

B. Columbia River

The Columbia River, its salmon and the people that depended on them, have shaped both the physical and human landscapes of the Northwest since times immemorial. The river was, and still is, the source for food, transportation, irrigation, hydropower, and inspiration. But where spring freshets once flooded and replenished fertile floodplains extending through the region, the river and its floodplains are severely degraded from what they once were. Massive dams for water storage and hydropower have substantially altered river flows. The channel and broader floodplain have been diked and dredged, and functioning riparian areas have been replaced by steep, riprapped shorelines. And while books have been written on the story of the mighty Columbia, with respect to its floodplain, the anthropogenic changes of the last 100 years have resulted in a much-reduced floodplain and interaction with Portland.

For centuries prior to European settlement in the Pacific Northwest, the Columbia River was central to the lives of Native People from who traded and traveled over vast portions of western North America. The Columbia River was a transportation route, and it was a bountiful source of salmon, steelhead, and other fish species that were harvested, eaten, dried, and stored, providing food and sustenance throughout the year. Many of the permanent and seasonal villages that lined the Columbia from its mouth at the Pacific Ocean to its headwaters in Canada were disrupted and displaced by the coming of new groups of people, primarily from the eastern United States and Europe, initially, but later including people of African and Asian ancestry. The newcomers to the area similarly relied on the Columbia as a source of food and transportation. Native Americans continue to thrive in the region, alongside the more recent immigrants, and the Columbia River continues to play a central role in their lives as a source of traditional first foods and as a spiritual and cultural focal point.

As is shown in Table 20, the FEMA 100-year floodplain along the Columbia River approximately 494 acres is located on 389 tax lots. When both the FEMA 100-year floodplain and 1996 Flood Inundation Area are included, Columbia River floodplains cover 552 acres. Table 20 does not include statistics for West Hayden Island, as it is not within the City of Portland's jurisdiction. Due to historical circumstances, many of the tax lots on East Hayden Island and Tomahawk Island include both the land and waters in Columbia's secondary channel and tax lots associated with marinas may include the waters of the marina as part of the tax lots. These tax lots are primarily zoned CE and include an additional 191 acres of 100-year floodplain.

TABLE 20: COLUMBIA RIVER FLOODPLAIN (IN ACRES)

	Tax lots (#)	100-Year Floodplain	1996 Flood Inundation Area	1996 Full Flood Extent¹¹	100-Year & 1996 Flood Inundation Area
Columbia River*	389	494	456	456	552

* Excludes West Hayden Island

Existing development within and adjacent to the Columbia River floodplain varies greatly and includes, among others, single-family houses along the levee, multi-family structures on Hayden Island, mobile home parks, commercial development, marinas, and floating home communities. Along the Marine Drive levee, undeveloped or underdeveloped properties face significant technical and service provision limitations (sewer, water, etc.). Similarly, changes to City requirements along the levee will need to be consistent with federal flood control requirements and may limit the increase of riparian vegetation and tree canopy along the levee.

i. Potential Impact of Development in the Floodplain

As mentioned previously, the Columbia River floodplain in Portland is constrained by the levee system. Approximately 389 individual tax lots (552 acres) are partially or fully within a mapped floodplain (100-Year and Metro Title 3/1996 Flood Inundation Area). Of these tax lots, 200 are located completely (95 percent or more) within a floodplain and 189 are located partially within a floodplain (see Table 21).

TABLE 21: COLUMBIA RIVER TAX LOTS WITHIN FLOODPLAINS BY BASE ZONE

Base Zone	Fully Within (>95%)	Partially Within	Grand Total
CM2	0	86	86
CE	46	28	74
OS	46	28	74
MC	54	2	56
IG2	25	22	47
R7	15	24	39
RF	38	1	39
IH	12	8	20
RM1	2	9	11
R10	4	4	8

¹¹ Statistics for the actual 1996 Flood Extent are included for informational purposes, only. Portland does not apply floodplain regulations to this area.

Base Zone	Fully Within (>95%)	Partially Within	Grand Total
RM2	4	1	5
RMP	0	2	2
CM1	0	1	1
EG2	0	1	1
Grand Total	200	189	389

A closer look at the tax lots partially within a floodplain allows an estimate of the potential for new development or redevelopment to impact floodplains. Using the maximum building coverage allowed by the base zone as a proxy, we analyzed whether tax lots contained the development area allowed by the base zone outside of the floodplain. This analysis (summary results in Table 22, below), which did not include areas such as the Environmental Protection overlay zone, found that of the 389 properties within a floodplain, 80 tax lots (38%) have sufficient area outside of the floodplain to develop to maximum building coverage. Development on the remaining 253 tax lots (62%) would either include some building in the floodplain or the building coverage would have to be less than the maximum allowed to avoid floodplain impacts. The percentage of the maximum building coverage that is within the floodplain on individual tax lots varies significantly.

TABLE 22: WILLAMETTE RIVER – TAX LOT AREA LOCATED OUTSIDE OF THE COMBINED FLOOD HAZARD AREA IS GREATER THAN OR EQUAL TO THE MAXIMUM ALLOWED BUILDING COVERAGE

Base Zone	No	Yes	Open Space	Grand Total
CM2	63	23	0	86
CE	62	12	0	74
OS	0	0	56	56
IG2	40	7	0	47
R7	15	24	0	39
RF	39	0	0	39
IH	20	0	0	20
RM1	4	7	0	11
R10	4	4	0	8
RM2	4	1	0	5
RMP	1	1	0	2
CM1	0	1	0	1
EG2	1	0	0	1
Grand Total	253	80	56	389

ii. Riparian Buffer Area

The riparian areas with any significant habitat functions along the Columbia River are essentially limited to areas on Hayden Island, particularly West Hayden Island, because the remaining areas are contained almost entirely by the Marine Drive levee. Because of the flood control purpose of the levee and associated engineering restrictions, trees may not be planted on or within 25 feet south of the toe of the Marine Drive levee slope. Instead of native vegetation and riparian functions, the riparian buffer area along the levee is limited to managed grasses and non-native groundcovers. Figure 16 below shows a typical section of the levee and riparian buffer area along the Columbia River east of I-205.



Figure 16: Example of riparian area on Marine Drive levee along Columbia River

There are 477 acres of riparian buffer area (RBA) mapped across 375 tax lots in the Columbia River watershed (see Table 23, below). Seventy-eight of these acres are zoned opened Open Space. A total of 1,380 structures are located within the estimated RBA. Moving forward with this regulatory work, it will be important to analyze what options exist to improve riparian habitat and floodplain functions along the Marine Drive levee.

TABLE 23: COLUMBIA RIVER RIPARIAN BUFFER AREA

Base Zone	Tax lots with RBA	Acres of RBA	Structures in RBA
CE	67	204	705
IG2	44	66	416
RF	39	63	70
RMP	2	8	61
IH	18	25	47
CM2	86	2	31
R10	8	16	22
OS	56	78	18
RM1	11	11	7
R7	38	2	2
RM2	5	2	1
EG2	1	0.5	0
Grand Total	375	477	1,380

iii. Additional Floodplain Characteristics

TABLE 24 COLUMBIA RIVER ZONING (IN ACRES)

Zone	Tax lots (#)	100-Year Floodplain	Metro Title 3/1996 Flood Inundation Area	1996 Actual Flood Extent ¹²	100-Year & 1996 Flood Inundation Area
CE	74	204	209	209	221
IG2	47	63	73	73	88
OS	56	88	46	46	88
RF	39	65	56	56	65
IH	20	30	34	34	37
RMP	2	13	11	11	21
R10	8	16	13	13	16
RM1	11	9	10	10	11
CM2	86	2	0	0	2
R7	39	2	2	2	2
RM2	5	2	2	2	2
EG2	1	0.5	0	0	0.5

¹² Statistics for the actual 1996 Flood Extent are included for informational purposes, only. Portland does not apply floodplain regulations to this area.

Zone	Tax lots (#)	100-Year Floodplain	Metro Title 3/1996 Flood Inundation Area	1996 Actual Flood Extent¹²	100-Year & 1996 Flood Inundation Area
CM1	1	0	0	0	0
Grand Total	389	494	456	456	552

TABLE 25: PROPERTY OWNERSHIP (IN ACRES)

Columbia River	Tax lots (#)	100-Year Floodplain	Metro Title 3/1996 Flood Inundation Area	1996 Actual Flood Extent¹³	100-Year & 1996 Flood Inundation Area
Private	311	350	349	349	394
Public	78	145	107	107	158
Grand Total	389	494	456	456	552

¹³ Statistics for the actual 1996 Flood Extent are included for informational purposes, only. Portland does not apply floodplain regulations to this area.

C. Columbia Slough

Before the Columbia Slough became the 19-mile main channel with an extensive managed system of dikes, levees, and flood control pumps providing hydrologic management and flood control that it is today, the watershed was once much more complex and dynamic. A network of side channels, lakes, and wetlands covered the floodplain of the Columbia River from the mouth of the Sandy River to the confluence of the Willamette River at Kelley Point (see Figure , below). Flood waters seasonally inundated the floodplain, depositing nutrient-rich sediment and creating new channels across the landscape that is now dominated by Portland International Airport and other industrial and commercial development.

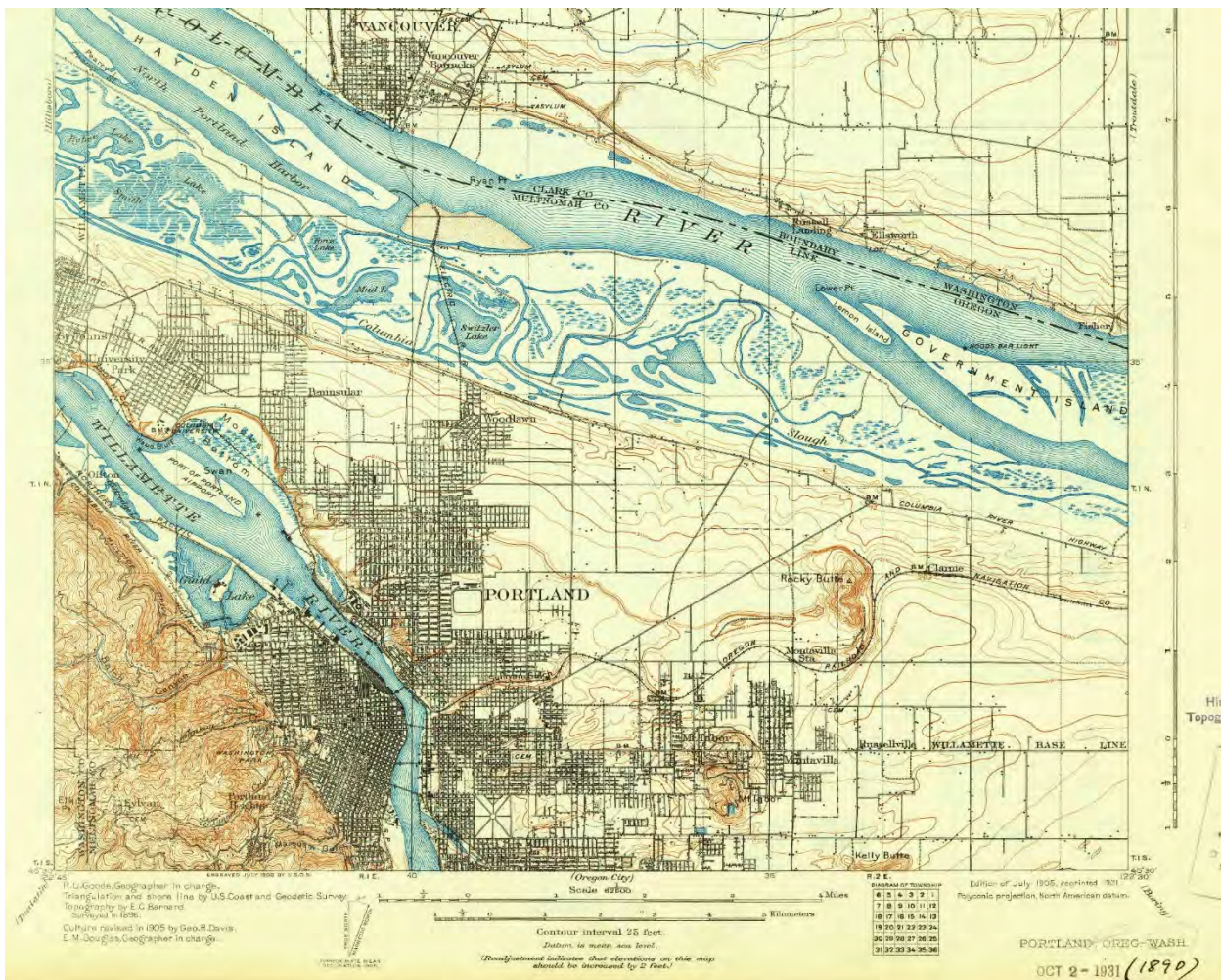


Figure 17: USGS map from 1890

Gradually, the watershed and waterways were drastically altered to make way for industry and agriculture, as well as other human development. Levees were built to keep out the Columbia River starting in 1918 and three drainage districts were established by local property owners – Peninsula

Drainage District No. 1 (Pen 1), Peninsula Drainage District No. 2 (Pen 2), and Multnomah County Drainage District (MCDD) – to provide flood protection, eliminate seasonal flooding, and promote agricultural development in the floodplain. Wetlands and side channels were drained and filled to allow for development, while the waterway was channelized, and dozens of streams were filled or diverted to underground pipes. As a result, massive amounts of flood storage capacity, habitat, and sediment and pollutant filtration capacity was lost throughout the watershed.

Given its history as an extension of the Columbia River floodplain, it’s unsurprising that the topography of the Columbia Slough watershed is relatively flat near the river. The gradient of the Slough channel is also nearly flat, which results in the direction of water flow changing dependent on the tide and operation of the pumps and gravity gages in the levees. The Slough within the USB can be divided into three reaches: Lower Slough, Middle Slough, and Upper Slough. The Middle and Upper Slough are both completely surrounded by levees and contained within MCDD, which manages the levees, water levels, and flows as a single environmental system. The total acreage in the different floodplain areas is summarized in Table 26.

TABLE 26: COLUMBIA SLOUGH FLOODPLAIN (IN ACRES)

	Tax lots (#)	100-Year Floodplain	Metro Title 3/1996 Flood Inundation Area	1996 Actual Flood Extent¹⁴	100-Year & 1996 Flood Inundation Area
Columbia Slough	1,027	3,246	2,346	2,491	3,350

Prior to the drainage districts, the Columbia Slough system’s water levels fluctuated in tandem with the Columbia and Willamette rivers, rising in the winter in response to Willamette rain-fed highs and even higher in May-June in response to the Columbia snowmelt highs, and receding in the late summer and early fall. Figure 18 illustrates how flows in both the Columbia River and the Willamette River influence water levels in the Columbia River near Portland. The two rivers would have had a similar influence on water levels in the Columbia Slough prior to MCDD management of the system. Peak water levels coincided with the spring freshets that have since been almost entirely removed from the Slough system by both water management on the Columbia River and within MCDD. In addition, groundwater and tidal influences would have been major factors contributing to water levels in the Slough. However,

¹⁴ Statistics for the actual 1996 Flood Extent are included for informational purposes, only. Portland does not apply floodplain regulations to this area.

the existing water management has resulted in conditions that are very different, and much more rigid, than historic conditions.

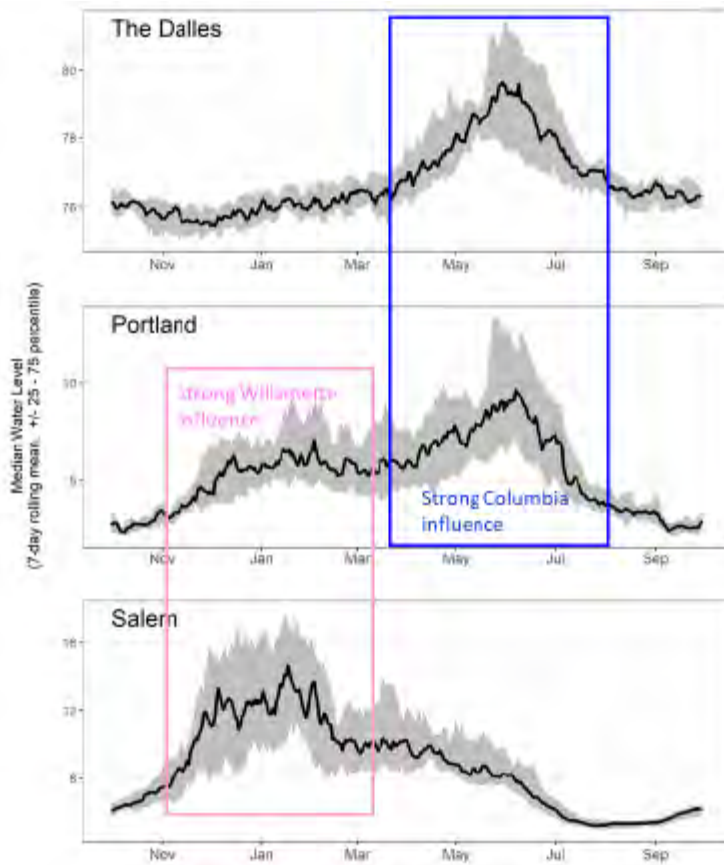


Figure 18: Seasonal fluctuations in water levels in the Columbia River near Portland are driven by flows in both the Columbia River and the Willamette River.

Lower Slough

This reach of the Slough begins at the Willamette River (to the west), and it extends approximately 8.5 miles east to the MCDD Columbia Slough Levy, comprising approximately 23,676 acres. This is the only portion of the Slough that is outside of the MCDD-managed floodplain and is influenced by tides and flows in the Columbia and Willamette Rivers. Because their passage into the Lower Slough from the Willamette is not blocked by a levy, salmon and steelhead have been documented in this reach. The Lower Slough has been designated as Critical Habitat for Columbia River Coho salmon, Chinook salmon, and steelhead listed in the Endangered Species Act (ESA) by NOAA Fisheries. Juvenile salmon use the Lower Slough during the winter months as they seek food, cover, and off-channel habitat areas away from the Willamette and Columbia Rivers. However, the current flow patterns of the Lower Slough have been significantly altered from historic conditions due to the numerous dams on the Willamette River

and Columbia River providing flood control in the, hydropower, and water storage. Management of the dams results in an attenuation of high and low flows, directly affecting the flow in the Lower Slough.

The Lower Slough channel varies in width from about 50 feet to over 500 feet, with most of the reach between 100 and 200 feet wide (CH2M Hill, 1995). Because this reach is the only one without directly managed water levels, the floodplain in this reach is most likely to flood and also most important for salmonid habitat. In addition, the Lower Slough borders and connects to Smith and Bybee Lakes. This approximately 2,000-acre wetland complex, though a remnant of the much larger historic wetland/floodplain complex, is the largest urban wetland in the United States. The lakes and associated wetlands provide essential habitat for many migratory birds and waterfowl, as well as countless other species.

Middle Slough

This reach of the Slough extends from the MCDD Columbia Slough Levee (to the east to the MCDD 142nd Cross Levee (to the east), near 18th Avenue, comprising approximately 6,848 acres. As part of a southern complex of sloughs and lakes, the Middle Slough also includes Buffalo Slough, Whitaker Slough, Johnson Lake, Mays Lake, Whitaker Ponds, and Prison Pond. This reach of the Slough receives water from the Upper Slough, stormwater outfalls, natural springs, overland flow, and groundwater. And while historically many free-flowing streams drained Alameda Ridge into the Slough, all of these have since been piped or filled.

The Middle Slough mainstem channel varies in width from 30 to 100 feet. Due to the highly managed nature of the Middle Slough, water movement and sediment quality are fairly homogenous. When MCDD is not operating pumps, the flows in the Middle Slough cease. In addition, aquatic vegetation, both native and non-native, can flourish when pumping activities are moving water through the system, thereby increasing the clarity of water. Accumulated vegetation in the slough channel can affect water flows. MCDD conducts aquatic vegetation management to reduce the presence of invasive aquatic macrophytes, thereby improving conveyance. Although floodplain is mapped along the Middle Slough, the water levels are entirely managed and controlled by the drainage district.

Upper Slough

The Upper Slough reach extends from the MCDD NE 142nd Cross Levee (to the east) to Fairview Lake (to the west) and comprises approximately 2,560 acres. Included within this area is the historic connection to the Columbia River on Marine Drive between NE 158th Avenue and NE 185th Avenue. Instead, this is now the location of MCDD Pump Station No. 4. The Upper Slough receives water from Fairview Lake (in Gresham), Wilkes Creek, stormwater outfalls, Alice Springs, groundwater, and overland flow. Like the Middle Slough, the Upper Slough is completely surrounded by levees and is managed by MCDD.

The Upper Slough mainstem has many of the same characteristics as the Middle Slough. However, the Upper Slough area contains the Big Four Corners Natural Area. This large-scale restoration/water quality improvement project involved the purchase of 115 acres wetland, wooded wetland, waterway, and Oregon white oak habitat and is one of the City's largest natural areas at 165 acres. Although the area provides important habitat to many species of animals and has resulted in improvements to water quality, the Columbia Slough still faces many pollutant pressures, both past and present.

Over time, extensive alteration of the Slough watershed, due to industrial and residential development, has had a deleterious effect on the environmental quality of the Watershed. As development occurs, the natural topography, hydrology, and vegetation are altered and impervious surfaces such as streets, parking lots, and buildings are placed over much of the land. As a result of urbanization, industrial releases, alteration of water flows, and runoff from agricultural land, the Columbia Slough has polluted water, sediments and fish [DEQ, 2005¹⁵].

Pollutants have accumulated in the sediments of the Columbia Slough from over 100 years of industrial and agricultural activity in the watershed. Sediment contamination in the Slough is widespread at relatively low concentrations, generally reflecting impacts from pervasive and historical sources. Pollutants in Slough sediment pose unacceptable risks to human and ecological receptors as defined by Oregon Environmental Cleanup requirements (Oregon Revised Statute 465). Pollutants identified in Slough sediments above Oregon Department of Environmental Quality (DEQ) defined baseline concentrations include polychlorinated biphenyls (PCBs), metals, pesticides (e.g., DDT, DDE, DDD, dieldrin), and Polycyclic Aromatic Hydrocarbons (PAHs). In 2005, DEQ issued a Record of Decision (ROD) for Columbia Slough that describes the selected remedial action to address contaminated sediments¹⁶. The ROD is meant to lay the foundation for a coordinated, watershed-based approach for addressing sediment contamination in the Columbia Slough and considers a combination of several remedial elements in a framework for a long-term effort that incorporates consideration of watershed wide inputs, interagency coordination, and adaptive management techniques with the ultimate goal to

¹⁵ DEQ. 2005. *Record Of Decision - Remedial Action Approach For Columbia Slough Sediment - Portland, Oregon*. Prepared by Oregon Department Of Environmental Quality (DEQ), Northwest Region Office. July 2005. Available at: <https://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=80616036-1b29-45ab-9024-ad9fcacbe06f.pdf&s=ROD for Columbia Slough, July 2005.pdf>

¹⁶ *ibid*

reduce contaminant levels in the sediment throughout the Columbia Slough to concentrations protective of human health and the environment [DEQ, 2005¹⁷].

Some of the pollutants (PCBs, pesticides, etc.) present in Slough sediments concentrate in fish tissue and pose unacceptable risks (cancer and non-cancer) to humans and wildlife who consume fish from the Slough. The Oregon Health Authority maintains a Fish Advisory for the Columbia Slough (1993-current) to inform and provide recommendations for reducing potential risks to people consuming fish from the Slough ¹⁸.

The City of Portland is required by DEQ to take actions to address both discrete and wide-spread pervasive sources of sediment contamination and prevent further contamination (i.e., recontamination) of sediments in the Columbia Slough, as documented in the 2005 ROD. City actions required to meet the ROD have been established in a series of IGAs between DEQ and BES (dated 2005, 2010, 2016, and 2021 [current]). These actions include 1) identifying and controlling contaminated stormwater runoff from upland sites, and 2) identifying and reducing pollutants from high traffic public roadways, or land uses that are typically associated with higher pollutant loading (e.g., heavy industrial) to minimize or prevent contamination or recontamination of Slough sediments.

The City through its Bureau of Environmental Services (BES) and DEQ have been working to identify and control upland sources of contamination and implement other actions to improve sediment quality and watershed health throughout the Slough. As of 2020, DEQ was overseeing source control and cleanup actions at approximately 20 sites in the Columbia Slough Watershed (BES & DEQ, 2021¹⁹).

¹⁷ ibid

¹⁸ Columbia Slough Fish Advisory website: <https://www.portlandoregon.gov/bes/79670>

¹⁹ 2020 Annual Report – Columbia Slough Sediment Report: <https://www.portlandoregon.gov/bes/article/780237>



Figure 19: Historic Photo of the Connection Between the Upper Slough and the Columbia River

i. Riparian Buffer Area

Just as the Columbia Slough channel vegetation is managed to facilitate flow through the system, much of the vegetation on the banks of the Columbia Slough is managed to preserve the integrity of the levee system. Because the Columbia Slough channels are confined by dikes and levees, the floodplain extents are much more limited than they would have been historically, when the topography of the area was flatter than it currently is, and when the Columbia River had a stronger influence on the flows in the Columbia Slough than it currently does.

The comparatively-limited extent of the floodplain is represented in the Columbia Slough’s riparian buffer area. As shown in Table 27, the total area within the riparian buffer area is approximately 380 acres and it is located on 218 tax lots. There are only 18 structures currently located in those 218 tax lots.

TABLE 27: COLUMBIA SLOUGH RIPARIAN BUFFER AREA

Base Zone	Tax lots with RBA	Acres of RBA	Structures in RBA
OS	40	196.7	0
IH	102	110.5	14
IG2	56	61.2	2
RF	3	7.3	2
EG2	12	3.9	0
CM2	2	0.6	0

Base Zone	Tax lots with RBA	Acres of RBA	Structures in RBA
CE	2	0.1	0
IR	1	0.1	0
Grand Total	218	380.3	18

Because of vegetation management on dikes and levees, much of the riparian vegetation that surrounds the slough is composed of grasses and non-native species that is regularly mowed or controlled. However, there are 197 acres of riparian buffer area that is located in the open space base zone, including area that is covered by tree canopy. There is also some higher quality habitat in the riparian buffer area that is located in the Big Four Corners Natural Area and Smith and Bybee Lakes. In all, there are 195 acres of tree canopy that are located in the Columbia Slough riparian buffer area. Most of this tree canopy is located in the portion of the riparian buffer area that intersects with the open space base zone. But even though the majority of the riparian buffer area in the open space zone is covered by tree canopy, the overall tree canopy coverage in the Columbia Slough riparian buffer area is only 53 percent, because other portions of the riparian buffer area have close to no tree canopy coverage.

ii. Potential Impact of Development in the Floodplain

Within the Columbia Slough system in Portland, approximately 1,027 tax lots (3,350 acres of floodplain) are partially or fully within a mapped floodplain (100-Year and/or Metro Title 3/1996 Flood Inundation Area). Of these tax lots, 150 are located completely (95 percent or more) within a floodplain and 877 are located partially within a floodplain (see Table 28, below).

TABLE 28: COLUMBIA SLOUGH TAX LOTS WITHIN THE FLOODPLAIN BY BASE ZONE

Base Zone	Fully Within (>95%)	Partially Within	Grand Total
IG2	27	468	495
IH	67	162	229
OS	52	52	104
R10	0	68	68
EG2	0	39	39
CM2	0	35	35
RF	4	25	29
R20	0	22	22
CM1	0	3	3
CE	0	2	2
IR	0	1	1
Grand Total	150	877	1,027

A closer look at the tax lots partially within a floodplain allows us to estimate the potential for new development or redevelopment that may impact floodplains. Using the maximum building coverage allowed by the base zone as a proxy, we analyzed whether tax lots had sufficient area outside of the floodplain to accommodate the square footage allowed by the base zone. As shown in Table 29, the analysis, which did not include areas such as the Environmental Protection overlay zone, determined that of the 1,027 properties within the floodplain, 431 tax lots (41.9%) have sufficient area outside of the floodplain to accommodate the base zone’s maximum building coverage. However, there is not sufficient space on the 492 tax lots (47.9%) to accommodate the base zone’s maximum building coverage. The percentage of the maximum building coverage that is within the floodplain on individual tax lots varies significantly.

TABLE 29: COLUMBIA SLOUGH – TAX LOT AREA OUTSIDE OF THE FLOODPLAIN IS GREATER THAN OR EQUAL TO THE MAXIMUM ALLOWED BUILDING COVERAGE

Base Zone	No	Yes	Open Space	Grand Total
IG2	218	277		495
IH	229	0		229
OS	0	0	104	104
R10	0	68		68
EG2	16	23		39
CM2	25	10		35
RF	4	25		29
R20	0	22		22
CM1	0	3		3
CE	0	2		2
IR	0	1		1
Grand Total	492	431	104	1,027

It is important to note that the number of tax lots that cannot develop to maximum building coverage is inflated by the 229 tax lots of Heavy Industrial (IH) zoning. The IH base zone has no maximum building coverage, so all IH-zoned tax lots within a floodplain were, to some extent, considered unable to build to maximum building coverage (the entire lot).

ii. Additional Floodplain Characteristics

TABLE 30: COLUMBIA SLOUGH ZONING (IN ACRES)

Zone	Tax lots (#)	100-Year Floodplain	Metro Title 3/ 1996 Flood Inundation Area	1996 Actual Flood Extent²⁰	100-Year & 1996 Flood Inundation Area
OS	104	2,088	1,781	1,793	2,097
IG2	495	572	183	183	600
IH	229	485	325	459	549
RF	29	42	33	33	42
EG2	39	26	14	14	28
R10	68	17	4	4	18
R20	22	8	1	1	8
CM2	35	5	4	4	6
CM1	3	1	0	0	1
CE	2	0.3	0	0	0.3
IR	1	0.2	0	0	0.2
Grand Total	1,027	3,246	2,346	2,491	3,350

TABLE 31: PROPERTY OWNERSHIP (IN ACRES)

Columbia Slough	Tax lots (#)	100-Year Floodplain	Metro Title 3/1996 Flood Inundation Area	1996 Actual Flood Extent¹⁹	100-Year & 1996 Flood Inundation Area
Private	731	608	316	364	664
Private-RR	15	48	49	49	51
Public	281	2,591	1,981	2,078	2,635
Grand Total	1,027	3,246	2,346	2,491	3,350

²⁰ Statistics for the actual 1996 Flood Extent are included for informational purposes, only. Portland does not apply floodplain regulations to this area.



Legend

- FEMA 100-Year Floodplain
- Metro Title 3/1996 Flood Area
- FEMA 500-Year Floodplain
- Watershed boundaries
- Urban Service Boundary

August 19, 2021

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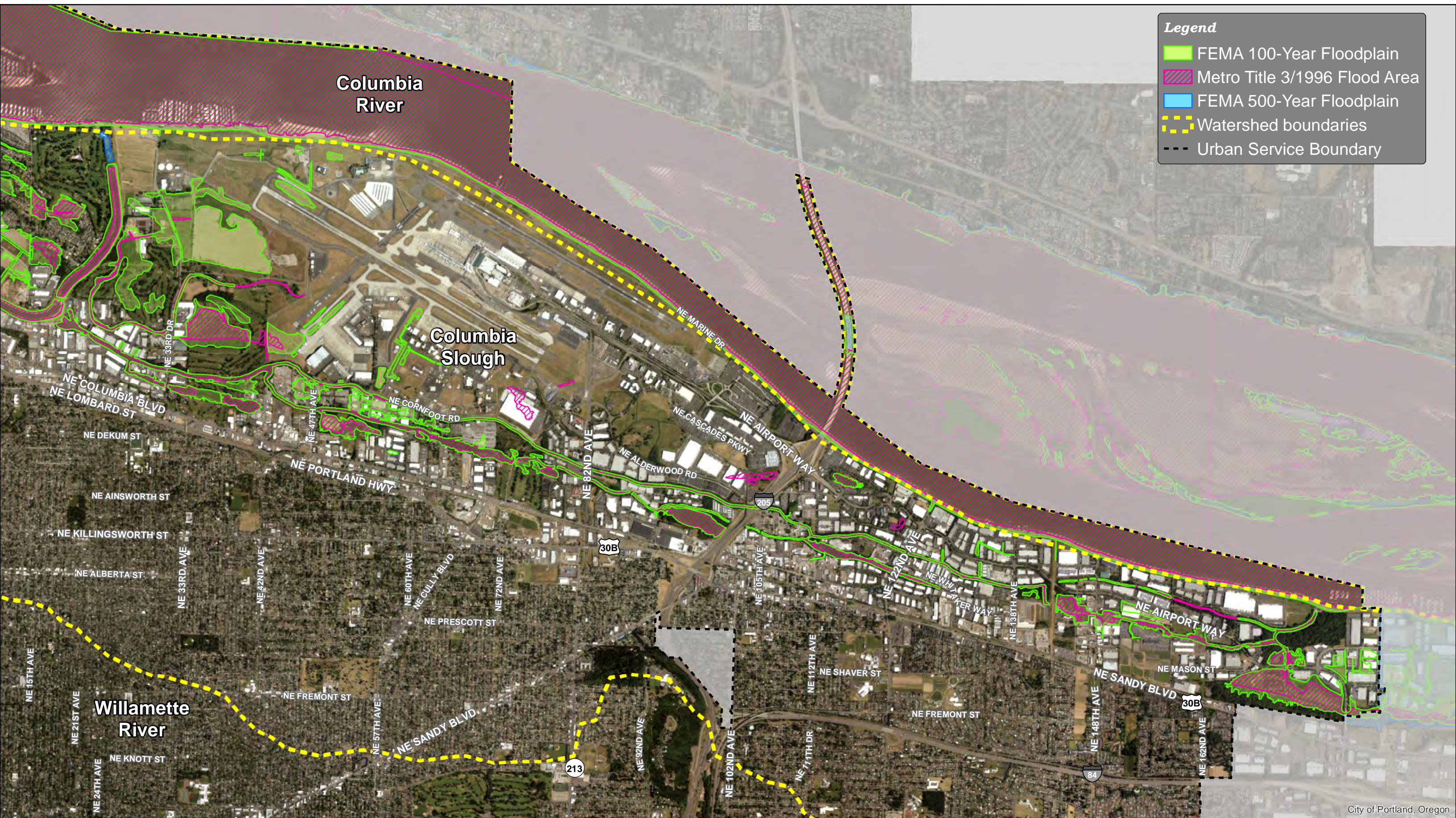
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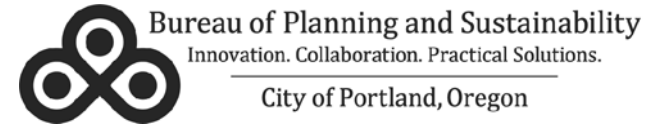
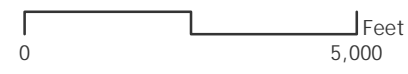


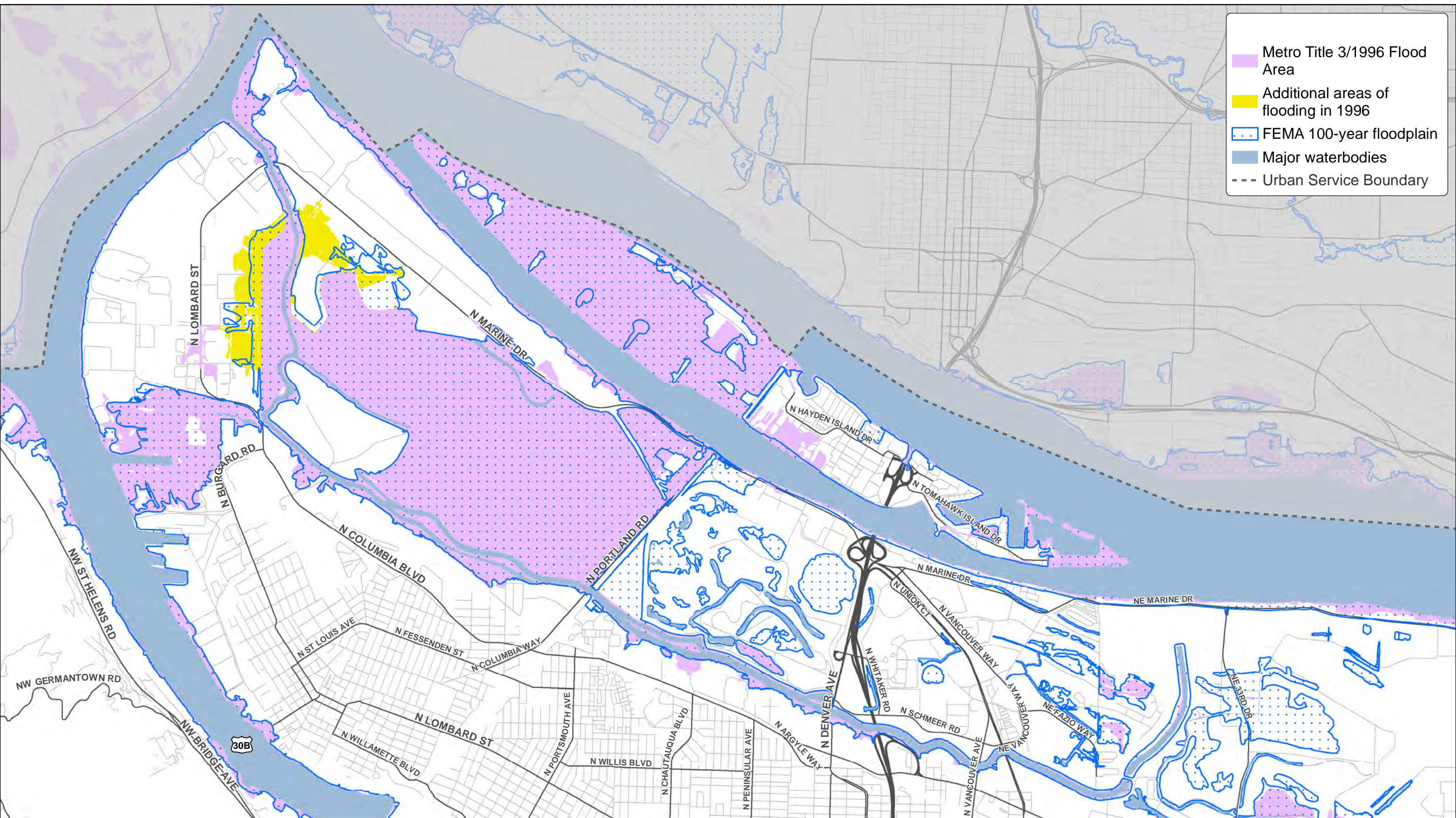
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- Metro Title 3/1996 Flood Area
- Additional areas of flooding in 1996
- FEMA 100-year floodplain
- Major waterbodies
- Urban Service Boundary

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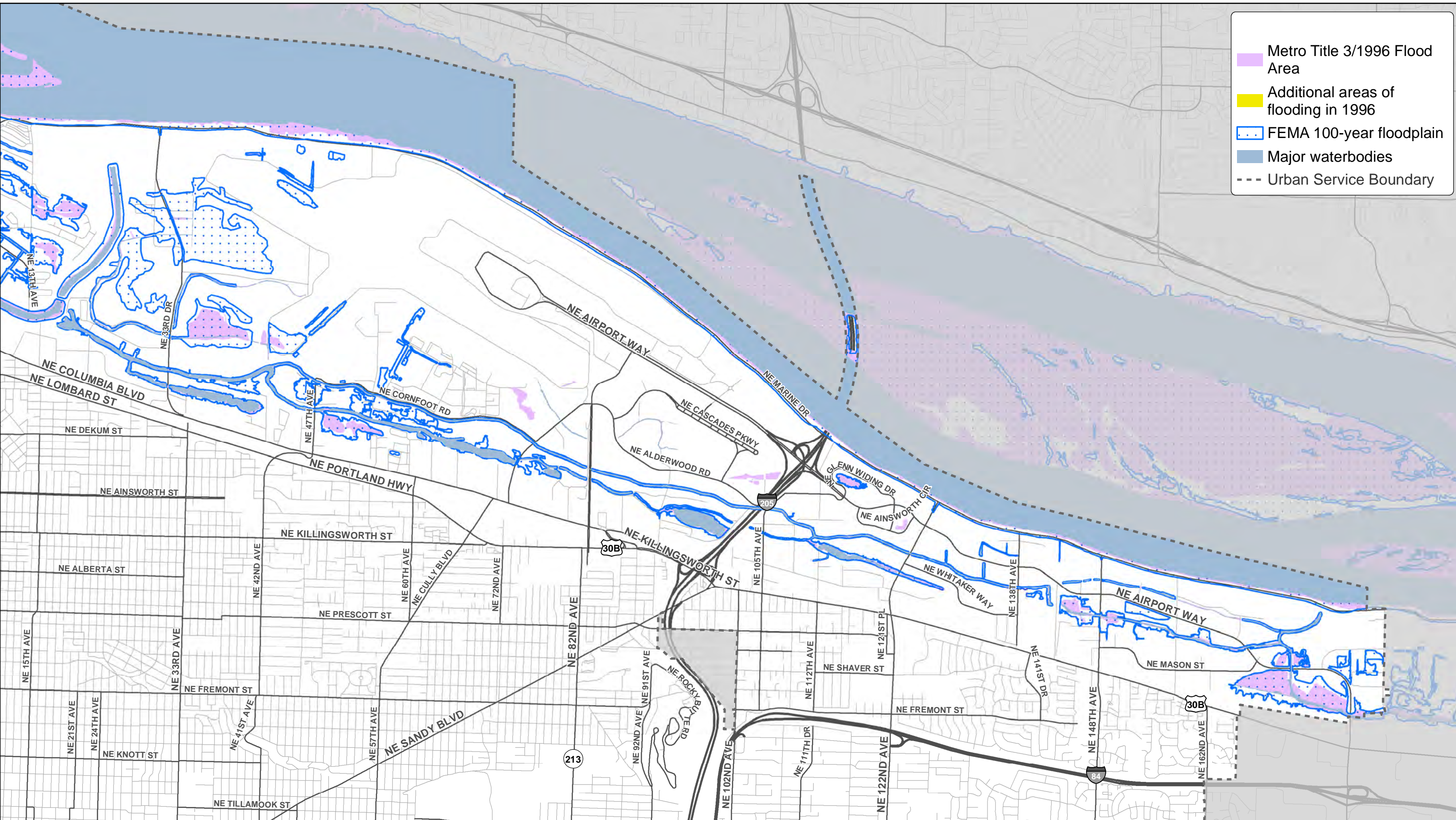
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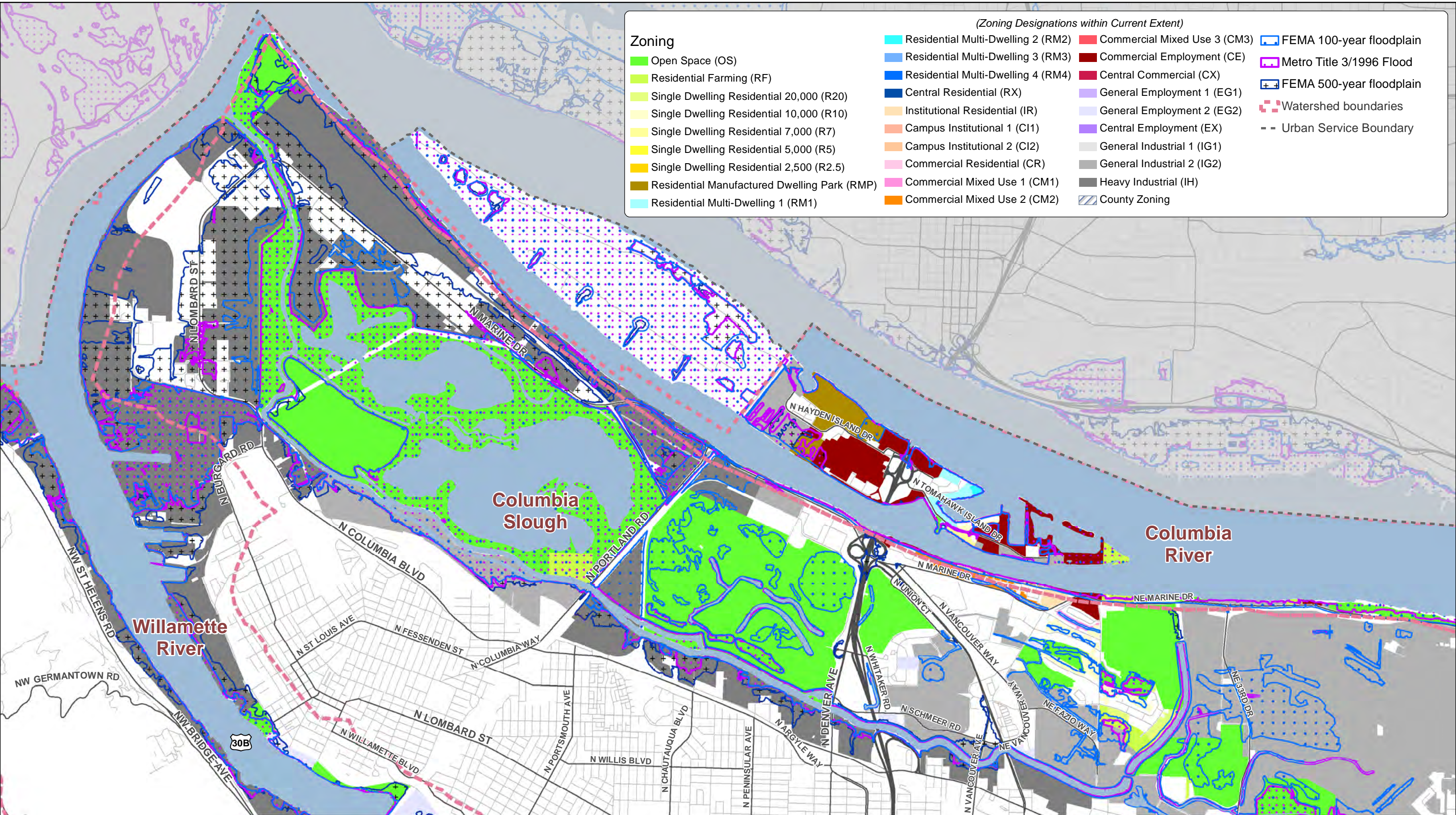
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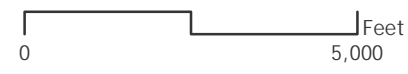
Zoning		(Zoning Designations within Current Extent)	
Open Space (OS)	Residential Multi-Dwelling 2 (RM2)	Commercial Mixed Use 3 (CM3)	FEMA 100-year floodplain
Residential Farming (RF)	Residential Multi-Dwelling 3 (RM3)	Commercial Employment (CE)	Metro Title 3/1996 Flood
Single Dwelling Residential 20,000 (R20)	Residential Multi-Dwelling 4 (RM4)	Central Commercial (CX)	FEMA 500-year floodplain
Single Dwelling Residential 10,000 (R10)	Central Residential (RX)	General Employment 1 (EG1)	Watershed boundaries
Single Dwelling Residential 7,000 (R7)	Institutional Residential (IR)	General Employment 2 (EG2)	Urban Service Boundary
Single Dwelling Residential 5,000 (R5)	Campus Institutional 1 (CI1)	Central Employment (EX)	
Single Dwelling Residential 2,500 (R2.5)	Campus Institutional 2 (CI2)	General Industrial 1 (IG1)	
Residential Manufactured Dwelling Park (RMP)	Commercial Residential (CR)	General Industrial 2 (IG2)	
Residential Multi-Dwelling 1 (RM1)	Commercial Mixed Use 1 (CM1)	Heavy Industrial (IH)	
	Commercial Mixed Use 2 (CM2)	County Zoning	

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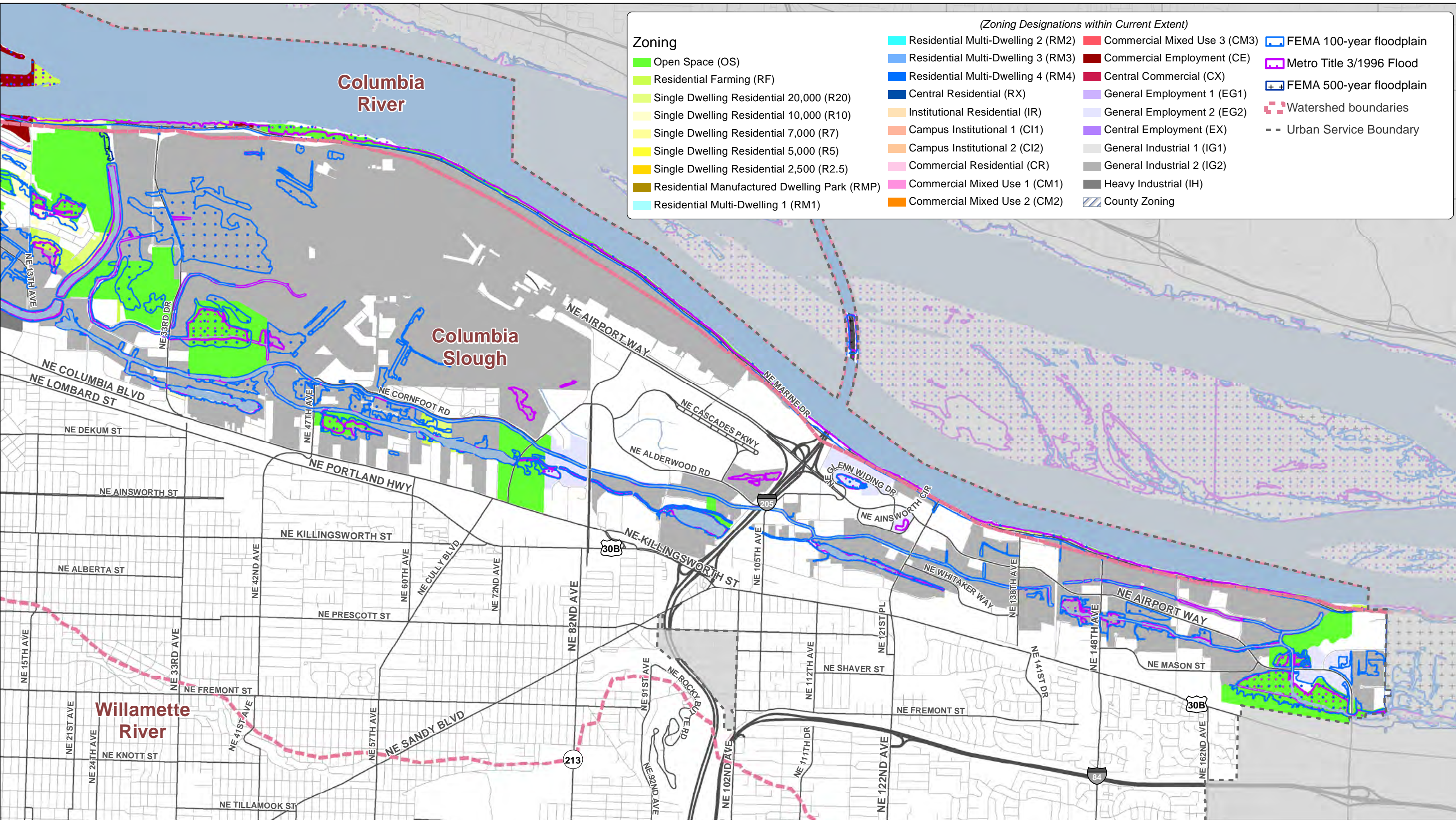
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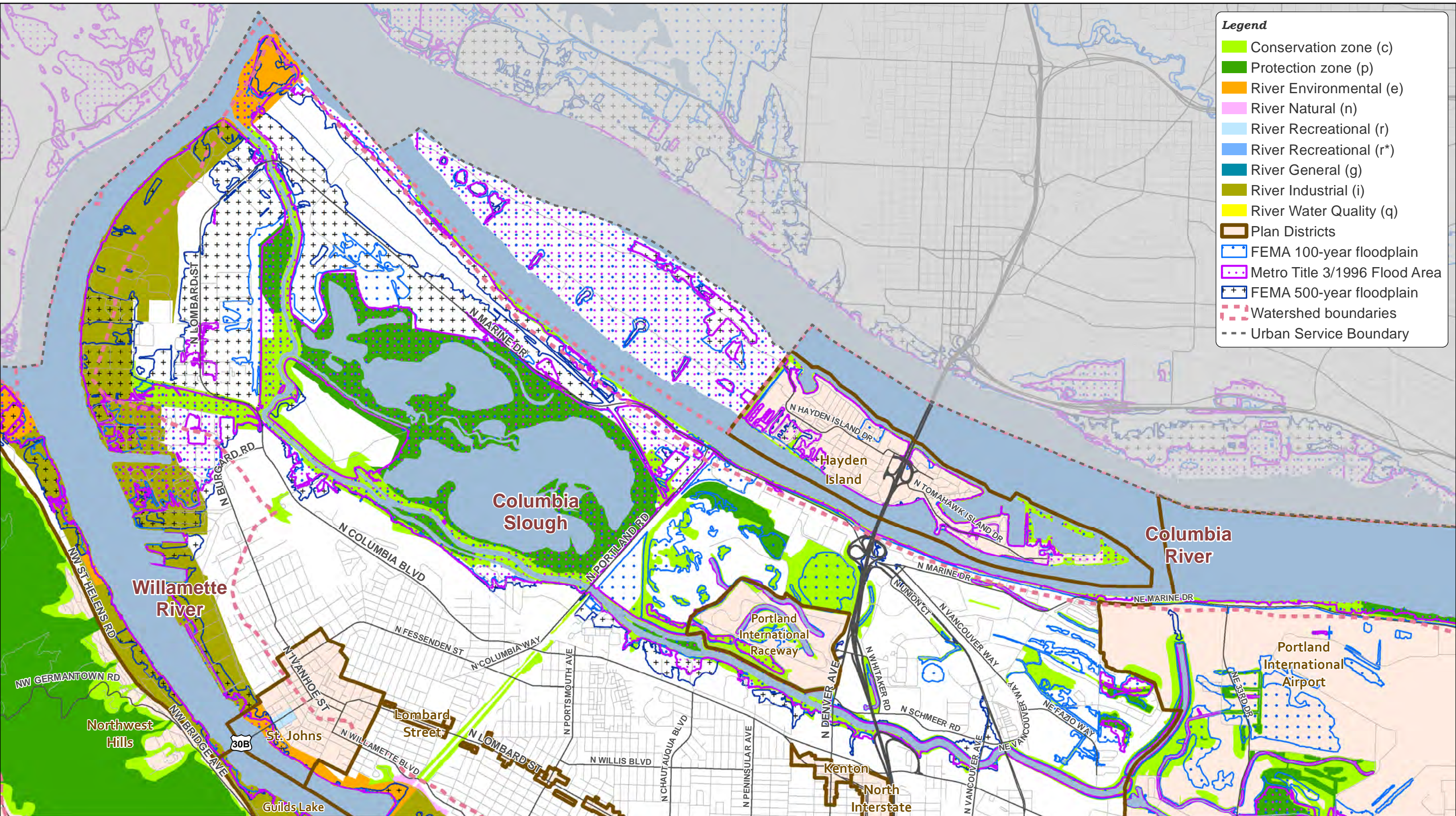
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Legend

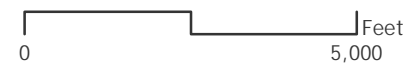
- Conservation zone (c)
- Protection zone (p)
- River Environmental (e)
- River Natural (n)
- River Recreational (r)
- River Recreational (r*)
- River General (g)
- River Industrial (i)
- River Water Quality (q)
- Plan Districts
- FEMA 100-year floodplain
- Metro Title 3/1996 Flood Area
- FEMA 500-year floodplain
- Watershed boundaries
- Urban Service Boundary

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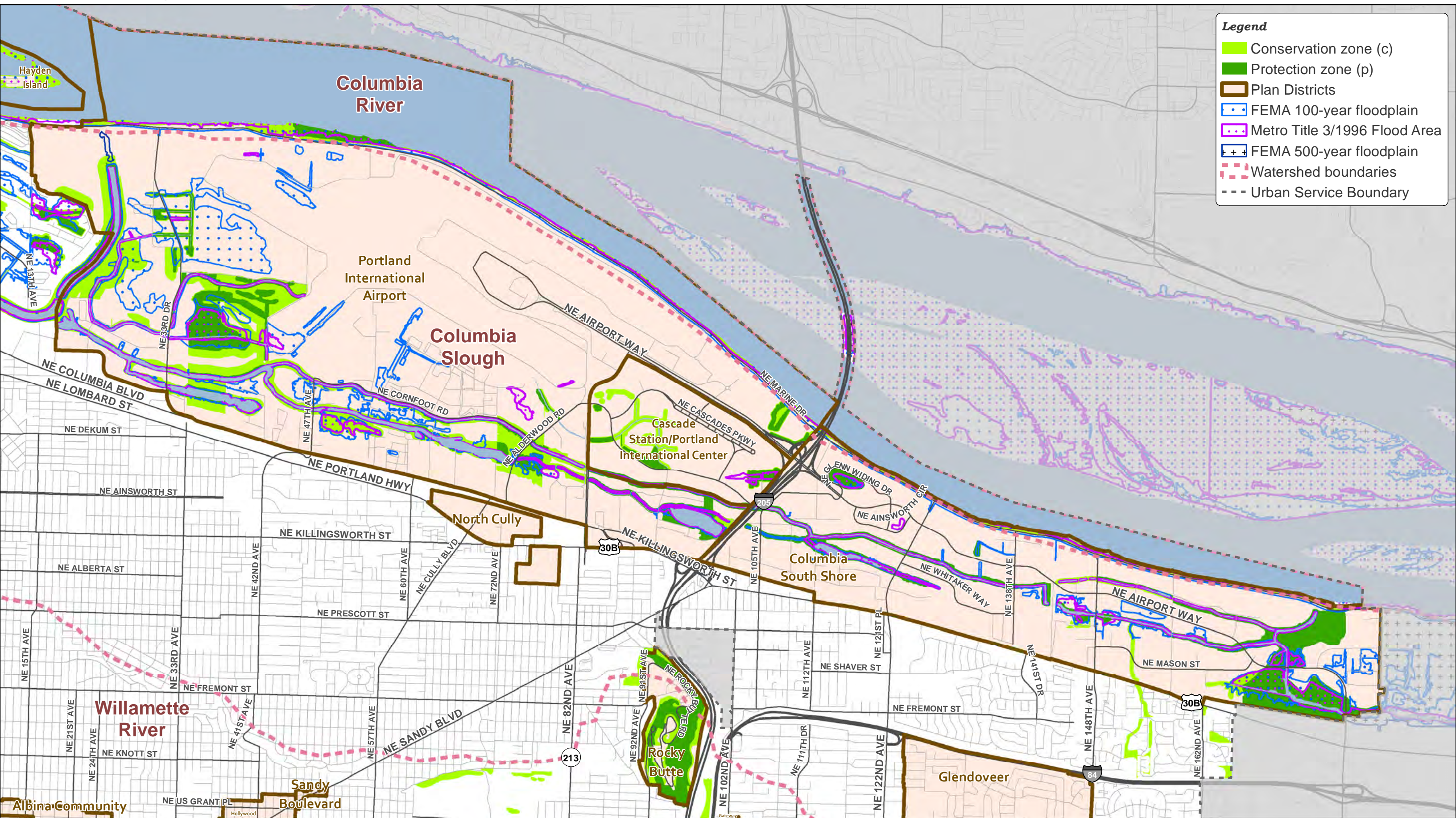
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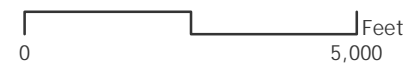
- Conservation zone (c)
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- Plan Districts
- FEMA 100-year floodplain
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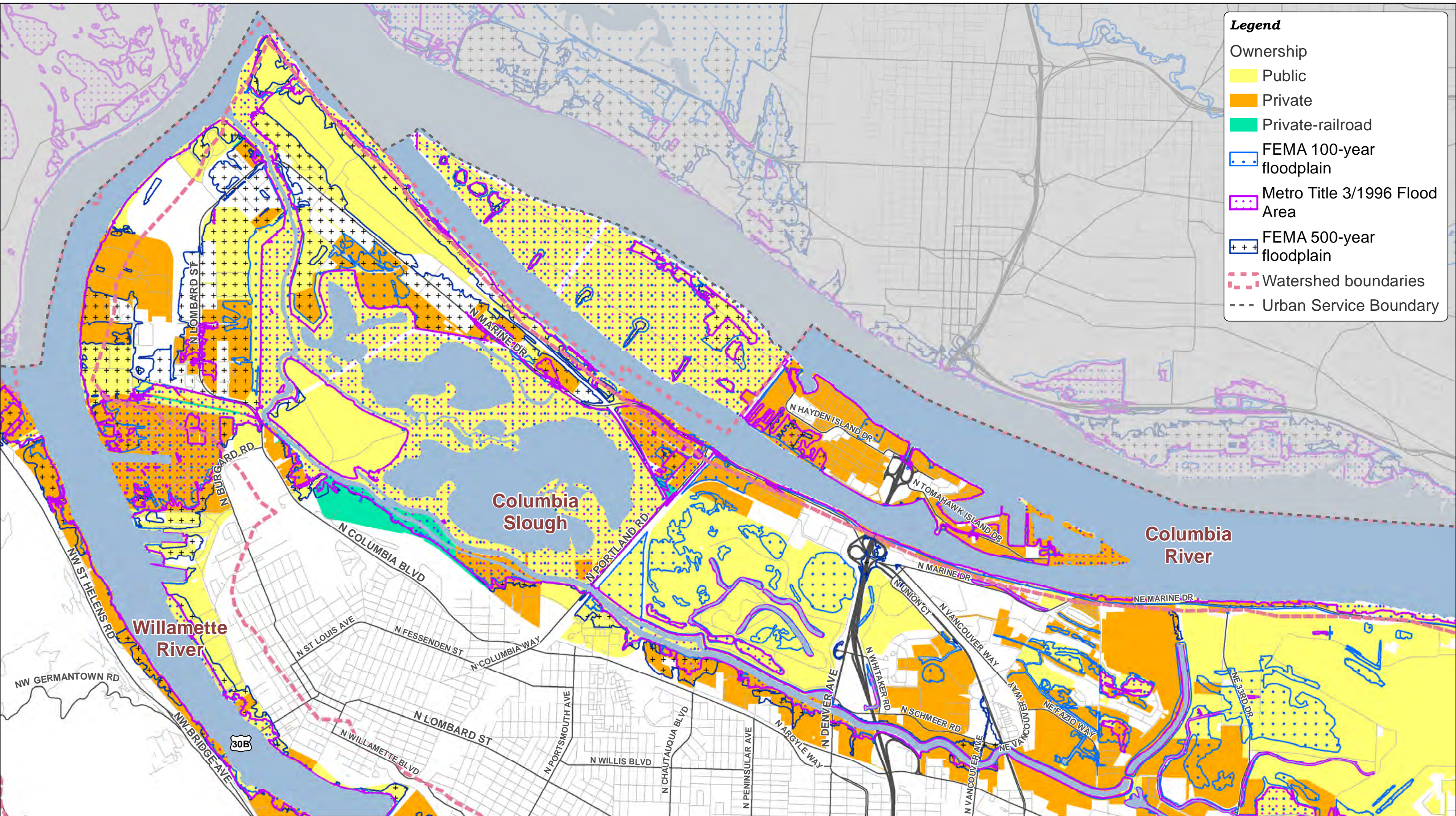
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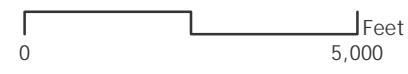
- Ownership
 - Public
 - Private
 - Private-railroad
- FEMA 100-year floodplain
- Metro Title 3/1996 Flood Area
- FEMA 500-year floodplain
- Watershed boundaries
- Urban Service Boundary

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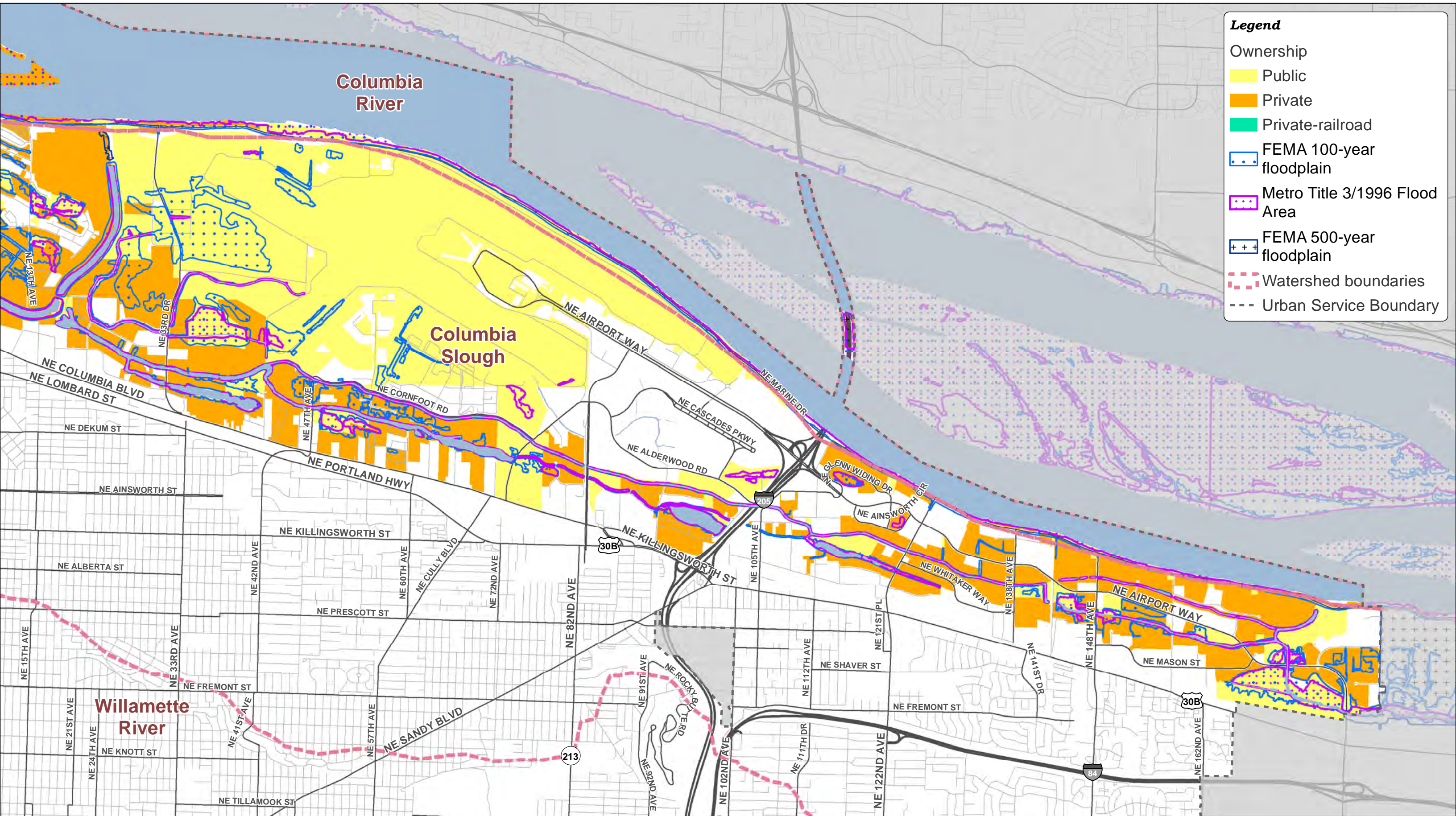
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Legend

- Ownership
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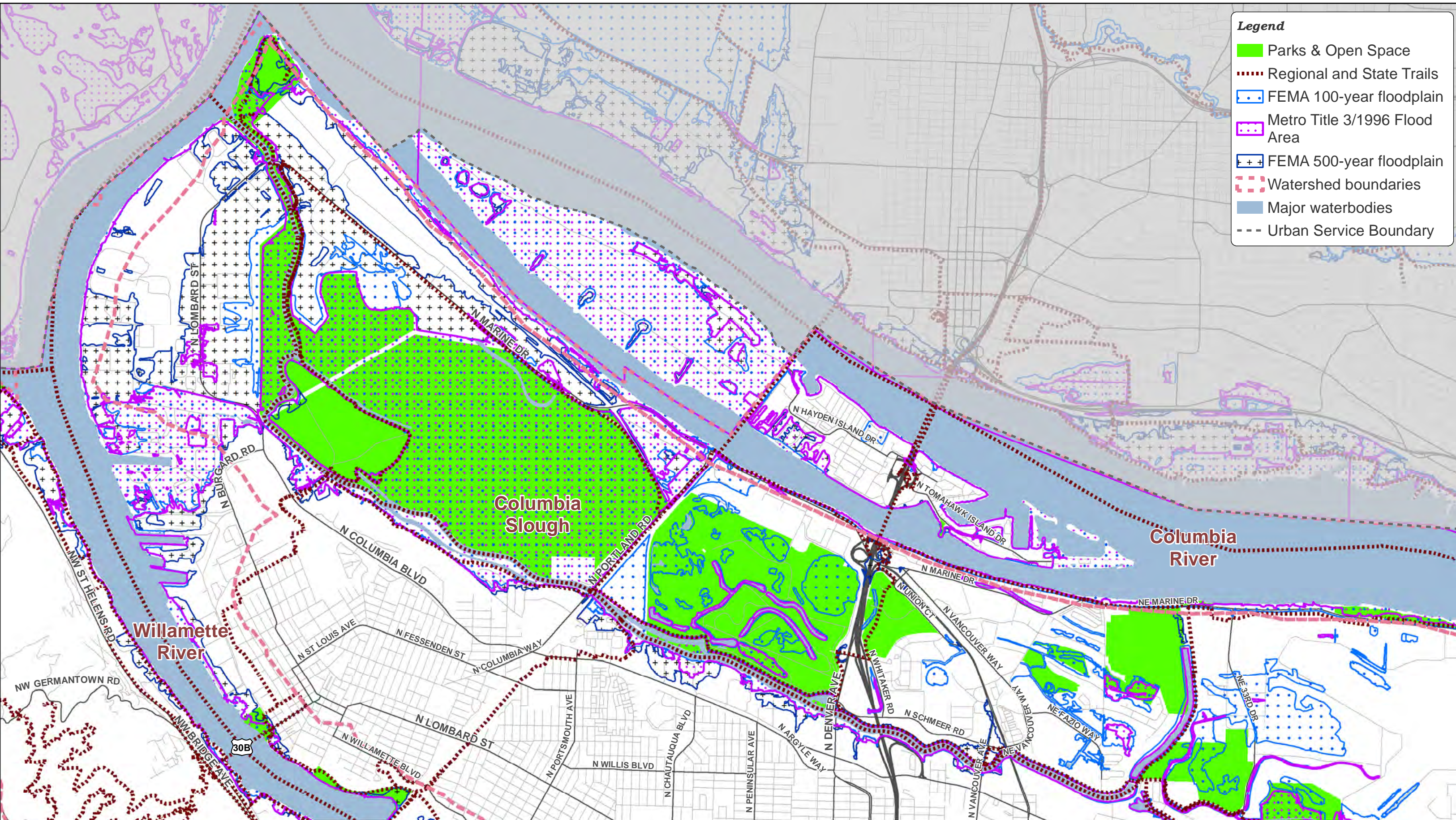
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Legend

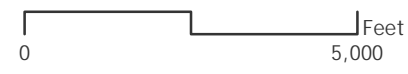
- Parks & Open Space
- Regional and State Trails
- FEMA 100-year floodplain
- Metro Title 3/1996 Flood Area
- FEMA 500-year floodplain
- Watershed boundaries
- Major waterbodies
- Urban Service Boundary

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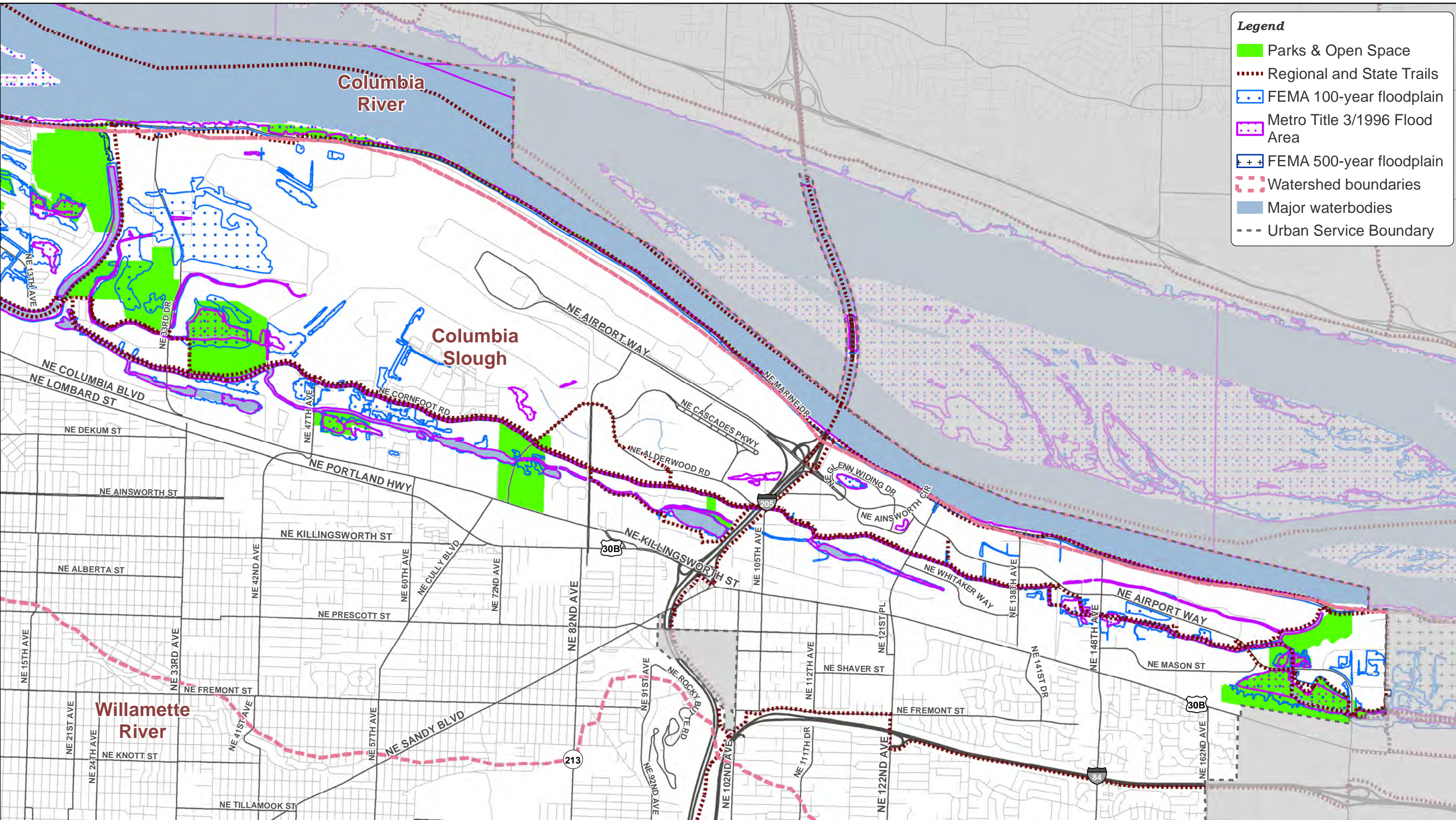
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Legend

- Parks & Open Space
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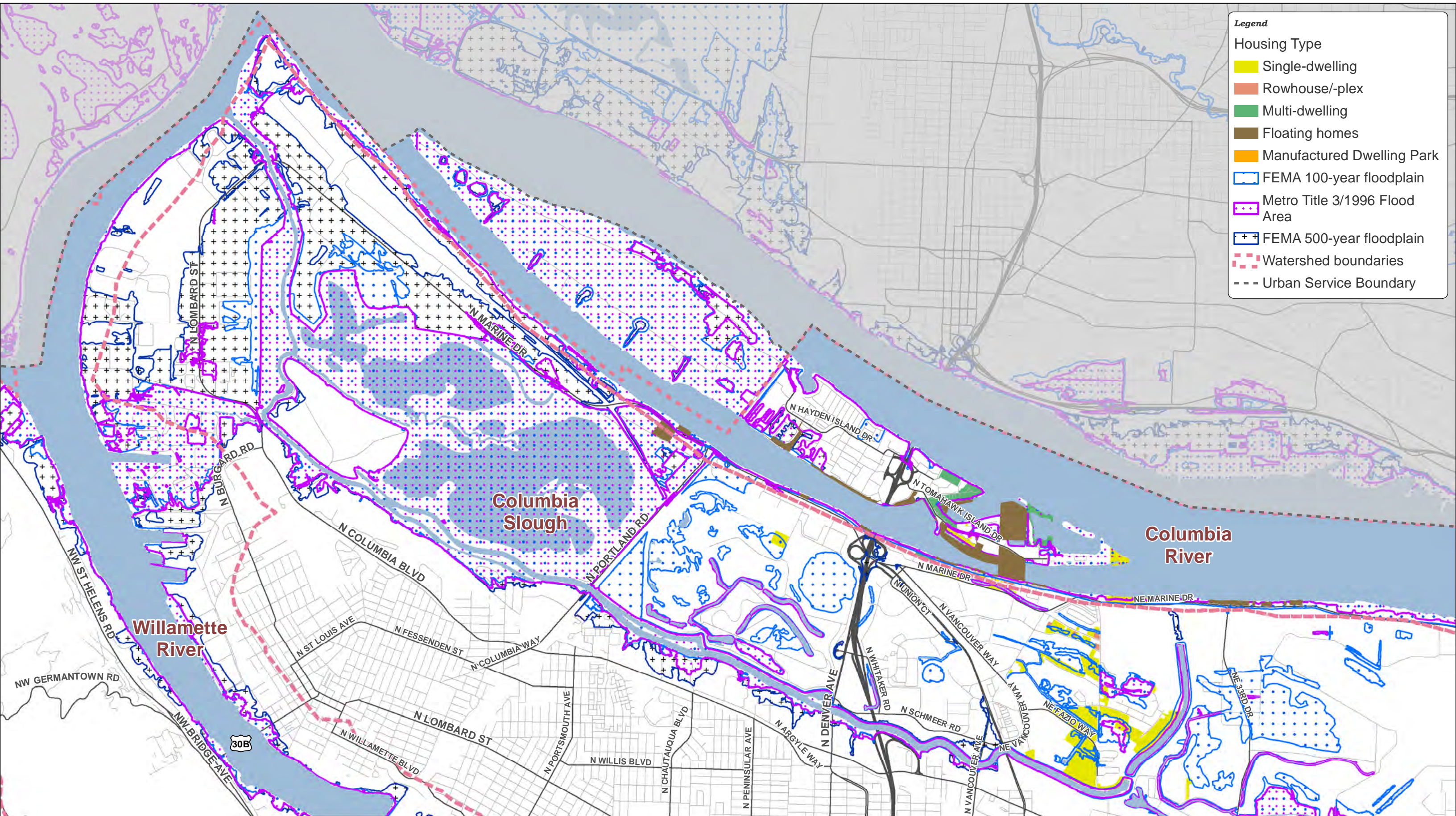
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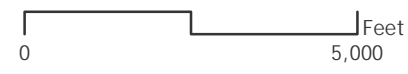
- Single-dwelling
- Rowhouse/-plex
- Multi-dwelling
- Floating homes
- Manufactured Dwelling Park
- FEMA 100-year floodplain
- Metro Title 3/1996 Flood Area
- FEMA 500-year floodplain
- Watershed boundaries
- Urban Service Boundary

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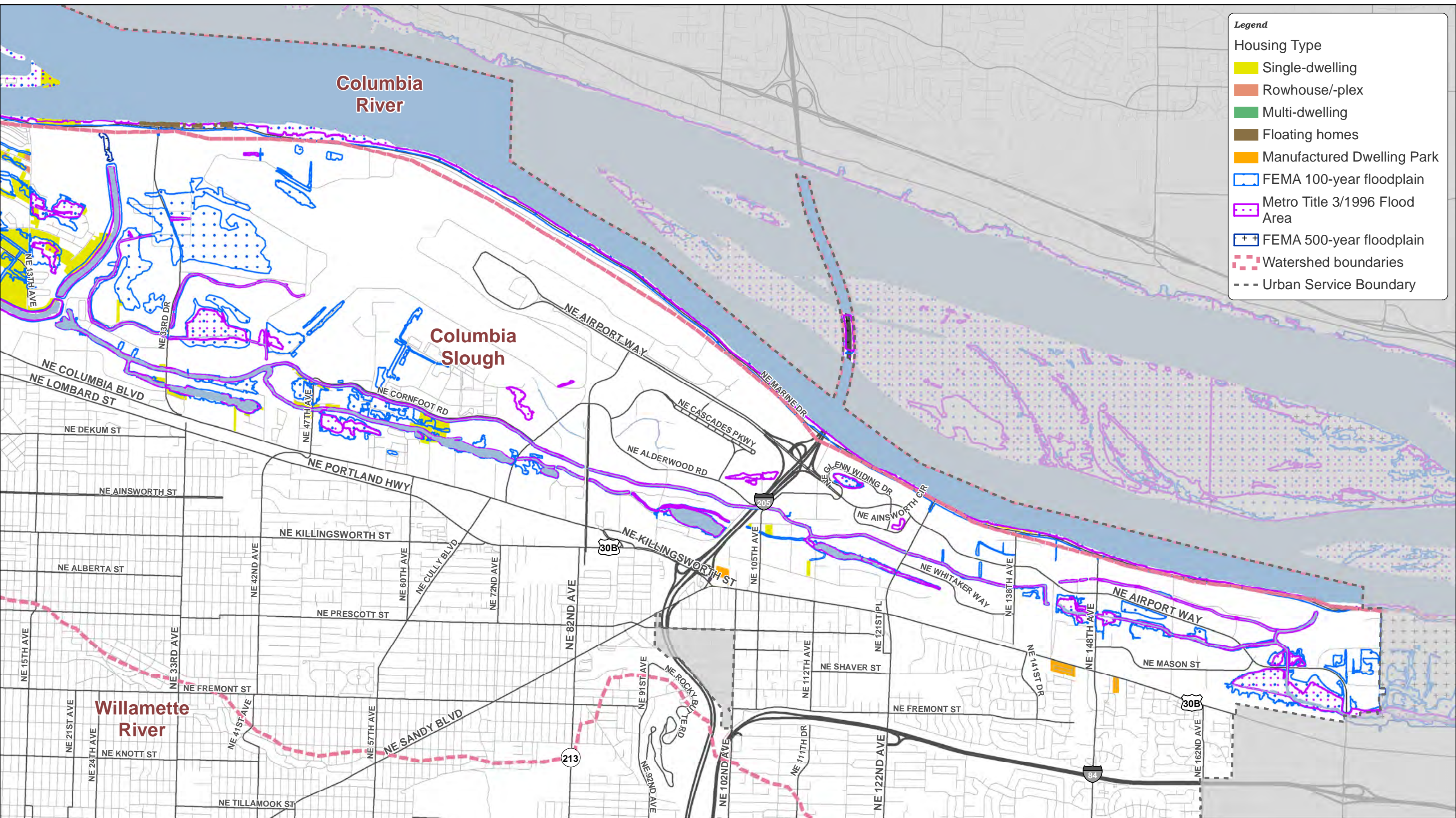
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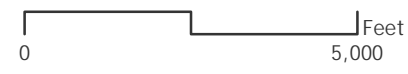
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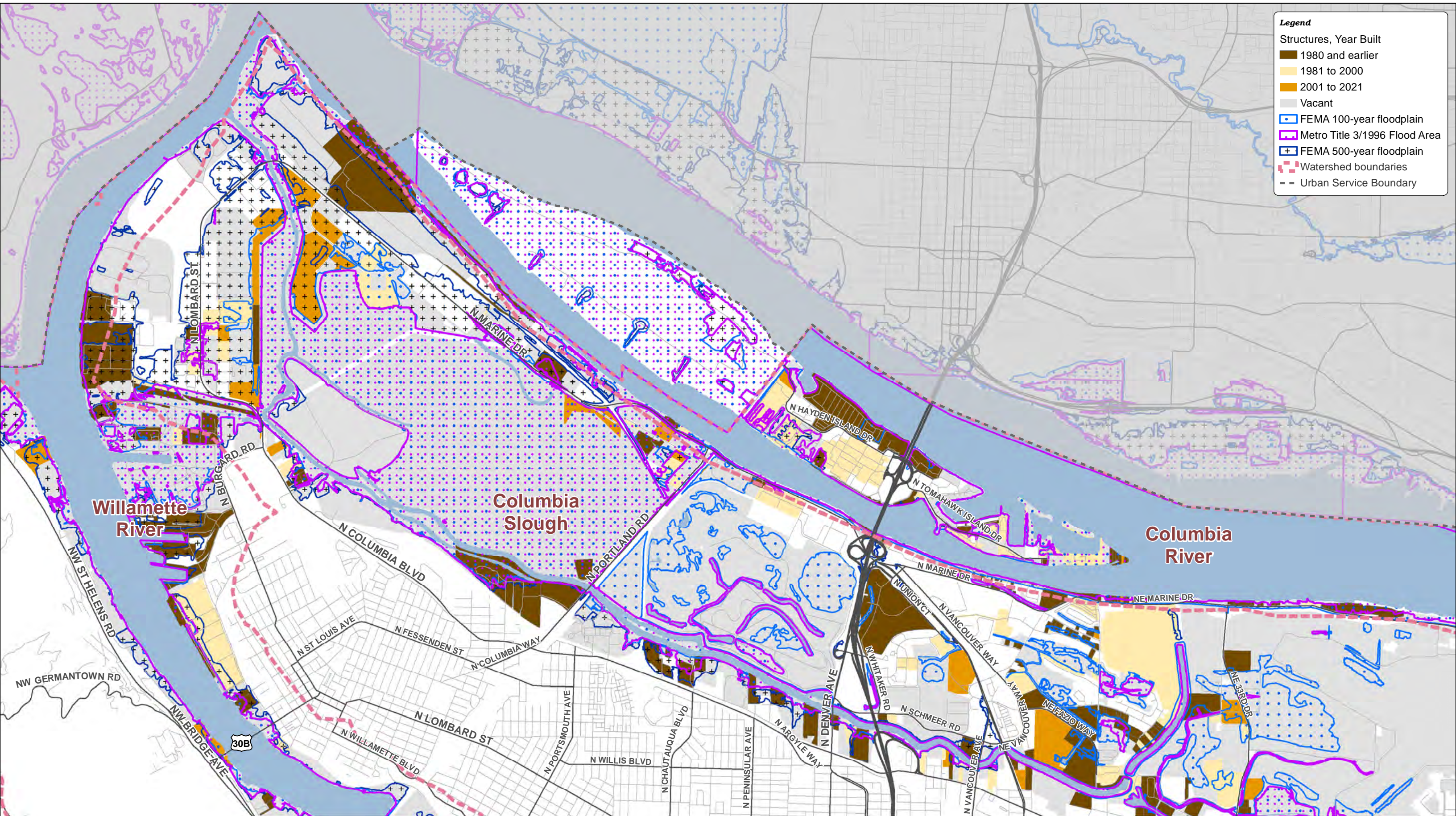
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Legend

- Structures, Year Built
 - 1980 and earlier
 - 1981 to 2000
 - 2001 to 2021
 - Vacant
- FEMA 100-year floodplain
- Metro Title 3/1996 Flood Area
- FEMA 500-year floodplain
- Watershed boundaries
- Urban Service Boundary

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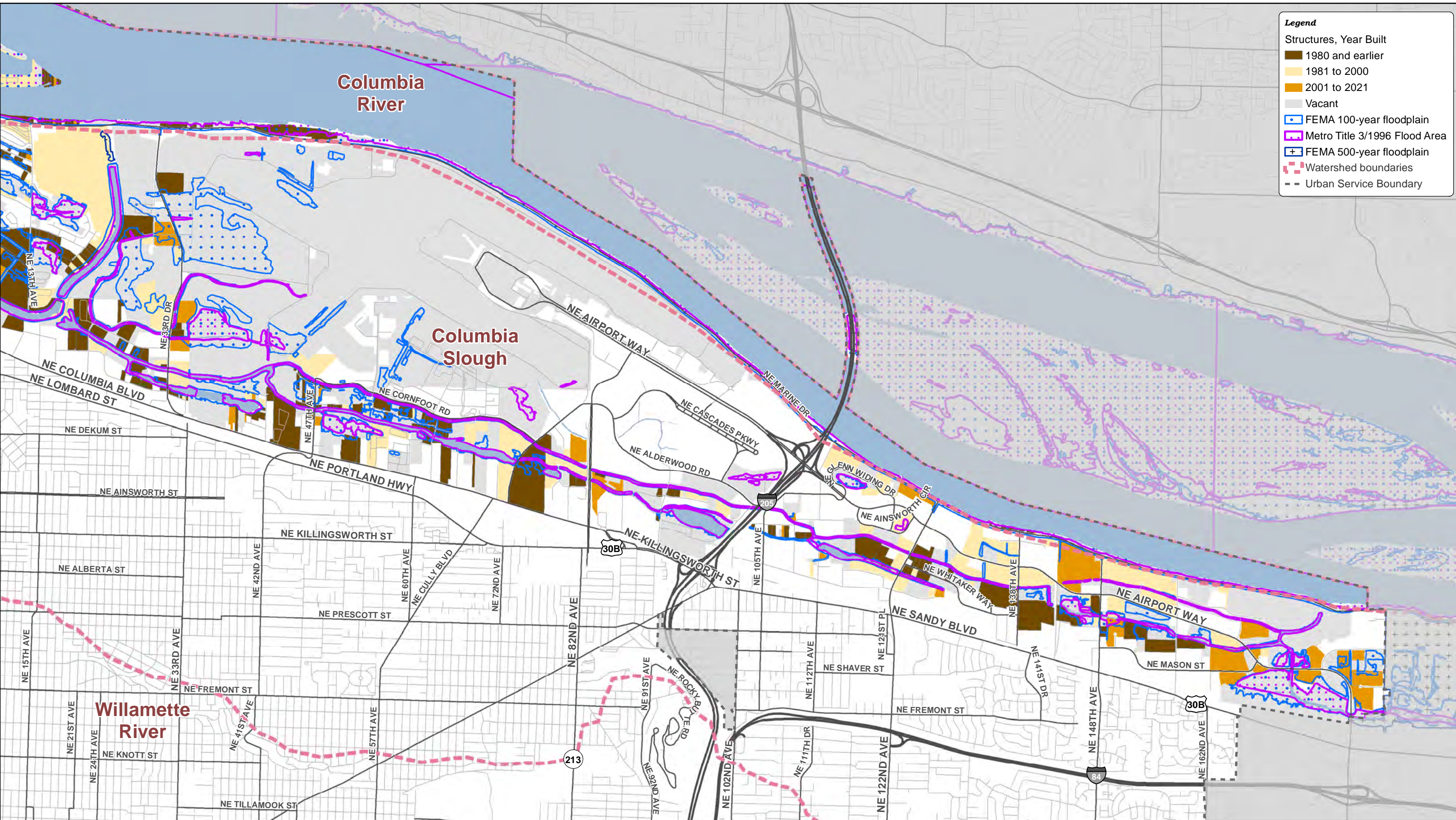
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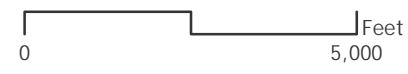
Legend

- Structures, Year Built
 - 1980 and earlier
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- FEMA 100-year floodplain
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- FEMA 500-year floodplain
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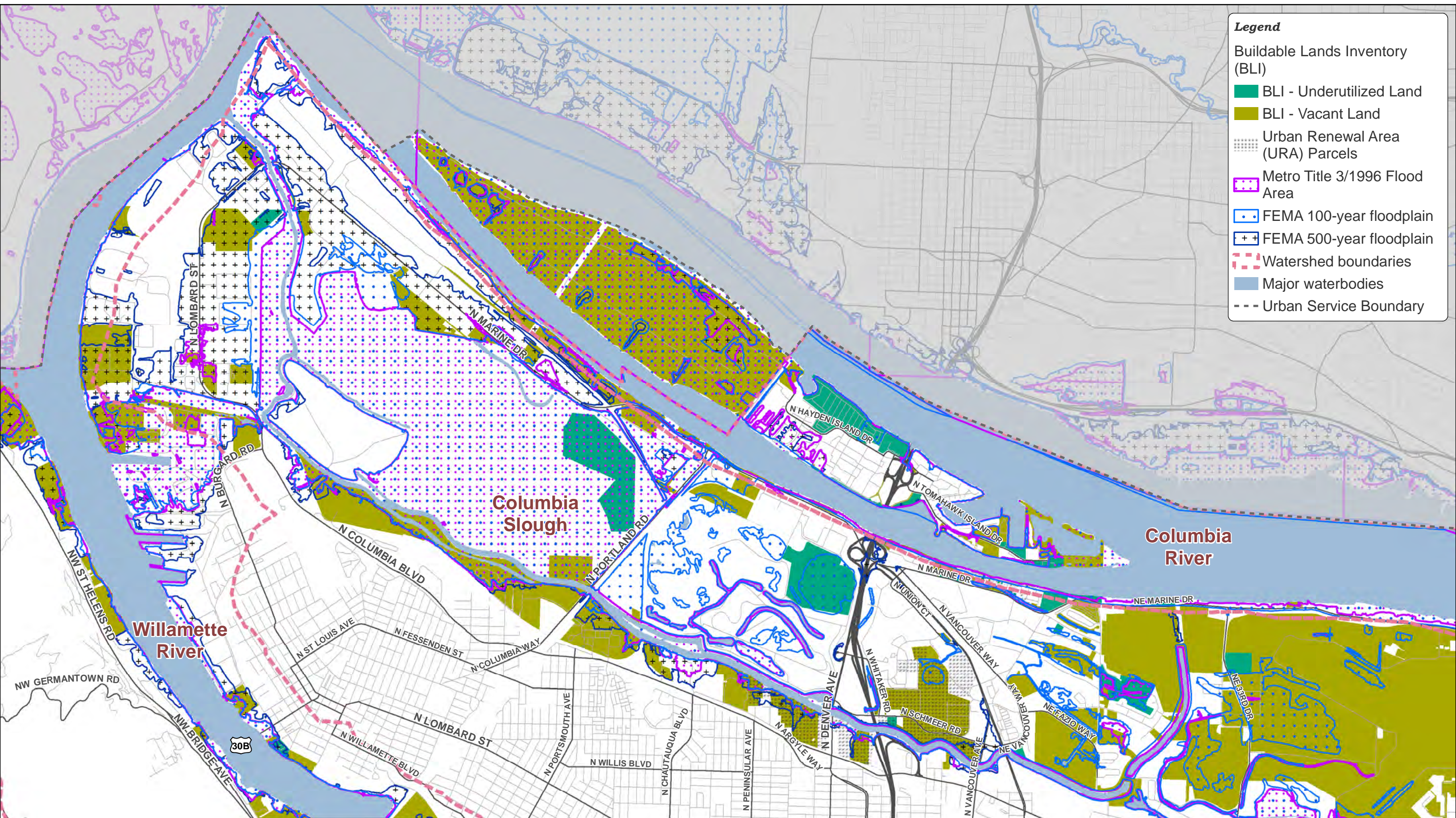
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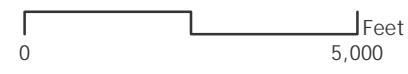
- Buildable Lands Inventory (BLI)
 - BLI - Underutilized Land
 - BLI - Vacant Land
- Urban Renewal Area (URA) Parcels
- Metro Title 3/1996 Flood Area
- FEMA 100-year floodplain
- FEMA 500-year floodplain
- Watershed boundaries
- Major waterbodies
- Urban Service Boundary

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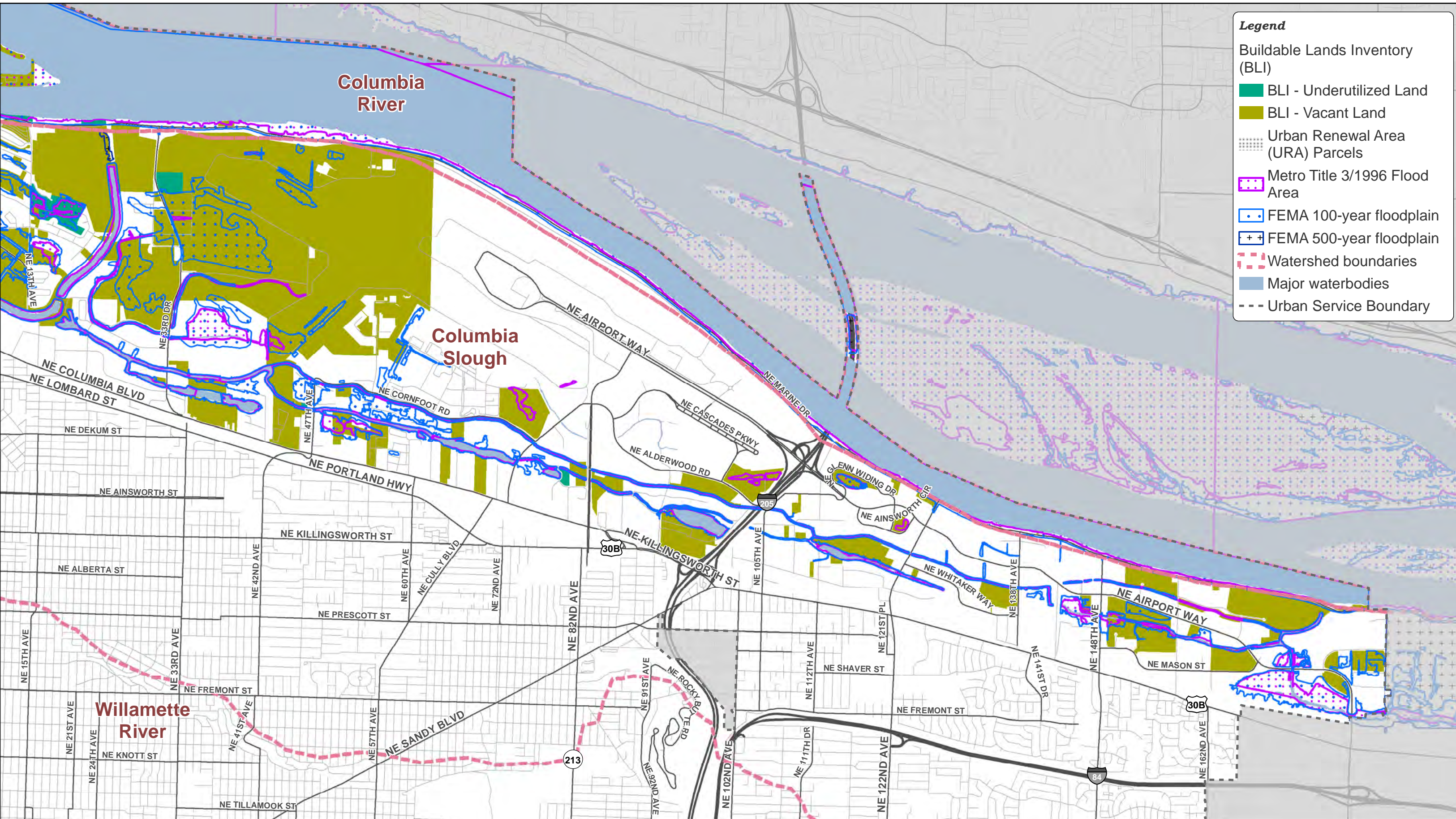
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Legend

- Buildable Lands Inventory (BLI)
 - BLI - Underutilized Land
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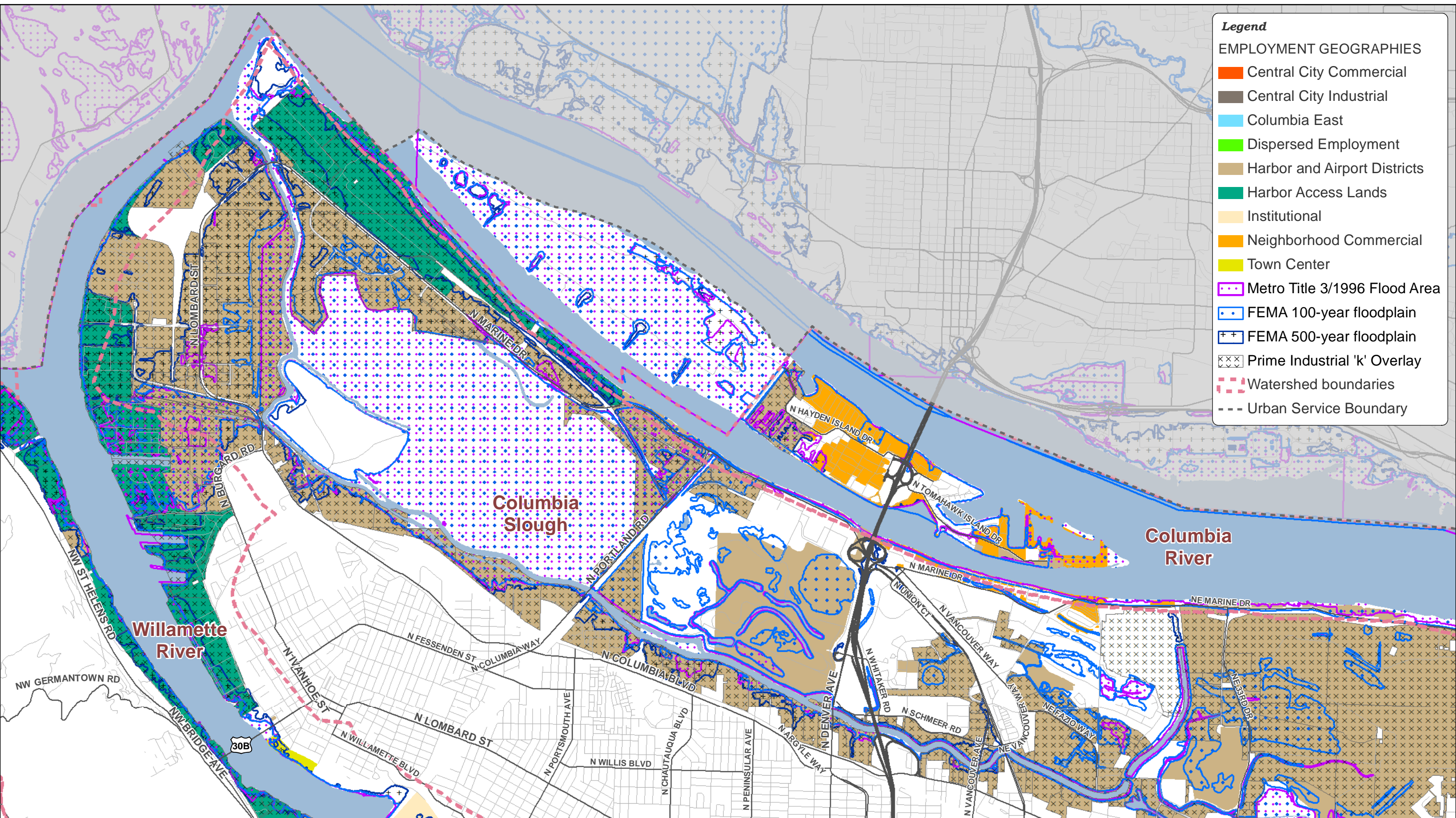
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FEMA Biological Opinion (BiOp) - Existing Conditions: Employment Geographies - Columbia River/Slough Watersheds - West



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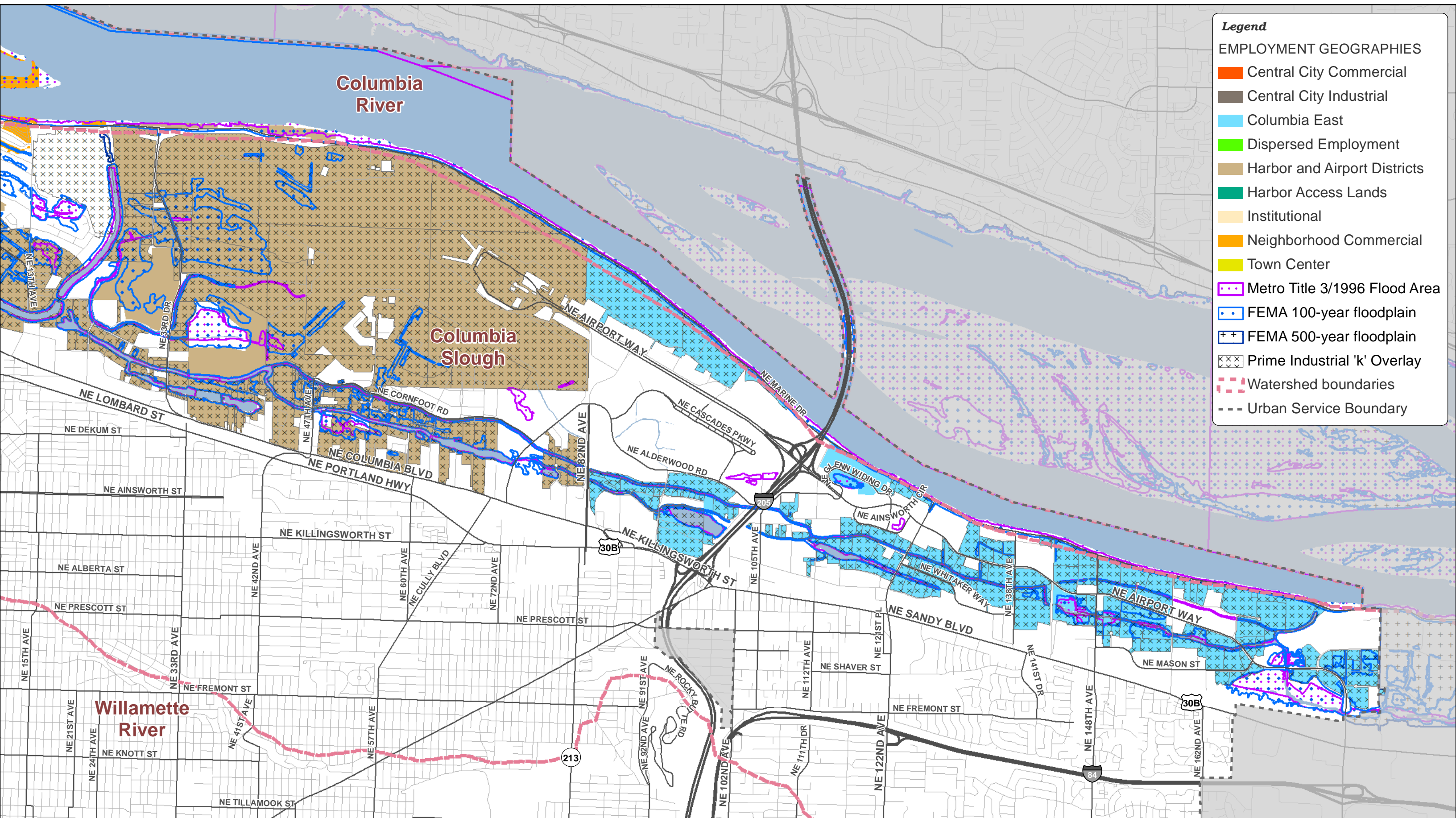


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FEMA Biological Opinion (BiOp) - Existing Conditions: Employment Geographies - Columbia River/Slough Watersheds - East



Legend

EMPLOYMENT GEOGRAPHIES

- Central City Commercial
- Central City Industrial
- Columbia East
- Dispersed Employment
- Harbor and Airport Districts
- Harbor Access Lands
- Institutional
- Neighborhood Commercial
- Town Center

FLOOD AND FLOODPLAIN DATA

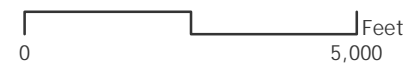
- Metro Title 3/1996 Flood Area
- FEMA 100-year floodplain
- FEMA 500-year floodplain
- Prime Industrial 'k' Overlay
- Watershed boundaries
- Urban Service Boundary

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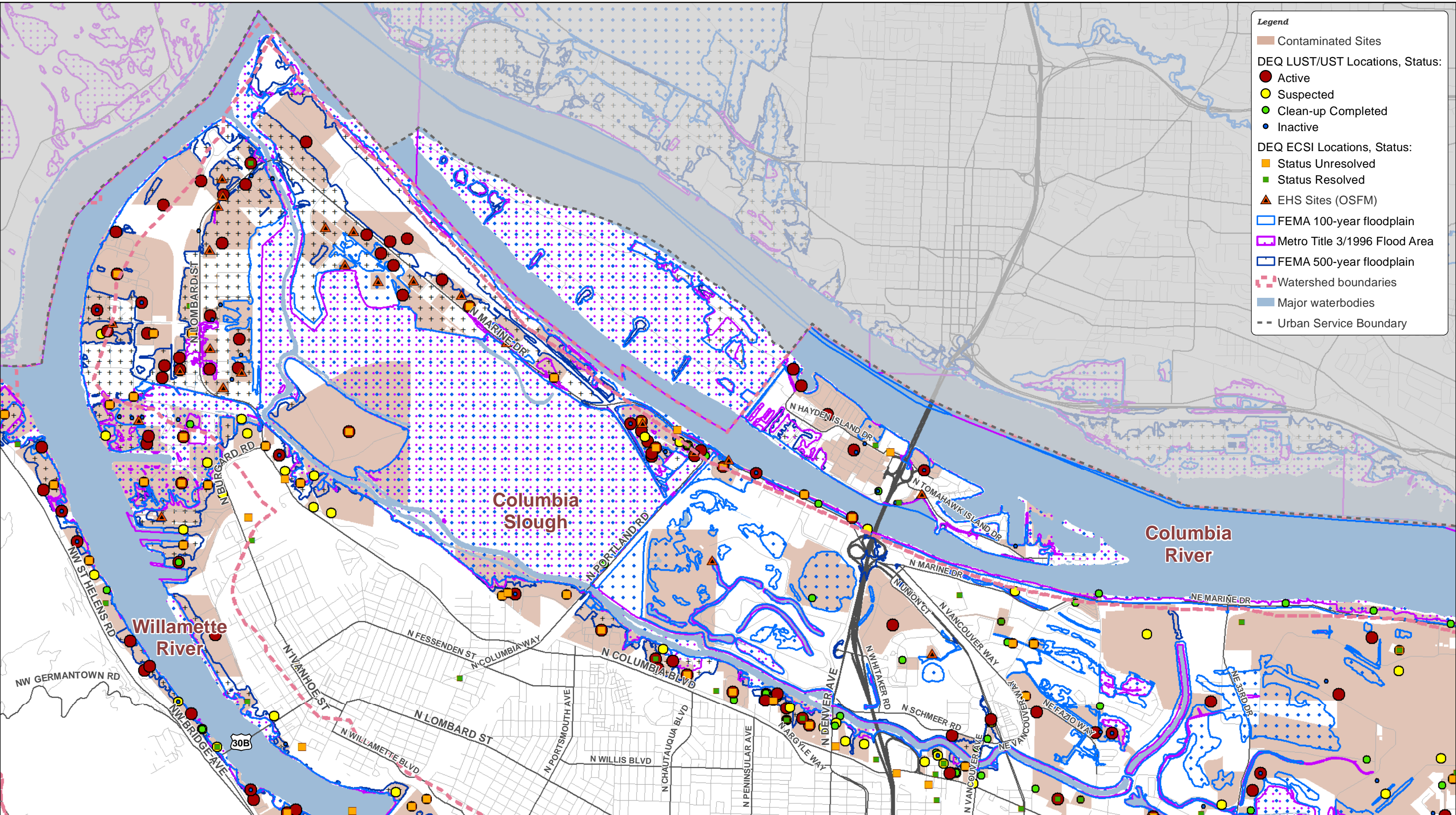
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FEMA Biological Opinion (BiOp) - Existing Conditions: Hazardous Substance Contamination Sites - Columbia River/Slough Watersheds - West



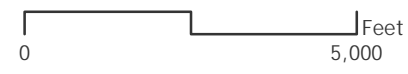
Legend

- Contaminated Sites
- DEQ LUST/UST Locations, Status:
 - Active
 - Suspected
 - Clean-up Completed
 - Inactive
- DEQ ECSI Locations, Status:
 - Status Unresolved
 - Status Resolved
- EHS Sites (OSFM)
- FEMA 100-year floodplain
- Metro Title 3/1996 Flood Area
- FEMA 500-year floodplain
- Watershed boundaries
- Major waterbodies
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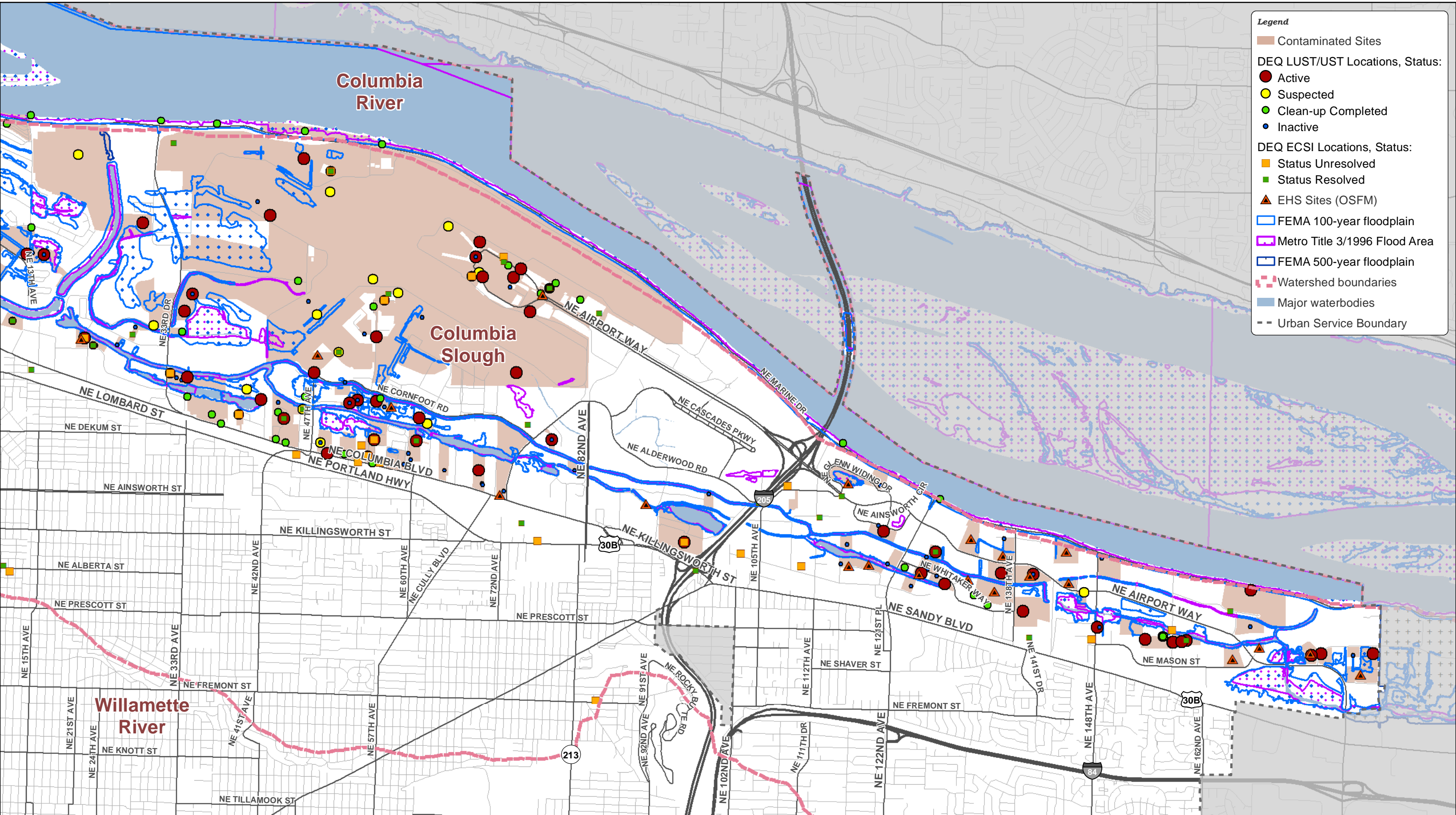


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FEMA Biological Opinion (BiOp) - Existing Conditions: Hazardous Substance Contamination Sites - Columbia River/Slough Watersheds - East



Legend

- Contaminated Sites
- DEQ LUST/UST Locations, Status:
 - Active
 - Suspected
 - Clean-up Completed
 - Inactive
- DEQ ECSI Locations, Status:
 - Status Unresolved
 - Status Resolved
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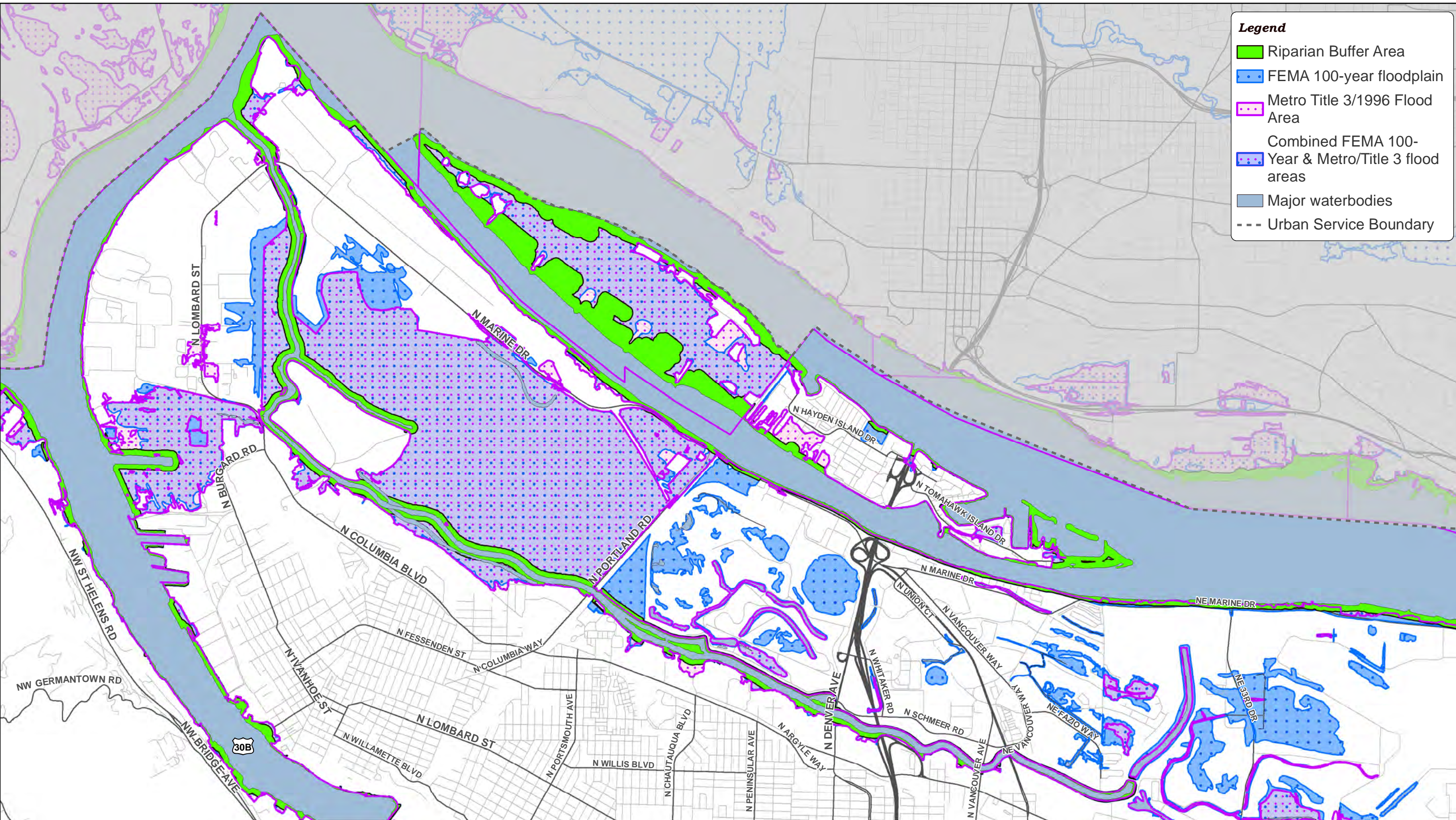
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Legend

- Riparian Buffer Area
- FEMA 100-year floodplain
- Metro Title 3/1996 Flood Area
- Combined FEMA 100-Year & Metro/Title 3 flood areas
- Major waterbodies
- Urban Service Boundary

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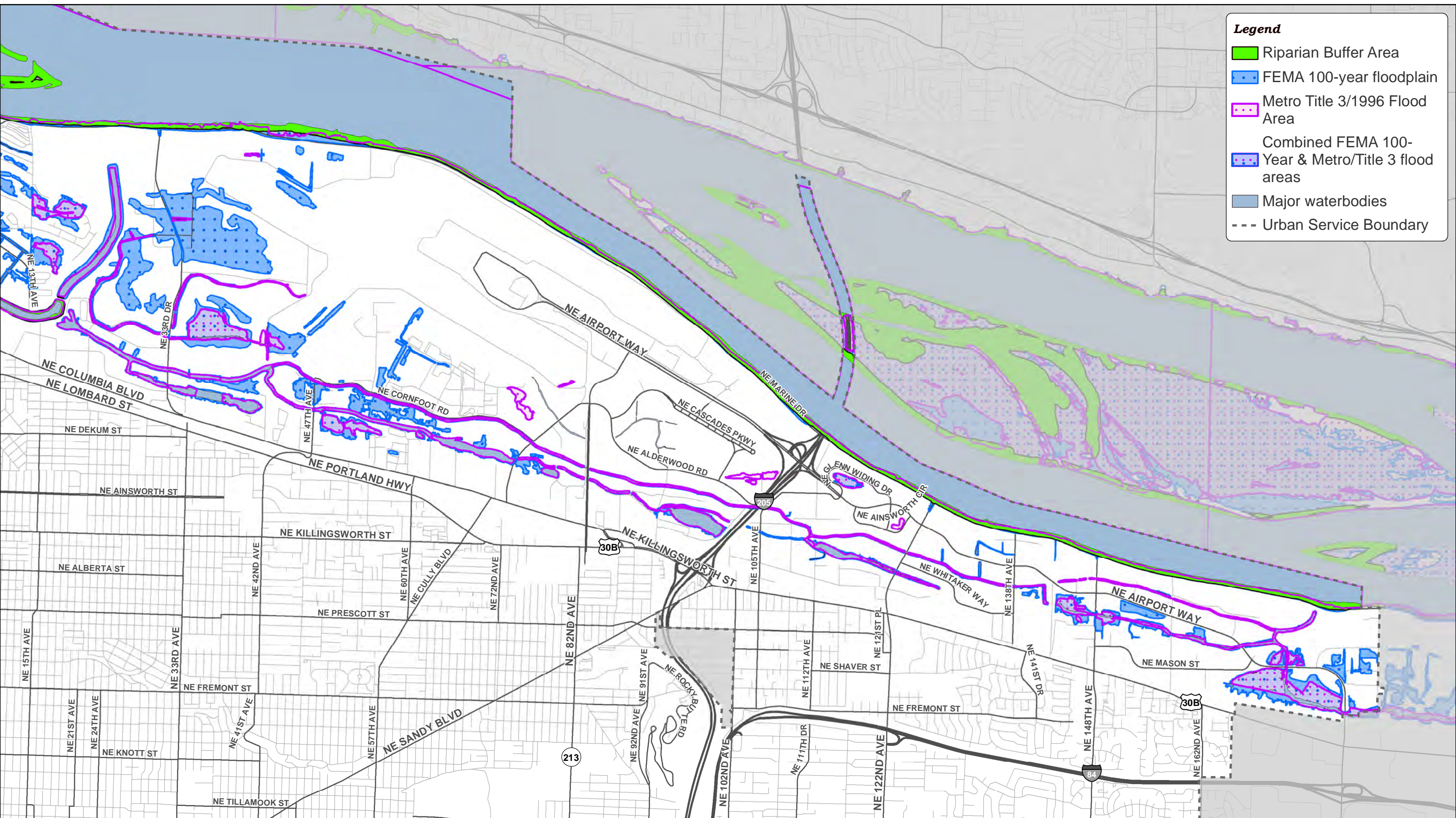
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Legend

- Riparian Buffer Area
- FEMA 100-year floodplain
- Metro Title 3/1996 Flood Area
- Combined FEMA 100-Year & Metro/Title 3 flood areas
- Major waterbodies
- Urban Service Boundary

August 19, 2021

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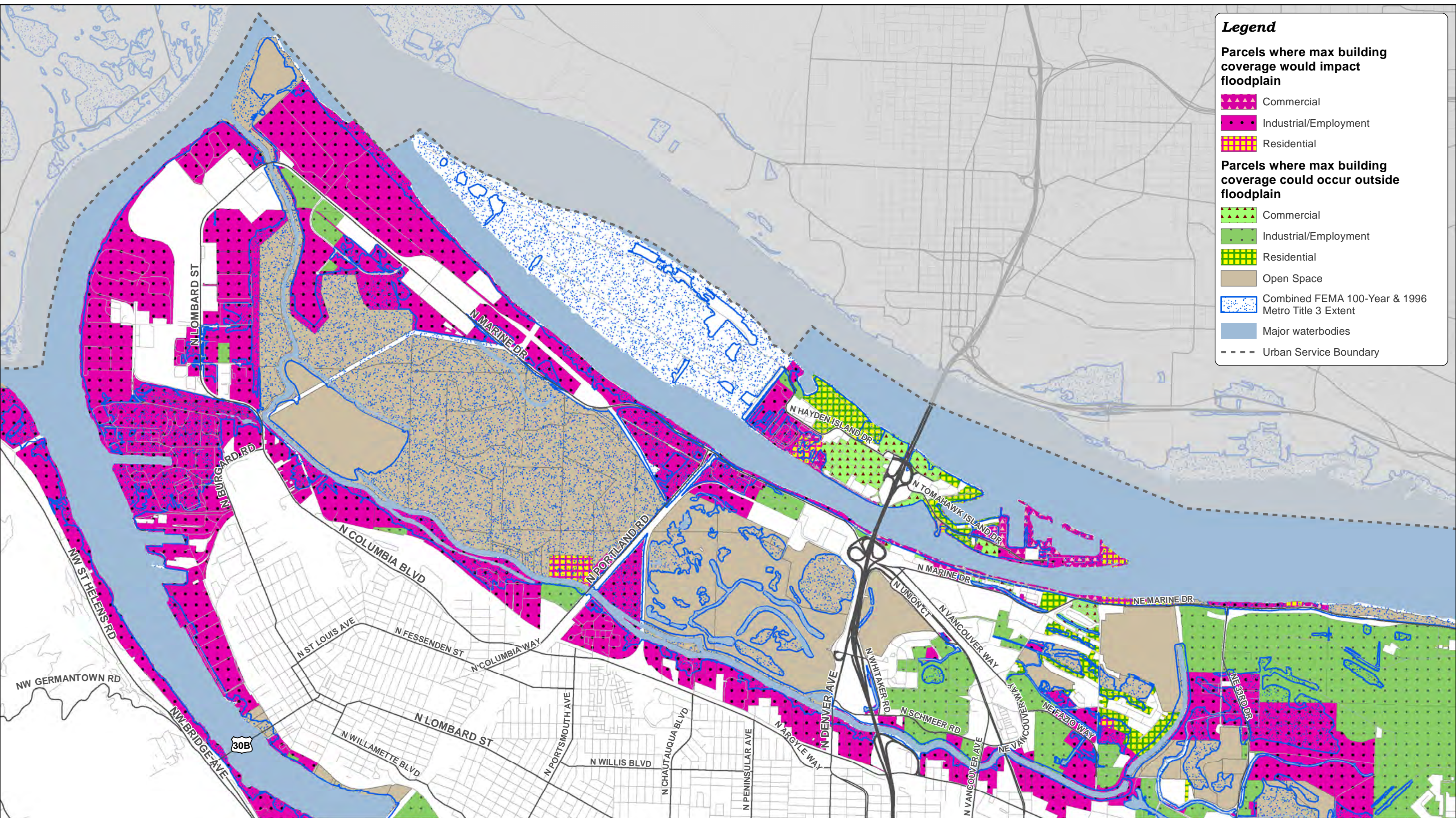
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Legend

Parcels where max building coverage would impact floodplain

- Commercial
- Industrial/Employment
- Residential

Parcels where max building coverage could occur outside floodplain

- Commercial
- Industrial/Employment
- Residential
- Open Space

Combined FEMA 100-Year & 1996 Metro Title 3 Extent

Major waterbodies

Urban Service Boundary

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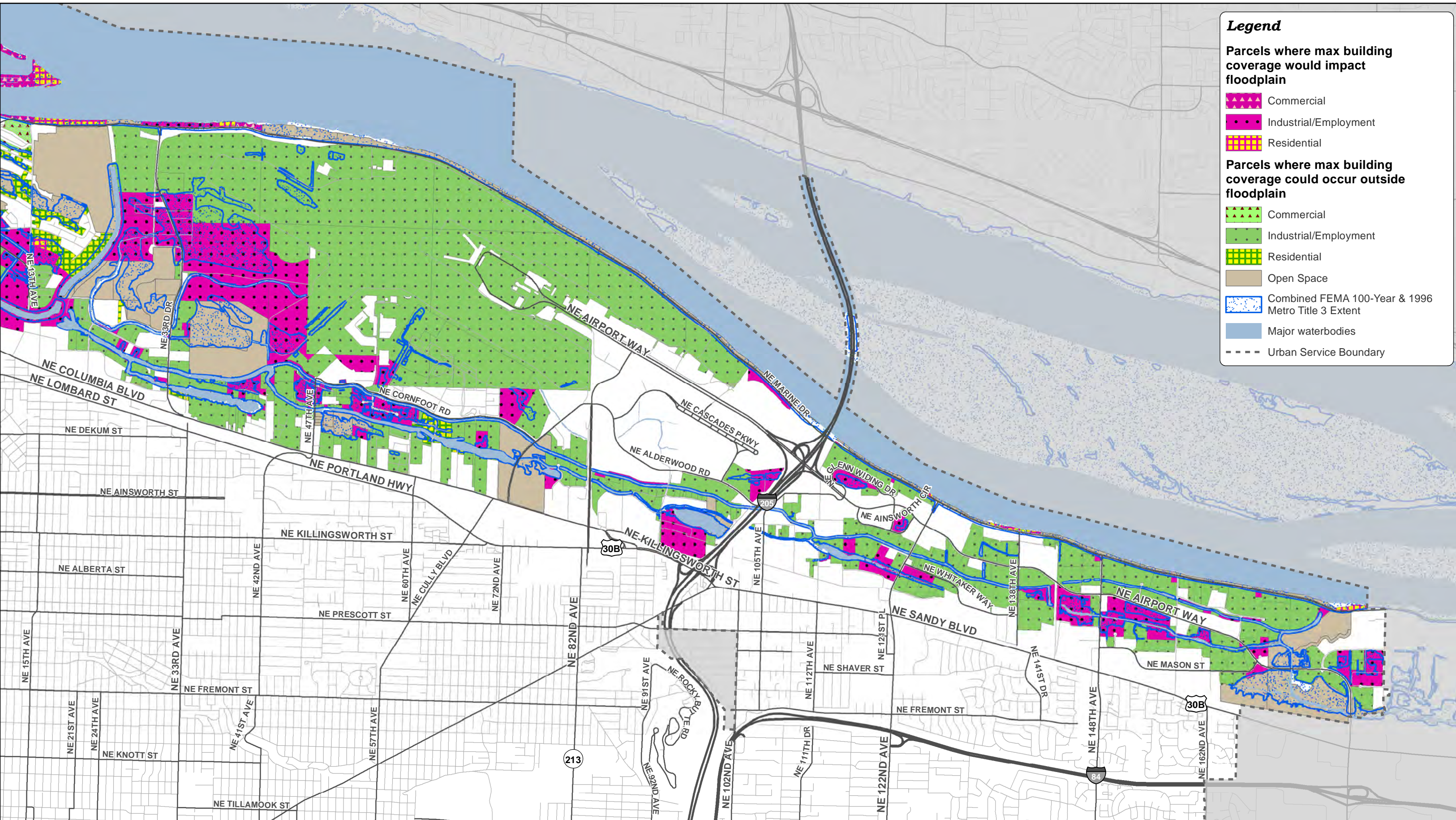
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Legend

Parcels where max building coverage would impact floodplain

- Commercial (Pink triangles)
- Industrial/Employment (Pink dots)
- Residential (Yellow squares)

Parcels where max building coverage could occur outside floodplain

- Commercial (Light green triangles)
- Industrial/Employment (Light green dots)
- Residential (Light green squares)
- Open Space (Brown)

Combined FEMA 100-Year & 1996 Metro Title 3 Extent (Blue wavy lines)

Major waterbodies (Blue)

Urban Service Boundary (Dashed line)

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