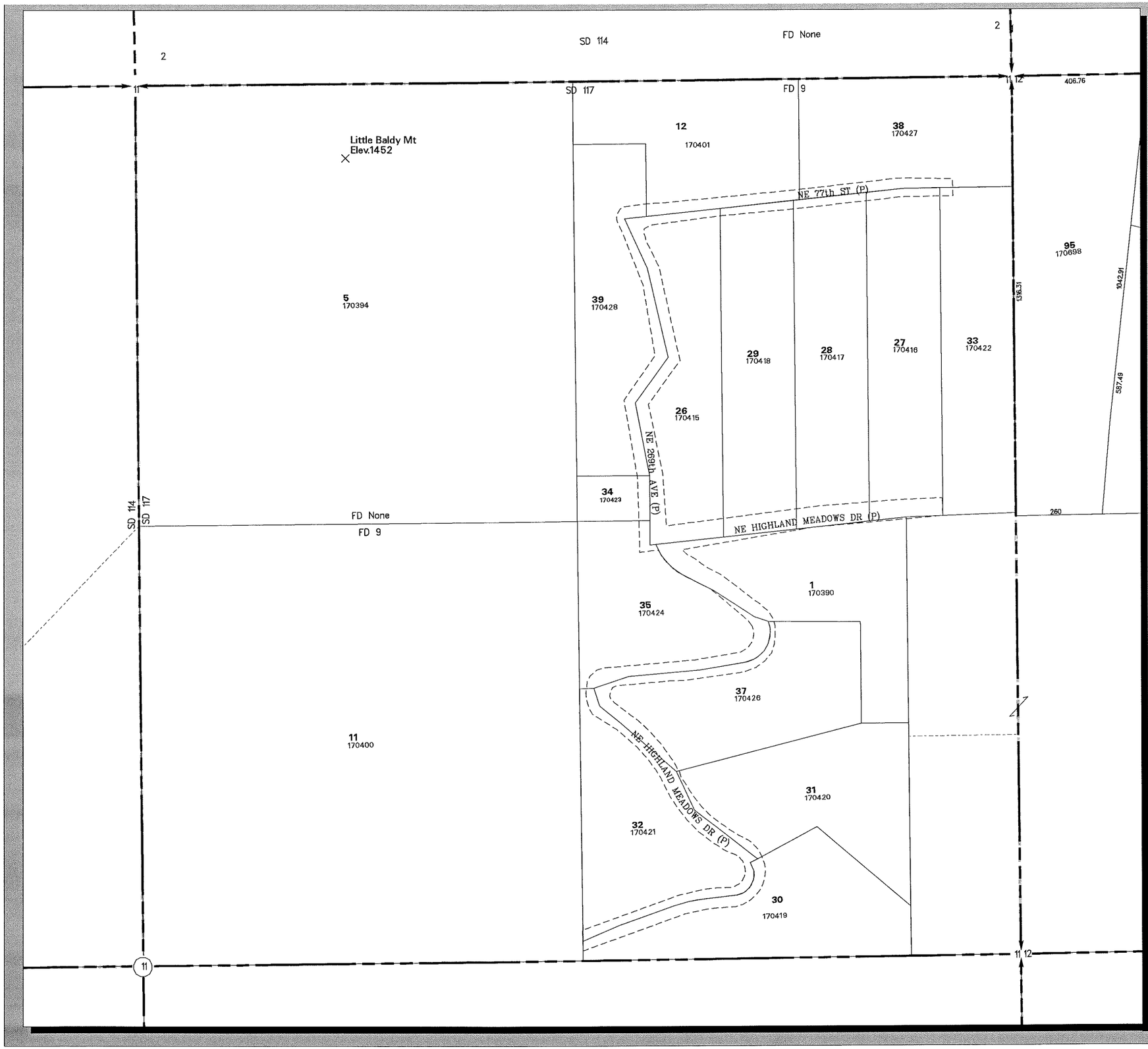


CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.

Clark County

Washington

NE Qtr of Section 11 T2N R3E WM



Explanation

- Streams
- Tax Code Line
- Donation Land Claim
- Easements
- Control Lines
- History
- Subdivision Lines
- City Boundary
- Road Right of Way ' Actual Road May Not Exist'
- Water
- Marsh

Cam

Cemetery District:
1

Municipality:
CC

School District:
117-Cam

Fire District:
East County, No District

Port District:

Developer's GIS Packet: Page 41 of 41

Atlas Page(s)
21

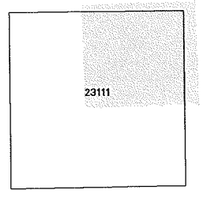
Scale 1:3600

0 100 200 300 400 500 600 Feet

Department of Assessment and GIS

Order 29677 GIS Product 1_24

July 11, 2007



CAUTION: This map is based upon information furnished by local surveyors and information available from public records. This information has not been checked by Clark County for accuracy. Clark County expressly disclaims any liability for any inaccuracies which may be present in this map. Users of this map should themselves check any details for accuracy before relying thereon.