
Portland Metro Levee System Feasibility Study

Integrated Feasibility Report and Environmental Assessment

Appendix H – Cultural Resources



**US Army Corps
of Engineers®**
Portland District



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Attachment 1 – New 10-900 Form or Updated Section 106 Clearance Form for the Columbia Slough Drainage Districts National Register District	
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1. Introduction

The Portland Metro Levee System (PMLS) Feasibility Study (study) is a flood risk management general investigations feasibility study being conducted by the Portland District U.S. Army Corps of Engineers (Corps) in partnership with the Columbia Corridor Drainage Districts Joint Contracting Authority (CCDD). The purpose of the study is to analyze current flood risks in the system, develop projections of future without-project conditions, and identify flood risk management options that could meet current and future needs within the policies and regulations of the Corps. Implementation of this study could lead to a federally supported construction component if a solution is found to be in the federal interest.

1.1. Purpose Statement

This appendix addresses NHPA requirements by (1) preparation of this technical report that addresses potential project effects to significant cultural resources within the area of potential effects (APE); and (2) preparation of a National Register of Historic Places Nomination Form (10-900 form) for the Columbia Slough Drainage Districts Historic District. The second task constitutes an update to Section 106 Clearance prepared in 2006 for the Historic District. The National Register Form is provided in Attachment 1 of this report. The APE for this project has been defined as encompassing all the lands in the four drainage districts.

1.2. Study Scope

The scope of the study includes the entire levee system, which is comprised of 4 integrated and contiguous levee systems: Peninsula Drainage District #1 (PEN 1), Peninsula Drainage District #2 (PEN 2), Multnomah County Drainage District # 1 (MCDD), and Sandy Drainage Improvement Company (SDIC) (Figure 1-1 and Figures 1-2 through 1-8). The study area lies within portions of four cities and has a population at risk of approximately 30,000. The PMLS protects drinking water supply serving more than 966,000 people, and contains critical infrastructure driving over \$16 billion in economic benefits and approximately \$7.3 billion in property values within the current levee protection area. There is a major natural gas pipeline that serves two states, two airports including Portland International Airport (19,882,788 passengers in 2018 or 54,473 daily) over three interstate highways (I-5, I-205, I-84), two transit and Class I freight rail lines, the U.S. Air National Guard Base, and hundreds of businesses and residences protected by the PMLS system. A high-risk levee segment of the overall levee system that failed in 1948 resulted in 15 deaths. Records indicate that a portion of the levee system embankment most likely includes an old wooden trestle that was part of the railroad system and was buried into the raised section of levee in PEN 1 and does not meet current levee safety standards. The quality and construction of the embankment is unknown as the railroads have declined to allow access to obtain data to fully analyze the embankment. The feasibility study will develop a plan to address potential system failures and reduce flood risk in the study area.

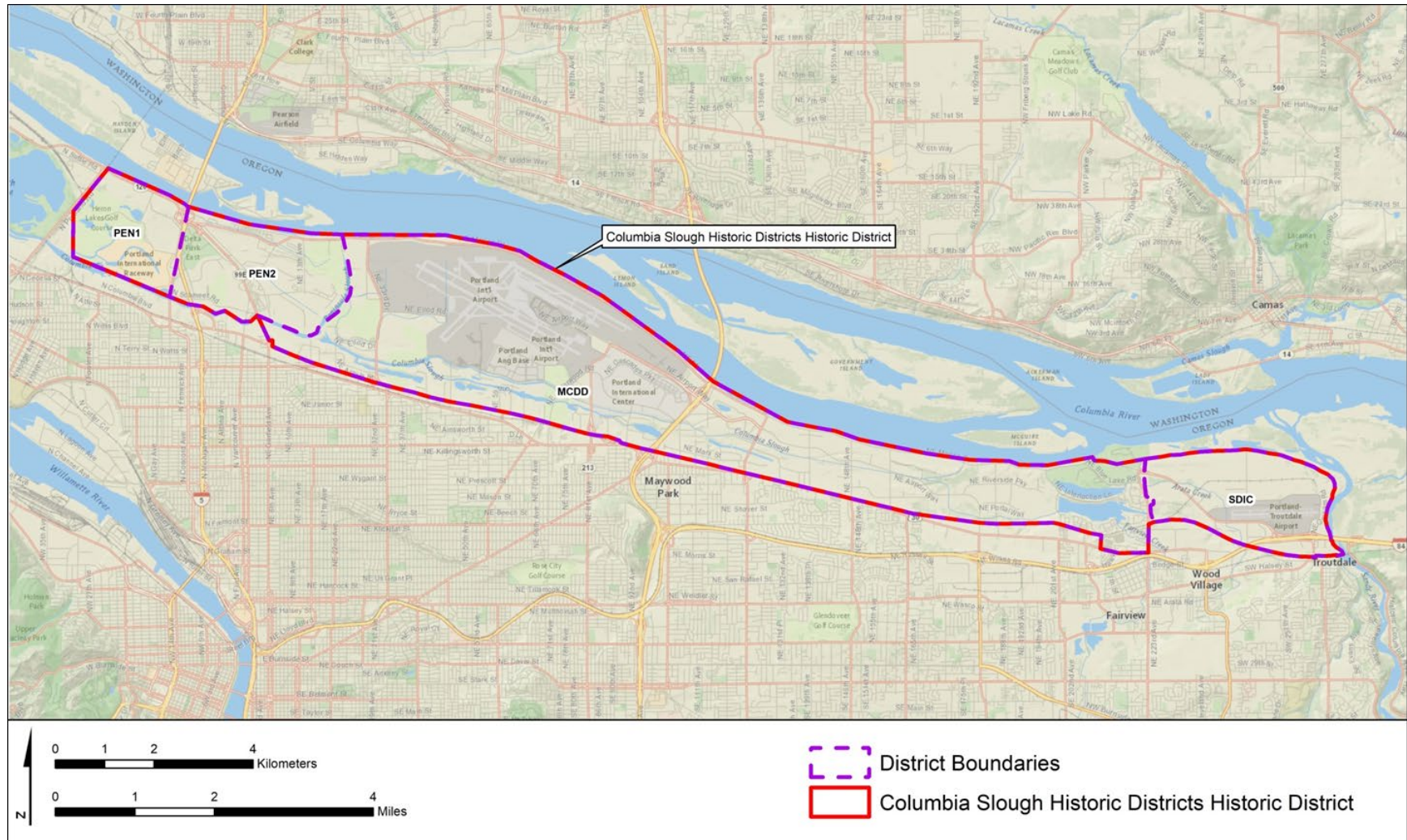
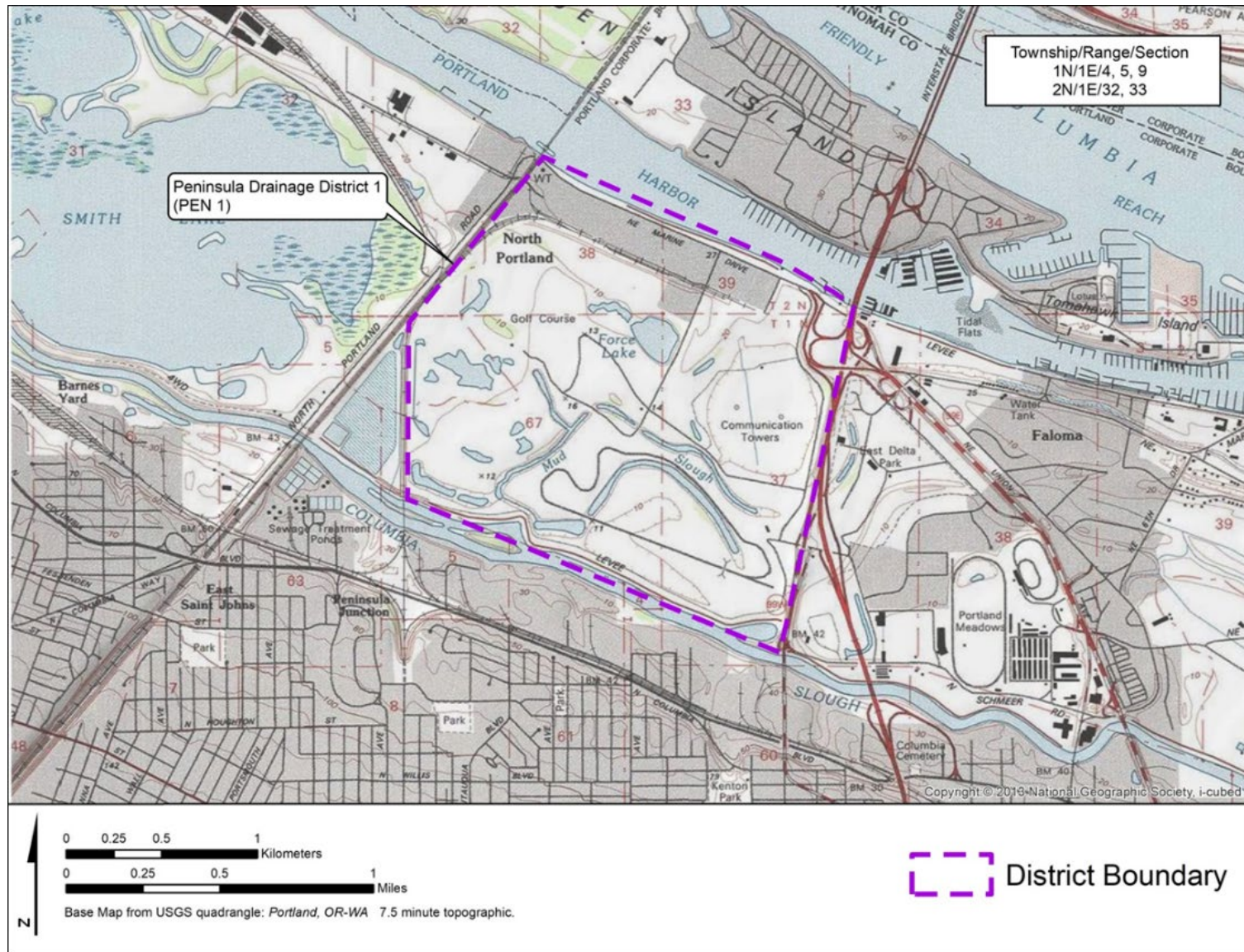


Figure 1-1 Project Location

*Figure 1-2 Location of PEN 1*

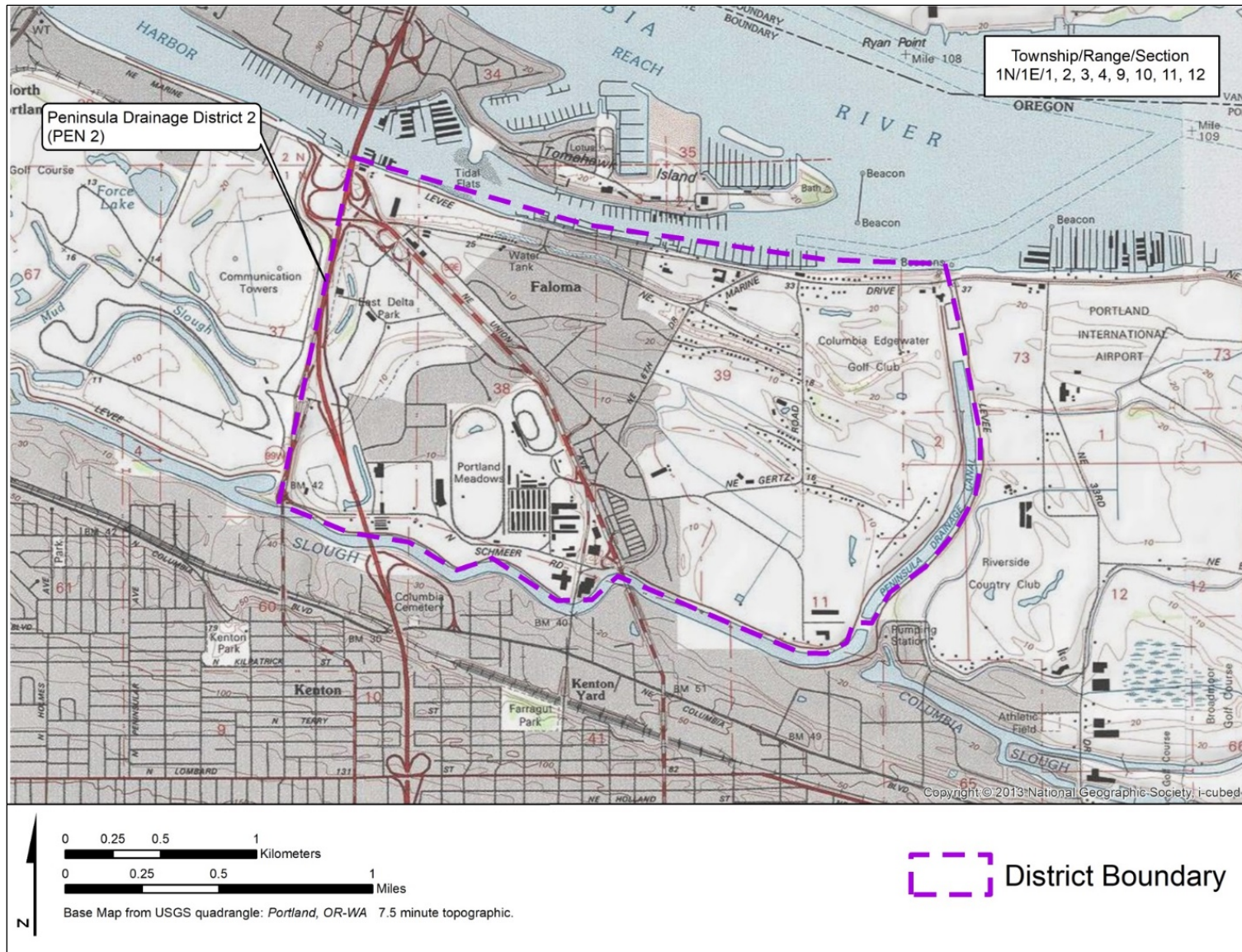


Figure 1-3 Location of PEN 2

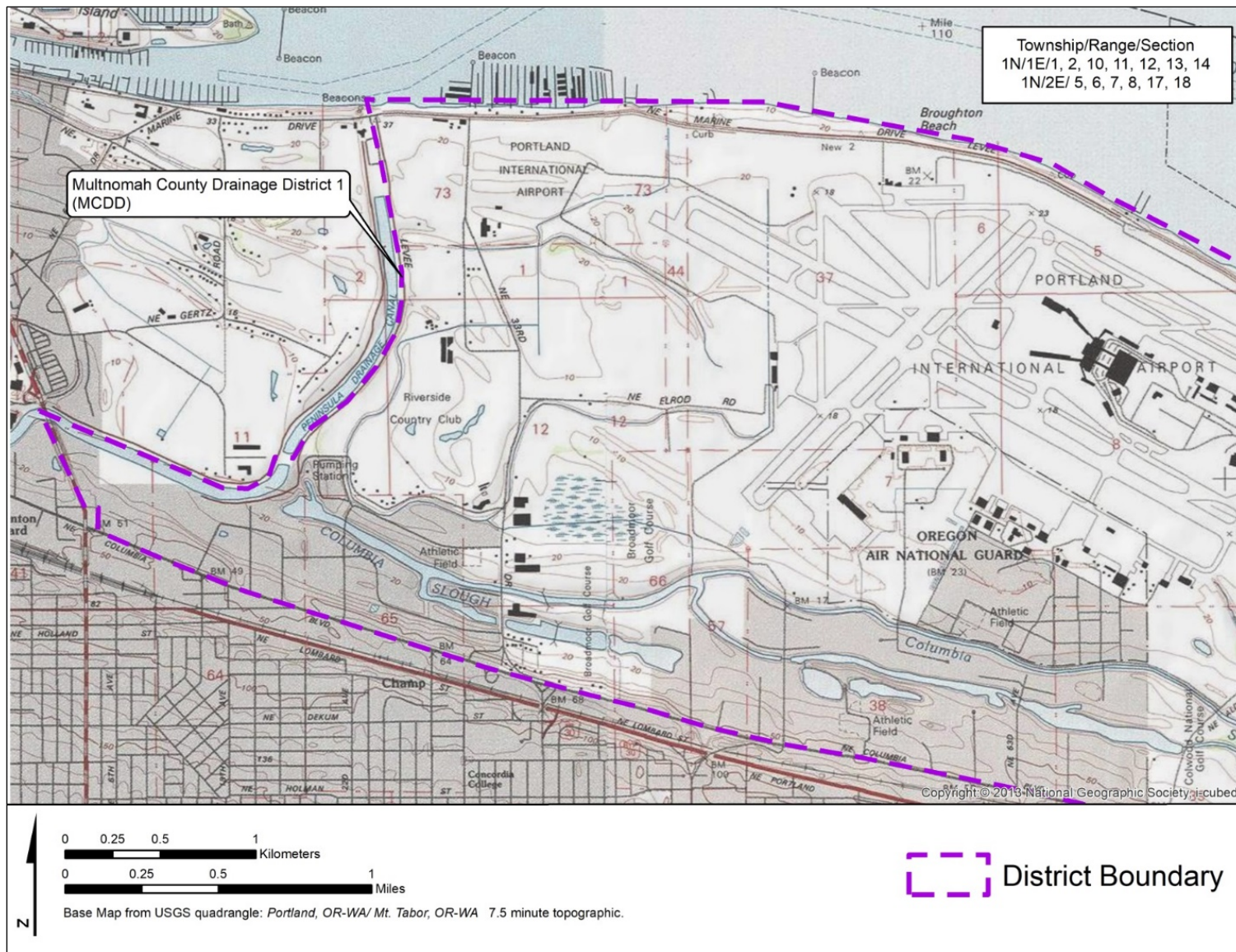


Figure 1-4 Location of MCDD (Western Portion)

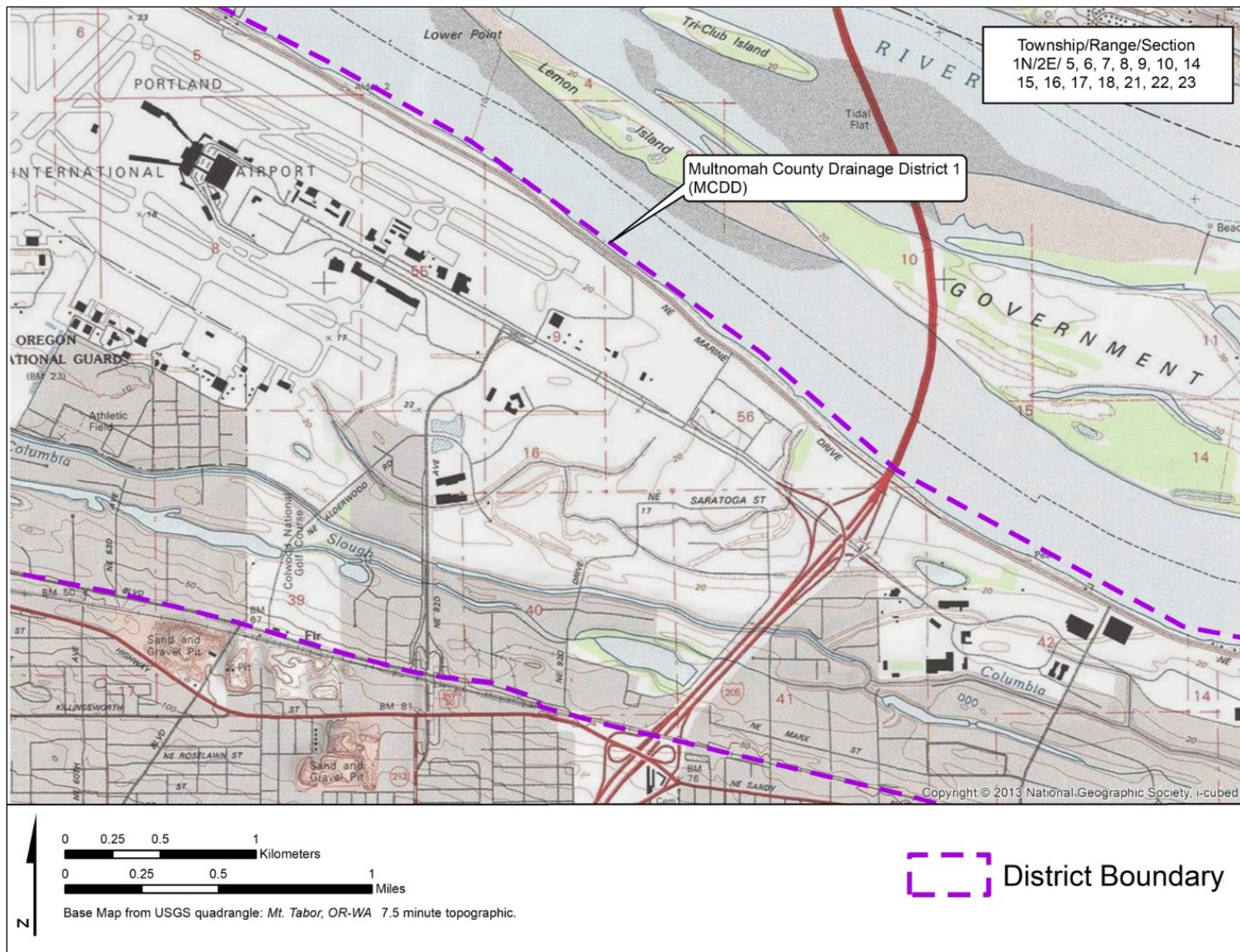


Figure 1-5 Location of MCDD (Middle Western Portion)

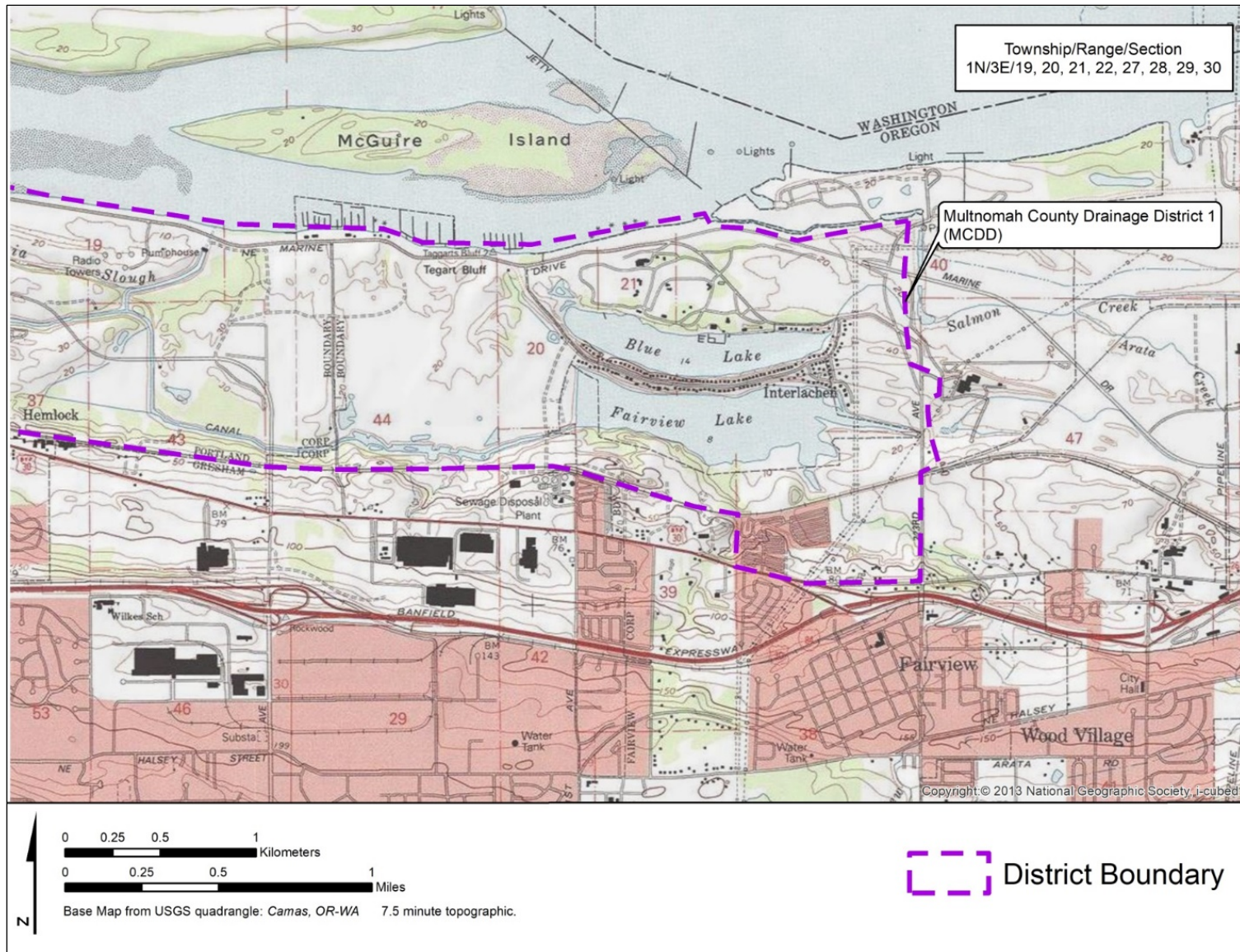


Figure 1-7 Location of MCDD (Eastern Portion)

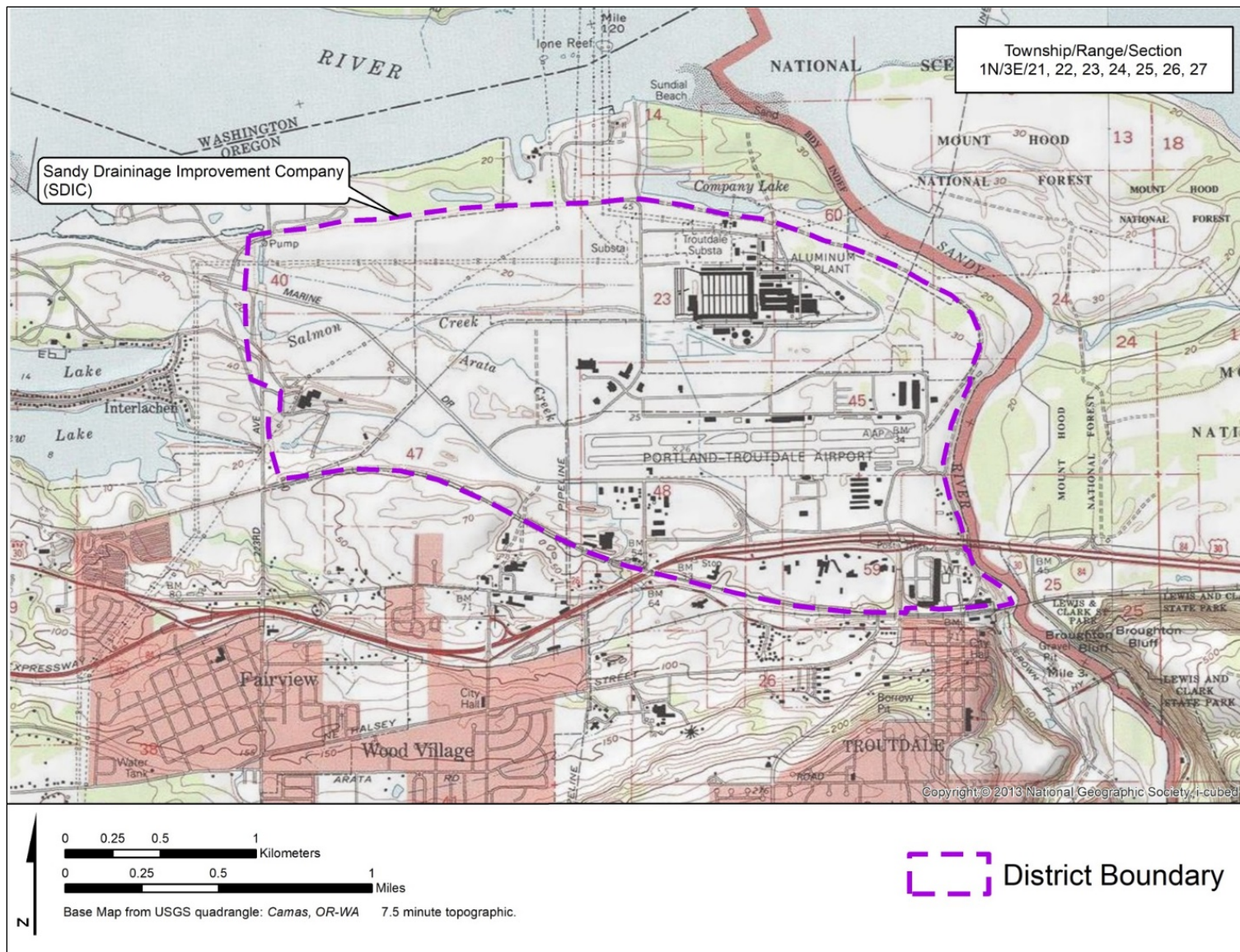


Figure 1-8 Location of SDIC

2. Project Area Description and Background

2.1. Environmental Setting

The project area extends across the southern Columbia River floodplain from the Sandy River west to the Burlington Northern Railroad alignment on the western boundary of PEN 1. The APE thus extends approximately 26 linear kilometers across the floodplain, encompassing about 47 square kilometers (approximately 12,750 acres) or approximately 85% of the Columbia River floodplain between the Sandy and Willamette Rivers

The floodplain has been shaped first by a series of terminal Pleistocene floods (the Missoula Floods) that scoured the Columbia River Gorge and flooded the Willamette Valley dozens of times between 15,000 and 12,700 years ago (Orr and Orr 2000:203, 211-214). In the Portland Basin, geologic surfaces associated with these floods are located between 61 and 107 m (200 and 350 ft) amsl, well above the floodplain. The southern boundary of the western portion of the APE can be generally defined at Alameda Ridge, which is a massive pendant bar formed by the floods (Figure 2-1) (Allen et al. 2009:163; Gates 1994:106, 108).

A combination of sea level change, regional subsidence, Cascade uplift, and sedimentary infilling have resulted in drastic changes to the Columbia River floodplain during the Holocene (last 10,000 years). Gates (1994:75) reported data from borings on Hayden Island on I-5 with contact with Missoula Flood deposits at 46 m (150 ft.). Based on the identification of Mazama ash in cores at the I-205/Airport Way interchange, it is apparent that approximately 15 m (50 ft) of alluvial sediment has accumulated over the last 6,800 years (Gates 1994:80, 199, Figure 24).

With the exception of a few outcroppings of the older Troutdale Formation, the entire floodplain in the present APE is mapped as Quaternary alluvium (Qal) or historical/modern fill (Qaf) (Beeson et al. 1991; Evarts et al. 2009). In the Portland Basin, geologists have identified three main Holocene age geomorphic surfaces: the Winkle, Ingram, and Horseshoe terraces. The oldest of these formations, the Winkle terrace, is found between 15 and 30 m (50 and 100 ft) amsl, well above the floodplain. The Ingram terrace, generally found between 6 m (20 ft.) and 15 m (50 ft) amsl and near the current Columbia River elevation, is estimated to be between 5,000 and 550 years old.

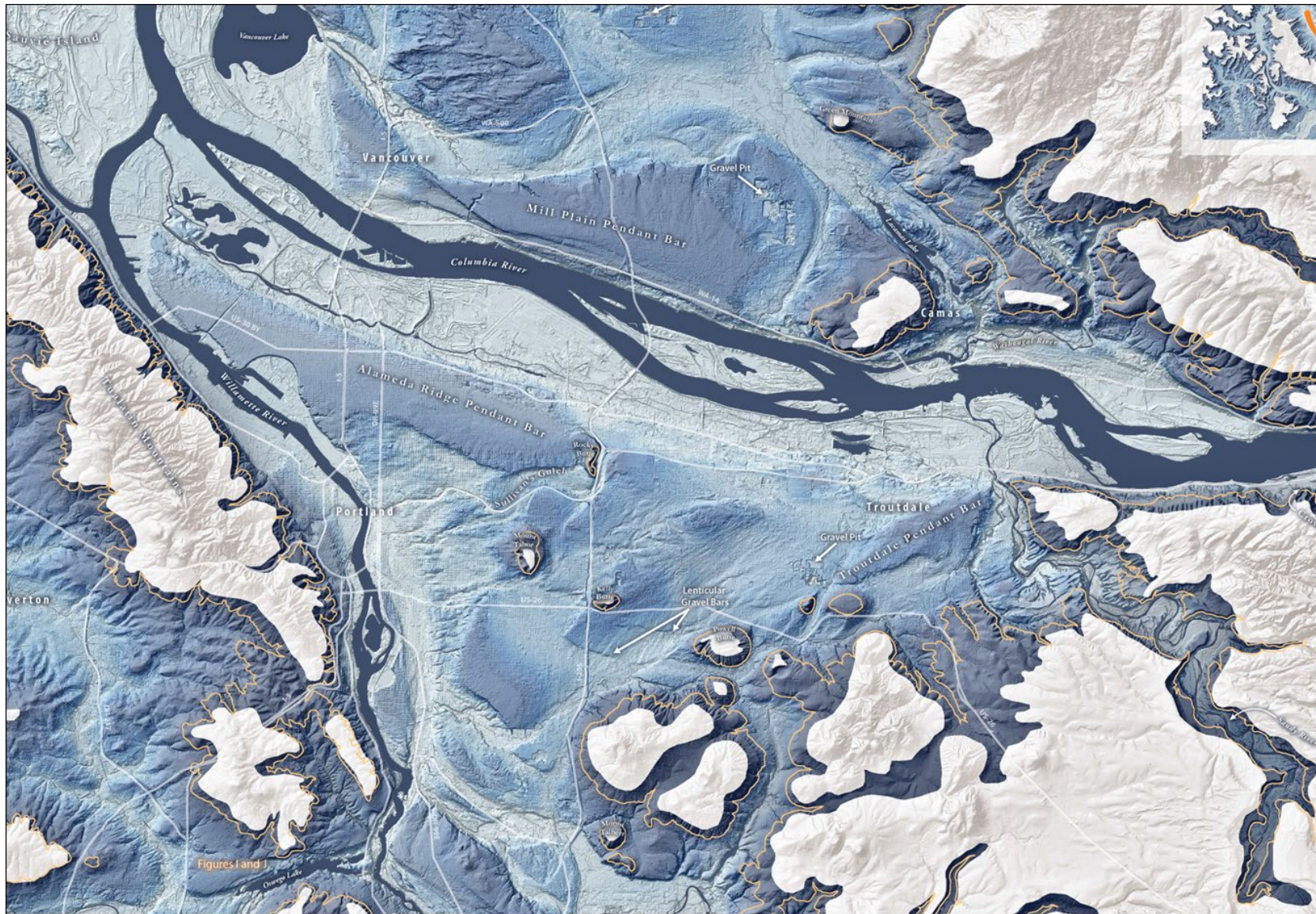


Figure 2-1 Extent of Missoula Floods near the Study Area. Reproduced from Burns and Coe (2012).

The more recent Horseshoe terrace is usually at elevations of less than 6 m found within incised sloughs and tributary channels and is subject to periodic erosion and deposition associated with annual floods. The Ingram terrace is typically associated with Sauvie, Faloma, and Wapato soils, and the Horseshoe terrace is dominated by Rafton and Pilchuck soils (Kuper and Lawes 1994:9-11). Most of the Columbia River floodplain in the western APE (PEN 1 and 2) is at elevations of less than 6 m, with the eastern area (MCDD and SDIC) generally between 6 and 9m (20-30 ft.). However, the entire floodplain within the APE is mapped as the Ingram surface (Green 1983: Geomorphic Map).

The project area is within the Willamette Valley portion of the Interior Valley or *Pinus-Quercus-Pseudotsuga* vegetation zone that is a mosaic of oak woodlands, coniferous forests, grasslands, and riparian forests. Forest stands, groves, and savannas dominated by deciduous oaks (primarily *Quercus garryana*) are common in this part of the Interior Valley zone. These oak communities also support bigleaf maple (*Acer macrophyllum*) and Douglas-fir (*Pseudotsuga menziesii*) and have an understory that includes hazelnut (*Corylus cornuta*), saskatoon (*Amelanchier alnifolia*), sword fern (*Polystichum munitum*), snowberry (*Symphoricarpos albus*), poison oak (*Rhus diversiloba*), and blackberry (*Rubus* sp.). These oak communities are interspersed with grasslands that are often created and maintained by human agents such as fire, agricultural land clearing, and grazing (Franklin and Dyrness 1988:110-129, Figure 27). Native populations used fire to maintain the grasslands, promoting the growth of important cultural plants such as camas and tarweed and providing grazing for deer and elk (Boyd 1986).

2.2. Environmental History

The earliest descriptions of the project vicinity come from the members of the Lewis and Clark expedition. During their return voyage (April 2, 1806), Lewis described the lowlands south of the Columbia River as a mosaic of forested uplands, riparian forest, prairies, and wetland ponds and sloughs (Moulton 1991:55).

More detailed descriptions of the project area itself come from General Land Office (GLO) surveyors' notes dating to the early 1850s and the 1852 and 1855 GLO maps of Township 1 North, Ranges 1, 2, and 3 East, and Township 2 North, Range 1 East (Figure 2-2). The survey notes for T. 1N, R. 3E, tend to be more abbreviated, with general descriptions of the terrain and vegetation. Within the present SDIC area, the land was described as level with wooded areas in fir (Douglas-fir?), (bigleaf?) maple, and cedar on drier ground and ash, willow, and cottonwood in wetter areas. A few sloughs were recorded, as well as small tracts of prairie. The more western areas of the township were described as having more wetlands than the area to the east: small lakes, swales, and an ash swamp, as well as Fairview and Blue Lakes (Cartee 1854).

Hunt (1852:111) described the north half of the T. 1N, R. 2E as “mostly rich aluvial bottoms which are considered very valuable for pastureage they are inundated to the depth of several feet by the rising of the Columbia River in the month of June this lasts for about two weeks when the river gradually subsides.”

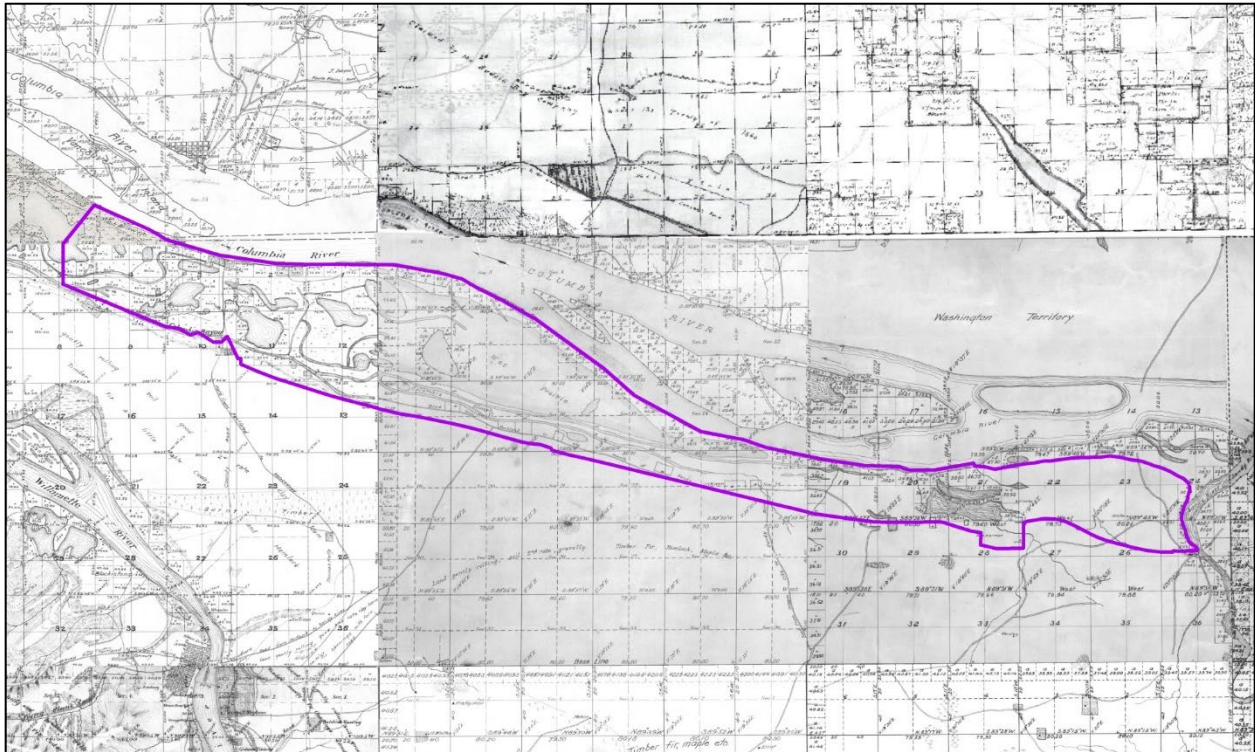


Figure 2-2 Project Area Depicted (in Purple) on the 1852 and 1855 GLO maps.

While surveying the section boundaries and Donation Land Claims that include the current project area, Hunt (1852:84-89), Cartee (1853:168-172), and Pownall (1854a:657-660) crossed numerous sloughs, small ponds and lakes (during the dry late summer), prairies, and areas of timber, especially along the margins of sloughs and the Columbia River. Based on the Hunt survey, the 1852 GLO map shows a natural levee along the Columbia River shoreline between 200 and 500 m (660 and 1,640 ft) wide, bordered on the south by a “wet prairie” containing several sloughs and small ponds. While most of the current project area in this township is within land shown as wet prairie, portions of the project area are located on the inland slope of the natural levee.

The best descriptions of the historic landscape of the APE are for T. 1N, R. 1E, due to the excellent 1851 fieldnotes of GLO surveyor Butler Ives. Ives (1851a:17) summarized the Columbia River floodplain as “overflowed by the river in high water except a narrow piece along the margin of the river & on some of the principal bayous [sloughs], they [the river bottoms] are very much cut up by bayous, small ponds & lakes, several lakes were noticed large enough to meander.” The regular flooding of the floodplain was echoed in most of Ives’s other fieldnotes (e.g., 1851b:114, 131, 133, 171, 197). These notes also referenced many muddy sloughs and lakes, as well as more details on vegetation. Much of the bottoms were occupied by meadows but some areas were covered with “thick brush, hardhack briars Elder etc. Some balmgilead [cottonwood] crabapple Willow etc.”, with similar vegetation typical of the higher ground along the river and sloughs (Ives 1851b:133, 149, 171).

The floodplain landscape was not mapped again until the late 1890s and very early 1900s. The most complete coverage is in the U.S. Coast and Geodetic Survey navigation charts (Figure 2-3 [the western portion of the map is dated 1888, the chart on the east dates to 1902]). Since the charts were prepared for navigation purposes, their coverage of interior areas is variable (e.g., the western floodplain is more completely mapped than the eastern floodplain). There is sparse evidence of human settlement other than a network of farm roads, some fences, and a few farms and orchards on the natural Columbia River levee. The only more substantial development was the Portland and Vancouver Railway line, which operated from the late 1880s to 1920 (modern NE Martin Luther King Blvd. north of NE Columbia closely follows the railroad alignment). The chart also shows the Spokane, Portland & Seattle Railway (now the BNSF) line that defines the western boundary of PEN 1, although construction of the line in this area did not begin until 1906 and the route shown on the chart doesn't correspond to the current route (Gaertner 1992:8-9).

This setting changed very little until the initiation of diking and drainage projects on the floodplain in the late 1910s and through the 1920s and 1930s (as described in detail below). The annual spring floods on the Columbia largely prevented any agricultural use of the floodplain other than grazing cattle and producing forage crops for hay. Construction of the Columbia River and Columbia Slough levees beginning in 1917 ended the threat of flooding except in exceptional years (e.g., the 1948 Vanport flood) and allowed production of row crops.

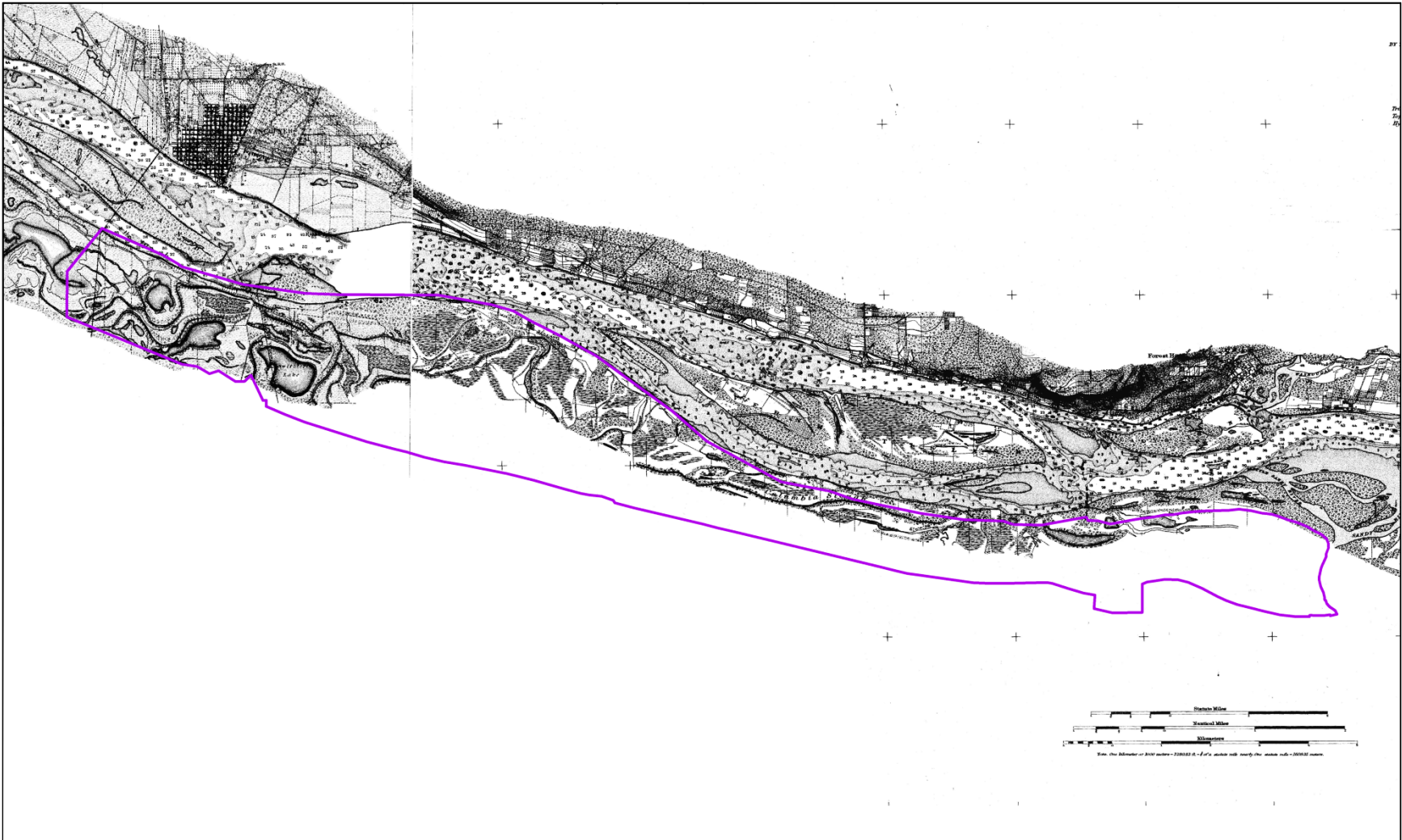


Figure 2-3 The 1888 and 1902 U.S. Coast and Geodetic Maps Depicting the Project Area (in Purple)

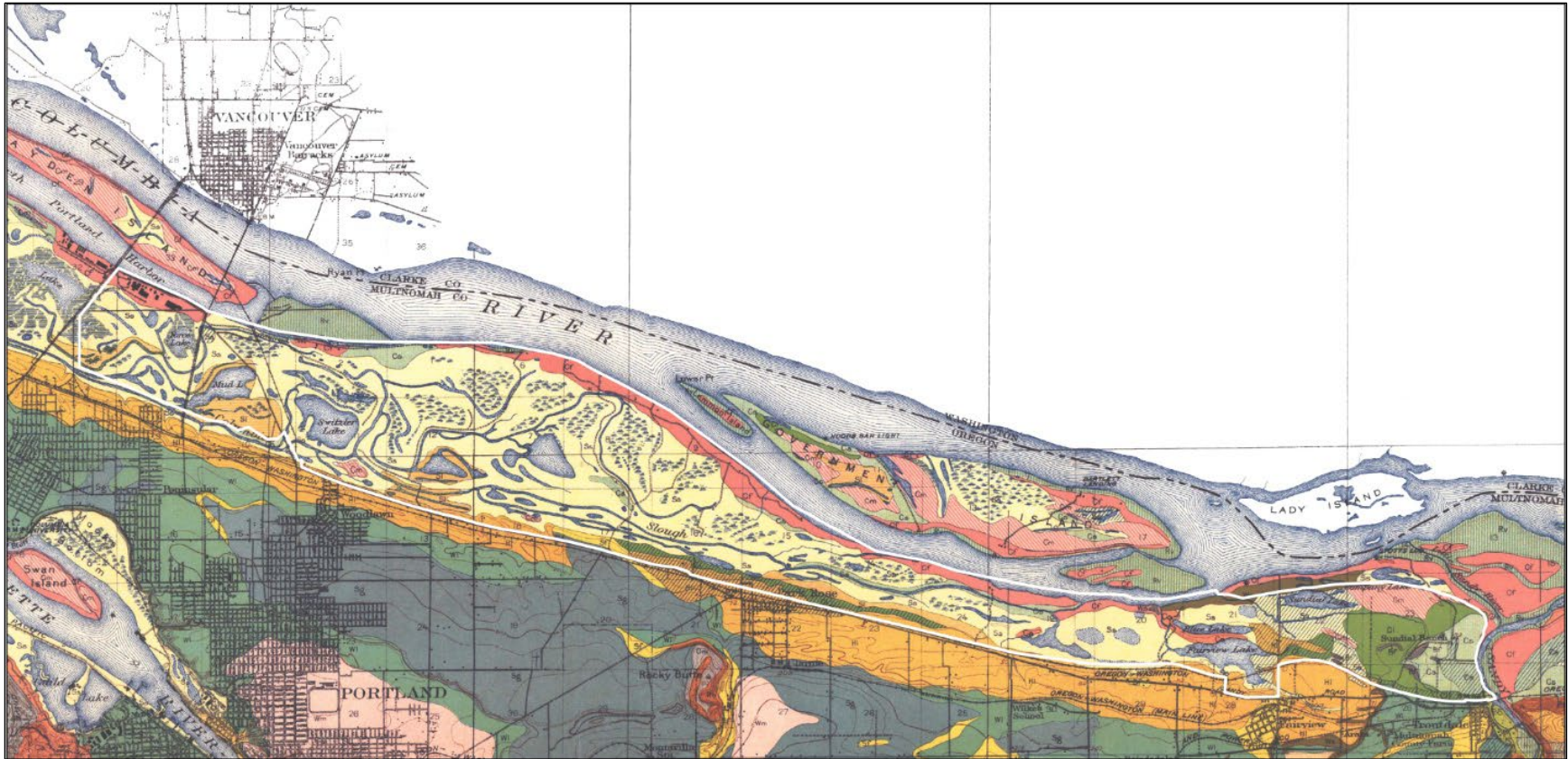


Figure 2-4 Historic Soil Map of the Project Area Showing Extent of Development near the Project Area (in White). Map (Dated 1919) Adapted from Ruzek and Carpenter (1922)

Many of the smaller wetlands in the area were drained by the drainage districts in the 1920s and 1930s, with the subsequent development of truck farms for the Portland market. In the 1922 soil survey of Multnomah County, Ruzek and Carpenter (1922:91) noted the dominant soil on the Columbia River floodplain was characterized by poor drainage after spring flooding so “probably not over 10 per cent of the land is cultivated. The rest is used for pasture and hay land.”

Figure 2-4 is the 1919 soil survey map and predates the development of the diking districts (Ruzek and Carpenter 1922). Much of the floodplain exhibits little change from the 1888-1902 U.S. Coast and Geodetic Survey navigation charts (see Figure 2-3). An important exception, however, came in construction beginning in 1907 of the Swift Meat Company plant (known best by its predecessor name, Union Meat [e.g., *Morning Oregonian* 1912, 1915]) on the south bank of the Columbia in the future PEN 1 area. Other industries soon located near the Swift plant, and the Portland Union Stockyards relocated there in 1919, eventually becoming the largest stockyard in the Pacific Northwest (Mylott 2008).

Dramatic changes to the local environment began in 1917 with the establishment of the first of the drainage districts, which are described in detail below. These activities changed the hydrologic regime in the project area, controlling or eliminating the effects of annual floods that averaged 5.2 m (17 ft) in elevation in a typical year (inundating portions of the project area), reaching as high as 10 and 10.6 m (33 and 35 ft) during 50- and 100-year floods, respectively (inundating all of the project area). Controlling these floodwaters eliminated the erosion and deposition that maintained the mosaic grassland/forest environment that historically characterized much of the floodplain.

More permanent development within the lower portions of the Columbia River floodplain was made possible by the construction of these flood control measures. While the lowland areas formerly used for pasturage during the drier months could now be used for row crops, structures were typically located along the natural (and now enhanced) levee along the Columbia River. The dramatic changes with establishment of the drainage districts is evident in Figure 2-5, which are dated to 1947 but are based on 1945 aerial photography. Portions of the floodplain are still rural in character and remain dominated by agricultural land use. But denser residential development is evident between Fairview and Blue Lakes, north of Parkrose, and in the Bridgeton neighborhood. Much more conspicuous are Vanport City and the Portland Meadows Race Track in PEN 1 (the race track has now been closed); the Portland Airport in MCDD; and the Reynolds Aluminum Plant and Troutdale Airport in SDIC.

The Portland Airport (PDX) probably constitutes the most permanent development in the APE over the past 80 years. Construction of PDX (originally the Portland Columbia Airport and later the Portland Airport) began in 1939 by the Works Progress Administration and U.S. Army Corps of Engineers. This construction involved grading the undulating terrain by filling low spots with dredge sand and occasionally cutting high spots (Cornell, Howland, Hayes & Merryfield 1970:8, 12).

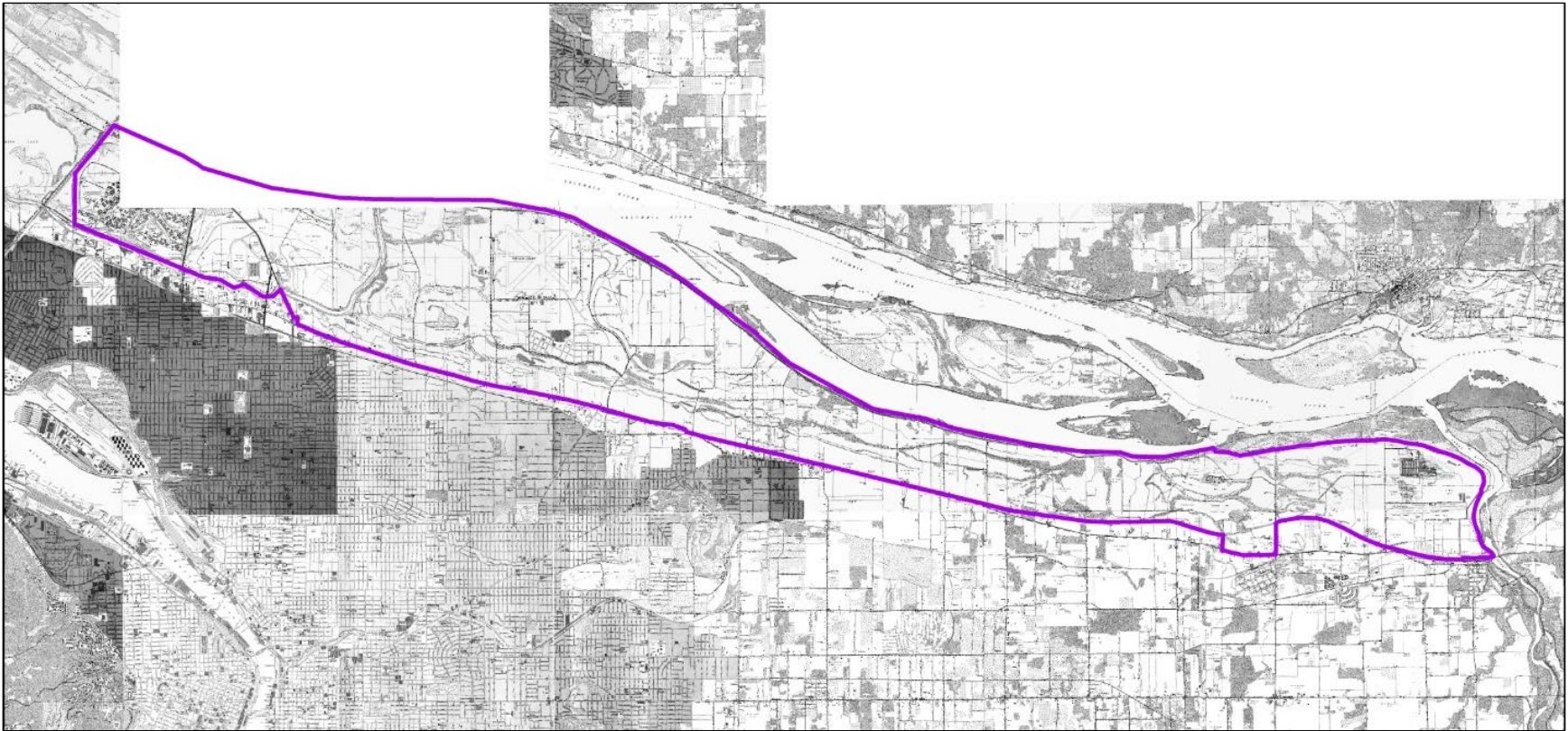


Figure 2-5 U.S. Coast and Geodetic Map (1947) Depicting the Project Area (in Purple). Note: Not all Maps that Comprise the Project Area were Readily Available

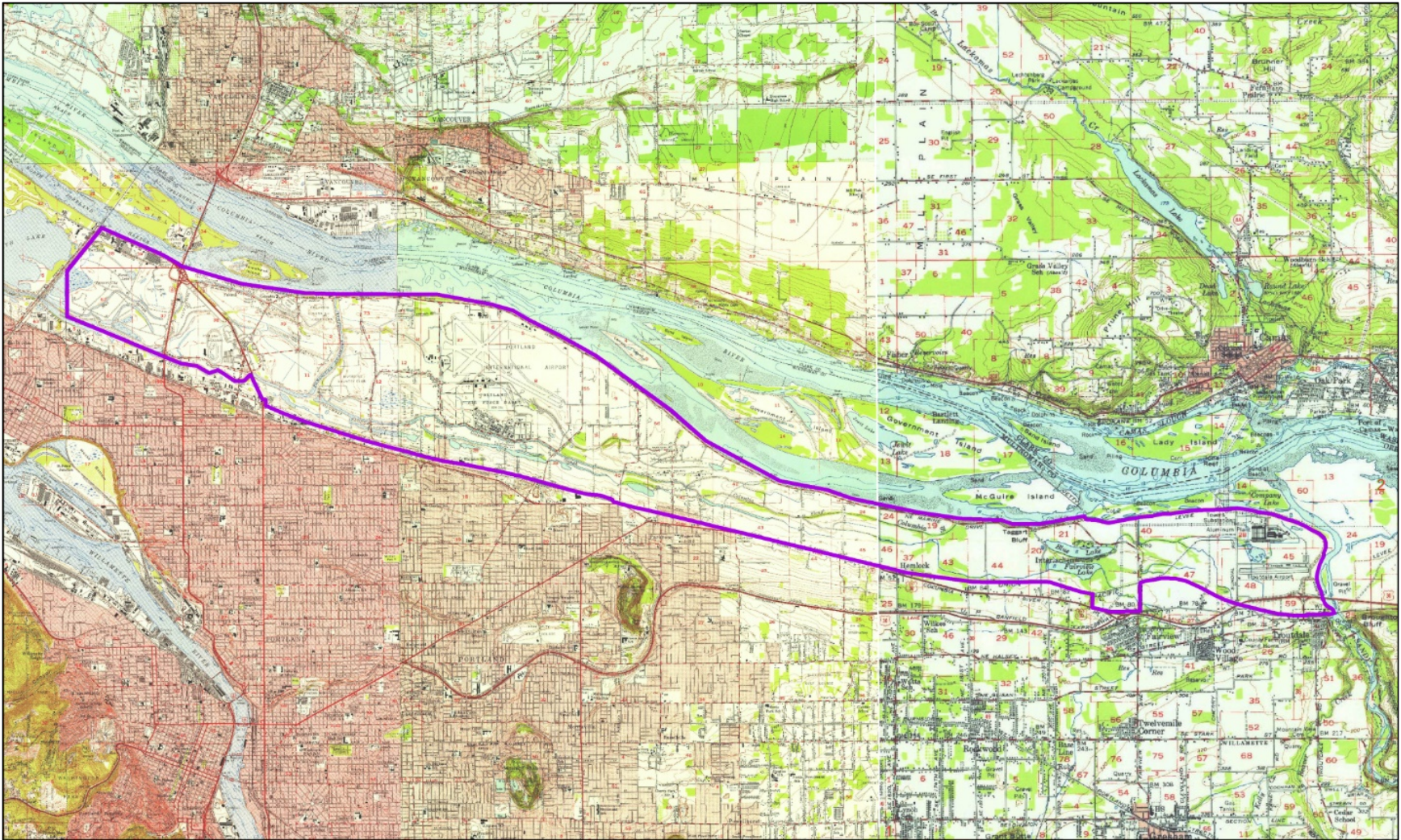


Figure 2-6 USGS Maps from the Mid-1950s Depicting the Project Area (in Purple)

The airport was later used and expanded after the establishment of the “Portland Army Airbase” during World War II (Ellis and Kent 1999:4).

The initial post-war period witnessed little change; Figure 2-6 illustrates the APE in the mid-1950s-early 1960s and exhibits few differences from the mid-1940s. The pace and geographic expansion of development accelerated beginning in the 1970s and 1980s with major expansions at PDX and construction of I-205 and Airport Way from I-205 east, especially in the MCDD. The current character of development in the APE ranges from predominantly recreational uses in PEN 1 (Portland International Raceway and Heron lakes Golf Course), but with the Portland Expo Center and some industrial uses in the northern area; a mix of commercial, industrial, residential, and recreational development (Delta Park East, Columbia-Edgewater Country Club, Portland Meadows Race Track [the last now closed]) in PEN 2; commercial and industrial uses, recreation (Broadmoor Golf Course, Riverside Country Club), and PDX dominating the western portion of MCDD, and commercial and industrial uses dominating the eastern portion of MCDD except at the far eastern end around Blue and Fairview Lakes, which is primarily residential other than Blue Lake Park; the SDIC is characterized almost exclusively by industrial and commercial uses, as well as the Troutdale Airport, and a very small area of residential development..

2.3. Precontact Context

The earliest confirmed human presence in the Pacific Northwest dates to between 10,800 and 10,500 BC and has been dubbed the Paleoindian period, commonly known as Clovis. Paleoindian people were highly mobile hunter-gatherers that likely followed migrating game (including late Pleistocene to early Holocene megafauna) and used distinctive large, fluted spear points named for the Clovis site in New Mexico, one of the first places they were identified. The Archaic period (10,500 to 4400 BC) also represents highly mobile hunter-gatherers using spear or dart technology (large projectile points) and is often known as the Windust and Cascade phases. The Pacific period spans over 6,000 years from 4400 BC until the introduction of European American goods and diseases (approximately AD 1775). This was a period of great changes in the Pacific Northwest as highly mobile hunter-gatherers became increasingly sedentary, forming large, semi-permanent villages of socially stratified populations (Ames and Maschner 1999:65-112). Archaeological sites within the Portland Basin itself date to the late Pacific Period, or the last 3500 years. The lack of earlier sites is due to sea level changes and the dynamic nature of the Columbia River floodplain where seasonal floods have eroded and/or deeply buried earlier sites (O'Rourke 2005:31).

Archaeologists have made several attempts at predicting site locations within the Columbia River floodplain based on environmental characteristics. A major problem with predicting site locations based on these environmental characteristics is the fact that these characteristics change over time as floodwaters alter the natural environment. O'Rourke (2005) used three main variables (elevation above nearby water, distance to nearest permanent water, and distance to nearest navigable water) in predicting site locations. O'Rourke found that areas of highest probability occur on elevated ground close to both permanent and navigable water. However, the

model has not proven useful in determining the likely locations of village vs. temporary camp or resource extraction sites.

Minor et al. (1994:72-90) developed a predictive model for the Columbia South Shore that includes the eastern portion of the current APE and is useful for the current investigations. Their model is based on environmental zones (slough/pond, marsh/meadow, grassland, and woodland/forest) that were identified in an environmental reconstruction for that project (see above). This Columbia South Shore model suggests that slough/pond environments, found at elevations below 4.3 m (14 ft), are likely to contain short-term, task-specific sites related to travel, fishing, hunting waterfowl, and harvesting wapato, but that these environments are least likely to contain archaeological resources. Marsh/meadow environments, at elevations between 4.3 and 6.1 m (14 and 20 ft) are most likely to contain archaeological resources, typically task-specific sites related to hunting waterfowl and harvesting wapato and other wetland plants. While grasslands found above 6.1 m (20 ft) in elevation were used as the locations of both task-specific sites (hunting deer and elk and harvesting camas) and village sites, site data indicates that this environmental zone does not have a high likelihood of containing archaeological resources. The final environmental zone, woodland/forests above 6.1 m (20 ft) in elevation, was used for task-specific sites relating to hunting and collecting berries or other resources. Most recorded village locations are found within woodland/forest zones that typically occur on natural levees adjacent to sloughs or rivers.

Most of the project area would have been within a network of marsh/meadow and grassland environments. According to the above model, these areas are likely to contain archaeological sites related to collecting or hunting wetland or grassland resources such as wapato, camas, and waterfowl. Woodland/forest areas likely to contain village sites would have been found to the north and south along natural levees along the Columbia River and Columbia Slough. Given the proximity of a historic Chinookan village in the project vicinity (see below), it is very likely that the project area itself would have been used on a temporary basis while harvesting these resources.

2.4. Previous Archaeological Investigations

The SHPO lists 133 reports on archaeological or other cultural resource surveys or similar studies/fieldwork conducted in the study area since 1976 (Appendix B). All but 24 of those reports date from 1990 to the present (some reports from 2018 and 2019 may not yet be posted on the SHPO GIS database). As shown in Figure 2-7 and Table 2-1, there is considerable variability in the proportions of each district that have been surveyed. There is also variability in the methods used in the reported surveys, which was defined by both professional standards at the era when fieldwork was conducted and the type of proposed development that triggered the fieldwork. For example, 40% of the reports did not reference any subsurface probing, which is now considered a standard procedure for most field surveys.

The SHPO lists 53 archaeological resources with the study area: 39 sites and 12 isolates (one isolate was recorded as a site and subsequently determined to not be a site by the SHPO due to

consisting of less than 10 artifacts, although it retains a site number of 35MU83) (Table 2-2). Of the 39 sites, 30 were recorded as precontact in age, 7 are historic-period sites, and 2 are multicomponent sites. SHPO currently lists 4 precontact sites, 4 historic-period sites, and 1 multicomponent site as not eligible for listing on the National Register. Seven precontact sites and one multicomponent site have been determined eligible for the National Register. The remaining 22 sites are shown as unevaluated. It is important to emphasize that SHPO does not keep records on sites that have been destroyed by construction. Some of these sites may therefore no longer be extant. All but nine of the sites are located on MCDD lands.

Table 2-1 Previous Cultural Resource Survey Areas by District

District	Total Acres	Acres Surveyed	Percentage Surveyed
SDIC	1555	869	56
MCDD	8587	3541	41
PEN 1	995	244	25
PEN 2	1611	284	18
Total	12748	4938	39*

**Cumulative acreage surveyed in all four districts*

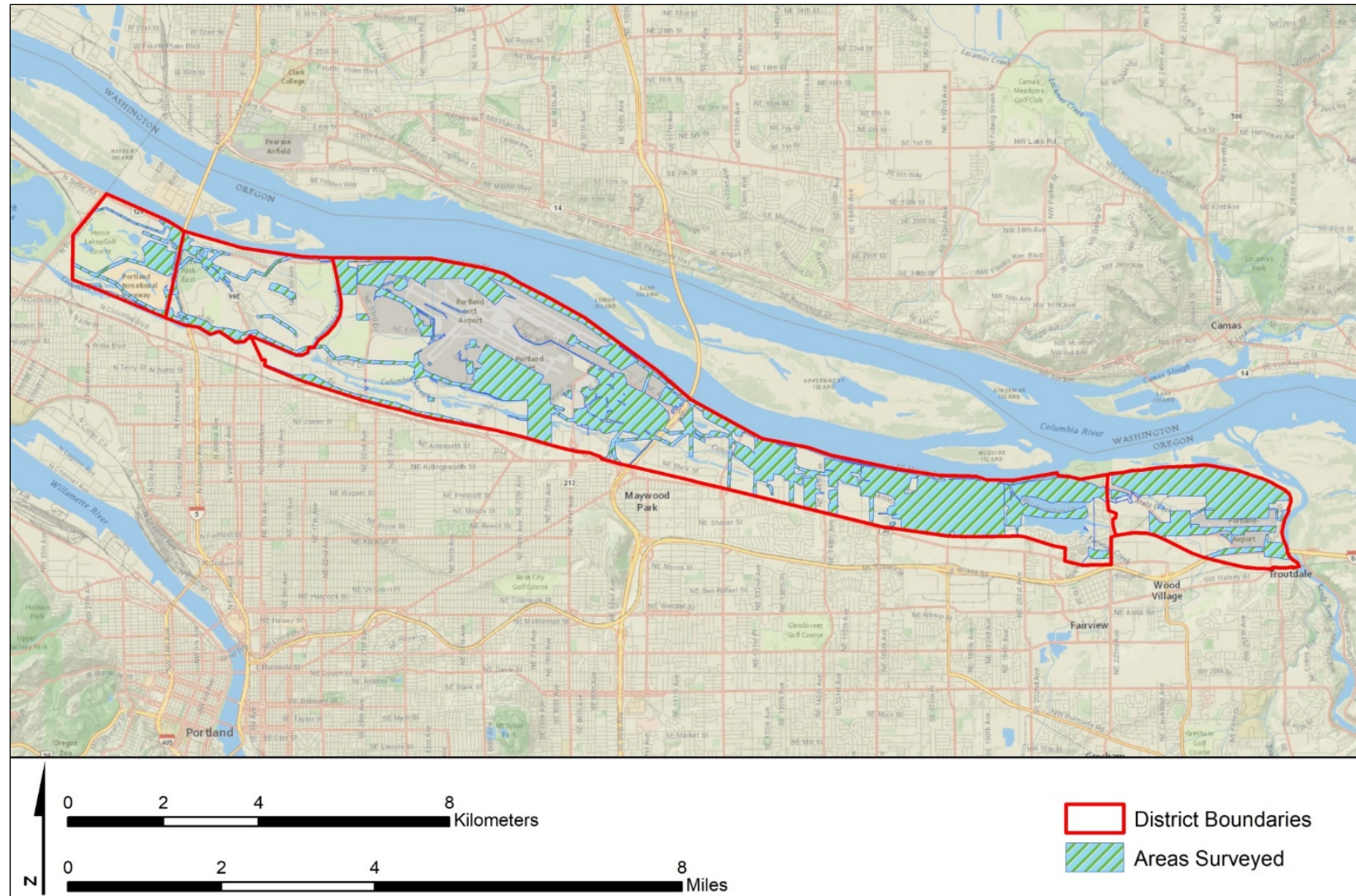


Figure 2-7 Overview of Areas Previously Surveyed within the APE

2.5. Archaeological Potential

The Columbia River levees were constructed on the natural river levees beginning in 1917. Previous archaeological surveys have identified at least seven precontact archaeological sites adjacent to the levee, all in the MCDD. There is a very high probability that all these sites extended into the natural levee and the deposits are present under or even in the twentieth-century levee fill. In 1940, a large number of burials and associated artifacts were exposed during levee construction at the west end of Blue Lake Park (White 1940). Human remains were also exposed in 1935 along the north side of the levee a short distance to the east (now recorded as archaeological site 35MU27 [Kongas 1979]).

Table 2-2 Previously Recorded Archaeological Sites Within Study Area

Smithsonian Trinomial	Site Type	Evaluated?
35MU113	Precontact	Unevaluated
35MU261	Historic	Not Eligible
35MU260	Historic	Not Eligible
35MU250	Historic	Not Eligible
35MU119	Precontact	Eligible
35MU158	Historic	Unevaluated
35MU82	Precontact	Unevaluated
35MU78	Precontact	Unevaluated
35MU80	Precontact	Unevaluated
35MU85	Precontact	Unevaluated
35MU81	Precontact	Unevaluated
35MU103	Precontact	Unevaluated
35MU30	Precontact	Unevaluated
35MU79	Precontact	Unevaluated
35MU84	Precontact	Not Eligible
35MU57	Precontact	Eligible
35MU97	Precontact	Not Eligible
35MU58	Precontact	Unevaluated
35MU99	Precontact	Not Eligible
35MU35	Precontact	Unevaluated
35MU36	Precontact	Unevaluated
35MU26	Precontact	Not Eligible
35MU77	Precontact	Unevaluated
35MU37	Precontact	Unevaluated
35MU106	Precontact	Says eligible on OARRA but neither site form or report confirms this
35MU70	Precontact	Eligible
35MU29	Precontact	Eligible
35MU28	Precontact	Unevaluated

Smithsonian Trinomial	Site Type	Evaluated?
35MU32	Precontact	Eligible
35MU27	Precontact	Unevaluated
35MU159	Historic	Unevaluated
35MU240	Precontact	Unevaluated
35MU107	Multi-component	Not Eligible
35MU24	Precontact	Eligible
35MU256	Historic	Unevaluated
35MU234	Multi-component	Eligible
35MU118	Precontact	Unevaluated
35MU43	Precontact	Unevaluated
35MU171	Historic	Not Eligible

No actions are proposed at or near this location among the project alternatives, but the burials encountered during levee construction indicates the potential for such discoveries at other locations along the Columbia River levees. A review of the limited record on the initial levee construction also establishes a high potential for archaeological materials to have been incorporated into levee fill. A 1921 article in *The Excavating Engineer* described construction of the MCDD levee. That article noted that 6,000 feet of the 11-mile long levee was constructed using a dragline, which in turn excavated 101,000 cubic yards from borrow pits on the interior side of the levee. Based on the high density of precontact archaeological sites adjacent to the Columbia River levee, it can be assumed archaeological deposits were excavated and deposited in the levee fill. Based on reported artifact densities from nearby sites at which excavations have been conducted, the 6,000 feet of the levee with 101,000 cubic yards could contain from 400,000 to 3,000,000 artifacts. This can best be considered an educated guess but provides a sense of the potential for archaeological materials in levee fill. It should be emphasized the hypothesized estimate of possible artifact density in levee fill is only for the 101,000 cubic yards referenced for the 6,000 linear feet of the MCDD levee, which represents about 10% of the entire length of that levee.

Another area of archaeological potential is in PEN 1, the former site of Vanport City. Vanport was constructed beginning in 1942 and was Oregon's second largest city at the peak of shipyard activity during World War II. The community was destroyed in the major Columbia River flood on May 30, 1948. Salvage efforts were initiated almost immediately after the flood, with demolition of surviving buildings beginning in August 1948 and completed in April 1949 (Maben 1987:127-128). However, it is unquestionable that a lot of small debris would have remained on the surface and buried at shallow depths. Subsequent development of Portland International Raceway and Heron Lakes Golf Course would have further redeposited some of this debris. A considerable amount of historic or modern debris was encountered in archaeological fieldwork at the present Vanport Wetlands location in 1998 but could not be definitively associated with Vanport. Those materials were therefore not recorded as an

archaeological site (Chapman et al. 1998:13). Debris from Vanport is likely to have deposited throughout PEN 1 and would now be considered an archaeological resource.

2.6. Native Peoples

At the time of European American contact various Chinookan-speaking groups occupied the Columbia River valley from The Dalles area to the Pacific Ocean. Ethnographers today differentiate the Chinookans primarily on linguistic variation. Speakers of the Lower Chinookan language included the Clatsop and Chinook proper, who lived around the mouth of the Columbia River. Upper Chinookan speakers occupied the upriver areas. Upper Chinookans in the Portland area consisted of two groups, the Multnomah and the Clackamas. Multnomah villages were concentrated on Sauvie Island, along the Multnomah Channel, and along the northern bank of the Columbia River downstream of the mouth of the Willamette. The Clackamas were found primarily on the river of that name, at Willamette Falls, and along the lower Willamette River. There is some evidence that the area around the mouth of the Willamette River and the southern shore of the Columbia River between the Willamette and Sandy rivers was occupied by both Clackamas and Multnomah groups (French and French 1998:360-363; Silverstein 1990:533-535).

Upper Chinookan can be considered a chain of related languages, with the Multnomah and Clackamas thought to have spoken different languages (very little information is known about the Multnomah language). The Clackamas spoke Kiksht, a language they shared with the Chinookans who lived in the western Columbia River Gorge (French and French 1998:360, Figure 1; Silverstein 1990:534-535). There were close ties between the Clackamas and the groups of the Columbia River Gorge (now designated the Cascades Indians). These relationships, the independence of individual Chinookan villages, and the mobility of both individuals and groups in the lower Columbia River valley can make it difficult at times to clearly establish who was where and when. European American concepts of territoriality and land and resource ownership are rarely applicable to the present study area. Ties of kinship through “blood” and marriage usually defined where individuals lived and rights of access to resource locations. As individuals often married outside their home villages, most families had networks of relationships that crossed both linguistic and cultural boundaries.

The complexity of relationships among Native groups can be seen in the historical accounts throughout the nineteenth century. The first known European American exploration of the area was by Lt. William Broughton of the H.M.S. Chatham in October 1792. Broughton’s exploration was brief, however, and other than referencing a few villages along the Columbia River, he provided little information on the Indians of the area (Lamb 1984:II:754-760).

Much better information is provided in the journals of the Lewis and Clark Expedition, which passed through the research area in the fall of 1805 and the spring of 1806. The accounts of the fall journey through the area are brief as the expedition was anxious to reach the Pacific before winter set in. On November 4, 1805, however, they visited the Ne-er-cho-ki-oo village, which was situated at or near the modern location of Portland International Airport (the expedition’s

maps show the village on the south side of the Columbia near the downstream end of Government Island).

We landed at a village of 25 Houses: 24 of these houses we[re] thatched with Straw and covered with bark, the other House is built of boards in the form of those above [i.e., in the Columbia River Gorge], except that it is above ground and about 50 feet in length and covered with broad Split boards This village contains about 200 men of the Skil-loot nation I counted 52 canoes on the bank of this village many of them very large and raised in bow [Moulton 1990:17; spelling and punctuation as in original].

The following spring on their return eastward, the expedition stopped briefly on the north side of the Columbia opposite this village. They were visited by five residents from the village.

When we descended the river in November last there were 24 other lodges formed of Straw and covered with bark near this house; these lodges are now destroyed and the inhabitants as the Indians inform us have returned to the great rapids of this river which is their permanent residence; the house that remains is inhabited . . . they [the visitors] informed us that their relations who were with them last fall usually visit them at that season for the purpose of hunting deer and Elk and collecting wapatoe and that they are lately returned to the rapids I presume to prepare for the fishing season as the Salmon will begin to run shortly [Moulton 1991:38].

At the beginning of April 1806, the expedition camped at the mouth of the Washougal River to accumulate food supplies before continuing their return up the Columbia. While there, they were informed by visiting Native men of the existence of the Willamette River, which had been hidden behind islands in the Columbia. William Clark and a small group decided to undertake a brief exploration up the river with a local guide. As they traveled down the Columbia to the Willamette, their guide pointed to a village on the south shore of the Columbia that was his home village, the name of which he said was Ne-cha-co-lee (also transcribed as Ne-cha-co kee).

The village visited previously was visited again by Clark, who provided a further account of the village and named it for the first time.

I landed at a large double house of the Ne-er-cho-ki-oo tribe of the Shah-ha-la Nation. At this place we had Seen 24 additional Straw Huts as we passed down last fall and whom as I have before mentioned reside at the Great rapids of the Columbia. On the bank at different times I observed Small Canoes which the women make use of to gather Wappato & roots in the Slashes . . . I think 100 of those canoes were piled up and Scattered in different directions about the Woods in the vicinity of this house, the pilot informed me that those Canoes were the property of the inhabitants of the Grand rapids who used them occasionally to gather roots. I entered one of the rooms of this house and offered Several articles to the natives in exchange for Wappato [the remainder of Clark's account relays a trick he played on them to compel them to trade with him] [Moulton 1991:57-58].

Clark stopped briefly at Ne-er-cho-ki-oo again on his return from the Willamette, adding only that the plankhouse was the home of eight families (Moulton 1991:64). Continuing his return to the Washougal camp, Clark stopped at Ne-cha-co-lee. He described the village as consisting of one long house with Seven apartments or rooms in Square form about 30 feet each room opening into a passage which is quit through the house those passages are about 4 feet in width and formed of Wide boards Set on end in the ground and reaching to the Ruff which Serves as divisions to the rooms. The ground plot is in this form [referencing a drawing in this journal] . . . this house is built of bark of the White Cedar Supported on long Stiff poles resting on the ends of broad boards which form the rooms &c. back of this house I observe the wreck of 5 houses remaining of a very large Village, the houses of which had been built in the form of those we first Saw at the long narrows of the E-lute Nation with whom those people are connected [Moulton 1991:64-65].

Clark asked the people about the abandoned houses and was told that a disease (probably smallpox) had killed many people about 25-30 years prior. He noted the Clatsop at the mouth of the Columbia had also told the expedition of an epidemic in the past (Moulton 1991:65).

From these descriptions, it is clear that Ne-er-cho-ki-oo had year-round residents who occupied a “large double house” constructed of cedar planks and typical of the plankhouses of the lower Columbia region. The inhabitants were related to another group who spent the winter at the village, occupying more temporary dwellings of “straw.” The visitors spent the remainder of the year living at the Cascades of the Columbia, their “permanent” home. The “double house” is likely to have been two smaller plankhouses with a common roof. The Ne-er-cho-ki-oo house was probably of similar construction as the Ne-cha-co-lee house; i.e., two houses separated by a narrow passage but with a shared roof. Lewis and Clark also reported “double” houses at the Cascades (Moulton 1991:110).

Lewis and Clark’s “Estimate of Western Indians” provides three different estimates of the population of Ne-er-cho-ki-oo: (1) two houses (the “double house”?) with 40 residents, (2) two houses with 140 residents, and (3) one house with 100 residents (Moulton 1990:478, 483). These contrasting numbers suggest that Lewis and Clark could not decide whether to count the “double house” as one or two houses. The higher population estimates probably include the seasonal residents. Ne-cha-co-lee is listed as one house with 100 residents (Moulton 1990:478, 484).

The presence of both permanent and seasonal visitors at Ne-er-cho-ki-oo created some confusion for Lewis and Clark in deciding to which Native group to assign the residents. They are referred to first as “Skil-loots” and later as “Shah-ha-las.” In their “Estimate of Western Indians,” Lewis and Clark (Moulton 1990:475) listed the “Shah-ha-las” as inhabiting the Columbia River from the Cascades of the Columbia downriver to Sauvie Island. The “Skil-lutes” extended from Sauvie Island downstream to the Cowlitz River. This change in designation suggests that Lewis and Clark first included Ne-er-cho-ki-oo with the Skil-lutes based on their geographical proximity and superficial similarity to the downriver peoples. More knowledgeable of Native groups on their return voyage, they reassigned Ne-er-cho-ki-oo to the upriver Shah-ha-las. Ne-cha-co-lee was defined as a village of Wap-pa-to Indians, which was their designation for the

people living from this settlement downriver to around the mouth of the Kalama River but excluding Ne-er-cho-ki-oo.

Lewis noted subtle differences in women's dress and burial practices among Native groups once they reached the area around the mouth of the Willamette River. He also commented that the more upriver people "have a few words the same with those below but the air of the language is entirely different, insomuch, that it may be justly deemed a different language" (Moulton 1991:38-39). His observation appears to have a recognition of entering the stretch of the river where Kiksch was spoken.

Anthropologists now consider Ne-er-cho-ki-oo to be the most downriver village of the Upper Chinookan people whose settlements were concentrated upriver at the Cascades of the Columbia in the Columbia River Gorge. The name "Ne-er-cho-ki-oo" appears to represent a misunderstanding by Lewis and Clark of the Chinookan phrase *niłxklayu*, which translates as "they went back home" (French and French 1998:362; Moulton 1991:61 fn 18). Ne-cha-co-lee appears to be an anglicized version of *ničáqwli*, 'stand of pines', (Clark [Moulton 1991:56] remarked that his guide's village was "near Some pine trees") (Silverstein 1990:Figure 1).

Neither village appears again in the historical record with their respective names. Ne-cha-co-lee may have been abandoned, or displaced, within a few years after Clark's visit. Alexander Henry, a later fur trader, briefly noted stopping at "the remains of an old village on the south side below seal rocks" to repair some canoe damage on January 12, 1814 (Gough 1992:II:643). "Seal Rocks" are a group of rocks in the Columbia a little below the mouth of the Sandy River.

There are references to a village at approximately the same location as Ne-er-cho-ki-oo described as the home of the "Cath-lal-thlalah Tribe." An 1838 census by the Hudson's Bay Company (HBC) listed this settlement as a winter village, with a summer village at the Cascades. The population of the winter village was 130 in 1838 (Manitoba Provincial Archives, HBC Archives B. 223/1/1, Folio 28, 1838). In September 1842, the Catholic missionary and bishop François Blanchet visited the Cascades, where he reported that Native groups were preparing to "leave their summer encampments and move to winter on the Vancouver islands [islands in the Columbia River near Fort Vancouver], where the cold is less rigorous and hunting more abundant" (Landerholm 1956:88-89).

The Ne-cha-co-lee village has long thought to be represented archaeologically by site 35MU24 in Blue Lake Park. The site fits the general location described by Lewis and Clark (i.e., opposite Government Island) and it represents a major settlement. Archaeological fieldwork at this site in the past (Archibald 1984; Ellis and Horton 1998; Woodward 1983; Woodward et al. 1977) have established the site deposits extend under the levee. However, the most recent fieldwork and research at the site have not yielded any evidence the site was occupied during the early contact period. Fieldwork in 1994 and 1996 at another site, 35MU70 at the intersection of Marine Drive and NE 185th, encountered deep midden deposits and yielded radiocarbon dates indicating an early contact occupation (Minor et al. 1994; Musil and Toepel 1996). This site would also fit the Ne-cha-co-lee location reported by Clark and is therefore another candidate archaeological site for the village. The site deposits for 35MU70 site also extend under the levee.

There is presently no known archaeological record of either Ne-er-cho-ki-oo or the later settlement referenced in the HBC records. Although not officially recorded as an archaeological site, N.G. Seaman (1946:8) describes a village site opposite the lower end of Government Island that was noted by Lewis and Clark (Ne-er-cho-ki-oo, see below). Seaman mentions that an early pioneer along the Columbia River noted the presence of a camp site, but that the site “had gone into the river a long time ago” and that portions were covered by over 30 cm (1 ft) of sand following the 1876 flood. Despite efforts to find this site, the only item observed by Seaman was a “poor pestle” near the top of the river bank. Similarly, Emory Strong (1967:26, 32) reported site MU18 (not an official Smithsonian site number) at the former location of the Ne-er-cho-ki-oo village near Portland.

By the 1840s, the character of the Native settlements throughout the lower Columbia River drainage had been radically altered by the epidemics of introduced European diseases and forced displacement. A smallpox epidemic is known to have struck the lower Columbia region in the 1770s and is estimated to have killed about a third of the Native population. Native peoples experienced periodic outbreaks of smallpox and possibly other introduced diseases such as measles through the 1860s. For the people of the lower Columbia, the most devastating epidemic was an outbreak of malaria in the 1830s. This epidemic devastated the Indian people of the lower Columbia region, eventually spreading east of the Cascade Range and south to northern California (Boyd 1990:146-147, 1999:233-238). The malaria epidemic of the early 1830s destroyed entire villages in a matter of days or weeks. The Indian population of the Willamette Valley and the lower Columbia River valley was reduced by 75 to 90% or higher. Boyd (1999:Table 3) has estimated that Cathlamet, Multnomah, Clackamas, and Cascades populations declined from about 12,000 in about 1800 to 300 by the 1850s (a population loss of almost 98%). These statistics hide what was undoubtedly a terrifying and devastating experience for the people struck by the disease. The oral tradition of the effects of the epidemic continued until at least the 1930s among some of the groups affected.

The first major expansion of European American settlements began in the 1840s, as thousands of American settlers flooded into western Oregon and Washington. There was a brief period through the 1840s when the new settlers and the Native populations lived uneasily side by side. By 1850, however, the need to clear Indian title to the land to provide a legal basis for the land claims of American settlers led to a series of treaty negotiations beginning in 1851.

The first treaties signed with the surviving tribes of western Oregon would have established several Indian reserves in the Willamette Valley. These treaties were never ratified by Congress due to opposition by American settlers to the reservations. Treaties signed during a second round of negotiations in 1854 and 1855 were ratified. One of these treaties included the Chinookan groups of the Clackamas and lower Willamette river drainages (Beckham 1990; Kappler 1904:II:665). No reservations were formally defined in the treaties with the tribes of western Oregon, but two reservations (Siletz and Grand Ronde) were established by executive order shortly after the treaties were ratified. With creation of the reservations, federal troops began the process of relocating the Willamette Valley groups to the reservations. Some of the Chinookans

of the Clackamas and lower Willamette river areas moved to the Warm Springs and Yakama reservations where they could be with their upriver relatives.

One of the groups signing the 1855 Willamette Valley treaty were the “Wa-lal-la band,” who were described as occupying “the southern banks of the Columbia River between the Willamette and Sandy, though they claim a considerable tract north of the Columbia, commencing a few miles above Fort Vancouver and extending to the Cascade Falls” (Joel Palmer, Oregon Superintendent of Indian Affairs, to George W. Manypenny, Commissioner of Indian Affairs, letter, January 23, 1855). The “Wa-lal-la” and the “Cath-lal-thlalah Tribe” were probably the same group as “wa” and “cathla” were often interchangeable prefixes in place names (“wa” means “place of”; “cathla” means “people of” [Hajda 1984:320]). Their treaty territory and their northern claims extending to the Cascades offer supporting evidence that these groups were the same and establish their continuing presence in the present project area into the early 1850s.

Palmer, the Oregon Superintendent of Indian Affairs cited above, established some temporary locations to which Indians were relocated while arrangements were made for establishing the more permanent reservations. One of these temporary locations was at the present site of Portland International Airport. There are only a few, brief references to this camp. Lot Whitcomb, who Palmer had assigned responsibility for creating this temporary “reserve,” was instructed to “proceed to the Indian Village on the bank of the Columbia River a few miles above Switzler’s and direct those Indians to repair at once to the designated encampment” (Joel Palmer, Oregon Superintendent of Indian Affairs, to Lot Whitcomb, letter, October 19, 1855, National Archives Microfilm M2, Roll 5, page 537). Whitcomb subsequently reported (Lot Whitcomb to Joel Palmer, letter, November 9, 1855, National Archives Microfilm M2, Roll 5, page 361) that he had moved “all the Indians on the south side of the Columbia River between the mouth of the Sandy and Willamette rivers,” numbering approximately 100 people, to an encampment “three miles above Mr. Switzlers.”

The “Mr. Switzler” was probably John Switzler, who had a Donation Land Claim (DLC) in the vicinity of modern Delta Park. The Switzler family operated a ferry across the Columbia River that connected the growing city of Portland to the south to Fort Vancouver. The Switzler ferry operated from about 1846 to 1856 and carried mostly foot traffic (Bauman 1988; McArthur and McArthur 2003:930). Whitcomb’s description of his “encampment” as being three miles above Switzler’s would place the camp in the general vicinity of the western end of the PDX North Runway. There are a few additional references to this encampment that provide some information on its location.

John Switzler’s son, Jehu, acquired the DLC of Ervine Taylor in 1855, which occupied a portion of the PDX North Runway. This property was subsequently described as between the DLC of Henry Holtgrieve on the east and an “Indian Reserve” on the west (Genealogical Forum of Portland 1957-1975:1:95). This reference indicates that the temporary camp established by Whitcomb was just west of the Taylor/Switzler claim. This would place the “Indian Reserve” in the western portion of the PDX North Runway.

In reminiscences of Henry Holtgrieve's wife Elizabeth (Attwell 1974:101) she described her husband traveling down the Columbia in late March or early April of 1856 and passing an "Indian camp" between the Millard claim and the Switzler ferry. The Gideon Millard DLC was about 1.6 km (1 mi) downriver of the Holtgrieve DLC, occupying the western portion of the present PDX. This Indian camp would therefore have been west of the PDX location and therefore appears to be different than the Indian Reserve described above.

The camp noted by Holtgrieve is likely to have been one of the "Indian encampments" recorded by GLO surveyor Butler Ives in late fall 1851 (Ives 1851b:207). Both of Ives's encampments were on the south shore of the Columbia River just west of the Millard DLC. Ives described one of these camps as the winter quarters of the Indians in residence and consisting of a group of cabins and huts. The second consisted of 3-4 cabins. Neither encampment was mapped on the GLO plat of T. 1N, R. 1E but can be plotted from Ives's fieldnotes. Both of these settlements were on the DLC of the heirs of Sarah Wilson but were not referenced when the DLC was surveyed in 1859 (Leland 1859). No Indian encampments are referenced in the GLO surveys of the neighboring Millard, Taylor, or Holtgrieve DLCs in 1853 and 1854 (Cartee 1853; Pownall 1854a, 1854b).

The encampments recorded by Ives in 1851 and the camp observed by Holtgrieve in 1856 do not appear to be the "Indian Reserve" established by Whitcomb. Holtgrieve's account is unlikely to be the reserve since Palmer (Diary of Joel Palmer, entry of April 4, 1856, Mss 114, on file, Oregon Historical Society) reported that all Indians from this area had been relocated by early April 1856. Furthermore, all of the land on the south side of the Columbia River west of the Holtgrieve DLC as far as the mouth of the Willamette River was occupied by other claims except an area between the Taylor/Switzler and Millard claims. Whitcomb may have established the temporary encampment on this unclaimed land.

It is clear from Palmer's instructions to Whitcomb that the "designated encampment" was to be a temporary settlement for the Wa-lal-la band before moving them to the Grand Ronde Reservation. Given the proximity of the reserve to the reported location of the Cath-lal-thlalah village, it seems likely that the reserve was at or very near the village, making it easier for Whitcomb to gather the Wa-lal-la there. From the Whitcomb and Palmer correspondence it is clear that the encampment was occupied beginning in late October/early November 1855 and had been vacated by early April 1856.

Available information is inadequate for determining if the Cath-lal-thlalah village or the Indian encampments noted in the 1850s correspond with Ne-er-cho-ki-oo. The locations given for the Cath-lal-thlalah village and Ne-er-cho-ki-oo in the written records are too imprecise to establish their locations. The Lewis and Clark map places Ne-er-cho-ki-oo on the mainland just below the lower end of Government Island (also see Plamondon 2004:50). This location would be in the vicinity of the Holtgrieve, Taylor/Switzler, and Millard claims. The encampments observed by Ives and Holtgrieve appear to be too far downriver to be Ne-er-cho-ki-oo but might represent the location of the Cath-lal-thlalah village, which is likely to also be the "Indian Village" mentioned in Palmer's letter to Whitcomb.

In considering this information, we can only conclude that there were one or more Indian villages on the southern mainland between the lower end of Government Island and the upper end of Hayden Island in the early 1800s. It is possible between 1806 and 1838 that Ne-er-cho-ki-oo village was relocated to the location referenced as the Cath-lal-thlalah village. The malaria epidemic that ravaged lower Columbia Chinookans in the early 1830s may have contributed to this move. If the encampments recorded by Ives in 1851 represent the Cath-lal-thlalah village, the village had dwindled slightly in population since 1838 (when the village had a population of 130) to the estimated 100 residents at Whitcomb's encampment. This is not unexpected given the impacts of American settlement and the continuing effects of introduced diseases. This stretch of the Columbia River appears to have ceased to be a center of Native settlement after local groups were forced to move to the Grand Ronde Reservation in the spring of 1856. Curtis (1911:181), who collected names of the Chinookan groups and villages in the early 1900s, listed no settlements along the Columbia River between the Washougal and Willamette rivers.

There were also a number of Indians who either eluded relocation or returned to their traditional homes after being placed on a reservation. In the current project area, the best-known example is an individual known as Indian John. Indian John was a Chinookan man who stayed in the area on the Wilkes family farmstead after most Native people had been removed to reservations. He had built a house for himself in the traditional Chinookan-style plankhouse. A second, larger house was built for him by local residents in a similar style. His dates of birth and death are unfortunately unknown other than he had died before 1939 (Darby 2014; Arlene J. Marble to David Ellis, letter, October 28, 1998, with attached transcript of 1939 reminiscences by Annie Wilkes Wright).

In 1934, anthropologist Philip Drucker interviewed John Wacheno, a Clackamas Indian and descendent of the Clackamas chief who had signed the 1855 treaty. Wacheno had been born on Eagle Creek near modern Estacada and appears to have spent his early years, at least, following a traditional way of life. He was most familiar with the lower Clackamas and Willamette Falls areas but mentioned (Drucker 1934:18) the wüxsün (wáksin) village at St. Johns and two locations up the Willamette River where the wüxsün people fished for sturgeon. Wacheno reported that the wüxsün people also fished for sturgeon at the mouth of the Willamette River.

Some Indian people, both those who had traditionally lived in the lower Columbia River drainage and those from outside the area, were drawn to the lower Willamette River by the spread of American settlement and the rise of the cities of Oregon City and Portland, as well as smaller communities. This area offered opportunities to both continue some traditional subsistence activity (e.g., fishing) and to find work as laborers in the cities and on nearby farms. Some Indians may have lived in the cities during the winter and worked on farms or in rural areas during the summer. Both Oregon City and Portland, as well as smaller communities along the lower Willamette River, have had Indian populations since time immemorial.

2.7. European American Historic Development

The present APE was a focus of European American settlement beginning in the late 1840s. This settlement was spurred by passage in 1850 of the Donation Land Claim Act. This Congressional act was designed to legitimize land claims made under the Oregon Provisional Government established in 1843 and to encourage further settlement. The Donation Land Claim Act allowed a single white man to claim up to 320 acres and a married couple up to 640 acres for free if they had arrived in the Oregon Territory before December 1, 1850. Individuals or couples who arrived after 1850 but before 1854 could claim only half the acreage of that could be claimed by those arrived before 1851. A woman held half of the acreage claimed by a couple in her own name.

As summarized in Table 2-3, 33 Donation Land Claims (DLCs) were filed within the present APE. Since DLCs were recorded by cadastral survey townships, an individual's or couple's claim might have multiple registrations if it extended into more than one township (e.g., the DLCs of Alexander Brown, George Force, and Jesse Flemming). One DLC—that of E.J. Taylor—was abandoned but subsequently acquired by Jehu Switzler through purchase rather than as a DLC (Genealogical Forum of Portland 1957-1975:I:95). Omitting the Taylor DLC, the total acreage of the remaining 32 DLCs was approximately 12,750 acres, which corresponds with the estimated total acreage of the APE. However, this is somewhat misleading as there are areas within the APE that were not within a DLC, and some of the DLCs extend outside the APE. A crude estimate is approximately 95% of the APE is within a DLC.

Eight DLCs were settled before passage of the Donation Land Claims Act, and those claims would reflect claimants who had arrived in Oregon during the first waves of the immigration in the 1840s (none of the claimants appear to have been former employees of the Hudson's Bay Company, whose arrival could date back to the 1820s). Only two claims postdate 1853 (Sarah Wilson and Calvin Reed); Sarah Wilson was a widow who held the claim in her own name. These data indicate the Columbia River floodplain attracted substantial settlement between 1850 and 1855, despite the challenges of farming land subject to annual flooding. The initial appeal of these lands may have been primarily the proximity to the Columbia River, which was the primary transportation corridor through the late nineteenth century. The GLO plats mapped the only locations of settlement were farms either on the natural levee of the Columbia River or at the southern edge of the floodplain, where the land sloped up to the south. These lands offered almost the only high ground on the floodplain. These plots depict vast expanses of the floodplain without any evidence of settlement although claimants were required to occupy their claims for four years and make improvements. As Bergquist (1957:33) has noted, the Act proved to be less successful than intended since 640 acres—or even 320 acres—was not practical for most families to actively farm in the 1850s and 1860s. As a result, once claimants received their patents, it was not unusual for portions of claims or entire claims to be sold, and some claims may have been filed only for speculation (the nineteenth-century equivalent of 'flipping').

Table 2-3 Summary of DLCs within the APE

Claimant	Claim #	Date settled	Acreage
T. 2N, R. 1E			
Alexander Brown	38	1848	270
George Force	39	1851	71
T. 1N, R. 1E			
Alexander Brown	67	1848	356
George Force	37	1851	554
J. R. Switzler	38	1851	412
John Switzler	39	1846	540
Sarah Wilson	73	1854	318
T. 1N, R. 2E			
Gideon Millard	37	1849	637
William Hall	66	1851	320
Anthony Whitaker	38	1850	644
Thomas Cully	39	1850	637
Henry Holtgrieve	55	1852	276
George Long	40	1852	319
Charles Stevenson	56	1851	265
E. L. Quimby	41	1852	640
John Powell	42	1852	320
David Powell	43	1851	324
William Wilkes	44	1847/1850	640
George Hamilton	45	1852	320
Jesse Flemming	46	1850	102
E. J. Taylor	58	Abandoned	
T. 1N, R. 3E			
Jesse Flemming	37	1850	213
Robert Wilmot	43	1850	323
George Pullen	44	1852	637
John Crosby	40	1852	643
Charles Fezett	47	1852	638
William Taylor	42	1852	234
Jacob Zimmerman	39	1853	329
E. R. Scott	38	1851	645
James Stott	48	1852	322
Calvin Reed	60	1854	320
Lewis Marr	45	1853	161
D. F. Buxton	59	1853	320
<i>Note: Claim number and acreage from GLO records. Date settled from Genealogical Forum of Portland 1957-1975.</i>			

With the exception of the limited areas of higher ground, the floodplain was used almost exclusively for grazing livestock and raising hay crops into the early 1900s as noted above. The U.S. Coast and Geodetic Survey maps that date 40 to 50 years after the GLO plats (see Figure 2-5) depict little change from the 1850s. There is a more extensive network of farm roads and fence lines, especially in the present MCDD area. But buildings and associated structures are confined to the Columbia River levee (however, most of the southern floodplain is not represented on these charts). The 1897 USGS Portland map provides coverage for PEN 1, PEN

2, and MCDD and depicts the southern floodplain not addressed in the USC&GS charts. It shows scattered houses or farms along the Columbia River levee and two or three buildings on the interior sloughs (barns or sheds?), with the densest settlement at the southern edge of the floodplain on the higher ground along the future Sandy Blvd. A 1905 revised edition of the USGS map shows no substantial changes since 1897. In 1917, a detailed topographic map of the floodplain was prepared for planned development of MCDD (Walters 1917). This map shows a similar network of roads as the earlier maps, and the only permanent structures within the APE were located along the Columbia River natural levee, with the possible exception of one or two buildings shown on the lower floodplain.

The 1927 Metsker Map of Multnomah County provides only maps of the roads and property ownership but also illustrates the changes from development of the drainage districts over the previous 8-10 years. PEN 1 has a relatively limited number of landowners and remains focused on the Swift meat-packing plant and associated industries on the north. PEN 2, however, has residential plats at Bridgeton and extensive planned development for “Golf Acres” to the north and south of the Columbia Country Club (now the Columbia-Edgewater Country Club). There is still considerable farmland in MCDD but there are also several plats for planned residential development, including some “garden tracts” popular in the 1910s and 1920s (10-15-acre residential lots promoted to families as offering land for a small garden or orchard). The Parkrose community was shown extending north of the present neighborhood almost to the Columbia. Interestingly, some families who had had DLCs still held some land (e.g., Holtgrieve, Pullen, Powell, Zimmerman), as well as families who were still farming in the area until recently (e.g., Egger, Cereghino).

The later historical development of the APE has been described above in the evolution of the environmental setting or is addressed below in the history of the drainage districts.

2.8. Drainage District Historical Development

The history of efforts to open lands to agriculture through construction of dikes and drainage systems extends back in time for thousands of years. Such efforts in the United States were initiated in the early 1800s but were primarily limited to individual farmers and landowners. Some limited legislation was adopted to encourage reclamation of swamp lands. In 1849, Congress passed a Swamp Land Act that transferred unclaimed swamplands to the State of Louisiana. The intent was to provide additional revenues to the state through reclamation and sale of those lands. The Act was extended to other southern states in 1850 and then to Oregon and Minnesota in 1860. Under the Act, the states were to designate swamplands and take ownership of them for eventual reclamation and sale. Abuse and corruption pervaded implementation of this act in every state, however (Carlson 2010:452).

In 1877, Congress passed the Desert Land Act, which was intended to encourage settlement and irrigation of arid lands in the American West. Its provisions were also initially subject to considerable fraud and abuse. The cost for constructing effective irrigation systems was also difficult for smaller claimants. One consequence was growth in private irrigation companies,

many of which proved to not be financially viable (Ganoe 1937). The 1890 census gathered data on western irrigated lands and reported that irrigation had had limited success in Oregon. Other than Jackson and Josephine Counties and the Hood River Valley (still in Wasco County in 1890), irrigation projects had been undertaken only in counties east of the Cascade Range, and even in those counties only about 5% of arable land had been irrigated. The most extensive irrigated acreage was in Baker, Harney, and Lake Counties, and in only three counties (Baker, Lake, Malheur) did the irrigated acreage occupy more than 10% of arable land (Newell 1894:202-217).

The Desert Land Act had had limited success in transforming arid lands in the American West into productive farmland. At the same time, there was a rapidly growing movement around the importance of irrigation, to which John Wesley Powell's 1879 Report on the Lands of the Arid Region of the United States was a critical early study. More studies were conducted in the 1880s, and 1891 saw the first meeting of the Irrigation Congress and publication of its journal, *The Irrigation Age*. The extensive lobbying for direct federal support of reclamation through the 1890s by the National Irrigation Association culminated in passage Reclamation Act in 1902 (Lee 1978:510-519). The Reclamation Act led to the creation of the Reclamation Service. Since the Reclamation Act was designed to address arid lands, the first projects in Oregon were east of the Cascade Range, in Malheur, Klamath, and Umatilla Counties (Lovin 2009:170-171).

The Reclamation Act had not passed without opposition. Some Midwestern and Southern members of Congress began lobbying for Reclamation funds for use in draining wetlands in the South and upper Midwest. This effort was then opposed by western members of Congress. Negotiations in 1906 to forge a compromise led to formation of the National Drainage Association (NDA). The NDA was established to be "a permanent lobbying organization dedicated to securing the passage of a national drainage law" (Carlson 2010:464). This effort ultimately failed due to regional conflicts and a 1907 U.S. Supreme Court decision that suggested the federal government did not have authority to improve private lands (under the Swamp Land Acts, ownership of many wetlands had been transferred to states and had subsequently been privatized). The NDA therefore shifted their focus to lobbying states that had not yet adopted legislation permitting the formation of drainage districts (Carlson 2010:465-470).

Despite the failure to develop a centralized federal drainage program in the first decade of the twentieth century, the formation of local drainage districts increased significantly during this era. Drainage districts began to be established in the decades after the Civil War, especially in the 1880s and 1890s. "The heyday of land drainage occurred between 1900 and 1919 when high farm incomes, heavy demand for agricultural commodities, and above normal precipitation provided optimum conditions for the organization of fifty-one million acres of farmland . . . into drainage districts and other municipal drainage projects" (Carlson 2010:452-453). Census data from 1920 reported almost 80% of drainage organizations (drainage and levee districts) had been formed between 1900 and 1919 (Marsden 1922:371).

State laws authorizing the establishment of drainage districts began to be enacted in 1857 (Michigan) and were largely limited to Midwestern states through the late 1800s. An 1868 Oregon statute authorized individuals and municipalities to apply for permission of the relevant

county to construct drainage facilities by acquiring rights of way across the necessary lands (U.S. Bureau of the Census 1932:406). The only other Western states authorizing drainage systems in the late 1800s were California (1885) and Washington (1895). Other western states followed between 1900 and 1920: Idaho (1903), Texas (1904), Nevada (1913), New Mexico (1917), Utah (1917), and Wyoming (1920) (McCorvie and Lant 1993:26).

The 1868 Oregon law appears to have addressed only the construction of drainage ditches or similar facilities but not the formation of drainage or diking districts. Further actions at the state level in Oregon followed passage of the Reclamation Act. The Oregon Reclamation Association was established in 1902 but was replaced by the Oregon Conservation Committee, which was created by the Oregon Legislature. That Committee was instrumental in passage in 1909 of the first legislation defining a process for the creation of drainage, diking, and irrigation districts (Lord and Montague 1910:III:2204-2238). Much of this legislation focused on formation of irrigation districts, possibly in response to problems that had arisen with irrigation projects in eastern Oregon.

The 1909 legislation stated that the owners of more than one-half of the acreage of lands “susceptible of one system of drainage, desire to drain and protect the same from overflow” could petition the relevant county for creation of a drainage district. The statute also defined how to establish a drainage district board and also granted such districts the authority to condemn land if necessary. Similar legislation was enacted for the creation of diking districts for lands subject to “overflow by tide water, or by freshets” (Lord and Montague 1910:III:2204, 2206-2207, 2209-2210). The 1909 statute was amended in 1911, 1913, 1915, and 1917. By 1919, the 1909 statute had grown substantially in length due the additional provisions on bonding authority, management of the districts, levying of taxes, etc. The 1909 language on formation of districts had been revised to read (Oregon State Water Board 1919:3):

The persons shown by the records of the county to be the owners of fifty per cent of the acreage in any contiguous body of Swamp, wet or overflowed lands or irrigated lands, waters from which contribute to the swamp, wet or overflowed conditions of said lands or any other lands, situate in one or more counties of the state, may form a drainage district for the purpose of having such lands reclaimed and protected by drainage or otherwise, from the effects of water for sanitary or agricultural purposes, or when the same may be conducive to the public health, convenience and welfare or of public utility or benefit.

Likely contributing to the legislation was formation of the Oregon Irrigation Congress in 1912 with a focus on providing state support for reclamation projects. The culmination was a 1919 amendment to the Oregon Constitution authorizing the State to guarantee the interest on the bonds issued by drainage and irrigation districts (i.e., cover the interest on such bonds if a district was unable to pay the interest). Districts were required to meet certain conditions to qualify for state support. Reclaimed lands could be sold, with World War I veterans and Red Cross nurses given preference in the purchase those lands (King 1972:4-5; Oregon State Water Board 1919:31-32). This provision in the Constitution was repealed in 1930.

The Oregon State Drainage Association was organized in 1915. A major figure in the organization was W.L. Powers, who chaired the Department of Irrigation and Drainage at Oregon Agricultural College (now Oregon State University). Powers was author or co-author of several leading guides on drainage in the 1920s and 1930s, especially for Oregon (e.g., Powers 1919, 1923a, 1923b, 1930; Powers and Cretcher 1921; Powers and Teeter 1922). Powers was a major proponent for the drainage of wetlands in the Willamette Valley for conversion to farmland. The Irrigation Congress and Drainage Association shared similar interests and merged in 1925 to form the Oregon Reclamation Congress, although the two organizations held separate meetings in 1926 and 1927 (King 1972:7-8).

The state legislation and the promotion of irrigation and drainage districts spurred interest in organizing such districts on the Columbia River floodplain in the Portland area beginning in the early 1910s. In January 1913, North Portland interests began lobbying for creation of a drainage district in the Peninsula area. The major focus of this effort was to dredge Columbia Slough for shipping and to provide an outlet for sewerage (Morning Oregonian 1913a, 1913b). By mid-February 1913, the Portland City Engineer had defined the boundaries of the proposed district (Morning Oregonian 1913c). The proposed district was still being promoted into March 1913 (Morning Oregonian 1913b) but appears to have lacked sufficient support and faded until revived in 1916.

The year 1916 witnessed the first successful effort at construction of flood control facilities in the present project area. Prominent Portland industrialist Charles Swigert and two partners had purchased the Sun Dial Ranch at the present location of the Troutdale Airport in 1905. Planning to subdivide the ranch into smaller tracts and concerned about the viability of the land due to flooding, they constructed a levee and a pump at the western boundary of the ranch in 1916. Levee construction continued into 1917 around the northern and eastern perimeters of the property. It was in 1917 that Sun Dial Ranch, the Union Meat Company (which owned land in the area), and several other landowners petitioned to establish “the Sandy drainage district. . . . They state in their petition that they desire to reclaim approximately 1500 acres lying between the Columbia and Sandy rivers. The proposed reclamation is for both sanitary and agricultural purposes” (Oregonian 1917).

A newspaper article in October 1918 (Sunday Oregonian 1918a) described a visit to Sun Dial Ranch by a large contingent of Portland area realtors. The visitors were “particularly interested in the fact that most of the Sun Dial ranch is land reclaimed from Columbia Slough by diking and drainage.” Following the visit to Sun Dial Ranch, the realtors traveled west “to inspect the proposed drainage and diking project along the shores of the slough from the Sun Dial ranch to the Interstate bridge.”

Not surprisingly, the tour of the proposed new district was led by J.O. Elrod, who was the leading proponent for what became the Multnomah County Drainage District No. 1. Elrod was an important real estate developer who—in partnership with several others—first proposed organizing the drainage district in early 1917.

Prior to this proposal, the Columbia Slough Development League reported a proposed Corps survey of the entire slough to make the slough navigable for small boat. At the same time, the City of Portland had initiated studies for possible use of the slough for disposal of sewage (Sunday Oregonian 1916a). Shortly after this report (January 1916), the North Portland Commercial Club stated it had chartered a train to carry volunteers armed with picks and shovels to travel to the headwaters to dig a 200-foot long channel to connect the upper end of Columbia Slough to the Columbia River, thus providing better flow for moving sewage through the slough (Oregonian 1916a). There is no record this channel was dug. Later in the year, several meetings were held in north Portland to rally support for formation of a drainage and reclamation district that would extend along Columbia Slough from its mouth to Troutdale and between the Columbia River and Alberta Street (Oregonian 1916b).

North Portland business interests continued to promote improvements to Columbia Slough through the summer of 1916. Newspaper articles noted both an interest in dredging the slough for ship traffic but also that dredging the slough would open up thousands of acres for farming. Flooding in June of that year that destroyed crops in the lowlands provided additional evidence for the need for improvements to the slough area. The public discussion and debate were concurrent with the City's plan to use the slough as a sewage outlet. Diking and dredging of Columbia Slough was thus presented as serving three objectives: creating a ship channel, opening up land for farming, and serving as a means of disposing of sewage (Oregonian 1916c; Sunday Oregonian 1916b). Local businesses led by the Peninsula Industrial Company and the Swift Meat Company organized the Peninsula Drainage District No. 1 in 1916. The following year saw formation of Peninsula Drainage District No.2 (Harry 1921a). The Swift Meat Company had purchased the former Union Meat Company plant along the Oregon Slough in 1906 and created the Kenton community in the early 1900s, where many of its workers lived (MacColl 1976:466).

There were no newspaper reports on these efforts between July 1916 and May 1917. It's unclear if this only reflects a lack of newspaper coverage or promotion of drainage projects waned during those months. May 1917, however, saw a report that a Multnomah County judge had approved formation of a Peninsula Drainage District, which would encompass 951 acres (Oregonian 1917). However, newspaper accounts failed again until January 1918 (U.S. entry into World War I in April 1917 undoubtedly diverted attention away from issues). In early 1918, another major dredging of Columbia Slough was proposed (Sunday Oregonian 1918b):

The plan is to dredge the Slough from the Willamette River to Blue Lake, about a mile from Fairview Avenue, and to dredge an intake from the Columbia River to Blue Lake, making Blue Lake a settling basin where silt may settle and thereby avoid settling in the Slough channel after the original dredging is completed.

The channel, as proposed, would be 300 feet wide, 14 feet deep at low water, 16 miles long, would cost about \$50,000 a mile, including the piling of the shore lines, at the intake. Such a channel would open up a vast extent of new industrial property and would furnish a means of disposing of Peninsula District sewage.

The Portland City Engineer stated the reclaimed lands would “change from cheap low-water pasture lands to high class industrial sites.” The projected costs for the project were \$900,000, with half the funding to come from the federal government (Oregon’s Congressional delegation promised support). A major issue to be addressed was the City’s plan to use the slough for sewage disposal from the Peninsula area, with concern that the slough was too sluggish to move the sewage. One proposal therefore recommended excavating a channel from the Sandy River to Blue Lake to increase water flow in the slough (Sunday Oregonian 1918b).

The plans then encountered major controversy with formation of the Multnomah County Drainage District No. 1 in late 1917. The District subsequently obtained a permit from the Corps to build a dam across Columbia Slough at Union Avenue. The dam would be a critical element in reclaiming the lowlands to the east. Local residents and the City of Portland immediately objected on the grounds the dam would prevent dredging the slough for shipping and would diminish water flow to an extent that disposal of sewage into the slough would no longer be viable (Laurgaard 1921:43; Oregonian 1918a, 1918b). The District and the City eventually resolved their differences through an agreement under which the location of the District’s proposed dam was relocated about 0.8 mile to the east. To move forward with the sewerage project, the City dredged the slough below the new “dam” (actually a levee) and excavated a new channel to the Columbia River that would assure sufficient flow for sewage. The new channel extended northerly following an existing slough (McBride’s Slough) and then continued to the Columbia in an artificial channel. This was later known as the “City Canal” or “Peninsula Drainage Canal.” Construction of the canal began in 1919 and was completed in 1921 (Laurgaard 1921:47-48; Oregonian 1919). The contractor for construction of the canal was Charles Swigert’s Pacific Bridge Company.

The creation of the four drainage districts was often presented as a means of transforming the floodplain into productive farmland. A 1918 tour of the Sandy and Multnomah drainage districts by delegates at Oregon State Drainage Association emphasized the increased value of crops grown on reclaimed land (Oregonian 1918c). As U.S. involvement in World War I escalated, the benefits of constructing the levees were stressed as integral to increasing emergency food production (Gresham Outlook 1918). A prominent Sunday Oregonian article in August 1920 (Harry 1920) glorified the transformation of mosquito-breeding lands and “carp pasture” into a “vegetable garden that will produce the best grown-stuffs at minimum cost.” “It means the addition of further industry to the city, the creation of more wealth, the lowering of living costs, and the placing of more families on the land that will yield a good living.” Harry echoed his promotion of the districts a few months later in another Oregonian article that described the reclamation projects as promising a “New Netherlands District Replaces Territory Formerly Haunt of Browsing Carp, Adding One-Third to Cultivated Area of Multnomah County” (Harry 1921b) Another 1921 article also stressed an increase in acreage from the drainage projects, providing Portland with a productive truck garden (Harry 1921c).

Agricultural prospects may not have always been the primary motivation for the formation of the districts. The late 1910s witnessed a push for development of industrial sites along the lower Willamette River, and the Peninsula district was promoted as the location of major growth in

Portland (MacColl 1979:227-230). It seems unlikely that the two major petitioners for the Peninsula Drainage District No. 1—the Peninsula Industrial Company and Swift Meat—were seriously interested in improving farming opportunities.

Another example of evolving plans is with J.O. Elrod and the Multnomah County Drainage District No. 1. Elrod was a prominent real estate developer and investor in Portland through the 1910s and 1920s, including industrial development of the Guild’s Lake district. Elrod partnered with other prominent business interests to establish the drainage district and served as its first president. The District’s organizers initially planned to provide opportunities for farming for returning veterans from World War I, and construction of the levee was used as a project by the U.S. Employment Service to employ servicemen returning from World War I (Oregon Sunday Journal 1919). They were successful in this plan until the collapse of farm prices beginning in 1920. By the mid-1920s, Elrod had shifted his investments in the drainage district to recreational developments. As early as 1924, Elrod became involved in developing two private golf courses within the newly established drainage districts, Columbia (later Columbia Edgewater, located in PEN 2) and Alderwood (located in MCDD, later demolished for the Portland Airport). Elrod became president of both golf clubs. These golf clubs were soon followed by three more, Broadmoor, Riverside, and Colwood (all located in MCDD) (MacColl 1979:240-244).

The initial impact of the drainage projects on agricultural production can be challenging to measure. The acreage of improved farmland in Multnomah County increased by more than 10,000 acres from 1910 to 1920. There was also a substantial increase over the same decade of total farm acreage by about 14,000 acres (Hall 1925:Table No. 2), which may reflect the surge in farm prices during World War I. But it isn’t clear how much of that increase can be attributed to development of the drainage districts as improvements in drainage on the floodplain were just beginning. The reported census data for 1920 (U.S. Bureau of the Census 1922:VII:722) enumerates 163 farms in Multnomah County as having drainage, but only 8 of those farms were listed as being in a drainage and levee district. However, the Hall report (1925:20, 28) noted a decline in dairying—which had a mainstay of agriculture on the Columbia River floodplain since the 1850s—and an increase in the production of truck crops: “several thousand acres of dyked land adapted to celery, cabbage, cauliflower, lettuce, and other vegetables are available” (Hall 1925:28).

The Great Depression of the 1930s created major financial challenges for irrigation and drainage districts. Support from the federal government through additional funding from the Bureau of Reclamation and research projects such as soil and hydrographic surveys by the Works Project Administration (King 1972:10).

The 1930s also saw the first involvement by the Corps in reclamation projects through the 1936 Flood Control Act. The act specified

The words “flood control” as used in section 701a of this title, shall be construed to include channel and major drainage improvements and flood prevention improvements for protection from groundwater-induced damages, and Federal investigations and improvements of rivers and other waterways for flood control and allied purposes shall

be under the jurisdiction of and shall be prosecuted by the Department of the Army under the direction of the Secretary of the Army and supervision of the Chief of Engineers [33 U.S. Code § 701a-1].

The 1938 annual report of the Chief of Engineers listed 40 drainage, diking, and improvement districts on the lower Columbia in which the Corps had initiated support. For the current projects, only surveys for proposed actions had been conducted in 1938. No work was proposed in 1939, but the following projects were recommended for 1940 (U.S. Army Corps of Engineers [USACE] 1938:1779-1782):

1. SDIC: reconstruction of approximately three miles of riverfront levee, placement of riprap, installation of tide-gates, and construction of a pumping plant.
2. MCDD: reconstruction of approximately 11 miles of riverfront levee and two miles of back levee, placement of riprap, and construction of “necessary drainage works” and a pumping plant.
3. PEN 1: reconstruction of approximately 1.2 miles of riverfront levee and 1.5 miles of back levee, and construction of “drainage works” and a pumping plant.
4. PEN 2: reconstruction of approximately 2.2 miles of riverfront levee and 3.1 miles of back levee, placement of riprap, and construction of a pumping plant.

The total projected costs for these projects was \$1,093,000.

As of the end of 1940, the plans had been further defined, additional surveys conducted, and contracts awarded but no construction yet initiated (USACE 1941:1958-1963).

1. SDIC: reconstruction of approximately 2.4 miles of existing levee along the Columbia and Little Sandy Rivers; construction of approximately 1.2 miles of new levee along the Sandy River; and construction of a pumping plant, tide box, and “appurtenant work” in the northwest portion of the district.
2. MCDD: enlarging and strengthening, by hydraulic embankment, about 1.2 miles of existing levee along the Columbia River at the Portland-Columbia Airport, and constructing appurtenant levee drainage works; constructing hydraulic and nonhydraulic levee embankment on the existing levee for a distance of about 8.45 miles along the Columbia River from the Portland-Columbia Airport easterly to the boundary of the Sandy drainage district; constructing nonhydraulic levee embankment on the existing levee for a distance of about 2.2 miles from the Columbia River levee at the inlet to Columbia Slough southwesterly to the Union Avenue embankment; constructing stone revetment for a distance of about 0.7 mile along the Columbia River levee near the Portland-Columbia Airport; and reconstructing the existing pumping plant.
3. PEN 1: Construction of new levee for a distance of about 0.2 mile along Oregon Slough, from Spokane, Portland & Seattle Railway easterly to flood wall and from easterly end of flood wall about 0.7 mile along Oregon Slough to high ground

- adjacent to Denver Avenue; construction of about 0.3 mile of reinforced concrete-steel sheet pile flood wall and four emergency stop-log structures in the industrial section of the drainage district, along Oregon Slough; enlarging and strengthening about 1.4 miles of existing levee along Columbia Slough from the Union Pacific Railroad embankment easterly to Denver Avenue; construction of one pumping plant; and construction of drainage facilities incidental to the levee and flood wall structure along Oregon Slough.
4. PEN 2: Enlarging and strengthening the existing levee for a distance of about 0.6 mile along Oregon Slough from the Union Avenue fill easterly to Faloma Station, and about 3.3 miles along Columbia Slough from the Columbia-Edgewater Clubhouse to Denver Avenue; the construction of two reinforced concrete flood walls, totaling 856 linear feet, along the existing levee between Faloma Station and the Portland Yacht Club; the construction of about 1.2 miles of stone revetment along Oregon Slough and the Columbia River; and the construction of one pumping plant and drainage facilities.

Projected costs for these projects had increased slightly to \$1,111,320.

At the end of 1941 the Corps reported that much of the work planned for 1941 had been completed. The remaining work consisted of (USACE 1942:1950-1957)

1. SDIC: some remaining levee reconstruction and embankment work and construction of the pumping plant.
2. MCDD: completion of the levee reconstruction and enlargement of the pumping plant.
3. PEN 1: completion of the levee reconstruction and the pumping plant.
4. PEN 2: the project was described as 95% complete with no details provided for remaining work.

The Corps report for 1943 referenced only the Multnomah Drainage District #1 and noted only that the remaining projects had been deferred due to the war (USACE 1944:1691-1692).

No action was undertaken to complete the unfinished projects until 1948, when the Corps may have initiated the work to enlarge the existing pumping plant for the Multnomah Drainage District. However, that plant was destroyed in the 1948 flood. The funds available for the plant modification were therefore diverted to purchase and install a new pump. Plans were developed for the unfinished levee project and the contract put out to bid. No other work was undertaken (USACE 1950:2483).

The 1948 flood led to efforts to reinforce the structural integrity of the levee system. The Chief of Engineers report for 1950 referenced the 1950 Flood Control Act that authorized work in all four districts totaling about \$4.7 million. This allocation appears to have been for new projects, but the only project undertaken in 1950, was improvements to a little more than a mile of the Multnomah Drainage District dike, some revetments, and completion of a pumping station. This

was referenced as finishing the projects that had been initiated in the late 1930s. It was also noted that “At the request of local interests, the levees were constructed with a top width of 36 feet to provide for construction of a roadway on the levee” (USACE 1951:2554-2555). In 1951, the only activity was for the Multnomah Drainage District: “Dressing up of the dumped-stone revetment placed prior to the high-water season in fiscal year 1950, was completed by contract on September 5, 1950.

The completed project was turned over to local interests for operation and maintenance by letter dated January 31, 1951. This completed all work authorized by the Flood Control Act approved June 22, 1936” (USACE 1952:2271).

Little or no work was undertaken for projects approved in the 1950 Flood Control Act other than engineering and surveys in 1953 for improvements for the levees in the Sandy Drainage District, including installation of an unspecified number of “type 2 toe drains” (USACE 1953:1894). This project was completed in 1954 (USACE 1954:1474). Work on projects proposed under the 1950 act resumed in 1959, with strengthening of the main levee and construction of a new cross levee for the Multnomah Drainage District. “Additional pumping capacity will be provided by the construction of a pumping plant in the east area of the district. Drainage structures equipped with gates at both ends will be installed at main slough crossings.” March 1959 saw completion of closure of the Peninsula Drainage Canal (USACE 1960:1772). The main levee improvements and construction of the cross levee at NE 142nd were completed in 1960 (USACE 1961a:1788). The remaining facilities for this district were completed in June 1961, including a new pumping station and canal (USACE 1961b:1874). Additional minor work was undertaken in 1961 and 1962: extension of a drainage canal in the vicinity of NE 174th and Marine Drive; and construction of an interceptor toe drain in the vicinity of NE 96th and Marine Drive (USACE 1962:1917).

The Corps initiated design and engineering for improvements to the Peninsula #1 and #2 levees in 1959 (USACE 1960:1773-1774). Problems arose with the two Peninsula districts arrangement “local cooperation” and the projects were either suspended or moved to inactive status (USACE 1961b:1874-1876). There is no evidence these projects were ever revived.

Later Corps reports only occasionally reference other projects for the four districts: protection work along the river at NE 96th (USACE 1966a:1466); bank protection work “in Powell” in the Multnomah District (USACE 1966b:1573), which was completed in 1968 (USACE 1968:1141); placement of stone revetment at the Switzler location in the Peninsula District #2 (USACE 1971:Table 37-K); placement of revetment at the NE 158th and Powell locations in the Multnomah Drainage District (USACE 1974:Table 37-K); placement of revetment at the 122nd Avenue location (USACE 1976:Table 37-K; the report does not reference any drainage district for this location but the Multnomah District is the most likely). By the 1970s, the annual reports provided more abbreviated information than previous reports, which poses challenges in identifying project details and locations.

The four districts operated independently with some coordination through the 1990s. PEN 1, PEN 2, and the SDIC faced growing challenges during the last decades of the 1900s with limited

staffs and small tax bases. The MCDD therefore agreed to assume management of all four districts in the early 2000s but with the other three districts retaining their respective boards. Legislation passed this year establishes a new flood safety and water quality district that absorbs all four districts into a single new district.

2.9. Historical Resources

A review of the SHPO Historic Sites Database lists 56 historic resources in the study area (Table 2-4). Of these, only four have been unquestionably determined eligible for or actually listed on the National Register. The majority of historic resources in this database are listed as eligible-contributing, but this designation is the SHPO's default for resources that lack sufficient information for determining eligibility (it is unclear why these resources are not listed as "undetermined").

Table 2-4 Historic Resources within the Study Area

Property Name	Use	Address/Location	Yr Built	Eligibility	NR Status
Columbia Slough Drainage Districts Historic District	Irrigation Facility	n/a	1921	Eligible/Significant	
USACE North Pacific Division Materials Laboratory	Industrial	202 NW Graham Rd	c. 1941	Eligible/Significant	
Urata House	Single Dwelling	4101 NE 223rd Ave	1925	Eligible/Contributing	
Peterson's Fairview Service Station	Service Station	22231 NE Sandy Blvd	1930	Eligible/Contributing	
Albert, Eibin & Louise, House	Single Dwelling	21407 NE Interlachen Ln	c. 1932	Eligible/Contributing	
Knoles, Clarissa & Olive, House	Single Dwelling	21345 NE Interlachen Ln	1938	Eligible/Contributing	
Chaney, Patrick, House	Single Dwelling	21116 NE Interlachen Ln	1928	Eligible/Contributing	
Foley, Mary Jo, House	Single Dwelling	21201 NE Interlachen Ln	1938	Eligible/Contributing	
Jacks, Jeffrey, House	Single Dwelling	20846 NE Interlachen Ln	1931	Eligible/Contributing	
Johnson, Richard & Donna, House	Single Dwelling	21001 NE Interlachen Ln	1930	Eligible/Contributing	
Moultrie, Kay, House	Single Dwelling	21213 NE Interlachen Ln	1930	Eligible/Contributing	
Star Metal Fabricators and Liberty Steel	Manufacturing Facility	4115 NE 148th Ave	1964	Eligible/Contributing	
(None)	Single Dwelling	13545 NE Marine Dr	1966	Eligible/Contributing	
Sheraton Inn	Hotel	8235 NE Airport Way	1974	Undetermined	

Project Area Description and Background

Property Name	Use	Address/Location	Yr Built	Eligibility	NR Status
Portland Air National Guard Base	Warehouse	6801 NE Cornfoot Rd	1941	Eligible/Significant	
Airbase Building 1	Air Facility	5501 NE Cornfoot Rd	1940	Eligible/Contributing	
Airbase Chapel	Religious Facility	5501 NE Cornfoot Rd	1940	Eligible/Contributing	
Airbase Officers' Mess	Military Facility	5501 NE Cornfoot Rd	1940	Eligible/Contributing	
Airbase Building 2	Air Related	5501 NE Cornfoot Rd	1940	Eligible/Contributing	
Portland-Columbia Airport	Air Related	7000 NE Airport Way	1940	Undetermined	
Broadmoor Golf Course Clubhouse	Clubhouse	3509 NE Columbia Blvd	1931	Eligible/Contributing	
[House]	Single Dwelling	3620 NE Elrod Rd	1927	Eligible/Contributing	
Pump Station	Waterworks	1100 NE Argyle Dr	1917	Undetermined	
Fisher, Raymond & Katherine, House	Single Dwelling	1625 NE Marine Dr	1927	Eligible/Significant	Individually Listed
[Bridge]	Bridge	1501 N Marine Dr	1916	Eligible/Contributing	
Byers, Donovan, House	Single Dwelling	1150 NE Faloma Rd	1935	Eligible/Contributing	
Columbia Elementary School	School	716 NE Marine Dr	1937	Not eligible/Non-contributing	
[Water tower]	Water tower	10218 NE 2nd Ave	c. 1920	Eligible/Contributing	
[House]	Single Dwelling	104 N Bridgeton Rd	1941	Eligible/Contributing	
(None)	Single Dwelling	26 N Bridgeton Rd	c. 1924	Not eligible/Non-contributing	
Dillon House	Single Dwelling	314 N Bridgeton Rd	1930	Eligible/Contributing	
[House]	Single Dwelling	128 N Bridgeton Rd	1921	Eligible/Contributing	
[House]	Single Dwelling	202 N Bridgeton Rd	1916	Eligible/Contributing	
[House]	Single Dwelling	320 N Bridgeton Rd	1910	Eligible/Contributing	
[House]	Single Dwelling	336 N Bridgeton Rd	c. 1920	Eligible/Contributing	
[House]	Single Dwelling	412 N Bridgeton Rd	c. 1920	Eligible/Contributing	
[House]	Single Dwelling	428 N Bridgeton Rd	c. 1920	Eligible/Contributing	
West House	Single Dwelling	118 N Bridgeton Rd	1926	Eligible/Contributing	
[House]	Single Dwelling	422 N Bridgeton Rd	c. 1920	Eligible/Contributing	
[House]	Single Dwelling	434 N Bridgeton Rd	1915	Eligible/Contributing	
Jubitz Truck Stop	Restaurant	10205 N Vancouver Way	1979	Undetermined	

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Property Name	Use	Address/Location	Yr Built	Eligibility	NR Status
(None)	Single Dwelling	9400 Gertz Ct	c. 1944	Not eligible/Non-contributing	
Union Ave Motel	Hotel	59 NE Gertz Rd	1950	Eligible/Contributing	
(None)	Single Dwelling	9201 NE 4th Ave	(None)	Not eligible/Non-contributing	
Hwy 99 E Bridge; Union Ave Bridge; Martin Luther King Blvd Bridge	Bridge	8800 NE Martin Luther King Blvd	1916	Eligible/Contributing	
Portland Meadows Racetrack	Building	1001 N Schmeer Rd	1970	Undetermined	
[Amphitheater (Drive-in Theater)]	Theater	146 NE Gertz Rd	1937	Eligible/Contributing	
West Delta Golf Course	Outdoor Recreation	3500 N Victory Blvd	(None)	Undetermined	
Portland Union Stockyard Co	Business	2416 N Marine Dr	c. 1916	Eligible/Contributing	
Red Steer Tavern	Restaurant	2514 N Marine Dr	1908	Eligible/Contributing	
Pacific International Arena	Animal Facility	2060 N Marine Dr	1919	Not eligible/Non-contributing	
Stockyards	Industrial Storage	2524 N Marine Dr	1910	Eligible/Contributing	
Swift Meat Packing Co Pumphouse	Irrigation Facility	2061 N Marine Dr	1924	Undetermined	
KGW Radio Station & Transmission Tower	Communications Facility	10000 N Denver Ave	1930	Demolished	
Vanport City, WW II Housing Site Plaque	Plaque	11000 N Denver Ave	1948	Eligible/Contributing	
Oregon Humane Society	Animal Facility	1061-1067 NE Columbia Blvd	1939	Demolished	
Pump Station	Waterworks	1100 NE Argyle Dr	1970	Undetermined	

Of the historic resources, the most important for the current study is the Columbia Slough Drainage Districts Historic District. This Historic District was determined National Register eligible in 2006 and confirmed again by the SHPO in 2011. The contributing resources in the Historic District consist of

1. the levees and cross levees in all four drainage districts;
2. most of the sloughs and other drainages in all four districts; and
3. the Schmeer Road Pumping Station in PEN 2.

The levees and cross levees are defined as extending from toe to toe. The character-defining features of the levees and cross levees are their alignments, construction (compacted earthen

structure with clay core), and general absence of trees and buildings in the critical sections of levees and cross levees.

The drainages defined as contributing resources in the Historic District are

1. Columbia Slough
2. City Canal or Peninsula Drainage Canal
3. McBride's Slough
4. NE 182nd Drainage System
5. Salmon and Arata Creek Drainage System
6. Switzler Lake Drainage
7. Mud Slough
8. Bayou Slough
9. Force Lake Drainage

The drainages are physically defined as bank top-to-bank top. Their character-defining features are their alignments.

For the Schmeer Road Pumping Station, the character-defining features are its rectangular, one-story massing and the horizontally-articulated metal siding, cornice, and parapet. Other character-defining features of the pumping station are the intact original ten-light wood windows on the north elevation and the wood double-doors with three-light windows on the east elevation. These are the features that most clearly articulate the pumping station's historic character. The one-story, shed-roof attachment on the west elevation is not historic nor are any of the adjacent facilities.

2.9.1. Newly Identified Resource

2.9.1.1. Heron Lakes Golf Course

The Heron Lakes Golf Course was originally developed as the West Delta Park Golf Course. The course was designed by prominent golf course architect, Robert Trent Jones, in 1968. It opened in 1971 and was described as the “first stadium course built by a city anywhere in the U.S.” and as Jones’ first municipal design, as well as being Jones’s only golf course in Oregon (Mershon 1968; Robinson 1971a, 1971b, 1987; Sunday Oregonian 1974). These first 18 holes are the Greenback Course. There are also golf courses in Oregon designed by Jones’s son, Robert Trent Jones, Jr.: at the Sunriver Resort, the Eagle Point Golf Course in Medford, and a redesign of the course at the Eugene Country Club. Construction of the West Delta Park course was supervised by Robert Trent Jones, Jr., who designed the expansion of the course with an additional nine holes in 1987 and a further nine holes in 1992 for a total of 18 holes (the Great Blue Course). It was officially renamed the Heron Lakes Golf Course in 1988.

The Heron Lakes Golf Course is recommended as eligible under National Register criteria B and C. It is recommended eligible under Criterion B for its association with Robert Trent Jones as the

first municipal golf course he designed and his only golf course in Oregon. It is also associated with Robert Trent Jones, Jr., who designed the Great Blue Course. It is recommended as eligible under Criterion C for its stadium design.

3. Conclusions

Based on our review of the environmental, archaeological, and historical data and the proposed actions for the three alternatives, we have identified potential effects to archaeological resources for each action for each alternative. Those effects are summarized below by alternative and action.

For historic resources, we have identified no proposed actions that would have adverse effects on the contributing resources in the Columbia Slough Drainage Districts Historic District. However, possible adverse effects have been identified for the Heron Lakes Golf Course, which is recommended as eligible for listing on the National Register of Historic Places. Those effects are summarized in the following sections.

Table 3-1 Summary of Potential Cultural Resource Impacts by Alternative

	Impact	Assessment	Potential Mitigation Action
No Action/Future Without	Over time, cultural artifacts may be discovered in the PMLS. Existing cultural protection laws will ensure their preservation and proper use.		mark sites, protect unanticipated sites (stop, notify, implement protection measures)
Alternative 3			
PEN 1	New Levee Parallel to Railroad berm (40 foot deep sheet pile cutoffs)	high probability area, limited prior survey, know site (35MU113) in area	Monitor on site
PEN 1	Clearing and grubbing for the new parallel levee would impact 10 acres of the Heron Lakes Golf Course (recommended eligible, NRHP)	Adverse effect Heron Lakes Golf Course	MOA
PEN 1	Columbia Slough Levee widening	low probability for archeological resources	None needed
PEN 1 and 2	New Floodwall and Flood Gate under I-5 (sheet pile placed to depth of 24 feet)	moderate probability for historic period archeology	monitor on site
MCDD	Peninsula Canal Cross Levee widening and new toe drain	moderate to high potential for precontact archeological resources	minimization measures, monitor on site
Alternative 4			
PEN 1	New Levee Parallel to Railroad berm (40 foot deep sheet pile cutoffs)	high probability area, limited prior survey, know site (35MU113) in area	Monitor on site
PEN 1	Clearing and grubbing for the new parallel levee would impact 12 acres of the Heron Lakes Golf Course (recommended eligible, NRHP)	Adverse effect Heron Lakes Golf Course	MOA
PEN 1 and 2	New Floodwall and Flood Gate under I-5 (sheet pile placed to depth of 24 feet)	moderate probability for historic period archeology	Monitor on site

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	Impact	Assessment	Potential Mitigation Action
PEN 2	Raise levee elevation at the Columbia River homes along Marine Drive (NE 13th Ave)	low potential for archeological resources	None needed
MCDD	Peninsula Canal Cross Levee widening and new toe drain	moderate to high potential for precontact archeological resources	minimization measures, monitor on site
MCDD	Raising NE Airport Way (NE 138th to NE 148th)	35MU80, unevaluated; moderate to high probability area	Internal review/coordinate with SHPO to confirm site is not eligible. minimization measures, monitor on site
SDIC	Columbia River Levee; widening NE 223rd to NE Sundial Road	proximity to the river and site 35MU234 indicate a moderate to high probability for cultural materials;	monitor on-site
SDIC	MCDD/SDIS Cross Levee off ramp raising and NE 223rd and N. Marine Drive	moderate to high probability for cultural materials;	minimization measures, monitor on site
SDIC	New Outlet Mall Levee	prior surveys negative, highly developed area; low probability for archeological resources	None needed
Alternative 5			
PEN 1	New Levee Parallel to Railroad berm (40 foot deep sheet pile cutoffs)	high probability area, limited prior survey, know site (35MU113) in area	minimization measures, monitor on site
PEN 1	Clearing and grubbing for the new parallel levee would impact 16 acres of the Heron Lakes Golf Course (recommended eligible, NRHP)	Adverse effect Heron Lakes Golf Course	MOA
PEN 1	New Floodwall (sheet pile 24 feet deep) and Flood gate, south bank Oregon Slough (is this the same as increasing levee height on Columbia River Levee?)	moderate probability for buried archaeological materials	monitor on site
PEN 2	Raising and Widening Columbia Slough Levee	moderate to high probability (artifacts looted from fill 1984)	minimization measures, monitor on site

	Impact	Assessment	Potential Mitigation Action
PEN 2	Floodwall, north boundary PEN 2	low to moderate potential	monitor on site
PEN 2	Columbia River Levee, increase in height	low potential	None needed
MCDD	Peninsula Canal Cross Levee taller and wider with new toe drain	moderate to high potential for precontact archeological resources	Monitor on site
MCDD	Columbia River Levee raise at 40-mile Loop Trail	prior surveys negative; in proximity to Ne-er-cho-ki-oo therefore potential for artifacts in levee fill	minimization measures, monitor on site
MCDD	Raising NE Airport Way (NE 138th to NE 148th)	35MU80, unevaluated; moderate to high probability area	Internal review/coordinate with SHPO to confirm site is not eligible. Minimization measures, monitor on site.
SDIC	Columbia River Levee; widening NE 223rd to NE Sundial Road	proximity to the river and site 35MU234 indicate a moderate to high probability for cultural materials;	minimization measures, monitor on site
SDIC	MCDD/SDIS Cross Levee off ramp raising and NE 223rd and N. Marine Drive	moderate to high probability for cultural materials	Monitor on-site
SDIC	New Outlet Mall Levee	prior surveys negative, highly developed area; low probability for archeological resources	None needed

3.1. Alternatives 3 and 4

3.1.1. PEN 1

3.1.1.1. New Parallel Levee

This proposed alignment is a high probability area for precontact archaeological resources. It was historically a complex network of both major and minor sloughs, numerous small lakes and wetlands, as well as two larger lakes. The last included the lake that is now occupied by the Vanport Wetlands (historically known as Force Lake; the name is now given to another lake). The easternmost shoreline of Smith Lake also into the western edge of the modern Heron lakes Golf Course, and some of the sloughs and lakes have been incorporated into the golf course as water hazards.

The new levee would cross the historical locations of slough channels and two historic lakebeds, including the remnant Smith Lake bed. Six cultural resource surveys have been conducted within PEN 1: Connolly (1987), Musil et al. (1994), Musil et al. (1995), Chapman et al. (1998), Bland and Connolly (2006), and Minor (2011). Three of these included subsurface probes. The Musil et al. 1995 survey included excavation of 62 auger probes along the toe of the levee on the north side of Columbia Slough. No evidence of archaeological deposits was encountered in these probes. The Chapman et al. survey included excavation of 44 auger probes and four backhoe trenches around the western edge of the present Vanport Wetlands. One precontact archaeological site was encountered, a possible hearth feature that was radiocarbon dated to AD 775 (35MU113). The Bland and Connolly survey included just three probes at the far southeastern edge of PEN 1. No archaeological resources were encountered. The Minor 2011 fieldwork included only a few geoarchaeological borings in the far northeastern edge of PEN 1.

Only one archaeological resource has therefore been identified in PEN 1, but it must be emphasized that only six surveys have been conducted and subsurface probing was undertaken in only four limited areas. The presence of 35MU113 is evidence of precontact use or occupation of the area, which is not unexpected given the rich resources the floodplain would have offered and proximity to important water-transportation routes such as the Columbia River and Columbia Slough. There is a high density of precontact archaeological resources around Smith and Bybee Lakes to the west and along Columbia Slough downstream of PEN 1. Those resources that have been dated establish precontact occupation of the area extending back at least 3,000 years.

The proposed new parallel levee therefore has a high probability for impacting precontact archaeological resources, especially where sheet pile cutoffs are proposed that would extend 40 feet deep. This designation would also apply to the proposed new floodwall that would extend from the northern end of the new levee to the existing floodwall along the south bank of Oregon Slough.

As discussed above, the Heron Lakes Golf Course is recommended as eligible for listing on the NRHP for its design and association with Robert Trent Jones and his son. Construction of the

new parallel levee would entail removal of most of the trees that define the western border of the golf course, which are an important element of the course's landscape and design. The parallel levee would therefore constitute an adverse effect to the golf course as a historic property. Those effects would vary, to some extent, by differences in the proposed width and character of the parallel levee among the three alternatives. Clearing and grubbing for the Alternative 3 levee would affect 10 acres, 12 acres for Alternative 4, and 16 acres for Alternative 5. All three alternatives would have adverse effects, but the effects would be greatest with Alternative 5.

3.1.1.2. Columbia Slough Levee

The proposed alignment for widening this levee was subject to extensive subsurface probing in 1995 and no evidence of any archaeological resources was encountered. This project element is considered to have a low probability for archaeological resources.

3.1.2. PEN 1 and PEN 2

3.1.2.1. Floodwall

Construction a new Columbia River floodwall has been proposed under I-5. This would tie together the floodwalls in PEN 1 and 2. See the discussion below of the proposed floodwall in PEN 1 for Alternative 5.

3.1.3. MCDD

3.1.3.1. Peninsula Canal Cross Levee

The existing levee would be widened, and a new toe drain installed. The Peninsula Canal consists of a channelized natural slough (McBride's Slough) and an artificial channel that originally extended to the Columbia River to provide sufficient flow after a dam and Pump Station 1 were constructed, disconnecting the eastern and western Columbia Slough drainages. As best as can be reconstructed from historical maps, the artificial channel is the linear segment from about station 135+00 north to the river.

Only two surveys have been previously conducted in this area: Minor et al. (1994) and Paraso and Taylor (2015). Only the latter survey included subsurface probes, which were in a field along the east side of the canal that is an artificial channel. The only archaeological resources identified in either survey were two historic-period sites (35MU260 and 35MU261) dating to the mid-1900s. Both sites were determined to not be eligible for the NRHP.

The northern portion of the levee improvements is considered to have a low potential for archaeological resources as it parallels the artificial channel. The remainder of the levee alignment is on the channelized section of the historical McBride's Slough. The 1902 U.S. Coast and Geodetic Survey chart for this portion of the floodplain shows two permanent sloughs and one ephemeral slough, two marshy areas (one of which may have been a marshy lake), and bands

of trees between grasslands. The levee crosses the historical locations of two sloughs that intersected with McBride's Slough, as well as an extensive marsh to the east. The channelization of McBride's Slough may have disturbed or destroyed sites on the slough bank, but the area is still regarded as having a moderate to high potential for precontact archaeological resources. The 1902 U.S. Coast and Geodetic Survey chart shows no historic features in the area other than a few fences.

3.2. Alternative 4

Alternative 4 proposed actions are addressed either jointly with Alternative 3 or jointly with Alternative 5. The exceptions include the improvements to the cross-levees in MCDD and SDIC.

3.2.1. MCDD 142nd Ave Cross-Levee

The only proposed action in MCDD is raising NE Airport Way where it crosses the MCDD cross levee between NE 138th and NE 148th. The alignment of Airport Way on the east side of the cross levee extends across a previously report archaeological site, 35MU80. The site is a precontact site with evidence for processing plant resources. It was recorded in 1989 prior to construction of Airport Way (Fleming and Atwell 1989). Later fieldwork at the site failed to identify any archaeological materials on the surface or in subsurface probes (Minor et al. 1994:104, 113) and the site was recommended as not significant. However, the SHPO officially lists this site as unevaluated.

Raising of the roadway is projected to involve approximately one acre of clearing and grubbing. Any clearing or grubbing outside the roadway prism on the east side of the cross levee would affect 35MU80 as currently defined. Removal of the existing pavement could also affect the site, which extends underneath Airport Way as the site was defined in 1989.

3.2.2. MCDD/SDIC Cross Levee

Modifications are proposed at the intersection NE 223rd Avenue and N. Marine Drive where Marine Drive crosses MCDD/SDIC cross levee. This action would include raising the 223rd on and off ramps to and from Marine Drive.

Historical maps (e.g., GLO 1855; USGS 1918) show the current project area as in the vicinity of a slough that historically emptied into the Columbia River to the northwest. However, the location would have offered proximity to important floodplain lakes to the east (Sundial Lake) and west (Blue and Fairview Lakes).

Four surveys are shown in SHPO records as having been conducted in the immediate vicinity of Marine Drive and 223rd. Three of these surveys are more than 30 years old (Ellis [1977]; Scott [1985]; Woodward [1988]), with fourth dating to 2015 (Butler et al. [2015]). Only the surveys reported by Scott and Butler et al. involved systematic fieldwork, and none of the surveys identified any archaeological resources.

Although this project location is a short distance south of the Columbia River levee area it is considered to have a moderate to high potential for precontact archaeological resources, the present location is considered to have a moderate potential for precontact archaeological resources given its greater distance to possible resource areas and the Columbia River, as well as that much of the work would occur within fill.

3.3. Alternatives 4 and 5

3.3.1. SDIC

3.3.1.1. Columbia River Levee

The existing Columbia River levee would be widened from NE 223rd Avenue east to NE Sundial Road. Historical map coverage of this area is not as extensive as the floodplain to the west; the 1902 U.S. Coast and Geodetic Survey chart depicts the floodplain for a relatively short distance inland. The 1918 U.S. Geological Survey map provides more complete mapping of the floodplain. The latter predates construction of the SDIC levee system (the map is dated 1918 but the actual field survey for the map was conducted in 1916) and shows a few small, unnamed lakes near the river and two larger, named lakes: Sundial Lake and Company Lake. Sundial Lake was to the south of the levee and was drained in the past; but the smaller lakes and Company Lake (which is just east of Sundial Road) are extant between the levee and the river.

Five cultural resource surveys have been previously conducted in this levee area: Ellis (2002), Baker et al. (2008), Ellis and Ogle (2013), Butler et al. (2015), O’Grady (2019). The first three surveys addressed varying amounts of acreage across the land south of the levee. The Butler et al. survey addressed a linear corridor for a BPA transmission line. The O’Grady survey was for a proposed extension of the 40-Mile Loop Trail and extended across the surface of the levee for the current project. Only the Ellis and Ogle survey included subsurface probes and those were excavated in a relatively small area. However, those probes identified a precontact archaeological site, 35MU234, at which data recovery excavations were subsequently conducted (Solimano et al. 2014). The site provided evidence of plant processing between 3500 and 4000 years ago. Adjacent to 35MU234 is 35MU256, which is an early twentieth-century historic-period site (Bajdek [2014]; there is no survey report at SHPO associated with this site). This site remains unevaluated. Both sites are approximately 175-180 meters south of the levee.

Its proximity to the Columbia River and 35MU234 and with access to the kinds of floodplain resources evidenced being used in the past by Native peoples indicates the levee area has a moderate to high probability area for precontact archaeological resources. It has a low potential for affecting historic-period archaeological resources.

Associated with this modification of the levee is raising of the levee roadway at the entrance to the Georgia Pacific facility east of the Chinook Landing Marine Park. The potential for precontact archaeological resources at this location is similar to all of the levee area but the

probability for encountering such resources may be relatively low given the comparatively small footprint of this specific action.

3.3.1.2. Outlet Mall Levee

Construction is proposed of a new levee just northwest of the Columbia Gorge Outlet Mall in Troutdale. This levee would extend along Graham Road northerly and then to the northeast to the I-84 on-ramp. A pedestrian walkway would be constructed on the levee surface.

This levee is in a highly developed location but is approximately 300 meters west of the Sandy River. Neither the 1855 GLO nor the 1918 USGS maps show any interior drainages or wetlands at the present location.

Seven previous surveys included the present project location or were in the vicinity: Bland and Connolly (2006), Cooper (2007), Edwards and Henrickson (2005a, 2005b), Jenkins (1988), and Turck (1993). All of these surveys were associated with projects on or along I-84. Only the survey reported by Cooper included subsurface probes. No archaeological resources were identified at or in the immediate vicinity of the present project location.

This project location is considered to have a low probability for archaeological resources.

The relative potential effects to archaeological and historical resources of the three alternatives can be summarized as follows:

1. Alternative 3 has the lowest potential to affect archaeological and historical resources as it has the fewest physical impacts, including the smallest footprint for the proposed new structure along the railroad embankment at the west edge of the Heron Lakes Golf Course.
2. Alternative 4 has the potential to affect more archaeological and historical resources than Alternative 3 as it would affect more locations of concern. It also has a slightly greater footprint than Alternative 3 for the parallel levee.
3. Alternative 5 has the highest potential for affecting archaeological and historical resources among the three alternatives given its greater footprint for the PEN 1 parallel levee and its proposed actions for the PEN 2 Columbia Slough levee.

In addressing the proposed new structure along the western edge of the Heron Lakes Golf Course, it is assumed that all three alternatives will remove the trees that define the western edge of the golf course that screen the railroad embankment. An important consideration is whether one alternative will require more tree removal and how such removal would be mitigated.

3.4. Alternative 5

3.4.1. PEN 1

The same findings provided for Alternatives 3 and 4 for the proposed new levee and the widening of the Columbia Slough levee would apply as well for Alternative 5. However, the new parallel levee would occupy a slightly larger footprint than the berm for Alternative 3 or the Alternative 4 parallel levee.

Alternative 5 includes a new floodwall and flood gate along the south bank of the Oregon Slough (North Portland Harbor). The new floodwall would consist of sheet pile placed to a depth of 24 feet for 1,900 feet to the west, with the remainder to the east to nine feet. Only one previous survey has been conducted in this portion of PEN 1, Connolly (1987). That survey consisted of a very limited examination of bank exposures due to extensive development. No archaeological resources were identified.

There are few data that can be used to define a probability for archaeological resources in the floodwall area. No precontact archaeological resources have been identified to date along Oregon Slough on either the south bank or on Hayden Island. There have been very few cultural resource surveys along the south bank of the Columbia River from the I-205 Glen Jackson Bridge and the mouth of the Willamette River, and no archaeological sites recorded along this bank in this stretch of the river. Strong's (1967:26-27) list of precontact archaeological sites known to avocational archaeologists and artifact collectors also shows no sites along this stretch of the river other than one reportedly destroyed site opposite the lower end of Government Island. Historic maps (e.g., U.S. Coast and Geodetic Survey 1888) show some scattered buildings and orchards on the south bank opposite Hayden island, which indicates a potential for historic-period archaeological sites. Industrial development of the floodwall area beginning in the early 1900s would have impacted archaeological deposits associated with those historical occupations. It is therefore unknown to what extent any archaeological evidence for the historical occupations may be extant.

The floodwall area is considered a moderate probability area for historic-period archaeological resources.

3.4.2. PEN 2

3.4.2.1. Columbia Slough Levee

Alternative 5 proposes raising and widening the Columbia Slough levee. This project area is considered to have a moderate to high probability for archaeological resources. As with PEN 1, PEN 2 was historically a network of sloughs, lakes, and marshes, dominated by one large but now-filled lake, Switzler Lake. Almost all of these natural features have been filled and developed, with a few sloughs having been channelized to serve as drainage ditches and a few remnant sloughs in the northeastern portion of PEN 2.

Only one previous survey has been conducted in the immediate levee vicinity, Musil et al. (1994). That survey did not include any subsurface probes and no resources were identified. However, in 1984 a report was received by SHPO of a precontact site illegally excavated into the levee by an artifact collector. As this excavation had compromised the structural integrity of the levee at that location, fill was reportedly placed over the excavation. The excavation may have been prompted by a reference in Strong (1967:32) to a site at or near this location. This site (Strong's designation was "MU17," which is not an official site designation) was described as the "Woodlawn site": "once a very large village, it was entirely carried away for fill material for a dike." It is therefore possible the artifacts exposed in 1984 were in the levee fill rather than in the native bank under the levee.

Based on this information, the Columbia Slough levee in PEN 2 is considered a moderate to high probability area for precontact archaeological resources. The historic maps do not depict any cultural features in this area.

3.4.2.2. Floodwall

Construction of a new floodwall is proposed across the entire northern boundary of PEN 2. The new floodwall would consist of sheet pile placed to a depth of nine feet.

Historic-period maps (e.g., U.S. Coast and Geodetic Survey 1888; U.S. Geological Survey 1897) depict extensive shoaling offshore in present PEN 2 area, some of which became Tomahawk Island. The mainland shoreline has few landscape features shown, with a minor slough and a few small ponds to the south. A few houses are shown on the natural river levee. By 1940 (US Geological Survey 1940), Tomahawk Island had begun evolving from the shoal and housing development had intensified in the Bridgeton community.

SHPO records indicate only one previous cultural resource survey (Musil et al. 1994) included the proposed floodwall alignment, and that survey addressed only the easternmost section from the intersection of Marine Drive and Bridgeton east to the PEN 2 eastern boundary. This survey included four auger probes along the south side of levee immediately west of NE 13th. Only a few items of modern debris were recorded. No archaeological resources have been previously recorded in this area, nor is there any record of such resources by avocational archaeologists or artifact collectors.

Given these data, we considered the proposed floodwall alignment to have a low to moderate potential for archaeological resources, with the moderate designation as more applicable for historic-period resources.

3.4.2.3. Columbia River Levee

Small increases in the levee embankment height and in a private driveway are proposed along the north side of N. Marine Drive at the intersection with NE 13th Avenue and a short distance to the east.

The comments above on the floodwall are generally applicable as well to these two locations. Given the minimal extent of change in levee height and that ground disturbance would be limited to levee fill, these projects are considered to have a very low potential for archaeological resources.

3.4.3. MCDD

3.4.3.1. Peninsula Canal Cross Levee

The discussion above for this proposed action for Alternatives 3 and 4 would also apply to Alternative 5.

3.4.3.2. Columbia River Levee

A minor increase in levee height is proposed where the 40-Mile Loop Trail (aka Marine Drive Trail) crosses Marine Drive at the eastern end of the James Gleason Memorial Boat Ramp. Previous surveys in the vicinity (Ellis and Panzarino Paraso [2009]; Finley [2016]; Musil et al. [1994]; Panzarino Paraso and Ellis [2009]) did not identify any archaeological resources. With the exception of the survey reported in Finley, these surveys included subsurface probes in the present project vicinity and did not yield any evidence of archaeological resources.

Although the previous surveys and minimal ground disturbance for this proposed action would indicate a low potential for archaeological resources, there is reason for some concern. As described above, the historical record references small Native settlements along the shoreline in this area in the 1850s. This area is also in the general vicinity of the Ne-er-cho-ki-oo village visited by the Lewis and Clark Expedition in 1805-1806. There is therefore a potential for artifacts associated with these settlements to be present in the levee fill. There is no record of historic-period use or occupation of this location until after World War II.

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Portland Metro Levee System Feasibility Study

Feasibility Report and Environmental Assessment

Appendix I – Cultural Resources

Attachment 1 – NRHP Form for the Columbia Slough Drainage Districts Historic District



**US Army Corps
of Engineers**®
Portland District



October 2019

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