PBS

Preliminary Assessment Report

North Ridge Estates
Klamath Falls, Oregon

prepared by:
PBS Engineering and Environmental

June 2003
Project #19148.003 Task 1

4412 SW Corbett
Portland, OR 97239
503.248.1939 MAIN
503.248.0223 FAX
888.248.1939 TOLLFREE

ENGINEERING AND ENVIRONMENTAL | www.pbsenv.com

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Purpose of Preliminary Assessment 1
1.2 Methods 1
1.3 General Site Information 2
2.0 BACKGROUND INFORMATION 2
2.1 Site Description 2
2.2 Ownership and Operational History 3
2.3 Redevelopment 4
2.4 Site Inspections Summary 5
3.0 HAZARDOUS SUBSTANCE SOURCE AREAS AND WASTE CHARACTERISTICS 6
3.1 Asbestos 6
3.2 Lead-Based Paint 7
3.3 Petroleum Hydrocarbons, Volatile Organic Compounds, Heavy Metals 7
3.4 Dry-Cleaning Solvents 8
3.5 PCBs 8
4.0 POTENTIAL PATHWAYS OF EXPOSURE 9
4.1 Asbestos 9
4.2 Lead-Based Paint 10
4.3 Other Hazardous Substances 10
5.0 SUMMARY AND CONCLUSIONS 11
6.0 DATA SOURCES AND REPORT REFERENCES 11

FIGURES

Figure 1 Site Location and Topographic Map
Figure 2 Former Marine Recuperational Barracks Facility Plan Map
Figure 3 North Ridge Estates Subdivision Map

1.0 INTRODUCTION

Pursuant to an Administrative Order on Consent for Removal Action and Streamlined Risk Assessment (Docket No. CERCLA–10-2003-0088) issued by the U.S. Environmental Protection Agency (EPA), Region 10, a Preliminary Assessment (PA) was conducted of the site known as North Ridge Estates, Klamath County, Oregon. The site was formerly the location of the Klamath Falls Marine Recuperational Barracks and subsequently the Oregon Technical Institute. The PA was performed by PBS Engineering and Environmental (PBS), Portland, Oregon, on behalf of MBK Partnership (MBK) of Klamath Falls, Oregon. Based on direction from the Consent Order, the scope of this PA has been focused primarily on asbestos-containing materials.

1.1 Purpose of Preliminary Assessment

PAs are generally intended to identify potential hazards at a site, to identify sites that require immediate action, and to establish priorities for sites requiring in-depth investigations. The PA is based on readily available information about the site and is not a full investigation or characterization of the site. Based on direction from the Consent Order, the scope of this PA has been focused primarily on asbestos-containing materials, to support an ongoing assessment of asbestos-related risks.

Oregon Department of Human Services (ODHS) investigations concluded that, in addition to asbestos, other hazardous materials may also have been used to construct or operate facilities at the original site and, therefore, may also be present in site soils or other environmental matrices. ODHS reports indicate that such materials may include (and may not be limited to): lead (from paint), various hydrocarbon fuels (from storage areas), and potential dry-cleaning solvents (from the facility laundry). Electrical power service at the site may have included transformers containing PCBs, although transformer presence has not been documented. (Refer to Section 3.5, PCBs).

1.2 Methods

The PA was performed in accordance with EPA (EPA, 1991) and Oregon Department of Environmental Quality (DEQ) (DEQ, 2003) guidelines to identify and retrieve environmentally-relevant historical information describing past activities and land use at the site. Available information from various public agencies and property owners was assembled to reconstruct the former facility, to determine the former locations and construction of buildings, to determine if other potentially hazardous substances were stored and used onsite, to estimate the location of the buried steam lines, and to identify potential burial locations. The data sources included recent and historic maps, historic aerial photographs, notes and field logs from various agencies conducting work at the site, interviews, and city/county historical records. A limited onsite reconnaissance survey was conducted of properties in North Ridge Estates subdivision.

1.3 General Site Information

Site Name: North Ridge Estates
Formerly, a portion of the Klamath Falls Marine Recuperational Barracks

DEQ Location ID: 40764
DEQ ECSI Number: 2335
U.S. Army Corps of Engineers Property Number: F10OR057000
Formerly Used Defense Sites (FUDS) Site Number: 570

Site Address: T38S, R9E, Section 15
Approximately 3 miles north of Klamath Falls, Klamath County, Oregon, on Old Fort Road and North Ridge Drive

Site Center Coordinates: Latitude 42° 15'58" North
Longitude 121° 44'46" West

2.0 BACKGROUND INFORMATION

2.1 Site Description

North Ridge Estates is located approximately three miles north of the City of Klamath Falls at an elevation of 4,500 feet (Figure 1) in portions of Section 15, Township 38 South, Range 9 East. The 422-acre subdivision is developed along both sides of Old Fort Road and North Ridge Drive at the site of the former Klamath Falls Marine Recuperational Barracks (Figure 2). Site vegetation is sparse and consists of ponderosa pine-western juniper woodland, sagebrush, shrubs, and grasses. Soil consists of very gravelly loam formed from weathered tuff, basalt, andesite, and volcanic ash (NRCS, 1985). Tuffaceous bedrock typically is present at depths of approximately 25 to 40 inches below ground surface. Soil is well drained with slow permeability. Surface water runoff on bare areas is rapid following rainfall and spring snowmelt, and the potential for erosion is high. The climate is relatively dry, with an average annual rainfall of 15 to 18 inches. The frost-free season ranges from 10 to 45 days.

NRCS Soil Survey (NRCS, 1985) rates the soils at the North Ridge Estates area as "moderate potential for frost action". The Oregon State University (OSU) Agricultural Research Klamath Experiment Station reports that maximum soil freezing depths in agricultural areas of the Klamath Basin are 8 to10 inches (personal communication from Dr. Ken Rykbost, Experiment Station Superintendent). Some winters have no freezing of soil. Snow depths typically range from 3 to 5 inches on ground following a snowfall, and melt off within several days. Observations of soil temperatures are representative of the main part of the Klamath Basin, ranging from about 4,100 to 4,300 feet elevation.

Mean minimum soil temperatures at 4-inch depth at the Klamath Experiment Station (3 miles south of Klamath Falls; elevation 4,092 feet) from 1984 to 1998 ranged from 66° F in July to 33° F in January. Soil temperatures at the 4,820-foot elevation of North Ridge Estates could be expected to be approximately 5° F cooler for the [1]upper soil (4 to 6 inch depth). Soil temperatures at 4-inch depth recorded at the Klamath Experiment Station in 2002 were below 32° F only from mid-January to mid-February. Soil temperatures were not measured deeper in soil. Other weather stations north of Klamath Falls record surface conditions, but not soil temperatures.

Records of the Oregon Water Resources Department (OWRD, 2003) show no groundwater wells in Section 15 and one well in Section 14. The well in the NW ¼ of the SE ¼ of Section 14 was completed in 1963 for domestic use to a depth of 145 feet below ground surface (bgs). Static water level at completion was 45 feet bgs. Wells completed during the last ten years at differing land surface elevations within approximately one mile of the North Ridge Estates site had static water levels ranging from 182 to 390 feet bgs.

The developed area of the subdivision (illustrated on Figure 3 by lot owner names) along Old Fort Road and North Ridge Drive currently has 23 homes, 4 privately-owned parcels without homes, 5 vacant home sites owned by MBK Partnership, and a memorial park. ODHS reports that there are 63 residents, including 26 children, in the developed area of the site. East of Old Fort Road are several homes, a five-unit apartment building, the Thicket Court residential homes, and additional vacant North Ridge Estates lots. Land to the west, north, and east of the subdivision is zoned for forestry, grazing, and agriculture. Residences on acreage are present to the south of the site, along Old Fort Road. According to the 2000 U.S. Census, there are 98 residents, including 14 children age 6 and under, within one half mile of the North Ridge Estates property (ODHS).

The focus of the Consent Order is the 23 residential parcels plus the 6 MBK-owned parcels (indicated with owner names on Figure 3) that encompass the primary area of observed asbestos-containing material surface debris. Additional areas include the former swimming pool at the south side of the subdivision and surficial wastes generated from the subject site that may be located on occupied properties beyond the 23 residences.

2.2 Ownership and Operational History[1]

North Ridge Estates is located on the site of the former Klamath Falls Marine Recuperational Barracks facility, built in 1944 by the United States Department of Defense to receive and care for marines who had contracted tropical diseases while

[1] Sections 2.2 and 2.3 are based upon the author's review of readily available information, some of which may conflict. Accordingly, these sections are not intended to provide a definitive or exhaustive site history, nor are they in any way intended to constitute factual admissions on behalf of the Respondents.

fighting in the Pacific theater in World War II. More than 80 buildings were originally constructed to house, feed, and provide routine services and medical care to the troops. Most of the military barracks buildings were west of Old Fort Road. A sewage treatment facility and horse barns were built one-quarter mile to the north. A medical laboratory, dispensary, medical staff housing, the brig, and a rifle range were built on the hillside east of Old Fort Road. Operational buildings near the north end of the site, and west of Old Fort Road, included the central power plant, warehouse, maintenance shop, bakery, and laundry buildings. A gym and indoor swimming pool buildings were located at the south end of the site, west of Old Fort Road. The site layout as mapped by the U.S. Marine Corps Reserves in 1945 is shown on Figure 2.

Buildings within the Marine Recuperational Barracks facility were constructed with cement asbestos board exterior siding, roofing materials, floor tiles, mastic, and other potentially asbestos-containing building materials (ACM). It is believed that buildings were constructed slab-on-grade or had elevated concrete foundations with crawlspaces, based on building slabs remaining on several parcels and interviews with former site occupants. Heat was provided to the buildings from a central coal-fired power plant through a series of buried steam pipes wrapped in asbestos-containing insulation.

In 1946, the Marine Recuperational Barracks closed and the property was transferred to the State of Oregon for use by the Oregon Technical Institute (now Oregon Institute of Technology) until the early 1960s. The Oregon Institute of Technology relocated to a site in Klamath Falls and the former barracks property subsequently passed into private ownership in 1966. From 1966 through the mid-1970s, property owners stripped the vacant buildings of salvageable materials such as copper and wood. Asbestos insulation reportedly was stripped from piping and boilers, metal was sold, and the insulation remained at the site (ODHS). The idle site was further subject to vandalism.

2.3 Redevelopment[1]

The North Ridge Estates property was purchased in December 1977 by MBK Partnership of Klamath Falls, the present property developer. Following their purchase, additional buildings remaining on the site were demolished. Most of the buildings were reportedly demolished in the mid- to late-1970s, with a few remaining buildings, including the auditorium and swimming pool, demolished in the 1980s. Some of the buildings east of Old Fort Road were demolished; other buildings currently remain in the Thicket Court area. Available information does not show when military buildings east of Old Fort Road were demolished, nor where demolition debris from this area was disposed. MBK subdivided the site into residential lots. Klamath County approved subdivision plans, and construction of homes in the subdivision began in 1993. Twenty three of the lots in the project area have been sold and developed as single-family houses, and are now occupied for residential use. Other undeveloped lots remain in private ownership or are owned by MBK. Available information indicates that at least 50% of the structures were demolished after 1977.

In the late 1970s, the Oregon DEQ and the U.S. EPA became aware of large quantities of ACM scattered throughout the site as a result of demolition activities. DEQ responded to a complaint of openly accumulated asbestos debris at the property and observed a bulldozer driving over four to six acres of demolition debris described as a great amount of "white, fluffy" insulation materials being blown by strong winds. In 1979, EPA issued an order requiring MBK to fully contain all asbestos at the site, primarily through burial, and identify properties known to contain asbestos materials. Since the local landfill would not accept asbestos materials, and due to concern about health risks to workers in removing such a large quantity of materials, DEQ agreed to allow MBK to dispose of the asbestos-contaminated materials on-site in two locations. An EPA Compliance Order in 1979 required that coverage and maintenance of the disposal site conform to the National Emission Standards for Hazardous Air Pollutants (NESHAP).

The DEQ contacted ODHS Superfund Health Investigation and Education program in May 2002 for assistance in assessing the health risks of exposure to fragments of ACM. ODHS reported that there were no indications that the 1979 EPA Compliance Order NESHAP requirements for proper disposal were met, nor that locations of ACM disposal sites were recorded on property deeds or similar documents, as was required by the 1979 EPA Compliance Order.

Malot Environmental, MBK's asbestos abatement contractor, removed over 50 tons of asbestos-containing material from the ground surface during 2002 and disposed of the materials offsite under the terms of a Mutual Agreement and Compliance Order signed with DEQ in June 2002. MBK also submitted maps to DEQ showing known and presumed locations of burial sites and underground piping, paid a civil penalty, and sent notifications to property owners.

2.4 Site Inspections Summary

Inspections of the North Ridge Estates site were performed by various agencies. The known dates and general observations are summarized below:

- **1970s:** In the late 1970s, DEQ responded to a complaint of openly accumulated asbestos debris at the property and observed a bulldozer/CAT driving over four to six acres of demolition debris described as a great amount of "white, fluffy" insulation materials being blown by strong winds.
- **1993:** The U.S. Army Corps of Engineers (COE) visited the site in 1993 (Gardenhire, 1993) and reported that demolition debris had been buried in a swimming pool, sewage lagoon, and other locations at the site.
- **2001:** In June 2001, DEQ received a complaint of two large piles (180 linear feet) of asbestos insulated pipe on the surface of a lot being developed in North Ridge Estates. The DEQ inspector observed "white to pale brown colored platy looking" fragments on the lot and on other lots throughout the subdivision
- **2002:** An asbestos survey was conducted by Malot Environmental of Central Point, Oregon, for MBK in April 2002. On 28 lots, 1.5 to 5.5 acres in size, ACM was reported on over 50 acres of the 81 acres surveyed. ACM was also reported on 3.5

acres on two of the three larger lots that comprise 223 acres of the property. Lots 1 and 2 of Tract 1267 and most of the acreage of the three larger lots were not surveyed, as they were determined by the asbestos abatement contractor to be outside of the area where military buildings had been demolished. The area east of Old Fort Road was not included in the area surveyed by Malot Environmental in 2002 for ACM, locations of disposal sites, and underground piping. ACM fragments, however, were observed by DEQ staff on these properties during their January 2003 site visit.

- **2002:** Staff from ODHS, the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) regional office, and DEQ visited the site accompanied by a representative of MBK in October 2002. Inspection staff walked through subdivision areas where asbestos had been surveyed, including the memorial park, vacant lots and the warehouse, and drove through adjacent neighborhoods. ACM fragments were noted throughout the subdivision areas visited. Visual inspections by ODHS staff indicated that approximately one-fourth to one-half of each occupied home site was covered with lawn and landscaping cover, while other large remaining areas had exposed dirt, rock and sparse vegetation
- **2003:** In January 2003, DEQ staff identified areas on three additional lots that may be disposal sites. One was located on a vacant lot on North Ridge Drive, a second on a residential lot on Old Fort Road, and a third at the former location of the family dispensary for the Marine Recuperational Barracks east of Old Fort Road.
- **2003:** In June 2003, PBS staff performed a cursory site inspection of North Ridge Estates. Locations of observed concentrations of ACM and reported locations of burial pits, existing former building foundation, and reported locations former steam heat pipes were noted.

3.0 HAZARDOUS SUBSTANCE SOURCE AREAS AND WASTE CHARACTERISTICS

3.1 Asbestos

Over the years, buildings at the site were damaged, demolished and scavenged. ACM was scattered in the vicinity of former buildings and over many other areas of the site. ACM can be found in several burial locations constructed to bury construction debris and is observed on the ground surface of the site. The full extent of occurrence of ACM in local soils is not currently known. It is also not known whether all of the areas used as burial sites have been identified. Current sources of ACM include several discrete burial piles, buried asbestos-insulated pipes, and surface debris. Further definition of the extent of such potential asbestos sources is currently underway.

Types of ACM found in the North Ridge Estates site include the following:

- Cement Asbestos Board (CAB) was used as siding on the former Marine Barracks buildings. CAB is platy in shape with a light to dark brown color. Some of the CAB in the area has been painted with a light green to yellow paint.

- Vinyl Floor Tiles (VAT) were used as flooring on concrete and wood floors in the former Marine Barracks buildings. VAT are 9 by 9 inch tiles, red or blue with white swirls. Broken VAT can occur in many different platy shape sizes and also in a curved shape. VAT mastic also contains asbestos.

- Roofing material used on the Marine Barracks buildings contained asbestos. Roofing material is gray and black. The black material is tar.

- Asbestos-insulated steam pipe is located on the site. The Marine Barracks facility had a central coal-fired power plant that supplied steam as a source of heat to many buildings in the complex. The asbestos-insulated steam pipe is a metal corrugated pipe of 8-inch, 10-inch, or 12-inch diameter wrapped in black felt paper containing asbestos. The inside of the corrugated pipe is lined with a black felt paper with about two inches of wooly material (90% asbestos). In the center of the wooly material is a metal pipe about 4 inches in diameter that once transported steam. Pipes have been located about two feet below ground surface in areas of the site.

3.2 Lead-Based Paint

Certain of the building components that were demolished onsite have been demonstrated to contain lead-based paint. Kennedy/Jenks Consultants tested two debris samples and found a level exceeding the action level in paint on one sample. Based on building components being the carrier for the paint, and the observed degree of ACM debris dispersal, there is a possibility that lead paint was similarly dispersed.

3.3 Petroleum Hydrocarbons, Volatile Organic Compounds, Heavy Metals

There is a probability of historic onsite use of petroleum products and fuel; cleaning or degreasing solvents; paint, thinner or stripping chemicals. Based on historic maps showing the former facility layout but with limited building labeling, it is likely such chemicals and products would have been stored and used in the vicinity of the power house and maintenance shop, formerly located near the north end of the North Ridge Estates site, or the former service station located near the southwest portion of the site. Historic site maps and plans provide only very limited information about building use, and there are no detailed records describing past practices with respect to management of wastes.

As a result of site redevelopment, only the maintenance shop concrete slab remains. There are no visible indications of significant surface staining, distressed vegetation or signs of existing underground structures (underground storage tanks, sumps, oil-water separators, etc.). The current general location of the former power house and maintenance shop are vacant lots immediately north (Homfeldt parcel) and south (MBK parcel) of Hunter's Ridge Road. The former service station was located in the vicinity of the current Lindell or Holland parcels.

Due to the expected depth to groundwater, absence of domestic water wells in the area and availability of public water supply, contamination that may have resulted from use of such chemicals would not present a health risk to site residents.

3.4 Dry-Cleaning Solvents

Historic site maps note a "Laundry" building near the north end of the former Marine Barracks facility, on Old Fort Road approximately at the MBK/Cornachione parcel boundary. ODHS notes the risk that dry-cleaning solvents may be present at the site. However, no documentation was found describing past practices at the Laundry or specific dry cleaning operations. The Marine Barracks was closed in 1946. There is a possibility of the use of Stoddard solvent, carbon tetrachloride, perchloroethylene (PCE) and/or trichloroethylene for spot-cleaning or dry-cleaning. Considering the expense of such chemicals and the probable limited industry use of PCE at that time, there is considered a low risk that significant use of such dry cleaning chemicals occurred at the Marine Barracks Laundry facility.

3.5 PCBs

An electrical substation was located near the junction of Old Fort Road and Scotts Valley Road, in the far northwest corner of the current Sarsenski property (personal communication from Dan Heister, EPA, June 23, 2003). He reported that the substation was in service at least until 1960 per an aerial photograph; PBS's review of a 1968 aerial photo shows a structure at that location, however its function cannot be determined from the photo. Parts of the substation were reportedly salvaged at the site. A 1945 Marine Barracks site plan shows "COPCO SUB-STATION" at this location.

Per Mr. Heister, evidence of a second substation has been found in the vicinity of the current Peterson parcel (northeast area of the site). Historic aerial photos and site plans do not show a facility at that location.

It is unknown if there was an onsite electric power generating facility. Transformers located at the substations are likely to have utilized mineral oil as dielectric fluid, given the time period of operation, and are not likely to have contained high levels of polychlorinated biphenol compounds (PCBs) (personal communication, Dan Heister, EPA, July 1, 2003). Certain historic photographs are unclear, but may show pole-mounted transformers.

4.0 POTENTIAL PATHWAYS OF EXPOSURE

4.1 Asbestos

Potential pathways of exposure for asbestos from ACM on the site are through *inhalation and direct ingestion*. Inhalation or ingestion of asbestos fibers can cause severe and fatal health effects, including mesothelioma, asbestosis, and lung cancer, as well as cancers of the esophagus, stomach, colon, and rectum. Children are especially sensitive, as are smokers. Based on information currently available, this is considered to be a complete potential pathway of exposure and warrants further assessment.

Current and suspected locations of asbestos include debris burial and burn sites, buried steam pipelines, and foundations indicating possible basements. In addition to surface debris that is widespread in occurrence, locations of identified asbestos sources and suspected locations, as determined from data research and site investigations to date, are presented below with current owner names in parentheses. Tax lot locations and owner names are shown on Figure 3.

<u>Subdivision Tract 1267 of North Ridge Estates</u>

- 15D-1400. Debris burial in former swimming pool on southeast side of Lot 4 (Rinehart)
- 15D-500. Debris burial pit on northeast side of Lot 6 (Cornachione)

<u>Subdivision Tract 1306, Second Addition to North Ridge Estates</u>

- 15B-200. 2 concrete foundations on Lot 12
- 15B-400. Debris burial pit on north side of Lot 13 (Selim)
- 15B-500. 2 concrete foundations on Lot 14
- 15C-200. Debris burn pit and 1 concrete foundation on Lot 16. 2 steam pipes (24 inches below ground surface) on northeast side on lot, parallel to North Ridge Road
- 15C-300. Debris burial pit on east side of Lot 17. 2 steam pipes (24 inches below ground surface) on northeast side of lot, parallel to North Ridge Road. (Villa)
- 15C- 400. 2 steam pipes (24 inches below ground surface) on northeast side of Lot 18, parallel to North Ridge Road
- 15C-500. Concrete foundation on Lot 19. 2 steam pipes (24 inches below ground surface) on northeast side of lot, parallel to North Ridge Road
- 15A-1800. Former steam boiler plant located in center of Lot 10. Steam main lines (18-inch diameter) and other 10-inch and 8-inch diameter pipes possible on lot
- 15A-1700. Concrete foundations on Lot 9. Possible steam pipes on northeast side of lot
- 15C-100. Steam pipes cross center of Lot 8, northeast to southwest. 18-inch,10-inch and 8-inch diameter pipes
- 15D-300. Debris burial pit on southwest side of Lot 6. Steam pipe (8-inch diameter) along northwest side and across center of lot. (MBK)

- 15D-3100. Steam pipe (probably 8-inch diameter) across center of Lot 5
- 15D-3200. Steam pipe (probably 8-inch diameter) across center of Lot 4
- 15D-3300. Steam pipe (probably 8-inch diameter) across center of Lot 3
- 15D-3400. Debris burial pit on northeast side of Lot 2. Steam pipe (probably 8-inch diameter) across northeast side of lot. (Graham)
- 15D-3500. Debris burial pit on north center of Lot 1 (Mingus)

4.2 Lead-Based Paint

Potential pathways of exposure to lead originating in lead paint, are similar to asbestos; that is through *inhalation and direct ingestion*. The long-term health effects of lead include decreased growth, hyperactivity, impaired hearing, and possible brain damage. Children are at a greater risk from exposure to lead than adults, and are more sensitive to the damaging effects of lead. Frequent hand-to-mouth activity often brings a child into greater contact with lead in the environment, especially in lead-containing dust and soil.

Based on building components being the carrier for the paint, and the observed degree of debris dispersal, it is not considered likely that lead has accumulated in soils at concentrations exceeding health-based action levels. Based on a current lack of data, however, this is considered a potentially complete pathway and warrants further assessment.

4.3 Other Hazardous Substances

Potential pathways of exposure to soil or groundwater contamination related to petroleum products, volatile organic compounds, heavy metals or PCBs include: *direct contact or ingestion, inhalation, volatilization to outdoor or indoor air.*

As a result of extensive site redevelopment, it is considered unlikely that significant quantities of such hazardous substances remain in surface or near-surface soil, at levels that would present a human health risk. The risk of exposure to such contaminants at unacceptable levels via soils is considered low.

Contaminated surface water is not considered to be a potential pathway for exposure. Available documents, site maps, and surface and aerial photographs show no ponds or surface water bodies on the North Ridge Estates properties or the immediate surrounding area. Existing ephemeral stream channels north and south of the site do not pass through or originate in the North Ridge Estates. The subdivision property is flat to very gently sloping to the north and northwest. Surface water runoff from the former powerhouse location may reach the head of the ephemeral stream channel extending northward from the general area of the former steam plant, during periods of very high precipitation. The specific route of surface water flow across the site was not documented as part of the PA.

Contaminated groundwater is not considered to be a potential pathway for contaminant exposure. Water at the North Ridge Estates subdivision is supplied by the City of

Klamath Falls municipal system. No groundwater wells are known to be present on the subdivision properties. The closest recorded groundwater wells are located approximately one mile to the east and south of the North Ridge Estates site (OWRD, 2003). Wells completed since 1990 at differing land surface elevations within approximately one mile of the site had static water levels ranging from 182 to 390 feet below ground surface.

5.0 SUMMARY AND CONCLUSIONS

ACM is present in several burial locations and is observed on the ground surface of portions of the site. ACM includes CAB, vinyl floor tiles with mastic, roofing materials, and asbestos-insulated steam pipes. Current and suspected locations of asbestos include surface debris, debris burial and burn sites, buried steam pipelines, and foundations. It is not known whether all of the areas used as burial sites have been identified. Potential pathways of exposure for asbestos from ACM on the site are through air inhalation and direct ingestion. Surface water and groundwater at the site are not considered to be potential pathways for asbestos exposure.

In addition to ACM, potential hazardous substances on the site may include lead-based paint, petroleum products and other hazardous chemicals, and heavy metals. Previous sampling found lead in one paint sample. As a result of extensive site redevelopment, it is considered unlikely that significant quantities of such hazardous substances remain in surface or near-surface soils, at levels that would present a human health risk. Surface water and groundwater at the site are not considered to be potential pathways for exposure.

The PA for the North Ridge Estates has identified known and potential hazards related to asbestos-containing materials, and supports an assessment of asbestos-related risks potentially posed to current and future residents. Recommended subsequent assessment of the site includes identification of specific locations of potentially hazardous materials and establishment of risk-based priorities for site remedial actions.

6.0 DATA SOURCES AND REPORT REFERENCES

Gardenhire, J.R., 1993. Memorandum for Files, Trip Report from DERP-FUDS Preliminary Inspection of Marine Recuperational Barracks, Jerry R. Gardenhire – Site Inspector, April 13, 1993.

Heister, Dan, On Scene Coordinator, USEPA Region 10, Personal communication by email, June 23, 2003; by telephone, July 1, 2003.

Klamath County Tax Assessor, 2003. North Ridge Estates Tax Assessor Maps.

Malot Environmental, no date. Asbestos Survey Report by Sid Pacheco, AHERA Certified Asbestos Inspector, Malot Environmental, Central Point, Oregon. (Date not found on report faxed to DEQ on September 13, 2002.)

Malot Environmental, no date. Report by Sid Pacheco, Malot Environmental, Central Point, Oregon, identifying locations of buried asbestos insulated steam piping and five demolition debris disposal sites. (Date not found on report faxed to DEQ on September 16, 2002.)

Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service), Joe Cahoon (author), 1985, Soil Survey of Klamath County, Oregon, Southern Part.

Oregon Department of Environmental Quality (DEQ), Sampling Report by DEQ Laboratory, Inorganic/Nonmetals Section, August 7, 2001, of 13 samples collected by Frank Messina, ODEQ Air Quality, July 31, 2001.

Oregon Department of Environmental Quality (DEQ), Notice of Noncompliance #AQ-ERB-01-7716, September 21, 2001.

Oregon Department of Environmental Quality (DEQ), 2002. Mutual Agreement and Order # AQ/AB-ER-01-250A, dated May 7, 2002, between DEQ and Melvin L. Stewart and Kenneth L. Tuttle, M.D., P.C. doing business as MBK Partnership.

Oregon Department of Environmental Quality, 2003. Facility Summary Report, Klamath Falls Marine Barracks (Former), Location ID 40764.

Oregon Department of Environmental Quality, 2003. Facility Summary Report, Kingsley Firing Range Annex, Location ID 48914.

Oregon Department of Environmental Quality, 2003. Screenings and Preliminary Assessments in DEQ's Site Assessment Program, DEQ Website, Land Quality, Cleanup & Spills, Site Assessment.

Oregon Department of Human Services (ODHS), Superfund Health Investigation & Education Program, no date. Public Health Considerations, Public Comment Release, North Ridge Estates.

Oregon Water Resources Department, 2003. Well Log Reports, T38S, R9E, Sections 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24.

Dr. Ken Rykbost, Oregon State University Agricultural Research, Klamath Experiment Station, Klamath Falls, Oregon. Personal communication on June 12, 2003, regarding soil freezing depths in North Ridge Estates area.

U.S. Army Corp of Engineers, 1996. Fact Sheet for Kingsley Firing Range Annex, Klamath Falls, Oregon, Formerly Used Defense Sites (FUDS) Property Information System.

U.S. Environmental Protection Agency (EPA),1979. Compliance Order #X79-08-14-113, dated September 17, 1979.

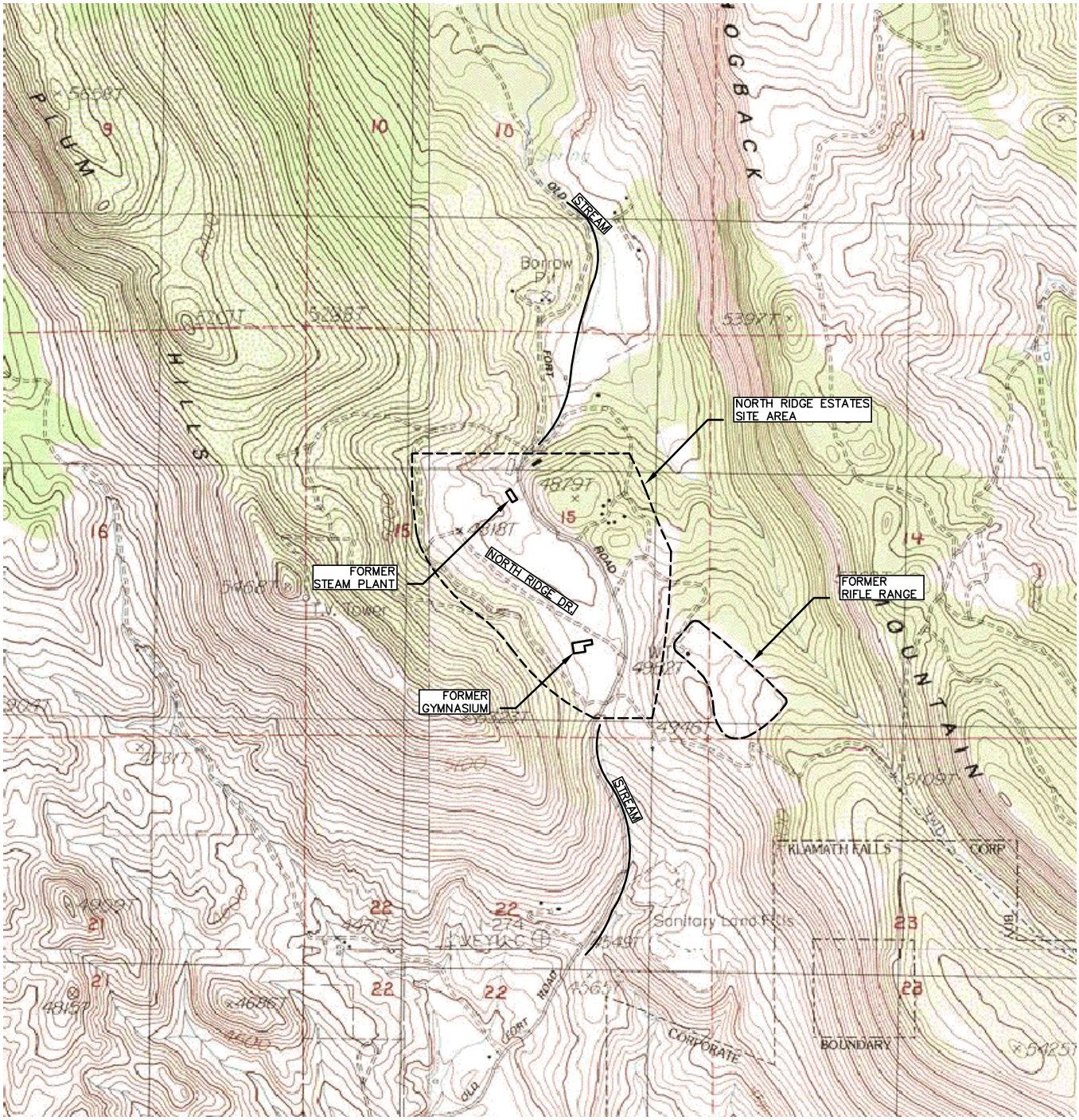
U.S. Environmental Protection Agency (EPA), 1991. Guidance to Performing Preliminary Assessments Under CERCLA, EPA/540/G-91/013, Publication 9345.0-01A, September 1991.

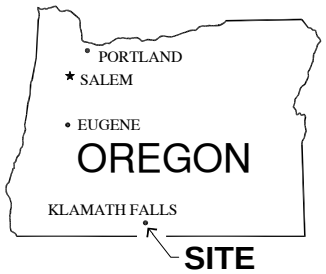
U.S. Geological Survey. Whiteline Reservoir, Oregon, 7.5-minute topographic quadrangle.

U.S. Marine Corps Reserve, 1945. Facility layout plan of Marine Barracks, Klamath Falls, Oregon, scale 1:2400, dated Sept. 9, 1945.

FIGURES:

1: Site Location and Topographic Map
2: Former Marine Recuperational Barracks Facility Plan Map
3: North Ridge Estates Subdivision Map





SOURCE: USGS WHITELINE RESERVOIR QUADRANGLE, OR. 1985
PHOTO REVISED 1982

Prepared for: DAVIS WRIGHT TREMAINE

PBS

Project #: 19148.003

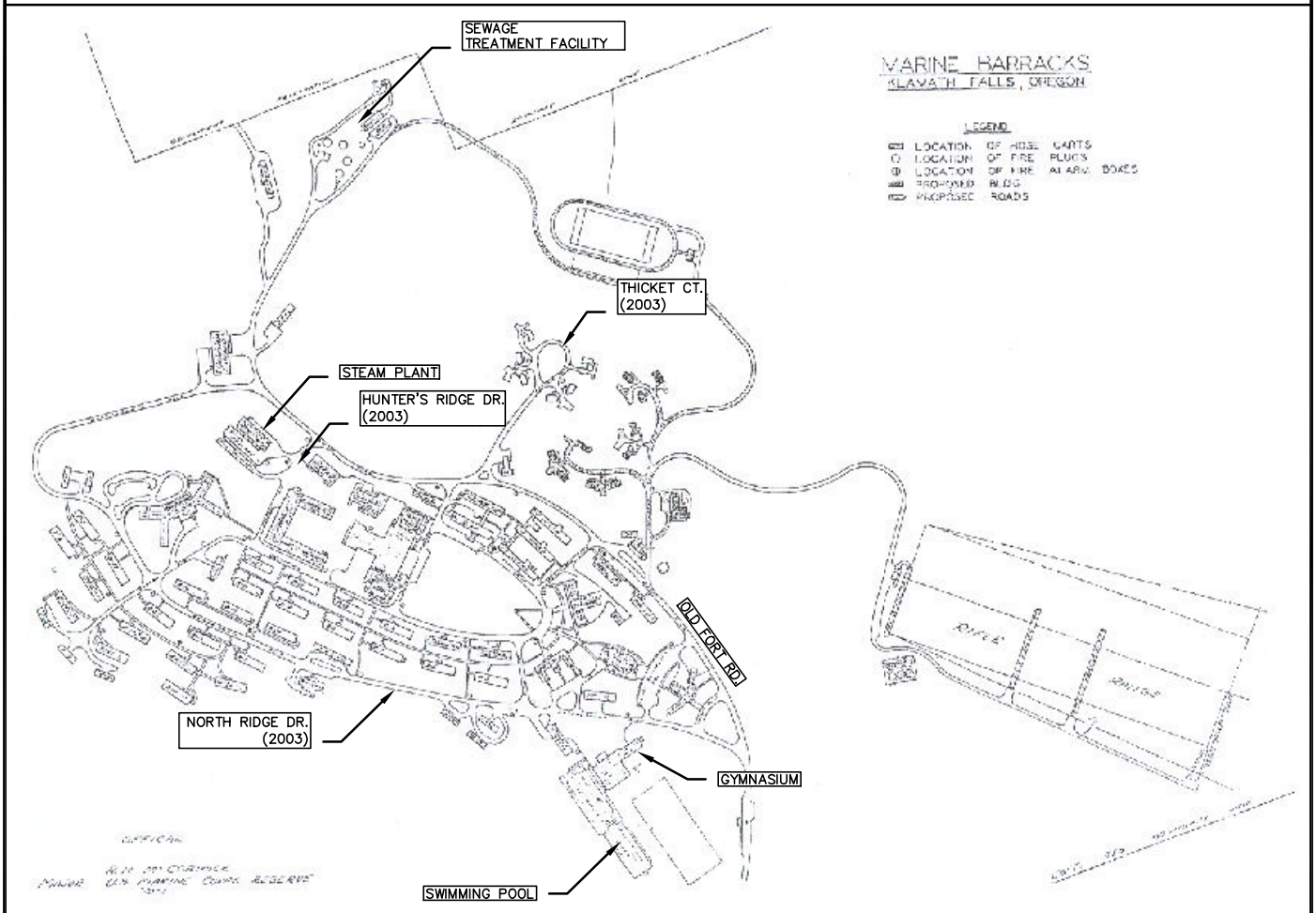
Date: JUNE 2003

SITE LOCATION MAP

NORTH RIDGE ESTATES
KLAMATH COUNTY, OREGON

FIGURE 1

6/17/03 15:55 P:\19000\19148\19148.003\19148.003_SITE_MAP.dwg



NOT TO SCALE

Prepared for: DAVIS WRIGHT TREMAINE

PBS

Project #: 19148.003

Date: JUNE 2003

SITE PLAN FOR FORMER MARINE RECUPERATIONAL BARRACKS, 1945

NORTH RIDGE ESTATES (2003)
KLAMATH FALLS, OREGON

FIGURE **2**

6/17/03 15:55 P:\19000\19148\19148.003\19148.003_SITE_MAP.dwg

North Ridge Estates Property Map

PBS Engineering and Environmental
Project No. 19148.003

Figure 3